SHEET 666 REVISION

SB-10163

### CONTROL MEMORY TEST

This program tests the ability of the control memory section to accept and retain various bit configurations. This is accomplished by loading and evaluating a series of patterns which range in complexity from the simplest to two patterns generating the maximum amount of noise in the core sense windings. These patterns included worst pattern, a complement worst pattern, a random number generator, a read/write test, and a pattern test consisting of hold 1's, hold 0's, alternate 1's and 0's and alternate 0's and 1's. Each pattern is loaded and evaluated within a subroutine which is under the control of an executive routine. In addition, a Hammer Test is included which is also under control of the executive.

The Control Memory Test is written from either a 128 or 256 word control memory. The Control Memory Size table shows the appropriate size index that must be entered into AL before the program is initiated.

### CONTROL MEMORY. SIZE TABLE

Control Memory Size	Set AL bits 2-0 to
128	0
256	1

The operator has the option of selecting either or both a computer console error display or an error typeout. If PROGRAM STOP 0 is set and an error is detected, the test will stop and display the correct pattern in AU and the incorrect pattern in AL. Upon restarting, the test will stop with the failing address in AL. If PROGRAM SKIP 4 is not set Typeout Subroutines will provide the operator with a typeout of the status of the Control Memory Test. If an error is detected, and PROGRAM SKIP 4 is not set, the failing address and the correct and incorrect patterns will be buffered out. All messages are buffered out in field data code via channel 0.

The Control Memory Test may be run separately or as a part of the Integrated Memory test. If it is run separately PROGRAM SKIP 2 must be set to remain in the CONTROL MEMORY TEST.

The following is the operating procedure for the CONTROL MEMORY TEST.

a. Disconnect the RTC.

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SPECIFICATION SYMBOL SB-10163

b. Load the CONTROL MEMORY TEST PROGRAM or the INTEGRATED MEMORY TEST PROGRAM. The jumps and stops for this program are as shown in the following table:

PROGRAM SWITCH	PROGRAM ACTION
PROGRAM SKIP 0	Set to recycle a failing test sub- routine
PROGRAM SKIP 2	Set to remain in the Control Memory test
PROGRAM SKIP 4 PROGRAM STOP 0 PROGRAM STOP 1 PROGRAM STOP 2 PROGRAM STOP 3	Set to supress typeouts Set to computer console error display Set to end test after current cycle Set to stop after error typeout Set to end test after a selected number (the number -1 in address NUMB) of cycles of the Control Memory Test. This stop is used with typeouts only.

- c. Set PROGRAM SKIPS and STOPS as desired according to the above table.
- d. Master Clear the Computer.
- e. Set AL bits 2-0 to the appropriate size index as found in the Control Memory Size table.
- f. Set the 1232/1532 channel number in AL bits 6 to 3.
- g. Set AL bit 8 if the I/O Console is a 1532.
- h. Set AL bits 17-15 as follows:

Set bit 17 if computer is in 1218 normal mode Set bit 16 if computer is in 1218 NTDS mode Set bit 15 if computer is in 1219 normal mode

- i. Insert (if necessary) the plug-in printed wiring assembly 7104010 in the location specified as follows:

  A4AlJ5G if computer is in 1218 normal mode

  A4AlJ5F if computer is in 1218 NTDS mode

  A4AlJ4G if computer is in 1219 normal mode
- j. Set P=3700.
- k. Start the Computer.



## PROGRAM DATA PAGE

SHEET 668

REVISION -

SPECIFICATION SYMBOL SB-10163

TITLE: SIZE - CONTROL MEMORY	SIZE DETERMIN	· MOITAN		
DECK IDENTIFIER: FACT		<u> </u>		
CS-1 LABEL: SIZE	KEY:	IS LABEL	DUPLICAT	E? <u>No</u>
PROGRAMMER: H W M modified	d by TLR	DATE: <u>8</u>	Dec. 6	7
NUMBER OF L4 OUTPUT INSTRU	CTIONS:26			

### DESCRIPTION:

This routine, SIZE, takes a size index that is manually entered into AL and uses it to set the upper limit of control memory and to initialize the routine, CHECK, that checks for the areas of main memory that are not to be tested.

This routine stores the 1232/1532 channel number in all I/O instructions. Also, the terminal BCW's for output and external function instructions are setup for either N or N+l termination.

This routine is run only once and is not referenced by subsequent routines.

SIZE saves the index in AL then adds the index to the base address for the control memory size. This modified address is used to enter the appropriate value for control memory size into AL and store it at address PARl. A similar procedure is used to store the appropriate instruction in routine CHEK.



# PROGRAM DATA PAGE (Cont)

SHEET 669

SPECIFICATION SYMBOL SB-10163

REVISION -

TITLE: SIZE - CONTROL MEMORY SIZE DETERMINATION

INPUT PARAMETERS (Listed Sequentially):

AL is entered manually before initialing program

OUTPUT PARAMETERS (Listed Sequentially):

PAR1 CHEK4

ABNORMAL EXITS (Listed Sequentially):

NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified):

TYPE IOSET CRANK

SYSTEM DATA REFERENCES:

ALARMS AND/OR REMARKS:



SHEET 670 REVISION ----SB-10163 SIZE TYPE SETUP, CHANNEI NUMBER,1232/ ,1532 İNTER-CHANGE N+1 BUFFER TERMINATION IOSET MODIFY BCW FOR N+1 BUFFER TERMINATION Save ΑL Set up the upper limit of control memory Initialize the check for main memory routine Exit to CRANK SIZE

# UNIVAC

## PROGRAM DATA PAGE

SHEET 671 REVISION J

SPECIFICATION SYMBOL SB-10163

TITLE: CRANK - 1219B CONTROL MEMORY TEST	MONITOR
DECK IDENTIFIER: FACT	
CS-1 LABEL: CRANK KEY:	IS LABEL DUPLICATE? NO
PROGRAMMER: HWM modified by CRB	DATE: 23 Jan. 69
NUMBER OF L4 OUTPUT INSTRUCTIONS: 34	·

### DESCRIPTION:

This routine, CRANK, monitors the 1219B Control Memory Test.

CRANK is referenced by routines TEST and FLUSH.

PROGRAM SKIP 4 is referenced when CRANK is entered. If not set, the I/O console is turned on and CONTROL MEMORY TEST is typed. It then exits to TRACK. If SKIP 4 is set, TRACK is entered. The number of cycles completed by Control Memory Test is referenced. If 10 cycles are not completed, the program exits to TEST. If 10 cycles are completed, the count is cleared and PROGRAM SKIP 4 is referenced. If set, the program continues without typeouts. If SKIP 4 is not set, a flag is checked to determine if any errors occurred during the test. If no errors occurred, OK, END CYCLES is printed and the program continues. If errors occurred, RECYCLE is printed, the error flag is cleared, and the program continues. PROGRAM STOP 3 is referenced. If it is set, TEST has ended. If it is not set, PROGRAM SKIP 2 is referenced. If it is set, exit to TRACK. If it is not set, exit to INTEGRATED EXECUTIVE.



#### DATA PAGE (Cont) PROGRAM

SHEET 672

REVISION 3

SPECIFICATION SYMBOL SB-10163

TITLE: CRANK - 1219B CONTROL MEMORY TEST MONITOR

INPUT PARAMETERS (Listed Sequentially):

BAER ,

## OUTPUT PARAMETERS (Listed Sequentially):

BUFFER PC

BUFFER MEM-MEMO+3 BUFFER END-END+5 BUFFER BUN-BUN+3

ABNORMAL EXITS (Listed Sequentially):

NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified):

TEST TYPT

SYSTEM DATA REFERENCES:

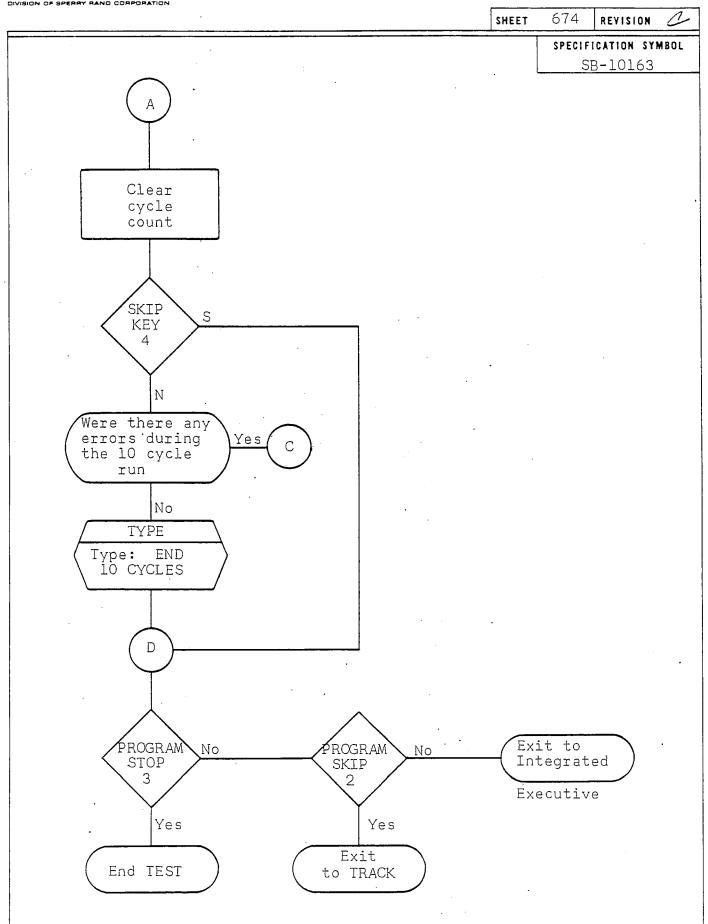
## ALARMS AND/OR REMARKS:

PROGRAM SKIP 4- set to suppress typecuts PROGRAM STOP 3- set to end test
PROGRAM SKIP 2- set to remain in the Control Memory Test

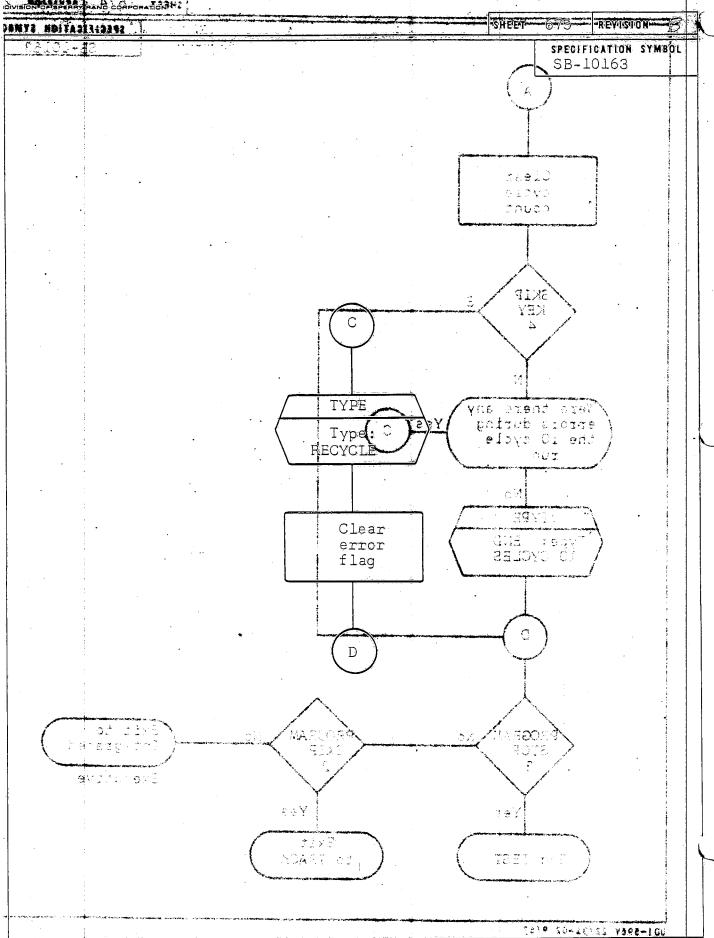
673 REVISION SHEET SPECIFICATION SYMBOL SB-10163 TRACK CRANK S Increment PROGRAM Exit to TRACK SKIP cycle count Ν TYPT Yes Have 10 cycles been completed Type: CONTROL MEMORY TEST NO Exit to TEST Exit to TRACK

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## SPECIFICATION SHEET



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# PROGRAMIDATA PAGE

SHEET -676 REVISION --

			SB-10163
TITUELE ERROUT ERROE	FYPEOUT		
DECK IDENTIFIER FACT			
CS.1 LABEL ERROUT	KEY	IS LABEL DU	PLICATE? No
PROGRAMMER: H W M m			
NUMBER OF LA OUTPUT	INSTRUCTIONS 35	Management	use of the Area Area (1997)
DESCRIPTION:			•
This subroutine, ERF ERRÖR	OUT, types out th	ne following	error indication:
lst ADDRESS	LAST- ADDRESS	CORRECT	INCORRECT
xxxxxx	XXXXXX	XXXXXX	xxxxx

After the typeout PROGRAM STOP 2 is referenced for the end of the Control Memory test. This routine, ERROUT, is referenced by the following routines: PROOF, WPI, CWP1, and RW.

Upon entering ERROUT the current ICR is stored and reset to 2. Then the contents B2 and the output buffer locations are stored. An error flag-is set. The typeout is completed in the format shown above and PROGRAM STOP 2 is referenced for end of test. The ICR, B2, and the output buffer locations are restored and an exit is made from ERROUT.

# PROGRAM DATA PAGE (Cont) SHEET 677 REVISION

SPECIFICATION SYMBOL SB-10163

TITLE ERROUT - ERROT TYPEOUT

INPUT PARAMETERS (Listed Sequentially):

HERE

THERE

DIP

DIP+1

OUTPUT PARAMETERS (Listed Sequentially):

BUFFER RUE - TRUE+11

BAER

BUFFER BUN - BUN+3

DIP

DIP+1

ABNORMAL EXITS (Listed Sequentially):

NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified):

TYPT CRANK

SYSTEM DATA REFERENCES:

ALARMS AND/OR REMARKS:

PROGRAM STOP 2 - set to stop after error typeout

### SPECIFICATION SHEET

# PROGRAM DATA PAGE

SHEET 679 REVISION -

SPECIFICATION SYMBOL SB-10163

TITLE: TYPE - SETUP	CHANNEL NUMBER,	1232/1532 INTERCHANGE	
DECK IDENTIFIER: FACT		· · · · · · · · · · · · · · · · · · ·	
CS-1 LABEL: TYPE	KEY:	IS LABEL DUPLICATE? No	
PROGRAMMER:	TLR	DATE: 8 December 1967	
NUMBER OF L4 OUTPU	T INSTRUCTIONS:	43 .	
DESCRIPTION:			

This subroutine inserts the 1232/1532 channel number in all I/O instructions. It also modifies the TYPT and TYPC subroutines so as to accept either 1232 or 1532 coded data.



## PROGRAM DATA PAGE (Cont)

SHEET 680

REVISION ---

SB-10163

TITLE: TYPE

INPUT PARAMETERS (Listed Sequentially):

ALPARM - Initial AL input parameter.

OUTPUT PARAMETERS (Listed Sequentially):

```
IS1 T$$1
152 T$$2
T$3 T$$3
I$4 T$$4

RJP - CONVER if 1232 selected.
```

RNOOP RIP - CONVER if 1232 selected.

ADDALK - 40 if 1532 selected.

ABNORMAL EXITS (Listed Sequentially):

NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified):

SYSTEM DATA REFERENCES:

ALARMS AND/OR REMARKS:



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SHEET 681 REVISION -SPECIFICATION SYMBOL SB-10163 TYPE INSERT 1232/ 1532 CHANNEL NUMBER IN ALL I/O COMMANDS RNOOP EQ .232 SELECT-ED ADDALK 40 RNOOP EQ RJP: CONVER EXIT

## SPECIFICATION SHEET

# PROGRAM DATA PAGE

SHEET 682 REVISION -

SPECIFICATION SYMBOL SB-10163

TITLE: IOSET			
DECK IDENTIFIER:IOSET			
CS-1 LABEL: IOSET	KEY:	IS LABEL DUPLICATE?	No
PROGRAMMER:	TLR	DATE: 8 December 1	967
NUMBER OF L4 OUTPUT INSTR	UCTIONS: 14		
DESCRIPTION:			

This subroutine modifies output and external function buffer for N+1 termination.

PROOF RAMEDATA PAGE (Cont)

SHEET 683

REVISION

SPECIFICATION-SYMBOL-SB-10163

TITLE: IOSET

INPUT PARAMETERS (Listed Sequentially):

T\$1+2 T\$2+2

OUTPUT PARAMETERS (Listed Sequentially):

T\$1+1 T\$2+1

ABNORMAL EXITS (Listed Sequentially):

NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified):

SYSTEM DATA REFERENCES:

ALARMS AND/OR REMARKS:

Continuary K 188 MEET A TA PAGE (Cont) SHEET SHEET

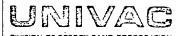
SPECIFICATION SYMBOL SB-10163

INPUT PARAMETERS (Listed Sequentially):

OUTPUT PARAMETERS (Listed Secure State Of Duplied's Colored Secure Secur

SYSTEM DATA REFERENCES:

ALARMY AMOVOR REMARKS



# PROGRAM DATA PAGE

SHEET 685 REVISION -

SPECIFICATION SYMBOL SB-10163

TITLE: CHEK - CHECK FOR MAIN MEMORY	
DECK IDENTIFIER: FACT	
CS-1 LABEL: CHEK KEY:	_IS LABEL DUPLICATE?No
PROGRAMMER: H W M modified by TLR	
NUMBER OF LA OUTPUT INSTRUCTIONS:	20

### DESCRIPTION:

This subroutine, CHEK, checks the address to be tested, the current value of PAR, to determine if it is in main memory. If it is in main memory appropriate modifications are made on the address (PAR) and an exit is made from this subroutine, CHEK.

This subroutine, CHEK, is referenced by the following routines: PROOF, TEST, HD1, HALT HALTO, WP1, CWP1, RW1 and FLUSH1.

If CHEK has been modified for the 128 Control Memory size the current address, PAR, is compared to 1779. If not equal an exit is made from CHEK. If equal, PAR is decremented by 100g and an exit is made from CHEK. If CHEK has not been modified for 128 Control Memory PAR is compared to 577g. If equal, PAR is decremented by 100g and an exit is made from CHEK. If not equal, PAR is compared to 377g. If equal, PAR is decremented by 100g and an exit is made from CHEK. If not equal PAR is compared to 177g. If not equal an exit is made from CHEK. If equal, PAR is decremented by 100g and an exit is made from CHEK.

# PROGRAM DATA PAGE (Cont)

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REVISION .

SPECIFICATION SYMBOL SE-10163

TITLE: CHEK - CHECK FOR MAIN MEMORY

INPUT PARAMETERS (Listed Sequentially):

PAR · CHEK 4-

OUTPUT PARAMETERS (Listed Sequentially):
PAR

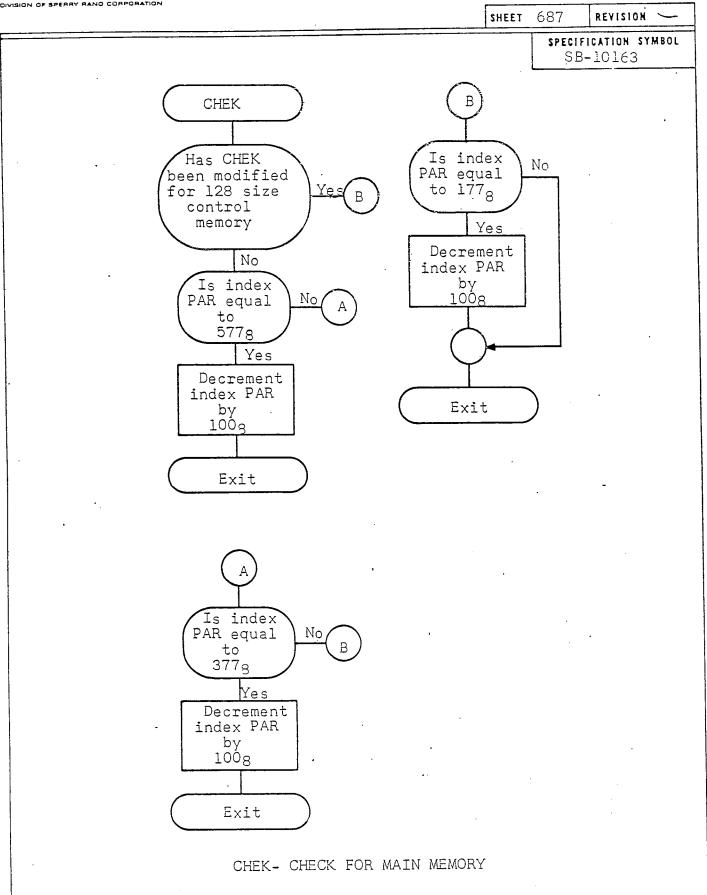
ABNORMAL EXITS (Listed Sequentially):

NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified):

SYSTEM DATA REFERENCES:

ALARMS AND/OR REMARKS:





# PROGRAM DATA PAGE

SHEET 688 REVISION

SPECIFICATION SYMBOL SB-10163

TITLE: PROOF - CONTINUE ERROR CHECK,	TYPEOUT
DECK IDENTIFIER: FACT	<del></del> .
CS-1 LABEL: PROOF KEY:	IS LABEL DUPLICATE? No
PROGRAMMER: H W M modified by TLF.	DATE:8 Dec. 67
NUMBER OF L4 OUTPUT INSTRUCTIONS:	
DESCRIPTION:	-

This subroutine, PROOF, continues the error check and initiates the error typeout whenever an error typeout is wanted in routines TEST, HD1, HALT and HALTO.

Whenever an error occurs in any of the higher level routines and an error typeout is wanted this routine, PROOF, continues to check the following addresses for incorrect contents. It then indicates an error typeout indicating the correct and incorrect test pattern and the inclusive consecutive addresses that contain incorrect test patterns. Upon completion of the error typeout, control is returned to the referencing routine.



A-1975

DATA PAGE (Cont) PROGRAM SHEET 689 REVISION SPECIFICATION SYMBOL JORNAL MOITE TORINGERS SB-10163 TITLE: PROOF - CONTINUE ERROR CHECK, TYPEOUT INPUT PARAMETERS (Listed Sequentially): PAR xaboi sysi 203 SAS åusenyt OUTPUT PARAMETERS (Listed Sequentially): THERE te database programmer 1490 - Te ABNORMAL EXITS (Listed Sequentially): ಾದಕ್ಕಾಡಲ್ಲಿಕ (ಶತ್ಯ) NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys vot Duplicate Labels Specified): **ERROUT** CHEK A STATE OF THE STA ಜಕಕಾರ ಬೆಂಕ SYSTEM DATA REFERENCES: ores ented rece FAR ALARMS AND/OR REMARKS: THE CLASS CONTROL OF THE PERSON AS THE PERSO



SHEET 690 REVISION -SPECIFICATION SYMBOL SB-10163 PROOF Save index PAR for typeout Have all remaining addres ses within parameters been checked and found to be incorrect No CHEK Test address for control memory ERROUT Ιs Error content of No address printout incorrect Yes Save decremented Exit index PAR for typeout

PROOF - CONTINUE ERROR CHECK, TYPEOUT

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# PROGRAM DATA PAGE

SHEET	691	REVISION

SB-10163

TITLE: TEST - HOLD ZEROES TEST			
DECK IDENTIFIER: FACT			
CS-1 LABEL: TEST KEY:	IS LABEL DUPLICATE?No		
PROGRAMMER: H W M modified by TLR	DATE:8 Dec. 67		
NUMBER OF L4 OUTPUT INSTRUCTIONS:			
DESCRIPTION:			

This routine, TEST, checks the ability of control memory to hold zeroes.

This routine is referenced by routines CRANK and FLUSH.

Control memory is cleared to all O's. At the completion of the clearing, the content of each address is entered into AL and checked. If AL contains all O's the next sequential address is checked. If it contains any improper information, the incorrect information is entered into AL, AU remains cleared which is the correct information. If PROGRAM STOP O is set the routine stops and the display may be evaluated. Upon restarting with PROGRAM STOP O set, the failing address will be displayed in AL and the routine stops. If PROGRAM STOP O is not set, or upon restarting, PROGRAM SKIP 4 is referenced. If it is not set an error typeout will cccur. After the typeout, or if PROGRAM SKIP 4 is set, PROGRAM SKIP O is checked. If set, the test for holding zeroes will recycle; if not set, the test will continue. Upon successful completion of the test an exit is made to routine HDl.

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## PROGRAM DATA PAGE (Cont)

SHEET 692

REVISION

SPECIFICATION SYMBOL SB-10163

TITLE: TEST - HOLD ZEROES TEST

INPUT PARAMETERS (Listed Sequentially):

PAR1

TEST PATTERN
PAT 000000

OUTPUT PARAMETERS (Listed Sequentially):

PAR DIP DIP+1 HERE

ABNORMAL EXITS (Listed Sequentially):

NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified): CHEK PROOF HD1

SYSTEM DATA REFERENCES:

ALARMS AND/OR REMARKS:

ERROR DISPLAYS

1st PROGRAM STOP 0 - correct information in AU (cleared) incorrect

information in AL

2nd PROGRAM STOP 0 - failing address in AL

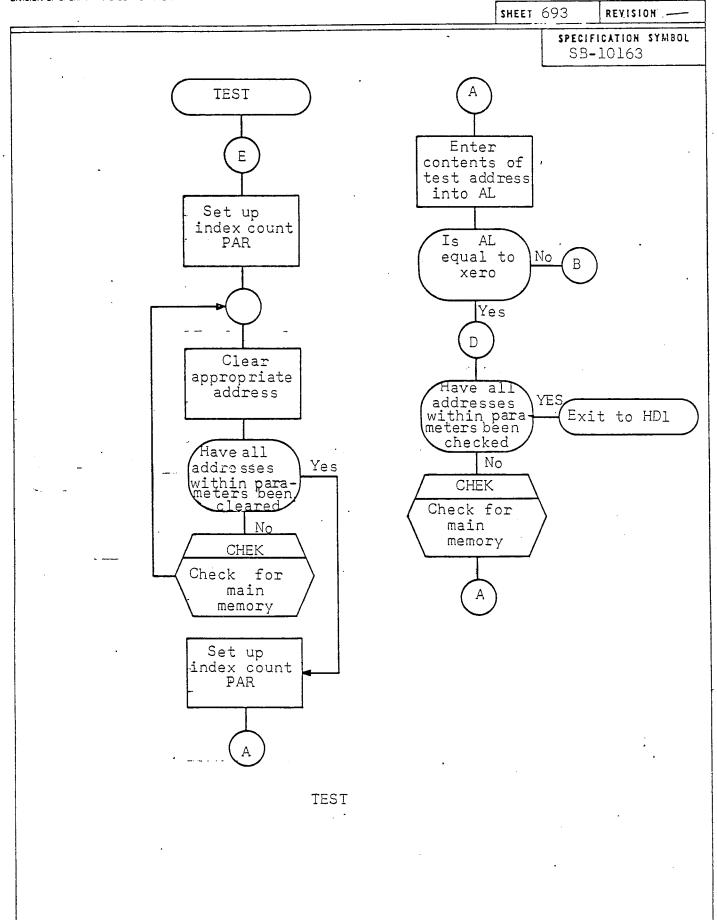
PROGRAM SKIP 4 - not set for error typeout

set to suppress typeout

PROGRAM SKIP 0 - set to recycle hold zeroes test

not set to continue test







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SHEET 694 REVISION -SPECIFICATION SYMBOL SE-10163 Correct to PROGRAM ΑU SKIP 4 Save correct (AU) PROOF for Continue error typeout check and typeout errors Save in-correct (AU) for typeout PROGRAM STOP: Error bit display PROGRAM SKIP 0 STOP 0 N Save failing address for typeout Failing address to AL STOP: Failing PROGRAM address in AL STOP 0 Ν TEST

DESCRIPTION:

### SPECIFICATION SHEET

## PROGRAM DATA PAGE

SHEET	695	REVISION	
 		CATION SY	MBOL

TITLE: HD1 - HOLD ONES	
DECK IDENTIFIER: FACT	<del></del>
CS-1 LABEL: HD] KEY:	IS LABEL DUPLICATE? No
PROGRAMMER: H W M modified by fLR	DATE: 8 Dec. 67
NUMBER OF L4 OUTPUT INSTRUCTIONS: 35	-

This routine, HDl, checks the ability of the control memory to receive and retain all ones.

This routine is entered from routine TEST.

Control memory is loaded with all ones (777777). When the load is completed, the content of each sequential address is entered into AL and checked for validity. If the contents are incorrect, AU is entered with the correct information (the incorrect being in AL) and PROGRAM STOP O is checked. If set, the subroutine stops and the display may be evaluated. Upon restarting, AL is entered with the failing address and, if PROGRAM STOP O is still set, the subroutine stops for the address display. If PROGRAM STOP O is not set, or upon restarting, PROGRAM SKIP 4 is referenced. If it is not set an error typeout will occur. After the typeout, or if PROGRAM SKIP 4 is set, PROGRAM SKIP O is checked. If set, HDI will recycle; if not set, the test will continue. Upon successful completion of HDI, an exit is made to routine HALT.

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#### DATA PAGE (Cont) SHEET 696 PROGRAM

REVISION -

SPECIFICATION SYMBOL SB-10163

TITLE: HD1 - HOLD ONES

INPUT PARAMETERS (Listed Sequentially):

PAR1 . PAR

TEST PATTERN PAT1 777777

OUTPUT PARAMETERS (Listed Sequentially):

DIP DIP+1 HERE

ABNORMAL EXITS (Listed Sequentially):

NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified): CHEK **PROOF** HALT

SYSTEM DATA REFERENCES:

## ALARMS AND/OR REMARKS:

ERROR DISPLAYS

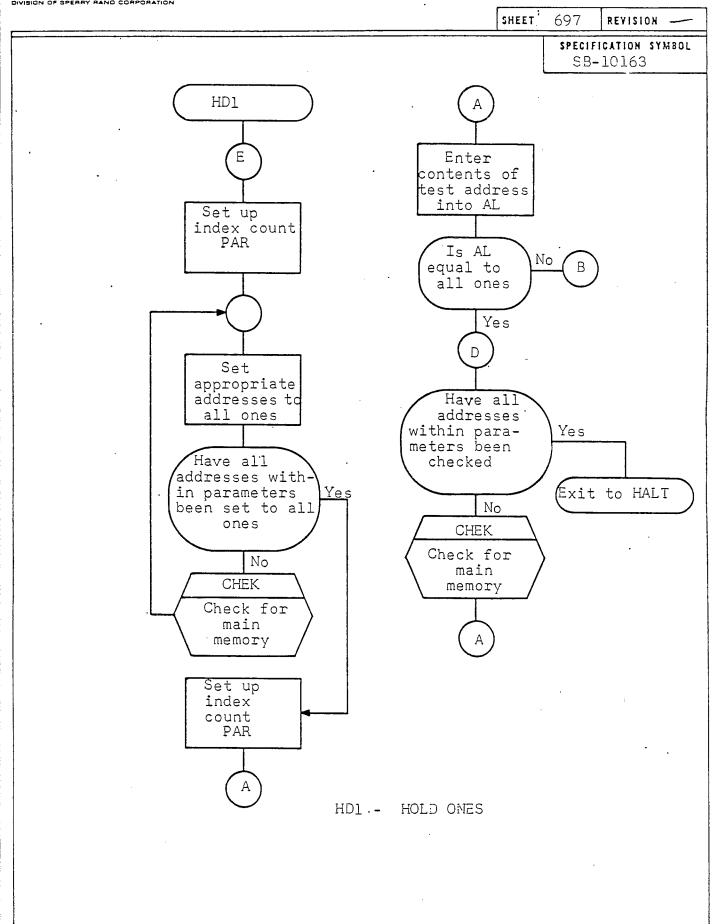
1st PROGRAM STOP 0 - correct information in AU (777777)incorrect information in AL

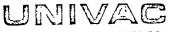
2nd PROGRAM STOP 0 - failing address displayed in AL PROGRAM SKIP 4 - not set for error typeout

set to suppress error typeout PROGRAM SKIP 0 - not set to continue routine HD1

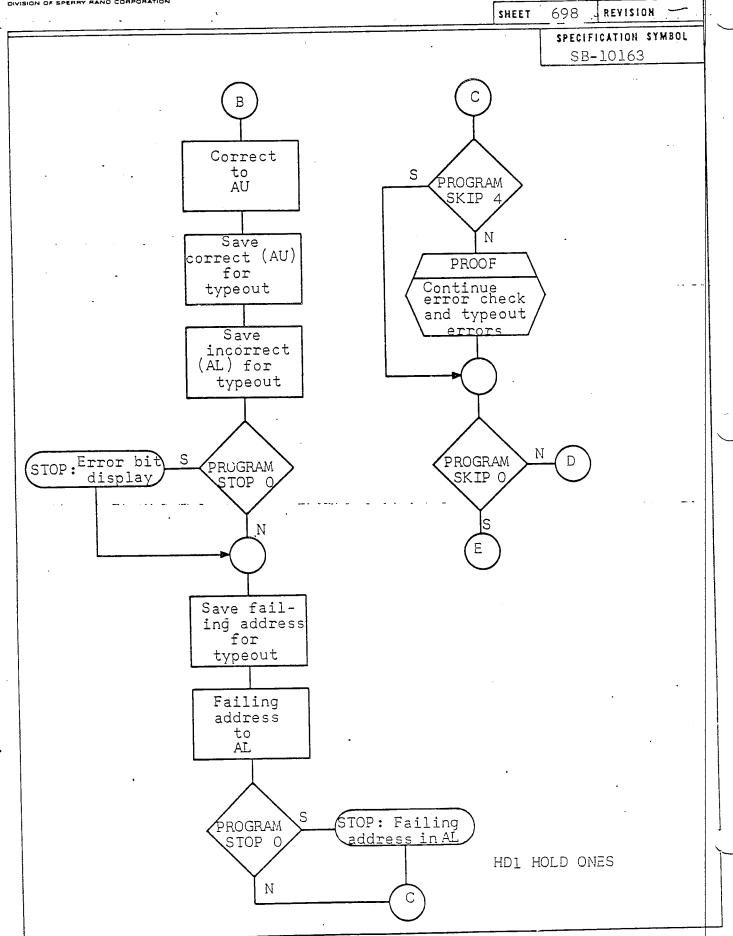
set to recycle routine HDl







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## PROGRAM DATA PAGE

SHEET 699 REVISION

SPECIFICATION SYMBOL SB-10163

TITLE: HALT - HOLD ALTERNATE ONES AND ZEROES
DECK IDENTIFIER: FACT
CS-1 LABEL: HD1 KEY: IS LABEL DUPLICATE? No
PROGRAMMER: H W M modified by TLR DATE: 8 Dec. 67
NUMBER OF L. OUTPUT INSTRUCTIONS: 35

### DESCRIPTION:

This routine, HALT, checks the ability of the control memory to receive and retain a pattern of alternate ones and zeroes (525252).

This routine is entered from routine HD1.

Control memory is loaded with alternate ones and zeroes (525252). When the load is completed, the content of each sequential address is entered into AL and checked for validity. If the contents are incorrect AU is entered with the correct information (the incorrect being in AL) and PROGRAM STOP O is checked. If set, the subroutine stops and the display may be evaluated. Upon restarting, AL is entered with the failing address and, it PROGRAM STOP O is still set, the subroutine stops for address display. If PROGRAM STOP O is not set, or upon restarting, PROGRAM SKIP 4 is referenced. If it is not set an error typeout will occur. After the typeout, of if PROGRAM SKIP 4 is set, PROGRAM SKIP O is checked. If set, HALT will recycle; if not set, the test will continue. Upon successful completion of HALT, an exit is made to routine HALTO.



#### PROGRAM DATA PAGE (Conf) SHEET 700

REVISION -

SPECIFICATION SYMBOL SB-10163

TITLE: HALT - HOLD ALTERNATE ONES AND ZEROES

INPUT PARAMETERS (Listed Sequentially):

PAR PAR1 TEST PATTERN 525252

OUTPUT PARAMETERS (Listed Sequentially):

DIP DIP+1 HERE

ABNORMAL EXITS (Listed Sequentially):

NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified): CHEK PROOF HALTO

SYSTEM DATA REFERENCES:

## ALARMS AND/OR REMARKS:

ERROR DISPLAYS

1st PROGRAM STOP 0 - correct information in AU·(525252) incorrect

information in AL

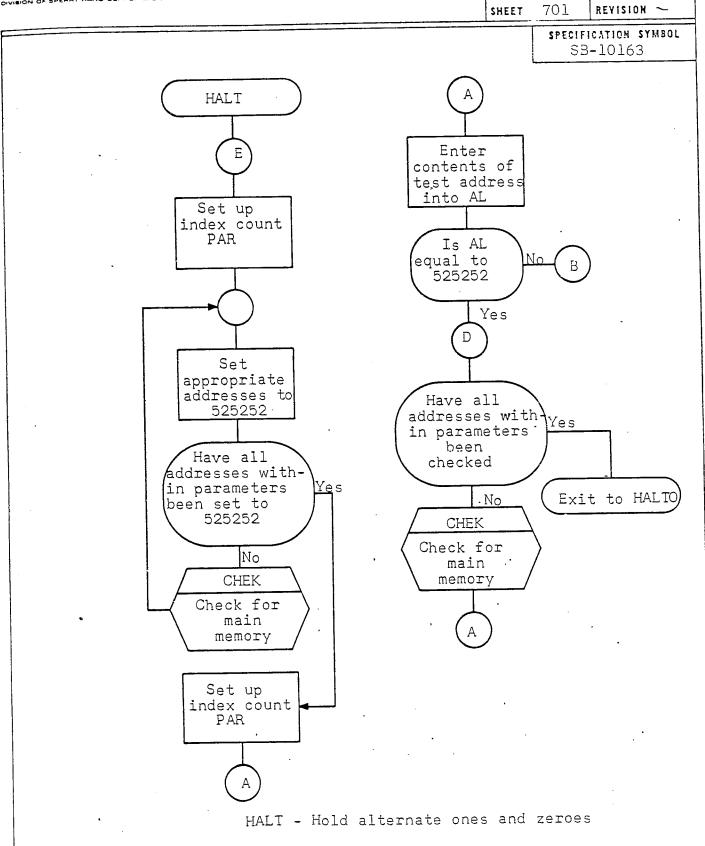
2nd PROGRAM STOP 0 - failing address displayed in AL

PROGRAM SKIP 4 - not set for error typeout

set to suppress error typeout

PROGRAM SKIP 0 - not set to continue routine HALT set to recycle routine HALT





702 REVISION SHEET SPECIFICATION SYMBOL SB-10163 Correct to PROGRAM AU SKIP 4 Save correct (AU) PROOF for Continue ertypeout ror check and typeout er Save incorrect (AL) for typeout STOP: Error bit, S Ν PROGRAM PROGRAM SKIP 0 display STOP Q N Save failing address for typeout Failing address to ΑL STOP: Failing PROGRAM address in AL STOP 0 Ν HALT - Hold alternate ones and zeroes

SHEET 703 REVISION -

SB-10163

TITLE: HALTO - HOLD ALTERNATE ZEROES AND ONES
DECK IDENTIFIER: FACT
CS-1 LABEL: HALTO KEY: IS LABEL DUPLICATE? No
PROGRAMMER: H W M modified by TLR DATE: 8 Dec. 67
NUMBER OF L4 OUTPUT INSTRUCTIONS: 35
DESCRIPTION:

This routine, HALTO, checks the ability of the control memory to receive and retain a pattern of alternate zeroes and ones (252525).

This routine is entered from routine HALT.

Control memory is loaded with alternate zeroes and ones (252525). When the load is completed, the content of each sequential address is entered into AL and checked for validity. If the contents are incorrect, AU is entered with the correct information (the incorrect being in AL) and PROGRAM STOP O is checked. If set, the routine stops and the display may be evaluated. Upon restarting, AL is entered with the failing address and, if PROGRAM STOP O is still set, the subroutine stops for address display. If PROGRAM STOP O is not set, or upon restarting, PROGRAM SKIP 4 is referenced. If it is not set an error typeout will occur. After the typeout, or if PROGRAM SKIP 4 is set, PROGRAM SKIP O is checked. If set, HALTO will recycle, if not set, the test will continue. Upon successful completion of HALTO, an exit is made to routine WP1.

# PROGRAM DATA PAGE (Cont)

SHEE- 704

REVISION

SP-10163

TITLE: HALTO - HOLD ALTERNATE ZEROES AND ONES

INPUT PARAMETERS (Listed Sequentially):

PAR PAR1 TEST PATTERN

252525

OUTPUT PARAMETERS (Listed Sequentially):

DIP DIP+1 HERE

ABNORMAL EXITS (Listed Sequentially):

NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified):

CHEK PROOF WP1

SYSTEM DATA REFERENCES:

ALARMS AND/OR REMARKS:

ERROR DISPLAYS

1st PROGRAM STOP 0 - correct information in AU (252525) incorrect information in AL

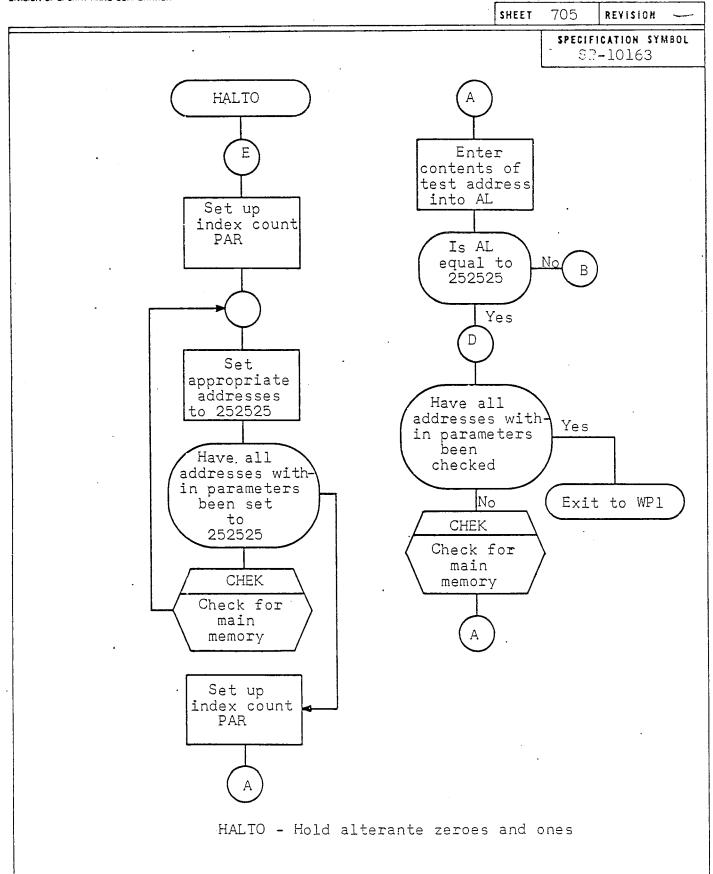
2nd PROGRAM STOP 0 - failing address displayed in AL

PROGRAM SKIP 4 - not set for error typeout

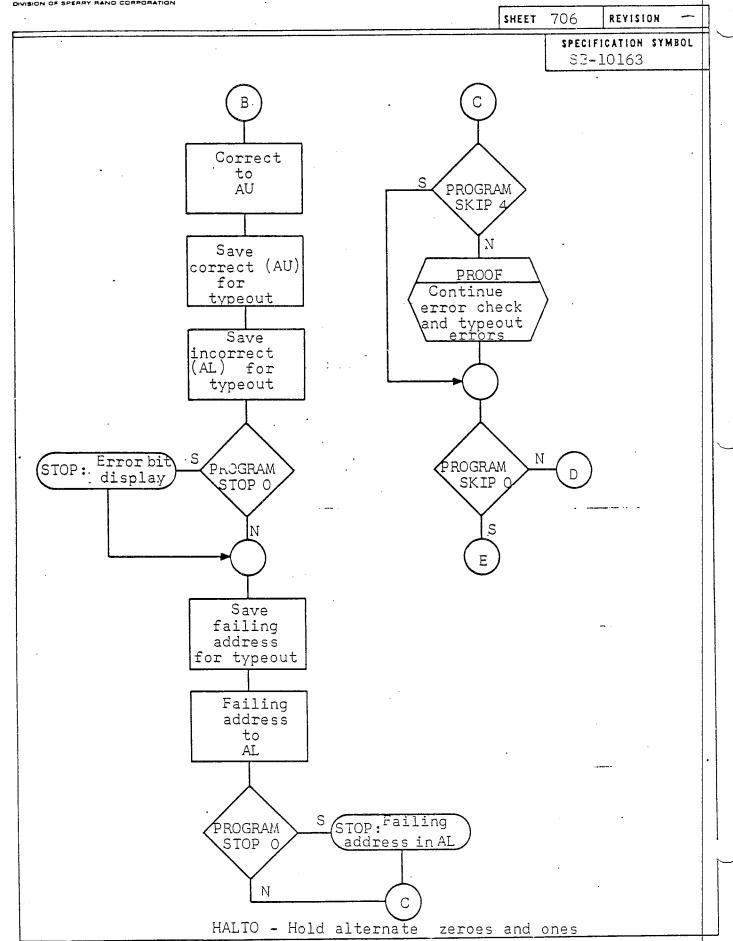
set to suppress error typeout

PROGRAM SKIP 0 - not set to continue routine HALTO set to recycle routine HALT 0









SHEET 707 REVISION

SPECIFICATION SYMBOL SB-10163

TITLE: WP1 - WORST PATTERN	
DECK IDENTIFIER: FACT	
CS-1 LABEL: WP1 KEY:	_IS LABEL DUPLICATE? No
PROGRAMMER: H W M modified by TLR	_ DATE:8 Dec. 67
NUMBER OF L. OUTPUT INSTRUCTIONS:	59

#### DESCRIPTION:

This routine, WP1, tests the ability of the control memory to accept and retain the worst pattern.

This routine is entered from routine HALTO.

The worst pattern causes maximum cross-talk noise. The following arrangement produces the maximum noise. The address storage selection is attained by utilizing an address parity mask of 000100. If upon checking, parity is found to be odd, all ones are loaded; if even the complement or all zeroes are loaded. After the control memory is loaded the content of each sequential address is entered into AL and checked for validity. If it is incorrect an exit is made to the error display routine AIR, upon completion of the error check, subroutine FLUSH, is utilized to set the tested control memory to all ones then to all zeroes. Then an exit is made to the next test routine CWP 1.

#### DATA PAGE (Cont) SHEET 708 PROGRAM

REVISION -

SPECIFICATION SYMBOL SB-10163

TITLE: WP1 - WORST PATTERN

INPUT PARAMETERS (Listed Sequentially):

PAR PARI TEST PATTERNS

CKWP 13 CKWP 14 000000 777777

OUTPUT PARAMETERS (Listed Sequentially):

ABNORMAL EXITS (Listed Sequentially):

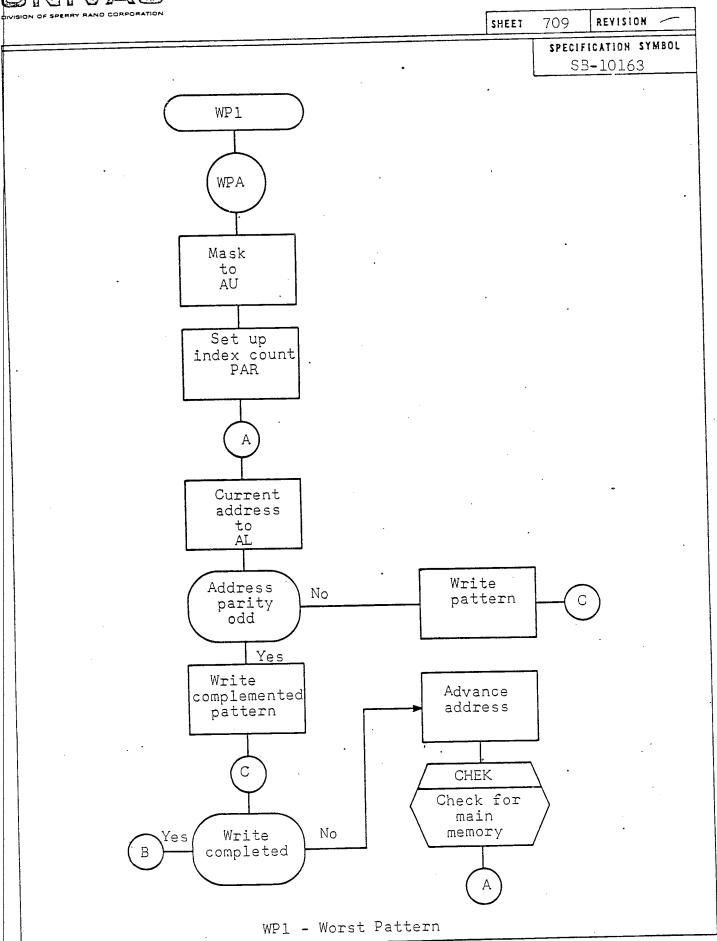
NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified):

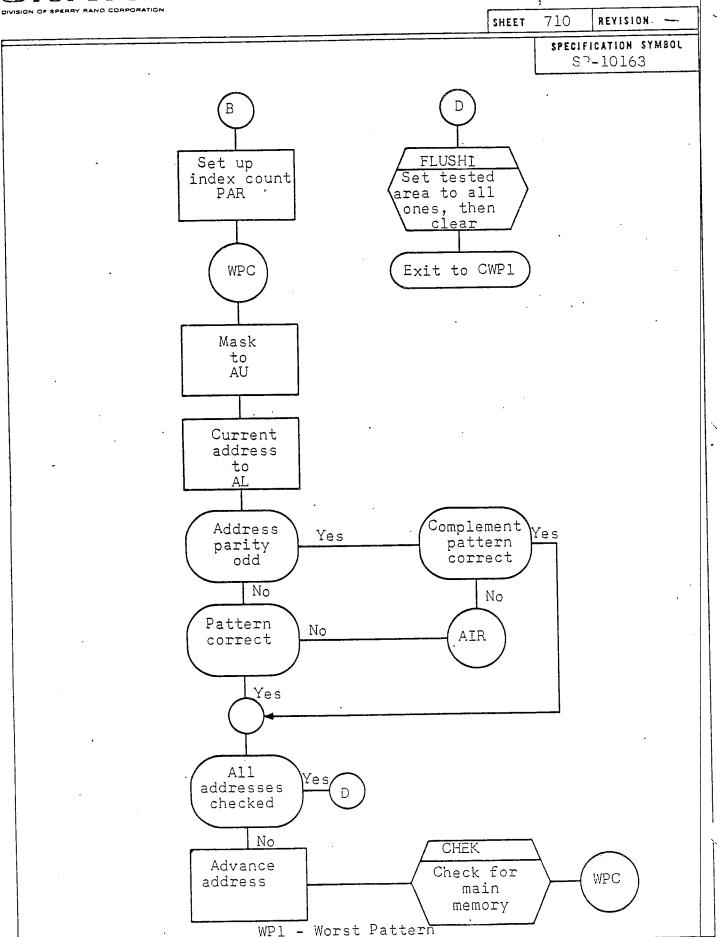
CHEK AIR FLUSH1 CWP1

SYSTEM DATA REFERENCES:

ALARMS AND/OR REMARKS:







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# PROGRAM DATA PAGE

SHEET	711	REVISI	03		
	SPECIFI	CATION	SY	MBOL	_

SPECIFICATION SYMBO

TITLE: AIR -	WORST PATTERN	I ERROR DISPLA	Υ	
DECK IDENTIF	IER: FACT			
CS-1 LABEL:	AIR	KEY:	IS LABEL	DUPLICATE? No
PROGRAMMER:	<u>H W M modifie</u>	ed by TLF	DATE:	8 P∋c. '67
NUMBER OF L	. OUTPUT INSTR	uctions:34	·	

#### DESCRIPTION:

This routine, AIR, is the error display for the worst pattern routine, WPl.

Should an error be detected by the validity check in the WPl routine, an entry is made to this routine, AIR.

When AIR is entered, AU is entered with the correct information and AL is entered with the incorrect, then AU and AL are saved for the error typeout and PROGRAM STOP O is checked. If PROGRAM STOP O is set the subroutine stops and the display may be evaluated. Upon restarting, the failing address is entered into AL then stored for the error typeout and PROGRAM STOP O is checked. If it is set the routine stops and the operator may note the failing address. Upon restarting, or if PROGRAM STOP O is not set, PROGRAM SKIP 4 is checked. If it is not set an error typeout will occur. After the typeout, or if PROGRAM SKIP 4 is set, PROGRAM SKIP O is checked. If set, WPl will recycle, if not set the error check in WPl will continue.

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# PROGRAM DATA PAGE (Cont)

SHEET 712

REVISION

SPECIFICATION SYMBOL SE-10163

TITLE: AIR - WORST PATTERN ERROR DISPLAY

INPUT PARAMETERS (Listed Sequentially):

TEST PATTERNS
CKWP13 000000
CKWP14 777777

OUTPUT PARAMETERS (Listed Sequentially):

HERE THERE DIP DIP+1

ABNORMAL EXITS (Listed Sequentially):

NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified): ERROUT
WP1

SYSTEM DATA REFERENCES: \*

## ALARMS AND/OR REMARKS:

ERROR DISPLAYS

1st PROGRAM STOP 0 - correct information in AU incorrect information in AL

2nd PROGRAM STOP 0 - failing address displayed in AL

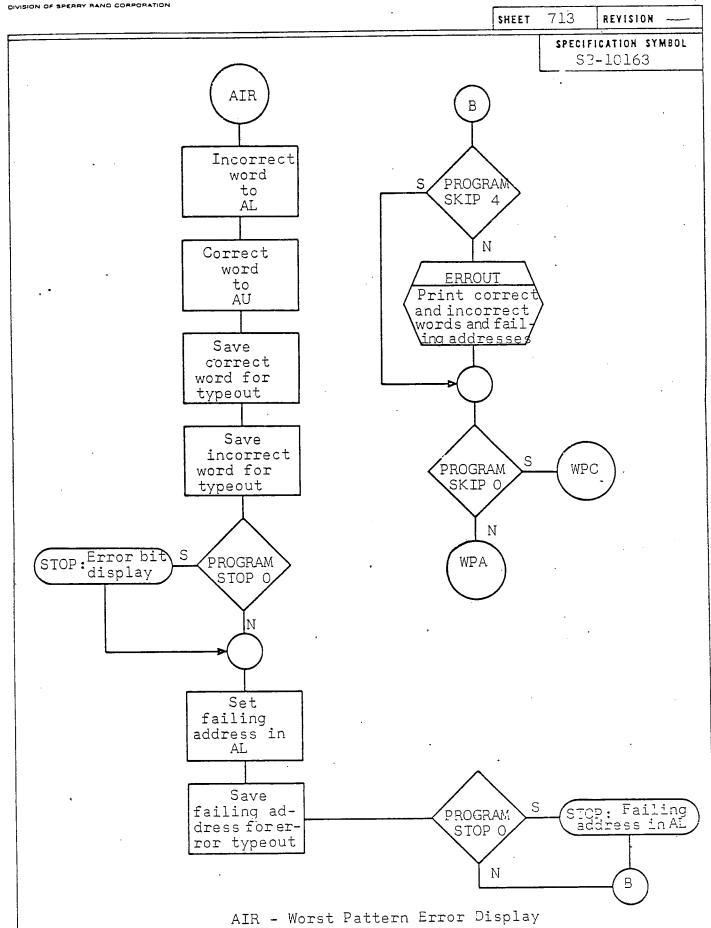
PROGRAM SKIP 4 - not set for error typeout

set to suppress error typeout PROGRAM SKIP O - not set to continue routine WPl

set to recycle routine WP1



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SHEET 714 REVISION

SPECIFICATION SYMBOL 33-10163

TITLE: CWP1 - COMPLEMENT WORST PATTERN	
DECK IDENTIFIER: FACT	•
CS-1 LABEL: CWP1 KEY:	IS LABEL DUPLICATE? No
PROGRAMMER: H W M modified by ILR	DATE: 8 Dec. 67
NUMBER OF L4 OUTPUT INSTRUCTIONS: 58	<del></del>
DESCRIPTION:	

This routine, CWP1, tests the ability of the control memory to accept and retain the worst pattern.

This routine is entered from routine WPl.

The complement worst pattern causes maximum cross-talk noise. The following arrangement produces the maximum noise. The address storage selection is attained by utilizing an address parity mask of 000100. If upon checking, parity is found to be even, all ones are loaded; if odd the complement or all zeroes are loaded. After the control memory is loaded the content of each sequential address is entered into AL and checked for validity. If it is incorrect an exit is made to the error display routine CAIR; upon completion of the error check, subroutine FLUSH, is utilized to set the tested control memory to all ones then to all zeroes. Then an exit is made to the next test routine RW.

# PROGRAM DATA PAGE (Cont)

SHEET

715

REVISION ---

SPECIFICATION SYMBOL SPECIFICATION SYMBOL

TITLE: CWP1 - COMPLEMENT WORST PATTERN

INPUT PARAMETERS (Listed Sequentially):

PAR PAR l TEST PATTERNS CKWP14 777777

CKWP13 000000

OUTPUT PARAMETERS (Listed Sequentially):

ABNORMAL EXITS (Listed Sequentially):

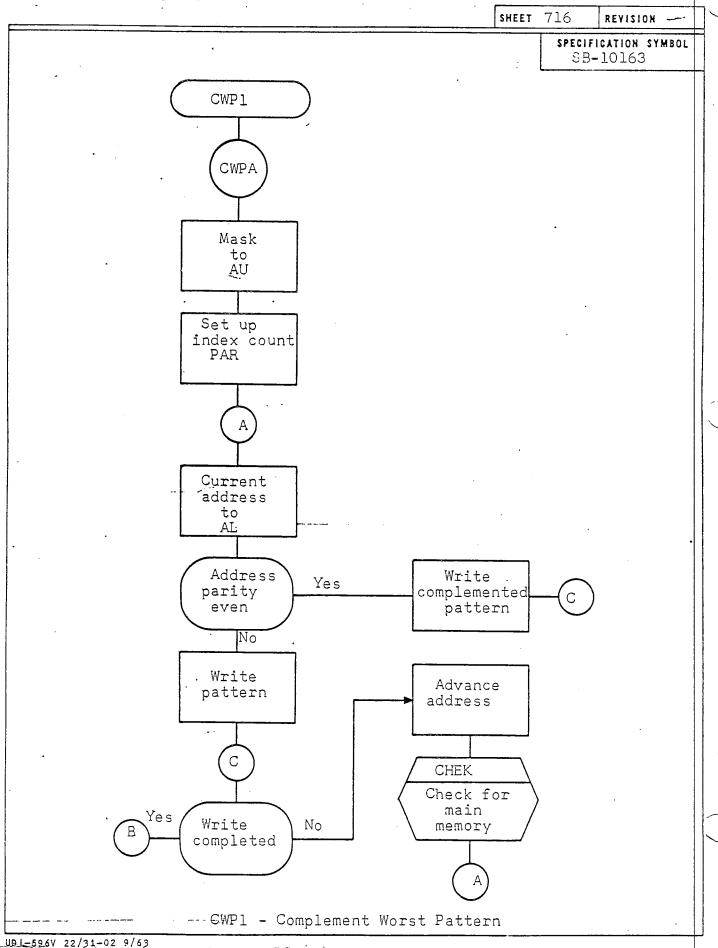
NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified):

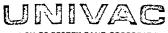
CHEK CAIR FLUSH1 RW

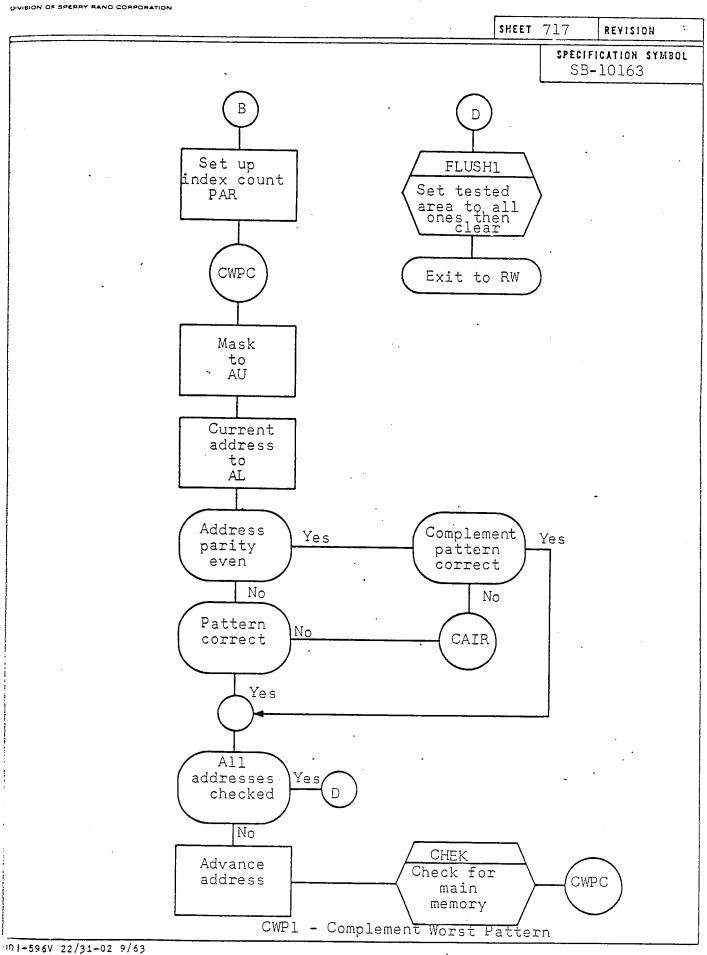
SYSTEM DATA REFERENCES:

ALARMS AND/OR REMARKS:









SHEET 718 REVISION -

SPECIFICATION SYMBOL SB-10163

TITLE: CAIR - COMPL	EMENT WORST PATTER	RN ERROR DISPL	ΑY
DECK IDENTIFIER: FA			
CS-1 LABEL: CAIR	KEY:	IS LABEL DU	PLICATE? No
PROGRAMMER: H W M	mocified by TLR	DATE:8	Dec. 67
NUMBER OF L4 OUTP	UT INSTRUCTIONS:	32 ′	•
DESCRIPTION.	•		

This routine, CAIR, is the error display for the complement worst pattern routine, CWPl.

Should an error be detected by the validity check in the CWP1 routine, an entry is made to this routine, CAIR.

When CAIR is entered, AU is entered with the correct information and AL is entered with the incorrect, then AU and AL are saved for the error typeout and PROGRAM STOP O is checked. If PROGRAM STOP O is set the subroutine stops and the display may be evaluated. Upon restarting, the failing address is entered into AL then stored for the error typeout and PROGRAM STOP O is checked. If it is set the routine stops and the operator may note the failing address. Upon restarting, or, if PROGRAM STOP O is not set, PROGRAM SKIP 4 is checked. If it is not sent an error typeout will occur. After the typeout, or if PROGRAM SKIP 4 is set, PROGRAM SKIP O is checked. If set, CWPl will recycle; if not set, the error check in CWPl will continue.



#### PROGRAM DATA PAGE (Cont)

**SHEET** 719

REVISION -

SPECIFICATION SYMBOL S7-10163

CAIR - COMPLEMENT WORST PATTERN ERROR DISPLAY TITLE:\_

INPUT PARAMETERS (Listed Sequentially):

TEST PATTERNS

CKWP14 777777 CKWP13 000000

OUTPUT PARAMETERS (Listed Sequentially):

HERE THERE DIP DIP+1

ABNORMAL EXITS (Listed Sequentially):

NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified): **ERROUT** CWP1

SYSTEM DATA REFERENCES:

#### ALARMS AND/OR REMARKS:

ERROR DISPLAYS

1st PROGRAM STOP O - Correct information in AU incorrect information in AL.

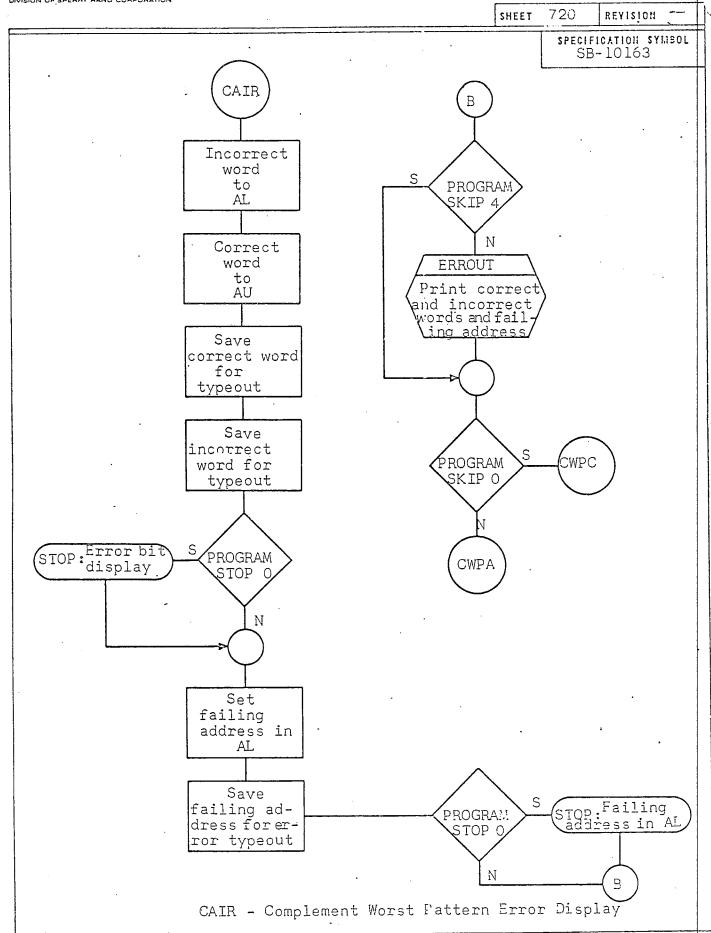
2nd PROGRAM STOP O - Failing address displayed in AL PROGRAM SKIP 4 - Not set for error typecut

Set to suppress error typeout

PROGRAM SKIP O - Not set to continue routine CWPl

Set to recycle routine CWPl





SHEET 721	REVISION	0

SPECIFICATION SYMBOL SB-10163

TITLE: RW - READ/WRITE	RANDOM WORD TE	EST
DECK IDENTIFIER:		
CS-1 LABEL: RW	KEY:	IS LABEL DUPLICATE? No
PROGRAMMER: H W M mod	ified by TLR	DATE: <u>8 Dec. 67</u> .
NUMBER OF L4 OUTPUT IN	NSTRUCTIONS:	70 .

#### DESCRIPTION:

This routine, RW, tests the ability of the control memory to accept and retain numbers and accomplish a fast read/write.

This routine is entered from routine CWPL.

This routine RW takes numbers generated by the random-number-generator subroutine (RAN) and stores them in the control memory. Simultaneously, a second store is made at another set of addresses to set up an image of the information being stored. This enables verification of the storages by comparing the two information cells at the completion of the fast read. For the fast read/write each address under test is read repeatedly 40 times. When the addresses have been read 40 times their contents are checked for validity. If the comparison with the image addresses does not check, the incorrect information is entered into AL, the correct is entered into AU, then AU and AL are saved for the error typeout, and PRO-GRAM STOP O is checked. If PROGRAM STOP O is set, the routine stops and the display may be evaluated. Upon restarting, or if PROGRAM STOP O is not set, the failing address is entered into AL, then AL is stored for the error typeout and PROGRAM STOP O is checked. If set the routine stops and the operator may note the failing address. Upon restarting or if PROGRAM STOP O is not set, PROGRAM SKIP 4 is checked. If not set an error typeout will occur. After the typeout, or if PROGRAM SKIP 4 is set, PROGRAM SKIP 0 is checked. If set RW will recycle, if not set RW will continue. After the completion of RW an exit is made to routine LCON.

# PROGRAM DATA PAGE (Cont)

**SHEET** 722

REVISION

SPECIFICATION SYMBOL SB-10163

TITLE: RW - READ/WRITE RANDOM TEST

INPUT PARAMETERS (Listed Sequentially):

PAR PAR 1

OUTPUT PARAMETERS (Listed Sequentially):

HERE THERE DIP DIP+1

ABNORMAL EXITS (Listed Sequentially):

NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified):

RAN CHEK ERROUT LCON

SYSTEM DATA REFERENCES:

#### ALARMS AND/OR REMARKS:

ERROR DISPLAYS

1st PROGRAM STOP O - Correct information in AU incorrect in AL

2nd PROGRAM STOP O - Failing address displayed in AL

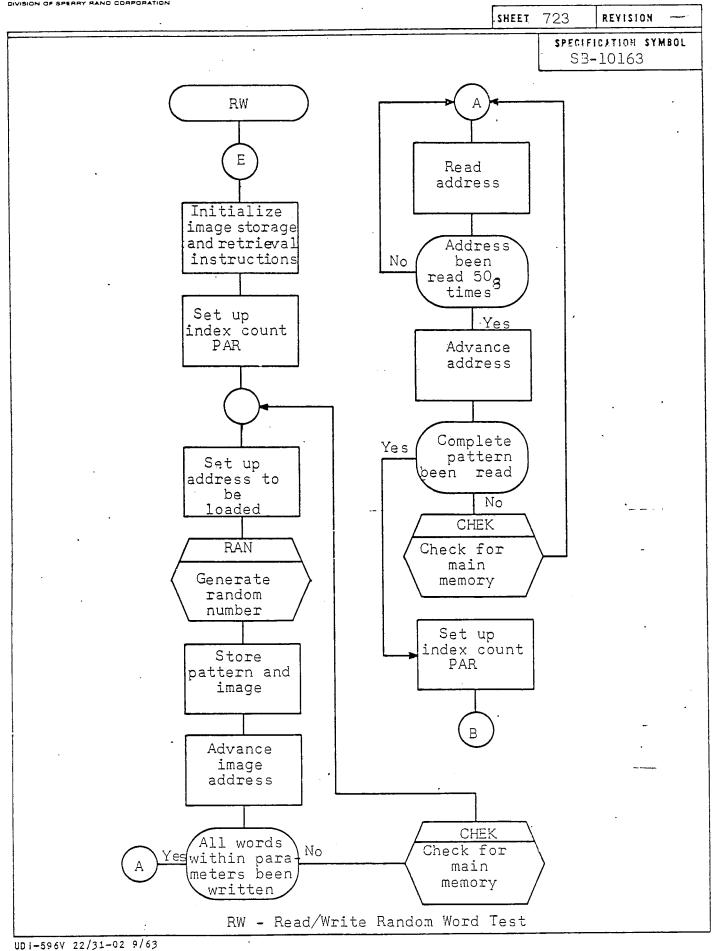
PROGRAM SKIP 4 - Not set for error typeout

Set to supress error typeout

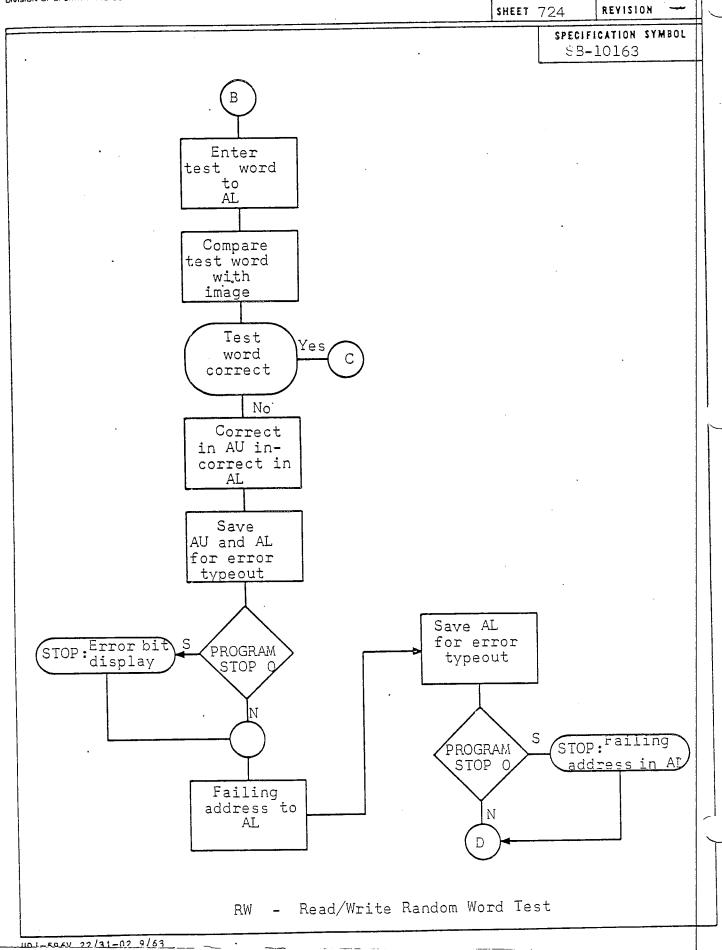
PROGRAM SKIP O - Not set to continue routine RW

Set to continue routine RW









SHEET 725 REVISION SPECIFICATION SYMBOL SB-10163 ERROUT Error PROGRAM typeout SKIP 4 S PROGRAM SKIP Q Ν Advance image address Pattern check completed Exit to LCON No CHEK Check for main memory RW - Read/Write Random Word Test



SHEET	726	REVISION	٠.,

SPECIFICATION SYMBOL SB-10163

TITLE: RAN - RANDOM NUMBER GENERAT	OR
DECK IDENTIFIER: FACT	
CS-1 LABEL: RAN KEY:	IS LABEL DUPLICATE?No
PROGRAMMER: P II C modified by TER	DATE:8 Dec. 67
NUMBER OF L4 OUTPUT INSTRUCTIONS:	11
DESCRIPTION.	

This subroutine generates a series of random numbers which are used by the read/write test, RW. Two basic constants are used: 0007031 (RAN2) and 377775 (RAN3). RAN2 is entered into AU and multiplied by itself. At the completion of the multiply, the contents of A are divided by RAN3 (377775) and AU is checked. If AU is not equal to zero the contents of AU are stored at RAN2. If AU is equal to zero the contents of AL are stored at RAN2, thereby setting a new constant for the next generation of a random number. An exit is then made to the referencing subroutine, P.W.

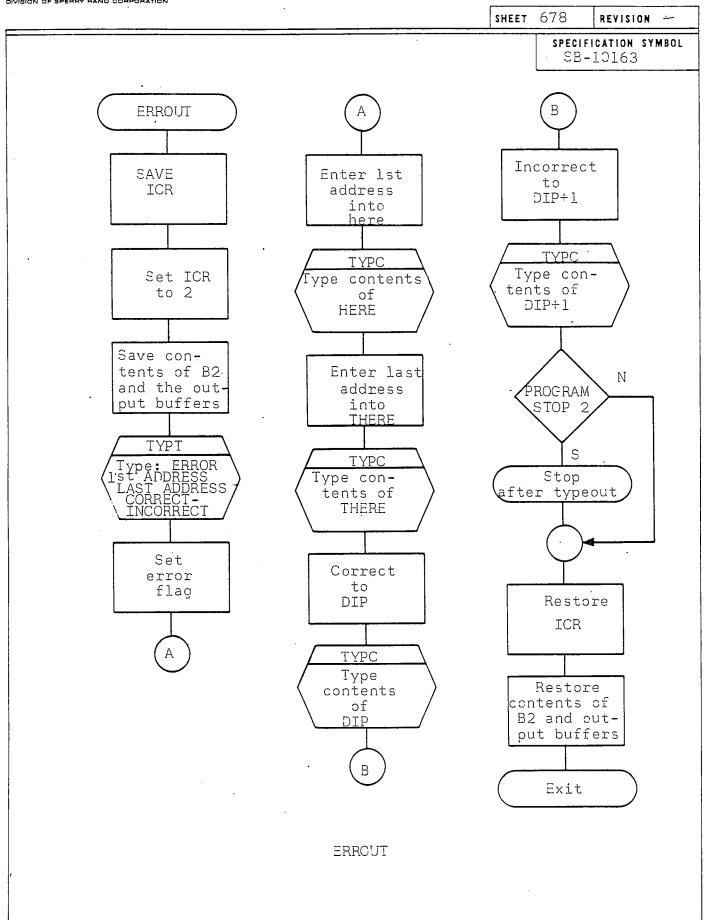
	ATA PAGE	(Cont) SHEET	727 KEVIDION U
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<b>多端半数</b>    P51 (111 × 113 <u>2 4 1</u>	and the second s	Benedige the grant to appear to the property of the property o	SI-10163.
TITLE:RAN - RANDOM N	UMBER GENERATOR		•
	And the second s	· · · · · · · · · · · · · · · · · · ·	
INPUT PARAMETERS (Lis	sted Sequentially):	, di	
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	el with RANZ		:
		V. Augustin	•
	The second secon	ar Baji	•
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	nt for IA		: <del></del>
OUTPUT PARAMETERS (L	isted Sequentially):	₹ : •	•
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SHEET 728 REVISION SPECIFICATION SYMBOL SB-10163 RAN Enter AL with RAN2 Multiply AL with RAN2 Divide A with RAN3 ΑU No equal to zero Yes Store AL at RAN2 Store AU at RAN2 Exit

RAN - Random Number Generator .







#### DATA PAGE PROGRAM

SHEET 728.1

REVISION . O

SPECIFICATION SYMBOL SB-10163

LABEL: LCON

TITLE AND/OR PURPOSE: LCON, the Hammer Test, Hammers a value into a cell located within control memory to see

if any other control memory cell changes

value as a result.

INPUT PARAMETERS:

None

OUTPUT PARAMETERS:

None

#### DESCRIPTION:

All cells within control memory are set to zero and then the first cell (address 20) is changed to the value 677 by hammering this value into the cell 10 times. The entire control memory is then checked to see if it was left unchanged by this action. If an error is detected and PROGRAM SKIP 4 is not set, a message is typed to display the error.

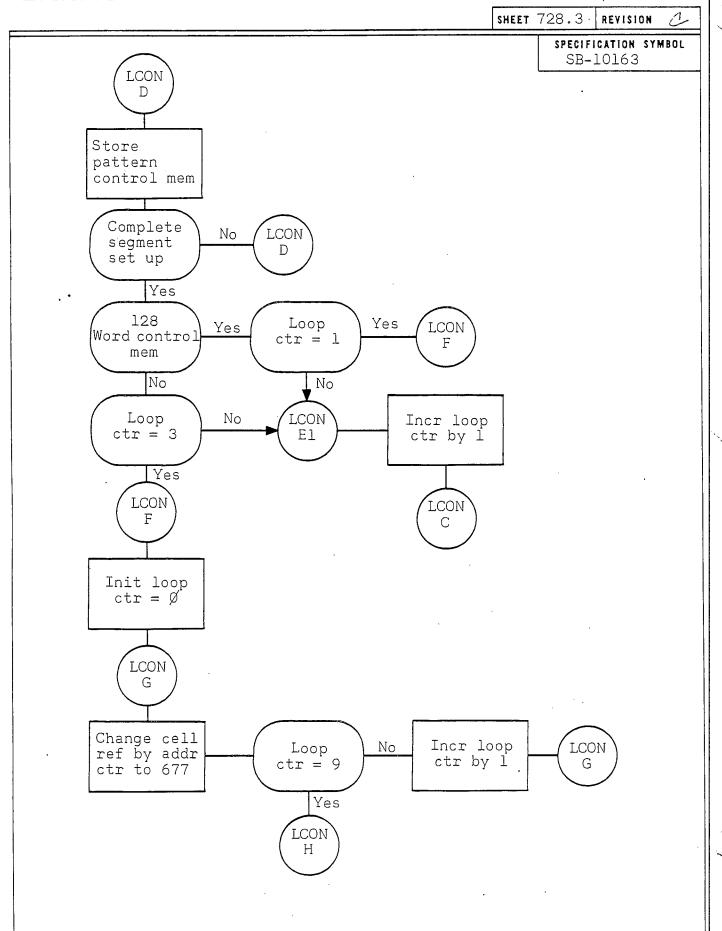
All cells are ragain set to zero and the hammering action for value 677 takes place into address 21. Following the error check, the procedure is repeated for each address within control memory.

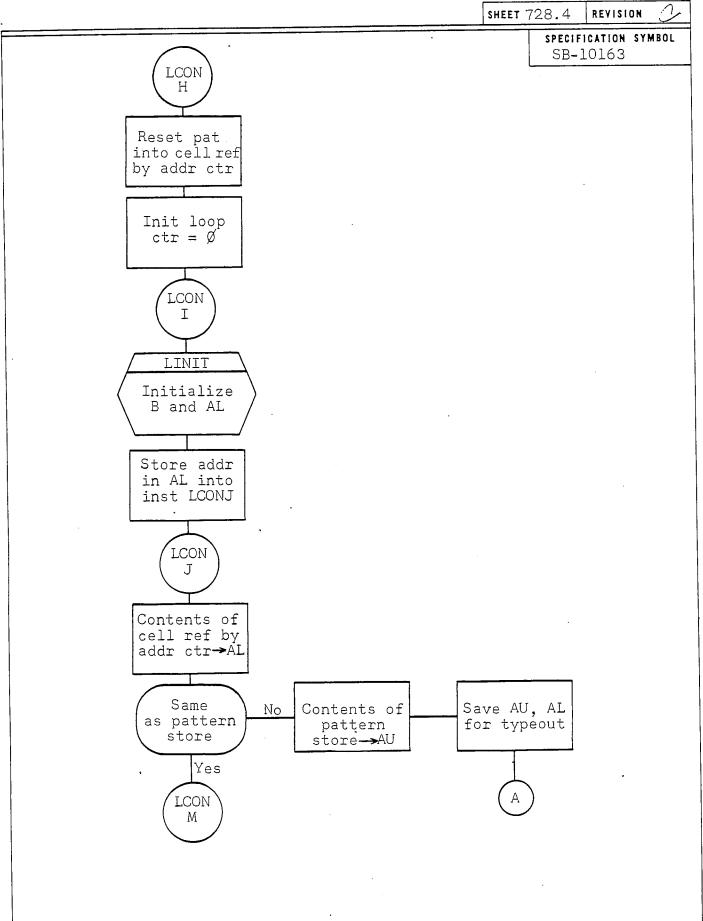
When the last address within control memory has been tested by the procedure with value 677, the entire test cycle, starting again with address 20, is repeated. The one difference is that all cells will initially be set to 777777 each time instead of zero.

At the end of this cycle, an exit is made to routine FLUSH.

SHEET 728.2 REVISION SPECIFICATION SYMBOL SB-10163 LCON Set pattern store =  $\emptyset$ LCON Α Init addr  $ctr = 2\emptyset_8$ LCON В Init loop
 ctr = Ø LCON LINIT Initialize B and AL Store addr in AL into inst LCOND LCON





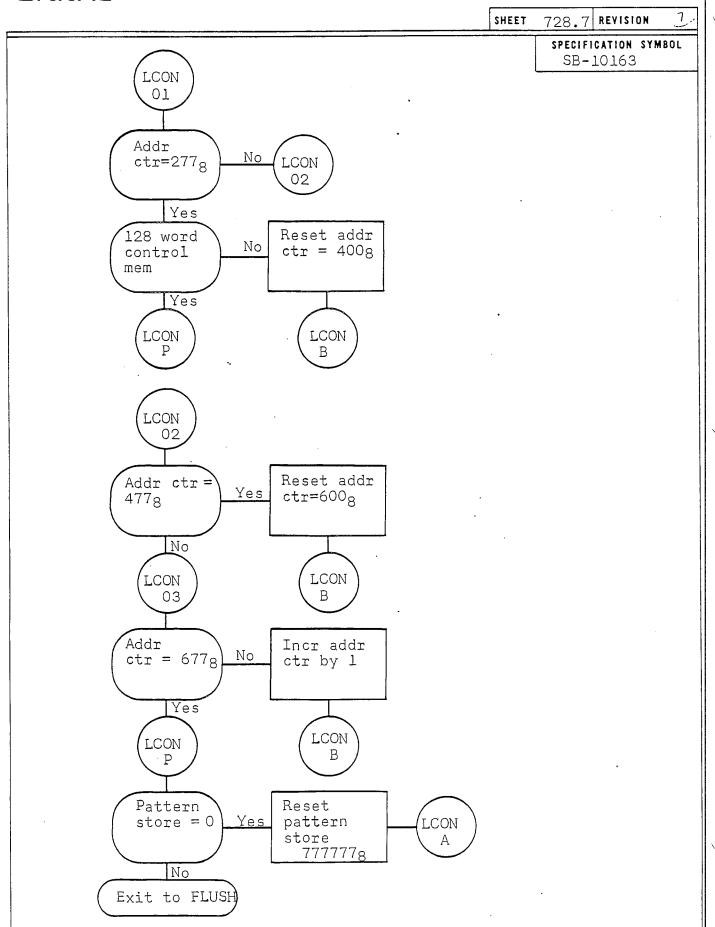


SHEET 728.5. REVISION SPECIFICATION SYMBOL SB-10163 STOP Ø Yes STOP Ø set No LCON Κ Address of error cell →AL Save AL for typeout STOP Ø Yes STOP Ø set No Skip 4 LCON Yes set No Set error flag TYPT STOP 2 Yes Print error STOP 2 set MSG No LCON LCON L L

## SPECIFICATION SHEET

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SHEET 728.6 REVISION SPECIFICATION SYMBOL SB-10163 LCON Yes Skip Ø LCON set No LCON M Complete No LCON segment checked Yes 128 word Loop Yes Yes LCON control ctr = 1mem No No Loop ctr = 3 LCON No N1 Yes Incr loop LCON ctr by 1 LCON Addr ctr = 778 No LCON Yes Reset Addr ctr = 2008LCON





SHEET 728.8 | RE'

REVISION

SPECIFICATION SYMBOL SB-10163

LABEL: LINIT

TITLE AND/OR PURPOSE: Initialize B and set AL with the segment

initial address.

#### INPUT PARAMETERS:

None

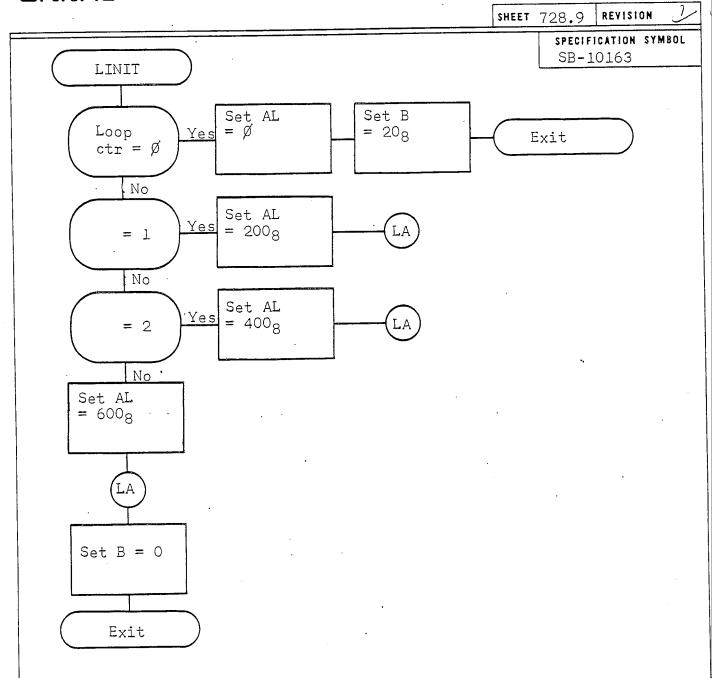
#### OUTPUT PARAMETERS:

B set to an address bias AL set to a base address

#### DESCRIPTION:

The loop counter (LOOP) is referenced to see which segment of control memory is next for a store operation or about to be checked. The initial address of the segment is set into AL and an address bias is set into B before the exit as follows:

- a. If LOOP = 0, AL is set to 0 and B is set to 20 octal
- b. If LOOP = 1, AL is set to 200 octal and B is set to 0
- c. If LOOP = 2,  $\overline{AL}$  is set to 400 octal and B is set to 0
- d. If LOOP = 3, AL is set to 600 octal and B is set to 0



SHEET	729	REVISION -	
 	SPECIF	CATION SYMBOL	_
	6.3 -	10163	

TITLE: FLUSH1- FLUSH CONTROL MEMORY			
DECK IDENTIFIER: FACT			
CS-1 LABEL: FLUSH1 KEY:	_IS LABEL	DUPLICATE?	No
PROGRAMMER: H W M modified by TIR	_ DATE:	8 Per.	67
NUMBER OF L4 OUTPUT INSTRUCTIONS:	2		

### DESCRIPTION:

This subroutine, FLUSHI, normalizes the control memory.

This subroutine is referenced by routines WPl, CWPl, and FLUSH.

The cells of control memory are first set to all ones (777777) then all the cells are cleared to zero (000000). An exit is then made to the referencing routine.

# PROGRAM DATA PAGE (Cont)

SHEET 730

REVISION -

SPECIFICATION SYMBOL SB-10163

TITLE: FLUSHI - FLUSH CONTROL MEMORY

INPUT PARAMETERS (Listed Sequentially):

TEST PATTERNS

PAT1

-777777

OUTPUT PARAMETERS (Listed Sequentially):

ABNORMAL EXITS (Listed Sequentially):

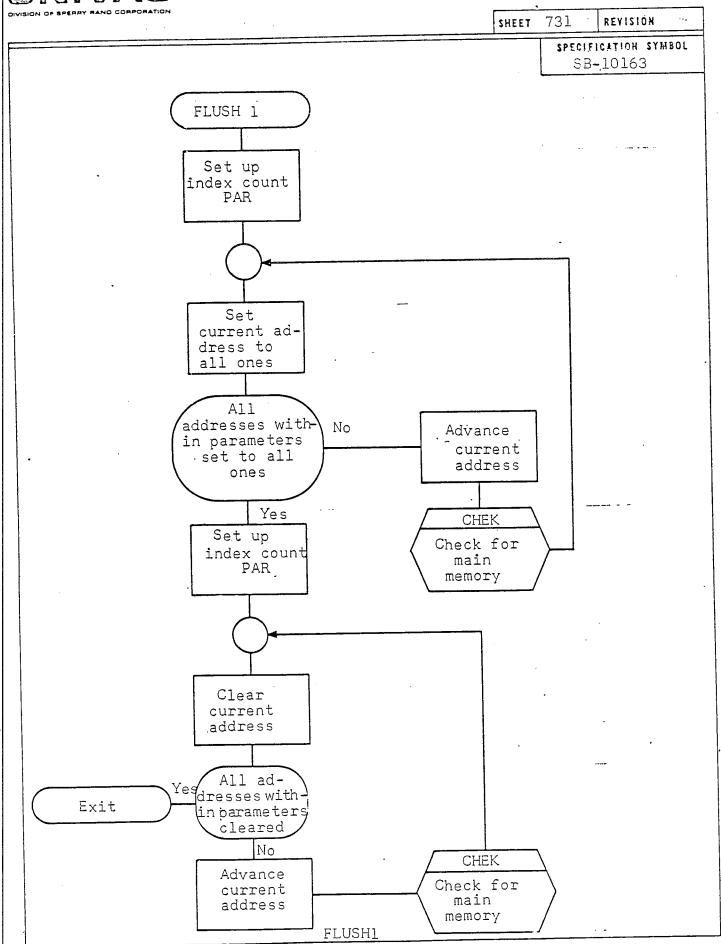
NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified): CHEK

SYSTEM DATA REFERENCES:

ALARMS AND/OR REMARKS:



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SHEET 732 REVISION

SPECIFICATION SYMBOL SB-10163

TITLE: FLUSH - FLUSH C	CONTROL MEMORY,	STOP, RECYC	<u>LE</u>	
DECK IDENTIFIER: FACT				
CS-1 LABEL: FLUSH	KEY:	IS LABEL D	UPLICATE?	No
PROGRAMMER: H W M mod	lified by TLR	DATE:8	Dec. 67	
NUMBER OF L4 OUTPUT II	NSTRUCTIONS:	5		
DESCRIPTION:				

This routine, FLUSH, normalizes control memory, checks PROGRAM STOP 1 for the end of the Control Memory test, and checks PROGRAM SKIP 4 for recycle conditions.

This routine is entered from routine LCON

FLUSH return jumps to FLUSH1 to flush control memory, then checks PROGRAM STOP 1. If set, the Control Memory test is terminated. If not set, or upon restarting, PROGRAM SKIP 4 is checked. If set the Control Memory test is recycled without typeouts. If not set the Control Memory test is recycled with typeouts.



# PROGRAM DATA PAGE (Cont)

SHEET 733

REVISION -

SPECIFICATION SYMBOL. S7-10163

FLUSH - FLUSH CONTROL MEMORY, STOP, RECYCLE

INPUT PARAMETERS (Listed Sequentially):

OUTPUT PARAMETERS (Listed Sequentially):

ABNORMAL EXITS (Listed Sequentially):

NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified): FLUSH1
HEAD+6 in routine CRANK
TEST

SYSTEM DATA REFERENCES:

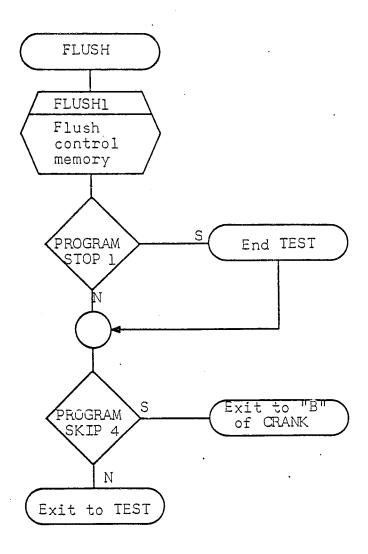
#### ALARMS AND/OR REMARKS:

PROGRAM STOP 1 - set for end of Control Memory test
PROGRAM SKIP 4 - set to recycle Control Memory test without typeouts
not set to recycle Control Memory test with typeouts



SHEET 734 REVISION -

SPECIFICATION SYMBOL SB-10163



FLUSH

UNIVAC SPECIFICATION SHEET PROGRAM DATA PAGE SHEET 735 . REVISION -SPECIFICATION SYMBOL PERCEPTION PERPO .B-10163 TITLE PAR - STORAGE, TEST PATTERNS DECK IDENTIFIER: FACT. KEY: \_\_\_\_\_\_\_\_\_\_ SPEABEL DUPLICATE? No CS-1 LABEL: PAR PROGRAMMER: H W M modified by TLR DATE: 8 Dec. 67 DESCRIPTION: This program contains test patterns and storage for parameters used in the Control Memory test. สะที่ราชทางคริกและไปสู่ และเกาะและสารทุกเมือ rai especial ( especial de la compania de la compa

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PROGRAM DATA PAGE (Cont)

SHEET 736 REVISION

SPECIFICATION SYMBOL SB=10163

TITLE: PAR - STORAGE, TEST PATTERNS

INPUT PARAMETERS (Listed Sequentially):

PAR PAR1 + DIP DIP+1

HERE THERE

OUTPUT PARAMETERS (Listed Sequentially):

ABNORMAL EXITS (Listed Sequentially):

NEXT LEVEL PROCEDURES OR SUBROUTINES (Keys of Duplicate Labels Specified):

SYSTEM DATA REFERENCES:

ALARMS AND/OR REMARKS: