80-10211
JSC-12917 NASA CR.
160678

FINAL DESIGN SPECIFICATION
FOR
EOD-LARSYS/DATA TRANSFORMATION PROCESSOR MODIFICATION

Job Order 81-127

(TIRF 76-0078)

(E80-10211) FINAL DESIGN SPECIFICATION FOR EOD-LARSYS/DATA TRANSFORMATION PROCESSOR MODIFICATION (Lockheed Electronics Co.) 112 p HC A06/MF A01 N80-29790
CSCL 05B Unclas
G3/43 00211

Prepared By

Lockheed Electronics Company, Inc.
Systems and Services Division
Houston, Texas

Contract NAS 9-15200

For

EARTH OBSERVATIONS DIVISION

SPACE AND LIFE SCIENCES DIRECTORATE

National Aeronautics and Space Administration

LYNDON B. JOHNSON SPACE CENTER

Houston, Texas

April, 1977

LEC-10662

JSC-12917

FINAL DESIGN SPECIFICATION
FOR
EOD-LARSYS/DATA TRANSFORMATION PROCESSOR MODIFICATION

Job Order 81-127
(TIRF 76-0078)

PREPARED BY

J. K. Rowland

APPROVED BY

P. L. Krumm, Supervisor
Software Development Section

Prepared By
Lockheed Electronics Company, Inc.
For
Earth Observations Division

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS

April, 1977

LEC-10662

CONTENTS

1. SCOPE

1.1 GENERAL

This specification establishes the design specifications and describes modifications made to the Data Transformation processor of the EOD-LARSYS system to satisfy the requirements specified on the IDSD category 1 (Job Order 81-127) task agreement titled, "Data Transformation Program Modification", dated 6/11/76. The EOD-FCMO reference for the task is TIRF (Transmittal Information Request Form) 76-0078.

2. APPLICABLE DOCUMENTS

The following documents, of exact issue shown, form a part of this specification to the extent specified herein:

- EOD-LARSYS Users Document: LEC 3984 Revision II
- Task Description and Agreement, dated 6/17/76, "Data Transformation Program Modification"
- EOD-FCMO TIRF 76-0078

3. SYSTEM DESCRIPTION

3.1 HARDWARE DESCRIPTION

N/A

3.2 SOFTWARE DESCRIPTION

The Data Transformation processor of the EOD-LARSYS system is modified to include an optional additive transformation bias vector, optional input and application of scaling parameters, to allow the scaling parameters used by the processor to be output on punched cards in processor control card format, and to allow for a transformation matrix with up to sixteen (16) linear combinations (i.e., up to 16 × 30 transformation matrix).

The application of the input transformation matrix was removed from subroutine LNTRAN and TRHIST and replaced with a subroutine called TRANSF, which implements the transformation of the input data vectors. The optional input transformation bias vector is incorporated in the transformation implemented in TRANSF.

Previously all transformed data values were arbitrarily scaled to a range of 0-256. This procedure has been changed so that no rescaling will be applied unless a processor control card, "RESCALE", is input directing the processor to scale the transformed data to a range 0-255. If scaling is requested, either the same (histogram or statistical) procedures as before are used for scaling or the scaling parameters are input to the processor by an "OPTION SCAFAC" control card.

The "OPTION PUNCH" processor control card initiates the punched card output of the scaling parameters used by the processor. These scaling parameters may be used as input in subsequent runs, without modification to the card(s).

3.2.1 SOFTWARE COMPONENT NO. 1 (DATATR)

3.2.1.1 Linkages

DATATR is the driver program for Data Transformation processing and is called by MONTOR, the LARSYS executive program. DATATR may call SETUP8, SETREM, KBTRAN, MAXMAT, TRHIST, or LNTRAN during processing.

3.2.1.2 Interfaces

DATATR utilizes common blocks GLOBAL, INFORM, and TRBLCK.

3.2.1.3 Inputs

Calling arguments unchanged in DATATR.

3.2.1.4 Outputs

None

3.2.1.5 Storage Requirements

Storage used: Code - 167_8, Data - 4171_8

3.2.1.6 Description

DATATR controls the Data Transformation processing. To determine which options are to be exercised during processing, SETUP8 is called to read the Processor Control Cards. If scaling parameters are input by control cards, SETREM is called to initialize the arrays CON and MIN with the scaling parameters from the input scale parameter pairs. The processing continues with a call to LNTRAN, where the data is transformed. (See section 3.2.6.6 for equation) If rescaling is desired by the statistical method, the histogram method, or the user input of parameters method, the processing continues with either a call to KBTRAN for the statistical method, to TRHIST for the histogram method, or to LNTRAN for the user-input method.

If rescaling is not specifically requested by means of the RESCALE control card, no rescaling of transformed data values will be performed.

3.2.1.7 Flowchart

See Appendix A

3.2.1.8 Listings

See Appendix B.

3.2.2 SOFTWARE COMPONENT NO. 2 (SETUP8)

3.2.2.1 Linkages

SETUP8 is called from DATATR. In the process of reading control cards, SETUP8 may call NXTCHR, FIND, BMFIL, NUMBER, ORDER, CRDSTA, FLTNUM, REDSAV, PRTCOV, or WRTBM.

3.2.2.2 Interfaces

SETUP8 utilizes common blocks GLOBAL, INFORM, and TRBLCK.

3.2.2.3 Inputs

Additions to or modification of the input to the SETUP8 subroutine that result from this data transformation processor modification are the control cards OPTION PUNCH, OPTION SCAFAC, BIAS, and RESCALE. Control card formats are described in section 4.1, User Documentation.

3.2.2.4 Outputs

SETUP8 outputs a line printer summary of the control card input. Input parameters or processing flags as a result of the OPTION PUNCH, OPTION SCAFAC, BIAS, or RESCALE control cards are returned to DATATR by subroutine argument.

3.2.2.5 Storage Requirements

Storage used: Code - 1372_8, Data - 303_8

3.2.2.6 Description

SETUP8 reads and analyzes all input processor control cards, including any parameter values provided on the control cards and sets default values for Data Transformation. Defaults added as a result of this specification are: (1) the additive transformation bias vector is set = 0 if no BIAS control card is provided, and (2) transformed data rescaling is not performed if the RESCALE control card is not input.

3.2.2.7 Flowchart

See Appendix A.

3.2.2.8 Listings

See Appendix B.

3.2.3 SOFTWARE COMPONENT NO. 3 (SETREM)

3.2.3.1 Linkages

SETREM is called from DATATR. A Univac system program, CMERR, is called by SETREM, to provide an error exit if encountered with scale parameters read from the OPTION SCAFAC control card.

3.2.3.2 Interfaces

Communication with DATATR is accomplished via calling arguments.

3.2.3.3 Inputs

The inputs to the SETREM subroutine (via calling argument) are the scale parameters read from the OPTION SCAFAC control card(s).

The scaling parameters are ordered pairs on the OPTION SCAFAC control card. Each pair is associated with one component of the transformed data. The first value in each pair is the multiplicative factor, and the second value in each pair is the transformed data minimum "M". These scaling parameter pairs are used in LNTRAN to scale the transformed data to the range of 0-255.

3.2.3.4 Outputs

SETREM outputs the scaling parameters to DATATR via subroutine arguments, CON and MIN (with $CON_i = S_i$ and $MIN_i = M_i$; see the description of the OPTION SCAFAC card, section 4.1).

3.2.3.5 Storage Requirements

Storage used: Code - 75_8, Data - 107_8

3.2.3.6 Description

SETREM receives the input scale parameters from DATATR in a single array (CONMIN) as they have been read from OPTION SCAFAC control card(s) in SETUP8. Since the input scale parameters consist of two values – the scaling factor, S (=CON), and the additive scaling bias, M (=MIN) – these values must be unpacked from the input array and stored in the CON and MIN arrays for use by LNTRAN. SETREM checks to see that there is one-for-one correspondence between input scaling parameter pairs and the components of the transformation. If the test for input pair versus transformation component fails due to too many or too few input scale parameter pairs, an error message is printed and Data Transformation is terminated by SETREM. The error message returned by SETREM is:

"SETREM ERROR – THERE WERE XX SCALE FACTORS AND MINIMUM VALUES INPUT THROUGH SCAFAC OPTION. YY LINEAR COMBINATIONS WERE REQUESTED. THERE MUST BE A SCALE FACTOR AND A MINIMUM VALUE FOR EACH LINEAR COMBINATION. THE PROGRAM WILL TERMINATE THROUGH CMERR."

3.2.3.7 Detailed Flowcharts

See Appendix A.

3.2.3.8 Listings

See Appendix B.

3.2.4 SOFTWARE COMPONENT NO. 4 (TRHIST)

3.2.4.1 Linkages

TRHIST is called from DATATR. TRHIST calls TAPHDR, FSBSFL, LAREAD, FLDINT, LINERD, FLDINT, and TRANSF.

3.2.4.2 Interfaces

TRHIST utilizes common blocks GLOBAL, INFORM, and TRBLCK.

3.2.4.3 Inputs

Input that affects TRHIST is the additive transformation bias vector input via the BIAS control card, and used in the transformation of data as Ax+b, where A = the transformation matrix, x = data, and b = bias value from the input BIAS control card. Tne input bias vector is transmitted to TRHIST via a calling argument, BIAS, added as a result of these modifications.

3.2.4.4 Outputs

There is no change in TRHIST output resulting from this specification.

3.2.4.5 Storage Requirements

Storage used: Code - 744_8, Data - 204_8

3.2.4.6 Description

The function performed by TRHIST is to compute scaling parameters for the transformed data, using a histogram of the transformed data to derive the scaling parameters MAX, MIN, and CON. A histogram of a segment of the transformed image is performed to find the maximum value, MAX_i, and minimum value, MIN_i, for each component of the transformed data. The scale factor, CON_i, is computed as $255/(MAX_i - MIN_i)$. The input (or default) PEROUT is applied in TRHIST in obtaining the scaling parameters MAX, MIN, and CON.

If the user defined field is smaller than 2000 pixels, all pixels are used in the histogram. Otherwise the following formula is used to determine the line increment and sample increment needed to obtain 2000 points for the histogram:

$$\alpha = \left(\frac{M*N}{2000}\right)^{\frac{1}{2}}$$

where M = Number of samples per line

N = Number of lines

α = increment (integer)

The input additive transformation bias vector is passed to TRHIST by subroutine argument (BIAS) and is used in TRANSF, which is called by TRHIST, to provide the transformation Ax+b, with A = the transformation matrix, x = data vector, and b = transformation bias vector.

The function performed by TRHIST is invoked by the input RESCALE control card when neither of the other two options for rescaling (statistical and user-input) are specified.

3.2.4.7 Flowchart

See Appendix A.

3.2.4.8 Listings

See Appendix B.

3.2.5 SOFTWARE COMPONENT NO. 5 (LNTRAN)

3.2.5.1 Linkages

LNTRAN is called from DATATR. During its processing LNTRAN calls LARSYS routines TAPHDR, FSBSFL, LAREAD, FLDINT, WRTHDR, LINERD, FLDINT, TRANSF, WRTLIN, and COMHST and UNIVAC system routine NTRAN.

3.2.5.2 Interfaces

LNTRAN utilizes common blocks GLOBAL, INFORM, and TRBLCK.

3.2.5.3 Inputs

Additional calling argument input to the LNTRAN routine due to these modifications include the scaling flags (RESCAL and SCAFLG) the punch card flag (NPUN), the transformation bias values (BIAS), and the flag SCAFLG set to indicate the source of the scaling parameters MAX, MIN, and CON (SCAFLG = 1; histogram, SCAFLG = 2; statistical; SCAFLG = 3, user-input).

3.2.5.4 Outputs

The transformed data set is output on UNIVAC Unit L (Fortran Unit 14) as usual. This assignment must be made to tape, if the transformed data set is to be saved by the user. The output transformed data set file will be in one of two formats, as specified on the FORMAT control card.

3.2.5.5 Storage Requirements

Storage used: Code - 2130_8, Data - 17477_8

3.2.5.6 Description

The functions provided by LNTRAN are to initiate the transformation of the data by a call to TRANSF, to rescale the transformed data, histogram the transformed data, apply PEROUT to the distribution of the transformed data, and output that data to a file, TRFORM. Depending on the flag, RESCAL, the transformed data may be either rescaled to 0-255 range or output to the file unscaled as it is received from the transformation subroutine, TRANSF. If rescaling is not performed (RESCAL = 0) the transformed values are checked for being within the range 0-255. Any value outside the range are set to the range minimum or maximum (0-255).

If the transformed data is to be rescaled (RESCAL > 0), rescaling is performed in LNTRAN using the following equation:

$$Y_i = CON_i \left(XT_i - MIN_i\right)$$ for each component i of the transformed data vector

where

MIN_i = minimum value for component i

XT_i = transformed data point

$CON_i = 255/(MAX_i - MIN_i)$

Y_i = rescaled transformed data point

If the OPTION PUNCH control card has been input, LNTRAN will output to the system punch file the card images containing the scaling parameters used to rescale the transformed data. The punched cards will be in control card format (OPTION SCAFAC=) and each card will contain two pairs of scaling parameters (CON, MIN). Each pair is associated with one component of the transformed data.

3.2.5.7 Detailed Flowcharts

See Appendix A.

3.2.5.8 Listings

See Appendix B.

3.2.6 SOFTWARE COMPONENT NO. 6 (TRANSF)

3.2.6.1 Linkages

TRANSF is called from both TRHIST and LNTRAN.

3.2.6.2 Interfaces

TRANSF utilizes common block TRBLCK.

3.2.6.3 Inputs

TRANSF receives the tape-input pixels, the transformation bias vector, the transformation matrix, and other parameters it needs to utilize this information via subroutine argument and the common block TRBLCK. The transformation bias vector is input to the processor, then to TRANSF, via the BIAS control card. The transformation matrix is input to the processor, then to TRANSF, via the B-MATRIX control card. The BIAS control card is discussed in section 4.0 below. The B-MATRIX control card is discussed in the EOD-LARSYS User Document, LEC-3984.

3.2.6.4 Outputs

TRANSF returns the transformed data value argument to LNTRAN (or TRHIST).

3.2.6.5 Storage Requirements

Storage used: Code 122_8, Data 34_8

3.2.6.6 Description

TRANSF performs the following linear transformation:

$$\vec{Z} = A\vec{X}$$

or, optionally,

$$\vec{Z} = A\vec{X}+\vec{b}$$

where

$\vec{Z}$ = transformed data vector

A = transformation matrix; either the B-Matrix or a user-supplied transformation matrix

$\vec{X}$ = input data vector

$\vec{b}$ = an additive bias vector

The B-Matrix is a dimension reduction transformation generated by the SELECT processor in EOD-LARSYS. The B-Matrix may be input to DATA-TR either from a file or a card deck created by the SELECT processor.

A user-supplied transformation matrix must be input in the same format as the B-Matrix. The format of the input transformation matrix is described in section 3.0 of the EOD-LARSYS USERS DOCUMENT, LEC-3984.

For the transformation, $\vec{Z} = A\vec{X} + \vec{b}$, the bias vector, $\vec{b}$, is an option to the user. The option is exercised and the bias vector is input via the BIAS control card. TRANSF performs the data transformation, $\vec{Z} = AX$, in the absence of the BIAS control card.

3.2.6.7 Detailed Flowcharts

See Appendix A.

3.2.6.8 Listings

See Appendix B.

4. OPERATION

The following section describes the Data Transformation processor as modified per this specification and the processor control cards added or revised due to this modification. Operation of the Data Transformation processor, utilizing the changes described in this specification, is accomplished by use of processor control cards as described below.

4.1 USER DOCUMENTATION

The following table contains the options that affect this specification, in the form of the processor control cards which are added or modified to initiate the design specification. The format of these control cards are standard EOD-LARSYS format; i.e., the keyword must begin in card column 1, the parameter(s) must begin in or after column 11 and end in or before card column 72:

KEYWORD	PARAMETER(S)	FUNCTION
RESCALE	None (DEFAULT: No rescaling performed)	Initiates rescaling of the transformed data set to an integer range, 0-255. No parameters are input on this card. The method of rescaling will depend either on use of another control card to indicate the type of rescaling (statistical or user-input) to be performed, or defaulting to the histogram method if another option is not input.

KEYWORD	PARAMETER(S)	FUNCTION
OPTION	SCAFAC=(S_1,M_1), $(S_2,M_2),\cdots,(S_N,M_N)$ N=1, No. components of $\vec{Z}$ (DEFAULT: Histogram method of rescaling)	Initiates the use of input scaling parameters, (S_i,M_i), to be used in rescaling the transformed data set to a range of 0-255. The scale parameters are ordered to be in correspondence with the $\vec{Z}$ (transformed data) components which they are to be applied to. Each pair of scaling parameters is: S_i=scale factor for component i $=255/(MAX_i-MIN_i)$ M_i=minimum of component i. S_i and M_i are <u>decimal</u> (floating point) numbers used as: $Y_i = S_i\left(\vec{Z}_i - M_i\right)$, where Y_i is the rescaled transformed $\vec{Z}$, component i. The enclosing parenthesis, "(" and ")", and the separating comma, ",", are required for each pair of scaling parameters. The scaling parameter pairs are also separated by the comma, ",". Blanks are ignored on the card. Continuation of a list of scaling parameters is accomplished by repeating the OPTION SCAFAC= card, with the list of pairs continuing from the preceding OPTION SCAFAC= card.

KEYWORD	PARAMETER(S)	FUNCTION
BIAS	$b_1, b_2, \cdots, b_k$ or $N*b_i, b_{i+1}, \cdots$ k=NO. of components in the transformed data set N=an integer repetition factor for b_i (DEFAULT: $b_i = 0.0$ $i = 1, \cdots, 16$)	b_i are decimal (floating point) numbers, separated by a comma, ",", which comprise the bias vector to be applied in the transformation of the input data set: $\vec{Z} = A\vec{X} + \vec{b}$
OPTION	PUNCH (DEFAULT: no punched output scaling parameters)	Directs the program to output punched cards containing the scaling parameters, (S_I, M_I), which were used to rescale the transformed data set. NOTE: If PEROUT > 0, the output scaling parameters reflect the range of the transformed data after application of PEROUT.

5. TEST PROCEDURE

5.1 DESCRIPTION OF TESTS

Five runs of the modified data transformation processor will be used to verify the output of the processor. The output from each of the five test runs is contained in Appendix C. TEST RUN 1 is headed by "SAMPLE RUN NO. 1", TEST RUN 2 is headed by "SAMPLE RUN NO. 7", TEST RUN 3 is headed by "SAMPLE RUN NO. 2", TEST RUN 4 is headed by "SAMPLE RUN NO. 5", and TEST RUN 5 is headed by "SAMPLE RUN 6". In all test runs, the transformation matrix following the "B-MATRIX CARDS" control card is a unit matrix.

TEST RUN 1 illustrates the default no-reading option (no "RESCALE" control card input), with no distribution trunication (PEROUT=0), and no bias applied to the transformed values (BIAS=[0]). With the unit transformation matrix applied, the histogram for each of the four components reflects the actual data values in each of the four channels.

TEST RUN 2 is the same as TEST RUN 1, except a selective additive bias is applied to the transformed data. Components 1 and 3 have no bias applied and the transformed values of components 2 and 4 are biased by +100 and -100, respectively. The histograms for this run illustrate the results of application of a transformation bias which is input via the "BIAS" control card.

TEST RUN 3 illustrates the results from the statistical rescaling option ("MODULE" and/or "STATFILE" control cards), with the initial range of transformed values constrained to be within 2 sigma (LAM=2) of the mean of each component, and the final output transformed values constrained to be within the central 90% of the distribution of the initial transformed values (PEROUT=5).

The histogram of each component of the final output transformed/ rescaled values will be compared for agreement with results from the unmodified data transformation processor, using the statistical rescale method. The histograms should be identical, except for allowance for the slight difference in scaling parameters due to the fact that the unmodified processor computed a scaling factor based on a range of 0-256, and the modified processor computes a scaling factor based on a range 0-255. TEST RUN 3 also exercises the option of punching the scaling parameters ("OPTION PUNCH") computed and applied in the run. The punched cards from this run will be input in TEST RUN 4.

TEST RUN 4 illustrates rescaling of transformed values with user-input scaling parameters ("OPTION SCAFAC=XX.X, ...").

The input scaling parameters are on processor control cards punched in TEST RUN 3. The histograms for TEST RUN 3 and TEST RUN 4 will be compared for agreement. The results should be identical, except for slight differences due to round-off of the input scaling parameters to three decimal places, compared to the eight decimal place values internally computed and applied in TEST RUN 3.

TEST RUN 5 illustrates rescaling by the histogram method. The histograms will be compared with histograms from the unmodified processor using the histogram rescale method. The histogram should be identical, except for slight differences reflected by the change of rescaled value range from 0-256 in the unmodified processor to a range 0-255 in the modified processor.

TEST VERIFICATION

For Data Transformation Program Modification

This verification is being conducted to insure that the delivered program products satisfy the requirements as originally stated by the requesting organization.

M C Trichel

NASA Monitor

J. C. Minter

Requestor

Developer

Barbara Hills

Cognizant System Manager

Quality Assurance

C J Hardison

Test Conductor

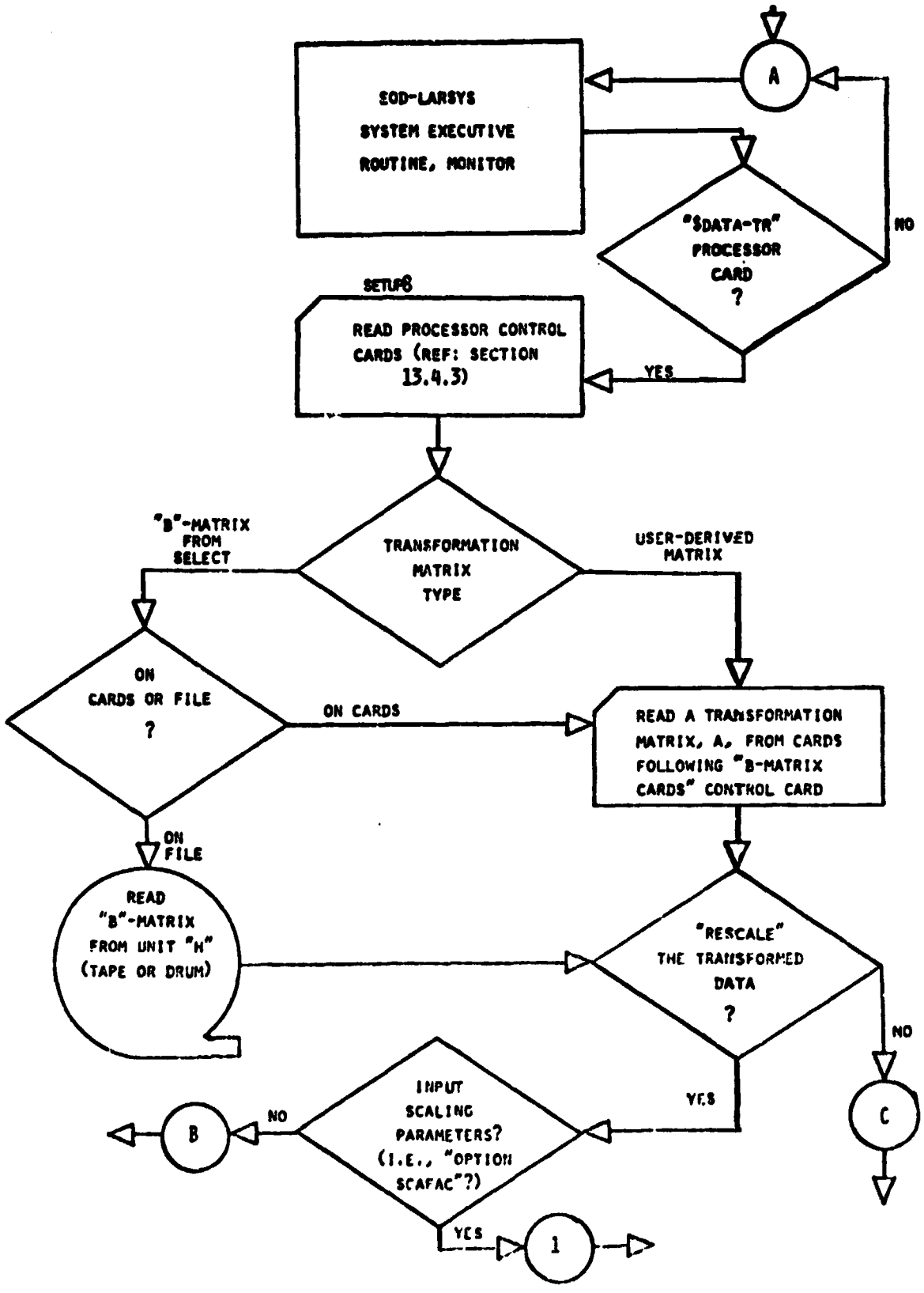
Verification Date: 4/25/77

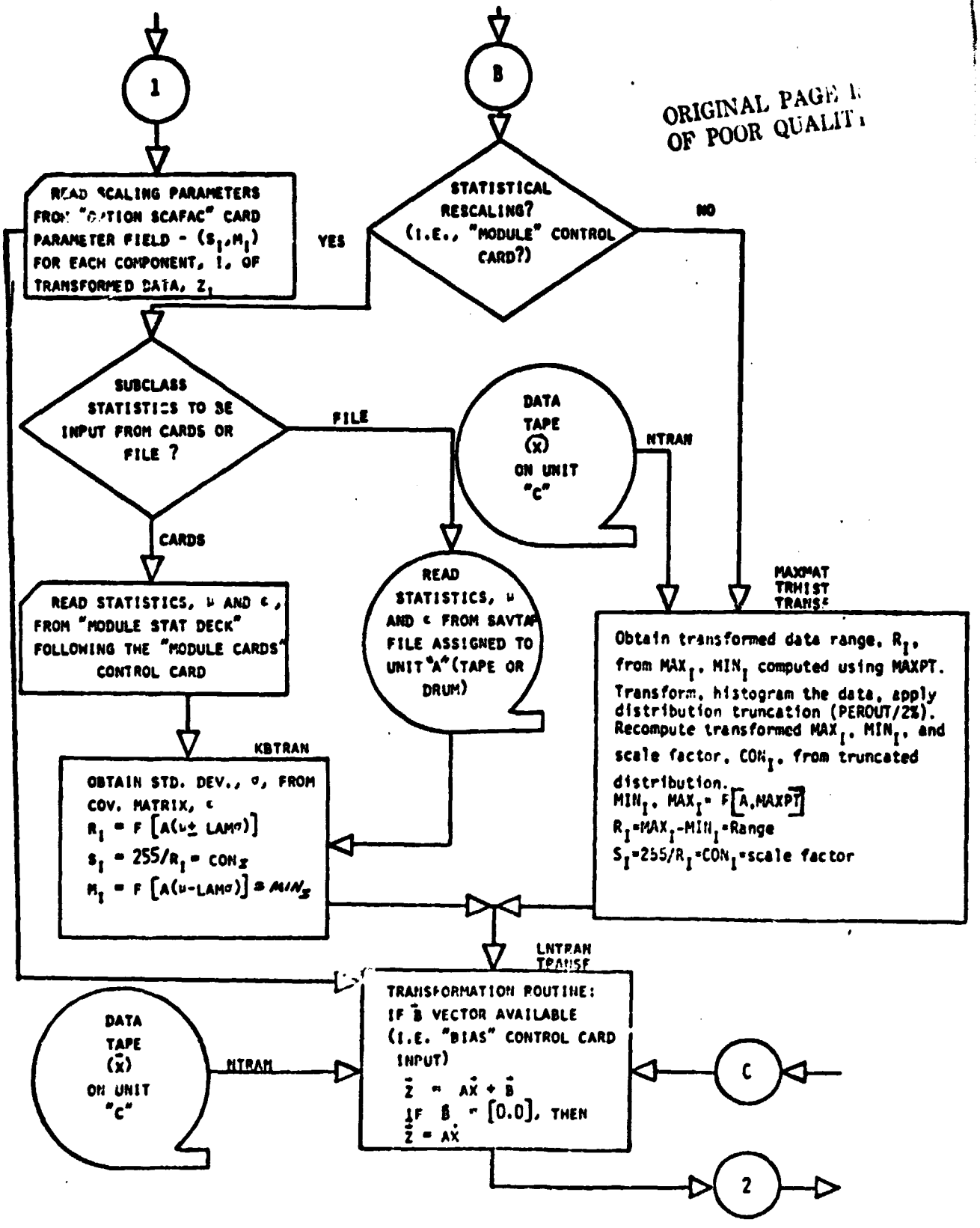
APPENDIX A

DATA TRANSFORMATION FLOWCHART

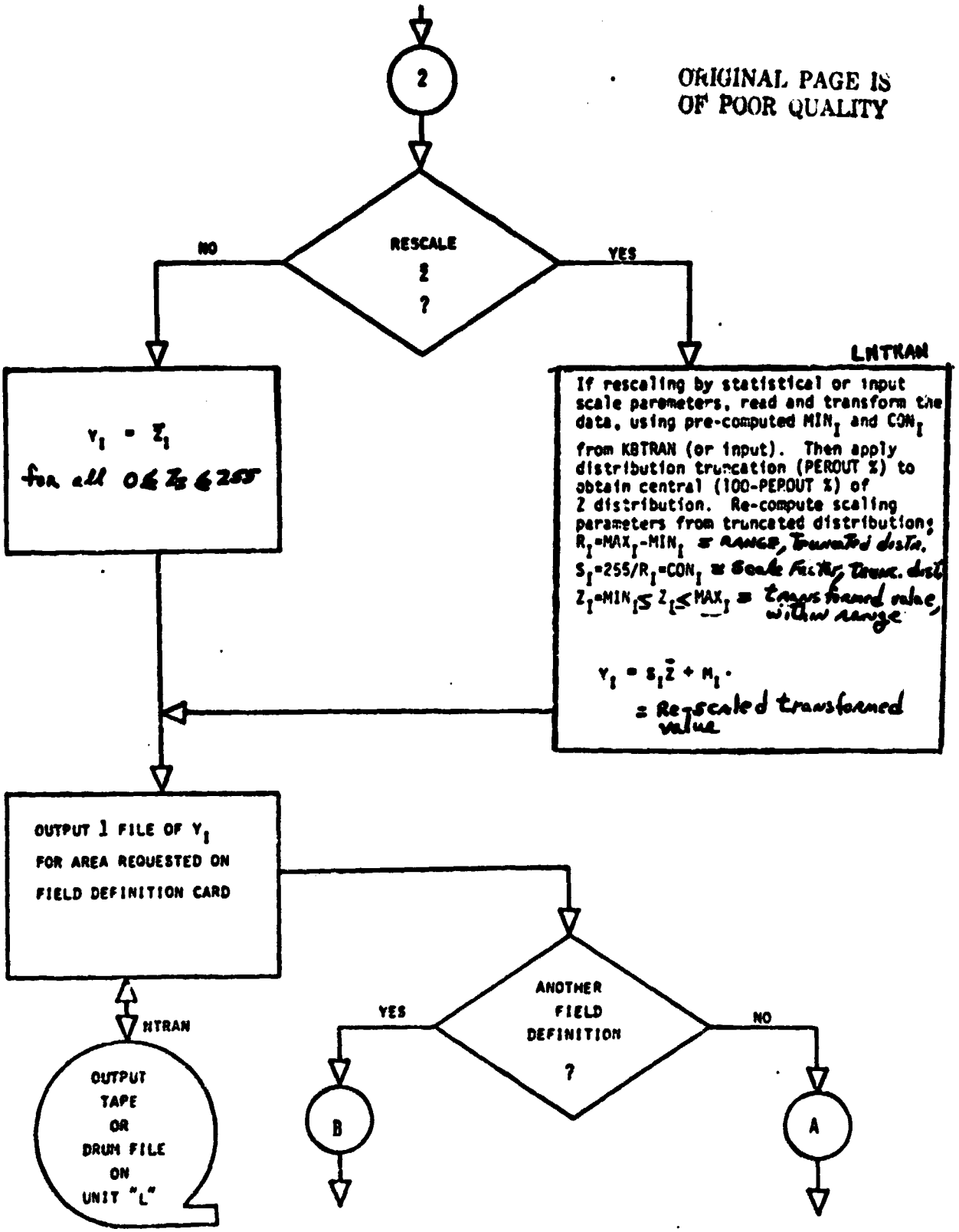
FUNCTIONAL FLOW CHART

DATA-TR PROCESSOR





ORIGINAL PAGE IS
OF POOR QUALITY



APPENDIX B

LISTINGS

```
@ FOR  DATATR,DATATR                                                                                   09 MAY 77        221 9?:
UNIVAC 1108 FORTRAN V EXEC II LEVEL 25A  -(EXEC8 LEVEL E1201001DA)
THIS COMPILATION WAS DONE ON 09 MAY 7? AT 22:09:36

   SUBROUTINE DATATR     ENTRY POINT 000257

   STORAGE USED: CODE(1) 003021 DATA(0) 004503; BLANK COMMON(2) 000000

    COMMON BLOCKS:

     0003    INFORM 001154
     0004    INBLCK 000096
     0005    GLOBAL 000075

   EXTERNAL REFERENCES (BLOCK, NAME)

     0006    SETUPB
     0007    SETHEM
     0010    RBTRAN
     0011    MAXMAT
     0012    TRHIST
     0013    LNTRAN
     0014    NROUS
     0015    N102S
     0016    NEHR3S

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

     0001     000002 123G      0001     000232 163G      0001     000077 20L       0001     000112 30L       0001     000197 50L
     0001     000200 60L       0000     004445 BDF       0000 R   001150 ACON      0000 I   004437 ADDNUM    0000 R   001100 AMAX
     0000 R   001120 AMIN      0005     000073 ASAV      0005     000074 ASAVFL    0003     000006 AVAR2     0000 R   000040 BIAS
     0000 R   000060 BMAT      0005     000055 BMFILE    0005     000056 BMKEY     0000 I   004431 BMTRIG    0003     000010 CLSID2
```

ORIGINAL PAGE IS
OF POOR QUALITY

26

```
 0003     000001 CLSVC2   0000 I 004362 COMNT    0000 R 000027 CON      0000 R 001040 CONMIN   0003   000007 COVAR2
 0005     000053 DATAPE   0005   000371 DATFIL   0005   000067 DKMHDS   0005   000066 DKUMAD   0005   000062 ERIPTP
 0005     000063 ERPKEY   0003   000015 FETVC2   0004   000010 FETVEC   0000 I 001210 FILMIS   0004   000002 FLDINF
 0000 I   004442 FLDNAM   0003   003313 FLDSV2   0003   000760 GROUPS   0003   000663 GRPCHK   0003   000566 GRPDEX
 0003     000472 GRPNAM   0000 I 004336 HDR1     0000 I 004350 HDR2     0005 I 000000 HEAD     0005   000057 HISFIL
 0005     000060 HISKEY   0000 I 004427 I        0000 I 004374 INDATE   0000   004461 INJPS    0000 I 004426 IPL19
 0000 I   004425 IPL2     0000 I 004447 IPL31    0003   003375 KEPPTS   0000 I 004433 LAM      0000 I 004441 LAK
 0000 I   004430 LCOMB    0005   000052 MAPTAP   0005   000064 MAPUNT   0000 R 000000 MAX      0003 I 001140 MAXPT
 0000 R   000020 MIN      0000 I 004443 NC       0000 I 004427 NF       0003   000000 NOCLS2   0004   000001 NOFEAT
 0003     000002 NOFET2   0005   000065 NOFILE   0003   000005 NOFLD2   0003   000471 NOGRP    0003   000001 NOSUB2
 0000 I   004440 NPUN     0004   000000 OUTFMT   0005   000070 PAGSIZ   0000 I 004432 PENOUT   0000 I 004436 RESCAL
 0005     000054 SAVTAP   0000 I 004434 SCAFLG   0005   000072 STAFIL   0003   000012 SUBUS2   0003   000011 SUBNU2
 0003     000166 SUBPTR   0003   000053 SUBVC2   0003   000004 TOTVT2   0000 I 004435 TRANSF   0005   000061 TRFORM
 0003     000003 VARS22   0000 I 004376 VERTCS   0003   000014 VERTX2

00101            SUBROUTINE DATATR(ARRAY,TOP)                                     DATR0001
00101      C                                                                      
00103            IMPLICIT INTEGER(A-Z)                                            DATR0002
00103      C                                                                      DATR0003

00103      C                                                                      DATR0004
00104            REAL    BIAS(16), BMAT(480), MAX(16), MIN(16), CON(16), CONMIN(32) DATR0005
00104      C                                                                      DATR0006
00105            REAL    AMAX(16), AMIN(16), ACON(16)                             DATR0007
00105      C                                                                      DATR0008
00105      C                                                                      DATR0009
00106            DIMENSION    ARRAY(TOP),  MAXPT(30),  FILMIS(1016)               DATR0010
00106      C                                                                      DATR0011
00107            DIMENSION    HDR1(10) , HDR2(10) , COMNT(10) , INDATE(2)         DATR0012
00110            INCLUDE COMBK1,LIST                                              DATR0013
00111            COMMON/INFORM/NOCLS2,NOSUB2,NOFET2,VARS22,TOTVT2,NOFLD2,
00111           *               AVAR2,COVAR2,CLSID2,SUBNU2,SUBUS2,FLDSV2,VERTX2,
00111           *               FETVC2(30),SUBVC2(75),SUBPTR(75),CLSVC2(60),
00111           *               KEPPTS(60),NOGRP,GRPNAM(60),GRPDEX(61),
00111           *               GRPCHK(61),GROUPS(124)
00112            END
00112            INCLUDE COMBK9,LIST                                              DATR0014
00113      C DATA TRANSFORMATION COMMON BLOCK
00114            COMMON/TRBLCK/OUTFMT,NOFEAT,FLDINF(6),          FETVEC(30)
00115            END
00116            INCLUDE COMBK6,LIST                                              DATR0015
00117            COMMON/GLOBAL/HEAD(92),MAPTAP,DATAPE,SAVTAP,DMFILE,DMKEY,
00117           *               HISFIL,HISKEY,TRFORM,ERIPTP,ERPKEY,MAPUNT,NOFILE,
00117           *     DKUMAD,DKMHDS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
00120            END
00120            DIMENSION VERTCS(2,11)                                           DATR0016
00121      C                                                                      DATR0017
00121      C                                                                      DATR0018
00121      C        RESCALING METHOD IS DETERMINED IN SETUPB :                    DATR0019
00121      C                                                                      DATR0020
00121      C        SCAFLG = 1 ,  RESCALE BY HISTOGRAM METHOD                     DATR0021
00121      C                                                                      DATR0022
00121      C        SCAFLG = 2 ,  RESCALE BY STATISTICS METHOD                    DATR0023
00121      C                                                                      DATR0024
00121      C        SCAFLG = 3 ,  RESCALE WITH USER-INPUT SCALING PARAMETERS      DATR0025
00121      C                                                                      DATR0026
```

```
00121     26.     C
00121     29.     C         IF THE FLAG   RESCAL   IS ZERO, NO RESCALING OCCURS
00121     30.     C
00121     31.     C
00121     32.     C
00122     33.           DO 10 I=1,10
00125     34.           IPL2 = I + 2
00126     35.           MDK1(I) = HEAD(IPL2)
00127     36.           IPL19 = I + 19
00130     37.           MDK2(I) = HEAD(IPL19)
00131     38.        10 COMNT(I) = 8H
00133     39.     C
00133     40.           INDATE(1) = HEAD(15)
00134     41.           INDATE(2) = HEAD(16)
00134     42.     C
00134     43.     C
00135     44.           NF = 0
00135     45.     C
00136     46.           CALL SETUP(BMAT,LCOMB,BMTRIG,PEROUT,MAXPT,AMRAY,LAM,
     .        SCAFLG , TOP, TRANSF, RESCAL, BIAS, ADUNUM, CUNMIN, NPUN )
00137     47.           IF (RESCAL.EQ.0) GO TO 50
00137     49.     C
```

ORIGINAL PAGE IS
OF POOR QUALITY

```
00137     50.     C
00141     51.           IF (SCAFLG.EQ.1) GO TO 30
00141     52.     C
00143     53.           IF (SCAFLG.EQ.2) GO TO 20
00143     54.     C
00145     55.           IF( SCAFLG .EQ. 3 )
00145     56.     C
00145     57.     .        CALL SETREM ( CONMIN, CON, MIN, ADUNUM, LCOMB )
00147     58.           GO TO 50
00147     59.     C
00147     60.     C
00147     61.     C     IF RESCALING BY THE STATISTICS METHOD, APPLY TRANSFORMATION TO
00147     62.     C     STATS ( MEANS, COVARIANCES ) , OBTAIN TRANSFORMED MAX AND MIN
00147     63.     C     USING TRANSFORMED STATS .
00147     64.     C
00150     65.        20 CALL  RBTMAN ( BMAT, LCOMB, AMRAY, LAM, MAX, MIN, CON, TRANSF )
00150     66.     C
00151     67.           GO TO 50
00151     68.     C
00151     69.     C
00151     70.     C     IF RESCALING BY THE HISTOGRAM METHOD,  OBTAIN THE PREDICTED
00151     71.     C     MAX AND MIN OF EACH COMPONENT OF THE TRANSFORMED DATA
00151     72.     C     ( VIA  MAXMAT )  AND PERFORM A HISTOGRAM OF THE TRANSFORMED
00151     73.     C     DATA ( VIA  THHIST ), IN ORDER  TO OBTAIN THE RESCALING
00151     74.     C     PARAMETERS ,  CON  AND  MIN .
00151     75.     C
00151     76.     C
00152     77.        30 CALL  MAXMAT ( AMAX, AMIN, ACON, BMAT, LCOMB, MAXPT )
00153     78.           CALL THHISTIAMRAY,AMAX,AMIN,ACON,BMAT,LCOMB,PEROUT,
     .        FILHIS,TOP,LAM,FLUNAM,NC,VERTCS,MAX,MIN,CON,
     .          BIAS)
00153     81.     C
00153     82.     C
00153     83.     C     APPLY TRANSFORMATION TO INPUT DATA, RESCALE ( IF OPTED ), APPLY
00153     84.     C  &  REJECTION ( PEROUT ) TO DISTRIBUTION OF TRANSFORMED DATA, AND
00153     85.     C     OUTPUT THE TRANSFORMED DATA ON THE FILE ,  INFORM .
```

```
      C
      C
            IF (LAR.EQ.0) GO TO 60
      C
      C
         50 CALL LNTRAN(ARRAY,MAX,MIN,CON,BMAT,LCOMB,WMTRIG,SCAFLG,PEROUT,
           * FILMIS,TOP,LAN,FLONAM,NC,VERTCS, RESCAL, BIAS,
           *  NE , NPUN )
      C
      C
            IF (SCAFLG.EQ.1) GO TO 30
      C
      C
         60 CONTINUE
      C
            DO 70 I=1,10
            IPL2 = I + 2
            HEAD(IPL2) = HDR1(I)
            IPL19 = I + 19
            HEAD(IPL19) = HDR2(I)
            IPL31 = I + 31
         70 HEAD(IPL31) = COMNT(I)
```

```
      C
            HEAD(15) = INDATE(1)
            HEAD(16) = INDATE(2)
      C
      C
            WRITE (6,80)
         80 FORMAT(////////// 10X, '*** SDATA-TR  COMPLETED ***' ///////)
      C
            RETURN
            END
```

END OF COMPILATION:		NO DIAGNOSTICS.						
DATATR		SYMBOLIC	25 APR 77	10:25:06	0	027U4256	14	116 (DELETED)
DATATR	CODE	RELOCATABLE	25 APR 77	10:25:06	1	027U7906	36	1 (DELETED)
					0	027U7952	14	23

ORIGINAL PAGE IS
OF POOR QUALITY

```
@ FOR  SETUP8,SETUP8                                                    09 MAY 77          22: 9:
UNIVAC 1108 FORTRAN V EXEC 11 LEVEL 25A  -(EXEC8 LEVEL E120100108)
THIS COMPILATION WAS DONE ON 09 MAY 77 AT 22:09:38

    SUBROUTINE SETUP8    ENTRY POINT 001456

    STORAGE USED: CODE(I) 001557; DATA(8) 000041; BLANK COMMON(2) 000000

     COMMON BLOCKS:

     0003   INFORM 001154
     0004   GLOBAL 000075
     0005   THBLCK 003046

    EXTERNAL REFERENCES (BLOCK, NAME)

     0006   NXTCHR
     0007   FIND
     0010   BMFIL
     0011   NUMBER
     0012   OKVLN
     0013   FLTNUM
     0014   CRDSTA
     0015   KEYSAV
     0016   PRTCUV
     0017   &RTBM
     0020   NAVU8
     0021   NIV18
     0022   NIV28
     0023   NAVU8
     0024   NEKK28
     0025   NEKK38
```

30

STORAGE ASSIGNMENT (BLOCK, TYPE, RELATIVE LOCATION, NAME)

```
0000   000226 100F      0001   000213 110L      0001   000257 120L      0001   000270 130L      0001   000304 150L
0001   000305 160L      0001   000335 170L      0001   000633 1716      0001   000400 180L      0001   000413 190L
0001   000426 200L      0001   000347 2046      0001   000441 210L      0000   000242 220F      0001   000072 2206
0001   000077 2256      0001   000464 230L      0001   000117 2376      0001   000132 2476      0001   000513 250L
0001   000140 2556      0001   000236 2656      0001   000543 270L      0001   000557 280L      0001   000607 290L
0001   000644 300L      0001   000660 310L      0001   000700 3156      0001   000674 320L      0001   000716 330L
0001   000720 340L      0001   000436 3446      0001   000775 350L      0001   000721 3636      0001   001000 360L
0001   000434 3626      0001   001013 370L      0001   000457 3746      0001   001022 380L      0001   001045 390L
0000   000244 400F      0001   001053 410L      0001   001104 420L      0001   001137 430L      0001   001157 440L
0000   000273 450F      0001   001167 460L      0001   001220 470L      0001   001253 480L      0001   001256 490L
0001   000102 50L       0001   001313 520L      0001   001403 530L      0001   001421 540L      0000   000313 550F
0000   000221 60F       0001   001344 6426      0001   001402 6526      0001   001430 6666      0000   000223 70F
0001   000177 90L       0004   000073 ASAV      0004   000074 ASAVFL    0003 I 000006 AVAN2     0000 I 000205 B
0000 I 000170 BLANK     0004   000055 BMFILE    0004   000056 BMKEY     0000 I 000176 BMSAT     0000 I 000133 BTEST
0000 I 000035 CAND2     0000 I 000032 CINDEX    0000 I 000146 CINMAX    0003   000010 CLSID2    0003   000301 CLSVC2
0000 I 000200 CODE      0000 I 000177 COL       0004 I 000037 COMENT    0003 I 000007 COVAR2    0000 I 000136 COVMUL
0000 I 000152 CP        0004 I 000053 DATAPE    0004 I 000016 DATE      0004 I 000071 DATFIL    0004   000057 DRMADS
0004   000066 DRUMAD    0000 I 000306 EQUVEC    0004   000062 ERIPTP    0004   000063 ERPKEY    0003 I 000015 FETVC2
0005 I 000010 FETVEC    0000 I 000213 FILNO     0000 I 000214 FILST     0007 I 000000 FIND      0005   000002 FLDINF



0003   000013 FLDSV2    0013 I 000000 FLINGM    0000 I 000027 FRVECT    0000 I 000032 FRVEC2    0003   000760 GROUPS
0003   000663 GRPCHK    0003   000566 GRPDEX    0003   000472 GRPNAM    0004   000000 HEAD      0004 I 000002 HED1
0004 I 000023 HED2      0004   000357 HISFIL    0004   000060 HISKEY    0000 I 000174 I         0000   000352 INJPS
0000 I 000201 J         0003   000375 KEPPTS    0000 I 000203 KET       0000 I 000207 KM        0000   000206 KZ
0005   000003 LINEND    0005   000034 LININC    0005   000002 LINSTR    0000 I 000202 M         0004   000052 MAPTAP
0004   000064 MAPUNT    0000 I 000167 MARFET    0000 I 000212 MK        0000 I 000172 MPT       0000 I 000140 MTA
0000 I 000215 NB        0000 I 000175 NBS       0000 I 000217 NK        0000 I 000211 NMN       0003 I 000000 NOCLS2
0005 I 000001 NOFEAT    0003 I 000002 NOFET2    0000 I 000204 NOFETN    0004   000065 NOFILE    0003   000005 NOFLD2
0003 I 000471 NOGRP     0003 I 000001 NOSUB2    0000 I 000171 NSF       0000 L 000155 NUDFIL    0000 L 000154 NUDTAP
0011 I 000000 NUMBER    0000 L 000157 NUSFIL    0000 L 000156 NUSTAP    0006 I 000000 MATCHR    0000 I 000150 OP
0000 I 000173 ORIG      0005 I 000020 OUTFMT    0004   000070 PAGSIZ    0005   000006 SAMEND    0005   000007 SAMINC
0005   000005 SAMSTR    0004 I 000054 SAVTAP    0000 I 000024 SINVEC    0004 I 000072 STAFIL    0003 I 000012 SUBUS2
0003   000011 SUBNO2    0003   000166 SUBPTR    0003 I 000053 SUBVC2    0000 I 000220 TEMP      0003   000004 TOTVT2
0004 I 000061 TRFORM    0003 I 000003 VARSZ2    0000 I 000216 VECMAX    0003   000014 VERTX2    0000 I 000210 Z
0000 I 000165 ZERO


00101     1*        SUBROUTINE SETUPB(BMAT,LCOMB,BMTRIG,PEROUT,MAXPT,ARRAY,LAM,SCAFLG,  SB0001
00101     2*       *   TOP, TRANSF, RESCAL, BIAS, ADDNUM, CONNIN, NPUN )                  SETB0002
00101     3*    C                                                                         
00103     4*        IMPLICIT INTEGER(A-Z)                                                  SETB0003
00104     5*        REAL    CONNIN(32) ,  BIAS(16) ,  BMAT(480)                            SETB0004
00105     6*        DIMENSION MAXPT(30),                                                   SETB0005
00106     7*        DIMENSION ARRAY(1)                                                     SETB0006
00107     8*        DIMENSION EQUVEC(2)                                                    SETB0007
00107     9*    C                                                                          SETB0008
00107    10*    C                                                                          SETB0009
00110    11*        INCLUDE COMBK1,LIST                                                    SETB0010
00111    11*        COMMON/INFORM/NOCLS2,NOSUB2,NOFET2,VARSZ2,TOTVT2,NOFLD2,
00111    11*       *              AVAR2,COVAR2,CLSID2,SUBNO2,SUBUS2,FLDSV2,VERTX2,
00111    11*       *              FETVC2(30),SUBVC2(75),SUBPTR(75),CLSVC2(60),
00111    11*       *              KEPPTS(60),NOGRP,GRPNAM(60),GRPDEX(61),
00111    11*       *              GRPCHK(61),GROUPS(124)
           *        END
```

```
      INCLUDE COMBK4.LIST                                                    SET00011
      DIMENSION HED1(10),HED2(10),DATE(2),COMENT(10)
      EQUIVALENCE (HED1(1),HEAD(3)),(DATE(1),HEAD(15)),
     *            (HED2(1),HEAD(20)),(COMENT(1),HEAD(32))
      END
      INCLUDE COMBK6.LIST                                                    SET00012
      COMMON/GLOBAL/HEAD(92),MAPTAP,DATAPE,SAVTAP,BNFILE,BNKEY,
     *             HISFIL,HISKEY,TRFORM,ENDPTP,LNPKEY,MAPUNT,NOFILE,
     *    DRUMAD,DRM4DS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
      END
      INCLUDE COMBK9.LIST                                                    SET00013
C DATA TRANSFORMATION COMMON BLOCK
      COMMON/TRBLCK/OUTFMT,NOFEAT,FLDINF(6),          FEATVEC(30)
      END
      EQUIVALENCE (FLDINF(1),LINSTR),(FLDINF(2),LINEND),                     SET00019
     *            (FLDINF(3),LININC),(FLDINF(4),SAMSTR),                     SET00016
     *            (FLDINF(5),SAMEND),(FLDINF(6),SAMINC)                      SET00016
      DIMENSION CINDEX(18),                                                  SET00017
     *    SINVEC(3), FRVEC1(3) , FRVEC2(3), CAND2(62),                       SET00018
     *    BTEST(3)                                                           SET00019
C                                                                            SET00020
C                                                                            SET00021
```

```
      DIMENSION   COMMD1(10)  ,  OP(2)  ,  CP(2)                             SET00022
C                                                                            SET00023
C                                                                            SET00024
      LOGICAL   NUDTAP , NUDFIL , NUSTAP , NUSFIL                            SET00025
C                                                                            SET00026
      DATA CINDEX/'B-MAIN','CHANNE','FORMAT','HED1','HED2',                  SET00027
     *'DATE','COMMEN','MAPPT','PEROUT','SUBCLA',                            SET00028
     *'MODULE','LAB','OPTION','-END-','DATAFI','STATFI',                    SET00029
     *    'RESCAL', 'BIAS'/                                                  SET00030
C                                                                            SET00031
      DIMENSION MIX (5)                                                      SET00032
C                                                                            SET00033
      DATA MIX / '0', '1', '2', '3', '4' /                                   SET00034
C                                                                            SET00035
      DATA   OP/ 1 , '(' /  ,  CP/ 1 , ')' /  ,  ZERO/ 0 /                  SET00036
C                                                                            SET00037
      DATA EQUVEC/1,'='/                                                     SET00038
        DATA SINVEC/2,',',',='/,                                             SET00039
     *    CINMAX /18/, MAXFET /30/,                                          SET00040
     * FRVEC1/2,'1','0'/ ,FRVEC2/2,'U','L'/,BLANK/' '/,                      SET00041
     * BTEST/2,'L','F'/,OUTFMT/2/,TRFORM/19/                                 SET00042
C                                                                            SET00043
C                                                                            SET00044
C        INITIALIZE FLAGS AND DEFAULT VALUES                                 SET00045
C                                                                            SET00046
C                                                                            SET00047
      NOSUB2=0                                                               SET00048
      NOGRP=0                                                                SET00049
      BNTRIG=0                                                               SET00050
      NSF = 1                                                                SET00051
      RESCAL = 0                                                             SET00052
      SCAFLG = 0                                                             SET00053
      NPT = 0                                                                SET00054
      ORIG = 0                                                               SET00055
      TRANSF = 0                                                             SET00056
      NPUN = 0                                                               SET00057
```

```
00167   570      C
00167   600      C  INITIALIZE THE TRANSFORMATION BIAS VECTOR ( BIAS ) AND NO. OF
00167   610      C  BIAS VALUES ( NBS )
00167   620      C
00170   630         DO 10 I=1,18
00173   640      10 BIAS(I) = 0.0
00175   650         NBS = 0
00176   660         NUDTAP = .FALSE.
00177   670         NUDFIL = .FALSE.
00200   680         NUSTAP = .FALSE.
00201   690         NUSFIL = .FALSE.
00202   700         BMSAT=1
00202   710      C
00202   720      C  INITIALIZE THE MAXIMUM EXPECTED DATA VALUE, FOR EACH CHANNEL
00202   730      C
00202   740         DO 20 I=1,30
00206   750      20 MAXPT(I)=255
00206   760      C
00206   770      C  INITIALIZE % DISTRIBUTION CUT-OFF, PEROUT , AND
00206   780      C  THE STANDARD DEVIATION MULTIPLE , LAM .
00206   790      C
00210   800         LAM=2
```

```
00211   810         PEROUT=5
00211   820      C
00211   830      C  INITIALIZE THE HEADING FOR UNTRANSFORMED STATISTICS PRINTOUT
00211   840      C
00212   850         COVHD1(1) = 6H*** ON
00213   860         COVHD1(2) = 6HIGINAL
00214   870         COVHD1(3) = 6H STATI
00215   880         COVHD1(4) =   6HSTICS
00216   890         COVHD1(5) = 6H ***
00217   900         DO 30 I=6,10
00222   910      30 COVHD1(I) = 6LBLANK
00222   920      C
00224   930         DO 40 I=1,10
00227   940      40 COMENT(I) = 6LBLANK
00227   950      C
00231   960      50 COL=0
00232   970         IF(NUSTAP .OR. NUSFIL) SCAFLG=2     D STATFILE CARD READ -
00234   980         READ (5,60)CODE,CARD2
00243   990      60 FORMAT(A6,9X,62A1)
00244  1000         WRITE (6,70)CODE,CARD2
00253  1010      70 FORMAT(5X,A6,9X,62A1)
00259  1020         DO 80 I=1,CINMAX
00257  1030      80 IF (CINDEX(I).EQ.CODE) GO TO (110,150,140,100,190,210,200,230,250,
00257  1040        *270,340,290,295,500,300,930,980,990),I
00257  1050      C
00262  1060      90 WRITE (6,100)CODE,CARD2
00267  1070      C
00271  1080     100 FORMAT(//// 5X,'*** BAD CONTROL CARD - DATATR/SETUP8 ***' // 5X,
00271  1090        *   A6, 9X, 62A1  /// )
00271  1100      C
00272  1110         GO TO 50
00272  1120      C B-MATRIX CARD
00273  1130     110 J=NETCHR(CARD2,COL)
00274  1140         IF (J.EQ.6LBLANK) GO TO 540
00276  1150         COL=COL-1
00277  1160         M=FINDI(CARD2,COL,6LTEST)
```

```
      IF (M.EQ.-1) GO TO 540
      BMTRIG=1
      IF (M.EQ.2) GO TO 120
C B-MATRIX DATA ON TAPE FILE
      KEY=2
C READ B-MATRIX ARRAY FROM TAPE FILE
      CALL BMFIL(BMAT,LCOMB,NOFEAT,FETVEC,KEY)
      GO TO 130
C B-MATRIX DATA READ FROM CARD FILE
  120 KEY=1
      CALL BMFIL(BMAT,LCOMB,NOFEAT,FETVEC,KEY)
  130 NOFET2=NOFEAT
      NOFET4=LCOMB
      DO 140 B=1,NOFEAT
  140 FETVC2(B)=FETVEC(B)
      GO TO 50
C FEATURE CARD
  150 CONTINUE
      GO TO 50
C FORMAT CARD
  160 CONTINUE
  175 M=FIND(CARD2,COL,FRVEC1)
```

```
      IF (M.EQ.-1) GO TO 540
      KZ=FIND(CARD2,COL,SINVEC)
      KM=FIND(CARD2,COL,FRVEC2)
      IF((M.EQ.3).AND.(KM.EQ.2)) OUTFMT=1
      IF((M.EQ.3).AND.(KM.EQ.3)) OUTFMT=2
      Z=FIND(CARD2,COL,SINVEC)
      IF (Z.NE.2) GO TO 50
      GO TO 170
C MED1 CARD
  180 READ (30,220)MED1
      GO TO 50
C MED2 CARD
  190 READ (30,220)MED2
      GO TO 50
C COMMENT CARD
  200 READ (30,220)COMENT
      GO TO 50
C DATE CARD
  210 M=NXTCHR(CARD2,COL)
      IF (M.EQ.BLANK) GO TO 50
      READ (30,220)DATE
  220 FORMAT(10A,10A6)
      GO TO 50
C MARPT CARD
  230 J=NXTCHR(CARD2,COL)
      IF (J.EQ.BLANK) GO TO 540
      COL=COL-1
      NPT = NUMBLK( CARD2, COL, MARPI, NPT )
C
      IF (NPT.GT.30) GO TO 90
C
      GO TO 50
C PENOUT CARD
  250 J=NXTCHR(CARD2,COL)
      IF (J.EQ.BLANK) GO TO 540
      COL=COL-1
```

```
00416            M = NUMBER ( CARD2, COL, ARRAY, ZERO )
00417            PERDUT = ARRAY(1)
00417      C
00420            IF (M.NE.1) GO TO 90
00420      C
00422            GO TO 50
00422      C SUBCLASS CARD
00423        270 NOSUB2=NUMBER(CARD2,COL,SUBVC2,NOSUB2)
00424            CALL ORDER(SUBVC2,NOSUB2)
00425            GO TO 50
00425      C LAM CARD
00426        280 J=NXTCHR(CARD2,COL)
00427            IF (J.EQ.BLANK) GO TO 540
00431            COL=COL-1
00432            M = NUMBER ( CARD2, COL, ARRAY, ZERO )
00433            LAM = ARRAY(1)
00433      C
00434            IF (M.NE.1) GO TO 90
00434      C
00436            GO TO 50
00436      C
00436      C
```

```
00436      C        OPTION  CARD
00436      C
00437        290 M=FIND(CARD2,COL,MTX)
00437      C
00440            M = IABS( M )
00440      C
00441            IF (M.EQ.0.OR.M.GT.5) GO TO 540
00441      C
00441      C
00441      C        IF  M = 1,  END-OF-CARD  HAS BEEN REACHED
00441      C
00441      C
00443            GO TO (50,300,310,320,350),M
00443      C
00443      C
00443      C     IF  M = 2,  ''O''  ,  OR  ''ORIG''
00443      C
00444        300 ORIG = 1
00444      C
00445            M = FIND ( CARD2, COL, SINVEC )
00445      C
00446            IF (M.EQ.2) GO TO 290
00446      C
00450            GO TO 50
00450      C
00450      C
00450      C        IF  M = 3,  ''T''  OR  ''TRANSF''
00450      C
00450      C
00451        310 TRANSF = 1
00451      C
00452            M = FIND ( CARD2, COL, SINVEC )
00452      C
00453            IF (M.EQ.2) GO TO 290
00453      C
00455            GO TO 50
```

```
C
C
C        IF  N = 9,   ' S'  ---   CHECK FOR  ''SCAFAC--''
C
  320 J = MATCHR ( CARD2, COL )
C
C
C        IF NEXT CHARACTER IS  ''C''  ,  ASSUME   ''SCAFAC''
C
      IF (J.NE.'C') GO TO 540
C
      Z = FIND ( CARD2, COL, SINVEC )
C
      IF (Z.EQ.3) GO TO 330
C
      GO TO 540
C
C
C        SCALE FACTOR OPTION :  READ SCALING PAIRS, CON AND MIN , INTO
C                               CONMIN
C
C

  330 SCAFLG = 3
C
  340 Z = FIND ( CARD2, COL, OP )
C
      IF (Z.NE.2) GO TO 50
C
      NNN =  FLTNUM ( CARD2, COL, CONMIN(NSF) , 2 )
C
      IF (NNN.NE.2) GO TO 540
C
      ADDNUM = NSF + 1
      IF ((NSF+NNN).GT.31) GO TO 50
C
      NSF = NSF + NNN
C
      Z = FIND ( CARD2, COL, CP )
C
      IF (Z.EQ.2) GO TO 340
C
      GO TO 540
C
C
C        PUNCH  OPTION
C
  350 NPUN =  1
C
C
      GO TO 290
C
C
C MODULE STAT DECK
  360 MR=MATCHR(CARD2,COL)
      IF (MR.NE.DTEST(3)) GO TO 370
C
      SCAFLG = 2
C
```

```
      GO TO 50
  370 CALL CHDSTA(ARRAY,TOP)
C
      SCAFLG = 2
C
      GO TO 50
C
C DATAFILE POSITIONING CARD
C
  380 IF (NUUTAP.AND.NUUFIL) GO TO 50
C
      N = MATCHN ( CARD2 , COL )
C
      IF (N.EQ.BLANK) GO TO 50
C
      IF (N.EQ.'U') GO TO 910
      IF (N.EQ.'F') GO TO 920
  390 WRITE (6,900)
  900 FORMAT(///// 5X, ****** DATATR/SETUP8 ***** ERROR ON INPUT DATA
     *FILE CARD --- CONTINUING TO PROCESS INPUT   *****' ///// )
C
```

```
      GO TO 50
  910 J=FIND(CARD2,COL,EQUVEC)
      IF (J.EQ.-1) GO TO 390
      N=NUMBER(CARD2,COL,DATAPE,ZERO)
      COL=COL-1
C
      IF (N.NE.1) GO TO 390
C
      NUUTAP =  .TRUE.
C
      GO TO 380
  920 J=FIND(CARD2,COL,EQUVEC)
      IF (J.EQ.-1) GO TO 390
      FILNO = NUMBER ( CARD2, COL, DATFIL, ZERO )
C
      IF (FILNO.NE.1) GO TO 390
C
      NUDFIL =  .TRUE.
C
      DATFIL=DATFIL-1
      COL=COL-1
      GO TO 380
C
C STATFILE POSITIONING CARD
C
  930 N=MATCHN(CARD2,COL)
      IF (N.EQ.BLANK) GO TO 50
C
      IF (N.EQ.'U') GO TO 960
      IF (N.EQ.'F') GO TO 970
  940 WRITE (6,950)
  950 FORMAT( ///// 5X,****** DATATR/SETUP8 ***** ERROR ON INPUT STATFI
     *LE CARD --- CONTINUING TO PROCESS INPUT   *****' /// )
C
      NUSTAP = .FALSE.
```

```
      NUSFIL = .FALSE.
C
      GO TO 50
C
  960 J=FIND(CARD2,COL,EQUVEC)
      IF (J.EQ.-1) GO TO 990
      M=NUMBER(CARD2,COL,SAVTAP,ZERO)
      COL=COL-1
C
      IF (M.NE.1) GO TO 970
C
      NUSTAP =  .TRUE.
C
      GO TO 930
  970 J=FIND(CARD2,COL,EQUVEC)
      IF (J.EQ.-1) GO TO 990
      FILST = NUMBER( CARD2, COL, STAFIL, ZERO )
C
      IF (FILST.NE.1) GO TO 990
C
      NUSFIL =  .TRUE.
C

      STAFIL=STAFIL-1
      COL=COL-1
      GO TO 930
C
C     RESCALE OPTION CARD
C
  980  CONTINUE
       RESCAL = 1
      GO TO 50
C
C     BIAS CONTROL CARD
C
  990  CONTINUE
        NB = MATCHR(CARD2, COL)
      IF (NB.EQ.BLANK) GO TO 590
        COL = COL -1
      VECMAX = 16 - NBS
        NK = NBS + 1
        NBS = FLTNUM (CARD2, COL, BIAS(NK), VECMAX)
      GO TO 50
C
C 'END' CARD
  500 CONTINUE
C
      IF ( RESCAL .GT. 0  .AND.  SCAFLG .EQ. 0 )   SCAFLG = 1
C
C
C         IF RESCALING BY THE STATISTICAL METHOD, READ STATISTICS FROM
C         FILE ( SAVTAP ) , REDUCE THE STATISTICS TO THE SET OF CHANNELS
C         SPECIFIED IN FETVC2 , AND STORE IN ARRAY .
C
C
      IF ( SCAFLG .EQ. 2 )  CALL REDSAV( ARRAY, TOP, BMSUT )
C
C
      IF (ORIG.EQ.0) GO TO 530
```

```
00637   407.   C                                                                                SETUP0406
00637   408.   C                                                                                SETUP0407
00641   409.         DO 510 I=1,10                                                              SETUP0408
00644   410.         TEMP = COMENT(I)                                                           SETUP0409
00645   411.         COMENT(I) = COVMDI(I)                                                      SETUP0410
00646   412.     510 COVMDI(I) = TEMP                                                           SETUP0411
00646   413.   C                                                                                SETUP0412
00650   414.         CALL PRTCOV(ARRAY(COVAR2),ARRAY(AVAR2),VARSZ2,NOFET2,ARRAY(SUBDS2)         SETUP0413
00650   415.        *)                                                                          SETUP0414
00650   416.   C                                                                                SETUP0415
00650   417.   C                                                                                SETUP0416
00651   418.         DO 520 I=1,10                                                              SETUP0417
00654   419.     520 COMENT(I) = COVMDI(I)                                                      SETUP0418
00654   420.   C                                                                                SETUP0419
00654   421.   C                                                                                SETUP0420
00654   422.   C                                                                                SETUP0421
00654   423.   C          PRINT OUT THE INPUT TRANSFORMATION MATRIX                             SETUP0422
00654   424.   C                                                                                SETUP0423
00654   425.   C                                                                                SETUP0424
00656   426.     530 CALL WRTRM(BMAT,NOFET4,NOFET2,FETVC2)                                      SETUP0425
00656   427.   C SET NOCLS2=NOSUB2 FOR REST OF PROGRAM                                          SETUP0426
00657   428.         NOCLS2=NOSUB2                                                              SETUP0427

00657   429.   C                                                                                SETUP0428
00660   430.         IF ( RESCAL .EQ. 0 )  SCAFLG = 0                                           SETUP0429
00660   431.   C                                                                                SETUP0430
00662   432.         RETURN                                                                     SETUP0431
00662   433.   C                                                                                SETUP0432
00662   434.   C                                                                                SETUP0433
00662   435.   C                                                                                SETUP0434
00663   436.     540 WRITE (6,550)CODE,CARD2                                                    SETUP0435
00663   437.   C                                                                                SETUP0436
00672   438.     550 FORMAT(//// 5X,'*****  INVALID CONTROL CARD REJECTED BY DATATR/SET         SETUP0437
00672   439.   C                                                                                SETUP0438
00672   440.        *UP8  *****' // 5X, A6, 4X, 62A1 //// )                                     SETUP0439
00672   441.   C                                                                                SETUP0440
00672   442.   C                                                                                SETUP0441
00672   443.   C                                                                                SETUP0442
00673   444.         GO TO 50                                                                   SETUP0443
00674   445.         END                                                                        SETUP0444

      END OF COMPILATION:        NO  DIAGNOSTICS.
    SETUP8         SYMBOLIC                          25 APR 77  10125110   0  02710154   14   444  (DELETED)
    SETUP8  CODE   RELOCATABLE                       25 APR 77  10125110   1  02724264   90     1  (DELETED)
                                                                           0  02724344   14   109
```

ORIGINAL PAGE IS
OF POOR QUALITY

39

```
@ FOR  SETREM,SETREM                                                                                   09 MAY 77        22E 9:
UNIVAC 1100 FORTRAN V EXEC II LEVEL 25A  -(EXEC8 LEVEL E1201001OA)
THIS COMPILATION WAS DONE ON 09 MAY 77 AT 22:09:43

   SUBROUTINE SETREM    ENTRY POINT 000041

   STORAGE USED: CODE(1) 000101; DATA(0) 000107; BLANK COMMON(2) 000000

   EXTERNAL REFERENCES (BLOCK, NAME)

    0003   CHERR
    0004   NWDUS
    0005   NI02S
    0006   NERR3S

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000025 111G      0001   000035 20L        0000   000002 30F        0000   000071 INJPS      0000 I 000001 NM
    0000 I 000000 NUMCH

 00101        1*            SUBROUTINE SETREM                                                          SREM0001
 00101        2*          *   (CONMIN, CON, MIN, ADDNUM , LCOMB )                                      SREM0002
 00101        3*      C
 00103        4*            IMPLICIT INTEGER (A-Z)                                                     SREM0003
 00104        5*            REAL    CON(16)  ,  MIN(16)  ,  CONMIN(2, 16 )                             SREM0004
 00105        6*            NUMCH = ADDNUM / 2                                                         SREM0005
 00106        7*            IF (NUMCH.NE.LCOMB) GO TO 20                                               SREM0006
 00110        8*            DO 10 NM=1,LCOMB                                                           SREM0007
 00113        9*            CON(NM) = CONMIN(1, NM)                                                    SREM0008
```

ORIGINAL PAGE IS
OF POOR QUALITY

40

```
00114      16*            MINI(NM) = CMIN(Z,NM)                                                   SKEMU009
00115      11*        10  CONTINUE                                                                SKEMU010
00117      12*            RETURN                                                                  SKEMU011
00120      13*        20  WRITE (6,30)NUMCM,LCOMB                                                 SKEMU012
00124      14*        30  FORMAT (5X, 'SETHEM ERROR - THERE WERE ', I5, ' SCALE '                 SKEMU013
00124      15*       C        'FACTORS AND MINIMUM VALUES INPUT THROUGH THE SCAFAC '                  SKEMU014
00124      16*       C        'OPTION.',                                                          SKEMU015
00124      17*       C        /, 5X, I5, ' LINEAR COMBINATIONS WERE REQUESTED.',                  SKEMU016
00124      18*       C        /, 5X, 'THERE MUST BE A SCALE FACTOR AND A MINIMUM '                SKEMU017
00124      19*       C        'VALUE FOR EACH LINEAR COMBINATION.',                               SKEMU018
00124      20*       C        /, 5X, 'THE PROGRAM WILL TERMINATE THROUGH CHERR')                  SKEMU019
00125      21*            CALL CHERR                                                              SKEMU020
00126      22*            END                                                                     SKEMU021

   END OF COMPILATION:           NO DIAGNOSTICS.
 SETHEM                SYMBOLIC                          25 APR 77  10:25:11   0  02727224  14   2  (DELETED)
 SETHEM    CODE        RELOCATABLE                       25 APR 77  10:25:11   1  02727672  24   1  (DELETED)
                                                                               0  02747722  19  13


@ FOR  KBTRAN,KBTRAN                                                                     09 MAY 77        22:09:14
UNIVAC 1100 FORTRAN V EXEC II LEVEL 25A  -(EXEC8 LEVEL E1201001DA)
THIS COMPILATION WAS DONE ON 09 MAY 77 AT 22:09:14

   SUBROUTINE KBTRAN    ENTRY POINT 000402

   STORAGE USED: CODE(1) 000957; DATA(0) 004701; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   INFORM 001159
    0004   TRBLCK 000096
    0005   GLOBAL 000075

   EXTERNAL REFERENCES (BLOCK, NAME)

    0006   MATVEC
    0007   MTMLS6
    0010   MTMDAT
    0011   PRTCOV
    0012   NERR3S

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001    000327 100L     0001    000026 1356     0001    000033 1426     0001    000053 1926     0001    000110 1696
    0001    000156 1716     0001    000237 2066     0001    000231 2146     0001    000261 2246     0001    000264 2276
    0001    000234 80L      0001    000309 90L      0005    000073 ASAV     0005    000079 ASAVFL   0003 I  000004 AVAN2
    0000 R  004674 AMEAN    0005    000055 BMFILE   0005    000056 BMKEY    0000 R  000014 C        0030 R  000759 CC
    0003    000010 CLSID2   0003    000001 CLSVC2   0005 I  000037 COMENT   0003 I  000007 COVAN2   0003 I  000000 COVMD2
    0000 I  004622 CVI      0000 R  001714 D        0005    000053 DATAPE   0005    000016 DATE     0005    000071 DATFIL
    0000 R  001734 DIAG     0005    000067 DRMADS   0005    000066 DRUMAD   0005    000062 ENIPTP   0005    000063 ENPKEY
    0003    000015 FETVC2   0004    000312 FETVEC   0004    000002 FLUIHF   0003    000013 FLDSV2   0003    000740 GROUPS
```

41

```
0003   000003 GRPCHK    0003   000366 GRPDLA    0003   003472 GRPNAM    0005   000000 HEAD      0035   000002 HED1
0005   000023 HED2      0005   000357 HISFIL    0005   000060 HISKEY    0000 I 004613 I         0030 I 004621 II
0000   004640 INJPS     0000 I 004619 IPP       0000 I 004627 J         0000 I 004616 K         0003   003376 KEPPTS
0000 I 004617 KK        0000 I 004620 KKK       0000 I 004615 LZ        0005   000052 MAPTAP    0005   000064 MAPUNT
0000 I 004645 NEL       0003 I 000036 NOCLS2    0004   000001 NOFEAT    0003 I 000002 NOFET2    0005   000065 NOFILE
0003   000005 NOFLU2    0003   000471 NOGRP     0003 I 000001 NOSUB2    0000 I 004500 NSUB      0004   000000 OUTFMT
0005   000070 PAGSIZ    0005   003059 SAVTAP    0005   000072 STAFIL    0003 I 000012 SUBDS2    0003   000011 SUBNO2
0003   000166 SUBPTR    0003   000353 SUBVC2    0000 I 004623 TEMP      0000 R 000013 TMAX      0000 R 000012 TMIN
0003   000004 TOTV12    0005   000361 TRFURM    0003 I 000003 VARS22    0003   000019 VENTA2

00101      1*          SUBROUTINE KBTRAN                                                   KBTR0001
00101      2*        *   ( BMAT, LCOMB, ARRAY, LAM, MAX, MIN, EPS, TRANSF)                 KBTR0002
00101      3*    C                                                                         
00103      4*          IMPLICIT INTEGER(A-Z)                                               KBTR0003
00103      5*    C                                                                         KBTR0004
00104      6*          DIMENSION  COVHD2(1G)                                               KBTR0005
00104      7*    C                                                                         KBTR0006
00105      8*          DIMENSION ARRAY(1)                                                  KBTR0007
00106      9*          REAL TMIN,TMAX                                                      KBTR0008

00106     10*    C                                                                         KBTR0009
00107     11*          REAL   BMAT(480), MAX(16), MIN(16), EPS(16)                         KBTR0010
00107     12*    C                                                                         KBTR0011
00110     13*          REAL   C(480), CC(480),  D(16),  DIAG(480),  BMEAN(900)             KBTR0012
00110     14*    C                                                                         KBTR0013
00110     15*    C                                                                         KBTR0014
00111     16*          INCLUDE COMBK1,LIST                                                 KBTR0015
00112     16*          COMMON/INFORM/NOCLS2,NOSUB2,NOFET2,VARS22,TOTV12,NOFL02,
00112     16*        *            AVAR2,COVAR2,CLS1D2,SUBNU2,SUBDS2,FLDSV2,(ERTA2,
00112     16*        *            FETVC2(30),SUBVC2(75),SUBPTR(75),CLSVC2(40),
00112     16*        *            KEPPTS(60),NOGRP,GRPNAM(60),GRPDLA(61),
00112     16*        *            GRPCHK(61),GROUPS(124)
00113     16*          END
00114     17*          INCLUDE COMBK9,LIST                                                 KBTR0016
00114     17*    C DATA TRANSFORMATION COMMON BLOCK
00115     17*          COMMON/TRBLCK/OUTFMT,NOFEAT,FLDINF(6),           ,FETVEC(30)
00116     17*          END
00117     18*          INCLUDE COMBK4,LIST                                                 KBTR0017
00120     18*          DIMENSION HED1(10),HED2(10),DATE(2),COMENT(10)
00121     18*          EQUIVALENCE (HED1(1),HEAD(3)),(DATE(1),HEAD(15)),
00121     18*        *            (HED2(1),HEAD(20)),(COMENT(1),HEAD(32))
00122     18*          END
00123     19*          INCLUDE COMBK6,LIST                                                 KBTR0018
00123     20*    C                                                                         KBTR0019
00123     21*    C COMPUTE TRANSFORMED MEANS FOR EACH SUBCLASS                             KBTR0020
00123     22*    C                                                                         KBTR0021
00124     22*          COMMON/GLOBAL/HEAD(42),MAPTAP,DATAPE,SAVTAP,BMFILE,BMKEY,
00124     22*        *            HISFIL,HISKEY,TRFORM,EHIPTP,LHPAEY,MAPUNT,NOFILE,
00124     22*        *      DRUMAD,DRMADS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
00125     22*          END
00126     23*          DIMENSION NSUB(75)                                                  KBTR0022
00126     24*    C                                                                         KBTR0023
00126     25*    C                                                                         KBTR0024
00127     26*          COVHD2(1) =  6H... TR                                               KBTR0025
00130     27*          COVHD2(2) =  6HANSFOR                                               KBTR0026
00131     28*          COVHD2(3) =  6HMEU ST                                               KBTR0027
```

```
      COVMD2(4) =  BMATIST1
      COVMD2(5) =  BMCS ...
      DO 10 I=6,10
   10 COVMD2(I) = 6H
      DO 20 I=1,NOSUB2
      IPP=SUBDS2+I-1
   20 NSUB(I)=ARRAY(IPP)
      LZ=AVAR2
      K=1
      DO 30 I=1,NOCLS2
      CALL MATVEC(BMAT,ARRAY(LZ),BMEAN(K),LCOMB,NOFET2)
      LZ=LZ+NOFET2
   30 K=K+LCOMB
C
C COMPUTE TRANSFORMED COVARIANCE MATRIX FOR EACH SUBCLASS
C
      KK=0
      K=COVAR2
      KKK=1
      DO 50 I=1,NOCLS2
C MULTIPLY BMAT BY COVARIANCE MATRIX
      CALL MTMLSO(BMAT,ARRAY(K),C,LCOMB,NOFET2)
```

```
C MULTIPLY RESULTING MATRIX BY TRANSPOSE OF BMAT
      CALL MTMDAT(C,BMAT,CC,LCOMB,NOFET2,LCOMB,D,ARRAY(KKK))
      DO 40 II=1,LCOMB
   40 DIAG(KK+II)=D(II)
      KKK=KKK+(LCOMB*(LCOMB+1))/2
      KK=KK+LCOMB
      K=K+VARS22
   50 CONTINUE
C
C PRINT TRANSFORMED COVARIANCE MATRIX
C
      CVI=(LCOMB*(LCOMB+1))/2
C
      IF (TRANSF.EQ.0) GO TO 80
      DO 60 I=1,10
      TEMP = COMENT(I)
      COMENT(I) = COVMD2(I)
   60 COVMD2(I) = TEMP
C
      CALL PRTCOV(ARRAY(I),BMEAN(I),CVI,LCOMB,NSUB(I))
      DO 70 I=1,10
   70 COMENT(I) = COVMD2(I)
   80 CONTINUE
C
C CALCULATE MINIMUM AND MAXIMUM FOR EACH SUBCLASS
C
      DO 120 I=1,LCOMB
      DO 110 J=1,NOCLS2
        NEL = (J - 1) * LCOMB + I
        MAX(I) = BMEAN(NEL) + LAM * DIAG(NEL)
      IF (J.NE.1) GO TO 90
        TMAX = MAX(I)
   90  CONTINUE
        IF( MAX(I) .GE. TMAX) TMAX = MAX(I)
        MIN(I) = BMEAN(NEL) - LAM * DIAG(NEL)
       IF (J.NE.1) GO TO 120
```

ORIGINAL PAGE IS OF POOR QUALITY

```
00244     87*              TMIN = MIN(I)                                                         RBTR0086
00245     88*         100  CONTINUE                                                              RBTR0087
00246     89*              IF( MIN(I) .LE. TMIN) TMIN = MIN(I)                                   RBTR0088
00250     90*         110  CONTINUE                                                              RBTR0089
00252     91*              MIN(I) = TMIN                                                         RBTR0090
00253     92*              MAX(I) = TMAX                                                         RBTR0091
00254     93*              EPS(I) = 255. /(MAX(I) - MIN(I))                                      RBTR0092
00255     94*         125  CONTINUE                                                              RBTR0093
00257     95*              RETURN                                                                RBTR0094
00260     96*              END                                                                   RBTR0095

     END OF COMPILATION:          NO  DIAGNOSTICS.
   RBTRAN            SYMBOLIC                             25 APR 77   10:25:13   0  02730210   14    95  (DELETED)
   RBTRAN   CODE     RELOCATABLE                          25 APR 77   10:25:13   1  02732672   36     1  (DELETED)
                                                                                 0  02732736   14    32

@ FOR  MAXMAT,MAXMAT                                                                 09 MAY 77         22:09:4
UNIVAC 1100 FORTRAN V EXEC II LEVEL 25A  -(EXEC8 LEVEL E1201001OA)
THIS COMPILATION WAS DONE ON 09 MAY 77 AT 22:09:46

   SUBROUTINE MAXMAT    ENTRY POINT 000120

   STORAGE USED: CODE(1) 000146; DATA(0) 000035; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   TRBLCK 000046

   EXTERNAL REFERENCES (BLOCK, NAME)

    0004   NERR3S

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000054 10L       0001   000023 112G      0001   000031 117G      0001   000064 20L       0003   000010 FETVEC
    0003   000002 FLDINF    0000 I 000000 I         0000   000005 INJPS     0000 I 000001 J         0000 I 000002 K
    0003 I 000001 NOFEAT    0003   000300 OUTFMT

00101      1*              SUBROUTINE MAXMAT ( MAX, MIN, CON, BMAT, LCOMB, MAXPT )               MAMT0001
00101      2*        C                                                                           MAMT001A
00101      3*        C     COMPUTE AN APPROXIMATE TRANSFORMED MAX AND MIN FOR EACH COMPONENT     MAMT0002
00101      4*        C       OF THE TRANSFORMATION                                               MAMT002A
00101      5*        C                                                                           MAMT002B
00103      6*              IMPLICIT INTEGER(A-Z)                                                 MAMT0003
00104      7*              DIMENSION MAXPT(33)                                                   MAMT0004
```

44

```
00104        C                                                                   MAMT0005
00104        C                                                                   MAMT0006
00105              REAL    BMAT(900), MAX(16), MIN(16), CON(16)                  MAMT0007
00105        C                                                                   MAMT0008
00105        C                                                                   MAMT0009
00105        C        USING INPUT ( OR DEFAULT )  MAXIMUM DATA VALUE FOR EACH    MAMT0010
00105        C        CHANNEL, COMPUTE THE TRANSFORMED VALUE RANGE ( MAX  AND  MIN ) MAMT0011
00105        C        AND COMPUTE THE HISTOGRAM SCALING FACTOR, CON .            MAMT0012
00105        C                                                                   MAMT0013
00105        C                                                                   MAMT0014
00106              INCLUDE COMBK9,LIST                                           MAMT0015
00106        C DATA TRANSFORMATION COMMON BLOCK
00107              COMMON/TRBLCK/OUTFMT,NOFEAT,FLDINF(6),             FETVEC(30)
00110              END
00111              DO 30 I=1,LCOMB                                               MAMT0016
00114              MAX(I) = 0.0                                                  MAMT0017
00115              MIN(I) = 0.0                                                  MAMT0018
00116              DO 20 J=1,NOFEAT                                              MAMT0019
00121              K=(J-1)*LCOMB+I                                               MAMT0020
00122              IF (BMAT(K).LE.0.0) GO TO 10                                  MAMT0021
00122        C                                                                   MAMT0022
00124              MAX(I) = MAX(I) + BMAT(K) * MAXPT(J)                          MAMT0023


00124        C                                                                   MXMT0024
00125              GO TO 20                                                      MAMT0025
00126           10 CONTINUE                                                      MAMT0026
00126        C                                                                   MAMT0027
00127              MIN(I) = MIN(I) + BMAT(K) * MAXPT(J)                          MAMT0028
00127        C                                                                   MAMT0029
00130           20 CONTINUE                                                      MAMT0030
00132              CON(I)=(MAX(I)-MIN(I))/100.                                   MAMT0031
00133           30 CONTINUE                                                      MAMT0032
00135              RETURN                                                        MAMT0033
00136              END                                                           MAMT0034

      END OF COMPILATION:        NO  DIAGNOSTICS.
 MARMAT        SYMBOLIC                      25 APR 77  10125119   0  02733636   19   39  (DELETED)
 MAAMAT  CODE  RELOCATABLE                   25 APR 77  10125119   1  02734572   29    1  (DELETED)
                                                                   0  02734622   19   11
```

```
0  FOR  TRMIST,TRMIST                                                                     09 MAY 77          22T 9:
UNIVAC 1100 FORTRAN V EXEC II LEVEL 25A  -(EXEC8 LEVEL E1201001OA)
THIS COMPILATION WAS DONE ON 09 MAY 77 AT 22:09:47

   SUBROUTINE TRMIST   ,  ENTRY POINT 000690

   STORAGE USED: CODE(1) 000750; DATA(0) 000176; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   INFORM 001159
    0004   TRBLCK 000096
    0005   GLOBAL 000075

   EXTERNAL REFERENCES (BLOCK, NAME)

    0006   LAREAD
    0007   TAPHDR
    0010   FLOINT
    0011   LINENO
    0012   FOLINT
    0013   TRANSF
    0014   SQRT
    0015   NERR3S

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000003 10L      0001   000435 110L     0001   000437 120L     0001   000055 139G     0001   000491 140L
    0001   000533 163L     0001   000179 161G     0001   000176 165G     0001   000536 170L     0001   000207 173G
    0001   000573 180L     0001   000576 190L     0001   000295 210G     0001   000610 210L     0001   000261 219G
    0001   000311 224G     0001   000453 265G     0001   000474 272G     0001   000510 277G     0001   000547 312G
    0001   000225 40L      0001   000230 50L      0001   000401 60L      0001   000405 70L      0001   000414 80L
```

46

```
0001   000426 VOL      0000 I 000134 ALP      0005   000073 ASAV     0005   000074 ASAVFL   0003   000006 AVAR2
0005   000055 BMFILE   0005 I 000056 BMKEY    0003   000010 CLSID2   0003   000101 CLSVC2   0005   000037 COMENT
0003   000007 COVAR2   0005 I 000053 DATAPE   0005   000016 DATE     0005 I 000071 DATFIL   0006 I 000116 DPT
0005   000067 DRMADS   0005   000066 DRUMAD   0000 I 000106 ENDTAP   0005   000062 ENTPTP   0005   000063 ENFALT
0003   000015 FETVC2   0004 T 000310 FETVEC   0000 I 000063 FL       0004 I 000002 FLDINF   0000 T 000073 FLGINP
0003   000013 FLDSV2   0003   000743 GROUPS   0003   000063 GRPCHK   0003   000566 GRPOLA   0003   000472 GRPNAM
0005   000000 HEAD     0005   000004 HED1     0005   000023 HED2     0005   000057 MISFIL   0005   000060 MISKEY
0000 I 000101 I        0000 I 000137 ILIN     0000   000126 INJPS    0000 I 000105 J        0003 I 000111 JJ
0000 I 000117 JMI      0000 I 000112 K        0003   000075 KEPPTS   0000 I 000113 KP       0006 I 000000 LAREAD
0000 I 000103 LINES    0000 I 000114 LK       0000 I 000115 LKP1     0005   000052 MAPTAP   0005   000004 MAPUNT
0003   000000 NOCLS2   0004 I 000031 NOFEAT   0003   000002 NOFET2   0005   000065 NOFILE   0003   000005 NOFLD2
0003   000471 NOGRP    0003   000001 NOSUB2   0000 I 000110 NS       0000 I 000102 NSAMP    0034   000000 OUTFMT
0005   000070 PAGSIZ   0003 R 000020 PERCEN   0005   000054 SAVTAP   0005   000072 STAFIL   0003   000014 SUBUS2
0003   000011 SUBNO2   0003   000166 SUBPTR   0003   000353 SUBVC2   0000 R 000042 SUMFIL   0000 I 000043 TOTPTS
0003   000004 TOTVT2   0005   000061 TRFORM   0003   000003 VARS22   0003   000014 VERTX2   0000 R 000040 XMIN
0000 R 000091 XPER     0000 R 000003 XT
```

```
      SUBROUTINE TRHIST(IDATA,AMAX,AMIN,ACON,BMAT,LCOMB,                TRNS0001
     *PEROUT,FILMIS,TOP,LAR,FLDNAM,NC,VERTCS,MAX,MIN,CON,               TRNS0002
```

```
     *     BIAS)                                                         TRNS0003
C                                                                        TRNS0004
C HISTOGRAM THE TRANSFORMED DATA AND CALCULATE THE MIN MAX AND RANGE     TRNS0005
C FOR THIS DATA TO ALLOW RESCALING IN THE 0-255 RANGE                    TRNS0006
C                                                                        TRNS0007
      IMPLICIT INTEGER(A-Z)                                              TRNS0008
C                                                                        TRNS0009
      REAL   BIAS(16), XT(16), PERCEN(16), MIN(16), MAX(16), CON(16)     TRNS0010
C                                                                        TRNS0011
      REAL   BMAT(400), AMIN(16), AMAX(16), ACON(16)                     TRNS0012
C                                                                        TRNS0013
      REAL   XMIN , XPER , SUMFIL                                        TRNS0014
C                                                                        TRNS0015
      INCLUDE COMBK1,LIST                                                TRNS0016
      COMMON/INFORM/NOCLS2,NOSUB2,NOFET2,VARS22,TOTVT2,NOFLD2,
     *            AVAR2,COVAR2,CLSID2,SUBNO2,SUBUS2,FLDSV2,VERTX2,
     *                  FETVC2(30),SUBVC2(75),SUBPTR(75),CLSVC2(60),
     *                  KEPPTS(60),NOGRP,GRPNAM(60),GRPOLA(16),
     *                  GRPCHK(16),GROUPS(129)
      END
      INCLUDE COMBK9,LIST                                                TRNS0017
C DATA TRANSFORMATION COMMON BLOCK
      COMMON/TRBLCK/OUTFMT,NOFEAT,FLDINF(6),              FETVEC(30)
      END
      INCLUDE COMBK4,LIST                                                TRNS0018
      DIMENSION HED1(10),HED2(10),DATE(2),COMENT(10)
      EQUIVALENCE (HED1(1),HEAD(3)),(DATE(1),HEAD(15)),
     *        (HED2(1),HEAD(20)),(COMENT(1),HEAD(32))
      END
      INCLUDE COMBK6,LIST                                                TRNS0019
      COMMON/GLOBAL/HEAD(92),MAPTAP,DATAPE,SAVTAP,BMFILE,BMKEY,
     *            MISFIL,MISKEY,TRFORM,ENTPTP,ENFALT,MAPUNT,NOFILE,
     *    DRUMAD,DRMADS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
      END
      DIMENSION  FILMIS(LCOMB,1U1), IDATA(TOP), TOTPTS(16) ,             TRNS0020
     * VERTCS(2,11),FL(8),FLDINF(6)                                      TRNS0021
```

47

```
00124     220      C
00124     230      C
00124     240      C          READ THE COORDINATES ( VERTICES ) OF THE FIELD, FOR THE
00124     250      C        DATA TO BE TRANSFORMED
00124     260      C
00124     270      C
00125     280        10 LAR=LANEAD(FLDNAM,VERTCS,FLDINF,NC)
00126     290           IF (LAR.EW.0) GO TO 210
00130     300           IF (LAR.LE.-1) GO TO 10
00130     310      C
00130     320      C
00130     330      C          POSITION THE INPUT DATA TAPE AND READ IN THE HEADER RECORD
00130     340      C
00130     350      C
00132     360           CALL TAPHDR( DATAPE , DATFIL )
00132     370      C
00133     380           DO 20 I=1,LCOMB
00136     390           MAX(I)=AMAX(I)
00137     400           MIN(I)=AMIN(I)
00140     410        20 COM(I)=ACOM(I)
00142     420           NSAMP=(FLDINF(5)-FLDINF(11))/FLDINF(8)+1
00143     430           LINES=(FLDINF(2)-FLDINF(1))/FLDINF(3)+1


00144     440           ALP=SQRT((LINES*NSAMPT/2000)
00145     450           IF(ALP.LE.1) ALP=1
00147     460           FLDINP(1)=FLDINF(1)
00150     470           FLDINP(2)=FLDINF(2)
00151     480           FLDINP(4)=FLDINF(4)
00152     490           FLDINP(5)=FLDINF(5)
00153     500           FLDINP(3)=ALP
00154     510           FLDINP(6)=ALP
00155     520           LINES=(FLDINP(2)-FLDINP(1))/FLDINP(3)+1
00156     530           NSAMP=(FLDINP(5)-FLDINP(4))/FLDINP(6)+1
00157     540           CALL FLDINT(FLDINP,FETVEC,NOFEAT)
00160     550           DO 30 I=1,LCOMB
00163     560           TOTPIS(I) = 0
00164     570           DO 30 J=1,101
00167     580        30 FILHIS(I,J)=0.
00172     590           DO 130 I=1,LINES
00175     600           CALL LINEMT(IDATA,ENDTAP)
00176     610           IF (ENDTAP.NE.0) GO TO 190
00200     620           IF (I.NE.1) GO TO 90
00202     630           ILIN=FLDINP(1)
00203     640           GO TO 50
00204     650        90 ILIN=ILIN+FLDINP(3)
00205     660        50 CONTINUE
00206     670           CALL FVLINT(VERTCS,NC,FL,ILIN,NS,JJ)
00207     680           DO 110 K=1,NSAMP
00212     690           KP=(K-1)*FLDINP(6)+FLDINP(4)
00213     700           DO 100 LK=1,JJ,2
00216     710           LKP1 = LK + 1
00217     720           IF (KP.LT.FL(LK)) GO TO 110
00221     730           IF (KP.GT.FL(LKP1)) GO TO 90
00223     740           DO 60 J=1,LCOMB
00226     750           AT(J)=0.
00226     760      C
00226     770      C          CALL TRANSF TO DO A DATA TRANSFORMATION
00226     780      C
00227     790           CALL TRANSF
                              UMAT, IDATA, TOP, J, K, LCOMB, NSAMP,
```

```
C     (AT ...
C
C         HISTOGRAM THE TRANSFORMED DATA ( USING TRANSFORMED DATA MAX
C         AND MIN AND SCALE FACTOR, CON , COMPUTED IN SUBR. MAXMAT
C         TO OBTAIN THE HISTOGRAM ''BIN LEVEL'' FOR EACH TRANSFORMED
C         DATA POINT )
C
C
      IF (XT(J).LE.MIN(J)) GO TO 60
      IF (XT(J).GE.MAX(J)) GO TO 70
      DPT=(XT(J)-MIN(J))/CON(J)+1
C
      IF( DPT .LE. 0)  DPT = 1
      IF ( DPT .GT. 101 )  DPT = 101
C
      FILHIS(J,DPT)=FILHIS(J,DPT)+1
      GO TO 80
   60 FILHIS(J,1)=FILHIS(J,1)+1
      GO TO 80
   70 FILHIS(J,101) = FILHIS(J,101) + 1
   80 TOTPTS(J)=TOTPTS(J)+1
```

```
      GO TO 110
   90 IF (LKP).GE.JJ) GO TO 120
  100 CONTINUE
  110 CONTINUE
  120 CONTINUE
  130 CONTINUE
  140 CONTINUE
C
C
C         ELEMINATE PEROUT/2  %  OF POINTS FROM UPPER AND LOWER TAILS OF
C         THE TRANSFORMED DATA DISTRIBUTION --- OBTAIN THE REVISED MAX
C         AND SCALING PARAMETERS CON AND MIN AFTER APPLICATION OF PEROUT
C
C
      XPER=PEROUT/200.
C CALCULATE MIN,MAX,AND CON ARRAYS
      DO 150 I=1,LCOMB
  150 PENCEN(I)=XPER*TOTPTS(I)
      DO 200 I=1,LCOMB
      XMIN=MIN(I)
      SUMFIL=0.
      DO 160 J=1,101
      SUMFIL=SUMFIL+FILHIS(I,J)
      IF (SUMFIL.LT.PENCEN(I)) GO TO 160
      MIN(I)=(J-1)*CON(I)+XMIN
      GO TO 170
  160 CONTINUE
  170 SUMFIL=0.
      DO 180 J=101,1,-1
      SUMFIL=SUMFIL+FILHIS(I,J)
      IF (SUMFIL.LT.PENCEN(I)) GO TO 180
      JM1 = J - 1
      MAX(I) = JM1 * CON(I) + XMIN
      GO TO 190
  180 CONTINUE
  190 CONTINUE
```

```
00325    1380          CON(I) = 255. / (MAX(I) - MIN(I))                TRNS0138
00326    1390      200 CONTINUE                                         TRNS0139
00326    1400  C                                                        TRNS0140
00326    1410  C                                                        TRNS0141
00326    1420  C        RETURN THE SCALING PARAMETERS, CON AND MIN , REQUIRED TO  TRNS0142
00326    1430  C        RESCALE THE TRANSFORMED DATA TO THE RANGE , 0 - 255 .     TRNS0143
00326    1440  C                                                        TRNS0144
00326    1450  C                                                        TRNS0145
00330    1460      210 RETURN                                           TRNS0146
00331    1470          END                                              TRNS0147

     END OF COMPILATION:        NO  DIAGNOSTICS.
   TNMIST       SYMBOLIC                  25 APR 77  10125117  0  02735054  19  197  (DELETED)
   TNMIST  CODE RELOCATABLE               25 APR 77  10125117  1  02791006  36    1  (DELETED)
                                                               0  02791132  19   50

0  FOR  LNTRAN,LNTRAN                                                    09 MAY 77    22:916
UNIVAC 1108 FORTRAN V EXEC II LEVEL 25A  -(EXEC8 LEVEL E12010B10A)
THIS COMPILATION WAS DONE ON 09 MAY 77 AT 22:09:50

   SUBROUTINE LNTRAN     ENTRY POINT 002477

   STORAGE USED: CODE(1) 002675; DATA(0) 021311; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003    INFORM 001159
    0004    TNBLCK 000096
    0005    GLOBAL 000075

   EXTERNAL REFERENCES (BLOCK, NAME)

    0006    TAPHUR
    0007    LANCAD
    0010    FLOINT
    0011    WRTMDR
    0012    LINEND
    0013    FDLINT
    0014    TRANSF
    0015    WRTLIN
    0016    NTRAN
    0017    COMMST
    0020    NRDUS
    0021    NIU2S
    0022    NIO1S
    0023    NSTOPS
     .      RDCS
    0025    NERR3S
```

STORAGE ASSIGNMENT (BLOCK, TYPE, RELATIVE LOCATION, NAME)

0000	020376	10CF	0001	002075	1092G	0001	002117	1017G	0001	002156	1091G	0001	002171	1051G
0001	002205	1091G	0001	002217	1670G	0000	020417	110F	0001	002239	1100G	0001	002260	1113G
0001	002279	1129G	0001	002313	1130G	0001	002320	1196G	0001	002403	1171G	0000	020933	120F
0001	002426	1225G	0001	002466	130L	0000	020955	140F	0001	000036	196G	0001	000275	150L
0001	000659	155G	0001	000161	165G	0001	000363	160L	0001	000907	190L	0001	000093	20L
0001	000912	200L	0001	000199	205G	0001	000160	214G	0001	000605	230L	0001	000619	290L
0001	000290	249G	0001	000623	250L	0001	000705	260L	0001	000759	270L	0001	000337	275G
0001	001009	280L	0001	001035	290L	0001	001067	300L	0001	000352	310G	0001	001075	310L
0001	001109	330L	0001	000936	334G	0001	001106	340L	0001	000991	391G	0001	001121	350L
0001	000961	351G	0001	000975	355G	0001	001209	360L	0001	000521	305G	0001	001225	370L
0001	000597	379G	0001	001239	380L	0001	001257	370L	0001	001309	400L	0001	001337	410L
0001	001313	430L	0001	001364	440L	0001	001490	450L	0001	001493	440L	0001	001953	470L
0001	001527	480L	0001	001542	470L	0001	000110	50L	0001	001594	500L	0001	001616	510L
0001	001621	522L	0001	001153	521G	0001	001175	526G	0001	001631	530L	0001	001705	590L
0001	001250	542G	0001	001718	550L	0001	001342	570G	0001	001792	560L	0001	001701	580L
0001	000119	60L	0001	001770	600L	0001	001378	601G	0000	020971	610F	0000	020519	620F
0001	001465	624G	0000	020521	63CF	0000	020526	640F	0000	020535	650F	0001	001559	650G
0000	020556	670F	0001	001643	673G	0000	020566	660F	0000	020019	720F	0001	002107	710L
0001	001727	717G	0001	002131	730L	0000	020617	790F	0000	020626	750F	0000	020690	760F

0001		002050	765G	0000		020655	770F	0000		020672	780F	0000		020710	790F	0001		000157	80L
0000		020739	800F	0000		020761	810F	0000		021012	820F	0000		021093	830F	0000		021076	840F
0001		002332	853L	0000		021112	860F	0000		021191	870F	0000		021151	880F	0001		002933	890L
0001		002493	900L	0000		021169	910F	0001		002459	920L	0005		000073	ASAV	0005		000079	ASAVEL
0003		000006	AVANZ	0000	I	020245	BAUMAX	0000	I	020225	BAUMIN	0005		000055	BAFILE	0005		000054	BMAEY
0003		000010	CLSIV2	0003		000331	CLSVC2	0000	I	020366	CMIN	0005		000037	COMENT	0000	I	020327	COMMA
0000	R	000250	CONSAV	0003		000037	COVAR2	0000	I	020329	CP	0000	R	000109	CUT	0005	I	000053	DATAPE
0005		000016	DATE	0005	I	000871	DATFIL	0000	I	020357	DPI	0005		000067	DKRADS	0005		000000	DNUMAD
0000	I	020346	ENDTAP	0005		000062	ERIPTP	0005		000063	ERPKEY	0003	I	000015	FETVC2	0004	I	000010	FETVEC
0000	I	000515	FL	0004	I	000332	FLDINF	0003		000013	FLUSV2	0003		000760	GROUPS	0003		000023	GRPCNK
0003		000566	GRPDER	0003		000972	GNPHAN	0005		000000	HEAD	0005		000002	HED1	0005		000023	HEDA
0000	I	000350	MISBUF	0005		000357	MISFIL	0005		000060	HISKEY	0000	I	020333	I	0000	I	020365	IA
0000	I	020363	IB	0000	I	020308	IDIM	0000	I	020369	IE	0000	I	020362	IG	0000	I	020354	IM
0000	I	020379	IL	0000	I	020397	ILIN	0000	I	020337	IN	0000	I	021250	INJPS	0000	I	020343	J
0000	I	020351	JJ	0000	I	020355	JK	0000	I	020356	JKPI	0000	I	020340	K	0003		000375	KEPPTS
0000	I	020331	KF	0000	I	020332	KK	0000	I	020359	KP	0000	I	020339	LAM	0007	I	000000	LANEAD
0000	I	020392	LINES	0000	I	020349	LSTLIN	0000	I	020395	M	0005		000052	MAPTAP	0005		000069	MAPUNT
0000	R	000091	MAIOT	0000	I	020305	MAXCUT	0000	R	000230	MAASAV	0000	I	020265	MINCUT	0000	R	000210	MINSAV
0000	R	000092	MIIOT	0000	I	020375	MN	0000	I	020335	MINAN	0000	R	000093	MLAMAX	0000	R	000063	MLAMIN
0003		000000	NUCLS2	0004	I	000331	NOFEAT	0003		000002	NOFLT2	0005		000065	NOFILE	0003		000005	NOFLT7
0003		000971	NUGRP	0003		000301	NOSUB2	0000	I	020367	NPCT	0000	R	000160	NPENT	0000	R	000167	NPENZ
0000	I	020350	NS	0000	I	020336	NSAMP	0000	R	000105	NALON	0000	I	020325	OP	0004	I	000000	OUTFMT
0005		000070	PAGSIZ	0000	I	000336	PMAX	0000	I	000310	PMIN	0000	I	020361	RSET	0005		000059	SAVTAP
0005		000072	STAFIL	0003		000312	SUBUS2	0003		000011	SUBNU2	0003		000166	SUBPIR	0003		000353	SUBVC2
0000	R	000103	SUM	0000	R	000021	TMAX	0000	R	000001	TMIN	0000	I	000270	TUTPIS	0003		000009	TUTVT2
0005	I	000061	TXFORM	0000	I	020338	TTL	0003		000003	VANSZ2	0003		000019	VENTA2	0000	R	000100	XCUM
0000	I	020391	ADIM	0000	I	020371	XMGN	0000	I	020372	XLUB	0000	I	020370	XSIZ	0000	R	000126	XI
0000	R	000170	AXCUM	0000	I	000525	Y	0000	R	000196	YREAL	0000	I	020373	YSIZ	0000	I	020360	ZS
0000	I	020353	ZSAMP																

```
00101    1.    SUBROUTINE LNTNAN(IDATA,MAX,MIN,CON,BMAT,LCOMB,BRTRIG,SCAFLG,   LNTN0001
00101    2.   * PEROUT,FILHIS,TOP,LAR,FLUNAN,NC,VERTCS, NESCAL, BIAS,           LNTN0002
00101    3.   *   NF , NPUN )                                                     LNTN0003
```

```
C
C     IF  SCAFLG = 1 ,  RESCALE BY HISTOGRAM METHOD
C     IF  SCAFLG = 2 ,  RESCALE BY THE STATISTICS METHOD
C     IF  SCAFLG = 3 ,  RESCALE WITH USER-INPUT SCALING PARAMETERS
C
C     NOTE:  IF THE FLAG,  RESCAL , IS ZERO, NO RESCALING IS
C            PERFORMED.  HOWEVER, PERCUT IS APPLIED TO THE TRANSFORMED
C            DATA DISTRIBUTION PRIOR TO FINAL OUTPUT OF TRANSFORMED
C            DATA VALUES .
C
      IMPLICIT INTEGER(A-Z)
      REAL   TMIN(16), TMAX(16),  MAT01 ,  MLT01
C
      REAL  NEWMAX(16) , NEWMIN(16) ,  SUM ,  CUT
C
       REAL MACON
C
      REAL   BIAS(16), ACON(16), AT(16),  TMEAL(16),  HPER1,  HPER2
C
      REAL   MAX(16), MIN(16), CON(16),  BMAT(900) ,  MACON(16)
C
      REAL   MINSAV(16) , MAXSAV(16) , CONSAV(16)
C
      DIMENSION   TOTPIS(16) , PMIN(16) , PMAX(16)
C
C A
      DIMENSION MISBUF(10),VERTCS(2,11),FLG(8)
C
      DIMENSION   IDATA(10P) , T(8000) ,  FILMISILCOMM.10) )
C
      DIMENSION   BADMIN(16) , BADMAX(16) , MINCUT(16) , MAXCUT(16)
C
      DATA OP/'('/,CP/')'/,COMMA/','/
      DATA TTL/'TOTAL'/
C
C
      INCLUDE COMBK1.LIST
      COMMON/INFORM/NOCLS2,NOSUB2,NOFET2,VARS2,TOTVT2,NOFLG2,
     .              AVAR2,COVAR2,CLS102,SUBNO2,SUBUS2,FLDS72,VCRTX2,
     .              FETVC2(30),SUBVC2(75),SUBP(NI)D),CLSVC2(40),
     .              REPPIS(40),NUGRP,GRPNAM(40),GRPDLS(16),
     .              GRPLNK(8);GROUPS(129)
      END
      INCLUDE COMBK9.LIST
C DATA TRANSFORMATION COMMON BLOCK
      COMMON/TRBLCK/OUTPUT,NOFEAT,FLDINT(16),          FETVEC(30)
      END
      INCLUDE COMBK9.LIST
      DIMENSION NEW1(10),NEW2(10),DATE(2),COMENT(10)
      EQUIVALENCE (NEW1(1),HEAD(1)),(DATE(1),HEAD(6)),
     .            (NEW2(1),HEAD(8)),(COMENT(1),HEAD(32))
      END
      INCLUDE COMBK8.LIST
      COMMON/GLOBAL/HEAD(92),MAPTAP,DATAPE,SAVTAP,UNFILE,UNNET,
```

```
     *          HISFIL,HISKCT,INPUNM,EXIPTF,EXPACT,MAPUNT,NUFILE,
     *    DRUMAD,DRMADS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
      END
      IF (RESCAL.EQ.0) GO TO 50
C
C     CHECK FOR RESCALE FACTORS INPUT BY USER ( SCAFLG = 3 )
C
      IF (SCAFLG.NE.3) GO TO 20
C
C        COMPUTE THE TRANSFORMED DATA MAX , USING INPUT
C        SCALING PARAMETERS , CON  AND  MIN .
C
      DO 10 KF=1,LCOMB
      MAX(KF) = 255./ CON(KF) + MIN(KF)
   10 CONTINUE
C
   20 CONTINUE
C
C        COMPUTE THE OUTPUT HISTOGRAM SCALE FACTOR,  XCON
C
      DO 30 KK=1,LCOMB
      XCON(KK)=(MAX(KK)-MIN(KK))/80
```

```
   30 FETVC2(KK)=KK
C
      IF (SCAFLG.EQ.1) GO TO 80
C
C       FOR STATISTICAL OR INPUT SCALE PARAMETERS, SAVE THE INITIAL
C       SCALING PARAMETERS ( MIN, MAX , CON )  FOR RE-INITIALIZATION
C       OF THESE PARAMETERS ON THE SECOND AND SUCCEEDING FIELDS TO BE
C       INPUT , TRANSFORMED , AND RESCALED ( IF RESCAL GT 0 )
C
C
      DO 40 I=1,LCOMB
      MAXSAV(I) = MAX(I)
      MINSAV(I) = MIN(I)
   40 CONSAV(I) = CON(I)
C
C
C        POSITION THE INPUT DATA FILE, AND READ IN THE HEADER RECORD
C
   50 CONTINUE
      CALL TAPHDR(DATAPE,DATFIL)
C
C
C        READ THE COORDINATES ( VERTICES ) OF THE FIELD FOR THE DATA
C        TO BE TRANSFORMED .
C
C
   60 LAM=LAREAD(FLDNAM,VERTCS,FLDINF,NC)
      IF (LAM.EQ.0) GO TO 920
      IF (LAM.LT.0) GO TO 900
C
C
C       FOR STATISTICAL OR INPUT SCALING PARAMETERS, INITIALIZE THE
C       SCALING PARAMETERS  MAX , MIN , CON , XCON  FOR THIS FIELD
C
C
      IF (RESCAL.EQ.0) GO TO 80
```

```
C
      DO 70 I=1,LCOMB
      MAX(I) = MAXSAV(I)
      MIN(I) = MINSAV(I)
      CON(I) = CONSAV(I)
   70 XCON(I) = ( MAX(I) - MIN(I) )/80.
   80 NF = NF + 1
C
      DO 90 I=1,LCOMB
      MAXCUT(I) = 0
      MINCUT(I) = 0
      NEWMAX(I) = 255.0
      XXCON(I) = XCON(I)
   90 NEWMIN(I) = 0.0
C
      MTRAN = 0
C
      NSAMP=(FLDINF(5)-FLDINF(4))/FLDINF(6)+1
      IDIM=NUFEAT*NSAMP
      IF (IDIM.GT.IOP) GO TO 130
      IN=NC-1
      WRITE (6,100)

      WRITE (6,110)FLDNAM,IN,FLDINF(6),FLDINF(3),((OP,VERTCS(1,K),COMMA,
     *VERTCS(2,K),CP),K=1,IN)
  100 FORMAT(1H1,T24,'NO. OF    SAMPLE  LINE'/,
     *T12,'FIELDNAME  VERTICES    INC     INC  VERTICES(SAMPLE,LINE)')
  110 FORMAT(13X,A6,6X,I2,7X,I4,2X,I4,2X,5(A1,I4,A1,I4,A1,2X)/
     * 5(A1,I4,A1,I4,A1,2X))
      XDIM=LCOMB*NSAMP
C
C
      IF (XDIM.LE.8000) GO TO 150
C
C
      WRITE (6,120)
  120 FORMAT(//' THE NUMBER OF COMPONENTS TIMES THE NUMBER OF SAMPLES EX
     *CEEDS THE SIZE OF THE STORAGE AREA ****'//)
      STOP 1
  130 WRITE (6,140)
  140 FORMAT('**** NUMBER OF CHANNELS TIMES NUMBER OF SAMPLES EXCEEDS 10
     *00 ****'//)
      STOP
C
C
C INITIALIZE TAPE READING FOR THIS FIELD
C
  150 CALL FLDINT(FLDINF,FETVEC,NOFEAT)
C
      LINES=(FLDINF(2)-FLDINF(1))/FLDINF(3)+1
C
C
C        WRITE HEADER RECORD ON OUTPUT FILE , TRFORM .
C
C
      CALL WRTHDR(LCOMB,FETVC2,NSAMP,OUTFMT,TRFORM)
C
C
      DO 170 I=1,LCOMB
```

54

```
      BAUMAX(I) = 0
      BAUMIN(I) = 0
      PMIN(I) = 0
      PMAX(I) = 0
      TOTPTS(I) = 0
      TMIN(I) = 1.0E35
      TMAX(I) = -1.0E35
      XCON(I) = XXCON(I)
      DO 160 J=1,101
  160 FILHIS(I,J) = 0
  170 CONTINUE
C
C
      LSTLIN=0
      M=0
  180 M=M+1
      IF (M.GT.LINES) GO TO 350
C
C        READ ONE SCAN  LINE OF DATA FROM THE INPUT TAPE
C
      CALL LINERD(IDATA,ENDTAP)
      IF (ENDTAP.NE.0) GO TO 350


      IF (M.NE.1) GO TO 190
      ILIN=FLDINF(1)
      GO TO 200
  190 ILIN=ILIN+FLDINF(3)
  200 CONTINUE
C
C        DETERMINE THE SAMPLE INTERCEPTS ON THE CURRENT SCAN LINE,
C        WHICH ARE CONTAINED IN THE DESIRED FIELD BOUNDARIES. PLACE
C        THE SAMPLE INTERCEPTS IN  FL  , AND THE NUMBER OF INTERCEPTS
C        IN  JJ .
C
      CALL FDLINT(VERTCS,NC,FL,ILIN,NS,JJ)
      DO 210 K=1,NSAMP
      DO 210 IM=1,LCOMB
      ZSAMP=(IM-1)*NSAMP+K
  210 Y(ZSAMP)=0
C
      NXCON = 255./100.
C
C
C        TRANSFORM, RESCALE, AND HISTOGRAM EACH DATA SAMPLE
C
      DO 330 K=1,NSAMP
      KP=(K-1)*FLDINF(6)+FLDINF(4)
      DO 320 JK=1,JJ,2
      JKP1 = JK + 1
      IF (KP.LT.FL(JK)) GO TO 330
      IF (KP.GT.FL(JKP1)) GO TO 310
      DO 220 I=1,LCOMB
      XT(I)=0.
C
C     CALL TRANSF TO DO A DATA TRANSFORMATION
C
        CALL TRANSF
     C     (AT, BMAT, IDATA, TOP, I, K, LCOMB, NSAMP, BIAS)
  220 CONTINUE
```

```
      DO 300 I=1,LLONG
      IF( XT(I) .LT. TMIN(I) )   TMIN(I) = XT(I)
      IF( XT(I) .GT. TMAX(I) )   TMAX(I) = XT(I)
C
C     IF RESCAL = 0 NO RESCALING IS APPLIED.  OTHER WISE RESCALE
C        USING SCALING PARAMETERS DERIVED FROM EITHER HISTOGRAM,
C        STATISTICS, OR USER-INPUT ( SCAFLG= 1, 2, OR 3 )
C
C
      IF (RESCAL.GT.0) GO TO 260
C
C
C           IF TRANSFORMED DATA IS NOT RESCALED ,
C           TEST FOR OUT- OF - RANGE  TRANSFORMED  VALUES
C
C           SET = 0  ANY VALUE LESS THAN 0, OR LESS THAN THE NEW MIN
C           AFTER APPLICATION OF PEROUT
C           SET = 255  ANY VALUE GREATER THAN 255, OR GREATER THAN
C           THE NEW MAX AFTER APPLICATION OF PEROUT
C
C
      IF (XT(I).LT.NEWMIN(I)) GO TO 230
```

```
      IF (XT(I).GT.NEWMAX(I)) GO TO 240
      GO TO 250
  230 IF( MTRAN .EQ. 0 )  BADMIN(I) = BADMIN(I) + 1
      XT(I) = 0.0
      GO TO 250
  240 IF ( MTRAN .EQ. 0 )  BADMAX(I) = BADMAX(I) + 1
      XT(I) = 255.
  250 CONTINUE
C
C
C           FOR THE CURRENT SCAN LINE,  HISTOGRAM THE TRANSFORMED DATA ,
C           AND STORE THE TRANSFORMED DATA INTO THE OUTPUT ARRAY,  Y  .
C
      DPT = XT(I)/NXCON + 1.1
        TOTPTS(I) = TOTPTS(I) + 1
        IF( DPT .GT. 101) DPT = 101
      IF ( DPT .LE. 0 )  DPT = 1
        FILMIS(I,DPT) = FILMIS(I,DPT) + 1
        ZS = (I -1) * NSAMP + K
      Y(ZS) = XT(I) + 0.5
      GO TO 300
  260  CONTINUE
C
C           FOR THE CURRENT SCAN LINE, HISTOGRAM THE TRANSFORMED DATA, AND
C           STORE THE TRANSFORMED DATA INTO THE OUTPUT ARRAY,  Y  .
C
      IF (XT(I).LT.MIN(I)) GO TO 270
      IF (XT(I).GT.MAX(I)) GO TO 280
      TREAL(I)=CON(I)*(XT(I)-MIN(I))
C
      DPT = ( XT(I) - MIN(I) )/ XCON(I) + 1)
C
      IF ( DPT .LE. 0 )  DPT = 1
      IF ( DPT .GT. 101 )  DPT = 101
C
      GO TO 290
```

```
00447    2770          270 DPT = ABS( MIN(I) - XT(I) )/ACON(I)                    LNTHU277
00447    2780      C                                                              LNTHU278
00450    2790            DPT = 10 - DPT                                           LNTHU279
00450    2800      C                                                              LNTHU280
00451    2810            PMIN(I) = PMINT(I) + 1                                   LNTHU281
00452    2820            IF(DPT.LE.0) DPT=1                                       LNTHU282
00454    2830            YREAL(I)=0                                               LNTHU283
00455    2840            GO TO 290                                                LNTHU284
00456    2850          280 DPT = ABS( XT(I) - MAXT(I) )/XCONT(I)                  LNTHU285
00456    2860      C                                                              LNTHU286
00457    2870            DPT = DPT + 91                                           LNTHU287
00457    2880      C                                                              LNTHU288
00460    2890            PMAX(I) = PMAX(I) + 1                                    LNTHU289
00461    2900            IF(DPT.GT.101) DPT=101                                   LNTHU290
00463    2910            YREAL(I)=255                                             LNTHU291
00464    2920          290 TOTPTS(I)=TOTPTS(I)+1                                  LNTHU292
00465    2930            FILHIS(I,DPT)=FILHIS(I,DPT)+1                            LNTHU293
00466    2940            ZSAMP=(I-1)*NSAMP+K                                      LNTHU294
00467    2950            TIZSAMP) = YREAL(I) + 0.5                                LNTHU295
00470    2960          300  CONTINUE                                              LNTHU296
00472    2970            GO TO 330                                                LNTHU297
00473    2980          310 IF (JKPI.GE.JJ) GO TO 340                              LNTHU298

00475    2990          320 CONTINUE                                               LNTHU299
00477    3000          330 CONTINUE                                               LNTHU300
00501    3010          340 CONTINUE                                               LNTHU301
00502    3020            IF(M.EQ.LINES) LSTLIN=1                                  LNTHU302
00502    3030      C                                                              LNTHU303
00502    3040      C                                                              LNTHU304
00502    3050      C       OUTPUT ONE LINE OF TRANSFORMED DATA ON THE OUTPUT FILE , TRFORM LNTHU305
00502    3060      C                                                              LNTHU306
00502    3070      C                                                              LNTHU307
00504    3080            CALL WRTLIN(Y,LSTLIN)                                    LNTHU308
00505    3090            GO TO 180                                                LNTHU309
00505    3100      C                                                              LNTHU310
00505    3110      C       IF RESCALING THE TRANSFORMED DATA BY EITHER THE STATISTICAL LNTHU311
00505    3120      C       OR USER-INPUT SCALING PARAMETERS,                      LNTHU312
00505    3130      C       APPLY PEROUT ( % OF POINTS TO BE REJECTED)  TO THE TRANSFORMED LNTHU313
00505    3140      C       DATA DISTRIBUTION - OBTAIN THE MAX, AND SCALING PARAMETERS LNTHU314
00505    3150      C       MIN AND CON , AFTER APPLICATION OF PEROUT ( ALSO, THE HISTOGRAMLNTHU315
00505    3160      C       SCALE FACTOR , XCON ) .                                LNTHU316
00505    3170      C                                                              LNTHU317
00505    3180      C       IF NOT RESCALING,  APPLY PEROUT TO THE TRANSFORMED DATA; LNTHU318
00505    3190      C    GET  NEW MAX AND MIN, RE-HISTOGRAM , AND OUTPUT THE REVISED DISTR. LNTHU319
00505    3200      C                                                              LNTHU320
00506    3210          350 CONTINUE                                               LNTHU321
00506    3220      C                                                              LNTHU322
00507    3230            IF (PEROUT.LE.0) GO TO 600                               LNTHU323
00507    3240      C                                                              LNTHU324
00511    3250            IF (SCAFLG.EQ.1) GO TO 600                               LNTHU325
00511    3260      C                                                              LNTHU326
00513    3270            IF (NTRAN.EQ.1) GO TO 600                                LNTHU327
00513    3280      C                                                              LNTHU328
00515    3290            IF (RESCAL.GT.0) GO TO 430                               LNTHU329
00515    3300      C                                                              LNTHU330
00517    3310            NPERI = FLOAT(PEROUT)/200.0                              LNTHU331
00517    3320      C                                                              LNTHU332
00520    3330            DO 420 I=1,LCOMB                                         LNTHU333
00523    3340            CUT =  NPERI *  FLOAT( TOTPTS(I) )                       LNTHU334
```

```
00524            SUM = 0.0
00525            DO 370 J=1,101,1
00530            IF (SUM.GE.CUT) GO TO 360
00532            GO TO 370
00533        360 MINCUT(I) = SUM
00534            NEWMIN(I) = (J-1) * NXCON + 0.5
00535            GO TO 380
00535      C
00536        370 SUM = SUM + FILHIS(I,J)
00540        380 SUM = 0.0
00541            DO 400 J=101,1,-1
00544            IF (SUM.GE.CUT) GO TO 390
00546            GO TO 400
00547        390 MAXCUT(I) =  SUM
00550            NEWMAX(I) = ( J - 1 ) * NXCON + 0.5
00551            GO TO 410
00552        400 SUM = SUM + FILHIS(I,J)
00554        410 CONTINUE
00555        420 CONTINUE
00557            GO TO 580
00557      C
00557      C
```

```
00560        430 NPER1 = PEROUT * .01 + .001
00561            NPER2 = PEROUT * .01 - .001
00561      C
00562            RSET=0
00563            IG = 0
00564            IB = 0
00565            IE = 0
00566            IA = 0
00566      C
00567            DO 560 I=1,LCOMB
00572            MATOT=TOTPIS(I)*NPER1
00573            MITOT=TOTPIS(I)*NPER2
00574            IF (PMIN(I).GT.MATOT) GO TO 440
00576            GO TO 460
00576      C RESET MIN SMALLER
00577        440 CMIN=PMIN(I)
00600            DO 450 J=IG,1,-1
00603            IG=IG+1
00604            CMIN=CMIN-FILHIS(I,J)
00605            IF (CMIN.GT.MATOT) GO TO 450
00607            IF(CMIN.LT.MITOT) IG=IG-1
00611            RSET=1
00612            MIN(I)=MIN(I)-IG*XCON(I)
00613            IG=0
00614            GO TO 490
00615        450 CONTINUE
00617        460 IF (PMIN(I).LT.MITOT) GO TO 470
00621            GO TO 490
00621      C RESET MIN LARGER
00622        470 CMIN=PMIN(I)
00623            DO 480 J=I1,91
00626            IB=IB+1
00627            CMIN=CMIN+FILHIS(I,J)
00630            IF (CMIN.LT.MITOT) GO TO 480
00632            IF(CMIN.GT.MATOT) IB=IB-1
00634            MIN(I)=MIN(I)+IB*XCON(I)
```

```
      IE=0
      NSET=1
      GO TO 490
  480 CONTINUE
C CHECK MAX
  490  CONTINUE
      IF (PMAX(I).GT.MATOT) GO TO 500
      GO TO 520
C RESET MAX LARGER
  500 CMIN=PMAX(I)
      DO 510 J=92,101
      IE=IE+1
      CMIN=CMIN-FILHIS(I,J)
      IF (CMIN.GT.MATOT) GO TO 510
      IF(CMIN.LT.MITOT) IE=IE-1
      NSET=1
      MAX(I)=MAX(I)+IE*ACON(I)
      IE=0
      GO TO 550
  510 CONTINUE
C RESET MAX SMALLER
  520 IF (PMAX(I).LT.MITOT) GO TO 530

      GO TO 550
  530 CMIN=PMAX(I)
      DO 540 J=91,1,-1
      IA=IA+1
      CMIN=CMIN+FILHIS(I,J)
      IF (CMIN.LT.MITOT) GO TO 540
      IF(CMIN.GT.MATOT) IA=IA-1
      NSET=1
      MAX(I)=MAX(I)-IA*ACON(I)
      IA=0
      GO TO 550
  540 CONTINUE
  550 CONTINUE
  560 CONTINUE
      IF (NSET.EQ.0) GO TO 600
      DO 570 I=1,LCOMB
      XCON(I)=(MAX(I)-MIN(I))/80
      XXCON(I) = XCON(I)
  570  CON(I) = 255. / (MAX(I) - MIN(I))
C
  580 IF (NF.EQ.1) GO TO 590
C
      CALL NTRAN(19,8,-2,8,1,22)
      NTRAN=1
      GO TO 150
  590 CALL NTRAN(19,10)
      NTRAN=1
      GO TO 150
  600 CONTINUE
      NTRAN=0
C
      IF (RESCAL.EQ.0) GO TO 710
C
      WRITE (6,610)NF
  610 FORMAT(///// 22X,'  OUTPUT FILE ', I3, 1X,'.' /////// 5X,
     .  '...  TRANSFORMED VALUES RESCALED TO A RANGE  0 - 255  ...' )
```

```
00749    4510      C
00749    4520            IF (SCAFLG.EQ.1) WRITE (6,620)                                  LNTRU451
00750    4530            IF (SCAFLG.EQ.2) WRITE (6,630)                                  LNTRU452
00751    4540            IF (SCAFLG.EQ.3) WRITE (6,640)                                  LNTRU453
00752    4550      C                                                                     LNTRU454
00753    4560          620 FORMAT( 24X, '(HISTOGRAM METHOD)' / )                         LNTRU455
00754    4570          630 FORMAT( 23X, '(STATISTICS METHOD)' / )                        LNTRU456
00755    4580          640 FORMAT( 20X, '(INPUT SCALING PARAMETERS)' / )                 LNTRU457
00760    4590      C                                                                     LNTRU458
00760    4600      C                                                                     LNTRU459
00761    4610            WRITE (6,650)                                                   LNTRU460
00761    4620      C                                                                     LNTRU461
00762    4630          650 FORMAT(//// 7X, '... ORIGINAL TRANSFORMED DATA RANGE ...' //  LNTRU462
00763    4640           *  T11, 'MIN' , T32, 'MAX' , T51, '( BIAS )' // )               LNTRU463
00763    4650      C                                                                     LNTRU464
00764    4660            DO 660 M=1,LCOMB                                                LNTRU465
00767    4670          660 WRITE (6,670)TMIN(M),TMAX(M),BIAS(M)                        LNTRU466
00767    4680      C                                                                     LNTRU467
00775    4690          670 FORMAT( 5X, F11.4, 10X, F11.4, 9X, '(' , F11.4, 1X, ')' / ) LNTRU468
00775    4700      C                                                                     LNTRU469
00776    4710            WRITE (6,680)                                                   LNTRU470
01000    4720          680 FORMAT(//// 7X, '... TRANSFORMED DATA RANGE, AFTER APPLICATION OF LNTRU471
```

```
01000    4730           * PEROUT ...' // 7X, 'MIN' , 10X, 'MAX' , 10X,                 LNTRU472
01000    4740           *   'CON  = 255/(MAX-MIN) ' // )                               LNTRU473
01000    4750      C PRINT OUT NEW MAX,MIN,CON ARRAYS                                  LNTRU474
01001    4760            DO 690 M=1,LCOMB                                                LNTRU475
01004    4770          690 WRITE (6,700)MIN(M),MAX(M),CON(M)                           LNTRU476
01012    4780          700 FORMAT(5X,3(F8.4,5X))                                       LNTRU477
01012    4790      C                                                                     LNTRU478
01013    4800            GO TO 850                                                       LNTRU479
01013    4810      C                                                                     LNTRU480
01013    4820      C                                                                     LNTRU481
01014    4830          710 IF (PEROUT.GT.0) GO TO 730                                  LNTRU482
01014    4840      C                                                                     LNTRU483
01014    4850            DO 720 I=1,LCOMB                                                LNTRU484
01021    4860            IF ( BADMIN(I) .EQ. 0 )  NEWMIN(I) = TMIN(I)                    LNTRU485
01023    4870            IF ( BADMAX(I) .EQ. 0 )  NEWMAX(I) = TMAX(I)                    LNTRU486
01025    4880          720 CONTINUE                                                    LNTRU487
01025    4890      C                                                                     LNTRU488
01027    4900          730 WRITE (6,740)NF                                             LNTRU489
01032    4910          740 FORMAT(//// 17X, '* OUTPUT FILE ', I3, 1X, '*' )            LNTRU490
01032    4920      C                                                                     LNTRU491
01033    4930            WRITE (6,750)                                                   LNTRU492
01035    4940          750 FORMAT(//// 5X,'*** TRANSFORMED VALUES NOT RESCALED ***' // ) LNTRU493
01035    4950      C                                                                     LNTRU494
01036    4960            WRITE (6,760)LCOMB,(TMIN(I),I=1,LCOMB)                          LNTRU495
01045    4970          760 FORMAT(/ 5X, 'TRANSFORMED MINIMUMS, COMPONENTS 1-' , I2, 2X,  LNTRU496
01045    4980           * '...' // 2(5X, 8F12.2/) )                                    LNTRU497
01045    4990      C                                                                     LNTRU498
01046    5000            WRITE (6,770)LCOMB,(TMAX(I),I=1,LCOMB)                          LNTRU499
01055    5010          770 FORMAT(/// 5X, 'TRANSFORMED MAXIMUMS, COMPONENTS 1-' , I2, 2X,  LNTRU500
01055    5020           * '...' // 2( 5X, 8F12.2 / ) )                                 LNTRU501
01055    5030      C                                                                     LNTRU502
01056    5040            WRITE (6,780)LCOMB,(BIAS(I),I=1,LCOMB)                          LNTRU503
01056    5050      C                                                                     LNTRU504
01065    5060          780 FORMAT(/// 5X, 'TRANSFORMED VALUE BIAS, COMPONENTS 1 - ' , I9.2X,LNTRU505
01065    5070      C                                                                     LNTRU506
01065    5080           *  ':' // 2( 5X, 8F12.2 / ) )                                  LNTRU507
```

```
C
C
C
      WRITE (6,790)(I,BADMIN(I),I=1,LCOMB)
C
  790 FORMAT(/// 5X,'NO. OF TRANSFORMED VALUES LESS THAN 0 ( SET = 0 ) :
C
     * ' // (5X,'COMPONENT', 1X, I2, '...', I6, 2X, 'VALUES' ) )
C
C
      WRITE (6,800)(I,BADMAX(I),I=1,LCOMB)
C
  800 FORMAT(/// 5X, 'NO. OF TRANSFORMED VALUES GREATER THAN 255 ( SET =
C
     * 255 ) :' // (5X,'COMPONENT', 1X, I2,'...',I6, 2X, 'VALUES' ) )
C
C
      NPERI = FLOAT(PEROUT)/2.0
C
      WRITE (6,810)NPERI,LCOMB,(MINCUT(I),I=1,LCOMB)
  810 FORMAT(/// 3X, 'NO. OF LOWER TAIL POINTS  REJECTED     ( SET = 0 F
     *OR OUTPUT )  TO SATISFY', F6.1,2X,'% CUT-OFF, COMPONENTS  1  -',

     * I4, 2X, '...' // I6(I8) )
C
      WRITE (6,820)NPERI,LCOMB,(MAXCUT(I),I=1,LCOMB)
  820 FORMAT(/// 3X,'NO. OF UPPER TAIL POINTS  REJECTED  ( SET = 255 F
     *OR OUTPUT )  TO SATISFY', F6.1, 2X, '% CUT-OFF,  COMPONENTS  1  -'
     *  , I4, 2X, '...' // I6( I8 ) )
      NPCT = 100 - PEROUT
      WRITE (6,830)NPCT,LCOMB,(NEWMIN(I),I=1,LCOMB)
  830 FORMAT(//// 3X,'*****  FINAL OUTPUT TRANSFORMED VALUES, CENTRAL' ,
     *  I5,3X,'%' , 2X, 'OF DISTRIBUTION :' // 3X, 'MINIMUMS, COMPONENTS
     *  1  -' , I4, 2X, '...' //  2(5X, 8F12.2 / ) )
C
      WRITE (6,840)LCOMB,(NEWMAX(I),I=1,LCOMB)
  840 FORMAT(// 3X,'MAXIMUMS, COMPONENTS  1  - ', I4, 2X,'...' //
     *  2( 5X, 8F12.2 / ) )
C
C
C
C PRINT HISTOGRAMS
C
  850 CONTINUE
C
      XSIZ=101
      XHGH=256
      XLOW=0
      YSIZ=15
      CALL COMHST(FILHIS,HISBUF,TTL,LCOMB,FETVCZ,XSIZ,XHGH,XLOW,YSIZ)
C
C
      IF (KESCAL.EQ.0) GO TO 60
C
C
C
      WRITE (6,860)INF
C
  860 FORMAT(1H1 // 5X,'SCALING PARAMETERS USED ON TRANSFORMED VALUES, O
```

61

```
01166    5670.   C                                                                   LNTRU5067
01166    5680.       'UTPUT FILE', 15// 19X, 'MINIMUM', 7X, 'MAXIMUM', 7X,           LNTRU5068
01166    5690.   C                                                                   LNTRU5069
01166    5700.     *  'SCALE FACTOR ( CON )'  )                                      LNTRU5070
01166    5710.   C                                                                   LNTRU5071
01167    5720.       WRITE (6,870)(FETVC2(IL),MIN(IL),MAX(IL),CON(IL),IL=1,LCOMB)    LNTRU5072
01167    5730.   C                                                                   LNTRU5073
01200    5740.   870 FORMAT(1X, 'COMPONENT',I3,1X,F12.3,2X,F12.3,7X,F12.3 )          LNTRU5074
01200    5750.   C                                                                   LNTRU5075
01200    5760.   C                                                                   LNTRU5076
01201    5770.       IF (INPUN.LL.0) GO TO 890                                       LNTRU5077
01201    5780.   C                                                                   LNTRU5078
01203    5790.       PUNCH 880,(CONTMNT,MINIMNT,MN=1,LCOMB)                          LNTRU5079
01203    5800.   C                                                                   LNTRU5080
01212    5810.   880 FORMAT(  ('OPTION',9X, 'SCAFAC=' , 2( ' (', F9.3, ',' , F9.3,   LNTRU5081
01212    5820.     * ' ) , ' ) ) )                                                   LNTRU5082
01212    5830.   C                                                                   LNTRU5083
01213    5840.   890  CONTINUE                                                       LNTRU5084
01213    5850.   C                                                                   LNTRU5085
01213    5860.   C                                                                   LNTRU5086
01214    5870.       IF ( SCAFLG .EQ. 1 )   RETURN                                   LNTRU5087
01214    5880.   C                                                                   LNTRU5088

01214    5890.   C                                                                   LNTRU5089
01216    5900.       GO TO 60                                                        LNTRU5090
01217    5910.   900 IF (LAM.EQ.0) GO TO 920                                         LNTRU5091
01221    5920.       WRITE (6,910)FLDNAM                                             LNTRU5092
01224    5930.   910 FORMAT(//// 5X,'*****  DATATR/LNTRAN *****  ERROR ON INPUT FIELD DELNTRU5093
01224    5940.     *FINITION CARD, FOR FIELD NAME  ',1H', A6, 1H', 3X, '******' /    LNTRU5094
01224    5950.     *  10X, 'CONTINUING TO NEXT FIELD DEFINITION CARD(S)' //// )      LNTRU5095
01225    5960.       GO TO 60                                                        LNTRU5096
01226    5970.   920  CONTINUE                                                       LNTRU5097
01227    5980.       RETURN                                                          LNTRU5098
01230    5990.       END                                                             LNTRU5099

     END OF COMPILATION:        NO  DIAGNOSTICS.
  LNTRAN          SYMBOLIC                          25 APR 77  10125123  0  02742926  19  400  (DELETED)
  LNTRAN  CODE    RELOCATABLE                       25 APR 77  10125123  1  02702796  90    1  (DELETED)
                                                                         0  02763026  19  191
```

```
@ FOR TRANSF,TRANSF                                                                          09 MAY 77        22 1
UNIVAC 1108 FORTRAN V EXEC II LEVEL 25A  *(EXEC8 LEVEL E1201D010A)
THIS COMPILATION WAS DONE ON 09 MAY 77 AT 22:09:57

   SUBROUTINE TRANSF     ENTRY POINT 000367

   STORAGE USED: CODE(1) 000187; DATA(0) 000026; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003    TRBLCK 000096

   EXTERNAL REFERENCES (BLOCK, NAME)

    0004    NERR3S

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000021 112G      0003   000018 FETVEC     0003    000002 FLDINF     0000   000003 INJPS      0000 I 000000 IT
    0000 I 000001 JSAMP     0003 I 000031 NOFEAT     0003    000000 OUTFMT     0000 I 000002 ICOMB

00101        1*              SUBROUTINE TRANSF                                      TRAN0001
00101        2*        *          (XT, WMAT, IDATA, TOP, IL, K, LCOMB, NSAMP, BIAS)  TRAN0002
00103        3*              IMPLICIT INTEGER (A-Z)                                 TRAN0003
00103        4*      C                                                              TRAN0004
00104        5*            REAL    XT(16) ,  WMAT(480) ,  BIAS(16)                  TRAN0005
00105        6*              INCLUDE COMBK9, LIST                                   TRAN0006
00105        6*      C DATA TRANSFORMATION COMMON BLOCK
00106        6*            COMMON/TRBLCK/OUTFMT,NOFEAT,FLDINF(6),          FETVEC(30)
```

ORIGINAL PAGE IS OF POOR QUALITY

63

```
00107          END
00110             DIMENSION IDATA (TOP)                                        TRANS0007
00110     C                                                                     TRANS0008
00110     C      SUBROUTINE TRANSF DOES A DATA-TRANSFORMATION USING THE        TRANS0009
00110     C      FORMULA                                                        TRANS0010
00110     C            XT = IDATA * BMAT + BIAS                                 TRANS0011
00110     C             XT = COMPONENT(IL), TRANSFORMED DATA VECTOR             TRANS0012
00110     C            IDATA = INPUT DATA VECTOR ( NOFEAT X 1 )                 TRANS0013
00110     C            BMAT = TRANSFORMATION MATRIX ( LCOMB X NOFEAT )          TRANS0014
00110     C               BIAS = ADDITIVE BIAS                                  TRANS0015
00110     C                                                                     TRANS0016
00111            DO 10 IT=1,NOFEAT                                              TRANS0017
00114               JSAMP = (IT - 1) * NSAMP + K                                TRANS0018
00115               ZCOMB = LCOMB * (IT - 1) + IL                               TRANS0019
00116               XT (IL) = XT (IL) +                                         TRANS0020
00116                  IDATA(JSAMP) * BMAT(ZCOMB)                               TRANS0021
00117        C                                                                  TRANS0022
00121     10  CONTINUE
             XT(IL) = XT(IL) + BIAS(IL)                                         TRANS0023
00122        RETURN                                                             TRANS0024
00123        END

      END OF COMPILATION:          NO  DIAGNOSTICS.
   TRANSF          SYMBOLIC                         25 APR 77  10:25:29  0  02770210  19  25  (DELETED)
   TRANSF   CODE   RELOCATABLE                      25 APR 77  10:25:29  1  02770796  29   1  (DELETED)
                                                                         0  02770776  19   6
```

APPENDIX C

VERIFICATION RUNS

TEST RUN 1

LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS

25 APR 77

```
$DATA-TR
      CURREN    ... SAMPLE RUN  NO.  1 ...
      B-MATR    CARDS
      PLMOUT    0
      DATAFI    UNIT = 3 , FILE=1
      FORMAT    OUTPUT = UNIV
      BIAS      0.0 , 11*0.0 , 0.0 , 2 * 0.0 , 0.0
      RLUT      DATA TRANSFORMATION PROCESSOR --- SAMPLE RUN
      NLO2      FLIGHT LINE C-1 DATA
      DATE      JAN 12,1977
      $END$
```

DATA TRANSFORMATION PROCESSOR --- SAMPLE RUN
FLIGHT LINE C-1 DATA

JAN 12,1977

... SAMPLE RUN NO. 1 ...

LINEAR TRANSFORMATION (B) MATRIX

NO. LINEAR COMB. = 4
NO. CHANNELS = 4

LIN. CMB.	CH(1)	CH(2)	CH(3)	CH(4)
1	.1000+01	.0000	.0000	.0000
2	.0000	.1000+01	.0000	.0000
3	.0000	.0000	.1000+01	.0000
4	.0000	.0000	.0000	.1000+01

INPUT IMAGE DATA TAPE INFORMATION

FORMAT	LANSYS 2
NO. OF CHANNELS	12
NO. OF PIXELS/LINE	228
FIRST SCAN LINE NO.	1
FIRST PIXEL REFERENCE PT	1

```
FIELDNAME  NO. OF    SAMPLE  LINE
           VERTICES  INC     INC   VERTICES(SAMPLE,LINE)
FL-C1.     4         1       1     ( 1, 1) ( 90, 1) ( 90, 90) ( 1, 90)

* OUTPUT FILE  1 *

*** TRANSFORMED VALUES NOT RESCALED ***

TRANSFORMED MINIMUMS, COMPONENTS  1- 4 ...
   103.00     95.00     199.00     196.00

TRANSFORMED MAXIMUMS, COMPONENTS  1- 4 ...
   199.00     211.00    210.00     210.00

TRANSFORMED VALUE BIAS, COMPONENTS  1 -  4 :
   .00        .00       .00        .00

NO. OF TRANSFORMED VALUES LESS THAN 0 ( SET = 0 ) :
COMPONENT  1...   0  VALUES
COMPONENT  2...   0  VALUES
COMPONENT  3...   0  VALUES
COMPONENT  4...   0  VALUES

NO. OF TRANSFORMED VALUES GREATER THAN 255 ( SET = 255 ) :
COMPONENT  1...   0  VALUES
COMPONENT  2...   0  VALUES
COMPONENT  3...   0  VALUES
COMPONENT  4...   0  VALUES

NO. OF LOWER TAIL POINTS  REJECTED   ( SET = 0 FOR OUTPUT )  TO SATISFY  .0 %  CUT-OFF, COMPONENTS  1 - 4 ...
  0      0      0      0
```

68

NO. OF UPPER TAIL POINTS REJECTED (SET = 256 FOR OUTPUT) TO SATISFY .0 % CUT-OFF. COMPONENTS 1 = 4 ...

0 0 0 0

.... FINAL OUTPUT TRANSFORMED VALUES, CENTRAL 100 % OF DISTRIBUTION ;

MINIMUMS, COMPONENTS 1 = 4 ...,

103.00 95.00 199.00 196.00

MAXIMUMS, COMPONENTS 1 = 4 ...,

199.00 211.00 218.00 210.00

69

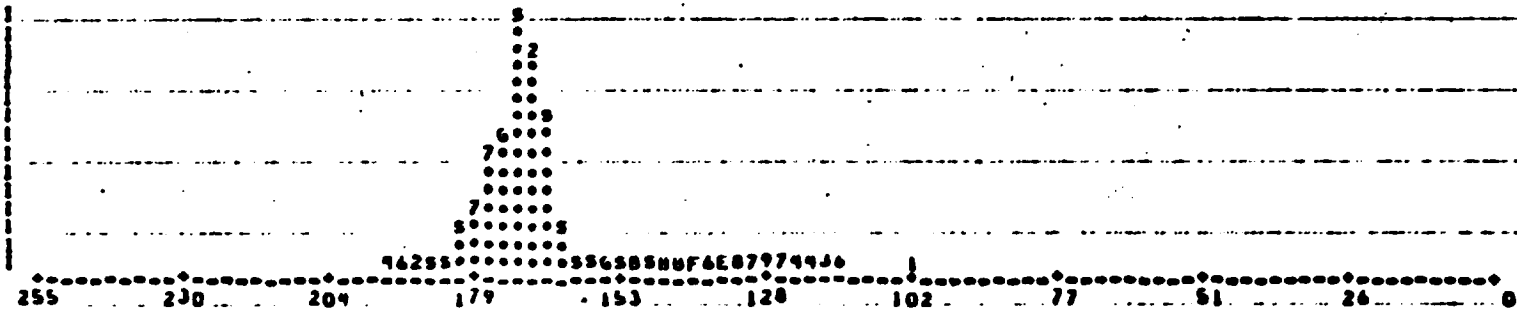
DATA TRANSFORMATION PROCESSOR --- SAMPLE RUN
FLIGHT LINE C-1 DATA

JAN 12,1977

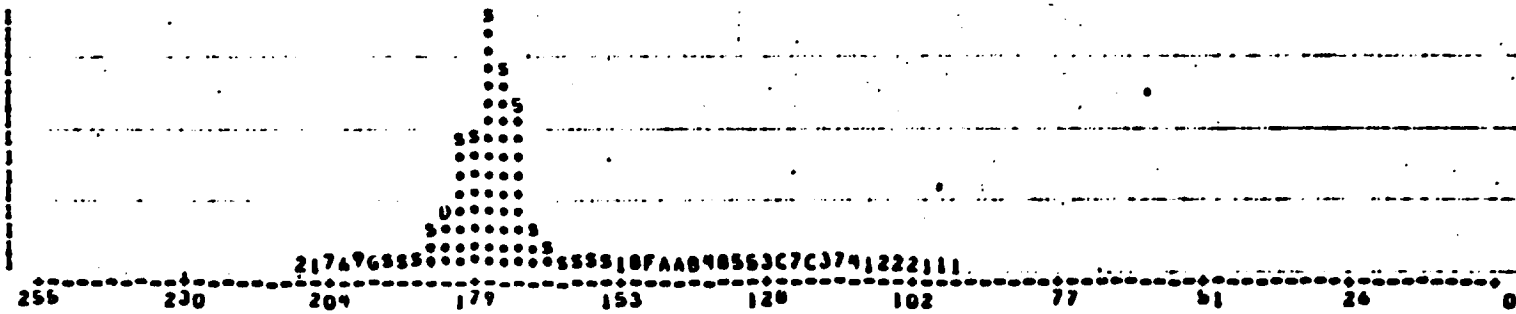
••• SAMPLE RUN NO. 1 •••

DATA TR

EACH • REPRESENTS 135 POINTS).



EACH • REPRESENTS 121 POINTS).



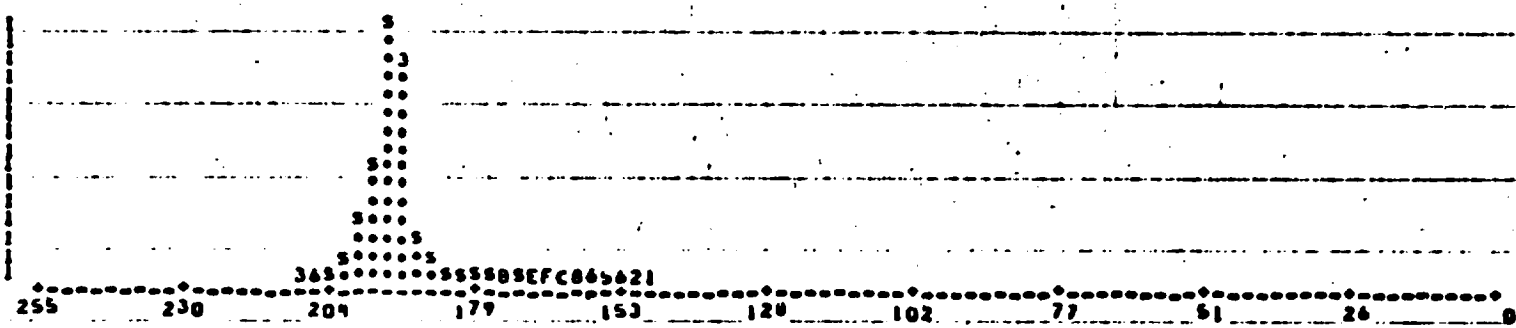
DATA TRANSFORMATION PROCESSOR --- SAMPLE RUN
FLIGHT LINE C-1 DATA

JAN 12,1977

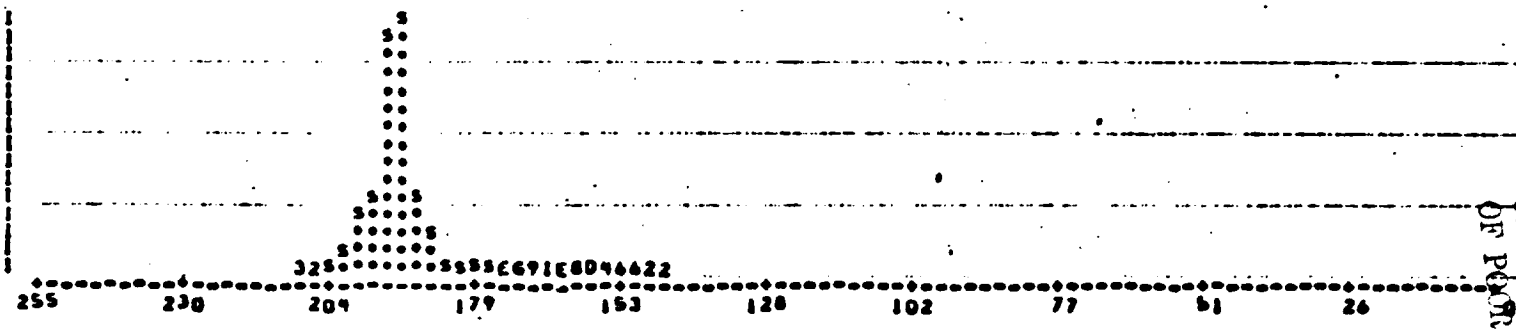
••• SAMPLE RUN NO. 1 •••

DATA TR

EACH • REPRESENTS 180 POINT(S).



EACH • REPRESENTS 176 POINT(S).



*** $DATA-TR COMPLETED ***

TIME FOR DATA-TRANSFORMATION .356

TEST RUN 2

LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS

26 APR 77

```
$DATA-TR
    COMMEN    ... SAMPLE RUN NO. 7 ...
    HLD1                    TEST RUN = DATATR
    HLD2                          C1 FLIGHT LINE
    B-MATR    CARDS
    PLHOUT     0
    BIAS      0.0  :  100.0
    BIAS      0.0  :  -100.0
    DATAFI    FILE = 1 , UNIT = 3
    $END$
```

TEST RUN - DATA7K
C) FLIGHT LINE

26 APR 77

••• SAMPLE RUN NO. 7 •••

LINEAR TRANSFORMATION (B) MATRIX

NO. LINEAR COMB. = 4
NO. CHANNELS = 4

LIN. COMB.	CH(1)	CH(2)	CH(3)	CH(4)
1	.1000*01	.0000	.0000	.0000
2	.0000	.1000*01	.0000	.0000
3	.0000	.0000	.1000*01	.0000
4	.0000	.0000	.0000	.1000*01

INPUT IMAGE DATA TAPE INFORMATION

FORMAT	LANSYS 2
NO. OF CHANNELS	12
NO. OF PIXELS/LINE	228
FIRST SCAN LINE NO.	1
FIRST PIXEL REFERENCE PT	1

```
FIELDNAME  NO. OF VERTICES  SAMPLE INC  LINE INC  VERTICES(SAMPLE,LINE)
  C=1            4              1         1     ( 1.  1)  ( 90.  1)  ( 90.  90)  ( 1.  90)

                 * OUTPUT FILE  1 *


    *** TRANSFORMED VALUES NOT RESCALED ***

    TRANSFORMED MINIMUMS, COMPONENTS 1= 4 ...
        103.00      195.00      199.00       96.00

    TRANSFORMED MAXIMUMS, COMPONENTS 1= 4 ...
        199.00      311.00      218.00      110.00

    TRANSFORMED VALUE BIAS, COMPONENTS 1 = 4 1
          .00      100.00         .00     -100.00

    NO. OF TRANSFORMED VALUES LESS THAN 0 ( SET = 0 ) 1
    COMPONENT  1...    0  VALUES
    COMPONENT  2...    0  VALUES
    COMPONENT  3...    0  VALUES
    COMPONENT  4...    0  VALUES

    NO. OF TRANSFORMED VALUES GREATER THAN 255 ( SET = 255 ) 1
    COMPONENT  1...    0  VALUES
    COMPONENT  2...  7998  VALUES
    COMPONENT  3...    0  VALUES
    COMPONENT  4...    0  VALUES

NO. OF LOWER TAIL POINTS REJECTED ( SET = 0 FOR OUTPUT ) TO SATISFY .0 % CUT-OFF, COMPONENTS 1 = 4 ...
    0       0       0       0

NO. OF UPPER TAIL POINTS REJECTED ( SET = 255 FOR OUTPUT ) TO SATISFY .0 % CUT-OFF, COMPONENTS 1 = 4 ...
    0       0       0       0
```

**** FINAL OUTPUT TRANSFORMED VALUES, CENTRAL 100 % OF DISTRIBUTION ****

MINIMUMS, COMPONENTS 1 - 4 ...

103.00 195.00 149.00 96.00

MAXIMUMS, COMPONENTS 1 - 4 ...

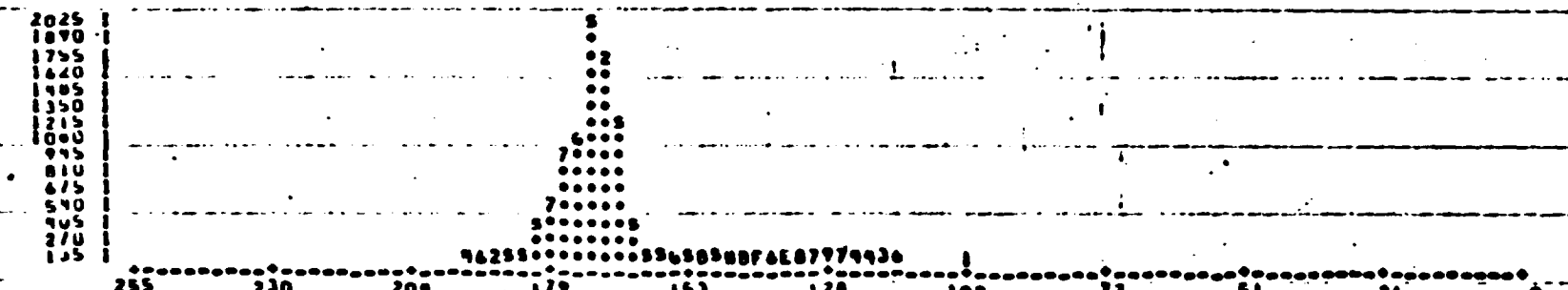
194.00 255.00 218.00 110.00

TEST RUN - DATATR
C1 FLIGHT LINE
26 APR 77

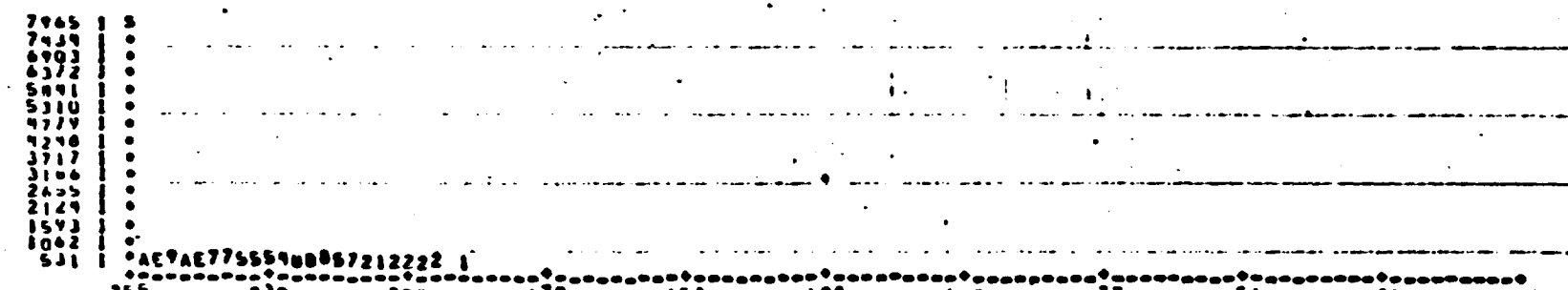
••• SAMPLE RUN NO. 7 •••

DATA TR

EACH • REPRESENTS 135 POINT(S).



EACH • REPRESENTS 531 POINT(S).



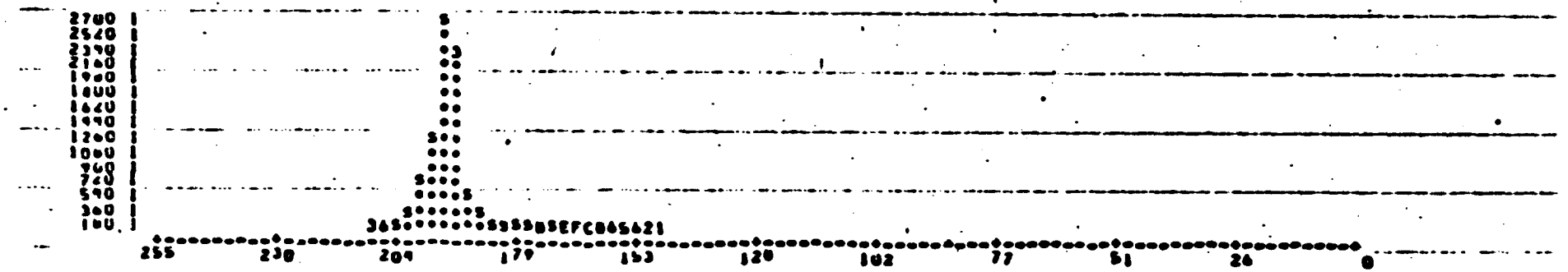
TEST RUN =: DATA7R
CI FLIGHT LINE

25 APR 77

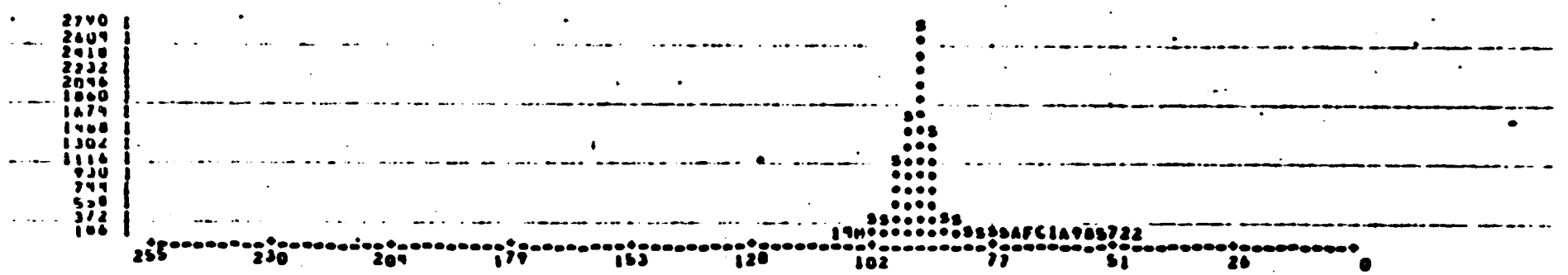
... SAMPLE RUN NO. 7 ...

DATA 7R

EACH • REPRESENTS 180 POINT(S).



EACH • REPRESENTS 186 POINT(S).



*** SDATA-TR COMPLETED ***

TIME FOR DATA-TRANSFORMATION .399

TEST RUN 3

LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS

28 APR 77

```
$DATA-TR
    CUMMEN      ••• SAMPLE RUN NO.  2 •••
    HEDI                DATA TRANSFORMATION PROCESSOR
    HED2                FL C-1  DATA
    DATE        JAN 12,1977
    R-MATR       CARUS
    RESCAL
    MODULE       FILE
    SUBCLA      1. 2. 3. 4. 5. 6.7.8.9.10.11.12.13
    STATFI       UNIT=1 , FILE = 1
    DATAFI       FILE = 1 ,  UNIT = 3
    OPTION      ORIG , TRANSF , PUNCH
    LAM          2
    PLNOUT       5
    BIAS        0.0, 5*0.0, 2 * 0.0 , 0.0,0.0
    BIAS         0.0 , 3 * 0.0 ,  0.0
    FORMAT       OUTPUT =  U
    $END
```

DATA TRANSFORMATION PROCESSOR JAN 12,1977

FL C-1 DATA

••• ORIGINAL STATISTICS •••

SUBCLASS #0##01
MEAN 165.84 171.16 190.76 189.32
COVARIANCE MATRIX

6.56			
6.40	9.22		
3.79	3.87	2.94	
5.30	6.32	3.45	5.64

SUBCLASS #0##02
MEAN 172.06 176.99 194.45 193.79
COVARIANCE MATRIX

64.91			
68.67	80.99		
45.66	50.00	34.29	
46.76	53.88	34.38	38.64

15

DATA TRANSFORMATION PROCESSOR JAN 12,1977

FL C=1 DATA

••• ORIGINAL STATISTICS •••

SUBCLASS NO=03
MEAN 172.99 177.85 195.47 194.72
COVARIANCE MATRIX
5.76
4.29 9.18
4.05 4.00 4.98
3.11 3.99 2.93 4.17

SUBCLASS NO=04
MEAN 171.96 175.75 193.34 191.79
COVARIANCE MATRIX
172.00
145.28 379.47
136.12 131.08 113.54
80.70 201.04 75.37 137.35

C-A7

DATA TRANSFORMATION PROCESSOR JAN 12.197
FL C-1 DATA

••• ORIGINAL STATISTICS •••

SUBCLASS NONWOS
MEAN 171.80 176.47 193.95 193.15
COVARIANCE MATRIX

8.96			
8.15	10.47		
4.63	4.93	3.94	
5.48	5.56	3.05	4.62

SUBCLASS NONNOI
MEAN 161.12 165.64 187.14 185.17
COVARIANCE MATRIX

186.76			
211.17	270.19		
136.70	158.82	102.31	
146.34	180.51	109.79	132.19

DATA TRANSFORMATION PROCESSOR
FL C-1 DATA

JAN 12,197

••• ORIGINAL STATISTICS •••

SUBCLASS NONNO2
MEAN 171.55 175.94 193.74 192.80
COVARIANCE MATRIX
40.86
39.18 58.52
28.71 29.46 21.91
26.24 36.08 19.91 26.87

SUBCLASS NONNO3
MEAN 171.02 175.56 193.67 192.92
COVARIANCE MATRIX
24.08
25.75 33.58
17.57 19.96 14.87
19.30 22.97 15.19 18.36

48

DATA TRANSFORMATION PROCESSOR JAN 12,191
FL C=1 DATA

••• ORIGINAL STATISTICS •••

SUBCLASS NONNOS
MEAN 173.69 177.90 194.75 193.81
COVARIANCE MATRIX

36.22

35.95 51.67

23.69 26.76 19.10

22.00 30.32 18.05 23.85

SUBCLASS NONNOS
MEAN 174.06 178.54 195.63 194.93
COVARIANCE MATRIX

19.77

18.32 21.82

12.45 12.65 9.87

12.57 13.66 9.05 11.38

DATA TRANSFORMATION PROCESSOR JAN 12,1977
FL C=1 DATA

••• ORIGINAL STATISTICS •••

SUBCLASS NONNO6
MEAN 169.27 174.90 192.77 192.00
COVARIANCE MATRIX

2.89			
.72	2.09		
.86	.48	2.05	
.41	.45	.19	.55

SUBCLASS NONNO7
MEAN 171.47 175.71 193.52 192.67
COVARIANCE MATRIX

21.87			
20.99	22.70		
17.81	17.82	16.25	
18.00	18.29	15.65	16.71

DATA TRANSFORMATION PROCESSOR JAN 12,197
FL C=1 DATA

... ORIGINAL STATISTICS ...

SUBCLASS NONNOB
MEAN 166.50 170.70 190.37 188.57
COVARIANCE MATRIX

1.78
.53 3.89
.36 .19 1.83
-.05 -.11 -.04 .32

DATA TRANSFORMATION PROCESSOR
FL C=1 DATA

JAN 12,1977

••• SAMPLE RUN NO. 2 •••

LINEAR TRANSFORMATION (B) MATRIX

NO. LINEAR COMB. = 4
NO. CHANNELS = 4

LIN. CMB.	CH(1)	CH(2)	CH(3)	CH(4)
1	.1000+01	.0000	.0000	.0000
2	.0000	.1000+01	.0000	.0000
3	.0000	.0000	.1000+01	.0000
4	.0000	.0000	.0000	.1000+01

88

... TRANSFORMED STATISTICS ...

SUBCLASS #DW#01
MEAN 165.89 171.16 190.76 189.32
COVARIANCE MATRIX

6.56			
6.40	9.22		
3.79	3.87	2.94	
5.30	6.32	3.45	5.64

SUBCLASS #DW#02
MEAN 172.06 176.99 194.45 193.79
COVARIANCE MATRIX

64.91			
60.67	80.99		
45.66	50.00	34.29	
46.76	53.80	34.38	38.69

DATA TRANSFORMATION PROCESSOR JAN 12,197
FL C-1 DATA

••• TRANSFORMED STATISTICS •••

SUBCLASS W0W03
MEAN 172.99 177.85 195.47 199.72
COVARIANCE MATRIX
6.76
4.29 9.18
4.05 4.00 4.48
3.11 3.99 2.93 4.17

SUBCLASS W0W04
MEAN 171.96 175.75 193.34 191.79
COVARIANCE MATRIX
172.00
145.28 379.47
136.12 131.08 113.54
80.70 201.04 75.37 137.35

DATA TRANSFORMATION PROCESSUR
FL C=1 DATA

JAN 12,1977

• TRANSFORMED STATISTICS •••

NONNO4
173.69 177.90 194.75 193.81
E MATRIX
36.22
35.95 51.67
23.69 26.76 19.10
22.00 30.32 18.05 23.85

NONNO5
174.06 178.54 195.63 194.93
E MATRIX
19.77
18.32 21.82
12.45 12.65 9.87
12.57 13.46 9.05 11.38

DATA TRANSFORMATION PROCESSOR
FL C-1 DATA

JAN 12,1977

... TRANSFORMED STATISTICS ...

SUBCLASS NONNO6
MEAN 169.27 174.90 192.77 192.00
COVARIANCE MATRIX
2.89
.72 2.64
.86 .98 2.05
.41 .45 .19 .55

SUBCLASS NONNO7
MEAN 171.97 175.71 193.52 192.67
COVARIANCE MATRIX
21.87
20.99 22.70
17.81 17.82 16.25
18.00 18.29 15.65 16.71

DATA TRANSFORMATION PROCESSOR
FL C-1 DATA

JAN 12,1977

... TRANSFORMED STATISTICS ...

SUBCLASS NONNOS
MEAN 166.50 170.90 190.37 188.57
COVARIANCE MATRIX

1.78
.53 3.89
.36 .19 1.83
-.05 -.11 -.09 .32

INPUT IMAGE DATA TAPE INFORMATION

FORMAT	LARSYS 2
NO. OF CHANNELS	12
NO. OF PIXELS/LINE	228
FIRST SCAN LINE NO.	1
FIRST PIXEL REFERENCE PT	1

FIELDNAME	NO. OF VERTICES	SAMPLE INC	LINE INC	VERTICES(SAMPLE,LINE)
FL-C1	4	1	1	(1, 1) (90, 1) (90, 90) (1, 90)

• OUTPUT FILE 1 •

••• TRANSFORMED VALUES RESCALED TO A RANGE 0 - 255 •••
(STATISTICS METHOD)

••• ORIGINAL TRANSFORMED DATA RANGE •••

MIN	MAX	(BIAS)
103.0000	194.0000	(.0000)
95.0000	211.0000	(.0000)
149.0000	210.0000	(.0000)
146.0000	210.0000	(.0000)

••• TRANSFORMED DATA RANGE, AFTER APPLICATION OF PEROUT •••

MIN	MAX	CON = 255/(MAX-MIN)
163.3398	182.9134	14.5103
185.5491	188.0274	12.4480
186.6042	203.9274	17.8333
184.7246	200.6389	16.3234

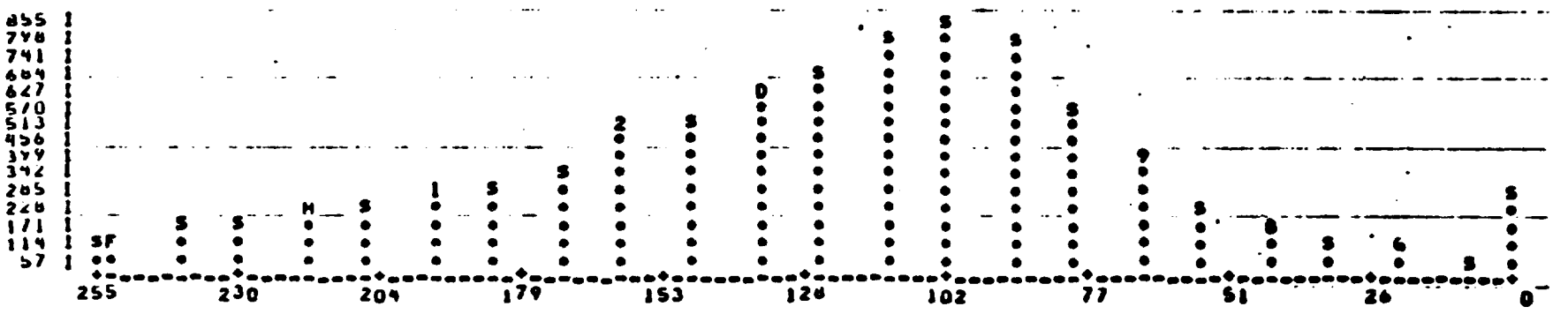
DATA TRANSFORMATION PROCESSOR
FL C-1 DATA

JAN 12,1977

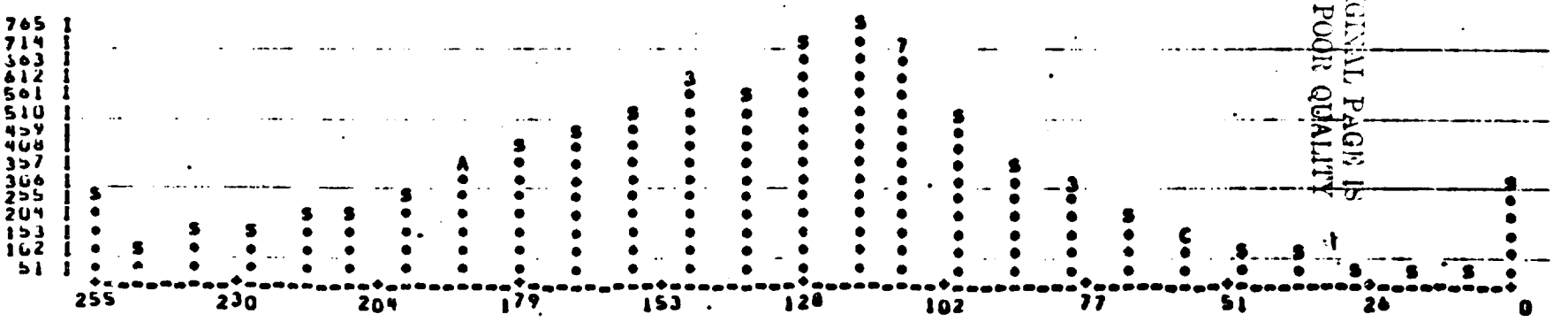
••• SAMPLE RUN NO. 2.•••

DATA TR

EACH • REPRESENTS 57 POINT(S).



EACH • REPRESENTS 51 POINT(S).



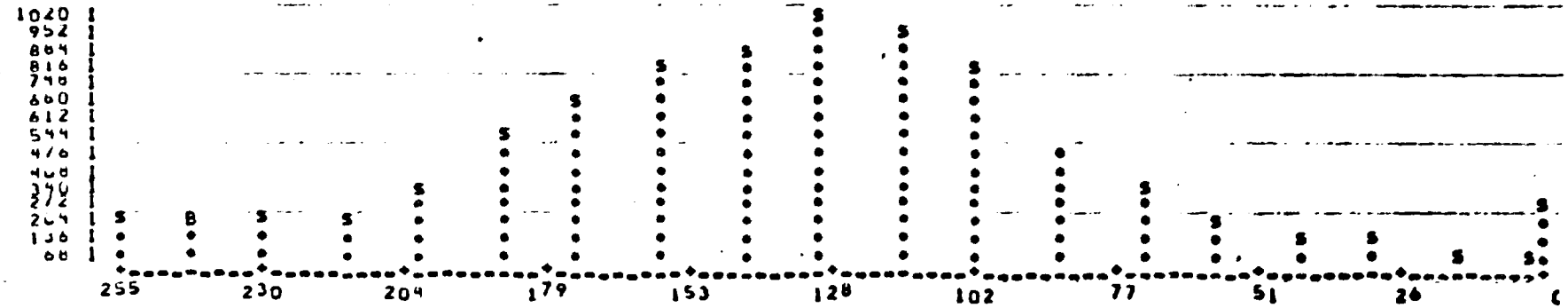
C-2

DATA TRANSFORMATION PROCESSOR JAN 12,1977
FL C=1 DATA

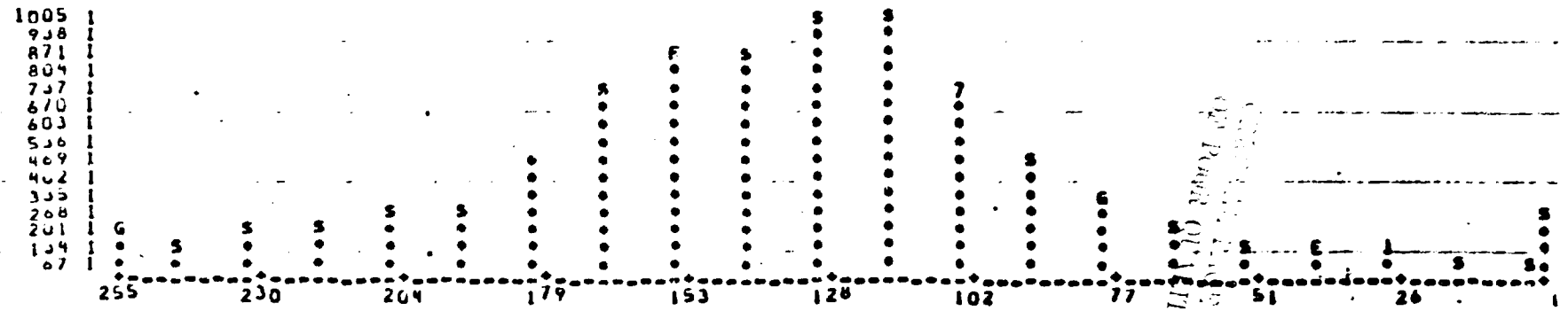
••• SAMPLE RUN NO. 2 •••

DATA TR

EACH • REPRESENTS 68 POINT(S).



EACH • REPRESENTS 67 POINT(S).



SCALING PARAMETERS USED ON TRANSFORMED VALUES, OUTPUT FILE 1

	MINIMUM	MAXIMUM	SCALE FACTOR (CON)
COMPONENT 1	163.340	180.914	19.510
COMPONENT 2	165.544	186.029	12.998
COMPONENT 3	186.604	203.927	17.803
COMPONENT 4	184.725	200.639	16.023

••• SDATA-TR COMPLETED •••

TIME FOR DATA-TRANSFORMATION .901

TEST RUN 4

LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS

26 APR 77

```
$DATA-TR
    COMMEN    *** SAMPLE RUN NO. 6 ***
    HED1                    SAMPLE RUN - DATA TR
    HED2                      FLT LINE C-1
    R-MATR    CARDS
    RESCAL
    OPTION    SCAFAC= (  14.510,  163.390 ) ; (  12.998,  165.549 ) ;
    OPTION    SCAFAC= (  17.803,  186.604 ) ; (  16.023,  189.726 ) ;
    PENOUT     0
    DATAF      U=3 , F=1
    FORMAT    OUTPUT = U
    *END*
```

SAMPLE RUN - DATA TR 26 APR 77
FLT LINE C-1

••• SAMPLE RUN NO. 5 •••

LINEAR TRANSFORMATION (B) MATRIX

NO. LINEAR COMB. = 4
NO. CHANNELS = 4

LIN. CMB.	CHI 1)	CHI 2)	CHI 3)	CHI 4)
1	•1000•01	•0000	•0000	•0000
2	•0000	•1000•01	•0000	•0000
3	•0000	•0000	•1000•01	•0000
4	•0000	•0000	•0000	•1000•01

INPUT IMAGE DATA TAPE INFORMATION

FORMAT	LARSYS 2
NO. OF CHANNELS	12
NO. OF PIXELS/LINE	226
FIRST SCAN LINE NO.	1
FIRST PIXEL REFERENCE PT	1

FIELDNAME (=)	NO. OF VERTICES	SAMPLE INC	LINE INC	VERTICES(SAMPLE,LINE)
	4	1	1	(1, 1) (90, 1) (90, 90) (1, 90)

• OUTPUT FILE 1 •

••• TRANSFORMED VALUES RESCALED TO A RANGE 0 - 255 •••
(INPUT SCALING PARAMETERS)

••• ORIGINAL TRANSFORMED DATA RANGE •••

MIN	MAX	(BIAS)
103.0000	194.0000	(.0000)
95.0000	211.0000	(.0000)
199.0000	210.0000	(.0000)
146.0000	210.0000	(.0000)

••• TRANSFORMED DATA RANGE, AFTER APPLICATION OF PEROUT •••

MIN	MAX	GAIN = 255/(MAX-MIN)
183.3400	180.9191	14.5100
165.5440	186.0292	12.4480
186.8040	200.9279	17.8030
184.7250	200.6394	16.0230

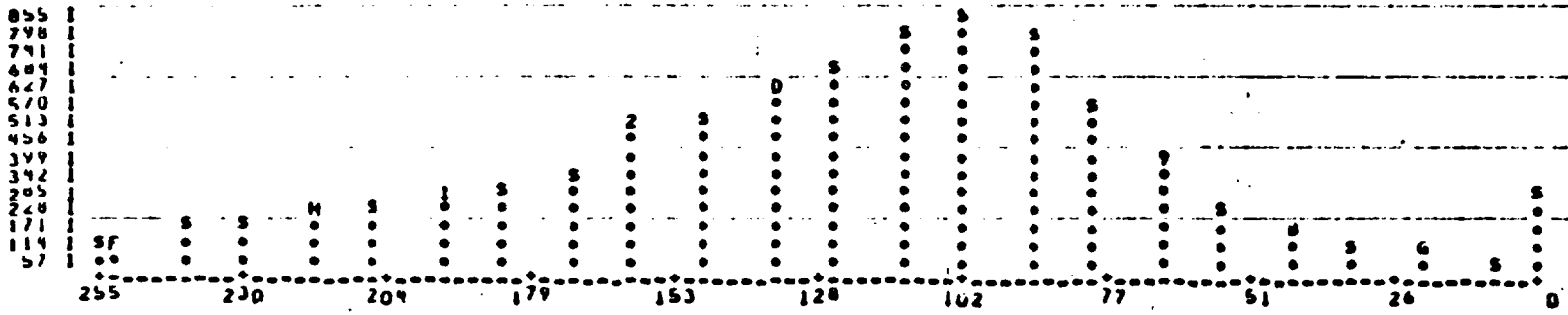
SAMPLE RUN - DATA TR
FLT LINE C-1

25 APR 77

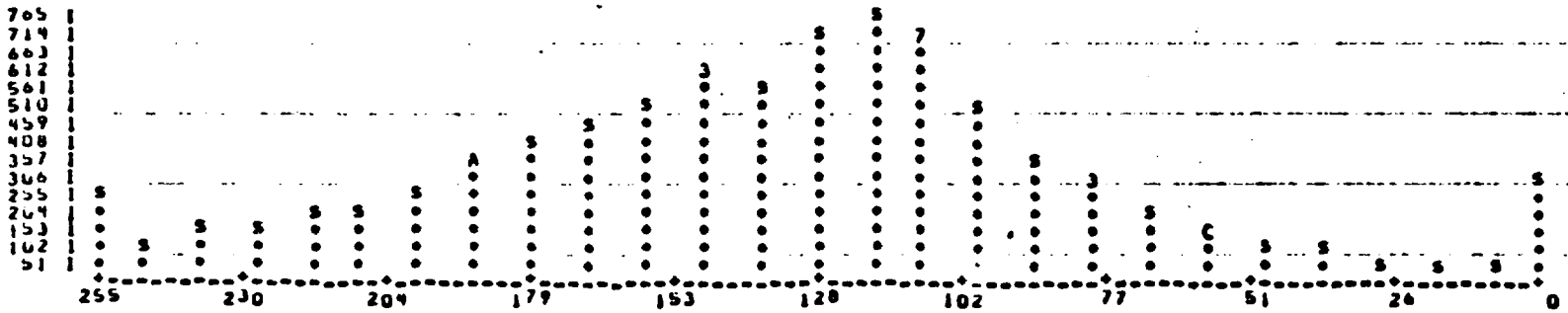
... SAMPLE RUN NO. 5 ...

DATA TR

EACH • REPRESENTS 57 POINT(S).



EACH • REPRESENTS 51 POINT(S).



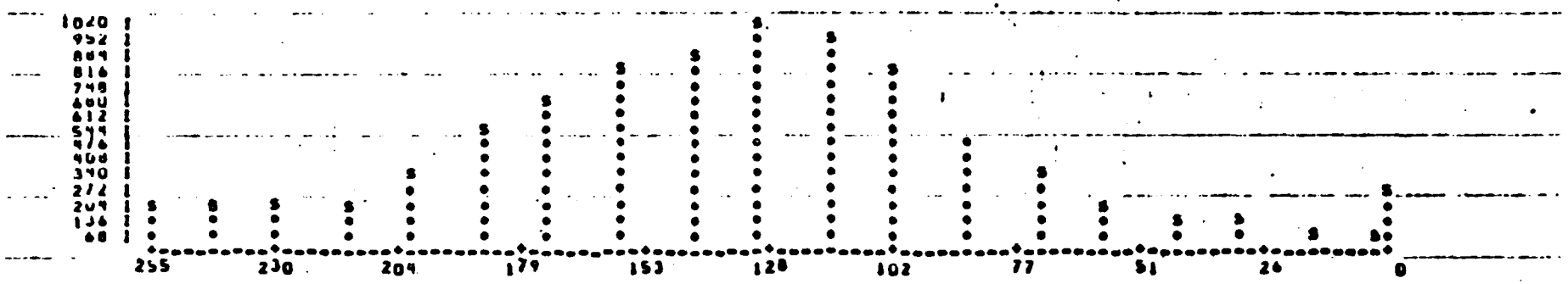
C-56

SAMPLE RUN - DATA TR
FLT LINE C-1
26 APR 77

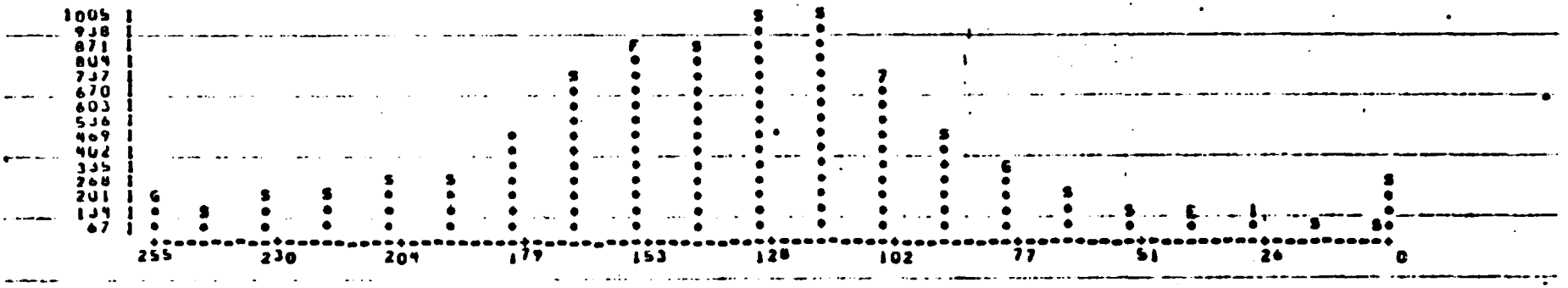
••• SAMPLE RUN NO. 5 •••

DATA TR

EACH • REPRESENTS 60 POINT(S).



EACH • REPRESENTS 67 POINT(S).



SCALING PARAMETERS USED ON TRANSFORMED VALUES, OUTPUT FILE 1

	MINIMUM	MAXIMUM	SCALE FACTOR (CON)
COMPONENT 1	163.390	180.919	19.510
COMPONENT 2	165.549	186.029	17.948
COMPONENT 3	186.609	200.927	17.803
COMPONENT 4	184.725	200.690	16.023

*** SDATA-TR COMPLETED ***

TIME FOR DATA-TRANSFORMATION .370

TEST RUN 5

LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS

25 APR 77

```
$DATA-TR
    CUMMEN    ...  SAMPLE RUN NO.  6  ...
    HLD1                    DATA-TR  PROCESSOR
    HLD2                    C-I  FLIGHT LINE
    DATE      12 JAN. 77
    R-MATR    CARUS
    MAAPT     255.255.255.255.255.255.255.255.255.255.255.255.255
    MAAPT     255.255.255.255.255.255.255.255.255.255.255.255.255
    MAAPT       255 . 255. 255. 255. 255. 255
    PLHOUT    5
    RESCAL
    DATAFI    U = 3 , F = 1
    $END$
```

101

... SAMPLE RUN NO. 6 ...

LINEAR TRANSFORMATION (B) MATRIX

NO. LINEAR COMB. = 4
NO. CHANNELS = 4

LIN. COMB.	CHN 1)	CHN 2)	CHN 3)	CHN 4)
1	.1000+01	.0000	.0000	.0000
2	.0000	.1000+01	.0000	.0000
3	.0000	.0000	.1000+01	.0000
4	.0000	.0000	.0000	.1000+01

INPUT IMAGE DATA TAPE INFORMATION

FORMAT	LANSTS 2
NO. OF CHANNELS	12
NO. OF PIXELS/LINE	228
FIRST SCAN LINE NO.	1
FIRST PIXEL REFERENCE PT	1

FIELDNAME (C=1)	NO. OF VERTICES	SAMPLE INC	LINE INC	VERTICES(SAMPLE,LINE)
4	1	1	(1, 1) (98, 1) (98, 98) (1, 98)

• OUTPUT FILE 1 •

••• TRANSFORMED VALUES RESCALED TO A RANGE 0 - 255 •••
(HISTOGRAM METHOD)

••• ORIGINAL TRANSFORMED DATA RANGE •••

MIN	MAX	(BIAS)
103.0000	194.0000	(.0000)
95.0000	211.0000	(.0000)
199.0000	210.0000	(.0000)
196.0000	210.0000	(.0000)

••• TRANSFORMED DATA RANGE, AFTER APPLICATION OF PEROUT •••

MIN	MAX	GAIN = 255/(MAX-MIN)
160.6500	181.0500	12.5000
158.1000	188.7000	8.3333
181.0500	201.9500	12.5000
178.5000	201.9500	11.1111

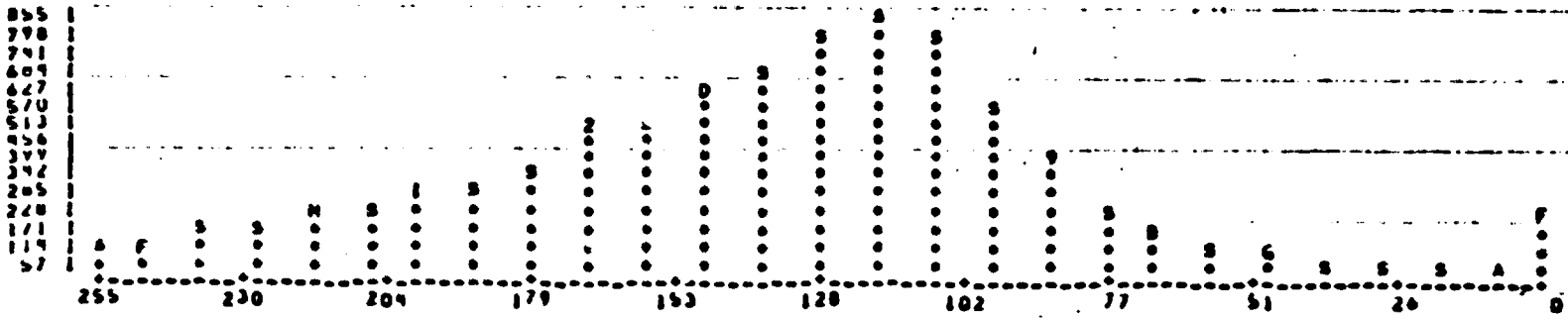
DATA-TR PROCESSOR
C-1 FLIGHT LINE

12 JAN. '77

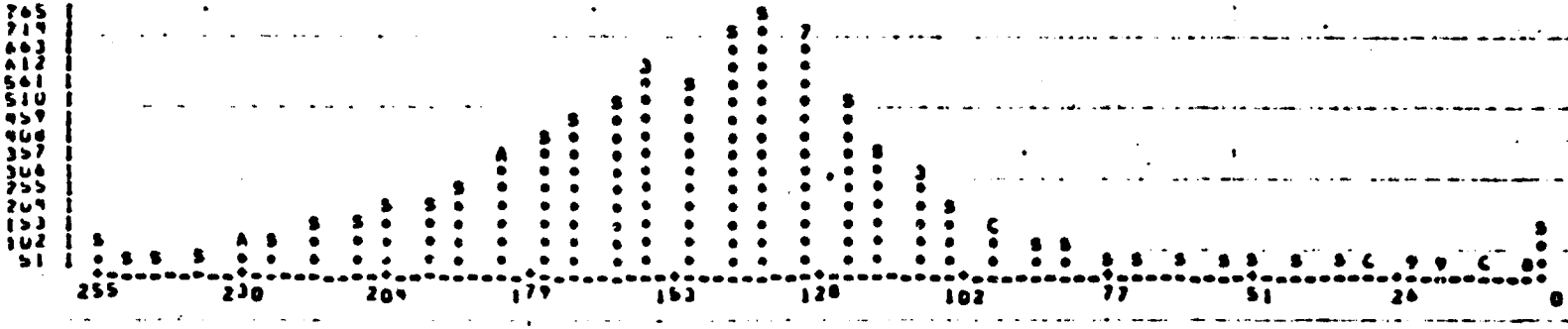
... SAMPLE RUN NO. 6 ...

DATA TR

EACH • REPRESENTS 57 POINT(S).



EACH • REPRESENTS 51 POINT(S).

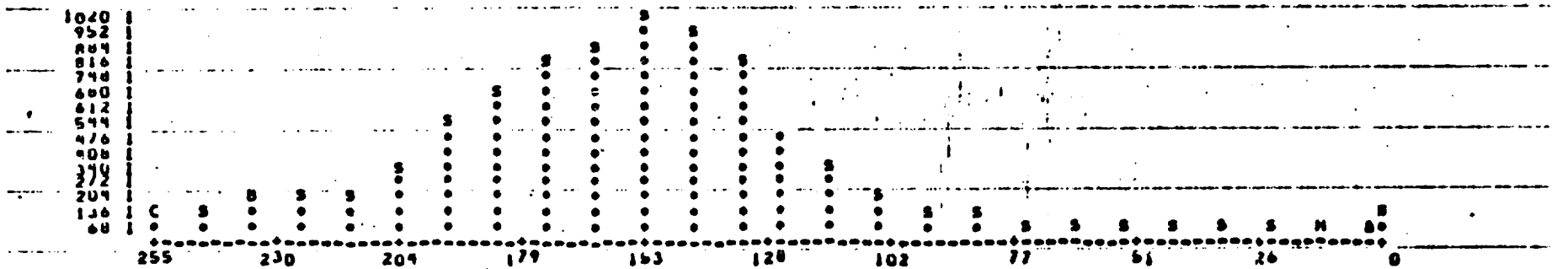


DATA-TR PROCESSOR 12 JAN. '77
C-I FLIGHT LINE

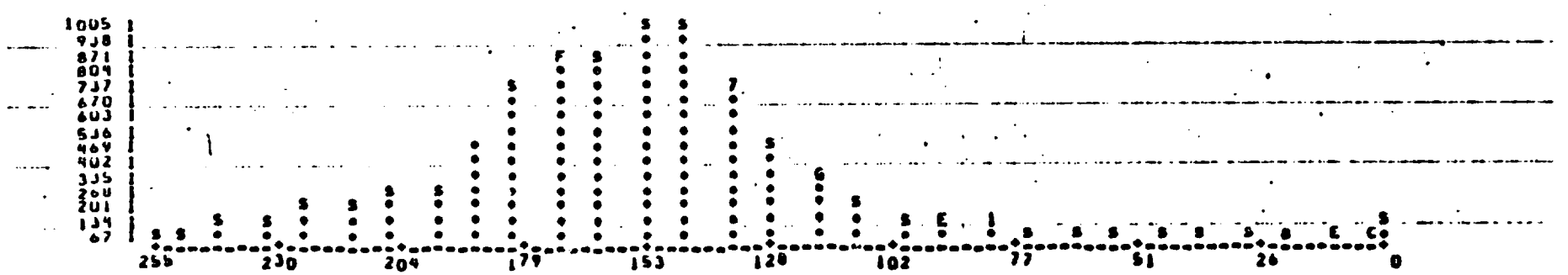
••• SAMPLE RUN NO. 6 •••

DATA TR

EACH • REPRESENTS 60 POINT(S).



EACH • REPRESENTS 67 POINT(S).



D-52

SCALING PARAMETERS USED ON TRANSFORMED VALUES. OUTPUT FILE 1

	MINIMUM	MAXIMUM	SCALE FACTOR (CON)
COMPONENT 1	160.650	161.950	12.500
COMPONENT 2	158.100	188.700	8.333
COMPONENT 3	181.050	201.450	12.500
COMPONENT 4	178.500	201.450	11.111

*** DATA-TR COMPLETED ***

TIME FOR DATA-TRANSFORMATION .534