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Electronic data processing offers many opportunities to simplify audit and control procedures — but it should not do so by making audit and control a part of the bookkeeping and recording function, the very function that auditing is supposed to check. Here's a system that works, designed for a Florida bank —

AN AUTOMATED SYSTEM FOR INTERNAL AUDIT AND CONTROL

by Gerald R. Broucek

Ring, Mahony & Arner

A NUMBER of articles published in recent years have advocated the use of electronic computers or other high-speed data processing equipment for automation of certain of the internal audit tests required for good control over entries affecting income-producing assets. Under most of the proposed approaches, however, a portion of the audit testing formerly performed by the internal audit staff would be performed as a by-product, so to speak, of the recording or bookkeeping function.

There is no question that computers can be assigned audit tasks and complete them efficiently, quickly, and accurately. Much more questionable, however, is the suggestion that a good deal of the audit control and testing now provided by an observer or outsider be provided instead by one of the participants in the receiving, disbursing, and recording group, that is, by one of the group formerly subject to audit testing and control. It should be apparent that adop-

tion of this proposal would negate one of the most basic principles of good auditing, that the audit level within any institution be an independent and objective function operating as a separate center for control over all other management and operating levels of the organization.

Since auditing began, the auditor's role in any organization has been that of an observer, a listener, an examiner or tester of accounts. Using various tools to complete his assigned tasks efficiently, the auditor has generally had responsibility for instituting and installing control procedures and for performing tests of the results of such controls at all institutional levels where funds were received or disbursed or where entries in connection with such receipts or disbursements were recorded.

No change in the tools employed should be allowed to alter this basic function. The tests applied at the audit or control level are only a means to an end, not an end in

themselves. Any combination of any other operating level with all or a part of the audit testing should not change the basic responsibility of the audit and control group.

Electronic data processing is here to stay. But there are better ways of coping with this problem than the combination of the audit and bookkeeping responsibilities.

Better ways

Audit techniques cannot continue to be applied on the same basis and premises as in pre-computer days. Therefore, it is basic that internal auditors should educate themselves in the programming and systems techniques involved in such installations.

There is nothing wrong with reducing the degree of audit testing at various operating levels if this relaxation or reduction of testing is based on a thorough knowledge of other audit controls or restrictions. The auditor can only relax such controls safely, however, when

he understands the new control devices completely and can judge the degree of added control. In addition—and more important—he should be able to identify any potential new control weaknesses spawned by the new system and devise tests to overcome these weaknesses.

Once the audit staff has acquired a thorough knowledge of the computer, it can go still further. The machine can be used as a tool within the internal audit department in the application of tests carried out by audit staff personnel. This approach is far from impractical. Assuming a knowledge of the equipment on the part of the audit staff, it can be accomplished in a number of ways.

The first and most obvious technique is to have members of the audit group devise test routines that are periodically applied on a surprise basis to the data files maintained by the data processing group, using the same equipment used by the data processing group. Another possibility is the use of a satellite computer system by the audit group itself. This approach is also practical, as this article will demonstrate; the satellite system required does not need to be as powerful as the main system from the standpoint of processing time since certain delays in processing and testing are tolerable at this level.

This article describes an automated system for internal audit and control based on the satellite system approach. The system was designed by the management consulting staff of our firm* for the Wilton Manors National Bank of Wilton Manors, Florida. The satellite system was chosen because the bank could not justify the use of its own computer to perform the audit tests desired. Therefore the work is

performed by an outside service bureau. The basic concept, however, remains unchanged from pre-computer days: an independent verification of entries at the audit level without regard for the methods employed in the normal bookkeeping function of the bank. This verification is performed by a computer; however, the concept remains the same whatever the bookkeeping methods used or the degree of automation thereof.

The computer used to perform the audit tests and to establish controls on all daily entries is an RPC 4000 computer with high-speed paper tape readers and punches required to handle large files of data. The equipment used by the bank to process bookkeeping entries, post detailed accounts, etc., consists of NCR Class 33 and 31 accounting machines equipped with punched paper tape recorders.

System goals

The computer audit and control system has the following major goals:

1. To provide a means of establishing accurate daily accrual amounts for daily reporting and control purposes
2. To provide for daily, weekly, and other periodic audit tests applied to entries affecting income-producing assets
3. To provide for testing interest accruals on time deposits on a detailed basis
4. To provide a method of capturing data for testing by the audit system at the point where original entries are posted to the detailed accounts maintained by the bank for bookkeeping purposes

5. To provide a system that can handle a completely variable number of entries, that is, one that can provide all of the controls desired regardless of the number of entries or size of the institution.

The system provides these controls for the financial institutions:

Daily statements

A daily statement of income on the accrual and on the cash basis, with a comparison of the two methods of reporting, provides the bank with a valuable management report as well as a tool for establishing both audit controls and budgetary controls within the financial reporting structure of the bank.

Daily income reported on the accrual basis includes interest on demand loans, interest on time loans, discount earned on installment loans, interest on investments, rents on safe deposit boxes, service charges, and exchange and collection charges. The reporting of interest earned on a daily basis on loans and investments gives the institution an accurate, immediately up-to-date indication of income changes not ordinarily apparent from most bank reports until a later period. This type of reporting provides management with a better, more accurate tool for making everyday policy decisions on investment of the institution's funds by enabling management to react more quickly to changing conditions within the loan and investment portfolio.

The expense section of the daily statement offers an excellent device for establishing budgetary controls over expenditures. Daily expenditure accrual amounts reflect one day's budgeted expenditures. If the expenditures budget is adjusted upward or downward during the course of the year, the result of such a change in the economic or financial policies of the institution is reflected immediately on the daily financial report. Normally such changes in management thinking would be reflected in operating results at some period in the future



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*Mr. C. D. Dyal, Jr., president of the Wilton Manors National Bank; other bank officers; and members of the internal audit team assisted in the design and installation of the audit system. Their assistance and cooperation played a large part in its successful completion.

WILTON MANORS NATIONAL BANK

ACCURAL POSITION					CASH POSITION		SUSPENSE BALANCES	
CURRENT PROFIT AND LOSS BALANCES					RECEIVED AND PAID TRANSACTIONS THIS DAY		RECEIVED AND PAID BALANCES PERIOD TO DATE	
THIS DAY SPECIAL	THIS DAY NORMAL	PERIOD TO DATE	INCOME ACCOUNTS		DR	CR	AMOUNTS CURRENT DATE	ACCOUNTS
	406.35 456.44 544.40	102165.08 129379.78 152202.42	INTEREST - DEMAND LOANS			648.02	87344.94 103367.38	14820.14 26012.40
			INTEREST - TIME LOANS				326557.73	174355.31
			DISCOUNT - INSTALLMENT LOANS		92.00	779.34		
.85	669.74 289.45 168.26	200331.90 51149.09 84672.50	INTEREST ON BONDS - U.S. GOVT.				118911.08	81420.82
			INTEREST ON BONDS - TAX EXEMPT				22441.51	28707.58
			INTEREST ON BONDS - OTHER				50150.59	34521.91
.85	2534.64	719900.77	TOTAL INTEREST AND DISCOUNT		92.00	1427.36	708773.23	11127.54
	24.00 450.00 23.00	6984.00 134550.00 7168.00	RENTS - SAFETY DEPOSIT BOXES		10.90	494.65	13218.79	6234.79
			SERVICE CHARGES				130426.07	4123.93
			EXCHANGE AND COLLECTION CHGS			26.95	6936.46	231.54
		3575.75 581.30	PROFIT ON SALE OF SECURITIES				3575.75	
			OTHER RECOVERIES				581.30	
.85	3031.64	872759.82	TOTAL INCOME		102.90	1948.96	863511.60	9248.22
			EXPENSE ACCOUNTS					
[96.32]	751.28 .17 33.90	214672.25 503.71 6679.35 34.12	INTEREST PAID				147905.67	66766.58
			AMORTIZATION - U.S. GOVT. BONDS				492.66	11.05
			AMORTIZATION - TAX EXEMPT BONDS				3255.32	3424.03
			AMORTIZATION - OTHER BONDS				34.12	
[96.32]	785.35	221889.43	TOTAL INTEREST AND AMORTIZATION EXPENSE				151687.77	70201.66
	52.00 28.00	15682.00 8591.00	ADVERTISING				17350.70	1668.70
			AUDITING AND EXAMINATIONS				7972.00	619.00
	5.00 5.00 80.00 10.00 10.00 2.00 5.25 5.75 18.00 97.00 31.00 7.10 50.00 5.50 41.00 48.75 129.00 6.00 691.00 27.00 11.00	2369.50 1369.50 22131.25 3445.89 2872.00 615.50 1527.75 1673.25 5271.25 26553.00 4555.50 2126.10 16000.00 1600.50 11931.00 13686.25 37515.25 1746.00 200133.36 7495.00 3251.00	CONVENTIONS				2688.95	319.45
			CREDIT REPORTS				1467.25	97.75
			DIRECTORS FEES				21720.00	411.25
			DONATIONS				3654.75	208.86
			DUES AND SUBSCRIPTIONS				3748.69	876.69
			FLOWERS				552.16	63.34
			FREIGHT AND EXPRESS				1790.40	262.65
			GUARD SERVICE				1472.00	201.25
			HEAT, LIGHT AND WATER				5671.05	399.80
			INSURANCE				26655.70	102.70
			LEGAL				5052.10	496.60
			LUNCH ROOM				2250.00	123.90
			MAINTENANCE AND REPAIRS				22139.90	6139.90
			MISCELLANEOUS		100.00		994.89	605.61
			OTHER TAXES				8329.98	3601.02
			POSTAGE				14201.30	515.05
			PRINTING, STATIONERY, SUPPLIES				52777.77	15262.52
			RENT				1507.50	238.50
			SALARIES				188886.15	11247.21
			TELEPHONE AND TELEGRAPH				6682.94	812.06
			TRAVEL AND ENTERTAINMENT				3981.19	730.19
	1365.35	392141.85	TOTAL OPERATING EXPENSES		100.00		401547.37	9405.52
	11.15 65.95 133.00	3244.65 20432.13 38394.00	RESERVE FOR DEPREC. - BUILDING					3244.65
			RESERVE FOR DEPREC. - FURN. & FIXTURES					20432.13
			RESERVE FOR BAD DEBTS		240.87	1.00	407785.34	446179.34
			OVER AND SHORT ACCOUNT				322.07	
			LOSSES ON SECURITIES				37784.75	
			OTHER CHARGE OFFS				1697.40	
	210.10	101875.00	TOTAL DEPRECIATION RESERVES AND LOSSES		240.87	1.00	367981.12	469856.12
[96.32]	2360.80	715906.28	TOTAL EXPENSES		340.87	1.00	185254.02	530652.26
97.17	670.84	156853.54	NET PROFITS BEFORE INCOME TAXES AND DIVIDENDS		443.77	1949.96	678257.58	521404.04
	165.00	48621.00	LESS INCOME TAXES				1545.85	50166.85
97.17	505.84	108232.54	NET PROFITS AFTER TAXES		443.77	1949.96	679803.43	571570.89
	123.30	35880.30	LESS DIVIDENDS				27000.00	8880.30
97.17	382.54	72352.24	NET PROFITS IN EXCESS OF RESERVES AND DIVIDENDS		443.77	1949.96	652803.43	580451.19

DATE:

10-18-66

ERRORS DETECTED BY DAILY AND WEEKLY AUDIT TESTS OF COMMERCIAL LOAN TRANSACTIONS

DAILY TESTS

NEW LOAN OR PAYMENT ERRORS

1. The code identifying a word of data is invalid.
2. The loan number is invalid.
3. The loan type is invalid.
4. The interest rate is invalid.
5. The transaction does not balance. New balances* do not equal old balances plus or minus new loans or payments.

NEW LOAN ERRORS

6. (Unassigned).
7. A new loan has a rebate.
8. On a new demand loan, there is any of the following:
 - a) Discount
 - b) Next principal due date
 - c) Amount due next principal due date
 - d) Term
 - e) Dollar amount of a principal payment
 - f) Interest paid to date
9. A new time loan has no term.
10. A new time loan has a term exceeding ten (10) years.
11. A new time discount loan has no interest paid to date.
12. A new time loan does not have a next principal due date.
13. The next principal due date on a new time loan is an invalid date.
14. The interest paid to date on a new time loan is an invalid date.
15. The principal amount of a new loan is less than the "Dollar Amount of Next Principal Payment Due."
16. The dollar amount of the next principal payment is equal to the principal amount of new loan, but today's date plus the term of the new loan is not equal to the next principal due date.
17. The dollar amount of the next principal payment is not equal to the principal amount of new loan, but today's date plus the term of the new loan is equal to the next principal due date.

PAYMENT OR REBATE ERRORS

18. There is an interest payment, but there is no interest paid to date.
19. There is a dollar amount of the next principal payment, but there is no next principal due date.
20. There is a next principal due date, but there is no dollar amount of the next principal payment.

21. On an interest payment or rebate the interest paid to date is invalid.
22. On an interest payment, the next principal due date is invalid.
23. Actual and computed discount do not agree.*
24. Actual and computed interest do not agree.*
25. (Unassigned).
26. There is a rebate on a demand loan payment.
27. On a rebate transaction there is no principal payment.

*Comparisons of actual to computed interest, discount, or rebate prescribe an error only if the variance exceeds fifty (50) cents.

WEEKLY TESTS

1. Represents a payment transaction where there is not a loan amount outstanding (a payment on a fictitious loan).
2. Represents a situation where the type of loan code punched with a principal payment does not agree with the master file type of loan code.
3. Represents a situation where a rebate of interest occurred but the interest was never collected originally (rebate on a non-discount loan).
4. Represents a transaction where a rebate was paid but the computer calculates a different amount of rebate.
5. Represents a transaction where the interest rate used to compute a rebate of interest does not agree with the interest rate used originally to compute the discount.
6. Represents a situation where the loan has been paid off but interest has not been collected to maturity.
7. Represents a situation where the number of days used to compute an interest amount is not equal to the number of days since the old interest paid to date to the new interest paid to date.
8. Represents a situation where the interest rate used to compute an interest amount collected does not agree with the original stated interest rate on the loan.
9. Represents a situation where the principal amount on which an interest amount has been computed does not agree with the interest-bearing principal amount of the loan.

EXHIBIT B

In addition to providing more meaningful, complete, and accurate management information, the daily statement format is an automatic control device for controlling receivables and accruals. The statement format enforces the computation of receivables by a method that calls for all accrual entries, cash receipts, and adjustments for the day to be reflected on the statement of income and in the resulting receivable or accrual balance shown thereon.

This computation is an automatic product of each income or expense line on the daily income statement. This establishes a method of computing and posting receivables and accruals to the general books of account that is difficult to tamper with by adjustments that otherwise would not find their way to the statements. Normal financial statement presentation shows receivable and accrual items separately on the statement of condition, with no indication of the method and amounts used to arrive at the balance shown. This opens the door to possible undetected maneuvering by forcing adjustments through balance sheet accounts. This possibility is precluded almost completely by the Wilton Manors National Bank statement format.

The daily statement provided is illustrated in Exhibit A on page 23. This approach to reporting is not new, nor is it significant in itself. What is significant is the fact that the computer, a nonhuman third party, absorbs the detailed transactions, ties them to general ledger cash postings, picks up prior period balances, calculates accrual changes, and produces an audited daily statement.

The "this day special" accrual column is provided to reflect income and expense for weekend days and holidays or for reporting special nonrecurring income or expense items. The computer automatically picks up the correct number of days' income or expense required to reflect a weekend, holi-

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REPORT FORMATS

AUDIT EXCEPTION REPORT

LOAN NUMBER	ERROR NUMBER	ERROR DESCRIPTION	AMOUNT OF PAYMENT \$	AMOUNT OF NEW LOAN \$	AMOUNT OF INTEREST, DISCOUNT OR REBATE \$	TRANSACTION DATE
-------------	--------------	-------------------	-------------------------	--------------------------	--	------------------

Other exception reports for savings account errors, general ledger posting, errors, etc., have similar format.

COMMERCIAL LOAN ANALYSIS REPORT (By Type, By Interest Rate)

TYPE OF LOAN	INTEREST RATE	LOAN BALANCE \$	INTEREST RECEIVABLE
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(20 possible types of loans) (32 possible interest rates within any type of loan class)

LOAN PAID OUT REPORT

TRANSACTION DATE	LOAN NUMBER	AMOUNT OF FINAL PAYMENT \$	INTEREST FACTOR
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In instances where a loan has been paid out, but interest has not been paid to maturity, an amount will appear in the interest factor column of the report.

DELINQUENT REPORT

LOAN NUMBER	DATE DUE	DAYS DELINQUENT	TIME		DEMAND DELINQUENT INTEREST
			DELINQUENT PRINCIPAL	DELINQUENT INTEREST	

EXHIBIT C

COMMERCIAL LOAN—FILE INTERROGATION

LOAN NUMBER	DUE DATE OF NEXT PRINCIPAL PAYMENT	DISCOUNT CODE	INTEREST RATE	DATE TO WHICH			LOAN TYPE	LOAN DATE	TERM	INTEREST FACTOR	AMOUNT DUE NEXT PRINCIPAL DUE DATE	DAILY EARNINGS RATE
				INTEREST IS PAID	PRINCIPAL AMOUNT	LOAN DATE						
10089	9/30/62	01	6.00	6/1/63	900.00	15	6/1/61	730	(-26.00)	50.00	1889	

EXHIBIT D

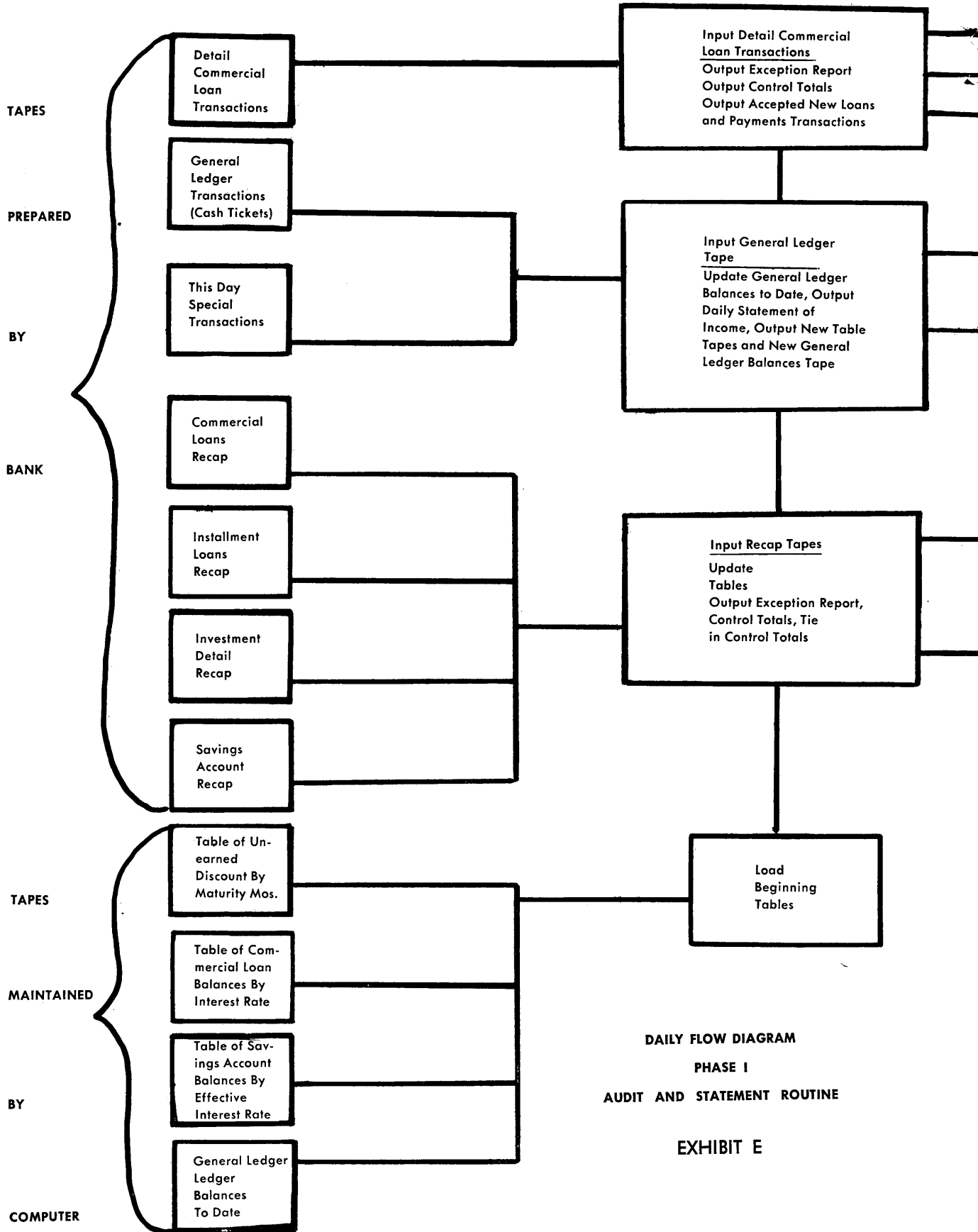
day, weekend with a preceding or following holiday, or any other possible combination of nonoperating days.

Audit exception reports

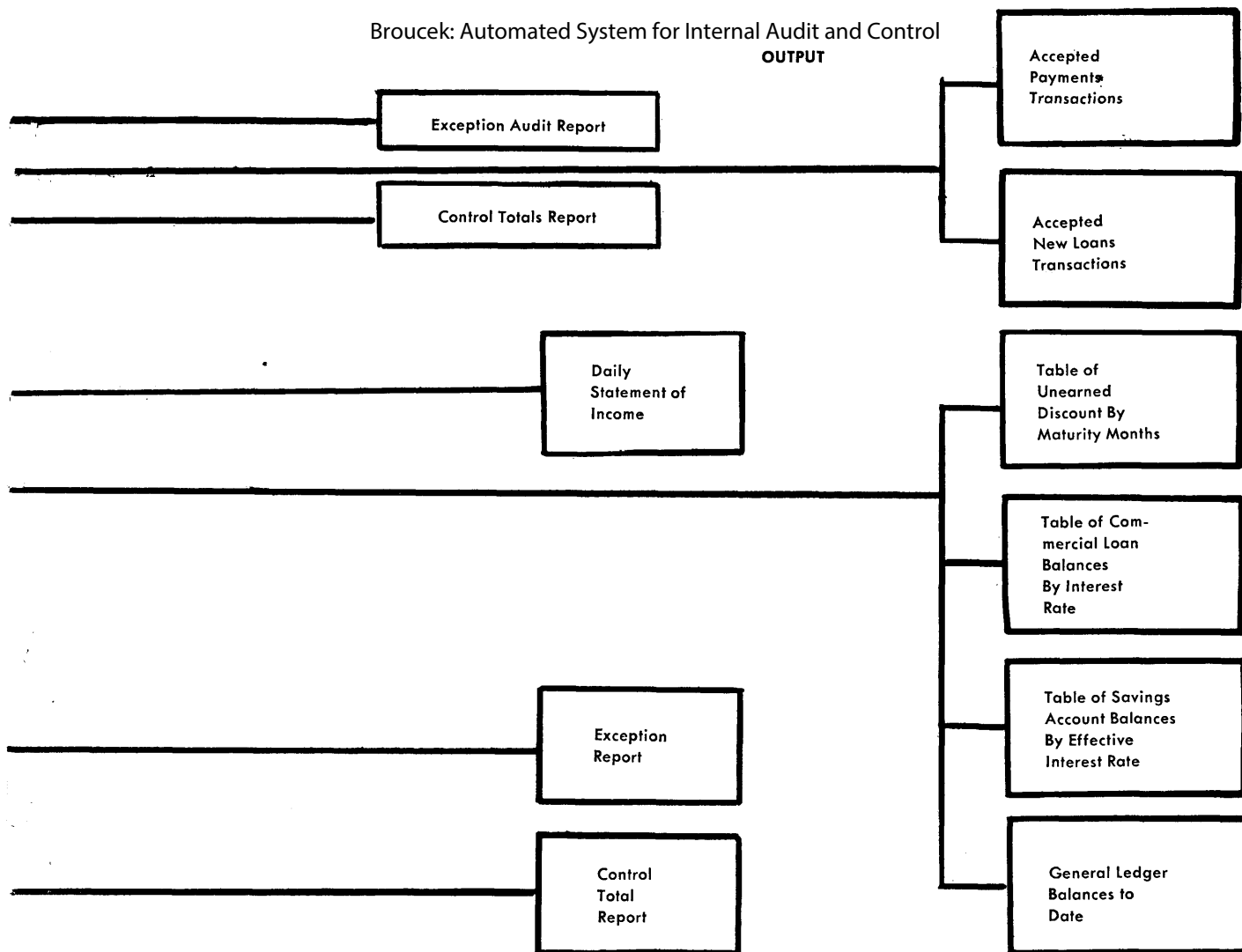
The system also provides daily and weekly auditing of commercial

loan transactions, with audit exception reports. This is the method: Every entry posted to the liability ledger or to detail loan account ledgers is audited each day. It is subjected to a series of 27 tests to determine the accuracy of the information. Loan transactions that fail to meet any one of these

tests are printed out on a daily audit exception report, which is returned to the bank the following day for further study and checking. All exceptions that appeared on any exception report are subsequently re-entered in corrected form. When the adjusted or corrected data are prepared and for-



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OUTPUT



warded to the computer, they are again subjected to the daily audit testing before being accepted for further audit processing.

At the end of each week detail loan transactions that have been processed and accepted by the daily audit testing program are subjected to a final series of audit tests which further verifies the accuracy of payment transactions by comparison of all details entered with each payment transaction against a master commercial loan file maintained by the system for each loan outstanding. During the course of this weekly audit testing the master commercial loan detail

file is posted and updated through the end of the weekly period. At the end of each weekly period all errors discovered as a result of the weekly audit testing are printed out on an exception report, which is forwarded to the bank's internal audit department for further checking. A list of errors detected by the daily and weekly audit testing of commercial loan transactions is presented as Exhibit B on page 24.

When the master detail loan file has been completely updated by the weekly testing and updating program, the new detail file is processed in order to prove its final agreement with the control ac-

counts established and maintained for all loans by type of loan. In addition, a weekly loan analysis report is produced that breaks out loan and interest receivable balances by type of loan and by interest rate. The interest receivable and daily earnings amounts on commercial loans as indicated by the weekly loan analysis report are compared with the related amounts appearing on the daily statement, and any differences are adjusted on the daily statement of income.

As a further control and audit feature, all loans paid out during the week are printed out on a separate report which is forwarded to

the bank each week for further study. This control establishes a written record of all loans removed from the commercial loan file during any period.

A delinquent report is prepared from the detail commercial loan file at different dates each month as a further control measure. All time demand loan principal and interest payments that are delinquent at the date of preparation appear on this report along with the due dates and number of days delinquent for each delinquent payment. The formats for the audit exception report, commercial loan analysis report, loan paid out report, and delinquent report are illustrated in Exhibit C on page 25.

Certain special purpose reports are provided to enable officers of the institution to interrogate all or a portion of all detailed audit files at any date for testing purposes. The example illustrated in Exhibit D on page 25 is a file printout of Commercial Loan 10089.

Other audits

A program for audit of unearned discount on installment loans provides a detail check wherein all installment loans at the audit date are processed and the amount of remaining discount on each loan is computed at that date. The computer maturity files maintained by months of discount maturity are adjusted to the audit analysis balances at the audit date.

A program is also provided for either the auditing of time deposit interest or the determination and reporting of interest on all time deposit accounts for any interest period.

Input data

A paper tape prepared as a by-product of posting to some source record within the bank on an accounting machine provides the data for computer audit testing. For example, entries posted to commercial loan liability ledgers are punched into paper tape as a by-

product of the posting operation. A commercial loan transaction journal is prepared simultaneously. At the end of each day the accounting machine control totals are the source for preparation of cash tickets for general ledger posting purposes.

Similar techniques are employed in the posting of other detail entries on savings accounts, installment loans, etc. Detail data tapes are prepared as by-products of normal bookkeeping posting; control totals on such posting runs are the basis for cash postings to the general ledger.

It is not essential to the system that data originate in this manner or that they be in paper tape format. There are other techniques for achieving the same end. The approach described here, however, enforces good control over data creation by mechanically assuring that entries posted to subsidiary records find their way "unaltered" into the audit data. It would require the agility of a gazelle, the mentality of an Einstein, and the audacity of a Russian to successfully create a proof journal, ledger record, and audit tape that did not contain identical information.

General ledger posting at the end of each day involves posting of cash transactions only and the simultaneous preparation of another audit tape.

The computer receives the following daily data audit tapes:

1. General ledger cash transactions
2. Commercial loan detail transactions
3. Installment loan summary transactions—new discount and/or rebates by number of months to maturity of loan
4. Time deposits summary transactions—net change in time deposits balance by effective interest rate
5. Investment detail transactions.

The tapes containing savings account detail transactions are prepared on a daily basis but processed only quarterly. These tapes are punched as a by-product of a

daily old balance/new balance back office proof run on the accounting machine.

Computer operation

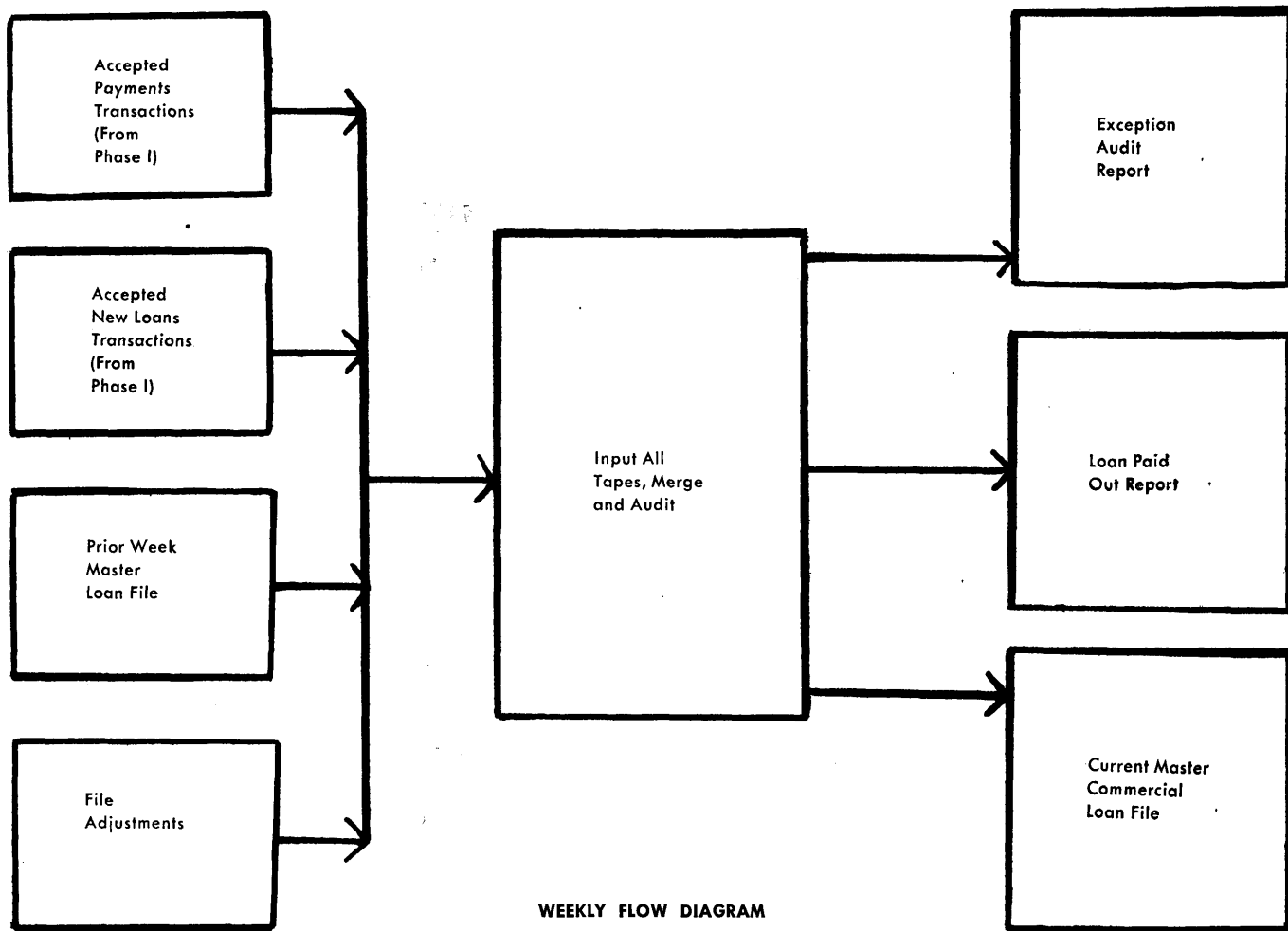
The computer processing flow is outlined in Exhibit E on pages 26 and 27 and Exhibit F on page 29. Exhibit E is the flow chart for daily processing; Exhibit F, for weekly processing.

The first step each day is to load into the computer the income or expense control tables for unearned discount, commercial loans, and time deposits and the prior day general ledger tables. The next step is to process the current day recap tapes and update the control tables. Then come entry and processing of all general ledger postings or special adjustments made by the bank that day.

All control table net changes processed are then reconciled to general ledger entries processed. Any exceptions detected are printed on a daily exception report. When all transactions have been reconciled, the daily statement is produced, and new table tapes and updated general ledger balance tapes are dumped from memory.

The final daily step is to process and audit all detail commercial loan transactions. The net total of all commercial loan entries processed is reconciled to general ledger postings. Any commercial loan transactions that fail to meet audit requirements are rejected by the computer and printed on a daily exception report. All acceptable transactions are rearranged in format and punched in a payments or new loan transactions file tape, which is processed at the end of each week when the master loan file is updated. As was pointed out earlier, all rejected transactions are repunched by the bank and resubmitted for audit before the end of each week.

The weekly audit and update run on commercial loans completes the audit tests on all transactions for each period of activity. Slight deviations in the final totals of in-



WEEKLY FLOW DIAGRAM
PHASE II
AUDIT & LOAN FILE UPDATING

EXHIBIT F

terest receivable on all loans in the detail file and the amount appearing on the daily statement are adjusted by a special adjustment once each week.

Conclusion

The audit and control system described in this article applies the computer to the audit process without disturbance of the normal bookkeeping functions. It does not attempt to substitute bookkeeping techniques for audit techniques or audit procedures for bookkeeping procedures.

Bookkeeping entries are captured at the source of original entry for audit test purposes. Instead of employing a large-scale computer system such as that required to maintain daily bookkeeping entries, the system uses a small satellite computer system for auditing. It could be applied by smaller banks with the aid of a service bureau or by larger banks with a subsidiary computer within the internal audit department.

Any or all parts of the system of daily accruals and internal audit controls may be applicable to any given financial institution, depend-

ing upon the institution's needs, its financial policies, its requirements that such policies be reflected within its records, and its approach to internal audit control. The system combines the economies of automating certain techniques within the normal bank record-keeping function with the advantages of a tight, thorough, automated control over entries originating at the bank that affect income-producing assets of the institution. The system is sufficiently flexible to be altered to meet changing conditions and unique situations within an individual bank.