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THE WAVEFORM PROCESSING SYSTEM (WPS). VOLUME IV, PART 2.(U)
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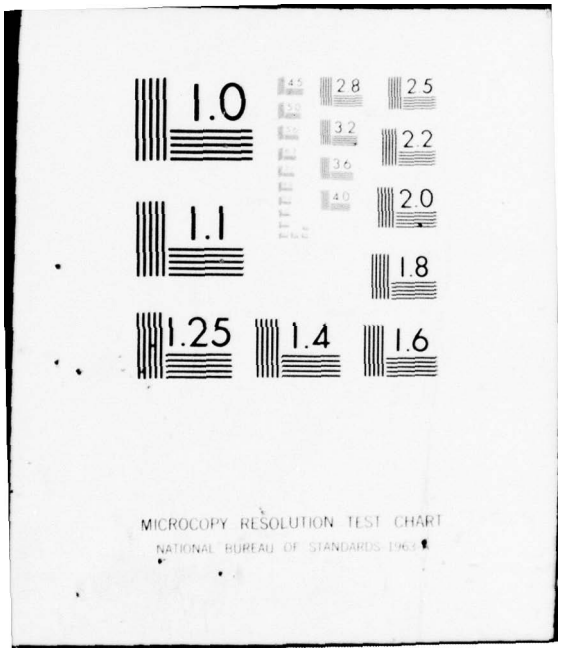
UNCLASSIFIED PAR-76-6-VOL-4-PT-2 RADC-TR-76-224-4-2 NL

1 OF 4
AD A038330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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963

AD A038330

RADC-TR-76-224, Volume IV, Part 2
Final Technical Report
February 1977

THE WAVEFORM PROCESSING SYSTEM (WPS)

Pattern Analysis and Recognition Corporation

DDC
APR 6 1977

Approved for public release; distribution unlimited.

ROME AIR DEVELOPMENT CENTER
AIR FORCE SYSTEMS COMMAND
GRIFFISS AIR FORCE BASE, NEW YORK 13441

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This report consists of Volume IV, Parts 1 through 3.

Part 1 contains Sections 1 - 6.

Part 2 contains Section 7 (pages 7-0001 through 7-0610).

Part 3 contains Section 7 (pages 7-0612 through 7-1184).

This report has been reviewed by the RADC Information Office (OI) and is releasable to the National Technical Information Service (NTIS). At NTIS it will be releasable to the general public including foreign nations.

This report has been reviewed and is approved for publication.

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Waveform Analysis
Feature Extraction
Pattern Recognition

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*:
This report contains the computer software documentation for the Waveform Processing System (WPS) developed by Pattern Analysis and Recognition Corporation for the Rome Air Development Center. The Waveform Processing System consists of (1) algorithms for performing mathematical operations on waveform data, (2) a language for extracting feature vectors from the waveform, and (3) algorithms for analyzing these vectors to develop pattern classification logic.

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Block 18.

This report consists of Volume IV, Parts 1 through 3.

Part 1 contains Sections 1 - 6.

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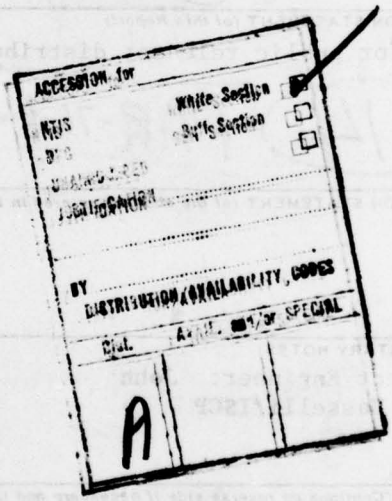

SECTION 7

PROGRAM DESCRIPTIONS

Program Name: ACEXEC

Program Type: Subroutine

Program Description:

ACEXEC handles all of the I/O in conjunction with isomorphic tree transformations. It acts as the executive for all algebraic calculus functions.

Inputs:

a) Number of passes per wave
b) Address of processor block

Outputs:

a) I/O block address*

*For a discussion of I/O block, see WPS document, "How to Write Routines Utilizing the Algebraic Calculus Executive."

Program contained in overlay(s):

RCTIFY
LIMITR

Program Name: ADD

Program Type: Subroutine

Program Description:

ADD is a routine used in pass-1 of the PARLAN compiler to concatenate the current character onto the current symbol.

Inputs:

Current character

Outputs:

Current symbol is updated to reflect new character addition

Program contained in overlay(s):

SYNTAX

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Program Name: ADDC Program Type: Subroutine

Program Description:

ADDC takes the current symbol in the input string of a user response to a LINKGO question and concatenates it onto the current symbol.

Inputs:

Current symbol

Outputs:

Variable SYMBOL is modified to contain current symbol

Program contained in overlay(s):

LINKGO

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Program Name: ADDIT Program Type: Subroutine

Program Description:

Subroutine ADDIT will add X points to BMARK. BMARK is the pointer to either BEGMRK or ENDMRK

Inputs:

Number of points

Outputs:

Updated BMARK

Program is contained in overlay(s):

SEGMNT

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Program Name: ADDNOD Program Type: Subroutine

Program Description:

ADDNOD will add nodes to a lowest node in the current logic tree.

Inputs:

1). Current logic tree file opened for update.

2). One page of logic tree file core resident at TRETBC.

3). Node number where nodes are to be added.

4). Number of nodes to add.

Outputs:

1). Nodes are added to logic tree table in core located at TRETBC.

Program is contained in overlay(s):

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Program Name: ADDSYM Program Type: Subroutine

Program Description:

ADDSYM adds class symbols to the class symbol file for a node in the current logic tree.

Inputs:

Logic tree
Node number
Class symbols

Outputs:

Class symbols are added to the class symbol file.

Program is contained in overlay(s):

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Program Name: ADVANC Program Type: Subroutine

Program Description:

Subroutine ADVANC will ask how far to advance ahead or after ; the marker is to be placed in relation to the current window. Ahead for begin mark - after for end mark.

Inputs:

Advance Distance

Outputs:

ADVAHD	Begin Parameter
or	
ADVAFT	End Parameter

Program is contained in overlay(s):

SEGOPT

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Program Name: ALLNOD Program Type: Subroutine

Program Description:

ALLNOD returns all the nodes of a specified tree (plus the number of nodes) in a buffer supplied by the caller. The order of the nodes is "bottom-up" so that a transformation of the tree could make use of the cumulative data stored in a node that has sub-nodes. The order goes from lowest-level nodes up, and the tree is traversed from left to right.

Inputs:

The identity of a system data tree and the address of a (user-supplied) buffer which should be at least 501 words in size.

Outputs:

A permutation of all the nodes of the given tree and those nodes loaded (ASCII format) to the buffer. The first word contains the number of nodes.

Program is contained in overlay(s):

KLENUP

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Program Name: ALLTXT Program Type: Subroutine

Program Description:

If waveform or display text exists, ALLTXT retrieves the text and displays it on the top left region of the display area on the VG.

Inputs:

Address of X coordinate
Address of Y coordinate of line above waveform text

Outputs:

Modification of VG buffer

Program is contained in overlay:

SINGLE

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Program Name: AMPB Program Type: Subroutine

Program Description:

Subroutine AMPB will find whether any value in "BUF1" meets the threshold criterion for BEGMRK.

Inputs:

A call to AMPB assumes that the data is in "BUF1", the number of points is in "NUM" and that the threshold logic for ENDMRK is in LOGICB.

Outputs:

"VALUE" contains amplitude

Program is contained in overlay(s):

SEGMNT

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Program Name: AMPE

Program Type: Subroutine

Program Description:

Subroutine AMPE will find whether any value in "BUF1" meets the threshold criterion for ENDMRK.

Inputs:

A call to AMPE assumes that the data is in "BUF1", the number of points is in "NUM" and that the threshold logic for ENDMRK is in LOGICE.

Outputs:

"VALUE" contains AMPE

Program is contained in overlay(s):

SEGMNT

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Program Name: AREAS Program Type: Subroutine

Program Description:

AREAS and its companion subroutine SQUARE generate Vector General display commands which divide the WPS display area into a large square region and a small rectangular one, and display messages in predefined areas within the smaller region.

Inputs:

a) Address of message

b) Length of message

c) (x,y) coordinates where message is to be displayed

Outputs:

a) Partitioned WPS display area

b) Displayed message

Program is contained in overlay(s):

PLOT2D

PLT1DA

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Program Name: ASC2FL Program Type: Subroutine

Program Description:

ASC2FL converts an ASCII string to a double precision floating point number.

Inputs:

Address of ASCII string
Address of floating point (double precision)number

Outputs:

Double precision floating point number

Program is contained in overlays:

RQSSTF, HSCALE, SEGWAV, CNGHDR, CARWAV, MRQSTF, SELSET, SPCOPT, SPCSET, LINKGO, PLAYBK

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Program Name: ASC2FS Program Type: Subroutine

Program Description:

ASC2FS converts an ASCII list of single-precision floating point numbers to their binary equivalents.

Inputs:

List of single-precision floating point numbers in ASCII format; each number delimited by an ASCII '&' and the list terminated by a space.

Outputs:

An output buffer containing the binary equivalents of the input ASCII list.

Program is contained in overlay(s):

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Program Name: ASCBI Program Type: Subroutine

Program Description:

ASCBI converts a string of ASCII characters separated by commas (each number can consist of up to 5 decimal numerals) into a string of 16-bit binary numbers.

Inputs:

ASCII string address
Binary numbers address
No. characters in string
No. binary numbers output

Outputs:

Binary number string

Program is contained in overlays:

MRQSTF, SPCOPT, SELSEQ, MHSCAL, MVSCAL, MULTI, VSCALE

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Program Name: ASCBIN

Program Type: Resident Subroutine

Program Description:

ASCBIN converts 1-5 ASCII characters into a 16-bit binary number which they represent. Only positive numbers are output.

Inputs:

ASCII string address
Number of characters
Binary number address

Outputs:

Binary number 0 - 65,535

Program is contained in overlays:

All

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Program Name: ASCFP Program Type: Subroutine

Program Description:

ASCFP converts an alphanumeric ASCII string in exponential format into a single precision floating point number and stores it in accumulator AC0.

Inputs:

ASCII string

Outputs:

Single precision floating point number in AC0

Program contained in overlay(s):

PLT1DA

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Program Name: ASCLNG Program Type: Subroutine

Program Description:

ASCLNG converts an ASCII string into a long integer (32-bit binary number).

Inputs:

ASCII string address (first byte = byte count)
Long integer address (first word or high order address)

Outputs:

Long integer

Program is contained in overlay(s):

SELSET, PWAVEC, PRTRND

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Program Name: ASKOUT Program Type: SUBROUTINE

Program Description:

Subroutine ASKOUT will ask for the output tree name. This output tree may either be data type 77 or 132, depending on whether the output is a segmented tree or a marker tree. ASKOUT also allows variable messages to be sent or passed using SMSGXX.

If the output file name already exists, an error message is displayed, instructing the user to try again.

If the specified name doesn't already exist as a file, a file will be created with the given name.

Inputs:

If the output file tree name is going to be the same as the current tree name, the user should load parameter "otototot" with the 6-character current tree name; then if a carriage return is hit without any other input, "name otototot" will be accepted as the output tree name.

Outputs:

Parameter "otototot" will contain output tree name

Program is contained in overlay(s):

SEGOPT

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Program Name: ASKPOS Program Type: Subroutine

Program Description:

ASKPOS is a subroutine used by the MULTI overlay to receive position numbers from the user via VG input.

Inputs:

Address of message to be displayed

Outputs:

Position numbers loaded in KBUFA

Program is contained in overlays:

MULTI, MVSCAL, MHSCAL, MRQSTF

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Program Name: AVDCPW Program Type: Subroutine

Program Description:

Subroutine AVDCPW will calculate the average DC power. This is done by first subtracting the DC component, and then computing the power.

Inputs:

A call to AVDCPW assumes that the data are in "BUF1", that the number of points is in "NUM", and that the average DC power is returned to "VALUE".

Outputs:

"VALUE" contains average DC power.

Program is contained in overlay(s):

SEGMNT

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Program Name: AVE Program Type: Subroutine

Program Description:

Subroutine AVE will find the average value of a buffer and place the average in "VALUE".

Inputs:

A call to AVE assumes that the buffer to be operated on is "BUF1", and that the number of points is in "NUM".

Outputs:

"VALUE" contains average

Program is contained in overlay(s):

SEGMNT

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Program Name: AVGPWR Program Type: Subroutine

Program Description:

Subroutine AVGPWR will calculate the average power, and place the result into "VALUE".

Inputs:

A call to AVGPWR assumes that the data are in "BUF1", that the number of points is in "NUM", and that the average power is returned to "VALUE".

Outputs:

"VALUE" contains the average power

Program is contained in overlay(s):

SEGMNT

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Program Name: B2D Program Type: Subroutine

Program Description:

B2D converts a binary number to a 6-character (5 numerals preceded by space or negative sign) decimal ASCII representation.

Inputs:

Binary value
Output ASCII string address

Outputs:

ASCII representation (with preceding zeroes (ASCII 60's) in the character string)

Program is contained in overlay(s):

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Program Name: BEGMRK

Program Type: ENTRY #2 TO OVERLAY "SEGOPT"

General Description:

BEGMRK will display the "begin" menu. It will then sequence the user through all the questions that CRMARK (entry point #6) will need to create begin markers for waveform segments. These parameters are placed in PARLST and saved on disk prior to the exit from this section.

At the conclusion of the questions, THOPBG (entry point #4) is called. This will change the menu blanks and allow the user to correct any begin parameters. BEGMRK will sequence through the input options until all have been answered.

Inputs:

#	Parameter	
1	Criteria	(1) Cross correlation
		(2) Convolution
		(3) Rise in time window
		(4) Fall in time window
		(5) Amplitude level
		(6) Average value in time
		(7) Average power in time
		(8) Average A-C power in time
		(9) Zero crossing
2	Width of sliding window	
3	Threshold	
4	Threshold logic (LT, LE, EQ, GE, GT, NE)	
5	Advance of window	
6	Window slide advance	
7	New prototype for cross correlation or convolution	

Outputs:

Parameters to PARLST

Program is contained in overlay(s):

SEGOPT

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Program Name: BIN20 Program Type: Subroutine

Program Description:

BIN20 converts a 16-bit value to its octal ASCII equivalent.

Inputs:

A 16-bit value (a word)

Outputs:

An octal ASCII equivalent of the 16-bit value

Program is contained in overlay(s):

ERRORS

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Program Name: BINCON Program Type: Subroutine

Program Description:

BINCON allocates a one-dimensional matrix in core for each class in the vector dataset and calls FILLBINS to load data into each matrix. A matrix represents a set of one-space histogram bins (ranges of data). FILLBINS counts up the number of vectors in each class that fall into these bins. BINCON then finds the largest value in each matrix and in all matrices and stores them for future reference.

Input:

The output of "HISTOGRAM"

Output:

a) A core histogram of each class

b) The maximum bin size of each class

c) The maximum bin size of all classes

d) A modified class information buffer (see histogram)

Program contained in overlay(s):

PLT1DA

PLT1DB

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Program Name: BINPAR Program Type: Subroutine

Program Description:

BINPAR changes the bin parameters of a one-space histogram plot. The bin parameters are bin size and number of bins. (Bins are ranges of data. A histogram counts up the number of dataset vectors that are within these ranges.)

Input:

a) Output of "HISTOGRAM"

Outputs:

a) New bin size and/or number of bins

b) New histogram plot

Program contained in overlay(s):

PLT1DA

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Program Name: BLDISP Program Type: Subroutine

Program Description:

This routine takes the ASCII code for the desired frame, and loads it into the menu region of the "UGBUF" in VG format

Inputs:

ASCII menu file loaded at "FRMLOC"

Outputs:

ASCII menu loaded in "VGBUF"

Program is contained in overlay(s):

None

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Program Name: BLDMOD Program Type: Program Development

Program Description:

BLDMOD writes the load module created by the DOS linker to the system disk as an overlay. The overlay is listed in the system space directory by its six-character DOS name with data type = 001.

Inputs:

Name of DOS linker created load module (on RK disk).

Outputs:

Overlay for WPS on the RP disk.

Program is contained in overlay(s):

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Program Name: BLKSEC Program Type: Subroutine

Program Description:

BLKSEC converts the number of waveform data words into the number of sectors. BLKSEC is a waveform I/O supporting subroutine.

Inputs:

1) Address of number of points

2) Address of number of sectors (for output)

Outputs:

Computation of number of sectors stored to the designated address

Program is contained in overlay(s):

THIS IS A COMMON ROUTINE CONTAINED IN MANY OVERLAYS

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Program Name: BLKSEC Program Type: Subroutine

Program Description:

BLKSEC converts the number of waveform data words into the number of sectors. BLKSEC is a waveform I/O supporting subroutine.

Inputs:

1) Address of number of points

2) Address of number of sectors (for output)

Outputs:

Computation of number of sectors stored to the designated address

Program is contained in overlay(s):

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Program Name: BMOVE

Program Type: SUBROUTINE

Program Description:

Subroutine BMOVE will move any number of bytes from one buffer to another.

Inputs:

Input buffer address
Number of bytes to be moved

Outputs:

Buffer 2

Program is contained in overlay(s):

SEGOPT
SEGMNT

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Program Name: BOOLOG Program Type: Overlay

Program Description:

BOOLOG creates boolean logic consisting of PDP-11 machine instructions compiled from a user-supplied boolean statement.

Inputs:

Data set

Outputs:

Boolean logic

Program is contained in overlay(s)

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Program Name: BOOREJ Program Type: Overlay

Program Description:

BOOREJ creates Boolean reject strategy for a logic node contained in the current logic tree.

Inputs:

Current logic tree

Outputs:

Boolean reject strategy at a node

Program is contained in overlay(s):

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Program Name: BUFMOV Program Type: Overlay

General Description:

BURMOV performs WPS initialization functions for memory management, boots GWORDS to high core, sets up local sector table and brings the WPS INIT frame up on the Vector General.

Inputs:

a) WPS "INIT" file

b) "GWORDS" file

Outputs:

A structured high core and loaded memory management registers.

Program contained in overlay(s):

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Program Name: BUFSYM Program Type: Subroutine

Program Description:

BUFSYM retrieves the list of symbols associated with the current logic node and stores them in the CSECT buffer for use by the plotting routines.

Library: None

Inputs:

External Variables: LOGNOD

Outputs:

List of symbols for classes at current logic node are stored in CSECT buffer

Limitations: Number of classes $\leq$ 50

Comments:

Program contained in overlay(s):

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Program Name: BYPASS Program Type: I/O Subroutine

Program Description:

BYPASS positions an opened file (input/output/update) N sectors away from the current position. The direction to skip (forward or backward) is taken from the sign of N.

Inputs:

1) Identity of file name

2) # of sectors to skip; forward is +, backward is -

3) Open file table entry of file name...(file must have been opened).

Outputs:

Modifications in the open file table entry for the named file reflecting a change of position with respect to the WPS I/O subroutines.

Program is contained in overlay(s):

THIS IS A COMMON ROUTINE CONTAINED IN MANY OVERLAYS

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Program Name: C2LSPC Program Type: Overlay

Program Description:

C2LSPC creates two-space OLPARS logic. It is a special form of CR2LOG applicable only to a Fisher pairwise modification discriminant plane plot. Two-space logic is a method of classifying vectors. A node of two-space logic consists of a set of projection vectors and threshold values. The vectors are determined by a boundary which was drawn on a two-space scatter plot. The boundary defines a region of the display. The purpose of the logic is to determine if a data set vector belongs to the given region. For each line segment in the boundary, there is a projection vector which reduces the N-dimensional data set vector to a single data point. If, after subtracting all the corresponding threshold values from the reduced vectors, the results are all found to be positive, the vector is said to belong to the node.

Inputs:

a) The boundaries from a two-space scatter plot

b) The Fisher pair (class symbols)

c) The current logic tree

d) The scatter plot scaling factors

Outputs:

a) Two-space logic (in core)

b) Number of sectors required to store the logic

Program contained in overlay(s):

C2LSPC

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Program Name: CALENT Program Type: Subroutine

Program Description:

CALENT converts the entry number (for a node) in the tree table (TRETBL) to an address in the table.

Inputs:

The tree table entry number of a node.

Outputs:

The address of the node's entry in the tree table. (Location TRETBL is the beginning of the tree table core image.)

Program is contained in overlay(s):

THIS IS A COMMON ROUTINE CONTAINED IN MANY OVERLAYS

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Program Name: CALIJ Program Type: Subroutine

Program Description:

For each dimension, CALIJ computes the probability of confusion for two given classes.

Inputs:

Files: SCRACH (DT0130) see file descriptions

Buffers: CSECT buffer - see buffer descriptions

Outputs:

Buffers: CSECT buffer - see buffer descriptions

Program is contained in overlay(s):

PCEVAL

Comments: This is a control and file manipulation routine. Other programs are called by this program to compute and store the metric.

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Program Name: CALIJK Program Type: Subroutine

Program Description:

CALIJK computes the probability of confusion between two classes for a given dimension.

Inputs:

Buffers: CSECT buffer - see buffer descriptions and program for details

Outputs:

Buffers: CSECT buffer - see buffer description and program for details

Program is contained in overlay(s):

PCEVAL

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Program Name: CALOUT Program Type: Spectral Subroutine

Program Description:

CALOUT receives an input waveform window, floats the data, and modifies the window as designated by the user (DC removal and weighting). CALOUT transforms this window to all the outputs desired and writes each one as a waveform to the corresponding output file. CALOUT is structured in such a manner as to avoid repeated computations. If the intermediate result of a desired output option is itself a desired output, it will be outputted before the additional computation is resumed.

Inputs:

1) The input waveform window

2) The spectral parameters

Outputs:

All the requested transforms written to their corresponding output files.

Program is contained in overlay(s):

SPCEXC

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Program Name: CARDIN Program Type: Subroutine

Program Description:

CARDIN is an interrupt driven driver executive for a DEC-CR11 card reader.

Inputs:

Deck of cards on card reader

Outputs:

ASCII representation of the next card on the card reader

Program contained in overlay(s):

CRDWPL

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Program Name: CARWAV Program Type: Overlay

Program Description:

CARWAV creates a waveform data set from card input. Values are punched as floating point, single-precision numbers. Tree text is also requested from the user for the created tree.

Inputs:

A card deck

Outputs:

A waveform tree

Program is contained in overlay(s):

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Program Name: CCPUT

Program Type: Spectral Analysis Subroutine

Program Description:

CCPUT formats and writes the waveform(s) from common storage to the specified output file(s).

Inputs:

1) Output tree name

2) Output type flag: imaginary/real/complex <--> -1/0/1

3) # of points in the waveform

4) Change domain flag: no change/change <--> 0/1

5) Domain of series: temporal/spectral <--> 0/1

6) Data points in common I/O buffer 'BUFFER'

7) Name of current low node being processed within tree

Outputs:

A WPS disk formatted waveform written to the output file identified by the output tree and node from the input list. The sampling rate of the tree is written to the tree's directory entry for the first waveform output.

Program is contained in overlay(s):

SPCEXC

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Program Name: CDA Program Type: Subroutine

Program Description:

CDA will convert a two-word positive integer to a decimal ASCII string.

Inputs:

Two-word positive integer

Outputs:

Decimal ASCII string

Program is contained in overlay(s):

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Program Name: CHECKB Program Type: SUBROUTINE

Program Description:

Subroutine CHECKB will check to see if all "begin mark" parameters in PARLST (FLAG=BEGINF) are set. If so, a NOP instruction is placed after the call, so the next instruction after the call will be executed. If not, a message is sent informing the user to pick BEGMRK, and then to place a RTS instruction after the call so there will be a return to the "light button" handler frame.

Inputs:

Outputs:

NOP or RTS instruction

Program is contained in overlay(s):

SEGOPT

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Program Name: CHECKE Program Type: SUBROUTINE

Program Description:

Subroutine CHECKE will check to see if all "end mark" parameters in PARLST (FLAG=ENDF) are set. If so, an NOP instruction is placed after the call, so that the next instruction after the call will be executed. If not, a message is sent informing the user to pick ENDMRK; it then places an RTS instruction after the call so that there will be a return to the "light button" handler frame.

Inputs:

Outputs:

NOP or RTS instruction

Program is contained in overlay(s):

SEGOPT

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Program Name: CHERFS Program Type: Subroutine

Program Description:

CHERFS tests for error conditions in the Multiple Wave display frame and outputs error messages to the VG if an error condition has been encountered.

Inputs:

File control block address in R4

Outputs:

Error return if an error or end of file is encountered

Program is contained in overlay(s):

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Program Name: CHGBIN Program Type: Subroutine

Program Description:

For a selected dimension, CHGBIN will change the number of bins used in the computation of the probability of confusion for that dimension.

Inputs:

N/A

Outputs:

Buffer: CSECT buffer (BINBUF) see buffer description

Program is contained in overlay(s):

PCIEVL

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Program Name: CHGLNE Program Type: Subroutine

Program Description:

CHGLNE modifies the number of classes that are plotted simultaneously in a one-space histogram plot. Its secondary entry point forces the display of the next page (group of classes) of that plot.

Inputs:

Output of histogram

Outputs:

a) New histogram paging scheme

b) New histogram plot of current page

Program is contained in overlay(s)

PLT1DA

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Program Name: CHGRNG Program Type: Subroutine

Program Description:

On command from the user, CHGRNG finds the full range or the three-sigma range of the selected data set. This will be used in the computation of the probability of confusion. This program is a control program; no direct I/O changes are made.

Inputs:

N/A

Outputs:

N/A

Program is contained in overlay(s):

PCIEVL

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Program Name: CHGSCA Program Type: Subroutine

Program Description:

CHGSCA changes the vertical scaling factor of a one-space histogram plot. The relative lengths of the lines that make up the bar graphs can be forced to depend on the maximum value being represented in each class of the data set, or the maximum value in the entire data set.

Inputs:

The outputs of HISTOGRAM and BINCON

Outputs:

A new histogram plot

Program contained in overlay(s):

PLT1DA

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Program Name: CHKEND Program Type: Subroutine

Program Description:

CHKEND checks to see if the number of bytes requested exceeds allocated space in the VG buffer, giving an error return if it does.

Inputs:

File control block address in R4
Address of number of bytes requested

Outputs:

A jump to error if allocated space is exceeded

Program is contained in overlay(s):

MULTI

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Program Name: CHKSYM Program Type: Subroutine

Program Description:

CHKSYM insures that in a one- or 2-space logic design, every available symbol at the current logic level has been associated with one or more of the new levels that are to be created. CHKSYM asks the user specifically to assign any class symbols that have not been associated.

Inputs:

a) The logic argument buffer defined by CR1LOG or CR2LOG

b) The outputs of NUMREG, and PNTSM1 or PNTSYM

Outputs:

a) A modified logic argument buffer containing any missing symbols

Program is contained in overlay(s):

CR1LOG

CR2LOG

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Program Name: CHRCHK Program Type: Subroutine

Program Description:

CHRCHK converts lower-case ASCII chracters into upper-case (capital) ASCII characters.

Inputs:

Chracter string address
Number of characters

Outputs:

Small alpha characters converted to capitals

Program is contained in overlay(s):

PRTRND, PRNTID, PRNHDR, PTRETL, PRNTBL, PRNTRE, PWAVEC

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Program Name: CLAMS Program Type: Subroutine

Program Description:

CLAMS retrieves the names of all the lowest nodes in the current vector tree and places the total number and names of each into a user buffer.

Inputs:

1). Current vector tree name (VECTNM).

2). Address of user buffer.

Outputs:

1). Total number and names of each lowest node in the current vector tree in the user buffer.

2). Address of last word used in the user buffer plus two.

Program is contained in overlay(s):

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Program Name: CLASEL Program Type: Subroutine

Program Description:

CLASEL allows the user to select with the light pen the one-space histogram plots that he wants to see. These bar graphs are normally presented in the order in which they appear in the data set. CLASEL temporarily bypasses that order.

Inputs:

The output of HISTOGRAM

Outputs:

The histograms of the user-selected classes

Program is contained in overlay(s):

PLT1DA

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Program Name: CLOCRE

Program Type: Subroutine

Program Description:

CLOCRE closes all data files used in creating a feature-reduced tree.

Inputs:

External Variables:

NEWNNM - Name of data node being created
VECTNM - Name of system data tree
NEWTNM - Name of data tree being created

Outputs:

N/A

Program is contained in overlay(s):

FEVCRE

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Program Name: CLONAS Program Type: Subroutine

Program Description:

CLONAS updates entry in the table stored in the NAME AND SAVE file.

Inputs:

Tables: NASTBL - see program for details

External Variables: DIRENT - address of file directory entry
NASFLG - see program for details

File: NAMSAV (DT 17.) - see file descriptions

Outputs:

File: NAMSAV (DT 17.) - updated. See file descriptions

Program is contained in overlay(s):

NASDEL
NAMSAV
SELLVC
SELVEC
NASIOP

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Program Name: CLOSE Program Type: I/O Subroutine

Program Description:

CLOSE closes any file previously opened by any of the six OPEN calls. The file's open file (name) table entry and local sector table entries (links) are deleted, and in the case of an output file, any disk sectors allocated for the file but not used are returned to the free sector pool.

Inputs:

The identity of a system data file opened for I/O

Outputs:

1) Removal of the file's open table entry and associated sector links

2) Sectors allocated to an output file but not employed returned to the free sector pool.

Program is contained in overlay(s):

THIS IS A COMMON ROUTINE CONTAINED IN MANY OVERLAYS

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Program Name: CLRHIS Program Type: Subroutine

Program Description:

CLRHIS clears the histogram buffer which is used in the computation of probability of confusion.

Inputs:

Variables: VECDIM - dimensionality of data set

Buffers: CSECT buffer - see buffer description and program for details

Outputs:

Buffers: HISBUF - cleared to 0. See program

Program is contained in overlay(s):

PCEVAL

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Program Name: CLRSEL Program Type: Subroutine

Program Description:

CLRSEL clears the buffer SELBUF. SELBUF is used in the feature evaluation frame to keep track of those dimensions which are selected as candidates for a possible new tree with fewer dimensions than the original.

Inputs:

N/A

Outputs:

Buffer: CSECT buffer (SELBUF) see buffer documentation

Program is contained in overlay(s):

PCEVAL
DMEVAL

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Program Name: CMBNDS Program Type: Overlay

Program Description:

CMBNDS combines two or more nodes which exist under a common immediate senior node into a single node. For vector data, the mean-covariance file for the new node is computed. All nodes that were combined and their mean-covariance files are deleted.

Inputs:

Data type
Tree name
Nodes to be combined

Outputs:

Modification of data tree structure

Program is contained in overlay(s):

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Program Name: CMPRES Program Type: Subroutine

Program Description:

The CMPRES module contains two subroutines: COMPRES which will remove row and column elements of a matrix or vector based on a list provided in the parameter list, and EXPAND which will insert zeros for row and column elements of a matrix or vector based on a list provided in the parameter list.

Inputs:

List of rows to remove or insert
Matrix address
Dimension

Outputs:

Matrix

Program is contained in overlay(s) :

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Program Name: CNGHDR Program Type: Overlay

General Description:

CNGHDR performs one of five user-designated header transformations on a given waveform, displayed under "single."

a) CNGID changes the ID of a waveform

b) INSEG inserts user-specified segment markers in the waveform header

c) INSYMB inserts apriori symbols into the waveform headers

d) MODTIM modifies the zero reference time of a given waveform

Inputs:

a) A "Single Wave Display" data set, currently being displayed on the VG

b) "Single" file control block

Outputs:

The current waveform headers are rewritten with the modifications described in "General Description."

Program is contained in overlay(s):

CNGHDR

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Program Name: CNV2SR Program Type: Subroutine

Program Description:

CNV2SR converts a floating value (single or double precision) into a sampling rate in WPS format.

Inputs:

Double-precision floating value address
Address to receive sampling rate

Outputs:

Sampling rate (one word)

Program is contained in overlay(s):

CARWAV, LINKGO

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Program Name: COMPAR Program Type: Subroutine

Program Description:

COMPAR compares two arrays, byte for byte, for identity. The output is the decision return: one for 'equal', the other for 'not equal'.

Inputs:

Two arrays and dimensionality of the arrays

Outputs:

The decision return indicating whether the arrays are identical or not

Program is contained in overlay(s):

LINKGO
SEGMNT
SEGOPT
SPCEXC
SPCSET

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Program Name: COMSIG Program Type: Overlay

Program Description:

COMSIG calls the appropriate subroutines to initialize the variables necessary for the computation of the probability of confusion. This is a control program; all I/O is done by called subroutines.

Inputs:

N/A

Outputs:

N/A

Program is contained in overlay(s):

PCIEVL

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Program Name: CONASC Program Type: Subroutine

Program Description:

CONASC converts an unsigned 16-bit binary integer to its ASCII decimal or octal equivalent. It produces five characters if the number is treated as decimal and six if it is treated as octal.

Inputs:

a) The binary number

b) The buffer where the ASCII equivalent will be stored

c) The type of conversion (octal or decimal)

Outputs:

A five- or six-character ASCII string

Program is contained in overlay(s):

PLOT20

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Program Name: CONTIN Program Type: Subroutine

Program Description:

CONTIN transforms the limited phase array -2pi to +2pi radians) to a continuous-angle array.

Inputs:

1) The phase array

2) The array dimensionality

3) The threshold value which determines a discontinuity in the limited phase array

Outputs:

The continuous phase array

Program is contained in overlay(s):

SPCEXC

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Program Name: CONVB Program Type: Subroutine

Program Description:

Subroutine CONVB will perform the convolution of a prototype waveform to the beginning window and check to see if any of the coefficients meet the threshold criterion.

Inputs:

A call to CONVB assumes that the data are in "BUF1", the number of points is in "NUM" and that the threshold logic is LOGICB; that the prototype wave is in PROBFB and that the prototype length is in PROSB.

Outputs:

Program is contained in overlay(s):

SEGMNT

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Program Name: CONVE Program Type: Subroutine

Program Description:

Subroutine CONVE will perform the convolution of a prototype waveform to the end window and check to see if any of the coefficients meet the threshold criterion.

Inputs:

A call to CONVE assumes that the data is in "BUF1", the number of points is in "NUM" and that the threshold logic is in LOGICE, that the prototype wave is in PROBFE and the proto length is in PROSE.

Outputs:

Program is contained in overlay(s):

SEGMNT

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Program Name: CONVSR Program Type: Subroutine

Program Description:

CONVSR converts a WPS formatted sampling rate into either a single or double precision floating value, depending on the state of the floating processor status word upon entry.

Inputs:

Sampling rate address
Floating value address

Outputs:

Floating point number

Program is contained in overlay(s):

RQSSTF, PLAYBK, MULTI, SINGLE, SPCEXC, LINKGO

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Program Name: CORE

Program Type: Subroutine

Program Description:

CORE, when linked properly to an overlay, will describe the free core area that may be used for buffer space.

Inputs:

None

Outputs:

None

Program is contained in overlay(s):

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Program Name: COVARF Program Type: Overlay

Program Description:

"COVARF" computes the mean and covariance for all lowest order nodes for a selected tree/senior node.

Inputs:

a) Tree or senior node name

b) Frame name

Outputs:

a) Mean and covariance for specified tree

Program is contained in overlay(s):

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Program Name: CPRINT Program Type: Subroutine

Program Description:

CPRINT outputs an array of binary values in octal ASCII representation to the line printer.

Inputs:

Number of binary numbers to output
Input binary number array address

Outputs:

Printout on line printer

Program is contained in overlay(s):

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Program Name: CPROTO Program Type: ENTRY #9

Program Description:

(Note: Execution is not yet implemented for this version.)

CPROTO will segment only one waveform from a given tree. If more than one waveform is in a low node, this section asks for the sequence number.

If the segment chosen is longer than desired, the user can adjust the size of the prototype to whatever size he wants.

Exit from this section is to THOPBG (entry point #4).

Inputs:

Sequence number
Prototype name
Adjusted width

Outputs:

Parameters to PARLST

Program is contained in overlay(s):

SEGOPT

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Program Name: CR1LOG Program Type: Overlay

Program Description:

CR1LOG creates one-space OLPARS logic and evaluates the current data set against it. One-space logic is a method of classifying vectors. It consists of a set of projection vectors and their associated threshold values. Each member of the set constitutes a node of a logic tree. The projection vectors of nodes at the same level are identical and reduce the data set vectors in n-dimensional space to single-dimensional data points. The value of a data point compared to the thresholds determines the logic node to which a vector belongs.

Inputs:

a) Current histogram with threshold values

b) Current vector data

c) Current logic tree

Outputs:

a) One-space logic

b) Modified data set (Classified vectors)

Program is contained in overlay(s):

CR1LOG

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Program Name: CR2LOG Program Type: Overlay

Program Description:

CR2LOG creates two-space OLPARS logic and evaluates the current data set against it. Two-space logic is a method of classifying vectors. A node of two-space logic consists of a set of projection vectors and threshold values. The vectors are determined by a boundary which was drawn on a two-space scatter plot. The boundary defines a region of the display. The purpose of the logic is to determine if a data set vector belongs to the given region. For each line segment in the boundary, there is a projection vector which reduces the n-dimensional data set vector to a single data point. If, after subtracting all the corresponding threshold values from the reduced vectors, the results are all found to be positive, the vector is said to belong to the node.

Inputs:

a) Current scatter plot with boundaries

b) Current vector data

c) Current logic tree

Outputs:

a) Two-space logic

b) Modified data set (classified vectors)

Program is contained in overlay(s):

CR2LOG

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Program Name: CRBOOL Program Type: Overlay

Program Description:

CRBOOL creates boolean logic at a lowest node of the current logic tree.

Inputs:

Logic tree
Data set
Logic node number

Outputs:

Boolean logic node

Program is contained in overlay(s) :

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Program Name: CRDWPL Program Type: Overlay

Program Description:

CRDWPL reads card decks for PARLAN (the On-Line Waveform Processing Language) from the card reader and creates a source file on disk.

Inputs:

Program deck on card reader

Outputs:

Source file containing card image of deck

Program contained in overlay(s):

CRDWPL

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Program Name: CREADY Program Type: Subroutine

Program Description:

CREADY checks the status of the card reader prior to an initial access and reports the condition if bad.

Inputs:

Status of the card reader

Outputs:

The message "ATTEND CARD READER" if the card reader is not ready and the standard return when the status indicates the card reader is ready.

Program is contained in overlay(s):

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Program Name: CRETRE Program Type: Overlay

Program Description:

CRETRE creates a new tree with one level of nodes from a set of input trees and their nodes.

Inputs:

Tree names, then names of lowest nodes from the trees

Outputs:

Tree with one level of nodes

Program is contained in overlay(s):

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Program Name: CRFISL Program Type: Overlay

Program Description:

CRFISL creates fisher pairwise logic at a lowest node in the current logic tree.

Inputs:

Logic tree
Data set
Logic node number

Outputs:

Create fisher pairwise logic at a lowest logic node.

Program is contained in overlay(s):

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Program Name: CRLBUF Program Type: SUBROUTINE

Program Description:

Subroutine CLRBUF will clear KBUF to zero.

Inputs:

None

Outputs:

None

Program is contained in overlay(s):

SEGOPT

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Program Name: CRLOG Program Type: Subroutine

Program Description:

CRLOG creates and initializes a logic tree comprising three files: a logic tree file, a logic file and a class symbol file.

Inputs:

Logic tree name

Outputs:

A logic tree is created.

Porgram is contained in overlay(s)

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Program Name: CRMARK

Program Type: ENTRY #6 TO OVERLAY "SEGOPT"

General Description:

CRMARK will use the "begin" and "end" parameters and criteria selected to create a new tree (data type = 132) that will contain a series of "begin" and "end" marks. This new marker tree will maintain the same tree/node structure as the original waveform tree, but will contain only markers (not waveforms).

This section runs a cross check to ensure that both begin mark and end mark parameters are set. If neither one has been set, the program will return to the light button mode, leaving a warning message telling which light button to select.

The marker tree may have the same name as the current data set (the one to be segmented), or a new name may be assigned. In any event, the text information created for the marker tree contains information on the tree and node from which it was created. This should prevent the user from using the marker set to segment another tree with a different tree structure. (The user should know his tree structures.)

Exit from this section is to SEGINT (entry point #1) to create actual markers.

Inputs:

Marker tree name

Outputs:

New marker tree parameters to PARLST

Program is contained in overlay(s):

SEGOPT

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Program Name: CROSB Program Type: Subroutine

Program Description:

Subroutine CROSB will perform the cross correlation of a prototype waveform to the beginning window and check the coefficients to see if they meet the threshold criterion

Inputs:

A call to CROSB assumes that the data is in "BUF1", the number of points is in "NUM" and that the threshold logic is in LOGICB, that the prototype wave is in PROBFB and the proto length is in PROSB.

Outputs:

Program is contained in overlay(s):

SEGMNT

AD-A038 330 PATTERN ANALYSIS AND RECOGNITION CORP ROME N Y F/G 9/2
THE WAVEFORM PROCESSING SYSTEM (WPS). VOLUME IV, PART 2.(U)
FEB 77 P K SANYAL F30602-72-C-0193
UNCLASSIFIED PAR-76-6-VOL-4-PT-2 RADC-TR-76-224-4-2 NL

2 OF 4
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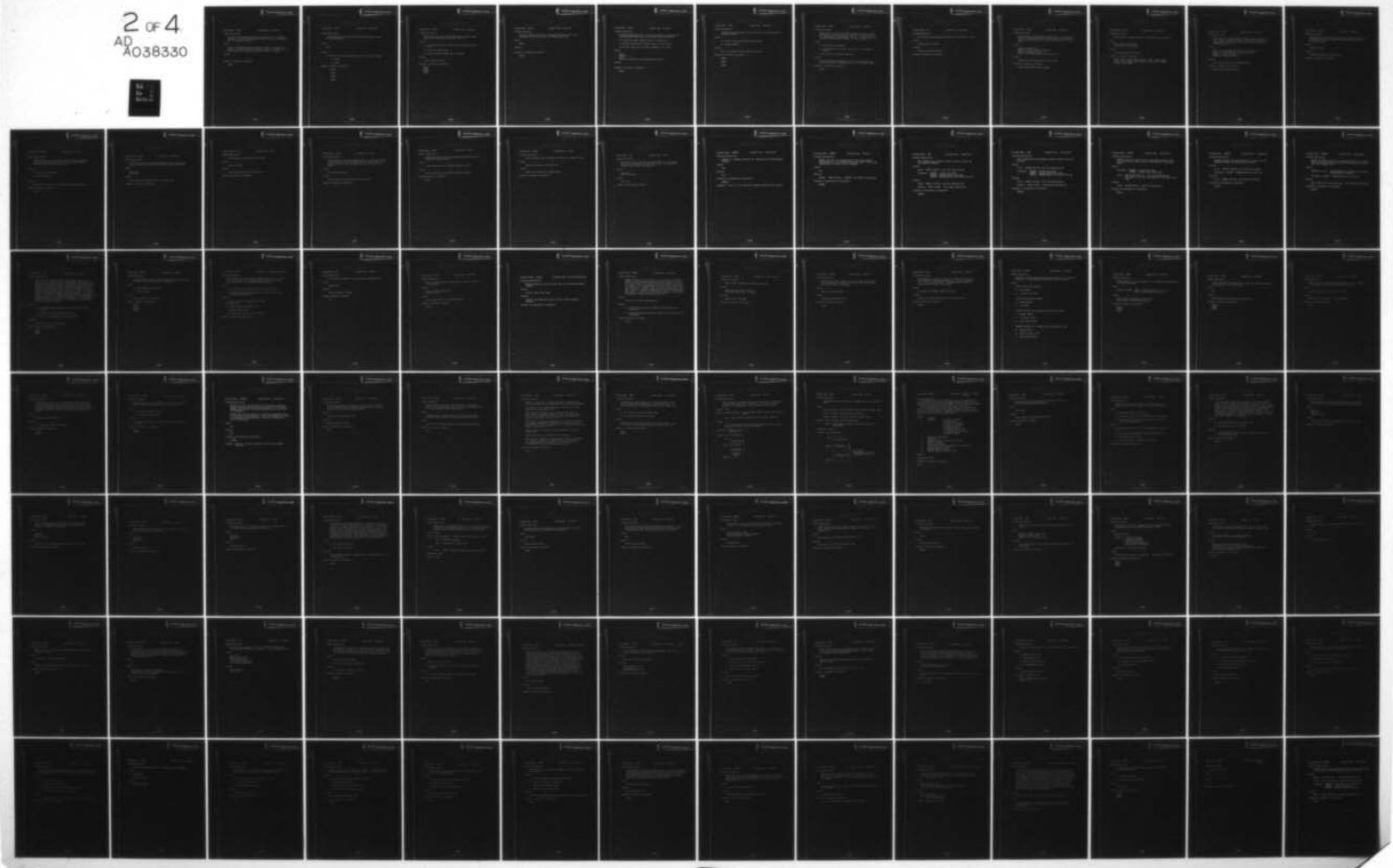

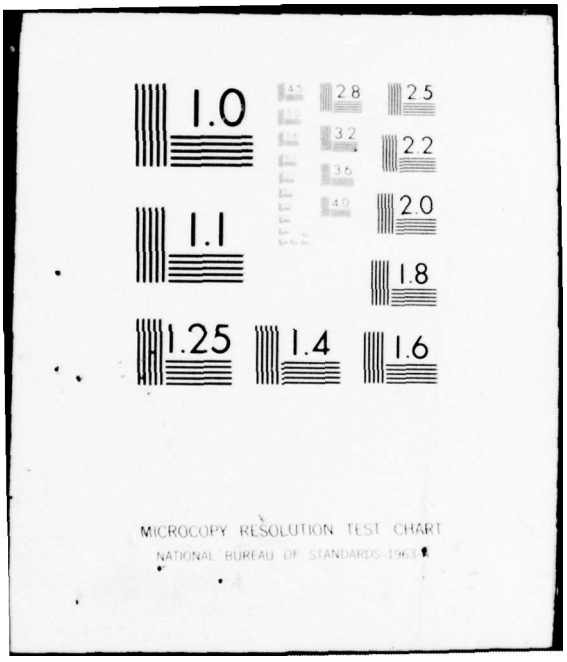
1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

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Program Name: CROSE Program Type: Subroutine

Program Description:

Subroutine CROSE will perform the cross correlation of a prototype waveform to the end window and check to see if any of the coefficients meet the threshold criterion.

Inputs:

A call to CROSE assumes that the data is in "BUF1", the number of points is in "NUM" and that the threshold logic is in LOGICE, that the prototype wave is in PROBFE and the proto length is in PROSE.

Outputs:

Program is contained in overlay(s):

SEGMNT

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: CROSS Program Type: Subroutine

Program Description:

CROSS generates cross-hairs on the V6 which are movable in the X and Y directions.

Inputs:

None

Outputs:

Coordinates of the intersection point are stored in global words:

a) CROSSX

b) CROSSY

Program contained in overlay(s):

TRNFNT

TRNBAK

SEGWAV

CNGHDR

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: CRTTXT Program Type: Subroutine

Program Description:

CRTTXT creates the tree text file and stores the actual text, along with the specified tree, in that text file.

Inputs:

1) 6-character name for the text file (to have the data type = 062)

2) 60-character text buffer

3) External location 'IN1TNM' used by 'STRTXT'

Outputs:

A newly created text file

Program is contained in overlay(s):

LINKGO
SEGMNT
SPCEXC
SPCSET

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8"x10½" Crop

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Program Name: CRUNCH Program Type: Subroutine

Program Description:

Subroutine CRUNCH will do all of the number crunching for the cross correlation and the convolution. The time method is used.

Inputs:

"BUF1"

Outputs:

Program is contained in overlay(s):

SEGMNT

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Program Name: CTHRES Program Type: Subroutine

Program Description:

Subroutine CTHRES will check to see if the threshold calculated by the criterion/method (VALUE) meets the threshold logic as specified.

If it meets the logic criterion, there is a normal exit.

If the logic specified is not legal, there is an error return.

If the logic is not met, it returns a message to that effect.

Inputs:

Logic
Threshold
Value
(Value is calculated by ciriterion/method routines)

Outputs:

Program is contained in overlay(s):

SEGMNT

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: CTRUN Program Type: Subroutine

General Description:

CTRUN calculates the address of the disk sector in which a waveform truncation occurred.

Inputs:

a) Pointer to the current node directory entry.

b) MARKER, MARKER+2.

Outputs:

The sector address in which truncation occurred.

Program is contained in overlay(s):

TRNFNT

TRNBAK

SEGWAV

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8"x10½" Crop
Page

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: CURWAV Program Type: Subroutine

Program Description:

CURWAV creates a one-file tree which contains the (one) waveform designated by a six-character file name and the offset sectors to that waveform from the beginning of the file. The output tree has the name 'X'TREE with node 'X'WAVE. The user specifies 'X'.

Inputs:

1) Node and tree name address

2) # of sectors to skip to position the file to the requested waveform

3) The output tree character (one byte)

Outputs:

A tree containing one waveform for the use of executing a tree structure preserving transformation on just a one-waveform input.

Program is contained in overlay(s):

SPCSET

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8"x 10½" Crop

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: DCA Program Type: Subroutine

Program Description:

DCA converts a one-word positive integer to a decimal ASCII string.

Inputs:

One-word positive integer

Outputs:

Decimal ASCII representation

Porgram is contained in overlay(s)

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Program Name: DECALE Program Type: Subroutine

Program Description:

DECALE converts a binary value to decimal ASCII. The caller may specify the number of characters he wants output and the value to load the preceding bytes in the output string before the actual value.

Inputs:

Address of binary value
Address of field to receive characters
Number of characters wanted
Value to load preceding bytes (usually 40 or 60)

Outputs:

Decimal ASCII representation of a binary number

Program is contained in overlay(s):

PRTRND, PRNTID PWAVEC, PTRETL, PRNHDR

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Program Name: DECASC Program Type: Subroutine

Program Description:

DECASC converts a binary value to its decimal ASCII representation.

Inputs:

ASCII output buffer address
Binary value to be converted

Outputs:

ASCII representation in decimal

Program is contained in overlays:

MULTI, LODWAV, DELSUB, SYNTAZ, DELTRE, TXTAPE, LISTRE, PRNTBL, TXDISK, FUTIL, CMBNDS, CRETRE, DELNOD, VGIDR, SINGLE, TDRAWR, SPCSET, SPCOPT, CRDWPL

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Program Name: DECOUT Program Type: Subroutine

Program Description:

DECOUT converts a double-precision floating point value into an ASCII string, outputting the number of characters desired with no decimal point. Preceding Q's are output to match the number of characters desired.

Inputs:

Address of intermediary work buffer (30 bytes at least)
Address of double-precision floating point number
Number of chracters desired
Address of output ASCII string

Outputs:

ASCII representation of the floating number

Program is contained in overlay(s):

PRTRND, PWAVEC, PRNHDR, PRNTID

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Program Name: DELNOD Program Type: OVERLAY

Program Description:

DELNOD deletes a specified node and all nodes existing beneath the node from a data tree and purges all deleted node entries from the directory table.

Inputs:

Light-button call

Outputs:

Modified tree table and data directory

Program is contained in overlay(s):

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Program Name: DELSUB

Program Type: Overlay

Program Description:

DELSUB will delete the entire tree structure under a designated node and combine all data into one low node, located under the designated node's immediate senior node.

Inputs:

a) Data file in tree format

b) User-specified node

Outputs:

Modification of input file as outlined in "Program Description."

Program contained in overlay(s):

DELSUB

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Program Name: DELSYM Program Type: Subroutine

Program Description:

DELSYM will delete an entry of class symbols from the class symbol file associated with a specified node in the current logic tree.

Inputs:

Logic tree
Node number

Outputs:

Class symbols are deleted from the class symbol file.

Program is contained in overlay(s)

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Program Name: DELTLT Program Type: Overlay

Program Description:

DELTLT deletes logic trees from the system.

Inputs:

Logic tree names

Outputs:

Logic trees are deleted from the system

Program is contained in overlay(s):

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Program Name: DELTRE Program Type: Overlay

Program Description:

DELTRE deletes a tree entry, along with all its lowest node entries, from the data directory, and returns its tree table sectors to the unused sector pool. The associated text file, if any, is also deleted.

Inputs:

Tree name and data type

Outputs:

Updated directory and the USAG11 and sector tables

Program is contained in overlay(s)

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Program Name: DELWAV Program Type: Overlay

General Description:

DELWAV will delete the current waveform being displayed by the "Single Wave Display" module.

Inputs:

"Single" wave data set, currently displayed on the VG

Outputs:

The input node minus the waveform currently displayed

Program contained in overlay(s):

DELWAV

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: DKTOTP Program Type: Overlay

Program Description:

DKTOTP transfers logic files from the system disk to magnetic tape.

Inputs:

Logic files located on the system disk

Outputs:

Logic files transferred to magnetic tape

Program is contained in overlay(s):

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Program Name: DLN Program Type: Overlay

Program Description:

DLN deletes a logic node from the current logic tree. All logic nodes below the selected node are also deleted. The selected node is made a lowest node in the logic tree.

Inputs:

Logic tree
Logic node number

Outputs:

Logic tree

Program is contained in overlay(s)

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Scale to 100 %

CLASSIFICATION (if any)

6.0 6.5

Program Name: DMCORE Program Type: Subroutine

Program Description:

DMCORE is a buffer area for the computation of discriminant measure.

Inputs:

N/A

Outputs:

N/A

Program is contained in overlay(s):

DMEVAL

Comments: This is to be the last program linked in the overlay

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)

8" x 10½" Crop

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Scale to 100 %

CLASSIFICATION (if any)

6.0 6.5

Program Name: DMEVAL Program Type: Overlay

Program Description:

DMEVAL controls the computation of the discriminant measurement for a selected tree/senior node. The actual computation is done by other programs.

Inputs:

N/A

Outputs:

Buffer: CSECT buffer - (FEVFLL) see buffer description

Program is contained in overlay(s):

DMEVAL

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)

8" x 10½" Crop

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: DMI Program Type: Subroutine

Program Description:

DMI computes the classwise figure of merit using the discriminant measure.

Inputs:

Files: MEASIJ (DT 88.) see file descriptions

Variables: VECTNM - system tree name
VECNNM - system senior node name
VECDIM - dimensionality of system data set

Outputs:

Files: MEASII (DT 88.) see file descriptions

Buffers: CSECT buffer - see buffer description

Program is contained in overlay(s):

DMEVAL

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8"x10½" Crop

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: DMIJ Program Type: Subroutine

Program Description:

DMIJ computes the discriminant measure between pairs of classes.

Inputs:

Files: SCRACH (DT 88.) see file descriptions

Variables: VECTNM - system tree name
VECNNM - system senior node name
VECDIM - dimensionality of system data set

Outputs:

Files: MEASIF (DT 88.) see file descriptions

Buffers: CSECT buffer - see buffer descriptions

Program is contained in overlay(s):

DMEVAL

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8"x 10½" Crop

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: DMINIT Program Type: Subroutine

Program Description:

DMINIT creates a scratch file containing the means and variances of each data class in the selected tree/senior node.

Inputs:

Variables: VECTNM - system tree name
VECNNM - system senior node name

Files: STAT FILES (DT 14.) - see file descriptions. The name of the file corresponds to the data class name.

Outputs:

Files: SCRACH (DT 88.) see file description

Program is contained in overlay(s):

DMEVAL

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: DMOVER Program Type: Subroutine

Program Description:

DMOVER computes the overall figure of merit for each dimension using the discriminant measure.

Inputs:

Files: MEASII (DT0130) see file descriptions

Variables: VECDIM - dimensionality of data set

Outputs:

Files: MEASOV (DT 88.) see file descriptions

Program is contained in overlay(s):

DMEVAL

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8"x10½"Crop

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Program Name: DMSORT Program Type: Subroutine

Program Description:

DMSORT transfers values in a formatted buffer to an array, then sorts this array and places the rank position back into the original list.

Inputs:

Argument in call: buffer-address of buffer to be sorted. See program for details

Variables: VECDIM - dimensionality of data set

Outputs:

User buffer with rank positions. See program for details

Program is contained in overlay(s):

DMEVAL

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Program Name: DOLOG Program Type: Subroutine

Program Description:

DOLOG fills a core buffer with one- or two-space OLPARS logic. A node of logic is created for every display region that the user has defined on the current histogram or scatter plot. Every node but one consists of a set of projection vectors and thresholds. (One node is reserved for the default region. This region is simply all space that does not belong to any other region.) Each member of the set is produced by a line segment of the boundary that defines the display region (in one-space, boundaries are single segments). The logic can be used to determine if a dataset vector falls within a particular region. If a vector is passed against the logic, its dot product with each projection vector of a node is calculated. The corresponding threshold values are subtracted. If the results are all positive, the vector belongs to the node.

Inputs:

a) Logic argument buffer defined and loaded by CR1LOG, CR2LOG, or C2LSPC

b) Scatter plot or histogram projection vectors

c) Scatter plot boundaries or histogram thresholds

Outputs:

A buffer of one- or two-space logic

Program contained in overlay(s):

CR1LOG
CR2LOG
C2LSPC

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Program Name: DOTPRD Program Type: Overlay

Program Description:

DOTPRD calculates the dot product of any two vectors which are represented by their floating point coefficients.

Inputs:

a) Dimensionality of the vectors

b) The two vectors

Outputs:

The dot product of the vectors

Program contained in overlay(s):

PLOT2D
CR1LOG
CR2LOG
EVLCDS

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Program Name: DPOSIT Program Type: Language Subroutine

Program Description:

DPOSIT handles most single-precision waveform header writes. These values are written to the waveform extension block to be picked up by the last pass of the waveform output subroutine.

Inputs:

1) File control block (which addresses the extension block)

2) The single-precision floating point value to be stored to the waveform extension block

Outputs:

A deposit of one of the following type values:

1) Waveform ID

2) Segment coordinates (markers 1 & 2)

3) Waveform sampling rate

4) Waveform start units: time or frequency

Program is contained in overlay(s):

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Program Name: DPP Program Type: Overlay

Program Description:

DPP deletes all references to a user-selected PARLAN program.

Inputs:

Program name

Outputs:

Selected program is deleted

Program contained in overlay(s):

DPP

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Program Name: DPRINT Program Type: Subroutine

Program Description:

DPRINT outputs an array of binary numbers to the line printer in decimal ASCII.

Inputs:

Number of binary values input
Address of array

Outputs:

ASCII representations of the binary numbers

Program is contained in overlay:

MODISK

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Program Name: DRALOG Program Type: Overlay-Subroutine

Program Description:

DRALOG draws the current logic tree on the Vector General display.

Inputs:

Current logic tree name

Outputs:

Control the drawing of logic tree on Vector General display.

Program is contained in overlay(s)

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Program Name: DRWBND Program Type: Subroutine

Program Description:

DRWBND allows the user to draw lines on a two-space scatter plot display in order to separate areas of the plot visually. The lines can be single segments or groups of connected segments (two lines, six segments each). They are produced by tracking the stylus over the surface of the data tablet and translating its position into display coordinates. DRWBND is useful to both structure analysis and logic design. It produces a mathematical criterion for classifying data; that is, a vector can be classified according to the side of the boundary on which its projected value falls.

Inputs:

The outputs of SCATTR, PAGE, and PLOT

Outputs:

a) A modified vector general display with lines drawn on the scatter plot

b) A buffer containing the unscaled values of the end points of the line segments

Program contained in overlay(s):

PLOT2D

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Program Name: DSKMAG Program Type: RS11 Utility

Program Description:

DSKMAG copies the RPØ2 disk onto magtape (unit #1)

Inputs:

USAG11 tables on sectors 2 and 4
RUN DSKMAG command under DOS monitor

Outputs:

Magtape copy of the RPØ2

Program is contained in overlay(s):

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Program Name: DSP1WV Program Type: Subroutine

Program Description:

DSP1WV plots a single waveform on the VG via WAVE1 and displays other scaling and miscellaneous information about the waveform and tree via internal subroutines.

Inputs:

Address of waveform header

Outputs:

Single waveform display on VG

Program is contained in overlay:

SINGLE

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Program Name: DSPBC Program Type: Subroutine

Program Description:

DSPBC displays the number of vectors of the current dataset which are contained in a user-selected bin of the one-space histogram plot. (A bin is range of data. HISTOGRAM counts the number of vectors which fall within such a range.)

Inputs:

The output of HISTOGRAM, BINCON, and PROCESS

Outputs:

Display of the number of vectors in a user-selected bin

Program contained in overlay(s):

PLT1DB

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Program Name: DSPDRV Program Type: Subroutine

Program Description:

"DSPDRV" is the main communication display driver for the VG under the WPS system. It has four parts, CRIN, CROUT, REPLYN and REPLYA.

Inputs:

"CRIN" accepts user's message

a) Input Buffer

b) # of bytes in message

"CROUT" displays user's message

a) Message Address

b) # of bytes

"REPLYA" displays user's message and accepts alpha input.

a) Message Address

b) # of bytes in RPLY

c) Input Buffer Address

"REPLYN" displays user's message and accepts numerical input.

a) Message Address

b) Number of bytes in RPLY

c) Input Buffer Address

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Program Name: DSPEND Program Type: Subroutine

Program Description:

DSPEND completes the V.G. display list for the display being generated for feature evaluation.

Inputs:

External Variables: GPNUM - First free address in V. G. list
VECDIM - Dimensionality of data set

Outputs:

End of display instructions in V.G. buffer
CSECT buffer - see buffer descriptions

Program is contained in overlay(s):

FEVDPC
FEVDPB
FEVDSP

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Program Name: DSPINT Program Type: Subroutine

Program Description:

DSPINT initializes the display list, setting the beginning coordinates and placing the V.G. into ASCII mode.

Inputs:

N/A

Outputs:

Instructions initializing the V.G. display list.

Program is contained in overlay(s):

FEVDPB
FEVDPC
FEVDSP

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Program Name: DSPLUP Program Type: Subroutine

Program Description:

DSPLUP checks the Vector General display buffer code to determine if any waveform of the Multiple Waveform display is up.

Inputs:

First file control block address in TOPC-MULS

Outputs:

Error return if no waveform has been displayed

Program is contained in overlay:

MULTI

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Program Name: DSPMAT Program Type: Subroutine

Program Description:

DSPMAT displays on the Vector General the confusion matrix that is created by PARTEV. It creates a column for each logic node in the current logic evaluation. Then, for each class of the dataset involved in the current evaluation, the number of vectors that were assigned by PARTEV to each node is displayed in the appropriate column.

Inputs:

The matrix created by PARTEV

Outputs:

A Vector General display of the matrix

Program contained in overlay(s):

CR1LOG
CR2LOG

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Program Name: DSPMSG Program Type: Subroutine

Program Description:

DSPMSG displays a set of messages (constructed with the MACRO MESG) in a sub-menu format on the V. G. display screen.

Inputs:

1) The number of 'MESG' constructs

2) The beginning 'MESG' address

Outputs:

A sub-menu on the Vector General screen composed of the series of messages.

Program is contained in overlay(s):

SEGOPT
SPCOPT

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Program Name: DSPRNG Program Type: Subroutine

Program Description:

DSPRNG controls the building of the display variables used in the computation of the probability of confusion. DSPRNG displays the variables associated with the first 25 dimensions.

NXTPAG will display groups of variables associated with a selected set of dimensions. Each time NXTPAG is called, the variables associated with the next 25 dimensions will be displayed.

Inputs:

N/A

Outputs:

N/A

Program is contained in overlay(s):

PCIEVL

Comment: This is a control program; no I/O is performed directly.

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Program Name: DSPTX3 Program Type: Subroutine

Program Description:

DSPTX3 converts all values to be displayed into ASCII, retrieves tree and waveform text, and checks for overflow before outputting three text lines into the VG display buffer.

Inputs:

File control block address in R4

Outputs:

Modification of VG buffer

Program is contained in overlay(s):

MULTI

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Program Name: DSPWAV Program Type: Subroutine

Program Description:

DSPWAV creates a VG display of all waveforms in the Multiple Waveform display frame with three lines of text and miscellaneous information displayed beneath each waveform.

Inputs:

A waveform will be displayed only if the error bits are off in the master control word in the associated file control block

Outputs:

Modification of VG display buffer to display multiple waveforms

Program is contained in overlay:

MULTI

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Program Name: DTSUBS Program Type: Subroutine

Program Description:

DTSUBS is a collection of 6 subroutines used to display text on the Vector General for the Multiple Waveform display frame (MWVDSP):

XFR transfers a byte string (byte count in first byte) from the address in R1 to the address in R2.

DECAL converts the binary value in global word AVAL into an ASCII string, the address of which is in R2. The output string will begin with enough 0's (ASCII 60) to make the string count equal the value in R1. No 0's if R1=0.

MDESR outputs the effective sampling rate, or computes and outputs the frequency resolution, from values in the multi file control block (address in R4) to the address in R2. The next available byte address is returned in R2.

WIDOUT outputs a ten-character ID number (address in R0) to the address in R2.

SUBXFR transfers 6 bytes from R1's to R2's address.

ANYTXT outputs a blank to R2's address, and any text if indicated. The parameter to ANYTXT is an offset which is to be added on to the beginning address of the multi file control block in R4. The offset points to either waveform or tree text.

Program is contained in overlay:

MULTI

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: DUPONT Program Type: I/O Subroutine

Program Description:

DUPONT creates a duplicate entry of an existing opened file in the opened name table (ONAMT) under a user-supplied name. This provides a multiple I/O positioning capability for a single file.

Inputs:

1) The identity of the file already opened

2) The duplicate 6-character file name

Outputs:

A duplicate open file entry with the user supplied name. A new sector chain is created rather than both entries sharing one.

Program is contained in overlay(s):

LINKGO
PLAYBK

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8"x10½"Crop

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Program Name: EIGCOV Program Type: Overlay

Program Description:

EIGCOV computes the covariance matrix for the vector data associated with the current logic node. The matrix is left in core for computation of the eigenvectors by the subsequent overlay, EIGEN.

Library: None

Inputs: External variables: VECDIM, VECTNM, VECNUM, VPOINT, LOGNOD, LOWCOR, TOPCOR

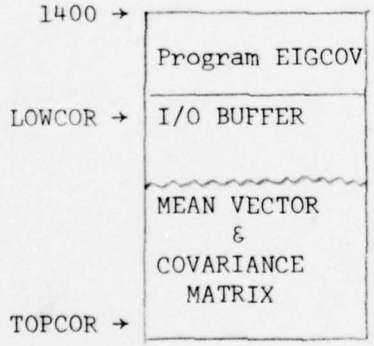
Files: Vector File and covariance file for current TREE/NODE

Outputs:

Covariance matrix for the vector data associated with the current logic node is left in core. (See Comments.)

Limitations: Number of classes: $\leq$ 50
VECDIM $\leq$100

Comments: Core Configuration



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Program Name: EIGEN Program Type: Overlay

Program Description:

EIGEN computes the eigenvectors and eigenvalues of a real, symmetric matrix.

Inputs:

External Variables - DIRENT, LOWCOR, TOPCOR, VECDIM, VECNNM, VECTNM

Files: Covariance file for current tree/node or

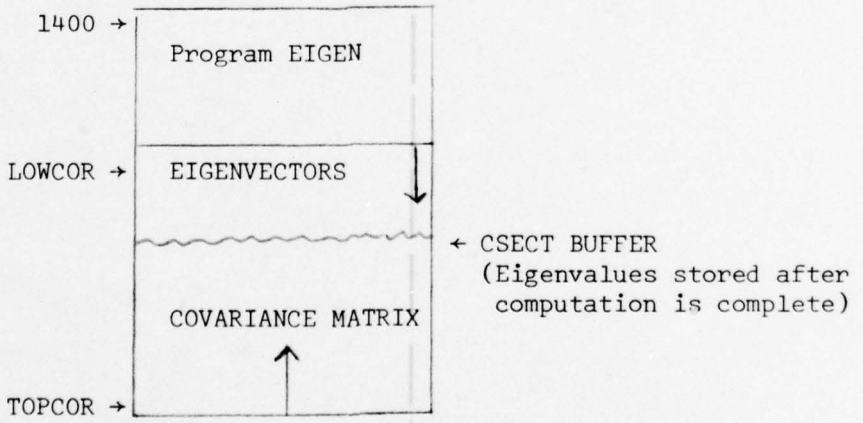
Passed: Covariance file left in core by overlay EIGCOV

Outputs: Files - EIGENV - Unsorted eigenvectors

Passed - Eigenvalues are passed to overlay EVSORT via the CSECT BUFFER

Limitations: VECDIM < 72

Comments: Core Configuration



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Program Name: ENDMRK

Program Type: ENTRY #3 TO OVERLAY "SEGOPT"

General Description:

ENDMRK will display the "end" menu, and will then sequence the user through all the questions that CRMARK (entry point #6) will need to create end markers for waveform segments. These parameters are placed in PARLST and saved on disk prior to exit from this section.

At the conclusion on the questions, THOPED (entry point #5) is called. This routine will change the menu blanks and allow the user to correct any end parameters. ENDMRK will sequence through the options shown until all questions have been answered.

Inputs:

#	Parameter	
1	Criteria	(1) Cross correlation
		(2) Convolution
		(3) Rise in time window
		(4) Fall in time window
		(5) Amplitude level
		(6) Average value in time
		(7) Average power in time
		(8) Average A-C power in time
		(9) Zero crossings
2	Width of sliding window	
3	Threshold	
4	Threshold logic (LT, LE, EQ, GE, GT, NE)	
5	Advance of window	
6	Window slide advance	
7	New prototype for cross correlation or convolution	
8	Lockout after turn-on point	
9	Maximum length of segment	
10	Segment length if no end criterion	

Outputs:

Parameters to PARLST

Program is contained in overlay(s):

SEGOPT

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Program Name: ERROR Program Type: Subroutine

Program Description:

ERROR marks and prints syntax errors for Pass-1 of PARLAN (the On-Line Waveform Processing Language).

Inputs:

Error number

Outputs:

Error message is printed on line printer

Program contained in overlay(s):

SYNTAX

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Program Name: ERRORS Program Type: Overlay

Program Description:

ERRORS sends a message (specified by the caller through (WPSERR) to the V. G. and returns to the Executive wait loop.

Inputs:

1) The message number in location 40_8.

2) The program counter of the message issuer...location 42_8.

3) The overlay last in core (before ERRORS) to identify the issuer...locations $44\text{-}50_8$.

Outputs:

The following outputs are sent to the communications region of the VG

1) The message corresponding to the input number (ASCII)

2) The program counter (ASCII)

3) The overlay name at the time of issue (ASCII)

Program is contained in overlay(s);

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Program Name: EVAL12 Program Type: Subroutine

Program Description:

EVAL12 evaluates a single vector against one- or two-space OLPARS logic. One- and two-space logic consists of a group of nodes. The purpose of the evaluation is to assign the vector to a node. Every node but the last one consists of a set of logic vectors and threshold values. EVAL12 computes the dot products of the vector and the logic vectors. It subtracts the corresponding threshold values. If the results are positive for every threshold in the set, the vector is assigned to the node. If the vector is not assigned to any other node, it is assigned to the last node.

Inputs:

a) Buffer containing one- or two-space logic

b) The address in core of the vector

Outputs:

a) A modified vector header (in core) assigning the vector to a node of the logic tree

Program contained in overlay(s):

EVLCDS

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Program Name: EVAL1C Program Type: Overlay

Program Description:

EVAL1C evaluates the current data set against pairwise logic that is located at the current node of the current logic tree.

Inputs:

Logic tree
Data set
Logic node number

Outputs:

Pairwise logic evaluation performed on the data set at node.

Program is contained in overlay(s)

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Program Name: EVAL1S Program Type: Overlay

Program Description:

EVAL1S evaluates the current data set against pairwise logic. There is no communication with the user. All information is contained in the pairwise logic node.

Inputs:

Logic tree
Data set
Logic node number

Outputs:

Pairwise logic evaluation performed on the data set at node.

Program is contained in overlay(s)

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Program Name: EVAL4S Program Type: Overlay

Program Description:

EVAL4S evaluates Boolean logic at the current node of the current logic tree without user interaction.

Inputs:

Logic tree
Node number
Data set

Outputs:

Evaluated data set

Program is contained in overlay(s)

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Program Name: EVAL5S Program Type: Overlay

Program Description:

EVAL5S evaluates nearest mean vector logic at the current node of the current logic tree without user interaction.

Inputs:

Logic tree
Node number
Data set

Outputs:

Evaluated data set

Program is contained in overlay(s):

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Program Name: EVLCDS Program Type: Overlay

Program Description:

EVLCDS performs the partial evaluation of the dataset according to the one- or two-space OLPARS logic that is defined as the current logic node. It maps every vector of the dataset that exists at the current level of the logic tree to a node in the next level. This method of vector classification involves a permanent modification of the dataset. Subsequent classification of the dataset at one of the nodes at the new level would exclude all vectors belonging to other nodes at that level. (This evaluation is called a partial evaluation because it involves only one level of the logic tree.)

Inputs:

a) The current vector data

b) The current logic node

Outputs:

Vector headers modified to contain new logic node numbers; that is, classified data

Program contained in overlay(s):

EVLCDS

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Program Name: EVSORT Program Type: Overlay

Program Description:

EVSORT sorts the eigenvalues left in core by the previous overlay (EIGEN) and the corresponding eigenvectors in descending order. The sorted values and vectors are stored on disk as file EIGENF.

Library: None

Inputs: External Variables - DIRENT, LOWCOR, TOPCOR, VECDIM, VPOINT

Files - EIGENV (Eigenvectors)

Passed - Eigenvalues via CSECT BUFFER

Outputs:

Files - EIGENF - Rank-ordered eigenvalues and eigenvectors

Limitations: None

Comments: None

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Program Name: EXCHG Program Type: Subroutine

Program Description:

Subroutine EXCHG will exchange all of the data points in a buffer from beginning to end and from end to beginning.

Inputs:

Input BUFFER

Outputs:

Reversed output buffer

Program is contained in overlay(s):

SEGMNT

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Program Name: EXEC Program Type: Subroutine

Program Description:

Initializes and brings up the waveform processing system. It further handles all light button interrupt traps, error traps, and performs overlay disk I/O for both foreground and background.

Inputs:

None

Outputs:

The WPS operating system

Program is contained in overlay(s):

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Program Name: EXPAND Program Type: Subroutine

Program Description:

Expand inserts zero elements into the specified row and column elements of a single-precision floating point matrix.

Inputs:

List of rows and columns
Single-precision floating point matrix
Original dimension of matrix

Outputs:

Expanded matrix

Program contained in overlay(s):

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Program Name: EXTEND Program Type: I/O Subroutine

Program Description:

"EXTEND" will position a file opened for input or update at the end of the file and set the open status to output so that data may be appended to it.

Inputs:

The identity of a file which has been opened for I/O

Outputs:

Modifications of the file's open table entry

Program is contained in overlay(s):

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Program Name: FALL Program Type: Subroutine

Program Description:

Subroutine FALL will place the value of "FALL" (calculated in RISFAL) into "VALUE".

Inputs:

"BUF1"

Outputs:

"VALUE contains "FALL"

Program is contained in overlay(s):

SEGMNT

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Program Name: FDMP Program Type: Subroutine

Program Description:

FDMP prints on the line printer floating point numbers in ASCII format.

Inputs:

Address of floating point values
Number of values to print
Single or double precision values

Outputs:

ASCII representation of the floating point values printed on the line printer

Program is contained in overlay(s):

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Program Name: FEVBOX Program Type: Subroutine

Program Description:

FEVBOX places into the V.G. display list the information box which is displayed in all of the Feature Evaluation displays.

Inputs:

Argument of call:

DISPLAY = 1 Overall evaluation
2 Classwise evaluation
3 Pairwise evaluation
4 Rank class by measurement
5 Rank pairwise by measurement

CSECT buffer - See buffer description

Outputs:

Information box in the V.G. display list. (See program for details.)

Program is contained in overlay(s):

FEVDPB
FEVDPC
FEVDSP

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Program Name: FEVCRE Program Type: Overlay

Program Description:

FEVCRE creates a reduced measurement tree from the current data set, using the dimensions selected in the feature evaluation frame.

Inputs:

CSECT buffer (SELBUF) - See buffer description
Data files (DT 13) See file descriptions

Outputs:

Data files (DT 13) See file descriptions
Statistical files (DT 14) See file descriptions
For each selected dimension, the line printer will indicate its corresponding new dimension number

Program is contained in overlay(s):

FEVCRE

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Program Name: FEVDSP Program Type: Overlay

Program Description:

"FEVDSP" displays the overall measurement evaluation on the VG screen

Inputs:

a) none

Outputs:

b) Displayed table on VG

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Program Name: FEVHED Program Type: Subroutine

Program Description:

FEVHED prints out on the line printer whatever is being currently displayed on the V.G.

Inputs:

CSECT buffer - See buffer description

Outputs:

Outputs on line printer what is being displayed on V.G. screen

Program is contained in overlay(s):

FEVPRN

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Program Name: FEVSEL Program Type: Overlay

Program Description:

FEVSEL permits the user to select a number of dimensions for feature reduction. Feature reduction (create tree option) involves taking the current data tree and creating a new tree having the same classes but only containing the dimensions selected in the feature evaluation frame.

Inputs:

N/A

Outputs:

CSECT buffer - See buffer descriptions
Display buffer - Buffer is modified if all dimensions of the selected data set are displayed

Program is contained in overlay(s):

FEVSEL

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Program Name: FFTC

Program Type: Subroutine

Program Description:

FFTC performs the forward or inverse fast Fourier transform of N complex data points, where N is a power of 2 in the range $8 \leq N \leq 1024$.

Inputs:

Input Array
Number of Data Points
Forward/Inverse Flag
Power Spectrum Option Flag
Real-Imaginary Data Flag

Outputs:

Transformed Array
Scale Factor

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Program Name: FILLBINS Program Type: Subroutine

Program Description:

FILLBINS maps the vectors of a specified class of the dataset into the one-space histogram bins. Bins are predefined ranges of data (see BINCON). FILLBINS counts the number of vectors in each range. The counts are later used to produce the histogram bar graphs.

Inputs:

a) The output of HISTOGRAM

b) The class name and associated file

Outputs:

a) The number of vectors in each bin

Program contained in overlay(s):

PLT1DA
PLT1DB

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Program Name: FILZRO Program Type: Subroutine

Program Description:

In the case where a transformation was to be done on N points of of a waveform, but only N-M points were available, FILZRO would, depending on parameters, fill the M points at the end (or on each side, M/2) with either the average value of the N-M points or some fixed value specified by the user.

Inputs:

1) Waveform file control block

2) External locations (in the common I/O buffer) for necessary parameters

Outputs:

The transformed waveform window. (See general description)

Program is contained in overlay(s):

SPCEXC

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Program Name: FIND Program Type: RESIDENT SUBROUTINE

Program Description:

FIND is a collection of filing system subroutines that provide the ability to allocate file space on the RP02 disk, to find files previously allocated, and to build and retrieve data trees. These subroutines do not transfer data to or from the RP02, they only manipulate various system tables. The nine existing functions are 1.) create a file directory entry, 2.) retrieve a file directory entry, 3.) delete a directory entry, 4.) reduce the number of sectors allocated for a file, 5.) append sectors to those already allocated for a file, 6.) create a directory entry for a data tree and create the tree table, 7.) add a node to a tree table and create the directory entry for the node file, 8.) retrieve the directory and tree table entry for a node, 9.) delete a node, along with all nodes existing below it, from a data tree and the directory.

Inputs:

See program listing

Outputs:

Various table modifications

Program is contained in overlay(s):

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Program Name: FISODP Program Type: Subroutine - Overlay

Program Description:

FISODP computes the fisher direction, discriminant plane vector, and file thresholds for a class pair.

Inputs:

Mean vector covariance matrix file

Outputs:

Fisher direction vector
Five thresholds
Discriminant plane vector

Program is contained in overlay(s)

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Program Name: FIX Program Type: Subroutine

Program Description:

FIX converts a list of floating point numbers to an integer list plus an associated scale factor. (Waveforms are stored on the disk as integer lists with one common scale factor.)

Inputs:

1) The floating point array address

2) The address for the resultant integer array

3) The array dimensionality (address)

4) The address for the scale factor

Outputs:

The integer array with one scale factor

Program is contained in overlay(s):

SPCEXC

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Program Name: FL2ALL Program Type: Subroutine

Program Description:

FL2ALL is an extremely accurate floating point to ASCII routine. It is very useful for converting extremely large or small floating point numbers into ASCII characters.

Inputs:

Address of floating point number in double precision address of character string.

Outputs:

ASCII representation in decimal up to a field of 51.

Program is contained in overlay(s):

PRTRND
PWAVEC

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Program Name: FL2ASC Program Type: Subroutine

Program Description:

FL2ASC outputs ASCII characters which represent the value of a double precision floating point number, the address of which is the first parameter. The starting ASCII string address is pointed to by the address in the second parameter. The next available byte address is returned to the same address in the second parameter.

Inputs:

Floating number (double-pre.) address
ASCII character buffer address

Outputs:

ASCII representation (in decimal) of a floating point double precision number

Program is contained in overlay(s):

MULTI, SINGLE

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Program Name: FLFFT Program Type: Subroutine

Program Description:

Compute the floating point FFT for a given data set or window thereof

Inputs:

a) Number of data points

b) Forward/Inverse flag

c) Power spectrum option flag

d) Real/Imaginary data flag

Outputs:

Frequency spectrum of input

For further information see:

Digital Equipment Corp. Document:
DECUS -11-16

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Program Name: FLNLOG

Program Type: Subroutine

Program Description:

FLNLOG takes the natural log of every floating point element of a source array and stores it in a destination array (the user sets single- or double- precision mode).

Inputs:

1) Source array (floating point) address

2) Destination array (floating point) address

3) Array dimensionality

Outputs:

The natural log array

Program is contained in overlay(s):

SPCEXC

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Program Name: FLOAT Program Type: Subroutine

Program Description:

FLOAT converts an integer list with its associated scale factor to a single-precision floating point array.

Inputs:

1) The integer (source) array address

2) The floating point (destination) array address

3) The array dimensionality (address)

4) The scale factor (address)

Outputs:

The floating point array

Program is contained in overlay(s):

LINKGO
SPCEXC

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Program Name: FLSQRT Program Type: Subroutine

Program Description:

FLSQRT takes the square root of each element of a source array and stores each result in a destination array.

Inputs:

1) Source array address (floating point values)

2) Destination array address

3) Address of the array dimensionaltiy

Outputs:

The floating point array containing the square root values

Program is contained in overlay(s):

SPCEXC

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Program Name: FLTADD Program Type: Subroutine

Program Description:

FLTADD adds each floating point element of a source array by a user-supplied constant and stores each result to a destination (floating point array).

Inputs:

1) The source array address

2) The destination array address

3) The address containing the array dimensionality

4) The address of the constant to be added

Outputs:

The resultant floating point array (see general description above).

Program is contained in overlay(s):

SPCEXC

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Program Name: FLTDEC Program Type: Subroutine

Program Description:

Converts a floating point array to decimal ASCII representation.

Input:

Array Address

Number of Elements

Outputs:

Decimal ASCII Array

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Program Name: FLTEXP Program Type: Subroutine

Program Description:

FLTEXP converts each element of a source array using the function EXP(X), and stores each result in a destination array.

Inputs:

1) Source array address (floating point values)

2) Destination array address

3) Array dimensionality address

Outputs:

The floating point array.

Program is contained in overlay(s):

SPCEXC

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Program Name: FLTMUL Program Type: Subroutine

Program Description:

FLTMUL multiplies each floating point element of a source array by a user-supplied constant and stores each result in a destination array.

Inputs:

1) Source array address (floating point values)

2) Destination array address

3) Address of the array dimensionality

4) Address of the multiplication constant

Outputs:

The resultant floating point array

Program is contained in overlay(s):

SPCEXC

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Program Name: FLTSQR Program Type: Subroutine

Program Description:

FLTSQR squares each element of a source array and stores each result in a destination array.

Inputs:

1) Source array address (floating point values)

2) Destination array address

3) Address of the array dimensionality

Outputs:

The resultant floating point array

Program is contained in overlay(s):

SPCEXC

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Program Name: FMIMAX Program Type: Subroutine

Prpgram Description:

FMIMAX extracts the minimum and maximum values from a floating point array.

Inputs:

1) Source (floating point values) array address

2) Address of the array dimensionality

3) Address for the minimum value

4) Address for the maximum value

Outputs:

The minimum and maximum (floating point) values of the source array.

Program is contained in overlay(s):

SPCEXC

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Program Name: FNDESR Program Type: Subroutine

Program Description:

FNDESR computes the effective sampling rate of a retrieved waveform and loads the corresponding word in the file control block from which the sampling rate and point sequence values were used as a base for the computation, as follows: Effective sampling rate (ESR)= Sampling rate (SR) divided by point sequence (P).

Inputs:

File control block address

Outputs:

ESR loaded in the FCB

Program is contained in overlay(s):

SINGLE

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Program Name: FNDLMM

Program Type: Subroutine

Program Description:

FNDLMM finds the line minimum and maximum of points in a specified data buffer and loads the specified file control block with the minimum and maximum values according to the vertical scale mode for the FCB.

Inputs:

File control block address in R4

Outputs:

Minimum and maximum for line loaded in the FCB

Program is contained in overlay(s):

MULTI

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Program Name: FNDSEG Program Type: I/O Subroutine

Program Description:

FNDSEG gets the information for the next sector link of a file opened for input, update or output. In the case of an output file, FNDSEG will append a link if the current link is the last one in the chain.

Inputs:

The file name via global address 'DTP' and the I/O table entries for the named file.

Outputs:

(See general description)

Program is contained in overlay(s):

THIS IS A COMMON ROUTINE CONTAINED IN MANY OVERLAYS

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Program Name: FNDSLT Program Type: Resident Subroutine

Program Description:

FNDSLT finds a slot in a directory. For a create function, the slot found is empty. For a retrieve, the slot found is occupied by a designated file name.

Inputs:

Subroutine call via R4
CRE2 = 0 (data directory) not 0 (overlay directory)
CRE1 is function code passed to FIND

Outputs:

R1 = disk address
R2 = total # sectors in file
R3 = directory entry address

Program is contained in overlays:

All

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Program Name: FORMAT Program Type: Language Subroutine

Program Description:

FORMAT initializes sector pairs (writes 0's) of an output waveform file in the order in which they are requested. The program also updates the starting sector of a waveform (on first access) and the total number of sectors for the waveform. For example, if the first point written for a waveform was the eleventh coordinate (W1(11)=I2), the 'FORMAT' will zero out the first two sectors of the waveform before writing the eleventh coordinate. In addition, the starting sector and number of sectors for the waveform are written to the extension control block. Since 245 (256 - 11) single-precision wave points are to fit into two sectors, if the next access was the 246th coordinate, then two more sectors would have to be initialized and the total number of sectors updated.

Inputs:

Waveform file control block and extension block information.

Outputs:

Initialization of the sector pair associated with the request coordinate and updates in the waveform file control block and extension block.

Program is contained in overlay(s):

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Program Name: FPASC Program Type: Subroutine

Program Description:

FPASC converts a two-word floating point number into ASCII characters equivalent.

Inputs:

a) Floating point number

b) Format control (field widths)

Outputs:

ASCII string

Program contained in overlay(s):

PLOT2D
PLT1DA
PLT1DB

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Program Name: FRMCRD

Program Type: Program Development

Program Description:

FRMCRD calls LDFRAM.

Inputs:

N/A

Outputs:

N/A

Program is contained in overlay(s):

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Program Name: FULRNG Program Type: Subroutine

Program Description:

FULRNG finds the maximum and minimum for each dimension of the data set and stores these into a buffer.

Inputs:

Buffer: CSECT buffer - see buffer description

Files: data file (DT 13.) see file descriptions

Variables: VECDIM - dimensionality of data set
VECTNM - system tree name
VECNNM - system senior node name

Outputs:

Buffer: CSECT buffer - see buffer descriptions

Program is contained in overlay(s):

PCIEVL

AD-A038 330 PATTERN ANALYSIS AND RECOGNITION CORP ROME N Y F/G 9/2
THE WAVEFORM PROCESSING SYSTEM (WPS). VOLUME IV, PART 2.(U)
FEB 77 P K SANYAL F30602-72-C-0193
UNCLASSIFIED PAR-76-6-VOL-4-PT-2 RADC-TR-76-224-4-2 NL

3 OF 4
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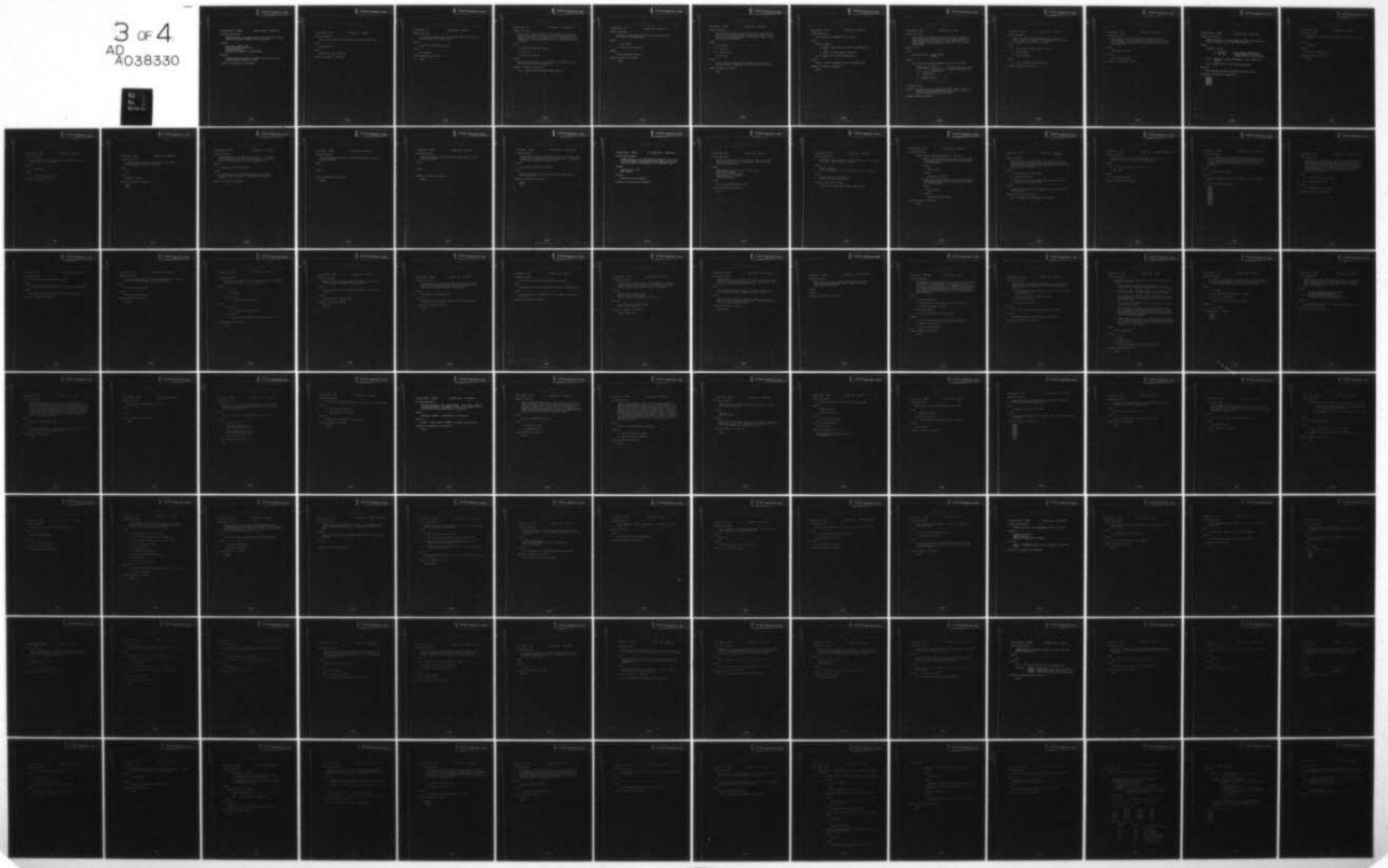

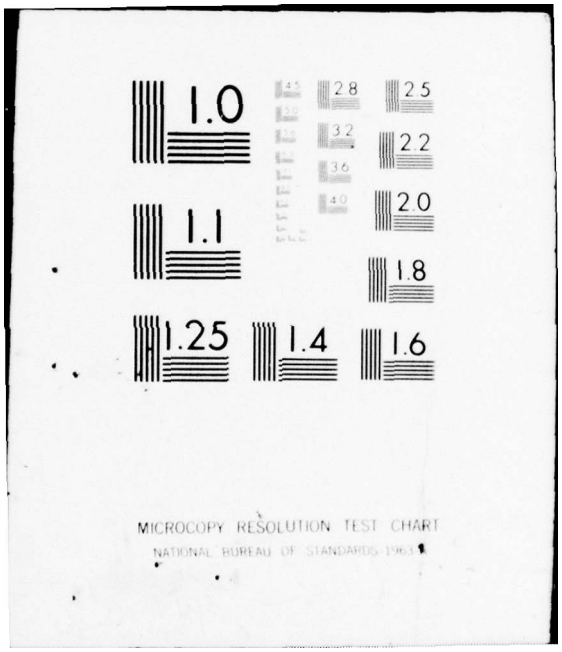
1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963

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Program Name: FUSMAT Program Type: Subroutine

Program Description:

FUSMAT formats a confusion matrix for printing on either the Vector General display or line printer.

Inputs:

True class symbol list
Assigned class symbol list
Confusion matrix
Reassociated symbols (if applicable)

Outputs:

Confusion matrix printed on either the line printer or Vector General display, or both.

Program is contained in overlay(s)

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Program Name: FUTIL Program Type: OVERLAY

Program Description:

FUTIL deletes a specified file entry from the data directory table.

Inputs:

Light-button call

Outputs:

Modification of data directory

Program is contained in overlay(s):

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Program Name: GC

Program Type: Subroutine

Program Description:

GC is a routine used in pass-1 of the PARLAN compiler to retrieve the next character from the input string.

Inputs:

Current line of PARLAN source code

Outputs:

Next character

Program contained in overlay(s):

SYNTAX

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: GET Program Type: I/O Subroutine

Program Description:

GET transfers a specified number of words from RP02 to a specified buffer. If the number of words is not an even multiple of 256, the remainder of the last sector read will be lost. Subsequent calls to GET will read, starting at the beginning of the next sequential sector in the file.

Inputs:

The complete file name consisting of:

1) data type

2) 6-character file name

Outputs:

A page of the data file to core and updates in the ONAMT reflecting the file's new I/O position, status, etc.

Program is contained in overlay(s):

THIS IS A COMMON ROUTINE CONTAINED IN MANY OVERLAYS

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Program Name: GETC Program Type: Subroutine

Program Description:

GETC gets the next sequential character from the input buffer and places it in variable CHAR.

Inputs:

a) Input buffer

b) Pointer to current symbol

Outputs:

CHAR contains next character

Program contained in overlay(s):

LINKGO

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Program Name: GETCIF Program Type: Subroutine

General Description:

When called by an overlay, GETCIF checks to see if the given file exists. If not, it creates the file and returns control. If the file has been previously created, it reads the core image from disk into a user-specified buffer.

Inputs:

a) file name

b) data type

c) buffer address

d) word count

Outputs:

Either a new file is created on the waveform disk or the user-specified buffer is loaded with the contents of the existing file.

Program contained in overlay(s):

SININ

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: GETFIL Program Type: Subroutine

Program Description:

GETFIL reads the file NAMSAV (DT 17.) into core.

Inputs:

External Variables:

A) DELBUF - Buffer which is to contain the NAMSAV file in core.

B) DIRENT - Directory entry of NAMSAV file.

Files - NAMSAV (DT 17.) See file descriptions

Outputs:

DELBUF - A buffer containing an image of the NAMSAV file.

Program is contained in overlay(s):

NASDEL

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Program Name: GETFIS Program Type: Overlay

Program Description:

GETFIS provides the capability for the on-line user to designate a class pair from the lowest node list of the current tree/node. The Fisher vector(s) for that class pair is then computed and used as a basis vector(s) for the histogram or scatter plot in the structure analysis module.

Library: None

Inputs:

External variables - VECDIM, VECTNM
VECNUM

Outputs:

GETFIS writes the following information into the CSECT BUFFER:

CLASS SYMBOL-1	CODE = 4
	CLASS SYMBOL-2
FISHER VECTOR	
ORTHOGONAL VECTOR	

CLASS SYMBOLs are those chosen to compute the Fisher Plane

Limitations: None

Comments: The Fisher vectors are computed by overlay FISODP. SELLVC calls FISODP as an overlay and is in turn recalled by FISODP as an overlay, using entry point CALLS or CALLH.

Program contained in overlay(s):

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Program Name: GETIX Program Type: Subroutine

Program Description:

GETIX will compute the absolute address of an element in a matrix. SETIXF and SETIXD will set parameters in the routine to correspond to the precision of the matrix.

Inputs:

1). Row and column number (relative to zero)

2). Matrix address

3). Matrix dimension

Outputs:

1). Absolute address of a matrix element.

Program is contained in overlay(s)

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Program Name: GETLOG Program Type: Subroutine

Program Description:

GETLOG contains a set of subroutines to manipulate the current logic tree file. There are subroutines to open the file, close the file, update the current page of the file, and read a specific page of the logic file.

Inputs:

Current logic tree name

Outputs:

Logic tree manipulation

Program is contained in overlay(s)

PRECEDING PAGE BLANK-NOT FILMED

Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: GETNAS Program Type: Subroutine

Program Description:

GETNAS retrieves a selected NAME AND SAVE vector from the file and places it in a specified location.

Inputs:

Arguments in call:

a)	Entry No.	See program documentation
b)	BUF ADD	Buffer address of location where vector is to be placed

Table - NASTBL for entry information. See program for details

File - NAMSAV (DT 17.) see file descriptions

Outputs:

User-specified buffer containing specified vector

Program is contained in overlay(s):

SELVEC
NASDEL
NAMSAV
SELLVC
NASIOP

6.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Program Name: GETNBC Program Type: Subroutine

Program Description:

GETNBC retrieves the next non-blank character from the current input string.

Inputs:

Input string

Outputs:

The next non-blank character

Program contained in overlay(s):

LINKGO

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Program Name: GETNOD Program Type: Subroutine

Program Description:

GETNOD returns in R1 the absolute address of the requested node entry in the current logic tree.

Inputs:

1). Node number

Outputs:

1). Address of logic tree node

Program is contained in overlay(s)

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Program Name: GETPAR Program Type: SUBROUTINE

Program Description:

Subroutine GETPAR will retrieve the parameter list (PARLST) from disk storage and move it into core.

Inputs:

None

Outputs:

Parameters to PARLST

Program is contained in overlay(s):

SEGOPT
SEGMNT

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Program Name: GETPAR Program Type: Subroutine

Program Description:

GETPAR retrieves the core-image file (or creates it if it does not exist) which is located in the system directory and is listed by a unique six-character name with a data type equal to 002.

Inputs:

The address for the core image file.

Outputs:

If the file does not yet exist then the first call to GETPAR creates the file in system space. Otherwise, the file is read to core.

Program is contained in overlay(s):

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Program Name: GETPRB Program Type: Subroutine

Program Description:

Subroutine GETPRB will load the buffer with the command to begin the prototype waveform.

Inputs:

Outputs:

Program is contained in overlay(s):

SEGMNT

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Program Name: GETPRE Program Type: Subroutine

Program Description:

Subroutine GETPRE will load the buffer with the command to end the prototype waveform.

Inputs:

Outputs:

Program is contained in overlay(s):

SEGMNT

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: GETSEG Program Type: I/O Subroutine

Program Description:

GETSEG reads to core the waveform points from the first segment marker coordinate for as many points as are requested, or up to the second segment marker coordinate, whichever is less.

Inputs:

A waveform file control block address.

Outputs:

The start window of the event marked (via the segment markers in the header) to core.

Program is contained in overlay(s):

LINKGO
SPCEXC

9.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: GETSYM Program Type: Subroutine

Program Description:

GETSYM returns in R2 the absolute address of the list of class symbols associated with the node in the logic tree file which is specified in the parameter list.

Inputs:

Current logic tree
Node number

Outputs:

Address of class symbols

Program is contained in overlay(s)

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8"x10½" Crop

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Program Name: GETTF Program Type: Subroutine

Program Description:

GETTF displays a message on the VG, accepts a time or frequency, and loads indirectly to the fifth parameter a WPS request time/ frequency formatted value.

Inputs:

Time/frequency indicator: time = 0 or plus; freq. = -
Sampling rate address
Total points in waveform address
Output message to user address
Request value address

Outputs:

Double-word formatted request value

Program is contained in overlay(s):

RQSSTF

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Program Name: GETTXT Program Type: Subroutine

Program Description:

GETTXT gets a text block from a text file (data type = 62) associated with either a tree or waveform or vector.

Inputs:

INITNM = tree name
R0, R1 = waveform or vector ID; or tree name - first 4 characters

Outputs:

Absolute address of text block in R2
or SCTIN = -4 if no text exists

Program is contained in overlays:

SINGLE, MULTI, PRTRND, PWAVEC, PRNHDR, PRNTID, PTRETL

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Program Name: GETVAR Program Type: Subroutine

Program Description:

GETVAR contains 2 independent subroutines. They are:

(1) GIVME - The subroutine in the link phase of PARLAN which asks the user for the disposition of each input variable in a PARLAN program.

Inputs:

Variable name

Outputs:

Disposition of variable

(2) GOVME - The subroutine in the link phase of PARLAN which asks the user for the disposition of each output variable in a PARLAN program.

Inputs:

Variable name

Outputs:

Disposition of the variable

Program contained in overlay(s):

LINKGO

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Program Name: GETVEC

Program Type: Vector I/O Subroutine

Program Description:

GETVEC retrieves the next vector (of a data set) and returns an address within a user-supplied buffer. Any number of files may be opened for input or update, provided that each file has an associated buffer (See file description).

Inputs:

1) Data type (must be a vector file)

2) 6-character file name

3) Address of file associated buffer which is preceeded by the 3-word vector file control block.

Outputs:

A pointer to the next vector. The address is contained in global location VPOINT.

Program is contained in overlay(s):

THIS IS A COMMON ROUTINE CONTAINED IN MANY OVERLAYS

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: GETVP Program Type: Language Subroutine

Program Description:

GETVP returns the value of the PARLAN expression V1(I2); i.e. it returns the value of a specified vector measurement.

Inputs:

1) The vector file control block address

2) The index

Outputs:

The value for that index.

Program is contained in overlay(s):

9.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Program Name: GETWAV Program Type: I/O Subroutine

Program Description:

A call to GETWAV will read (from a waveform file opened for input) the first window of the next waveform to be accessed. Each page of data is prefixed by a header which reflects information about the data in terms of identification, number of points, and time or frequency.

Inputs:

A file control block address.

Outputs:

The first requested window of the next waveform in the designated file.

Program is contained in overlay(s):

LINKGO
MULTI
PLAYBK
PRNHDR
PRNTID
PRTRND
PWAVEC
SEGMNT
SINGLE
SPCEXC
SPCSET

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Program Name: GETWP Program Type: Language Subroutine

Program Description:

GETWP returns the waveform value of a specified waveform coordinate. The program takes care of paging waveform blocks from disk. An initial GETWAV call must have been executed to identify the waveform ID and to write the file control block information. (The Parlan compiler generates a call to GETWP in response to a statement such as: LET I3=W2(I6). I3 is the wave coordinate and W2(I6) is the value at that coordinate.)

Inputs:

1) The waveform file control block

2) The index (coordinate)

Outputs:

The waveform value at that index.

Program is contained in overlay(s):

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Program Name: GFR Program Type: Subroutine

Program Description:

GFR returns the waveform frequency resolution.

Inputs:

The waveform file control block (which links to the extension block).

Outputs:

The waveform frequency resolution stored in the parameter list.

Program is contained in overlay(s):

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Program Name: GNBC Program Type: Subroutine

Program Description:

GNBC is a routine used by pass-1 of the PARLAN compiler to retrieve the next non-blank character from the input string.

Inputs:

Current line of source code

Outputs:

The next non-blank character

Program contained in overlay(s):

SYNTAX

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Program Name: GPREGN Program Type: Overlay

Program Description:

PREGN saves or redisplays on or from the disk, the code associated with the display region of the Vector General.

Inputs:

In save mode:

a) VG BUFFER

In restore mode:

a) A previously saved VG BUFFER

Outputs:

In save mode:

a) A VG BUFFER file on the WPS disk

In restore mode:

a) The specified VG BUFFER file is displayed on the VG

Program contained in overlay(s):

GPREGN

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Program Name: GRDMRK Program Type: Subroutine

Program Description:

GRDMRK outputs display instructions to the Vector General display buffer to display grid marks for the SINGLE frame.

Inputs:

File control block in CSECT buffer with pertinent scaling values filled

Outputs:

Modification of VG display buffer

Program is contained in overlay:

SINGLE

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Program Name: GRMDRM Program Type: Subroutine

Program Description:

GRMDRM computes the number of grid marks to be displayed in one position in the Multiple Waveform display frame and also outputs the VG code to display grid marks to the VG buffer.

Inputs:

File control block address in R4

Outputs:

Modification of a file control block and the VG display buffer

Program is contained in overlay(s):

MULTI

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Program Name: GSF Program Type: Subroutine

Program Description:

GSF returns the scale factor associated with a waveform.

Inputs:

The waveform file control block address (linking the extension block).

Outputs:

The scale factor to the parameter list (this number is the exponent of base 2).

Program is contained in overlay(s):

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Program Name: GT50R6 Program Type: Subroutine

Program Description:

GT50R6 converts an ASCII string of variable-length file names with separators into an output string of 5- or 6-character file names without separators and returns the number of file names.

Inputs:

Address of ASCII string (input)
Address of ASCII string (output)
Address of count of file names to be received

Outputs:

Output string of uniform file names
Count of file names output

Program is contained in overlay(s):

PRTRND, PRNHDR, CRETRE

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: GTONMT Program Type: I/O Subroutine

Program Description:

GTONMT searches for the named file in the Open File Table and returns a pointer to the entry, if found, or a return indicating that entry does not exist (file was not opened for I/O).

Inputs:

The file name consisting of the data type and 6-character name is taken from external location 'SNAM' (also known as 'DTP').

Outputs:

If file's entry is found in the Open File Table, then register 4 (R4) is the address of word #4 in the entry. Otherwise a return indicates that the entry was not found.

Program is contained in overlay(s):

COMMON ROUTINE

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Program Name: GWORDS

Program Type: RESIDENT BUFFER

Program Description:

GWORDS is a collection of .GLOBL words used for inter-overlay communication in the WPS system. Also, a 7K buffer exists for use as core space within it.

Inputs:

Outputs:

Program is contained in overlay(s):

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Program Name: HISTOGRAM Program Type: Overlay

Program Description:

HISTOGRAM is the main entry point of the one-space histogram overlay for WPS-OLPARS. It mathematically projects the vector data set onto a line. That is, each vector in n-dimensional space is reduced to a single one-dimensional data point. HISTOGRAM calls subroutines which produce a set of bargraphs on the Vector General display. These bargraphs represent the distribution of the vectors over the range of the data.

Inputs:

a) Current vector data

b) Projection vector (for reducing the vectors to points)

c) Flag indicating type of vector

In logic design only:

d) Logic node and associated class symbols

Outputs:

a) List of classes needed by one-space plotting routines

b) Modified vector headers

c) One-space histogram plot

Program contained in overlay(s):

PLT1DA

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Program Name: HSCALE Program Type: Overlay

Program Description:

HSCALE presents a VG display and allows a user to select one of four horizontal scaling modes for the Single Waveform display, which follow:

0) Accept default values (points per line = 512, lines per frame = 4, point sequence =1)

1) Enter N units per line (seconds or Hertz)

2) Enter explicit values

3) Fit waveform to N lines

Inputs:

User enters option number and further values if required

Outputs:

Horizontal option set in the Single file control block

Program is contained in overlay(s):

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Program Name: HZOOM Program Type: Overlay

Program Description:

HZOOM handles six display manipulation options for one-space histogram plots. They are:

1. Display new menu. This calls a secondary menu of options. (The entire list of histogram options will not fit in one menu.)

2. Restore full range. The range of data to be represented by the plot is set equal to the actual range of the vector dataset.

3. Dial new range. The range of data to be represented by the plot is determined by two display boundaries that the user positions using control dials.

4. Type new range. The range of data to be represented by the plot is typed in by the user.

5. Select bin range. The range of data to be represented by the plot is determined by user-selected first and last bins. Each bin represents a range of data and only those vectors which fall between the minimum value of the first bin and the maximum value of the last bin will be plotted.

6. Compare classes. The user selects the bargraph of any displayed class (mode) of the dataset. An image of that bargraph can then be moved with a control dial, until it is superimposed on any other bargraph that is on the display.

Inputs:

Current histogram plot

Outputs:

a) New menu
   or
b) New histogram plot
   or
c) Ability to move histograms on the display screen

Program contained in overlay(s):

PLT1DB

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Program Name: IASC Program Type: Subroutine

Program Description:

IASC converts an unsigned 16-bit integer into its ASCII equivalent, in octal or decimal format. It produces exactly the number of digits the user requests (leading zeros are returned as blanks).

Inputs:

a) The number

b) The buffer where the number is to be stored

c) The size of the buffer

d) The type of conversion (octal or decimal)

Outputs:

An ASCII string

Program contained in overlay(s):

PLOT2D
PLT1DA
PLT1DB

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Program Name: IDCOUT Program Type: Subroutine

Program Description:

IDCOUT takes an integer-valued source array, computes the average value, subtracts this value from each element in the array, and stores the resultant vector in a destination array. The average value is also returned.

Inputs:

1. the source (integer-valued) array (address)
2. the array dimensionality (address)
3. destination (integer-valued) array address
4. the address of the average value in the source

Outputs:

The destination array which is the source array minus the average value of the source array.

Program is contained in overlay(s):

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Program Name: INDEX Program Type: Subroutine

Program Description:

INDEX identifies points on a two-space scatter plot display. The points represent projected scaled OLPARS vectors (see SCATTR, PAGE, and PLOT). The user selects a point on the Vector General display with the light pen, and for every vector on the current page which is plotted at that point, "INDEX" prints on the line printer a vector ID (first two words of the vector header), a class symbol (last byte of the name of the node to which the vector belongs), and the X and Y values of the projected vector.

Inputs:

Outputs of SCATTR, PAGE, and PLOT

Outputs:

Line printer listing of ID numbers which identify the data set vectors which are plotted at a user-selected point

Program contained in overlay(s):

PLOT2D

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Program Name: INITCB Program Type: Subroutine

Program Description:

Subroutine INITCB will initialize the TCB's

Inputs:

Outputs:

Program is contained in overlay(s):

SEGMNT

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Program Name: INITLZ Program Type: RS11 Utility

Program Description:

INITLZ enables a user, through Tektronix input, to initialize the data and/or overlay directory, the two associated USAG11 tables, and the sector table (SECTBL).

Inputs:

User inputs "D" or "V" or "B" after entering "1" or "2" or "3"

Outputs:

"1.)" and/or "2.)", and "3.)"

1.) Data directory on sector 1
USAG11 table (data) on sector 2

2.) Overlay directory on sector 0
USAG11 table (overlay) on sector 4

3.) Sector table on sector 3

Program is contained in overlay(s):

None

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Program Name: INSR Program Type: Subroutine

Program Description:

INSR inserts the sampling rate for a waveform tree into the tree table.

Inputs:

a) Tree control block address

b) Sampling rate to be inserted

Outputs:

Sampling rate is inserted in the tree table

Program contained in overlay(s):

LINKGO

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Program Name: INTBIN Program Type: Subroutine

Program Description:

INTBIN initializes the buffer BINBUF. This buffer contains, for each dimension, the number of bins to be used in the computation of the probability of confusion.

Inputs:

Variables: VECDIM - dimensionality of data set

Outputs:

Buffer: CSECT buffer (BINBUF) see buffer descriptions

Program is contained in overlay(s):

PCIEVL

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Program Name: INTENS Program Type: Subroutine

Program Description:

INTENS increases the legibility of a two-space scatter plot (See SCATTR). It asks the user to select with the light pen one or more alphanumeric symbols from a list of symbols that represent the classes or nodes of the current vector dataset. All points on the display screen which are represented by the selected symbols are then caused to blink on and off or are temporarily erased.

Inputs:

Outputs of SCATTR, PAGE, and PLOT

Outputs:

a) Blinking plot symbols

b) Eliminated classes

Program contained in overlay(s):

PLOT2D

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Program Name: INTHRE Program Type: Subroutine

Program Description:

INTHRE allows the user to separate areas of a one-space histogram plot by positioning lines on the Vector General display. The lines are single segment, straight lines that extend from the top of display to the bottom. They appear automatically one at a time and are maneuvered into position by user manipulation of a control dial. A maximum of four such lines can be produced. INTHRE is useful to both structure analysis and logic design. It produces a mathematical criterion for separating data; that is, a vector is classified according to the side of a line (called a threshold) on which its projected value falls.

Inputs:

Outputs of HISTOGRAM, BINCON, and PROCESS

Outputs:

a) Vertical display line segments

b) Unscaled values of the segments

Program contained in overlay(s):

PLT1DB

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Program Name: INTNOD Program Type: SUBROUTINE

Program Description:

INTNOD finds all intermediate nodes existing beneath a specified node within a data tree.

Inputs:

Data type
Specified node name

Outputs:

Modification of the system stack: first, the number of intermediate nodes must be popped, then the absolute tree table address of all the intermediate nodes found must be popped

Program is contained in overlay(s):

PRTRND

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Program Name: INVFIL Program Type: Subroutine

Program Description:

Annihilates the frequency components of the input waveform

Inputs:

a) Number of points

b) Address of data start

Outputs:

a) Noise spectrum of input

For further information see:

WPS Final Report

"INVFIL" was designed by the:

Speech Communications Research Lab, Inc.
Santa Barbara, CA

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Program Name: INVMAT Program Type: Subroutine

Program Description:

INVMAT inverts a square two-word floating point matrix.

Inputs:

1). Dimension of matrix

2). Address of matrix

3). Scratch buffer (2* dimension size bytes in length)

Outputs:

Inverted matrix

Program is contained in overlay(s)

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Program Name: IWFCB Program Type: I/O Subroutine

Program Description:

IWFCB initializes the waveform file control block by clearing all locations other than the default values.

Inputs:

A waveform file control block address.

Outputs:

An initialized waveform file control block. (See software documentation for GETWAV.)

Program is contained in overlay(s):

LINKGO
PRNHDR
PRNTID
PRTRND
PWAVEC
SEGMNT
SININ
SPCEXC
SPCSET

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Program Name: KLENUP Program Type: Overlay

Program Description:

KLENUP closes all files created by overlay LINKGO and calculates the mean and covariance of all vector files.

Inputs:

Vector file of each output vector

Outputs:

Mean and covariance file for each output vector file

Program contained in overlay(s):

KLENUP

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Program Name: L1DTRE Program Type: Subroutine

Program Description:

L1DTRE displays all active trees of a specified data type, with associated text blocks, sequentially on the V. G. screen. In addition, the program returns the number of such trees found and provides paging and hardcopy as required.

Inputs:

Data type and all inputs referenced in program LISTRE.

Outputs:

See general description

Program is contained in overlay(s):

SPCOPT

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Program Name: LBLPUT Program Type: Subroutine

Program Description:

LBLPUT has 2 functions in relation to code generation for a label:

1. Insert the offset from the beginning of the program to the label statement in the symbol table.

2. If the label is the end of a DO loop, generate code to end that DO loop.

Inputs:

Label symbol table address

Outputs:

a) Code is generated for the end of the DO loop

b) Symbol table is modified to reflect absolute address of the label

Program contained in overlay(s):

LINKGO

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Program Name: LDBLNK Program Type: Subroutine

Program Description:

LDBLNK loads a specified field with ASCII blanks.

Inputs:

Number of blanks to load
Address to receive blanks

Outputs:

A field filled with blanks

Program is contained in overlay(s):

PRTRND, PWAVEC, PRNHDR, PRNTID

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Program Name: LDBOX Program Type: Subroutine

Program Description:

LDBOX displays a description of the current plot on the Vector General immediately beneath the plot and scales and draws any boundaries which are associated with the plot.

Inputs:

a) Current OLPARS vector data tree name

b) Flag for "Logic Design" or "Structure Analysis"

c) Flag for type of projection vectors used by SCATTR

d) Number of pages in the plot

e) Current page number

f) Scaling factors and flags

g) End points of multi-segment boundaries

In logic design only:

h) Current logic node number

Outputs:

a) Four-line description of the plot containing inputs a-f and h

b) Display of boundaries

Program contained in overlay(s):

PLOT2D

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Program Name: LDBOXH

Program Type: Subroutine

Program Description:

LDBOXH generates a Vector General display immediately below a one-space histogram that describes the histogram in terms of the parameters that were used to create it. It also draws any thresholds (see INTHRESH) that may belong to the plot.

Inputs:

Outputs of HISTOGRAM, BINCON, PROCESS, and possibly INTHRESH

Outputs:

a) Display of plot parameters

b) Display of thresholds

Program contained in overlay(s):

PLT1DA
PLT1DB

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Program Name: LDFRAM Program Type: Program Development

Program Description:

LDFRAM creates the WPS frames from card input. The frames are listed in the system space directory by a six-character name with data type = ØØØ.

Inputs:

Cards in format described under FRMTBL/FRMLOC in the Table Description Section.

Outputs:

Program is contained in overlay(s):

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Program Name: LDONM1 Program Type: I/O Subroutine

Program Description:

LDONM1 initializes the Open File Table entry for the file requested for open status input/update/output.

Inputs:

The complete file name and open status:

1) The file data type is taken from external location 'DTP'

2) The 6-character file name is taken from external location 'NDNM' (which follows location 'DTP').

3) The open status, i.e., input or update or output is taken from external location 'IOSW'.

Outputs:

An Open File Table entry with a pointer to the Local Sector Table for the named file.

Program is contained in overlay(s):

COMMON ROUTINE

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Program Name: LDTEXT Program Type: Subroutine

Program Description:

LDTEXT retrieves and outputs to the caller requested text from the ID or tree name. If no text is found, an ASCII string of blanks is output.

Inputs:

ID address or tree name
IN1DTP, IN1NNM, IN1TNM must be set to current data set
Output buffer address

Outputs:

Tree or waveform text in a specified buffer (60 characters)

Program is contained in overlay(s):

PRTRND, PWAVEC, PRNTID, PTRETL, PRNHDR

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Program Name: LFCLPB Program Type: Overlay

Program Description:

LFCLPB changes the a priori probabilities of the classes in a logic tree.

Inputs: Logic file

Outputs:

Modification of a priori probabilities

Program is contained in overlay(s):

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Program Name: LFILE Program Type: Subroutine

Program Description:

LFILE contains a set of subroutines designed to open, close and read random pages of the current logic file.

Inputs:

Logic file

Outputs:

Transfer of logic file from disk into core.

Program is contained in overlay(s)

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Program Name: LGCST Program Type: Language Subroutine

Program Description:

LGCST returns the start units of the current waveform page in core.

Inputs:

1) The waveform file control block address.

2) The address for the return

Outputs:

The current page's start units

Program is contained in overlay(s):

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Program Name: LIMITR Program Type: Overlay

General Description:

LIMITR transforms a given dataset to reflect a user-specified minimum and maximum.

Inputs:

a) User-specified minimum and maximum

b) WPS formatted data node

Outputs:

A new tree, with the input tree structure preserved, containing the input data set which has been clamped at the user-specified minimum and maximum.

Program contained in overlay(s):

LIMITR

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Program Name: LINDEP Program Type: Subroutine

Program Description:

LINDEP finds the linear dependent rows of a matrix.

Inputs:

Dimension of matrix
Matrix address
Address of dependent row buffer

Outputs:

Number of dependent rows, and row numbers of dependent rows.

Program is contained in overlay(s)

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Program Name: LINKED Program Type: Overlay

Program Description:

LINKED is responsible for partitioning core for variables used in a PARLAN program.

Inputs:

Selected PARLAN program symbol table

Outputs:

A method for partitioning core for variables

Program contained in overlay(s):

LINKED

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Program Name: LINKGO Program Type: Overlay

Program Description:

LINKGO links PARLAN programs, assigns core for their variables and executes them.

Inputs:

PDP-11/45 machine language code of the PARLAN program

Outputs:

Performs the action sequences of the PARLAN program

Program contained in overlay(s):

LINKGO

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Program Name: LISDIR Program Type: SUBROUTINE

Program Description:

LISDIR presents a VG display which shows all entries of the data directory table and their corresponding sector table entries if they exist.

Inputs:

Data directory on sector 1 (starting sector of the directory table) of the RP02

Outputs:

VG display

Program is contained in overlay(s):

TXTAPE
VGDIR
TXDISK
FUTIL

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Program Name: LISTCS **Program Type:** Subroutine

Program Description:

LISTCS displays the class symbols located at the current pairwise node of the current logic tree and requests that the user select a class pair from the displayed list.

Inputs:

Scratch buffer

Outputs:

Symbols for class pair selected

Program is contained in overlay(s)

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Program Name: LISTRE Program Type: Subroutine

Program Description:

LISTRE displays all trees (regardless of data type) and associated text blocks sequentially on the VG screen.

Inputs:

1) Directory (sectors 1 and following extensions)

2) Absolute left x-coordinate in the VG display buffer

3) VG screen width

4) Absolute top y-coordinate in the VG display buffer

5) Absolute bottom y-coordinate in the VG display buffer

Outputs:

See general description

Program is contained in overlay(s):

DELTRE
LISTRE

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Program Name: LN2 Program Type: Subroutine

Program Description:

For any value P, $1 \leq P \leq 65535$, LN2 computes the value INT (LOG(P)). The base for the logarithm is 2.

Inputs:

1) The address of the source value(P)

2) The address for the output value (INTEGER(LOG(P))).

Outputs:

INTEGER (LOG(P))

Program is contained in overlay(s):

SPCEXC

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Program Name: LNPRNT

Program Type: Device Driver Subroutine

Program Description:

LNPRNT streams the ASCII buffer specified by the user to the line printer. Termination of the stream output is 80 characters, line feed character, carriage return character, or form feed character: whichever comes first.

Inputs:

The source (ASCII) buffer address

Outputs:

See description above

Program is contained in overlay(s):

THIS IS A COMMON ROUTINE CONTAINED IN MANY OVERLAYS

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Program Name: LOCATE Program Type: Language Subroutine

Program Description:

Given a single-precision floating point index (for example I1 in the language statement W1(I1)=2), LOCATE computes the sector offset and byte offset for that index relative to the current waveform.

Inputs:

1) Address of the (floating point value) index.

2) Address for the sector offset (output)

3) Address for the byte offset (output)

Outputs:

1) The sector offset
and 2) The byte offset

Program is contained in overlay(s):

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Program Name: LOCK Program Type: SUBROUTINE

Program Description:

Subroutine LOCK will ask the user for the amount of lockout that is required between the last part of the "begin" window and the start of the "end" window.

Inputs:

Outputs:

Lockout

Program is contained in overlay(s):

SEGOPT

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Program Name: LODFIL

Program Type: Vector I/O Subroutine

Program Description:

LODFIL stores the file data type and name from the calling routine's list to common reference locations used by the vector I/O subroutines.

Inputs:

The complete file name; data type and 6-character name from the caller's parameter list. (the stack contains the address of the caller's list).

Outputs:

External locations 'DTP' (in GWORDS) and 'FILDTP' (in RTREEV) are loaded with the complete file name.

Program is contained in overlay(s):

THIS IS A COMMON ROUTINE CONTAINED IN MANY OVERLAYS

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Program Name: LODNAM Program Type: Subroutine

Program Description:

LODNAM loads the file name locations of the two most commonly called waveform I/O subroutines WAVGET and SKIPS. All of these programs support the main waveform I/O subroutines GETWAV and MORWAV.

Inputs:

The file name from the file control block via register R0.

Outputs:

Locations in commonly used routines loaded with the file name.

Program is contained in overlay(s):

THIS IS A COMMON ROUTINE CONTAINED IN MANY OVERLAYS.

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Program Name: LODORG Program Type: Subroutine

Program Description:

LODORG outputs the origin value of a waveform or transform in ASCII characters. The beginning value (NO) address is taken from the fourth word of the waveform header (5th word if in frequency mode).

Inputs:

Address of 4th header word
Output address
Sampling rate address

Outputs:

ASCII representation of the origin in seconds or Hertz

Program is contained in overlays:

PRTRND, PWAVEC, PRNHDR

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Program Name: LODPRM Program Type: I/O Subroutine

Program Description:

LODPRM loads the common reference file data type name and tree name locations for assorted I/O subroutines.

Inputs:

The complete data set name; data type, 6-character node name and 6-character tree name from the caller's parameter list. (the stack contains the address of the caller's list).

Outputs:

External location 'DTP' (in section GWORDS) contains the complete data set name.

Program is contained in overlay(s):

THIS IS A COMMON ROUTINE CONTAINED IN MANY OVERLAYS

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Program Name: LODVEC Program Type: Overlay

Program Description:

LODVEC inputs a vector tree from tape into the 11/45 WPS/OLPARS system.

Inputs:

N/A

Outputs:

Files: Data Files (DT 13.) see file description

Variables: VECDIM - dimensionality of last tree read in
VECTNM - tree name of last tree read in
VECNNM - senior node name of last tree read in

Program is contained in overlay(s):

LODVEC

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Program Name: LODWAV Program Type: Overlay

Program Description:

This routine is responsible for loading a WPS format tape onto the system disk. It is the main means of loading waveform data into the WPS system.

Inputs:

A WPS format data tape mounted on magtape unit #1.

Outputs:

A WPS format data tree located on the RP02 system disk

Program is contained in overlay(s):

LODWAV

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Program Name: LOGF Program Type: Subroutine

Program Description:

LOGF contains a series of subroutines to access the current logic file.

Inputs:

Logic file

Outputs:

Logic file

Program is contained in overlay(s)

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Program Name: LOGIC

Program Type: SUBROUTINE

Program Description:

Subroutine LOGIC will ask for the logic to be used in the threshold logic. Types are: LT = less than; LE = less than or equal; EQ = equal; GE = greater than or equal; GT = greater than; NE = not equal.

Inputs:

Logic type

Outputs:

LOGICB	begin parameter
or	
LOGICE	end parameter

Program is contained in overlay(s):

SEGOPT

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Program Name: LOGTRE Program Type: Subroutine

Program Description:

LOGTRE displays the current logic tree.

Inputs:

1). Starting node number

2). Number of levels to display

3). Flag indicating whether to print class symbols

Outputs:

Current logic tree displayed on vector general

Program is contained in overlay(s)

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Program Name: LOOKUP Program Type: Subroutine

Program Description:

LOOKUP is a routine used in pass -1 of the PARLAN compiler to determine the internal representation of the current symbol.

Inputs:

The current symbol

Outputs:

Internal representation of the current symbol

Program contained in overlay(s):

SYNTAX

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Program Name: LOWNAM Program Type: Subroutine

Program Description:

LOWNAM contains two routines:

A) LOWNAM stores all of the lowest-order node names of the system data tree in a buffer.

B) NAMNOD places a new low order node name into NEWNNM every time it is called.

Inputs:

External variable for LOWNAM

VECTNM - system tree name

DIRENT - directory entry for system tree

Outputs:

LOWNAM - N/A

NAMNOD - Variable NEWNNM is updated with new node name

Program is contained in overlay(s):

FEVCRE

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Program Name: LOWNOD Program Type: I/O Subroutine

Program Description:

LOWNOD returns the addresses of all lowest-level sub-nodes under a user-specified node. The number of addresses returned is also returned, as are the addresses on the system stack.

Inputs:

1) The tree's tree table should be in core (at external location 'TRETBL' using the appropriate find subroutine(s)).

2) The address of the starting node's entry in the tree table.

Outputs:

1) The # of low nodes returned (first word on stack)

2) All the low node entry addresses (on subsequent words on the stack)

Program is contained in overlay(s):

THIS IS A COMMON ROUTINE CONTAINED IN MANY OVERLAYS

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Program Name: LPDRIVE Program Type: Subroutine

Program Description:

LPDRIV sends a user buffer to the line printer one byte at a time. It is indifferent to the contents of the buffer and accepts any length. The user is responsible for insuring that all bytes are printable ASCII characters and for providing any control characters (form feeds, line feeds, and carriage returns).

Inputs:

a) Number of bytes in the buffer

b) Address of the buffer

Outputs:

Line printer listing of the contents of the buffer

Program contained in overlay(s):

PLOT2D
CR1LOG
CR2LOG

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Program Name: LPMAT

Program Type: Subroutine

Program Description:

LPMAT produces a line printer listing of the confusion matrix that is created by PARTEV. It creates a column for each logic node in the current logic evaluation. Then for each class involved in the evaluation, the number of vectors that were assigned by PARTEV to each node is printed in the appropriate column.

Inputs:

The matrix created by PARTEV

Outputs:

A line printer listing of the matrix

Program contained in overlay(s):

CR1LOG
CR2LOG

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Program Name: LSLTRE Program Type: Subroutine

Program Description:

LSLTRE displays on the Vector General the logic tree names currently in the system.

Inputs:

None

Outputs:

Logic tree names displayed on the Vector General

Program is contained in overlay(s):

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Program Name: LSTCLD Program Type: I/O Subroutine

Program Description:

LSCTLD copies the sector information of a file just opened from the directory entry to the (run time) Local Sector Table.

Inputs:

R3 - points to the file's directory entry. Sector link(s) information is taken from the external location 'SECTBL'.

Outputs:

Program is contained in overlay(s):

THIS IS A COMMON ROUTINE CONTAINED IN MANY OVERLAYS

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Program Name: LUTILS Program Type: Subroutine

Program Description:

LUTILS is a set of 6 independent subroutines used by the link phase of PARLAN.

(1) TCBSET - Sets up a tree control block for an output variable

Inputs:

Variable description

Outputs:

Tree control block is created in core

(2) IDTPSET - Sets up the input data type of a tree control block

Inputs:

Variable description

Outputs:

The input data type is created in core

(3) SCANIT - Breaks up user responses into its basic elements

Inputs:

User response

Outputs:

Next symbol in response

(4) OSETUP - Sets up descriptions for all output trees not in program's parameter list

Inputs:

Variable name

Outputs:

A description for this variable is created in core

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LUTILS (Continued)

(5) IFOUT - Sets up a description block for an output I or F variable

Inputs:

Variable name

Outputs:

A description block for this variable is created in core

(6) IFIN - Sets up a description block for an input I or F variable

Inputs: Variable name

Outputs:

A description block for this variable is created in core

Program is contained in overlay(s):

LINKGO

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Program Name: MAGDSK Program Type: RS11 Utility

Program Description:

MAGDSK copies a magtape copy of the RPØ2 back onto the RPØ2 disk.

Inputs:

Magtape (unit #1) built by DSKMAG
RUN MAGDSK command under DOS monitor

Outputs:

RPØ2 disk duplicating the RPØ2 rolled out under DSKMAG

Program is contained in overlay(s):

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Program Name: MAGTAP Program Type: SUBROUTINE

Program Description:

MAGTAP is the driver for all magnetic tape operations under WPS.

Inputs:

1. Complete indicator (operation status code set by MAGTAP)
   0 = transfer is complete and successful
   1 = transfer is still in operation
   2 = an end-of-file has been read
   3 = an end-of-tape has been detected on a read or write operation
   negative value = an error occurred on the transfer - the complete indicator contains the contents of the status register with bit 15 set

2. Buffer address

3. Number of words to be transferred (or records to be skipped)

4. Unit select (lower byte = 0; upper byte = unit number)

5. Density & track (7/9) select

	Density	Track Sel.	Mode
0 =	200 BPI	7-track	CHAR
20000 =	556 BPI	7-track	CHAR
40000 =	800 BPI	7-track	CHAR
60000 =	800 BPI	9-track	DUMP
160000 =	800 BPI	7-track	DUMP

6. Function and parity type

Odd parity	Even parity	Description
100	4100	rewind tape and place units off line
103	4103	read data tape
105	4105	write data tape
107	4107	write end of file
111	4111	space forward N records
113	4113	space reverse N records
115	4115	write with extended record gaps
117	4117	rewind to load point

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Program Name: MAGTAP (Continued)

Outputs:

.GLOBL MWORDS = the true number of words transferred in a read or write operation

Error message: "SWITCHES OR FILE PROTECT"

The above error message has two meanings possible:

1. A conflict in switch settings and the selected unit exists:
   a) unit not selected
   b) selected unit in LOCAL
   c) selected unit went to LOCAL during an operation
   d) a new command was received by the controller during an operation

2. A write command was issued without a write ring on the tape

For both cases"1" and "2" the CPU will halt, allowing the operator to correct the error. By depressing "CONTINUE" the transfer will be attempted again and normal operation will be restored

Program is contained in overlay(s):

LODWAV
TXDISK
TXTAPE
WPSTAP
DSKMAG
MAGDSK

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Program Name: MARK

Program Type: Language
Subroutine

Program Description:

Given the byte offset (corresponding to the requested index), MARK returns the mask word and location in the buffer to record that index.

Inputs:

1. the waveform file control block address (for the buffer start)
2. the address of the byte offset
3. the address for (output) mask
4. the location for the address to write the mask

Outputs:

1. the mask word, and
2. the address (within the buffer) to write the mask

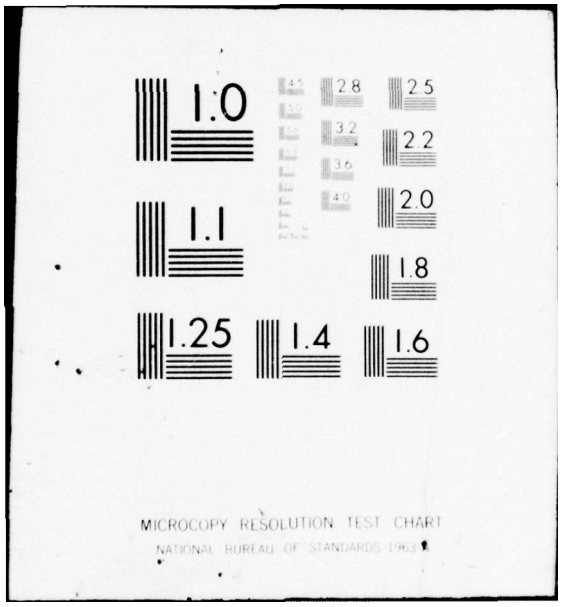
Program is contained in overlay(s):

AD-A038 330 PATTERN ANALYSIS AND RECOGNITION CORP ROME N Y F/G 9/2
THE WAVEFORM PROCESSING SYSTEM (WPS). VOLUME IV, PART 2.(U)
FEB 77 P K SANYAL F30602-72-C-0193
UNCLASSIFIED PAR-76-6-VOL-4-PT-2 RADC-TR-76-224-4-2 NL

4 OF 4
AD A038330

END

DATE FILMED
5-77


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963

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Program Name: MARK

Program Type: Subroutine

Program Description:

MARK calculates the ordinal point number from the beginning of the wave to the user-controlled intersection of two software-generated VG cross hairs.

Inputs:

CROSSX, CROSSY, loaded by subroutine CROSS.

Outputs:

Ordinal point number stored in global MARKER and MARKER+Z.

Program contained in overlay(s):

TRNFNT

TRNBAK

SEGWAV

CNGHDR

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Program Name: MAXBIN Program Type: Subroutine

Program Description:

MAXBIN finds the maximum value in a one-dimensional matrix. The values in the matrix are assumed to be one-word, signed integers. MAXBIN is designed to be used by BINCON, but is not restricted to that use.

Inputs:

a) Size of matrix

b) The matrix (one word, signed integers)

Outputs:

The maximum value in the matrix

Program contained in overlay(s):

PLT1DA
PLT1DB

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: MDOTV Program Type: Subroutine

Program Description:

MDOTV computes the dot product between a matrix and a vector.

Inputs:

1). Matrix address

2). Vector address

3). Number of rows and columns

Outputs:

1). Output vector

Program is contained in overlay(s):

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: MENCOV Program Type: Subroutine

Program Description:

MENCOV computes the mean vector and covariance matrix for each node of a designated vector tree.

Inputs:

The 6-character vector tree name

Outputs:

The mean vector and covariance matrix file for each node of the designated vector tree.

Program is contained in overlay(s):

KLENUP

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: MENU Program Type: Subroutine

Program Description:

MENU initializes the VG buffer for multiple waveform displaying.

Inputs:

positions chosen in TOPWDS

Outputs:

Modification of VG buffer

Program is contained in overlay:

MULTI

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: MERGE Program Type: Subroutine

Program Description:

MERGE is a process used repetitively to form a list of symbols from the union of a series of symbol lists. The newly created list contains only unique symbols and the order of the symbols is "append at end" in the merge process.

Inputs:

Two lists of one-byte symbols

Outputs:

First list merged into the second list containing unique symbols

Program is contained in overlay(s)

9.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Program Name: METHOD Program Type: Subroutine

Program Description:

Subroutine METHOD will ask for the criterion number (method number) which the user wants to calculate for a "BEGIN" or an "END" mark.

Inputs:

Criterion Number

Outputs:

CRITB	Begin Parameter
or	
CRITE	End Parameter

Program is contained in overlay(s):

SEGOPT

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: MGMAXV Program Type: Subroutine

Program Description:

MGMAXV returns the maximum value of a waveform.

Inputs:

The waveform file control block address

Outputs:

The maximum value (single-precision floating point) of the waveform

Program is contained in overlay(s):

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8"x10½"Crop

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Scale to 100 %

CLASSIFICATION (if any)

6.0 6.5

Program Name: MGMINV Program Type: Subroutine

Program Description:

MGMINV returns the minimum value of a waveform.

Inputs:

The waveform file control block address.

Outputs:

The minimum value (single-precision floating point) of the waveform.

Program is contained in overlay(s):

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)

8"x10½"Crop

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: MGSR Program Type: Subroutine

Program Description:

MGSR returns the sampling rate of a waveform.

Inputs:

The waveform file control block address.

Outputs:

The (single-precision floating point) sampling rate of the waveform.

Program is contained in overlay(s):

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: MGNPT Program Type: Subroutine

Program Description:

MGNPT returns the waveform dimensionality as a single-precision floating point number.

Inputs:

The waveform file control block address.

Outputs:

See description above.

Program is contained in overlay(s):

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Program Name: MGSM1 Program Type: Subroutine

Program Description:

MGSM1 returns the first segment marker position of a waveform in single-precision floating point format.

Inputs:

The waveform file control block address

Outputs:

See description above.

Program is contained in overlay(s):

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: MGSM2 Program Type: Subroutine

Program Description:

MGSM2 returns the second segment marker position of a waveform in single-precision floating point format.

Inputs:

The waveform file control block address.

Outputs:

See general description above.

Program is contained in overlay(s):

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8"x10½"Crop

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Program Name: MGST Program Type: Subroutine

Program Description:

MGST returns the start units of a waveform.

Inputs:

The waveform file control block address.

Outputs:

The single-precision floating point start units (time or frequency) of the waveform.

Program is contained in overlay(s):

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Program Name: MHSCAL Program Type: Overlay

Program Description:

MHSCAL presents a VG display which allows a user to select the mode of display for each position (waveform) within the Multiple-Waveform display. He may select one of four modes for each position:

1. DEFAULT - Displays 513 points (512 intervals)/line, sets point sequence = 1

2. UNITS/LINE - Displays whatever number of seconds or hertz the user enters, the actual number of points determined by the sampling rate of the waveform.

3. EXPLICIT - User selects N points/line, and point sequence.

4. FIT - Fits the entire waveform on the line.

The user may also request grid marks, in which case the grid mark options will be displayed on the VGF for each position he may select one of two grid mark modes, units/mark or marks/line, and enter the appropriate number of units.

Inputs:

Position numbers followed by corresponding option numbers and other user input as described above

Outputs:

Horizontal and grid mark modes filled in file control blocks

Program is contained in overlay(s)

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Program Name: MIMX Program Type: Subroutine

Program Description:

MIMX searches for the minimum and maximum values in a block of words.

Inputs:

Start address in R0
words in buffer in R1
Initial minimum and maximum values in MIMUM & MXMUM

Outputs:

MIMUM = minimum
MXMUM = maximum

Program is contained in overlay:

PLAYBK

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Scale to 100 %
CLASSIFICATION (if any)
6.0 6.5

Program Name: MINMAX Program Type: Subroutine

Program Description:

MINMAX returns the minimum and maximum values of an integer-value array.

Inputs:

1) Integer array address (source)

2) The address of the array dimensionality.

3) The address for the (output) minimum value

4) The address for the (output) maximum value.

Outputs:

The integer valued minimum and maximum of the source array.

Program is contained in overlay(s):

PLAYBK
SPCEXC

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)
8" x 10½" Crop

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Program Name: MMARK Program Type: Subroutine

Program Description:

MMARK enables a user to select a start request time or frequency value via cross-hair input in a multiple waveform display.

Inputs:

Cross-hair dial selection of a point

Outputs:

Request value in a file control block

Program is contained in overlay(s):

MRQSTF

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Program Name: MNDIFF Program Type: Overlay

Program Description:

MNDIFF prints the mean difference vector and corresponding Euclidean distance for all possible node pairs (senior and lowest) in the current tree/node.

Library: None

Inputs:

External variables - LOWCOR, TOPCOR, VECDIM, VECNNM, VECTNM, TOPCOR

Files: The covariance file of the current node and all lowest nodes under the current node is used.

Outputs:

A printed output consists of node name, its difference vector, and corresponding Euclidean distance for each nodepair in the input set. (See listing for sample output.)

Limitations: Let NDIM = Dimensionality of current vector tree

Let NCL = Number of lowest nodes under current node

Then $(2*NDIM)*(NCL + 1) \leq 17,462$ must be true in order for the program to execute properly.

Program contained in overlay(s):

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Program Name: MOBOL Program Type: Overlay

Program Description:

MOBOL substitutes boolean logic for the logic of a class pair in the current pairwise logic node of the current logic tree.

Inputs:

Logic tree
Data set

Outputs:

Boolean logic replaces fisher pair

Program is contained in overlay(s)

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Program Name: MODAR Program Type: Overlay

Program Description:

MODAR substitutes boolean logic for the logic of a class pair in the current pairwise logic node of the current logic tree.

Inputs:

Logic tree
Data set
Pairwise logic node number

Outputs:

Boolean logic pairwise modification

Program is contained in overlay(s)

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Program Name: MODHIS

Program Type: Overlay

Program Description:

MODHIS is the control program for histogram pairwise modification. The program selects a class pair at the current pairwise logic node in the current logic tree and prepares to have the histogram for the class data plotted. The five thresholds that are returned by the histogram overlay are inserted into logic block for the pair.

Inputs:

Data set
Logic tree
Pairwise node

Outputs:

Thresholds for pair modified

Program is contained in overlay(s)

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Program Name: MODIN Program Type: Subroutine

Program Description:

MODIN inserts either Boolean logic or two-space logic for a class pair into the logic block of the current pairwise logic node.

Inputs:

Class pair
Logic type
Logic block

Outputs:

Logic block modified

Program is contained in overlay(s)

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Program Name: MODISP Program Type: Overlay

Program Description:

MODISP is the control program for two-space pairwise logic modification. The program selects a class pair at the current pairwise logic node in the current logic tree and prepares to have the two-space plot for the class data displayed.

Inputs:

Logic tree
Data set
Pairwise logic node number

Outputs:

Two-space pairwise logic modification

Program is contained in overlay(s)

PRECEDING PAGE BLANK-NOT FILMED

Program Name: MORSEG Program Type: I/O Subroutine

Program Description:

MORSEG retrieves subsequent waveform data point windows after GETSEG has been called. The data points retrieved are those points delimited by two waveform coordinates called segment markers, which are the beginning and end coordinates of some event in the waveform.

Inputs:

The waveform file control block address.

Outputs:

Subsequent pages of data corresponding to an event in the waveform designated by "segment markers" in the headers. (See GETSEG).

Program is contained in overlay(s):

LINKGO
SPCEXC

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Program Name: MORWAV Program Type: I/O Subroutine

Program Description:

MORWAV pages subsequent windows of a waveform whose first window was retrieved by GETWAV. (Refer to documentation of GETWAV.)

Inputs:

A file control block address.

Outputs:

Subsequent wave windows paged to core.

Program is contained in overlay(s):

LINKGO
MULTI
PLAYBK
PRTRND
PWAVEC
SEGMNT
SINGLE
SPCEXC
SPCSET

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Program Name: MOTH Program Type: Overlay

Program Description:

MOTH changes the threshold number for fisher logic or one-space logic at a pairwise logic node.

Inputs:

Logic tree
Pairwise node

Outputs:

Modified threshold numbers for fisher pairs

Program is contained in overlay(s)

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Program Name: MOUT Program Type: Overlay

Program Description:

MOUT is the intermediary overlay between the Multiple-Init (MINIT) frame and either the WPS or initial frame. It closes all files, restores the current data set name, and displays the new frame.

Inputs:

VG light-button call

Outputs:

IN1DTP buffer filled with current data set
New frame displayed
ONAMT totally cleared

Program is contained in overlay(s)

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Scale to 100 %

CLASSIFICATION (if any)

6.0 6.5

Program Name: MOVE Program Type: Subroutine

Program Description:

MOVE transfers a block of words from one location to another.

Inputs:

1) The source block

2) The block size (in words)

Outputs:

The destination block

Program is contained in overlay(s):

INVFIL
LINKGO
SPCEXC
SPCOPT
SPCSET

8.0
8.5
8.75
9.0

CLASSIFICATION (if any)

8" x 10½" Crop

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Program Name: MOVTHR Program Type: Subroutine

Program Description:

MOVTHR allows the user to reposition thresholds on a one-space histogram plot. The thresholds are line segments that extend vertically from the top to the bottom of the display space. The user moves them with a Vector General control dial. MOVTHR is strictly a logic design function and is used to move the thresholds which have been generated by a pairwise modification plot.

Inputs:

a) Outputs of HISTOGRAM, BINCON, and PROCESS

b) Thresholds (vertical line segments on the display)

Outputs:

New threshold values

Program contained in overlay(s):

PLT1DB

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Program Name: MRQSTF Program Type: Overlay

Program Description:

MRQSTF allows a user to request a starting time or frequency via cross-hair or keyboard input for any or all of the waveform positions in the Multiple Waveform display frame.

Inputs:

Cross-hair request by user
Cross-hair input using dials or keyboard input by typing in the time or frequency after entering positions to receive start values

Outputs:

Time/frequency request start time double integer loaded in file control blocks

Program is contained in overlay(s)

METRIC SYSTEM

BASE UNITS:

Quantity	Unit	SI Symbol	Formula
length	metre	m	...
mass	kilogram	kg	...
time	second	s	...
electric current	ampere	A	...
thermodynamic temperature	kelvin	K	...
amount of substance	mole	mol	...
luminous intensity	candela	cd	...

SUPPLEMENTARY UNITS:

plane angle	radian	rad	...
solid angle	steradian	sr	...

DERIVED UNITS:

Acceleration	metre per second squared	...	m/s
activity (of a radioactive source)	disintegration per second	...	(disintegration)/s
angular acceleration	radian per second squared	...	rad/s
angular velocity	radian per second	...	rad/s
area	square metre	...	m
density	kilogram per cubic metre	...	kg/m
electric capacitance	farad	F	A·s/V
electrical conductance	siemens	S	A/V
electric field strength	volt per metre	...	V/m
electric inductance	henry	H	V·s/A
electric potential difference	volt	V	W/A
electric resistance	ohm		V/A
electromotive force	volt	V	W/A
energy	joule	J	N·m
entropy	joule per kelvin	...	J/K
force	newton	N	kg·m/s
frequency	hertz	Hz	(cycle)/s
illuminance	lux	lx	lm/m
luminance	candela per square metre	...	cd/m
luminous flux	lumen	lm	cd·sr
magnetic field strength	ampere per metre	...	A/m
magnetic flux	weber	Wb	V·s
magnetic flux density	tesla	T	Wb/m
magnetomotive force	ampere	A	...
power	watt	W	J/s
pressure	pascal	Pa	N/m
quantity of electricity	coulomb	C	A·s
quantity of heat	joule	J	N·m
radiant intensity	watt per steradian	...	W/sr
specific heat	joule per kilogram-kelvin	...	J/kg·K
stress	pascal	Pa	N/m
thermal conductivity	watt per metre-kelvin	...	W/m·K
velocity	metre per second	...	m/s
viscosity, dynamic	pascal-second	...	Pa·s
viscosity, kinematic	square metre per second	...	m/s
voltage	volt	V	W/A
volume	cubic metre	...	m
wavenumber	reciprocal metre	...	(wave)/m
work	joule	J	N·m

SI PREFIXES:

Multiplication Factors	Prefix	SI Symbol
$1\,000\,000\,000\,000 = 10^{12}$	tera	T
$1\,000\,000\,000 = 10^{9}$	giga	G
$1\,000\,000 = 10^{6}$	mega	M
$1\,000 = 10^{3}$	kilo	k
$100 = 10^{2}$	hecto*	h
$10 = 10^{1}$	deka*	da
$0.1 = 10^{-1}$	deci*	d
$0.01 = 10^{-2}$	centi*	c
$0.001 = 10^{-3}$	milli	m
$0.000\,001 = 10^{-6}$	micro	μ
$0.000\,000\,001 = 10^{-9}$	nano	n
$0.000\,000\,000\,001 = 10^{-12}$	pico	p
$0.000\,000\,000\,000\,001 = 10^{-15}$	femto	f
$0.000\,000\,000\,000\,000\,001 = 10^{-18}$	atto	a

* To be avoided where possible.