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"AS-BUILT" DESIGN SPECIFICATION FOR PARCLS

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"AS-BUILT" DESIGN SPECIFICATION FOR PARCLS

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15. Supplementary Notes

16. Abstract

This document is the "As-Built" Design Specification for the PARCLS program is part of the CLASFYG package. The program reads a parameter file created by the CLASFYG program and a pure pixel Ground Truth file to create a classification file of three separate crop categories in Universal Format.

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PARCLS PROGRAM

1.0 SCOPE

This document contains the description of the implementation of the PARCLS program. The purposes of the program are as follows:

(1) Read a parameter file created by the CLASFYG program and a pure pixel Ground Truth file to create a classification file of three separate crop categories in Universal Format.

(2) Produce a report containing statistical information concerning the input Ground Truth file, training field chosen from the Ground Truth file, and output classification file.

2.0 APPLICABLE DOCUMENTS

The following documents form a part of this specification:

AD 63-2457-3308-03 Transferring Badhwar Software.

AD NAS 9-15200 Technical Memorandum Format Specifications for LACIE (Phase III) and Accuracy Assessment Computer Data Products.

3.0 SYSTEM DESCRIPTION

3.1 SYSTEM FLOWCHART

The system level data flow diagram for the PARCLS Program is depicted in Figure 3.1.1. A program hierarchy is shown in Figure 3.1.2.

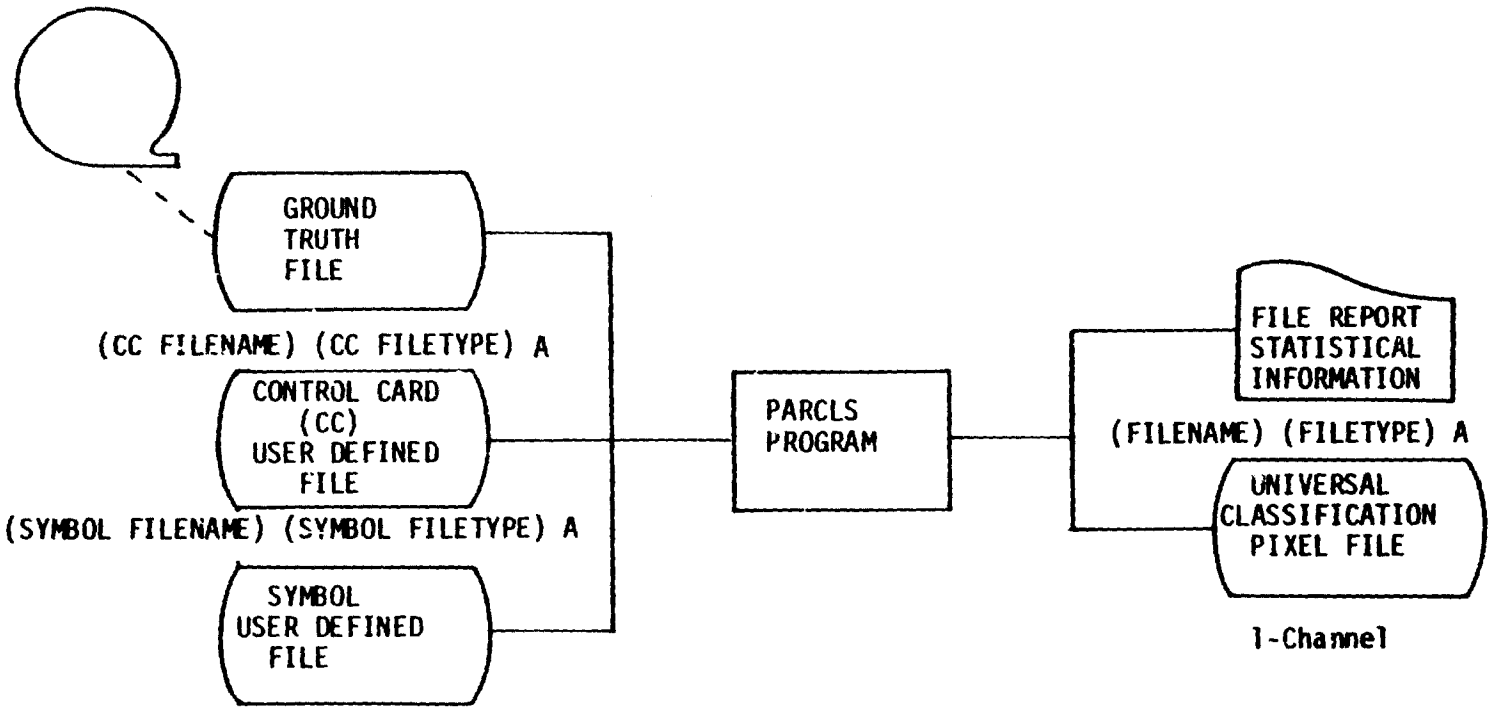

Figure 3.1.1 System level flow diagram for the PARCLS Program.

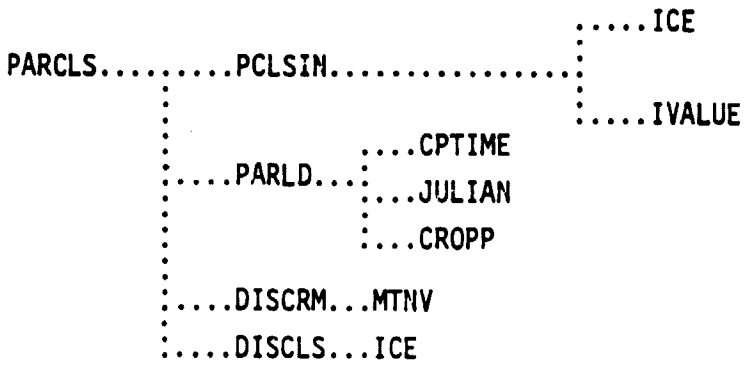

Figure 3.1.2 Hierarchy diagram for the PARCLS Program.

3.2 HARDWARE DESCRIPTION

The software for the PARHIS Program is operational on the IBM 3031 computer at PURDUE.

3.3 SOFTWARE DESCRIPTION

This program reads a parameter file created by the CLASFYG program and a Ground Truth file to create a classification file of three separate crop categories in Universal Format. The user defines the crop categories, including a category to contain all selected pixels which lie outside a user defined t_0 range. (See section 3.4.2 for a complete description of the CROP, CATEGORY, and TØMINMAX cards.)

The ground truth file is first scanned to determine the number of pixels in each crop category. Depending on the training data size, a skip factor is determined so as to sample the training pixels from the entire segment. (See section 3.4.2 for a complete description of the Dots card.) The parameter file provides the values of α, β, t_0, and χ^2 for these training pixels. Any χ^2 coefficient within the parameter file greater than a user defined χ^2 value determines that the pixel vector is of no interest and the pixel is not used for training. (See Section 3.4.2 for a description of the CHICUT card.) Using this data the separation plane is determined by the Ho-Kashyap linear classifier. This procedure maximizes the distance in the α, β, and t_0 space using the training data. Each pixel is assigned a symbol from one of the three crop categories depending on where the pixel falls with respect to the separation plane. (See section 3.4.2 for a complete description of the SYMBOL card.)

3.4 FILE DESCRIPTIONS

3.4.1 INPUT FILE(S)

Two input data files are required to execute the PARCLS program. The two files and their description are as follows:

PARCLS accepts as input, a classification file output from the CLASFYG PROGRAM. This classification file consist of 118 records. The first record is a header record consisting of 3060 bytes. The header record follows universal format requirements. Records 2 - 118 contain data records. Each data record consists of 196 pixel vectors. Each pixel vector consists of four coefficients: α, β, t_0 and χ^2. Each coefficient contains a signed integer value stored in a 32 - bit full word. (For a complete description of this file see "AS-BUILT" DESIGN SPECIFICATION FOR CLASFYG LEMSCO-16649/JSC-17369).

The Ground Truth file is in UNIVERSAL FORMAT with one channel per physical record. There are 351 records of length 540 8 bit-bytes. The contents of each byte have been biased with -128 and are stored in 8 bit twos-complement notation. (For a complete description of the file see Earth Resources Data Format Control Book, Volume 1, PHO-TR543).

3.4.2 USER DEFINED FILE (SYMBOL FILENAME) (SYMBOL FILETYPE) A

This file is used to specify (1) the pixel purity range and (2) the ground truth information.

Corresponding to one classification pixel is six ground truth subpixels. A majority pixel is chosen from the six subpixels. This is either the category of the first subpixel or is the category which occurs the most among the subpixels. The number of occurances of the majority category is defined to be the purity of the given pixel. The pixel purity range defines the acceptable pixel purity for any given execution of the PARCLS PROGRAM. The ground truth transformation allows the user to map specific ground truth codes to "Classification Categories". These categories correspond to the numerical order of the categories entered on the CROP control card in the required control card file (See Section 3.4.3 for all exceptions concerning the use of this card). Therefore, any assignment of a crop code to a category greater than the total number of categories entered signifies that the code is of no interest. If a crop code is not assigned to a category the program assigns as a default a category of 6. The last entry in the symbol file must be 0 0 0.

The first entry in the symbol file is as follows:

Column	1	2	3	
Format	I1	1X	I1	Purpose
	start		end	Defines the start and end of a range of pixel purity.

The remaining entries in the symbol file are as follows:

Columns	1-5	6-10	11-15	
Format	I5	I5	I5	Purpose
	start	end	category	Defines the start and end of a range of crop values assigned to a category.
	0	0	0	Signifies the end of Ground Truth transformation information.

The following is an example of a symbol file.

```
 1  6
      1     10     1
     11     20     2
     21     79     3
     80     80     6
     84     86     2
    127    127     3
    164    164     6
    165    165     3
      0      0     0
```

3.4.3 USER DEFINED FILE (FILENAME) CC A

This Control Card file is used to specify inputs to the PARPLT program.

The inputs are on card image records. A record consists of (1) a keyword which is ten characters or less and begins in the first card column and (2) input parameters in columns 11 through 72. The following description lists the keywords and describes the corresponding inputs.

KEYWORD	ACCEPTABLE INPUTS	DESCRIPTION
TØMINMAX	Pair of postive numbers	This card defines the minimum and maximum acceptabie t_o values. The numbers are assumed to be postive real numbers and any integers will be converted. The numbers are separated by any delimiter except '.'.
DOTS	$1 \leq$ number ≤ 100	This card specifies the numbers of pixels within the training field.
CATEGORY	$1 \leq$ number ≤ 3	This card defines the crop category which will contain all crops not classified as the primary or secondary crop. The number refers to order of crop names and, therefore, must not exceed the total number of crop names input.
CROP	1-3 crop names	This card gives name(s) to the categories to be plotted. The categories are separated by any non character deliminter except a blank. Embedded blanks are considered part of a category's name.
CHICUT	Postive number	This card defines the upper limit for all χ^2 values. If the χ^2 value is greater than this defined limit then the corresponding α value is set to zero.

KEYWORD	ACCEPTABLE INPUTS	DESCRIPTION
SYMBOL	$1 \leq$ number ≤ 255 •	This card defines numeric symbols for each of the defined crop categories. These symbols are designated by crop codes produced by the data management section at J.S.C. and vary according to crop and year.
AI	Analyst's name	This card specifies the analyst's name for report identification and is an optional input.
SEGMENT	Segment number	This card specifies the segment number for report identification and is an optional input.
*END	Ignored	This card identifies the end of the user defined cards.

An example of a control card file is as follows:

```
AI          MARY ANN TOMPKINS
SEGMENT     0123
DATE        MAY 26, 1981
DOTS        30
CATEGORY    3
CHICUT      9999
TOMINMAX    1100,1700
CROP        CORN, SOYBEAN, OTHERS
*END
```

3.5.1 PROGRAM PARCLS

Purpose

PARCLS calls the subroutines which compute from ground truth a training set and develops a Universal Classification file from a CLASFYG output parameter file.

Linkages

PARCLS calls Subroutines PCLSIN, PARLD, DISCRM and DISCLS.

Interface

Calling sequence:

Not applicable (PARCLS EXEC which can be used to load and execute PARPLT is described in Section 4.0).

Calling sequence parameters:

None.

Function value:

Not applicable.

Labeled COMMON parameters:

Full description of labeled COMMON blocks are contained in Appendix A.

Label	Variable	Element Position	Input/ Output	Description
HEAD	RCROP(4,3)	1	I	Crop names.
	NCROP	2	I	Number of crop categories.

Blank COMMON parameters:

None.

Inputs

None.

Outputs

Unit	Type	Description
6	Printer	Program report.

Storage requirement

Not applicable.

Description

PARCLAS calls the following routines for the given purpose:

ROUTINE	PURPOSE
PCLSIN	User inputs
PARLD	Chooses a training field for each crop
DISCRM	Linear descriminate matrix function
DISCLS	Creates a one channel universal classification file.

Flowchart

Not applicable.

Listing

See Appendix B for routine listing.

3.5.2 SUBROUTINE CROPP

Purpose

CROPP accepts six subpixels as input and outputs a pixel value representative of the subpixels.

Linkages

CROPP is called by PARPLT.

Interface

Calling sequence:

CALL CROPP (KROP, IXLCNT).

Calling sequence parameters:

Argument	Input/ Output	Description
KROP	O	Majority crop code.
IXLCNT	O	Count of number subpixels that match the majority code.

Function value:

Not applicable.

Labeled COMMON parameters:

Full description of labeled COMMON blocks are contained in Appendix A.

Label	Variable	Element Position	Input/ Output	Description
/NSBIXL/	NSUBPX(6)	1	I	Subpixels that map to a pixel.

Blank COMMON parameters:

None.

Inputs

None.

Outputs

None.

Storage requirement

Not applicable.

Description

The first sub-pixel value upon entry is considered to be the majority pixel (KROP) value. The NSUBPX array is traversed and tne number of codes equal to KROP counted. This procedure continues until a count of each unique code is made. If at anytime a count becomes greater than the count of KROP this code becomes KROP's value.

Flowchart

Not applicable.

Listing

See Appendix B for routine listing.

3.5.3 SUBROUTINE DISCLS

Purpose

Produces a one channel universal classification file from a CLASFYG parameter file.

Linkages

DISCLS is called by PARCLS.

Interface

Calling sequence:

CALL DISCLS (W, KHICUT, MINMAX, KATGRY, ICODE).

Calling sequence parameters:

Argument	Input/ Output	Description
W	I	Weight matrix
KHICUT	I	χ^2 limit.
MINMAX	I	Minimum and maximum values for t_o.
KATGRY	I	Category for parameters which lie outside the defined limits.
ICODE	I	Number symbols (crop codes).

Function value:

Not applicable.

Labeled COMMON parameters:

None.

Blank COMMON parameters:

None.

Inputs

Unit	Type	Description
10	Sequential data	Classification file (See Section 3.4.1).

Outputs

Unit	Type	Description
6	Printer	Program report.
28	Sequential data	Universal format classification file.

Storage requirement

Not applicable.

Description

DISCLS classifies the pixels on the basis of the parameters Alpha, Beta and t_o using a linear discriminate calculated in the SUBROUTINE DISCRM, and writes a one channel universal formatted file.

Flowchart

Not applicable.

Listing

See Appendix B for routine listing.

3.5.4 SUBROUTINE DISCRM

Purpose

DISCRM calculates the weights to be used in a 3 class linear discriminate.

Linkages

DISCRM is called by PARCLS.
DISCRM calls MTNV.

Interface

Calling sequence:

```
CALL DISCRM (N1, A, W)
```

Calling sequence parameters:

Argument	Input/ Output	Description
N1	I	Number of pixels sample per crop.
A	I	Training field.
W	O	Weight matrix.

Function value:

Not applicable.

Labeled COMMON parameters:

None.

Blank COMMON parameters:

None.

Inputs

None

Outputs

Unit	Type	Description
5	Printer	Program report.

Storage requirement

Not applicable.

Description

This program uses the Ho-Kashyap linear discriminate method. It solves the vector equation AW=B where A is the data matrix; W is the weight vector.

Flowchart

Not applicable.

Listing

See Appendix B for routine listing.

3.5.5 FUNCTION ICE

Purpose

To established the integer character equivalence of a byte.

Linkages

ICE is called by PPLTIN.

Interface

Calling sequence:

```
K = ICE (INT).
```

Calling sequence parameters:

Argument	Input/ Output	Description
INT	I	One byte in character form.

Function value:

Name	Description
K	One byte in computation form.

Labeled COMMON parameters:

None.

Blank COMMON parameters:

None.

Inputs

None.

Outputs

None.

Storage requirement

Not applicable.

Description

ICE sets the input parameter to the function and returns.

Flowchart

Not applicable.

Listing

See Appendix B for function listing.

3.5.6 FUNCTION IVALUE

Purpose

To allow the in line storage and testing of integer quoted literals.

Linkages

IVALUE is called by PPLTIN.

Interface

Calling sequence:

```
K = IVALUE (INT).
```

Calling sequence parameters:

Argument	Input/ Output	Description
INT	I	Quoted literal declared integer.

Function value:

Name	Description
K	Quoted literal.

Labeled COMMON parameters:

None.

Blank COMMON parameters:

None.

Inputs

None.

Outputs

None.

Storage requirement

Not applicable.

Description

IVALUE sets quoted literals to integer function and returns.

Flowchart

Not applicable.

Listing

See Appendix B for function listing.

3.5.7 SUBROUTINE JULIAN

Purpose

To convert a Gregorian Calendar date to a Julian calendar date.

Linkages

JULIAN is called by PARPLT.

Interface

Calling sequence:

CALL JULIAN (JDATE, INERR, INDAY, INMNTH, INYEAR).

Calling sequence parameters:

Argument	Input/ Output	Description
JDATE(3)	O	Array to return Julian date.
INERR	O	Error flag indicating input value out of range (zero returned if no error occurred).
INDAY	I	Day of month.
INMNTH	I	Month of the year.
INYEAR	I	Last two digits of the year.

Function value:

Not applicable.

Labeled COMMON parameters:

None.

Blank COMMON parameters:

None.

Inputs

None.

Outputs

None.

Storage requirement

Not applicable.

Description

If the input day is less than 1 or greater than 31, and input month is less than 1 or greater than 12 set INERR = 1 for error flag and return. Compute Julian date from month and day. If the year is a leap year and the month is greater than two add one to the computed Julian date.

Flowchart

Not applicable.

Listing

See Appendix B for routine listing.

3.5.8 SUBROUTINE MTNV

Purpose

MTNV computes the inverse of a NXN array.

Linkages

MTNV is called by DISCRM.

Interface

Calling sequence:

```
CALL MTNV (AA, N, AINV)
```

Calling sequence parameters:

Argument	Input/ Output	Description
AA	I	Input array.
N	I	Array is NXN
AINV	O	Inverse of AA (Input array)

Function value:

Not applicable.

Labeled COMMON parameters:

None.

Blank COMMON parameters:

None.

Inputs

None.

Outputs

None.

Storage requirement

Not applicable.

Description

Computes the inverse of AA using an adaptation of the Gauss-Jordan algorithm.

Flowchart

Not applicable.

Listing

See Appendix B for routine listing.

3.5.9 SUBROUTINE PARLD

Purpose

PARLD develops a training set from a ground truth file.

Linkages

PARALD is called by PARCLS.
PARALD calls subroutine JULIAN and CROPP.

Interface

Calling sequence:

CALL PARLD (A, N1, KHICUT, MINMAX, NUMDOT, IERR).

Calling sequence parameters:

Argument	Input/ Output	Description
A	O	Training field array.
N1	O	Number of pixels sampled per crop.
KHICUT	I	Upper limit for acceptable χ^2 parameters.
MINMAX	I	Minimum and maximum ranges for t_o.
NUMDOT	I	Number of dots in a training set.
IERR	O	Error flag. 0 - OK 1 - Error

Function value:

Not applicable.

Labeled COMMON parameters:

Full description of labeled COMMON blocks are contained in Appendix A.

Label	Variable	Element Position	Input/ Output	Description
NSBIXL	NSBIXL	1	I	Subpixel that map to a pixel.
DEFGT	GTRSEG	1	O	Ground truth segment number.

Label	Variable	Element Position	Input/ Ouput	Description
	TYR	2	O	Ground truth file year.
	GTDATE(3)	3	O	Ground truth file Julian date.
DEFKL	KLSEG	1	O	Classification segment number.
	KYR	2	O	Classification file year.
	KLDATE(3)	3	O	Classification file Julian date.
HEAD	RCROP(4,3)	1	I	Crop names.
	NCROP	2	I	Number of crops.

Blank COMMON parameters:

None.

Inputs

Unit	Type	Description
9	Sequential data	Ground truth file (See Section 3.4.1).
10	Sequential data	Classification file (See Section 3.4.1).
19	Sequential data	Symbolic mapping elements, pixel purity range. (See Section 3.4.2).

Outputs

Unit	Type	Description
5	Terminal	Run time diagnostics
6	Printer	Program report.

Storage requirement

Not applicable.

Description

The ground truth data is scanned to determine the number of each crop and each χ^2 coefficient from the parameter file is checked to see that it is less than a user defined limit. The Alpha parameter is set to zero for those vectors failing the χ^2 limit requirement. The parameter vectors are stored in the BUF array and are written to files. Each file contains vectors which relate to one crop as defined by the ground truth file. After processing all pixels a skip factor is determined so as to sample the training pixels from the entire segment. The files previously written are then processed. Each pixel that is a modular function of the skip factor is tested against a user defined t_o range. If the pixel is acceptable it becomes a part of the training field.

Flowchart

Not applicable.

Listing

See Appendix B for routine listing.

3.5.10 SUBROUTINE PCLSIN

Purpose

PCLSIN reads records in card image format, decodes the records, and test that the records contain appropriate inputs and all necessary information.

Linkages

PCLSIN is called by PARCLS.
PCLSIN calls Subroutine ICE and IVALUE.

Interface

Calling sequence:

CALL PCLSIN (NCROP, RCROP, MINMAX, KATGRY, NUMDOT, KHICUT, ISYM, IERR).

Calling sequence parameters:

Argument	Input/ Output	Description
NCROP	O	Number of crops to be evaluated.
RCROP	O	Crop category names.
MINMAX	O	Minimum maximum values for t_o parameter.
KATGRY	O	Category for all parameters other than the defined primary or secondary.
NUMDOT	O	Number of dots in the training field.
KHICUT	O	Define the upper limit for acceptable χ^2 parameters.
ISYM	O	Numeric symbols to represent crop categories.
IERR	O	Error flag 0 - OK 1 - Error

Function value:

Not applicable.

Labeled COMMON parameters:

None.

Blank COMMON parameters:

None.

Inputs

Unit	Type	Description
21	Sequential data	User information file (See Section 3.4.3).

Outputs

Unit	Type	Description
5	Terminal	Run time diagnostics.
20	Printer	Report of user information file.

Storage requirement

Not applicable.

Description

PCLSIN processes each input card. After the *END card is reached PCLSIN test for the following conditions:

1. More/less than two numbers on the t_0 MINMAX card.
2. Minimum value > maximum value on the MINMAX card.
3. The MINMAX, DOTS, CATEGORY, SYMBOL, CROP, or CHICUT card missing.
4. More than three crops on a crop card.
5. More than one number on the DOTS, CATEGORY, or CHICUT card.
6. Number of symbols not equal to number of crops.

If any of the conditions exist, a diagnostic message is issued and IERR is set to one. If a control card is not recognized, a warning message is printed.

Flowchart

Not applicable.

Listing

See Appendix B for routine listing.

4.0 OPERATION

4.1 OPERATING DESCRIPTION

PARCLS is operational on the IBM 3031 computer at LARS, West Lafayette, Indiana.

The PARCLS program is one of the programs of the BADHWAR SYSTEM which includes the programs CLASFYT, CLASFYG, MISMAP, PARCLS, PARHIS, and UNIV4VEC.

PARCLS requires the use of a D disk which is assigned as a temporary disk and an E disk which is used by the LARS' routines. The user, therefore, must not assign a disk to his machine using either MODE E or MODE D. These disks, will be assigned as needed.

Prior to executing the PARCLS program the user must (1) establish on his A disk a SYMBOL file as described in section 3.4.2 and (2) establish the CARD CONTROL file as described in section 3.4.3, if he wishes to use this file.

4.2 COMMANDS DESCRIPTION

To execute PARCLS, the user enters a series of commands which invoke the JOB CONTROL SOFTWARE. These commands are divided into two classes namely (1) FUNCTION commands and (2) PROGRAM commands. The FUNCTION commands, which perform all the functions except executing the program are reusable; i.e., once they are invoked they remain in effect until reentered. The PROGRAM commands, which execute the program, must be reentered each time the program is to be executed.

The following list gives the commands required to execute the PARCLS program. They are all FUNCTION commands except the PROGRAM command PARCLS. These commands must be given in the listed order except that the order of the DEFGTRU command and the DEFCLAS command may be interchanged.

START

DEFCTRU.....

DEFCLAS.....

PARCLS.....

END

The following sections describe each of the commands in detail. Input fields are separated by blanks. If more than one work is required to describe an input field, the descriptive text is enclosed in pointed brackets <>. If an input is optional the field is enclosed in square brackets []. Do not include these explanatory characters <> [] when actually submitting input to the computer. To enter a command the user types one input per defined input field and separates each field with a blank.

4.2.1 START

The START command spools the user's console file. The user of this command, along with the END command, will provide listing of all information appearing on the user's console file. (If running an interactive job, this is the terminal. If running a batch job, this is a system defined device.) The START command is invoked by the user typing the following:

```
START
```

4.2.2 DEFGTRU

The DEFGTRU command defines a Ground Truth file. The user can use this command to define Ground Truth files on tape, disk, or may request the use of a file from the LARS RT&E Data Base. If the data request is for the use of a file from the LARS Data Base, a series of programs are invoked to provide interface with the data base. The following diagram illustrates this software flow.

```
                          ..RTEERR (LARS ROUTINE)
DEFGTRU.....GTRUINF....
                          ..GTINFO (LARS ROUTINE)
```

For a detailed description of the above JOB CONTROL SOFTWARE see appendix B.

The DEFGTRU command has the following forms and is invoked by typing one of the following, according to the user's requirement.

If the file is on tape -

```
DEFGTRU TAPE# FILE# <TAPE DENSITY>
```

If the file is on disk -

```
DEFGTRU FILENAME FILETYPE FILEMODE
```

If the file is on the LARS Data Base -

```
DEFGTRU SEGMENT# YEAR
   (year-last two digits of data generation year)
```

This command remains in effect for the use of any of the BADHWAR SYSTEM PROGRAM commands and does not have to be reissued unless the user wishes to redefine the input Ground Truth File.

4.2.3 DEFCLAS

The DEFCLAS command defines the input Classification file. The user can use this command to define a Classification file on tape or disk. The DEFCLAS command has the following forms and is invoked by typing one of the following, according to the user's requirement.

If the file is on tape -

DEFCLAS TAPE# FILE# <TAPE DENSITY>

If the file is on disk -

DEFCLAS FILENAME FILETYPE FILEMODE

This command remains in effect for the use of any of the BADHWAR SYSTEM PROGRAM commands and does not have to be reissued unless the user wishes to redefine the input Classification File.

4.2.4 PARCLS

The PARCLS command is a PROGRAM command and is used to invoke the execution of the PARCLS program. This command must not be used unless the DEFCLAS and the DEFGTRU FUNCTION commands have been previously issued. Also, as previously stated the user must have established a SYMBOL FILE and a CARD CONTROL FILE on his A disk before invoking this command. The PARCLS command is invoked by the user typing the following:

```
PARCLS  < SYMBOL >  < SYMBOL >  <CONTROL CARD>  < OUTPUT >  < OUTPUT >
        <FILENAME>  <FILETYPE>  <  FILENAME  >  <FILENAME>  <FILETYPE>
```

The OUTPUT file is written on the user A disk under the user defined name and the REPORT file from the PARCLS program is spooled to the HOUSTON line printer.

4.2.5 END

This command closes the user's console file and causes a spooled copy to be sent to the HOUSTON printer. This command has no effect if the START command was not previously issued. The END command is invoked by the user typing the following:

```
END
```

4.3 OPERATING EXAMPLE

For our example we will assume the following:

The symbol file is established on the user's A disk under the file description: PARCLS1 DATA A

The control card file is established on the user's A disk under the file description: PARCLS1 CC A

Furthermore, the user has elected to use a ground truth file at LARS.

COMMAND	EXPLANATION OR ACTION TAKEN
START	Spools the console file.
DEFGTRU 882 79	Defines a ground truth file using data from the LARS Data Base.
DEFCLAS 0882 COEF01 B	Defines a Class file on the user's B disk. This data is on a disk which the user has previously attached to his disk using a B mode.
PARCLS PARPLT1 DATA PARPLT1 0882 PARCOEF	Executes the PARCLS PROGRAM.
END	Closes the user's console file and spools the files to the HOUSTON printer.

APPENDIX A

COMMON BLOCK

COMMON BLOCKS

/NSBIXL/ NSUBPX(6)

NSUBPX Six subpixels that map to a pixel.

/DEFGT/ GTRSEG, TYR, GTDATE(3)

GTRSEG Ground truth segment number

TYR Year of ground truth file creation.

GTDATE Julian date of ground truth file creation.

/DEFKL/ KLASEG, KYR, KLDATE(3)

KLASEG Classification segment number.

KYR Year of classification file creation.

KLDATE Julian date of classification creation.

/HEAD/ RCROP(4,3), NCROP

RCROP Crop names.

NCROP Number of crop categories.

APPENDIX B

PROGRAM LISTINGS

REQUESTED OPTIONS: NOTERM

OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

```
      C     PROGRAM PARCLS                                                    PAR00010
      C                    TO GENERATE STATISTICAL TABLES AND OUTPUT DATA    PAR00020
      C-----------------------------------------------------------------     PAR00030
      C                                                                       PAR00040
      C                                                                       PAR00050
      C  HISTORY                                                              PAR00060
      C  -------                                                              PAR00070
      C                                                                       PAR00080
      C     G.RADHAR   NASA(JSC)                  ORIGINAL CODE(POP-11)     PAR00090
      C     M.TOMPKINS LEMSCO      4/1/81         TRANSFER DESIGN           PAR00100
      C     D.CHENG    LEMSCO      4/15/81        MODIFIED FOR IBM          PAR00110
      C                                                                       PAR00120
      C                                                                       PAR00130
      C  METHOD                                                               PAR00140
      C  ------                                                               PAR00150
      C                                                                       PAR00160
      C     THIS MAIN PROGRAM DECLARES THE VARIABLES.                         PAR00170
      C     CALLS SUBPROGRAMS: PCLSIN FOR VALUES FROM INPUT FILE;             PAR00180
      C                        PARLD FOR DEVELOPING A CLASSIFICATION TRAINING PAR00190
      C                        FIELD.                                         PAR00200
      C                        DISCRM FOR LINEAR DISCRIMATION MATRIX FUNCTION.PAR00210
      C                        DISCLS FOR CLASSIFICATION OF THE PIXELS ON THE PAR00220
      C                        HASIS OF THE PARAMETERS ALPHA, BETA & TO.      PAR00230
      C                                                                       PAR00240
      C                                                                       PAR00250
      C  EXCEPTIONS                                                          PAR00260
      C  ----------                                                           PAR00270
      C                                                                       PAR00280
      C     IF ERROR OCCURS IN SUBPROGRAM PCLSIN AND PARLD.                   PAR00290
      C     IERR .NE. 0                                                       PAR00300
      C     STOP THE PROGRAM.                                                 PAR00310
      C                                                                       PAR00320
      C                                                                       PAR00330
      C  EXTERNAL REFERENCE                                                   PAR00340
      C  ------------------                                                   PAR00350
      C                                                                       PAR00360
      C    PCLSIN   VALUES FOR USER INPUT FILE                                PAR00370
      C    PARLD    DEVELOPING CLASSIFICATION TRAINING FIELD                  PAR00380
      C    DISCRM   LINEAR DISCRIMATION MATRIX FUNCTION                       PAR00390
      C    DISCLS   CREATE ONE CHANNEL UNIVERSAL FORMATTED FILE               PAR00400
      C                                                                       PAR00410
      C                                                                       PAR00420
      C  LOCAL DECLARATIONS                                                   PAR00430
      C  ------------------                                                   PAR00440
      C                                                                       PAR00450
ISN 0002      INTEGER A(400,4)                                                PAR00460
      C                                ARRAY FOR TRAINING FIELD               PAR00470
ISN 0003      INTEGER N1(3)                                                   PAR00480
      C                                NO. OF PIXELS SAMPLED PER CROP         PAR00490
ISN 0004      INTEGER KHICUT                                                  PAR00500
      C                                CHI-SQUARE CUT                         PAR00510
ISN 0005      INTEGER MINMAX(2)                                               PAR00520
      C                                MINIMUM, MAXIMUM RANGE FOR TO          PAR00530
ISN 0006      INTEGER NCROP                                                   PAR00540
      C                                NUMBER OF CROPS                        PAR00550
ISN 0007      INTEGER KATGRY                                                  PAR00560
      C                                CATAGORY TO HOLD ALL PARAMETERS        PAR00570
      C                                THAT LIES OUTSIDE DEFINED LIMITS       PAR00580
ISN 0008      INTEGER NUMDOT                                                  PAR00590
      C                                NUMBER OF DOT IN A TRAIN FIELD         PAR00600
ISN 0009      INTEGER IERR                                                    PAR00610
      C                                ERROR FLAG, 0-O.K., 1-ERROR            PAR00620
ISN 0010      REAL RCROP(4,3)                                                 PAR00630
      C                                ARRAY FOR INPUT CROP CHARACTERS        PAR00640
ISN 0011      REAL W(4,3)                                                     PAR00650
      C                                WEIGHT MATRIX                          PAR00660
ISN 0012      LOGICAL*1 ISYM(3)                                               PAR00670
      C                                NUMERIC CORP OUTPUT VALUE              PAR00680
      C                                                                       PAR00690
ISN 0013      COMMON/HEAD/RCROP,NCROP                                         PAR00700
      C                                                                       PAR00710
      C                                                                       PAR00720
      C  PROCEDURE                                                            PAR00730
```

```
                C  ---------                                                          PAR00740
                C                                                                     PAR00750
                C  INITIALIZE ERROR FLAG.                                             PAR00760
                C                                                                     PAR00770
   ISN 0014             IERR=0                                                        PAR00780
                C                                                                     PAR00790
                C  CALL EACH SUBROUTINE:                                              PAR00800
                C                                                                     PAR00810
   ISN 0015             CALL PCLSIN(NCROP,RCROP,MINMAX,KATGRY,NUMDOT,KHICUT,ISYM,IERR) PAR00820
                C                                                                     PAR00830
   ISN 0016             CALL PARLD(A,NI,KHICUT,MINMAX,NUMDOT,JERR)                    PAR00840
                C                                                                     PAR00850
                C                                                                     PAR00860
                C  IF ERROR OCCURS, TERMINATES THE PROGRAM.                           PAR00870
                C                                                                     PAR00880
   ISN 0017             IF(JERR.NE.0)IERR=1                                           PAR00890
   ISN 0018             IF(IERR.NE.0) GO TO 1000                                      PAR00900
                C                                                                     PAR00910
   ISN 0021             CALL DISCRM(NI,A,W)                                           PAR00920
                C                                                                     PAR00930
                C  WRITE W MATRIX                                                     PAR00940
                C                                                                     PAR00950
   ISN 0022             WRITE(6,950) ((W(I,J),J=1,3),I=1,4)                           PAR00960
   ISN 0023         950 FORMAT(/10X,'FINAL WEIGHT MATRIX'/,4(5X,3E16.4/))             PAR00970
                C                                                                     PAR00980
   ISN 0024             CALL DISCLS(W,KHICUT,MINMAX,KATGRY,ISYM)                      PAR00990
                C                                                                     PAR01000
   ISN 0025          1000 STOP                                                        PAR01010
   ISN 0026               END                                                        PAR01020
```

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

SYMBOL	INTERNAL	STATEMENT NUMBERS			
A	0002	0016	0021		
I	0022	0022	0022		
J	0022	0022	0022		
W	0011	0021	0022	0024	
NI	0003	0016	0021		
IERR	0009	0014	0015	0017	0019
ISYM	0012	0015	0024		
JERR	0016	0017			
NCROP	0006	0013	0015		
PARLD	0016				
RCROP	0010	0013	0015		
DISCLS	0024				
DISCRM	0021				
KATGRY	0007	0015	0024		
KHICUT	0004	0015	0016	0024	
MINMAX	0005	0015	0016	0024	
NUMDOT	0008	0015	0016		
PCLSIN	0015				

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

LABEL	DEFINED	REFERENCES
950	0023	0022
1000	0025	0019

/ MAIN / SIZE OF PROGRAM 001852 HEXADECIMAL BYTES

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
A	SFA	I*4	000170	I	F	I*4	000118	J	F	I*4	00011C	W	SFA	R*4	000138
NI	SFA	I*4	000168	IERR	SFA	I*4	000120	ISYM	SFA	L*1	000134	JERR	SFA	I*4	000124
NCROP	SFA C	I*4	000030	PARLD	SF XF		000000	RCROP	SFA C	R*4	000000	DISCLS	SF XF		000000
DISCRM	SF XF		000000	IHCOM#	F XF	R*4	000000	KATGRY	SFA	I*4	000128	KHICUT	SFA	I*4	00012C
MINMAX	SFA	I*4	000174	NUMDOT	SFA	I*4	000130	PCLSIN	SF XF		000000				

***** COMMON INFORMATION *****

NAME OF COMMON BLOCK * HEAD* SIZE OF BLOCK 000034 HEXADECIMAL BYTES

VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.
RCROP	R*4	000000	NCROP	I*4	000030						

SOURCE STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
1000	25	001422									

COMPILER GENERATED LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
100000	1	001A9C	100001	19	001ACE	100002	19	001AD2	100003	21	001ADC

FORMAT STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
950	23	000028									

*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
STATISTICS SOURCE STATEMENTS = 25, PROGRAM SIZE = 6994, SUBPROGRAM NAME = MAIN
STATISTICS NO DIAGNOSTICS GENERATED
****** END OF COMPILATION ******

288K BYTES OF CORE NOT USED

```
*LEVEL 2.3.0 (JULE 78)                  OS/360  FORTRAN H EXTENDED          DATE 81.140/12.32.28       PAGE   1
REQUESTED OPTIONS: NOTERM
OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
                   SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

   ISN 0002            SUBROUTINE CROPP(KROP,IXLCNT)                                          CRU00010
                       ----------------------------                                           CRU00020
                                                                                              CRU00030
                                                                                              CRU00040
                       INTEGER KROP       CROP CODE - MAJORITY RULE OR FIRST IN               CRU00050
                       INTEGER IXLCNT     COUNT OF CODE USED AS CROP CODE                     CRU00060
                                                                                              CRU00070
                                                                                              CRU00080
                      HISTORY                                                                 CRU00090
                      -------                                                                 CRU00100
                                                                                              CRU00110
                        CARL AKLERS    LEC                          ORIGINAL CODE (PDP)     CRU00120
                        MARY TOMPKINS  LEMSCO     11/21/80          RECC (IBM)              CRU00130
                                                                                              CRU00140
                      PURPOSE                                                                 CRU00150
                      -------                                                                 CRU00160
                                                                                              CRU00170
                        THIS ROUTINE IS CALLED TO MAKE THE MAJORITY RULE DECISION             CRU00180
                        FOR THE 6 SUB-PIXELS .                                                CRU00190
                                                                                              CRU00200
                                                                                              CRU00210
                      EXTERNAL REFERENCES                                                     CRU00220
                      -------------------                                                     CRU00230
                                                                                              CRU00240
                        NONE.                                                                 CRU00250
                                                                                              CRU00260
                                                                                              CRU00270
                      EXCEPTIONS                                                              CRU00280
                      ----------                                                              CRU00290
                                                                                              CRU00300
                        NONE.                                                                 CRU00310
                                                                                              CRU00320
                                                                                              CRU00330
                      LOCAL DECLARATIONS                                                      CRU00340
                      ------------------                                                      CRU00350
                                                                                              CRU00360
                        INTEGER KOUNT      COUNT OF CURRENT TYPE CROP CODE                    CRU00370
                                                                                              CRU00380
                                                                                              CRU00390
                      PROCEDURE                                                               CRU00400
                      ---------                                                               CRU00410
                                                                                              CRU00420
   ISN 0003           C     COMMON/NSHIXL/NSUBPX(6)                                          CRU00430
                                                                                              CRU00440
   ISN 0004           C     IXLCNT = 0                                                       CRU00450
                                                                                              CRU00460
   ISN 0005                 DO 20 I = 1,6                                                    CRU00470
   ISN 0006                    KOUNT = 0                                                     CRU00480
   ISN 0007                    DO 10 J = 1,6                                                 CRU00490
   ISN 0008                       IF(NSUBPX(I).EQ.NSUBPX(J))KOUNT = KOUNT + 1                CRU00500
   ISN 0010              10    CONTINUE                                                      CRU00510
   ISN 0011                    IF(KOUNT.LE.IXLCNT) GO TO 20                                  CRU00520
   ISN 0013                    IXLCNT = KOUNT                                                CRU00530
   ISN 0014                    KROP = NSUBPX(I)                                              CRU00540
   ISN 0015                    IF(IXLCNT.GE.3)RETURN                                         CRU00550
   ISN 0017              20 CONTINUE                                                         CRU00560
   ISN 0018                 RETURN                                                           CRU00570
   ISN 0019                 END                                                              CRU00580

                          *****F O R T R A N   C R O S S   R E F E R E N C E   L I S T I N G*****
SYMBOL   INTERNAL STATEMENT NUMBERS
I        0005  000H  0014
J        0007  0008
KROP     0002  0014
CROPP    0002
KOUNT    0006  0008  000A  0011  0013
IXLCNT   0002  0004  0011  0013  0015
NSUBPX   0003  0009  0009  0014

                          *****F O R T R A N   C R O S S   R E F E R E N C E   L I S T I N G*****
 LABEL   DEFINED   REFERENCES
```

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

LABEL	DEFINED	REFERENCES
10	0010	0007
20	0017	0005 0011

/ CROPP / SIZE OF PROGRAM 000194 HEXADECIMAL BYTES

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
I	SF	I*4	000090	J	SF	I*4	000094	KROP	S	I*4	000098	CROPP		R*4	00009C
KOUNT	SF	I*4	0000A0	IXLCNT	S	I*4	0000A4	NSUBPX	F C	I*4	000000				

***** COMMON INFORMATION *****

NAME OF COMMON BLOCK *NSBIXL* SIZE OF BLOCK 000018 HEXADECIMAL BYTES

VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.
NSUBPX	I*4	000000									

SOURCE STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
10	10	0000FE	20	17	00012C						

COMPILER GENERATED LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
100001	2	0000AC	100002	6	0000D0	100003	8	0000D4	100004	9	0000EC
100005	11	0000F6	100006	13	0000FC	100007	16	000114	100008	18	000134

*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

STATISTICS SOURCE STATEMENTS = 18, PROGRAM SIZE = 404, SUBPROGRAM NAME = CROPP

STATISTICS NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ****** 296K BYTES OF CORE NOT USED

```
REQUESTED OPTIONS: NOTERM
OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
                   SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
```

```
ISN 0002            SUBROUTINE DISCLS(                                          DIS00010
                   C                  PRODUCES A 1 CHANNEL UNIVERSAL CLASS FILE DIS00020
                   C                                                            DIS00030
                   C    = W,                                                    DIS00040
                   C            WEIGHT METRIX                                   DIS00050
                   C    = KHICUT,                                               DIS00060
                   C            CHI-SQUARE CUT                                  DIS00070
                   C    = MINMAX,                                               DIS00080
                   C            MINIMUM, MAXIMUM RANGES FOR TO                  DIS00090
                   C    = KATGRY,                                               DIS00100
                   C            CATAGORY FOR PARAMETERS OUTSIDE LIMITS          DIS00110
                   C    = ICODE)                                                DIS00120
                   C            TRANSFORMATION CODE                             DIS00130
                   C                                                            DIS00140
                   C ------------------------------------------------------------ DIS00150
                   C                                                            DIS00160
                   C HISTORY                                                    DIS00170
                   C -------                                                    DIS00180
                   C                                                            DIS00190
                   C    G.RADHWAR    NASA(JSC)                 ORGINAL CODE (PDP-11) DIS00200
                   C    M.TOMPKINS   LEMSCO      4/1/81       TRANSFER DESIGN  DIS00210
                   C    D.CHENG      LEMSCO      4/17/81      MODIFIED FOR IBM DIS00220
                   C                                                            DIS00230
                   C METHOD                                                     DIS00240
                   C ------                                                     DIS00250
                   C                                                            DIS00260
                   C    THIS SUBROUTINE CLASSIFIES THE PIXELS ON THE BASIS OF THE DIS00270
                   C    PARAMETERS ALPHA,BETA, AND TO, USING A LINEAR DISCRIMINANT DIS00280
                   C    CALCULATED IN THE SUBROUTINE DISCRM, AND WRITES A ONE CHANNEL DIS00290
                   C    UNIVERSAL FORMATTED FILE AND A SUMMARY REPORT.          DIS00300
                   C                                                            DIS00310
                   C                                                            DIS00320
                   C EXTERNAL REFERENCE                                         DIS00330
                   C ------------------                                         DIS00340
                   C                                                            DIS00350
                   C    NONE                                                    DIS00360
                   C                                                            DIS00370
                   C                                                            DIS00380
                   C EXCEPTIONS                                                 DIS00390
                   C ----------                                                 DIS00400
                   C                                                            DIS00410
                   C    NONE                                                    DIS00420
                   C                                                            DIS00430
                   C                                                            DIS00440
                   C LOCAL DECLARATIONS                                         DIS00450
                   C -----------------                                          DIS00460
                   C                                                            DIS00470
                   C                                                            DIS00480
ISN 0003           C    INTEGER  KHICUT                                         DIS00490
                   C                  ARGUMENT                                  DIS00500
ISN 0004           C    INTEGER MINMAX(2)                                       DIS00510
                   C                  ARGUMENT                                  DIS00520
ISN 0005           C    INTEGER KATGRY                                          DIS00530
                   C                  ARGUMENT                                  DIS00540
ISN 0006           C    INTEGER NCROP                                           DIS00550
                   C                  NUMBER OF CROP                            DIS00560
ISN 0007           C    INTEGER A(4,196)                                        DIS00570
                   C                  LINES FOR PIXELS                          DIS00580
ISN 0008           C    INTEGER ICHI(196)                                       DIS00590
                   C                  A LINE OF CHI-SQUARE VALUE                DIS00600
ISN 0009           C    INTEGER LINE                                            DIS00610
                   C                  ONE LINE FOR PIXELS                       DIS00620
ISN 0010           C    REAL RCROP(4,3)                                         DIS00630
                   C                  ARRAY FOR INPUT CROP CHARACTERS           DIS00640
ISN 0011           C    REAL G(3)                                               DIS00650
                   C                  MATRIX FOR THREE CLASSES                  DIS00660
ISN 0012           C    REAL W(4,3)                                             DIS00670
                   C                  WEIGHT MATRIX                             DIS00680
ISN 0013           C    LOGICAL*1 ICODE(3)                                      DIS00690
                   C                  CHI-SQUARE CODE                           DIS00700
ISN 0014           C    LOGICAL*1 HDR(3060)                                     DIS00710
                   C                  HEADER ARRAY                              DIS00720
ISN 0015           C    LOGICAL*1 DATREC(360)                                   DIS00730
```

```
                C                          ONE RECORD OF CLASSIFICATION FILE                    DIS00740
                C                                                                               DIS00750
     ISN 0016       COMMON/HEAD/RCROP,NCROP                                                     DIS00760
                    EQUIVALENCE (HDR(1),DATREC(1)),(LINE,DATREC(71))                            DIS00770
                C                                                                               DIS00780
                C                                                                               DIS00790
                C  PROCEDURE                                                                    DIS00800
                C  ---------                                                                    DIS00810
                C                                                                               DIS00820
                C  READ THE PARAMETER FILE ON UNIT 10.                                          DIS00830
                C  MAKE SURE IT IS AT THE BEGINNING OF THE FILE.                                DIS00840
                C                                                                               DIS00850
     ISN 0017       REWIND 10                                                                   DIS00860
                C                                                                               DIS00870
     ISN 0018       READ(10,1000) (HDR(I),I=1,3060)                                             DIS00880
                C                                                                               DIS00890
                C  INPUT CHARACTERS: 'FROM CLASFYG'                                             DIS00900
                C                                                                               DIS00910
     ISN 0019       HDR(27)=ICE('F')                                                            DIS00920
     ISN 0020       HDR(28)=ICE('R')                                                            DIS00930
     ISN 0021       HDR(29)=ICE('O')                                                            DIS00940
     ISN 0022       HDR(30)=ICE('M')                                                            DIS00950
     ISN 0023       HDR(31)=ICE(' ')                                                            DIS00960
     ISN 0024       HDR(32)=ICE('C')                                                            DIS00970
     ISN 0025       HDR(33)=ICE('L')                                                            DIS00980
     ISN 0026       HDR(34)=ICE('A')                                                            DIS00990
     ISN 0027       HDR(35)=ICE('S')                                                            DIS01000
     ISN 0028       HDR(36)=ICE('F')                                                            DIS01010
     ISN 0029       HDR(37)=ICE('Y')                                                            DIS01020
     ISN 0030       HDR(38)=ICE('G')                                                            DIS01030
                C                                                                               DIS01040
                C  WRITE HEADER RECORD TO OUTPUT FILE                                           DIS01050
                C                                                                               DIS01060
     ISN 0031       WRITE(28,1000) (HDR(I),I=1,3060)                                            DIS01070
     ISN 0032    1000 FORMAT(17(180A1))                                                         DIS01080
                C                                                                               DIS01090
                C  CLEAR OUTPUT ARRAY FOR DATA - DATREC                                         DIS01100
                C                                                                               DIS01110
     ISN 0033       DO 100 I=1,360                                                              DIS01120
     ISN 0034     100  DATREC(I)=0                                                             DIS01130
                C                                                                               DIS01140
                C  PUT 1'S IN THE FOURTH ELEMENT OF THE A ARRAY.                                DIS01150
                C                                                                               DIS01160
     ISN 0035       DO 110 I=1,196                                                              DIS01170
     ISN 0036     110  A(4,I)=1                                                                DIS01180
                C                                                                               DIS01190
                C  START READING LINES FROM THE PARAMETER FILE.                                 DIS01200
                C                                                                               DIS01210
     ISN 0037       DO 400 LINENO=1,117                                                         DIS01220
                C                                                                               DIS01230
                C  READ LINE FROM THE PARAMETER FILE.                                           DIS01240
                C                                                                               DIS01250
     ISN 0038       READ(10,1010) (((A(I,J),I=1,3),ICHI(J)),J=1,196)                            DIS01260
     ISN 0039    1010  FORMAT(4(196A4))                                                         DIS01270
                C                                                                               DIS01280
                C  START PROCESSING SAMPLES.                                                    DIS01290
                C                                                                               DIS01300
     ISN 0040       DO 300 ISAMP=1,196                                                          DIS01310
                C                                                                               DIS01320
                C  CHECK TO SEE IF THE PIXEL IS TO BE THRESHOLDED.                              DIS01330
                C                                                                               DIS01340
     ISN 0041          IF(A(1,ISAMP).NE.0) GO TO 140                                            DIS01350
     ISN 0043          DATREC(72+ISAMP)=ICODE(KATGRY)                                           DIS01360
     ISN 0044          GO TO 300                                                                DIS01370
     ISN 0045     140  IF(ICHI(ISAMP).LT.KHICUT.AND.A(3,ISAMP).LT.MINMAX(2).AND.              DIS01380
                  *    A(3,ISAMP).GT.MINMAX(1)) GO TO 141                                       DIS01390
     ISN 0047          DATREC(72+ISAMP)=ICODE(KATGRY)                                           DIS01400
     ISN 0048          GO TO 300                                                                DIS01410
     ISN 0049     141  IF(A(1,ISAMP).LT.6500) GO TO 142                                        DIS01420
     ISN 0051          DATREC(72+ISAMP)=15                                                      DIS01430
     ISN 0052          GO TO 300                                                                DIS01440
                C                                                                               DIS01450
                C  CALCULATE WEIGHTS FOR THE THREE CLASSES.                                     DIS01460
                C                                                                               DIS01470
     ISN 0053     142  DO 200 ICLS=1,3                                                         DIS01480
     ISN 0054            G(ICLS)=0.                                                           DIS01490
     ISN 0055            DO 150 IPAR=1,4                                                      DIS01500
     ISN 0056     150    G(ICLS)=G(ICLS)+W(IPAR,ICLS)*A(IPAR,ISAMP)                           DIS01510
```

```
   ISN 0057        200     CONTINUE                                                DISC1520
                C                                                                  DISC1530
                C   DETERMINE THE LARGEST G+ AND ENTER CODE IN OUTPUT ARRAY.      DISC1540
                C                                                                  DISC1550
   ISN 0058             GMAX=AMAX1(G(1),G(2),G(3))                                 DISC1560
   ISN 0059             DATREC(ISAMP+72)=15                                        DISC1570
   ISN 0060             DO 210 I=1,3                                               DISC1580
   ISN 0061       210   IF(G(I).EQ.GMAX) DATREC(72+ISAMP)=ICODE(I)                 DISC1590
   ISN 0063       300 CONTINUE                                                     DISC1600
                C                                                                  DISC1610
                C   A LINE IS COMPLETE AND READY TO BE SENT TO THE OUTPUT FILE.   DISC1620
                C                                                                  DISC1630
   ISN 0064             WRITE(28,1020) (DATREC(I),I=1,360)                        DISC1640
   ISN 0065       1020  FORMAT(2(180A1))                                           DISC1650
   ISN 0066       400 CONTINUE                                                     DISC1660
                C                                                                  DISC1670
                C   PROCESSING OF THE CLASSIFICATION FILE IS COMPLETE.            DISC1680
                C                                                                  DISC1690
   ISN 0067             WRITE(6,1030)(RCROP(I,KATGRY),I = 1,4),KHICUT,MINMAX(1),MINDISC1700
                &  (RCROP(I,KATGRY),I = 1,4),KATGRY                               DISC1710
   ISN 0068       1030 FORMAT(1H0,10X,'VALUES FOR CLASSIFICATION AS ',4A4//       DISC1720
                     *'              CHISQR GREATER THAN ',I5//                   DISC1730
                     *'              TO     LESS THAN  ',I5//                     DISC1740
                     *'              TO     GREATER THAN ',I5//                   DISC1750
                     *,11X,4A4,'         CLASS = ',I1//)                         DISC1760
   ISN 0069             RETURN                                                    DISC1770
   ISN 0070             END                                                       DISC1780
```

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

SYMBOL	INTERNAL STATEMENT NUMBERS
A	0007 0036 0038 0041 0045 0045 0049 0056
G	0011 0054 0056 0056 0058 0058 0058 0061
I	0018 0018 0018 0031 0031 0031 0033 0034 0035 0036 0038 0038 0038 0060 0061 0061 0064 0064 0064
	0067 0067 0067 0067 0067 0067
J	0038 0038 0039 0038
W	0002 0012 0056
HDR	0014 0018 0019 0020 0021 0022 0023 0024 0025 0026 0027 0028 0029 0030 0031
ICE	0019 0020 0021 0022 0023 0024 0025 0026 0027 0028 0029 0030
GMAX	0058 0061
ICHI	0008 0038 0045
ICLS	0053 0054 0056 0056 0056
IPAR	0055 0056 0056
LINE	0009
AMAX1	0058
ICODE	0002 0013 0043 0047 0061
ISAMP	0040 0041 0043 0045 0045 0045 0047 0049 0051 0056 0059 0061
NCROP	0006 0016
RCROP	0010 0016 0067 0067
DATREC	0015 0034 0043 0047 0051 0059 0061 0064
DISCLS	0002
KATGRY	0003 0005 0043 0047 0067 0067 0067
KHICUT	0002 0003 0045 0067
LINENO	0037
MINMAX	0002 0004 0045 0045 0067 0067

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

LABEL	DEFINED	REFERENCES
100	0034	0033
110	0036	0035
140	0045	0041
141	0049	0045
142	0053	0049
150	0056	0055
200	0057	0053
210	0061	0060
300	0063	0040 0044 0048 0052
400	0066	0037
1000	0032	0018 0031
1010	0039	0038
1020	0065	0064
1030	0068	0067

/ DISCLS / SIZE OF PROGRAM 0023AC HEXADECIMAL BYTES

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.

```
        A SF          I*4   000FDC        G SFA         R*4   001C1C        I SF          I*4   000258        J F           I*4   00025C
        W F  XR       R*4   000000      HDR SF          L*1   0002A0      ICE F  XF       I*4   000000     GMAX S           R*4   000260
     ICHI S           I*4   001C28     ICLS SF          I*4   000264     IPAR SF          I*4   000268     LINE             I*4   NR
    ICODE F  XR       L*1   000000   ISAMP SF          I*4   00026C    NCROP    C       I*4   NR         RCROP F  C       R*4   000000
   DATREC SF          L*1   000E74   DISCLS            R*4   000270   IBCOM# F  XF       I*4   000000   KATGRY F         I*4   000274
   KHICUT F           I*4   000278   LINENO SF         I*4   00027C   MINMAX F  XR       I*4   000000
```

***** COMMON INFORMATION *****

NAME OF COMMON BLOCK * HEAD* SIZE OF BLOCK 000034 HEXADECIMAL BYTES

```
VAR. NAME  TYPE  REL. ADDR.   VAR. NAME  TYPE  REL. ADDR.   VAR. NAME  TYPE  REL. ADDR.   VAR. NAME  TYPE  REL. ADDR.
  RCROP    R*4    000000       NCROP    I*4    000030 NR
```

SOURCE STATEMENT LABELS

```
LABEL  ISN  ADDR      LABEL  ISN  ADDR      LABEL  ISN  ADDR      LABEL  ISN  ADDR
  100   34  002082      110   36  002096      140   45  002120      141   49  002174
  142   53  002192      150   56  0021A4      200   57  0021FE      210   61  002232
  300   63  00225C      400   66  002290
```

COMPILER GENERATED LABELS

```
LABEL  ISN  ADDR      LABEL  ISN  ADDR      LABEL  ISN  ADDR      LABEL  ISN  ADDR
100001    2  001C60  200001   33  002080  100006   35  002094  100007   37  0020AA
100008   38  0020AE  100009   38  0020C2  100012   38  0020F4  100013   41  0020FA
100014   43  002104  200002   46  002132  200003   46  002148  100015   47  00215E
100016   51  002186  100017   54  002194  100019   58  002208  100020   62  002244
100021   63  002252  100023   64  002266  100026   67  0022A2
```

FORMAT STATEMENT LABELS

```
LABEL  ISN  ADDR      LABEL  ISN  ADDR      LABEL  ISN  ADDR      LABEL  ISN  ADDR
 1000   32  000028     1010   39  000031     1020   65  00003A     1030   68  000043
```

B-9

```
*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
*STATISTICS*      SOURCE STATEMENTS =      69, PROGRAM SIZE =     9132, SUBPROGRAM NAME =DISCLS
*STATISTICS*  NO  DIAGNOSTICS GENERATED
****** END OF COMPILATION ******                          284K BYTES OF CORE NOT USED
```

REQUESTED OPTIONS: NOTERM

OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

```
ISN 0002              SUBROUTINE DISCRM(N1,A,W)                                  DIS00010
                      C                                                          DIS00020
                      C     THIS VERSION OF DISCRM IS SET UP TO SCALE THE INPUT DATA BY 100.  DIS00030
                      C                                                          DIS00040
ISN 0003              INTEGER N1(3),A(400,4)                                     DIS00050
ISN 0004              DIMENSION X(400),AG1(4,400)                                DIS00060
ISN 0005              DIMENSION B(400,3),A1(4,4),A11(4,4)                        DIS00070
ISN 0006              DIMENSION W(4,3),Y(400,3),YC(400,3),G(400,3)               DIS00080
ISN 0007              DIMENSION E(4,3),M(3,3)                                    DIS00090
ISN 0008              DOUBLE PRECISION B1(5,5),B11(5,5)                          DIS00100
ISN 0009             NPT=400                                                     DIS00110
                      C       ITT UNIT NO OF TERMINAL                            DIS00120
                      C       ITO UNIT NO OF PRINTER                             DIS00130
ISN 0010             ITT=5                                                       DIS00140
ISN 0011              ITO=6                                                      DIS00150
ISN 0012             RHO=0.8                                                     DIS00160
ISN 0013             NT=0                                                        DIS00170
                      C       N= NO OF FEATURES INCLUDING CONSTANTS =4            DIS00180
ISN 0014              N=4                                                        DIS00190
                      C       THIS PROGRAM TAKEN FROM BGB.C IS THE HO-KYCHAP LINEAR  DIS00200
                      C       DISCRIMATION PROGRAM                               DIS00210
                      C       IT SOLVES THE VECTOR EQUATION AW=B                 DIS00220
                      C       WHERE A IS DATA MATRIX; W THE WEIGHT VECTORS       DIS00230
                      C       THE DATA MATRIX IS SET UP AS FOLLOWS:              DIS00240
                      C       ------------------------------------               DIS00250
                      C       N1(1)    'ALPHA  BETA TO  1. '                     DIS00260
                      C                'ALPHA  BETA TO  1. '                     DIS00270
                      C                '                   '                     DIS00280
                      C                '                   '                     DIS00290
                      C       N1(2)    'ALPHA  BETA TO  1. '                     DIS00300
                      C                'ALPHA  BETA TO  1. '                     DIS00310
                      C       N1(3)    'ALPHA  BETA TO  1. '                     DIS00320
                      C                'ALPHA  BETA TO  1. '                     DIS00330
                      C       N1(I),I=1,3 IS THE VARIABLES ALPHA,BETA,TO         DIS00340
                      C       NC=3  IS THE NO OF CLASES                          DIS00350
ISN 0015             NC=3                                                        DIS00360
ISN 0016              N=4                                                        DIS00370
                      C       SET UP B MATRIX                                    DIS00380
                      C                 |  -1  -1                                DIS00390
                      C                 |  -1  -1        CLASSS 1                DIS00400
                      C                 |  -1  -1                                DIS00410
                      C                ----------                                DIS00420
                      C                -1  |  -1                                DIS00430
                      C                -1  |  -1        CLASS 2                 DIS00440
                      C                    :                                     DIS00450
                      C                    :                                     DIS00460
                      C                ---------                                 DIS00470
                      C                -1  -1  |                                 DIS00480
                      C                -1  -1  |        CLASS 3                  DIS00490
                      C                    :                                     DIS00500
                      C                    :                                     DIS00510
                      C                ---------                                 DIS00520
ISN 0017              DO 44 I1=1,NC                                              DIS00530
ISN 0018              N11=N1(I1)                                                 DIS00540
ISN 0019              DO 44 I2=1,N11                                             DIS00550
ISN 0020              NT=NT+1                                                    DIS00560
ISN 0021              I4=0                                                       DIS00570
ISN 0022              DO 46 I3=1,NC                                              DIS00580
ISN 0023              I4=I4+1                                                    DIS00590
ISN 0024              IF(I1-I4)48,52,48                                          DIS00600
ISN 0025       48     CONTINUE                                                   DIS00610
ISN 0026              B(NT,I3)=-1.0                                              DIS00620
ISN 0027              GO TO 54                                                   DIS00630
ISN 0028       52     CONTINUE                                                   DIS00640
ISN 0029              B(NT,I3)=1.0                                               DIS00650
ISN 0030       54     CONTINUE                                                   DIS00660
ISN 0031       46     CONTINUE                                                   DIS00670
ISN 0032       44     CONTINUE                                                   DIS00680
                      C                                                          DIS00690
                      C          T                                               DIS00700
                      C       A1=A  A                                            DIS00710
                      C       X( ) IS USED IN THE COMPUTATION OF A ARRAY INSTEAD OF USING  DIS00720
```

```
                C       ANOTHER ARRAY FOR A TRANSPOSE                                   DIS00740
                C                                                                       DIS00750
   ISN 0033             DO 56 I1=1,N                                                    DIS00760
   ISN 0034             DO 58 I2=1,NT                                                   DIS00770
   ISN 0035             X(I2)=A(I2,I1)                                                  DIS00740
   ISN 0036            X(I2)=X(I2)/100.                                                 DIS00790
   ISN 0037      58     CONTINUE                                                        DIS00800
   ISN 0038             DO 60 I2=1,N                                                    DIS00810
   ISN 0039             A1(I1,I2)=0.0                                                   DIS00820
   ISN 0040             DO 60 I3=1,NT                                                   DIS00830
   ISN 0041            DUMMY=A(I3,I2)                                                   DIS00840
   ISN 0042             A1(I1,I2)=A1(I1,I2)+X(I3)*(DUMMY/100.)                          DIS00850
   ISN 0043      60     CONTINUE                                                        DIS00860
   ISN 0044      56     CONTINUE                                                        DIS00870
                C       B1,B11 DOUBLE PRECISION ARRAYS FOR INVERSE COMPUTATION          DIS00880
   ISN 0045             DO 53 I1=1,N                                                    DIS00890
   ISN 0046             DO 53 I2=1,N                                                    DIS00900
   ISN 0047      53     B1(I1,I2)=A1(I1,I2)                                             DIS00910
   ISN 0048             CALL MTNV(B1,N,B11)                                             DIS00920
   ISN 0049             DO 55 I1=1,N                                                    DIS00930
   ISN 0050             DO 55 I2=1,N                                                    DIS00940
   ISN 0051      55     A11(I1,I2)=B11(I1,I2)                                           DIS00950
                C                                                                       DIS00960
                CCC                                                                     DIS00970
                C        AGI( ,) =(ATA)-1AT                                             DIS00980
                C        GENERALIZED INVERSE OF A ARRAY                                 DIS00990
   ISN 0052             DO 62 I1=1,N                                                    DIS01000
   ISN 0053             DO 64 I2=1,NT                                                   DIS01010
   ISN 0054             AGI(I1,I2)=0.0                                                  DIS01020
   ISN 0055             DO 66 I3=1,N                                                    DIS01030
   ISN 0056             X(I3)=A(I2,I3)                                                  DIS01040
   ISN 0057            X(I3)=X(I3)/100.                                                 DIS01050
   ISN 0058      66     CONTINUE                                                        DIS01060
   ISN 0059             DO 69 I3=1,N                                                    DIS01070
   ISN 0060             AGI(I1,I2)=AGI(I1,I2)+X(I3)*A11(I1,I3)                          DIS01080
   ISN 0061      69     CONTINUE                                                        DIS01090
   ISN 0062      64     CONTINUE                                                        DIS01100
   ISN 0063      62     CONTINUE                                                        DIS01110
                C        INTIAL WEIGHT VECTOR COMPUTATION                               DIS01120
                C        W=(ATA)-1ATB                                                   DIS01130
                CCC                                                                     DIS01140
                C                                                                       DIS01150
   ISN 0064             DO 74 I1=1,N                                                    DIS01160
   ISN 0065             DO 74 I2=1,NC                                                   DIS01170
   ISN 0066             W(I1,I2)=0.0                                                    DIS01180
   ISN 0067             DO 76 I3=1,NT                                                   DIS01190
   ISN 0068             W(I1,I2)=W(I1,I2)+AGI(I1,I3)*B(I3,I2)                           DIS01200
   ISN 0069      76     CONTINUE                                                        DIS01210
   ISN 0070      74     CONTINUE                                                        DIS01220
   ISN 0071             WRITE(ITO,78)                                                   DIS01230
   ISN 0072      78     FORMAT(1H0,10X,'INITIAL WEIGHT VECTOR MATRIX')                  DIS01240
   ISN 0073             DO 80 I1=1,N                                                    DIS01250
   ISN 0074             WRITE(ITO,81)(W(I1,I2),I2=1,NC)                                 DIS01260
   ISN 0075      81     FORMAT(10X,6E12.3/)                                             DIS01270
   ISN 0076      80     CONTINUE                                                        DIS01280
   ISN 0077             NT1=NT*NC                                                       DIS01290
                C                                                                       DIS01300
                C                                                                       DIS01310
   ISN 0078             L1=0                                                            DIS01320
   ISN 0079             DO 82 L=1,100                                                   DIS01330
   ISN 0080             L1=L1+1                                                         DIS01340
                C                                                                       DIS01350
                CC                                                                      DIS01360
                C        G=AW MATRIX DISCRIMINANT FUNCTION VALUES                       DIS01370
   ISN 0081             DO 84 I1=1,NT                                                   DIS01380
   ISN 0082             DO 84 I2=1,NC                                                   DIS01390
   ISN 0083             G(I1,I2)=0.0                                                    DIS01400
   ISN 0084             DO 86 I3=1,N                                                    DIS01410
   ISN 0085            DUMMY=A(I1,I3)                                                   DIS01420
   ISN 0086             G(I1,I2)=G(I1,I2)+(DUMMY/100.)*W(I3,I2)                         DIS01430
   ISN 0087      86     CONTINUE                                                        DIS01440
   ISN 0088      84     CONTINUE                                                        DIS01450
                C                                                                       DIS01460
                CC                                                                      DIS01470
                C        CHECK G MATRIX:WHETHER ALL THE TRAINING PATTERNS IN THE        DIS01480
                C        MATRIX ARE CORECTLY CLASSIFIED. THAT IS INDICATED BY L2=0      DIS01490
   ISN 0089             L2=0                                                            DIS01500
   ISN 0090             L3=0                                                            DIS01510
```

```
ISN 0091              DO 88 I1=1,NC                                          DIS01520
ISN 0092              NII=NI(I1)                                             DIS01530
ISN 0093              DO 88 I2=1,NII                                         DIS01540
ISN 0094              L3=L3+1                                                DIS01550
ISN 0095              DO 90 I3=1,NC                                          DIS01560
ISN 0096              IF(I1-I3)92,94,92                                      DIS01570
ISN 0097           92 CONTINUE                                               DIS01580
ISN 0098              IF(G(L3,I1) .GT. G(L3,I3))GO TO 96                     DIS01590
ISN 0100              L2=L2+1                                                DIS01600
ISN 0101           94 CONTINUE                                               DIS01610
ISN 0102           96 CONTINUE                                               DIS01620
ISN 0103           90 CONTINUE                                               DIS01630
ISN 0104           88 CONTINUE                                               DIS01640
ISN 0105              IF(L2)98,100,98                                        DIS01650
                   C   IF L2=0, GET OUT OF LOOP TRAINING PATTERNS ONE CORRECTLY DIS01660
                   C   CLASSIFIED.                                           DIS01670
ISN 0106           98 CONTINUE                                               DIS01680
                   C   Y NT X NC ERROR MATRIX Y=AW-B                        DIS01690
ISN 0107              DO 102 I1=1,NT                                         DIS01700
ISN 0108              DO 102 I2=1,NC                                         DIS01710
ISN 0109              Y(I1,I2)=G(I1,I2)-B(I1,I2)                             DIS01720
ISN 0110          102 CONTINUE                                               DIS01730
                   C   CREATE YC MATRIX NT X NC                            DIS01740
                   C   YC(I,J)=ABS(Y(I,J))*SGN B(I,J)                       DIS01750
                   C                                                        DIS01760
                   C                                                        DIS01770
ISN 0111              DO 104 I1=1,NT                                         DIS01780
ISN 0112              DO 104 I2=1,NC                                         DIS01790
ISN 0113              IF(B(I1,I2))106,108,112                                DIS01800
ISN 0114          106 CONTINUE                                               DIS01810
ISN 0115              YC(I1,I2)=-1.0*ABS(Y(I1,I2))                           DIS01820
ISN 0116              GO TO 114                                              DIS01830
ISN 0117          112 CONTINUE                                               DIS01840
ISN 0118              YC(I1,I2)=ABS(Y(I1,I2))                                DIS01850
ISN 0119          114 CONTINUE                                               DIS01860
ISN 0120          108 CONTINUE                                               DIS01870
ISN 0121          104 CONTINUE                                               DIS01880
                   C                                                        DIS01890
                   C   CHECK ALL THE ELEMENTS OF Y*YC ARE ZERO!CONVERGENCE INDICATION DIS01900
                   C                                                        DIS01910
ISN 0122              L3=0                                                   DIS01920
ISN 0123              DO 116 I1=1,NT                                         DIS01930
ISN 0124              DO 116 I2=1,NC                                         DIS01940
ISN 0125              D1=Y(I1,I2)*YC(I1,I2)                                  DIS01950
ISN 0126              IF(ABS(D1)-0.00005)118,118,116                         DIS01960
ISN 0127          118 CONTINUE                                               DIS01970
ISN 0128              L3=L3+1                                                DIS01980
ISN 0129          116 CONTINUE                                               DIS01990
                   C   IF ALL THE ELEMENTS OF Y*YC ARE ZERO!GET OUT OF LOOP  DIS02000
ISN 0130              IF(L3-NT)120,122,122                                   DIS02010
ISN 0131          120 CONTINUE                                               DIS02020
                   C                                                        DIS02030
                   C                                                        DIS02040
ISN 0132              DO 124 I1=1,N                                          DIS02050
ISN 0133              DO 124 I2=1,NC                                         DIS02060
ISN 0134              E(I1,I2)=0.0                                           DIS02070
ISN 0135              DO 126 I3=1,NT                                         DIS02080
ISN 0136              E(I1,I2)=E(I1,I2)+AGI(I1,I3)*(Y(I3,I2)+YC(I3,I2))      DIS02090
                   C   E=A+(Y+YC)                                           DIS02100
                   C   A+ GENERALISED INVERSE OF A=(ATA)-1AT                DIS02110
ISN 0137          126 CONTINUE                                               DIS02120
ISN 0138          124 CONTINUE                                               DIS02130
                   C   W(R TH+1)=W (R TH)+RHO*E                             DIS02140
                   C   0 LESS THAN RHO LESS THAN 2 FOR CONVERGENCE          DIS02150
                   C   IT IS SET AT 0.8                                     DIS02160
                   C                                                        DIS02170
                   C                                                        DIS02180
ISN 0139              DO 128 I1=1,N                                          DIS02190
ISN 0140              DO 128 I2=1,NC                                         DIS02200
ISN 0141              W(I1,I2)=W(I1,I2)+RHO*E(I1,I2)                         DIS02210
ISN 0142          128 CONTINUE                                               DIS02220
                   C   B( R TH+1)=B( R TH)+RHO*(Y+YC)                       DIS02230
ISN 0143              DO 130 I1=1,NT                                         DIS02240
ISN 0144              DO 130 I2=1,NC                                         DIS02250
ISN 0145              B(I1,I2)=B(I1,I2)+RHO*(Y(I1,I2)+YC(I1,I2))             DIS02260
ISN 0146          130 CONTINUE                                               DIS02270
ISN 0147          132 CONTINUE                                               DIS02280
ISN 0148          122 CONTINUE                                               DIS02290
```

```
ISN 0149            WRITE(ITO,132)                                                DIS02300
ISN 0150      132   FORMAT(//10X,'PATTERNS ARE NOT LINEARLY SEPARABLE')           DIS02310
ISN 0151            WRITE(ITO,134)I2                                              DIS02320
ISN 0152      134   FORMAT(/,10X,'NO OF MISCLASSIFIED PATTERNS LESS THAN OR EQUAL TODIS02330
                   *,I5)                                                         DIS02340
ISN 0153      100   CONTINUE                                                      DIS02350
ISN 0154            WRITE(ITO,136)                                                DIS02360
ISN 0155      136   FORMAT(/15X,'SOLUTION    WEIGHT     VECTORS')                 DIS02370
ISN 0156            DO 138 I=1,N                                                  DIS02380
ISN 0157            WRITE(ITO,139)(W(I,J),J=1,NC)                                 DIS02390
ISN 0158      139   FORMAT(10X,6F 2.3/)                                           DIS02400
ISN 0159      138   CONTINUE                                                      DIS02410
                C                                                                 DIS02420
                C                                                                 DIS02430
                C                                                                 DIS02440
ISN 0160            NT=0                                                          DIS02450
ISN 0161            DO 140 II=1,NC                                                DIS02460
ISN 0162            NII=NI(II)                                                    DIS02470
                C   WRITE(ITT,142)II                                             DIS02480
                C142 FORMAT(5X,'DISCRIM VALUES OF TRAIN PATTERNS OF CLASS',I5)    DIS02490
ISN 0163            DO 144 I2=1,NII                                               DIS02500
ISN 0164            NT=NT+1                                                       DIS02510
                C   WRITE(ITT,146)I2,(G(NT,I3),I3=1,NC)                         DIS02520
                C146 FORMAT(2X,I5,2X,6E11.3)                                      DIS02530
ISN 0165      144    CONTINUE                                                     DIS02540
ISN 0166      140   CONTINUE                                                      DIS02550
ISN 0167            WRITE(ITO,148) LL                                             DIS02560
ISN 0168      148   FORMAT(//10X,'TOTAL NO OF ITERATIONS=',I5)                    DIS02570
                C    MI CONFUSION MATRIX OF TRAINING PATTERNS                     DIS02580
                C                TRAINING CLASS                                   DIS02590
                C                                                                 DIS02600
                C                1       2       3                                DIS02610
                C     ------------------------------------------                  DIS02620
                C                                                                 DIS02630
                C     |  T                                                        DIS02640
                C     |  R   1                                                    DIS02650
                C     |  U                                                        DIS02660
                C     |  E                                                        DIS02670
                C     ------------------------------------------                  DIS02680
                C                                                                 DIS02690
                C     |  C                                                        DIS02700
                C     |  L                                                        DIS02710
                C     |  A   2                                                    DIS02720
                C     |  S                                                        DIS02730
                C     |  S                                                        DIS02740
                C     ------------------------------------------                  DIS02750
                C                                                                 DIS02760
                C                                                                 DIS02770
                C                    3                                            DIS02780
                C                                                                 DIS02790
                C     ------------------------------------------                  DIS02800
ISN 0169            DO 150 I1=1,NC                                                DIS02810
ISN 0170            DO 150 I2=1,NC                                                DIS02820
ISN 0171      150   MI(I1,I2)=0                                                   DIS02830
ISN 0172            NT=0                                                          DIS02840
ISN 0173            DO 152 I2=1,NC                                                DIS02850
ISN 0174            NII=NI(I2)                                                    DIS02860
ISN 0175            DO 154 I3=1,NII                                               DIS02870
ISN 0176            NT=NT+1                                                       DIS02880
ISN 0177            DO 156 I1=1,NC                                                DIS02890
ISN 0178            IF(I1 .EQ. I2)GO TO 156                                       DIS02900
ISN 0180            IF(G(NT,I2) .LE. G(NT,I1))GO TO 158                           DIS02910
ISN 0182      156   CONTINUE                                                      DIS02920
ISN 0183            MI(I2,I2)=MI(I2,I2)+1                                         DIS02930
ISN 0184            GO TO 160                                                     DIS02940
ISN 0185      158   CONTINUE                                                      DIS02950
ISN 0186            DM=G(NT,1)                                                    DIS02960
ISN 0187            N4=1                                                          DIS02970
ISN 0188            DO 162 I1=1,NC                                                DIS02980
ISN 0189            IF(DM .GE. G(NT,I1))GO TO 162                                 DIS02990
ISN 0191            DM=G(NT,I1)                                                   DIS03000
ISN 0192            N4=I1                                                         DIS03010
ISN 0193      162   CONTINUE                                                      DIS03020
ISN 0194            MI(I2,N4)=MI(I2,N4)+1                                         DIS03030
ISN 0195      160   CONTINUE                                                      DIS03040
ISN 0196      154   CONTINUE                                                      DIS03050
ISN 0197      152   CONTINUE                                                      DIS03060
ISN 0198            WRITE(ITO,164)                                                DIS03070
```

```
   ISN 0199      154   FORMAT(//10X,'CONFUSION MATRIX FOR TRAINING PATTERNS')          DIS03080
   ISN 0200            DO 163 I1=1,NC                                                 DIS03090
   ISN 0201            WRITE(ITO,166)(M(I1,I2),I2=1,NC)                               DIS03100
   ISN 0202      166   FORMAT(10X,5110/)                                              DIS03110
   ISN 0203      163   CONTINUE                                                       DIS03120
   ISN 0204            RETURN                                                         DIS03130
   ISN 0205            END                                                            DIS03140
```

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

SYMBOL	INTERNAL STATEMENT NUMBERS
A	0002 0003 0035 0041 0056 0085
B	0005 0026 0029 0068 0109 0113 0145 0145
E	0007 0134 0136 0136 0141
G	0006 0083 0086 0086 0098 0098 0109 0180 0180 0186 0189 0191
I	0156 0157
J	0157 0157 0157
L	0079
N	0014 0016 0033 0038 0045 0046 0048 0049 0050 0052 0055 0059 0064 0073 0084 0132 0139 0156
W	0002 0006 0066 0068 0068 0074 0086 0141 0141 0157
X	0004 0035 0036 0036 0042 0056 0057 0057 0060
Y	0006 0109 0115 0118 0125 0136 0145
A1	0005 0039 0042 0042 0047
B1	000A 0047 0048
DM	0186 0189 0191
D1	0125 0126
I1	0017 0018 0024 0033 0035 0039 0042 0042 0045 0047 0047 0049 0051 0051 0052 0054 0060 0060 0060
	0064 0066 0068 0068 0068 0073 0074 0081 0083 0085 0086 0086 0091 0092 0096 0098 0107 0109 0109
	0109 0111 0113 0115 0115 0118 0118 0123 0125 0125 0132 0134 0136 0136 0136 0139 0141 0141 0141
	0143 0145 0145 0145 0145 0161 0162 0169 0171 0177 0178 0180 0188 0189 0191 0192 0200 0201
I2	0019 0034 0035 0035 0036 0036 0038 0039 0041 0042 0042 0046 0047 0047 0050 0051 0051 0053 0054
	0056 0060 0060 0065 0066 0068 0068 0068 0074 0074 0074 0082 0083 0086 0086 0086 0093 0108 0109
	0109 0109 0112 0113 0115 0115 0118 0118 0124 0125 0125 0133 0134 0136 0136 0136 0136 0140 0141
	0141 0141 0144 0145 0145 0145 0145 0163 0170 0171 0173 0174 0178 0180 0183 0183 0183 0183 0194
	0194 0201 0201 0201
I3	0022 0026 0029 0040 0041 0042 0055 0056 0056 0057 0057 0059 0060 0060 0067 0068 0068 0084 0085
	0086 0095 0096 0098 0135 0136 0136 0136 0175
I4	0021 0023 0023 0024
L1	0078 0080 0080 0167
L2	0089 0100 0100 0105 0151
L3	0090 0094 0094 0098 0098 0122 0128 0128 0130
M1	0007 0171 0183 0183 0194 0194 0201
NC	0015 0017 0022 0065 0074 0077 0082 0091 0095 0108 0112 0124 0133 0140 0144 0157 0161 0169 0170
	0173 0177 0188 0200 0201
NT	0013 0020 0020 0026 0029 0034 0040 0053 0067 0077 0081 0107 0111 0123 0135 0143 0160 0164 0164
	0172 0176 0176 0180 0180 0186 0189 0191
N1	0002 0003 0018 0092 0162 0174
N4	0187 0192 0194 0194
YC	0006 0115 0118 0125 0136 0145
ABS	0115 0118 0126
AGI	0004 0054 0060 0060 0068 0136
AII	0005 0051 0060
BII	0008 0048 0051
ITO	0011 0071 0074 0149 0151 0154 0157 0167 0198 0201
ITT	0010
NPT	0009
NTI	0077 0130
NII	0018 0019 0092 0093 0162 0163 0174 0175
RHO	0012 0141 0145
MTNV	0048
DUMMY	0041 0042 0085 0086
DISCRM	0002

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

LABEL	DEFINED	REFERENCES
44	0032	0017 0019
46	0031	0022
48	0025	0024 0024
52	0029	0024
53	0047	0045 0046
54	0030	0027
55	0051	0049 0050
56	0044	0033
58	0037	0034
60	0043	0038 0040
62	0063	0052
64	0062	0053

*****FORTRAN CROSS REFERENCE LISTING*****

LABEL	DEFINED	REFERENCES
66	0058	0055
69	0061	0059
74	0070	0064 0065
76	0069	0067
78	0072	0071
80	0076	0073
81	0075	0074
82	0147	0079
84	0088	0081 0082
86	0087	0084
88	0104	0091 0093
90	0103	0095
92	0097	0096 0096
94	0101	0096
96	0102	0098
98	0106	0105 0105
100	0153	0105
102	0110	0107 0108
104	0121	0111 0112
106	0114	0113
108	0120	0113
112	0117	0113
114	0119	0116
116	0129	0123 0124 0126
118	0127	0126 0126
120	0131	0130
122	0148	0130 0130
124	0138	0132 0133
126	0137	0135
128	0142	0139 0140
130	0146	0143 0144
132	0150	0149
134	0152	0151
136	0155	0154
138	0159	0156
139	0158	0157
140	0166	0161
144	0165	0163
148	0168	0167
150	0171	0169 0170
152	0197	0173
154	0196	0175
156	0182	0177 0178
158	0185	0180
160	0195	0184
162	0193	0188 0189
163	0203	0200
164	0199	0198
166	0202	0201

/ DISCRM / SIZE OF PROGRAM 007B04 HEXADECIMAL BYTES

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
A F	XR	I*4	000000	B	SF	R*4	0036C8	E	SF	R*4	00025C	G	SF	R*4	004980				
I SF		I*4	0001FC	J	F	I*4	000200	L	SF	I*4	000204	N	SFA	I*4	000208				
W SF	XR	R*4	000000	X	SF	R*4	00028C	Y	SFA	R*4	0008CC	A1	SF	R*4	0018BC				
B1 SFA		R*8	003538	DM	S	R*4	00020C	D1	S A	R*4	000210	I1	SFA	I*4	000214				
I2 SFA		I*4	000218	I3	SF	I*4	00021C	I4	SF	I*4	000220	L1	SF	I*4	000224				
L2 SF		I*4	000228	L3	SF	I*4	00022C	M1	SF	I*4	0018CC	NC	SF	I*4	000230				
NT SF		I*4	000234	N1	F XR	I*4	000000	N4	SF	I*4	000238	YC	SF	R*4	005C4C				
AG1 SF		R*4	0018F0	A11	SF	R*4	0034F4	B11	SFA	R*8	003600	ITO	SF	I*4	0023CC				
ITT S		I*4	000240	NPT	S	I*4	000244	NTI	S	I*4	000248	NII	SF	I*4	000250				
RHO SF		R*4	000250	MINV	SF XF		000000	DUMMY	SF	R*4	000254	DISCRM		R*4	000258				
IBCOM# F	XF	I*4	000000																

SOURCE STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
48	25	006FD4	52	28	006FF6	54	30	007012	46	31	007012
44	32	007010	58	37	00707C	60	43	007108	56	44	007110
53	47	00712A	55	51	00717A	66	58	00721E	69	61	007278
64	62	007282	62	63	00728C	76	69	007310	74	70	00731A

80	76	007382	86	87	007440	84	88	00744A	92	97	007494
94	101	0074CE	96	102	0074CE	90	103	0074CE	98	104	0074D8
98	106	0074F6	102	110	007538	106	114	007570	112	117	0075A4
114	119	00750E	108	120	00750E	104	121	00750E	118	127	007624
116	129	00762E	120	131	00764E	126	137	007600	124	138	00760A
128	142	007732	130	146	0077A4	82	147	007788	122	148	0077CA
100	153	0077FC	138	159	007850	144	165	00788A	140	166	007894
150	171	0078C0	156	182	00794E	158	185	007986	162	193	0079E4
160	195	007A1C	154	196	007A1C	152	197	007A26	163	203	007A82

COMPILER GENERATED LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
100001	2	006F48	100002	18	006F9A	100003	20	006FAE	100004	23	006FC2
100006	33	007026	100007	33	007030	100008	34	007032	100009	35	007034
100010	38	007086	100011	39	007088	100012	41	0070A4	100013	44	007112
100015	45	007126	100016	46	007128	100017	48	007162	100018	48	00716C
100019	50	007178	100020	52	0071AC	100021	52	0071B6	100022	53	007188
100023	54	0071BA	100024	56	0071D6	100025	59	007228	100026	60	00722A
100029	64	007296	100030	65	007298	100031	66	00729A	100032	68	007286
100034	71	007324	100035	71	00732E	100036	74	007346	100039	77	00736C
100040	80	0073A4	100041	82	0073B0	100042	83	0073B2	100043	85	0073CE
100045	89	007454	100046	89	00745F	100047	92	00746C	100048	94	007480
100049	96	00748C	100050	100	0074C4	100052	105	0074E2	100053	105	0074EC
100054	108	0074FA	100055	109	0074FA	100056	111	007542	100057	111	00754C
100058	112	00764F	100059	113	007550	100060	122	0075D8	100061	122	0075E2
100062	124	0075EC	100063	125	0075FE	100064	130	007638	100065	130	007642
100066	133	007650	100067	134	007652	100068	136	00766A	100070	139	0076E4
100071	139	0076EE	100072	140	0076F0	100073	141	0076F2	100074	143	00773C
100075	143	007746	100076	144	007748	100077	145	00774A	100078	147	0077AE
100081	157	007814	100084	160	007862	100085	162	00786C	100086	164	007880
100088	167	007B9E	100089	170	007BBE	100090	172	007BE4	100091	172	007BEE
100092	174	007BF8	100093	176	007C0C	100094	178	007918	100095	180	00791E
100096	183	00795A	100097	189	0079A4	100098	191	0079C4	100099	194	0079EE
100101	198	007A30	100102	201	007A46	100105	204	007A8C			

FORMAT STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
78	72	000028	81	75	000040	132	150	000057	134	152	000082
136	155	000080	139	158	0000E2	148	168	0000EC	164	199	00010D
166	202	000138									

*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

STATISTICS SOURCE STATEMENTS = 204, PROGRAM SIZE = 31492, SUBPROGRAM NAME =DISCRM

STATISTICS NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ****** 252K BYTES OF CORE NOT USED

```
*LEVEL 2.3.0 (JUNE 78)                  OS/360  FORTRAN H EXTENDED          DATE 81.139/13.25.00       PAGE   1
REQUESTED OPTIONS: NOTERM
OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
                   SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

   ISN 0002             INTEGER FUNCTION ICE(INT)                                                  ICE00010
C                                                                                                 ICE00020
C                                        INTEGER CHARACTER EQUIVALENCE                            ICE00030
C     ------------------------------------------------------------                                ICE00040
C                                                                                                 ICE00050
C    HISTORY                                                                                      ICE00060
C    -------                                                                                      ICE00070
C                                                                                                 ICE00080
C        M S TOMPKINS      LEMSCO      01/27/81      ORIGINAL CODE                                ICE00090
C                                                                                                 ICE00100
C    METHOD                                                                                       ICE00110
C    ------                                                                                       ICE00120
C                                                                                                 ICE00130
C        SET INPUT TO FUNCTION. RETURN.                                                           ICE00140
C                                                                                                 ICE00150
C    EXCEPTIONS                                                                                   ICE00160
C    ----------                                                                                   ICE00170
C                                                                                                 ICE00180
C        IF THE FUNCTION IS APPLIED TO A WORD THE VALUE RETURNED IS OF                            ICE00190
C        THE LEFT MOST BYTE                                                                       ICE00200
C                                                                                                 ICE00210
C    LOCAL DECLARATION                                                                            ICE00220
C    -----------------                                                                            ICE00230
C                                                                                                 ICE00240
C                                                                                                 ICE00250
   ISN 0003             LOGICAL*1 INT                                                            ICE00260
C                                                                                                 ICE00270
C    PROCEDURE                                                                                    ICE00280
C    ---------                                                                                    ICE00290
C                                                                                                 ICE00300
C                                                                                                 ICE00310
   ISN 0004             ICE = INT                                                                ICE00320
   ISN 0005             RETURN                                                                   ICE00330
   ISN 0006             END                                                                      ICE00340
                                                                                                 ICE00350
                                                                                                 ICE00360
                                                                                                 ICE00370
                                                                                                 ICE00380

                    *****F O R T R A N   C R O S S   R E F E R E N C E   L I S T I N G*****
SYMBOL  INTERNAL STATEMENT NUMBERS
ICE     0002  0004
INT     0002  0003  0004

                                                    /     ICE /     SIZE OF PROGRAM 0000C2 HEXADECIMAL BYTES

      NAME     TAG   TYPE  ADD.        NAME     TAG   TYPE  ADD.        NAME     TAG   TYPE  ADD.        NAME     TAG   TYPE  ADD.
       ICE S         I*4   000084       INT  F         L*1   000080

  COMPILER GENERATED LABELS

    LABEL  ISN   ADDR          LABEL  ISN   ADDR          LABEL  ISN   ADDR          LABEL  ISN   ADDR
    100001    ?  000088

*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
*STATISTICS*     SOURCE STATEMENTS =       5, PROGRAM SIZE =      194, SUBPROGRAM NAME =   ICE
*STATISTICS*  NO  DIAGNOSTICS GENERATED
****** END OF COMPILATION ******                                  292K BYTES OF CORE NOT USED
```

```
*LEVEL 2.3.0 (JUNE 78)                  OS/360  FORTRAN H EXTENDED          DATE 81.139/13.25.16       PAGE   1
REQUESTED OPTIONS: NOTERM
OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
                   SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

   ISN 0002            INTEGER FUNCTION IVALUE(INT)                                          |VA00010
                     C                                  ALLOWS QUOTED LITERALS             |VA00020
                     C     ---------------------------------------------------             |VA00030
                     C                                                                     |VA00040
                     C HISTORY                                                             |VA00050
                     C -------                                                             |VA00060
                     C                                                                     |VA00070
                     C     M A TOMPKINS     LEMSCO     01/27/81     ORIGINAL CODE         |VA00080
                     C                                                                     |VA00090
                     C METHOD                                                              |VA00100
                     C ------                                                              |VA00110
                     C                                                                     |VA00120
                     C     SET INPUT TO FUNCTION. RETURN.                                  |VA00130
                     C                                                                     |VA00140
                     C PROCEDURE                                                           |VA00150
                     C ---------                                                           |VA00160
                     C                                                                     |VA00170
                     C                                                                     |VA00180
                     C                                                                     |VA00190
                     C                                                                     |VA00200
   ISN 0003            IVALUE = INT                                                        |VA00210
   ISN 0004            RETURN                                                              |VA00220
   ISN 0005            END                                                                 |VA00230

                     *****F O R T R A N   C R O S S   R E F E R E N C E   L I S T I N G*****
SYMBOL  INTERNAL STATEMENT NUMBERS
INT     0002  0003
IVALUE  0002  0003

                                                        /  IVALUE /     SIZE OF PROGRAM 0000C2 HEXADECIMAL BYTES
      NAME     TAG   TYPE  ADD.       NAME     TAG   TYPE  ADD.       NAME     TAG   TYPE  ADD.       NAME     TAG   TYPE  ADD.
       INT   F       I*4   000080    IVALUE S       I*4   000084

  COMPILER GENERATED LABELS
    LABEL  ISN   ADDR          LABEL  ISN   ADDR          LABEL  ISN   ADDR          LABEL  ISN   ADDR
    100001   2  000088

*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
*STATISTICS*      SOURCE STATEMENTS =        4, PROGRAM SIZE =      194, SUBPROGRAM NAME =IVALUE
*STATISTICS*  NO  DIAGNOSTICS GENERATED)
****** END OF COMPILATION ******                                  292K BYTES OF CORE NOT USED
```

```
*LEVEL 2.3.0 (JUNE 78)                  OS/360  FORTRAN H EXTENDED          DATE 81.141/10.12.17       PAGE   1
REQUESTED OPTIONS: NOTERM
OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
                   SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
    ISN 0002            SUBROUTINE JULIAN (JDATE,INERR,INDAY,INMNTH,INYEAR)                    JUL00010
                C                                                                              JUL00020
                C                                                                              JUL00030
                C   PURPOSE:  TO CONVERT STANDARD DAY AND MONTH TO JULIAN DATE                 JUL00040
                C                                                                              JUL00050
                C                                                                              JUL00060
                C   HISTORY:                                                                   JUL00070
                C     J C CRISP         LEMSCO     02/09/81     ORIGINAL CODE                 JUL00080
                C                                                                              JUL00090
                C                                                                              JUL00100
                C   DESCRIPTION OF ARGUMENTS:                                                  JUL00110
                C     JDATE--ARRAY TO RETURN JULIAN DATE (1 DIGIT PER ARRAY ELEMENT)           JUL00120
                C     INERR--ERROR FLAG INDICATING INPUT VALUE OUT OF RANGE (ZERO              JUL00130
                C            RETURNED IF NO ERROR OCCURS)                                      JUL00140
                C     INDAY--DAY OF MONTH                                                      JUL00150
                C     INMNTH--MONTH OF YEAR AS INTEGER                                         JUL00160
                C     INYEAR--LAST TWO DIGITS OF YEAR                                          JUL00170
                C                                                                              JUL00180
                C                                                                              JUL00190
                C   DESCRIPTION OF VARIABLES:                                                  JUL00200
                C     JTEMP--TEMPORARY STORAGE FOR JULIAN DATE                                 JUL00210
                C                                                                              JUL00220
                C                                                                              JUL00230
                C                                                                              JUL00240
    ISN 0003            DIMENSION JDATE (3)                                                    JUL00250
                C                                                                              JUL00260
                C                                                                              JUL00270
                C   CHECK FOR INPUT VALUE OUT OF RANGE                                         JUL00280
                C                                                                              JUL00290
    ISN 0004            IF ((INDAY.LT.1).OR.(INDAY.GT.31)) GO TO 800                           JUL00300
    ISN 0006            IF ((INMNTH.LT.1).OR.(INMNTH.GT.12)) GO TO 800                         JUL00310
                C                                                                              JUL00320
                C                                                                              JUL00330
                C   DETERMINE JULIAN DATE FOR INPUT MONTH                                      JUL00340
                C                                                                              JUL00350
    ISN 0008            IF (INMNTH.EQ.1) JTEMP=0                                               JUL00360
    ISN 0010            IF (INMNTH.EQ.2) JTEMP=31                                              JUL00370
    ISN 0012            IF (INMNTH.EQ.3) JTEMP=59                                              JUL00380
    ISN 0014            IF (INMNTH.EQ.4) JTEMP=90                                              JUL00390
    ISN 0016            IF (INMNTH.EQ.5) JTEMP=120                                             JUL00400
    ISN 0018            IF (INMNTH.EQ.6) JTEMP=151                                             JUL00410
    ISN 0020            IF (INMNTH.EQ.7) JTEMP=181                                             JUL00420
    ISN 0022            IF (INMNTH.EQ.8) JTEMP=212                                             JUL00430
    ISN 0024            IF (INMNTH.EQ.9) JTEMP=243                                             JUL00440
    ISN 0026            IF (INMNTH.EQ.10) JTEMP=273                                            JUL00450
    ISN 0028            IF (INMNTH.EQ.11) JTEMP=304                                            JUL00460
    ISN 0030            IF (INMNTH.EQ.12) JTEMP=334                                            JUL00470
    ISN 0032            JTEMP=JTEMP+INDAY                                                      JUL00480
                C                                                                              JUL00490
                C                                                                              JUL00500
                C   CHECK FOR LEAP YEAR AND ADD ONE DAY IF MONTH IS 3 OR GREATER             JUL00510
                C                                                                              JUL00520
    ISN 0033            IF ((INMNTH.GE.3).AND.(MOD(INYEAR,4).EQ.0)) JTEMP=JTEMP+1              JUL00530
                C                                                                              JUL00540
                C                                                                              JUL00550
                C   STORE DATE IN ARRAY, ONE DIGIT PER ARRAY ELEMENT                           JUL00560
                C                                                                              JUL00570
    ISN 0035            JDATE(1)=JTEMP/100                                                     JUL00580
    ISN 0036            JDATE(2)=(JTEMP-((JTEMP/100)*100))/10                                  JUL00590
    ISN 0037            JDATE(3)=JTEMP-((JTEMP/10)*10)                                         JUL00600
    ISN 0038            INERR=0                                                                JUL00610
    ISN 0039            GO TO 900                                                              JUL00620
                C                                                                              JUL00630
                C                                                                              JUL00640
                C   INPUT ERROR                                                               JUL00650
                C                                                                              JUL00660
    ISN 0040        800 INERR=1                                                                JUL00670
                C                                                                              JUL00680
                C                                                                              JUL00690
    ISN 0041        900 RETURN                                                                 JUL00700
    ISN 0042            END                                                                    JUL00710
```

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

SYMBOL	INTERNAL STATEMENT NUMBERS																		
MOD	0033																		
INDAY	0002	0004	0004	0032															
INERR	0002	0038	0040																
JDATE	0002	0003	0035	0036	0037														
JTEMP	0008	0010	0012	0014	0016	0018	0020	0022	0024	0026	0028	0030	0032	0032	0033	0033	0035	0036	0036
	0037	0037																	
INMNTH	0002	0006	0006	0008	0010	0012	0014	0016	0018	0020	0022	0024	0026	0028	0030	0033			
INYEAR	0002	0033																	
JULIAN	0002																		

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

LABEL	DEFINED	REFERENCES
800	0040	0004 0006
900	0041	0039

/ JULIAN / SIZE OF PROGRAM 000300 HEXADECIMAL BYTES

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
INDAY	F	I*4	0000E4	INERR	S	I*4	0000E8	JDATE	S	XR	I*4	000000	JTEMP	SF	I*4	0000EC
INMNTH		I*4	0000F0	INYEAR	A	I*4	0000F4	JULIAN			I*4	0000F8				

SOURCE STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
800	40	00027E	900	41	000282						

COMPILER GENERATED LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
100001	2	000110	100002	6	000148	100003	8	00016A	100004	9	000170
100005	10	000174	100006	11	00017C	100007	12	000180	100008	13	000188
100009	14	00018C	100010	15	000194	100011	16	000198	100012	17	0001A0
100013	18	0001A4	100014	19	0001AC	100015	20	0001B0	100016	21	0001B8
100017	22	0001BC	100018	23	0001C4	100019	24	0001C8	100020	25	0001D0
100021	26	0001D4	100022	27	0001DC	100023	28	0001E0	100024	29	0001E8
100025	30	0001EC	100026	31	0001F4	100027	32	0001F8	100028	34	00022C
100029	35	00022E									

*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

STATISTICS SOURCE STATEMENTS = 41, PROGRAM SIZE = 768, SUBPROGRAM NAME =JULIAN

STATISTICS NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ****** 296K BYTES OF CORE NOT USED

REQUESTED OPTIONS: NOTERM

OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

```
                      C  PROGRAM .MINV.                                                    MTN00010
ISN 0002                    SUBROUTINE MINV(AA,N,AINV)                                    MTN00020
ISN 0003                    DOUBLE PRECISION AA(5,5),AINV(5,5),A(5,10)                    MTN00030
ISN 0004                    DOUBLE PRECISION B,C,W                                        MTN00040
ISN 0005                    DIMENSION ID(5)                                               MTN00050
ISN 0006                    IFU=6                                                         MTN00060
ISN 0007                    NN=N+1                                                        MTN00070
ISN 0008                    N2=2*N                                                        MTN00080
ISN 0009                    DO 199 I=1,N                                                  MTN00090
ISN 0010                    DO 199 J=1,N                                                  MTN00100
ISN 0011                    A(I,J)=AA(I,J)                                                MTN00110
ISN 0012             199    CONTINUE                                                      MTN00120
ISN 0013                    K=1                                                           MTN00130
ISN 0014                    DO 1 I=1,N                                                    MTN00140
ISN 0015                    DO 1 J=NN,N2                                                  MTN00150
ISN 0016                    A(I,J)=0.0                                                    MTN00160
ISN 0017             1      CONTINUE                                                      MTN00170
ISN 0018                    DO 2 I=1,N                                                    MTN00180
ISN 0019                    NI=N+I                                                        MTN00190
ISN 0020                    A(I,NI)=1.0                                                   MTN00200
ISN 0021                    ID(I)=I                                                       MTN00210
ISN 0022             2      CONTINUE                                                      MTN00220
ISN 0023             11     CONTINUE                                                      MTN00230
ISN 0024                    KK=K+1                                                        MTN00240
ISN 0025                    IS=K                                                          MTN00250
ISN 0026                    IT=K                                                          MTN00260
ISN 0027                    B=DABS(A(K,K))                                                MTN00270
ISN 0028                    DO 3 I=K,N                                                    MTN00280
ISN 0029                    DO 3 J=K,N                                                    MTN00290
ISN 0030                    IF(DABS(A(I,J))-B)3,3,31                                      MTN00300
ISN 0031             31     IS=I                                                          MTN00310
ISN 0032                    IT=J                                                          MTN00320
ISN 0033                    B=DABS(A(I,J))                                                MTN00330
ISN 0034             3      CONTINUE                                                      MTN00340
ISN 0035                    IF(IS-K)4,4,41                                                MTN00350
ISN 0036             41     CONTINUE                                                      MTN00360
ISN 0037                    DO 42 J=K,N2                                                  MTN00370
ISN 0038                    C=A(IS,J)                                                     MTN00380
ISN 0039                    A(IS,J)=A(K,J)                                                MTN00390
ISN 0040                    A(K,J)=C                                                      MTN00400
ISN 0041             42     CONTINUE                                                      MTN00410
ISN 0042             4      CONTINUE                                                      MTN00420
ISN 0043                    IF(IT-K)49,49,51                                              MTN00430
ISN 0044             51     IC=ID(K)                                                      MTN00440
ISN 0045                    ID(K)=ID(IT)                                                  MTN00450
ISN 0046                    ID(IT)=IC                                                     MTN00460
ISN 0047                    DO 52 I=1,N                                                   MTN00470
ISN 0048                    C=A(I,IT)                                                     MTN00480
ISN 0049                    A(I,IT)=A(I,K)                                                MTN00490
ISN 0050                    A(I,K)=C                                                      MTN00500
ISN 0051             52     CONTINUE                                                      MTN00510
ISN 0052             49     CONTINUE                                                      MTN00520
ISN 0053                    IF(A(K,K))6,119,6                                             MTN00530
ISN 0054             6      CONTINUE                                                      MTN00540
ISN 0055                    DO 7 J=KK,N2                                                  MTN00550
ISN 0056                    A(K,J)=A(K,J)/A(K,K)                                          MTN00560
ISN 0057                    DO 7 I=KK,N                                                   MTN00570
ISN 0058                    W=A(I,K)*A(K,J)                                               MTN00580
ISN 0059                    A(I,J)=A(I,J)-W                                               MTN00590
ISN 0060                    IF(DABS(A(I,J)) .GT. 0.1D-10)GO TO 7                          MTN00600
ISN 0062                    A(I,J)=0.0000                                                 MTN00610
                      C     IF(DABS(A(I,J))-0.0001D00*DABS(W))71,7,7                      MTN00620
                      C71   A(I,J)=0.0                                                    MTN00630
ISN 0063             7      CONTINUE                                                      MTN00640
ISN 0064                    K=KK                                                          MTN00650
ISN 0065                    IF(K-N)13,81,119                                              MTN00660
ISN 0066             81     CONTINUE                                                      MTN00670
ISN 0067                    IF(A(N,N))8,119,8                                             MTN00680
ISN 0068             8      CONTINUE                                                      MTN00690
ISN 0069                    DO 9 J=NN,N2                                                  MTN00700
ISN 0070                    A(N,J)=A(N,J)/A(N,N)                                          MTN00710
ISN 0071             9      CONTINUE                                                      MTN00720
ISN 0072                    N1=N-1                                                        MTN00730
```

```
ISN 0073              DO 10 M=1,NI                                          MTN00740
ISN 0074              I=N-M                                                 MTN00750
ISN 0075              II=I+1                                                MTN00760
ISN 0076              DO 10 K=II,N                                          MTN00770
ISN 0077              DO 10 J=NN,N2                                         MTN00780
ISN 0078              A(I,J)=A(I,J)-A(I,K)*A(K,J)                           MTN00790
ISN 0079        10    CONTINUE                                              MTN00800
ISN 0080              DO 11 I=1,N                                           MTN00810
ISN 0081              DO 11 J=1,N                                           MTN00820
ISN 0082              IF(IO(J)-I)11,111,11                                  MTN00830
ISN 0083        111   CONTINUE                                              MTN00840
ISN 0084              DO 112 K=NN,N2                                        MTN00850
ISN 0085              KN=K-N                                                MTN00860
ISN 0086              AINV(I,KN)=A(J,K)                                     MTN00870
ISN 0087        112   CONTINUE                                              MTN00880
ISN 0088        11    CONTINUE                                              MTN00890
ISN 0089              GO TO 14                                              MTN00900
ISN 0090        113   CONTINUE                                              MTN00910
ISN 0091              WRITE(NFU,113)                                        MTN00920
ISN 0092        113   FORMAT(10X,'SNGLR')                                   MTN00930
ISN 0093        14    CONTINUE                                              MTN00940
ISN 0094              RETURN                                                MTN00950
ISN 0095              END                                                   MTN00960
```

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

SYMBOL	INTERNAL STATEMENT NUMBERS																		
A	0003	0011	0016	0020	0027	0030	0033	0038	0039	0039	0040	0048	0049	0049	0050	0053	0056	0056	0056
	0058	0058	0059	0059	0060	0062	0067	0070	0070	0070	0078	0078	0078	0078	0086				
B	0004	0027	0030	0033															
C	0004	0038	0040	0048	0050														
I	0009	0011	0011	0014	0016	0018	0019	0020	0021	0021	0028	0030	0031	0033	0047	0048	0049	0049	0050
	0057	0058	0059	0059	0060	0062	0074	0075	0078	0078	0078	0080	0082	0086					
J	0010	0011	0011	0015	0016	0029	0030	0032	0033	0037	0038	0039	0039	0040	0055	0056	0056	0058	0059
	0059	0060	0062	0069	0070	0070	0077	0078	0078	0078	0081	0082	0086						
K	0013	0024	0025	0026	0027	0027	0028	0029	0035	0037	0039	0040	0043	0044	0045	0049	0050	0053	0053
	0056	0056	0056	0058	0058	0064	0065	0076	0078	0078	0084	0085	0086						
M	0073	0074																	
N	0002	0007	0008	0009	0010	0014	0018	0019	0028	0029	0047	0057	0065	0067	0067	0070	0070	0070	0070
	0072	0074	0076	0080	0081	0085													
W	0004	0058	0059																
AA	0002	0003	0011																
IC	0044	0046																	
ID	0005	0021	0044	0045	0045	0046	0082												
II	0075	0076																	
IS	0025	0031	0035	0038	0039														
IT	0026	0032	0043	0045	0046	0048	0049												
KK	0024	0055	0057	0064															
KN	0085	0086																	
NI	0019	0020																	
NN	0007	0015	0069	0077	0084														
N1	0072	0073																	
N2	0008	0015	0037	0055	0069	0077	0084												
NFU	0006	0091																	
AINV	0002	0003	0086																
DABS	0027	0030	0033	0060															
MTNV	0002																		

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

LABEL	DEFINED	REFERENCES			
1	0017	0014	0015		
2	0022	0018			
3	0034	0028	0029	0030	0030
4	0042	0035	0035		
6	0054	0053	0053		
7	0063	0055	0057	0060	
8	0068	0067	0067		
9	0071	0069			
10	0079	0073	0076	0077	
11	0088	0080	0081	0082	0082
13	0023	0065			
14	0093	0089			
31	0031	0030			
41	0036	0035			
42	0041	0037			
49	0052	0043	0043		
51	0044	0043			

***** F O R T R A N C R O S S R E F E R E N C E L I S T I N G *****

LABEL	DEFINED	REFERENCES		
52	0051	0047		
81	0066	0065		
111	0083	0082		
112	0087	0084		
113	0092	0091		
119	0090	0053	0065	0067
199	0012	0009	0010	

/ MTNV / SIZE OF PROGRAM 00079A HEXADECIMAL BYTES

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
A	SFA	R*8	000130	B	S	R*8	000100	C	SF	R*8	000108	I	SFA	I*4	0000B8
J	SFA	I*4	0000BC	K	SFA	I*4	0000C0	M	SF	I*4	0000C4	N	F	I*4	0000C8
W	SF	R*8	000110	AA	F XR	R*8	000000	IC	SF	I*4	0000CC	ID	SF	I*4	000118
II	SF	I*4	0000D0	IS	SF	I*4	0000D4	IT	SF	I*4	0000D8	KK	SF	I*4	00000C
KN	SF	I*4	0000E0	NI	SF	I*4	0000E4	NN	SF	I*4	0000E8	NJ	SF	I*4	0000EC
N2	SF	I*4	0000F0	NFU	SF	I*4	0000F4	AINV	S XR	R*8	000000	MTNV		I*4	0000F8
IBCOM#	F XF	I*4	000000												

SOURCE STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
199	12	000332	1	17	000360	2	22	00039A	13	23	0003A2
31	31	0003E6	3	34	000404	41	36	00041E	42	41	000464
4	42	00046E	51	44	000478	52	51	0004EE	49	52	0004F6
6	54	00050C	7	63	0005B8	81	66	00050A	8	68	0005F0
9	71	000624	10	79	000690	111	83	0006C8	112	87	0006F6
11	88	000700	119	90	000714	14	93	000728			

COMPILER GENERATED LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
100001	2	0002D4	100002	10	00030C	100003	11	00030E	100004	13	00033A
100005	13	000342	100006	15	000346	100007	16	00034A	100008	18	00036A
100009	18	000372	100010	19	000374	100012	29	0003CA	100013	30	0003CC
100014	35	00040C	100015	35	000414	100016	38	000420	100018	48	0004AA
100020	56	000510	100021	58	000544	100022	62	0005A4	100023	64	0005C0
100024	64	0005CA	100025	70	0005F4	100026	72	00062E	100027	74	00063A
100028	77	00064A	100029	78	00064E	100030	80	00069A	100031	80	0006A2
100032	80	0006B4	100033	81	0006B6	100034	82	0006B8	100035	85	0006CC
100037	89	000708	100038	89	000710						

FORMAT STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
113	92	000028									

*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

STATISTICS SOURCE STATEMENTS = 94, PROGRAM SIZE = 1946, SUBPROGRAM NAME = MTNV

STATISTICS NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ****** 268K BYTES OF CORE NOT USED

REQUESTED OPTIONS: NOTERM

OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

```
ISN 0002            SUBROUTINE PARLD(                                       PAR00010
C                                 DEVELOPS A CLASSIFICATION TRAINING FIELD  PAR00020
C                                                                           PAR00030
C     =A,           ARRAY FOR TRAINING FIELD                                PAR00040
C                                                                           PAR00050
C     =M1,          NUMBER OF PIXELS SAMPLED PER CROP                       PAR00060
C                                                                           PAR00070
C     =KHICUT,      CHI-SQUARE CUT                                          PAR00080
C                                                                           PAR00090
C     =MINMAX,      MINIMUM & MAXIMUM RANGES FOR TO                         PAR00100
C                                                                           PAR00110
C     =NUMDOT,      NUMBER OF DOTS IN A TRAINING FIELD                      PAR00120
C                                                                           PAR00130
C     =IERR)        ERROR FLAG                                              PAR00140
C                                                                           PAR00150
C         ------------------------------------------------------            PAR00160
C                                                                           PAR00170
C                                                                           PAR00180
C     HISTORY                                                               PAR00190
C     -------                                                               PAR00200
C                                                                           PAR00210
C  THIS PROGRAM IS BASED ON THE PROGRAM AASGMAP, THEY ARE PART              PAR00220
C  OF THE ORIGINAL PROGRAM MISMAP                                           PAR00230
C                                                                           PAR00240
C     J.CARNES        LEMSCO      3/19/79     ORIGINAL CODE (MISMAP)        PAR00250
C     G.BADHWAR       NASA(JSC)               REDO (PARLD) FOR PDP-11       PAR00260
C     M.TOMPKINS      LEMSCO      4/1/81      TRANSFER DESIGN               PAR00270
C     D.CHENG         LEMSCO      4/14/81     MODIFIED FOR IBM              PAR00280
C                                                                           PAR00290
C                                                                           PAR00300
C     METHOD                                                                PAR00310
C     ------                                                                PAR00320
C                                                                           PAR00330
C     1. PASS THE INPUT VARIABLES THROUGH ARGUMENTS.                        PAR00340
C                                                                           PAR00350
C     2. READ THE HEADER RECORDS OF BOTH GROUND TRUTH                       PAR00360
C        AND CLASSIFICATION FILES AND PRINT OUT REPORT.                     PAR00370
C                                                                           PAR00380
C     3. READ GROUND TRUTH FILE AND ASSIGN A TRANSFORMED                    PAR00390
C        CODE FOR EACH GROUND TRUTH SUBPIXEL. USE MAJORITY                  PAR00400
C        RULE FOR THE PIXEL CODE ASSIGNMENT.                                PAR00410
C                                                                           PAR00420
C     4. READ THE CLASSIFICATION FILE(ALPHA, BETA, TO AND CHI-SQUARE)       PAR00430
C        SET THE ALPHA VALUES TO ZEROS, IF THEY DO NOT MEET CHI-SQURE       PAR00440
C        CUT CRITERION.                                                     PAR00450
C                                                                           PAR00460
C     5. STORE ALPHA, BETA AND TO PARAMETERS IN SEPARATE DISK FILES.        PAR00470
C                                                                           PAR00480
C     6. DEVELOP A TRAINING FIELD FOR THESE PARAMETERS. DETERMINE THE       PAR00490
C        NUMBER OF RECORDS IN EACH FIELD AND NUMBER OF PIXELS SKIPPED       PAR00500
C        FOR EACH CLASS.                                                    PAR00510
C                                                                           PAR00520
C     7. ELIMINATE ALL CHOSEN PIXELS WHICH FALL OUTSIDE USER DEFINED        PAR00530
C        TO RANGES.                                                         PAR00540
C                                                                           PAR00550
C     8. STORE THE SAMPLED PIXELS (PARAMETERS CHOSEN) IN A1 ARRAY           PAR00560
C        FOR THE TRAINING FIELD AND PASS THE ARRAY THROUGH ARGUMENT         PAR00570
C        FOR LATER STATISTICAL MANIPULATION.                                PAR00580
C                                                                           PAR00590
C                                                                           PAR00600
C     EXTERNAL REFERENCES                                                   PAR00610
C     -------------------                                                   PAR00620
C                                                                           PAR00630
C  CPTIME          CURRENT TIME AND DATE                                    PAR00640
C  JULIAN          COMPUTE JULIAN DATE                                      PAR00650
C  CROPP           SUBPROGRAM FOR DETERMINATION OF MAJORITY RULE            PAR00660
C                                                                           PAR00670
C                                                                           PAR00680
C     EXCEPTIONS                                                            PAR00690
C     ----------                                                            PAR00700
C                                                                           PAR00710
C  IF ANY OF THE FOLLOWING CONDITION EXISTS, SET IERR=1                     PAR00720
C                                                                           PAR00730
```

```
C
C     1. PIXEL PURITY INPUT ERRORS:                                      PAR00740
C        NPURL>6 OR NPURL<1, NPURU>6 OR NPURU<1                          PAR00750
C        NPURL > NPURU                                                   PAR00760
C     2. CLASSIFICATION HEADER ERROR                                     PAR00770
C                                                                        PAR00780
C     3. GROUND TRUTH HEADER ERRORS                                      PAR00790
C                                                                        PAR00800
C     4. SEGMENT ERRORS                                                  PAR00810
C        GTRSEG .NE. KLASEG                                              PAR00820
C                                                                        PAR00830
C     5. GROUND TRUTH TRANSFORMATION ERRORS:                             PAR00840
C        1>NB.NE.NO>255                                                  PAR00850
C                                                                        PAR00860
C  IF IERR=1   TERMINATE THE PROGRAM AND SEND THE MSG                    PAR00870
C                                                                        PAR00880
C                                                                        PAR00890
C                                                                        PAR00900
C                                                                        PAR00910
C     LOCAL DECLARATIONS                                                 PAR00920
C     ------------------                                                 PAR00930
C                                                                        PAR00940
ISN 0003        IMPLICIT INTEGER (A-Q,S-Z)                               PAR00950
C                                SET R REAL, THE REST ARE INTEGER        PAR00960
ISN 0004        INTEGER GT(255)                                          PAR00970
C                                GROUND TRUTH TRANSFORMATION CODES (1-6) PAR00980
ISN 0005        INTEGER BUF(20,3,3)                                      PAR00990
C                                ALPHA, BETA &TO VALUES OF QUALIFIED TRAINING
C                                FIELD PIXELS                            PAR01000
ISN 0006        INTEGER NSUBPX(6)                                        PAR01010
C                                SUBPIXEL VALUES THAT MAP TO A PIXEL     PAR01020
ISN 0007        INTEGER ABUF(196)                                        PAR01030
C                                ALPHA VALUES FROM THE CLASSIFICATION FILE PAR01040
ISN 0008        INTEGER BBUF(196)                                        PAR01050
C                                BETA VALUES FROM THE CLASSIFICATION FILE PAR01060
ISN 0009        INTEGER TBUF(196)                                        PAR01070
C                                TO VALUES FROM THE CLASSIFICATION FILE  PAR01080
ISN 0010        INTEGER ICHI(196)                                        PAR01090
C                                CHI SQUARE VALUES FROM THE CLASSIFICATION FILE PAR01100
ISN 0011        INTEGER KLDATE(3)                                        PAR01110
C                                CLASSIFICATION JULIAN DATE              PAR01120
ISN 0012        INTEGER GTDATE(3)                                        PAR01130
C                                GROUND TRUTH JULIAN DATE                PAR01140
ISN 0013        INTEGER NB                                               PAR01150
C                                BEGINNING VALUE OF TRANSFORMATION RANGE PAR01160
ISN 0014        INTEGER NE                                               PAR01170
C                                ENDING VALUE OF TRANSFORMATION RANGE    PAR01180
ISN 0015        INTEGER NO                                               PAR01190
C                                TRANSFORMATION CODES (1 TO 6)           PAR01200
ISN 0016        INTEGER NPURL                                            PAR01210
C                                LOWER LIMIT ON PIXEL PURITY             PAR01220
ISN 0017        INTEGER NPURU                                            PAR01230
C                                UPPER LIMIT ON PIXEL PURITY             PAR01240
ISN 0018        INTEGER NCROP                                            PAR01250
C                                NUMBER OF CROPS TO BE PROCESSED         PAR01260
ISN 0019        INTEGER KLASEG                                           PAR01270
C                                CLASSIFICATION SEGMENT NUMBER           PAR01280
ISN 0020        INTEGER KDAY                                             PAR01290
C                                DAY OF THE MONTH IN THE CLASS HEADER RECORDS PAR01300
ISN 0021        INTEGER KMON                                             PAR01310
C                                MONTH OF THE YEAR IN THE CLASS HEADER RECORDS PAR01320
ISN 0022        INTEGER KYR                                              PAR01330
C                                YEAR IN THE CLASS HEADER RECORDS        PAR01340
ISN 0023        INTEGER GTRSEG                                           PAR01350
C                                GROUND TRUTH SEGMENT NUMBER             PAR01360
ISN 0024        INTEGER TDAY                                             PAR01370
C                                DAY OF THE MONTH IN THE GROUND TRUTH HEADER PAR01380
ISN 0025        INTEGER TMON                                             PAR01390
C                                MONTH OF THE YEAR IN THE GROUND TRUTH HEADER PAR01400
ISN 0026        INTEGER TYR                                              PAR01410
C                                YEAR IN THE GROUND TRUTH HEADER         PAR01420
ISN 0027        INTEGER JERR                                             PAR01430
C                                ERROR MSG FROM SUBROUTINE JULIAN        PAR01440
ISN 0028        INTEGER IERR                                             PAR01450
C                                ERROR FLAG TO TERMINATE THE PROGRAM, IERR=1 PAR01460
ISN 0029        INTEGER IREC                                             PAR01470
C                                GROUND TRUTH FILE  COUNTER OF NO. OF RECORD PAR01480
ISN 0030        INTEGER LINE                                             PAR01490
C                                117 ROWS OF PIXELS IN A FILE            PAR01500
                                                                         PAR01510
```

```
ISN 0031          INTEGER SPIX                                                  PAR01520
ISN 0032      C   INTEGER SAMP                SUBPIXEL OF INTEREST              PAR01530
ISN 0033      C   INTEGER GTCODE              196 PIXELS IN A LINE              PAR01540
ISN 0034      C   INTEGER NCODE(400)          MAJORITY GROUND TRUTH CODES (TRANSFORMED)  PAR01550
ISN 0035      C   INTEGER COUNT(3)            TRANSFORMED CROP CODES FOR PIXELS SAMPLED  PAR01560
ISN 0036      C   INTEGER DATE(2)             VECTOR POSITION WITHIN BUF ARRAY  PAR01570
ISN 0037      C   INTEGER*2 HMS(3)            CPTIME DAY/MONTH/YEAR             PAR01580
ISN 0038      C   INTEGER IUNIT               CPTIME FOR HOUR,MINUTE AND SECOND PAR01590
ISN 0039      C   INTEGER PIXSKP              UNITS NUMBER OF FILES             PAR01600
ISN 0040      C   INTEGER KHICUT              NUMBER OF PIXEL TO SKIP           PAR01610
ISN 0041      C   INTEGER MINMAX(2)           ARGUMENT                          PAR01620
ISN 0042      C   INTEGER A(400,4)            ARGUMENT                          PAR01630
ISN 0043      C   INTEGER NI(3)               ARGUMENT                          PAR01640
ISN 0044      C   INTEGER IXLTOT(6)           ARGUMENT                          PAR01650
ISN 0045      C   INTEGER NREC                SUM OF PIXELS FOR ALL CATEGORIES  PAR01660
ISN 0046      C   INTEGER LREC                NUMBER OF RECORD                  PAR01670
ISN 0047      C   INTEGER NCNT                NUMBER OF RECORD LEFT             PAR01680
ISN 0048      C   REAL RCROP(4,3)             TOTAL NUMBER OF PIXELS SAMPLED    PAR01690
ISN 0049      C   REAL RCODE                  ARRAY FOR INPUT CROP CHARACTERS   PAR01700
ISN 0050      C   LOGICAL*1 GTBUF(3,540)      MAJORITY GROUND TRUTH CODE        PAR01710
ISN 0051      C   LOGICAL*1 GTBUF1(6,270)     GROUND TRUTH PIXEL BUFFER (3X540) PAR01720
ISN 0052      C   LOGICAL*1 HDR(3060)         GROUND TRUTH PIXEL BUFFER (6X270) PAR01730
              C                               3060 BYTE HEADER RECORD           PAR01740
              C                                                                 PAR01750
ISN 0053          COMMON/NSBIXL/NSUBPX                                          PAR01760
ISN 0054          COMMON/DEFGT/GTRSFG,IYR,GTDATE                                PAR01770
ISN 0055          COMMON/DEFKL/KLASFG,KYR,KLDATE                                PAR01780
ISN 0056          COMMON/HEAD/RCROP,NCROP                                       PAR01790
ISN 0057          EQUIVALENCE (GTBUF(1),GTBUF1(1,1))                            PAR01800
              C                                                                 PAR01810
              C   PROCEDURE                                                     PAR01820
              C   ---------                                                     PAR01830
              C                                                                 PAR01840
              C                                                                 PAR01850
              C   PRINT JOB DESCRIPTION, DATE AND TIME                         PAR01860
              C                                                                 PAR01870
ISN 0058          CALL CPTIME(DATE,HMS,IT,VT)                                   PAR01880
ISN 0059      C   WRITE(6,1000)(DATE(I),I=1,2),(HMS(J),J=1,3)                  PAR01890
              C                                                                 PAR01900
              C   READ IN RANGE OF PIXEL PURITY                                PAR01910
              C     RANGE OF PIXEL PURITY - LOWER AND UPPER LIMITS ON PIXEL     PAR01920
              C     PURITIES WHICH WILL BE CONSIDERED IN AN (I1,1X,I1) FORMAT.  PAR01930
              C                                                                 PAR01940
ISN 0060          READ(19,1005) NPURL,NPURU                                     PAR01950
ISN 0061          IF((NPURL.GE.1.AND.NPURL.LE.6).AND.                           PAR01960
             &       (NPURU.GE.1.AND.NPURU.LE.6).AND.                         PAR01970
             &       (NPURL.LE.NPURU)) GO TO 10                               PAR01980
              C                                                                 PAR01990
              C   WRITE ERROR MESSAGE, PIXEL PURITY ERROR                      PAR02000
              C                                                                 PAR02010
ISN 0063          IERR=1                                                        PAR02020
ISN 0064          WRITE(5,1008)                                                 PAR02030
                                                                                PAR02040
                                                                                PAR02050
                                                                                PAR02060
                                                                                PAR02070
                                                                                PAR02080
                                                                                PAR02090
                                                                                PAR02100
                                                                                PAR02110
                                                                                PAR02120
                                                                                PAR02130
                                                                                PAR02140
                                                                                PAR02150
                                                                                PAR02160
                                                                                PAR02170
                                                                                PAR02180
                                                                                PAR02190
                                                                                PAR02200
                                                                                PAR02210
                                                                                PAR02220
                                                                                PAR02230
                                                                                PAR02240
                                                                                PAR02250
                                                                                PAR02260
                                                                                PAR02270
                                                                                PAR02280
                                                                                PAR02290
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                C                                                                       PAR02300
                C                                                                       PAR02310
                C  READ THE HEADER RECORD OF BOTH FILES,                                PAR02320
                C  AND CALL  SUBPROGRAM FOR JULIAN DATE.                                PAR02330
                C                                                                       PAR02340
   ISN 0065         10 READ(10,1120)(HDR(I),I=1,3060)                                   PAR02350
   ISN 0066            KLASEG = HDR(67)*2**8 + HDR(68)                                  PAR02360
   ISN 0067            KDAY = HDR(61)                                                   PAR02370
   ISN 0068            KMON = HDR(62)                                                   PAR02380
   ISN 0069            KYR  = HDR(63)                                                   PAR02390
   ISN 0070            CALL JULIAN(KLDATE,JERR,   KDAY,KMON,KYR)                        PAR02400
                C                                                                       PAR02410
   ISN 0071            IF(JERR.NE.0)IERR=1                                              PAR02420
                C                                                                       PAR02430
                C  ERROR MSG FROM CLASSIFICATION HEADER, IF ERROR OCCURS, OUTPUT MSG     PAR02440
                C                                                                       PAR02450
   ISN 0073            IF(JERR.NE.0)WRITE(5,1010)                                       PAR02460
                C                                                                       PAR02470
   ISN 0075            REWIND 10                                                        PAR02480
                C                                                                       PAR02490
   ISN 0076            READ(9,1120) (HDR(I),I=1,3060)                                   PAR02500
   ISN 0077            GTRSEG = HDR(67)*2**8 + HDR(68)                                  PAR02510
   ISN 0078            TDAY = HDR(61)                                                   PAR02520
   ISN 0079            TMON = HDR(62)                                                   PAR02530
   ISN 0080            TYR  = HDR(63)                                                   PAR02540
   ISN 0081            CALL JULIAN(GTDATE,JERR,   TDAY,TMON,TYR)                        PAR02550
                C                                                                       PAR02560
   ISN 0082            IF(JERR.NE.0)IERR = 1                                            PAR02570
                C                                                                       PAR02580
                C  ERROR MSG FROM GROUND TRUTH HEADER, IF ERROR OCCURS, OUTPUT MSG      PAR02590
                C                                                                       PAR02600
   ISN 0084            IF(JERR.NE.0)WRITE(5,1020)                                       PAR02610
                C                                                                       PAR02620
   ISN 0086            IF(GTRSEG.NE.KLASEG) IERR=1                                      PAR02630
                C                                                                       PAR02640
                C  ERROR MSG FROM BOTH SEGMENT NO., IF ERROR OCCURS, OUTPUT MSG         PAR02650
                C                                                                       PAR02660
   ISN 0088            IF(GTRSEG.NE.KLASEG) WRITE(5,1025)KLASEG,GTRSEG                  PAR02670
                C                                                                       PAR02680
                C  PRINT OUT HEADER FOR SEGMENT NO. , JULIAN DATE AND PIXEL PURITY       PAR02690
                C                                                                       PAR02700
   ISN 0090            WRITE(6,1043)GTRSEG,TYR,(GTDATE(I),I=1,3)                        PAR02710
   ISN 0091            WRITE(6,1047)KLASEG,KYR,(KLDATE(I),I=1,3)                        PAR02720
   ISN 0092            WRITE(6,1050)NPURL,NPURU                                         PAR02730
                C                                                                       PAR02740
                C  SET GROUND TRUTH TRANSFORMATION ARRAY TO ALL 6'S.                    PAR02750
                C                                                                       PAR02760
   ISN 0093              DO 20 I=1,255                                                  PAR02770
   ISN 0094         20   GT(I)=6                                                        PAR02780
                C                                                                       PAR02790
                C  WRITE GROUND TRUTH TRANSFORMATION HEADER                             PAR02800
                C                                                                       PAR02810
   ISN 0095            WRITE(6,1060)                                                    PAR02820
                C                                                                       PAR02830
                C     LOAD GROUND TRUTH TRANSFORMATION DATA FROM "SYMBOL" FILE.         PAR02840
                C     GROUND TRUTH TRANSFORMATIONS - 1 LINE FOR EACH                    PAR02850
                C     TRANSFORMATION IN THE FORM STARTING CODE, ENDING CODE,            PAR02860
                C     AND NEW CODE IN A (3I5) FORMAT.                                   PAR02870
                C                                                                       PAR02880
   ISN 0096         30  READ(19,1030) NB,NE,NO                                         PAR02890
   ISN 0097             IF(NB.EQ.0.AND.NE.EQ.0.AND.NO.EQ.0) GO TO 60                   PAR02900
                C                                                                       PAR02910
                C  TEST FOR GT TRANSFORMATION CODE ERRORS, IF OCCURS, OUTPUT MSG        PAR02920
                C                                                                       PAR02930
   ISN 0099             IF(NB.GE.1.AND.NB.LE.255.AND.NE.GE.1.AND.NE.LE.255) GO TO 40   PAR02940
   ISN 0101             IERR=1                                                         PAR02950
                C                                                                       PAR02960
   ISN 0102             WRITE(5,1033)NB,NE,NO                                          PAR02970
   ISN 0103             GO TO 60                                                       PAR02980
   ISN 0104         40  IF(NO.GT.6.OR.NO.LT.1) NO=6                                   PAR02990
                C                                                                       PAR03000
                C  PRINT OUT GROUND TRUTH TRANSFORMATION                                PAR03010
                C                                                                       PAR03020
                C                                                                       PAR03030
   ISN 0106             WRITE(6,1070) NB,NE,NO                                         PAR03040
                C                                                                       PAR03050
   ISN 0107               DO 50 I=NB,NE                                                PAR03060
   ISN 0108         50    GT(I)=NO                                                     PAR03070
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ISN 0109            GO TO 30                                                    PAR03080
                C                                                               PAR03090
                C                                                               PAR03100
                C  PRINT OUT CROPS TO BE EVALUATED.                             PAR03110
                C                                                               PAR03120
ISN 0110          30 WRITE(6,1090) NCROP,((I,(RCROP(J,I),J=1,4),I=1,NCROP)      PAR03130
                C                                                               PAR03140
                C  INITIALIZE THE SUMMING ARRAY.                                PAR03150
                C                                                               PAR03160
ISN 0111             DO 70  I=1,400                                             PAR03170
ISN 0112              NCOUF(I)=0                                                PAR03180
ISN 0113              DO 70  J=1,4                                              PAR03190
ISN 0114          70  A(I,J)=0                                                  PAR03200
                C                                                               PAR03210
                C  PRINT OUT CONTENTS OF HEADER RECORD FOR GROUND TRUTH FILE    PAR03220
                C                                                               PAR03230
ISN 0115             WRITE(6,1122)GTPSEG,TYR,(GTDATE(I),I=1,3)                  PAR03240
ISN 0116             WRITE(6,1130) (HDR(I),I=1,60)                              PAR03250
ISN 0117             WRITE(6,1140) (HDR(I),I=2249,2285)                         PAR03260
ISN 0118             WRITE(6,1150) (HDR(I),I=2760,2789)                         PAR03270
                C                                                               PAR03280
                C  READ THE CLASSIFICATION HEADER RECORD AGAIN                  PAR03290
                C  IN ORDER TO WRITE THE HEADER INFORMATION                     PAR03300
                C                                                               PAR03310
ISN 0119             READ(10,1120)(HDR(I),I=1,3060)                             PAR03320
                C                                                               PAR03330
ISN 0120             WRITE(6,1125)KLASEG,KYR,(KLDATE(I),I=1,3)                  PAR03340
ISN 0121             WRITE(6,1130) (HDR(I),I=1,60)                              PAR03350
ISN 0122             WRITE(6,1140) (HDR(I),I=2249,2285)                         PAR03360
ISN 0123             WRITE(6,1150) (HDR(I),I=2760,2789)                         PAR03370
ISN 0124             WRITE(6,1155)                                              PAR03380
ISN 0125             WRITE(6,1160) (HDR(I),I=2941,3000)                         PAR03390
                C                                                               PAR03400
                C  CLEAR SUMMING ARRAY.                                         PAR03410
                C                                                               PAR03420
ISN 0126             DO 80  J=1,6                                               PAR03430
ISN 0127          80 IXLTOT(J)=0                                                PAR03440
                C                                                               PAR03450
ISN 0128             DO 90  I=1,3                                               PAR03460
ISN 0129          90 COUNT(I)=1                                                 PAR03470
                C                                                               PAR03480
                C  WRITE ERROR MSG AND TERMINATE THE PROGRAM                    PAR03490
                C  BECAUSE OF ERRORS IN INPUT DATA, IERR IS NONZERO             PAR03500
                C                                                               PAR03510
ISN 0130             IF(IERR.EQ.1)WRITE(5,1065)                                 PAR03520
ISN 0132             IF(IERR.EQ.1)GO TO 2000                                    PAR03530
                C                                                               PAR03540
                C                                                               PAR03550
                C  READ THROUGH IMAGES ONE LINE AT A TIME FOR CLASSIFICATION FILE PAR03560
                C  THE VALUES OF ALPHA, BETA, TO AND THEDA                      PAR03570
                C     AND THREE LINES AT A TIME FOR THE GROUND TRUTH FILE.      PAR03580
                C                                                               PAR03590
ISN 0134             INDEX=0                                                    PAR03600
ISN 0135             DO 400 LINE=1,117                                          PAR03610
                C                                                               PAR03620
                C                                                               PAR03630
ISN 0136               READ(10,1170,END=900)(ABUF(I),BBUF(I),TBUF(I),ICHI(I),I=1,196)  PAR03640
                C                                                               PAR03650
                C   READ GROUND TRUTH FILE INTO A 3X540 ARRAY.                  PAR03660
                C   FOR I = 1,3  J = 1,72, GTBUF(I,J) CONTAINS ANCILLARY DATA.  PAR03670
                C   GROUND TRUTH FILE CONTAINS 6 TIMES AS MUCH DATA AS THE     PAR03680
                C   CLASSIFICATION FILE.  SO, CORRESPONDING TO EACH VIDEO BLOCK (196  PAR03690
                C   BYTES) OF THE CLASSIFICATION FILE, THE GROUND TRUTH FILE IS TWICE  PAR03700
                C   AS LONG AND THREE ROWS DEEP.                                PAR03710
                C   SUBPIXEL DATA REQUIRE 2 COLUMNS AND 3 ROWS.                 PAR03720
                C   READ 72 CONTROL CHARACTERS + 2*196 ADJUSTED TO A MULTIPLE   PAR03730
                C   OF 180.                                                     PAR03740
                C                                                               PAR03750
ISN 0137               DO 100 IREC=1,3                                          PAR03760
ISN 0138          100  READ(9,1200) (GTBUF(IREC,I),I=1,540)                     PAR03770
                C                                                               PAR03790
                C                                                               PAR03800
                C  MAKE COMPARISON ON PIXEL BY PIXEL BASIS.                     PAR03810
                C                                                               PAR03820
ISN 0139               DO 300 SAMP=1,196                                        PAR03830
                C                                                               PAR03840
                C   IF THE CHISQR CUT IS MADE, CHANGE THE VALUE OF ALPHA TO 0.  PAR03850
                C   THIS WILL BE USED LATER TO REMOVE THIS FROM THE ARRAY USED  PAR03860
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                C   TO DETERMINE THE DISCRIMINANT LINE.                                  PAR03870
                C                                                                       PAR03880
   ISN 0140             IF(ICHI(SAMP).GT.KHICUT) ABUF(SAMP)=0                          PAR03890
                C                                                                       PAR03900
                C                                                                       PAR03910
                C   DETERMINE GROUND TRUTH CODE.                                       PAR03920
                C   GTBUF1 IS A 6X270 ARRAY EQUIVALENCED TO GTBUF.  THE CONTROL        PAR03930
                C   CHARACTERS ARE NOW STORED IN GTBUF1(I,J) FOR I = 1,6  J = 1,36     PAR03940
                C   AND SUBPIXEL DATA REQUIRE 1 COLUMN AND 6 ROWS.                     PAR03950
                C                                                                       PAR03960
   ISN 0142             DO 110 SPIX=1,6                                                PAR03970
   ISN 0143                    M=GTBUF1(SPIX,SAMP,36)                                  PAR03980
                C                                                                       PAR03990
                C   ADD 128 TO COMPENSATE FOR ADJUSTMENT MADE IN CARTO LAB             PAR04000
                C                                                                       PAR04010
   ISN 0144                    M=M+128                                                 PAR04020
   ISN 0145                    IF(M.GT.255) M=M-256                                    PAR04030
   ISN 0147           110   NSUBPX(SPIX)=GT(M)                                         PAR04040
                C                                                                       PAR04050
                C   DETERMINE MAJORITY RULE CODE FOR PIXEL.                           PAR04060
                C                                                                       PAR04070
   ISN 0148             CALL CROPP(GTCODE,NC)                                          PAR04080
                C                                                                       PAR04090
   ISN 0149             IF(NC.LT.NPURL.OR.NC.GT.NPURU)GO TO 300                        PAR04100
                C                                                                       PAR04110
   ISN 0151             IF(GTCODE.GT.NCROP)GO TO 300                                   PAR04120
                C                                                                       PAR04130
                C  COUNT NUMBER OF PIXELS                                              PAR04140
                C                                                                       PAR04150
   ISN 0153             IXLTOT(GTCODE)=IXLTOT(GTCODE)+1                                PAR04160
                C                                                                       PAR04170
                C  SEND DATA TO PROPER ARRAY.                                          PAR04180
                C                                                                       PAR04190
   ISN 0154             BUF(COUNT(GTCODE),GTCODE,1)=ABUF(SAMP)                         PAR04200
   ISN 0155             BUF(COUNT(GTCODE),GTCODE,2)=BBUF(SAMP)                         PAR04210
   ISN 0156             BUF(COUNT(GTCODE),GTCODE,3)=TBUF(SAMP)                         PAR04220
   ISN 0157             IF(MOD(COUNT(GTCODE),20).NE.0) GO TO 120                       PAR04230
   ISN 0159             IUNIT=GTCODE+23                                                PAR04240
   ISN 0160             WRITE(IUNIT) ((BUF(J,GTCODE,K),K=1,3),J=1,20)                  PAR04250
   ISN 0161             COUNT(GTCODE)=0                                                PAR04260
   ISN 0162           120 COUNT(GTCODE)=COUNT(GTCODE)+1                                PAR04270
   ISN 0163           300 CONTINUE                                                     PAR04280
   ISN 0164           400 CONTINUE                                                     PAR04290
                C                                                                       PAR04300
                C   WRITE THE LAST RECORD FOR EACH CATEGORY IF THERE IS ANYTHING      PAR04310
                C   IN IT.                                                            PAR04320
                C                                                                       PAR04330
   ISN 0165             DO 150 I=1,3                                                   PAR04340
   ISN 0166             IUNIT=I+23                                                     PAR04350
   ISN 0167           150   IF(COUNT(I).GT.1) WRITE(IUNIT) ((BUF(J,I,K),K=1,3),J=1,20) PAR04360
                C                                                                       PAR04370
                C                                                                       PAR04380
                C   PRINT OUT SUMMARY.                                                 PAR04390
                C                                                                       PAR04400
   ISN 0169             WRITE(6,1210) ((IRCROP(J,I),J=1,4),IXLTOT(I),I=1,NCROP)        PAR04410
                C                                                                       PAR04420
                C   TRANSFER THE DATA FROM THE OUTPUT FILES TO THE A ARRAY.            PAR04430
                C                                                                       PAR04440
   ISN 0170             INDEX=0                                                        PAR04450
   ISN 0171             DO 160 I=1,3                                                   PAR04460
   ISN 0172           160 N1(I)=0                                                      PAR04470
   ISN 0173             DO 700 CLASS=1,NCROP                                           PAR04480
                C                                                                       PAR04490
                C   REWIND THE OUTPUT FILE.                                           PAR04500
                C                                                                       PAR04510
   ISN 0174             IUNIT=CLASS+23                                                 PAR04520
   ISN 0175             REWIND IUNIT                                                   PAR04530
   ISN 0176             IF(IXLTOT(CLASS).EQ.0) GO TO 700                               PAR04540
                C                                                                       PAR04550
                C   DETERMINE THE NUMBER OF RECORDS IN EACH FILE.                      PAR04560
                C                                                                       PAR04570
   ISN 0178             NREC=IXLTOT(CLASS)/20                                          PAR04580
   ISN 0179             LREC=IXLTOT(CLASS)-NREC*20                                     PAR04590
   ISN 0180             IF(LREC.NE.0) NREC=NREC+1                                      PAR04600
                C                                                                       PAR04610
                C   DETERMINE THE NUMBER OF PIXELS CORRESPONDING TO ONE SAMPLE.       PAR04620
                C                                                                       PAR04630
   ISN 0182             PIXSKP=IXLTOT(CLASS)/NUMDOT                                    PAR04640
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                C
                C   BEGIN PROCESSING THE PIXELS IN THE FILE.                                    PAR04650
                C                                                                             PAR04660
                C                                                                             PAR04670
    ISN 0183            DO 600 IREC=1,NREC                                                    PAR04680
    ISN 0184            READ(IUNIT) ((BUF(J,1,K),K=1,3),J=1,20)                               PAR04690
    ISN 0185            NSAMP=20                                                              PAR04700
    ISN 0186            IF(IREC.EQ.NREC.AND.LREC.NE.0) NSAMP=LREC                             PAR04710
    ISN 0188            DO 600 ISAMP=1,NSAMP                                                  PAR04720
    ISN 0189            INDEX=INDEX+1                                                         PAR04730
    ISN 0190            IF(MOD(INDEX,PIXSKP).NE.0) GO TO 600                                  PAR04740
                C                                                                             PAR04750
                C   CHECK TO SEE IF PIXEL DATA IS BAD. BUF() WAS SET TO ZERO                 PAR04760
                C   IF THE CHISQR CUT WAS NOT MET.                                           PAR04770
                C                                                                             PAR04780
    ISN 0192            IF(BUF(ISAMP,1,1).EQ.0) GO TO 600                                     PAR04790
                C                                                                             PAR04800
                C   CHECK TO SEE IF THE PIXEL MEETS THE TO CRITERION.                         PAR04810
                C                                                                             PAR04820
    ISN 0194            IF(BUF(ISAMP,1,3).GT.MINMAX(2).OR.BUF(ISAMP,1,3).LT.MINMAX(1))       PAR04830
                       *GO TO 600                                                             PAR04840
                C                                                                             PAR04850
                C   PIXEL IS TO BE SAMPLED.                                                  PAR04860
                C                                                                             PAR04870
    ISN 0196            N1(CLASS)=N1(CLASS)+1                                                 PAR04880
    ISN 0197            NCNT=NCNT+1                                                           PAR04890
    ISN 0198            IF(NCNT.GT.400) GO TO 800                                             PAR04900
    ISN 0200              DO 650 I=1,3                                                        PAR04910
    ISN 0201  650         A(NCNT,I)=BUF(ISAMP,1,I)                                            PAR04920
    ISN 0202            A(NCNT,4)=1                                                           PAR04930
    ISN 0203            NCODE(NCNT)=CLASS                                                     PAR04940
    ISN 0204  600 CONTINUE                                                                    PAR04950
    ISN 0205  700 CONTINUE                                                                    PAR04960
    ISN 0206  800 CONTINUE                                                                    PAR04970
                C                                                                             PAR04980
                C                                                                             PAR04990
    ISN 0207  900 WRITE(6,1220) ((RCROP(J,I),J=1,4),I=1,3)                                    PAR05000
                C                                                                             PAR05010
    ISN 0209        WRITE(6,1230)(N1(I),I=1,3)                                                PAR05020
                C                                                                             PAR05030
                C                                                                             PAR05040
                C                                                                             PAR05050
                C  THE FORMAT STATEMENTS START :                                              PAR05060
    ISN 0209  1000 FORMAT(1H1,' JOB INITIATED ON ',2A4,' AT ',I2,':'                          PAR05070
                &     ,I2,':',I2,' PROGRAM PARLS ')                                         PAR05080
    ISN 0210  1005 FORMAT(1I,1X,1I)                                                           PAR05090
    ISN 0211  1008 FORMAT(/1X,' PIXEL PURITY RANGE ',I3,I3,'  ---  UNACCEPTABLE ')            PAR05100
    ISN 0212  1010 FORMAT(/1X,' ERRORS OCCUR IN CLASSIFICATION HEADER.')                      PAR05110
    ISN 0213  1020 FORMAT(/1X,' ERRORS OCCUR IN GROUND TRUTH HEADER.')                        PAR05120
    ISN 0214  1025 FORMAT(' CLASS FILE FOR SEG.',I5,' GROUND TRUTH FILE FOR SEG',I5)          PAR05130
    ISN 0215  1030 FORMAT(3I5)                                                                PAR05140
    ISN 0216  1033 FORMAT(' GROUND TRUTH SYMBOL TABLE RANGE',I5,I5,1X,A1,                     PAR05150
                     1          'UNACCEPTABLE')                                           PAR05160
    ISN 0217  1043 FORMAT(//5X,'GROUND TRUTH FILE -          ',11X,I5,I2,I1,I1,I1)        PAR05170
    ISN 0218  1047 FORMAT(/5X,'CLASSIFICATION FILE -         ',10X,I5,I2,I1,I1,I1)        PAR05180
    ISN 0219  1050 FORMAT(1H0,//,10X,'PIXEL PURITY RANGE - FROM ',I1,' TO ',I1,               PAR05190
                   *' SUPPIXELS'//)                                                         PAR05200
    ISN 0220  1060 FORMAT(/10X,'GROUND TRUTH TRANSFORMATIONS'/)                               PAR05210
    ISN 0221  1065 FORMAT(/1X,'ERRORS IN THE INPUT FILE, PROGRAM TERMINATES  ')               PAR05220
    ISN 0222  1070 FORMAT(1H ,17X,I3,' TO ',I3,' = ',I1)                                      PAR05230
    ISN 0223  1090 FORMAT(1H0,10X,' NUMBER OF CROPS TO BE EVALUATED =',I3/                    PAR05240
                   *3(11X,I2,4X,4A4/))                                                      PAR05250
    ISN 0224  1120 FORMAT(17(1A0A1))                                                          PAR05260
    ISN 0225  1122 FORMAT(//,11X,'HEADER INFORMATION FOR GROUND TRUTH FILE',11X               PAR05270
                &     ,I4,I2,I1,I1,I1)                                                      PAR05280
    ISN 0226  1125 FORMAT(//,11X,'HEADER INFORMATION FOR CLASS FILE',9X,I4,I2,I1,I1          PAR05290
                &     ,I1)                                                                  PAR05300
    ISN 0227  1130 FORMAT(1H0,10X,'COMPUTING SYSTEM ID = ',60A1)                              PAR05310
    ISN 0228  1140 FORMAT(1H0,10X,'ACQUISITIONS USED    = ',5(8A1,3X))                       PAR05320
    ISN 0229  1150 FORMAT(1H0,10X,'PFC JOB IDENT.       = ',30A1)                            PAR05330
    ISN 0230  1155 FORMAT(33X,'(SAMPLE,LINE) ')                                               PAR05340
    ISN 0231  1160 FORMAT(1X,'USER SUPPLIED DATA  = ',60A1)                                   PAR05350
    ISN 0232  1170 FORMAT(1A(45A4))                                                           PAR05360
    ISN 0233  1200 FORMAT(3(1A0A1))                                                           PAR05370
    ISN 0234  1210 FORMAT(1H0,10X,'SUMMARY OF NUMBER OF PIXELS IN EACH CATEGORY'/             PAR05380
                   *3(11X,4A4,4X,110/))                                                     PAR05390
    ISN 0235  1220 FORMAT(1H1,/10X,' PIXELS SAMPLED FOR EACH CLASS ',/11X,3(4A4))             PAR05400
    ISN 0236  1230 FORMAT(1X,3I15/)                                                           PAR05410
    ISN 0237  2000 RETURN                                                                     PAR05420
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ISN 0238 END PAR05430

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

SYMBOL	INTERNAL STATEMENT NUMBERS																	
A	0002	0042	0114	0201	0202													
I	0059	0059	0059	0065	0065	0065	0076	0076	0076	0090	0090	0090	0091	0091	0091	0093	0094	0107	0108
	0110	0110	0110	0110	0111	0112	0114	0115	0115	0115	0116	0116	0116	0117	0117	0117	0118	0118	0118
	0119	0119	0119	0120	0120	0120	0121	0121	0121	0122	0122	0122	0123	0123	0123	0125	0125	0125	0126
	0129	0136	0136	0136	0136	0136	0136	0138	0138	0138	0165	0166	0167	0167	0169	0169	0169	0169	0171
	0172	0200	0201	0201	0207	0207	0207	0208	0208	0208									
J	0059	0059	0059	0110	0110	0110	0113	0114	0126	0127	0160	0160	0160	0167	0167	0167	0169	0169	0169
	0184	0184	0184	0207	0207	0207													
K	0160	0160	0160	0167	0167	0167	0184	0184	0184										
N	0143	0144	0144	0145	0145	0145	0147												
GI	0094	0094	0108	0147															
NB	0013	0096	0097	0099	0099	0102	0106	0107											
NC	0148	0149	0149																
NE	0014	0096	0097	0099	0099	0102	0106	0107											
NO	0015	0096	0097	0102	0104	0104	0104	0106	0109										
NI	0002	0043	0172	0196	0196	0208													
TT	0058																		
VT	0058																		
BUF	0005	0154	0155	0156	0160	0167	0184	0192	0194	0194	0201								
HDR	0052	0065	0066	0066	0067	0068	0069	0076	0077	0077	0078	0079	0080	0116	0117	0118	0119	0121	0122
	0123	0125																	
HMS	0037	0058	0059																
KYR	0022	0055	0069	0070	0091	0120													
MOD	0157	0190																	
TYR	0026	0054	0080	0081	0090	0115													
ABUF	0007	0136	0140	0154															
BBUF	0008	0136	0155																
DATE	0036	0058	0059																
ICHI	0010	0136	0140																
IERR	0002	0028	0063	0071	0082	0086	0101	0130	0132										
IREC	0029	0137	0138	0183	0186														
JERR	0027	0070	0071	0073	0081	0082	0084												
KDAY	0020	0067	0070																
KMON	0021	0068	0070																
LINE	0030	0135																	
LREC	0046	0179	0180	0186	0186														
NCNT	0047	0197	0197	0198	0201	0202	0203												
NREC	0045	0178	0179	0180	0180	0183	0186												
SAMP	0032	0139	0140	0140	0143	0156	0155	0156											
SPIX	0031	0142	0143	0147															
TBUF	0009	0136	0156																
TDAY	0024	0078	0081																
TMON	0025	0079	0081																
CLASS	0173	0174	0176	0178	0179	0182	0196	0196	0203										
COUNT	0035	0129	0154	0155	0156	0157	0161	0162	0162	0167									
CROPP	0148																		
GTBUF	0050	0057	0138																
INDEX	0134	0170	0189	0189	0190														
ISAMP	0188	0192	0194	0194	0201														
IUNIT	0038	0159	0160	0166	0167	0174	0175	0184											
NCODE	0034	0112	0203																
NCROP	0018	0056	0110	0110	0151	0169	0173												
NPURL	0016	0060	0061	0061	0061	0092	0149												
NPURU	0017	0060	0061	0061	0061	0092	0149												
NSAMP	0185	0186	0188																
PARLD	0002																		
RCODE	0049																		
RCROP	004A	0056	0110	0169	0207														
CPTIME	005A																		
GTBUF1	0051	0057	0143																
GTCODE	0033	0148	0151	0153	0153	0154	0154	0155	0155	0156	0156	0157	0159	0160	0161	0162	0162		
GTDATE	0012	0054	0081	0090	0115														
GTRSEG	0023	0054	0077	0086	0088	0088	0090	0115											
IXLTOT	0044	0127	0153	0153	0169	0176	0178	0179	0182										
JULIAN	0070	0081																	
KHICUT	0002	0040	0140																
KLASEG	0019	0055	0066	0086	0088	0088	0091	0120											
KLDATE	0011	0055	0070	0091	0120														
MINMAX	0002	0041	0194	0194															
NSUBPX	0006	0051	0147																
NUMDOT	0002	0182																	
PIXSKP	0039	0182	0190																

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

LABEL	DEFINED	REFERENCES
10	0165	0061
20	0094	0093
30	0096	0109
40	0104	0099
50	0108	0107
60	0110	0097 0103
70	0114	0111 0113
80	0127	0126
90	0129	0128
100	0138	0137
110	0147	0142
120	0162	0157
150	0167	0165
160	0172	0171
300	0163	0139 0149 0151
400	0164	0135
600	0204	0183 0188 0190 0192 0194
650	0201	0200
700	0205	0173 0176
800	0206	0198
900	0207	0136
1000	0209	0059
1005	0210	0060
1008	0211	0064
1010	0212	0073
1020	0213	0084
1025	0214	0088
1030	0215	0096
1033	0216	0102
1043	0217	0090
1047	0218	0091
1050	0219	0092
1060	0220	0095
1065	0221	0130
1070	0222	0106
1090	0223	0110
1120	0224	0065 0076 0119
1122	0225	0115
1125	0226	0120
1130	0227	0116 0121
1140	0228	0117 0122
1150	0229	0118 0123
1155	0230	0124
1160	0231	0125
1170	0232	0126
1200	0233	0138
1210	0234	0169
1220	0235	0207
1230	0236	0208
2000	0237	0132

/ PARLD / SIZE OF PROGRAM 004042 HEXADECIMAL BYTES

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
A S	XR	I*4	000000	I SF		I*4	000590	J SF		I*4	000594	K F		I*4	000598
M SF		I*4	00059C	GT SF		I*4	001218	NB SF		I*4	0005A0	NC SFA		I*4	0005A4
NE SF		I*4	0005A8	NO SF		I*4	0005AC	N1 SF	XR	I*4	000000	TT SFA		I*4	0005B0
VT SFA		I*4	0005B4	HUF SF		I*4	001614	HDR SF		L*1	00061C	HMS SFA		I*2	001210
KYR SFA	C	I*4	000004	TYR SFA	C	I*4	000004	ABUF SF		I*4	0018E4	BBUF SF		I*4	0018F4
DATE SFA		I*4	001F04	ICHI S		I*4	001F0C	IERR S		I*4	000588	IREC SF		I*4	0005BC
JERR SFA		I*4	0005C0	KDAY SFA		I*4	0005C4	KMON SFA		I*4	0005C8	LINE SF		I*4	0005CC
LREC SF		I*4	0005D0	NCNT SF		I*4	0005D4	NREC SF		I*4	0005D8	SAMP SF		I*4	0005DC
SPIX SF		I*4	0005E0	THUF SF		I*4	00221C	TDAY SFA		I*4	0005E4	TMON SFA		I*4	0005E8
CLASS SF		I*4	0005EC	COUNT SFA		I*4	00252C	CROPP SF	XF		000000	GTBUF S	E	L*1	002B90
INDEX SFA		I*4	0005F0	ISAMP SF		I*4	0005F4	IUNIT SF		I*4	0005F8	NCODE S		I*4	002538
NCROP F	C	I*4	000030	NPURL SF		I*4	0005FC	NPURU SF		I*4	000600	NSAMP SF		I*4	000604
PARLD		I*4	000608	PCODE		R*4	NR	PCROP F	C	R*4	000000	CPTIME SF	XF		000000
GTBUF1 F	E	L*1	002B90	GTCODE SFA		I*4	00060C	GTDATE SFA	C	I*4	000008	GTRSEG SF	C	I*4	000000
IBCOM# V	XF	I*4	000000	IXLTOT SF		I*4	002B78	JULIAN SF	XF		000000	XHICUT		I*4	000610
KLASFG SF	C	I*4	000000	KLDATE SFA	C	I*4	000008	MINMAX	XR	I*4	000000	NSUBPX S	C	I*4	000000
NUMDOT F		I*4	000614	PIXSKP S A		I*4	00061R								

***** COMMON INFORMATION *****

NAME OF COMMON BLOCK *NSRIXI* SIZE OF BLOCK 000018 HEXADECIMAL BYTES

VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.
NSUBPX	I*4	000000									

NAME OF COMMON BLOCK * DEFGT* SIZE OF BLOCK 000014 HEXADECIMAL BYTES

VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.
GTRSEG	I*4	000000	TYR	I*4	000004	GTDATE	I*4	000008			

NAME OF COMMON BLOCK * DEFKL* SIZE OF BLOCK 000014 HEXADECIMAL BYTES

VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.
KLASEG	I*4	000000	KYR	I*4	000004	KLDATE	I*4	000008			

NAME OF COMMON BLOCK * HEAD* SIZE OF BLOCK 000034 HEXADECIMAL BYTES

VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.
RCROP	R*4	000000	NCROP	I*4	000030						

SOURCE STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
10	65	003324	20	9	00354C	30	96	003584	40	104	00362C
50	108	00367C	60	116	0036A2	70	114	00371A	80	127	003928
90	129	00394F	100	138	003A0E	110	147	003AA8	120	162	003C0C
300	163	003C26	400	164	003C30	150	167	003C5A	160	172	003D1A
650	201	003EAA	600	204	003F10	700	205	003F34	800	206	003F4A
900	207	003F4A	2000	237	003FAC						

COMPILER GENERATED LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
100001	2	003230	100006	63	00330C	100009	72	00339C	100010	73	0033A0
100011	74	0033AA	100012	75	0033C0	100015	83	003440	100016	84	003444
100017	85	00344E	100018	86	003464	100019	87	003474	100020	88	003478
100021	89	003488	100022	90	003480	100027	95	00356E	200001	98	00358A
200002	98	0035C4	100028	99	0035CE	200003	100	0035D6	200004	100	0035E2
200005	100	0035EA	100029	101	0035F6	200006	105	003638	100030	105	003640
100031	106	003648	100032	109	00369E	100033	110	0036C4	100036	110	0036FE
100037	112	003706	100038	115	00374A	100039	115	00375C	200007	123	0038C0
100060	128	00394A	100061	130	00396C	100062	131	003974	100063	132	003988
100064	134	003990	100065	136	00399C	100066	136	0039B0	100067	136	0039B4
100068	136	003A06	100071	139	003A4E	100072	140	003A52	100073	141	003A66
100074	142	003A76	100075	143	003A7A	100076	146	003AAC	100077	148	003AD6
200008	150	003AEC	100078	151	003AF8	100079	153	003B08	100080	159	003BBA
100086	165	003C4A	100087	166	003C4E	100088	168	003C6A	100093	169	003CA0
100094	169	003CB2	100095	169	003CCB	100098	169	003D0A	100099	173	003D40
100100	174	003D44	100101	178	003D6E	100102	181	003DA2	100103	182	003DA8
100104	184	003DC4	200009	187	003E04	100109	187	003E0E	100110	188	003E16
100111	189	003E1A	100112	192	003E34	100113	194	003E46	200010	195	003E5E
100114	196	003E76	100115	200	003EA6	100116	202	003EEC	100117	205	003F22

FORMAT STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
1000	209	000028	1005	210	000068	1008	211	000070	1010	212	0000A5
1020	213	000003	1025	214	0000FF	1030	215	000137	1033	216	000130
1043	217	000177	1047	218	0001A6	1050	219	000105	1060	220	000212
1065	221	000236	1070	222	000268	1090	223	000283	1120	224	00020F
1122	225	0002CB	1125	226	000304	1130	227	000339	1140	228	00035C
1150	229	000384	1155	230	0003A7	1160	231	0003BB	1170	232	000300
1200	233	0003E4	1210	234	0003ED	1220	235	000431	1230	236	000464

*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

STATISTICS SOURCE STATEMENTS = 237, PROGRAM SIZE = 16450, SUBPROGRAM NAME = PARLD

STATISTICS NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ****** 236K BYTES OF CORE NOT USED

REQUESTED OPTIONS: NOTERM

OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

```
ISN 0002            SUBROUTINE PCLST1(
                C                        PARCLS INPUT FROM CARDS                                PCL00010
                C                                                                               PCL00020
                C     O NCROP.                                                                  PCL00030
                C                  TOTAL NUMBER OF CROPS                                        PCL00040
                C     O RCROP.                                                                  PCL00050
                C                  CROPS TO BE EVALUATED                                        PCL00060
                C     O MINMAX.                                                                 PCL00070
                C                  MIN AND MAX OF TO                                            PCL00080
                C     O KATGRY.                                                                 PCL00090
                C                  CATEGORY TO CONTAIN THOSE PARAMETERS OUTSIDE                 PCL00100
                C                  INPUT LIMITS                                                 PCL00110
                C     O NUMDOT.                                                                 PCL00120
                C                  NUMBER OF DOTS IN TRAINING FIELD                             PCL00130
                C     O KHICUT.                                                                 PCL00140
                C                  LIMIT FOR CHISQR PARAMETERS                                  PCL00150
                C     O ISYM.                                                                   PCL00160
                C                  NUMERIC SYMBOLS CORRESPONDING TO CROPS                       PCL00170
                C     O IERR)                                                                   PCL00180
                C                  ERROR FLAG                                                   PCL00190
                C                   0 - OK                                                      PCL00200
                C                   1 - ERROR INCOUNTERED                                       PCL00210
                C ---------------------------------------------                                 PCL00220
                C                                                                               PCL00230
                C HISTORY                                                                       PCL00240
                C -------                                                                       PCL00250
                C                                                                               PCL00260
                C                                                                               PCL00270
                C     MARY TOMPKINS     LEMSCO      04/09/81     ORIGINAL CODE                  PCL00280
                C                                                                               PCL00290
                C                                                                               PCL00300
                C METHOD                                                                        PCL00310
                C -------                                                                       PCL00320
                C                                                                               PCL00330
                C     READS,CLASSIFIES, AND ANALYZES CARDS DESCRIBING THE FOLLOWING:            PCL00340
                C        A1,SEGMENT,DATE,FILE   DOCUMENTATION -- READ AND WRITTEN              PCL00350
                C        TOMINMAX               MIN MAX MINMAX FOR TO COEFS.                   PCL00360
                C        DOTS                   NUMBER OF DOT WITHIN TRAINING FIELD            PCL00370
                C        CATEGORY               NUM. OF CATEGORY TO PLACE COEF NOT             PCL00380
                C                               WITHIN LIMITS                                  PCL00390
                C        CROP                   1-3 CROPS TO MAP. ENBEDDED BLANKS              PCL00400
                C                               ARE INCLUDED IN NAME.                          PCL00410
                C        CHICUT                 LIMIT APPLIED TO PARAMETERS                    PCL00420
                C        SYMBOL                 NUMERIC SYMBOLS THAT CORRESPOND TO CROPS       PCL00430
                C        *END                   SPECIFIES THE END OF USER DEFINED CARDS        PCL00440
                C                                                                               PCL00450
                C                                                                               PCL00460
                C EXTERNAL REFERENCE                                                            PCL00470
                C ------------------                                                            PCL00480
                C                                                                               PCL00490
                C                                                                               PCL00500
                C     ICE    INTEGER CHARACTER EQUIVALENT                                       PCL00510
                C     IVALUE ALLOWS END LINE TESTING / STORING OF QUOTED LITERALS.            PCL00520
                C                                                                               PCL00530
                C                                                                               PCL00540
                C EXCEPTIONS                                                                    PCL00550
                C ----------                                                                    PCL00560
                C                                                                               PCL00570
                C     IF ANY OF THE FOLLOWING CONDITIONS EXIST IERR IS SET EQUAL                PCL00580
                C     TO 1, A DIAGNOSTIC MESSAGE IS ISSUED AND EXCUTION CONTINUES.              PCL00590
                C        1.MORE/LESS THAN 2 NUMBERS ON THE TO MINMAX CARD.                      PCL00600
                C        2.MIN>=MAX ON THE TO MINMAX CARD.                                      PCL00610
                C        3.TO MINMAX CARD MISSING.                                              PCL00620
                C        4.MORE THAN 3 CROPS ON A CROP CARD.                                    PCL00630
                C        5.CROP CARD MISSING.                                                   PCL00640
                C        6.MORE THAN ONE NUMBER ON THE DOTS, CATEGORY, OR CHICUT CARD.          PCL00650
                C        7.DOTS,CATEGORY,SYMBOL OR CHICUT CARD MISSING.                         PCL00660
                C        8.NUMBER OF SYMBOLS<>NUMBER OF CROPS.                                  PCL00670
                C     IF A CONTROL CARD IS NOT RECOGNIZED AS ONE OF THE DEFINED                 PCL00680
                C     TYPE A WARNING MESSAGE IS PRINTED.                                        PCL00690
                C                                                                               PCL00700
                C                                                                               PCL00710
                C LOCAL VARIABLES                                                               PCL00720
                C ---------------                                                               PCL00730
```

```
                C                                                                       PCL00740
                C                                                                       PCL00750
ISN 0003            LOGICAL*1 KHAR(80)                                                  PCL00760
                C                       1 CARD IMAGE, PACKED                            PCL00770
ISN 0004            INTEGER NUMCNT                                                      PCL00780
                C                       SET ACORDING TO SPECIFIC COEF                   PCL00790
ISN 0005            INTEGER KOLTMP                                                      PCL00800
                C                       COUNTER TO ADJUST FOR BYTES CONTAINING          PCL00810
                C                       A DIGIT.                                        PCL00820
ISN 0006            INTEGER KOLCHA                                                      PCL00830
                C                       COLUMNS OF CHARS ON CARD                        PCL00840
ISN 0007            INTEGER IUNIT                                                       PCL00850
                C                       UNIT OF DIGIT                                   PCL00860
ISN 0008            INTEGER KARTMP                                                      PCL00870
                C                       COUNTER TO ADJUST FOR BYTES CONTAINING          PCL00880
                C                       CHARACTERS                                      PCL00890
ISN 0009            INTEGER MINMAX(2)                                                   PCL00900
                C                       ARGUMENT                                        PCL00910
ISN 0010            REAL RCROP(4,3)                                                     PCL00920
                C                       ARGUMENT                                        PCL00930
ISN 0011            INTEGER KEYWRD                                                      PCL00940
                C                       KEY WORD IN CARD (BYTES 1-4)                    PCL00950
ISN 0012            INTEGER ISTMP(3)                                                    PCL00960
                C                       TEMP STORAGE FOR CROP SYMBOLS                   PCL00970
ISN 0013            REAL RCRPWD(20)                                                     PCL00980
                C                       ONE CROP PACKED IN WORDS                        PCL00990
ISN 0014            LOGICAL*1 RCRPBY(80)                                                PCL01000
                C                       ONE CROP PACKED IN BYTES                        PCL01010
ISN 0015            LOGICAL*1 ISYM(3)                                                   PCL01020
                C                       ARGUMENT                                        PCL01030
ISN 0016            EQUIVALENCE(KHAR(1),KEYWRD)                                         PCL01040
ISN 0017            EQUIVALENCE(RCRPWD(1),RCRPBY(1))                                    PCL01050
ISN 0018            INTEGER INVEC(11)/'AI','SEGM','DATE','FILE','CATE','DOTS','CHIC',   PCL01060
                   & 'SYMB','TOMI','CROP','*END'/                                       PCL01070
                C                                                                       PCL01080
                C PROCEDURE                                                             PCL01090
                C ---------                                                             PCL01100
                C                                                                       PCL01110
                C                                                                       PCL01120
                C INITIALIZE VARIABLES                                                  PCL01130
                C                                                                       PCL01140
ISN 0019            RCROP(1,1) = IVALUE('     ')                                        PCL01150
ISN 0020            IERR = 0                                                            PCL01160
                C                                                                       PCL01170
ISN 0021            DO 10 I = 1,2                                                       PCL01180
ISN 0022                MINMAX(I) = 0                                                   PCL01190
ISN 0023         10 CONTINUE                                                            PCL01200
                C                                                                       PCL01210
ISN 0024            DO 50 I = 1,3                                                       PCL01220
ISN 0025                ISYM(I) = 0                                                     PCL01230
ISN 0026         50 CONTINUE                                                            PCL01240
                C                                                                       PCL01250
ISN 0027            NUMDOT = 0                                                          PCL01260
ISN 0028            KATGRY = 0                                                          PCL01270
ISN 0029            NUMSYM = 0                                                          PCL01280
                C                                                                       PCL01290
                C                                                                       PCL01300
                C WRITE HEADING FOR INPUT SUMMARY                                       PCL01310
                C                                                                       PCL01320
ISN 0030            WRITE(20,200)                                                       PCL01330
ISN 0031        200 FORMAT(//' INPUT SUMMARY'//)                                        PCL01340
                C                                                                       PCL01350
                C                                                                       PCL01360
                C READ CARD, PRINT CARD ON SUMMARY                                      PCL01370
                C                                                                       PCL01380
ISN 0032        210 READ(21,220,END=890)(KHAR(I),I = 1,80)                              PCL01390
ISN 0033        220 FORMAT(80A1)                                                        PCL01400
ISN 0034            WRITE(20,230)(KHAR(I),I = 1,80)                                     PCL01410
ISN 0035        230 FORMAT(1X,80A1)                                                     PCL01420
                C                                                                       PCL01430
                C                                                                       PCL01440
                C ANALYZE CARD                                                          PCL01450
                C -- DETERMINE CARD TYPE                                                PCL01460
                C                                                                       PCL01470
ISN 0036            DO 240 I = 1,11                                                     PCL01480
ISN 0037                IF(KEYWRD.EQ.INVEC(I)) GO TO (260,260,260,260,265,265,265,310,  PCL01490
                   &        310,500,700),I                                              PCL01500
ISN 0039        240 CONTINUE                                                            PCL01510
```

```
                C
                C
                C INVALID CARD TYPE
                C
     ISN 0040         WRITE(20,250)
     ISN 0041     250 FORMAT(' INVALID INPUT CARD -- IGNORED')
     ISN 0042         GO TO 210
                C
                C
                C DOCUMENTARY CARDS: AI,SEGMENT #,DATE,FILE
                C
     ISN 0043         GO TO 210
                C
                C
                C CHICUT CARD INTEGER > 0
                C DOTS CARD -- 10 > INTEGER < 100
                C CATEGORY CARD -- 0 > INTEGER <= NCROP
                C
     ISN 0044     265 NUMCNT = 0
     ISN 0045         KOLCHA = 11
     ISN 0046         IUNIT = 1
     ISN 0047     268 DO 270 I = KOLCHA,72
     ISN 0048         KOL = I
     ISN 0049         IF(ICE(KHAR(I)).GT.ICE('0').AND.
                &    ICE(KHAR(I)).LE.ICE('9')) GO TO 275
     ISN 0051     270 CONTINUE
     ISN 0052         GO TO 210
                C
     ISN 0053     275 NUMCNT = NUMCNT + 1
     ISN 0054         IF(NUMCNT.GT.1) WRITE(5,280) NUMCNT,(KHAR(J),J = 1,10)
     ISN 0056     280 FORMAT(1X,I2,' NUMBERS INPUT ON',10A1)
     ISN 0057         IF(NUMCNT.GT.1) IERR = 1
                C
     ISN 0059         DO 285 I = KOL,72
     ISN 0060           KOLTMP = I
     ISN 0061         IF(ICE(KHAR(I)).LT.ICE('0').OR.
                &    ICE(KHAR(I)).GT.ICE('9')) GO TO 290
                C
     ISN 0063         IF(KEYWRD.EQ.IVALUE('CATE'))
                &    KATGRY = KATGRY*IUNIT + (ICE(KHAR(I))-ICE('0'))
                C
     ISN 0065         IF(KEYWRD.EQ.IVALUE('DOTS'))
                &    NUMDOT = NUMDOT*IUNIT + (ICE(KHAR(I))-ICE('0'))
                C
     ISN 0067         IF(KEYWRD.EQ.IVALUE('CHIC'))
                &    KHICUT = KHICUT*IUNIT + (ICE(KHAR(I))-ICE('0'))
     ISN 0069         IUNIT = 10
     ISN 0070     285 CONTINUE
                C
     ISN 0071     290 KOLCHA = KOLTMP + 1
     ISN 0072         IF(KOLCHA.LT.72) GO TO 268
     ISN 0074         GO TO 210
                C
                C
                C MIN AND MAX MINMAX FOR COEFS --  TO
                C (MIN AND MAX) > 0   MIN < MAX
                C        MINMAX(1) MIN-ALPHA    MINMAX(2) MAX-ALPHA
                C SYMBOLS USED IN OUTPUT FILE
                C 0 < SYM < 256
                C
     ISN 0075     310 NUMCNT = 0
                C
                C VALID INPUTS START IN COLUMN 11, ENDS IN COLUMN 72.
                C INPUT MUST BE NUMERIC -- TWO NUMBERS PER CARD FOR MINMAX.
                C                          THREE NUMBERS PER CARD FOR SYMBOL.
                C
     ISN 0076         KOLCHA = 11
     ISN 0077     320 DO 330 I = KOLCHA,72
     ISN 0078         KOL = I
     ISN 0079         IF((ICE(KHAR(I)).GE.ICE('0').AND.
                &        ICE(KHAR(I)).LE.ICE('9')))GO TO 340
     ISN 0081     330 CONTINUE
     ISN 0082         GO TO 210
                C
                C
                C CHARACTER IS NUMERIC -- DECODE
```

PCL01520 PCL01530 PCL01540 PCL01550 PCL01560 PCL01570 PCL01580 PCL01590 PCL01600 PCL01610 PCL01620 PCL01630 PCL01640 PCL01650 PCL01660 PCL01670 PCL01680 PCL01690 PCL01700 PCL01710 PCL01720 PCL01730 PCL01740 PCL01750 PCL01760 PCL01770 PCL01780 PCL01790 PCL01800 PCL01810 PCL01820 PCL01830 PCL01840 PCL01850 PCL01860 PCL01870 PCL01880 PCL01890 PCL01900 PCL01910 PCL01920 PCL01930 PCL01940 PCL01950 PCL01960 PCL01970 PCL01980 PCL01990 PCL02000 PCL02010 PCL02020 PCL02030 PCL02040 PCL02050 PCL02060 PCL02070 PCL02080 PCL02090 PCL02100 PCL02110 PCL02120 PCL02130 PCL02140 PCL02150 PCL02160 PCL02170 PCL02180 PCL02190 PCL02200 PCL02210 PCL02220 PCL02230 PCL02240 PCL02250 PCL02260 PCL02270 PCL02280 PCL02290

```
                C                                                                       PCL02300
     ISN 0083       340 NUMCNT = NUMCNT + 1                                             PCL02310
     ISN 0084           IUNIT = 1                                                       PCL02320
                C                                                                       PCL02330
     ISN 0085           DO 390 NUMCOL = KOL,72                                          PCL02340
     ISN 0086             KOLTMP = NUMCOL                                               PCL02350
     ISN 0087             IF(ICE(KHAR(NUMCOL)).LT.ICE('0').OR.                          PCL02360
                    &        ICE(KHAR(NUMCOL)).GT.ICE('9')) GO TO 390                  PCL02370
     ISN 0089             IF(KEYWRD.NE.IVALUE('TOMI')) GO TO 375                        PCL02380
     ISN 0091             IF(NUMCNT.GT.2)GO TO 400                                      PCL02390
     ISN 0093             MINMAX(NUMCNT)=MINMAX(NUMCNT)*IUNIT+(ICE(KHAR(NUMCOL))-ICE('0'))PCL02400
     ISN 0094             GO TO 378                                                     PCL02410
     ISN 0095        375  IF(NUMCNT.GT.3) GO TO 400                                    PCL02420
     ISN 0097             NUMSYM = NUMCNT                                               PCL02430
     ISN 0098             ISTMP(NUMCNT)=ISTMP(NUMCNT)*IUNIT+(ICE(KHAR(NUMCOL))-ICE('0'))PCL02440
     ISN 0099             IF(ISTMP(NUMCNT).LT.255)ISYM(NUMCNT)=ISTMP(NUMCNT)            PCL02450
     ISN 0101             IF(ISTMP(NUMCNT).GT.255)WRITE(5,377)ISTMP(NUMCNT)             PCL02460
     ISN 0103        377  FORMAT(1X,I5,' IS NOT A VALID SYMBOL')                        PCL02470
     ISN 0104        378  IUNIT = 10                                                    PCL02480
     ISN 0105        390 CONTINUE                                                       PCL02490
                C                                                                       PCL02500
     ISN 0106        390 KOLCHA = KOLTMP + 1                                            PCL02510
     ISN 0107            IF(KOLCHA.LT.72) GO TO 320                                    PCL02520
     ISN 0109            GO TO 210                                                     PCL02530
                C                                                                       PCL02540
                C                                                                       PCL02550
                C MORE THAN TWO NUMBERS ON A CARD                                       PCL02560
                C                                                                       PCL02570
     ISN 0110       400 WRITE(5,410)(KHAR(I),I = 1,10)                                 PCL02580
     ISN 0111       410 FORMAT(' TOO MANY NUMBERS ON ',10A1,'  CONTROL CARD')          PCL02590
     ISN 0112           IERR = 1                                                      PCL02600
     ISN 0113           GO TO 210                                                     PCL02610
                C                                                                       PCL02620
                C                                                                       PCL02630
                C CROP CARD VALID INPUT STARTS IN COLUMN 11, ENDS IN COLUMN 72          PCL02640
                C INPUT IS CHARACTER, MAXIMUM OF 3 CROPS, ENBEDED BLANKS ARE            PCL02650
                C IGNORED.                                                              PCL02660
                C                                                                       PCL02670
     ISN 0114       500 KAR = 11                                                       PCL02680
     ISN 0115           NCROP = 0                                                     PCL02690
     ISN 0116       505 DO 510 KARCOL = KAR,72                                         PCL02700
     ISN 0117           KARSTR = KARCOL                                               PCL02710
     ISN 0118           IF(ICE(KHAR(KARCOL)).NE.ICE(' ')) GO TO 530                   PCL02720
     ISN 0120       510 CONTINUE                                                       PCL02730
     ISN 0121           GO TO 210                                                     PCL02740
                C                                                                       PCL02750
                C                                                                       PCL02760
                C CHARACTER IS FIRST IN CROP (NON BLANK)                                PCL02770
                C                                                                       PCL02780
     ISN 0122       530 NCROP = NCROP + 1                                              PCL02790
     ISN 0123           KROCHA = 1                                                    PCL02800
     ISN 0124           DO 540 I = 1,16                                               PCL02810
     ISN 0125           RCRPBY(I) = ICE(' ')                                          PCL02820
     ISN 0126       540 CONTINUE                                                       PCL02830
                C                                                                       PCL02840
     ISN 0127           DO 560 I = KARSTR,72                                          PCL02850
     ISN 0128           KARTMP = I                                                    PCL02860
     ISN 0129           IF(ICE(KHAR(I)).EQ.ICE(',')) GO TO 600                        PCL02870
     ISN 0131           RCRPBY(KROCHA) = KHAR(I)                                      PCL02880
     ISN 0132           KROCHA = KROCHA + 1                                           PCL02890
     ISN 0133       560 CONTINUE                                                       PCL02900
                C                                                                       PCL02910
                C                                                                       PCL02920
                C STORE 16 BYTES IN RCROP ARRAY                                         PCL02930
                C                                                                       PCL02940
     ISN 0134       600 IF(NCROP.LE.3)GO TO 630                                        PCL02950
     ISN 0136           WRITE(5,610)                                                  PCL02960
     ISN 0137       610 FORMAT(' TOO MANY CROPS SPECIFIED ON CONTROL CARD')           PCL02970
     ISN 0138           NCROP = NCROP - 1                                             PCL02980
     ISN 0139           IERR = 1                                                      PCL02990
     ISN 0140           GO TO 210                                                     PCL03000
     ISN 0141       630 DO 650 I = 1,4                                                PCL03010
     ISN 0142           RCROP(I,NCROP) = RCRPWD(I)                                    PCL03020
     ISN 0143       650 CONTINUE                                                       PCL03030
                C                                                                       PCL03040
                C                                                                       PCL03050
                C                                                                       PCL03060
                C CHECK CURRENT BYTE                                                    PCL03070
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                      C                                                                 PCL03040
ISN 0144                    KAR = KARTMP + 1                                            PCL03090
ISN 0145                    IF(KARCOL.LT.72) GO TO 505                                  PCL03100
ISN 0147                    GO TO 210                                                   PCL03110
                      C                                                                 PCL03120
                      C *END CHECK FOR ERRORS                                           PCL03130
                      C                                                                 PCL03140
                      C --                                                              PCL03150
                      C     CATEGORY CARD,DOTS CARD,SYMBOL CARD, OR CHICUT CARD MISSING?PCL03160
                      C                                                                 PCL03170
ISN 0148              700 IF(NUMDOT.EQ.0) WRITE(5,710)                                  PCL03180
ISN 0150              710 FORMAT(' DOTS CARD MISSING')                                  PCL03190
ISN 0151                  IF(NUMDOT.EQ.0)IERR = 1                                       PCL03200
                      C                                                                 PCL03210
ISN 0153                  IF(KATGRY.EQ.0) WRITE(5,720)                                  PCL03220
ISN 0155              720 FORMAT(' CATEGORY CARD MISSING')                              PCL03230
ISN 0156                  IF(KATGRY.EQ.0)IERR = 1                                       PCL03240
                      C                                                                 PCL03250
ISN 0158                  IF(NUMSYM.EQ.0)WRITE(5,721)                                   PCL03260
ISN 0160              721 FORMAT(' SYMBOL CARD MISSING')                                PCL03270
ISN 0161                  IF(NUMSYM.EQ.0)IERR = 1                                       PCL03280
                      C                                                                 PCL03290
ISN 0163                  IF(KHICUT.EQ.0) WRITE(5,722)                                  PCL03300
ISN 0165              722 FORMAT(' CHICUT CARD MISSING')                                PCL03310
ISN 0166                  IF(KHICUT.EQ.0)IERR = 1                                       PCL03320
                      C                                                                 PCL03330
                      C --                                                              PCL03340
                      C     CHICUT VALID?                                               PCL03350
                      C                                                                 PCL03360
ISN 0168                  IF(KHICUT.LT.1)WRITE(5,723)KHICUT                             PCL03370
ISN 0170              723 FORMAT(' CHICUT CARD',I3,' UNACCEPTABLE')                     PCL03380
ISN 0171                  IF(KHICUT.LT.1)IERR = 1                                       PCL03390
                      C                                                                 PCL03400
                      C --                                                              PCL03410
                      C     DOT CARD VALID?                                             PCL03420
                      C                                                                 PCL03430
ISN 0173                  IF(NUMDOT.LT.10.OR.NUMDOT.GT.100) WRITE(5,725)NUMDOT          PCL03440
ISN 0175              725 FORMAT(1X,I5,' IS NOT AN ACCEPTABLE COUNT FOR DOTS')          PCL03450
ISN 0176                  IF(NUMDOT.LT.10.OR.NUMDOT.GT.100)IERR = 1                     PCL03460
                      C                                                                 PCL03470
                      C --                                                              PCL03480
                      C     CATEGORY CARD VALID?                                        PCL03490
                      C                                                                 PCL03500
ISN 0178                  IF(KATGRY.LT.1.OR.KATGRY.GT.NCROP) WRITE(5,730)KATGRY,NCROP PCL03510
ISN 0180              730 FORMAT(1X,I4,' IS NOT AN ACCEPTABLE CATEGORY WITH',I5,' CROPS')PCL03520
ISN 0181                  IF(KATGRY.LT.1.OR.KATGRY.GT.NCROP)IERR = 1                    PCL03530
                      C --                                                              PCL03540
                      C    MINMAX MIN >= MAX                                            PCL03550
                      C                                                                 PCL03560
ISN 0183                  IF(MINMAX(1).GE.MINMAX(2))IERR = 2                            PCL03570
ISN 0185                  IF(MINMAX(2).EQ.0) WRITE(5,820)                               PCL03580
ISN 0187              820 FORMAT(' TO MINMAX CARD MISSING OR INCORRECTLY ENTERED')      PCL03590
ISN 0188                  IF(IERR.EQ.2)WRITE(5,830)MINMAX(1),MINMAX(2)                  PCL03600
ISN 0190              830 FORMAT(' TOMINMAX ',I8,2X,I8,' UNACCEPTABLE')                 PCL03610
ISN 0191                  IF(IERR.EQ.2)IERR = 1                                         PCL03620
                      C                                                                 PCL03630
                      C --                                                              PCL03640
                      C     CROP CARD MISSING??                                         PCL03650
                      C                                                                 PCL03660
ISN 0193                  IF(RCROP(1,1).NE.IVALUE('    ')) GO TO 885                    PCL03670
ISN 0195                  WRITE(5,850)                                                  PCL03680
ISN 0196              850 FORMAT(' CROP CARD MISSING')                                  PCL03690
ISN 0197                  IERR = 1                                                      PCL03700
                      C                                                                 PCL03710
                      C                                                                 PCL03720
                      C                                                                 PCL03730
                      C                                                                 PCL03740
                      C --                                                              PCL03750
                      C     SYMBOL CARD VALID?                                          PCL03760
                      C                                                                 PCL03770
ISN 0198              885 IF(NUMSYM.NE.NCROP) IERR = 1                                  PCL03780
ISN 0200                  IF(NUMSYM.NE.NCROP) WRITE(5,860)NCROP                         PCL03790
ISN 0202              860 FORMAT(' SYMBOL CARD MUST HAVE ',I2,' ENTRIES')               PCL03800
ISN 0203                  DO 880 I = 1,NUMSYM                                           PCL03810
ISN 0204                     IF(ICE(ISYM(I)).EQ.ICE(0)) IERR = 1                        PCL03820
ISN 0206                     IF(ICE(ISYM(I)).EQ.ICE(0)) WRITE(5,870)                    PCL03830
ISN 0208              870    FORMAT(' IMPROPER ENTRY ON SYMBOL CARD')                   PCL03840
ISN 0209              880 CONTINUE                                                      PCL03850
```

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                C
                C CARDS ARE COMMENT CARDS                                                    PCI 03860
                C                                                                            PCI 03870
                                                                                             PCI 03880
   ISN 0210       890 READ(21,220,END=900)(KHAR(I),I = 1,80)                                 PCI 03890
   ISN 0211           WRITE(20,230)(KHAR(I),I = 1,80)                                        PCI 03900
   ISN 0212           GO TO 890                                                              PCI 03910
   ISN 0213       900 RETURN                                                                 PCI 03920
   ISN 0214           END                                                                    PCI 03930
```

*******F O R T R A N C R O S S R E F E R E N C E L I S T I N G*******

SYMBOL	INTERNAL STATEMENT NUMBERS																	
I	0021	0022	0024	0025	0032	0032	0032	0034	0034	0034	0036	0037	0037	0047	0048	0049	0049	0059	0060
	0061	0061	0063	0065	0067	0077	0078	0079	0079	0110	0110	0110	0124	0125	0127	0128	0129	0131	0141
	0142	0142	0203	0204	0206	0210	0210	0210	0211	0211	0211								
	0054	0054	0054																
ICE	0049	0049	0049	0049	0061	0061	0061	0061	0063	0063	0065	0065	0067	0067	0079	0079	0079	0079	0087
	0087	0087	0087	0093	0093	0098	0098	0118	0118	0125	0129	0129	0204	0204	0206	0206			
KAR	0114	0116	0144																
KOL	0048	0059	0078	0085															
IERR	0002	0020	0057	0112	0139	0151	0156	0161	0166	0171	0176	0181	0183	0188	0191	0191	0197	0198	0204
ISYM	0002	0015	0025	0099	0204	0206													
KHAR	0003	0016	0032	0034	0049	0049	0054	0061	0061	0063	0065	0067	0079	0079	0087	0087	0093	0098	0110
	0118	0129	0131	0210	0211														
INVEC	001A	001A	0037																
ISTMP	0012	0098	0098	0099	0099	0101	0101												
IUNIT	0007	0046	0063	0065	0067	0069	0084	0093	0098	0104									
NCROP	0002	0115	0122	0122	0134	0138	0138	0142	0178	0178	0181	0198	0200	0200					
RCROP	0002	0010	0019	0142	0193														
IVALUE	0019	0063	0065	0067	0189	0193													
KARCOL	0116	0117	0118	0145															
KARSTR	0117	0127																	
KARTMP	000A	0128	0144																
KATGRY	0002	0028	0063	0063	0153	0156	0178	0178	0178	0181	0181								
KEYWRD	0011	0016	0037	0063	0065	0067	0089												
KHICUT	0002	0067	0067	0163	0166	0168	0168	0171											
KOLCHA	0006	0045	0047	0071	0072	0076	0077	0106	0107										
KOLTMP	0005	0060	0071	0086	0106														
KROCHA	0123	0131	0131	0132	0132														
MINMAX	0002	0009	0022	0093	0093	0183	0183	0185	0188	0188									
NUMCNT	0004	0044	0053	0053	0054	0054	0057	0075	0083	0083	0091	0093	0093	0095	0097	0098	0098	0099	0099
	0099	0101	0101																
NUMCOL	0085	0086	0087	0087	0093	0098													
NUMDOT	0002	0027	0065	0065	0148	0151	0173	0173	0173	0176	0176								
NUMSYM	0029	0097	0158	0161	0198	0200	0203												
PCLSIN	0002																		
RCRPBY	0014	0017	0125	0131															
RCRPWD	0013	0017	0142																

*******F O R T R A N C R O S S R E F E R E N C E L I S T I N G*******

LABEL	DEFINED	REFERENCES									
10	0021	0021									
50	0026	0024									
200	0031	0030									
210	0032	0042	0043	0052	0074	0082	0109	0113	0121	0140	0147
220	0033	0032	0210								
230	0035	0034	0211								
240	0039	0036									
250	0041	0040									
260	0043	0037	0037	0037	0037						
265	0044	0037	0037	0037							
268	0047	0072									
270	0051	0047									
275	0053	0049									
280	0056	0054									
285	0070	0059									
290	0071	0061									
310	0075	0037	0037								
320	0077	0107									
330	0081	0077									
340	0083	0079									
375	0095	0089									
377	0103	0101									
37A	0104	0094									
380	0105	0095									
390	0106	0087									
400	0110	0021	0095								

*****FORTRAN CROSS REFERENCE LISTING*****

LABEL	DEFINED	REFERENCES
410	0111	0110
500	0114	0037
505	0116	0145
510	0120	0116
530	0122	0118
540	0126	0124
560	0133	0127
600	0134	0129
610	0137	0136
630	0141	0134
650	0143	0141
700	0148	0037
710	0150	0148
720	0155	0153
721	0160	0158
722	0165	0163
723	0170	0168
725	0175	0173
730	0180	0178
820	0187	0185
830	0190	0188
850	0196	0195
860	0202	0200
870	020A	0206
880	0209	0203
885	0198	0193
890	0210	0032 0212
900	0213	0210

/ PCLSIN / SIZE OF PROGRAM 0011FE HEXADECIMAL BYTES

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
I	SFA	I*4	000478	J	F	I*4	00047C	ICE	XF	I*4	000000	KAR	SF	I*4	000480
KOL	SF	I*4	000484	IERR	S	I*4	000488	ISYM	S A XR	L*1	000000	KHAR	SFA E	C*1	000500
INVEC		I*4	0004CA	ISTMP	SF	I*4	0004E4	IUNIT	SF	I*4	00048C	NCROP	SF	I*4	000490
RCROP	S XR	R*4	000000	IBCOM#	F XF	I*4	000000	IVALUE	F XF	I*4	000000	KARCOL	SFA	I*4	000494
KARSTR	SF	I*4	000498	KARTMP	SF	I*4	00049C	KATGRY	SF	I*4	0004A0	KEYWRD	E	I*4	000500
KHICUT	SF	I*4	0004A4	KOLCHA	SF	I*4	0004A8	KOLTMP	SF	I*4	0004AC	KROCHA	SF	I*4	000480
MINMAX	SF XR	I*4	000000	NUMCNT	SF	I*4	0004B4	NUMCOL	SFA	I*4	0004B8	NUMDOT	SF	I*4	0004BC
NUMSYM	SF	I*4	0004C0	PCLSIN		R*4	0004C4	RCRPBY	S E	L*1	000558	RCRPWD	F E	R*4	000558

SOURCE STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
10	23	000640	50	26	000662	210	32	000698	240	39	00071C
260	43	000748	265	44	00074C	268	47	000760	270	51	0007D0
275	53	0007E4	285	70	000990	290	71	0009A0	310	75	000984
320	77	0009C4	330	81	000A48	340	83	000A5C	375	95	000834
378	104	000AF0	380	105	000BF8	390	106	000C00	400	110	000C14
500	114	000C42	505	116	000C52	510	120	000C92	530	122	000CA6
540	126	000CCA	560	133	000D38	600	134	000D48	630	141	000D78
650	143	000DA2	700	148	000DCA	885	198	000FF2	880	209	0010A4
890	210	0010B6	900	213	001110						

COMPILER GENERATED LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
100001	2	0005EC	100002	22	000630	100003	24	000652	100004	25	000656
100005	27	000674	100006	32	0006AC	100011	37	0006F0	100012	38	000704
100014	40	00072F	100015	48	000768	200001	50	0007A0	100016	52	0007E0
100017	55	0007F4	100020	57	000824	100021	58	00082C	100022	59	00082E
100023	60	000836	200002	62	000866	100024	63	00089E	100025	64	0008B0
100026	65	0008EC	100027	66	0008FE	100028	67	00093A	100029	68	00094C
100030	69	000988	100032	74	0009B0	100033	78	0009CC	100034	82	000A58
100035	86	000A6F	200003	88	000A9E	100036	89	000ACA	100037	91	000ADC
100038	93	000AEA	100039	97	000B40	100040	100	000BA2	100041	101	000B96
100042	102	000BCA	100044	109	000C10	100047	117	000C5A	100048	121	000CA2
100049	125	000CAB	100050	127	000CUC	100051	128	000CE4	100052	131	000D1C
100054	136	000D54	100055	142	000D7C	100056	144	000DB4	100057	147	000DC6
100058	149	000DD4	100059	151	000DE8	100060	152	000DF2	100061	153	000DF4
100062	154	000DFE	100063	156	000E14	100064	157	000E1E	100065	158	000E20

100066	159	000F2A	100067	161	000E40	100068	162	000	100069	163	000E4C
100070	164	000F56	100071	166	000E6C	100072	167	000E	100073	168	000E78
100074	169	000E80	100075	171	000E9C	100076	172	000E	100077	173	000EA6
200004	174	000EB2	100078	174	000EBF	100079	176	000EL	200005	177	000EE8
100080	177	000EF4	100081	176	000EF6	200006	179	000EFE	100082	179	000F0A
100083	181	000F30	200007	182	000F38	100084	182	000F44	100085	183	000F46
100086	184	000F52	100087	185	000F56	100088	186	000F60	100089	188	000F74
100090	189	000F7C	100091	191	000FA0	100092	192	000FA8	100093	193	000FAA
100094	195	000FDA	100095	199	000FFE	100096	200	001000	100097	201	00100C
100098	203	001028	100099	204	00102C	100100	205	00105C	100101	206	00105E
100102	207	00108E	100104	210	0010CC						

FORMAT STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
200	31	000028	220	33	00003E	230	35	000044	250	41	00004C
280	56	00006E	377	103	000088	410	111	0000A9	610	137	0000D6
710	150	000103	720	155	000119	721	160	000133	722	165	000148
723	170	000163	725	175	000184	730	180	0001B0	820	187	0001E5
830	190	000217	850	196	00023A	860	202	000250	870	208	000277

*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

STATISTICS SOURCE STATEMENTS = 213, PROGRAM SIZE = 4590, SUBPROGRAM NAME =PCLSIN

STATISTICS NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ****** 244K BYTES OF CORE NOT USED

APPENDIX C

JOB CONTROL SOFTWARE

```
    &CONTROL OFF
*
* PARCLS EXEC
* -----------
*
* HISTORY
* -------
*
*    MARY TOMPKINS     LEMSCO     02/15/81     ORIGINAL CODE
*
* PURPOSE
* -------
*
*    THIS EXEC EXCUTES THE PARCLS PROGRAM AND REISSUES FILEDEFS FOR
*    GROUND TRUTH AND CLASS BY FILES EXECUTING THE FILRCALL PROGRAM.
*
*    ARGUMENTS TO THIS EXEC ARE:
* < SYMBOL >     < SYMBOL >     <    CC    >     < OUTPUT >     < OUTPUT >
* <FILENAME>     <FILETYPE>     <FILENAME>     <FILENAME>     <FILETYPE>
*
*    FILE DEFINITION DESCRIPTION FOR ALL FILES USED IN BADHWAR
*    PROGRAMS AND EXECS ARE AS FOLLOWS:
*          UNIT              DESCRIPTION
*           2-4              BADHWAR SYSTEM
*           5                TERMINAL - WRITE
*           6                PRINTER FILE STORED IN FILE OUT LISTING
*           7-8              BADHWAR SYSTEM
*           9                GROUND TRUTH (MUST BE DEFINED PREVIOUSLY)
*          10                CLASS FILE  (MUST BE DEFINED PREVIOUSLY)
*          11                BADHWAR SYSTEM
*          12-18             BADHWAR SYSTEM
*          19                SYMBOL FILE STORED IN &1 &2 A
*          20                DOCUMENTATION -- STORED IN PCLAS FILE D
*          21                USER DEFINED FILE STORED IN &3 CC A
*          22                RECALL FILE FOR GROUND TRUTH FILE
*          23                RECALL FILE FOR CLASS FILE
*          24                TEMP FILE CONTAINING ALPHA COEFS
*          25                TEMP FILE CONTAINING BETA COEFS
*          26                TEMP FILE CONTAINING TO COEFS
*          28                CLASSIFICATION FILE OUTPUT IN UNIVERSAL FORMAT
*          30                REREAD UNIT
*
*    NOTE THOSE FILES USED BY BADHWAR SYSTEM CAN BE USED IN THIS
*    PROGRAM. THIS IS JUST A WARNING THAT ONE SHOULD BE CAREFUL BEFORE
*    DOING SO IF HE INTENDS TO MAKE A BADHWAR SYSTEM RUN.
*
* EXCEPTION
* ----------
*
*    THE FOLLOWING ERRORS CAUSE PROGRAM TERMINATION:
*
*        1. NO TEMPORARY DISK ASSIGNED.
*        2. INSUFFICIENT PARAMETERS INPUT TO PROGRAM
*        3. GROUND TRUTH/CLASS FILE NOT DEFINED
*
* PROCEDURE
* ---------
*
* ASSIGN PRINTER, SPECIFY LIBRARIES
*
    &IERR = 0
    &TYPE PARCLS &1 &2 &3 &4 &5
    TAG DEV PRINTER HOUSTON
    SPOOL PRINTER CONT NOHOLD TO RSCS
*
* CHECK TO SEE IF TEMPORARY DISK IS ASSIGNED
*
    CP QUERY VIRTUAL 192
    &IF &RETCODE EQ 0 &GOTO -TRUE
    &TYPE GROUND TRUTH / CLASS FILE NOT YET DEFINED.
    &IERR = 1
```

```
-TRUE
*
*
* CHECK FOR ACCEPTABLE PARAMETERS
*
     &IF &INDEX EQ 5 &GOTO -CONT
     &TYPE TOO MANY-TOO FEW INPUTS
     &IERR = 1
-CONT &IF &IERR EQ 1 &EXIT 1
*
*
* ISSUE FILEDEFS
*
     FILEDEF FT02F001 DISK GTCLINF EXEC D (LRECL 80 BLKSIZE 80 PERM
     FILEDEF 5 TERMINAL (PERM
     FILEDEF FT06F001 DISK OUT LISTING D(PERM
     FILEDEF FT19F001 DISK &1 &2 A(PERM LRECL 80 BLKSIZE 80
     FILEDEF FT20F001 DISK PCLAS FILE D (LRECL 132 BLKSIZE 132 PERM
     FILEDEF FT21F001 DISK &3 CC A(PERM LRECL 80 BLKSIZE 80
     FILEDEF FT22F001 DISK FLGTRU FILE D (LRECL 80 BLKSIZE 80 PERM
     FILEDEF FT23F001 DISK FLCLAS FILE D (LRECL 80 BLKSIZE 80 PERM
     FILEDEF FT24F001 DISK ALPHA DATA D (LRECL 80 BLKSIZE 80 PERM
     FILEDEF FT25F001 DISK BETA DATA D (LRECL 80 BLKSIZE 80 PERM
     FILEDEF FT26F001 DISK TD DATA D (LRECL 80 BLKSIZE 80 PERM
     FILEDEF FT28F001 DISK &4 &5 A(LRECL 3060 BLKSIZE 3060 RECFM U PERM
*
*
* RECALL INFO FOR FILDEF
*
     LOAD FILRCALL(CLEAR NOMAP START
*
*
* LOAD EXEC TO FILEDEF GT AND CLASS FILES
*
     EXEC GTCLINF D
     &READ VARS &TERROR
     &IF &TERROR EQ 1 &EXIT 2
*
*
* LOAD MAIN PROGRAM
*
     LOAD PARCLS(NOMAP CLEAR START
*
*
* CLOSE FILE PRINT FILES
*
     PRINT PCLAS FILE D
     PRINT OUT LISTING D
     SPOOL PRINTER CLOSE
     &EXIT
&END
```

```
    &CONTROL OFF
*
* DEFCLAS
* -------
*
* HISTORY
* -------
*
*    M A TOMPKINS     LEMSCO     02/04/81     ORIGINAL CODE
*
* PURPOSE
* -------
*
*    THIS EXEC IS USED TO DEFINE CLASSIFICATION/CLUSTER FILES.
*
*    FILENAME FILETYPE FILEMODE OF CLASS FILE OR WRITTEN
*    ON A RECALL FILE (UNIT 23) BY FORTRAN ROUTINE FILWRT.
*    ARGUMENTS TO THE EXEC ARE AS FOLLOWS:
*
*    FOR SEGMENT ON DATA FILE:
*       FILENAME FILETYPE FILEMODE
*    FOR SEGMENT ON TAPE:
*       TAPE# FILE# TAPEDENSITY
*
*    FILE DEFINITION DESCRIPTION FOR ALL FILES USED IN THESE PROGRAMS
*    AND EXECS ARE AS FOLLOWS:
*          UNIT                DESCRIPTION
*           2                  GTRUINFO
*           3                  TERMINAL: READ
*           4                  LARS GTRUINF
*           5                  TERMINAL: WRITE LARS ERROR MSG ROUTINE
*           6                  BADHWAR SYSTEM
*           7                  BADHWAR SYSTEM
*           8                  BADHWAR SYSTEM
*           9                  BADHWAR SYSTEM
*          10                  CLASSIFICATION/CLUSTER FILE
*          11 - 19             BADHWAR SYSTEM
*          21                  BADHWAR SYSTEM
*          22                  BADHWAR SYSTEM
*          23                  RECALL FILE FOR CLASS FILE
*          24-28               BADHWAR SYSTEM
*          30                  REREAD UNIT
*
*    NOTE: THOSE FILES USED BY BADHWAR SYSTEM CAN BE USED IN THIS
*    PROGRAM THIS IS JUST A WARNING THAT ONE SHOULD BE CAREFUL BEFORE
*    DOING SO.
*
* EXCEPTION
* ---------
*
*    THE FOLLOWING ERRORS CAUSE PROGRAM TERMINATION:
*
*       1. NO TEMPORARY DISK AVAILABLE.
*       2. INSUFFICIENT PARAMETERS INPUT TO PROGRAM
*       3. ERROR IN ACCESSING LARS DATA BASE
*
* PROCEDURE
* ---------
*
* ASSIGN A TEMP DISK, SPECIFY LIBRARIES
*
    &SPACE 3
    &TYPE DEFCLAS &1 &2 &3
    GLOBAL TXTLIB CMSLIB FORTMOD2
    CP QUERY VIRTUAL 192
    &IF &RETCODE NE 0 GETDISK TEMP  2M CLEAR
    &IF &RETCODE NE 0 &TYPE NO TEMP DISK ACCESSED.
    &IF &RETCODE NE 0 &EXIT 1
*
*   STACK UNIT NUMBER AND FILEDEF RECALL UNIT
```

```
*
     &STACK 10
     FILEDEF 3 TERM(PERM
     FILEDEF FT23F001 DISK FLCLAS FILE D(LRECL 80 BLKSIZE 80 PERM
*
*
* CHECK FOR ACCEPTABLE PARAMETER COUNT AND DETERMINE INPUT
* OPTION
*
     &IF &INDEX EQ 1 &GOTO -TRUE
     &TYPE TOO MANY-TOO FEW INPUTS
     &EXIT 2
*
*
-TRUE
     &IF &3 EQ 1600 &GOTO -TAPE
     &IF &3 EQ  800 &GOTO -TAPE
     &TEST = &DATATYPE &3
     &IF &TEST EQ NUM &TYPE INPUTS NOT CORRECT
     &IF &TEST EQ NUM &EXIT 3
*
*
* DATA IS ON DISK
*
 FILEDEF FT10F001 DISK &1 &2 &3( LRECL 3168 BLOCK 3168 PERM RECFM U
     &STACK &1
     &STACK &2
     &STACK &3
     LOAD FILWRT (CLEAR NOMAP START
     &EXIT 4
*
!
* DATA IS ON TAPE
*
-TAPE &NAME = &CONCAT &1'&2
     TAPMOUNT &1 TAP1 RO &3
     TAPE REW (TAP1
     &SK = &2 - 1
     &IF &SK EQ 0 &SKIP 1
     TAPE FSF &SK
     FILEDEF INMOVE TAP1(LRECL 3168 BLOCK 3168 RECFM U PERM DEN &3
     FILEDEF OUTMOVE DISK &NAME CLA D(LRECL 3168 BLOCK 3168 RECFM U PERM
     MOVEFILE
     DETACH 181
     FILEDEF FT10F001 DI  &NAME CLA D(LRECL 3168 BLOCK 3168 RECFM U PERM
     &STACK &NAME
     &STACK CLA
     &STACK D
     LOAD FILWRT(CLEAR NOMAP START
     &EXIT
&END
```

```
    &CONTROL OFF
*
* DEFGTRU EXEC
* ------------
*
* HISTORY
* -------
*
*    M A TOMPKINS     LEMSCO     02/04/81     ORIGINAL CODE
*
* PURPOSE
* -------
*
*    THIS EXEC EXECUTES A FORTRAN PROGRAN (GTRUINF) WHICH ACCESSES
*    THE LARS RTLE DATA BASE FOR INFO ON REQUESTED GROUND TRUTH TAPES
*    GTRUINF WRITES AN EXEC (GTRUINFO) WHICH TRANSMITS TO THIS EXEC
*    THE TAPE# FILE# OF TAPE THAT CONTAINS THE REQUESTED SEGMENT.
*    IN ADDITION THE FILENAME.FILETYPE.FILEMODE, AND UNIT 9 ARE
*    ARE PASSED TO PROGRAM FILWRT WHICH WRITES THIS INFO TO A FILE
*    DEFINED TO UNIT 22.
*
*    ARGUMENTS TO THE EXEC ARE AS FOLLOWS:
*
*    FOR SEGMENT ON DATA FILE:
*       FILENAME FILETYPE FILEMODE
*    FOR SEGMENT ON TAPE:
*       TAPE# FILE# TAPEDENSITY
*    FOR SEGMENT AT LARS:
*       SEGMENT# YEAR  (YEAR IS THE LAST 2 DIGITS OF THE YEAR OF SEGMENT)
*
*    FILE DEFINITION DESCRIPTION FOR ALL FILES USED IN THESE PROGRAMS
*    AND EXECS ARE AS FOLLOWS:
*          UNIT                  DESCRIPTION
*           2                    GTRUINFO
*           3                    TERMINAL: READ
*           4                    LARS GTRUINF
*           5                    TERMINAL: WRITE LARS ERROR MSG ROUTINE
*           6                    BADHWAR SYSTEM
*           7                    BADHWAR SYSTEM
*           8                    BADHWAR SYSTEM
*           9                    GROUND TRUTH FILES
*          10                    BADHWAR SYSTEM
*          11 - 19               BADHWAR SYSTEM
*          21                    BADHWAR SYSTEM
*          22                    GROUND TRUTH FILE INFO
*          23                    BADHWAR SYSTEM
*          24-28                 BADHWAR SYSTEM
*          30                    REREAD UNIT
*
*    NOTE: THOSE FILES USED BY BADHWAR SYSTEM CAN BE USED IN THIS
*    PROGRAM THIS IS JUST A WARNING THAT ONE SHOULD BE CAREFUL BEFORE
*    DOING SO.
*
* EXCEPTION
* ---------
*
*    THE FOLLOWING ERRORS CAUSE PROGRAM TERMINATION:
*
*       1. NO TEMPORARY DISK AVAILABLE.
*       2. INSUFFICIENT PARAMETERS INPUT TO PROGRAM
*       3. 3RD INPUT NOT AS EXPECTED
*       4. ERROR IN ACCESSING LARS DATA BASE
*
* PROCEDURE
* ---------
*
* ASSIGN A TEMP DISK, SPECIFY LIBRARIES
*
    &SPACE 3
    &TYPE DEFGTRU &1 &2 &3
    GLOBAL TXTLIB CMSLIB FORTMOD2
    CP QUERY VIRTUAL 192
```


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```
      &IF &RETCODE NE 0 GETDISK TEMP 2M CLEAR
      &IF &RETCODE NE 0 &TYPE NO TEMP DISK ACCESSED.
      &IF &RETCODE NE 0 &EXIT 1
*
*
* ISSUE FILEDEFS FOR FILWRT FORTRAN PROGRAM
* CHECK FOR ACCEPTABLE PARAMETER COUNT AND DETERMINE INPUT
* OPTION
*
      FILEDEF 3 TERM(PERM
      FILEDEF FT22F001 DISK FLGTRU FILE D(LRECL 80 BLKSIZE 80 PERM
      &IF &INDEX LT 2 &GOTO -NO
      &IF &INDEX LE 3 &GOTO -TRUE
-NO   &TYPE TOO MANY-TOO FEW INPUTS
      &EXIT 2
*
*
-TRUE &UNIT = 09
      &IF &INDEX EQ 2 &GOTO -LARS
      &IF &3 EQ 1600 &GOTO -TAPE
      &IF &3 EQ  800 &GOTO -TAPE
      &TEST = &DATATYPE &3
      &IF &TEST EQ NUM &TYPE INPUTS NOT CORRECT
      &IF &TEST EQ NUM &EXIT 3
*
* DATA IS ON DISK
*
 FILEDEF FT09F001 DISK &1 &2 &3( LRECL 3060 BLOCK 3060 PERM RECFM U
      &STACK &UNIT
      &STACK &1
      &STACK &2
      &STACK &3
      LOAD FILWRT (CLEAR NOMAP START
      &EXIT 4
*
* DATA IS ON TAPE
*
-TAPE &NAME = &CONCAT &1 &2
      TAPMOUNT &1 TAP1 RO &3
      TAPE REW (TAP1
      &SK = &2 - 1
      &IF &SK EQ 0 &SKIP 1
      TAPE FSF &SK
      FILEDEF INMOVE TAP1(LRECL 3060 BLOCK 3060 RECFM U PERM DEN &3
      FILEDEF OUTMOVE DISK &NAME GTO D(LRECL 3060 BLOCK 3060 RECFM U PERM
      &STACK &UNIT
      &STACK &NAME
      &STACK GTO
      &STACK D
      LOAD FILWRT (CLEAR NOMAP START
      MOVEFILE
      DETACH (81
      FILEDEF FT09F001 DISK &NAME GTO D(LRECL 3060 BLOCK 3060 RECFM U PERM
      &EXIT 5
*
*
* GET TAPE AND FILE NUMBER FROM LARS
*
-LARS
*
*
* CHECK FOR PROPER ARGUMENTS
*
      &TEST = &DATATYPE &1
      &IF &TEST EQ CHAR &TYPE INPUTS NOT CORRECT FOR LARS DATA BASE
      &IF &TEST EQ CHAR &EXIT 6
*
      &TEST = &DATATYPE &2
      &IF &TEST EQ CHAR &TYPE INPUTS NOT CORRECT FOR LARS DATA BASE
      &IF &TEST EQ CHAR &EXIT 7
*
*
* GET LARS DISK WHICH CONTAINS RT&E DATA BASE
*
      GETDISK JSCDISK 19A E
*
*
```

```
* FILEDEF TERMINAL AND EXEC FILE WRITTEN DURNING RUN.
*
     FILEDEF 3 TERM(PERM
     FILEDEF 5 TERM(PERM
     FILEDEF FT02F001 DISK GROINFO EXEC D( LRECL 80 BLKSIZE 80 PERM
*
*
* IF LENGTH OF &1 (SEGMENT NUMBER) < 4 CONCATENATE 0
*
-LOOP &SEGLNG = &LENGTH &1
     &IF &SEGLNG EQ 4 &SKIP 2
     &1 = &CONCAT 0 &1
     &GOTO -LOOP
*
*
* STACK INPUTS TO ALLOW GTRUINF TO ACCESS LARS RT&E DATA BASE.
* GTRUINF WILL WRITE GTRUINFO EXEC TO ALLOW THE PASS THROUGH OF
* TAPE# FILE#.
*
     &STACK &1
     &STACK &2
*
     LOAD GTRUINF GTINFOHX RTEERRHX (CLEAR NOMAP START
*
*
*
* LOAD EXEC WRITTEN BY PROGRAM.
*
     EXEC GROINFO 0
     REL E(DET
     &READ VARS &TAPE
     &READ VARS &FILE
     &1 = &TAPE
     &2 = &FILE
     &3 = 800
     &IF &1 NE 0 &GOTO -TAPE
     &EXIT
&END
```

```
&CONTROL OFF
*
* END EXEC
* --------
*
* PURPOSE
* -------
*    THIS EXEC WILL CLOSE CONSOLE FILE AND PRINT THE FILE
*
* PROCEDURE
*
SPOOL CONSOLE STOP CLOSE
&EXIT
&END
```

```
     &CONTROL OFF
*
* START EXEC
* ----------
*
*
* PURPOSE
* -------
*    THIS EXEC WILL ALLOW THE USER TO SPOOL ALL RESPONCES TO THE
*    CONSOLE.THIS IS TO BE USED WITH END EXEC WHICH WILL PRINT THE FILE.
*
* PROCEDURE
* ---------
*
     TAG DEV CONS HOUSTON
     SPOOL CONS START NOHOLD TO RSCS
     &EXIT
&END
```

REQUESTED OPTIONS: NOTERM

OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

```
                      C     PROGRAM FILRCALL                                                          FIL00010
                      C                                                                               FIL00020
                      C                     READ FILE INFO FOR GT FILE CLASS FILE.                    FIL00030
                      C     ------------------------------------------------------                    FIL00040
                      C                                                                               FIL00050
                      C                                                                               FIL00060
                      C  HISTORY                                                                      FIL00070
                      C  -------                                                                      FIL00080
                      C                                                                               FIL00090
                      C     MARY TOMPKINS     LEMSCO     03/12/81     ORIGINAL CODE                  FIL00100
                      C                                                                               FIL00110
                      C                                                                               FIL00120
                      C  METHOD                                                                       FIL00130
                      C  ------                                                                       FIL00140
                      C                                                                               FIL00150
                      C     READ FROM RECALL FILE 22 FOR GT FILE INFO AND FILE 23 FOR                 FIL00160
                      C     CLASSIFICATION FILE INFO. IF BOTH OR FITHER ARE EMPTY WRITE               FIL00170
                      C     EXEC WITH ERROR FLAG SET TO 1.IF BOTH FILES ARE AVAILABLE                 FIL00180
                      C     WRITE EXEC TO FILEDEF GT AND CLASS FILE. THIS IS NECESSARY                FIL00190
                      C     ONLY BECAUSE OF THE POSSIBILITY OF THE FILE DEFNITION BEING               FIL00200
                      C     LOST ON A SYSTEM ERROR ON ONE OF THE PROGRAM EXECUTIONS.                  FIL00210
                      C                                                                               FIL00220
                      C  EXTERNAL REFERENCES                                                          FIL00230
                      C  -------------------                                                          FIL00240
                      C                                                                               FIL00250
                      C     NONE.                                                                     FIL00260
                      C                                                                               FIL00270
                      C  EXCEPTIONS                                                                   FIL00280
                      C  ----------                                                                   FIL00290
                      C                                                                               FIL00300
                      C     1.IF RECALL FILE IS EMPTY ISSUE DIAGNOSTIC MSG                            FIL00310
                      C       AND WRITE ERROR EXEC.                                                   FIL00320
                      C                                                                               FIL00330
                      C  LOCAL DECLARATIONS                                                           FIL00340
                      C  ------------------                                                           FIL00350
                      C                                                                               FIL00360
ISN 0002              C     INTEGER NAMEGT(2)                                                         FIL00370
                      C                          GROUND TRUTH FILE NAME                               FIL00380
ISN 0003              C     INTEGER NAMGTY(2)                                                         FIL00390
                      C                          GROUND TRUTH FILE TYPE                               FIL00400
ISN 0004              C     INTEGER MODEGT                                                            FIL00410
                      C                          GROUND TRUTH FILE MODE                               FIL00420
ISN 0005              C     INTEGER IUNIT                                                             FIL00430
                      C                          UNIT FOR GROUND TRUTH -- 9                           FIL00440
ISN 0006              C     INTEGER NAMECL(2)                                                         FIL00450
                      C                          CLASS FILE NAME                                      FIL00460
ISN 0007              C     INTEGER NAMCTY(2)                                                         FIL00470
                      C                          CLASS FILE TYPE                                      FIL00480
ISN 0008              C     INTEGER MODECL                                                            FIL00490
                      C                          CLASS FILE MODE                                      FIL00500
ISN 0009              C     INTEGER JUNIT                                                             FIL00510
                      C                          UNIT FOR GROUND TRUTH -- 10                          FIL00520
                      C                                                                               FIL00530
                      C  PROCEDURE                                                                    FIL00540
                      C  ---------                                                                    FIL00550
                      C                                                                               FIL00560
                      C  START WRITING RECALL EXEC                                                    FIL00570
                      C                                                                               FIL00580
ISN 0010                    WRITE(2,20)                                                               FIL00590
ISN 0011              20 FORMAT(' $CONTROL OFF')                                                      FIL00600
                      C                                                                               FIL00610
                      C  READ FROM RECALL FILE FOR GROUND TRUTH DATA                                  FIL00620
                      C                                                                               FIL00630
ISN 0012                    IUNIT = 0                                                                 FIL00640
ISN 0013                    READ(22,100,END=200)IUNIT,(NAMEGT(I),I = 1,2),                            FIL00650
                           * (NAMGTY(I),I = 1,2),MODEGT                                               FIL00660
ISN 0014              100 FORMAT(I2,2A4,2A4,A1)                                                       FIL00670
                                                                                                      FIL00680
                                                                                                      FIL00690
                                                                                                      FIL00700
                                                                                                      FIL00710
                                                                                                      FIL00720
                                                                                                      FIL00730
```

```
ISN 0015        200 IF(IUNIT.NE.0)GO TO 400                                          FIL00740
ISN 0017            WRITE(5,210)                                                     FIL00750
ISN 0018        210 FORMAT(' GROUND TRUTH FILE IS UNDEFINED')                        FIL00760
ISN 0019            WRITE(2,220)                                                     FIL00770
ISN 0020        220 FORMAT(' &STACK 1')                                              FIL00780
ISN 0021            GO TO 400                                                        FIL00790
                C                                                                    FIL00800
                C                                                                    FIL00810
                C READ FROM RECALL FILE FOR CLASSIFICATION DATA                      FIL00820
                C                                                                    FIL00830
ISN 0022        400 JUNIT = 0                                                        FIL00840
ISN 0023            READ(23,100,END=405)JUNIT,(NAMECL(I),I = 1,2),                   FIL00850
                   & (NAMCTY(I),I = 1,2),MODECL                                      FIL00860
ISN 0024        405 IF(JUNIT.EQ.0)WRITE(5,410)                                       FIL00870
ISN 0026        410 FORMAT(' CLASSIFICATION FILE IS UNDEFINED')                      FIL00880
ISN 0027            IF(JUNIT.EQ.0.AND.IUNIT.NE.0)WRITE(2,220)                        FIL00890
ISN 0029            IF(JUNIT.EQ.0.OR.IUNIT.EQ.0)WRITE(2,420)                         FIL00900
ISN 0031        420 FORMAT(' &EXIT')                                                 FIL00910
ISN 0032            IF(JUNIT.EQ.0.OR.IUNIT.EQ.0)GO TO 900                            FIL00920
                C                                                                    FIL00930
                C                                                                    FIL00940
                C WRITE EXEC                                                         FIL00950
                C                                                                    FIL00960
ISN 0034            WRITE(2,430)                                                     FIL00970
ISN 0035        430 FORMAT(' &STACK 0')                                              FIL00980
ISN 0036            WRITE(2,440)(NAMEGT(I),I = 1,2),(NAMGTY(I),I = 1,2),MODEGT       FIL00990
ISN 0037        440 FORMAT('FI FT09F001 DISK ',2A4,' ',2A4,' ',A1                    FIL01000
                   & ,'(LRECL 3060 BLOCK 3060 PERM RECFM U')                         FIL01010
                C                                                                    FIL01020
ISN 0038            WRITE(2,450)(NAMECL(I),I = 1,2),(NAMCTY(I),I = 1,2),MODECL       FIL01030
ISN 0039        450 FORMAT('FI FT10F001 DISK ',2A4,' ',2A4,' ',A1                    FIL01040
                   & ,'(LRECL 3168 BLOCK 3168 PERM RECFM U')                         FIL01050
ISN 0040            WRITE(2,420)                                                     FIL01060
                C                                                                    FIL01070
ISN 0041        900 STOP                                                             FIL01080
ISN 0042            END                                                              FIL01090
```

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*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

SYMBOL	INTERNAL	STATEMENT NUMBERS																	
I	0013	0013	0013	0013	0013	0013	0023	0023	0023	0023	0023	0023	0036	0036	0036	0036	0036	0036	0038
	0038	0038	0038	0038	0038														
IUNIT	0005	0012	0013	0015	0027	0029	0032												
JUNIT	0009	0022	0023	0024	0027	0029	0032												
MODECL	0008	0023	0038																
MODEGT	0004	0013	0036																
NAMCTY	0007	0023	0038																
NAMECL	0006	0023	0038																
NAMEGT	0002	0013	0036																
NAMGTY	0003	0013	0036																

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

LABEL	DEFINED	REFERENCES	
20	0011	0010	
100	0014	0013	0023
200	0015	0013	
210	0018	0017	
220	0020	0019	0027
400	0022	0015	0021
405	0024	0023	
410	0026	0024	
420	0031	0029	0040
430	0035	0034	
440	0037	0036	
450	0039	0038	
900	0041	0032	

/ MAIN / SIZE OF PROGRAM 00044C HEXADECIMAL BYTES

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
I	F	I*4	000|AC	IUNIT	S	I*4	000|B0	JUNIT	S	I*4	000|B4	I9COM#	F	XF	I*4	000000
MODECL	SF	I*4	000|B8	MODEGT	SF	I*4	000|BC	NAMCTY	SF	I*4	000|C0	NAMECL	SF		I*4	000|C8
NAMEGT	SF	I*4	000|D0	NAMGTY	SF	I*4	000|D9										

SOURCE STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
200	15	000260	400	22	000298	405	24	0002EC	900	41	000420

COMPILER GENERATED LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
100000	1	0001E4	100001	13	000210	100002	13	000224	100007	17	00026A
100008	23	000290	100009	23	000280	100014	25	0002F6	100015	27	00030C
200001	28	000316	100016	28	000320	100017	29	000334	200002	30	00033E
10001A	30	000348	100019	32	00035C	200003	33	000366	100020	34	000370

FORMAT STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
20	11	000028	100	14	000039	210	18	000047	220	20	00006A
410	26	000077	420	31	00009C	430	35	0000A6	440	37	0000B3
450	39	0000ED									

*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

STATISTICS SOURCE STATEMENTS = 41, PROGRAM SIZE = 1100, SUBPROGRAM NAME = MAIN

STATISTICS NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ****** 288K BYTES OF CORE NOT USED

APPENDIX D

PROGRAM RUN EXAMPLES

REQUESTED OPTIONS: NOTERM

OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

```
                      C     PROGRAM FILWRT                                                    FIL00010
                      C                  WRITE INPUTS TO DEFGTRU/DEFCLAS EXECS TO RECALL FILE.FIL00020
                      C     ------------------------------------------------------------------FIL00030
                      C                                                                       FIL00040
                      C                                                                       FIL00050
                      C HISTORY                                                               FIL00060
                      C -------                                                               FIL00070
                      C                                                                       FIL00080
                      C     M A TOMPKINS     LEMSCO     03/12/81     ORIGINAL CODE          FIL00090
                      C                                                                       FIL00100
                      C                                                                       FIL00110
                      C METHOD                                                                FIL00120
                      C ------                                                                FIL00130
                      C                                                                       FIL00140
                      C     READ FROM INPUT OF DEFGTRU/DEFCLAS STACK AND OUTPUT TO FILE.      FIL00150
                      C                                                                       FIL00160
                      C                                                                       FIL00170
                      C EXTERNAL REFERENCES                                                   FIL00180
                      C -------------------                                                   FIL00190
                      C                                                                       FIL00200
                      C     NONE.                                                             FIL00210
                      C                                                                       FIL00220
                      C                                                                       FIL00230
                      C EXTERNAL REFERENCES                                                   FIL00240
                      C -------------------                                                   FIL00250
                      C                                                                       FIL00260
                      C     NONE.                                                             FIL00270
                      C                                                                       FIL00280
                      C                                                                       FIL00290
                      C EXCEPTIONS                                                            FIL00300
                      C ----------                                                            FIL00310
                      C                                                                       FIL00320
                      C     NONE.                                                             FIL00330
                      C                                                                       FIL00340
                      C LOCAL DECLARATIONS                                                    FIL00350
                      C ------------------                                                    FIL00360
                      C                                                                       FIL00370
ISN 0002              C     INTEGER IUNIT                                                     FIL00380
                      C                  LOGICAL UNIT NUMBER OF FILE 9-G TRUTH 10-CLASS     FIL00390
ISN 0003              C     INTEGER NAME(2)                                                   FIL00400
                      C                  FILENAME                                           FIL00410
ISN 0004              C     INTEGER NAMETY(2)                                                 FIL00420
                      C                  FILENAME TYPE                                      FIL00430
ISN 0005              C     INTEGER MODE                                                      FIL00440
                      C                  FILE MODE                                          FIL00450
                      C                                                                       FIL00460
                      C                                                                       FIL00470
                      C PROCEDURE                                                             FIL00480
                      C ---------                                                             FIL00490
                      C                                                                       FIL00500
                      C                                                                       FIL00510
                      C READ FROM EXEC STACK                                                  FIL00520
                      C                                                                       FIL00530
ISN 0006              C     READ(3,100)IUNIT                                                  FIL00540
ISN 0007              C 100 FORMAT(I2)                                                        FIL00550
                      C                                                                       FIL00560
ISN 0008              C     READ(3,150)(NAME(I),I = 1,2)                                      FIL00570
ISN 0009              C 150 FORMAT(2A4)                                                       FIL00580
                      C                                                                       FIL00590
ISN 0010              C     READ(3,150)(NAMETY(I),I = 1,2)                                    FIL00600
                      C                                                                       FIL00610
ISN 0011              C     READ(3,200)MODE                                                   FIL00620
ISN 0012              C 200 FORMAT(A1)                                                        FIL00630
                      C                                                                       FIL00640
                      C                                                                       FIL00650
                      C WRITE FILES                                                           FIL00660
                      C                                                                       FIL00670
ISN 0013              C     IF(IUNIT.EQ.9)WRITE(22,300)IUNIT,(NAME(I),I = 1,2),               FIL00680
                     &  (NAMETY(I),I = 1,2),MODE                                              FIL00690
ISN 0015              C 300 FORMAT(I2,2A4,2A4,A1)                                             FIL00700
ISN 0016              C     IF(IUNIT.EQ.10)WRITE(23,300)IUNIT,(NAME(I),I = 1,2),              FIL00710
                     &  (NAMETY(I),I = 1,2),MODE                                              FIL00720
                      C                                                                       FIL00730
```

D-1

```
                C                                                                    FIL00740
   ISN 0018           STOP                                                           FIL00750
   ISN 0019           END                                                            FIL00760
```

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

SYMBOL	INTERNAL STATEMENT NUMBERS																	
I	0008	0008	0008	0010	0010	0010	0013	0013	0013	0013	0013	0013	0016	0016	0016	0016	0016	0016
MODE	0005	0011	0013	0016														
NAME	0003	0008	0013	0016														
IUNIT	0002	0006	0013	0013	0016	0016												
NAMETY	0004	0010	0013	0016														

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

LABEL	DEFINED	REFERENCES	
100	0007	0006	
150	0009	0008	0010
200	0012	0011	
300	0015	0013	0016

/ MAIN / SIZE OF PROGRAM 000238 HEXADECIMAL BYTES

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
I F		I*4	0000H0	MODE SF		I*4	0000B4	NAME SF		I*4	0000BC	IUNIT SF		I*4	0000B8
IRCOM# F	xF	I*4	000000	NAMETY SF		I*4	0000C4								

COMPILER GENERATED LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
100000	1	0000D4	100005	14	00016C	100010	16	000188	100011	17	0001C0
100016	18	000200									

FORMAT STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
100	7	000028	150	9	00002C	200	12	000032	300	15	000036

```
*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
*STATISTICS*      SOURCE STATEMENTS =      18, PROGRAM SIZE =      568, SUBPROGRAM NAME = MAIN
*STATISTICS*  NO  DIAGNOSTICS GENERATED
****** END OF COMPILATION ******                          296K BYTES OF CORE NOT USED
```

REQUESTED OPTIONS: NOTERM

OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

```
                      C     PROGRAM GTRUINF                                                    GTR00010
                      C                  GET GROUND TRUTH INFO FROM LARS DATA BASE          GTR00020
                      C     ------------------------------------------------------           GTR00030
                      C                                                                      GTR00040
                      C                                                                      GTR00050
                      C     HISTORY                                                          GTR00060
                      C     -------                                                          GTR00070
                      C         M A TOMPKINS    LEMSCO     02/04/81     ORIGINAL CODE       GTR00080
                      C                                                                      GTR00090
                      C                                                                      GTR00100
                      C     METHOD                                                           GTR00110
                      C     ------                                                           GTR00120
                      C                                                                      GTR00130
                      C         READ NUMBER OF ACQS.,SEGMENT NUMBER AND LAST TWO DIGITS OF SEG GTR00140
                      C         YEAR. ACCESS THE LARS RT&E DATA BASE. IF SUCESSFUL WRITE GTRUINFO GTR00150
                      C         EXEC TO TRANSMIT THE TAPE# FILE# TO THE DEFGTRU EXEC.        GTR00160
                      C                                                                      GTR00170
                      C                                                                      GTR00180
                      C     EXTERNAL REFERENCES                                              GTR00190
                      C     -------------------                                              GTR00200
                      C                                                                      GTR00210
                      C         GTINFO      LARS ROUTINE TO ACQUIRE INFO FROM LARS RT&E DATA BASE GTR00220
                      C         RTEERR      LARS ERROR MESSAGE ROUTINE                       GTR00230
                      C                                                                      GTR00240
                      C                                                                      GTR00250
                      C     EXCEPTIONS                                                       GTR00260
                      C     ----------                                                       GTR00270
                      C         IF IERR <> 0 OR 4 WRITE ERROR MESSAGE AND WRITE EXEC         GTR00280
                      C         TO TERMINATE PROGRAM.                                        GTR00290
                      C                                                                      GTR00300
                      C                                                                      GTR00310
                      C     LOCAL DECLARATIONS                                               GTR00320
                      C     ------------------                                               GTR00330
                      C                                                                      GTR00340
                      C                                                                      GTR00350
ISN 0002              C         INTEGER INDEX(9,64)                                          GTR00360
                      C                                 INFO ON GROUND TRUTH TAPES           GTR00370
ISN 0003              C         INTEGER IYR                                                  GTR00380
                      C                                 LAST 2 DIGITS OF YEAR OF GROUND TRUTH GTR00390
ISN 0004              C         INTEGER IERR                                                 GTR00400
                      C                                 LARS ERROR FLAG                      GTR00410
ISN 0005              C         INTEGER ISEGNO                                               GTR00420
                      C                                 SEGMENT NUMBER                       GTR00430
ISN 0006              C         INTEGER IDUMMY(64)                                           GTR00440
                      C                                 ARG THAT DOESN'T PERTAIN TO THIS APPLICA- GTR00450
                      C                                 TION OF LARS STANDARD  ROUTINE PARAMETERS GTR00460
                      C                                                                      GTR00470
                      C                                                                      GTR00480
                      C     PROCEDURE                                                        GTR00490
                      C     ---------                                                        GTR00500
                      C                                                                      GTR00510
                      C                                                                      GTR00520
                      C     READ FROM CONSOLE STACK USER INPUTS. START WRITING EXEC          GTR00530
                      C                                                                      GTR00540
ISN 0007                    WRITE(2,100)                                                     GTR00550
ISN 0008              100 FORMAT(' &CONTROL OFF')                                          GTR00560
                      C                                                                      GTR00570
ISN 0009                    READ(3,110)ISEGNO                                                GTR00580
ISN 0010              110 FORMAT(I4)                                                       GTR00590
                      C                                                                      GTR00600
ISN 0011                    READ(3,120)IYR                                                   GTR00610
ISN 0012              120 FORMAT(I2)                                                       GTR00620
                      C                                                                      GTR00630
                      C                                                                      GTR00640
                      C     CALL LARS ROUTINE FOR INFO.                                      GTR00650
                      C                                                                      GTR00660
ISN 0013                    CALL GTINFO(ISEGNO,IYR,IDUMMY,INDEX,IERR,4,'E')                  GTR00670
                      C                                                                      GTR00680
                      C                                                                      GTR00690
                      C     CHECK FOR ERROR                                                  GTR00700
                      C                                                                      GTR00710
ISN 0014                    IF(IERR.EQ.0.OR.IERR.EQ.4)GO TO 160                              GTR00720
ISN 0016                    CALL RTEERR(IERR,5)                                              GTR00730
```

```
   ISN 0017          WRITE(2,150)                                          GTR00740
   ISN 0018      150 FORMAT(' &STACK 0',/,' &EXIT')                        GTR00750
   ISN 0019          GO TO 900                                             GTR00760
   ISN 0020      160 WRITE(2,180)INDEX(1,1),INDEX(2,1)                     GTR00770
   ISN 0021      180 FORMAT(' &STACK',I5,/,' &STACK',I5,/,' &EXIT')        GTR00780
   ISN 0022      900 STOP                                                  GTR00790
   ISN 0023          END                                                   GTR00800
```

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

SYMBOL	INTERNAL	STATEMENT	NUMBERS		
IYR	0003	0011	0013		
IERR	0004	0013	0014	0014	0016
INDEX	0002	0013	0020	0020	
GTINFO	0013				
IDUMMY	0006	0013			
ISEGNO	0005	0009	0013		
RTEERR	0016				

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

LABEL	DEFINED	REFERENCES
100	0008	0007
110	0010	0009
120	0012	0011
150	0018	0017
160	0020	0014
180	0021	0020
900	0022	0019

/ MAIN / SIZE OF PROGRAM 000C14 HEXADECIMAL BYTES

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
IYR	SFA	I*4	000118	IERR	SFA	I*4	00011C	INDEX	SFA	I*4	000124	GTINFO	SF	XF	000000
IBCOM#	F	XF	I*4	000000	IDUMMY	SFA	I*4	000A24	ISEGNO	SFA	I*4	000120	RTEERR	SF	XF	000000

SOURCE STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
160	20	000BC4	900	22	000BE8						

COMPILER GENERATED LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
100000	1	000834	200001	15	000894	100001	16	000BA0			

FORMAT STATEMENT LABELS

LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR	LABEL	ISN	ADDR
100	8	000028	110	10	000039	120	12	00003D	150	18	000041
180	21	000057									

*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSYMT XREF ALC NOANSF NOTERM IBM FLAG(I)

STATISTICS SOURCE STATEMENTS = 22, PROGRAM SIZE = 3092, SUBPROGRAM NAME = MAIN

STATISTICS NO DIAGNOSTICS GENERATED

****** END OF COMPILATION ****** 296K BYTES OF CORE NOT USED

INPUT SUMMARY

```
AI              DONALD E. CHENG
SEGMENT         0982
DATE            MARCH 27,1980
CATEGORY        4
DOTS            30
CHICUT          9999
TOMINMAX        1100, 1700
CROP            CORN, SOYBEAN, OTHERS
SYMBOL          239,207,143
*END
```

```
JOB INITIATED ON 05/19/81 AT 15: 8:24 PROGRAM PARLS

   GROUND TRUTH FILE -                    12379365
   CLASSIFICATION FILE -                  12381064

      PIXEL PURITY RANGE - FROM 1 TO 6 SUBPIXELS


      GROUND TRUTH TRANSFORMATIONS

            1 TO  10 = 1
           11 TO  20 = 2
           21 TO  79 = 3
           80 TO  80 = 6
           81 TO  91 = 3
           92 TO  92 = 1
           93 TO  96 = 3
           97 TO  97 = 2
           98 TO 116 = 3
          117 TO 117 = 1
          118 TO 121 = 3
          122 TO 122 = 2
          123 TO 163 = 3
          164 TO 164 = 6
          165 TO 255 = 3

       NUMBER OF CROPS TO BE EVALUATED =  3
       1    CORN
       2    SOYBEAN
       3    OTHERS


      HEADER INFORMATION FOR GROUND TRUTH FILE          12379365
      COMPUTING SYSTEM ID = PDP-11/45 TAPEOUT PROGRAM
      ACQUISITIONS USED   =
      PFC JOB IDENT.      =

      HEADER INFORMATION FOR CLASS FILE         12381064
      COMPUTING SYSTEM ID = SP MULT TEMPR CLASSIFIER
      ACQUISITIONS USED   = 78107      78161      78197      78233      78269
      PFC JOB IDENT.      = SR CLASS FOR
      USER SUPPLIED DATA  = TP FLD  ( 58.,  3.),( 64.,  3.),( 66.,  8.),( 60.,  8.),
                            (SAMPLE,LINE)
      SUMMARY OF NUMBER OF PIXELS IN EACH CATEGORY
      CORN                      7172
      SOYBEAN                   7090
      OTHERS                    7473
```

```
 PIXELS SAMPLED FOR EACH CLASS
 CORN            SOYBEAN          OTHERS
    27               13               16

 INITIAL WEIGHT VECTOR MATRIX
  -0.264E+00    0.458E+00   -0.193E+00
   0.270E+00   -0.403E+00    0.133E+00
   0.305E+00   -0.198E+00   -0.107E+00
  -0.477E+03    0.189E+03    0.188E+03

PATTERNS ARE NOT LINEARLY SEPARABLE

NO OF MISCLASSIFIED PATTERNS LESS THAN OR EQUAL TO   27

      SOLUTION      WEIGHT       VECTORS
  -0.279E+00    0.611E+00   -0.193E+00
   0.283E+00   -0.535E+00    0.133E+00
   0.320E+00   -0.280E+00   -0.107E+00
  -0.497E+03    0.285E+03    0.188E+03

TOTAL NO OF ITERATIONS=    11

CONFUSION MATRIX FOR TRAINING PATTERNS
          24            2            1
           9            1            3
           7            1            8

FINAL WEIGHT MATRIX
  -0.2792E+00       0.6110E+00       -0.1931E+00
   0.2829E+00      -0.5354E+00        0.1330E+00
   0.3199E+00      -0.2801E+00       -0.1072E+00
  -0.4972E+03       0.2848E+03        0.1878E+03

 VALUES FOR CLASSIFICATION AS OTHERS

 CHISQR GREATER THAN  9999

 TO      LESS THAN    1100

 TO      GREATER THAN  1700

 OTHERS                    CLASS = 3
```