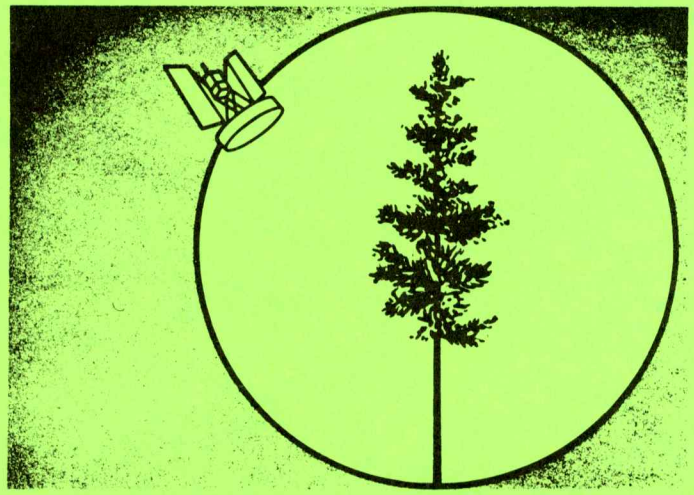

FRIS

FOREST RESOURCE INFORMATION SYSTEM

NASA ST. REGIS LARS

LARSFRIS USER'S MANUAL

Volume 4

Purdue University
Laboratory for Applications
of Remote Sensing

LARS Contract
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16. Abstract

This document contains user instructions for the proper use and application of the Software which comprises the LARSFRIS package. LARSFRIS represents a compilation of software developed over a number of years by the staff at Purdue University's Laboratory for Applications of Remote Sensing. The software packages are designed to help the user analyses digital image data such as that collected by the Landsat Multispectral scanner. This is one of five documents that comprise the LARSFRIS package.

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LARS staff who made significant contributions to either creating new or updating existing program modules included; Sue Schwingendorf, Bill Shelley, Carol Jobusch, Joan Buis, Luis Bartolucci, Louis Lang, and John Cain. Kay Hunt deserves special thanks for coordinating and organizing staff efforts.

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PREFACE

The documentation of the LARSFRIS system closely parallels existing LARSYS Version 3.1 documentation. The major differences are in the addition of certain program modules which provide the user greater flexibility in the analysis of multispectral data. The LARSFRIS documentation exists in three parts: LARSFRIS Program Abstracts, LARSFRIS System Manual, and LARSFRIS User's Manual.

The first of these contains the documentation of each Fortran and Assembler routine and each CMS Executive routine in LARSFRIS. These program abstracts are provided for programmers who are required to revise and/or maintain these routines.

The second manual, LARSFRIS System Manual, is directed primarily to programmers and analysts who maintain or revise the system or write new functions that must be interfaced with LARSYS. It contains detailed information of (and references to) the hardware and software framework upon which the system was built, the internal organization of the software, the organization of the data fields, and a discussion of special techniques that were used in the implementation of LARSFRIS.

This manual, LARSFRIS User's Manual, contains a comprehensive description of the functional organization of the system, the processing functions provided, and the manner in which the

functions are invoked and controlled. While it is written primarily for the system's user, a good knowledge of its contents is essential for any individual who intends to work with the system -- be he a user, an analyst, or a programmer.

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CONTROL CARD LISTING

The LARSFRIS Control Card Listings contain a brief explanation of the LARSFRIS Control Commands, the Initialization Functions, and the control and data cards for each of the Processing Functions. The Control Card Listings can be used for quick reference when some aspect of controlling LARSFRIS is in question.

Since the Control Card Listing contains only brief descriptions, they should not be used to learn how to control the system. The user should become thoroughly familiar with the remainder of this manual before attempting to use the Control Card Listings for an explanation of a particular keyword or parameter. After the familiarization has taken place, however, the Control Card Listings represent the quickest method of obtaining this type of information.

A list of all Control Card Listings and their latest revision date can be obtained by using the LARSFRIS Control Command 'list'. It is expected that revisions to the Control Card Listing will be made as changes are made in LARSFRIS. Users should take the responsibility to ensure that their Control Card Listing is up-to-date. New or additional listings can be obtained through the use of the 'reference' Control Command.

LARSYS CONTROL COMMANDS

KEY WORD	CONTROL PARAMETER	FUNCTION	DEFAULT
		********** NOTE THAT SINGLE QUOTES ARE USED TO INDICATE A USER SPECIFIED CONTROL PARAMETER. THE SINGLE QUOTES SHOULD NOT BE TYPED AS PART OF THE CONTROL PARAMETER. **********	
LOGIN	'USER-ID'	INITIAL COMMAND TO LOGIN USER'S VIRTUAL MACHINE AND TERMINAL.	(NONE)
I	LARSYS	INITIALIZE LARSYS CONTROL SYSTEM. ********** NOTE THAT THE I LARSYS COMMAND MAY BE USED TO CANCEL A RUN. THIS IS DONE BY PRESSING THE ATTENTION KEY ONCE AND THEN ENTERING THE COMMAND. **********	(NONE)
NEWS	(NONE)	TYPE LATEST SYSTEM NEWS --- IT WILL MENTION RECENT ADDITIONS TO OTHER NEWS FILES.	(NONE)
	SYSTEM	PRINT ABOVE SYSTEM NEWS.	(NONE)
	LARSYS	PRINT INFORMATION ON LARSYS SYSTEM UPDATES.	(NONE)
	SCHEDULE	PRINT SYSTEM OPERATION SCHED.	(NONE)
REFERENCE	COMMANDS	PRINT SYSTEM COMMAND LISTING	(NONE)
	INITIALIZATION	PRINT LARSYS INITIALIZATION FUNCTION LISTING.	(NONE)
	'FUNCTIONNAME'	PRINT CONTROL CARD DESCRIPTIONS FOR FUNCTION 'FUNCTIONNAME'.	(NONE)
	ALL	PRINT ALL OF ABOVE.	(NONE)
	RUNTABLE	PRINT CURRENT RUNTABLE LISTING.	(NONE)
	RUNTABLE 'NNNN'	TYPES RUNTABLE ENTRY FOR RUN 'NNNN' (8 DIGITS) IF IT IS IN THE RUNTABLE.	(NONE)
LIST	(NONE)	PRINT LIST INDEXING ALL INFORMATION AVAILABLE FROM 'NEWS' AND 'REFERENCE' COMMANDS, TOGETHER WITH DATE LAST UPDATED.	(NONE)
	'ITEMNAME'	TYPE THE SINGLE LINE FROM THE ABOVE LIST DESCRIBING THE ITEM 'ITEMNAME'.	(NONE)
PRINT	'SITE-ID'	PRINTER OUTPUT IS DIRECTED TO SPECIFIED SITE.	SITE OF USER TERMINAL
	TYPEWRITER	PRINTER OUTPUT IS PRINTED ON THE USER TERMINAL.	SITE OF USER TERMINAL
	HOLD	PRINTER OUTPUT IS NOT PRINTED UNTIL 'PRINT RELEASE' OR LOGOUT IS ISSUED.	OUTPUT IS NOT HELD
	RELEASE	PREVIOUSLY HELD OUTPUT IS PRINTED.	PRINTER IS RELEASED

LARSYS CONTROL COMMANDS PAGE 2

KEY WORD	CONTROL PARAMETER	FUNCTION	DEFAULT
PUNCH	'SITE-ID'	PUNCH OUTPUT IS DIRECTED TO SITE SPECIFIED.	SITE OF USER TERMINAL
	HOLD	PUNCH OUTPUT IS NOT PUNCHED UNTIL 'PUNCH RELEASE' OR LOGOUT IS ISSUED.	OUTPUT NOT HELD
	RELEASE	PREVIOUSLY HELD OUTPUT IS PUNCHED.	PUNCH IS RELEASED
CCINPUT	'FN' 'FT'	LARSYS CONTROL CARDS ARE LOCATED ON USER DISK AS 'FILENAME' 'FILETYPE'.	CARDS ARE EXPECTED FROM CARD READER.
	CARDS	INPUT EXPECTED FROM VIRTUAL CARD READER.	CARDS ARE EXPECTED FROM CARD READER.
STATDECK	SAVE	STATISTICS FILE IS SAVED ON USER DISK.	(NONE)
	USE	USE A PREVIOUSLY SAVED STATISTICS FILE ON USER DISK.	(NONE)
	STATUS	ALLOWS A USER TO DETERMINE IF A STATISTICS FILE IS SAVED ON HIS DISK.	(NONE)
HISTDECK	SAVE	HISTOGRAM FILE IS SAVED ON USER DISK.	(NONE)
	USE	USE A PREVIOUSLY SAVED HISTOGRAM FILE.	(NONE)
	STATUS	ALLOW A USER TO DETERMINE IF A HISTOGRAM FILE IS SAVED ON HIS DISK.	(NONE)
CLEAR	READER	CLEARS VIRTUAL READER.	(NONE)
	STATDECK	CLEARS ANY SAVED STATISTICS FILE FROM USER DISK.	(NONE)
	HISTDECK	CLEARS ANY SAVED HISTOGRAM FILE FROM USER DISK.	(NONE)
TERMTEST	'NN'	TERMINAL AND PHONE LINE ARE TESTED BY REQUESTING A LINE BE ENTERED -- AND THEN ECHOING IT BACK 'NN' TIMES TO THE USER'S TERMINAL.	10 TIMES
MSG	'USER-ID'	'CHARACTERSTRING' 'CHARACTERSTRING' IS SENT TO USER-ID SPECIFIED. (CP IS USED TO REFERENCE THE COMPUTER OPERATOR.)	(NONE)
RUN	LARSYS	START PROCESSING LARSYS CONTROL CARDS.	(NONE)
BATCH	(NONE)	LARSYS CONTROL CARDS ARE SENT TO BE PROCESSED BY THE BATCH VIRTUAL MACHINE. OUTPUT IS DIRECTED TO LOCATION SPECIFIED BY USER.	(NONE)
QUIT	(NONE)	END OF TERMINAL SESSION.	(NONE)

LARSYS CONTROL COMMANDS PAGE 3

KEY WORD	CONTROL PARAMETER	FUNCTION	DEFAULT
*		FOLLOWING COMMANDS ARE ISSUED FROM A DIFFERENT MODE THAN THOSE PREVIOUSLY GIVEN. THE USER PRESSES THE ATTENTION KEY, WAITS THE 'CP' MESSAGE, AND THEN PRESSES ATTENTION AGAIN BEFORE ENTERING THE COMMAND.	*
DISCONNECT	(NONE)	TERMINAL IS RELEASED AND JOB CONTINUES WITHOUT SUPERVISION UNTIL FINISHED WHEN USER TERMINAL IS LOGGED OUT FROM THE SYSTEM.	(NONE)
SUSPEND	(NONE)	PROCESSING IS HALTED IN SUCH MANNER THAT IT COULD BE RESTARTED IN THE FUTURE. (CLASSIFYPOINT ONLY)	(NONE)
STOP	(NONE)	PROCESSING IS HALTED WITH NO REGARD TO RESTARTING.	(NONE)

LARSYS CONTROL CARDS

INITIALIZATION FUNCTIONS

KEYWORD (COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
-CHECKOUT	(NONE)	ALL CONTROL AND DATA CARDS FOLLOWING ARE CHECKED FOR SYNTACTICAL ERRORS, NO PROCESSING OCCURS.	(NONE)
-HD1	64 CHARACTERS	REPLACE FIRST HEADER LINE WITH SPECIFIED CHARACTER STRING.	STANDARD HEADER
-HD2	64 CHARACTERS	REPLACE SECOND HEADER LINE WITH SPECIFIED CHARACTER STRING.	STANDARD HEADER
-COMMENT	64 CHARACTERS	PRINTS A USER SPECIFIED COMMENT AT THE TOP OF EACH PAGE.	NO COMMENT PRINTED
-DATE	20 CHARACTERS	DATE IS PRINTED AS GIVEN IN CHARACTER STRING.	CURRENT DATE IS USED
-TYPE	(NONE)	ALL SYSTEM INITIALIZATION AND CONTROL CARDS ARE EXPECTED FROM THE TYPEWRITER.	-CARD
-CARD	(NONE)	ALL SYSTEM INITIALIZATION AND CONTROL CARDS ARE EXPECTED FROM THE CARD READER.	-CARD
-RESET	(NONE)	LARSYS CONTROL SYTEM IS REINITIALIZED AND ALL DEFAULTS ARE RESET.	(NONE)
-RUNTABLE	(NONE)	CREATES USER RUNTABLE WITH RUN INFORMATION FROM USER-DEFINED ENTRIES INSTEAD OF FROM SYSTEM TABLE.	SYSTEM RUNTABLE USED
DATA	-----START OF DATA	REQUIRED IF THE RUNTABLE FUNCTION IS SPECIFIED. ONE CARD IS INCLUDED FOR EACH RUN IN THE USER RUNTABLE. THE FORMAT IS. . . RUN(XXXXXXXX),TAPE(TTT),FILE(FF)	
END		END OF DATA	

REVISED 11/30/77

BIPLOT

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*BIPLOT	(NONE)	SELECT BISPECTRAL PLOTTING.	(NONE)
	OPTIONS	PROB(.XXX)	CLASSIFY PROBABILITY CUT-OFF	0.995
	SYMBOLS	S1,S2,S3...	SYMBOLS FOR INFORMATION CLASSES IN EACH PLOT.	SAME STD. SET AS *SEP & *STAT
	CARDS	READSTATS	STATISTICS FILE IN CARDS.	STATS ON T-DISK
	SCALE	ORIG(N,X.XX)	ORIGIN FOR CHANNEL N	X.XX = 0.00
		UNIT(N,X.XX)	INTERVAL FOR CHANNEL N	X.XX = 1.00
+	PLOT	MEANS(C1,C2)	MEANS PLOT OF CHANNELS C1 VS C2 WITH SEPARABILITY.	(NONE)
		ELLIPSE(C1,C2)	ELLIPSOIDS OF CONCENTRATION PLOT OF CHANNELS C1 VS C2.	(NONE)
		CLASS(C1,C2)	CLASSIFIED FEATURE SPACE IN CHANNEL C1 VS C2.	(NONE)
	DATA	I-----START OF DATA DECK----------I I STATISTICS DECK ON CARDS IF 'CARDS READSTATS' I I----------I		
+	END	(NONE)	END OF FUNCTION	(NONE)

NOTE... SCALE CARD - IF N = 0, ALL CHANNELS ARE SET TO X.XX
PLOT SIZE IS 100 BY 100 UNITS.

PLOT CARD - MAY BE REPEATED UP TO 30 PLOTS.
- IMPOSSIBLE CHANNEL COMBINATIONS ARE IGNORED.

EXAMPLE - LANDSAT, 4CHANNELS, 7 CLASSES...

```
*BIPLOT
OPTIONS PROB(.998)
SYMBOLS W,T,A,R,G,F,C
SCALE   UNIT(0,1.2),UNIT(4,0.6)
PLOT    MEANS(1,3),ELLIPSE(1,3)
PLOT    ELLIPSE(2,4),CLASS(2,4)
END
```

REVISED 08/08/80

CHANNELTRANSFORMATION

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*CHANNELTRANSFORMATION		SELECT CHANNEL TRANSFORM FUNCTION.	(NONE)
+	FROM	RUN(XXXXXXXX)	COPY RUN XXXXXXXX.	(NONE)
		LINE(X,Y,Z)	FROM LINE X TO LINE Y WITH INCREMENT Z.	THE WHOLE RUN
		COL(X,Y,Z)	FROM COLUMN X TO COLUMN Y WITH INCREMENT Z.	THE WHOLE RUN
+	TO	TAPE(XXX)	TO TAPE XXX	(NONE) (EITHER FILE OR)
		FILE(XXX)	IN FILE XXX	(INITIALIZE MUST)
		INITIALIZE	INITIALIZE TAPE XXX	(BE SPECIFIED.)
+	CHANNELS	I,J....	SPECIFY CHANNELS FROM WHICH DATA IS TO BE USED.	(NONE)
+	NEWCHANNELS	N	SELECT NUMBER OF CHANNELS TO BE GENERATED.	(NONE)
+	DATA	START OF DATA DECK... ALGEBRAIC EXPRESSIONS (FORTRAN SENSE) TO DEFINE THE NEW CHANNELS. SEE THE EXAMPLE BELOW.		
+	END	(NONE)	END OF FUNCTION.	(NONE)

**** EXAMPLE:

```
*CHANNELTRANSFORMATION
FROM RUN(73093400),LINE(815,895,1),COL(1145,1256,1)
TO TAPE(555),FILE(10)
CHANNELS 2,3                        ** CHANNELS 2 & 3 WILL BE USED.
NEWCHANNELS 4          ** 4 CHANNELS WILL BE CREATED**
DATA
C1=((C2+0.1)/(0.98*C3+0.1)+6)*100
C2=((C3+0.1)/(0.98*C2+0.1)+6)*100
C3=((C2+0.1)*2/(0.98*C3+0.1)+6)*100
C4=((C3+0.1)*2/(0.98*C2+0.1)+6)*100
END
```

THE CHANNELS 1 THRU 4 WERE RE-DEFINED ACCORDING TO THE ABOVE EQUATIONS. WHEN A CHANNEL IS DEFINED, SUBSEQUENT OPERATIONS WITH THAT CHANNEL NUMBER USE THE NEW VALUE AND NOT THE OLD VALUE.

'C' FOLLOWED BY A NUMBER LESS THAN OR EQUAL TO THE NUMBER ON THE NEWCHANNELS CARD IS THE NEW DEFINITION FOR THAT CHANNEL NUMBER.

*** END OF EXAMPLE **

REVISED 06/06/79

CLASSIFYPOINTS

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*CLASSIFYPOINTS	(NONE)	SELECT POINT CLASSIFICATION FUNCTION.	(NONE)
	RESTART	(NONE)	USED TO RESTART A PREVIOUSLY SUSPENDED CLASSIFYPOINTS. NEED ONLY RESULTS CARD IN CONJUNCTION WITH THIS.	NOT A RESTART
	PROCEDURE	L1	CLASSIFY DATA USING MINIMUM L1 DISTANCE PROCEDURE	MAXIMUM LIKELIHOOD PROCEDURE USED
		L2	CLASSIFY DATA USING MINIMUM L2 DISTANCE PROCEDURE	
	AUTO	CHANNELS	USE CHANNELS SELECTED BY SEPARABILITY.	AUTO OR CHANNELS MUST BE USED
+	RESULTS		DESTINATION OF RESULTS	(NONE)
		TAPE(XXX)	PUT ON TAPE XXX.	
		FILE(FF)	FILE FF.	
		INITIALIZE	INITIALIZE FILE ONE OF A NEW RESULTS TAPE (REQUIRED WHEN USING A NEW TAPE).	SEE CONTROL CARD DICTIONARY
		DISK	RESULTS WILL BE STORED ON LARSYS DISK.	
	PRINT	STATS	PRINT STATISTICS TO BE USED.	NO STATISTICS PRINTED
		MAP	PRINT RESULTS MAP.	NO MAP PRINTED
		NOFIELDS	NO TRAINING FIELDS PRINTED.	TRAINING FIELDS PRINTED
	CLASSES	NAME (P1/C1,C2/)	POOL STATISTICS FOR TRAINING CLASSES C1,C2,.... ASSIGN NAME AS POOL NAME AND P1 AS POOL NUMBER. (SEE NOTE BELOW)	INDIVIDUAL CLASSES USED
	WEIGHTS	W1,W2,W3,....	ASSIGN WEIGHTS TO POOLS. IN THIS ORDER.	EQUAL WEIGHTS USED
	CARDS	READSTATS	STATISTICS FILE WILL BE INPUT ON CARDS.	STATISTICS EXPECTED FROM DISK
	CHANNELS	I,J,....	CHANNELS I,J,.... ARE SELECTED.	AUTO OR CHANNEL MUST BE USED
	DATA	-----START OF DATA DECK----------		
			PUNCHED STATISTICS FILE FROM STATISTICS FUNCTION IF 'CARDS READSTATS' CONTROL CARD IS INCLUDED.	

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CLASSIFYPOINTS

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	DATA	-----START OF DATA DECK----------		
		I		I
		I	FIELD DESCRIPTION CARDS DESCRIBING AREAS TO	I
		I	BE CLASSIFIED (ALWAYS REQUIRED). EITHER FORM OF THE	I
		I	FIELD DESCRIPTION CARD MAY BE USED.	I
		I		I

+	END	(NONE)	END OF FUNCTION.	(NONE)

NOTE... THE FORMAT C1,C2.... MAY BE USED FOR THE CLASSES AND TO INDICATE THAT ONLY A SUBSET OF CLASSES (C1,C2....) IN THE STATISTICS FILE SHOULD BE CONSIDERED. IF A CLASSES CARD IS USED, ALL DESIRED CLASSES MUST BE EXPLICITLY REQUESTED. IF NO CLASSES CARD IS INCLUDED, ALL CLASSES ARE USED.

REVISED 11/11/74

CLUSTER

DEVELOPMENTAL LARSYS PROGRAM (LARSYSDV)

R E Q	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*CLUSTER	(NONE)	SELECT CLUSTERING FUNCTION.	(NONE)
	IDNAME	AAA...	CLUSTERING IDENTIFICATION NAME -MAX 16 CHARACT.- (FOR USER IDENTIFICATION)	IDNAME = NS
	OPTIONS	MAXCLAS(N)	THE NUMBER OF CLASSES FOR CLUSTERING IS N.	MAXCLAS(5)
		MINCLAS(N)	MINIMUM NUMBER OF CLASSES TO BE CLUSTERED IS N.	MINCLAS=MAXCLAS
		INTV(N)	EVERY NTH VECTOR IS TO BE PROCESSED BY THE CLUSTERING ALGORITHM. ALL VECTORS ARE DISPLAYED BY THE MAPS.	INTV(1)
		CONV(XX.X)	THE MINIMUM NUMBER OF VECTORS UNCHANGED FOR A SUCCESSFUL CLUSTERING IS XX.X PERCENT OF ALL VECTORS INPUTTED.	CONV(100.0)
		THRESH(X.XX)	THE THRESHOLD VALUE FOR POOLING CLUSTERS IS SET TO X.XX.	THRESH = 0.75
	PRINT	HIST	HISTOGRAMS OF ALL CLUSTERS ARE PRINTED.	NO PRINTING OF HISTOGRAMS.
	PUNCH	FIELD	PUNCH FIELD DESCRIPTION CARDS.	NO PUNCHING
		MINPOINTS(N)	PUNCH FIELD DESCRIPTION CARDS CONTAINING N POINTS OR MORE. PUNCH FIELD MUST BE REQUESTED ALSO.	MINPOINTS(4)
		STAT	PUNCH BINARY STATISTICS FOR CLUSTERS.	NO STATISTICS PUNCHED
		CHAR	PUNCH STATISTICS IN CHARACTER FORMAT. PUNCH STAT MUST ALSO BE REQUESTED.	BINARY FORMAT
+	CHANNELS	I,J,...	CHANNELS TO BE USED IN CLUSTERING ARE I,J.	(NONE)
	SYMBOLS	S1,S2,S3,...	SYMBOLS FOR MAP OF CLUSTERED ARRAY.	1,2,3...
+	DATA	-----START OF DATA DECK----------		
		FIELD DESCRIPTION CARDS DEFINING AREAS TO BE CLUSTERED. (ALWAYS REQUIRED)		
+	END	(NONE)	END OF FUNCTION.	(NONE)

LARSYS CONTROL CARDS

COLUMNGRAPH

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*COLUMNGRAPH	(NONE)	REQUESTED COLUMNS OF DATA FROM MULTISPECTRAL IMAGE STORAGE TAPES ARE PLOTTED ON THE LINE PRINTER.	(NONE)
+	PRINT	RUN(XXXXXXXX)	DATA FROM RUN XXXXXXXX IS REQUESTED.	THE CURRENT RUN
		LINE(X,Y,Z)	DATA FROM LINE X TO Y WITH INTERVAL Z.	(NONE) IT MUST BE INCLUDED ON PRINT CARD
		COL(X,Y,Z)	DATA FROM COL X TO Y WITH INTERVAL Z.	DATA NOT GRAPHED
		ROLL	GRAPHS THE ROLL PARAMETER USING THE SYMBOL '$'.	ROLL PARAMETER NOT GRAPHED
		C0	GRAPHS CALIBRATION VALUE C0.	C0 NOT GRAPHED
		C1	GRAPHS CALIBRATION VALUE C1.	C1 NOT GRAPHED
		C2	GRAPHS CALIBRATION VALUE C2.	C2 NOT GRAPHED
+	CHANNELS	I,J,...	CHANNELS I,J,... ARE SELECTED.	(NONE)
	SCALE	XLOW(A)	SCALE THE LOW VALUE OF X AXIS TO A.	A=32.0
		BINSIZ(B)	SCALE BIN INCREMENT OF X AXIS TO B.	B=2.0
+	END	(NONE)	END OF FUNCTION.	(NONE)

REVISED 03/28/79

COMPARERESULTS

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*COMPARERESULT	(NONE)	SELECT COMPARERESULTS FUNCTION	(NONE)
+	FIRSTRESULTS		LOCATION OF RESULTS FROM FIRST DATE.	(NONE)
		TAPE(XXX)	LOCATED ON TAPE XXX.	(SEE CONTROL CARD)
		FILE(FF)	FILE FF.	(DICTIONARY)
		DISK	USE RESULTS PLACED ON DISK IN CURRENT TERMINAL SESSION.	
+	SECONDRESULTS		LOCATION OF RESULTS FROM SECOND DATE.	(NONE)
		TAPE(XXX)	LOCATED ON TAPE XXX.	
		FILE(FF)	FILE FF.	
		DISK	USE RESULTS PLACED ON DISK IN CURRENT TERMINAL SESSION.	
+	NEWRESULTS		LOCATION OF CHANGE (OUTPUT) RESULTS FILE.	(NONE)
		TAPE(XXX)	WRITE ON TAPE XXX.	
		FILE(FF)	FILE FF.	
		INIT	INITIALIZE TAPE AND WRITE RESULTS IN FILE 1	
		DISK	PLACE RESULTS ON DISK	
+	BLOCK			
		RUN(XXXXXXXX)	RUN NUMBER IS XXXXXXXX	
		LINES(X,Y,Z)	DISPLAY LINES X TO Y WITH LINE INTERVAL Z	(NONE)
		COL(X,Y,Z)	DISPLAY COLUMNS X TO Y WITH COLUMN INTERVAL Z	

+ DATA

```
-----START OF DATA DECK-----------------------------------------------
I                                                                      I
I        DEFINE CHANGE CLASSES OF INTEREST BY NAMING THE CLASS         I
I          ON A 'CLASS' CARD, AND INDICATING WHICH CLASSES             I
I          FROM THE FIRST CLASSIFICATION (ON 'FIRST' CARD) AND         I
I          WHICH CLASSES FROM THE SECOND CLASSIFICATION (ON            I
I          'SECOND' CARD) ARE PERMITTED FOR A POINT TO BELONG          I
I          TO THIS CLASS.                                              I
I                                                                      I
I CLASS NAME1                                                          I
I FIRST N1, N2, N3, ....                                               I
I SECOND M1, M2, M3, ...                                               I
I CLASS NAME2                                                          I
I          .                                                           I
I          .                                                           I
I          .                                                           I
I        ETC       (WHERE M1,M2.... AND N1,N2.... ARE CLASS OR        I
I                   (POOL NUMBERS FROM CLASSIFYPOINTS.                 I
I                                                                      I
----------------------------------------------------------------------
```

NOTE... IF THE CLASS COMBINATION IS NOT DEFINED (NAMED) IN THE ABOVE DATA DECK THEN COMPARERESULTS WILL ASSIGN THESE POINTS TO AN ADDITIONAL CLASS, '*CHANGE*'

+	END	(NONE)	END OF FUNCTION.	(NONE)

LARSYS CONTROL CARDS

COPYRESULTS

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*COPYRESULTS	(NONE)	SELECT RESULTS FILE COPYING FUNCTION.	(NONE)
+	FROM			(NONE) (SEE THE (CONTROL CARD) (DICTIONARY)
		TAPE (TTT)	TAPE NUMBER TO BE COPIED.	
		FILE (FF)	FILE TO BE COPIED.	
		DISK	RESULTS COPIED FROM DISK.	
		ALL	COPY ALL TAPE FILES.	
+	TO	TAPE (TTT)	TAPE TO RECEIVE COPIED FILE.	(NONE)
		FILE (FF)	POSITION OF COPIED FILE ON NEW TAPE.	(EITHER FILE OR) (INITIALIZE MUST)
		INITIALIZE	INITIALIZE NEW RESULTS TAPE. (REQUIRED WHEN USING NEW TAPE)	(BE SPECIFIED.)
	PRINT	NOLIST	SUPRESS LISTING OF FILE INFORMATION.	LIST ALL FILE INFORMATION
+	END	(NONE)	END OF FUNCTION.	(NONE)

LARSYS CONTROL CARDS

GRAPHHISTOGRAM

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*GRAPHHISTOGRAM	(NONE)	PREVIOUSLY CALCULATED HISTOGRAMS FOR THE REQUESTED CHANNELS ARE GRAPHED ON THE LINE PRINTER.	(NONE)
+	CHANNELS	I,J,...	CHANNELS I,J,... ARE SELECTED.	(NONE)
+	END	(NONE)	END OF FUNCTION.	(NONE)

LARSYS CONTROL CARDS

HISTOGRAM

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*HISTOGRAM	(NONE)	HISTOGRAMS OF DATA REQUESTED FROM LARS MULTISPECTRAL IMAGE STORAGE TAPES ARE GENERATED AND STORED IN THE COMPUTER. THEY REMAIN UNCHANGED UNTIL THEY ARE REQUESTED TO BE CHANGED OR THE USER LOGS OFF THE SYSTEM OR ISSUES THE I LARSYS COMMAND. (THEY ARE THEN ERASED.)	(NONE)
	OPTIONS	ACCUM	THE STORED HISTOGRAM IS UPDATED BY DATA FROM THE CURRENT RUN.	STORED HISTOGRAM IS ERASED.
	PUNCH	HIST	HISTOGRAM FILE IS PUNCHED INDICATING, FOR EACH CHANNEL SELECTED, THE CALIBRATION CODE AND THE CURRENT STORED HISTOGRAM.	NO PUNCHING
	BLOCK	RUN(XXXXXXXX)	DATA FROM RUN XXXXXXXX IS REQUESTED.	THE CURRENT RUN
		LINE(X,Y,Z)	DATA FROM LINE X TO Y WITH INTERVAL Z.	LINES 1 TO END OF RUN WITH INTERVAL OF 10.
		COL(X,Y,Z)	DATA FROM COL X TO Y WITH INTERVAL Z.	COLUMNS 1 TO END OF LINE WITH INTVAL OF 10.
+	CHANNELS	I,J,...	CHANNELS I,J,... ARE SELECTED.	(NONE)
+	END	(NONE)	END OF FUNCTION.	(NONE)

LARSYS CONTROL CARDS

IDPRINT

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*IDPRINT	(NONE)	SELECT ID PRINT FUNCTION. PRINT ID RECORDS FROM MULTI-SPECTRAL IMAGE STORAGE TAPES.	(NONE)
+	PRINT			(NONE)
		RUN(XXXXXXXX)	THE IDENTIFICATION FOR RUN XXXXXXXX IS PRINTED.	NOTE - ONLY ONE CONTROL PARAMETER MAY BE USED ON PRINT CARD
		TAPE(XXX)	THE IDENTIFICATION FOR ALL RUNS ON TAPE XXXX ARE PRINTED.	
		ALL	THE IDENTIFICATION FOR ALL RUNS MAINTAINED BY LARSYS WILL BE PRINTED.	
+	END	(NONE)	END OF FUNCTION.	(NONE)

LARSYS CONTROL CARDS

LINEGRAPH

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*LINEGRAPH	(NONE)	REQUESTED LINES OF DATA FROM LARS MULTISPECTRAL IMAGE STORAGE TAPES ARE PLOTTED ON THE LINE PRINTER.	(NONE)
+	PRINT			(NONE)
		RUN(XXXXXXXX)	DATA FROM RUN XXXXXXXX IS REQUESTED.	THE CURRENT RUN
		LINE(X,Y,Z)	DATA FROM LINE X TO Y WITH INTERVAL Z.	(NONE) IT MUST BE INCLUDED ON PRINT CARD
		COL(X,Y,Z)	DATA FROM COL X TO Y WITH INTERVAL Z.	(NONE) IT MUST BE INCLUDED ON PRINT CARD
+	CHANNELS	I,J,...	CHANNELS I,J,... ARE SELECTED.	(NONE)
	SCALE	XLOW(A)	SCALE THE LOW VALUE OF X AXIS TO A.	A=32.0
		BINSIZ(B)	SCALE BIN INCREMENT OF X AXIS TO B.	B=2.0
+	END	(NONE)	END OF FUNCTION.	(NONE)

LAKSYS CONTROL CARDS

LISTRESULTS

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*LISTRESULTS	(NONE)	SELECT RESULTS LISTING FUNCTION. LIST RESULT TAPE.	(NONE)
+	FROM	TAPE(TTT) FILE(FF)	TAPE NUMBER TO BE LISTED. FILE TO BE LISTED.	(NONE) ALL FILES
+	END	(NONE)	END OF FUNCTION.	(NONE)

REVISED 1/3/80

MERGESTATISTICS

REQ	KEY WORD(COL. 1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	#MERGESTATISTICS	(NONE)	SELECT THE MERGESTATISTICS FUNCTION TO MODIFY AND/OR COMBINE EXISTING STATISTICS FILES.	(NONE)
	PRINT	FIELDS	PRINT LIST OF TRAINING FIELDS.	NO TRAINING FIELDS PRINTED
		STATS	PRINT SUMMARY OF MODIFIED STATISTICS FILE.	NO STATISTICS PRINTED
		COSPEC	PRINT ONE COINCIDENT SPECTRAL PLOT OF ALL POOLS OR OF ALL CLASSES IF POOLS ARE NOT REQUESTED (THE SCALE CARD MAY BE USED TO ADJUST THIS PLOT)	NO COINCIDENT SPECTRAL PLOTS PRINTED
		MEANS (CI,CJ)	PRINT ONE BI-SPECTRAL PLOT OF CHANNEL I VS. CHANNEL J (THE SCALE CARD MAY BE USED TO ADJUST THIS PLOT)	NO BI-SPEC - TRAL PLOTS PRINTED
		MEANS (CI, CJ,CK,CL)	PRINTS ONE BI-SPECTRAL PLOT OF THE AVERAGE OF CHANNELS I AND J VS. THE AVERAGE OF CHANNELS K AND L (SCALE CARD MAY USED TO ADJUST THIS PLOT)	NO BI-SPEC - TRAL PLOTS PRINTED
	PUNCH	(NONE)	PUNCH CLASS MEANS AND COVARIANCE MATRICES IN BINARY FORMAT	NO PUNCHING
		CHARACTERS	PUNCH CLASS MEANS AND COVARIANCE MATRICES IN CHARACTER FORMAT	BINARY FORMAT
		ONEFIELD	A SINGLE DUMMY FIELD DESCRIPTION CARD IS PUNCHED FOR EACH CLASS OF THE MODIFIED STATISTICS FILE.	ALL FIELD DESCRIPTION CARDS PUNCHED
	CHANNELS	I,J...	CHANNELS I,J... ARE SELECTED (SEE NOTE BELOW)	CHANNELS COM- MON TO ALL STATISTICS DECKS ARE USED

MERGESTATISTICS

REQ	KEY WORD(COL. 1)	CONTROL PARAMETER	FUNCTION	DEFAULT
*	CLASSES	ENTIRE (D1,D2...)	ALL CLASSES IN DECKS D1, D2... ARE INCLUDED IN NEW STATISTICS FILE.	(NONE)
		DELETE (DN/CI,CJ-CM, CN/,DM/CI, CJ,CK-CP/)	CLASSES I,J THROUGH M AND N OF DECK N, AND CLASSES I,J, AND K THROUGH P OF DECK M ARE TO BE DELETED FROM NEW STATISTICS FILE.	
		INCLUDE (DN/CI,CJ-CM/, DM/CI,CJ, CK-CP,CQ/)	CLASSES I, J THROUGH M, OF DECK N AND CLASSES I,J,K THROUGH P, AND Q OF DECK M ARE TO BE INCLUDED IN NEW STATISTICS FILE.	
	POOL	NAME (DN/CI,CJ-CK,CP/, DM/CI,CK/)	CLASSES I, J THROUGH K AND P OF DECK N AND CLASSES I AND K OF DECK M ARE TO BE POOLED TO CREATE A NEW CLASS WITH NAME OF NAME. IF A POOL CARD IS USED, ALL DESIRED POOLS AND CLASSES MUST BE EXPLICITLY REQUESTED	NO POOLING
	DISK	READSTATS	DECK 1 WILL BE READ FROM DISK.	ALL DECKS READ FROM CARDS
	SCALE	SPCLOW(D)	SET LOW END OF COINCIDENT SPECTRAL PLOT TO D.	D=0.00
		SPCINT(E)	SET COINCIDENT SPECTRAL PLOT INTERVAL TO E.	E=1.00
		ORIGIN (N,X.XX)	ON THE BI-SPECTRAL PLOT, THIS WILL SET THE ORIGIN FOR CHANNEL N TO X.XX. IF THE PLOT IS OF FOUR CHANNELS, I.E. MEANS (CI,CJ,CK,CL), THE ORIGIN FOR THE LEFT MOST CHANNEL WILL BE USED FOR EACH AXIS. E.G. IF YOU ARE PLOTING CHANNEL 3 & 4 VS. 8 & 7, THE ORIGIN FOR 3 WILL AFFECT THE PLOT, BUT, AN ORIGIN FOR CH. 4 WILL NOT AFFECT THE PLOT. SIMILARLY, AN ORIGIN FOR CHANNEL 8 WILL AFFECT THE PLOT, AND AN ORIGIN FOR CH. 7 WILL NOT AFFECT THE PLOT.	X.XX =0.00

MERGESTATISTICS

REQ	KEY WORD(COL. 1)	CONTROL PARAMETER	FUNCTION	DEFAULT
		UNIT (N,Y.YY)	ON THE BI-SPECTRAL PLOT, THIS WILL SET THE INTERVAL FOR CHANNEL N TO Y.YY. THE LEFT MOST CHANNEL PER AXIS RULE AS EXPLAINED ABOVE APPLYS HERE ALSO.	Y.YY= 1.00
	DATA	----START OF DATA DECK----		
		DECK 1 - LARSYS VERSION 3 STATISTICS DECK		
	DATA	----CONTINUE TO USE DATA CARD IN FRONT OF EACH STAT DECK.--		
		LARSYS VERSION 3 STATISTICS DECK IN THE ORDER GIVEN BY THE CLASSES CARDS		
+	END	(NONE)	END OF FUNCTION	(NONE)

NOTES... IF A CHANNEL SELECTED IS NOT IN ANY OF THE STATISTICS DECKS OR IT IS IN SOME BUT NOT IN ALL OF THEM, ARTIFICIAL MEANS AND COVARIANCES WILL BE GENERATED (ZEROS ARE USED). THIS FEATURE WAS IMPLEMENTED FOR ANALYSIS OF MULTITEMPORAL DATA USING, FOR EXAMPLE, THE LAYERED CLASSIFIER.

... MULTIPLE BI-SPECTRAL PLOTS MAY BE REQUESTED

... AFTER EACH BI-SPECTRAL PLOT IS PRINTED, A TABLE WITH THE FOLLOWING INFORMATION FOR EACH CLASS WILL BE PRINTED: CLASS NUMBER, SYMBOL, MEAN VALUES, CLASS NAME AND NUMBER OF POINTS IN EACH CLASS.

LARSYS CONTROL CARDS

PICTUREPRINT

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*PICTUREPRINT	(NONE)	SELECT PICTORIAL PRINTOUT FUNCTION.	(NONE)
+	DISPLAY	RUN(KKKKKKKK)	RUN KKKKKKKK WILL BE PRINTED.	(NONE)
		LINE(X,Y,Z)	DATA FROM LINE X TO Y WITH INTERVAL Z.	SEE NOTE BELOW
		COL(X,Y,Z)	DATA FROM COLUMN X TO Y WITH INTERVAL Z.	SEE NOTE BELOW
		WIDTH(X)	ALTERNATE WAY OF SELECTING LINE (Z) AND COL(X,Y,Z). THESE PARAMETERS ARE CALCULATED SO THAT A PRINTOUT X SHEETS WIDE IS GENERATED.	WIDTH(1)
	CHANNELS	I,J,K,...	CHANNELS I,J,K ARE SELECTED. THIS CARD IS REQUIRED UNLESS 'HISTOGRAM LEVELSCARDS' IS USED.	(NONE)
	SYMBOLS	S1,S2,...	THE SYMBOLS USED FOR THE PICTORIAL PRINTOUT ARE IN ORDER OF BRIGHTNESS S1,S2,... (NOTE THAT THE NUMBER OF SYMBOLS GIVEN, 16 OR LESS, OVERRIDES NLEV(X).	PREPROGRAMMED SYMBOLS
		NLEV(X)	THE NUMBER OF SYMBOLS USED IS SET TO X FOR X BETWEEN 2 AND 16. NLEV MUST NOT BE USED WHEN SPECIFYING USER-DEFINED SYMBOLS.	X=10
	HISTOGRAM	COMPUTE	CALCULATE HISTOGRAM.	COMPUTE
		DISK	USE STORED HISTOGRAMS FROM LARSYS DISK.	
		HISTOCARDS	READ HISTOGRAM CARDS IN DATA DECK.	
		LEVELSCARDS	DATA CARDS WHICH DEFINE THE CHANNELS, CALIBRATION, AND NUMBER OF LEVELS ARE READ AND USED FOR PICTORIAL PRINTOUT.	
	BLOCK		PARAMETERS TO SELECT DATA BLOCK TO BE HISTOGRAMED.	
		RUN(XXXXXXXX)	DATA FROM RUN XXXXXXXX IS REQUESTED.	DISPLAY RUN
		LINE(X,Y,Z)	DATA FROM LINE X TO Y WITH INTERVAL Z.	LINES SPECIFIED ON DISPLAY CARD WITH INTERVAL OF 10.
		COL(X,Y,Z)	DATA FROM COLUMN X TO Y WITH INTERVAL Z.	COLUMNS SPECIFIED ON DISPLAY CARD WITH INTERVAL OF 10.
	PRINT	HIST	PRINT HISTOGRAMS GRAPHS.	NO PRINTING
	PUNCH	HIST	PUNCH HISTOGRAMS FILE.	NOT PUNCHED

LARSYS CONTROL CARDS PAGE 2

PICTUREPRINT

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
	BOUNDARY	DELETE	DELETES ALL STORED BOUNDARIES FROM THE COMPUTER FOR TRAINING AND TEST.	(NONE)
		STORE	READS FIELD DESCRIPTION CARDS AND STORES BOUNDARIES.	(NONE)
		OUTLINE	OUTLINE STORED TRAINING AND TEST FIELDS ON THE PICTORIAL PRINTOUT.	(NONE)
	DATA	-----START OF DATA DECK----------	FIELD DESCRIPTION CARDS DEFINING TEST AND TRAINING FIELDS. REQUIRED IF 'BOUNDARY STORE' WAS SPECIFIED. TEST FIELDS FOLLOW A CARD WITH 'TEST' STARTING IN COL. 1, AND TRAINING FIELDS FOLLOW A CARD WITH 'CLASS' STARTING IN COL. 1.	
	DATA	-----START OF DATA DECK----------	HISTOGRAM DECK IF 'HISTOGRAM HISTOCARDS' WAS SPECIFIED.	
	DATA	-----START OF DATA DECK----------	LEVELS CARDS FOR USER-SPECIFIED DEFINITION OF HISTOGRAM LEVELS. REQUIRED WHEN 'HISTOGRAM LEVELSCARDS' IS SPECIFIED. FOR EACH CHANNEL, A CARD WITH FORMAT - CHAN(N),CALIB(I),L1,L2,L3,... SHOULD BE USED. WHERE N = CHANNEL NUMBER, I = CALIBRATION CODE, AND L1 = UPPER LIMIT OF FIRST BIN, ETC.	
+	END	(NONE)	END OF FUNCTION.	(NONE)

NOTE... IF THE LINE PARAMETER ON THE DISPLAY CARD IS OMITTED, PICTUREPRINT WILL USE ALL LINES IN THE RUN WITH AN INTERVAL EQUAL TO THE COLUMN INTERVAL. IF THE COLUMN PARAMETER IS OMITTED, ALL COLUMNS WILL BE USED AND THE INTERVAL WILL BE CALCULATED TO PRODUCE A SINGLE PRINTER WIDTH PICTORIAL MAP.

REVISED 08/29/78

PRINTRESULTS

DEVELOPMENTAL LARSYS PROGRAM (LARSYSDV)

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*PRINTRESULTS	(NONE)	SELECTS DISPLAY OF CLASSIFICATION RESULTS USING LINE PRINTER.	(NONE)
+	RESULTS		LOCATION OF RESULTS TO BE DISPLAYED.	(NONE)
		TAPE(XXX)	LOCATED ON TAPE XXX.	(SEE CONTROL CARD)
		FILE(FF)	FILE FF.	(DICTIONARY)
		DISK	USE RESULTS PLACED ON DISK BY CLASSIFYPOINTS IN CURRENT TERMINAL SESSION.	
	PRINT	STATS	PRINT SAVED STATISTICS.	NO STATISTICS PRINTED
		NOLIST	SUPPRESS SAVED FIELD LISTINGS.	SAVED FIELDS PRINTED
		MAPS(N)	PRINT N COPIES OF MAP.	MAPS=1
		OUTLINE(TRAIN)	OUTLINE TRAINING FIELDS.	NO OUTLINE
		OUTLINE(TEST)	OUTLINE TEST FIELDS.	NO OUTLINE
		OUTLINE(TRAIN, TEST)	OUTLINE ALL FIELDS.	NO OUTLINE
		TRAIN(C)	PRINT TRAINING CLASS PERFORMANCE.	
		TRAIN(F)	PRINT TRAINING FIELD PERFORMANCE.	
		TRAIN(A)	PRINT ACRES AND HECTARES TABLES FOR TRAINING FIELDS	
		TRAIN(F,C,A)	PRINT TRAINING FIELD , CLASS PERFORMANCE AND ACRE AND HECTARE TABLES.	NO TABLES PRINTED.
		TEST(F)	PRINT TEST FIELD PERFORMANCE.	
		TEST(C)	PRINT TEST CLASS PERFORMANCE.	
		TEST(P)	PRINT TEST FIELD PERCENTAGES.	
		TEST(A)	PRINT ACRES AND HECTARES TABLES.	
		TEST(F,C,P,A)	PRINT ALL TEST RESULTS.	
		TABLES(N)	PRINT N COPIES OF ALL REQUESTED TABLES.	N = 1
		ACRES(N)	TOTAL NUMBER OF ACRES IN POINTS TABULATED.	ACRES AND HECTARES NOT CALCULATED.
		SCALE(X.XX)	CONVERSION FACTOR FROM PIXELS TO ACRES.	SCALE = 1.15
		DELETE(C1,C2,C3,...)	DELETE THESE CLASSES FROM ACREAGE CALCULATIONS.	ALL CLASSES USED
+	SYMBOLS	I1,I2,...	ASSIGN THESE GRAY LEVELS TO CLASSES. THESE SYMBOLS ARE REQUIRED FOR CLASSIFICATION MAPS	(NONE)
	PROBABILITY	R1,R2,...	ASSIGN EACH POINT TO GIVEN PERCENT PROBABILITY OF CORRECT CASSFN RANGES. R1,R2,... ARE THE LOWER BOUNDS ON THE RANGES (E.G. R1 CORRESPONDS TO 100% TO R1	8 PRESET RANGES (SEE NOTE)
	PSYMBOLS	P1,P2,...	ASSIGN THESE SYMBOLS TO PROBABILITY RANGES	8 PRESET SYMBOLS

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
	THRESHOLD	T1,T2,...	USE THESE THRESHOLDS FOR CLASSES 1,2,...(SEE NOTE BELOW) THRESHOLDS MUST BE POSITIVE AND ONE VALUE MUST BE SPECIFIED FOR EACH CLASS.	THRESHOLDING NOT USED
	GROUP	NAME(G1/P1,P2/)	GROUP CLASSIFICATION POOLS P1,P2... FOR CALCULATING CORRECT RECOGNITION. 'NAME' IS THE GROUP NAME AND G1 IS THE GROUP NUMBER.	NO GROUPING
	BLOCK			ENTIRE AREA
		RUN(XXXXXXXX)	DISPLAY ONLY RUN XXXXXXXX	
		LINES(X,Y,Z)	DISPLAY ONLY LINES X TO Y WITH LINE INTERVAL Z	(NONE)
		COL(X,Y,Z)	DISPLAY ONLY COLUMNS X TO Y WITH COLUMN INTERVAL Z	
		CALC	CALCULATIONS BASED ONLY ON AREA DISPLAYED.	ENTIRE AREA
	DATA	-----START OF DATA DECK-----		
			FIELD DESCRIPTION CARDS DEFINING TEST FIELDS. REQUIRED FOR ANY PRINT CARD OPTIONS DEALING WITH TEST FIELDS.	
		TEST N1		
		FIELD DESCRIPTION CARDS		
		TEST N2		
		FIELD DESCRIPTION CARDS		
		.		
		.		
		.		
		ETC	(WHERE N1 AND N2 ARE CLASS OR POOLED CLASS (NUMBERS FROM CLASSIFYPOINTS OR GROUP NUMBERS (DEFINED BY THE GROUP CARDS.	
+	END	(NONE)	END OF FUNCTION.	(NONE)

NOTE.....THRESHOLD VALUES MAY ALSO BE SPECIFIED IN THE FOLLOWING FO

N1*T1,N2*T2,...

WHERE N1 AND N2 ARE INTEGERS WHICH SPECIFY HOW MANY CONSECUTIVE TIMES THE CORRESPONDING THRESHOLDS SHOULD BE USED AND T1 AND T2 ARE DECIMAL NUMBERS WHICH DESIGNATE THE PERCENTAGE OF POINTS THAT ARE EXPECTED TO BE THRESHOL

THUS, 2*7.5, 3*2.9, 1.5
HAS THE SAME EFFECT AS 7.5,7.5,2.9,2.9,2.9,1.5

NOTE.....TO GET A PROBABILITY MAP OR TABLES USING THE DEFAULT RANGES, USE A 'PROBABILITY' CARD WITH NO RANGES SPECIFIED.

THE DEFAULT RANGES AND SYMBOLS ARE:
80 , 60 , 45 , 30 , 20 , 10 , 3 , 0
M , X , O , I , / , - , , ,

LARSYS CONTROL CARDS

PUNCHSTATISTICS

REQ	KEY WORD(CCL.L)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*PUNCHSTATISTICS	(NONE)	SELECT STATISTICS PUNCHING FUNCTION. PUNCH STATISTICS FROM RESULTS TAPE.	(NONE)
+	FROM	TAPE(TT) FILE(FF)	TAPE NUMBER TO BE USED. FILE NUMBER TO BE USED.	(NONE) (NONE)
	PRINT	NOLIST	SUPPRESS LISTING OF FILE INFORMATION.	LIST ALL FILE INFORMATION
+	END	(NONE)	END OF FUNCTION.	(NONE)

REVISED 09/07/76

RATIO

DEVELOPMENTAL LARSYS PROGRAM (LARSYSDV)

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*RATIO	(NONE)	SELECT RATIO FUNCTION. PRINTS MEANS, VARIANCES, AND RATIOS USING A STATISTICS DECK.	(NONE)
	FROM	DISK	USE STATISTICS CURRENTLY ON DISK.	DISK
		CARDS	READ STATISTICS FROM CARD READER.	DISK
		TAPE(TTT) FILE(FF)	RESULTS TAPE TO BE USED. FILE NUMBER TO BE USED.	DISK (NONE IF TAPE SPECIFIED.
	OPTIONS		USER SPECIFIED WEIGHTING. ABBREVIATED OUTPUT.	DEFAULT CHANNELS. (SEE NOTE BELOW)
		VIS(I,J,L,...)	WHICH CHANNELS IN THE STATISTICS FILE THAT ARE TO BE TREATED AS VISIBLE.	FIRST 2 CHANNELS.
		IR(I,J,L,...)	WHICH CHANNELS IN THE STATISTICS FILE THAT ARE TO BE TREATED AS INFRARED.	SECOND 2 CHANNELS.
	SYMBOLS	S1,S2,...	ASSIGN THESE SYMBOLS TO CLASSES.	DEFAULT SYMBOLS. (A-Z,$,+,=,/)
	PRINT		LISTING OF FILE INFORMATION.	SUPPRESS LISTING.
		NOLIST	SUPPRESS LISTING.	SUPPRESS LISTING.
	NORATIOS		SUPPRESS RATIO CALCULATION. (MOVES THE STATISTICS DECK TO DISK.)	DO CALCULATIONS.
	DATA	-----START OF DATA DECK----------		
		PUNCHED STATISTICS FILE FROM STATISTICS FUNCTION. IF 'FROM CARDS' CONTROL CARD IS INCLUDED.		
+	END	(NONE)	END OF FUNCTION.	(NONE)

NOTE... IF AN OPTIONS CARD IS USED, BOTH THE VIS AND THE IR OPTION HAVE TO BE SPECIFIED WITH A MAXIMUN OF SIXTY CHANNELS POSSIBLE FOR EACH. TO ALLOW FOR WEIGHTING, CHANNELS CAN APPEAR MORE THAN ONCE IN AN OPTION AND IN BOTH THE VIS AND THE IR OPTION. THERE CAN BE SEVERAL OPTIONS CARDS FOR BOTH OPTIONS OR BOTH CAN APPEAR ON THE SAME CARD.

INCLUSION OF ANY OPTIONS CARDS SUPRESSES THE PRINTING OF MEANS AND VARIANCES.

LARSYS CONTROL CARDS

SAMPLECLASSIFY

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*SAMPLECLASSIFY	(NONE)	SELECT SAMPLE CLASSIFIER FUNCTION.	(NONE)
	PRINT	STATS	PRINT SUMMARY OF SAVED REDUCED STATISTICS.	NO STATISTICS PRINTED
+	CHANNELS	I,J,K,...	CHANNELS I,J,K,... ARE SELECTED FOR CLASSIFICATION.	(NONE)
	CARDS	READSTATS	STATISTICS FILE WILL BE INPUT ON CARDS.	STATISTICS EXPECTED FROM DISK
	CLASSES	NAME(P1/C1,C2/)	POOL STATISTICS FOR TRAINING CLASSES C1,C2,... ASSIGN 'NAME' AS POOL NAME AND P1 AS POOL NUMBER (SEE NOTE BELOW).	INDIVIDUAL CLASSES USED
	GROUP	NAME(G1/P1,P2/)	GROUP CLASSIFICATION POOLS P1,P2,... FOR CALCULATING CORRECT RECOGNITION. 'NAME' IS THE GROUP NAME AND G1 IS THE GROUP NUMBER.	NO GROUPING
	DATA	-----START OF DATA DECK-----	STATISTICS DECK REQUIRED IF 'CARDS READSTATS' CONTROL CARD IS USED.	
+	DATA	-----START OF DATA DECK-----	FIELD DESCRIPTION CARDS DEFINING FIELDS TO BE CLASSIFIED (TEST FIELDS). THEY ARE ALWAYS REQUIRED.	
		TEST N FIELD DESCRIPTION CARDS		
		TEST N FIELD DESCRIPTION CARDS		
		. . . ETC.		
		....WHERE N = THE NUMBER OF A TRAINING CLASS FROM STATISTICS, A POOLED CLASS ON THE CLASSES CARD, OR A GROUP ON THE GROUP CARD. (SEE CONTROL CARD DICTIONARY)		
+	END	(NONE)	END OF FUNCTION.	(NONE)

NOTE.....THE FORMAT C1,C2,... MAY BE USED FOR THE CLASSES CARD TO MERELY ELIMINATE CLASSES FROM THE CLASSIFICATION. ALSO, IF A CLASSES CARD IS USED, ALL DESIRED CLASSES MUST BE EXPLICITLY REQUESTED.

REVISED 04/20/79

SUPERVISED ECHO

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*SECHO	(NONE)	SELECT SUPERVISED ECHO CLASSIFIER	(NONE)
+	RESULTS		DESTINATION OF RESULTS	(NONE)
		TAPE(XXX)	RESULTS PUT ON TAPE XXX.	
		FILE(FF)	FILE FF.	
		INITIALIZE	INITIALIZE FILE ONE OF A NEW RESULTS TAPE (REQUIRED WHEN USING A NEW TAPE).	
		DISK	RESULTS WILL BE STORED ON LARSYS DISK	
	INTERMEDIATE		DESTINATION OF INTERMEDIATE RESULTS	(NONE)
		TAPE(XXX)	PUT ON TAPE XXX.	
		FILE(FF)	FILE FF.	
		INITIALIZE	INITIALIZE FILE ONE OF A NEW RESULTS TAPE (REQUIRED WHEN USING A NEW TAPE).	SEE CONTROL CARD DICTIONARY
	ANNEXATION	THRESHOLD(XX.X)	USE XX.X AS ANNEXATION THRESHOLD (REQUIRED IF RUNNING PHASE 2)	(NONE)
	SYMBOLS	S1,S2,...	USE S1,S2,... AS SYMBOLS IN SINGULAR CELL MAP	(NONE)
	PRINT	STATS	PRINT STATISTICS TO BE USED.	NO STATISTICS PRINTED
		SINGULAR	PRINT SINGULAR CELL MAP.	NO MAP PRINTED
		CLASSIFICATION	PRINT CLASSIFICATION MAP.	NO MAP PRINTED
	CLASSES	NAME (P1/C1,C2/)	POOL STATISTICS FOR TRAINING CLASSES C1,C2,... ASSIGN NAME AS POOL NAME AND P1 AS POOL NUMBER. (SEE NOTE BELOW)	INDIVIDUAL CLASSES USED
	OPTIONS	INTERMEDIATE	PERFORM ONLY PHASE 2 USING TAPE FOR INTERMEDIATE RESULTS AND TAPE OR DISK FOR CLASSIFICATION	PERFORM BOTH PHASES OR PHASE 1 ONLY PROD (DEPENDING ON TAPES SELECTED)
+	CELL	SIZE(XX)	SET CELL SIZE TO XX	CELL SIZE = 2
		HOMOGENEITY(XX.X)	USE XX.X AS CELL HOMOGENEITY THRESHOLD	(NONE)
	CARDS	READSTATS	STATISTICS FILE WILL BE INPUT ON CARDS.	STATISTICS EXPECTED FROM DISK

LARSYS CONTROL CARDS PAGE 2

SUPERVISED ECHO

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	CHANNELS	I,J,...	CHANNELS I,J,... ARE SELECTED.	(NONE)
	DATA	-----START OF DATA DECK----------		
			PUNCHED STATISTICS FILE FROM STATISTICS FUNCTION IF 'CARDS READSTATS' CONTROL CARD IS INCLUDED.	
+	DATA	-----START OF DATA DECK----------		
			FIELD DESCRIPTION CARDS DESCRIBING AREAS TO BE CLASSIFIED (ALWAYS REQUIRED). EITHER FORM OF THE FIELD DESCRIPTION CARD MAY BE USED.	
+	END	(NONE)	END OF FUNCTION.	(NONE)

NOTE... THE FORMAT C1,C2,... MAY BE USED FOR THE CLASSES AND TO INDICATE THAT ONLY A SUBSET OF CLASSES (C1,C2,...) IN THE STATISTICS FILE SHOULD BE CONSIDERED. IF A CLASSES CARD IS USED, ALL DESIRED CLASSES MUST BE EXPLICITLY REQUESTED. IF NO CLASSES CARD IS INCLUDED, ALL CLASSES ARE USED.

NOTE... AS SS.S (VALUE OF SEL1) INCREASES, PER FIELD-TYPE CLASSIFICATION IS APPROACHED. AS SS DECREASES, PER POINT CLASSIFICATION IS APPROACHED. SS = 200 HAS BEEN USED WITH LANDSAT DATA - WITH CELW OF 2 - TO ALMOST ELIMINATE ANY PER POINT CLASSIFICATION.

NOTES.....

1. USE A RESULTS CARD WHENEVER CLASSIFICATION RESULTS ARE GENERATED.
2. USE THE INTERMEDIATE CARD WHENEVER THE PROCESSOR IS TO BE RUN IN TWO SEPARATE SESSIONS.
3. USE THE CELL CARD WHENEVER THE CELL HOMOGENEITY TEST IS TO BE PERFORMED.
4. USE THE ANNEXATION CARD WHENEVER CELL-TO-FIELD ANNEXATION IS TO BE PERFORMED.
5. USE THE OPTIONS CARD WHEN ONLY CELL-TO-FIELD ANNEXATION IS TO BE PERFORMED.

REVISED 1/26/76

SEPARABILTY

DEVELOPMENTAL LARSYS PROGRAM (LARSYSDV)

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*SEPARABILITY	(NONE)	SELECT SEPARABILITY FUNCTION. (INCLUDES GROUPING TABLE)	(NONE)
+	COMBINATIONS	N1,N2,...	ANALYZE ALL COMBINATIONS OF N1 CHANNELS OUT OF TOTAL CHANNELS AS SPECIFIED ON CHANNELS CARD. THEN N2,ETC.	(NONE)
	SYMBOLS	S1,S2,...	USE THESE SYMBOLS TO REPRESENT THE RESPECTIVE CLASSES.	A,B,C,... SAME AS USED IN STAT
	WEIGHTS	S1S2S3...SN(W)	ASSIGN WEIGHT W TO ALL CLASS PAIRS REPRESENTED BY ANY PAIR COMBINATION OF THE SYMBOLS S1,S2,S3,...SN.	W=10 FOR ALL PAIR COMBINATIONS
	CLASSES	NAME(P1/C1,C2.../)	POOL STATISTICS FOR TRAINING CLASSES C1,C2,... ASSIGN 'NAME' AS POOL NAME AND P1 AS POOL NUMBER. (SEE NOTE BELOW)	INDIVIDUAL CLASSES USED
	CARDS	READSTATS	STATISTICS FILE WILL BE INPUT ON CARDS.	STATISTICS EXPECTED FROM DISK
	CHANNELS	I,J,K...	USE ONLY CHANNELS I,J,K	USE THE CHANNELS IN STATISTICS FILE
	PRINT	BEST(N)	PRINT RESULTS FOR BEST N COMBINATIONS.	N=30
		STATS	PRINT SUMMARY OF STATISTICS USED.	NO STATISTICS
		SHOW(F1,F2,...)	PRINT RESULTS FOR THIS CHANNEL COMBINATION REGARDLESS OF RANK.	BEST(N) PRINTED
		DIV(VALUE)	PRINTS A LIST OF ALL CLASS PAIRS WITH A TRANSFORM DIVERGENCE OF 'VALUE' OR LESS FOR THE 'BEST(N)' COMBINATIONS OF CHANNELS ALONG WITH THE AVERAGE OF THOSE 'N' DIVERGENCES. A GROUPING TABLE IS ALSO PRINTED WITH THRESHOLD EQUAL TO 'VALUE'	NOT PRINTED
	OPTIONS	MAX(VALUE)	SET UPPER BOUND ON THE SEPARATION MEASURE TO VALUE.	VALUE =30000
		MIN(VALUE)	SET LOWER BOUND ON THE SEPARATION MEASURE TO VALUE.	VALUE=0
		EXCLUDE(F1,...)	EXCLUDES FROM CONSIDERATION ANY CHANNEL SET THAT CONTAINS SUBSET F1,F2,... .	USE ALL
		TYPE	TO REQUEST CAPABILITY TO ENTER OPTIONS AT THE TYPEWRITER.	KEYBOARD NOT UNLOCKED
		UNTRANS	USE AND PRINT UNTRANSFORMED DIVERGENCE RESULTS.	TRANSFORMED RESULTS
		SORT	SORT AND PRINT RESULTS BY DIJ(MIN).	ORDERED BY D(AVE)

LARSYS CONTROL CARDS PAGE 3

TYPEWRITER INPUT FOR *SEPARABILITY

TYPEWRITER INPUT IF 'OPTIONS TYPE' IS SPECIFIED CAN BE SELECTED FROM THOSE LISTED BELOW. INPUT RULES ARE THE SAME AS CONTROL CARD RULES. ANY INPUT LIST MUST BE TYPED ON SEPARATE LINES WITH AN 'END' BEING THE LAST INPUT EXCEPT FOR 'STOP' WHICH IS CONSIDERED A COMPLETE INPUT LIST.

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
	STOP		TERMINATE ANALYSIS OF THIS NUMBER OF CHANNELS.	CONTINUE ANALYSIS
	WEIGHTS	S1S2S3...SN(W)	CHANGE WEIGHT W TO ALL CLASS PAIRS REPRESENTED BY ANY PAIR COMBINATION OF THE SYMBOLS S1,S2,S3,...SN.	PREVIOUS WEIGHT
	PRINT	BEST(N)	CHANGE N.	PREVIOUS N
		SHOW(F1,F2,...)	PRINT RESULTS FOR THIS COMBINATION REGARDLESS OF RANK.	PREVIOUSLY DEFINED COMBINATIONS
		DIV(VALUE)	ALL CLASS PAIRS WHOSE N VALUES EACH GIVE A SEPARABILITY OF VALUE OR LESS WILL BE PRINTED ALONG WITH THE AVERAGE OF THOSE N SEPARABILITIES.	PREVIOUS REQUEST
	OPTIONS	MAX(VALUE)	CHANGE UPPER BOUND ON SEPARATION TO VALUE.	PREVIOUS VALUE
		MIN(VALUE)	CHANGE LOWER BOUND ON SEPARATION TO VALUE.	PREVIOUS VALUE
		EXCLUDE(F1,...)	ADD THIS CHANNEL SET TO EXCLUSIONS.	PREVIOUS EXCLUSIONS
		UNTRANS	USE UNTRANSFORMED RESULTS.	PREVIOUS SPECIFICATION
		TRANS	USE TRANSFORMED RESULTS.	PREVIOUS SPECIFICATION
		SORT	APPLY SORT OPTION.	PREVIOUS REQUEST
		NOSORT	RANK THE CHANNEL COMBINATIONS ACCORDING TO D(AVE).	PREVIOUS REQUEST
		RESET	RESET ALL PARAMETERS TO THEIR CARD INPUT OR DEFAULT VALUES.	DOES NOT RESET
		HELP	TYPE A LIST OF POSSIBLE REQUESTS.	NO TABLE PRINTED
		TABLE	TYPE A TABLE OF CLASSES AND THEIR CORRESPONDING SYMBOLS.	NO TABLE TYPED
+	END		END OF INPUT. START PROCESSING.	

LARSYS CONTROL CARDS PAGE 2

SEPARABILITY

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
	DATA	I----START OF DATA DECK----------		I
		I		I
		I	STATISTICS FILE ON CARDS.	I
		I	REQUIRED IF 'CARDS	I
		I	READSTATS' IS SPECIFIED.	I
		I		I
		----------	----------	----------
+	END	(NONE)	END OF FUNCTION.	(NONE)

NOTE... THE FORMAT C1,C2,... MAY BE USED FOR THE CLASSES AND TO INDICATE THAT ONLY A SUBSET OF CLASSES (C1,C2,...) IN THE STATISTICS DECK SHOULD BE CONSIDERED. IF A CLASSES CARD IS USED, ALL DESIRED CLASSES MUST BE EXPLICITLY REQUESTED.

REVISED 01/24/80

SMOOTHRESULTS

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*SMOOTHRESULTS	(NONE)	SELECT THE CLASSIFICATION RESULTS POST-PROCESSOR THAT REPLACES GROUPS OF POINTS WITH THE DOMINANT CLASS.	(NONE)
+	INRESULTS		LOCATION OF INPUT RESULTS	(NONE)
		TAPE(XXX)	LOCATED ON TAPE XXX	
		FILE(FF)	FILE FF	
		DISK	USE RESULTS PLACED ON DISK BY CLASSIFYPOINTS IN CURRENT TERMINAL SESSION.	
	CELLSIZE	LL,CC	DEFINE THE CELL DIMENSIONS. LL IS THE NUMBER OF LINES. CC IS THE NUMBER OF COLUMNS. MAXIMUM SIZE IS 10 X 10.	(2X2)
+	OUTRESULTS		DESTINATION OF RESULTS	(NONE)
		TAPE(XXX)	PLT ON TAPE XXX.	
		FILE(FF)	FILE FF.	
		INITIALIZE	INITIALIZE FILE ONE OF A NEW RESULTS TAPE (REQUIRED WHEN USING A NEW TAPE).	SEE CONTROL CARD DICTIONARY
		DISK	RESULTS WILL BE STORED ON LARSYS DISK.	
	PRIORITY	G1,G2....	PRIORITY GROUPS G1,G2.... WILL NOT BE REPLACED WHEN THE CELL IS MODIFIED.	(NONE)
	GROUP	NAME(G1/P1,P2/)	GROUP CLASSIFICATION POOLS P1,P2.... FOR CALCULATING CORRECT RECOGNITION.'NAME,' IS THE GROUP NAME AND G1 IS THE GROUP NUMBER.	NO GROUPING
	WEIGHTS	W1,W2....	ASSIGN WEIGHTS TO POOLS, IN THIS ORDER.	EQUAL WEIGHTS USED
	BLOCK	RUN(XXXXXXXX)	DATA FROM RUN XXXXXXXX IS REQUESTED.	ENTIRE AREA
		LINE(X,Y,Z)	DATA FROM LINE X TO Y WITH INTERVAL Z	
		COL(X,Y,Z)	DATA FROM COLUMN X TO Y WITH INTERVAL Z.	
	MIXCLASS	NAME(P1,P2-P3...)	ASSIGN POINTS TO NEW CLASS 'NAME.' IF CELL HAS P1% POINTS IN FIRST GROUP(POOL), P2%-P3% POINTS IN THE SECOND GROUP(OR POOL)...	
+	END	(NONE)	END OF FUNCTION	(NONE)

LARSYS CONTROL CARDS

STATISTICS

REQ	KEY WORD(CCL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*STATISTICS	(NONE)	SELECT THE STATISTICS FUNCTION.	(NONE)
	OPTIONS	HIST(I,J,...)	HISTOGRAM ONLY CHANNELS I,J,...	ALL CHANNELS ON CHANNELS CARD USED
	PRINT	HIST(F)	PRINT HISTOGRAMS FOR FIELDS ONLY.	NO HISTOGRAMS PRINTED
		HIST(C)	PRINT HISTOGRAMS FOR CLASSES ONLY.	
		HIST(F,C)	PRINT HISTOGRAMS FOR FIELDS AND CLASSES.	
		CORRE(F)	PRINT MEANS AND CORRELATION MATRICES FOR FIELDS ONLY.	NO STATISTICS PRINTED
		CORRE(C)	PRINT MEANS AND CORRELATION MATRICES FOR CLASSES ONLY.	
		CORRE(F,C)	PRINT MEANS AND CORRELATION MATRICES FOR FIELDS AND CLASSES.	
		SPECTRL(F)	PRINT SPECTRAL PLOTS FOR FIELDS ONLY.	NO SPECTRAL PLOTS PRINTED
		SPECTRL(C)	PRINT SPECTRAL PLOTS FOR CLASSES ONLY.	
		SPECTRL(F,C)	PRINT SPECTRAL PLOTS FOR FIELDS AND CLASSES.	
		COSPEC(I,J,...)	PRINT COINCIDENT SPECTRAL PLOTS OF CLASSES I,J,... FOR EACH COSPEC OPTION CHOSEN.	ONE COSPECTRAL PLOT CONTAINING ALL CLASSES
	PUNCH	(NONE)	PUNCH CLASS MEANS AND COVARIANCE MATRICES IN BINARY FORMAT (INTERNAL COMPUTER FORM).	NO PUNCHING
		CHARACTERS	PUNCH CLASS MEANS AND COVARIANCE MATRICES IN CHARACTER FORMAT (EXTERNAL COMPUTER FORM).	BINARY FORMAT
+	CHANNELS	I,J,K...	CHANNELS I,J,... ARE SELECTED.	(NONE)
	SCALE	SPCLOW(D)	SET LOW END OF SPECTRAL PLOT = D.	D=0
		SPCINT(E)	SET SPECTRAL PLOT INTERVAL = E.	E=3
+	DATA	-----START OF DATA DECK-----		
		FIELD DESCRIPTION CARDS DESCRIBING TRAINING CLASSES. THEY ARE ALWAYS REQUIRED. THE CARDS FOR EACH CLASS ARE GROUPED TOGETHER AND EACH GROUP IS PRECEDED BY A CLASS NAME CARD WHERE 'CLASS' STARTS IN COLUMN 1 AND NAME CAN BE UP TO EIGHT CHARACTERS.		
+	END	(NONE)	END OF FUNCTION.	(NONE)

LARSYS CONTROL CARDS

TRANSFERDATA

REQ	KEY WORD(COL.1)	CONTROL PARAMETER	FUNCTION	DEFAULT
+	*TRANSFERDATA		DATA FROM MULTISPECTRAL IMAGE STORAGE TAPES IS PRINTED, TAPED, AND/OR PUNCHED FOR FUTURE USE AS REQUESTED.	(NONE)
	TAPE			NO TAPE
		TAPE(XXX)	REQUESTS TAPE OUTPUT AND SPECIFIES TAPE TO BE MOUNTED.	(NONE)
		FILE(XXX)	REQUESTS FILE ON TAPE TO BE USED FOR STORING DATA.	FILE(1)
	PUNCH	(NONE)	REQUESTS CARD OUTPUT.	NO CARD PUNCHED
	PRINT	DATA	REQUESTS LINE PRINTER OUTPUT.	PRINT IF TAPE OR PUNCH NOT SPECIFIED
		ROLL	REQUESTS ROLL PARAMETER TO BE PRINTED.	NO ROLL PRINTED
	OPTIONS	MODNO(XXX)	THE FIRST MODULE NUMBER WILL BE XXX (EACH REQUESTED OUTPUT HAS A MODULE NUMBER ONE GREATER THAN THE ONE BEFORE).	MODNO(1)
+	CHANNELS	I,J,...	CHANNELS I,J,... ARE SELECTED.	(NONE)
+	DATA	-----START OF DATA DECK-----		
			FIELD DESCRIPTION CARDS IDENTIFYING THE DATA TO BE TRANSFERRED. THESE CARDS ARE ALWAYS REQUIRED. IF BLANK CARDS OR 'CLASSES' CARDS ARE INTERSPERSED IN THE DECK THEY WILL BE IGNORED.	
+	END	(NONE)	END OF FUNCTION.	(NONE)

APPENDIX III

MESSAGES

APPENDIX III

MESSAGES

This appendix contains the documentation of all LARSFRIS error messages and information messages. The messages are presented in two groups, each of which is ordered in numerical sequence by message number.

Each message item contains the message line as it appears at the typewriter terminal (or on printed output) followed by an explanation of the reason for the message and possible user actions or responses. The message line consists of the message code, followed by the message text, followed by program code(s). In many cases, the message text is adequate, so the explanation is brief. However, certain messages only indicate the condition or possible condition that exists, and a number of reasons and user actions must be explained.

It is incumbent on the user to understand why a message is issued and to take the appropriate action that may be required. Assistance is usually available from members of the programming staff or the user's own organization. The remedial steps given here should be adequate to help the user begin an investigation of any problem encountered.

The message items are listed in message number sequence, i.e., Ennn in the Error Message subsection and Innnn in the Information Message subsection. Readers will note that certain numbers in the sequence are missing. This is due to blocks of numbers being assigned for use in programs during the system's development. In some cases, not all the numbers were needed, and in others, additional partial blocks were needed. Therefore, the message numbers will not necessarily appear in one sequence for each function. Also, some functions share the same message. As presently organized, any break in the number sequence is reflected by starting the next message on a new page. In this way, revisions which use missing numbers can be incorporated as system development progresses.

IHC Error Messages

Error messages prefixed by 'IHC' may appear on printed output or on the typewriter. The message has a number after the 'IHC' and some text. This line is followed by a number of lines of what is called traceback information. If such a message appears, first check the description of the preceding LARSFRIS error message (a message with prefix 'E') to see if such an IHC message is expected to accompany that error. If this is not the case, the IHC message represents a program error and the programming staff should be notified. The output containing the message should be kept for use by the programming staff.

FORTRAN Error Summary

At the end of printer output the line 'SUMMARY OF ERRORS' may be printed. This is a summary of errors causing the IHC error messages described above, not those resulting in LARSFRIS messages. The Error summary may, however, be printed when no IHC error messages have actually been printed. This will happen when floating point numbers have been computed which are closer to zero than the computer can store. (The smallest number the computer can store is approximately $\pm 1.0 \times 10^{-75}$.) This can happen in the normal course of computation in some LARSFRIS functions. LARSFRIS does not permit the IHC error message to be printed or to interrupt processing. Instead it simply treats any such number as "0.0".

CMS DEBUG Errors

If the message 'DEBUG ENTERED...' occurs, it means that a program error has occurred. Contact the programming staff. Be certain to keep the terminal output and printer output to show to the programming staff. The user's recovery is to press the attention key, wait for the response 'cp' and then type the 'i larsys' command to re-initiate LARSFRIS Note that this procedure will erase all previously generated disk files.

Message Handling in DISCONNECT and BATCH Modes

Several of the messages require the user to type a response before the processing can proceed (e.g., correct a control card). If any such message occurs while running in the Disconnect Mode, the run will be terminated, and the virtual machine will be logged out. Error messages will appear on the printed output, but information messages will not.

If such a message occurs while running in Batch Mode (and the operator is not attending the batch virtual machine in Interactive Mode), only that function will be terminated, and execution will proceed to the next function.

Messages Requiring Control Card Correction:

Some error messages request that the user type a corrected control card. In these cases, the user should be aware of the following conditions:

- A control card is processed from left to right. Consequently, if the error is not the first parameter of several possible parameters on the card, those parameters to the left of the one in error have been processed and need not be included on the corrected card. For example,

a syntax error in the 'MINCLAS' parameter below:

```
OPTIONS MAXCLAS(5), MNCLAS(3), INTV(2)
```

would require a corrected card of only:

```
OPTIONS MINCLAS(3), INTV(2)
```

The system will accept, however, an entirely retyped card.

- The response of only a Carriage Return to a message requesting a corrected control card indicates to the system to ignore the control card. However, any parameters to the left of the error will have already been processed. Therefore, it is likely that another message will be issued to reflect the incomplete entry or to notify the user of an illegal response.

- If the error is in a Field Description Card, the corrected card may be typed in either the free-form or fixed-form format, regardless of the form of the original entry.

- An erroneous card is typed out prior to the message that indicates the error and requests a corrected card. The erroneous card is typed exactly as it was read by the system, except the line is indented five spaces.

ERROR MESSAGES

E100 PROGRAM ERROR - CONTACT PROGRAMMING STAFF (BLOAD)

The probable cause is a bad module file in the system. The user should notify the programming staff.

E101 PROGRAM ERROR - CONTACT PROGRAMMING STAFF (ERPRNT)

No user error is involved. Contact the programming staff.

E102 INVALID KEYWORD - TYPE CORRECT CARD (CTLWRD)

A keyword on the card is invalid. The card in error will have been typed (or printed) just prior to this message. The keyboard will unlock to accept the corrected card. A response of carriage return will cause the card to be ignored and the next input card will be read from the normal input source (be it cards, disk or typewriter).

E103 INVALID CONTROL PARAMETER - TYPE CORRECT CARD (CTLPRM)

The control parameter is not valid for this control card. The card in error will have been typed (and printed) just prior to this message. The keyboard will unlock to accept the corrected card. A response of carriage return will cause the card to be ignored.

E104 SYNTAX ERROR ON CONTROL CARD - TYPE CORRECT CARD (CTLWRD)

The control card has a syntax error. The card in error will have been typed and printed just prior to this message. The keyboard will unlock to accept the new card. A response of carriage return will cause the card to be ignored. A syntax error is a violation of the general rules for control cards rather than an error specific to this control cards.

E105 ERROR CODE ____ OCCURRED WHILE TRYING TO LINK TO LARSLIB SOURCE/TEXT LIBRARY. CONTACT PROGRAMMING STAFF (EXCOMD)

The "RUN PROGNAME" command was issued by the user, and an unexpected error occurred while attempting to link to the source/text library. Contact programming staff.

E106 'SITE-ID' IS NOT A VALID SITE-ID (EXCOMD)

The site-id given in a PRINT or PUNCH command is not in the list of sites which are recognized.

E107 FILE 'FN FT' DOES NOT EXIST (EXCOMD)

The file fn ft given in the CCINPUT command does not exist on your p-disk.

E108 THERE IS NO STATISTICS DECK TO BE SAVED (EXCOMD)

The temporary disk has no statistics to be saved by the STATDECK SAVE command.

E109 THERE IS NOT SUFFICIENT SPACE ON THE PRIVATE DISK (EXCOMD)

You have requested the saving of a Statistics or Histogram File. However, your private disk does not have enough space for the file to be stored. The command is not executed.

E110 THERE EXISTS NO STATISTICS DECK ON THE PRIVATE DISK (EXCOMD)

No Statistics File exists on the private disk to copy onto the temporary disk. The command is not executed.

E111 'OPTION' IS AN INVALID OPTION (EXCOMD)

The option listing is an invalid option on this Control Command. Type in valid command.

E112 THERE IS NO HISTOGRAM DECK TO BE SAVED (EXCOMD)

The temporary disk has no Histogram File to be saved.

E113 THERE EXISTS NO HISTOGRAM DECK ON THE PRIVATE DISK (EXCOMD)

There is no Histogram File on the private disk to copy onto the temporary disk. The command is not executed.

E114 LARSLIB SOURCE/TEXT LIBRARY IS BEING UPDATED. TRY COMMAND AGAIN IN 5 MINUTES (EXCOMD)

The "RUN PROGNAME" command was issued by the user, and the source/text library could not be linked since it is being updated.

E115 YOU DO NOT HAVE A DATA DECK IN YOUR VIRTUAL READER (EXCOMD)

The batch command has been issued which required a data deck to be in your virtual reader to be used for the batch job to be given to the batch machine. The batch command is not executed.

E116 'COMMAND' IS NOT A VALID CONTROL COMMAND (EXCOMD)

The command listed is invalid. Type in a valid command.

E117 SYNTAX ERROR IN CORRE SPECIFICATION - TYPE CORRECT CARD (STARDR)

Error is on PRINT card. Standard corrective action.

E118 SYNTAX ERROR IN HIST SPECIFICATION - TYPE CORRECT CARD (STARDR)

Error is on PRINT card. Standard corrective action.

E119 SYNTAX ERROR IN SPECTRL SPECIFICATION - TYPE CORRECT CARD (STARDR)

Error is on the PRINT card. Standard corrective action.

E120 SYNTAX ERROR IN SPCLOW SPECIFICATION - TYPE CORRECT CARD (STARDR)

Error is on SCALE card. Standard corrective action.

E121 SYNTAX ERROR IN SPCINT SPECIFICATION - TYPE CORRECT CARD (STARDR)

Error is on SCALE card. Standard corrective action.

E122 SYNTAX ERROR IN HIST SPECIFICATION - TYPE CORRECT CARD (STARDR)

Error is in the HIST specification on the OPTIONS card. Standard corrective action.

E123 A TEST CARD WAS READ IN TRAINING FIELD DECK - RUN TERMINATED (STAINT)

The training field data deck should contain only CLASS cards and field description cards. The TEST card is a valid card in certain other functions but not in STATISTICS.

E124 CHANNELS MUST BE SUPPLIED - TYPE IN CHANNELS CARD (STARDR)

No channels card was supplied. Type in a channels card.

E125 HISTOGRAM CHANNELS MUST BE A SUBSET OF CHANNELS - RUN TERMINATED (STARDR)

The histogram channels given on the OPTIONS card in the HIST specification include one or more channels not listed on the channels card. This is not permitted.

E126 A DATA CARD WAS READ WHEN AN END CARD EXPECTED - END ASSUMED (STAINT)

In the training field data deck, a DATA card was detected. Since STATISTICS has only one data deck, no DATA card should be encountered. The program assumes that an END card was intended.

E127 TWO CLASS CARDS IN A ROW - FIRST IGNORED (STAINT)

In the training field data deck, two consecutive CLASS cards were read. The first is ignored and the following training fields are considered as members of the class named in the second CLASS card.

E128 CLASS CARD MISSING NAME - NAME 'NONE' ASSIGNED (STAINT)

CLASS cards in the training field data deck should have a class name on them. A CLASS card was read with no class name. A class name of 'NONE' is assigned to the class. This name will appear on the CLASS card punched in the statistics deck.

E129 ERROR CODE ____ OCCURRED WHILE TRYING TO LOGIN LARSLIB SOURCE/TEXT LIBRARY. CONTACT PROGRAMMING STAFF

(EXCMD)

The "RUN PROGNAME" command was issued by the user, and an unexpected error occurred while attempting to login the source/text library. Contact programming staff.

E130 INCORRECT DISPOSITION 'DISP' SPECIFIED. 'STOP' ASSUMED.

(ERPRNT)

This error indicates a program error in calling the error printer. Contact the programming staff. The invalid disposition is given as 'disp'. Run terminates.

E132 AN EXCESS DATA CARD HAS BEEN ENCOUNTERED IN THE INPUT DECK (RTBSUP)

More than one data card was encountered in the data deck for RUNTABLE. Execution terminates.

E133 MAXIMUM OF TEN RUNTABLE ENTRIES EXCEEDED - ABOVE CARD IGNORED (RTBSUP)

Only ten entries can be made into the user runtable. You have tried to add more than ten. The excess data card is printed prior to this message. Execution continues and the excess entry is ignored. Note that multiple executions of RUNTABLE in a single LARSFRISrun add cumulatively to the user runtable.

E134 RUN, TAPE OR FILE PARAMETER MISSING - TYPE CORRECT CARD (RTBSUP)

One of the parameters is missing from the RUNTABLE data card. Standard corrective action.

E135 ERROR IN RUN PARAMETER - TYPE CORRECT CARD (RTBSUP)

There is a syntax error in the run parameter. Standard corrective action.

E136 RUN ALREADY IN USER RUNTABLE - CARD IGNORED (RTBSUP)

The run on the data card typed just prior to this message is already in the user runtable so the card is ignored.

E137 ERROR IN TAPE PARAMETER - TYPE CORRECT CARD (RTBSUP)

There is a syntax error in the tape parameter. Standard corrective action.

E138 ERROR IN FILE PARAMETER - TYPE CORRECT CARD (RTBSUP)

There is a syntax error in the file parameter. Standard corrective action.

E139 UNEXPECTED END OF FILE ON INPUT DATA (RTBSUP)

The end of the input deck was reached while reading cards for a function. This normally means that the END card was ommitted. If '-TYPE' is in effect, it means that a carriage return was given as a function control card before the END card. Execution terminates.

E140 NO ENTRIES WERE MADE INTO THE USER RUNTABLE (RTBSUP)

RUNTABLE was executed but there are no entries in the user runtable. Execution continues normally.

E150 ERROR ON DATA CARD - TYPE CORRECT CARD (LAREAD)

The data card is incorrect as either form of field description card and is not a TEST, CLAS, DATA, or END card. Standard corrective action.

E151 ERROR IN RUN PARAMETER - TYPE CORRECT CARD (LAREAD)

The run parameter has a syntax error. Standard corrective action.

E152 ERROR IN LINES PARAMETER - TYPE CORRECT CARD (LAREAD)

The lines parameter has a syntax error. Standard corrective action.

E153 ERROR IN COLUMN PARAMETER - TYPE CORRECT CARD (LAREAD)

The column parameter has a syntax error. Standard corrective action.

E154 RUN NUMBER MUST BE GREATER THAN ZERO - TYPE CORRECT CARD (LAREAD)

Standard corrective action.

E155 FIRST LINE NUMBER MUST BE GREATER THAN LAST LINE - TYPE CORRECT CARD (LAREAD)

Standard corrective action.

E156 FIRST LINE MUST BE GREATER THAN ZERO - TYPE CORRECT CARD (LAREAD)

Standard corrective action.

E157 FIRST SAMPLE MUST BE GREATER THAN LAST - TYPE CORRECT CARD (LAREAD)

Standard corrective action.

E158 FIRST SAMPLE NUMBER MUST BE GREATER THAN ZERO - TYPE CORRECT CARD (LAREAD)

Standard corrective action.

E160 COVARIANCE MATRIX IS SINGULAR - FUNCTION TERMINATED (SMCLS1)

A singular covariance matrix will always result if the number of training samples in a class is not greater than the number of features (channels) used for classification. A singular covariance matrix is likely to result if the number of training samples in a class is only slightly larger than the number of features.

E161 ERROR ON WEIGHTS CARD - TYPE CORRECT CARD (SEPRDR) (CLARDR)

Standard corrective action. (CLAINT)

E162 MAXIMUM ALLOWABLE SHOW REQUESTS EXCEEDED. (SEPRDR)

More show requests have been made than are permitted. This and all remaining show requests will be ignored and execution continues.

E163 SYNTAX ERROR AFTER CONTROL PARAMETER - TYPE CORRECT CARD (SEPRDR)

A syntax error has been found after the control parameter (i.e., the control parameter was recognized). Standard corrective action.

E164 NO COMBINATIONS CARD - TYPE CORRECT CARD (SEPRDR)

A COMBINATIONS card must be given. The keyboard will unlock for the COMBINATIONS card to be typed. If you respond with just a carriage return, this error will repeat.

E166 NO SYMBOLS SPECIFIED - TYPE IN SYMBOLS CARD (SEPRDR)

A symbols card must be given. See E164 for response.

E167 SYNTAX ERROR IN COMBINATIONS CARD - TYPE CORRECT CARD (SEPRDR)

Standard corrective action.

E168 SYNTAX ERROR IN SYMBOLS CARD - TYPE CORRECT CARD (SEPRDR)

Standard corrective action.

E169 YOU HAVE ENTERED N SYMBOLS. THE MAXIMUM NUMBER THAT CAN BE STORED IS M. CORRECT AND TYPE IN NEW SYMBOLS CARD. (SEPRDR)

A new symbols card containing all desired symbols must be typed at this point. If more symbols are desired than fit on one card, the user will be given a chance later to type in additional SYMBOLS cards.

E171 ERROR ON CHANNELS CARD - TYPE CORRECT CARD (SEPRDR) (HISRDR)

Standard corrective action.

E172 MAXIMUM ALLOWABLE WEIGHTS EXCEEDED - REMAINDER IGNORED (SEPRDR)

More weights have been given than can be accepted. The weights card typed prior to this message is ignored.

E173 NOT ENOUGH SYMBOLS GIVEN - TYPE IN ADDITIONAL SYMBOLS CARD (SEPRDR) (SEPINT)

Fewer symbols were given than there are classes. Type an additional SYMBOLS card. The keyboard will unlock to accept an additional SYMBOLS card. This message will be repeated until sufficient symbols have been supplied.

E175 NO TEMPORARY DISKS ARE AVAILABLE (EXCOMD) (BPROFILE)

Only a limited number of temporary disks are available. Since LARSFRIS cannot be run without a temporary disk, the virtual machine is logged out. Availability of these disks is the responsibility of the programming staff, so they should be contacted if this occurs frequently. Normal action is to wait several minutes to allow a disk to be freed and try again.

E176 ALL CHANNELS IGNORED - FUNCTION TERMINATED (SEPINT)

None of the channels requested are available in the statistics so the function is terminated.

E177 NO VALID COMBINATIONS REQUESTS - RUN TERMINATED (SEPINT)

None of the combinations requests is valid so the run is terminated.

E178 THE ABOVE CHANNEL DOES NOT EXIST ON THIS RUN - FUNCTION TERMINATED. (SMCLS2)

Channel requested is greater than the number of channels available on the data tape.

E181 MAIN STORAGE OVERFLOW - COMBINATIONS REQUEST IGNORED (ARBASE)

There is insufficient main storage for the arrays needed for calculations for this combinations request so the request is ignored and processing goes to the next combinations request.

E182 ERROR IN MAX REQUEST - TYPE CORRECT REQUEST (USER)

The incorrect card will have been typed prior to this message. The keyboard will unlock to accept the corrected card. A response of carriage return will cause the request to be ignored.

E183 ERROR IN MIN REQUEST - TYPE CORRECT REQUEST (USER)

See E182 for response.

E184 SHOW REQUEST HAS INCORRECT NUMBER OF FEATURES - TYPE CORRECT REQUEST (USER)

See E182 for response.

E185 ERROR IN SHOW REQUEST - TYPE CORRECT REQUEST (USER)

See E182 for response.

E186 REQUESTED SHOW COMBINATION INVALID - TYPE CORRECT REQUEST (USER)

See E182 for response.

E187 ERROR IN DIV OPTION - TYPE CORRECT REQUEST (USER)

See E182 for response.

E188 ERROR IN EXCLUDE OPTION - TYPE CORRECT REQUEST (USER)

See E182 for response.

E189 BELOW CLASS COMBINATION DOES NOT EXIST - TYPE CORRECT REQUEST (USER)

The invalid class combination will be typed on the line after this error message. See E182 for response.

E190 ERROR IN WEIGHT REQUEST - TYPE CORRECT REQUEST (USER)

See E182 for response.

E191 ERROR IN BEST OPTION - TYPE CORRECT REQUEST (USER)

See E182 for response.

E192
and
E193 PROGRAM ERROR (DIVPRT)

These errors should not occur. If they do, contact the programming staff. Execution terminates.

E194 NO FIELDS FOR THE LAST CLASS (OR NO DATA DECK) - FUNCTION TERMINATED (STAINT)

This message usually indicates that no data deck is present. It will also occur if the data deck contained only a CLASS (or CLASSes) card(s) with no field description card or if the final CLASS card was followed immediately by the END card with no field description cards. The function is terminated.

E195 INSUFFICIENT MAIN STORAGE FOR READING DATA TAPE- OVERFLOW BY _____ BYTES (LEARN)

There is insufficient main storage for buffer space for reading in the Multispectral Image Storage tape for a training field. The run is terminated. The field causing the problem is the field in the training field deck following the last field processed (as noted on the printed output). To correct the error, run again using fewer channels or classes or do not use the run containing the training field in question.

E196 CLASS CARD MUST BE FIRST CARD IN DATA DECK - FUNCTION TERMINATED (STAINT)

A CLASS card must be the first card in the training field data deck. However, a field description card was read as the first card of the deck. The run is terminated.

E197 NUMBER OF CLASSES EXCEEDS MAXIMUM OF 60 - REMAINDER IGNORED (STAINT)

More than 60 classes are present in the training field data deck. All classes past the first 60 are ignored and processing continues. The statistics deck will not contain the training fields for the excess classes.

E198 LAST CARD OF STATISTICS DECK MISSING - FUNCTION TERMINATED (STAT)

A DATA or END card was read before the last card of the statistics deck was read. This may mean that other cards of the statistics deck are missing. The run is terminated.

E199 SYNTAX ERROR IN COSPEC SPECIFICATION - TYPE CORRECT CARD (STARDR)

Error is on PRINT Card. Standard corrective action.

E241 FIELD EXCEEDS LIMITS OF DATA. FIELD IGNORED. FIELD DESIGNATION FOLLOWS (LEARN)

The first column of the field is greater than the last column of data on the tape. The field is ignored and processing continues.

E250 INSUFFICIENT MAIN STORAGE FOR STATISTICS - OVERFLOW BY _____ BYTES (STASUP)

There is insufficient storage for all arrays for the statistics. Reduce the number of channels, number of classes or the options used. Storage required is proportional to the square of the number of channels and to the number of classes. The function is terminated.

E251 HISTOGRAM CHANNELS HAVE BEEN SPECIFIED - TYPE IN PRINT CARD (STARDR)

To request histograms the PRINT card with the HIST option must be used. This error message indicates that this card was not specified. The OPTIONS HIST card merely indicates which subset of channels to histogram, it does not request histogramming. After this message the keyboard will unlock to accept a PRINT card. If you wish to request histogramming, type in a PRINT card with the HIST control parameter. If you do not wish to request histogramming, type in a PRINT card with no control parameters.

E252 USERID DIRECTORY BEING UPDATED (EXCOMD)

The system programmer is updating the directory containing userids and passwords. While this is being done, no temporary disk can be accessed. The updating task only takes a few minutes. Issue the 'i larsys' command again in about 30 seconds.

E253 NO CARDS IN VIRTUAL READER - RUN TERMINATED (CTLWRD)

It is likely that the 'run larsys' command was issued before cards were read into the virtual reader. In this case, read in the cards and issue the command again. If the 'ccinput' command was used to request the control cards from another disk file, this message indicates an error occurred in reading this file. In this case, try the 'run' command again; if the problem persists, contact the programming staff. When E253 occurs, error code IHC218I will appear on any printed output.

E255 TAPE CARD READ - TAPE PARAMETER MISSING - TYPE ADDITIONAL TAPE CARD (TRARDR)

When a TAPE card is read to indicate that tape output is desired, the TAPE parameter must be present. Type in a TAPE card with the TAPE parameter. The FILE parameter need not be respecified.

E256 TEST CARD IS MISSING FROM DATA DECK - FUNCTION TERMINATED (RDFLDS)

Certain data decks require TEST cards in the data deck. In these decks, a TEST card must be the first card in the deck. This error indicates that the first card of the data deck is not a TEST card.

E257 TAPE MUST BE USED AS INPUT TO RESTART OPTION (CLARDR)

The results card specified disk. This is incompatible with the use of restart. The function is terminated.

E258 BAD RESTART TAPE - FUNCTION TERMINATED (CLSFY2)

The restart file on the end of the results file is incompatible with the results file preceding it. It is likely that this error is a program error, so the programming staff should be notified.

E259 END OF TAPE OR I/O ERROR WRITING RESTART FILE. CANNOT RESTART (CLSFY2)

While writing the restart file onto the results tape, either end of tape was encountered or a write error occurred on the tape. The suspended results file is usable, but the classification cannot be restarted.

E260 REQUESTED FILE IS NOT A RESTART FILE - FUNCTION TERMINATED (MMTAPE)

The results file specified on the RESULTS card is not a restartable classification. This is because there is no restarting information appended to the tape in a restart file.

E261 TAPE IS NOT RESULTS TAPE OR RESULTS TAPE BAD - FUNCTION TERMINATED (MMTAPE)

An error occurred reading the requested results tape. The probable cause is that the tape is a bad tape. It is also possible that a tape has been used which is not a results tape. A remote possibility is that a hardware error has occurred.

E262 DATA DECK CONTAINS NO TEST FIELDS - FUNCTION TERMINATED (RDFLDS)

The data deck which should contain test fields contains either no cards or only TEST cards with no field description cards.

E263 THRESHOLD VALUES CANNOT EXCEED 99.0. TYPE CORRECT CARD (PRIRDR)

A threshold value of greater than 99.0 has been specified. Type a corrected THRESHOLD card containing all threshold values on the erroneous card.

E266 COLUMNS AND CALIBRATION GRAPHS REQUESTED - CALIBRATION IGNORED (LINRDR)

In the Columngraph function, the COL parameter on the PRINT is mutually exclusive with the C0, C1 or C2 parameters. COL was specified with one of C0, C1 or C2. The C0, C1 and C2 requests are ignored.

E267 LAST CARD OF HISTOGRAM DECK MISSING - FUNCTION TERMINATED (PIC1)

An END card was encountered before the last card of the histogram deck. Part of the histogram deck is missing.

E300 FIRST CARD OF STATISTICS FILE INCORRECT - FUNCTION TERMINATED (STAT)

Either the first card of a statistics file on cards is incorrect or a bad statistics file is on disk. An incorrect card is one without the characters 'LARS' in columns 1-4. The function terminates.

E301 NO STATISTICS STORED ON DISK - RUN TERMINATED (STAT)

You have requested the use of saved statistics from disk but none exist on the temporary disk.

E302 BAD STATISTICS ON DISK - RUN TERMINATED (REDSTA)

This error indicates a bad statistics file on disk. The error is probably a program error which will require the user contact the programming staff for assistance. If this error follows E303, however, the statistics file is in error.

E303 SEQUENCE ERROR IN STATISTICS FILE - EXECUTION CONTINUES (STAT)

The statistics file has sequence numbers in columns 73-80 which start at 1 and increment by 1. When a card is read whose sequence number is out of sequence, this message is written. This message will occur only for the first occurrence of cards out of sequence in the file. This message may indicate a bad Statistics deck, which may cause other errors.

E304 FIRST LINE REQUESTED GREATER THAN LAST LINE ON TPAE - REQUEST CANCELED (LINRDR)

The user should check the maximum number of lines available in the run. Make corrections to the PRINT card and execute the function again.

E305 FIRST COLUMN REQUESTED GREATER THAN LAST COLUMN ON TAPE - REQUEST CANCELED (LINRDR)

The user should check the maximum number of columns available on the run, correct the PRINT card, and execute the function again.

E306 COUNT ERROR READING ID RECORD - CONSULT PROGRAMMING STAFF **(GADRUN)**

A wrong length record indication occurred in reading the ID record from a data storage tape. The program attempts to continue assuming it has valid ID information.

E310 UNRECOVERABLE ERROR READING ID RECORD - FUNCTION TERMINATED (RUNERR)

A serious read error occurred in reading the ID record of a data run. Contact the programming staff. The error code which was returned from GADRUN is printed on the following line. This error may indicate a hardware error or a bad data tape.

E311 INVALID DATA SET NUMBER IN GADRUN - RUN TERMINATED (RUNERR)

An invalid FORTRAN DSRN was passed as an argument to GADRUN. In LARSFRIS this should not happen so contact the programming staff.

E312 RUN NUMBER NOT WHERE THE RUNTABLE SAYS IT IS - RUN NUMBER FOLLOWS (RUNERR)

The runtable points to a given tape and file but that file does not contain the given run. The run number is printed on the line after the message. This error indicates an error in the runtable. Execution of the function terminates. Contact programming staff.

E313 RUN NOT IN RUNTABLE. FUNCTION TERMINATED. RUN NUMBER FOLLOWS (RUNERR)

The requested run number cannot be found in either a user runtable or the system runtable. The run number is written on the line after the message.

E314 READ ERROR ON DATA TAPE - EXECUTION CONTINUES. CODE FOLLOWS (LINERR)

An incorrect byte count, hardware parity error or parity error or some combination of these three has occurred. Execution continues. The program will probably ignore the line. The error code number returned from GADLIN is written on the line after the message. A bad line on the data tape is the most likely cause.

E315 SERIOUS PROGRAM ERROR READING TAPE - CONTACT PROGRAMMING STAFF (LINERR)

The only condition which can cause this error that can be corrected by the user was an attempt to write on a tape which does not have the ring in. Other conditions can also cause the error, but if they do, the program is in error, and the programming staff should analyze the problem.

E316 READ ERROR ON DATA TAPE - FUNCTION TERMINATED. CODE FOLLOWS (LINERR)

GADLIN has received an invalid request for a read from a data tape. This means that the call to GADLIN contains invalid data. Contact the programming staff. The error code returned from GADLIN is written on the line after the error message.

E317 DATA FOR A LINE DOES NOT EXIST ON TAPE - LINE IGNORED. LINE NUMBER FOLLOWS (LINERR)

The line number will be written on the line after the message. Execution continues.

E318 DATA FOR A LINE CANNOT BE CALIBRATED AS REQUESTED. LINE NUMBER FOLLOWS (LINERR)

The line number which cannot be calibrated as requested is written on the line after the message. Execution continues.

E331 BAD DATA SET REFERENCE NUMBER (MOUNT)

The tape mounting subroutine, MOUNT, was requested to mount a tape on an invalid DSRN. Contact the programming staff. Execution terminates.

E340 DISK OPTION CANNOT ALSO SPECIFY TAPE (CLARDR)

On a previous RESULTS card or earlier on this RESULTS card, you have specified a TAPE, FILE or INITIALIZE parameter. This message serves as a warning. Disk will be used for results and message E346 may also occur.

E341 ERROR IN CLASSES CARD. CORRECT ALL CLASSES CARDS AND START OVER (CLARDR)

The function terminates.

E342 NO CHANNELS ARE AVAILABLE TO THE PROCESSOR VIA AUTO (CLARDR)

There are no channels passed from SEPARABILITY. This will occur if SEPARABILITY was not run in this execution of the RUN command. The function will terminate after reading the rest of the control cards.

E343 NO AUTO OR CHANNELS CARD. TYPE IN CHANNELS CARD (CLARDR)

Channels must be given via the CHANNELS or AUTO card. After this message, the keyboard will unlock to accept a CHANNELS card. A response of carriage return will cause the keyboard to unlock again.

E344 A POOL HAS NOT BEEN DEFINED. CORRECT CLASSES CARD. POOL NUMBER IS (CLARDR)

The pool number is written on the next line. The function terminates. Pool numbers must be consecutive and start at 1.

E345 RESTART OPTION MUST SUPPLY NUMBER OF AN OLD TAPE (CLARDR)

You have specified INITIALIZE on the RESULTS card and are using the restart option. This is a conflict. The function terminates.

E346 WARNING - A TAPE NUMBER HAS BEEN SPECIFIED WHEN DISK IS BEING USED (CLARDR)

The DISK option was specified on the RESULTS card and a non-zero tape number was specified. Disk will be used for results.

E347 NO FILE NUMBER IS GIVEN - TYPE IN ADDITIONAL RESULTS CARD **(CLARDR)**

A non-zero file number must be requested for a tape. The keyboard will unlock after this message to accept an additional RESULTS card. A response of carriage return will cause the keyboard to unlock again. Specifying anything other than FILE on the additional RESULTS card may have disastrous consequences.

E348 ERROR IN RESULTS CARD (TAPE OR FILE PARAMETER) - TYPE IN CORRECT CARD **(CLARDR)**

Syntax error in the TAPE or FILE specification. Standard corrective action.

E349 MAXIMUM OF 60 CLASS WEIGHTS EXCEEDED. FUNCTION TERMINATED **(CLARDR)** **(CLAINT)**

More than sixty weights were entered on the WEIGHTS card.

E350 NUMBER OF WEIGHTS DOES NOT EQUAL NUMBERS OF POOLS. TYPE IN WEIGHTS CARD. POOLS FOLLOW **(CLAINT)**

The pool names are written on the next line. The keyboard then unlocks to accept a WEIGHTS card. All weights should be entered. A carriage return will cause error 536 to be written.

E361 REQUESTED FILE DOESN'T EXIST ON THIS TAPE. LAST FILE IS (MMTAPE)

The file number of the last file on the tape is written on the line after the message. The function terminates because the requested file does not exist.

E362 CANNOT WRITE ON REQUESTED FILE BECAUSE LAST FILE ON TAPE IS (MMTAPE)

The file number of the last file on the tape is written on the line after the error message. The function terminates because the requested file does not exist.

E363 REQUESTED FILE IS NOT A RESTART FILE - FUNCTION TERMINATED (MMTAPE)

The file you have specified must be a restart file if the restart option is used.

E364 FILE IS A RESTART FILE - NOT A RESULTS FILE (MMTAPE)

The requested file is not a results file. The function terminates.

E365 BAD RESULTS TAPE OR INVALID FILE SPECIFIED - FUNCTION TERMINATED (MMTAPE)

An end of file was detected on the tape where none should exist. Contact programming staff.

E371 CORE OVERFLOW FROM STATISTICS - FUNCTION TERMINATED (CLAINT)

There is not enough core for storage of statistics from the original statistics (before being reduced). Use a Statistics deck with less classes or channels.

E372 NO CHANNELS USED IN CLASSIFYPOINTS (CLAINT)

After checking for existence of requested channels in the statistics, no channels are left for use in classification. The function terminates.

E373 UNEXPECTED CLASS TEST OR DATA CARD READ IN FIELD DESCRIPTION DECK - HANDLED AS AN END CARD. (CLAINT)

The data deck with field descriptions of areas to be classified should contain only field description cards and be ended by the END card. A CLAS, TEST or DATA card was detected in the deck. The card is treated as an END card, that is no more cards will be read.

E374 NOT ENOUGH SPACE ON DISK FOR CLASSIFICATION RESULTS - FUNCTION TERMINATED (CLAINT)

There is not enough space on the temporary disk for classification results from this run. On the line after the message, a line will be written giving the bytes needed for results and the bytes available on the disk.

E375 COVARIANCE MATRIX IS SINGULAR FOR CLASS LISTED - FUNCTION TERMINATED (COVIN)

The class number will be printed on the line after the message.

E376 CORE OVERFLOW - FUNCTION TERMINATED - OVERFLOW BY (CLSFY2)

When space was allocated for storage of raw data and results data for an area to be classified, there is insufficient core. The number of bytes of overflow is written on the next line. The function terminates by writing the correct trailer information on the results file so that the results are usable for areas already classified. To correct, use fewer classes or channels or classify less points per line.

E377 PROGRAM ERROR - THRESHOLDING - CONTACT PROGRAMMING STAFF (CLAINT)

An error occurred in the computation of Chi-square values. Contact programming staff.

E390 THERE IS NO XXXXXXXX REFERENC FILE. **(REFERENC)**

This reference information is not available. Is the parameter spelled correctly? Check the index from the "LIST" command.

E391 NNNNNNNN IS NOT IN RUNTABLE. (REFERENC)

The run is not included in the current system runtable.

E400 THERE IS NO XXXXXXXX NEWS FILE. (NEWS)

No news information is available for this item.
Check the index from the "LIST" command.

E410 XXXXXXXX IS NOT AVAILABLE. (LIST)

The item XXXXXXXX is not in the list.

E411 INADEQUATE MAIN STORAGE AVAILABLE - REQUEST CANCELED - CONTACT PROGRAMMING STAFF (LINRDR)

Data buffer too small for data requested. Contact programming staff.

E412 NO LINES SPECIFIED - TYPE IN ADDITIONAL PRINT CARD (LINRDR)

Refer to the appropriate control card listing or dictionary for a description of the control card.

E413 EITHER ROLL,C0,C1,C2 OR COLUMN MUST BE SPECIFIED ON THE PRINT CARD - TYPE ADDITIONAL PRINT CARD (LINRDR)

At least one of these parameters must be requested for any particular run.

E414 ERROR IN SCALE CARD (XLOW PARAMETER) - TYPE CORRECT CARD (LINRDR)

There is an error in the XLOW parameter on the SCALE control card. Enter the entire correct card via the typewriter. Refer to the appropriate control card listing or dictionary for a description of the control card.

E415 ERROR IN SCALE CARD (BINSIZ PARAMETER) - TYPE CORRECT CARD (LINRDR)

There is an error in the BINSIZ parameter on the SCALE control card. Enter the entire correct card via the typewriter. Refer to the appropriate control card listing or dictionary for a description of the control card.

E416 NO RUN NUMBER WAS GIVEN - TYPE IN ADDITIONAL PRINT CARD (LINRDR)

A run number was not supplied to the function. Enter an additional PRINT control card via the typewriter. Refer to the appropriate control card listing or dictionary for a description of the control card.

E417 NO CHANNELS SPECIFIED - TYPE IN A CHANNELS CARD **(HISRDR) (LINRDR)**

Channel numbers were not specified to the function. Enter a correct CHANNELS card via the typewriter. Refer to the appropriate control card listing or dictionary for a description of the control card.

E418 NO COLUMNS SPECIFIED - TYPE IN ADDITIONAL PRINT CARD **(LINRDR)**

Column numbers were not specified to the function. Enter an additional PRINT control card via the typewriter. Refer to the appropriate control card listing or dictionary for a description of the control card.

E419 FIRST LINE MUST BE LESS THAN LAST LINE - TYPE IN A CORRECTED PRINT CARD **(LINRDR)**

The first line number shown in the LINE parameter on the PRINT control card is greater than the second line number in the parameter. Enter a correct PRINT control card via the typewriter. Refer to the appropriate control card listing or dictionary for a description of the control card.

E420 FIRST COLUMN MUST BE LESS THAN LAST - TYPE IN A CORRECTED PRINT CARD **(LINRDR)**

The first column number shown in the COL parameter on the PRINT control card is greater then the second column number in the parameter. Enter a correct PRINT control card via the typewriter. Refer to the appropriate control card listing or dictionary for a description of the control card.

E421 PROGRAM ERROR - CONTACT PROGRAMMING STAFF **(LINRDR)**

Contact programming staff.

E426 RUN NUMBER MUST BE SPECIFIED - TYPE CORRECT 'FROM' CARD. (CHASUP)

User did not specify run number.

E427 TAPE AND FILE NUMBERS MUST BE GREATER THAN ZERO - TYPE CORRECT 'TO' CARD. (CHASUP)

One or both of the above numbers were not specified. This message is printed out after message I0120.

E430 NO PARAMETER SPECIFIED ON PRINT CARD - TYPE PRINT CARD. (RUNSUP)

Usually syntax error. Also refer to control card listing and dictionary for IDPRINT.

E431 PRINT CARD ERROR - TYPE ONE CARD WITH ONLY ONE PARAMETER. (RUNSUP)

Issued by Idprint function. More than one PRINT card or more than one parameter on a PRINT card was used.

E432 NO CHANNELS REQUESTED - TYPE IN CHANNELS CARD (TRARDR)

User did not include CHANNELS card.

E433 REQUESTED RUN NOT FOUND. FUNCTION TERMINATED. (RUNSUP)

Issued by Idprint function. Requested run number is not in system Runtable.

E434 NEW FILE NUMBER MUST BE GREATER THAN OLD FILE NUMBER. TRY AGAIN. (CHASUP)

This message is printed out after messages I0066 and I0122.

E435 TYPING ERROR IN FILE NUMBER - RETYPE FILE NUMBER (CHASUP)

Syntax error. This message is printed out after messages I0066 and I0122.

E436 END OF FILE REACHED ON TAPE. JOB TERMINATED. (RUNSUP)

End of file reached on Multispectral Image Storage Tape when printing ID record for IDPRINT. Program terminated. Contact Programming Staff.

E439 DATA BUFFER TOO SMALL FOR DATA REQUESTED.
REQUEST IGNORED, NEXT CARD READ. **(TRADR)**

Contact programming staff.

E441 SYNTAX ERROR IN MAPS SPECIFICATION - TYPE CORRECT CARD (PRIRDR)

Error is in PRINT card. Standard corrective action.

E442 SYNTAX ERROR IN OUTLINE SPECIFICATION - TYPE CORRECT CARD (PRIRDR)

Error is on PRINT card. Standard corrective action.

E443 SYNTAX ERROR IN TRAIN SPECIFICATION - TYPE CORRECT CARD (PRIRDR)

Error is on PRINT card. Standard corrective action.

E444 SYNTAX ERROR IN TEST SPECIFICATION - TYPE CORRECT CARD (PRIRDR)

Error is on PRINT card. Standard corrective action.

E445 SYNTAX ERROR IN TABLES SPECIFICATION - TYPE CORRECT CARD (PRIRDR)

Error is on PRINT card. Standard corrective action.

E446 SYNTAX ERROR IN GROUP CARD - TYPE CORRECT CARD (PRIRDR)

The GROUP card is incorrect. This includes such errors as repeated classes and missing slashes and parenthesis. Standard corrective action.

E447 SYNTAX ERROR ON SYMBOLS CARD - TYPE CORRECT CARD (PRIRDR)

The SYMBOLS card is incorrect. This includes such errors as missing commas, two commas in a row, or more than 34 symbols on one card. Standard corrective action.

E448 SYNTAX ERROR ON THRESHOLD CARD - TYPE CORRECT CARD (PRIRDR)

The THRESHOLD card is incorrect. This includes errors such as two commas in a row or the specification of a number of threshold values that makes the total number specified more than 60. Standard corrective action.

E449 SYNTAX ERROR IN RUN SPECIFICATION - TYPE CORRECT CARD (PRIRDR)

The error is on the BLOCK card. This includes errors such as specifying more than one run number in the parenthesis or leaving off a parenthesis. Standard corrective action.

E450 SYNTAX ERROR IN LINE SPECIFICATION - TYPE CORRECT CARD (PRIRDR)

The error is on the BLOCK card. This includes errors such as missing parentheses and giving more than 3 values in the parentheses. Standard corrective action.

E451 LAST LINE MUST BE GREATER THAN FIRST LINE - TYPE CORRECT CARD (PRIRDR)

The error is in the LINE specification on the BLOCK card. The last line number that has been specified is less than the first line number. Standard corrective action.

E452 SYNTAX ERROR IN COL SPECIFICATION - TYPE CORRECT CARD (PRIRDR)

The error is on the BLOCK card. This includes errors such as missing parentheses or giving more than 3 values in the parentheses. Standard corrective action.

E453 LAST COLUMN MUST BE GREATER THAN FIRST - TYPE CORRECT CARD (PRIRDR)

The error is in the COL specification on the BLOCK card. The last column number that has been given is less than the first column number. Standard corrective action.

E454 SYNTAX ERROR IN TAPE SPECIFICATION - TYPE CORRECT CARD (PRIRDR)

The error is on the RESULTS card. Standard corrective action.

E455 SYNTAX ERROR IN FILE SPECIFICATION - TYPE CORRECT CARD (PRIRDR)

The error is on the RESULTS card. Standard corrective action.

E456 INCOMPLETE RESULTS INFORMATION GIVEN - TYPE ADDITIONAL RESULTS CARD (PRIRDR)

Either DISK, FILE, or INITIALIZE must be specified. Type in an additional RESULTS card.

E457 MAPS WERE REQUESTED BUT NO SYMBOLS GIVEN - TYPE IN SYMBOLS CARD (PRIRDR)

If maps are to be printed, display symbols must be specified. Type in a SYMBOLS card.

E458 ERROR IN GROUPING. GROUPS MUST APPEAR IN ORDER - START RUN OVER (PRIRDR)

The group numbers on the GROUP card are not in numerical order. The run is terminated.

E459 NO RESULTS FILE ON DISK (PRIRDR)

The DISK specification was used on the RESULTS card, but there are no classification results on disk. The run is terminated.

E460 INVALID RUN NUMBER (TOO MANY OR TOO FEW DIGITS) RETYPE BLOCK CARD (PRIRDR)

The run number must be an 8-digit number. Standard corrective action.

E464 FIRST COL REQUESTED MUST BE LESS THAN LAST COL ON TAPE - REQ CANCELED (HISRDR) (PICRDR)

The first column requested is greater than the number of samples for this data run. Correct card and resubmit job to be run.

E465 NO RUN NUMBER WAS GIVEN - REQUEST CANCELED (HISRDR) (PICRDR)

No run number was specified and there was no current run number to use as a default. Correct card and resubmit job.

E466 NO CHANNELS SPECIFIED - REQUEST CANCELED (PICRDR)

The CHANNELS card is required and none was present. Add a CHANNELS card and resubmit job.

E467 INSUFFICIENT MAIN STORAGE FOR REQUEST - REQUEST CANCELED (PICRDR)

More main storage was required to process the request than was available. Try reducing the number of samples requested (the COL parameter on the DISPLAY card).

E468 INSUFFICIENT MAIN STORAGE FOR HISTOGRAM CALCULATION - REQUEST CANCELED (HISRDR) (PICRDR)

More main storage was required to process the request than was available. Try reducing the number of samples requested (the COL parameter on the BLOCK card) and/or reducing the number of channels requested on the CHANNELS card.

E469 FIRST LINE MUST BE LESS THAN LAST LINE ON BLOCK CARD - REQUEST CANCELED (HISRDR)

Correct BLOCK card and resubmit job.

E470 FIRST COLUMN MUST BE LESS THAN LAST COLUMN ON BLOCK CARD - REQUEST CANCELED (HISRDR)

Correct BLOCK card and resubmit job.

E471 INVALID CALIBRATION INFORMATION IN CSEL - FUNCTION TERMINATED (HISRDR)

This is a system error. The channel select vector, CSEL, has a value of zero for one of the specified channels. Contact programming staff.

E472 ACCUM HISTS REQUESTED, BUT NO PRIOR HISTS EXIST - FUNCTION TERMINATED (HISTD)

The OPTIONS ACCUM card may only be used if histogram data from previous histogramming functions exists on the LARSFRIS disk. Data will be on the disk if histogramming has been performed within the current terminal session or the HISTDECK USE command has been successfully executed. Either perform histogramming prior to this run or else remove the OPTIONS ACCUM card.

E473 FIRST LINE REQUESTED MUST BE LESS THAN LAST LINE ON TAPE - FUNCTION TERMINATED (HISTD)

The LINE parameter specifies a starting line number that is greater than the total number of lines for the data run number specified. Correct the card and resubmit the job.

E481 SYNTAX ERROR ON TEST CARD - TYPE IN CORRECT TEST CARD **(RDFLDS)**

Either a CLASS card has been read in the test field deck or there is a syntax error in the group number specification. Standard corrective action.

E482 INVALID GROUP NUMBER SPECIFIED. GROUP IGNORED. GROUP NUMBER FOLLOWS GROUP ____ (RDFLDS)

The group number on a TEST card is greater than the number of groups. All field description cards following this TEST card will be read, but not processed. When the next TEST card is read, normal processing will continue.

E483 UNEXPECTED END OF FILE ON RESULTS FILE - RUN TERMINATED (DISPLY)

An end of file was read on the results file when data was expected. The results file is not usable. The run is terminated. Contact programming staff.

E484 INSUFFICIENT MAIN STORAGE FOR READING RESULTS FILE - OVERFLOW BY ____ BYTES (DISPY1)

There is not enough main storage for the buffers for reading the results file. Reduce the number of training and test fields or eliminate performance table requests and run again. Run is terminated.

E485 INSUFFICIENT SYMBOLS SUPPLIED - ENTER ALL SYMBOLS. CLASSES FOLLOW (PRIINT)

This message is followed by a list of class names for the classification being displayed. There have been fewer symbols supplied than there are classes. All previously defined symbols are cleared and you must type in SYMBOLS card or cards to enter all symbols. The keyboard will continue to unlock to accept additional SYMBOLS cards until enough symbols have been supplied.

E486 ERROR ON SYMBOLS CARD - TYPE IN AGAIN (PRIINT)

There is a syntax error such as two commas in a row or you have given more than the maximum of 34 symbols on a single card. Type in the card again. This message does not appear on printed output.

E487 TOO MANY SYMBOLS - ENTER ALL SYMBOLS AGAIN (PRIINT)

The symbols on this card bring the total to greater than the maximum of 60. All symbols are cleared, and the keyboard will unlock to accept new SYMBOLS cards. This message does not appear on printed output.

E488 INSUFFICIENT MAIN STORAGE FOR STATISTICS AND FIELDS OVERFLOW BY _____ BYTES (PRIINT)

There is not enough main storage for all statistics, training and test field descriptions and performance data. Reduce the number of test fields or remove the request for training or test field performance. The run is terminated.

E489 CORE OVERFLOW READING TEST FIELDS. MAXIMUM NUMBER WITH THIS OPTIONS IS _____. (RDFLDS)

There is not enough main storage to store all the test field descriptions. The maximum number which could be stored is given. The run is terminated.

E490 BAD TRAINING FIELD INFORMATION ON RESULTS FILE. (RDTRN)

Either the results file contains conflicting information concerning the number of training fields or the results file contains a TEST card in the training field portion of the statistics deck. The results file is probably not usable. The run is terminated. Contact programming staff.

E491 REQUESTED BLOCK NOT IN CLASSIFIED RESULTS. FUNCTION TERMINATED (DISPY1)

All areas of this file of the results file have been checked and none of them contain any portion of the BLOCK requested for display.

E500 SYMBOLS CARD CAN'T HAVE NLEV WITH OTHER PARAMETERS - TYPE CORRECT CARD **(PICRDR)**

The SYMBOLS card can have either an NLEV parameter or a string of user-selected symbols, but not both. These two choices for the SYMBOLS card are mutually exclusive.

E501 SYMBOLS CARD HAS ERROR IN NLEV PARAMETER - TYPE CORRECT CARD (PICRDR)

Correct the NLEV parameter by typing in new SYMBOLS card.

E502 SYMBOLS CARD HAS ERROR IN SPECIFYING SYMBOLS - TYPE CORRECT CARD (PICRDR)

Correct the user-specified symbols. A maximum of 16 symbols can be specified.

E503 DISPLAY CARD HAD ERROR IN RUN PARAMETER - TYPE CORRECT CARD (PICRDR)

Correct the RUN parameter and type in the new DISPLAY card.

E504 DISPLAY CARD HAS ERROR IN LINE PARAMETER - TYPE CORRECT CARD (PICRDR)

Correct the LINE parameter and type in the new DISPLAY card.

E505 DISPLAY CARD HAS ERROR IN COLUMN PARAMETER - TYPE CORRECT CARD (PICRDR)

Correct the COLUMN parameter and type in the new DISPLAY card.

E506 DISPLAY CARD HAS ERROR IN THE WIDTH PARAMETER (PICRDR)

Correct the WIDTH parameter and type in the new DISPLAY card.

E507 DATA CARDS WERE NOT SUPPLIED AS SPECIFIED (PICRDR)

If BOUNDARY STORE was specified, a field description card for each boundary is required. If HISTOGRAM HISTOCARDS was specified, the histogram deck is required. If HISTOGRAM LEVELSCARDS is specified, a set of levels cards is required.

E508 FIRST LINE MUST BE LESS THAN LAST LINE ON DISPLAY CARD - TYPE CORRECTION (PICRDR)

The last line specified in the LINES parameter of the DISPLAY card is less than the first line.

E509 FIRST COL MUST BE LESS THAN LAST COL ON DISPLAY CARD - TYPE CORRECTION (PICRDR)

The last line specified in the COL parameter of the DISPLAY card is less than the first line.

E510 ONLY ONE PARAMETER ALLOWED ON HISTOGRAM CARD - TYPE CORRECT CARD (PICRDR)

The four parameters of the HISTOGRAM card (COMPUTE, DISK, HISTOCARDS, and LEVELSCARDS) are mutually exclusive. Choose the desired parameter and type a new HISTOGRAM card.

E511 FIRST LINE MUST BE LESS THAN LAST LINE ON BLOCK CARD - TYPE CORRECT CARD (PICRDR)

Correct the LINE parameter and type new BLOCK card.

E512 FIRST COL MUST BE LESS THAN LAST COL ON BLOCK CARD - TYPE CORRECT CARD (PICRDR)

Correct the COL parameter and type new BLOCK card.

E513 CHANNEL ON LEVELS CARD NOT EQUAL TO NEXT REQUESTED CHANNEL - TYPE CARD (PIC1)

The channel requested on a "levels" card is not equal to the next channel as specified on a CHANNELS card. Message I0096 will follow this error message and will give the channel numbers required. Correct the CHAN(I) parameter and type the new "levels" card.

E514 SYNTAX ERROR ON LEVELS CARD - TYPE CORRECT CARD (PIC1)

A corrected LEVELS card must be supplied. The possible errors are: misspelled 'CHAN' or 'CALIB', missing 'CHAN' or 'CALIB' specifications, parentheses omitted from specifications, calibration code outside the range 1-7, or levels not in ascending order.

E515 A CHANNEL WAS NOT HISTOGRAMMED - ITS DISPLAY IS OMITTED (PIC1)

This error message is followed by message I0097 which gives the channel number involved. This error usually occurs when the HISTOGRAM DISK card is used and the previously stored histogram does not contain the required channel(s). Change the HISTOGRAM card to HISTOGRAM COMPUTE and use the proper BLOCK card to get the desired histograms and resubmit job. Meanwhile, execution continues for those channels properly histogrammed.

E516 THE HISTOGRAM DECK HAS A SEQUENCE ERROR - FUNCTION TERMINATED (PIC1)

This error message is followed by message I0098 which gives the sequence number (columns 73-80) of the last acceptable card. Cards are either missing or have been rearranged. If the cards can not easily be corrected, run the HISTOGRAM processor to get a new histogram deck and then resubmit this job.

E519 ERROR ON LEVELS CARD - FUNCTION TERMINATED (PIC1)

The user has ignored a previous request to correct an error on a "levels" card. This occurs if only a Carriage Return is made when a corrected "levels" card is expected. Correct the "levels" card(s) and resubmit job.

E530 NO DATA CARD. JOB TERMINATED. (TRARDR)

An 'END' card appeared before the 'DATA' card. Check for card sequence or for presence of 'DATA' card and data cards.

E531 PRINTED, PUNCHED OUTPUT TERMINATED FOR THIS RUN, NEXT DATA CARD READ. (RUNSUP)

Used during processing of Transferdata function if printed or punched output was requested and there was an error while reading the input tape. Contact programming staff.

E532 TAPE OUTPUT ERASED FOR THIS RUN. NEXT DATA CARD READ. (RUNSUP)

Used during processing of Transferdata function if tape output requested and there was an error while reading the input tape. Contact programming staff.

E533 ERROR OCCURRED WHILE BACKSPACING TAPE. JOB TERMINATED. (RUNSUP)

If error message 532 is issued, the output tape is backspaced to the beginning of the current requested run. Try running job again; if error persists, contact programming staff.

E534 TAPE WRITE ERROR --- (CHASUP)

This message is issued when a tape write error is encountered. It is followed by message I0069, which gives the error code and data line number. It will also be followed by either message I0160 or E535.

E535 FUNCTION TERMINATED DUE TO TAPE WRITE ERROR (CHASUP)

One of two conditions has occurred:

1. The end of the tape has been encountered. To successfully run the function, use a tape with more available space (perhaps by using a tape with less files already written on it).

2. E534 occurred and the user responded with 'YES' and the write error occurred again.

E536 ADDITIONAL CARD MUST BE SUPPLIED - TYPE IN CORRECT CARD (CTLWRD)

When an additional card has been requested due to incomplete data specifications, the card must be typed in. This message appears when the response was a carriage return. Type in the required card.

E560 MAXCLS MUST BE GREATER THAN OR EQUAL TO MINCLS - TYPE OPTIONS CARD (CLURDR)

The specified value of MINCLAS was greater than the specified value of MAXCLAS (or its default of 5). Type in an OPTIONS card changing either MINCLAS or MAXCLAS.

E561 MAIN STORAGE OVERFLOW - FUNCTION TERMINATED - OVERFLOW BY nnnn BYTES (FIXFLD)

The line gives the number of bytes of overflow. This error indicates that the program's memory allocation scheme has failed to accommodate your requirements. This message will occur when lines with an extremely large number of samples are used. The run can be made error free by reducing the number of samples in a line, reducing MAXCLAS, or reducing the number of channels.

E562 CHANNEL BELOW DOES NOT EXIST ON ABOVE RUN - FUNCTION TERMINATED (FIXFLD)

More than one run number has been used to describe the area to be clustered. If a channel does not exist for the first run processed, message I0075 is written. If a channel is missing from any succeeding run processed, the function is terminated since that channel may have existed in the other runs.

E580 FUNCTION REQUESTED NOT AVAILABLE. CONSULT PROGRAMMING STAFF. (RESSUP)

Job was terminated because an invalid function was requested. Only COPYRESULTS, LISTRESULTS, and PUNCHSTATISTICS are valid requests at this time. See Applications Programming Staff to determine the source of the error.

E581 TAPE DESIGNATION INCORRECT. RETYPE CORRECTED CARD. (RESRDR)

Error concerns the value input for the tape number. Card must be retyped.

E582 FILE DESIGNATION INCORRECT. RETYPE CORRECTED CARD. (RESRDR)

Error concerns the value input for the file number. Card must be retyped.

E583 FROM CARD MUST SPECIFY 'FILE' OR 'ALL' OR 'DISK'. TYPE IN FROM CARD. (RESRDR)

Neither 'FILE', 'ALL' nor 'DISK' were specified. If input results are on tape, choose either 'FILE' or 'ALL'. If input results are on disk, specify 'DISK'. Card must be retyped.

E584 BOTH 'FILE' AND 'DISK' MAY NOT BE SPECIFIED ON FROM CARD. RETYPE CARD. (RESRDR)

Since FILE indicates a tape is to be used for input and DISK indicates results are on disk, both may not be specified. Card must be retyped with only one of these two parameters present.

E585 BOTH 'ALL' AND 'DISK' SPECIFIED ON FROM CARD. RETYPE CARD. (RESRDR)

ALL indicates classification results are on tape and DISK indicates results are on disk. Both may not be specified. Card must be retyped with only one of these two parameters present.

E586 OUTPUT RESULTS TAPE NUMBER NOT SPECIFIED. TYPE A TO CARD (RESRDR)

The tape number of the tape to which classification results will be copied must be specified. A scratch tape (i.e., TTT=0) is invalid as input. A new card must be typed.

E587 BOTH 'FILE' AND 'INITIALIZE' SPECIFIED ON 'TO' CARD. RETYPE CARD. (RESRDR)

Only one of the two parameters, 'FILE' and 'INITIALIZE', may be specified. If FILE is used then it is assumed that the tape has been initialized. If 'INITIALIZE' is specified then results automatically will be put into file 1. Card must be retyped specifying only one parameter.

E588 TO CARD MUST SPECIFY 'FILE' OR 'INITIALIZE'. TYPE IN TO CARD. (RESRDR)

Either 'FILE' or 'INITIALIZE' must be specified on TO card. Card must be typed with one of these parameters present.

E589 INPUT RESULTS TAPE NUMBER NOT SPECIFIED. TYPE IN A FROM CARD. (RESRDR)

The tape number to be used must be specified. A scratch tape (i.e., TTT=0) is not valid. Card must be typed with the TAPE parameter specified.

E590 INPUT RESULTS FILE NUMBER NOT SPECIFIED. TYPE A FROM CARD. (RESRDR)

The file number to be used must be specified. Card must be typed with the FILE parameter specified.

E591 INSUFFICIENT CORE AVAILABLE. SEE PROGRAMMING STAFF. (RESCOP) (COPY)

There is not enough computer core storage available to process the results requested. Program terminated. See Data Processing Staff for assistance.

E592 ERROR ENCOUNTERED IN WRITING RESULTS TAPE. SEE PROGRAMMING STAFF. (COPY)

A problem occurred in physically generating the results output tape. Job terminated. See Programming Staff for assistance.

E593 UNEXPECTED EOF ON INPUT TAPE. SEE PROGRAMMING STAFF. (COPY)

While reading the input results tape, an unexpected end of file mark was detected. Job terminated. See Programming Staff for assistance.

E594 ERROR ENCOUNTERED IN READING INPUT TAPE. SEE PROGRAMMING STAFF. (COPY)

A problem occurred in physically reading the results input tape. Job terminated. See Programming Staff for assistance.

E620 INIT IS AN INVALID OPTION FOR INPUT TAPE (COMRDR)

The initialize option can only be used with an output tape. An attempt to initialize an input tape generates the above message and the request is ignored.

E621 ONE INPUT RESULTS FILE ALREADY ON DISK... FUNCTION TERMINATED (COMRDR)

Of the three (3) result files used in the COMPARERESULTS function only one may be specified for to or from disk; any attempt to use the disk option more than once will cause the function to terminate.

E622 INIT OPTION INVALID WITH DISK OPTION (COMRDR)

If both the disk and initialize option were requested for the output results file (NEW-RESULTS) then the above message is generated and the initialize option is ignored.

E623 NO FIRSTRESULTS CARD, OR ERROR. RETYPE CARD (COMRDR)

If the supplied tape or file numbers are not greater than zero (0) and the disk option was not requested then the above message is generated and the keyboard is unlocked to enter the corrected card.

E624 MISSING OR BAD SECONDRESULTS CARD. RETYPE CARD (COMRDR)

If the supplied tape or file numbers are not greater than zero (0) and the disk option was not requested then the above message is generated and the keyboard is unlocked to enter the new or corrected card.

E625 MISSING OR BAD NEWRESULTS CARD. RETYPE CARD (COMRDR)

If the supplied tape number is not greater than or equal to zer0 (0) or the file number is not greater than zero (0) then an error results. If the initialize option is used with a tape number that is not greater than or equal to zero (0) then the above message should be entered.

E626 MISSING OR BAD BLOCK CARD. RETYPE CARD (COMRDR)

If any of the block parameters are equal to zero (0) then this message is issued. Also, if the last column or line is less than the first column or line respectively, then the error is issued and the program waits for a new block card.

E627 ERROR IN LIST OF CLASS NUMBERS FOR CLASS 'NNNN'. RERUN JOB (COMRDR)

This error indicates that a syntax error has been made in either the 'FIRST; or 'SECOND' card for class 'NNNN'. The card must be corrected and the job rerun.

E628 CLASS GROUPING CARD MISSING FOR CLASS 'NNNN'. CHECK YOUR CONTROL CARD DECK AND RERUN THE JOB (COMRDR)

Either the 'FIRST' or 'SECOND' card for class 'NNNN' is missing. The function is terminated.

E629 NO CLASS CARDS IN DATA DECK. RERUN THE JOB. (COMRDR)

The reader routine found no 'CLASS' cards in the DATA DECK. Since these cards are required the function is terminated.

E630 CLASS CARD EXPECTED AFTER DATA CARD. CHECK INPUT DECK (COMRDR)

The card found immediately after the 'DATA' card was not a 'CLASS' card. This order is required. Therefore, the function is terminated.

E631 CLASS CARD FOUND BEFORE DATA CARD.
CHECK INPUT DECK (COMRDR)

The 'CLASS' card should be found immediately following the 'DATA' card. This error indicates that this is not the case and the function is terminated.

E632 END CARD FOUND BEFORE DATA. CHECK INPUT DECK (COMRDR)

An 'END' card was encountered before a 'DATA' card was found. The function is terminated.

E633 INITIALIZE OPTION AND FILE NUMBER BOTH USED. (COMRDR)

The initialize option cannot be used when a filt number is specified, therefore the function is terminated.

E634 ERROR IN WRITING EOF. TOPEF CODE = 'XX' (TAPOP)

An error has occurred while writing the end-of-file mark. 'XX' is the error return code from TOPEF and is defined in the TAPOP abstract (#011 LARS).

E635 AREA SPECIFIED NOT ON FIRSTRESULTS
JOB TERMINATED (CHANGE)

The area specified on the block card was not found on the input 'FIRSTRESULTS'.

E636 AREA SPECIFIED NOT ON SECONDRESULTS
JOB TERMINATED (CHANGE)

The area specified by the block card was not found on the input 'SECONDRESULTS'.

E637 COLUMN OR LINE INTERVAL ON FIRSTRESULTS NOT SAME AS THAT SPECIFIED. JOB TERMINATED (CHANGE)

The line or column interval specified by the block card does not match that of the area on the input 'FIRSTRESULTS'.

E638 COLUMN OR LINE INTERVAL ON SECONDRESULTS NOT SAME AS THAT SPECIFIED. JOB TERMINATED. (CHANGE)

The line or column interval specified by the block card does not match that of the area on the input 'SECONDRESULTS'.

E640 INIT IS AN INVALID OPTION FOR INPUT TAPE (SMORDR)

An attempt to initialize an input device will generate the above message and the attempt will be ignored.

E641 ONE DISK HAS ALREADY BEEN SPECIFIED EXECUTION TERMINATED (SMORDR)

Of the two (2) result files used by *SMOOTHRESULTS only one may be specified for to or from disk; any attempt to use the disk option more than once will cause the function to terminate.

E642 SYNTAX ERROR ON CELL CARD. RETYPE CARD (SMORDR)

The CELL card was entered incorrectly. An image of the faulty card is displayed along with the above message and the program waits for the corrected card to be reentered. (See the SMOOTHRESULTS REFERENCE file for correct card syntax).

E643 MAXIMUM NUMBER OF PRIORITY CLASSES EXCEEDED (60) ANY BEYOND ARE IGNORED (SMORDR)

The number of user defined priority classes must be less than or equal to 60. Any classes specified beyond this value will be ignored.

E644 SYNTAX ERROR ON THE PRIORITY CARD. RETYPE CARD (SMORDR)

The PRIORITY card was typed incorrectly. An image of the faulty card is displayed along with the above message and the program waits for the corrected card to be reentered. (see the SMOOTHRESULTS REFERENCE file for correct card syntax).

E645 CELL DIMENSION PARAMETERS OUT OF RANGE (MAX 10X10) RETYPE CARD (SMORDR)

Either one or both of the parameters passed on the CELL card exceed their maximum value of 10 or are less than 1. The corrected CELL card should be reentered at the keyboard.

E646 BOTH FILE AND INIT OPTIONS REQUESTED. FILE REQUEST IGNORED. FUNCTION CONTINUES (SMORDR)

The initialize option was requested for the output device in addition to a file number in the RESULTS parameters. The profram ignores the file request and initializes the output device. Execution continues.

E647 INVALID SET OF RANGES FOR CLASS --'NNNN' -- IMPOSSIBLE FOR DATA TO FIT. RETYPE CARD (READMX)

The ranges specified on the MIXCLASS card are invalid; either the sum of the lower ranges is greater than 100% of the sum of the upper ranges is less than 100% (part of the cell is not defined) (READMX)

E648 SYNTAX ERROR ON MIXCLASS CARD NEAR COL 'XXX' RETYPE CARD (READMX)

A syntax error has been found near the vicinity of column number XXX. This could be missing commas, parenthesis, etc. See SMOOTHRESULT Control Card listing for correct MIXCLASS syntax. The program waits for a corrected card to be entered at the keyboard before continuing.

E650 ERROR IN WRITING EOF. TOPEF CODE = 'XXX' (TAPOP)

The tape routine TOPEF has returned an error code of 'XXX.' See TOPEF abstract for definitions of the error code. The routine is used here to mark the end of the "Smoothed" RESULTS file created.

E655 SYNTAX ERROR ON PROCEDURE CARD NEAR COLUMN XXX
RETYPE CARD (CLARDR)

The PROCEDURE option card was incorrectly entered. The error exists at or around column XXX. The function waits for the corrected version to be entered. See the control card dictionary for the proper syntax.

E660 MORE THAN 60 CLASSES WERE REQUESTED ON DELETE CARD - EXCESS IGNORED (PRIRDR)

60 is the maximum number of classes allowed, any in addition to the first 60 will be ignored.

E661 SYNTAX ERROR ON PSYMBOLS CARD - TYPE CORRECT CARD (PRIRDR)

The user has incorrectly entered the PSYMBOLS option Card. The function waits for the corrected version to be entered at the terminal. See the control card dictionary for correct syntax.

E662 SYNTAX ERROR ON PROBABILITY CARD - TYPE CORRECT CARD (PRIRDR)

The user has incorrectly entered the PROBABILITY option Card. The function waits for the corrected version to be entered at the terminal. See the control card dictionary for correct syntax.

E663 MAXIMUM NUMBER OF PROBABILITY RANGES HAS BEEN EXCEEDED - RETYPE LAST CARD (PRIRDR)

Only 60 probability ranges may be specified on the PROBABILITY Card. If this number is exceeded the user should retype the last card entered short the excess ranges.

E664 INSUFFICIENT SYMBOLS - ENTER ALL SYMBOLS ON A PSYMBOLS CARD
RANGES FOLLOW (PRIRDR)

The user failed to enter enough symbols to represent each of the probability ranges. A list of the ranges is printed on the screen and the program waits for the user to input a new PSYMBOLS Card.

E665 ACRES AND SCALE REQUESTED - ONLY ONE CAN BE SPECIFIED -- SCALE IGNORED (PRIRDR)

The ACRES option requires the user to input the number of acres where as the SCALE option calculates the number of ACRES from a pixel to acre scale, therefore, only one can be specified to be meaningful. If both are requested the SCALE option is ignored.

E666 DELETE OPTION AND GROUP CARD SPECIFIED -- DELETE OPTION IGNORED (PRIRDR)

These two options (Grouping and Deleting) are illegal together. If both are requested then the DELETE option will be ignored and the function continues.

E667 ACRES CARD NEGATIVE -- REQUEST IGNORED (PRIRDR)

A negative ACRES parameter is illegal, the ACRES request is ignored.

E670 DATA CARD NOT EXPECTED -- MAY CRASH (BIPRDR)

The CARDS option was not used yet a statistics deck on cards was entered. There is a possibility something may go wrong. If statistics are to be read off of cards, use the CARDS 'READSTATS' option.

E671 STATISTICS MISSING -- WILL TRY DISK (BIPRDR)

The user specified that the statistics existed on cards but none were input . The program searches the disk for the statistics.

E672 CORE OVERFLOW BY X BYTES -- ABORT (BIPRDR)

There is not enough room in core to store the class means, class names, class numbers, Feature vectors, etc. X is the number of bytes greater than the core size. The function terminates.

E673 PLOT OF CLAS (X,Y) SILLY -- IGNORED (BIPRDR)

This error results when one requests a plot of channels that are not contained in the input statistics file. The request is ignored.

E674 SYNTAX ERROR ON ABOVE CARD -- RETYPE (BIPRDR)

The above message is typed with the card image of the incorrect card. The program awaits the input of the corrected card. See the control card dictionary for correct syntax.

E675 VALUE OUT OF RANGE ON FOLLOWING CARD (BIPRDR)

One or more of the probability cut-off values is greater than or equal to 1 or less than or equal to 0. These values are illegal. E675 is typed along with E674 and a card image.

E676 PROB VALUE COMPUTE ERROR - DEFAULT USED (BIPRDR)

There was an error return from the subroutine TWRESC indicating that the output from the routine is invalid. If this error occurs the subroutine is recalled using the default value of .995.

E680 PLOT OF MEANS 'X' & 'Y' VS 'X2' & 'Y2' IGNORED-CHANNEL$ NOT IN STAT DECK (BISPLT)

The plot of the indicated channels is ignored because one or more of these channels were not found in the statistic deck.

E681 PLOT OF MEANS ('X' 'Y') - IGNORED (BISPLT)

The plot of the indicated channels is ignored because one or both of the indicated channels, X and Y were not found in the statistic deck.

E682 POOL 'N1' DECK 'D1' CLASS 'C1' IS NOT INCLUDED ON A CLASSES CARD -- FUNCTION TERMINATED (MERINT)

The class, C1, requested in pool, N1, was not included on the CLASSES card. The program aborts.

E683 GAP IN DECK NUMBERS - FUNCTION TERMINATED THE DECK NUMBER IS 'X' (MERINT)

The deck indicated in the above message has no classes and is therefore nonexistent or illegal. The program aborts further processing.

E684 TOO MANY CLASSES REQUESTED - FUNCTION TERMINATED (MERINT)

If there are more than 120 classes used in the input decks or if there are more than 60 classes used without pooling or if there are to be more than 60 pools in the new statistics deck then the above error will be printed and the program will abort.

E685 END CARD READ BEFORE DATA CARD WHEN STATS EXPECTED FROM CARDS -- FUNCTION TERMINATED (MERRDR)

The END card must follow the DATA cards if DATA cards are used. E685 indicates that the function was expecting DATA cards (statistic decks) but read the END card first. Check the position of the END card in the control card deck and for the presence of input statistic decks. The program aborts.

E686 NO PARAMETER ON ABOVE CARD. CARD IGNORED (MERRDR)

Necessary parameters are missing on the card image displayed with this message. This card is ignored. See the Control Card dictionary for parameter descriptions.

E687 SYNTAX ERROR ON ABOVE CARD - TYPE CORRECT CARD (MERRDR)

The card whose image accompanies this message was incorrectly entered. The program waits for the corrected version to be typed in at the terminal. See the Control Card dictionary for valid syntax.

E688 ERROR INSIDE PARENTHESIS ON CLASSES CARD -- FUNCTION TERMINATED (MERRDR)

A syntax error has been discovered on the CLASSES card. Consult the Control Card dictionary for valid syntax.

E689 DECK 'X' PREVIOUSLY MENTIONED ON CLASSES CARD - REFERENCE IGNORED (MERRDR)

Deck 'X' has already been referenced in the CLASSES card and the latest reference is ignored.

E690 NO CLASSES CARD READ - TYPE IN A CLASSES CARD (MERRDR)

The CLASSES card is required and must be entered.

E691 ERROR ON POOLS CARD. CORRECT ALL POOLS CARDS AND START OVER (MERRDR)

A syntax error has been discovered on the pools card. Consult the Control Card dictionary for valid syntax.

E692 CORE OVERFLOW BY 'X' BYTES - FUNCTION TERMINATED (MERSTT)

There is not enough core space for the merging of the statistics. X represents the number of bytes in excess of the allocated core space. This error causes the program to abort.

E693 ERROR IN NUMBER OF FIELD CARDS - FUNCTION TERMINATED (MERSTT)
E694 (POLMER)

An error has occured when writing to or reading from the scratch disk (TTFLDX). See Programming Staff. The program aborts.

E695 ERROR IN CONSTRUCTING POOLED CLASSES -- FUNCTION TERMINATED (POLMER)

An error has been detected while pooling. This is possibly due to illegal pooling and the POOL card should be checked for validity. The program terminates.

E696 CORE OVERFLOW BY 'X' BYTES FUNCTION TERMINATED (STATRD)

There is insufficient core space to store statistics. X represents the number of bytes in excess of the allocated core area. The program aborts.

E697 NO SUBSET OF CHANNELS IS POSSIBLE - FUNCTION TERMINATED (STATRD)

No subset of channels is found in common throughout statistic decks. The function aborts.

E700 ONLY ONE OPTION SPECIFIED PLEASE TYPE OPTIONS CARD FOR 'XXX' OPTION (RATRDR)

If an options card is used both the VIS and the IR option have to be specified with a maximum of sixty channels possible for each. The user must now enter an OPTION card for the option specified by XXX.

E701 NOT ENOUGH CHANNELS IN STATISTIC DECK FOR NORMAL PROCESSING EXECUTION TERMINATED (RATRDR)

Since the OPTION card was not used, the program attempted to do default ratio calculations. The function terminated because there was an insufficient number of channels (less than 4) for such calculations.

E705 UNEXPECTED END OF FILE READING STATS FROM DISK -- FUNCTION TERMINATED (SECINT)

An unexpected EOF was read while reading the statistics from the disk, see the programming staff for assistance.

E706 END OF RECORD READING INTERMEDIATE TAPE -- FUNCTION TERMINATED (SECINT)

An EOF has been encountered while reading from the intermediate tape; the program aborts. See the programming staff for advice.

E707 ERROR IN TAPE OR FILE SPECIFICATION -- TYPE CORRECT CARD (SECRDR)

A non-numeric character was entered as either a tape or file number.

E708 ERROR IN PARAMETER VALUE SPECIFICATION -- TYPE CORRECT CARD (SECRDR)

A non-numeric character was specified as the cell size, cell selection, or annexation value.

E709 CELL SIZE MUST BE GREATER THAN OR EQUAL TO TWO -- DEFAULT OF 2 ASSUMED -- TYPE CORRECT CARD (SECRDR)

The CELL SIZE (X) parameter cannot be less than 2. A corrected card must be supplied.

E710 CELL HOMOGENEITY PARAMETER MUST BE GREATER THAN OR EQUAL TO ZERO -- TYPE CORRECT CARD (SECRDR)

The CELL SELECT(X) entry cannot be negative, a new card is requested.

E711 ANNEXATION THRESHOLD MUST BE NON-NEGATIVE. TYPE A CORRECTED ANNEXATION THRESHOLD CARD. (SECRDR)

The THRES specified is negative. The user is requested to correct the error.

E712 BOTH SINGULAR CELL AND CLASSIFICATION MAPS REQUESTED. ONLY OBJECT MAP WILL BE PRODUCED. (SECRDR)

Only one map can be produced during annexation. If both are requested, only the singular cell map will be printed.

E713 NO INTERMEDIATE TAPE SUPPLIED FOR OPTIONS INTERMEDIATE. TYPE IN INTERMEDIATE CARD. (SECRDR)

When requesting that processing start from an intermediate tape, an intermediate tape number must be specified.

E714 INTERMEDIATE FILE OR INITIALIZE MUST BE SPECIFIED. TYPE ADDITIONAL INTERMEDIATE CARD. (SECRDR)

When producing an intermediate tape, some indication of file number must be given.

E715 BOTH INTERMEDIATE TAPE AND RESULTS LOCATION SPECIFIED WITHOUT OPTIONS INTERMEDIATE-- JOB TERMINATED. (SECRDR)

It is impossible to determine which part of the classification should be performed when this set of options is supplied. Execution is terminated.

E716 EITHER INTERMEDIATE TAPE OR RESULTS LOCATION MUST BE SPECIFIED WITHOUT OPTIONS INTERMEDIATE. TYPE IN ADDITIONAL CARD. (SECRDR)

Some output file is needed for processing. Additional information is requested.

E717 EITHER RESULTS FILE OR INITIALIZE MUST BE REQUESTED. TYPE IN ADDITIONAL RESULTS CARD. (SECRDR)

When producing a results tape, some indication of file number must be given.

E718 NO RESULTS DESTINATION SPECIFIED -- TYPE IN RESULTS CARD. (SECRDR)

Either tape and file or disk must be specified when results will be produced. Additional information is requested.

E719 BOTH RESULTS TAPE PARAMETERS AND DISK SPECIFIED -- FUNCTION TERMINATED. (SECRDR)

Either tape or disk can be selected for results but not both.

E720 BOTH FILE AND INITIALIZE REQUESTED FOR INTERMEDIATE TAPE -- FILE REQUEST IGNORED. (SECRDR)

The intermediate output tape is initialized. Only file 1 can be initialized.

E721 BOTH FILE AND INITIALIZE REQUESTED FOR RESULTS TAPE -- FILE REQUEST IGNORED. (SECRDR)

The results tape is initialized. Only file 1 can be initialized.

E901 PROGRAM ERROR (OP CODE) CONTACT PROGRAMMING STAFF

E902 PROGRAM ERROR (PRIVILEGED OP.) CONTACT PROGRAMMING STAFF

E903 PROGRAM ERROR (EXECUTE) CONTACT PROGRAMMING STAFF

E904 PROGRAM ERROR (PROTECTION) CONTACT PROGRAMMING STAFF

E905 PROGRAM ERROR (ADDRESSING) CONTACT PROGRAMMING STAFF

E906 PROGRAM ERROR (SPECIFICATION) CONTACT PROGRAMMING STAFF

E907 PROGRAM ERROR (DATA EXCEPTION) CONTACT PROGRAMMING STAFF

E908 PROGRAM ERROR (OVERFLOW) CONTACT PROGRAMMING STAFF

E909 PROGRAM ERROR (DIVIDE) CONTACT PROGRAMMING STAFF

E910 PROGRAM ERROR (OVERFLOW) CONTACT PROGRAMMING STAFF

E911 PROGRAM ERROR (DIVIDE) CONTACT PROGRAMMING STAFF

E912 PROGRAM ERROR (OVERFLOW) CONTACT PROGRAMMING STAFF

E913 PROGRAM ERROR (UNDERFLOW) CONTACT PROGRAMMING STAFF

E914 PROGRAM ERROR (SIGNIFICANCE) CONTACT PROGRAMMING STAFF

E915 PROGRAM ERROR (DIVIDE) CONTACT PROGRAMMING STAFF

These errors mean that a program interrupt has occurred. This should not happen so contact the programming staff if it does. A second line is typed and printed giving the old PSW address which can be useful in identifying the error. The kind of program interrupt is given in the text. The run terminates after any of these errors.

INFORMATION MESSAGES

I0002 TAPE NNNN HAS BEEN REQUESTED ON UNIT DDD (MOUNT)

The operator has been requested to mount tape number nnnn (or scratch) and attach to a drive which is virtual device ddd. The program will respond with I0003 when the tape is ready. If an unreasonable amount of time passes before I0003, contact operator to determine the problem.

I0003 TAPE READY ... EXECUTION CONTINUING (MOUNT)

This message will follow I0002. It means that the requested tape is ready and the function is executing.

I0004 END OF INPUT DECK - RUN COMPLETED (LARSMN)

This message means that when the system attempted to read the next function selector or system initialization card, there was no more input data. This message will normally occur at the end of each run.

I0005 CLASSIFICATION SUSPENDED AT LINE NNNN (CLSFY2)

The SUSPEND command has taken effect and classification has suspended. NNNN is the last line classified.

I0006 NO SAVED (STATISTICS / HISTOGRAM) DECK EXISTS ON YOUR PRIVATE DISK (EXCOMD)

This message is in response to the STATDECK STATUS or HISTDECK STATUS command and indicates that no deck is stored on the private disk.

I0007 FILENAME FILETYPE MODE ITEMS DATE TIME (EXCOMD)
FILENAME FILETYPE A1 NNN M/D/Y H:M

This is another response to STATDECK or HISTDECK STATUS. The filename and filetype given indicate the standard name of the statdeck or histdeck on the private disk. Mode of A1 indicates that the saved deck is on the private disk. ITEMS is either the number of cards in the statistics deck or the standard number of records for the histogram deck. DATE is the date the data was placed onto the disk by STATDECK or HISTDECK SAVE commands, and TIME is the time the data was written.

I0010 TYPE IN RUNTABLE CARDS (RTBSUP)

The -TYPE initialization card has been used before the -RUNTABLE card. The keyboard will unlock for input of cards to the Runtable function.

I0011 SEPARABILITY FUNCTION COMPLETED (SEPSUP)

The Separability function has completed.

I0012 TYPE IN SEPARABILITY CONTROL CARDS (SEPRDR)

The Type initialization function is in effect. The keyboard will unlock for input of Separability control cards.

I0013 CLASS II FROM POOL JJ NOT IN DATA. REQUEST IGNORED (CLSCHK)

Class number ii is not in the statistics data given, so this class will be ignored and eliminated from the pool jj.

I0014 POOL JJ IS NOT IN GIVEN DATA. REQUEST IGNORED (GRPCHK)

The grouping request is ignored.

I0015 CHANNEL IS NOT IN GIVEN DATA. REQUEST IGNORED (FETCHK)

A channel is not in the supplied statistics data so no use will be made of the channel.

I0016 DATA TO BE CLASSIFIED NOT CALIBRATED THE SAME AS THE STATISTICS (FETCHK)

The calibration code requested for the data to be classified is different from that used in the statistics for at least one channel.

I0017 COMBINATIONS NNN IS GREATER THAN THE NUMBER OF CHANNELS IN THE DATA. REQUEST IGNORED. (BSTCHK)

NNN is greater than the number of channels in the statistics data so 'COMBINATIONS nnn' has no meaning. The request is ignored and other combinations will be completed.

I0018 INVALID CLASS COMBINATION ... CC - WEIGHT REQUEST IGNORED (SYMSET)

The class combination represented by the symbols CC is invalid. This weight request is ignored.

I0019 NO MORE SHOW REQUEST CAN BE ACCEPTED (GETSHW)

There is no more storage for show requests so no more will be accepted.

I0020 THE NN CHANNEL STATISTICS FOR CLASS II ARE ILL-CONDITIONED COMBINATIONS JJ DELETED (GETINV)

The statistics for class ii, channel nn produce a singular matrix. Thus the 'COMBINATIONS jj' request is not performed. Processing goes to the next combinations request.

I0021 NNNN OF TTTT CALCULATIONS COMPLETED (DIVRG2)

Of a total of tttt divergence calculations needed for this combinations request, nnnn are completed. The message will be typed after every 100 calculations.

I0022 DIVERGENCE CALCULATIONS COMPLETE-READY TO ORDER AND PRINT (DIVRG2)

The divergence computation for this combinations request is complete.

I0023 PROCESSOR TERMINATED DUE TO STOP COMMAND (DIVRG2) (CLSFY2)

The STOP command has taken effect.

I0024 ENTER OPTIONS (USER)

The user has used the OPTIONS TYPE control card and the keyboard will now unlock to accept input of typewriter options.

I0025 SHOW REQUEST CANNOT BE LOCATED (USER)

The show request cannot be found in the list of channel combinations for which divergences are available.

I0026 SHOW REQUEST PREVIOUSLY SAVED (USER)

This show request has already been saved so this duplicate request is ignored.

I0027 SORT ON DIJ(MIN) ALREADY IN EFFECT (USER)

The sort option has already been placed in effect. The duplicate request changes nothing.

I0028 SORT HAS NOT BEEN IN EFFECT (USER)

The sort option was not in effect so specifying 'nosort' has no effect.

I0029 SATURATING TRANSFORM ALREADY IN EFFECT (USER)

The saturating transform is already in effect so specifying 'TRANS' has no effect.

I0030 SATURATING TRANSFORM HAS NOT BEEN IN EFFECT (USER)

The saturating transform has not been in effect so specifying 'UNTRANS' has no effect.

I0031 INVALID SHOW REQUEST (BSTCHK)

The show request which is printed with the message is invalid and will be deleted from the list of show requests. The request may have channels out of order or contain a channel not used.

I0032 REDUCED STATISTICS COMPUTED (REDSAV)

The reduced statistics have been computed and are available for use.

I0033 DATA IS IN LARSYS FORMAT (GADRUN)

The file of the tape mounted by GADRUN contains data that is in LARSYS format.

I0034 ALL CONTROL AND DATA CARDS HAVE BEEN READ (SEPINT) (CLAINT)

All of the function control and data cards have been read and interpreted and the data checked for completeness. At this point you may run disconnected and be certain that the virtual machine will not be logged out as a result of a control or data card error.

I0035 SEARCHING FOR RUN NNNNNNNN (GADRUN)

This message indicates that the tape must be moved to a different file in order to find the desired run. If the desired run is the first run on a tape, this message will not appear.

I0036 DESIRED RUN FOUND..NNNNNNNN (GADRUN)

Run nnnnnnnn has been located on a multispectral image storage tape.

I0037 BATCH RUN TERMINATED DUE TO EXCEEDING CPU TIME LIMIT OF XXXXXXXX SECONDS (BATEND)

The batch machine may have a CPU time limit on all jobs run on it, or the user may have specified a time limit on the BATCH TIME card. (The system picks the smaller of the two). I0037 indicates that this time limit was exceeded. Output may be incomplete.

I0038 BATCH RUN TERMINATED DUE TO SYNTAX ERROR ON TIME CARD (BATRD)

This message is printed on the user's output to indicate why the job was not run.

I0039 DATA IS IN UNIVERSAL FORMAT (GADRUN)

The file of the tape mounted by GADRUN contains data that is in Universal format.

I0040 CLASSIFYPOINTS FUNCTION COMPLETED (CLASUP)

The Classifypoints function has completed execution.

I0041 TYPE IN CLASSIFYPOINTS CONTROL CARDS (CLARDR)

The TYPE initialization function is in effect. The keyboard will unlock for input of Classifypoints control cards.

I0042 POSITIONING RESULTS TAPE TTT TO FILE FF (MMTAPE)

The results tape is mounted (tape ttt) and is being positioned to file number ff. A tape number of zero means a scratch tape is being used.

I0043 FILE HAS RESULTS IN IT - DO YOU WISH TO OVERWRITE THE FILE, RESPECIFY THE ENTIRE RESULTS CARD, OR TERMINATE THE JOB (OVERWRITE, RESPECIFY, TERMINATE) (MMTAPE)

The file number requested on the results tape already has results in it. The keyboard will unlock to accept your response. Type 'OVER' to overwrite this and all succeeding files. Type 'TERM' to terminate the functions. Type 'RESP' to be able to enter a new results card (See I0099). A response must be made.

I0044 FILE IS A RESTART FILE - DO YOU WISH TO OVERWRITE THE FILE, RESPECIFY THE ENTIRE RESULTS CARD, OR TERMINATE THE JOB (OVERWRITE, RESPECIFY, TERMINATE) (MMTAPE)

The file number requested on the results tape already has results in it. The keyboard will unlock to accept your response. Type 'OVER' to overwrite this and all succeeding files. Type 'TERM' to terminate the functions. Type 'RESP' to be able to enter a new results card (See I0099). A response must be made.

I0045 RESULTS TAPE MOUNTED AND POSITIONED (MMTAPE)

The results tape is positioned as the requested file and execution is continuing.

I0046 YOU HAVE REQUESTED A CHANNEL WHICH IS NOT AVAILABLE ON THIS RUN. (CLSFY2)

A channel requested for use in classification is not available for this run. Thus this area will not be classified. Processing continues to the next area to be classified.

I0047 END OF TAPE OR I/O ERROR - CLASSIFICATION TERMINATED AT LINE NNNN (CLSFY2)

Either end of tape was reached or an I/O error occurred in writing results. The printer output will contain a FORTRAN-generated error message which will indicate the nature of the error. If the message is IHC218 with BSAM error 12 indicated, then end of tape was reached. If end of tape was reached, the file can be used as input to other functions. The last line on the tape will be less than NNNN.

I0048 LAST SAMPLE NUMBER (III) OF FIELD CCCCCCCC EXCEEDS LAST SAMPLE ON TAPE. LAST SAMPLE SET TO NNN (CLSFY2)

Request was through Sample III, but the tape run contains only through Sample NNN, so the last sample is reset to NNN.

I0049 NNN OUT OF TTT LINES CLASSIFIED (CLSFY2)

This message is typed as every 100 lines have been classified. NNN is the total number of lines classified thus far for all areas. TTT is the number of lines to be classified in this area; thus, NNN can exceed TTT.

I0051 TYPE FUNCTION CONTROL CARDS (LINRDR)

The Type initialization function is in effect. All control cards for the function are now expected from the typewriter.

I0052 CHANNEL n DOES NOT EXIST ON THIS RUN. REQUEST OMITTED - EXECUTION CONTINUED. (LINRDR)

When setting up parameters for execution it was discovered that one of the requested channels does not exist for a particular run. Processing for other requested channels is not affected.

I0053 n COLUMNS OF LINE y GRAPHED (GLIN)

This message gives some indication to the user that processing is under way. It is printed every time 100 columns of a particular line are graphed.

I0054 RESET LAST COLUMN TO n (LAST COLUMN ON TAPE) (LINRDR)

The message indicates that the last column requested was greater than the last column available on the tape. The last column is reset to the last column available and execution continues. This change may create an error where the first column requested is now greater than the last column requested. If this is true, an E420 error message will be encountered and the correction may be made at that time.

I0055 n LINES OF COLUMN y GRAPHED (GCOL)

This message gives some indication to the user that processing is under way. It is printed every time 100 lines of a particular column are graphed.

I0056 n LINES OF ROLL GRAPHED (GCOL)

Indicates to user that processing is underway.

I0057 n LINES OF CALIBRATION VALUE C y GRAPHED (GCOL)

Indication to user that processing is underway. Printed every 100 lines.

I0058 ERRONEOUS GRAPH CALIBRATION FLAG (GCOL)

A graph was requested for an invalid calibration code. Valid codes are C0, C1, and C2. The request is ignored and processing continues.

I0059 TYPE GRAPHHISTOGRAM CONTROL CARDS (GRHRDR)

The TYPE initialization function is in effect. All control cards for the Graphhistogram function are now expected from the typewriter.

I0060 NO HISTOGRAM HAS BEEN STORED FOR CHANNEL n (GRHIST)

User is requesting a graph of a channel that has not been previously histogrammed within this terminal session. Alter the CHANNELS card in the function which is computing the histogram (either Histogram, Pictureprint or Imagedisplay).

I0061 TYPE IN CHANNELTRANSFORMATION CONTROL CARDS (CHASUP)

'-TYPE' initialization control card was used; all function control cards are expected from the typewriter.

I0062 TYPE IN IDPRINT CONTROL CARDS (RUNSUP)

'-TYPE' initialization control card was used; all function control cards are expected from the typewriter.

I0063 ERROR IN READING ID RECORD - ERROR = nn (RUNSUP)

Used by Idprint function if 'PRINT TAPE(XXX)' is requested and a tape read error occurs. The ID record is not printed out and processing continues with the next ID record. If the user desires more information concerning the error number from the tape read program(TOPRD), he should contact the programming staff.

I0064 TYPE IN TRANSFERDATA CONTROL CARDS (TRARDR)

'-TYPE' initialization control card was used; all function control cards are expected from the typewriter.

I0065 IDPRINT FUNCTION HAS BEEN REQUESTED (RUNSUP)

This message indicates that the function has been entered.

I0066 FILE____OF TAPE_____IS NOT EMPTY. DO YOU WISH TO DESTROY IT.
TYPE 'YES' OR 'NO'. (CHASUP)

If 'YES', file and all succeeding files are overwritten; if 'NO', user is asked to type another file number (I0122).

I0067 TRY AGAIN (CHASUP)

Used after I0066 if user responded with something other than 'YES', or 'NO'. Used after I0160 if user did not type in 'YES' or press carriage return.

I0068 RUN_____WILL BE COPIED ONTO TAPE_____FILE_____. (CHASUP)

The input tape is positioned at the beginning of the run, and the output tape is positioned at the requested file, and the run is ready to be copied.

I0069 CODE = _____, DATA LINE = _____. (CHASUP)

These values are printed out for the user after message E534 (tape write error) has been printed. If the user desires more information concerning the error code from the tape write program (TOPWR), he should contact the programming staff.

I0070 TAPE READ ERROR CODE_____LINE_____OUTPUT DATA LINE FLAGGED. PROCESSING CONTINUES. (CHASUP)

An error occurred in reading the input tape for the line indicated. Special coding is added on the output tape to flag the erroneous line. The programming staff can assist the user in determining the nature of the error from the error code (for TOPRD) in the message.

I0071 PRINTRESULTS FUNCTION COMPLETED (PRISUP)

The PRINTRESULTS function has finished. This indicates completion though not necessarily error free completion.

I0072 TYPE PRINTRESULTS CONTROL CARD (PRIRDR)

You have used the '-TYPE' initialization card and can now enter the control cards via the typewriter.

I0073 YOU HAVE ENTERED ____SYMBOLS. THE MAXIMUM ALLOWED IS____. EXCESS SYMBOLS WILL NOT BE USED. (PRIRDR) (RATRDR) (SECRDR)

There is a limit to the number of symbols which can be specified. If you enter more than that number this message appears. Execution will proceed normally using only the number of symbols needed.

I0074 MAXIMUM OF 60 THRESHOLDS ALREADY STORED. ABOVE CARD IGNORED (PRIRDR)

Since there can be only 60 classes, only 60 threshold values have meaning. This message occurs when 60 values had already been specified on this and previous cards.

I0075 CHANNEL XX DOES NOT EXIST ON THIS RUN. REQUEST OMITTED. (HISRDR) (PICRDR)

The requested channel XX is greater than the highest numbered channel on this run. Processing for this channel is omitted. Processing for the other valid channels, if any, will proceed.

I0076 TYPE IN HISTOGRAM CONTROL CARDS (HISRDR)

The keyboard will unlock for input of HISTOGRAM control cards. This message only appears if the -TYPE system initialization card was read.

I0077 MAXIMUM NUMBER OF CHANNELS IS XX. (HISRDR) (PICRDR)

This message always immediately follows error message E468. Reduce the number of requested channels and resubmit the job.

I0078 ERROR READING CLASSIFICATION LINE_____LINE IGNORED (DISPLY)

A read error occurred on the results file for the line given. This line will simply be ignored. Processing continues with the next line.

I0079 _____LINES DISPLAYED (DISPLY)

This message appears after each 100 lines of the current area are processed.

I0080 COPY____OF DISPLAY MAP BEING PRINTED (DISPLY)

If multiple copies of the map were requested, this message prints just before each copy is written. If only one copy of the map was requested, this message will not appear.

I0081 TEST FIELDS BEING READ (PRINT)

The test field data deck is being read.

I0082 XXXX LINES HISTOGRAMMED (HISTD)

This progress message will print after every 100 lines are histogrammed. XXXX is the total at that point in time.

I0084 HISTOGRAM(S) READY TO BE PUNCHED (HISTD) (PIC1)

The cards resulting from the PUNCH HIST control card are now being produced.

I0085 BINS FULL AT LINE XXXX. HISTOGRAMMING TERMINATED. (HISTD)

The histogram was calculated with XXXX as the last line rather than the last line of the LINE parameter. If the full range of lines is desired, try increasing the line interval of the LINE parameter on the BLOCK card. The program can histogram only a fixed number of points in each level. This message appears when the number of points of one level has reached the maximum.

I0086 NO PREVIOUS HISTOGRAMS STORED FOR CHANNEL XX (HISTD)

This message always follows error message E472 to indicate which channel(s) was not previously histogrammed.

I0087 HISTOGRAM FUNCTION REQUESTED (HISSUP)

A *HISTOGRAM function selector card has been read.

I0088 XX OF THE LINES REQUESTED COULD NOT BE USED. (HISTD)

Out of the lines requested on the BLOCK card, XXX were not used. A line will not be used if there is a read error from the tape, the line is not in the run, or the line can't be calibrated.

I0090 HISTOGRAM FUNCTION COMPLETED (HISSUP)

The function has completed. This message does not imply that the function has necessarily completed successfully.

I0091 END OF FILE REACHED ON MULTISPECTRAL IMAGE STORAGE TAPE (LINERR)

The last line of the run has been read. This will occur when the user has specified the last line number as greater than the last line on the tape. The function will stop processing of this data run and continue.

I0092 PICTUREPRINT FUNCTION REQUESTED (PICSUP)

A *PICTUREPRINT function selector card has been read.

I0093 PICTUREPRINT FUNCTION COMPLETED (PICSUP)

The function has completed. This message does not imply that the function has necessarily completed successfully.

I0094 TYPE IN PICTUREPRINT CONTROL CARDS (PICRDR)

The keyword will unlock for input of PICTUREPRINT control cards. This message appears only if the -TYPE system initialization card was read.

I0095 CHANNEL XX DOES NOT EXIST FOR HISTOGRAM RUN. CHANNEL IGNORED. (PICRDR)

Channel XX is not on the tape for the Run number selected via the BLOCK card or its defaults. Execution continues.

I0096 LEVELS CARD CHANNEL XX NOT EQUAL TO NEXT REQUESTED CHANNEL XX. (PIC1)

This message provides additional information for error message E513. Correct the LEVELS card by typing the new card.

I0097 CHANNEL XX NOT HISTOGRAMMED (PIC1)

This message provides additional information for message E515. Execution continues.

I0098 SEQUENCE ERROR AFTER CARD XXXXXXXX (PIC1)

This message provides additional information for error message E516. The last card that was in sequence has XXXXXXXX in columns 73-80 of the card.

I0099 XX LINES DISPLAYED FOR CHANNEL XX **(PICRDR)**

This message appears after each 100 lines are printed on the map for each channel.

I0100 ENTER RESULTS CARD (MMTAPE)

In CLASSIFYPOINTS, you have selected the option of specifying a new results card upon discovery that previous tape file contains results. Type in a new results card with new file or tape or disk option. A results card must be entered.

I0101 DISK WILL BE USED FOR RESULTS (MMTAPE)

The disk option was specified on the results card following message I0100. The disk option overrides any other parameters on the results card.

I0111 SEPARABILITY FUNCTION REQUESTED (SEPSUP)

The Separability function was requested and is beginning execution.

I0112 CLASSIFYPOINTS FUNCTION REQUESTED (CLASUP)

The Classifypoints function was requested and is beginning execution.

I0113 PRINTRESULTS FUNCTION REQUESTED (PRISUP)

The Printresults function was requested and is beginning execution.

I0114 IDPRINT FUNCTION COMPLETED. (RUNSUP)

Execution has been completed for the Idprint function.

I0115 CHANNELTRANSFORM FUNCTION REQUESTED (RUNSUP)

This message indicates that the Channeltransform function was entered.

I0116 LINE NUMBER = _____. (RUNSUP)

Used during processing of Transferdata function. It is printed before E531 or E532 if a certain type of error has occurred while reading from a Multispectral Image Storage Tape.

I0117 TRANSFERDATA FUNCTION REQUESTED. (RUNSUP)

This message indicates that the Transferdata function has been entered.

I0118 TRANSFERDATA FUNCTION COMPLETED. (RUNSUP)

Execution has been completed for the Transferdata function.

I0119 FILE COPIED AND ENDED PROPERLY (DUPSUP)

Since there is no printout for the Channeltransform function except a listing of control cards, this message indicates that the run has been copied successfully.

I0120 **REQUESTED OUTPUT TAPE = _____,FILE = _____.** (CHASUP)

Printed before message E427 so that the user knows what values he did or did not specify. That is, if the value printed out for 'FILE' is zero, the user did not specify a file number. He now has the opportunity to do so at the typewriter.

I0121 CHANNELTRANSFORM FUNCTION COMPLETED **(RUNSUP)**

Execution has been completed for the CHANNELTRANSFORM **function.**

I0122 **TYPE NEW FILE NUMBER IF YOU WISH TO COMPLETE** CHANNELTRANSFORM. IF NOT, PRESS CARRIAGE RETURN **TO TERMINATE FUNCTION.** (CHASUP)

If the user's response to I0066 is 'NO', this message is printed.

I0123 **COLUMNGRAPH FUNCTION REQUESTED** **(GRHSUP)**

The message indicates that the Columngraph function has been started.

I0125 COLUMNGRAPH FUNCTION COMPLETED (GRHSUP)

Execution has been completed for the Columngraph function.

I0126 GRAPHHISTOGRAM FUNCTION REQUESTED (GRHSUP)

This message indicates that the Graphhistogram function has been started.

I0128 GRAPHHISTOGRAM FUNCTION COMPLETED (GRHSUP)

Execution has been completed for the Graphhistogram function.

I0129 LINEGRAPH FUNCTION REQUESTED (GRHSUP)

This message indicates that the Linegraph function has been started.

I0131 LINEGRAPH FUNCTION COMPLETED (GRHSUP)

Execution has been completed for the Linegraph function.

I0160 IF YOU WISH PROCESSOR TO ATTEMPT WRITING DATA LINE AGAIN, TYPE 'YES'. IF NOT, PRESS CARRIAGE RETURN TO TERMINATE FUNCTION. (CHASUP)

This message is printed out after E534 and I0069 if the tape write error was an error other than end of tape.

I0161 FUNCTION TERMINATED BY USER. (CHASUP)

Printed out after I0122 if user press carriage return. Execution of CHANNELTRANSFORM function is terminated.

I0162 TYPE IN CLUSTER CONTROL CARDS (CLURDR)

The '-TYPE' initialization control card was used. All processor control cards are expected from the typewriter.

I0163 MINCLS MUST BE GREATER THAN OR EQUAL TO 2. MINCLS IS NOW RESET TO 2. (CLURDR)

User specified a number less than 2 for MINCLS. The number is reset to 2 and processing continues.

I0164 MINCLS = ____, MAXCLS _____. (CLURDR)

The user has specified MAXCLS, the maximum number of classes to be clustered, as a number less than MINCLS, the minimum number of classes to be clustered. These values are printed out before E560 so the user knows why he must correct MAXCLS or MINCLS.

I0165 CLUSTER FUNCTION REQUESTED. (CLUSUP)

This message indicates that the above processing routine has been entered.

I0166 CLUSTER FUNCTION COMPLETED. (CLUSUP)

Execution has been completed for the cluster processor.

I0167 CORE OVERFLOW BY_____BYTES. NUMBER OF VECTORS IS _____. PROGRAM WILL REDUCE VECTORS TO FIT. (FIXFLD)

The user has specified too great a number of samples to be clustered. The program will increase the line interval by one for all fields and calculate the amount of storage needed again. If the message is printed out a second time, the program increases the column interval by 1 and tries again. Thus, the numbers of samples is decreased alternately by lines and then columns until the samples fit in the storage allocated for this program.

I0168 FIELD DESCRIPTION CARDS READY TO BE PUNCHED. (CLUPRO)

This message is printed out to inform the user that the cards he requested are being punched.

I0170 CLUSTERING NOT SUCCESSFUL FOR _____ CLASSES.
NUMBER OF CLASSES REDUCED BY ONE. (CLUPRO)

_____ number of classes not found during clustering. Number of classes is reduced by one and clustering is again attempted.

I0171 FLAG = __ NOMOD = __ INTOT = __ INTV = __

ITER = __ TIME = __ SECS,NCHAN = __ CHAN = __ (CLUMP)

FLAG = 0 if clustering successful for initial cluster center that were calculated;

= 1 if message I0170 was printed out.

NOMOD = number of classes used for clustering. This number is either the value of MAXCLS or, if message I0170 was printed out, less than MAXCLS.

INTOT = Total number of vectors used for clustering. This number is reduced from the original number of vectors if message I0167 was printed out.

INTV = Interval supplied by user or default of 1.

ITER = Number of times clustering was performed for the number of classes specified by NOMOD above. For the same number of cluster centers (classes), the vectors are always clustered more than once before clustering is complete. Clustering is complete when the percent of vectors unchanged for two consecutive iterations is greater than or equal to the value of CONV (supplied by user or default of 100.0).

TIME = Clustering time given in seconds.

NCHAN = Number of channels supplied by user.

CHAN = Channels specified by user.

This message is printed out when clustering is complete for a particular number of cluster points.

I0172 ___/___ VECTORS UNCHANGED ON THE___TH ITERATION (CLUMP)

This message is printed out every five minutes to inform the user of the progress being made in clustering.

I0173 STAT AND FIELD DECK REQUESTED, ONLY STAT DECK WILL BE PUNCHED. (CLURDR)

User cannot obtain a statistics deck and field cards in the same cluster run.

I0182 COPYRESULTS FUNCTION REQUESTED (RESSUP)

A'*COPYRESULTS' card was read and processing begins for the Copyresults function.

I0183 LISTRESULTS FUNCTION REQUESTED (RESSUP)

A'*LISTRESULTS' card was read and processing begins for the Listresults function.

I0184 PUNCHSTATISTICS FUNCTION REQUESTED (RESSUP)

A '*PUNCHSTATISTICS' card was read and processing begins for the Punchstatistics function.

I0185 COPYRESULTS FUNCTION COMPLETED (RESSUP)

Execution of the Copyresults function is completed.

I0186 LISTRESULTS FUNCTION COMPLETED (RESSUP)

Execution of the Listresults function is completed.

I0187 PUNCHSTATISTICS FUNCTION COMPLETED (RESSUP)

Execution of the Punchstatistics function is completed.

I0188 TYPE COPYRESULTS CONTROL CARDS (RESRDR)

Typewriter keyboard is unlocked for entering function control cards at the typewriter.

I0189 TYPE LISTRESULTS CONTROL CARDS (RESRDR)

Typewriter keyboard is unlocked for entering function control cards at the typewriter.

I0190 TYPE PUNCHSTATISTICS CONTROL CARDS (RESRDR)

Typewriter keyboard is unlocked for entering function control cards at the typewriter.

I0191 BOTH THE 'ALL' AND 'FILE' OPTION ON THE 'FROM' CARD USED. 'FILE' DISREGARDED. (RESRDR)

Both 'ALL' and 'FILE' were specified. Therefore all files on the input results tape will be copied. The 'FILE' parameter has been disregarded.

I0192 CARDS READ, TAPE(S) MOUNTED, PROCESSING BEGINS (RESRDR)

All preprocessing work is complete. All input cards have been read and requested tapes mounted. Execution of the function begins.

I0193 TAPE N FILE M COMPLETE (COPY)

Tape number N, file number M on the output results tape has been copied.

I0194 PUNCHING OF STATISTICS COMPLETE (COPY)

The requested statistics deck has been punched from the results tape.

I0196 RUNNING CONTROL CARD CHECKOUT (LARSMN)

This message is typed just prior to the execution of each function run using the control card check-out option.

I0197 TYPE IN STATISTICS CONTROL CARDS (STARDR)

The user has used the Type initialization function and may now type in control cards.

I0198 STATISTICS FUNCTION REQUESTED (STASUP)

The Statistics function is beginning execution.

I0199 STATISTICS FUNCTION COMPLETED (STASUP)

The Statistics function has completed execution. This does not indicate error free completion, just completion.

I0200 TRAINING FIELDS NOW BEING PROCESSED (STAINT)

The training field deck is being read and checked for error.

I0201 STATISTICS BEING CALCULATED FOR CLASS _____ (LEARN)

Computation of statistics for the class listed has begun. This message appears before the data run is requested for the first training field in the class.

I0202 LAST SAMPLE NUMBER OF FIELD _____ EXCEEDS LAST SAMPLE NUMBER ON TAPE. LAST SAMPLE NUMBER RESET TO _____ (LEARN)

The last sample of the field listed calls for an area not on the data run. The field coordinates are adjusted to conform to the available data.

I0203 CHANNEL ____ NOT AVAILABLE ON THIS RUN. REQUEST CANCELED. (LEARN)

The channel listed does not exist in this data run. No statistics for this channel will be generated.

I0204 CLASS CONTAINS LESS THAN 2 POINTS. THEREFORE STATISTICS NOT CALCULATED AND SPECTRAL PLOTS NOT PRINTED. (CLSSPC)

The class has less than two points, so statistics and a spectral plot have no meaning and are not calculated.

I0205 FIELD CONTAINS LESS THAN 2 POINTS. THEREFORE STATISTICS NOT CALCULATED AND SPECTRAL PLOTS NOT PRINTED. (CLSSPC)

Same as I0204 except for a field rather than a class.

I0206 WARNING - TOTAL NUMBER OF POINTS LESS THAN NUMBER OF CHANNELS. (FLDCOV)

This means the number of points is less than the number of degrees of freedom.

I0207 CORRELATION AND MEAN NOT CALCULATED BECAUSE THE FIELD CONTAINED LESS THAN 2 POINTS. (FLDCOV)

Fields must contain at least two points in order to have meaningful statistics.

I0208 STATISTICS BEING PUNCHED (PCHSTA) (CLUPRO)

The Statistics Deck is being punched to the virtual punch. Actual punching will not occur until the end of the run. This message indicates that all statistics are computed and the deck prepared.

I0209 COINCIDENT SPECTRAL PLOT(S) PRINTED (CLSSPC)

The coincident spectral plot (or plots) are being generated.

I0211 TYPE SAMPLECLASSIFY CONTROL CARDS (SAMRDR)

Type initialization function in effect. Function control cards are expected from the typewriter.

I0212 LAST SAMPLE NUMBER _____ EXCEEDS LAST SAMPLE ON TAPE. LAST SAMPLE NUMBER RESET TO _____. (SMCLS2)

Field size is limited by the number of available samples on the data tape.

I0213 _____ LINES CLASSIFIED (SMCLS2)

This message gives some indication to the user that processing is under way. It is printed every 100 lines.

I0214 CALIBRATION VALUES USED FOR CLASSIFICATION ARE NOT THE SAME AS THOSE USED IN THE STATISTICS. (SMCLS2)

Warning to user since classification data is usually calibrated the same as statistics data (i.e., for the same run number; this is not necessarily true when using different run numbers for statistics and classification data).

I0215 LINE _____ IGNORED, PROCESSING CONTINUED (SMCLS2)

Data does not exist or cannot be calibrated for this line.

I0217 SAMPLECLASSIFY FUNCTION REQUESTED (SAMSUP)

This message indicates that the function has been entered.

I0218 SAMPLECLASSIFY FUNCTION COMPLETED (SAMSUP)

Execution has been completed for the Sampleclassify function.

I0236 TYPE NEXT FUNCTION SELECTOR CARD (LARSMN)

The Type initialization function is in effect, and a function has just completed execution.

I0237 ALL CONTROL CARDS FOR PICTUREPRINT HAVE BEEN READ (PICRDR)

All function control cards for PICTUREPRINT have been read and interpreted. The data cards are read as processing is done so no message indicating that they have been read will be produced.

I0238 INSUFFICIENT DISK SPACE FOR TRANSFER TO TAPE - STOP EXECUTED (CLSFY2)

When the SUSPEND command is used and results are on disk, the results are transferred to tape. To do this the program uses some disk space to save certain data. This message indicates that the space is not available. The program executes as if the STOP command was issued rather than SUSPEND. The results can be transferred to tape via the COPYRESULTS function.

I0239 ENTER RESULTS CARD FOR SUSPEND TAPE (CLSFY2)

When SUSPEND is used in CLASSIFYPOINTS and the results are on disk, the results are transferred to tape for possible restart at a later time. This message requests the user to indicate what tape to use. Normal restrictions on the RESULTS apply with the exception that the DISK parameter should not be used.

I0240 TEST OF TERMINAL AND PHONE LINE.
ENTER ANY INPUT LINE... (TERMTEST)

The typewriter keyboard is unlocked, and the user may type in any line (upper or lower case, special characters, etc.) of 130 characters or less. This line will be sent to the computer, and then echoed back to the typewriter terminal, exactly as it was typed in.

I0241 END OF TERMTEST **(TERMTEST)**

The terminal test is completed, and control is being passed back to the LARSFRIS Command environment. If the lines echoed back by the computer match the input line exactly, the terminal and phone line may be considered to be in good working order.

I0245 MAXCLS MUST BE GREATER THAN OR EQUAL TO 2.
MAXCLS IS NOW RESET TO 2 (CLURDR)

MAXCLAS was specified less than 2. The system has reset its value to 2.

I0260 COMPARERESULTS FUNCTION REQUESTED (COMSUP)

A *COMPARERESULTS card was read and processing begins for the COMPARERESULTS function.

I0261 TYPE IN COMPARERESULT CONTROL CARDS (COMRDR)

Typewriter keyboard is unlocked for entering COMPARERESULT function control cards at typewriter.

I0262 ALL CONTROL AND DATA CARDS HAVE BEEN READ (COMRDR)

All of the function control and data cards have been read and interpreted and the data checked for validity and completeness.

I0263 THE RUNUMBERS OF THE TWO INPUT TAPES ARE NOT THE SAME (CHANGE)

This message informs the user that the funnumbers of the two input results are not the same. This may mean misregistration.

I0264 COMPARERESULTS FUNCTION COMPLETED (COMSUP)

Execution of COMPARERESULTS function is completed.

I0270 SMOOTHRESULTS FUNCTION REQUESTED (SMOSUP)

A *SMOOTHRESULTS card was read and processing begins for the SMOOTHRESULTS function.

I0271 TYPE IN SMOOTHRESULTS CONTROL CARDS (SMORDR)

Typewriter keyboard is unlocked for entering SMOOTHRESULTS function control cards at the typewriter.

I0272 ALL CONTROL AND DATA CARDS HAVE BEEN READ (SMORDR)

All of the function control and data cards have been read and interpreted and the data checked for validity and completeness.

I0273 THIS IS A RESTART FILE - RUN CLASSIFYPOINTS FIRST (SMOINT)

The input file has previously been suspended by the SUSPEND option in CLASSIFYPOINTS. This message requests the user to finish the classification (see the ('RESTART' option in CLASSIFYPOINTS) before running SMOOTHRESULTS. The function is then terminated.

I0274 FILE LENGTH IS ONLY ONE RECORD -- TRY RUNNING LISTRESULTS (SMOINT)

The RESULTS file format places an additional RECORD TYPE ONE at the end of each file as an end marker. (See LARSFRIS SYSTEMS MANUAL). This error occurs if the program begins input at this record instead of the initial record. Running LISTRESULTS is suggested to verify that the data exists. Execution is terminated.

I0275 AREA REQUESTED ONLY PARTIALLY WITHIN THIS CLASSIFICATION AREA. DO YOU WISH TO CONTINUE? (SMOINT)

Only part of the area defined by the BLOCK card is found in the file. The user is given the option to continue or terminate the run. If the user continues, only the partial area is used for the remainder of the function.

I0276 EXECUTION TERMINATED BY USER DO NOT CONSIDER PARTIAL AREA (SMOINT)

This message indicates that the user answered "N" for no to the question posed in I0275. The area requested by the user only partially existed and the option to terminate the function was chosen.

I0277 PLEASE TYPE "Y" FOR YES OR "N" FOR NO (SMOINT)

The user has failed to enter a valid answer for message I0275. This message is to clarify the required user input.

I0278 SMOOTHRESULTS FUNCTION COMPLETED (SMOSUP)

Execution of SMOOTHRESULTS function is completed.

I0280 NNNNN PAIRWISE DISTANCES LESS THAN XXXX.XX HAVE BEEN EXAMINED (CGROUP)

This message keeps the user updated on the progress of the optimal cluster grouping algorithm. Here NNNNN represents the number of pairwise distances and XXXX.XX is the quotient value being processed. See CGROUP abstract for a more detailed explanation of the algorithm.

I0285 NO PROBABILITY SYMBOLS, DEFAULT SYMBOLS USED (PRIRDR)

If the user does not enter a PSYMBOL card, the program will assign up to eight (8) default symbols — M, X, O, I, /, -, ., "blank". — from first to last range respectively. If there are more than eight ranges the above message will be printed followed by error "E664."

I0286 IN ORDER NOT TO EXCEED MAXIMUM NUMBER OF RANGES, RANGE XX.XX HAS BEEN DELETED (PRIRDR)

The program automatically creates a range from the lower limit of the last range specified by the user (if it is not already zero) to zero (e.g., if the last range entered by the user was 3.80 then the range 3.79-0 would be created). If the addition of this range will cause the number of ranges to exceed the maximum of 60, the last user specified range XX.XX will be deleted and the above message printed.

I0287 TRAINING FIELD ACREAGE TABLE REQUESTED AND NO ACRE OR SCALE PARAMETERS SUPPLIED -- SCALE = 1.15 ASSUMED (PRIRDR)

If an acreage table is requested by the user but no acre or scale parameters were supplied then scale defaults to 1.15 acres/pixel.

I0288 TEST FIELD ACREAGE TABLES REQUESTED AND NO ACRES OR SCALE PARAMETER SUPPLIED -- SCALE = 1.15 ASSUMED (PRIRDR)

If an acreage table is requested by the user but no acre or scale parameters were supplied then scale defaults to 1.15 acres/pixel.

I0289 ACRES OR SCALE SPECIFIED WITHOUT TRAINING OR TEST FIELD ACREAGE PARAMETER -- REQUEST IGNORED (PRIRDR)

The user did not request a training or test field acreage option from the PRINT parameter list yet still requested the ACRES or SCALE option. This is meaningless and the request is ignored.

I0295 DOING 'N' PLOT OF 'X' VS 'Y' (BIPLTR)

The above informational message is generated to inform the use of the type of plot, means, ellipse, or classify, and the two channels being used, x and y.

I0296 READ STATISTICS COMPLETED (BIPRDR)

The Statistics file has been read by the subroutine REDSTA.

I0297 NO. SYMBOLS LESS THAN CLASSES -- WARNING (BIPRDR)

The number of sumbols input by the user is less than the number of classes. This is just a warning, no action is taken.

I0299 UNIQUE SYMBOLS LESS THAN CLASSES -- WARNING (BIPRDR)

The number of symbols input by the user and the number of standard default symbols are less than the number of classes. Therefore the same symbol may represent two different classes.

I0300 BIPLOT FUNCTION SELECTED (BIPSUP)

A '*BIPLOT' card was read and processing begins for the Biplot function.

I0301 ALL CONTROL AND DATA CARDS HAVE BEEN READ (BIPSUP)

All of the function control and data cards have been read and interpreted and the data checked for completeness. At this point you may run disconnected and be certain that the virtual machine will not be logged out as a result of a control or data card error.

I0305 DOING MEANS PLOT OF 'X' & 'Y' VS 'X2' & 'Y2' (BISPLT)

The means plot of the indicated channels comparison is being done (4 channels).

I0306 DOING MEANS PLOT OF 'X' VS 'Y' (BISPLT)

The means plot of the indicated channel comparison is being done (2 channel).

I0307 WARNING -- CHANNEL 'X' WAS NOT IN ANY OF THE INPUT STATISTICS (MERINT)

An informational self-explanatory note to the user.

I0308 STATISTICS BEING MERGED (MERSTT)

This message informs the user at what point in time the statistics are being merged and a new statistics deck is being created.

I0309 STATISTICS BEING POOLED (POLMER)

A statistics deck is created in which the user specified classes are pooled.

I0310 MERGESTATISTICS FUNCTION REQUESTED (MERSUP)

The Mergestatistic function was requested and is beginning execution.

I0311 MERGESTATISTICS FUNCTION COMPLETED (MERSUP)

Execution has been completed for the Mergestatistics function.

I0315 TYPE RATIO CONTROL CARDS (RATRDR)

The '-TYPE' initialization function is in effect. All control cards for the function are now expected from the typewriter.

I0316 CARDS READ, PROCESSING BEGINS (RATRDR)

All the control cards have been read and checked for validity and completeness.

I0317 RATIO FUNCTION REQUESTED (RATSUP)

This message indicates that the Ratio function was entered.

I0318 RATIO CALCULATIONS BEGIN (RATSUP)

This message indicates that the statistics have been read into core and the ratio calculations have been started.

I0319 MOVING OF STATISTICS COMPLETE (RATTAP)

The statistics have been moved from the classification tape to disk.

I0319 RATIO FUNCTION COMPLETED (RATSUP)

Execution has been completed for the Ratio function.

I0325 SUPERVISED ECHO FUNCTION REQUESTED (SECSUP)

This message indicates that the Supervised Echo routine has been entered.

I0326 SUPERVISED ECHO FUNCTION COMPLETED (SECSUP)

The Supervised Echo function is finished. This indicates completion but not necessarily error-free completion.

I0327 TYPE IN SUPERVISED ECHO CONTROL CARDS (SECRDR)

'--TYPE' initialization control card was used: all function control cards are expected from the typewriter.

APPENDIX IV

A MULTISPECTRAL IMAGE STORAGE TAPE AND DATA CALIBRATION

APPENDIX IV

THE MULTISPECTRAL IMAGE STORAGE TAPE AND DATA CALIBRATION

The Multispectral Image Storage Tape is the basic input file to the LARSFRIS processing functions. Most of the functions use this file as direct input, and the others use derivatives of it, i.e., output files that are produced from it. The file contains the multispectral measurements that have been recorded by an airborne or satellite-borne measurement system, converted to computer-compatible form, and formatted on the tape in the particular way that the LARSFRIS programs require.

Data Format

The basic unit of data on the Multispectral Image Storage Tape is the "run". A run represents all of the multispectral data from a single large rectangular area on the surface of the earth. The data is recorded on the tape in terms of scan lines, columns (or samples within a scan line), and channels (or spectral bands). There is a single recorded spectral response value for each channel of each column of each line.

A line represents all of the data that was recorded in a single scan of the multispectral scanner perpendicular to the direction that the sensor platform was moving. There is a

separate recording of each of the spectral bands (channels) that the scanner provides. The scanner also records calibration responses which relate the measured responses to known values. If the response of the scanner is recorded in analog format, it is converted to digital format by "sampling" the analog signal at measured intervals across each scan line and recording the values (one per channel) at each interval. The result is that each line of data is converted to a number of "columns" (or data points) for each spectral band.

The spectral response for each of the channels at each of these points (and for each scanner calibration response) is recorded on the tape as a digital value ranging from 0 to 255. Values that cannot be represented in the range of 0 to 255 are "cut off" and are represented by a zero if they are below the lowest level that can be accommodated, and by 255 if they are above the highest level. At the same time, calibration values are calculated and placed on the tape to facilitate converting the data to another range when it is processed in the LARSYS programs. These calibration values that are created at the time of conversion of the data to digital form are called the "conversion calibration constants" (as opposed to the "scanner calibration constants") in the discussion of calibration that follows later in this text.

The data for each run on the Multispectral Image Storage Tape consists of two types of records: a single identification record, and a variable number of data records - one data record for each line in the run. The identification record contains:

- The run number and a "flight line" identification name.
- The tape and file numbers on which the run is recorded.
- The year, month, day and time of day that the data was recorded by the data collection system.
- The altitude and ground heading of the sensor platform.
- The number of lines, columns and channels that are included in the run.
- The spectral band width of the sensor, and C0, C1 and C2 conversion calibration constants for each channel.

The identification record from any Multispectral Image Storage Tape may be printed in a formatted listing by the IDPRINT function or REFERENCE RUNTABLE function. In addition, the other functions that use the file as input print a portion of the ID information as part of their standard output.

Each data record for a run contains all of the data for a single scan line. At the beginning of each of these records is the line number and the "roll" parameter for the line. The roll parameter is a number proportional to the relative roll position of the sensor platform at the time the line was scanned. If the roll parameter is recorded as -32,767, the roll data for the line does not exist. If it is recorded as +32,767, the data exists, but the roll parameter was not calculated. Any other value represents a valid roll parameter.

Following the roll parameter, the data record contains the digitized spectral response value for channel one of each column of the line, followed by the responses for channel two for each column, and so forth, for all channels which have been recorded for the line. Immediately following the data for each channel there are six calibration values, the three scanner calibration constants (C0, C1 and C2) that were recorded in the scanner at the time the data was collected and the three variances of these constants, if they are obtained by averaging several samples of a measurement.

The user may control the input of this data to a LARSFRIS function by specifying the lines, columns and channels that are used. He may control the lines that are used by specifying both the

range of lines and the interval at which they are selected within this range. For example, the control card specification "Line (100,900,5)" will cause every fifth line from line 100 to line 900 to be used. The same type of specification is used for the columns that are selected. Finally, the LARSFRIS functions require that the user specify the particular channels that are to be used.

The System Runtable

Multispectral Image Storage Tapes are normally accessed by LARSFRIS through a system catalog called the System Runtable. This is an index to all of the tapes that are maintained as a part of the LARSFRIS system. It contains the entire ID record from each of these runs; however, only two items from the record are used for accessing the run. The tape number is used by LARSYS to locate and mount the tape, and the file number to properly position the tape after it is mounted.

The user originates the procedure by specifying the run number of the run he wishes to use. The applicable LARSFRIS processing function then searches the Runtable to determine the tape number on which the run is recorded, and issues a request to the operator to mount the tape. When the tape has been mounted, the function positions it at the proper file and begins processing. The user has no part in this procedure, other than the original specification of the run number.

The user may also use the RUNTABLE System Initialization Function to specify his own runtable. This user-defined runtable differs from the System Runtable, however, in that it contains only the run number, tape number and file number for the run; and that it exists only for the time that the input deck it is associated with is being executed. The run identification information is provided by the user as outlined in the '-RUNTABLE' control card description in Section 5 of this manual.

If the user specifies his own Runtable, LARSFRIS will search it first when attempting to locate a requested run. If the run is not found there, the search will continue to the System Runtable. The user may reference runs in the same input deck from either, or both, his own user-defined Runtable or the System Runtable.

Calibration of Data

This discussion of data calibration is intended to provide the user with a summary of the way calibration is performed in LARSFRIS and the means by which the user may control this process. For a more detailed and more technical treatment of the subject, the reader should refer to LARS Information Note 071069.

LARSFRIS employs three calibration constants, all of which are based upon measurements by the sensor of known radiation sources.

Co - The dark level response inside the scanner (zero radiation)

C1 - The response from a constant light source filtered to closely approximate the spectral energy curve of solar illumination.

C2 - The response from solar illumination at the altitude of the sensor platform.

Values for each of these constants are measured in the sensor for each line of data at the time the data is gathered and are later recorded on the Multispectral Image Storage Tape in the record for that line. A second set of similar constants is created at the time of data conversion and are stored in the identification record.

In addition to these two sets of constants, the user may specify his own constants for calibrating the data from particular channels. When the user so specifies, the constants he supplies will be used for the appropriate channels instead of the corresponding constant from the identification record (i.e., the conversion calibration constant). These user-defined constants are supplied on the CHANNELS cards.

The basic calibration equation for LARSFRIS is:

$$D = A.T + B$$

where: D is the calibrated data value used in LARSFRIS

T is the data value on the tape, and

A and B are conversion factors calculated for each line of data and are used throughout the line.

The calibration of data may be done using only one of the three calibration constants or by using two out of the three. Most commonly in "bias drift" calibration, only a single constant is used, and this constant is usually the C0 value. If the user does not specify otherwise, the data will automatically be calibrated in this way.

When only one of the constants is being used:

- The value of A is set to 1, and
- The value of B is set to the value of the conversion constant (or user-supplied constant) minus the value of the scanner constant.

Thus for the system default calibration using only C0, the basic equation becomes:

$$D = T + (C0_c - C0_s)$$

where: $C0_c$ is the conversion constant for C0, and

$C0_s$ is the scanner constant for C0.

The user may also elect to use two of the three constants. He may select one of the following pairs:

C0 and C1

C0 and C2

C1 and C2

When one of these pairs of constants is selected, the basic equation becomes a little more complicated. For instance, if the user specifies calibration using the C0 and C2 constants, the basic equation becomes:

$$D = \left[\frac{C0_c - C2_c}{C0_s - C2_s}\right] T + \left[\frac{(C0_s \times C2_c) - (C0_c \times C2_s)}{(C0_s - C2_s)}\right]$$

where: $C0_c$ is the conversion constant for C0,

$C0_s$ is the scanner constant for C0,

$C2_c$ is the conversion constant for C2, and

$C2_s$ is the scanner constant for C2.

Seven calibration codes are available for the user to select the form of the calibration to be applied to his data:

Calibration Code	Data Calibration Uses
1	C0
2	C1
3	C2
4	C0 and C1
5	C0 and C2
6	C1 and C2
7	Data not calibrated

The user may also specify particular values to be used in place of any or all of the conversion constants. Both of these specifications are made on the CHANNELS control card in his input deck. If the user does not specify a calibration code, calibration code 1 is assumed. Refer to the description of the CHANNELS control card in the Control Card Dictionary in Appendix II for the details on how these specifications are made.

APPENDIX V

SECTION 3 OUTPUTS

APPENDIX V

SECTION 3 OUTPUTS

This appendix contains eight sample outputs that were obtained from the execution of the input deck used for the sample run in Section 3. These outputs are listed below:

```
DEMO                    LABORATORY FOR APPLICATIONS OF REMOTE SENSING    MAR  7,1973
PHILLIPS                          PURDUE UNIVERSITY                  12 30 44 PM
                                                                     LARSYS VERSION 3

     *CLASSIFYPOINTS
     RESULTS DISK
     CARDS READSTATS
     CHANNELS 2,8,12
     DATA
YOU HAVE SELECTED THE FOLLOWING CLASSIFY OPTIONS
     USE DISK FOR CLASSIFICATION RESULTS

CLASSIFYPOINTS SUPERVISOR INFORMATION....
     CLASSIFICATION STUDY.... 306645050
     NO. OF CLASSES.............    9
     NO. OF CHANNELS............    3
     NO. OF FIELDS..............   16
     CHANNELS SELECTED ARE......    2,  8, 12,
```


Figure V-1. The Classifypoints Input Deck Summary

DEMO
PHILLIPS

LABORATORY FOR APPLICATIONS OF REMOTE SENSING
PURDUE UNIVERSITY

MAR 7,1973
12 31 31 PM
LARSYS VERSION 3

CLASSIFICATION STUDY 306645050

TRAINING CLASSES		CHANNELS FROM STATISTICS			
SYMBOL	CLASS	CHANNEL NO.	SPECTRAL BAND		CAL. CODE
1	CORN1	2	0.48	0.51	1
2	CORN2	8	0.72	0.92	1
3	SOYBEAN1	12	9.30	11.70	1
4	SOYBEAN2				
5	OATSCUT				
6	HAY				
7	SA				
8	WHEAT				
9	FOREST				

Figure V-2. The Classes and Channels Table

DEMO
PHILLIPS

LABORATORY FOR APPLICATIONS OF REMOTE SENSING
PURDUE UNIVERSITY

MAR 7,1973
12 31 32 PM
LARSYS VERSION 3

CLASSIFICATION STUDY 306645050

SAVED TRAINING FIELDS

	RUN NUMBER	FIELD DESIG.	FIRST LINE	LAST LINE	LINE INT.	FIRST COLUMN	LAST COLUMN	COLUMN INT.	FIELD TYPE	OTHER INFORMATION	STAT. CLASS	POOLED CLASS
1	71053900	L-6	610	628	1	35	52	1	CORN		CORN1	CORN1
2	71053900	L-7	619	628	1	58	94	1	CORN		CORN1	CORN1
3	71053900	D*5	618	641	1	100	132	1	CORN		CORN2	CORN2
4	71053900	H*1	598	612	1	138	169	1	CORN		CORN2	CORN2
5	71053900	L-5	619	628	1	23	29	1	SOYBEANS		SOYBEAN1	SOYBEAN1
6	71053900	L-8	606	614	1	58	94	1	SOYBEANS		SOYBEAN1	SOYBEAN1
7	71053900	D*6	592	612	1	101	131	1	SOYBEANS		SOYBEAN2	SOYBEAN2
8	71053900	H*2	591	593	1	137	170	1	SOYBEANS		SOYBEAN2	SOYBEAN2
9	71053900	F-9	461	473	1	64	98	1	OATS		OATSCUT	OATSCUT
10	71053900	K-4	541	559	1	35	38	1	OATS		OATSCUT	OATSCUT
11	71053900	G*2	565	582	1	144	149	1	OATS		OATSCUT	OATSCUT
12	71053900	R-1	482	492	1	40	56	1	HAY		HAY	HAY
13	71053900	E*1	426	441	1	179	193	1	OTHER	SET ASIDE	SA	SA
14	71053900	G*3	562	582	1	156	164	1	WHEAT		WHEAT	WHEAT
15	71053900	H-6	543	562	1	63	72	1	WOODS		FOREST	FOREST
16	71053900	E*2	523	528	1	147	197	1	WOODS		FOREST	FOREST

Figure V-3. The Saved Training Fields Table

DEMO
PHILLIPS

LABORATORY FOR APPLICATIONS OF REMOTE SENSING
PURDUE UNIVERSITY

MAR 7,1973
12 31 34 PM
LARSYS VERSION 3

CLASSIFICATION STUDY 306645050

RUN NUMBER..... 71053900	DATE DATA TAKEN... AUG 13,1971
FLIGHT LINE... CRN 8LT LO FL210	TIME DATA TAKEN..... 1202 HOURS
TAPE/FILE NUMBER..... 10427 1	PLATFORM ALTITUDE.. 5000 FEET
REFORMATTING DATE. AUG 16,1971	GROUND HEADING..... 180 DEGREES

CHANNELS USED

CHANNEL 2	SPECTRAL BAND 0.48 TO 0.51 MICROMETERS	CALIBRATION CODE = 1	CO =	23.10
CHANNEL 8	SPECTRAL BAND 0.72 TO 0.92 MICROMETERS	CALIBRATION CODE = 1	CO =	24.85
CHANNEL 12	SPECTRAL BAND 9.30 TO 11.70 MICROMETERS	CALIBRATION CODE = 1	CO =	20.60

AREA CLASSIFIED.....LINES 425- 644 (BY 2)
COLUMNS 1- 222 (BY 2)

Figure V-4. The Classification Study Identification Table

```
DEMO                    LABORATORY FOR APPLICATIONS OF REMOTE SENSING          MAR  7,1973
PHILLIPS                          PURDUE UNIVERSITY                        12 31 34 PM
                                                                           LARSYS VERSION 3

     *PRINTRESULTS
     RESULTS DISK
     PRINT NOLIST,TRAIN(F),OUTLINE(TRAIN)
     SYMBOLS C,C,S,S,O,H,D,W,F
     DATA

YOU HAVE SELECTED THE FOLLOWING DISPLAY OPTIONS

     OUTLINE TRAINING FIELDS
     PRINT TRAINING FIELD PERFORMANCE
     DO NOT LIST TRAIN AND TEST FIELDS
     USE CLASSIFICATION RESULTS FROM DISK

PRINTRESULTS SUPERVISOR INFORMATION....

     CLASSIFICATION STUDY.....  306645050
     NUMBER OF MAPS.....  1
     NUMBER OF TRAINING FIELDS SAVED...  16
     NUMBER OF TEST FIELDS SAVED.....  0
     NUMBER OF COPIES OF TABLES.....  1
```


Figure V-5. The Printresults Input Deck Summary

DEMO
PHILLIPS

LABORATORY FOR APPLICATIONS OF REMOTE SENSING
PURDUE UNIVERSITY

MAR 7,1973
12:32:33 PM
LARSYS VERSION 3

CLASSIFICATION STUDY 306645050
RUN NUMBER..... 71053900
FLIGHT LINE... CRN BLT LO FL210
TAPE/FILE NUMBER..... 1042/ 1
REFORMATTING DATE. AUG 16,1971

CLASSIFIED. MAR 7,1973
DATE DATA TAKEN... AUG 13,1971
TIME DATA TAKEN..... 1202 HOURS
PLATFORM ALTITUDE.. 5000 FEET
GROUND HEADING..... 180 DEGREES

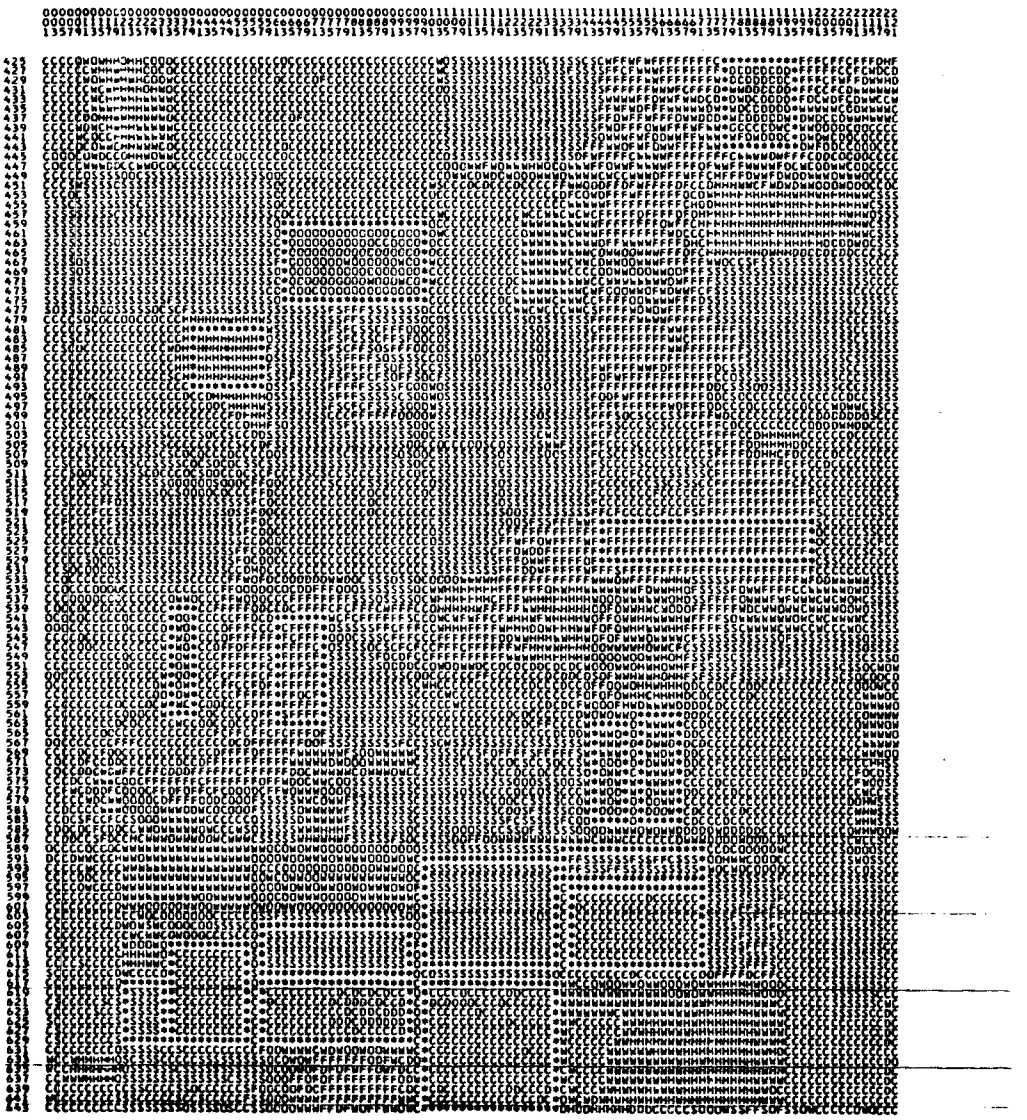
CHANNELS USED

CHANNEL 2	SPECTRAL BAND	0.48 TO	0.51 MICROMETERS	CALIBRATION CODE = 1	CO =	23.10
CHANNEL 8	SPECTRAL BAND	0.72 TO	0.92 MICROMETERS	CALIBRATION CODE = 1	CO =	24.85
CHANNEL 12	SPECTRAL BAND	9.30 TO	11.70 MICROMETERS	CALIBRATION CODE = 1	CO =	20.60

CLASSES

SYMBOL	CLASS	SYMBOL	CLASS
C	CORN1	H	HAY
C	CORN2	O	SA
S	SOYBEAN1	W	WHEAT
S	SOYBEAN2	F	FOREST
O	OATSCUT		

TRAINING FIELDS OUTLINED WITH A *



NUMBER OF POINTS DISPLAYED IS 12210

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Figure 6. The Classification Map

DEMO
PHILLIPS

LABORATORY FOR APPLICATIONS OF REMOTE SENSING
PURDUE UNIVERSITY

MAR 7,1973
12 32 38 PM
LARSYS VERSION 3

CLASSIFICATION STUDY 306645050 CLASSIFIED. MAR 7,1973

CHANNELS USED

CHANNEL 2	SPECTRAL BAND 0.48 TO 0.51 MICROMETERS	CALIBRATION CODE = 1	CO = 23.10
CHANNEL 8	SPECTRAL BAND 0.72 TO 0.92 MICROMETERS	CALIBRATION CODE = 1	CO = 24.85
CHANNEL 12	SPECTRAL BAND 9.30 TO 11.70 MICROMETERS	CALIBRATION CODE = 1	CO = 20.60

CLASSES

	CLASS		CLASS
1	CORN1	6	HAY
2	CORN2	7	SA
3	SOYBEAN1	8	WHEAT
4	SOYBEAN2	9	FOREST
5	OATSCUT		

TRAINING FIELD PERFORMANCE

FIELD DESIG.	GROUP	NO OF SAMPS	PCT. CORCT	NUMBER OF SAMPLES CLASSIFIED INTO CORN1	CORN2	SOYBEAN1	SOYBEAN2	OATSCUT	HAY	SA	WHEAT	FOREST
L-6	CORN1	81	86.4	70	11	0	0	0	0	0	0	0
L-7	CORN1	90	50.0	45	17	0	0	0	0	28	0	0
D*5	CORN2	192	70.3	40	135	0	0	9	0	8	0	0
H*1	CORN2	112	78.6	22	88	0	0	0	0	2	0	0
L-5	SOYBEAN1	20	100.0	0	0	20	0	0	0	0	0	0
L-8	SOYBEAN1	72	95.8	0	0	69	3	0	0	0	0	0
D*6	SOYBEAN2	160	90.6	0	0	14	145	1	0	0	0	0
H*2	SOYBEAN2	34	52.9	1	0	6	18	0	0	0	0	9
F-9	OATSCUT	119	93.3	0	4	0	0	111	0	0	4	0
K-4	OATSCUT	20	55.0	0	1	0	0	11	0	0	8	0
G*2	OATSCUT	27	40.7	0	0	0	0	11	0	1	15	0
R-1	HAY	40	100.0	0	0	0	0	0	40	0	0	0
E*1	SA	64	71.9	4	3	0	0	1	0	46	9	1
G*3	WHEAT	40	75.0	0	0	0	0	5	0	5	30	0
H-6	FOREST	50	86.0	0	4	0	2	1	0	0	0	43
E*2	FOREST	78	100.0	0	0	0	0	0	0	0	0	78
	TOTAL	1199		182	263	109	168	150	40	90	66	131

OVERALL PERFORMANCE(960/ 1199) = 80.1

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V-8

Figure V-7. The Training Field Performance Table

DEMO
PHILLIPS

LABORATORY FOR APPLICATIONS OF REMOTE SENSING
PURDUE UNIVERSITY

FEB 15,1973
2 36 39 PM
LARSYS VERSION 3

THIS IS A TEST FOR THE LARSYS USERS MANUAL

CLASSIFICATION STUDY 304652562

TRAINING CLASSES		CHANNELS FROM STATISTICS			
SYMBOL	CLASS	CHANNEL NO.	SPECTRAL BAND		CAL. CODE
1	CORN1	2	0.48	0.51	1
2	CORN2	8	0.72	0.92	1
3	SOYBEAN1	12	9.30	11.70	1
4	SOYBEAN2				
5	OATSCUT				
6	HAY				
7	SA				
8	WHEAT				
9	FOREST				

Figure V-8. An Illustration of the "COMMENTS" Initialization Function

```
DEMO                    LABORATORY FOR APPLICATIONS OF REMOTE SENSING          MAR  7,1973
PHILLIPS                          PURDUE UNIVERSITY                        11 04 48 AM
                                                                           LARSYS VERSION 3

-RUNTABLE
DATA
RUN(71053900),TAPE(1042),FILE(1)
RUN(71053001),TAPE(1042),FILE(2)
RUN(66000600),TAPE(1042),FILE(3)
END
```

PERSONAL RUNTABLE ENTRIES

RUN	TAPE	FILE
71053900	1042	1
71053001	1042	2
66000600	1042	3

Figure V-9. The User Runtable Listing

APPENDIX VI

UNIVERSAL IMAGE TAPES

APPENDIX VI

UNIVERSAL IMAGE TAPES

In addition to LARSFRIS data tapes, LARSFRIS accesses universal image tapes. The tapes contain four bands of multi-spectral data obtained from Landsat. The use of the universal image tapes follows that of LARSYS data except the structure of the header records differ. A detailed explanation of that header record follows.

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IMAGE UNLOAD TAPE DESCRIPTION

EACH IMAGE UNLOAD TAPE HAS A RANDOM NUMBER OF FILES ON IT. EACH FILE HAS A HEADER RECORD OF 3060 BYTES AND 117 DATA RECORDS. EACH DATA RECORD IS FOR EACH LINE FOR THE SITE. THE DESCRIPTION FOR EACH RECORD TYPE IS AS FOLLOWS:

UNLOAD TAPE HEADER RECORD FORMAT

BYTE	CONTENTS	DESCRIPTION
1-32	LACIE NDPF ...	COMPUTING SYSTEM ID-EBCDIC
33-38	XXXXXX	6-DIGIT UNLOAD TAPE NUMBER
39-52	PYYDDDHHMMSSTH	RUNID (EBCIDIC)
53-60	ERTS MSS ...	SENSOR ID-EBCDIC
61-63		DATE OF THIS TAPE GENERATION
61		DAY OF MONTH - BINARY
62		MONTH NUMBER - BINARY
63		YEAR - LAST 2 DIGITS - BINARY
64	S	DAILY TAPE SERIAL NUMBER - BINARY
65-66		ERTS MISSION NUMBER - BINARY
		1 = ERTS A
		2 = ERTS B
67-68		SITE - BINARY (SAMPLE SEGMENT NUMBER)
		RANGE 1-50CC
69	00000000	LINE - BINARY
70	00000000	RUN - BINARY
71-72		ORBIT NUMBER OF NEW DATA - BINARY
73-80		TIME OF FIRST SCAN IN THIS JOB (FOR LACIE THIS IS THE TIME OF THE CENTER SCAN OF THE ERTS SCENE CONTAINING THE SAMPLE SEGMENT TO THE LAST TEN SECONDS)
73-74		TENTHS OF SECONDS X 1000 - BINARY
75		SECONDS - BINARY
76		MINUTES - BINARY
77		HOURS - BINARY
78		DAY OF MONTH - BINARY
79		MONTH NUMBER - BINARY
80		YEAR - LAST 2 DIGITS - BINARY
81-88		BANDS ACTIVE IN THIS JOB, 1 BIT PER BAND LEFT TO RIGHT (MSB TO LSB). VIDEO DATA ALWAYS APPEARS IN THE ORDER INDICATED HERE. 1 = ACTIVE.
81	11110000	BANDS 1,2,3,4 ACTIVE
82-88	0	BANDS 5-64 NOT APPLICABLE TO LACIE
89	0	PROCESSING FLAG - R/W DATA - BINARY
90	4	NUMBER OF BANDS IN THIS JOB - BINARY
91	8	NUMBER OF BITS IN A PICTURE ELEMENT BINARY
92-93	1	ADDRESS OF START OF VIDEO DATA GIVES LOCATION OF START OF VIDEO WITHIN SCAN - BINARY
94-95	0	ADDRESS OF START OF FIRST CALIBRATION AREA WITHIN THE SCAN - BINARY
96-97	196	NUMBER OF VIDEO ELEMENTS PER SCAN WITHIN A SINGLE BAND - BINARY
98-99	0	NUMBER OF CALIBRATION ELEMENTS IN THE FIRST CALIBRATION AREA WITHIN THE SCAN IN A SINGLE BAND - BINARY
100-101	900	PHYSICAL RECORD SIZE IN BYTES - BINARY
102	0	NUMBER OF BANDS PER PHYSICAL RECORD OF DATA SET STARTING WITH THE SECOND RECORD OF THE DATA SET - BINARY
103	0	NUMBER OF PHYSICAL RECORDS PER SCAN PER BAND - BINARY. ZERO UNLESS THE ELEMENTS PER BAND IS GREATER THAN 3K.
104	1	NUMBER OF RECORDS TO MAKE A COMPLETE DATA SET - BINARY
105-106	70	LENGTH OF ANCILLARY BLOCK IN BYTES - BINARY
107	0	DATA ORDER INDICATOR - BINARY 0 = VIDEO ORDERED BY BAND
108-109	1	START PIXEL NUMBER NUMBER OF THE FIRST PIXEL PER SCAN ON THIS TAPE REFERENCED TO THE START OF THE SCAN - BINARY
110-111	196	STOP PIXEL NUMBER NUMBER OF THE LAST PIXEL PER SCAN ON THIS TAPE REFERENCED TO THE START OF THE SCAN - BINARY
112-623		COEFFICIENTS AND EXPONENTS-OF-TEN TO LINEARLY TRANSLATE PARAMETER VALUES FROM UP TO 64 BANDS TO ENGINEERING UNITS. TWO BYTES PER COEFFICIENT OR EXPONENT WITH EACH PAIR OF BYTES EXPRESSED IN SIGNED BINARY. (MSB A SIGN BIT: 0=+, 1=-. (REMAINING 15 BITS STRAIGHT BINARY).
112-119	0	A0 COEFFICIENTS FOR BANDS 1-4
120-239	0	BANDS 5-64 NOT APPLICABLE TO LACIP
240-247	0	E0 EXPONENTS OF TEN FOR BANDS 1-4
248-367	0	BANDS 5-64 NOT APPLICABLE TO LACIE
368-369	1	A1 COEFFICIENT FOR BAND 1
370-371	1	A1 COEFFICIENT FOR BAND 2
372-373	1	A1 COEFFICIENT FOR BAND 3
374-375	1	A1 COEFFICIENT FOR BAND 4
376-495	0	BANDS 5-64 NOT APPLICABLE TO LACIE
496-503	0	E1 EXPONENTS OF TEN FOR BANDS 1-4 WHERE FOR EACH BAND Y = ENGINEERING UNITS C = PARAMETER VALUE: Y = A0*10**E1+ C*A1 *10**E1
504-623	0	BANDS 5-64 NOT APPLICABLE TO LACIE
624-687	TO BE SUPPLIED BY JSC	COLOR CODE INFORMATION ONE BYTE PER BAND IN SAME ORDER AS CHANNEL ACTIVE ON THIS TAPE INDICATOR - BINARY. 0 = NO COLOR ASSIGNMENT

688-751	0	SCALE FACTOR - ONE BYTE PER BAND IN SAME ORDER AS CHANNEL ACTIVE ON THIS TAPE INDICATOR - BINARY 0 = NOT ACTIVE
752	0	OFFSET CONSTANT - BINARY
753	16	WORD SIZE OF GENERATING COMPUTER. THIS IS THE SMALLEST QUANTITY IN BITS THAT THE COMPUTER CAN WRITE ON TAPE.
754-1777		SHORTEST AND LONGEST WAVE-LENGTH OF EACH BAND - EBCDIC. EIGHT BYTES PER LIMIT. 16 BYTES PER BAND - MILI MICRONS
754-769	0000050000000600	BAND 1 - EBCDIC
770-785	0000060000000700	BAND 2 - EBCDIC
786-801	0000070000000800	BAND 3 - EBCDIC
802-817	0000080000001100	BAND 4 - EBCDIC
818-1777	0	BANDS 5-64 NOT APPLICABLE TO LACIP - EBCDIC
1778	1	NUMBER OF DATA SETS PER PHYSICAL RECORD BINARY
1779-1780	0	ADDRESS OF START OF SECOND CALIBRATION WITHIN A SCAN - BINARY
1781-1782	0	NUMBER OF CALIBRATION ELEMENTS IN THE SECOND CALIBRATION AREA WITHIN THE SCAN IN A SINGLE BAND - BINARY
1783	0	CALIBRATION SOURCE INDICATOR - BINARY
1784	0	FILL ZERO.
1785-1786	4	NUMBER OF BANDS IN THE FIRST RECORD OF THE DATA SET - BINARY
1787-1788	196	TOTAL NUMBER OF ELEMENTS PER SCAN PER BAND - BINARY
1789-1790	1	PIXEL SKIP FACTOR - THE QUANTITY TO BE ADDED TO THE NUMBER OF THE LAST PIXEL PROCESSED TO YIELD THE NUMBER OF THE NEXT PIXEL TO BE PROCESSED - BINARY 1 = PROCESS EVERY PIXEL
1791-1792	1	SCAN SKIP FACTOR - THE QUANTITY TO BE ADDED TO THE NUMBER OF THE LAST SCAN PROCESSED TO YIELD THE NUMBER OF THE NEXT SCAN TO BE PROCESSED - BINARY. 1 = PROCESS EVERY SCAN
1793-2940		GENERAL INFORMATION. INFORMATION IN EBCDIC GENERATED TO SATISFY USER REQUIREMENTS. CONTENTS WILL BE UNIQUE FOR EACH USER AND WILL DEPEND NOT ONLY ON THE SENSOR, BUT ALSO ON THE SPECIFICATIONS OF THE USER FOR WHOM THE TAPE IS GENERATED. BYTES FOR WHICH USER SPECIFIES NO REQUIREMENTS WILL CONTAIN FILL ZEROS.
1793-2086		FILL ZEROS
2087-2184		GENERAL ANNOTATION BYTE ASSIGNMENT FOR ERTS LACIE
2087-2094	←X.XXXXX	PEAK SHARPNESS - EBCDIC
2095-2102	←X.XXXXX	NORMALIZED PEAK TO BACKGROUND RATIO - EBCDIC
2103		MANUAL REGISTRATION FLAG 0 = AUTOMATIC 1 = MANUALLY ASSISTED
2104		ZERO FILL FLAG - BINARY 0 = THE SAMPLE SEGMENT CONTAINS NO ZERO FILL DATA 1 = PART OF THE SAMPLE SEGMENT CONTAINS ZERO FILL DATA
2105-2106		ORBIT NUMBER OF REFERENCE DATA SET - BINARY (NOT USED = 0)
2107-2109		ZERO FILL
2110		CLOUD COVER - BINARY - PERCENT OF 10X11 NM SEARCH AREA COVERED BY CLOUDS
2111		ZERO FILL
2112-2120		ERTS SCENE/FRAME ID NUMBER FOR REFERENCE DATA SET - EBCDIC - ADDDHHMMS (SEE BYTES 2123-2131 FOR CONTENT)
2121		ZERO FILL
2122		FLAG INDICATING WHETHER A REFERENCE SCENE HAS BEEN USED FOR REGISTRATION - BINARY 0 = HASN'T BEEN USED 1 = HAS BEEN USED
2123-2131		ERTS SCENE-FRAME ID NUMBER FOR NEW DATA-EBCDIC-ADDDHHMMS
2123		A = ERTS MISSION NUMBER
2124-2126		DDD = DAY NUMBER RELATIVE TO LAUNCH AT TIME OF OBSERVATION
2127-2128		HH = HOUR AT TIME OF OBSERVATION
2129-2130		MM = MINUTE AT TIME OF OBSERVATION
2131		S = TENS OF SECONDS AT TIME OF OBSERVATION
2132		ZERO FILL
2133		DATA QUALITY CLASSIFICATION 0 = ACCEPTABLE 1 = MARGINAL
2134-2145		CENTER OF SAMPLE SEGMENT - EBCDIC RIGHT JUSTIFIED AND PADDED WITH ZEROS
2134-2139		LATITUDE
2134		N = NORTH S = SOUTH
2135-2137		DEGREES - INTEGRAL
2138-2139		MINUTES - INTEGRAL
2140-2145		LONGITUDE
2140		E = EAST W = WEST
2141-2143		DEGREES - INTEGRAL
2144-2145		MINUTES - INTEGRAL

2146-2149		BAND SYNC STATUS - BINARY - THE NUMBER OF LINES FOR WHICH SYNC COULD NOT BE MAINTAINED DURING PRE-PROCESSING BY BAND
2146		BAND 1
2147		BAND 2
2148		BAND 3
2149		BAND 4
2150-2156		ZERO FILL
2157-2170		SUN ANGLE - EBCDIC
2157-2162	SUN EL	SUN EL - EBCDIC
2163-2164		SUN ELEVATION - INTEGRAL DEGREES EBCDIC
2165-2167	AZ	AZ - EBCDIC
2168-2170		SUN AZIMUTH - INTEGRAL DEGREES - EBCDIC
2171-2178		TIME AND DATE OF LAST UPDATE TO CONTROLLING INFORMATION - EBCDIC - YDDDHHMM
2179-2200		ZERO FILL
2201-2208		SUN ANGLES ARE 2 BYTE BINARY
2201-2202		SUN ANGLE FOR RSEG CHANNELS 1-4
2203-2204		SUN ANGLE FOR RSEG CHANNELS 5-8
2205-2206		SUN ANGLE FOR RSEG CHANNELS 9-12
2207-2208		SUN ANGLE FOR RSEG CHANNELS 13-16
2209-2248		ZERO FILL
2249-2253	YYDDD	1ST ACQUISITION DATE (CHARACTERS)
2254-2256	X	AVERAGE SOIL GREENNESS FOR 1ST ACQUISITION (BINARY NUMBER)
2257-2261	YYDDD	2ND ACQUISITION DATE OR BLANKS
2262-2264	X	AVERAGE SOIL GREENNESS FOR 2ND ACQUISITION
2265-2269	YYDDD	3RD ACQUISITION DATE OR BLANKS
2270-2272	X	AVERAGE SOIL GREENNESS FOR 3RD ACQUISITION
2273-2277	YYDDD	4TH ACQUISITION DATE OR BLANKS
2278-2280	X	AVERAGE SOIL GREENNESS FOR 4TH ACQUISITION
2281-2550		ZERO FILL
2551-2642	0	GENERAL ANNOTATION BYTE ASSIGNMENTS FOR THE CYBER AT JSC
2643-2940		GENERAL ANNOTATION BYTE ASSIGNMENTS FOR THE PRODUCTION FILM CONVERTER
2643-2658		BIAS FACTORS AND SCALING FACTORS - SIGNED BINARY. FOUR BYTES PER CHANNEL, WHERE FIRST TWO BYTES = BIAS FACTOR; SECOND TWO BYTES = SCALING FACTOR. EACH FACTOR HAS AN IMPLIED DECIMAL POINT TO THE LEFT OF THE LEAST SIGNIFICANT DECIMAL DIGIT. IF MSB = 1 THE FACTOR IS NEGATIVE; IF THE MSB = 0 THE FACTOR IS POSITIVE.
2643-2646		CHANNEL 1
2643-2644		BIAS FACTOR
2645-2646		SCALING FACTOR
2647-2650		CHANNEL 2
2647-2648		BIAS FACTOR
2649-2650		SCALING FACTOR
2651-2654		CHANNEL 3
2651-2652		BIAS FACTOR
2653-2654		SCALING FACTOR
2655-2658		CHANNEL 4
2655-2656		BIAS FACTOR
2657-2658		SCALING FACTOR
2659-2759		ZERO FILL
2759	1	N THOUSAND SCAN LINES PER FRAME - BINARY
2760-2783		USER ID
2784-2789		BLANKS
2790-2792	0	ALTITUDE IN METERS - BINARY
2793-2794	0	GROUND SPEED IN MET/SEC - BINARY
2795	1	SCAN TYPE - BINARY 00000000 = RAW DATA 00000001 = SMOOTHED DATA
2796	0	ANGLE OF ABC IN DEGREES - BINARY
2797	1	CAMERA - BINARY 00000000 = 70 MM 00000001 = 5 INCH
2798	0	INPUT DEVICE - BINARY 00000000 = 9-TRACK 00000001 = HIGH DENSITY TAPE
2799	2	TRUNCATION 0 = 2 LOW ORDER BITS 1 = 2 HIGH ORDER BITS 2 = NO TRUNCATIONS
2800-2807		CHANNELS REQUESTED. 1 BIT PER CHANNEL - BINARY
2800-2801	1111000000000000 (1 ACQ) 1111111100000000 (2 ACQ) 1111111111110000 (3 ACQ) 1111111111111111 (4 ACQ)	CHANNELS 1, 2, 3, 4 REQUESTED
2802-2807	0	CHANNELS 16-64 NOT APPLICABLE FOR UNLOAD
2808	0	PROCESSING MODE - BINARY 00000000 = SERIALLY 00000001 = CONCURRENTLY
2809-2824	0	DENSITY FOR EIGHT SATURATED COLORS - TWO BYTES PER SATURATED COLOR - BINARY WHERE FIRST BYTE = LOW INTENSITY LEVEL OF THE RANGE; SECOND BYTE = HIGH THE RANGE OF THE INTENSITY LEVEL IS 0 TO 255
2809-2810		RED DENSITY RANGE
2811-2812		BLUE DENSITY RANGE
2813-2814		GREEN DENSITY RANGE
2815-2816		MAGENTA DENSITY RANGE
2817-2818		CYAN DENSITY RANGE
2819-2820		YELLOW DENSITY RANGE
2821-2822		WHITE DENSITY RANGE
2823-2824		BLACK DENSITY RANGE

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2825	TO BE SUPPLIED BY JSC	FILM PROCESSING FLAG 0 = PROCESS THIS FILE 1 = SKIP THIS FILE
2826-2873	0	FILL ZERO
2874	0	COLOR SELECT* - BINARY 0 = NO COLOR 1 = ASSIGNED COLOR 2 = FALSE COLOR 3 = SATURATED COLOR
2875	0	IMAGE FORMAT* - BINARY 0 = SINGLE IMAGE 1 = ENHANCED IMAGES 2 = ABUT IMAGES 3 = OFFSET IMAGES
2876	6	REPEAT OF PIXELS PER SCAN - BINARY 0 = NONE 1 = 1 REPEAT 2 = 2 REPEATS N = N REPEATS
2877	8	REPEAT OF SCAN - BINARY 0 = NONE 1 = 1 REPEAT 2 = 2 REPEATS N = N REPEATS
2878-2881		PARTIAL SCAN - BINARY
2878-2879	0	START PIXEL NUMBER
2880-2881	0	STOP PIXEL NUMBER (IF BYTES 2787-2881 CONTAIN ALL ZEROS, FULL SCAN IS EXPECTED - NOT PARTIAL)
2882-2883	0	SENSOR SCAN RATE IN SCANS/SECOND - BINARY
2884	0	PIXEL SIZE - BINARY
2885-2886	0	ANGLE OF DRIFT - BINARY
2885		+-INTEGER DEGREES
2886		FRACTION
2887-2940	0	FILL ZEROS
2941-3000	LACIE NDPF •••	TITLE - USER DESIGNATED IDENTIFICATION
3001-3060	0	FILL ZEROS, MAKES THE RECORD AN INTEGRAL NUMBER OF COMPUTER WORDS. THESE BYTES MUST NEVER CONTAIN DATA.

DATA RECORD FORMAT

BYTES	CONTENTS
1 - 2	RECORD COUNTER
3 - 72	ANCILLARY BLOCK
73 - 368	BAND 1 DATA FOR LINE
369 - 564	BAND 2 DATA FOR LINE
565 - 760	BAND 3 DATA FOR LINE
761 - 856	BAND 4 DATA FOR LINE
857 - 900	ZERO FILLED