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FINAL DESIGN SPECIFICATION FOR EOD-LARSYS/STATISTICS AND DATA TRANSFORMATION PROCESSORS MODIFICATION

Job Order 71-593

(TIRF 77-0034)

Prepared By

Lockheed Electronics Company, Inc.

Systems and Services Division

Houston, Texas

Contract NAS 9-15200

For

EARTH OBSERVATIONS DIVISION

SPACE AND LIFE SCIENCES DIRECTORATE

National Aeronautics and Space Administration

LYNDON B. JOHNSON SPACE CENTER

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Prepared By
Cheevon Bo-Linn
Lockheed Electronics Company, Inc.

APPROVED BY
James A Wilkinson
for Philip L. Krumm, Manager
Data Systems Department

Prepared By

Lockheed Electronics Company, Inc.

For

Earth Observations Division

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

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CONTENTS

1. SCOPE

This document contains the design specifications and description of the modifications made to the Statistics and Data Transformation processors on the Procedure I tape of the EOD-LARSYS system. The requirements that were satisfied are specified in the task agreement 77-3 titled, "LARSYS/Data Transformation Processor Modification" originally dated 6/17/77 and revised 9/12/77 and the "EOD-LARSYS System Design Modifications for PCG Transformation Requirements" memo, dated 8/24/77. The modification requirements were provided by the Research, Test, and Evaluation Branch (RT&E) of the Earth Observations Division (EOD), of NASA/JSC.

The new modifications to the Statistics and Data Transformation processors are found on the LARSYS PCF tapes X03635 and X03597.

2. APPLICABLE DOCUMENTS

The following documents will serve as references:

- EOD-LARSYS Users' Document, LEC-3984, March 1977
- Task Description and Agreement, dated 6/17/77, "LARSYS/Data Transformation Processor Modification"
- Symat, Covar, Test Procedures for Matrix Calculations by W. L. Morris, C. L. Wiginton, and D. K. Lowell, Report #17, Contract NAS 9-12777, dated October 1972
- Principal Component Greenness (PCG) Transformation Requirements for LARSYS by R. A. Abotteen
- EOD-LARSYS System Design Modifications for PCG Transformation Requirements, dated August 24, 1977
- Action document: CAT1, TIRF: 77-0034, (New requirements for checking the first eigenvector of the unitary matrix)

3. SYSTEM DESCRIPTION

In order to load and execute the DATA-TR processor on the Procedure I tape, the DSPLAY, SELECT, and LABEL processors were removed from the Map and commented out in the Montor routine.

This document describes the changes that were implemented into the existing Procedure I Statistics and Data Transformation processors to generate and output an optional Greenness and/or Principal Component Greenness (PCG) Image. The basic image will continue to be a multi-temporal/multi-pass data tape. The result is a transformation which will assist in LACIE-type classification. The user will be provided the options of:

a. Filtering raw or sun angle corrected data vectors in the Statistics processor,

b. Using sun angle corrected data in the Data - Transformation processor to compute a greenness and/or principal component image.

3.1 HARDWARE DESCRIPTION

N/A

3.2 SOFTWARE DESCRIPTION

3.2.1 SOFTWARE COMPONENT NO. 1 (STAT)

The Statistics processor, STAT, will be modified to calculate on option the mean and covariance matrices from filtered and/or sun angle corrected data. These options will be provided if the new control cards 'SUNANG' and 'OPTION WATER' or 'OPTION TASSEL' are input by the user.

If the 'SUNANG' control card is present, the channel-oriented sun angle bias and gain correction factors will be applied to the corresponding channel component of the raw data vector.

$$X_T(I) = SAGAIN(I) * X_R(I) + SABIAS(I)$$

where $X_T(I)$ = the I-th channel component of the sun angle corrected data

SAGAIN(I) = the sun angle gain correction factor for the I-th channel

SABIAS(I) = the sun angle bias correction factor for the I-th channel

$X_R(I)$ = the I-th channel component of the raw data

The user will have the option of applying one of the following filters to the raw or sun angle corrected data vectors:

a. Water filter - initiated by the input of the 'OPTION WATER' control card. (see Appendix A.2 for the 'Water' filter test)

b. Tassel Cap filter - initiated by the input of the 'OPTION TASSEL' control card. (see Appendix A.2 for the 'Tassel Cap' filter test)

3.2.1.1 Linkages

The STAT processor uses the FORTRAN-V compiler, Univac software system routines, EOD-LARSYS utility routines, and the COMBK4 and STBASE common blocks.

See Appendix A for the modifications to be made to the individual subroutines.

3.2.1.2 Interfaces

The STAT processor interfaces with the EOD-LARSYS executive routine, MONTOR.

3.2.1.3 Inputs

The processor requires an MSS data tape (DATAPE). The default tape assignment is the logical unit C (Fortran Unit 3).

- NEW CONTROL CARDS

Keyword (col. 1)	Parameter (col. 11-72)	Function
SUNANG	Tape (Default - no sun angle correction applied)	Sun angles will be extracted from the ERIPS 'unload' MSS image tape.
SUNANG	$n_1, \ldots, n_j$ (Default- no sun angle correction applied	n_i = sun angle for pass i, $1 \leq i \leq 8$. Sun angles are integer numbers which are $5 \leq n_i \leq 85$.
B-MATRIX	Cards (Default - none)	The B-Matrix will be found on the cards immediately following this control card.
B-MATRIX	File (Default - none)	The subroutine BMFIL will be called to read the B-Matrix off of the file, BMFILE
THRESHOLD	$a_1, \ldots, a_j$ (Default - for 'Tassel Cap' filter, $a_1 = 100$, $a_2 = 8.0$, $a_3 = 6.0$, $a_4 = 10.0$, $a_5 = 35.0$ for the 'Water' filter, $a_1 = 43.0$, $a_2 = 12.0$)	The a_i's are decimal (floating point) numbers, separated by commas; if the user requested a 'Tassel Cap' filter, j must be equal to 5; if the 'Water' filter was requested, j must be equal to 2.

Keyword	Parameter	Function
BIAS	$b_1, \ldots, b_4$ (Default - b_i = 0.0)	The b_i's are decimal (floating point) numbers, separated by commas; the bias values will be used only if the 'Tassel Cap' filter is requested.
OPTION	Tassel (Default - none)	Initiates the Tassel Cap filtering.
OPTION	Water (Default - none)	Initiates the Water filtering.

- MODIFIED CONTROL CARD

Keyword	Parameter	Function
(col. 1)	(col. 11-72)	
CHANNELS	Data = $l_1, \ldots, l_n$, (Default - n = 30), Filter = $m_1, \ldots m_j$ (Default - none)	The l_i's and m_i's are integer channel numbers, separated by commas; they must be a subset of the MSS Image tape. The l_i's will be used in the generation of the mean and covariance matrix. The m_k's are the channels to be used in the user-requested filter process. If the 'Tassel Cap' filter was requested, j must be equal to 4 (based on 4 channels/pass). If the 'Water' filter was requested j must be equal to 2.

The function and/or default value of the following 'SIZE' control cards will be initialized if the 'SUN ANGLE' control card is present:

1) XHIGH will default to 3000

2) XLOW will default to 0

3) XSIZ will default to 101

4) SPECBAS will default to $\min_{k \epsilon \text{ fields}}(\min_{j \epsilon \text{ channels}}(\mu_{kj} - \sigma_{kj}))$

Several modifications have been made to the function section of the 'SIZE SPECBAS = I' control card. If the 'SUN ANGLE' control card was read in, the

1) Y - axis increment will be set equal to $\{[\max_{k \epsilon \text{ fields}}(\max_{j \epsilon \text{ channels}}(\mu_{kj} + \sigma_{kj}))] - [\min_{k \epsilon \text{ fields}}(\min_{j \epsilon \text{ channels}}(\mu_{kj} - \sigma_{kj}))]\}/49 + 1.0$

2) The range of the Y-axis will be:

$(Y_{min} = \text{SPECBAS},\ Y_{max} = \max_{k \epsilon \text{ fields}}(\max_{j \epsilon \text{ channels}}(\mu_{kj} + \sigma_{kj}))$

3.2.1.4 Outputs

The Statistics processor will continue to output the statistics on the default or user-requested SAVTAP file. The default logical unit is A (Fortran unit 1) and the default file number is 1. The line printer and file output remain unchanged.

3.2.1.5 Storage Requirements

See Appendix A

3.2.1.6 Description

The Statistics processor, STAT, of the EOD-LARSYS system has been modified to optionally calculate and output on SAVTAP a mean vector and mixture covariance matrix Σ_x calculated from the optionally filtered raw or sun angle corrected data vectors. Several new control cards will be implemented in the STAT processor to determine if the above calculations are to take place. The presence or absence of the 'SUNANG' control card will determine if raw or sun angle corrected data vectors are to be used in the generation of the above matrices. The user will also have the option of filtering out some data vectors from the above calculations by the presence or absence of the 'OPTION TASSEL' or 'OPTION WATER' control card.

The new mixture covariance matrix will be used in the DATA-TR processor to generate the mixture covariance matrix of the Green Image bands.

3.2.1.7 Flowchart

Appendix C

3.2.1.8 Listing

Appendix E

3.2.2 SOFTWARE COMPONENT NO. 2 (DATA-TR)

The Data Transformation processor, DATA-TR, of the EOD-LARSYS system has been modified to perform an optional Green Image and/or Principal Component Greenness (PCG) Image Transformation (s). The addition of a SUNANG control card allows for the sun angle gain and bias correction factors to be applied to the raw data before the above mentioned transformation(s). The Green Image and/or PCG image are additional to the current options for performing transformations in DATA-TR.

3.2.2.1 Linkages

The DATA-TR processor uses the Fortran-V complier, Univac software system routines, EOD-LARSYS utility routines, and the INFORM, TRBLCK, and GLOBAL common blocks.

3.2.2.2 Interfaces

The DATA-TR processor interfaces with the EOD-LARSYS executive routine, MONTOR.

3.2.2.3 Inputs

The processor requires an MSS data tape (DATAPE). The default tape assignment is the logical unit C (Fortran Unit 3).

- NEW CONTROL CARDS

Keyword (col. 1)	Parameter (col. 11-72)	Function
OPTION	Green (Default - Green image not generated for output)	The Green image will be generated and output.

Keyword (col. 1)	Parameter (col. 11-72)	Function
OPTION	PCG (Default - No Principal Components Green Image output)	The PCG image will be generated and output.
FORMAT	Universal (Default - Universal)	The transformed data will be output in the Universal format.
FORMAT	LARSYS (Default - Universal)	The Transformed data will be output in the LARSYS II format.
SUNANG	Tape (Default - no sun angle correction applied)	Sun angles will be extracted from the ERIPS "unload" MSS image tape.
SUNANG	$n_1, \ldots, n_j$ (Default - no sun angle correction applied)	n_i = sun angle for pass i, $1 \le i \le 8$. Sun angles are integer numbers, $5 \le n_i \le 85$.
TRFORM	OUTPUT/UNIT=N, FILE=M (Default - N=14, M=1)	N = the tape's Fortran logical unit number that the new image of transformed data is to be output on. M = the file number that the new image is to be output on. If both Greenness and PCG are to be generated, the former image will be on file M and the latter image on file (M+1)

3.2.2.4 Outputs

The Data-Transformation processor will output the transformed/rescaled data on the default or user-requested TRFORM file (TRNSFL) and/or unit, (TRFORM) in either the Universal or LARSYS II format. The default logical unit is L (Fortran unit 14) and the default file number is 1.

The two additional optional transformed/rescaled data output are Green Image and Principal Component Greenness (PCG) Image. If both Green and PCG images are to be generated, the Green image will be output on TRNSFL and PCG on TRNSFL+1.

3.2.2.5 Storage Requirements

See Appendix B

3.2.2.6 Description

In order to allow the user to optionally generate and output raw or sun angle corrected Green Image and/or PCG Image, several existing subroutines will be modified. In addition, several new subroutines and formulas will also be implemented into the Data Transformation processor.

The scaling parameters MAX, MIN, and CON calculated in KBTRAN will be derived from the sun angle corrected SAVTAP subclasses' mean and standard deviation terms when the sun angle correction option is requested.

The new subroutine GETGCV will be called to pull out the mixture covariance matrix $\sum_x$ from SAVTAP. The new subroutine SUNF2 will provide the sun angle correction parameters.
The green image will be generated as follows:

$$\vec{G} = A\vec{x} + \vec{b}$$

where $\vec{G}$ = transformed green image vector

$\vec{x}$ = raw (or sun angle corrected) data vector

A = matrix in which each row contains the L1, L2, or user-specified Kauth greenness vector (stored internally in BMAT in the 'B-Matrix' format)

$\vec{b}$ = default or user-specified bias vector

The covariance matrix Σ_x will be used to generate the Green Image's covariance matrix Σ_G according to the formula:

$$\Sigma_G = A \ \Sigma_X \ A^T$$

where Σ_G = the Green Image's covariance matrix

Σ_X = the (optionally) filtered raw or sun angle corrected covariance matrix calculated in STAT

A^T = the transpose of the A transformation matrix

The newly generated covariance matrix Σ_G will then be input into the new subroutine PCMMAT to derive an nxn unitary matrix PCM.

The PCG image will then be generated as follows:

$$\vec{P} = (PCM)\ \vec{G}$$

where $\vec{P}$ = n-dimensional PCG image vector (n - number of passes; i.e., LANDSAT acquisitions)

PCM = an nxn unitary matrix obtained from PCMMAT

$\vec{G}$ = n-dimensional green image vector

The currently available options for rescaling the transformed data to a range of 0-255 for output will be unchanged. All rescaling options will be available to be applied to the Green image and/or the PCG image created as a result of these modifications.

3.2.2.7 Flowchart

Appendix D

3.2.2.8 Listing

Appendix F

4. OPERATION

The following section describes the modifications made to the Statistics and Data Transformation processors via the added or revised control cards.

4.1 USER DOCUMENTATION

The following list contains the new or revised control cards which were programmed into the STAT and DATA-TR processors. The format of these control cards remain in the standard EOD-LARSYS format; i.e. the keyword must begin in column 1 and the parameter(s) in column 11. The parameter list must end at or before column 72.

Stat:

- NEW CONTROL CARDS

Keyword	Parameter	Function
(col. 1)	(col. 11-72)	
SUNANG	Tape (Default - no sun angle correction applied)	Sun angles will be extracted from the ERIPS 'unload' MSS image tape.
SUNANG	$n_1,\ldots,n_j$ (Default no sun angle correction applied	n_i = sun angle for pass i, $1\leq i\leq 8$. Sun angles are integer numbers which are $5\leq n_i\leq 85$.
B-MATRIX	Cards (Default - none)	The B-Matrix will be found on the cards immediately following this control card
B-MATRIX	File (Default - none)	The subroutine BMFIL will be called to read the B-Matrix off of the file, BMFILE

Keyword	Parameter	Function
THRESHOLD	$a_1,\ldots,a_j$ (Default - for 'Tassel Cap' filter, $a_1 = 100.0$, $a_2 = 8.0$, $a_3 = 6.0$, $a_4 = 10.0$, $a_5 = 35.0$; for the 'Water' filter, $a_1 = 43.0$, $a_2 = 12.0$)	The a_i's are decimal (floating point) numbers, separated by commas; if the user requested a 'Tassel Cap' filter, j must be equal to 5; if the 'Water' filter was requested, j must be equal to 2.
BIAS	$b_1,\ldots,b_4$ (Default - $b_i = 0.0$)	The b_i's are decimal (floating point) numbers, separated by commas; the bias values will be used only if the 'Tassel Cap' filter is requested.
OPTION	Tassel (Default - none)	Initiates the Tassel Cap filtering.
OPTION	Water (Default - none)	Initiates the Water filtering.

- MODIFIED CONTROL CARD

Keyword	Parameter	Function
(col. 1)	(col. 11-72)	
CHANNELS	Data = l_1, . . ., l_n, (Default - n = 30),	The l_i's and m_i's are integer channel numbers,

Keyword	Parameter	Function
	Filter = $m_1, \ldots m_j$ (Default - none)	separated by commas; they must be a subset of the MSS Image tape. The l_i's will be used in the generation of the mean and covariance matrix. The m_k's are the channels to be used in the user-requested filter process. If the 'Tassel Cap' filter was requested, j must be equal to 4 (based on 4 channels/ pass). If the 'Water' filter was requested, j must be equal to 2.

Data-Tr:

- NEW CONTROL CARDS

Keyword (col. 1)	Parameter (col. 11-72)	Function
OPTION	PCG (Default - No Principal Components Green Image output)	The PCG image will be generated and output.
FORMAT	Universal (Default - Universal)	The transformed data will be output in the LARSYS II format.
SUNANG	Tape (Default - no sun	Sun angles will be extracted from the ERIPS

Keyword	Parameter	Function
	angle correction applied)	"unload" MSS image tape.
SUNANG	$n_1, . . ., n_j$ (Default - no sun angle correction applied)	n_i = sun angle for pass i, $1 \le i \le 8$. Sun angles are integer numbers, $5 \le n_i \le 85$.
TRFORM	OUTPUT/UNIT=N, FILE=M (Default - N=14, M=1)	N = the tape's Fortran logical unit number that the new image of transformed data is to be output on. M = the file number that the new image is to be output on. If both Greenness and PCG are to be generated, the former image will be on file M and the latter image on file (M+1)
OPTION	GREEN (Default - Green image not generated for output)	The Green image will be generated and output.
FORMAT	LARSYS (Default - Universal)	The transformed data will be output in the LARSYS II format.

5. TEST PROCEDURE

5.1 DESCRIPTION OF TESTS

Four Statistics processor runs and two Data-Transformation processor runs were made to verify the new modifications. The output from each of the runs is contained in Appendix G. The Landsat I Kauth Greenness vector was used to generate the 'B-Matrix' in the Data-Transformation runs. In the Statistics processor runs, the Landsat I Kauth matrix was used in the 'Tassel Cap' filter option.

Test Run one (1) demonstrates the 'Tassel Cap' filter option on the generated statistics. The default tassel cap threshold values (100., 8., 6., 10., 35.) and the bias vector (0., 16., 25., 20.) were used in the transformation process.

Test Run two (2) outputs the statistics generated after applying the 'water' filter. The default water threshold values (43., 12.) were used.

Test Run three (3) illustrates the generation of the 'Green and PCG' images by the histogram method. The Data-Transformation run also illustrates the use of the new 'TRFORM' control card.

Test Run four (4) generates the statistics for sixteen (16) channels.

Test Run five (5) generates sun angle corrected, tassel cap filtered statistics. The new 'SUNANG TAPE' control card was used.

Test Run six (6) generates the sun angle corrected 'Green and PCG' images. The Data-Transformation run generated the images by the statistical method.

*No longer Section 6, except for RT&E; provide only 1 copy attached to TPS.

1 (System Identifier) 2 (Program/System Title)

TIRF # ________

AD # ________ As, and if, appropriate

J.O. # ________

3 (Test type) Test Specification

APPROVAL SHEET

TEST CONDUCTOR: Chueven Bol DATE: 2/27/78

COGNIZANT ENGINEER: J. C. Minter DATE: 2/27/78

REQUIREMENTS: R. A. Abbotteen DATE: 2/27/78

USER: R. A. Abbotteen DATE: 2/27/78

NASA TECHNICAL MONITOR: R. P. Heydorn DATE: 3/6/78

MAINTENANCE & OPERATIONS: ________ DATE: ________

LACIE QUALITY ASSURANCE: ________ DATE: ________

QUALITY ASSURANCE: ________ DATE: ________

REMARKS: ________

1	2	3
Image Processor Support Processor NOVA 1200 Univac 1108 Etc.	ASATS CAMS I-100 Hybrid System Universal R/W Program Color Code Spectral Plots Processor Etc.	Acceptance Qualification Re-Qualification Verification Etc.

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APPENDIX A

APPENDIX A

TABLE OF CONTENTS

A.1 SOFTWARE SUBPROGRAM NO. 1 (SETUP1)

The modifications to the subroutine SETUP1 will result in the reading and decoding of the following additional control cards:

a. SUNANG

b. B-MATRIX

c. THRESHOLD

d. BIAS

Two new additional parameters will be read and decoded from the 'OPTION' control card. They are:

a. OPTION TASSEL

b. OPTION WATER

The format of the 'CHANNELS' control card was modified to:

CHANNELS DATA = $d_1, \ldots, d_n$, FILTER = $f_1, \ldots, f_j$

where the d_i's and f_k's are integers.

Several new flags were initialized in the subroutine to be tested in the LEARN subroutine. The flags that were placed in the STBASE common block are:

a. SAKEY - sun angle key - if on, apply the sun angle correction factors to the current raw data.

b. FKEY - filter key - if FKEY=0, no filtering will be applied to the data vectors;

if FKEY=1, the water filter will be applied to the data vectors;

if FKEY=2, the Tassel Cap filter will be applied to the data vectors.

The following dimensioned variables were initialized in this subroutine to be used in the LEARN subroutine:

a. SSUNAG - the sun angles read from the 'SUNANG' control card

b. BIAS - the bias vector to be used in the Tassel Cap filtering process.

c. TH - the threshold values to be used in the 'Tassel Cap' or 'Water' filtering process.

d. BMAT - the matrix (in the B-MATRIX format) to be used in the Tassel Cap filter test.

e. FCHN - the channels of the data vector that will be used in the user-requested filter test.

If the flag SAKEY is on (i.e. the 'SUNANG' control card was read in), the following default parameter values from the 'SIZE' control card will be initialized:

1) XHIGH = 3000
2) XLOW = 0
3) XSIZ = 101
4) SPECBAS will default to $\min\limits_{k \in \text{fields}}(\min\limits_{j \in \text{channels}}(\mu_{kj} - \sigma_{kj}))$

As a result of the sun angle correction capability, several modifications have been made in the function section of the

'SIZE SPECBAS=I'

control card. The y-axis increment will be computed according to the formula $[\max\limits_{k \in \text{fields}}(\max\limits_{j \in \text{channels}}(\mu_{kj} + \sigma_{kj})) - \text{Spcbas}]/49 + 1.0$. (SPCBAS=SPECBAS)

In order to display the sun angle corrected spectral plot more accurately, the y-axis range will be (y_{min} = specbas, y_{max} = $\max\limits_{k \in \text{fields}}(\max\limits_{j \in \text{channels}}(\mu_{kj} + \sigma_{kj}))$).

The above changes take place in the subroutine CLSSPC. The processor will continue to have 50 y-axis values on the spectral plot.

A.1.1 Linkages

SETUP1 is called by the Statistics processor driver program, STAT.

The following subroutines may be called by SETUP1: NXTCHR, FIND, NUMBER, BMFIL, WRTBM, and FLTNUM.

A.1.2 Interfaces

SETUP1 references the following common blocks: STBASE and GLOBAL.

A.1.3 Inputs

The calling sequence to SETUP1 remains unchanged.

- NEW CONTROL CARDS

Keyword (col. 1)	Parameter (col. 11-72)	Function
SUNANG	Tape (Default: no sun angle correction applied)	Sun angles will be extracted from the ERIPS unload MSS image tape.
SUNANG	$n_1, \ldots, n_j$ (Default: no sun angle correction applied)	n_i = sun angle for pass i, $1 \leq i \leq 8$. Sun angles are integer numbers which are $5 \leq n_i \leq 85$.
B-MATRIX	Cards (Default: none)	The B-Matrix will be found on the cards immediately following this control card.
B-MATRIX	File (Default: none)	The subroutine BMFIL will be called to read the B-Matrix off of the file, BMFILE.
THRESHOLD	$a_1, \ldots, a_j$ (Default: for 'Tassel Cap' filter, $a_1 = 100$ $a_2 = 8.0$ $a_3 = 6.0$ $a_4 = 10.0$	The a_i's are decimal (floating point) numbers, separated by commas; if the user requested a 'Tassel Cap' filter, j must be equal to 5; if the Water filter was re-

Keyword (col. 1)	Parameter (col. 11-72	Function
	a_5 = 35.0 for the 'Water' filter, a_1 = 43.0 a_2 = 12.0	quested, j must be equal to 2.
BIAS	$b_1, \ldots, b_4$ (Default: $b_i = 0.0$)	The b_i's are decimal (floating point) numbers, separated by commas; the bias values will be used only if the 'Tassel Cap' filter is requested.
OPTION	Tassel (Default: none)	Sets the flag (FKEY=2) to apply the 'Tassel Cap' filter to the data vectors.
OPTION	Water (Default: none)	Set the flag (FKEY=1) to apply the 'Water' filter to the data vectors.

- MODIFIED CONTROL CARD

The following control card will replace the current 'CHANNELS' format.

Keyword (col. 1)	Parameter (col. 11-72)	Function
CHANNELS	Data = $l_1, \ldots, l_n$, (Default: n = 30), Filter = $m_1, \ldots, m_j$ (Default: none)	The l_i's and m_k's are integer channel numbers, separated by commas; they must be a subset of the MSS Image tape. The l_i's will be used in the generation of the mean and covariance matrix.

Keyword (col. 1)	Parameter (col. 11-72)	Function
		The m_k's are the channels to be used in the user-requested filter process. If the 'Tassel Cap' filter was requested, j must be equal to 4 (based on 4 channels/pass). If the 'Water' filter was requested, j must be equal to 2.

If the 'SUN ANGLE' control card was read in, the following default values and/or function will be initialized on the 'SIZE' control cards:

Keyword (col. 1)	Parameter (col. 11-72)	Function
SIZE	XHIGH=K $0<K\leq 255$ Default: XHIGH = 220 (no sun angle) XHIGH = 3000 (sun angle)	K is an integer which sets the maximum radiance value which will be histogrammed. XHIGH becomes X_{max} of the X-axis of the histogram plot.
SIZE	XLOW = L $0\leq L<XHIGH$ Default: XLOW = 120 (no sun angle) XLOW = 0 (sun angle)	L is an integer which sets the minimum radiance value which will be histogrammed. XLOW becomes X_{min} of the X-axis of the histogram plot.

Keyword (col. 1)	Parameter (col. 11-72)	Function
SIZE	XSIZ=K Default: XHIGH-XLOW (no sun angle) 101 (sun angle)	Sets the range which will be histogramed; maximum range is 101.
SIZE	SPECTRAL=I $0 \leq I \leq 105$ Default: SPECBAS=75 (no sun angle) $\min_{k\varepsilon \text{ fields}}(\min_{j\varepsilon \text{ channels}}(\mu_{kj} - \sigma_{kj}))$ (sun angle)	I is an integer which sets the minimum radiance value on the Y-axis of the spectral plot (i.e., Y_{min}). For no sun angle correction: The processor has a fixed Y-axis increment (3) and a fixed number of Y-axis values (50). Using SPECBAS, the processor determines the Y-axis range to be: Y_{min}=SPECBAS, Y_{max}=SPECBAS+150 For sun angle correction: The processor will calculate the Y-axis increment according to the formula: $[\max_{k\varepsilon \text{ fields}}(\max_{j\varepsilon \text{ channels}}(\mu_{kj} + \sigma_{kj})) -$ SPECBAS]/49 + 1.0. The range for the Y-axis is: (Y_{min} = specbas, $Y_{max} = \max_{k\varepsilon \text{ fields}}(\max_{j\varepsilon \text{ channels}}{}_{kj} + \sigma_{kj})$)

A.1.4 Outputs

Three new additional line printer outputs have been implemented into the subroutine SETUP1:

a. If the Tassel Cap filter was requested but the number of input filter channels is not equal to four or the number of input threshold values is not five, the following error message will be output:

'The number of input filter channels or threshold values are not compatible with the filter option requested-Terminate Execution'.

b. If the 'Water' filter was requested but the number of input filter channels and/or threshold values is not two, the above error message will be output.

c. The subroutine WRTBM will be called to write out the user requested 'B-MATRIX' array from the card or tape file.

d. If the 'Tassel Cap' filter was requested but the user did not input the 'B-MATRIX' control card or if the dimension of the B-Matrix (KAUTH filter matrix) is not 4 x 4 then the following error message will be output:

'The B-Matrix was not input or was not of the right dimension-Terminate.'

A.1.5 Storage Requirements

DATA = 1022_8

CODE = 2215_8

A.1.6 Description

The purpose of the SETUP1 subroutine is to read and analyze all of the input processor control cards as well as their parameters.

As a result of the modifications to SETUP1, the user will be given the options to:

a. Apply the sun angle correction factors to the raw data vectors,

b. Apply a 'Tassel Cap', 'Water', or no filter to the raw or sun angle corrected data vectors, and

c. Calculate and output the filtered raw or sun angle corrected mean and covariance matrix computed over the image data set.

The covariance matrix will be used in the DATA-TR processor to generate a Principal Component Greenness Image.

A.1.7 Flowchart

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A.2 SOFTWARE SUBPROGRAM NO. 2 (LEARN)

The functions that are provided by the subroutine LEARN are to enable the user to calculate the mean vector and covariance matrix from filtered raw or sun angle corrected data vectors. The new flag SAKEY will be tested to determine if the sun angle correction factors are to be applied to the raw data vectors. The value of the new flag FKEY will determine if Water, Tassel Cap, or no filter is to be applied to the data vectors.

A.2.1 Linkages

LEARN is called by STAT, the driver program for the STATISTICS processing.

The following subroutines may be called by LEARN: TAPHDR, SUNF1, FSBSFL, CMERR, LAREAD, LINERD, FDLINT, MTVEC1, FLDCOV, FLDSPC, FLDHIS, CLSCOV, CLSSPC, CLSHIS, MULSPC, FLDINT, and SETMRG.

Note: In order to stay within the core storage limits, several subroutines were taken out of the main link and copied and remapped into the appropriate processor's link. The subroutines SUNF1 (in LEARN) and SUNF2 (in SETUP 8, Data-Tr) are identical as well as MATVEC (in TRHIST, KBTRAN, LNTRAN and Data-Tr) and MTVEC1 (in LEARN). The subroutines SUNF1 and SUNF2 are identical to the existing subroutine SUNFAC except that the two former subroutines have the added capability to output the appropriate 'bias' factors.

A.2.2 Interfaces

LEARN references the STBASE, GLOBAL, COMBK4 and ISOLNK common blocks.

A.2.3 Inputs

The calling sequence to LEARN remains unchanged.

As a result of the sun angle correction option, the following calling sequences have been modified:

Call Fldspc (Fldmen, Dev, Fldsav,(1,N), Dumptr, Idata, Fldnam, Fldvar, Title, Nofeat, Fetvec, Spcbas, Sakey)

Call Clsspc (Avar (1, subno), Substd (1, subno), Title, Dumptr, Idata, Title, Nofeat, Fetvec, Spcbas, Sakey)

Call Mulspc (Avar (1, 1), Substd (1,1), Subdes, Spec (1,I), Idata, Nofeat, Fetvec, Spcbas, Sakey)

A.2.4 Outputs

The user will know how many data vectors were used in the calculation of the mean and covariance matrices from the following new line printer output:

'XXXXX Points will be used in the field mean, covariance calculations'

A.2.5 Storage Requirements

DATA = 31424_8

CODE = 3304_8

A.2.6 Description

The modifications that were made to the subroutine LEARN are to test the sun angle (SAKEY) and filter (FKEY) flags.

If the SAKEY flag is on (SAKEY = 1), the following will take place:

a. Test the flag ISUNT. If ISUNT is on (ISUNT = 1), the sun angles that relate to the B-Matrix channels will be read from the data tape. If ISUNT is off (ISUNT = 0), the sun angles were read in SETUP1. The sun angles will be used in the sun angle correction process.

b. The subroutine SUNF1 will be called to output the sun angle bias and gain correction factors.

c. The sun angle correction factors (bias and gain) will be applied to the raw data vectors before calculating the mean and covariance matrix.

If the filter flag (FKEY) is equal to:

a. Zero - the raw or sun angle corrected data vectors will not be filtered before calculating the mean and covariance matrices.

b. One - the 'Water' filter will be applied to the raw or sun angle corrected data vectors before calculating the mean and covariance.

The data vector will be filtered if the following holds:

$X_1 - \frac{t(1)}{t(2)} (X_2) \geq 0$ and $X_2 \leq t(2)$

where X_i = the radiance value of the f_i component of the current data vector.

f_i = the $i^{\underline{th}}$ channel value read from the FILTER parameter section of the CHANNELS control card.

t_i = the $i^{\underline{th}}$ user-supplied (the $i^{\underline{th}}$ parameter read off of the THRESHOLD control card) or default (t_1= 43.0, t_2 = 12.0) threshold value.

c. Two - the Tassel Cap filter will be applied to the raw or sun angle corrected data vectors before calculating the mean and covariance matrices.

The following transformation will be applied to each data vector before it is filtered.

$$\vec{Y} = \begin{pmatrix} Y_1 \\ Y_2 \\ Y_3 \\ Y_4 \end{pmatrix} = K \vec{X} + \vec{b}$$

where $\vec{Y}$ = transformed raw or sun angle corrected data vector,
$\vec{K}$ = the matrix input via cards or via the file, BMFILE,
$\vec{X}$ = the $f_1 \rightarrow f_4$ components of the raw or sun angle corrected data vector, and
$\vec{b}$ = tne user - supplied or default ($b_i = 0.0$) additive bias vector.

The data vector will be filtered if one of the following holds:

1. $Y_1 > t_1$
2. $Y_2 < t_2$
3. $Y_3 < t_3$
4. $Y_4 < t_4$
5. $Y_4 > t_5$

The default threshold values are $t_1 = 100.0$, $t_2 = 8.0$, $t_3 = 6.0$, $t_4 = 10.0$, and $t_5 = 35.0$

A.2.7 Flowchart

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A.3 SOFTWARE SUBPROGRAM NO. 3 (SUNF1)

The new subroutine SUNF1 is a modified version of the existing subroutine SUNFAC. While SUNFAC only returns the sun angle gain factors, SUNF1 returns both the sun angle gain and bias factors.

A.3.1 Linkages

SUNF1 is called by the LEARN subroutine.

A.3.2 Interfaces

SUNF1 does not make reference to any common blocks.

A.3.3 Inputs

The dimensioned variable SABIAS was added to the calling sequence.

The new calling sequence to SUNF1 is:

- Call SUNF1 (SUNCOR, SUNANG, FETVEC, NOFEAT, ISUNC, ISUNT, SABIAS)

Parameter	Dimension	In/Out	Definition
SUNCOR	1	Out	The sun angle gain factors that correspond to the input sun angles
SUNANG	1	In	Array of sun angles
FETVEC	1	In	Array of selected channels
NOFEAT	1	In	Number of input channels
ISUNC	1	In	Number of input sun angles
ISUNT	1	In	If ISUNT = 1, read the sun angles off of the tape; otherwise, do not.
SABIAS	1	Out	The sun angle bias factors that correspond to SUNANG

A.3.4 Outputs

There are two new line printer outputs:

a. The sun angle gain factors are:

   XXXXXX XXXXXX XXXXXX

b. The sun angle bias factors are:

   XXXXXX XXXXXX XXXXXX

A.3.5 Storage Requirements

DATA = 1326_8

CODE = 306_8

A.3.6 Description

SUNF1 will return the sun angle bias and gain factors that correspond to the input sun angle array.

A.3.7 Flowchart

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A.4 SOFTWARE SUBPROGRAM NO.4 (CLSSPC)

Several modifications were made to the existing CLSSPC subroutine as a result of the sun angle correction option.

A.4.1 Linkages

The subroutine LEARN calls CLSSPC by way of the entry points: CLSSPC, FLDSPC, and MULSPC.

A.4.2 Interfaces

CLSSPC references the GLOBAL common block.

A.4.3 Inputs

The flag SAKEY was added to the calling sequence. The new calling sequences are:

- Call CLSSPC (MEAN, SUBSTD, IDVEC, PTRVEC, PLOT, TITLE, NOFEAT, FETVEC, SPCBAS, SAKEY)
- Call FLDSPC (DMEAN, DEV, IDVEC, PTRVEC, PLOT, MEAN, SUBSTD, FLDNAM, NOFEAT, FETVEC, SPCBAS, SAKEY)
- Call MULSPC (MEAN, SUBSTD, JDVEC, PTRVEC, PLOT, NOFEAT, FETVEC, SPCBAS, SAKEY)

Parameter	Dimension	In/Out	Definition
MEAN	1	In	The mean vector(s)
SUBSTD	1	In	The standard deviation array(s)
DMEAN	1	In	MEAN is set equal to DMEAN
DEV	1	In	SUBSTD is set equal to DEV
IDVEC	1	In	The subclass name
PTRVEC	5	In	PTRVEC(1) = 1, PTRVEC(5) = 1 PTRVEC(2), (3), (4) = 0

Parameter	Dimension	In/Out	Definition
PLOT	(4,NOFEAT,49)	Out	The plot information array
TITLE	1	In	The subclass number
NOFEAT	1	In	The number of channels to be used
FETVEC	30	In	The array of selected channels
SPCBAS	1	In	The minimum radiance value on the Y-axis of the spectral plot
SAKEY	1	In	The flag to indicate if sun angle corrected data was used in the calculation of the mean and standard deviation
FLDNAM	FLDNAM is not used in CLSSPC		
JDVEC	1	In	The subclass name

A.4.4 Outputs

As a result of the sun angle option, MENLOW may be larger than MENHGH; therefore, if the above occurs, the following new message will be printed:

'IN CLSSPC, MENLOW IS GREATER THAN MENHGH - NO PLOTTING WILL BE DONE;

A.4.5 Storage Requirements

DATA = 312_8

CODE = 1353_8

A.4.6 Description

The purpose of CLSSPC is to print a spectral plot (may be composite) for the subclass and/or field indicated by the user. As a result of the sun angle correction option, the INCR and SPCBAS variables may be recomputed. If the flag SAKEY is on (i.e. = 1), the maximum of the input ($\mu+\sigma$) and the minimum of the input ($\mu - \sigma$) will be computed. If SPCBAS does not equal to -999, the user specified SPCBAS value will be used. If SPCBAS is equal to -999, MINV will be set equal to $\min_{k \varepsilon \text{ fields}} (\min_{j \varepsilon \text{ channels}}(\mu_{kj} - \sigma_{kj}))$.

The variable INCR will be set equal to $[\max(\max(\mu_{kj} + \sigma_{kj})) - \text{SPCBAS}]/49 + 1.0$.

The original CLSSPC was debugged in order to print the ERRLIN over the correct channel plot.

A.4.7 Flowchart

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APPENDIX B

APPENDIX B

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B.1 SOFTWARE SUBPROGRAM NO. 1 (DATATR)

The driver program for the Data Transformation processing, DATATR, was modified to optionally generate an nxn unitary matrix PCM when the PCGC flag is on. The PCM matrix will be used in the generation of the Principal Component Greenness (PCG) Image.

B.1.1 Linkages

DATATR is called by the LARSYS executive program, MONTOR.

The following subroutines may be called by DATATR: SETUP8, SETREM, KBTRAN, MAXMAT, TRHIST, LNTRAN, MTMLS6, MTMDAT, and the new subroutines GETGCV and PCMMAT.

B.1.2 Interfaces

DATATR references the INFORM, TRBLCK, and GLOBAL common blocks.

B.1.3 Inputs

The calling sequence to DATATR remains unchanged.

The calling sequence to KBTRAN has been changed to:

- Call KBTRAN (BMAT, LCOMB, ARRAY, LAM, MAX, MIN, CON, TRANSF, NSUB)

Two new calling sequences were added to the subroutine Data-Tr:

- Call GETGCV (SAVTAP, CP, NCHAN, GCOV)

This subroutine (which is similar to the existing subroutine GETST) will read the filtered raw or sun angle corrected data covariance matrix $\sum_x$ from SAVTAP if the PCGC flag is on,

- Call PCMMAT (T, PCM, T, R, LCOMB, ID).
  This new subroutine will output an unitary orthogonal matrix.

B.1.4 Output

If the column dimension of the 'B-MATRIX' is not equal to the row and column dimensions of the data covariance matrix $\sum_x$

read from SAVTAP, the following error message will be output: 'THE DIMENSION OF BMAT XXX AND DCOV XXX ARE NOT COMPATIBLE - CALL EXIT'.

B.1.5 Storage Requirements

DATA = 6032_8 CODE = 462_8

B.1.6 Description

As a result of declaring 'Array' real in the subroutine KBTRAN, the array NSUB (initialized by integer 'Array') will be formulated in DATATR instead of KBTRAN.

The following modifications will take place only if the PCGC flag is on (i.e., the OPTION PCG control card was read in SETUP8):

a. The subroutine GETGCV will pull the data covariance matrix (to be used in the PCG processing) off of the SAVTAP. The covariance matrix will have been calculated from filtered raw or sun angle corrected data vectors depending on the 'OPTION' and 'SUNANG' control cards input by the user during the STAT processor mode. $\sum_X$ will be pulled from the (STAFIL+1) file.

b. Before the mixture covariance matrix of the Green Image bands ($\sum_G$) is to be generated, the row and column dimensions (the row and the column dimensions should be equal) will be checked against the column dimension of the B-MATRIX. If these dimensions are not equivalent, the error message stated in the output section B.1.4 will be printed.

c. The subroutines MTMLS6 and MTMDAT will generate the GCOV matrix.

$$\sum_G = B \sum_X B^T$$

where Σ_G = mixture covariance matrix of the Green Image bands,

B = Transformation matrix in which each row contains the greenness vector. The matrix is to be input in the 'B-MATRIX' format,

Σ_X = The PCG data covariance matrix read off of SAVTAP, and

B^T = The transpose of B.

d. The subroutine PCMMAT will be called to operate on the matrix Σ_G. The program will in turn return an nxn unitary matrix PCM. The PCG Image will then be generated by applying the PCM matrix to the Green Image.

B.1.7 Flowchart

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B.2 SOFTWARE SUBPROGRAM NO. 2 (SETUP8)

The modifications to subroutine SETUP8 will result in the reading and decoding of the following additional and modified control cards:

a. TRFORM OUTPUT/UNIT=n, FILE=m

b. SUNANG n_1, n_2,...n_j

c. OPTION GREEN

d. OPTION PCG

e. SUNANG TAPE

The following flags will be set and used in the other subprograms. They are added to the labeled common block, TRBLCK.

a. PCF - flag indicating that the 'OPTION GREEN' and/or 'OPTION PCG' control card was read in.

b. SAKEY - sun angle key - if on, apply the sun angle gain, SAGAIN and sun angle bias, SABIAS correction factors obtained from the subroutine SUNF2.

c. PCGC - flag indicating that the 'OPTION PCG' control card was read in.

d. GIC - flag indicating that the 'OPTION GREEN' control card was read in.

The following variables have been added to the common blocks TRBLCK and GLOBAL to be referenced by the other subprograms:

a. SAGAIN - sun angle gain correction factor.

b. SABIAS - sun angle bias correction factor.

c. TRNSFL - the file number that the output transformed data is to be output on (default = 1).

d. PCM - an array that contains the nxn unitary matrix output by the subroutine PCMMAT. This array will be used in the generation of the'Principle Component Greenness' image.

e. NCHPAS - designates the number of channels per pass (default = 4).

B.2.1 Linkages

SETUP8 is called by the driver program for Data Transformation, DATATR. SETUP8 in turn calls the TAPHDR, PRTCOV, NXTCHR, FIND, BMFIL, NUMBER, ORDER, FLTNUM, CRDSTA, REDSAV, and WRTBM routines. If sun angle corrections for the Green Image and/or PCG Image Transformations were requested, a call will be made to the new subroutine, SUNF2.

SUNF2 will return the set of sun angle gain and bias correction factors to be used on each data channels input.

B.2.2 Interfaces

SETUP8 references the following common blocks: INFORM, GLOBAL, ISOLNK, and TRBLCK.

B.2.3 Inputs

The calling sequence to SETUP8 remains unchanged.

- NEW CONTROL CARDS

Keyword (col. 1)	Parameter (col. 11-72)	Function
OPTION	Green (Default - Green Image not generated for output)	The Green image will be generated and output.

Keyword (col .1)	Parameter (col. 11-72)	Function
OPTION	PCG (Default - no Principal Components Green Image output)	The PCG Image will be generated and output.
FORMAT	UNIVERSAL (Default - Universal)	The transformed data will be output in the Universal format.
FORMAT	LARSYS (Default - Universal)	The transformed data will be output in the LARSYS II format.
SUNANG	Tape (Default - no sun angle correction applied)	Sun angles will be extracted from the ERIPS "unload" MSS image tape.
SUNANG	$n_1, . . ., n_j$ (Default - no sun angle correction applied	n_i=sun angle for pass i, $1 \leq i \leq 8$. Sun angles are integer numbers, $5 \leq n_i \leq 85$.
TRFORM	OUTPUT/UNIT=N, FILE=M (Default - N=14 M=1)	N = the tape's Fortran logical unit number that the new image of transformed data is to be output on. M = the file number that the new image is to be output on. If both Greenness and PCG are requested, the former image will be output on file M and the latter image on file (M+1).

B.2.4 Outputs

Modification to SETUP8 will include the addition of the following error message:

a. If the B-MATRIX input flag BMTRIG is not on (=1), the error message will be:

   'The B-MATRIX CONTROL CARD WAS NOT FOUND - TERMINATE EXECUTION'.

   The line printer output will continue to list the (new) control cards read in by SETUP8.

B.2.5 Storage Requirements

DATA = 473_8 CODE = 2073_8

B.2.6 Description

The function of SETUP8 is to read and decode all of the input processor control cards as well as their parameters. The following modifications will be made:

a. The user will be able to specify on the new 'TRFORM' control card which unit number (default = 14) and file number (default = 1) are to be used for the output transformed image tape.

b. The user will be given the option of using raw or sun angle corrected data vectors in the transformation process depending on the absence or presence of the SUNANG control card. If the SUNANG control card was read in, the input 'MAXPT' vector will be sun angle corrected.

c. The user has the option of creating a Green Image and/or Principal Component Greeness (PCG) Image.

d. The transformed data will be output in the Universal format unless the LARSYS parameter is specified on the FORMAT control card.

e. If the Green Image and/or PCG Image is to be generated, the maximum dimension allowed for B-MATRIX is (n, n*k), where k = number of channels per pass and n = the number of passes and $n^2*k\leq 400$. The default number of channels per pass

(NCHPAS) is equal to 4. NCHPAS is set in the BLKCOM subroutine and included in the GLOBAL common block.

f. The statistical method will be performed if:

1. The 'MODULE FILE' and 'STATFILE' control cards are input

or 2. The 'MODULE CARDS' control card is input.

B.2.7 Flowchart

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B.2.8 Listing

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B.3 SOFTWARE SUBPROGRAM NO. 3 (KBTRAN)

The subroutine KBTRAN has been modified to test the new flags:

a. SAKEY - when it is on (SAKEY = 1), the channel-oriented sun angle correction bias and gain factors (obtained from the subroutine SUNF2) will be applied to the respective channel component of the mean vector and covariance matrix obtained from the subclasses statistics file, SAVTAP.

b. PCGC - when it is on (PCGC=1), the PCM array will be applied to the calculated MAX, MIN, and CON arrays to generate the PCG image's scaling parameters. These scaling parameters will be stored in the locations:

   BMAT (401) → BMAT (400 + 3 * LCOMB)

B.3.1 Linkages

Subprogram KBTRAN is called by the Data Transformation driver program, DATATR, when rescaling by the statistical method is requested by the user. KBTRAN calls the following subroutines: MATVEC, MTMLS6, MTMDAT, and PRTCOV.

B.3.2 Interfaces

The common blocks referenced by the KBTRAN subprogram are: INFORM, TRBLCK, GLOBAL, and COMBK4.

B.3.3 Inputs

The calling sequence for KBTRAN has been modified to:

- Call KBTRAN (BMAT, LCOMB, ARRAY, LAM, MAX, MIN, EPS, TRANSF, NSUB)

The explanation for adding the variable NSUB to the calling argument is found in section B.1.6 (DATATR-Description). 'ARRAY' was declared real as a result of the 'sun angle correction' option.

Parameter	Dimension	In/Out	Definition
BMAT	480	In	The transformation matrix array
LCOMB	1	In	The number of passes (linear combinations)
ARRAY	1	In	Array contains the mean and covariance matrices
LAM	1	In	An integer multiplied by the standard deviations of the input subclass statistics to derive an approximate range for rescaling the transformed data
MAX	16	Out	The maximum value for each pass
MIN	16	Out	The minimum value for each pass
EPS	16	Out	The array containing the computed 255/[max(I)-min(I)], I=1, . . . ,LCOMB
TRANSF	1	In	Flag to indicate if the transformed statistics is to be printed out
NSUB	75	In	The subclass name

B.3.4 Outputs

If the SAKEY is on:

a. The SAVTAP's mean vectors will be transformed using the sun angle correction factors, SAGAIN and SABIAS. The formula used is:

TM(I) = SAGAIN(I) * M(I) + SABIAS(I),

where TM(I) = Ith component (channel) of the sun angle corrected transformed mean vector,

SAGAIN(I) = Ith sun angle gain factor that relates to the Ith channel,

M(I) = Ith component (channel) of the mean vector from SAVTAP, and

SABIAS(I) = Ith sun angle bias factor that relates to the Ith channel.

b. The appropriate sun angle correction factors will be applied to the SAVTAP's covariance matrix, Σ_X, before transforming it to $B\Sigma_X B^T$, where B is the 'B-MATRIX' which contains the Kauth Greenness vectors and B^T is the transpose of B. The formula used on each component of Σ_X is:

TCOV(I,J) = SAGAIN(I) * COV(I,J) * SAGAIN(J)

where TCOV(I,J) = sun angle corrected transformed (I,J)th component of the SAVTAP's covariance matrix Σ, I, J = 1, . . . , NOFEAT, SAGAIN(I) = Ith sun angle gain factor that relates to channel I.

SAGAIN(J) = J-th sun angle gain factor that relates to channel J, and

COV,(I,J) = (I,J)th component of the SAVTAP's covariance matrix.

B.3.5 Storage Requirements

DATA = 4661_8 CODE = 1106_8

B.3.6 Description

If the SAKEY flag is on, the sun angle correction bias and gain factors will be applied to the corresponding component of the SAVTAP mean vector and covariance matrix.

A check to see if each component of the MAX vector is greater than or equal to the corresponding component of the MIN vector was initialized as a result of the 'sun angle correction' option being performed on the mean and covariance arrays. If the above test fails, the corresponding MAX and MIN components will be interchanged before generating the EPS vector.

If the PCGC flag is on (i.e. the 'OPTION PCG' control card was read in SETUP8), the matrix array PCM (output from the PCMMAT subroutine) will be applied to the calculated Green Image's MAX_G (=MAX), MIN_G(=MIN), and CON_G(=EPS) vectors to obtain the PCG

B.3.4 Outputs

If the SAKEY is on:

a. The SAVTAP's mean vectors will be transformed using the sun angle correction factors, SAGAIN and SABIAS. The formula used is:

TM(I) = SAGAIN(I) * M(I) + SABIAS(I),

where TM(I) = Ith component (channel) of the sun angle corrected transformed mean vector,

SAGAIN(I) = Ith sun angle gain factor that relates to the Ith channel,

M(I) = Ith component (channel) of the mean vector from SAVTAP, and

SABIAS(I) = Ith sun angle bias factor that relates to the Ith channel.

b. The appropriate sun angle correction factors will be applied to the SAVTAP's covariance matrix, Σ_X, before transforming it to $B\Sigma_X B^T$, where B is the 'B-MATRIX' which contains the Kauth Greenness vectors and B^T is the transpose of B. The formula used on each component of Σ_X is:

TCOV(I,J) = SAGAIN(I) * COV(I,J) * SAGAIN(J)

where TCOV(I,J) = sun angle corrected transformed (I,J)th component of the SAVTAP's covariance matrix Σ , I, J = 1, . . . , NOFEAT, Image's scaling parameters, MAX_P, MIN_P, and CON_P.

The PCG Image's

a. MAX_P vector (PCM * MAX_G) will be stored in locations BMAT (401) → BMAT (401 + LCOMB-1).

b. MIN_P vector (PCM * MIN_G) will be stored in locations BMAT (401 + LCOMB) → BMAT (401 + 2 * LCOMB-1).

c. CON_P vector (PCM * CON_G) will be stored in locations BMAT (401 + 2 * LCOMB) → BMAT (401 + 3 * LCOMB-1).

B.3.7 Flowchart

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B.4 SOFTWARE SUBPROGRAM NO. 4 (TRHIST)

The following modifications to TRHIST will be performed if the PCGC flag is on (i.e. the 'OPTION PCG' control card was read in SETUP8):

a. The scaling parameters, MAX, MIN, and CON, obtained from the histogram of the transformed data will be multiplied by the PCM matrix array. The resulting vectors will be the PCG Image's scaling parameters, MAX_P, MIN_P, and CON_P.

b. The PCG Image's scaling parameters will be stored in BMAT's scratch storage locations: BMAT (401) → BMAT (401 + 3 * LCOMB-1).

B.4.1 Linkages

The driver program DATATR calls TRHIST when the user specifies rescaling by the histogram method.

TRHIST calls the following subroutines and/or function: LAREAD, TAPHDR, SQRT, FLDINT, LINERD, FDLINT, TRANSF, and MATVEC.

B.4.2 Interfaces

TRHIST references the following common blocks: INFORM, TRBLCK, COMBK4, and GLOBAL.

B.4.3 Inputs

The calling sequence to TRHIST remains unchanged.

Since TRANSF was changed from a 'subroutine' to a 'function', the calling sequence to TRANSF is:

- XT(J) = TRANSF (BMAT, IDATA, TOP, J, K, LCOMB, NSAMP, BIAS)

B.4.4 Outputs

There is no line printer output.

B.4.5 Storage Requirements

DATA = 242_8 CODE = 1247_8

B.4.6 Description

TRHIST will obtain the scaling parameters, MAX, MIN, and CON for the transformed data from the histogram of the transformed data of the first field of a set of fields.

Since the 'MAXPT' values may undergo a 'sun angle correction' transformation, a test to check the max and min vectors was initiated. If the current component of the MAX vector is not greater than or equal to the corresponding MIN component, the two values will be interchanged.

If the PCGC flag is on (i.e. the 'OPTION PCG' control card was read in SETUP8), the matrix array PCM (output from the subroutine PCMMAT) will be applied to the Green Image's scaling parameters MAX_G (=MAX), MIN_G(=MIN), and CON_G (=CON).
The PCGC Image's scaling parameters:

a. MAX_P (PCM * MAX_G) will be stored in locations BMAT (401) → BMAT (401 + LCOMB-1).

b. MIN_P (PCM * MIN_G) will be stored in locations BMAT (401 + LCOMB) → BMAT (401 + 2 * LCOMB-1).

c. CON_P (PCM * CON_G) will be stored in locations BMAT (401 + 2 * LCOMB) → BMAT (401 + 3 * LCOMB-1).

B.4.7 Flowchart

Appendix D

B. 4. 8 Listing

Appendix F

B.5 SOFTWARE SUBPROGRAM NO. 5 (PCMMAT)

The new subroutine PCMMAT was originally programmed for execution under EXEC8 by W. L. Morris, C. L. Wiginton, and D. K. Lowell (University of Houston Mathematics Department). The revised subroutine has been incorporated in the Data Transformation subroutine PCMMAT. PCMMAT operates on a real symmetric matrix A to produce an orthogonal matrix of approximate eigenvectors of A. For the Principal Component Greenness (PCG) transformation, the symmetric matrix is the mixture covariance matrix of the green bands (Σ_G) and the output orthogonal matrix is PCM. The n x n (n = LCOMB = row dimension of Σ_G) unitary matrix PCM will have its ith column correspond to the ith largest normalized eigenvector of Σ_G . The resulting components of PCM will be approximate eigenvalues (i.e. the error bounds will be between $\pm$ 0.000005) of Σ_G . In the present context,

$$\Sigma_G = B \; \Sigma_X \; B^T$$

where Σ_G = mixture covariance matrix of the green bands.

B = BMAT = matrix in which each row contains the greenness vector.

Σ_X = the filtered raw or sun angle corrected data covariance matrix calculated in STAT.

B.5.1 Linkages

PCMMAT is called by DATATR.

PCMMAT references the following new external subroutines and function: MINDEX, SUPSUM ORD1, and PCMAML. The SQRT routine is also referenced.

B.5.2 Interfaces

PCMMAT does not reference any common blocks. The interface with the calling program is by means of the calling sequence.

B.5.3 Inputs

The calling sequence to PCMMAT is:

Call PCMMAT (T, PCM, C, R, N, ID)

Parameter	Dimension	In/Out	Definition
T	(ID)	IN	A symmetric lower triangular real matrix array (for PCG transformation processing, T = the lower traingular section of $\sum_G$, the mixture covariance matrix of the green image bands).
PCM	(49)	OUT	An unitary orthogonal matrix of normalized eigenvectors of T.
C	N	OUT	Vectors of centers of Weinstein discs.
R	N	OUT	Vector of radii of Weinstein discs.
N	1	IN	The row and column dimension of T (for $\sum_G$, N=LCOMB=number of LANDSAT Passes).
ID	1	IN	The dimension of the input T array. $ID = \frac{N(N+1)}{2}$

B.5.4 Outputs

The orthogonal unitary matrix array PCM is returned to the calling subroutine DATATR, via calling argument.

The vector of eigenvalues and radii will be printed along with the transpose of the unitary matrix, PCM.

B.5.5 Storage Requirements

DATA = 1703_8 CODE = 1540_8

B.5.6 Description

PCMMAT proceeds through an iterative algorithm to produce the output orthogonal matrix PCM. PCM, which is composed of approximate eigenvectors of Σ_G is formulated by calling the following external subroutines and function:

a. MINDEX - selects the order of operations within PCMMAT.

b. ORD1 - reorders the components of the input vector into ascending order.

c. SUPSUM - adds the components of the reordered vector from ORD1.

d. PCMAML - computes the matrix products.

The relative error allowed in the approximate eigenvalues of Σ_G is set to 0.000005.

Before the final PCM matrix array is printed, the first row will be checked for concavity. If $(P_{1,1} + P_{1,N})/2 > (P_{1,2} + \cdots + P_{1,N-1})/N-2$, $P_{1,i} = - P_{1,i}$, for $i = 1, \cdots, N$. The $P_{1,i}$'s are the components from the first PCM column.

B.5.7 Flowchart

Appendix D

B.5.8 Listing

Appendix F

B.6 SOFTWARE SUBPROGRAM NO. 6 (TRANSF)

The calling sequence to TRANSF has been modified to exclude the XT variable. TRANSF has been changed from a subroutine to a function. The internal variable XT will be set equal to TRANSF. The flag SAKEY will be tested to determine if the input raw data vector, IDATA is to be sun angle corrected before performing the data transformation calculation.

B.6.1 Linkages

TRANSF is called by either the subroutines TRHIST and/or LNTRAN. TRANSF does not call any subroutine.

B.6.2 Interfaces

TRANSF refers to the TRBLCK common block.

B.6.3 Inputs

The calling sequence to TRANSF is:

- XT(J)=TRANSF (BMAT, IDATA, TOP, IL, K, LCOMB, NSAMP, BIAS).

Parameter	Dimension	In/Out	Definition
BMAT	480	IN	The matrix, which is stored in the 'B-MATRIX' format, to be used in the transformation process.
IDATA	TOP	IN	The input raw data vector to be transformed.
TOP	1	IN	The maximum usable locations in the array IDATA.
IL	1	IN	The component of the transformed data vector that will be generated.

Parameter	Dimension	In/Out	Definition
K	1	IN	The current sample pixel being processed.
LCOMB	1	IN	The number of linear combinations or passes to be used in the calculation.
NSAMP	1	IN	The number of sample data vectors to be transformed.
BIAS	16	IN	The bias vector to be used in the data-transformation process.

B.6.4 Outputs

There is no line printer output. The value of the IL-th component of the transformed data vector (XT) will be returned in the function name TRANSF.

B.6.5 Storage Requirements

DATA = 27_8 CODE = 135_8

B.6.6 Description

The flag SAKEY will be tested in the function TRANSF to determine if the input raw data vector is to be sun angle corrected or not. If the flag was turned on (i.e. SAKEY = 1), the following transformation will take place before the existing data transformation process:

TDATA = SAGAIN(I) * IDATA(L) + SABIAS(I)

where TDATA = the sun angle corrected I-th channel component of the current data vector,

SAGAIN(I) = the sun angle gain correction factor for the I-th channel, IDATA(L) = the I-th channel component $\left(\frac{L \quad +1}{NSAMP+1}\right)$ of the current data vector

NSAMP = the number of sample data vectors (for the current scan line) that needs to be transformed, and

SABIAS(I) = the sun angle bias correction factor for the I-th channel.

If the SAKEY was not on (i.e. SAKEY = 0), the raw data vector, IDATA, will be used in the data transformation formula:

XT = IDATA * BMAT + BIAS

If the SAKEY was turned on (i.e. SAKEY = 1), the sun angle corrected data vector, TDATA, will be used in the transformation formula:

XT = TDATA * BMAT + BIAS

Before returning to the calling subroutine, TRANSF will be set equal to XT.

B.6.7 Flowchart

Appendix D

B.6.8 Listing

Appendix F

B.7 SOFTWARE SUBPROGRAM NO. 7 (LNTRAN)

The modifications to be made to the subroutine LNTRAN will enable the user to generate and output a 'Green' and/or 'Principal Component Greeness' (PCG) Image. The decision on whether these images are to be generated and output will depend on the new flags PCGC (turned on when the OPTION PCG control card was read in SETUP8) and GIC (turned on when the OPTION GREEN control card was read in SETUP8).

B.7.1 Linkages

LNTRAN may call the following subroutines: TAPHDR, LAREAD, FLDINT, WRTHDR, LINERD, FDLINT, TRANSF, WRTLIN, NTRAN, COMHST, and MATVEC.

LNTRAN is called by the driver program of Data Transformation, DATATR.

B.7.2 Interfaces

LNTRAN references the following common blocks: INFORM, TRBLCK, COMBK4, and GLOBAL.

B.7.3 Inputs

The calling sequence to LNTRAN remains unchanged.

B.7.4 Outputs

The user will be able to generate and output a Green and/or PCG Image depending on the value of the flags GIC and PCGC.

If Green or PCG Image is requested, the transformed data set will be output on the default (Fortran unit 14, file = 1) or user-specified tape unit and file number.

If both images are requested, the Green Image will be output on the default or user-specified file number and the PCG Image will be output on the following file.

The heading 'Green Image', 'PCG Image', or 'Transformed Image' will be printed before the respective image is output.

B.7.5 Storage Requirements

DATA = 21350_8 CODE = 3256_8

B.7.6 Description

If the GIC flag is on (GIC=1), the scaling parameters MAX, MIN, and CON derived from the histogram of the 'Green Image' will be used in the transforming, rescaling, and histogramming processes of the data vectors.

If the PCGC flag is on (PCGC=1), the scaling parameters (derived from the histogram of 'PCG' Image) stored in locations BMAT (401) → BMAT (400 + 3 * LCOMB) will be used in the processes of transforming, rescaling, and histogramming the data vectors. Recall that the MAX vector is stored in locations BMAT (401)→BMAT(400 + LCOMB), the MIN vector in locations BMAT (401 + LCOMB) → BMAT (400 + 2 * LCOMB), and the CON vector in locations BMAT (401 + 2 * LCOMB) → BMAT (401 + 3 * LCOMB).

Since different sun angle correction transformations were performed earlier, a test to check the MAX against the MIN vector was initiated. If a component of the MAX vector is less than the corresponding MIN component, the two values will be interchanged.

If the PCGC flag is on, the matrix PCM will be applied to the transformed data vectors output from the function TRANSF.

The transformed data vectors will be compared against $\pm$ 3000 if the user had requested the sun angle correction option and no rescaling of the transformed data.

B.7.7 Flowchart

Appendix D

B.7.8 Listing

Appendix F

B.8 SOFTWARE SUBPROGRAM NO. 8 (GETGCV)

The existing subroutine GETST was modified to create the new subroutine GETGCV. The sole purpose of GETGCV is to read one covariance matrix from SAVTAP.

B.8.1 Linkages

GETGCV is called by the DATA-TR subroutine.

B.8.2 Interfaces

GETGCV does not reference any common blocks.

B.8.3 Inputs

The calling sequence to GETGCV is:

- Call GETGCV (UNIT, FILE, NCHAN, COVAR)

Parameter	Dimension	In/Out	Definition
UNIT	1	IN	The fortran unit number from which the covariance matrix is to be read from
FILE	1	IN	The file number on 'UNIT' from which the covariance matrix is to be read from
NCHAN	1	IN	The number of channels requested from the training segment
COVAR	465	OUT	The covariance matrix array retrieved from the input unit and file number

B.8.4 Outputs

If the tape drive cannot position the tape to the requested file, the following error message will appear:

'ERROR IN POSITIONING UNIT XXX TO
FILE XXX'

The run will be terminated after the above message has been printed.

B.8.5 Storage Requirements

DATA = 103_8 CODE = 156_8

B.8.6 Description

The purpose of the new subroutine GETGCV is to retrieve the mixture covariance matrix from the requested file and unit number. This matrix generated in STAT, will be used in the transformation process to create an unitary matrix PCM. PCM will be used to generate the 'Principal Component Greenness' image.

B.8.7 Flowchart

Appendix D

B.8.8 Listing

Appendix F

B.9 SOFTWARE SUBPROGRAM NO. 9 (SUNF2)

The new subroutine SUNF2 is a modified version of the existing subroutine SUNFAC. While SUNFAC only returns the sun angle gain factors, SUNF2 returns both the sun angle gain and bias factors.

B.9.1 Linkages

SUNF2 is called by the SETUP8 subroutine.

B.9.2 Interfaces

SUNF2 does not make reference to any common blocks.

B.9.3 Inputs

The dimensioned variable SABIAS was added to the calling sequence.

The new calling sequence to SUNF2 is:

- Call SUNF2 (SUNCOR, SUNANG, FETVEC, NOFEAT, ISUNC, ISUNT, SABIAS)

Parameter	Dimension	In/Out	Definition
SUNCOR	1	OUT	The sun angle gain factors that correspond to the input sun angles
SUNANG	1	IN	Array of sun angles
FETVEC	1	IN	Array of selected channels
NOFEAT	1	IN	Number of input channels
ISUNC	1	IN	Number of input sun angles
ISUNT	1	IN	If ISUNT = 1, read the sun angles off of the tape, otherwise, do not.
SABIAS	1	OUT	The sun angle bias factors that correspond to the input sun angles.

B.9.4 Outputs

There are two new line printer outputs:

a. The sun angle gain factors are:

   XXXXXX XXXXXX . . . XXXXXX

b. The sun angle bias factors are:

   XXXXXX XXXXXX . . . XXXXXX

B.9.5 Storage Requirements

DATA = 1326_8

CODE = 306_8

B.9.6 Description

SUNF2 will return the sun angle bias and gain factors that correspond to the input sun angle array.

B.9.7 Flowchart

Appendix D

B.9.8 Listing

Appendix F

B.10 SOFTWARE SUBPROGRAM NO. 10 (PCMAML)

The new subroutine PCMAML performs the multiplication operation on the two input matrices, A and X.

B.10.1 Linkages

PCMAML is called by PCMMAT.

PCMAML references the new function, SUPSUM.

B.10.2 Interfaces

PCMAML does not reference any common blocks.

B.10.3 Inputs

The calling sequence to PCMAML is:

- PCMAML (A, X, B, I, J, K, NA, NX, NB)

Parameter	Dimension	In/Out	Definition
A	(NA, NX)	IN	The matrix to be used in the multiplication process.
X	(NX, NB)	IN	The other matrix to be used in the multiplication process.
B	(NA, NB)	OUT	The matrix generated from A*X.
I	1	IN	The number of rows in A
J	1	IN	The number of columns in A and rows in X
K	1	IN	The number of columns in X
NA	1	IN	NA=16
NX	1	IN	NX=16
NB	1	IN	NB=16

B.10.4 Outputs

There is no line printer output

B.10.5 Storage Requirements

DATA = 354_8

CODE = 161_8

B.10.6 Description

A work vector, P, is initialized each time a row of A is multiplied by a column of X. For row L of A and column M of X, the P vector will be equal to:

$$P = \begin{pmatrix} A(L,1) * X\ (1,M) \\ A(L,2) * X\ (2,M) \\ \cdot \\ \cdot \\ \cdot \\ A(L,J) * X\ (J,M) \end{pmatrix}.$$

The function SUPSUM will then be referenced to form the ordered sum of elements in P.

B.10.7 Flowchart

Appendix D

B.10.8 Listing

Appendix F

B.11 SOFTWARE SUBPROGRAM NO. 11 (SUPSUM)

The new function SUPSUM returns the ordered sum of the input vector, A.

B.11.1 Linkages

SUPSUM is called by the new subroutines PCMMAT and PCMAML. SUPSUM calls the new subroutine ORD1.

B.11.2 Interfaces

SUPSUM does not reference any common blocks.

B.11.3 Inputs

The calling sequence to function SUPSUM is:

X = SUPSUM (A, I, N)

Parameter	Dimension	In/Out	Definition
A	N	In	The vector that will be ordered and summed up.
I	1	IN	The ending position in A to sum to
N	1	IN	The size of A

B.11.4 Outputs

There is no line printer output.

B.11.5 Storage Requi ~ments

DATA = 23_8

CODE = 132_8

B.11.6 Description

The input vector A goes through an ordering process in ORD1. After the components of A are placed in ascending order, they are then summed up to the Ith position in A.

B.11.7 Flowchart

Appendix D

B.11.8 Listing

Appendix F

B.12 SOFTWARE SUBPROGRAM NO. 12 (MINDEX)

The output vector JM will contain the indices that correspond to the R vector after R has been placed in ascending order.

B.12.1 Linkages

MINDEX is called by the new subroutine PCMMAT.

B.12.2 Interfaces

MINDEX does not reference any common blocks.

B.12.3 Inputs

The calling sequence to MINDEX is:

- Call MINDEX (R, JM, IM, N)

Parameter	Dimension	In/Out	Definition
R	N	IN	The input vector of values
JM	N	IN/OUT	The vector of length N whose elements have been initialized to JM(J)=J, J=1,•••,N.
IM	1	IN	The position (index) of place to begin the scan in R.
N	1	IN	The maximum size of R and JM.

B.12.4 Outputs

There is no line printer output.

B.12.5 Storage Requirements

DATA = 23_8

CODE = 77_8

B.12.6 Description

The new subroutine MINDEX will go through a search process in order to place the index of the smallest value in R into JM(1), the next smallest in JM(2), etc. The last value, JM(N) will contain the index of the largest value in R.

B.12.7 Flowchart

Appendix D

B.12.8 Listing

Appendix F

B.13 SOFTWARE SUBPROGRAM NO. 13 (ORD1)

The new subroutine ORD1 will reorder the input vector into ascending order.

B.13.1 Linkages

ORD1 is called by the new function SUPSUM

B.13.2 Interfaces

ORD1 does not reference any common blocks.

B.13.3 Inputs

The calling sequence to ORD1 is:

- Call ORD1 (A, I1, I2, N)

Parameter	Dimension	In/Out	Definition
A	N	IN/OUT	The vector to be ordered in ascending order.
I1	1	IN	The position in A to begin the ordering process.
I2	1	IN	The position in A to end the ordering process.
N	1	IN	The maximum length of vector A

B.13.4 Outputs

There is no line printer output

B.13.5 Description

The subroutine ORD1 will reorder the input vector A and place the results back in A. The components in the output vector A will be in ascending order.

B.13.6 Storage Requirements

DATA = 21_8

CODE = 132_8

B.13.7 Flowchart

Appendix D

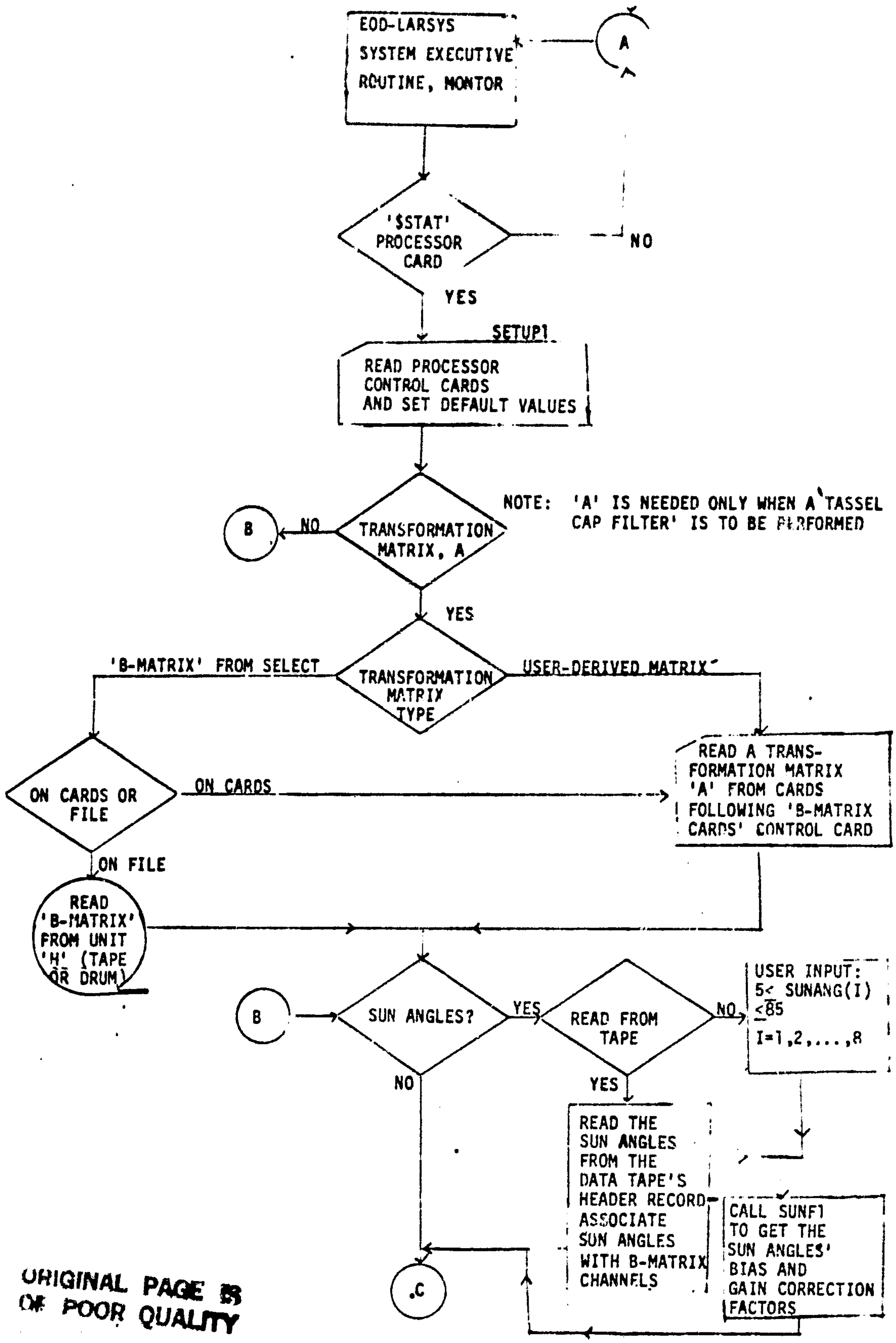
B.13.8 Listing

Appendix F

APPENDIX C

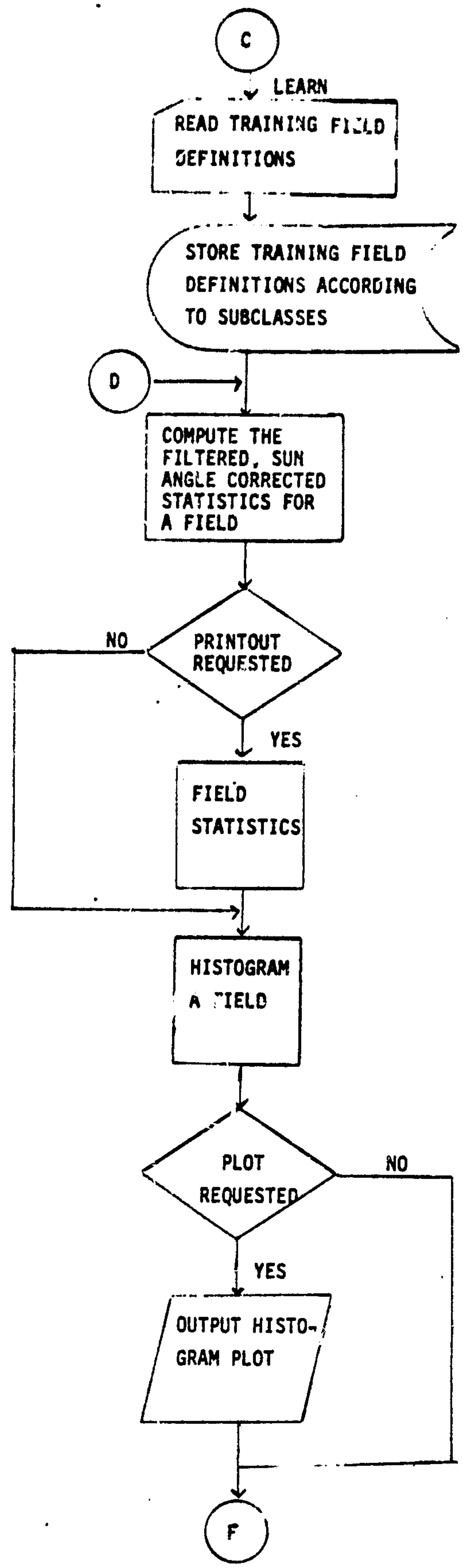
FUNCTIONAL FLOWCHART - STAT PROCESSOR

STAT PROCESSOR

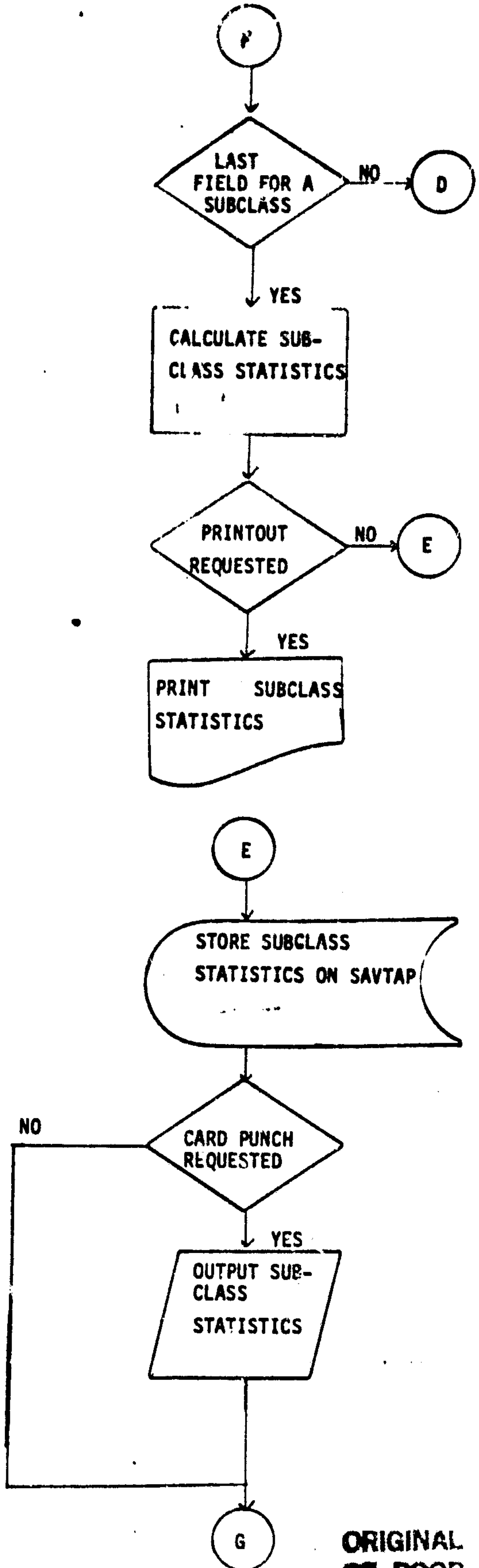


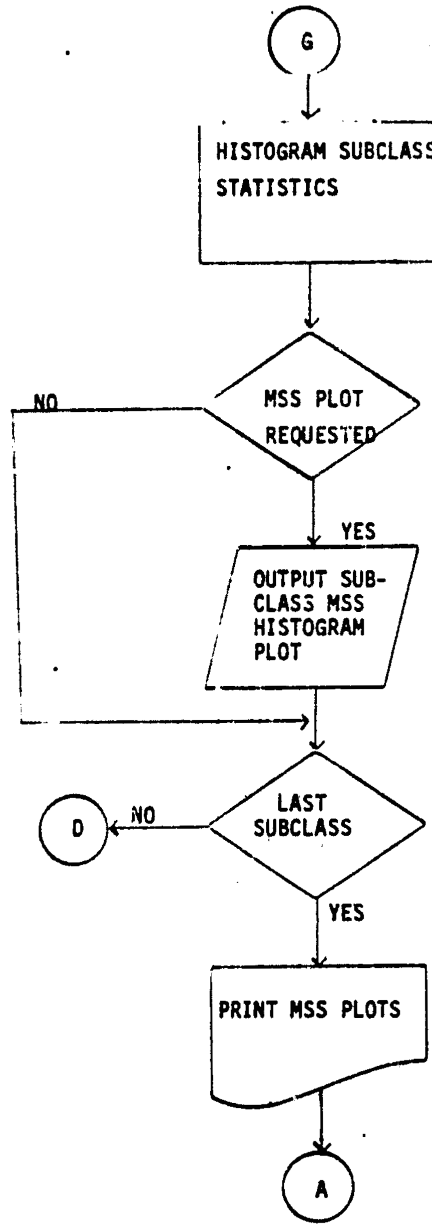
ORIGINAL PAGE IS OF POOR QUALITY

~~C-I~~



ORIGINAL PAGE IS
OF POOR QUALITY


LAST FIELD FOR A SUBCLASS
NO
D
YES
CALCULATE SUB-CLASS STATISTICS
PRINTOUT REQUESTED
NO
E
YES
PRINT SUBCLASS STATISTICS
E
STORE SUBCLASS STATISTICS ON SAVTAP
CARD PUNCH REQUESTED
NO
YES
OUTPUT SUB-CLASS STATISTICS
G


G
HISTOGRAM SUBCLASS STATISTICS
MSS PLOT REQUESTED
NO
YES
OUTPUT SUB-CLASS MSS HISTOGRAM PLOT
LAST SUBCLASS
NO
D
YES
PRINT MSS PLOTS
A

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APPENDIX D

LISTINGS - STAT PROCESSOR
(MONTOR IS INCLUDED)

```
0016     _TRPL
0017     DOTDAT
0020     NERR2$
0021     NWDUS
0022     N102$
0023     NREWS
0024     NSTOP$

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

0001  000006 10L     0001  000121 100I    0030  000030 110F    0001  000133 120L    0000  000034 130F
0001  000151 140L    0000  000043 150F    0001  000143 160L    0000  000050 170F    0001  000201 175L

0000   000057 176F      0001   000213 180I      0000   000067 190F      0001   000041 20L      0001   000231 200L
0000   000077 213F      0001   000247 220L      0000   000107 230F      0001   000265 240L     0000   000117 250F
0001   000303 260L      0000   000127 270F      0001   000307 280L      0000   000004 30F      0001   000057 40L
0000   000011 50F       0001   000075 60L       0000   000016 70F       0001   000107 80L      0000   000023 90F
0002 I 000000 ARRAY     0003   000073 ASAV      0003   000074 ASAVFL    0003   000055 BMFILE   0003   000056 BMKEY
0003   000053 DATAPE    0003   000071 DATFIL    0000 I 000001 DBUG      0003   000102 DOTFIL   0003   000101 DOTUNT
0003 I 000067 DRMWDS    0003 I 000066 DRUMAD    0003   000062 ERIPTP    0003   000063 ERPKEY   0003   000000 HEAD
0003   000057 HISFIL    0003   000060 HISKEY    0000 I 000002 J60       0003   000100 MAPFIL   0003   000052 MAPTAP
0003 I 000064 MAPUNT    0003   000076 NHSTFI    0003   000075 NHSTUN    0003 I 000065 NOFILE   0003   000070 PAGSIZ
0003   000054 SAVTAP    0003   000077 SCTRUN    0003   000072 STAFIL    0000 I 000003 TIME     0000 I 000000 TOP
0003   000061 TRFORM

00100      1*     C      //MONTOR                                                      MONT0000
00100      2*     C                                                                    MONT0010
00100      3*     C!--------------------------------------------------------------------!MONT0020
00100      4*     C!                                                                   !MONT0030
00100      5*     C!     CALL..     SYSTEM MONITOR  (// EXEC  LARSYSAA )                !MONT0040
00100      6*     C!                                                                   !MONT0050
00100      7*     C!     PURPOSE.. MONITORS THE VARIOUS SYSTEM SUPERVISORS              !MONT0060
00100      8*     C!                                                                   !MONT0070
00100      9*     C!               ROUTINES MSCAN   CLSFY  DSPLAY  STAT
00100     10*     C!                        SELECT  HIST   GRAYMP  DATATR
00100     11*     C!                        ISOCLS
00100     12*     C!                                                                   !MONT0110
00100     13*     C!     RETURNS.. NONE                                                 !MONT0120
00100     14*     C!                                                                   !MONT0130
00100     15*     C!--------------------------------------------------------------------!MONT0140
00100     16*     C                                                                    MONT0150
00100     17*     C                                                                    MONT0160
00101     18*            IMPLICIT INTEGER(A-H,O-Z)                                     MONT0170
00103     19*            COMMON ARRAY                                                  MONT0180
00104     20*            DIMENSION ARRAY(10600)
00104     21*     C.
00104     22*     C.     'ARRAY' IS A BLOCK OF STORAGE PASSED TO EACH PROCESSOR FOR THE
00104     23*     C.     VARIABLE DIMENSIONING OF OTHER ARRAYS. THE ARRAY IS NEVER USED
00104     24*     C.     TO PASS INFORMATION  FROM ONE PROCESSOR TO ANOTHER.
00104     25*     C.
00105     26*            DATA TOP/10600/
00107     27*            INCLUDE COMBK6,LIST
00107     28*     C                                                                    MONT0230
00107     29*     C                                                                    MONT0240
00110     29*            COMMON/GLOBAL/HEAD(42),MAPTAP,DATAPE,SAVTAP,BMFILE,BMKEY,
00110     29*           *          HISFIL,HISKEY,TRFORM,ERIPTP,ERPKEY,MAPUNT,NOFILE,
00110     29*           *   DRUMAD,DRMWDS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
00110     29*           *  ,NHSTUN,NHSTFI,SCTRUN,MAPFIL
00110     29*           *   ,DOTUNT,DOTFIL
00111     29*            END
00112     30*            INCLUDE COMNT6,LIST
00112     30*     C.
00112     30*     C.     GLOBAL COMMON IS USED IN EVERY PROCESSOR. IT IS ALWAYS IN CORE.
00112     30*     C.     ALL PARAMETERS ARE INITIALIZED IN THE MONITOR ROUTINE OR BLKCOM
00112     30*     C.     EXCEPT AS NOTED BELOW
00112     30*     C.     DEFINITIONS
00112     30*     C.         HEAD   - STANDARD HEADING PRINTED ON MOST OUTPUT PAGES.
00112     30*     C.         MAPTAP - FORTRAN UNIT NUMBER ON WHICH THE MAPTAP FILE IS
```

```
00112    30.   C.            WRITTEN (=2)
00112    30.   C.     DATAPE = UNIT NO. FOR THE IMAGE DATA TAPE (=3)
00112    30.   C.     SAVTAP = UNIT NO. ON WHICH THE STATISTICS FILE IS WRITTEN (=1
00112    30.   C.     BMFILE = UNIT NO. ON WHICH THE B-MATRIX FILE IS WRITTEN (=10)
00112    30.   C.     BMKEY  = TRIGGER INDICATING THAT THE B-MATRIX FILE HAS BEEN
00112    30.   C.              WRITTEN. CAN BE SET IN SELECT CLASSIFY OR DATA-TR.
00112    30.   C.     HISFIL = UNIT NO. ON WHICH THE HISTOGRAM FILE IS WRITTEN (=13)
00112    30.   C.     HISKEY = TRIGGER INDICATING THE HISTOGRAM FILE HAS BEEN
00112    30.   C.              WRITTEN. SET IN HIST PROCESSOR.
00112    30.   C.     TRFORM = UNIT NO. ON WHICH THE TRANSFORMED IMAGE IS WRITTEN BY
00112    30.   C.              THE DATA-TRANSFORMATION PROCESSOR. (=14)
00112    30.   C.     ERIPTP = UNIT NO. ON WHICH THE ISOCLS PROCESSOR WRITES
00112    30.   C.              CLUSTER STATISTICS FOR THE ERIPS SYSTEM. (=16)
00112    30.   C.     ERPKEY = TRIGGER INDICATING THAT THE ERIPS INTERFACE TAPE
00112    30.   C.              HAS BEEN WRITTEN.
00112    30.   C.     MAPUNT = UNIT NO. ON WHICH THE ISOCLS OR DISPLAY PROCESSOR
00112    30.   C.              WRITES THE CLUSTERED OR CLASSIFIED DATA
00112    30.   C.           TO BE DISPLAYED ON THE PMIS DAS
00112    30.   C.     NOFILE = NO. OF FILES WRITTEN ON UNIT 16 (MAP OUTPUT TAPE)
00112    30.   C.              BY DISPLAY AND/OR ISOCLS
00112    30.   C.              SET EITHER IN ISOCLS OR DISPLAY.
00112    30.   C.     DRUMAD = BEGINNING ADDRESS FOR THE RANDOM ACCESS HIGH SPEED
00112    30.   C.              DRUM FILE. THIS FILE IS USED AS A SCRATCH FILE IN
00112    30.   C.              SEVERAL PROCESSORS. REFERENCES TO SYSTEM ROUTINES
00112    30.   C.              'RREAD' AND 'RWRITE' ACCESS THIS FILE.
00112    30.   C.     DRMWDS = NO. OF WORDS AVAILABLE ON THE RANDOM ACCESS FILE.
00112    30.   C.     PAGSIZ = NO. OF LINES AVAILABLE FOR PRINTING ON A PAGE.
00112    30.   C.     DATFIL = NO. OF E-O-F'S TO BE READ OVER BY TAPERD ROUTINE IN
00112    30.   C.              ORDER TO POSITION THE DATA TAPE TO DESIRED FILE
00112    30.   C.     STAFIL = NO. OF E-O-F'S TO SKIP OVER TO POSITION STAT FILE')
00112    30.   C.       ASAV = UNIT NO. ON WHICH TRSTAT WRITES THE TRANSFORMED
00112    30.   C.              STATS
00112    30.   C.     ASAVFL = NO. OF E-O-F'S TI SJIP OVER TO POSITION TRANSFORMED
00112    30.   C.              STATS
00112    30.   C.     DOTUNT = UNIT NO. ON WHICH DOT DATA FILE (DOTFIL) IS WRITTEN
00112    30.   C.     DOTFIL = NO. OF E-O-F S TO SKIP OVER TO POSITION DOTFIL FILE
00113    30.          END
00114    31.          DBUG=-1                                                          MONT0250
00114    32.   C.
00114    33.   C.     SYSTEM ROUTINE RINIT ASSIGNS THE RANDOM ACCESS DRUM FILE.
00114    34.   C.
00114    35.   C.          -DRUMAD-- IS THE ADDRESS TO BEGIN WRITING
00114    36.   C.          -DRMWDS- IS THE NO. OF WORDS AVAILABLE ON THE DRUM FILE.
00114    37.   C.
00114    38.   C.     THE FOLLOWING PROCESSORS USE THE RANDOM ACCESS DRUM FILE FOR SCRATCH
00114    39.   C.          -ISOCLS-
00114    40.   C.          -DISPLY-
00114    41.   C.          -SELECT-
00114    42.   C.
00114    43.   C.          -GRAYMP-
00114    44.   C.          -SIGEXT-
00114    45.   C.
00115    46.          CALL RINIT(DRUMAD,DRMWDS)
00116    47.       10 CONTINUE                                                         MONT0270
00117    48.          CALL RESET                                                       MONT0280
00120    49.          CALL MSCAN(JGO,DBUG)                                             MONT0290
00121    50.          GO TO (20,40,60,80,100,120,140,160,175,180,200,220,240,260,
00121    51.         *      280),JGO
```

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```
00114      C•        -ISOCLS-
00114      C•        -DISPLY-
00114      C•        -SELECT-
00114      C•
00114      C•        -GRA.MP-
00114      C•        -SIGEXT-
00114      C•
00115            CALL RINIT(DRUMAD,DRMWDS)
00116         10 CONTINUE                                                    MONTO270
00117            CALL RESET                                                  MONTO280
00120            CALL MSCAN(JGO,DBUG)                                        MONTO290
00121            GO TO (20,40,60,80,100,120,140,160,175,180,200,220,240,260,
00121      •           280),JGO


00121      C                                                                 MONTO310
00122         20 CONTINUE                                                    MONTO320
00123            CALL STAT(ARRAY,TOP)
00124            CALL CLOCK(TIME)                                            MONTO340
00125            WRITE (6,30)TIME                                            MONTO350
00130         30 FORMAT(' TIME FOR STAT',F10.3)                              MONTO360
00131            GO TO 10                                                    MONTO380
00131      C                                                                 MONTO390
00131      C                                                                 MONTO400
00132         40 CONTINUE                                                    MONTO410
00133            CALL CLSFY(ARRAY,TOP)
00134            CALL CLOCK(TIME)                                            MONTO430
00135            WRITE (6,50)TIME                                            MONTO440
00140         50 FORMAT(' TIME FOR CLASSIFY',F10.3 )                         MONTO450
00141            GO TO 10                                                    MONTO470
00141      C                                                                 MONTO480
00141      C                                                                 MONTO490
00142         60 CONTINUE                                                    MONTO500
00142      C     ••• DSPLAY                                                          •NE?
00143            CALL CLOCK(TIME)                                            MONTO520•••1
00144            WRITE (6,70)TIME                                            MONTO530
00147         70 FORMAT(' TIME FOR DISPLAY',F10.3)                           MONTO540
00150            GO TO 10                                                    MONTO560
00150      C                                                                 MONTO570
00150      C                                                                 MONTO580
00151         80 CONTINUE                                                    MONTO590
00151      C•     CALL SELECT(ARRAY,TOP)                                             •NEW
00152            CALL CLOCK(TIME)                                            MONTO610•••1
00153            WRITE (6,90)TIME                                            MONTO620
00156         90 FORMAT(' TIME FOR SELECT',F10.3)                            MONTO630
00157            GO TO 10                                                    MONTO650
00157      C                                                                 MONTO660
00157      C                                                                 MONTO670
00160        100 CONTINUE
00160      C  ••• HIST
00161            CALL CLOCK(TIME)
00162            WRITE(6,110)TIME
00165        110 FORMAT(' TIME FOR HISTOGRAM',F10.3)
00166            GO TO 10
00166      C
00166      C     GO HERE FOR ISOCLS
00166      C
00167        120 CONTINUE
00170            CALL ISOCLS(ARRAY,TOP)
00171            CALL CLOCK(TIME)
00172            WRITE(6,130) TIME
00175        130 FORMAT(' TIME FOR ISOCLS',F10.3)
00176            GO TO 10
00176      C
00176      C     GO HERE FOR GRAYMAP
00177        140 CONTINUE
00177      C  ••• GRAYMAP
00200            CALL CLOCK(TIME)
00201            WRITE(6,150) TIME
00204        150 FORMAT(' TIME FOR GRAYMAP',F10.3)
00205            GO TO 10
00205      C
00205      C     GO HERE FOR DATA-TRANSFORMATION
```

```
00205      C
00206        160 CONTINUE
00207              CALL DATATR(ARRAY,TOP)                         *NEW
00210             CALL CLOCK(TIME)                               **-1
00211             WRITE(6,170) TIME
00214        170 FORMAT(' TIME FOR DATA-TRANSFORMATION',F10.3)
00215             GO TO 10
00215      C*
00215      C*     GO HERE FOR SIGEXT MODULE
00215      C*
00216        175 CONTINUE
00216      C  *** SIGEXT
00217             CALL CLOCK(TIME)
00220             WRITE(6,176)TIME
00223        176 FORMAT(//' TIME FOR SIGEXT ',F10.3, 'MINUTES' )
00224             GO TO 10
00224      C
00224      C      GO HERE FOR TRSTAT
00224      C
00225        180 CONTINUE
00226              CALL TRSTAT(ARRAY,TOP)                         *NEW
00227             CALL CLOCK(TIME)                               **-1
00230             WRITE(6,190)TIME
00233        190 FORMAT(//' TIME FOR TRSTAT',F10.3,' MINUTES')
00234             GO TO 10
00234      C
00234      C      GO HERE FOR NDHIST
00234      C
00235        200 CALL NDHIST(ARRAY,TOP)
00236             CALL CLOCK(TIME)
00237             WRITE(6,210)TIME
00242        210 FORMAT(//' TIME FOR NDHIST',F10.3,' MINUTES')
00243             GO TO 10
00243      C
00243      C      GO HERE FOR SCTRPL
00243      C
00244        220 CALL SCTRPL(ARRAY,TOP)
00245             CALL CLOCK(TIME)
00246             WRITE(6,230)TIME
00251        230 FORMAT(//' TIME FOR SCTRPT',F10.3,' MINUTES')
00252             GO TO 10
00252      C
00252      C
00252      C      GO HERE FOR DOTDATA
00252      C
00253        240 CALL DOTDAT(ARRAY,TOP)
00254             CALL CLOCK(TIME)
00255             WRITE(6,250)TIME
00260        250 FORMAT(//' TIME FOR DOTDATA',F10.3,' MINUTES')
00261             GO TO 10
00261      C
00261      C      GO HERE FOR LABEL
00261      C
00262        260 CONTINUE
00262      C      *** CALL LABEL(ARRAY,TOP)                      *NEW
00263             CALL CLOCK(TIME)                               **-1
00264        270 FORMAT(//' TIME FOR LABEL',F10.3,' MINUTES')
00265             GO TO 10
```

```
00265     168*      C
00266     169*        260 IF (NOFILE .GT. 0) REWIND MAPUNT
00270     170*            END                                                       MONT0690

     END OF COMPILATION:            NO  DIAGNOSTICS.
  MONTOR          SYMBOLIC                                  20 JUN 77  01:56:58  0  02614506   14   170  (DELETED)
  MONTOR   CODE   RELOCATABLE                               20 JUN 77  01:56:58  1  01640346   36     1  (DELETED)
                                                                                 0  01640412   14    34
```

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```
                                                                                     05 APR 77            7'43'17.770
FOR,* STAT,STAT
UNIVAC 1108 FORTRAN V EXEC II LEVEL 25A  -(EXEC8 LEVEL E1201001DA)
THIS COMPILATION WAS DONE ON 05 APR 77 AT 07'43'17

   SUBROUTINE STAT       ENTRY POINT 000214

   STORAGE USED' CODE(1) 000233  DATA(0) 000210  BLANK COMMON(2) 000000

    COMMON BLOCKS'

    0003   STBASE 000017
    0004   STCBLK 000217

   EXTERNAL REFERENCES (BLOCK, NAME)

    0005   SETUP1
    0006   LEARN
    0007   NWDU$
    0010   NIC2$
    0011   NERR3$

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

    0000    000075 2F        0003 I 000011 AVAR1     0003 I 000012 CLSID1    0004   000212 CLSPTS    0000   000145 COMENT
    0003 I  000010 COVAR1    0000   000124 DATE      0004   000105 FETVC2    0004   000047 FETVEC    0004   003203 FLDINF
    0004    000211 FLDPTS    0003 I 000016 FLDSV1    0003 I 000013 FLMEN1    0003 I 000014 FLVAR1    0000   000106 HEAD
    0000    000110 HED1      0000   000131 HED2      0003 I 000015 HFTAL1    0004   000143 HISVEC    0003 I 000006 HSTAL1
    0004    000011 IBLOCK    0000   000160 INJP$     0000 I 000000 KEPPTS    0004   000001 MAXCLS    0004   000000 MAXFET
    0004    000002 MAXFLD    0000 I 000074 MAXSUB    0004   000202 NOCLS     0004   000003 NOFEAT    0004   000004 NOFET2
    0004    000201 NOFLD     0004   000007 NOHIST    0004   000006 NOSPEC    0003 I 000005 SAVER1    0004   000010 SPCBAS
    0003 I  000007 SPEC1     0003 I 000004 SUBCL1    0003 I 000001 SUBMN1    0003 I 000003 SUBSD1    0003 I 000000 SUMSV1
    0003 I  000002 SUBVR1    0004   000005 VARSIZ    0004   000214 XHGH      0004   000215 XLOW      0004   003213 XSIZ
    0004    000216 YSIZ


  00100       1*      C      //STAT                                                  SUP10010
  00101       2*             COMPILER (DATA=SHORT)
  00103       3*             SUBROUTINE STAT(ARRAY,TCP)                              SUP10030
  00105       4*             IMPLICIT INTEGER (A-H,O-Z)                              SUP10050
  00106       5*             DOUBLE PRECISION ARRAY(1500)
  00107       6*             DIMENSION KEPPTS(60)                                    SUP10060
  00107       7*      C                                                             ISUP10170
  00107       8*      CI     PURPOSE.. COORDINATES THE VARIOUS ROUTINES             ISUP10180
  00107       9*      CI               FOR 'STATISTICS' STEP                        ISUP10190
  00107      10*      CI
  00110      11*             INCLUDE COMBK4,LIST
  00111      11*             DIMENSION HED1(10),HED2(10),DATE(2),COMENT(10)
  00112      11*             EQUIVALENCE (HED1(1),HEAD(3)),(DATE(1),HEAD(15)),
  00112      11*            *        (HED2(1),HEAD(20)),(COMENT(1),HEAD(32))
  00113      11*             END
  00114      12*             INCLUDE COMBK8,LIST
  00114      12*      C STAT COMMON BLOCK
```

```
      COMMON /STBASE/SUBSV1,SUBMN1,SUBVR1,SUBSD1,SUBCL1,SAVER1,HSTAL1,
     *SPEC1,COVAR1,AVAR1,CLSID1,FLMEN1,FLVAR1,HFTAL1,FLDSV1
      COMMON /STCBLK/        MAXFET,MAXCLS,MAXFLD,NCFEAT,NOFET2,
     *VARSIZ,NOSPEC,NOHIST,SPCBAS,IBLOCK(30),FETVEC(30),
     *FETVC2(30),HISVEC(30),NCFLD,NOCLS,
     *   FLDINF(6),FLDPTS,CLSPTS,XSIZ,XHGH,XLOW,YSIZ
      END
      CALL SETUP1(APRAY,TOF MAXSUB)
      CALL LEARN(ARRAY(SPEC1),ARRAY(COVAR1),ARRAY(AVAR1),
     *          ARRAY(CLSID1),ARRAY(SUBSV1),ARRAY(FLMEN1),ARRAY(FLVAR1)
     *,         ARRAY(SUBMN1),ARRAY(SUBVR1),ARRAY(SUBSD1),ARRAY(SUBCL1)
     *,         ARRAY(HFTAL1),ARRAY(HSTAL1),ARRAY(FLDSV1),
     *          ARRAY(SAVER1),KEPPTS,MAXSUB)
      WRITE (6,2)                                                       SUP10520
    2 FORMAT(////////// 2X,'***  $STAT - COMPLETED  ***' //////)
      RETURN                                                            SUP10540
       END                                                              SUP10550

      END OF COMPILATION:          NO  DIAGNOSTICS.
   STAT           SYMBOLIC                      29 MAR 77  12:39:41  0  02160256   14    22  (DELETED)
   STAT    CODE   RELOCATABLE                   29 MAR 77  12:39:41  1  02160742   36     1  (DELETED)
                                                                     0  02161006   14    17
```

```
000         000014 FLVARI      0000 I 000000 HFDKEY      0003 I 000    STALI       0000 I 000000 I        0000 I 000241 ISTA
0005        000023 HFD2        0004 I 000016 HFUKEY      0003 I 000    STALI       0000 I 000234 IPI      0000 I 000247 KCHN
0004 I 000143 HISVFC           0004 I 000015 HSBKEY      0000   0007   INJPX       0000 I 000243 K        0005   000100 MAFFIL
0000 I 000235 II               0000 I 000215 INFMT       0000 I 000232 J           0000 I 000230 M        0004 I 000002 MAXFLD
0000 I 000224 ISUNC            0000 I 000223 ISUNT       0000 I 000245 LCUMB       0004 I 000000 MAXFET   0005   000076 NHSTFI
0000 I 000244 KEY              0000 I 000200 LACD        0004 I 000001 MAXCLS      0000 I 000221 NFCH     0004 I 000003 NOFEAT
0005   000052 MAPTAP           0005   000064 MAPUNT      0005   000103 NCMPAS      0004   000202 NOCLS    0004 I 000004 NOSPEC
0000 I 000205 NBCD             0000 I 000212 NBLOCK      0000 I 000233 NMI         0004 I 000007 NOHIST   0010 I 000000 NUMBER
0005   000075 NHSTUN           0000 I 000246 NKCHN       0004   000201 NOFLD       0000 I 000250 NTH      0005   000070 PAGSIZ
0004   000004 NOFET2           0005   000045 NOFILE      0000 I 000242 NSUNAG      0000 I 000160 OPTCOD   0004 I 001205 SAKEY
0004   000021 NOTHG2           0004   000011 NOTHNG      0000 I 000206 OBCD        0004 I 000012 PCHKEY   0000 I 000231 SETFLG
0000 I 000000 NUMVEC           0006 I 000000 NXTCHR      0004   000023 PCFDKY      0005   000077 SCTRUN
0004   000031 PCALKY           0004   000024 PCCLKY      0000 I 000207 SBCD
0003 I 000005 SAVERI           0005 I 000054 SAVTAP

0004 I 000020 SFDKEY           0000 I 000036 SINVEC      0000 I 003251 SIZE        0004 I 000010 SPCBAS   0003 I 000007 SPECI
0004 I 000013 SSFKEY           0004 I 000017 SSLKEY      0004 I 003217 SSUNAG      0005 I 000072 STAFIL   0004   000030 STATKY
0003 I 000004 SUBCLI           0003 I 000001 SUBHNI      0003 I 000003 SUBSDI      0003 I 000000 SUBSVI   0003 I 000002 SUBVKI
0000 I 000214 SYMMAX           0000 I 000237 TEMP        0004 R 003233 TH          0000 I 000222 THKEY    0004   000027 THRSKY
0000 I 000252 TIPTOP           0005   000061 TRFORM      0004   000026 TRNKEY      0005   000104 TRNSFL   0004   000025 TSTKEY
0004 I 000005 VARSIZ           0000 I 000202 XBCD        0000 I 000217 XHF         0004 I 000219 XHGH     0000 I 000216 XLF
0004 I 000215 XLOW             0000 I 000220 XSF         0004 I 000213 XSIZ        0000 I 000203 YBCD     0004 I 000216 YSIZ
0000 I 000240 ZERO

00101     1*           COMPILER (DATA=SHORT)                                         SET10000
00103     2*           SUBROUTINE SETUP1(SPCVEC,TOP,MAXSUB)                          SET10020
00103     3*     C                                                                   SET10030
00105     4*           IMPLICIT INTEGER (A-M,O-Z)
00106     5*           DIMENSION  CONENT(10), DATE(2), HED1(10), HED2(10), NUMVEC(30)
00106     6*     C
00107     7*           DIMENSION  SINVEC(3), SPCVEC(5,20), CARD2(42)
00107     8*     C
00110     9*           DIMENSION CINDEX(17),OPTCOD(7),EQUVEC(2)                                *NEW
00111    10*           REAL BIAS,TH,BMAT                                                       *NEW
00112    11*            DIMENSION BTEST(3)                                                     *NEW
00112    12*     CI                                                                 ISET10070***1
00112    13*     CI--------------------------------------------------------------ISET10080
00112    14*     CI    PURPOSE.. READS AND ANALYZES SUPERVISOR CONTROL CARDS        ISET10190
00112    15*     CI              FOR THE 'STATISTICS' STEP                          ISET10200
00113    16*           INCLUDE COMBKA,LIST
00113    16*     C STAT COMMON BLOCK
00114    16*           COMMON /STHASE/SUBSVI,SUBHNI,SUBVKI,SUBSDI,SUBCLI,SAVERI,NSTALI,
00114    16*          *SPECI,COVARI,AVARI,CLSIDI,FLMENI,FLVARI,HFTALI,FLUSVI
00115    16*           COMMON /STCHLK/        MAXFET,MAXCLS,MAXFLD,NOFEAT,NOFET2,
00115    16*          *VARSIZ,NOSPEC,NOHIST,SPCBAS,IBLOCK(30),FETVEC(30),
00115    16*          *FETVC2(30),HISVEC(30),NOFLD,NOCLS,
00115    16*          *   FLDINF(6),FLDPTS,CLSPTS,XSIZ,XHGH,XLOW,YSIZ
00115    16*          * ,SSUNAG(8),BIAS(4),TH(5),BMAT(480),FCHN(4),FKEY,SAKEY                *NEW
00116    16*           END
00117    17*           EQUIVALENCE        (IBLOCK( 1),NOTHNG),(IBLOCK( 2),PCHKEY),     SET10410
00117    18*          *      (IBLOCK(3),SSFKEY),(IBLOCK(4),CFDKEY),
00117    19*          *           (IBLOCK(5),HSBKEY),(IBLOCK(6),HFDKEY),
00117    20*          *           (IBLOCK(7), SSLKEY),(IBLOCK(8),SFDKEY),
00117    21*          4                (IBLOCK( 9),NOTHG2),(IBLOCK(10),CALKEY),         SET10450
00117    22*          5                (IBLOCK(11),PCFDKY),(IBLOCK(12),PCCLKY),         SET10460
00117    23*          6                (IBLOCK(13),TSTKEY),(IBLOCK(14),TRNKEY),         SET10470
00117    24*          7                (IBLOCK(15),THRSKY),(IBLOCK(16),STATKY),         SET10480
00117    25*          8                (IBLOCK(17),PCALKY)                              SET10490
00117    26*     C                                                                   SET10500
00120    27*           EQUIVALENCE       (HED1(1),HEAD(3)), (DATE(1),HEAD(15)),        SET10510
00120    28*          1                  (HED2(1),HEAD(20)),(CONENT(1),HEAD(32))       SET10520
00120    29*     C                                                                   SET10530
00120    30*     C     ----------------------------------------------------------SET10540
00120    31*     C                                                                   SET10550
00121    32*           INCLUDE  COMBK6,LIST
00121    33*     C                                                                   SET10730
00121    34*     C                                                                   SET10740
00121    35*     C     ----------------------------------------------------------SET10750
00121    36*     C                                                                   SET10760
00121    37*     C
```

```
C0121    38.    C
00121    39.    C
C0122    39.          COMMON/GLOBA/ HEAD(42),MAPTAP,DATAPE,SAVTAP,UMFILE,UMKEY,
00122    39.         *           HISFIL,HISKEY,TRFORM,ERIPTP,ERPKEY,MAPUNT,NOFILE,
00122    39.         *    DRUMAD,DRNWDS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
00122    39.         *  ,NHSTON,NHSTFI,SCTRUN,MAPFIL
00122    39.         * ,OUTUNT,OUTFIL,NCHPAS,TRNSFL                                        *NEW
00123    39.          END                                                                  **-1
C0124    40.          DATA  SINVEC/2,'.',' , '=' / , EQUAL/'='  /, BLANK/ ' ' /
00130    41.          DATA          CRCD/'C'/,FBCD/'F'/,LBCD/'L'/,SBCD/'S'/,XBCD/'X'/,     SET10790
00130    42.         1              YRCD/'Y'/,BLANK/' '/,HBCD/'H'/                          SET10800
00130    43.         1              ,NBCD/'N'/,OBCD/'O'/,ABCD/'A'/                          SET10800
00130    44.    C                                                                             *NEW
00144    45.          DATA CINMAX/17/,EQUVEC/1,'='/                                          *NEW
00147    46.           DATA RTEST/2,'C','F'/                                    SET10820**-1
00147    47.    C                                                                 SET10840
00147    48.    C
00151    49.          DATA OPTCOD/'H','P','C','H','S','T','H'/                                *NEW
C0153    50.          DATA  CINDEX/'OPTION', 'CHANNE', 'HISTO', 'SPECTR', 'IBLOCK',          **-1
00153    51.         1'SIZE','DATE','*END*','COMMEN',
C0153    52.         2 'HED1','HED2','DATAFI','STATFI','SUNANG',                             *NEW
00153    53.         3 'B-MATR','THRESH','BIAS'/                                             *NEW
00153    54.    C                                                              SET10890**-1
00153    55.    C     ---------------------------------------------------------SET10900
C0153    56.    C     ---------------------------------------------------------SET10910
00153    57.    C                                                              SET10920
00153    58.    C     INIZ                                                     SET10930
00153    59.    C     ---------------------------------------------------------SET10940
C0153    60.    C                                                              SET10950
C0153    61.    C*
C0153    62.    C*    READ AND UNPACK HEADER RECORD TO SET MAXFET ACCORDING TO ID(5)
00153    63.    C*
C0155    64.        1 DO 2 I=1,30                                               SET10960
00160    65.          FETVEC(I) = 1                                             SET10970
C0161    66.          HISVEC(I) = 1                                             SET10980
C0162    67.        2 IBLOCK(I) = 0                                             SET10990
C0164    68.          NBLOCK = 0
C0165    69.          CALKEY =0                                                 SET11000
C0166    70.          CCLKEY = 1                                                SET11010
00167    71.          MAXCLS = 15                                               SET11020
00170    72.          MAXSUB=15
C0171    73.          MAXFET=30
C0172    74.          SYMMAX=30
00173    75.          NOSPEC = 0                                                SET11050
00174    76.           SPCHAS = -999                                                       *NEW
00175    77.          YSIZ = 14                                                 SET11070**-1
00176    78.          XSIZ=0                                                    SET11080
00177    79.          XLOW=120                                                  SET11090
C0200    80.          XHGH=220                                                  SET11100
00201    81.          INFMT = 0
00202    82.          NOFEAT=0
00203    83.           XLF=0                                                                *NEW
00204    84.           XHF=                                                                 *NEW
00205    85.           XSF=0                                                                *NEW
C0205    86.    C      INITIALIZE THE SUN ANGLES                                            *NEW
C0206    87.            DO 4 I=1,8                                                         *NEW
00211    88.           SSUNAG(I)=60                                                        *NEW
C0212    89.        4  CONTINUE                                                            *NEW
```

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```
      NOSPFC = 0
      SPCHAS = -999
      YSIZ = 14
      XSIZ=0
      XLOW=120
      XHGH=220
      INFMT = 0
      NOFEAT=0
      XLF=0
      XHF=0
      XSF=0
C     INITIALIZE THE SUN ANGLES
      DO 4 I=1,8
      SSUNAG(I)=69
    4 CONTINUE

C     INITIALIZE THE BIAS VECTOR
      DO 3 I=1,9
      BIAS(I)=0.
    3 CONTINUE
      NFCH=0
      FKEY=0
      THKEY=0
      ISUNT=0
      ISUNC=0
      SAKEY=0
      BHTRIG=0
C
C
C     READ AND ANALYZE SUPERVISOR CONTROL CARDS
C     ------------------------------------------------------------------
C
  200 COL = 0
      READ(5,2002) CODE,CARD2
 2002 FORMAT (A6,4X,62A1)
  225 WRITE(6,2252)  CODE,CARD2
 2252 FORMAT (T5,A6,4X,62A1)
      DO 230 I=1,CINMAX
  230 IF (CINDEX(I) .EQ. CODE)
     1 GO TO(10,600,700,800,1100,1200,1400,900,1500,1600,
     2 1700,1710,1720,1730,1740,1750,1760),I
      GO TO 1000
C
C     OPTION CARD
C     ---------------------
C
   10 M = NXTCHR(CARD2,COL)
      IF(M .EQ. BLANK ) GO TO 200
      IF( M .EQ. OPTCOD(1) ) GO TO 20
      IF (M.EQ.OPTCOD(6)) GO TO 26
       IF (M.EQ.OPTCOD(7)) GO TO 35
      SETFLG = 1
      IF ( M .NE. NRCO ) GOTO 14
      J = COL-1
      M = NXTCHR(CARD2,COL)
      IF (M .NE. ORCO ) GOTO 12
      SETFLG = 0
      J = COL
C
   12 COL = J
      M = NXTCHR(CARD2,COL)
   14 DO 15 I=2,5
   15 IF( M .EQ. OPTCOD(I) )  GO TO (40,30,25,30,30), I
C
      IF( M .EQ. BLANK)  GO TO 200
   40 M = COL + 10
      WRITE(6,402)   M
  402 FORMAT(/ 1X,'***  STAT/SETUPI --- ERROR IN OPTION(S) REQUESTED - S
     1CAN OF OPTION(S) DISCONTINUED AT CARD COLUMN',I5,2X,'****' /)
      GO TO 200
C
   20 M = FIND(CARD2,COL,SINVEC)
      IF ( SINVEC(M) .NE. EQUAL ) GO TO 40
      M = NUMBER(CARD2,COL,NUMVFC,29)
```

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```
      IF( NUMVEC(30) .LE. 0)  GO TO 40
      MAXSUB=NUMVEC(30)
      GO TO 10
C
   25 J = 20
      M = NXTCHR(CARD2,COL)
      IF ( M .EQ. OBCD ) J=3
      IF ( M .EQ. ABCD ) J=9
      IF ( J .LT. 20 ) GOTO 32
      GOTO 40
C
   30 J = J*2-3
   32 M = FIND(CARD2,COL,SINVEC)
      IF ( SINVEC(M) .NE. EQUAL ) GOTO 38
      M = NXTCHR(CARD2,COL)
      IF ( M .EQ. CBCD ) IBLOCK(J) = SETFLG
      IF ( M .EQ. FBCD ) IBLOCK(J+1) = SETFLG
      M = FIND(CARD2,COL,SINVEC)
      IF ( M .LE. 0 ) GOTO 200
      GOTO 10
C
   38 IBLOCK(J) = SETFLG
      IBLOCK(J+1) = SETFLG
      IF ( M .LE. 0 ) GOTO 200
      GOTO 10
C     FOUND THE TASSEL CAP OPTION - SET FKEY=2
   26  FKEY=2
       M=FIND(CARD2,COL,SINVEC)
       IF (M.EQ.2) GO TO 10
       GO TO 200
C     FOUND THE WATER OPTION - SET FKEY=1
   35  FKEY=1
       M=FIND(CARD2,COL,SINVEC)
       IF (M.EQ.2) GO TO 10
       GO TO 200
C
C     CHANNELS
C     --------
C     ------------------------
C
C      LOOK FOR DATA OR FILTER PARAMETER
  400  J=FIND(CARD2,COL,EQUVEC)
       IF (J.EQ.-1) GO TO 200
C     LOOK FOR DATA PARAMETER
       IF (CARD2(COL-4).NE.'D') GO TO 601
      NOFEAT = NUMBER(CARD2,COL,FETVEC,NOFEAT)
       GO TO 602
C     LOOK FOR FILTER PARAMETER
  601  IF (CARD2(COL-6).NE.'F') GO TO 600
      NFCH=NUMBER(CARD2,COL,FCHN,NFCH)
      GO TO 600
C
C     ELIMINATE OUT-OF-RANGE REQUESTED FEATURES,IF ANY.
C     ORDER THE RESULTING FEATURE VECTOR
C
  602  NM1 = NOFEAT - 1
      IF( NM1 .LE. 0)  NM1 = 1
      DO  611  I=1,NM1,1
```


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C-2

```
00401         C     ----
00403               IF (CARD2(COL-4).NE.'D') GO TO 401                      **-3
00405               NOFEAT = NUMBER(CARD2,COL,FETVEC,NOFEAT)                *NEW
00406               GO TO 402                                               *NEW
00406         C     LOOK FOR FILTER PARAMETER                               *NEW
00407          401  IF (CARD2(COL-6).NE.'F') GO TO 600                      *NEW
00411               NFCH=NUMBER(CARD2,COL,FCHN,NFCH)                        *NEW
00412               GO TO 600
00412         C
00412         C     ELIMINATE OUT-OF-RANGE REQUESTED FEATURES,IF ANY.
00412         C     ORDER THE RESULTING FEATURE VECTOR
00412         C
00413          402  NM1 = NOFEAT - 1                                        *NEW
00414               IF( NM1 .LE. 0)  NM1 = 1                                **-1
00416               DO  411  I=1,NM1,1

00421               IP1 = I + 1
00422               IF( IP1 .GT. NOFEAT)  GO TO 611
00424               DO  410  J=IP1,NOFEAT,1
00427               IF( FETVEC(I) .EQ. FETVEC(J)) FETVEC(J) = I*MAXFET+J
00431          410  CONTINUE
00433          411  CONTINUE
00435               II = 0
00436               DO  612  I=1,NOFEAT,1
00441               CHK = FETVEC(I)
00442               IF( CHK .LE. 0 .OR. CHK .GT. MAXFET)  GO TO 612
00444               II = II + 1
00445               FETVEC(II) = FETVEC(I)
00446          612  CONTINUE
00450               NOFEAT = II
00451               IF( NOFEAT .EQ. 0)  GO TO 1303
00453               NM1 = NOFEAT - 1
00454               IF( NM1 .LE. 0)  NM1 = 1
00456               DO  614  I=1,NM1,1
00461               IP1 = I + 1
00462               IF( IP1 .GT. NOFEAT)  GO TO 614
00464               DO  613  J=IP1,NOFEAT,1
00467               IF( FETVEC(I) .LT. FETVEC(J))  GO TO 613
00471               TEMP = FETVEC(I)
00472               FETVEC(I) = FETVEC(J)
00473               FETVEC(J) = TEMP
00474          613  CONTINUE
00476          614  CONTINUE
00500               GO TO 600                                               *NEW
00500         C                                                SET11950**-1
00500         C     HISTOGRAM CARD                             SET11960
00500         C     ----------------------                     SET11970
00500         C                                                SET11980
00501          700  J = NXTCHR(CARD2,COL)                      SET11990
00502               IF  ( J .EQ. BLANK )  GOTO 200             SET12000
00504               COL = COL-1                                SET12010
00505               NOHIST = NUMBER(CARD2,COL,HISVEC,NOHIST)
00505         C
00505         C  ELIMINATE OUT OF RANGE REQUESTED SUBCLASSES,IF ANY, AND
00505         C  ORDER THE RESULTING SUBCLASS VECTOR
00505         C
00506               NM1 = NOHIST - 1
00507               IF( NM1 .LE. 0)  NM1 = 1
00511               DO  711  I=1,NM1,1
00514               IP1 = I + 1
00515               IF( IP1 .GT. NOHIST)  GO TO 711
00517               DO  710  J=IP1,NOHIST,1
00522               IF( HISVEC(I) .EQ. HISVEC(J)) HISVEC(J) = I*SYMMAX+J
00524          710  CONTINUE
00526          711  CONTINUE
00530               II = 0
00531               DO  712  I=1,NOHIST,1
00534               CHK = HISVEC(I)
00535               IF( CHK .LE. 0 .OR. CHK .GT. SYMMAX)  GO TO 712
00537               II = II + 1
00540               HISVEC(II) = HISVEC(I)
00541          712  CONTINUE
00543               NOHIST = II
00544               IF( NOHIST .EQ. 0)  GO TO 1303
```

```
00546            NM1 = NOHIST - 1
00547            IF( NM1 .LE. 0)  NM1 = 1
00551            DO  714  I=1,NM1,1
00554            IP1 = I + 1
00555            IF( IP1 .GT. NOHIST)  GO TO 714
00557            DO  713  J=IP1,NOHIST,1
00562            IF( HISVEC(I) .LT. HISVEC(J))  GO TO 713
00564            TEMP = HISVEC(I)
00565            HISVEC(I) = HISVEC(J)
00566            HISVEC(J) = TEMP
00567      713   CONTINUE
00571      714   CONTINUE
00573            GO TO 200
00573     C
00573     C      SPEC CARD
00573     C      ------------------------
00573     C
00574      800   J = NXTCHR(CARD2,COL)
00575            IF  ( J .EQ. BLANK ) GOTO 200
00577            COL = COL-1
00600            NOSPEC = NOSPEC + 1
00601            IF( NOSPEC .GT. 20)  GO TO 200
00603            J = NUMBER(CARD2,COL,NUMVEC,0)
00604            IF ( J .GT.  4 ) J = 4
00606            DO 810 I=1,J
00611            IF (NUMVEC(I) .LE. 0 ) GOTO 815
00613      810   SPCVEC(I,NOSPEC) = NUMVEC(I)
00615            I = J+1
00616      815   SPCVEC(5,NOSPEC) = I-1
00617            GOTO 200
00617     C
00617     C      IBLOCK CARD
00617     C      ------------------------
00617     C
00620     1100   J = NXTCHR(CARD2,COL)
00621            IF  ( J .EQ. BLANK ) GOTO 200
00623            COL = COL-1
00624            NBLOCK = NUMBER(CARD2,COL,NUMVEC,NBLOCK)
00625            DO  1110  I=1,NBLOCK,1
00630     1110   IF( NUMVEC(I) .EQ. 1 )  IBLOCK(I) = 1
00633            GO TO 200
00633     C
00633     C      SIZE CARD
00633     C      ------------------------
00633     C
00634       97   COL=COL-1
00635     1200   J = NXTCHR(CARD2,COL)
00636            IF( J .EQ. BLANK ) GOTO 200
00640            IF ( J .EQ. XRCD) GO TO 1220
00642            IF ( J .EQ. SRCD) GO TO 1230
00644            IF ( J .EQ. YRCD) GO TO 1210
00646            GO TO 1000
00646     C
00647     1220   J = NXTCHR(CARD2,COL)
00650            M = FIND(CARD2,COL,SINVEC)
00651            IF( SINVEC(M) .NE. EQUAL ) GO TO 1000
00653            M = NUMBER(CARD2,COL,NUMVEC,29)
00654            IF( J .EQ. LRCD)  XLOW = NUMVEC(30)
```

```
C
   97 COL=COL-1
 1200 J = NXTCHR(CARD2,COL)
      IF( J .EQ. BLANK ) GOTO 200
      IF ( J .EQ. XACD) GO TO 1220
      IF ( J .EQ. SACD) GO TO 1230
      IF ( J .EQ. YACD) GO TO 1240
      GO TO 1000
C
 1220 J = NXTCHR(CARD2,COL)
      M = FIND(CARD2,COL,SINVEC)
      IF( SINVEC(M) .NE. EQUAL ) GO TO 1000
      M = NUMBER(CARD2,COL,NUMVEC,29)
      IF( J .EQ. LBCD)  XLOW = NUMVEC(30)
```

```
      IF (J.EQ.LHCD) XLF=1                                  *NEW
      IF( J .EQ. HACD)  XHGH = NUMVEC(30)                   *NEW
      IF (J.EQ.HHCD) XHF=1
      IF(J.NE.SBCD) GO TO 97                                *NEW
      XSF=1
      XSIZ = NUMVEC(30)
      GO TO 97
C
 1230 M = FIND(CARD2,COL,SINVEC)
      IF( SINVEC(M) .NE. EQUAL ) GO TO 1000
      M = NUMBER( CARD2,COL,NUMVEC,29)
      SPCBAS = NUMVEC(30)
      GO TO 97
C
 1240 M = FIND(CARD2,COL,SINVEC)
      IF( SINVEC(M) .NE. EQUAL ) GO TO 1000
      M = NUMBER(CARD2,COL,NUMVEC,29)
      YSIZ = NUMVEC(30)
      GO TO 97
C
C     DATE CARD
C     ------------------------
C
 1400 M = NXTCHR(CARD2,COL)
      IF( M .EQ. BLANK ) GO TO 200
      READ (30,999) DATE
  999 FORMAT (10X,10A6)
      GO TO 200
C
C     COMMENT CARD
C     ------------------------
C
 1500 READ (30,999) COMENT
      GO TO 200
C
C     HED1 CARD
C     ------------------------
C
 1600 READ (30,999) HED1
      GO TO 200

C
C     HED2 CARD
C     ------------------------
C
 1700 READ (30,999) HED2
      GOTO 200
C
C     DATA FILE CARD
C
 1710 M = NXTCHR(CARD2,COL)
      IF (M .EQ. 1H )  GO TO 200
      IF (M .EQ. 'U')  GO TO 1715
      IF (M .EQ. 'F')  GO TO 1717
 1713 WRITE(6,753)
  753 FORMAT('  ERROR ON DATA FILE CARD')
      GO TO 200
 1715 J = FIND(CARD2,COL,EQUVEC)
```

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00761           IF ( J .EQ. -1)  GO TO 1713
00763           M = NUMBER(CARD2,COL,DATAPE,ZERO)
00764           COL = COL - 1
00765           GO TO 1710
00766      1717 J = FIND(CARD2,COL,F, VFC)
00767           IF(J.EQ.-1) GO TO 1713
00771           M = NUMBER(CARD2,COL,DATFIL,ZERO)
00772           DATFIL = DATFIL - 1
00773           IF (DATFIL .LT. 0)  DATFIL = 0
00775           COL = COL - 1
00776           GO TO 1710
00776      C
00776      C    STAT FILE CARD
00776      C
00777      1720 M = NXTCHR(CARD2,COL)
01000           IF (M .EQ. 1H )  GO TO 200
01002           IF (M .EQ. 'U')  GO TO 1725
01004           IF (M .EQ. 'F')  GO TO 1727
01006      1723 WRITE(6,755)
01010       755 FORMAT('  ERROR ON STAT FILE CARD')
01011           GO TO 200
01012      1725 J = FIND(CARD2,COL,FQUVEC)
01013           IF ( J .EQ. -1)  GO TO 1723
01015           M = NUMBER(CARD2,COL,SAVTAP,ZERO)
01016           COL = COL - 1
01017           GO TO 1720
01020      1727 J = FIND(CARD2,COL,FQUVEC)
01021           IF (J .EQ. -1)  GO TO 1723
01023           M = NUMBER(CARD2,COL,STAFIL,ZERO)
01024           STAFIL = STAFIL - 1
01025           IF (STAFIL .LT. 0) STAFIL = 0
01027           COL = COL - 1
01030           GO TO 1720                                                   NEW
01030      C     SUNANG CONTROL CARD                                          NEW
01031      1730   J=NXTCHR(CARD2,COL)                                         NEW
01032            IF (J.NE.'T') GO TO 1731                                     NEW
01032      C     SET THE FLAG TO READ THE SUNANGLES OFF OF THE TAPE          NEW
01034            ISUNT=1                                                      NEW
01035           SAKEY=1                                                       NEW
01036            GO TO 200                                                    NEW
01037      1731    ISTART=0                                                   NEW
01040           COL = COL-1                                                   NEW
01041            NSUNAG=NUMBER(CARD2,COL,SSUNAG,ISTART)                       NEW
01042             IF (NSUNAG.GT.8) NSUNAG=8                                   NEW
01044           IF (NSUNAG.EQ.0) GO TO 200                                    NEW
01046            ISUNC=NSUNAG                                                 NEW
01047           DO 1732 K=1,NSUNAG                                            NEW
01047      C     TEST TO SEE IF THE INPUT SUNANGLE WAS LEGITIMATE - IF NOT,   NEW
01047      C      SET IT TO 60                                                NEW
01052      1732   IF ((SSUNAG(K).LT.5).OR.(SSUNAG(K).GT.85)) SSUNAG(K)=60     NEW
01055           SAKEY=1                                                       NEW
01056            GO TO 200                                                    NEW
01056      C     B-MATRIX CONTROL CARD                                        NEW
01057      1740   J=NXTCHR(CARD2,COL)                                         NEW
01060           IF (J.EQ.BLANK) GO TO 1000                                    NEW
01062            COL=COL-1                                                    NEW
01063            M=FIND(CARD2,COL,BTEST)                                      NEW
01064           IF (M.EQ.-1) GO TO 1000
```

```
01037         COL = COL+1
01040          NSUNAG=NUMBER(CARD2,COL,SSUNAG,15,...                        *NEW
01041           IF (NSUNAG.GT.8) NSUNAG=8                                    *NEW
01042         IF (NSUNAG.EQ.0) GO TO 200                                     *NEW
01044          ISUNC=NSUNAG                                                  *NEW
01046         DO 1732 K=1,NSUNAG                                             *NEW
01047   C       TEST TO SEE IF THE INPUT SUNANGLE WAS LEGITIMATE - IF NOT,   *NEW
01047   C        SET IT TO 60                                                *NEW
01047   1732     IF ((SSUNAG(K).LT.5).OR.(SSUNAG(K).GT.85)) SSUNAG(K)=60     *NEW
01052         SAKEY=1                                                        *NEW
01055          GO TO 200                                                     *NEW
01056   C      B-MATRIX CONTROL CARD                                         *NEW
01056   1740    J=NXTCHR(CARD2,COL)                                          *NEW
01057         IF (J.EQ.BLANK) GO TO 1000                                     *NEW
01060          COL=COL-1                                                     *NEW
01062          M=FIND(CARD2,COL,H  ST)                                       *NEW
01063          IF (M.EQ.-1) GO TO 1000
01064


01066          BMTRIG=1                                                      *NEW
01067          IF (M.EQ.2) GO TO 1741                                        *NEW
01067   C      B-MATRIX DATA ON TAPE FILE                                    *NEW
01071          KEY=2                                                         *NEW
01071   C     READ B-MATRIX ARRAY FROM TAPE FILE                             *NEW
01072         CALL BMFIL(BMAT,LCOMB,NKCHN,KCHN,KEY)                          *NEW
01073          CALL WRTBM(BMAT,LCOMB,NKCHN,KCHN)                             *NEW
01074         GO TO 200                                                      *NEW
01074   C     B-MATRIX DATA READ FROM CARD FILE                              *NEW
01075   1741   KEY=1                                                         *NEW
01076          CALL BMFIL(BMAT,LCOMB,NKCHN,KCHN,KEY)                         *NEW
01077          CALL WRTBM(BMAT,LCOMB,NKCHN,KCHN)                             *NEW
01100          GO TO 200                                                     *NEW
01100   C     THRESHOLD CONTROL CARD                                         *NEW
01101   1750   NTH=FLTNUM(CARD2,COL,TH,5)                                    *NEW
01102         THKEY=1                                                        *NEW
01103         WRITE (6,1751) (TH(I),I=1,NTH)                                 *NEW
01111   1751   FORMAT(//2X,'THE THRESHOLDS ARE'/5(2X,F7.2))                  *NEW
01112         GO TO 200                                                      *NEW
01112   C     BIAS CONTROL CARD                                              *NEW
01113   1760    J=FLTNUM(CARD2,COL,BIAS,4)                                   *NEW
01114         WRITE (6,1761) (BIAS(I),I=1,4)                                 *NEW
01122   1761   FORMAT(//2X,'THE BIAS ARE'/4(2X,F7.2))                        *NEW
01123          GO TO 200                                                     *NEW
01123   C                                                                SET13060
01123   C     CALCULATE BASES OF THE ARRAYS                              SET13070
01123   C     -----------------------------------------------------------SET13080
01123   C                                                                SET13090
01124    900  CONTINUE
01125          IF (SAKEY.EQ.0.AND.SPCBAS.EQ.-999) SPCBAS = 75                *NEW
01127          IF (SAKEY.EQ.0) GO TO 901                                     *NEW
01127   C      RESET THE HIST  DEFAULTS                                      *NEW
01131          IF (XLF.EQ.0) XLOW=0                                          *NEW
01133          IF (XHF.EQ.0) XHGH=3000                                       *NEW
01135          IF (XSF.EQ.0) XSIZ=101                                        *NEW
01137    901    CONTINUE                                                     *NEW
01140         IF( NOSPEC .GT. 20)  NOSPEC = 20
01142         IF( NOSPEC .NE. 0)  GO TO 950
01144         NOSPEC = (MAXCLS+3)/4                                      SET13110
01145         SPCVEC(1,1) = 0                                            SET13120
01146    950  VARSIZ = NOFEAT*(NOFEAT+1)/2                               SET13130
01147         IF(XSIZ.LE.0) XSIZ=XHGH-XLOW+1                             SET13140
01151         IF(XSIZ.GT.101) XSIZ=101                                   SET13150
01153         SPECI=(5*NOSPEC+1)/2*2
01154         COVARI=(VARSIZ+1)/2*2
01155         AVARI=(NOFEAT*MAXSUB+1)/2*2
01156         CLSIDI=(MAXSUB+1)/2*2
01157         SUBSVI=(5*MAXSUB+1)/2*2
01160         FLMENI=NOFEAT*2
01161         FLVARI=VARSIZ*2
01162         SUBMNI=NOFEAT*2
01163         SUBVRI=VARSIZ*2
01164         SUBSDI=(NOFEAT*MAXSUB+1)/2*2
01165         SUBCLI=(MAXSUB+1)/2*2
01166         HFTALI=(XSIZ*NOHIST+1)/2*2+HFDKEY
01167         HSTALI=(XSIZ*NOHIST+1)/2*2+HSBKEY
01170         SIZE=SPECI+COVARI+AVARI+CLSIDI+SUBSVI+FLMENI+FLVARI+
01170        * SUBMNI+SUBVRI+SUBSDI+SUBCLI+HFTALI+HSTALI
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01171          MAXFLD=(TOP-SIZE-32)/32
01172          IF(MAXFLD.LE.0) GO TO 1300
01174          SPECI=1
01175          COVARI=SPECI+(5*NOSPEC+1)/2
01176          AVARI=COVARI+(VARSIZ+1)/2
01177          CLSIDI=AVARI+(NOFFAT*MAXSUB+1)/2
01200          SUBSVI=CLSIDI+(MAXSUB+1)/2
01201          FLMENI=SUBSVI+(5*MAXSUB+1)/2
01202          FLVARI=FLMENI+NOFFAT
01203          SUBMNI=FLVARI+VARSIZ
01204          SUBVRI=SUBMNI+NOFFAT
01205          SUBSDI=SUBVRI+VARSIZ
01206          SUBCLI=SUBSDI+(NOFEAT*MAXSUB+1)/2
01207          HFTALI=SUBCLI+(MAXSUB+1)/2
01210          HSTALI=HFTALI+(XSIZ*NOHIST+1)/2+HFDKEY
01211          FLDSVI=HSTALI+(XSIZ*NOHIST+1)/2+HSBKEY
01212          SAVERI=FLDSVI+(10*MAXFLD)/2
01213          TIPTOP=SAVERI+(22*MAXFLD)/2
01214          BADCOR=TOP-2*TIPTOP
01215          IF(BADCOR.LT.0) GO TO 1300
01215   C      PRINT OUT OPTIONS                                                    SET13460
01215   C      ---------------------------------------------------------------------SET13470
01215   C                                                                           SET13480
01217          WRITE(6,HEAD)                                                        SET13490
01221          IF(PCHKEY+SSFKEY+CFDKEY+HSBKEY+HFDKEY+SSLKEY
01221         1   +SFDKEY+CALKEY .LE. 0 )  GOTO 960                                 SET13510
01223          WRITE(6,9001)                                                        SET13520
01225          IF(CFDKEY .EQ.  1)  WRITE(6,9002)                                    SET13530
01230          IF(SFDKEY .EQ.  1)  WRITE(6,9004)                                    SET13540
01233          IF(SSLKEY.EQ.1) WRITE(6,9006)
01236          IF(PCHKEY .EQ. 1) WRITE(6,9008)                                      SET13560
01241          IF( HFDKEY .EQ. 1)  WRITE(6,9012)                                    SET13570
01244          IF(HSBKEY.EQ.1) WRITE(6,9014)
01247          IF ( CALKEY .EQ. 1 ) WRITE(6,9016)                                   SET13590
01252          IF(SSFKEY.EQ.1) WRITE(6,9018)
01252   C       CHECK TASSEL CAP FILTER OPTIONS                                            *NEW
01255           IF (FKEY.NE.2) GO TO 951                                                   *NEW
01257           IF (BMTRIG.NE.1) GO TO 985                                                 *NEW
01261            IF (NKCHN.NE.4) GO TO 985                                                 *NEW
01263          IF (THKEY.EQ.1) GO TO 952                                                   *NEW
01263   C      SET THE DEFAULT THRESHOLD VALUES                                            *NEW
01265          TH(1)=100.                                                                  *NEW
01266           TH(2)=8.                                                                   *NEW
01267           TH(3)=6.                                                                   *NEW
01270           TH(4)=10.                                                                  *NEW
01271          TH(5)=35.                                                                   *NEW
01272          NTH=5                                                                       *NEW
01273     952  IF (NTH.NE.5.OR.NFCH.NE.4) GO TO 1304                                       *NEW
01273   C       CHECK THE WATER FILTER OPTIONS                                             *NEW
01275     951   IF (FKEY.NE.1) GO TO 960                                                   *NEW
01277          IF (THKEY.EQ.1) GO TO 961                                                   *NEW
01277   C      SET THE DEFAULT THRESHOLD VALUES                                            *NEW
01301           TH(1)=43.                                                                  *NEW
01302          TH(2)=12.                                                                   *NEW
01303          NTH=2                                                                       *NEW
01304     961  IF (NTH.NE.2.OR.NFCH.NE.2) GO TO 1304                                       *NEW
01304   C
01306    9001  FORMAT(1X,'YOU HAVE SELECTED THE FOLLOWING  SSTAT  PROCESSOR OPTIO
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```
01270          TH(4)=10.                                                         *NEW
01271          TH(5)=35.                                                         *NEW
01272          NTH=5                                                             *NEW
01273   952    IF (NTH.NE.5.OR.NFCH.NE.4) GO TO 1304                             *NEW
01273   C       CHECK THE WATER FILTER OPTIONS                                   *NEW
01275   951     IF (FKEY.NE.1) GO TO 960                                         *NEW
01277           IF (THKEY.EQ.1) GO TO 961                                        *NEW
01277   C      SET THE DEFAULT THRESHOLD VALUES                                  *NEW
01301           TH(1)=43.                                                        *NEW
01302          TH(2)=12.                                                         *NEW
01303          NTH=2                                                             *NEW
01304   961    IF (NTH.NE.2.OR.NFCH.NE.2) GO TO 1304                             *NEW
01304   C
01306   9001 FORMAT(1X,'YOU HAVE SELECTED THE FOLLOWING  $STAT  PROCESSOR OPTIO

01306          1NS:'//)
01307   9002 FORMAT(T5,' PRINT MEAN AND COVARIANCE FOR EACH FIELD')          SET13620
01310   9004 FORMAT(T5,' PRINT SPECTRAL PLOT FOR EACH FIELD')                SET13630
01311   9006 FORMAT(T5,' PRINT SPECTRAL PLOT FOR EACH SUBCLASS')
01312   9008 FORMAT(T5,' PUNCH MEAN AND COVARIANCE MATRIX FOR EACH SUBCLASS')
01313   9012 FORMAT(T5,' PRINT A HISTOGRAM FOR EACH FIELD')                  SET13660
01314   9014 FORMAT(T5,' PRINT A HISTOGRAM  FOR EACH SUBCLASS')
01315   9016 FORMAT(T5,' *** USE CALIBRATED DATA ***')                       SET13680
01316   9018 FORMAT(T5,' PRINT MEAN AND COVARIANCE FOR EACH SUBCLASS')
01317    960 WRITE(6,9502) RADCOR,MAXFLD,MAXSUB,(FETVEC(I),I=1,NOFEAT)
01330   9502 FORMAT('0'//'$SUPERVISOR INFORMATION:'//T5,'UNUSED CORE',I6,' LOCA
01330       *TIONS'/T5,'MAXIMUM NO. OF FIELDS...',I3/T5,'MAXIMUM NO. OF SUBCLASS
01330       - 2ES...',I3/T5,'CHANNELS SELECTED ARE   ',15(I3,','))/T27,15(I3,',') )
01331          IF( HFDKEY+HCLKEY .NE. 0) WRITE(6,9504)  (HISVEC(I),I=1,NCHIST)  SET13740
01340   9504 FORMAT(T5,'HISTOGRAM CHANNELS ARE ',15(I3,',')/T28,15(I3,',') )
01341          IF( SPCVEC(1,1) .EQ. 0 )  GOTO 971                            SET13760
01343          WRITE(6,9505)                                                 SET13770
01345   9505 FORMAT(T5,'MULTISPECTRAL PLOTS ARE...')                         SET13780
01346          DO 970 J =1,NOSPEC                                            SET13790
01351          K = SPCVEC(5,J)                                               SET13800
01352          WRITE(6,9506)  (SPCVEC(I,J),I=1,K)                            SET13810
01360   9506 FORMAT(T44,'(',T31,'(',4(I2,','))                             SET13820
01361    970  CONTINUE                                                       SET13830
01363    971 CONTINUE                                                        SET13840
01364    980 RETURN                                                          SET13850
01364   C                                                                    SET13860
01364   C        ERROR  ROUTINES                                             SET13870
01364   C     ---------------------------------------------------------------SET13880
01364   C                                                                    SET13890
01365   1000 WRITE (6,10002) CODE, CARD2                                     SET13900
01374  10002 FORMAT(///5X,'/////  FROM SUBR. SETUP1  ---   BAD CONTROL CARD ENC
01374       1OUNTERED  ---  INPUT CARD IS ...'//8X,2H'',A6,4X,62A1,2H'' //)
01375          GO TO 200                                                     SET13920
01375   C                                                                    SET13930
01376   1300 WRITE (6,1302)                                                  SET13940
01400   1302 FORMAT(////  5X,'/////  FROM SUBR. SETUP1  ---  DECREASE OPTIONS'
01400       1 // 5X,'*****  TERMINATING PROGRAM EXECUTION FROM SUBR. SETUP1  **
01400       2***' /1H1)
01401          GO TO 1305
01402   1303 WRITE(6,10002)  CODE, CARD2
01411          WRITE(6,13031)  MAXFET
01414  13031 FORMAT(//5X,'CHECK CHANNELS OR SUBCLASS NO.S REQUESTED-CANNOT BE
01414       1 LESS THAN OR EQUAL ZERO, OR GREATER THAN',I5///5X,
01414       2  '*****  TERMINATING PROGRAM EXECUTION FROM SUBR. SETUP1  *****'
01414       3 /1H1)
01415   1305 CALL EXIT
01416   1304    WRITE (6,1306)                                                   *NEW
01420   1306    FORMAT (//2X,'THE NUMBER OF INPUT FILTER CHANNELS OR THRESHOLD   *NEW
01420         C VALUES ARE NOT'/2X,'COMPATIBLE WITH THE FILTER OPTION REQUESTED *  *NEW
01420         C TERMINATE EXECUTION')                                            *NEW
01421           CALL EXIT                                                        *NEW
01422   985     WRITE (6,986 )                                                   *NEW
01424   986     FORMAT (//2X,'THE R-MATRIX WAS NOT INPUT OR WAS NOT OF THE RIGHT *NEW
01424         C  DIMENSION - TERMINATE')                                         *NEW
01425          CALL EXIT                                                         *NEW
01426           END                                                          SET13970
```

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OF POOR QUALITY

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   END OF COMPILATION:          NO  DIAGNOSTICS.
  SETUP1          SYMBOLIC                               20 JUN 77  01:59:28   0  03032054   14   479  (DELETED)
  SETUP1   CODE   RELOCATABLE                            20 JUN 77  01:59:28   1  01731474   36     1  (DELETED)
                                                                               0  01731540   14   167
```

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0001   001763 1010G     0001   000343 11L       0001   0022L  [illegible]1G  0001   002215 1104G     0001   002321 1130G
0001   002321 1133G     0001   002416 1144G     0001   002430 1154G     0001   002556 1177G     0000   001340 12F
0001   002544 1203G     0001   002623 1217G     0001   002636 1226G     0001   002670 1243G     0001   002673 1246G
0001   002734 1266G     0001   002753 1273G     0001   000362 13L       0001   003327 1315G     0001   003039 1323G
0001   003051 1332G     0001   000417 14L       0001   002121 15L       0001   000125 150G      0001   000133 153G
0001   002161 14L       0000   001365 165F      0001   000151 165G      0001   000215 19L       0001   002132 2L
0001   000200 201G      0001   001177 2317L     0001   000226 22L       0001   000317 241G      0001   000317 244G
0001   000340 244G      0001   000340 257G      0001   002270 273L      0001   002300 280L      0000   001502 29F
0001   002152 3L        0001   002325 300L      0001   002345 301L      0001   002467 33L       0001   000507 337G
0001   000510 342G      0001   000553 362G      0001   000564 367G      0001   000604 374G      0001   002515 380L
0001   002531 390L      0001   000614 402G      0000   001440 41F       0001   000634 411G      0001   000642 415G
0000   001420 42F       0001   000650 421G      0000   001433 43F       0001   002717 440L      0001   000715 444G


0001   002726 450L      0001   000706 452G      0001   000741 456G      0001   002770 460L      0000   001530 465F
0001   000761 446G      0000   001545 470F      0003   001540 471F      0001   001000 476G      0001   003076 480L
0001   003111 490L      0001   001576 50L       0000   001562 500F      0001   001013 505G      0001   002020 51L
0001   003123 510L      0001   001076 514G      0001   001706 52L       0000   001607 520F      0001   001042 524G
0001   002142 53L       0001   003135 530L      0001   001051 531G      0000   001646 540F      0001   000247 541L
0000   001327 542F      0001   001140 551G      0001   001167 565G      0001   000142 6L        0001   000524 60L
0001   001225 607G      0001   001233 614G      0001   001032 62L       0001   001252 623G      0001   001267 626G
0000   001342 63F       0001   001275 633G      0000   001350 64F       0001   001344 653G      0000   001371 66F
0000   001375 67F       0001   001372 670G      0001   001373 673G      0000   001401 68F       0000   001406 69F
0001   001703 70L       0001   001431 706G      0001   001461 713G      0001   001515 721G      0001   001537 725G
0001   001722 774G      0001   001364 8L        0001   001367 9L        0000   001413 90F       0001   002642 94L
0000   001517 95F       0000   001522 96F       0000   001525 97F       0005   000073 ASAV      0005   000074 ASAVFL
0003   000011 AVARI     0000 I 001253 BADFLG    0000 I 001321 BC        0000   001647 BESTVC    0004 R 000227 BIAS
0000 I 001241 BLANK     0004 I 000240 BHAT      0005   000355 BMFILE    0005   000056 BMKEY     0004 I 000022 CALKEY
0000 I 001252 CALSW     0004 I 000014 CFDKEY    0000 I 001256 CFLAG     0003   000012 CLSIDI    0004   000212 CLSPTS
0000 I 001254 CLSTOT    0005   000037 COMENT    0000 I 001244 COMMA     0000 R 001705 CON       0003   000010 COVARI
0000 I 001243 CPAR      0000 I 001240 DASH      0005 I 000053 DATAPE    0005   000016 DATE      0005 I 000071 DATFIL
0000 D 000151 DEV       0005   000102 DOTFIL    0005   000101 DOTUNT    0005   000067 DRMADS    0005   000066 DRUMAD
0000 I 000245 DUMPTR    0000 I 001317 EC        0000 I 001237 ENDCHR    0000 I 001300 ENDTAP    0005   000062 EKIPTP
0005   000063 ERPKEY    0000 I 001323 FC        0004 I 001200 FCHN      0004   000105 FETVC2    0004 I 000047 FETVEC
0000 I 001272 FIELDL    0000 I 001271 FIELDI    0004 I 001204 FKEY      0000 I 000137 FL        0004 I 000203 FLDINF
0000 I 001257 FLDNAM    0004 I 000211 FLDPTS    0003   000016 FLDSVI    0004   000211 FLDTYP    0003   000013 FLMENI
0003   000014 FLVARI    0005 I 000000 HEAD      0005   000002 HEDI      0005   000023 HED2      0004 I 000016 MFDKEY
0003   000015 HFTALI    0005   000057 HISFIL    0005   000060 HISKEY    0004 I 000143 HISVEC    0004 I 000015 MSBKEY
0003   000026 HSTALI    0000 I 001246 I         0004   000011 IBLOCK    0000 I 001705 IDATA     0000 R 000005 IDW
0000 I 001322 IDT       0000 I 001325 II        0000 I 001307 INDEXI    0000 I 001310 INDEX2    0000   031272 INJPS
0000 I 001324 IPUT      0006 I 000011 ISUNC     0006 I 000010 ISUNT     0000 I 001247 J         0000 I 001326 JI
0000 I 001264 JJ        0000 I 001303 JJJ       0000 I 001314 JK        0000 I 001277 JLINES    0000 I 001312 JPT
0000 I 001261 K         0000 I 001306 KC        0000 I 001266 KJ        0000 I 001304 KK        0000 I 001313 KPT
0000 I 001311 L         0013 I 000000 LARFAD    0000 I 001647 LHIST     0004 I 000204 LINEND    0000 I 001274 LINES
0004 I 000205 LININC    0006   000015 LINSKP    0004 I 000203 LINSTR    0000 I 001315 M         0005   000100 MAPFIL
0005   000052 MAPTAP    0005   000064 MAPUNT    0004   000001 MAXCLS    0004 I 000000 MAXFET    0004 I 000002 MAXFLD
0000 I 001265 MP        0000 I 001267 MPP       0000 I 001273 N         0000 I 001260 NC        0005 I 000103 NCHPAS
0005   000076 NHSTFI    0005   000075 NHSTUN    0000 I 001301 NLINES    0000 I 001305 NN        0004 I 000202 NUCLS
0004 I 000003 NOFEAT    0004   000024 NOFFT2    0005   000065 NOFILE    0004 I 000201 NOFLD     0004 I 000007 NOHIST
0004 I 000006 NOSPEC    0004   000021 NOTMG2    0004   000011 NOTMNG    0000 I 001302 NS        0000 I 00127[illegible] NSAMP
0000 I 001251 NSTAT     0000 I 001242 OPAR      0005   000070 PAGSIZ    0004   000031 PCALKY    0004   000027 PCCLKY
0004   000023 PCFDKY    0004 I 000012 PCHKEY    0000 I 001275 PTS       0000 I 001245 PUNCH     0000 R 000053 SABIAS
0000 R 000015 SAGAIN    0004 I 001205 SAKEY     0004 I 000207 SAMEND    0004 I 000210 SAMINC    0004 I 000206 SAMSTR
0003   000005 SAVERI    0005 I 000054 SAVTAP    0000 I 001255 SCLTOT    0005   000077 SCTRUN    0004 I 000020 SFDKEY
0006   000014 SMINC     0006   000013 SMSTP     0006   000012 SMSTK     0004 I 000010 SPCBAS    0003   000007 SPECI
0004 I 000013 SSFKEY    0004 I 000017 SSLKEY    0004 I 000217 SSUNAG    0005 I 000072 STAFIL    0004   000030 STATKY
0003   000004 SUBCLI    0000 I 000253 SUBDES    0003   000001 SUBMNO    0000 I 000252 SUBNO     0000 I 001270 SUBPTS
0003   000003 SUBSDI    0003   000000 SUBSVI    0003   000002 SUBVRO    0004 I 000000 SUNANG    0000 I 001250 T
0000 R 000000 TCV       0000 R 000064 TD        0000 I 001320 TF        0000 R 000007 TFD       0004 R 000233 TH
0004   000027 THRSKY    0000 I 001246 TITLE     0000 I 001316 TL        0000 R 000006 TLD       0000 R 000010 TN
0000 I 001263 TNC       0000 I 001242 TOTVRT    0005   000361 TRFORM    0004   000026 TRNKEY    0005   000104 TRNSFL
0004   000025 TSTKEY    0000 R 000011 TTC       0000   001245 TTITLE    0004 I 000005 VARSIZ    0000 I 000111 VERTCS
0004 I 000214 XHGH      0004 I 000215 XLOW      0000 R 000147 XSCALE    0000 R 000150 XSHFT     0004 I 000213 XSIZ
0004 I 000216 YSIZ

00101      1*        SUBROUTINE LEARN(SPEC,COVAR,AVAR,CLSDES,SUBSAV,
00101      2*       *                FLDMEN,FLDVAR,SUBMEN,SUBVAR,SUBSTD,
00101      3*       *                SUBCLS,HFTALY,HSTALY,FLDSAV,SAVERT,KEPPTS,MAXSUB)
00103      4*        IMPLICIT INTEGER(A-Z)
```

```
00104     5*          INCLUDE COMBK4.LIST
00105     5*          DIMENSION HED1(10),HED2(10),DATE(2),COMENT(10)
00106     5*          EQUIVALENCE (HED1(1),HEAD(3)),(DATE(1),HEAD(15)),
00106     5*         *            (HED2(1),HEAD(20)),(COMENT(1),HEAD(32))
00107     5*          END
00110     6*          INCLUDE COMBK8.LIST
00110     6*    C STAT COMMON BLOCK
00111     6*          COMMON /STBASE/SUBSV1,SUBMN1,SUBVR1,SUBSD1,SUBCL1,SAVER1,HSTAL1,
00111     6*         *SPEC1,COVAR1,AVAR1,CLSID1,FLMEN1,FLVAR1,HFTAL1,FLDSV1
00112     6*          COMMON /STCBLK/        MAXFET,MAXCLS,MAXFLD,NOFEAT,NE(?)2,
00112     6*         *VARSIZ,NOSPEC,NOHIST,SPCBAS,IBLOCK(30),FETVEC(30),
00112     6*         *FETVC2(30),HISVEC(30),NOFLD,NOCLS,
00112     6*         *  FLDINF(6),FLDPTS,CLSPTS,XSIZ,XHGH,XLOW,YSIZ
00112     6*         * ,SSUNAG(8),BIAS(4),TH(5),BMAT(480),FCHN(4),FKEY,SAKEY                  *NEW
00113     6*          END
00114     7*          INCLUDE COMBK6.LIST
00115     7*          COMMON/GLOBAL/HEAD(42),MAPTAP,DATAPE,SAVTAP,BMFILE,BMKEY,
00115     7*         *              HISFIL,HISKEY,TRFORM,ERIPTP,ERPKEY,MAPUNT,NUFILE,
00115     7*         *    DRUMAD,DRMWDS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
00115     7*         *  ,NHSTUN,NHSTFI,SCTRUN,MAPFIL                                         *NEW
00115     7*         * ,DOTUNT,DOTFIL,NCHPAS,TRNSFL                                          *--1
00116     7*          END                                                                    *NEW
00117     8*          INCLUDE CMBK14.LIST
00120     8*          COMMON/ISOLNK/SUNANG(8),ISUNT,ISUNC,SHSTR,SHSTP,SHINC,LINSKP
00121     8*          END                                                                    *NEW
00122     9*            REAL TCV(4),BIAS,TO                                                  *NEW
00123    10*          REAL TOJ,TLO,TFO ,TH,TN ,TTC(4)                                        *NEW
00124    11*           REAL SAGAIN(30),SABIAS(30)
00125    12*          DIMENSION LHIST(30),VERTCS(2,11),FL(8)
00126    13*          EQUIVALENCE (LHIST,RESTVC)
00127    14*          REAL XSCALE,XSHFT,
00127    15*         * COVAR(VARSIZ),AVAR(NOFEAT,MAXSUB),SUBSTD(NOFEAT,MAXSUB)
00130    16*          DOUBLE PRECISION FLDMEN(NOFEAT),FLDVAR(VARSIZ),SUBMEN(NOFEAT),
00130    17*         * SUBVAR(VARSIZ),COR(465),DEV(30)
00131    18*          DIMENSION SPEC(5,NOSPEC),FLDSAV(10,MAXFLD),CLSDES(MAXSUB),
00131    19*         * HFTALY(NOHIST,XSIZ),HSTALY(NOHIST,XSIZ),KEPPTS(MAXSUB),
00131    20*         * IDATA(12000),DUMPTR(5),SUBSAV(4,MAXSUB),
00131    21*         *SAVERT(22,MAXFLD),SUBCLS(SUBNO),SUBDES(500)
00131    22*    C                                                                   LEAR0540
00132    23*          EQUIVALENCE       (IBLOCK( 1),NOTHNG),(IBLOCK( 2),PCHKEY),    LEAR0550
00132    24*         *        (IBLOCK(3),SSFKEY),(IBLOCK(4),LFDKEY),
00132    25*         *              (IBLOCK(5),HSBKEY),(IBLOCK(6),HFDKEY),
00132    26*         *              (IBLOCK(7), SSLKEY),(IBLOCK(8),SFDKEY),
00132    27*         4                   (IBLOCK( 9),NOTHG2),(IBLOCK(10),CALKEY),   LEAR0590
00132    28*         5                   (IBLOCK(11),PCFDKY),(IBLOCK(12),PCCLKY),   LEAR0600
00132    29*         6                   (IBLOCK(13),TSTKEY),(IBLOCK(14),TRNKEY),   LEAR0610
00132    30*         7                   (IBLOCK(15),THRSKY),(IBLOCK(16),STATKY),   LEAR0620
00132    31*         8                   (IBLOCK(17),PCALKY)                        LEAR0630
00133    32*          EQUIVALENCE (IDATA(1),COR(1))
00134    33*          DATA ENDCRD/'SEND' '/,DUMPTR/1,3*0,1/,DASH/'-------'/,
00134    34*         * BLANK/' '/,OPAR/'('/,CPAR/')'/,COMMA/','/,PUNCH/-3/
00145    35*          EQUIVALENCE (TTITLE(2),TITLE(1))
00146    36*          EQUIVALENCE       (FLDINF(1), LINSTR), (FLDINF(2),LINEND),    LEAR0730
00146    37*         1                  (FLDINF(3),LININC), (FLDINF(4), SAMSTR),    LEAR0740
00146    38*         2                  (FLDINF(5),SAMEND),(FLDINF(6),SAMINC),      LEAR0750
00146    39*         3                  (FLDINF(7),FLDTYP)                          LEAR0760
00146    40*    C                                                                   LEAR0840
00146    41*    C     ------------------------------------------------------------LEAR0850
```

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00146   C      --------------------------------------------------------------LEAR0860
00146   C                                                                    LEAR0870
00146   C      INIZ                                                          LEAR0880
00146   C      --------------------------------------------------------------LEAR0890
00146   C                                                                    LEAR0900
00146   C*     SET UP LOGICAL ARRAY FOR FEATURES TO BE HISTOGRAMMED.
00147          DO 7 I=1,NOHIST
00152          DO 5 J=1,NOFEAT
00155          IF(HISVEC(I).EQ.FETVEC(J))GO TO 6
00157        5 CONTINUE
00161        6 LHIST(I)=J
00162        7 CONTINUE
00164          DO 922 I=1,MAXSUB
00167      922 SUBCLS(I)=0
00167   C*     READ HEADER RECORD ON DATA TAPE
00171          CALL TAPHDR(DATAPE,DATFIL)
00172          REWIND SAVTAP
00173          IF (SAKEY.EQ.0) GO TO 22                                      *NEW
00175          IF (ISUNT.EQ.0) GO TO 19                                      *NEW
00175   C       PULL THE SUN ANGLES OFF OF THE DATA TAPE                     *NEW
00175   C       ASSOCIATE SUN ANGLE WITH THE CHANNEL NUMBERS                 *NEW
00177           T=0                                                          *NEW
00200           DO 24 I=1,NOFEAT,NCHPAS                                      *NEW
00203          J=FETVEC(I)                                                   *NEW
00204           J=(J+3)/4                                                    *NEW
00205            T=T+1                                                       *NEW
00206           SSUNAG(T)=SUNANG(J)                                          *NEW
00207       24 CONTINUE                                                      *NEW
00207   C      CALL   SUNFI TO GET THE SUN ANGLE BIAS AND GAIN CORRECTION FACTORS *NEW
00211       19 CALL   SUNFI(SAGAIN,SSUNAG,FETVEC,NOFEAT,ISUNC,ISUNT,SABIAS)  *NEW
00212       22  IF (STAFIL.EQ.0) GO TO 541                                   *NEW
00214          CALL FSRSFI(SAVTAP,STAFIL,NSTAT)                              *NEW
00215       23  IF (NSTAT.EQ.0) GO TO 541                                    **-1
00217          WRITE(6,542) NSTAT                                            *NEW
00222      542 FORMAT(' BAD POSITIONING OF SAVTAP, TERMINATING ',I3)         **-1
00223          CALL CHERR
00224      541 CONTINUE
00225          CALSW = CALKEY                                                LEAR0910
00226          BADFLG = 0                                                    LEAR0920
00227          NOFLD =0                                                      LEAR0930
00230          NOCLS = 0                                                     LEAR0940
00231       10 CONTINUE                                                      LEAR0970
00232          WRITE(6,HEAD)
00234          IF(HSBKEY+HFDKEY.EQ.0) GO TO 14
00236          XSCALE=FLOAT(1-XSIZ)/(XHGH-XLOW)                              LEAR1010
00237          XSHFT=-XHGH*XSCALE+1.0                                        LEAR1020
00240          DO 20 I=1,XSIZ                                                LEAR1030
00243          DO 20 J=1,NOHIST                                              LEAR1040
00246       20 HFTALY(J,I) = 0                                               LEAR1050
00251          IF(HSBKEY+HFDKEY.NE.2) GO TO 14
00253          DO 30 I=1,XSIZ                                                LEAR1070
00254          DO 30 J=1,NOHIST                                              LEAR1080
00261       30 HSTALY(J,I)=0
00264          GO TO 14
00264   C CLASSES
00265       11 READ(30,12) TITLE
00270       12 FORMAT(10X,A6)
00271          NOCLS=NOCLS+1
```

```
00272           CLSTOT=NOCLS
00273           CLSDES(NOCLS)=TITLE
00274           GO TO 14
[illegible]   C SUBCLASSES
[illegible]     13 READ([illegible]) TITLE
[illegible]        SUBNO=SUBNO+1
00301           IF(SUBNO.GT.MAXSUB) GO TO 9[illegible]
00303           SCLTOT=SUBNO
00304           SUBSAV(4,SUBNO)=TITLE
00305           SUBSAV(2,SUBNO)=NOFLD+1          @ STARTING FIELD
00306           SUBSAV(1,SUBNO)=NOCLS
00307           SUBCLS(NOCLS)=SUBCLS(NOCLS)+1
00307         C READ FIELD CARD
00310       14 CFLAG=AREAD(FLDNAM,VERTCS,FLDINF,NC)
00311           IF(CFLAG.EQ.0) GO TO 60        @END \
00313           IF(CFLAG.EQ.-1) GO TO 11          @CLASS
00315           IF(CFLAG.EQ.-2) GO TO 13          @SUBCLASS
00317           NOFLD=NOFLD+1
00320           IF(NOFLD.GT.MAXFLD) GO TO 510
00322           FLDSAV(1,NOFLD)=FLDNAM
00323           FLDSAV(2,NOFLD)=NOCLS
00324           FLDSAV(3,NOFLD)=SUBNO
00325           FLDSAV(4,NOFLD)=NC
00326           FLDSAV(5,NOFLD)=LINSTR
00327           FLDSAV(6,NOFLD)=LINEND
00330           FLDSAV(7,NOFLD)=SAMSTR
00331           FLDSAV(8,NOFLD)=SAMEND
00332           FLDSAV(9,NOFLD)=LININC
00333           FLDSAV(10,NOFLD)=SAMINC
00334           SUBSAV(3,SUBNO)=NOFLD             @ENDING FIELD OF SUB
00335           K=0
00336           DO 111 J=1,11
00341           DO 111 I=1,2
00344           K=K+1
00345      111 SAVERT(K,NOFLD)=VERTCS(I,J)
00350           TOTVRT=TOTVRT+NC
00351           GO TO 14
00352       60 CONTINUE
00353           WRITE(SAVTAP) NOCLS,SUBNO,NOFEAT,NOFLD,TOTVRT,(FETVEC(I),I=1,NOFEA
00353          *T)
00366           DO 61 I=1,NOFLD
00371           TNC=2*FLDSAV(4,I)
00372           WRITE(SAVTAP) (FLDSAV(J,I),J=1,4)
00400       61 WRITE(SAVTAP) (SAVERT(J,I),J=1,TNC)
00407           WRITE(SAVTAP)(CLSDES(J),J=1,NOCLS),(SUBCLS(J),J=1,NOCLS),
00407          *              (SUBSAV(4,J),J=1,SUBNO)
00425           IF(PCHKEY.NE.1) GO TO 62
00427           WRITE(PUNCH,63)
00431       63 FORMAT('MODULE    TRAINING FIELD DECK')
00432           WRITE(PUNCH,64) NOCLS,SUBNO,NOFEAT,NOFLD,TOTVRT
00441       64 FORMAT('NOCLS ',I4,' NOSUB  ',I2,' NOFEAT ',I2,' NOFLD ',I3,
00441          * ' TOTVRT ',I4)
00442           WRITE(PUNCH,165) (FETVEC(I),I=1,NOFEAT)
00450      165 FORMAT('CHNVEC',4X,30I2)
00451           DO 65 I=1,NOFLD
00454           WRITE(PUNCH,66) (FLDSAV(J,I),J=1,4)
00462       66 FORMAT(A6,4X,I2,8X,I2,8X,I2)
00463           TNC=2*FLDSAV(4,I)
```

```
      IF(PCHKEY.NE.1) GO TO 62
      WRITE(PUNCH,A3)
   63 FORMAT('MODULE     TRAINING FIELD DECK')
      WRITE(PUNCH,44) NOCLS,SUBNO,NOFEAT,NOFLD,TOTVRT
   44 FORMAT('NOCLS ',I4,' NOSUB  ',I2,' NOFEAT ',I2,' NOFLD ',I3,
     *' TOTVRT ',I4)
      WRITE(PUNCH,165) (FFTVEC(I),I=1,NOFEAT)
  165 FORMAT('CHNVEC',4X,30I2)
      DO 65 I=1,NOFLD
      WRITE(PUNCH,66) (FLDSAV(J,I),J=1,4)
   66 FORMAT(A6,4X,I2,8X,I2,8X,I2)
      TNC=2*FLDSAV(4,I)
```

```
   65 WRITE(PUNCH,67) (SAVERT(J,I),J=1,TNC)
   67 FORMAT('VERTICES  ',14I5)
      WRITE(PUNCH,68) (CLSDES(J),J=1,NOCLS)
   68 FORMAT(('CLSDES  ',9(2X,A6)))
      WRITE(PUNCH,69) (SUBCLS(J),J=1,NOCLS)
   69 FORMAT(('SUBNO  ',24(1X,I2)))
      WRITE(PUNCH,90) (SUBSAV(4,J),J=1,SUBNO)
   90 FORMAT(('SUBDES  ',10(A6,1X)))
   62 CONTINUE
      WRITE(6,41) (DASH,I=1,14)
      DO 40 K=1,NOFLD
      JJ=2*(FLDSAV(4,K)-1)
      MP=FLDSAV(2,K)
      KJ=10
      IF(JJ.LE.10) KJ=JJ
      MPP=FLDSAV(3,K)
      WRITE(6,42) K,FLDSAV(1,K),CLSDES(MP),SUBSAV(4,MPP),FLDSAV(10,K),
     *FLDSAV(9,K),((OPAR,SAVERT(I,K),COMMA,SAVERT(I+1,K),CPAR),I=1,KJ,2)
      IF(JJ.LE.10) GO TO 2017
      WRITE(6,43) ((OPAR,SAVERT(I,K),COMMA,SAVERT(I+1,K),CPAR),I=11,JJ,2
     *)
 2017 CONTINUE
   42 FORMAT(4X,I4,2X,A6,2X,A6,2X,A6,3X,I4,3X,I4,4X,
     *5(A1,I4,A1,I4,A1,2X))
   43 FORMAT(50X,5(A1,I4,A1,I4,A1,2X))
   40 CONTINUE
   41 FORMAT(//T50,'TRAINING FIELDS'/T49,3A6//
     *7X,'FIELD',T36,'SAMPLE LINE'/
     *5X,'NO.  NAME',4X,'CLASS',3X,'SUBCLASS  INC    INC',
     *4X,'VERTICES(SAMPLE,LINE)'/
     *4X,2A6,2X,A6,2X,A6,A2,1X,A6,1X,A4,4X,3A6,A3)
      SUBNO=0
   70 SUBNO=SUBNO+1
      SUBPTS=0
      DO 71 I=1,NOFEAT
   71 SUBMEN(I)=0.
      DO 72 I=1,VARSIZ
   72 SUBVAR(I)=0.
      FIELD1=SUBSAV(2,SUBNO)
      FIELDL=SUBSAV(3,SUBNO)
      DO 301 N=FIELD1,FIELDL
      DO 73 I=1,NOFEAT
   73 FLDMEN(I)=0.
      DO 74 I=1,VARSIZ
   74 FLDVAR(I)=0.
      LINSTR=FLDSAV(5,N)
      LINEND=FLDSAV(6,N)
      LININC=FLDSAV(9,N)
      SAMSTR=FLDSAV(7,N)
      SAMEND=FLDSAV(8,N)
      SAMINC=FLDSAV(10,N)
      CALL FLDINT(FLDINF,FETVEC,NOFEAT)
      LINES=(LINEND-LINSTR)/LININC+1
      PTS=(SAMEND-SAMSTR)/SAMINC+1
      NSAMP=PTS
      FLDPTS=0
      DO 17 JLINES=1,LINES
      CALL LINERD(IDATA,ENDTAP)
```

```
00656           IF(IFDTAP(N).EQ.1) GO TO 18
00660           IF(JLINES.NE.1) GO TO 8
00662           NLINES=LINSTR
00663           GO TO 9
00664         8 NLINES=NLINES+LININC
00665         9 CONTINUE
00666           K=0
00667           DO 93 I=1,11
00672           DO 93 J=1,2
00675           K=K+1
00676        93 VERTCS(J,I)=SAVERT(K,N)
00701           CALL FDLINT(VERTCS,FLDSAV(4,N),FL,NLINES,NS,JJJ)
00702           KK=0
00703           NN=1
00704           KC=0
00705           DO 1 J=1,NOFFAT
00710           INDEX1=(J-1)*NSAMP
00711           JJ=J
00712           DO 3 K=1,JJ
00715           KK=KK+1
00716           INDEX2=(K-1)*NSAMP
00717           L=1
00720           DO 2 JPT=1,NSAMP
00723           KPT=(JPT-1)*SAMINC+SAMSTR
00724           DO 4 JK=L,JJJ,2
00727           IF(KPT.LT.FL(JK)) GO TO 2
00731           IF(KPT.GT.FL(JK+1)) GO TO 15                             *NEW
00733            M=IDATA(INDEX1+JPT)                                     *NEW
00734            IDJ=FLOAT(M)                                            *NEW
00735            M=IDATA(INDEX2+JPT)                                     *NEW
00736            TD=FLOAT(M)                                             *NEW
00736     C      APPLY THE SUN ANGLE CORRECTION FACTORS TO THE DATA IF SAKEY=1 *NEW
00737           IF (SAKEY.EQ.0) GO TO 50                                 *NEW
00741            IDJ=SAGAIN(J)*IDJ + SABIAS(J)                           *NEW
00742            TD=SAGAIN(K)*TD + SABIAS(K)                             *NEW
00742     C     APPLY THE APPROPRIATE FILTER TO THE DATA                 *NEW
00742     C      APPLY NO FILTER - FKEY=0                                *NEW
00743    50     IF (FKEY.EQ.0) GO TO 51                                  *NEW
00745            IF (J.NE.1) GO TO 51                                    *NEW
00745     C      APPLY THE WATER FILTER - FKEY=1                         *NEW
00747            IF (FKEY.NE.1) GO TO 52                                 *NEW
00751            TL=(FCHN(2)-1)*NSAMP + JPT                              *NEW
00752           EC = FCHN(2)                                             *NEW
00753            TLD = SAGAIN(EC)*IDATA(TL) + SABIAS(EC)                 *NEW
00754           TF = (FCHN(1)-1)*NSAMP + JPT                             *NEW
00755             BC = FCHN(1)                                           *NEW
00756           TFD = SAGAIN(BC)*IDATA(TF) + SABIAS(BC)                  *NEW
00757            IDT=IDATA(TL)                                           *NEW
00760             IF (SAKEY.EQ.0) TLD=FLOAT(IDT)                         *NEW
00762            IDT=IDATA(TF)                                           *NEW
00763            IF (SAKEY.EQ.0) TFD=FLOAT(IDT)                          *NEW
00765            TN = TFD -.(TH(1)/TH(2))*TLD                            *NEW
00766            IF (TN.GE.0.AND.TLD.LE.TH(2)) GO TO 2                   *NEW
00770            GO TO 51                                                *NEW
00770     C      APPLY THE TASSEL CAP FILTER - FKEY=2                    *NEW
00771    52     IF (FKEY.NE.2) CALL EXIT                                 *NEW
00773           DO 54 I=1,4                                              *NEW
00776            FC = (FCHN(I)-1)*NSAMP + JPT
```

```
00756              TFD = SAGAIN(BC)*IDATA(TF) + SABIAS(BC)                    *NEW*
00757               IDT=IDATA(TF) .                                            *NEW*
00760               IF (SAKEY.EQ.0) TFD=FLOAT(IDT)                             *NEW*
00762              IDT=IDATA(TF)                                               *NEW*
00763              IF (SAKEY.EQ.0) TFD=FLOAT(IDT)                              *NEW*
00765              TN = TFD - (TH(1)/TH(2))*TLD                                *NEW*
00766              IF (TN.GE.0.AND.TLD.LE.TH(2)) GO TO 2                       *NEW*
00770              GO TO 51                                                    *NEW*
00770      C       APPLY THE TASSEL CAP FILTER - FKEY=2                        *NEW*
00771         52   IF (FKEY.NE.2) CALL EXIT                                    *NEW*
00773              DO 54 I=1,4                                                 *NEW*
00776              FC = (FCHN(I)-1)*NSAMP + JPT                                *NEW*


00777              BC = ICHN(I)                                                *NEW*
01000              TCV(I) = SAGAIN(BC)*IDATA(FC) + SABIAS(BC)                  *NEW*
01001              IDT=IDATA(FC)                                               *NEW*
01002              IF (SAKEY.EQ.0) TCV(I)=FLOAT(IDT)                           *NEW*
01004         54   CONTINUE                                                    *NEW*
01004      C       CALCULATE THE TASSEL CAP FILTER VECTOR                      *NEW*
01006              CALL MTVEC1(BMAT,TCV,TTC,4,4)                               *NEW*
01007              DO 55 I=1,4                                                 *NEW*
01012         55   TCV(I) = TTC(I) + BIAS(I)                                   *NEW*
01012      C       APPLY THE FILTER TEST                                       *NEW*
01014              IF (TCV(1).GT.TH(1)) GO TO 2                                *NEW*
01016               IF (TCV(2).LT.TH(2)) GO TO 2                               *NEW*
01020               IF (TCV(3).LT.TH(3)) GO TO 2                               *NEW*
01022               IF (TCV(4).LT.TH(4)) GO TO 2                               *NEW*
01024               IF (TCV(4).GT.TH(5)) GO TO 2                               *NEW*
01026         51   CONTINUE                                                    *NEW*
01027              IF(J.EQ.1) FLDPTS=FLDPTS+1                                  **-1
01031              IF(K.EQ.1) FLDMEN(J)=FLDMEN(J)+IDJ
01033              FLDVAR(KK)=FLDVAR(KK) + IDJ*TD                              *NEW*
01034              IF(LHIST(NN).NE.J) GO TO 2                                  **-1
01036              KC=1
01037              IPUT=IDJ*XSCALE+XSHFT+0.501                                 *NEW*
01040              IF(IPUT.LT.1) IPUT=1                                        **-1
01042              IF(IPUT.GT.XSIZ) IPUT=XSIZ
01044              HFTALY(NN,IPUT)=HFTALY(NN,IPUT)+1
01045              IF(JPT.EQ.NSAMP) NN=NN+1
01047              GO TO 2
01050         15 L=L+2
01051              IF(L.GT.JJJ) GO TO 53
01053          4 CONTINUE
01055          2 CONTINUE
01057              IF(JPT.EQ.NSAMP) GO TO 3
01061         53 IF(KC.EQ.1) NN=NN+1
01063              KC=0
01064          3 CONTINUE
01066          1 CONTINUE
01070         17 CONTINUE
01072         16 CONTINUE
01073              WRITE(6,29) FLDPTS                                          *NEW*
01076         29   FORMAT(//2X,I5,' POINTS WILL BE USED IN THE FIELD   MEAN,COVARIAN *NEW*
01076             ICE CALCULATIONS')                                           *NEW*
01077              SUBPTS=SUBPTS+FLDPTS
01100              DO 200 I=1,NOFEAT
01103        200 SUBMEN(I)=SUBMEN(I)+FLDMEN(I)
01105              DO 21 I=1,VARSIZ
01110         21 SUBVAR(I)=SUBVAR(I)+FLDVAR(I)
01112              TITLE=SUBSAV(4,SUBNO)
01113              IF(CFDKEY+SFDKEY+HFDKEY.EQ.0) GO TO 301
01115              IF(CFDKEY+SFDKEY.EQ.0) GO TO 280
01117              CALL FLDCOV(COR,DEV,FLDMEN,FLDVAR,FLDPTS,CFDKEY,FLDSAV(1,N),
01117             *NOFEAT,MAXFET,VARSIZ)
01117      C PLOT SPECTRAL RESPONSE FOR FIELDS
01120              IF(SFDKEY.EQ.0) GO TO 270
01122              CALL FLDSPC(FLDMEN,DEV,FLDSAV(1,N),DUMPTR,IDATA,
01122             * FLDNAM,FLDVAR,TITLE,NOFEAT,FETVEC,SPCBAS,SAKEY)           *NEW*
01123        270 IF(HFDKEY.EQ.0) GO TO 301                                     **-1
01125        280 IF(HSBKEY.EQ.0) GO TO 300
01127              DO 290 I=1,XSIZ
```

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01132        DO 290 J=1,NOHIST
01135    290 HSTALY(J,I)=HSTALY(J,I)+HFTALY(J,I)
01140    300 CONTINUE
01141        CALL FLDHIS(HFTALY,IDATA,FLDSAV(1,N),XSIZ,XHGH,XLOW,YSIZ,
01141       *NOHIST,FLDPTS,TITLE,HISVEC)
01142    301 CONTINUE
01142  C CALCULATE COVAR MTX AND MEAN VECTOR FOR SUBCLASS
01144        CALL CLSCOV(COR,DEV,SUBMEN,SUBVAR,SUBPTS,SSFKEY,
01144       *TITLE,NOFEAT,MAXFET,VARSIZ)
01144  C SAVE SUBCLASS MEAN,COVAR,STD DEV
01145    130 DO 31 I=1,NOFEAT
01150        AVAR(I,SUBNO)=SUBMEN(I)
01151     31 SUBSTD(I,SUBNO)=DEV(I)
01153        DO 32 J=1,VARSIZ
01154     32 COVAR(J)=SUBVAR(J)
01160        KEPPTS(SUBNO)=SUBPTS
01160  C PLOT SPECTRAL RESPONSE FOR EACH SUBCLASS
01161        IF(SSLKEY.EQ.0) GO TO 33
01163        CALL CLSSPC(AVAR(1,SUBNO),SUBSTD(1,SUBNO),TITLE,DUMPTR,IDATA,
01163       * TITLE,NOFEAT,FETVEC,SPCBAS,SAKEY)                                  *NE?
01163  C PRINT SUBCLASS HIST
01164     33 IF(HSRKEY.EQ.0) GO TO 390
01166        TITLE=SUBSAV(4,SUBNO)
01167        IF(HFDKEY.EQ.0) GO TO 380
01171        CALL CLSHIS(HSTALY,IDATA,TITLE    ,XSIZ,XHGH,XLOW,YSIZ,
01171       *NOHIST,FLDPTS,HISVEC)
01172        GO TO 390
01173    380 CALL CLSHIS(HFTALY,IDATA,TITLE    ,XSIZ,XHGH,XLOW,YSIZ,
01173       *NOHIST,FLDPTS,HISVEC)
01174    390 WRITE(SAVTAP) KEPPTS(SUBNO),(COVAR(I),I=1,VARSIZ),
01174       *             (AVAR(I,SUBNO),I=1,NOFEAT)
01207        IF(PCHKEY.NE.1) GO TO 94
01211        WRITE(PUNCH,95) KEPPTS(SUBNO)
01214     95 FORMAT('NOPTS ',6X,I8)
01215        WRITE(PUNCH,96) (AVAR(I,SUBNO),I=1,NOFEAT)
01223     96 FORMAT('MEANS',5E15.8)
01224        WRITE(PUNCH,97) (COVAR(I),I=1,VARSIZ)
01232     97 FORMAT('COVAR',5E15.8)
01233     94 IF(SUBNO.LT.SCLTOT) GO TO 70
01235        ENDFILE SAVTAP
01236        REWIND SAVTAP
01236  C                                                                     LEAR2780
01236  C      PUBLISH THE MULTISPECTRAL PLOTS                                LEAR2790
01236  C      ------------------------------------------------------------  LEAR2800
01236  C                                                                     LEAR2810
01237    410 IF (SPEC(1,1).NE.0) GO TO 450                                   LEAR2820
01241        JK = 0                                                          LEAR2830
01242        DO 430 I=1,NOSPEC                                               LEAR2840
01245        DO 420 J=1,4                                                    LEAR2850
01250        II=I
01251        JJ=J
01252        JK =JK+1                                                        LEAR2860
01253        SPEC(J,I) = JK                                                  LEAR2870
01254        IF(JK.EQ.SUBNO) GO TO 440
01256    420 CONTINUE                                                        LEAR2890
01260    430 SPEC(5,I) = 4                                                   LEAR2900
01262    440 SPEC(5,II)=JJ
01263        NOSPEC=II
```

```
01241            JK = 0                                                     LEAR2830
01242            DO 430 I=1,NOSPEC                                          LEAR2840
01245            DO 420 J=1,4                                               LEAR2850
01250            II=I
01251            JJ=J
01252            JK =JK+1                                                   LEAR2860
01253            SPEC(J,I) = JK                                             LEAR2870
01254            IF(JK.EQ.SUBNO) GO TO 440
01256        420 CONTINUE                                                   LEAR2890
01260        430 SPEC(5,I) = 4                                              LEAR2900
01262        440 SPEC(5,II)=JJ
0126             NOSPEC=II


01264        450 CONTINUE                                                   LEAR2930
01265            DO 480 I=1,NOSPEC                                          LEAR2940
01270            K = SPEC(5,I)                                              LEAR2950
01271            JJ = 0                                                     LEAR2960
01272            DO 460 J=1,K                                               LEAR2970
01275            IF(SPEC(J,I).GT.SUBNO) GO TO 460
01277            JJ = JJ +1                                                 LEAR2990
01300            SPEC(JJ,I) = SPEC(J,I)                                     LEAR3000
01301        460 CONTINUE                                                   LEAR3010
01303            IF (JJ.EQ.0) GO TO 480                                     LEAR3020
01305            SPEC(5,I) = JJ                                             LEAR3030
01306            WRITE (6,HEAD)                                             LEAR3040
01310            WRITE(6,465)
01312       465  FORMAT(// 27X,'COMPOSITE SPECTRAL PLOT (MEAN,PLUS AND MINUS ONE ST
01312           1D. DEV. ) FOR:' / )
01313            WRITE (6,470)(SPEC(J,I),J=1,JJ)                            LEAR3050
01321        470 FORMAT(38X,'TRAINING SUBCLASS(ES) ',4I4/41X,'-----------------'/)
01322            DO 98 JI=1,SUBNO
01325         98 SUBDES(JI)=SUBSAV(4,JI)
01327            IF( JJ .LT. 4)  WRITE(6,471)   ( DASH,II=1,3 )
01336       471  FORMAT(41X,3A6 / )
01337            CALL MULSPC(AVAR(1,1),SUBSTD(1,1),SUBDES,SPEC(1,I),IDATA,
01337           * NOFEAT,FETVEC,SPCBAS,SAKEY)                               *NEW
01340        480 CONTINUE                                                   LEAR3080***I
01342            CALL SETMRG(66,4,42)
01343            RETURN                                                     LEAR3140
01343      C                                                                LEAR3150
01343      C     ERROR ROUTINES                                             LEAR3160
01343      C     ------------------------------------------------------------LEAR3170
01343      C                                                                LEAR3180
01344        490  BADFLG = 2                                                LEAR3190
01345            WRITE(6,500) MAXSUB,MAXSUB
01351        500 FORMAT(//5X,'*** STAT/LEARNN   MAX NO. OF',I8,3X, 'SUBCLASSES EXEC
01351           *EEDED---FIRST',I8,3X,'SUBCLASSES USED--REMAINDER IGNORED'///)
01352            GO TO 530                                                  LEAR3230
01352      C                                                                LEAR3240
01353        510 BADFLG = 1                                                 LEAR3250
01354            WRITE(6,520) MAXFLD,MAXFLD,SUBNO
01361       520  FORMAT(//// 5X,'*****  STAT/LEARNN --- MAX. OF',I8,,3X,
01361           1 'FIELDS EXCEEDED --- ',I8,3X,'FIELDS RETAINED FOR',I8,3X,
01361           *'SUBCLASSES'/5X,'***REMAINDER OF INPUT TRAINING FIELDS NOT USED'/)
01361      C                                                                LEAR3290
01362        530 READ (5,540)I                                              LEAR3300
01365        540 FORMAT (A6)                                                LEAR3310
01366            IF (I.NE.ENDCRD) GO TO 530                                 LEAR3320
01370            GO TO 60
01370      C                                                                LEAR3340
01371             END                                                       LEAR3350

     END OF COMPILATION:        NO  DIAGNOSTICS.
   LEARNN         SYMBOLIC                          20 JUN 77  01:56:27   G  02534334   14   371  (DELETED)
   LEARNN  CODE   RELOCATABLE                       20 JUN 77  01:56:27   1  01615524   48     1  (DELETED)
                                                                          0  01615604   14   181
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EXTERNAL REFERENCES (BLOCK, NAME)

 0003   NWDOU$
 0004   NI02$
 0005   NI01$
 0006   NFRR3$

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

 0001   000034 156G     0001   000116 200G     0000   001227 210F     0000   001231 215F     0001   000135 217L
 0000   001240 220F     0001   000173 220G     0000   001246 230F     0001   000207 230G     0000   001257 231F
 0001   000222 237G     0000   001223 90F      0000 R 001212 BLANK    0000 R 000505 BIAS     0000 R 000001 EXTRA

 0000 I 001211 I        0000 I 001221 IEND     0000 I 001222 IENDS    0000 I 001216 IND      0000   001272 INJPS
 0000 I 001220 ISTART   0000 I 001214 K        0000 I 001215 KR       0000 I 001213 KS       0000 I 001217 NOFETR
 0000 I 000000 SUNA

00101         SUBROUTINE SUNFI(SUNCOR,SUNANG,FETVEC,NOFEAT,ISUNC,ISUNT,SABIAS)     NEW
00103         INTEGER SUNANG,FETVEC,SUNA                                            -1
00104         DIMENSION EXTRA(324),SUNANG(1),FETVEC(1),SUNCOR(1)
00105         DIMENSION BIAS(324),SABIAS(1)                                        NEW
00106         DATA(EXTRA(I), I=1,36) /16.413,14.887,14.089,13.401,
00106        1 13.015,11.901,11.323,10.816,10.755,9.893,9.449,9.052,
00106        1 9.094,8.413,8.063,7.745,7.832,7.285,7.002,6.744,
00106        1 6.880,6.425,6.190,5.973,6.098,5.722,5.527,5.346,
00106        1 5.474,5.156,4.991,4.838,4.967,4.694,4.551,4.419/
00110         DATA(EXTRA(I),I=37,72) /4.530,4.297,4.179,4.061,
00110        1 4.163,3.961,3.855,3.757,3.852,3.675,3.583,3.497,
00110        1 3.580,3.426,3.344,3.269,3.342,3.207,3.135,3.069,
00110        1 3.135,3.015,2.952,2.893,2.953,2.846,2.789,2.737,
00110        1 2.788,2.693,2.643,2.597,2.642,2.557,2.513,2.471/
00112         DATA(EXTRA(I),I=73,108) /2.511,2.435,2.395,2.358,
00112        1 2.393,2.325,2.289,2.255,2.285,2.223,2.191,2.161,
00112        1 2.187,2.131,2.102,2.076,2.097,2.047,2.021,1.997,
00112        1 2.016,1.971,1.947,1.925,1.940,1.899,1.878,1.858,
00112        1 1.871,1.834,1.815,1.797,1.807,1.773,1.756,1.740/
00114         DATA(EXTRA(I),I=109,144) /1.748,1.717,1.701,1.687,
00114        1 1.693,1.665,1.651,1.637,1.642,1.617,1.603,1.591,
00114        1 1.594,1.571,1.559,1.548,1.550,1.529,1.518,1.508,
00114        1 1.508,1.489,1.479,1.470,1.469,1.452,1.443,1.435,
00114        1 1.432,1.417,1.409,1.402,1.398,1.384,1.377,1.370/
00116         DATA(EXTRA(I),I=145,180) /1.366,1.353,1.347,1.341,
00116        1 1.336,1.324,1.318,1.313,1.307,1.297,1.291,1.286,
00116        1 1.280,1.271,1.266,1.261,1.255,1.246,1.242,1.238,
00116        1 1.230,1.223,1.219,1.216,1.208,1.201,1.198,1.195,
00116        1 1.186,1.180,1.177,1.174,1.166,1.161,1.158,1.155/
00120         DATA(EXTRA(I),I=181,216) /1.146,1.142,1.140,1.137,
00120        1 1.128,1.124,1.122,1.120,1.111,1.107,1.106,1.104,
00120        1 1.094,1.091,1.090,1.089,1.078,1.076,1.075,1.074,
00120        1 1.064,1.062,1.061,1.060,1.050,1.048,1.047,1.047,
00120        1 1.036,1.035,1.035,1.034,1.023,1.023,1.022,1.022/
00122         DATA(EXTRA(I),I=217,252) /1.011,1.011,1.011,1.011,
00122        1 1.000,1.000,1.000,1.000,.989,.989,.990,.990,
00122        1 .979,.979,.980,.980,.969,.970,.970,.971,
00122        1 .960,.961,.961,.962,.951,.952,.953,.954,
00122        1 .943,.944,.945,.946,.935,.937,.937,.938/
00124         DATA(EXTRA(I),I=253,288)/ .928,.929,.930,.931,
00124        1 .921,.923,.924,.925,.914,.916,.917,.918,
00124        1 .908,.910,.911,.912,.902,.904,.906,.907,
00124        1 .897,.899,.901,.902,.892,.894,.896,.897,
00124        1 .887,.890,.891,.892,.882,.885,.887,.888/
00126         DATA(EXTRA(I),I=289,324) /.878,.881,.883,.884,
00126        1 .875,.878,.879,.881,.871,.874,.876,.878,
00126        1 .868,.871,.873,.875,.865,.869,.870,.872,
00126        1 .863,.866,.868,.870,.861,.864,.866,.868,
00126        1 .859,.862,.864,.866,.857,.861,.863,.864/
00130         DATA (BIAS(I),I=1,36) /10.28,16.43,43.78,16.79,13.7,60.31,17,     NEW
00130        2 12.49,-6.09,2.02,27.86,9.63,-9.40,-1.20,17.32,7.66,-11.00,      NEW
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ORIGINAL PAGE IS OF POOR QUALITY

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00130      3 -2.99,13.54,6.27,-12.21,-4.36,10.69,5.20,-12.23,-4.82,8.49,          *NEW
00130      4 4.42,-12.13,-5.11,7.16,3.81,-12.05,-5.35,5.91,3.30/                  *NEW
00132       DATA (BIAS(I),I=37,72) /-11.41,-5.14,5.10,2.93,-10.80,-4.91,          *NEW
00132      2 4.46,2.62,-10.28,-4.71,3.91,2.36,-9.64,-4.42,3.50,2.14,              *NEW
00132      3 -6.95,-4.07,3.20,1.97,-8.35,-3.76,2.93,1.81,-7.82,-3.50,             *NEW
00132      4 2.78,1.68,-7.19,-3.14,2.54,1.56,-6.62,-2.86,2.40,1.46/               *NEW
00134       DATA (BIAS(I),I=73,108) /-6.11,-2.59,2.27,1.37,-5.64,-2.31,           *NEW
00134      2 2.16,1.29,-5.12,-2.03,2.11,1.23,-4.65,-1.76,2.00,1.17,-4.22,         *NEW
00134      3 -1.51,2.02,1.12,-3.83,-1.28,1.97,1.07,-3.50,-1.13,1.87,1.01,         *NEW
00134      4 -3.20,-1.00,1.78,.95,-2.92,-.87,1.70,.89/                            *NEW
00136       DATA (BIAS(I),I=109,144) /-2.66,-.75,1.62,.84,-2.38,-.61,             *NEW
00136      2 1.58,.80,-2.12,-.47,1.54,.77,-1.87,-.34,1.51,.73,-1.64,              *NEW
00136      3 -.21,1.47,.70,-1.43,-.11,1.44,.67,-1.24,-.01,1.49,.64,               *NEW
00136      4 -1.07,.07,1.36,.61,-.90,-.16,1.32,.59/                               *NEW
00140       DATA (BIAS(I),I=145,180) /-.74,.23,1.29,.56,-.62,.27,1.23,.53,        *NEW
00140      2 -.51,.31,1.18,.50,-.41,.36,1.12,.47,-.31,.38,1.07,.44,-.92,          *NEW
00140      3 .40,1.02,.41,-.14,.41,.96,.38,-.10,.41,.89,.36,-.04,.41,             *NEW
00140      4 .83,.33/                                                             *NEW
00142       DATA (BIAS(I),I=181,216) /.01,.42,.78,.33,.05,.41,.71,.27,            *NEW
00142      2 .07,.38,.64,.24,.09,.35,.57,.21,.10,.32,.50,.19,.12,.30,             *NEW
00142      3 .44,.16,.11,.25,.34,.13,.08,.18,.26,.09,.05,.12,.17,.06/             *NEW
00144       DATA (BIAS(I),I=217,252) /.03,.06,.08,.03,-.00,-.00,-.00,             *NEW
00144      2 -.00,-.05,-.08,-.10,-.04,-.12,-.18,-.21,-.07,-.18,-.28,              *NEW
00144      3 -.32,-.11,-.24,-.37,-.42,-.15,-.30,-.45,-.52,-.18,-.37,              *NEW
00144      4 -.56,-.63,-.21,-.46,-.67,-.75,-.25/                                  *NEW
00146       DATA (BIAS(I),I=253,288) /-.55,-.78,-.86,-.29,-.63,-.89,              *NEW
00146      2 -.97,-.33,-.70,-.99,-1.07,-.36,-.80,-1.10,-1.18,-.40,                *NEW
00146      3 -.91,-1.25,-1.32,-.44,-1.02,-1.38,-1.44,-.48,-1.12,                  *NEW
00146      4 -1.50,-1.56,-.52,-1.22,-1.61,-1.67,-.55,-1.34,-1.76,-1.80,-.59/      *NEW
00150       DATA (BIAS(I),I=289,324) /-1.54,-1.99,-2.00,-.65,-1.73,-2.21,         *NEW
00150      2 -2.19,-.72,-1.89,-2.40,-2.36,-.77,-2.05,-2.58,-2.62,-.82,            *NEW
00150      3 -2.21,-2.77,-2.69,-.87,-2.55,-3.14,-3.01,-.97,-2.84,-3.47,           *NEW
00150      4 -3.29,-1.05,-3.09,-3.76,-3.53,-1.13,-3.31,-4.00,-3.74,-1.19/         *NEW
00152       DATA BLANK/' '/
00154       KS = 0
00155       DO 200 I=1,NOFEAT
00160       K=(FETVEC(I)-1)/4
00161       IF (ISUNC.NE.0.AND.I.EQ.1) KS=K
00163       KR=FETVEC(I)-K*4
00164       K=K+1
00165       SUNA = SUNANG(K-KS)
00166  100  IND=(SUNA-5)*4+KR
00167       SUNCOR(I)=EXTRA(IND)
00170       SABIAS(I)=BIAS(IND)                                                   *NEW
00171  200  CONTINUE
00173       WRITE(6,90)
00175   90 FORMAT(//T61,'SUN ANGLES'/)
00176        WRITE (6,210) (SUNANG(I), I = 1,8)
00204  210 FORMAT(T45,8I5)
00205       WRITE(6,215)
00207  215 FORMAT(//T52,'CORRECTIONS FOR SUN ANGLES')
00207  C
00210       NOFETR = NOFEAT
00211       ISTART = 1
00212       IEND = 16
00213  217 IF (IEND .GE. NOFETR) IEND = NOFETR
00215       IENDS = ISTART + IEND - 1
00216       WRITE(6,220)(BLANK,FETVEC(I),I=ISTART,IENDS)
```

```
00173            WRITE(6,90)
00175         90 FORMAT(//T61,'SUN ANGLES'/)
00176             WRITE (6,210) (SUNANG(I), I = 1,8)
00204        210 FORMAT(T45,A(5)
00205            WRITE(6,215)
00207        215 FORMAT(//T52,'CORRECTIONS FOR SUN ANGLES')
00207      C
00210            NOFETR = NOFEAT
00211            ISTART = 1
00212            IEND = 16
00213        217 IF (IEND .GE. NOFETR) IEND = NOFETR
00215            IENDS = ISTART + IEND - 1
00216            WRITE(6,220)(BLANK,FETVEC(I),I=ISTART,IENDS)

00225        220 FORMAT(//1X,16(A1,'CH(',I2,')',1X))
00226            WRITE(6,230)(SUNCOR(I),I=ISTART,IENDS)
00234        230 FORMAT (3X,'THE SUN ANGLE GAIN FACTORS ARE'/16(2X,F6.2))             *NE*
00235            WRITE (6,231) (SABIAS(I),I=ISTART,IENDS)                               *NE*
00243        231 FORMAT (3X,'THE SUN ANGLE BIAS FACTORS ARE'/16(2X,F6.2))             *NE*
00243      C                                                                          **-1
00244            NOFETR = NOFETR - IEND
00245            ISTART = IENDS + 1
00246            IF (NOFETR .LE. 0) RETURN
00250            GO TO 217
00251            END

     END OF COMPILATION:        NO DIAGNOSTICS.
```

```
0001   000730 377G      0001   000402 400L      0000   000147 4002F     0001   000730 4016      0001   000777 4296
0001   000573 430L      0001   000620 450L      0001   001137 477G      0001   000469 500L      0001   001155 5066
0000   000161 7002F     0000   000166 7003F     0000   000172 8002F     0000   000201 8003F     0001   001023 8004L
0001   001121 900L      0000   000222 9002F     0003   000073 ASAV      0003   000079 ASAVFL    0000 R 000002 BIAS
0000 I 000034 BLANK     0003   000055 BHFILE    0003   000056 BMKEY     0000 I 000062 BUF       0000 I 000046 CNT
0000 I 000035 DASH      0003   000053 DATAPE    0003   000071 DATFIL    0000 R 000005 DEVI      0003   000102 DOTFIL
0003   000101 DOTUNT    0003   000067 DRMWDS    0003   000066 DRUMAD    0003   000062 ERIPTP    0003   000063 ERPKEY
0000 I 000026 ERRLIN    0003 I 000000 HEAD      0003   000057 HISFIL    0003   000060 HISKEY    0000 I 000036 I
0000 R 000003 INCR      0000   000235 INJPS     0000 I 000051 ISTOP     0000 I 000037 J         0000 I 000042 JBIAS
0000 I 000056 JF        0000 I 000057 JFEAT     0000 I 000055 JK        0000 I 000067 JKL       0000 I 000052 JKSV
0000 I 000053 JP        0000 I 000061 JPLOT     0000 I 000040 JPSTR     0000 I 000050 K         0000 I 000000 LOC
0003   000100 MAPFIL    0003   000052 MAPTAP    0003   000064 MAPUNT    0000 I 000043 MAXV      0000 I 000054 MENBAS
0000 I 000061 MENHGH    0000 R 000004 MENI      0000 I 000060 MENLOW    0000 I 000044 MINV      0000 I 000045 MT
0003   000103 NCHPAS    0003   000076 NHSTFI    0003   000075 NHSTUN    0003   000065 NOFILE    0000 I 000033 NOLINE
0000 L 000001 OVRFLG    0000 I 000047 OVRFLW    0003   000070 PAGSIZ    0003   000054 SAVTAP    0003   000077 SCTRUN
0003   000072 STAFIL    0000 I 000006 SYMVEC    0000 I 000012 TAB       0003   000061 TRFORM    0003   000104 TRNSFL
0000 I 000066 WAT
```

```
      C      //SPECOGRM                                                       CLSS0000
             COMPILER(DATA=SHORT)                                             CLSS0010
      C                                                                       CLSS0020
             SUBROUTINE CLSSPC(MEAN,SUBSTD,IDVEC,PTRVEC,PLOT,
            * TITLE,NOFEAT,FETVEC,SPCBAS,SAKEY)                                           *NEW
             IMPLICIT INTEGER (A-H,O-Z)                                       CLSS0040***-1
             LOGICAL OVRFLG                                                   CLSS0050
             REAL MEAN(1),SUBSTD(1),BIAS,INCR,MENI,DEVI
             DOUBLE PRECISION DEV(1),DMEAN(1)
             DIMENSION PLOT(4,NOFEAT,49),PTRVEC(5)
             INCLUDE COMBK6,LIST
             COMMON/GLOBAL/HEAD(42),MAPTAP,DATAPE,SAVTAP,BHFILE,BMKEY,
            *             HISFIL,HISKEY,TRFORM,ERIPTP,ERPKEY,MAPUNT,NOFILE,
            *    DRUMAD,DRMWDS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
            *  ,NHSTUN,NHSTFI,SCTRUN,MAPFIL
            *  ,DOTUNT,DOTFIL,NCHPAS,TRNSFL                                                *NEW
             END                                                                           ***1
             DIMENSION FETVEC(30)
            *, SYMVEC(4),TAB(12),ERRLIN(5)
      C                                                                       CLSS0780
      C      ----------------------------------------------------------------CLSS0790
      C                                                                       CLSS0800
             DATA SYMVEC/'S','+','=','*'/,  INCR/3.0/, NOLINE/49/,            CLSS0810
            1     BLANK /' '/                                                 CLSS0820
      C                                                                       CLSS0830
             DATA  TAB /'12','20','28','36','44','52'                         CLSS0840
            1           ,'60','68','76','84','92','99'/                       CLSS0850
             DATA  ERRLIN /30H('+',T       ,'(',A1,')',I3)    /               CLSS0860
      C                                                                       CLSS0870
             DATA  DASH/'-------'/
      C                                                                       CLSS0880
      C      ----------------------------------------------------------------CLSS0890
      C      ----------------------------------------------------------------CLSS0900
      C                                                                       CLSS0910
      C       SPEC INIZ                                                       CLSS0920
      C                                                                       CLSS0930
             WRITE(6,HEAD)                                                    CLSS0940
```

```
00116      C                                                              CLSS0830
00123            DATA  TAB /'12','20','28','36','44','52',                CLSS0840
00123           1      '60','68','76','84','92','99'/                     CLSS0850
00125            DATA  ERPLIN /30H1'+',T       ,'1',A1,')',I3)   /        CLSS0860
00125      C                                                              CLSS0870
00127            DATA  DASH/'-------'/
00127      C                                                              CLSS0880
00127      C    ----------------------------------------------------------CLSS0890
00127      C    ----------------------------------------------------------CLSS0900
00127      C                                                              CLSS0910
00127      C     SPEC INIZ                                                CLSS0920
00127      C                                                              CLSS0930
00131            WRITE(6,HEAD)                                            CLSS0940

00133            WRITE(6,10021)
00136            WRITE(6,10021)  TITLE   ,(DASH,I=1,2)
00144      10021 FORMAT(    34X,'SPECTRAL PLOT (MEAN,PLUS AND MINUS ONE STD. DEV. )
00144           1 FOR' / )
00145       1002 FORMAT(44X,'TRAINING SUBCLASS   ',A6/47X,2A6/)
00146            WRITE(6,20021)
00150            WRITE(6,9002) SYMVEC(2),IDVEC
00154            GO TO 250                                                CLSS1000
00154      C                                                              CLSS1010
00154      C    ----------------------------------------------------------CLSS1020
00154      C                                                              CLSS1030
00155            ENTRY FLDSPC(DMEAN,DEV,IDVEC,PTRVEC,PLOT,MEAN,SUBSTD,FLDNAM,
00155           * NOFEAT,FETVEC,SPCBAS,SAKEY)                                  *NEW
00157            WRITE(6,HEAD)                                            CLSS1050**-1
00161            WRITE(6,10021)
00163            WRITE(6,1004) IDVEC,(DASH,I=1,2)
00172       1004 FORMAT(47X,'TRAINING FIELD   ',A6/47X,2A6/)
00173            WRITE(6,20021)
00176      20021 FORMAT( / 47X, 'PLOT LEGEND:' / 47X, '------------' )
00176            WRITE(6,2002) SYMVEC(2),IDVEC
00202       2002 FORMAT(60X,A1,' = FIELD   ',A6)
00202      C                                                              CLSS1130
00203            DO 100 J=1,NOFEAT                                        CLSS1140
00206        100 MEAN(J) = DMEAN(J)                                       CLSS1150
00210            DO 399 I=1,NOFEAT
00213        399 SUBSTD(I)=DEV(I)
00215        250 JPSTR = 2                                                CLSS1180
00216            JPLOT = 2                                                CLSS1190
00217            JBIAS = 1                                                CLSS1200
00217      C                                                              CLSS1210
00217      C     COMBINED INIZ                                            CLSS1220
00217      C                                                              CLSS1230
00217      C     IF THE SAKEY=1, RECOMPUTE INCR,SPCBAS                             *NEW
00220        300 IF (SAKEY.EQ.0) GO TO 305                                     *NEW
00220      C     FIND THE MIN(MEAN-ST) AND MAX(MEAN+ST)                            *NEW
00222            MAXV=MEAN(1)+SUBSTD(1)+1.                                         *NEW
00223            MINV=MEAN(1)-SUBSTD(1)                                            *NEW
00224            DO 301 I=2,NOFEAT                                                 *NEW
00227            MT=MEAN(I)+SUBSTD(I)+1.                                           *NEW
00230            IF (MAXV.LT.MT) MAXV=MT                                           *NEW
00232            IF (SPCBAS.NE.-999) GO TO 301                                     *NEW
00234            MT=MEAN(I)-SUBSTD(I)                                              *NEW
00235            IF (MINV.GT.MT) MINV=MT                                           *NEW
00237        301 CONTINUE                                                          *NEW
00241            IF (SPCBAS.NE.-999) MINV = SPCBAS                                 *NEW
00243            SPCBAS=MINV                                                       *NEW
00244            INCR=(MAXV-MINV)/49 + 1.0                                         *NEW
00245            WRITE(6,303) MAXV,SPCBAS,INCR                                     *NEW
00252        303 FORMAT(//2X,'MAXV=',I10,' SPCBAS=',I10,' INCR=',F8.2)             *NEW
00253        305 BIAS=SPCBAS                                                       *NEW
00254            WRITE(6,4002)                                                     **-1
00256            CNT = BIAS                                               CLSS1250
00257            OVRFLW = 0                                               CLSS1260
00260            OVRFLG = .TRUE.                                          CLSS1270
00261            DO 350 J=1,NOFEAT
00264            DO 350 I=1,4                                             CLSS1290
00267            DO 350 K=1,49                                            CLSS1300
00272        350 PLOT(I,J,K) = BLANK                                      CLSS1310
```

ORIGINAL PAGE IS
OF POOR QUALITY

```
      LOC=1
      IST)P=NOFEAT
      IF(NOFEAT.GT.12)ISTOP=12
C
C     SET UP 'PLOT' MATRIX
C
      JKSV=0
  400 DO 690 JP=JPSTR,JPLOT
      MENBAS = (PTRVEC(JP-JBIAS)-1)*NOFEAT
      IF( OVRFLG) WRITE(6,4002)
 4002 FORMAT(' ')
      OVRFLG = .FALSE.
      JK=JKSV
      JF = 0
      DO 500 JFEAT=LOC,ISTOP
            JK = JK+JFEAT
            MENI = MEAN(MENBAS+JFEAT)
      DEVI=SURSTD(MENBAS+JFEAT)
            MENLOW = (MENI-DEVI-BIAS)/INCR+0.5
            MENHGH = (MENI+DEVI-BIAS)/INCR+0.5
            IF( MENLOW .GE. 1) GO TO 430
      OVRFLW = MENI-DEVI+0.5
            MENLOW = 1
  430       IF(MENHGH .LE. NOLINE)  GO TO 450
      OVRFLW = MENI+DEVI+0.5
            MENHGH = NOLINE
       IF (MENLOW.GT.MENHGH) GO TO 306
  450       DO 490 J =MENLOW,MENHGH
  490          PLOT(JP,JFEAT,J) = SYMVEC(JP)
      JF=JF+1
      IF(OVRFLW .EQ. 0 ) GOTO 500
      ERRLIN(2)=TAR(JF)
      WRITE(6,ERRLIN)  SYMVEC(JP),OVRFLW
      OVRFLG = .TRUE.
      OVRFLW = 0
  500       CONTINUE
  690    CONTINUE
C
C     PRINT OUT 'PLOT' MATRIX
      WRITE(6,3004) CNT,CNT
 3004  FORMAT(3X,I4,2X,'I------I',12('-------I'),1X,I4)
      CNT = CNT+INCR
  700 DO 790 K= 1,NOLINE
      WRITE(6,7002)CNT,((PLOT(I,J,K),I=1,4),J=LOC,ISTOP)
      WRITE(6,7003)CNT
 7002  FORMAT(3X,I4,2X,'I ',12(4X,4A1))
 7003  FORMAT('+',111X,'I',1X,I4)
         CNT = CNT+INCR
  790    CONTINUE
C
  800 WRITE(6,3004)  CNT, CNT

      WRITE(6,8002)  ( FETVEC(I), I=LOC,ISTOP)
 8002 FORMAT( / 1X, 'CHANNEL NO.' , 3X, I2, ( 11(6X,I2) )  )
      WRITE(6,8003)  DASH,DASH
 8003 FORMAT(1X, 2A6 ///)
C
       GO TO 8004
```

ORIGINAL PAGE IS
OF POOR QUALITY

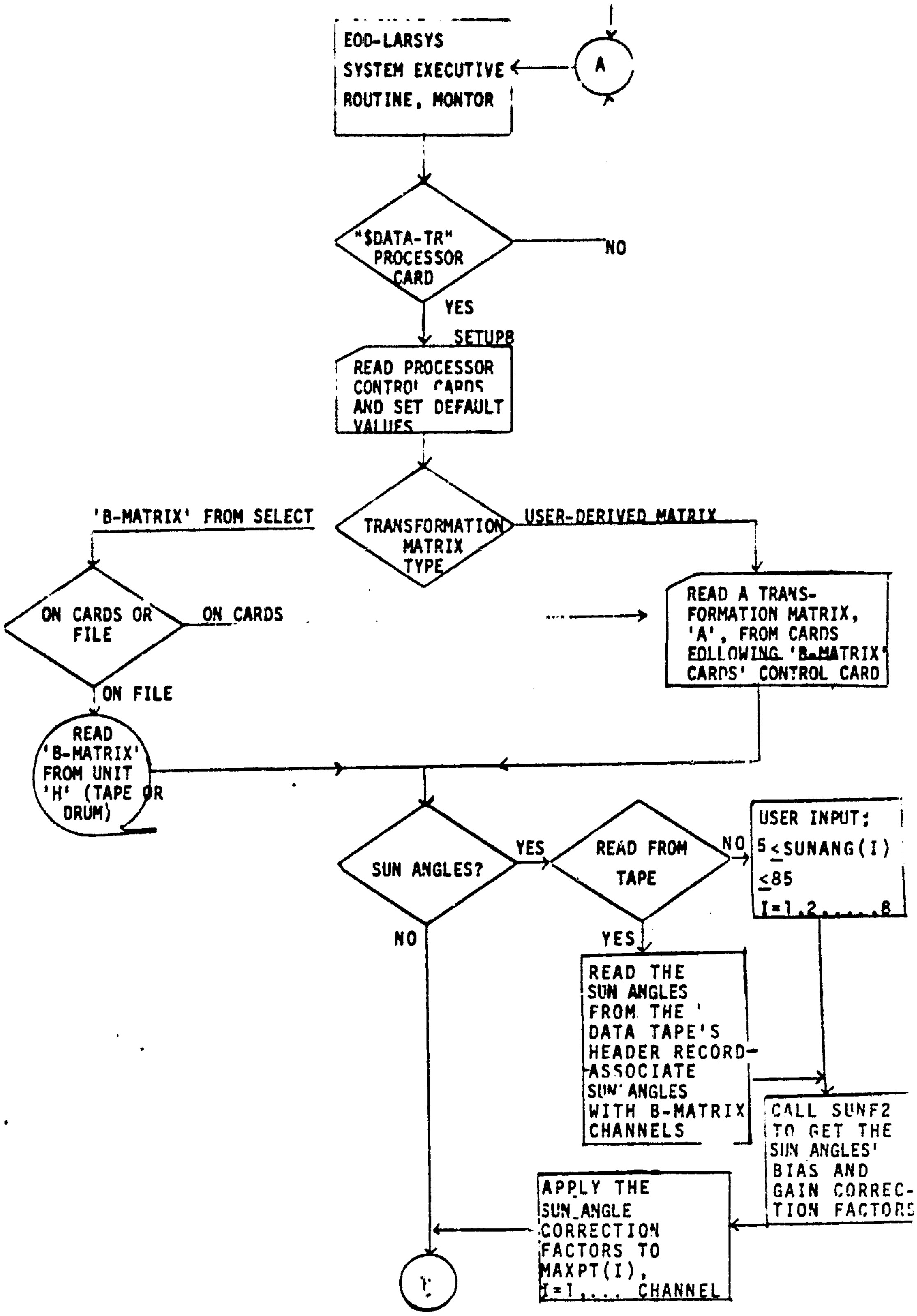
```
                                                                          *NEW
00411      7002  FORMAT(3X,I4,2X,'I  ',12(4X,4A1))                        *NEW
00412      7003  FORMAT('+',111X,'I',1X,I4)                     CLSS1720***2
00413              CNT = CNT+INCR                                CLSS1730
00414       790    CONTINUE
00414      C
00416      800   WRITE(6,3004)  CNT, CNT
00416      C
00422            WRITE(6,8002)  ( FETVEC(I), I=LOC,ISTOP)
00430      8002  FORMAT( / 1X, 'CHANNEL NO.' , 3X, I2, ( 11(6X,I2) )  )
00431            WRITE(6,8003)  DASH,DASH
00435      8003  FORMAT(1X, 2A4 ///)
00435      C                                                              *NEW
00436             GO TO 8004

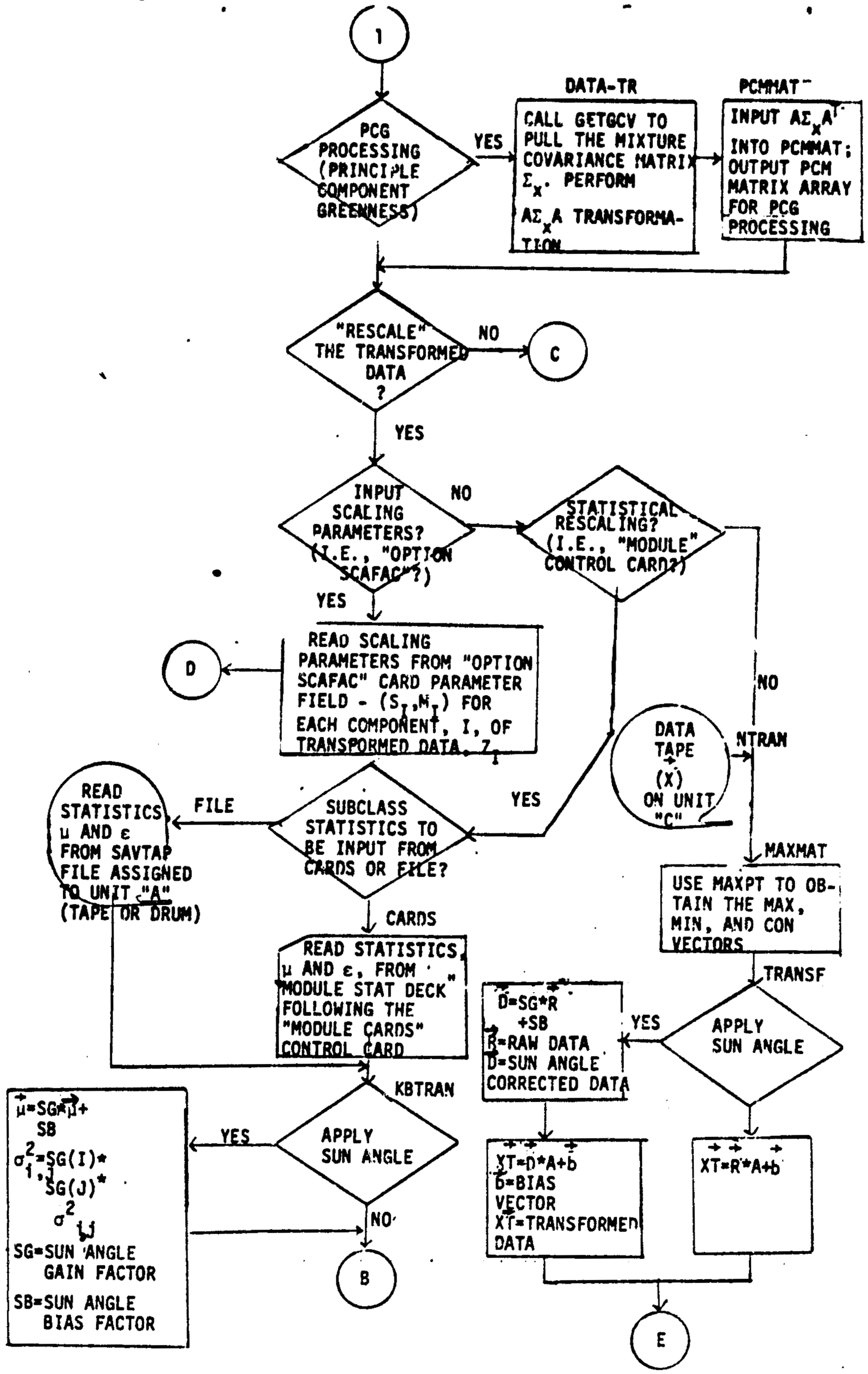

00437      306   WRITE(6,307)                                             *NEW
00441      307   FORMAT(//2X,'IN CLSSPC,MENLOW IS GREATER THAN MENHGH = NO *NEW
00441           * PLOTTING WILL BE DONE')                                 *NEW
00442            RETURN                                                   *NEW
00443      8004  IF (ISTOP.EQ.NOFEAT) RETURN                              ***1
00445            CNT=BIAS
00446            JKSV=JK
00447            LOC=LOC+12
00450            ISTOP=ISTOP+12
00451            IF(ISTOP.GT.NOFEAT)ISTOP=NOFEAT
00453            GO TO 400                                       CLSS1830
00453      C                                                     CLSS1840
00453      C      ----------------------------------------------CLSS1850
00453      C                                                     CLSS1860
00453      C
00454            ENTRY MULSPC(MEAN,SUBSTD,JDVEC,PTRVEC,PLOT,              *NEW
00454           * NOFEAT,FETVEC,SPCBAS,SAKEY)                             ***1
00456            DIMENSION JDVEC(1,1),BUF(4)
00457            WRITE(6,2002))                                  CLSS1890
00461            JPSTR =1                                        CLSS1900
00462            JPLOT = PTRVEC(5)                               CLSS1910
00463            IF(JPLOT .NE. 1) GOTO 900                       CLSS1920
00465            JPSTR = 2                                       CLSS1930
00466            JPLOT = 2                                       CLSS1940
00467            JBIS = 1                                        CLSS1950
00470            WAT=PTRVEC(1)
00471            WRITE(6,9002) SYMVEC(2),JDVEC(1,WAT)            CLSS1970
00475            GOTO 300                                        CLSS1980
00476      900   DO 22 JKL=JPSTR,JPLOT                @ SUB=SUB  CLSS1990
00501            WAT=PTRVEC(JKL)
00502       22   BUF(JKL)=JDVEC(1,WAT)
00504            WRITE(6,9002)   (SYMVEC(I),BUF(I),
00504           *       I=JPSTR,JPLOT) @ SEE DEFINE-SUBSCRIPTED SUBSCRIPT  CLSS2030
00513      9002  FORMAT(57X,A1,' = SUBCLASS ',A6)                CLSS2050
00514            JBIAS = 0                                       CLSS2060
00515            GO TO 300                                       CLSS2070
00516             END

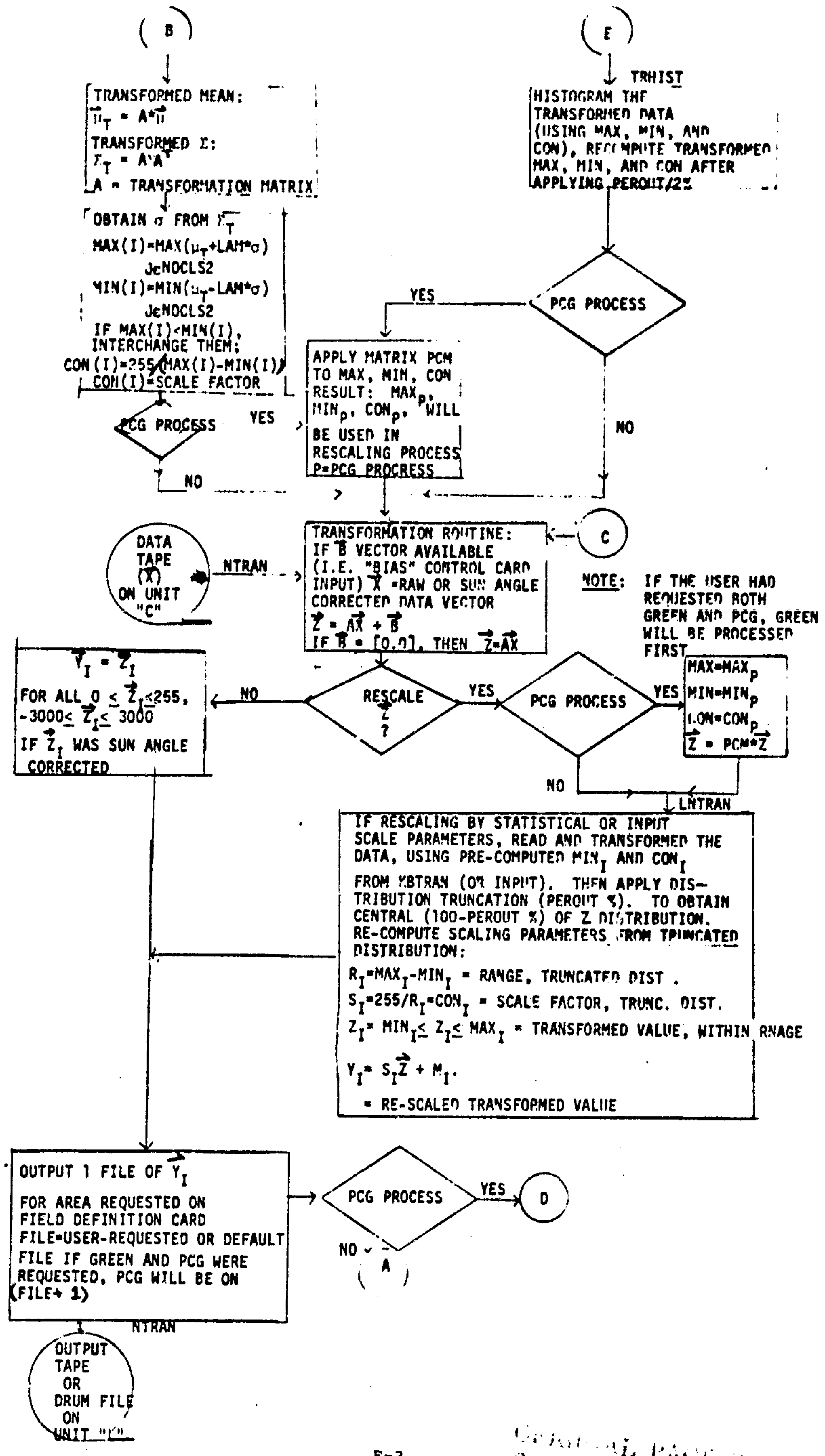
     END OF COMPILATION:       NO DIAGNOSTICS.
  CLSSPC          SYMBOLIC          20 JUN 77  01:53:11  0  02221674  19  161  (DELETED)
  CLSSPC   CODE   RELOCATABLE       20 JUN 77  01:53:11  1  01477252  36    1  (DELETED)
                                                         0  01477316  14   74
```

APPENDIX E

FUNCTIONAL FLOWCHART - DATA-TR PROCESSOR


EOD-LARSYS SYSTEM EXECUTIVE ROUTINE, MONTOR
A
"$DATA-TR" PROCESSOR CARD
NO
YES
SETUPB
READ PROCESSOR CONTROL CARDS AND SET DEFAULT VALUES
TRANSFORMATION MATRIX TYPE
'B-MATRIX' FROM SELECT
USER-DERIVED MATRIX
ON CARDS OR FILE
ON CARDS
ON FILE
READ A TRANSFORMATION MATRIX, 'A', FROM CARDS FOLLOWING 'B-MATRIX CARDS' CONTROL CARD
READ 'B-MATRIX' FROM UNIT 'H' (TAPE OR DRUM)
SUN ANGLES?
YES
NO
READ FROM TAPE
NO
YES
USER INPUT; 5≤SUNANG(I) ≤85 I=1,2,...,8
READ THE SUN ANGLES FROM THE DATA TAPE'S HEADER RECORD-ASSOCIATE SUN ANGLES WITH B-MATRIX CHANNELS
CALL SUNF2 TO GET THE SUN ANGLES' BIAS AND GAIN CORRECTION FACTORS
APPLY THE SUN ANGLE CORRECTION FACTORS TO MAXPT(I), I=1,... CHANNEL


1
PCG PROCESSING (PRINCIPLE COMPONENT GREENNESS)
YES
DATA-TR
CALL GETGCV TO PULL THE MIXTURE COVARIANCE MATRIX Σ_x. PERFORM $A\Sigma_x A$ TRANSFORMATION
PCMMAT
INPUT $A\Sigma_x A'$ INTO PCMMAT; OUTPUT PCM MATRIX ARRAY FOR PCG PROCESSING
"RESCALE" THE TRANSFORMED DATA ?
NO
C
YES
INPUT SCALING PARAMETERS? (I.E., "OPTION SCAFAC"?)
NO
STATISTICAL RESCALING? (I.E., "MODULE" CONTROL CARD?)
YES
READ SCALING PARAMETERS FROM "OPTION SCAFAC" CARD PARAMETER FIELD - (S_I,M_I) FOR EACH COMPONENT, I, OF TRANSFORMED DATA, Z_I
D
NO
DATA TAPE ($\vec{X}$) ON UNIT "C"
NTRAN
YES
SUBCLASS STATISTICS TO BE INPUT FROM CARDS OR FILE?
FILE
READ STATISTICS μ AND ε FROM SAVTAP FILE ASSIGNED TO UNIT "A" (TAPE OR DRUM)
CARDS
READ STATISTICS, μ AND ε, FROM "MODULE STAT DECK" FOLLOWING THE "MODULE CARDS" CONTROL CARD
MAXMAT
USE MAXPT TO OBTAIN THE MAX, MIN, AND CON VECTORS
TRANSF
APPLY SUN ANGLE
YES
$\vec{D}$=SG*$\vec{R}$ +SB
$\vec{R}$=RAW DATA
$\vec{D}$=SUN ANGLE CORRECTED DATA
KBTRAN
APPLY SUN ANGLE
YES
$\vec{\mu}$=SG*$\vec{\mu}$+ SB
$\sigma^2_{i,j}$=SG(I)* SG(J)* $\sigma^2_{i,j}$
SG=SUN ANGLE GAIN FACTOR
SB=SUN ANGLE BIAS FACTOR
NO
B
$\vec{XT}$=$\vec{D}$*A+$\vec{b}$
$\vec{b}$=BIAS VECTOR
$\vec{XT}$=TRANSFORMED DATA
$\vec{XT}$=$\vec{R}$*A+$\vec{b}$
E


B
TRANSFORMED MEAN:
$\vec{\mu}_T = A*\vec{\mu}$
TRANSFORMED Σ:
$\Sigma_T = A\Sigma A^T$
A = TRANSFORMATION MATRIX
OBTAIN σ FROM Σ_T
MAX(I)=MAX(μ_T+LAM*σ)
J∈NOCLS2
MIN(I)=MIN(μ_T-LAM*σ)
J∈NOCLS2
IF MAX(I)<MIN(I), INTERCHANGE THEM;
CON(I)=255/(MAX(I)-MIN(I))
CON(I)=SCALE FACTOR
PCG PROCESS
YES
NO
E
TRHIST
HISTOGRAM THE TRANSFORMED DATA (USING MAX, MIN, AND CON), RECOMPUTE TRANSFORMED MAX, MIN, AND CON AFTER APPLYING PEROUT/2%
PCG PROCESS
YES
NO
APPLY MATRIX PCM TO MAX, MIN, CON RESULT: MAX_P, MIN_P, CON_P, WILL BE USED IN RESCALING PROCESS P=PCG PROCRESS
DATA TAPE ($\vec{X}$) ON UNIT "C"
NTRAN
TRANSFORMATION ROUTINE: IF $\vec{B}$ VECTOR AVAILABLE (I.E. "BIAS" CONTROL CARD INPUT) $\vec{X}$ =RAW OR SUN ANGLE CORRECTED DATA VECTOR
$\vec{Z} = A\vec{X} + \vec{B}$
IF $\vec{B}$ = [0,0], THEN $\vec{Z}=A\vec{X}$
C
NOTE: IF THE USER HAD REQUESTED BOTH GREEN AND PCG, GREEN WILL BE PROCESSED FIRST
$\vec{Y}_I = \vec{Z}_I$
FOR ALL $0 \le \vec{Z}_I \le 255$, $-3000 \le \vec{Z}_I \le 3000$
IF $\vec{Z}_I$ WAS SUN ANGLE CORRECTED
NO
RESCALE $\vec{Z}$?
YES
PCG PROCESS
YES
MAX=MAX_P
MIN=MIN_P
CON=CON_P
$\vec{Z}$ = PCM*$\vec{Z}$
NO
LNTRAN
IF RESCALING BY STATISTICAL OR INPUT SCALE PARAMETERS, READ AND TRANSFORMED THE DATA, USING PRE-COMPUTED MIN_I AND CON_I FROM XBTRAN (OR INPUT). THEN APPLY DISTRIBUTION TRUNCATION (PEROUT %). TO OBTAIN CENTRAL (100-PEROUT %) OF Z DISTRIBUTION. RE-COMPUTE SCALING PARAMETERS FROM TRUNCATED DISTRIBUTION:
$R_I=MAX_I-MIN_I$ = RANGE, TRUNCATED DIST .
$S_I=255/R_I=CON_I$ = SCALE FACTOR, TRUNC. DIST.
$Z_I= MIN_I \le Z_I \le MAX_I$ = TRANSFORMED VALUE, WITHIN RNAGE
$Y_I= S_I\vec{Z} + M_I$.
= RE-SCALED TRANSFORMED VALUE
OUTPUT 1 FILE OF $\vec{Y}_I$
FOR AREA REQUESTED ON FIELD DEFINITION CARD FILE=USER-REQUESTED OR DEFAULT FILE IF GREEN AND PCG WERE REQUESTED, PCG WILL BE ON (FILE+ 1)
NTRAN
OUTPUT TAPE OR DRUM FILE ON UNIT "E"
PCG PROCESS
YES
D
NO
A

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APPENDIX F

LISTINGS - DATA-TR PROCESSOR

```
0021        VTRAN
0020        XIT
0021        NWDUS
0022        N1025
0023        N1015
0024        NERR3S

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

0001   000005 126G     0001   000131 157G     0001   000146 164G     0001   000222 20L     0001   000226 207G
0001   000174 21L      0001   000345 227G     0001   003255 30L      0000   005741 41F     0000   005750 42F

0001     000312 50L      0001     000343 60L      0000     005753 80F      0001     000406 81L      0000     005765 82F
0000 I   005732 A        0000 R   001253 ACON     0000 I   005723 ADDNUM   0000 R   001213 AMAX     0000 R   001233 AMIN
0005     000073 ASAV     0005     000074 ASAVFL   0003     000006 AVAK2    0000 R   000040 BIAS     0000 R   000060 BMAT
0005     000055 BMFILE   0005     000056 BMKEY    0000 I   005715 BMIRIG   0003     000010 CLSID2   0003     000301 CLSVC2
0000 I   005646 COMNT    0000 R   001020 CON      0000 R   001042 CONMIN   0003     000007 COVAR2   0000 I   005725 CP
0005     000053 DATAPE   0005     000071 DATFIL   0005     003102 DOTFIL   0005     000101 DOTUNT   0005     000067 DRMWDS
0005     000066 DRUMAD   0005     000062 ERIPTP   0005     003063 ERPKEY   0003     000015 FETVC2   0004     000010 FETVEC
0000 I   002502 FILHIS   0004     000002 FLDINF   0000 I   005736 FLDNAM   0003     000013 FLDSV2   0000 R   001273 GCOV
0004     000051 GIC      0003     000760 GROUPS   0003     000663 GRPCHK   0003     000566 GRPDEX   0003     000472 GRPNAM
0000 I   005622 HDR1     0000 I   005634 HDR2     0005 I   003000 HEAD     0005     000057 HISFIL   0005     000060 HISKEY
0000 I   005710 I        0000 I   005733 ID       0000 I   005660 INDATE   0000     006407 INJPS    0000 I   005712 IPL19
0000 I   005711 IPL2     0000 I   005740 IPL31    0000 I   005734 IPP      0000 I   005730 J        0003     000375 KEPPTS
0000 I   005717 LAM      0000 I   005735 LAR      0000 I   005714 LCOMB    0000 I   005731 M        0005     000100 MAPFIL
0005     000052 MAPTAP   0005     000064 MAPUNT   0000 R   000000 MAX      0000 I   002444 MAXPT    0000 R   000020 MIN
0000 I   005727 N        0000 I   005737 NC       0000 I   005726 NCHAN    0005     000103 NCHPAS   0000 I   005713 NF
0005     000076 NHSTFI   0005     000075 NHSTUN   0003     000003 NOCLS2   0004 I   000001 NOFEAT   0003 I   000002 NOFET2
0005     000065 NOFILE   0003     000005 NOFLD2   0003     000471 NOGRP    0003 I   000001 NOSUB2   0000 I   005724 NPUN
0000 I   001100 NSUB     0004     000000 OUTFMT   0005     000072 PAGSIZ   0004     000046 PCF      0004 I   000047 PCGC
0004 R   000146 PCM      0000 I   005716 PERDUT   0000 R   002435 R        0000 I   005722 RESCAL   0004     000110 SABIAS
0004     000052 SAGAIN   0004     000050 SAKEY    0005 I   003054 SAVTAP   0000 I   005720 SCAFLG   0005     000077 SCTRUN
0005 I   000072 STAFIL   0003 I   000012 SUBDS2   0003     003011 SUBNO2   0003     000166 SUBPTR   0003     000053 SUBVC2
0000 R   002125 T        0003     000004 TOTVT2   0000 I   005721 TRANSF   0005     000061 TRFORM   0005     000104 TRNSFL
0003     000003 VARSZ2   0000 I   005662 VERTCS   0003     000014 VERTX2

00101      1*            SUBROUTINE DATATR(ARRAY,TOP)                                          DATR0001
00101      2*     C
00103      3*            IMPLICIT INTEGER(A-Z)                                                 DATR0002
00103      4*     C                                                                            DATR0003
00103      5*     C                                                                            DATR0004
00104      6*            REAL   BIAS(16), BMAT(480), MAX(16), MIN(16), CON(16), CONMIN(32)     DATR0005
00105      7*             DIMENSION NSUB(75)                                                               *NEW
00105      8*     C                                                                            DATR0006
00106      9*            REAL   AMAX(16), AMIN(16), ACON(16)                                   DATR0007
00107     10*             REAL PCM                                                                         *NEW
00110     11*             REAL GCOV(480),T(280),R(7)                                                       *NEW
00110     12*     C                                                                            DATR0008
00110     13*     C                                                                            DATR0009
00111     14*            DIMENSION   ARRAY(TOP),  MAXPT(30),  FILHIS(1616)                     DATR0010
00111     15*     C                                                                            DATR0011
00112     16*            DIMENSION   HDR1(10) , HDR2(10) , COMNT(10) , INDATE(2)               DATR0012
00113     17*            INCLUDE COMRK1,LIST                                                   DATR0013
00114     17*            COMMON/INFORM/NOCLS2,NOSUB2,NOFET2,VARSZ2,TOTVT2,NOFLD2,
00114     17*           *          AVAK2,COVAR2,CLSID2,SUBNO2,SUBDS2,FLDSV2,VERTX2,
00114     17*           *          FETVC2(30),SUBVC2(75),SUBPTR(75),CLSVC2(60),
00114     17*           *          KEPPTS(60),NOGRP,GRPNAM(60),GRPDEX(61),
00114     17*           *          GRPCHK(61),GROUPS(124)
00115     17*            END
00116     18*            INCLUDE COMRK9,LIST                                                   DATR0014
00116     18*     C DATA TRANSFORMATION COMMON BLOCK
00117     18*            COMMON/TRBLCK/OUTFMT,NOFEAT,FLDINF(6),FETVEC(30),PCF,                             *NEW
00117     18*           1 PCGC,SAKEY,GIC,SAGAIN(30),SABIAS(30),PCM(49)                                     *NEW
00120     18*            END                                                                               **-1
00121     19*            INCLUDE COMRK4,LIST                                                   DATR0015
00122     19*            COMMON/GLOBAL/HEAD(42),MAPTAP,DATAPE,SAVTAP,BMFILE,BMKEY,
00122     19*           *          HISFIL,HISKEY,TRFORM,ERIPTP,ERPKEY,MAPUNT,NOFILE,
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00122      •    DRUNAD,DRNWDS,PAGSIZ,DATFIL,STAFIL,ASAV,A'AVFL
00122      •   ,NHSTUN,NHSTFI,SCTRUN,MAPFIL                                   •NE•
00122      •   ,DOTUNT,DOTFIL,NCHPAS,TRHSFL                                   ••-1
00123       END                                                     DATR0016
C0124       DIMENSION VERTCS(2,11)                                  DATR0017
00124     C                                                         DATR0018
00124     C     RESCALING METHOD IS DETERMINED IN SETUPB :          DATR0019
C0124     C                                                         DATR0020
00124     C     SCAFLG = 1 .  RESCALE BY HISTOGRAM METHOD           DATR0021
00124     C                                                         DATR0022
00124     C     SCAFLG = 2 . RESCALE BY STATISTICS METHOD           DATR0023
00124     C                                                         DATR0024
00124     C     SCAFLG = 3 . RESCALE WITH USER-INPUT SCALING PARAMETERS  DATR0025
00124     C                                                         DATR0026
00124     C                                                         DATR0027
C0124     C     IF THE FLAG   RESCAL   IS ZERO, NO RESCALING OCCURS DATR0028
C0124     C                                                         DATR0029
C0124     C                                                         DATR0030
C0124     C                                                         DATR0031
C0125       DO 10 I=1,10                                            DATR0032
C0130       IPL2 = I + 2                                            DATR0033
C0131       HDR1(I) = HEAD(IPL2)                                    DATR0034
C0132       IPL19 = I + 19                                          DATR0035
C0133       HDR2(I) = HEAD(IPL19)                                   DATR0036
C0134    10 COMNT(I) = 4H                                           DATR0037
C0134     C                                                         DATR0038
00136       INDATE(1) = HEAD(15)                                    DATR0039
C0137       INDATE(2) = HEAD(16)                                    DATR0040
00137     C                                                         DATR0041
00137     C                                                         DATR0042
C0140       NF = 0                                                  DATR0043
C0140     C                                                         DATR0044
C0141       CALL SETUPB(BMAT,LCOMB,RMTRIG,PFROUT,MAXPT,ARRAY,LAM,    DATR0045
00141      •   SCAFLG , TOP, TRANSF, RESCAL, BIAS, ADDNUM, CONMIN, NPUN )   DATR0046
C0141     C CALCULATE THE GREEN IMAGE COVARIANCE MATRIX IF PLGC=1           •NE•
C0142       IF (PCGC.NE.1) GO TO 21                                         •NE•
00144       CP=STAFIL+2                                                     •NE•
00144     C CALL GETGCV TO READ THE PCG DATA COVARIANCE MATRIX              •NE•
C0144     C CALCULATED IN STAT                                              •NE•
00145       CALL GETGCV(SAVTAP,CP,NCHAN,GCOV)                               •NE•
C0146       IF (NCHAN.NE.NOFEAT) GO TO 81                                   •NE•
C0150       CALL MTMLSA(BMAT,GCOV,T,LCOMB,NOFET2)                           •NE•
00151       CALL MTMDAT(T,BMAT,GCOV,LCOMB,NOFET2,LCOMB,MAX,I)              •NE•
C0151     C CALCULATE THE PCM MATRIX                                        •NE•
C0152       WRITE(6,40)                                                     •NE•
C0154    40 FORMAT(//2X,'THE INPUT MATRIX TO PCMMAT IS'/)                   •NE•
00155       N=1                                                             •NE•
C0156       DO 41 J=1,LCOMB                                                 •NE•
C0161       M=J*LCOMB                                                       •NE•
00162       WRITE(6,42) (GCOV(A),A=N,M)                                     •NE•
00170    41 N=M+1                                                           •NE•
00172    42 FORMAT(1H0,8(F12.6))                                            •NE•
00173       ID=(LCOMB*(LCOMB+1))/2                                          •NE•
00174       CALL PCMMAT(T,PCM,T,R,LCOMB,ID)                                 •NE•
C0175    21 IF (RESCAL.EQ.0) GO TO 50                         DATR0048••-1
C0175     C                                                   DATR0049
00175     C
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00154        49   FORMAT(///2X,*THE INPUT MATRIX TO PCMM      */)                        *NEW
00155             N=1                                                                    *NEW
00156             DO 41 J=1,LCOMB                                                        *NEW
00161             M=J+LCOMB                                                              *NEW
00162             WRITE(6,42) (GCOV(A),A=N,M)                                            *NEW
00170        41   N=M+1                                                                  *NEW
00172        42   FORMAT(1H0,8(F12.6))                                                   *NEW
00173             ID=(LCOMB*(LCOMB+1))/2                                                 *NEW
00174             CALL PCMMAT(T,PCM,T,R,LCOMB,ID)                                        *NEW
00175        21   IF (RESCAL.EQ.0) GO TO 50                                              *NEW
00175        C                                                                 DATR0048***-1
00175        C                                                                 DATR0049

00177             IF (SCAFLG.EQ.1) GO TO 30                                    DATR0050
00177        C                                                                 DATR0051
00201             IF (SCAFLG.EQ.2) GO TO 20                                    DATR0052
00201        C                                                                 DATR0053
00203             IF( SCAFLG .EQ. 3 )                                          DATR0054
00203        C                                                                 DATR0055
00203        *        CALL SETREM ( CONMIN, CON, MIN, ADUNUM, LCOMB )           DATR0056
00205             GO TO 50                                                     DATR0057
00205        C                                                                 DATR0058
00205        C                                                                 DATR0059
00205        C      IF RESCALING BY THE STATISTICS METHOD, APPLY TRANSFORMATION TO DATR0060
00205        C      STATS ( MEANS, COVARIANCES ) , OBTAIN TRANSFORMED MAX AND MIN  DATR0061
00205        C      USING TRANSFORMED STATS .                                  DATR0062
00205        C                                                                 DATR0063
00206        20    DO 12 I=1,NOSUB2                                                      *NEW
00211             IPP = SUBDS2 + I - 1                                                   *NEW
00212        12   NSUB(I) = ARRAY(IPP)                                                   *NEW
00214              CALL KBTRAN(BMAT,LCOMB,ARRAY,LAM,MAX,MIN,CON,TRANSF,NSUB)             *NEW
00214        C                                                                 DATR0065***-1
00215             GO TO 50                                                     DATR0066
00215        C                                                                 DATR0067
00215        C                                                                 DATR0068
00215        C      IF RESCALING BY THE HISTOGRAM METHOD,  OBTAIN THE PREDICTED    DATR0069
00215        C      MAX AND MIN OF EACH COMPONENT OF THE TRANSFORMED DATA      DATR0070
00215        C      ( VIA  MAXMAT )  AND PERFORM A HISTOGRAM OF THE TRANSFORMED    DATR0071
00215        C      DATA ( VIA  TRHIST ), IN ORDER  TO OBTAIN THE RESCALING    DATR0072
00215        C      PARAMETERS .  CON  AND  MIN .                              DATR0073
00215        C                                                                 DATR0074
00215        C                                                                 DATR0075
00216        30   CALL  MAXMAT ( AMAX, AMIN, ACON, BMAT, LCOMB, MAXPT )        DATR0076
00217            CALL TRHIST(ARRAY,AMAX,AMIN,ACON,BMAT,LCOMB,PEROUT,           DATR0077
00217           *FILHIS,TOP,LAR,FLONAM,NC,VERTCS,MAX,MIN,CON,                  DATR0078
00217           *     BIAS)                                                    DATR0079
00217        C                                                                 DATR0080
00217        C                                                                 DATR0081
00217        C      APPLY TRANSFORMATION TO INPUT DATA, RESCALE ( IF OPTED ), APPLYDATR0082
00217        C $  REJECTION ( PEROUT ) TO DISTRIBUTION OF TRANSFORMED DATA, AND   DATR0083
00217        C      OUTPUT THE TRANSFORMED DATA ON THE FILE  .  INFORM .       DATR0084
00217        C                                                                 DATR0085
00217        C                                                                 DATR0086
00220             IF (LAR.EQ.0) GO TO 60                                       DATR0087
00220        C                                                                 DATR0088
00220        C                                                                 DATR0089
00222        50 CALL LNTRAN(ARRAY,MAX,MIN,CON,BMAT,LCOMB,BMTRIG,SCAFLG,PEROUT, DATR0090
00222          * FILHIS,TOP,LAR,FLONAM,NC,VERTCS, RESCAL, BIAS,                DATR0091
00222          *  NF , NPUN )                                                  DATR0092
00222        C                                                                 DATR0093
00222        C                                                                 DATR0094
00223             IF (SCAFLG.EQ.1) GO TO 30                                    DATR0095
00223        C                                                                 DATR0096
00223        C                                                                 DATR0097
00225        60 CONTINUE                                                       DATR0098
00225        C                                                                 DATR0099
00226             DO 70 I=1,10                                                 DATR0100
00231             IPL2 = I + 2                                                 DATR0101
00232             HEAD(IPL2) = HOR1(I)                                         DATR0102
00233             IPL19 = I + 19                                               DATR0103
00234             HEAD(IPL19) = HOR2(I)                                        DATR0104
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00235                IPL31 = I + 31                                        DATR0105
00236             70 HEAD(IPL31) = COMNT(I)                                DATR0106
00236        C                                                             DATR0107
00240                HEAD(15) = INDATE(1)                                  DATR0108
00241                HEAD(16) = INDATE(2)                                  DATR0109
00241        C                                                             DATR0110
00241        C                                                             DATR0111
00242                WRITE (6,80)                                          DATR0112
00244             80 FORMAT(///////////// 10X, '*** SDATA-TR  COMPLETED  ***  //////)  DATR0113
00244        C                                                             DATR0114
00245                RETURN                                                DATR0115
00246          81     WRITE (6,82) NOFFAT,NCHAN                                  *NEW
00252          82     FORMAT (//2X,'THE DIMENSION OF BMAT',I3,/' AND DCOV',I3,' ARE NOT   *NEW
00252             C COMPATIBLE - CALL EXIT')                                     *NEW
00253                CALL EXIT                                                   *NEW
00254                END                                                   DATR0116

     END OF COMPILATION:        NO  DIAGNOSTICS.
   DATATR          SYMBOLIC                           20 JUN 77  01:53:36   0  02260142   14   117  (DELETED)
   DATATR   CODE   RELOCATABLE                        20 JUN 77  01:53:36   1  01512606   36     1  (DELETED)
                                                                            0  01512652   14    23
```

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0000 L 000156 NUDTAP     0013 I 000000 NUMBER     0000 L 003161 NUSFIL     0000 I 000160 NUSTAP     0010 I 000000 NXTCHR
0000 I 000152 OP         0000 I 000234 ORIG       0006 I 000000 OUTFMT     0005   000070 PAGSIZ     0006 I 000046 PCF
0006 I 000047 PCGC       0006   000146 PCM        0006 R 000110 SABIAS     0006 R 000052 SAGAIN     0006 I 000050 SAKEY
0006   000006 SAMEND     0006   000007 SAMINC     0006   000005 SAMSTR     0005 I 000054 SAVTAP     0000 I 000263 SC
0005   000077 SCTRUN     0000 I 000026 SINVEC     0003   000014 SHINC      0003   000013 SMSTP      0003   000012 SMSTR
0005 I 000072 STAFIL     0004 I 000012 SUBDS2     0004   000311 SUBNO2     0004   000166 SUBPTR     0004 I 000053 SUBVC2
0003 I 000000 SUNANG     0000 I 000250 T          0000 I 000264 TEMP       0004   000004 TOTVT2     0005 I 000061 TRFORM
0005 I 000104 TRNSFL     0004 I 000003 VARSZ2     0000 I 000257 VECMAX     0004   000014 VERTX2     0000 I 000251 Z
0000 I 000226 ZERO


00101      1*         SUBROUTINE SETUP8(BMAT,LCOMB,BMTRIG,PEROUT,MAXPT,ARRAY,LAM,SCAFLG,  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(960)                          SET00004
00105      6*         INCLUDE CMBK16,LIST                                                          *NEW
00106      6*         COMMON/ISOLNK/SUNANG(8),ISUNT,ISUNC,SMSTR,SMSTP,SMINC,LINSKP
00107      6*         END
00110      7*         DIMENSION MAXPT(30)                                                 SET00005
00111      8*         DIMENSION ARRAY(1)                                                  SET00006
00112      9*         DIMENSION EQUVEC(2)                                                 SET00007
00112     10*      C                                                                      SET00008
00112     11*      C                                                                      SET00009
00113     12*         INCLUDE COMBK1,LIST                                                 SET00010
00114     12*         COMMON/INFORM/NOCLS2,NOSUB2,NOFET2,VARSZ2,TOTVT2,NOFLD2,
00114     12*        *           AVAR2,COVAR2,CLSID2,SUBNO2,SUBDS2,FLDSV2,VERTX2,
00114     12*        *           FETVC2(30),SUBVC2(75),SUBPTR(75),CLSVC2(60),
00114     12*        *           KEPPTS(60),NOGRP,GRPNAM(60),GRPDEX(61),
00114     12*        *           GRPCHK(61),GROUPS(124)
00115     12*         END
00116     13*         INCLUDE COMBK4,LIST                                                 SET00011
00117     13*         DIMENSION HED1(10),HED2(10),DATE(2),COMENT(10)
00120     13*         EQUIVALENCE (HED1(1),HEAD(3)),(DATE(1),HEAD(15)),
00120     13*        *        (HED2(1),HEAD(20)),(COMENT(1),HEAD(32))
00121     13*         END
00122     14*         INCLUDE COMBK6,LIST                                                 SET00012
00123     14*         COMMON/GLOBAL/HEAD(42),MAPTAP,DATAPE,SAVTAP,BMFILE,BMKEY,
00123     14*        *           HISFIL,HISKEY,TRFORM,ERIPTP,ERPKEY,MAPUNT,NOFILE,
00123     14*        *   DRUMAD,DRMWDS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
00123     14*        *  ,NHSTUN,NHSTFI,SCTRUN,MAPFIL
00123     14*        * ,DOTUNT,DOTFIL,NCHPAS,TRNSFL                                                *NEW
00124     14*         END                                                                          **-1
00125     15*         INCLUDE COMBK9,LIST                                                 SET00013
00125     15*      C DATA TRANSFORMATION COMMON BLOCK
00126     15*         COMMON/TRBLCK/OUTFMT,NOFEAT,FLDINF(6),FETVEC(30),PCF,                        *NEW
00126     15*        1 PCGC,SAKEY,GIC,SAGAIN(30),SABIAS(30),PCM(49)                                *NEW
00127     15*         END                                                                          **-1
00130     16*         EQUIVALENCE (FLDINF(1),LINSTR),(FLDINF(2),LINEND),                  SET00014
00130     17*        *           (FLDINF(3),LININC),(FLDINF(4),SAMSTR),                   SET00015
00130     18*        *           (FLDINF(5),SAMEND),(FLDINF(6),SAMINC)                    SET00016
00131     19*         REAL MAXPT                                                                   *NEW
00132     20*          REAL SAGAIN,SABIAS                                                          *NEW
00133     21*          DIMENSION CINDEX(20),                                                       *NEW
00133     22*        *     SINVEC(3), FRVEC1(3) , FRVEC2(3), CAND2(62),                   SET00018**-1
00133     23*        *     BTEST(3)                                                       SET00019
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      END                                                                SET#0013
      INCLUDE COMMK9,LIST
C DATA TRANSFORMATION COMMON BLOCK                                               *NEW
      COMMON/TRBLCK/OUTFMT,NOFEAT,FLDINF(6),FE..EC(30),PCF,                     *NEW
     1 PCGC,SAKEY,GIC,SAGAIN(30),SABIAS(30),PCM(49)                             **-1
      END
      EQUIVALENCE (FLDINF(1),LINSTR),(FLDINF(2),LINEND),                SET#0014
     *            (FLDINF(3),LININC),(FLDINF(4),SAMSTR),                SET#0015
     *            (FLDINF(5),SAMEND),(FLDINF(6),SAMINC)                 SET#0016
      REAL MAXPT                                                                 *NEW
       REAL SAGAIN,SABIAS.                                                       *NEW
       DIMENSION CINDEX(20),                                                     *NEW
     *     SINVEC(3), FRVEC1(3) , FRVEC2(3), CARD2(62),                 SET#0018**-1
     *    BTEST(3)                                                      SET#0019
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C                                                                        SET#0020
C                                                                        SET#0021
      DIMENSION  COVMOT(10)  ,  OP(2)  ,  CP(2)                          SET#0022
C                                                                        SET#0023
C                                                                        SET#0024
      LOGICAL   NUDTAP , NUDFIL , NUSTAP , NUSFIL                        SET#0025
C                                                                        SET#0026
       DATA CINDEX/'R-MATR','CHANNE','FORMAT','MED1','MED2',             SET#0027
     * 'DATE','COMMEN','MAXPT','PEROUT','SUBCLA',                        SET#0028
     *'MODULE','LAM','OPTION','*END*','DATAFI','STATFI',                 SET#0029
     1 'RESCAL','BIAS','SUNANG','TRFORM'/                                       *NEW
C                                                                        SET#0031**-1
      DIMENSION MTX(6)                                                           *NEW
       DIMENSION MXPT(30)                                                        *NEW
C                                                                        SET#0033**-1
       DATA MTX/5,'O','T','S','P','G'/                                           *NEW
C                                                                        SET#0035**-1
      DATA   OP/ 1 , '(' /  ,  CP/ 1 , ')' /  ,  ZERO/ 0 /               SET#0036
C                                                                        SET#0037
      DATA EQUVEC/1,'='/                                                 SET#0038
        DATA SINVEC/2,'.','='/,                                          SET#0039
     * CINMAX/20/,MAXFET/30/,                                                    *NEW
     * FRVEC1/2,'1','0'/ ,FRVEC2/2,'U','L'/,BLANK/' '/,                 SET#0041**-1
     * BTEST/2,'C','F'/,OUTFMT/1/,TRFORM/14/,TRNSFL/0/                           *NEW
C                                                                        SET#0043**-1
C                                                                        SET#0044
C        INITIALIZE FLAGS AND DEFAULT VALUES                             SET#0045
C                                                                        SET#0046
C                                                                        SET#0047
      NOSUB2=0                                                           SET#0048
      NOGRP=0                                                            SET#0049
      BMTRIG=0                                                           SET#0050
      NSF = 1                                                            SET#0051
       RESCAL = 0                                                        SET#0052
      SCAFLG = 0                                                         SET#0053
      MPT = 0                                                            SET#0054
      ORIG = 0                                                           SET#0055
      TRANSF = 0                                                         SET#0056
      NPUN = 0                                                           SET#0057
       ISUNT=0                                                                   *NEW
       ISUNC=0                                                                   *NEW
      SAKEY=0                                                                    *NEW
      PCGC=0                                                                     *NEW
       GIC=0                                                                     *NEW
      PCF=0                                                                      *NEW
C                                                                        SET#0058
C  INITIALIZE THE TRANSFORMATION BIAS VECTOR ( BIAS ) AND NO. OF         SET#0059
C  BIAS VALUES  (  NBS )                                                 SET#0060
C                                                                        SET#0061
       DO 10 I=1,16                                                      SET#0062
   10 BIAS(I) = 0.0                                                      SET#0063
      NBS = 0                                                            SET#0064
       NUDTAP =  .FALSE.                                                 SET#0065
       NUDFIL =  .FALSE.                                                 SET#0066
       NUSTAP =  .FALSE.                                                 SET#0067
       NUSFIL =  .FALSE.                                                 SET#0068
      BMSWT=1                                                            SET#0069
C                                                                        SET#0070
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ORIGINAL PAGE IS OF POOR QUALITY

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00217   C  INITIALIZE THE MAXIMUM EXPECTED DATA VALUE, FOR EACH CHANNEL           SET#0071
00217   C                                                                          SET#0072
00220        DO 20 I=1,30                                                          SET#0073
00223   20    MAXPT(I)=225.0                                                               *NE*
00223   C                                                                          SET#0075***1
00223   C  INITIALIZE  %  DISTRIBUTION CUT-OFF,  PEROUT ,  AND                     SET#0076
00223   C  THE STANDARD DEVIATION MULTIPLE ,  LAM .                                SET#0077
00223   C                                                                          SET#0078
00225        LAM=2                                                                 SET#0079
00226        PEROUT=5                                                              SET#0080
00226   C                                                                          SET#0081
00226   C  INITIALIZE THE HEADING FOR UNTRANSFORMED STATISTICS PRINTOUT            SET#0082
00226   C                                                                          SET#0083
00227        COVHDI(1) = 4H... OR                                                  SET#0084
00230        COVHDI(2) = 4HIGINAL                                                  SET#0085
00231        COVHDI(3) = 4H STATI                                                  SET#0086
00232        COVHDI(4) =    4HSTICS                                                SET#0087
00233        COVHDI(5) =4H ...                                                     SET#0088
00234        DO 30 I=6,10                                                          SET#0089
00237     30 COVHDI(I) = BLANK                                                     SET#0090
00237   C                                                                          SET#0091
00241        DO 40 I=1,10                                                          SET#0092
00244     40 COMENT(I) = BLANK                                                     SET#0093
00244   C      READ DATAPF'S HEADER RECORD TO INITIALIZE NOFEAT AND THE SUNANG             *NE*
00244   C        VECTOR                                                                    *NE*
00246        CALL TAPHDR(DATAPF,DATFIL)                                                    *NE*
00246   C                                                                          SET#0094
00247     50 COL=0                                                                 SET#0095
00250        IF(NUSTAP .OR. NUSFIL) SCAFLG=2     @ STATFILE CARD READ -            SET#0096
00252        READ (5,60)CODE,CARD2                                                 SET#0097
00261     60 FORMAT(A6,4X,62A1)                                                    SET#0098
00262        WRITE (6,70)CODE,CARD2                                                SET#0099
00271     70 FORMAT(T5,A6,4X,62A1)                                                 SET#0100
00272        DO 80 I=1,CINMAX                                                      SET#0101
00275     80 IF (CINDEX(I).EQ.CODE) GO TO (110,150,160,180,190,210,200,230,250.SET#0102
00275      *270,360,280,290,500,380,430,480,490,700,750),I                                *NE*
00275   C                                                                          SET#0104***1
00300     90 WRITE (6,100)CODE,CARD2                                               SET#0105
00300   C                                                                          SET#0106
00307    100 FORMAT(//// 5X,'*** BAD CONTROL CARD - DATATR/SETUP# ***' // 5X,      SET#0107
00307      *     A6, 4X, 62A1  /// )                                               SET#0108
00307   C                                                                          SET#0109
00310        GO TO 50                                                              SET#0110
00310   C B-MATRIX CARD                                                            SET#0111
00311    110 J=NXTCHR(CARD2,COL)                                                   SET#0112
00312        IF (J.EQ.BLANK) GO TO 540                                             SET#0113
00314        COL=COL+1                                                             SE#0114
00315        M=FIND(CARD2,COL,BTEST)                                               SET#0115
00316        IF (M.EQ.-1) GO TO 540                                                SET#0116
00320        BMTRIG=1                                                              SET#0117
00321        IF (M.EQ.2) GO TO 120                                                 SET#0118
00321   C B-MATRIX DATA ON TAPE FILE                                               SET#0119
00323        KEY=2                                                                 SET#0120
00323   C READ B-MATRIX ARRAY FROM TAPE FILE                                       SET#0121
00324        CALL BMFIL(BMAT,LCOMB,NOFFAT,FLTVEC,KEY)                              SET#0122
00325        GO TO 130                                                             SET#0123
00325   C B-MATRIX DATA READ FROM CARD FILE                                        SET#0124
00326    120 KEY=1                                                                 SET#0125
```

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00311            110 J=NXTCHR(CARD2,COL)
00312                IF (J.EQ.BLANK) GO TO 540                     SETW0113
00314                COL=COL-1                                     SETW0114
00315                M=FIND(CARD2,COL,HTEST)                       SETW0115
00316                IF (M.EQ.-1) GO TO 540                        SETW0116
00320                BMTRIG=1                                      SETW0117
00321                IF (M.EQ.2) GO TO 120                         SETW0118
00321         C B-MATRIX DATA ON TAPE FILE                         SETW0119
00323                KEY=2                                         SETW0120
00323         C READ B-MATRIX ARRAY FROM TAPE FILE                 SETW0121
00324                CALL BMFIL(BMAT,LCOMB,NOFFAT,FETVEC,KEY)      SETW0122
00325                GO TO 130                                     SETW0123
00325         C B-MATRIX DATA READ FROM CARD FILE                  SETW0124
00326            120 KEY=1                                         SETW0125

00327                CALL BMFIL(BMAT,LCOMB,NOFFAT,FETVEC,KEY)      SETW0126
00330            130 NOFET2=NOFEAT                                 SETW0127
00331                NOFET4=LCOMB                                  SETW0128
00332                DO 140 B=1,NOFFAT                             SETW0129
00335            140 FETVC2(B)=FETVEC(B)                           SETW0130
00337                GO TO 50                                      SETW0131
00337         C FEATURE CARD                                       SETW0132
00340            150 CONTINUE                                      SETW0133
00341                GO TO 50                                      SETW0134
00341         C FORMAT CARD                                        SETW0135
00342            160 CONTINUE                                      SETW0136
00343                KM=FIND(CARD2,COL,FRVEC2)                             *NEW
00344                IF (KM.EQ.2) OUTFMT=1                                 *NEW
00346                IF (KM.EQ.3) OUTFMT=2                                 *NEW
00350                 GO TO 50                                             *NEW
00350         C HED1 CARD                                          SETW0146**-9
00351            180 READ (30,220)HED1                             SETW0147
00357                GO TO 50                                      SETW0148
00357         C HED2 CARD                                          SETW0149
00360            190 READ (30,220)HED2                             SETW0150
00366                GO TO 50                                      SETW0151
00366         C COMMENT CARD                                       SETW0152
00367            200 READ (30,220)COMENT                           SETW0153
00375                GO TO 50                                      SETW0154
00375         C DATE CARD                                          SETW0155
00376            210 M=NXTCHR(CARD2,COL)                           SETW0156
00377                IF (M.EQ.BLANK) GO TO 50                      SETW0157
00401                READ (30,220)DATE                             SETW0158
00407            220 FORMAT(10X,10A6)                              SETW0159
00410                GO TO 50                                      SETW0160
00410         C MAXPT CARD                                         SETW0161
00411            230 J=NXTCHR(CARD2,COL)                           SETW0162
00412                IF (J.EQ.BLANK) GO TO 540                     SETW0163
00414                COL=COL-1                                     SETW0164
00415                  MPT=NUMBER(CARD2,COL,MXPT,MPT)                      *NEW
00416                 DO 231 I=1,MPT                                       *NEW
00421                 T=MXPT(I)                                            *NEW
00422                 MAXPT(I)=FLOAT(T)                                    *NEW
00423          231    CONTINUE                                             *NEW
00423         C                                                    SETW0166**-1
00425                IF (MPT.GT.30) GO TO 90                       SETW0167
00425         C                                                    SETW0168
00427                GO TO 50                                      SETW0169
00427         C PEROUT CARD                                        SETW0170
00430            250 J=NXTCHR(CARD2,COL)                           SETW0171
00431                IF (J.EQ.BLANK) GO TO 540                     SETW0172
00433                COL=COL-1                                     SETW0173
00434                M = NUMBER ( CARD2, COL, ARRAY, ZERO )        SETW0174
00435                PEROUT = ARRAY(1)                             SETW0175
00435         C                                                    SETW0176
00436                IF (M.NE.1) GO TO 90                          SETW0177
00436         C                                                    SETW0178
00440                GO TO 50                                      SETW0179
00440         C SUBCLASS CARD                                      SETW0180
00441            270 NOSUB2=NUMBER(CARD2,COL,SUBVC2,NOSUB2)        SETW0181
00442                CALL ORDER(SUBVC2,NOSUB2)                     SETW0182
00443                GO TO 50                                      SETW0183
00443         C LAM CARD                                           SETW0184
```

```
00444      280 J=NXTCHR(CARD2,COL)                                    SETW0185
00445          IF (J.EQ.BLANK) GO TO 540                              SETW0186
00447          COL=COL-1                                              SETW0187
00450          M = NUMBER ( CARD2, COL, ARRAY, ZERO )                 SETW0188
00451          LAM = ARRAY(1)                                         SETW0189
00451    C                                                            SETW0190
00452          IF (M.NE.1) GO TO 99                                   SETW0191
00452    C                                                            SETW0192
00454          GO TO 50                                               SETW0193
00454    C                                                            SETW0194
00454    C                                                            SETW0195
00454    C        OPTION  CARD                                        SETW0196
00454    C                                                            SETW0197
00455      290 M=FIND(CARD2,COL,MTX)                                  SETW0198
00455    C                                                            SETW0199
00456          M = IABS( M )                                          SETW0200
00456    C                                                            SETW0201
                                                                              *NEW
00457           IF (M.EQ.0.OR.M.GT.6) GO TO 540                       SETW0203***-1
00457    C                                                            SETW0204
00457    C        IF  M = 1,  END-OF-CARD  HAS BEEN REACHED           SETW0205
00457    C                                                            SETW0206
00457    C                                                            SETW0207
                                                                              *NEW
00461          GO TO (50,300,310,320,350,355),M                       SETW0209***-1
00461    C                                                            SETW0210
00461    C     IF  M = 2,  ''O''  ,  OR  ''ORIG''                     SETW0211
00461    C                                                            SETW0212
00462      300 ORIG = 1                                               SETW0213
00462    C                                                            SETW0214
00463          M = FIND ( CARD2, COL, SINVEC )                        SETW0215
00463    C                                                            SETW0216
00464          IF (M.EQ.2) GO TO 290                                  SETW0217
00464    C                                                            SETW0218
00466          GO TO 50                                               SETW0219
00466    C                                                            SETW0220
00466    C                                                            SETW0221
00466    C        IF  M = 3,  ''T''  OR  ''TRANSF''                   SETW0222
00466    C                                                            SETW0223
00466    C                                                            SETW0224
00467      310 TRANSF = 1                                             SETW0225
00467    C                                                            SETW0226
00470          M = FIND ( CARD2, COL, SINVEC )                        SETW0227
00470    C                                                            SETW0228
00471          IF (M.EQ.2) GO TO 290                                  SETW0229
00471    C                                                            SETW0230
00473          GO TO 50                                               SETW0231
00473    C                                                            SETW0232
00473    C                                                            SETW0233
00473    C         IF  M = 4,   ' S'  ---   CHECK FOR  ''SCAFAC''     SETW0234
00473    C                                                            SETW0235
00474      320 J = NXTCHR ( CARD2, COL )                              SETW0236
00474    C                                                            SETW0237
00474    C                                                            SETW0238
00474    C        IF NEXT CHARACTER IS  ''C''  ,  ASSUME   ''SCAFAC'' SETW0239
00474    C                                                            SETW0240
00475          IF (J.NE.'C') GO TO 540                                SETW0241
00475    C                                                            SETW0242
```

```
00471      C
00473            GO TO 50                                                    SET#0231
00473      C                                                                 SET#0232
00473      C                                                                 SET#0233
00473      C        IF  M = 4,   ' S'  ---   CHECK FOR  ''SCAFAC''            SET#0234
00473      C                                                                 SET#0235
00474       320 J = NXTCHR ( CARD2, COL )                                    SET#0236
00474      C                                                                 SET#0237
00474      C                                                                 SET#0238
00474      C       IF NEXT CHARACTER IS  ''C''  ,  ASSUME   ''SCAFAC''       SET#0239
00474      C                                                                 SET#0240
00475            IF (J.NE.'C') GO TO 540                                     SET#0241
00475      C                                                                 SET#0242

00477            Z = FIND ( CARD2, COL, SINVEC )                             SET#0243
00477      C                                                                 SET#0244
00500            IF (Z.EQ.3) GO TO 330                                       SET#0245
00500      C                                                                 SET#0246
00502            GO TO 540                                                   SET#0247
00502      C                                                                 SET#0248
00502      C                                                                 SET#0249
00502      C        SCALF FACTOR OPTION :  READ SCALING PAIRS, CON AND MIN , INTO   SET#0250
                                       CONMIN
00502      C                                                                 SET#0251
00502      C                                                                 SET#0252
00502      C                                                                 SET#0253
00503       330 SCAFLG = 3                                                   SET#0254
00503      C                                                                 SET#0255
00504       340 Z = FIND ( CARD2, COL, OP )                                  SET#0256
00504      C                                                                 SET#0257
00505            IF (Z.NE.2) GO TO 50                                        SET#0258
00505      C                                                                 SET#0259
00507            NMN =  FLTNUM ( CARD2, COL , CONMIN(NSF) , 2 )              SET#0260
00507      C                                                                 SET#0261
00510            IF (NMN.NE.2) GO TO 540                                     SET#0262
00510      C                                                                 SET#0263
00512            ADDNUM = NSF + 1                                            SET#0264
00513            IF ((NSF+NMN).GT.31) GO TO 50                               SET#0265
00513      C                                                                 SET#0266
00515            NSF = NSF + NMN                                             SET#0267
00515      C                                                                 SET#0268
00516            Z = FIND ( CARD2, COL, CP )                                 SET#0269
00516      C                                                                 SET#0270
00517            IF (Z.EQ.2) GO TO 340                                       SET#0271
00517      C                                                                 SET#0272
00521            GO TO 540                                                   SET#0273
00521      C                                                                 SET#0274
00521      C     TEST FOR PUNCH OR PCG PARAMETER                                    *NEW
00522       350   M=NXTCHR(CARD2,COL)                                               *NEW
00523             IF (M.EQ.'U') GO TO 351                                           *NEW
00525             IF (M.EQ.'C') GO TO 352                                           *NEW
00527             GO TO 50                                                          *NEW
00527      C                                                                 SET#0275
00527      C        PUNCH  OPTION                                            SET#0276
00527      C                                                                 SET#0277
00530       351   NPUN = 1                                                          *NEW
00530      C                                                                 SET#0279**-1
00530      C                                                                 SET#0280
00531            GO TO 290                                                   SET#0281
00531      C                                                                        *NEW
00531      C      PCG OPTION                                                        *NEW
00531      C                                                                        *NEW
00532       352   PCGC=1                                                            *NEW
00533             GO TO 290                                                         *NEW
00533      C     GREEN OPTION                                                       *NEW
00534       355   GI =1                                                             *NEW
00535             GO TO 290                                                         *NEW
00535      C                                                                 SET#0282
00535      C                                                                 SET#0283
00535      C MODULE STAT DECK                                                SET#0284
00536       360 MK=NXTCHR(CARD2,COL)                                         SET#0285
00537             IF (MK.NE.MTEST(3)) GO TO 370                              SET#0286
00537      C                                                                 SET#0287
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00541              SCAFLG = 2                                                  SET#0288
00541        C                                                                 SET#0289
00542              GO TO 50                                                    SET#0290
00543          370 CALL CROSTA(ARRAY,TOP)                                      SET#0291
00543        C                                                                 SET#0292
00544              SCAFLG = 2                                                  SET#0293
00544        C                                                                 SET#0294
00545              GO TO 50                                                    SET#0295
00545        C                                                                 SET#0296
00545        C DATAFILE POSITIONING CARD                                       SET#0297
00545        C                                                                 SET#0298
00546          380 IF (NUDTAP.AND.NUDFIL) GO TO 50                             SET#0299
00546        C                                                                 SET#0300
00550              M = NXTCHR ( CARD2 , COL )                                  SET#0301
00550        C                                                                 SET#0302
00551              IF (M.EQ.BLANK) GO TO 50                                    SET#0303
00551        C                                                                 SET#0304
00553              IF (M.EQ.'U') GO TO 410                                     SET#0305
00555              IF (M.EQ.'F') GO TO 420                                     SET#0306
00557          390 WRITE (6,400)                                               SET#0307
00561          400 FORMAT(///// 5X, '***** DATATR/SETUPB ***** ERROR ON INPUT DATASET#0308
00561        C                                                                 SET#0309
00561             *FILE CARD --- CONTINUING TO PROCESS INPUT   *****' ///// )  SET#0310
00561        C                                                                 SET#0311
00562              GO TO 50                                                    SET#0312
00563          410 J=FIND(CARD2,COL,EQUVEC)                                    SET#0313
00564              IF (J.EQ.-1) GO TO 390                                      SET#0314
00566              M=NUMBER(CARD2,COL,DATAPE,ZERO)                             SET#0315
00567              COL=COL-1                                                   SET#0316
00567        C                                                                 SET#0317
00570              IF (M.NE.1) GO TO 390                                       SET#0318
00570        C                                                                 SET#0319
00572              NUDTAP =  .TRUE.                                            SET#0320
00572        C                                                                 SET#0321
00573              GO TO 380                                                   SET#0322
00574          420 J=FIND(CARD2,COL,EQUVEC)                                    SET#0323
00575              IF (J.EQ.-1) GO TO 390                                      SET#0324
00577              FILNO = NUMBER ( CARD2, COL, DATFIL, ZERO )                 SET#0325
00577        C                                                                 SET#0326
00600              IF (FILNO.NE.1) GO TO 390                                   SET#0327
00600        C                                                                 SET#0328
00602              NUDFIL =  .TRUE.                                            SET#0329
00602        C                                                                 SET#0330
00603              DATFIL=DATFIL+1                                             SET#0331
00604              COL=COL-1                                                   SET#0332
00605              GO TO 380                                                   SET#0333
00605        C                                                                 SET#0334
00605        C STATFILE POSITIONING CARD                                       SET#0335
00605        C                                                                 SET#0336
00606          430 M=NXTCHR(CARD2,COL)                                         SET#0337
00607              IF (M.EQ.BLANK) GO TO 50                                    SET#0338
00607        C                                                                 SET#0339
00611              IF (M.EQ.'U') GO TO 460                                     SET#0340
00613              IF (M.EQ.'F') GO TO 470                                     SET#0341
00615          440 WRITE (6,450)                                               SET#0342
00617          450 FORMAT( ///// 5X,'***** DATATR/SETUPB *****  ERROR ON INPUT STATFISET#0343
00617        C                                                                 SET#0344
00617             *LE CARD  ---  CONTINUING TO PROCESS INPUT  *****' /// )     SET#0345
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```
00604     3.     COL=COL-1
00605     4.     GO TO 380                                                       SET#0333
00605  3600.  C                                                                  SET#0334
00605  3610.  C STATFILE POSITIONING CARD                                        SET#0335
00605  3620.  C                                                                  SET#0336
00606  3630.    430 M=NXTCHR(CARD2,COL)                                          SET#0337
00607  3640.        IF (M.EQ.BLANK) GO TO 50                                     SET#0338
00607  3650.  C                                                                  SET#0339
00611  3660.        IF (M.EQ.'U') GO TO 460                                      SET#0340
00613  3670.        IF (M.EQ.'F') GO TO 470                                      SET#0341
00615  3680.    440 WRITE (6,450)                                                SET#0342
00617  3690.    450 FORMAT( ///// 5X,'***** DATATR/SETUPB *****  ERROR ON INPUT STATFISET#0343
00617  3700.  C                                                                  SET#0344
00617  3710.       *LE CARD  ---  CONTINUING TO PROCESS INPUT  *****' /// )       SET#0345

00617  3720.  C                                                                  SET#0346
00620  3730.          NUSTAP = .FALSE.                                          SET#0347
00621  3740.          NUSFIL = .FALSE.                                          SET#0348
00621  3750.  C                                                                  SET#0349
00622  3760.          GO TO 50                                                  SET#0350
00622  3770.  C                                                                  SET#0351
00623  3780.    460 J=FIND(CARD2,COL,EQUVEC)                                     SET#0352
00624  3790.        IF (J.EQ.-1) GO TO 440                                       SET#0353
00626  3800.        M=NUMBER(CARD2,COL,SAVTAP,ZERO)                              SET#0354
00627  3810.        COL=COL-1                                                    SET#0355
00627  3820.  C                                                                  SET#0356
00630  3830.        IF (M.NE.1) GO TO 440                                        SET#0357
00630  3840.  C                                                                  SET#0358
00630  3850.  C                                                                  SET#0360**-1
00632  3860.        GO TO 430                                                    SET#0361
00633  3870.    470 J=FIND(CARD2,COL,EQUVEC)                                     SET#0362
00634  3880.        IF (J.EQ.-1) GO TO 440                                       SET#0363
00636  3890.        FILST = NUMBER( CARD2, COL, STAFIL, ZERO )                   SET#0364
00636  3900.  C                                                                  SET#0365
00637  3910.        IF (FILST.NE.1) GO TO 440                                    SET#0366
00637  3920.  C                                                                  SET#0367
00637  3930.  C                                                                  SET#0369***-1
00641  3940.        STAFIL=STAFIL-1                                              SET#0370
00642  3950.        COL=COL-1                                                    SET#0371
00643  3960.        GO TO 430                                                    SET#0372
00643  3970.  C                                                                  SET#0373
00643  3980.  C     RESCALE OPTION CARD                                          SET#0374
00643  3990.  C                                                                  SET#0375
00644  4000.    480  CONTINUE                                                    SET#0376
00645  4010.         RESCAL = 1                                                  SET#0377
00646  4020.        GO TO 50                                                     SET#0378
00646  4030.  C                                                                  SET#0379
00646  4040.  C     BIAS CONTROL CARD                                            SET#0380
00646  4050.  C                                                                  SET#0381
00647  4060.    490  CONTINUE                                                    SET#0382
00650  4070.         NB = NXTCHR(CARD2, COL)                                     SET#0383
00651  4080.        IF (NB.EQ.BLANK) GO TO 540                                   SET#0384
00653  4090.         COL = COL -1                                                SET#0385
00654  4100.        VECMAX = 16 - NBS                                            SET#0386
00655  4110.         NK = NBS + 1                                                SET#0387
00656  4120.         NBS = FLTNUM (CARD2, COL, BIAS(NK), VECMAX)                 SET#0388
00657  4130.        GO TO 50                                                     SET#0389
00657  4140.  C                                                                  *NEW
00657  4150.  C      SUNANG CONTROL CARD                                         *NEW
00657  4160.  C                                                                  *NEW
00660  4170.    700   J=NXTCHR(CARD2,COL)                                        *NEW
00661  4180.          IF (J.NE.'T') GO TO 701                                    *NEW
00661  4190.  C       SET THE FLAG TO READ THE SUNANGLES OFF OF THE TAPE         *NEW
00663  4200.        ISUNT=1                                                      *NEW
00664  4210.        SAKEY=1                                                      *NEW
00665  4220.        GO TO 50                                                     *NEW
00666  4230.    701    ISTART=0                                                  *NEW
00667  4240.        COL=COL-1                                                    *NEW
00670  4250.        J=NUMBER(CARD2,COL,ARRAY(TOP-30),ISTART)                     *NEW
00671  4260.         IF (J.GT.8) J=8                                             *NEW
00673  4270.        IF (J.EQ.0) GO TO 50                                         *NEW
00675  4280.        ISUNC=0                                                      *NEW
00676  4290.         DO 702 JJ=1,J                                               *NEW
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00701   430.          ISUNC=ISUNC+1                                                        *NEW
00702   431.           SUNANG(JJ)=ARRAY(TOP-3)+ISUNC)                                      *NEW
00702   432.   C       TEST TO SEE IF THE INPUT SUNANGLE WAS LEGITIMATE - IF NOT,          *NEW
00702   433.   C              SET IT TO 63                                                 *NEW
00703   434.    702   IF ((SUNANG(JJ).LT.5).OR.(SUNANG(JJ).GT.85)) SUNANG(JJ)=60           *NEW
00706   435.           SAKEY=1                                                             *NEW
00707   436.           SC=J                                                                *NEW
00710   437.           GO TO 50                                                            *NEW
00710   438.   C                                                                           *NEW
00710   439.   C       TRFORM  CONTROL CARD                                                *NEW
00710   440.   C                                                                           *NEW
00711   441.    750     M=NXTCHR(CARD2,COL)                                                *NEW
00712   442.             IF (M.NE.'0') GO TO 50                                            *NEW
00714   443.    752     M=FIND(CARD2,COL,EQUVEC)                                           *NEW
00715   444.           IF (M.EQ.-1) GO TO 50                                               *NEW
00717   445.           IF (CARD2(COL-1).EQ.'E') GO TO 751                                  *NEW
00721   446.           IF (CARD2(COL-1).NE.'T') GO TO  752                                 *NEW
00721   447.   C       READ OFF THE USER SUPPLIED UNIT NUMBER                              *NEW
00723   448.            M=NUMBER(CARD2,COL,TRFORM,ZERO)                                    *NEW
00724   449.           GO TO 752                                                           *NEW
00724   450.   C       READ OFF THE USER SUPPLIED FILE NUMBER                              *NEW
00725   451.    751    M=NUMBER(CARD2,COL,TRNSFL,ZERO)                                     *NEW
00726   452.           TRNSFL=TRNSFL - 1                                                   *NEW
00727   453.            GO TO 752                                                          *NEW
00727   454.   C                                                              SET#0390
00727   455.   C .END. CARD                                                   SET#0391
00730   456.     500 CONTINUE                                                 SET#0392
00730   457.   C                                                              SET#0393
00731   458.          I  ( RESCAL .GT. 0  .AND.  SCAFLG .EQ. 0 )   SCAFLG = 1 SET#0394
00731   459.   C                                                              SET#0395
00731   460.   C                                                              SET#0396
00731   461.   C         IF RESCALING BY THE STATISTICAL METHOD, READ STATISTICS FROM SET#0397
00731   462.   C         FILE ( SAVTAP ) , REDUCE THE STATISTICS TO THE SET OF CHANNELS SET#0398
00731   463.   C         SPECIFIED IN FETVC2 , AND STORE IN ARRAY .            SET#0399
00731   464.   C                                                              SET#0400
00731   465.   C                                                              SET#0401
00733   466.          IF ( SCAFLG .EQ. 2 )  CALL REDSAV( ARRAY, TOP, WMSRT )  SET#0402
00733   467.   C                                                              SET#0403
00733   468.   C                                                              SET#0404
00735   469.          IF (ORIG.EQ.0) GO TO 530                                SET#0405
00735   470.   C                                                              SET#0406
00735   471.   C                                                              SET#0407
00737   472.          DO 510 I=1,10                                           SET#0408
00742   473.          TEMP = COMENT(I)                                        SET#0409
00743   474.          COMENT(I) = COVHDI(I)                                   SET#0410
00744   475.     510 COVHDI(I) = TEMP                                         SET#0411
00744   476.   C                                                              SET#0412
00746   477.          CALL PRTCOV(ARRAY(COVAR2),ARRAY(AVAR2),VARSZ2,NOFET2,ARRAY(SUBDS2)SET#0413
00746   478.         *)                                                       SET#0414
00746   479.   C                                                              SET#0415
00746   480.   C                                                              SET#0416
00747   481.          DO 520 I=1,10                                           SET#0417
00752   482.     520 COMENT(I) = COVHDI(I)                                    SET#0418
00752   483.   C                                                              SET#0419
00752   484.   C                                                              SET#0420
00752   485.   C                                                              SET#0421
00752   486.   C         PRINT OUT THE INPUT TRANSFORMATION MATRIX            SET#0422
00752   487.   C                                                              SET#0423
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00744        C                                                                        SET#0411
00746  ...   C  (line partially cut off) COVHDI(I) = TEMP                                        SET#0412
00746              CALL PRTCOV(ARRAY(COVAR2),ARRAY(AVAR2),..NS22,NOFET2,ARRAY(SUBUS2)SET#0413
00746             *)                                                                 SET#0414
00746        C                                                                        SET#0415
00746        C                                                                        SET#0416
00747              DO 520 I=1,18                                                      SET#0417
00752         520 COMENT(I) = COVHDI(I)                                               SET#0418
00752        C                                                                        SET#0419
00752        C                                                                        SET#0420
00752        C                                                                        SET#0421
00752        C        PRINT OUT THE INPUT TRANSFORMATION MATRIX                       SET#0422
00752        C                                                                        SET#0423

00752        C                                                                        SET#0424
00754         530  IF (RMTRIG.NE.1) GO TO 553                                                  *NEW
00756              CALL WRTBM(RMAT,NOFET4,NOFET2,FETVC2)                                       *NEW
00756        C SET NOCLS2=NOSUB2 FOR REST OF PROGRAM                                  SET#0426**-1
00757              NOCLS2=NOSUB2                                                      SET#0427
00757        C                                                                        SET#0428
00760              IF ( RESCAL .EQ. 0 )  SCAFLG = 0                                   SET#0429
00762               IF ((GIC.EQ.1).OR.(PCGC.EQ.1)) PCF=1                                       *NEW
00762        C      SET UP THE SUN ANGLE CORRECTION FACTORS IF SAKEY=1                         *NEW
00764                IF (SAKEY.EQ.0) RETURN                                                    *NEW
00764        C      ASSOCIATE THE TAPE'S SUN ANGLE WITH FETVEC                                 *NEW
00766               IF (ISUNT.NE.1) GO TO 551                                                  *NEW
00770              T=0                                                                         *NEW
00771              DO 552 I=1,NOFEAT,NCHPAS                                                    *NEW
00774              J=FETVEC(I)                                                                 *NEW
00775               J=(J+3)/4                                                                  *NEW
00776              T=T+1                                                                       *NEW
00777         552   SUNANG(T)=SUNANG(J)                                                        *NEW
00777        C                                                                                 *NEW
00777        C     CALL  SUNF2 TO GET THE SUN ANGLE BIAS AND GAIN CORRECTION FACTORS           *NEW
01001         551  CALL  SUNF2(SAGAIN,SUNANG,FETVEC,NOFEAT,ISUNC,ISUNT,SABIAS)                 *NEW
01001        C     APPLY SUN ANGLE CORRECTION FACTOR TO MAXPT                                  *NEW
01002              DO 501 I=1,NOFEAT                                                           *NEW
01005               MAXPT(I) = SAGAIN(I)*MAXPT(I) + SABIAS(I)                                  *NEW
01006         501   CONTINUE                                                                   *NEW
01006        C                                                                        SET#0430
01010              RETURN                                                             SET#0431
01010        C                                                                        SET#0432
01010        C                                                                        SET#0433
01010        C                                                                        SET#0434
01011         540 WRITE (6,550)CODE,CARD2                                             SET#0435
01011        C                                                                        SET#0436
01020         550 FORMAT(//// 5X,'*****  INVALID CONTROL CARD REJECTED BY DATATR/SETSET#0437
01020        C                                                                        SET#0438
01020            *UP8  *****' // 5X, A6, 4X, 62A1 //// )                              SET#0439
01020        C                                                                        SET#0440
01020        C                                                                        SET#0441
01020        C                                                                        SET#0442
01021              GO TO 50                                                           SET#0443
01022         553   WRITE (6,554)                                                              *NEW
01024         554   FORMAT (//2X,'THE B-MATRIX CONTROL CARD WAS NOT FOUND - TERMINATE          *NEW
01024            C EXECUTION')                                                                 *NEW
01025              CALL EXIT                                                                   *NEW
01026              END                                                                SET#0444

       END OF COMPILATION:          NO  DIAGNOSTICS.
   SETUP8         SYMBOLIC                       20 JUN 77  01:59:56   0  03132100   14   445  (DELETED)
   SETUP8 CODE    RELOCATABLE                    20 JUN 77  01:59:56   1  01757214   48     1  (DELETED)
                                                                       0  01757274   14   104
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0007     MTMLS6
0010     MTMDAT
0011     PRTCOV
0012     NWOUS
0013     NIO2S
0014     NIO1S
0015     NERR3S

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

0001    000441 100L     0000    004520 119F     0001    000719 121L     0001    000467 14L      0001    000033 1406
0001    000043 147G     0001    000102 157G     0001    000149 179G     0001    000200 206G     0001    000072 21L
0001    000206 211G     0000    004540 225F     0001    000265 225G     0000    004545 226F     0000    004552 227F
0000    004531 228F     0001    000316 242G     0001    000342 252G     0001    000373 260G     0001    000376 263G
0001    000125 31L      0001    000514 326G     0001    000527 334G     0001    000542 342G     0001    000604 357G
0001    000646 371G     0001    000710 403G     0001    000166 51L      0001    000237 52L      0001    000345 90L
0001    000416 90L      0005    000073 ASAV     0005    000074 ASAVFL   0003 I  000006 AVAR2    0000 I  004517 B
0000 R  002675 BMEAN    0005    000055 BMFILE   0005    000056 BMKEY    0000 R  000015 C        0000 R  000755 CC
0003    000010 CLSID2   0003    000301 CLSVC2   0005 I  000037 COMENT   0003 I  000007 COVAR2   0000 I  000000 COVMD2
0000 I  004514 CV1      0000 R  001715 D        0005    000053 DATAPE   0005    000016 DATE     0005    000071 DATFIL
0000 R  001735 DIAG     0005    000102 DOTFIL   0005    000101 DOTUNT   0005    000067 DRM#DS   0005    000066 DRUMAD
0005    000062 ERIPTP   0005    000063 ERPKEY   0000 I  004512 F        0003    000015 FETVC2   0004    000010 FETVEC
0004    000002 FLDINF   0003    000013 FLDSV2   0000 I  004510 G        0004    000051 GIC      0003    000760 GROUPS
0003    000463 GRPCHK   0003    000566 GRPDEX   0003    000472 GRPNAM   0005    000000 HEAD     0005    000002 HED1
0005    000023 HED2     0005    000057 HISFIL   0005    000060 HISKEY   0000 I  004501 I        0000 I  004513 II
0000    004572 INJPS    0000 I  004505 J        0000 I  004503 K        0003    000375 IEPPTS   0000 I  004506 KK
0000 I  004507 KKK      0000 I  004502 L7       0000 I  004511 M        0005    000100 MAPFIL   0005    000052 MAPTAP
0005    000064 MAPUNT   0005    000103 NCHPAS   0000 I  004516 NEL      0005    000076 MSTFI    0005    000075 NMSTUN
0003 I  000000 NOCLSZ   0004    000001 NOFEAT   0003 I  000002 NOFETZ   0005    000065 NOFILE   0003    000005 NOFLD2
0003    000471 NOGRP    0003    000001 NOSUB2   0004    000003 OUTFMT   0005    000070 PAGSIZ   0004    000046 PCF
0004 I  000047 PCGC     0004 R  000146 PCM      0004 R  000110 SABIAS   0004 R  000052 SAGAIN   0004 I  000050 SAKEY
0005    000054 SAVTAP   0005    000077 SCTRUN   0005    000072 STAFIL   0003    000012 SUBOS2   0003    000011 SUBNG2
0003    000166 SUBPTR   0003    000053 SUBVC2   0000 I  004509 T        0000 I  004515 TEMP     0000 R  000014 TMAX
0000 R  000013 TMIN     0000 R  000012 TMP      0003    000004 TOTVT2   0005    000061 TRFORM   0005    000109 TRNSFL
0003 I  000003 VARSZ2   0003    000014 VERTX2

00101          SUBROUTINE KBTRAN                                           KBTR0001
00101         *(BMAT,LCOMB,ARRAY,LAM,MAX,MIN,EPS,TRANSF,NSUB)                       *NE*
00101   C                                                                           **-1
00103          IMPLICIT INTEGER(A-Z)                                       KBTR0003
00103   C                                                                  KBTR0004
00104          DIMENSION  COVMD2(18)                                       KBTR0005
00104   C                                                                  KBTR0006
00105                REAL ARRAY(1)                                                  *NE*
00106           REAL SAGAIN,SABIAS                                                  *NE*
00107           REAL PCM                                                            *NE*
00110           REAL TMP                                                            *NE*
00110   C                                                                           *NE*
00111          REAL TMIN,TMAX                                              KBTR0008**-1
00111   C                                                                  KBTR0009
00112          REAL    BMAT(480), MAX(16), MIN(16), EPS(16)                KBTR0010
00112   C                                                                  KBTR0011
00113          REAL    C(480), CC(480),  D(16),  DIAG(480),  BMEAN(900)    KBTR0012
00113   C                                                                  KBTR0013
```

```
      IMPLICIT INTEGER(A-Z)
C                                                                 KBTR0003
      DIMENSION  COVHD2(10)                                       KBTR0004
C                                                                 KBTR0005
         REAL ARRAY(1)                                            KBTR0006
       REAL SAGAIN,SABIAS                                               *NEW
       REAL PCM                                                         *NEW
       REAL TMP                                                         *NEW
C                                                                       *NEW
      REAL TMIN,TMAX                                              KBTR000***-1
C                                                                 KBTR00
      REAL   BMAT(480), MAX(16), MIN(16), EPS(16)                 KBTR00
C                                                                 KBTR00
      REAL   C(480), CC(480), U(16), UIAN(480), BMEAN(933)        KBTR00
C                                                                 KBTR00



C                                                                 KBTR0014
      INCLUDE COMBK1,LIST                                         KBTR0015
      COMMON/INFORM/NOCLS2,NOSUB2,NOFET2,VARSZ2,TOTVT2,NOFLD2,
     *             AVAR2,COVAR2,CLSID2,SUBNO2,SUBUS2,FLDSV2,VERTX2,
     *             FETVC2(30),SUBVC2(75),SUBPTR(75),CLSVC2(60),
     *             KEPPTS(60),NOGRP,GRPNAM(60),GRPDEX(61),
     *             GRPCHK(61),GROUPS(124)
      END
      INCLUDE COMBK9,LIST                                         KBTR0016
C DATA TRANSFORMATION COMMON BLOCK
      COMMON/TRBLCK/OUTFMT,NOFEAT,FLDINF(6),FETVEC(30),PCF,             *NEW
     1 PCGC,SAKEY,GIC,SAGAIN(30),SABIAS(30),PCM(49)                     *NEW
      END                                                               ***-1
      INCLUDE COMBK4,LIST                                         KBTR0017
      DIMENSION HED1(10),HED2(10),DATE(2),COMENT(10)
      EQUIVALENCE (HED1(1),HEAD(3)),(DATE(1),HEAD(15)),
     *            (HED2(1),HEAD(20)),(COMENT(1),HEAD(32))
      END
      INCLUDE COMBK6,LIST                                         KBTR0018
C                                                                 KBTR0019
C COMPUTE TRANSFORMED MEANS FOR EACH SUBCLASS                     KBTR0020
C                                                                 KBTR0021
      COMMON/GLOBAL/HEAD(42),MAPTAP,DATAPE,SAVTAP,BMFILE,BMKEY,
     *             HISFIL,HISKEY,TRFORM,ERIPTP,ERPKEY,MAPUNT,NOFILE,
     *    DRUMAD,DRMWDS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
     *   ,NHSTUN,NHSTFI,SCTRUN,MAPFIL
     *  ,DOTUNT,DOTFIL,NCHPAS,TRNSFL                                    *NEW
      END                                                               ***-1
      DIMENSION NSUB(75)                                          KBTR0022
C                                                                 KBTR0023
C                                                                 KBTR0024
      COVHD2(1) = 6H... TR                                        KBTR0025
      COVHD2(2) =  6HANSFOR                                       KBTR0026
      COVHD2(3) =  6HMED ST                                       KBTR0027
      COVHD2(4) =  6HATISTI                                       KBTR0028
      COVHD2(5) =. 6HCS ...                                       KBTR0029
      DO 10 I=6,10                                                KBTR0030
   10 COVHD2(I) = 6H                                              KBTR0031
      LZ=AVAR2                                                    KBTR0035***-3
      K=1                                                         KBTR0036
      DO 30 I=1,NOCLS2                                            KBTR0037
C      IF SAKEY=1, APPLY THE SUN ANGLE CORRECTION FACTORS               *NEW
C        TO THE MEAN BEFORE TRANSFORMING IT                             *NEW
      IF (SAKEY.EQ.1) GO TO 21                                          *NEW
      CALL MATVEC(BMAT,ARRAY(LZ),BMEAN(K),LCOMB,NOFET2)           KBTR0038
      GO TO 31                                                          *NEW
 21   T=LZ-1                                                            *NEW
      DO 23 J=1,NOFET2                                                  *NEW
      T=T+1                                                             *NEW
 23   C(J)=SAGAIN(J)*ARRAY(T) + SABIAS(J)                               *NEW
      CALL MATVEC(BMAT,C(1),BMEAN(K),LCOMB,NOFET2)                      *NEW
 31   LZ=LZ + NOFET2                                                    *NEW
   30 K=K+LCOMB                                                   KBTR0040***-1
C                                                                 KBTR0041
C COMPUTE TRANSFORMED COVARIANCE MATRIX FOR EACH SUBCLASS         KBTR0042
C                                                                 KBTR0043
      KK=0                                                        KBTR0044
      K=COVAR2                                                    KBTR0045
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```
00172          KKK=1
00173          DO 50 I=1,NOCLS2                                          KBTR0046
00173    C MULTIPLY BMAT BY COVARIANCE MATRIX                            KBTR0047
00173    C                                                               KBTR0048
00173    C     IF SAKEY=1, APPLY THE SUN ANGLE CORRECTION                        *NEW
00173    C      FACTORS TO THE COVARIANCE BEFORE TRANSFORMING IT                 *NEW
00176          IF (SAKEY.EQ.1) GO TO 51                                          *NEW
00200          CALL MTMLS6(BMAT,ARRAY(K),C,LCOMB,NOFET2)                         *NEW
00201          GO TO 52                                                  KBTR0049
00202     51     T=K-1                                                           *NEW
00203          G=0                                                               *NEW
00204          M = 1                                                             *NEW
00205          DO 24 J=1,NOFET2                                                  *NEW
00210          DO 25 F=1,J                                                       *NEW
00213          T=T+1                                                             *NEW
00214          G=G+1                                                             *NEW
00215     25   CC(G)=SAGAIN(J)*SAGAIN(F)*ARRAY(T)                                *NEW
00217            M = G + 1                                                       *NEW
00220     24   CONTINUE                                                          *NEW
00222         CALL MTMLS4(BMAT,CC(1),C,LCOMB,NOFET2)                             *NEW
00222    C MULTIPLY RESULTING MATRIX BY TRANSPOSE OF BMAT                        *NEW
00223     52     CALL MTMDAT(C,BMAT,CC,LCOMB,NOFET2,LCOMB,D,ARRAY(KKK))  KBTR0050
00224          DO 40 II=1,LCOMB                                                  *NEW
00227       40 DIAG(KK+II)=D(II)                                         KBTR0052**-1
00231          KKK=KKK+(LCOMB*(LCOMB+1))/2                               KBTR0053
00232          KK=KK+LCOMB                                               KBTR0054
00233          K=K+VARSZ2                                                KBTR0055
00234       50 CONTINUE                                                  KBTR0056
00234    C                                                               KBTR0057
00234    C PRINT TRANSFORMED COVARIANCE MATRIX                           KBTR0058
00234    C                                                               KBTR0059
00236          CVI=(LCOMB*(LCOMB+1))/2                                   KBTR0060
00236    C                                                               KBTR0061
00237          IF (TRANSF.EQ.0) GO TO 80                                 KBTR0062
00241          DO 60 I=1,10                                              KBTR0063
00244          TEMP = COMENT(I)                                          KBTR0064
00245          COMENT(I) = COVHD2(I)                                     KBTR0065
00246       60 COVHD2(I) = TEMP                                          KBTR0066
00246    C                                                               KBTR0067
00250          CALL PRTCOV(ARRAY(1),BMEAN(1),CVI,LCOMB,NSUB(1))          KBTR0068
00251          DO 70 I=1,10                                              KBTR0069
00254       70 COMENT(I) = COVHD2(I)                                     KBTR0070
00256       80 CONTINUE                                                  KBTR0071
00256    C                                                               KBTR0072
00256    C CALCULATE MINIMUM AND MAXIMUM FOR EACH SUBCLASS               KBTR0073
00256    C                                                               KBTR0074
00257          DO 120 I=1,LCOMB                                          KBTR0075
00262          DO 110 J=1,NOCLS2                                         KBTR0076
00265            NEL = (J - 1) * LCOMB + I                               KBTR0077
00266            MAX(I) = BMEAN(NEL) + LAM * DIAG(NEL)                   KBTR0078
00267          IF (J.NE.1) GO TO 90                                      KBTR0079
00271            TMAX = MAX(I)                                           KBTR0080
00272       90   CONTINUE                                                KBTR0081
00273            IF( MAX(I) .GE. TMAX) TMAX = MAX(I)                     KBTR0082
00275            MIN(I) = BMEAN(NEL) - LAM * DIAG(NEL)                   KBTR0083
00276          IF (J.NE.1) GO TO 100                                     KBTR0084
00300            TMIN = MIN(I)                                           KBTR0085
00301      100   CONTINUE                                                KBTR0086
                                                                         KBTR0087
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00256    101.   C CALCULATE MINIMUM AND MAXIMUM FOR EACH SUBCLASS                  KBTR0074
00256    102.   C                                                                  KBTR0075
00257    103.          DO 120 I=1,LCOMB                                            KBTR0076
00262    104.          DO 110 J=1,NOCLS2                                           KBTR0077
00265    105.            NEL = (J - 1) * LCOMB + 1                                 KBTR0078
00266    106.            MAX(I) = RMEAN(NEL) + LAM * DIAG(NEL)                     KBTR0079
00267    107.          IF (J.NE.1) GO TO 90                                        KBTR0080
00271    108.           TMAX = MAX(I)                                              KBTR0081
00272    109.       90  CONTINUE                                                   KBTR0082
00273    110.            IF( MAX(I) .GE. TMAX) TMAX = MAX(I)                       KBTR0083
00275    111.            MIN(I) = RMEAN(NEL) - LAM * DIAG(NEL)                     KBTR0084
00276    112.          IF (J.NE.1) GO TO 100                                       KBTR0085
00300    113.            TMIN = MIN(I)                                             KBTR0086
00301    114.      100  CONTINUE                                                   KBTR0087

00302    115.            IF( MIN(I) .LE. TMIN) TMIN = MIN(I)                       KBTR0088
00304    116.      110 CONTINUE                                                    KBTR0089
00306    117.            MIN(I) = TMIN                                             KBTR0090
00307    118.           MAX(I) = TMAX                                              KBTR0091
00307    119.   C        CHECK TO SEE IF MAX .GT. MIN                                      *NEW
00310    120.          IF (MAX(I).GE.MIN(I)) GO TO 14                                      *NEW
00312    121.          TMP = MAX(I)                                                        *NEW
00313    122.           MAX(I) = MIN(I)                                                    *NEW
00314    123.          MIN(I) = TMP                                                        *NEW
00315    124.       14  CONTINUE                                                           *NEW
00316    125.          EPS(I) = 255. /(MAX(I) - MIN(I))                            KBTR0092
00317    126.      120 CONTINUE                                                    KBTR0093
00321    127.           WRITE(6,119)                                                       *NEW
00323    128.      119  FORMAT(//2X,'THE SCALING PARAMETERS FROM KBTRAN ARE')              *NEW
00324    129.           WRITE(6,226) (MAX(I),I=1,LCOMB)                                    *NEW
00332    130.          WRITE(6,226) (MIN(I),I=1,LCOMB)                                     *NEW
00340    131.          WRITE(6,227) (EPS(I),I=1,LCOMB)                                     *NEW
00340    132.   C      CALCULATE THE PCG IMAGE SCALING PARAMETERS IF PCGC=1                *NEW
00346    133.          IF (PCGC.NE.1) GO TO 121                                            *NEW
00346    134.   C        PLACE THE SCALING PARAMETERS (MAX,MIN,CON) THAT WERE DERIVED      *NEW
00346    135.   C      FROM THE PCG-IMAGE INTO LOCATION BMAT(401) - BMAT(401+3*LCOMB-1)    *NEW
00350    136.          WRITE (6,228)                                                       *NEW
00352    137.      228  FORMAT(/2X,'THE PCG SCALING PARAMETERS ARE')                       *NEW
00353    138.           CALL MATVEC(PCM,MAX,BMAT(401),LCOMB,LCOMB)                         *NEW
00354    139.          B=LCOMB + 400                                                       *NEW
00355    140.          WRITE (6,225) (BMAT(I),I=401,B)                                     *NEW
00363    141.      225  FORMAT(/2X,'THE MAX IS'/2X,7F8.2)                                  *NEW
00364    142.          B = B + 1                                                           *NEW
00365    143.          CALL MATVEC (PCM,MIN,BMAT(B),LCOMB,LCOMB)                           *NEW
00366    144.          T=B+LCOMB-1                                                         *NEW
00367    145.           WRITE (6,226) (BMAT(I),I=B,T)                                      *NEW
00375    146.      226  FORMAT(/2X,'THE MIN IS'/2X,7F8.2)                                  *NEW
00376    147.          B=B+LCOMB                                                           *NEW
00377    148.           CALL MATVEC(PCM,EPS,BMAT(B),LCOMB,LCOMB)                           *NEW
00400    149.          T=B+LCOMB-1                                                         *NEW
00401    150.           WRITE (6,227) (BMAT(I),I=B,T)                                      *NEW
00407    151.      227  FORMAT(/2X,'THE CON IS'/2X,7F8.2)                                  *NEW
00410    152.      121   RETURN                                                            *NEW
00411    153.          END                                                         KBTR0095***-1

      END OF COMPILATION:       NO  DIAGNOSTICS.
   KBTRAN          SYMBOLIC                          20 JUN 77  01:56:08   0  02505302  14   96  (DELETED)
   KBTRAN  CODE    RELOCATABLE                       20 JUN 77  01:56:08   1  01605132  36    1  (DELETED)
                                                                           0  01605176  14   32
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SUBRC     : TRHIST     ENTRY POINT 001121

STORAGE USED: CODE(1) 001250; DATA(0) 000243; BLANK COMMON(2) 000000

 COMMON BLOCKS:

  0003     INFORM 001154
  0004     TRHLCK 000227
  0005     GLOBAL 000105


EXTERNAL REFERENCES (BLOCK, NAME)

  0006     LAREAD
  0007     TAPHDR
  0010     FLOINT
  0011     LINERD
  0012     FDLINT
  0013     TRANSF
  0014     MATVEC
  0015     SQRT
  0016     NWDUS
  0017     NI02S
  0020     NI01S
  0021     NERR2S
  0022     NERR3S

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

  0001     000011 10L       0001     000445 110L      0001     000447 120L      0001     000063 134G      0001     000451 140L
  0001     000727 152L      0001     000754 153L      0001     001012 154L      0001     001052 155L      0001     000543 160L
  0001     000202 161G      0001     000204 165G      0001     000546 170L      0001     000215 173G      0001     000603 180L
  0001     000606 190L      0001     000620 191L      0001     000253 210G      0001     001071 210L      0001     000267 214G
  0000     000124 221F      0001     000317 224G      0000     000142 225F      0000     000147 226F      0000     000154 227F
  0000     000133 228F      0001     000463 267G      0001     000504 274G      0001     000520 301G      0001     000557 314G
  0001     000646 345G      0001     000661 353G      0001     000674 361G      0001     000733 377G      0001     000233 40L
  0001     000765 407G      0001     001025 423G      0001     001065 437G      0001     000236 50L       0001     000411 60L
  0001     000415 70L       0001     000424 80L       0001     000436 90L       0000 I   000104 ALP       0005     000073 ASAV
  0005     000074 ASAVFL    0003     000006 AVAR2     0000 I   000121 B         0005     000055 BMFILE    0005     000056 BMKEY
  0003     000010 CISID2    0003     000301 CLSVC2    0005     000037 COMENT    0003     000007 COVAR2    0005 I   000053 DATAPE
  0005     000016 DATE      0005 I   000071 DATFIL    0005     000102 DOTFIL    0005     000101 DOTUNT    0000 I   000117 DPT
  0005     000067 DRMNDS    0005     000066 DRUMAD    0000 I   000106 FNUTAP    0005     000062 ERIPTP    0005     000063 ERPKEY
  0003     000015 FFTVC2    0004 I   000010 FFTVEC    0000 I   000063 FL        0004 I   000002 FLDINF    0000 I   000073 FLDINP
  0003     000013 FLOSV2    0004     000051 GTC       0003     000376 GROUPS    0003     000663 GRPCHK    0003     000566 GRPDEX
  0003     000472 GRPNAM    0005     000000 HEAD      0005     000002 HED1      0005     000023 HED2      0005     000057 HISFIL
  0005     000060 HISKEY    0000 I   000101 I         0000 I   000107 ILIN      0000     000170 INJPS     0000 I   000105 J
  0000 I   000111 JJ        0000 I   000120 JM1       0000 I   000112 K         0003     000375 KEPPTS    0000 I   000113 KP
  0006 I   000000 LAREAD    0000 I   000103 LINES     0000 I   000114 LK        0000 I   000115 LKP1      0005     000100 MAPFIL
  0005     000052 MAPTAP    0005     000064 MAPUNT    0005     000103 NCHPAS    0005     000076 NHSTFI    0005     000075 NHSTUN
  0003     000000 NOCLS2    0004 I   000001 NOFFAT    0003     000002 NOFET2    0005     000065 NOFILE    0003     000005 NOFLU2
  0003     000471 NOGRP     0003     000001 NOSUB2    0000 I   000110 NS        0000 I   000102 NSAMP     0004     000000 OUTFMT
  0005     000070 PAGSIZ    0004     000046 PCF       0004 I   000047 PCGC      0004 R   000146 PCM       0000 R   000020 PERCEN
  0004     000110 SARIAS    0004     000052 SAGAIN    0004     000050 SAKEY     0005     000054 SAVTAP    0005     000077 SCTRUN
  0005     000072 STAFIL    0003     000012 SUBDS2    0003     000011 SUBNU2    0003     000166 SUBPTR    0003     000053 SUBVC2
  0000 R   000042 SUMFIL    0000 I   000123 T         0000 R   000116 TEMP      0000 I   000043 TOTPTS    0003     000004 TOTVT2
  0013 I   000000 TRANSF    0005     000061 TRFORM    0005     000104 TRNSFL    0003     000003 VARSZ2    0003     000014 VERTX2
  0000 I   000122 WK        0000 R   000040 XMIN      0000 R   000041 XPER      0000 R   000000 XT


00101       1*            SUBROUTINE TRHIST(IDATA,AMAX,AMIN,ACON,BMAT,LCUMB,              TRHS0001
00101       2*           *PEROUT,FILMIS,TOP,LAR,FIDNAM,NC,VERTCS,MAX,MIN,CON,             TRHS0002
00101       3*           *     BIAS)                                                      TRHS0003
00101       4*      C                                                                     TRHS0004
00101       5*      C HISTOGRAM THE TRANSFORMED DATA AND CALCULATE THE MIN MAX AND RANGE  TRHS0005
00101       6*      C FOR THIS DATA TO ALLOW RESCALING IN THE 0-255 RANGE                 TRHS0006
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00101     7.    C                                                                   TRMS0007
C0103     8.          IMPLICIT INTEGER(A-Z)                                         TRMS0008
C0103     9.    C                                                                   TRMS0009
C0104    10.          REAL   BIAS(16), XT(16), PERCEN(16), MIN(16), MAX(16), CON(16) TRMS0010
00104    11.    C                                                                   TRMS0011
00105    12.          REAL   RMAT(480), AMIN(16), AMAX(16), ACON(16)                TRMS0012
00105    13.    C                                                                   TRMS0013
C0106    14.          REAL   XMIN , XPER ,  SUMFIL                                  TRMS0014
C0106    15.    C                                                                   TRMS0015
C0107    16.          INCLUDE COMRK1,LIST                                           TRMS0016
C0110    16.          COMMON/INFORM/NOCLS2,NOSUB2,NOFET2,VARSZ2,TOTVI2,NOFLD2,
C0110    16.     .             AVAR2,COVAR2,CLSID2,SUBNO2,SUBDS2,FLDSV2,VERTX2,
C0110    16.     .             FETVC2(30),SUBVC2(75),SUBPTR(75),CLSVC2(60),
00110    16.     .             KEPPTS(60),NOGRP,GRPNAM(60),GRPDEA(61),
00110    16.     .             GRPCHK(61),GROUPS(124)
C0111    16.          END
00112    17.          INCLUDE COMRK9,LIST                                           TRMS0017
00112    17.    C DATA TRANSFORMATION COMMON BLOCK
C0113    17.          COMMON/TRBLCK/OUTFMT,NOFEAT,FLDINF(6),FETVEC(30),PCF,          .NE.
C0113    17.        1 PCGC,SAKEY,GIC,SAGAIN(30),SABIAS(30),PCM(49)                   .NE.
00115    17.          END                                                            ..-1
00115    18.          INCLUDE COMRK4,LIST                                           TRMS0018
00116    18.          DIMENSION HED1(10),HED2(10),DATE(2),COMENT(10)
00117    18.          EQUIVALENCE (HED1(1),HEAD(3)),(DATE(1),HEAD(15)),
00117    18.     .             (HED2(1),HEAD(20)),(COMENT(1),HEAD(32))
C0120    18.          END
C0121    19.          INCLUDE COMRK6,LIST                                           TRMS0019
C0122    19.          COMMON/GLOBAL/HEAD(42),MAPTAP,DATAPE,SAVTAP,BMFILE,BMKEY,
C0122    19.     .             HISFIL,HISKEY,TRFORM,ERIPTP,ERPKEY,MAPUNT,NOFILE,
00122    19.     .    DRUMAD,DRMADS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
C0122    19.     .  ,NHSTUN,NHSTFI,SCTRUN,MAPFIL
00122    19.     . ,DOTUNT,DOTFIL,NCHPAS,TRNSFL                                     .NE.
C0123    19.          END                                                            ..-1
C0124    20.          DIMENSION  FILHIS(LCOMB,100), IDATA(TOP), TOTPTS(16) ,        TRMS0020
C0124    21.        . VERTCS(2,11),FL(6),FLDINP(6)                                  TRMS0021
C0124    22.    C                                                                   TRMS0022
C0124    23.    C                                                                   TRMS0023
C0124    24.    C        READ THE  COORDINATES ( VERTICES ) OF THE FIELD, FOR THE   TRMS0024
C0124    25.    C       DATA TO BE TRANSFORMED                                      TRMS0025
C0124    26.    C                                                                   TRMS0026
C0124    27.    C                                                                   TRMS0027
C0125    28.       10 LAR=LARFAD(FLDNAM,VERTCS,FLDINF,NC)                           TRMS0028
C0126    29.          IF (LAR.EQ.0) GO TO 210                                       TRMS0029
00130    30.          IF (LAR.LE.-1) GO TO 10                                       TRMS0030
00130    31.    C                                                                   TRMS0031
00130    32.    C                                                                   TRMS0032
00130    33.    C       POSITION THE INPUT DATA TAPE AND READ IN THE HEADER RECORD  TRMS0033
00130    34.    C                                                                   TRMS0034
00130    35.    C                                                                   TRMS0035
C0132    36.          CALL TAPMDR( DATAPE , DATFIL )                                TRMS0036
C0132    37.    C                                                                   TRMS0037
C0133    38.          DO 20 I=1,LCOMB                                               TRMS0038
00136    39.          MAX(I)=AMAX(I)                                                TRMS0039
00137    40.          MIN(I)=AMIN(I)                                                TRMS0040
00140    41.       20 CON(I)=ACON(I)                                                TRMS0041
00142    42.          NSAMP=(FLDINF(5)-FLDINF(4))/FLDINF(6)+1                       TRMS0042
00143    43.          LINES=(FLDINF(2)-FLDINF(1))/FLDINF(3)+1                       TRMS0043
C0144    44.          ALP=SQRT((LINES*NSAMP)/2000)                                  TRMS0044
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   20 CON(I)=ACON(I)
      NSAMP=(FLDINF(5)-FLDINF(4))/FLDINF(6)+1                           TRHS0042
      LINES=(FLDINF(2)-FLDINF(1))/FLDINF(3)+1                           TRHS0043
      ALP=SQRT((LINES*NSAMP)/2000)                                      TRHS0044

      IF(ALP.LE.1) ALP=1                                                TRHS0045
      FLDINP(1)=FLDINF(1)                                               TRHS0046
      FLDINP(2)=FLDINF(2)                                               TRHS0047
      FLDINP(4)=FLDINF(4)                                               TRHS0048
      FLDINP(5)=FLDINF(5)                                               TRHS0049
      FLDINP(3)=ALP                                                     TRHS0050
      FLDINP(6)=ALP                                                     TRHS0051
      LINES=(FLDINP(2)-FLDINP(1))/FLDINP(3)+1                           TRHS0052
      NSAMP=(FLDINP(5)-FLDINP(4))/FLDINP(6)+1                           TRHS0053
      CALL FLDINT(FLDINP,FETVEC,NOFEAT)                                 TRHS0054
      DO 30 I=1,LCOMB                                                   TRHS0055
      TOTPTS(I) = 0                                                     TRHS0056
      DO 30 J=1,101                                                     TRHS0057
   30 FILHIS(I,J) = 0                                                           *NE*
      DO 130 I=1,LINES                                                  TRHS0059***1
      CALL LINERD(IDATA,ENDTAP)                                         TRHS0060
      IF (ENDTAP.NE.0) GO TO 140                                        TRHS0061
      IF (I.NE.1) GO TO 40                                              TRHS0062
      ILIN=FLDINP(1)                                                    TRHS0063
      GO TO 50                                                          TRHS0064
   40 ILIN=ILIN+FLDINP(3)                                               TRHS0065
   50 CONTINUE                                                          TRHS0066
      CALL FDLINT(VERTCS,NC,FL,ILIN,NS,JJ)                              TRHS0067
      DO 110 K=1,NSAMP                                                  TRHS0068
      KP=(K-1)*FLDINP(6)+FLDINP(4)                                      TRHS0069
      DO 101 IK=1,JJ,2                                                  TRHS0070
      LKP1 = IK + 1                                                     TRHS0071
      IF (KP.LT.FL(IK)) GO TO 110                                       TRHS0072
      IF (KP.GT.FL(LKP1)) GO TO 90                                      TRHS0073
      DO 80 J=1,LCOMB                                                   TRHS0074
      XT(J)=0.                                                          TRHS0075
C                                                                       TRHS0076
C        CALL TRANSF TO DO A DATA TRANSFORMATION                        TRHS0077
C                                                                       TRHS0078
       REAL PCM                                                                 *NE*
        REAL TEMP                                                               *NE*
       XT(J) = TRANSF                                                           *NE*
     C      (BMAT,IDATA,TOP,J,K,LCOMB,NSAMP,BIAS)                               *NE*
C                                                                       TRHS0081***2
C                                                                       TRHS0082
C         HISTOGRAM THE TRANSFORMED DATA ( USING TRANSFORMED DATA MAX   TRHS0083
C         AND MIN AND SCALE FACTOR, CON , COMPUTED IN SUBR. MAXMAT      TRHS0084
C         TO OBTAIN THE HISTOGRAM ''BIN LEVEL'' FOR EACH TRANSFORMED    TRHS0085
C         DATA POINT )                                                  TRHS0086
C                                                                       TRHS0087
C                                                                       TRHS0088
      IF (XT(J).LE.MIN(J)) GO TO 60                                     TRHS0089
      IF (XT(J).GE.MAX(J)) GO TO 70                                     TRHS0090
      DPT=(XT(J)-MIN(J))/CON(J)+1                                       TRHS0091
C                                                                       TRHS0092
      IF( DPT .LE. 0). DPT = 1                                          TRHS0093
      IF ( DPT .GT. 101 )  DPT = 101                                    TRHS0094
C                                                                       TRHS0095
      FILHIS(J,DPT)=FILHIS(J,DPT)+1                                     TRHS0096
      GO TO 80                                                          TRHS0097
   60 FILHIS(J,1)=FILHIS(J,1)+1                                         TRHS0098
      GO TO 80                                                          TRHS0099
   70 FILHIS(J,101) = FILHIS(J,101) + 1                                 TRHS0100
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ORIGINAL PAGE IS
OF POOR QUALITY

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00250   103.        80 TOTPTS(J)=TOTPTS(J)+1                                        TRHS0101
00252   104.           GO TO 110                                                    TRHS0102
00253   105.        90 IF (LKPI.GE.JJ) GO TO 120                                    TRHS0103
00255   106.       100 CONTINUE                                                     TRHS0104
00257   107.       110 CONTINUE                                                     TRHS0105
00261   108.       120 CONTINUE                                                     TRHS0106
00262   109.       130 CONTINUE                                                     TRHS0107
00264   110.       140 CONTINUE                                                     TRHS0108
00264   111.     C                                                                  TRHS0109
00264   112.     C                                                                  TRHS0110
00264   113.     C        ELEMINATE PEROUT/2  8  OF POINTS FROM UPPER AND LOWER TAILS OF TRHS0111
00264   114.     C        THE TRANSFORMED DATA DISTRIBUTION --- OBTAIN THE REVISED MAX  TRHS0112
00264   115.     C        AND SCALING PARAMETERS CON AND MIN AFTER APPLICATION OF PEROUT TRHS0113
00264   116.     C                                                                  TRHS0114
00264   117.     C                                                                  TRHS0115
00265   118.           XPER=PEROUT/200.                                             TRHS0116
00265   119.     C CALCULATE MIN,MAX,AND CON ARRAYS                                 TRHS0117
00266   120.           DO 150 I=1,LCOMB                                             TRHS0118
00271   121.       150 PERCEN(I)=XPER*TOTPTS(I)                                     TRHS0119
00273   122.           DO 200 I=1,LCOMB                                             TRHS0120
00276   123.           XMIN=MIN(I)                                                  TRHS0121
00277   124.           SUMFIL=0.                                                    TRHS0122
00300   125.           DO 160 J=1,101                                               TRHS0123
00303   126.           SUMFIL=SUMFIL+FILHIS(I,J)                                    TRHS0124
00304   127.           IF (SUMFIL.LT.PERCEN(I)) GO TO 160                           TRHS0125
00306   128.           MIN(I)=(J-1)*CON(I)+XMIN                                     TRHS0126
00307   129.           GO TO 170                                                    TRHS0127
00310   130.       160 CONTINUE                                                     TRHS0128
00312   131.       170 SUMFIL=0.                                                    TRHS0129
00313   132.           DO 180 J=101,1,-1                                            TRHS0130
00316   133.           SUMFIL=SUMFIL+FILHIS(I,J)                                    TRHS0131
00317   134.           IF (SUMFIL.LT.PERCEN(I)) GO TO 180                           TRHS0132
00321   135.           JMI = J - 1                                                  TRHS0133
00322   136.           MAX(I) = JMI * CON(I) + XMIN                                 TRHS0134
00323   137.           GO TO 190                                                    TRHS0135
00324   138.       180 CONTINUE                                                     TRHS0136
00326   139.       190  CONTINUE                                                    TRHS0137
00326   140.     C      CHECK TO SEE IF MAX.GT.MIN                                            *NEW
00327   141.             IF (MAX(I).GT.MIN(I)) GO TO 191                                      *NEW
00331   142.            TEMP = MAX(I)                                                         *NEW
00332   143.             MAX(I) = MIN(I)                                                      *NEW
00333   144.            MIN(I) = TEMP                                                         *NEW
00334   145.      191     CONTINUE                                                            *NEW
00335   146.            CON(I) = 255. / (MAX(I) - MIN(I))                           TRHS0138
00336   147.       200 CONTINUE                                                     TRHS0139
00340   148.           WRITE(6,221)                                                           *NEW
00342   149.       221  FORMAT(//2X,'THE PARAMETERS FROM TRHIST')                             *NEW
00343   150.             WRITE(6,226) (MAX(I),I=1,LCOMB)                                      *NEW
00351   151.           WRITE(6,226) (MIN(I),I=1,LCOMB)                                        *NEW
00357   152.           WRITE(6,227) (CON(I),I=1,LCOMB)                                        *NEW
00357   153.     C     CALCULATE THE PCG IMAGE SCALING PARAMETERS IF PCGC=1                   *NEW
00365   154.            IF (PCGC.NE.1) GO TO 210                                              *NEW
00365   155.     C      PLACE THE SCALING PARAMETERS (MAX,MIN,CON) THAT WERE DERIVED          *NEW
00365   156.     C     FROM THE PCG-IMAGE INTO LOCATION BMAT(401) - BMAT(401+3*LCOMB-I)       *NEW
00367   157.           WRITE (6,228)                                                          *NEW
00371   158.      228   FORMAT(/2X,'THE PCG SCALING PARAMETERS ARE')                          *NEW
00372   159.            CALL MATVEC(PCM,MAX,XT,LCOMB,LCOMB)                                   *NEW
00373   160.           B=LCOMB + 400                                                          *NEW
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00342     149.     221   FORMAT(//2X,'THE PARAMETERS FROM TRHIST')                         *NEW
00343     150.             WRITE(6,225) (MAX(I),I=1,LCOMB)                                 *NEW
00351     151.           WRITE(6,226) (MIN(I),I=1,LCOMB)                                   *NEW
00357     152.           WRITE(6,227) (CON(I),I=1,LCOMB)                                   *NEW
00357     153.       C   CALCULATE THE PCG IMAGE SCALING PARAMETERS IF PCGC=1              *NEW
00365     154.            IF (PCGC.NE.1) GO TO 210                                         *NEW
00365     155.       C    PLACE THE SCALING PARAMETERS (MAX,MIN,CON) THAT WERE DERIVED     *NEW
00365     156.       C   FROM THE PCG-IMAGE INTO LOCATION BMAT(401) - BMAT(401+3*LCOMB-1)  *NEW
00367     157.           WRITE (6,228)                                                     *NEW
00371     158.     228    FORMAT(/2X,'THE PCG SCALING PARAMETERS ARE')                     *NEW
00372     159.            CALL MATVEC(PCM,MAX,XT,LCOMB,LCOMB)                              *NEW
00373     160.           B=LCOMB + 400                                                     *NEW

00374     161.              J=400                                                          *NEW
00375     162.              WK = 1                                                         *NEW
00376     163.     152      DO 151 I=1,LCOMB                                               *NEW
00401     164.              J = J + 1                                                      *NEW
00402     165.     151        BMAT(J) = XT(I)                                              *NEW
00404     166.            GO TO (153,154,155),WK                                           *NEW
00405     167.     153   WRITE (6,225) (BMAT(I),I=401,B)                                   *NEW
00413     168.     225    FORMAT(/2X,'THE MAX IS'/2X,7F8.2)                                *NEW
00414     169.           B = B + 1                                                         *NEW
00415     170.            CALL MATVEC(PCM,MIN,XT,LCOMB,LCOMB)                              *NEW
00416     171.           T=B+LCOMB-1                                                       *NEW
00417     172.            WK = 2                                                           *NEW
00420     173.            GO TO 152                                                        *NEW
00421     174.     154    WRITE (6,226) (BMAT(I),I=B,T)                                    *NEW
00427     175.     226    FORMAT(/2X,'THE MIN IS'/2X,7F8.2)                                *NEW
00430     176.           B=B+LCOMB                                                         *NEW
00431     177.            CALL MATVEC(PCM,CON,XT,LCOMB,LCOMB)                              *NEW
00432     178.           T=B+LCOMB-1                                                       *NEW
00433     179.             WK = 3                                                          *NEW
00434     180.            GO TO 152                                                        *NEW
00435     181.     155    WRITE (6,227) (BMAT(I),I=B,T)                                    *NEW
00443     182.     227    FORMAT(/2X,'THE CON IS'/2X,7F8.2)                                *NEW
00443     183.       C                                                            TRMS0140
00443     184.       C                                                            TRMS0141
00443     185.       C      RETURN THE SCALING PARAMETERS,  CON  AND  MIN ,  REQUIRED TO  TRMS0142
00443     186.       C      RESCALE THE TRANSFORMED DATA TO THE RANGE , 0 - 255  .        TRMS0143
00443     187.       C                                                            TRMS0144
00443     188.       C                                                            TRMS0145
00444     189.       210 RETURN                                                   TRMS0146
00445     190.           END                                                      TRMS0147

      END OF COMPILATION:          NO  DIAGNOSTICS.
   TRHIST           SYMBOLIC                           20 JUN 77  02:01:04   0  03324050   14   147  (DELETED)
   TRHIST   CODE    RELOCATABLE                        20 JUN 77  02:01:04   1  02033042   36     1  (DELETED)
                                                                             0  02033106   14    50
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@ FOR PCHMAT,PCHMAT                                                                          03 MAR 78          17: 0143.266
UNIVAC 1108 FORTRAN V EXEC II LEVEL 25A  -(FXECB LEVEL E1201001OA)
THIS COMPILATION WAS DONE ON 03 MAR 78 AT 17:00:43

   SUBROUTINE PCHMAT    ENTRY POINT 001422

   STORAGE USED: CODE(1) 001534; DATA(0) 001703; BLANK COMMON(2) 000000

   EXTERNAL REFERENCES (BLOCK, NAME)

    0003   PCHAML
    0004   SUPSUM
    0005   MINDEX
    0006   SORT
    0007   NWDUS
    0010   N1025
    0011   N101S
    0012   NERR3S

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

    0000   001556 102F      0001   000062 127G      0001   000079 132G      0001   000119 143G      0001   000139 147G
    0001   001234 14BL      0000   001547 151F      0000   001566 152F      0000   001576 153F      0001   000145 156G
    0001   000151 142G      0001   000206 172G      0001   000222 175G      0001   000261 207G      0001   000302 216G
    0001   000341 226G      0001   000364 232G      0001   000437 251G      0001   000546 271G      0001   001002 30L
    0001   000615 304G      0001   000741 31L       0001   000706 331G      0001   000575 35L       0001   001015 365G
    0001   000323 38L       0001   000272 39L       0001   001063 406G      0001   001113 414G      0000   001544 420F
    0001   001137 422G      0001   001155 430G      0001   001162 435G      0001   001211 451G      0001   001231 461G
    0001   001031 50L       0001   001766 500G      0001   001275 503G      0001   001314 513G      0001   001346 530G
    0001   001364 541G      0001   000761 60L       0001   001055 70L       0000 R 000002 A         0000 R 001011 AA
    0000 R 001533 AWIIB     0000 R 001532 AWIIS     0000 R 001507 AWIJ      0000 R 001501 DEL       0000 R 001525 EIGEN
    0000 R 001517 FPS       0000 R 001476 ERR       0000 R 001477 ERRCM     0000 R 001520 GAMMA     0000 I 001503 I
    0000 I 001514 IB        0000 I 001002 IFMT      0000 I 001513 IK        0000 I 000000 IN        0000   001624 INJPS
    0000 I 000001 IOUT      0000 I 001511 IS        0000 I 001504 J         0000 I 001537 JJ        0000 I 001411 JM
    0000 I 001506 K         0000 I 001541 KF        0000 I 001502 KK        0000 I 001542 KP        0000 I 001543 L
    0000 I 001540 M         0000 I 001472 NCMAX     0000 I 001475 NM        0000 I 001473 NMAX      0000 I 001534 NR
    0000 I 001505 NRM       0000 I 001471 NRMAX     0000 R 001500 RE        0000 R 001474 REL       0000 R 001521 RHO
    0000 R 001512 RMIN      0000 R 001510 RSUM      0000 R 001536 SE        0000 R 001535 SM        0000 R 001522 SM11
    0000 R 001524 SM12      0000 R 001523 SM22      0004 R 000000 SUPSUM    0000 R 001451 U         0000 R 001431 V
    0000 R 000402 W         0000 R 001515 WAAW      0000 R 001516 WAW       0000 R 001531 WIIB      0000 R 001530 WIIS
    0000 R 001526 X1        0000 R 001527 X2

 00101      1*            SUBROUTINE PCHMAT(T,PCM,C,R,N,ID)                                      MAI00530
 00101      2*      C                                                                            MAI00540
 00101      3*      C     INPUT OUTPUT DEVICE ASSIGNMENTS                                        MAI00550
 00103      4*            IN = 5                                                                 MAI00560
 00104      5*            IOUT = 6                                                               MAI00570
 00104      6*      C                                                                            MAI05140
 00104      7*      C ************ PARAMETER DEFINITIONS ******************************           MAI05150
 00104      8*      C     A = N BY N SYMMETRIC REAL MATRIX (INPUT)
 00104      9*      C     PCM = N BY N ORTHOGONAL MATRIX OF EIGENVECTORS (OUTPUT)
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00101          SUBROUTINE PCHMAT(T,PCM,C,R,N,ID)
00101    C                                                            MAI00530
00101    C     INPUT OUTPUT DEVICE ASSIGNMENTS                        MAI00540
00103          IN = 5                                                 MAI00550
00104          IOUT = 6                                               MAI00560
00104    C                                                            MAI00570
00104    C  ............ PARAMETER DEFINITIONS ........................ MAI05140
00104    C     A = N BY N SYMMETRIC REAL MATRIX (INPUT)               MAI05150
00104    C     PCM = N BY N ORTHOGONAL MATRIX OF EIGENVECTORS (OUTPUT)

00104    C     C = N VECTOR OF CENTERS OF WENISTEIN  DISCS (OUTPUT)   MAI05170
00104    C     R = N VECTOR OF RADII OF WENISTEIN DISCS (OUTPUT)      MAI05180
00104    C     REL = RELATIVE ERROR=0.000005
00104    C     JM,V,U ARE WORKING VECTORS
00104    C     AW IS A WORKING MATRIX
00104    C     SUBROUTINES USED .                                     MAI05310
00104    C                                                            MAI05320
00104    C      SUPSUM,ORG1,MINDEX,MATMUL
00104    C                                                            MAI05340
00104    C                                                            MAI05350
00105           DIMENSION A(16,16),W(16,16),C(16),R(16),IFMT(7)
00106           DIMENSION AW(16,16)
00107           DIMENSION JM(16),V(16),U(16),PCM(49)
00110           DIMENSION T(10)
00111          DATA IFMT/ '(//,','  ','(1X,','G14.','6,','1X),'8' )' /  MAI00360
00111    C                                                            MAI05370
00111    C                                                            MAI05400
00111    C --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- MAI05410
00111    C                                                            MAI05420
00113           NRMAX=16
00114           NCMAX=200
00115           NMAX=NRMAX
00116          REL=0.000005
00117          NM=N-1                                                 MAI05430
00120          IN = 1                                                 MAI05440
00121          ERR = .01                                              MAI05450
00122          ERRCM = 1.0 - ERR                                      MAI05460
00123          RE = REL*REL                                           MAI05470
00124          DEL = -2.0/N                                           MAI05480
00125           KK=0
00126           DO 201 I=1,N
00131           DO 199 J=1,I
00134           KK=KK+1
00135     199     A(I,J) = T(KK)
00137     201    CONTINUE
00141           NRM=N - 1
00142           DO 501 I=1,NRM
00145           K = I + 1
00146           DO 500 J=K,N
00151     500   A(I,J) = A(J,I)
00153     501   CONTINUE
00155          DO 10 I=1,N                                            MAI05490
00160          JM(I)=I                                                MAI05500
00161          DO 11 J=1,N                                            MAI05510
00164     11   W(I,J) = DEL                                           MAI05520
00166     10   W(I,I) = 1.0 + DEL                                     MAI05530
00170            CALL PCMAM1 (A,W,AW,N,N,N,NMAX,NMAX,NMAX)
00171          DO 12 J=1, N                                           MAI05550
00174          DO 13 I=1, N                                           MAI05560
00177          AWIJ = AW(I,J)                                         MAI05570
00200           (I) = W(I,J) * AWIJ                                   MAI05580
00201     13   V(I) = AWIJ**2                                         MAI05590
00203           C(J)=SUPSUM(U,N,NMAX)
00204     12    R(J)=SUPSUM(V,N,NMAX) -(C(J))**2
00206          DO 14 J=1, N                                           MAI05620
00211     14   U(J) = R(J)                                            MAI05630
00213          RSUM=SUPSUM(U,N,N)                                     MAI05640
00213    C                                                            MAI05650
```

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```
00213        C --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---
00213        C     MAIN LOOP
00213        C
00214     39       CONTINUE
00215              DO 30 K=IN,NM
00220              CALL MINDEX(R,JM,K,N)
00221              IS=JM(K)
00222              IF( R(IS) .LE. 0.0 ) GO TO 60
00224     38       RMIN=R(IS)
00224        C
00224        C     ITERATIVE SUM LOOP  -------------
00224        C
00225              DO 31 IK=K,NM
00230              IB=JM(IK+1)
00231              DO 32 I=1,N
00234              U(I) = AW(I,IS) * AW(I,IB)
00235     32       V(I) =  W(I,IS) * AW(I,IB)
00237              WAAW=SUPSUM(U,N,N)
00240              WAW=SUPSUM(V,N,N)
00241              DEL=WAAW-2.*C(IS)*WAW
00242              DEL=(DEL/R(IS))**2
00243              EPS=ERR*(ERR+(R(IB)/R(IS))-1.)
00244              IF(DEL.LT.EPS)GO TO 31
00246              GAMMA=C(IS)
00247              RHO=R(IS)
00250              DO 33 J=1,NM
00250        C
00250        C     FORM ITERATION MATRIX
00250        C
00253              SM11=R(IS)+(C(IS)-GAMMA)**2
00254              SM22=R(IB)+(C(IB)-GAMMA)**2
00255              SM12=WAAW-2.*GAMMA*WAW
00256              EIGEN=0.5*(SM11+SM22-SQRT((SM11-SM22)**2+4.*SM12**2))
00257              X1=SM22-EIGEN
00260              X2=-SM12
00261              DEL=SQRT(X1**2+X2**2)
00262              X1=X1/DEL
00263              X2=X2/DEL
00264              IF ( EIGEN .LE. 0.0 ) GO TO 35
00266              IF( EIGEN .GT. RHO*FRRCH ) GO TO 35
00270              DO 34 I=1,N
00273              U(I)=(X1*AW(I,IS)+X2*AW(I,IB))*(X1*W(I,IS)+X2*W(I,IB))
00274     34       CONTINUE
00276              GAMMA=SUPSUM(U,N,N)
00277              RHO=EIGEN
00300     33       CONTINUE
00302     35       CONTINUE
00303              DO 36 I=1,N
00306              WIIS = W(I,IS)
00307              WIIB = W(I,IB)
00310              U(I) = X1*WIIS + X2*WIIB
00311              V(I) = X2*WIIS - X1*WIIB
00312              W(I,IS)=U(I)
00313              W(I,IB)=V(I)
00314              AWIIS = AW(I,IS)
00315              AWIIB = AW(I,IB)
00316              U(I) = X1*AWIIS + X2*AWIIB
00317              V(I) = X2*AWIIS - X1*AWIIB
```

```
00327             WIIS = W(I,IS)                                        MAI06140
00330             WIIB = W(I,IB)                                        MAI06150
00331             U(I) = X1*WIIS + X2*WIIB                              MAI06160
00332             V(I) = X2*WIIS - X1*WIIB                              MAI06170
00333             W(I,IS)=U(I)                                          MAI06180
00334             W(I,IB)=V(I)                                          MAI06190
00335             AWIIS = AW(I,IS)                                      MAI06200
00336             AWIIB = AW(I,IB)                                      MAI06210
00337             U(I) = X1*AWIIS + X2*AWIIB                            MAI06220
00340             V(I) = X2*AWIIS - X1*AWIIB                            MAI06230
00341             AW(I,IS)=U(I)                                         MAI06240
00342             AW(I,IB)=V(I)                                         MAI06250
00343             U(I)=W(I,IS)*U(I)                                     MAI06260
00344             V(I)=W(I,IB)*V(I)                                     MAI06270
00345       36    CONTINUE                                              MAI06280
00347               WRITE(6,40) IS
00352       40     FORMAT(//2X,'IS=',I4)
00353              WRITE(6,420) (W(I,IS),I=1,N)
00361              WRITE(6,41) IB
00364       41     FORMAT(//2X,'IB=',I4)
00365              WRITE(6,420) (W(I,IB),I=1,N)
00373             C(IS)=SUPSUM(U,N,N)                                   MAI06290
00374             C(IB)=SUPSUM(V,N,N)                                   MAI06300
00375             DO 37 I=1,N                                           MAI06310
00400             U(I) = (AW(I,IS) - C(IS) * W(I,IS))**2                MAI06320
00401       37    V(I) = (AW(I,IB) - C(IB) * W(I,IB))**2                MAI06330
00403             R(IS) = SUPSUM(U,N,N)                                 MAI06340
00404             R(IB) = SUPSUM(V,N,N)                                 MAI06350
00405             IF( R(IS) .LE. 0.0 ) GO TO 60                         MAI06360
00407       31    CONTINUE                                              MAI06370
00407       C                                                           MAI06380
00407       C     END OF SUB LOOP    ------------------                 MAI06390
00407       C                                                           MAI06400
00411             IF (R(IS) .LT. RE*C(IS)**2 ) GO TO 30                 MAI06410
00413             IF( RMIN .GT. 4.0*R(IS)) GO TO 38                     MAI06420
00415             GO TO 30                                              MAI06430
00415       C                                                           MAI06440
00415       C                                                           MAI06450
00416       60    CONTINUE                                              MAI06460
00417             JM(K) = JM(IN)                                        MAI06470
00420             JM(IN) = IS                                           MAI06480
00421             R(IS) = 0.0                                           MAI06490
00422             IN = IN + 1                                           MAI06500
00423             IF( IN .GE. N ) GO TO 70                              MAI06510
00425             GO TO 39                                              MAI06520
00426       30    CONTINUE                                              MAI06530
00426       C                                                           MAI06540
00426       C     END OF MAIN LOOP                                      MAI06550
00426       C                                                           MAI06560
00426       C --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---   MAI06570
00426       C     TERMINAL CHECK                                        MAI06580
00426       C --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---   MAI06590
00430             IS=0                                                  MAI06600
00431             DO 50 I=1,N                                           MAI06610
00434             U(I)=R(I)                                             MAI06620
00435             IF( R(I) .LT. RE*C(I)**2 ) GO TO 50                   MAI06630
00437             IS=IS+1                                               MAI06650
```

```
00440         50    CONTINUE
00442               IF(IS.EQ.0)GO TO 70
00444               DEL=SUPSUM(U,N,N)                                          MAI06660
00445               IF(2.*DEL.GT.RSUM)GO TO 70                                 MAI06670
00447               RSUM = DEL                                                 MAI06680
00450               GO TO 39                                                   MAI06690
00450         C --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---MAI06700
00450         C                                                                MAI06710
00450         C                                                                MAI06720
00450         C     FINAL ORDERING                                             MAI06730
00450         C --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---MAI06740
00450         C                                                                MAI06750
00451         70    CONTINUE                                                   MAI06760
00452               DO 75 I=1, N                                               MAI06770
00455         75    U(I) = ABS(C(I))                                           MAI06780
00457               CALL MINDEX(U,JM,1,N)                                      MAI06790
00460               DO 71 I=1,N                                                MAI06800
00463               IS=JM(N-I+1)                                               MAI06810
00464               U(I)=C(IS)                                                 MAI06820
00465               V(I)=SQRT(R(IS))                                           MAI06830
00466               DO 71 J=1,N                                                MAI06840
00471         71    AW(J,I) = W(J,IS)                                          MAI06850
00474                WRITE(6,77)                                               MAI06860
00476         77     FORMAT(//2X,'AW SHOULD BE EQUAL TO TRANSPOSE OF W')       MAI06870
00477                DO 78 J=1,N
00502         78     WRITE(6,420) (AW(J,I),I=1,N)
00511               DO 72 I=1,N
00514               C(I)=U(I)
00515               R(I)=V(I)                                                  MAI06880
00516               DO 72 J=1,N                                                MAI06890
00521         72    W(I,J)=AW(I,J)                                             MAI06900
00521         C --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---MAI06910
00521         C                                                                MAI06920
00521         C                                                                MAI06930
00524               NR = N                                                     MAI06940
00525               WRITE(IOUT,150)                                            MAI06950
00527         150   FORMAT(//,10X,'A MATRIX = ',/)
00530         420   FORMAT(1H0,8(F12.6))                                       MAI01110
00531               DO 415 I = 1,NR                                            MAI01120
00534         415   WRITE(IOUT,420) (A(I,J),J=1,NR)                            MAI01130
00543               WRITE(IOUT,151)                                            MAI01140
00545         151   FORMAT(///,10X,'MATRIX OF EIGENVECTORS = ',/)              MAI01150
00546                 SM=0.                                                    MAI01160
00547                 SE=0.                                                    MAI01170
00550               SE = (W(1,1)+W(N,1))/2
00551               JJ = N-1
00552               DO 149 J=2,JJ
00555         149   SM=SM + W(J,1)
00557               SM = SM/(N-2)
00560               IF (SM.GE.SE) GO TO 148
00562                DO 147 J=1,N
00565         147    W(J,1) = -W(J,1)
00567         148    CONTINUE
00570               DO 116 J = 1,NR
00573         116   WRITE(IOUT,420) (W(I,J),I=1,NR)                            MAI01180
00602               WRITE (6,102)                                              MAI01190
00604         102    FORMAT(//2X,'THE TRANSPOSE OF - PCM MATRIX - IS')
00605                M = 0
```

```
00606                KE = N
00607                KP = 1
00610                DO 100 I=1,N
00613                DO 101 J=1,N
00616                M = M + 1
00617                PCM(M) = W(I,J)
00620      101       CONTINUE
00622                WRITE(6,420) (PCM(L),L=KP,KE)
00630                KP = KP + N
00631                 KE = KP + N - 1
00632      100       CONTINUE
00634               WRITE(IOUT,152)                                              MAI01200
00636      152      FORMAT(///,10X,' VECTOR OF EIGEN VALUES C(I) = ',/)           MAI01210
00637               WRITE(IOUT,IFMT) (C(I),I=1,NR)                               MAI01220
00645               WRITE(IOUT,153)                                              MAI01230
00647      153      FORMAT(///,10X,'VECTOR OF RADII R(I) = ',/)                   MAI01240
00650               WRITE(IOUT,IFMT) (R(I) I=1,NR)                               MAI01250
00656               RETURN                                                       MAI06960
00657                END

       END OF COMPILATION:        NO  DIAGNOSTICS.
```

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TRAN. /

FUNCTION TRANSF   ENTRY POINT 000117

STORAGE USED: CODE(1) 000136; DATA(0) 000030; BLANK COMMON(2) 000000

COMMON BLOCKS:

0003 TRBLCK 000227

EXTERNAL REFERENCES (BLOCK, NAME)

0004 NERR3S

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

```
0001   000066 10L      0001   000051 11L      0001   000017 115G     0003   000010 FETVEC   0003   000002 FLDINF
0003   000051 GIC      0000   000007 INJPS    0000 I 000003 IT       0000 I 000004 JSAMP    0003 I 000001 NOFEAT
0003   000000 OUTFMT   0003   000046 PCF      0003   000047 PCGC     0003   000146 PCM      0003 R 000110 SABIAS
0003 R 000052 SAGAIN   0003 I 000050 SAKEY    0000 R 000002 TDATA    0000 I 000000 TRANSF   0000 R 000001 XT
0000 I 000005 ZCOMB
```

```
00101          FUNCTION TRANSF                                               *NEW
00101        * (BMAT,IDATA,TOP,IL,K,LCOMB,NSAMP,BIAS)                        *NEW
00103           IMPLICIT INTEGER (A-Z)                                TRAN0003**-2
00103    C                                                            TRAN0004
00104           REAL SAGAIN,SABIAS                                           *NEW
00105          REAL BMAT(480),BIAS(16),XT                                    *NEW
00106          REAL TDATA                                                    *NEW
00107           INCLUDE COMBK9, LIST                                  TRAN0006**-1
00107    C DATA TRANSFORMATION COMMON BLOCK
00110          COMMON/TRBLCK/OUTFMT,NOFEAT,FLDINF(6),FETVEC(30),PCF,         *NEW
00110        1 PCGC,SAKEY,GIC,SAGAIN(30),SABIAS(30),PCM(49)                  *NEW
00111          END                                                           **-1
00112           DIMENSION IDATA (TOP)                                 TRAN0007
00112    C                                                            TRAN0008
00112    C     SUBROUTINE TRANSF DOES A DATA-TRANSFORMATION USING THE TRAN0009
00112    C     FORMULA                                                TRAN0010
00112    C           XT = IDATA * BMAT + BIAS                         TRAN0011
00112    C            XT = COMPONENT(IL), TRANSFORMED DATA VECTOR     TRAN0012
00112    C            IDATA = INPUT DATA VECTOR ( NOFEAT X 1 )        TRAN0013
00112    C            BMAT = TRANSFORMATION MATRIX ( LCOMB X NOFEAT ) TRAN0014
00112    C              BIAS = ADDITIVE BIAS                          TRAN0015
00112    C                                                            TRAN0016
00113          XT = 0.                                                       *NEW
00114         DO 10 IT=1,NOFEAT                                       TRAN0017
00117            JSAMP = (IT - 1) * NSAMP + K                         TRAN0018
00120            ZCOMB = LCOMB * (IT - 1) + IL                        TRAN0019
00120    C     IF SAKEY=1, APPLY THE SUN ANGLE CORRECTION FACTOR TO IDATA    *NEW
00120    C      BEFORE THE TRANSFORMATION                                    *NEW
00121          IF (SAKEY.EQ.1) GO TO 11                                      *NEW
00123          XT = XT +                                                     *NEW
00123         C           IDATA(JSAMP) * BMAT(ZCOMB)                  TRAN0021**-1
00124          GO TO 10                                                      *NEW
00125    11    TDATA = SAGAIN(IT)*IDATA(JSAMP) + SABIAS(IT)                  *NEW
00126           XT = XT + TDATA*BMAT(ZCOMB)                                  *NEW
00127       10  CONTINUE                                              TRAN0022
00131         XT=XT + BIAS(IL)                                               *NEW
00132         TRANSF=XT                                                      *NEW
00133           RETURN                                                TRAN0024**-1
00134            END
```

```
    END OF COMPILATION:         NO. DIAGNOSTICS.
TRANSF              SYMBOLIC                          20 JUN 77  02:01:01  0  03323312   14    25  (DELETED)
TRANSF   CODE       RELOCATABLE                       20 JUN 77  02:01:01  1  02032632   24     1  (DELETED)
                                                                           0  02032662   14     6
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0000      001701 710G      0001      002303 710L      0001      020    740F      0000      020    750F      0000
0000      020671 750F      0001      002057 757G      0000      020    760F      0000      020720 770F      0000      020735 780I
0000      020753 790F      0001      000126 8L        0001      002271 8CL       0000      020777 800F      0000      021022 810F
0000      021054 820F      0000      021106 830F      0000      021141 840F      0001      002631 850L      0000      021155 860F
0000      021204 870F      0000      021214 880F      0001      002761 890L      0001      000043 9L        0001      002776 900L
0000      021227 910F      0001      003011 920L      0001      003026 923L      0005      000073 ASAV      0005      000074 ASAVFL
0003      000006 AVAR2     0000 I    020265 BADMAX    0000 I    020245 BADMIN    0005      000055 BMFILE    0005      000056 BMKEY
0003      000010 CISID2    0003      000301 CISVC2    0000 I    020412 CMIN      0005      000037 COMENT    0000 I    020347 COMMA
0000 R    000270 CONSAV    0003      000007 COVAR2    0000 I    020346 CP        0000 R    000104 CUT       0005 I    000053 DATAPE
0005      000016 DATE      0005 I    000071 DATFIL    0005      000102 DOTFIL    0005      000101 DOTUNT    0000 I    020403 DPT
0005      000067 DRMNDS    0005      000066 DRUMAD    0000 I    020372 ENDTAP    0005      000062 ERIPTP    0005      000063 ERPKEY
0003 I    000015 FFTVC2    0004 I    000010 FFTVEC    0000 I    020351 FINI      0000 I    000535 FL        0004 I    000002 FLDINF
0003      000013 FIDSV2    0004 I    000051 GIC       0003      000760 GROUPS    0003      000663 GRPCHK    0003      000566 GRPDEX
0003      000472 GRPNAM    0005      000090 HEAD      0005      003002 HED1      0005      000023 HED2      0000 I    000370 HISBUF
0005      000057 HISFIL    0005      000060 HISKEY    0000 I    020355 I         0000 I    020411 IA        0000 I    020407 IB


0000 I    000000 IDIM      0000 I    020410 IF        0000 I    020406 IG        0000 I    020376 IH        0000 I    020420 IL
0000 I    020373 ILIN      0000 I    020363 IN        0000      021301 INJPS     0000 I    020367 J         0000 I    020375 JJ
0000 I    020401 JK        0000 I    020402 JKPI      0000 I    020364 K         0003      000375 KEPPTS    0000 I    020356 KF
0000 I    020357 KK        0000 I    020400 KP        0000 I    020360 LAM       0007 I    000000 LAREAD    0000 I    020366 LINES
0000 I    020370 LSTLIN    0000 I    020371 M         0005      000100 MAPFIL    0005      000052 MAPTAP    0005      000064 MAPUNT
0000 R    000041 MATOT     0000 I    020325 MAXCUT    0000 R    000253 MAXSAV    0000 I    020305 MINCUT    0000 R    000230 MINSAV
0000 R    000042 MITOT     0000 I    020421 MN        0000 I    020361 MTRAN     0005      000103 NCHPAS    0000 R    000043 NEWMAX
0000 R    000063 NEWMIN    0005      000076 NHSTFI    0005      000075 NHSTUN    0003      000000 NOCLS2    0004 I    000001 NOFEAT
0003      000002 NOFET2    0005      000065 NOFILE    0003      000005 NOFLD2    0003      000471 NOGRP     0003      000001 NOSUB2
0000 I    020413 NPCT      0000 R    000206 NPER1     0000 R    000207 NPER2     0000 I    020374 NS        0000 I    020362 NSAMP
0000 R    000105 NXCON     0000 I    020345 OP        0004 I    000000 OUTFMT    0005      000070 PAGSIZ    0004 I    000046 PCF
0004 I    000047 PCGC      0004 R    000146 PCM       0000 I    000350 PMAX      0000 I    000330 PMIN      0000 I    020352 PPCF
0000 I    020405 RSET      0000 I    020354 S         0004      000110 SABIAS    0004      000052 SAGAIN    0004 I    000050 SAKEY
0005      000054 SAVTAP    0005      000077 SCTRUN    0005      000072 STAFIL    0003      000012 SUBUS2    0003      000011 SUBNO2
0003      000164 SUBPTR    0003      000053 SUBVC2    0000 R    000103 SUM       0000 I    020353 T         0000 R    000106 TEMP
0000 R    000021 TMAX      0000 R    000001 TMIN      0000 I    000313 TOTPTS    0003      000004 TOTVT2    0015 I    000000 TRANSF
0005 I    000061 TRFORM    0005 I    000104 TRNSFL    0000 I    020350 TTL       0003      000003 VARSZ2    0003      000014 VERTX2
0000 R    000126 XCON      0000 I    020345 XDIM      0000 I    020415 XHGH      0000 I    020416 XLCW      0000 I    020414 XSIZ
0000 R    000146 XT        0000 R    000210 XXCON     0000 I    000545 Y         0000 R    000164 YREAL     0000 I    020417 YSIZ
0000 I    020404 ZS        0000 I    020377 ZSAMP


00101              SUBROUTINE LNTRAN(IDATA,MAX,MIN,CON,BMAT,LCOMB,NMTRIG,SCAFLG,        LNTR0001
00101             * PEROUT,FILHIS,TOP,LAR,FLDNAM,NC,VERTCS, RESCAL, BIAS,               LNTR0002
00101             *   NF , NPUN )                                                       LNTR0003
00101         C                                                                         LNTR0004
00101         C                                                                         LNTR0005
00101         C        IF   SCAFLG = 1 .   RESCALE BY HISTOGRAM METHOD                  LNTR0006
00101         C                                                                         LNTR0007
00101         C        IF   SCAFLG = 2 .  RESCALE BY THE STATISTICS METHOD              LNTR0008
00101         C                                                                         LNTR0009
00101         C        IF   SCAFLG = 3 .  RESCALE WITH USER-INPUT SCALING PARAMETERS    LNTR0010
00101         C                                                                         LNTR0011
00101         C                                                                         LNTR0012
00101         C        NOTE:   IF THE FLAG.  RESCAL  . IS ZERO. NO RESCALING IS         LNTR0013
00101         C                PERFORMED. HOWEVER. PEROUT IS APPLIED TO THE TRANSFORMEDLNTR0014
00101         C                DATA DISTRIBUTION PRIOR TO FINAL OUTPUT OF TRANSFORMED   LNTR0015
00101         C                DATA VALUES .                                            LNTR0016
00101         C                                                                         LNTR0017
00103              IMPLICIT INTEGER(A-Z)                                                LNTR0018
00104              REAL    TMIN(16). TMAX(16).  MATOT .  MITOT                          LNTR0019
00104         C                                                                         LNTR0020
00105              REAL   NEWMAX(16) . NEWMIN(16) .  SUM .  CUT                         LNTR0021
00105         C                                                                         LNTR0022
00106               REAL NXCON                                                          LNTR0023
00107              REAL PCM                                                                      *NEW
00110              REAL TEMP(16)                                                                 *NEW
00110         C                                                                         LNTR0024
00111              REAL    BIAS(16). XCON(16). XT(16).   YREAL(16).   NPER1.   NPER2    LNTR0025
00111         C                                                                         LNTR0026
00112              REAL    MAX(16). MIN(16). CON(16).  BMAT(480) .  XXCON(16)           LNTR0027
00112         C                                                                         LNTR0028
00113              REAL    MINSAV(16) . MAXSAV(16) . CONSAV(16)                         LNTR0029
00113         C                                                                         LNTR0030
00114              DIMENSION   TOTPTS(16) . PMIN(16) . PMAX(16)                         LNTR0031
00114         C                                                                         LNTR0032
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00114         C                                                                          LNTR0033
00116              DIMENSION HISBUF(10),VERTCS(2,11),FL(8)                               LNTR0034
00115         C                                                                          LNTR0035
00116              DIMENSION   IDATA(TOP) ,  Y(8000) ,  FILMIS(LCOMB,10) )               LNTR0036
00116         C                                                                          LNTR0037
00117              DIMENSION   BADMIN(16) , BADMAX(16) , MINCUT(16) , MAXCUT(16)         LNTR0038
00117         C                                                                          LNTR0039
00120              DATA OP/'('/,CP/')'/,COMMA/','/                                       LNTR0040
00124              DATA TTL/'TOTAL '/                                                    LNTR0041
00124         C                                                                          LNTR0042
00124         C                                                                          LNTR0043
00126              INCLUDE COMBK1,LIST                                                   LNTR0044
00127              COMMON/INFORM/NOCLS2,NOSUB2,NOFET2,VARS22,TOTVT2,NOFLD2,
00127           *               AVAR2,COVAR2,CLSID2,SUBNO2,SUBDS2,FLDSV2,VERTX2,
00127           *               FETVC2(30),SUBVC2(75),SUBPTR(75),CLSVC2(60),
00127           *               KEPPTS(40),NOGRP,GRPNAM(60),GRPDEX(61),
00127           *               GRPCHK(61),GROUPS(124)
00130              END
00131              INCLUDE COMBK9,LIST                                                   LNTR0045
00131         C DATA TRANSFORMATION COMMON BLOCK
00132              COMMON/TRBLCK/OUTFMT,NOFEAT,FLDINF(6),FETVEC(30),PCF,                           *NEW
00132            1 PCGC,SAKEY,GIC,SAGAIN(30),SABIAS(30),PCM(49)                                    *NEW
00133              END                                                                             **-1
00134              INCLUDE COMBK4,LIST                                                   LNTR0046
00135              DIMENSION HED1(10),HED2(10),DATE(2),COMENT(10)
00136              EQUIVALENCE (HED1(1),HEAD(3)),(DATE(1),HEAD(15)),
00136           *           (HED2(1),HEAD(20)),(COMENT(1),HEAD(32))
00137              END
00140              INCLUDE COMBK6,LIST                                                   LNTR0047
00141              COMMON/GLOBAL/HEAD(42),MAPTAP,DATAPE,SAVTAP,BMFILE,BMKEY,
00141           *               HISFIL,HISKEY,TRFORM,ERIPTP,ERPKEY,MAPUNT,NOFILE,
00141           *     DRUMAD,DRMWDS,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
00141           *  ,NHSTUN,NHSTFI,SCTRUN,MAPFIL
00141           *  ,DOTUNT,DOTFIL,NCHPAS,TRNSFL                                                    *NEW
00142              END                                                                             **-1
00143               NF=TRNSFL                                                                      *NEW
00143         C    FINI=1 IF BOTH GREEN AND PCG IMAGE PROCESSINGS WERE REQUESTED                   *NEW
00144              FINI=0                                                                          *NEW
00145               PPCF=0                                                                         *NEW
00145         C     CHECK TO SEE IF GREEN AND/OR PCG IMAGE REQUESTED                               *NEW
00146               IF (PCF.NE.1) GO TO 9                                                          *NEW
00150               IF (GIC.EQ.1) GO TO 9                                                          *NEW
00150         C     SET THE FLAG PPCF= TO INDICATE PCG IMAGE                                       *NEW
00152               PPCF=1                                                                         *NEW
00153               IF (RESCAL.EQ.0) GO TO 50                                                      *NEW
00153         C                                                                          LNTR0049**-1
00153         C    CHECK FOR RESCALE FACTORS INPUT BY USER (  SCAFLG = 3 )               LNTR0050
00155               IF (PPCF.NE.1) GO TO 8                                                         *NEW
00155         C     PULL THE PCF'S SCALING PARAMETERS FROM BMAT                                    *NEW
00157                T=400+LCOMB                                                                   *NEW
00160               S=400+2*LCOMB                                                                  *NEW
00161               DO 7 I=1,LCOMB                                                                 *NEW
00164               MAX(I)=BMAT(400+I)                                                             *NEW
00165               MIN(I)=BMAT(T+I)                                                               *NEW
00166               CON(I)=BMAT(S+I)                                                               *NEW
00166         C     CHECK TO SEE IF MAX.GT.MIN                                                     *NEW
00167               IF (MAX(I).GT.MIN(I))  GO TO 7                                                 *NEW
00171               TEMP(I) = MAX(I)                                                               *NEW
```

```
      IF (RESCAL.EQ.0) GO TO 50                                      ***
C                                                                    LNTR0049***1
C     CHECK FOR RESCALE FACTORS INPUT BY USER ( SCAFLG = 3 )         LNTR0050
       IF (PPCF.NE.1) GO TO 8                                            *NE*
C     PULL THE PCF'S SCALING PARAMETERS FROM BMAT                        *NE*
       T=400+LCOMB                                                       *NE*
      S=400+2*LCOMB                                                      *NE*
      DO 7 I=1,LCOMB.                                                    *NE*
      MAX(I)=BMAT(400+I)                                                 *NE*
      MIN(I)=BMAT(T+I)                                                   *NE*
      CON(I)=BMAT(S+I)                                                   *NE*
C     CHECK TO SEE IF MAX.GT.MIN                                         *NE*
       IF (MAX(I).GT.MIN(I))  GO TO 7                                    *NE*
      TEMP(I) = MAX(I)                                                   *NE*


      MAX(I) = MIN(I)                                                    *NE*
      MIN(I) = TEMP(I)                                                   *NE*
      CON(I) = ABS(CON(I))                                               *NE*
    7 CONTINUE                                                           *NE*
    8 CONTINUE                                                           *NE*
C                                                                    LNTR0051
      IF (SCAFLG.NE.3) GO TO 20                                      LNTR0052
C                                                                    LNTR0053
C        COMPUTE THE TRANSFORMED DATA MAX , USING INPUT              LNTR0054
C        SCALING PARAMETERS , CON  AND  MIN .                        LNTR0055
C                                                                    LNTR0056
      DO 10 KF=1,LCOMB                                               LNTR0057
      MAX(KF) = 255./ CON(KF) + MIN(KF)                              LNTR0058
   10 CONTINUE                                                       LNTR0059
C                                                                    LNTR0060
   20 CONTINUE                                                       LNTR0061
C                                                                    LNTR0062
C        COMPUTE THE OUTPUT HISTOGRAM SCALE FACTOR,  XCON            LNTR0063
C                                                                    LNTR0064
      DO 30 KK=1,LCOMB                                               LNTR0065
      XCON(KK)=(MAX(KK)-MIN(KK))/80                                  LNTR0066
   30 FETVC2(KK)=KK                                                  LNTR0067
C                                                                    LNTR0068
      IF (SCAFLG.EQ.1) GO TO 80                                      LNTR0069
C                                                                    LNTR0070
C      FOR STATISTICAL OR INPUT SCALE PARAMETERS, SAVE THE INITIAL   LNTR0071
C      SCALING PARAMETERS ( MIN, MAX , CON )  FOR RE-INITIALIZATION  LNTR0072
C      OF THESE PARAMETERS ON THE SECOND AND SUCCEEDING FIELDS TO BE LNTR0073
C      INPUT , TRANSFORMED , AND RESCALED ( IF RESCAL GT 0 )         LNTR0074
C                                                                    LNTR0075
C                                                                    LNTR0076
      DO 40 I=1,LCOMB                                                LNTR0077
      MAXSAV(I) = MAX(I)                                             LNTR0078
      MINSAV(I) = MIN(I)                                             LNTR0079
   40 CONSAV(I) = CON(I)                                             LNTR0080
C                                                                    LNTR0081
C                                                                    LNTR0082
C        POSITION THE INPUT DATA FILE, AND READ IN THE HEADER RECORD LNTR0083
C                                                                    LNTR0084
   50 CONTINUE                                                       LNTR0085
      CALL TAPHOR(DATAPE,DATFIL)                                     LNTR0086
C                                                                    LNTR0087
C                                                                    LNTR0088
C        READ THE COORDINATES ( VERTICES ) OF THE FIELD FOR THE DATA LNTR0089
C        TO BE TRANSFORMED .                                         LNTR0090
C                                                                    LNTR0091
C                                                                    LNTR0092
C     DO NOT READ IN THE COORDINATE AGAIN FOR PCG PROCESSING IF READ IN  *NE*
C     FOR GREEN RPOCESSING                                               *NE*
      IF (FINI.EQ.1) GO TO 61                                            *NE*
   60 LAM=LARFAD(FLDNAM,VERTCS,FLDINF,NC)                            LNTR0093
   61  IF (LAM.EQ.0) GO TO 920                                           *NE*
      IF (LAM.LT.0) GO TO 900                                        LNTR0095***1
C                                                                    LNTR0096
C                                                                    LNTR0097
C      FOR STATISTICAL OR INPUT SCALING PARAMETERS, INITIALIZE THE   LNTR0098
C      SCALING PARAMETERS  MAX , MIN , CON , XCON  FOR THIS FIELD    LNTR0099
C                                                                    LNTR0100
```

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00237         C                                                                  LNTRO101
00241               IF (RESCAL.EQ.0) GO TO 80                                    LNTRO102
00241         C                                                                  LNTRO103
00243               DO 70 I=1,LCOMB                                              LNTRO104
00246               MAX(I) = MAXSAV(I)                                           LNTRO105
00247               MIN(I) = MINSAV(I)                                           LNTRO106
00250               CON(I) = CONSAV(I)                                           LNTRO107
00251          70   XCON(I) = ( MAX(I) - MIN(I) )/80.                            LNTRO108
00253          80   NF = NF + 1                                                  LNTRO109
00253         C                                                                  LNTRO110
00254               DO 90 I=1,LCOMB                                              LNTRO111
00257               MAXCUT(I) = 0                                                LNTRO112
00260               MINCUT(I) = 0                                                LNTRO113
00261               NEWMAX(I) = 255.0                                            LNTRO114
00262                IF (SAKEY.EQ.1) NEWMAX(I) = 3000.                                   *NEW
00264               XXCON(I) = XCON(I)                                           LNTRO115
00265                 NEWMIN(I) = 0.                                                     *NEW
00266          90    IF (SAKEY.EQ.1) NEWMIN(I) = -3000.                                  *NEW
00266         C                                                                  LNTRO117**-1
00271               MTRAN = 0                                                    LNTRO118
00271         C                                                                  LNTRO119
00272               NSAMP=(FLDINF(5)-FLDINF(4))/FLDINF(6)+1                      LNTRO120
00273               IDIM=NOFEAT*NSAMP                                            LNTRO121
00274               IF (IDIM.GT.TOP) GO TO 130                                   LNTRO122
00276               IN=NC-1                                                      LNTRO123
00277               WRITE (6,100)                                                LNTRO124
00301               WRITE (6,110)FLDNAM,IN,FLDINF(6),FLDINF(3),((OP,VERTCS(1,K),COMMA,LNTRO125
00301              *VERTCS(2,K),CP),K=1,IN)                                      LNTRO126
00317         100 FORMAT(1H1,T24,'NO. OF    SAMPLE  LINE'/,                      LNTRO127
00317              *T12,'FIELDNAME  VERTICES     INC     INC  VERTICES(SAMPLE,LINE)') LNTRO128
00320         110 FORMAT(13X,A6,6X,I2,7X,I4,2X,I4,2X,5(A1,I4,A1,I4,A1,2X)/       LNTRO129
00320              * 5(A1,I4,A1,I4,A1,2X))                                       LNTRO130
00321               XDIM=LCOMB*NSAMP                                             LNTRO131
00321         C                                                                  LNTRO132
00321         C                                                                  LNTRO133
00322               IF (XDIM.LE.8000) GO TO 150                                  LNTRO134
00322         C                                                                  LNTRO135
00322         C                                                                  LNTRO136
00324               WRITE (6,120)                                                LNTRO137
00326         120 FORMAT(//' THE NUMBER OF COMPONENTS TIMES THE NUMBER OF SAMPLES EXLNTRO138
00326              *CEEDS THE SIZE OF THE STORAGE AREA ***'//)                   LNTRO139
00327               STOP 1                                                       LNTRO140
00330         130 WRITE (6,140)                                                  LNTRO141
00332         140 FORMAT('*** NUMBER OF CHANNELS TIMES NUMBER OF SAMPLES EXCEEDS 10LNTRO142
00332              *00 ***'//)                                                   LNTRO143
00333               STOP                                                         LNTRO144
00333         C                                                                  LNTRO145
00333         C                                                                  LNTRO146
00333         C INITIALIZE TAPE READING FOR THIS FIELD                           LNTRO147
00333         C                                                                  LNTRO148
00334         150 CALL FLDINT(FLDINF,FETVEC,NOFEAT)                              LNTRO149
00334         C                                                                  LNTRO150
00335               LINES=(FLDINF(2)-FLDINF(1))/FLDINF(3)+1                      LNTRO151
00335         C                                                                  LNTRO152
00336                IF (MTRAN.EQ.1) GO TO 151                                           *NEW
00336         C     POSITION TRFORM TO DEFAULT OR USER SPECIFIED FILE NUMBER             *NEW
00336         C                                                                          *NEW
00340                S=NF-1                                                              *NEW
```

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00332          140 FORMAT(**** NUMBER OF CHANNELS TIMES NU        ..........
00332             *DD ****//)                                               LNTRO143
00333              STOP                                                     LNTRO144
00333          C                                                            LNTRO145
00333          C                                                            LNTRO146
00333          C  INITIALIZE TAPE READING FOR THIS FIELD                    LNTRO147
00333          C                                                            LNTRO148
00334          150 CALL FLDINT(FLDINF,FETVEC,NOFEAT)                        LNTRO149
00334          C                                                            LNTRO150
00335                LINES=(FLDINF(2)-FLDINF(1))/FLDINF(3)+1                LNTRO151
00335          C                                                            LNTRO152
00336                 IF (NTRAN.EQ.1) GO TO 151                                     *NEW
00336          C     POSITION TRFORM TO DEFAULT OR USER SPECIFIED FILE NUMBER       *NEW
00336          C                                                                    *NEW
00340                  S=NF-1                                                       *NEW

00341                  CALL NTRAN(TRFORM,10,8,S,22)                                 *NEW
00342             151  CONTINUE                                                     *NEW
00342          C                                                            LNTRO153
00342          C        WRITE HEADER RECORD ON OUTPUT FILE , TRFORM .       LNTRO154
00342          C                                                            LNTRO155
00342          C                                                            LNTRO156
00343                CALL WRTHDR(LCOMB,FETVC2,NSAMP,OUTFMT,TRFORM)          LNTRO157
00343          C                                                            LNTRO158
00343          C                                                            LNTRO159
00344                DO 170 I=1,LCOMB                                       LNTRO160
00347                BADMAX(I) = 0                                          LNTRO161
00350                BADMIN(I) = 0                                          LNTRO162
00351                PMIN(I) = 0                                            LNTRO163
00352                PMAX(I) = 0                                            LNTRO164
00353                TOTPTS(I) = 0                                          LNTRO165
00354                TMIN(I) = 1.0E35                                       LNTRO166
00355                TMAX(I) = -1.0E35                                      LNTRO167
00356                XCON(I) = XXCON(I)                                     LNTRO168
00357                DO 160 J=1,101                                         LNTRO169
00362            160 FILHIS(I,J) = 0                                        LNTRO170
00364            170 CONTINUE                                               LNTRO171
00364          C                                                            LNTRO172
00364          C                                                            LNTRO173
00366                LSTLIN=0                                               LNTRO174
00367                M=0                                                    LNTRO175
00370            180 M=M+1                                                  LNTRO176
00371                IF (M.GT.LINES) GO TO 350                              LNTRO177
00371          C                                                            LNTRO178
00371          C       READ ONE SCAN LINE OF DATA FROM THE INPUT TAPE       LNTRO179
00371          C                                                            LNTRO180
00373                CALL LINERD(IDATA,ENDTAP)                              LNTRO181
00374                IF (ENDTAP.NE.0) GO TO 350                             LNTRO182
00376                IF (M.NE.1) GO TO 190                                  LNTRO183
00400                ILIN=FLDINF(1)                                         LNTRO184
00401                GO TO 200                                              LNTRO185
00402            190 ILIN=ILIN+FLDINF(3)                                    LNTRO186
00403            200 CONTINUE                                               LNTRO187
00403          C                                                            LNTRO188
00403          C       DETERMINE THE SAMPLE INTERCEPTS ON THE CURRENT SCAN LINE,   LNTRO189
00403          C       WHICH ARE CONTAINED IN THE DESIRED FIELD BOUNDARIES. PLACE  LNTRO190
00403          C       THE SAMPLE INTERCEPTS IN  FL  , AND THE NUMBER OF INTERCEPTS LNTRO191
00403          C       IN  JJ .                                             LNTRO192
00403          C                                                            LNTRO193
00404                CALL FDLINT(VERTCS,NC,FL,ILIN,NS,JJ)                   LNTRO194
00405                DO 210 K=1,NSAMP                                       LNTRO195
00410                DO 210 IH=1,LCOMB                                      LNTRO196
00413                ZSAMP=(IH-1)*NSAMP+K                                   LNTRO197
00414            210 Y(ZSAMP)=0                                             LNTRO198
00414          C                                                            LNTRO199
00417                NX ON = 255./100.                                      LNTRO200
00420                 IF (SAKEY.EQ.1) NXCON = 1000./100.                            *NEW
00420          C                                                            LNTRO201
00420          C                                                            LNTRO202
00420          C       TRANSFORM, RESCALE, AND HISTOGRAM EACH DATA SAMPLE   LNTRO203
00420          C                                                            LNTRO204
00422                DO 330 K=1,NSAMP                                       LNTRO205
00425                KP=(K-1)*FLDINF(6)+FLDINF(4)                           LNTRO206
00426                DO 320 JK=1,JJ,2                                       LNTRO207
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00431   247.          JKP1 = JK + 1                                                    LNTR0208
00432   248.          IF (KP.LT.FL(JK)) GO TO 330                                      LNTR0209
00434   249.          IF (KP.GT.FL(JKP1)) GO TO 310                                    LNTR0210
00436   250.          DO 220 I=1,LCOMB                                                 LNTR0211
00441   251.          XT(I)=0.                                                         LNTR0212
00441   252.    C                                                                      LNTR0213
00441   253.    C     CALL TRANSF TO DO A DATA TRANSFORMATION                          LNTR0214
00441   254.    C                                                                      LNTR0215
00442   255.           XT(I) = TRANSF                                                          *NEW
00442   256.         C     (BMAT,IDATA,TOP,I,K,LCOMB,NSAMP,BIAS)                               *NEW
00443   257.      220  CONTINUE                                                        LNTR0218***-2
00443   258.    C      IF PPCF=1, APPLY PCM TO XT                                              *NEW
00445   259.           IF (PPCF.EQ.0) GO TO 221                                                *NEW
00447   260.           CALL MATVEC(PCM,XT,TEMP,LCOMB,LCOMB)                                    *NEW
00450   261.          DO 222 I=1,LCOMB                                                         *NEW
00453   262.      222  XT(I)=TEMP(I)                                                           *NEW
00455   263.      221  DO 300 I=1,LCOMB                                                        *NEW
00460   264.          IF( XT(I) .LT. TMIN(I) )  TMIN(I) = XT(I)                        LNTR0220***-1
00462   265.          IF( XT(I) .GT. TMAX(I) )  TMAX(I) = XT(I)                        LNTR0221
00462   266.    C                                                                      LNTR0222
00462   267.    C     IF RESCAL = 0 NO RESCALING IS APPLIED.  OTHER WISE RESCALE       LNTR0223
00462   268.    C        USING SCALING PARAMETERS DERIVED FROM EITHER HISTOGRAM,       LNTR0224
00462   269.    C        STATISTICS, OR USER-INPUT ( SCAFLG= 1, 2, OR 3 )              LNTR0225
00462   270.    C                                                                      LNTR0226
00462   271.    C                                                                      LNTR0227
00464   272.          IF (RESCAL.GT.0) GO TO 260                                       LNTR0228
00464   273.    C                                                                      LNTR0229
00464   274.    C                                                                      LNTR0230
00464   275.    C        IF TRANSFORMED DATA IS NOT RESCALED ,                         LNTR0231
00464   276.    C        TEST FOR OUT- OF - RANGE  TRANSFORMED  VALUES                 LNTR0232
00464   277.    C                                                                      LNTR0233
00464   278.    C        SET = 0  ANY VALUE LESS THAN 0, OR LESS THAN THE NEW MIN      LNTR0234
00464   279.    C        AFTER APPLICATION OF PEROUT                                   LNTR0235
00464   280.    C        SET = 255  ANY VALUE GREATER THAN 255, OR GREATER THAN        LNTR0236
00464   281.    C        THE NEW MAX AFTER APPLICATION OF PEROUT                       LNTR0237
00464   282.    C                                                                      LNTR0238
00464   283.    C                                                                      LNTR0239
00466   284.          IF (XT(I).LT.NEWMIN(I)) GO TO 230                                LNTR0240
00470   285.          IF (XT(I).GT.NEWMAX(I)) GO TO 240                                LNTR0241
00472   286.          GO TO 250                                                        LNTR0242
00473   287.      230 IF( MTRAN .EQ. 0 )  BADMIN(I) = BADMIN(I) + 1                    LNTR0243
00475   288.           XT(I) = NEWMIN(I)                                                       *NEW
00476   289.          GO TO 250                                                        LNTR0245***-1
00477   290.      240 IF ( MTRAN .EQ. 0 )  BADMAX(I) = BADMAX(I) + 1                   LNTR0246
00501   291.          XT(I) = 255.                                                     LNTR0247
00502   292.           IF (SAKEY.EQ.1) XT(I) = 3000.                                           *NEW
00504   293.      250 CONTINUE                                                         LNTR0248
00504   294.    C                                                                      LNTR0249
00504   295.    C                                                                      LNTR0250
00504   296.    C        FOR THE CURRENT SCAN LINE, HISTOGRAM THE TRANSFORMED DATA ,   LNTR0251
00504   297.    C        AND STORE THE TRANSFORMED DATA INTO THE OUTPUT ARRAY,  Y  .   LNTR0252
00504   298.    C                                                                      LNTR0253
00505   299.          DPT = XT(I)/WXCON + 1.1                                          LNTR0254
00506   300.           TOTPTS(I) = TOTPTS(I) + 1                                       LNTR0255
00507   301.           IF( DPT .GT. 101) DPT = 101                                     LNTR0256
00511   302.          IF ( DPT .LE. 0 )  DPT = 1                                       LNTR0257
00513   303.           FILHIS(I,DPT) = FILHIS(I,DPT) + 1                               LNTR0258
00514   304.            ZS = (I -1) * NSAMP + K                                        LNTR0259
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```
      XT(I) = 255.
      IF (SAKEY.EQ.1) XT(I) = 3000.
  250 CONTINUE
C
C
C        FOR THE CURRENT SCAN LINE,  HISTOGRAM THE TRANSFORMED DATA ,
C        AND STORE THE TRANSFORMED DATA INTO THE OUTPUT ARRAY,  Y  .
C
      DPT = XT(I)/NXCON + 1.1
        TOTPTS(I) = TOTPTS(I) + 1
        IF( DPT .GT. 101) DPT = 101
      IF ( DPT .LE. 0 )  DPT = 1
        FILHIS(I,DPT) = FILHIS(I,DPT) + 1
        ZS = (I -1) * NSAMP + K

      Y(ZS) = XT(I) + 0.5
      GO TO 300
  260  CONTINUE
C
C        FOR THE CURRENT SCAN LINE, HISTOGRAM THE TRANSFORMED DATA, AND
C        STORE THE TRANSFORMED DATA INTO THE OUTPUT ARRAY,  Y  .
C
      IF (XT(I).LT.MIN(I)) GO TO 270
      IF (XT(I).GT.MAX(I)) GO TO 280
      YREAL(I)=CON(I)*(XT(I)-MIN(I))
C
      DPT = ( XT(I) - MIN(I) )/ XCON(I) + 11
C
      IF ( DPT .LE. 0.)  DPT = 1
      IF ( DPT .GT. 101 )  DPT = 101
C
      GO TO 290
  270 DPT = ABS( MIN(I) - XT(I) )/XCON(I)
C
      DPT = 10 - DPT
C
      PMIN(I) = PMIN(I) + 1
      IF(DPT.LE.0) DPT=1
      YREAL(I)=0
      GO TO 290
  280 DPT = ABS( XT(I) - MAX(I) )/XCON(I)
C
      DPT = DPT + 91
C
      PMAX(I) = PMAX(I) + 1
      IF(DPT.GT.101) DPT=101
      YREAL(I)=255
  290 TOTPTS(I)=TOTPTS(I)+1
      FILHIS(I,DPT)=FILHIS(I,DPT)+1
      ZSAMP=(I-1)*NSAMP+K
      Y(ZSAMP) = YREAL(I) + 0.5
  300  CONTINUE
      GO TO 330
  310 IF (JKPI.GE.JJ) GO TO 340
  320 CONTINUE
  330 CONTINUE
  340 CONTINUE
      IF(M.EQ.LINES) LSTLIN=-1
C
C
C        OUTPUT ONE LINE OF TRANSFORMED DATA ON THE OUTPUT FILE , TRFORM
C
C
      CALL WRTLIN(Y,LSTLIN)
      GO TO 180
C
C        IF RESCALING THE TRANSFORMED DATA BY EITHER THE STATISTICAL
C        OR USER-INPUT SCALING PARAMETERS,
C        APPLY PEROUT ( % OF POINTS TO BE REJECTED)  TO THE TRANSFORMED
C        DATA DISTRIBUTION - OBTAIN THE MAX, AND SCALING PARAMETERS
C        MIN AND CON , AFTER APPLICATION OF PEROUT ( ALSO, THE HISTOGRAM
C        SCALE FACTOR , XCON ) .
C
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00571   C          IF NOT RESCALING.  APPLY PEROUT TO THE TRANSFORMED DATA.       LNTRO318
00571   C    GET  NEW MAX AND MIN. RE-HISTOGRAM , AND OUTPUT THE REVISED DISTR.  LNTRO319
00571   C                                                                       LNTRO320
00572     350 CONTINUE                                                          LNTRO321
00572   C                                                                       LNTRO322
00573         IF (PEROUT.LE.0) GO TO 600                                        LNTRO323
00573   C                                                                       LNTRO324
00575         IF (SCAFLG.EQ.1) GO TO 600                                        LNTRO325
00575   C                                                                       LNTRO326
00577         IF (NTRAN.EQ.1) GO TO 600                                         LNTRO327
00577   C                                                                       LNTRO328
00601         IF (RESCAL.GT.0) GO TO 430                                        LNTRO329
00601   C                                                                       LNTRO330
00603         NPERI = FLOAT(PEROUT)/200.0                                       LNTRO331
00603   C                                                                       LNTRO332
00604         DO 420 I=1,LCOMB                                                  LNTRO333
00607         CUT =  NPERI *  FLOAT( TOTPTS(I) )                                LNTRO334
00610         SUM = 0.0                                                         LNTRO335
00611         DO 370 J=1,101,1                                                  LNTRO336
00614         IF (SUM.GE.CUT) GO TO 360                                         LNTRO337
00616         GO TO 370                                                         LNTRO338
00617     360 MINCUT(I) = SUM                                                   LNTRO339
00620         NEWMIN(I) = (J-1) * NXCON + 0.5                                   LNTRO340
00621         GO TO 380                                                         LNTRO341
00621   C                                                                       LNTRO342
00622     370 SUM = SUM + FILHIS(I,J)                                           LNTRO343
00624     380 SUM = 0.0                                                         LNTRO344
00625         DO 400 J=101,1,-1                                                 LNTRO345
00630         IF (SUM.GE.CUT) GO TO 390                                         LNTRO346
00632         GO TO 400                                                         LNTRO347
00633     390 MAXCUT(I) =  SUM                                                  LNTRO348
00634         NEWMAX(I) = ( J - 1 ) * NXCON + 0.5                               LNTRO349
00635         GO TO 410                                                         LNTRO350
00636     400 SUM = SUM + FILHIS(I,J)                                           LNTRO351
00640     410 CONTINUE                                                          LNTRO352
00641     420 CONTINUE                                                          LNTRO353
00643         GO TO 580                                                         LNTRO354
00643   C                                                                       LNTRO355
00643   C                                                                       LNTRO356
00644     430 NPERI = PEROUT * .01 + .001                                       LNTRO357
00645         NPER2 = PEROUT * .01 - .001                                       LNTRO358
00645   C                                                                       LNTRO359
00646         RSET=0                                                            LNTRO360
00647         IG = 0                                                            LNTRO361
00650         IB = 0                                                            LNTRO362
00651         IE = 0                                                            LNTRO363
00652         IA = 0                                                            LNTRO364
00652   C                                                                       LNTRO365
00653         DO 560 I=1,LCOMB                                                  LNTRO366
00656         MATOT=TOTPTS(I)*NPERI                                             LNTRO367
00657         MITOT=TOTPTS(I)*NPER2                                             LNTRO368
00660          IF (FLOAT(PMIN(I)).GT.MATOT) GO TO 440                                     *NEW
00662         GO TO 460                                                         LNTRO370***1
00662   C RESET MIN SMALLER                                                     LNTRO371
00663     440 CMIN=PMIN(I)                                                      LNTRO372
00664         DO 450 J=10,1,-1                                                  LNTRO373
00667         IG=IG+1                                                           LNTRO374
00670         CMIN=CMIN-FILHIS(I,J)                                             LNTRO375
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00647          IN = 0
00650          IB = 0                                            LNTR0362
00651   408*   IE = 0                                            LNTR0363
00652   409*   IA = 0                                            LNTR0364
00652   410*   C                                                 LNTR0365
00653   411*         DO 560 I=1,LCOMB                            LNTR0366
00656   412*         MATOT=TOTPTS(I)*NPER1                       LNTR0367
00657   413*         MITOT=TOTPTS(I)*NPER2                       LNTR0368
00660   414*          IF (FLOAT(PMIN(I)).GT.MATOT) GO TO 440                   *NEW
00662   415*         GO TO 460                                   LNTR0370***-1
00662   416*   C RESET MIN SMALLER                               LNTR0371
00663   417*     440 CMIN=PMIN(I)                                LNTR0372
00664   418*         DO 450 J=30,1,-1                            LNTR0373
00667   419*         IG=IG+1                                     LNTR0374
00670   420*         CMIN=CMIN-FILHIS(I,J)                       LNTR0375

00671   421*           IF (FLOAT(CMIN).GT.MATOT) GO TO 450                     *NEW
00673   422*           IF (FLOAT(CMIN).LT.MITOT) IG=IG-1                       *NEW
00675   423*         RSET=1                                      LNTR0378***-2
00676   424*         MIN(I)=MIN(I)-IG*XCON(I)                    LNTR0379
00677   425*         IG=0                                        LNTR0380
00700   426*         GO TO 490                                   LNTR0381
00701   427*     450 CONTINUE                                    LNTR0382
00703   428*    460   IF (FLOAT(PMIN(I)).LT.MITOT) GO TO 470                   *NEW
00705   429*         GO TO 490                                   LNTR0384***-1
00705   430*   C RESET MIN LARGER                                LNTR0385
00706   431*     470 CMIN=PMIN(I)                                LNTR0386
00707   432*         DO 480 J=11,91                              LNTR0387
00712   433*         IB=IB+1                                     LNTR0388
00713   434*         CMIN=CMIN+FILHIS(I,J)                       LNTR0389
00714   435*           IF (FLOAT(CMIN).LT.MITOT) GO TO 480                     *NEW
00716   436*           IF (FLOAT(CMIN).GT.MATOT) IB=IB-1                       *NEW
00720   437*         MIN(I)=MIN(I)+IB*XCON(I)                    LNTR0392***-2
00721   438*         IB=0                                        LNTR0393
00722   439*         RSET=1                                      LNTR0394
00723   440*         GO TO 490                                   LNTR0395
00724   441*     480 CONTINUE                                    LNTR0396
00724   442*   C CHECK MAX                                       LNTR0397
00726   443*     490  CONTINUE                                   LNTR0398
00727   444*           IF (FLOAT(PMAX(I)).GT.MATOT) GO TO 500                  *NEW
00731   445*         GO TO 520                                   LNTR0400***-1
00731   446*   C RESET MAX LARGER                                LNTR0401
00732   447*     500 CMIN=PMAX(I)                                LNTR0402
00733   448*         DO 510 J=92,101                             LNTR0403
00736   449*         IE=IE+1                                     LNTR0404
00737   450*         CMIN=CMIN-FILHIS(I,J)                       LNTR0405
00740   451*          IF (FLOAT(CMIN).GT.MATOT) GO TO 510                      *NEW
00742   452*           IF (FLOAT(CMIN).LT.MITOT) IE=IE-1                       *NEW
00744   453*         RSET=1                                      LNTR0408***-2
00745   454*         MAX(I)=MAX(I)+IE*XCON(I)                    LNTR0409
00746   455*         IE=0                                        LNTR0410
00747   456*         GO TO 550                                   LNTR0411
00750   457*     510 CONTINUE                                    LNTR0412
00750   458*   C RESET MAX SMALLER                               LNTR0413
00752   459*     520   IF (FLOAT(PMAX(I)).LT.MITOT) GO TO 530                  *NEW
00754   460*         GO TO 550                                   LNTR0415***-1
00755   461*     530 CMIN=PMAX(I)                                LNTR0416
00756   462*         DO 540 J=91,1,-1                            LNTR0417
00761   463*         IA=IA+1                                     LNTR0418
00762   464*         CMIN=CMIN+FILHIS(I,J)                       LNTR0419
00763   465*          IF (FLOAT(CMIN).LT.MITOT) GO TO 540                      *NEW
00765   466*          IF (FLOAT(CMIN).GT.MATOT) IA=IA-1                        *NEW
00767   467*         RSET=1                                      LNTR0422***-2
00770   468*         MAX(I)=MAX(I)-IA*XCON(I)                    LNTR0423
00771   469*         IA=0                                        LNTR0424
00772   470*         GO TO 550                                   LNTR0425
00773   471*     540 CONTINUE                                    LNTR0426
00775   472*     550 CONTINUE                                    LNTR0427
00776   473*     560 CONTINUE                                    LNTR0428
01000   474*         IF (RSET.EQ.0) GO TO 400                    LNTR0429
01002   475*         DO 570 I=1,LCOMB                            LNTR0430
01005   476*         XCON(I)=(MAX(I)-MIN(I))/80                  LNTR0431
01006   477*         XXCON(I) = XCON(I)                          LNTR0432
01007   478*     570  CON(I) = 255. / (MAX(I) - MIN(I))          LNTR0433
```

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OF POOR QUALITY

```
01007      C                                                                LNTRO434
01007      C                                                                    *NEW
01011        580  S=NF-1                                                        *NEW
01012             CALL NTRAN(TRFORM,10,8,S,22)                                  *NEW
01013             NTRAN=1                                                   LNTRO441**-6
01014             GO TO 150                                                 LNTRO442
01015        600  CONTINUE                                                  LNTRO443
01016             NTRAN=0                                                   LNTRO444
01016      C                                                                LNTRO445
01017             IF (GIC.EQ.1.AND.PPCF.EQ.0) WRITE(6,601)                      *NEW
01022             IF (PCGC.EQ.1.AND.PPCF.EQ.1) WRITE(6,602)                     *NEW
01025             IF (PCF.NE.1) WRITE(6,603)                                    *NEW
01030        601   FORMAT(/////,22X,'GREEN IMAGE')                              *NEW
01031        602   FORMAT(/////22X,'PCG IMAGE')                                 *NEW
01032        603  FORMAT(/////22X,'TRANSFORMED IMAGE')                          *NEW
01033             IF (RESCAL.EQ.0) GO TO 710                                LNTRO446
01033      C                                                                LNTRO447
C1035             WRITE (6,610)NF                                           LNTRO448
01040        610 FORMAT(///// 22X,'* OUTPUT FILE ', I3, 1X,'*' /////// 5X,  LNTRO449
01040        *   '***  TRANSFORMED VALUES RESCALED TO A RANGE  0 - 255  ***' )  LNTRO450
01040      C                                                                LNTRO451
01041             IF (SCAFLG.EQ.1) WRITE (6,620)                            LNTRO452
01044             IF (SCAFLG.EQ.2) WRITE (6,630)                            LNTRO453
01047             IF (SCAFLG.EQ.3) WRITE (6,640)                            LNTRO454
01047      C                                                                LNTRO455
C1052        620 FORMAT( 24X, '(HISTOGRAM METHOD)' / )                      LNTRO456
01053        630 FORMAT( 23X, '(STATISTICS METHOD)' / )                     LNTRO457
01054        640 FORMAT( 20X, '(INPUT SCALING PARAMETERS)' / )              LNTRO458
C1054      C                                                                LNTRO459
C1054      C                                                                LNTRO460
01055             WRITE (6,650)                                             LNTRO461
01055      C                                                                LNTRO462
01057        650 FORMAT(//// 7X, '*** ORIGINAL TRANSFORMED DATA RANGE  ***' //  LNTRO463
01057        *   T11, 'MIN' , T32, 'MAX' , T51, '( BIAS )'  // )            LNTRO464
01057      C                                                                LNTRO465
01060             DO 660 M=1,LCOMB                                          LNTRO466
01063        660 WRITE (6,670)TMIN(M),TMAX(M),BIAS(M)                       LNTRO467
01063      C                                                                LNTRO468
01071        670 FORMAT( 5X, F11.4, 10X, F11.4, 9X, '(' , F11.4, 1X, ')' / )  LNTRO469
01071      C                                                                LNTRO470
01072             WRITE (6,680)                                             LNTRO471
01074        680 FORMAT(///// 7X, '*** TRANSFORMED DATA RANGE, AFTER APPLICATION OFLNTRO472
01074        * PEROUT  ***' // 7X, 'MIN' , 10X, 'MAX' , 10X,                LNTRO473
01074        *     'CON  = 255/(MAX-MIN) ' // )                             LNTRO474
01074      C PRINT OUT NEW MAX,MIN,CON ARRAYS                               LNTRO475
01075             DO 690 M=1,LCOMB                                          LNTRO476
01100        690 WRITE (6,700)MIN(M),MAX(M),CON(M)                          LNTRO477
01106        700   FORMAT(2X,3(F11.4,2X))                                       *NEW
01106      C                                                                LNTRO479**-1
01107             GO TO 850                                                 LNTRO480
01107      C                                                                LNTRO481
01107      C                                                                LNTRO482
01110        710 IF (PEPOUT.GT.0) GO TO 730                                 LNTRO483
01110      C                                                                LNTRO484
01112             DO 720 I=1,LCOMB                                          LNTRO485
01115             IF ( BADMIN(I) .EQ. 0 )  NEWMIN(I) = TMIN(I)              LNTRO486
01117             IF ( BADMAX(I) .EQ. 0 )  NEWMAX(I) = TMAX(I)              LNTRO487
01121        720 CONTINUE                                                   LNTRO488
```

```
C PRINT OUT NEW MAX,MIN,CON ARRAYS
      DO 690 M=1,LCOMB
  690 WRITE (6,700)MIN(M),MAX(M),CON(M)
  700 FORMAT(2X,3(F11.4,2X))
C
      GO TO 850
C
C
  710 IF (PEROUT.GT.0) GO TO 730
C
      DO 720 I=1,LCOMB
      IF ( BADMIN(I) .EQ. 0 )  NEWMIN(I) = TMIN(I)
      IF ( BADMAX(I) .EQ. 0 )  NEWMAX(I) = TMAX(I)
  720 CONTINUE

C
  730 WRITE (6,740)NF
  740 FORMAT(///// 19X, '* OUTPUT FILE ', I3, 1X, '*' )
C
      WRITE (6,750)
  750 FORMAT(///// 5X,'*** TRANSFORMED VALUES NOT RESCALED ***' // )
C
      WRITE (6,760)LCOMB,(TMIN(I),I=1,LCOMB)
  760 FORMAT(/ 5X, 'TRANSFORMED MINIMUMS, COMPONENTS  1-' , I2, 2X,
     * '...' // 2(5X, 8F12.2/)  )
C
      WRITE (6,770)LCOMB,(TMAX(I),I=1,LCOMB)
  770 FORMAT(// 5X, 'TRANSFORMED MAXIMUMS, COMPONENTS  1-' , I2, 2X,
     * '...' // 2( 5X, 8F12.2 / )  )
C
      WRITE (6,780)LCOMB,(BIAS(I),I=1,LCOMB)
C
  780 FORMAT(/// 5X, 'TRANSFORMED VALUE BIAS, COMPONENTS  1 - ' , I4,2X,
C
     *  ':' // 2( 5X, 8F12.2 / )  )
C
C
C
      TEMP(1) = 0.
      IF (SAKEY.EQ.1) TEMP(1) = -3000.
      WRITE(6,790) TEMP(1)  ,(I,BADMIN(I),I=1,LCOMB)
  790 FORMAT(///5X,'NO. OF TRANSFORMED VALUES LESS THAN',F7.1,'(SET=)
C
     * ' // (5X,'COMPONENT', 1X, I2, '...' , I6, 2X, 'VALUES' ) )
C
C
      TEMP(2) = 255.
      IF (SAKEY.EQ.1) TEMP(2) = 3000.
      WRITE(6,800) TEMP(2)  ,(I,BADMAX(I),I=1,LCOMB)
  800 FORMAT(///5X,'NO. OF TRANSFORMED VALUES GREATER THAN (SET=)',F7.1,
     * //(5X,'COMPONENT',1X,I2,'...',I6,2X,'VALUES'))
C
C
      NPER1 = FLOAT(PEROUT)/2.0
C
      WRITE(6,810) TEMP(1),NPER1,LCOMB,(MINCUT(I),I=1,LCOMB)
  810 FORMAT(///3X,'NO. OF LOWER TAIL POINTS REJECTED (SET=',F7.1,'   F
     *OR OUTPUT )  TO SATISFY', F6.1,2X,'% CUT-OFF, COMPONENTS  1 -'
     * I4, 2X, '...' // 16(I8) )
C
      WRITE(6,820) TEMP(2),NPER1,LCOMB,(MAXCUT(I),I=1,LCOMB)
  820 FORMAT(///3X,'NO. OF UPPER TAIL POINTS REJECTED (SET=',F7.1,'   F
     *OR OUTPUT )  TO SATISFY', F6.1, 2X, '% CUT-OFF,  COMPONENTS  1  -'
     *  , I4, 2X, '...' // 16( I8 ) )
      NPCT = 100 - PEROUT
      WRITE (6,830)NPCT,LCOMB,(NEWMIN(I),I=1,LCOMB)
  830 FORMAT(//// 3X,'**** FINAL OUTPUT TRANSFORMED VALUES, CENTRAL' ,
     *  I5,3X,'%' , 2X, 'OF DISTRIBUTION :' // 3X, 'MINIMUMS, COMPONENTS
     *  1 - ' , I4, 2X, '...' //  2(5X, 8F12.2 / )  )
C
      WRITE (6,840)LCOMB,(NEWMAX(I),I=1,LCOMB)
  840 FORMAT(// 3X,'MAXIMUMS, COMPONENTS  1 - ', I4, 2X,'...' //
     *  2( 5X, 8F12.2 / )  )
```

```
01260   C                                                                      LNTR0546
01260   C                                                                      LNTR0547
01260   C                                                                      LNTR0548
01250   C PRINT HISTOGRAMS                                                     LNTR0549
01250   C                                                                      LNTR0550
01261     850 CONTINUE                                                         LNTR0551
01261   C                                                                      LNTR0552
01262         XSIZ=101                                                         LNTR0553
01263         XHGH=255                                                         LNTR0554
01264          IF (SAKEY.EQ.1.AND.RESCAL.EQ.0) XHGH = 3000                            .NEW
01266          IF (SAKEY.EQ.1.AND.RESCAL.EQ.0) XLOW=-3000                             .NEW
01270         YSIZ=15                                                          LNTR0556...1
01271         CALL COMHST(FILHIS,HISBUF,TTL,LCOMB,FETVC2,XSIZ,XHGH,XLOW,YSIZ)  LNTR0557
01271   C                                                                      LNTR0558
01271   C                                                                      LNTR0559
01272          IF (RESCAL.EQ.0) GO TO 920                                             .NEW
01272   C                                                                      LNTR0561...1
01272   C                                                                      LNTR0562
01272   C                                                                      LNTR0563
01274         WRITE (6,860)NF                                                  LNTR0564
01274   C                                                                      LNTR0565
01277     860 FORMAT(1H1 // 5X,'SCALING PARAMETERS USED ON TRANSFORMED VALUES, OLNTR0566
01277   C                                                                      LNTR0567
01277         .UTPUT FILE', I5// 19X, 'MINIMUM', 7X, 'MAXIMUM', 7X,            LNTR0568
01277   C                                                                      LNTR0569
01277         . 'SCALE FACTOR ( CON )'  )                                      LNTR0570
01277   C                                                                      LNTR0571
01300         WRITE (6,870)(FETVC2(IL),MIN(IL),MAX(IL),CON(IL),IL=1,LCOMB)     LNTR0572
01300   C                                                                      LNTR0573
01311     870 FORMAT(1X, 'COMPONENT',I3,1X,F12.3,2X,F12.3,7X,F12.3 )           LNTR0574
01311   C                                                                      LNTR0575
01311   C                                                                      LNTR0576
01312         IF (NPUN.LE.0) GO TO 890                                         LNTR0577
01312   C                                                                      LNTR0578
01314         PUNCH 880,(CON(MN),MIN(MN),MN=1,LCOMB)                           LNTR0579
01314   C                                                                      LNTR0580
01323     880 FORMAT(  ('OPTION',4X, 'SCAFAC=' , 2( ' (', F9.3, ',' , F9.3,    LNTR0581
01323         . ' ) ' , ' )  )  )                                              LNTR0582
01323   C                                                                      LNTR0583
01324     890  CONTINUE                                                        LNTR0584
01324   C                                                                      LNTR0585
01324   C                                                                      LNTR0586
01324   C      RETURN TO PROCESS THE PCG IMAGE IF THE PCGC AND PPCF FLAGS ARE ON      .NEW
01325          IF (PCGC.EQ.1.AND.PPCF.EQ.0) GO TO 923                                 .NEW
01325   C                                                                      LNTR0588...1
01325   C                                                                      LNTR0589
01326   C      ONLY 1 FIELD WILL BE PROCESSED                                         .NEW
01327          RETURN                                                                 .NEW
01330     900 IF (LAM.EQ.0) GO TO 920                                          LNTR0591...1
01332         WRITE (6,910)FLDNAM                                              LNTR0592
01335     910 FORMAT(//// 5X,'***** DATATR/LNTRAN *****  ERROR ON INPUT FIELD DELNTR0593
01335         .FINITION CARD, FOR FIELD NAME  ',1H', A6, 1H', 3X, '*****', /   LNTR0594
01335         .)                                                                      .NEW
01336          RETURN                                                                 .NEW
01337     920  CONTINUE                                                        LNTR0597...2
01340          IF (PCGC.EQ.1.AND.PPCF.EQ.0) GO TO 923                                 .NEW
01342         RETURN                                                           LNTR0598
01343     923  PPCF=1                                                                 .NEW
```

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01325   6380          IF (PCGC.EQ.1.AND.PPCF.EQ.0) GO TO 923                              *NEW
01325   6390     C                                                                 LNTRO588***1
01325   6400     C                                                                 LNTRO589
01325   6410     C    ONLY 1 FIELD WILL BE PROCESSED                                    *NEW
01327   6420           RETURN                                                           *NEW
01330   6430      900 IF (LAM.EQ.0) GO TO 920                                      LNTRO591***1
01332   6440          WRITE (6,910)FLDNAM                                          LNTRO592
01335   6450      910 FORMAT(//// 5X,'*****' DATATR/LNTRAN *****  ERROR ON INPUT FIELD DELNTRO593
01335   6460         *FINITION CARD, FOR FIELD NAME  ',1H', A6, 1H', 3X, '******', / LNTRO594
01335   6470         *)                                                                 *NEW
01336   6480          RETURN                                                            *NEW
01337   6490      920  CONTINUE                                                    LNTRO597***2
01340   6500          IF (PCGC.EQ.1.AND.PPCF.EQ.0) GO TO 923                            *NEW
01342   6510          RETURN                                                       LNTRO598
01343   6520      923  PPCF=1                                                           *NEW

01344   6530            FINI=1                                                          *NEW
01345   6540            GO TO 9                                                         *NEW
01346   6550          END                                                          LNTRO599

      END OF COMPILATION:          NO  DIAGNOSTICS.
   LNTRAN          SYMHOLIC                        20 JUN 77  01:56:37  0  02554456  14  599  (DELETED)
   LNTRAN  CODE    RELOCATABLE                     20 JUN 77  01:56:37  1  01625102  48    1  (DELETED)
                                                                        0  01625162  14  191
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```
      SUBROUTINE GETGCV(UNIT,FILE,NCHAN,COVAR)                      *NEW
C                                                                    ***2
C*****************************************************************
C
C     SUBROUTINE GETSTA RETRIEVES THE MEANS AND STANDARD DEVIATIONS
C     FROM A STATISTICS FILE IN THE LARSYS 'SAVTAP' FORMAT.
C
C     INPUT ARGUMENTS:
C
C       UNIT    = FORTRAN UNIT NUMBER FROM WHICH THE STATS ARE TO BE
C                 RETRIEVED.
C       FILE    = FILE NO. ON 'UNIT' FROM WHICH THE STATS ARE TO BE
C                 RETRIEVED.
C       NOCHAN  = NO. OF CHANNELS REQUESTED FROM TRAINING SEGMENT.
C                   NOCHAN LESS THAN OR = NO. OF CHANNELS ON STAT FILE
C       CHNVEC  = ARRAY CONTAINING ACTUAL CHANNELS REQUESTED FROM
C                   TRAINING SEGMENT. MUST BE A SUBSET OF CHANNELS
C                   ON STAT FILE
C
C      ITRIG    = IF ITRIG=1, ST. DEV. WILL BE RETURNED ALONG WITH MEANS.
C
C     OUTPUT ARGUMENTS:
C
C       MENS    = ARRAY CONTAINING THE MEAN VECTORS FOR EACH SUBCLASS
C                   ( A SUBSET OF THE CHANNELS MAY BE SELECTED, BUT NOT
C                   A SUBSET OF THE SUBCLASSES).
C       STDEV   = ARRAY CONTAINING THE SUBSET OF ST. DEV. FOR REQUES-
C                   TED CHANNELS IN EACH SUBCLASS
C                 IN EACH SUBCLASS.
C      NOSUB    = NUMBER OF SUBCLASSES ON THE STAT FILE
C     CHNVEC  = ARRAY CONTAINING ACTUAL CHANNELS REQUESTED FROM
C                 TRAINING SEGMENT
C
C*****************************************************************
C*****************************************************************
C
C   **NOTE**  THE STORAGE ARRAYS PASSED TO THIS SUBROUTINE FOR THE
C             MEANS AND STANDARD DEVIATIONS SHOULD BE SINGLY DIMENSIONED
C             IN THE CALLING ROUTINE.  ON OUTPUT THE ITEMS ARE STORED
C             AS FOLLOWS: (SAME FOR STDEV)
C
C                    MEANS(1)        =  CHANNEL 1, SUBCLASS 1
C                         (2)        =  CHANNEL 2, SUBCLASS 1
C                          3         =  CHANNEL 3, SUBCLASS 1
C                          .         =            .
C                          .         =            .
C                    (NOCHAN)        =            NOCHAN,SUBCLASS 1
C                    (NOCHAN+1)      =  CHANNEL 1, SUBCLASS 2
C                    (NOCHAN+2)      =  CHANNEL 2, SUBCLASS 2
C                    (NOCHAN+3)      =  CHANNEL 3, SUBCLASS 2
C                             .      =
C                             .      =
C                    (2*NOCHAN)      =  CHANNEL NOCHAN OF SUBCLASS 2
C                          .
C                          .
C                          .
C                         ETC.
```

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```
00101        C.
00101        C.                                      .              =              .
00101        C.                                      .              =         NOCHAN,SUBCLASS 1
00101        C.                                  (NOCHAN)           =   CHANNEL 1, SUBCLASS 2
00101        C.                                  (NOCHAN+1)         =   CHANNEL 2, SUBCLASS 2
00101        C.                                  (NOCHAN+2)         =   CHANNEL 3, SUBCLASS 2
00101        C.                                  (NOCHAN+3)         =
00101        C.                                          .          =
00101        C.                                          .          =
00101        C.                                  (2*NOCHAN)         =   CHANNEL NOCHAN OF SUBCLASS 2
00101        C.                                      .
00101        C.                                      .
00101        C.                                      .
00101        C.                                    ETC.


00101        C.                                    THRU
00101        C.                               (NOCHAN*NOSUB)
00101        C.
00101        C.....................................................................
00101        C.                                                                         *NEW
00103              DIMENSION CHNVC(30)                                                  **-1
00104              DATA BLANK/' '/                                                      **-2
00106              IMPLICIT INTEGER(A-Z)                                                *NEW
00107               REAL COVAR(465)                                                     **-2
00110              REWIND UNIT
00111              NF=FILE-1
00112              CALL FSBSFL(UNIT,NF,ISTAT)
00113              IF(ISTAT.EQ.0)GO TO 5
00115              WRITE(6,100)UNIT,FILE
00121          100 FORMAT(1X,'ERROR IN POSITIONING UNIT',I3,' TO FILE', I3)
00122              CALL CHERR
00123            5 CONTINUE
00124              READ(UNIT)NOCLS,NOSUB,NCHAN,NOFLD,TOTVRT,(CHNVC(I),I=1,NCHAN)
00124        C.                                                                         *-23
00124        C.    READ PAST THE TRAINING FIELD INFORMATION
00124        C.
00137              DO 10 I=1,NOFLD
00142              READ(UNIT)DUM
00145              READ(UNIT)DUM
00150           10 CONTINUE
00152              READ(UNIT)DUM
00155              VARSIZ = NCHAN*(NCHAN+1)/2                                           *NEW
00156               READ (UNIT) N,(COVAR(J),J=1,VARSIZ)                                 *NEW
00165              RETURN                                                               *NEW
00166              END

     END OF COMPILATION:          NO  DIAGNOSTICS.
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@ FOR,* SUNF1,SUNF2,SUNF2/CODE                                              03 MAR 78        17:0:38. 31
UNIVAC 1108 FORTRAN V EXEC II LEVEL 35A  -(FXECH LEVEL E1201001OA)
THIS COMPILATION WAS DONE ON 03 MAR 78 AT 17:00:38

-1.1

      SUBROUTINE SUNF2(SUNCOR,SUNANG,FETVEC,NOFEAT,ISUNC,ISUNT,SABIAS)

   SUBROUTINE SUNF2      ENTRY POINT 000263

   STORAGE USED: CODE(1) 000307; DATA(0) 001327; BLANK COMMON(2) 000000

   EXTERNAL REFERENCES (BLOCK, NAME)

    0003   NWDUS
    0004   NI02S
    0005   NI01S
    0006   NERR3S

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

    0001    000034 156G      0001    000116 200G      0000    001227 210F      0000    001231 215F      0001    000135 217L
    0000    001240 220F      0001    000173 220G      0000    001246 230F      0001    000207 230G      0000    001257 231F
    0001    000222 237G      0000    001223 90F       0000 R  001212 BLANK     0000 R  000505 BIAS      0000 R  000001 EXTRA
    0000 I  001211 I         0000 I  001221 IEND      0000 I  001222 IENDS     0000 I  001216 IND       0000    001272 INJPS
    0000 I  001220 ISTART    0000 I  001214 K         0000 I  001215 KR        0000 I  001213 KS        0000 I  001217 NOFETR
    0000 I  000000 SUNA


00101      1*          SUBROUTINE SUNF2(SUNCOR,SUNANG,FETVEC,NOFEAT,ISUNC,ISUNT,SABIAS)     *NEW
00103      2*          INTEGER SUNANG,FETVEC,SUNA                                           **-1
00104      3*          DIMENSION EXTRA(324),SUNANG(1),FETVEC(1),SUNCOR(1)
00105      4*          DIMENSION BIAS(324),SABIAS(1)
00106      5*          DATA(EXTRA(I), I=1,36) /16.413,14.887,14.089,13.401,
00106      6*         *13.015,11.901,11.323,10.816,10.755,9.893,9.449,9.052,
00106      7*         *9.094,8.413,8.063,7.745,7.832,7.285,7.002,6.744,
00106      8*         *6.880,6.425,6.190,5.973,6.098,5.722,5.527,5.346,
00106      9*         *5.474,5.156,4.991,4.838,4.967,4.694,4.551,4.419/
00110     10*          DATA(EXTRA(I),I=37,72) /4.530,4.297,4.174,4.061,
00110     11*         *4.163,3.961,3.855,3.757,3.852,3.675,3.583,3.497,
00110     12*         *3.580,3.426,3.344,3.269,3.342,3.207,3.135,3.069,
00110     13*         *3.135,3.015,2.952,2.893,2.953,2.846,2.789,2.737,
00110     14*         *2.788,2.693,2.643,2.597,2.642,2.557,2.513,2.471/
00112     15*          DATA(EXTRA(I),I=73,108) /2.511,2.435,2.395,2.358,
00112     16*         *2.393,2.325,2.289,2.255,2.285,2.223,2.191,2.161,
00112     17*         *2.187,2.131,2.102,2.076,2.097,2.047,2.021,1.997,
00112     18*         *2.016,1.971,1.947,1.925,1.940,1.899,1.878,1.858,
00112     19*         *1.871,1.834,1.815,1.797,1.807,1.773,1.756,1.740/
00114     20*          DATA(EXTRA(I),I=109,144) /1.748,1.717,1.701,1.687,
00114     21*         *1.693,1.666,1.651,1.637,1.642,1.617,1.603,1.591,
00114     22*         *1.594,1.571,1.559,1.548,1.550,1.529,1.518,1.508,
00114     23*         *1.508,1.489,1.479,1.470,1.469,1.452,1.443,1.435,
```

```
00110
00110   *4.163,3.961,3.855,3.757,...
00110   *3.580,3.426,3.344,3.269,3.342,3.207,3.135     9,
00110   *3.135,3.015,2.952,2.893,2.953,2.846,2.789     7,
00110   *2.788,2.693,2.643,2.597,2.642,2.557,2.513,    71/
00112    DATA(EXTRA(I),I=73,108) /2.511,2.435,2.395,2.356,
00112   *2.393,2.325,2.289,2.255,2.285,2.223,2.191,2.161,
00112   *2.187,2.131,2.102,2.076,2.097,2.047,2.021,1.997,
00112   *2.014,1.971,1.947,1.925,1.940,1.899,1.878,1.858,
00112   *1.871,1.834,1.815,1.797,1.807,1.773,1.756,1.740/
00114    DATA(EXTRA(I),I=109,144) /1.748,1.717,1.701,1.687,
00114   *1.693,1.665,1.651,1.637,1.642,1.617,1.603,1.591,
00114   *1.594,1.571,1.559,1.548,1.550,1.529,1.518,1.508,
00114   *1.508,1.489,1.479,1.470,1.469,1.452,1.443,1.435,

00114   *1.432,1.417,1.409,1.402,1.398,1.384,1.377,1.370/
00116    DATA(EXTRA(I),I=145,180) /1.366,1.353,1.347,1.341,
00116   *1.336,1.324,1.318,1.313,1.307,1.297,1.291,1.286,
00116   *1.280,1.271,1.266,1.261,1.255,1.246,1.242,1.238,
00116   *1.230,1.223,1.219,1.216,1.208,1.201,1.198,1.195,
00116   *1.186,1.180,1.177,1.174,1.166,1.161,1.158,1.155/
00120    DATA(EXTRA(I),I=181,216) /1.146,1.142,1.140,1.137,
00120   *1.128,1.124,1.122,1.120,1.111,1.107,1.106,1.104,
00120   *1.094,1.091,1.090,1.089,1.078,1.076,1.075,1.074,
00120   *1.064,1.062,1.061,1.060,1.050,1.048,1.047,1.047,
00120   *1.036,1.035,1.035,1.034,1.023,1.023,1.022,1.022/
00122    DATA(EXTRA(I),I=217,252) /1.011,1.011,1.011,1.011,
00122   *1.000,1.000,1.000,1.000,.989,.989,.990,.990,
00122   *.979,.979,.980,.980,.969,.970,.970,.971,
00122   *.960,.961,.961,.962,.951,.952,.953,.954,
00122   *.943,.944,.945,.946,.935,.937,.937,.938/
00124    DATA(EXTRA(I),I=253,288)/ .928,.929,.930,.931,
00124   *.921,.923,.924,.925,.914,.916,.917,.918,
00124   *.908,.910,.911,.912,.902,.904,.906,.907,
00124   *.897,.899,.901,.902,.892,.894,.896,.897,
00124   *.887,.890,.891,.892,.882,.885,.887,.888/
00126    DATA(EXTRA(I),I=289,324) /.878,.881,.883,.884,
00126   *.875,.878,.879,.881,.871,.874,.876,.878,
00126   *.868,.871,.873,.875,.865,.869,.870,.872,
00126   *.863,.866,.868,.870,.861,.864,.866,.868,
00126   *.859,.862,.864,.866,.857,.861,.863,.864/
00130    DATA (BIAS(I),I=1,36) /10.28,16.43,43.78,16.79,.13,7.60,.31,.17,
00130  2 12.49,-6.09,2.02,2.22,.86,9.63,-9.40,-1.20,17.32,7.66,-11.00,
00130  3 -2.99,13.54,4.27,-12.21,-4.36,10.64,5.20,-12.23,-4.82,8.49,
00130  4 4.42,-12.13,-5.11,7.16,3.81,-12.05,-5.35,5.91,3.30/
00132    DATA (BIAS(I),I=37,72) /-11.41,-5.14,5.10,2.93,-10.80,-4.91,
00132  2 4.46,2.62,-10.28,-4.71,3.91,2.36,-9.64,-4.42,3.50,2.14,
00132  3 -8.95,-4.07,3.20,1.97,-8.35,-3.76,2.93,1.81,-7.82,-3.50,
00132  4 2.78,1.68,-7.19,-3.16,2.54,1.56,-6.62,-2.86,2.40,1.46/
00134    DATA (BIAS(I),I=73,108) /-6.11,-2.59,2.27,1.37,-5.64,-2.33,
00134  2 2.16,1.29,-5.12,-2.03,2.11,1.23,-4.65,-1.76,2.06,1.17,-4.22,
00134  3 -1.51,2.02,1.12,-3.83,-1.28,1.97,1.07,-3.50,-1.13,1.87,1.01,
00134  4 -3.20,-1.00,1.78,.95,-2.92,-.87,1.73,.89/
00136    DATA (BIAS(I),I=109,144) /-2.66,-.75,1.62,.84,-2.38,-.61,
00136  2 1.58,.80,-2.12,-.47,1.54,.77,-1.87,-.34,1.51,.73,-1.64,
00136  3 -.21,1.47,.70,-1.43,-.11,1.44,.67,-1.24,-.01,1.49,.64,
00136  4 -1.07,.07,1.36,.61,-.90,-.16,1.32,.59/
00140    DATA (BIAS(I),I=145,180) /-.74,.23,1.29,.56,-.62,.27,1.23,.53,
00140  2 -.51,.31,1.18,.50,-.41,.36,1.12,.47,-.31,.38,1.07,.44,-.22,
 0140  3 .40,1.02,.41,-.14,.41,.96,.38,-.10,.41,.89,.36,-.04,.41,
00140  4 .83,.33/
00142    DATA (BIAS(I),I=181,216) /.01,.42,.78,.30,.05,.41,.71,.27,
00142  2 .07,.38,.64,.24,.09,.35,.57,.21,.10,.32,.50,.19,.12,.30,
00142  3 .44,.16,.11,.25,.36,.13,.08,.18,.26,.09,.05,.12,.17,.06/
00144    DATA (BIAS(I),I=217,252) /.03,.06,.08,.03,-.00,-.00,-.00,
00144  2 -.00,-.05,-.08,-.10,-.04,-.12,-.18,-.21,-.07,-.18,-.28,
00144  3 -.32,-.11,-.24,-.37,-.42,-.15,-.30,-.45,-.52,-.18,-.37,
00144  4 -.56,-.63,-.21,-.46,-.67,-.75,-.25/
00146    DATA (BIAS(I),I=253,288) /-.55,-.78,-.36,-.29,-.63,-.89,
00146  2 -.97,-.33,-.70,-.99,-1.07,-.35,-.80,-1.10,-1.18,-.40,
00146  3 -.91,-1.25,-1.32,-.44,-1.02,-1.38,-1.44,-.48,-1.12,
00146  4 -1.50,-1.56,-.52,-1.22,-1.61,-1.67,-.55,-1.34,-1.76,-1.80,-.59/
00150    DATA (BIAS(I),I=289,324) /-1.54,-1.99,-2.00,-.65,-1.73,-2.21,
```

OF POOR

```
00150          2 -2.19,-.72,-1.89,-2.40,-2.36,-.77,-2.05,-2.54,-2.62,-.82,
00150          3 -2.21,-2.77,-2.69,-.87,-2.55,-3.14,-3.01,-.97,-2.84,-3.47,
00150          4 -3.29,-1.05,-3.09,-3.76,-3.53,-1.13,-3.31,-4.00,-3.74,-1.19/
00152            DATA BLANK/' '/
00154            KS = 0
00155            DO 200 I=1,NOFEAT
00160            K=(FETVEC(I)-1)/4
00161            IF (ISUNC.NE.0.AND.I.EQ.1) KS=K
00163            KR=FETVEC(I)-K*4
00164            K=K+1
00165            SUNA = SUNANG(K-KS)
00166      100   IND=(SUNA-5)*4+KR
00167            SUNCOR(I)=EXTRA(IND)
00170            SABIAS(I)=BIAS(IND)
00171      200   CONTINUE
00173            WRITE(6,90)
00175        90 FORMAT(//T61,'SUN ANGLES'/)
00176            WRITE (6,210) (SUNANG(I), I = 1,8)
00204       210 FORMAT(T45,8I5)
00205            WRITE(6,215)
00207       215 FORMAT(//T52,'CORRECTIONS FOR SUN ANGLES')
00207      C
00210            NOFETR = NOFEAT
00211            ISTART = 1
00212            IEND = 16
00213       217 IF (IEND .GE. NOFETR) IEND = NOFETR
00215            IENDS = ISTART + IEND - 1
00216            WRITE(6,220)(BLANK,FETVEC(I),I=ISTART,IENDS)
00225       220 FORMAT(//1X,16(A1,'CH(',I2,')',1X))
00226            WRITE(6,230)(SUNCOR(I),I=ISTART,IENDS)
00234      230   FORMAT (3X,'THE SUN ANGLE GAIN FACTORS ARE'/16(2X,F6.2))
00235            WRITE (6,231) (SABIAS(I),I=ISTART,IENDS)
00243      231   FORMAT (3X,'THE SUN ANGLE BIAS FACTORS ARE'/16(2X,F6.2))
00243      C
00244            NOFETR = NOFETR - IEND
00245            ISTART = IENDS + 1
00246            IF (NOFETR .LE. 0) RETURN
00250            GO TO 217
00251            END

     END OF COMPILATION:        NO  DIAGNOSTICS.
```

```
@ FOR PCMAMI.PCMAML                                                                         03 MAR 78          [7: 0149.79]
UNIVAC 1108 FORTRAN V EXEC II LEVEL 25A  -(EXEC8 LEVEL E1201001DA)
THIS COMPILATION WAS DONE ON 03 MAR 78 AT 17:00:49

   SUBROUTINE PCMAML      ENTRY POINT 000133

   STORAGE USED: CODE(1) 000162; DATA(0) 000355; BLANK COMMON(2) 000000

   EXTERNAL REFERENCES (BLOCK, NAME)

    0003   SUPSUM
    0004   NERR3$

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

    0001   000035 105G       0001   000045 110G       0001   000067 113G       0000   000315 INJP$       0000 I 000310 I1
    0000 I 000312 I2         0000 I 000311 I3         0000 R 000000 P          0003 R 000000 SUPSUM


00101           SUBROUTINE PCMAML(A,X,B,I,J,K,NA,NX,NB)
00101     C                                                                     MAI03520
00101     C                                                                     MAI03530
00101     C      * MATRIX MULTIPLICATION                                        MAI03540
00101     C   ************ PARAMETER DEFINITIONS ****************************** MAI03550
00101     C      * A(I,J) * X(J,K) = B(I,K)                                     MAI03560
00101     C      * WHERE                                                        MAI03570
00101     C      * I = NUMBER OF ROWS IN A                                      MAI03580
00101     C      * J = NUMBER OF COLUMNS IN A AND ROWS IN X                     MAI03590
00101     C      * K = NUMBER OF COLUMNS IN X                                   MAI03600
00101     C      *                                                              MAI03620
00101     C      *                                                              MAI03630
00101     C     SUBROUTINES USED                                                MAI03640
00101     C        SUPSUM, ORDER                                                MAI03650
00101     C      *                                                              MAI03660
00101     C      *                                                              MAI03670
00103           DIMENSION A(NA,NX),X(NX,NB),B(NA,NB),P(200)
00103     C                                                                     MAI03690
00103     C --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- MAI03700
00103     C      *  P = WORK VECTOR FOR SUMMING.  DIMENSION LIMITS MULTIPLY TO  MAI03710
00103     C      *       LARGEST DIMENSION BEING 200.                           MAI03720
00103     C     P = COMMON WORK AREA USED BY MATMUL
00103     C                                                                     MAI03770
00103     C                                                                     MAI03790
00104          DO 100 I1 = 1, I                                                 MAI03800
00107          DO 100 I3 = 1, K                                                 MAI03810
00112          DO 200 I2 = 1, J                                                 MAI03820
00115          P(I2) = A(I1,I2) * X(I2,I3)                                      MAI03830
00116      200 CONTINUE                                                         MAI03840
00120           B(I1,I3) = SUPSUM(P,J,NX)
00121      100 CONTINUE                                                         MAI03860
00124          RETURN                                                           MAI03870
00125           END
```

END OF COMPILATION: NO DIAGNOSTICS.

```
@ FOR SUPSUM,SUPSUM
UNIVAC 1108 FORTRAN V EXEC II LEVEL 25A  -(FXEC8 LEVEL E1201001OA)                03 MAR 78        17: 0148.537
THIS COMPILATION WAS DONE ON 03 MAR 78 AT 17:00:48

   FUNCTION SUPSUM       ENTRY POINT 000107

   STORAGE USED: CODE(1) 000133; DATA(0) 000024; BLANK COMMON(2) 000000

   EXTERNAL REFERENCES (BLOCK, NAME)

    0003   ORDI
    0004   NERR3S

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

    0001   000041 100L      0001   000065 110L      0001   000034 111G      0000 I 000001 IM2      0000   000005 INJPS
    0000 I 000002 J         0000 I 000003 JPI       0000 R 000000 SUPSUM

 00101               FUNCTION SUPSUM(A,I,N)
 00101        C      .                                                      MAI04390
 00101        C  ............ PARAMETER DEFINITIONS ........................ MAI04390
 00101        C      A = INPUT VECTOR.                                      MAI04400
 00101        C      I = ENDING POSITION IN A TO SUM TO.                    MAI04410
 00101        C      N = SIZE OF A                                          MAI04420
 00101        C      NOTE:  --  THE VALUES IN A ARE DESTROYED BY THIS FUNCTION MAI04430
 00101        C                                                             MAI04440
 00101        C      FUNCTION TO FORM THE ORDERED SUM OF ELEMENTS IN A.     MAI04450
 00101        C                                                             MAI04460
 00101        C      .                                                      MAI04470
 00101        C      .                                                      MAI04480
 00101        C      SUBROUTINES USED                                       MAI04490
 00101        C        ORDI                                                 MAI04500
 00101        C      .                                                      MAI04520
 00101        C      .                                                      MAI04530
 00101        C --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- MAI04540
 00101        C                                                             MAI04550
 00103               DIMENSION A(N)                                         MAI04560
 00103        C                                                             MAI04570
 00103        C --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- MAI04580
 00104               IF( I .LE. 2 ) GO TO 110                               MAI04590
 00106                CALL ORDI(A,1,I,N)
 00107               IM2 = I - 2
 00110               DO 100 J=1, IM2                                        MAI04610
 00113               JP  = J + 1                                            MAI04620
 00114               A(JPI) = A(J) + A(JPI)                                 MAI04630
 00115               IF( ABS(A(JPI)) .LE. ABS(A(J+2)) ) GO TO 100           MAI04640
 00117                CALL ORDI(A,JPI,I,N)                                  MAI04650
 00120        100    CONTINUE
 00122        110    SUPSUM = A(I) + A(I-1)                                 MAI04670
 00123               RETURN                                                 MAI04680
 00124                END                                                   MAI04690
```

END OF COMPILATION: NO DIAGNOSTICS.

```
00523     18*          WRITE(IOUT,162)
00525     A*     162   FORMAT(///,10X,' VECTOR OF EIGEN VALUE.    ,I = ',/)         MAI01200
00526    229*          WRITE(IOUT,IFMT) (C(I),I=1,NR)                              MAI01210
00534    230*          WRITE(IOUT,163)                                             MAI01220
00536    231*    163   FORMAT(///,10X,'VECTOR OF RADII R(I) = ',/)                 MAI01230
00537    232*          WRITE(IOUT,IFMT) (R(I),I=1,NR)                              MAI01240
00545    233*          RETURN                                                      MAI01250
00546    234*           END                                                        MAI06960

     END OF COMPILATION:        NO DIAGNOSTICS.


@ FOR MINDEX,MINDEX                                                      03 MAR 78       17: 0:47.303
UNIVAC 1108 FORTRAN V EXEC II LEVEL 25A  -(FXFCB LEVEL E1201D310A)
THIS COMPILATION WAS DONE ON 03 MAR 78 AT 17:00:47

   SUBROUTINE MINDEX    ENTRY POINT 000065

   STORAGE USED: CODE(1) 000100; DATA(0) 000024; BLANK COMMON(2) 000000

   EXTERNAL REFERENCES (BLOCK, NAME)

    0003   NERR3S

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

    0001   000044 10L     0001   000023 107G    0001   000015 9L      0000 I 000002 I      0000 I 000001 ICK
    0000 I 000000 IJ      0000   000005 INJPS   0000 I 000003 L       0000 I 000004 M

00101      1*          SUBROUTINE MINDEX(R,JM,IM,N)                                MAI04710
00101      2*    C                                                                 MAI01260
00101      3*    C --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- MAI01270
00101      4*    C                                                                 MAI06970
00101      5*    C                                                                 MAI04750
00101      6*    C     SUBROUTINE TO PLACE THE INDEX OF THE SMALLEST VALUE IN R INTO MAI04760
00101      7*    C        JM(1). THE NEXT SMALLEST IN JM(2) ETC.                   MAI04770
00101      8*    C                                                                 MAI04780
00101      9*    C ............ PARAMETER DEFINITIONS ............................ MAI04790
00101     10*    C     R = INPUT VECTOR OF VALUES                                  MAI04800
00101     11*    C     JM = VECTOR OF LENGTH N WHOSE ELEMENTS HAVE BEEN INITIALIZED MAI04810
00101     12*    C        TO JM(1) = 1, JM(2) = 2, JM(3) = 3, ... JM(N) = N .      MAI04820
00101     13*    C     IM = POSITION (INDEX) OF PLACE TO BEGIN SCAN IN R           MAI04830
00101     14*    C     N = MAX SIZE OF R AND JM                                    MAI04840
00101     15*    C     .                                                           MAI04850
00101     16*    C     .                                                           MAI04860
00101     17*    C     SUBROUTINES USED                                            MAI04870
00101     18*    C        NONE.                                                    MAI04880
00101     19*    C     .                                                           MAI04890
00101     20*    C     .                                                           MAI04900
00101     21*    C                                                                 MAI04910
00103     22*          DIMENSION R(N),JM(N)                                        MAI04920
00103     23*    C                                                                 MAI04930
00103     24*    C --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- MAI04940
00103     25*    C                                                                 MAI04950
00104     26*          IJ=N-1                                                      MAI04960
00105     27*      9   ICK=0                                                       MAI04970
00106     28*          DO 10 I=IM,IJ                                               MAI04980
00111     29*          L=JM(I)                                                     MAI04990
00112     30*          M=JM(I+1)                                                   MAI05000
00113     31*          IF(R(L).LE.R(M))GO TO 10                                    MAI05010
00115     32*          JM(I)=M                                                     MAI05020
00116     33*          JM(I+1)=L                                                   MAI05030
00117     34*          ICK=1                                                       MAI05040
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00120      35.      10    CONTINUE                                          MA105050
00122      36.            IF(ICK.NE.0)GO TO 9                               MA105060
00124      37.            RETURN                                            MA105070
00125      38.             END

        END OF COMPILATION:        NO  DIAGNOSTICS.
```

```
@ FOR ORD1,ORD1                                                          03 MAR 78        17:0:51.46
UNIVAC 1108 FORTRAN V EXEC II LEVEL 25A  -(EXEC8 LEVEL E1201001OA)
THIS COMPILATION WAS DONE ON 03 MAR 78 AT 17:00:51

   SUBROUTINE ORD1        ENTRY POINT 000116

   STORAGE USED: CODE(1) 000133; DATA(0) 000022; BLANK COMMON(2) 000000

   EXTERNAL REFERENCES (BLOCK, NAME)

    0003   NERR3S

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

    0001   000022 1106       0001   000005 150L      0001   000077 200L      0001   000102 210L      0000 R 000003 COPY
    0000   000006 INJPS      0000 I 000000 IXSTOP    0000 I 000001 J         0000 I 000002 JP1       0000 I 000004 K
    0000 I 000005 KP1

 00101      1*            SUBROUTINE ORD1(A,I1,I2,N)
 00101      2*      C                                                              MAI03930
 00101      3*      C     SUBROUTINE TO REORDER A VECTOR INTO ASCENDING ORDER     MAI03940
 00101      4*      C     *                                                        MAI03950
 00101      5*      C     *                                                        MAI03960
 00101      6*      C  .............. PARAMETER DEFINITIONS ..............................  MAI03970
 00101      7*      C     A = INPUT VECTOR   ---    RESULTS RETURNED IN A          MAI03980
 00101      8*      C     I1 = BEGINNING POSITION IN VECTOR                        MAI03990
 00101      9*      C     I2 = ENDING POSITION IN VECTOR                           MAI04000
 00101     10*      C     N = MAXIMUM LENGTH OF VECTOR                             MAI04010
 00101     11*      C     *                                                        MAI04020
 00101     12*      C     *                                                        MAI04030
 00101     13*      C     SUBROUTINES USED                                         MAI04040
 00101     14*      C        NONE.                                                 MAI04050
 00101     15*      C     *                                                        MAI04060
 00101     16*      C     *                                                        MAI04070
 00101     17*      C                                                              MAI04080
 00103     18*            DIMENSION A(N)                                           MAI04090
 00103     19*      C                                                              MAI04100
 00103     20*      C --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---  MAI04110
 00103     21*      C                                                              MAI04120
 00104     22*            IXSTOP = I2 - 1                                          MAI04130
 00105     23*            IF( (IXSTOP-I1) .LT. 1 ) GO TO 210                       MAI04140
 00107     24*            DO 200 J=I1, IXSTOP                                      MAI04150
 00112     25*            JP1 = J + 1                                              MAI04160
 00113     26*            IF( ABS(A(J)) .LE. ABS(A(JP1)) ) GO TO 200               MAI04170
 00115     27*            COPY = A(J)                                              MAI04180
 00116     28*            A(J) = A(JP1)                                            MAI04190
 00117     29*            A(JP1) = COPY                                            MAI04200
 00120     30*            K = J                                                    MAI04210
 00121     31*      150   K = K - 1                                                MAI04220
 00122     32*            IF( K .LT. I1 ) GO TO 200                                MAI04230
 00124     33*            KP1 = K + 1                                              MAI04240
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00125    340           IF( ABS(A(K)) .LE. ABS(A(KP1)) ) GO TO 200              MAI04250
00127    350           COPY = A(K)                                             MAI04260
00130    360           A(K) = A(KP1)                                           MAI04270
00131    370           A(KP1) = COPY                                           MAI04280
00132    380           GO TO 150                                               MAI04290
00133    390      200  CONTINUE                                                MAI04300
00135    400      210  CONTINUE                                                MAI04310
00136    410           RETURN                                                  MAI04320
00137    420           END                                                     MAI04330

      END OF COMPILATION:        NO  DIAGNOSTICS.
```

APPENDIX G
VERIFICATION RUNS

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT ... ORIGINAL 23 FEB 78
HOUSTON,TEXAS

TEST RUN 1

```
$STAT
   DATAFI     FILE=4
   CHANNE     DATA=1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16  FILTER=5,6,7,8
   B-MATR     CARDS
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

LINEAR TRANSFORMATION (B) MATRIX

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

CH(5)   CH(6)   CH(7)   CH(8)

172

```
                    LINEAR TRANSFORMATION (B) MATRIX

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

            CH( 5)     CH( 6)     CH( 7)     CH( 8)
LIN. CMB.
    1       .4330+00   .6320+00   .5860+00   .2640+00
    2      -.2900+00  -.5620+00   .6000+00   .4910+00
    3      -.8290+00   .5220+00  -.3900-01   .1940+00
    4       .2230+00   .1200-01  -.5430+00   .8100+00
   BIAS       0.0,16.0,25.0,20.0

 THE BIAS ARE
     .00      16.00      25.00      20.00
   OPTION     TASSEL
   OPTION     COVAR
   OPTION     HIST
   HISTO      1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16
   STATFI     FILE=2
   OPTION     MAXSUB=1
   HEDI       RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
   .END.
```

ORIGINAL PAGE IS
OF POOR QUALITY

RUN TO MAKE SURE THE CHANGES DIDN'T EFFE IE ORIGINAL 23 FEB 78
HOUS. ,TEXAS

YOU HAVE SELECTED THE FOLLOWING SSTAT PROCESSOR OPTIONS:

PRINT MEAN AND COVARIANCE FOR EACH FIELD
PRINT A HISTOGRAM FOR EACH FIELD
PRINT A HISTOGRAM FOR EACH SUBCLASS
PRINT MEAN AND COVARIANCE FOR EACH SUBCLASS

SUPERVISOR INFORMATION:

UNUSED CORE 28 LOCATIONS
MAXIMUM NO. OF FIELDS..209
MAXIMUM NO. OF SUBCLASSES... 1
CHANNELS SELECTED ARE 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
16,
HISTOGRAM CHANNELS ARE 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
16,

INPUT IMAGE DATA TAPE INFORMATION

FORMAT UNIVERSAL
NO. OF CHANNELS 16
NO. OF PIXELS/LINE 196
FIRST SCAN LINE NO. 1
FIRST PIXEL REFERENCE PT 1

174

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

TRAINING FIELDS

FIELD NO.	NAME	CLASS	SUBCLASS	SAMPLE INC	LINE INC	VERTICES(SAMPLE,LINE)
1	81-01	BARLEY	SWHEAT	1	1	(1, 1) (196, 1) (196, 117) (1, 117)

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL HOUSTON,TEXAS 23 FEB 78

TRAINING FIELDS

FIELD NO.	FIELD NAME	CLASS	SUBCLASS	SAMPLE INC	LINE INC	VERTICES(SAMPLE,LINE)
1	81-01	BARLEY	SWHEAT	1	1	(1, 1) (196, 1) (196, 117) (1, 117)

22850 POINTS WILL BE USED IN THE FIELD MEAN,COVARIANCE CALCULATIONS

ORIGINAL PAGE IS OF POOR QUALITY

THE MEAN,STANDARD DEVIATION,COVARIANCE,AND CORRELATION (16 CHANNELS) FOR:

TRAINING FIELD 81-01

MEAN:	32.88	36.49	46.25	19.18	27.11	26.08	55.25	29.80	22.63	22.90	43.16	20.20
ST DEV:	5.21	8.47	10.43	5.02	4.61	8.38	12.97	7.22	4.41	8.01	8.21	4.96

MEAN:	26.16	34.34	40.01	17.25
ST DEV:	4.74	9.39	10.25	4.42

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COVARIANCE MATRIX

27.10											
42.28	71.81										
30.49	36.99	108.85									
10.34	10.28	50.30	25.22								
12.24	17.91	17.56	6.51	21.28							
20.47	31.16	33.36	12.62	36.37	70.22						
14.58	23.26	27.74	13.52	-11.53	-35.94	168.19					
5.20	8.40	11.37	6.13	-11.22	-28.15	91.02	52.19				
8.60	10.52	19.38	8.20	13.38	27.76	-23.67	-15.89	19.41			
15.52	20.71	36.54	15.40	25.54	52.45	-43.99	-29.61	33.68	64.15		
7.80	10.28	23.03	11.92	-5.87	-16.33	78.44	43.36	-9.26	-19.92	67.39	
2.51	3.46	8.37	4.80	-7.10	-16.72	50.78	29.10	-10.11	-20.16	38.53	24.80
11.61	19.63	7.52	1.70	.71	-1.07	29.74	15.45	-3.43	-5.15	12.29	7.75
20.27	36.30	10.18	1.66	-2.09	-11.07	72.71	38.88	-11.59	-20.06	32.42	21.15
11.61	21.66	4.86	1.02	-10.94	-27.19	89.53	49.46	-19.54	-34.89	46.84	30.80
2.26	4.49	.52	.30	-6.56	-14.76	39.36	22.15	-9.72	-17.59	22.06	14.61

22.47			
41.64	88.18		
38.50	84.32	104.99	
13.57	31.45	43.17	19.56

CORRELATION MATRIX

1.00											
.96	1.00										
.56	.42	1.00									
.40	.24	.96	1.00								
.51	.46	.36	.28	1.00							
.47	.44	.38	.30	.94	1.00						
.22	.21	.21	.21	-.19	-.33	1.00					
.14	.14	.15	.17	-.34	-.47	.97	1.00				
.37	.28	.42	.37	.66	.75	-.41	-.50	1.00			
.37	.31	.44	.38	.69	.78	-.42	-.51	.95	1.00		
.18	.15	.27	.29	-.16	-.24	.74	.73	-.26	-.30	1.00	
.10	.08	.16	.19	-.31	-.40	.79	.81	-.46	-.51	.94	1.00
.47	.49	.15	.07	.03	-.03	.48	.45	-.16	-.14	.32	.33
.41	.46	.10	.04	-.05	-.14	.60	.57	-.28	-.27	.42	.45
.22	.25	.05	.02	-.23	-.32	.67	.67	-.43	-.43	.56	.60
.10	.12	.01	.01	-.32	-.40	.69	.69	-.50	-.50	.61	.66

1.00			
.94	1.00		
.79	.88	1.00	
.65	.76	.95	1.00

177

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL . 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING FIELD BI-A1

(NO. SAMPLES= 22050 , SUBCLASS= SWHEAT)

CHANNEL 1

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL   23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING FIELD BI-A1

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

CHANNEL 1

EACH • REPRESENTS 1633 POINT(S).

```
22862 I                                                                              S
21229 I                                                                              •
19596 I                                                                              •
17963 I                                                                              •
16330 I                                                                              •
14697 I                                                                              •
13064 I                                                                              •
11431 I                                                                              •
 9798 I                                                                              •
 8165 I                                                                              •
 6532 I                                                                              •
 4899 I                                                                              •
 3266 I                                                                              •
 1633 I                                                                              •
       +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      220       210       200       190       180       170       160       150       140       130       120
```

CHANNEL 2

EACH • REPRESENTS 1638 POINT(S).

```
22932 I                                                                              •
21294 I                                                                              •
19656 I                                                                              •
18018 I                                                                              •
16380 I                                                                              •
14742 I                                                                              •
13104 I                                                                              •
11466 I                                                                              •
 9828 I                                                                              •
 8190 I                                                                              •
 6552 I                                                                              •
 4914 I                                                                              •
 3276 I                                                                              •
 1638 I                                                                              •
       +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      220       210       200       190       180       170       160       150       140       130       120
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFEC. HE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING FIELD BI-N1

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

CHANNEL 3

```
 EACH * REPRESENTS    1638  POINT(S).
22932 I                                                                                       *
21294 I                                                                                       *
19656 I                                                                                       *
18018 I                                                                                       *
16380 I                                                                                       *
14742 I                                                                                       *
13104 I                                                                                       *
11466 I                                                                                       *
 9828 I                                                                                       *
 8190 I                                                                                       *
 6552 I                                                                                       *
 4914 I                                                                                       *
 3276 I                                                                                       *
 1638 I                                                                                       *
       +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      220       210       200       190       180       170       160       150       140       130      120
```

CHANNEL 4

```
 EACH * REPRESENTS    1638  POINT(S).
22932 I                                                                                       *
21294 I                                                                                       *
19656 I                                                                                       *
18016 I                                                                                       *
16380 I                                                                                       *
14742 I                                                                                       *
13104 I                                                                                       *
11466 I                                                                                       *
 9828 I                                                                                       *
 8190 I                                                                                       *
 6552 I                                                                                       *
 4914 I                                                                                       *
 3276 I                                                                                       *
 1638 I                                                                                       *
       +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      220       210       200       190       180       170       160       150       140       130      120
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING FIELD BI-N1

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

CHANNEL 5

ORIGINAL PAGE IS
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RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL   23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING FIELD   81-A1

(NO. SAMPLES=   22850 , SUBCLASS= SWHEAT)

CHANNEL 5

EACH • REPRESENTS   1638 POINT(S).

```
22932 I                                                                        •
21294 I                                                                        •
19656 I                                                                        •
18018 I                                                                        •
16380 I                                                                        •
14742 I                                                                        •
13104 I                                                                        •
11466 I                                                                        •
 9828 I                                                                        •
 8190 I                                                                        •
 6552 I                                                                        •
 4914 I                                                                        •
 3276 I                                                                        •
 1638 I                                                                        •
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
     220       210       200       190       180       170       160       150       140       130       120
```

CHANNEL 6

EACH • REPRESENTS   1638 POINT(S).

```
22932 I                                                                        •
21294 I                                                                        •
19656 I                                                                        •
18018 I                                                                        •
16380 I                                                                        •
14742 I                                                                        •
13104 I                                                                        •
11466 I                                                                        •
 9828 I                                                                        •
 8190 I                                                                        •
 6552 I                                                                        •
 4914 I                                                                        •
 3276 I                                                                        •
 1638 I                                                                        •
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
     220       210       200       190       180       170       160       150       140       130       120
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

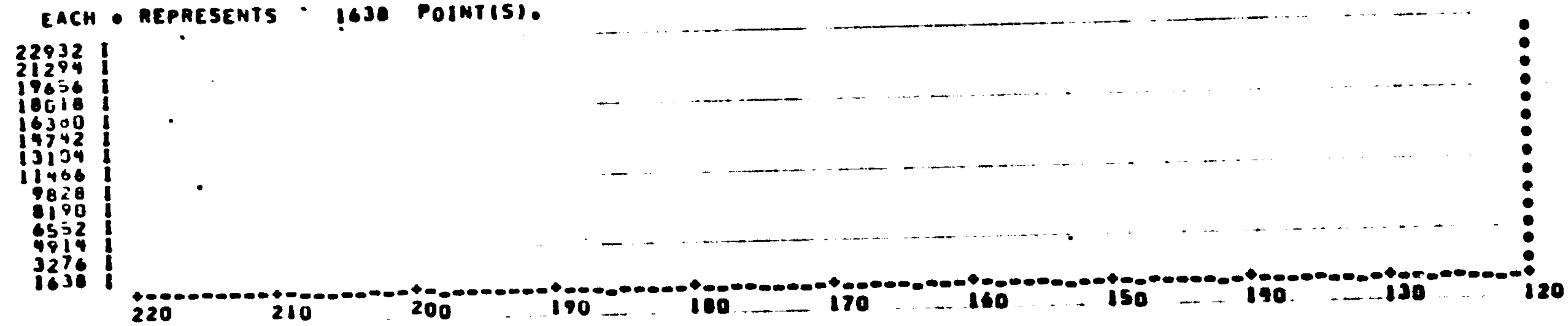
HISTOGRAM

TRAINING FIELD BI-01

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

CHANNEL 7

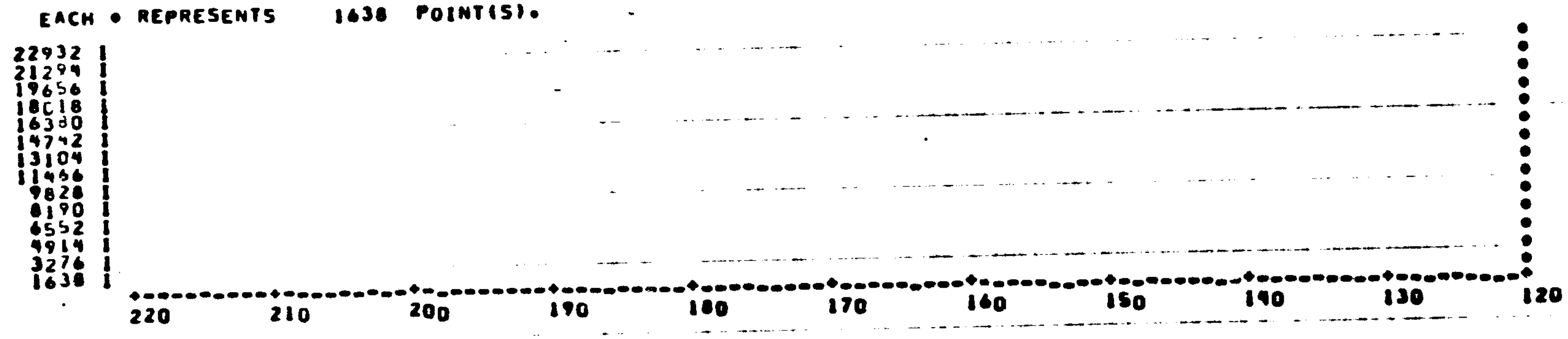
EACH • REPRESENTS 1638 POINT(S).



C-3

CHANNEL 8

EACH • REPRESENTS 1638 POINT(S).



ORIGINAL PAGE IS
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181

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING FIELD BI-01

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

CHANNEL 9

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON, TEXAS

23 FEB 78

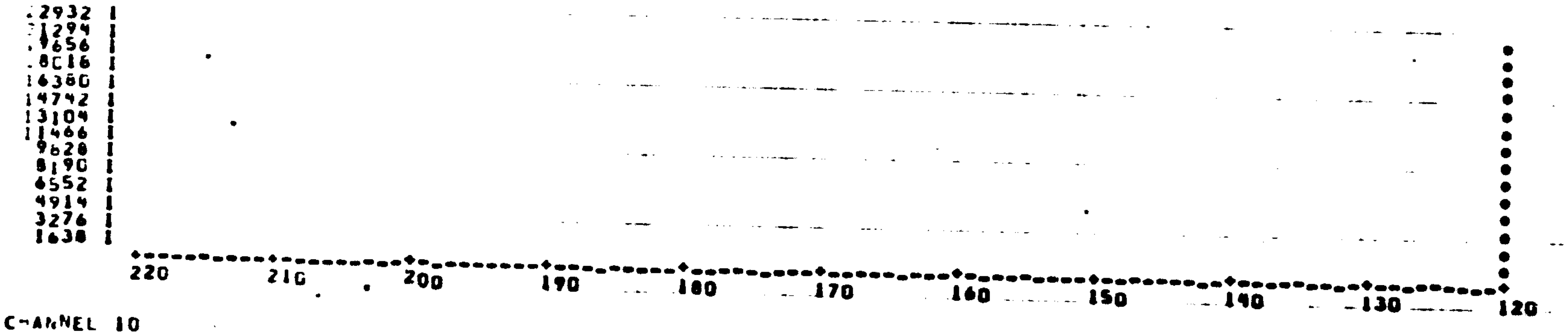
HISTOGRAM

TRAINING FIELD   81-01

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

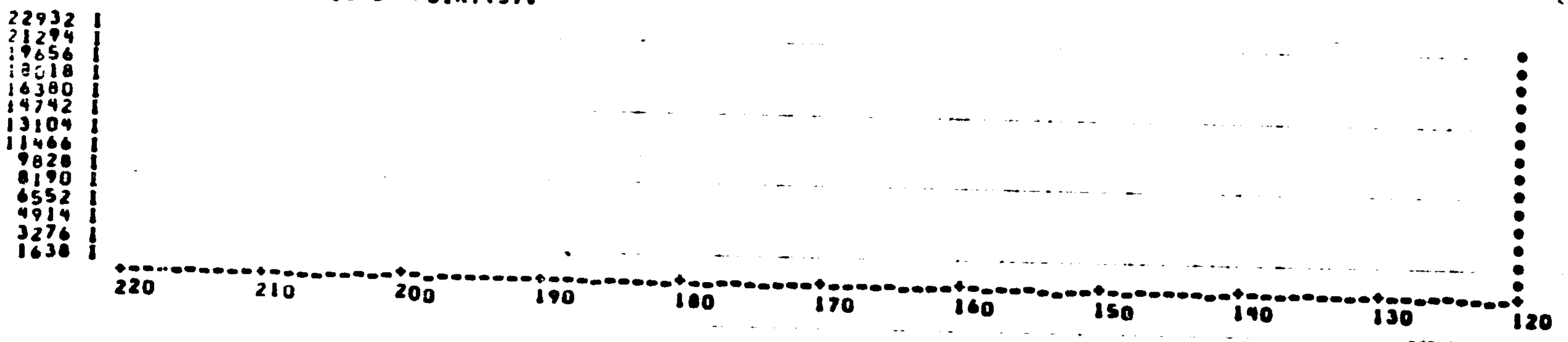
CHANNEL 9

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 10

EACH • REPRESENTS 1638 POINT(S).



182

RUN TO MAKE SURE THE CHANGES DIDN'T EFFE THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

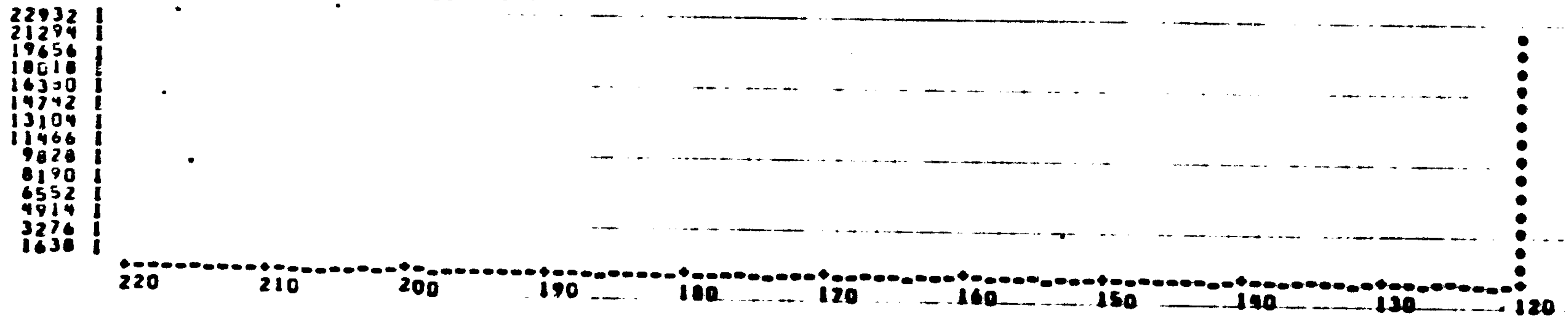
HISTOGRAM

TRAINING FIELD B1-n1

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

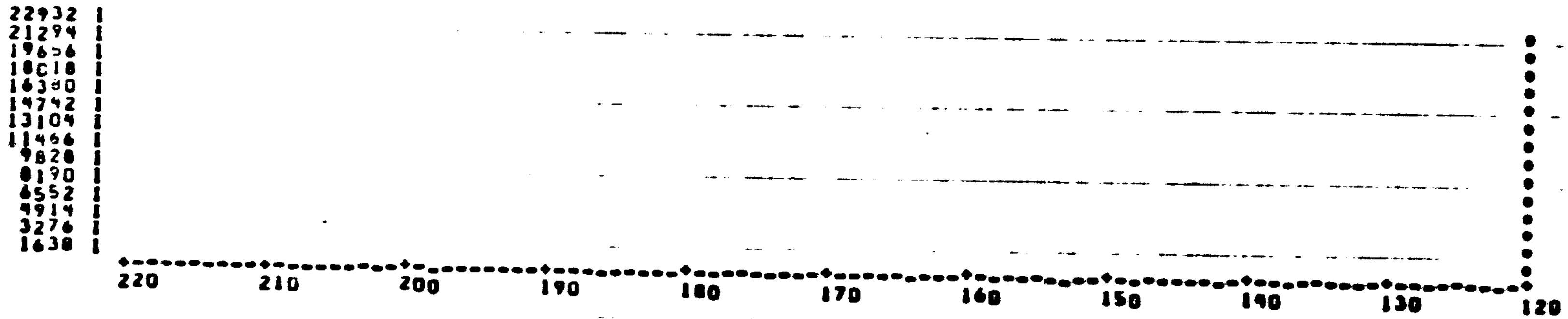
CHANNEL 11

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 12

EACH • REPRESENTS 1638 POINT(S).



ORIGINAL PAGE IS
OF POOR QUALITY

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

HISTOGRAM

TRAINING FIELD B1-n1

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

CHANNEL 13

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

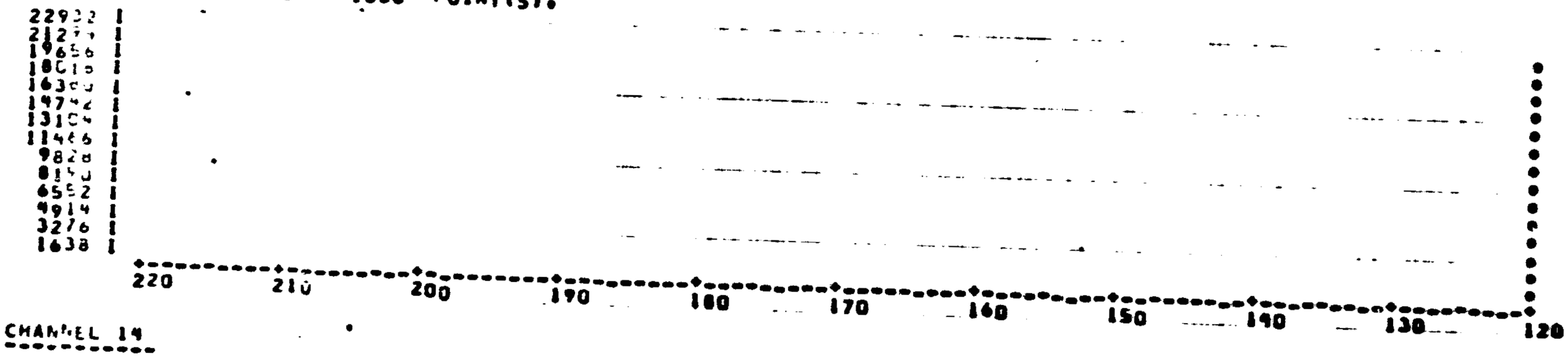
HISTOGRAM

TRAINING FIELD 81-n1

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

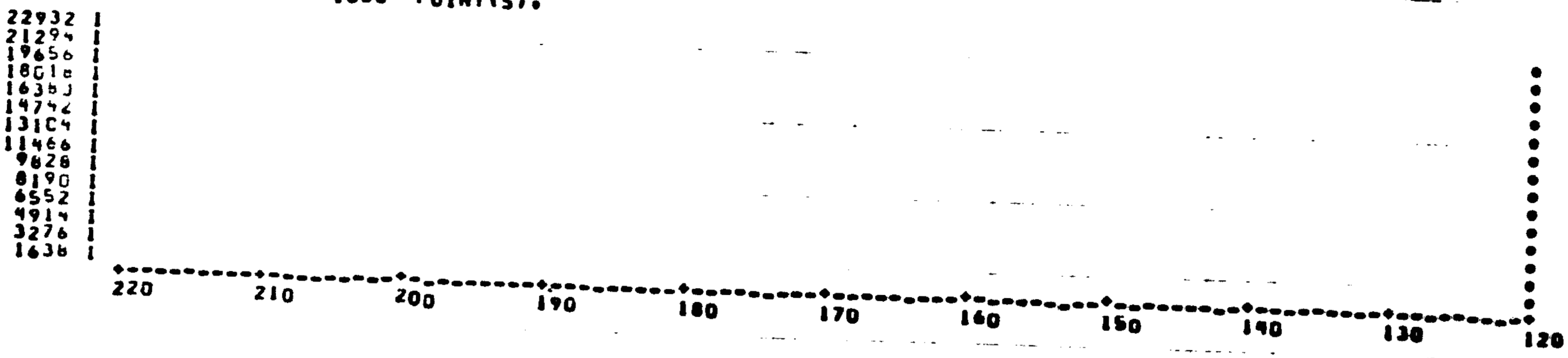
CHANNEL 13

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 14

EACH • REPRESENTS 1638 POINT(S).



184

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

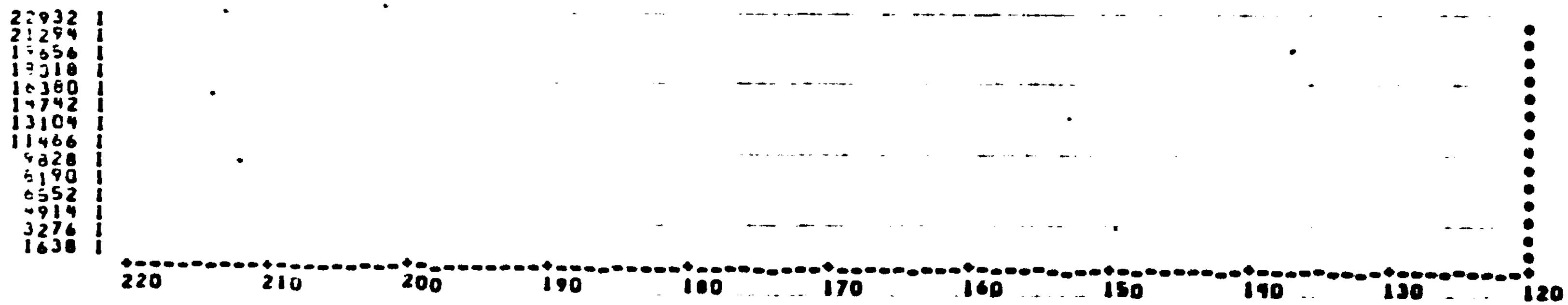
HISTOGRAM

TRAINING FIELD BI-01

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

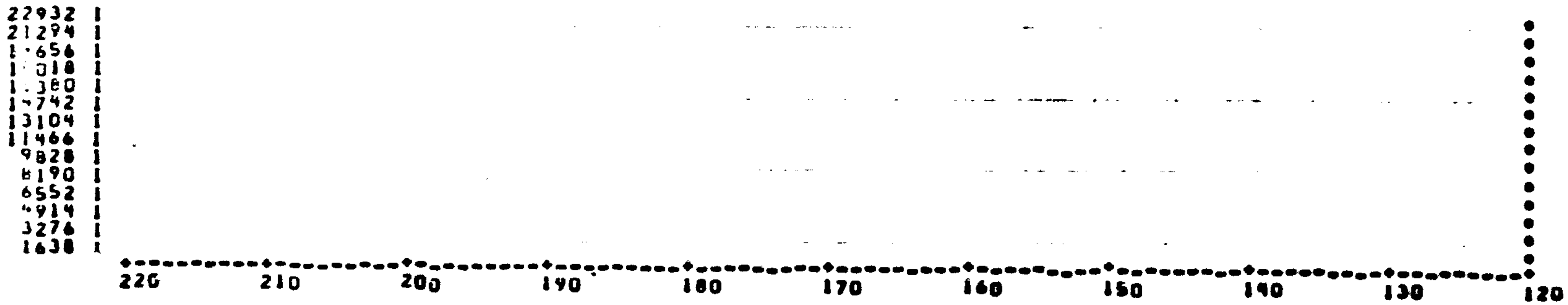
CHANNEL 15

EACH * REPRESENTS 1638 POINT(S).



CHANNEL 16

EACH * REPRESENTS 1638 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFE.. THE ORIGINAL 2? ..B 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING FIELD 81-01

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

CHANNEL 7

```
EACH . REPRESENTS   1638  POINT(S).
22932 I                                                              .
21294 I                                                              .
19656 I                                                              .
18018 I                                                              .
16380 I                                                              .
14742 I                                                              .
13104 I                                                              .
11466 I                                                              .
 9828 I                                                              .
 8190 I                                                              .
 6552 I                                                              .
 4914 I                                                              .
 3276 I                                                              .
 1638 I                                                              .
       +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      220       210       200       190       180       170       160       150       140       130       120
```

CHANNEL 8

```
EACH . REPRESENTS   1638  POINT(S).
22932 I                                                              .
21294 I                                                              .
19656 I                                                              .
18018 I                                                              .
16380 I                                                              .
14742 I                                                              .
13104 I                                                              .
11466 I                                                              .
 9828 I                                                              .
 8190 I                                                              .
 6552 I                                                              .
 4914 I                                                              .
 3276 I                                                              .
 1638 I                                                              .
       +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      220       210       200       190       180       170       160       150       140       130       120
```

ORIGINAL PAGE IS
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C-3

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING FIELD 81-01

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

CHANNEL 9

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON, TEXAS

23 FEB 78

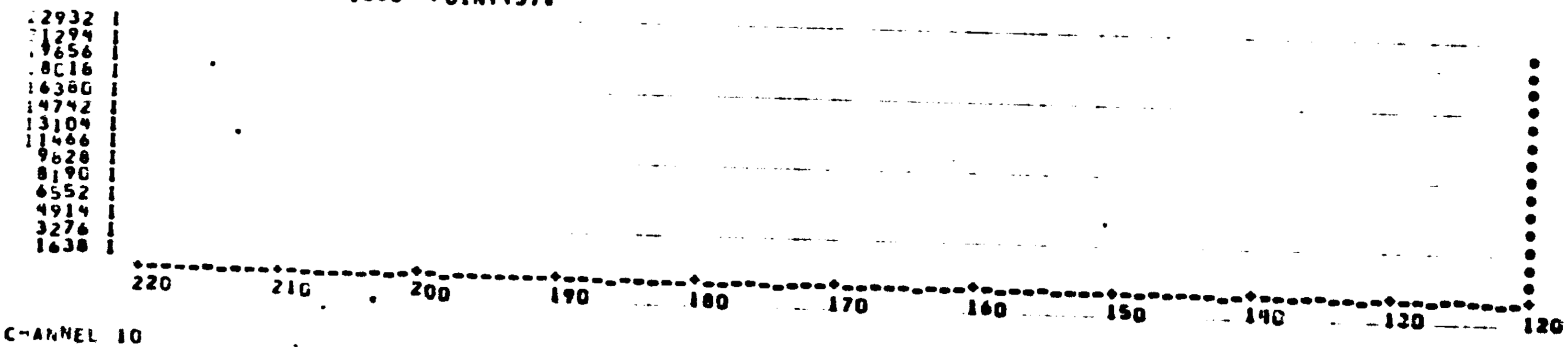
HISTOGRAM

TRAINING FIELD 81-01

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

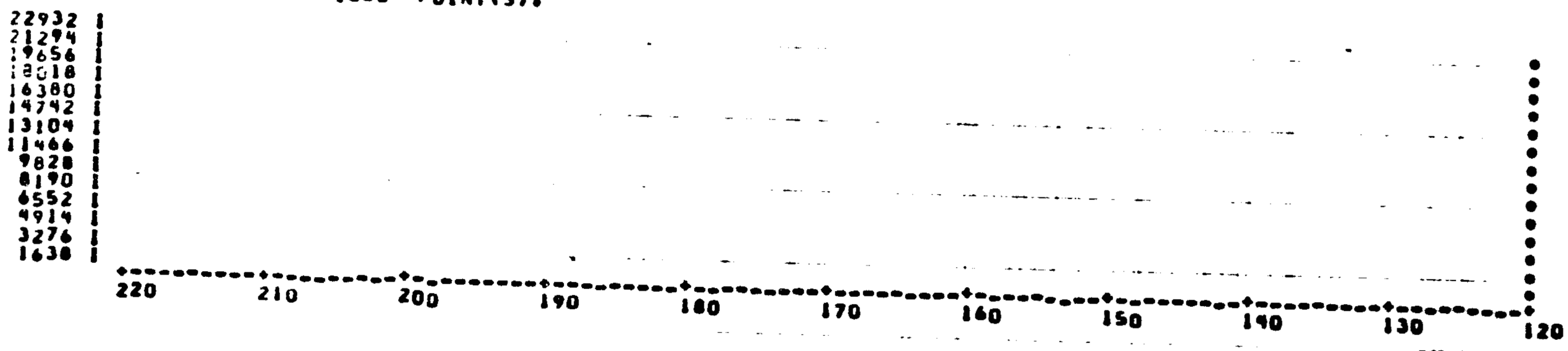
CHANNEL 9

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 10

EACH • REPRESENTS 1638 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFE THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

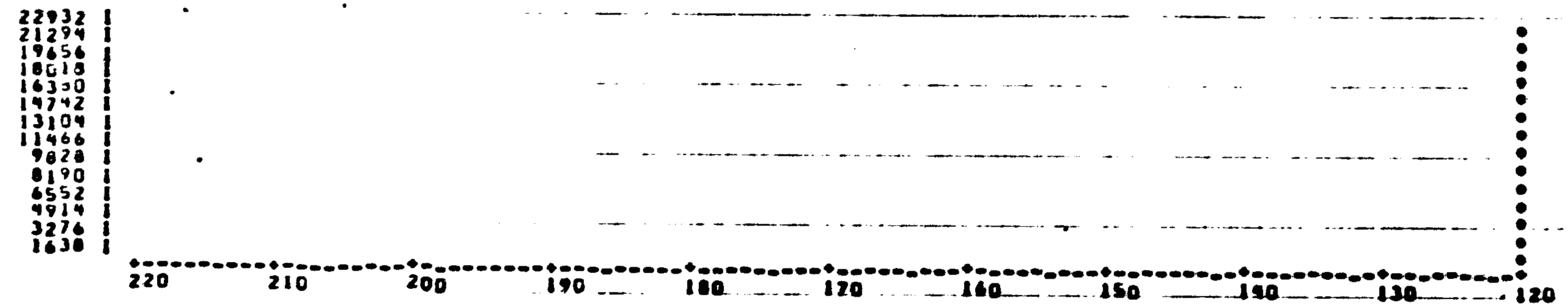
HISTOGRAM

TRAINING FIELD   BI-ñI

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

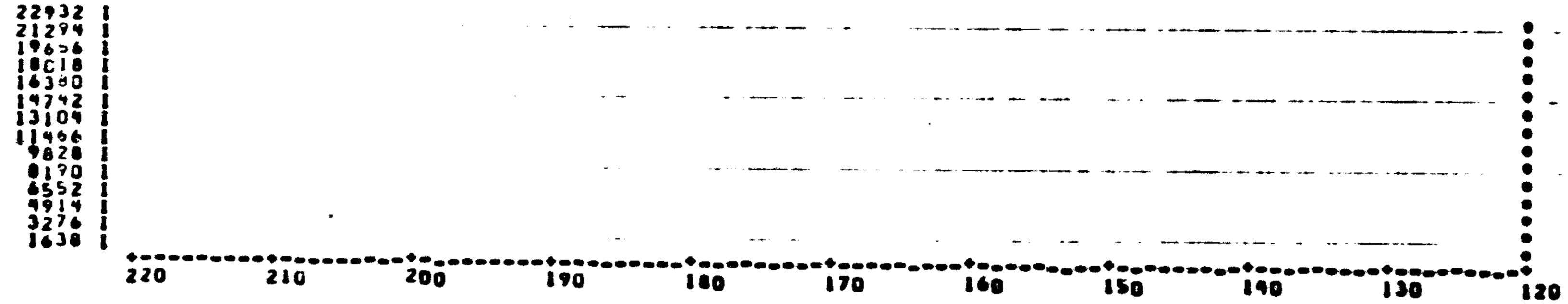
CHANNEL 11

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 12

EACH • REPRESENTS 1638 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

HISTOGRAM

TRAINING FIELD   BI-ñI

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

CHANNEL 13

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

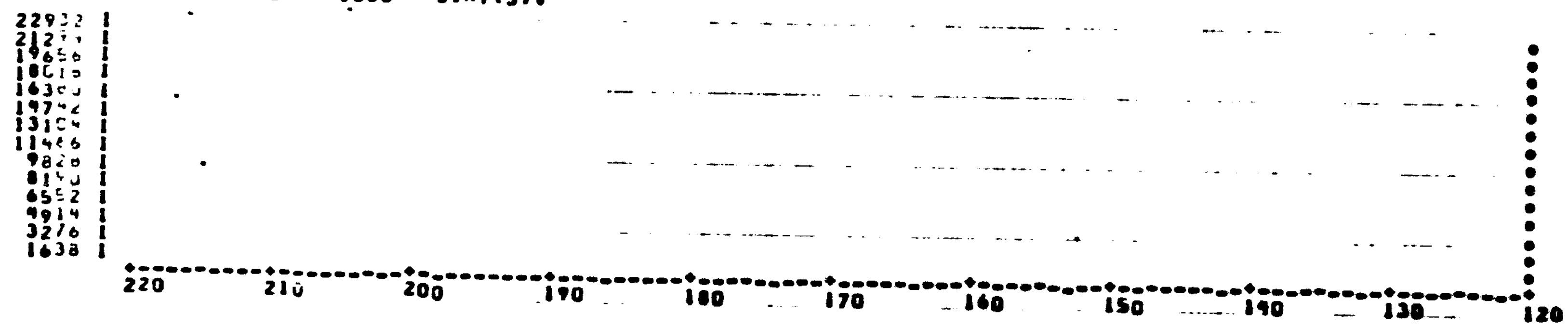
HISTOGRAM

TRAINING FIELD BI-01

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

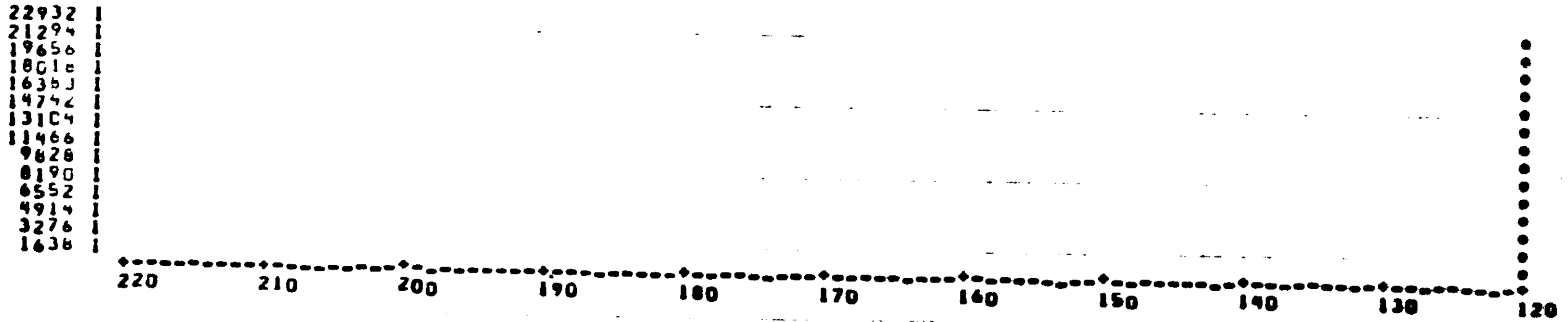
CHANNEL 13

EACH * REPRESENTS 1638 POINT(S).



CHANNEL 14

EACH * REPRESENTS 1638 POINT(S).



184

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

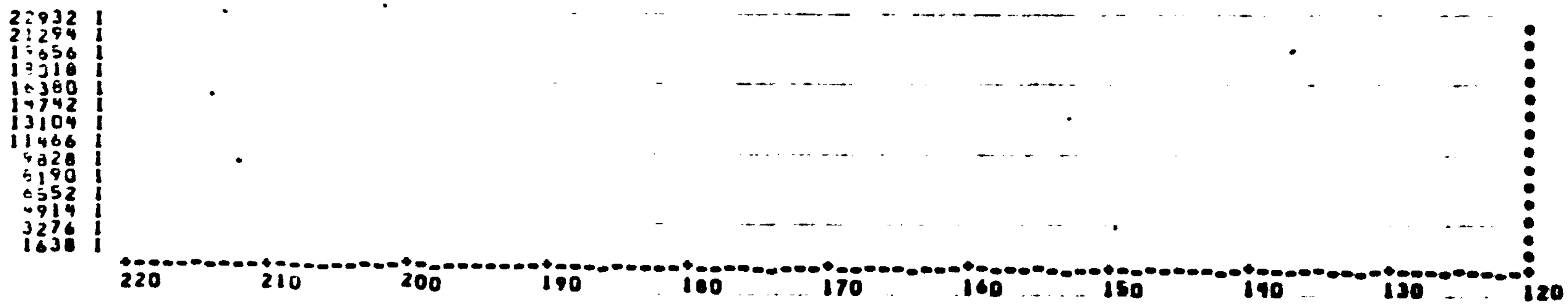
HISTOGRAM

TRAINING FIELD B1-A1

(NO. SAMPLES= 22850 , SUBCLASS= SWHEAT)

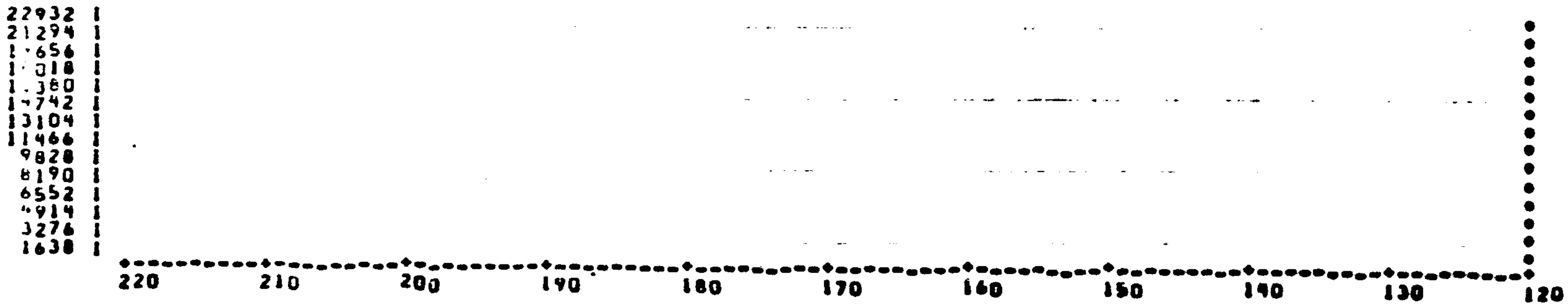
CHANNEL 15

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 16

EACH • REPRESENTS 1638 POINT(S).



185

RUN TO MAKE SURE THE CHANGES DIDN'T EFFL THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

THE MEAN,STANDARD DEVIATION,COVARIANCE,AND CORRELATION (16 CHANNELS) FOR:

TRAINING SUBCLASS SWHEAT

MEAN:	32.88	36.49	46.25	19.18	27.11	26.08	55.25	24.80	22.63	22.40	43.36	20.20
ST DEV:	5.21	6.47	10.43	5.02	4.61	8.38	12.97	7.22	4.41	8.01	8.21	4.98

MEAN:	26.16	34.34	40.01	17.25
ST DEV:	4.74	9.39	10.25	4.42

COVARIANCE MATRIX

27.10											
42.28	71.81										
30.49	36.99	108.85									
10.34	10.28	50.30	25.22								
12.24	17.91	17.56	6.51	21.28							
20.47	31.16	33.36	12.62	36.37	70.22						
14.58	23.26	27.74	13.52	-11.53	-35.94	168.19					
5.20	6.40	11.37	6.13	-11.22	-28.15	91.02	52.19				
8.60	10.52	19.38	8.20	13.38	27.76	-23.67	-15.89	19.41			
15.52	20.71	36.54	15.40	25.54	52.45	-43.99	-29.61	33.68	64.15		
7.80	10.28	23.03	11.92	-5.07	-16.33	78.44	43.36	-9.26	-19.92	67.39	
2.51	3.46	8.37	4.80	-7.10	-16.72	50.78	29.10	-10.11	-20.16	38.53	24.80
11.61	19.63	7.52	1.70	.71	-1.07	29.74	15.45	-3.43	-5.15	12.29	7.75

20.27	36.30	13.18	1.66	-2.09	-11.07	72.71	38.88	-11.59	-20.06	32.42	21.15
11.61	21.66	4.86	1.02	-10.94	-27.19	89.53	49.46	-19.54	-34.87	46.84	30.80
2.26	4.49	.52	.30	-6.56	-14.76	39.36	22.15	-9.72	-17.54	22.06	14.61

22.47			
41.64	88.18		
38.50	84.32	104.99	
13.57	31.45	43.17	19.56

CORRELATION MATRIX

1.00											
.96	1.00										
.56	.42	1.00									
.90	.24	.96	1.00								
.51	.46	.36	.28	1.00							
.47	.44	.38	.30	.94	1.00						
.22	.21	.21	.21	-.19	-.33	1.00					
.14	.14	.15	.17	-.34	-.47	.97	1.00				
.37	.28	.42	.37	.66	.75	-.41	-.50	1.00			
.37	.31	.44	.38	.69	.78	-.42	-.51	.95	1.00		
.18	.15	.27	.29	-.16	-.24	.74	.73	-.26	-.30	1.00	
.10	.08	.16	.19	-.31	-.40	.79	.81	-.46	[illegible]	.94	1.00
.47	.49	.15	.07	.03	-.03	.48	.45	-.16	-.14	.32	.33
.41	.46	.10	.04	-.05	-.14	.60	.57	-.28	-.27	.42	.45
.22	.25	.05	.02	-.23	-.32	.67	.67	-.43	-.43	.56	.60
.10	.12	.01	.01	-.32	-.40	.69	.69	-.50	-.50	.61	.66

1.00			
.94	1.00		
.79	.88	1.00	
.65	.76	.95	1.00

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

HISTOGRAM

TRAINING SUBCLASS SWHEAT

CHANNEL 1

EACH * REPRESENTS 1633 POINT(S).

187

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL HOUSTON,TEXAS . 23 FEB 78

HISTOGRAM

TRAINING SUBCLASS SHMFAT

CHANNEL 1

EACH • REPRESENTS 1633 POINT(S).

```
22862 I                                                                              S
21229 I                                                                              •
19596 I                                                                              •
17963 I                                                                              •
16330 I                                                                              •
14697 I                                                                              •
13064 I                                                                              •
11431 I                                                                              •
 9798 I                                                                              •
 8165 I                                                                              •
 6532 I                                                                              •
 4899 I                                                                              •
 3266 I                                                                              •
 1633 I                                                                              •
       +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      220       210       200       190       180       170       160       150       140       130       120
```

CHANNEL 2

EACH • REPRESENTS 1638 POINT(S).

```
22932 I                                                                              •
21294 I                                                                              •
19656 I                                                                              •
18018 I                                                                              •
16380 I                                                                              •
14742 I                                                                              •
13104 I                                                                              •
11466 I                                                                              •
 9828 I                                                                              •
 8190 I                                                                              •
 6552 I                                                                              •
 4914 I                                                                              •
 3276 I                                                                              •
 1638 I                                                                              •
       +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      220       210       200       190       180       170       160       150       140       130       120
```

188

RUN TO MAKE SURE THE CHANGES DIDN'T EFFEL. THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SHHFAT

CHANNEL 3

EACH • REPRESENTS 1638 POINT(S).

```
22932 I                                                                                                   •
21294 I                                                                                                   •
19656 I                                                                                                   •
18018 I                                                                                                   •
16380 I                                                                                                   •
14742 I                                                                                                   •
13104 I                                                                                                   •
11466 I                                                                                                   •
 9828 I                                                                                                   •
 8190 I                                                                                                   •
 6552 I                                                                                                   •
 4914 I                                                                                                   •
 3276 I                                                                                                   •
 1638 I                                                                                                   •
       •---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+•
      220       210       200       190       180       170       160       150       140       130       120
```

CHANNEL 4

EACH • REPRESENTS 1638 POINT(S).

```
22932 I                                                                                                   •
21294 I                                                                                                   •
19656 I                                                                                                   •
18018 I                                                                                                   •
16380 I                                                                                                   •
14742 I                                                                                                   •
13104 I                                                                                                   •
11466 I                                                                                                   •
 9828 I                                                                                                   •
 8190 I                                                                                                   •
 6552 I                                                                                                   •
 4914 I                                                                                                   •
 3276 I                                                                                                   •
 1638 I                                                                                                   •
       •---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+•
      220       210       200       190       180       170       160       150       140       130       120
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SHHFAT

CHANNEL 5

EACH • REPRESENTS 1638 POINT(S).

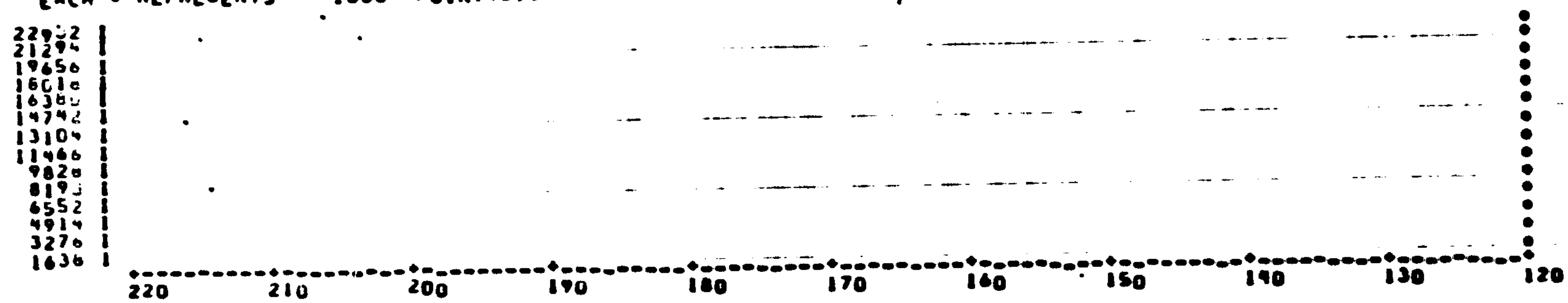
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SUNFAT

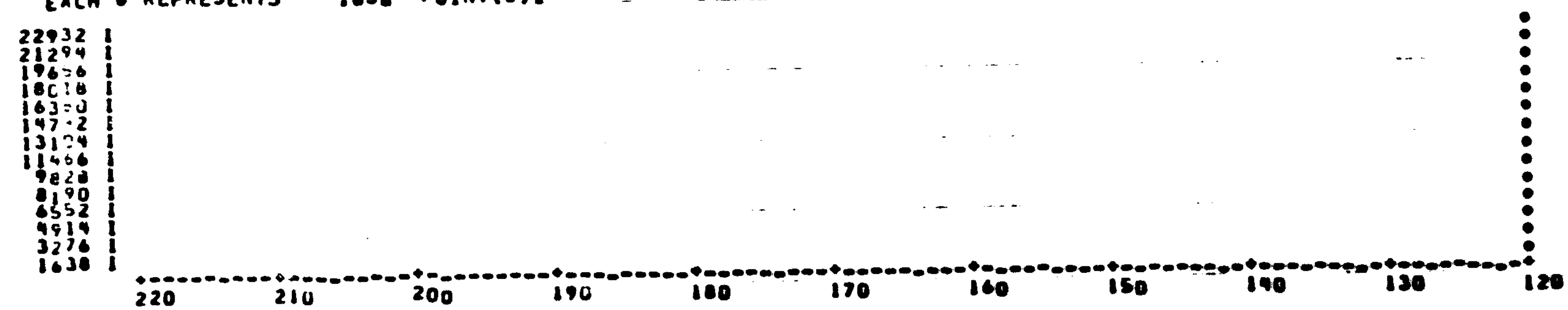
CHANNEL 5

EACH * REPRESENTS 1638 POINT(S).



CHANNEL 6

EACH * REPRESENTS 1638 POINT(S).



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RUN TO MAKE SURE THE CHANGES DIDN'T EFFEC HE ORIGINAL
HOUSTON,TEXAS

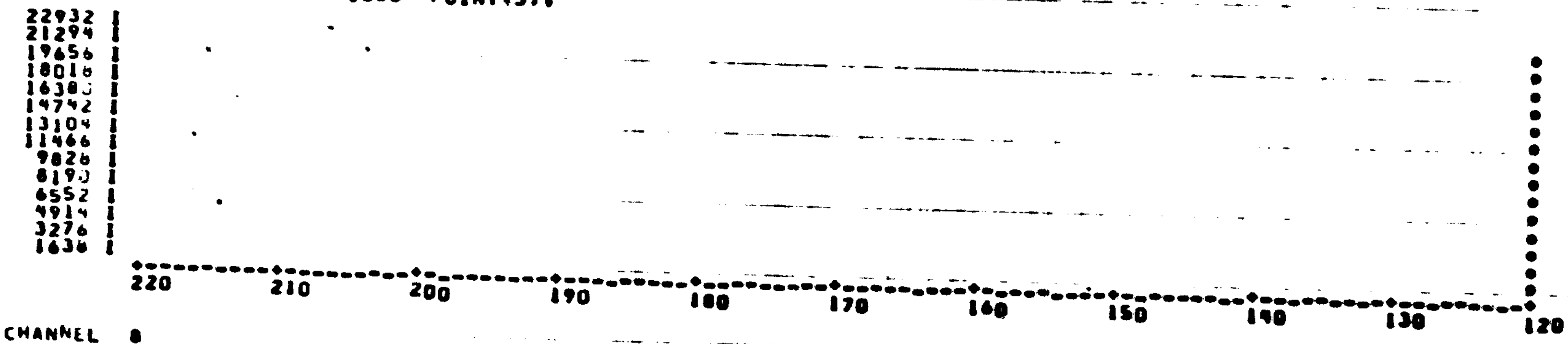
23 FEB 78

HISTOGRAM

TRAINING SUBCLASS SWHFAT

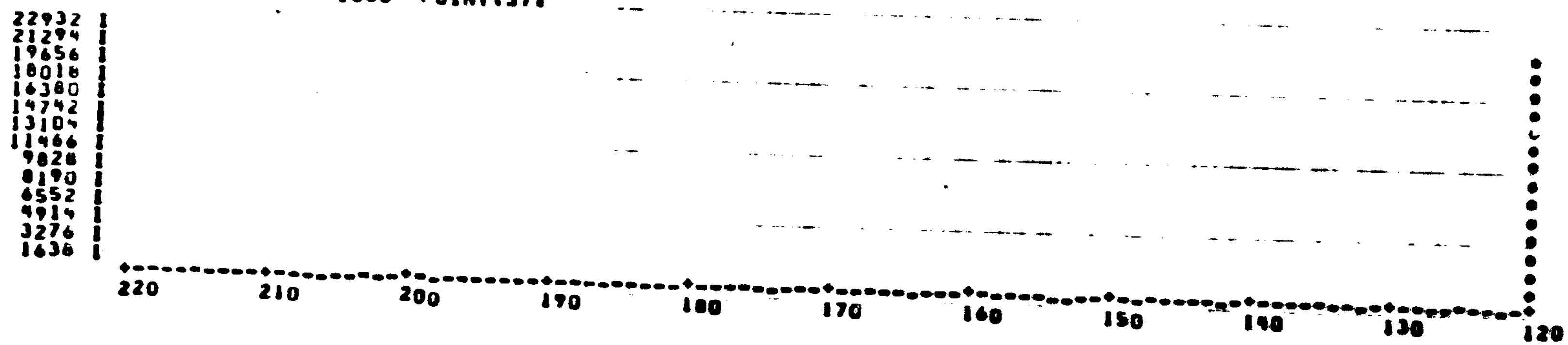
CHANNEL 7

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 8

EACH • REPRESENTS 1638 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

HISTOGRAM

TRAINING SUBCLASS SWHFAT

CHANNEL 9

EACH • REPRESENTS 1638 POINT(S).

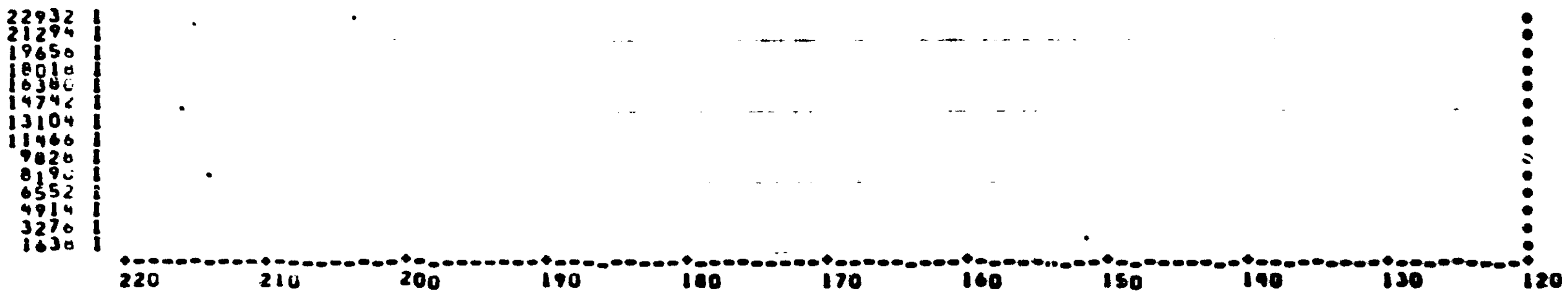
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SOHFAT

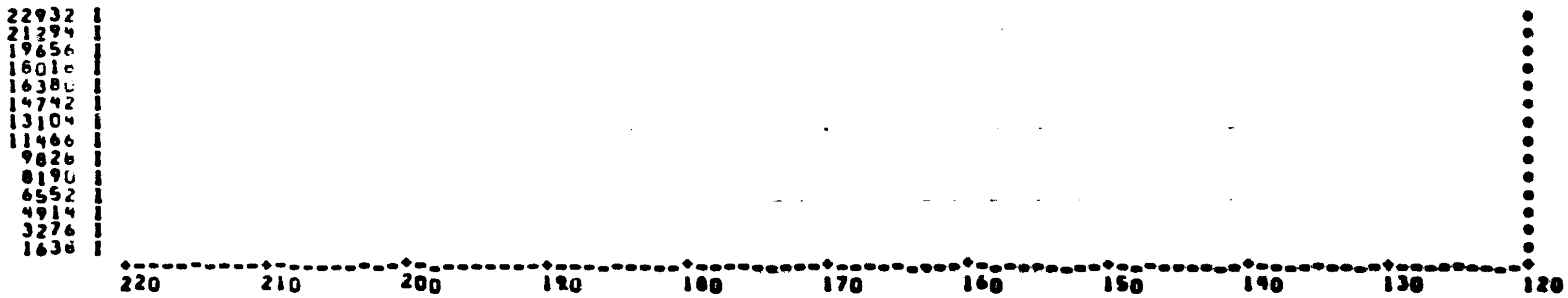
CHANNEL 9

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 10

EACH • REPRESENTS 1638 POINT(S).



192

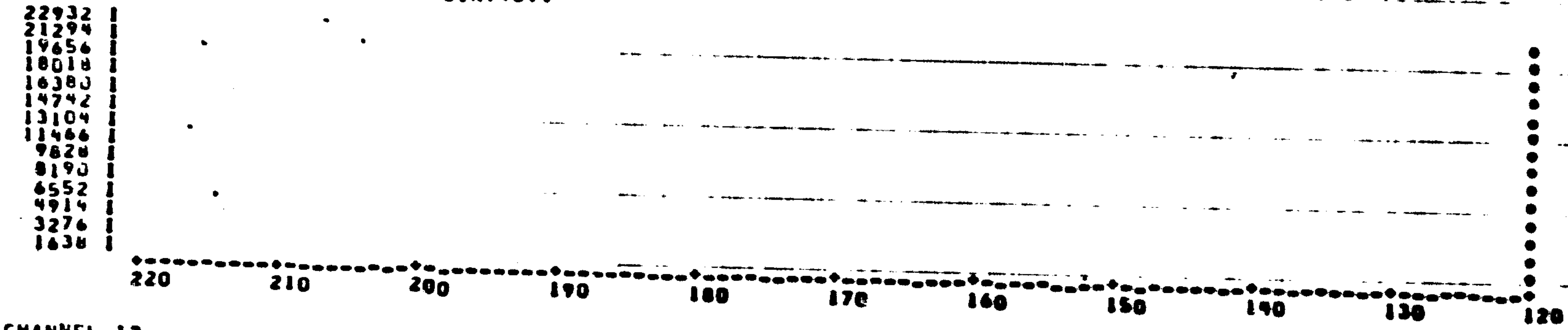
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SWHEAT

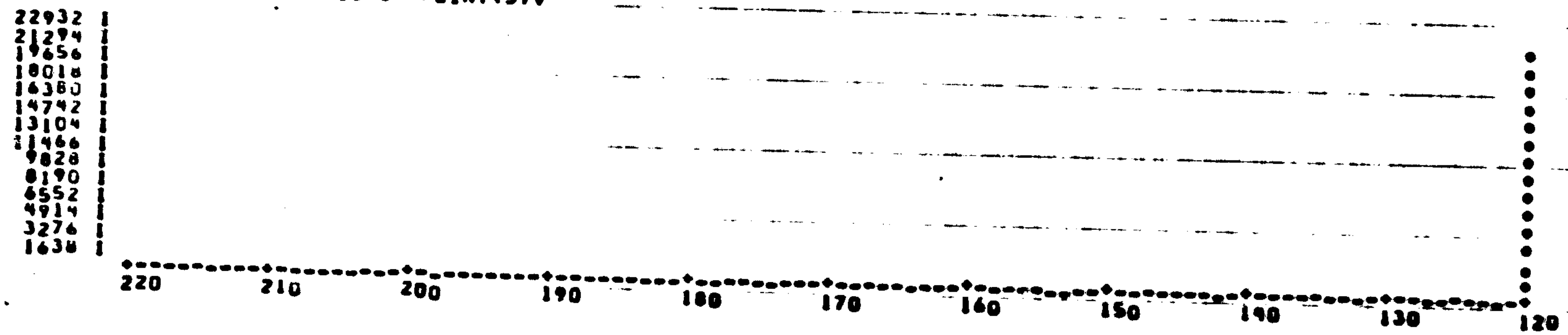
CHANNEL 11

EACH * REPRESENTS 1638 POINT(S).



CHANNEL 12

EACH * REPRESENTS 1638 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SWHEAT

CHANNEL 13

EACH * REPRESENTS 1638 POINT(S).

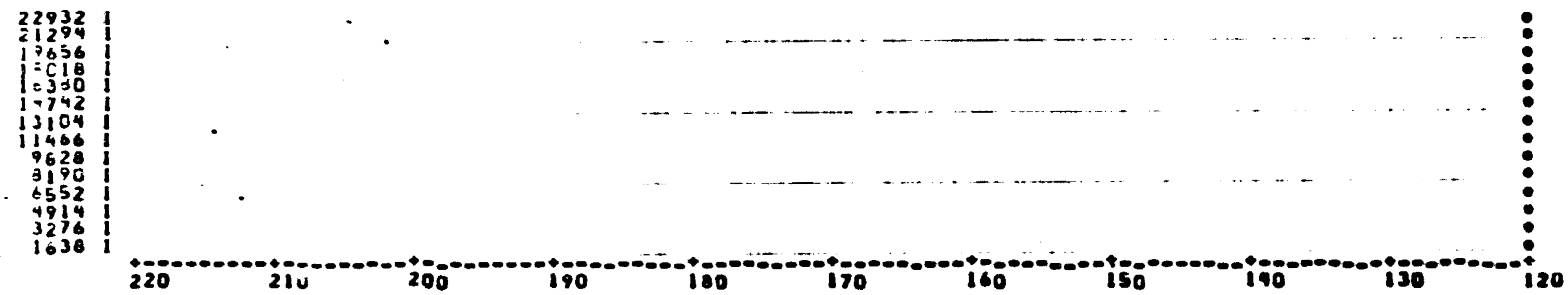
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON, TEXAS

HISTOGRAM

TRAINING SUBCLASS SWHEAT

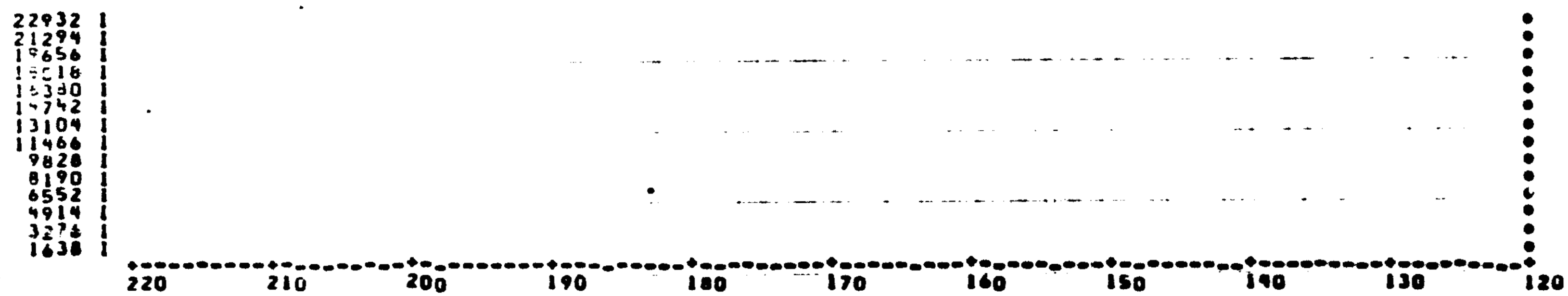
CHANNEL 13

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 14

EACH • REPRESENTS 1638 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SWHFAT

CHANNEL 15

EACH • REPRESENTS 1638 POINT(S).

```
22932 I                                                                                                   •
21294 I                                                                                                   •
19656 I                                                                                                   •
18018 I                                                                                                   •
16380 I                                                                                                   •
14742 I                                                                                                   •
13104 I                                                                                                   •
11466 I                                                                                                   •
 9828 I                                                                                                   •
 8190 I                                                                                                   •
 6552 I                                                                                                   •
 4914 I                                                                                                   •
 3276 I                                                                                                   •
 1638 I                                                                                                   •
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
     220       210       200       190       180       170       160       150       140       130       120
```

CHANNEL 16

EACH • REPRESENTS 1638 POINT(S).

```
22932 I                                                                                                   •
21294 I                                                                                                   •
19656 I                                                                                                   •
18018 I                                                                                                   •
16380 I                                                                                                   •
14742 I                                                                                                   •
13104 I                                                                                                   •
11466 I                                                                                                   •
 9828 I                                                                                                   •
 8190 I                                                                                                   •
 6552 I                                                                                                   •
 4914 I                                                                                                   •
 3276 I                                                                                                   •
 1638 I                                                                                                   •
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
     220       210       200       190       180       170       160       150       140       130       120
```


195

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON, TEXAS

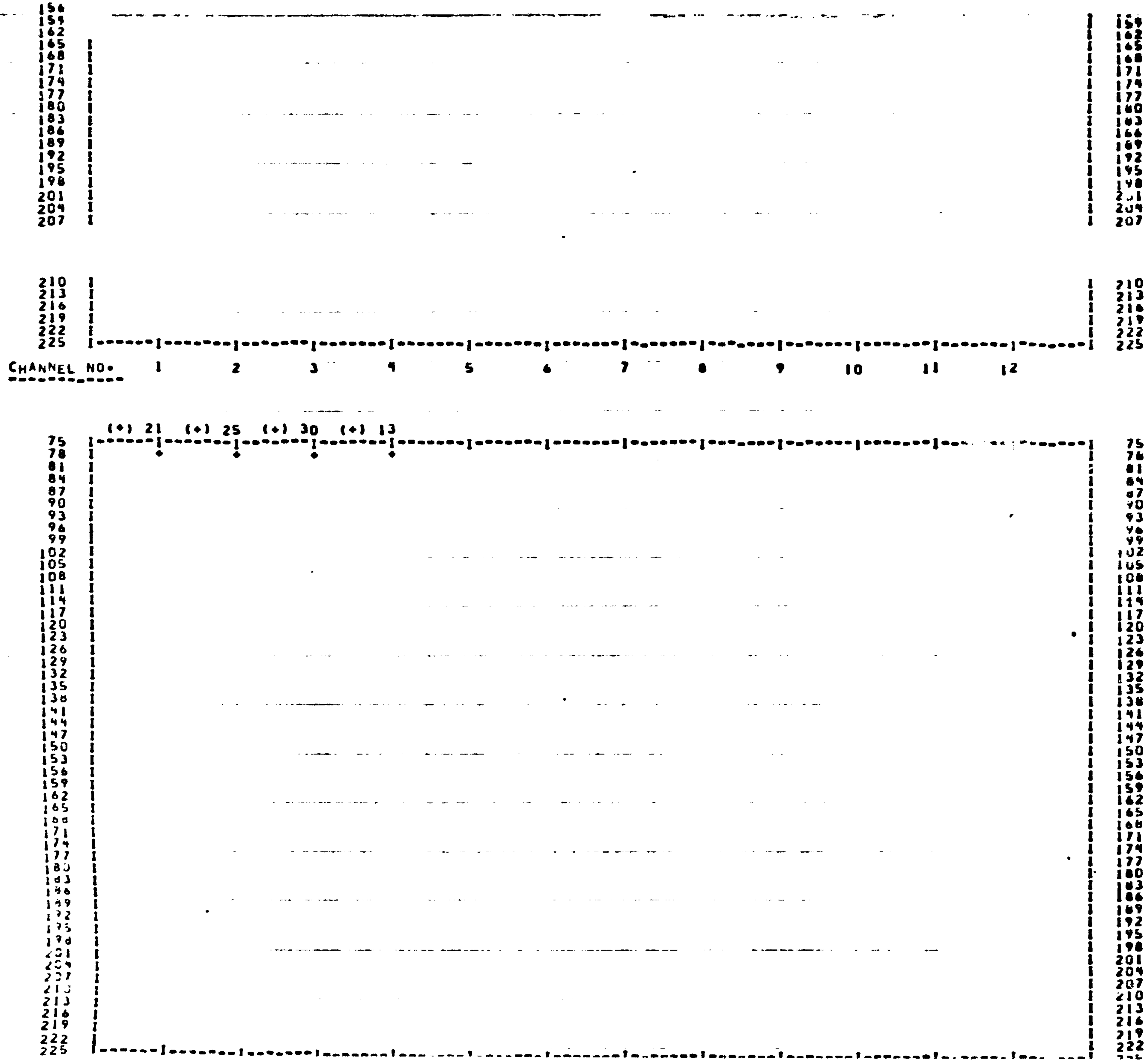
COMPOSITE SPECTRAL PLOT (MEAN, PLUS AND MINUS ONE STD. DEV.) FOR:

TRAINING SUBCLASS(ES) 1

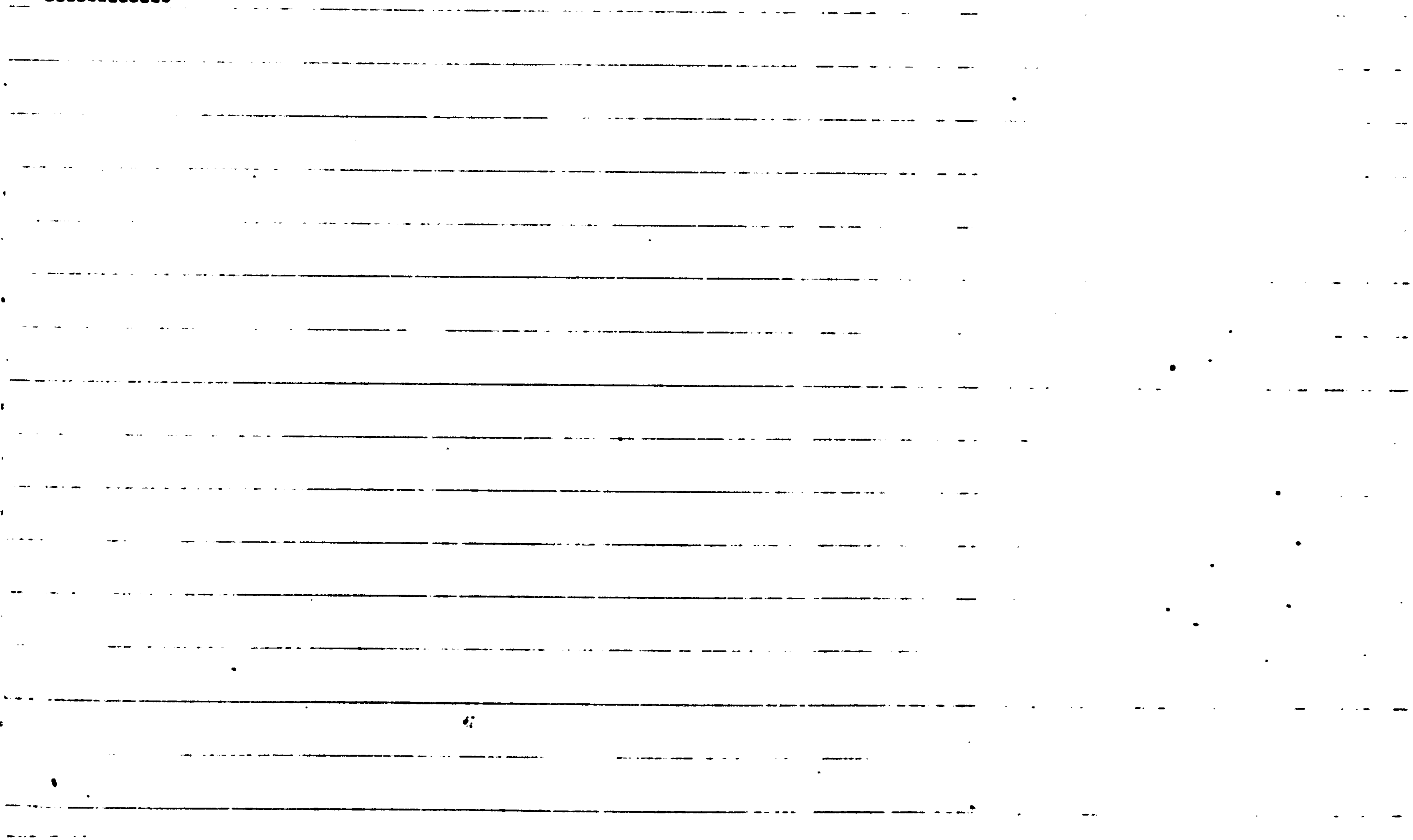
PLOT LEGEND:

+ = SUBCLASS S*HEAT

```
       (+) 28  (+) 28  (+) 36  (+) 14  (+) 22  (+) 18  (+) 42  (+) 18  (+) 18  (+) 14  (+) 35  (+) 15
 75  I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I   75
 78  I       +       +       +       +       +       +       +       +       +       +       +       +       I   78
 81  I                                                                                                       I   81
 84  I                                                                                                       I   84
 87  I                                                                                                       I   87
 90  I                                                                                                       I   90
 93  I                                                                                                       I   93
 96  I                                                                                                       I   96
 99  I                                                                                                       I   99
102  I                                                                                                       I  102
105  I                                                                                                       I  105
108  I                                                                                                       I  108
111  I                                                                                                       I  111
114  I                                                                                                       I  114
117  I                                                                                                       I  117
120  I                                                                                                       I  120
123  I                                                                                                       I  123
126  I                                                                                                       I  126
129  I                                                                                                       I  129
132  I                                                                                                       I  132
135  I                                                                                                       I  135
138  I                                                                                                       I  138
141  I                                                                                                       I  141
144  I                                                                                                       I  144
147  I                                                                                                       I  147
150  I                                                                                                       I  150
153  I                                                                                                       I  153
156  I                                                                                                       I  156
159  I                                                                                                       I  159
162  I                                                                                                       I  162
165  I                                                                                                       I  165
168  I                                                                                                       I  168
171  I                                                                                                       I  171
174  I                                                                                                       I  174
177  I                                                                                                       I  177
180  I                                                                                                       I  180
183  I                                                                                                       I  183
186  I                                                                                                       I  186
189  I                                                                                                       I  189
192  I                                                                                                       I  192
195  I                                                                                                       I  195
198  I                                                                                                       I  198
201  I                                                                                                       I  201
204  I                                                                                                       I  204
207  I                                                                                                       I  207
```


CHANNEL NO.
1 2 3 4 5 6 7 8 9 10 11 12
(+) 21 (+) 25 (+) 30 (+) 13
75 78 81 84 87 90 93 96 99 102 105 108 111 114 117 120 123 126 129 132 135 138 141 144 147 150 153 156 159 162 165 168 171 174 177 180 183 186 189 192 195 198 201 204 207 210 213 216 219 222 225

CHANNEL NO. 13 14 15 16



••• $STAT - COMPLETED •••

TIME FOR STAT 6.106

TEST RUN 2

```
SSTAT
    DATAFI    FILE=6
    OPTION    COVAR
    CHANNE    DATA=1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16  FILTER=5,8
    STATFI    FILE=2
    OPTION    MAXSUB=1
    OPTION    HIST
    HISTO     1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16
    OPTION    WATER
    *END*
```

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200

YOU HAVE SELECTED THE FOLLOWING SSTAT PROCESSOR OPTIONS:

```
PRINT MEAN AND COVARIANCE FOR EACH FIELD
PRINT A HISTOGRAM FOR EACH FIELD
PRINT A HISTOGRAM  FOR EACH SUBCLASS
PRINT MEAN AND COVARIANCE FOR EACH SUBCLASS
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

YOU HAVE SELECTED THE FOLLOWING SSTAT PROCESSOR OPTIONS:

PRINT MEAN AND COVARIANCE FOR EACH FIELD
PRINT A HISTOGRAM FOR EACH FIELD
PRINT A HISTOGRAM FOR EACH SUBCLASS
PRINT MEAN AND COVARIANCE FOR EACH SUBCLASS

SUPERVISOR INFORMATION:

UNUSED CORE 28 LOCATIONS
MAXIMUM NO. OF FIELDS..204
MAXIMUM NO. OF SUBCLASSES... 1
CHANNELS SELECTED ARE 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
16,
HISTOGRAM CHANNELS ARE 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
16,

INPUT IMAGE DATA TAPE INFORMATION

FORMAT	UNIVERSAL
NO. OF CHANNELS	16
NO. OF PIXELS/LINE	196
FIRST SCAN LINE NO.	1
FIRST PIXEL REFERENCE PT	1

RUN TO MAKE SURE THE CHANGES DIDN'T EFF HE ORIGINAL 23 FEB 78
HOUS ,TEXAS

TRAINING FIELDS

FIELD NO.	NAME	CLASS	SUBCLASS	SAMPLE INC	LINE INC	VERTICES(SAMPLE,LINE)
1	BI-01	WHEAT	SBAR	1	1	(1, 1) (196, 1) (196, 117) (1, 117)

22466 POINTS WILL BE USED IN THE FIELD MEAN,COVARIANCE CALCULATIONS

207

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

THE MEAN,STANDARD DEVIATION,COVARIANCE,AND CORRELATION (16 CHANNELS) FOR:

TRAINING FIELD BI-01

MEAN:	33.10	37.12	47.04	19.51	27.57	26.53	56.20	25.31	23.02	22.78	44.10	20.54

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

THE MEAN,STANDARD DEVIATION,COVARIANCE,AND CORRELATION (16 CHANNELS) FOR:

TRAINING FIELD 81-01

MEAN:	33.10	37.12	47.04	19.51	27.57	26.53	56.20	25.31	23.02	22.78	44.10	20.54
ST DEV:	4.97	7.06	8.57	4.39	2.98	7.72	10.86	6.50	3.29	7.52	5.99	4.24

MEAN:	26.60	34.93	40.69	17.54
ST DEV:	3.31	8.32	8.89	3.84

COVARIANCE MATRIX

24.70											
34.82	49.88										
20.64	8.28	73.52									
6.22	-1.71	35.74	19.26								
6.36	1.02	-3.94	-2.42	8.87							
14.97	15.14	12.96	4.13	24.70	59.59						
2.43	-11.40	-16.21	-4.68	-37.76	-61.61	117.99					
-.30	-7.25	-8.44	-2.07	-23.14	-39.92	68.67	42.31				
3.67	-3.66	1.51	.79	2.95	17.97	-45.82	-25.96	10.84			
10.76	6.86	19.15	8.19	15.42	43.19	-66.26	-39.80	25.44	56.52		
-1.80	-17.05	-11.44	-2.33	-26.41	-36.27	38.14	25.34	-26.48	-37.[illegible]	35.86	
-1.98	-9.30	-7.73	-1.85	-16.74	-26.17	32.25	20.85	-18.23	-28.37	23.96	18.13
5.94	3.37	-13.39	-7.00	-11.60	-12.95	5.12	4.39	-13.78	-15.42	-7.22	-1.31

203

2.91	15.13	-17.26	-9.76	-18.31	-26.83	.97	24.69	-25.30	-33.77	7.09	9.46
2.83	-3.36	-27.23	-12.30	-29.98	-45.80	52.63	33.00	-35.62	-51.07	17.48	17.27
-1.57	-6.38	-13.34	-5.44	-14.80	-22.84	23.47	15.07	-16.67	-24.55	9.43	8.80

10.96			
26.74	69.18		
20.96	61.87	78.95	
5.96	21.69	31.91	14.72

CORRELATION MATRIX

1.00					
.99	1.00				
.48	.14	1.00			
.28	-.06	.95	1.00		
.43	.05	-.15	-.18	1.00	
.39	.28	.20	.12	1.07	1.00

CORRELATION MATRIX

1.00											
.99	1.00										
.48	.14	1.00									
.28	-.06	.95	1.00								
.43	.05	-.15	-.18	1.00							
.39	.28	.20	.12	1.07	1.00						
.05	-.15	-.17	-.10	-1.17	-.73	1.00					
-.01	-.16	-.15	-.07	-1.19	-.79	.97	1.00				
.22	-.16	.05	.05	.30	.71	-1.28	-1.21	1.00			
.29	.13	.30	.25	.69	.74	-.81	-.81	1.03	1.00		
-.06	-.40	-.22	-.09	-1.48	-.78	.59	.65	-1.34	-.82	1.00	
-.09	-.31	-.21	-.10	-1.32	-.80	.70	.75	-1.30	-.89	.94	1.00
.36	.14	-.47	-.48	-1.18	-.51	.14	.20	-1.26	-.62	-.36	-.09
.31	.26	-.24	-.27	-.74	-.42	.45	.46	-.92	-.54	.14	.27
.06	-.05	-.36	-.32	-1.13	-.67	.55	.57	-1.22	-.76	.33	.46
-.08	-.24	-.41	-.32	-1.30	-.77	.56	.60	-1.32	-.85	.91	.54

1.00			
.97	1.00		
.71	.84	1.00	
.47	.68	.94	1.00

RUN TO MAKE SURE THE CHANGES DIDN'T EFI THE ORIGINAL
HOU. ..TEXAS

23 FEB 78

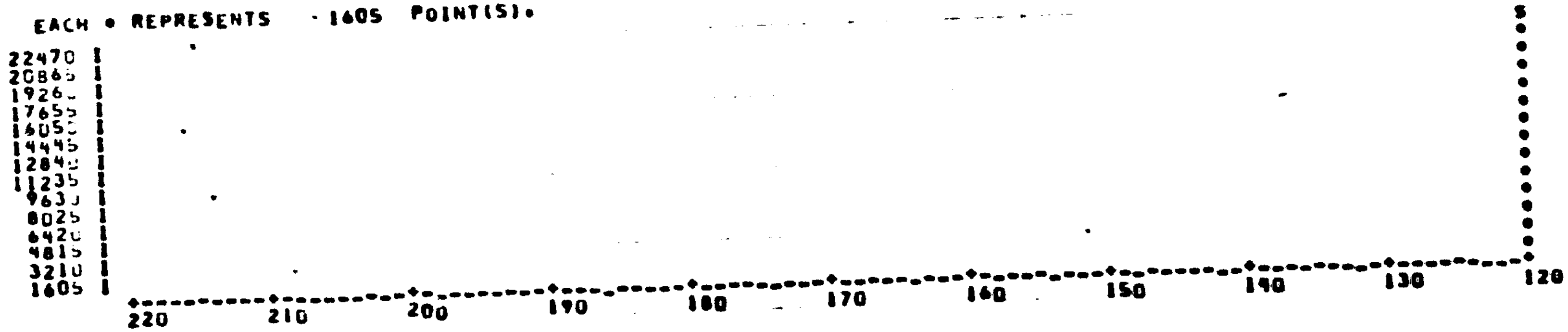
HISTOGRAM

TRAINING FIELD   B1-ñ1

(NO. SAMPLES= 22466 , SUBCLASS= SBAR)

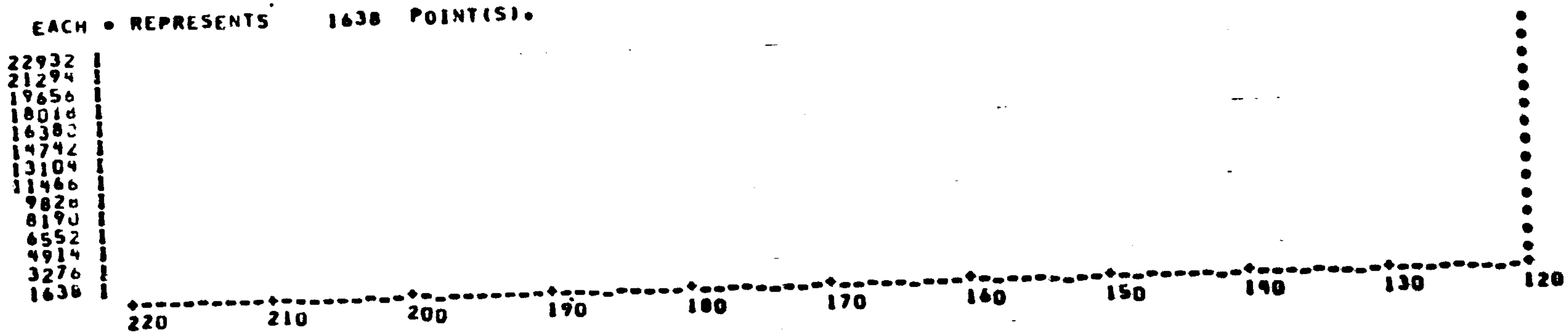
CHANNEL 1

EACH • REPRESENTS 1605 POINT(S).



CHANNEL 2

EACH • REPRESENTS 1638 POINT(S).



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OF POOR QUALITY

206

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

HISTOGRAM

TRAINING FIELD   B1-ñ1

(NO. SAMPLES= 22466 , SUBCLASS= SBAR)

CHANNEL 3

EACH • REPRESENTS

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

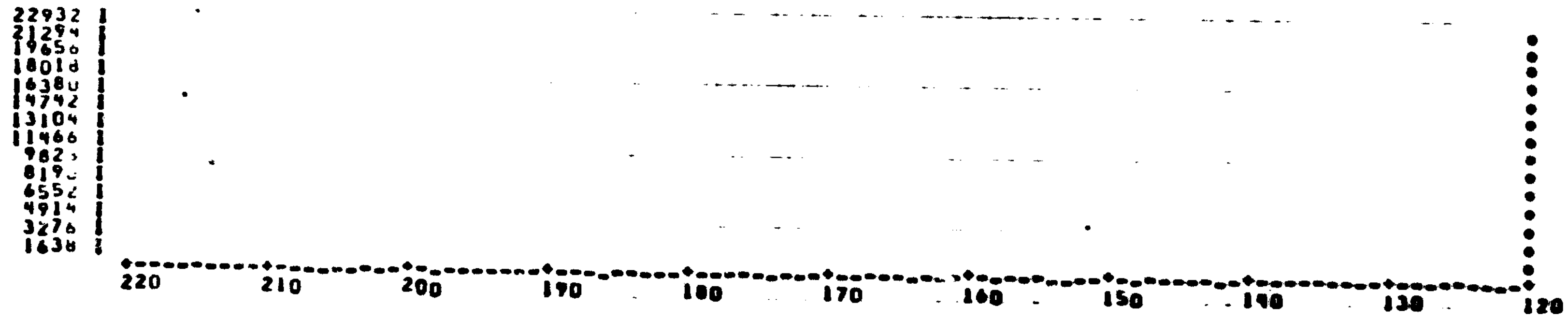
HISTOGRAM

TRAINING FIELD   81-81

(NO. SAMPLES=   22466 , SUBCLASS= SBAR)

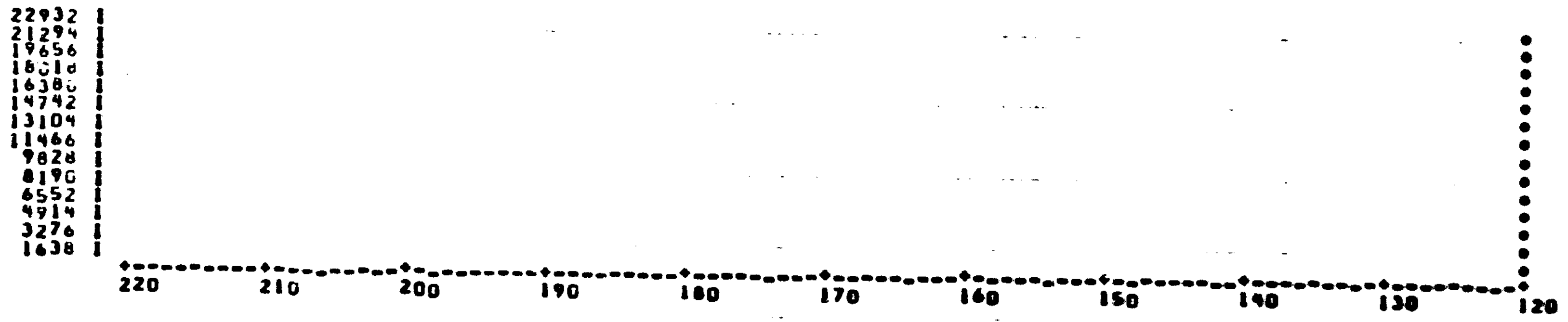
CHANNEL 3

EACH • REPRESENTS   1638 POINT(S).



CHANNEL 4

EACH • REPRESENTS   1638 POINT(S).



207

RUN TO MAKE SURE THE CHANGES DIDN'T EFFEC[illegible] [illegible] ORIGINAL 23 FEB 78
HOUST[illegible] [illegible]EXAS

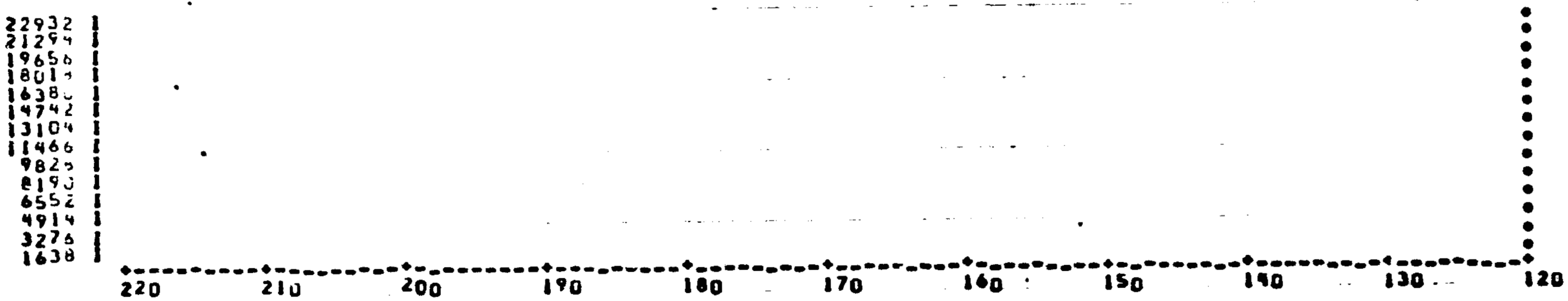
HISTOGRAM

TRAINING FIELD 81-01

(NO. SAMPLES= 22466 , SUBCLASS= SBAR)

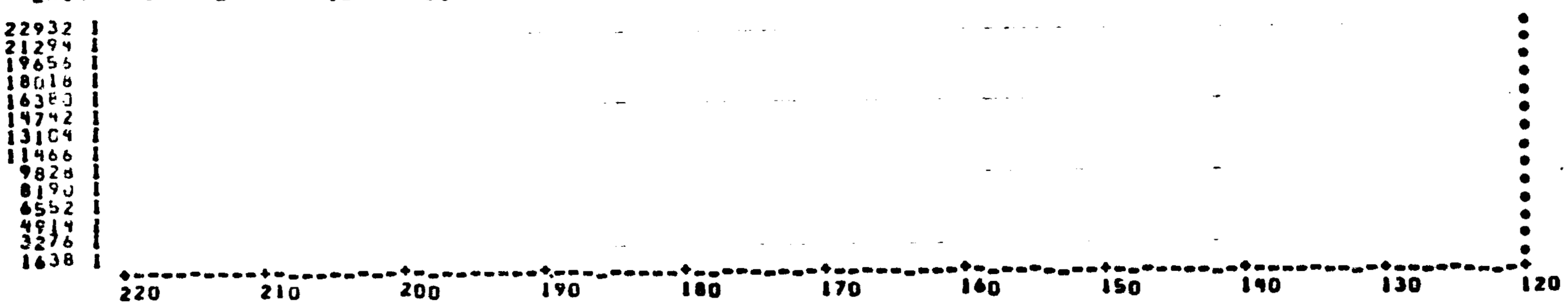
CHANNEL 5

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 6

EACH • REPRESENTS 1638 POINT(S).



208

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING FIELD 81-01

(NO. SAMPLES= 22466 , SUBCLASS= SBAR)

CHANNEL 7

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

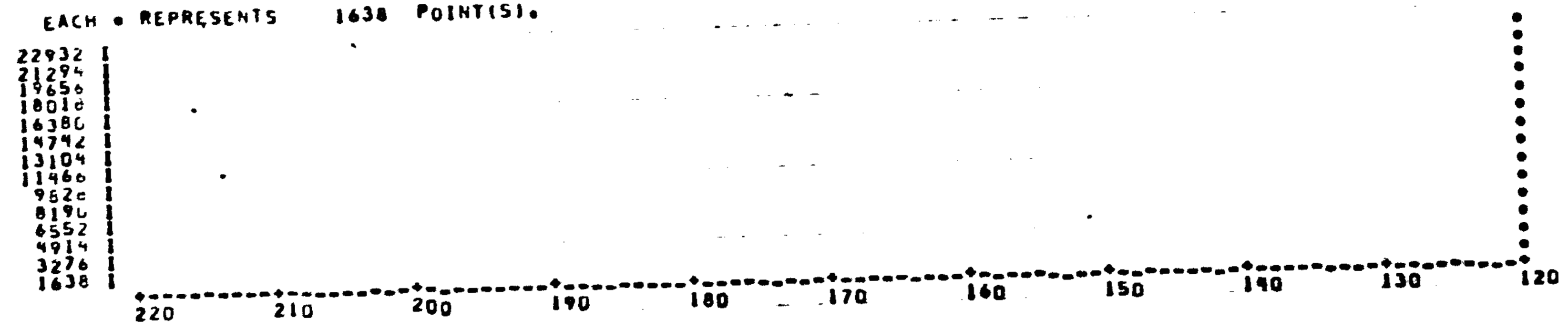
HISTOGRAM

TRAINING FIELD B1-01

(NO. SAMPLES= 22466 , SUBCLASS= SBAR)

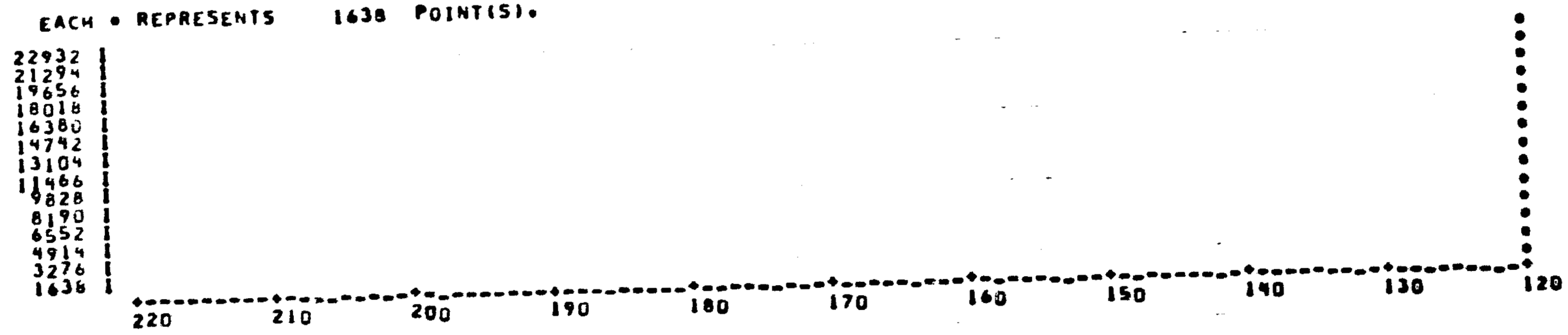
CHANNEL 7

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 8

EACH • REPRESENTS 1638 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFE[illegible] HE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

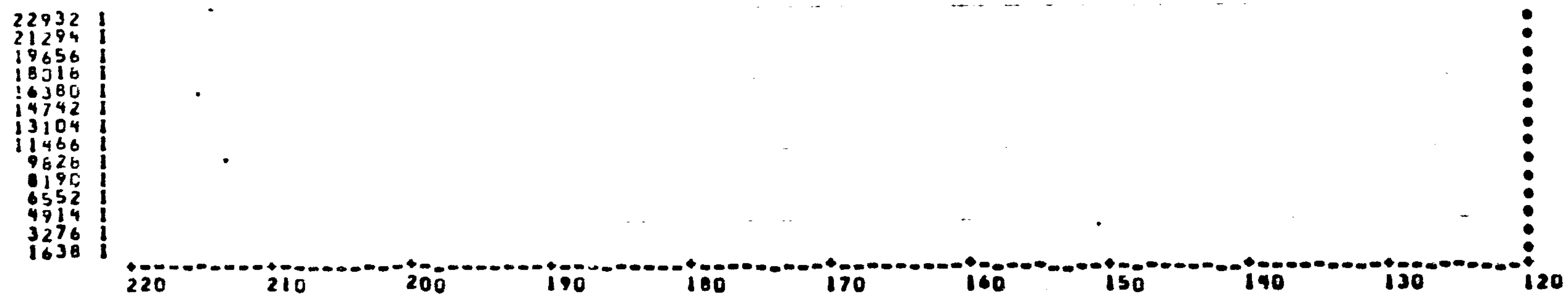
HISTOGRAM

TRAINING FIELD BI-ñ1

(NO. SAMPLES= 22466 , SUBCLASS= SBAR)

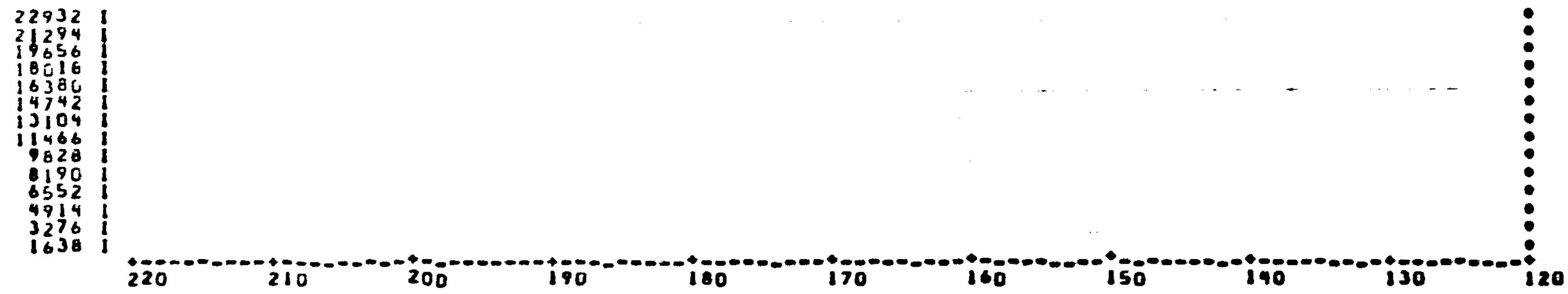
CHANNEL 9

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 10

EACH • REPRESENTS 1638 POINT(S).



210

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

HISTOGRAM

TRAINING FIELD BI-ñ1

(NO. SAMPLES= 22466 , SUBCLASS= SBAR)

CHANNEL 11

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING FIELD 81-01

(NO. SAMPLES= 22466 , SUBCLASS= SBAR)

CHANNEL 11

```
   EACH * REPRESENTS    1638  POINT(S).

22932 I                                                                                 *
21294 I                                                                                 *
19656 I                                                                                 *
18018 I                                                                                 *
16380 I                                                                                 *
14742 I                                                                                 *
13104 I                                                                                 *
11466 I                                                                                 *
 9828 I                                                                                 *
 8190 I                                                                                 *
 6552 I                                                                                 *
 4914 I                                                                                 *
 3276 I                                                                                 *
 1638 I                                                                                 *
       +--------+--------+--------+--------+--------+--------+--------+--------+--------+--------+
      220      210      200      190      180      170      160      150      140      130      120
```

CHANNEL 12

```
   EACH * REPRESENTS    1638  POINT(S).

22932 I                                                                                 *
21294 I                                                                                 *
19656 I                                                                                 *
18018 I                                                                                 *
16380 I                                                                                 *
14742 I                                                                                 *
13104 I                                                                                 *
11466 I                                                                                 *
 9828 I                                                                                 *
 8190 I                                                                                 *
 6552 I                                                                                 *
 4914 I                                                                                 *
 3276 I                                                                                 *
 1636 I                                                                                 *
       +--------+--------+--------+--------+--------+--------+--------+--------+--------+--------+
      220      210      200      190      180      170      160      150      140      130      120
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

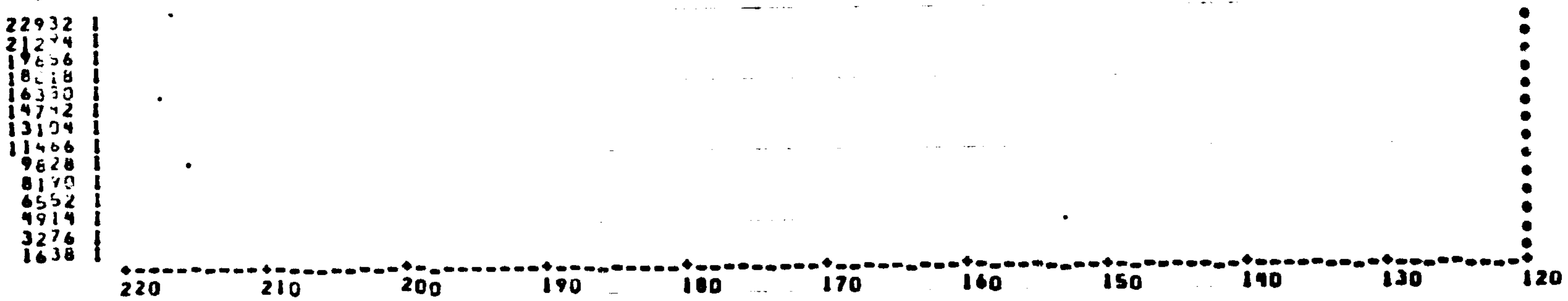
HISTOGRAM

TRAINING FIELD B1-N1

(NO. SAMPLES= 22466 , SUBCLASS= SBAR)

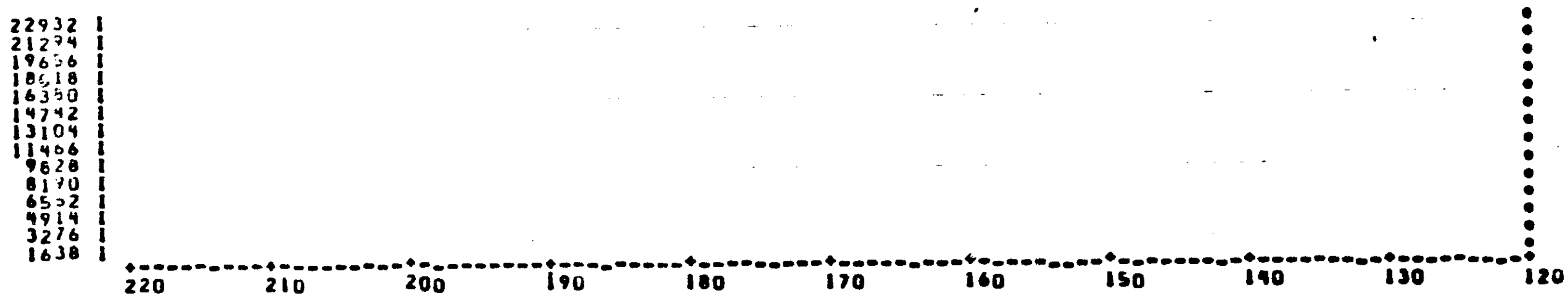
CHANNEL 13

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 14

EACH • REPRESENTS 1638 POINT(S).



212

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

HISTOGRAM

TRAINING FIELD B1-N1

(NO. SAMPLES= 22466 , SUBCLASS= SBAR)

CHANNEL 15

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING FIELD BI-N1

(NO. SAMPLES= 22466 , SUBCLASS= SBAR)

CHANNEL 15

```
  EACH * REPRESENTS    1638  POINT(S).
22932 I                                                                                                 *
21294 I                                                                                                 *
19656 I                                                                                                 *
18018 I                                                                                                 *
16380 I                                                                                                 *
14742 I                                                                                                 *
13104 I                                                                                                 *
11466 I                                                                                                 *
 9828 I                                                                                                 *
 8190 I                                                                                                 *
 6552 I                                                                                                 *
 4914 I                                                                                                 *
 3276 I                                                                                                 *
 1638 I                                                                                                 *
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      220       210       200       190       180       170       160       150       140       130       120
```

CHANNEL 16

```
  EACH * REPRESENTS    1638  POINT(S).
22932 I                                                                                                 *
21294 I                                                                                                 *
19656 I                                                                                                 *
18018 I                                                                                                 *
16380 I                                                                                                 *
14742 I                                                                                                 *
13104 I                                                                                                 *
11466 I                                                                                                 *
 9828 I                                                                                                 *
 8190 I                                                                                                 *
 6552 I                                                                                                 *
 4914 I                                                                                                 *
 3276 I                                                                                                 *
 1638 I                                                                                                 *
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      220       210       200       190       180       170       160       150       140       130       120
```

213

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

THE MEAN,STANDARD DEVIATION,COVARIANCE,AND CORRELATION (16 CHANNELS) FOR:

TRAINING SUBCLASS SBAR

MEAN:	33.10	37.12	47.04	19.51	27.57	26.53	56.20	25.31	23.02	22.78	44.10	20.54
ST DEV:	4.97	7.06	8.57	4.39	2.98	7.72	10.86	6.50	3.29	7.52	5.99	4.24

MEAN:	26.60	34.93	40.69	17.54
ST DEV:	3.31	8.32	8.89	3.84

COVARIANCE MATRIX

24.70											
34.82	49.88										
20.64	8.28	73.52									
6.22	-1.71	35.74	19.26								
6.36	1.02	-3.94	-2.42	8.87							
14.97	15.14	12.96	4.13	24.70	59.59						
2.43	-11.40	-16.21	-4.68	-37.76	-61.61	117.99					
-.30	-7.25	-8.44	-2.07	-23.14	-39.92	68.67	42.41				
3.67	-3.66	1.51	.79	2.95	17.97	-45.82	-25.96	10.84			
10.76	6.86	19.15	8.19	15.42	43.19	-66.26	-39.80	25.44	56.52		
-1.80	-17.05	-11.44	-2.33	-26.41	-36.27	38.14	25.34	-26.48	-37.14	35.96	
-1.98	-9.30	-7.73	-1.85	-16.74	-26.17	32.25	20.85	-18.23	-28.37	23.96	18.13
5.94	3.37	-13.39	-7.00	-11.60	-12.95	5.12	4.39	-13.78	-15.42	-7.22	-1.31

.91	15.13	-17.26	-9.76	-18.31	-26.83	40.97	24.69	-25.30	-33.77	7.09	9.46
2.83	-3.36	-27.23	-12.30	-29.98	-45.80	52.63	33.00	-35.62	-51.07	17.48	17.27
-1.57	-6.38	-13.34	-5.44	-14.80	-22.84	23.47	15.07	-16.67	-24.55	9.43	8.80

10.96			
26.74	69.18		
20.96	61.87	78.95	
5.96	21.69	31.91	14.72

215

CORRELATION MATRIX

1.00					
.99	1.00				
.48	.14	1.00			
.28	-.06	.95	1.00		
.43	.05	-.15	-.18	1.00	
.39	.28	.20	.12	[illegible]	[illegible]

CORRELATION MATRIX

1.00											
.99	1.00										
.48	.14	1.00									
.28	-.06	.95	1.00								
.43	.05	-.15	-.18	1.00							
.39	.28	.20	.12	1.07	1.00						
.05	-.15	-.17	-.10	-1.17	-.73	1.00					
-.01	-.16	-.15	-.07	-1.19	-.79	.97	1.00				
.22	-.16	.05	.05	.30	.71	-1.28	-1.21	1.00			
.29	.13	.30	.25	.69	.74	-.81	-.81	1.03	1.00		
-.06	-.40	-.22	-.09	-1.48	-.78	.59	.65	-1.34	-.82	1.00	
-.09	-.31	-.21	-.10	-1.32	-.80	.70	.75	-1.30	-.89	.94	1.00
.36	.14	-.47	-.48	-1.18	-.51	.14	.20	-1.24	-.62	-.36	-.09
.31	.26	-.24	-.27	-.74	-.42	.45	.46	-.92	-.59	.19	.27
.06	-.05	-.36	-.32	-1.13	-.67	.55	.57	-1.22	-.76	.33	.46
-.08	-.24	-.41	-.32	-1.30	-.77	.56	.60	-1.32	-.85	.41	.54

1.00			
.97	1.00		
.71	.84	1.00	
.47	.68	.94	1.00

ORIGINAL PAGE IS
OF POOR QUALITY

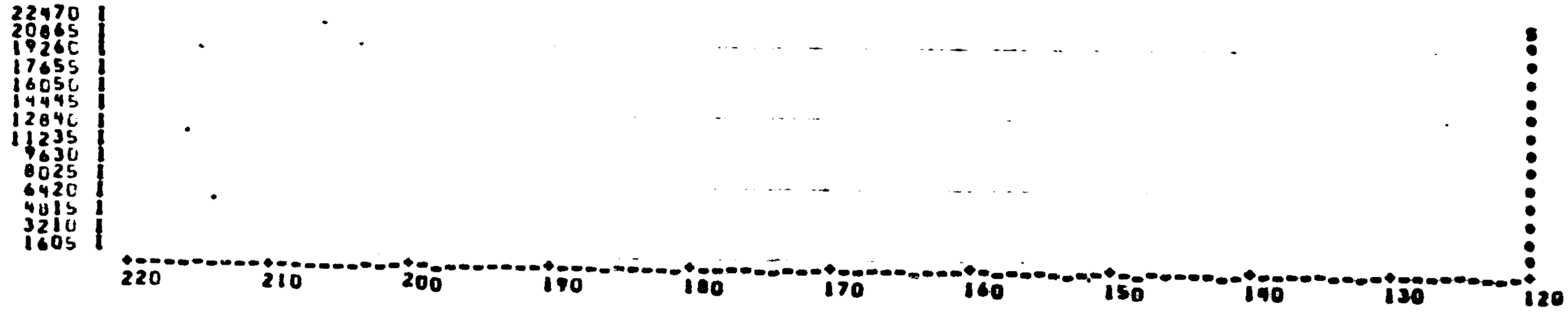
RUN TO MAKE SURE THE CHANGES DIDN'T EFFE_ HE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SBAR

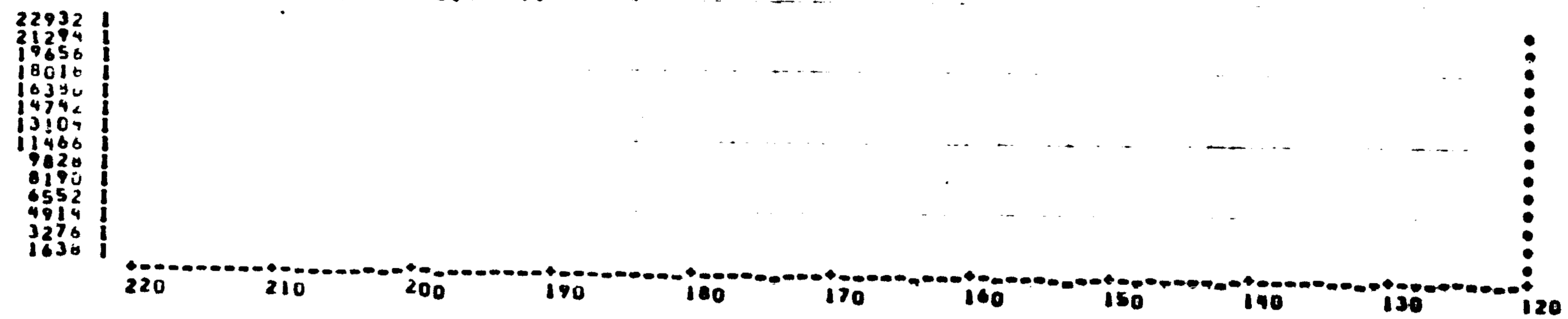
CHANNEL 1

EACH • REPRESENTS 1605 POINT(S).



CHANNEL 2

EACH • REPRESENTS 1638 POINT(S).



217

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SBAR

CHANNEL 3

EACH • REPRESENTS 1638 POINT(S).

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON, TEXAS

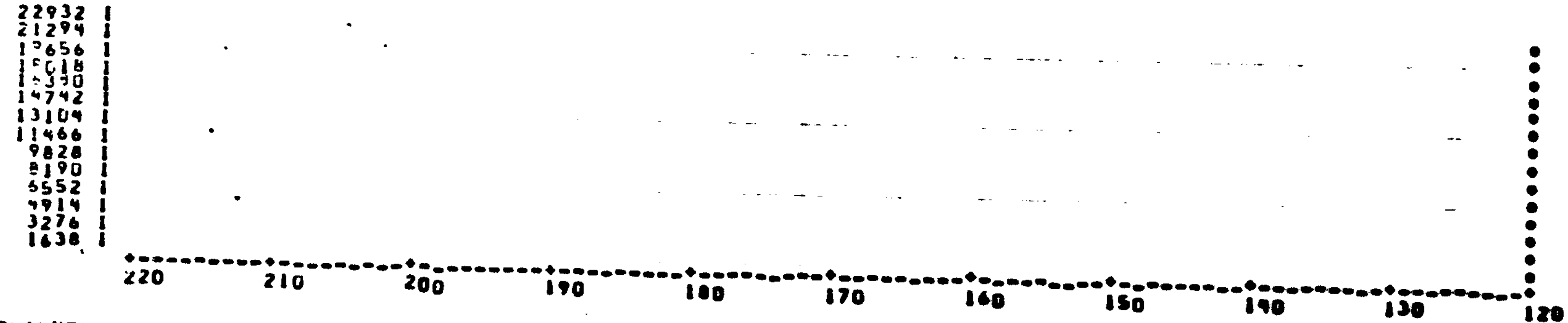
23 FEB 78

HISTOGRAM

TRAINING SUBCLASS SBAR

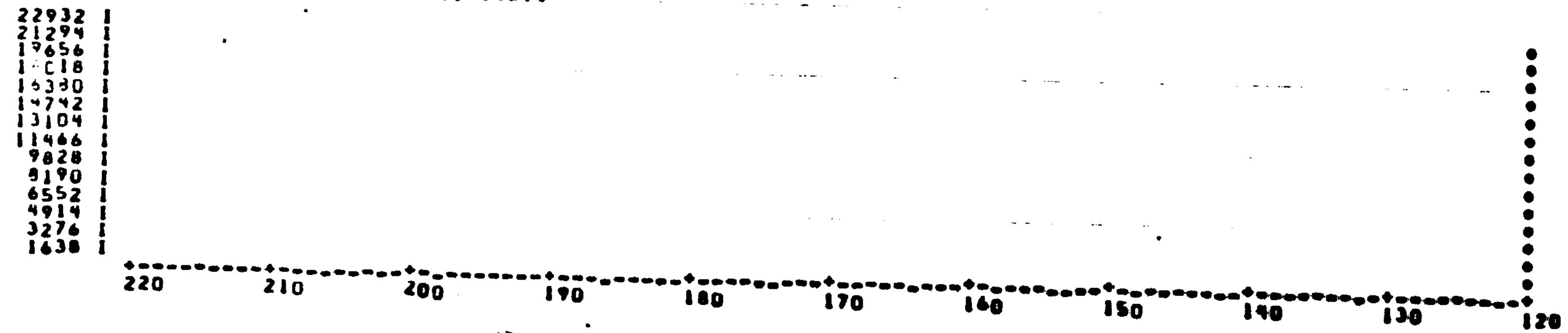
CHANNEL 3

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 4

EACH • REPRESENTS 1638 POINT(S).



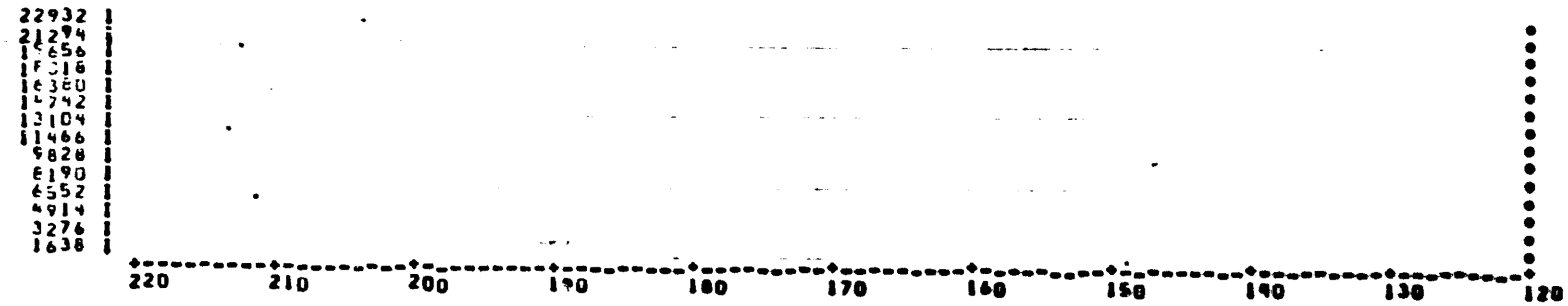
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL — 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SBAR

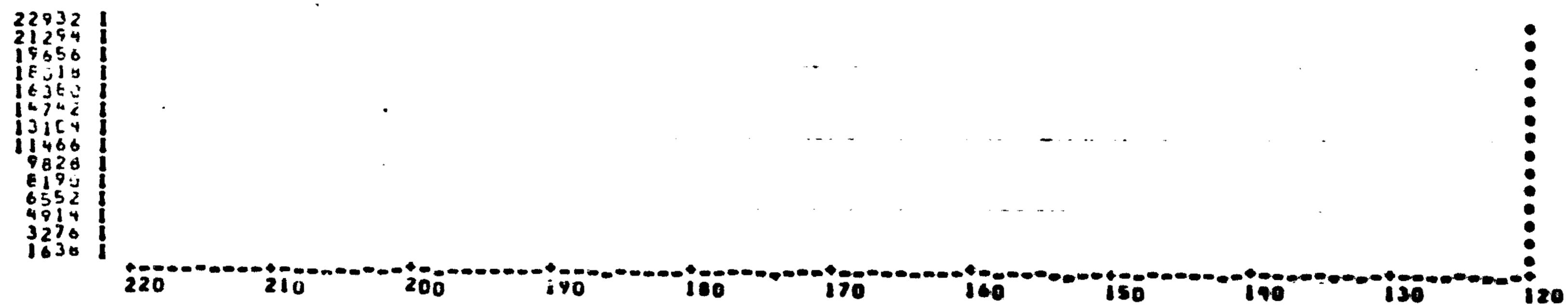
CHANNEL 5

EACH * REPRESENTS 1638 POINT(S).



CHANNEL 6

EACH * REPRESENTS 1638 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL — 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SBAR

CHANNEL 7

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL — 23 FEB 78

HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SBAR

CHANNEL 7

EACH * REPRESENTS 1638 POINT(S).

```
22932 I                                                                                  *
21294 I                                                                                  *
19656 I                                                                                  *
18018 I                                                                                  *
16380 I                                                                                  *
14742 I                                                                                  *
13104 I                                                                                  *
11466 I                                                                                  *
 9828 I                                                                                  *
 8190 I                                                                                  *
 6552 I                                                                                  *
 4914 I                                                                                  *
 3276 I                                                                                  *
 1638 I                                                                                  *
       +-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+
      220     210     200     190     180     170     160     150     140     130     120
```

CHANNEL 8

EACH * REPRESENTS 1638 POINT(S).

```
22932 I                                                                                  *
21294 I                                                                                  *
19656 I                                                                                  *
18018 I                                                                                  *
16380 I                                                                                  *
14742 I                                                                                  *
13104 I                                                                                  *
11466 I                                                                                  *
 9828 I                                                                                  *
 8190 I                                                                                  *
 6552 I                                                                                  *
 4914 I                                                                                  *
 3276 I                                                                                  *
 1638 I                                                                                  *
       +-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+
      220     210     200     190     180     170     160     150     140     130     120
```

220

RUN TO MAKE SURE THE CHANGES DIDN'T EFFEC. THE ORIGINAL   23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS   SBAR

CHANNEL 9

```
  EACH * REPRESENTS    1638  POINT(S).
22932 I                                                                                          *
21294 I                                                                                          *
19656 I                                                                                          *
18018 I                                                                                          *
16380 I                                                                                          *
14742 I                                                                                          *
13104 I                                                                                          *
11466 I                                                                                          *
 9828 I                                                                                          *
 8190 I                                                                                          *
 6552 I                                                                                          *
 4914 I                                                                                          *
 3276 I                                                                                          *
 1638 I                                                                                          *
       +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      220       210       200       190       180       170       160       150       140       130       120
```

CHANNEL 10

```
  EACH * REPRESENTS    1638  POINT(S).
22932 I                                                                                          *
21294 I                                                                                          *
19656 I                                                                                          *
18018 I                                                                                          *
16380 I                                                                                          *
14742 I                                                                                          *
13104 I                                                                                          *
11466 I                                                                                          *
 9828 I                                                                                          *
 8190 I                                                                                          *
 6552 I                                                                                          *
 4914 I                                                                                          *
 3276 I                                                                                          *
 1638 I                                                                                          *
       +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      220       210       200       190       180       170       160       150       140       130       120
```

221

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL   23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS   SBAR

CHANNEL 11

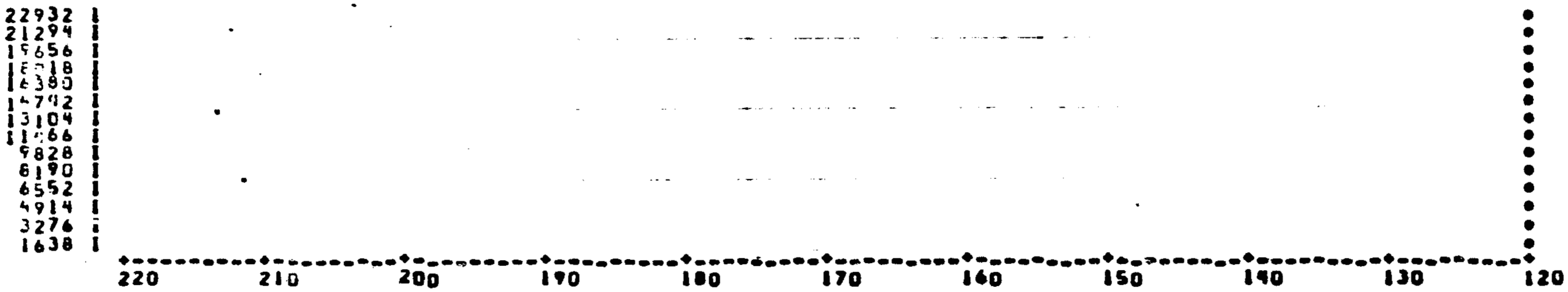
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SBAR

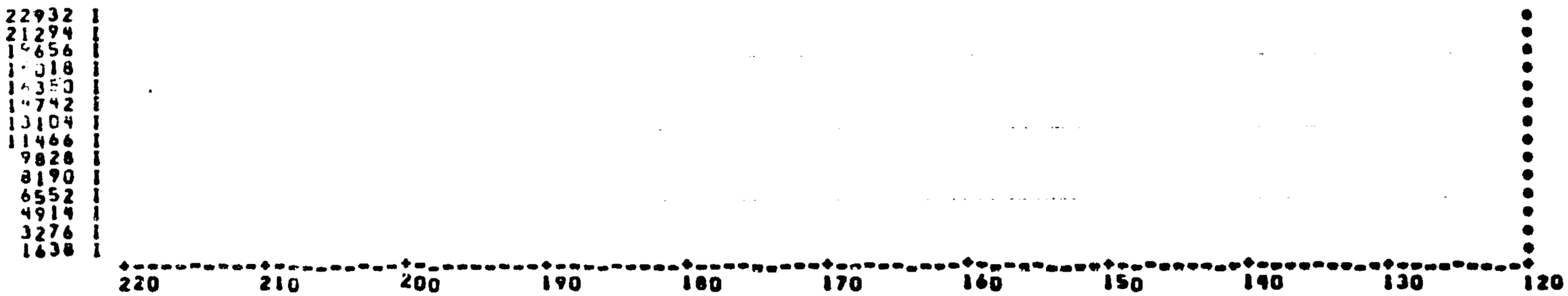
CHANNEL 11

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 12

EACH • REPRESENTS . 1638 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFE THE ORIGINAL
HOUSTON, TEXAS

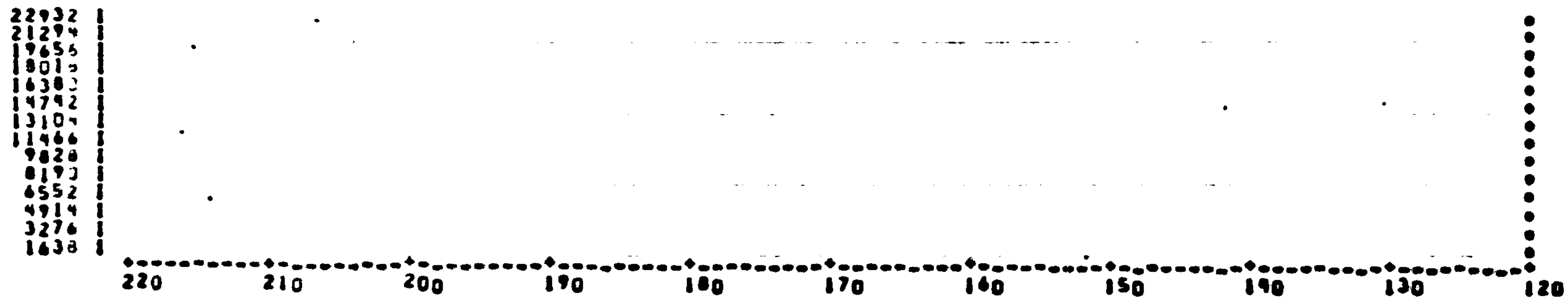
23 FEB 78

HISTOGRAM

TRAINING SUBCLASS SBAR

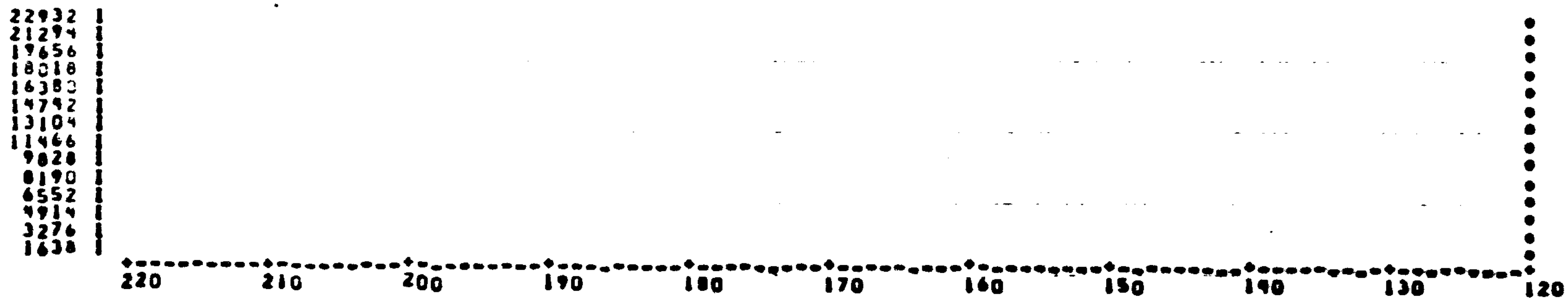
CHANNEL 13

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 14

EACH • REPRESENTS 1638 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON, TEXAS

23 FEB 78

HISTOGRAM

TRAINING SUBCLASS SBAR

CHANNEL 15

EACH • REPRESENTS 1638 POINT(S).

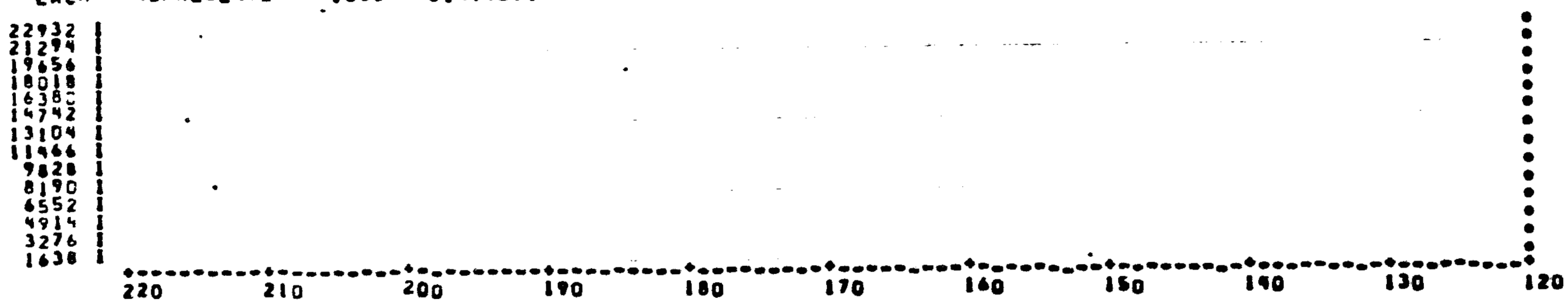
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SBAR

CHANNEL 15

EACH • REPRESENTS 1638 POINT(S).



CHANNEL 16

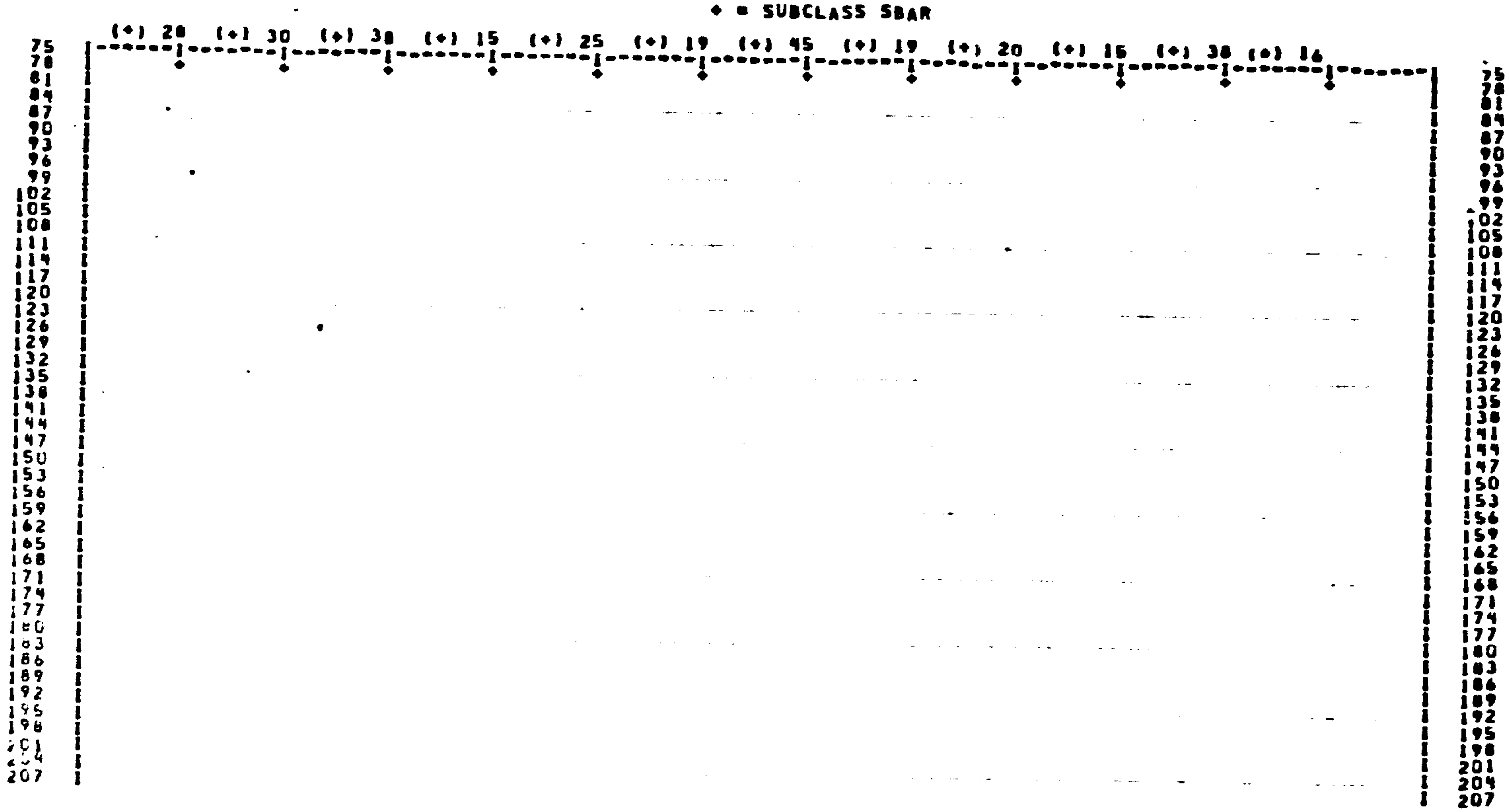
EACH • REPRESENTS 1638 POINT(S).

224

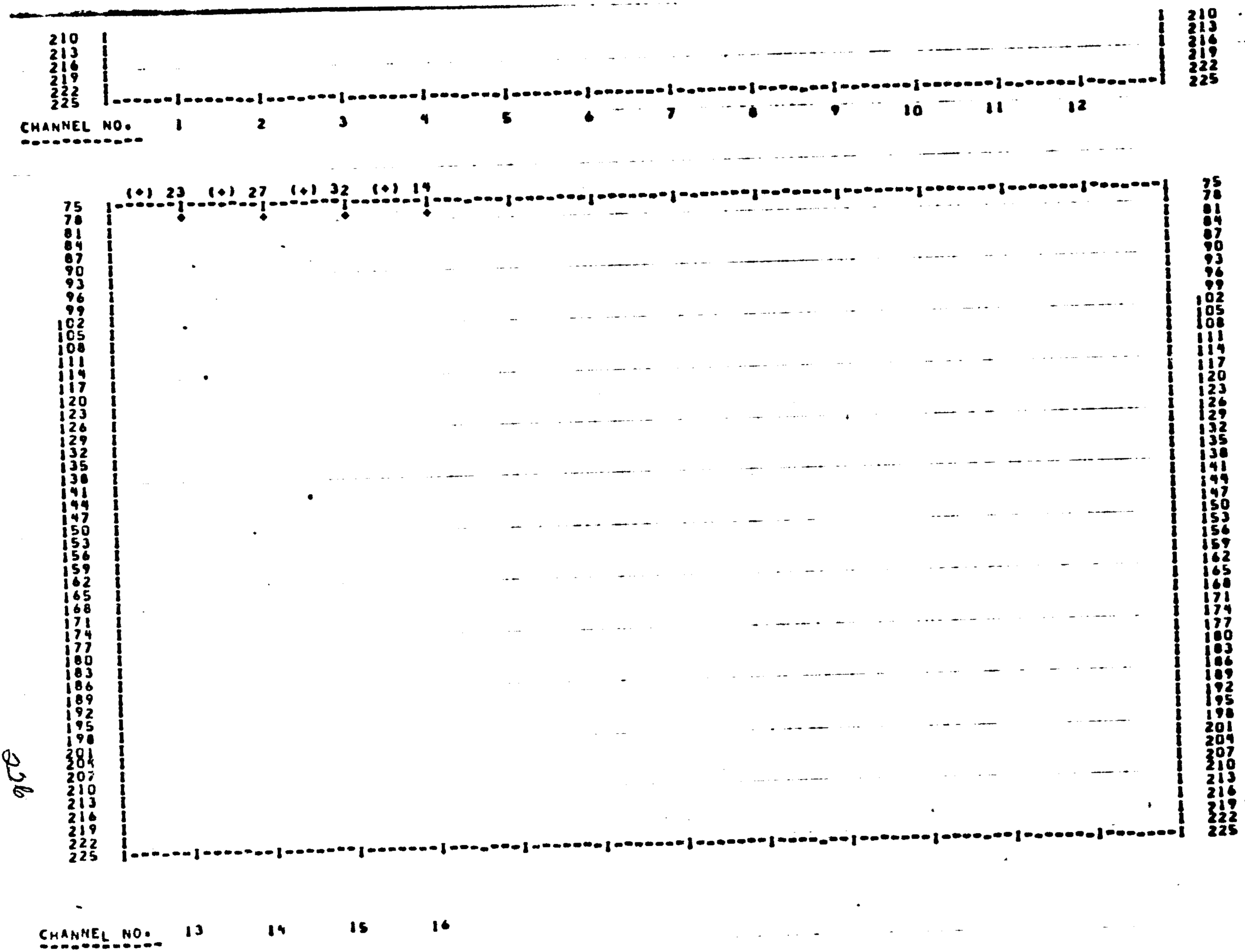
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

COMPOSITE SPECTRAL PLOT (MEAN,PLUS AND MINUS ONE STD. DEV.) FOR:
TRAINING SUBCLASS(ES) 1

PLOT LEGEND:
◆ = SUBCLASS SBAR



225


CHANNEL NO. 1 2 3 4 5 6 7 8 9 10 11 12
(+) 23 (+) 27 (+) 32 (+) 14
CHANNEL NO. 13 14 15 16
75 78 81 84 87 90 93 96 99 102 105 108 111 114 117 120 123 126 129 132 135 138 141 144 147 150 153 156 159 162 165 168 171 174 177 180 183 186 189 192 195 198 201 204 207 210 213 216 219 222 225

226

CHANNEL NO. 13 14 15 16

227

```
*** SSTAT - COMPLETED ***

TIME FOR STAT     5.973
```

ORIGINAL PAGE IS
OF POOR QUALITY

```
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL              23 FEB 78
                                   HOUSTON,TEXAS

SDATA-TR

INPUT IMAGE DATA TAPE INFORMATION
    FORMAT                UNIVERSAL
    NO. OF CHANNELS          16
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

SDATA-IR

TEST RUN 3

INPUT IMAGE DATA TAPE INFORMATION

```
    FORMAT                          UNIVERSAL
    NO. OF CHANNELS                    16
    NO. OF PIXELS/LINE                196
    FIRST SCAN LINE NO.                 1
    FIRST PIXEL REFERENCE PT            1
  RESCAL
  DATAFI      FILE=6
  TRFORM      OUTPUT/FILE=3
  STATFI      FILE=1
  B-MATR      CARDS
  FORMAT      OUTPUT=UNIVERSAL
  OPTION      GREEN,PCG
  *END*
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

LINEAR TRANSFORMATION (B) MATRIX

NO. LINEAR COMB. = 4
NO. CHANNELS = 16

LIN. CMB.	CH(1)	CH(2)	CH(3)	CH(4)	CH(5)	CH(6)	CH(7)	CH(8)	CH(9)	CH(10)	CH(11)	CH(12)
1	-.2900+00	-.5620+00	.6000+00	.4910+00	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
2	.0000	.0000	.0000	.0000	-.2900+00	-.5620+00	.6000+00	.4910+00	.0000	.0000	.0000	.0000
3	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	-.2900+00	-.5620+00	.6000+00	.4910+00
4	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

LIN. CMB.	CH(13)	CH(14)	CH(15)	CH(16)
1	.0000	.0000	.0000	.0000
2	.0000	.0000	.0000	.0000
3	.0000	.0000	.0000	.0000
4	-.2900+00	-.5620+00	.6000+00	.4910+00

THE INPUT MATRIX TO PCMMAT IS

67.755363	-1.296438	-4.081439	3.723611
-1.296438	204.071314	126.473337	31.593011
-4.081439	126.473337	113.564596	26.827166
3.723611	31.593011	26.827166	19.572757

MATRIX OF EIGENVECTORS =

THE TRANSPOSE OF - PCM MATRIX - IS

-.012248	.995889	-.028554	-.085085
.807569	.031684	.586067	.057913
.671323	-.042226	-.752973	-.323789
.145853	.073606	-.297895	.940514

230

VECTOR OF EIGEN VALUES C(I) =

299.272
68.1624
25.5843
11.9455

VECTOR OF RADII R(I) =

```
VECTOR OF EIGEN VALUES C(I) =

  299.272
  68.1629
  25.5843
  11.9455

   VECTOR OF RADII R(I) =

  .199319-04
  .858788-05
  .147275-05
  .209874-05

INPUT IMAGE DATA TAPE INFORMATION

  FORMAT                      UNIVERSAL
  NO. OF CHANNELS                16
  NO. OF PIXELS/LINE            196
  FIRST SCAN LINE NO.             1
  FIRST PIXEL REFERENCE PT        1

THE PARAMETERS FROM TRHIST

THE MAX IS
  26.89    44.37    31.26    13.77

THE MIN IS
  -8.09    -3.71    -3.71    -3.71

THE CON IS
  7.29     5.30     7.29    14.58

THE PCG SCALING PARAMETERS ARE

THE MAX IS
  55.37    27.88    -2.90     3.11

THE MIN IS
  -5.56    -8.29     1.96    -1.82

THE CON IS
  10.49     8.19    -6.93    11.04
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON, TEXAS

23 FEB 78

FIELDNAME	NO. OF VERTICES	SAMPLE INC	LINE INC	VERTICES(SAMPLE,LINE)
BI-01	4	1	1	(1, 1) (196, 1) (196, 117) (1, 117)

GREEN IMAGE

* OUTPUT FILE 3 *

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

*** ORIGINAL TRANSFORMED DATA RANGE ***

MIN	MAX	(BIAS)
-14.0000	62.0000	(.0000)
-11.0000	60.0000	(.0000)
-14.0000	49.0000	(.0000)
-9.0000	27.0000	(.0000)

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

MIN	MAX	CON = 255/(MAX-MIN)
-8.0865	26.8875	7.2911
-3.7148	44.3745	5.3026
-3.7148	31.2592	7.2911
-3.7148	13.7722	14.5823

ORIGINAL PAGE IS
OF POOR QUALITY

DATA TO

EACH * REPRESENTS 187 POINT(S).

26.. I
26.. I
2... I

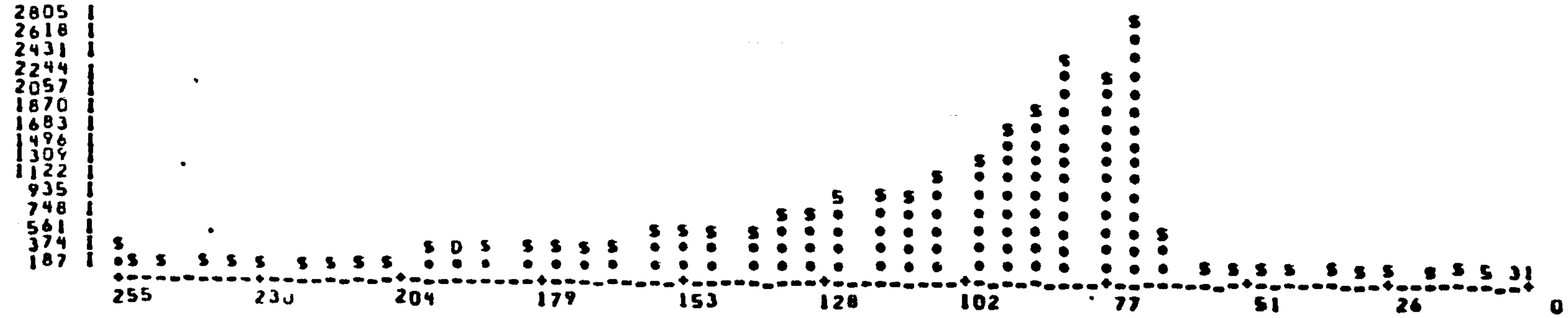
232

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON, TEXAS

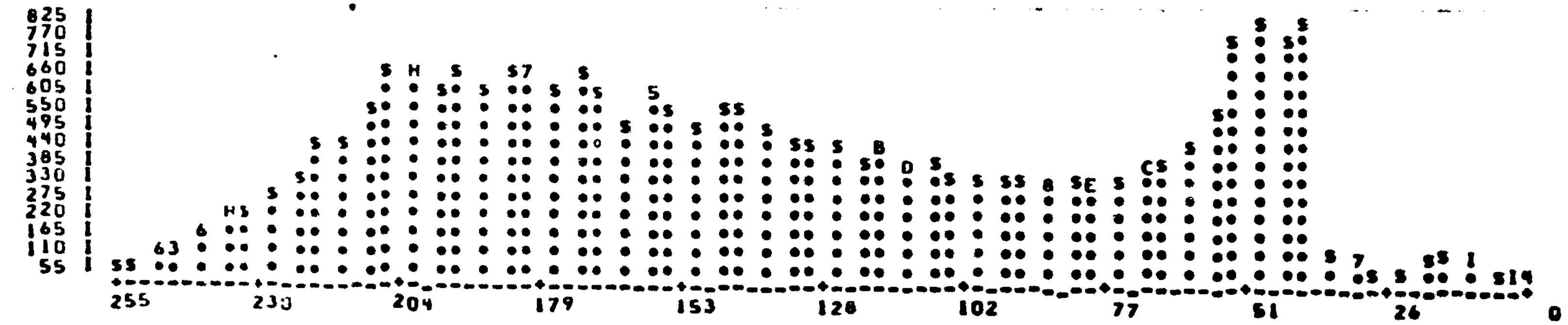
23 FEB 78

DATA TR

EACH • REPRESENTS 187 POINT(S).



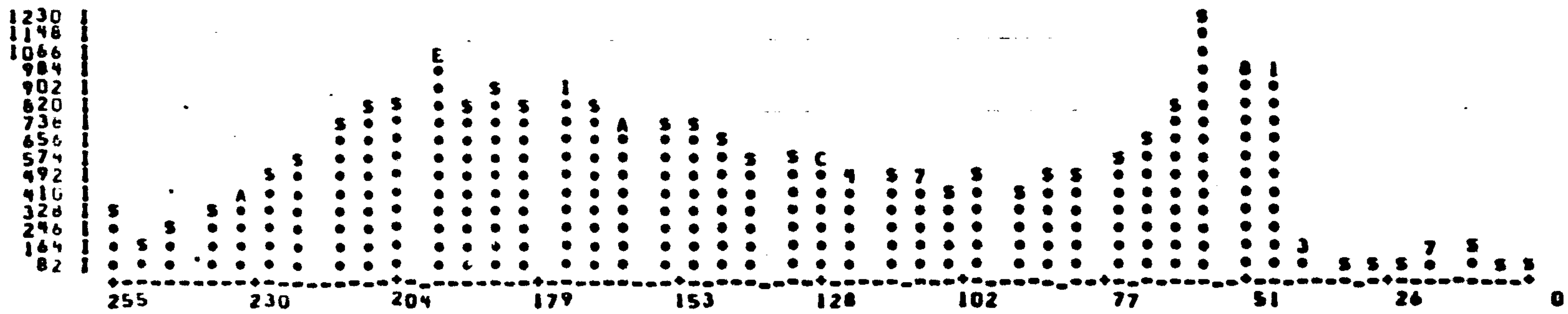
EACH • REPRESENTS 55 POINT(S).



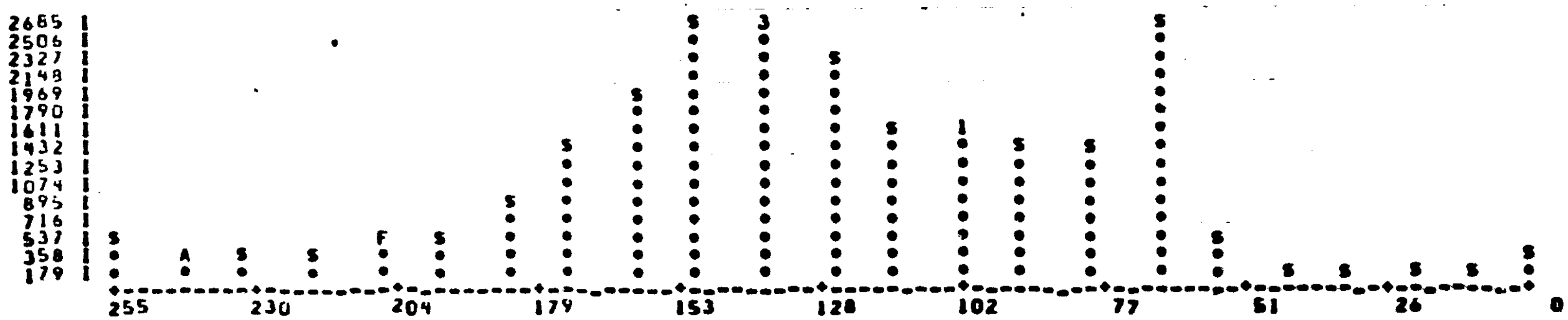
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 23 FEB 78
HOUSTON,TEXAS

DATA TR

EACH • REPRESENTS 82 POINT(S).



EACH • REPRESENTS 179 POINT(S).



SCALI ARAMETERS USED ON TRANSFORMED VALUES, OUTPUT FILE

	MINIMUM	MAXIMUM	SCALE FACTOR (CON)
COMPONENT 1	-8.087	26.687	7.291
COMPONENT 2	-3.715	44.374	5.303
COMPONENT 3	-3.715	31.259	7.291
COMPONENT 4	-3.715	13.772	19.582

FIELDNAME	NO. OF VERTICES	SAMPLE INC	LINE INC	VERTICES(SAMPLE,LINE)
81-01	4	.1	1	(1. 1) (196. 1) (196. 117) (1. 117)

PCG IMAGE

• OUTPUT FILE 4 •

235

IELDNAME	NO. OF VERTICES	SAMPLE INC	LINE INC	VERTICES(SAMPLE,LINE)
81-01	4	1	1	(1, 1) (196, 1) (196, 117) (1, 117)

PCG IMAGE

• OUTPUT FILE 4 •

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

••• ORIGINAL TRANSFORMED DAT- RANGE •••

MIN	MAX	(BIAS)
-14.6387	73.0621	(.0000)
-14.0264	63.1594	(.0000)
-31.1160	32.4544	(.0000)
-12.0557	20.6903	(.0000)

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

MIN	MAX	CON = 255/(MAX-MIN)
-5.5650	55.3740	10.4854
-8.2875	27.5767	8.1946
-2.4014	1.9575	6.9345
-1.8181	3.1138	11.0408

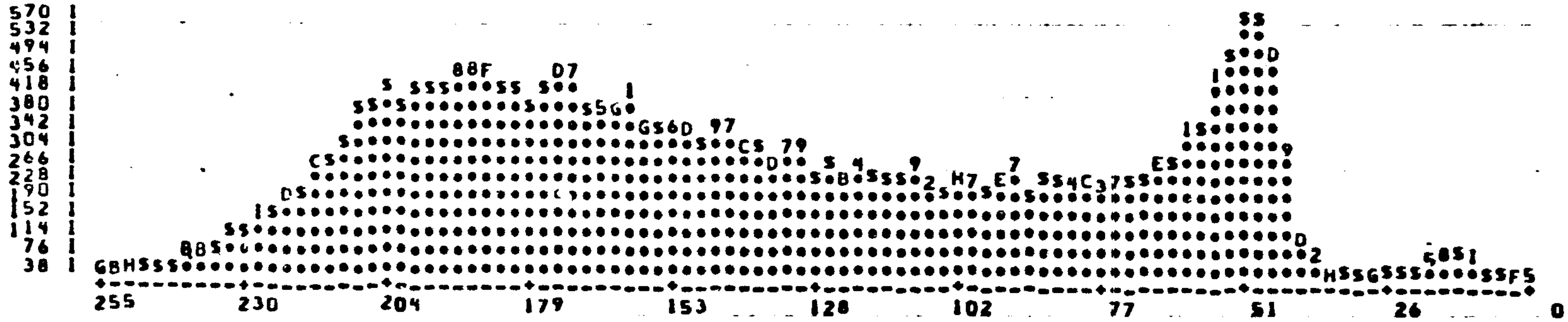
ORIGINAL PAGE IS
OF POOR QUALITY

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT ORIGINAL
HOUSTON ,AS

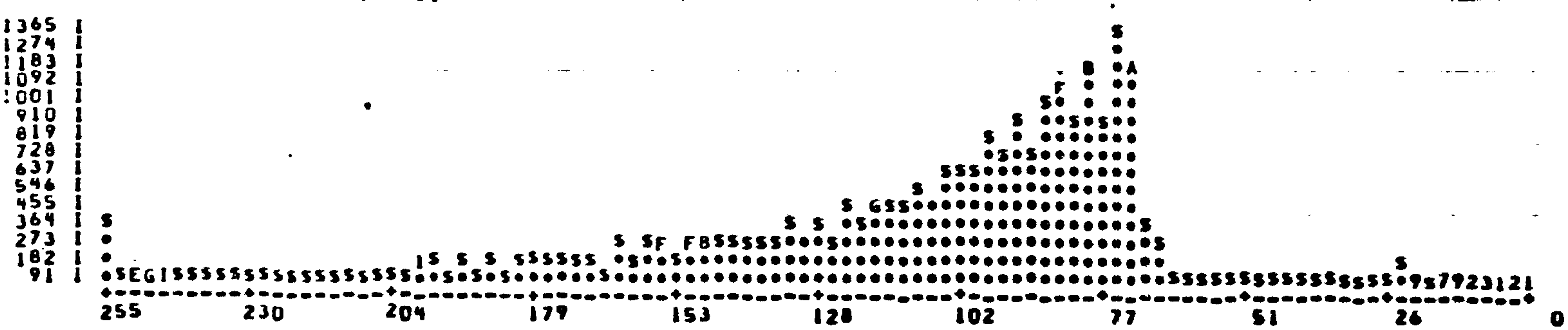
23 FEB 78

DATA TR

EACH • REPRESENTS 38 POINT(S).



EACH • REPRESENTS 91 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

23 FEB 78

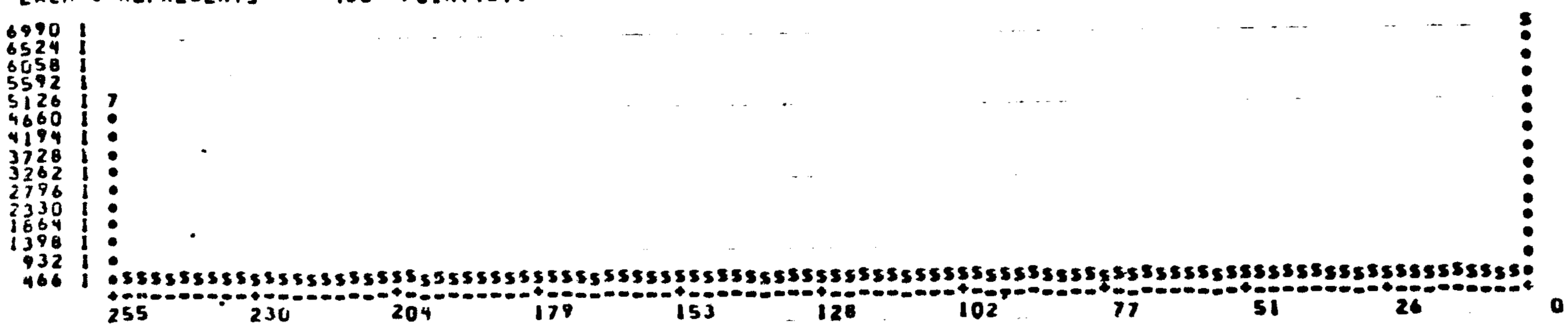
237

DATA TR

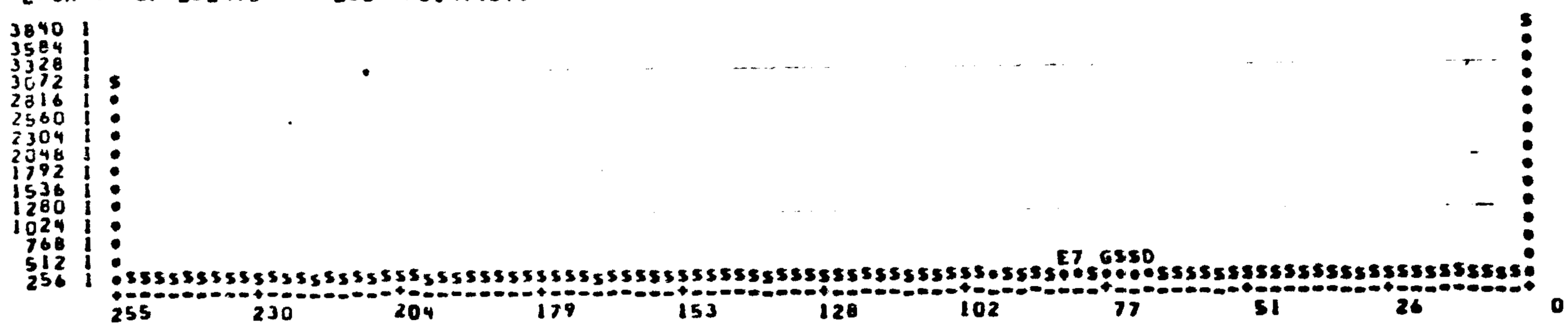
EACH • REPRESENTS 466 POINT(S).

DATA TR

EACH • REPRESENTS 466 POINT(S).



EACH • REPRESENTS 256 POINT(S).



SCALING PARAMETERS USED ON TRANSFORMED VALUES, OUTPUT FILE 4

	MINIMUM	MAXIMUM	SCALE FACTOR (CON)
COMPONENT 1	-5.565	55.374	10.485
COMPONENT 2	-8.288	27.677	8.195
COMPONENT 3	-2.401	1.958	6.939
COMPONENT 4	-1.818	3.114	11.041

*** SDATA-TR COMPLETED ***

TIME FOR DATA-TRANSFORMATION 6.933

TEST RUN 4

```
$STAT

    DATAFI    FILE=7
    CHANNE    DATA=1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16
    OPTION    COVAR
    OPTION    HIST
    HISTO     1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16
    OPTION    MAXSUM=1
    MEDI      RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
    *END*
```

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RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 03 MAR 78
HOUSTON,TEXAS

YOU HAVE SELECTED THE FOLLOWING $STAT PROCESSOR OPTIONS:

```
    PRINT MEAN AND COVARIANCE FOR EACH FIELD
    PRINT A HISTOGRAM FOR EACH FIELD
    PRINT A HISTOGRAM  FOR EACH SUBCLASS
    PRINT MEAN AND COVARIANCE FOR EACH SUBCLASS
```

SUPERVISOR INFORMATION:

```
   UNUSED CORE     28 LOCATIONS
   MAXIMUM NO. OF FIELDS..204
   MAXIMUM NO. OF SUBCLASSES...  1
   CHANNELS SELECTED ARE     1.  2.  3.  4.  5.  6.  7.  8.  9. 10. 11. 12. 13. 14. 15.
                            16.
   HISTOGRAM CHANNELS ARE    1.  2.  3.  4.  5.  6.  7.  8.  9. 10. 11. 12. 13. 14. 15.
                             1..
```

INPUT IMAGE DATA TAPE INFORMATION

```
    FORMAT                     UNIVERSAL
    NO. OF CHANNELS                16
    NO. OF PIXELS/LINE            196
    FIRST SCAN LINE NO.             1
    FIRST PIXEL REFERENCE PT        1
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 03 MAR 78
HOUSTON,TEXAS

TRAINING FIELDS

FIELD NO.	FIELD NAME	CLASS	SUBCLASS	SAMPLE INC	LINE INC	VERTICES(SAMPLE,LINE)
1	81-01	BARLEY	SWHEAT	1	1	(1, 1) (196, 1) (196, 117) (1, 117)

22932 POINTS WILL BE USED IN THE FIELD MEAN,COVARIANCE CALCULATIONS

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON, TEXAS

03 MAR 78

THE MEAN, STANDARD DEVIATION, COVARIANCE, AND CORRELATION (16 CHANNELS) FOR:

TRAINING FIELD 81-U1

MEAN:	38.43	44.64	53.61	22.36	37.46	43.37	54.38	21.90	38.28	47.08	52.56	20.71
ST DEV:	3.51	5.92	6.93	3.40	5.47	9.18	6.55	3.12	4.07	6.26	6.89	3.14

MEAN:	36.99	47.08	48.79	18.56
ST DEV:	4.05	7.73	7.92	3.32

COVARIANCE MATRIX

12.29									
17.88	35.00								
8.93	17.05	48.03							
1.56	3.45	21.56	11.68						
10.50	18.22	-2.33	-4.54	29.94					
17.54	33.48	1.64	-4.85	47.03	84.26				
9.52	19.82	32.25	14.10	9.02	20.67	42.90			
1.87	4.51	16.36	8.13	-3.30	-3.26	17.13	9.76		
7.07	11.74	3.30	-.40	10.09	16.48	6.01	.39	16.54	
9.06	17.65	19.86	7.28	8.06	15.90	20.28	7.85	19.16	39.16

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7.25	15.08	35.44	16.34	-1.25	3.14	30.47	15.06	8.18	27.65	47.42	
8.00	4.59	16.31	8.04	-2.89	-2.34	13.30	7.19	.73	8.38	19.75	9.87
3.72	6.02	6.86	2.34	2.15	3.07	7.52	3.30	8.22	16.36	11.31	3.45
5.12	10.40	21.81	9.48	-2.55	-1.97	20.84	10.86	10.59	30.57	29.54	11.38
4.24	9.39	30.96	14.72	-7.18	-7.92	27.19	15.15	5.29	25.84	38.09	17.03
1.38	3.61	14.70	7.27	-4.15	-4.57	12.71	7.25	.38	8.60	17.03	8.17

16.42			
27.27	59.70		
23.06	54.36	62.75	
7.44	19.73	24.47	11.03

CORRELATION MATRIX

1.00											
.86	1.00										
.37	.42	1.00									
.13	.17	.91	1.00								
.55	.56	-.06	4.24	1.00							
.64	.62	.03	-.16	.94	1.00						
.41	.61	.71	.63	.25	.34	1.00					
.17	.24	.76	.76	-.19	-.11	.84	1.00				
.50	.49	.12	-.03	.45	.44	.23	.03	1.00			
.41	.48	.46	.34	.24	.28	.49	.40	.75	1.00		
.30	.37	.74	.70	-.03	.05	.68	.70	.29	.64	1.00	
.18	.25	.75	.75	-.17	-.08	.65	.73	.06	.43	.91	1.00
.26	.25	.24	.17	.10	.08	.28	.26	.50	.65	.41	.27
.19	.23	.41	.36	-.04	-.03	.41	.45	.34	.63	.56	.47
.15	.20	.56	.55	-.17	-.11	.52	.61	.16	.52	.70	.68
.12	.16	.64	.64	-.23	-.15	.56	.70	.03	.41	.74	.76

1.00			
.87	1.00		
.72	.89	1.00	
.55	.77	.93	1.00

ORIGINAL PAGE IS
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RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL　　　　03 MAR 76
HOUSTON, TEXAS

HISTOGRAM

TRAINING FIELD　　61-01

(NO. SAMPLES=　22932 , SUBCLASS= WHEAT)

CHANNEL 1

EACH * REPRESENTS　1638 POINT(S).

```
22932 I                                                                                              *
21294 I                                                                                              *
19656 I                                                                                              *
18018 I                                                                                              *
16380 I                                                                                              *
14742 I                                                                                              *
13104 I                                                                                              *
11466 I                                                                                              *
 9828 I                                                                                              *
 8190 I                                                                                              *
 6552 I                                                                                              *
 4914 I                                                                                              *
 3276 I                                                                                              *
 1638 I                                                                                              *
       +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      220       210       200       190       180       170       160       150       140       130       120
```

CHANNEL 2

EACH * REPRESENTS　1638 POINT(S).

```
22932 I                                                                                              *
21294 I                                                                                              *
19656 I                                                                                              *
18018 I                                                                                              *
16380 I                                                                                              *
14742 I                                                                                              *
13104 I                                                                                              *
11466 I                                                                                              *
 9828 I                                                                                              *
 8190 I                                                                                              *
 6552 I                                                                                              *
 4914 I                                                                                              *
 3276 I                                                                                              *
 1638 I                                                                                              *
       +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      220       210       200       190       180       170       160       150       140       130       120
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

03 MAR 78

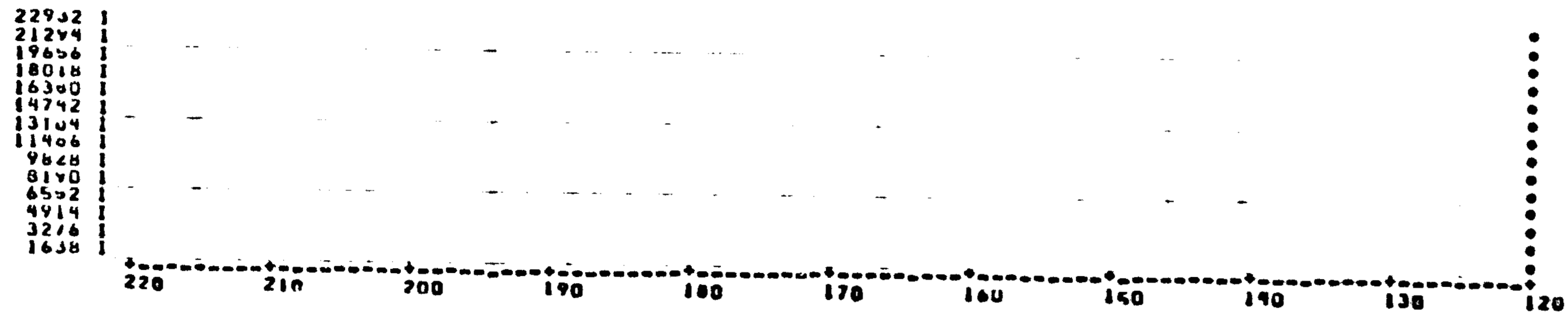
HISTOGRAM

TRAINING FIELD BI-01

(NO. SAMPLES= 22932 , SUBCLASS= SWHEAT)

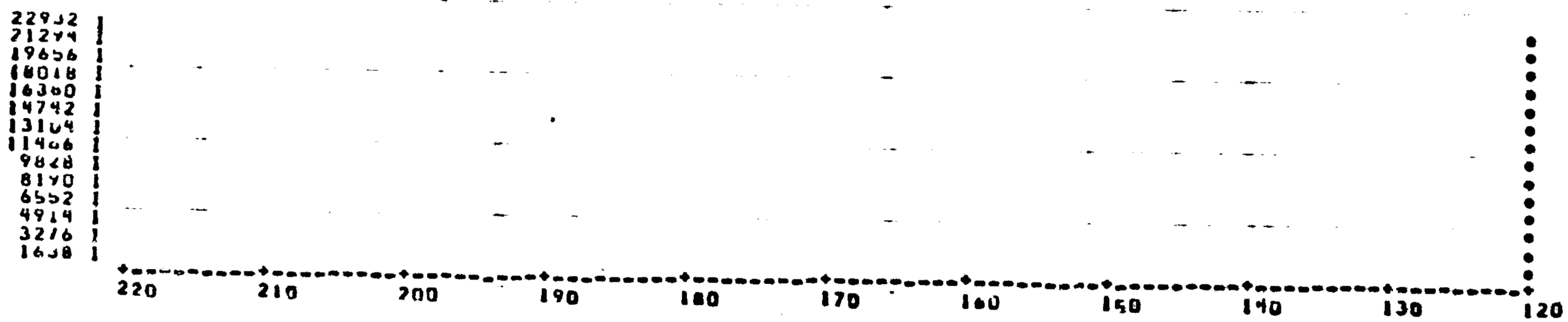
CHANNEL 3

EACH * REPRESENTS 1638 POINT(S).



CHANNEL 4

EACH * REPRESENTS 1638 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 03 MAR 78
HOUSTON,TEXAS

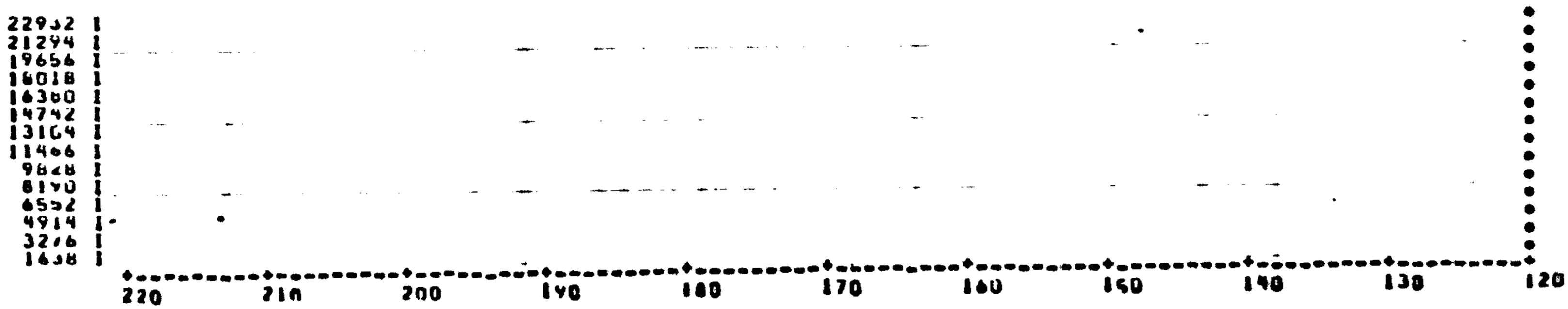
HISTOGRAM

TRAINING FIELD BI-01

(NO. SAMPLES= 22932 , SUBCLASS= WHEAT)

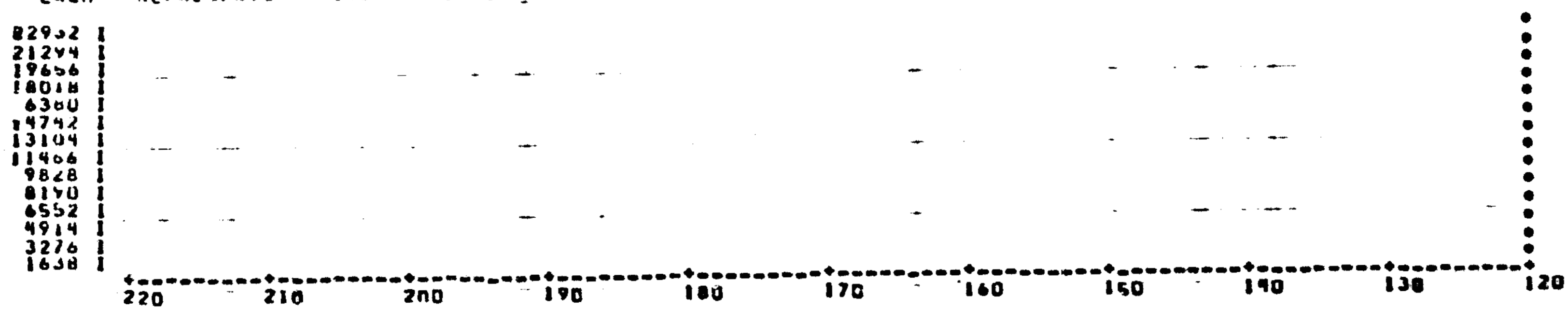
CHANNEL 5

EACH * REPRESENTS 1638 POINT(S).



CHANNEL 6

EACH * REPRESENTS 1638 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL   03 MAR 78
HOUSTON,TEXAS

ORIGINAL PAGE IS
OF POOR QUALITY

```
                                   HISTOGRAM
                                   ---------

                          TRAINING FIELD      81-01

                 (NO. SAMPLES=   22932 , SUBCLASS= SWHEAT)
CHANNEL  7
----------
   EACH * REPRESENTS    1638  POINT(S).

 22932 I                                                                                   *
 21294 I                                                                                   *
 19656 I                                                                                   *
 18018 I                                                                                   *
 16380 I                                                                                   *
 14742 I                                                                                   *
 13104 I                                                                                   *
 11466 I                                                                                   *
  9828 I                                                                                   *
  8190 I                                                                                   *
  6552 I                                                                                   *
  4914 I                                                                                   *
  3276 I                                                                                   *
  1638 I                                                                                   *
        +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
       220       210       200       190       180       170       160       150       140       130       120

CHANNEL  8
----------
   EACH * REPRESENTS    1638  POINT(S).

 22932 I                                                                                   *
 21294 I                                                                                   *
 19656 I                                                                                   *
 18018 I                                                                                   *
 16380 I                                                                                   *
 14742 I                                                                                   *
 13104 I                                                                                   *
 11466 I                                                                                   *
  9828 I                                                                                   *
  8190 I                                                                                   *
  6552 I                                                                                   *
  4914 I                                                                                   *
  3276 I                                                                                   *
  1638 I                                                                                   *
        +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
       220       210       200       190       180       170       160       150       140       130       120
```

```
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL                  03 MAR 78
                              HOUSTON,TEXAS

                                HISTOGRAM
                                ---------
                         TRAINING FIELD      81-01

                  (NO. SAMPLES=   22932 , SUBCLASS= SWHEAT)
CHANNEL  9
----------
  EACH * REPRESENTS    1638  POINT(S).

22932 I
21294 I                                                                    *
19656 I                                                                    *
18018 I                                                                    *
16380 I                                                                    *
14742 I                                                                    *
13104 I                                                                    *
11466 I                                                                    *
 9828 I                                                                    *
 8190 I                                                                    *
 6552 I                                                                    *
 4914 I                                                                    *
 3276 I                                                                    *
 1638 I                                                                    *
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
     220       210       200       190       180       170       160       150       140       130       120

CHANNEL 10
----------
  EACH * REPRESENTS    1638  POINT(S).

22932 I
21294 I                                                                    *
19656 I                                                                    *
18018 I                                                                    *
16380 I                                                                    *
14742 I                                                                    *
13104 I                                                                    *
11466 I                                                                    *
 9828 I                                                                    *
 8190 I                                                                    *
 6552 I                                                                    *
 4914 I                                                                    *
 3276 I                                                                    *
 1638 I                                                                    *
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
     220       210       200       190       180       170       160       150       140       130       120
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 03 MAR 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING FIELD 61-01

(NO. SAMPLES= 22932 , SUBCLASS= SWHEAT)

CHANNEL 11

EACH * REPRESENTS 1638 POINT(S).

```
22932 I                                                                              *
21294 I                                                                              *
19656 I                                                                              *
18018 I                                                                              *
16380 I                                                                              *
14742 I                                                                              *
13104 I                                                                              *
11466 I                                                                              *
 9828 I                                                                              *
 8190 I                                                                              *
 6552 I                                                                              *
 4914 I                                                                              *
 3276 I                                                                              *
 1638 I                                                                              *
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
     220       210       200       190       180       170       160       150       140       130       120
```

CHANNEL 12

EACH * REPRESENTS 1638 POINT(S).

```
22932 I                                                                              *
21294 I                                                                              *
19656 I                                                                              *
18018 I                                                                              *
16380 I                                                                              *
14742 I                                                                              *
13104 I                                                                              *
11466 I                                                                              *
 9828 I                                                                              *
 8190 I                                                                              *
 6552 I                                                                              *
 4914 I                                                                              *
 3276 I                                                                              *
 1638 I                                                                              *
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
     220       210       200       190       180       170       160       150       140       130       120
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 03 MAR 78
HOUSTON, TEXAS

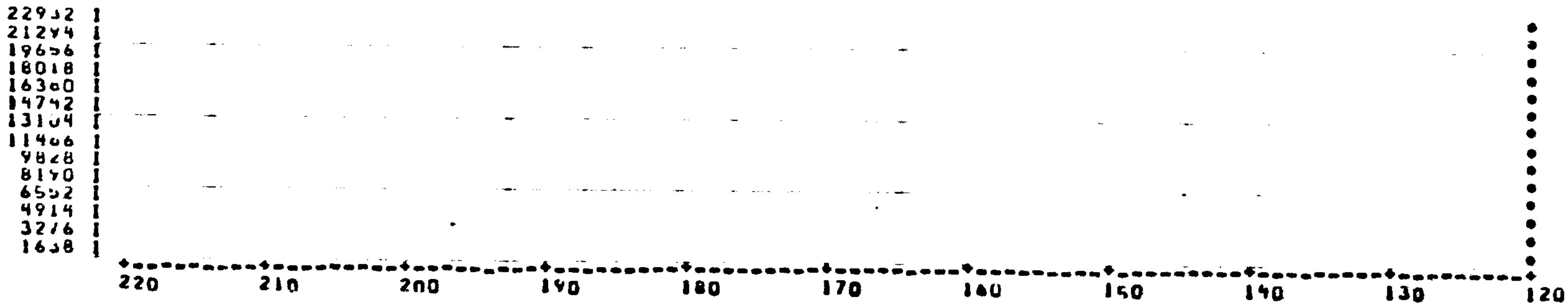
HISTOGRAM

TRAINING FIELD BI-01

(NO. SAMPLES= 22932 , SUBCLASS= SWHEAT)

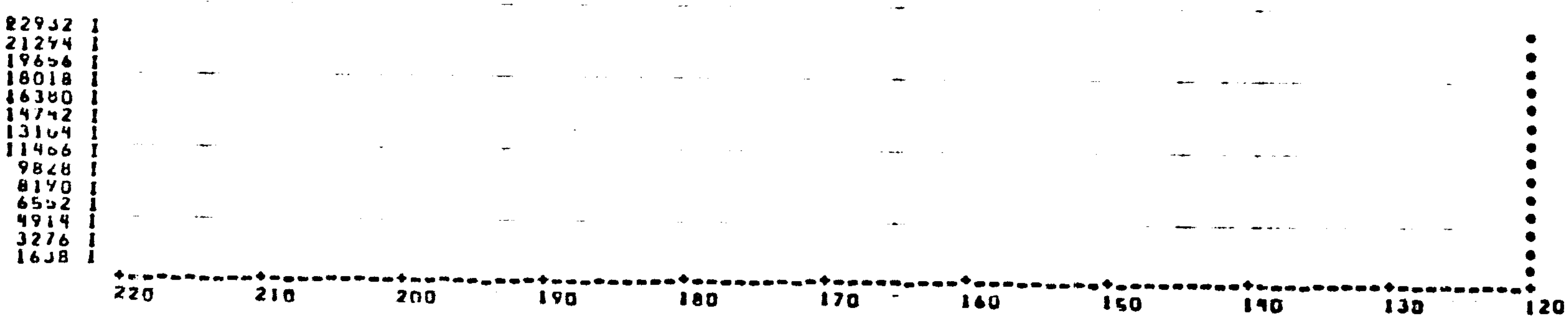
CHANNEL 13

EACH * REPRESENTS 1638 POINT(S).



CHANNEL 14

EACH * REPRESENTS 1638 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL HOUSTON,TEXAS 03 MAR 78

HISTOGRAM

TRAINING FIELD 81-01

(NO. SAMPLES= 22932 , SUBCLASS= SWHEAT)


```
CHANNEL 15
----------
  EACH * REPRESENTS    1638  POINT(S).
  22932 I                                                                                                  *
  21294 I                                                                                                  *
  19656 I                                                                                                  *
  18018 I                                                                                                  *
  16380 I                                                                                                  *
  14742 I                                                                                                  *
  13104 I                                                                                                  *
  11466 I                                                                                                  *
   9828 I                                                                                                  *
   8190 I                                                                                                  *
   6552 I                                                                                                  *
   4914 I                                                                                                  *
   3276 I                                                                                                  *
   1638 I                                                                                                  *
         +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
        220       210       200       190       180       170       160       150       140       130       120

CHANNEL 16
----------
  EACH * REPRESENTS    1638  POINT(S).
  22932 I                                                                                                  *
  21294 I                                                                                                  *
  19656 I                                                                                                  *
  18018 I                                                                                                  *
  16380 I                                                                                                  *
  14742 I                                                                                                  *
  13104 I                                                                                                  *
  11466 I                                                                                                  *
   9828 I                                                                                                  *
   8190 I                                                                                                  *
   6552 I                                                                                                  *
   4914 I                                                                                                  *
   3276 I                                                                                                  *
   1638 I                                                                                                  *
         +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
        220       210       200       190       180       170       160       150       140       130       120
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 03 MAR 78
HOUSTON, TEXAS

THE MEAN, STANDARD DEVIATION, COVARIANCE, AND CORRELATION (16 CHANNELS) FOR:

TRAINING SUBCLASS SWHEAT

MEAN:	38.43	44.64	53.61	22.36	37.46	43.37	54.38	21.90	38.28	47.08	52.56	20.71
ST DEV:	3.51	5.92	6.93	3.48	5.47	9.18	6.55	3.12	4.07	6.26	6.89	3.14
MEAN:	36.99	47.08	48.74	18.56								
ST DEV:	4.05	7.73	7.92	3.32								

COVARIANCE MATRIX

12.29											
17.88	35.00										
8.93	17.05	48.03									
1.56	3.45	21.56	11.58								
10.50	18.22	-2.33	-4.54	29.94							
17.54	33.48	1.64	-4.85	47.03	84.26						
9.52	19.82	32.25	14.10	9.02	20.67	42.90					
1.87	4.51	16.36	8.13	-3.30	-3.26	17.13	9.76				
7.07	11.74	3.30	-.40	10.09	16.48	6.01	.39	16.54			
9.06	17.65	19.86	7.28	8.06	15.90	20.28	7.85	19.16	39.16		
7.25	15.08	35.44	16.34	-1.25	3.14	30.47	15.06	8.18	27.45	47.42	
2.00	4.59	16.31	8.04	-2.89	-2.34	13.30	7.19	.73	8.38	19.76	9.87
3.72	6.02	6.86	2.34	2.15	3.07	7.52	3.30	8.22	16.36	11.31	3.45

5.12	10.48	21.81	9.48	-2.55	-1.97	20.84	10.86	10.57	30.57	29.54	11.38
4.24	9.39	30.96	14.72	-7.18	-7.92	27.19	15.15	5.29	25.84	38.39	17.03
1.38	3.61	14.70	7.27	-4.16	-4.57	12.71	7.25	.38	8.60	17.03	8.17

16.42			
27.27	59.70		
23.06	54.36	62.75	
7.44	19.73	24.47	11.03

CORRELATION MATRIX

CORRELATION MATRIX

1.00											
.86	1.00										
.37	.42	1.00									
.13	.17	.91	1.00								
.55	.56	-.06	-.24	1.00							
.54	.62	.03	-.16	.94	1.00						
.41	.51	.71	.63	.25	.34	1.00					
.17	.24	.76	.76	-.19	-.11	.84	1.00				
.50	.49	.12	-.03	.45	.44	.23	.03	1.00			
.41	.48	.46	.34	.24	.28	.49	.40	.75	1.00		
.30	.37	.74	.70	-.03	.05	.68	.70	.29	.64	1.00	
.18	.25	.75	.75	-.17	-.08	.65	.73	.06	.43	.91	1.00
.26	.25	.24	.17	.10	.08	.28	.26	.50	.65	.41	.27
.19	.23	.41	.36	-.06	-.03	.41	.45	.34	.63	.56	.47
.15	.20	.56	.55	-.17	-.11	.52	.61	.16	.52	.70	.68
.12	.18	.64	.64	-.23	-.15	.58	.70	.03	.41	.74	.78

1.00			
.87	1.00		
.72	.89	1.00	
.55	.77	.93	1.00

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON, TEXAS

HISTOGRAM

TRAINING SUBCLASS SWHEAT

CHANNEL 1

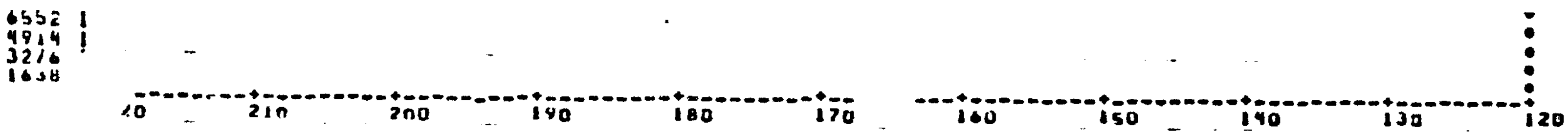
```
EACH * REPRESENTS    1638  POINT(S).

 22932 I                                                                                   *
 21294 I                                                                                   *
 19656 I                                                                                   *
 18018 I                                                                                   *
 16380 I                                                                                   *
 14742 I                                                                                   *
 13104 I                                                                                   *
 11466 I                                                                                   *
  9828 I                                                                                   *
  8190 I                                                                                   *
  6552 I                                                                                   *
  4914 I                                                                                   *
  3276 I                                                                                   *
  1638 I                                                                                   *
        +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
       220       210       200       190       180       170       160       150       140       130       120
```

CHANNEL 2

```
EACH * REPRESENTS    1638  POINT(S).

 22932 I                                                                                   *
 21294 I                                                                                   *
 19656 I                                                                                   *
 18018 I                                                                                   *
 16380 I                                                                                   *
 14742 I                                                                                   *
 13104 I                                                                                   *
 11466 I                                                                                   *
  9828 I                                                                                   *
  8190 I                                                                                   *
  6552 I                                                                                   *
  4914 I                                                                                   *
  3276 I                                                                                   *
  1638 I                                                                                   *
        +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
       220       210       200       190       180       170       160       150       140       130       120
```



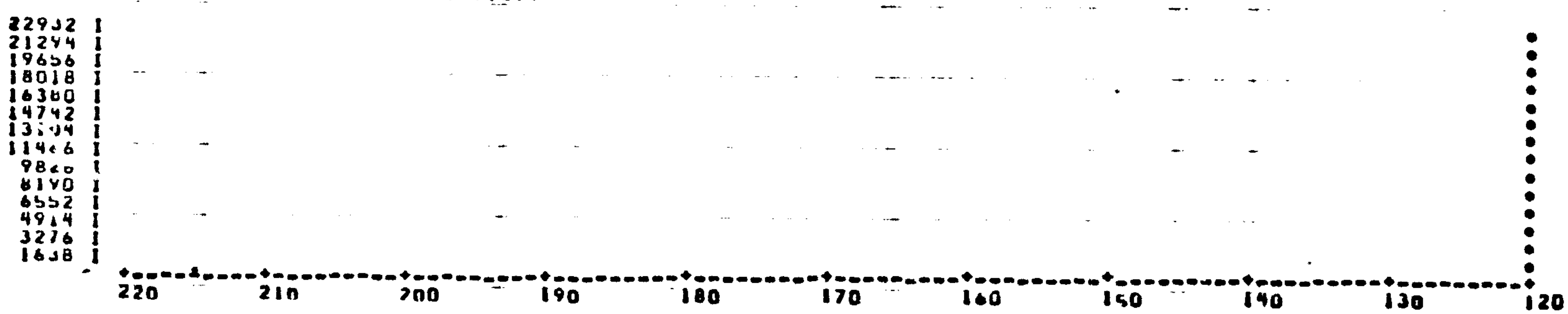
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL   03 MAR 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS   SWHEAT

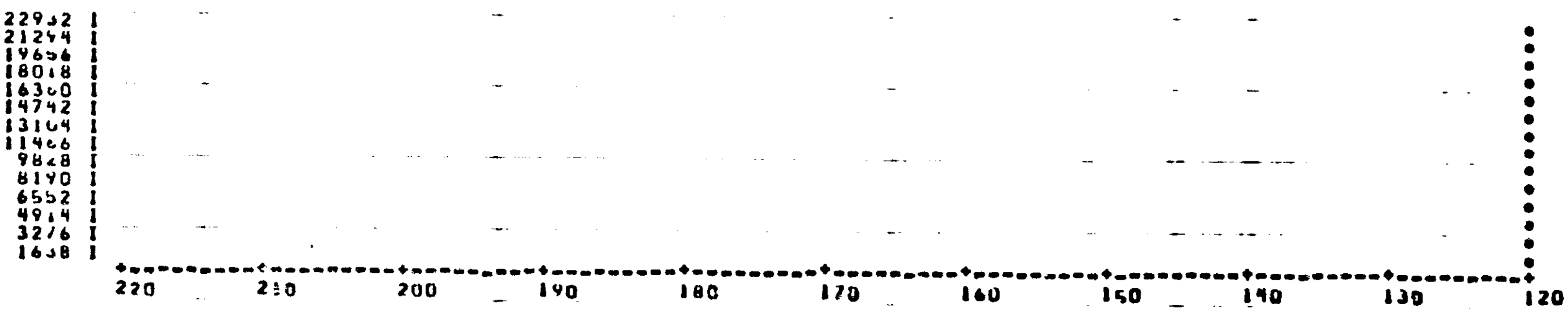
CHANNEL 3

EACH * REPRESENTS   1638 POINT(S).



CHANNEL 4

EACH * REPRESENTS   1638 POINT(S).



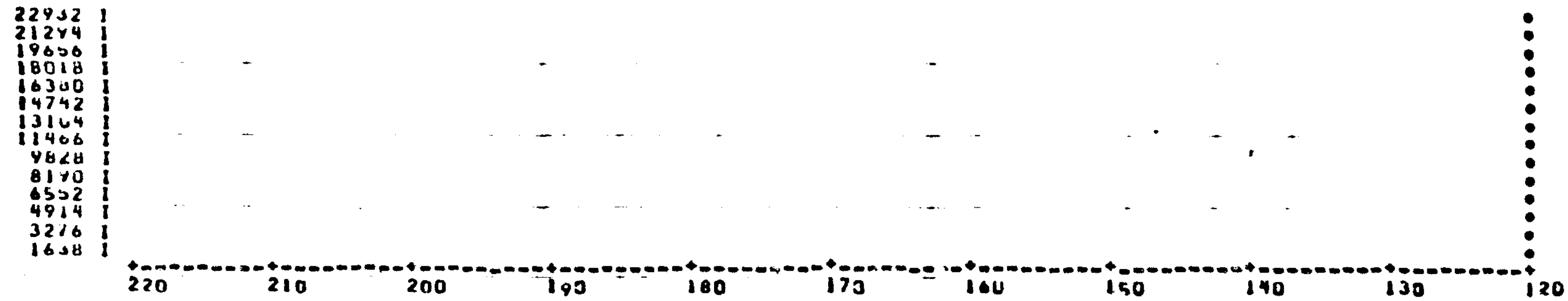
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 03 MAR 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SWHEAT

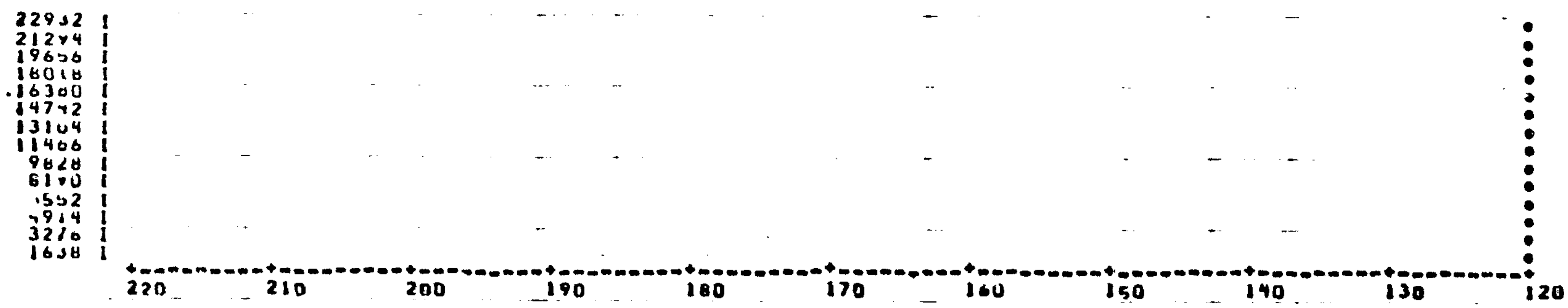
CHANNEL 5

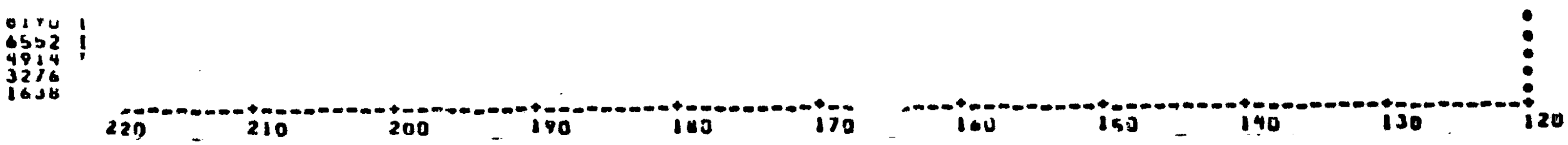
EACH * REPRESENTS 1638 POINT(S).



CHANNEL 6

EACH * REPRESENTS 1638 POINT(S).





RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

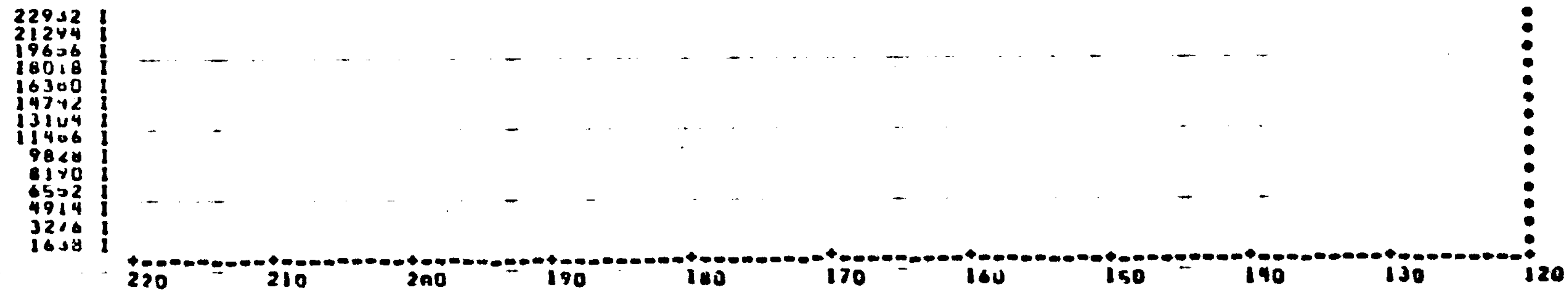
03 MAR 78

HISTOGRAM

TRAINING SUBCLASS SWHEAT

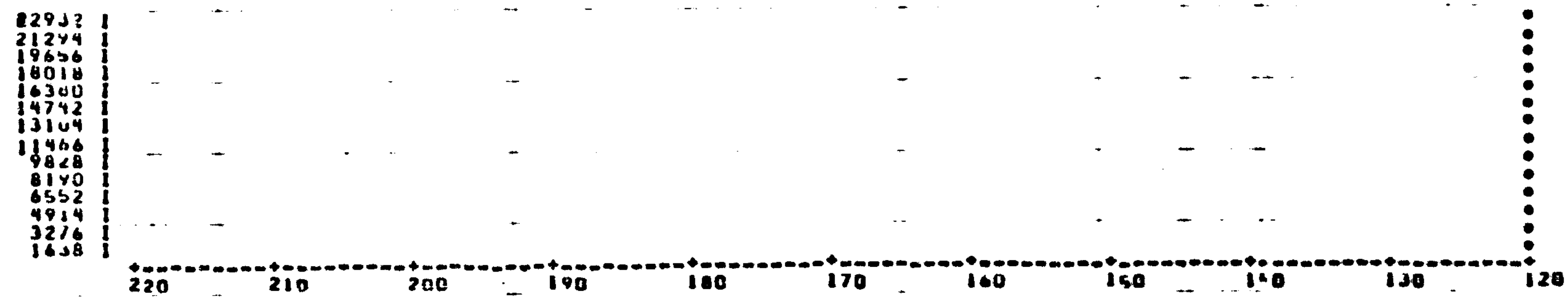
CHANNEL 7

EACH * REPRESENTS 1638 POINT(S).



CHANNEL 8

EACH * REPRESENTS 1638 POINT(S).



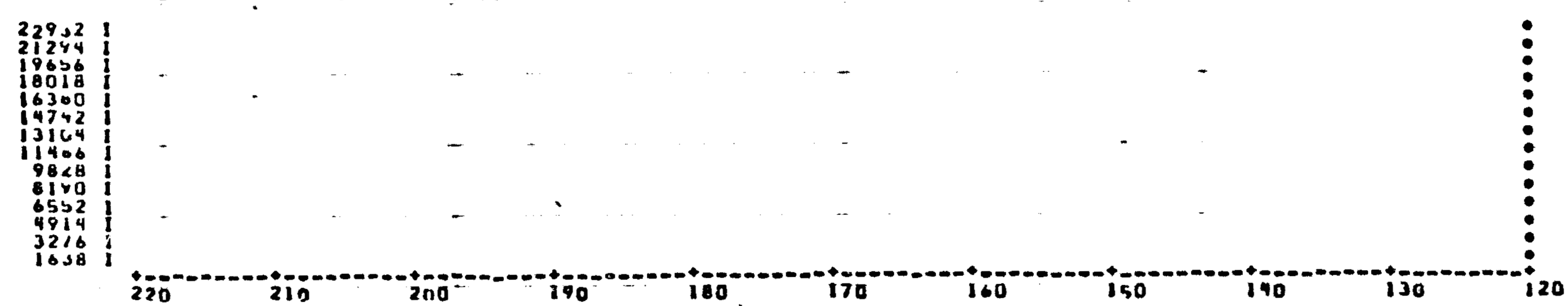
260

HISTOGRAM

TRAINING SUBCLASS SWHEAT

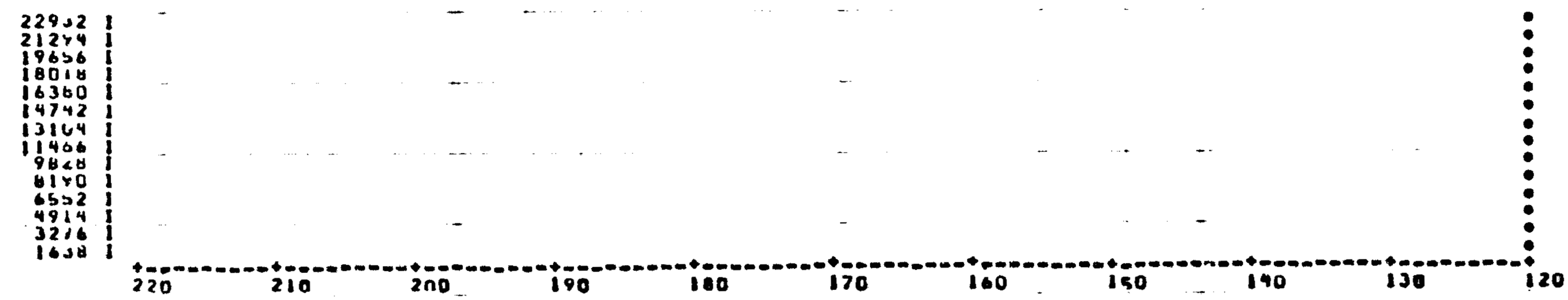
CHANNEL 9

EACH * REPRESENTS 1638 POINT(S).



CHANNEL 10

EACH * REPRESENTS 1638 POINT(S).



```
 9828                                                                                                      *
 8190                                                                                                      *
 6552                                                                                                      *
 4914                                                                                                      *
 3276 I                                                                                                    *
 1638 I                                                                                                    *
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
     220       210       200       190       180       170       160       150       140       130       120
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL   03 MAR 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS   SWHEAT

CHANNEL 11

EACH * REPRESENTS   1638 POINT(S).

```
22932 I                                                                                                    *
21294 I                                                                                                    *
19656 I                                                                                                    *
18018 I                                                                                                    *
16380 I                                                                                                    *
14742 I                                                                                                    *
13104 I                                                                                                    *
11466 I                                                                                                    *
 9828 I                                                                                                    *
 8190 I                                                                                                    *
 6552 I                                                                                                    *
 4914 I                                                                                                    *
 3276 I                                                                                                    *
 1638 I                                                                                                    *
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
     220       210       200       190       180       170       160       150       140       130       120
```

CHANNEL 12

EACH * REPRESENTS   1638 POINT(S).

```
22932 I                                                                                                    *
21294 I                                                                                                    *
19656 I                                                                                                    *
18018 I                                                                                                    *
16380 I                                                                                                    *
14742 I                                                                                                    *
13104 I                                                                                                    *
11466 I                                                                                                    *
 9828 I                                                                                                    *
 8190 I                                                                                                    *
 6552 I                                                                                                    *
 4914 I                                                                                                    *
 3276 I                                                                                                    *
 1638 I                                                                                                    *
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
     220       210       200       190       180       170       160       150       140       130       120
```

HISTOGRAM

TRAINING SUBCLASS SWHEAT

CHANNEL 13

EACH * REPRESENTS 1638 POINT(S).

```
22932 I                                                                                                    *
21294 I                                                                                                    *
19656 I                                                                                                    *
18018 I                                                                                                    *
16380 I                                                                                                    *
14742 I                                                                                                    *
13104 I                                                                                                    *
11466 I                                                                                                    *
 9828 I                                                                                                    *
 8190 I                                                                                                    *
 6552 I                                                                                                    *
 4914 I                                                                                                    *
 3276 I                                                                                                    *
 1638 I                                                                                                    *
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------*
     220       210       200       190       180       170       160       150       140       130       120
```

CHANNEL 14

EACH * REPRESENTS 1638 POINT(S).

```
22932 I                                                                                                    *
21294 I                                                                                                    *
19656 I                                                                                                    *
18018 I                                                                                                    *
16380 I                                                                                                    *
14742 I                                                                                                    *
13104 I                                                                                                    *
11466 I                                                                                                    *
 9828 I                                                                                                    *
 8190 I                                                                                                    *
 6552 I                                                                                                    *
 4914 I                                                                                                    *
 3276 I                                                                                                    *
 1638 I                                                                                                    *
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------*
     220       210       200       190       180       170       160       150       140       130       120
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 03 MAR 78
HOUSTON,TEXAS

```
 9828 I                                                                                        *
 8190                                                                                          *
 6552                                                                                          *
 4914                                                                                          *
 3276                                                                                          *
 1638 I                                                                                        *
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
     220       210       200       190       180       170       160       150       140       130       120
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL   03 MAR 75
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SWHEAT

CHANNEL 15

EACH * REPRESENTS 1638 POINT(S).

```
22932 I                                                                                        *
21294 I                                                                                        *
19656 I                                                                                        *
18018 I                                                                                        *
16380 I                                                                                        *
14742 I                                                                                        *
13104 I                                                                                        *
11466 I                                                                                        *
 9828 I                                                                                        *
 8190 I                                                                                        *
 6552 I                                                                                        *
 4914 I                                                                                        *
 3276 I                                                                                        *
 1638 I                                                                                        *
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
     220       210       200       190       180       170       160       150       140       130       120
```

CHANNEL 16

EACH * REPRESENTS 1638 POINT(S).

```
22932 I                                                                                        *
21294 I                                                                                        *
19656 I                                                                                        *
18018 I                                                                                        *
16380 I                                                                                        *
14742 I                                                                                        *
13104 I                                                                                        *
11466 I                                                                                        *
 9828 I                                                                                        *
 8190 I                                                                                        *
 6552 I                                                                                        *
 4914 I                                                                                        *
 3276 I                                                                                        *
 1638 I                                                                                        *
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
     220       210       200       190       180       170       160       150       140       130       120
```

264

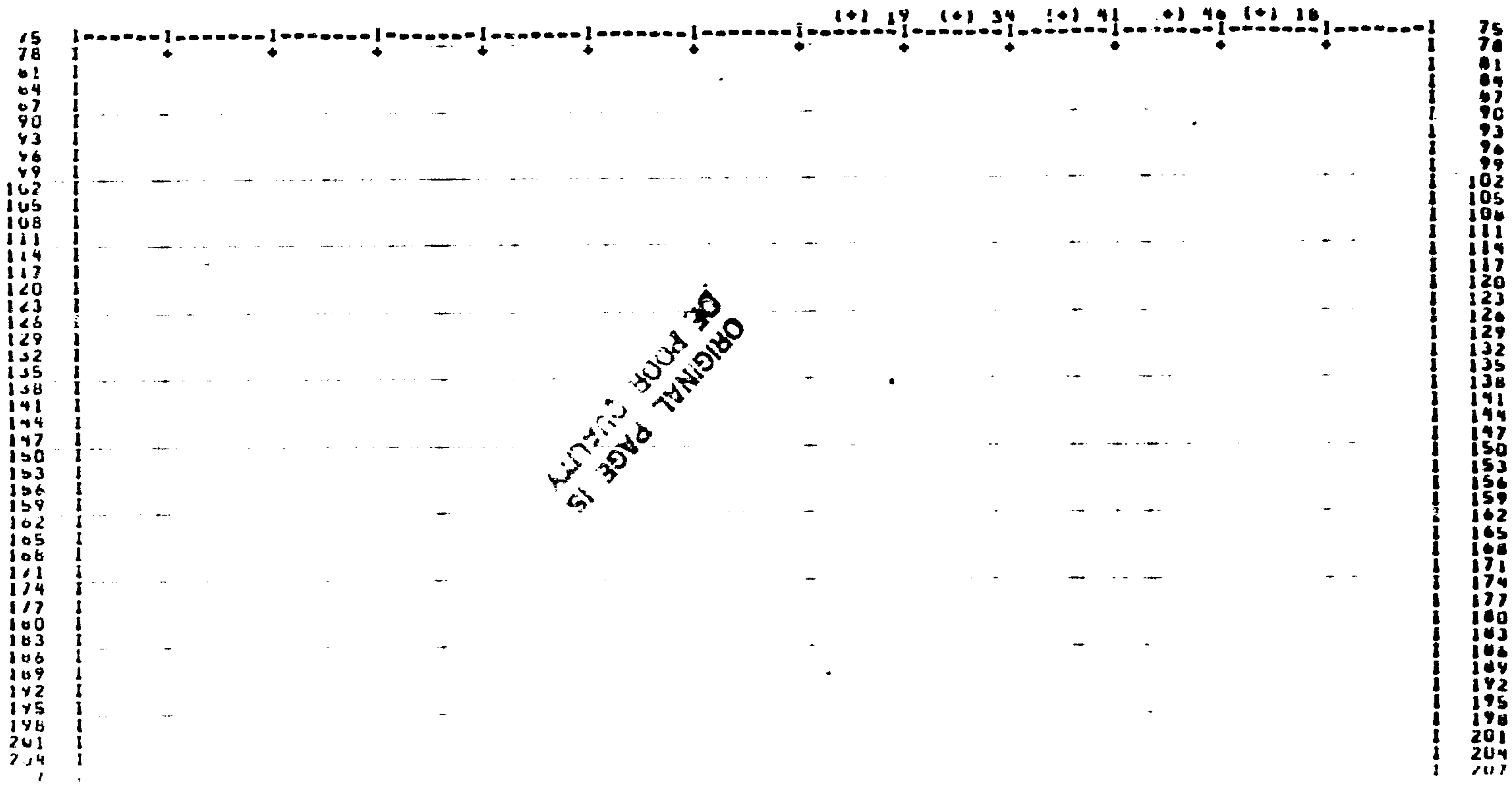
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 03 MAR 78
HOUSTON,TEXAS

COMPOSITE SPECTRAL PLOT (MEAN,PLUS AND MINUS ONE STD. DEV.) FOR:

TRAINING SUBCLASS(ES) 1

PLOT LEGEND:
+ = SUBCLASS S=HEAT

(+) 35 (+) 39 (+) 47 (+) 19 (+) 32 (+) 34



```
210  I                                                                                          I  210
213  I                                                                                          I  213
216  I                                                                                          I  216
219  I                                                                                          I  219
222  I                                                                                          I  222
225  I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I  225
CHANNEL NO.   1       2       3       4       5       6       7       8       9       10      11      12
-----------

       (+) 33  (+) 39  (+) 41  (+) 15
 75  I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I   75
 78  I       +       +       +       +                                                                   I   78
 81  I                                                                                          I   81
 84  I                                                                                          I   84
 87  I                                                                                          I   87
 90  I                                                                                          I   90
 93  I                                                                                          I   93
 96  I                                                                                          I   96
 99  I                                                                                          I   99
102  I                                                                                          I  102
105  I                                                                                          I  105
108  I                                                                                          I  108
111  I                                                                                          I  111
114  I                                                                                          I  114
117  I                                                                                          I  117
120  I                                                                                          I  120
123  I                                                                                          I  123
126  I                                                                                          I  126
129  I                                                                                          I  129
132  I                                                                                          I  132
135  I                                                                                          I  135
138  I                                                                                          I  138
141  I                                                                                          I  141
144  I                                                                                          I  144
147  I                                                                                          I  147
150  I                                                                                          I  150
153  I                                                                                          I  153
156  I                                                                                          I  156
159  I                                                                                          I  159
162  I                                                                                          I  162
165  I                                                                                          I  165
168  I                                                                                          I  168
171  I                                                                                          I  171
174  I                                                                                          I  174
177  I                                                                                          I  177
180  I                                                                                          I  180
183  I                                                                                          I  183
186  I                                                                                          I  186
189  I                                                                                          I  189
192  I                                                                                          I  192
195  I                                                                                          I  195
198  I                                                                                          I  198
201  I                                                                                          I  201
204  I                                                                                          I  204
207  I                                                                                          I  207
210  I                                                                                          I  210
213  I                                                                                          I  213
216  I                                                                                          I  216
219  I                                                                                          I  219
222  I                                                                                          I  222
225  I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I  225
```

```
177 I                                                                                      I 177
180 I                                                                                      I 180
183 I                                                                                      I 183
  I                                                                                        I
  I                                                                                        I
  I                                                                                        I 192
195 I                                                                                      I 195
198 I                                                                                      I 198
201 I                                                                                      I 201
204 I                                                                                      I 204
207 I                                                                                      I 207
210 I                                                                                      I 210
213 I                                                                                      I 213
216 I                                                                                      I 216
219 I                                                                                      I 219
222 I                                                                                      I 222
225 I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I 225

CHANNEL NO.   13       14       15       16
-----------
```

267

```
***  $STAT = COMPLETED  ***

TIME FOR STAT     5.502
```

TEST RUN 5

```
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL          03 MAR 78
                                      HOUSTON,TEXAS

$STAT

    SUNANG    TAPE
    CHANNE    DATA=1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16  FILTER=5,6,7,8
    HISTO     1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16
    B-MATR    CARDS
```

ORIGINAL PAGE IS OF POOR QUALITY

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL — 03 MAR 78

HOUSTON,TEXAS

LINEAR TRANSFORMATION (6) MATRIX

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

LIN. CMB.	CH(5)	CH(6)	CH(7)	CH(8)
1	.4330+00	.6320+00	.5860+00	.2640+00
2	-.2900+00	-.5620+00	.6000+00	.4910+00
3	-.8290+00	.5220+00	-.3900-01	.1940+00
4	.2230+00	.1200-01	-.5430+00	.8100+00
BIAS	0.0.16.0.25.0.20.0			

```
THE BIAS ARE
   .00      16.00     25.00     20.00
  OPTION    TASSEL
  OPTION    COVAR
  OPTION    HIST
  DATAFI    FILE=7
  STATFI    FILE=2
  OPTION    MAXSUB=1
  HEDI      RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
  .END.
```

371

```
             RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL                    03 MAR 78
                                          HOUSTON,TEXAS

YOU HAVE SELECTED THE FOLLOWING  SSTAT  PROCESSOR OPTIONS:

    PRINT MEAN AND COVARIANCE FOR EACH FIELD
    PRINT A HISTOGRAM FOR EACH FIELD
    PRINT A HISTOGRAM  FOR EACH SUBCLASS
    PRINT MEAN AND COVARIANCE FOR EACH SUBCLASS

SUPERVISOR INFORMATION:

   UNUSED CORE     28 LOCATIONS
   MAXIMUM NO. OF FIELDS..204
   MAXIMUM NO. OF SUBCLASSES...  1
   CHANNELS SELECTED ARE     1.  2.  3.  4.  5.  6.  7.  8.  9. 10. 11. 12. 13. 14. 15.
                            16.
   HISTOGRAM CHANNELS ARE    1.  2.  3.  4.  5.  6.  7.  8.  9. 10. 11. 12. 13. 14. 15.
                            16.

INPUT IMAGE DATA TAPE INFORMATION

    FORMAT                   UNIVERSAL
    NO. OF CHANNELS             16
    NO. OF PIXELS/LINE         196
    FIRST SCAN LINE NO.          1
    FIRST PIXEL REFERENCE PT     1

                                          SUN ANGLES

                              60   60   60   60   60   60   60   60

                                   CORRECTIONS FOR SUN ANGLES

CH( 1)  CH( 2)  CH( 3)  CH( 4)  CH( 5)  CH( 6)  CH( 7)  CH( 8)  CH( 9)  CH(10)  CH(11)  CH(12)  CH(13)  CH(14)  CH(15)  CH(16)
 THE SUN ANGLE GAIN FACTORS ARE
  1.00    1.00    1.00    1.00    1.00    1.00    1.00    1.00    1.00    1.00    1.00    1.00    1.00    1.00    1.00    1.00
 THE SUN ANGLE BIAS FACTORS ARE
   .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 03 MAR 78
HOUSTON,TEXAS

TRAINING FIELDS

FIELD NO.	FIELD NAME	CLASS	SUBCLASS	SAMPLE INC	LINE INC	VERTICES(SAMPLE,LINE)
1	81-01	BARLEY	SWHEAT	1	1	(1, 1) (196, 1) (196, 117) (1, 117)

22169 POINTS WILL BE USED IN THE FIELD MEAN,COVARIANCE CALCULATIONS

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON, TEXAS

03 MAR 78

THE MEAN, STANDARD DEVIATION, COVARIANCE, AND CORRELATION (16 CHANNELS) FOR:

TRAINING FIELD BI-01

MEAN:	38.40	46.17	55.46	23.12	38.75	44.86	56.26	22.65	39.60	48.70	54.37	21.42
ST DEV:	3.43	5.89	7.26	2.41	4.36	4.49	7.81	2.64	5.92	6.20	7.62	2.25
MEAN:	38.26	48.70	50.42	19.20								
ST DEV:	5.63	4.14	4.44	.95								

COVARIANCE MATRIX

11.77									
20.09	-34.74								
11.09	-67.57	-52.65							
2.39	-31.96	-20.37	-5.82						
12.16	-40.69	-73.91	-34.51	-18.99					
19.64	-34.30	-81.08	-39.53	-9.19	20.19				
11.73	-65.93	-70.45	-28.70	-63.20	-62.60	-60.92			
2.69	-30.13	-24.87	-9.02	-32.61	-37.18	-24.67	-6.97		
8.63	-48.69	-69.66	-30.88	-40.62	-42.06	-67.91	-29.44	-35.06	
11.00	-56.57	-69.33	-29.95	-54.45	-56.26	-70.19	-28.59	-44.36	-38.42

9.32	-67.93	-63.67	-24.93	-71.39	-77.90	-70.25	-25.39	-63.17	-59.51	-49.30	
2.79	-28.17	-22.66	-8.16	-30.61	-34.39	-26.34	-8.70	-27.48	-26.05	-18.32	-5.06
5.13	-52.56	-63.51	-27.02	-47.10	-53.94	-63.84	-25.42	-41.91	-45.08	-57.51	-23.70
6.92	-63.99	-67.30	-27.67	-65.43	-74.73	-69.60	-25.47	-53.21	-47.30	-57.56	-22.94
6.07	-67.75	-61.01	-23.56	-72.43	-83.45	-66.24	-22.32	-60.96	-54.98	-51.80	-18.32
2.07	-25.77	-20.22	-7.26	-29.05	-33.39	-22.80	-6.97	-24.91	-22.22	-17.13	-5.24

-31.72			
-33.79	-17.17		
-40.33	-25.47	-19.67	
-16.75	-10.70	-6.90	-.86

CORRELATION MATRIX

1.00											
.99	-1.00										
.45	-1.58	-1.00									
.29	-2.25	-1.16	-1.00								
.81	-1.58	-2.34	-3.28	-1.00							
1.27	-1.29	-2.49	-3.65	-.47	1.00						
.44	-1.43	-1.24	-1.52	-1.86	-1.78	-1.00					
.30	-1.94	-1.30	-1.42	-2.83	-3.13	-1.20	-1.00				
.43	-1.40	-1.62	-2.16	-1.57	-1.58	-1.47	-1.88	-1.00			
.52	-1.55	-1.54	-2.00	-2.02	-2.02	-1.45	-1.75	-1.21	-1.00		
.39	-1.64	-1.25	-1.47	-2.33	-2.47	-1.24	-1.37	-1.52	-1.37	-1.00	
.36	-2.12	-1.39	-1.50	-3.12	-3.40	-1.50	-1.47	-2.06	-1.87	-1.16	-1.00
.27	-1.58	-1.55	-1.99	-1.92	-2.13	-1.45	-1.71	-1.26	-1.29	-1.45	-1.87
.49	-2.62	-2.24	-2.77	-3.62	-4.01	-2.15	-2.33	-2.17	-1.84	-1.96	-2.46
.40	-2.59	-1.90	-2.20	-3.75	-4.19	-1.91	-1.91	-2.32	-2.00	-1.66	-1.84
.65	-4.71	-3.00	-3.24	-7.18	-8.00	-3.14	-2.84	-4.53	-3.86	-2.63	-2.51

-1.00			
-1.45	-1.00		
-1.61	-1.39	-1.00	
-3.2[illegible]	-2.78	-1.67	-1.00

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

03 MAR 78

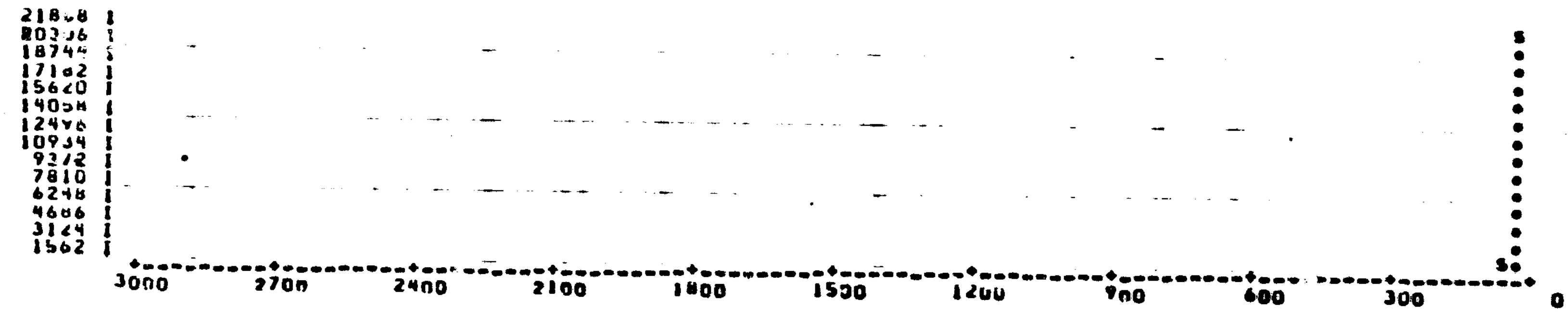
HISTOGRAM

TRAINING FIELD BI-01

(NO. SAMPLES= 22169 , SUBCLASS= WHEAT)

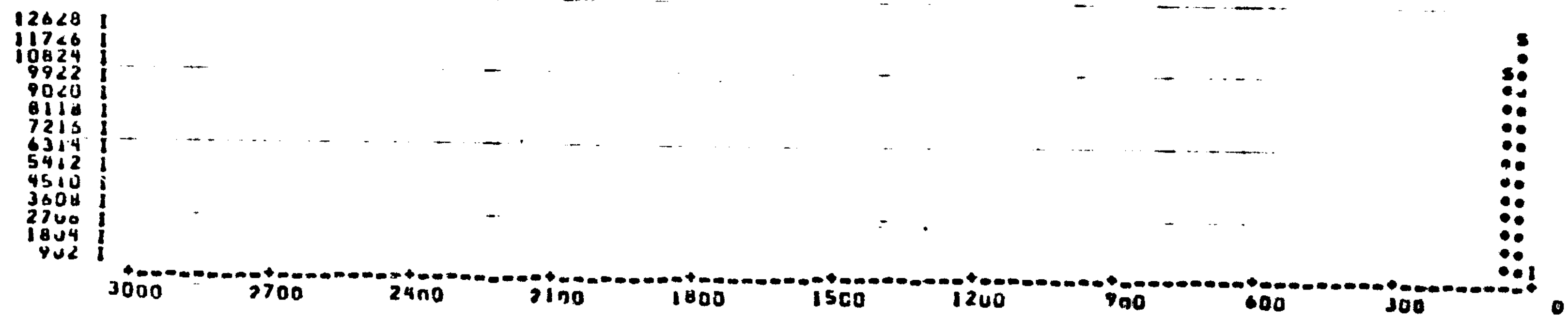
CHANNEL 1

EACH • REPRESENTS 1562 POINT(S).



CHANNEL 2

EACH • REPRESENTS 902 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL   03 MAR 78
HOUSTON,TEXAS

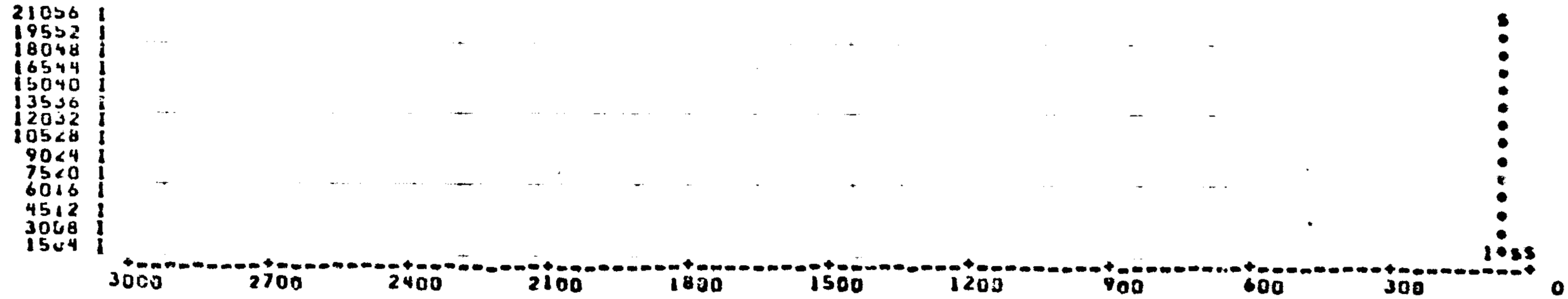
HISTOGRAM

TRAINING FIELD   8I-01

(NO. SAMPLES= 22169 , SUBCLASS= SWHEAT)

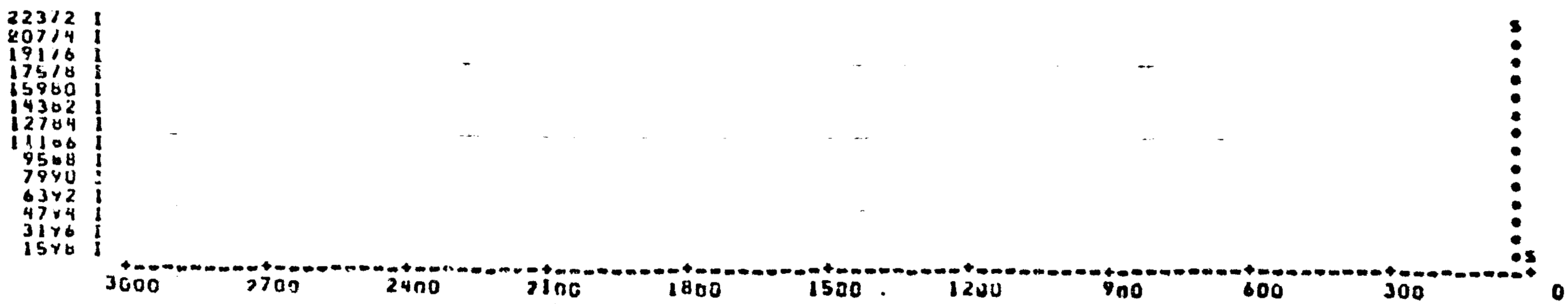
CHANNEL 3

EACH * REPRESENTS   1504 POINT(S).



CHANNEL 4

EACH * REPRESENTS   1598 POINT(S).



```
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL                                03 MAR 78
                                          HOUSTON,TEXAS

                                            HISTOGRAM
                                            ---------

                                      TRAINING FIELD       81-01

                              (NO. SAMPLES=   22169 , SUBCLASS= SWHEAT)
CHANNEL  7
----------

   EACH * REPRESENTS     1520  POINT(S).

 21280 I
 19760 I                                                                                         S
 18240 I                                                                                         *
 16720 I                                                                                         *
 15200 I                                                                                         *
 13680 I                                                                                         *
 12160 I                                                                                         *
 10640 I                                                                                         *
  9120 I                                                                                         *
  7600 I                                                                                         *
  6080 I                                                                                         *
  4560 I                                                                                         *
  3040 I                                                                                         *
  1520 I                                                                                         *
        +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      3000      2700      2400      2100      1800      1500      1200       900       600       300    3055   0

CHANNEL  8
----------

   EACH * REPRESENTS     1593  POINT(S).

 22302 I
 20709 I                                                                                         S
 19116 I                                                                                         *
 17523 I                                                                                         *
 15930 I                                                                                         *
 14337 I                                                                                         *
 12744 I                                                                                         *
 11151 I                                                                                         *
  9558 I                                                                                         *
  7965 I                                                                                         *
  6372 I                                                                                         *
  4779 I                                                                                         *
  3186 I                                                                                         *
  1593 I                                                                                         *
        +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      3000      2700      2400      2100      1800      1500      1200       900       600       300     *S   0
```

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RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON, TEXAS

03 MAR 78

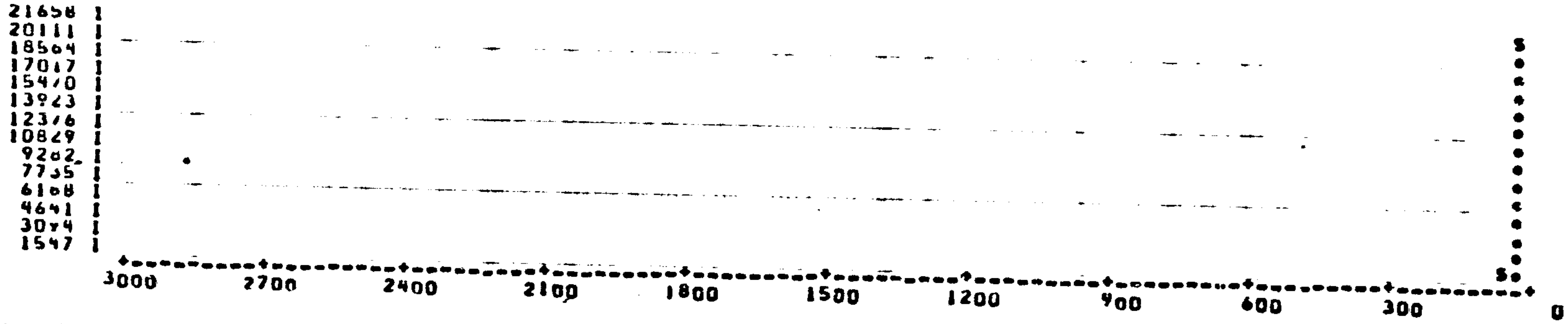
HISTOGRAM

TRAINING FIELD 81-01

(NO. SAMPLES= 22169 , SUBCLASS= WHEAT)

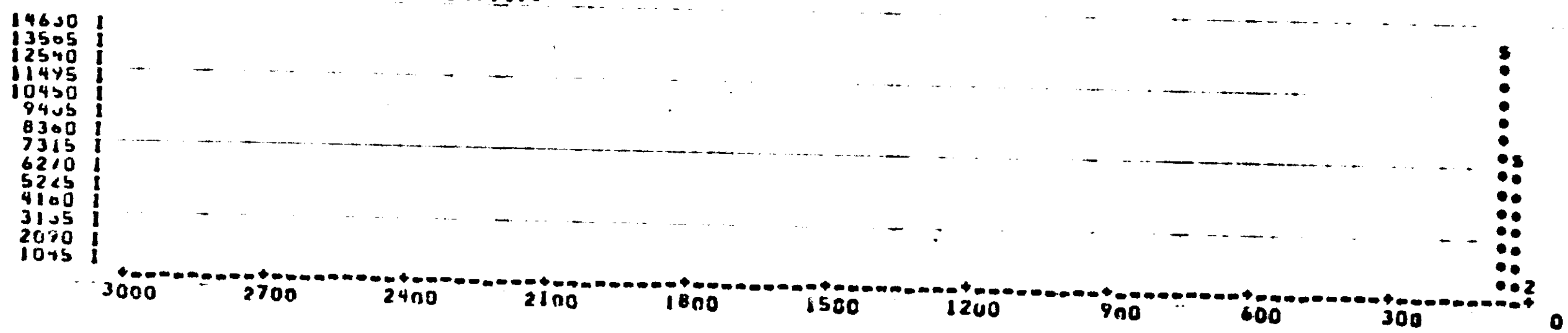
CHANNEL 9

EACH * REPRESENTS 1547 POINT(S).



CHANNEL 10

EACH * REPRESENTS 1045 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINA_ 03 MAR 78
HOUSTON,TEXAS

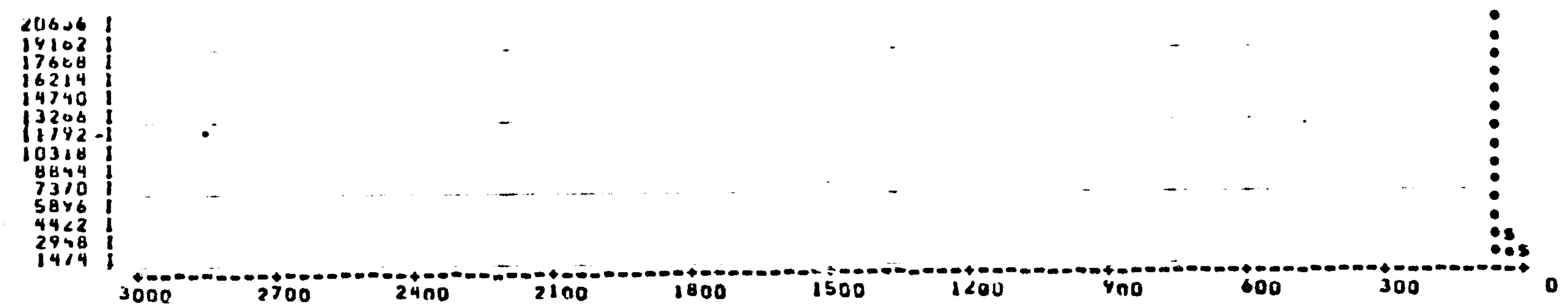
HISTOGRAM

TRAINING FIELD 81-01

(NO. SAMPLES= 22169 , SUBCLASS= SWHEAT)

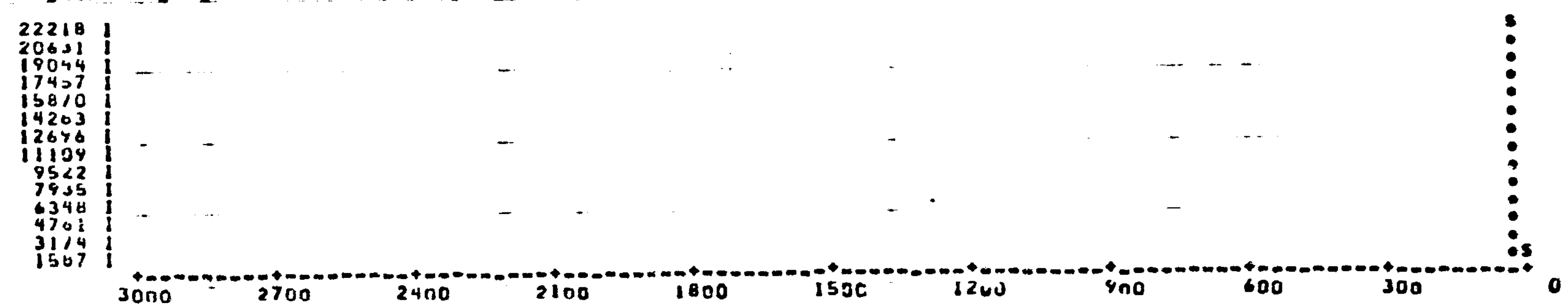
CHANNEL 11

EACH * REPRESENTS 1474 POINT(S).



CHANNEL 12

EACH * REPRESENTS 1587 POINT(S).



281

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

03 MAR 78

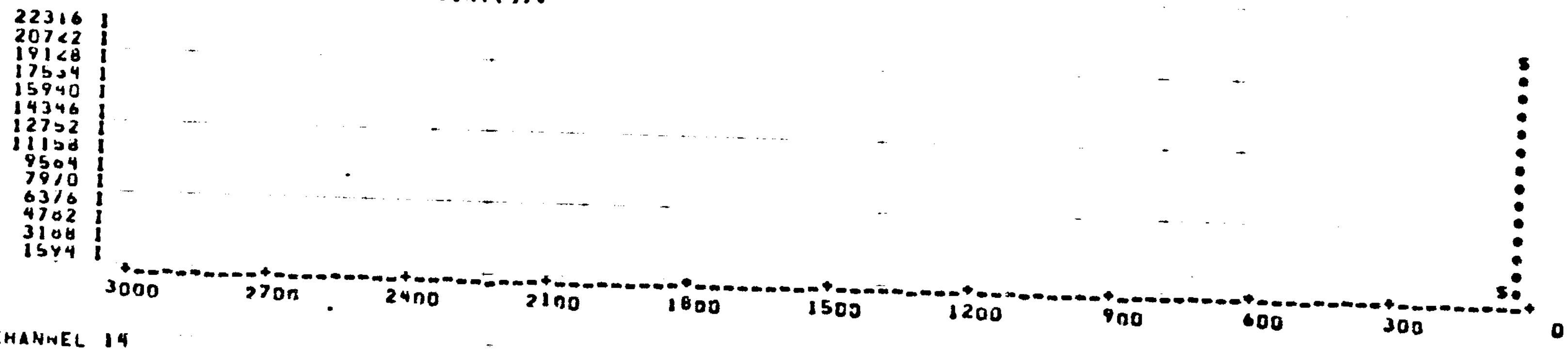
HISTOGRAM

TRAINING FIELD 81-01

(NO, SAMPLES= 22169 , SUBCLASS= SWHEAT)

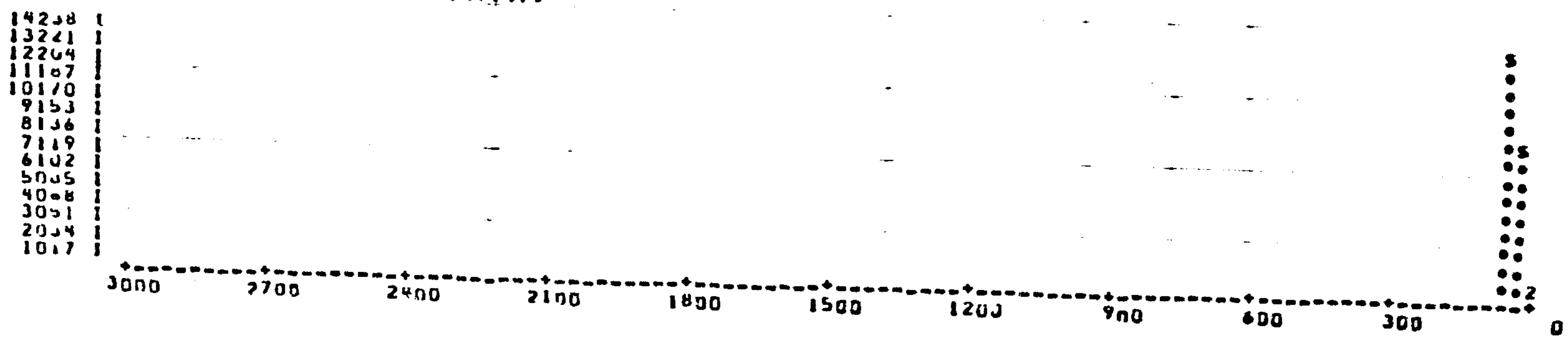
CHANNEL 13

EACH * REPRESENTS 1594 POINT(S).



CHANNEL 14

EACH * REPRESENTS 1017 POINT(S).



284

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 03 MAR 78

HOUSTON,TEXAS

HISTOGRAM

TRAINING FIELD 81-01

(NO. SAMPLES= 22169 , SUBCLASS= SWHEAT)

CHANNEL 15

EACH * REPRESENTS 1140 POINT(S).

```
15960 I                                                                                                 S
14820 I                                                                                                 *
13680 I                                                                                                 *
12540 I                                                                                                 *
11400 I                                                                                                 *
10260 I                                                                                                 *
 9120 I                                                                                                 *
 7980 I                                                                                                 *
 6840 I                                                                                                 *S
 5700 I                                                                                                 **
 4560 I                                                                                                 **
 3420 I                                                                                                 **
 2280 I                                                                                                 **
 1140 I                                                                                                E**I
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
    3000      2700      2400      2100      1800      1500      1200       900       600       300         0
```

CHANNEL 16

EACH * REPRESENTS 1408 POINT(S).

```
19712 I                                                                                                 S
18304 I                                                                                                 *
16896 I                                                                                                 *
15488 I                                                                                                 *
14080 I                                                                                                 *
12672 I                                                                                                 *
11264 I                                                                                                 *
 9856 I                                                                                                 *
 8448 I                                                                                                 *
 7040 I                                                                                                 *
 5632 I                                                                                                 *
 4224 I                                                                                                 *S
 2816 I                                                                                                 **
 1408 I                                                                                                 **
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
    3000      2700      2400      2100      1800      1500      1200       900       600       300         0
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 03 MAR 78
HOUSTON, TEXAS

THE MEAN, STANDARD DEVIATION, COVARIANCE, AND CORRELATION (16 CHANNELS) FOR:

TRAINING SUBCLASS SWHEAT

MEAN:	38.40	46.17	55.46	23.12	38.75	44.86	56.26	22.65	39.60	48.70	54.37	21.42
ST DEV:	3.43	5.89	7.26	2.41	4.36	4.49	7.81	2.64	5.92	6.20	7.02	2.25
MEAN:	38.26	48.70	50.42	19.20								
ST DEV:	5.63	4.14	4.44	.93								

COVARIANCE MATRIX

11.77											
20.04	-34.74										
11.09	-67.57	-52.65									
2.39	-31.96	-20.37	-5.82								
12.16	-40.69	-73.91	-34.51	-18.99							
19.64	-34.30	-81.08	-39.53	-9.19	20.19						
11.73	-65.93	-70.45	-28.70	-63.20	-62.60	-60.92					
2.69	-30.13	-24.87	-9.02	-32.61	-37.18	-24.67	-6.97				
8.63	-48.69	-69.66	-30.88	-40.62	-42.06	-67.91	-29.44	-35.06			
11.00	-56.57	-69.33	-29.95	-54.45	-56.26	-70.19	-28.59	-44.36	-38.42		
9.32	-67.93	-63.67	-24.93	-71.39	-77.90	-70.25	-25.39	-63.17	-59.51	-49.30	
2.79	-28.17	-22.66	-8.16	-30.61	-34.39	-26.34	-8.70	-27.48	-26.05	-18.32	-5.06
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-61.84	-25.42	-41.91	[illegible]	-57.51	-23.70

6.92	-63.99	-67.30	-27.67	-65.43	-74.73	-69.60	-25.47	-53.21	-47.30	-57.55	-22.94
6.07	-67.75	-61.01	-23.56	-72.43	-83.45	-66.24	-22.32	-60.96	-54.98	-51.80	-18.32
2.07	-25.77	-20.22	-7.26	-29.05	-33.39	-22.80	-6.97	-24.91	-22.22	-17.13	-5.29

-31.72			
-33.79	-17.17		
-40.33	-25.47	-19.67	
-16.75	-10.70	-6.90	-.86

285

CORRELATION MATRIX

1.00											
.99	-1.00										
.45	-1.58	-1.00									
.29	-2.25	-1.16	-1.00								
.81	-1.58	-2.34	-3.28	-1.00							
1.27	-1.29	-2.49	-3.65	-.47	1.00						
.44	-1.43	-1.24	-1.52	-1.86	-1.78	-1.00					
.30	-1.94	-1.30	-1.42	-2.83	-3.13	-1.20	-1.00				
.43	-1.40	-1.62	-2.16	-1.57	-1.58	-1.47	-1.88	-1.00			
.52	-1.55	-1.54	-2.00	-2.02	-2.02	-1.45	-1.75	-1.21	-1.00		
.39	-1.64	-1.25	-1.47	-2.33	-2.47	-1.28	-1.37	-1.52	-1.37	-1.00	
.36	-2.12	-1.39	-1.50	-3.12	-3.40	-1.50	-1.47	-2.06	-1.87	-1.16	-1.00
.27	-1.56	-1.55	-1.99	-1.92	-2.13	-1.45	-1.71	-1.26	-1.29	-1.45	-1.87
.49	-2.62	-2.24	-2.77	-3.62	-4.01	-2.15	-2.33	-2.17	-1.84	-1.98	-2.46
.40	-2.59	-1.90	-2.20	-3.75	-4.19	-1.91	-1.91	-2.32	-2.00	-1.66	-1.84
.65	-4.71	-3.00	-3.24	-7.18	-8.00	-3.14	-2.84	-4.53	-3.86	-2.63	-2.51

-1.00			
-1.45	-1.00		
-1.61	-1.39	-1.00	
-3.20	-2.78	-1.67	-1.00

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 03 MAR 78
HOUSTON,TEXAS

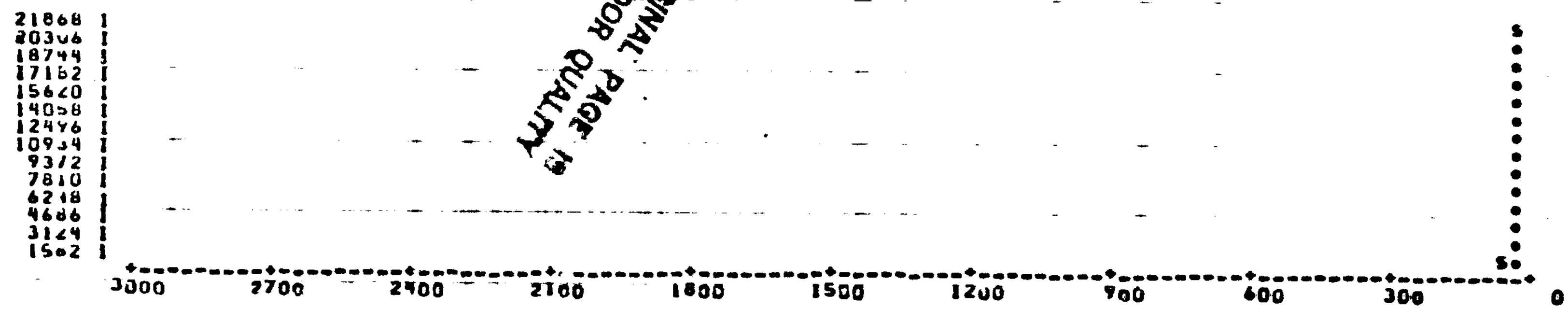
HISTOGRAM

TRAINING SUBCLASS SWHEAT

ORIGINAL PAGE IS OF POOR QUALITY

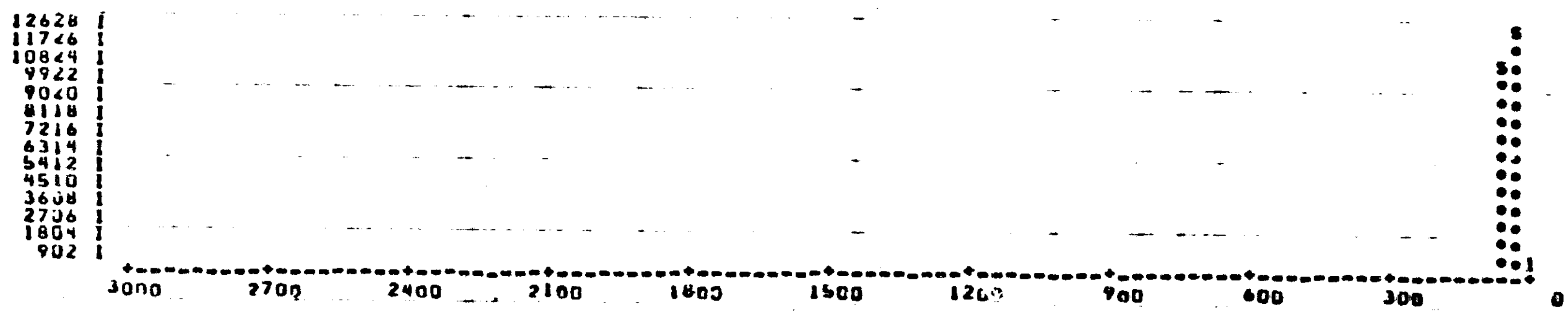
CHANNEL 1

EACH * REPRESENTS 1562 POINT(S).



CHANNEL 2

EACH * REPRESENTS 902 POINT(S).



```
 9922 I                                                                                                          ..
 9020 I                                                                                                          ..
 811'                                                                                                            ..
 72                                                                                                              ..
 63                                                                                                              ..
 54.                                                                                                             ..
 4510 I                                                                                                          ..
 3608 I                                                                                                          ..
 2706 I                                                                                                          ..
 1804 I                                                                                                          ..
  902 I                                                                                                          ..1
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+------+
     3000      2700      2400      2100      1800      1500      1200       900       600       300            0
```

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL   03 MAR 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS   SWHEAT

CHANNEL 3

EACH * REPRESENTS   1504 POINT(S).

```
21056 I                                                                                                           S
19552 I                                                                                                           .
18048 I                                                                                                           .
16544 I                                                                                                           .
15040 I                                                                                                           .
13536 I                                                                                                           .
12032 I                                                                                                           .
10528 I                                                                                                           .
 9024 I                                                                                                           .
 7520 I                                                                                                           .
 6016 I                                                                                                           .
 4512 I                                                                                                           .
 3008 I                                                                                                           .
 1504 I                                                                                                           .
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+---1*55+
     3000      2700      2400      2100      1800      1500      1200       900       600       300            0
```

CHANNEL 4

EACH * REPRESENTS   1598 POINT(S).

```
22372 I                                                                                                           S
20774 I                                                                                                           .
19176 I                                                                                                           .
17578 I                                                                                                           .
15980 I                                                                                                           .
14382 I                                                                                                           .
12784 I                                                                                                           .
11186 I                                                                                                           .
 9588 I                                                                                                           .
 7990 I                                                                                                           .
 6392 I                                                                                                           .
 4794 I                                                                                                           .
 3196 I                                                                                                           .
 1598 I                                                                                                           .5
      +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+------+
     3000      2700      2400      2100      1800      1500      1200       900       600       300            0
```

288

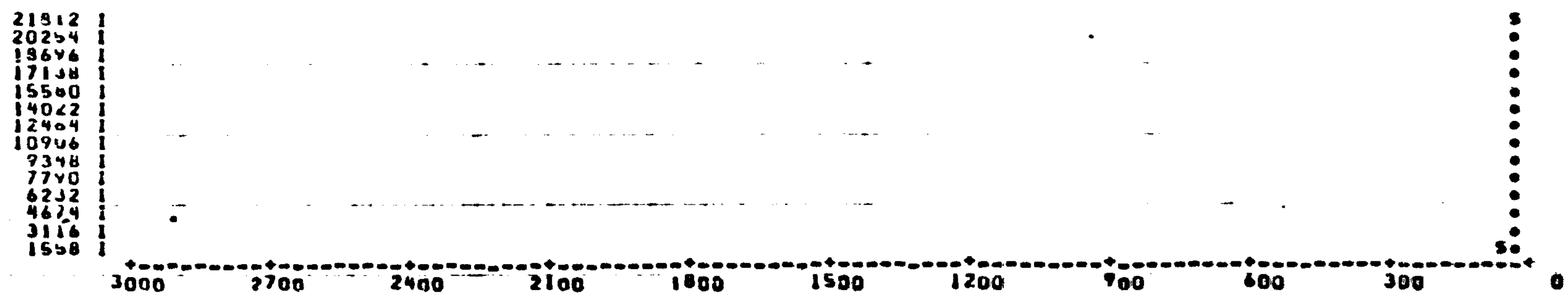
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL — 03 MAR 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SWHEAT

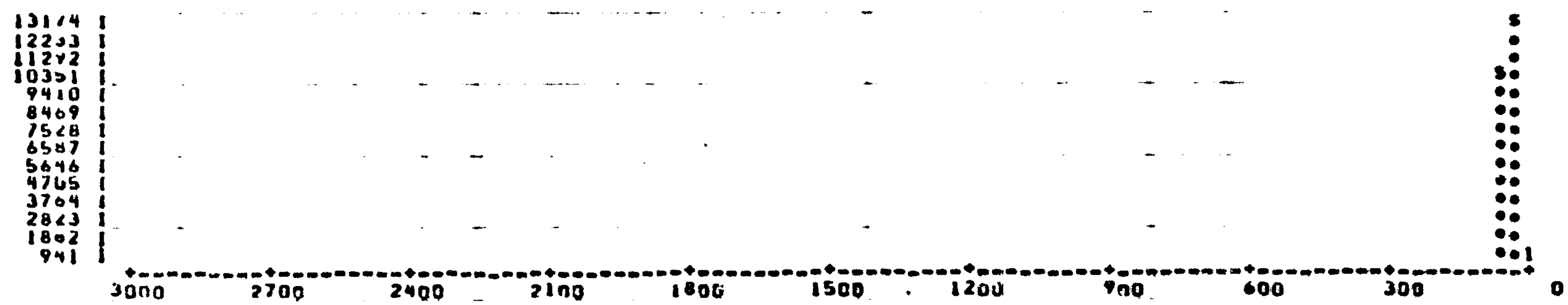
CHANNEL 5

EACH * REPRESENTS 1558 POINT(S).

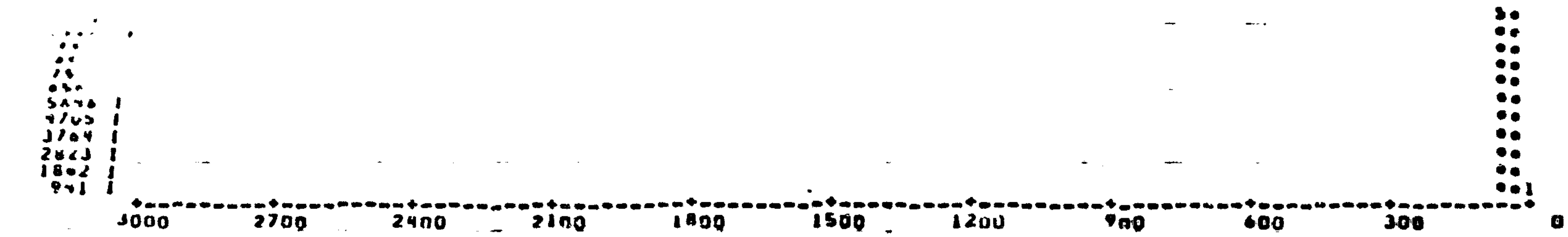


CHANNEL 4

EACH * REPRESENTS 941 POINT(S).



289



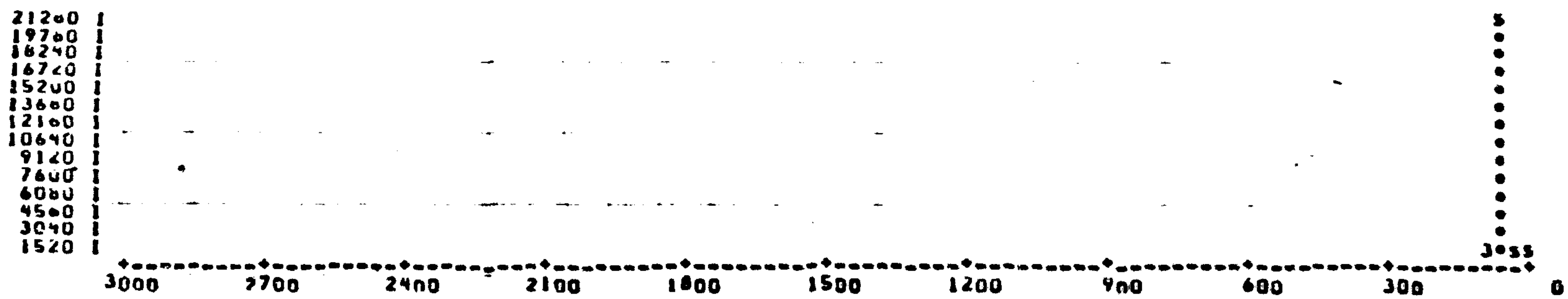
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 03 MAR 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SWHEAT

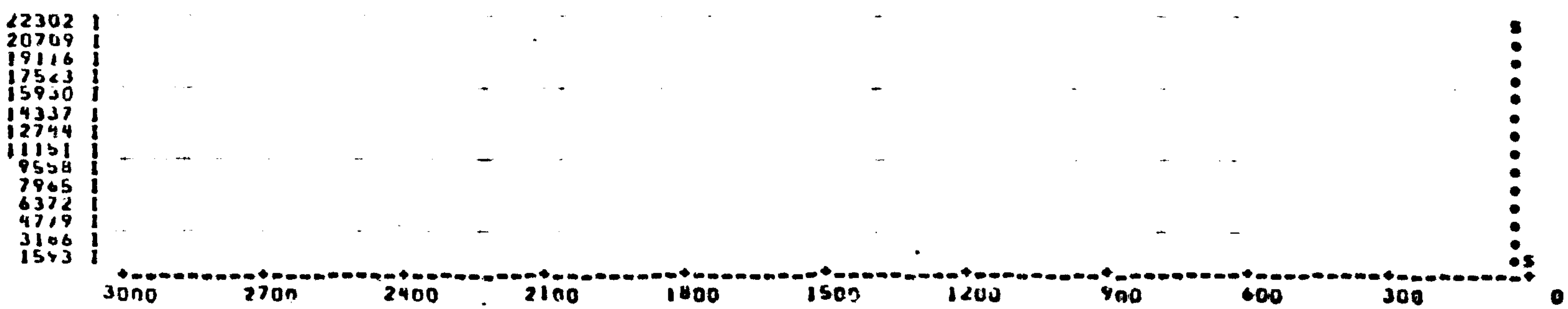
CHANNEL 7

EACH * REPRESENTS 1520 POINT(S).



CHANNEL 8

EACH * REPRESENTS 1593 POINT(S).



```
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL                    03 MAR 78
                                     HOUSTON,TEXAS

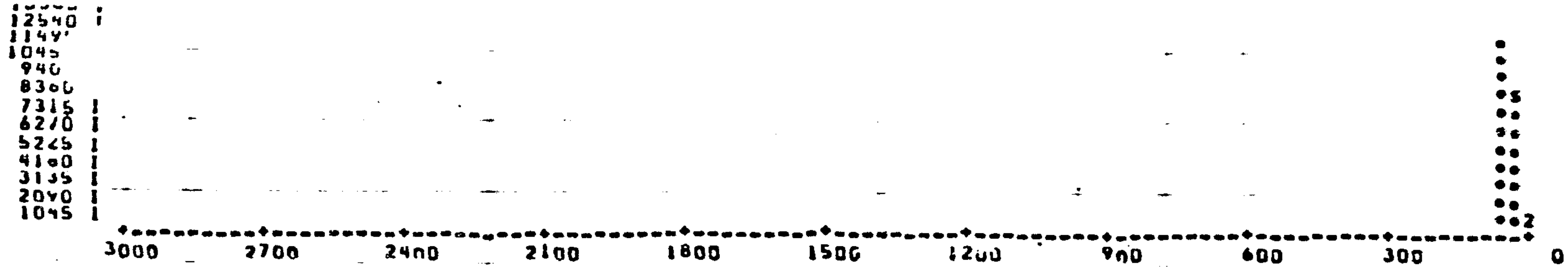
                                         HISTOGRAM
                                     -----------------
                                TRAINING SUBCLASS   SWHEAT
                                -----------------------------
CHANNEL  9
----------
   EACH * REPRESENTS    1547  POINT(S).

 21658 I                                                                                   $
 20111 I                                                                                   *
 18564 I                                                                                   *
 17017 I                                                                                   *
 15470 I                                                                                   *
 13923 I                                                                                   *
 12376 I                                                                                   *
 10829 I                                                                                   *
  9282 I                                                                                   *
  7735 I                                                                                   *
  6188 I                                                                                   *
  4641 I                                                                                   *
  3094 I                                                                                   *
  1547 I                                                                                  $*
        +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      3000      2700      2400      2100      1800      1500      1200       900       600       300         0

CHANNEL 10
----------
   EACH * REPRESENTS    1045  POINT(S).

 14630 I                                                                                  $
 13585 I                                                                                  *
 12540 I                                                                                  *
 11495 I                                                                                  *
 10450 I                                                                                  *
  9405 I                                                                                  *
  8360 I                                                                                  *$
  7315 I                                                                                  **
  6270 I                                                                                  **
  5225 I                                                                                  **
  4180 I                                                                                  **
  3135 I                                                                                  **
  2090 I                                                                                  **
  1045 I                                                                                  **2
        +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
      3000      2700      2400      2100      1800      1500      1200       900       600       300         0
```

241



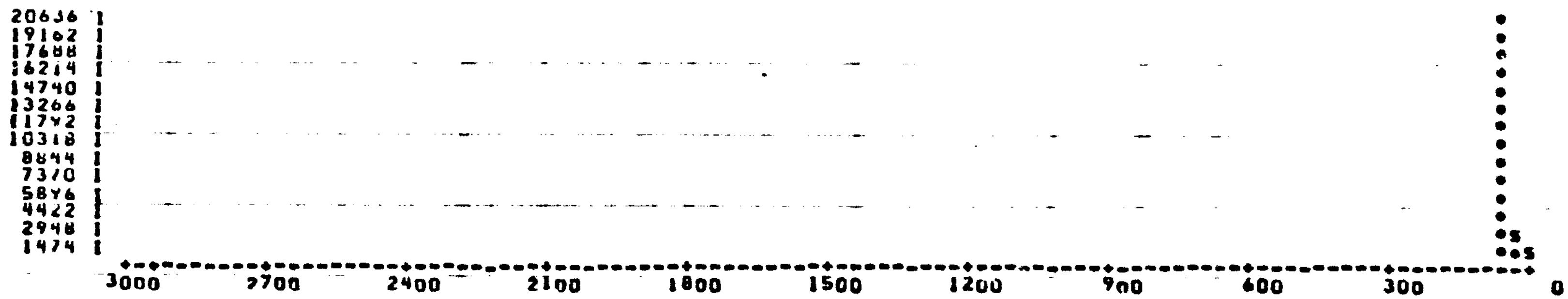
RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 03 MAR 78
HOUSTON,TEXAS

HISTOGRAM

TRAINING SUBCLASS SWHEAT

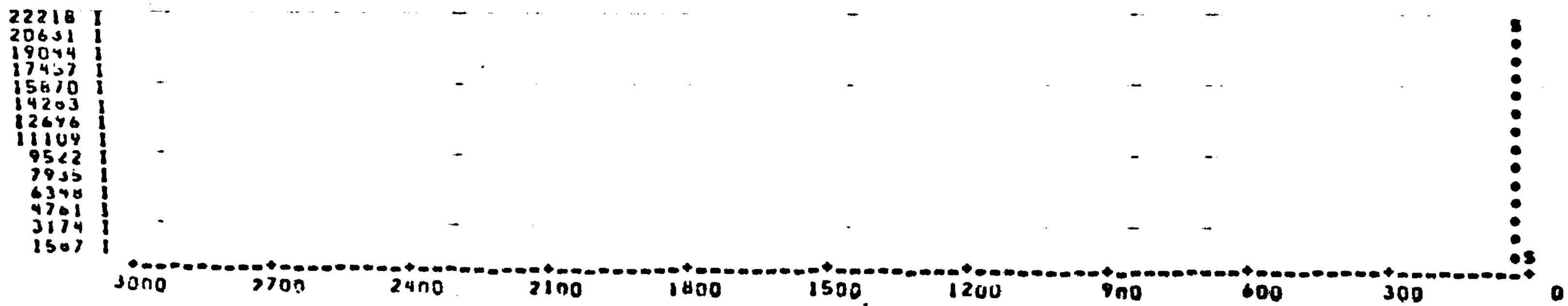
CHANNEL 11

EACH * REPRESENTS 1474 POINT(S).



CHANNEL 12

EACH * REPRESENTS 1587 POINT(S).



ORIGINAL PAGE IS OF POOR QUALITY

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

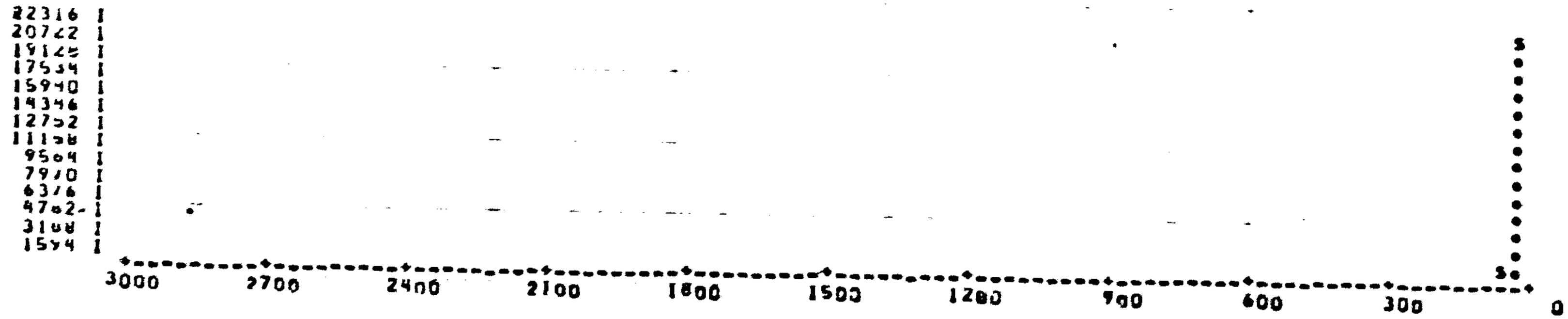
03 MAR 78

HISTOGRAM

TRAINING SUBCLASS SWHEAT

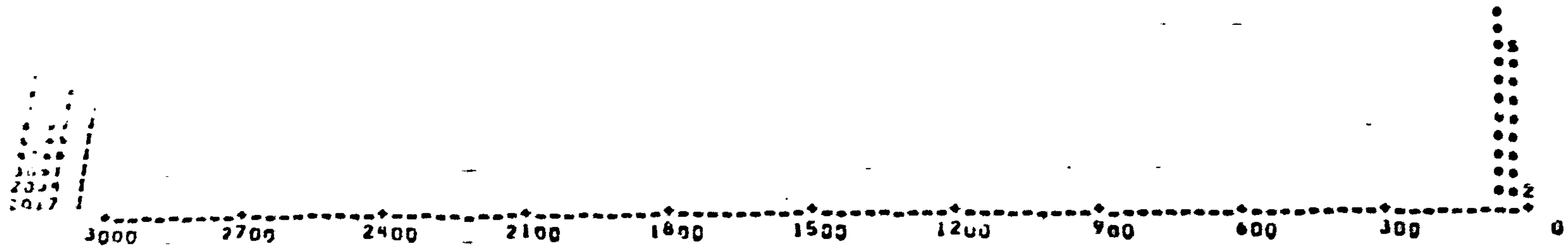
CHANNEL 13

EACH * REPRESENTS 1594 POINT(S).



CHANNEL 14

EACH * REPRESENTS 1017 POINT(S).



RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

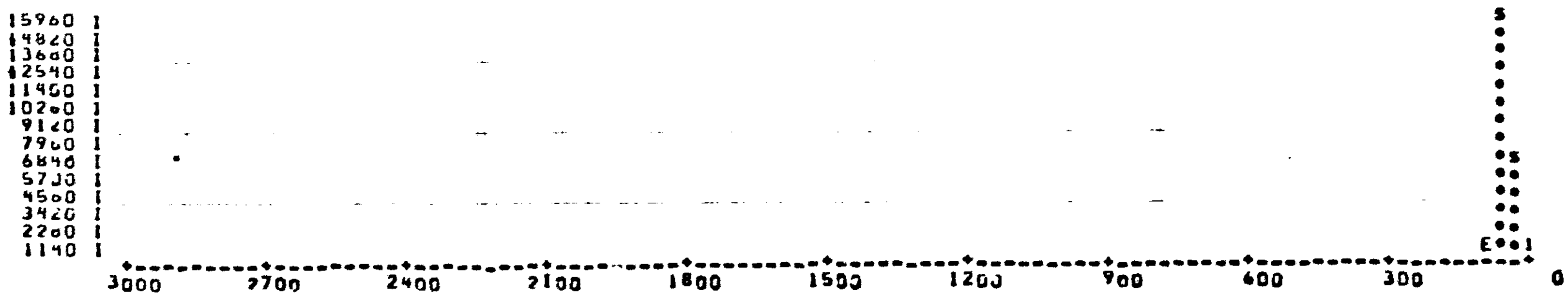
03 MAR 78

HISTOGRAM

TRAINING SUBCLASS SWHEAT

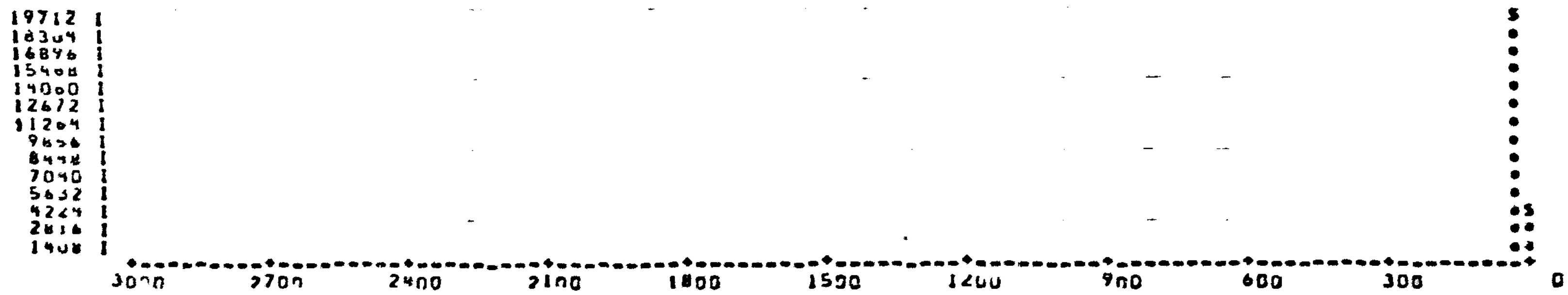
CHANNEL 15

EACH * REPRESENTS 1140 POINT(S).



CHANNEL 16

EACH * REPRESENTS 1408 POINT(S).



244

RUN ?) MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL HOUSTON,TEXAS 03 MAR 76

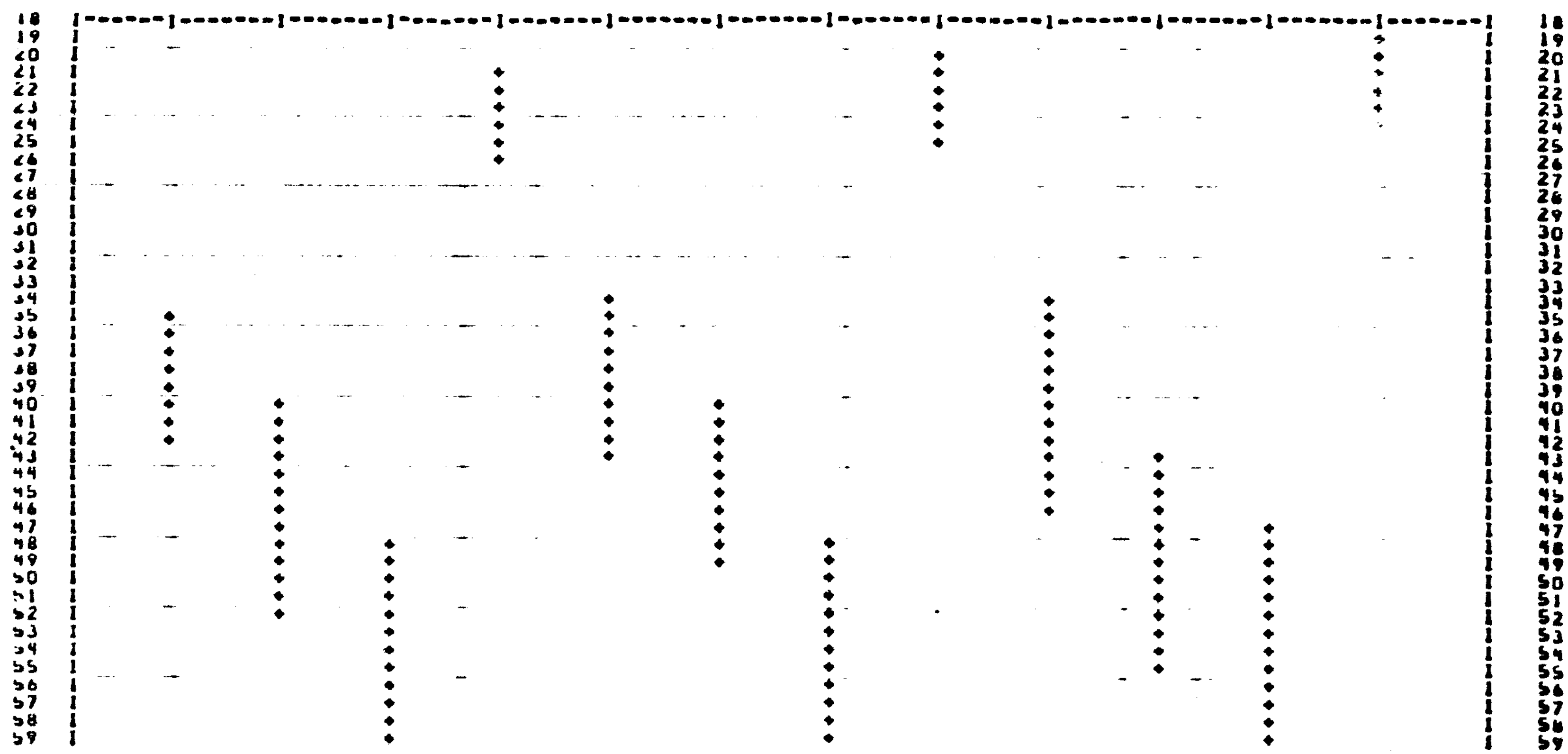
COMPOSITE SPECTRAL PLOT (MEAN,PLUS AND MINUS ONE STD. DEV.) FOR

TRAINING SUBCLASS(ES) 1

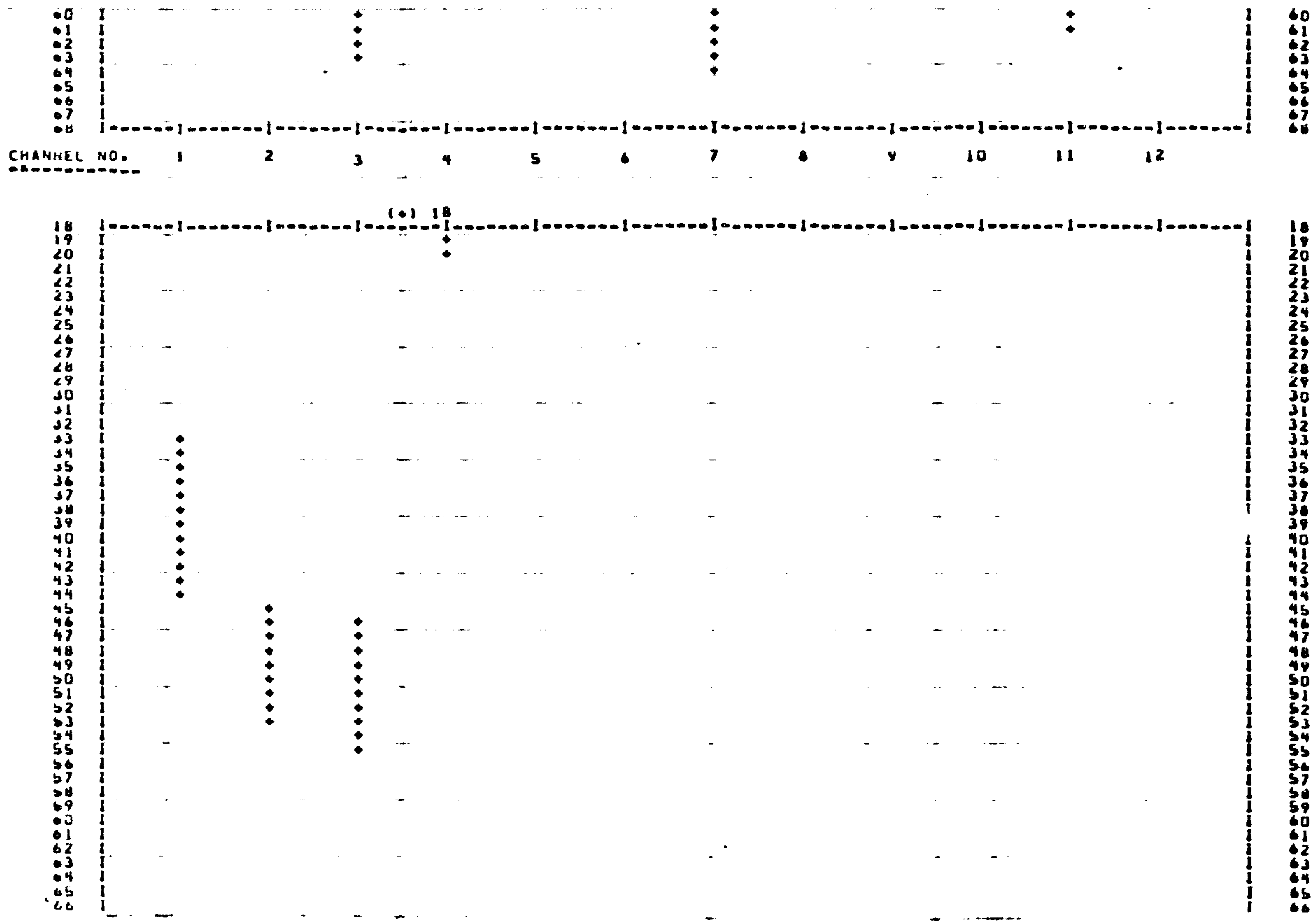
PLOT LEGEND:

\+ = SUBCLASS SWHEAT

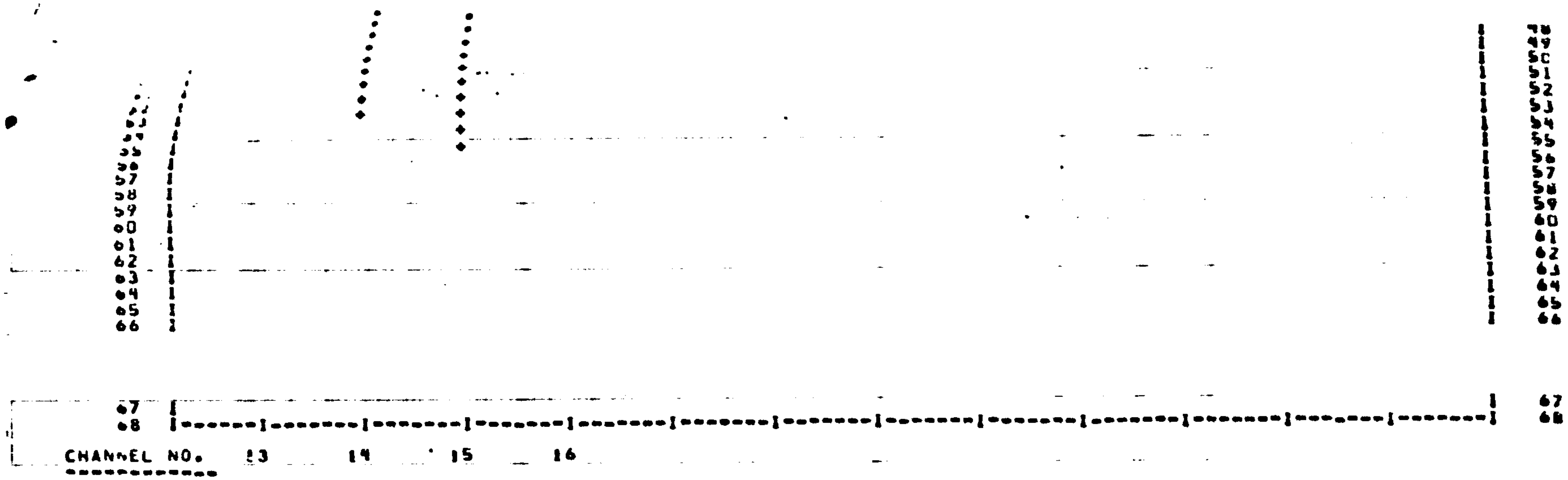
MAXV= 65 SPCBAS= 18 INCR= 1.00



295


CHANNEL NO.
1 2 3 4 5 6 7 8 9 10 11 12
(+) 18
60 61 62 63 64 65 66 67 68
18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66

296


48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68
CHANNEL NO. 13 14 15 16

```
*** $STAT - COMPLETED ***

TIME FOR STAT     7.004
```

TEST RUN 6

03 MAR 78

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

```
SDATA-TR

INPUT IMAGE DATA TAPE INFORMATION
    FORMAT                        UNIVERSAL
    NO. OF CHANNELS                  16
    NO. OF PIXELS/LINE              196
    FIRST SCAN LINE NO.               1
    FIRST PIXEL REFERENCE PT          1
   DATAFI     FILE=7
   SUNANG     5.10.15.20
   MODULE     FILE
   OPTION     ORIG.TRANSF
   OPTION     GREEN.PCG
   STATFI     FILE=1
   TRFORM     OUTPUT/FILE=1,UNIT=16
   B-MATR     CARDS
   RESCAL
   FORMAT     OUTPUT=UNIVERSAL
   *END*
```

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RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL HOUSTON,TEXAS 03 MAR 78

••• ORIGINAL STATISTICS •••

SUBCLASS SWHEAT

MEAN	38.43	44.64	53.61	22.34	37.46	43.37	54.38	21.90	38.28	47.08	52.56	20.71
MEAN	36.99	47.08	48.74	18.56								

COVARIANCE MATRIX

12.29											
17.88	35.00										
8.93	17.05	48.03									
1.56	3.45	21.56	11.58								
10.50	18.22	-2.33	-4.54	29.94							
17.54	33.48	1.64	-4.85	47.03	84.26						
9.52	19.82	32.25	14.10	9.02	20.67	42.90					
1.87	4.51	16.36	8.13	-3.30	-3.26	17.13	9.76				
7.07	11.74	3.30	-.40	10.09	16.48	6.01	.39	16.54			
9.06	17.65	19.86	7.28	8.06	15.90	20.28	7.85	19.16	39.16		
7.25	15.08	35.44	16.34	-1.25	3.14	30.47	15.06	8.18	27.65	47.42	
2.00	4.59	14.31	8.04	-2.89	-2.34	13.30	7.19	.73	8.30	19.75	9.87
3.72	6.02	6.86	2.34	2.15	3.07	7.52	3.30	8.22	16.36	11.31	3.45
5.12	10.48	21.81	9.48	-2.55	-1.97	20.84	10.86	10.59	30.57	29.54	11.38
4.24	9.39	30.96	14.72	-7.18	-7.92	27.19	15.15	5.29	25.84	38.09	17.03
1.38	3.61	14.70	7.27	-4.15	-4.57	12.71	7.25	.38	8.60	17.03	8.17

16.42			
27.27	59.70		
23.06	54.36	62.75	
7.44	19.73	24.47	11.03

16.42			
27	69.70		
-3.05	54.36	62.75	
7.44	19.73	24.47	11.03

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RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL 03 MAR 78
HOUSTON,TEXAS

LINEAR TRANSFORMATION (B) MATRIX

NO. LINEAR COMB. = 4
NO. CHANNELS = 16

LIN. CMB.	CH(1)	CH(2)	CH(3)	CH(4)	CH(5)	CH(6)	CH(7)	CH(8)	CH(9)	CH(10)	CH(11)	CH(12)
1	-.2900+00	-.5620+00	.6000+00	.4910+00	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
2	.0000	.0000	.0000	.0000	-.2900+00	-.5620+00	.6000+00	.4910+00	.0000	.0000	.0000	.0000
3	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	-.2900+00	-.5620+00	.6000+00	.4910+00
4	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

LIN. CMB.	CH(13)	CH(14)	CH(15)	CH(16)
1	.0000	.0000	.0000	.0000
2	.0000	.0000	.0000	.0000
3	.0000	.0000	.0000	.0000
4	-.2900+00	-.5620+00	.6000+00	.4910+00

SUN ANGLES

5 10 15 20 60 60 60 60

CORRECTIONS FOR SUN ANGLES

	CH(1)	CH(2)	CH(3)	CH(4)	CH(5)	CH(6)	CH(7)	CH(8)	CH(9)	CH(10)	CH(11)	CH(12)	CH(13)	CH(14)	CH(15)	CH(16)
THE SUN ANGLE GAIN FACTORS ARE	16.41	14.89	14.09	13.40	6.88	6.43	6.19	5.97	4.16	3.96	3.85	3.76	2.95	2.85	2.79	2.74
THE SUN ANGLE BIAS FACTORS ARE	10.28	16.43	43.78	16.79	-12.21	-4.36	10.64	5.20	-10.80	-4.91	4.96	2.62	-7.82	-3.50	2.78	1.68

THE INPUT MATRIX TO PCMMAT IS

22.865461	27.589824	14.633116	10.004507
27.589825	57.647354	20.563041	13.477083
14.633116	20.563041	25.013398	13.101498
10.004506	13.477083	13.101498	11.429339

MATRIX OF EIGENVECTORS =

THE TRANSPOSE OF - PCM MATRIX - IS

.443882	.038479	-.881933	.153841
.760696	-.543629	.353029	-.034345
.398155	.731024	.312305	.457757
.256482	.410579	-.005535	-.874992

VECTOR OF EIGEN VALUES C(I) =

49.0535
17.8543
6.70251
3.34522

VECTOR OF RADII R(I) =

.591739-05
.303685-05
.471463-05
.791341-06

... TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL — 03 MAR 78
HOUSTON,TEXAS

... TRANSFORMED STATISTICS ...

SUBCLASS SWHEAT
MEAN 66.20 49.79 18.60 6.24
COVARIANCE MATRIX

6877.89			
2879.15	2363.92		
906.91	512.25	374.56	
396.75	227.20	138.16	86.11

THE SCALING PARAMETERS FROM KBTRAN ARE

THE MAX IS
232.06 147.01 57.30 24.82

THE MIN IS
-99.67 -47.45 -20.11 -12.30

THE CON IS
.77 1.31 3.29 6.87

THE PCG SCALING PARAMETERS ARE

THE MAX IS
244.03 -18.87 -135.00 35.17

THE MIN IS
-91.50 2.19 64.93 -12.15

THE CON IS
4.41 4.55 .78 -4.43

INPUT IMAGE DATA TAPE INFORMATION

FORMAT	UNIVERSAL
NO. OF CHANNELS	16
NO. OF PIXELS/LINE	196
FIRST SCAN LINE NO.	1
FIRST PIXEL REFERENCE PT	1

363

FIELDNAME	NO. OF VERTICES	SAMPLE INC	LINE INC	VERTICES(SAMPLE,LINE)
BI-01	4	1	1	(1, 1) (196, 1) (196, 117) (1, 117)

GREEN IMAGE

• OUTPUT FILE 1 •

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

••• ORIGINAL TRANSFORMED DATA RANGE •••

MIN	MAX	(BIAS)
-316.0000	392.0000	(.0000)
-160.0000	207.0000	(.0000)
-104.0000	118.0000	(.0000)
-66.0000	69.0000	(.0000)

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

MIN	MAX	CON = 255/(MAX-MIN)
-33.3212	207.1847	1.0603
-8.5575	132.4409	1.8085
-3.6610	45.6902	5.1670
-4.4130	18.7865	10.9916

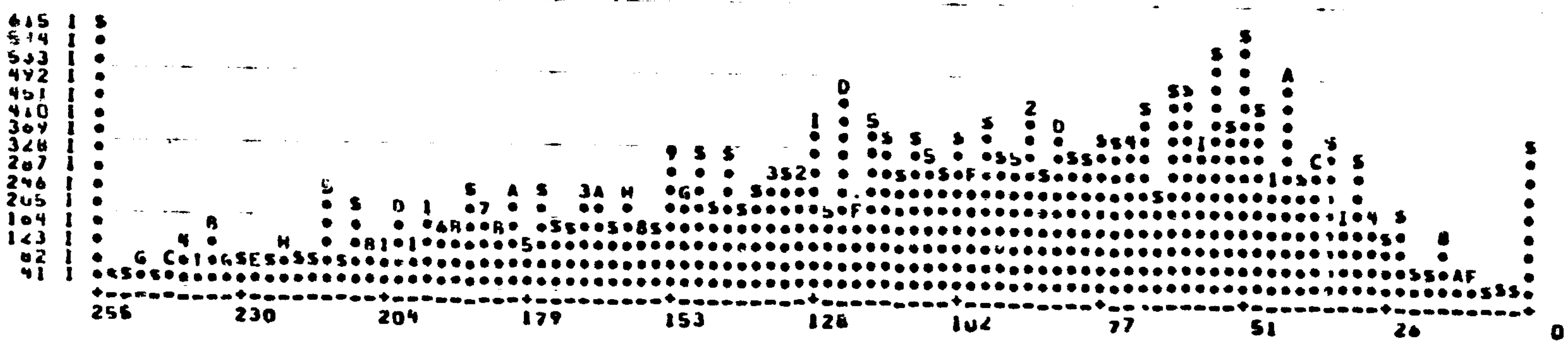
304

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

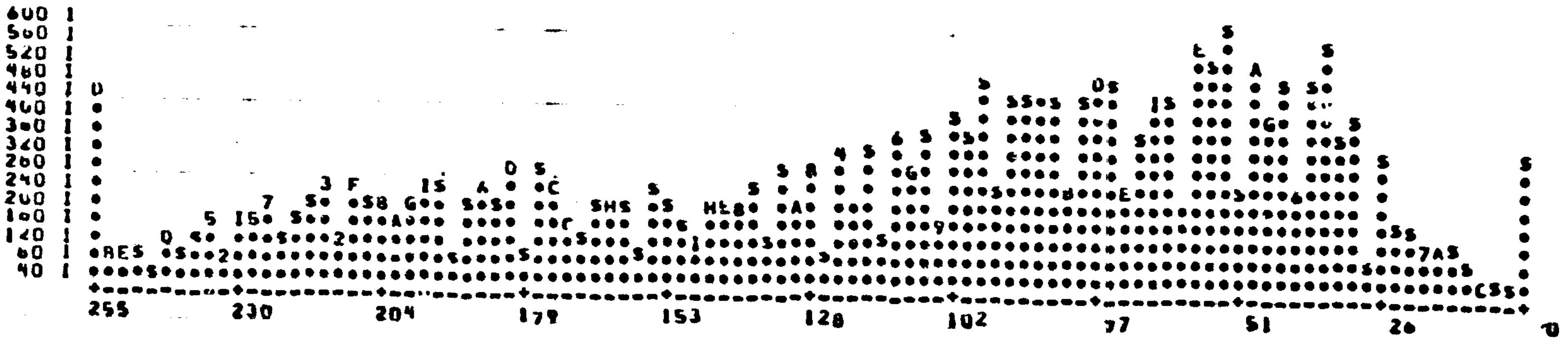
03 MAR 78

DATA TR

EACH * REPRESENTS 41 POINT(S).



EACH * REPRESENTS 40 POINT(S).

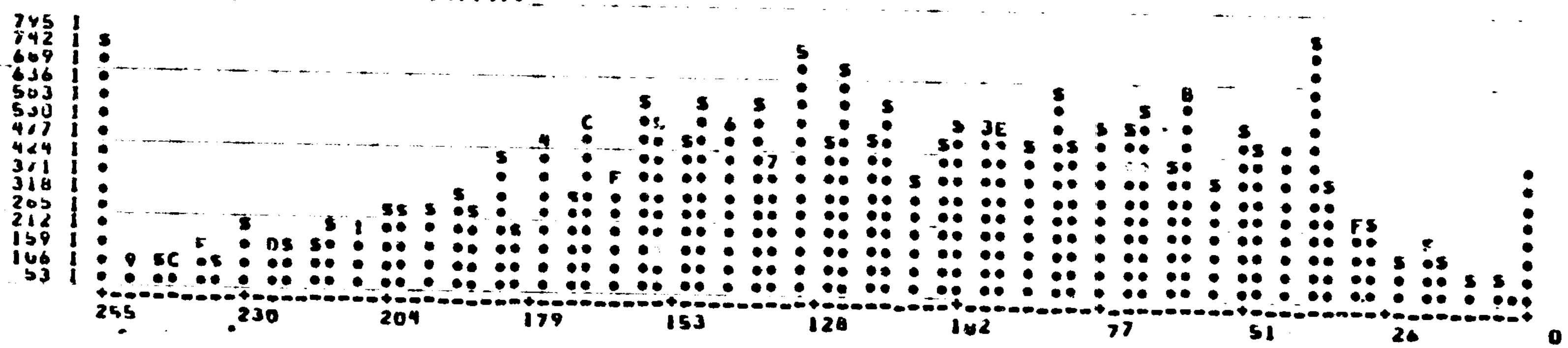


RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

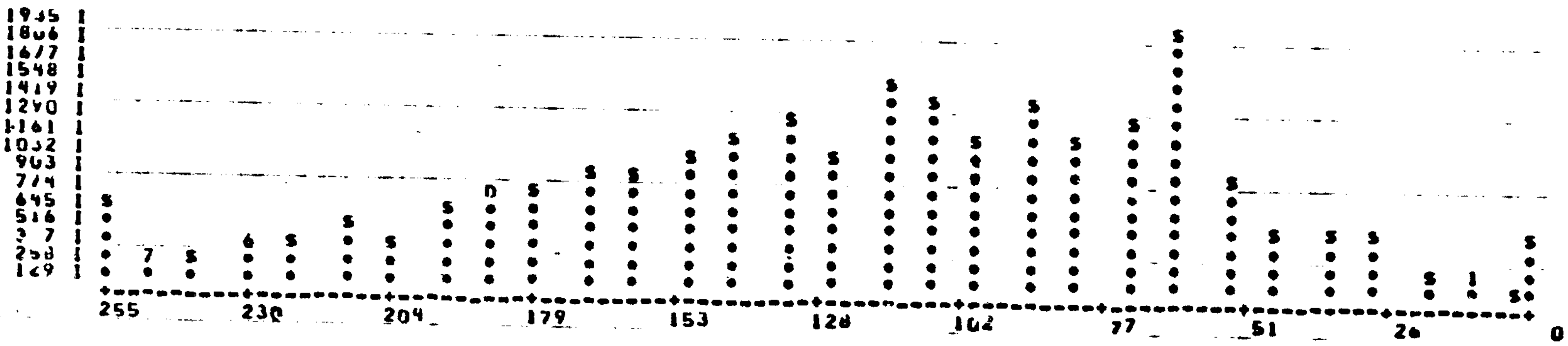
03 MAR 78

DATA TR

EACH * REPRESENTS 53 POINT(S).



EACH * REPRESENTS 129 POINT(S).



SCALING PARAMETERS USED ON TRANSFORMED VALUES. OUTPUT FILE 1

		MINIMUM	MAXIMUM	SCALE FACTOR (CON)
COMPONENT	1	-33.321	207.185	1.060
COMPONENT	2	-8.558	132.441	1.809
COMPONENT	3	-3.661	45.690	5.167
COMPONENT	4	-4.413	18.787	10.992

INPUT IMAGE DATA TAPE INFORMATION

FORMAT	UNIVERSAL
NO. OF CHANNELS	16
NO. OF PIXELS/LINE	196
FIRST SCAN LINE NO.	1
FIRST PIXEL REFERENCE PT	1

FIELDNAME	NO. OF VERTICES	SAMPLE INC	LINE INC	VERTICES(SAMPLE,LINE)
B1-01	4	1	1	(1, 1) (196, 1) (196, 117) (1, 117)

PCG IMAGE

• OUTPUT FILE 2 •

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

••• ORIGINAL TRANSFORMED DATA RANGE •••

MIN	MAX	(BIAS)
-297.5990	340.1382	(.0000)
-92.8081	101.0274	(.0000)
-240.7617	265.2945	(.0000)
-71.4373	64.2937	(.0000)

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

MIN	MAX	CON = 255/(MAX-MIN)
-11.8116	197.8969	1.2160
-21.2422	4.5592	9.8832
-140.0006	39.9427	1.4171
-7.4150	35.1661	5.9886

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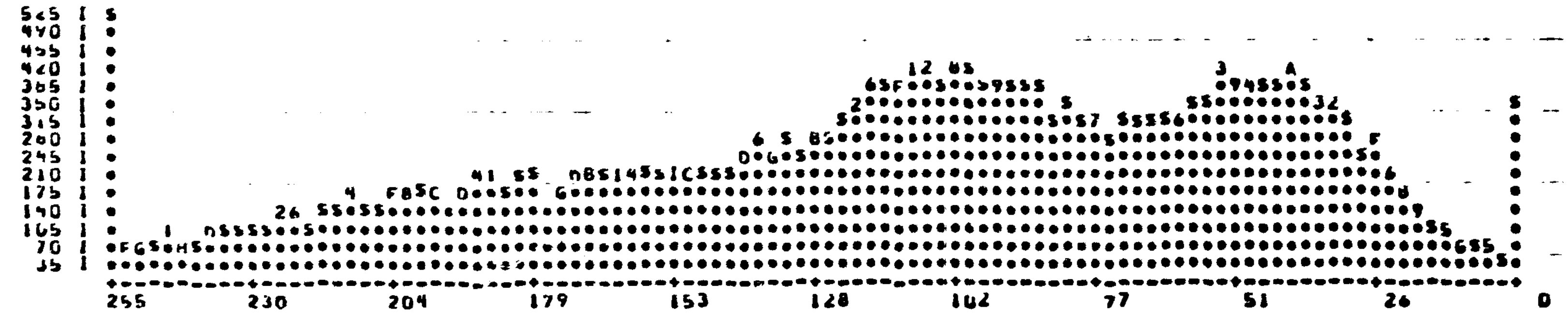
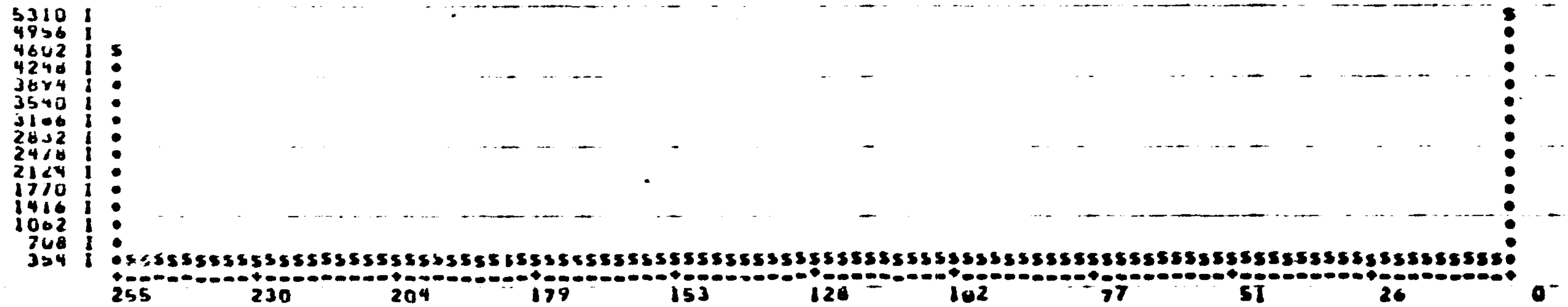
DATA TR

EACH * REPRESENTS 35 POINT(S).



EACH * REPRESENTS 354 POINT(S).



ORIGINAL PAGE IS
OF POOR QUALITY

DATA TR

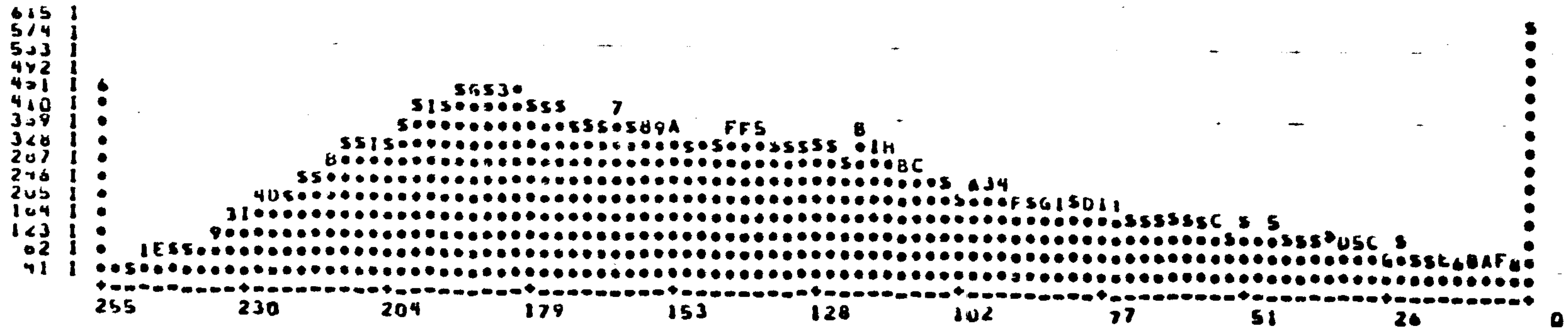
EACH * REPRESENTS 41 POINT(S).

RUN TO MAKE SURE THE CHANGES DIDN'T EFFECT THE ORIGINAL
HOUSTON,TEXAS

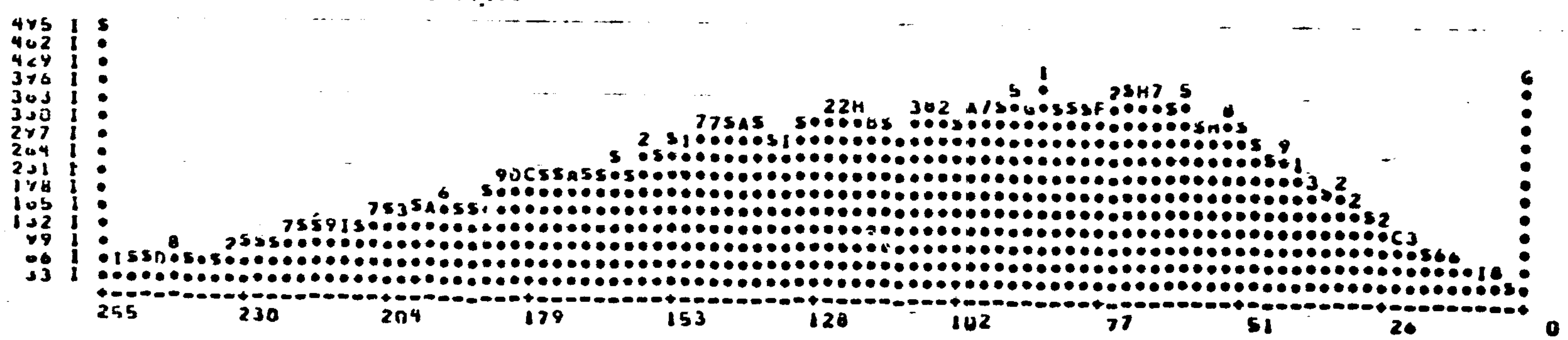
03 MAR 78

DATA TR

EACH • REPRESENTS 41 POINT(S).



EACH • REPRESENTS 33 POINT(S).



3/0

SCALING PARAMETERS USED ON TRANSFORMED VALUES, OUTPUT FILE 2

	MINIMUM	MAXIMUM	SCALE FACTOR (CON)
COMPONENT 1	-11.812	197.897	1.216
COMPONENT 2	-21.242	4.559	9.883
COMPONENT 3	-140.001	39.943	1.417
COMPONENT 4	-7.415	35.166	6.969

*** SDATA-TR COMPLETED ***

TIME FOR DATA-TRANSFORMATION 13.117

311