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Key inventory control system: A team project

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Key Inventory Control System
A Team Project

by
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As a computer scientist moves from a school environment to a work environment, a difference in the size of and approach to solving programming needs will be observed. As the size of a program grows, it becomes increasingly difficult for one person to comprehend the whole picture. Many companies are turning to a group or team approach to solve these types of problems. To gain experience in solving a problem with a team approach, this programming project was done with a strict division of the system into two subsystems, and an exchange of tasks throughout.

The Key Inventory Control System was a program requested by the University of Montana Physical Plant. It was felt that computerization would improve the key inventory control situation. The system subdivided nicely into two subsystems. The front office system maintained records of all persons possessing a given key, the deposits received, keys issued to an individual and deposit refunds. The locksmith system was responsible for maintaining records of key numbers currently in use, those available for use, those retired, and the length of retirement.

The Waterfall Method of designing software systems was used. This method partitions the problem into phases, each having a deliverable and a verification or validation process. As each phase of the project was completed, the documentation was exchanged and each individual on the project then continued the next phase by working with the team member's documentation on the other subsystem.

Although this method of approaching a programming problem is more time consuming, the end product was more thoroughly tested, was more bug-free, and was better documented than other projects that the author has been involved with.

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Introduction

Purpose

As we progress from the academic environment to the work environment, we will notice and must adapt to the differences that we encounter. The academic process of educating oneself in the field of Computer Science often is limited to the confines of the scholastic world. Familiarity with 'real-world' situations is a great asset to students graduating and moving into the work environment.

The purpose of this thesis, was two-fold. One purpose was to establish and verify that knowledge of the principles taught during the graduate level of study had been learned, and more importantly, could be applied. A second purpose was to choose a substantial programming project that was as close to a real world situation as was possible. Although the scope of this project was necessarily limited, due to time and manpower constraints, it was felt that this project was valuable in meeting this criteria as a close approximation of a real-world situation where the end product must meet the needs of the user.

Justification

The rationale in choosing this project and structuring it as a team effort was based upon meeting the following criteria:

1. It would provide graduate students with an opportunity to work on a team project defined by an outside group. This will generally be the method of producing a system in future career situations.

2. It would allow for rigorous and impartial testing, as functions, procedures, subsystems, etc. could be tested by the other member of the team, who would not be personally 'attached' to the code. This will provide for a more reliable and bug-free program for the Physical Plant. Because this system will provide for the security of the entire University, it's correct operation is essential.

3. It would provide a cross-check on validation of the stages involved with the life-cycle of the system to ensure the writing of the 'right' program. In other words, it will establish that the program will perform according to the specifications set down in the requirements document.

4. It would provide for a cross-check on verifi-

cation of the stages involved with the life-cycle of the system to ensure that the program is written correctly, so that all functions operate as intended in the design document, and that there are no unintentional side effects.

5. It would provide assurance of program sufficiency for the user. Because cross-checks can be performed at various points within the life-cycle of the project, precision, depth of work and detail in each phase can be expected, leading to better assurance of user satisfaction with the system. Furthermore, complete, detailed and correct documentation will be a result of periodic review by someone besides the author of the documentation. Finally, a more rigorous approach to the life-cycle will produce a product which is easily maintainable in the future.

6. Specific division of labor. The structure of the problem is such that there are two major areas to be addressed. These are the locksmith functions and the record-keeping, or front office procedures. With this dichotomy, each team member may work on a discrete portion of the project in the development phase with the added advantage of cross-checking at validation and

verification checkpoints.

Purpose

We expected that a project structured as a team effort would consume more time than one done individually, or as a group effort. Not only are the lines of communication increased, but additional time must be spent in acquainting oneself with the author's intentions within the current working document. However, it is also expected that a more thorough, well designed, and well documented program would be the result of the interaction. Another result of the team effort would be a greater awareness of the problems, inconsistencies, and areas that were overlooked, as questions were posed from one team member to another.

Method

Problem Description

A brief description will be given here to aid the reader in understanding the problem as it existed, and the proposed areas of solution. For further descriptions, the reader is referred to the Appendixes. Appendix A contains a copy of the proposal submitted to the Physical Plant, which describes in detail the current manual system. Appendix C, the Requirements and Specification Document presents a thorough description of the proposed project and the areas of automation.

Current Procedures

There are two major divisions within the current key inventory control system. The first is the actual locksmith operation, in which not only are keys made, but records are kept of which keys open which locks. The locksmith must maintain records of key numbers currently in use, those available for use, those retired, and the length of retirement. Furthermore, an inventory must be maintained of key blanks and other lock components. Presently, the locksmith is notified as particular keys are disbursed and supplies are depleted, thereby necessitating their duplication.

The second major portion of the key inventory system is key issue control. Records must be kept of all persons possessing a given key, the deposits received, keys issued to an individual, keys returned by an individual and deposit refunds. Although the procedure for this is relatively straightforward, the amount of information that must be processed is quite extensive. Accuracy is essential for university security. The only account of key distribution is maintained by this office.

Recently, an unofficial audit was performed by State of Montana auditors on the key inventory control system, which suggested improvements might be in order. Because of the large number of keys involved, it has become extremely difficult and tedious to perform manual searches of records for desired information. Furthermore, much valuable employee time is consumed in this process. With the amount of transactions performed daily in the office, the possibility of an error exists. In addition, prompt service is often requested and may not be possible due to the current manual system.

Proposed Key Inventory Control System

The following subsystems are components of the key inventory system, listed in order of decreasing importance.

1. The database would include files containing information on what keys an individual had been issued, which individual had a particular key, which keys open what doors, what keys belong to a building, and how long a key has been out.

2. Deposit accounting would trace the deposits entering the system and the refund of deposits after the return of a key.

3. The proposed system would interface with current administrative programs. An interface with personnel and registration is possible to allow for tracking of keys when an employee, staff, student, or instructor, with a key leaves the university. Furthermore, this interface will provide additional information to the Physical Plant which is not currently available. Cross-referencing of social security numbers stored in these files will enable the Physical Plant to maintain databases of a smaller size.

4. Information security, would provide for restricted access to the key inventory system. Accessibility of information within different parts of the system would be limited.

5. Correspondence generation, to provide for an automatic generation of form letters requesting the return of keys prior to graduation, or termination, etc.

6. Report generation, to provide for an automatic generation of reports which include such information as a list of all the keys individuals have issued to them, a list of what keys open which doors, or a list of all retired keys.

7. Key inventory control system, to provide instantaneous information regarding the number of any one key available to be issued, the number of individual keys, and the number of duplications to be made.

8. Bit pattern generation of numbers available to use for rekeying a lock, providing a number for the lock which would be compatable with the master keys opening the lock in question. This generation of numbers would also take into account any numbers which

are on the retired list, and requirements concerning bit cuts.

9. A rekey history would provide a means for tracing the history of a lock which was rekeyed.

10. A parts inventory control, which would maintain a count of all key blanks for each keyway. Yearly, an inventory re-order list would be generated.

Dual Authorship

As was previously mentioned, one of the requirements of a project to be considered as a candidate for a thesis was that it needed to be as close an approximation of a 'real world' system as possible and a system that would be used within the operation of an organization. In the work environment, it is clear that it is very probable that most projects to be undertaken are of a magnitude greater than the capacity of one individual to undertake. It is also possible that due to the structure of the organization where one becomes employed, an individual may not have the opportunity to follow one project completely from initiation to completion.

Therefore, quite a useful experience to undergo would be a team project where there is strict delineation of tasks. Each individual would be responsible for specific individual tasks corresponding to separate phases throughout the software life-cycle. It was believed that this project would be an appropriate one for this type of a study consisting of two individuals. The persons involved were myself and Michele Miley, co-author of the system.

Exchange of Tasks

The project lent itself readily to the exchange and delineation of tasks. The methodology employed to generate the entire system is the Waterfall Method, put forth by B. Boehm in "Software Engineering Economics". The reader is referred to his book for a more detailed discussion of this method. This is a well thought-of methodology consisting of specific steps, each step having an end product, or deliverable, and a verification or validation process. A copy of each deliverable for each phase has been attached to this document and the reader is referred to the Appendix for further reading. The following steps comprise the Software Life Cycle Waterfall Method through the implementation phase.

1. Feasibility - defining a preferred concept for the software product, and determining its feasibility and superiority to alternative concepts.

2. Requirements - a complete validated specification of the required functions, interfaces, and performance for the software product.

3. Product Design - a complete verified specification of the overall hardware-software architecture, control structure, and data structures for the product, with draft user's manuals and test plans.

4. Detailed Design - a complete verified specification of the control structure, data structures, interface relations, algorithms, etc., of each program component.

5. Coding - a complete, verified set of program components.

6. Integration - a properly functioning software product composed of the software components.

7. Implementation - a fully functioning operational hardware-software system, including such objectives as program and data conversion, installation, and training.

The only change made to this process was to combine the high-level product design and the low-level detailed design phase into one deliverable. This change was considered appropriate because the system under construction was not large enough to warrant two levels of design. It was felt that this would be an unnecessary duplication of effort.

The chart presented below shows the various steps of the Waterfall method and who was reponsible for specific tasks.

[2]

	Locksmith Function	Front Office Function
Proposal	both	both
Feasibility	both	both
Requirements	Michele	Robin
Design	Robin	Michele
Coding (unit testing)	Michele	Robin
Testing (integration)	Robin	Michele

As can be seen, the purpose of the exchange of tasks was to provide each individual with the opportunity to do specific tasks throughout the life-cycle, without following the same function in its entirety.

As was mentioned previously, the Key Inventory System divided nicely into two unique subsystems which interfaced only through files. An arbitrary decision was made to determine how the initial assignment was to be made. Following that, a switch on the subsystem was made at each baseline. As the author did the Requirements for the Front Office System, Michele then took those Requirements and generated a Design following the specifications that had been laid down. The author then took her design and coded that portion of the entire system. She then did the final testing on the author's coded modules. Obviously, the opposite situation occurred on the Locksmith portion of the Key Inventory System.

Great care was taken to maintain this separation. No assumptions were made by either of us as to what the author of our current working document intended. All questions and specifically doubts and/or any changes, were thoroughly discussed with the author prior to making any decisions.

Results

Problems Encountered

Not many problems were encountered. Only one problem could be specifically blamed on the methodology, in that the team effort appeared to be more time consuming than an individual or group effort. The other problems encountered were derived from a different source.

There were times when the proposed design was not amenable to the language chosen and changes in process descriptions needed to be made. I believe that more valuable time was spent here than would have been using another methodology. The coder needed to fully understand the intent of the designer prior to restructuring the process to fit the language, or proposing a change to the author. It was also a standard between both of us, that the author should be contacted and the situation fully explained, should any questions arise and prior to making anything more than a minor change in the process descriptions. Had we not split the system into two halves, this would not have occurred.

The completed project follows the structure of the design entirely. Only one change had to be made in the design during coding and implementation. This problem arose with the proverbial user question "But, can it do this?". To add the requested functions would have required additional modules and a rather convoluted design. A redesign took place, resulting in a simpler, more elegant solution. In all other cases, the design was followed and no problems were encountered in coding from another's design.

The user interface was not dealt with to the extent that it should have been during the Requirements and Specification phase. Once the system was delivered to them, under a trial basis, many items were brought up, necessitating time spent recoding existing modules. The user interface needs to be specified down to the level that will affect the structure of the system. A minor modification to a module is not as time consuming as a re-structuring of the modules within a function. The time spent working with the user at this level is well worth the trade-off in less time spent on re-structuring the delivered system. Although some of the detailed lower level interface specifications cannot be extracted from the user until they have a trial system available to them, most of these changes require only minor adjustments to the existing code. To attempt to make these decisions prior to delivering a trial system would require too much time explaining details.

The file interface was not specified as much as it could have been. When interfacing with existing files and/or software, more time should be spent in determining structures and interface parameters. Time was spent in coding modules, only to find out the that structure of the file was not as expected and more time was spent re-coding modules and functions.

The last major problem encountered resulted not from the method used, but from an unexpected source. One of the benefits of the resulting system would be access of the program to existing university files containing information on students and personnel. By accessing these files, the Physical Plant would not only need to store less information in their own data files, but would have access to more information than they currently store in their paper files. However, progress was not as smooth as was expected, and program modules that were expected to work, simply did not. After endless hours of consultation with the Computer Center personnel, the conclusion was finally reached that because the files were stored in a different format from the text files we had been using elsewhere, the commands that were expected to work, did not.

After talking to the Software House responsible for the software package, the conclusion was reached that a bonafide 'bug' had been found. We have written the program under the assumption that the files will be converted to the format where these programming constructs will work properly.

Benefits

Benefits from this project, I believe, were numerous and stemmed not only from the division of labor concept, but also because the system being built dealt with a "real" user and had a great deal of user interface to contend with. I feel that this added complication created a much more viable project. Many of the benefits and added knowledge would not have presented themselves had there not been considerable user interface to be specified individually.

It was good experience to work from someone else's documents, especially the design document. In coding from another design, one can more easily accept the fact that there are many different, but equally as good ways of visualizing a problem and the process necessary to solve it. As one gains more experience in Computer Science, I believe an individual develops their own style. This is only natural, but leads to the feeling that your way is the only way. By coding from another design, one gets a greater appreciation for the variation in solutions to any one problem and a greater faith in another's ability to solve problems.

By working from someone else's design, I now have a much better knowledge of how much and how little to specify in a working design document. Questions that I would have in coding from another's design would allow me to reflect on how I had designed my half. There were instances where I had over-specified, leaving nothing creative for the coder to do, and other areas where I had not specified completely enough. I, specifically, had a tendency to overspecify the actual pseudo-code, and not be complete enough with the control flags necessary to indicate paths of execution.

A greater awareness of the need to further specify the high level user interface was gained. As the time came to separate and begin the design of the individual subsystems, using requirements laid out by the other team member, it became apparent that the high level interfaces between the two systems needed to be specified before either one of us could begin to design our portion. Often the user interface has been ignored until coding actually begins, but with the division of tasks as we had, it was quite apparent that the user interface needed to be looked into much earlier in the life cycle.

Standardization of user interface on this type of project is essential. This is typically not addressed until the user manual is written. However, during integration, we became aware that, although the system ran and integration had been successful, the user interface looked sloppy. Different prompts were being used, and different feedback was being directed at the user. To create a good looking and a properly executing system, these items needed to be addressed before undertaking coding. As it was, several man-days of time were wasted in re-doing the existing code, to standardize the low-level user interfaces.

Lastly, along the same lines, I can see where much more time needs to be spent with the potential users. These users should be the ones who will be actually using the system, not the managers who have requested it. A prototype of the user interface would be nice, although not always practical. However, it is much less practical to deliver a finished system, only to have the user ask "Could it do this?", or "Why doesn't it do this". A lot of time can be spent in fixing little items which will make it much more usable by the end user, but were not thought of at the time, by the high level manager who only requested the system, or the designer who will not be dealing with it on a daily basis.

Discussion

Throughout the phases of this project, strict adherence was observed to the ground rules set down at the initiation of the project regarding individual tasks. Also, as previously mentioned, all questions were presented to the other team member as they arose and no assumptions were made. An attempt was made to create an atmosphere that was as close to a 'real world' work environment as was possible. Because of this, I believe the project was a success. I do feel that it took a greater amount of time and effort as a team project, than as either an individual effort or a group project. More time must be spend in consultation with the author's of the current working document to fully understand their intentions.

However, I also am firmly convinced that the final product, including all the documentation is more complete, more accurate, and the program more thoroughly tested than would otherwise have been under other circumstances. With the exchange of effort throughout the life cycle phases, no individual was 'attached' to his code. this tendency as been mentioned and described by Boehn[1], Myers[7], and DeMarco[3]. It became possible to look at the product in a more detached frame of mind and the individual was more open to suggestions. Also, because of this exchange of tasks, there were no assumptions made, and as a question or ambiguity arose, the subject was thoroughly discussed. In this manner, more problems were recognized sooner and a solution arrived at in a timely manner, thereby increasing the validity of the end product. However, I believe that the structure of this project may have enhanced this type of approach. Because the two subsystems interfaced only through files, and not through data, not as much time needed to be spent specifying the interfaces and work was done individually with no need to collaborate.

Because of the use of the Waterfall Method, which divides the process into specific tasks, delineation of individual portions was not difficult. This may not always be possible. Also, as an individual switched back and forth between the Front Office System and the Locksmith System, some knowledge of the entire system was obtained. This may have provided the individual with an advantaged that would not always be present. If an individual with no prior knowledge of the project, is handed a document to continue work upon, the process may not go as smoothly.

I am of the opinion that this project was as successful as it was, for one other very important reason. In this situation, both individuals were able to choose their team member. This choice was based upon knowledge of the others 'computing skills', i.e. an ability to competently design, code and test in whatever language was chosen. Also important was confidence in the other's commitment to a quality project, and their willingness to meet deadlines and do their fair share. Without this knowledge, I don't think the project would have been quite so successful. In a job situation, where group and team members are chosen by the management, problems relating to these types of concerns are unavoidable. However, should an individual be either in job situation where there is an opportunity to choose a team member, or perhaps in a situation where a partnership is being considered to create a privately owned business, these qualities and commitments need to be inherent for an endeavor to succeed.

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THESIS PROPOSAL:

KEY INVENTORY CONTROL

by

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Michele Miley

April 4, 1985

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Introduction

Prior to the commencement of effort involved with a major undertaking such as a thesis project, clarification of the problem is attained through the written proposal. The purpose of this document is, therefore, to provide a general understanding of the problem as it exists, an overview of the scope of possible solutions, and a rationale for resolution. This proposal is prepared as a preliminary step toward the completion of a master's thesis project for the Department of Computer Science within the University of Montana.

The project under consideration has been requested by the University of Montana Physical Plant, the department responsible for campus security and maintenance. The need for an improved key inventory control system is recognized as a priority within the Physical Plant and by the State of Montana auditors. It was suggested that computerization would meet this need.

Current System Description

There are two major divisions within the current key inventory control system. The first is the actual locksmith operation, in which not only are keys made, but records are kept of which keys open which locks. There are approximately 7000 locks on campus, including both door locks and padlocks. All types of locks are referred to as cylinders. Keys are sorted into four levels. The lowest level of key is a change key (CK) which will open at most only a few doors. The next level is the master key (M) which opens several doors. There are various kinds of master keys, such as those issued for faculty, staff, or departmental specialty. Above the master key is the grand master (GM) which may open all locks in an entire building and is issued for the most part to custodial staff. The highest level is the great grand master (GG). This key is not an issue key, and is distributed exclusively to maintenance and security personnel. It has the capability of opening all cylinders in several buildings. Currently, there are 18 of these, but it is hoped that the number be reduced to 8 to 10 in the future.

Each key has two numbers on it, the first corresponding to the keyway, and the second reflecting the cut or bit numbers. The keyway refers to the slots on the side of the key, whereas the bit numbers refer to the actual cylinder arrangements of the lock which the key is cut for. The keyway prefix is given with each key blank, whereas the bit number is not stamped until the bit cut has been made. There are six points to each key where a bit cut may be made. On at least one cut per key, there must be a minimum of two bits difference from any other key. When a lock is rekeyed, the old key is retired for one year, prior to reuse.

The locksmith must maintain records of key numbers currently in use, those available for use, those retired, and the length of retirement. Furthermore, an inventory must be maintained of key blanks and other lock components. Presently, the locksmith is notified as particular keys are disbursed and supplies are depleted, thereby necessitating their duplication.

The second major portion of the key inventory system is key issue control. Records must be kept of all persons possessing a given key, the deposits received, keys issued to an individual, keys returned by an individual and deposit refunds. Although the procedure for this is relatively straightforward, the amount of information that must be processed is quite extensive. Accuracy is essential for university security. The only account of key distribution is maintained by this office.

Problems With The Current System

Recently, an unofficial audit was performed by State of Montana auditors on the key inventory control system, which suggested improvements might be in order. Because of the large number of keys involved, it has become extremely difficult and tedious to perform manual searches of records for desired information. Furthermore, much valuable employee time is consumed in this process. With the amount of transactions performed daily in the office, the possibility of an error exists. In addition, prompt service is often requested and may not be possible due to the current manual system.

Two factors contribute to the cost of the current system. One previously discussed, is that of employee time spent manually searching records. The second is the cost incurred when a key is not recovered. The cost of rekeying a building due to the loss of a grand master may easily approach

$20,000. Should a great grand master be lost, the cost would be phenomenal. With current procedures, recovery of keys is not always possible as people leave the university system.

Proposed Areas of Solution

It is proposed that a computerized system would address the following areas:

1. A key inventory control system, to provide instantaneous information regarding the number of any one key available to be issued, the number of those keys already issued, a threshold number for ordering the duplication of individual keys, and the number of duplications to be made.

2. A parts inventory control, which would maintain a count of all key blanks for each keyway. Yearly, an inventory re-order list would be generated. In addition, a count of lock components would also be maintained.

3. Bit pattern generation, of numbers available to use for any one lock, providing a number for the lock which would be compatible with the master keys opening the lock in question. This generation of numbers would also take into account any numbers which are on the retired list, and requirements concerning bit cuts.

4. A rekey history would provide a means for tracing the history of a lock which was rekeyed.

5. Database information would include files containing information on what keys an individual is issued, which individuals had a particular key, what keys open what doors, what keys belong to a building, what keys (or doors) a master key would open, and how long a key has been out.

6. Deposit accounting would trace the deposits entering the system and the refund of deposits after the return of a key.

7. Expenditure accounting would provide the department with a trace of expenditures on inventory and other aspects of the system.

8. Interface with current administrative programs. An interface with payroll is possible to allow for tracking of keys when an employee, staff or instructor, with a key leaves the university. Furthermore, an interface with the registrars office would provide lists of those persons graduating, to cross-reference with outstanding keys.

9. Correspondence generation, to provide for an automatic generation of form letters requesting the return of keys prior to graduation, or summer break, etc.

10. Information security, providing for restricted access to the key inventory system. Accessibility of information within different parts of the system would be limited.

Justification

Due to the nature of this project, involving the security of the university, a complete and thorough job of the entire life cycle is indicated. The size of the project, items requested, and the expectation of a system that is operational, thoroughly tested, and complete with detailed documentation and a user´s manual indicate that the project could be allocated to two people.

The following reasons are presented for working on this project as a team:

1. A well written, documented system meeting the needs and requirements of the Physical Plant, as has been requested, would enhance relations between the computer science department and other departments involved.

2. Provides graduate students an opportunity to work on a team project, defined by an outside

group. This will generally be the method of producing a system in future career situations.

3. Provides for rigorous and impartial testing, as functions, procedures, subsystems, etc. can be tested by the other member of the team, who is not personally ´attached´ to the code. This will provide for a more reliable and bug-free program for the Physical Plant. Because this system will provide for the security of the entire University, it´s correct operation is essential.

4. Provides a cross-check on validation of the stages involved with the life-cycle of the system to ensure the writing of the ´right´ program.

5. Cross-check on verification of the stages involved with the life-cycle of the system to ensure writing the program correctly.

6. Assurance of program sufficiency for the user. Because cross-checks can be performed at

various points within the life-cycle of the project, precision and depth of work in each phase can be expected, leading to better assurance of user satisfaction with the system. Furthermore, complete, detailed and correct documentation will be a result of periodic review by someone besides the author of the documentation. Finally, the more rigorous approach to the life-cycle will produce a product which is easily maintainable in the future.

7. Required effort estimation. There are ten proposed areas of solution to the problem, and each represents a separate program. At an average of 500 lines per program, this produces an overall estimate of 5,000 lines of code at completion. Using formulas as discussed in the COCOMO model of estimation, this yields 13 man-months of work, with a time for development of 6.6 months, and an average of 2 full time persons working on the project. The formulas are as follows:

$$\begin{array}{ll} MM = 2.4(KDSI)^{1.05} & 13MM = 2.4(5000)^{1.05} \\ TDEV = 2.5(MM)^{0.38} & 6.6TDEV = 2.5(13)^{0.38} \\ FSP = MM/TDEV & 2FSP = 13/6.6 \end{array}$$

8. Specific division of labor. The structure of the problem is such that there are two major areas to be addressed. These are the locksmith function areas and the record-keeping, or front office procedures. With this dichotomy, each team member may work on a discrete portion of the project in the development phase with the added advantage of cross-checking at validation and verification checkpoints.

Conclusion

In conclusion, several major points stand out from the foregoing discussion as being particularly important in the proposed project. First of all is the critical nature of the problem. Since campus security depends upon the correct and complete resolution of the problem, care must be taken to provide appropriate and thorough solutions. This can be provided via a joint effort and system of cross-checks throughout the development of the system. Second, as demonstrated by the COCOMO model of estimation, the amount of labor required is sufficient to justify the work contribution of two persons. And finally, a commitment to complete the project and produce a fully documented and tested system to be used by the Physical Plant by August, 1985, requires that enough manpower be provided to ensure successful conclusion of the project.

FEASIBILITY STUDY:

KEY INVENTORY CONTROL

by

Michele Miley

Robin Fauntleroy

April 29, 1985

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Introduction

Some purposes for the completion of a feasibility study are to determine whether there is a new way of doing business that justifies the expense of a project, and to document the parameters that would govern such a project. The development of the feasibility document also benefits the user in that it will determine if the system specified can be implemented within given constraints, assures that the project the user wants will be developed within the forementioned constraints, and assures that the user and developer have the same time and cost expectations. Furthermore, it will determine if time, money and other resources are adequately available to complete a given project and provide a milestone from which the next phase of the software life cycle may proceed. Finally, some of the purposes are to determine whether the objectives stated in the proposal are attainable, and if not, what constraints must be removed, to define the major problems existing so that the systems analyst can plan his strategy for the full investigation, to define the areas where potential exists for making savings of money time or effort, and to decide if specialists will be needed to render assistance in the full investigation.

In summary, the feasibility study is an integral part of the production of a viable software product. If researched thoroughly, the conclusions reached will serve as a framework for future stages in system development.

A proposal was submitted, April 4, 1985, to involved parties, outlining the keys inventory control project under consideration. This document is a feasibility study of that system containing possible alternative solutions, evaluation of those alternatives, and recommendations.

Management Summary and Recommendations

Based on the following discussion, it is the recommendation of this study that the first alternative discussed, that of implementing the entire system on the DEC 2065 is the most feasible solution. Although some of the assumptions made concerning the TRS 80 may be realized at a future date, current conditions are such that a decision should not be based on these assumptions. The adoption of this alternative, of course, is contingent upon approval by the Computer Center. Along the same lines, alternative options discussed which involve the purchase of a microcomputer, assume that the purchase could be approved and made in a timely manner. As these conditions cannot be guaranteed, basing a decision on these assumptions would not be warranted.

In summarizing the reasons for recommending this alternative, it has been found that the DEC 2065 provides the most amenable environment for the project development. User access to this system is satisfactory, along with response time, and program interface with administrative systems is feasible. Increased efficiency of key issue control may be realized via this alternative. Furthermore, preliminary estimates of disk space requirements are in a reasonable range.

Current System Description

Overview

The project under consideration has been requested by the University of Montana Physical Plant, the department responsible for campus security and maintenance. The need for an improved key inventory control system is recognized as a priority within the Physical Plant and by the State of Montana auditors. It was suggested that computerization would meet this need.

There are two major divisions within the current key inventory control system. The first is the actual locksmith operation, in which not only are keys made, but records are kept of which keys open which locks. The locksmith must maintain records of key numbers currently in use, those available for use, those retired, and the length of retirement. Furthermore, an inventory must be maintained of key blanks and other lock components. Presently, the locksmith is notified as particular keys are disbursed and supplies are depleted, thereby necessitating their duplication.

The second major portion of the key inventory system is key issue control. Records must be kept of all persons possessing a given key, the deposits received, keys issued to an individual, keys returned by an individual and deposit refunds. Although the procedure for this is relatively straightforward, the amount of information that must be processed is quite extensive. Accuracy is essential for university security. The only account of key distribution is maintained by this office.

Recently, an unofficial audit was performed by State of Montana auditors on the key inventory control system, which suggested improvements might be in order. Because of the large number of keys involved, it has become extremely difficult and tedious to perform manual searches of records for desired information. Furthermore, much valuable employee time is consumed in this process. With the amount of transactions performed daily in the office, the possibility of an error exists. In addition, prompt service is often requested and may not be possible due to the current manual system.

Constraints

The major constraint foreseen for the project concerns available hardware. Currently there are two machines feasible for consideration. These are the DEC 2065 and a TRS 80 previously purchased by the University of Montana Physical Plant. It is possible that a hardware purchase will be made in the future, however, not necessarily in time to host the key inventory system. Included here, is a study of several micro computers on the market today, which could sufficiently contain the key inventory system.

Furthermore, response time to user requests is required within a reasonable amount of time. It must be faster and more efficient than the current manual lookup system. Sufficient storage must be provided to accommodate the amount of data necessary on-line, and off-line storage must be available for audit and security purposes.

Prioritized Subsystems

The following subsystems are components of the key inventory system, as previously listed in the project proposal. They are listed in order of decreasing importance.

1. The database information would include files containing information on what keys an individual is issued, which individual had a particular key, what keys open what doors, what keys belong to a building, what locks (or doors) a master key would open, and how long a key has been out.

2. Deposit accounting would trace the deposits entering the system and the refund of deposits after the return of a key.

3. Interface with current administrative programs. An interface with payroll is possible to allow for tracking of keys when an employee, staff, or instructor, with a key leaves the university. Furthermore, an interface with the registrars office would provide lists of those persons graduating, to cross reference with outstanding keys.

4. Information security, providing for restricted access to the key inventory system. Accessibility of information within different parts of the system would be limited.

5. Correspondence generation, to provide for an automatic generation of form letters requesting the return of keys prior to graduation, or summer break, etc.

6. Key inventory control system, to provide instantaneous information regarding the number of any one key available to be issued, the number of those keys already issued, a threshold number for ordering the duplication of individual keys, and the number of duplications to be made.

7. Bit pattern generation of numbers available to use for any one lock, providing a number for the lock which would be compatible with the master keys opening the lock in questions. This generation of numbers would also take into account any numbers which are on the retire list, and requirements concerning bit cuts.

8. A rekey history would provide a means for tracing the history of a lock which was rekeyed.

9. A parts inventory control, which would maintain a count of all key blanks for each keyway. Yearly, an inventory re-order list would be generated. In addition, account of lock components would also be maintained.

10. Expenditure accounting would provide the department with a trace of expenditures on inventory and other aspects of the system.

Alternative Solutions

The two computers available for use are the DEC 2065 and the TRS 80. The DEC 2065 is operated by the University of Montana Computer Center and is the host machine for many of the campus administrative programs. The computer center provides support services for qualifying programs. The TRS 80 is a micro-computer owned by the Physical Plant. It is currently used by several people in that department, however, investigations are being conducted to determine the feasibility of purchasing another microcomputer.

DEC 2065

The project under study is dependent upon extensive data files to which storage and access is necessary. This aspect of the system indicates that a database approach is appropriate. While a database may be constructed in any one of the languages available on the DEC 2065, the amount of effort required to produce such a system would be prohibitive. The DEC 2065 does, however, provide a database manager, 1022, and its associated programming language, PL1022. Furthermore, support for this language is provided by the Computer Center and several of the administrative programs are written in PL1022, making it easier for these programs to be interfaced with each other. Therefore, it is recommended that the 1022 system be used for the current project. The following estimates and figures are based on this assumption.

A preliminary estimate has been made to determine the amount of space necessary to store both the proposed program and its files on the DEC 2065. File structures have been drafted to estimate the space requirements, however, this is not necessarily the final structure of the files. A more detailed study of the system will be required to determine the precise layout.

There are six files needed to store the necessary information in an efficient manner. These are the Name File, Key Id File, Master File, Master Key File, Change Key File, and Parts Inventory File. The fields of these files and the space required for each file is listed below.

Name File:	Field type	# Bytes
Social Security Number	integer	9
Name	text	30
Key Id Number	integer	5
Date Out	date	8
Deposit	integer	4

19,872 records X 52 bytes = 1,033,344 bytes

1,033,344 bytes / 2560 bytes/page = 403 pages

Key Id File:	Field type	# Bytes
Key Identification	text	10
Key Id Number	integer	5

7500 records X 15 bytes = 112,500 bytes

112,500 bytes / 2560 bytes/page = 44 pages

Master File:	Field type	# Bytes
Key Id Number	integer	5
Type	text	1
Number Out	integer	3
Total Number	integer	3
Status	text	1
Date	date	8

7500 records X 21 bytes = 157,500 bytes

157,500 bytes / 2560 bytes/page = 62 pages

Master Key File:	Field type	# Bytes
Key Id Number	integer	5
Building	text	3
Lock/Room	text	4

5000 records X 12 bytes = 60,000 bytes

60,000 bytes / 2560 bytes/page = 25 pages

Change Key File:	Field type	# Bytes
Key Id Number	integer	5
Building	text	3
Lock/Room	text	4

7000 records X 12 bytes = 84,000 bytes

84,000 bytes / 2560 bytes/page = 35 pages

Parts Inventory File:	Field type	# Bytes
Keyway	text	4
Number on Hand	integer	5
Reorder Number	integer	4

30 records X 13 bytes = 390 bytes

390 bytes / 2560 bytes/page = 1 page

In 1022, all fields are stored as text fields, even though treated mathematically as numeric fields. Therefore, space estimates may be determined according to the maximum number of characters a given field will occupy. 2,560 characters may be stored on a disk page. In the format previously listed, the files for the proposed project will require 570 disk pages, while it is estimated that the code itself will need 100 pages. Therefore, the total space required to implement the entire project on the DEC 2065 will be 670 disk pages. Approval of this amount of storage is necessary from the Computer Center, before development can proceed.

Access to the DEC 2065 is possible from the terminals already possessed by the Physical Plant. Furthermore, compatible printers are available in the department. Because of the amount of usage the DEC 2065 is exposed to, a delay in logon access time may occur. Once logged on, however, response time is satisfactory.

An advantage to considering this alternative is that the interface with other administrative programs would be of relative ease. Access to files utilized by other administrative departments would increase the accuracy of information used by the proposed system, by providing missing information. In particular, social security numbers would be accessible, thereby improving the possible return rate of keys. Also, support provided by the Computer Center would allow for future maintenance and enhancements, should these be necessary.

The major disadvantage to utilizing the DEC 2065 is that delays may be unavoidable when logging on. Periodic equipment downtime may occur, however, this is a difficulty encountered with any machine. Of course, maintenance on the DEC 2065 is provided by the Computer Center, whereas, departmentally owned hardware is the responsibility of that department.

VAX 11/785

A second mainframe computer is owned by the University of Montana and maintained by the Computer Center. This is the VAX 11/785. It was recently acquired through student computer fees, and has been installed on the condition that its use will be by students only, and that administrative programs would not be run on it. It is, therefore, not a viable alternative for the current key inventory control system.

TRS 80

As previously mentioned, a 64K TRS 80 microcomputer is located at the Physical Plant. Currently, use of this machine is quite high, however, the possibility exists that a new system will be purchased, thus freeing space on the TRS 80. Database software is available for this system, however, none of these packages are owned by the Physical Plant. The possibility exists for programming a database manager on the TRS 80, but this is outside of the scope of the current project. Therefore, for this system to be feasible on the TRS 80, the purchase of a database package would be required.

Assuming that access difficulties are resolved, and database software becomes available, consideration of this system as a^Hn alternative may be made. A survey of available software reveals that database systems may be purchased with storage capacity from 700 records up to 65,536. These range in price from $200 to $700 and require two to four floppy disk drives, or an external Winchester hard disk drive. There are four floppy disk drives installed on the available TRS 80.

File structure on the TRS 80 would be different from that shown above for the DEC 2065. In this particular configuration, only three files would be necessary, the largest of these containing 19,872 records. The record width would be up to 102 characters wide. Available software will handle records up to a width of 255 characters. The following shows the breakdown of these three files.

Name File:	Field Type	# Bytes
Social Security #	integer	9
Name	text	30
Key Number	integer	5
Date Out	date	8
Deposit	integer	4
Building	text	9
Room/Lock	text	40
Key Type	text	1

19,872 records X 102 bytes = 2,026,944 bytes

2,026,944 / 184K bytes/disk = 11 floppy disks

Master File:	Field Type	# Bytes
Key Id Number	integer	5
Type	text	1
# Out	integer	3
Total #	integer	3
Status	text	1
Date	date	8

7500 records X 21 bytes = 157,500 bytes

157,500 / 184K bytes/disk = 1 floppy disk

Parts File:	Field Type	# Bytes
Keyway	text	4
# on Hand	integer	5
Reorder #	integer	4

30 records X 13 bytes = 390 bytes

390 / 184K bytes/disk = 1 floppy disk

From these figures, it can be seen that, although possible, swapping eleven disks to access the information in one file, may get rather tedious. The purchase of a Winchester Hard Disk would alleviate the problem, however, the cost could approach approximately $2,000.

The major advantages of using the TRS 80 are that security of the key inventory system would be enhanced by limited access. Access would be limited only to in-house users, as opposed to use by the entire university community of the DEC 2065.

The major disadvantages are that at present, access is limited because of the heavy use of the system. Furthermore, the prohibitive size of the files creates a response time difficulty that could not be alleviated without major hardware purchase, even assuming the purchase of database software. Also, there would not be the access of additional information, through other administrative programs.

Combination

The possibility exists of dividing the proposed project between the two previously mentioned computers. The portion of the system that must interface with administrative programs is that of the key issue control, which could be implemented on the DEC 2065, while, the locksmith portion could be developed for the TRS 80. Five files would remain on the DEC 2065, these being the Name File, Key Id File, Master File, Master Key File, and Change Key File. A reduction in the size of the Master File would be realized because two fields would be eliminated. This would result in an overall page reduction from 670 pages to 642.

Two files would be required on the TRS 80, the Master File and the Parts Inventory File. Because it is no longer an integral system, the programs would not interface, therefore duplication of files would be necessary. One disk would be needed for both of the files on the TRS 80, necessitating only two floppy disk as opposed to the original 13 disks.

Assuming that the previously mentioned access problems are resolved, the locksmith may have faster access to his portion of the program on the TRS 80, as opposed to the DEC 2065. However, this also assumes that database software purchases will be approved in a timely manner.

The major disadvantage to this approach is that the key inventory system will be divided into two separate subsystems, necessitating both a duplication of files and information, and a lack of interface between the two systems. In addition, the assumptions of increased access time and purchase of database software may not be realized.

HP 150

Hewlett Packard has a micro computer which could be purchased to fill the needs of the Physical Plant and the key inventory system. The HP 150 boasts a 15M hard disk with memory boards available for additional storage capacity. The hard disk would fill the needs of the key inventory system, and provide a back up on the floppy disks. The file structure, should this computer be purchased would be identical to the one suggested for the TRS 80. However, as there are up to 710K bytes of storage on a floppy disk, only 4 floppy disks would be needed to store the back up files. The cost of this system would be approximately $6,000 to $7,000. This would include any additional memory boards, the MSDOS operating system, and DBaseII, for the data base manager.

The major advantages of this system, should it be purchased, would be much the same as the TRS

80 in that the access to the files would be limited to only those individuals needing to use it. Also, as this computer has a much greater memory capacity in its hard disk, floppy disks would only be used for back up. This would alleviate the problem of constantly changing disks. The HP 150 also provides a unique new method of ´program´ control in it´s TOUCHSCREEN option. This allows the novice user to simply point (touch) the screen where the change or option is wanted. This may make it easier for the new and/or novice user to manipulate the programs without having to deal with the sometimes threatening idea of a keyboard.

The major disadvantage of using the HP 150 is that by putting the key inventory system on a micro computer, all interfaces with other administrative programs would be extremely difficult, if not impossible. The additional information gained from these other programs would greatly enhance the Physical Plant´s recovery rate of outstanding keys. Furthermore, the system would have to be purchased, which can be a lengthy process in a state institution such as the University of Montana.

IBM XT

The IBM XT provides an alternative that could also be purchased within the same price range as the HP 150. The basic system with 10 Megabytes of memory on a hard disk would cost approximately $4500. Memory can be added in increments of 256k to 640K. This machine would require a one week order delay. The floppy disk, used by the IBM XT stores from 300K to 350K. Therefore, use of this system would require twice as many floppy disks to store the back up files as the HP 150 did. The purchase of this system, with the data base software, would run $6000 to $7000.

As mentioned above, the major advantage of the micro computer owned and operated by the Physical Plant is that access to the key inventory files could be limited to only those individuals needing access. The ability to log on to the computer would not be a function of the number of individuals attempting to use the system. Therefore, access to programs could be more timely.

Disadvantages, also, would be seen, in the inability to interface with on-campus programs. Also, as the system would not be on a University Computer, maintenance of the programs and any problems which might arise would need to be resolved by the Physical Plant.

Apple IIe

The Apple IIe microcomputer is also available as an alternative hardware system for the key inventory control program. Its purchase price including database software (either DBaseII or DBMaster) and the DOS 3.3 operating system plus a dual disk drive and hard disk drive is approximately $3500 to $4000. The hard disk drive has 10 Megabytes of storage and each of its floppy disks may hold up to 150K bytes of information.

The advantages of using a microcomputer for the key inventory control system all apply to this alternative as they did to the HP 150 and IBM XT, however, because of the limited storage on the floppy disks for the Apple IIe, back up storage would be more of a problem. It would take twice as many disks to store the back up information on the Apple IIe as the IBM XT, and five times as many as the HP 150. Furthermore, the maintenance and lack of interface disadvantages also apply to this alternative.

Recommendations and Justification

Based on the foregoing discussion, it is the recommendation of this study that the first alternative discussed, that of implementing the entire system on the DEC 2065 is the most feasible solution. Although some of the assumptions made concerning the TRS 80 may be realized at a future date, current conditions are such that a decision should not be based on these assumptions. The adoption of this alternative, of course, is contingent upon approval by the Computer Center.

Each of the microcomputers available on the market but not currently owned by the Physical Plant are viable alternatives to implementing the entire key inventory control system. However, even at $3500, the systems purchase price may be a difficulty, while the DEC 2065 is available for administrative use free of charge. Also, utilization of any of these alternatives would create difficulties in interfacing with other University programs and would not be maintainable by the Computer Center.

While any of the microcomputers discussed would be a possible candidate for implementing a portion of the system on them, and the other portion on the DEC 2065, the interface problems still exist, and the disadvantage of needing to purchase the system is also a consideration. Furthermore, the disk space savings realized by moving a portion of the program to another computer is not enough to justify losing the interface between program portions, duplication of file information, and loss of guaranteed program maintenance.

Proposed Schedule of Development

Following is a projected schedule for the completion of the proposed project. These dates are approximate, due to the inexact art of estimation.

4/22/85	-	System Feasibility
4/24/85	-	Validation
5/6/85	-	Software Plans and Requirements
5/8/85	-	Validation
6/3/85	-	Product Design
6/5/85	-	Verification
6/26/85	-	Detailed Design
6/28/85	-	Verification
7/10/85	-	Coding and Unit Testing
7/31/85	-	Integration Testing
8/9/85	-	Final Implementation and User Manual

REQUIREMENTS AND SPECIFICATION DOCUMENT

for CS 599

by

Robin Fauntleroy

Michele Miley

May 5, 1985

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Introduction

The software requirements analysis attempts to satisfy the following objectives: (1). provide a foundation for software development by uncovering the flow and structure of information, (2). describe the software by identifying interface details, providing an in-depth description of functions; determining design constraints and defining software validation requirements, and (3) establish and maintain communication with the user and the requester so that the above two objectives may be satisfied. In the context of this document, then, the requirements and specifications of the key inventory control system for the Physical Plant at the University of Montana will be delineated.

There are two major divisions within the current key inventory control system. The first is the actual locksmith operation, in which not only are keys made, but records are kept of which keys open which locks. The locksmith must maintain records of key numbers currently in use, those available for use, those retired, and the length of retirement. Furthermore, an inventory must be maintained of key blanks and other lock components. Presently, the locksmith is notified as particular keys are disbursed and supplies are depleted, thereby necessitating their duplication.

The second major portion of the key inventory system is key issue control. Records must be kept of all persons possessing a given key, the deposits received, keys issued to an individual, keys returned by an individual and deposit refunds. Although the procedure for this is relatively straightforward, the amount of information that must be processed is quite extensive. Accuracy is essential for university security. The only account of key distribution is maintained by this office.

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The following subsystems are components of the key inventory system, listed in order of decreasing importance.

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2. Deposit accounting would trace the deposits entering the system and the refund of deposits after the return of a key.

3. Interface with current administrative programs. An interface with payroll is possible to allow for tracking of keys when an employee, staff, or instructor, with a key leaves the university. Furthermore, an interface with the registrars office would provide lists of those persons graduating, to cross reference with outstanding keys.

4. Information security, providing for restricted access to the key inventory system. Accessibility of information within different parts of the system would be limited.

5. Correspondence generation, to provide for an automatic generation of form letters requesting the return of keys prior to graduation, or summer break, etc.

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7. Bit pattern generation of numbers available to use for any one lock, providing a number for the lock which would be compatible with the master keys opening the lock in questions. This generation of numbers would also take into account any numbers which are on the retire list, and requirements concerning bit cuts.

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9. A parts inventory control, which would maintain a count of all key blanks for each keyway. Yearly, an inventory re-order list would be generated. In addition, account of lock components would also be maintained.

10. Expenditure accounting would provide the department with a trace of expenditures on inventory and other aspects of the system.

Requirements and Specifications

Requirements analysis is the last step in the initial planning phase of the software life-cycle. The analyst must evaluate the flow and structure of information, refine all software functions in detail, establish system interface characteristics, and uncover design constraints. This section introduces partitionings and definitions of current procedures and the partitioning of the proposed system via the use of graphic aids, data dictionaries, and functional descriptions of processes.

Data Flow Diagrams

The following pages comprise a graphic representation of the key inventory system as it currently operates. Circles indicate a process being performed, while arrows indicate the information flowing between the processes. Processes may be broken down into subprocesses, and will be labeled with a number to refer to the original process. For example, subprocesses of process number two will be labeled 2.1, 2.2, and so on. The first section shows the diagrams for the current operation of both the front office and locksmith procedures, while the second section depicts those for the proposed operation of both systems.

FIGURE 1
LEVEL 0
CONTEXT DIAGRAM
(CURRENT)

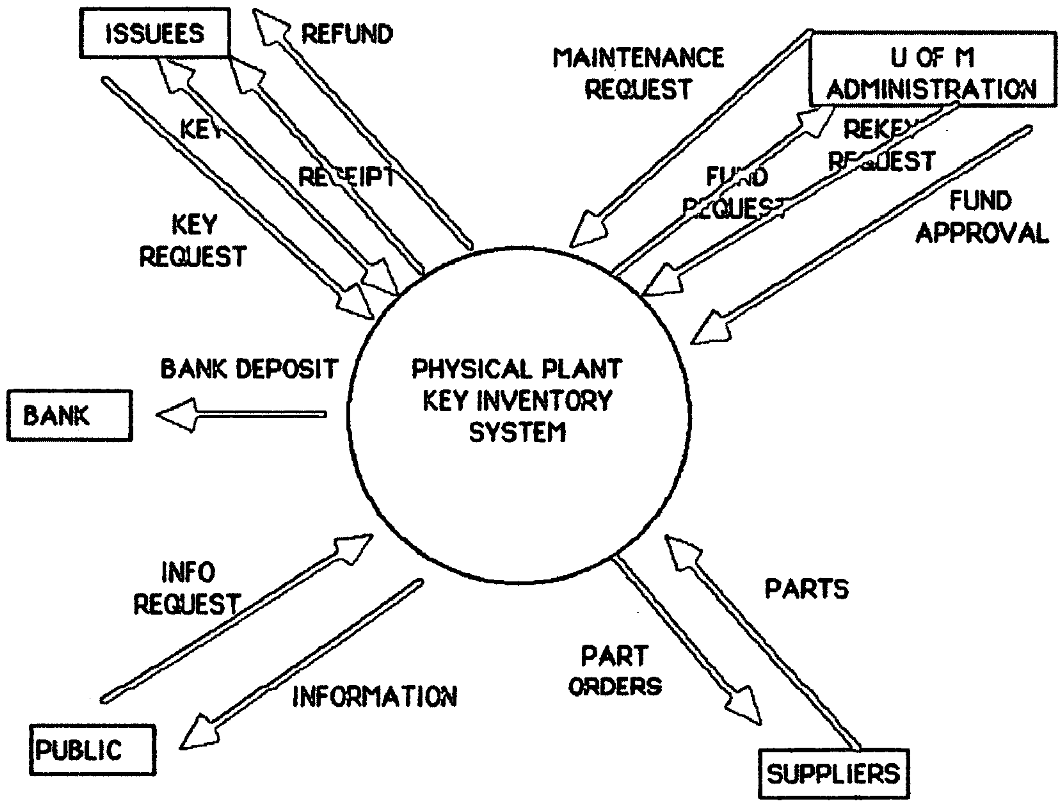


FIGURE 2
LEVEL 1
CONTEXT DIAGRAM
(CURRENT)

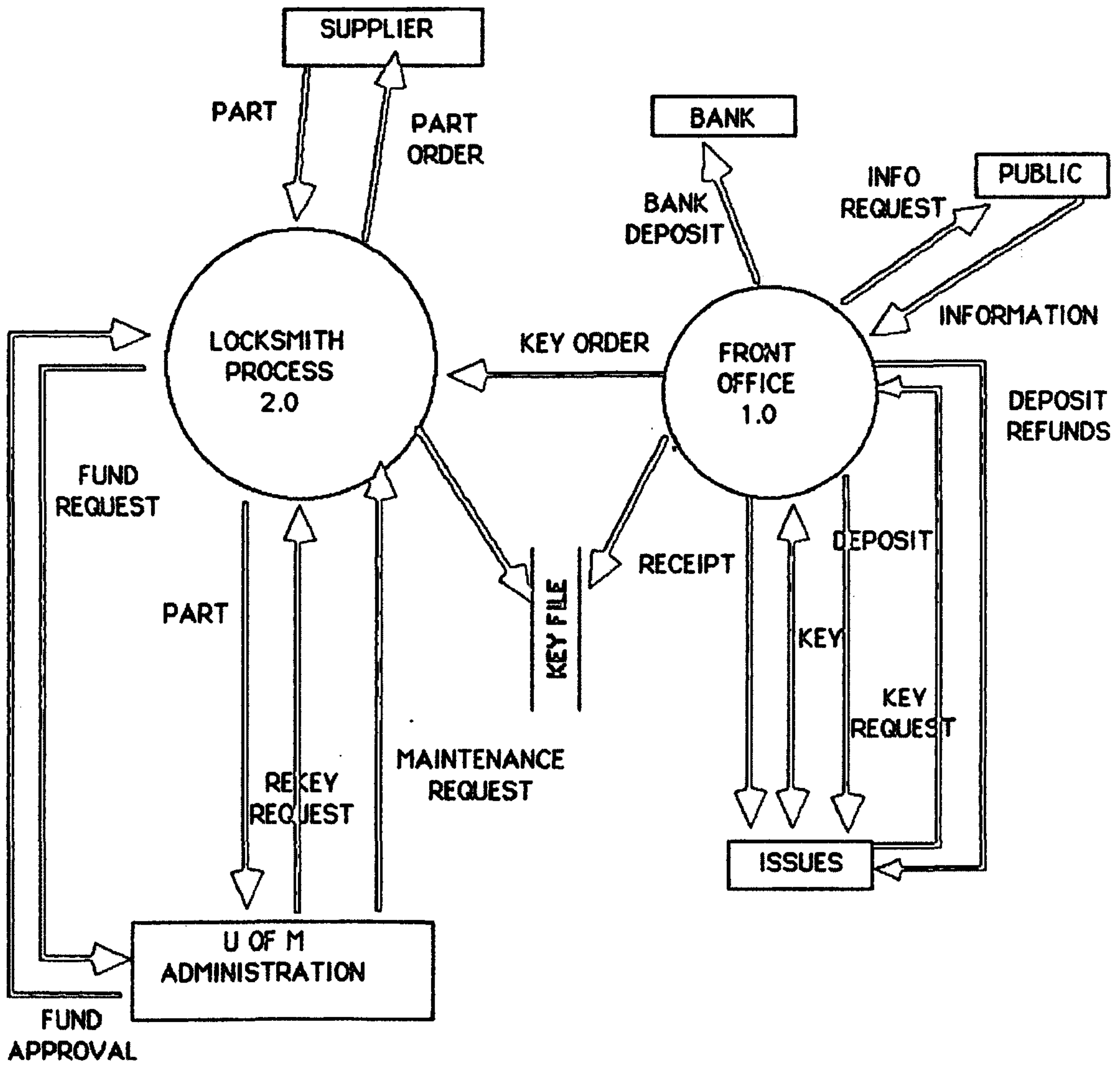


FIGURE 3
LEVEL 1 FRONT OFFICE
CONTEXT DIAGRAM
(CURRENT)

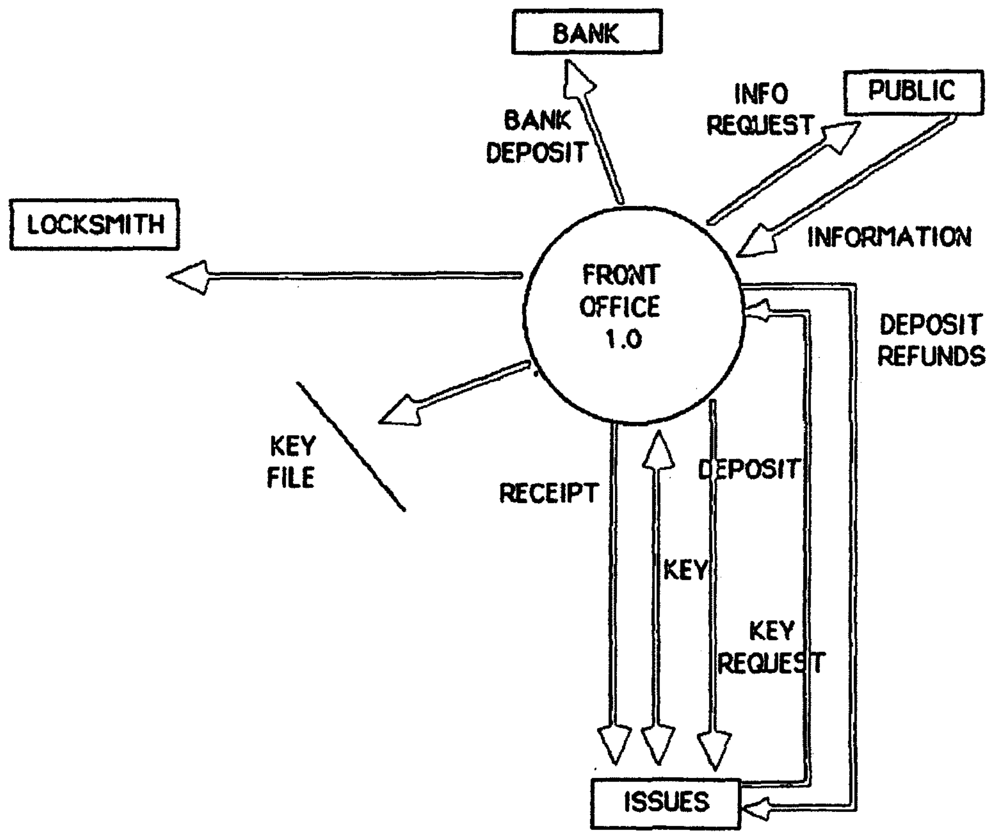


FIGURE 4
LEVEL 2 FRONT OFFICE
PROCEDURES (CURRENT)

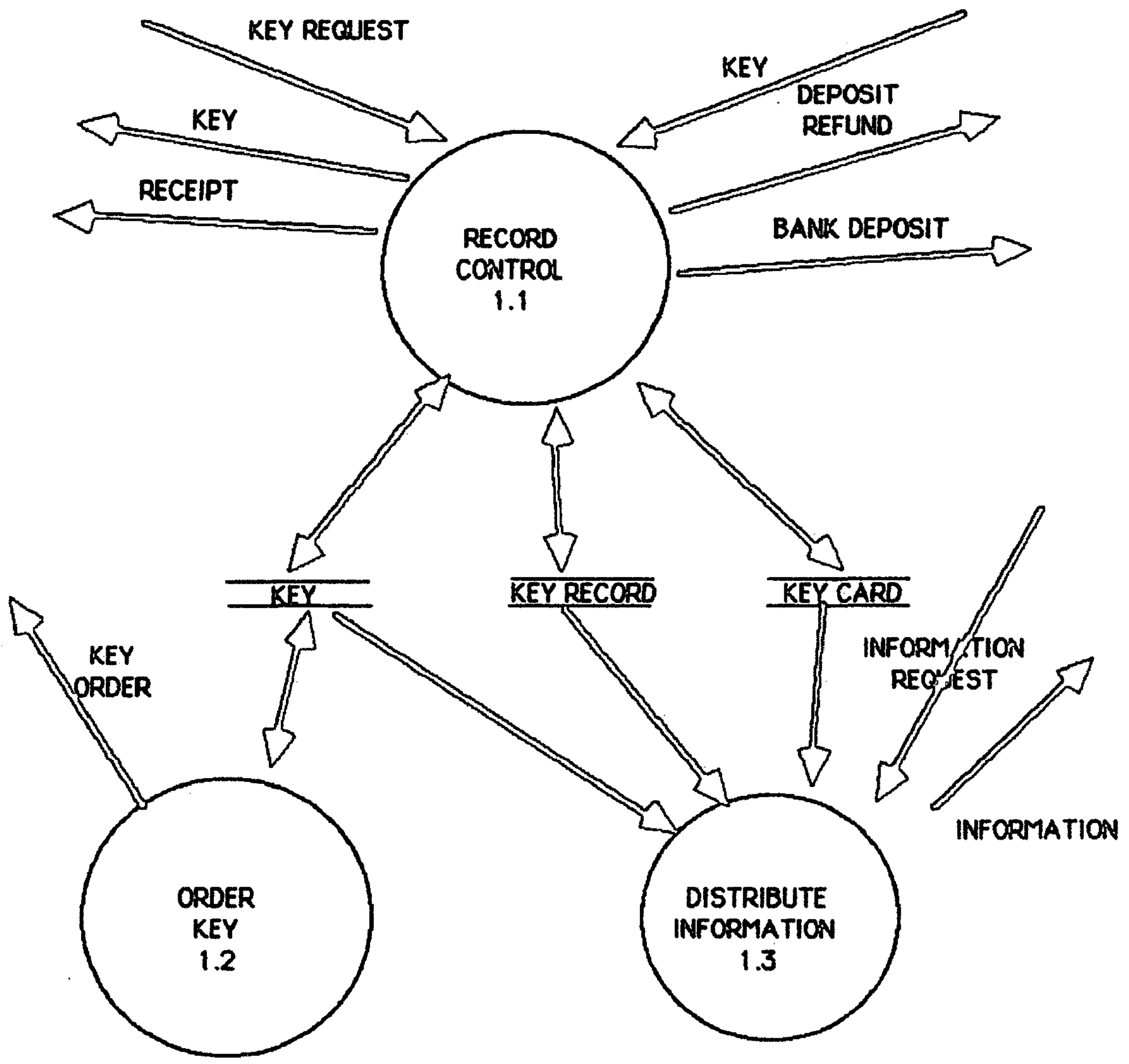


FIGURE 5
LEVEL 3 FRONT OFFICE
RECORD CONTROL (CURRENT)

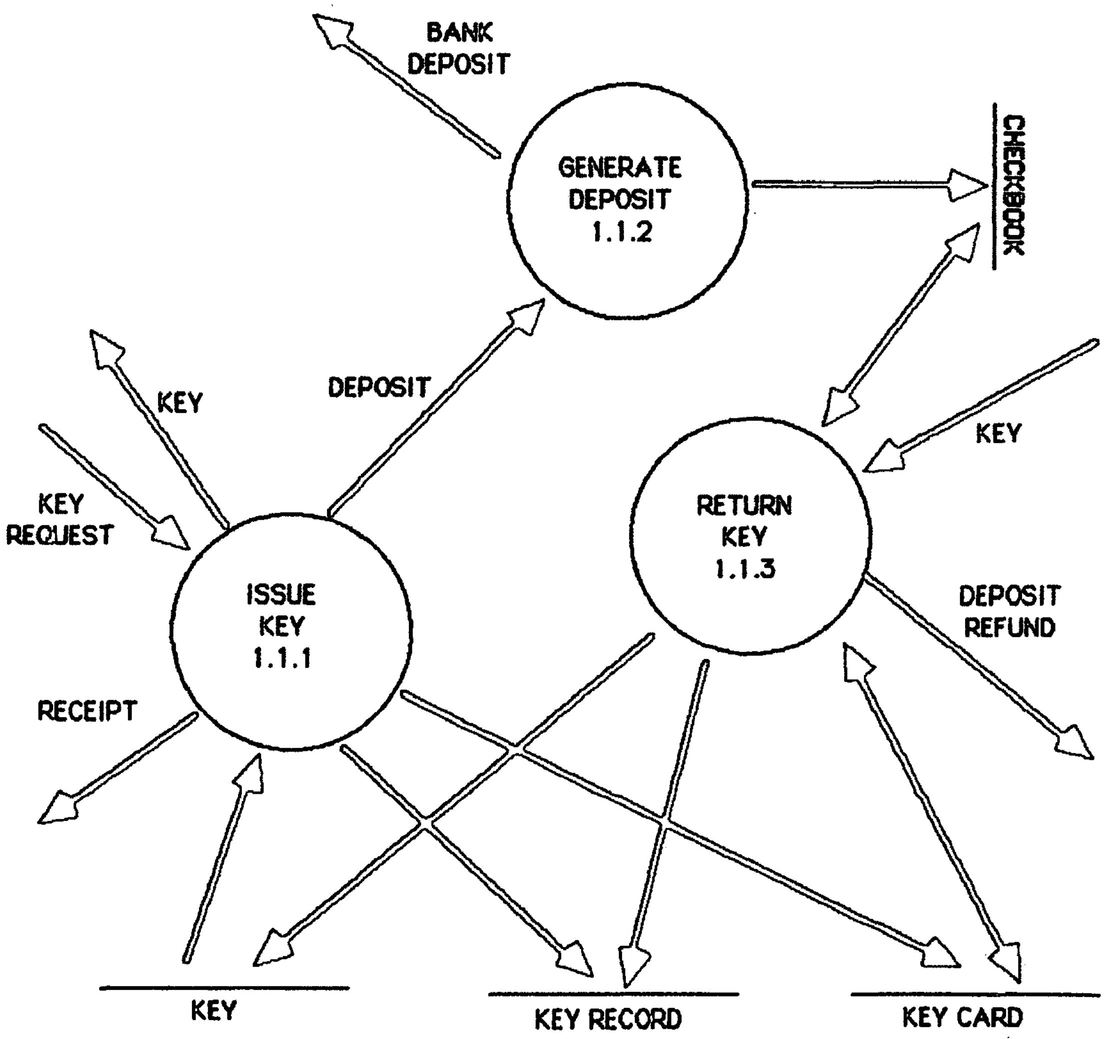


FIGURE 6
LEVEL 1 LOCKSMITH
CONTEXT DIAGRAM
(CURRENT)

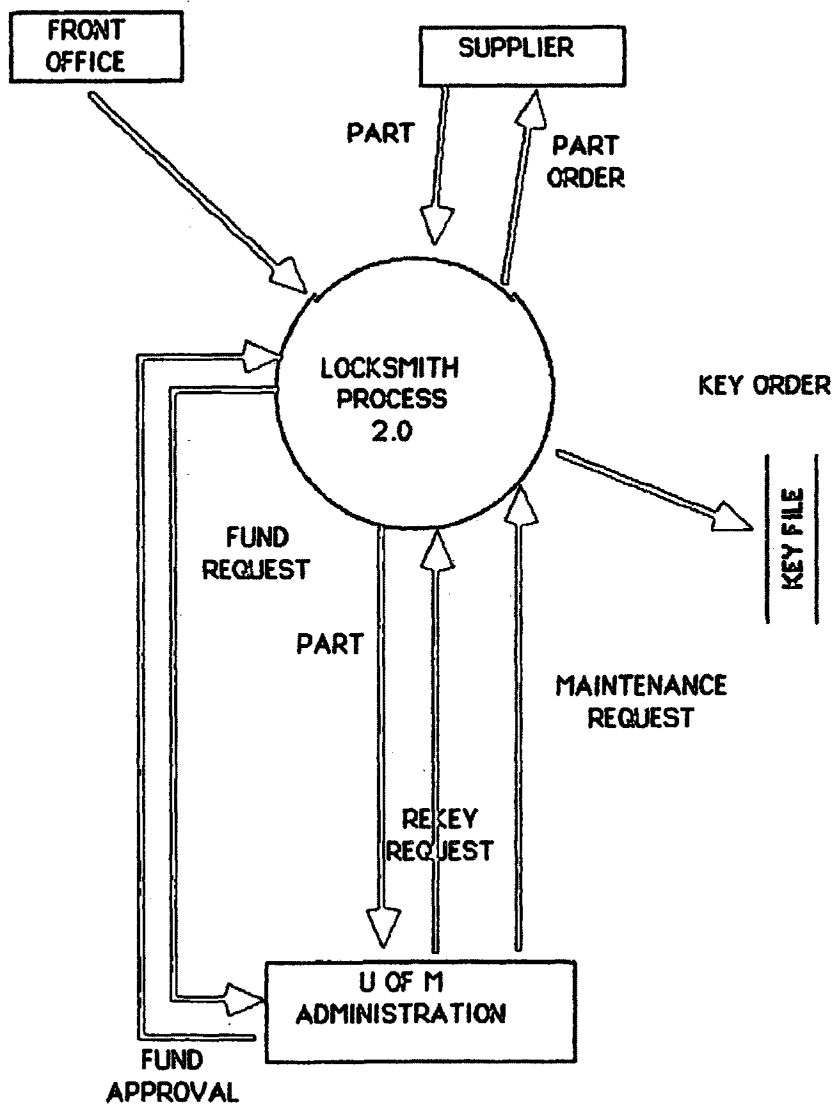


FIGURE 7
LEVEL 2 LOCKSMITH
PROCEDURES (CURRENT)

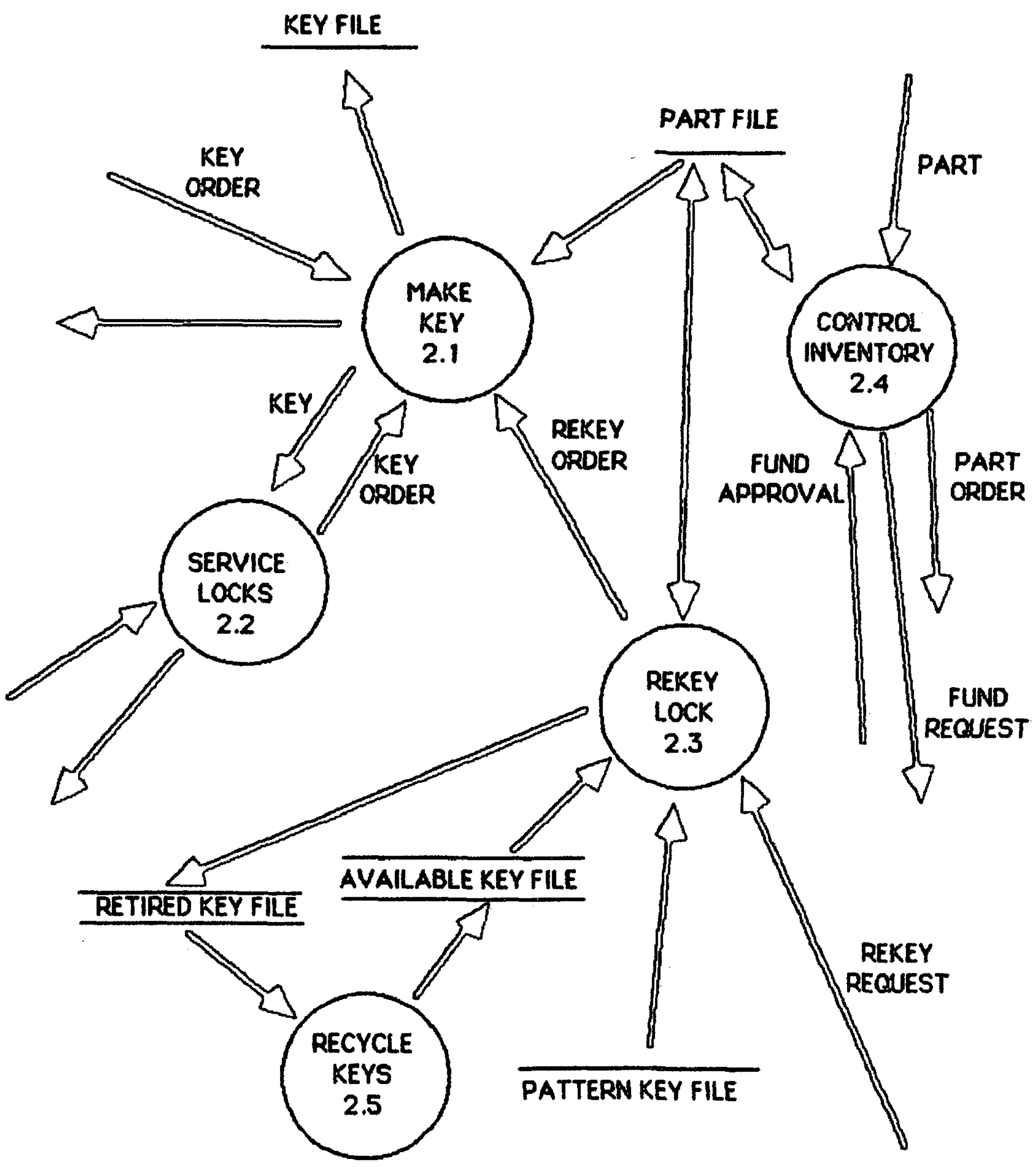


FIGURE 8
LEVEL 3 REKEY LOCK
(CURRENT)

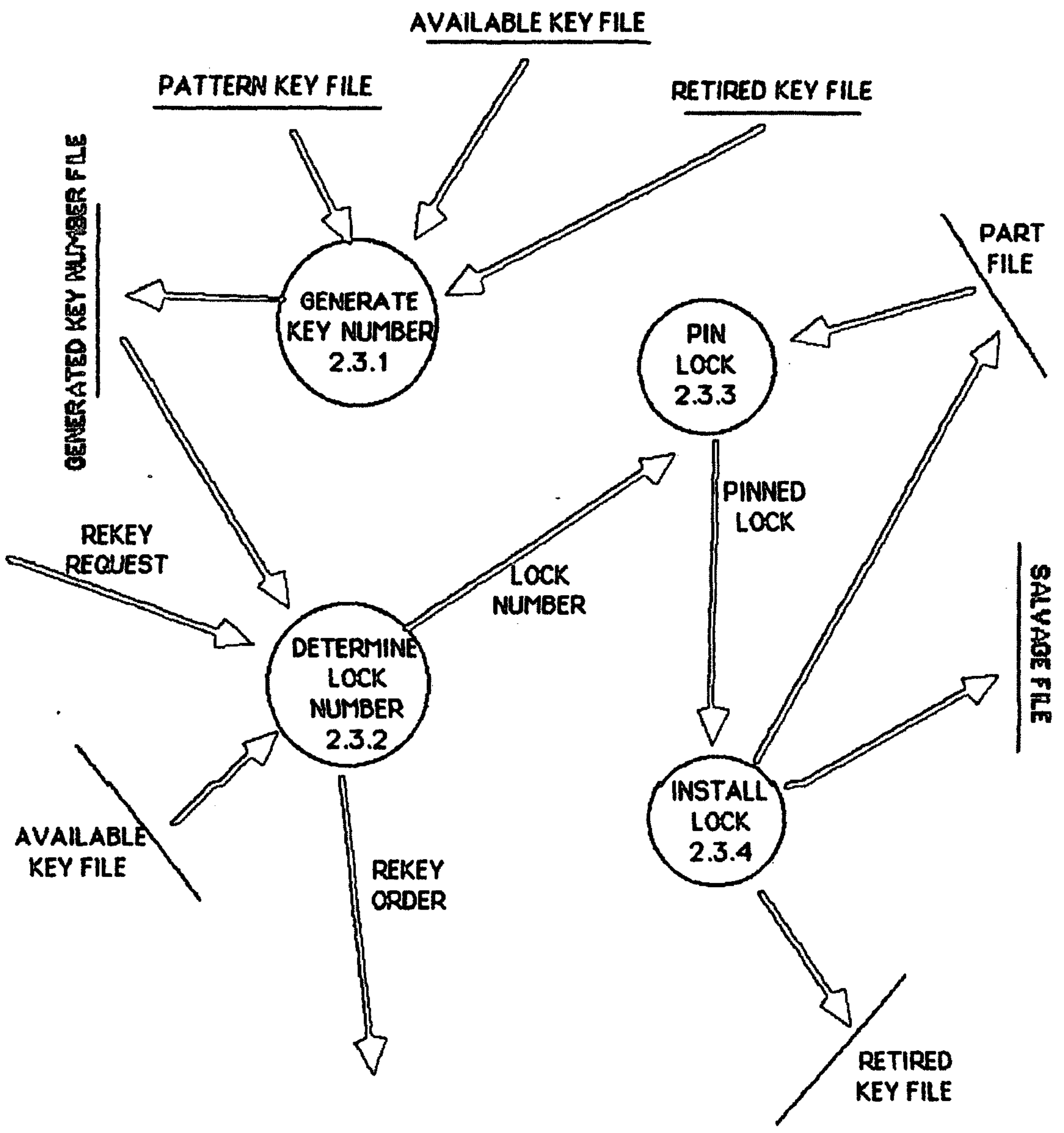


FIGURE 9
LEVEL 3 CONTROL INVENTORY
(CURRENT)

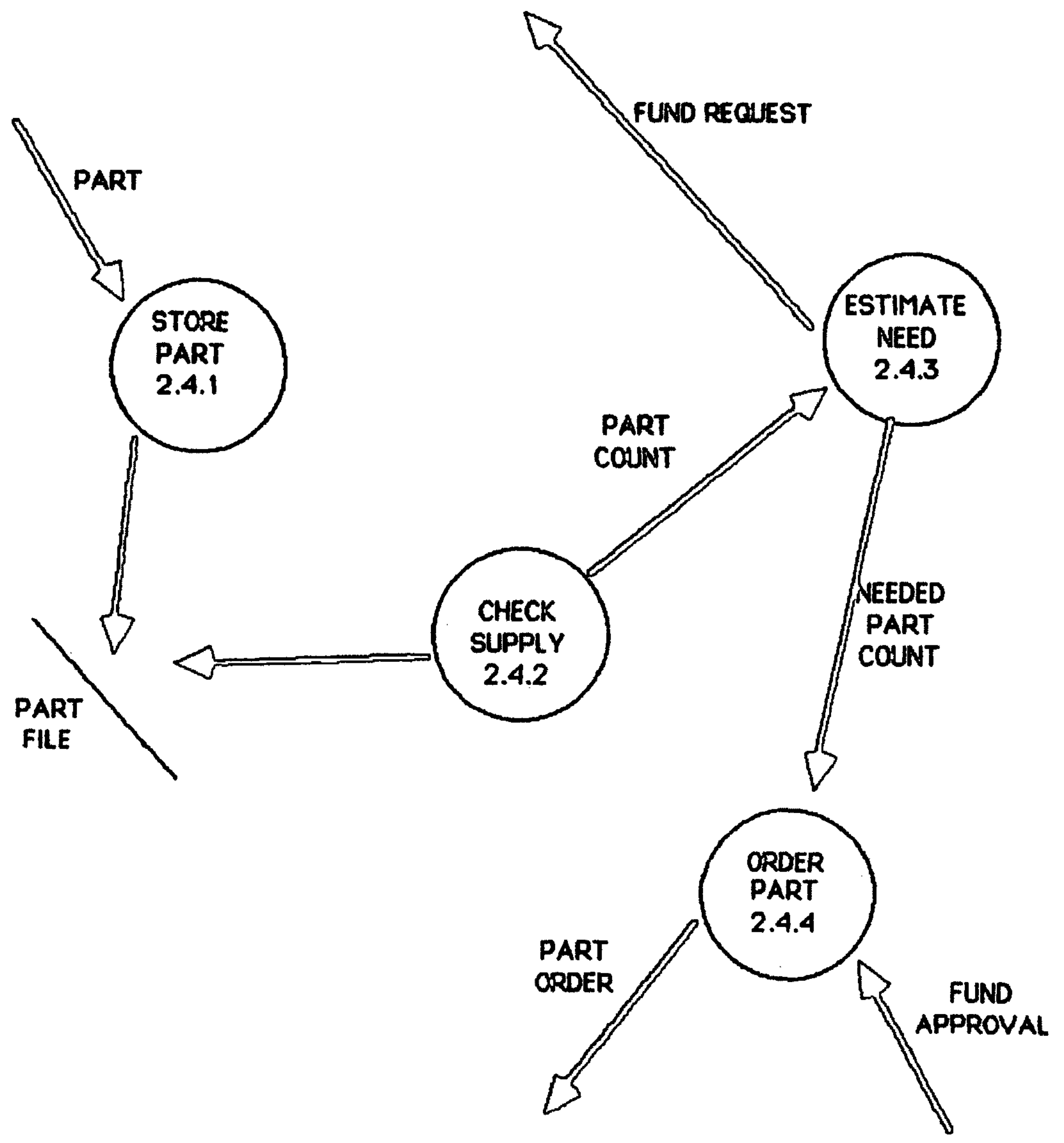


FIGURE 10
LEVEL 2: FRONT OFFICE
(PROPOSED)

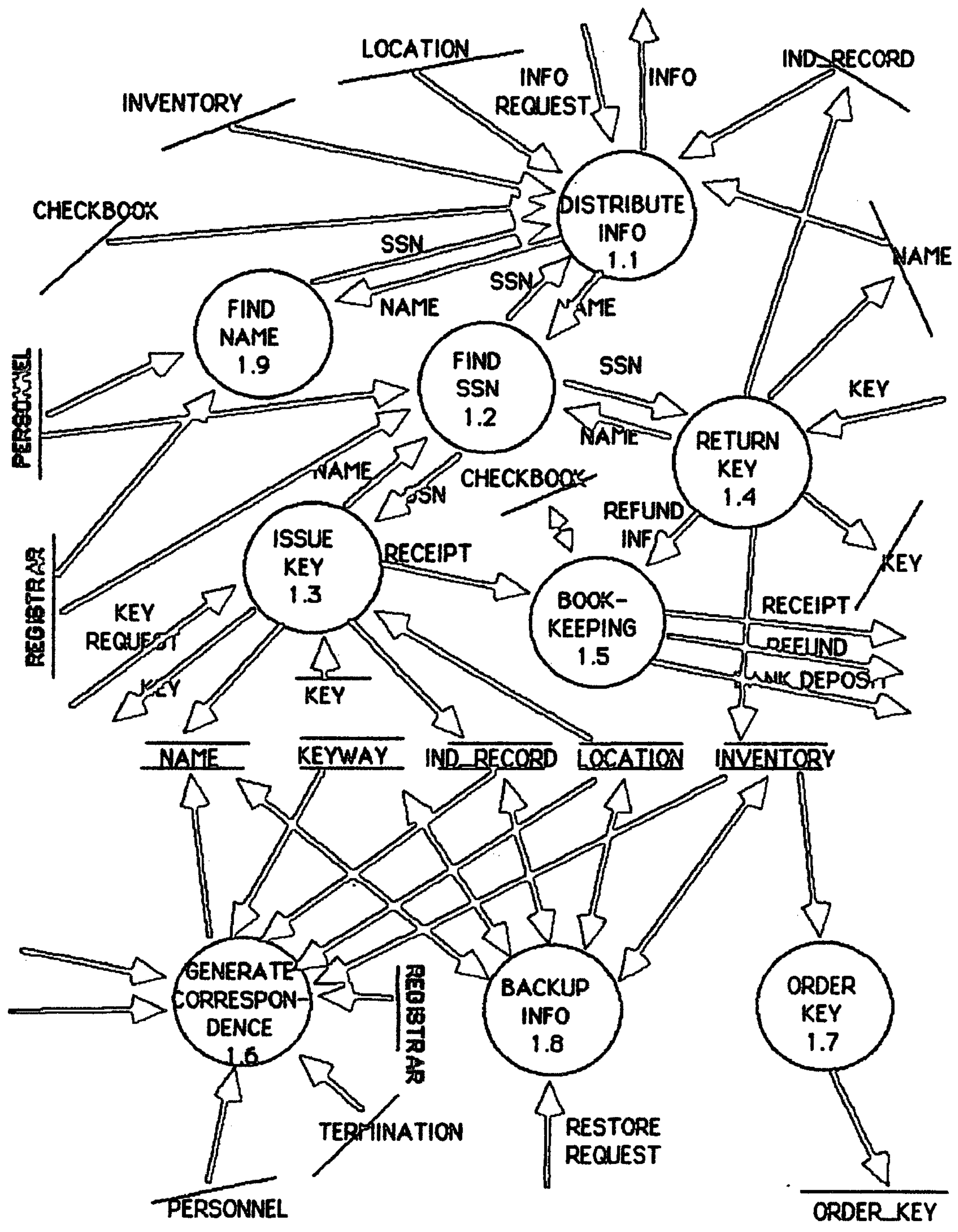


FIGURE 11
LEVEL 3: ISSUE KEY
(PROPOSED)

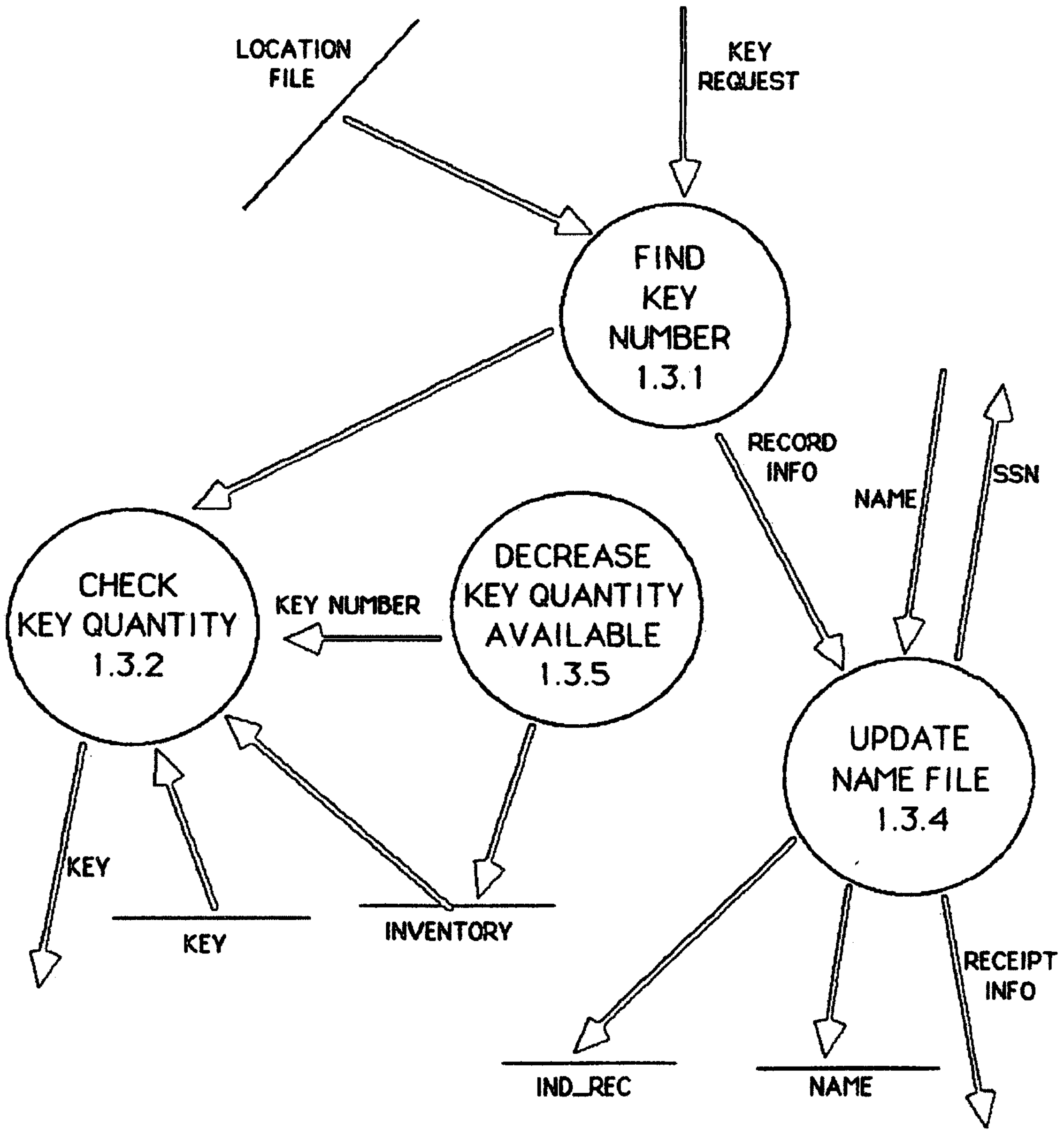


FIGURE 12
LEVEL 3: RETURN KEY
(PROPOSED)

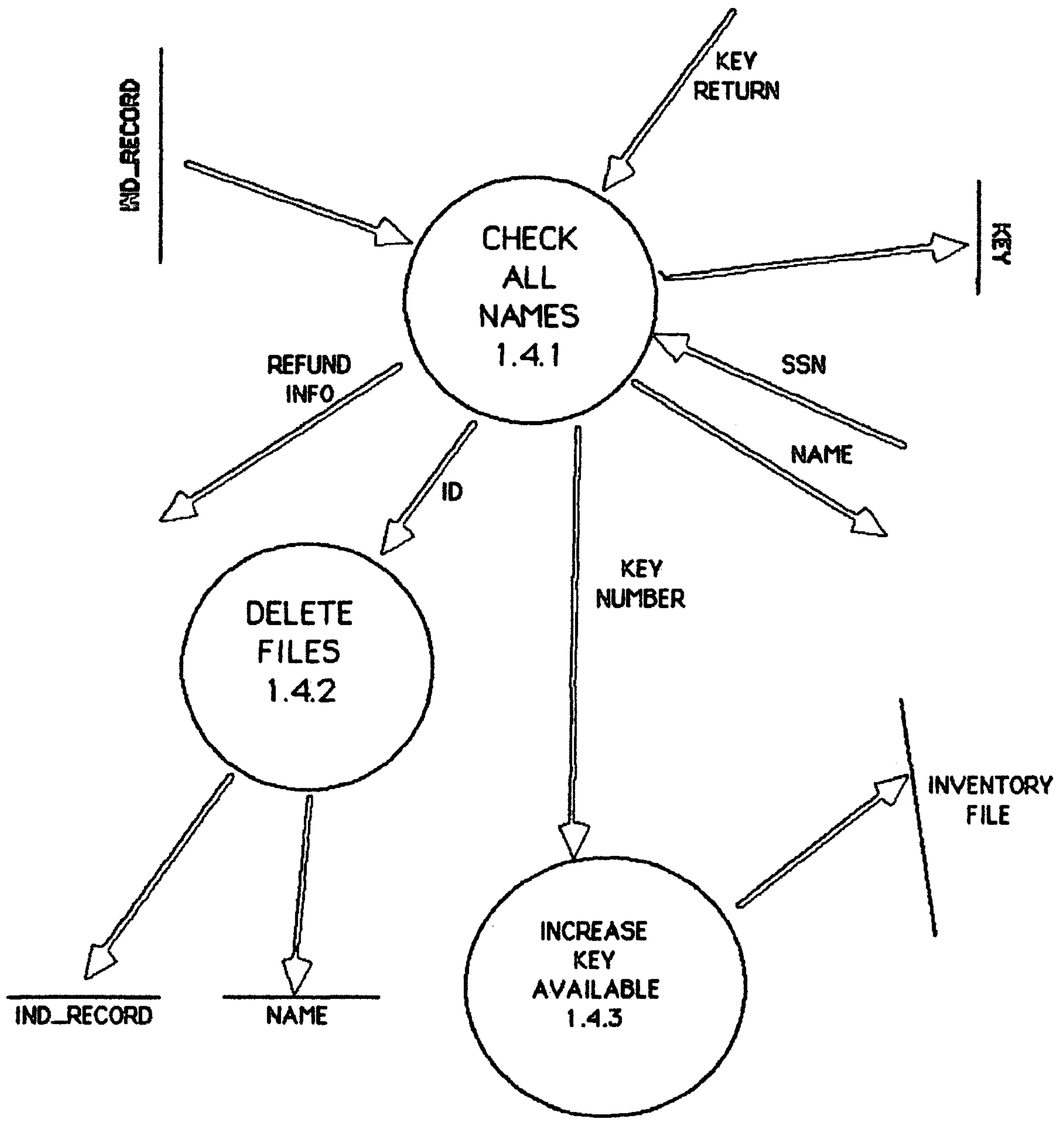


FIGURE 13

LEVEL 3: BOOKKEEPING
(PROPOSED)

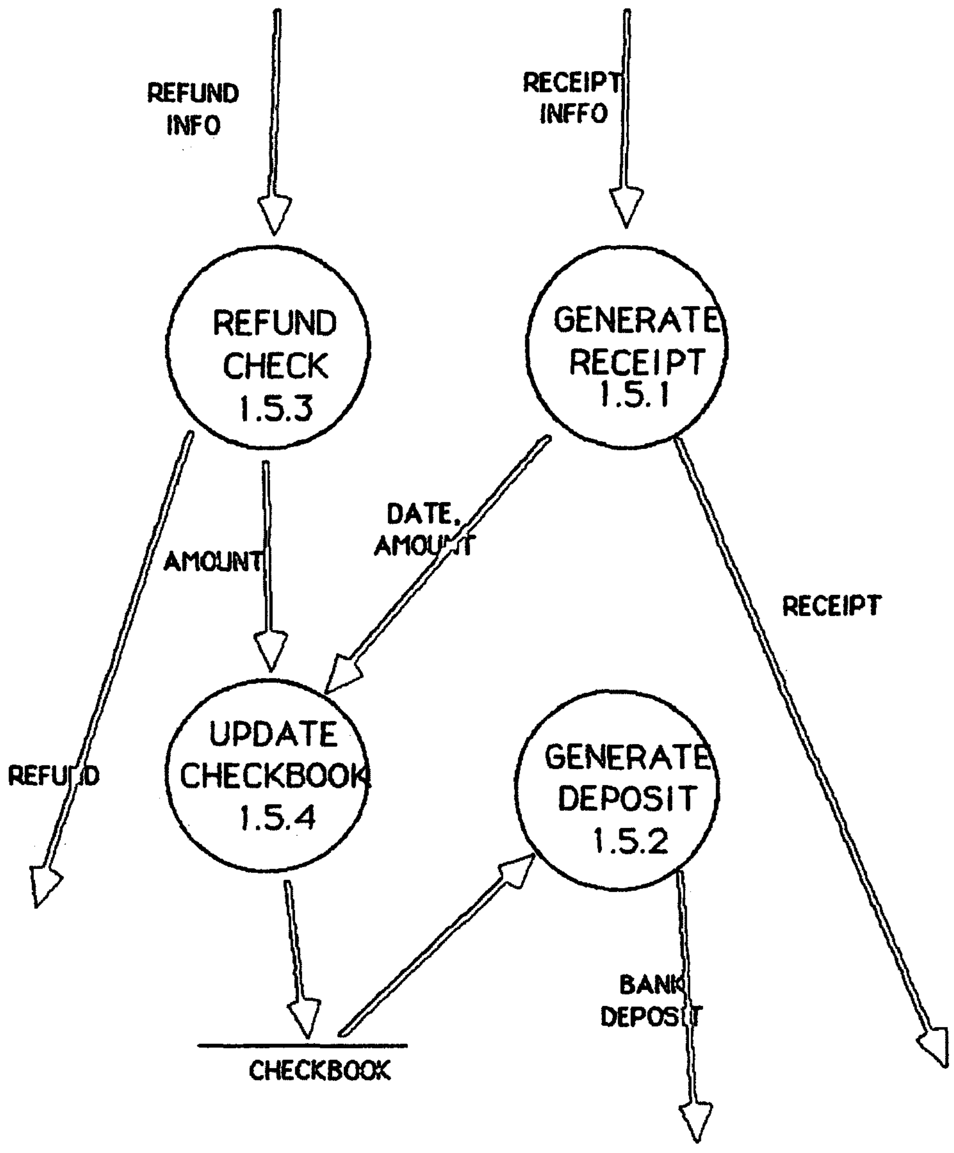


FIGURE 14
LEVEL 3: GENERATE CORRESPONDENCE
(PROPOSED)

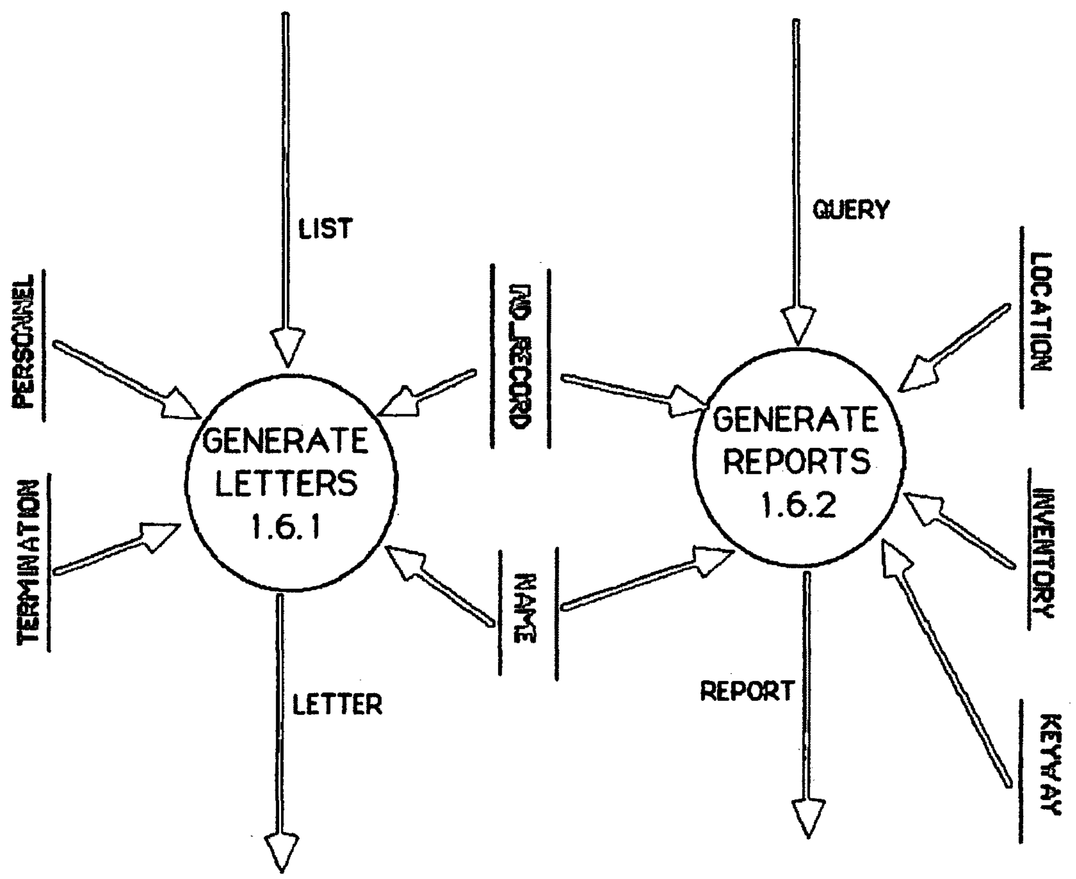


FIGURE 15
LEVEL 3: BACKUP INFO
(PROPOSED)

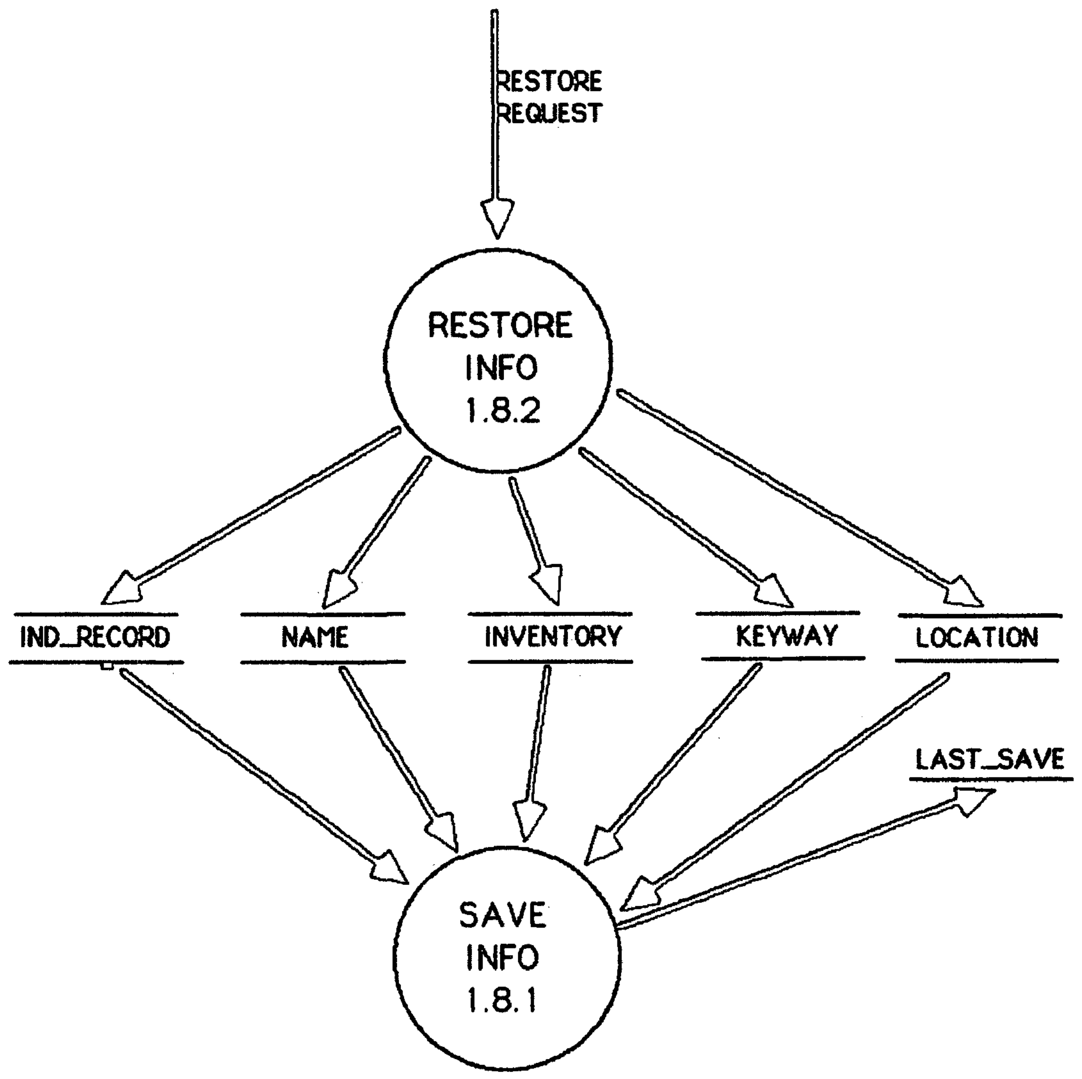


FIGURE 16
LEVEL 1: LOCKSMITH
CONTEXT DIAGRAM
(PROPOSED)

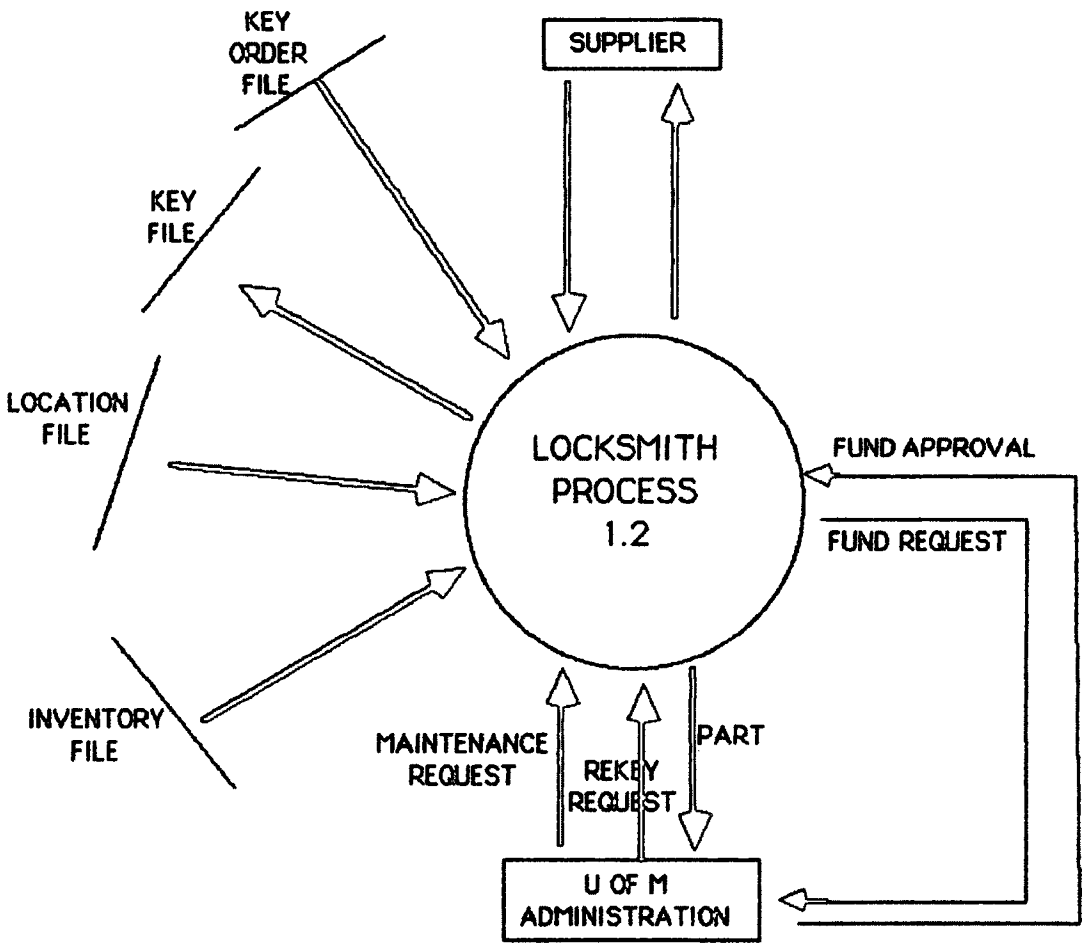


FIGURE 17
LEVEL 2: LOCKSMITH PROCEDURES
(PROPOSED)

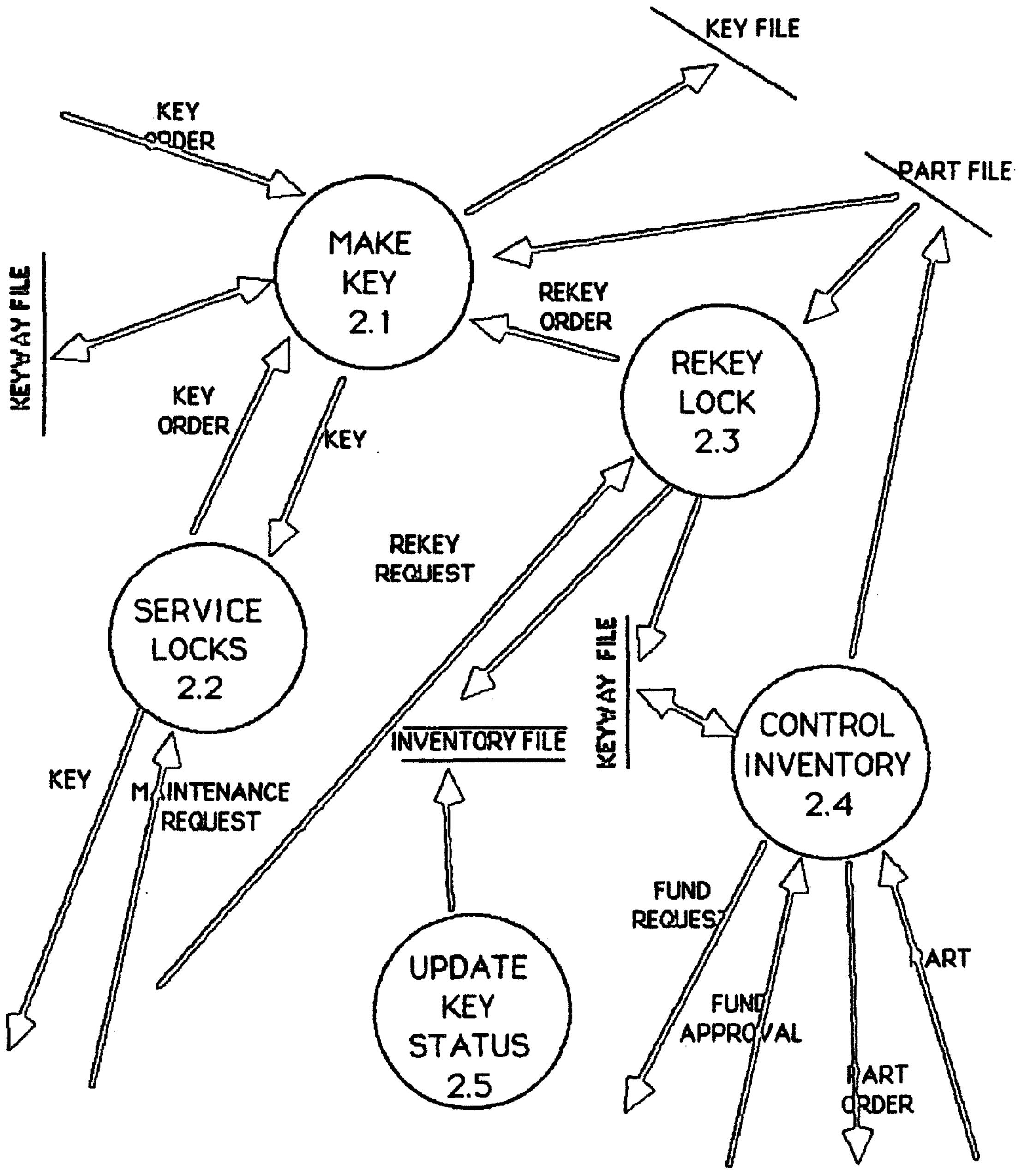


FIGURE 18
LEVEL 3: REKEY LOCK
(PROPOSED)

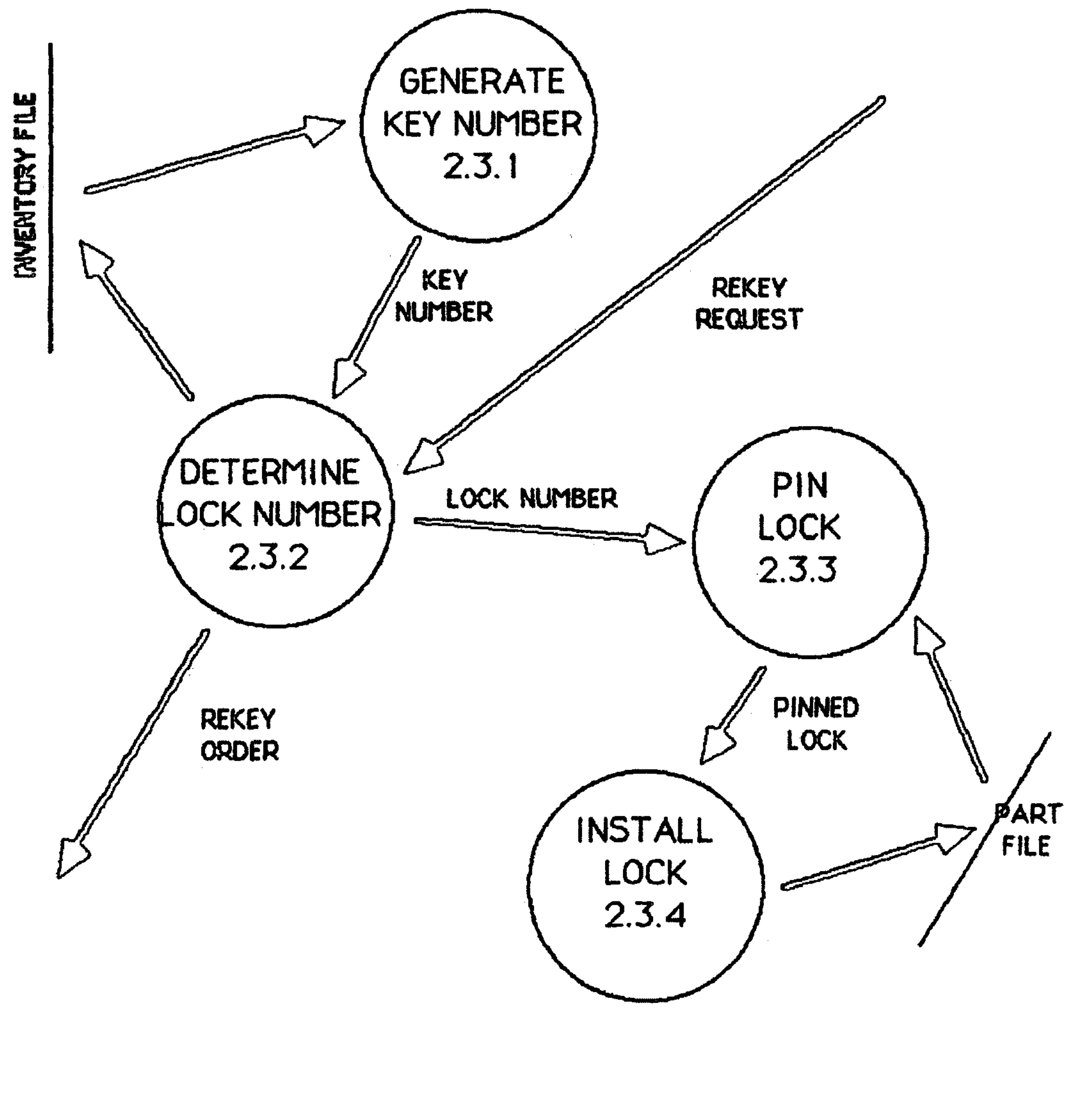
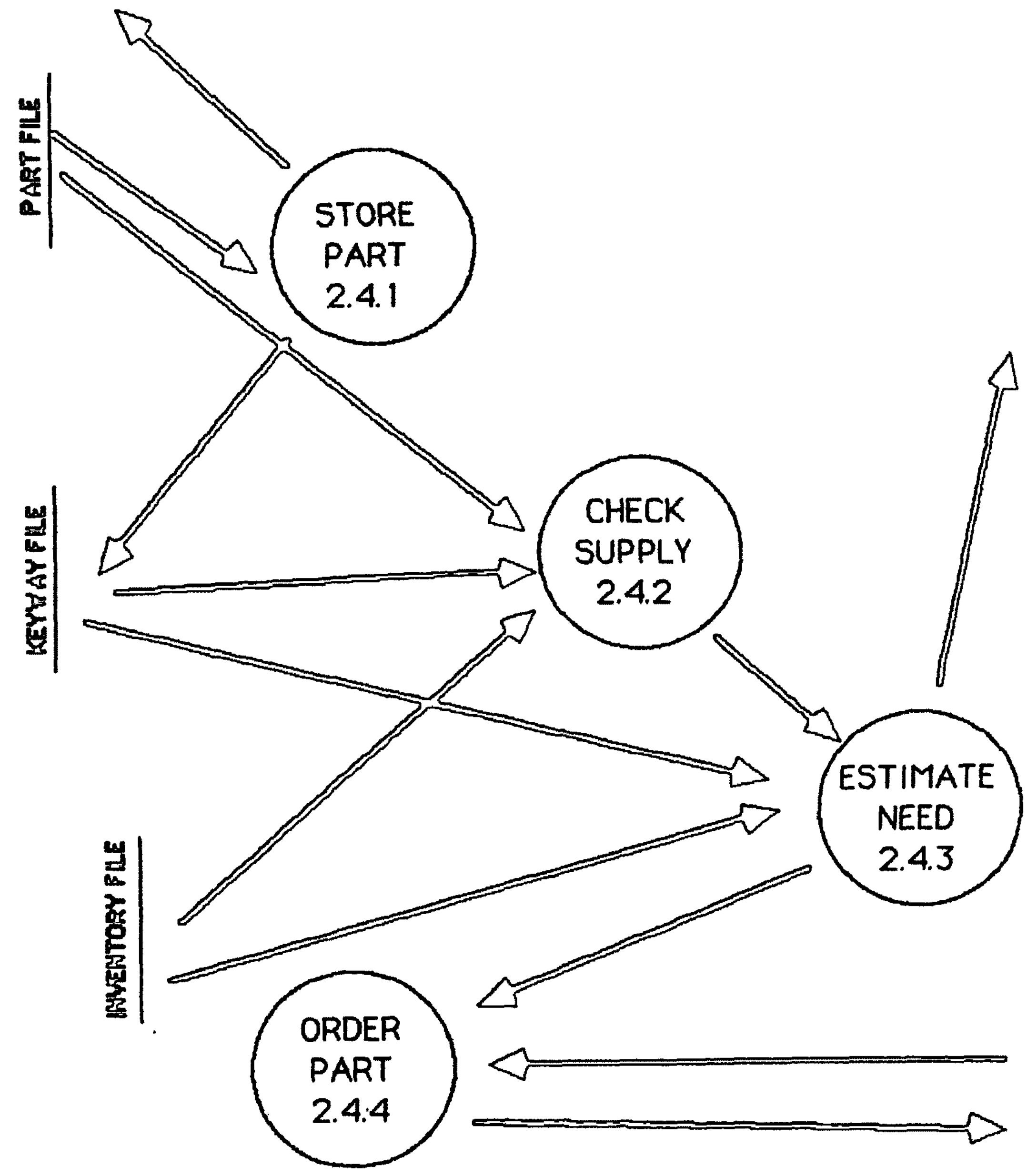


FIGURE 19
LEVEL 3: CONTROL INVENTORY
(PROPOSED)



Data Structure Representation

This section describes the format of necessary files and other major data structures within the system. Because of the large amount of data contained within the key inventory control system, the format of stored information is of vital concern, both to maximize the efficiency of accessing the data, and to minimize the amount of disk storage required. The following description attempts to meet both of these goals.

I. Current Front Office Files

Currently, the front office files consist of three separate files. These can be seen in the data flow diagrams as the key file, the key record file and the key card file. These files are described below, with an indication of the current information within each file. For the proposed files, the reader is referred to the section describing proposed front office data structures.

The key file is maintained for both front office and locksmith accessibility. It contains one or more keys for each building and room number available for issue and some master keys which are issued. Approximately 7,000 individual keys are maintained in this file.

The key record file is maintained on each individual who has a key issued to him. Please refer to the data dictionary for a complete description of what is contained in this file. The key record is maintained on the individual until all keys issued to him have been returned. There are approximately 20,000 key records maintained.

The key card file contains a card for each key which is issued to an individual. Each card is maintained in the file until the key has been returned. When a key is returned the key card is attached to the key record file. When all keys belonging to an individual have been returned, then the key record and the key cards are removed from the file.

The master key record file contains a card for each individual who has been issued a master key. A card may contain information on more than one key issue. These cards are kept, and updated as keys are returned, until all master keys issued to an individual are returned.

II. Current Locksmith Files

Presently, there are seven areas where information is stored in the locksmith procedures. These are shown in the data flow diagrams as the key file, the pattern key file, the retired key file, the available key file, the part file, the generated key number file, and the salvage file. The structure listed below describes the current information residing in those files, with no attempt to optimize storage. For the proposed files, the reader is referred to the section describing proposed locksmith data structures.

The current key file is the same as the one described for the front office. Both front office and locksmith operations need access to this file. For each building and room number, it contains one or more keys, in addition to some master keys available for issue to authorized persons. Approximately 7,000 keys are maintained here.

The pattern key file is a physical file, and contains a copy of each possible key, including masters, grand masters, and great grand masters. These keys are never issued, and are only used as a pattern to make additional keys. Each key is associated with a building (or buildings for a great grand master), and a room number or room numbers. Again, there are approximately 7,000 keys kept in this file.

The retired key file, again a physical file, consists of keys that have been taken out of circulation after a lock has been rekeyed. Each key has a date associated with it to indicate when it was taken out of service. It is stored here for one year before that particular pattern may be used again. The number of keys stored is variable.

The available key file consists of keys that have been retired for one year or more. These keys may now be used to rekey a lock. As with the retired key file, the number of keys stored here is variable.

The part file, a physical file, contains parts (locks, pinned locks, pins, and key blanks) which may be used for the construction of new locks or new keys. Each part has its own part number. The number of parts is variable, although a standard amount of stock is ordered on an annual basis.

The generated key number file is a repository for numbers available for use in rekeying a lock. The restrictions on these numbers is such that on at least one cut per key there must be a minimum of two bits difference. This file must contain only those numbers that are sufficiently different from any key made previously, including those in use, those retired, and those already made and available for use. The amount of numbers available for use may vary.

The ´salvage file´ is used to store parts that are no longer of use. This is a physical file. When a sufficient quantity is reached, the parts stored here are sold as scrap metal. It may contain any of the parts previously listed and is also used by other departments of the Physical Plant. No differentiation is made between any of the parts, and the amount of parts stored is variable.

III. Proposed Front Office Data Structures

The following files have been determined as being sufficient to store the data required to maintain the front office key issue procedures. There are four files required for the data base information. Note that the Master Key Record File has been eliminated and the information contained there is stored within the Inventory File as a field indicating the ´type´ (master, grand master, change, etc) of the key. These are:

Ind_Record File:	Field Type	Length
Social Security Number	integer	9
Key ID Number	text	10
Date Out	date	8
Deposit	integer	4

Name File:	Field Type	Length
Social Security Number	integer	9
Name	text	30

Inventory File:	Field Type	Length
Key ID	text	10
Type	text	1
Quantity on Hand	integer	3
Total Number	integer	3
Status	text	1
Date	date	8

Location File:	Field Type	Length
Key ID	text	10
Building	text	3
Lock/Room	text	4

IV. Proposed Locksmith Data Structures

In the proposed locksmith portion of the key inventory control system, most of the files will remain the same with the exception of the parts file, the retired key file, and the available key file. The retired key and available key files will no longer be used, while the used keys formerly stored there will now be stored in the parts file. This is not a computer data file. An additional file will be used, that of the master file as described in the proposed front office data structure representation.

Data Dictionary

Entries in the following pages provide a concrete definition for the flow af data between system processes. Each piece of data describes an item of information needed for a process to perform its function, or output desired by the users. Curly braces indicate that there may be a repetition of information within a data element, a plus sign indicates ´and´, and a vertical bar indicates ´or´. Parentheses depict an item that is optional. Comments about legal data values are enclosed by a slash and an asterisk. Data flows for both the front office and locksmith procedures are defined together, and both the current and proposed system may be found in this section.

```
amount = dollar amount of deposit |
         dollar amount of refund



bank deposit = dollar amount +
               date +
               account number



date = date of deposit received
```

```
deposit = amount paid when key is issued


deposit refunds = name +
                  date +
                  dollar amount


fund approval = fund request +
                signature of approval


fund request = needed part count +
               estimated dollar amount


ID = name |
     social security number


info = information
info request = building + room number |
               key number |
               ID


information = keyholder |
              key number |
              location |
              bank deposit |
              inventory |
              keys held


information requests = room number |
                       building |
                       {key owners}


key = key blank +
      key number


key number = bit cut number +
             keyway number
```

```
key order =    key number +
               amount needed



key request = ID +
              date +
              user´s position +
              building +
              room number +
              approval signature +
              deposit amount



key return = ID +
             key number



letter = letter to terminated personnel |
         letter to graduating students



list =      name +
            SSN +
            address
         /* list of graduating students */
```

```
location = building +
           room number



lock number = key number



maintenance request = building number +
                      room number +
                      description of
                         problem



name = /* name of keyholder */
       /* stored in Personnel,
             Registrar, or
             Name File */



needed part count =     part +
                        part number +
                        amount needed
```

```
part = lock |
       pin |
       pinned lock |
       key blank


part count =     part +
                 part number +
                 amount on hand


part number = lock number |
              keyway number |
              pin size


part order = needed part count +
             fund approval


pinned lock = lock +
              lock number
```

```
query = keyholder report  |
        inventory report  |
        locksmith report  |
        location report


receipt = receipt info


receipt info = name +
               amount +
               date


record info = ID +
              key number +
              date +
              amount


refund = refund info +
         dollar amount of refund


refund info = name +
              amount +
              date
```

```
rekey order = key order +
              building  +
              room number
```

```
rekey request = building name +
                (room number)
```

```
request info = info request
```

```
requested = /* flag to indicate user
                    request for
                    maintenance program
                    entry */
            /* value is true or false */
```

```
report = keyholder |
         inventory |
         locksmith |
         location
```

```
restore request = requested
```

room number = number assigned to given
room

SSN = social security number

System Interface Description

This section describes the transactions that the system makes with outside entities, both data received and information that must be output. For a detailed definition of each of the interface data elements described here, the reader is referred to the data dictionary.

I. Current Front Office System Interfaces

The front office key issue system currently interfaces with two outside entities. These are the Physical Plant locksmith operation and a bank. The key orders are sent to the locksmith when the supply of a key is determined to be low, and keys are then received from the locksmith and stored in the key file. Deposits are made regularly to a local bank which consist of the key deposits collected for each key issue.

II. Current Locksmith System Interfaces

There are presently three outside entities with which the locksmith operation interfaces. These are the Physical Plant front office, parts suppliers, and University of Montana administration. Key orders are received from the front office, and keys made according to those orders are then stored in the front office key file. Parts are ordered from suppliers for the most part on an annual basis, and then received from them. On occasion, parts must be ordered at irregular intervals rather than on the yearly order. Finally, maintenance and rekey requests are received from U of M administration, and either the necessary service is performed, or the appropriate part is distributed to the requester. Fund requests for parts orders are submitted to U of M administration, and fund approvals are received back.

III. Proposed Front Office System Interfaces

The proposed front office key issue system will be adding several interfaces to those already existing. The new system will be combining the front office procedures with those of the locksmith. Therefore, the existing outside interface with the locksmith will cease to exist as such, and will become an internal interface. However, the interface with the bank will still remain unchanged. Additionally, there will be interfaces with U of M Personnel, and Student Records. These interfaces will provide the Physical Plant with two enhancements to the system that do not exist today. First, these files will be accessed for information which will correlate a social security number with a name. This will allow the data files necessary for the Physical Plant to be stored in a more economical and space saving manner by not having to store the name. These files will be accessed at the initiation of the Key Inventory Control System to determine which records, as they exist now, can be stored with only the corresponding social security number. These files will then be used to access the proper record during general use of the system, by providing the corresponding social security number of an individual when given the individual´s name. Secondly, these files may be used when personnel are leaving University payroll system, or when students are graduating. With this information, reminder letters may be sent to these persons, with the intent of greater return of issued keys.

IV. Proposed Locksmith System Interfaces

The proposed locksmith system interfaces will remain the same as was described in the current system interfaces. The outside entities receiving and submitting data are the parts supplier, the

Physical Plant front office, and University of Montana Administration. The exchange of information will also remain unchanged.

Functional Description

The functional description portion of this document describes each of the functions delineated in the data flow diagrams both in a narrative style, and then in an algorithmic or structured English version in order to clarify the procedures performed by the system. Data and control interfaces between processes within the system are also described. As with the system interface description, the reader is referred to the data dictionary for a more complete definition of each of the internal data flows, and to the data structure representation for detail on the data base and file structure. Each interface is described in terms of the data flow diagram processes, therefore the reader is referred to those pages while reading this section.

Functions and Internal Interfaces

I. Current Front Office Functions and Internal Interfaces

The current front office portion of the key inventory system utilizes four files. These are the key file, key record, master key record and key card file. The processes within the system can be divided as follows:

1.1 Record Control. This module currently maintains the records of all keys issued to individuals. This process consists of adding a key record or master key record and key card to the respective files, and decreasing quantity on hand from the key file when a key is being issued. When a key is then returned, the opposite procedure is followed. Information on money collected and disbursed is also maintained. This module may be then subdivided as follows:

1.1.1 Issue Key. This subsystem is activated by receipt of a key request. This consists of a card and an appropriate deposit. Currently, a key is retrieved from the key file, the key request form is separated and the appropriate parts are placed in the key record and key card files. If the request is for a master key, a master key card is filled out, or the information is added to an already existing card for that individual. A receipt is then written to reflect the deposit amount. This module interfaces with the Generate Deposit module, by means of the deposit amount.

1.1.2 Generate Deposit. This module is passed the deposit amount. As monies are collected a total is maintained. This total must agree with the checkbook.

1.1.3 Return Deposit. This module is used when a key is being returned. As a key is received in the Physical Plant, the key is replaced within the key file, and the corresponding key card is retrieved from the key card file. The key record card is also retrieved from the key record file and marked returned. If the individual has no other key issued to him, then the key record is disposed of, however, if other keys are outstanding, the old record is stapled to the current ones and are maintained until all keys have been returned. This module will add to the refund list, the name and total amount of refund, as refund checks are not issued from the Physical Plant office. At the same time, the checkbook is decremented to reflect the refund. This module will access the information in all three files.

1.2 Order Keys. This subsystem interfaces only with the key file. As supplies of keys get low, an order for additional keys is made to the locksmith division of the Physical Plant. Currently, this subsystem is entirely manual, and relies on the user of the system to be aware of how often a key is needed and what additional amount of keys might be necessary. There are approximately 7,000 keys in the key file.

1.3 Distribute Information. This subsystem interfaces with all three files and attempts to answer questions posed to the Physical Plant with reference to key situations and problems. Currently, to answer a question, the user must access the data in the files manually. This involves accessing the keys file, which contains around 7,000 keys and the key record file,

II. Current Locksmith Functions and Internal Interfaces

The top level of the locksmith operation can be divided into five processes. The first of these is Make Key which receives key orders from the front office and the Service Locks procedure, and rekey orders from the Rekey Lock process. From these orders, new keys are made, using a pattern key from the pattern key file as a model. Keys made are either returned to the front office key file or the Service Locks process. In addition, periodically the Make Key function will make a new pattern key as old ones wear out or as locks are rekeyed, to be stored in the pattern key file.

Service Locks receives maintenance requests from the University of Montana Administration. The type of service necessary is determined, and the service performed. From time to time, it may be necessary to make a new key, at which time the Make Key process is sent a key order. Information concerning key numbers or lock numbers is obtained from the pattern key file.

Rekey Lock receives rekey requests from the University of Montana Administration. It accesses the available key file to determine if there is a valid key number already available, and places old keys in the retired key file. It receives necessary parts from the part file. Rekey Lock may be broken into four subprocesses. These are Generate Key Number, Determine Lock Number, Pin Lock, and

Install Lock.

Generate Key Number accesses the pattern key file, the available key file, and the retired key file to determine bit cut numbers that have not yet been used, and stores these in the generated key number file.

Determine Lock Number first checks the available key file for bit cuts fitting the key requirements as rekey requests are received. If no bit cuts are appropriate, then it accesses the generated key number file for an appropriate bit cut. Once a key number has been determined, the lock number is sent to the Pin Lock process while a rekey order is sent to the Make Key function.

The Pin Lock procedure takes locks and pins from the part file and installs the pins in the lock according to the lock number. The pinned lock is then passed alonq to the Install Lock procedure.

Install Lock, as the name implies, installs locks in doors. Old locks may be returned to the part file if still of use, otherwise, they are placed in the salvage file. Keys corresponding to the old lock are either put in the retired key file or the salvage file.

The Control Inventory function receives parts from suppliers, sends parts orders to suppliers, sends fund requests to the University of Montana Administration, and receives fund approvals. It accesses the part file to determine the amount of parts needed and to store received parts. It may be divided into four subprocedures, Store Part, Check Supply, Estimate Need, and Order Part.

Store Part receives parts from the supplier and places them in the part file. Check Supply checks the part file and counts the amount of parts on hand. The part count is then sent to the Estimate Need function.

Estimate Need determines the past need of a given part and future need in relation to possible projects, and estimates the amount to be ordered. This needed part count is sent to the Order Part process. An estimate is also made of the dollar amount required to purchase the parts, and this is sent out as a fund request the the University of Montana Administration.

The Order Part procedure waits until fund approvals are received from the University of Montana Administration, and once received, sends a part order to the supplier.

Recycle Keys accesses the retired key file to determine which keys have been out of circulation for a year or more. These keys are then transferred to the available key file.

III. Proposed Front Office Functions and Internal Interfaces

1.1 Distribute Information. This module interfaces with the existing data base files. It will allow the user to query the files for specific information to respond to questions posed to the Physical Plant. This will provide access, quickly, to such questions as ´How many keys does an individual have issued to him?´, or ´What key opens a particular room in a particular building?´. This module will also interface with the Find SSN module by way of the ´ID´.

1.2 The Find SSN module is used to find the correct file to access for key records. This module is passed a name, and will check both the University Personnel records and the University Student records for that name and the corresponding social security number. If the name is found, then the social security number can be used to access the Ind Record file, otherwise the original name is used to access the Name file. The Find SSN module receives the name to search for from either Distribute Information, Issue Keys, or

Return Key.

1.3 Issue Key. This module maintains the Ind Record file and the Name file to reflect the current state of keys issued. As a new key is issued to an individual, a new record is placed in either the Ind Record file or the Name file to indicate this transaction. Current figures must also be maintained to reflect the additional deposit acquired. This record keeping is done within the bookkeeping module. The Issue Key module interfaces with the Find SSN module through the individuals name, if available, and to the bookkeeping module by way of receipt information. This module can be broken down as follows:

1.3.1 Find Key #. This module is passed the key request information It uses the room and building number to find the appropriate key number from the Location File. The only other module that Find Key # interfaces with is the Update Name File, which is passed the record information.

1.3.2 Update Name will interface with the Find SSN module to determine which file to access. It will add a record for the current transaction, reflecting the issue of a key.

1.3.3 Check Key Quantity. This module checks the master file to be sure that there is a key available to be issued to the requester.

1.3.4 Decrease Key Quantity Available. This module will decrement the record field that indicates how many keys are currently available (Quantity on Hand). This provides a measure of the number of keys available for issue and allows for a means of re-ordering keys (through the Order Key module).

1.4 Return Key. This module is passed the key return information (ID and key number). It passes to Find SSN the individuals ID, if needed to find the name to access the proper file. It will change the key status in the proper file to reflect the returned key. It will also search the file for all occurrences of that individual to determine if he has returned all of the keys he has been issued. If so, all records will be removed from the files. This module also access the Inventory File, and increments the number of keys available, for the particular key number, that has been returned. It can be divided into the following functions:

1.4.1 Check All Names. This module will peruse the appropriate file for all records belonging to that particular user. It will then check to see if all the keys issued to that individual have been returned.

1.4.2 Delete Files will delete all records pertaining to that individual.

1.4.3 Increase Key Available will access the Inventory File and increase by one the amount of keys available for that particular key number.

1.5 Bookkeeping. This module does the general bookkeeping tasks for the key inventory system. It is passed the name, date and amount from either of two modules, the Issue Key module or the Return Key module. It will generate either a receipt or a refund check. It also maintains a ´checkbook´, which contains a current total of monies available. This module can be divided into the following subsystems:

1.5.1 Generate receipt is passed the name, date and amount from issue key. It then generates a receipt for that amount.

1.5.2 Generate deposit is passed the date and amount and will increment the deposit total. It will generate a daily total.

1.5.3 Refund check is passed the name, date and total amount of refund. It adds this information to the refund list, as checks are not issued directly from the Physical Plant.

1.5.4 Update checkbook is passed am amount from either refund check, in which case it decreases the checkbook amount, or from generate deposit, where it will increment the checkbook by the ´amount´.

1.6 Generate Correspondence. This module will provide the Physical Plant with a means of generating correspondence. Input to this module will be of two possible types. One is a query to the data base files, which is possible in the 1022 data base language. The other type of input would be a list, possible generated by the University Administration, or Registrars office. For example, a list of graduating seniors could be compared with those individuals having been issued keys and letters written reminding the students to return keys prior to leaving the University. By use of a query, specific information may be extracted from the files. Informal reports may then be generated to relay this information to the user. This module may be broken down into the following subsystems:

1.6.1 Generate Letters. This module will access the Ind Record file only as all names coming from the University system will have a social security number. The module will interface with the Find SSN module to determine the proper name to access.

1.6.2 Generate Reports. This module may access many files and modules depending on the information requested. It has access to the Ind_Record file, the Name file, the Location file and the Inventory file.

1.7 Order Keys. This module interfaces with the Inventory file. It will check the threshold number and the number of key available for issue and order new keys, if necessary.

1.8 Backup Info. This module provides a means of creating backup files for security of information and audit purposes. This module will access the University tape drives, and simply store the files requested on the tape. The Restore request will move the files off the tape, restoring them to disk, but providing another name so as not to overwrite the current files.

1.9 Find Name. This module will find the name associated with the given SSN in the Personnel, Student, and Name files, and return this to the calling procedures.

IV. Proposed Locksmith Functions and Internal Interfaces

Many of the locksmith procedures are not amenable to computerization, therefore most of the processes remain unchanged from the current system to the proposed system. However, there are some changes as described below.

The available key file and retired key file no longer exist as such in the proposed system, while necessary information about these keys is stored in the on-line master file. All previous mention of accesses to these files, then, are replaced with accesses to the master file. In addition, the Recycle Keys function is not necessary, but is replaced by the process Update Key Status. Update Key Status accesses the master file and checks the retired status and date of each key record. If the key has been retired for a year or more, its status is changed to available.

Furthermore, an on-line inventory file is kept of all keyway numbers. Each time a key blank is used, then, the on-line count must be decreased, and as parts are received from suppliers, the count must be increased by the amount received.

Processing Narratives

This section provides an unambiguous description of processes within the system in the form of a structured English or algorithmic method of specification. This allows for more clarity in the understanding of how the system works, and how the proposed system will carry out the same tasks. These processing narratives correspond to those processes found at the lower levels of the entire system.

I. Current Front Office Processing Narratives

1.1.1 Issue Key

```
with key request do
     find key in key file
     give to requester
     separate key request card
     place key record in key
           record file
     place key card in key card
           file
     if key is a master key
     then check master key file
           for previous issues
           if card exists
           then add current key
               information to card
           else create new card
               with current
               information
     write receipt for amount
     give receipt to requester
```

1.1.2 Generate Deposit

```
if date has not changed
then add deposit amount to bank
     deposit total
     adjust checkbook total to
          reflect new amount
else print bank deposit
     set bank deposit total to zero
     add deposit amount to bank
          deposit total
     adjust checkbook total to
          reflect new amount
```

1.1.3 Return Deposit

```
with a key return do
     place key in key file
     remove corresponding key
          card and dispose
     find corresponding key
          record card and
               mark returned
     find all key records for
          that individual
     if all are marked returned
     then dispose of all of them
     else staple returned key
          record to active key
          record
     if key was a master key
     then find appropriate card
          in master key card file
          mark key returned
          if all master keys have
               been returned
          then dispose of card
```

1.2 Order Key

```
check each key in key file
if key supply appears to be low
   order more
```

1.3 Distribute Information

```
for each information request
    determine appropriate file
    if information can be accessed
    then respond to request
```

II. Current Locksmith Processing Narratives

2.1 Make Key

```
as key order is received,
   for each entry on key order,
      match key number with
         key in pattern file
      select key blank from
         parts file with same
         keyway number as
         pattern key
      for each amount needed,
         cut key blank
         according to pattern
         key bit cut
      return pattern key to
         pattern key file.
as rekey order is received,
   for each entry on rekey order,
      select key blank from
         parts file with keyway
         number indicated on
         rekey order,
      cut key blank according to
         bit cut number
         indicated on rekey order,
      paint key red,
      put key in pattern key file,
      put old pattern key in
         retired file and
         mark date.
as needed,
   check pattern key file for worn keys,
   for each worn key found,
      select key blank from parts
         file with same
         keyway number as worn key,
      cut key blank according to
         worn key bit cut,
      paint key red,
      put key in pattern key file,
      put old key in salvage file.
```

2.2 Service Locks

```
as maintenance requests are received,
  determine type of service necessary.
  if new key is required,
       send key order to make
            key process,
       receive key,
       distribute key to requester.
  else, if service necessary,
       perform required service.
```

2.5 Recycle Keys

```
once per month,
     check retired key file for dates
          older than one year,
     move these keys to the available
          key file.
```

2.3.1 Generate Key Number

```
check all existing key numbers in
     pattern key file,
     available key file,
     and retired key file.
determine key numbers not in use.
of these, select numbers fitting
     bit cut number
     requirements and put in
     generated key number
     file.
```

2.3.2 Determine Lock Number

```
as rekey request is received,
     check available key file for
          key number fitting
          master, grand master,
          and great grand
          master requirements.
     if found, select first one as
          lock number,
     else, check generated key
          number file for key
          number fitting master,
          grand master, and great
          grand master requirements.
          select first one as lock
               number.
```

2.3.3 Pin Lock

```
· for each number in lock number,
     determine size of pin needed,
     get pin from part file,
     place pin in lock in appropriate
          position.
```

2.3.4 Install Lock

```
as pinned lock is received,
     install lock in door,
     if parts are still usable,
          place corresponding keys
               in retired file,
          place other parts in part
               file,
     else, place all parts in
          salvage file.
```

2.4.1 Store Part

```
as parts are received,
     separate according to type
          and part number,
     store in part file.
```

2.4.2 Check Supply

```
periodically,
     for each part type,
          for each part number,
               count amount of
                    parts on hand.
```

2.4.3 Estimate Need

```
determine projects to be completed.
determine parts needed for projects.
subtract part count from parts
     needed to get needed
     part count.
estimate dollar amount of needed
     parts.
fill out fund request.
```

2.4.4 Order Part

```
as fund approval is received,
     mail part order to supplier.
```

III. Proposed Front Office Processing Narratives

1.1 Distribute Information

```
if info request refers to name of
        person,
        amount of keys, etc.
then check University Files for
        social security number
     if found then find answer to
        question in Ind_Record file
          respond to question
     else look in Name file for
        appropriate social
        security number
          map back to Ind_Record file
          respond to question
else if info request refers to keys,
        key numbers, etc.
     then find answer to question in
        master file
          respond to question
     else no response to question
```

1.2 Find SS#

```
check Personnel files for name
    if found then return social
        security number
    else check student files for name
         if found then return
            social security number
         else return not found
```

1.3.1 Find Key Number

```
while not found and not end of
    master key file
  compare building and room numbers
  if equal then found equals true
              return key number
  else return invalid specifications
```

1.3.2 Check Key Quantity

```
while not found and not end of
    master file
  compare current number with key
    number
  if equal then found equals true
        if key quantity is greater
            than zero
               return available
        else return not available
```

1.3.3 Decrease Key Quantity Available

```
with current key number
   decrease key quantity available
            by one
```

1.3.4 Update Name File

```
If accessing Ind_Record file
then create new record
   add social security number
   add key number
   add date
   add amount of deposit
   insert in Ind_Record file
else
   create new record
   add name
   if available add social security
            number
   add key number
   add date
   add amount of deposit
   insert in Name file
```

1.4.2 Delete Files

```
with the appropriate record
   delete from file
```

1.4.3 Increase Key Available

```
with the appropriate master file
            record
   increase the keys available by
            one
```

1.4.1 Check All Names

```
if ID is a name
then while there are more entries
            in the Name file
   check to see if record matches
            name
   if matches, map back to
            Ind_Record file
            check for key returned
               set flag
else if ID is a social security
            number
   then while there are more entries
            in the Ind_Record file
              check to see if record
                 matches name
              if matches, check for
                 key returned
              set flag
```

1.5.1 Generate Receipt

```
print name
print date
print total amount of deposit
```

1.5.2 Generate Deposit

```
if date is changed
   then print out yesterday's total
   set total to 0
   increment total by deposit amount
else increment total by deposit amount
```

1.5.3 Refund Check

```
add name, date, and amount of refund
                 to refund list
```

1.5.4 Update Checkbook

```
if amount is from generate deposit
then add amount to checkbook amount
   store new amount in checkbook
else subtract amount from checkbook
              amount
   store new amount in checkbook
```

1.6.1 Generate Letters

```
while there are names or social
                security numbers
                on the list
  find appropriate records
  print reminder letter
```

1.6.2 Generate Reports

```
find information pertinent to the
    query
print the information
```

1.7 Order keys

```
while there are more keys to check
      compare the number of keys
           available with
              the threshold number
      if the number is less than
           threshold number
      then order key made
```

1.8.1 Save Info

```
while there are more files to save
     save the file on tape
```

1.8.2 Restore Info

```
while there are more files to restore
     change name to ´file´.bak
     restore the file to disk
```

1.9 Find Name

```
check Personnel Files for SSN
     if found then return name,
     else check student files for SSN
          if found then return name,
          else return not found
```

IV. Proposed Locksmith Processing Narratives

2.1 Make Key

```
as key order is received,
   for each entry on key order,
      match key number with key
       in pattern file
      select key blank from parts
       file with same
       keyway number as pattern
       key
      subtract key blank from
       keyway file.
      for each amount needed,
         cut key blank according
            to pattern key
              bit cut
      return pattern key to pattern
         key file
      add key to master file.
as rekey order is received,
   for each entry on rekey order,
      select key blank from parts
         file with keyway
         number indicated on rekey
         order,
      subtract key blank from keyway
         file
      cut key blank according to bit
         cut number
         indicated on rekey order,
      paint key red,
      put key in pattern key file,
      put old pattern key in retired
         file and mark date,
      add key to master file.
as needed,
   check pattern key file for worn keys,
   for each worn key found,
      select key blank from parts file
         with same
         keyway number as worn key,
      subtract key blank from keyway
      file
   cut key blank according to worn
      key bit cut,
   paint key red,
   put key in pattern key file,
   put old key in salvage file.
```

2.2 Service Locks

```
as maintenance requests are received,
   determine type of service necessary.
   if new key is required,
      send key order to make key
         process,
      receive key,
      distribute key to requester.
 else, if service necessary,
    perform required service.
```

2.5 Update Key Status

```
once per month,
   check master file for retired key
      dates older
      than one year,
   change status on these to available.
```

2.3.1 Generate Key Number

```
check all existing key numbers in master
     file,
determine key numbers not in use.
of these, select numbers fitting bit
     cut number
     requirements and put in
     generated key number
     file.
```

2.3.2 Determine Lock Number

```
as rekey request is received,
     check available key file for
          key number fitting
          master, grand master,
          and great grand
          master requirements.
     if found, select first one as
          lock number,
     else, check generated key number
          file for key
          number fitting master,
          grand master, and great
          grand master requirements.
          select first one as lock
               number.
```

2.3.3 Pin Lock

```
for each number in lock number,
    determine size of pin needed,
    get pin from part file,
    place pin in lock in appropriate
        position.
```

2.3.4 Install Lock

```
as pinned lock is received,
    install lock in door,
    if parts are still usable,
        add corresponding keys to
        master file,
        place parts in part file,
    else, place all parts in salvage
        file.
```

2.4.1 Store Part

```
as parts are received,
    separate according to type and
        part number,
    store in part file.
if key blanks are received,
    add amount to keyway file.
```

2.4.2 Check Supply

```
periodically,
     check keyway file for amount of
          key blanks in stock.
     for each other part type,
          for each other part number,
               count amount of parts on
                    hand.
```

2.4.3 Estimate Need

```
determine projects to be completed.
determine parts needed for projects.
determine past amount used from
    master file,
subtract part count from parts needed
    to get needed
     part count.
estimate dollar amount of needed parts.
fill out fund request.
```

2.4.4 Order Part

```
as fund approval is received,
     mail part order to supplier.
```

Resources

Several different types of resources are necessary for the development of a software product. These include human, hardware and software resources. The subject of this section is to discuss the resources available to the completion of the proposed system, and those necessary for successful completion. In addition, availability windows are given to describe the time that each resource is needed and when each will be available for use.

Human Resources

During the course of development, certain tasks must be completed, requiring sufficient manpower at these points. A two member development team is available for the duration of the project to complete both the documentation and implementation of the system. In addition, a four member committee is necessary for the review and approval of results at given milestones in the course of system development. The committee is composed of the chairman, a professor of computer science whose special expertise lies in the area of data processing application programming, another computer science professor who has specific knowledge concerning the development of sufficient specifications and requirements for the system, an employee of the Computer Center, who brings expertise on University of Montana administrative programs, and policy regarding their development, and finally, the requester of the system, who has intimate knowledge of the system for which the proposed project is being developed. Each of these members must be available to review the progress of the project at proposed dates of delivery as discussed in the feasibility document. It is anticipated that there will be times when all committee members will not be able to be present at certain progress meetings, therefore individual review of documentation may be necessary in addition to the traditional group review of progress.

However, each member must be present for the final review, or defense, of the system scheduled for the first week in August.

In addition to periodic review of the proposed system by committee members, end users must also be available to clarify current system operation and to verify the desired nature of the eventual software. In particular, it is necessary to have communication with the two primary end users of the system as questions concerning procedures arise. Finally, before the system is operationally complete, the files of the current system must be entered into the automated system, requiring the time of one or more persons to perform data entry tasks. One of the end users has discussed the possibility that she may be able to do this task or that temporary help may be hired. Because of the lightened work load during the summer quarter at the University of Montana Physical Plant, it has been decided that this would be the most feasible time to enter the data if space is available on the target hardware system. Training of users on the proposed system once it is complete will be performed by the two member development team.

Hardware Resources

Several hardware alternatives were discussed in the feasibility document produced earlier, and it was the final recommendation to develop the system for the DEC 2065, a mainframe computer used for University of Montana administrative programs, because of program interface possibilities and ease of future maintenance. Based on this recommendation, this section will discuss those hardware resources available for use with the DEC 2065, and those necessary.

As previously discussed, the DEC 2065 is available for University of Montana administrative programs for which disk space has been allotted. It is currently being decided both whether and when disk space may be allocated for the key issue control data base and associated programs. The availability of disk space in time for full implementation of the program by August 1985 is as yet, unknown. Other necessary hardware includes a tape drive to create back up storage of data base information, which is currently available on the DEC 2065, and access to the program via terminals and printers. The Physical Plant currently owns several compatible terminals, and at least one printer to be used for this interface.

Software Resources

One of the main advantages of using the DEC 2065, as discussed in the feasibility study, is the opportunity for the key inventory control system to interface with existing administrative programs and data base information to provide for better control and tracking of key holders. In particular, access to both personnel and registration files may provide an earlier indication of key holders leaving the University system so that key returns may be requested. In addition, presently there are no records of key holder social security numbers, and these may be obtained via information already stored in administrative data bases. Addresses of key holders are also not maintained by the current system, but may be obtained by interfacing with available information on the DEC 2065, in order to initiate a letter sending function of the system which is anticipated to increase the return rate of keys. Therefore, the existence of these data bases is one of the software resources available to the proposed project.

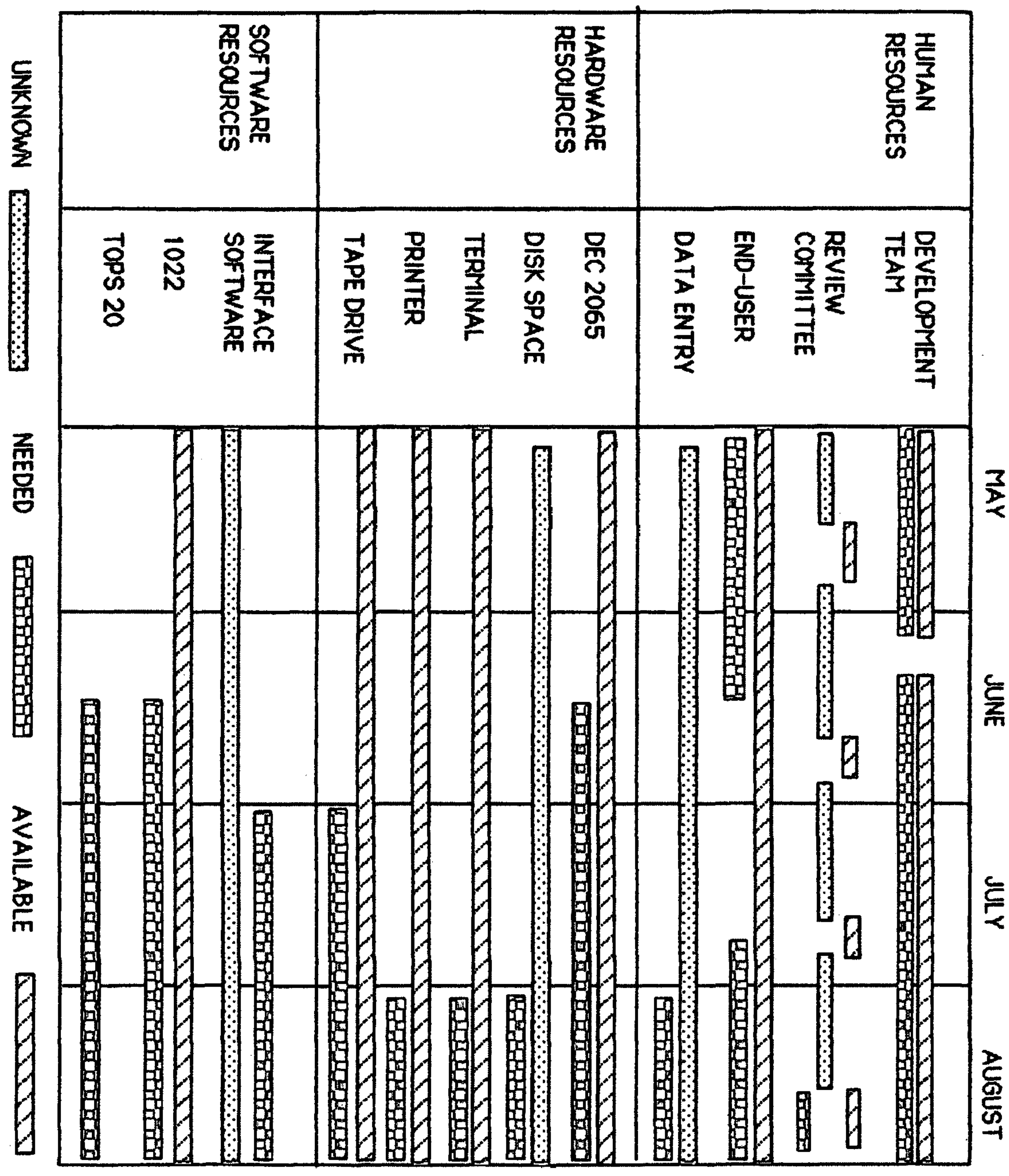
Another advantage of the DEC 2065 is the presence of a sophisticated data base system, 1022. This software allows for both storage of large amounts of data, and for query concerning this data. It also provides a programming language to access the data base. The proposed system must interface with the 1022 software. A less noticeable, but highly important software resource is the TOPS 20 operating system implemented on the

DEC 2065, which provides a user friendly environment for future use of the proposed project, and a rich setting for program development.

Availability Windows

The following diagram depicts the time frame when each human, hardware, and software resource will be necessary, and when each will be available.

FIGURE 20
AVAILABILITY WINDOWS



Cost/Benefit Appraisal

Several categories of cost may be incurred during the development of a software product. These are directly related to the resources necessary, and those already available. As seen in the previous section, all hardware resources are available, therefore, under the assumption of development proceeding on the DEC 2065, no funds will be required for the purchase of additional hardware. If, however, transition is made from the DEC 2065 to a microcomputer, hardware purchases will have to be made. From a survey of market availability, this figure would be approximately $5,000.00 to $8,000.00, depending on the sophistication and capabilities of the desired computer system.

Software resources are also available on the DEC 2065, therefore, no software purchases must be made for the present development effort. The cost of data base and operating system software for microcomputer development is included in the hardware cost figure above, should this become a future option.

The final cost to be discussed is that of human resources. Because of the nature of this project as a coursework requirement for the development team members, team development effort will require no funding. However, should the proposed system be converted to a microcomputer system, it will be necessary to fund persons for conversion. The cost of data entry can be estimated by the amount of time it will take to enter all current records into the data base system. With an estimation of approximately 20,000 records of key holders, and another 27,000 records concerning inventory and control records, and with the assumption that 500 records may be entered daily, the cost for data entry may approach $2,500.00.

The cost saved by the proposed system is harder to estimate. Time will be saved by using an on-line system, however, the major source of savings will be realized by the increased return rate of keys because of the accuracy and interface possibilities of the proposed system. The money saved in this area will be realized by the reduction of the necessity to rekey buildings because of the loss or non-return of keys, which, as discussed in the proposal document of this system, may approach $7,000.00 to rekey a building. In addition, more efficient use of the locksmith´s time may be gained by prediction of key use and the necessity to make more keys as supplies get low. Furthermore, front office procedures may be speeded up to allow office personnel more efficient use of their time.

Conclusion

In summary, this document provides the reader with an understanding of the processes of the current system, both physical and logical. Requirements for the implementation of the proposed system have been discussed and constraints on development have been described. System functions and data within the system have been defined, and necessary resources delineated. From the information contained within this narrative, progress may continue on the product design phase of development.

Schedule

Following is a projected schedule for the completion of remaining phases in the proposed project. These dates are approximate, due to both the inexact art of estimation and the difficulty of scheduling review meetings at the end of each phase.

5/13/85	-	Software Plans and Requirements
5/15/85	-	Validation
6/3/85	-	Product Design
6/5/85	-	Verification
6/26/85	-	Detailed Design
6/28/85	-	Verification
7/10/85	-	Coding and Unit Testing
7/31/85	-	Integration Testing
8/9/85	-	Final Implementation and User Manual

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Administrative Development, University of Montana Computer C

DESIGN DOCUMENT

KEY INVENTORY CONTROL

by

Michele Miley

Robin Fauntleroy

June 26, 1985

Table of Contents

Introduction

The software design phase of the life-cycle attempts to determine ´how´ to implement the ´what´ that was specified in the requirements phase. This is considered the structural design of the program or system; that is, what are the appropriate subsystems, programs, or modules, and how are they interconnected? In other words, it describes an acceptable programming solution to the problem specified in the requirements document. This process will determine the major characteristics of the final system, establishes the upper bounds in performance and quality that the best implementation can achieve, and may even determine what the final cost may be. The overall technical objective function of a the design phase is made up of varying amounts of emphasis on efficiency, maintainability, modifiability, generality, flexibility, and utility.

A good design specification shows the solution in two ways, in terms of function and logic. The functional description shows what the system is to do; the logic description shows how the system is actually structured to provide those functions. Tools are used to describe to the reader how these requirements are to be fulfilled. A design document may include some or all of the following tools available:

flow chart - a diagram that combines symbols and abbreviated narrative to describe a sequence of operations in a program system.

HIPO - consists of (1) a set of diagrams which show the functional breakdown of a system in the form of traditional hierarchy charts and (2) separate diagrams which explode each box on the hierarchy chart into a set of three boxes showing inputs, processes, and outputs.

pseudo-code - a notation similar in look, form, and meaning to both spoken language and programming languages; a bridge between the two.

structured charts - a pictorial way of expressing program logic, or structure, in a rigorous way, readable from top to bottom.

data flow diagrams - describes the system functionally, with symbols and text to describe a sequence of operations, but has no regard for the actual system structure.

decision tables - a simple, convenient way of showing what action is to be taken if a given condition or set of conditions exist.

coverage matrices - a means of showing the relationship between two kinds of information.

storage maps - pictures describing how the various storage devices are being utilized.

simulation models - the system being modeled is expressed in some computer language and the computer executes the resultant programs in imitation of the described system.

To establish criteria for evaluation of a ´good´ design, the following guidelines are presented:

1) A design should exhibit a hierarchical organization that makes intelligent use of control among elements of software.

2) A design should be modular; that is, the software should be logically partitioned into elements that perform specific functions and subfunctions.

3) A design should lead to modules (e.g., subroutines or procedures) that exhibit independent functional characteristics.

4) A design should be derived using a repeatable method that is driven by information obtained during software requirements analysis.

This design document is written for the Key Inventory Control System for the Physical Plant at the University of Montana. For a complete description of this system as it exists today and the proposed system, the reader is referred to the proposal (written April 4, 1985) and the Feasibility Document (written April 18, 1985). However, a brief overview of the system will be presented here to refresh the reader with the system under design.

There are two major divisions within the current key inventory system control system. The first is the actual locksmith operation, in which not only are keys made, but records are kept of which keys open which locks. The locksmith must maintain records of key numbers currently in use, those available for use, those retired, and the length of retirement. Furthermore, an inventory must be maintained of key blanks and other lock components. Presently, the locksmith is notified as particular keys are disbursed and supplies are depleted, thereby necessitating their duplication. The second major portion of the key inventory system is key issue control. Records must be kept of all persons possessing a given key, the deposits received, keys issued to an individual, keys returned by an individual and deposit refunds. Although the procedure for this is relatively straightforward, the amount of information that must be processed is quite extensive. Accuracy is essential for university security. The only account of key distribution is maintained by this office.

Recently, an unofficial audit was performed by State of Montana auditors on the key inventory control system, which suggested improvements might be in order. Because of the large number of keys involved, it has become extremely difficult and tedious to perform manual searches of records for desired information. Furthermore, much valuable employee time is consumed in this process. With the amount of transactions performed daily in the office, the possibility of an error exists. In addition, prompt service is often requested and may not be possible due to the current manual system.

Design Decomposition

The principles of structured design were used to specify the design of the key inventory control system. Structured design has two main principles: modules should be weakly coupled to each other and should exhibit as strong a level of cohesion as possible.

Coupling is defined as a measure of the strength of interconnection between modules. Thus, "highly coupled" modules are joined by strong interconnections and "loosely coupled" by weak interconnections. In other words, the more that we must know about module B in order to understand module A, the more closely connected A is to B. The factors that influence coupling are:

type of connection between modules;
complexity of interface;
type of information flow along the connection;
and, binding time of the connection.

Cohesion of each module is defined as how tightly bound or related its internal elements are to one another. An uncohesive module is one that may perform several tasks, whereas a highly cohesive module performs only one task. There are seven levels of cohesion and are listed here in order of increasing strength of cohesion.

coincidental cohesion
logical cohesion
temporal cohesion
procedural cohesion
communicational cohesion
sequential cohesion
functional cohesion

Cohesion and coupling are interrelated and generally, the greater the cohesion of individual modules in the system, the lower the coupling between modules will be. The major aim, then of structured design, is to produce modules which are functionally cohesive (execute one function only) and are loosely coupled (do their task with a minimum of information from other modules).

The method of transform analysis was used to derive an initial structural design. This method is a form of top-down strategy, which generally requires only a modest restructuring to arrive at a final design. Transform analysis consists of the following four steps:

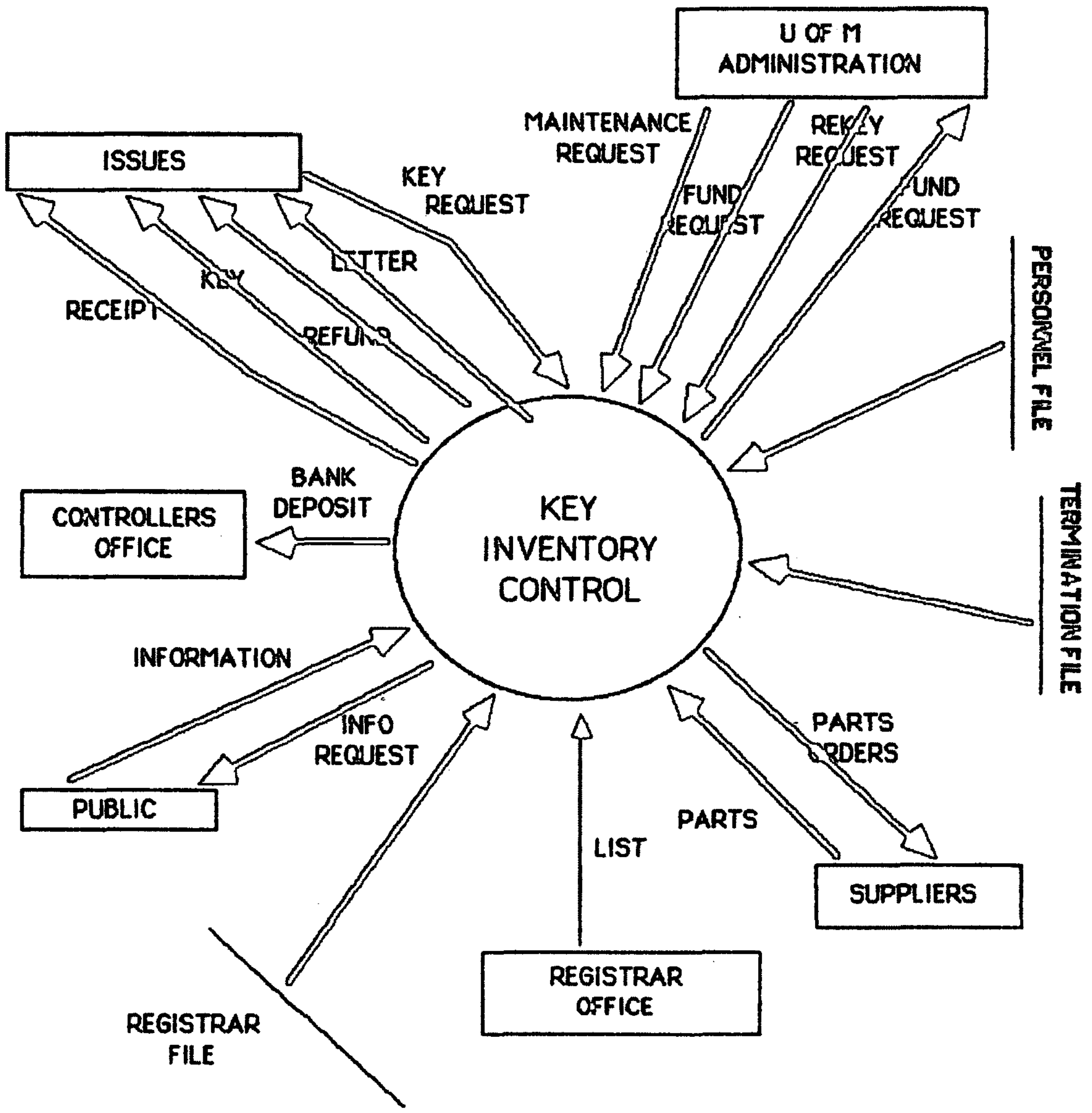
- restating the problem as a data flow graph (from Requirements document)
- identifying the afferent and efferent data elements
- first-level factoring
- factoring of afferent, efferent, and transform branches

The following section of this design document specifies the design for the key inventory control system. Data flow diagrams follow (from the Requirements Document) with the afferent, efferent and transform elements identified. Next is included the data dictionary which defines all terms used in the data flow diagrams. The hierarchical charts are included next and are followed by the overall description and interface specifications; and the algorithmic description. These two descriptions, written in both spoken English and pseudo-code should provide an unambiguous description of the modules. The last part of this section will include descriptions of the files necessary for storage of information within the system.

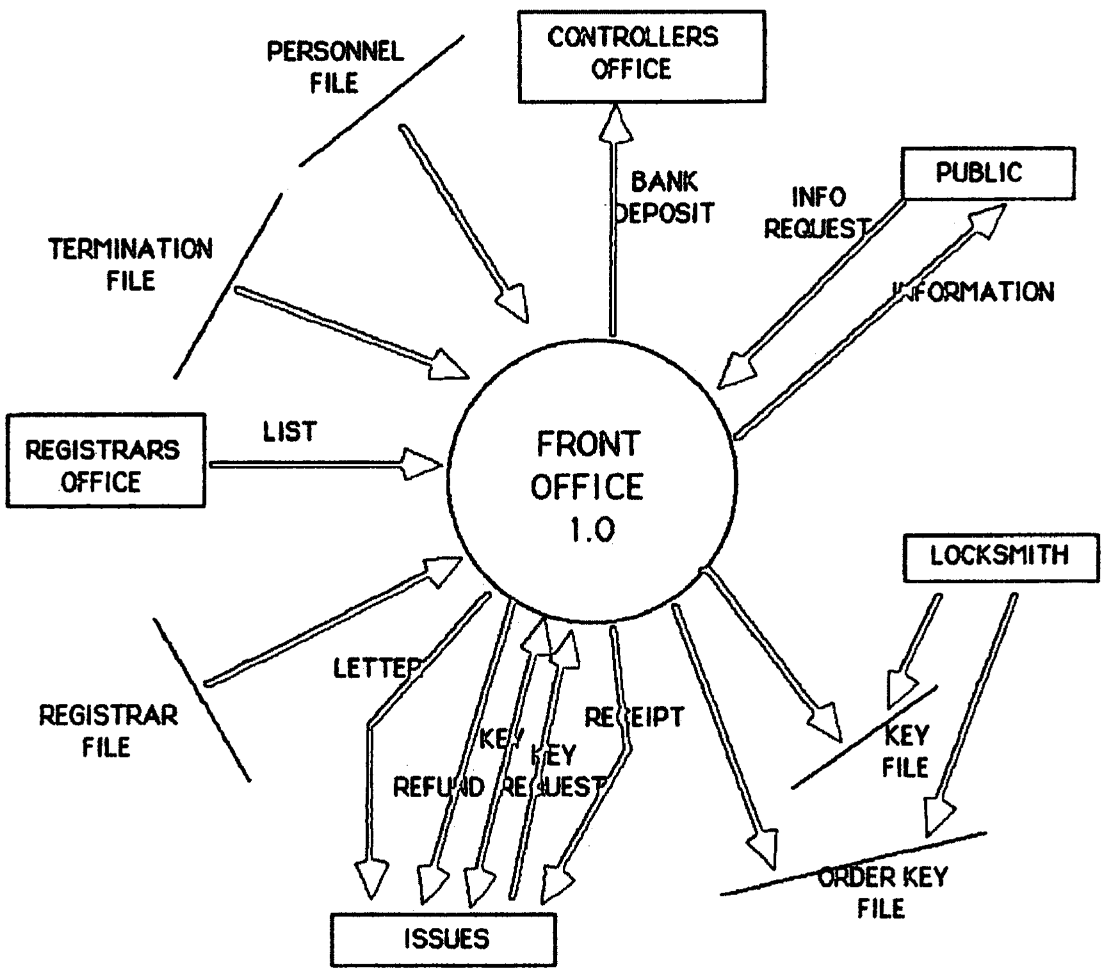
Data Flow Diagrams

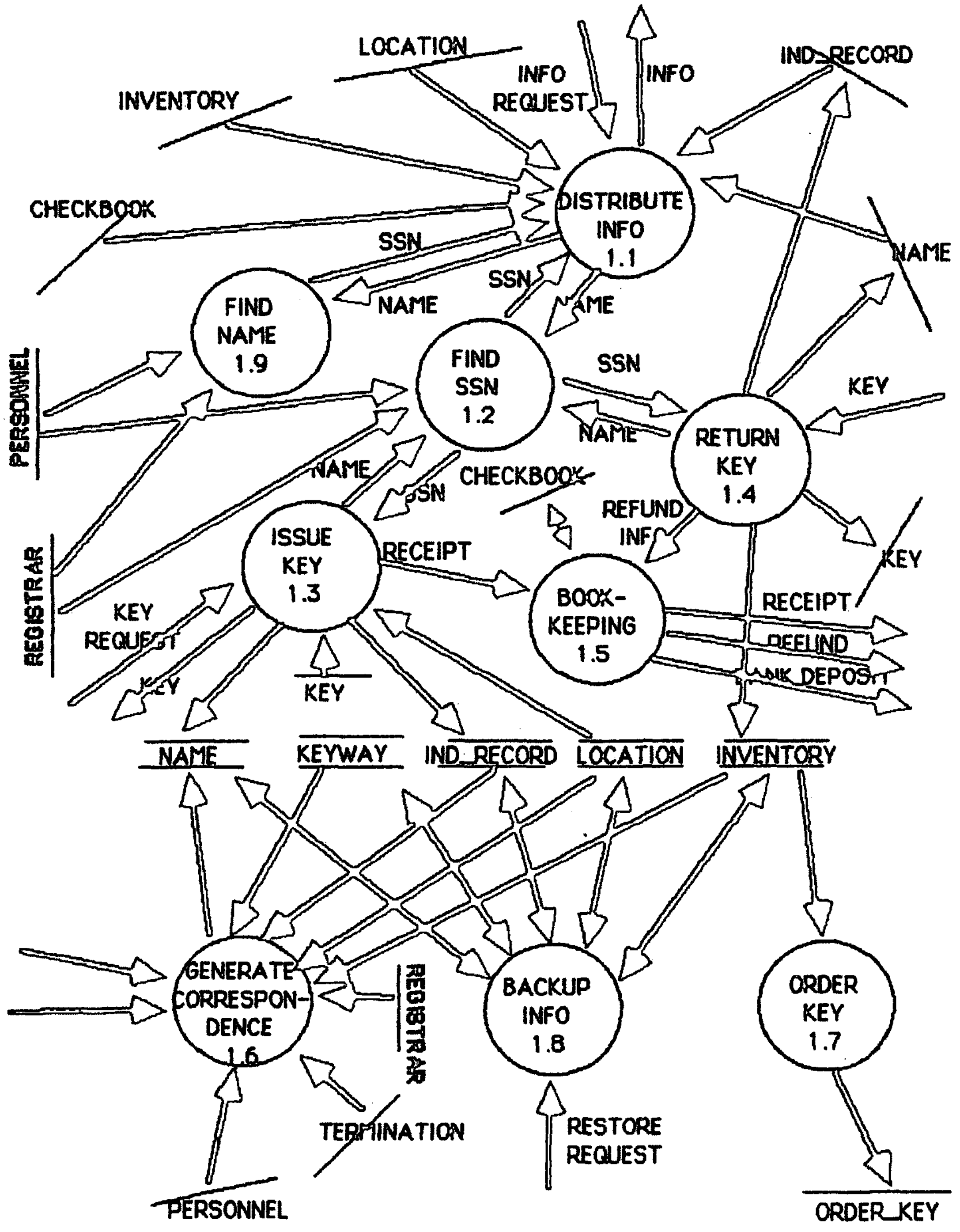
The following pages contain a pictorial representation of the data flows present in the proposed system. They are marked too indicate the afferent, transform and efferent processes within the system.

LEVEL 0: CONTEXT DIAGRAM

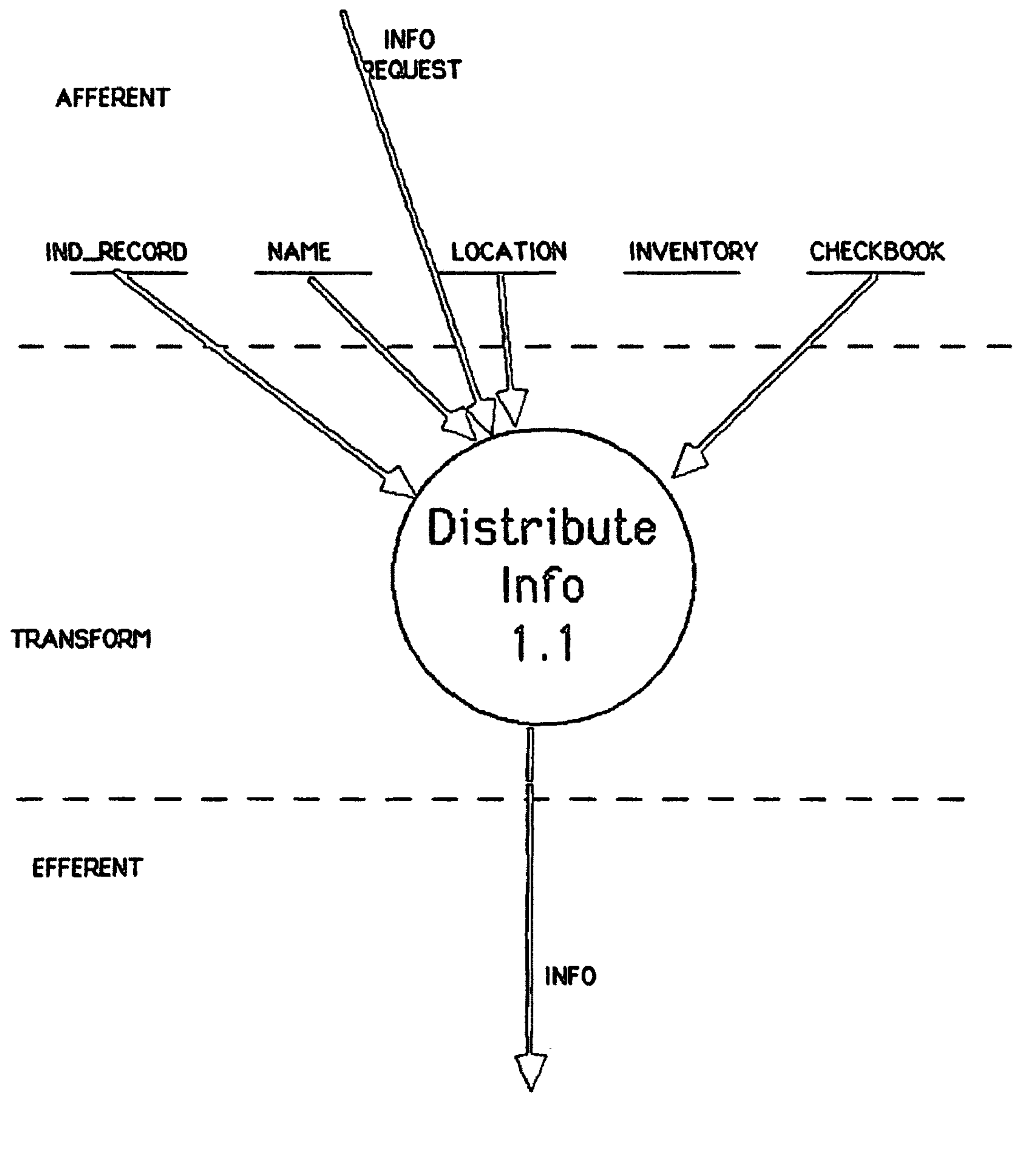


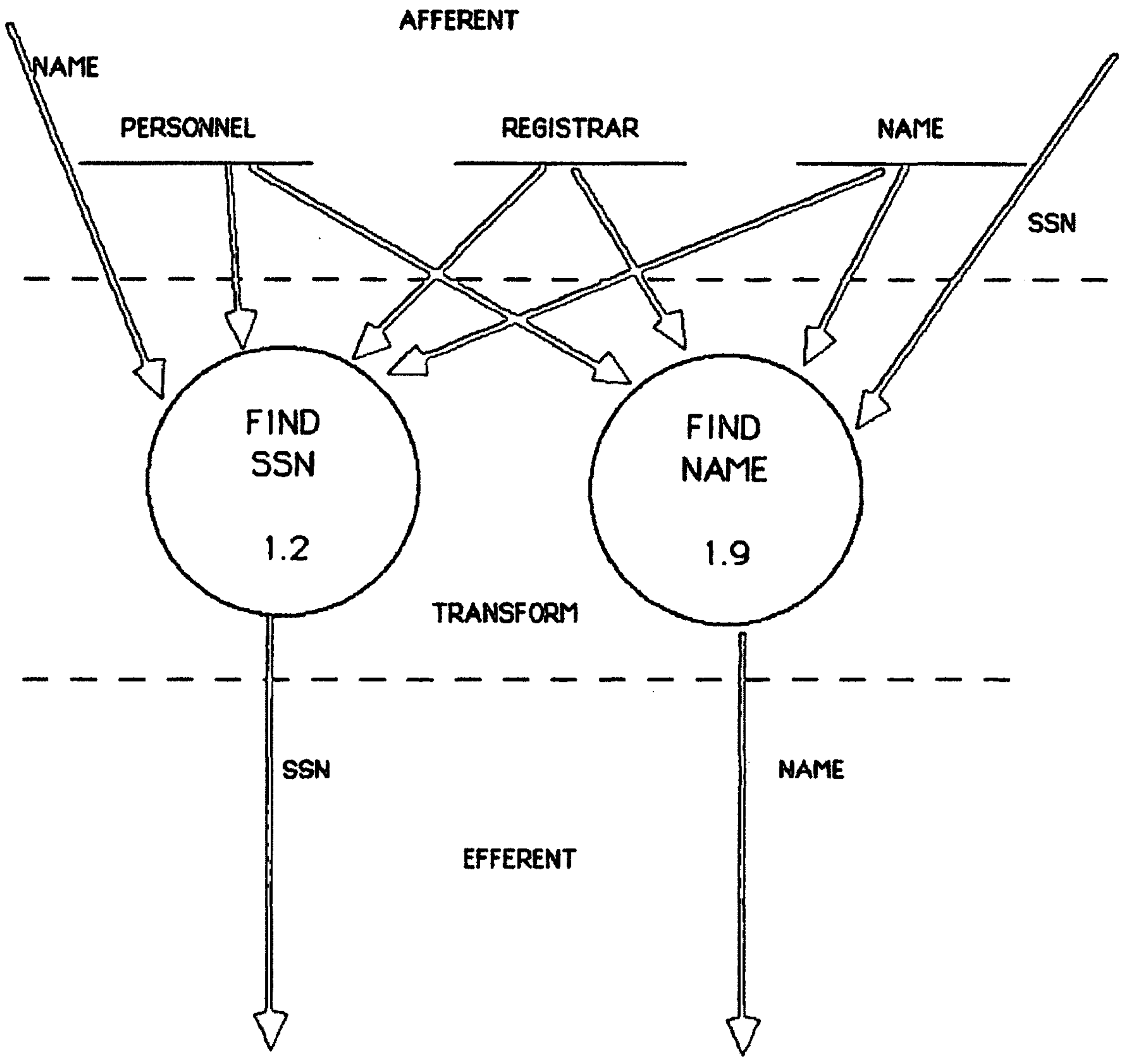
LEVEL 1: CONTEXT DIAGRAM
FRONT OFFICE



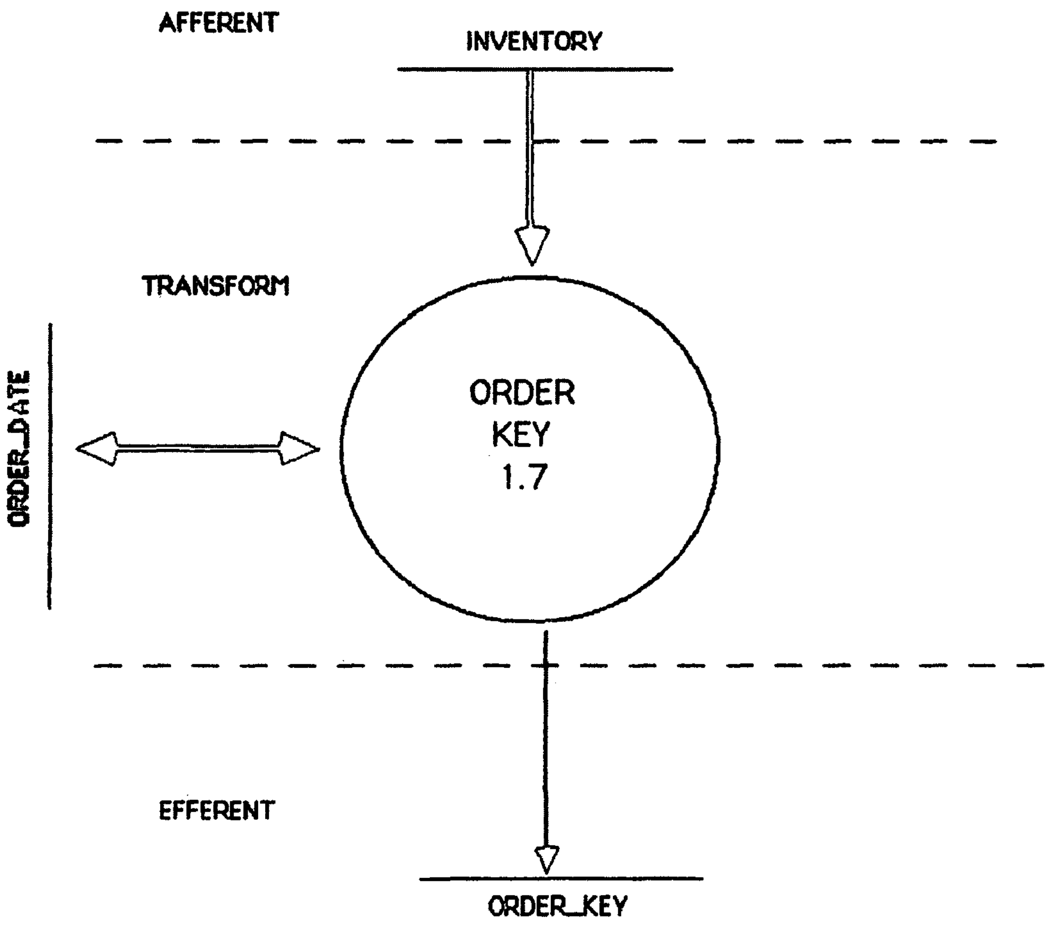

LOCATION
INVENTORY
INFO REQUEST
INFO
IND_RECORD
CHECKBOOK
DISTRIBUTE INFO 1.1
SSN
NAME
FIND NAME 1.9
FIND SSN 1.2
PERSONNEL
RETURN KEY 1.4
KEY
REGISTRAR
CHECKBOOK
REFUND INFO
ISSUE KEY 1.3
RECEIPT
BOOK-KEEPING 1.5
REFUND
BANK DEPOSIT
KEY REQUEST
KEYWAY
GENERATE CORRESPONDENCE 1.6
BACKUP INFO 1.8
ORDER KEY 1.7
TERMINATION
RESTORE REQUEST
ORDER_KEY

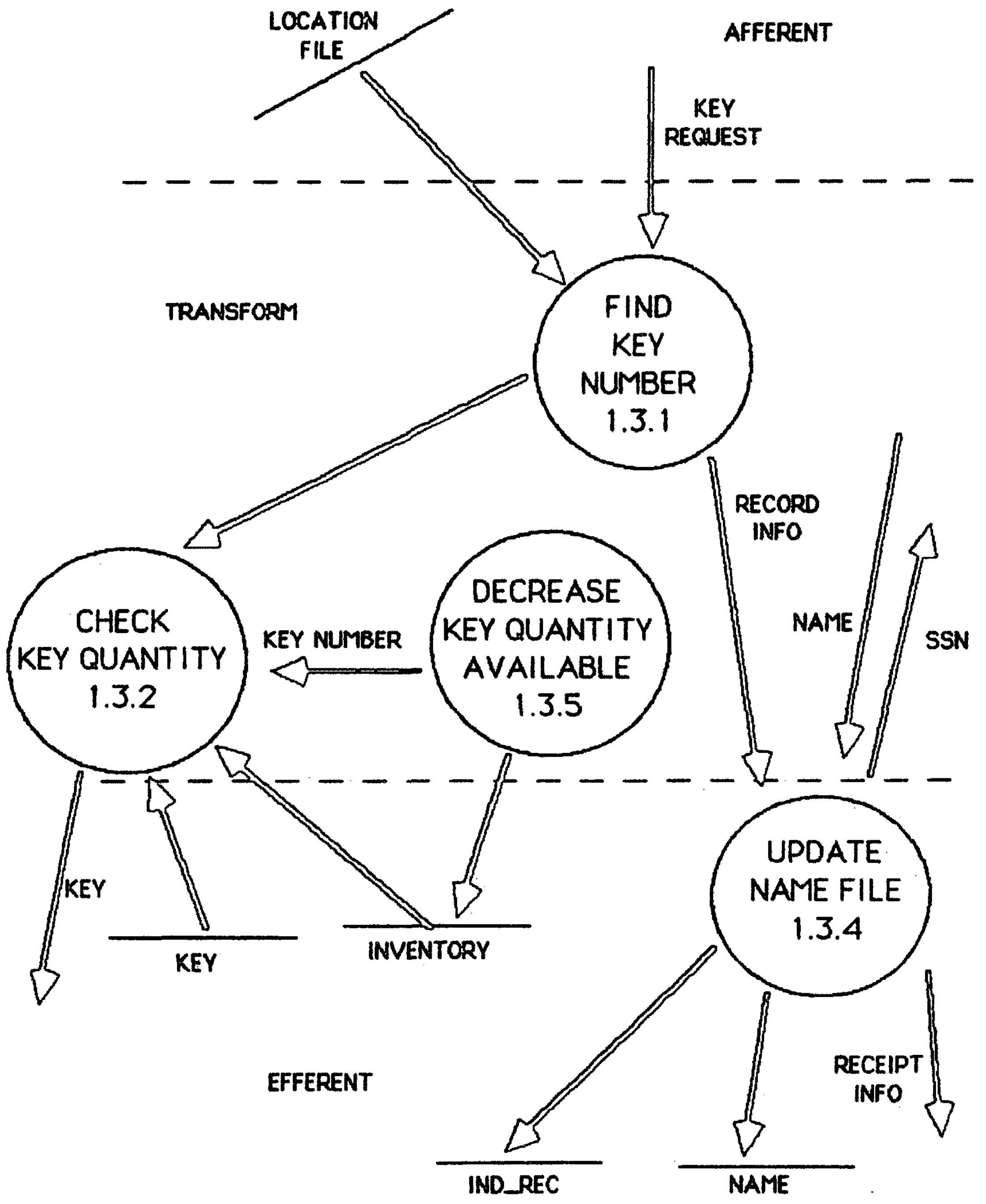
LEVEL 2: DISTRIBUTE INFO



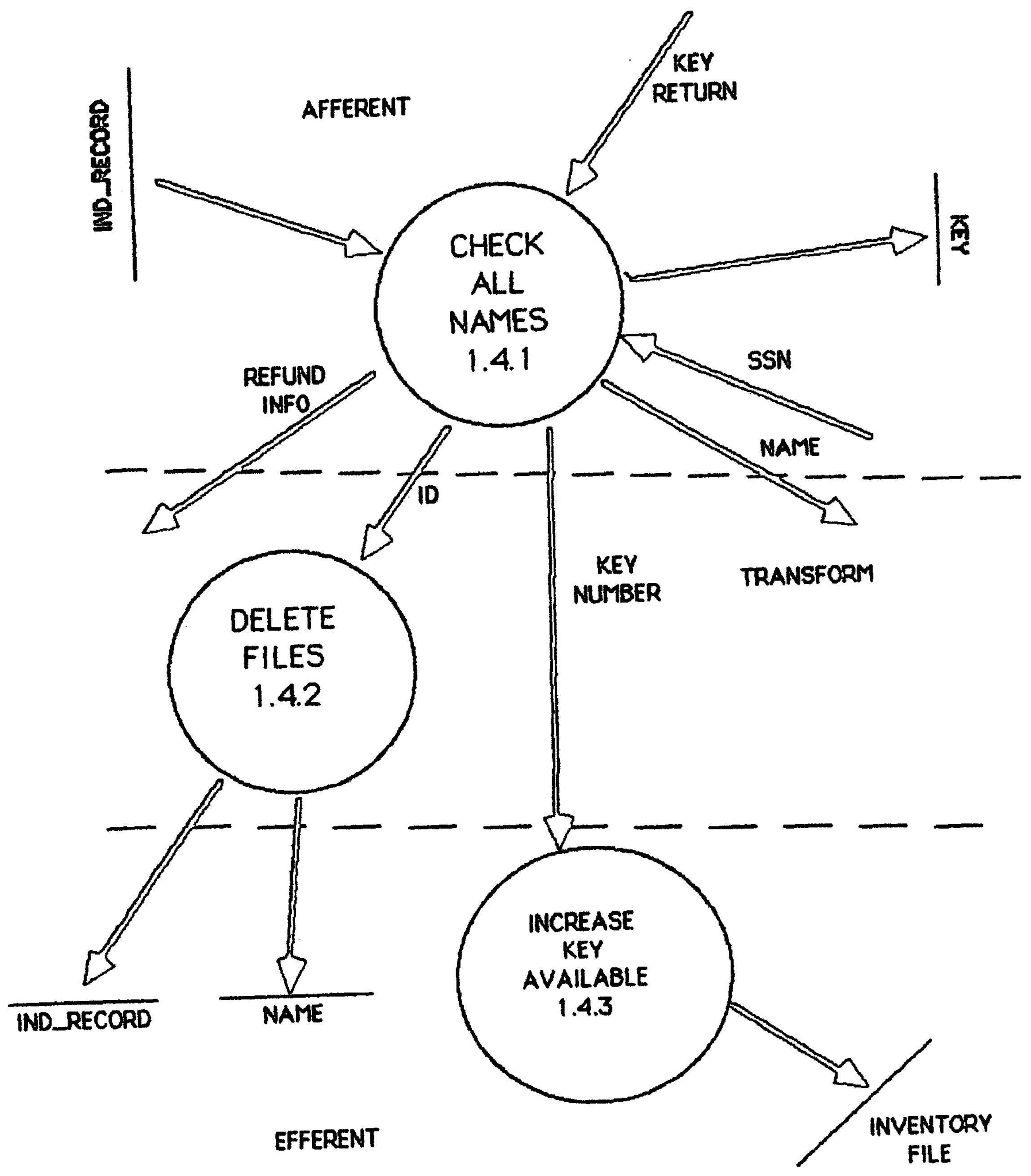

AFFERENT
NAME
PERSONNEL
REGISTRAR
NAME
SSN
FIND SSN 1.2
FIND NAME 1.9
TRANSFORM
SSN
NAME
EFFERENT

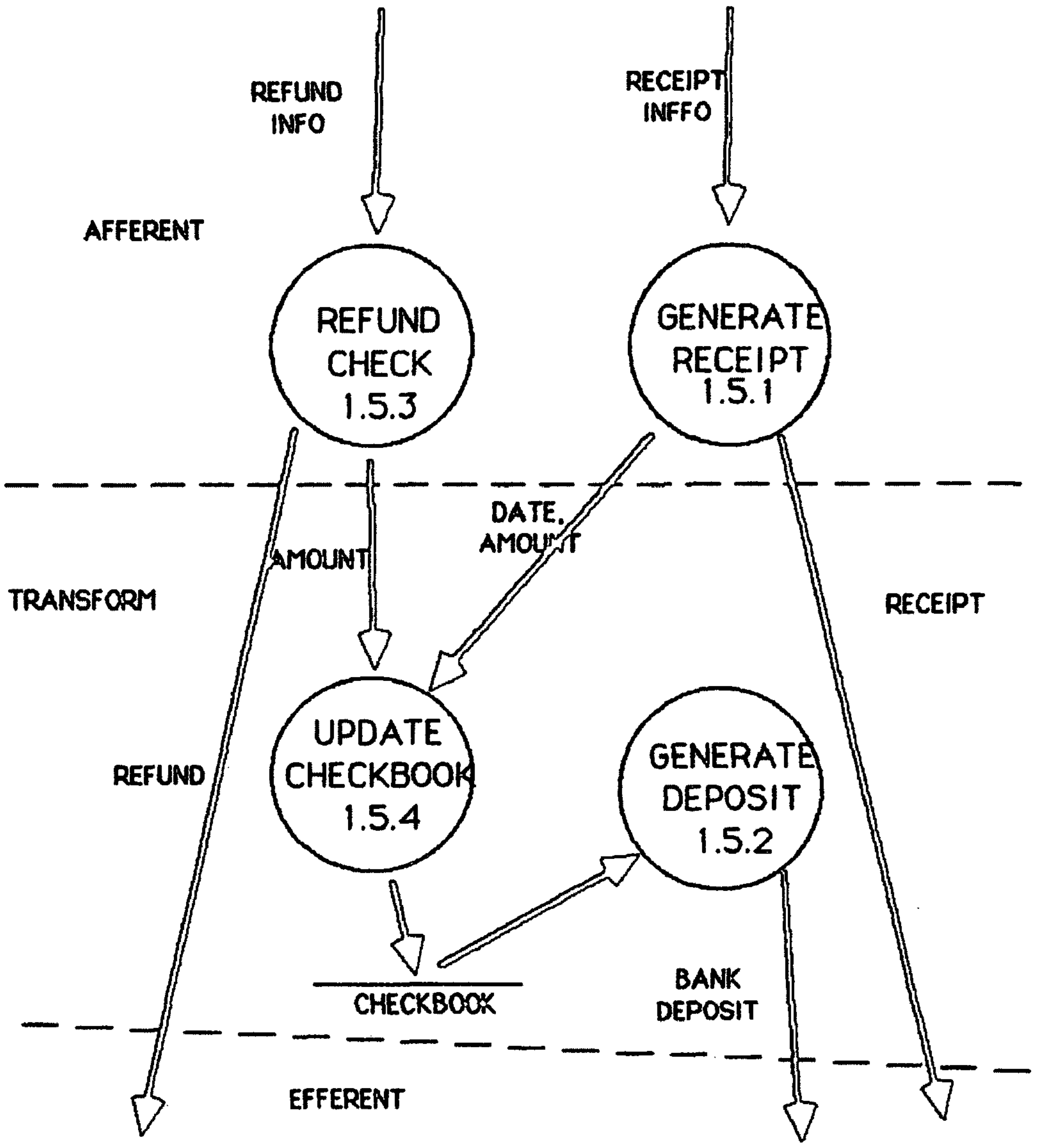
LEVEL 2: ORDER KEY

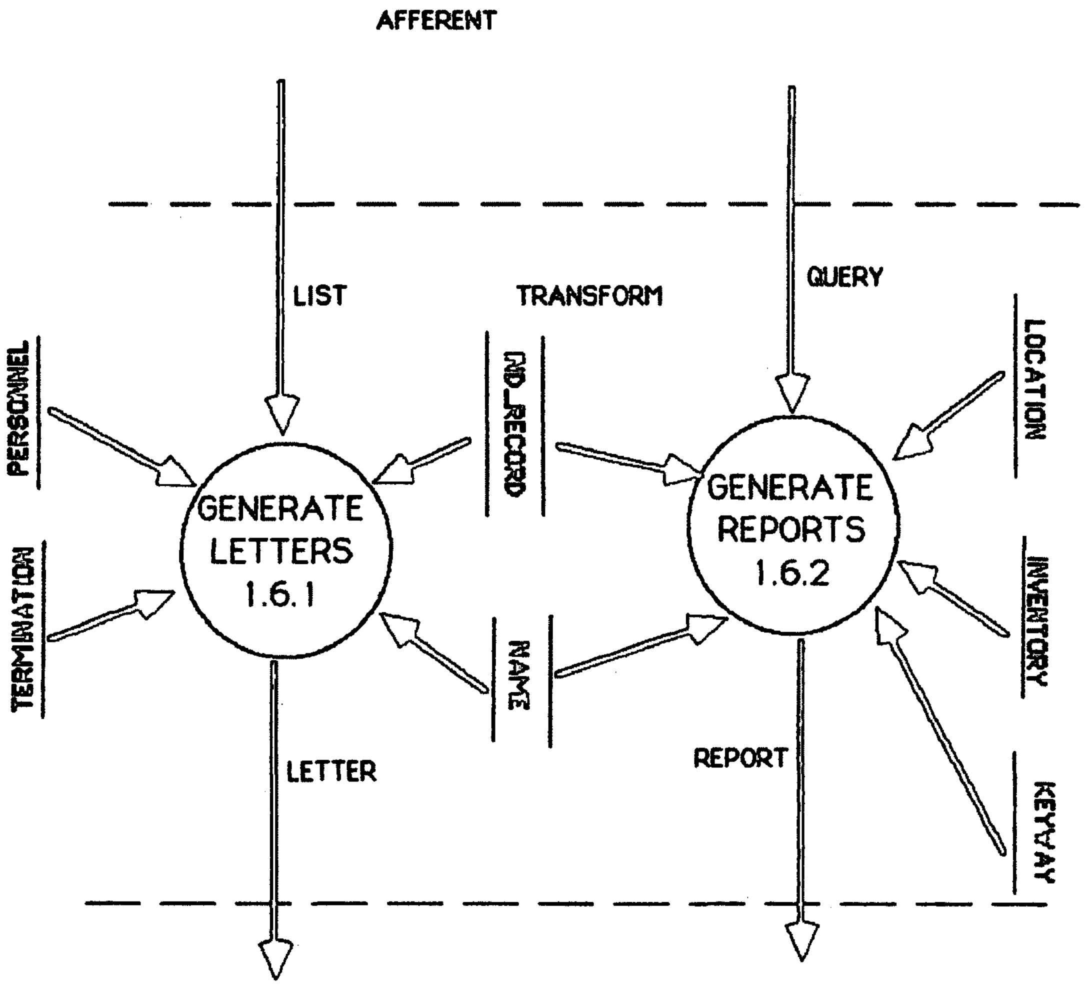



LOCATION FILE
AFFERENT
KEY REQUEST
TRANSFORM
FIND KEY NUMBER 1.3.1
RECORD INFO
CHECK KEY QUANTITY 1.3.2
KEY NUMBER
DECREASE KEY QUANTITY AVAILABLE 1.3.5
NAME
SSN
KEY
KEY
INVENTORY
UPDATE NAME FILE 1.3.4
EFFERENT
RECEIPT INFO
IND_REC
NAME

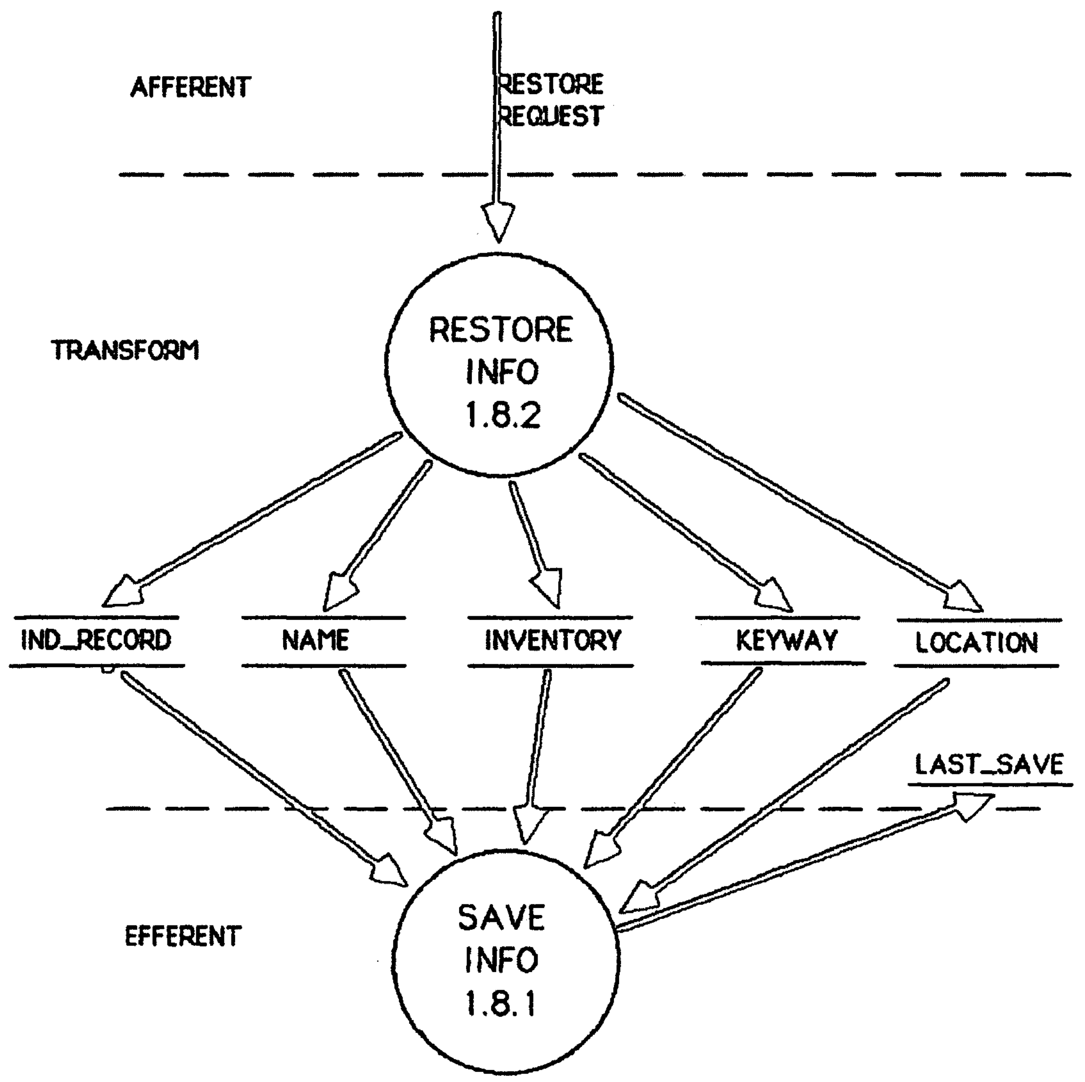
LEVEL 3: RETURN KEY



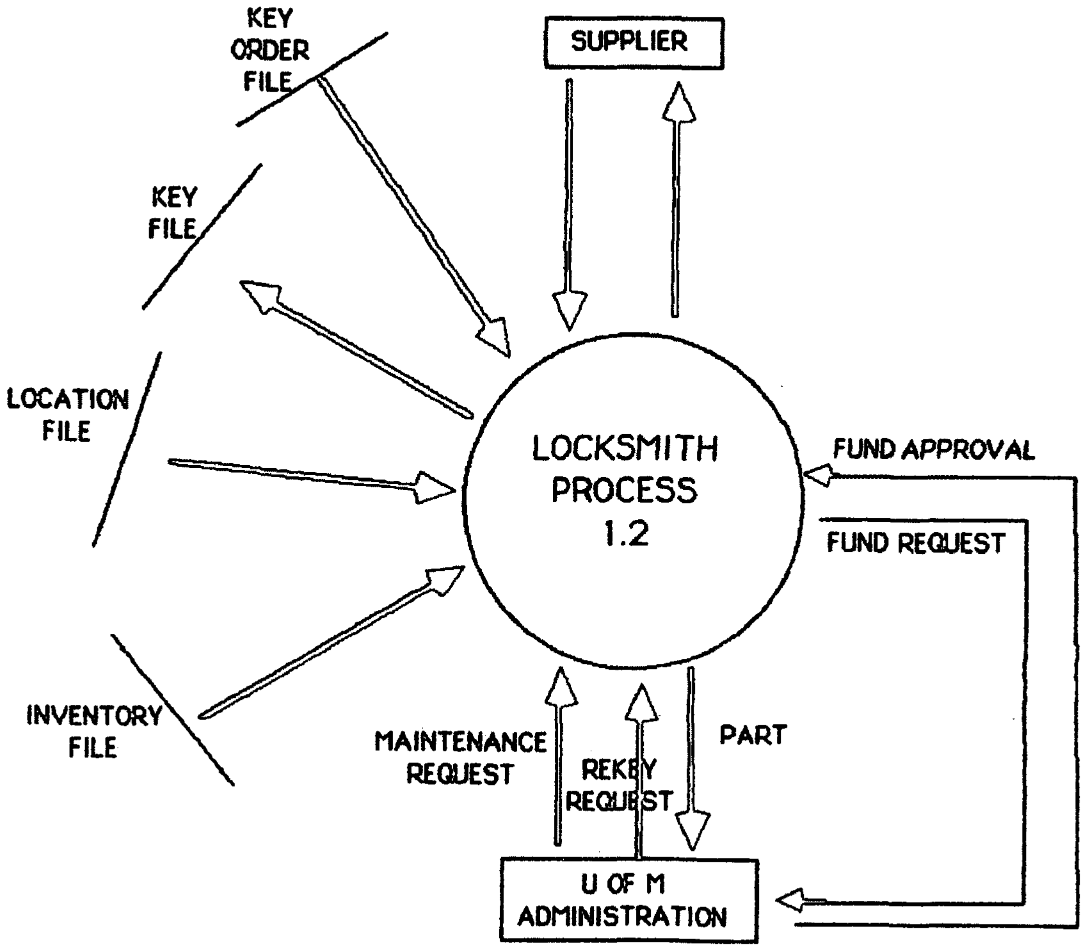

REFUND INFO
RECEIPT INFFO
AFFERENT
REFUND CHECK 1.5.3
GENERATE RECEIPT 1.5.1
DATE, AMOUNT
AMOUNT
TRANSFORM
RECEIPT
UPDATE CHECKBOOK 1.5.4
GENERATE DEPOSIT 1.5.2
REFUND
CHECKBOOK
BANK DEPOSIT
EFFERENT

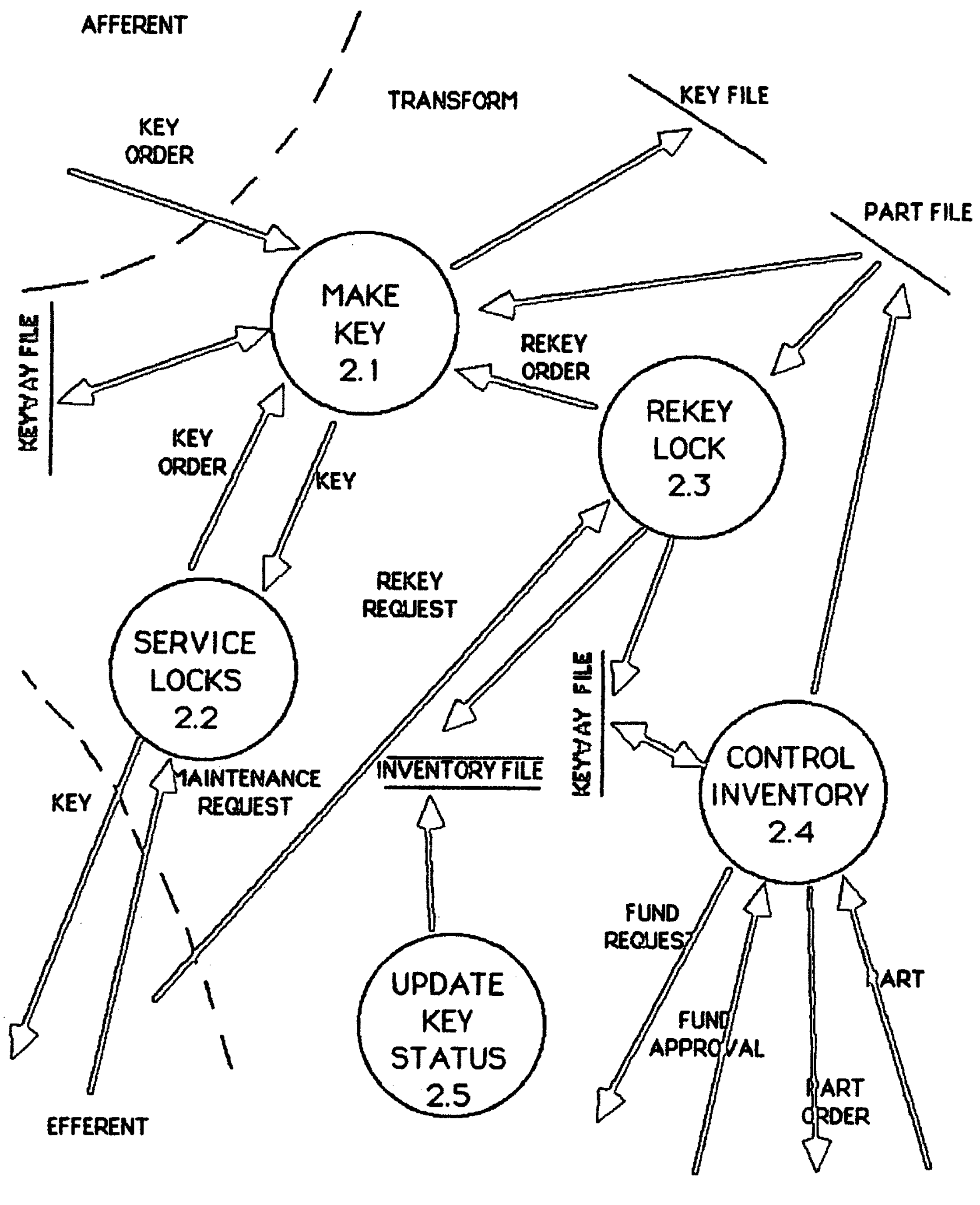

AFFERENT
LIST
TRANSFORM
QUERY
PERSONNEL
TERMINATION
GENERATE LETTERS 1.6.1
AID_RECORD
NAME
GENERATE REPORTS 1.6.2
LOCATION
INVENTORY
KEYWAY
LETTER
REPORT

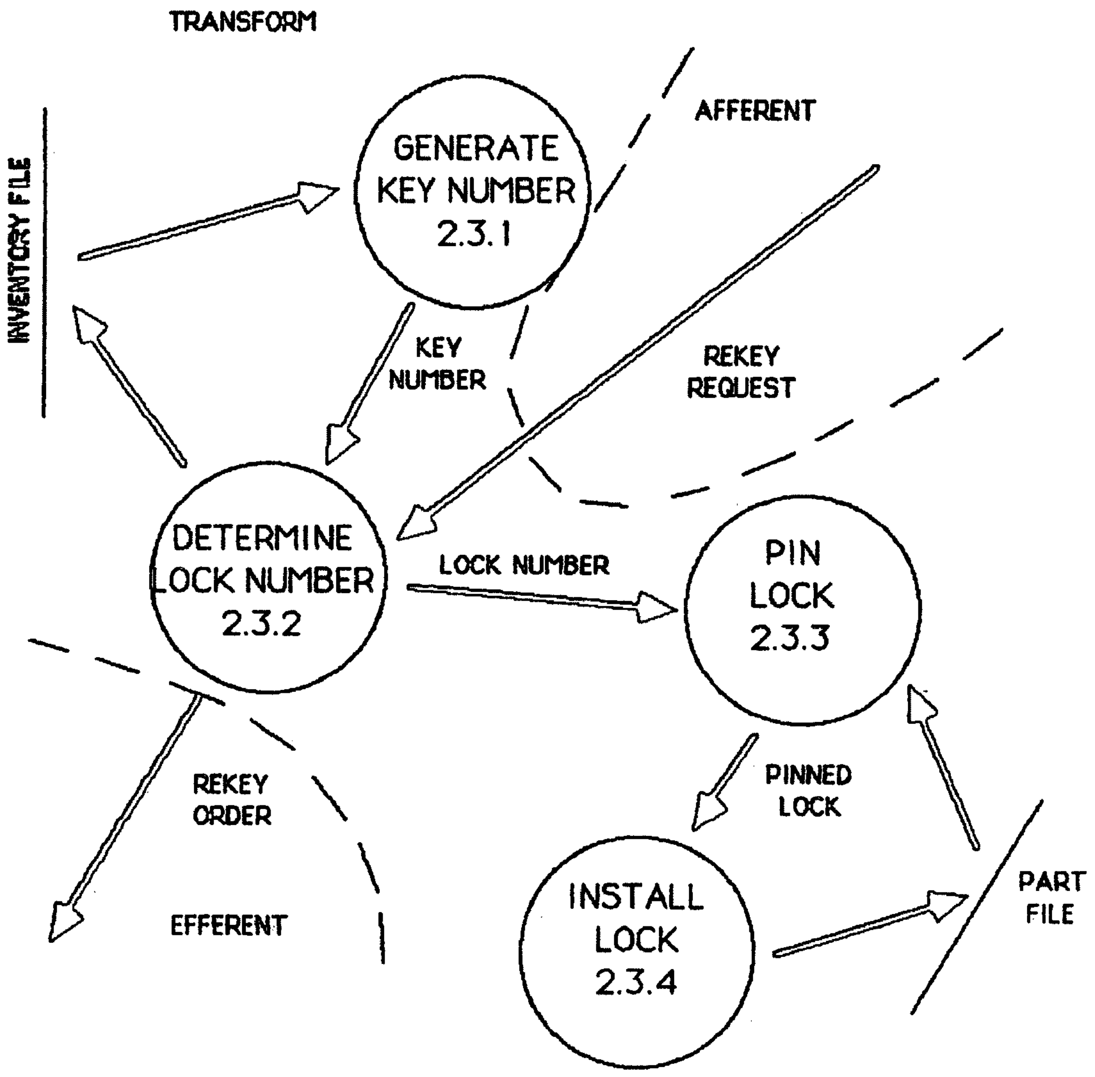
LEVEL 3: BACKUP INFO

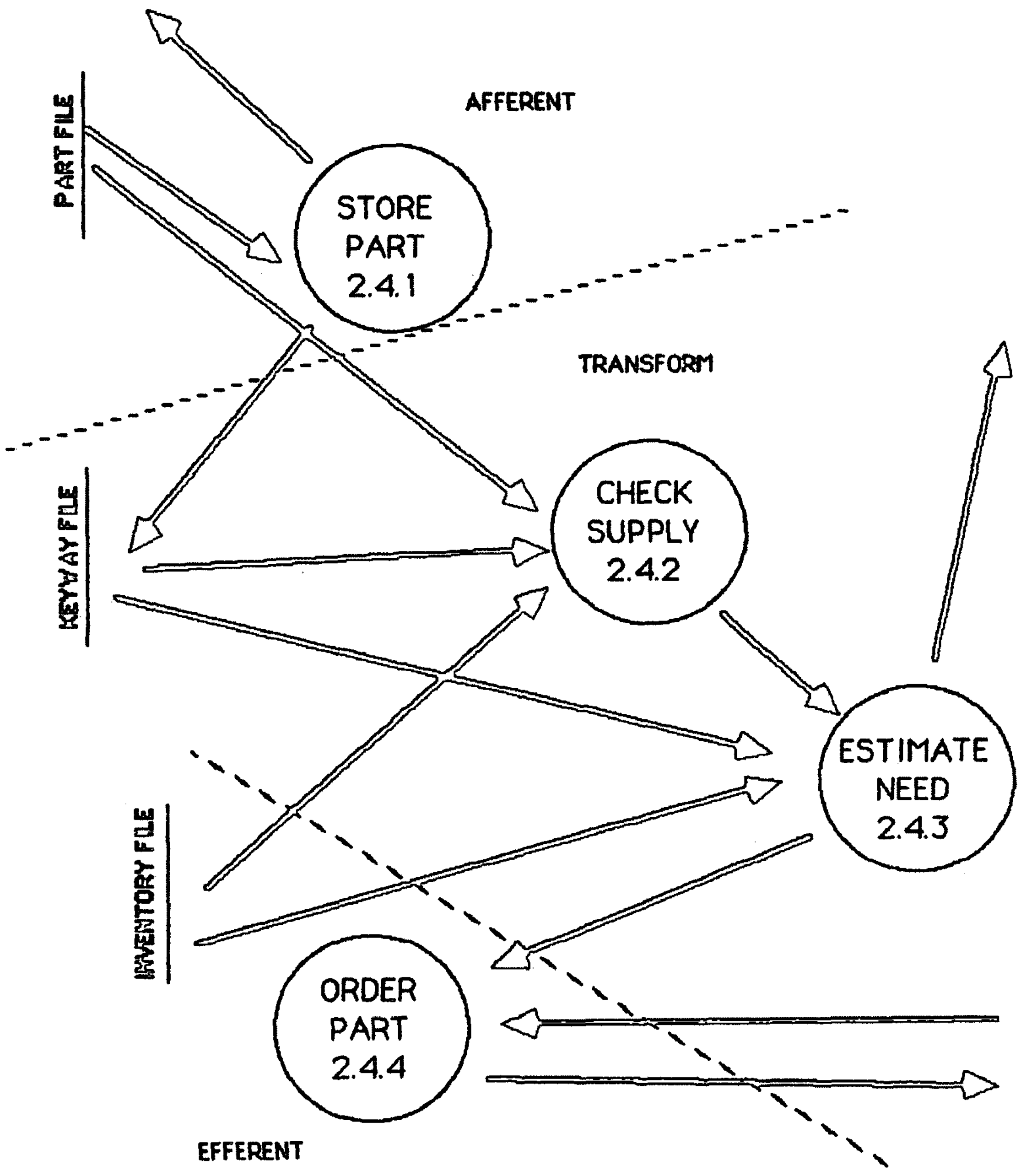


LEVEL 1: LOCKSMITH
CONTEXT DIAGRAM




AFFERENT
TRANSFORM
KEY FILE
KEY ORDER
PART FILE
MAKE KEY 2.1
KEYWAY FILE
REKEY ORDER
REKEY LOCK 2.3
KEY ORDER
KEY
REKEY REQUEST
SERVICE LOCKS 2.2
KEYWAY FILE
INVENTORY FILE
CONTROL INVENTORY 2.4
KEY
MAINTENANCE REQUEST
FUND REQUEST
PART
UPDATE KEY STATUS 2.5
FUND APPROVAL
PART ORDER
EFFERENT


TRANSFORM
AFFERENT
INVENTORY FILE
GENERATE KEY NUMBER 2.3.1
KEY NUMBER
REKEY REQUEST
DETERMINE LOCK NUMBER 2.3.2
LOCK NUMBER
PIN LOCK 2.3.3
REKEY ORDER
PINNED LOCK
EFFERENT
INSTALL LOCK 2.3.4
PART FILE


AFFERENT
PART FILE
STORE PART 2.4.1
TRANSFORM
KEYWAY FILE
CHECK SUPPLY 2.4.2
ESTIMATE NEED 2.4.3
INVENTORY FILE
ORDER PART 2.4.4
EFFERENT

Data Dictionary

Entries in the following pages provide a concrete definition for the flow af data between system processes. Each piece of data describes an item of information needed for a process to perform its function, or output desired by the users. Curly braces indicate that there may be a repetition of information within a data element, a plus sign indicates ´and´, and a vertical bar indicates ´or´. Parentheses depict an item that is optional. Comments about legal data values are enclosed by a slash and an asterisk. Data flows for both the front office and locksmith procedures are defined together, and both the current and proposed system may be found in this section. Descriptions of files and file layouts along with data structures to be used may be found in the appendixes.

```
allow entry = /* flag returned from Password */
              /* value is true or false */
```

```
amount = dollar amount of deposit |
         dollar amount of refund



availability = /* flag to indicate key issue
                      availability */
               /* value is true or false */



bank deposit = dollar amount +
               date +
               account number
```

```
building = Aber Hall |
           Alumni Center |
           Art Annex |
           Botany |
           Brantly Hall |
           Business Administration |
           Chemistry-Pharmacy |
           Corbin Hall |
           Craig Hall |
           Duniway Hall |
           Elrod Hall |
           Field House |
           Fine Arts |
           Forestry |
           Health Science |
           Health Service |
           Heating Plant |
           Jesse Hall |
           Journalism |
           Knowles Hall |
           Law |
           Lecture Hall |
           Liberal Arts |
           Library |
           Lodge |
           Mathematics |
           Men´s Gymnasium |
           Miller Hall |
           Music |
           North Corbin Hall |
           Pharmacy-Psychology |
           Physical Plant |
           Jeanette Rankin Hall |
           Science Complex |
           Social Sciences |
           Swimming Pool |
           Turner Hall |
           University Center |
           University Hall |
           McGill Hall |
           1010 Arthur |
           600 Beckwith |
            720 Beckwith |
            612 Eddy |
            616 Eddy |
            626 Eddy |
            724 Eddy |
            730 Eddy |
            1414 Maurice |
            600 University |
            Forestry Science Lab |
            Forestry Science Admin |
            Forestry Biolab |
            Clinical Psychology Center |
            Performing Arts |
            Married Student Housing



date = date of deposit received



delete name flag = /* flag to indicate no keys
                      held */
                   /* value is true or false */



deposit refunds = name +
                  date +
                  dollar amount



fund approval = fund request +
                signature of approval
```

```
fund request = needed part count +
               estimated dollar amount



ID = name |
     social security number



info = information



info request = building + room number |
               key number |
               ID



information = keyholder |
              key number |
              location |
              bank deposit |
              inventory |
              keys held



information requests = room number |
                       building |
                       {key owners}
```

```
key = key blank +
      key number



key list = { key number }
           /* all entries refer to same building
              and room number */



keycard = ID +
          building number +
          room number +
          key number +
          date



key number = bit cut number +
             keyway number



key order =    key number +
               amount needed
```

```
key request = ID +
              date +
              user´s position +
              building +
              room number +
              approval signature +
              deposit amount



key return = ID +
             key number



letter = letter to terminated personnel |
         letter to graduating students



list =     name +
           SSN +
           address
        /* list of graduating students */



location = building +
           room number
```

```
lock number = key number



maintenance request = building number +
                      room number +
                      description of problem



married student housing = Garnet Court |
                          Bannack Court |
                          Rimini Court |
                          Yreka Court |
                          Pioneer Court |
                          Helena Court |
                          Craighead



menu choice = /* flag to indicate user´s choice
                 of function */



name = /* name of keyholder */
       /* stored in Personnel, Registrar, or
          Name File */
```

```
name issue info = name +
                  key number +
                  deposit amount +
                  date +
                  (social security number)



name return info = name +
                   key number +
                   (social security number)



needed part count =     part +
                        part number +
                        amount needed



new_key_number = key number



part = lock |
       pin |
       pinned lock |
       key blank
```

```
part count =     part +
                 part number +
                 amount on hand


part number = lock number |
              keyway number |
              pin size


part order = needed part count +
             fund approval


password = /* word given to gain access to
                  program portions */


pinned lock = lock +
              lock number


query = keyholder report |
        inventory report |
        locksmith report |
        location report
```

```
receipt = receipt info


receipt info = name +
               amount +
               date


record info = ID +
              key number +
              date +
              amount


refund = refund info +
         dollar amount of refund


refund info = name +
              amount +
              date


rekey order = key order +
               building  +
               room number
```

```
rekey request = building name +
                (room number)



request info = info request



requested = /* flag to indicate user request for
                 maintenance program entry */
            /* value is true or false */



report = keyholder  |
         inventory  |
         locksmith  |
         location



restore request = requested



room number = number assigned to given room
```

```
ssissue info = social security number +
               key number +
               deposit amount +
               date
```

```
SSN = social security number
```

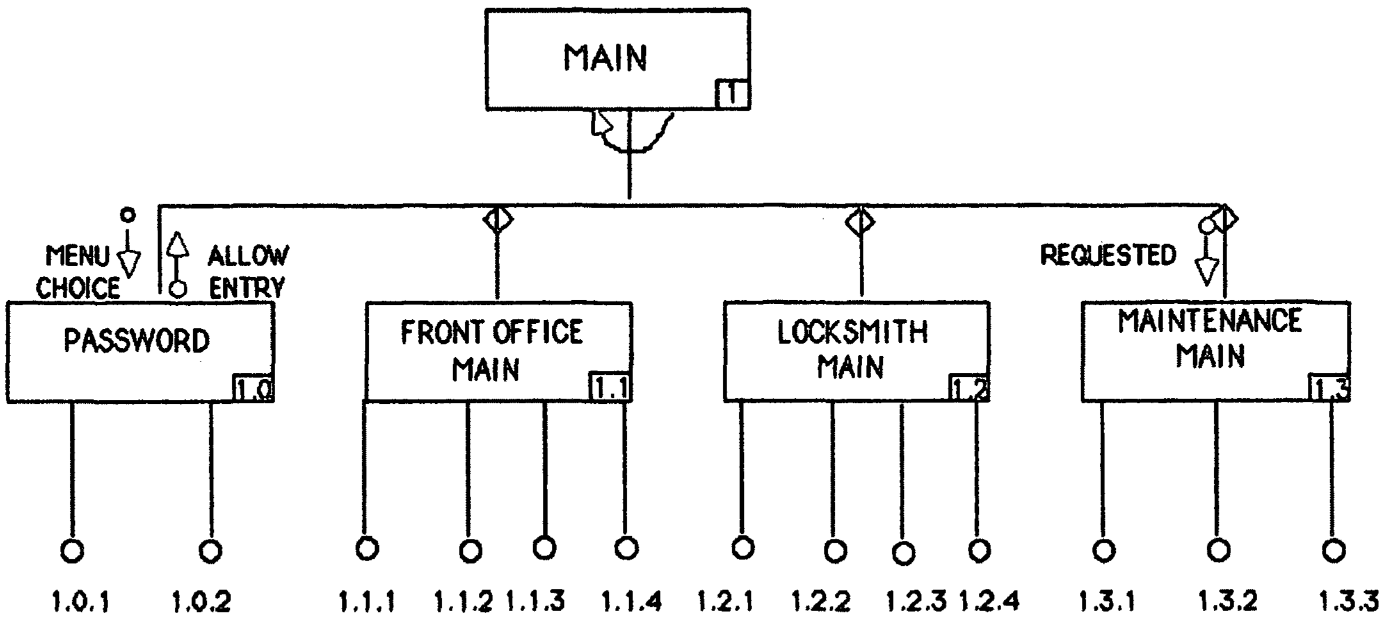
```
ssreturn info = social security number +
                key number
```

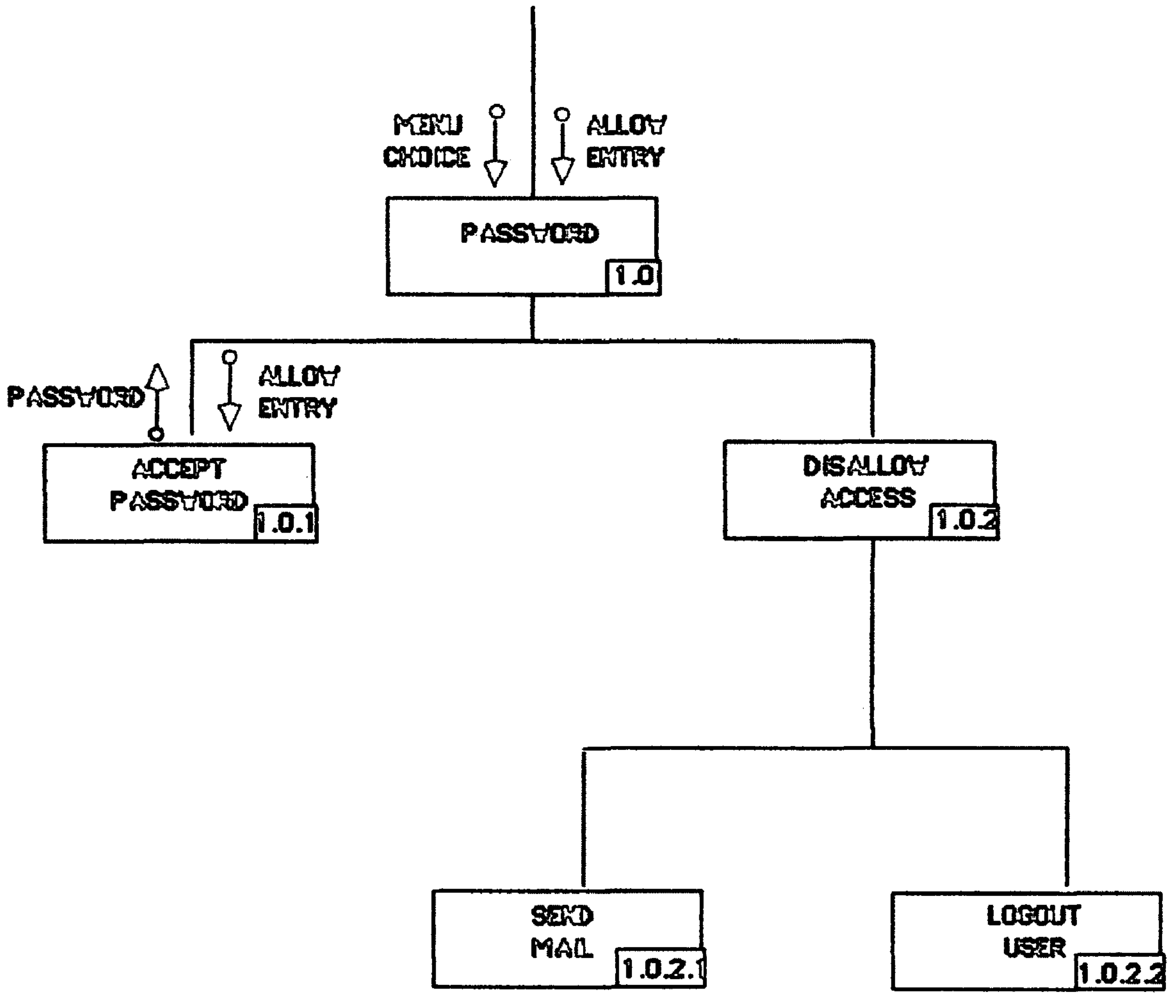
```
temp list = SSN +
            { key number }
```

```
user choice = menu choice
```

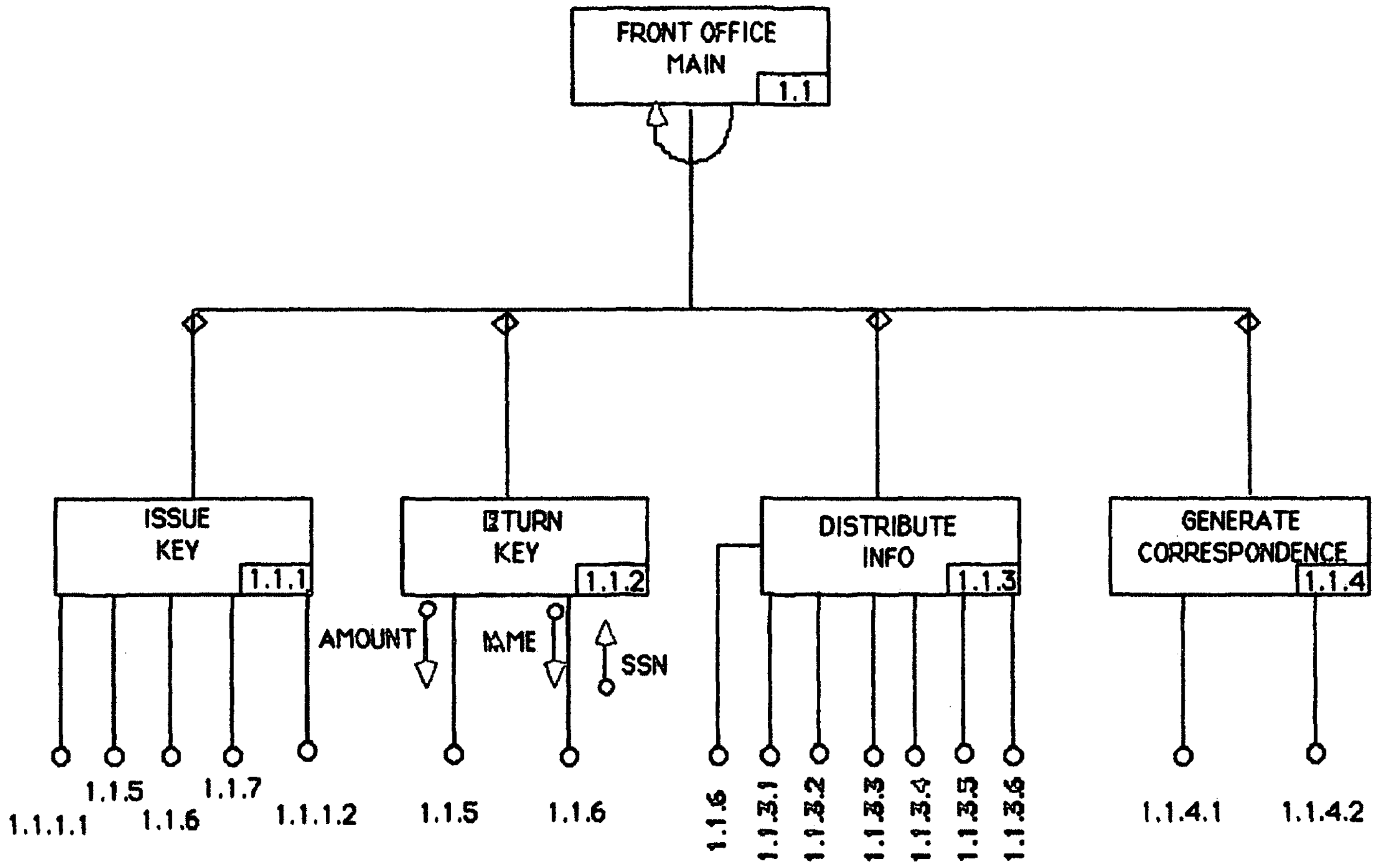
Hierarchical Charts

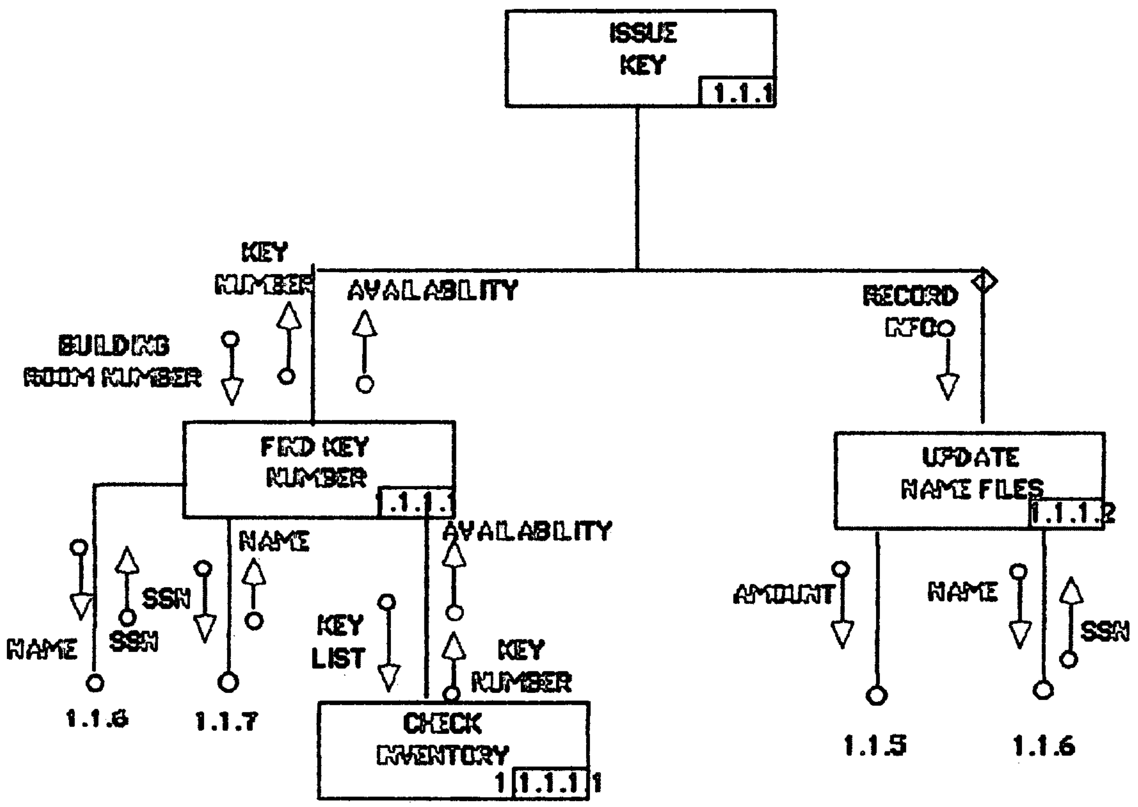
The following pages contain a pictorial representation of the modular structure of the proposed program solution. Both flow of data and flow of control are indicated.

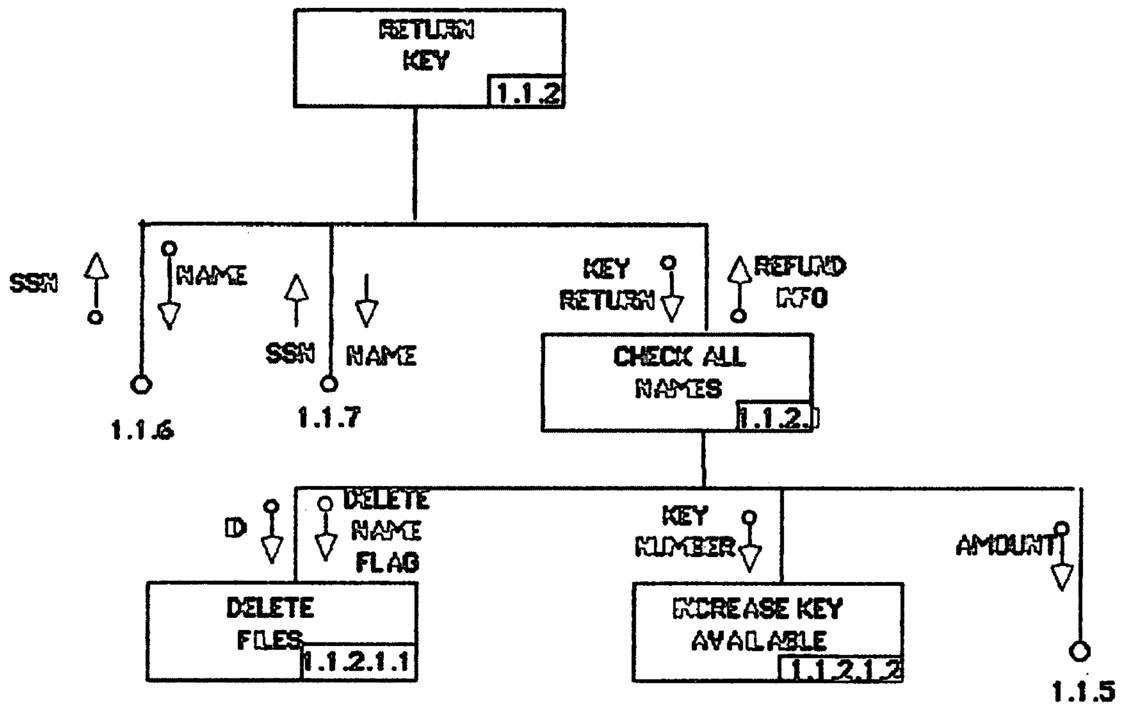

MAIN
1
MENU CHOICE
ALLOW ENTRY
REQUESTED
PASSWORD
1.0
FRONT OFFICE MAIN
1.1
LOCKSMITH MAIN
1.2
MAINTENANCE MAIN
1.3
1.0.1
1.0.2
1.1.1
1.1.2
1.1.3
1.1.4
1.2.1
1.2.2
1.2.3
1.2.4
1.3.1
1.3.2
1.3.3

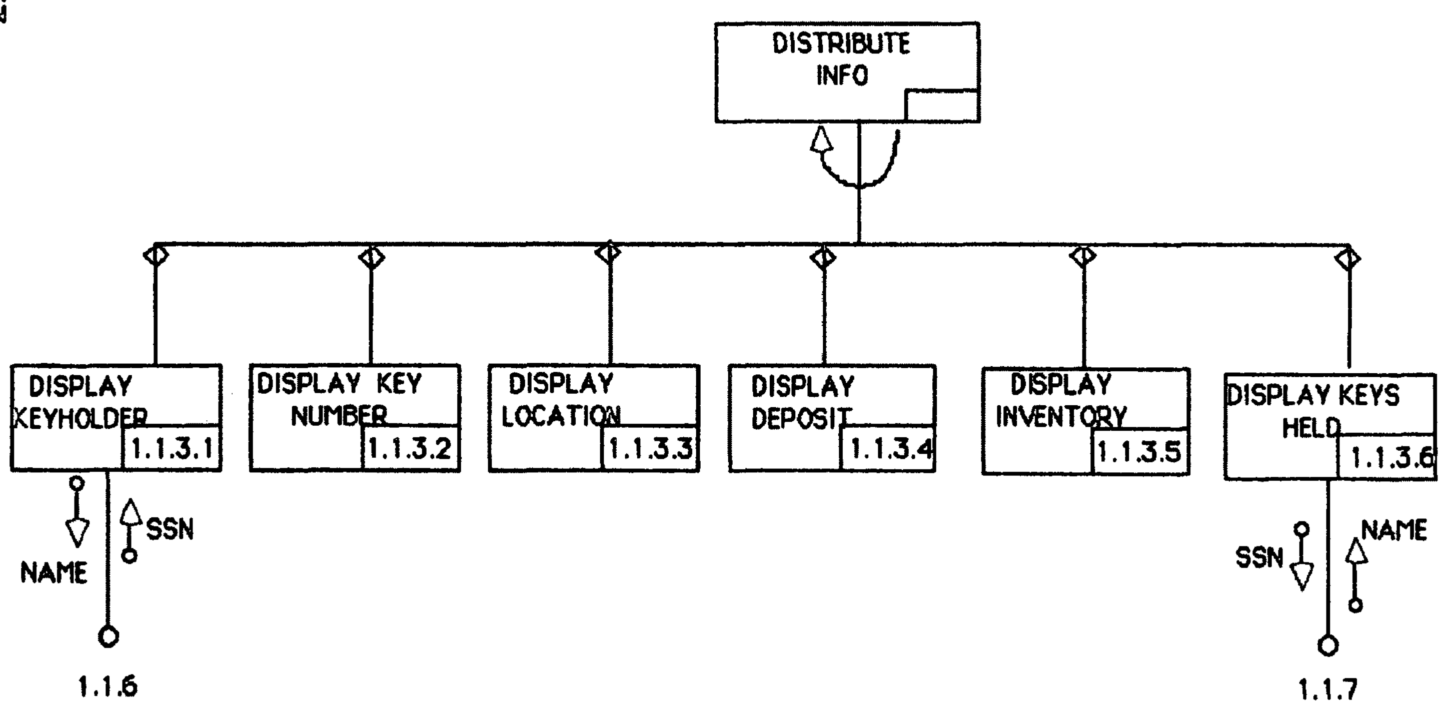

MENU CHOICE
ALLOW ENTRY
PASSWORD
1.0
PASSWORD
ALLOW ENTRY
ACCEPT PASSWORD
1.0.1
DISALLOW ACCESS
1.0.2
SEND MAIL
1.0.2.1
LOGOUT USER
1.0.2.2

FRONT OFFICE MAIN



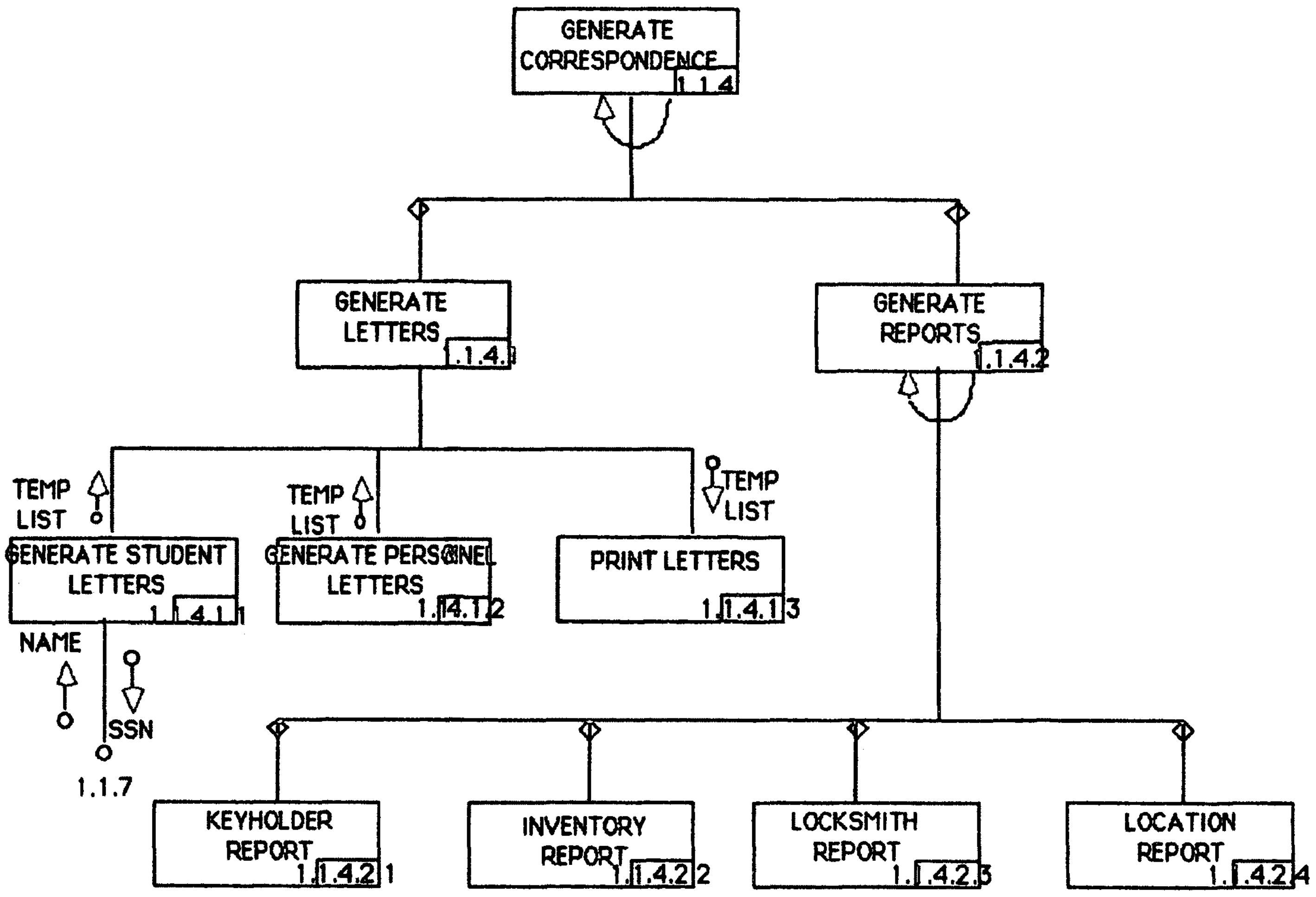

ISSUE KEY
1.1.1
KEY NUMBER
AVAILABILITY
RECORD INFO
BUILDING ROOM NUMBER
FIND KEY NUMBER
1.1.1.1
UPDATE NAME FILES
1.1.1.2
NAME
SSN
SSN
NAME
AVAILABILITY
KEY LIST
KEY NUMBER
1.1.6
1.1.7
CHECK INVENTORY
1.1.1.1.1
AMOUNT
NAME
SSN
1.1.5
1.1.6


RETURN KEY
1.1.2
SSN
NAME
1.1.6
SSN
NAME
1.1.7
KEY RETURN
REFUND INFO
CHECK ALL NAMES
1.1.2.1
ID
DELETE NAME FLAG
DELETE FILES
1.1.2.1.1
KEY NUMBER
INCREASE KEY AVAILABLE
1.1.2.1.2
AMOUNT
1.1.5

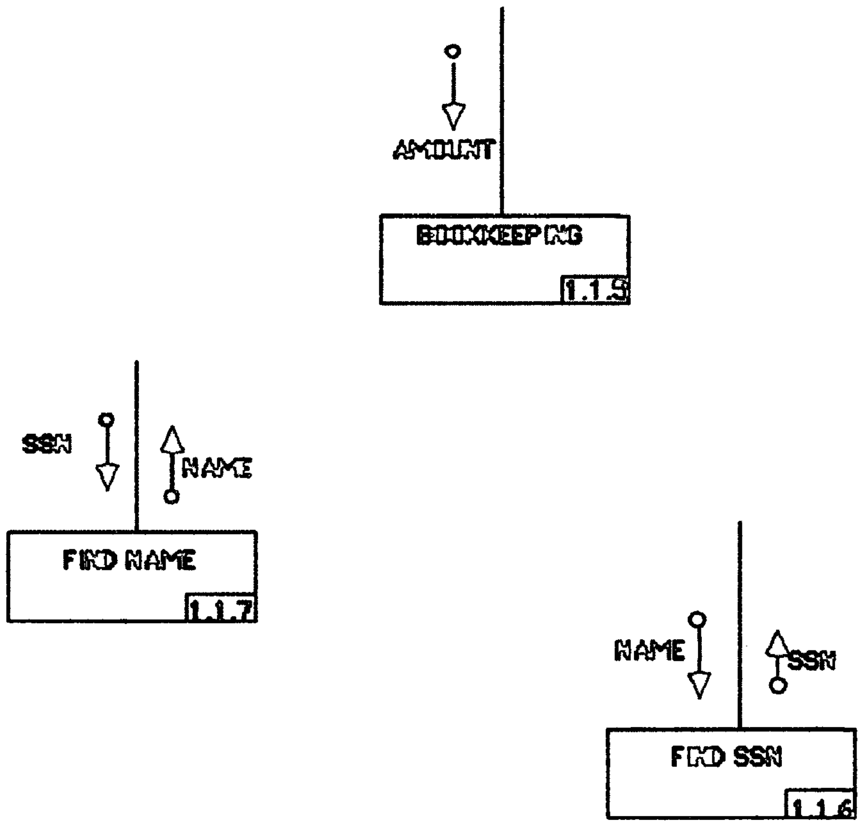


DISTRIBUTE INFO

GENERATE CORRESPONDENCE


GENERATE CORRESPONDENCE 1.1.4
GENERATE LETTERS 1.1.4.1
GENERATE REPORTS 1.1.4.2
TEMP LIST
GENERATE STUDENT LETTERS 1.1.4.1.1
TEMP LIST
GENERATE PERSONNEL LETTERS 1.1.4.1.2
TEMP LIST
PRINT LETTERS 1.1.4.1.3
NAME
SSN
1.1.7
KEYHOLDER REPORT 1.1.4.2.1
INVENTORY REPORT 1.1.4.2.2
LOCKSMITH REPORT 1.1.4.2.3
LOCATION REPORT 1.1.4.2.4

BOOKKEEPING,
FIND SSN,
FIND NAME



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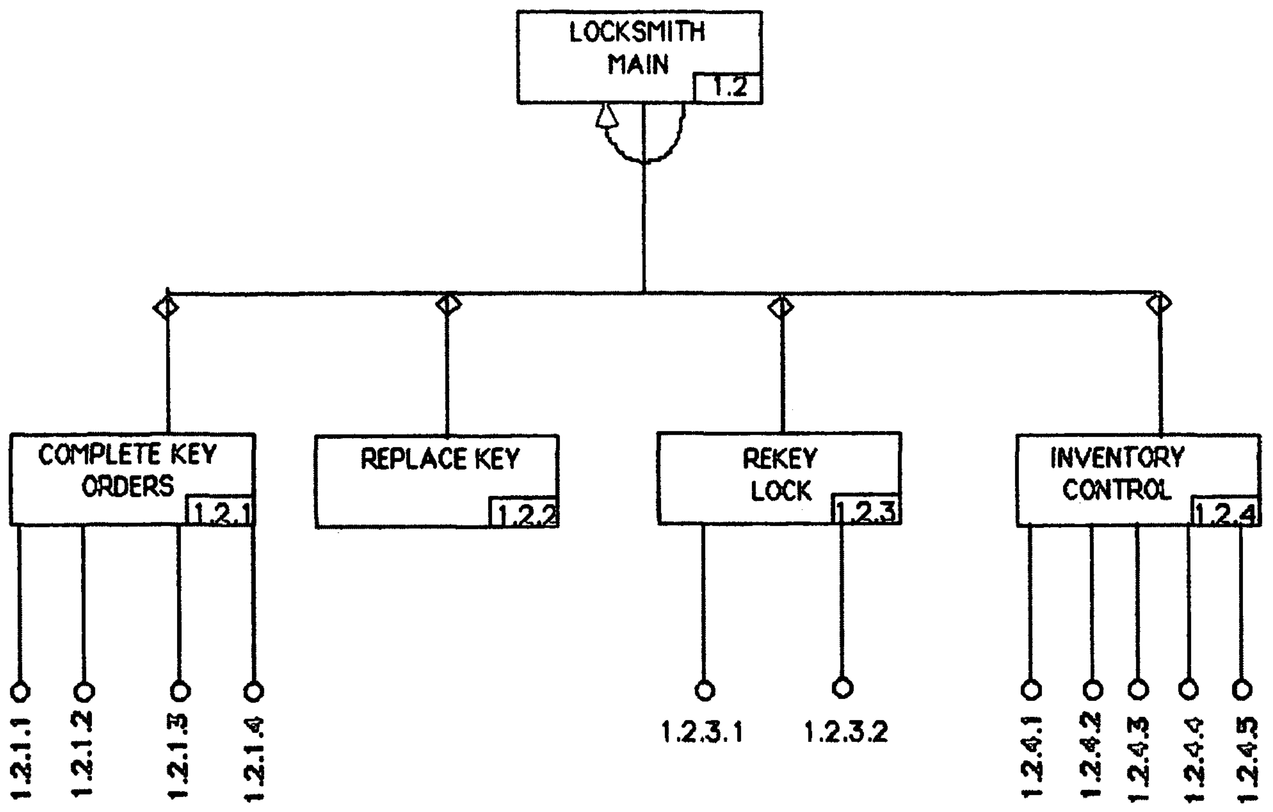
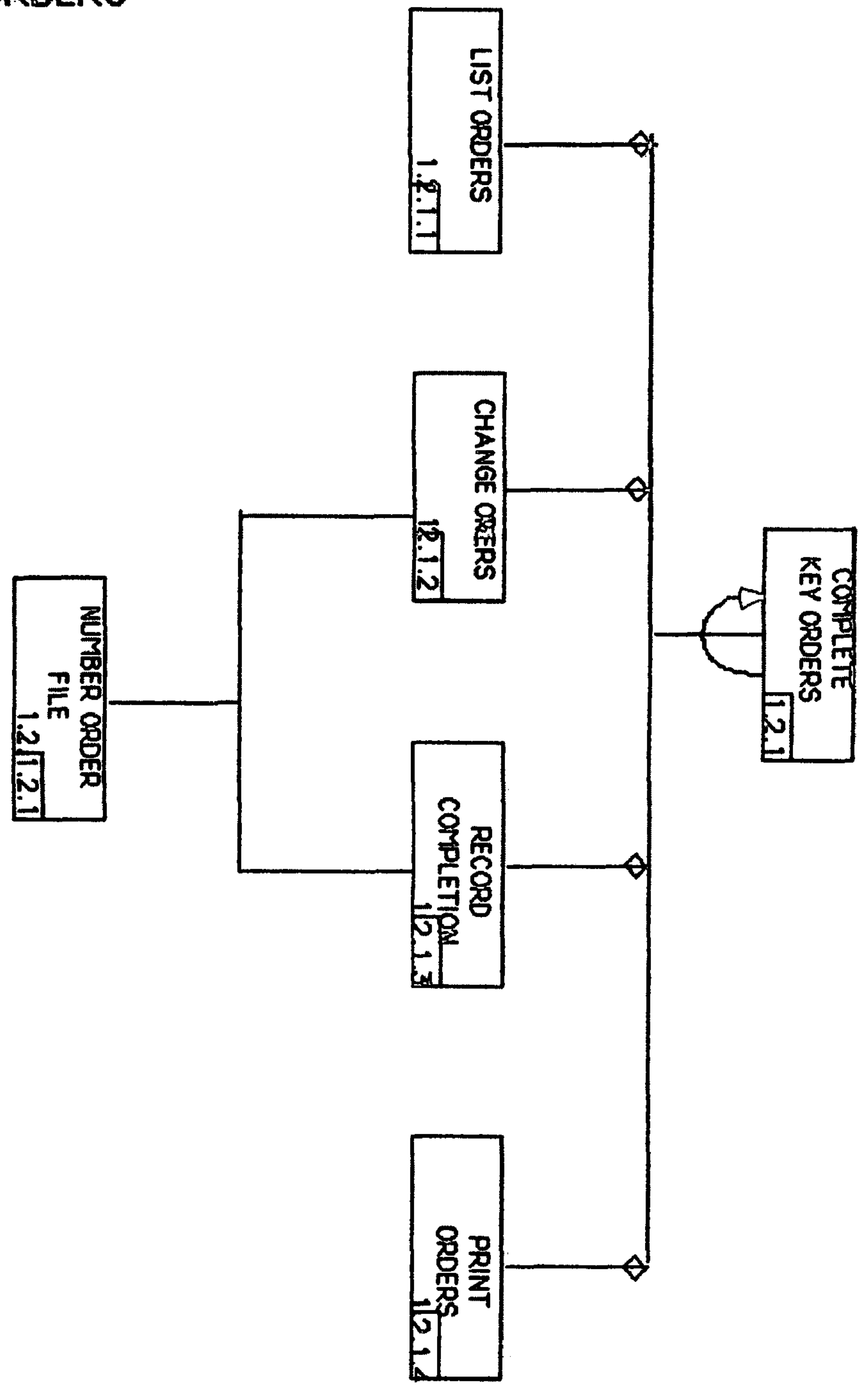
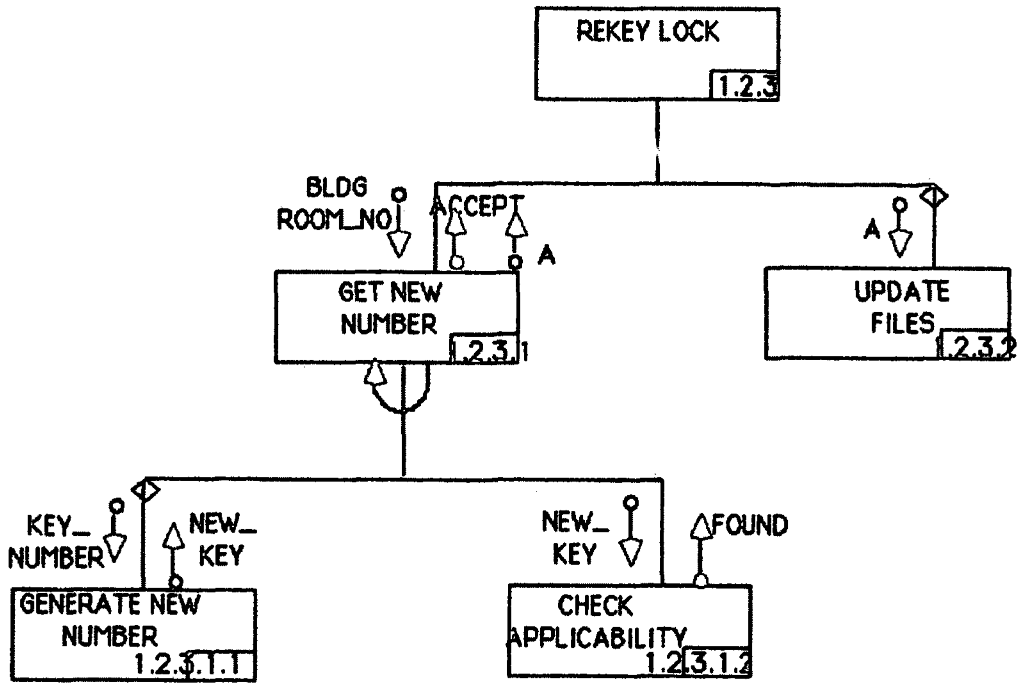
LOCKSMITH MAIN



COMPLETE
KEY
ORDERS

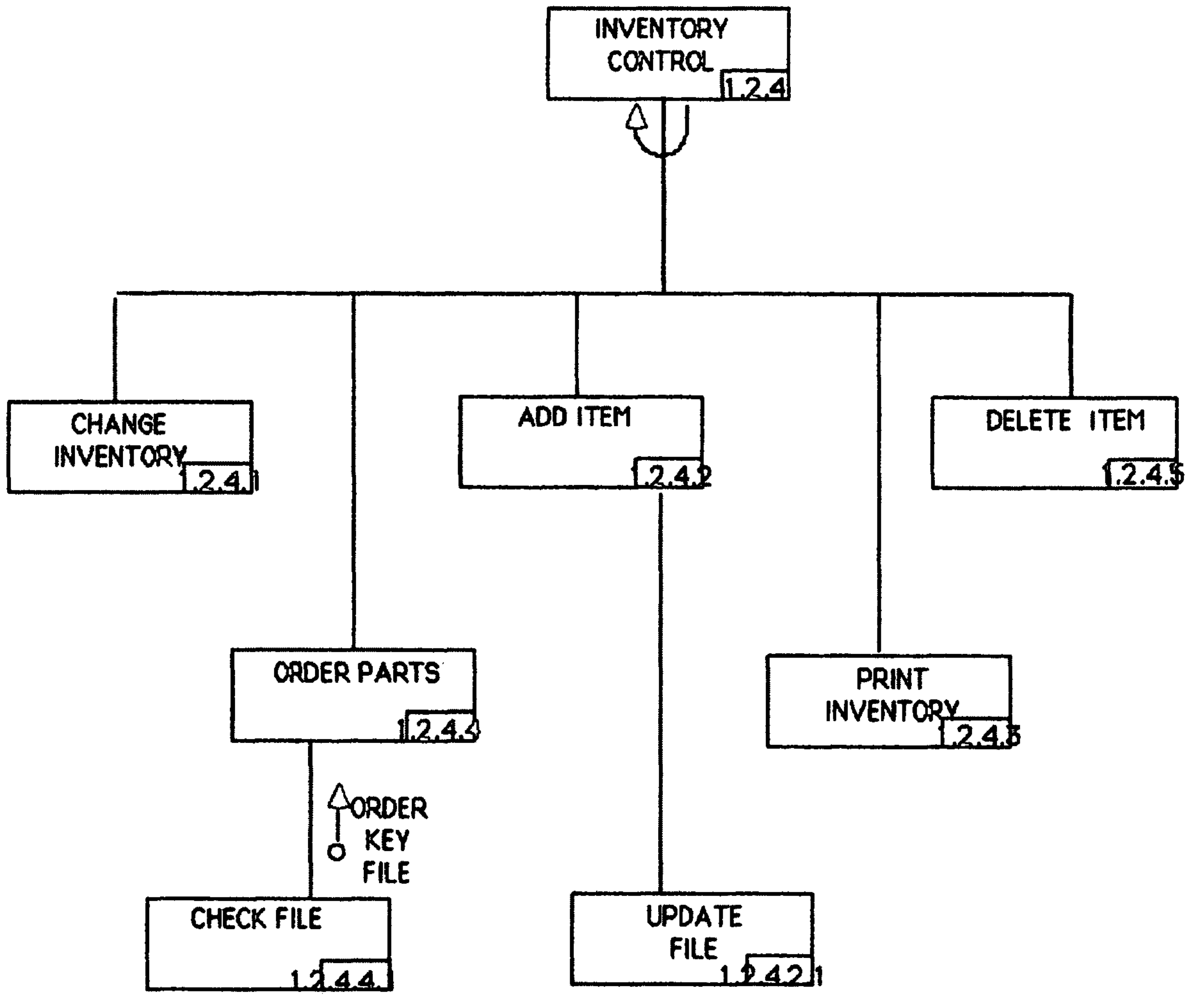


REKEY LOCK

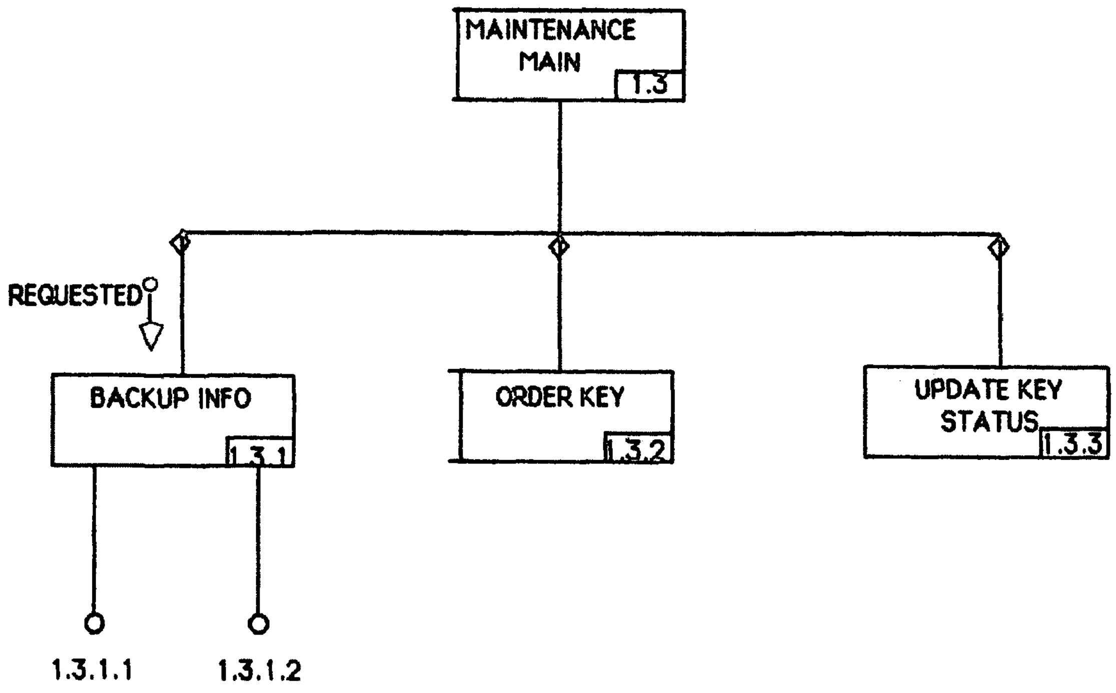


A.
NEW_KEY,
AMT,
ORDER_AMT,
KEY_NUM

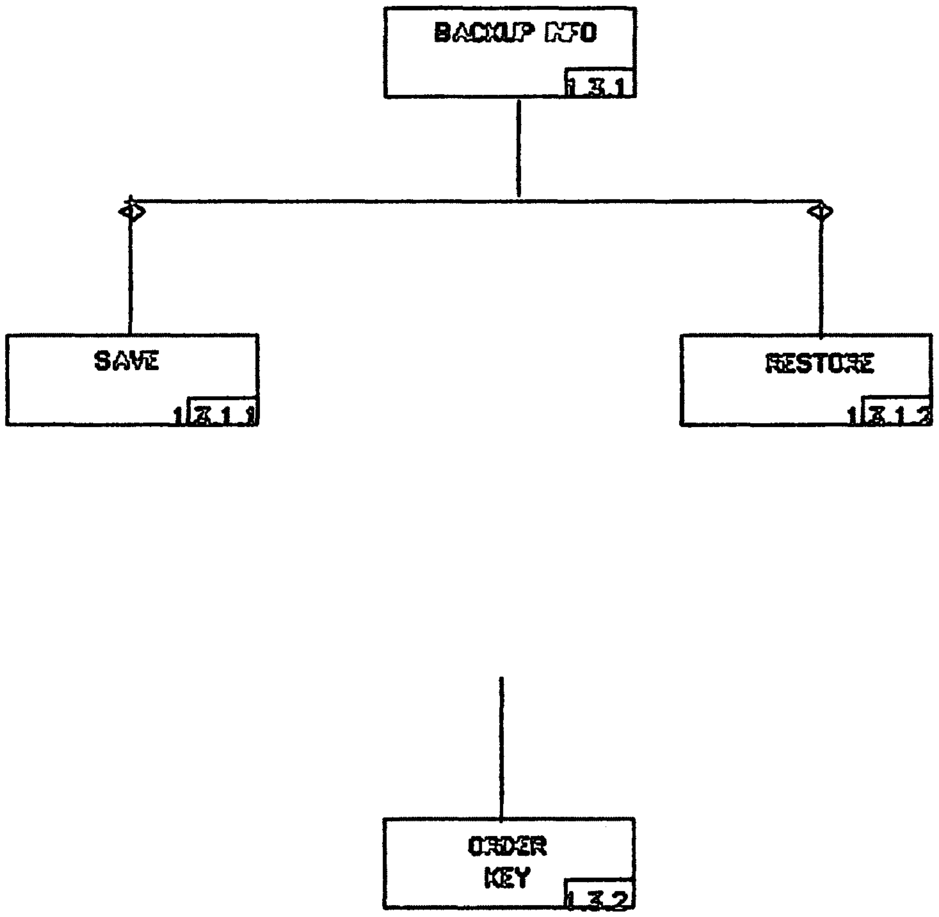
INVENTORY CONTROL



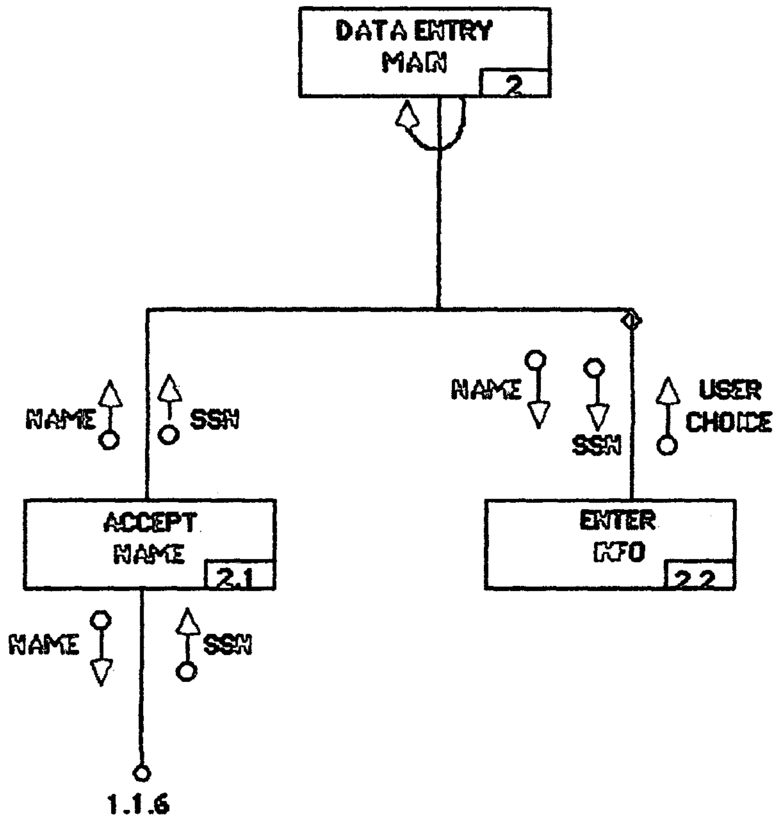
MAINTENANCE MAIN



BACKUP INFO
ORDER KEY



DATA ENTRY
MAIN



Functions and Internal Interfaces

Main Driver and Password Modules

Module 1 of the Key Inventory Control System, Main, is the main driver module of the entire program. It allows the user to choose either the front office, locksmith, or maintenance functions of the system, and once a choice is entered, it calls the password routines to determine if the person attempting access should be allowed entry. Because there are different passwords to different portions of the system, the menu choice is passed to the password routines so they may determine if the correct password has been entered for that particular part of the system. Main receives a flag, allow_entry, back, and it is either true or false depending upon the correct entry of the appropriate password.

Module 1.0, Password, is the controlling module of the password routines. It calls Accept_Password, and receives the allow_entry flag from this module. Depending on how this flag is set, it may or may not call Disallow_Access, and pass it the menu_choice. Accept_Password prompts the user for the appropriate password depending on the portion of the system to be accessed. If the user enters the password incorrectly the first time, he is allowed a second chance. However, a second mis-entry will result in setting the allow_entry flag to false, and Disallow_Access will be called by the main Password routine. Disallow_Access, module 1.0.2, calls Send_Mail, passing it the menu_choice, and Logout_User, both batch or system processes. Send_Mail will leave a message in the user area concerning the attempted access, and the portion of the system which was chosen, and Logout_User will allow the program to terminate normally, then log the illegal user off the system.

Front Office Modules

The front office portion of the program is controlled by module 1.1, Front Office Main. It displays the front office menu (shown in the user interface section), and calls the appropriate module depending on the user´s choice of function. A password is required to enter this section of the system, however, once the user in in this area, any number of front office functions may be performed without re-entering a password. As with all menus in this program, if an incorrect choice is entered, an error message is displayed, and the user is asked to re-enter the desired choice.

Module 1.1.1, Issue Key, is the driver routine for entry of key issue information. When an individual requests a key from the Physical Plant, this program portion is used. Issue Key prompts the user for the necessary information, and then calls the appropriate Find Key Number, passing it the building and room number. Find Key Number, module 1.1.1.1, determines if the building and room number are valid, and if so, calls module

1.1.1.1.1, Check Inventory, passing it the list of possible key numbers. Check Inventory checks to make sure there is a key available for issue, of the key type requested, and returns the key number and availability status to Find Key Number. If a key is available for issue, Issue Key will then call module 1.1.1.2, Update Name Files, passing it record_info. Update Name Files calls Find SSN if the social security number has not been given, and enters the appropriate information in both the Ind_Record File and the Name File if necessary. In addition, Update Name Files calls the Bookkeeping module, passing it the amount of deposit paid by the individual requesting a key.

Module 1.1.2, Return Key, is called when a keyholder returns a key to the Physical Plant. It prompts the user for the keyholder´s name and social security number, and if no social security number is given, it calls Find SSN to determine the correct number. It also requests the key number being returned. Check All Names, module

1.1.2.1, is then called, passing it the entire key return record. Check All Names checks the Ind_Record File and Name File for entries concerning the holding of that key, and if the correct entry is found, it calls Delete Files, module 1.1.2.1.1, passing it the keyholder ID, and a flag indicating whether the name may be deleted if the individual possesses no more keys. Increase Key Available is also called by Check All Names, and it increases the quantity on hand field of the Inventory File. It is passed the returned key id number.

Distribute Info, module 1.1.3, is called if the user requests the information access option of the front office portion of the program. It displays a menu allowing the user a choice of types of information that may be requested. Depending on the user choice, Display Keyholder, Display Key Number, Display Location, Display Deposit, Display Inventory, or Display Keys Held may be called. Display Keyholder, module 1.1.3.1, displays a menu allowing the user to choose what information to enter to find the holders of a particular key. Building and room may be entered to find all holders of keys to that room, and key numbers may be entered to find all individuals possessing that particular combination of keys. All holders of a given key may be found by entering only one key number. This function calls Find Name in order to produce the name of an individual rather than a social security number.

Display Key Number, module 1.1.3.2, allows the user to enter a building and room number, and it will display all the key numbers fitting that particular lock. Module 1.1.3.3, Display Location, will use a key number to determine which door or doors it will open in which building. Module 1.1.3.4, Display Deposit, will display the balance of cash flow for that particular day, up to the time it is called. If it is being used for daily balancing purposes, the user has the option of clearing out the total when it is called. Display

Inventory, module 1.1.3.5, will display the number of keys on hand, the number out, and the total number, given a particular key number. Given a social security number or name, module 1.1.3.6, Display Keys Held, will list each key held by that individual, the date it was issued, and the deposit paid for each key.

Module 1.1.4, Generate Correspondence, is the controlling module for the generation of letters and reports. It display a user menu, and dependent upon the user´s choice, may call either Generate Letters or Generate Reports. Generate Letters will allow the user to generate letters to graduating students who still have keys, and to personnel leaving the University system. Module 1.1.4.1.1, Generate Student Letters, uses address labels to be provided by the Registrar´s Office and manual input of the social security numbers on those labels to determine if a student possesses a key, and if so, it adds that student and the outstanding keys to a list. Generate Personnel Letters accesses Personnel files to determine terminated employees and, if they have keys, puts their social security numbers and keys held in a list. It also prints address labels for those on the list. Module 1.1.4.1.3, Print Letters, uses the list produced by the previous two modules to print letters to each of the individuals on the list. Examples of the letter sent may be found in the appendix portion of this document.

Generate Reports, module 1.1.4.2, is the controlling module for the report generation function of the system. It displays a menu allowing the user to choose the desired report. Depending on user choice, it may call Keyholder Report, Inventory Report, Key Retirement Report, or Location Report. Module 1.1.4.2.1, Keyholder Report, produces a listing of all individuals holding keys, the keys in their possession, dates issued, and deposits paid. Inventory Report lists all key numbers, the quantity on hand, the quantity out, and the total number. Location Report, module

1.1.4.2.4, lists all key numbers and the buildings and room numbers that they will open. The Key Retirement module produces a report of all retired keys, the quantity on hand, quantity out, total number, and date of retirement. Sample reports may be found in the appendix section of this document.

Module 1.1.5, Bookkeeping, calls no other modules. It is passed an amount by either the Return Key or Issue Key functions, and it updates the current Checkbook balance. At the end of the day, this balance may be used to balance the cash drawer, and then cleared out for the following days transactions.

Module 1.1.6, Find SSN, uses a name to search Personnel and Registrar Files to find the matching social security number. It is called by a number of modules, including the support modules to be used during data entry. Find Name, module 1.1.7, performs the reverse function, in that, given a social security number, it will search the appropriate files for the matching name.

Locksmith Modules

Module 1.2, Locksmith Main, is the controlling module for the locksmith portion of the program. This segment of the program is mostly menu run. A sample of the menu format can be seen in Appendix E. For further specification of the menus, the reader is referred to the section on the User Interface. The main locksmith module calls one of four modules, depending on the choice given by the user in response to the menu. These modules are: Complete Key Orders, Replace Key, Rekey Lock, and Inventory Control.

Module 1.2.1, Complete Key Orders allows the user flexibility with the Order Key file. It offers the user four choices. Module 1.2.1.1, List Orders, simply prints the list of orders, in order of priority and date, to the screen. This provides a means of determining what the keys to be made are. Module 1.2.1.2, Change Orders, provides the user with a means of changing an existing order, whether it was input incorrectly or a need exists to change part of the order. This module calls Module 1.2.1.2.1, Number Order File, which takes the order file and lists it to the screen with numbers prefixing each order. To record the completion of an order, Module 1.2.1.3, Record Completion is called. This module also calls Number Order File, as it needs the orders listed to the screen. Finally, Print Orders, Module 1.2.1.4 prints to the line printer a copy of the Order Key file.

Module 1.2.2, Replace Key, is a means of acknowledging the fact that keys become broken and ineffective. It simply accesses the Inventory file and subtracts one from the total_amount and quantity_on_hand. (It assumes that as an individual returns a broken key, they will have that key replaced with another key with no paperwork involved in the transaction.)

Module 1.2.3, Rekey Lock, allows the user to either generate an entirely new number for a rekeying of a lock, or to determine if a key retrieved from the retired key file is eligible to be used. The user is prompted for the building and room number of the lock being rekeyed, and then Module 1.2.3.1, Get New Number is called. The user is prompted for the use of a new key or an existing, retired one. If the user requests a new key, Module 1.2.3.1.1, Generate New Number is called, and if an existing key is reqested, the user is prompted for the existing key number. In either case, once a numer has been requested for use, Module 1.2.3.1.2, Check Applicability, is called to determine whether that key number may be used. Once an eligible key number has been determined, the user is asked if he wishes to use that number. If so, Module 1.2.3.2, Update Files is called, which updates all the appropriate files.

Module 1.2.4, Inventory Control, is provided to allow the user access to the inventory files.

It provides the user five choices, dependent upon a choice made from a menu. Module 1.2.4.1, Change Inventory, will change the amount field in the Keyway file. Order_Parts, Module 1.2.4.4, will print a list of those items within the keyway file which need to be ordered (are below the threshold number). It calls Module 1.2.4.4.1, which checks each record in the keyway file for the amount and checks that against the threshold number. It will create an internal file of keyway numbers to be ordered, and passes that file back up to Order_Parts to be printed. Add_Item, Module 1.2.4.2, allows the user to add new items to the inventory list. It will prompt for the new keyway number and an amount if it exists. It then calls Update File, Module 1.2.4.2.1, which inserts a new record in the keyway file with the appropriate keyway number and amount. Module 1.2.4.3, Print Inventory, prints to the line printer a copy of the information stored in the Keyway file. Delete Item, Module 1.2.4.5, prompts the user for an item which needs to be removed permanently from the Keyway file. It then deletes that record from the file.

Maintenance Modules

Module 1.3, Maintenance Main, is the controlling module for the maintenance portion of the program. For the most part, this portion of the program runs automatically, with the exception that a user may request that desired files stored on magnetic tape be retrieved. This module calls Backup Info, Order Key and Update Key Status, although the actual execution of these modules depends on the current system date and the date they were last executed. Backup Info is passed the flag "requested" to indicate whether the user has requested entry to the maintenance portion of the program or whether it is being called automatically. Backup Info controls the storage and retrieval of information on magnetic tape. It calls Save and Restore. The function of Save is to back up current files weekly. Restore is a user requested process which will pull the desired files from magnetic tape and put them in the user area.

Process 1.3.2, Order Key, is designed to search the Inventory File daily, and if keys are below the threshold level, it will place a record of this in the Order Key File to be accessed by the locksmith portion of the program.

Module 1.3.3, Update Key Status, is executed periodically. It´s purpose is to increment through the Inventory file, checking for keys which have been retired. If the key status is retired, but the date of retirement is greater than one year from that date, the status field is then set to available.

Data Entry Modules

Module 2, Data Entry Main, is the controlling module for the support processes to be used during initial data entry. It calls Accept Name and Enter Info. Accept Name, module 2.1, prompts the user for the keyholder name, and calls Find SSN to determine the correct social security number. Both name and social security number are passed to the calling procedure. Enter Info accepts the name and social security number passed to it from Data Entry Main and enters these in the appropriate files. The user is then prompted for additional information to be entered and this information is also entered in the appropriate file.

Algorithmic Descriptions

Front Office Processing Narratives

```
Module Name: 1 Main
Parameters:
     In: none
     Out: menu_choice, allow_entry
     In/Out: none
Module Description:

display main menu
set allow_entry to false
prompt user for menu_choice
if not a valid choice, then
     repeat
          display error message
          prompt for choice
     until menu_choice is valid
set requested to false
call Maintenance_Main(requested)
if menu_choice is quit, then
     terminate program run
call Password(menu_choice)
if allow_entry is true, then
   repeat
      if menu_choice is front office, then
         call Front_Office_Main
      else, if menu_choice is locksmith, then
         call Locksmith_Main
      else, if menu_choice is maintenance, then
         set requested to true
         call Maintenance_Main(requested)
   until menu_choice is quit
else, terminate program run.
```

```
Module Name: 1.0 Password
Parameters:
     In: menu_choice
     Out: allow_entry
     In/Out: none
Module Description:

if menu_choice is for front office, then
     prompt for front_office_password
     call Accept_Password(front_office_password)
else, if menu_choice is locksmith, then
     prompt for locksmith_password
     call Accept_Password(locksmith_password)
else, if menu_choice is maintenance, then
     prompt for maintenance_password
     call Accept_Password(maintenance_password)
if allow_entry is false,
     print incorrect password message
     prompt user for password re-entry
     call Accept_Password(password)
if allow_entry is false,
     call Disallow_Entry(menu_choice).
```

```
Module Name: 1.01 Accept Password
Parameters:
     In: none
     Out: password, allow_entry
     In/Out: none
Module Description:

if menu_choice is front office
          and front_office_password is correct,
   OR menu_choice is locksmith
          and locksmith_password is correct,
   OR menu_choice is maintenance
          and maintenance_password is correct,
     then set allow_entry to true
else,
     set allow_entry to false.
```

```
Module Name: 1.0.2 Disallow Access
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

call Send_Mail
call Logout_User
```

Module Name: 1.0.2.1 Send Mail
Parameters:
    In: none
    Out: none
    In/Out: none
Module Description:

Send mail about system entry attempt.

Module Name: Logout User
Parameters:
    In: none
    Out: none
    In/Out: none
Module Description:

delay for program termination
log user off system.

Module Name: 1.1 Front Office Main
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
repeat
     display Front Office Menu
          /* see user interface section */
     prompt for menu_choice
     if menu_choice is not valid, then
          repeat
               display error message
               prompt for menu_choice
          until menu_choice is valid
     if menu_choice is issue key, then
          call Issue_Key
     else, if menu_choice is return key, then
          call Return_Key
     else, if menu_choice is distribute info, then
          call Distribute_Info
     else, if menu_choice is generate
               correspondence, then
          call Generate_Correspondence
until menu_choice is quit.
```

```
Module Name: 1.1.1 Issue Key
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

set available to false
prompt for name
prompt for social security number
if social security number is unknown, then
     set social security number to negative number
prompt for building abbreviation
prompt for room number
call Find_Key_Number(building, room)
if available is true, then
     call Update_Name_Files(record_info)
else,
     display insufficient supply message.
```

```
Module Name: 1.1.1.1 Find Key Number
Parameters:
     In: building, room number
     Out: key number, availability
     In/Out: none
Module Description:

open Location File
find all entries matching building
find all entries matching room number
if found, then
     call Check_Inventory(key_list)
else,
     display invalid building/room message
close Location File.
```

Module Name: 1.1.1.1.1 Check Inventory
Parameters:
     In: key list
     Out: availability, key number
     In/Out: none
Module Description:

```
open Inventory File
prompt user for key_type requested
repeat
     find record matching top entry on key list
     if key_type matches, then
        if quantity_on_hand greater than 0, then
           set found to true
           set key_number to key_id_number field
        else,
           discard top item on key_list
until found or key_list is empty
if found, then
     decrease quantity_on_hand by one
else,
     display insufficient supply message
     set available to false
close Inventory File.
```

```
Module Name: 1.1.1.2 Update Name Files
Parameters:
     In: record_info
     Out: none
     In/Out: none
Module Description:

open Ind_Record File and Name File
if social security number is less than 0, then
     call Find_SSN(name)
if social security number is less than 0, then
 add name and social security number to Name File
add social security number, key_number, deposit,
            to Ind_Record File
call Bookkeeping(deposit)
close Ind_Record and Name Files.
```

```
Module Name: 1.1.2 Return Key
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

prompt for keyholder name
prompt for social security number
if social security number is unknown, then
  call Find_SSN(name)
if social security number is unknown, then
  open Name File
  find name in Name File
  set social security number to SSN in Name File
  close Name File
prompt for key_number
call Check_All_Names(key_number).
```

```
Module Name: 1.1.2.1 Check All Names
Parameters:
     In: key_return
     Out: refund_info
     In/Out: none
Module Description:

open Ind_Record File
find all entries matching ID
if Sysnrec is 1, then
     set delete_name_flag to true
repeat
     match key_id_number in file to key_number in
                 top record
     if they match, then
          set found to true
          with refund_info record, do
               set amount to (-1 * deposit)
               set date to Sysdate
               call Bookkeeping(amount)
until found or no records left
if found, then
     call Delete_Files(ID, delete_name_flag)
else,
     display no record found message
close Ind_Record File
call Increase_Key_Available(key_number).
```

```
Module Name: 1.1.2.1.1 Delete Files
Parameters:
     In: ID, delete_name_flag
     Out: none
     In/Out: none
Module Description:

in Ind_Record File    /* file is already open */
     delete current record
if delete_name_flag is true, then
     open Name File
     find matching name or social security number
     delete that record
     close Name File.
```

```
Module Name: 1.1.2.1.2 Increase Key Available
Parameters:
     In: key_number
     Out: none
     In/Out: none
Module Description:

open Inventory File
find record matching key_number
increment quantity_on_hand by one
close Inventory File.
```

```
Module Name: 1.1.3 Distribute Info
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

display Information Access Menu
     /* see user interface section */
repeat
     prompt for menu_choice
     if menu_choice is keyholder, then
          call Display_Keyholder
     else, if menu_choice is key numbers, then
          call Display_Key_Number
     else, if menu_choice is building and room
                 number, then
          call Display_Location
     else, if menu_choice is cash balance, then
          call Display_Deposit
     else, if menu_choice is key inventory, then
          call Display_Inventory
     else, if menu_choice is keys held, then
          call Display_Keys_Held
     else, if menu_choice is quit, then
          do nothing for now
     else,
          display invalid choice message
until menu_choice is quit.
```

Module Name: Display Keyholder
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
display Keyholder Menu
repeat
   prompt for menu_choice
   if menu_choice is building/room, then
      prompt for building and room number
      open Ind_Record File
      find all records matching building
          and room
      make temporary list of social security
          numbers
      close Ind_Record File
      for each social security number on the list,
         call Find_Name(social_security_number)
         put name in list
      display name_list
   else, if menu_choice is key_numbers, then
      repeat
         prompt for key_number
         put key_number in list
      until no key_numbers given (CR)
      open Ind_Record File
      find all entries matching each key_number
             in list
      put social security numbers in temporary
             list
      close Ind_Record File
      for each social_security_number in list,
         call Find_Name(social_security_number)
         put name in name_list
      display name_list
   else, if menu_choice is quit, then
      do nothing
   else,
      display invalid choice message
```

```
until menu_choice is quit
```

Module Name: 1.1.3.2 Display Key Number
Parameters:
    In: none
    Out: none
    In/Out: none
Module Description:

```
prompt user for building
prompt user for room number
open Location File
find all records matching building and room
for each record,
     display key_id_number
close Location File.
```

Module Name: 1.1.3.3 Display Location
Parameters:
    In: none
    Out: none
    In/Out: none
Module Description:

```
prompt user for key_number
open Location File
find all records matching key_number
for each record,
     display building
     display room number
close Location File.
```

Module Name: 1.1.3.4 Display Deposit
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
open Checkbook File
display balance in file
ask user if end of day
if yes, then
     set balance to 0
close Checkbook File.
```

Module Name: 1.1.3.5 Display Inventory
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
prompt user for key_number
open Inventory File
find all records matching key_number
for each record /* there should only be one */
     display quantity_on_hand
     set total_out to
           (total_number - quantity_on_hand)
     display total_out
     display total_number
close Inventory File.
```

Module Name: 1.1.3.6 Display Keys Held
Parameters:
In: none
Out: none
In/Out: none
Module Description:

```
prompt for social_security_number
if none (CR), then
     prompt for keyholder name
     call Find_SSN(name)
     set social_security_number to SSN returned
open Ind_Record File
find all records matching social_security_number
for each record,
     display key_id_number
     display date_out
     display deposit
close Ind_Record File.
```

Module Name: 1.1.4 Generate Correspondence
Parameters:
    In: none
    Out: none
    In/Out: none
Module Description:

```
repeat
     prompt user for letter or report
     if choice is letter, then
          call Generate_Letters
     else, if choice id report, then
          call Generate_Report
     else, if (CR), then
          do nothing
     else,
          display invalid choice message
until choice is quit (CR).
```

Module Name: 1.1.4.1 Generate Letters
Parameters:
In: none
Out: none
In/Out: none
Module Description:

```
repeat
     prompt user for student or personnel letters
     if choice is student, then
          call Generate_Student_Letters
          call Print_Letters(temp_list)
     else, if choice is personnel, then
          call Generate_Personnel_Letters
          call Print_Letters(temp_list)
     else, if choice is quit (CR), then
          do nothing
     else,
          display invalid choice message
until choice is quit (CR).
```

Module Name: 1.1.4.1.1 Generate Student Letters
Parameters:
    In: none
    Out: temp_list
    In/Out: none
Module Description:

```
open Ind_Record File
repeat
   prompt user for social security number
   find all records matching social security number
   if no records, then
      display no keys outstanding message
   else,
      put social security number in temp_list
      for each record,
         put key_id_number in temp_list
      put end_of_keys flag in temp_list
      display found outstanding keys message
until no more social security numbers (CR)
close Ind_Record File.
```

Module Name: 1.1.4.1.1 Generate Personnel Letters
Parameters:
     In: none
     Out: temp_list
     In/Out: none
Module Description:

```
open Terminated File
for each entry in Terminated File,
     put social security number in ssn_list
close Terminated File
open Ind_Record File
for each entry in ssn_lit,
     find matching record in Ind_Record File
     if none, then
      delete social security number from ssn_list
     else,
      put social security number in temp_list
      for each record,
           put key_number in temp_list
      put end_of_keys flag in temp_list
close Ind_Record File
open Personnel File
for each entry on ssn_list
     find matching entry in Personnel File
     with name and address fields,
          print address label
close Personnel File.
```

Module Name: 1.1.4.1.3 Print Letters
Parameters:
     In: temp_list
     Out: none
     In/Out: none
Module Description:

```
for each social security number in temp_list,
     print letter heading
     for each key_number under ssn in temp_list,
          print key_number
     print letter closing
     /* see Appendix for sample letter format */
```

Module Name: 1.1.4.2 Generate Reports
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
display Generate Report Menu
    /* see user interface section */
repeat
     prompt user for menu_choice
     if menu_choice is keyholder, then
          call Keyholder_Report
     else, if menu_choice is inventory, then
          call Inventory_Report
     else, if menu_choice is locksmith, then
          call Locksmith_Report
     else, if menu_choice is location, then
          call Location_Report
     else, if menu_choice is quit, then
          do nothing
     else,
          display invalid choice message
until menu_choice is quit.
```

Module Name: 1.1.4.2.1 Keyholder Report
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
open Ind_Record File
print keyholder report heading
sort file by social security number
for each unique social security number in file
 call Find_Name(ssn)
 print name
 for each record with same social security number,
      print key number
      print date issued
      print deposit paid
close Ind_Record File.
```

Module Name: 1.1.4.2.2 Inventory Report
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
print inventory report heading
open Inventory File
sort by key number
for each entry,
     print key number
     print quantity on hand
     print (total_number - quantity_on_hand)
     print total number
close Inventory File.
```

```
Module Name: 1.1.4.2.3 Key Retirement Report
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

print key retirement report heading
open Inventory File
sort by key number
for each retired key,
     print key number
     print quantity on hand
     print (total_number - quantity_on_hand)
     print total number
     print date retired
close Inventory File.
```

```
Module Name: 1.1.4.2.4 Location Report
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

print location report heading
open Location File
sort by key number
for each unique key number,
     print key number
     for each entry with same key number,
          print building
          print room number
close Location File.
```

```
Module Name: 1.1.5 Bookkeeping
Parameters:
     In: amount
     Out: none
     In/Out: none
Module Description:

open Checkbook File
add amount to balance in Checkbook File
close Checkbook File.
```

```
Module Name: 1.1.6 Find SSN
Parameters:
     In: name
     Out: SSN
     In/Out: none
Module Description:

open Personnel File
find record matching name
if none, then
     close Personnel File
     open Registrar File
     find record matching name
     if none, then
          display not found message
     else,
          set social security number to SSN field
                in Registrar record
     close Registrar File
else,
     set social security number to SSN in
         Personnel File
     close Personnel File.
```

Module Name: 1.1.7 Find Name
Parameters:
In: SSN
Out: name
In/Out: none
Module Description:

```
if social security number is less than zero, then
     open Name File
     find record matching social security number
     if none, then
          display not found record
     else,
          set name to name in Name File
else,
     open Personnel File
     find record matching social security number
     if none, then
      close Personnel File
      open Registrar File
      find record matching social security number
      if none, then
           display not found message
      else,
           set name to name in Registrar File
      close Registrar File
     else,
      set name to name in Personnel File
      close Personnel File.
```

Locksmith Processing Narratives

Module Name: 1.2 Locksmith Main
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
display Locksmith Main Menu
     /* see user interface section */
repeat
   prompt for menu_choice
   if menu_choice is Complete Key Orders, then
      call Complete Key Orders
   else if menu_choice is Replace Key, then
      call Replace Key
   else if menu_choice is Rekey Lock, then
      call Rekey Lock
   else if menu_choice is Inventory Control, then
      call Inventory Control
   else, if menu_choice is quit, then
      do nothing
   else, display invalid choice message
until menu_choice is quit
```

Module Name: 1.2.1 Complete Key Orders
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
display Complete Key Orders Menu
repeat
   prompt for menu_choice
   if menu_choice is List Orders, then
      call List Orders
   else if menu_choice is Change Orders, then
      call Change Orders
   else if menu_choice is Record Completion, then
      call Record Completion
   else if menu_choice is Print Orders, then
      call Print Orders
   else if menu_choice is quit, then
      do nothing
   else display invalid choice message
until menu_choice is quit
```

Module Name: 1.2.1.1 List Orders
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
sort order file on date
sort order file on priority
list all orders that currently exist (on screen)
```

Module Name: 1.2.1.2 Change Orders
Parameters:
In: none
Out: none
In/Out: none
Module Description:

```
Number_Order_File
while not done
   prompt user for order number or symbol to quit
   if quit symbol
   then done set equal to true
   else if proper order number
      then prompt for new priority
         replace existing priority with new
              priority
         prompt for new amount
         replace existing amount with new amount
      else print error message
```

Module Name: 1.2.1.2.1 Number Order File
Parameters:
In: none
Out: none
In/Out: none
Module Description:

```
set counter to 1
open key order file
sort on date
sort on priority
while there are records in the file
     list the counter (to the screen)
     list the corresponding record (to the screen)
     increment the counter
```

Module Name: 1.2.1.3 Record Completion
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
Number_Order_File
while not done
prompt for order number completed or symbol to
     quit
if a correct order number
then map to Inventory file via key ID number
     increase total_amount by amount
     increase quantity_on_hand by amount
     return to order file
     delete record
else if quit symbol
     then done set equal to true
     else display error message
```

Module Name: 1.2.1.4 Print Orders
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
sort order file on date
sort order file on priority
print all (line printer)
```

Module Name: 1.2.2 Replace Key
Parameters:
In: none
Out: none
In/Out: none
Module Description:

```
prompt for key number
find key number in Inventory file
subtract 1 from quantity_on_hand
subtract 1 from total_amount
```

Module Name: 1.2.3 Rekey Lock
Parameters:
In: none
Out: none
In/Out: none
Module Description:

```
prompt for building
prompt for room number
call Get New Number
if accept_number is true, then
     call Update Files
```

```
Module Name: 1.2.3.1 Get New Number
Parameters:
     In: building, room number
     Out: accept_number, new_key_number, amount,
          order_amount, key_number
     In/Out: none
Module Description:

open Location File
find record matching building and room number
if it exists, then
     let key_number equal KIN
else,
     print message,
     prompt for key_number
prompt user for new or existing key
repeat
     if new then
          call Generate_New_Number(key_number,
                new_key)
     else,
          prompt for new_key
     call Check_Applicability(new_key, found)
until found
display new_number
prompt user for acceptance
if acceptance equal true, then
     if existing, then
          prompt for amount on hand
     prompt for amount needed
```

Module Name: 1.2.3.1.1 Generate New Number
Parameters:
     In: key_number
     Out: new_key_number
     In/Out: none
Module Description:

```
in Inventory file
find all records with corresponding keyway number
within that selection set
while not done
choose first record
     increment the key number by 2
     check new number with all numbers in
           selection set
     if not duplicated, then found
     else choose next record
```

Module Name: 1.2.3.1.2 Check Applicability
Parameters:
     In: new_key_number
     Out: found
     In/Out: none
Module Description:

```
in Inventory file
find all records with corresponding keyway number
if number is not present or
      number is found and status is available
then return found
```

Module Name: 1.2.3.2 Update Files
Parameters:
In: new_key_number, amount, order_amount, key_number
Out: none
In/Out: none
Module Description:

```
open Inventory File
retire old key number
find new key number
if it exists, then
     "unretire" it,
else,
     change quantities to amount
     add record
open Location File
find record matching key_number, building, and
     room
if it exists, then
     change to new_key_number,
else,
     add new record
open Order File
     add new record
```

Module Name: 1.2.4 Inventory Control
Parameters:
 In: none
 Out: none
 In/Out: none
Module Description:

```
display Inventory Control Menu
repeat
     prompt for menu_choice
     if menu_choice is Change Inventory, then
          call Change Inventory
     else if menu_choice is Order Parts, then
          call Order Parts
     else if menu_choice is Add Item, then
          call Add Item
     else if menu_choice is Print Inventory, then
          call Print Inventory
     else if menu_choice is Delete Item, then
          call Delete Item
     else if menu_choice is quit, then
          do nothing
     else display invalid choice message
until menu_choice is quit
```

Module Name: 1.2.4.1 Change Inventory
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
prompt for keyway number
access keyway file
find keyway number
if number exists
     prompt for new_amount
     substitute new_amount for amount
     display changed entry
else display error message
```

Module Name: 1.2.4.2 Add Item
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
while there are more entries
     prompt for keyway number
     prompt for new_amount
     Update_file
```

```
Module Name: 1.2.4.2.1 Update File
Parameters:
     In: key_number, new_amount
     Out: none
     In/Out: none
Module Description:

access Keyway File
find keyway number
if number exists
     add new_amount to amount
else request verification of number
     if verified
     then add new record with keyway number
          and new_amount for amount
```

```
Module Name: 1.2.4.3 Print Inventory
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

access Keyway File
print all
```

Module Name: 1.2.4.4 Order Parts
Parameters:
    In: none
    Out: none
    In/Out: none
Module Description:

```
Check_File
Print Order_Parts_File
```

Module Name: 1.2.4.4.1 Check File
Parameters:
    In: none
    Out: none
    In/Out: none
Module Description:

```
for each record in keyway file
if amount is less than threshold number
then add keyway number to Order_Parts_File
```

```
Module Name: 1.2.4.5 Delete Item
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

while there are more items to delete
     prompt for keyway number
     find number in keyway file
     if it exists
          verify number
          delete record
     else print error message
```

```
Module Name: 1.3 Maintenance Main
Parameters:
     In: requested
     Out: none
     In/Out: none
Module Description:

call Backup_Info(requested)
call Order_Key
call Update_Key_Status.
```

Module Name: 1.3.1 Backup Info
Parameters:
     In: requested
     Out: none
     In/Out: none
Module Description:

```
if not requested, then
     open Last_Save File
     if date last saved is less than
                    sysdate - 7 days, then
          call Save
else,
     display File Restoration Menu
     repeat
          prompt user for menu_choice
          if valid menu_choice,
               call Restore(menu_choice)
          else,
               display invalid choice message
     until menu_choice is quit.
```

Module Name: 1.3.1.1 Save
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
save Ind_Record File on tape
save Name File on tape
save Location File on tape
save Inventory File on tape.
save Keyway File on tape
save Order Key File on tape.
```

Module Name: 1.3.1.2 Restore
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
if menu_choice is Ind_Record File, then
     copy Ind_Record File from tape to user area
else, if menu_choice is Name File, then
     copy Name File from tape to user area
else, if menu_choice is Location File, then
     copy Location File from tape to user area
else, if menu_choice is Inventory File, then
     copy Inventory File from tape to user area
else, if menu_choice is Keyway File, then
     copy Keyway File from tape to user area
else, if menu_choice is Order Key File, then
     copy Order Key File from tape to user area
else, if menu_choice is All Files, then
     copy all files from tape to user area.
```

Module Name: 1.3.2 Order Key
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
open Order Date File
if last_order_date does not equal sysdate, then
   set last_order_date to sysdate
   open Inventory and Order Key Files
   find all quantity_on_hand less than 6 in
           Inventory File
   for each record,
      find matching key_number in Order Key File
      if found, then
         if (6 - quantity_on_hand) is greater
                 than amount, then
              change amount to
                 (6 - quantity_on_hand)
         else,
              do nothing
      else,
         add priority, key_id_number, amount
                record to Order Key File
  close Order Key and Inventory Files
close Order Date File.
```

Module Name: 1.3.3 Update Key Status
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
for each record in Inventory file
     if status is unavailable
     then if date is older than one year
          then change status to available
```

Module Name: 2 Data Entry Main
Parameters:
     In: none
     Out: none
     In/Out: none
Module Description:

```
repeat
     call Accept_Name
     call Enter_Info
until user_choice is quit.
```

Module Name: 2.1 Accept Name
Parameters:
    In: none
    Out: name, SSN
    In/Out: none
Module Description:

```
repeat
     prompt user for name or quit (CR)
     call Find_SSN(name)
     set social security number to ssn found
until user choice is quit
if social security number is not found, then
     open Dummy_SS File
     set social security number to dummy_ssn
     decrement dummy_ssn by one
     close Dummy_SS File.
```

Module Name: 2.2 Enter Info
Parameters:
     In: name, SSN
     Out: user_choice
     In/Out: none
Module Description:

```
if social security number is less than zero, then
     open Name File
     enter name in name field
     enter social security number in ssn field
     close Name File
open Ind_Record File
enter social security number in ssn field
repeat
     prompt for key_number
     prompt for deposit_amount
     if deposit_amount (CR), then
          set deposit_amount to 2
     display key_number and deposit_amount
     ask user if correct
until correct
enter key_number in key_id_number field
enter deposit_amount in deposit field
close Ind_Record File.
```

File Descriptions

The following files have been determined as being sufficient to store the data required to maintain the key inventory control system. There are six external files used throughout the system. The keyway file is used exclusively in the locksmith operation, the Ind_Record file and Name file are used exclusively in the front office operation, and the remaining files; Inventory file, Order Key file, and Location file are used by both operations.

Ind_Record File:	Field Type	Length
Social Security Number	integer	9
Key ID Number	text	10
Date Out	date	8
Deposit	integer	4

Name File:	Field Type	Length
Social Security Number	integer	9
Name	text	30

Inventory File:	Field Type	Length
Key ID	text	10
Type	text	1
Quantity on Hand	integer	3
Total Number	integer	3
Status	text	1
Date	date	8

Location File:	Field Type	Length
Key ID	text	10
Building	text	3
Lock/Room	text	4

Keyway File:	Field Type	Length
Keyway Number	text	4
Quantity On Hand	integer	3

Order Key File:	Field Type	Length
Priority	text	1
Key ID	text	10
Amount	integer	3

Requirements Mapping

A requirements mapping is included here to indicate to the reader and the user that all requirements have been addressed. For each requirement specified in the requirement document, an entry is made and a cross-reference is indicated to the appropriate modules within the design. The purpose of this cross-reference matrix is to (1) establish that all functional requirements (listed in the left hand column) are satisfied by the software design and indicate which modules (listed across the top row) are critical to the implementation of specific requirements.

Requirements Table

The following is a listing of all the requirements specified in the Requirements Document. The reader is referred to the Requirements Document in case of questions, as some of the requirements specified below are not automated and therefore will have no requirements cross-reference.

1.1 Distribute Information
1.2 Find SSN
1.3 Issue Key
1.3.1 Find Key Number
1.3.2 Update Name
1.3.3 Check Key Quantity
1.3.4 Decrease Key Quantity Available
1.4 Return Key
1.4.1 Flag Record
1.4.2 Check All Names
1.4.3 Delete Files
1.4.4 Increase Key Quantity
1.5 Bookkeeping
1.5.1 Generate Receipt
1.5.2 Generate Deposit
1.5.3 Refund Check
1.5.4 Update Checkbook
1.6 Generate Correspondence
1.6.1 Generate Letters
1.6.2 Generate Reports
1.7 Order Keys
1.8 Backup Information
2.1 Make Key
2.2 Service Locks
2.3 Rekey Lock
2.3.1 Generate Key Number
2.3.2 Determine Lock Number
2.3.3 Pin Lock
2.3.4 Install Lock
2.4 Control Inventory
2.4.1 Store Part
2.4.2 Check Supply
2.4.3 Estimate Need
2.4.4 Order Part
2.5 Recycle Keys

DESIGN MODULES

REQUIREMENTS

	1	1.0	1.0.1	1.0.2	1.0.2.1	1.0.2.2	1.1	1.1.1	1.1.1.1	1.1.1.1.1	1.1.1.2	1.1.2	1.1.2.1	1.1.2.1.1	1.1.2.1.2	1.1.3	1.1.3.1	1.1.3.2	1.1.3.3	1.1.3.4	1.1.3.5	1.1.3.6	1.1.4	1.1.4.1	1.1.4.1.1	1.1.4.1.2	1.1.4.1.3	1.1.4.2	1.1.4.2.1	1.1.4.2.2	1.1.4.2.3	1.1.4.2.4	1.1.5	1.1.6	1.1.7
1.1																x	x	x	x	x	x	x													
1.2																																		x	
1.3								x	x	x	x																								
1.3.1									x	x																									
1.3.2											x																								
1.3.3										x																									
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1.4												x	x	x	x																				
1.4.1												x																							
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1.5																																	x		
1.5.1																																	x		
1.5.2																																	x		
1.5.3																																	x		
1.5.4																																	x		
1.6																							x	x	x	x	x	x	x	x	x	x			
1.6.1																								x	x	x	x								
1.6.2																												x	x	x	x	x			
1.7																																			
1.8																																			
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2.4.1																																			
2.4.2																																			
2.4.3																																			
2.4.4																																			
2.5																																			
3.0	x	x	x	x	x	x																													
4.0																																			

DESIGN MODULES

REQUIREMENTS

	1.2	1.2.1	1.2.1.2	1.2.1.2.1	1.2.1.3	1.2.1.4	1.2.2	1.2.3	1.2.3.1	1.2.3.1.1	1.2.3.1.2	1.2.3.2	1.2.4	1.2.4.1	1.2.4.2	1.2.4.2.1	1.2.4.3	1.2.4.4	1.2.4.4.1	1.2.4.5	1.3	1.3.1	1.3.1.1	1.3.1.2	1.3.2	1.3.3	2	2.1	2.2
1.1																													
1.2																													
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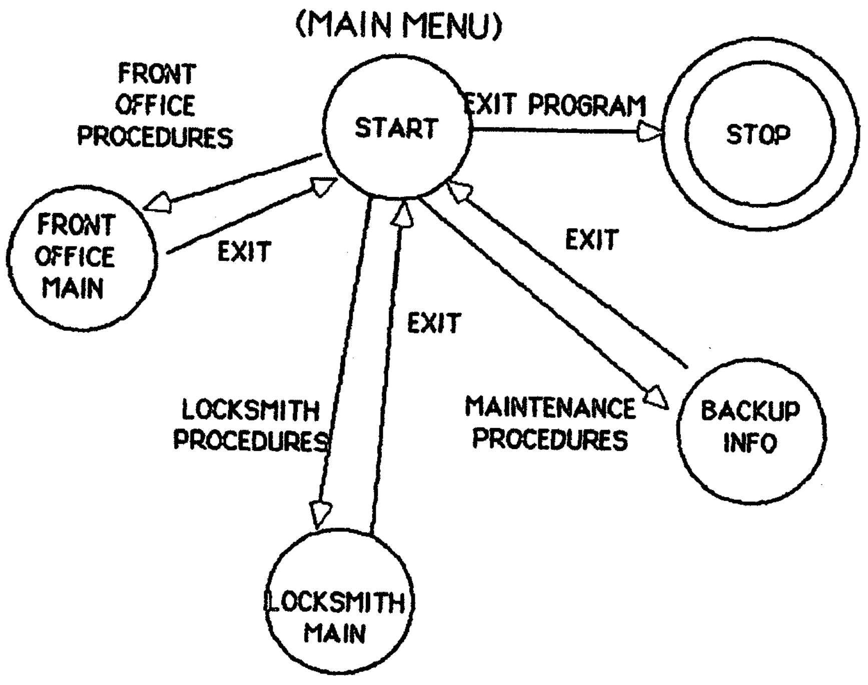
1.5.4																													
1.6																													
1.6.1																													
1.6.2																													
1.7																										x			
1.8																						x	x	x	x				
2.1	x	x	x	x	x	x																							
2.2							x																						
2.3								x	x	x	x	x																	
2.3.1										x																			
2.3.2									x	x	x																		
2.3.3																													
2.3.4																													
2.4													x	x	x	x	x	x	x	x									
2.4.1															x	x													
2.4.2																			x										
2.4.3																			x										
2.4.4																	x	x	x										
2.5																										x			
3.0																													
4.0																											x	x	x

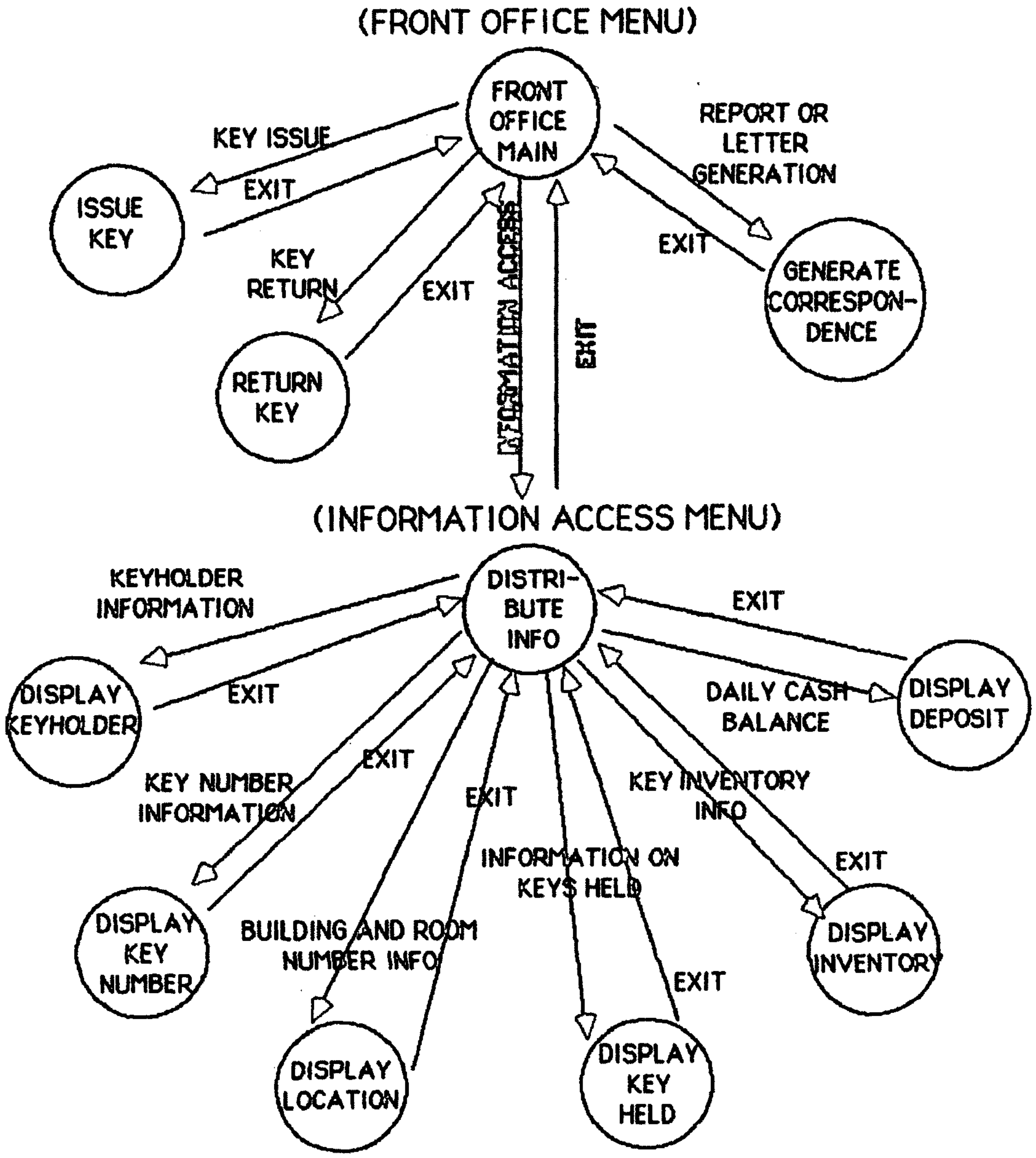
User Interface

The following state transition diagram shows the various states that the Key Inventory Control system will undergo as various menu options are chosen. This should provide the user with the ability to trace the movements of the working program throughout the user interface.

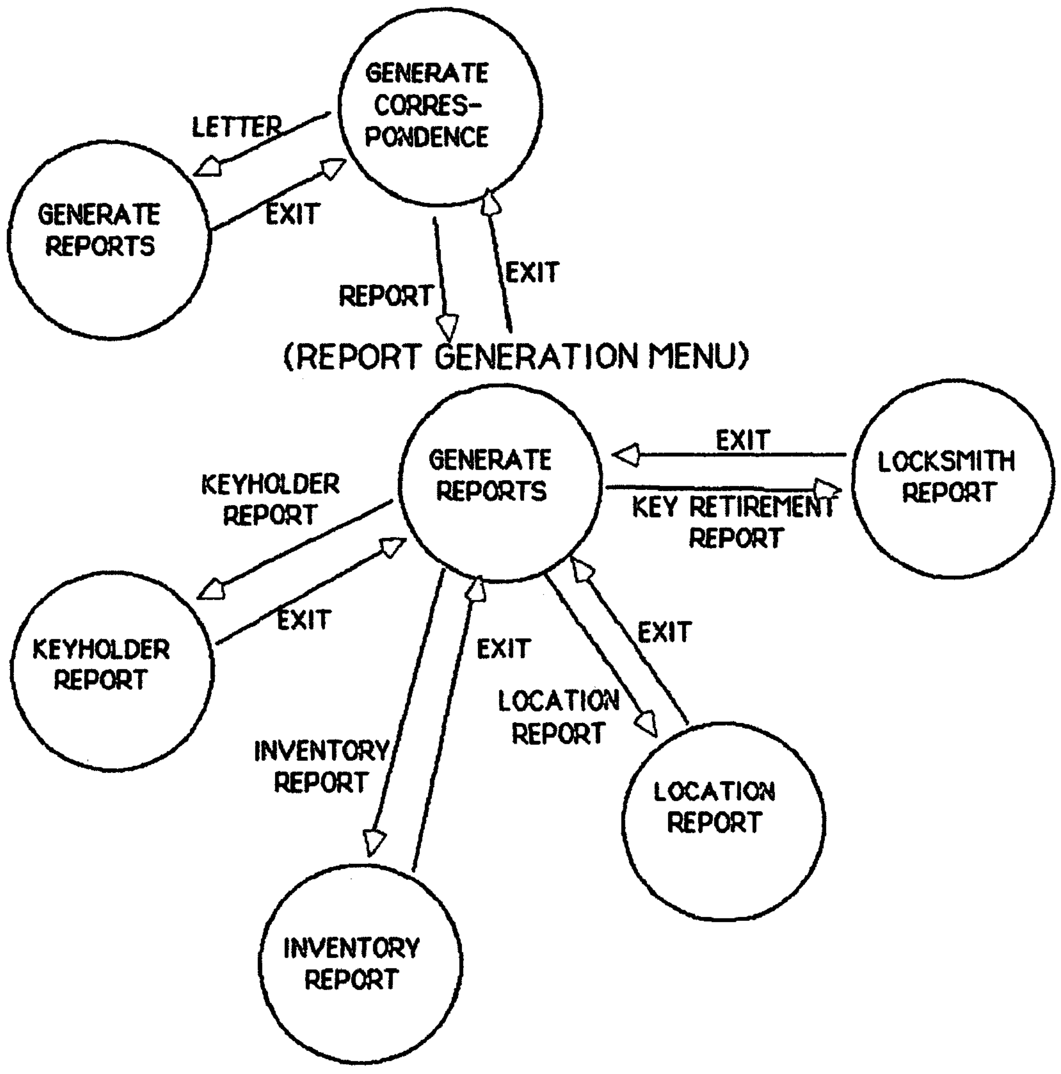
STATE TRANSITION DIAGRAM
MAIN



STATE TRANSITION DIAGRAM
FRONT OFFICE MAIN

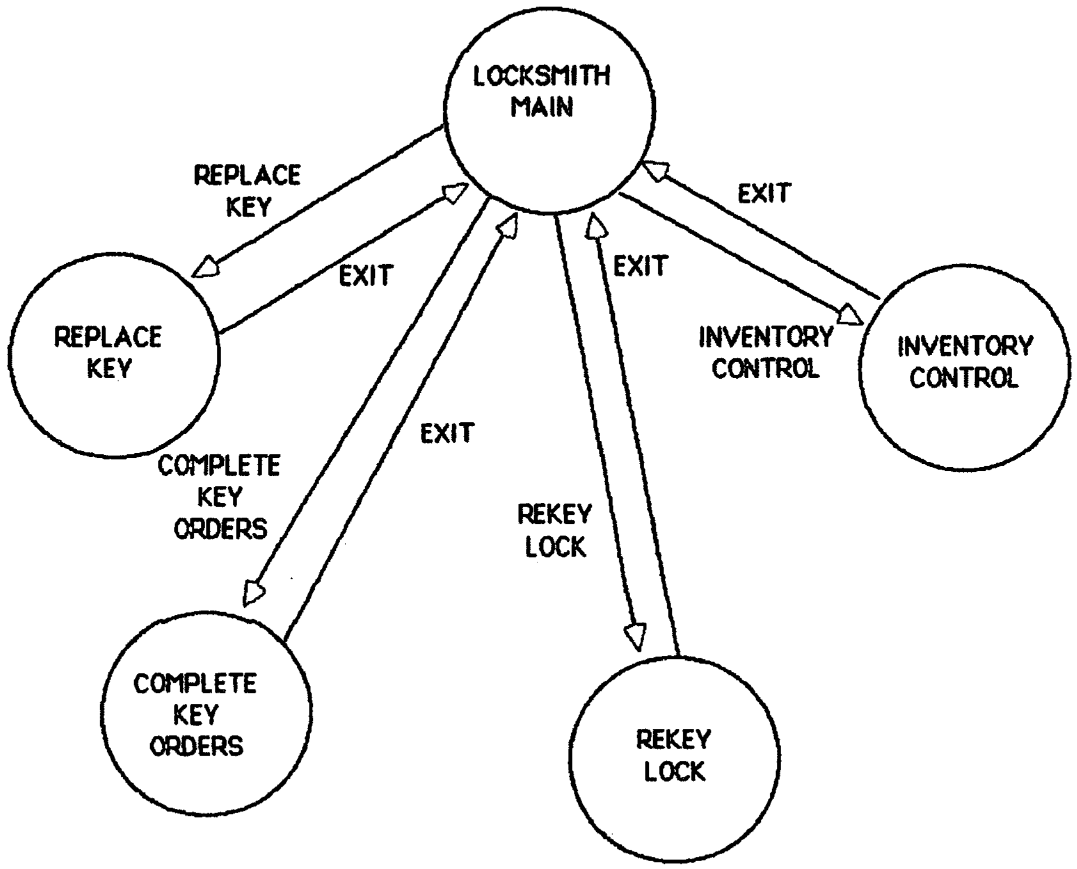


STATE TRANSITION DIAGRAM
GENERATE CORRESPONDENCE



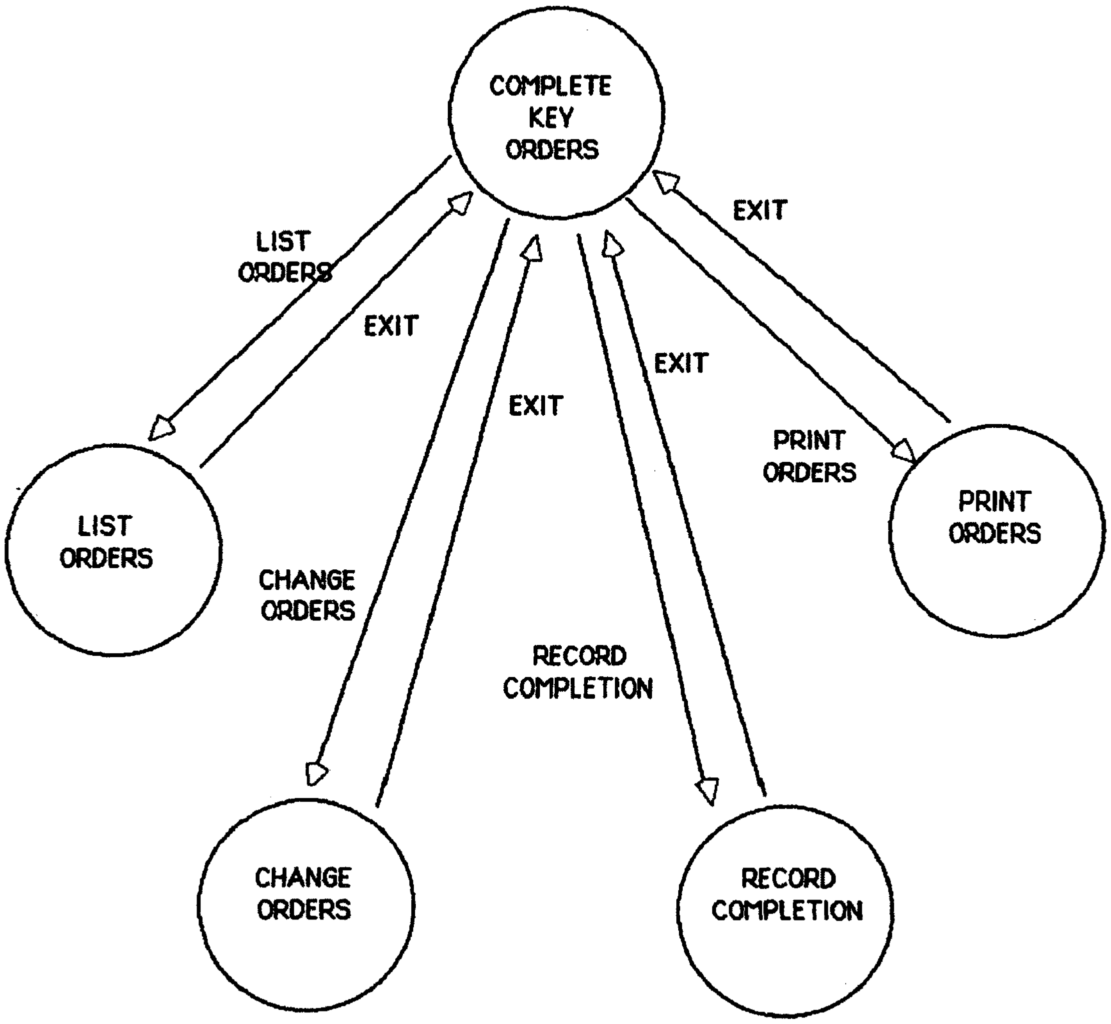
STATE TRANSITION DIAGRAM
LOCKSMITH MAIN

(LOCKSMITH MAIN MENU)

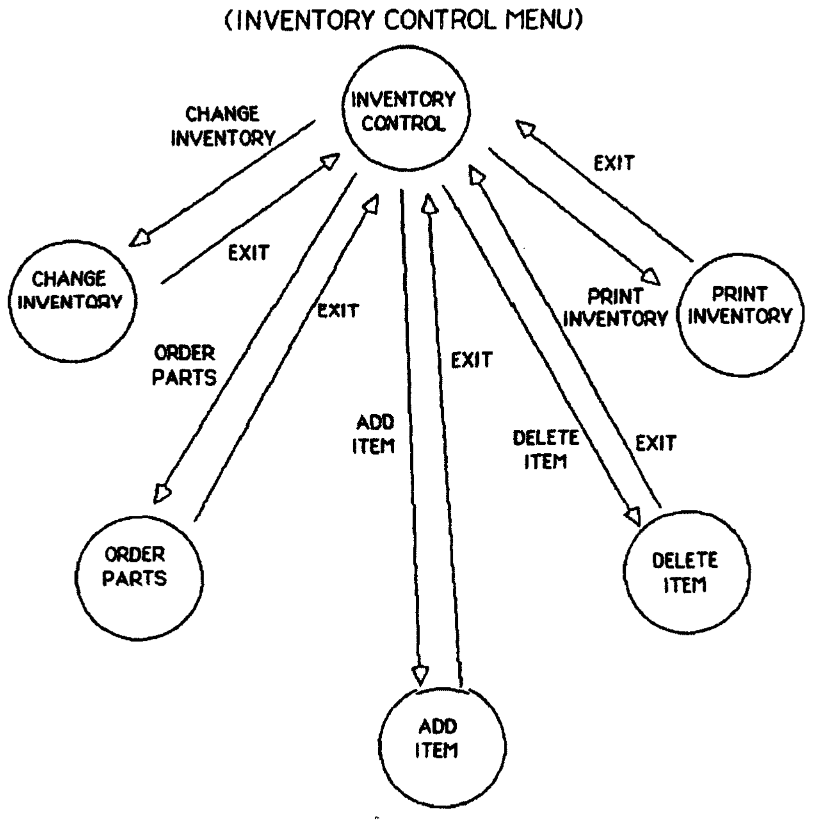


STATE TRANSITION DIAGRAM
COMPLETE KEY ORDERS

(COMPLETE KEY ORDERS MENU)



STATE TRANSITION DIAGRAM
INVENTORY CONTROL



Menu Descriptions

The following is a brief overview of the user interface and proposed menu selections.

Front Office Menus

The first menu the Key Inventory Control System user will encounter is the main menu, giving the choices of subprograms that the user may choose to enter. Each of these expects a separate password, however, so indiscriminate access to all portions of the program is not allowed.

```
***************************************************
*                                                 *
*                   MAIN MENU                     *
*                                                 *
***************************************************
*                                                 *
*     Enter program choice:                       *
*          A  Front Office Procedures             *
*          B  Locksmith Procedures                *
*          C  Maintenance Procedures              *
*          D  Exit Program                        *
*                                                 *
***************************************************
```

If the Front Office Procedure was chosen at the main program level and the password for that section was entered correctly, the next menu the user will encounter is that of the Front Office. It allows the user of front office function choices. These functions my be chosen in any order, and any number of times until the user indicates a desire to exit the front office portion of the program.

```
**************************************************
*                                                *
*                  FRONT OFFICE MENU             *
*                                                *
**************************************************
*                                                *
*     Enter function choice:                     *
*          A  Key Issue                          *
*          B  Key Return                         *
*          C  Information Access                 *
*          D  Report or Letter Generation        *
*          E  Exit                               *
*                                                *
**************************************************
```

If information access was the function chosen from the front office menu, then the Information

Access menu will be displayed. This allows the user to choose the type of information he would like to obtain.

```
**************************************************
*                                                *
*               INFORMATION ACCESS MENU          *
*                                                *
**************************************************
*                                                *
*     Enter information topic option:            *
*          A  Keyholder Information              *
*          B  Key Number Information             *
*          C  Building and Room Number           *
*               Information                      *
*          D  Information on Keys Held           *
*          E  Key Inventory Information          *
*          F  Daily Cash Balance                 *
*          G  Exit                               *
*                                                *
**************************************************
```

Selection of the option of Keyholder Information in the Information Access menu will result in the display of the Keyholder Information Menu. This menu will allow the user to choose which information to enter in order to obtain information concerning key holders.

```
*******************************************************
*                                                     *
*              KEYHOLDER INFORMATION MENU             *
*                                                     *
*******************************************************
*                                                     *
*   Enter option for which you have information:      *
*          A  Building and room number                *
*          B  Key numbers                             *
*          C  Exit                                    *
*                                                     *
*******************************************************
```

If the user had entered the Report or Letter Generation function at the Front Office Menu, and then indicated (from a single prompt) the desire to generate reports, then the Report Generation Menu would appear. This menu indicates which reports the user may produce.

```
*************************************************
*                                               *
*             REPORT GENERATION MENU            *
*                                               *
*************************************************
*                                               *
*     Enter report option:                      *
*          A  Keyholder Report                  *
*          B  Inventory Report                  *
*          C  Location Report                   *
*          D  Key Retirement Report             *
*          E  Exit                              *
*                                               *
*************************************************
```

If, at the Main Menu level, the user had chosen the Maintenance Program option, and entered the password correctly, this would allow access to the file restoration function. This function allows the user to pull previously stored files from magnetic tape to be accessed via interactive 1022 commands. The menu provided for this function allows the user to choose which files he wishes to restore.

```
**************************************************
*                                                *
*               FILE RESTORATION MENU            *
*                                                *
**************************************************
*                                                *
*     Enter file to be restored:                 *
*          A  Individual Record File             *
*          B  Name File                          *
*          C  Inventory File                     *
*          D  Location File                      *
*          E  Keyway File                        *
*          F  All Files                          *
*          G  Exit                               *
*                                                *
**************************************************
```

Locksmith Menus

The following menu is presented at the onset of the locksmith portion of the program. It controls all the options available at the high level. The user can choose any one of the four options.

```
**************************************************
*                                                *
*                  LOCKSMITH MENU                *
*                                                *
**************************************************
*                                                *
*     Choose option:                             *
*          A  Complete Key Orders                *
*          B  Replace Key                        *
*          C  Rekey Lock                         *
*          D  Inventory Control                  *
*          E  Exit                               *
*                                                *
**************************************************
```

The following menu is presented to the user with the choice of ´A´ above.

```
**************************************************
*                                                *
*            COMPLETE KEY ORDERS MENU            *
*                                                *
**************************************************
*                                                *
*     Choose Option:                             *
*          A  List Orders                        *
*          B  Change Orders                      *
*          C  Record Completion                  *
*          D  Print Orders                       *
*          E  Exit                               *
*                                                *
**************************************************
```

The following menu is displayed following the choice of ´D´, (Inventory Control) in the main menu. The choice of ´B´ or ´C´, does not provide the user with a menu, as there is only one function to perform and no menu is needed.

```
**************************************************
*                                                *
*              INVENTORY CONTROL MENU            *
*                                                *
**************************************************
*                                                *
*     Choose Option:                             *
*          A  Change Inventory                   *
*          B  Order Parts                        *
*          C  Add Item                           *
*          D  Delete Item                        *
*          E  Print Inventory                    *
*          F  Exit                               *
*                                                *
**************************************************
```

Memory Use

The memory usage of this system has been estimated at 400 pages. Needless to say, at this time the exact number of pages required to implement this system cannot be established. Although the amount of space needed for storage of files can be fairly accurately estimated, only a rough estimate of program length can be arrived at. This can be attributed to the inexact art of estimation (especially of lines of code), but also to the inexperience of the developers in the fields of large program development and estimation skills.

Memory usage is composed of two separate categories. These are file storage and program length (lines of code). Currently, the following figures have been calculated for the amount of storage required for the various files needed for information storage. The reader is referred to the section on File Descriptions for a complete description and field breakdown of all the files listed here.

Ind_Record File length: 31

19,872 records X 31 bytes = 616,032 bytes

616,032 bytes / 2560 bytes/page = 231 pages

Name File length: 39

1,000 records X 39 bytes = 39,000 bytes

39,000 bytes / 2560 bytes/page = 16 pages

Inventory File length: 26

7500 records X 26 bytes = 195,000 bytes

195,000 bytes / 2560 bytes/page = 77 pages

Location File length: 17

5000 records X 17 bytes = 85,000 bytes

85,000 bytes / 2560 bytes/page = 34 pages

Order Key File length: 14

50 records X 14 bytes = 700 bytes

700 bytes / 2560 bytes/page = 1 page

Keyway File length: 7

15 records X 7 bytes = 105 bytes

105 bytes / 2560 bytes/page = 1 page

The total number of pages required for file storage is therefore estimated to be 360 pages. The estimate for program storage is estimated to be 40 pages. This figure was arrived by taking the number of modules in the program (calculated from the hierarchical charts) and multiplying this figure by an average figure of 70 lines of code per module. Obviously, this figure is not, and will not follow throughout the program, but is only an average. Following the concepts of structured design, the smaller the module is, the easier to modify and to understand. We, therefore, will strive to keep module size as small as possible, however, as this system is highly user interactive and must include error checking, we estimate that the average module size will be larger than non-user-interactive programs. The approximate lines of code necessary is:

71 (modules) X 70 (statements/module) = 4970

The memory use needed by this program will consist of a combination of the amount needed for file storage and that needed for program storage. This figure is estimated to be:

360 (files) + 40 (program) = 400 (total)

Hardware Considerations

The Physical Plant has currently several terminals and printers which will provide them with access to the Dec 2065, upon which the Key Inventory Control system will be developed.

Access to the Dec 2065 is imperative to the development of this system. Currently, space has been guaranteed for the development of the program and the files necessary. However, the amount of space necessary to store all the information within the data files has been calculated to be approximately 360 pages. This amount of space cannot be guaranteed at this time, by the Computer Center.

Performance Considerations

The Dec 2065 was chosen as host computer for several reasons. The Dec 2065 is operated by the University of Montana Computer Center and is the host machine for many of the campus administrative programs. Access has been provided to several of these files, providing not only for less storage space within the files, but for access to additional information, hopefully allowing for greater traceability of keys. Additionally, support of these programs and the Key Inventory Control System is provided by the Computer Center. Also, due to the amount of information contained within the data base files, accessing information could be somewhat time consuming. Use of the Dec 2065, a mainframe, will provide a satisfactory response time.

Use of structured design principles and documented testing procedures will provide the Physical Plant with a reliable program. This is essential, as the data base will contain information on the whereabouts of the keys and thus, the security of the University.

Development Projections

Following is a projected schedule for the completion of the remaining phases in the proposed project. These dates are approximate, due to both the inexact art of estimation and the difficulty of scheduling review meetings at the end of each phase.

6/26/85	-	Detailed Design
6/28/85	-	Verification
7/10/85	-	Coding and Unit Testing
7/31/85	-	Integration Testing
8/9/85	-	Final Implementation and User Manual

Maintenance Considerations

Maintainability is the ease with which a software system can be corrected when errors or deficiencies occur, and can be expanded or contracted to satisfy new requirements. This is one of several characteristics sought in a high-quality software system. Maintainability can be thought of as a product of the following characteristics:

testable
understandable
modifiable
portable
reliable
efficient
usable

Of these characteristics, perhaps understandability is the most important, and if a program is understandable it tends to naturally have some of the other characteristics. If a program is not understood it is virtually impossible to maintain in any sort of efficient or effective manner. Understandable programs have many of the following properties:

modularity
consistency of style
avoidance of obscure code
use of meaningful data and procedure names
structuredness

Use of structured design leads to these properties. Structuredness and modularity are concepts of structured design and direct the systems towards a more easily maintained and modified system. It also provides for a means of generating test cases and, it follows, greater testing and higher reliability.

The reader is referred to the Appendixes where several standardizations have already been specified. This helps to provide the consistency of style mentioned above. As this enhances readability, and understandability, it therefore, enhances maintainability.

Acknowledgements

At this point we would like to express our appreciation to Mr. Philip Bain of the Registrar´s Office and Ms. Linda Brown of the Personnel Office, whose cooperation has been most helpful in establishing the interfaces between the various existing university data base programs and the creation of the Physical Plant Key Inventory Control system. Without their support, many of the proposed functions would not be possible to implement.

We would also like to thank those people in the Physical Plant which have donated their time and expertise to help with the development of the Key Inventory Control system. Harry Simon, locksmith, Patty Gibson and Marlice McMahon, administrative aide, have offered invaluable assistance, without which our task would have been much more difficult.

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Appendix A: Layout of DMD Files

The following file formats are those to be used within the actual program in order to store the necessary data base information. All fields are laid out in the order shown, and these will be used as the 1022 definition files.

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!
!     IND_RECORD.DMD
!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
SOCIAL_SECURITY_NUMBER SSN INTEGER KEYED 9
KEY_ID_NUMBER KIN TEXT KEYED 10
DATE_OUT DO DATE-OF-ENTRY 8
DEPOSIT DEP INTEGER 4
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!
!     NAME.DMD
!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
SOCIAL_SECURITY_NUMBER SSN INTEGER KEYED 9
LAST_NAME LNM TEXT 17
FIRST_NAME FNM TEXT 13
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!
!     INVEN.DMD
!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
KEY_ID_NUMBER KIN TEXT KEYED 10
KEY_TYPE KY TEXT 1
QUANTITY_ON_HAND QON INTEGER 3
TOTAL_NUMBER TN INTEGER 3
STATUS ST TEXT 1
DATE_RETIRED DR DATE 8
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!
!     LOCATE.DMD
!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
KEY_ID_NUMBER KIN TEXT KEYED 10
BUILDING BLD TEXT 3
ROOM_NUMBER RN TEXT 4
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!
!     KEYWAY.DMD
!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
KEYWAY_NUMBER KYN TEXT KEYED 4
QUANTITY_ON_HAND QON INTEGER 4
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!
!     ORDER.DMD
!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
PRIORITY PR TEXT 1
KEY_ID_NUMBER KID TEXT KEYED 10
AMOUNT AMT INTEGER 3
ENTRY_DATE ED DATE OF ENTRY 8
```

Appendix B: Data Structure Layout

This section describes the layout of internally used files rather than the external ones previously defined. These files are not included in the file relationship diagram because they are used only to store information from one program run to the next. They do not map to any other files, and for the most part have only one field and one entry in that field.

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!
!     DUMMY_SS.DMD
!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
SOCIAL_SECURITY_NUMBER SSN INTEGER KEYED 9
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!
!     CHECKBOOK.DMD
!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
BALANCE BAL INTEGER KEYED 6
```

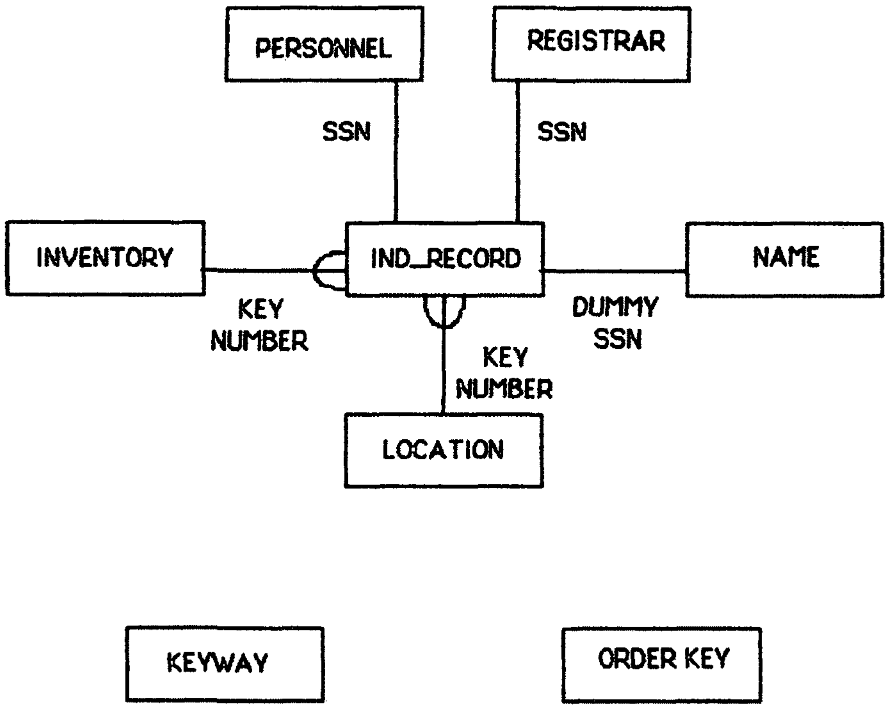
```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!
!     ORDER_DATE.DMD
!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
ORDER_DATE OD DATE-OF-ENTRY  8
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!
!     LAST_SAVE.DMD
!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
DATE_LAST_SAVED DLS DATE OF ENTRY 8
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!
!     KEY_ORDER_FILE.DMD
!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
KEYWAY_NUMBER KYN INTEGER 4
AMOUNT QON INTEGER 4
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!
!     HOLDER.DMD
!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
SOCIAL_SECURITY SSN INTEGER KEYED 9
KEY_NUMBER KIN TEXT 10
```

APPENDIX C: FILE RELATIONSHIPS



Appendix D: Standard Module Heading Information

The following is a pictorial representation of the module heading information that will be included within the code of the program to identify each module, its parameters, and its function. It is included to make future maintenance work easier in identifying particular parts of the entire program.

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                    !
!     Module Name:                                   !
!     Parameters:                                    !
!          In Only:                                  !
!          Out Only:                                 !
!          In/Out:                                   !
!     Coded By:                                      !
!     Date Last Modified:                            !
!     Reason Modified:                               !
!                                                    !
!     Module Description:                            !
!           (functional description)                 !
!                                                    !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
```

The length of the module heading may vary dependent upon the amount of information to be included within the functional description.

Appendix E: Standard Menu Format and Prompt Layout

The following is a pictorial representation of the standard menu layout to be used within the entire key inventory control system. It is standardized so that all menus encountered by the user will be of the same format, and require the same type of user response form one section of the program to another. The width of the menu display will remain constant, however, dependent upon the number of choices available to the user, the length may vary. In addition, a prompt will be included at the end of the menu to remind the user to make a choice, and any additional instructions necessary will be included here.

```
**************************************************
*                                                *
*                   MENU NAME                    *
*                                                *
**************************************************
*                                                *
*     Menu Instruction:                          *
*          A  Choice A                           *
*          B  Choice B                           *
*          C  Choice C                           *
*          D  Choice D                           *
*                                                *
**************************************************
```

User prompt:

In addition to the standardized user menu, a standardized form of prompt will be used to obtain information from the user other than that obtained from the menu. Whenever a user must enter information into the system, a prompt indicating the type of information will appear on the screen, and blanks over which the user may type the information. If there are a finite number of responses possible to a question such as Yes/No, the user will be given a list of the possible choices. The format for the user prompt is as follows.

Instruction/Question (possible answers):

Appendix F: Sample Letter

The following letter shows the content of letters sent out to personnel and students leaving the University system if they still possess keys. The letter itself will be kept in a separate file so that it will be easily changed should another format be desirable in the future.

Date

Dear Student/University Employee,

It has come to our attention that you will soon be leaving the University system, and that you still possess one or more keys from the Physical Plant. Please return these to the Physical Plant prior to leaving, and your deposit will be refunded. The keys we show that you have are:

Key Number 1
Key Number 2
...
Key Number n

Thank you for your cooperation!

University of Montana Physical Plant

Appendix G: Sample Reports

Several kinds of reports may be generated by the report generation function of the Key Inventory Control System. The format of these reports is shown below. Each sample is a greatly abbreviated representation of the actual report, but may be used to understand the layout of each.

Keyholder Report

```
Keyholder Name:  Key Number: Date Issued:  Deposit:
---------------  ----------  -----------   -------

Doe, John E.      3K68179      2/12/85        2.00
                  3K65132      3/15/84        2.00

Smith, Mary L.    3K63128      6/18/75        2.00
```

```
Inventory Report

             Quantity     Quantity     Total
Key Number:  on Hand:     Out:         Number:
-----------  ---------    ---------    -------

  3K68179       10           25           35
  2F43289        3           17           20
  3K63219       18            5           23
```

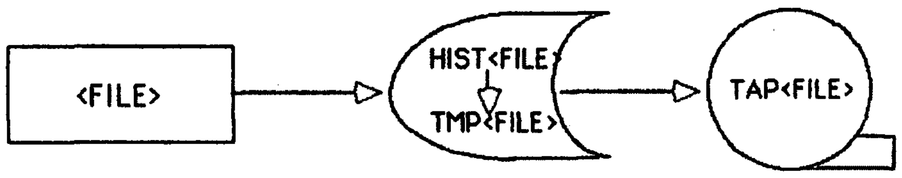
Location Report

Key Number:	Building:	Room Number:
3K68179	UH	315
3K47328	UH	22
2F53728	LA	103

Key Retirement Report

Key Number:	Quantity on Hand:	Quantity Out:	Total Number:	Date Retired:
3K68179	33	2	35	1/15/85
2F34287	12	17	29	5/14/85

APPENDIX H:
FILE NAMING CONVENTIONS:
RESTORE



RESTORE: LOADS TAP<FILE> TO TMP<FILE>

Appendix E: Test Run

```
[RECORDING INITIATED AT 21:38:10]

LINK FROM CS.GRAD.MILEY, TTY 25

 TOPS-20 Command processor 5(712)
@1022
7/30/85
System 1022A 116A(436)

* use keys

 TOPS-20 Command processor 5(712)
@$H$J
@
          *************************************************************
          *                                                           *
          *               KEY INVENTORY CONTROL MENU                  *
          *                                                           *
          *************************************************************
          *                                                           *
          *     Enter Program Choice:                                 *
          *          A  Front Office Procedures                       *
          *          B  Locksmith Procedures                          *
          *          C  Maintenance Procedures                        *
          *          D  Exit Program                                  *
          *                                                           *
          *************************************************************
Enter Choice:  c^H$Kx
Invalid Choice

 TOPS-20 Command processor 5(712)
@$H$J
@
          *************************************************************
          *                                                           *
          *               KEY INVENTORY CONTROL MENU                  *
          *                                                           *
          *************************************************************
          *                                                           *
          *     Enter Program Choice:                                 *
          *          A  Front Office Procedures                       *
          *          B  Locksmith Procedures                          *
          *          C  Maintenance Procedures                        *
          *          D  Exit Program                                  *
          *                                                           *
          *************************************************************
Enter Choice:  a

Enter Password:
1234449

 TOPS-20 Command processor 5(712)
@$H$J
@
Incorrect Password
Please Re-enter Password
1234567^H$K9

 TOPS-20 Command processor 5(712)
@$H$J
@

 TOPS-20 Command processor 5(712)
@[Job MAIL Queued, Request-ID 163, Limit 0:05:00]
```

```
@
* use keys

 TOPS-20 Command processor 5(712)
@$H$J
@
          *************************************************************
          *                                                           *
          *                KEY INVENTORY CONTROL MENU                 *
          *                                                           *
          *************************************************************
          *                                                           *
          *     Enter Program Choice:                                 *
          *          A  Front Office Procedures                       *
          *          B  Locksmith Procedures                          *
          *          C  Maintenance Procedures                        *
          *          D  Exit Program                                  *
          *                                                           *
          *************************************************************
Enter Choice:  a

Enter Password:
1234567

 TOPS-20 Command processor 5(712)
@$H$J
@

 TOPS-20 Command processor 5(712)
@$H$J
@
          *************************************************************
          *                                                           *
          *                   FRONT OFFICE MENU                       *
          *                                                           *
          *************************************************************
          *                                                           *
          *     Enter Function Choice:                                *
          *          A  Key Issue                                     *
          *          B  Key Return                                    *
          *          C  Information Access                            *
          *          D  Report or Letter Generation                   *
          *          E  Exit Program                                  *
          *                                                           *
          *************************************************************
Enter Choice:  a

Please enter 9-digit social security number,
If not available, simply type a 0 (zero).
SSN:  516745486

SSN:   516745486
Is this correct? (Y/N)  y


There is no corresponding record for that SSN.

Please enter issuee's last name:  buck

Please enter issuee's first name and middle initial:  david f.

LAST NAME:   buck
FIRST NAME:   david f.

Is this correct? (Y/N)  y
```

```
Please enter building abbreviation,
(maximum 3 characters).
Bldg:  lib

Please enter room number,
(maximum 4 characters).
Room No:  110

Bldg:   lib
Room No:   110

Is this correct? (Y/N)  y

Enter deposit amount
If amount is other than standard, type in
new amount, otherwise type a carriage return:

The following record will be entered into the files:
Name:  david f. buck
Bldg & Room:   lib 110
Key Number:   36H444444
Deposit Amt:    $2.00
Is this correct?  (Y/N)  y
That record has been entered.

Do you have another entry for this individual (Y/N)  n

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                  FRONT OFFICE MENU                       *
          *                                                          *
          ************************************************************
          *                                                          *
          *   - Enter Function Choice:                               *
          *          A  Key Issue                                    *
          *          B  Key Return                                   *
          *          C  Information Access                           *
          *          D  Report or Letter Generation                  *
          *          E  Exit Program                                 *
          *                                                          *
          ************************************************************
Enter Choice:  a

Please enter 9-digit social security number,
If not available, simply type a 0 (zero).
SSN:  728418899

SSN:   728418899
Is this correct? (Y/N)  y

NAME:   GLENDA BARNES

Please enter building abbreviation,
(maximum 3 characters).
Bldg:  uh

Please enter room number,
(maximum 4 characters).
Room No:  118

Bldg:   uh
Room No:   118
```

```
Is this correct? (Y/N)  n

Please enter building abbreviation,
(maximum 3 characters).
Bldg:  ma

Please enter room number,
(maximum 4 characters).
Room No:  118

Bldg:   ma
Room No:   118

Is this correct? (Y/N)  y

You have an invalid building and room combination.
Please check your numbers.
(Type a carriage return <cr> to continue)

Do you have another entry for this individual (Y/N)  y

Please enter building abbreviation,
(maximum 3 characters).
Bldg:  ma

Please enter room number,
(maximum 4 characters).
Room No:    ^H$K^H$Koo^H$K^H$K001

Bldg:   ma
Room No:   001

Is this correct? (Y/N)  y

Enter deposit amount
If amount is other than standard, type in
new amount, otherwise type a carriage return:  8800

The following record will be entered into the files:
Name:  GLENDA BARNES
Bldg & Room:   ma  001
Key Number:   2F246834
Deposit Amt:  $***.**
Is this correct?  (Y/N)  n

Do you have another entry for this individual (Y/N)  y

Please enter building abbreviation,
(maximum 3 characters).
Bldg:  ma

Please enter room number,
(maximum 4 characters).
Room No:  001

Bldg:   ma
Room No:   001

Is this correct? (Y/N)  y

Enter deposit amount
If amount is other than standard, type in
new amount, otherwise type a carriage return:  800
```

```
[illegible]
Name:  GLENDA BARNES
Bldg & Room:   ma  001
Key Number:   2F246834                                   343
Deposit Amt:  $800.00
Is this correct?  (Y/N)  y

That record has been entered.

Do you have another entry for this individual (Y/N)  n

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                    FRONT OFFICE MENU                     *
          *                                                          *
          ************************************************************
          *                                                          *
          *      Enter Function Choice:                              *
          *           A  Key Issue                                   *
          *           B  Key Return                                  *
          *           C  Information Access                          *
          *           D  Report or Letter Generation                 *
          *           E  Exit Program                                *
          *                                                          *
          ************************************************************
Enter Choice:  c

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                INFORMATION ACCESS MENU                   *
          *                                                          *
          ************************************************************
          *                                                          *
          *         Enter information topic option:                  *
          *           A  Keyholder Information                       *
          *           B  Key Number Information                      *
          *           C  Building and Room Number Information        *
          *           D  Information on Keys Held                    *
          *           E  Key Inventory Information                   *
          *           F  Daily Cash Balance                          *
          *           G  Exit                                        *
          *                                                          *
          ************************************************************
Enter Choice:  a

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *              KEYHOLDER INFORMATION MENU                  *
          *                                                          *
          ************************************************************
          *                                                          *
          *      Enter option for which you have information:        *
          *           A  Building and room number                    *
          *           B  Key numbers                                 *
          *           C  Exit                                        *
          *                                                          *
          ************************************************************
```

```
Please enter menu choice.  a

Please enter the building abbreviation
(maximum 3 characters):
Bldg:  ma

Please enter the room number
(maximum 4 characters):
Room No:  oo^H$K^H$K001

Bldg:   ma
Room No:   001
Is this correct? (Y/N)  y
NAME:   RHEA ASHMORE
NAME:   GERRY BAERTSCH
NAME:   GLENDA BARNES

Do you have another request? (Y/N)  y

Please enter the building abbreviation
(maximum 3 characters):
Bldg:  f

Please enter the room number
(maximum 4 characters):
Room No:  301

Bldg:   f
Room No:   301
Is this correct? (Y/N)  n

Please enter the building abbreviation
(maximum 3 characters):
Bldg:  la

Please enter the room number
(maximum 4 characters):
Room No:  103

Bldg:   la
Room No:   103
Is this correct? (Y/N)  y
NAME:    WILLIAM DERRICK
NAME:   JOHN SMITH
NAME:   KEN MILLER

Do you have another request? (Y/N)  y^H$Kn

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *              KEYHOLDER INFORMATION MENU                  *
          *                                                          *
          ************************************************************
          *                                                          *
          *      Enter option for which you have information:        *
          *           A  Building and room number                    *
          *           B  Key numbers                                 *
          *           C  Exit                                        *
          *                                                          *
          ************************************************************

Please enter menu choice.  c
```

```
 TOPS-20 Command processor 5(712)
@$H$J
@
          ***********************************************************
          *                                                         *
          *                 INFORMATION ACCESS MENU                 *
          *                                                         *
          ***********************************************************
          *                                                         *
          *        Enter information topic option:                  *
          *          A  Keyholder Information                       *
          *          B  Key Number Information                      *
          *          C  Building and Room Number Information        *
          *          D  Information on Keys Held                    *
          *          E  Key Inventory Information                   *
          *          F  Daily Cash Balance                          *
          *          G  Exit                                        *
          *                                                         *
          ***********************************************************
Enter Choice:  F

Deposit Total
    $4949.00

Do you wish to have the total cleared? (Y/N)  Y
Deposit total is now $0.00.

Type a carriage return <cr> to continue

 TOPS-20 Command processor 5(712)
@$H$J
@
          ***********************************************************
          *                                                         *
          *                 INFORMATION ACCESS MENU                 *
          *                                                         *
          ***********************************************************
          *                                                         *
          *        Enter information topic option:                  *
          *          A  Keyholder Information                       *
          *          B  Key Number Information                      *
          *          C  Building and Room Number Information        *
          *          D  Information on Keys Held                    *
          *          E  Key Inventory Information                   *
          *          F  Daily Cash Balance                          *
          *          G  Exit                                        *
          *                                                         *
          ***********************************************************
Enter Choice:  D

Please enter the individual's SSN. ( 9 digits ).
( or a carriage return <cr> if none )

Please enter the individual's last name.
Last Name:  BUCK

Please enter the individual's first name.
First Name:  DAVID

LAST NAME:   BUCK
FIRST NAME:   DAVID
Is this correct? (Y/N)  Y
```

```
Key Number     Date Out     Deposit Amount
----------     --------     --------------

36H444444       7/30/1985       $2.00

Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                  INFORMATION ACCESS MENU                 *
          *                                                          *
          ************************************************************
          *                                                          *
          *        Enter information topic option:                   *
          *          A  Keyholder Information                        *
          *          B  Key Number Information                       *
          *          C  Building and Room Number Information         *
          *          D  Information on Keys Held                     *
          *          E  Key Inventory Information                    *
          *          F  Daily Cash Balance                           *
          *          G  Exit                                         *
          *                                                          *
          ************************************************************
Enter Choice:  E
Please enter the Key Number.
Key Number:  3K123460

KEY NUMBER     QUANTITY ON HAND     TOTAL OUT     TOTAL NUMBER
----------     ----------------     ---------     ------------

3K123460              32                8              40


Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                  INFORMATION ACCESS MENU                 *
          *                                                          *
          ************************************************************
          *                                                          *
          *        Enter information topic option:                   *
          *          A  Keyholder Information                        *
          *          B  Key Number Information                       *
          *          C  Building and Room Number Information         *
          *          D  Information on Keys Held                     *
          *          E  Key Inventory Information                    *
          *          F  Daily Cash Balance                           *
          *          G  Exit                                         *
          *                                                          *
          ************************************************************
Enter Choice:  A

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *             KEYHOLDER INFORMATION MENU                   *
          *                                                          *
          ************************************************************
          *                                                          *   347
          *     Enter option for which you have information:         *
          *          A  Building and room number                     *
          *          B  Key numbers                                  *
          *          C  Exit                                         *
          *                                                          *
          ************************************************************

Please enter menu choice.  D
Invalid choice,  Please try again.

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *            KEYHOLDER INFORMATION MENU                    *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter option for which you have information:         *
          *          A  Building and room number                     *
          *          B  Key numbers                                  *
          *          C  Exit                                         *
          *                                                          *
          ************************************************************

Please enter menu choice.  B

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  36H66666

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  36H666666

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  36H444444

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  3K1232^H$K460

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q
Do you have another request? (Y/N)  Y

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  3K123462

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q
NAME:    VICKI ANDRE
```

```
NAME:    JOAN RADANDT
NAME:    VIRGINIA REESMAN
NAME:    WILLIAM EVANS
NAME:    JULIETTE CRUMP
NAME:   ANN SMITH
NAME:   JOE ANDERSON
NAME:   STEVE ANDERSON
NAME:   MARY SMITH
Do you have another request? (Y/N)  Y

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  62K123464

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  62K1234647

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  66666666666666666666666666666666
?1022 INPUT ERROR, FIELD 1; PLEASE RETYPE LINE...
555555555

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  3

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q
Do you have another request? (Y/N)  Y

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q

There is no one who has all those keys issued to them
Do you have another request? (Y/N)  Y

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  2F246824

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q
NAME:   SALLY SMITH
NAME:   DAVID ALT
NAME:   FRANK ANDERSON
NAME:   STEPHEN BALOGH
NAME:   BRUCE BARRETT
NAME:    ROBERT REAM
NAME:    LORETTA EDWARDS
NAME:    CHARLES EYER
Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
```

```
@$H$J
@
          ************************************************************
          *                                                          *
          *              KEYHOLDER INFORMATION MENU                  *
          *                                                          *
          ************************************************************
          *                                                          *
          *      Enter option for which you have information:        *
          *           A  Building and room number                    *
          *           B  Key numbers                                 *
          *           C  Exit                                        *
          *                                                          *
          ************************************************************

Please enter menu choice.  C


 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                   INFORMATION ACCESS MENU                *
          *                                                          *
          ************************************************************
          *                                                          *
          *         Enter information topic option:                  *
          *           A  Keyholder Information                       *
          *           B  Key Number Information                      *
          *           C  Building and Room Number Information        *
          *           D  Information on Keys Held                    *
          *           E  Key Inventory Information                   *
          *           F  Daily Cash Balance                          *
          *           G  Exit                                        *
          *                                                          *
          ************************************************************
Enter Choice:  G


 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                   FRONT OFFICE MENU                      *
          *                                                          *
          ************************************************************
          *                                                          *
          *      Enter Function Choice:                              *
          *           A  Key Issue                                   *
          *           B  Key Return                                  *
          *           C  Information Access                          *
          *           D  Report or Letter Generation                 *
          *           E  Exit Program                                *
          *                                                          *
          ************************************************************
Enter Choice:  D

 TOPS-20 Command processor 5(712)
@$H$J
@

 The following types of correspondence are available:

    L:  Letter
    R:  Report
    Q:  Quit

Please enter choice:  L

The following types of letters are available:
  S:   Student
  P:   Personnel
  Q:   Quit

Please enter choice:  S
NOT IMPLEMENTED YET
IN PRINT LETTERS.
NOT IMPLEMENTED YET

The following types of letters are available:
  S:   Student
  P:   Personnel
  Q:   Quit

Please enter choice:  P
 IN GEN PERS LETTERS.
 NOT IMPLEMENTED YET
IN PRINT LETTERS.
NOT IMPLEMENTED YET

The following types of letters are available:
  S:   Student
  P:   Personnel
  Q:   Quit

Please enter choice:  Q
Leaving letter generation

 TOPS-20 Command processor 5(712)
@$H$J
@

 The following types of correspondence are available:

    L:  Letter
    R:  Report
    Q:  Quit

Please enter choice:  R

 TOPS-20 Command processor 5(712)
@$H$J
@
         ************************************************************
         *                                                          *
         *              REPORT GENERATION MENU                      *
         *                                                          *
         ************************************************************
         *                                                          *
         *      Enter report option:                                *
         *           A  Keyholder Report                            *
         *           B  Inventory Report                            *
         *           C  Location Report                             *
         *           D  Key Retirement Report                       *
         *           E  Exit                                        *
         *                                                          *
         ************************************************************

Please enter option choice:  C
Please choose one of the following:
    T:  Total Location Report
        (sorted by either keyway number or building number)
    I:  Individual Report
        (report by individual keyways or building numbers)
    Q:  Quit

Please enter your choice:  I

Would you like a report based upon a Keyway Number
or Building Number?  (K/B):  B

Please enter building abbreviation for report.
Building Number:  MA

Your report has been sent to the line printer
and can be picked up at the computer center
Type a carriage return <cr> to continue:

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *              REPORT GENERATION MENU                      *
          *                                                          *
          ************************************************************
          *                                                          *
          *      Enter report option:                                *
          *           A  Keyholder Report                            *
          *           B  Inventory Report                            *
          *           C  Location Report                             *
          *           D  Key Retirement Report                       *
          *           E  Exit                                        *
          *                                                          *
          ************************************************************

Please enter option choice:  A

Please choose one of the following:
    T:  Report on Total Keyholders
    I:  Individual Report
        (report by individual keyways)
    Q:  Quit

Please enter your choice:  I

Please enter keyway number for report.
Keyway Number:  88

Your report has been sent to the line printer
and can be picked up at the computer center
Type a carriage return <cr> to continue:

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *              REPORT GENERATION MENU                      *
          *                                                          *
          ************************************************************
          *                                                          *
          *      Enter report option:                                *
          *           A  Keyholder Report                            *
          *           B  Inventory Report                            *
          *          C  Location Report                                 *
          *          D  Key Retirement Report                           *
          *          E  Exit                                            *
          *                                                             *
          ***************************************************************

Please enter option choice:  B

Please choose one of the following:
    T:  Report on Total Inventory
    I:  Individual Report
        (report by individual keyways)
    Q:  Quit

Please enter your choice:  T

Your report has been sent to the line printer
and can be picked up at the computer center
Type a carriage return <cr> to continue:

 TOPS-20 Command processor 5(712)
@$H$J
@
          ***************************************************************
          *                                                             *
          *               REPORT GENERATION MENU                        *
          *                                                             *
          ***************************************************************
          *                                                             *
          *     Enter report option:                                    *
          *          A  Keyholder Report                                *
          *          B  Inventory Report                                *
          *          C  Location Report                                 *
          *          D  Key Retirement Report                           *
          *          E  Exit                                            *
          *                                                             *
          ***************************************************************

Please enter option choice:  E


 TOPS-20 Command processor 5(712)
@$H$J
@

 The following types of correspondence are available:

    L:  Letter
    R:  Report
    Q:  Quit

Please enter choice:  Q


 TOPS-20 Command processor 5(712)
@$H$J
@
          ***************************************************************
          *                                                             *
          *                    FRONT OFFICE MENU                        *
          *                                                             *
          ***************************************************************
          *                                                             *
          *     Enter Function Choice:                                  *
          *          A  Key Issue                                       *
          *          B  Key Return                                      *
          *         C  Information Access                              *
          *         D  Report or Letter Generation                     *
          *         E  Exit Program                                    *
          *                                                            *
          **************************************************************
Enter Choice:  C

 TOPS-20 Command processor 5(712)
@$H$J
@
          **************************************************************
          *                                                            *
          *                  INFORMATION ACCESS MENU                   *
          *                                                            *
          **************************************************************
          *                                                            *
          *        Enter information topic option:                     *
          *          A  Keyholder Information                          *
          *          B  Key Number Information                         *
          *          C  Building and Room Number Information           *
          *          D  Information on Keys Held                       *
          *          E  Key Inventory Information                      *
          *          F  Daily Cash Balance                             *
          *          G  Exit                                           *
          *                                                            *
          **************************************************************
Enter Choice:  F

Deposit Total
        $.00

Do you wish to have the total cleared? (Y/N)  N

Type a carriage return <cr> to continue

 TOPS-20 Command processor 5(712)
@$H$J
@
          **************************************************************
          *                                                            *
          *                  INFORMATION ACCESS MENU                   *
          *                                                            *
          **************************************************************
          *                                                            *
          *        Enter information topic option:                     *
          *          A  Keyholder Information                          *
          *          B  Key Number Information                         *
          *          C  Building and Room Number Information           *
          *          D  Information on Keys Held                       *
          *          E  Key Inventory Information                      *
          *          F  Daily Cash Balance                             *
          *          G  Exit                                           *
          *                                                            *
          **************************************************************
Enter Choice:  A

 TOPS-20 Command processor 5(712)
@$H$J
@
          **************************************************************
          *                                                            *
          *             KEYHOLDER INFORMATION MENU                     *
          *                                                            *
          **************************************************************
          *                                                            *
          *     Enter option for which you have information:           *
          *          A  Building and room number                       *
          *          B  Key numbers                                    *
          *          C  Exit                                           *
          *                                                            *
          **************************************************************

Please enter menu choice.  B

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q

There is no one who has all those keys issued to them
Do you have another request? (Y/N)  Y

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  6666666

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q

There is no one who has all those keys issued to them
Do you have another request? (Y/N)  Y

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  999999999

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q

There is no one who has all those keys issued to them
Do you have another request? (Y/N)  62K123464
?1022 INPUT ERROR, FIELD 1; PLEASE RETYPE LINE...
Y

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  62K123464

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q
NAME:    HARRY RAY
NAME:    JULIETTE CRUMP
NAME:   KEN MILLER
Do you have another request? (Y/N)  Y

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  36H444666

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
```

```
Key Number:  Q

There is no one who has all those keys issued to them
Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *             KEYHOLDER INFORMATION MENU                   *
          *                                                          *
          ************************************************************
          *                                                          *
          *      Enter option for which you have information:        *
          *           A  Building and room number                    *
          *           B  Key numbers                                 *
          *           C  Exit                                        *
          *                                                          *
          ************************************************************

Please enter menu choice.  C


 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                  INFORMATION ACCESS MENU                 *
          *                                                          *
          ************************************************************
          *                                                          *
          *         Enter information topic option:                  *
          *           A  Keyholder Information                       *
          *           B  Key Number Information                      *
          *           C  Building and Room Number Information        *
          *           D  Information on Keys Held                    *
          *           E  Key Inventory Information                   *
          *           F  Daily Cash Balance                          *
          *           G  Exit                                        *
          *                                                          *
          ************************************************************
Enter Choice:  D

Please enter the individual's SSN. ( 9 digits ).
( or a carriage return <cr> if none )  516545186


That individual does not have any keys issued to him.

Do you have another request? (Y/N)  Y

Please enter the individual's SSN. ( 9 digits ).
( or a carriage return <cr> if none )  516745186


That individual does not have any keys issued to him.

Do you have another request? (Y/N)  251457199
?1022 INPUT ERROR, FIELD 1; PLEASE RETYPE LINE...
Y

Please enter the individual's SSN. ( 9 digits ).
( or a carriage return <cr> if none )  251457199
NAME:     DELORES RENZ
```

```
Key Number      Date Out      Deposit Amount
___________     _________     ______________

3K123458        7/17/1985      $2.00
62K123462        7/17/1985      $2.00
4K3F864292        7/17/1985      $2.00
3K123464        7/17/1985      $2.00

Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                  INFORMATION ACCESS MENU                 *
          *                                                          *
          ************************************************************
          *                                                          *
          *        Enter information topic option:                   *
          *          A  Keyholder Information                        *
          *          B  Key Number Information                       *
          *          C  Building and Room Number Information         *
          *          D  Information on Keys Held                     *
          *          E  Key Inventory Information                    *
          *          F  Daily Cash Balance                           *
          *          G  Exit                                         *
          *                                                          *
          ************************************************************
Enter Choice:  E
Please enter the Key Number.
Key Number:  62K123464

KEY NUMBER     QUANTITY ON HAND     TOTAL OUT     TOTAL NUMBER
__________     ________________     _________     ____________

62K123464             9                 4              13


Do you have another request? (Y/N)  B
Please enter the Key Number.
Key Number:  888888888

Invalid key number given.

Do you have another request? (Y/N)  G
Please enter the Key Number.
Key Number:  7777777777

Invalid key number given.

Do you have another request? (Y/N)  TYHUJ
?1022 INPUT ERROR, FIELD 1; PLEASE RETYPE LINE...
T
?1022 INPUT ERROR, FIELD 1; PLEASE RETYPE LINE...
Y
Please enter the Key Number.
Key Number:  666666

Invalid key number given.

Do you have another request? (Y/N)  H
Please enter the Key Number.
Key Number:  LKIJUYH7
```

```
Invalid key number given.

Do you have another request? (Y/N)  N^H$KL
Please enter the Key Number.
Key Number:  000000000

Invalid key number given.

Do you have another request? (Y/N)  K
Please enter the Key Number.
Key Number:  8UY8YHUY7

Invalid key number given.

Do you have another request? (Y/N)  F
Please enter the Key Number.
Key Number:  N

Invalid key number given.

Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                  INFORMATION ACCESS MENU                 *
          *                                                          *
          ************************************************************
          *                                                          *
          *         Enter information topic option:                  *
          *           A  Keyholder Information                       *
          *           B  Key Number Information                      *
          *           C  Building and Room Number Information        *
          *           D  Information on Keys Held                    *
          *           E  Key Inventory Information                   *
          *           F  Daily Cash Balance                          *
          *           G  Exit                                        *
          *                                                          *
          ************************************************************
Enter Choice:  G


 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                  FRONT OFFICE MENU                       *
          *                                                          *
          ************************************************************
          *                                                          *
          *      Enter Function Choice:                              *
          *           A  Key Issue                                   *
          *           B  Key Return                                  *
          *           C  Information Access                          *
          *           D  Report or Letter Generation                 *
          *           E  Exit Program                                *
          *                                                          *
          ************************************************************
Enter Choice:  A

Please enter 9-digit social security number,
If not available, simply type a 0 (zero).
SSN:  0
```

```
SSN:   0
Is this correct? (Y/N)  G

Please enter 9-digit social security number,
If not available, simply type a 0 (zero).
SSN:  0

SSN:   0
Is this correct? (Y/N)  Y

There is no corresponding record for that SSN.

Please enter issuee's last name:  BUCK

Please enter issuee's first name and middle initial:  DAVID F.

LAST NAME:   BUCK
FIRST NAME:   DAVID F.

Is this correct? (Y/N)  T^H$KY



Please enter building abbreviation,
(maximum 3 characters).
Bldg:  MA

Please enter room number,
(maximum 4 characters).
Room No:  001

Bldg:   MA
Room No:   001

Is this correct? (Y/N)  Y

Enter deposit amount
If amount is other than standard, type in
new amount, otherwise type a carriage return:  896

The following record will be entered into the files:
Name:  DAVID F.     BUCK
Bldg & Room:   MA  001
Key Number:   2F246834
Deposit Amt:  $896.00
Is this correct?  (Y/N)  Y

That record has been entered.

Do you have another entry for this individual (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                   FRONT OFFICE MENU                      *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter Function Choice:                               *
          *          A  Key Issue                                    *
          *          B  Key Return                                   *
          *          C  Information Access                           *
          *          D  Report or Letter Generation                  *
          *          E  Exit Program                                  *
          *                                                           *
          *************************************************************
Enter Choice:  B

Please enter SSN or a 0 <zero> if not available:  0

SSN:   0
Is this correct? (Y/N)  Y

Please enter the individual´s last name.
Last Name:  MILEY

Please enter indivdual´s first name
 and middle initial if known.
First Name:  MICHELE NONE

Last Name:   MILEY
First Name:   MICHELE NONE
Is this correct? (Y/N)  Y


The matching SSN could not be found

There is no record for that individual
This operation is aborted.
(Type carriage return <cr> to continue)  .

 TOPS-20 Command processor 5(712)
@$H$J
@
          *************************************************************
          *                                                           *
          *                     FRONT OFFICE MENU                     *
          *                                                           *
          *************************************************************
          *                                                           *
          *     Enter Function Choice:                                *
          *          A  Key Issue                                     *
          *          B  Key Return                                    *
          *          C  Information Access                            *
          *          D  Report or Letter Generation                   *
          *          E  Exit Program                                  *
          *                                                           *
          *************************************************************
Enter Choice:  B

Please enter SSN or a 0 <zero> if not available:  516745486

SSN:   516745486
Is this correct? (Y/N)  Y



Please enter the individual´s last name.
Last Name:  BUCK

Please enter indivdual´s first name
 and middle initial if known.
First Name:  DAVID F.

Last Name:   BUCK
First Name:   DAVID F.
Is this correct? (Y/N)  Y
```

```
Enter the key number of the returned key.
Key Number:  8

Key Number:   8
Is this correct? (Y/N)  N

Enter the key number of the returned key.
Key Number:  8

Key Number:   8
Is this correct? (Y/N)  Y
The record corresponding to that individual and
key number could not be located.
(type carriage return <cr> to continue)

Do you have more keys to return for this individual? (Y/N)  Y

Enter the key number of the returned key.
Key Number:  62K123464

Key Number:   62K123464
Is this correct? (Y/N)  Y
The record corresponding to that individual and
key number could not be located.
(type carriage return <cr> to continue)

Do you have more keys to return for this individual? (Y/N)  Y

Enter the key number of the returned key.
Key Number:  0

Key Number:   0
Is this correct? (Y/N)  Y
The record corresponding to that individual and
key number could not be located.
(type carriage return <cr> to continue)

Do you have more keys to return for this individual? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          **************************************************************
          *                                                            *
          *                   FRONT OFFICE MENU                        *
          *                                                            *
          **************************************************************
          *                                                            *
          *     Enter Function Choice:                                 *
          *          A  Key Issue                                      *
          *          B  Key Return                                     *
          *          C  Information Access                             *
          *          D  Report or Letter Generation                    *
          *          E  Exit Program                                   *
          *                                                            *
          **************************************************************
Enter Choice:  A

Please enter 9-digit social security number,
If not available, simply type a 0 (zero).
SSN:  0

SSN:   0
Is this correct? (Y/N)  Y
```

```
There is no corresponding record for that SSN.

Please enter issuee's last name:  MILEY

Please enter issuee's first name and middle initial:  MICHELE NONE

LAST NAME:   MILEY
FIRST NAME:   MICHELE NONE

Is this correct? (Y/N)  Y


The matching SSN could not be found

Please enter building abbreviation,
(maximum 3 characters).
Bldg:  MA

Please enter room number,
(maximum 4 characters).
Room No:  001

Bldg:   MA
Room No:   001

Is this correct? (Y/N)  Y

Enter deposit amount
If amount is other than standard, type in
new amount, otherwise type a carriage return:  99

The following record will be entered into the files:
Name:  MICHELE NONE MILEY
Bldg & Room:   MA  001
Key Number:   2F246834
Deposit Amt:   $99.00
Is this correct?  (Y/N)  Y

That record has been entered.

Do you have another entry for this individual (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                    FRONT OFFICE MENU                     *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter Function Choice:                               *
          *          A  Key Issue                                    *
          *          B  Key Return                                   *
          *          C  Information Access                           *
          *          D  Report or Letter Generation                  *
          *          E  Exit Program                                 *
          *                                                          *
          ************************************************************
Enter Choice:  C

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                  INFORMATION ACCESS MENU                  *
          *                                                           *
          *************************************************************
          *                                                           *
          *        Enter information topic option:                    *
          *          A  Keyholder Information                         *
          *          B  Key Number Information                        *
          *          C  Building and Room Number Information          *
          *          D  Information on Keys Held                      *
          *          E  Key Inventory Information                     *
          *          F  Daily Cash Balance                            *
          *          G  Exit                                          *
          *                                                           *
          *************************************************************
Enter Choice:  A

 TOPS-20 Command processor 5(712)
@$H$J
@
          *************************************************************
          *                                                           *
          *               KEYHOLDER INFORMATION MENU                  *
          *                                                           *
          *************************************************************
          *                                                           *
          *     Enter option for which you have information:          *
          *          A  Building and room number                      *
          *          B  Key numbers                                   *
          *          C  Exit                                          *
          *                                                           *
          *************************************************************

Please enter menu choice.  A

Please enter the building abbreviation
(maximum 3 characters):
Bldg:  MA

Please enter the room number
(maximum 4 characters):
Room No:  001

Bldg:   MA
Room No:   001
Is this correct? (Y/N)  Y
NAME:   RHEA ASHMORE
NAME:   GERRY BAERTSCH
NAME:   GLENDA BARNES

NAME:   MICHELE NONE MILEY

Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          *************************************************************
          *                                                           *
          *               KEYHOLDER INFORMATION MENU                  *
          *                                                           *
          *************************************************************
          *                                                           *
          *     Enter option for which you have information:          *
          *          A  Building and room number                      *
          *          B  Key numbers                                   *
          *          C  Exit                                          *
          *                                                            *
          **************************************************************

Please enter menu choice.  B

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  62K123464

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q
NAME:   BARBARA BAIN
NAME:    HARRY RAY
NAME:    JULIETTE CRUMP
NAME:   KEN MILLER
Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          **************************************************************
          *                                                            *
          *              KEYHOLDER INFORMATION MENU                    *
          *                                                            *
          **************************************************************
          *                                                            *
          *      Enter option for which you have information:          *
          *           A  Building and room number                      *
          *           B  Key numbers                                   *
          *           C  Exit                                          *
          *                                                            *
          **************************************************************

Please enter menu choice.  C


 TOPS-20 Command processor 5(712)
@$H$J
@
          **************************************************************
          *                                                            *
          *                   INFORMATION ACCESS MENU                  *
          *                                                            *
          **************************************************************
          *                                                            *
          *         Enter information topic option:                    *
          *           A  Keyholder Information                         *
          *           B  Key Number Information                        *
          *           C  Building and Room Number Information          *
          *           D  Information on Keys Held                      *
          *           E  Key Inventory Information                     *
          *           F  Daily Cash Balance                            *
          *           G  Exit                                          *
          *                                                            *
          **************************************************************
Enter Choice:  A

 TOPS-20 Command processor 5(712)
@$H$J
@
          **************************************************************
          *                                                            *
          *              KEYHOLDER INFORMATION MENU                    *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter option for which you have information:         *
          *          A  Building and room number                     *
          *          B  Key numbers                                  *
          *          C  Exit                                         *
          *                                                          *
          ************************************************************

Please enter menu choice.  C


 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                  INFORMATION ACCESS MENU                 *
          *                                                          *
          ************************************************************
          *                                                          *
          *        Enter information topic option:                   *
          *          A  Keyholder Information                        *
          *          B  Key Number Information                       *
          *          C  Building and Room Number Information         *
          *          D  Information on Keys Held                     *
          *          E  Key Inventory Information                    *
          *          F  Daily Cash Balance                           *
          *          G  Exit                                         *
          *                                                          *
          ************************************************************
Enter Choice:  E
Please enter the Key Number.
Key Number:

Invalid key number given.

Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                  INFORMATION ACCESS MENU                 *
          *                                                          *
          ************************************************************
          *                                                          *
          *        Enter information topic option:                   *
          *          A  Keyholder Information                        *
          *          B  Key Number Information                       *
          *          C  Building and Room Number Information         *
          *          D  Information on Keys Held                     *
          *          E  Key Inventory Information                    *
          *          F  Daily Cash Balance                           *
          *          G  Exit                                         *
          *                                                          *
          ************************************************************
Enter Choice:  F

Deposit Total
     $995.00

Do you wish to have the total cleared? (Y/N)  N
```

```
Type a carriage return <cr> to continue

 TOPS-20 Command processor 5(712)
@$H$J
@
          ***********************************************************
          *                                                         *
          *                   INFORMATION ACCESS MENU               *
          *                                                         *
          ***********************************************************
          *                                                         *
          *         Enter information topic option:                 *
          *           A  Keyholder Information                      *
          *           B  Key Number Information                     *
          *           C  Building and Room Number Information       *
          *           D  Information on Keys Held                   *
          *           E  Key Inventory Information                  *
          *           F  Daily Cash Balance                         *
          *           G  Exit                                       *
          *                                                         *
          ***********************************************************
Enter Choice:  G


 TOPS-20 Command processor 5(712)
@$H$J
@
          ***********************************************************
          *                                                         *
          *                   FRONT OFFICE MENU                     *
          *                                                         *
          ***********************************************************
          *                                                         *
          *      Enter Function Choice:                             *
          *           A  Key Issue                                  *
          *           B  Key Return                                 *
          *           C  Information Access                         *
          *           D  Report or Letter Generation                *
          *           E  Exit Program                               *
          *                                                         *
          ***********************************************************
Enter Choice:  A

Please enter 9-digit social security number,
If not available, simply type a 0 (zero).
SSN:  516745486

SSN:   516745486
Is this correct? (Y/N)  Y


There is no corresponding record for that SSN.

Please enter issuee's last name:  BUCK

Please enter issuee's first name and middle initial:  DAVID F.

LAST NAME:   BUCK
FIRST NAME:   DAVID F.

Is this correct? (Y/N)  Y

Please enter building abbreviation,
(maximum 3 characters).
Bldg:  MA 001
```

```
?1022 INPUT ERROR, FIELD 1; PLEASE RETYPE LINE...
MA

Please enter room number,
(maximum 4 characters).
Room No:  001

Bldg:   MA
Room No:   001

Is this correct? (Y/N)  Y

Enter deposit amount
If amount is other than standard, type in
new amount, otherwise type a carriage return:  8

The following record will be entered into the files:
Name:  DAVID F. BUCK
Bldg & Room:   MA  001
Key Number:   2F246834
Deposit Amt:    $8.00
Is this correct?  (Y/N)  Y

That record has been entered.

Do you have another entry for this individual (Y/N)  Y

Please enter building abbreviation,
(maximum 3 characters).
Bldg:  LIB

Please enter room number,
(maximum 4 characters).
Room No:  114

Bldg:   LIB
Room No:   114

Is this correct? (Y/N)  Y

Enter deposit amount
If amount is other than standard, type in
new amount, otherwise type a carriage return:  4

The following record will be entered into the files:
Name:  DAVID F. BUCK
Bldg & Room:   LIB 114
Key Number:   36H666666
Deposit Amt:    $4.00
Is this correct?  (Y/N)  Y

That record has been entered.

Do you have another entry for this individual (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                   FRONT OFFICE MENU                      *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter Function Choice:                               *
          *          A  Key Issue                                    *
          *          B  Key Return                                     *
          *          C  Information Access                             *
          *          D  Report or Letter Generation                    *
          *          E  Exit Program                                   *
          *                                                            *
          **************************************************************
Enter Choice:  C

 TOPS-20 Command processor 5(712)
@$H$J
@
          **************************************************************
          *                                                            *
          *                    INFORMATION ACCESS MENU                 *
          *                                                            *
          **************************************************************
          *                                                            *
          *        Enter information topic option:                     *
          *          A  Keyholder Information                          *
          *          B  Key Number Information                         *
          *          C  Building and Room Number Information           *
          *          D  Information on Keys Held                       *
          *          E  Key Inventory Information                      *
          *          F  Daily Cash Balance                             *
          *          G  Exit                                           *
          *                                                            *
          **************************************************************
Enter Choice:  B

Please enter the building abbreviation
( maximum 3 characters)
Bldg:  LIB

Please enter the room number
( maximum 4 characters)
Room No:  114

LIB 114  36H666666

Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          **************************************************************
          *                                                            *
          *                    INFORMATION ACCESS MENU                 *
          *                                                            *
          **************************************************************
          *                                                            *
          *        Enter information topic option:                     *
          *          A  Keyholder Information                          *
          *          B  Key Number Information                         *
          *          C  Building and Room Number Information           *
          *          D  Information on Keys Held                       *
          *          E  Key Inventory Information                      *
          *          F  Daily Cash Balance                             *
          *          G  Exit                                           *
          *                                                            *
          **************************************************************
Enter Choice:  D

Please enter the individual's SSN. ( 9 digits ).
( or a carriage return <cr> if none )  516745486
```

```
Key Number      Date Out      Deposit Amount
__________      ________      ______________

36H444444        7/30/1985        $2.00
2F246834        7/30/1985      $896.00
2F246834        7/30/1985        $8.00
36H666666        7/30/1985        $4.00

Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                 INFORMATION ACCESS MENU                  *
          *                                                          *
          ************************************************************
          *                                                          *
          *         Enter information topic option:                  *
          *           A  Keyholder Information                       *
          *           B  Key Number Information                      *
          *           C  Building and Room Number Information        *
          *           D  Information on Keys Held                    *
          *           E  Key Inventory Information                   *
          *           F  Daily Cash Balance                          *
          *           G  Exit                                        *
          *                                                          *
          ************************************************************
Enter Choice:  F

Deposit Total
    $1007.00

Do you wish to have the total cleared? (Y/N)  N

Type a carriage return <cr> to continue

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                 INFORMATION ACCESS MENU                  *
          *                                                          *
          ************************************************************
          *                                                          *
          *         Enter information topic option:                  *
          *           A  Keyholder Information                       *
          *           B  Key Number Information                      *
          *           C  Building and Room Number Information        *
          *           D  Information on Keys Held                    *
          *           E  Key Inventory Information                   *
          *           F  Daily Cash Balance                          *
          *           G  Exit                                        *
          *                                                          *
          ************************************************************
Enter Choice:  A

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *            KEYHOLDER INFORMATION MENU                    *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter option for which you have information:         *
          *          A  Building and room number                     *
          *          B  Key numbers                                  *
          *          C  Exit                                         *
          *                                                          *
          ************************************************************

Please enter menu choice.  A

Please enter the building abbreviation
(maximum 3 characters):
Bldg:  LIB

Please enter the room number
(maximum 4 characters):
Room No:  114

Bldg:   LIB
Room No:   114
Is this correct? (Y/N)  Y
NAME:   SHARON BARRETT
NAME:    HARRY RAY
NAME:    GLEN READ
NAME:    EVAN DENNY
NAME:   SURESH VADHVA


Do you have another request? (Y/N)  K

Please enter the building abbreviation
(maximum 3 characters):
Bldg:  MA

Please enter the room number
(maximum 4 characters):
Room No:  001

Bldg:   MA
Room No:   001
Is this correct? (Y/N)  Y
NAME:   RHEA ASHMORE
NAME:   GERRY BAERTSCH
NAME:   GLENDA BARNES

NAME:   MICHELE NONE MILEY


Do you have another request? (Y/N)  M

Please enter the building abbreviation
(maximum 3 characters):
Bldg:  K

Please enter the room number
(maximum 4 characters):
Room No:  99

Bldg:   K
Room No:   99
Is this correct? (Y/N)  N

Please enter the building abbreviation
(maximum 3 characters):
Bldg:  O
```

```
Please enter the room number
(maximum 4 characters):
Room No:  ;;

Bldg:   O
Room No:   ;;
Is this correct? (Y/N)  Y

You have an invalid building and room number

Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *              KEYHOLDER INFORMATION MENU                  *
          *                                                          *
          ************************************************************
          *                                                          *
          *      Enter option for which you have information:        *
          *           A  Building and room number                    *
          *           B  Key numbers                                 *
          *           C  Exit                                        *
          *                                                          *
          ************************************************************

Please enter menu choice.  B

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  2F246834

Please enter a key number or a 'q' to
indicate no more keys. If no-names appear
then no one has been issued that group of keys.
Key Number:  36H666666

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  36H444444

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q
Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *              KEYHOLDER INFORMATION MENU                  *
          *                                                          *
          ************************************************************
          *                                                          *
          *      Enter option for which you have information:        *
          *           A  Building and room number                    *
          *           B  Key numbers                                 *
          *           C  Exit                                        *
          *                                                          *
          ************************************************************

Please enter menu choice.  B

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  36H666666

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q
NAME:   SHARON BARRETT
NAME:    HARRY RAY
NAME:    GLEN READ
NAME:    EVAN DENNY
NAME:   SURESH VADHVA

Do you have another request? (Y/N)  Y

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  2F246834

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q
NAME:   RHEA ASHMORE
NAME:   GERRY BAERTSCH
NAME:   GLENDA BARNES
NAME:   MICHELE NONE MILEY
Do you have another request? (Y/N)  Y

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  36H444444

Please enter a key number or a 'q' to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q
NAME:   SALLY SMITH
NAME:   HOWARD JONES
NAME:   DAVID ALT
NAME:   AARON ANDREASON
NAME:   GERRY BAERTSCH
NAME:   BARBARA BAIN
NAME:   GREGORY BARRETT
NAME:    JOAN RADANDT
NAME:    JULIA RADTKE
NAME:    JAMES RANNEY
NAME:    HARRY RAY
NAME:    MARLYN EGGE
NAME:    IRENE EVERS
NAME:    BETTINA ESCUDERO
NAME:    JULIETTE CRUMP
NAME:   ANN SMITH
NAME:   SURESH VADHVA

Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
```

```
@$H$J
@
          ************************************************************
          *                                                          *
          *             KEYHOLDER INFORMATION MENU                   *
          *                                                          *
          ************************************************************
          *                                                          *
          *      Enter option for which you have information:        *
          *           A  Building and room number                    *
          *           B  Key numbers                                 *
          *           C  Exit                                        *
          *                                                          *
          ************************************************************

Please enter menu choice.  C


 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                  INFORMATION ACCESS MENU                 *
          *                                                          *
          ************************************************************
          *                                                          *
          *         Enter information topic option:                  *
          *           A  Keyholder Information                       *
          *           B  Key Number Information                      *
          *           C  Building and Room Number Information        *
          *           D  Information on Keys Held                    *
          *           E  Key Inventory Information                   *
          *           F  Daily Cash Balance                          *
          *           G  Exit                                        *
          *                                                          *
          ************************************************************
Enter Choice:  D

Please enter the individual's SSN. ( 9 digits ).
( or a carriage return <cr> if none )  516745486


Key Number     Date Out     Deposit Amount
__________     ________     ______________

36H444444       7/30/1985       $2.00
2F246834       7/30/1985     $896.00
2F246834       7/30/1985       $8.00
36H666666       7/30/1985       $4.00

Do you have another request? (Y/N)  H

Please enter the individual's SSN. ( 9 digits ).
( or a carriage return <cr> if none )  777888999


That individual does not have any keys issued to him.

Do you have another request? (Y/N)  F

Please enter the individual's SSN. ( 9 digits ).
( or a carriage return <cr> if none )  MMMMMMMMMMMMM
?1022 INPUT ERROR, FIELD 1; PLEASE RETYPE LINE...
77777777777
?1022 INPUT ERROR, FIELD 1; PLEASE RETYPE LINE...
```

```
[illegible]
11111111

That individual does not have any keys issued to him.

Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                 INFORMATION ACCESS MENU                  *
          *                                                          *
          ************************************************************
          *                                                          *
          *        Enter information topic option:                   *
          *          A  Keyholder Information                        *
          *          B  Key Number Information                       *
          *          C  Building and Room Number Information         *
          *          D  Information on Keys Held                     *
          *          E  Key Inventory Information                    *
          *          F  Daily Cash Balance                           *
          *          G  Exit                                         *
          *                                                          *
          ************************************************************
Enter Choice:  A

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *            KEYHOLDER INFORMATION MENU                    *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter option for which you have information:         *
          *          A  Building and room number                     *
          *          B  Key numbers                                  *
          *          C  Exit                                         *
          *                                                          *
          ************************************************************

Please enter menu choice.  B

Please enter a key number or a ´q´ to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q

There is no one who has all those keys issued to them
Do you have another request? (Y/N)  Y

Please enter a key number or a ´q´ to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  2F246834

Please enter a key number or a ´q´ to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q
NAME:   RHEA ASHMORE
NAME:   GERRY BAERTSCH
NAME:   GLENDA BARNES
```

```
NAME:   MICHELE NONE MILEY
Do you have another request? (Y/N)  N                                   374

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *              KEYHOLDER INFORMATION MENU                  *
          *                                                          *
          ************************************************************
          *                                                          *
          *       Enter option for which you have information:       *
          *            A  Building and room number                   *
          *            B  Key numbers                                *
          *            C  Exit                                       *
          *                                                          *
          ************************************************************

Please enter menu choice.  C


 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                   INFORMATION ACCESS MENU                *
          *                                                          *
          ************************************************************
          *                                                          *
          *          Enter information topic option:                 *
          *            A  Keyholder Information                      *
          *            B  Key Number Information                     *
          *            C  Building and Room Number Information       *
          *            D  Information on Keys Held                   *
          *            E  Key Inventory Information                  *
          *            F  Daily Cash Balance                         *
          *            G  Exit                                       *
          *                                                          *
          ************************************************************
Enter Choice:  G


 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                   FRONT OFFICE MENU                      *
          *                                                          *
          ************************************************************
          *                                                          *
          *       Enter Function Choice:                             *
          *            A  Key Issue                                  *
          *            B  Key Return                                 *
          *            C  Information Access                         *
          *            D  Report or Letter Generation                *
          *            E  Exit Program                               *
          *                                                          *
          ************************************************************
Enter Choice:  B

Please enter SSN or a 0 <zero> if not available:  516745486

SSN:    516745486
```

```
Is this correct? (Y/N)  Y


Please enter the individual's last name.
Last Name:  BUCK

Please enter indivdual's first name
 and middle initial if known.
First Name:  DAVID F.

Last Name:   BUCK
First Name:   DAVID F.
Is this correct? (Y/N)  TY^H$K^H$KY



buck                david f.      516745486
BUCK                DAVID F.      516745486
BUCK                DAVID F.      516745486

With the information given the correct
individual cannot be determined. All the
above records apply. Do you have additional
information to distinguish between entries (Y/N)  Y

Enter the corresponding SSN.  516745486

SSN:   516745486

Is this correct? (Y/N):  Y

Enter the key number of the returned key.
Key Number:  2F246834

Key Number:   2F246834
Is this correct? (Y/N)  Y

The following record will be deleted from the files:
Name:   DAVID F.     BUCK
Key Number:   2F246834
Bldg:   MA
Room Num:   001
Deposit Amount:  $896.00
Deposit Amount:    $8.00

Is this correct? (Y/N)  Y
The record has been deleted.

Do you have more keys to return for this individual? (Y/N)   N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                    FRONT OFFICE MENU                     *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter Function Choice:                               *
          *          A  Key Issue                                    *
          *          B  Key Return                                   *
          *          C  Information Access                           *
          *          D  Report or Letter Generation                  *
          *          E  Exit Program                                 *
          *                                                          *
          ************************************************************
Enter Choice:  A

Please enter 9-digit social security number,
If not available, simply type a 0 (zero).
SSN:  0

SSN:   0
Is this correct? (Y/N)  Y

There is no corresponding record for that SSN.

Please enter issuee's last name:  BUCK

Please enter issuee's first name and middle initial:  DAVID F.

LAST NAME:   BUCK
FIRST NAME:   DAVID F.

Is this correct? (Y/N)  Y



buck              david f.      516745486
BUCK              DAVID F.      516745486
BUCK              DAVID F.      516745486

With the information given the correct
individual cannot be determined. All the
above records apply. Do you have additional
information to distinguish between entries (Y/N)  N

Please enter building abbreviation,
(maximum 3 characters).
Bldg:  MA

Please enter room number,
(maximum 4 characters).
Room No:  001

Bldg:   MA
Room No:   001

Is this correct? (Y/N)  Y

Enter deposit amount
If amount is other than standard, type in
new amount, otherwise type a carriage return:  666

The following record will be entered into the files:
Name:  DAVID F.     BUCK
Bldg & Room:   MA  001
Key Number:   2F246834
Deposit Amt:  $666.00
Is this correct?  (Y/N)  Y

That record has been entered.

Do you have another entry for this individual (Y/N)  Y'
?1022 INPUT ERROR, FIELD 1; PLEASE RETYPE LINE...
Y

Please enter building abbreviation,
(maximum 3 characters).
Bldg:  LIB
```

```
Please enter room number,
(maximum 4 characters).
Room No:  110

Bldg:   LIB
Room No:   110

Is this correct? (Y/N)  Y

Enter deposit amount
If amount is other than standard, type in
new amount, otherwise type a carriage return:  2

The following record will be entered into the files:
Name:  DAVID F.     BUCK
Bldg & Room:   LIB 110
Key Number:   36H444444
Deposit Amt:    $2.00
Is this correct?  (Y/N)  Y


That record has been entered.

Do you have another entry for this individual (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                   FRONT OFFICE MENU                      *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter Function Choice:                               *
          *          A  Key Issue                                    *
          *          B  Key Return                                   *
          *          C  Information Access                           *
          *          D  Report or Letter Generation                  *
          *          E  Exit Program                                 *
          *                                                          *
          ************************************************************
Enter Choice:  E


 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                KEY INVENTORY CONTROL MENU                *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter Program Choice:                                *
          *          A  Front Office Procedures                      *
          *          B  Locksmith Procedures                         *
          *          C  Maintenance Procedures                       *
          *          D  Exit Program                                 *
          *                                                          *
          ************************************************************
Enter Choice:  B

Enter Password:
2345678
```

```
 TOPS-20 Command processor 5(712)
@$H$J
@

 TOPS-20 Command processor 5(712)
@$H$J
@
          *************************************************************
          *                                                           *
          *                 LOCKSMITH MENU                            *
          *                                                           *
          *************************************************************
          *                                                           *
          *     Choose Option:                                        *
          *          A  Complete Key Orders                           *
          *          B  Replace Key                                   *
          *          C  Rekey Lock                                    *
          *          D  Inventory Control                             *
          *          E  Exit                                          *
          *                                                           *
          *************************************************************
Enter choice: D

 TOPS-20 Command processor 5(712)
@$H$J
@
          *************************************************************
          *                                                           *
          *              INVENTORY CONTROL MENU                       *
          *                                                           *
          *************************************************************
          *                                                           *
          *     Choose Option:                                        *
          *          A  Change Inventory                              *
          *          B  Order Parts                                   *
          *          C  Add Item                                      *
          *          D  Delete Item                                   *
          *          E  Print Inventory                               *
          *          F  Exit                                          *
          *                                                           *
          *************************************************************
Enter choice: E

 TOPS-20 Command processor 5(712)
@$H$J
@

                 Keyway Number    Quantity on Hand
                 -------------    ----------------
                     3K                  332
                     2F                   95
                     3GH                  89
                     62K                 206
                     4K3F                 73

Type carriage return <cr> to continue:

 TOPS-20 Command processor 5(712)
@$H$J
@
          *************************************************************
          *                                                           *
          *              INVENTORY CONTROL MENU                       *
          *                                                           *
          *************************************************************
          *                                                           *
          *     Choose Option:                                        *
          *          A  Change Inventory                              *
          *          B  Order Parts                                   *
          *          C  Add Item                                      *
          *          D  Delete Item                                   *
          *          E  Print Inventory                               *
          *          F  Exit                                          *
          *                                                           *
          *************************************************************
Enter choice: F

 TOPS-20 Command processor 5(712)
@$H$J
@
          *************************************************************
          *                                                           *
          *                  LOCKSMITH MENU                           *
          *                                                           *
          *************************************************************
          *                                                           *
          *     Choose Option:                                        *
          *          A  Complete Key Orders                           *
          *          B  Replace Key                                   *
          *          C  Rekey Lock                                    *
          *          D  Inventory Control                             *
          *          E  Exit                                          *
          *                                                           *
          *************************************************************
Enter choice: E

 TOPS-20 Command processor 5(712)
@$H$J
@
          *************************************************************
          *                                                           *
          *             KEY INVENTORY CONTROL MENU                    *
          *                                                           *
          *************************************************************
          *                                                           *
          *     Enter Program Choice:                                 *
          *          A  Front Office Procedures                       *
          *          B  Locksmith Procedures                          *
          *          C  Maintenance Procedures                        *
          *          D  Exit Program                                  *
          *                                                           *
          *************************************************************
Enter Choice:  C

Enter Password:
999000

 TOPS-20 Command processor 5(712)
@$H$J
@
Incorrect Password
Please Re-enter Password
3456789

 TOPS-20 Command processor 5(712)
@$H$J
@

 TOPS-20 Command processor 5(712)
@$H$J
@
```

```
          ************************************************************
          *                                                          *
          *                  FILE RESTORATION MENU                   *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter file to be restored:                           *
          *          A  Individual Record File                       *
          *          B  Name File                                    *
          *          C  Inventory File                               *
          *          D  Location File                                *
          *          E  Keyway File                                  *
          *          F  Order File                                   *
          *          G  All Files                                    *
          *          H  Exit                                         *
          *                                                          *
          ************************************************************

Please enter the file to be restored:  B

 TOPS-20 Command processor 5(712)
@
?Unrecognized command - File not found - "NAME.CTL"
@A
?Unrecognized command - Ambiguous - "A"
@USE KEYS
?Unrecognized command - Does not match switch or keyword - "USE"
@1 ^H$K022
7/30/85
System 1022A 116A(436)

* USE KEYS

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *               KEY INVENTORY CONTROL MENU                 *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter Program Choice:                                *
          *          A  Front Office Procedures                      *
          *          B  Locksmith Procedures                         *
          *          C  Maintenance Procedures                       *
          *          D  Exit Program                                 *
          *                                                          *
          ************************************************************
Enter Choice:  A

Enter Password:
1234567

 TOPS-20 Command processor 5(712)
@$H$J
@

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                   FRONT OFFICE MENU                      *
          *                                                          *
          ************************************************************
          *                                                           *
          *     Enter Function Choice:                                *
          *          A  Key Issue                                     *
          *          B  Key Return                                    *
          *          C  Information Access                            *
          *          D  Report or Letter Generation                   *
          *          E  Exit Program                                  *
          *                                                           *
          *************************************************************
Enter Choice:  E


 TOPS-20 Command processor 5(712)
@$H$J
@
          *************************************************************
          *                                                           *
          *                  KEY INVENTORY CONTROL MENU               *
          *                                                           *
          *************************************************************
          *                                                           *
          *     Enter Program Choice:                                 *
          *          A  Front Office Procedures                       *
          *          B  Locksmith Procedures                          *
          *          C  Maintenance Procedures                        *
          *          D  Exit Program                                  *
          *                                                           *
          *************************************************************
Enter Choice:  A

Enter Password:
1234567

 TOPS-20 Command processor 5(712)
@$H$J
@

 TOPS-20 Command processor 5(712)
@$H$J
@
          *************************************************************
          *                                                           *
          *                     FRONT OFFICE MENU                     *
          *                                                           *
          *************************************************************
          *                                                           *
          *     Enter Function Choice:                                *
          *          A  Key Issue                                     *
          *          B  Key Return                                    *
          *          C  Information Access                            *
          *          D  Report or Letter Generation                   *
          *          E  Exit Program                                  *
          *                                                           *
          *************************************************************
Enter Choice:  C

 TOPS-20 Command processor 5(712)
@$H$J
@
          *************************************************************
          *                                                           *
          *                 INFORMATION ACCESS MENU                   *
          *                                                           *
          *************************************************************
          *                                                           *
          *        Enter information topic option:                    *
          *          A  Keyholder Information                        *
          *          B  Key Number Information                       *
          *          C  Building and Room Number Information         *
          *          D  Information on Keys Held                     *
          *          E  Key Inventory Information                    *
          *          F  Daily Cash Balance                           *
          *          G  Exit                                         *
          *                                                          *
          ************************************************************
Enter Choice:  B

Please enter the building abbreviation
( maximum 3 characters)
Bldg:  LIB

Please enter the room number
( maximum 4 characters)
Room No:  110

LIB 110  36H444444

Do you have another request? (Y/N)  Y

Please enter the building abbreviation
( maximum 3 characters)
Bldg:  MA

Please enter the room number
( maximum 4 characters)
Room No:  001

MA  001  2F246834

Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                 INFORMATION ACCESS MENU                  *
          *                                                          *
          ************************************************************
          *                                                          *
          *        Enter information topic option:                   *
          *          A  Keyholder Information                        *
          *          B  Key Number Information                       *
          *          C  Building and Room Number Information         *
          *          D  Information on Keys Held                     *
          *          E  Key Inventory Information                    *
          *          F  Daily Cash Balance                           *
          *          G  Exit                                         *
          *                                                          *
          ************************************************************
Enter Choice:  B

Please enter the building abbreviation
( maximum 3 characters)
Bldg:  LIB

Please enter the room number
( maximum 4 characters)
Room No:  110

LIB 110  36H444444
```

```
Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                  INFORMATION ACCESS MENU                 *
          *                                                          *
          ************************************************************
          *                                                          *
          *        Enter information topic option:                   *
          *          A  Keyholder Information                        *
          *          B  Key Number Information                       *
          *          C  Building and Room Number Information         *
          *          D  Information on Keys Held                     *
          *          E  Key Inventory Information                    *
          *          F  Daily Cash Balance                           *
          *          G  Exit                                         *
          *                                                          *
          ************************************************************
Enter Choice:  A

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *             KEYHOLDER INFORMATION MENU                   *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter option for which you have information:         *
          *          A  Building and room number                     *
          *          B  Key numbers                                  *
          *          C  Exit                                         *
          *                                                          *
          ************************************************************

Please enter menu choice.  B

Please enter a key number or a ´q´ to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  2F246834

Please enter a key number or a ´q´ to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q
NAME:    RHEA ASHMORE
NAME:    GERRY BAERTSCH
NAME:    GLENDA BARNES
NAME:    MICHELE NONE MILEY

Do you have another request? (Y/N)  Y

Please enter a key number or a ´q´ to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  36H666666

Please enter a key number or a ´q´ to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q
```

```
NAME:   SHARON BARRETT
NAME:    HARRY RAY
NAME:    GLEN READ
NAME:    EVAN DENNY
NAME:   SURESH VADHVA

Do you have another request? (Y/N)  Y

Please enter a key number or a ´q´ to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  36H444444

Please enter a key number or a ´q´ to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q
NAME:   SALLY SMITH
NAME:   HOWARD JONES
NAME:   DAVID ALT
NAME:   AARON ANDREASON
NAME:   GERRY BAERTSCH
NAME:   BARBARA BAIN
NAME:   GREGORY BARRETT
NAME:    JOAN RADANDT
NAME:    JULIA RADTKE
NAME:    JAMES RANNEY
NAME:    HARRY RAY
NAME:    MARLYN EGGE
NAME:    IRENE EVERS
NAME:    BETTINA ESCUDERO
NAME:    JULIETTE CRUMP
NAME:   ANN SMITH
NAME:   SURESH VADHVA


Do you have another request? (Y/N)  Y

Please enter a key number or a ´q´ to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  2F246834

Please enter a key number or a ´q´ to
indicate no more keys. If no names appear
then no one has been issued that group of keys.
Key Number:  Q
NAME:   RHEA ASHMORE
NAME:   GERRY BAERTSCH
NAME:   GLENDA BARNES
NAME:   MICHELE NONE MILEY

Do you have another request? (Y/N)  N

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *              KEYHOLDER INFORMATION MENU                  *
          *                                                          *
          ************************************************************
          *                                                          *
          *      Enter option for which you have information:        *
          *           A  Building and room number                    *
          *           B  Key numbers                                 *
          *          C  Exit                                      *
          *                                                       *
          *********************************************************

Please enter menu choice.  C


 TOPS-20 Command processor 5(712)
@$H$J
@
          *********************************************************
          *                                                       *
          *                  INFORMATION ACCESS MENU              *
          *                                                       *
          *********************************************************
          *                                                       *
          *        Enter information topic option:                *
          *          A  Keyholder Information                     *
          *          B  Key Number Information                    *
          *          C  Building and Room Number Information      *
          *          D  Information on Keys Held                  *
          *          E  Key Inventory Information                 *
          *          F  Daily Cash Balance                        *
          *          G  Exit                                      *
          *                                                       *
          *********************************************************
Enter Choice:  G


 TOPS-20 Command processor 5(712)
@$H$J
@
          *********************************************************
          *                                                       *
          *                  FRONT OFFICE MENU                    *
          *                                                       *
          *********************************************************
          *                                                       *
          *     Enter Function Choice:                            *
          *          A  Key Issue                                 *
          *          B  Key Return                                *
          *          C  Information Access                        *
          *          D  Report or Letter Generation               *
          *          E  Exit Program                              *
          *                                                       *
          *********************************************************
Enter Choice:  E


 TOPS-20 Command processor 5(712)
@$H$J
@
          *********************************************************
          *                                                       *
          *               KEY INVENTORY CONTROL MENU              *
          *                                                       *
          *********************************************************
          *                                                       *
          *     Enter Program Choice:                             *
          *          A  Front Office Procedures                   *
          *          B  Locksmith Procedures                      *
          *          C  Maintenance Procedures                    *
          *          D  Exit Program                              *
          *                                                       *
          *********************************************************
Enter Choice:  C
Enter Password:
3456789

 TOPS-20 Command processor 5(712)
@$H$J
@

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                   FILE RESTORATION MENU                  *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter file to be restored:                           *
          *          A  Individual Record File                       *
          *          B  Name File                                    *
          *          C  Inventory File                               *
          *          D  Location File                                *
          *          E  Keyway File                                  *
          *          F  Order File                                   *
          *          G  All Files                                    *
          *          H  Exit                                         *
          *                                                          *
          ************************************************************

Please enter the file to be restored:  B

 TOPS-20 Command processor 5(712)
@
?Unrecognized command - File not found - "NAME.CTL"
@BUCK, D
?Unrecognized command - Does not match switch or keyword - "BUCK"
@POP


 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                   FILE RESTORATION MENU                  *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter file to be restored:                           *
          *          A  Individual Record File                       *
          *          B  Name File                                    *
          *          C  Inventory File                               *
          *          D  Location File                                *
          *          E  Keyway File                                  *
          *          F  Order File                                   *
          *          G  All Files                                    *
          *          H  Exit                                         *
          *                                                          *
          ************************************************************

Please enter the file to be restored:  BUCK, DAVID F.
?1022 INPUT ERROR, FIELD 1; PLEASE RETYPE LINE...
BUCK
?1022 INPUT ERROR, FIELD 1; PLEASE RETYPE LINE...
C
```

```
 TOPS-20 Command processor 5(712)
@
?Unrecognized command - File not found - "INVENTORY.CTL"
@1022
7/30/85
System 1022A 116A(436)

* EXIT

EXIT
@POP


 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                    FILE RESTORATION MENU                 *
          *                                                          *
          ************************************************************
          *                                                          *
          *      Enter file to be restored:                          *
          *           A  Individual Record File                      *
          *           B  Name File                                   *
          *           C  Inventory File                              *
          *           D  Location File                               *
          *           E  Keyway File                                 *
          *           F  Order File                                  *
          *           G  All Files                                   *
          *           H  Exit                                        *
          *                                                          *
          ************************************************************

Please enter the file to be restored:  H

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                 KEY INVENTORY CONTROL MENU               *
          *                                                          *
          ************************************************************
          *                                                          *
          *      Enter Program Choice:                               *
          *           A  Front Office Procedures                     *
          *           B  Locksmith Procedures                        *
          *           C  Maintenance Procedures                      *
          *           D  Exit Program                                *
          *                                                          *
          ************************************************************
Enter Choice:  D

* POP
? (CS24) Invalid command
 POP
* EXIT

EXIT
@POP


 TOPS-20 Command processor 5(712)
@$H$J
@
```

```
          ************************************************************
          *                                                          *
          *                   FILE RESTORATION MENU                  *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter file to be restored:                           *
          *          A  Individual Record File                       *
          *          B  Name File                                    *
          *          C  Inventory File                               *
          *          D  Location File                                *
          *          E  Keyway File                                  *
          *          F  Order File                                   *
          *          G  All Files                                    *
          *          H  Exit                                         *
          *                                                          *
          ************************************************************

Please enter the file to be restored:  G

 TOPS-20 Command processor 5(712)
@
?Unrecognized command - File not found - "RESTORE.CTL"
@POP


 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                   FILE RESTORATION MENU                  *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter file to be restored:                           *
          *          A  Individual Record File                       *
          *          B  Name File                                    *
          *          C  Inventory File                               *
          *          D  Location File                                *
          *          E  Keyway File                                  *
          *          F  Order File                                   *
          *          G  All Files                                    *
          *          H  Exit                                         *
          *                                                          *
          ************************************************************

Please enter the file to be restored:  H

 TOPS-20 Command processor 5(712)
@$H$J
@
          ************************************************************
          *                                                          *
          *                KEY INVENTORY CONTROL MENU                *
          *                                                          *
          ************************************************************
          *                                                          *
          *     Enter Program Choice:                                *
          *          A  Front Office Procedures                      *
          *          B  Locksmith Procedures                         *
          *          C  Maintenance Procedures                       *
          *          D  Exit Program                                 *
          *                                                          *
          ************************************************************
Enter Choice:  D
```

```
* EXIT

EXIT
@CONN <CS. GRAD. ROBMICH>
?No such directory or structure not mounted
@POP

[RECORDING TERMINATED AT 23:57:54]
@
```

```
 IND_RECORD.FIL.3

SOCIAL
SECURITY   KEY        DATE        DEPOSIT

---------- ---------- ---------- -------
-123456799 3K123460    7/18/1985 200
-123456798 36H666666   7/18/1985 200
-123456796 3K123462    7/17/1985 200
-123456796 36H888888   7/17/1985 200
-123456796 36H666666   7/17/1985 200
-123456796 36H444444   7/17/1985 200
-123456796 62K123462   7/17/1985 200
-123456796 3K654328    7/17/1985 200
-123456796 3K222222    7/17/1985 200
-123456795 3K123462    7/17/1985 200
-123456794 4K3F864292  7/17/1985 200
-123456794 62K123462   7/17/1985 200
-123456794 2F246832    7/17/1985 200
-123456794 2F246826    7/17/1985 200
-123456794 3K123462    7/17/1985 200
-123456793 62K123464   7/17/1985 200
-123456793 62K123456   7/17/1985 200
-123456793 3K654322    7/17/1985 200
-123456792 4K3F864292  7/17/1985 200
-123456792 62K123462   7/17/1985 200
-123456792 2F246826    7/17/1985 200
-123456792 3K654328    7/17/1985 200
-123456792 3K123462    7/17/1985 200
-123456791 62K123464   7/17/1985 200
-123456791 4K3F864292  7/17/1985 200
-123456791 62K123458   7/17/1985 200
-123456791 3K123462    7/17/1985 200
-123456790 36H444444   7/17/1985 200
-123456790 62K123458   7/17/1985 200
-123456790 62K123456   7/17/1985 200
-123456790 2F246826    7/17/1985 200
-123456790 3K123462    7/17/1985 200
-123456789 62K123462   7/17/1985 200
-123456789 2F246826    7/17/1985 200
-123456789 3K654328    7/17/1985 200
-123456789 3K654322    7/17/1985 200
-123456789 3K222222    7/17/1985 200
123456789 62K123462   7/17/1985 200
123456789 3K123456    7/17/1985 200
123456789 3K654328    7/17/1985 200
123456789 2F246830    7/17/1985 200
241406699 3K222222    7/17/1985 200
241406699 62K123456   7/17/1985 200
241406699 62K123458   7/17/1985 200
241406699 36H666666   7/17/1985 200
251207299 3K222222    7/17/1985 200
251207299 3K654328    7/17/1985 200
251207299 2F246830    7/17/1985 200
251207299 2F246832    7/17/1985 200
251207299 62K123458   7/17/1985 200
251410299 62K123456   7/17/1985 200
251410299 62K123458   7/17/1985 200
251410299 3K654328    7/17/1985 200
251410299 3K123462    7/17/1985 200
251410299 3K123456    7/17/1985 200
251450699 3K123456    7/17/1985 200
251457199 4K3F864292  7/17/1985 200
251457199 3K123464    7/17/1985 200
```

```
251457199 62K123462   7/17/1985 200
251457199 3K123458    7/17/1985 200
251531599 3K123456    7/17/1985 200
251531599 4K3F864290  7/17/1985 200
251531599 62K123456   7/17/1985 200
251531599 4K3F864288  7/17/1985 200
273229199 4K3F864294  7/17/1985 200
273229199 3K123456    7/17/1985 200
273294699 3K123456    7/17/1985 200
273294699 2F246832    7/17/1985 200
273294699 2F246834    7/17/1985 200
273294699 62K123460   7/17/1985 200
273296099 3K123456    7/17/1985 200
273296099 62K123458   7/17/1985 200
273296099 4K3F864290  7/17/1985 200
273296099 36H444444   7/17/1985 200
321456789 2F246826    7/17/1985 200
321456789 3K123458    7/17/1985 200
517723545 3K123456    7/18/1985 150
519308699 2F246826    7/17/1985 200
519308699 4K3F864292  7/17/1985 200
519308699 36H444444   7/17/1985 200
519308699 3K123464    7/17/1985 200
519308699 3K123460    7/17/1985 200
542019599 3K123460    7/17/1985 200
542019599 3K654328    7/17/1985 200
542256399 3K123456    7/17/1985 200
542256399 2F246824    7/17/1985 200
542256399 62K123458   7/17/1985 200
542256399 62K123462   7/17/1985 200
542256399 62K123460   7/17/1985 200
542269599 3K123458    7/17/1985 200
542269599 2F246824    7/17/1985 200
542269599 62K123462   7/17/1985 200
542269599 4K3F864288  7/17/1985 200
542269599 4K3F864290  7/17/1985 200
543320899 3K123456    7/17/1985 200
543320899 3K654322    7/17/1985 200
543329499 62K123458   7/17/1985 200
543329499 36H444444   7/17/1985 200
543329499 3K123460    7/17/1985 200
543431899 3K654328    7/17/1985 200
543431899 3K123456    7/17/1985 200
543440399 62K123462   7/17/1985 200
543440399 3K123464    7/17/1985 200
543440399 3K123458    7/17/1985 200
543440399 2F246826    7/17/1985 200
543440399 62K123460   7/17/1985 200
543493499 62K123460   7/17/1985 200
543493499 36H444444   7/17/1985 200
543493499 3K123458    7/17/1985 200
543493499 62K123456   7/17/1985 200
543493499 3K123464    7/17/1985 200
543564599 2F246828    7/17/1985 200
543564599 3K123456    7/17/1985 200
543564599 62K123464   7/17/1985 200
543564599 36H444444   7/17/1985 200
543617799 62K123460   7/17/1985 200
543617799 3K123456    7/17/1985 200
543617799 62K123462   7/17/1985 200
543617799 2F246824    7/17/1985 200
543617799 62K123458   7/17/1985 200
543708699 3K123458    7/17/1985 200
543781899 4K3F864292  7/17/1985 200
543781899 3K123458    7/17/1985 200
543781999 3K123458    7/17/1985 200
[illegible]
```

543781999	62K123458	7/17/1985	200
543781999	4K3F864290	7/17/1985	200
543888999	36H444444	7/17/1985	200
543888999	3K123458	7/17/1985	200
543888999	3K654328	7/17/1985	200
543888999	62K123460	7/17/1985	200
543888999	2F246824	7/17/1985	200
543892799	4K3F864292	7/17/1985	200
543892799	2F246826	7/17/1985	200
543892799	3K123462	7/17/1985	200
543892799	3K123460	7/17/1985	200
549260399	3K123456	7/17/1985	200
549260399	4K3F864290	7/17/1985	200
549260399	36H444444	7/17/1985	200
549525199	3K123460	7/17/1985	200
549599799	3K123456	7/17/1985	200
549599799	2F246826	7/17/1985	200
549684999	3K123458	7/17/1985	200
549703599	2F246824	7/17/1985	200
549703599	3K123456	7/17/1985	200
678123987	36H444444	7/17/1985	200
678123987	4K3F864292	7/17/1985	200
678123987	62K123460	7/17/1985	200
678123987	3K123456	7/17/1985	200
678456987	4K3F864286	7/17/1985	200
678456987	3K123460	7/17/1985	200
678456987	2F246826	7/17/1985	200
678456987	62K123458	7/17/1985	200
678456987	4K3F864290	7/17/1985	200
678901234	62K123458	7/17/1985	200
678901234	4K3F864290	7/17/1985	200
678901234	36H444444	7/17/1985	200
678901234	2F246824	7/17/1985	200
678901234	3K123458	7/17/1985	200
721012999	4K3F864290	7/17/1985	200
721012999	62K123456	7/17/1985	200
721012999	3K123460	7/17/1985	200
721012999	3K222222	7/17/1985	200
721115699	62K123456	7/17/1985	200
721115699	62K123462	7/17/1985	200
721115699	36H444444	7/17/1985	200
721115699	2F246834	7/17/1985	200
721115699	3K123456	7/17/1985	200
721193599	3K123458	7/17/1985	200
721193599	36H666666	7/17/1985	200
721193599	36H444444	7/17/1985	200
721193599	4K3F864290	7/17/1985	200
721193599	62K123464	7/17/1985	200
721203899	2F246826	7/17/1985	200
721203899	62K123458	7/17/1985	200
721203899	62K123462	7/17/1985	200
721203899	3K123458	7/17/1985	200
721203899	2F246824	7/17/1985	200
721307999	4K3F864290	7/17/1985	200
721307999	62K123462	7/17/1985	200
721307999	62K123458	7/17/1985	200
721307999	3K123456	7/17/1985	200
721369599	2F246836	7/17/1985	200
721369599	36H888888	7/17/1985	200
721369599	4K3F864294	7/17/1985	200
721369599	3K123456	7/17/1985	200
721369599	36H666666	7/17/1985	200
721369599	2F246826	7/17/1985	200
721369599	3K654328	7/17/1985	200
721369599	3K222222	7/17/1985	200
721369899	4K3F864290	7/17/1985	200
[illegible]	[illegible]	[illegible]	[illegible]

721369899	3K123458	7/17/1985	200
728194599	2F246836	7/17/1985	200
728194599	4K3F864290	7/17/1985	200
728194599	3K123456	7/17/1985	200
728273799	62K123458	7/17/1985	200
728273799	62K123456	7/17/1985	200
728273799	3K123458	7/17/1985	200
728273799	2F246830	7/17/1985	200
728273799	2F246826	7/17/1985	200
728277499	3K123456	7/17/1985	200
728277499	36H444444	7/17/1985	200
728277499	36H888888	7/17/1985	200
728277499	3K123464	7/17/1985	200
728277499	3K123462	7/17/1985	200
728277499	3K654328	7/17/1985	200
728277499	62K123464	7/17/1985	200
728277499	2F246826	7/17/1985	200
728277499	62K123458	7/17/1985	200
728329599	2F246826	7/17/1985	200
728329599	62K123458	7/17/1985	200
728329599	4K3F864290	7/17/1985	200
728329599	3K123456	7/17/1985	200
728407299	62K123460	7/17/1985	200
728407299	62K123462	7/17/1985	200
728407299	4K3F864292	7/17/1985	200
728407299	3K123458	7/17/1985	200
728407299	62K123458	7/17/1985	200
728412299	3K222222	7/17/1985	200
728418899	3K123456	7/17/1985	200
728418899	4K3F864288	7/17/1985	200
728418899	62K123458	7/17/1985	200
728418899	62K123460	7/17/1985	200
728418899	62K123462	7/17/1985	200
728424899	36H444444	7/17/1985	200
728424899	62K123456	7/17/1985	200
728424899	3K123456	7/17/1985	200
728424899	3K123464	7/17/1985	200
728443499	3K123458	7/17/1985	200
728443499	36H666666	7/17/1985	200
728443499	4K3F864288	7/17/1985	200
728479399	62K123458	7/17/1985	200
728479399	3K123462	7/17/1985	200
728479399	62K123462	7/17/1985	200
728479399	36H444444	7/17/1985	200
728592699	62K123456	7/17/1985	200
728592699	62K123458	7/17/1985	200
728592699	2F246826	7/17/1985	200
728592699	3K123458	7/17/1985	200
728592699	3K654328	7/17/1985	200
728620899	3K654324	7/17/1985	200
728620899	3K123462	7/17/1985	200
728620899	3K123458	7/17/1985	200
728620899	62K123460	7/17/1985	200
728650899	3K123458	7/17/1985	200
728675199	3K123458	7/17/1985	200
728675199	4K3F864290	7/17/1985	200
728675199	4K3F864288	7/17/1985	200
728675199	2F246832	7/17/1985	200
728684899	62K123456	7/17/1985	200
728684899	3K123458	7/17/1985	200
728684899	2F246826	7/17/1985	200
728684899	36H444444	7/17/1985	200
728684899	4K3F864290	7/17/1985	200
728746699	62K123462	7/17/1985	200
728746699	62K123460	7/17/1985	200
728746699	3K123456	7/17/1985	200

```
728746699 2F246832    7/17/1985 200
728746699 62K123458   7/17/1985 200
728865799 62K123460   7/17/1985 200
728865799 62K123458   7/17/1985 200
728865799 62K123456   7/17/1985 200
728865799 2F246824    7/17/1985 200
728865799 3K123456    7/17/1985 200
738479399 3K123458    7/17/1985 200
796349876 62K123462   7/18/1985 250
878454567 62K123462   7/17/1985 200
878454567 4K3F864290  7/17/1985 200
878454567 62K123458   7/17/1985 200
878454567 3K123456    7/17/1985 200
878456789 4K3F864286  7/17/1985 200
878456789 62K123456   7/17/1985 200
878456789 3K222222    7/17/1985 200
878456789 3K123460    7/17/1985 200
987654321 62K123456   7/17/1985 200
987654321 62K123458   7/17/1985 200
987654321 3K222222    7/17/1985 200
987654321 3K123456    7/17/1985 200
```

```
 INVEN.FIL.3

               QUANTITY
KEY             ON       TOTAL RETIRED DATE
NUMBER  TYPE  HAND     QUANTITYSTATUS RETIRED
-------- --- -------- --------  -------- -------
          C 0 0
2F246824  C 10 23
2F246826  C 12 24
2F246828  C 89 90
2F246830  C 5 8
2F246832  C 20 25
2F246834  M 15 17
2F246836  C 12 14 R  7/12/1985
36H444444 M 15 33
36H444666 M 4 4 R 11/12/1984
36H666666 M 9 15
36H888888 M 7 10
3K123456  C 16 44
3K123458  C 4 27
3K123460  C 31 40
3K123462  C 15 25
3K123462  C 26 27 R  2/07/1984
3K123464  C 14 20 R  6/08/1984
3K222222  M 5 14
3K654322  C 10 13 R  7/19/1985
3K654324  C 9 10
3K654326  C 18 18
3K654328  C 12 24
4K3F864286 M 16 18
4K3F864288 C 10 15
4K3F864290 C 4 20
4K3F864292 M 12 20 R  7/18/1985
4K3F864294 C 19 22 R  3/14/1984
62K123456  C 10 25
62K123458  C 7 32
62K123460  C 16 30
62K123462  C 16 35
62K123464  C 8 13 R  5/03/1985
```

```
 KEYWAY.FIL.3

KEYWAYQUANTITY
NUMBER  ON HAND
```

```
  ----  --------

2F   95
3GH  89
3K   360
4K3F 73
62K  206

 LOCATE.FIL.3

KEY       BLDG  ROOM
NUMBER    NMBR  NMBR
------    ----  ----

            LA  103
2F246824    F   206
2F246826    F   301
2F246828    MA  305
2F246830    MA  304
2F246832    MA  214
2F246834    MA  001
36H444444   LIB 110
36H666666   LIB 114
36H888888   LIB 118
3K123456    UH  315
3K123458    UH  214
3K123460    UH  22
3K123462    UH  2A
3K222222    UH  UH
3K654324    LA  11
3K654326    LA  203
3K654328    LA  304
4K3F864286  UC  CC
4K3F864288  UC  WRC
4K3F864290  UC  OPC
4K3F864292  UC  BS
62K123456   JRH 201
62K123458   JRH 203
62K123460   SS  340
62K123462   SS  352

 NAME.FIL.3

SOCIAL
SECURITY       LAST NAME        FIRST
NUMBER                 NAME
---------- ----------------  --------

-123456799 SMITH             JOHN
-123456796 VADHVA            SURESH
-123456795 ANDERSON          ROBIN
-123456794 FAUNTLEROY        ROBIN
-123456793 MILLER            KEN
-123456792 ANDERSON          JOE
-123456791 SMITH             MARY
-123456790 SMITH             ANN
-123456789 SMITH             JOHN
796349876 JACKSON           ROBINSON




 PSMAST.FIL.3
 PSMAST.FIL.4

SOCIAL
SECURITY  FIRST        LAST
NUMBER  NAME        NAME
--------- ------------ -----------

123456789 FRED          SMITH
251450699 LEROY         ANDERSON
251531599 ROBERT        BANAUGH
273229199 STEPANIE      ANDERSEN
273294699 RHEA          ASHMORE
273296099 AARON         ANDREASON
321456789 JAMES         SMITH
542019599 CHARLOTTE     BARGER
542256399 BRUCE         BARRETT
543564599 BARBARA       BAIN
543617799 FRANK         ANDERSON
543781899 ELDON         BAKER
543781999 DAN           BALLAS
543888999 DAVID         ALT
549260399 GREGORY       BARRETT
549599799 WILLIAM       BALLARD
678123987 HOWARD        JONES
678456987 LINDA         JONES
678901234 SALLY         SMITH
721012999 SUSAN         BARR
721115699 GERRY         BAERTSCH
721203899 STEPHEN       BALOGH
721369599 SHARON        BARRETT
721369899 BETSY         BACH
728194599 ROBERT        ANDERSON
728329599 MARLENE       BACHMAN
728418899 GLENDA        BARNES
728592699 PHILIP        BAIN
728620899 VICKI         ANDRE
728650899 ROBERT        BALCH
728675199 I             BALL
878454567 ERNEST        BROWN
878456789 ERNEST        SMITH
987654321 MIKE          MILLER

 SRMAST.FIL.3

SSN       NAME
--------- -----------------

241406699 EVAN DENNY
251207299 RICHARD DRAKE
251410299 VIRGINIA REESMAN
251457199 DELORES RENZ
519308699 MARLYN EGGE
542269599 ROBERT REAM
543320899 WILLIAM DERRICK
543329499 IRENE EVERS
543431899 ROY REGEL
543440399 HOWARD REINHARDT
543493499 JAMES RANNEY
543708699 ARETTE EGGE
543892799 WILLIAM EVANS
549525199 IDRIS EVANS
549684999 LINDA REAVES
549703599 LORETTA EDWARDS
721193599 HARRY RAY
```

```
721307999 MARK REFSELL
728273799 BILL RAOUL
728277499 JULIETTE CRUMP
728407299 JOHN EGAN
728412299 MARIBETH DWYER
728424899 BETTINA ESCUDERO
728443499 GLEN READ
728479399 JOAN RADANDT
728684899 JULIA RADTKE
728746699 MICHAEL RAFFIN
728865799 CHARLES EYER
@
```

KEY INVENTORY CONTROL SYSTEM

USER MANUAL

by

Robin Fauntleroy

Michele Miley

Table of Contents

Introduction

The Key Inventory Control System is a "menu-driven" program, meaning that when you run the program, and you are at a point that you may make one of many choices, those choices will be listed on the screen with a brief description of each choice, and a letter corresponding to that choice. To choose one of the displayed choices, simply type its corresponding letter followed by a carriage return. Should the user inadvertently type an invalid choice, the menu will be redisplayed and another opportunity will be given to enter the desired option. There are parts of the program that will require typing a response, but no menu will be displayed. This happens when the program needs some information from you in order to carry out the function that you have selected from the menu. In each of these cases, a "prompt" will be shown on the screen, or a question concerning the data the program needs. If the response must be entered in a special format, the "prompt" will explain this also. Furthermore, if there are a limited number of responses to be made, such as "yes or no", these responses will be listed after the prompt.

In response to a prompt, there may be a time when you inadvertently type the wrong answer. After each prompt or series of prompts, the information you have typed in will be redisplayed, and you will be asked if the response you typed is the correct one. If it is not, simply answer "N" for no, and you will be given another chance to retype the information. If the information is correct, type "Y" for yes, and the program will carry out the function you requested, or if needed, will ask you for more information.

This manual is designed to walk through the program with you in the order that menu choices are displayed. Each function will be discussed and explained, and examples of the information you will see on the screen are shown. Each section is titled according to the function of that particular menu choice.

System Description

The following pages provide a walkthrough of each of the available functions within the Key Inventory Control program. You may either read this section while working at the terminal, or prior to experimenting with the program. Examples of what you will encounter in the program are provided so that if you are not working at the terminal, you will know what to expect of each section.

The Key Inventory Control System is divided into three major parts, the Front Office Procedures, Locksmith Procedures, and Maintenance Procedures. The functions under the Front Office Procedures include Key Issue, Key Return, Information Access, and Report or Letter Generation. Under the Locksmith portion of the system you will find Key Order Completion, Key Replacement, Lock Rekeying, and Inventory Control. Finally, the

Maintenance subsystem contains the File Restoration function in addition to several automatic program maintenance procedures.

"Logging On" to the System

When you first turn on the terminal, you will see a blank screen. When you type a carriage return, the line:

```
WELCOME TO THE UNIVERSITY OF MONTANA
enter class
```

will appear on the screen. The class refers to the particular computer you have an account on, and for this program, that is "deca", so at this time type "deca" (without the quotation marks) and type a carriage return. Another message will be displayed on the terminal followed by the "@" sign. Next to the @ sign, type:

```
LOG CS.GRAD.ROBMICH KICS
```

When you type KICS, it will not show up on the screen. This is the password to enter the system, and should not be given to those not authorized to use the Key Inventory Control System. Several messages will be displayed, and finally an asterisk ("*") will appear on the screen. At the asterisk, type "use keys", and the program will begin running.

The Key Inventory Control Menu

Once you are in the Key Inventory Control System, the main menu will be displayed on the screen. It looks like:

```
**************************************************
*                                                *
*            KEY INVENTORY CONTROL MENU          *
*                                                *
**************************************************
*                                                *
*     Enter program choice:                      *
*          A  Front Office Procedures            *
*          B  Locksmith Procedures               *
*          C  Maintenance Procedures             *
*          D  Exit Program                       *
*                                                *
**************************************************
```

To choose the Front Office Procedures, simply type A in either upper or lower case followed by a carriage return. Likewise, to choose any of the other options, type the letter preceding it followed by a carriage return. If you choose option D, Exit Program, you will leave the program, and may then log off of the system. Choosing option A will result in the prompt:

```
    Enter Password:
```

At this point you should enter the password for the Front Office Procedures, which is currently "1234567", however, you may change that to any password as long as it is seven letters/characters or less. If the wrong password is entered at this point, the message will appear:

```
    Incorrect Password
    Please Re-enter Password:
```

If the password is entered incorrectly again, you will not be allowed access to the program. Mail will be sent to the account administrator concerning the unauthorized attempted access. The password is displayed on the screen as you type it in, then the screen is cleared, however, this may be a slow process at times, therefore you should take care that unauthorized personnel do not witness this process.

The Front Office Menu

Once the password has been correctly entered for the Front Office Procedures, the Front Office Menu will be displayed. The menu appears as:

```
*************************************************
*                                               *
*                 FRONT OFFICE MENU             *
*                                               *
*************************************************
*                                               *
*     Enter Function Choice:                    *
*          A  Key Issue                         *
*          B  Key Return                        *
*          C  Information Access                *
*          D  Report or Letter Generation       *
*          E  Exit                              *
*                                               *
*************************************************
```

This menu lists the major functions within the Front Office portion of the system. Key Issue is chosen when an individual requests a key, whereas Key Return is the choice when an individual returns a key. The function of Information Access is to provide the user with a means of accessing a variety of information stored within the system.

Report of Letter Generation is utilized when the user wishes to generate letters to keyholders leaving the University system or when a specific report is desired. Exit will return you to the Main Menu.

The Key Issue Option

If the Key Issue function was chosen from the Front Office Menu, you will be prompted for the social security number of the individual requesting a key issue. If this number is not known, then you will be prompted to type in a zero. The prompt is as follows:

```
Please enter 9-digit social security number,
If not available, simply type a 0 (zero).
Social Security Number:
```

You will be asked if this is the correct entry and provided with an opportunity to change the number if it is not correct. Once you are satisfied that the entry is accurate, the program will attempt to find the name associated with that social security number. If it is found, then it will be displayed on the screen and you may verify that with the individual, however, if it is not found you will be prompted to enter the last name, first name, and middle initial. The prompt will appear as follows:

```
Please enter issuee´s last name:
Please enter issue´s first name and middle
    initial:
```

In the case that there are several individuals with the same last name within the University records, these names and social security numbers will be displayed for the user to attempt to distinguish between the various records. If the user can determine the correct record, the program will prompt for the corresponding social security number. Otherwise, a unique identification number will be assigned to that individual by the program for the exclusive use of the Key Inventory Control

System. Following correct entry of the issuee´s name, or verification of the name displayed by the program, you will be prompted for the building and room number that the individual wishes to be issued a key for. This will be displayed as:

```
    Please enter building abbreviation
        (maximum 3 characters):

    Please enter room number
        (maximum 4 characters):
```

Finally, you will be prompted for the deposit amount. If the deposit amount is the standard $2.00, no response is required except a carriage return <cr>. However, any other amount must be entered at this point. Entry must be an integer value. For example, $1.00 should be entered as 1. This prompt will appear as:

```
    Enter deposit amount
    If amount is other than standard, type in
    new amount, otherwise type a carriage return
         <cr>:
```

This completes the key issue process for that particular key. You will be asked if there is another key to issue for that particular individual. If so, you will be asked to enter the building and room number and deposit amount. This will continue until you respond ´N´, there are no more keys to issue to that individual and you will then be returned to the Front Office Menu.

The Return Key Function

If choice "B", Key Return, was selected from the Front Office Menu, information about the individual returning the key must be obtained. This procedure will follow that which was discussed previously under Issue Key regarding the issuee´s social security number and/or name. Following this procedure, rather than requesting a building and room number, the program will request the number of the key being returned. This will be displayed as:

Enter the key number of the returned key:

After completing this process, you will again have the opportunity to continue returning keys for that individual. You will then be returned to the Front Office Menu.

The Information Access Menu

If Information Access was the function chosen from the Front Office Menu, then the Information Access Menu will be displayed. This allows you to choose the type of information you would like to obtain.

```
**************************************************
*                                                *
*               INFORMATION ACCESS MENU          *
*                                                *
**************************************************
*                                                *
*     Enter information topic option:            *
*          A  Keyholder Information              *
*          B  Key Number Information             *
*          C  Building and Room Number           *
*              Information                       *
*          D  Information on Keys Held           *
*          E  Key Inventory Information          *
*          F  Daily Cash Balance                 *
*          G  Exit                               *
*                                                *
**************************************************
```

The selection of option "A", Keyholder Information, is used for obtaining a list of persons possessing keys for a particular building and room number or key number. Option "B", Key Number Information, requires the input of building and room number and will provide you with the corresponding key number. Selection "C", Building and Room Number Information, will display the corresponding building and room number, once a key number is entered. Option "D", Information on Keys Held will list all keys possessed by a given individual. Key Inventory Selection, selection "E", provides you with a summary of the number of keys on hand, the number issued, and the total number. Option "F", Daily Cash Balance, will print out the current balance of cash received and refunded. It may be cleared upon request. The choice of option "G", Exit, will return you to the Front Office Menu.

The Keyholder Information Menu

Selection of the option of Keyholder Information in the Information Access Menu will result in the display of the Keyholder Information Menu. This menu will allow the user to choose which information to enter in order to obtain information concerning key holders.

```
**************************************************
*                                                *
*              KEYHOLDER INFORMATION MENU        *
*                                                *
**************************************************
*                                                *
*     Enter option for which you have            *
*              information:                      *
*          A  Building and room number           *
*          B  Key numbers                        *
*          C  Exit                               *
*                                                *
**************************************************
```

Depending upon the information available to you, you may determine persons possessing a particular key or keys. Selection of option "A" will result in the prompt:

```
    Please enter the building abbreviation
       (maximum 3 characters):

    Please enter the room number
       (maximum 4 characters):
```

Those persons possessing the key for that building and room will then be displayed. However, should you have a key number or numbers, choice of option

"B" will then prompt you for those numbers as follows:

```
Please enter a key number
or a ´q´ to indicate there
are no more keys:
```

This will result in a list of all persons who have been issued that group of keys. Choice "C" will return you to the Information Access Menu.

The Key Number Information Function

Selection of this option, "B", will provide you with the key number which corresponds to a particular building and room number. You will be prompted for this information as option "A" of the Key Holder Information Menu above.

Building and Room Number Information

Option "C", will display the building and room number corresponding to a given key number. You will be prompted for the key number in the following manner:

    Please enter the key number:

The Information on Keys Held Function

This function, "D", within the Information Access Menu, will display all keys held by a particular individual. You will be prompted, as in Issue Key, for a social security number, or, if not available a last and first name. Please see the section under Issue Key for more specific information on these prompts.

The Key Inventory Information Function

Option "E", given a valid key number, will display a summary of the quantity on hand, number issued, and total number of keys. This prompt will be identical to that seen in Option "C".

The Daily Cash Balance Function

This function, "F", on the Information Access Menu, will display the current balance of all cash received and refunded throughout the chosen time period. This may be used to balance the cash on hand for the daily deposit. An option is provided within this function to clear the total. Choice "G", Exit will return you to the Front Office Menu.

The Report or Letter Generation Function

If the user had entered the Report or Letter Generation function at the Front Office Menu, option "D", and then indicated (from a single prompt) the desire to generate reports, then the Report Generation Menu would appear. This menu indicates which reports the user may produce.

```
*************************************************
*                                               *
*              REPORT GENERATION MENU           *
*                                               *
*************************************************
*                                               *
*     Enter report option:                      *
*          A  Keyholder Report                  *
*          B  Inventory Report                  *
*          C  Location Report                   *
*          D  Key Retirement Report             *
*          E  Exit                              *
*                                               *
*************************************************
```

The report generation function allows the user to choose among a variety of reports available. The keyholder report will list keyholders and the corresponding keys that they have issued to them. The inventory report is a summary of the inventory available, and includes such information as total number of keys, amount issued, amount available, etc. The location report is a cross reference between the key numbers and the building and room numbers. Finally, the key retirement report is a list of all keys which have been ´retired´ and the date of retirement.

The Keyholder Report Option

This option will allow the you to choose whether you would like a report consisting of the entire information, (a large report), or a "individual report", which consists of a subset of the information. Should you choose the "Total" report at the prompt, you will be asked whether you would like the information sorted by the social security number of the individuals or the key numbers. After responding to this prompt, the report will be generated and you will be returned to the menu. The final report will be stored in a file called "Keyholder.txt". The individual reports are subdivided by keyways. Should you choose this option, you will be prompted for the keyway number which you want the report based upon. As there are many keys under a particular keyway number, you will then have the same option of sorting on either social security number of key number.

The Inventory Report Option

This report option will also provide you will the opportunity of subdividing the report into smaller divisions. You will see the same prompt for either a "Total" report or an "Individual" report. If you choose the "Individual" report, you will be asked for the keyway number you wish the report to be based upon. The final report will be stored in a file called "Inven.txt".

The Location Report Option

This report will provide a cross reference between key numbers and building and room numbers. It also can be divided into particular keyway numbers, to allow for a more concise report. The final report may be found in a file called "Locat.txt".

The Key Retirement Option

The key retirement report will simply print a report of all keys that have been put on the "retired" list and the date of retirement. The final report will be located in a file called "Retire.txt".

The Letter Generation Function

The letter generation function is not implemented at this time, however, sample letters can be found in the Appendix. A choice of any of the options, except "Q", will display a "Not Implemented Yet" message. Choice of "Q", will return you to the Front Office Menu.

If you chose option, "E", from the Front Office Menu, you will return to the Key Inventory Control Menu.

The Locksmith Menu

If selection "B", Locksmith Procedures is chosen at the Key Inventory Control Menu, the program will prompt you for a password in exactly the same manner encountered in the Front Office Procedures. The present password for this portion of the program is "2345678", however this may be changed if desired. Once the password has been entered correctly, the following menu is presented at the onset of the locksmith portion of the program.

```
**************************************************
*                                                *
*                  LOCKSMITH MENU                *
*                                                *
**************************************************
*                                                *
*     Choose option:                             *
*          A  Complete Key Orders                *
*          B  Replace Key                        *
*          C  Rekey Lock                         *
*          D  Inventory Control                  *
*          E  Exit                               *
*                                                *
**************************************************
```

The Complete Key Orders function, option "A", provides the user with access to the orders received for keys from the Front Office Procedures. Orders may be viewed, completed, printed, and changed from this selection. Selection "B", Replace Key, records the return and subsequent replacement of a damaged or ineffective key. Option "C", Rekey Lock is designed to record the retirement of a key, and to generate the new key number to be used for that lock. Inventory Control, selection "D", allows the viewing, manipulation, and recording of keyway inventory levels. Option "E" will return you to the Key Inventory Control Menu.

The Complete Key Orders Menu

The following menu is presented to the user with the choice of ´A´ on the Locksmith Menu.

```
**************************************************
*                                                *
*             COMPLETE KEY ORDERS MENU           *
*                                                *
**************************************************
*                                                *
*     Choose Option:                             *
*          A  List Orders                        *
*          B  Change Orders                      *
*          C  Record Completion                  *
*          D  Print Orders                       *
*          E  Exit                               *
*                                                *
**************************************************
```

Option "A", List Orders, will display all the orders needed by the Front Office to maintain an adequate supply of keys available for issue for each building and room. Change Orders, selection "B", allows you to change the priority and/or amount of keys in the key order list. Selection "C", Record Completion, will adjust key inventory levels as orders are completed. Print Orders, option "D", will produce a printed copy of the order list. Finally, option "E", Exit, will return you to the Locksmith Menu.

The List Orders Function

No input is required from you when this choice is selected from the Complete Key Orders Menu. The list of orders produced by the Front Office Procedures and the Rekey Lock Function will be displayed on the screen at this time.

The Change Orders Function

When this option is chosen from the Complete Key Orders Menu, a list of orders is displayed as in the List Orders Function, however, each order is preceded by a number to indicate its position in the list. You will be prompted for the order that you wish to change. The prompt is as follows:

```
Please type the number of the record you wish to
change. (Enter a 0 (zero) if you wish to exit
     this portion of the program.)
Order Number:

What is the new priority you would like to assign?
Priority:

What is the new amount to be assigned?
Amount:
```

As with Front Office Procedures, if an incorrect entry is made, you will be given the opportunity to re-enter the correct data. The new amount and priority will be entered into the order file, replacing the existing values.

The Record Completion Function

Selection of choice "C", Record Completion, will display the order file as in the Change Order Function, with the preceding number. Once all keys have been made for a particular order, you may choose this option to delete that entry from the list. This will update the Front Office inventory file and the Locksmith keyway inventory file. You will again be prompted for the order number as follows:

```
Please type the number of the record which has
been completed.  (Enter a 0 (zero) if you wish
to exit this portion of the program.)
Order Number:
```

The Print Orders Function

Choice "D" of the Complete Orders Menu will print a paper copy of the order list. To get a printout, simply type the ´print´ key on the keyboard.

The Replace Key Function

Selection "B" from the Locksmith Menu, Replace Key, allows you to record the return of an irreparably damaged key. This will update the appropriate files. You will be prompted for the key number in the following way:

```
Enter the key number of the returned key.
(If you wish to exit without entering the
key number, type E for Exit.)
Key Number:
```

The Rekey Lock Function

Option "C" of the Locksmith Menu, the Rekey Lock Function, is used when a particular room is being rekeyed. It will determine the new bit cut number to be used, whether an already existing and retired key, or an entirely new key. Upon entry to this portion of the program, you will be prompted as follows:

```
Do you wish to continue with the lock rekeying
process? (Y/N)
```

At this point you may exit this section by typing "N", or proceed by typing "Y". If you exit, you will be returned to the Locksmith Menu, and if you continue, you will be prompted for the building and room number as follows:

```
Please enter the building and room number that
are being rekeyed.
Building:
Room Number:
```

As in other parts of the system, the program will ask you if this information is correct before performing any functions. If it is correct, the following prompt will appear:

```
Do you wish to use a new key number or an
existing one?
Type N for New, and E for Existing:
```

The choice of "E" is used when you have a retired key that you would like to use to rekey the lock, but are unsure if it has been in retirement long enough. Otherwise, you may enter "N", and the program will generate a new number with the same keyway that is two bit cuts away from any other number and is not in use. If you have decided to choose the "E" option, th following prompt will appear:

```
    Please enter the old key number you wish to use.
    Old Key Number:
```

Again, the information you have entered will be verified, and if correct, will check whether that key is available for use. If it is available for use, the following prompt will appear:

```
Enter the amount you have on hand.
Amount:
```

In response to this, you should enter the number of the retired keys you have on hand. An order will automatically be generated and placed on the order list as described in the Complete Key Orders Menu section of this document. In addition, the old key will be listed as retired, and the new key number to be used will be listed as the key opening that particular building and door.

The Inventory Control Menu

If you selected choice "D", Inventory Control, from the Locksmith Menu, the Inventory Control Menu will be displayed. It appears as:

```
*************************************************
*                                               *
*             INVENTORY CONTROL MENU            *
*                                               *
*************************************************
*                                               *
*     Choose Option:                            *
*          A  Change Inventory                  *
*          B  Order Parts                       *
*          C  Add Item                          *
*          D  Delete Item                       *
*          E  Print Inventory                   *
*          F  Exit                              *
*                                               *
*************************************************
```

Option "A", Change Inventory, is used to manually change the quantity on hand of key blanks listed in the inventory records, rather than rely on the automatic generation of order amounts. Order Parts, option "B", will generate the order amounts needed for each key blank and print these out on the printer. Selection "C", Add Item, is chosen when you receive an order and wish to increase the inventory levels listed. Delete Item, selection "D", is used to delete the record for a keyway that is no longer being used. Option "E", Print

Inventory, will produce a paper copy of the amounts on hand of each key blank. Finally, option "F", Exit, will return you to the Locksmith Menu.

The Change Inventory Function

When you enter the Change Inventory Function, you will be prompted with:

```
Do you wish to continue with the inventory
change process? (Y/N)
```

If you choose "N", you will be returned to the Inventory Control Menu, however, if you choose "Y", th following prompt will appear:

```
    Please enter the keyway number for which you wish
    to make a change.
    Keyway Number:
```

Once you have entered the keyway number and verified that it is correct, you will be prompted with:

```
What is the new amount you would like to enter?
Amount:
```

Again, once you´ve entered the amount and verified that it is correct, both the keyway number and the new amount listed will be displayed on the screen.

The Order Parts Function

The Order Parts Function, selection "B" on the Inventory Control Menu, is used to produce a listing of the number of key blanks to be ordered to bring the inventory levels of each blank to the threshold level.

The Add Item Function

If you chose option "C" at the Inventory Control Menu, this is the function you will be performing. This is used when an order is received and inventory levels must be increased to reflect that. You will be prompted as follows:

```
Please enter the keyway number for which you have
received inventory.
Keyway Number:

What is the amount received?
Amount Received:
```

The amount you type in as amount received will be added to the current quantity on hand once you have indicated that it is correct. You will next be prompted with:

```
    Do you have more entries to add? (Y/N)
```

A choice of "Y" will repeat the process you have just completed, while the choice of "N" will return you to the Inventory Control Menu.

The Delete Item Function

If a keyway number is no longer in use, it may be deleted from the files with this function. You will be prompted with:

```
Please enter the keyway number for the record
to be deleted.
Keyway Number:
```

If there are no records with that keyway number, a message will appear on the screen informing you of this, and no change will be made to the files, however, if that number does exist, it will be deleted from the files.

The Print Inventory Function

The Print Inventory function prints a paper copy of the amounts on hand for each keyway number. To activate the printer, simply type the ´print´ key.

The Maintenance Function

If, at the Key Inventory Control Menu level, you had chosen the Maintenance Program option, and entered the password correctly, this would allow access to the file restoration function. This function allows you to pull previously stored files from magnetic tape to be accessed via interactive 1022 commands. The menu provided for this function allows you to choose which files you wish to restore. In addition to the file restoration function, the Maintenance Function performs other maintenance routines automatically, such as weekly saving of all files on magnetic tape, and checking threshold levels of Front Office keys and placing those needed into the Locksmith order list.

The File Restoration Menu

If you selected the Maintenance Program at the Key Inventory Control Menu, you would see the following menu:

```
**************************************************
*                                                *
*              FILE RESTORATION MENU             *
*                                                *
**************************************************
*                                                *
*     Enter file to be restored:                 *
*          A  Individual Record File             *
*          B  Name File                          *
*          C  Inventory File                     *
*          D  Location File                      *
*          E  Keyway File                        *
*          F  Order File                         *
*          G  All Files                          *
*          H  Exit                               *
*                                                *
**************************************************
```

Each of the choices listed represents a file that has been automatically saved weekly by the Maintenance Function, and which, should anything happen to your current files, could be restored so that a minimum of data would be lost. You may choose to only restore one file, perhaps to view historical data, or you may choose to restore them all. Because there is no current tape at the Computer Center for the Physical Plant, it is suggested that you do not run these modules at present, although they are implemented and tested.

"Logging Off" of the System

When you are finished running the Key Inventory Control System, and you have selected the Exit Program option from the Key Inventory Control Menu, you will see an asterisk ("*") displayed on the screen. At this point type "exit" and a "@" sign will appear. Type "logout" at the "@" sign, and this will disengage your connection to the computer. Now you may turn off your terminal and Gandalf switch.

Appendix A: Sample Letters

The following letter shows the content of letters sent out to personnel and students leaving the University system if they still possess keys. The letter itself will be kept in a separate file so that it will be easily changed should another format be desirable in the future.

Date

Dear Student/University Employee,

It has come to our attention that you will soon be leaving the University system, and that you still possess one or more keys from the Physical Plant. Please return these to the Physical Plant prior to leaving, and your deposit will be refunded. The keys we show that you have are:

Key Number 1
Key Number 2
...
Key Number n

Thank you for your cooperation!

University of Montana Physical Plant

Appendix B: Sample Reports

Several kinds of reports may be generated by the report generation function of the Key Inventory Control System. The format of these reports is shown below. Each sample is a greatly abbreviated representation of the actual report, but may be used to understand the layout of each.

Keyholder Report

Keyholder Name:	Key Number:	Date Issued:	Deposit:
Doe, John E.	3K68179	2/12/85	2.00
	3K65132	3/15/84	2.00
Smith, Mary L.	3K63128	6/18/75	2.00

Inventory Report

Key Number:	Quantity on Hand:	Quantity Out:	Total Number:
3K68179	10	25	35
2F43289	3	17	20
3K63219	18	5	23

Location Report

Key Number:	Building:	Room Number:
3K68179	UH	315
3K47328	UH	22
2F53728	LA	103

Key Retirement Report

Key Number:	Quantity on Hand:	Quantity Out:	Total Number:	Date Retired:
3K68179	33	2	35	1/15/85
2F34287	12	17	29	5/14/85

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                             !
!     Module Name:  10 PASSWORD MAIN                                          !
!     Parameters:                                                             !
!          In Only:                                                           !
!          Out Only:                                                          !
!          In/Out:   G1_ALLOW_ENTRY                                              !
!                    G1_MAIN_MENU_CHOICE                                         !
!     Coded By:  Robin FauntLeRoy                                             !
!     Date Last Modified: July 9, 1985                                        !
!     Reason Modified:                                                        !
!                                                                             !
!     Module Description:  This module controls  the password functions      !
!          It calls ACCEPT_PASSWORD and receives the G1_ALLOW_ENTRY flag         !
!     from this module.  Depending on the flag it may or may not call         !
!     DISALLOW_ACCESS.                                                         !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 7 PASSWORD.


IF G1_MAIN_MENU_CHOICE EQ ('A','a','B','b','C','c') THEN
        PRINT "Enter Password:".
        ACCEPT PASSWORD.
        PUSH USING BL
        POP END.
        CALL ACCEPT_PASSWORD.
ENDIF.
IF G1_ALLOW_ENTRY EQ "F" THEN
        PRINT "Incorrect Password".
        PRINT "Please Re-enter Password".
        ACCEPT PASSWORD.
        PUSH USING BL
        POP END.
        CALL ACCEPT_PASSWORD.
ENDIF.
IF G1_ALLOW_ENTRY EQ "F" THEN
        CALL DISALLOW_ACCESS.
ENDIF.
RETURN.

ACCEPT_PASSWORD: @R101_ACCEPT_PASSWORD.DMC
DISALLOW_ACCESS: @R102_DISALLOW_ACCESS.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name: 101 ACCEPT PASSWORD                                       !
!     Parameters:                                                            !
!          In Only:  PASSWORD                                                !
!          Out Only:                                                         !
!          In/Out:   G1_MAIN_MENU_CHOICE                                     !
!                    G1_ALLOW_ENTRY                                             !
!     Coded By:   Robin FauntLeRoy                                           !
!     Date Last Modified: July 9, 1985                                       !
!     Reason Modified:                                                       !
!                                                                            !
!     Module Description:   This module compares the value of the password  !
!     accepted with the appropriate password for the system requested        !
!     and sets the G1_ALLOW_entry flag accordingly.                             !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 7 FRONT_PASSWORD
       TEXT 7 LOCK_PASSWORD
       TEXT 7 MAINT_PASSWORD.

LET FRONT_PASSWORD EQ "1234567".
LET LOCK_PASSWORD EQ "2345678".
LET MAINT_PASSWORD EQ "3456789".

IF G1_MAIN_MENU_CHOICE EQ ('A','a') AND PASSWORD EQ FRONT_PASSWORD OR
  G1_MAIN_MENU_CHOICE EQ ('B','b') AND PASSWORD EQ LOCK_PASSWORD OR
  G1_MAIN_MENU_CHOICE EQ ('C','c') AND PASSWORD EQ MAINT_PASSWORD THEN
        LET G1_ALLOW_ENTRY EQ "T".
ELSE
        LET G1_ALLOW_ENTRY EQ "F".
ENDIF.

RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name:   102 Disallow_Access                                     !
!     Parameters:                                                            !
!          In Only:                                                          !
!          Out Only:                                                         !
!          In/Out:                                                           !
!     Coded By:  Robin FauntLeRoy                                            !
!     Date Last Modified:  July 9, 1985                                      !
!     Reason Modified:                                                       !
!                                                                            !
!     Module Description:                                                    !
!          This module is the controller module for the processes that       !
!     execute with an attempt by someone who doesn't know the correct        !
!     password to enter the system.                                          !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
CALL SEND_MAIL.
CALL LOGOUT_USER.
RETURN.

SEND_MAIL: @R1021_SEND_MAIL.DMC
LOGOUT_USER: @R1022_LOGOUT_USER.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!     Module Name:   1021 SEND_MAIL                                         !
!     Parameters:                                                           !
!          In Only:                                                         !
!          Out Only:                                                        !
!          In/Out:                                                          !
!     Coded By: Robin FauntleRoy                                            !
!     Date Last Modified: July 9, 1985                                      !
!     Reason Modified:                                                      !
!                                                                           !
!     Module Description:                                                   !
!          This module simply pushes out to the monitor level,              !
!     submits a batch job, which sends mail to the user notifying           !
!     them of an unauthorized entry attempt and then pops to return         !
!     to 1022.                                                              !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
PUSH USING SUBMIT MAIL/OUTPUT:ERRORS
POP END.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                          !
!     Module Name:  1022 Logout User                                       !
!     Parameters:                                                          !
!          In Only:  none                                                  !
!          Out Only:  none                                                 !
!          In/Out: none                                                    !
!     Coded By:  Robin FauntLeRoy                                          !
!     Date Last Modified:  July 17, 1985                                   !
!     Reason Modified:                                                     !
!                                                                          !
!     Module Description:                                                  !
!           This module is called if someone attempts to use the keys      !
!     system and does not have the proper passwords.  It simply calls      !
!     the program end which closes all the files and exits 1022.           !
!                                                                          !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

CALL PROGRAM_END.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name: 11 Front Office Main                                     !
!     Parameters:                                                           !
!          In Only: none                                                    !
!          Out Only: G11_LAST_NAME                                          !
!                    G11_FIRST_NAME                                         !
!                    G11_NAME                                               !
!                    G11_SS_NUMBER                                          !
!          In/Out: none                                                     !
!     Coded By: Robin FauntLeRoy                                            !
!     Date Last Modified: July 9, 1985                                      !
!     Reason Modified:                                                      !
!                                                                           !
!     Module Description:                                                   !
!          The Main module is the controlling module for the front          !
!     office  and displays a menu asking the user to choose between         !
!     the functions provided.  It passes no parameters                      !
!     and accesses no files.                                                !
!                                                                     !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L1_FRONT_OFFICE_MENU_CHOICE
       TEXT 17 G11_LAST_NAME
       TEXT 30 G11_NAME
       TEXT 13 G11_FIRST_NAME.

DEFINE INTEGER G11_SS_NUMBER.

REPEAT
        REPEAT
        PUSH USING BL
        POP END.
        PRINT "          ******************************************************
*****".
        PRINT "          *
    *".
         PRINT "          *                  FRONT OFFICE MENU
     *".
        PRINT "          *
    *".
        PRINT "          ******************************************************
*****".
        PRINT "          *
    *".
        PRINT "          *     Enter Function Choice:
    *".
        PRINT "          *          A  Key Issue
    *".
        PRINT "          *          B  Key Return
    *".
        PRINT "          *          C  Information Access
    *".
        PRINT "          *          D  Report or Letter Generation
    *".
        PRINT "          *          E  Exit Program
    *".
        PRINT "          *
    *".
        PRINT "          ******************************************************
*****".

        PRINT FMT $ "Enter Choice:  " END.
        ACCEPT L1_FRONT_OFFICE_MENU_CHOICE.

        IF L1_FRONT_OFFICE_MENU_CHOICE NEQ ('A','a','B','b','C','c','D','d','E',
'e') THEN
                PRINT "Invalid Choice, please try again.".
        ENDIF.
        UNTIL L1_FRONT_OFFICE_MENU_CHOICE EQ ('A','a','B','b','C','c','D','d','E
','e').
        IF L1_FRONT_OFFICE_MENU_CHOICE EQ ('A','a') THEN
                CALL ISSUE_KEY.
        ELSEIF L1_FRONT_OFFICE_MENU_CHOICE EQ ('B','b') THEN
                CALL RETURN_KEY.
        ELSEIF L1_FRONT_OFFICE_MENU_CHOICE EQ ('C','c') THEN
                CALL INFORMATION_ACCESS.
        ELSEIF L1_FRONT_OFFICE_MENU_CHOICE EQ ('D','d') THEN
                CALL GENERATE_CORRESPONDENCE.
        ELSE
                PRINT " ".

        ENDIF.
UNTIL L1_FRONT_OFFICE_MENU_CHOICE EQ ('E','e').
RETURN.

ISSUE_KEY: @R111_ISSUE_KEY.DMC
RETURN_KEY: @R112_RETURN_KEY.DMC
INFORMATION_ACCESS: @R113_INFORMATION_ACCESS.DMC
GENERATE_CORRESPONDENCE: @R114_GEN_CORRES.DMC

@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                          !
!     Module Name:  111 ISSUE KEY                                          !
!     Parameters:                                                          !
!          In Only:                                                        !
!          Out Only:  G111_KEY_NUMBER                                      !
!                     G111_AVAILABLE                                       !
!                     G111_FOUND                                           !
!                     G111_BLD_NUMBER                                      !
!                     G111_ROOM_NUMBER                                     !
!                     G111_DEPOSIT                                         !
!          In/Out:  G11_SS_Number                                          !
!                   G11_Last_Name                                          !
!                   G11_First_Name                                         !
!     Coded By:   Robin Fauntleroy                                         !
!     Date Last Modified:   July 10, 1985                                  !
!     Reason Modified:                                                     !
!                                                                          !
!     Module Description:                                                  !
!          This module will collect the information necessary to issue     !
!     a key and then update the files to reflect this information          !
!                                                                          !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 G111_AVAILABLE
       TEXT 1 L111_ANSWER
       TEXT 1 L111_FILLER
       TEXT 1 G111_FOUND
       TEXT 1 L111_DONE
       TEXT 10 G111_KEY_NUMBER
       TEXT 3 G111_BLD_NUMBER
       TEXT 4 G111_ROOM_NUMBER
       TEXT 5 L111_DEPOSIT.

DEFINE INTEGER L111_AMOUNT
       INTEGER G111_DEPOSIT.

LET L111_FILLER EQ " ".
LET G111_DEPOSIT EQ 2.
LET G111_FOUND EQ "F".
LET L111_DONE EQ "F".
LET G111_AVAILABLE EQ "F".
REPEAT
        PRINT " ".
        PRINT "Please enter 9-digit social security number,".
        PRINT "If not available, simply type a 0 (zero).  ".
        PRINT FMT $ "SSN:  "END.
        ACCEPT G11_SS_NUMBER.
        PRINT " ".
        PRINT "SSN:  " G11_SS_NUMBER.
        PRINT FMT $ "Is this correct? (Y/N)  "END.
        ACCEPT L111_ANSWER.
UNTIL L111_ANSWER EQ ('Y','y').
IF G11_SS_NUMBER EQ 0 THEN
        LET G111_FOUND EQ "F".
ELSE
        PRINT " ".
        CALL FIND_NAME.
ENDIF.
IF G111_FOUND EQ "F" THEN
        PRINT " ".
        PRINT "There is no corresponding record for that SSN.".
        REPEAT
                PRINT " ".
                PRINT FMT $ "Please enter issuee's last name:  "END.
                ACCEPT G11_LAST_NAME.
                PRINT " ".
                PRINT FMT $ "Please enter issuee's first name and middle initial
:  "END.
                ACCEPT G11_FIRST_NAME.
                PRINT " ".
                PRINT "LAST NAME:  " G11_LAST_NAME.
                PRINT "FIRST NAME:  " G11_FIRST_NAME.
                PRINT " ".
                PRINT FMT $ "Is this correct? (Y/N)  "END.
                ACCEPT L111_ANSWER.
        UNTIL L111_ANSWER EQ ('Y','y').
        LET G11_NAME EQ $TRIM(G11_FIRST_NAME) + L111_FILLER + $TRIM(G11_LAST_NAM
E).
ENDIF.
IF G11_SS_NUMBER EQ 0 THEN
        CALL FIND_SSN.
        IF G11_SS_NUMBER NEQ 0 THEN
                LET G111_FOUND EQ "T".
        ENDIF.
ENDIF.
REPEAT
        REPEAT
                PRINT " ".
                PRINT "Please enter building abbreviation,".
                PRINT "(maximum 3 characters).".
                PRINT FMT $ "Bldg:  "END.
                ACCEPT G111_BLD_NUMBER.
                PRINT " ".
                PRINT "Please enter room number,".
                PRINT "(maximum 4 characters).".
                PRINT FMT $ "Room No:  "END.
                ACCEPT G111_ROOM_NUMBER.
                PRINT " ".
                PRINT "Bldg:  "G111_BLD_NUMBER.
                PRINT "Room No:  " G111_ROOM_NUMBER.
                PRINT " ".
                PRINT FMT $ "Is this correct? (Y/N)  "END.
                ACCEPT L111_ANSWER.
        UNTIL L111_ANSWER EQ ('Y','y').
        CALL FIND_KEY_NUMBER.
        IF G111_AVAILABLE EQ "T" THEN
                PRINT " ".
                PRINT "Enter deposit amount".
                PRINT "If amount is other than standard, type in ".
                PRINT FMT $ "new amount, otherwise type a carriage return:  " EN
D.
                ACCEPT L111_DEPOSIT.
                LET L111_AMOUNT EQ $INT(L111_DEPOSIT).
                IF L111_AMOUNT GT 0 THEN
                        LET G111_DEPOSIT EQ L111_AMOUNT.
                ENDIF.
                PRINT " ".
                PRINT "The following record will be entered into the files: ".
                PRINT "Name: " G11_NAME.
                PRINT "Bldg & Room:  " G111_BLD_NUMBER G111_ROOM_NUMBER.
                PRINT "Key Number:  "G111_KEY_NUMBER.
                PRINT "Deposit Amt:  " G111_DEPOSIT.
                PRINT FMT $ "Is this correct?  (Y/N)  "END.
                ACCEPT L111_ANSWER.
                IF L111_ANSWER EQ ('Y','y') THEN
                        CALL UPDATE_NAME_FILES.
                ENDIF.
        ENDIF.
        PRINT " ".
        PRINT FMT $ "Do you have another entry for this individual (Y/N)  "END.
        ACCEPT L111_DONE.
UNTIL L111_DONE EQ "N".
RETURN.


FIND_KEY_NUMBER: @R1111_FIND_KEY_NUMBER.DMC
UPDATE_NAME_FILES: @R1112_UPDATE_NAME_FILES
FIND_NAME: @ R117_FIND_NAME.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                          !
!     Module Name:  1111 Find Key Number                                   !
!     Parameters:                                                          !
!          In Only: G111_BLD_NUMBER                                        !
!                   G111_ROOM_NUMBER                                       !
!          Out Only:                                                       !
!          In/Out:  G111_AVAILABILITY                                      !
!                   G111_Key_Number
!     Coded By:  Robin FauntLeRoy                                          !
!     Date Last Modified: 7/10/85                                          !
!     Reason Modified:                                                     !
!                                                                          !
!     Module Description:                                                  !
!          This module will check the locate file to determine if there     !
!     is a key that fits the appropriate room and building number given    !
!     by the user who wishes to be issued a key.                           !
!     If an appropriate key number is found, then Check_Inventory is       !
!     called to determine if there is a key available to be issued.        !
!                                                                          !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L1111_WAIT.

DBSET LOCATE.
FIND ALL.
SEARCH BLD CT $TRIM(G111_BLD_NUMBER).
SEARCH RN CT $TRIM(G111_ROOM_NUMBER).
IF SYSNREC EQ 1 THEN
        CALL CHECK_INVENTORY.
ELSE
        PRINT " ".
        PRINT "You have an invalid building and room combination.".
        PRINT "Please check your numbers.".
        PRINT FMT $ "(Type a carriage return <cr> to continue) " END.
        ACCEPT L1111_WAIT.
ENDIF.
RETURN.

CHECK_INVENTORY: @R11111_CHECK_INVENTORY.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name: 11111 Check Inventory                                     !
!     Parameters:                                                            !
!          In Only:                                                          !
!          Out Only:                                                         !
!          In/Out:  G111_Available                                           !
!          In/Out:  G111_Key_Number
!     Coded By:  Robin FauntLeRoy                                            !
!     Date Last Modified:  7/10/85                                           !
!     Reason Modified:                                                       !
!                                                                            !
!     Module Description:                                                    !
!          This module takes the key number found by Find_Key_Number         !
!     and checks to see if there is a key available to be issued.  If       !
!     there is, it decreases the quantity_on_hand by one and sets the       !
!     available flag to true.                                                !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
DEFINE TEXT 1 L11111_FOUND
       TEXT 1 L11111_WAIT.

LET G111_AVAILABLE EQ "F".
MAP TO INVEN VIA KIN.
IF SYSNREC EQ 1 THEN
        IF QON GT 0 THEN
                LET L11111_FOUND EQ "T".
                LET G111_KEY_NUMBER EQ KIN.
                CHANGE QON QON-1.
                LET G111_AVAILABLE EQ "T".
        ELSE
                PRINT " ".
                PRINT "There is an insufficient supply of that key ".
                PRINT "to issue one.  The key number will be sent to ".
                PRINT "the locksmith to order some additional made.".
        ENDIF.
ELSE
        PRINT " ".
        PRINT "That key has no record in the inventory file.".
        PRINT FMT $ "(Type a carriage return <cr> to continue) "END.
        ACCEPT L11111_WAIT.
ENDIF.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name:    1112 Update Name Files                                 !
!     Parameters:                                                            !
!          In Only:  G111_Key_Number                                         !
!          Out Only:                                                         !
!          In/Out:  G111_Ind_Name                                            !
!                   G11_SS_Number                                            !
!     Coded By:  Robin FauntLeRoy                                            !
!     Date Last Modified:  7/11/85                                           !
!     Reason Modified:                                                       !
!     Module Description:                                                    !
!           This module will add information to the Ind_Record file and     !
!     the Name file (if necessary) to reflect a recent key issue             !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


IF G11_SS_NUMBER LT 0 THEN
        CALL FIND_SSN.
ENDIF.
IF G111_FOUND NEQ "T" THEN
        IF G11_SS_NUMBER EQ 0 THEN
                DBSET DUMMY_SS.
                FIND ALL.
                LET G11_SS_NUMBER EQ SSN.
                CHANGE SSN SSN-1.
        ENDIF.
        DBSET NAME.
        ADD SSN G11_SS_NUMBER LNM G11_LAST_NAME FNM G11_FIRST_NAME.
ENDIF.
DBSET IND_RECORD.
ADD SSN G11_SS_NUMBER KIN G111_KEY_NUMBER DEP G111_DEPOSIT.
CALL BOOKKEEPING.

RETURN.

BOOKKEEPING: @R115_BOOKKEEPING.DMC
FIND_SSN: @R116_FIND_SSN.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name:  112 Return Key                                          !
!     Parameters:                                                           !
!          In Only:                                                         !
!          In/Out:  G11_SS_Number                                          !
!                      G11_First_Name                                      !
!                      G11_Last_Name                                       !
!          Out Only: G112_Key_Number                                        !
!     Coded By:   Robin FauntLeRoy                                          !
!     Date Last Modified: 7/11/85                                           !
!     Reason Modified:                                                      !
!                                                                           !
!     Module Description:                                                   !
!          This module checks the files for the ssn and key number          !
!     for an individual who is returning a key                              !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


DEFINE TEXT 10 G112_KEY_NUMBER
       TEXT 1 L112_DONE
       TEXT 1 L112_ANSWER.

LET SYSCASE EQ 1.
LET G111_FOUND EQ "F".
LET G11_SS_NUMBER EQ 0.
LET L112_DONE EQ "Y".
REPEAT
        PRINT " ".
        PRINT FMT $ "Please enter SSN or a 0 <zero> if not available:  "END.
        ACCEPT G11_SS_NUMBER.
        PRINT " ".
        PRINT "SSN:  "G11_SS_NUMBER.
        PRINT FMT $ "Is this correct? (Y/N)  "END.
        ACCEPT L112_ANSWER.
UNTIL L112_ANSWER EQ ('Y','y').
IF G11_SS_NUMBER NEQ 0 THEN
        PRINT " ".
        CALL FIND_NAME.
ENDIF.
IF G111_FOUND NEQ "T" THEN
       LET G11_SS_NUMBER EQ 0.
        REPEAT
                PRINT " ".
                PRINT "Please enter the individual's last name.  ".
                PRINT FMT $ "Last Name:  "END.
                ACCEPT G11_LAST_NAME.
                PRINT " ".
                PRINT  "Please enter indivdual's first name ".
                PRINT " and middle initial if known.  ".
                PRINT FMT $ "First Name:  "END.
                ACCEPT G11_FIRST_NAME.
                PRINT " ".
                PRINT "Last Name:  " G11_LAST_NAME.
                PRINT "First Name:  " G11_FIRST_NAME.
                PRINT FMT $ "Is this correct? (Y/N)  "  END.
                ACCEPT L112_ANSWER.
        UNTIL L112_ANSWER EQ ('Y','y').
        CALL FIND_SSN.

ENDIF.
IF G11_SS_NUMBER EQ 0 THEN
        PRINT " ".
        PRINT "There is no record for that individual".
        PRINT "This operation is aborted.".
        PRINT  FMT $ "(Type carriage return <cr> to continue)  ."END.
        ACCEPT L112_ANSWER.
ELSE
REPEAT
        REPEAT
                PRINT " ".
                PRINT "Enter the key number of the returned key.  ".
                PRINT FMT $ "Key Number:  "END.
                ACCEPT G112_KEY_NUMBER.
                PRINT " ".
                PRINT "Key Number:  " G112_KEY_NUMBER.
                PRINT FMT $ "Is this correct? (Y/N)  "END.
                ACCEPT L112_ANSWER.
        UNTIL L112_ANSWER EQ ('Y','y').
        CALL CHECK_ALL_NAMES.
        PRINT " ".
        PRINT FMT $ "Do you have more keys to return for this individual? (Y/N)
 "END.
        ACCEPT L112_DONE.
UNTIL L112_DONE EQ "N".
ENDIF.
RETURN.

CHECK_ALL_NAMES: @R1121_CHECK_ALL_NAMES.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name:     1121 CHECK ALL NAMES                                 !
!     Parameters:                                                           !
!          In Only:                                                         !
!          Out Only:     G1121_DELETE_FLAG                                  !
!                        G1121_DEPOSIT                                      !
!          In/Out:                                                          !
!     Coded By:        ROBIN FAUNTLEROY                                     !
!     Date Last Modified:   JULY 17, 1985                                   !
!     Reason Modified:                                                      !
!                                                                           !
!     Module Description:                                                   !
!          This module will check to see if that individual who is          !
!     returning a key has only one key, if so it will set a flag to check   !
!     to delete the corresponding record in the name file, if it exists     !
!     there.  Also, it will find the appropriate record to delete in the    !
!     individual record file.                                               !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


DEFINE TEXT 1 G1121_DELETE_FLAG
       TEXT 1 L1121_WAIT
       TEXT 1 L1121_FOUND.
DEFINE INTEGER G1121_DEPOSIT.


LET L1121_FOUND EQ "F".
DBSET IND_RECORD.
FIND ALL.
FIND SSN EQ G11_SS_NUMBER.
IF SYSNREC EQ 1 THEN
        IF KIN EQ G112_KEY_NUMBER THEN
                LET G1121_DELETE_FLAG EQ "T".
                LET L1121_FOUND EQ "T".
        ENDIF.
ELSE
        SEARCH KIN EQ G112_KEY_NUMBER.
        IF SYSNREC NEQ 0 THEN
                LET L1121_FOUND EQ "T".
        ENDIF.
ENDIF.
IF L1121_FOUND EQ "T" THEN
        LET G111_DEPOSIT EQ -1*DEP.
        CALL BOOKKEEPING.
        CALL DELETE_FILES.
        CALL INCREASE_KEY_AVAILABLE.
ELSE
        PRINT "The record corresponding to that individual and ".
        PRINT "key number could not be located.".
        PRINT FMT $ "(type carriage return <cr> to continue)  "END.
        ACCEPT L1121_WAIT.
ENDIF.
RETURN.

DELETE_FILES: @R11211_DELETE_FILES.DMC
INCREASE_KEY_AVAILABLE: @R11212_INCREASE_KEY_AVAILABLE.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name:   11211 Delete Files                                     !
!     Parameters:                                                           !
!          In Only:     G112_key_number                                     !
!          Out Only:                                                        !
!          In/Out:                                                          !
!     Coded By:   Robin FauntLeroy                                          !
!     Date Last Modified:   7/18/85                                         !
!     Reason Modified:                                                      !
!                                                                           !
!     Module Description:                                                   !
!          This module will delete the appropriate files, after an          !
!     individual has returned a key.                                        !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


DEFINE TEXT 1 L11211_RESPONSE
       TEXT 3 L11211_BLD_NUMBER
       TEXT 4 L11211_RM_NUMBER.

DBSET LOCATE.
FIND ALL.
FIND KIN EQ G112_KEY_NUMBER.
LET L11211_BLD_NUMBER EQ BLD.
LET L11211_RM_NUMBER EQ RN.
DBSET IND_RECORD.
PRINT " ".
PRINT "The following record will be deleted from the files:".
PRINT "Name:  "G11_NAME.
PRINT "Key Number:  "G112_KEY_NUMBER.
PRINT "Bldg:  "L11211_BLD_NUMBER.
PRINT "Room Num:  "L11211_RM_NUMBER.
PRINT DEP FORMAT "Deposit Amount:  "F$3.2 END.
PRINT " ".
PRINT FMT $ "Is this correct? (Y/N)  "END.
ACCEPT L11211_RESPONSE.
IF L11211_RESPONSE EQ ('Y','y') THEN
        PRINT "The record has been deleted.".
        DELETE.
        IF G1121_DELETE_FLAG EQ "T" THEN
                DBSET NAME.
                FIND ALL.
                FIND SSN EQ G11_SS_NUMBER.
                DELETE.
        ENDIF.
ENDIF.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name:  11212 Increase Key Available                            !
!     Parameters:                                                           !
!          In Only:  g112_key_number                                        !
!          Out Only:                                                        !
!          In/Out:                                                          !
!     Coded By:      Robin FauntLeRoy                                       !
!     Date Last Modified:    7/15/85                                        !
!     Reason Modified:                                                      !
!                                                                           !
!     Module Description:                                                   !
!          This module update the inventory file to reflect the return      !
!     of a key.                                                             !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


DBSET INVEN.
FIND ALL.
FIND KIN EQ G112_KEY_NUMBER.
CHANGE QON QON+1.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                         !
!     Module Name: 113 Distribute Info                                    !
!     Parameters:                                                         !
!          In Only: none                                                  !
!          Out Only: none                                                 !
!          In/Out: none                                                   !
!     Coded By: Robin FauntLeRoy                                          !
!     Date Last Modified: July 12, 1985                                   !
!     Reason Modified:                                                    !
!                                                                         !
!     Module Description:                                                 !
!          The module is the main controlling module for the distribute   !
!     info section and displays a menu to allow the user to choose        !
!     what infomation is wanted.  It passes no parameters and calls       !
!     modules depending upon the user choice.                             !
                                                                   !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L113_INFO_MENU_CHOICE.


REPEAT
        REPEAT
        PUSH USING BL
        POP END.
        PRINT "          ******************************************************
*****".
        PRINT "          *
    *".
        PRINT "          *                  INFORMATION ACCESS MENU
    *".
        PRINT "          *
    *".
        PRINT "          ******************************************************
*****".
        PRINT "          *
    *".
        PRINT "          *        Enter information topic option:
    *".
        PRINT "          *          A  Keyholder Information
    *".
        PRINT "          *          B  Key Number Information
    *".
        PRINT "          *          C  Building and Room Number Information
    *".
        PRINT "          *          D  Information on Keys Held
    *".
        PRINT "          *          E  Key Inventory Information
    *".
        PRINT "          *          F  Daily Cash Balance
    *".
        PRINT "          *          G  Exit
    *".
        PRINT "          *
    *".
        PRINT "          ******************************************************
*****".

        PRINT FMT $ "Enter Choice:  " END.
        ACCEPT L113_INFO_MENU_CHOICE.

        IF L113_INFO_MENU_CHOICE NEQ ('A','a','B','b','C','c','D','d','E','e','F
','f','G','g') THEN
```

```
                PRINT "Invalid Choice, please try again.".
        ENDIF.
        UNTIL L113_INFO_MENU_CHOICE EQ ('A','a','B','b','C','c','D','d','E','e',
'F','f','G','g').
        IF L113_INFO_MENU_CHOICE EQ ('A','a') THEN
                CALL DISPLAY_OWNER.
        ELSEIF L113_INFO_MENU_CHOICE EQ ('B','b') THEN
                CALL DISPLAY_KEY_NUMBER.
        ELSEIF L113_INFO_MENU_CHOICE EQ ('C','c') THEN
                CALL DISPLAY_LOCATION.
        ELSEIF L113_INFO_MENU_CHOICE EQ ('D','d') THEN
                CALL DISPLAY_HOLDER_KEYS.
        ELSEIF L113_INFO_MENU_CHOICE EQ ('E','e') THEN
                CALL DISPLAY_INVENTORY.
        ELSEIF L113_INFO_MENU_CHOICE EQ ('F','f') THEN
                CALL DISPLAY_DEPOSIT.
        ELSE
                PRINT " ".

        ENDIF.
UNTIL L113_INFO_MENU_CHOICE EQ ('G','g').
RETURN.

DISPLAY_OWNER: @R1131_DISPLAY_OWNER.DMC
DISPLAY_KEY_NUMBER: @R1132_DISPLAY_KEY_NUMBER.DMC
DISPLAY_LOCATION: @R1133_DISPLAY_LOCATION.DMC
DISPLAY_DEPOSIT: @R1134_DISPLAY_DEPOSIT.DMC
DISPLAY_INVENTORY: @R1135_DISPLAY_INVENTORY.DMC
DISPLAY_HOLDER_KEYS: @R1136_DISPLAY_HOLDER.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name:  1131 Display Owner                                       !
!     Parameters:                                                            !
!          In Only:  G11_NAME                                                !
!                    G11_SS_NUMBER                                           !
!          Out Only:  none                                                   !
!          In/Out:  none                                                     !
!     Coded By:  Robin FauntLeRoy                                            !
!     Date Last Modified:  7/12/85                                           !
!     Reason Modified:                                                       !
!                                                                            !
!     Module Description:                                                    !
!          This module will display all individual who have a certain        !
!     key.  The user is prompted for either the building and room            !
!     number for which he wishes information, or the key number, and         !
!     will then see displayed a list of all those individuals who have       !
!     been issued that key.                                                  !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L1131_MENU_CHOICE
       TEXT 3 L1131_BLD_NUMBER
       TEXT 4 L1131_ROOM_NUMBER
       TEXT 1 L1131_RESPONSE
       TEXT 10 L1131_KEY
       TEXT 1 L1131_WAIT
       TEXT 10 L1131_KEY_NUMBER.

DEFINE INTEGER L1131_COUNT
       INTEGER L1131_SOC
       INTEGER L1131_SS_TEMP
       INTEGER L1131_TEMP_CTR
       INTEGER L1131_TOTAL.


LET L1131_RESPONSE EQ "N".
REPEAT
        REPEAT
                PUSH USING BL
                POP END.
                PRINT "          ***********************************************
**************".
                PRINT "          *
            *".
                PRINT "          *             KEYHOLDER INFORMATION MENU
            *".
                PRINT "          *
            *".
                PRINT "          ***********************************************
**************".
                PRINT "          *
            *".
                PRINT "          *     Enter option for which you have informati
on:         *".
                PRINT "          *          A  Building and room number
            *".
                PRINT "          *          B  Key numbers
            *".
                PRINT "          *          C  Exit
            *".
                PRINT "          *
            *".
```

```
                PRINT "           ***********************************************
.*************".
                PRINT " ".
                PRINT FMT $ "Please enter menu choice.  "END.
                ACCEPT L1131_MENU_CHOICE.
                IF L1131_MENU_CHOICE NEQ ('A','a','B','b','C','c') THEN
                        PRINT "Invalid choice,  Please try again.".
                ENDIF.
        UNTIL L1131_MENU_CHOICE EQ ('A','a','B','b','C','c').
IF L1131_MENU_CHOICE EQ ('A','a') THEN
REPEAT
        REPEAT
                PRINT " ".
                PRINT "Please enter the building abbreviation".
                PRINT "(maximum 3 characters):".
                PRINT FMT $ "Bldg:  "END.
                ACCEPT L1131_BLD_NUMBER.
                PRINT " ".
                PRINT "Please enter the room number  ".
                PRINT "(maximum 4 characters):".
                PRINT FMT $ "Room No:  "END.
                ACCEPT L1131_ROOM_NUMBER.
                PRINT " ".
                PRINT "Bldg:  "L1131_BLD_NUMBER.
                PRINT "Room No:  "L1131_ROOM_NUMBER.
                PRINT FMT $ "Is this correct? (Y/N)  "END.
                ACCEPT L1131_WAIT.
        UNTIL L1131_WAIT EQ ('Y','y').
        DBSET LOCATE.
        FIND ALL.
        SEARCH BLD EQ L1131_BLD_NUMBER.
        SEARCH RN EQ L1131_ROOM_NUMBER.
        IF SYSNREC EQ 0 THEN
                PRINT " ".
                PRINT "You have an invalid building and room number ".
        ELSEIF SYSNREC EQ 1 THEN
                MAP IND_RECORD VIA KIN.
                IF SYSNREC EQ 0 THEN
                        PRINT " ".
                        PRINT "No one has been issued that key number.".
                ELSE
                REPEAT
                        GETREC LEAVE.
                        LET G11_SS_NUMBER EQ SSN.
                        CALL FIND_NAME.
                UNTIL SYSNREC EQ 0.
                ENDIF.
        ELSE
        REPEAT
                GETREC LEAVE.
                MAP IND_RECORD VIA KIN.
                REPEAT
                        GETREC LEAVE.
                        LET G11_SS_NUMBER EQ SSN.
                        CALL FIND_NAME.
                UNTIL SYSNREC EQ 0.
        UNTIL SYSNREC EQ 0.
        ENDIF.
        PRINT " ".
        PRINT FMT $ "Do you have another request? (Y/N)  "END.
        ACCEPT L1131_RESPONSE.
UNTIL L1131_RESPONSE EQ ('N','n').
ELSEIF L1131_MENU_CHOICE EQ ('B','b') THEN
REPEAT
        LET L1131_COUNT EQ 0.
        REPEAT
```

```
                PRINT " ".
                PRINT "Please enter a key number or a 'q' to  ".
                PRINT "indicate no more keys. If no names appear ".
                PRINT "then no one has been issued that group of keys.".
                PRINT FMT $ "Key Number:  "END.
                ACCEPT L1131_KEY_NUMBER.
                IF L1131_KEY_NUMBER NEQ ('Q','q') THEN
                        LET L1131_COUNT EQ L1131_COUNT + 1.
                        DBSET IND_RECORD.
                        FIND KIN EQ L1131_KEY_NUMBER.
                        IF SYSNREC GT 0 THEN
                                IF L1131_COUNT EQ 1 THEN
                                        LET L1131_TOTAL EQ SYSNREC.
                                ENDIF.
                                REPEAT
                                        GETREC LEAVE.
                                        LET L1131_SOC EQ SSN.
                                        LET L1131_KEY EQ KIN.
                                        DBSET HOLDER.
                                        FIND ALL.
                                        ADD SNS L1131_SOC KN L1131_KEY.
                                UNTIL SYSNREC EQ 0.
                        ENDIF.
                ENDIF.
        UNTIL L1131_KEY_NUMBER EQ ('Q','q').
        DBSET HOLDER.
        FIND ALL.
        IF SYSNREC EQ 0 THEN
                PRINT " ".
                PRINT "There is no one who has all those keys issued to them".
        ELSE
                LET L1131_TEMP_CTR EQ 0.
                REPEAT
                        FIND ALL.
                        LET L1131_TEMP_CTR EQ L1131_TEMP_CTR + 1.
                        GETREC LEAVE L1131_TEMP_CTR.
                        LET L1131_SS_TEMP EQ SNS.
                        FIND ALL.
                        SEARCH SNS EQ L1131_SS_TEMP.
                        IF SYSNREC EQ L1131_COUNT THEN
                                LET G11_SS_NUMBER EQ L1131_SS_TEMP.
                                CALL FIND_NAME.
                        ENDIF.
                UNTIL L1131_TEMP_CTR EQ L1131_TOTAL.
        ENDIF.
        DBSET HOLDER.
        FIND ALL.
        DELETE.
        PRINT FMT $ "Do you have another request? (Y/N)  "END.
        ACCEPT L1131_RESPONSE.
UNTIL L1131_RESPONSE EQ ('N','n').
ELSE
                PRINT " ".
ENDIF.
UNTIL L1131_MENU_CHOICE EQ ('C','c').
RETURN.

@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                         !
!     Module Name:   1132 Display Key Number                              !
!     Parameters:                                                         !
!          In Only:  none                                                 !
!          Out Only:  none                                                !
!          In/Out:  none                                                  !
!     Coded By:  Robin FauntLeRoy                                         !
!     Date Last Modified:  7/12/85                                        !
!     Reason Modified:                                                    !
!                                                                         !
!     Module Description:                                                 !
!          This module will take a building number and room number        !
!     and displays the keys that will open that door.                     !
!                                                                         !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 3 L1132_BLD_NUMBER
       TEXT 1 L1132_WAIT
       TEXT 4 L1132_ROOM_NUMBER.

LET L1132_WAIT EQ "N".
REPEAT
        PRINT " ".
        PRINT "Please enter the building abbreviation".
        PRINT "( maximum 3 characters)  ".
        PRINT FMT $ "Bldg:  "END.
        ACCEPT L1132_BLD_NUMBER.
        PRINT " ".
        PRINT "Please enter the room number".
        PRINT "( maximum 4 characters)  ".
        PRINT FMT $ "Room No:  "END.
        ACCEPT L1132_ROOM_NUMBER.
        DBSET LOCATE.
        FIND ALL.
        SEARCH BLD EQ L1132_BLD_NUMBER.
        SEARCH RN EQ L1132_ROOM_NUMBER.
        IF SYSNREC NEQ 0 THEN
                PRINT " ".
                PRINT BLD RN KIN.
        ELSE
                PRINT " ".
                PRINT "That is an invalid building and room number.".
        ENDIF.
        PRINT " ".
        PRINT FMT $ "Do you have another request? (Y/N)  "END.
        ACCEPT L1132_WAIT.
UNTIL L1132_WAIT EQ ('N','n').
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name:  1133 Display Location                                    !
!     Parameters:                                                            !
!          In Only:   none                                                   !
!          Out Only:   none                                                  !
!          In/Out:  none                                                     !
!     Coded By:  Robin FauntLeRoy                                            !
!     Date Last Modified:  7/12/85                                           !
!     Reason Modified:                                                       !
!                                                                            !
!     Module Description:                                                    !
!          This module, given a key number will display the location         !
!     of the building and room that that key opens                           !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 10 L1133_KEY_NUMBER
      TEXT 1 L1133_WAIT.

LET L1133_WAIT EQ "N".
REPEAT
        PRINT " ".
        PRINT "Please enter the key number.".
        PRINT FMT $ "Key Number:  "END.
        ACCEPT L1133_KEY_NUMBER.
        DBSET LOCATE.
        FIND ALL.
        FIND KIN EQ L1133_KEY_NUMBER.
        IF SYSNREC NEQ 0 THEN
                PRINT " ".
                PRINT KIN BLD RN.
        ELSE
                PRINT " ".
                PRINT "That is an invalid key number.".
        ENDIF.
        PRINT " ".
        PRINT FMT $ "Do you have another request? (Y/N)  "END.
        ACCEPT L1133_WAIT.
UNTIL L1133_WAIT EQ ('N','n').
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                         !
!     Module Name:  1134 Display Deposit                                  !
!     Parameters:                                                         !
!          In Only:  none                                                 !
!          Out Only:  none                                                !
!          In/Out:  none                                                  !
!     Coded By:  Robin FauntLeRoy                                         !
!     Date Last Modified:  7/12/85                                        !
!     Reason Modified:                                                    !
!                                                                         !
!     Module Description:                                                 !
!          This module will print out the total of the amount in the      !
!     the checkbook file.  This file maintains a running total of the     !
!     deposit amount.  It also provides the user with a method of zero'ing !
!     out the total to start another days total.                          !
!                                                                         !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L1134_CLEAR
       TEXT 1 L1134_WAIT.

DBSET CHECKBOOK.
FIND ALL.
PRINT " ".
PRINT "Deposit Total".
PRINT BAL*100 FORMAT 3X I$5..2 END.
PRINT " ".
PRINT FMT $ "Do you wish to have the total cleared? (Y/N)  "END.
ACCEPT L1134_CLEAR.
IF L1134_CLEAR EQ ('Y','y') THEN
        CHANGE BAL 0.
        PRINT "Deposit total is now $0.00.".
ENDIF.
PRINT " ".
PRINT FMT $  "Type a carriage return <cr> to continue  "END.
ACCEPT L1134_WAIT.
RETURN.
@
```

```
` !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
  !                                                                           !
  !     Module Name:  1135 Display Inventory                                  !
  !     Parameters:                                                           !
  !          In Only:  none                                                   !
  !          Out Only:  none                                                  !
  !          In/Out:  none                                                    !
  !     Coded By:  Robin FauntLeRoy                                           !
  !     Date Last Modified:  7/12/85                                          !
  !     Reason Modified:                                                      !
  !                                                                           !
  !     Module Description:                                                   !
  !          This module will prompt the user for the key number for          !
  !     which the inventory information is requested.  It will then         PRINT
      !
  !     the information to the screen.                                        !
  !                                                                           !
  !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 10 L1135_KEY_NUMBER
       TEXT 1 L1135_WAIT.

DEFINE INTEGER L1135_TOTAL_OUT.

LET L1135_WAIT EQ "N".
REPEAT
        PRINT "Please enter the Key Number.".
        PRINT FMT $ "Key Number:  "END.
        ACCEPT L1135_KEY_NUMBER.
        DBSET INVEN.
        FIND ALL.
        FIND KIN EQ L1135_KEY_NUMBER.
        IF SYSNREC EQ 1 THEN
                LET L1135_TOTAL_OUT EQ TN-QON.
                PRINT " ".
                PRINT "KEY NUMBER     QUANTITY ON HAND     TOTAL OUT     TOTAL N
UMBER".
                PRINT "__________     ________________     _________     _______
_____".
                PRINT " ".
                PRINT KIN QON L1135_TOTAL_OUT TN FORMAT I10 10X I3 16X I3 12X I3
 END.
                PRINT " ".
        ELSE
                PRINT " ".
                PRINT "Invalid key number given.".
        ENDIF.
        PRINT " ".
        PRINT FMT $ "Do you have another request? (Y/N)  "END.
        ACCEPT L1135_WAIT.
UNTIL L1135_WAIT EQ ('n','N').
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                             !
!     Module Name:   1136 Display Holder                                      !
!     Parameters:                                                             !
!          In Only:                                                           !
!          Out Only:                                                          !
!          In/Out:  G11_SS_Number                                             !
!                   G11_Last_Name                                             !
!                   G11_First_Name                                            !
!     Coded By:  Robin FauntLeRoy                                             !
!     Date Last Modified:   7/16/85                                           !
!     Reason Modified:                                                        !
!                                                                             !
!     Module Description:                                                     !
!          This module will determine which individual the user is            !
!     requesting the information for, and then display all keys that          !
!     that user has issued to him.                                            !
!                                                                             !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


DEFINE TEXT 9 L1136_RESPONSE
       TEXT 1 L1136_AGAIN
       TEXT 1 L1136_ANSWER.


LET L1136_AGAIN EQ "N".
REPEAT
        LET G11_SS_NUMBER EQ 0.
        PRINT " ".
        PRINT "Please enter the individual's SSN. ( 9 digits ).".
        PRINT FMT $ "( or a carriage return <cr> if none )  "END.
        ACCEPT L1136_RESPONSE.
        IF $INT(L1136_RESPONSE) NEQ 0 THEN
                LET G11_SS_NUMBER EQ $INT(L1136_RESPONSE).
                CALL FIND_NAME.
        ELSE
                REPEAT
                        PRINT " ".
                        PRINT "Please enter the individual's last name. ".
                        PRINT FMT $ "Last Name:  "END.
                        ACCEPT G11_LAST_NAME.
                        PRINT " ".
                        PRINT "Please enter the individual's first name. ".
                        PRINT FMT $ "First Name:  "END.
                        ACCEPT G11_FIRST_NAME.
                        PRINT " ".
                        PRINT "LAST NAME:  "G11_LAST_NAME.
                        PRINT "FIRST NAME:  "G11_FIRST_NAME.
                        PRINT FMT $ "Is this correct? (Y/N)  "END.
                        ACCEPT L1136_ANSWER.
                UNTIL L1136_ANSWER EQ ('Y','y').
                CALL FIND_SSN.
        ENDIF.
        IF G11_SS_NUMBER NEQ 0 THEN
        DBSET IND_RECORD.
        FIND ALL.
        FIND SSN EQ G11_SS_NUMBER.
                IF SYSNREC NEQ 0 THEN
                        PRINT " ".
                        PRINT "Key Number     Date Out     Deposit Amount".
                        PRINT "__________     ________     ______________".
                        PRINT " ".
                        PRINT KIN DO DEP FORMAT A 6X D3 5X F$3.2 END.
                ELSE
                        PRINT " ".
                        PRINT "That individual does not have any keys issued to
him.".
                ENDIF.
        ELSE
                PRINT " ".
                PRINT "That individual does not have any keys issued to him.".
        ENDIF.
        PRINT " ".
        PRINT FMT $ "Do you have another request? (Y/N)  "END.
        ACCEPT L1136_AGAIN.
UNTIL L1136_AGAIN EQ ('n','N').
RETURN.

@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                          !
!     Module Name:  114 Gen Corres                                         !
!     Parameters:                                                          !
!          In Only:      none                                              !
!          Out Only:     none                                              !
!          In/Out:     G11_SS_Number                                       !
!                      G11_Name                                            !
!                      G11_Last_Name                                       !
!                      G11_First_Name                                      !
!     Coded By:   Robin FauntLeRoy                                         !
!     Date Last Modified: 7/12/85                                          !
!     Reason Modified:                                                     !
!                                                                          !
!     Module Description:                                                  !
!          This module is the controlling module for the correspondence    !
!     section of the system.                                               !
!                                                                          !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L114_CHOICE.

REPEAT
        PUSH USING BL
        POP END.
        PRINT " ".
        PRINT " The following types of correspondence are available:".
        PRINT " ".
        PRINT "    L:  Letter".
        PRINT "    R:  Report".
        PRINT "    Q:  Quit".
        PRINT " ".
        PRINT FMT $ "Please enter choice:  "END.
        ACCEPT L114_CHOICE.
        IF L114_CHOICE EQ ('L','l') THEN
                CALL GENERATE_LETTERS.
        ELSEIF L114_CHOICE EQ ('R','r') THEN
                CALL GENERATE_REPORTS.
        ELSEIF L114_CHOICE EQ ('Q','q') THEN
                PRINT " ".
        ELSE
                PRINT "Invalid choice, please try again.".
        ENDIF.
UNTIL L114_CHOICE EQ ('Q','q').
RETURN.


GENERATE_LETTERS: @R1141_GEN_LETTERS.DMC
GENERATE_REPORTS: @R1142_GEN_REPORTS.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                       !
!     Module Name:      1141 Gen Letters                                !
!     Parameters:                                                       !
!          In Only:  none                                               !
!          Out Only:   none                                             !
!          In/Out:  G11_SS_Number                                       !
!                   G11_Name                                            !
!                   G11_First_Name                                      !
!                   G11_Last_Name                                       !
!     Coded By:   Robin FauntLeRoy                                      !
!     Date Last Modified:  7/12/85                                      !
!     Reason Modified:                                                  !
!                                                                       !
!     Module Description:                                               !
!          This module determines whether the user wants to generate    !
!     student letters or personnel letters and then calls the appropriate  !
!     modules.                                                          !
!                                                                       !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L1141_MENU_CHOICE.


REPEAT
        PRINT " ".
        PRINT "The following types of letters are available:".
        PRINT "  S:   Student".
        PRINT "  P:   Personnel".
        PRINT "  Q:   Quit".
        PRINT " ".
        PRINT FMT $ "Please enter choice:  "END.
        ACCEPT L1141_MENU_CHOICE.
        IF L1141_MENU_CHOICE EQ ('S','s') THEN
                CALL GEN_STUDENT_LETTERS.
                CALL PRINT_LETTERS.
        ELSEIF L1141_MENU_CHOICE EQ ('P','p') THEN
                CALL GEN_PERSONNEL_LETTERS.
                CALL PRINT_LETTERS.
        ELSEIF L1141_MENU_CHOICE EQ ('Q','q') THEN
                PRINT "Leaving letter generation".
        ELSE
                PRINT "Invalid choice, please try again.".
ENDIF.
UNTIL L1141_MENU_CHOICE EQ ('Q','q').
RETURN.


GEN_STUDENT_LETTERS: @R11411_GEN_STU_LETTERS.DMC
GEN_PERSONNEL_LETTERS: @R11412_GEN_PER_LETTERS.DMC
PRINT_LETTERS: @R11413_PRINT_LETTERS.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name:   11411_Gen_Per_letters                                   !
!     Parameters:                                                            !
!          In Only:                                                          !
!          Out Only:                                                         !
!          In/Out:                                                           !
!     Coded By:  Robin FauntLeRoy                                            !
!     Date Last Modified:   8/04/85                                          !
!     Reason Modified:                                                       !
!                                                                            !
!     Module Description:                                                    !
!          This module will determine which students are intending to        !
!     graduate during the quarter indicated and have keys issued to them.    !
!     It will generate a letter to each one, requesting the return of the    !
!     keys which have been issued to each.                                   !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


DEFINE TEXT 20 L11411_ADD
       TEXT 1 L11411_RESPONSE
       TEXT 1 L11411_FOUND
       TEXT 18 L11411_CITY
       TEXT 3 L11411_SEARCH
       TEXT 1 L11411_WAIT
       TEXT 30 L11411_NAME
       TEXT 2 L11411_STATE
       TEXT 6 L11411_ZIP.

DEFINE INTEGER L11411_QUARTER
       INTEGER L11411_SSN.
PRINT " ".
PRINT "This process may take some time.".
PRINT FMT $ "Do you wish to continue? (Y/N)  "END.
ACCEPT L11411_RESPONSE.
IF L11411_RESPONSE EQ ('Y','y') THEN
REPEAT
        PUSH USING BL
        POP END.
        PRINT " ".
        PRINT "         ______________________________".
        PRINT "                    QUARTER            ".
        PRINT "         ------------------------------".
        PRINT "                   1 - FALL ".
        PRINT "                   2 - WINTER".
        PRINT "                   3 - SPRING".
        PRINT "                   4 - SUMMER".
        PRINT "         ------------------------------".
        PRINT " ".
        PRINT "Please choose the quarter you would like your  ".
        PRINT "letters of graduation based upon".
        PRINT FMT $ "Quarter:  "END.
        ACCEPT L11412_QUARTER.
UNTIL L11412_QUARTER LE 4 AND L11412_QUARTER GT 0.
LET L11411_FOUND EQ "F".
DBSET GRAD.
FIND ALL.
LET L11411_SEARCH EQ ($RIGHT($TEXTR($YEAR(SYSDATE)),2) + $RIGHT($TEXTR(L11412_QU
ARTER),1)).
FIND EGD_DATE EQ L11411_SEARCH.
IF SYSNREC EQ 0 THEN
        PRINT " ".
        PRINT "No one is graduating that quarter."
        PRINT "No one is graduating that quarter.".
ELSE
        INIT 7 STU.LST.
        REPEAT.
                GETREC LEAVE.
                LET L11411_NAME EQ NAME.
                LET L11411_ADD EQ L_STR.
                LET L11411_CITY EQ L_CITY.
                LET L11411_STATE EQ L_STATE.
                LET L11411_ZIP EQ L_ZIP.
                LET L11411_SSN EQ $INT(SSNO).
                DBSET IND_RECORD.
                FIND ALL.
                FIND SSN EQ L11411_SSN.
PRINT "IN IND_REC".
PRINT ALL.
                IF SYSNREC GT 0 THEN
                        LET L11411_FOUND EQ "T".
                        PRINT ON 7 FMT ///// END.
                        PRINT ON 7 L11411_NAME.
                        PRINT ON 7 L11411_ADD.
                        PRINT ON 7 L11411_CITY L11411_STATE L11411_ZIP.
                        PRINT ON 7 SYSDATE FMT /// D2 /// END.
                        PRINT ON 7 FMT / "Dear Student/University Employee," / E
ND.
                        PRINT ON 7 FMT $ "It has come to our attention "END.
                        PRINT ON 7  "that you will soon be leaving ".
                        PRINT ON 7 FMT $ "the University system, and that " END.
                        PRINT ON 7 "you still possess one or ".
                        PRINT ON 7 FMT $ "more keys from the Physical Plant.  "E
ND.
                        PRINT ON 7 "Please return these to ".
                        PRINT ON 7 FMT $ "the Physical Plant prior to "END.
                        PRINT ON 7 "leaving and your deposit will ".
                        PRINT ON 7 FMT $ "be refunded.  The keys we "END.
                        PRINT ON 7 FMT "show that you have are:" / / END.
                        PRINT ON 7 KIN FMT 10X A10 END.
                        PRINT ON 7 FMT // "Thank you for your cooperation."END.
                        PRINT ON 7 FMT // "University of Montana Physical Plant"
 / C1 END.
                 ENDIF.
        UNTIL SYSNREC EQ 0.
        IF L11411_FOUND EQ "F" THEN
                PRINT " ".
                PRINT "None of the individuals who were terminating had keys".
        ELSE
                PRINT " ".
                PRINT "The letters have been generated and can be picked up ".
                PRINT "at the Computer Center tomorrow.".
        ENDIF.
ENDIF.
PRINT " ".
PRINT FMT $ "Type a carriage return <cr> to continue:  "END.
ACCEPT L11411_WAIT.
ENDIF.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name:   11412_Gen_Per_letters                                   !
!     Parameters:                                                            !
!          In Only:                                                          !
!          Out Only:                                                         !
!          In/Out:                                                           !
!     Coded By:  Robin FauntLeRoy                                            !
!     Date Last Modified:   8/02/85                                          !
!     Reason Modified:                                                       !
!                                                                            !
!     Module Description:                                                    !
!          This module will determine those individuals employed for the     !
!     university, who are terminated and have keys issued to them.  This     !
!     information will be placed in a list to be printed.                    !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


DEFINE TEXT 20 L11412_1ADD
       TEXT 1 L11412_FOUND
       TEXT 20 L11412_2ADD
       TEXT 1 L11412_WAIT
       TEXT 20 L11412_3ADD
       TEXT 30 L11412_NAME
       TEXT 2 L11412_STATE
       TEXT 6 L11412_ZIP.

LET L11412_FOUND EQ "F".
DBSET PSMAST.
FIND ALL.
SEARCH TMDT GT $TEXTR(000000) AND TMDT LE $TEXTR(SYSDATE).
IF SYSNREC EQ 0 THEN
        PRINT " ".
        PRINT "There is no one terminated lately.".
ELSE
        INIT 7 LETR.LST.
        REPEAT.
                GETREC LEAVE.
                LET L11412_NAME EQ $TRIM(FMNAM) + " " + $TRIM(LNAM).
                LET L11412_1ADD EQ ADDR1.
                LET L11412_2ADD EQ ADDR2.
                LET L11412_3ADD EQ ADDR3.
                LET L11412_STATE EQ ST.
                LET L11412_ZIP EQ ZIP.
                MAP TO IND_RECORD VIA SSN.
                IF SYSNREC GT 0 THEN
                        LET L11412_FOUND EQ "T".
                        PRINT ON 7 FMT ///// END.
                        PRINT ON 7 L11412_NAME.
                        PRINT ON 7 L11412_1ADD L11412_2ADD.
                        PRINT ON 7 L11412_3ADD L11412_STATE L11412_ZIP.
                        PRINT ON 7 SYSDATE FMT /// D2 /// END.
                        PRINT ON 7 FMT / "Dear Student/University Employee," / E
ND.
                        PRINT ON 7 FMT $ "It has come to our attention "END.
                        PRINT ON 7  "that you will soon be leaving ".
                        PRINT ON 7 FMT $ "the University system, and that " END.
                        PRINT ON 7 "you still possess one or ".
                        PRINT ON 7 FMT $ "more keys from the Physical Plant.  "E
ND.
                        PRINT ON 7 "Please return these to ".
                        PRINT ON 7 FMT $ "the Physical Plant prior to "END.
                        PRINT ON 7 "leaving and your deposit will ".
                        PRINT ON 7 FMT $ "be refunded.  The keys we "END.
                        PRINT ON 7 FMT "show that you have are:" / / END.
                        PRINT ON 7 KIN FMT 10X A10 END.
                        PRINT ON 7 FMT // "Thank you for your cooperation."END.
                        PRINT ON 7 FMT // "University of Montana Physical Plant"
 / C1 END.
                 ENDIF.
        UNTIL SYSNREC EQ 0.
        IF L11412_FOUND EQ "F" THEN
                PRINT " ".
                PRINT "None of the individuals who were terminating had keys".
        ELSE
                PRINT " ".
                PRINT "The letters have been generated and can be picked up ".
                PRINT "at the Computer Center tomorrow.".
        ENDIF.
ENDIF.
PRINT " ".
PRINT FMT $ "Type a carriage return <cr> to continue:  "END.
ACCEPT L11412_WAIT.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                          !
!     Module Name:   1142 Gen Reports                                      !
!     Parameters:                                                          !
!          In Only:  none                                                  !
!          Out Only:                                                       !
!          In/Out:  Gl_Report                                              !
!     Coded By:  Robin FauntLeRoy                                          !
!     Date Last Modified:  7/26/85                                         !
!     Reason Modified:                                                     !
!                                                                          !
!     Module Description:                                                  !
!          This module sets the gl132_report flag, which determines        !
!     whether or not the name found in Find_Name is printed out, and       !
!     then determines which report the user wants.                         !
!                                                                          !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L1142_RESPONSE.


REPEAT
        REPEAT
                LET Gl_REPORT EQ "T".
                PUSH USING BL
                POP END.
                PRINT "          ***********************************************
**************".
                PRINT "          *
            *".
                PRINT "          *              REPORT GENERATION MENU
            *".
                PRINT "          *
            *".
                PRINT "          ***********************************************
**************".
                PRINT "          *
            *".
                PRINT "          *      Enter report option:
            *".
                PRINT "          *           A  Keyholder Report
            *".
                PRINT "          *           B  Inventory Report
            *".
                PRINT "          *           C  Location Report
            *".
                PRINT "          *           D  Key Retirement Report
            *".
                PRINT "          *           E  Exit
            *".
                PRINT "          *
            *".
                PRINT "          ***********************************************
**************".
                PRINT " ".
                PRINT FMT $ "Please enter option choice:  "END.
                ACCEPT L1142_RESPONSE.
                IF L1142_RESPONSE NEQ ('A','a','B','b','C','c','D','d','E','e')
THEN
                        PRINT "Invalid choice, please try again.".
                ENDIF.
        UNTIL L1142_RESPONSE EQ ('A','a','B','b','C','c','D','d','E','e').
        IF L1142_RESPONSE EQ ('A','a') THEN
                CALL KEYHOLDER_REPORT.
                !PUSH USING PRINT INVEN.TXT.
                !POP END.
        ELSEIF L1142_RESPONSE EQ ('B','b') THEN
                CALL INVENTORY_REPORT.
        ELSEIF L1142_RESPONSE EQ ('C','c') THEN
                CALL LOCATION_REPORT.
        ELSEIF L1142_RESPONSE EQ ('D','d') THEN
                CALL RETIREMENT_REPORT.
        ELSE
                PRINT " ".
        ENDIF.
UNTIL L1142_RESPONSE EQ ('E','e').
RETURN.

KEYHOLDER_REPORT: @R11421_KEY_REPT.DMC
INVENTORY_REPORT: @R11422_INVEN_REPT.DMC
LOCATION_REPORT: @R11423_LOCAT_REPT.DMC
RETIREMENT_REPORT: @R11424_RETIRE_REPT.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name:     11421 Key Rept                                        !
!     Parameters:                                                            !
!          In Only:  none                                                    !
!          Out Only:  none                                                   !
!          In/Out:  G1_Report                                                !
!     Coded By:  Robin Fauntleroy                                            !
!     Date Last Modified:  7/26/85                                           !
!     Reason Modified:                                                       !
!                                                                            !
!     Module Description:                                                    !
!          This module determines the extent of the keyholder report        !
!     requested by the user, and sets up the information for the report.    !
!     It also sets the report flag, so that names are not printed out       !
!     when Find_Name is called.                                              !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


DEFINE TEXT 1 L11421_RESPONSE
       TEXT 10 L11421_NUM
       TEXT 1 L11421_WAIT
       TEXT 4 L11421_KEY.

REPEAT
        PRINT " ".
        PRINT "Please choose one of the following: ".
        PRINT "     T:  Report on Total Keyholders".
        PRINT "     I:  Individual Report  ".
        PRINT "         (report by individual keyways)".
        PRINT "     Q:  Quit ".
        PRINT " ".
        PRINT FMT $ "Please enter your choice:  "END.
        ACCEPT L11421_RESPONSE.
UNTIL L11421_RESPONSE EQ ('T','t','I','i','Q','q').
IF L11421_RESPONSE NEQ ('Q','q') THEN
        LET G1_REPORT EQ "T".
        DBSET IND_RECORD.
        IF L11421_RESPONSE EQ ('T','t') THEN
                FIND ALL.
                SORT BY SSN.
        ELSE
                REPEAT
                        PRINT " ".
                        PRINT "Please enter keyway number for report.".
                        PRINT FMT $ "Keyway Number:  "END.
                        ACCEPT L11421_KEY.
                        FIND ALL.
                        FIND KIN CT $TRIM(L11421_KEY).
                        IF SYSNREC EQ 0 THEN
                                PRINT "Invalid Keyway Number.".
                        ENDIF.
                UNTIL SYSNREC GT 0.
                SORT SSN.
        ENDIF.
        IF SYSNREC GT 0 THEN
                REPORT START.
                SECTION INITIAL.
                        INIT 5 KEYHOLDER.TXT.
                HEADING ON 5 PRINT SYSDATE FMT ///// 30T "KEYHOLDER REPORT" 60T
D3 ///END.
                FOOTING ON 5 2 PRINT SYSPAGE FORMAT 40T I2..0 END.
                PAGE 60.
                BODY 60.
                SECTION GETREC.
                        LET G11_SS_NUMBER EQ SSN.
                        IF G11_SS_NUMBER LT 0 THEN
                             LET L11421_NUM EQ "DUMMY SSN:".
                        ELSE
                             LET L11421_NUM EQ $TEXTL(G11_SS_NUMBER).
                        ENDIF.
                        LET G1_REPORT EQ "T".
                        CALL FIND_NAME.
                        DBSET IND_RECORD.
                SECTION HEADING.
                ON CHANGE SSN PRINT ON 5 L11421_NUM G11_NAME FORMAT / A10 15T A3
0 END.
                SECTION PRINT.
                PRINT ON 5 KIN DO DEP FORMAT 10T A10 25T D3 40T F$3.2 END.
                SECTION TOTALS.
                SECTION FINAL.
                REPORT END.
                PRINT " ".
                PRINT "Your report has been sent to the line printer".
                PRINT "and can be picked up at the computer center".
                PRINT FMT $ "Type a carriage return <cr> to continue:  "END.
                ACCEPT L11421_WAIT.
                RELEASE 5.
        ENDIF.
ENDIF.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                          !
!     Module Name:     11422 Inven Rept                                    !
!     Parameters:                                                          !
!          In Only:  none                                                  !
!          Out Only:  none                                                 !
!          In/Out:  none                                                   !
!     Coded By:  Robin Fauntleroy                                          !
!     Date Last Modified:  7/26/85                                         !
!     Reason Modified:                                                     !
!                                                                          !
!     Module Description:                                                  !
!          This module determines the extent of the inventory report       !
!     requested by the user, and sets up the information for the report    !
!                                                                          !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


DEFINE TEXT 1 L11422_RESPONSE
       TEXT 1 L11422_WAIT
       TEXT 4 L11422_KEY.

REPEAT
        PRINT " ".
        PRINT "Please choose one of the following: ".
        PRINT "    T:  Report on Total Inventory".
        PRINT "    I:  Individual Report   ".
        PRINT "        (report by individual keyways)".
        PRINT "    Q:  Quit ".
        PRINT " ".
        PRINT FMT $ "Please enter your choice:  "END.
        ACCEPT L11422_RESPONSE.
UNTIL L11422_RESPONSE EQ ('T','t','I','i','Q','q').
IF L11422_RESPONSE NEQ ('Q','q') THEN
        DBSET INVEN.
        IF L11422_RESPONSE EQ ('T','t') THEN
                FIND ALL.
                SORT BY KIN.
        ELSE
                REPEAT
                        PRINT " ".
                        PRINT "Please enter keyway number for report.".
                        PRINT FMT $ "Keyway Number:  "END.
                        ACCEPT L11422_KEY.
                        FIND ALL.
                        FIND KIN CT $TRIM(L11422_KEY).
                        IF SYSNREC EQ 0 THEN
                                PRINT "Invalid Keyway Number.".
                        ENDIF.
                UNTIL SYSNREC GT 0.
                SORT KIN.
        ENDIF.
        IF SYSNREC GT 0 THEN
                REPORT START.
                INIT 2 INVEN.TXT.
                HEADING ON 2 PRINT SYSDATE FMT ///// 30T "INVENTORY REPORT" 60T
D3 ///END.
                FOOTING ON 2 2 PRINT SYSPAGE FORMAT 40T I2..0 END.
                PAGE 60.
                BODY 60.
                ON START PRINT ON 2 FMT 5T "KEY NUMBER:" 20T "QUANTITY ON HAND:"
 40T "QUANTITY OUT:" 55T "TOTAL NUMBER:" /END.
                ON START PRINT ON 2 FMT 5T "__________" 20T "_________________"
                       40T "_____________" 55T "_____________" /END.
                PRINT ON 2 KIN QON TN-QON TN FMT 7T A10 27T I3 45T I3 60T I3 END

                REPORT END.
                PRINT " ".
                PRINT "Your report has been sent to the line printer".
                PRINT "and can be picked up at the computer center".
                PRINT FMT $ "Type a carriage return <cr> to continue:  "END.
                ACCEPT L11422_WAIT.
                RELEASE 2.
        ENDIF.
ENDIF.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name:     11423 Locat Rept                                     !
!     Parameters:                                                           !
!          In Only:  none                                                   !
!          Out Only:  none                                                  !
!          In/Out:  none                                                    !
!     Coded By:  Robin Fauntleroy                                           !
!     Date Last Modified:  7/26/85                                          !
!     Reason Modified:                                                      !
!                                                                           !
!     Module Description:                                 .                 !
!          This module determines the extent of the location report         !
!     requested by the user, and sets up the information for the report     !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


DEFINE TEXT 1 L11423_RESPONSE
       TEXT 1 L11423_WAIT
       TEXT 1 L11423_SORT
       TEXT 3 L11423_BLDG
       TEXT 4 L11423_KEY.

REPEAT
        PRINT " ".
        PRINT "Please choose one of the following: ".
        PRINT "    T:  Total Location Report ".
        PRINT "         (sorted by either keyway number or building number)".
        PRINT "    I:  Individual Report  ".
        PRINT "         (report by individual keyways or building numbers)".
        PRINT "    Q:  Quit ".
        PRINT " ".
        PRINT FMT $ "Please enter your choice:  "END.
        ACCEPT L11423_RESPONSE.
UNTIL L11423_RESPONSE EQ ('T','t','I','i','Q','q').
IF L11423_RESPONSE NEQ ('Q','q') THEN
        DBSET LOCATE.
        IF L11423_RESPONSE EQ ('T','t') THEN
                REPEAT
                    PRINT " ".
                    PRINT "Would you like the report sorted by Keyway Number".
                    PRINT FMT $ "or Building Number?  (K/B):  "END.
                    ACCEPT L11423_SORT.
                UNTIL L11423_SORT EQ ('K','k','B','b').
                IF L11423_SORT EQ ('K','k') THEN
                    FIND ALL.
                    SORT BY KIN.
                ELSE
                    FIND ALL.
                    SORT BY BLD RN.
                ENDIF.
        ELSEIF L11423_RESPONSE EQ ('I','i') THEN
                REPEAT
                    PRINT " ".
                    PRINT "Would you like a report based upon a Keyway Number".
                    PRINT FMT $ "or Building Number?  (K/B):  "END.
                    ACCEPT L11423_SORT.
                UNTIL L11423_SORT EQ ('K','k','B','b').
                IF L11423_SORT EQ ('K','k') THEN
                REPEAT
                        PRINT " ".
                        PRINT "Please enter keyway number for report.".
                        PRINT FMT $ "Keyway Number:  "END.
                        ACCEPT L11423_KEY.
                        FIND ALL.
                        FIND KIN CT $TRIM(L11423_KEY).
                        IF SYSNREC EQ 0 THEN
                                PRINT "Invalid Keyway Number.".
                        ENDIF.
                UNTIL SYSNREC GT 0.
                SORT KIN.
                ELSE
                REPEAT
                        PRINT " ".
                        PRINT "Please enter building abbreviation for report.".
                        PRINT FMT $ "Building Number:  "END.
                        ACCEPT L11423_BLDG.
                        FIND ALL.
                        SEARCH BLD EQ L11423_BLDG.
                        IF SYSNREC EQ 0 THEN
                                PRINT "Invalid building abbreviation.".
                        ENDIF.
                UNTIL SYSNREC GT 0.
                ENDIF.
        ELSE
                PRINT " ".
        ENDIF.
         IF SYSNREC GT 0 THEN
                REPORT START.
                INIT 3 LOCAT.TXT.
                HEADING ON 3 PRINT SYSDATE FMT ///// 33T "LOCATION REPORT" 60T D
3 ///END.
                FOOTING ON 3 2 PRINT SYSPAGE FORMAT 40T I2..0 END.
                PAGE 60.
                BODY 60.
                ON START PRINT ON 3 FMT 5T "KEY NUMBER:" 20T "BUILDING NUMBER:"
40T
                    "ROOM NUMBER:" END.
                ON START PRINT ON 3 FMT 5T "__________" 20T "_______________"
                       40T "____________" /END.
                PRINT ON 3 KIN BLD RN FMT 7T A10 26T A3 45T A4 END.
                REPORT END.
                PRINT " ".
                PRINT "Your report has been sent to the line printer".
                PRINT "and can be picked up at the computer center".
                PRINT FMT $ "Type a carriage return <cr> to continue:  "END.
                ACCEPT L11423_WAIT.
                RELEASE 3.
         ENDIF.
ENDIF.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                         !
!     Module Name:    11424 Retire Rept                                   !
!     Parameters:                                                         !
!          In Only:  none                                                 !
!          Out Only:  none                                                !
!          In/Out:  none                                                  !
!     Coded By:  Robin Fauntleroy                                         !
!     Date Last Modified:  7/26/85                                        !
!     Reason Modified:                                                    !
!                                                                         !
!     Module Description:                                                 !
!          This module prints a report consisting of a list of all        !
!     keys that have been retired.                                        !
!                                                                         !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


DEFINE TEXT 1 L11424_WAIT.

DBSET INVEN.
FIND ALL.
SEARCH ST EQ "R".
IF SYSNREC EQ 0 THEN
        PRINT " ".
        PRINT "There are no retired keys at this time.".
ELSE
        SORT KIN.
        REPORT START.
        INIT 4 RETIRE.TXT.
        HEADING ON 4 PRINT SYSDATE FMT ///// 30T "RETIRED KEY REPORT" 60T D3 ///
END.
                FOOTING ON 4 2 PRINT SYSPAGE FORMAT 40T I2..0 END.
                PAGE 60.
                BODY 60.
                ON START PRINT ON 4 FMT 1T "KEY NUMBER:" 15T "QUANTITY ON HAND:"
 34T "QUANTITY OUT:" 49T "TOTAL NUMBER:" 65T "DATE RETIRED:" /END.
                ON START PRINT ON 4 FMT 1T "___________" 15T "__________________"
                       34T "_____________" 49T "_____________" 65T "___________
__" /END.
                PRINT ON 4 KIN QON TN-QON TN DR FMT 4T A10 24T I3 38T I3 53T I3
66T D2 END.
                REPORT END.
                PRINT " ".
                PRINT "Your report has been sent to the line printer".
                PRINT "and can be picked up at the computer center".
                PRINT FMT $ "Type a carriage return <cr> to continue:  "END.
                ACCEPT L11424_WAIT.
                RELEASE 4.
ENDIF.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name: 115 Bookkeeping                                           !
!     Parameters:                                                            !
!          In Only:  G111_Deposit                                            !
!          Out Only:                                                         !
!          In/Out:                                                           !
!     Coded By:   Robin FauntLeRoy                                           !
!     Date Last Modified:   7/11/85                                          !
!     Reason Modified:                                                       !
!                                                                            !
!     Module Description:                                                    !
!         This module will maintain the amount in the checkbook.             !
!     It will open the checkbook file and update the balance there.          !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DBSET CHECKBOOK.
FIND ALL.
CHANGE BAL BAL+G111_DEPOSIT.

RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name:    116 Find SSN                                          !
!     Parameters:                                                           !
!          In Only:  G11_First_Name                                         !
!                    G11_Last_Name                                          !
!          Out Only:                                                        !
!          In/Out: G11_SS_Number                                            !
!                  G11_Name                                                 !
!     Coded By:  Robin FauntLeRoy                                           !
!     Date Last Modified: 7/11/85                                           !
!     Reason Modified:                                                      !
!                                                                           !
!     Module Description:                                                   !
!         This module will search the Personnel and Registrar files         !
!     when given a name, for a matching name and social security number.    !
!     If found, it sets the name variables to the value of that name.       !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L116_ANSWER.

LET G11_NAME EQ G11_FIRST_NAME + G11_LAST_NAME.
DBSET PSMAST.
FIND ALL.
SEARCH LNAM CT $TRIM(G11_LAST_NAME).
SEARCH FMNAM CT $TRIM(G11_FIRST_NAME).
IF SYSNREC EQ 1 THEN
       LET G11_SS_NUMBER EQ SSN.
ELSEIF SYSNREC GT 1 THEN
        PRINT " ".
        PRINT LNAM FMNAM SSN.
        PRINT " ".
        PRINT "With the information given the correct ".
        PRINT "individual cannot be determined. All the ".
        PRINT "above records apply. Do you have additional".
        PRINT FMT $ "information to distinguish between entries (Y/N)  "END.
        ACCEPT L116_ANSWER.
        IF L116_ANSWER EQ ('Y','y') THEN
                REPEAT
                        PRINT " ".
                        PRINT FMT $ "Enter the corresponding SSN.  "END.
                        ACCEPT G11_SS_NUMBER.
                        PRINT " ".
                        PRINT "SSN:  "G11_SS_NUMBER.
                        PRINT " ".
                        PRINT FMT $ "Is this correct? (Y/N):  "END.
                        ACCEPT L116_ANSWER.
                UNTIL L116_ANSWER EQ ('Y','y').
                FIND ALL.
                FIND SSN EQ G11_SS_NUMBER.
        ENDIF.
ELSE
        PRINT " ".
ENDIF.
IF G11_SS_NUMBER EQ 0 THEN
        DBSET SRMAST.
        FIND ALL.
        FIND NAME CT $TRIM(G11_LAST_NAME).
        SEARCH NAME CT $TRIM(G11_FIRST_NAME).
        IF SYSNREC EQ 1 THEN
                LET G11_SS_NUMBER EQ ID.
        ELSEIF SYSNREC GT 1 THEN
                PRINT " ".
                PRINT NAME ID.
                PRINT " ".
                PRINT "With the information given the correct ".
                PRINT "individual cannot be determined. All the ".
                PRINT "above records apply. Do you have additional".
                PRINT FMT $ "information to distinguish between entries (Y/N)  "
END.
                ACCEPT L116_ANSWER.
                IF L116_ANSWER EQ ('Y','y') THEN
                REPEAT
                        PRINT " ".
                        PRINT FMT $ "Enter the corresponding SSN.  "END.
                        ACCEPT G11_SS_NUMBER.
                        PRINT " ".
                        PRINT "SSN:  "G11_SS_NUMBER.
                        PRINT " ".
                        PRINT FMT $ "Is this correct? (Y/N):  "END.
                        ACCEPT L116_ANSWER.
                UNTIL L116_ANSWER EQ ('Y','y').
                FIND ALL.
                FIND ID EQ G11_SS_NUMBER.
                LET G11_SS_NUMBER EQ ID.
                LET G11_NAME EQ NAME.
                ENDIF.
        ELSE
                PRINT " ".
        ENDIF.
ENDIF.
IF G11_SS_NUMBER EQ 0 THEN
        DBSET NAME.
        FIND ALL.
        SEARCH LNM CT $TRIM(G11_LAST_NAME).
        SEARCH FNM CT $TRIM(G11_FIRST_NAME).
        IF SYSNREC EQ 0 THEN
                PRINT "The matching SSN could not be found".
        ELSEIF SYSNREC EQ 1 THEN
                LET G11_SS_NUMBER EQ SSN.
        ELSE
                PRINT " ".
                PRINT LNM FNM SSN.
                PRINT " ".
                PRINT "With the information given the correct ".
                PRINT "individual cannot be determined. All the ".
                PRINT "above records apply. Do you have additional".
                PRINT FMT $ "information to distinguish between entries (Y/N)  "
END.
                ACCEPT L116_ANSWER.
                IF L116_ANSWER EQ ('Y','y') THEN
                REPEAT
                        PRINT " ".
                        PRINT FMT $ "Enter the corresponding SSN.  "END.
                        ACCEPT G11_SS_NUMBER.
                        PRINT " ".
                        PRINT "SSN:  "G11_SS_NUMBER.
                        PRINT " ".
                        PRINT FMT $ "Is this correct? (Y/N):  "END.
                        ACCEPT L116_ANSWER.
                UNTIL L116_ANSWER EQ ('Y','y').
                FIND ALL.
                FIND SSN EQ G11_SS_NUMBER.
                ENDIF.
        ENDIF.
ENDIF.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name:  117 FIND Name                                            !
!     Parameters:                                                            !
!          In Only: G11_SS_Number                                            !
!          Out Only:                                                         !
!          In/Out: G111_Found                                                !
!                  G11_Last_Name                                             !
!                 G11_First_Name                                             !
!     Coded By: Robin FauntLeRoy                                             !
!     Date Last Modified:  7/11/85                                           !
!     Reason Modified:                                                       !
!                                                                            !
!     Module Description:                                                    !
!          This module will search all available files for an occurrence     !
!     of the social security number passed to it.  If it finds one, then     !
!     it sets the social security variable to that number.                   !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L117_FILLER.


LET L117_FILLER EQ " ".
IF G11_SS_NUMBER LT 0 THEN
        DBSET NAME.
        FIND ALL.
        FIND SSN EQ G11_SS_NUMBER.
        IF SYSNREC NEQ 1 THEN
                PRINT " ".
        ELSE
                LET G11_LAST_NAME EQ LNM.
                LET G11_FIRST_NAME EQ FNM.
                LET G11_NAME EQ $TRIM(G11_FIRST_NAME) + L117_FILLER + $TRIM(G11_
LAST_NAME).
                LET G111_FOUND EQ "T".
                IF G1_REPORT EQ "F" THEN
                        PRINT "NAME:  "G11_NAME.
                ENDIF.
        ENDIF.
ELSE
        DBSET PSMAST.
        FIND ALL.
        FIND SSN EQ G11_SS_NUMBER.
        IF SYSNREC NEQ 1 THEN
                DBSET SRMAST.
                FIND ALL.
                FIND ID EQ G11_SS_NUMBER.
                IF SYSNREC NEQ 1 THEN
                     PRINT " ".
                ELSE
                     LET G11_NAME EQ NAME.
                     LET G111_FOUND EQ "T".
                     IF G1_REPORT EQ "F" THEN
                             PRINT "NAME:  "G11_NAME.
                     ENDIF.
                ENDIF.
        ELSE
                LET G11_FIRST_NAME EQ FMNAM.
                LET G11_LAST_NAME EQ LNAM.
                LET G111_FOUND EQ "T".
                LET G11_NAME EQ $TRIM(G11_FIRST_NAME) + L117_FILLER + $TRIM(G11_
LAST_NAME).
                IF G1_REPORT EQ "F" THEN
```

```
                        PRINT "NAME:  "G11_NAME.
                 ENDIF.
        ENDIF.
ENDIF.
LET G1_REPORT EQ "F".

RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name: 1.2 Locksmith Main                                       !
!     Parameters:                                                           !
!          In Only: none                                                    !
!          Out Only: none                                                   !
!          In/Out: none                                                     !
!     Coded By: Michele Miley                                               !
!     Date Last Modified: July 5, 1985                                      !
!     Reason Modified: Initial module creation.                             !
!                                                                           !
!     Module Description:                                                   !
!          The Locksmith Main module is a controlling module which          !
!     displays a user menu, and asks the user to choose which locksmith     !
!     subprogram he wishes to use. It has no parameters and accesses        !
!     no files.                                                             !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L12_MENU_CHOICE.

REPEAT

PUSH USING BL
POP END.
PRINT "          *********************************************************".
PRINT "          *                                                       *".
PRINT "          *                   LOCKSMITH MENU                      *".
PRINT "          *                                                       *".
PRINT "          *********************************************************".
PRINT "          *                                                       *".
PRINT "          *     Choose Option:                                    *".
PRINT "          *          A  Complete Key Orders                       *".
PRINT "          *          B  Replace Key                               *".
PRINT "          *          C  Rekey Lock                                *".
PRINT "          *          D  Inventory Control                         *".
PRINT "          *          E  Exit                                      *".
PRINT "          *                                                       *".
PRINT "          *********************************************************".

        PRINT FMT $ "Enter choice: " END.
        ACCEPT L12_MENU_CHOICE.
        IF L12_MENU_CHOICE EQ 'A' OR L12_MENU_CHOICE EQ 'a' THEN
                CALL M121_COMPLETE_KEY_ORDERS.
        ELSEIF L12_MENU_CHOICE EQ ('B', 'b') THEN
                CALL M122_REPLACE_KEY.
        ELSEIF L12_MENU_CHOICE EQ ('C', 'c') THEN
                CALL M123_REKEY_LOCK.
        ELSEIF L12_MENU_CHOICE EQ ('D', 'd') THEN
                CALL M124_INVENTORY_CONTROL.
        ELSEIF L12_MENU_CHOICE NEQ ('E', 'e') THEN
                PRINT "You have entered an invalid choice.".
        ENDIF.
UNTIL L12_MENU_CHOICE EQ ('E', 'e').
RETURN.

M121_COMPLETE_KEY_ORDERS: @M121_COMPLETE_KEY_ORDERS.DMC
M122_REPLACE_KEY: @M122_REPLACE_KEY.DMC
M123_REKEY_LOCK: @M123_REKEY_LOCK.DMC
M124_INVENTORY_CONTROL:@M124_INVENTORY_CONTROL.DMC

@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                          !
!     Module Name: M_121_COMPLETE_KEY_ORDERS.DMC                           !
!     Parameters:                                                          !
!          In Only: none                                                   !
!          Out Only: none                                                  !
!          In/Out: none                                                    !
!     Coded By: Michele Miley                                              !
!     Date Last Modified: July 6, 1985                                     !
!     Reason Modified: Initial module creation.                            !
!                                                                          !
!     Module Description:                                                  !
!          This module presents the user with a menu pertaining to         !
!     choices available to him in the locksmith subprogram of completing   !
!     key orders.                                                          !
!                                                                          !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L121_MENU_CHOICE.

REPEAT

PUSH USING BL
POP END.
PRINT "          ***********************************************************".
PRINT "          *                                                         *".
PRINT "          *            COMPLETE KEY ORDERS MENU                     *".
PRINT "          *                                                         *".
PRINT "          ***********************************************************".
PRINT "          *                                                         *".
PRINT "          *     Choose Option:                                      *".
PRINT "          *          A  List Orders                                 *".
PRINT "          *          B  Change Orders                               *".
PRINT "          *          C  Record Completion                           *".
PRINT "          *          D  Print Orders                                *".
PRINT "          *          E  Exit                                        *".
PRINT "          *                                                         *".
PRINT "          ***********************************************************".

        PRINT FMT $ "Enter choice: " END.
        ACCEPT L121_MENU_CHOICE.
        IF L121_MENU_CHOICE EQ ('A', 'a') THEN
                CALL LIST_ORDERS.
        ELSEIF L121_MENU_CHOICE EQ ('B', 'b') THEN
                CALL CHANGE_ORDERS.
        ELSEIF L121_MENU_CHOICE EQ ('C', 'c') THEN
                CALL RECORD_COMPLETION.
        ELSEIF L121_MENU_CHOICE EQ ('D','d') THEN
                CALL PRINT_ORDERS.
      ELSEIF L121_MENU_CHOICE NEQ ('E', 'e')THEN
                PRINT "You have entered an invalid choice.".
        ENDIF.
UNTIL L121_MENU_CHOICE EQ ('E', 'e').
RETURN.

LIST_ORDERS: @M1211_LIST_ORDERS.DMC
CHANGE_ORDERS: @M1212_CHANGE_ORDERS.DMC
RECORD_COMPLETION: @M1213_RECORD_COMPLETION.DMC
PRINT_ORDERS: @M1214_PRINT_ORDERS.DMC

@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name: M1211_LIST_ORDERS.DMC                                     !
!     Parameters:                                                            !
!          In Only: none                                                     !
!          Out Only: none                                                    !
!          In/Out: none                                                      !
!     Coded By: Michele Miley                                                !
!     Date Last Modified: July 7, 1985                                       !
!     Reason Modified: Initial module creation.                              !
!                                                                            !
!     Module Description:                                                    !
!          This module sorts the Order File by date and priority and         !
!     displays the contents of the file on the screen.                       !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L1211_CONTINUE.

DBSET ORDER.
FIND ALL.
SORT BY PRIORITY ENTRY_DATE.
PUSH USING BL
POP END.
PRINT " ".
PRINT "            Priority  Key Number   Amount Needed  Date Ordered".
PRINT "            --------  ----------   -------------  ------------".
PRINT "              " PR KID AMT " " ED FMT A16 A9 A10 I8 A10 D3 END.
PRINT " ".
PRINT FMT $ "Type a carriage return <cr> to continue. " END.
ACCEPT L1211_CONTINUE.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                         !
!     Module Name: M1212_CHANGE_ORDERS.DMC                                !
!     Parameters:                                                         !
!          In Only: none                                                  !
!          Out Only: none                                                 !
!          In/Out: none                                                   !
!     Coded By: Michele Miley                                             !
!     Date Last Modified: July 7, 1985                                    !
!     Reason Modified: Initial module creation.                           !
!     Date Last Modified: July 21, 1985                                   !
!     Reason Modified: Format user interface.                             !
!                                                                         !
!     Module Description:                                                 !
!          This module allows the user to change fields in the Order      !
!     File manually rather than use the system assigned values            !
!     automatically.                                                      !
!                                                                         !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L1212_DONE
              L1212_NEW_PR
              L1212_CORRECT.
DEFINE INTEGER L1212_AMT
               L1212_ORDER_NUMBER.

CALL NUMBER_ORDER_FILE.
LET L1212_DONE EQ 'F'.
WHILE L1212_DONE NEQ 'T' DO
     DBSET ORDER.
     SORT BY PRIORITY ED.
     FIND ALL.
     PRINT " ".
     PRINT "Please type the number of the record you wish to change.".
     PRINT "(Enter a zero if you wish to exit this portion of the program.)".
     PRINT FMT $ "Order Number: " END.
     ACCEPT L1212_ORDER_NUMBER.
     PRINT " ".
     IF L1212_ORDER_NUMBER EQ 0 THEN
          LET L1212_DONE EQ 'T'.
     ELSEIF L1212_ORDER_NUMBER LEQ SYSNREC THEN
       REPEAT
          PRINT "What is the new priority you would like to assign?".
          PRINT FMT $ "Priority: " END.
          ACCEPT L1212_NEW_PR.
          PRINT " ".
          PRINT "What is the new amount to be assigned?".
          PRINT FMT $ "Amount: " END.
          ACCEPT L1212_AMT.
          PRINT " ".
          PRINT "New Priority: " L1212_NEW_PR.
          PRINT "New Amount: " L1212_AMT.
          PRINT FMT $ "Are these the correct values? (Y/N) " END.
          ACCEPT L1212_CORRECT.
       UNTIL L1212_CORRECT EQ ('Y','y').
       GETREC LEAVE L1212_ORDER_NUMBER.
       CHANGE PR L1212_NEW_PR.
       CHANGE AMT L1212_AMT.
       PRINT " ".
       PRINT "The order has been changed to the values you entered.".
     ELSE
       PRINT " ".
       PRINT "There are no records corresponding to that order number.".
     ENDIF.
```

```
ENDWHILE.
RETURN.

NUMBER_ORDER_FILE: @M12121_NUMBER_ORDER_FILE.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name: M12121_NUMBER_ORDER_FILE.DMC                             !
!     Parameters:                                                           !
!          In Only: none                                                    !
!          Out Only: none                                                   !
!          In/Out: none                                                     !
!     Coded By: Michele Miley                                               !
!     Date Last Modified: July 7, 1985                                      !
!     Reason Modified: Initial module creation.                             !
!                                                                           !
!     Module Description:                                                   !
!          This module accesses the order file and sorts it according to    !
!     priority and date, then lists it along with a counter so that the     !
!     user may select a record according to the counter value.              !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE INTEGER L12121_COUNT.

LET L12121_COUNT EQ 1.
DBSET ORDER.
FIND ALL.
SORT BY PRIORITY ED.
PUSH USING BL
POP END.
PRINT " ".
PRINT "          Order Number   Priority   Key Number   Amount  Date Ordered".
PRINT "         ------------   --------   ----------   ------  ------------".
WHILE SYSNREC GT 0 DO
     GETREC LEAVE.
     PRINT " " L12121_COUNT " " PR KID " " AMT " " ED FMT A15 I2 A11 I10
          A10 A2 I5 A4 D3 END.
     LET L12121_COUNT EQ L12121_COUNT+1.
ENDWHILE.
PRINT " ".
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name: M1213_RECORD_COMPLETION.DMC                               !
!     Parameters:                                                            !
!          In Only: none                                                     !
!          Out Only: none                                                    !
!          In/Out: none                                                      !
!     Coded By: Michele Miley                                                !
!     Date Last Modified: July 7,1985                                        !
!     Reason Modified: Initial module creation.                              !
!                                                                            !
!     Module Description:                                                    !
!          This module increases the amount of inventory listed in the       !
!     inventory file after keys have been ordered and cut.                   !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 10 L1213_KEY.
DEFINE TEXT 1 L1213_DONE
              L1213_CORRECT.
DEFINE INTEGER L1213_ORDER_NUMBER
               L1213_AMT.

CALL M1213_NUMBER_ORDER_FILE.
LET L1213_DONE EQ 'F'.
WHILE L1213_DONE NEQ 'T' DO
     DBSET ORDER.
     FIND ALL.
     SORT BY PRIORITY ED.
     REPEAT
     PRINT " ".
     PRINT "Please type the number of the record which has been completed.".
     PRINT "(Enter a zero if you wish to exit this portion of the program.)".
     PRINT FMT $ "Order Number: " END.
     ACCEPT L1213_ORDER_NUMBER.
     PRINT " ".
     PRINT "Order Number: " L1213_ORDER_NUMBER.
     PRINT FMT $ "Is this the correct order number? (Y/N) " END.
     ACCEPT L1213_CORRECT.
     UNTIL L1213_CORRECT EQ ('Y','y').
     IF L1213_ORDER_NUMBER EQ 0 THEN
          LET L1213_DONE EQ 'T'.
     ELSEIF L1213_ORDER_NUMBER LEQ SYSNREC THEN
          GETREC LEAVE L1213_ORDER_NUMBER.
          LET L1213_AMT EQ AMT.
          LET L1213_KEY EQ KID.
          DELETE.
          DBSET INVEN.
          FIND ALL.
          FIND KIN EQ L1213_KEY.
          CHANGE TN TN+L1213_AMT.
          CHANGE QON QON+L1213_AMT.
          DBSET KEYWAY.
          FIND KYN CT $LEFT($CAPS($TRIM(L1213_KEY)), $LEN($TRIM(L1213_KEY)) - 6)

          CHANGE QON QON - L1213_AMT.
          PRINT " ".
          PRINT "The completion of that order has been recorded.".
     ELSE
          PRINT " ".
          PRINT "There are no records corresponding to that order number.".
     ENDIF.
ENDWHILE.
RETURN.
```

```
M1213_NUMBER_ORDER_FILE: @M12121_NUMBER_ORDER_FILE.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name: M1214_PRINT_ORDERS.DMC                                    !
!     Parameters:                                                            !
!          In Only: none                                                     !
!          Out Only: none                                                    !
!          In/Out: none                                                      !
!     Coded By: Michele Miley                                                !
!     Date Last Modified: July 10, 1985                                      !
!     Reason Modified: Initial module creation.                              !
!     Date Last Modified: July 21, 1985                                      !
!     Reason Modified: To stop screen display from scrolling.                !
!                                                                            !
!     Module Description:                                                    !
!          This module prints the orders to be completed to the line         !
!     printer.                                                               !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L1214_CONT.

DBSET ORDER.
FIND ALL.
PUSH USING BL
POP END.
PRINT " ".
SORT BY PRIORITY ENTRY_DATE.
PRINT "            Priority  Key Number   Amount Needed  Date Ordered".
PRINT "            --------  ----------   -------------  ------------".
PRINT "              " PR KID AMT " " ED FMT A16 A9 A10 I8 A10 D3 END.

PRINT " ".
PRINT FMT $ "Type carriage return <cr> to continue: " END.
ACCEPT L1214_CONT.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                             !
!     Module Name: M122_REPLACE_KEY.DMC                                       !
!     Parameters:                                                             !
!          In Only: none                                                      !
!          Out Only: none                                                     !
!          In/Out: none                                                       !
!     Coded By: Michele Miley                                                 !
!     Date Last Modified: July 7, 1985                                        !
!     Reason Modified: Initial module creation                                !
!                                                                             !
!     Module Description:                                                     !
!          If a defective key is returned for replacement, this amount        !
!     must be subtracted from the inventory file. This module accesses       !
!     that file and automatically decrements the quantity on hand and        !
!     the total amount.                                                       !
!                                                                             !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 10 L122_KEY_NUMBER.
DEFINE TEXT 1  L122_CORRECT
               L122_CONT.

PRINT " ".
PRINT "Please enter the key number for the key to be replaced.".
PRINT "(If you wish to exit without entering the key number, type".
PRINT "     E for Exit.)".
PRINT FMT $ "Key Number: " END.
ACCEPT L122_KEY_NUMBER.
PRINT " ".
IF L122_KEY_NUMBER NEQ ('E', 'e') THEN
     PRINT FMT $ "Key Number: " END.
     PRINT L122_KEY_NUMBER.
     PRINT FMT $ "Is this the correct key number? (Y/N) " END.
     ACCEPT L122_CORRECT.
     IF L122_CORRECT EQ ('N','n') THEN
             REPEAT
                     PRINT " ".
                     PRINT FMT $ "Please re-enter the key number: " END.
                     PRINT " ".
                     PRINT FMT $ "Key Number: " END.
                     PRINT L122_KEY_NUMBER.
                     PRINT FMT $ "Is this the correct entry? (Y/N) " END.
           UNTIL L122_CORRECT EQ ('Y', 'y').
     ENDIF.
     DBSET INVEN.
     FIND KIN EQ L122_KEY_NUMBER.
     IF (QON LEQ 0) OR (TN LEQ 0) OR (SYSNREC EQ 0) THEN
             PRINT " ".
             PRINT "The inventory file shows there are no keys listed".
             PRINT "by that number.".
             PRINT FMT $ "Type carriage return <cr> to continue: " END.
             ACCEPT L122_CONT.
     ELSE
             PRINT " ".
             PRINT "The replacement of that key has been recorded.".
             PRINT FMT $ "Type carriage return <cr> to continue: " END.
             ACCEPT L122_CONT.
             CHANGE QON QON-1, TN TN-1.
     ENDIF.
ENDIF.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name: M123_REKEY_LOCK.DMC                                       !
!     Parameters:                                                            !
!          In Only: none                                                     !
!          Out Only: none                                                    !
!          In/Out: none                                                      !
!     Coded By: Michele Miley                                                !
!     Date Last Modified: July 25, 1985                                      !
!     Reason Modified: Initial module creation.                              !
!                                                                            !
!     Module Description:                                                    !
!          This module prompts the user for the room being rekeyed and       !
!     calls the appropriate modules to generate the new key number           !
!     and update the files.                                                  !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 10 G123_KEY_NUM
               G123_NEW_KEY.
DEFINE TEXT 4 G123_ROOM.
DEFINE TEXT 3 G123_BLDG.
DEFINE TEXT 1 G123_FOUND
              G123_ACCEPT.
DEFINE INTEGER G123_AMT
               G123_ORDER_AMT.
DEFINE TEXT 1 L123_CORRECT.

LET G123_FOUND EQ 'F'.
REPEAT
    PRINT " ".
    PRINT "Please enter the building and room number that are being rekeyed,".
    PRINT "following their respective prompts.".
    PRINT FMT $ "Building: " END.
    ACCEPT G123_BLDG.
    PRINT FMT $ "Room number: " END.
    ACCEPT G123_ROOM.
    PRINT " ".
    PRINT "Building:" G123_BLDG.
    PRINT "Room number:" G123_ROOM.
    PRINT FMT $ "Are these values correct? (Y/N) " END.
    ACCEPT L123_CORRECT.
UNTIL L123_CORRECT EQ ('Y','y').

CALL L123_GET_NUM.
IF G123_ACCEPT EQ ('Y', 'y') THEN
     CALL L123_UPDATE.
     PRINT " ".
     PRINT "The files have been changed to reflect the new key number.".
     PRINT FMT $ "Type carriage return <cr> to continue: " END.
     ACCEPT L123_CORRECT.
ENDIF.
RETURN.

L123_GET_NUM: @M1231_GET_NEW_NUMBER.DMC
L123_UPDATE: @M1232_UPDATE_FILES.DMC

@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name: M1231_GET_NEW_NUMBER                                     !
!     Parameters:                                                           !
!          In Only: G123_BLDG, G123_ROOM                                    !
!          Out Only: G123_ACCEPT, G123_KEY_NUM, G123_AMT, G123_ORDER_AMT,   !
!                    G123_NEW_KEY                                           !
!          In/Out: none                                                     !
!     Coded By: Michele Miley                                               !
!     Date Last Modified: July 25, 1985                                     !
!     Reason Modified: Initial module creation.                             !
!                                                                           !
!     Module Description:                                                   !
!          This module determines the new key number and accepts an         !
!     existing number as the new number or calls the appropriate modules    !
!     for determining a new number.                                         !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L1231_CORRECT
              L1231_TYPE.

DBSET LOCATE.
FIND ALL.
SEARCH BLD CT $CAPS($TRIM(G123_BLDG)) AND RN CT $CAPS($TRIM(G123_ROOM)).
IF SYSNREC EQ 1 THEN
     LET G123_KEY_NUM EQ KIN.
ELSEIF SYSNREC GT 1 THEN
     PRINT "More than one key will fit that lock.".
     REPEAT
          PRINT " ".
          PRINT "Please enter the key number you are changing.".
          PRINT FMT $ "Key Number: " END.
          ACCEPT G123_KEY_NUM.
          PRINT " ".
          PRINT "Key Number: " G123_KEY_NUM.
          PRINT FMT $ "Is this the correct key number? (Y/N) " END.
          ACCEPT L1231_CORRECT.
     UNTIL L1231_CORRECT EQ ('Y', 'y').
ELSE
     PRINT "There is no record of a key fitting that lock.".
     REPEAT
          PRINT " ".
          PRINT "Please enter the key number opening that lock.".
          PRINT FMT $ "Key Number: " END.
          ACCEPT G123_KEY_NUM.
          PRINT " ".
          PRINT "Key Number: " G123_KEY_NUM.
          PRINT FMT $ "Is this the correct key number? (Y/N) " END.
          ACCEPT L1231_CORRECT.
     UNTIL L1231_CORRECT EQ ('Y', 'y').
ENDIF.

REPEAT

PRINT " ".
PRINT "Do you wish to use a new key or an existing one? ".
PRINT FMT $ "Type 'N' for new or 'E' for existing: " END.
ACCEPT L1231_TYPE.
IF L1231_TYPE EQ ('N' ,'n') THEN
     PRINT " ".
     PRINT FMT $ "Do you have a number you would like to use? (Y/N) " END.
     ACCEPT L1231_TYPE.
     IF L1231_TYPE EQ ('Y', 'y') THEN
```

```
       REPEAT
          PRINT " ".
          PRINT "Please enter the key number you would like to use.".
          PRINT FMT $ "Key Number: " END.
          ACCEPT G123_NEW_KEY.
          PRINT " ".
          PRINT "Key Number: " G123_NEW_KEY.
          PRINT FMT $ "Is this the correct key number? (Y/N) " END.
          ACCEPT L1231_CORRECT.
       UNTIL L1231_CORRECT EQ ('Y', 'y').
     ELSE
          CALL L1231_GEN_NEW.
     ENDIF.
ELSE
  REPEAT
     PRINT " ".
     PRINT "What is the existing number you would like to use? ".
     PRINT FMT $ "Key Number: " END.
     ACCEPT G123_NEW_KEY.
     PRINT " ".
     PRINT "Key Number: " G123_NEW_KEY.
     PRINT FMT $ "Is this the correct key number? (Y/N) " END.
     ACCEPT L1231_CORRECT.
  UNTIL L1231_COused is: " G123_NEW_KEY.
PRINT FMT $ "Do you wish to use this number? (Y/N) " END.
ACCEPT G123_ACCEPT.
IF G123_ACCEPT EQ ('Y', 'y') AND L1231_TYPE EQ ('E', 'e') THEN
     PRINT " ".
     PRINT "How many keys do you have on hand?".
     PRINT FMT $ "Amount on Hand: " END.
     ACCEPT G123_AMT.
ENDIF.
IF G123_ACCEPT EQ ('Y', 'y') THEN
     PRINT " ".
     PRINT "How many keys do you need to make?".
     PRINT FMT $ "Amount to Order: " END.
     ACCEPT G123_ORDER_AMT.
ELSE
     PRINT " ".
     PRINT "The files have not been changed.".
     PRINT FMT $ "Type carriage return <cr> to continue: " END.
     ACCEPT L1231_CORRECT.
ENDIF.
RETURN.

L1231_GEN_NEW: @M12311_GENERATE_NEW_NUMBER.DMC
L1231_CHECK: @M12312_CHECK_APPLICABILITY.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name: M12311_GENERATE_NEW_NUMBER.DMC                           !
!     Parameters:                                                           !
!          In Only: G123_KEY_NUM                                            !
!          Out Only: G123_NEW_KEY                                           !
!          In/Out: none                                                     !
!     Coded By: Michele Miley                                               !
!     Date Last Modified: July 25, 1985                                     !
!     Reason Modified: Initial module creation.                             !
!                                                                           !
!     Module Description:                                                   !
!          This module generates a new key number when a lock is            !
!     being rekeyed and the user does not wish to use an old number.        !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
DEFINE TEXT 4 L12311_KWY.
DEFINE TEXT 6 L12311_KEYNO.
DEFINE INTEGER L12311_KID.

LET L12311_KWY EQ $LEFT($TRIM(G123_KEY_NUM),$LEN($TRIM(G123_KEY_NUM)) - 6).

DBSET INVEN.
FIND ALL.
FIND KIN CT $CAPS($TRIM(L12311_KWY)).
WHILE G123_FOUND NEQ 'T' DO
     GETREC LEAVE.
     WHILE G123_FOUND NEQ 'T' DO
     LET L12311_KEYNO EQ $RIGHT($TRIM(KIN),6).
     LET L12311_KID EQ $INT(L12311_KEYNO).
     LET L12311_KID EQ L12311_KID + 2.
     LET L12311_KEYNO EQ $TEXTR(L12311_KID).
     FIND KIN CT $CAPS($TRIM(L12311_KWY)) AND KIN CT $CAPS($TRIM(L12311_KEYNO)).
     IF SYSNREC EQ 0 THEN
          LET G123_FOUND EQ 'T'.
          LET G123_NEW_KEY EQ $CAPS($TRIM(L12311_KWY) + $TRIM(L12311_KEYNO)).
     ENDIF.
     ENDWHILE.
ENDWHILE.

RETURN.

@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name: M12341_CHECK_APPLICABILITY                                !
!     Parameters:                                                            !
!          In Only: G123_NEW_KEY, G123_AMT                                   !
!          Out Only: G123_FOUND, G123_NO_MORE                                !
!          In/Out: none                                                      !
!     Coded By: Michele Miley                                                !
!     Date Last Modified: July 25, 1985                                      !
!     Reason Modified: Initial module creation.                              !
!                                                                            !
!     Module Description:                                                    !
!          This module checks for the availability for use of a              !
!     previously retired key.                                                !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DBSET INVEN.
FIND ALL.
FIND KIN EQ $CAPS($TRIM(G123_NEW_KEY)).
IF SYSNREC EQ 0 THEN
     LET G123_FOUND EQ 'T'.
ELSEIF STATUS EQ 'R' AND DR LT SYSDATE - 365 THEN
     LET G123_FOUND EQ 'T'.
ELSE
     PRINT " ".
     PRINT "That number is not available for use.".
     LET G123_FOUND EQ 'F'.
ENDIF.
RETURN.


@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name: M1232_UPDATE_FILES                                       !
!     Parameters:                                                           !
!          In Only: G123_NEW_KEY, G123_AMT, G123_ORDER_AMT, G123_KEY_NUM    !
!          Out Only: none                                                   !
!          In/Out: none                                                     !
!     Coded By: Michele Miley                                               !
!     Date Last Modified: July 25, 1985                                     !
!     Reason Modified: Initial module creation.                             !
!                                                                           !
!     Module Description:                                                   !
!          If a key number is accepted, this module updates all the files   !
!     associated with the rekeyed lock.                                     !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DBSET INVEN.
FIND ALL.
FIND KIN EQ $CAPS(G123_KEY_NUM).
CHANGE ST "R" DR SYSDATE.
FIND ALL.
FIND KIN EQ $CAPS(G123_NEW_KEY).
IF SYSNREC GT 0 THEN
     CHANGE ST " " DR " ".
     CHANGE QON G123_AMT TN G123_AMT.
ELSE
     ADD KIN $CAPS(G123_NEW_KEY) KY "C" QON G123_AMT TN G123_AMT ST " " DR " ".
ENDIF.

DBSET LOCATE.
FIND ALL.
FIND KIN EQ $CAPS(G123_KEY_NUM).
SEARCH BLD CT $CAPS($TRIM(G123_BLDG)) AND RN CT $CAPS($TRIM(G123_ROOM)).
IF SYSNREC GT 0 THEN
     CHANGE KIN $CAPS(G123_NEW_KEY).
ELSE
     ADD KIN $CAPS(G123_NEW_KEY) BLD $CAPS(G123_BLDG) RN $CAPS(G123_ROOM).
ENDIF.

DBSET ORDER.
ADD PR 1 KID $CAPS(G123_NEW_KEY) AMT G123_ORDER_AMT.

RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                          !
!     Module Name: M124_INVENTORY_CONTROL                                  !
!     Parameters:                                                          !
!          In Only: none                                                   !
!          Out Only: none                                                  !
!          In/Out: none                                                    !
!     Coded By: Michele Miley                                              !
!     Date Last Modified: July 6, 9185                                     !
!     Reason Modified: Initial module creation.                            !
!                                                                          !
!     Module Description:                                                  !
!          This module is a controlling module for the inventory control   !
!     subsystem of the locksmith portion of the Key Inventory Control      !
!     system. It displays a menu allowing the user to choose the options   !
!     available to him.                                                    !
!                                                                          !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L124_MENU_CHOICE.

REPEAT

PUSH USING BL
POP END.
PRINT "          ************************************************************".
PRINT "          *                                                          *".
PRINT "          *               INVENTORY CONTROL MENU                     *".
PRINT "          *                                                          *".
PRINT "          ************************************************************".
PRINT "          *                                                          *".
PRINT "          *     Choose Option:                                       *".
PRINT "          *          A  Change Inventory                             *".
PRINT "          *          B  Order Parts                                  *".
PRINT "          *          C  Add Item                                     *".
PRINT "          *          D  Delete Item                                  *".
PRINT "          *          E  Print Inventory                              *".
PRINT "          *          F  Exit                                         *".
PRINT "          *                                                          *".
PRINT "          ************************************************************".

        PRINT FMT $ "Enter choice: " END.
        ACCEPT L124_MENU_CHOICE.
        IF L124_MENU_CHOICE EQ ('A', 'a') THEN
                CALL CHANGE_INVENTORY.
        ELSEIF L124_MENU_CHOICE EQ ('B','b') THEN
                CALL ORDER_PARTS.
        ELSEIF L124_MENU_CHOICE EQ ('C','c') THEN
                CALL ADD_ITEM.
        ELSEIF L124_MENU_CHOICE EQ ('D','d') THEN
                CALL DELETE_ITEM.
        ELSEIF L124_MENU_CHOICE EQ ('E','e') THEN
                CALL PRINT_INVENTORY.
        ELSEIF L124_MENU_CHOICE NEQ ('F','f') THEN
                PRINT "You have entered an invalid choice.".
        ENDIF.
UNTIL L124_MENU_CHOICE EQ ('F','f').
RETURN.

CHANGE_INVENTORY: @M1241_CHANGE_INVENTORY.DMC
ORDER_PARTS: @M1244_ORDER_PARTS.DMC
ADD_ITEM: @M1242_ADD_ITEM.DMC
DELETE_ITEM: @M1245_DELETE_ITEM.DMC
PRINT_INVENTORY: @M1243_PRINT_INVENTORY.DMC
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name: M1241_CHANGE_INVENTORY.DMC                                !
!     Parameters:                                                            !
!          In Only: none                                                     !
!          Out Only: none                                                    !
!          In/Out: none                                                      !
!     Coded By: Michele Miley                                                !
!     Date Last Modified: July 8, 1985                                       !
!     Reason Modified: Initial module creation.                              !
!     Date Last Modified: July 21, 1985                                      !
!     Reason Modified: To allow for lower case text entries.                 !
!                                                                            !
!     Module Description:                                                    !
!          This module allows the user to change an inventory record         !
!     in the keyway file. Only the amount field may be changed.              !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 4 L1241_KWY.
DEFINE TEXT 1 L1241_CORRECT.
DEFINE TEXT 1 L1241_CONTINUE.
DEFINE INTEGER L1241_AMT.

PRINT " ".
PRINT FMT $ "Do you wish to continue with the inventory change process? (Y/N) "
END.
ACCEPT L1241_CONTINUE.
IF L1241_CONTINUE EQ ('Y','y') THEN
REPEAT
     PRINT " ".
     PRINT "Please enter the keyway number for which you wish".
     PRINT "to make a change.".
     PRINT FMT $ "Keyway Number: " END.
     ACCEPT L1241_KWY.
     PRINT " ".
     PRINT FMT $ "Keyway Number: " END.
     PRINT L1241_KWY.
     PRINT FMT $ "Is this the correct entry? (Y/N) " END.
     ACCEPT L1241_CORRECT.
UNTIL L1241_CORRECT EQ ('Y','y').

DBSET KEYWAY.
FIND KYN CT $CAPS($TRIM(L1241_KWY)).
PRINT " ".
PRINT "The current inventory record is: ".
PRINT "Keyway Number: " L1241_KWY.
PRINT "Quantity on Hand: " QON.
IF SYSNREC GT 0 THEN
     LET L1241_CORRECT EQ 'F'.
     REPEAT
     PRINT " ".
     PRINT "What is the new amount you would like to enter?".
     PRINT FMT $ "Amount: " END.
     ACCEPT L1241_AMT.
     PRINT " ".
     PRINT FMT $ "Amount: " END.
     PRINT L1241_AMT.
     PRINT FMT $ "Is this the correct amount? (Y/N) " END.
     ACCEPT L1241_CORRECT.
     UNTIL L1241_CORRECT EQ ('Y', 'y').
     CHANGE QON L1241_AMT.
     PRINT " ".
     PRINT "The inventory record has been changed to:".
     PRINT "Keyway Number:" KYN "Quantity on Hand:" QON.
     PRINT " ".
     PRINT FMT $ "Type carriage return <cr> to continue: " END.
     ACCEPT L1241_CONTINUE.
ELSE
     PRINT "There are no entries in the file corrsponding to that".
     PRINT "keyway number.".
     PRINT FMT $ "Type carriage return <cr> to continue: " END.
     ACCEPT L1241_CONTINUE.
ENDIF.
ENDIF.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name: M12421_UPDATE_FILE.DMC                                   !
!     Parameters:                                                           !
!          In Only: G1242_AMT, G1242_KWY                                    !
!          Out Only: none                                                   !
!          In/Out: none                                                     !
!     Coded By: Michele Miley                                               !
!     Date Last Modified: July 8, 1985                                      !
!     Reason Modified: Initial module creation.                             !
!     Date Last Modified: July 21, 1985                                     !
!     Reason Modified: To allow for lower case text entries.                !
!                                                                           !
!     Module Description:                                                   !
!          This module accepts the keyway number and amount to be added to  !
!     the keyway quantity on hand from M1242_ADD_ITEM, and proceeds         !
!     to add the amount to the keyway file quantity on hand.                !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L12421_CORRECT.
DEFINE TEXT 1 L12421_CONT.

DBSET KEYWAY.
FIND KYN CT $CAPS($TRIM(G1242_KWY)).
IF SYSNREC GT 0 THEN
     CHANGE QON QON+G1242_AMT.
     PRINT " ".
     PRINT "The updated inventory record is: ".
     PRINT "Keyway Number: " KYN.
     PRINT "Quantity on Hand: " QON.
     PRINT " ".
     PRINT FMT $ "Type carriage return <cr> to continue: " END.
     ACCEPT L12421_CONT.
ELSE
     PRINT " ".
     PRINT "The keyway file shows no entry for that keyway number.".
     PRINT " ".
     PRINT FMT $ "Keyway Number: " END.
     PRINT G1242_KWY.
     PRINT FMT $ "Is this the correct entry? (Y/N) " END.
     ACCEPT L12421_CORRECT.
     IF L12421_CORRECT EQ ('Y','y') THEN
          ADD KYN G1242_KWY QON G1242_AMT.
     ENDIF.
ENDIF.
RETURN.
@
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name: M1243_PRINT_INVENTORY.DMC                                !
!     Parameters:                                                           !
!          In Only: none                                                    !
!          Out Only: none                                                   !
!          In/Out: none                                                     !
!     Coded By: Michele Miley                                               !
!     Date Last Modified: July 10, 1985                                     !
!     Reason Modified: Initial module creation.                             !
!     Date Last Modified: July 21, 1985                                     !
!     Reason Modified: To change user interface.                            !
!                                                                           !
!     Module Description:                                                   !
!          This module prints a listing of the inventory file on the line   !
!     printer.                                                              !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L1243_CONT.

DBSET KEYWAY.
FIND ALL.
PUSH USING BL
POP END.
PRINT " ".
PRINT "                  Keyway Number    Quantity on Hand".
PRINT "                  -------------    ----------------".
PRINT " " KYN QON FMT A21 A20 I3 END.
PRINT " ".
PRINT FMT $ "Type carriage return <cr> to continue: " END.
ACCEPT L1243_CONT.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                            !
!     Module Name: M1244_ORDER_PARTS.DMC                                     !
!     Parameters:                                                            !
!          In Only: none                                                     !
!          Out Only: none                                                    !
!          In/Out: none                                                      !
!     Coded By: Michele Miley                                                !
!     Date Last Modified: July 10, 1985                                      !
!     Reason Modified: Initial module creation.                              !
!     Date Last Modified: July 21, 1985                                      !
!     Reason Modified: To change user interface.                             !
!                                                                            !
!     Module Description:                                                    !
!          This module sends a copy of the contents of the Key Order         !
!     File to the line printer.                                              !
!                                                                            !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L1244_CONT.

CALL CHECK_FILE.
PUSH USING BL
POP END.
DBSET KEY_ORDER_FILE.
FIND ALL.
PRINT " ".
PRINT "              Keyway Number     Amount".
PRINT "              -------------     ------".
PRINT " " KYN QON FMT A19 A13 I3 END.
PRINT " ".
PRINT FMT $ "Type carriage return <cr> to continue: " END.
ACCEPT L1244_CONT.
RETURN.

CHECK_FILE: @M12441_CHECK_FILE.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                             !
!     Module Name: M12441_CHECK_FILE.DMC                                      !
!     Parameters:                                                             !
!          In Only: none                                                      !
!          Out Only: none                                                     !
!          In/Out: none                                                       !
!     Coded By: Michele Miley                                                 !
!     Date Last Modified: July 10, 1985                                       !
!     Reason Modified: Initial module creation.                               !
!     Date Last Modified: July 21, 1985                                       !
!     Reason Modified: To change file access method.                          !
!                                                                             !
!     Module Description:                                                     !
!          This module checks the keyway file for amounts less than the       !
!     threshhold number and places these in the key order file.               !
!                                                                             !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DBSET KEY_ORDER_FILE.
CLOSE.
FILE DELETE KEY_ORDER_FILE.DMS.
DBSET KEYWAY.
FIND ALL.
SELECT QON LT 100.
DUMP SET KEY_ORDER_FILE.
OPEN NOCLOSE KEY_ORDER_FILE.
KEY NOMSG ALL.

FIND ALL.
     CHANGE QON 100 - QON.
RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                          !
!     Module Name: M1245_DELETE_ITEM.DMC                                   !
!     Parameters:                                                          !
!          In Only: none                                                   !
!          Out Only: none                                                  !
!          In/Out: none                                                    !
!     Coded By: Michele Miley                                              !
!     Date Last Modified: July 8, 1985                                     !
!     Reason Modified: Initial module creation.                            !
!     Date Last Modified: July 21, 1985                                    !
!     Reason Modified: To allow for lower case text entries.               !
!                                                                          !
!     Module Description:                                                  !
!          This module will delete an entry from the keyway file when      !
!     the user indicates this keyway number is no longer in use.           !
!                                                                          !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 4 L1245_KWY.
DEFINE TEXT 1 L1245_CORRECT
              L1245_CONTINUE.

REPEAT
     PRINT " ".
     PRINT "Please enter the keyway number for the record to be deleted.".
     PRINT FMT $ "Keyway Number: " END.
     ACCEPT L1245_KWY.
     DBSET KEYWAY.
     FIND KYN CT $CAPS($TRIM(L1245_KWY)).
     IF SYSNREC GT 0 THEN
          PRINT " ".
          PRINT FMT $ "Keyway Number: " END.
          PRINT L1245_KWY.
          PRINT FMT $ "Is this the correct entry? (Y/N) " END.
          ACCEPT L1245_CORRECT.
          IF L1245_CORRECT EQ ('Y', 'y') THEN
               PRINT " ".
               PRINT "Continuation of this procedure will result in the deletion
 ".
               PRINT FMT $ "of that record. Do you wish to continue? (Y/N) " END
.
               ACCEPT L1245_CONT.
               IF L1245_CONT EQ ('Y', 'y') THEN
                    DELETE.
                    PRINT "The record for that keyway number has been deleted.".
               ENDIF.
          ENDIF.
     ELSE
          PRINT " ".
          PRINT "There are no records corresponding to that number.".
     ENDIF.
     PRINT " ".
     PRINT FMT $ "Do you wish to delete another entry? (Y/N) " END.
     ACCEPT L1245_CONTINUE.
UNTIL L1245_CONTINUE EQ ('N', 'n').

RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                             !
!     Module Name:       13 Maint Main                                        !
!     Parameters:                                                             !
!          In Only:   none                                                    !
!          Out Only:  none                                                    !
!          In/Out:   none                                                     !
!     Coded By:    Robin FauntLeRoy                                           !
!     Date Last Modified:   7/12/85                                           !
!     Reason Modified:                                                        !
!                                                                             !
!     Module Description:                                                     !
!          This module is the controller for all that occurs in the          !
!     upkeep of this system.  It includes such things as backing up          !
!     the information on tape, and ordering keys made.                       !
!                                                                             !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


CALL BACKUP_INFO.
CALL ORDER_KEY.
CALL UPDATE_KEY_STATUS.

RETURN.

BACKUP_INFO: @R131_BACKUP_INFO.DMC
ORDER_KEY: @R132_ORDER_KEY.DMC
UPDATE_KEY: @R133_UPDATE_KEY.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                         !
!     Module Name:  131 BACKUP INFO                                       !
!     Parameters:                                                         !
!          In Only:  G1_REQUESTED                                         !
!          Out Only:  G131_FILE_CHOICE                                    !
!          In/Out:  none                                                  !
!     Coded By:  Robin FauntLeRoy                                         !
!     Date Last Modified:   7/15/85                                       !
!     Reason Modified:                                                    !
!                                                                         !
!     Module Description:                                                 !
!          This module is passed requested, which will determine whether  !
!     the user wished to enter this section of the program.  If so, the   !
!     menu will be displayed, otherwise, if it has been 7 days since the  !
!     last save, then an automatic save of all files for backup will be   !
!     requested.                                                          !
!                                                                         !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 G131_FILE_CHOICE.


IF G1_REQUESTED EQ "F" THEN
        DBSET LAST_SAVE.
        FIND ALL.
        IF $DATEJUL(DLS) LT $DATEJUL(SYSDATE)-7 THEN
                CALL SAVE.
        ENDIF.
ELSE
REPEAT
PUSH USING BL
POP END.
        REPEAT
                PRINT "         ***********************************************
**************".
                PRINT "         *
            *".
                PRINT "         *                  FILE RESTORATION MENU
            *".
                PRINT "         *
            *".
                PRINT "         ***********************************************
**************".
                PRINT "         *
            *".
                PRINT "         *     Enter file to be restored:
            *".
                PRINT "         *          A  Individual Record File
            *".
                PRINT "         *          B  Name File
            *".
                PRINT "         *          C  Inventory File
            *".
                PRINT "         *          D  Location File
            *".
                PRINT "         *          E  Keyway File
            *".
                PRINT "         *          F  Order File
            *".
                PRINT "         *          G  All Files
            *".
                PRINT "         *          H  Exit
            *".
```

```
                 PRINT "           *
            *".
                 PRINT "          ***********************************************
*************".
                 PRINT " ".
                 PRINT FMT $ "Please enter the file to be restored:  "END.
                 ACCEPT G131_FILE_CHOICE.
                 IF G131_FILE_CHOICE NEQ
                 ('A','a','b','B','C','c','D','d','E','e','F','f','G','g','H','h'
) THEN
                         PRINT "Invalid choice, please try again.".
                 ENDIF.
         UNTIL G131_FILE_CHOICE EQ
         ('A','a','B','b','C','c','D','d','E','e','F','f','G','g','H','h').
         IF G131_FILE_CHOICE NEQ ('H','h') THEN
                 CALL RESTORE.
         ENDIF.
UNTIL G131_FILE_CHOICE EQ ('H','h').
ENDIF.

RETURN.

RESTORE: @R1312_RESTORE.DMC
SAVE: @R1311_SAVE.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                             !
!     Module Name:      1311 SAVE                                             !
!     Parameters:                                                             !
!          In Only:   none                                                    !
!          Out Only:   none                                                   !
!          In/Out:  none                                                      !
!     Coded By:  Robin FauntLeRoy                                             !
!     Date Last Modified:  7/15/85                                            !
!     Reason Modified:                                                        !
!                                                                             !
!     Module Description:                                                     !
!          This module calls a batch job which will mount the tape            !
!     used for saving files and save all pertinent files for the key          !
!     inventory control system.                                               !
!                                                                             !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

PUSH USING SAVE.CTL
POP END.

RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name:  1312 Restore                                            !
!     Parameters:                                                           !
!          In Only:   G131_File_Choice                                      !
!          Out Only:   none                                                 !
!          In/Out:   none                                                   !
!     Coded By:   Robin FauntLeRoy                                          !
!     Date Last Modified:  7/15/85                                          !
!     Reason Modified:                                                      !
!                                                                           !
!     Module Description:                                                   !
!          This module is passed the menu choice and thereby decides        !
!     which batch job to call to save the particular file(s) of choice.     !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


IF G131_FILE_CHOICE EQ ('A','a') THEN
        PUSH USING INDIVIDUAL.CTL/OUTPUT:ERRORS
        POP END.
ELSEIF G131_FILE_CHOICE EQ ('B','b') THEN
        PUSH USING NAME.CTL/OUTPUT:ERRORS
        POP END.
ELSEIF G131_FILE_CHOICE EQ ('C','c') THEN
        PUSH USING INVENTORY.CTL/OUTPUT:ERRORS
        POP END.
ELSEIF G131_FILE_CHOICE EQ ('D','d') THEN
        PUSH USING LOCATION.CTL/OUTPUT:ERRORS
        POP END.
ELSEIF G131_FILE_CHOICE EQ ('E','e') THEN
        PUSH USING KEYWAY.CTL/OUTPUT:ERRORS
        POP END.
ELSEIF G131_FILE_CHOICE EQ ('F','f') THEN
        PUSH USING ORDER.CTL/OUTPUT:ERRORS
        POP END.
ELSE
        PUSH USING RESTORE.CTL/OUTPUT:ERRORS
        POP END.
ENDIF.

RETURN.

@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                             !
!     Module Name:      132 Order Key                                         !
!     Parameters:                                                             !
!          In Only:                                                           !
!          Out Only:                                                          !
!          In/Out:                                                            !
!     Coded By:   Robin FauntLeroy                                            !
!     Date Last Modified:   7/17/85                                           !
!     Reason Modified:                                                        !
!                                                                             !
!     Module Description:                                                     !
!          This module will access the inventory file and check to be         !
!     sure that the quantity on hand is adequate.  If not, it will map        !
!     the Order file to find out whether it has been ordered or not,          !
!     and if not, insert the order for more keys into the order file.         !
!                                                                             !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

DEFINE TEXT 1 L132_PRIOR.

DEFINE INTEGER L132_QON.
DEFINE TEXT 10 L132_KEY_NUMBER.

DBSET ORDER_DATE.
FIND ALL.
IF OD NEQ SYSDATE THEN
        CHANGE OD SYSDATE.
        DBSET INVEN.
        FIND ALL.
        SEARCH QON LT 3 ST NEQ "R".
        IF SYSNREC GT 0 THEN
                REPEAT.
                GETREC LEAVE.
                LET L132_QON EQ QON.
                LET L132_KEY_NUMBER EQ KIN.
                MAP TO ORDER VIA KIN TO KID.
                IF SYSNREC EQ 1 THEN
                        IF (3-L132_QON) GT AMT THEN
                                CHANGE AMT (3-L132_QON).
                        ENDIF.
                ELSE
                        IF L132_QON EQ 1 THEN
                                LET L132_PRIOR EQ "1".
                        ELSE
                                LET L132_PRIOR EQ "2".
                        ENDIF.
                        ADD PR L132_PRIOR KID L132_KEY_NUMBER AMT (3-L132_QON).
                ENDIF.
                UNTIL SYSNREC EQ 0.
        ENDIF.
ENDIF.

RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name: R133_UPDATE_KEY.DMC                                      !
!     Parameters:                                                           !
!          In Only: none                                                    !
!          Out Only: none                                                   !
!          In/Out:  none                                                    !
!     Coded By: Michele Miley                                               !
!     Date Last Modified: July 21, 1985                                     !
!     Reason Modified: Initial module creation.                             !
!                                                                           !
!     Module Description:                                                   !
!          This module updates the inventory file so that keys retired      !
!     for more than one year are listed as available.                       !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

RETURN.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name:   2 Data Entry Main                                      !
!     Parameters:                                                           !
!          In Only:                                                         !
!          Out Only:                                                        !
!          In/Out:                                                          !
!     Coded By:   Robin FauntLeRoy                                          !
!     Date Last Modified:   7/12/85                                         !
!     Reason Modified:                                                      !
!                                                                           !
!     Module Description:                                                   !
!          This module simply calls other modules until the user wishes to  !
!     quit.                                                                 !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

CLEAR.
DEFINE TEXT 17 G11_LAST_NAME.

SET FMSG OFF.
OPEN IND_RECORD DUMMY_SS PSMAST SRMAST NAME.

PL1022 START.
REPEAT
        CALL ACCEPT_NAME.
        CALL ENTER_INFO.
UNTIL G11_LAST_NAME EQ Q.

ACCEPT_NAME: @R21_ACCEPT_NAME.DMC
ENTER_INFO: @R22_ENTER_INFO.DMC

PL1022 STOP.

CLOSE.
CLOSE.
CLOSE.
SET FMSG ON.
PL1022 END.
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                           !
!     Module Name:   21 Accept Name                                         !
!     Parameters:                                                           !
!          In Only:                                                         !
!          Out Only:   gll_ss_number                                        !
!          In/Out:                                                          !
!     Coded By:        Robin Fauntleroy                                     !
!     Date Last Modified:  7/29/85                                          !
!     Reason Modified:                                                      !
!                                                                           !
!     Module Description:                                                   !
!          This module will determine if a name exists on campus for the    !
!     individual who has a key issued to him                                !
!                                                                           !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


DEFINE TEXT 1 L21_ANSWER
       TEXT 30 G11_NAME
       TEXT 13 G11_FIRST_NAME.

DEFINE INTEGER G11_SS_NUMBER.

LET G11_SS_NUMBER EQ 0.
REPEAT
        PRINT " ".
        PRINT "Please enter issuee's last name.".
        PRINT FMT $ "( or a Q to quit entering ).  "END.
        ACCEPT G11_LAST_NAME.
        PRINT " ".
        PRINT "Name:  "G11_LAST_NAME.
        PRINT FMT $ "Is this correct? (y or n):  "END.
        ACCEPT L21_ANSWER.
UNTIL L21_ANSWER EQ ('Y','y').
IF G11_LAST_NAME NEQ "Q" THEN
REPEAT
        PRINT " ".
        PRINT FMT $ "Please enter issuee's first name.  "END.
        ACCEPT G11_FIRST_NAME.
        PRINT " ".
        PRINT "Name:  "G11_FIRST_NAME.
        PRINT FMT $ "Is this correct? (y or n):  "END.
        ACCEPT L21_ANSWER.
UNTIL L21_ANSWER EQ ('Y','y').
LET G11_NAME EQ G11_LAST_NAME + G11_FIRST_NAME.
CALL FIND_SSN.
IF G11_SS_NUMBER EQ 0 THEN
        DBSET DUMMY_SS.
        FIND ALL.
        LET G11_SS_NUMBER EQ SSN.
        CHANGE SSN SSN-1.
ENDIF.
ENDIF.

FIND_SSN:  @R116_FIND_SSN.DMC
@
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                          !
!     Module Name:    22 Enter Info                                        !
!     Parameters:                                                          !
!          In Only:  g11_ss_number                                         !
!          Out Only:                                                       !
!          In/Out:                                                         !
!     Coded By:    Robin Fauntleroy                                        !
!     Date Last Modified:   7/12/85                                        !
!     Reason Modified:                                                     !
!                                                                          !
!     Module Description:                                                  !
!          This module enters into the appropriate files the incoming      !
!     information about a key which is issued.                            !
!                                                                          !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


DEFINE TEXT 10 L22_KEY_NUMBER
       TEXT 5 L22_ANSWER
       TEXT 1 L22_WAIT.

DEFINE INTEGER L22_AMOUNT
       INTEGER L22_DEPOSIT.

IF G11_LAST_NAME NEQ "Q" THEN
        IF G11_SS_NUMBER LT 0 THEN
                DBSET NAME.
                ADD NM G11_NAME SSN G11_SS_NUMBER.
        ENDIF.
        DBSET IND_RECORD.
        REPEAT
                PRINT " ".
                PRINT FMT $ "Please enter key-number:  "END.
                ACCEPT L22_KEY_NUMBER.
                PRINT " ".
                PRINT "Key_Number:  " L22_KEY_NUMBER.
                PRINT FMT $ "Is this correct? (y or n):  "END.
                ACCEPT L22_WAIT.
        UNTIL L22_WAIT EQ ('Y','y').
        PRINT " ".
        PRINT "Enter deposit amount".
        PRINT "If amount is other than normal, type in ".
        PRINT FMT $ "new amount.  Otherwise type a carriage return.  "END.
        ACCEPT L22_ANSWER.
        LET L22_AMOUNT EQ $INT(L22_ANSWER).
        IF L22_AMOUNT GT 0 THEN
                LET L22_DEPOSIT EQ L22_AMOUNT.
        ELSE
                LET L22_DEPOSIT EQ 200.
        ENDIF.
        ADD SSN G11_SS_NUMBER KIN L22_KEY_NUMBER DEP L22_DEPOSIT NUL.
ENDIF.
RETURN.
@
```

INDIVIDUAL.CTL.1

```
@MOUNT TAPE KIC:/WRI
@DUMPER
*TAPE KIC:
*FILES
*REWIND
*RESTORE IND_RECORD.DMS
*REWIND
*EXIT
@DISMOUNT KIC:
```

INVENTORY.CTL.1

```
@MOUNT TAPE KIC:/WRI
@DUMPER
*TAPE KIC:
*FILES
*REWIND
*RESTORE INVENTORY.DMS
*REWIND
*EXIT
@DISMOUNT KIC:
```

KEYWAY.CTL.1

```
@MOUNT TAPE KIC:/WRI
@DUMPER
*TAPE KIC:
*FILES
*REWIND
*RESTORE KEYWAY.DMS
*REWIND
*EXIT
@DISMOUNT KIC:
```

LOCATION.CTL.1

```
@MOUNT TAPE KIC:/WRI
@DUMPER
*TAPE KIC:
*FILES
*REWIND
*RESTORE LOCATION.DMS
*REWIND
*EXIT
@DISMOUNT KIC:
```

MAIL.CTL.2

```
@MAIL
*CS.GRAD.FAUNTLEROY
*
*UNAUTHORIZED ACCESS
*An attempt was made to enter the Key Inventory
*Control system by someone who did not know the
*proper password for entry.
*^Z
```

NAME.CTL.1

```
@MOUNT TAPE KIC:/WRI
@DUMPER
*TAPE KIC:
```

```
*FILES
*REWIND
*RESTORE NAME.DMS
*REWIND
*EXIT
@DISMOUNT KIC:
```

ORDER.CTL.1

```
@MOUNT TAPE KIC:/WRI
@DUMPER
*TAPE KIC:
*FILES
*REWIND
*RESTORE ORDER.DMS
*REWIND
*EXIT
@DISMOUNT KIC:
```

RESTORE.CTL.1

```
@MOUNT TAPE KIC:/WRI
@DUMPER
*TAPE KIC:
*FILES
*REWIND
*RESTORE
*REWIND
*EXIT
@DISMOUNT KIC:
```

SAVE.CTL.1

```
@MOUNT TAPE KIC:/WRI
@DUMPER
*TAPE KIC:
*FILES
*REWIND
*SSNAME KEY INVENTORY CONTROL DATA FILES
*SAVE IND_RECORD.DMS TMPIND_RECORD.DMS,NAME.DMS TMPNAME.DMS, LOCATION.DMS
*TMPLOCATION.DMS, INVENTORY.DMS TMPINVENTORY.DMS, KEYWAY.DMS TMPKEYWAY.DMS
*ORDER.DMS TMPORDER.DMS
*EXIT
@DISMOUNT KIC:
@
```