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JSC-12917 NASA CR.
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FINAL DESIGN SPECIFICATION
FOR
EOD-LARSYS/DATA TRANSFORMATION PROCESSOR MODIFICATION

Job Order 81-127

(TIRF 76-0078)

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Prepared By

Lockheed Electronics Company, Inc.
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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

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FOR
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Job Order 81-127
(TIRF 76-0078)

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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

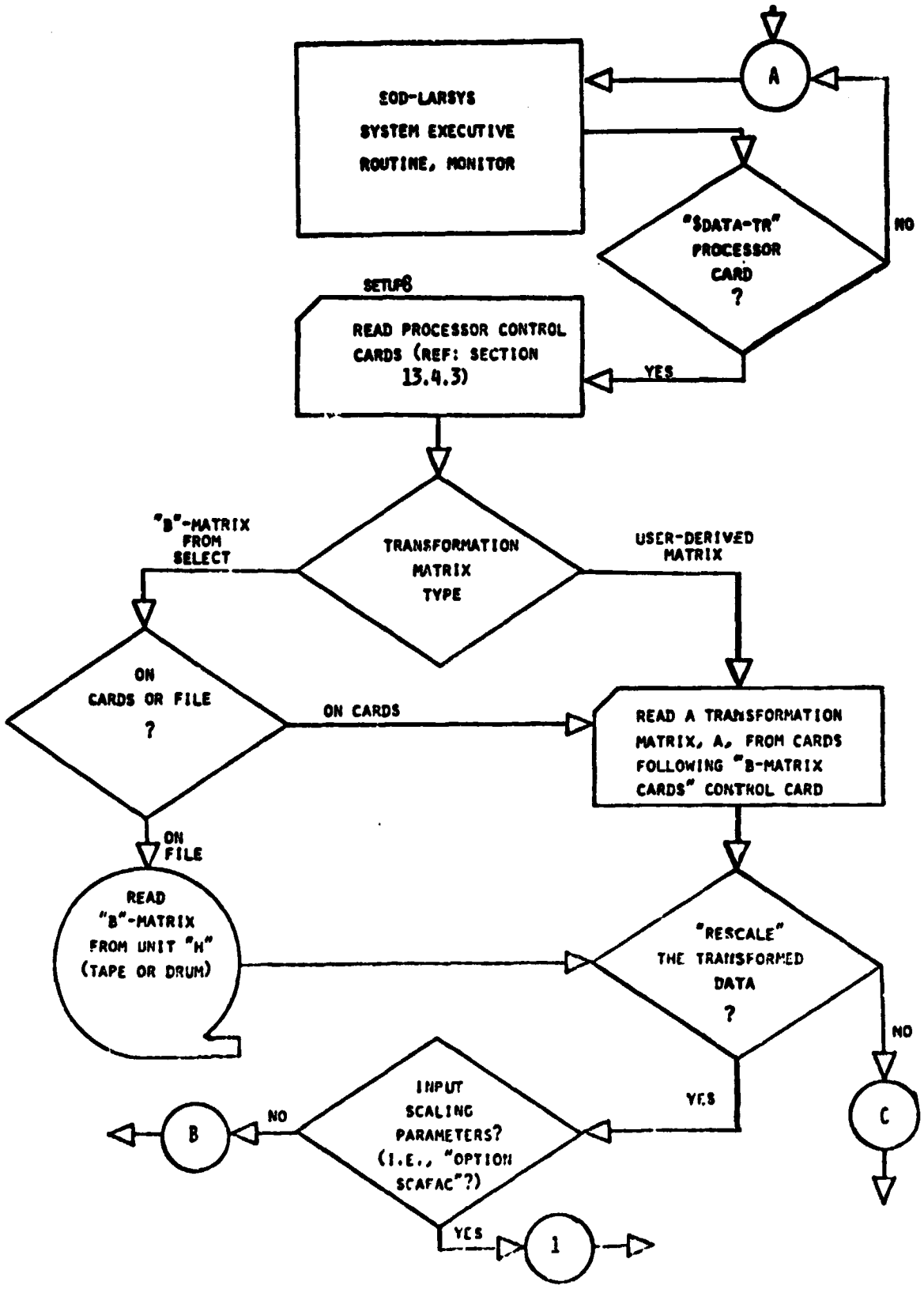
Verification Date: 4/25/77

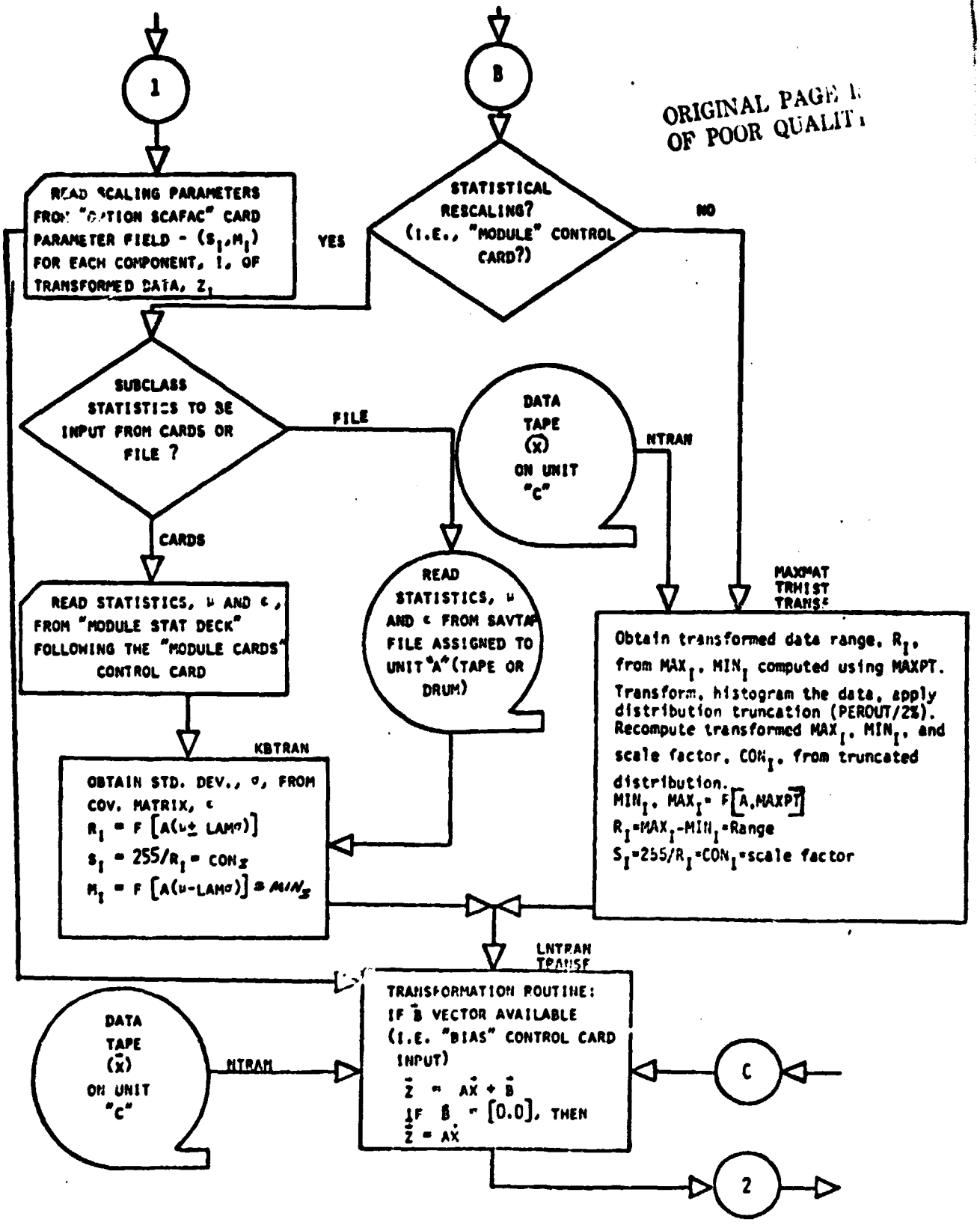
APPENDIX A

DATA TRANSFORMATION FLOWCHART

FUNCTIONAL FLOW CHART

DATA-TR PROCESSOR





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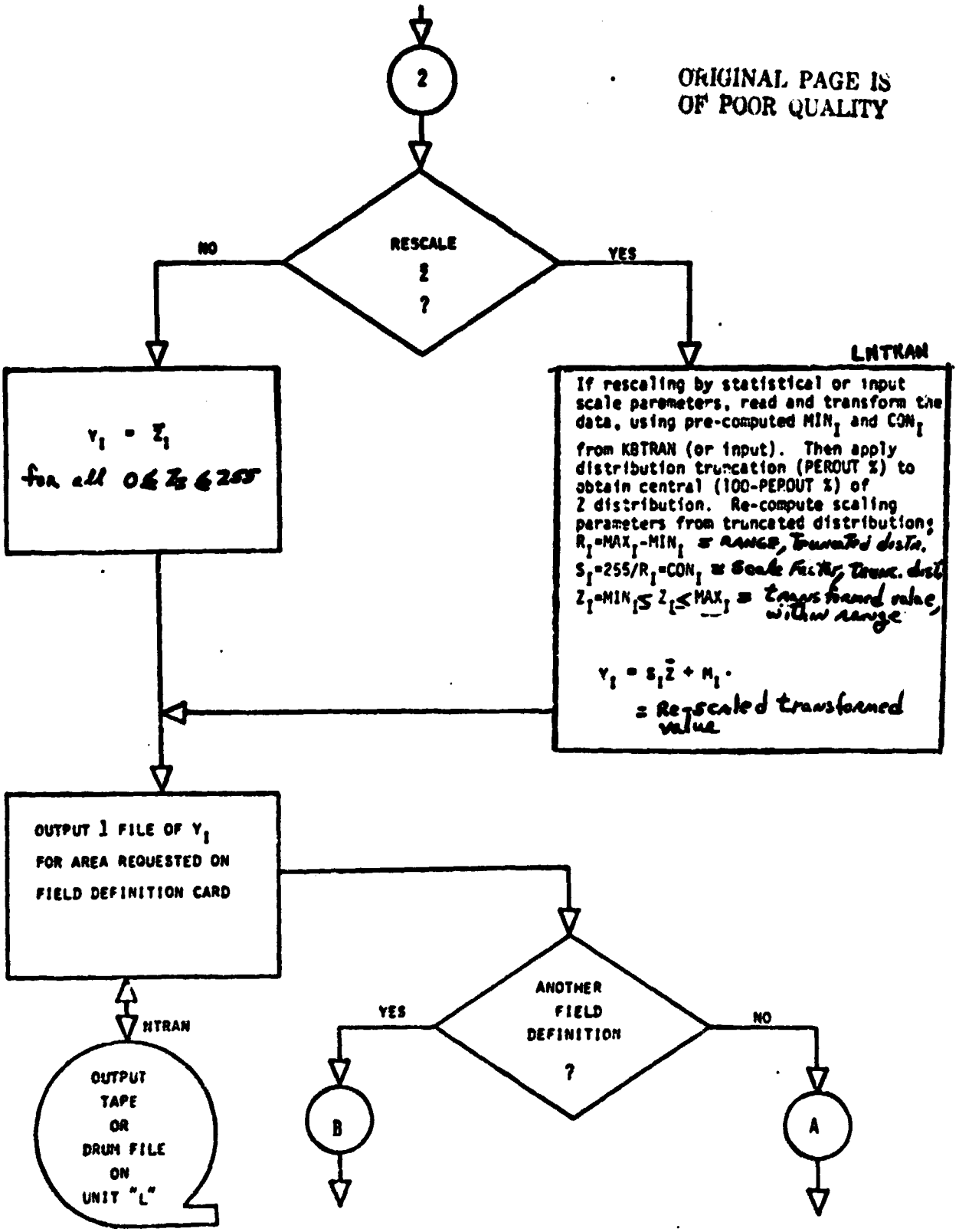
OF POOR QUALITY



APPENDIX B

LISTINGS

```
@ FOR DATATR,DATATR                                                    09 MAY 77        221 93
UNIVAC 1108 FORTRAN V EXEC 11 LEVEL 25A -(EXEC8 LEVEL 612010010A)
THIS COMPILATION WAS DONE ON 09 MAY 77 AT 22:09:36

    SUBROUTINE DATATR     ENTRY POINT 000257

    STORAGE USED: CODE(1) 000302  DATA(3) 004503  BLANK COMMON(2) 000000

     COMMON BLOCKS:

     0003   INFORM 001154
     0004   INBLCK 000046
     0005   GLOBAL 000075

    EXTERNAL REFERENCES (BLOCK, NAME)

     0006   SETUP8
     0007   SETMEM
     0010   ABTRAN
     0011   MAXMAT
     0012   TRMIST
     0013   LNTRAN
     0014   MBUUS
     0015   MIO25
     0016   MEMR35

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

     0001   000002 123B    0001   000202 163B    0001   000877 20L     0001   000112 30L     0001   000197 50L
     0001   000200 60L     0000   004445 88F     0000 R 001140 ACON    0000 I 004437 AUDNUM   0000 X 001100 AMAX
     0000 R 001120 AMIN    0005   000073 ASAV    0005   000077 ASAVFL  0003 I 000004 AVARZ    0000 X 000040 BIAS
     0000 R 000060 BMAT    0005   000055 BMFILE  0005   000056 BMKEY   0000 I 004431 BNTRIG    0003   000010 CLSIO2
```

```
0005     0000031 CLSVC2    0000  I  0099362 COMNT     0000  R  0001027 COM       0000  R  0001040 COMMON      0005     0000007 CUTPAR2
0005     0001053 DATAPE    0005     0000371 DATFIL    0005     0000107 DKMBUS    0005     0001064 DKUMAD      0005     0000064 ENTPTP
0005     0000063 ENPKET    0003     0000015 FETVC2    0004     0000010 FETVEC    0000  I  0001210 FILMIS      0004     0000002 FLUINF
0000  I  0099992 FLUNAM    0003     0000013 FLDSV2    0003     0000700 GKOUPS    0003     0001064 GRPCHK      0003     0000500 GRPVEA
0003     0000172 GRPNAM    0000  I  0001330 HDR1      0000  I  0099350 HDR2      0005  I  0000000 HEAD       0005     0000057 HISFIL
0005     0000060 HISKET    0000  I  0099429 I         0000  I  0001379 INUATE    0000     0001461 INJPS       0000  I  0001420 IPL19
0000  I  0099425 IPL2      0000  I  0099999 IPL31     0003     0003375 KEPPTS    0000  I  0001331 LAM        0003  I  0001441 LAM
0000  I  0099430 LCOMB     0005     0000052 MAPTAP    0005     0001669 MAPUNT    0000  R  0000000 MAX        0003  I  0001160 MAXPT
0000  R  0000020 MIN       0000  I  0099443 NC        0000  I  0001427 NF        0003     0000000 NOCLS2      0001     0000001 NOFEAT
0003     0000002 NOFEIZ    0005     0000065 NOFILE    0003     0000005 NOFLU2    0003     0001471 NOGRP       0003     0000001 NOSUB2
0000  I  0099990 NPUN      0004     0000008 OUTFMT    0005     0000070 PAGSIZ    0000  I  0001432 PENOUT      0000  I  0000136 RESCAL
0005     0000059 SAVTAP    0000  I  0099434 SCAFLG    0005     0000072 STAFIL    0003     0000014 SUBUS2      0003     0000011 SUBNU2
0003     0001166 SUBPTR    0003     0000053 SUBVC2    0003  -  0001009 TOTVT2    0000  I  0001435 TRANSF      0005     0000061 TRFORM
0003     0000003 VARSZ2    0000  I  0099370 VERTCS    0003     0001019 VERTX2
```

```
00101     1C          SUBROUTINE DATATR(ARRAY,TOP)                                                    DATR0001
00101     2C     C
00103     3C          IMPLICIT INTEGER(A-Z)                                                           DATR0002
00103     9C     C                                                                                    DATR0003
```

```
00103     5C     C
00104     6C          REAL   BIAS(16), BMAT(480), MAX(16), MIN(16), CON(16), CUMMIN(32)               DATR0005
00104     7C     C                                                                                    DATR0006
00105     8C          REAL   AMAX(16), AMIN(16), ACUM(16)                                             DATR0007
00105     9C     C                                                                                    DATR0008
00105     10C    C                                                                                    DATR0009
00106     11C         DIMENSION   ARRAY(TOP),  MAXPT(30),  FILMIS(1616)                               DATR0010
00106     12C    C                                                                                    DATR0011
00107     13C         DIMENSION   HDR1(10) , HDR2(10) , COMNT(10) , INUATE(2)                         DATR0012
00110     14C         INCLUDE CUMBK1.LIST                                                              DATR0013
00111     14C         COMMON/INFORM/NOCLS2,NOSUB2,NOFET2,VARSZ2,TOTVT2,NOFLO2,
00111     14C        *            AVARZ,CUVARZ,CLSID2,SUBNU2,SUBUS2,FLUSV2,VERTX2,
00111     14C        *            FETVC2(30),SUBVC2(75),SUBPTR(75),CLSVC2(60),
00111     14C        *            KEPPTS(60),NUGRP,GRPNAM(60),GRPDEA(16),
00111     14C        *            GRP(HK(16)),GROUPS(129)
00112     14C         END
00113     15C         INCLUDE COMBK9.LIST                                                              DATR0014
00113     15C    C DATA TRANSFORMATION COMMON BLOCK
00114     15C         COMMON/TRBLCK/OUTFMT,NOFEAT,FLUINF(6),          FETVEC(30)
00115     15C         END
00116     16C         INCLUDE COMBK6.LIST                                                              DATR0015
00117     16C         COMMON/GLOBAL/HEAD(92),MAPTAP,DATAPE,SAVTAP,DMFILE,DMKEY,
00117     16C        *             HISFIL,HISKET,TRFORM,ENTPTP,ENPKET,MAPUNT,NOFILE,
00117     16C        *     DKUMAD,DKMBUS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
00120     16C         END
00121     17C         DIMENSION VERTCS(2,11)                                                           DATR0016
00121     18C    C                                                                                    DATR0017
00121     19C    C                                                                                    DATR0018
00121     20C    C    RESCALING METHOD IS DETERMINED IN SETUP8 :                                      DATR0019
00121     21C    C                                                                                    DATR0020
00121     22C    C      SCAFLG = 1 ,  RESCALE BY HISTOGRAM METHOD                                     DATR0021
00121     23C    C                                                                                    DATR0022
00121     24C    C      SCAFLG = 2 ,  RESCALE BY STATISTICS METHOD                                    DATR0023
00121     25C    C                                                                                    DATR0024
00121     26C    C      SCAFLG = 3 ,  RESCALE WITH USER-INPUT SCALING PARAMETERS                      DATR0025
00121     27C    C                                                                                    DATR0026
```

```
00121     260      C
00121     290      C         IF THE FLAG   RESCAL   IS ZERO, NO RESCALING OCCURS
00121     300      C
00121     310      C
00121     320      C
00122     330            DO 10 I=1,10
00125     340            IPL2 = I + 2
00126     350            MDK1(I) = HEAD(IPL2)
00127     360            IPL19 = I + 19
00130     370            MDK2(I) = HEAD(IPL19)
00131     380         10 COMNT(I) = 6H
00131     390      C
00133     400            INDATE(1) = HEAD(15)
00134     410            INDATE(2) = HEAD(16)
00134     420      C
00134     430      C
00135     440            NF = 0
00135     450      C
00136     460            CALL SETUP(BMAT,LCOMB,BNTRIG,PEROUT,MAXPT,AMRAY,LAM,
     .       SCAFLG , TOP, TRANSF, RESCAL, BIAS, ADUNUM, CUNMIN, NPUN )
00137     480            IF (RESCAL.EQ.0) GO TO 50
00137     490      C
```

```
00137     500      C
00141     510            IF (SCAFLG.EQ.1) GO TO 30
00141     520      C
00143     530            IF (SCAFLG.EQ.2) GO TO 20
00143     540      C
00145     550            IF( SCAFLG .EQ. 3 )
00145     560      C
00145     570      .        CALL SETREM ( CONMIN, CON, MIN, ADUNUM, LCOMB )
00147     580            GO TO 50
00147     590      C
00147     600      C
00147     610      C     IF RESCALING BY THE STATISTICS METHOD, APPLY TRANSFORMATION TO
00147     620      C     STATS ( MEANS, COVARIANCES ) , OBTAIN TRANSFORMED MAX AND MIN
00147     630      C     USING TRANSFORMED STATS .
00147     640      C
00150     650         20 CALL  KBTMAN ( BMAT, LCOMB, AMRAY, LAM, MAX, MIN, CON, TRANSF )
00150     660      C
00151     670            GO TO 50
00151     680      C
00151     690      C
00151     700      C     IF RESCALING BY THE HISTOGRAM METHOD,  OBTAIN THE PREDICTED
00151     710      C     MAX AND MIN OF EACH COMPONENT OF THE TRANSFORMED DATA
00151     720      C     ( VIA  MAXMAT )  AND PERFORM A HISTOGRAM OF THE TRANSFORMED
00151     730      C     DATA ( VIA  THHIST ), IN ORDER  TO OBTAIN THE RESCALING
00151     740      C     PARAMETERS ,  CON  AND  MIN .
00151     750      C
00151     760      C
00152     770         30 CALL  MAXMAT ( AMAX, AMIN, ACON, BMAT, LCOMB, MAXPT )
00153     780            CALL THHIST(AMRAY,AMAX,AMIN,ACON,BMAT,LCOMB,PEROUT,
     .       FILHIS,TOP,LAM,FLUNAM,NC,VERTCS,MAX,MIN,CON,
     .         BIAS)
00153     810      C
00153     820      C
00153     830      C     APPLY TRANSFORMATION TO INPUT DATA, RESCALE ( IF OPTED ), APPLY
00153     840      C  &  REJECTION ( PEROUT ) TO DISTRIBUTION OF TRANSFORMED DATA, AND
00153     850      C     OUTPUT THE TRANSFORMED DATA ON THE FILE ,  INFORM .
```

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OF POOR QUALITY

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00153    86.      C
00153    87.      C
00154    88.          IF (LAR.EQ.0) GO TO 60                                                    DATKU086
00154    89.      C                                                                             DATKU087
00154    90.      C                                                                             DATKU088
00154    91.          50 CALL LNTRAN(ARRAY,MAX,MIN,CON,BMAT,LCOMB,BMTRIG,SCAFLG,PEROUT,         DATKU089
00156    92.           * FILMIS,TUP,LAN,FLONAM,NC,VERTCS, RESCAL, BIAS,                         DATKU090
00156    93.           *  NF , NPUM )                                                           DATKU091
00156    94.      C                                                                             DATKU092
00156    95.      C                                                                             DATKU093
00156    96.          IF (SCAFLG.EQ.1) GO TO 30                                                 DATKU094
00157    97.      C                                                                             DATKU095
00157    98.      C                                                                             DATKU096
00161    99.          60 CONTINUE                                                               DATKU097
00161   100.      C                                                                             DATKU098
00162   101.          DO 70 I=1,10                                                              DATKU099
00165   102.          IPL2 = I + 2                                                              DATKU100
00166   103.          HEAD(IPL2) = HDR1(I)                                                      DATKU101
00167   104.          IPL19 = I + 19                                                            DATKU102
00170   105.          HEAD(IPL19) = HDR2(I)                                                     DATKU103
00171   106.          IPL31 = I + 31                                                            DATKU104
00172   107.          70 HEAD(IPL31) = COMNT(I)                                                 DATKU105

00172   108.      C                                                                             DATKU107
00174   109.          HEAD(15) = INDATE(1)                                                      DATKU108
00175   110.          HEAD(16) = INDATE(2)                                                      DATKU109
00175   111.      C                                                                             DATKU110
00175   112.      C                                                                             DATKU111
00176   113.          WRITE (6,80)                                                              DATKU112
00200   114.          80 FORMAT(////////// 18X, '*** SDATA-TR COMPLETED ***' ///////)          DATKU113
00200   115.      C                                                                             DATKU114
00201   116.          RETURN                                                                    DATKU115
00202   117.          END                                                                       DATKU116

      END OF COMPILATION:      NO DIAGNOSTICS.

DATATR          SYMBOLIC        25 APR 77  10:25:06   0  027044B6   14   116  (DELETED)
DATATR  CODE    RELOCATABLE     25 APR 77  10:25:06   1  027074D6   Ja     1  (DELETED)
                                           0  027074B2   14    23
```

```
@ FOR  SETUP8,SETUP8                                                    09 MAY 77          22: 9:
UNIVAC 1108 FORTRAN V EXEC II 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 000046

    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
```

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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  000333 170L    0001  000433 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  000134 2476    0001  000513 250L
0001  000140 2556    0001  000230 2656    0001  000544 270L    0001  000557 280L    0001  000607 290L
0001  000649 300L    0001  000640 310L    0001  000300 3156    0001  000679 320L    0001  000716 330L
0001  000720 340L    0001  000736 3446    0001  000775 350L    0001  000721 3606    0001  001000 360L
0001  000439 3626    0001  001013 370L    0001  000957 3746    0001  001024 380L    0001  001045 390L
0000  000249 4006    0001  001053 410L    0001  001104 420L    0001  001137 430L    0001  001157 440L
0000  000270 45CF    0001  001167 460L    0001  001220 470L    0001  001254 480L    0001  001256 490L
0001  000102 50L     0001  001313 520L    0001  001403 530L    0001  001421 540L    0000  000313 550F
0000  000241 60F     0001  001344 6426    0001  001400 6526    0001  001430 6606    0000  000223 70F
0001  000177 70L     0004  000073 ASAV    0004  000077 ASAVFL    0003  000008 AVAR2    0000  000205 B
0000  000170 BLANK   0004  000055 BMFILE  0004  000056 BMKEY    0000  000176 BMSET    0000  000133 BTEST
0000  000035 CARD2   0000  000032 CINDEX  0004  000164 CINMAX   0003  000010 CLS102   0003  000101 CLSVC2
0000  000200 COVE    0004  000177 COL     0004  000207 COMENT   0003  000007 COVAR2   0000  000136 COVAR2
0000  000152 CP      0004  000053 DATAPE  0004  000016 DATL    0004  000071 DATFIL   0004  000057 DRMAUS
0004  000066 DRVMAU  0000  000206 EQUVEC  0004  000062 ERIPTP   0004  000043 ERPKEY   0003  000015 FETVC2
0005  000010 FETVEC  0000  000213 FILNO   0000  000214 FILST    0007  000000 FIND     0005  000004 FLUINF

0003  000013 FLDSV2  0013  000000 FLINUM  0000  000027 FRVECT   0000  000032 FRVEC2   0003  000760 GROUPS
0003  000663 GRPCHK  0003  000566 GRPDEX  0003  000472 GRPNAM   0004  000000 HEAD     0004  000004 HED1
0004  000023 HED2    0004  000357 HISFIL  0004  000060 HISKEY   0000  000174 I        0000  000352 INJPS
0000  000201 J       0003  000375 KEPPTS  0000  000203 KET      0000  000207 KM       0000  000206 KZ
0005  000003 LINEND  0005  000004 LININC  0005  000004 LINSTR   0000  000202 M        0004  000052 MAPTAP
0004  000069 MAPUNT  0000  000167 MAXFET  0000  000212 MK       0000  000172 MPT      0000  000160 MTA
0000  000215 NB      0000  000175 NBS     0000  000217 NK       0000  000211 NMN      0003  000000 NOLLS2
0005  000001 NOFEAT  0003  000052 NOFET2  0000  000204 NOFET4   0004  000065 NOFILE   0003  000005 NOFLD2
0003  000471 NOGRP   0003  000031 NOSUB2  0000  000171 NSF      0000  000155 NUDFIL   0000  000154 NUUTAP
0011  000000 NUMBER  0000  000157 NUSFIL  0000  000156 NUSTAP   0004  000000 NXTCHR   0000  000150 OP
0000  000173 UNIT    0005  000000 OUTFMT  0004  000070 PAGSIZ   0005  000000 SAMLND   0003  000007 SAMINC
0005  000005 SAMSTR  0004  000054 SAVTAP  0000  000024 SINVEC   0004  000072 STAFIL   0003  000014 SUBUS2
0003  000011 SUBNU2  0003  000166 SUBPTR  0003  000053 SUBVC2   0000  000220 TEMP     0003  000004 TOTVT2
0004  000061 TRFORM  0003  000003 VARS22  0000  000216 VECMAX   0003  000014 VLNTH2   0003  000210 Z
0000  000165 ZERO

00101    1*          SUBROUTINE SETUP(BMAT,LCOMB,BMTRIG,PENOUT,MAAPT,ANRAY,LAM,SCAFL4,    S00001
00101    2*         *   TOP, TRANSF, RESCAL, BIAS, ADDNUM, CONMIN, NPUN )                  SET00002
00101    3*     C
00103    4*           IMPLICIT INTEGER(A-Z)                                                SET00003
00104    5*           REAL    CONMIN(32) , BIAS(16) , BMAT(900)                            SET00004
00105    6*           DIMENSION MAAPT(30),                                                 SET00005
00106    7*           DIMENSION ANRAY(1)                                                   SET00006
00107    8*           DIMENSION EQUVEC(2)                                                  SET00007
00107    9*     C                                                                          SET00008
00107   10*     C                                                                          SET00009
00110   11*           INCLUDE COMBK1,LIST                                                  SET00010
00111   11*           COMMON/NFORM/NOLLS2,NOSUB2,NOFET2,VARS22,TOTVT2,NOFLD2,
00111   11*          *            AVAR2,COVAR2,CLS102,SUBNU2,SUBUS2,FLDSV2,VERTX2,
00111   11*          *            FETVC2(30),SUBVC2(75),SUBPTR(75),CLSVC2(60),
00111   11*          *            KEPPTS(60),NUGRP,GRPNAM(60),GRPDEX(61),
00111   11*          *            GRPCHK(61),GROUPS(124)
        1*          *       END
```

```
                      INCLUDE COMBK4.LIST                                                    SET00011
00113     11.         DIMENSION HED1(10),HED2(10),DATE(2),COMENT(10)
00114     12.         EQUIVALENCE (HED1(1),HEAD(3)),(DATE(1),HEAD(15)),
00115     13.        *           (HED2(1),HEAD(20)),(COMENT(1),HEAD(32))
00116     14.         END
00117     15.         INCLUDE COMBK6.LIST                                                    SET00012
00118     16.         COMMON/GLOBAL/HEAD(92),MAPTAP,DATAPE,SAVTAP,BNFILE,BNKEY,
00119     17.        *            MISFIL,MISKEY,TRFORM,ENDPTP,LNPKEY,MAPUNT,NOFILE,
00120     18.        *    DRUMAD,DRM4DS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
00121     19.         END
00122     20.         INCLUDE COMBK9.LIST                                                    SET00013
00122     21.   C DATA TRANSFORMATION COMMON BLOCK
00123     22.         COMMON/TRULCK/OUTFMT,NOFEAT,FLDINF(6),                FETVEC13DT
00124     23.         END
00125     24.         EQUIVALENCE (FLDINF(1),LINSTR),(FLDINF(2),LINEND),                     SET00014
00125     25.        *            (FLDINF(3),LININC),(FLDINF(4),SAMSTR),                     SET00015
00125     26.        *            (FLDINF(5),SAMEND),(FLDINF(6),SAMINC)                      SET00016
00126     27.         DIMENSION CINDEX(18),                                                 SET00017
00126     28.        *    SINVEC(3), FRVEC1(3) , FRVEC2(3), CAND2(62),                      SET00018
00126     29.        *    BTEST(3)                                                          SET00019
00126     30.   C                                                                          SET00020
00126     31.   C                                                                          SET00021
00127     32.         DIMENSION   COMND1(10)  ,  OP(2)  ,  CP(2)                         SET00022
00127     33.   C                                                                          SET00023
00127     34.   C                                                                          SET00024
00130     35.         LOGICAL   NUDTAP , NUDFIL , NUSTAP , NUSFIL                        SET00025
00131     36.   C                                                                          SET00026
00131     37.         DATA CINDEX/'B-MATR','CHANNE','FORMAT','HED1','HED2',              SET00027
00131     38.        *'DATE','COMMEN','MAPPT','PEROUT','SUBCLA',                        SET00028
00131     39.        *'MODULE','LAB','OPTION','END-','DATAFI','STATFI',                 SET00029
00131     40.        *     'RESCAL', 'BIAS'/                                            SET00030
00131     41.   C                                                                          SET00031
00132     42.         DIMENSION MIX (5)                                                  SET00032
00133     43.   C                                                                          SET00033
00134     44.         DATA MIX / 4, '0', '1', '5', 'P' / *                               SET00034
00134     45.   C                                                                          SET00035
00135     46.         DATA   OP/ 1 , '(' /  ,  CP/ 1 , ')' /  ,  ZERO/ 0 /              SET00036
00136     47.   C                                                                          SET00037
00142     48.         DATA EQUVEC/1,'='/                                                 SET00038
00144     49.           DATA SINVEC/2,',',',='/,                                         SET00039
00144     50.        *     CINMAX /18/, MAXFET /30/,                                     SET00040
00144     51.        * FRVEC1/2,'1','0'/ ,FRVEC2/2,'U','L'/,BLANK/' '/,                  SET00041
00144     52.        * BTEST/2,'C','F'/,OUTFMT/2/,TRFORM/19/                             SET00042
00144     53.   C                                                                          SET00043
00144     54.   C                                                                          SET00044
00144     55.   C        INITIALIZE FLAGS AND DEFAULT VALUES                               SET00045
00144     56.   C                                                                          SET00046
00144     57.   C                                                                          SET00047
00156     58.         NOSUB2=0                                                           SET00048
00157     59.         NOGRP=0                                                            SET00049
00160     60.         BNTRIG=0                                                           SET00050
00161     61.         NSF = 1                                                            SET00051
00162     62.          RESCAL = 0                                                        SET00052
00163     63.         SCAFLG = 0                                                         SET00053
00164     64.         NPT = 0                                                            SET00054
00165     65.         ORIG = 0                                                           SET00055
00166     66.         TRANSF = 0                                                         SET00056
00167     67.         NPUN = 0                                                           SET00057
```

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00167   570      C
00167   580      C  INITIALIZE THE TRANSFORMATION BIAS VECTOR ( BIAS ) AND NO. OF
00167   590      C  BIAS VALUES ( NBS )
00167   600      C
00170   610         DO 10 I=1,18
00173   620      10 BIAS(I) = 0.0
00175   630         NBS = 0
00176   640         NUDTAP = .FALSE.
00177   650         NUDFIL = .FALSE.
00200   660         NUSTAP = .FALSE.
00201   670         NUSFIL = .FALSE.
00202   680         BMSAT=1
00202   690      C
00202   700      C  INITIALIZE THE MAXIMUM EXPECTED DATA VALUE, FOR EACH CHANNEL
00202   710      C
00202   720         DO 20 I=1,30
00206   730      20 MAXPT(I)=255
00206   740      C
00206   750      C  INITIALIZE  %  DISTRIBUTION CUT-OFF,  PEROUT ,  AND
00206   760      C  THE STANDARD DEVIATION MULTIPLE ,  LAM .
00206   770      C
00210   780         LAM=2
```

```
00211   810         PEROUT=5
00211   820      C
00211   830      C  INITIALIZE THE HEADING FOR UNTRANSFORMED STATISTICS PRINTOUT
00211   840      C
00212   850         COVHDI(1) = 6H*** ON
00213   860         COVHDI(2) = 6HIGINAL
00214   870         COVHDI(3) = 6H STATI
00215   880         COVHDI(4) =   6HSTICS
00216   890         COVHDI(5) = 6H ***
00217   900         DO 30 I=6,10
00222   910      30 COVHDI(I) = BLANK
00222   920      C
00224   930         DO 40 I=1,10
00227   940      40 COMENT(I) = BLANK
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,
     .        270,340,290,290,500,300,930,980,970),I
00257  1040      C
00262  1050         90 WRITE (6,100)CODE,CARD2
00267  1060      C
00271  1070      100 FORMAT(//// 5X,'*** BAD CONTROL CARD - DATATN/SETUPB ***' // 5X,
     .        'CODE=',A6, 9X, 62A1  /// )
00271  1080      C
00272  1090         GO TO 50
00272  1100      C B-MATRIX CARD
00273  1110      110 J=NITCHR(CARD2,COL)
00274  1120         IF (J.EQ.BLANK) GO TO 540
00276  1130         COL=COL-1
00277  1140         M=FINDI(CARD2,COL,BTEST)
```

```
00300   1170          IF (M.LE.-1) GO TO 540                                  SETE0110
00302   1180          ENTRIE=1                                                SETE0117
00303   1190          IF (M.EQ.2) GO TO 120                                   SETE0118
        1200    C B-MATRIX DATA ON TAPE FILE                                  SETE0119
00305   1210          KEY=2                                                   SETE0120
00305   1220    C READ B-MATRIX ARRAY FROM TAPE FILE                          SETE0121
00306   1230          CALL BMFILE(BMAT,LCOMB,NOFEAT,FETVEC,KEY)               SETE0122
00307   1240          GO TO 130                                               SETE0123
00307   1250    C B-MATRIX DATA READ FROM CARD FILE                           SETE0124
00310   1260      120 KEY=1                                                   SETE0125
00311   1270          CALL BMFILE(BMAT,LCOMB,NOFEAT,FETVEC,KEY)               SETE0126
00312   1280      130 NOFET2=NOFEAT                                           SETE0127
00313   1290          NOFET4=LCOMB                                            SETE0128
00314   1300          DO 140 B=1,NOFEAT                                       SETE0129
00317   1310      140 FETVC2(B)=FETVEC(B)                                     SETE0130
00321   1320          GO TO 50                                                SETE0131
00321   1330    C FEATURE CARD                                                SETE0132
00322   1340      150 CONTINUE                                                SETE0133
00323   1350          GO TO 50                                                SETE0134
00323   1360    C FORMAT CARD                                                 SETE0135
00324   1370      160 CONTINUE                                                SETE0136
00325   1380      170 M=FIND(CARD2,COL,FRVEC)                                 SETE0137
```

```
00326   1390          IF (M.EQ.-1) GO TO 540                                  SETE0138
00330   1400          KZ=FIND(CARD2,COL,SINVEC)                               SETE0139
00331   1410          KM=FIND(CARD2,COL,FRVEC2)                               SETE0140
00332   1420          IF((M.LE.3).AND.(KM.EQ.2)) OUTFNT=1                     SETE0141
00334   1430          IF((M.LE.3).AND.(KM.EQ.3)) OUTFNT=2                     SETE0142
00336   1440          Z=FIND(CARD2,COL,SINVEC)                                SETE0143
00337   1450          IF (Z.NE.2) GO TO 50                                    SETE0144
00341   1460          GO TO 170                                               SETE0145
00341   1470    C HED1 CARD                                                   SETE0146
00342   1480      180 READ (30,220)HED1                                       SETE0147
00350   1490          GO TO 50                                                SETE0148
00350   1500    C HED2 CARD                                                   SETE0149
00351   1510      190 READ (30,220)HED2                                       SETE0150
00357   1520          GO TO 50                                                SETE0151
00357   1530    C COMMENT CARD                                                SETE0152
00360   1540      200 READ (30,220)COMENT                                     SETE0153
00366   1550          GO TO 50                                                SETE0154
00366   1560    C DATE CARD                                                   SETE0155
00367   1570      210 M=NITCHR(CARD2,COL)                                     SETE0156
00370   1580          IF (M.EQ.BLANK) GO TO 50                                SETE0157
00372   1590          READ (30,220)DATE                                       SETE0158
00400   1600      220 FORMAT(10A,10A6)                                        SETE0159
00401   1610          GO TO 50                                                SETE0160
00401   1620    C MARPT CARD                                                  SETE0161
00402   1630      230 J=NITCHR(CARD2,COL)                                     SETE0162
00403   1640          IF (J.EQ.BLANK) GO TO 540                               SETE0163
00405   1650          COL=COL-1                                               SETE0164
00406   1660          MPT = NUMBLK( CARD2, COL, MARPI, MPT )                  SETE0165
00406   1670    C                                                             SETE0166
00407   1680          IF (MPT.GT.30) GO TO 90                                 SETE0167
00407   1690    C                                                             SETE0168
00411   1700          GO TO 50                                                SETE0169
00411   1710    C PLNOUT CARD                                                 SETE0170
00412   1720      250 J=NITCHR(CARD2,COL)                                     SETE0171
00413   1730          IF (J.EQ.BLANK) GO TO 540                               SETE0172
00415   1740          COL=COL-1                                               SETE0173
```

```
00416    1750          N = NUMBER ( CARD2, COL, ARRAY, ZERO )                    SETBU179
00417    1760          PEROUT = ARRAY(1)                                         SETBU176
00420    1770     C                                                              SETBU177
00421    1780          IF (N.NE.1) GO TO 90                                      SETBU178
00422    1790     C                                                              SETBU179
00423    1800          GO TO 50                                                  SETBU180
00424    1810     C SUBCLASS CARD                                                SETBU181
00425    1820      270 NOSUB2=NUMBER(CARD2,COL,SUBVC2,NOSUB2)                    SETBU182
00426    1830          CALL ORDER(SUBVC2,NOSUB2)                                 SETBU183
00427    1840          GO TO 50                                                  SETBU184
00430    1850     C LAM CARD                                                     SETBU185
00431    1860      280 J=NITCHR(CARD2,COL)                                       SETBU186
00432    1870          IF (J.EQ.BLANK) GO TO 540                                 SETBU187
00433    1880          COL=COL-1                                                 SETBU188
00434    1890          N = NUMBER ( CARD2, COL, ARRAY, ZERO )                    SETBU189
00435    1900          LAM = ARRAY(1)                                            SETBU190
00436    1910     C                                                              SETBU191
00437    1920          IF (N.NE.1) GO TO 90                                      SETBU192
00440    1930     C                                                              SETBU193
00441    1940          GO TO 50                                                  SETBU194
00442    1950     C                                                              SETBU195
00443    1960     C
```

```
00436    1970     C          OPTION  CARD                                        SETBU196
00436    1980     C                                                              SETBU197
00437    1990      290 N=FIND(CARD2,COL,NTR)                                     SETBU198
00440    2000     C                                                              SETBU199
00441    2010          N = IABS( N )                                             SETBU200
00442    2020     C                                                              SETBU201
00443    2030          IF (N.EQ.0.OR.N.GT.5) GO TO 540                           SETBU202
00444    2040     C                                                              SETBU203
00445    2050     C                                                              SETBU204
00446    2060     C         IF  N = 1,  END-OF-CARD  HAS BEEN REACHED            SETBU205
00447    2070     C                                                              SETBU206
00450    2080     C                                                              SETBU207
00451    2090          GO TO (50,300,310,320,350),N                              SETBU208
00452    2100     C                                                              SETBU209
00453    2110     C                                                              SETBU210
00454    2120     C         IF  N = 2,  ''O''  ,  OR  ''ORIG''                   SETBU211
00455    2130     C                                                              SETBU212
00456    2140      300 ORIG = 1                                                  SETBU213
00457    2150     C                                                              SETBU214
00460    2160          N = FIND ( CARD2, COL, SINVEC )                           SETBU215
00461    2170     C                                                              SETBU216
00462    2180          IF (N.EQ.2) GO TO 290                                     SETBU217
00463    2190     C                                                              SETBU218
00464    2200          GO TO 50                                                  SETBU219
00465    2210     C                                                              SETBU220
00466    2220     C                                                              SETBU221
00467    2230     C         IF  N = 3,  ''T''  OR  ''TRANSF''                    SETBU222
00470    2240     C                                                              SETBU223
00471    2250     C                                                              SETBU224
00472    2260      310 TRANSF = 1                                                SETBU225
00473    2270     C                                                              SETBU226
00474    2280          N = FIND ( CARD2, COL, SINVEC )                           SETBU227
00475    2290     C                                                              SETBU228
00476    2300          IF (N.EQ.2) GO TO 290                                     SETBU229
00477    2310     C                                                              SETBU230
00500    2320          GO TO 50                                                  SETBU231
```

```
00455    2330      C
00455    2340      C          IF  N = 9,   I 5I  ---   CHECK FOR  ''SCAFAC=''
00455    2350      C
00455    2360      C
00456    2370      320 J = MATCHR ( CARD2, COL )
00456    2380      C
00456    2390      C
00456    2400      C          IF NEXT CHARACTER IS  ''C''  ,  ASSUME  ''SCAFAC''
00456    2410      C
00457    2420           IF (J.NE.'C') GO TO 540
00457    2430      C
00461    2440           Z = FIND ( CARD2, COL, SINVEC )
00461    2450      C
00462    2460           IF (Z.EQ.3) GO TO 330
00462    2470      C
00464    2480           GO TO 540
00464    2490      C
00464    2500      C
00464    2510      C       SCALE FACTOR OPTION :  READ SCALING PAIRS, CON AND MIN , INTO
00464    2520      C                              CONMIN
00464    2530      C
00464    2540      C
```

```
00465    2550      330 SCAFLG = 3
00465    2560      C
00466    2570      340 Z = FIND ( CARD2, COL, OP )
00466    2580      C
00467    2590           IF (Z.NE.2) GO TO 50
00467    2600      C
00471    2610           NNN =  FLTNUM ( CARD2, COL, CONMIN(NSF) , 2 )
00471    2620      C
00472    2630           IF (NNN.NE.2) GO TO 540
00472    2640      C
00474    2650           ADDNUM = NSF + 1
00475    2660           IF ((NSF+NNN).GT.31) GO TO 50
00475    2670      C
00477    2680           NSF = NSF + NNN
00477    2690      C
00500    2700           Z = FIND ( CARD2, COL, CP )
00500    2710      C
00501    2720           IF (Z.EQ.2) GO TO 340
00501    2730      C
00503    2740           GO TO 540
00503    2750      C
00503    2760      C
00503    2770      C       PUNCH  OPTION
00503    2780      C
00504    2790      350 NPUN = 1
00504    2800      C
00504    2810      C
00505    2820           GO TO 290
00505    2830      C
00505    2840      C
00505    2850      C MODULE STAT DECK
00506    2860           340 MA=MATCHR(CARD2,COL)
00507    2870           IF (MA.NE.BTEST(J)) GO TO 370
00507    2880      C
00511    2890           SCAFLG = 2
00511    2900      C
```

```
005312  2910          GO TO 50                                                SETOU290
005313  2920      370 CALL CHDSTA(ARRAY,TOP)                                  SETOU291
005313  2930  C       SCALE = 2                                               SETOU292
005314  2940                                                                  SETOU293
005315  2950  C       GO TO 50                                                SETOU294
005315  2960                                                                  SETOU295
005315  2970  C                                                             SETOU296
005315  2980  C DATAFILE POSITIONING CARD                                    SETOU297
005315  2990  C                                                             SETOU298
005316  3000      380 IF (NUDTAP.AND.NUDFIL) GO TO 50                         SETOU299
005316  3010  C                                                             SETOU300
005320  3020        N = MATCHN ( CARD2 , COL )                                SETOU301
005320  3030  C                                                             SETOU302
005321  3040        IF (N.EQ.BLANK) GO TO 50                                  SETOU303
005321  3050  C                                                             SETOU304
005323  3060        IF (N.EQ.'U') GO TO 410                                   SETOU305
005325  3070        IF (N.EQ.'F') GO TO 420                                   SETOU306
005327  3080      390 WRITE (6,900)                                           SETOU307
005331  3090      900 FORMAT(/////' SX, '***** DATATR/SETUP8 *****  ERROR ON INPUT DATA
005331  3100  C       *FILE CARD ---  CONTINUING TO PROCESS INPUT  *****' /////)  SETOU309
005331  3110  C                                                             SETOU310
005331  3120  C                                                             SETOU311
```

```
005332  3130  C       GO TO 50                                                SETOU312
005333  3140      410 J=FINDI(CARD2,COL,EQUVEC)                               SETOU313
005334  3150          IF (J.EQ.-1) GO TO 390                                  SETOU314
005336  3160          N=NUMBER(CARD2,COL,DATAPE,ZERO)                         SETOU315
005337  3170          COL=COL-1                                               SETOU316
005337  3180  C                                                             SETOU317
005340  3190          IF (N.NE.1) GO TO 390                                   SETOU318
005340  3200  C                                                             SETOU319
005342  3210          NUDTAP =  .TRUE.                                        SETOU320
005342  3220  C                                                             SETOU321
005343  3230          GO TO 300                                               SETOU322
005344  3240      420 J=FINDI(CARD2,COL,EQUVEC)                               SETOU323
005345  3250          IF (J.EQ.-1) GO TO 390                                  SETOU324
005347  3260          FILNO = NUMBER ( CARD2, COL, DATFIL, ZERO )             SETOU325
005347  3270  C                                                             SETOU326
005350  3280          IF (FILNO.NE.1) GO TO 390                               SETOU327
005350  3290  C                                                             SETOU328
005352  3300          NUDFIL =  .TRUE.                                        SETOU329
005352  3310  C                                                             SETOU330
005353  3320          DATFIL=DATFIL-1                                         SETOU331
005354  3330          COL=COL-1                                               SETOU332
005355  3340          GO TO 300                                               SETOU333
005355  3350  C                                                             SETOU334
005355  3360  C STATFILE POSITIONING CARD                                    SETOU335
005355  3370  C                                                             SETOU336
005356  3380      430 N=MATCHR(CARD2,COL)                                     SETOU337
005357  3390          IF (N.EQ.BLANK) GO TO 50                                SETOU338
005357  3400  C                                                             SETOU339
005361  3410          IF (N.EQ.'U') GO TO 460                                 SETOU340
005363  3420          IF (N.EQ.'F') GO TO 470                                 SETOU341
005365  3430      440 WRITE (6,950)                                           SETOU342
005367  3440      950 FORMAT(' ///// SX,'***** DATATR/SETUP8 *****  ERROR ON INPUT STATF
005367  3450  C                                                             SETOU344
005367  3460  C       *LE CARD  ---  CONTINUING TO PROCESS INPUT  *****' /// )  SETOU345
005367  3470  C                                                             SETOU346
005370  3480          NUDTAP = .FALSE.                                        SETOU347
```

```
      NUSFIL = .FALSE.                                                  SET00370
C                                                                       SET00371
      GO TO 50                                                          SET00372
C                                                                       SET00373
  960 J=FINDI(CARD2,COL,EQUVEC)                                         SET00374
      IF (J.EQ.-1) GO TO 990                                            SET00375
      A=NUMBER(CARD2,COL,SAVTAP,ZERO)                                   SET00376
      COL=COL-1                                                         SET00377
C                                                                       SET00378
      IF (A.NE.1) GO TO 990                                             SET00379
C                                                                       SET00380
      NUSTAP = .TRUE.                                                   SET00381
C                                                                       SET00382
      GO TO 930                                                         SET00383
  970 J=FINDI(CARD2,COL,EQUVEC)                                         SET00384
      IF (J.EQ.-1) GO TO 990                                            SET00385
      FILST = NUMBER(CARD2,COL,STAFIL,ZERO)                             SET00386
C                                                                       SET00387
      IF (FILST.NE.1) GO TO 990                                         SET00388
C                                                                       SET00389
      NUSFIL = .TRUE.                                                   SET00390
C                                                                       SET00391
```

```
      STAFIL=STAFIL+1                                                   SET00370
      COL=COL+1                                                         SET00371
      GO TO 930                                                         SET00372
C                                                                       SET00373
C     RESCALE OPTION CARD                                               SET00374
C                                                                       SET00375
  980 CONTINUE                                                          SET00376
      RESCAL = 1                                                        SET00377
      GO TO 50                                                          SET00378
C                                                                       SET00379
C     BIAS CONTROL CARD                                                 SET00380
C                                                                       SET00381
  990 CONTINUE                                                          SET00382
      NB = NEICHR(CARD2,COL)                                            SET00383
      IF (NB.EQ.BLANK) GO TO 590                                        SET00384
      COL = COL +1                                                      SET00385
      VECMAX = 10 * NBS                                                 SET00386
      NK = NBS * 1                                                      SET00387
      NBS = FLINUM (CARD2, COL, BIAS(NK), VECMAX)                       SET00388
      GO TO 50                                                          SET00389
C                                                                       SET00390
C *END* CARD                                                            SET00391
  500 CONTINUE                                                          SET00392
C                                                                       SET00393
      IF ( RESCAL .GT. 0  .AND.  SCAFLG .EQ. 0 )  SCAFLG = 1            SET00394
C                                                                       SET00395
C                                                                       SET00396
C        IF RESCALING BY THE STATISTICAL METHOD: READ STATISTICS FROM   SET00397
C     FILE ( NUTAP ), REDUCE THE STATISTICS TO THE SET OF CHANNELS      SET00398
C     SPECIFIED IN FETVEC , AND STORE IN ARRAY .                        SET00399
C                                                                       SET00400
C                                                                       SET00401
C                                                                       SET00402
      IF ( SCAFLG .EQ. 2 )  CALL REDSAV( ARRAY, TOP, BNS01 )            SET00403
C                                                                       SET00404
C                                                                       SET00405
      IF (ORIG.EQ.0) GO TO 530                                          SET00406
```

```
00637    4070     C                                                                  SETBU406
00637    4080     C                                                                  SETBU407
00641    4090           DO 510 I=1,10                                                SETBU408
00644    4100           TEMP = COMENT(I)                                             SETBU409
00645    4110           COMENT(I) = COVHD1(I)                                        SETBU410
00646    4120     510   COVHD1(I) = TEMP                                             SETBU411
00648    4130     C                                                                  SETBU412
00650    4140           CALL PRTCOV(ARRAY(COVAR2),ARRAY(AVAR2),VARSZ2,NOFET2,ARRAY(SUBOS2)SETBU413
00650    4150          *)                                                            SETBU414
00650    4160     C                                                                  SETBU415
00650    4170     C                                                                  SETBU416
00651    4180           DO 520 I=1,10                                                SETBU417
00654    4190     520   COMENT(I) = COVHD1(I)                                        SETBU418
00654    4200     C                                                                  SETBU419
00654    4210     C                                                                  SETBU420
00654    4220     C                                                                  SETBU421
00654    4230     C          PRINT OUT THE INPUT TRANSFORMATION MATRIX               SETBU422
00654    4240     C                                                                  SETBU423
00654    4250     C                                                                  SETBU424
00656    4260     530   CALL WRTRM16MAT,NOFET4,NOFET2,FETYC2)                        SETBU425
00656    4270     C     SET NOCLS2=NOSUB2 FOR REST OF PROGRAM                        SETBU426
00657    4280           NOCLS2=NOSUB2                                                SETBU427

00657    4290     C                                                                  SETBU428
00660    4300           IF ( NESCAL .EQ. 0 )  SCAFLG = 0                             SETBU429
00660    4310     C                                                                  SETBU430
00662    4320           RETURN                                                       SETBU431
00662    4330     C                                                                  SETBU432
00662    4340     C                                                                  SETBU433
00662    4350     C                                                                  SETBU434
00663    4360     540   WRITE (6,550)CODE,CARD2                                      SETBU435
00663    4370     C                                                                  SETBU436
00672    4380     550   FORMAT(//// 5X,'*****  INVALID CONTROL CARD REJECTED BY DATATR/SETSETBU437
00672    4390     C                                                                  SETBU438
00672    4400          *UP8  *****' // 5X, A6, 4X, 62A1 //// )                       SETBU439
00672    4410     C                                                                  SETBU440
00672    4420     C                                                                  SETBU441
00672    4430     C                                                                  SETBU442
00673    4440           GO TO 50                                                     SETBU443
00674    4450           END                                                          SETBU444

      END OF COMPILATION:       NO  DIAGNOSTICS.

SETUP8          SYMBOLIC                    25 APR 77  10:25:10   0  02710154    14    999   (DELETED)
SETUP8  CODE    RELOCATABLE                 25 APR 77  10:25:10   1  02724264    98      1   (DELETED)
                                                                  0  02724344    14    109
```

```
@ FOR SETREM,SETREM                                                    09 MAY 77        225 V8
UNIVAC 1100 FORTRAN V EXEC 11 LEVEL 25A -(EXEC8 LEVEL E120100108)
THIS COMPILATION WAS DONE ON 09 MAY 77 AT 22:09:43

   SUBROUTINE SETNEM    ENTRY POINT 000001

   STORAGE USED: CODE(I) 000101  DATA(D) 000107  BLANK COMMON(Z) 000000

   EXTERNAL REFERENCES (BLOCK, NAME)

      0003   CMENN
      0004   NWUUS
      0005   NIU2S
      0006   NENNJS

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

      0001   000025 1116      0001   000035 2CL       0000   000002 3OF       0000   000071 INJPS     0000 1 000001 NM
      0000 I 000000 NUMCM

00101     1*          SUBROUTINE SETREM                                                    SNEN0001
00101     2*     *       (CONMIN, CON, MIN, ADDNUM , LCOMB )                             SNEN0002
00101     3*     C
00103     4*           IMPLICIT INTEGER (A-Z)                                            SNEN0003
00104     5*           REAL   CON(16)  ,  MIN(16)  ,  CONMIN(2, 16 )                     SNEN0004
00105     6*           NUMCM = ADDNUM  / 2                                               SNEN0005
00106     7*           IF (NUMCM.NE.LCOMB) GO TO 20                                      SNEN0006
00110     8*           DO 10 NM=1,LCOMB                                                  SNEN0007
00113     9*             CON(NM) = CONMIN(1, NM)                                         SNEN0008
```

```
00114     100          MININM) = CUMMIN(I2,NM)                                          SKENU0U9
00115     110       10 CUNTINUE                                                         SKENU010
00117     120          RETURN                                                           SKENU011
00120     130       25 WRITE (6,30)NUMCM,LCOMB                                          SKENU012
00124     140       30 FORMAT (5A, 'SKENEM ERROR - THERE WERE ', I5, ' SCALE '         SKENU013
00124     150          C     'FACTORS AND MINIMUM VALUES INPUT THROUGH THE SCAFAC '    SKENU014
00124     160          C     'OPTION:',                                               SKENU015
00124     170          C     /, 5A, I5, ' LINEAR COMBINATIONS WERE REQUESTED:',       SKENU016
00124     180          C     /, 5A, 'THERE MUST BE A SCALE FACTOR AND A MINIMUM '     SKENU017
00124     190          C     'VALUE FOR EACH LINEAR COMBINATION.',                    SKENU018
00124     200          C     /, 5A, 'THE PROGRAM WILL TERMINATE THROUGH CHEKK')       SKENU019
00125     210          CALL CHEKK                                                       SKENU020
00126     220          END                                                              SKENU021

     END OF COMPILATION:      NO DIAGNOSTICS.

     SCIKEM    SYMBOLIC                    25 APR 77  10:25:11   0  02727224   14   2   (DELETED)
     SCIKEM    CODE      RELOCATABLE       25 APR 77  10:25:11   1  02727672   24   3   (DELETED)
                                                                  0  02747722   14   13

0  FOR  KBTRAN,KBTRAN                                                    09 MAY 77        22:09:14
UNIVAC 1100 FORTRAN V EXEC 11 LEVEL 25A  -(EXEC8 LEVEL E120100104)
THIS COMPILATION WAS DONE ON 09 MAY 77 AT 22:09:14

     SUBROUTINE KBTRAN     ENTRY POINT 000402

     STORAGE USED:  CODE(1) 000457;  DATA(3)  004701;  BLANK COMMON(2)  000000

      COMMON BLOCKS:

     0003    INFORM 001154
     0004    TRBLCK 000096
     0005    GLOBAL 000075

     EXTERNAL REFERENCES (BLOCK, NAME)

     0006    MATVEC
     0007    MTML56
     0010    MTMDAT
     0011    PRTLOV
     0012    NEKK35

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

     0001    000327 100L      0001   000024 I356      0001   000033 I426      0001   000063 I926      0001   000110 I476
     0001    000156 1716      0001   000237 2046      0001   000231 2146      0001   000261 2296      0001   000269 2276
     0001    000234 80L       0001   000309 90L       0005   000073 ASAV      0005   000079 ASAVFL    0003 I 000000 AVAR2
     0000 R  004674 BMEAN     0005   000055 BMFILE    0005   000056 BMKEY     0000 R 000014 C         0038 R 000764 CC
     0003    000010 CLS1D2    0003   000361 CLSVC2    0005 I 000037 COMENT    0003 I 000007 COVAR2    0038 I 000000 COVM02
     0000 I  004622 CVI       0000 R 001714 D         0005   000053 DATAPE    0005   000016 DATE      0005   000071 DATFIL
     0000 R  001734 DIAG      0005   000067 DRM005    0005   000064 DRVMAD    0005   000062 ENIPTP    0005   000063 ENPKEY
     0003    000015 FETVC2    0004   000310 FFTVEC    0004   000004 FLUIHE    0003   000013 FLOSV2    0003   000740 GRUPS
```

```
0003  000003 GNPLMA  0003  000360 GNPOLA  0003  000372 GNPNAM  0005  000000 HEAD    0035  000002 HEU1
0005  000023 HEU2    0005  000357 HISFIL  0005  000068 HISKEY  0000 I 004013 I     0020 I 004021 II
0000  004040 INJPS   0000 I 004017 IPP    0000 I 004023 J     0000 I 004016 K     0007  000375 KEPPTS
0000 I 004017 KK     0000 I 004020 KKK    0000 I 004015 LZ    0005  000052 MAPTAP  0005  000064 MAPUNI
0000 I 004045 MEL    0003 I 000336 NOCLS2  0003  000001 NOFEAT  0003 I 000002 NOFET2  0005  000065 NOFILE
0003  000005 NOFLU2  0003  000371 NOGRP   0003 I 000001 NOSUB2  0000 I 004004 NSUB    0004  000000 OUTPUT
0005  000070 PAGSIZ  0005  000359 SAVTAP  0005  000072 STAFIL  0003 I 000012 SUBDS2  0003  000011 SUBNO2
0003  000165 SUBPTR  0003  000353 SUBVC2  0000 I 004023 TEMP    0000 R 000013 TMAX    0000 R 000012 TMIN
0003  000004 TOTV12  0005  000361 TRFORM  0003 I 000004 VARS22  0003  000014 VENTA2
```

```
00101    1*          SUBROUTINE KBTRAN                                                    KBTR0001
00101    2*         *    ( BMAT, LCOMB, ANRAY, LAM, MAX, MIN, EPS, TRANSF)               KBTR0002
00101    3*       C
00103    4*             IMPLICIT INTEGER(A-Z)                                            KBTR0003
00103    5*       C
00104    6*             DIMENSION  COVHD2(16)                                            KBTR0005
00104    7*       C
00105    8*             DIMENSION ARRAY(1)                                               KBTR0007
00106    9*             REAL TMIN,TMAX                                                   KBTR0008
```

```
00106   10*       C                                                                      KBTR0009
00107   11*             REAL   BMAT(4900), MAX(16), MIN(16), EPS(16)                     KBTR0010
00107   12*       C                                                                      KBTR0011
00110   13*             REAL   C(4900), CC(4900), D(16), DIAG(4900), 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,NOFLU2,
00112   16*            *              AVAN2,COVAN2,CLS102,SUBNU2,SUBDS2,FLUSV2,STAT2,
00112   16*            *              FETVC2(30),SUBVC2(75),SUBPTR(75),CLSVC2(30),
00112   16*            *              KEPPTS(60),NOGRP,GNPNAM(60),GRPDLA(61),
00112   16*            *              GRPCHK(61),GROUPS(129)
00113   16*             END
00114   17*             INCLUDE COMBK9.LIST                                              KBTR0016
00114   17*       C DATA TRANSFORMATION COMMON BLOCK
00115   17*             COMMON/TRBLCK/OUTPUT,NOFEAT,FLDINF(6),       ,FETVEC(30)
00116   17*             END
00117   18*             INCLUDE COMBK9.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                                                                      KBTR0041
00123   22*             COMMON/GLOBAL/HEAD(42),MAPTAP,DATAPE,SAVTAP,BMFILE,BMKEY,
00124   22*            *              MISFIL,MISKEY,TRFORM,ERIPTP,LNPAET,MAPUNI,NOFILE,
00124   22*            *     DRUMAU,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
```

```
00132   270           COVHD2(4) =  BMAT(5,5)                                  KBTHUU28
00133   300           COVHD2(5) =  BMCS ...                                   KBTHUU29
00134   310           DO 10 I=6,10                                            KBTHUU30
00137   320        10 COVHD2(I) = BM                                          KBTHUU31
00141   330           DO 20 I=1,NUSUB2                                        KBTHUU32
00144   340           IPP=SUBOS2+I-1                                          KBTHUU33
00145   350        20 NSUB(I)=ANRAT(IPP)                                      KBTHUU34
00147   360           LZ=AVAR2                                                KBTHUU35
00150   370           K=1                                                     KBTHUU36
00151   380           DO 30 I=1,NOCLS2                                        KBTHUU37
00154   390           CALL MATVEC(BMAT,ARRAY(LZ),BMEAN(K),LCOMB,NOFET2)       KBTHUU38
00155   400           LZ=LZ+NOFET2                                            KBTHUU39
00156   410        30 K=K+LCOMB                                               KBTHUU40
00156   420     C                                                             KBTHUU41
00156   430     C COMPUTE TRANSFORMED COVARIANCE MATRIX FOR EACH SUBCLASS      KBTHUU42
00156   440     C                                                             KBTHUU43
00160   450           KK=0                                                    KBTHUU44
00161   460           K=COVAR2                                                KBTHUU45
00162   470           KKK=1                                                   KBTHUU46
00163   480           DO 50 I=1,NOCLS2                                        KBTHUU47
00163   490     C MULTIPLY BMAT BY COVARIANCE MATRIX                          KBTHUU48
00166   500           CALL MTMLS6(BMAT,ARRAY(K),C,LCOMB,NOFET2)               KBTHUU49
```

```
00166   510     C MULTIPLY RESULTING MATRIX BY TRANSPOSE OF BMAT               KBTHUU50
00167   520           CALL MTMDAT(C,BMAT,CC,LCOMB,NOFET2,LCOMB,D,ARRAY(KKK))  KBTHUU51
00170   530           DO 40 II=1,LCOMB                                        KBTHUU52
00173   540        40 DIAG(KK+II)=D(II)                                       KBTHUU53
00175   550           KKK=KKK+(LCOMB*(LCOMB+1))/2                             KBTHUU54
00176   560           KK=KK+LCOMB                                             KBTHUU55
00177   570           K=K+VARS22                                              KBTHUU56
00200   580        50 CONTINUE                                                KBTHUU57
00200   590     C                                                             KBTHUU58
00200   600     C PRINT TRANSFORMED COVARIANCE MATRIX                         KBTHUU59
00200   610     C                                                             KBTHUU60
00202   620           CVI=(LCOMB*(LCOMB+1))/2                                 KBTHUU61
00202   630     C                                                             KBTHUU62
00203   640           IF (TRANSF.EQ.0) GO TO 80                               KBTHUU63
00205   650           DO 60 I=1,10                                            KBTHUU64
00210   660           TEMP = COMENT(I)                                        KBTHUU65
00211   670           COMENT(I) = COVHD2(I)                                   KBTHUU66
00212   680        60 COVHD2(I) = TEMP                                        KBTHUU67
00212   690     C                                                             KBTHUU68
00214   700           CALL PRTCOV(ARRAY(1),BMEAN(1),CVI,LCOMB,NSUB(1))        KBTHUU69
00215   710           DO 70 I=1,10                                            KBTHUU70
00220   720        70 COMENT(I) = COVHD2(I)                                   KBTHUU71
00222   730        80 CONTINUE                                                KBTHUU72
00222   740     C                                                             KBTHUU73
00222   750     C CALCULATE MINIMUM AND MAXIMUM FOR EACH SUBCLASS             KBTHUU74
00222   760     C                                                             KBTHUU75
00223   770           DO 120 I=1,LCOMB                                        KBTHUU76
00226   780           DO 110 J=1,NOCLS2                                       KBTHUU77
00231   790             NEL = (J - 1) * LCOMB + I                             KBTHUU78
00232   800             MAX(I) = BMEAN(NEL) + LAM * DIAG(NEL)                 KBTHUU79
00233   810           IF (J.NE.1) GO TO 90                                    KBTHUU80
00235   820             TMAX = MAX(I)                                         KBTHUU81
00236   830        90   CONTINUE                                              KBTHUU82
00237   840             IF( MAX(I) .GE. TMAX) TMAX = MAX(I)                   KBTHUU83
00241   850             MIN(I) = BMEAN(NEL) - LAM * DIAG(NEL)                 KBTHUU84
00242   860           IF (J.NE.1) GO TO 110                                   KBTHUU85
```

```
00244      87.          TMIN = MIN(I)                                          KBTKU0086
00245      88.    100   CONTINUE                                               KBTKU0087
00246      89.          IF( MIN(I) .LE. TMIN) TMIN = MIN(I)                    KBTKU0088
00250      90.    110   CONTINUE                                               KBTKU0089
00252      91.          MIN(I) = TMIN                                          KBTK00090
00253      92.          MAX(I) = TMAX                                          KBTKU0091
00254      93.          EPS(I) = 255. /(MAX(I) - MIN(I))                       KBTK00092
00255      94.    120   CONTINUE                                               KBTKU0093
00257      95.          RETURN                                                 KBTKU0094
00260      96.          END                                                    KBTKU0095

      END OF COMPILATION:        NO  DIAGNOSTICS.
KBINAN          SYMBOLIC      25 APR 77  10:25:13   0  027302:0    14    95  (DELETED)
KBINAN  CODE    RELOCATABLE   25 APR 77  10:25:13   1  027322:72   36     1  (DELETED)
                                                    0  027342:36   14    32

@ FOR MAXMAT,MAXMAT
UNIVAC 1100 FORTRAN V EXEC 11 LEVEL 25A -(EXEC8 LEVEL E12010010A)          09 MAY 77          228 9:4
THIS COMPILATION WAS DONE ON 09 MAY 77 AT 22:09:46

   SUBROUTINE MAXMAT    ENTRY POINT 000120

   STORAGE USED: CODE(I) 000146  DATA(D) 000035  BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   TRBLCK 000046

   EXTERNAL REFERENCES (BLOCK, NAME)

    0004   NERR35

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

    0001  000054 IOL      0001  000023 1126     0001  000031 1176     0001  000064 ZOL      0003  000010 FETVEC
    0003  000002 FLOINF   0000  000000 I        0000  000005 INJPS    0000  000001 J        0000  000004 K
    0003  000001 NUFLAT   0003  000300 OUTFMT

00101      1.          SUBROUTINE MAXMAT ( MAX, MIN, CON, BMAT, LCOMB, MAAPT )   MAMT0001
00101      2.     C                                                              MAMT001A
00101      3.     C  COMPUTE AN APPROXIMATE TRANSFORMED MAX AND MIN FOR EACH COMPONENT   MAMTUUU2
00101      4.     C   OF THE TRANSFORMATION                                      MAMTL02A
00101      5.     C                                                              MAMTU028
00103      6.          IMPLICIT INTEGER(A-Z)                                     MAMTUUU3
00104      7.          DIMENSION MAAPT(1)                                        MAMTUUU4
```

```
00104      90      C                                                                  MAMTU005
00105      100     C                                                                  MAMTU006
00105      110         REAL   BMAT(900), MAX(16), MIN(16), CON(16)                    MAMTU007
00105      120     C                                                                  MAMTU008
00105      130     C                                                                  MAMTU009
00105      140     C     USING INPUT ( OR DEFAULT ) MAXIMUM DATA VALUE FOR EACH       MAMTU010
00105      150     C     CHANNEL, COMPUTE THE TRANSFORMED VALUE RANGE ( MAX AND MIN ) MAMTU011
00105      160     C     AND COMPUTE THE HISTOGRAM SCALING FACTOR, CON .              MAMTU012
00105      170     C                                                                  MAMTU013
00105      180     C                                                                  MAMTU014
00106      190         INCLUDE COMBLK.LIST                                            MAMTU015
00106      200     C DATA TRANSFORMATION COMMON BLOCK
00107      210         COMMON/TRBLCK/OUTFMT,NOFEAT,FLDINF(6),          FETVEC(30)
00110      220         END
00111      230         DO 30 I=1,LCOMB                                                MAMTU016
00114      240         MAX(I) = 0.0                                                   MAMTU017
00115      250         MIN(I) = 0.0                                                   MAMTU018
00116      260         DO 20 J=1,NOFEAT                                               MAMTU019
00121      270         K=(J-1)*LCOMB+I                                                MAMTU020
00122      280         IF (BMAT(K).LE.0.0) GO TO 10                                   MAMTU021
00122      290     C                                                                  MAMTU022
00124      300         MAX(I) = MAX(I) + BMAT(K) * MAXPT(J)                           MAMTU023
```

```
00124      310     C                                                                  MAMTU024
00125      320         GO TO 20                                                       MAMTU025
00126      330      10 CONTINUE                                                       MAMTU026
00126      340     C                                                                  MAMTU027
00127      350         MIN(I) = MIN(I) + BMAT(K) * MAXPT(J)                          MAMTU028
00127      360     C                                                                  MAMTU029
00130      370      20 CONTINUE                                                       MAMTU030
00132      380         CON(I)=(MAX(I)-MIN(I))/100.                                    MAMTU031
00133      390      30 CONTINUE                                                       MAMTU032
00135      400         RETURN                                                         MAMTU033
00136      410         END                                                            MAMTU034
```

```
      END OF COMPILATION:        NO  DIAGNOSTICS.
  MAAMAT          SYMBOLIC                    25 APR 77  10:25:19    0  027336B6    19     39  (DELETED)
  MAAMAT  CODE    RELOCATABLE                 25 APR 77  10:25:19    1  027346T2    49      1  (DELETED)
                                                                      0  027346B2    19     11
```

```
@ FOR TRHIST,TRHIST                                                    09 MAY 77        22: 9:
UNIVAC 1100 FORTRAN V EXEC II LEVEL 25A -(EXEC8 LEVEL E120100108)
THIS COMPILATION WAS DONE ON 09 MAY 77 AT 22:09:47

    SUBROUTINE TRHIST    ENTRY POINT 000690

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

     COMMON BLOCKS:

     0003   INFORM 001159
     0004   INBLCK 000096
     0005   GLOBAL 000075

    EXTERNAL REFERENCES (BLOCK, NAME)

     0006   LAHEAD
     0007   IAPHOR
     0010   FLOINT
     0011   LINEHO
     0012   FOLINT
     0013   IHANSF
     0014   SQRT
     0015   HERR3S

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

     0001  000003 10L   0001  000435 110L  0001  000437 120L  0001  000055 130L  0001  000441 140L
     0001  000533 150L  0001  000179 160L  0001  000176 165G  0001  000536 170L  0001  000207 175G
     0001  000573 180L  0001  000576 190L  0001  000245 210G  0001  000610 210L  0001  000261 215G
     0001  000311 225G  0001  000453 265G  0001  000474 272G  0001  000510 279G  0001  000547 312G
     0001  000225 40L   0001  000230 50L   0001  000401 60L   0001  000405 70L   0001  000414 80L
```

```
0001  0004E6 VOL      0000 I 000134 ALP      0005  0006F5 ASAV     0005  0006F9 ASAVFL   0004  0000A6 ATANZ
0005  000055 BMFILE   0005  000056 BMKEY    0003  000010 CLSID2    0003  000001 CLSVC2   0005  000037 CORLNT
0003  000007 COVAN2   0005 I 000053 DATAPE   0005  000018 DATE     0005 I 000071 DATFIL   0006 I 000116 DPT
0005  000067 DRMADS   0005  000066 DRUMAD   0000 I 000104 ENDTAP   0005  000062 ENIPTP   0005  000063 ENPART
0003  000015 FETVC2   0004 I 000310 FETVEC   0000 I 000664 FL       0004 I 000673 FLDINF   0006 I 000173 FLGINP
0003  000013 FLDSV2   0003  000763 GROUPS   0003  000663 GRPCMK   0003  000566 GRPDLA   0003  000172 GRPNAM
0005  000000 HEAD     0005  000062 HED1     0005  000023 HED2     0005  000057 HISFIL   0005  000040 HISKEY
0000 I 000101 I       0000 I 000137 ILIN     0000  000126 INJPS    0000 I 000105 J        0002 I 000111 JJ
0000 I 000117 JMI     0000 I 000112 K        0003  000075 KEPPTS   0000 I 000113 KP       0004 I 000000 LANDAD
0004 I 000103 LINES   0000 I 000119 LK       0000 I 000115 LRPI     0005  000052 MAPTAP   0005  000005 MAPUNI
0003  000300 NOCLS2   0004 I 000031 NOFEAT   0003  000604 NOFET2   0005  000065 NOFILE   0003  000005 NOFLO2
0003  000471 NOGRP    0003  000301 NOSUB2   0000 I 000110 NS       0000 I 000102 NSAMP    0004  000000 OUTPNT
0005  000070 PAGSIZ   0000 R 000320 PENCEN   0005  000005 SAVTAP   0005  000072 STAFIL   0003  000014 SUBUS2
0003  000011 SUBNO2   0003  000166 SUBPTR   0003  000353 SUBVC2   0000 R 000342 SUMFIL   0000 I 000173 TOTPTS
0003  000004 TOTVT2   0005  000061 TRFORM   0003  000003 VARS22   0003  000019 VENTA2   0000 R 000000 XMIN
0000 R 000091 XPER     0000 R 000000 XT
```

```
00101   1*          SUBROUTINE TRHIST(IDATA,AMAX,AMIN,ACON,BMAT,LCOMB,                TRMS0001
00101   2*         *PENOUT,FILMIS,TOP,LAR,FLDNAM,NC,VERTCS,MAA,MIN,CUN,              TRMS0002
```

```
00101   3*          *     BIAS)                                                      TRMS0003
00101   4*      C                                                                    TRMS0004
00101   5*      C HISTOGRAM THE TRANSFORMED DATA AND CALCULATE THE MIN MAX AND RANGE  TRMS0005
00101   6*      C FOR THIS DATA TO ALLOW RESCALING IN THE 0-255 RANGE                TRMS0006
00101   7*      C                                                                    TRMS0007
00103   8*            IMPLICIT INTEGER(A-Z)                                          TRMS0008
00103   9*      C                                                                    TRMS0009
00104  10*            REAL   BIAS(16), AT(16), PENCEN(16), MIN(16), MAA(16), CON(16) TRMS0010
00104  11*      C                                                                    TRMS0011
00105  12*            REAL   BMAT(900), AMIN(16), AMAX(16), ACON(16)                 TRMS0012
00105  13*      C                                                                    TRMS0013
00106  14*            REAL   XMIN , XPER , SUMFIL                                    TRMS0014
00106  15*      C                                                                    TRMS0015
00107  16*            INCLUDE CUMBK1.LIST                                            TRMS0016
00110  16*            COMMON/INFORM/NOCLS2,NOSUB2,NOFET2,VARS22,TOTVT2,NOFLO2,
00110  16*           *              AVAN2,COVAN2,CLSID2,SUBNO2,SUBUS2,FLDSV2,VENTA2,
00110  16*           *              FETVC2(30),SUBVC2(75),SUBPTR(75),CLSVC2(60),
00110  16*           *              KEPPTS(60),NOGRP,GRPNAM(60),GRPDLA(61),
00110  16*           *              GRPCMK(61),GROUPS(129)
00111  16*            END                                                            TRMS0017
00112  17*            INCLUDE CUMBK9.LIST
00112  17*      C DATA TRANSFORMATION COMMON BLOCK
00113  17*            COMMON/TRBLCK/OUTPNT,NOFEAT,FLDINF(6),          FETVEC(30)
00114  17*            END                                                            TRMS0018
00115  18*            INCLUDE CUMBK4.LIST
00116  18*            DIMENSION HED1(10),HED2(10),DATE(2),COMENT(10)
00117  18*            EQUIVALENCE (HED1(1),HEAD(1)),(DATE(1),HEAD(11)),
00117  18*           *            (HED2(1),HEAD(20)),(COMENT(1),HEAD(32))
00120  18*            END                                                            TRMS0019
00121  19*            INCLUDE CUMBK6.LIST
00122  19*            COMMON/GLOBAL/HEAD(92),MAPTAP,DATAPE,SAVTAP,BMFILE,BMKEY,
00122  19*           *             MISFIL,MISKEY,TRFORM,ENIPTP,ENPART,MAPUNT,NOFILE,
00122  19*           *     DRUMAD,DRMADS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
00123  19*            END
00124  20*            DIMENSION  FILMIS(CUMB,10), IDATA(TOP), TOTPTS(16) ,           TRMS0020
00124   1*           * VERTCS(2,11),FL(6),FLDINF(6)                                  TRMS0021
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```
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(6)+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 LINEMUT(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,
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```
00227    800.    C      (AT[illegible]                                                        TRNS0080
00227    810.    C                                                                            TRNS0081
00227    820.    C                                                                            TRNS0082
00227    830.    C          HISTOGRAM THE TRANSFORMED DATA ( USING TRANSFORMED DATA MAX       TRNS0083
00227    840.    C          AND MIN AND SCALE FACTOR, CON , COMPUTED IN SUBR. MAXMAT          TRNS0084
00227    850.    C          TO OBTAIN THE HISTOGRAM ''BIN LEVEL''  FOR EACH TRANSFORMED       TRNS0085
00227    860.    C          DATA POINT )                                                      TRNS0086
00227    870.    C                                                                            TRNS0087
00227    880.    C                                                                            TRNS0088
00230    890.           IF (XT(J).LE.MIN(J)) GO TO 60                                         TRNS0089
00232    900.           IF (XT(J).GE.MAX(J)) GO TO 70                                         TRNS0090
00234    910.           DPT=(XT(J)-MIN(J))/CON(J)+1                                           TRNS0091
00234    920.    C                                                                            TRNS0092
00235    930.           IF( DPT .LE. 0)  DPT = 1                                              TRNS0093
00237    940.           IF ( DPT .GT. 101 )  DPT = 101                                        TRNS0094
00237    950.    C                                                                            TRNS0095
00241    960.           FILHIS(J,DPT)=FILHIS(J,DPT)+1                                         TRNS0096
00242    970.           GO TO 80                                                              TRNS0097
00243    980.        60 FILHIS(J,1)=FILHIS(J,1)+1                                             TRNS0098
00244    990.           GO TO 80                                                              TRNS0099
00245   1000.        70 FILHIS(J,101) = FILHIS(J,101) + 1                                     TRNS0100
00246   1010.        80 TOTPTS(J)=TOTPTS(J)+1                                                 TRNS0101
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00250   1020.           GO TO 110                                                             TRNS0102
00251   1030.        90 IF (LKPI.GE.JJ) GO TO 120                                             TRNS0103
00253   1040.       100 CONTINUE                                                              TRNS0104
00255   1050.       110 CONTINUE                                                              TRNS0105
00257   1060.       120 CONTINUE                                                              TRNS0106
00260   1070.       130 CONTINUE                                                              TRNS0107
00262   1080.       140 CONTINUE                                                              TRNS0108
00262   1090.    C                                                                            TRNS0109
00262   1100.    C                                                                            TRNS0110
00262   1110.    C          ELEMINATE PEROUT/2 % OF POINTS FROM UPPER AND LOWER TAILS OF      TRNS0111
00262   1120.    C          THE TRANSFORMED DATA DISTRIBUTION --- OBTAIN THE REVISED MAX      TRNS0112
00262   1130.    C          AND SCALING PARAMETERS CON AND MIN AFTER APPLICATION OF PEROUT    TRNS0113
00262   1140.    C                                                                            TRNS0114
00262   1150.    C                                                                            TRNS0115
00263   1160.           XPER=PEROUT/200.                                                      TRNS0116
00263   1170.    C CALCULATE MIN,MAX,AND CON ARRAYS                                           TRNS0117
00264   1180.           DO 150 I=1,LCOMB                                                      TRNS0118
00267   1190.       150 PERCEN(I)=XPER*TOTPTS(I)                                              TRNS0119
00271   1200.           DO 200 I=1,LCOMB                                                      TRNS0120
00274   1210.           XMIN=MIN(I)                                                           TRNS0121
00275   1220.           SUMFIL=0.                                                             TRNS0122
00276   1230.           DO 160 J=1,101                                                        TRNS0123
00301   1240.           SUMFIL=SUMFIL+FILHIS(I,J)                                             TRNS0124
00302   1250.           IF (SUMFIL.LT.PERCEN(I)) GO TO 160                                    TRNS0125
00304   1260.           MIN(I)=(J-1)*CON(I)+XMIN                                              TRNS0126
00305   1270.           GO TO 170                                                             TRNS0127
00306   1280.       160 CONTINUE                                                              TRNS0128
00310   1290.       170 SUMFIL=0.                                                             TRNS0129
00311   1300.           DO 180 J=101,1,-1                                                     TRNS0130
00314   1310.           SUMFIL=SUMFIL+FILHIS(I,J)                                             TRNS0131
00315   1320.           IF (SUMFIL.LT.PERCEN(I)) GO TO 180                                    TRNS0132
00317   1330.           JM1 = J - 1                                                           TRNS0133
00320   1340.           MAX(I) = JM1 * CON(I) + XMIN                                          TRNS0134
00321   1350.           GO TO 190                                                             TRNS0135
00322   1360.       180 CONTINUE                                                              TRNS0136
00324   1370.       190 CONTINUE                                                              TRNS0137
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00325   1300          CUN(I) = 255. / (MAX(I) - MIN(I))                                  TRNS0138
00326   1310      200 CONTINUE                                                           TRNS0139
00326   1320      C                                                                      TRNS0140
00326   1330      C                                                                      TRNS0141
00326   1340      C     RETURN THE SCALING PARAMETERS, CON AND MIN ; REQUIRED TO         TRNS0142
00326   1350      C     RESCALE THE TRANSFORMED DATA TO THE RANGE : 0 - 255 .            TRNS0143
00326   1360      C                                                                      TRNS0144
00326   1370      C                                                                      TRNS0145
00330   1380      210 RETURN                                                             TRNS0146
00331   1390          END                                                                TRNS0147

    END OF COMPILATION:      NO  DIAGNOSTICS.
    TRNIST          SYMBOLIC      26 APR 77  10:25:17   0  027350S4    19   197  (DELETED)
    TRNIST  CODE    RELOCATABLE   26 APR 77  10:25:17   1  027910A4    36     1  (DELETED)
                                                        0  027911B2    19    50

0  FOR  LNTRAN,LNTRAN                                                                  09 MAY 77          228 9:5
UNIVAC 1100 FORTRAN V EXEC 11 LEVEL 28A  -(EXEC0 LEVEL E120100104)
THIS COMPILATION WAS DONE ON 09 MAY 77 AT 22:09:50

    SUBROUTINE LNTRAN     ENTRY POINT 002477

    STORAGE USED: CODE(1) 002675; DATA(3) 021311; BLANK COMMON(2) 000000

     COMMON BLOCKS:

     0003   INFORM 007154
     0004   TRBLCK 000076
     0005   GLOBAL 000075

    EXTERNAL REFERENCES (BLOCK, NAME)

     0006   TAPHDR
     0007   LABCAD
     0010   FLOINT
     0011   ORIHDR
     0012   LINEHD
     0013   FOLINT
     0014   TRANSF
     0015   ORILIN
     0016   NTRAN
     0017   COMMST
     0020   NADDS
     0021   NIUZS
     0022   NIUIS
     0023   NSTOPS
            NDCS
     0025   NERRJS
```

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

0000	020376	1000	0001	002075	10026	0001	002117	10176	0001	002156	10316	0001	002171	10516			
0001	002205	10616	0001	002217	10706	0000	020417	11006	0001	002234	11006	0001	002260	11136			
0001	002274	11296	0001	002314	11306	0001	002326	11506	0001	002403	11716	0000	020433	12001			
0001	002426	12056	0001	002466	13QL	0000	020455	14UF	0001	000036	1406	0001	002506	1501			
0001	000559	1556	0001	000161	1656	0001	000363	15UL	0001	000407	17UL	0001	020043	20UL			
0001	000512	2001	0001	000144	2056	0001	000344	21UL	0001	000405	23UL	0001	000419	23UL			
0001	000290	2496	0001	030423	25QL	0001	000705	25UL	0001	000759	27QL	0001	000537	27UL			
0001	001009	2805	0001	001036	29QL	0001	001067	30UL	0001	000352	31QL	0001	001075	31UL			
0001	001109	3306	0001	000436	33QL	0001	001166	34UL	0001	000441	34QL	0001	001121	35UL			
0001	000461	3516	0001	000475	3556	0001	001209	36UL	0001	000521	3656	0001	001225	37UL			
0001	000547	3706	0001	001239	38QL	0001	001247	37UL	0001	001304	39QL	0001	001337	39UL			
0001	001313	4006	0001	001344	41QL	0001	001400	41UL	0001	001443	42QL	0001	001455	42UL			
0001	001527	4406	0001	001542	45QL	0001	001610	5UL	0001	001544	5UQL	0001	001614	51UL			
0001	001621	5206	0001	001653	5216	0001	001705	52UL	0001	001631	53QL	0001	001705	54UL			
0001	001750	5426	0001	001718	5506	0001	001742	55UL	0001	001742	56QL	0001	001701	57UL			
0001	001119	6006	0001	001774	6006	0001	001370	6016	0000	020471	61QF	0000	020519	62UF			
0001	001465	6256	0000	020521	63QF	0000	020526	63UF	0000	020535	65QF	0001	001559	65U6			
0000	020550	67QF	0001	001643	67J6	0000	020564	68QF	0000	020617	70QF	0001	002107	71UL			
0001	001727	7176	0001	002131	73QL	0000	020617	74QF	0000	020626	75QF	0000	020648	76QF			

0001	002050	7656	0000	020655	77QF	0000	020672	78QF	0000	020710	79QF	0001	000157	80L			
0000	020734	800F	0000	020761	81QF	0000	021012	82QF	0000	021043	83QF	0000	021076	840F			
0001	002132	8536	0000	021112	86QF	0000	021141	87QF	0000	021151	88QF	0001	002133	89UL			
0001	002143	9006	0000	021164	91QF	0001	002159	92QL	0005	000073	ASAV	0005	000077	ASAVEL			
0003	000006	AVAR2	0000	020245	BAUMAR	0000	020225	BAUMIN	0005	000055	BMFILE	0005	000056	BMAET			
0003	000010	CLSIU2	0003	000037	CLSVC2	0003	020466	CMIN	0005	000037	COMENT	0008	020327	COMMA			
0000 R	000250	CONSAV	0003	000037	COVAR2	0000	020320	CP	0008 R	000107	CUT	0035	000053	DATAPE			
0005	000016	DATE	0005	000071	DATFIL	0000	020457	DPI	0005	000047	DRRADS	0035	000000	DRUMAB			
0000	020246	ENDTAP	0005	000062	ERIPTP	0005	000063	ERPKEY	0003	000015	FETVC2	0003	000010	FETVEC			
0000	000515	FL	0003	000032	FLDINF	0003	000013	FLUST2	0003	000760	GROUPS	0003	000033	GRPCNR			
0003	000566	GRPDER	0003	000072	GRPNAM	0005	000000	HEAD	0005	000002	HLDI	0005	000023	HLD2			
0000	000350	HISBUF	0005	000057	HISFIL	0005	000060	HISKEY	0008	020333	I	0035	020346	IA			
0000	020363	IB	0000	020377	IDIM	0000	020346	IE	0000	020362	IG	0000	020354	IM			
0000	020377	IL	0000	020347	ILIN	0000	020337	IN	0000	021250	INJPS	0000	020343	J			
0000	020351	JJ	0000	020355	JK	0000	020356	JKPI	0000	020344	K	0003	000375	KEPPTS			
0000	020331	KF	0000	020332	KK	0000	020357	KP	0000	020334	LAM	0003	000000	LAMEAD			
0000	020342	LINES	0000	020340	LSTLIN	0000	020345	M	0005	000052	MAPTAP	0005	000067	MAPUNT			
0000 R	000041	MATOT	0000	020335	MAXCUT	0000 R	000238	MAXSAV	0000	020465	MINCUT	0000 R	000210	MINSAV			
0000 R	000042	MITOT	0000	020375	MN	0000	020333	MINAN	0000 R	000043	MLGMAR	0035 R	000063	MLGMIN			
0003	000000	MOCLS2	0003	000001	MOFEAT	0003	000002	MOFLT2	0005	000065	MOFILE	0003	000005	MOPTS			
0003	000771	MUGRP	0003	000001	MOSUB2	0000	020367	MPCT	0000 R	000166	MPERT	0035 R	000167	MPERT2			
0000	020350	MS	0000	020336	MSAMP	0000 R	020103	MALGM	0000	020325	OP	0034	000000	OUTPUT			
0005	000070	PAGSIZ	0000	000316	PMAX	0000	000310	PMIN	0035	020361	RSET	0005	000053	SAVTAP			
0005	000072	STAFIL	0003	000312	SUBUS2	0003	000311	SUBNU2	0003	000166	SUBPTR	0003	000353	SUBVC2			
0000 R	000103	SUM	0000 R	020021	TMAA	0000 R	000101	TMIN	0035	000270	TUTPTS	0035	000107	TUTVT2			
0005	000061	TXFORM	0000	020338	TTL	0003	000303	VARSL2	0003	000317	VERTAX	0035 R	000104	XCUR			
0000	020371	ADIM	0000	020371	XMGM	0000	020372	ALOG	0008	020377	XSIZ	0008 R	000126	XI			
0000 R	000170	XICUN	0000	000525	Y	0000 R	000196	YREAL	0008	020373	YSIZ	0008	020360	XS			
0000	020353	ZSAMP															

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00101     1*          SUBROUTINE LNTRAN(IDATA,MAX,MIN,CON,BMAT,LCOMB,BMTRIX,SCAFLG,     LNTR0001
00101     2*         * PEROUT,FILNIS,TOP,LAR,FLUMAR,NC,VERTCS, RESCAL, BIAS,            LNTR0002
00101     3*         *   MF , NPUN )                                                    LNTR0003
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```
C0101      90      C
C0101      95      C
C0101      96      C        IF   SCAFLG = 1 ,   RESCALE BY HISTOGRAM METHOD
C0101      97      C
C0101      98      C        IF  SCAFLG = 2 ,  RESCALE BY THE STATISTICS METHOD
C0101      99      C
C0101     100      C        IF  SCAFLG = 3 ,  RESCALE WITH USER-INPUT SCALING PARAMETERS
C0101     110      C
C0101     120      C
C0101     130      C        NOTE:  IF THE FLAG,  RESCAL , IS ZERO, NO RESCALING IS
C0101     140      C               PERFORMED.  HOWEVER, PERCUT IS APPLIED TO THE TRANSFORMED
C0101     150      C               DATA DISTRIBUTION PRIOR TO FINAL OUTPUT OF TRANSFORMED
C0101     160      C               DATA VALUES .
C0101     170      C
C0103     180            IMPLICIT INTEGER(A-Z)
C0104     190            REAL   TMIN(16), TMAX(16),  MATRI ,  MLTPI
C0105     200      C
C0105     210            REAL  NEWMAX(16) , NEWMIN(16) ,  SUM ,  CUT
C0105     220      C
C0106     230             REAL MACON
C0106     240      C
C0107     250            REAL   BIAS(16), ACONT(16), AT(16),  TMEAL(16),  HPERI,  HPER2

C0107     260      C
C0110     270            REAL   MAX(16), MIN(16), CON(16),  BMAT(900) ,  MACON(16)
C0110     280      C
C0111     290            REAL   MINSAV(16) , MAXSAV(16) , CONSAV(16)
C0111     300      C
C0112     310            DIMENSION   TOTPIS(16) , PMIN(16) , PMAX(16)
C0112     320      C
C0112     330      C A
C0113     340            DIMENSION MISBUF(10),VERTCS(2,11),FL(8)
C0113     350      C
C0114     360            DIMENSION   IDATA(TOP) , TI(8000) ,  FILMISILCOMM.10) )
C0115     370      C
C0115     380            DIMENSION   BADMIN(16) , BADMAX(16) , MINCUT(16) , MAXCUT(16)
C0115     390      C
C0116     400            DATA OP/'('/,CP/')'/,COMMA/','/
C0122     410            DATA TTL/'TOTAL '/
C0122     420      C
C0122     430      C
C0124     440            INCLUDE COMBK1.LIST
C0125     450            COMMON/INFORM/NOCLS2,NOSUB2,NOFET2,VARS22,TOTVT2,NOFLD2,
C0125     460           *                AVAR2,COVAR2,CLS102,SUBNO2,SUBUS2,FLDST2,VERTX2,
C0125     470           *                FETVC2(30),SUBVC2(75),SUBP(NI)D),CLSVC2(40),
C0125     480           *                REPPIS(40),NUGRP,GRPNAM(40),GRPDLS(16),
C0125     490           *                GRPLNK(8),GROUPS(129)
C0126     500            END
C0127     510            INCLUDE COMBK9.LIST                                          LNTR0095
C0127     520      C DATA TRANSFORMATION COMMON BLOCK
C0130     530            COMMON/TRBLCK/OUTPUT,NOFEAT,FLDINI(16),          FETVEC(30)
C0131     540            END
C0132     550            INCLUDE COMBK9.LIST                                          LNTR0096
C0133     560            DIMENSION NEW1(10),NEW2(10),DATE(2),COMENT(10)
C0134     570            EQUIVALENCE (NEW1(1),HEAD(1)),(DATE(1),HEAD(6)),
C0134     580           *            (NEW2(1),HEAD(8)),(COMENT(1),HEAD(32))
C0135     590            END
C0136     600            INCLUDE COMBK8.LIST                                          LNTR0097
C0137     610            COMMON/GLOBAL/HEAD(92),MAPTAP,DATAPE,SAVTAP,UNFILE,UNNET,
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00137   470.          *              MISFIL,MISALT,INPUNM,ENDFIL,EXPALT,MAPUNI,NUFILE,
00137   470.          *    DRUMAD,DNMMDS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
00140   470.           END
00141   480.           IF (RESCAL.EQ.0) GO TO 50                                    LNTKG048
20141   490.     C                                                                  LNTKG049
00141   500.     C     CHECK FOR RESCALE FACTORS INPUT BY USER ( SCAFLG = 3 )       LNTKG050
00141   510.     C                                                                  LNTKG051
00143   520.           IF (SCAFLG.NE.3) GO TO 20                                    LNTKG052
00143   530.     C                                                                  LNTKG053
00143   540.     C        COMPUTE THE TRANSFORMED DATA MAX , USING INPUT            LNTKG054
00143   550.     C        SCALING PARAMETERS , CON  AND  MIN .                      LNTKG055
00143   560.     C                                                                  LNTKG056
20145   570.           DO 10 KF=1,LCOMB                                             LNTKG057
00150   580.            MAX(KF) = 255./ CON(KF) + MIN(KF)                           LNTKG058
00151   590.       10  CONTINUE                                                     LNTKG059
00151   600.     C                                                                  LNTKG060
00153   610.       20  CONTINUE                                                     LNTKG061
00153   620.     C                                                                  LNTKG062
00153   630.     C        COMPUTE THE OUTPUT HISTOGRAM SCALE FACTOR:  ACON          LNTKG063
00153   640.     C                                                                  LNTKG064
00154   650.           DO 30 KK=1,LCOMB                                             LNTKG065
00157   660.           ACON(KK)=(MAA(KK)-MIN(KK))/80                                LNTKG066
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00160   670.       30 FETVC2(KK)=KK                                                 LNTKG067
00160   680.     C                                                                  LNTKG068
00162   690.           IF (SCAFLG.EQ.1) GO TO 80                                    LNTKG069
00162   700.     C                                                                  LNTKG070
00162   710.     C        FOR STATISTICAL OR INPUT SCALE PARAMETERS, SAVE THE INITIAL LNTKG071
00162   720.     C        SCALING PARAMETERS ( MIN, MAX , CON ) FOR RE-INITIALIZATION LNTKG072
00162   730.     C        OF THESE PARAMETERS ON THE SECOND AND SUCCEEDING FIELDS TO BE LNTKG073
00162   740.     C        INPUT , TRANSFORMED , AND RESCALED ( IF RESCAL GT 0 )       LNTKG074
00162   750.     C                                                                  LNTKG075
00162   760.     C                                                                  LNTKG076
00164   770.           DO 40 I=1,LCOMB                                              LNTKG077
00167   780.           MAASAV(I) = MAA(I)                                           LNTKG078
00170   790.           MINSAV(I) = MIN(I)                                           LNTKG079
00171   800.       40  CONSAV(I) = CON(I)                                           LNTKG080
00171   810.     C                                                                  LNTKG081
00171   820.     C                                                                  LNTKG082
00171   830.     C        POSITION THE INPUT DATA FILE, AND READ IN THE HEADER RECORD LNTKG083
00171   840.     C                                                                  LNTKG084
00173   850.       50  CONTINUE                                                     LNTKG085
00174   860.           CALL TAPMDH(DATAPE,DATFIL)                                   LNTKG086
00174   870.     C                                                                  LNTKG087
00174   880.     C                                                                  LNTKG088
00174   890.     C        READ THE COORDINATES ( VERTICES ) OF THE FIELD FOR THE DATA LNTKG089
00174   900.     C        TO BE TRANSFORMED .                                       LNTKG090
00174   910.     C                                                                  LNTKG091
00174   920.     C                                                                  LNTKG092
00175   930.       60  LAN=LANEAD(FLDNAM,VERTCS,FLDINF,NC)                         LNTKG093
00176   940.           IF (LAN.EQ.0) GO TO 920                                      LNTKG094
00200   950.           IF (LAN.LT.0) GO TO 900                                      LNTKG095
00200   960.     C                                                                  LNTKG096
00200   970.     C                                                                  LNTKG097
00200   980.     C        FOR STATISTICAL OR INPUT SCALING PARAMETERS, INITIALIZE THE LNTKG098
00200   990.     C        SCALING PARAMETERS  MAX , MIN , CON , ACON  FOR THIS FIELD LNTKG099
00200  1000.     C                                                                  LNTKG100
00200  1010.     C                                                                  LNTKG101
00202  1020.           IF (RESCAL.EQ.0) GO TO 80                                    LNTKG102
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00202   1040      C
00203   1050            DO 70 I=1,LCOMB                                          LNTRDU104
00204   1060            MAX(I) = MAXSAV(I)                                       LNTRDU105
00205   1070            MIN(I) = MINSAV(I)                                       LNTRDU106
00206   1080            CON(I) = CONSAV(I)                                       LNTRDU107
00207   1090       70   XCON(I) = ( MAX(I) - MIN(I) )/80.                        LNTRDU108
00210   1100       80   NF = NF + 1                                              LNTRDU109
00211   1110      C                                                             LNTRDU110
00212   1120            DO 90 I=1,LCOMB                                          LNTRDU111
00213   1130            MAXCUT(I) = 0                                            LNTRDU112
00214   1140            MINCUT(I) = 0                                            LNTRDU113
00215   1150            NEWMAX(I) = 255.0                                        LNTRDU114
00216   1160            XICON(I) = XCON(I)                                       LNTRDU115
00217   1170       90   NEWMIN(I) = 0.0                                          LNTRDU116
00220   1180      C                                                             LNTRDU117
00221   1190            MTRAN = 0                                                LNTRDU118
00222   1200      C                                                             LNTRDU119
00223   1210            NSAMP=(FLDINF(5)-FLDINF(4))/FLDINF(6)+1                  LNTRDU120
00224   1220            IDIM=NUFEAT*NSAMP                                        LNTRDU121
00225   1230            IF (IDIM.GT.IOP) GO TO 130                               LNTRDU122
00226   1240            IN=NC-1                                                  LNTRDU123
00227   1250            WRITE (6,100)                                            LNTRDU124

00230   1260            WRITE (6,110)FLDNAM,IN,FLDINF(6),FLDINF(3),ITOP,VERTCS(I,K),COMMA,LNTRDU125
00231   1270           *VERTCS(2,K),CP),K=1,IN)                                  LNTRDU126
00232   1280       100 FORMAT(1HI,T29,'NO. OF   SAMPLE  LINE'/,                  LNTRDU127
00233   1290           *T12,'FIELDNAME  VERTICES    INC     INC  VERTICES(SAMPLE,LINE)')  LNTRDU128
00234   1300       110 FORMAT(13X,A6,6X,I2,7X,I4,2X,I4,2X,5(A1,I4,A1,I4,A1,2X)/  LNTRDU129
00235   1310           * 5(A1,I4,A1,I4,A1,2X))                                  LNTRDU130
00236   1320            IDIM=LCOMB*NSAMP                                         LNTRDU131
00237   1330      C                                                             LNTRDU132
00240   1340      C                                                             LNTRDU133
00241   1350            IF (IDIM.LE.8003) GO TO 150                              LNTRDU134
00242   1360      C                                                             LNTRDU135
00243   1370      C                                                             LNTRDU136
00244   1380            WRITE (6,120)                                            LNTRDU137
00245   1390       120 FORMAT(//' THE NUMBER OF COMPONENTS TIMES THE NUMBER OF SAMPLES EALNTRDU138
00246   1400           *CEEDS THE SIZE OF THE STORAGE AREA ***'//)               LNTRDU139
00247   1410            STOP 1                                                   LNTRDU140
00250   1420       130 WRITE (6,140)                                            LNTRDU141
00251   1430       140 FORMAT('***** NUMBER OF CHANNELS TIMES NUMBER OF SAMPLES EXCEEDS 100LNTRDU142
00252   1440           *00 ***'//)                                              LNTRDU143
00253   1450            STOP                                                     LNTRDU144
00254   1460      C                                                             LNTRDU145
00255   1470      C                                                             LNTRDU146
00256   1480      C INITIALIZE TAPE READING FOR THIS FIELD                      LNTRDU147
00257   1490      C                                                             LNTRDU148
00260   1500       150 CALL FLDINT(FLDINF,FETVEC,NOFEAT)                        LNTRDU149
00261   1510      C                                                             LNTRDU150
00262   1520            LINES=(FLDINF(2)-FLDINF(1))/FLDINF(3)+1                  LNTRDU151
00263   1530      C                                                             LNTRDU152
00264   1540      C                                                             LNTRDU153
00265   1550      C         WRITE HEADER RECORD ON OUTPUT FILE . TRFORM .        LNTRDU154
00266   1560      C                                                             LNTRDU155
00267   1570      C                                                             LNTRDU156
00270   1580            CALL WRTHDR(LCOMB,FETVC2,NSAMP,OUTFMT,TRFORM)            LNTRDU157
00271   1590      C                                                             LNTRDU158
00272   1600      C                                                             LNTRDU159
00273   1610            DO 170 I=1,LCOMB                                         LNTRDU160
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00277   1610          BAUMAX(I) = 0                                                  LNTKU161
00300   1620          BAUMIN(I) = 0                                                  LNTKU162
00301   1630          FMIN(I) = 0                                                    LNTKU163
00302   1640          FMAX(I) = 0                                                    LNTKU164
00303   1650          TOTPTS(I) = 0                                                  LNTKU165
00304   1660          TMIN(I) = 1.0E35                                               LNTKU166
00305   1670          TMAX(I) = -1.0E35                                              LNTKU167
00306   1680          ACON(I) = XACON(I)                                             LNTKU168
00307   1690          DO 160 J=1,101                                                 LNTKU169
00312   1700      160 FILMIS(I,J) = 0                                                LNTKU170
00314   1710      170 CONTINUE                                                       LNTKU171
00314   1720  C                                                                      LNTKU172
00314   1730  C                                                                      LNTKU173
00316   1740          LSTLIN=0                                                       LNTKU174
00317   1750          M=0                                                            LNTKU175
00320   1760      180 M=M+1                                                          LNTKU176
00321   1770          IF (M.GT.LINES) GO TO 350                                      LNTKU177
00321   1780  C                                                                      LNTKU178
00321   1790  C       READ ONE SCAN  LINE OF DATA FROM THE INPUT TAPE                LNTKU179
00321   1800  C                                                                      LNTKU180
00323   1810          CALL LINEREAD(IDATA,ENDTAP)                                    LNTKU181
00324   1820          IF (ENDTAP.NE.0) GO TO 350                                     LNTKU182

00326   1830          IF (M.NE.1) GO TO 190                                          LNTKU183
00330   1840          ILIN=FLDINF(1)                                                 LNTKU184
00331   1850          GO TO 200                                                      LNTKU185
00332   1860      190 ILIN=ILIN+FLDINF(3)                                            LNTKU186
00333   1870      200 CONTINUE                                                       LNTKU187
00333   1880  C                                                                      LNTKU188
00333   1890  C       DETERMINE THE SAMPLE INTERCEPTS ON THE CURRENT SCAN LINE,      LNTKU189
00333   1900  C       WHICH ARE CONTAINED IN THE DESIRED FIELD BOUNDARIES.  PLACE    LNTKU190
00333   1910  C       THE SAMPLE INTERCEPTS IN  FL  , AND THE NUMBER OF INTERCEPTS   LNTKU191
00333   1920  C       IN  JJ .                                                       LNTKU192
00333   1930  C                                                                      LNTKU193
00334   1940          CALL FDLINTVERTCS(NC,FL,ILIN,NS,JJ)                            LNTKU194
00335   1950          DO 210 K=1,NSAMP                                               LNTKU195
00340   1960          DO 210 IM=1,LCOMB                                              LNTKU196
00343   1970          ZSAMP=(IM-1)*NSAMP+K                                           LNTKU197
00344   1980      210 Y(ZSAMP)=0                                                     LNTKU198
00344   1990  C                                                                      LNTKU199
00347   2000          XACON = 255./100.                                              LNTKU200
00347   2010  C                                                                      LNTKU201
00347   2020  C                                                                      LNTKU202
00347   2030  C       TRANSFORM, RESCALE, AND HISTOGRAM EACH DATA SAMPLE             LNTKU203
00347   2040  C                                                                      LNTKU204
00350   2050          DO 330 K=1,NSAMP                                               LNTKU205
00353   2060          KP=(K-1)*FLDINF(6)+FLDINF(4)                                   LNTKU206
00354   2070          DO 320 JK=1,JJ,2                                               LNTKU207
00357   2080          JKP1 = JK + 1                                                  LNTKU208
00360   2090          IF (KP.LT.FL(JK)) GO TO 330                                    LNTKU209
00362   2100          IF (KP.GT.FL(JKP1)) GO TO 310                                  LNTKU210
00364   2110          DO 220 I=1,LCOMB                                               LNTKU211
00367   2120          AT(I)=0.                                                       LNTKU212
00367   2130  C                                                                      LNTKU213
00367   2140  C       CALL TRANSF TO DO A DATA TRANSFORMATION                        LNTKU214
00367   2150  C                                                                      LNTKU215
00370   2160            CALL TRANSF                                                  LNTKU216
00370   2170      C     (AT, BMAT, IDATA, TOP, I, K, LCOMB, NSAMP, BIAS)            LNTKU217
00371   2180      220 CONTINUE                                                       LNTKU218
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C0373     2170          DO 300 I=1,LLOOPS                                                LNTHU217
00376     2180          IF( AT(I) .LT. TMIN(I) )  TMIN(I) = AT(I)                        LNTHU218
00400     2190          IF( AT(I) .GT. TMAX(I) )  TMAX(I) = AT(I)                        LNTHU219
00400     2200                                                                           LNTHU220
00400     2210      C                                                                    LNTHU221
00400     2220      C   IF RESCAL = 0 NO RESCALING IS APPLIED.  OTHERWISE RESCALE       LNTHU222
00400     2230      C     USING SCALING PARAMETERS DERIVED FROM EITHER HISTOGRAM,       LNTHU223
00400     2240      C     STATISTICS, OR USER-INPUT ( SCAFLG= 1, 2, OR 3 )             LNTHU224
00400     2250      C                                                                    LNTHU225
00400     2260      C                                                                    LNTHU226
00400     2270      C                                                                    LNTHU227
00402     2280          IF (RESCAL.GT.0) GO TO 260                                       LNTHU228
00402     2290      C                                                                    LNTHU229
00402     2300      C                                                                    LNTHU230
00402     2310      C     IF TRANSFORMED DATA IS NOT RESCALED ,                          LNTHU231
00402     2320      C     TEST FOR OUT- OF - RANGE  TRANSFORMED  VALUES                  LNTHU232
00402     2330      C                                                                    LNTHU233
00402     2340      C     SET = 0  ANY VALUE LESS THAN 0, OR LESS THAN THE NEW MIN       LNTHU234
00402     2350      C     AFTER APPLICATION OF PENOUT                                    LNTHU235
00402     2360      C     SET = 255  ANY VALUE GREATER THAN 255, OR GREATER THAN         LNTHU236
00402     2370      C     THE NEW MAX AFTER APPLICATION OF PENOUT                        LNTHU237
00402     2380      C                                                                    LNTHU238
00402     2390      C                                                                    LNTHU239
00404     2400          IF (AT(I).LT.NEWMIN(I)) GO TO 230                                LNTHU240
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00406     2410          IF (AT(I).GT.NEWMAX(I)) GO TO 240                                LNTHU241
00410     2420          GO TO 250                                                        LNTHU242
00411     2430      238 IF( MTRAN .EQ. 0 )  BADMIN(I) = BADMIN(I) + 1                    LNTHU243
00413     2440          AT(I) = 0.0                                                      LNTHU244
00414     2450          GO TO 250                                                        LNTHU245
00415     2460      240 IF ( MTRAN .EQ. 0 )  BADMAX(I) = BADMAX(I) + 1                   LNTHU246
00417     2470          AT(I) = 255.                                                     LNTHU247
00420     2480      250 CONTINUE                                                         LNTHU248
00420     2490      C                                                                    LNTHU249
00420     2500      C                                                                    LNTHU250
00420     2510      C     FOR THE CURRENT SCAN LINE, HISTOGRAM THE TRANSFORMED DATA ,    LNTHU251
00420     2520      C     AND STORE THE TRANSFORMED DATA INTO THE OUTPUT ARRAY, Y .       LNTHU252
00420     2530      C                                                                    LNTHU253
00421     2540          DPT = AT(I)/NACON + 1.1                                          LNTHU254
00422     2550            TOTPTS(I) = TOTPTS(I) + 1                                      LNTHU255
00423     2560            IF( DPT .GT. 101) DPT = 101                                    LNTHU256
00425     2570          IF ( DPT .LE. 0 )  DPT = 1                                       LNTHU257
00427     2580            FILMIS(I,DPT) = FILMIS(I,DPT) + 1                            LNTHU258
00430     2590            ZS = (I -1) * NSAMP + K                                      LNTHU259
00431     2600          Y(ZS) = AT(I) + 0.5                                              LNTHU260
00432     2610          GO TO 300                                                        LNTHU261
00433     2620      260  CONTINUE                                                       LNTHU262
00433     2630      C                                                                    LNTHU263
00433     2640      C     FOR THE CURRENT SCAN LINE, HISTOGRAM THE TRANSFORMED DATA, AND LNTHU264
00433     2650      C     STORE THE TRANSFORMED DATA INTO THE OUTPUT ARRAY,  Y .          LNTHU265
00433     2660      C                                                                    LNTHU266
00434     2670          IF (AT(I).LT.MIN(I)) GO TO 270                                   LNTHU267
00436     2680          IF (AT(I).GT.MAX(I)) GO TO 280                                   LNTHU268
00440     2690          TREAL(I)=CON(I)*(AT(I)-MIN(I))                                   LNTHU269
00440     2700      C                                                                    LNTHU270
00441     2710          DPT = ( AT(I) - MIN(I) )/ ACON(I) + 11                           LNTHU271
00441     2720      C                                                                    LNTHU272
00442     2730          IF ( DPT .LE. 0 )  DPT = 1                                       LNTHU273
00444     2740          IF ( DPT .GT. 101 )  DPT = 101                                   LNTHU274
00444     2750      C                                                                    LNTHU275
00446     2760          GO TO 290                                                        LNTHU276
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00447    2770          270 DPT = ABS( MIN(I) - AT(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( AT(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 (JKPT.GE.JJ) GO TO 340                              LNTHU298
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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
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C0524    3350          SUM = 0.0                                                  LNTHU335
00525    3360          DO 370 J=1,101,1                                           LNTHU336
00530    3370          IF (SUM.GE.CUT) GO TO 360                                  LNTHU337
00532    3380          GO TO 370                                                  LNTHU338
00533    3390      360 MINCUT(I) = SUM                                            LNTHU339
00534    3400          NEWMIN(I) = (J-1) * NXCON * 0.5                            LNTHU340
00535    3410          GO TO 380                                                  LNTHU341
00535    3420      C                                                              LNTHU342
00536    3430      370 SUM = SUM + FILHIS(I,J)                                    LNTHU343
00540    3440      380 SUM = 0.0                                                  LNTHU344
00541    3450          DO 400 J=101,1,-1                                          LNTHU345
00544    3460          IF (SUM.GE.CUT) GO TO 390                                  LNTHU346
00546    3470          GO TO 400                                                  LNTHU347
00547    3480      390 MAXCUT(I) = SUM                                            LNTHU348
00550    3490          NEWMAX(I) = ( J - 1 ) * NXCON * 0.5                        LNTHU349
00551    3500          GO TO 410                                                  LNTHU350
00552    3510      400 SUM = SUM + FILHIST(I,J)                                   LNTHU351
00554    3520      410 CONTINUE                                                   LNTHU352
00555    3530      420 CONTINUE                                                   LNTHU353
00557    3540          GO TO 580                                                  LNTHU354
00557    3550      C                                                              LNTHU355
00557    3560      C                                                              LNTHU356
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00560    3570      430 NPER1 = PEROUT * .01 + .001                                LNTHU357
00561    3580          NPER2 = PEROUT * .01 - .001                                LNTHU358
00561    3590      C                                                              LNTHU359
00562    3600          RSET=0                                                     LNTHU360
00563    3610          IG = 0                                                     LNTHU361
00564    3620          IB = 0                                                     LNTHU362
00565    3630          IE = 0                                                     LNTHU363
00566    3640          IA = 0                                                     LNTHU364
00566    3650      C                                                              LNTHU365
00567    3660          DO 560 I=1,LCOMB                                           LNTHU366
00572    3670          MATOT=TOTPIS(I)*NPER1                                      LNTHU367
00573    3680          MITOT=TOTPIS(I)*NPER2                                      LNTHU368
00574    3690          IF (PMIN(I).GT.MATOT) GO TO 440                            LNTHU369
00576    3700          GO TO 460                                                  LNTHU370
00576    3710      C RESET MIN SMALLER                                            LNTHU371
00577    3720      440 CMIN=PMIN(I)                                               LNTHU372
00600    3730          DO 450 J=IG,1,-1                                           LNTHU373
00603    3740          IG=IG+1                                                    LNTHU374
00604    3750          CMIN=CMIN-FILHIS(I,J)                                      LNTHU375
00605    3760          IF (CMIN.GT.MATOT) GO TO 450                               LNTHU376
00607    3770          IF(CMIN.LT.MITOT) IG=IG-1                                  LNTHU377
00611    3780          RSET=1                                                     LNTHU378
00612    3790          MIN(I)=MIN(I)-IG*ACON(I)                                   LNTHU379
00613    3800          IG=0                                                       LNTHU380
00614    3810          GO TO 490                                                  LNTHU381
00615    3820      450 CONTINUE                                                   LNTHU382
00617    3830      460 IF (PMIN(I).LT.MITOT) GO TO 470                            LNTHU383
00621    3840          GO TO 490                                                  LNTHU384
00621    3850      C RESET MIN LARGER                                             LNTHU385
00622    3860      470 CMIN=PMIN(I)                                               LNTHU386
00623    3870          DO 480 J=IB,91                                             LNTHU387
00626    3880          IB=IB+1                                                    LNTHU388
00627    3890          CMIN=CMIN+FILHIS(I,J)                                      LNTHU389
00630    3900          IF (CMIN.LT.MITOT) GO TO 480                               LNTHU390
00632    3910          IF(CMIN.GT.MATOT) IB=IB-1                                  LNTHU391
00634    3920          MIN(I)=MIN(I)+IB*ACON(I)                                   LNTHU392
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00635   3930          IB=0                                                    LNTHU393
00636   3940          NSET=1                                                  LNTHU394
00637   3950          GO TO 490                                               LNTHU395
00640   3960      480 CONTINUE                                                LNTHU396
00640   3970  C CHECK MAX                                                    LNTHU397
00642   3980      490  CONTINUE                                              LNTHU398
00643   3990          IF (PMAX(I).GT.MATOT) GO TO 500                         LNTHU399
00645   4000          GO TO 520                                               LNTHU400
00645   4010  C RESET MAX LARGER                                             LNTHU401
00646   4020      500 CMIN=PMAX(I)                                            LNTHU402
00647   4030          DO 510 J=92,101                                         LNTHU403
00652   4040          IE=IE+1                                                 LNTHU404
00653   4050          CMIN=CMIN-FILHIS(I,J)                                   LNTHU405
00654   4060          IF (CMIN.GT.MATOT) GO TO 510                            LNTHU406
00656   4070          IF(CMIN.LT.MITOT) IE=IE-1                               LNTHU407
00660   4080          NSET=1                                                  LNTHU408
00661   4090          MAX(I)=MAX(I)+IE*ACON(I)                                LNTHU409
00662   4100          IE=0                                                    LNTHU410
00663   4110          GO TO 550                                               LNTHU411
00664   4120      510 CONTINUE                                                LNTHU412
00665   4130  C RESET MAX SMALLER                                            LNTHU413
00666   4140      520 IF (PMAX(I).LT.MITOT) GO TO 530                         LNTHU414
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00670   4150          GO TO 550                                               LNTHU415
00671   4160      530 CMIN=PMAX(I)                                            LNTHU416
00672   4170          DO 540 J=91,1,-1                                        LNTHU417
00675   4180          IA=IA+1                                                 LNTHU418
00676   4190          CMIN=CMIN+FILHIS(I,J)                                   LNTHU419
00677   4200          IF (CMIN.LT.MITOT) GO TO 540                            LNTHU420
00701   4210          IF(CMIN.GT.MATOT) IA=IA-1                               LNTHU421
00703   4220          NSET=1                                                  LNTHU422
00704   4230          MAX(I)=MAX(I)-IA*ACON(I)                                LNTHU423
00705   4240          IA=0                                                    LNTHU424
00706   4250          GO TO 550                                               LNTHU425
00707   4260      540 CONTINUE                                                LNTHU426
00711   4270      550 CONTINUE                                                LNTHU427
00712   4280      560 CONTINUE                                                LNTHU428
00714   4290          IF (NSET.EQ.0) GO TO 600                                LNTHU429
00716   4300          DO 570 I=1,LCOMB                                        LNTHU430
00721   4310          ACON(I)=(MAX(I)-MIN(I))/80                              LNTHU431
00722   4320          RACON(I) = ACON(I)                                      LNTHU432
00723   4330      570  CON(I) = 255. / (MAX(I) - MIN(I))                     LNTHU433
00723   4340  C                                                               LNTHU434
00725   4350      580 IF (NF.EQ.1) GO TO 590                                  LNTHU435
00725   4360  C                                                               LNTHU436
00727   4370          CALL NTRAN(19,8,-2.8,1.22)                              LNTHU437
00730   4380          MTRAN=1                                                 LNTHU438
00731   4390          GO TO 150                                               LNTHU439
00732   4400      590 CALL NTRAN(19,10)                                       LNTHU440
00733   4410          MTRAN=1                                                 LNTHU441
00734   4420          GO TO 150                                               LNTHU442
00735   4430      600 CONTINUE                                                LNTHU443
00736   4440          MTRAN=0                                                 LNTHU444
00736   4450  C                                                               LNTHU445
00737   4460          IF (RESCAL.EQ.0) GO TO 710                              LNTHU446
00737   4470  C                                                               LNTHU447
00741   4480          WRITE (6,610)NF                                         LNTHU448
00744   4490      610 FORMAT(///// 22A,'* OUTPUT FILE ', I3, 1X,'*' ///////, 58A
00744   4500     .  '*** TRANSFORMED VALUES RESCALED TO A RANGE  0 - 255  ***' ) LNTHU450
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00744    4510      C
00745    4520            IF (SCAFLG.EQ.1) WRITE (6,620)                                  LNTRU451
00750    4530            IF (SCAFLG.EQ.2) WRITE (6,630)                                  LNTRU452
00753    4540            IF (SCAFLG.EQ.3) WRITE (6,640)                                  LNTRU453
00753    4550      C                                                                     LNTRU454
00754    4560          620 FORMAT( 24X, '(HISTOGRAM METHOD)' / )                         LNTRU455
00757    4570          630 FORMAT( 23X, '(STATISTICS METHOD)' / )                        LNTRU456
00760    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
00763    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
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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
01016    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(//// 19X, '* 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
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01065  5070      C                                                                LNTNU507
01065  5080      C                                                                LNTNU508
01065  5090      C                                                                LNTNU509
01066  5100          WRITE (6,790)(I,BADMIN(I),I=1,LCOMB)                         LNTNU510
01066  5110      C                                                                LNTNU511
01075  5120      790 FORMAT(/// 5X,'NO. OF TRANSFORMED VALUES LESS THAN 0 ( SET = 0 ) :LNTNU512
01075  5130      C                                                                LNTNU513
01075  5140          * ' // (5X,'COMPONENT',1X,I2,'...',I4,2X,'VALUES' ) )        LNTNU514
01075  5150      C                                                                LNTNU515
01075  5160          WRITE (6,800)(I,BAUMAX(I),I=1,LCOMB)                         LNTNU516
01076  5170      C                                                                LNTNU517
01105  5180      800 FORMAT(/// 5X, 'NO. OF TRANSFORMED VALUES GREATER THAN 255 ( SET =LNTNU518
01105  5190      C                                                                LNTNU519
01105  5200          * 255 ) :' // (5X,'COMPONENT',1X,I2,'...',I4,2X,'VALUES' ) )LNTNU520
01105  5210      C                                                                LNTNU521
01105  5220          NPER1 = FLOAT(PENOUT)/2.0                                    LNTNU522
01106  5230      C                                                                LNTNU523
01107  5240          WRITE (6,810)NPER1,LCOMB,(MINCUT(I),I=1,LCOMB)               LNTNU524
01117  5250      810 FORMAT(/// 3X, 'NO. OF LOWER TAIL POINTS  REJECTED  ( SET = 0 FLNTNU525
01117  5260          *OR OUTPUT )  TO SATISFY',F6.1,2X,'% CUT-OFF, COMPONENTS  1  -' LNTNU526
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01117  5270          * I4, 2X, '...' // 16(I8) )                                  LNTNU527
01117  5280      C                                                                LNTNU528
01120  5290          WRITE (6,820)NPER1,LCOMB,(MAXCUT(I),I=1,LCOMB)               LNTNU529
01130  5300      820 FORMAT(/// 3X, 'NO. OF UPPER TAIL POINTS  REJECTED  ( SET = 255 FLNTNU530
01130  5310          *OR OUTPUT )  TO SATISFY',F6.1, 2X, '% CUT-OFF, COMPONENTS  1  -'LNTNU531
01130  5320          * , I4, 2X, '...' // 16( I8 ) )                              LNTNU532
01131  5330          NPCT = 100 - PENOUT                                          LNTNU533
01132  5340          WRITE (6,830)NPCT,LCOMB,(NEWMIN(I),I=1,LCOMB)                LNTNU534
01142  5350      830 FORMAT(////  3X,'****  FINAL OUTPUT TRANSFORMED VALUES, CENTRAL' LNTNU535
01142  5360          *  15,3X,'%' , 2X, 'OF DISTRIBUTION :' // 3X, 'MINIMUMS, COMPONENTSLNTNU536
01142  5370          *  1 - ' , I4, 2X, '...' //  2(5X, 8F12.2 / ) )               LNTNU537
01142  5380      C                                                                LNTNU538
01145  5390          WRITE (6,840)LCOMB,(NEWMAX(I),I=1,LCOMB)                     LNTNU539
01152  5400      840 FORMAT(// 3X,'MAXIMUMS, COMPONENTS  1  - ', I4, 2X,'...' //  LNTNU540
01152  5410          *  2( 5X, 8F12.2 / )  )                                      LNTNU541
01152  5420      C                                                                LNTNU542
01152  5430      C                                                                LNTNU543
01152  5440      C                                                                LNTNU544
01152  5450      C PRINT HISTOGRAMS                                               LNTNU545
01152  5460      C                                                                LNTNU546
01153  5470      850 CONTINUE                                                     LNTNU547
01153  5480      C                                                                LNTNU548
01154  5490          XSIZ=10.1                                                    LNTNU549
01155  5500          XHIGH=255                                                    LNTNU550
01156  5510          XLOW=0                                                       LNTNU551
01157  5520          YSIZ=15                                                      LNTNU552
01160  5530          CALL COMMST(FILNIS,HISBUF,TTL,LCOMB,FETVCZ,XSIZ,XHIGH,XLOW,YSIZ)LNTNU553
01160  5540      C                                                                LNTNU554
01160  5550      C                                                                LNTNU555
01161  5560          IF (RESCAL.EQ.0) GO TO 60                                    LNTNU556
01161  5570      C                                                                LNTNU557
01161  5580      C                                                                LNTNU558
01161  5590          WRITE (6,860)NF                                              LNTNU559
01163  5600      C                                                                LNTNU560
01164  5610      860 FORMAT(1H1 // 5X,'SCALING PARAMETERS USED ON TRANSFORMED VALUES, OLNTNU561
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01164    5670      C
01164    5680      C     'UTPUT FILE', I5// 19X, 'MINIMUM', 7X, 'MAXIMUM', 7X,                    LNINKU567
01164    5690      C                                                                              LNINKU568
01164    5700      C     .  'SCALE FACTOR ( CON )'  )                                             LNINKU569
01164    5710      C                                                                              LNINKU570
01167    5720      C     WRITE (6,870)(FETYC2(IL),MIN(IL),MAX(IL),CON(IL),IL=1,LCOMB)             LNINKU571
01167    5730      C                                                                              LNINKU572
01200    5740    870 FORMAT(1X, 'COMPONENT',I3,1X,F12.3,2X,F12.3,7X,F12.3 )                       LNINKU573
01200    5750      C                                                                              LNINKU574
01200    5760      C                                                                              LNINKU575
01201    5770      C     IF (NPUN.LL.0) GO TO 890                                                 LNINKU576
01201    5780      C                                                                              LNINKU577
01203    5790      C     PUNCH 880,(CONTANT,MINIMUM,MAXIMUM,I=1,LCOMB)                            LNINKU578
01203    5800      C                                                                              LNINKU579
01212    5810    880 FORMAT(  ('OPTION',9X, 'SCAFAC=' , 2( ' (', F9.3, ',' , F9.3,               LNINKU580
01212    5820      .  ' ) ' , ' ) ' ) )                                                           LNINKU581
01212    5830      C                                                                              LNINKU582
01213    5840    890  CONTINUE                                                                   LNINKU583
01213    5850      C                                                                              LNINKU584
01213    5860      C                                                                              LNINKU585
01214    5870      C     IF ( SCAFLG .EQ. 1 )   RETURN                                            LNINKU586
01214    5880      C                                                                              LNINKU587
01214    5890      C                                                                              LNINKU588
01216    5900      C     GO TO 60                                                                 LNINKU589
01217    5910    908 IF (LAM.EQ.0) GO TO 920                                                      LNINKU590
01221    5920      WRITE (6,918)FLDNAM                                                            LNINKU591
01224    5930    918 FORMAT(//// 5X,'*****  DATATR/LNTRAN *****  ERROR ON INPUT FIELD DE         LNINKU592
01224    5940      .FINITION CARD, FOR FIELD NAME  ',1H', A6, 1H', 3X, '******' /                 LNINKU593
01224    5950      .  10X, 'CONTINUING TO NEXT FIELD DEFINITION CARD(S)' //// )                  LNINKU594
01225    5960      GO TO 60                                                                       LNINKU595
01226    5970    920  CONTINUE                                                                   LNINKU596
01227    5980      RETURN                                                                         LNINKU597
01230    5990      END                                                                            LNINKU598
                                                                                                  LNINKU599

      END OF COMPILATION:        NO  DIAGNOSTICS.
  LNTRAN          SYMBOLIC                    25 APR 77  10:25:23    0  027+2926    19    400  (DELETED)
  LNTRAN  CODE    RELOCATABLE                 25 APR 77  10:25:23    1  027+2746    98      1  (DELETED)
                                                                     0  027+3026    19    191
```

```
0 FOR TRANSF.TRANSF                                                    09 MAY 77          226 1
UNIVAC 1108 FORTRAN V EXEC 11 LEVEL 25A -(EXEC8 LEVEL E12018018A)
THIS COMPILATION WAS DONE ON 09 MAY 77 AT 22:09:57

    SUBROUTINE TRANSF    ENTRY POINT 000367

    STORAGE USED: CODE(1) 000187; DATA(D) 000261; BLANK COMMON(2) 000000

     COMMON BLOCKS:
    0003  TRBLCK 000046

    EXTERNAL REFERENCES (BLOCK, NAME)
     0009   NERR3S

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

     0001   000021 11B6      0003   000018 FETVEC     0003   000002 FLDINF     0000   000003 INJPS      0008 I 000000 IT
     0000 I 000001 JSAMP     0003 I 000035 NOFEAT     0003   000000 QUIENT     0000 I 000002 LCOND

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

```
00107    90          END
00110    70          DIMENSION IDATA (TOP)                                          TRANS007
00111    80    C                                                                    TRANS008
00112    90    C     SUBROUTINE TRANSF DOES A DATA-TRANSFORMATION USING THE         TRANS009
00113    100   C     FORMULA                                                        TRANS010
00114    110   C          AT = IDATA * BMAT + BIAS                                  TRANS011
00115    120   C          AT = COMPONENT(IL), TRANSFORMED DATA VECTOR                TRANS012
00116    130   C          IDATA = INPUT DATA VECTOR ( NOFLAT X 1 )                  TRANS013
00117    140   C          BMAT = TRANSFORMATION MATRIX ( LCOMB X NOFLAT )           TRANS014
00118    150   C            BIAS = ADDITIVE BIAS                                    TRANS015
00119    160   C                                                                    TRANS016
00120    170         DO 10 IT=1,NOFLAT                                              TRANS017
00121    180         JSAMP = (IT - 1) * NSAMP + K                                   TRANS018
00122    190         ZCOMB = LCOMB * (IT - 1) + IL                                  TRANS019
00123    200         AT (IL) = AT (IL) +                                            TRANS020
00124    210   C           (DATA(JSAMP) * BMAT(ZCOMB)                               TRANS021
00125    220    10   CONTINUE                                                       TRANS022
00126    230         AT(IL) = AT(IL) + BIAS(IL)                                     TRANS023
00127    240         RETURN                                                         TRANS024
00128    250         END
```

```
      END OF COMPILATION:       NO  DIAGNOSTICS.

THANSF          SYMBOLIC          25 APR 77  10:25:29    0  027702I0    19    25  (DELETED)
THANSF  CODE    RELOCATABLE       25 APR 77  10:25:29    1  02770796    29     1  (RELATED)
                                                         0  02770776    19     0
```

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
      HLOT      DATA TRANSFORMATION PROCESSOR --- SAMPLE RUN
      HLO2            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 VERTICES  SAMPLE INC  LINE INC  VERTICES(SAMPLE,LINE)
      FL-C1          4               1           1      ( 1, 1) ( 90, 90)  ( 1, 90)
```

• OUTPUT FILE 1 •

••• TRANSFORMED VALUES NOT RESCALED •••

TRANSFORMED MINIMUMS, COMPONENTS 1- 4 •••

103.00	96.00	199.00	196.00

TRANSFORMED MAXIMUMS, COMPONENTS 1- 4 •••

199.00	211.00	210.00	210.00

TRANSFORMED VALUE BIAS, COMPONENTS 1 - 4 1

.00	.00	.00	.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••• 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

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 ...,

194.00 211.00 218.00 210.00

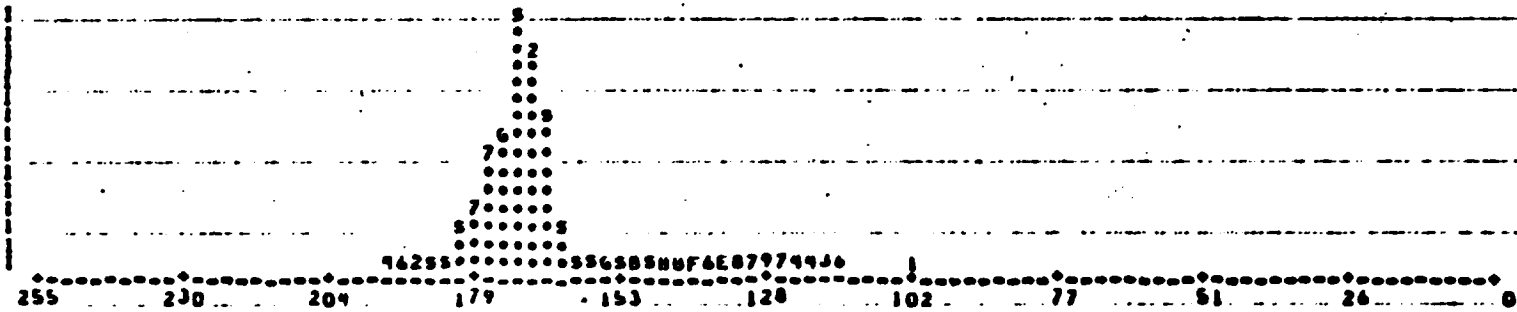
67

DATA TRANSFORMATION PROCESSOR --- SAMPLE RUN JAN 12,1977
FLIGHT LINE C-1 DATA

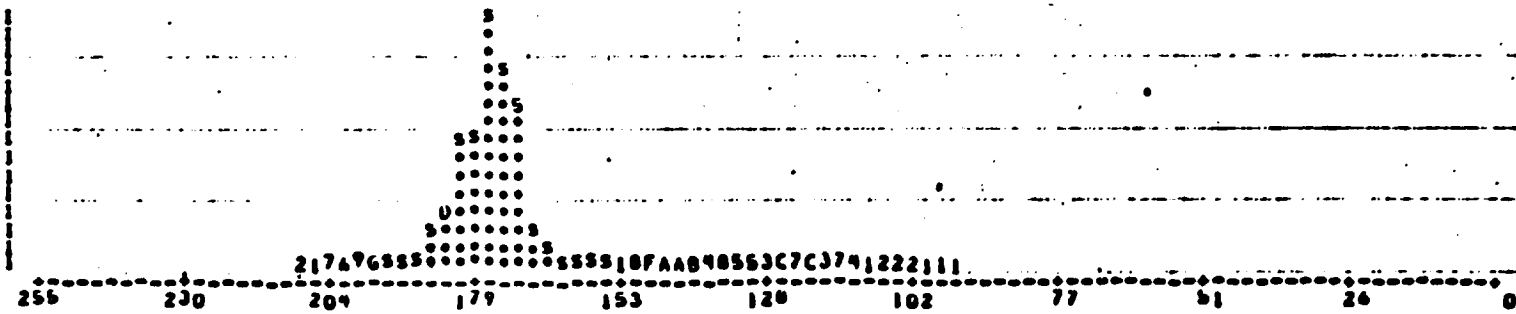
... SAMPLE RUN NO. 1 ...

DATA TR

EACH • REPRESENTS 135 POINT(S).



EACH • REPRESENTS 121 POINT(S).



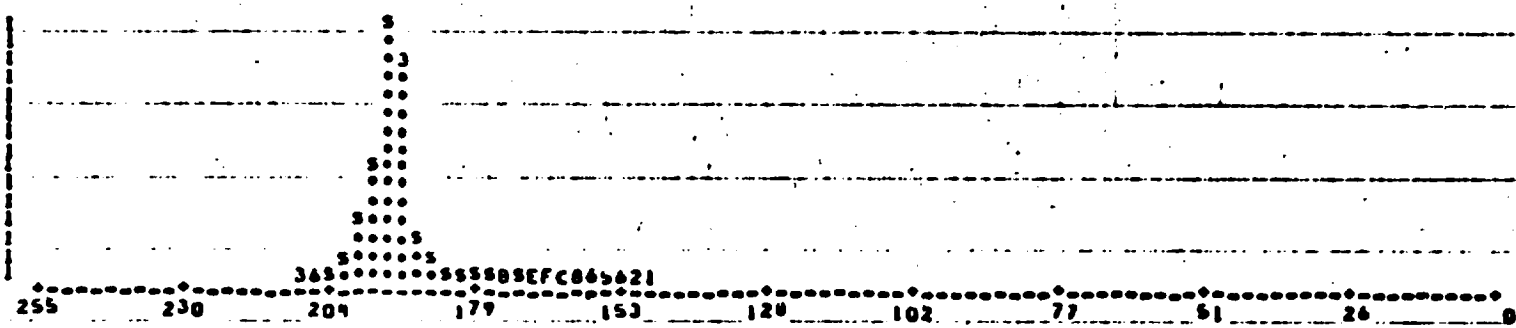
DATA TRANSFORMATION PROCESSOR --- SAMPLE RUN
FLIGHT LINE C-1 DATA

JAN 12,1977

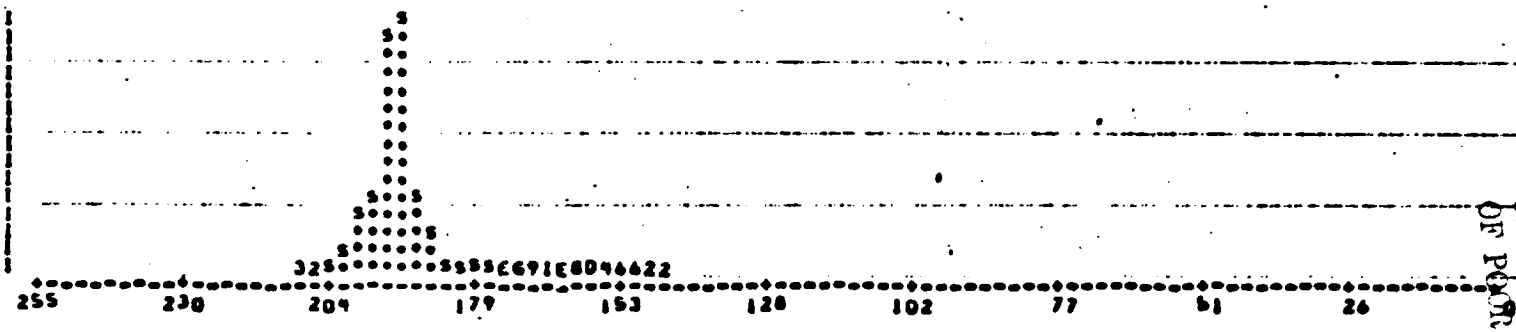
... SAMPLE RUN NO. 1 ...

DATA TR

EACH • REPRESENTS 180 POINT(S).



EACH • REPRESENTS 176 POINT(S).



*** SDATA-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

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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 :
.00 100.00 .00 -100.00

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••• 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 ...

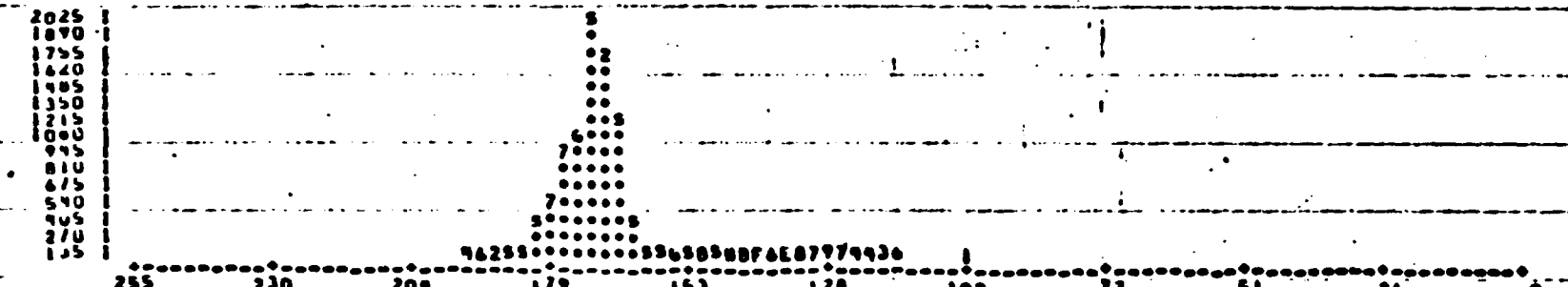
194.00 255.00 218.00 110.00

TEST RUN - DATATR
C1 FLIGHT LINE
26 APR 77

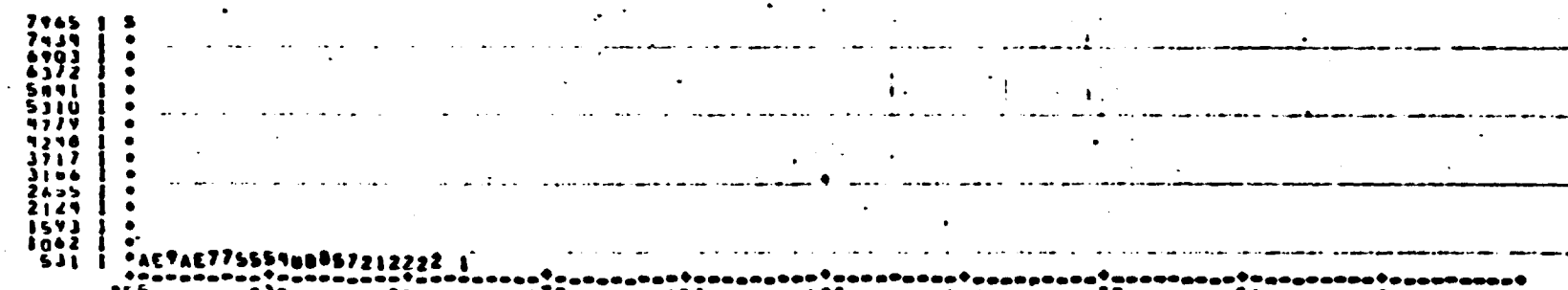
••• SAMPLE RUN NO. 7 •••

DATA TR

EACH • REPRESENTS 135 POINT(S).



EACH • REPRESENTS 531 POINT(S).



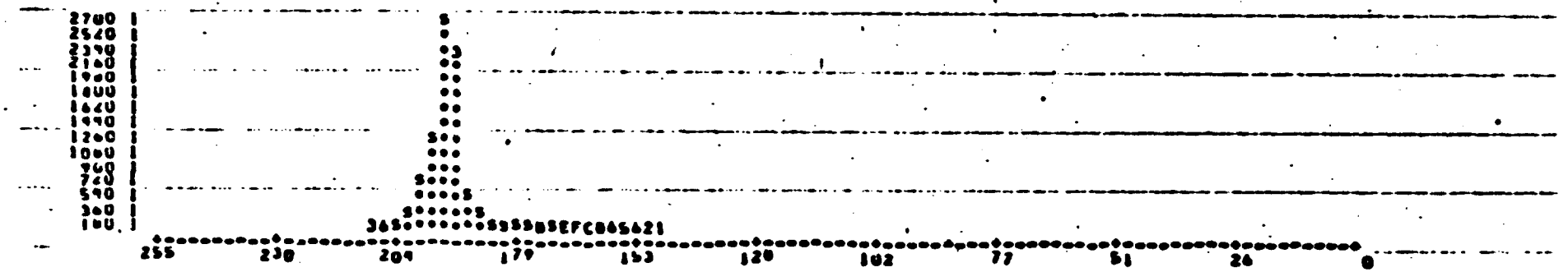
TEST RUN =: DATA7R
CI FLIGHT LINE

25 APR 77

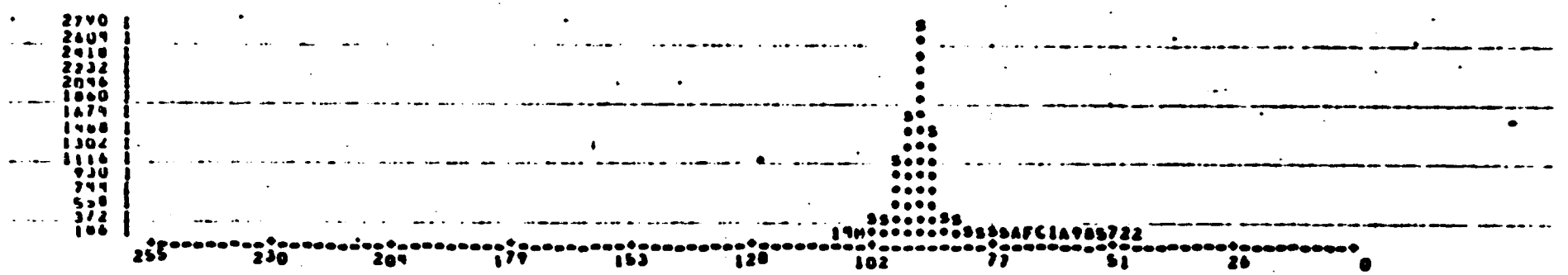
... SAMPLE RUN NO. 7 ...

DATA 7R

EACH • REPRESENTS 180 POINT(S).



EACH • REPRESENTS 186 POINT(S).



```
*** DATA-TM COMPLETED ***

TIME FOR DATA-TRANSFORMATION    .399
```

TEST RUN 3

LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS

26 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
    PRNOUT      5
    BIAS       0.0, 5*0.0, 2 * 0.0 , 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 #OWN01
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 #O#N02
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

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

••• ORIGINAL STATISTICS •••

SUBCLASS NONNO4
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

98

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

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

... 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 172.06 170.99 194.45 193.79
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 PROCESSOR
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

93

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	208.0274	12.4480
186.6042	203.9274	17.8333
184.7246	200.6389	16.5234

DATA TRANSFORMATION PROCESSOR
FL C-1 DATA

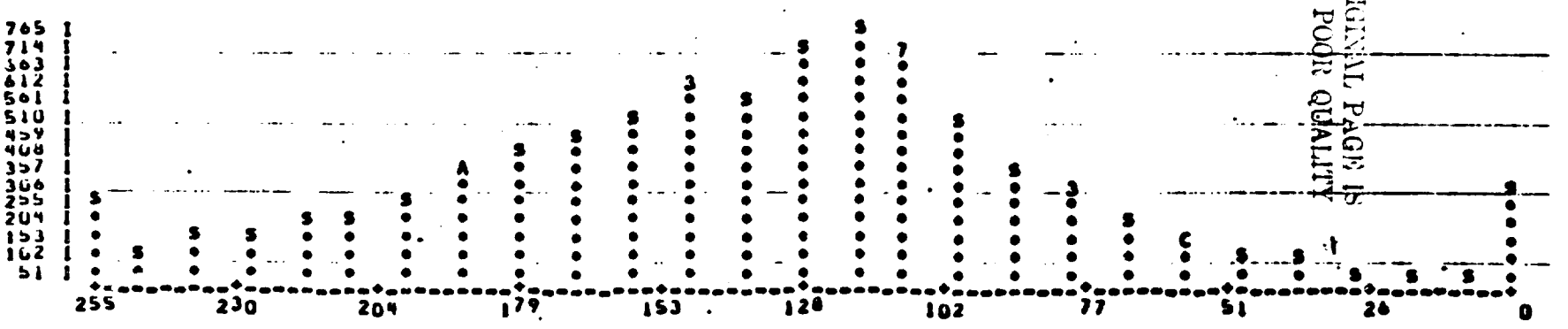
JAN 12,1977

••• SAMPLE RUN NO. 2.•••

DATA TR

EACH • REPRESENTS 57 POINT(S).

EACH • REPRESENTS 51 POINT(S).



C-2

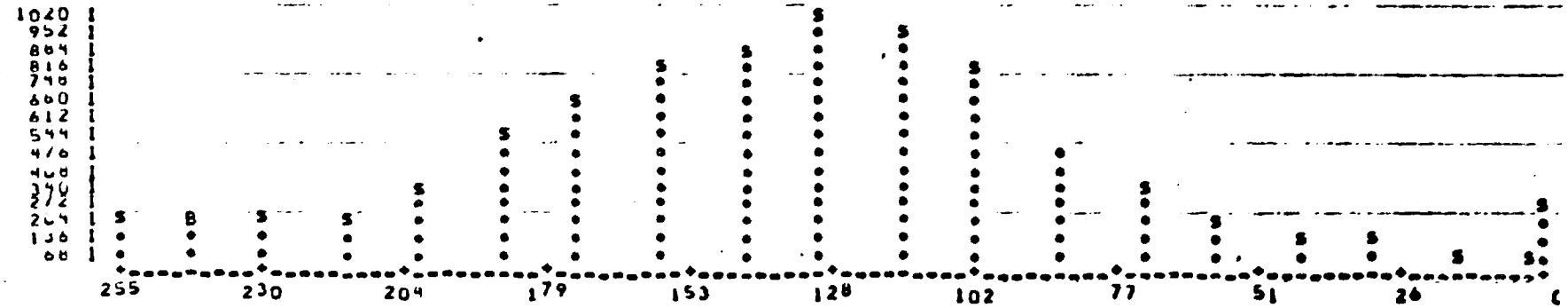
DATA TRANSFORMATION PROCESSOR
FL C=1 DATA

JAN 12,1977

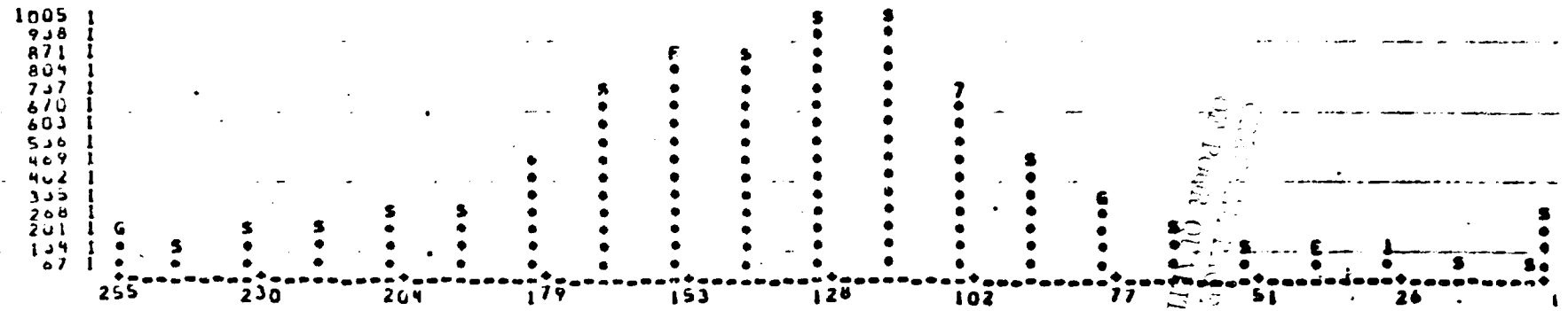
••• SAMPLE RUN NO. 2 •••

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	166.029	12.998
COMPONENT 3	166.604	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	220
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

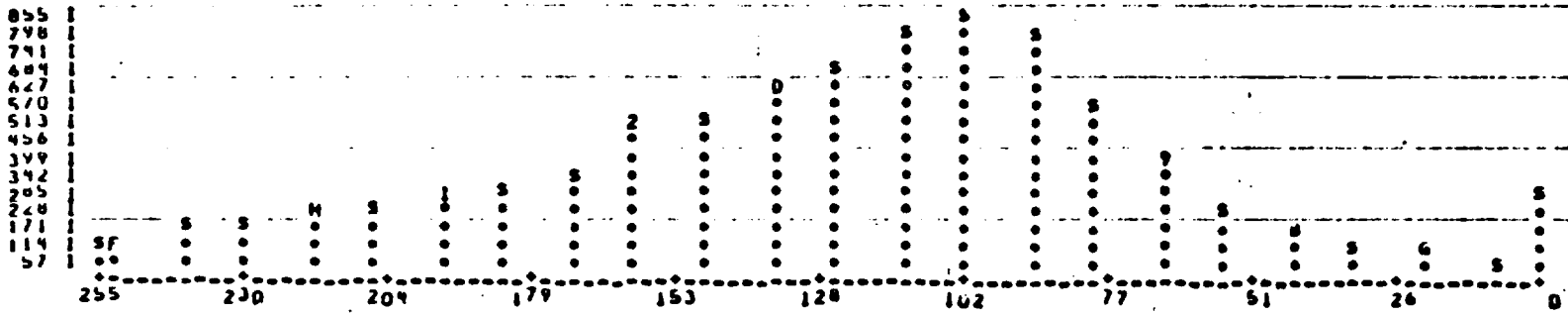
SAMPLE RUN - DATA TR
FLT LINE C-1

25 APR 77

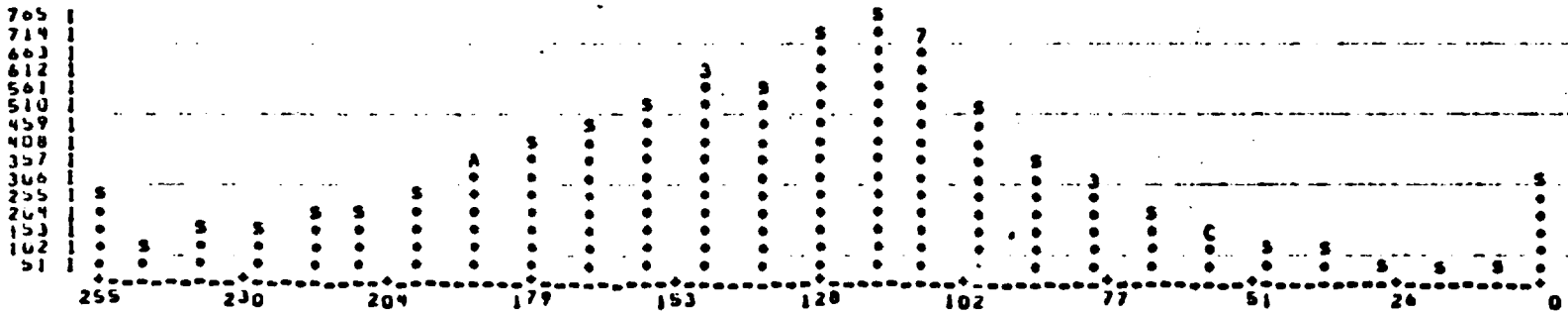
... SAMPLE RUN NO. 5 ...

DATA TR

EACH • REPRESENTS 57 POINT(S).



EACH • REPRESENTS 51 POINT(S).



C-56

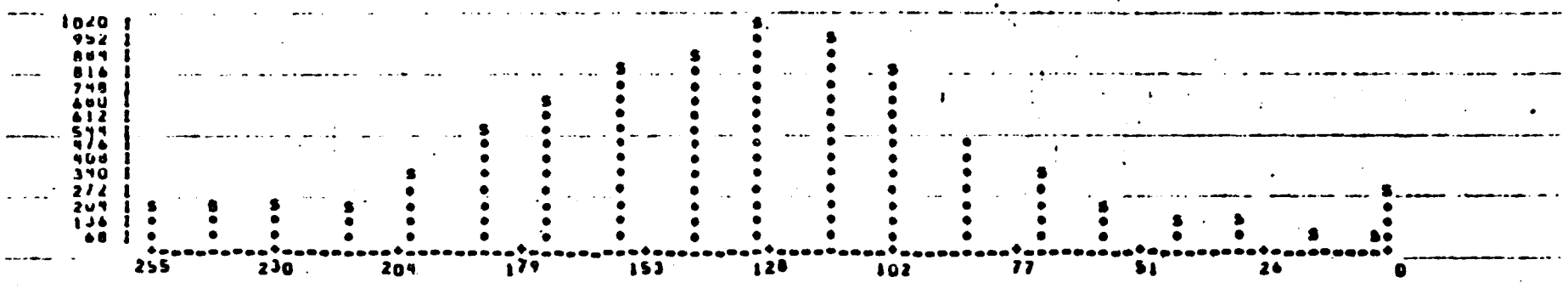
SAMPLE RUN - DATA TR
FLT LINE C-1

26 APR 77

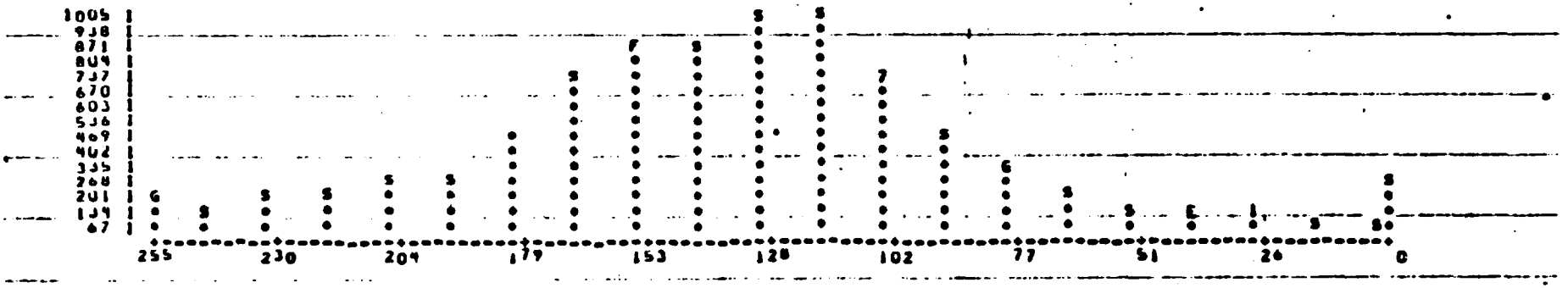
... SAMPLE RUN NO. 5 ...

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	200.640	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
    $END$
```

... 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 4 | SAMPLE INC 1 | LINE INC 1 | VERTICES(SAMPLE,LINE) (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

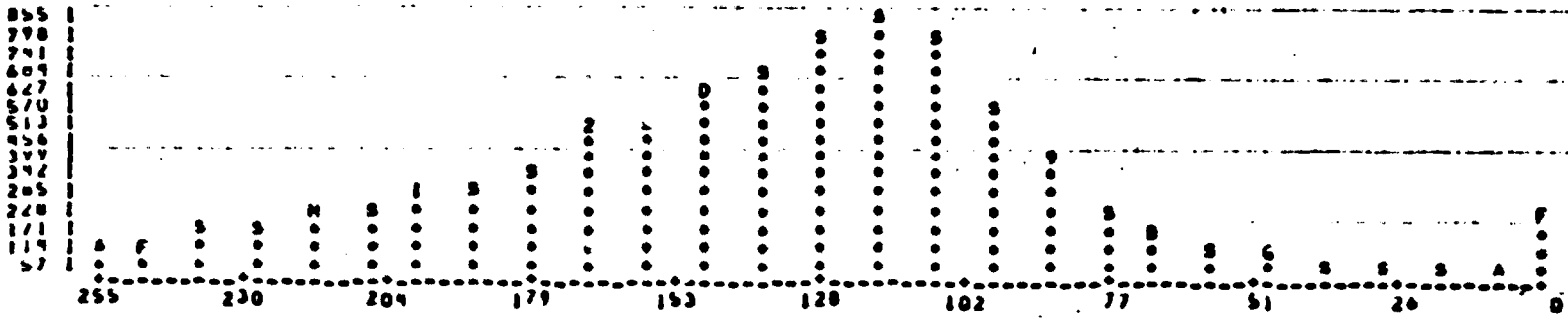
DATA-TR PROCESSOR
C-1 FLIGHT LINE

12 JAN. '77

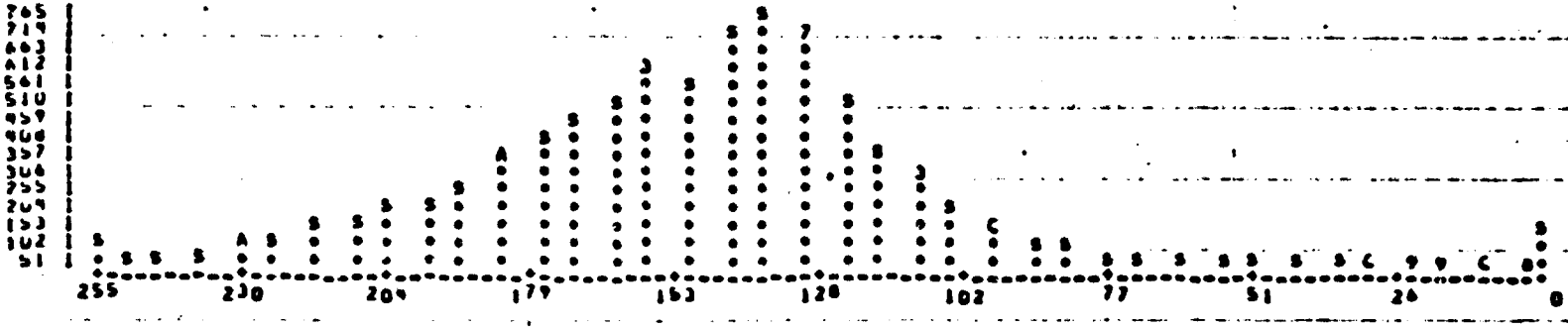
... SAMPLE RUN NO. 6 ...

DATA TR

EACH • REPRESENTS 57 POINT(S).



EACH • REPRESENTS 51 POINT(S).

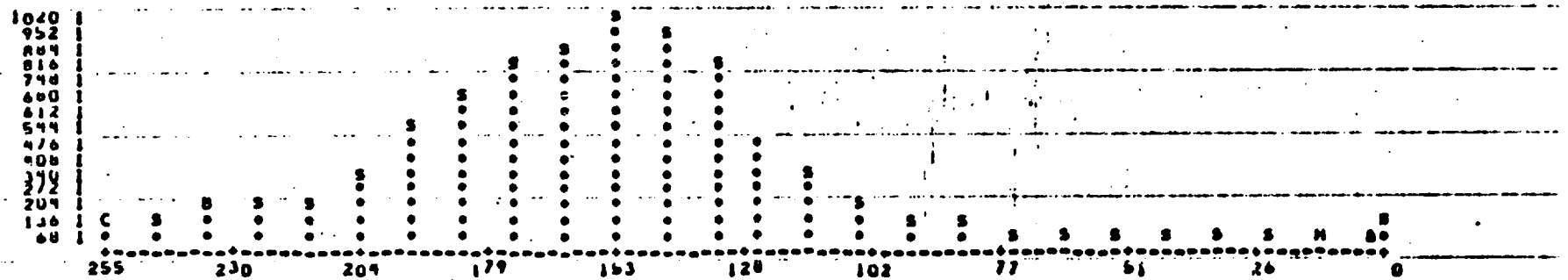


DATA-TR PROCESSOR 12 JAN. '77
C-I FLIGHT LINE

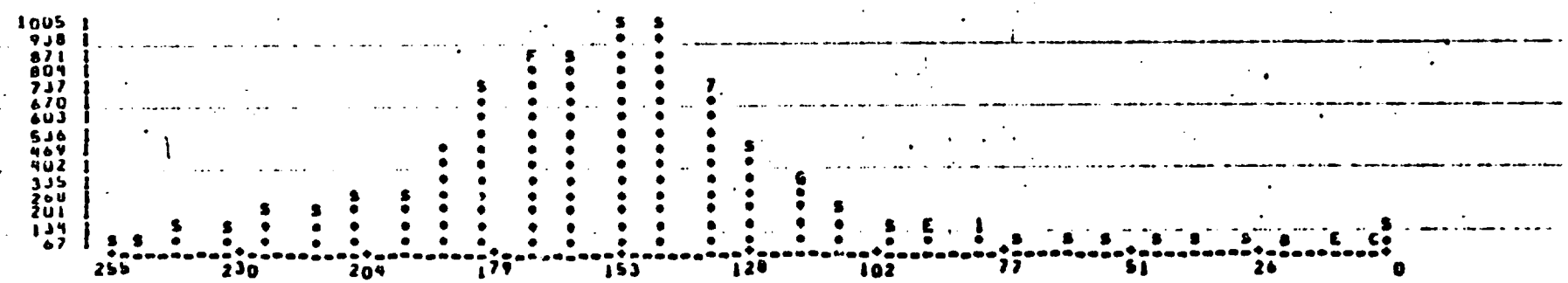
••• SAMPLE RUN NO. 6 •••

DATA TR

EACH • REPRESENTS 68 POINT(S).



EACH • REPRESENTS 67 POINT(S).



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SCALING PARAMETERS USED ON TRANSFORMED VALUES. OUTPUT FILE 1

	MINIMUM	MAXIMUM	SCALE FACTOR (CON)
COMPONENT 1	160.650	161.958	12.500
COMPONENT 2	158.100	188.733	8.333
COMPONENT 3	181.050	201.455	12.500
COMPONENT 4	178.500	201.455	11.111

*** DATA-TR COMPLETED ***

TIME FOR DATA-TRANSFORMATION .534