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DIAGNOSTIC PROGRAM MANUAL

SIGMA 5 AND 7 EXTENDED PERFORMANCE RAPID ACCESS DATA (RAD) FILE

PROGRAM NO. 704978C

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Diagnostic Control Program for Sigma 5 and Sigma 7 Peripheral Devices, Reference Manual	900712
Sigma 5 and 7 Relocatable Diagnostic Program Loader, Diagnostic Program Manual	900972
Rapid Access Data (RAD) File Model 7231/7232, Technical Manual	901565
XDS Sigma Symbol and Meta-Symbol, Reference Manual	900952

SECTION I
INTRODUCTION

1-1 SCOPE OF MANUAL

This manual describes a flexible and comprehensive test program for the Sigma 5/7 Extended Performance Rapid Access Data (RAD) File, model numbers 7231/7232.

This manual is made up of five sections. Section I is a general introduction to the test program. Section II contains a complete operating procedure and a description of each test subroutine. Section III describes in detail the individual tests. Section IV contains a complete program listing. Section V contains the concordance listing.

1-2 PROGRAM OBJECTIVES

The Sigma 5/7 Extended Performance RAD Test Program, Catalog No. 704978, consists of a collection of closed subroutines designed to operate under the executive control of the Sigma 5/7 Diagnostic Control Program (DCP), Reference Manual 900712. Most of these subroutines can be activated by the DCP in any combination or sequence specified by the user through the input of a syntax test language.

The reader is referred to the DCP Reference Manual for a detailed explanation of the test language and its use.

The test routines are of three different categories: environmental, operational, and utility. The environmental routines are used to establish the operating environment by supplying the program with the addresses of the available units, the desired track and sector address, the type pattern, the record length, etc. The operational routines are those that actually execute the different orders such as READ, WRT, SEEK, and those that affect the operations of order, such as the delay routine, the error report routine, the counter control routine and the stop routine. The utility routines do not relate directly to the actual program. They perform such functions as dumping sections of core and altering locations of core. (See the DCP manual.) Figure 1-1 is a general flow chart of the test program; figure 1-2 is a detailed flow chart.

1-3 GENERAL SPECIFICATIONS

General specifications for this program are listed in table 1-1.

Table 1-1. General Specifications

Computer configuration:	Sigma 5 or Sigma 7 computer with minimum of 8K memory
Required equipment:	Keyboard printer RAD Device Controller Model No. 7231 RAD Storage Unit Model No. 7232
Optional equipment:	Card reader and line printer
Storage:	4057_{10} words from 40_{16} to 1018_{16}
Source language:	XDS Metasymbol
Prerequisites:	The RAD controller and storage unit must conform to Equipment Design Specification, Drawing No. 139578A
Program media:	Self-loading paper tape or cards

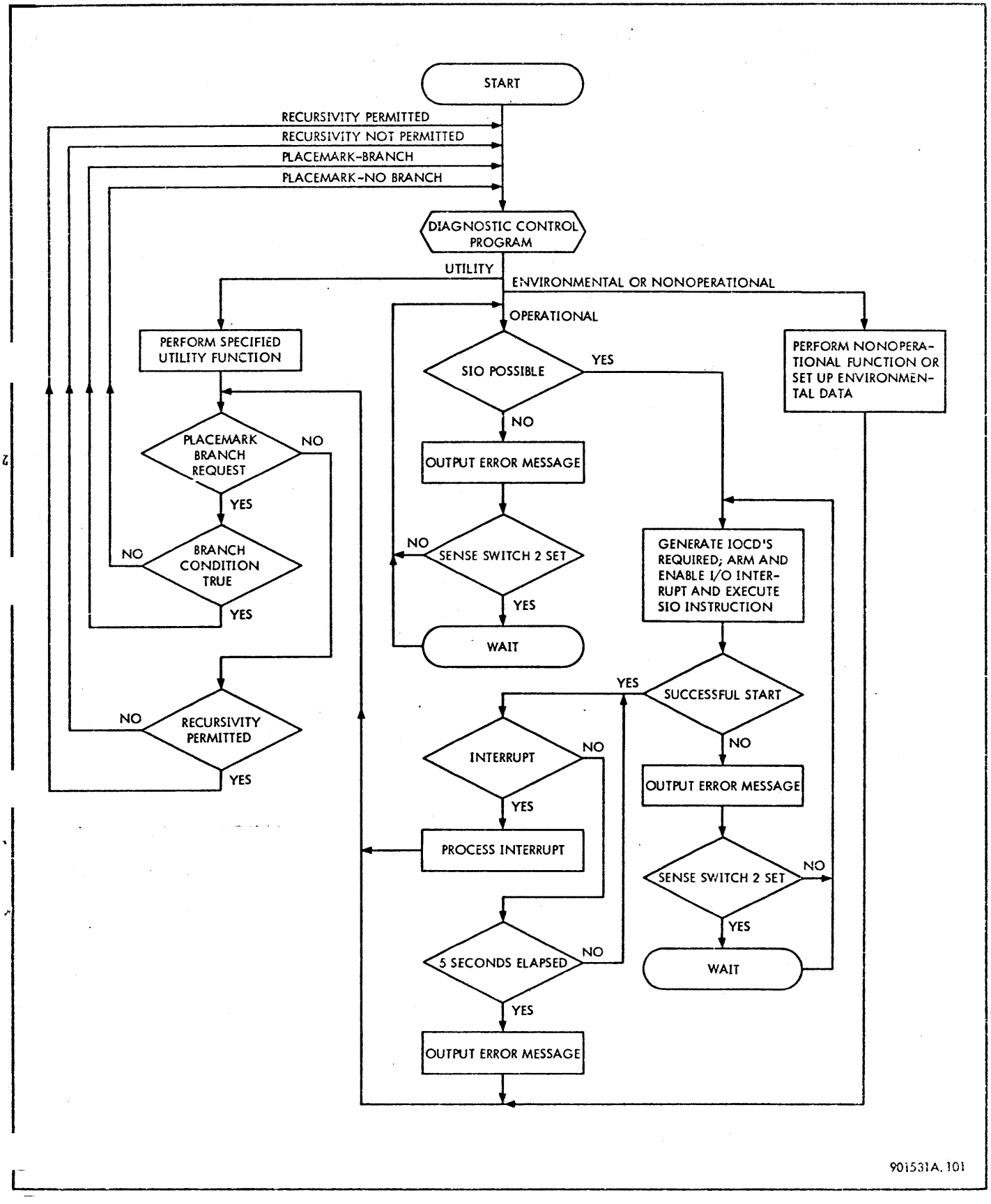

Figure 1-1. Extended Performance RAD File Test, General Flow Chart

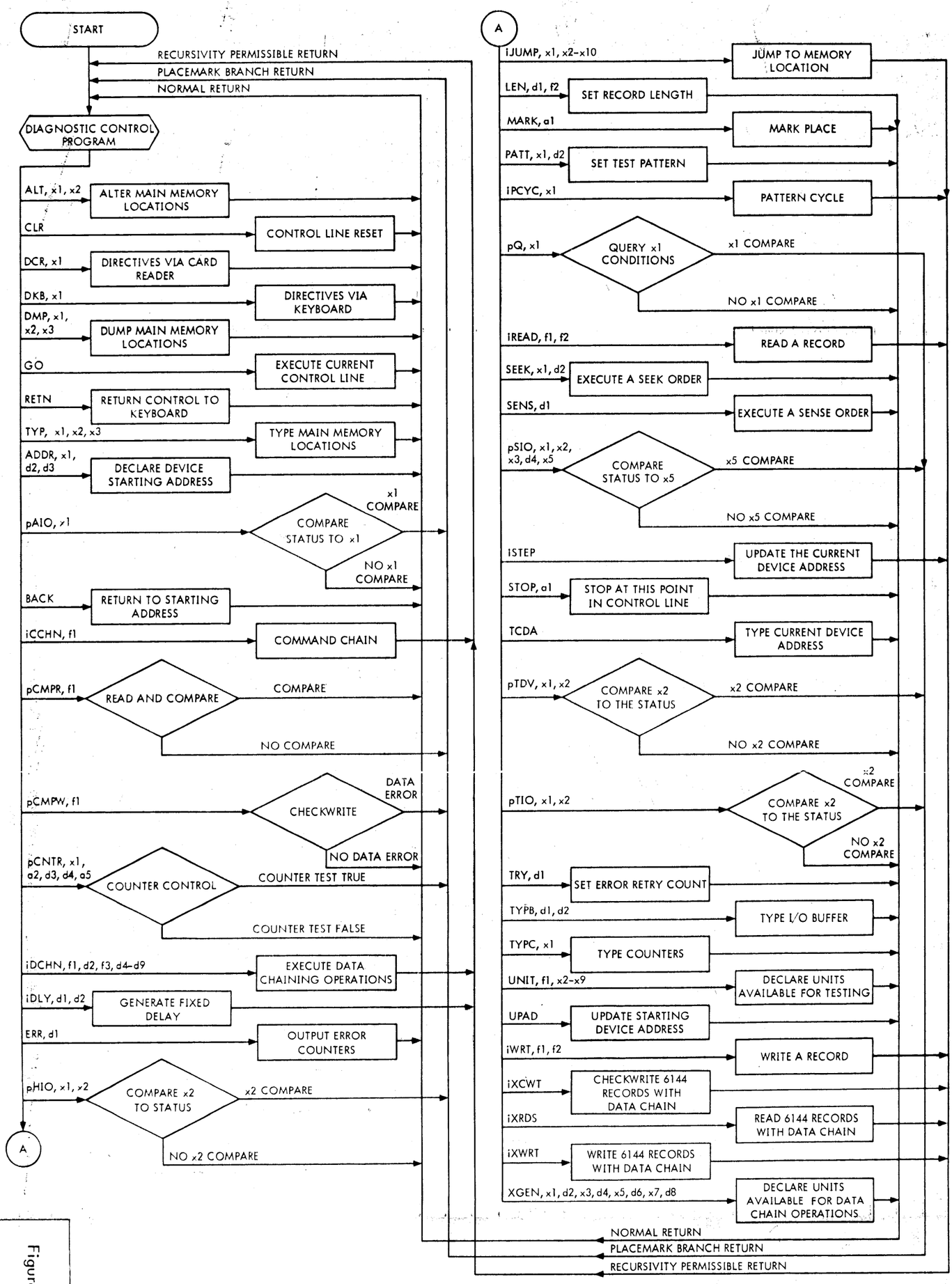

Figure 1-2. Extended Performance RAD File Test, Detailed Flow Chart

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SECTION II
OPERATING INSTRUCTIONS

2-1 PROGRAM LOADING PROCEDURE

The test program uses the Sigma 5/7 Relocatable Diagnostic Program Loader, Catalog No. 704356, which is supplied with the object program media. (See XDS Manual 900972 for a detailed loading procedure.)

2-2 LOADER SUCCESS/ERROR INDICATIONS

A successful load operation is indicated by the following printout on the keyboard printer:

SIGMA 5/7 EXTENDED PERFORMANCE RAD TEST 704978B00 MANUAL 901540B
S

An unsuccessful load operation may result in a program wait or loop. (See XDS Manual 900972).

2-3 PROGRAM OPERATING PROCEDURE

2-4 CONSOLE SENSE SWITCH OPTIONS

Table 2-1 contains a listing of console sense switch options.

2-5 REGAINING OPERATOR CONTROL

Three methods are available for regaining program control:

a. Setting SENSE switch 1 during the running of the program.

b. Pressing the console INTERRUPT pushbutton will return control to the keyboard printer.

c. Setting the console COMPUTE switch to IDLE, pressing the CPU RESET pushbutton, and then setting the COMPUTE switch to RUN.

2-6 TEST LANGUAGE OPTIONS

The test program operates under the executive control of the DCP. Communication between the user and the DCP is provided through the use of a syntax test language. The procedure for using the test language is described in detail in the DCP reference manual. The following paragraphs include information unique to the extended performance RAD test language and are intended to supplement the DCP manual.

2-7 Definitions of Terms and Symbols

Table 2-2 contains definitions of the terms and symbols used in describing the test language.

2-8 Directives

Table 2-3 contains a glossary of the test language directives unique to the extended performance RAD test program.

Table 2-1. SENSE Switch Options

Switch	States	Function
1	OFF	Cycle repetitively through an input test language control line
1	ON	Terminate execution of the current test language control line and return to the input media for new control options
2	OFF	Do not halt or any errors
2	ON	Halt after "SIO NOT POSS", "UNSUCC START", or "COUPLER ERROR" message output
3	OFF	During execution of the read compare function, output all failing words and allow bit summary message
3	ON	During the read compare function, output only the first failing word of a record and inhibit the bit summary message
4	OFF	Output all messages which are at the same level or higher than the present message level key to the selected output device (see SMD and SML directives, DCP Reference Manual)
4	ON	Suppress low priority messages (see DCP Reference Manual)

Table 2-2. Definitions of Test Language Terms and Symbols

Symbol	Column Location in Test Language Glossary, Table 2-3	Explanation
i	Format	Iteration count for recursive operation may range from 1 to 9999. Always optional. If not specified, a value of 1 is assumed
p	Format	Place marker identification number for test-type operations. Refer to DCP manual for explanations of place marker use
a	Format, Parameter Identification Code	An alphabetic character, A through Z
d	Format, Parameter Identification Code	A decimal value using numeric characters 0 through 9
f	Format, Parameter Identification Code	A decimal value using numeric characters 0 through 9. This trailing parameter denotes the setting of a flag
h	Format, Parameter Identification Code	A Hollerith byte string using any alphanumeric or special characters
x	Format, Parameter Identification Code	A hexadecimal value using numerical characters 0 through 9, and alphabetical characters A through F
O	Execution Mode	Optional. The execution mode for all extended performance RAD directives. All directives may be executed in either the immediate or control line mode
O	Parameter Requirement	Optional. Indicates that the input of the respective parameter is not mandatory. If omitted, the value specified under the Standard column of table 2-3 is assumed by the program

Table 2-3. Extended Performance RAD Test Language Glossary (Continued)

MNEMONIC	FUNCTION NAME	FORMAT	EXECUTION MODE	PARAMETERS						
				Identification Code	Definition	Minimum Value	Maximum Value	Standard Value	Requirement	Notes
ADDR	Declare device starting address	ADDR, x1, d2, d3	O	x1	Unit list selection	1	FF		O	1
				d2	Starting track address	0	1023	0	O	
				d3	Starting sector address	0	11	0	O	
AIO	Execute AIO instruction	pAIO, x1	O	x1	Status compare word	0	FFFFC	0	O	2
BACK	Return to starting address	BACK	O		None					
CCHN	Command Chain	iCCHN, f1	O	f1	0 = Read 1 = Write	0	1	0	O	3
CMPR	Read Compare	pCMPR, f1	O	f1	0 = Read all tracks 1 = Skip write protected tracks	0	1	0	O	
CMPW	Write Compare	pCMPW, f1, d2	O	f1	0 = Checkwrite all tracks 1 = Skip write protected tracks	0	1	0	O	4
				d2	0 = I/O buffer address is starting address 1-8 = Contents of counter 1-8 is starting byte address	0	8	0	O	
CNTR	Counter Control	pCNTR, x1, a2, d3, d4, f5	O	x1	Counter selection	0	FFFFF	0	O	5
				a2	Add, subtract, or set counter	0	A or S	0	O	
				d3	Operation value	0	9999	0	O	
				d4	Counter test value	0	9999	0	O	
				f5	Counter output control	0	1	0	O	
DCHN	Data Chain	iDCHN, f1, d2, f3, d4-d9	O	f1	0 = Read, 1 = Write	0	1	0	O	
				d2	Number of times Data Chain is to be done	1	30	6	O	
				f3	IZC flag control	0	1	0	O	
				d4-d9	Byte counts	1	65535	1024	O	

Table 2-3. Extended Performance RAD Test Language Glossary (Cont.)

MNEMONIC	FUNCTION NAME	FORMAT	EXECUTION MODE	PARAMETERS						Notes
				Identification Code	Definition	Minimum Value	Maximum Value	Standard Value	Requirement	
DLY	Delay Generated	iDLY, d1, d2	O	d1	Standard counter	0	4	4	O	
				d2	Number pulse count	0	9999	17	O	
ERR	Error Report	ERR, d1	O	d1	Report frequency	0	9999	0	O	
HIO	Execute HIO instruction	pHIO, x1, x2	O	x1	Device address	0	7FF	0	O	6
				x2	Status compare word	0	FFFFC	0	O	
JUMP	Jump to location	iJUMP, x1, x2-x10	O	x1	Memory address	0	1FFFF	0	O	
				x2-x10	Input parameters	0	FFFFFFFF	0	O	
LEN	Set record length	LEN, d1, f2	O	d1	Byte count	0	65535	1024	O	7
				f2	SIL flag control	0	1	0	O	
MARK	Mark Identify	MARK, h1	O	h1	Any 4 characters	0000	ZZZZ	4 Blanks	O	
PATT	Set Test Pattern	PATT, x1, d2	O	x1	Pattern data	0	FFFFFFFF	0	O	8
				d2	Number of characters	0	8	0	O	
PCYC	Cycle Test Pattern	iPCYC, x1	O	x1	= 0 = Cycle ≠ 0 = Add x1	0	FFFFFFFF	0	O	9
Q	Query Test	pQ, x1	O	x1	Condition compare data	0	FFFF	0	O	10
READ	Read a Record	iREAD, f1, f2 ,0, 1,	O	f1	0 = Read all tracks 1 = Skip write protected tracks	0	1	0	O	
				f2	0 = Report errors at end of record 1 = Report errors at end of sector	0	1	0	O	
RIO	Reset I/O	RIO	O							
SEEK	Execute Seek Order	SEEK, x1, d2	O	x1	Track and sector address	0	FFFF	0	O	11
				d2	Byte Count	0	99	2	O	

(Continued)

Table 2-3. Extended Performance RAD Test Language Glossary (Cont.)

MNEMONIC	FUNCTION NAME	FORMAT	EXECUTION MODE	PARAMETERS						
				Identification Code	Definition	Minimum Value	Maximum Value	Standard Value	Requirement	Notes
SENS	Execute Sense Order	SENS, d1	O	d1	Byte Count	0	99	3	O	
SIO	Execute SIO instruction	pSIO, x1, x2, x3, d4, x5	O	x1	Device address	0	7FF	0	O	12
				x2	Order	0	FF	0	O	
				x3	Flag bits	0	FF	0	O	
				d4	Byte count	0	1024	0	O	
				x5	Status compare word	0	FFFFC	0	O	
STEP	Move device address	iSTEP	O							
STOP	Stop and Identify	STOP, h1	O	h1	Stop identify character	0	ZZZZ	4 Blanks	O	
TCDA	Type Current Device Address	TCDA	O							
TDV	Execute TDV instruction	pTDV, x1, x2	O	x1	Device address	0	7FF	0	O	17
				x2	Status compare word	0	FFFF8	0	O	
TIO	Execute TIO instruction	pTIO, x1, x2	O	x1	Device address	0	7FF	0	O	6
				x2	Status compare word	0	FFFFC	0	O	
TRY	Declare Error Retry Count	TRY, d1	O	d1	Retry count	0	9999	0	O	
TYPB	Type I/O Buffer	TYPB, d1, d2	O	d1	Relative starting location	1	First buffer word	0	O	
				d2	Relative final location	1	Last buffer word	0	O	
TYPC	Type counters	TYPC, x1	O	x1	Counter selection	0	FFFFF	0	O	13
UNIT	Declare Unit Environment	UNIT, f1, x2-x9	O	f1	0 = New list 1 = Add to list	0	1	0	O	16
				x2-x9	Individual unit addresses	0800	7FF1	0	O	

(Continued)

Table 2-3. Extended Performance RAD Test Language Glossary (Cont.)

MNEMONIC	FUNCTION NAME	FORMAT	EXECUTION MODE	PARAMETERS						
				Identification Code	Definition	Minimum Value	Maximum Value	Standard Value	Requirement	Notes
UPAD	Update Device Address	UPAD	O							
WRT	Write a Record	iWRT, f1, d2	O	f1	0 = Write all tracks 1 = Skip write protected tracks	0	1	0	O	4
				d2	0 = I/O buffer address is starting address 1-8 = Contents of counters 1-8 is starting byte address	0	8	0	O	
XCWT	Checkwrite-Data Chaining	iXCWT	O							14
XGEN	Declare unit environment for Data Chaining	XGEN, x1, d2, x3, d4, x5, d6, x7, d8	O	x1, x3, x5, x7	Unit addresses	800	FF1	0	O	15
				d2, d4, d6, d8	Starting track addresses	0	1536	0	O	
XRDS	Read-Data Chaining	iXRDS	O							14
XWRT	Write-Data Chaining	iXWRT	O							14

2-9 Glossary Notes

1. x1 defines which storage units are to be run (any numbers from 1 to 8, as entered in the unit list; see UNIT directive). The program assumes a maximum of eight units, but more can be tested by changing the unit list after the present group is tested. If two or more units are selected, they will be treated as one logical unit. If there is not enough storage left on the currently addressed unit to contain a record during a write operation, the next unit will be selected at track 0, sector 0, and the record will be written there.

2. The final character, C, corresponds to the condition code bits 1 and 2. These bits are included in the comparison.

3. This will start at the CDA and read or write 1024 bytes. The pattern will be the address of the particular data group (track and sector address). Since the group address requires two bytes, it will be written 512 times. At the completion of the operation, the track and sector address (CDA) are both incremented by one and this is the address of the next data group. This is done 16 times. The result is that the data is written on the disc in a spiral fashion.

4. If d2 is 1 through 8, the content of the counter specified by d2 (1 through 8) is used as the starting byte address for the operation. This allows a variable byte boundary and variable data to be used as the test pattern. Should d2 be used with the CMPW directive, a WRT directive should immediately precede CMPW, and parameter d2 of WRT should refer to the same byte address.

5. Twenty counters are maintained within the program. Counters 1 through 8 are provided for the user's convenience. Counters 9 through 20 keep count of different types of errors. (See table 2-4.)

x1 specifies which counters are active
a2 specifies what operation is to be performed on the selected counters. A = Add; S = Subtract. If a2 = 0, set the counter to the value of d3.
d3 is the value to be added, subtracted, or loaded in the selected counters.
d4 is the value that the selected counters are to be compared to. If the contents of any of the selected counters are greater than d4 or less than 0, the value in that counter is typed out, along with the counter number, and if a place mark is present, the place mark branch is taken. f5 controls whether or not the counters are typed out on a test operation. If f5 = 0, no type-out occurs. If f5 = 1, a type-out will occur during the test function.

Table 2-4 lists counter functions.

Table 2-4. Counter Functions

Function	Number	Use
Utility counter	1	General purpose
Utility counter	2	General purpose
Utility counter	3	General purpose
Utility counter	4	General purpose
Utility counter	5	General purpose
Utility counter	6	General purpose
Utility counter	7	General purpose
Utility counter	8	General purpose
Record counter	9	Maintains a count of the number of records passed since the last address declaration. It is unconditionally reset when the ADDR or UPAD directives are executed
Read error counter	10	Maintains a count of the errors occurring during read operations
Write error counter	11	Maintains a count of the errors occurring during write operations
Write protect violation counter	12	Maintains a count of the number of times a write is tried on a write protected sector
Address error count-sector unavailable	13	Maintains a count of the number of times an attempt is made to reference an unavailable sector
Transmission error count-data	14	Maintains a count of data transmission errors
Transmission error count-memory	15	Maintains a count of memory transmission errors
Memory address error count	16	Maintains a count of memory addressing errors
IOP memory error count	17	Maintains a count of IOP memory errors

(Continued)

Table 2-4. Counter Functions (Cont.)

Function	Number	Use
IOP control error count	18	Maintains a count of IOP control errors
Rate error count	19	Maintains a count of rate errors
Unusual end count	20	Maintains a count of unusual end conditions

Parameter x1 of the CNTR directive selects these counters for modification or testing. The hexadecimal configuration to select each counter is as follows:

00001	ctr 1	00400	ctr 11
00002	ctr 2	00800	ctr 12
00004	ctr 3	01000	ctr 13
00008	ctr 4	02000	ctr 14
00010	ctr 5	04000	ctr 15
00020	ctr 6	08000	ctr 16
00040	ctr 7	10000	ctr 17
00080	ctr 8	20000	ctr 18
00100	ctr 9	40000	ctr 19
00200	ctr 10	80000	ctr 20

Combinations of counters may be selected by merging these values.

6. x2 specifies which bits are to be tested in the status response. A one in any selected position will cause place mark branch (p) to be executed. The final character, C, corresponds to condition code bits 1 and 2 and the bits are included in the comparison.

7. If d1 = 0, a byte count of 1024 will be used. If f2 = 0, set Suppress Incorrect Length flag if length is not on integral multiple of 1024 bytes. If f2 = 1, set Suppress Incorrect Length flag to zero.

8. The number of digits entered will be spread in the I/O buffer area until the record length specified in the LEN directive has been reached. The pattern will be cyclical every N bytes, where N = d2.

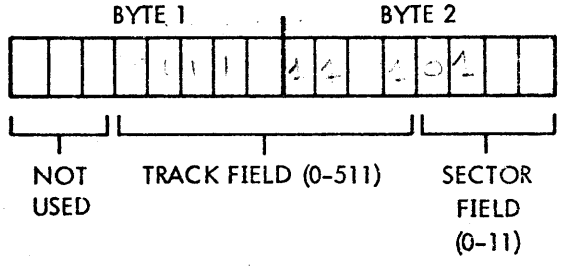
If x1 = 0, the data entered by the PATT directive will be cycled right one bit position. To shift more than one bit position, set the iteration count to the desired number of .

If x1 ≠ 0, x1 is added to x1 of the PATT directive, and the pattern is spread.

10. If any of the tested conditions are true, the place mark branch is taken. If all tested conditions are false, the next directive in the control line is executed.

The desired test conditions are specified by x1, and are defined as in table 2-5.

11. x1 is the track and sector address to be loaded. Parameter x1 is defined as follows:



12. x3 controls the time when the next directive is executed. If the ICE (interrupt at channel end), HTE (halt on error), or IUE (interrupt on unusual end) flags are set, the next directive will not be executed until the completion of the current operation. If these three flags are all cleared, the next directive will be executed without waiting for the current operation to finish.

x5 selects the bits to be tested in the status response. (See Glossary Note 6.)

13. This will output the number and the contents of the counters selected by x1. (See Table 2-4.)

14. The entire RAD can be tested in 2048 revolutions. The first 256 words of the I/O buffer are used for the operation on each sector. Each operation uses data chaining on 6144 sectors. (See Glossary Note 15.)

Table 2-5. Test Conditions

x1	Test Condition	Printout	Remarks
0001	Device not ready	See Table 2-6	Current status as indicated by a TIO
0002	Device not operational	See Table 2-6	Current status as indicated by a TIO
0004	Device busy	See Table 2-6	Current status as indicated by a TIO
0008	Controller not ready	See Table 2-6	Current status as indicated by a TIO
0010	Controller busy	See Table 2-6	Current status as indicated by a TIO
0020	SIO not possible	See Table 2-6	Current status as indicated by a TIO
0040	No address recognition	See Table 2-6	Current status as indicated by a TIO
0080	Interrupt pending	See Table 2-6	Current status as indicated by a TIO
0100	Unusual end	See Table 2-6	AIO and HIO status from previous operation
0200	Write protect violation	See Table 2-6	AIO and HIO status from previous operation
0400	Sector unavailable	See Table 2-6	AIO and HIO status from previous operation
0800	Rate error	See Table 2-6	AIO and HIO status from previous operation
1000	Transmission error	See Table 2-6	AIO and HIO status from previous operation
2000	Incorrect length	See Table 2-6	AIO and HIO status from previous operation
4000	Coupler error	See Table 2-6	AIO and HIO status from previous operation

15. This directive is to XCWT, XRDS, and XWRT what the UNIT and ADDR directives are to READ, WRT, CMPW, etc., in that it will set up environmental prerequisites for data chaining operations.

x1, x3, x5, x7 specify the units to be tested. The x parameters are defined as follows:

First character = IOP number (0_{16} - 7_{16})

Second character = DC number (8_{16} - F_{16})

Third character = Device number (0_{16} - F_{16})

Parameters d2, d4, d6, d8 specify the respective starting track on each unit.

16. x2 through x9 specify the units available for testing. The parameter is defined by four characters, as follows:

First character = IOP number (0 through 7)

Second character = Device controller number (8 through F)

Third character = Device number (0 through F)

Fourth character = Has to be 1

17. x2 specifies which bits are to be tested in the status response. A one in any selected position will cause place mark branch (p) to be executed. The final character, 8, corresponds to condition code bit 1 and is included in the comparison.

2-10 Program Printouts

The Extended Performance RAD test program identifies error conditions by the output of error messages. Their output may be inhibited by SENSE switch settings or message level selections.

Table 2-6 lists error messages and their meanings.

Table 2-6. Error Messages

Message No.	Messcge Level	Message Printout	Description and Recovery Procedure
1	ML-1	O/L/U/T/S/X	O is the operation in process at the time the error occurred. O can be WRT, READ, SEEK, SENS, CMPW, or ILEG if the order is not one of the above. L is the current byte count as last set up in the LEN directive. U is the current device address, consisting of the IOP number, the device controller number, and the unit number. T is the current track address. S is the current sector address. X is the number of bytes remaining.
2	ML-2	CURRENT COMMAND XXXXXXXX XXXXXXXX	X is the current command in hexadecimal notation. This message is output following the message described in message No. 1.
3	ML-3	XXX 0123 4567 8901 2345 CC1,2 ADDRESS I I I SSSS SSSS SSSS SSSS CC AAA	I is the I/O instruction for which this status was received (SIO, HIO, TIO, TDV, AIO) S is the status response to the instruction. C is condition code bits 1 and 2 A is the device address (IOP + controller address + unit address). This message is output following the messages described in messages Nos. 1 and 2.
4	ML-1	SIO NOT POSS	An SIO has been attempted and could not be performed. This message is followed by the TIO status as described in message No. 3.
5	ML-1	UNSUCC START	The TIO status has indicated that an SIO was possible, but the SIO proved unsuccessful. This message is followed by the SIO status, as described in message No. 3.
6	ML-1	CHAN END NOT RECEIVED	An SIO has had a successful start, but has not been completed within 5 seconds
7	ML-1	NO UNITS SEL	Parameter x1 of the ADDR directive is equal to zero or has referenced entries in the unit list which are equal to zero
8	ML-1	CCHN COMPARE ERROR @ XXXXX	Read Command Chaining operation has been performed and the data received is incorrect. X is the address in the I/O buffer area of the first word of the failing block of data

(Continued)

Table 2-6. Error Messages (Cont.)

Message No.	Message Level	Message Printout	Description and Recovery Procedure
9	ML-1	COMPARE ERROR @ U/TT/SS AAAAA EEEEEEEE RRRRRRRR	During a Read and Compare (CMPR) operation, a word in the I/O buffer area failed to compare. U, T, and S have the same meaning as in message No. 1 of this table. A is the relative word address in the I/O area. E is the expected word. R is the word received.
10	ML-3	SUMMARY U/TT/SS BIT POS DROPPED PICKED 0 X X 1 X X 2 X X 3 X X 4 X X 5 X X 6 X X 7 X X	After all comparisons are made on a Read and Compare (CMPR) operation, this message is output if any compare errors occurred, unless inhibited by SENSE switch 3 or 4. U, T, and S have the same meaning as in message No. 1. X corresponds to the number of times the particular bit was picked or dropped
11	ML-1	WRT COMPARE ERROR @ U/TT/SS AAA	During a Checkwrite (CMPW) operation a byte has failed to compare. U, T, and S have the same meaning as in message No. 1. A is the remaining byte count at the time of the error.
12	ML-0	ADDRESS OUT OF RANGE	This message is output in a Checkwrite (CMPW) or Write (WRT) operation where parameter d2 specifies a counter, if the starting byte address, as contained in the counter, plus the byte count, as entered in the LEN directive, exceeds the core capacity of the machine.
13	ML-1	CNTR NN VVVV	Message format of utility or error counters as a result of the CNTR, ERR, or TYPC directives. N is the counter number. V is the counter contents.
14	ML-1	CPLR ERR SEEK AAAA SENS RRRR	Before a Read, Write or Checkwrite operation is attempted, a Seek is executed, followed by a Sense. This message is output if the Sense data does not compare with the Seek data. A is the data sent to the RAD address register. R is the data received by the Sense.

(Continued)

Table 2-6. Error Messages (Cont.)

Message No.	Message Level	Message Printout	Description and Recovery Procedure
15	ML-1	MAX REC LENGTH NNNN BYTES	Parameter d1 of the LEN directive specified a byte count greater than the I/O buffer area could contain. N is the maximum number of bytes available for an I/O buffer
16	ML-0	MARK AAAA	MARK directive was executed. A is the data entered as parameter h1
17	ML-1	DEV NOT RDY	Q directive tested the device and found it not ready
18	ML-1	DEV NOT OPTL	Q directive tested the device and found it not operational
19	ML-1	DEV BUSY	Q directive tested the device and found it busy
20	ML-1	CTLR NOT OPTL	Q directive tested the device controller and found it not operational
21	ML-1	CTLR BUSY	Q directive tested the device controller and found it busy
22	ML-1	SIO NOT POSS	Q directive tested the device and controller and found condition code bit 2 set
23	ML-1	NO ADDR REC	Q directive tested the device and controller and found condition code bit 1 set
24	ML-1	INT PDG	Q directive tested the device and found an interrupt pending
25	ML-1	UNUS END	Q directive found the unusual end indicator set from a previous operation
26	ML-1	WRT PROT VIOL	Q directive found the write protect violation indicator set from a previous operation
27	ML-1	SECT UNAV	Q directive found the sector unavailable indicator set from previous operation
28	ML-1	RATE ERR	Q directive found the rate error indicator set from a previous operation
29	ML-1	TRANS ERR	Q directive found the data transmission error indicator set from a previous operation
30	ML-1	INC LENGTH	Q directive found the incorrect length indicator set from a previous operation

(Continued)

Table 2-6. Error Messages (Cont.)

Message No.	Message Level	Message Printout	Description and Recovery Procedure
31	ML-1	CPLR ERR	Q directive found the coupler error indicator set from a previous operation
32	ML-1	SENS TTSSCC	SENS directive has been executed, and the four bytes received are output T and S are the contents of the RAD address register. C is the current angular position of the current sector.
33	ML-1	STOP AAAA	STOP directive has been executed. A is the data entered as parameter h1
34	ML-1	CDA U/T/S	TCDA directive has been executed. U, T, and S have the same meaning as in message No. 1
35	ML-1	CDA U/T/S REL LOC	TYPB directive has been executed. U, T, and S have the same meaning as in message No. 1 REL LOC indicates that the addresses following it are relative locations and not actual core addresses
36	ML-1	UNIT LIST FULL	UNIT directive has been executed with parameter f1 $\neq$ 0 and the unit list contained eight entries, so that no more could be added to the list
37	ML-2	O/L/U/T/S/WRT PROTECTED	A write (WRT), READ, read, and compare (CMPR), or checkwrite (CMPW) operation has been specified, and f1 was $\neq$ 0, causing the program to skip write protected bands. This message is output for each band that is being skipped. O, L, U, T, and S have the same meaning as in message No. 1
38	ML-0	CONTROL ERROR - XGEN DIRECTIVE MUST BE USED BEFORE DIRECTIVES XCWT, XRDS OR XWRT	A data chaining operation of check-write (XCWT), Write (XWRT) or Read (XRDS) was attempted prior to use of environmental directive XGEN, which declares the unit environment for data-chaining.

SECTION III
PROGRAM DESCRIPTION

3-1 GENERAL

This section describes eight tests applicable to the Extended Performance RAD Test Program. All these tests assume operator control via keyboard printer, at address 001, and only one unit, at address 090, is being tested.

The flow charts in this section are general rather than specific representations of the tests that accompany them.

3-2 TEST 1

3-3 OBJECTIVE

The object is to verify the addressing capabilities of the system. This will also test the WRITE, CHECKWRITE, and READ orders. The test consists of two parts.

3-4 PROCEDURE

Enter the following at the keyboard:

```
$SMD,1/
$SML,3/
$CLR/
UNIT,,901+ADDR,1+LEN,1024+
1@+512(WRT+CMPW+2@)+MARK,AAAA+BACK+
1@+512(CMPR+2@)+MARK,BBBB+RETN+
1.+PATT,0,1+@+2.+12STEP+PCYC,1+@+/
```

3-5 SUCCESS INDICATION

After successful completion of the first part of the test the following will be output:

```
MARK AAAA
```

After successful completion of the last part of the test the following will be output:

```
MARK BBBB
$
```

3-6 ERROR INDICATION

Any other message will indicate error conditions. (See table 2-6.)

3-7 EXECUTION

a. In the first part of the test, the environmental prerequisites are set up, UNIT, ADDR and LEN. A unique pattern is then written and checked on Sector 0 of each Track. A pattern of 0 is written on Track 0, Sector 0. After checking, the address is stepped by 12 sectors, a one is added to the previously defined pattern, and this is now written and checked. The track address is thus written on Sector 0 of each of the 512 tracks of the file. MARK AAAA indicates the end of this part of the test.

b. The second part of the test uses the same addressing and pattern setup as described in a, above, but with a Read order, and comparison of the data against the pattern. The end of the test is indicated by MARK BBBB.

3-8 TEST 2

3-9 OBJECTIVE

The object is to check out the SEEK and SENSE orders and the proper reporting of an illegal address.

3-10 PROCEDURE

Enter the following at the keyboard:

```
$SMD,1/
$SML,3/
$CLR/
UNIT,,901+ADDR,1+SEEK,0000+1@+SEEK,127A+1@+SEEK,1FFB+1@+
SEEK,123F+MARK,AAAA+SEEK,9567+MARK,BBBB+RETN+
1.+SENS+@+/
```

3-11 SUCCESS INDICATION

After each successful completion of a SEEK and SENS in the above control line, the following messages will be output:

```
SENS          4
SENS      127A09
SENS      1FFB05
```

3-12 ERROR INDICATION

a. To Seek an unavailable sector (such as 123F) will cause the following message to be output:

```
SEEK          2 90/   0/ 0/      0
CURRENT COMMAND      3003193    1C000002
UNUS END
SECT UNAV
AIO 0123 4567 8901 2345   CC1,2    ADDRESS
    0010 0000 0001 1000       01      90
TDV 0123 4567 8901 2345   CC1,2    ADDRESS
    0010 0000 0000 0000       01      90
HIO 0123 4567 8901 2345   CC1,2    ADDRESS
    0001 1000 0000 0000       00      90
```

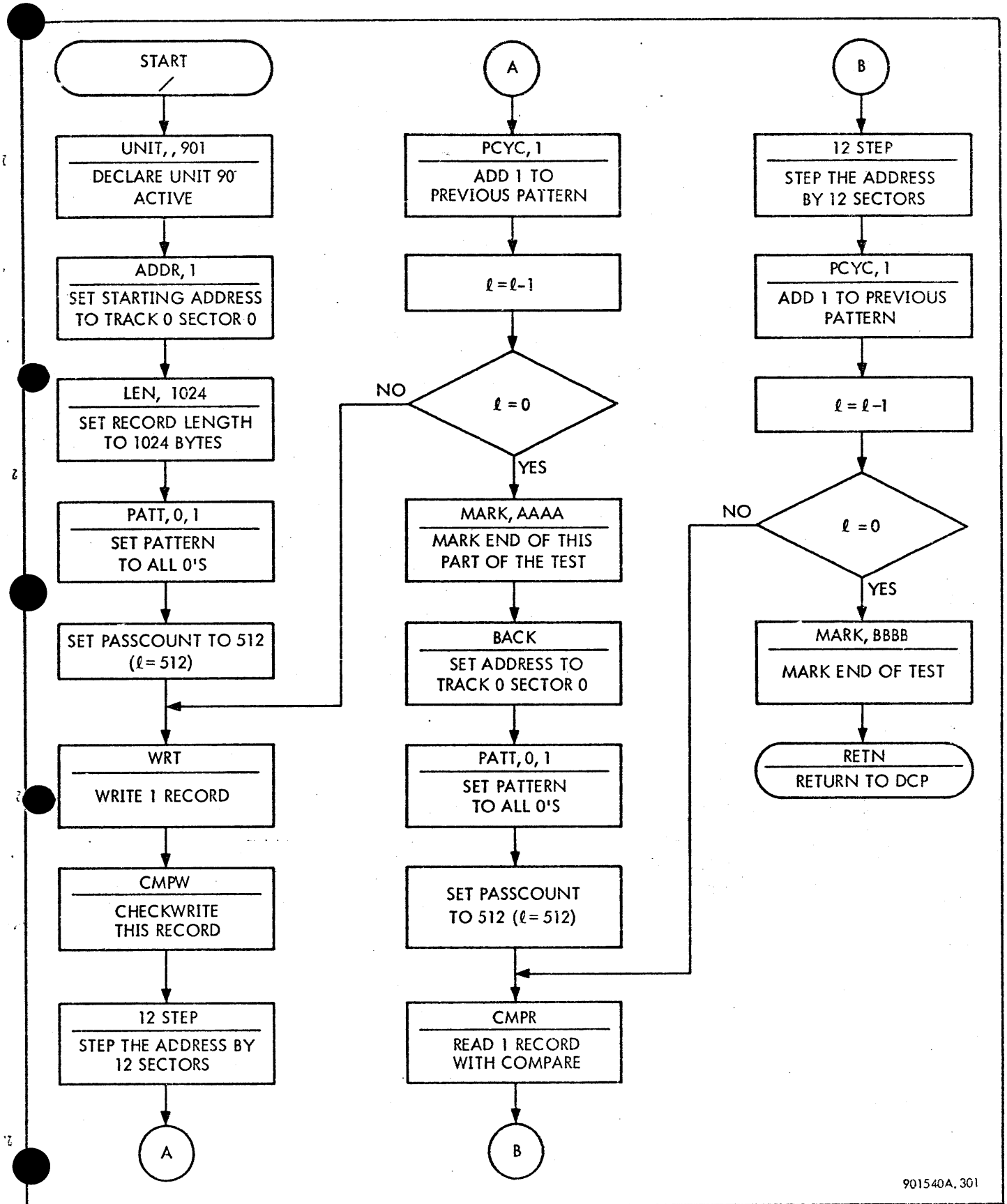


Figure 3-1. Test 1 Flow Chart

Then,

```
MARK AAAA
```

serves the purpose of separating the previous message from the following.

b. To Seek an unavailable track (such as 9567) amounts to seeking an unavailable sector, and the same type of message will be output:

```
SEEK            2 90/   0/ 0/       1
CURRENT COMMAND       3003193     1C000002
UNUS END
SECT UNAV
INC LENGTH
AIO 0123 4567 8901 2345   CC1,2     ADDRESS
    0010 0000 1001 1000       01       90
TDV 0123 4567 8901 2345   CC1,2     ADDRESS
    0010 0000 1000 0010       01       90
HIO 0123 4567 8901 2345   CC1,2     ADDRESS
    0001 1000 1000 0010       00       90
```

Finally,

```
MARK BBBB
$
```

indicates the end of the test.

c. Any other message or bits in the status responses will indicate other error conditions. (See table 2-6.)

3-13 EXECUTION

The first SEEK defines the address to be sent to the RAD address register as being Track 0, Sector 0. This is followed by a SENS which reads the RAD address register and types it out. This address should be the same as the one defined by the previous SEEK. This is done two more times for valid addresses. The last two SEEK directives, however, define invalid addresses, Track 291, Sector 15, and Track 2390, Sector 7, respectively. Whereupon, the error messages described in 3-12 a and b are output. Control is then returned to the keyboard.

3-14 TEST 3

3-15 OBJECTIVE

The object is to test the proper functioning of the RAD Write Protect switches.

3-16 PROCEDURE

Enter the following at the keyboard:

```
$SMD,1/
$SML,3/
$UNIT,,901/
$ADDR,1/
$LEN,12288/
$PATT,F,1/
$CLR/
BACK+512(WRT+STEP)+/
```

a. Set the first Write Protect switch to the UP position. A message will be output, as described in paragraph 3-19a.

b. Reset the Write Protect switch which was set. Set the next Write Protect switch to the UP position to test its proper functioning. Continue the test for all 16 switches.

c. Regain keyboard control. (See paragraph 2-8.)

3-17 SUCCESS INDICATION

No typeout shall occur for those tracks which are not write protected (i.e., those tracks whose Write Protect switches are in the DOWN position).

3-18 ERROR INDICATION

a. The following type of message will be output, indicating write protect violation for those tracks which are write protected (i.e., those tracks whose Write Protect switches are in the UP position).

```
WRT         12288 90/   0/ 0/   12276
CURRENT COMMAND       1004D98    1C003000
UNUS END
WRT PROT VIOL
AIO 0123 4567 8901 2345   CC1,2     ADDRESS
    0001 0000 0001 1000       01       90
TDV 0123 4567 8901 2345   CC1,2     ADDRESS
    0001 0000 0000 0000       01       90
HIO 0123 4567 8901 2345   CC1,2     ADDRESS
    0001 1000 0000 0000       00       90
WRT         12288 90/   1/ 0/   12276
CURRENT COMMAND       1004D98    1C003000
UNUS END
WRT PROT VIOL
AIO 0123 4567 8901 2345   CC1,2     ADDRESS
    0001 0000 0001 1000       01       90
TDV 0123 4567 8901 2345   CC1,2     ADDRESS
    0001 0000 0000 0000       01       90
HIO 0123 4567 8901 2345   CC1,2     ADDRESS
    0001 1000 0000 0000       00       90
```

b. Any other type of message or bits in the status or operational status byte responses will indicate error conditions other than write protect violations. (See table 2-6.)

3-19 EXECUTION

The record length, LEN, is set to one track and the starting address to Track 0, Sector 0. One track will then be written (or an attempt will be made to write) on the RAD file. Should the corresponding Write Protect switch be in the UP position, a message will be output. (See paragraph 3-18a.) The address will then be stepped by 12 sectors, or one track. Should the corresponding Write Protect switch be in the DOWN position, however, no message will be output, and the address will be stepped by 12 sectors. This is done 512 times, so that an attempt is made to write on all tracks of the file, after which the whole process starts over at Track 0, Sector 0.

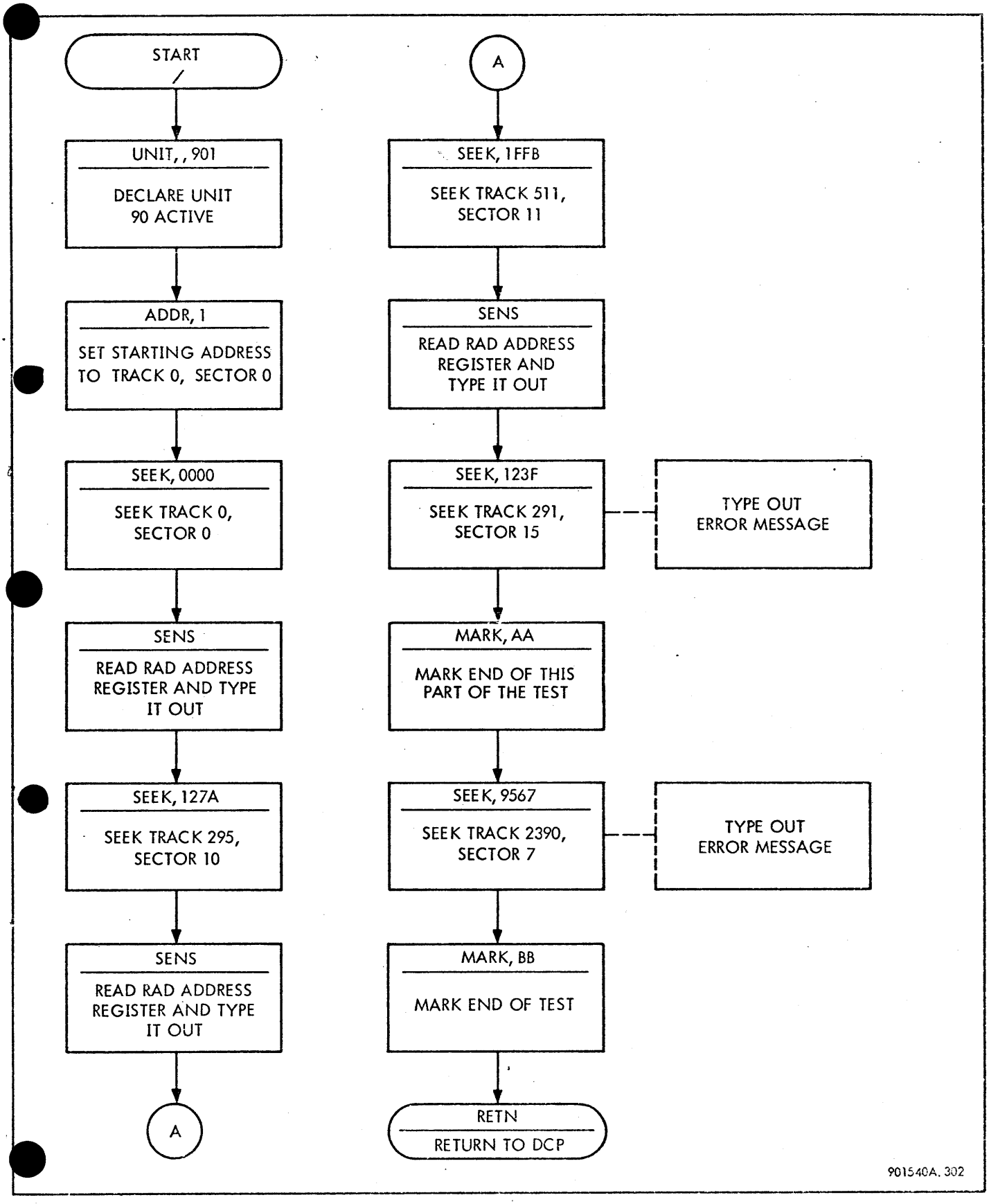


Figure 3-2. Test 2 Flow Chart

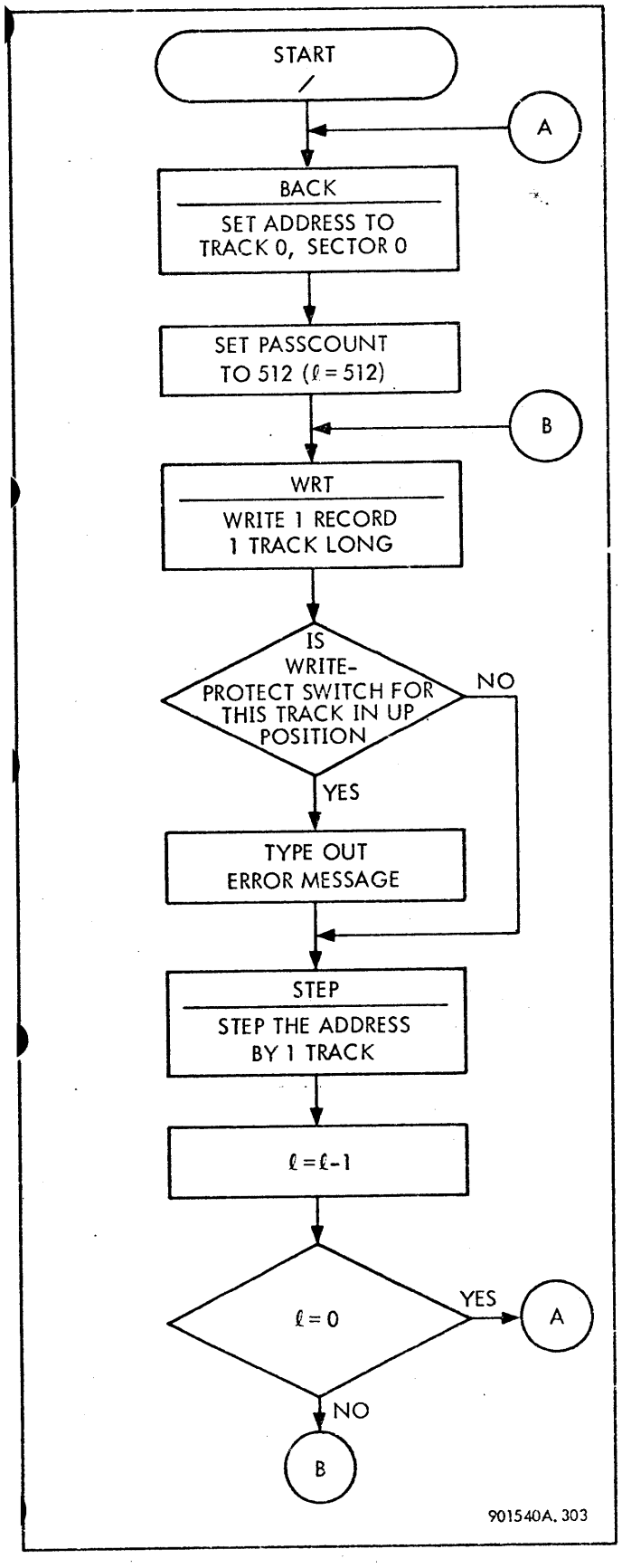


Figure 3-3. Test 3 Flow Chart

3-20 TEST 4

3-21 OBJECTIVE

The object is to verify proper reporting of an Incorrect Length condition. The test consists of two parts.

3-22 PROCEDURE

Enter the following at the keyboard:

```
$SMD,1/
$SML,3/
$CLR/
UNIT,,901+ADDR,1+LEN,1023+PATT,F,1+1@+MARK,AAAA+
LEN,1025+1@+MARK,BBBB+RETN+
1.+WRT+TIO,90+@+/
```

3-23 SUCCESS INDICATION

No typeout shall occur as a result of the WRT directive.

3-24 ERROR INDICATION

a. After completion of the first part of the test the following message will be output:

```
TIO 0123 4567 8901 2345   CC1,2    ADDRESS
    0001 0000 1000 0000      00       90
```

Then,

```
MARK AAAA
```

indicates the end of the first part of the test.

b. After completion of the last part of the test, the following message will be output:

```
TIO 0123 4567 8901 2345   CC1,2    ADDRESS
    0001 0000 1000 0000      00       90
```

And

```
MARK  BB
$
```

indicates the end of the test.

c. Any other message or bits in the TIO status response will indicate error conditions. (See table 2-6.)

3-25 EXECUTION

a. In the first part of the test, the record length, LEN, is set to 1023 bytes, i.e., smaller than one sector. A record is then written, and a message is output as in paragraph 3-24.

b. The second part of the test sets up the record length to 1025 bytes, i.e., greater than one sector. And the process described in a, above, is repeated.

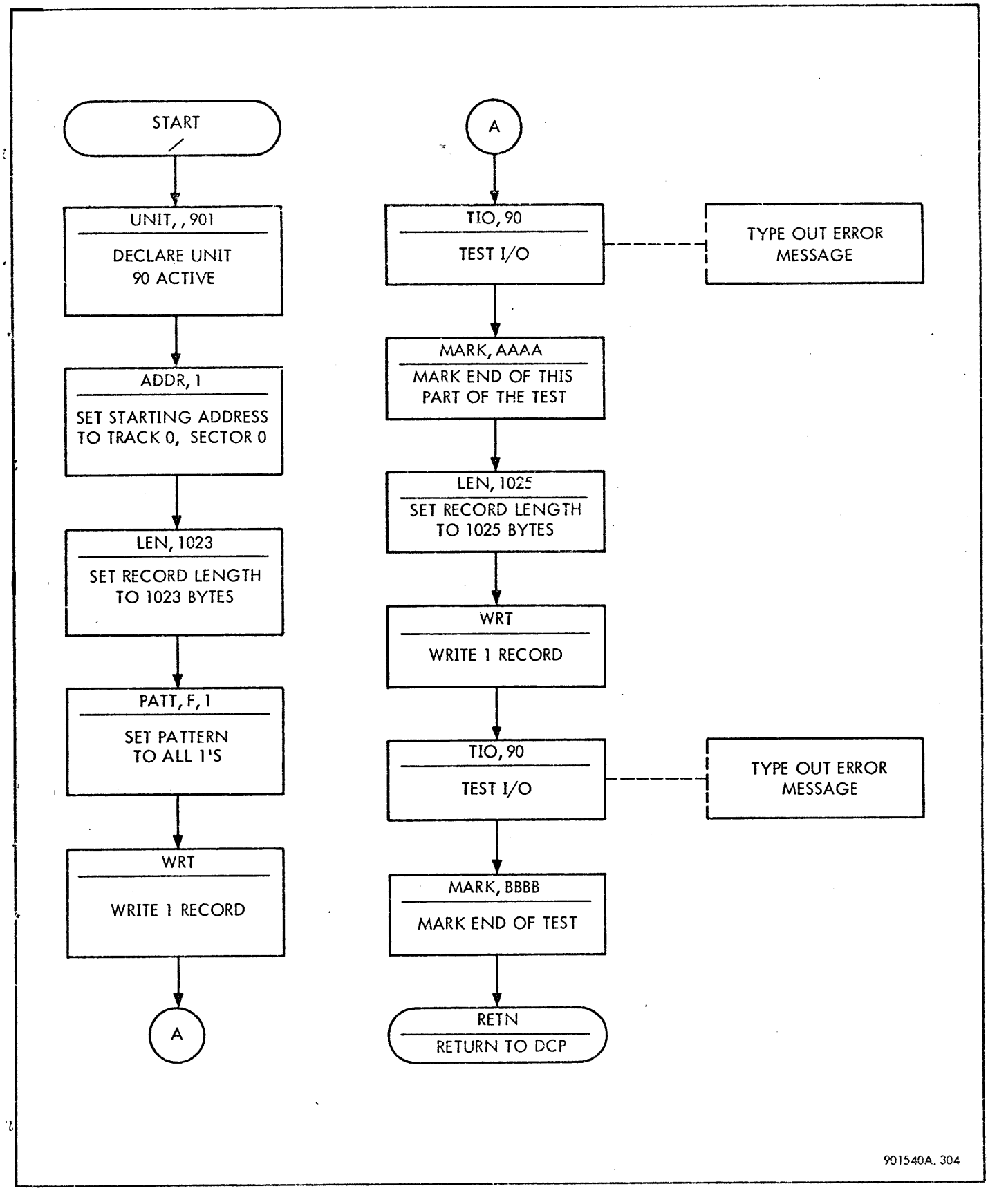


Figure 3-4. Test 4 Flow Chart

3-26 TEST 5

3-27 OBJECTIVE

The object is to verify proper reporting of a Sector Unavailable condition.

3-28 PROCEDURE

Enter the following at the keyboard:

```
$SMD,1/
$SML,3/
$CLR/
UNIT,,901+ADDR,1,511,11+LEN,2048+PATT,F,1+WRT+RETN+/
```

3-29 SUCCESS INDICATION

No typeout shall occur for the sector which is available.

3-30 ERROR INDICATION

a. The following message will be output, indicating that a sector was unavailable.

```
WRT       . 2048 90/ 511/11/     1012
CURRENT COMMAND       1004D98     1C000800
UNUS END
SECT UNAV
AIO 0123 4567 8901 2345   CC1,2     ADDRESS
    0010 0000 0001 1000        01       90
TDV 0123 4567 8901 2345   CC1,2     ADDRESS
    0010 0000 0000 0000        01       90
HIO 0123 4567 8901 2345   CC1,2     ADDRESS
    0001 1000 0000 0000        00       90
$
```

b. Any other message or bits in the reported statuses will indicate error conditions other than Sector Unavailable. (See table 2-6.)

3-31 EXECUTION

The starting address is specified as Track 511, Sector 11, i.e., the last sector of the file. The record length, LEN, is set to 2048 bytes, or two sectors long. The pattern is being written on the last sector and an attempt is being made to write on the next sector, which is unavailable. Whereupon, the message described in paragraph 3-30 is output. The first line of this message shows the remaining byte count, 1012, at the time of error reporting.

3-32 TEST 6

3-33 OBJECTIVE

The object is to verify proper error reporting on the Check-write (CMPW) and Read with Compare (CMPR) directives. The test consists of two parts.

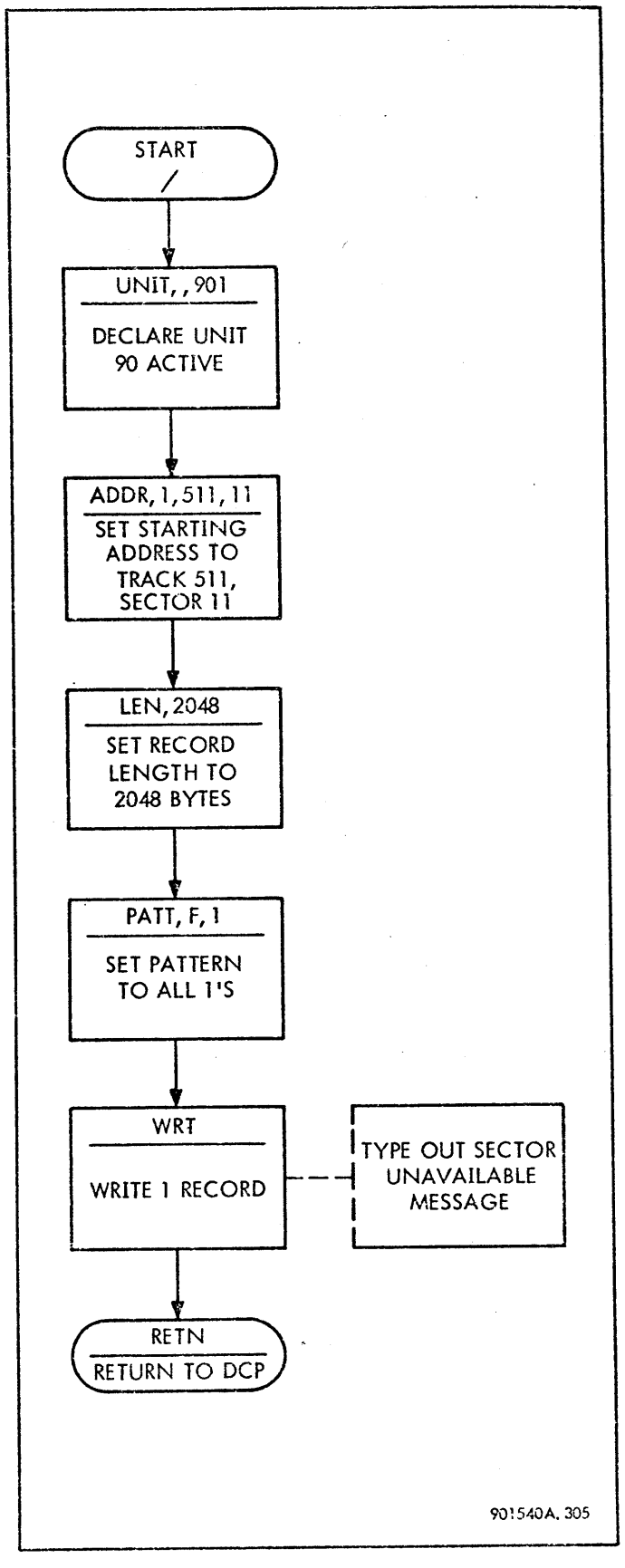


Figure 3-5. Test 5 Flow Chart

4 PROCEDURE

Enter the following at the keyboard:

```
$SMD,1/
$SML,3/
$CLR/
UNIT,,901+ADDR,1+LEN,1024+CNTR,82000+PATT,5,1+WRT+PATT,A,1+CMPW+
MARK,AAAA+TYPC,82000+MARK,BBBB+PATT,5,1+LEN,1019+CMPR+RETN+/
```

3-35 SUCCESS INDICATION

No typeout shall occur as a result of the Write (WRT) directive.

3-36 ERROR INDICATION

a. The following message will be output on the CMPW directive:

```
WRT COMPARE ERROR @  90/   0/ 0/    1012
CWRT        1024 90/   0/ 0/    1012
CURRENT COMMAND      5004098    1C000400
UNUS END
?TRANS ERR
AIO 0123 4567 8901 2345   CC1,2    ADDRESS
    0000 0000 0101 1000       01      90
TDV 0123 4567 8901 2345   CC1,2    ADDRESS
    0000 0000 0100 0010       00      90
HIO 0123 4567 8901 2345   CC1,2    ADDRESS
    0001 1000 0100 0010       00      90
```

b. Following the above message, counters 14 (Transmission Errors) and 20 (Unusual End) will be output:

```
MARK AAAA
CNTR  14
CNTR  20
MARK BBBB
```

c. Then, the following message will be output on the PR directive:

```
COMPARE ERROR @  90/   0/ 0/
 255    55555555    55555500
SUMMARY  90/   0/ 0/
BIT  DROPPED  PICKED
  0       0       0
  1       1       0
  2       0       0
  3       1       0
  4       0       0
  5       1       0
  6       0       0
  7       1       0
$
```

d. Any other messages or bits in the reported status response will indicate error conditions. (See table 2-6.)

7 EXECUTION

In the first part of the test, counters 14 and 20 are cleared the pattern is set to 0101 and written on a complete sector (1024 bytes). The pattern is then changed to 1010, and a Checkwrite order is issued. The message described in 3-36a is output immediately.

The number of Transmission Errors and Unusual Ends is then output from counters 14 and 20. MARK AAAA and MARK BBBB delimit this message from the preceding and following error messages. In the second part of the test, the pattern is set again to 0101 as was originally written on the disc, but the record length, LEN, is set to 1019 bytes, and a Read order is issued, with comparison of the data read-in against the pattern. Since at the end of the sector the comparison is not satisfactory, the message described in 3-36c is output.

3-38 TEST 7

3-39 OBJECTIVE

The object is to verify the proper operation of Command Chaining. The test consists of two parts.

3-40 PROCEDURE

Enter the following at the keyboard:

```
$SMD,1/
$SML,3/
$CLR/
UNIT,,901+ADDR,1+10+MARK,AAAA+ADDR,1,16,0+10+MARK,BBBB+RETN+
1.+CCHN,1+BACK+CCHN,0+TYPR,1+0+/
```

3-41 SUCCESS INDICATION

a. After completion of the first part of the test, the following message will be output:

```
CDA    /90/  0
REL LOC
 00001  00000000
MARK AAAA
```

b. After completion of the second part of the test, the following will be output:

```
CDA    /90/  16
REL LOC
 00001  01000100
MARK BBBB
$
```

3-42 ERROR INDICATION

Any other message will indicate error conditions. (See table 2-6.)

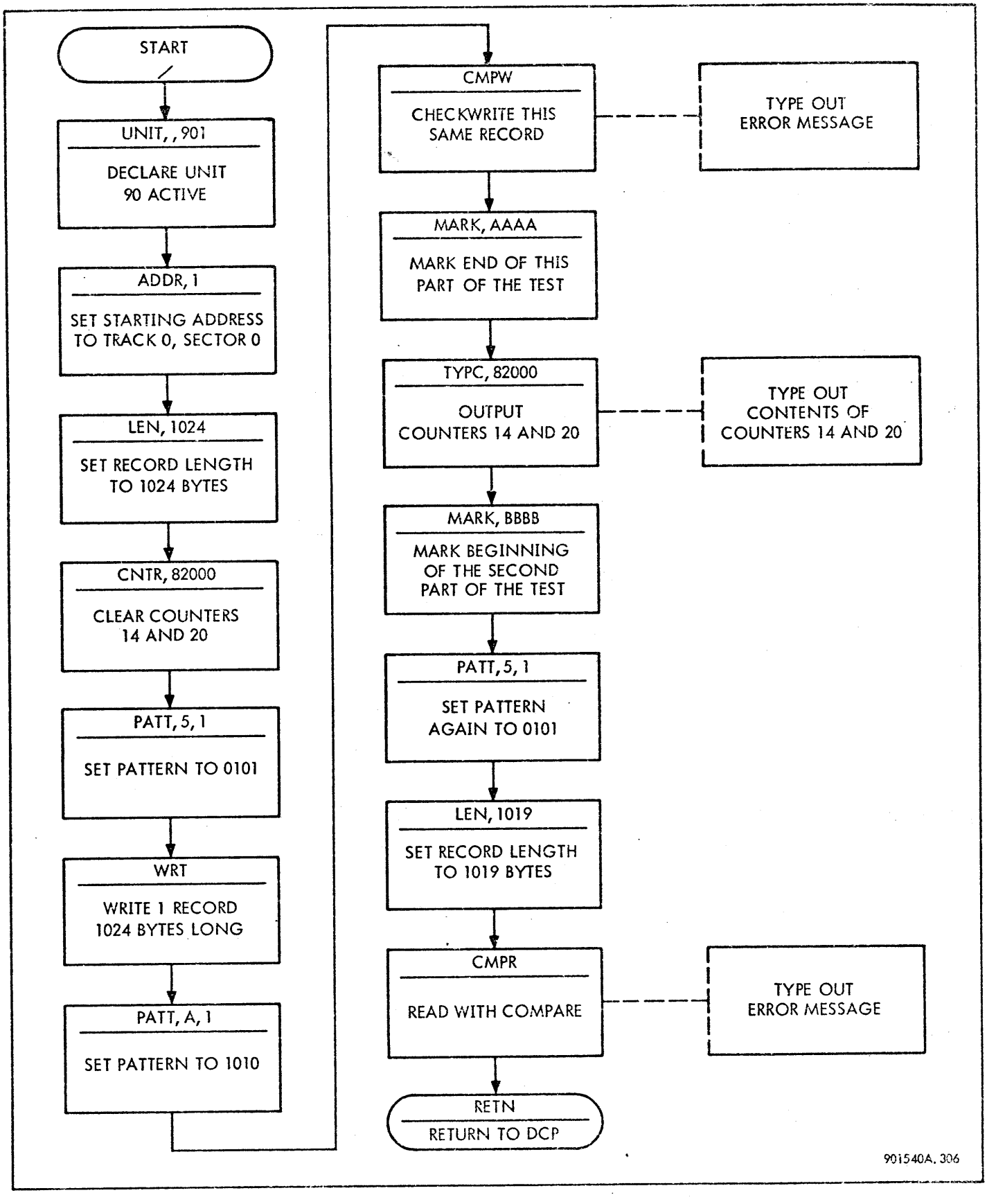


Figure 3-6. Test 6 Flow Chart

3 EXECUTION

In the first part of the test, the starting address is set to Track 0, Sector 0. Then a Write order with Command Chaining is issued. This operation is performed as described in paragraph 2-9-3. The starting address is then set back to Track 0, Sector 0, and Command Chaining with a Read order is preformed in the same fashion. The first word of data read in the I/O buffer is then typed out, and this information should reflect the current Track and Sector address. MARK AAAA defines the end of this part of the test.

The second part of the test addresses Track 16, Sector 0, and the same operations are performed. MARK BBBB indicates the end of the test.

It should be remembered that in a Command Chaining operation, the Track and Sector address appears twice in a word. Thus, in the second part of the test, the first word in the I/O buffer contains twice 0100 which is the hexadecimal representation for Track 16, Sector 0.

3-44 TEST 8

5 OBJECTIVE

The object is to Write, Checkwrite, and Read 6144 sectors using data chaining and different patterns.

3-46 PROCEDURE

Enter the following at the keyboard:

```
1/
$   ,3/
$CLR/
LEN,1024+PATT,F082B55,7+CNTR,1+XGEN,90,0+
1.+3CNTR,1,A,1,2+XWRT+46+MARK,WSUC+XCWT+4@+MARK,CWSU+
XRDS+4@+MARK,RSUC+1@+
3.+MARK,OKOK+6@+4.+5Q,FFFFF+@+5.+MARK,EROR+6.+RETN+/
```

3-47 SUCCESS INDICATIONS

Upon successful completion of the operations, the following messages will be output:

```
MARK WSUC
MARK CWSU
MARK RSUC
MARK WSUC
MARK CWSU
MARK RSUC
MARK OKOK
$
```

3-48 ERROR INDICATION

Should an error occur in any operation, an appropriate message will be output (see table 2-6), followed by MARK EROR. The test will then be terminated and control will be returned to the keyboard.

3-49 EXECUTION

Counter 1 will be used to allow only two iterations of the control line. After setting up the pattern, counter 1 is cleared and Unit 90 is declared active for the following data chaining operations. Counter 1 is then incremented by one. Its content is interrogated for being greater than two. Since it is smaller than two — at least at the beginning of the test — 6144 sectors are being written on the disc. If no error occurred, MARK WSUC will indicate a successful Write operation. However, if an error had been detected, MARK EROR would be output after an appropriate message, and the test would come to an end.

The same process occurs for the XCWT and XRDS directives, with MARK CWSU and MARK XRDS their respective success indications.

Counter 1 is then again incremented by one and is content interrogated. The control line is executed once more. When Counter 1 gets incremented again, its contents are then greater than two, and no more data chain operations take place. Instead, MARK OKOK is output indicating the end of the test.

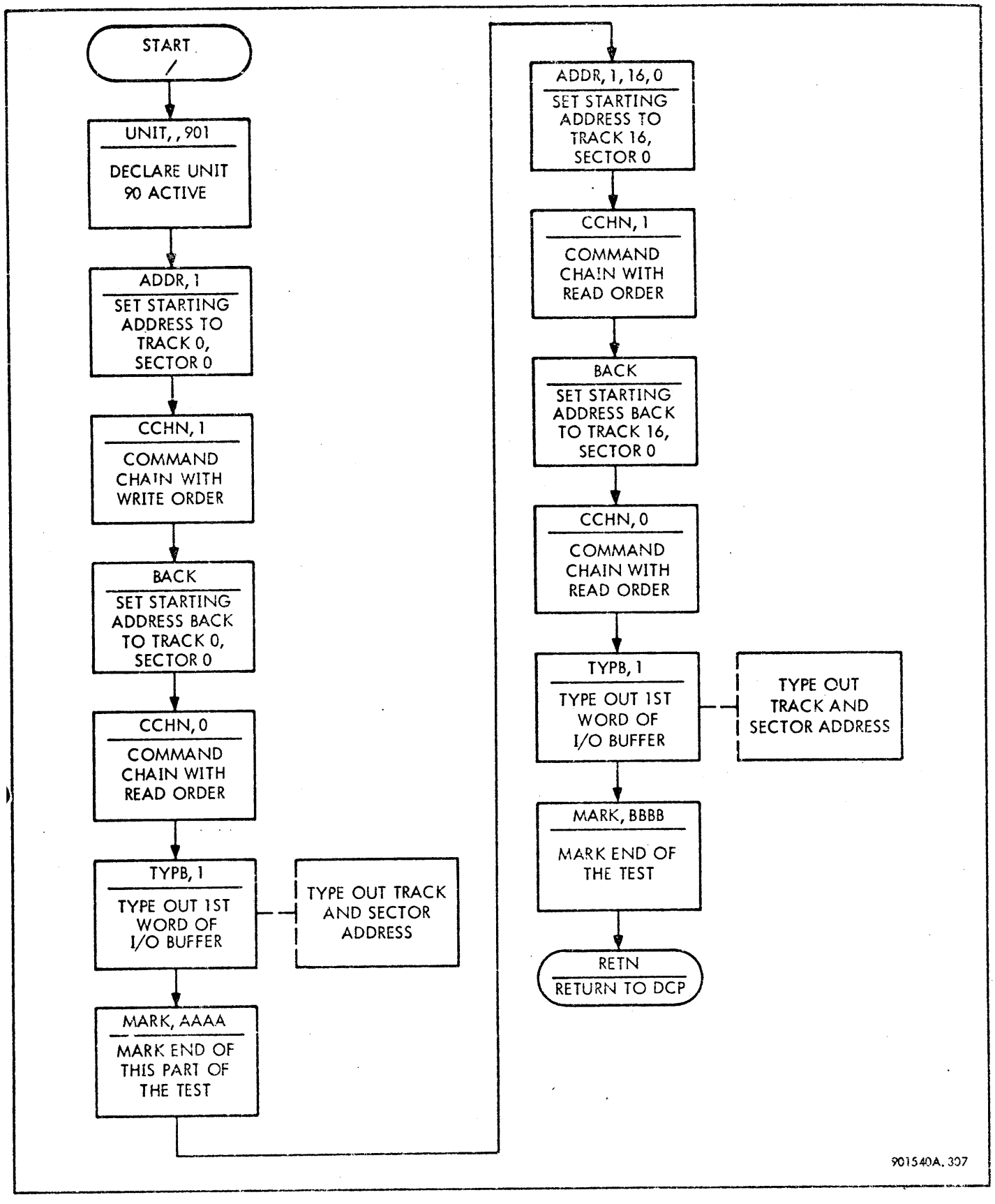


Figure 3-7. Test 7 Flow Chart

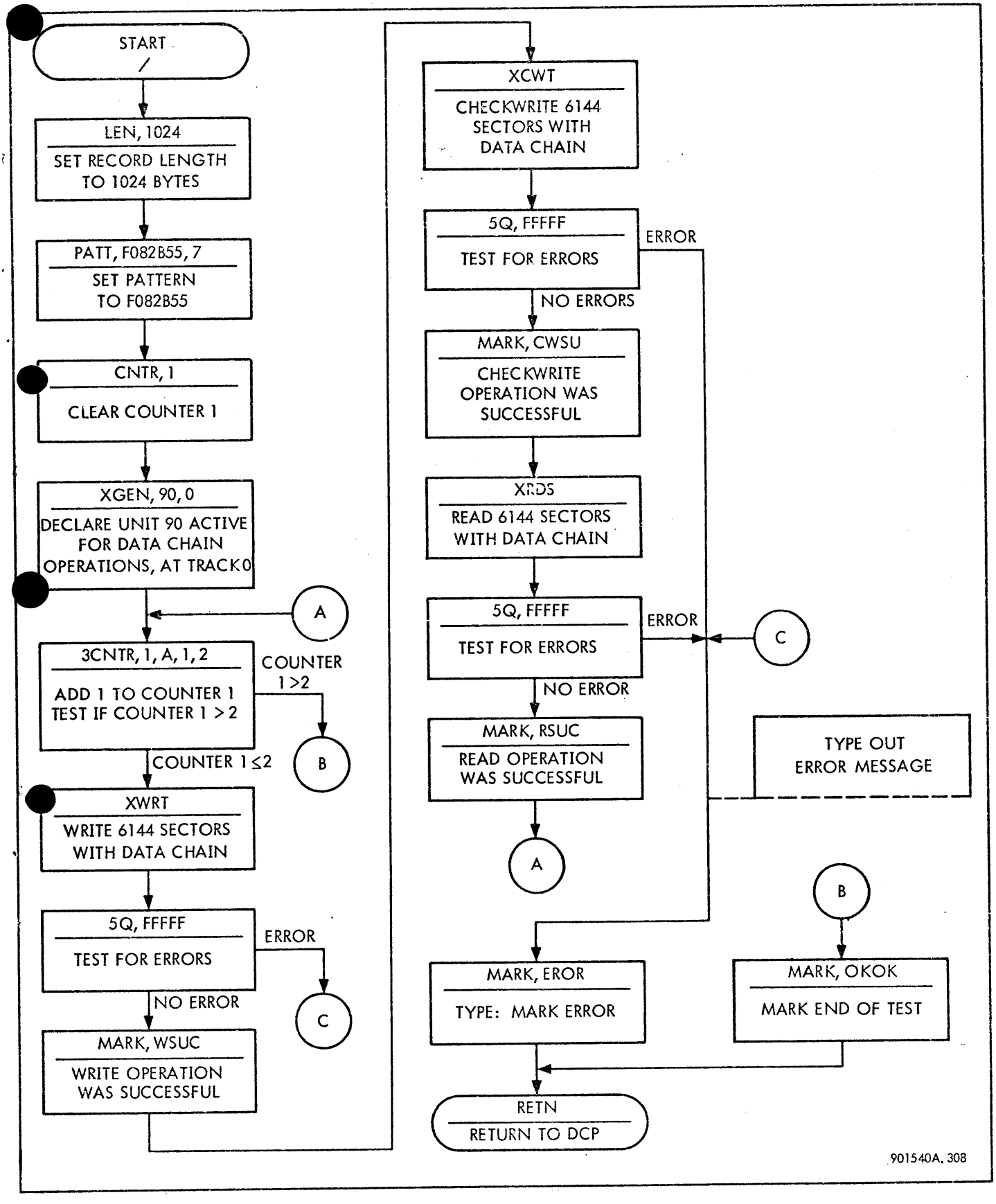


Figure 3-8. Test 8 Flow Chart

SECTION IV
PROGRAM LISTING

```
                                SIGMA 5/7 EXTENDED PERFORMANCE RAD TEST 704978-51C00
                                    TITLE 'SIGMA 5/7 EXTENDED PERFORMANCE RAD TEST 704978-51C00 JULY 16,69'
                                            SYSTEM   SIG7FDP
01 00C40                                    ORG      64
01 00040
                                *
                                * RIVISION C00 (7/16/69) DOCUMENTATION REFORMATTING CHANGE ONLY          *C
                                *       REVISION B00  10-21-68  CHANGES TO PROGRAM ARE INDICATED BY     *B
                                *       IN COLS. 71-72.  IMPROVEMENTS ARE:                              *B
                                *                                                                       *B
                                *       TO PERMIT PROGRAM TO START A DATA CHAIN OPERATION IN WRITE,     *B
                                *       CHECKWRITE, OR READ MODE FROM OTHER THAN TRACK ADDRESS ZERO     *B
                                *       TO PROVIDE OPERATOR NOTIFICATION IF XGEN ENVIRONMENTAL DI-      *B
                                *       RECTIVE IS NOT USED PRIOR TO XRDS, XCWT OR XWRT DIRECTIVES      *B
                                *                                                                       *B
                                *                                                                       *B
                                *               LISTED BELOW, IN ALPHABETICAL ORDER, IS A TABLE OF
                                *               TEST LANGUAGE DIRECTIVES WITH THEIR RESPECTIVE
                                *               ADDRESSES. THESE DIRECTIVES ARE UNIQUE TO THE
                                *               SIGMA 5/7 HIGH CAPACITY RAD MEMORY TEST PROGRAM.
                                *
                                *
                                        OPEN     PAGE            THIS INHIBITS                  *C
00000000                        PAGE    CNAME                     PAGE                         *C
                                        PROC                       DIRECTIVE                   *C
                                        PEND                         TO PERMIT MAX.LINAGE/PAGE *C
                                *
                                *
                                *TABLE OF DIRECTIVES
                                *
                                *
01 00040    00000640            ADDRINDX DATA    ADDR           TO ESTABLISH THE INITIAL OPERATING
                                *                                POINTS IN THE PROGRAM
01 00041    00000699            AIOINDX  DATA    AIO            TO ISSUE AN AIO INSTRUCTION AND
                                *                                HAVE THE STATUS RESPONSE PRINTED
01 00042    000006A8            BACKINDX DATA    BACK           RETURN TO STARTING ADDRESS
01 00043    000006CC            CCHNINDX DATA    CCHN           TO TEST COMMAND CHAINING CAPABILI-
                                *                                TIES OF THE DEVICE AND ITS CON-
                                *                                TROLLER
01 00044    000007B3            CMPRINDX DATA    CMPR           READ DATA FROM DISC AND COMPARE IT
                                *                                WITH THE PATTERN DEFINED BY THE
                                *                                PATT DIRECTIVE
01 00045    000007C3            CMPWINDX DATA    CMPW           VERIFY CORRECT EXECUTION OF A
                                *                                WRITE OPERATION
01 00046    00000818            CNTRINDX DATA    CNTR           FOR COUNTER CONTROL
01 00047    0000095A            DCHNINDX DATA    DCHN           TEST DATA CHAINING CAPABICITIES
01 00048    000009D3            DLYINDX  DATA    DLY            TO ALLOW THE GENERATION OF A FIXED
                                *                                DELAY
01 00049    000009F1            ERRINDX  DATA    ERR            TO OUTPUT THE CONTENTS OF THE ERROR
                                *                                COUNTERS 9 THROUGH 20
01 0004A    00000B0A            HIOINDX  DATA    HIO            TO ISSUE AN HIO INSTRUCTION AND
                                *                                HAVE THE STATUS RESPONSE PRINTED
01 0004B    00000B30            JUMPINDX DATA    JUMP           TO ALLOW USER SUBROUTINES TO INTER-
                                *                                FACE WITH THE DCP
01 0004C    00000B36            LENINDX  DATA    LEN            ESTABLISH THE RECORD LENGTH FOR
                                *                                ALL READ, WRITE, CHECKWRITE OR
                                *                                COMPARE OPERATIONS
01 0004D    00000B7B            MARKINDX DATA    MARK           TO MARK A POSITION IN A CONTROL
                                *                                LINE
01 0004E    00000B9B            PATTINDX DATA    PATT           SET TEST PATTERN FOR WRITE, READ
                                *                                OR COMPARE OPERATIONS
01 0004F    00000BDC            PCYCINDX DATA    PCYC           TO MODIFY THE PATTERN PREVIOUSLY
                                *                                ESTABLISHED BY THE PATT DIRECTIVE
01 00050    00000C0A            QINDX    DATA    Q              ALLOWS THE USER TO TEST CERTAIN
                                *                                CONDITIONS
01 00051    00000C90            READINDX DATA    READ           READ ONE RECORD FROM THE DISC UNIT
01 00052    00000CCD            RIOINDX  DATA    RIO            RESET OF THE I/O SYSTEM
01 00053    00000CD2            SEEKINDX DATA    SEEK           LOAD BAND AND SECTOR ADDRESS INTO
                                *                                THE DISC ADDRESS REGISTER
01 00054    00000CED            SENSINDX DATA    SENS           TO READ THE DISC ADDRESS REGISTER
                                *                                AND PRINT IT OUT
```

```
LINE  MEM PROT  MEMORY    MEMORY     ABS OR REL ORIG  LABEL      OPERATION  OPERAND   COMMENTS
NO.   KEY       ADDRESS   CONTENTS
 70   01        00055     00000D22                    SIBINDX    DATA       SIB       TB ISSUE AN SIB INSTRUCTION AND
 71                                                   *                               HAVE THE STATUS RESPONSE PRINTED
 72   01        00056     00000DCC                    STEPINDX   DATA       STEP      INCREMENT THE CURRENT DEVICE ADDR
 73                                                   *                               BY THE NUMBER OF SECTORS REQUIRED
 74                                                   *                               TO CONTAIN THE RECORD LENGTH
 75   01        00057     00000DDE                    STOPINDX   DATA       STOP      HALT THE COMPUTER AFTER PRINTING
 76                                                   *                               STOP XXXX
 77   01        00058     00000DED                    TCDAINDX   DATA       TCDA      PRINT THE CURRENT DEVICE ADDRESS
 78   01        00059     00000DFE                    TDVINDX    DATA       TDV       TB ISSUE A TDV INSTRUCTION AND
 79                                                   *                               HAVE THE STATUS RESPONSE PRINTED
 80   01        0005A     00000E11                    TIBINDX    DATA       TIB       TB ISSUE A TIB INSTRUCTION AND
 81                                                   *                               HAVE THE STATUS RESPONSE PRINTED
 82   01        0005B     00000E23                    TRYINDX    DATA       TRY       SET UP A RETRY COUNTER
 83   01        0005C     00000E4C                    TYPBINDX   DATA       TYPB      PRINT CONTENTS OF I/O BUFFER
 84   01        0005D     00000E66                    TYPCINDX   DATA       TYPC      PRINT CONTENTS OF SELECTED COUNTERS
 85   01        0005E     00000E7C                    UNITINDX   DATA       UNIT      ESTABLISH EQUIPMENT ENVIRONMENT
 86   01        0005F     00000EB9                    UPADINDX   DATA       UPAD      THE CURRENT DEVICE ADDRESS BECOMES
 87                                                   *                               THE STARTING DEVICE ADDRESS
 88   01        00060     00000EE5                    WRTINDX    DATA       WRT       WRITE ONE RECORD ON THE DISC UNIT
 89   01        00061     00000F3F                    XCWTINDX   DATA       XCWT      CHECKWRITE ENTIRE RAD
 90   01        00062     00000F22                    XGENINDX   DATA       XGEN      GENERATE A UNIT LIST WITH STARTING
 91                                                   *                               ADDRESSES FOR USE BY XCWT XRDS OR
 92                                                   *                               XWRT DIRECTIVES
 93   01        00063     00000F49                    XRDSINDX   DATA       XRDS      READ ENTIRE RAD
 94   01        00064     00000F44                    XWRTINDX   DATA       XWRT      WRITE ENTIRE RAD
 95                                                              PAGE
 96                                                   *                   LISTED BELOW, IS A TABLE OF WAITS AND LOOPS WITH
 97                                                   *                   THEIR RESPECTIVE ADDRESSES
 98                                                   *
 99                                                   *
100                                                   *PROGRAM HALTS AND LOOPS - SUMMARY
101                                                   *
102                                                   *
103   01        00065     00000663                    WAIT01     DATA       WAIT1     WAITING BECAUSE AN INEXISTENT
104                                                   *                               DEVICE ADDRESS HAS BEEN ENTERED
105   01        00066     00000905                    WAIT02     DATA       WAIT2     A COUPLER ERROR HAS OCCURRED AND
106                                                   *                               SENSE SWITCH 2 IS SET
107   01        00067     000009EC                    WAIT03     DATA       WAIT3     EXECUTING DELAY DIRECTIVE (DLY)
108                                                   *
109   01        00068     00000D6C                    WAIT04     DATA       WAIT4     SIB IS NOT POSSIBLE AND SENSE
110                                                   *                               SWITCH 2 IS SET
111   01        00069     00000DE6                    WAIT05     DATA       WAIT5     EXECUTING THE STOP DIRECTIVE
112                                                   *
113   01        0006A     00000ER2                    WAIT06     DATA       WAIT6     UNSUCCESSFUL START AND SENSE
114                                                   *                               SWITCH 2 IS SET
115   01        0006B     00000F8D                    WAIT07     DATA       XWAIT     WAITING FOR ZERO BYTE COUNT INTER-
116                                                   *                               RUPT DURING A DATA CHAIN OPERATION
117                                                   *                               ON THE ENTIRE RAD
118   01        0006C     000007A0                    L00P01     DATA       L00P1     WAITING FOR CHANNEL END INTERRUPT
119                                                   *
120   01        0006D     00000AB2                    L00P02     DATA       L00P2     LOOPING BECAUSE SIB IS NOT POSSIBLE
121                                                   *
122   01        0006E     00000ABA                    L00P03     DATA       L00P3     LOOPING BECAUSE OF AN UNSUCCESSFUL
123                                                   *                               START OF THE CURRENT OPERATION
124                                                              SPACE      8
125                                                   *                   AN AREA OF 32 WORDS IS RESERVED FOR THE USER'S
126                                                   *                   CONVENIENCE. IT IS LOCATED AT THE FOLLOWING ADDRESS
127                                                   *
128   01        0006F     0000062A                    PTCHINDX   DATA       PTCHAREA
129                                                              PAGE
130                                                   *
131                                                   *STATUS BITS FOR SIO, TIO AND HIO INSTRUCTIONS
132                                                   *
```

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
133					*			
134					*POSITION AND STATE IN REGISTER RU1			
135					* 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5			
136					*			
137					* 1			DEVICE INTERRUPT PENDING
138					* 0 0			DEVICE READY
139					* 0 1			DEVICE NOT OPERATIONAL
140					* 1 0			DEVICE UNAVAILABLE
141					* 1 1			DEVICE BUSY
142					* 0			DEVICE MANUAL
143					* 1			DEVICE AUTOMATIC
144					*			
145					* 1			DEVICE UNUSUAL END
146					* 0 0			DEVICE CONTROLLER READY
147					* 0 1			DEVICE CONTROLLER NOT OPERATIONAL
148					* 1 0			DEVICE CONTROLLER UNAVAILABLE
149					* 1 1			DEVICE CONTROLLER BUSY
150					* 0			UNASSIGNED
151					*			
152					* 1			INCORRECT LENGTH
153					* 1			TRANSMISSION DATA ERROR
154					* 1			TRANSMISSION MEMORY ERROR
155					* 1			MEMORY ADDRESS ERROR
156					*			
157					* 1			IOP MEMORY ERROR
158					* 1			IOP CONTROL ERROR
159					* 1			IOP HALT
160					* 1			IOP BUSY
161					PAGE			
162					*			
163					*STATUS BITS FOR AIO INSTRUCTION			
164					*			
165					*			
166					*POSITION AND STATE IN REGISTER R			
167					*			
168					* 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5			
169					*			
170					* 1			RATE ERROR
171					* 1			SECTOR UNAVAILABLE
172					* 1			WRITE-PROTECT VIOLATION
173					*			
174					* 1			INCORRECT LENGTH
175					* 1			TRANSMISSION DATA ERROR
176					* 1			ZERO BYTE COUNT INTERRUPT
177					* 1			CHANNEL END INTERRUPT
178					*			
179					* 1			UNUSUAL END INTERRUPT
180					* 0			UNASSIGNED
181					* 0			UNASSIGNED
182					* 0			UNASSIGNED
183					PAGE			
184					*			
185					*STATUS BITS FOR TDV INSTRUCTIONS			
186					*			
187					*			
188					*POSITION AND STATE IN REGISTER RU1			
189					* 0 1 2 3, 4 5 6 7, 8 9 0 1, 2 3 4 5			
190					*			
191					* 1			RATE ERROR
192					* 1			SECTOR UNAVAILABLE
193					* 1			WRITE-PROTECT VIOLATION
194					*			
195					* 1			INCORRECT LENGTH
196					* 1			TRANSMISSION DATA ERROR
197					* 1			TRANSMISSION MEMORY ERROR
198					* 1			MEMORY ADDRESS ERROR
199					*			
200					* 1			IOP MEMORY ERROR
201					* 1			IOP CONTROL ERROR
202					* 1			IOP HALT
203					* 1			IOP BUSY
204					PAGE			

SIO, TIO, HIO

AIO

TDV

```
MEM PROT KEY | MEMORY ADDRESS | MEMORY CONTENTS | ABS OR REL ORIG | LABEL | OPERATION | OPERAND | COMMENTS

                    *
                    *CONDITION CODE BITS FOR I/O INSTRUCTIONS
                    *
                    *
                    *          POSITION AND STATE OF CC
                    *          1       2       3       4
                    *
                    *   SIO    0                               I/O ADDRESS RECOGNITION
                    *          1                               NO I/O ADDRESS RECOGNITION
                    *                  0                       SUCCESSFUL START
                    *                  1                       UNSUCCESSFUL START
                    *
                    *   TIO    0                               I/O ADDRESS RECOGNITION
                    *          1                               NO I/O ADDRESS RECOGNITION
                    *                  0                       SIO POSSIBLE
                    *                  1                       SIO NOT POSSIBLE
                    *
                    *   HIO    0                               I/O ADDRESS RECOGNITION
                    *          1                               NO I/O ADDRESS RECOGNITION
                    *                  0                       DEVICE NOT OPERATING AT TIME OF HALT
                    *                  1                       DEVICE OPERATING AT TIME OF HALT
                    *
                    *   AIO    0                               I/O INTERRUPT RECOGNITION
                    *          1                               NO I/O INTERRUPT RECOGNITION
                    *                  0                       NORMAL INTERRUPT
                    *                  1                       UNUSUAL CONDITION INTERRUPT
                    *
                    *   TDV    0                               I/O ADDRESS RECOGNITION
                    *          1                               NO I/O ADDRESS RECOGNITION
                               PAGE
                    * CATALOG NO. 704070 SIGMA 5/7 DIAGNOSTIC CONTROL PROGRAM (DCP)
                    *
                    *
01 00040                       ORG       64
01 00040
                    * ASSIGN MNEMONIC NAMES TO INDEX REGISTERS
                    *
        00000001    X1         EQU       1
        00000002    X2         EQU       2
        00000003    X3         EQU       3
        00000004    X4         EQU       4
        00000005    X5         EQU       5
        00000006    X6         EQU       6
        00000007    X7         EQU       7
                    *
                    * ASSIGN MNEMONIC NAMES TO GENERAL REGISTERS
                    *
        00000000    R0         EQU       0
        00000001    R1         EQU       1
        00000002    R2         EQU       2
        00000003    R3         EQU       3
        00000004    R4         EQU       4
        00000005    R5         EQU       5
        00000006    R6         EQU       6
        00000007    R7         EQU       7
        00000008    R8         EQU       8
        00000009    R9         EQU       9
        0000000A    R10        EQU       X'A'
        0000000B    R11        EQU       X'B'
        0000000C    R12        EQU       X'C'
        0000000D    R13        EQU       X'D'
        0000000E    R14        EQU       X'E'
        0000000F    R15        EQU       X'F'
                               PAGE
                    *
                    * EQUATE STATEMENTS TO UTILIZE UNASSIGNED MEMORY LOCATIONS
                    *
        00000010    ZML10      EQU       X'10'          LOCATIONS 10-IF UTILIZED
        00000014    ZML14      EQU       X'14'          BY COMMON TYPE/PRINT ROUTINE
        0000001E    ZML1E      EQU       X'1E'
        0000001F    ZML1F      EQU       X'1F'
        00000022    ZCLLNK     EQU       X'22'          TEMPORARY
```

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
276		00000023			ZEGLNK	EQU	X'23'	LINK STORAGE
277		00000024			ZMSLNK	EQU	X'24'	FOR TRANSLATOR
278		00000025			ZLPLNK	EQU	X'25'	SUBROUTINES
279		00000025			ZRPLNK	EQU	X'25'	
280					* CPU RESET RECOVERY LOCATION			
281		00000027			ZPDLNK	EQU	X'27'	
282		00000028			ZASLNK	EQU	X'28'	
283		00000029			ZPMLNK	EQU	X'29'	
284		0000002A			ZC8LNK	EQU	X'2A'	
285		0000002B			ZFSLNK	EQU	X'2B'	
286		0000002C			ZPLLNK	EQU	X'2C'	
287		0000002D			ZUDFPM	EQU	X'2D'	
288		0000002E			ZPTY	EQU	X'2E'	
289		0000002F			ZPCNT	EQU	X'2F'	
290		00000030			ZPCHK	EQU	X'30'	
291		00000031			ZPCHK1	EQU	X'31'	
		00000032			ZDSLNK	EQU	X'32'	
		00000033			ZDSPTR	EQU	X'33'	
294		00000034			ZCFRLNK	EQU	X'34'	
295		00000035			ZCFRCA	EQU	X'35'	
296		00000036			ZPC7LNK	EQU	X'36'	
297		00000037			ZMFRLNK	EQU	X'37'	
298		00000038			ZTSTLNK	EQU	X'38'	
299		00000039			ZCHAR	EQU	X'39'	
300		0000003A			ZLSTCH	EQU	X'3A'	
301		0000003C			ZFTF	EQU	X'3C'	
302		0000003D			ZDSFLG	EQU	X'3D'	
303						PAGE		
304					*			
					* FORM DIRECTIVES FOR FORMATTED WORDS			
					*			
					ZFCP	FORM	8,24	ORDER,BYTE ADDRESS/COUNT
					ZFOT	FORM	8,7,17	OPERATOR,UNASSIGNED,ADDRESS
308					*			
309					* PROCEDURE FOR GENERATION OF FORMATTED MESSAGE WORDS			
310					*			
311								
312		00000000			ZFMW	CNAME		
313						PROC		
314					LF	GEN,4,4,8,16 ABSVAL(AF(1)),ABSVAL(AF(2)),ABSVAL(AF(3)),;		
315					ABSVAL(AF(4))			
316						PEND		
317					*			
318					* PROCEDURE FOR GENERATION OF FORMATTED SUBROUTINE CONTROL TABLE			
					*			
		00000000			ZFST2	CNAME		
321						PROC		
322					LF	GEN,4,2,9,17 ABSVAL(AF(1)),ABSVAL(AF(2)),ABSVAL(AF(3)),;		
323					ABSVAL(AF(4))			
324						PEND		
325					*			
326					* PROCEDURE FOR GENERATION OF FORMATTED PARAMETER WORDS			
327					*			
328		00000000			ZFSAT	CNAME		
329						PROC		
330					LF	GEN,4,2,2,7,17 ABSVAL(AF(1)),ABSVAL(AF(2)),;		
331					ABSVAL(AF(3)),ABSVAL(AF(4)),ABSVAL(AF(5))			
332						PEND		
333					*			
334					* PROCEDURE FOR GENERATION OF FORMATTED HALF-WORDS			
335					*			
336		00000000			ZAP1	CNAME		
337						PROC		
338					LF	GEN,16,16 ABSVAL(AF(1)),ABSVAL(AF(2))		
339						PEND		
340						PAGE		
341					*			
					* SYNTAX ERROR CODE MESSAGES			
					* NO. MEANING			
					* --- -------			
					* 001 UNDEFINED SPECIAL CHARACTER			
345					* 010 COMMENTS LINE INITIATOR (ASTERISK) NOT PRECEDED			

MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
				* BY NEW LINE CHARACTER			
				* 020 DECIMAL RE-ITERATION COUNT AND/OR PLACE MARKER			
				* IDENTIFIER SUB-FIELD GREATER OR LESS THAN AND/OR			
				* NOT PERMITTED BY DIRECTIVE			
				* 021 ALPHABETIC CHARACTERS ENCOUNTERED IN DECIMAL SUB-			
				* FIELD OR ABSENCE OF FIELD SEPARATOR			
				* 030 PLACE MARKER IDENTIFIER TABLE OVERFLOW			
				* 031 DOUBLY DEFINED PLACE MARKER IDENTIFIERS			
				* 032 UNDEFINED PLACE MARKER IDENTIFIERS AT EXECUTE TIME			
				* 040 CLOSE LOOP OPERATION WITHOUT PRIOR OPEN LOOP OPER.			
				* 041 OPEN LOOP OPERATIONS EXIST AT EXECUTE TIME			
				* 050 UNDEFINED MNEMONIC DIRECTIVE			
				* 051 DIRECTIVE NON-EXECUTABLE IN CONTROL LINE MODE			
				* 052 DIRECTIVE NON-EXECUTABLE IN IMMEDIATE MODE			
				* 053 UNDEFINED AND/OR DOUBLY DEFINED MNEMONIC DIRECTIVE			
				* NAME FOR MNEMONIC NAME RE-DEFINITION			
				* 054 ILLEGAL FIELD SEPARATOR FOLLOWING DIRECTIVE			
				* 055 FIELD SEPARATOR ENTERED PRIOR TO REQUIRED PARAMETER			
				* 100 EXECUTE TABLE OVERFLOW-UNCONDITIONAL ABORT			
				* 101 EXECUTE TABLE UNDERFLOW-UNCONDITIONAL ABORT			
				* 105 GO ERROR UNCONDITIONAL ABORT			
				* 110 LINK TABLE OVERFLOW-UNCONDITIONAL ABORT			
				* 111 LINK TABLE UNDERFLOW-UNCONDITIONAL ABORT			
				* 120 SYMBOLIC INPUT OVERFLOW-UNCONDITIONAL ABORT			
					PAGE		
				*			
				* PRE-INITIALIZATION OF CPU TRAP LOCATIONS			
				*			
01	00040	0F0005BC			XPSD,0	ZCMST40	40 NON-ALLOWED OPERATION
01	00041	0F000144			XPSD,0	ZT41	41 UNIMPLEMENTED INSTRUCTION
01	00042	0F000158			XPSD,0	ZCTL	42 PUSHDOWN STACK LIMIT
01	00043	0F000148			XPSD,0	ZT43	43 FIXED POINT OVERFLOW
01	00044	0F000158			XPSD,0	ZCTL	44 FLOATING POINT FAULT
01	00045	0F000158			XPSD,0	ZCTL	45 DECIMAL ARITHMETIC FAULT
01	00046	0F00014C			XPSD,0	ZT46	46 WATCHDOG TIMER RUNOUT
01	00047	0F000158			XPSD,0	ZCTL	47 UNASSIGNED
01	00048	0F000158			XPSD,0	ZCTL	48 CALL 1
01	00049	0F000158			XPSD,0	ZCTL	49 CALL 2
01	0004A	0F000158			XPSD,0	ZCTL	4A CALL 3
01	0004B	0F000158			XPSD,0	ZCTL	4B CALL 4
01	0004C	0F000158			XPSD,0	ZCTL	4C CURRENT
01	0004D	0F000158			XPSD,0	ZCTL	4D UNASSIGNED
01	0004E	0F000158			XPSD,0	ZCTL	4E TRAP
01	0004F	0F000158			XPSD,0	ZCTL	4F LOCATIONS
					PAGE		
				*			
				* PRE-INITIALIZATION OF INTERRUPT LOCATIONS			
				*			
01	00050	0F000158			XPSD,0	ZCTL	50 OPTIONAL POWER ON
01	00051	0F000158			XPSD,0	ZCTL	51 POWER OFF INTERRUPTS
01	00052	0F000158			XPSD,0	ZCTL	52 OPTIONAL COUNTER
01	00053	0F000158			XPSD,0	ZCTL	53 1-3 COUNT
01	00054	0F000158			XPSD,0	ZCTL	54 PULSES
01	00055	0F000158			XPSD,0	ZCTL	55 STANDARD COUNTER 4 PULSE
01	00056	0F000150			XPSD,0	ZI56	56 MEMORY PARITY
01	00057	0F000158			XPSD,0	ZCTL	57 UNASSIGNED
01	00058	0F000158			XPSD,0	ZCTL	58 OPOIONAL COUNTER
01	00059	0F000158			XPSD,0	ZCTL	59 1-3 INTERRUPT
01	0005A	0F000158			XPSD,0	ZCTL	5A LOCATIONS
01	0005B	0F000158			XPSD,0	ZCTL	5B STANDARD COUNTER 4 INT.
01	0005C	0F000158			XPSD,0	ZCTL	5C INPUT/OUTPUT INTERRUPT
01	0005D	0F000154			XPSD,0	ZI5D	5D CONSOLE INTERRUPT
01	0005E	0F000158			XPSD,0	ZCTL	5E CURRENTLY
01	0005F	0F000158		ZIL5F	XPSD,0	ZCTL	5F UNASSIGNED
				* INTERRUPT LOCATIONS INITIALIZED			60 OPTIONAL EXTERNAL GROUPS
				* AT LOAD TIME TO XPSD,0 ZCTL			61 2-15 LOCATIONS 60-13F
					PAGE		
				*			
				* PRE-INITIALIZED CPU TRAP RECOVERY			
				*			
01	00140				ORG	X'140'	
01	00140						

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
418	01	00140	00000000	A	ZT40	DATA	0	
419	01	00141	00000000	A		DATA	0	
420	01	00142	0000015C			DATA	ZTL40	
421	01	00143	00000000	A		DATA	0	
422	01	00144	00000000	A	ZT41	DATA	0	
423	01	00145	00000000	A		DATA	0	
424	01	00146	00000168			DATA	ZTL41	
425	01	00147	00000000	A		DATA	0	
426	01	00148	00000000	A	ZT43	DATA	0	
427	01	00149	00000000	A		DATA	0	
428	01	0014A	0000017C			DATA	ZTL43	
429	01	0014B	00000000	A		DATA	0	
430	01	0014C	00000000	A	ZT46	DATA	0	
431	01	0014D	00000000	A		DATA	0	
432	01	0014E	00000175			DATA	ZTL46	
433	01	0014F	00000000	A		DATA	0	
434	01	00150	00000000	A	ZI56	DATA	0	
435	01	00151	00000000	A		DATA	0	
436	01	00152	0000017C			DATA	ZIL56	
437	01	00153	00000000	A		DATA	0	
438	01	00154	00000000	A	ZI5D	DATA	0	
439	01	00155	00000000	A		DATA	0	
440	01	00156	0000054C			DATA	ZC8NINT	
441	01	00157	00000000	A		DATA	0	
442	01	00158	00000000	A	ZCTL	DATA	0	
443	01	00159	00000000	A		DATA	0	
444	01	0015A	00000182			DATA	ZTLHLT	
445	01	0015B	00000000	A		DATA	0	
446	01	0015C	74000007	A	ZTL40	STCF	R7	
447	01	0015D	72700007	A		LB,R7	R7	
448	01	0015E	2570047C	A		SAS,R7	-4	
449	01	0015F	320E0162			LW,R0	ZTL40M,X7	
450	01	00160	32C00165			LW,R12	ZTL40M+3	
451	01	00161	6800017E			B	ZTLMSG	
452	01	00162	C9E2C640	A	ZTL40M	TEXT	'ISF '	
453	01	00163	D4D7E540	A		TEXT	'MPV '	
454	01	00164	D7C9E2D4	A		TEXT	'PISM'	
455	01	00165	40E3F4F0	A		TEXT	' T40'	
456	01	00166	D5C5D4C1	A		TEXT	'NEMA'	
457	01	00167	C7D6D6C6	A	ZTL40M1	TEXT	'G88F'	
458	01	00168	40D6C6C6	A		TEXT	' 8FF'	
459	01	00169	2008059C	A		ZFMW	2,0,8,BA(ZTL40M1)	
460	01	0016A	D5C5C940	A		TEXT	'NEI '	
461	01	0016B	3200016E		ZTL41	LW,R0	ZTL41M	
462	01	0016C	32C0016F			LW,R12	ZTL41M+1	
463	01	0016D	6800017E			B	ZTLMSG	
464	01	0016E	E4C9C940	A	ZTL41M	TEXT	'UII '	
465	01	0016F	40E3F4F1	A		TEXT	' T41'	
466	01	00170	32000173		ZTL43	LW,R0	ZTL43M	
467	01	00171	32C00174			LW,R12	ZTL43M+1	
468	01	00172	6800017E			B	ZTLMSG	
469	01	00173	C6D7D640	A	ZTL43M	TEXT	'FP8 '	
470	01	00174	40E3F4F3	A		TEXT	' T43'	
471	01	00175	32000178		ZTL46	LW,R0	ZTL46M	
472	01	00176	32C00179			LW,R12	ZTL46M+1	
473	01	00177	6800017E			B	ZTLMSG	
474	01	00178	E6C5E340	A	ZTL46M	TEXT	'WDT '	
475	01	00179	40E3F4F6	A		TEXT	' T46'	
476	01	0017A	D4D7C540	A	ZIL56M	TEXT	'MPE '	
477	01	0017B	40C9F5F6	A		TEXT	' I56'	
478	01	0017C	3200017A		ZIL56	LW,R0	ZIL56M	
479	01	0017D	32C00179			LW,R12	ZIL56M+1	
480	01	0017E	35C00167		ZTLMSG	STW,R0	ZTL40M+5	
481	01	0017F	35C00168			STW,R12	ZTL40M+6	
482	01	00180	32C00169			LW,R12	ZTL40M+7	
483	01	00181	6AF0048E			BAL,R15	ZSML40	
484	01	00182	2E000000	A	ZTLHLT	WAIT		
485						PAGE		
486					*			
487					* INITIALIZATION FOR MAIN-LINE TRANSLATOR			
488					*			

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
489	01	00183	6AF0041B		ZPC010	BAL,R15	ZSCIR	
490	01	00184	32F00199			LW,R15	ZREC8V	
491	01	00185	35F00026	A		STW,R15	X'26'	
492	01	00186	22F00800	A		LI,R15	X'800'	
493	01	00187	6DF01200	A		AD,R15	X'1200'	
494	01	00188	32F00586			LW,R15	ZMFRIBAD	
495	01	00189	25F00402	A		SAS,R15	2	
496	01	0018A	55F20355			STH,R15	ZMFRX7,X1	
497	01	0018B	55F20356			STH,R15	ZMFRNBA,X1	
498	01	0018C	52F20423			LH,R15	ZDK8+1,X1	
499	01	0018D	55F2036A			STH,R15	ZMFRDA,X1	
500	01	0018E	32C00198		ZPC020	LW,R12	ZPC050	
501	01	0018F	6AF0048B			BAL,R15	ZTMNCR	
502	01	00190	22900000	A		LI,R9	0	
503	01	00191	6AF001DA			BAL,R15	ZDSTRN	
504	01	00192	68000193			B	$+1	
505	01	00193	22F00196			LI,R15	ZPC030	
506	01	00194	55F201C1			STH,R15	ZTRN60,X1	
507	01	00195	680001AA			B	ZPC210	
508	01	00196	6AF001E7		ZPC030	BAL,R15	ZDSSET	
509	01	00197	6800018E			B	ZPC020	
510	01	00198	1001072C	A	ZPC050	ZFMW	1,0,1,BA(ZDS)	
511	01	00199	68000183		ZREC8V	B	ZPC010	
512						PAGE		
513					*			
514					* CLEAR EXISTENT EXECUTE TABLE AND C8NSTRUCT NEW TABLE			
515					*			
516	01	0019A	6AF0041B		ZPC200	BAL,R15	ZSCIR	
517	01	0019B	3500002D	A		STW,R0	ZUDFPM	
518	01	0019C	3500003D	A		STW,R0	ZDSFLG	
519	01	0019D	5502055D			STH,R0	ZG8PTR,X1	
520	01	0019E	228001AC			LI,R11	ZTRN10	
521	01	0019F	55B201C1			STH,R11	ZTRN60,X1	
522	01	001A0	32B00584			LW,R11	ZPMADR	
523	01	001A1	35B00585			STW,R11	ZPMPTR	
524	01	001A2	32B00582			LW,R11	ZLKADR	
525	01	001A3	35B00583			STW,R11	ZLKPTR	
526	01	001A4	32B00E8F			LW,R11	ZEXADR	
527	01	001A5	6AF00390			BAL,R15	ZSTPTR	
528	01	001A6	32B00580			LW,R11	ZLBADR	
529	01	001A7	35B00581			STW,R11	ZLBPTR	
530	01	001A8	32C001C3			LW,R12	ZTRN100	
531	01	001A9	6AF0048B			BAL,R15	ZTMNCR	
532	01	001AA	72A001C7		ZPC210	LB,R10	ZNL	
533	01	001AB	35A00039	A		STW,R10	ZCHAR	
534						PAGE		
535					*			
536					* MAIN-LINE TRANSLAT9R			
537					*			
538	01	001AC	22800000	A	ZTRN10	LI,R8	0	
539	01	001AD	6AF0032F			BAL,R15	ZFNDTB	
540	01	001AE	227FFFEA	A		LI,X7	-Z8PLEN	
541	01	001AF	32BE01DA			LW,R11	Z8PTBL,X7	
542	01	001B0	71A00008	A		CB,R10	R11	
543	01	001B1	683001C0			BCR,3	ZTRN50	
544	01	001B2	657001AF			BIR,X7	$-3	
545	01	001B3	21A000C1	A		CI,R10	X'C1'	
546	01	001B4	691001BE			BCS,1	ZTRN40	
547	01	001B5	21A000E9	A		CI,R10	X'E9'	
548	01	001B6	692001BE			BCS,2	ZTRN40	
549	01	001B7	3280000A	A		LW,R8	R10	
550	01	001B8	6AF0033F			BAL,R15	ZFA+1	
551	01	001B9	227FFFEA	A		LI,X7	-Z8PLEN	
552	01	001BA	32BE01DA			LW,R11	Z8PTBL,X7	
553	01	001BB	71A00008	A		CB,R10	R11	
554	01	001BC	683001C0			BCR,3	ZTRN50	
555	01	001BD	657001BA			BIR,X7	$-3	
556	01	001BE	22C00001	A	ZTRN40	LI,R12	X'01'	
557	01	001BF	68000377			B	ZSNER	
558	01	001C0	EAFC00CB	A	ZTRN50	BAL,R15	*R11	
559	01	001C1	6AFC01AC		ZTRN60	BAL,R15	ZTRN10	

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LINE  MEM PROT  MEMORY    MEMORY     ABS OR REL ORIG  LABEL      OPERATION  OPERAND          COMMENTS
NO.   KEY       ADDRESS   CONTENTS
560   01        001C2     680001AC                    ZTRN10     B          ZTRN10
561   01        001C3     0001071C   A                ZTRN100    ZFMW       0,0,1,BA(ZNL)
562                                                    ZPBEG      PAGE
563                                                    *
564                                                    * SYNTAX TEST LANGUAGE TABLE CONTAINING ALL SPECIAL CHARACTERS
565                                                    *  ONE WORD PER SYNTAX OR SPECIAL CHARACTER
566                                                    *    BITS 0-7      SYNTAX OR SPECIAL CHARACTER
567                                                    *    BITS 8-14     RESERVED
568                                                    *    BITS 15-31    SYNTAX PROCESSOR SUBROUTINE ADDRESS
569                                                    *
570             01 001C4                              ZPBEG      EQU        $
571   01        001C4     5D00022C                    ZRP        ZFOT       X'5D',0,ZRPTRN     ) CLOSE LOOP
572   01        001C5     610002F1                    ZFS        ZFOT       X'61',0,ZFSTRN     / RELEASE TO EXECUTE
573   01        001C6     40000284                    ZSP        ZFOT       X'40',0,ZPLTRN     FIELD SEPARATORS
574   01        001C7     15000284                    ZNL        ZFOT       X'15',0,ZPLTRN     NL
575   01        001C8     4E000284                    ZPL        ZFOT       X'4E',0,ZPLTRN     +
576   01        001C9     50000284                               ZFOT       X'50',0,ZPLTRN     +
577   01        001CA     60000201                    ZMS        ZFOT       X'60',0,ZMSTRN     - FIELD DELETOR
578             01 001CB                              ZPTB2      EQU        $
579             00000007                              ZPLN2      EQU        $-ZPBEG
580   01        001CB     5B0001DA                    ZDS        ZFOT       X'5B',0,ZDSTRN     $ IMMEDIATE EXECUTION
581   01        001CC     4D00021D                    ZLP        ZFOT       X'4D',0,ZLPTRN     ( OPEN LOOP
582   01        001CD     7C000240                    ZAS        ZFOT       X'7C',0,ZASTRN     ' TRANSFER OR LINK
583   01        001CE     6B000284                    ZCO        ZFOT       X'6B',0,ZPLTRN     , PARAMETER SEPARATOR
584   01        001CF     4B00023B                    ZPD        ZFOT       X'4B',0,ZPDTRN     . PLACE MARKER
585   01        001D0     5C0001F8                    ZCL        ZFOT       X'5C',0,ZCLTRN     * COMMENTS LINE
586   01        001D1     7E000209                    ZEQ        ZFOT       X'7E',0,ZEQTRN     = MNEMONIC REDEFINITION
587   01        001D2     7A0001BE                               ZFOT       X'7A',0,ZTRN40     0 CURRENTLY
588   01        001D3     7B0001BE                               ZFOT       X'7B',0,ZTRN40     =  UNDEFINED
589   01        001D4     4C0001BE                               ZFOT       X'4C',0,ZTRN40     <   SPECIAL
590   01        001D5     6C0001BE                               ZFOT       X'6C',0,ZTRN40     (    CHARACTERS
591   01        001D6     5E0001BE                               ZFOT       X'5E',0,ZTRN40     ;
592   01        001D7     6E0001BE                               ZFOT       X'6E',0,ZTRN40     >
593   01        001D8     4F0001BE                               ZFOT       X'4F',0,ZTRN40     1
594   01        001D9     7D0001BE                               ZFOT       X'7D',0,ZTRN40     '
595             01 001DA                              ZPTBL      EQU        $
596             00000016                              ZPLEN      EQU        $-ZPBEG
597                                                    ZDSTRN     PAGE
598                                                    *
599                                                    * DOLLAR SIGN TRANSLATOR PROCESSOR TO INITIALIZE TRANSLATOR
600                                                    *
601   01        001DA     35F00032   A                ZDSTRN     STW,R15    ZDSLNK
602   01        001DB     6AF003C1                               BAL,R15    ZTST3
603   01        001DC     3590058D                               STW,R9     PO
604   01        001DD     33000C3D   A                          MTW,0      ZDSFLG
605   01        001DE     693001E1                               BCS,3      $+3
606   01        001DF     32F00589                               LW,R15     ZEXPTO
607   01        001E0     35F00033   A                          STW,R15    ZDSPTR
608   01        001E1     22B0058D                               LI,R11     PO
609   01        001E2     6AF00390                               BAL,R15    ZSTPTR
610   01        001E3     35B0003D   A                          STW,R11    ZDSFLG
611   01        001E4     22B001E7                               LI,R11     ZDSSET
612   01        001E5     55B201C1                               STH,R11    ZTRN60,X1
613   01        001E6     E8020032   A                          B          *ZDSLNK,X1
614                                                    *
615                                                    * IMMEDIATE EXECUTION OF DIRECTIVE
616                                                    *
617   01        001E7     35F00032   A                ZDSSET     STW,R15    ZDSLNK
618   01        001E8     6AF0041B                               BAL,R15    ZSCIR
619   01        001E9     3300058D                               MTW,0      PO
620   01        001EA     683001F2                               BCR,3      ZDSSET10
621   01        001EB     22B0058D                               LI,R11     PO
622   01        001EC     6AF00390                               BAL,R15    ZSTPTR
623   01        001ED     6AF00524                               BAL,R15    ZMPTWA
624   01        001EE     B2B00589                               LW,R11     *ZEXPTO
625   01        001EF     EAF0000B   A                          BAL,R15    *R11
626   01        001F0     680001F1                               B          $+1
627   01        001F1     6AF0041B                               BAL,R15    ZSCIR
628   01        001F2     3500003D   A                ZDSSET10   STW,R0     ZDSFLG
629   01        001F3     22B001AC                               LI,R11     ZTRN10
630   01        001F4     55B201C1                               STH,R11    ZTRN60,X1
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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL     OPERATION  OPERAND    COMMENTS
631       01            001F5           32800033         A                LW,R11    ZDSPTR
632       01            001F6           6AF00390                          BAL,R15   ZSTPTR
633       01            001F7           E8000032         A                B         *ZDSLNK
634                                                                        PAGE
635                                                       *
636                                                       * ASTERISK TRANSLATOR PROCESSOR, VERIFIES LEGAL COMMENTS LINE
637                                                       *  OR AN ERRONEOUS ENTRY, IF LEGAL WAIT FOR NL TO TERMINATE
638                                                       *   COMMENTS LINE AND RETURN TO MAIN-LINE TRANSLATOR, IF ILLEGAL
639                                                       *    DELETE CURRENT FIELD AND OUTPUT ERROR MESSAGE AND RETURN TO
640                                                       *     MAIN-LINE TRANSLATOR FOR RE-ENTRY OF SAME FIELD
641                                                       *      NO EXECUTE TABLE ENTRY
642                                                       *
643       01            001F8           35F00022         A        ZCLTRN  STW,R15   ZCLLNK
644       01            001F9           22C00010         A                LI,R12    X'10'
645       01            001FA           32F0003A         A                LW,R15    ZLSTCH
646       01            001FB           71F001C7                          CB,R15    ZNL
647       01            001FC           69300377                          BCS,3     ZSNER
648       01            001FD           6AF00352                          BAL,R15   ZFBC
649       01            001FE           71A001C7                          CB,R10    ZNL
650       01            001FF           693001FD                          BCS,3     $-2
651       01            00200           E8000022         A                B         *ZCLLNK
652                                                       *
653                                                       * MINUS SIGN TRANSLATOR PROCESSOR
654                                                       *  DELETES CURRENT FIELD FOR RE-ENTRY
655                                                       *   NO EXECUTE TABLE ENTRY
656                                                       *
657       01            00201           35F00024         A        ZMSTRN  STW,R15   ZMSLNK
658       01            00202           32B00589                          LW,R11    ZEXPTO
659       01            00203           6AF00390                          BAL,R15   ZSTPTR
660       01            00204           22C00000         A                LI,R12    0
661       01            00205           B5C00589                          STW,R12   *ZEXPTO
662       01            00206           32C001C3                          LW,R12    ZTRN100
663       01            00207           6AF0048B                          BAL,R15   ZTMNCR
664       01            00208           E8000024         A                B         *ZMSLNK
665                                                                        PAGE
666                                                       *
667                                                       * EQUAL TRANSLATOR PROCESSOR, NO EXECUTE TABLE ENTRY
668                                                       *  RE-ASSIGN MNEMONIC SUB-ROUTINE, ALPHA CHARACTERS ONLY
669                                                       *   VERIFIES MNEMONIC EXISTS AND RE-ASSIGN MNEMONIC NON-EXISTENT
670                                                       *    REPLACES (DELETES) CURRENT MNEMONIC NAME
671                                                       *     INSERTS NEW MNEMONIC INTO SUBROUTINE DICTIONARY
672                                                       *
673       01            00209           35F00023         A        ZEQTRN  STW,R15   ZEQLNK
674       01            0020A           6AF003C1                          BAL,R15   ZTST3
675       01            0020B           32900008         A                LW,R9     R8
676       01            0020C           6AF0033E                          BAL,R15   ZFA
677       01            0020D           33000008         A                MTW,0     R8
678       01            0020E           68300216                          BCR,3     ZEQTRN10
679       01            0020F           227FFFD0         A                LI,X7     -ZSRLEN
680       01            00210           35700006         A                STW,X7    X6
681       01            00211           318E05FA                          CW,R8     ZSRTBL,X7
682       01            00212           68300216                          BCR,3     ZEQTRN10
683       01            00213           319E05FA                          CW,R9     ZSRTBL,X7
684       01            00214           6830021A                          BCR,3     ZEQTRN20
685       01            00215           65700210                          BIR,X7    $-5
686       01            00216           22C00053         A        ZEQTRN10 LI,R12    X'53'
687       01            00217           68000377                          B         ZSNER
688       01            00218           319E05FA                          CW,R9     ZSRTBL,X7
689       01            00219           68300216                          BCR,3     ZEQTRN10
690       01            0021A           65700218                 ZEQTRN20 BIR,X7    $-2
691       01            0021B           358C05FA                          STW,R8    ZSRTBL,X6
692       01            0021C           E8000023         A                B         *ZEQLNK
693                                                                        PAGE
694                                                       *
695                                                       * LEFT PARAN TRANSLATOR PROCESSOR FOR OPEN LOOP
696                                                       *  EXECUTE TABLE ENTRY EQUALS TWO WORDS FOR REITERATION COUNT
697                                                       *   GREATER THAN ONE, NON-EXISTENT FOR 0 AND 1
698                                                       *
699       01            0021D           35F00025         A        ZLPTRN  STW,R15   ZLPLNK
700       01            0021E           6AF003C8                          BAL,R15   ZTST7
701       01            0021F           32F00551                          LW,R15    ZLPPRO
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LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
702	01	00220	B5F00589			STW,R15	*ZEXPTO	
703	01	00221	6AF003A5			BAL,R15	ZTST1	
704	01	00222	22F00000	A		LI,R15	0	
705	01	00223	33000009	A		MTW,0	R9	
706	01	00224	68200226			BCR,2	$+2	
707	01	00225	32F00589			LW,R15	ZEXPTO	
708	01	00226	B5F00581			STW,R15	*ZLBPTR	
709	01	00227	33100581			MTW,1	ZLBPTR	
710	01	00228	33000009	A		MTW,0	R9	
711	01	00229	E8200025	A		BCR,2	*ZLPLNK	
712	01	0022A	6AF0038C			BAL,R15	ZADPTR	
713	01	0022B	E8000025	A		B	*ZLPLNK	
714					*			
715					* RIGHT PARAN TRANSLATOR PROCESSOR FOR CLOSE LOOP			
716					* EXECUTE TABLE ENTRY EQUALS TWO WORDS			
717					* SECOND WORD CONTAINS ADDRESS OF BASE WORD FOR START OF LOOP			
718					*			
719	01	0022C	35F00025	A	ZRPTRN	STW,R15	ZRPLNK	
720	01	0022D	6AF00284			BAL,R15	ZPLTRN	
721	01	0022E	6AF003C8			BAL,R15	ZTST7	
722	01	0022F	22C00040	A		LI,R12	X'40'	
723	01	00230	32F00581			LW,R15	ZLBPTR	
724	01	00231	31F00580			CW,R15	ZLBADR	
725	01	00232	68300377			BCR,3	ZSNER	
726	01	00233	32F00552			LW,R15	ZRPPR0-1	
727	01	00234	B5F00589			STW,R15	*ZEXPTO	
728	01	00235	33F00581			MTW,-1	ZLBPTR	
729	01	00236	B2F00581			LW,R15	*ZLBPTR	
730	01	00237	E8200025	A		BCR,2	*ZRPLNK	
731	01	00238	B5F0058A			STW,R15	*ZEXPT1	
732	01	00239	6AF0038C			BAL,R15	ZADPTR	
733	01	0023A	E8000025	A		B	*ZRPLNK	
734						PAGE		
735					*			
736					* PERIOD , PLACE MARKER, TRANSLATOR PROCESSOR			
737					* LEGAL IF NON-ZERO PLACE MARKER, MARK PLACE IN CONTROL LINE			
738					* ILLEGAL IF ZERO PLACE MARKER AND/OR PREVIOUSLY DEFINED			
739					* NO EXECUTE TABLE ENTRY, ENTRY TO PLACE MARKER TABLE			
740					*			
741	01	0023B	35F00027	A	ZPDTRN	STW,R15	ZPDLNK	
742	01	0023C	6AF003C8			BAL,R15	ZTST7	
743	01	0023D	6AF003B8			BAL,R15	ZTST2	
744	01	0023E	6AF0024D			BAL,R15	ZPMEN	
745	01	0023F	E8000027	A		B	*ZPDLNK	
746					*			
747					* DELTA TRANSLATOR PROCESSOR			
748					* ABSOLUTE TRANSFER REFERENCE TO NON-ZERO PLACE MARKER			
749					* LINK RETURN TRANSFER REFERENCE TO ZERO PLACE MARKER			
750					* ABSOLUTE TRANSFER EQUALS TWO WORD ENTRY TO EXECUTE TABLE			
751					* LINK TRANSFER EQUALS ONE WORD ENTRY TO EXECUTE TABLE			
752					*			
753	01	00240	35F00028	A	ZASTRN	STW,R15	ZASLNK	
754	01	00241	6AF003C8			BAL,R15	ZTST7	
755	01	00242	22F00566			LI,R15	ZLKAS	
756	01	00243	B5F00589			STW,R15	*ZEXPTO	
757	01	00244	33000009	A		MTW,0	R9	
758	01	00245	6830024A			BCR,3	ZASTRN10	
759	01	00246	32F00564			LW,R15	ZASPR0-1	
760	01	00247	B5F00589			STW,R15	*ZEXPTO	
761	01	00248	6AF003B8			BAL,R15	ZTST2	
762	01	00249	6AF0024C			BAL,R15	ZPMRQ	
763	01	0024A	6AF0038C		ZASTRN10	BAL,R15	ZADPTR	
764	01	0024B	E8000028	A		B	*ZASLNK	
765						PAGE		
766					*			
767					* PLACE MARKER PROCESSOR FOR PLACE MARKER TABLE			
768					* PROCESSES PLACE MARKER ENTRIES AND REQUESTS			
769					* ASSUMES R9 CONTAINS BINARY VALUE FOR PLACE MARKER			
770					*			
771	01	0024C	20900800	A	ZPMRQ	AI,R9	X'800'	
772	01	0024D	35F00029	A	ZPMEN	STW,R15	ZPMLNK	
773	01	0024E	32700584			LW,X7	ZPMADR	

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
774	01	0024F	38700585			SW,X7	ZPMPTR	
775	01	00250	68300273			BCR,3	ZPMEN40	
776	01	00251	B2BE0585		ZPMEN10	LW,R11	*ZPMPTR,X7	
777	01	00252	25B0046F	A		SAS,R11	-17	
778	01	00253	21900800	A		CI,R9	X'800'	
779	01	00254	6940025B			BCS,4	ZPMEN20	
780	01	00255	21B00800	A		CI,R11	X'800'	
781	01	00256	69400265			BCS,4	ZPMEN30	
782	01	00257	31900008	A		CW,R9	R11	
783	01	00258	69300272			BCS,3	ZPMEN40-1	
784	01	00259	22C00031	A		LI,R12	X'31'	
785	01	0025A	68000377			B	ZSNER	
786	01	0025B	21B00800	A	ZPMEN20	CI,R11	X'800'	
787	01	0025C	69400272			BCS,4	ZPMEN40-1	
788	01	0025D	20B00800	A		AI,R11	X'800'	
789	01	0025E	31900008	A		CW,R9	R11	
790	01	0025F	69300272			BCS,3	ZPMEN40-1	
791	01	00260	22B1FFFF	A		LI,R11	X'1FFFF'	
792	01	00261	C8BE0585			AND,R11	*ZPMPTR,X7	
793	01	00262	B5B0058A			STW,R11	*ZEXPT1	
794	01	00263	6AF00392			BAL,R15	ZTST4	
795	01	00264	E8000029	A		B	*ZPMLNK	
796	01	00265	22F003FF	A	ZPMEN30	LI,R15	X'3FF'	
797	01	00266	4BB0000F	A		AND,R11	R15	
798	01	00267	31900008	A		CW,R9	R11	
799	01	00268	69300272			BCS,3	ZPMEN40-1	
800	01	00269	33F0002D	A		MTW,-1	ZUDFPM	
801	01	0026A	B2FE0585			LW,R15	*ZPMPTR,X7	
802	01	0026B	32B00589			LW,R11	ZEXPT0	
803	01	0026C	B5B0000F	A		STW,R11	*R15	
804	01	0026D	33F00585			MTW,-1	ZPMPTR	
805	01	0026E	B2B00585			LW,R11	*ZPMPTR	
806	01	0026F	33100007	A		MTW,1	X7	
807	01	00270	B5BE0585			STW,R11	*ZPMPTR,X7	
808	01	00271	6800024E			B	ZPMEN+1	
809	01	00272	65700251			BIR,X7	ZPMEN10	
810	01	00273	21900800	A	ZPMEN40	CI,R9	X'800'	
811	01	00274	69400278			BCS,4	$+4	
812	01	00275	25900411	A		SAS,R9	17	
813	01	00276	49900589			BR,R9	ZEXPT0	
814	01	00277	6800027C			B	$+5	
815	01	00278	33100020	A		MTW,1	ZUDFPM	
816	01	00279	25900411	A		SAS,R9	17	
817	01	0027A	4990058A			BR,R9	ZEXPT1	
818	01	0027B	6AF00392			BAL,R15	ZTST4	
819	01	0027C	B5900585			STW,R9	*ZPMPTR	
820	01	0027D	22C00030	A		LI,R12	X'30'	
821	01	0027E	32B00585			LW,R11	ZPMPTR	
822	01	0027F	33100008	A		MTW,1	R11	
823	01	00280	31B00586			CW,R11	ZMFRIBAD	
824	01	00281	69200377			BCS,2	ZSNER	
825	01	00282	35B00585			STW,R11	ZPMPTR	
826	01	00283	E8000029	A		B	*ZPMLNK	
827						PAGE		
828					*			
829					* FIELD SEPARATORS,SPACE,PLUS,NEW LINE,ETC.			
830					* PROCESSES LEADING DECIMAL RE-ITERATION COUNT OR PLACE MARKER			
831					* IDENTIFIER FIELD FOR CALLED SUB-ROUTINE			
832					* PROCESSES TRAILING PARAMETERS FOR SUB-ROUTINES			
833					*			
834	01	00284	33000008	A	ZPLTRN	MTW,0	R8	
835	01	00285	683003C1			BCR,3	ZTST3	
836	01	00286	35F0002C	A		STW,R15	ZPLLNK	
837	01	00287	227FFFDC	A		LI,X7	-ZSRLEN	
838	01	00288	318E05FA			CW,R8	ZSRTBL,X7	
839	01	00289	6830028D			BCR,3	ZPLTRN20	
840	01	0028A	65700288			BIR,X7	$-2	
841	01	0028B	22C0005C	A		LI,R12	X'50'	
842	01	0028C	68000377			B	ZSNER	
843	01	0028D	32BE062A		ZPLTRN20	LW,R11	ZSRADR,X7	
844	01	0028E	B5B00589			STW,R11	*ZEXPTC	

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
845	01	0028F	F2C00589			LB,R12	*ZEXPT0	
846	01	00290	4EC00003	A		AND,R12	R3	
847	01	00291	683001C0			BCR,3	ZTRN50	
848	01	00292	3300003D	A		MTW,0	ZDSFLG	
849	01	00293	693002A8			BCS,3	ZPLTRN30	
850	01	00294	22C00051	A		LI,R12	X'51'	
851	01	00295	71100008	A		CB,R1	R11	
852	01	00296	68400377			BCR,4	ZSNER	
853	01	00297	25B00206	A		SCS,R11	6	
854	01	00298	25B00402	A		SAS,R11	2	
855	01	00299	F5B00589			STB,R11	*ZEXPT0	
856	01	0029A	6AF003A5			BAL,R15	ZTST1	
857	01	00298	6AF002B4			BAL,R15	ZC0TRN	
858	01	0029C	22F001C1			LI,R15	ZTRN60	
859	01	0029D	71A001CA			CB,R10	ZMS	
860	01	0029E	E83001CA			BCR,3	*ZMS	
861	01	0029F	6AF0038C			BAL,R15	ZADPTR	
862	01	002A0	22800000	A		LI,R8	0	
863	01	002A1	22900000	A		LI,R9	0	
864	01	002A2	22F001C1			LI,R15	ZTRN60	
865	01	002A3	71A001C5			CB,R10	ZFS	
866	01	002A4	E83001C5			BCR,3	*ZFS	
867	01	002A5	71A001C4			CB,R10	ZRP	
868	01	002A6	E83001C4			BCR,3	*ZRP	
869	01	002A7	E800002C	A		B	*ZPLLNK	
870	01	002A8	22C00052	A	ZPLTRN30	LI,R12	X'52'	
871	01	002A9	71200008	A		CB,R2	R11	
872	01	002AA	68400377			BCR,4	ZSNER	
873	01	002AB	25B00204	A		SCS,R11	4	
874	01	002AC	25B00404	A		SAS,R11	4	
875	01	002AD	F5B00589			STB,R11	*ZEXPT0	
876	01	002AE	6AF003C1			BAL,R15	ZTST3	
877	01	002AF	6AF002B4			BAL,R15	ZC0TRN	
878	01	002B0	22F001C1			LI,R15	ZTRN60	
879	01	002B1	71A001CA			CB,R10	ZMS	
880	01	002B2	E83001CA			BCR,3	*ZMS	
881	01	002B3	680001C1			B	ZTRN60	
882						PAGE		
883					*			
884					* COMMA TRANSLATOR PROCESSOR			
885					* CALLED ONLY BY FIELD SEPARATOR TRANSLATOR PROCESSOR			
886					* PROCESSES ALL SUB-ROUTINE TRAILING PARAMETERS			
887					*			
888	01	002B4	35F0002A	A	ZC0TRN	STW,R15	ZC0LNK	
889	01	002B5	32B0058A			LW,R11	ZEXPT1	
890	01	002B6	35B00030	A		STW,R11	ZPCHK	
891	01	002B7	35B00031	A		STW,R11	ZPCHK1	
892	01	002B8	F2B00589			LB,R11	*ZEXPT0	
893	01	002B9	25B0047C	A		SAS,R11	-4	
894	01	002BA	35B0002F	A		STW,R11	ZPCNT	
895	01	002BB	75B6034E			STB,R11	ZPC7M,X3	
896	01	002BC	D2B20589			LH,R11	*ZEXPT0,X1	
897	01	002BD	38B0002F	A		SW,R11	ZPCNT	
898	01	002BE	35B0002E	A		STW,R11	ZPTY	
899	01	002BF	22800000	A	ZC0TRN10	LI,R8	0	
900	01	002C0	22900000	A		LI,R9	0	
901	01	002C1	B5B0058A			STW,R8	*ZEXPT1	
902	01	002C2	F270002E	A		LB,R7	*ZPTY	
903	01	002C3	33F0002F	A		MTW,-1	ZPCNT	
904	01	002C4	691002D6			BCS,1	ZC0TRN50	
905	01	002C5	71A001CE			CB,R10	ZC0	
906	01	002C6	683002CD			BCR,3	ZC0TRN30	
907	01	002C7	71A6034E			CB,R10	ZPC7M,X3	
908	01	002C8	683002CD			BCR,3	ZC0TRN30	
909	01	002C9	21700008	A		CI,R7	8	
910	01	002CA	684002DC			BCR,4	ZC0TRN40	
911	01	002CB	22C00055	A		LI,R12	X'55'	
912	01	002CC	68000377			B	ZSNER	
913	01	002CD	2570047C	A	ZC0TRN30	SAS,R7	-4	
914	01	002CE	670E02F9			EXU	ZPRTYP,X7	
915	01	002CF	B590058A			STW,R9	*ZEXPT1	

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
916	01	002D0	33100002E	A	ZC8TRN40	MTW,1	ZPTY	
917	01	002D1	6AF00392			BAL,R15	ZTST4	
918	01	002D2	33000009	A		MTW,0	R9	
919	01	002D3	683002BF			BCR,3	ZC8TRN10	
920	01	002D4	35B00031	A		STW,R11	ZPCHK1	
921	01	002D5	680002BF			B	ZC8TRN10	
922	01	002D6	71A6034E		ZC8TRN50	CB,R10	ZPC7M,X3	
923	01	002D7	693002D9			BCS,3	$+2	
924	01	002D8	22A00040	A		LI,R10	X'40'	
925	01	002D9	227FFFF9	A		LI,X7	-Z8PLN2	
926	01	002DA	32BE01CB			LW,R11	Z8PT82,X7	
927	01	002DB	71A0000B	A		CB,R10	R11	
928	01	002DC	683002F0			BCR,3	ZC8TRN60	
929	01	002DD	657002DA			BIR,X7	$-3	
930	01	002DE	22C00054	A		LI,R12	X'54'	
931	01	002DF	68000377			B	ZSNER	
932	01	002E0	32B00031	A	ZC8TRN60	LW,R11	ZPCHK1	
933	01	002E1	38B00030	A		SW,R11	ZPCHK	
934	01	002E2	25B00404	A		SAS,R11	4	
935	01	002E3	22F0000F	A		LI,R15	X'F'	
936	01	002E4	F2700589			LB,R7	*ZEXPTO	
937	01	002E5	4B70000F	A		AND,R7	R15	
938	01	002E6	49B00007	A		OR,R11	R7	
939	01	002E7	F5B00589			STB,R11	*ZEXPTO	
940	01	002E8	E8000002A	A		B	*ZC8LNK	
941						PAGE		
942					*			
943					* VARIABLE ENTRY TABLE TO PARAMETER PROCESSORS			
944					*			
945	01	002E9	6AF00329		ZPRTYP	BAL,R15	ZFNUP	
946	01	002EA	6AF0032C			BAL,R15	ZFN	
947	01	002EB	6AF0032F			BAL,R15	ZFNDTB	
948	01	002EC	6AF00335			BAL,R15	ZF8CT	
949	01	002ED	6AF00338			BAL,R15	ZFH	
950	01	002EE	6AF0033B			BAL,R15	ZPC5	
951	01	002EF	6AF00341			BAL,R15	ZPC6	
952	01	002F0	6AF00347			BAL,R15	ZPC7	
953					*			
954					* PARAMETER INFORMATION			
955					* PARAMETER DECODE WORD FORMAT			
956					* BIT 0-3 CODE TYPE			
957					* 4 ON-PARAMETER REQUIRED			
958					* OFF-PARAMETER NOT REQUIRED			
959					*			
960					* CODE TYPE			
961					* 0 NUMERIC 0-9 ONLY; STORE WITH ZONE BITS			
962					* 1 NUMERIC 0-9 ONLY; STORE WITHOUT ZONE BITS			
963					* 2 NUMERIC 0-9 ONLY; CONVERT TO BINARY			
964					* 3 NUMERIC 0-7 ONLY, OCTAL			
965					* 4 HEXADECIMAL 0-9 A-F; STORE AS BINARY VALUE			
966					* 5 ALPHABETIC ONLY A-Z			
967					* 6 ALPHA-NUMERIC ONLY A-Z 0-9			
968					* 7 ANY CHARACTER; FIRST CHARACTER REPRESENTS			
969					* TERMINATOR, BOTH NOT PUTAWAY			
970					*			
971						PAGE		
972					*			
973					* FORWARD SLASH TRANSLATOR PROCESSOR, TERMINATE CONTROL			
974					* EXECUTE TABLE ENTRY EQUALS TWO WORDS			
975					* VERFIES ALL LOOPS AND PLACE MARKER REQUESTS PROCESSED			
976					* VERFIES LAST DIRECTIVE PROCESSED			
977					* SAVES THIS ENTRY LOCATION FOR POSSIBLE EXTEND OR PATCH			
978					*			
979	01	002F1	35F00028	A	ZFSTRN	STW,R15	ZFSLNK	
980	01	002F2	6AF00284			BAL,R15	ZPLTRN	
981	01	002F3	33000030	A		MTW,0	ZDSFLG	
982	01	002F4	E930002B	A		BCS,3	*ZFSLNK	
983	01	002F5	32B0056C			LW,R11	ZFSPR8-1	
984	01	002F6	85B00589			STW,R11	*ZEXPTO	
985	01	002F7	22C00101	A		LI,R12	X'101'	
986	01	002F8	32B00FEF			LW,R11	ZEXADR	

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
987	01	002F9	31B00589			CW,R11	ZEXPTO	
988	01	002FA	68300377			BCR,3	ZSNER	
989	01	002FB	B5B0058A			STW,R11	*ZEXPT1	
990	01	002FC	22C00041	A		LI,R12	X'41'	
991	01	002FD	32B00581			LW,R11	ZLBPTR	
992	01	002FE	31B00580			CW,R11	ZLBADR	
993	01	002FF	69200377			BCS,2	ZSNER	
994	01	00300	33000009	A		MTW,0	R9	
995	01	00301	68300304			BCR,3	$+3	
996	01	00302	6AF003BB			BAL,R15	ZTST2	
997	01	00303	6AF0024C			BAL,R15	ZPMRQ	
998	01	00304	22C00032	A		LI,R12	X'32'	
999	01	00305	3300002D	A		MTW,0	ZUDFPM	
1000	01	00306	69200377			BCS,2	ZSNER	
1001	01	00307	32B00589			LW,R11	ZEXPTO	
1002	01	00308	6AF00390			BAL,R15	ZSTPTR	
1003	01	00309	B2B0000B	A		LW,R11	*R11	
1004	01	0030A	55B2055D			STH,R11	ZG8PTR,X1	
1005	01	0030B	52C20355			LH,R12	ZMFRX7,X1	
1006	01	0030C	55C20356			STH,R12	ZMFRNBA,X1	
1007	01	0030D	32C001C3			LW,R12	ZTRN100	
1008	01	0030E	6AF004BB			BAL,R15	ZTMNCR	
1009	01	0030F	68000516			B	ZEX00	
1010						PAGE		
1011					*			
1012					* COMMON FETCH ROUTINE PARAMETERIZED BY ONE WORD FOLLOWING CALL			
1013					* LINK IN R14 AND LINK RETURN IN R15 TO FETCH WITHIN LIMITS			
1014					* REGISTER-MINIMUM-MAXIMUM-SHIFT			
1015					*			
1016	01	00310	35E00035	A	ZCFR	STW,R14	ZCFRCA	
1017	01	00311	35F00034	A		STW,R15	ZCFRLNK	
1018	01	00312	6AF00352			BAL,R15	ZF8C	
1019	01	00313	F1A20035	A		CB,R10	*ZCFRCA,X1	
1020	01	00314	E9100034	A		BCS,1	*ZCFRLNK	
1021	01	00315	F1A40035	A		CB,R10	*ZCFRCA,X2	
1022	01	00316	E9200034	A		BCS,2	*ZCFRLNK	
1023	01	00317	22F0033A			LI,R15	ZFH+2	
1024	01	00318	31F00035	A		CW,R15	ZCFRCA	
1025	01	00319	6930031F			BCS,3	$+6	
1026	01	0031A	21A000E9	A		CI,R10	X'E9'	
1027	01	0031B	6920031F			BCS,2	$+4	
1028	01	0031C	21A000C6	A		CI,R10	X'C6'	
1029	01	0031D	E9200034	A		BCS,2	*ZCFRLNK	
1030	01	0031E	20A00009	A		AI,R10	X'9'	
1031	01	0031F	32F0000A	A		LW,R15	R10	
1032	01	00320	BA700035	A		LCW,X7	*ZCFRCA	
1033	01	00321	F2E00035	A		LB,R14	*ZCFRCA	
1034	01	00322	B2E0000E	A		LW,R14	*R14	
1035	01	00323	25FE0200	A		SCS,R15	0,X7	
1036	01	00324	B2700035	A		LW,X7	*ZCFRCA	
1037	01	00325	25EE0500	A		SAD,R14	0,X7	
1038	01	00326	F2F00035	A		LB,R15	*ZCFRCA	
1039	01	00327	B5E0000F	A		STW,R14	*R15	
1040	01	00328	68000312			B	ZCFR+2	
1041						PAGE		
1042					*			
1043					* FETCH NUMERIC 0-9 UNPACKED ZONE BITS PRESENT			
1044					*			
1045	01	00329	22900000	A	ZFNUP	LI,R9	0	
1046	01	0032A	6AE00310			BAL,R14	ZCFR	
1047	01	00328	09F0F908	A		DATA	X'09F0F908'	
1048					*			
1049					* FETCH NUMERIC 0-9 PACKED ZONE BITS NOT PRESENT			
1050					*			
1051	01	0032C	22900000	A	ZFN	LI,R9	0	
1052	01	0032D	6AE00310			BAL,R14	ZCFR	
1053	01	0032E	09F0F904	A		DATA	X'09F0F904'	
1054					*			
1055					* FETCH NUMERIC 0-9 CONVERTED TO BINARY			
1056					*			
1057	01	0032F	35F00420		ZFNDTB	STW,R15	ZCSRL	
1058	01	00330	6AF0032C			BAL,R15	ZFN	

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
1059	01	00331	46C00009	A		XW,R12	R9	
1060	01	00332	6AF003CC			BAL,R15	ZDTB	
1061	01	00333	46C00009	A		XW,R12	R9	
1062	01	00334	E8000420			B	*ZCSRL	
1063					*			
1064					* FETCH OCTAL 0-7 BINARY VALUE			
1065					*			
1066	01	00335	22900000	A	ZF8CT	LI,R9	0	
1067	01	00336	6AE00310			BAL,R14	ZCFR	
1068	01	00337	09F0F703	A		DATA	X'09F0F703'	
1069					*			
1070					* FETCH HEXADECIMAL 0-F BINARY VALUE			
1071					*			
1072	01	00338	22900000	A	ZFH	LI,R9	0	
1073	01	00339	6AE00310			BAL,R14	ZCFR	
1074	01	0033A	09C1F904	A		DATA	X'09C1F904'	
1075						PAGE		
1076					*			
1077					* FETCH ALPHABETIC A-Z UNPACKED ZONE BITS PRESENT			
1078					*			
1079	01	0033B	22900000	A	ZPC5	LI,R9	0	
1080	01	0033C	6AE00310			BAL,R14	ZCFR	
1081	01	0033D	09C1E908	A		DATA	X'09C1E908'	
1082	01	0033E	22800000	A	ZFA	LI,R8	0	
1083	01	0033F	6AE00310			BAL,R14	ZCFR	
1084	01	00340	08C1E908	A		DATA	X'08C1E908'	
1085					*			
1086					* FETCH ALPHA -NUMERIC 0-9 A-Z UNPACKED ZONE BITS PRESENT			
1087					*			
1088	01	00341	22900000	A	ZPC6	LI,R9	0	
1089	01	00342	6AE00310			BAL,R14	ZCFR	
1090	01	00343	09C1F908	A		DATA	X'09C1F908'	
1091	01	00344	22800000	A	ZFAN	LI,R8	0	
1092	01	00345	6AE00310			BAL,R14	ZCFR	
1093	01	00346	08C1F908	A		DATA	X'08C1F908'	
1094					*			
1095					* FETCH ANY CHARACTER *SPECIAL APPLICATIONS*			
1096					* FIRST CHARACTER REPRESENTS TERMINATOR WITH FIRST AND			
1097					* LAST CHARACTER NOT INCLUDED IN BYTE COUNT			
1098					*			
1099	01	00347	35F00036	A	ZPC7	STW,R15	ZPC7LNK	
1100	01	00348	6AF00352			BAL,R15	ZF9C	
1101	01	00349	75A6034E			STB,R10	ZPC7M,X3	
1102	01	0034A	52F20355			LH,R15	ZMFRX7,X1	
1103	01	0034B	B5F0058A			STW,R15	*ZEXPT1	
1104	01	0034C	6AF00352			BAL,R15	ZF8C	
1105	01	0034D	B290058A			LW,R9	*ZEXPT1	
1106	01	0034E	21A00000	A	ZPC7M	CI,R10	0	
1107	01	0034F	E8300036	A		BCR,3	*ZPC7LNK	
1108	01	00350	F310058A			MTB,1	*ZEXPT1	
1109	01	00351	6800034C			B	$-5	
1110						PAGE		
1111					*			
1112					* MAINLINE FETCH ROUTINE VIA TYPEWRITER OR CARD READER			
1113					* INPUT CONTROL LINE SYNTAX TO INPUT/OUTPUT AREA			
1114					*			
1115	01	00352	35F00037	A	ZF9C	STW,R15	ZMFRLNK	
1116	01	00353	32A00039	A		LW,R10	ZCHAR	
1117	01	00354	35A0003A	A		STW,R10	ZLSTCH	
1118	01	00355	22700000	A	ZMFRX7	LI,R7	0	
1119	01	00356	21700000	A	ZMFRNBA	CI,R7	0	
1120	01	00357	69100370			BCS,1	ZMFRTCBA	
1121	01	00358	55720374			STH,R7	ZMFRCWO,X1	
1122	01	00359	32A00587			LW,R10	ZIBADR	
1123	01	0035A	25A00402	A		SAS,R10	2	
1124	01	0035B	58A20356			SH,R10	ZMFRNBA,X1	
1125	01	0035C	68300376			BCR,3	ZMFRIOF	
1126	01	0035D	21A00050	A		CI,R10	80	
1127	01	0035E	69100360			BCS,1	$+2	
1128	01	0035F	22A00050	A		LI,R10	80	
1129	01	00360	52F20423			LH,R15	ZDKB+1,X1	

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
1130	01	00361	51F2036A			CH,R15	ZMFRDA,X1	
1131	01	00362	69300364			BCS,3	$+2	
1132	01	00363	22A00001	A		LI,R10	1	
1133	01	00364	55A20375			STH,R10	ZMFRCW1,X1	
1134	01	00365	50A20355			AH,R10	ZMFRX7,X1	
1135	01	00366	55A20356			STH,R10	ZMFRNBA,X1	
1136	01	00367	CDC0036A			TIB,R12	*ZMFRDA	
1137	01	00368	69C00367			BCS,12	$-1	
1138	01	00369	22C0018A			LI,R0	DA(ZMFRCW0)	
1139	01	0036A	4CC00001	A	ZMFRDA	SIB,R12	1	
1140	01	0036B	69C0036A			BCS,12	$-1	
1141	01	0036C	CDC0036A			TIB,R12	*ZMFRDA	
1142	01	0036D	72D0000D	A		LB,R13	R13	
1143	01	0036E	21D00060	A		CI,R13	X'60'	
1144	01	0036F	6940036C			BCS,4	$-3	
1145	01	00370	72AEC000	A	ZMFRTCBA	LB,R10	0,X7	
1146	01	00371	35A00039	A		STW,R10	ZCHAR	
1147	01	00372	33100355			MTW,1	ZMFRX7	
1148	01	00373	E8000037	A		B	*ZMFRLNK	
1149						BBUND 8		
1150	01	00374	0E000000		ZMFRCW0	ZFCP	X'E',BA($)	
1151	01	00375	02000001	A	ZMFRCW1	ZFCP	2,1	
1152						PAGE		
1153					*			
1154					* SYNTAX ERROR REPORTER			
1155					*			
1156	01	00376	22C00120	A	ZMFRIBF	LI,R12	X'120'	
1157	01	00377	6AF003F5		ZSNER	BAL,R15	ZBTH	
1158	01	00378	25D00208	A		SCS,R13	8	
1159	01	00379	35D0038B			STW,R13	ZSNMSG+2	
1160	01	0037A	22FC0015	A		LI,R15	X'15'	
1161	01	0037B	75F6038B			STB,R15	ZSNMSG+2,X3	
1162	01	0037C	52C20355			LH,R12	ZMFRX7,X1	
1163	01	0037D	55C20356			STH,R12	ZMFRNBA,X1	
1164	01	0037E	32C00388			LW,R12	ZSNERMW	
1165	01	0037F	6AF004BE			BAL,R15	ZSML40	
1166	01	00380	72F0038B			LB,R15	ZSNMSG+2	
1167	01	00381	21F000F0	A		CI,R15	X'F0'	
1168	01	00382	69200183			BCS,2	ZPC010	
1169	01	00383	52F20426			LH,R15	ZDCR+1,X1	
1170	01	00384	51F2036A			CH,R15	ZMFRDA,X1	
1171	01	00385	68300183			BCR,3	ZPC010	
1172	01	00386	22F001C1			LI,R15	ZTRN60	
1173	01	00387	E80001CA			B	*ZMS	
1174	01	00388	100C0E24	A	ZSNERMW	ZFMW	1,0,12,BA(ZSNMSG)	
1175	01	00389	E2E8D540	A	ZSNMSG	TEXT	'SYN ERR '	
	01	0038A	C5D9D940	A				
	01	0038B	40404040	A				
1176						PAGE		
1177					*			
1178					* UPDATE EXECUTE TABLE POINTERS TO NEXT ENTRY			
1179					* BASED UPON PARAMETER COUNT AND/OR RE-ITERATION COUNT OR			
1180					* IDENTIFIER FIELD			
1181					*			
1182	01	0038C	F2B00589		ZADPTR	LB,R11	*ZEXPTO	
1183	01	0038D	20B0001C	A		AI,R11	X'1C'	
1184	01	0038E	25B0047C	A		SAS,R11	-4	
1185	01	0038F	30B00589			AW,R11	ZEXPTO	
1186					*			
1187					* SET EXECUTE TABLE POINTERS FOR BASE WORD AND POSSIBLE			
1188					* RE-ITERATION COUNT OR PLACE MARKER ADDRESS FIELD			
1189					*			
1190	01	00390	35B00589		ZSTPTR	STW,R11	ZEXPTO	
1191	01	00391	35B0058A			STW,R11	ZEXPT1	
1192					*			
1193					* VERIFY EXECUTE TABLE NON-OVERFLOW			
1194					*			
1195	01	00392	3310058A		ZYST4	MTW,1	ZEXPT1	
1196	01	00393	32B0058A			LW,R11	ZEXPT1	
1197	01	00394	31B00582			CW,R11	ZLKADR	
1198	01	00395	E910000F	A		BCS,1	*R15	

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
1199	01	00396	22C00100	A		LI,R12	X'100'	
1200	01	00397	68000377			B	ZSNER	
1201						PAGE		
1202					*			
1203					* ADVANCE POINTERS AND CLEAR RE-ITERATION COUNT FIELD			
1204					* IF EXISTENT IN EXECUTE TABLE ENTRY			
1205					*			
1206	01	00398	35F0000E	A	ZADCRC	STW,R15	R14	
1207	01	00399	6AF0038C			BAL,R15	ZADPTR	
1208	01	0039A	6800039D			B	$+3	
1209					*			
1210					* SET POINTERS AND CLEAR RE-ITERATION COUNT FIELD			
1211					* (R11) CONTAINS BASE WORD VALUE			
1212					*			
1213	01	00398	35F0000E	A	ZSTCRC	STW,R15	R14	
1214	01	0039C	6AF00390			BAL,R15	ZSTPTR	
1215	01	0039D	32F0000E	A		LW,R15	R14	
1216					*			
1217					* CLEAR OR RESET RE-ITERATION COUNT FIELD IN EXECUTE TABLE			
1218					* ONLY IF RC FIELD IS EXISTENT			
1219					*			
1220	01	0039E	F2B00589		ZCRC	LB,R11	*ZEXPTO	
1221	01	0039F	21B00008	A		CI,R11	8	
1222	01	003A0	E840000F	A		BCR,4	*R15	
1223	01	003A1	D2B0058A			LH,R11	*ZEXPT1	
1224	01	003A2	25B00410	A		SAS,R11	16	
1225	01	003A3	B5B0058A			STW,R11	*ZEXPT1	
1226	01	003A4	E800000F	A		B	*R15	
1227						PAGE		
1228					*			
1229					*A PROCESS LEADING DECIMAL SUB-FIELD ASSUMED BINARY IN R9			
1230					* RE-ITERATION COUNT LESS THAN 10K AND GREATER THAN 1			
1231					* PLACE MARKER IDENTIFIER LESS THAN 512			
1232					*			
1233	01	003A5	F2B00589		ZTST1	LB,R11	*ZEXPTO	
1234	01	003A6	21B0000C	A		CI,R11	X'C'	
1235	01	003A7	684003C1			BCR,4	ZTST3	
1236	01	003A8	21B00008	A		CI,R11	8	
1237	01	003A9	694003AF			BCS,4	ZTST1A	
1238	01	003AA	33000009	A		MTW,0	R9	
1239	01	003AB	683003B1			BCR,3	ZTST1AA	
1240	01	003AC	219001FF	A		CI,R9	511	
1241	01	003AD	692003BF			BCS,2	ZTST2A	
1242	01	003AE	6800024C			B	ZPMRQ	
1243	01	003AF	33F00009	A	ZTST1A	MTW,-1	R9	
1244	01	003B0	692003B5			BCS,2	ZTST1B	
1245	01	003B1	22C000F3	A	ZTST1AA	LI,R12	X'F3'	
1246	01	003B2	4BB0000C	A		AND,R11	R12	
1247	01	003B3	F5B00589			STB,R11	*ZEXPTC	
1248	01	003B4	E800000F	A		B	*R15	
1249	01	003B5	2190270F	A	ZTST1B	CI,R9	9999	
1250	01	003B6	692003BF			BCS,2	ZTST2A	
1251	01	003B7	32C00009	A		LW,R12	R9	
1252	01	003B8	25C00410	A		SAS,R12	16	
1253	01	003B9	B5C0058A		ZTST1C	STW,R12	*ZEXPT1	
1254	01	003BA	68000392			B	ZTST4	
1255						PAGE		
1256					*			
1257					* VERIFIES PLACE MARKER VALUE GREATER THAN ONE			
1258					* AND LESS THAN 512 DECIMAL			
1259					*			
1260	01	003BB	33000009	A	ZTST2	MTW,0	R9	
1261	01	003BC	683003BF			BCR,3	ZTST2A	
1262	01	003BD	21900200	A		CI,R9	X'200'	
1263	01	003BE	E910000F	A		BCS,1	*R15	
1264	01	003BF	22C00020	A	ZTST2A	LI,R12	X'20'	
1265	01	003C0	68000377			B	ZSNER	
1266					*			
1267					* VERIFY NUMERIC ACCUMULATOR IS EMPTY (ZERO)			
1268					*			
1269	01	003C1	33000009	A	ZTST3	MTW,0	R9	
1270	01	003C2	E830000F	A		BCR,3	*R15	

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
1271	01	003C3	680003BF			B	ZTST2A	
1272						*		
1273						* VERIFY ALPHA ACCUMULATOR EMPTY (ZERO)		
1274						*		
1275	01	003C4	33000008	A	ZTST6	MTW,0	R8	
1276	01	003C5	E830000F	A		BCR,3	*R15	
1277	01	003C6	22C00021	A		LI,R12	X'21'	
1278	01	003C7	68000377			B	ZSNER	
1279						*		
1280						* VERIFY TRANSLATOR NOT IN IMMEDIATE MODE		
1281						*		
1282	01	003C8	3300003D	A	ZTST7	MTW,0	ZDSFLG	
1283	01	003C9	E830000F	A		BCR,3	*R15	
1284	01	003CA	22C00052	A		LI,R12	X'52'	
1285	01	003CB	68000377			B	ZSNER	
1286						PAGE		
1287						*		
1288						* DECIMAL TO BINARY CONVERTER FOUR BITS PER DIGIT		
1289						* (R12) VALUE TO CONVERT TO R12 AND ZTEMP		
1290						* (R15) LINK RETURN VALUE		
1291						*		
1292	01	003CC	46C0000F	A	ZDTB	XW,R12	R15	
1293	01	003CD	35F0058B			STW,R15	ZTEMP	
1294	01	003CE	48F003DE			AND,R15	ZDTB10	
1295	01	003CF	25F0027C	A		SCS,R15	-4	
1296	01	003D0	23FFFFFA	A		MI,R15	-6	
1297	01	003D1	30F0058B			AW,R15	ZTEMP	
1298	01	003D2	35F0058B			STW,R15	ZTEMP	
1299	01	003D3	48F003DF			AND,R15	ZDTB20	
1300	01	003D4	25F00278	A		SCS,R15	-8	
1301	01	003D5	23FFFF64	A		MI,R15	-156	
1302	01	003D6	30F0058B			AW,R15	ZTEMP	
1303	01	003D7	35F0058B			STW,R15	ZTEMP	
1304	01	003D8	52F0000F	A		LH,R15	R15	
1305	01	003D9	23FF2710	A		MI,R15	-55536	
1306	01	003DA	30F0058B			AW,R15	ZTEMP	
1307	01	003DB	35F0058B			STW,R15	ZTEMP	
1308	01	003DC	46C0000F	A		XW,R12	R15	
1309	01	003DD	E800000F	A		B	*R15	
1310	01	003DE	F0F0F0F0	A	ZDTB10	DATA	X'F0F0F0F0'	
1311	01	003DF	FF00FF00	A	ZDTB20	DATA	X'FF00FF00'	
1312						PAGE		
1313						*		
1314						* BINARY TO DECIMAL CONVERTER FOUR BITS PER DIGIT		
1315						* (R12) VALUE TO CONVERT TO R12 AND ZTEMP		
1316						* (R15) LINK RETURN VALUE		
1317						*		
1318	01	003E0	35D0042C		ZBTD	STW,R13	ZCSRL	
1319	01	003E1	22D0C400	A		LI,R13	X'400'	
1320	01	003E2	46C0C00D	A		XW,R12	R13	
1321	01	003E3	35C0059D			STW,R12	PX	
1322	01	003E4	22C00000	A		LI,R12	0	
1323	01	003E5	35C0058B			STW,R12	ZTEMP	
1324	01	003E6	22C00000	A	ZBTD10	LI,R12	0	
1325	01	003E7	21D0000A	A		CI,R13	10	
1326	01	003E8	691003EE			BCS,1	ZBTD20	
1327	01	003E9	36C003F4			DW,R12	ZBTD30	
1328	01	003EA	A5C0059D			S,R12	*PX	
1329	01	003EB	3340059D			MTW,4	PX	
1330	01	003EC	66C0058B			AWM,R12	ZTEMP	
1331	01	003ED	680003E6			B	ZBTD10	
1332	01	003EE	32C00420		ZBTD20	LW,R12	ZCSRL	
1333	01	003EF	46C0C00D	A		XW,R12	R13	
1334	01	003F0	A5C0059D			S,R12	*PX	
1335	01	003F1	49C0058B			OR,R12	ZTEMP	
1336	01	003F2	35C0058B			STW,R12	ZTEMP	
1337	01	003F3	E800000F	A		B	*R15	
1338	01	003F4	0000000A	A	ZBTD30	DATA	10	
1339						PAGE		
1340						*		
1341						* BINARY TO HEXADECIMAL CONVERTER		

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
1342					*	(R12) VALUE TO CONVERT TO R12-R13 AND ZTEMP-ZTEMP1		
1343					*	(R15) LINK RETURN VALUE		
1344					*			
1345	01	C03F5	35100420		ZRTH	STW,R1	ZCSRL	
1346	01	C03F6	221FFFF8	A		LI,X1	-8	
1347	01	C03F7	22DC000F	A		LI,R13	X'F'	
1348	01	C03F8	25CC0304	A		SCD,R12	4	
1349	01	C03F9	21DC00FA	A		CI,R13	X'FA'	
1350	01	C03FA	691003FC			BCS,1	$+2	
1351	01	C03FB	20DC00C7	A		AI,R13	X'C7'	
1352	01	C03FC	75D20580			STB,R13	ZTEMP1+1,X1	
1353	01	C03FD	651003F7			BIR,X1	ZRTH+2	
1354	01	C03FE	32CC0588			LW,R12	ZTEMP	
1355	01	C03FF	32DC058C			LW,R13	ZTEMP1	
1356	01	C0400	32100420			LW,R1	ZCSRL	
1357	01	C0401	E80C000F	A		B	*R15	
1358					*			
1359					*	LEADING ZERO SUPPRESSION ON UNPACKED VALUE		
1360					*	(R12) CONTAINS VALUE TO SUPPRESS		
1361					*	(R15) CONTAINS LINK RETURN ADDRESS		
1362					*			
1363	01	C0402	35F00420		ZSUP	STW,R15	ZCSRL	
1364	01	C0403	35100588			STW,X1	ZTEMP	
1365	01	C0404	221FFFFC	A		LI,X1	-X'4'	
1366	01	C0405	22F000F0	A		LI,R15	X'F0'	
1367	01	C0406	71F20000	A		CB,R15	R12+1,X1	
1368	01	C0407	69300408			BCS,3	$+4	
1369	01	C0408	22F00040	A		LI,R15	X'40'	
1370	01	C0409	75F20000	A		STB,R15	R12+1,X1	
1371	01	C040A	65100405			BIR,X1	ZSUP+3	
1372	01	C040B	32100588			LW,R1	ZTEMP	
1373	01	C040C	35CC0588			STW,R12	ZTEMP	
1374	01	C040D	E8000420			B	*ZCSRL	
1375						PAGE		
1376					*			
1377					*	DECIMAL ADDER FOUR BITS PER DIGIT		
1378					*	(R12) CURRENT DECIMAL ADDER VALUE		
1379					*	(R15) LINK RETURN VALUE		
1380					*			
1381	01	C040E	35100588		ZDECADER	STW,R1	ZTEMP	
1382	01	C040F	221FFFF8	A		LI,X1	-8	
1383	01	C0410	33100000	A		MTW,1	R12	
1384	01	C0411	21C00008	A		CI,R12	X'8'	
1385	01	C0412	68400416			BCR,4	$+4	
1386	01	C0413	21C00002	A		CI,R12	X'2'	
1387	01	C0414	68400416			BCR,4	$+2	
1388	01	C0415	33600000	A		MTW,6	R12	
1389	01	C0416	25C0027C	A		SCS,R12	-4	
1390	01	C0417	65100411			BIR,X1	$-6	
1391	01	C0418	32100000	A		LW,R1	R12	
1392	01	C0419	46100588			XW,R1	ZTEMP	
1393	01	C041A	E800000F	A		B	*R15	
1394					*			
1395					*	INITIALIZE COMMON INDEX REGISTERS		
1396					*			
1397	01	C041B	22000000	A	ZSCIR	LI,R0	0	
1398	01	C041C	22100001	A		LI,X1	1	
1399	01	C041D	22200002	A		LI,X2	2	
1400	01	C041E	22300003	A		LI,X3	3	
1401	01	C041F	E80C000F	A		B	*R15	
1402	01	C0420	00000000	A	ZCSRL	PZE		
1403						PAGE		
1404					*			
1405					*	DKB DIRECTIVE ASSIGNING DIRECTIVE INPUT VIA TYPEWRITER		
1406					*			
1407	01	C0421	40000000	A		DATA	X'40000000'	
1408	01	C0422	6AEC0427		ZDKB	BAL,R14	ZKBCRIBA	
1409	01	C0423	00000001	A		DATA	1	
1410					*			
1411					*	DCR DIRECTIVE ASSIGNING DIRECTIVE INPUT VIA CARD READER		
1412					*			

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
1413	01	00424	40000000	A		DATA	X'40000000'	
1414	01	00425	6AE00427		ZBCR	BAL,R14	ZKBCRIBA	
1415	01	00426	00000003	A		DATA	3	
1416						*		
1417						* PRESERVE TYPEWRITER/CARD READER INPUT/OUTPUT ADDRESS		
1418						*		
1419	01	00427	2200077F	A	ZKBCRIBA	LI,R0	X'77F'	
1420	01	00428	4B0005BE			AND,R0	P1	
1421	01	00429	B500000E	A		STW,R0	*R14	
1422	01	0042A	5502036A			STH,R0	ZMFRDA,X1	
1423	01	0042B	52020355			LH,R0	ZMFRX7,X1	
1424	01	0042C	55020356			STH,R0	ZMFRNBA,X1	
1425	01	0042D	E800000F	A		B	*R15	
1426						PAGE		
1427						*		
1428						* SML DIRECTIVE ASSIGNING MESSAGE LEVELS TO BE REPORTED		
1429						*		
1430	01	0042E	10000000	A		DATA	X'10000000'	
1431	01	0042F	32C0058E		ZSML	LW,R0	P1	
1432	01	00430	48000003	A		AND,R0	R3	
1433	01	00431	550204C9			STH,R0	ZMSGKEY,X1	
1434	01	00432	E800000F	A		B	*R15	
1435						*		
1436						* SMD DIRECTIVE ASSIGNING MESSAGES TO TYPEWRITER OR LINE PRINTER		
1437						*		
1438	01	00433	40000000	A		DATA	X'40000000'	
1439	01	00434	2200077F	A	ZSMD	LI,R0	X'77F'	
1440	01	00435	4B0058E			AND,R0	P1	
1441	01	00436	550204E1			STH,R0	ZTWLP8,X1	
1442	01	00437	E800000F	A		B	*R15	
1443						PAGE		
1444						*		
1445						* HLT DIRECTIVE TO IDENTIFY LOCATION IN CONTROL LINE		
1446						*		
1447	01	00438	10000000	A		DATA	X'10000000'	P1 DECIMAL IDENTIFIER
1448	01	00439	35F0059C		ZHLT	STW,R15	P15	
1449	01	0043A	32C005BE			LW,R12	P1	
1450	01	0043B	6AF003F5			BAL,R15	ZBTH	
1451	01	0043C	35D00447			STW,R13	ZHLTMSG+1	
1452	01	0043D	32C00445			LW,R12	ZHLTMSG+1	
1453	01	0043E	023000?0	A		LCFI	7	
1454	01	0043F	6AF004BF			BAL,R15	ZTWLP	
1455	01	00440	22F00001	A		LI,R15	1	
1456	01	00441	4BF005BE			AND,R15	P1	
1457	01	00442	E82205?C			BCR,2	*P15,X1	
1458	01	00443	2E000000	A		WAIT		
1459	01	00444	E802059C			B	*P15,X1	
1460	01	00445	10081118	A		ZFMW	1,0,8,BA(ZHLTMSG)	
1461	01	00446	C8D3E340	A	ZHLTMSG	TEXT	'HLT XXXX'	
	01	00447	E7E7E7E7	A				
1462						PAGE		
1463						*		
1464						* ALT DIRECTIVE TO ALTER CONTIGUOUS MAIN MEMORY LOCATIONS		
1465						*		
1466	01	00448	35F00420		ZALT	STW,R15	ZCSRL	
1467	01	00449	6AF00457			BAL,R15	ZALT10	
1468	01	0044A	6AF00338			BAL,R15	ZFH	
1469	01	0044B	6AF00457			BAL,R15	ZALT10	
1470	01	0044C	22F1FFFF	A		LI,R15	X'1FFFF'	
1471	01	0044D	4B900000F	A		AND,R9	R15	
1472	01	0044E	31900?7E		ZALT05	CW,R9	ZFMS	
1473	01	0044F	E9200420			BCS,2	*ZCSRL	
1474	01	00450	35900588			STW,R9	ZTEMP	
1475	01	00451	6AF00338			BAL,R15	ZFH	
1476	01	00452	6AF00457			BAL,R15	ZALT10	
1477	01	00453	B5900588			STW,R9	*ZTEMP	
1478	01	00454	33100558			MTW,1	ZTEMP	
1479	01	00455	32900588			LW,R9	ZTEMP	
1480	01	00456	6800044E			B	ZALT05	
1481	01	00457	21A00068	A	ZALT10	CI,R10	X'6B'	
1482	01	00458	E830000F	A		BCR,3	*R15	

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
1483	01	00459	E8000420			B	*ZCSRL	
1484						PAGE		
1485					*			
1486					* DMP DIRECTIVE TO DUMP CONTIGUOUS MAIN MEMORY LOCATIONS			
1487					*			
1488	01	0045A	40000000	A		DATA	X'40000000'	
1489	01	0045B	40000000	A		DATA	X'40000000'	
1490	01	0045C	40000000	A		DATA	X'40000000'	
1491	01	0045D	02300070	A	ZTYP	LCFI	7	
1492	01	0045E	68000463			B	ZDMP+1	
1493	01	0045F	40000000	A		DATA	X'40000000'	P1 FIRST
1494	01	00460	40000000	A		DATA	X'40000000'	P2 LAST
1495	01	00461	40000000	A		DATA	X'40000000'	P3 RELATIVE
1496	01	00462	023000F0	A	ZDMP	LCFI	X'F'	
1497	01	00463	74060498			STCF	ZDMP24+2,X3	
1498	01	00464	35F0059C			STW,R15	P15	
1499	01	00465	227FFFFD	A		LI,X7	-3	TRUNCATE
1500	01	00466	32CE0591			LW,R12	P3+1,X7	
1501	01	00467	4BC0057E			AND,R12	ZEMS	
1502	01	00468	35CE0591			STW,R12	P3+1,X7	ADDRESSES
1503	01	00469	65700466			BIR,X7	$-3	
1504	01	0046A	6AF0041B			BAL,R15	ZSCIR	
1505	01	0046B	32D0058F			LW,R13	P2	
1506	01	0046C	33100000	A		MTW,1	R13	
1507	01	0046D	31D0057E			CW,R13	ZEMS	
1508	01	0046E	68200470			BCR,2	$+2	
1509	01	0046F	33F0058F			MTW,-1	P2	
1510	01	00470	32C00590			LW,R12	P3	
1511	01	00471	68300474			BCR,3	$+3	
1512	01	00472	3200058E			LW,R0	P1	
1513	01	00473	3800059C			SW,R0	P3	
1514	01	00474	35000590			STW,R0	P3	
1515	01	00475	32C0058E		ZDMP10	LW,R12	P1	
1516	01	00476	38C00590			SW,R12	P3	
1517	01	00477	6AF003F5			BAL,R15	ZBTH	
1518	01	00478	22F04040	A		LI,R15	X'4040'	
1519	01	00479	55F0000C	A		STH,R15	R12	
1520	01	0047A	25C00310	A		SCD,R12	16	
1521	01	0047B	35C0059E			STW,R12	ZDMPA	
1522	01	0047C	35D0059F			STW,R13	ZDMPA+1	
1523	01	0047D	75F0059E			STB,R15	ZDMPA	
1524	01	0047E	22700007	A		LI,X7	7	RESET INDEX
1525	01	0047F	22F00000	A		LI,R15	0	DUPLICATE
1526	01	00480	35F0059B			STW,R15	P14	COUNTER
1527	01	00481	B2C0058E		ZDMP20	LW,R12	*P1	DUPLICATE
1528	01	00482	B1C2058E			CW,R12	*P1,X1	WORDS
1529	01	00483	6830049D			BCR,3	ZDMP30	
1530	01	00484	3300059B			MTW,0	P14	DUPLICATE
1531	01	00485	683004A8			BCR,3	ZDMP40	BLOCK
1532	01	00486	22C00060	A		LI,R12	X'60'	
1533	01	00487	75CE059E			STB,R12	ZDMPA,X7	
1534	01	00488	32C0058E		ZDMP22	LW,R12	P1	
1535	01	00489	38C00590			SW,R12	P3	
1536	01	0048A	6AF003F5			BAL,R15	ZBTH	
1537	01	0048B	22F04040	A		LI,R15	X'4040'	
1538	01	0048C	55F0000C	A		STH,R15	R12	
1539	01	0048D	25C00310	A		SCD,R12	16	
1540	01	0048E	35C005A0			STW,R12	ZDMPA+2	
1541	01	0048F	35D005A1			STW,R13	ZDMPA+3	
1542	01	00490	75F005A0			STB,R15	ZDMPA+2	
1543	01	00491	B2C0058E			LW,R12	*P1	SET DUPLICATE
1544	01	00492	6AF003F5			BAL,R15	ZBTH	KEY FOR OUTPUT
1545	01	00493	35C005A2			STW,R12	ZDMPA+4	
1546	01	00494	35D005A3			STW,R13	ZDMPA+5	
1547	01	00495	22700018	A		LI,R7	24	
1548	01	00496	7572C4BA		ZDMP24	STB,R7	ZDMP70,X1	
1549	01	00497	32C004BA			LW,R12	ZDMP70	
1550	01	00498	023000F0	A		LCFI	X'F'	
1551	01	00499	6AFC04BF			BAL,R15	ZTWLP	
1552	01	0049A	6AF004B6			BAL,R15	ZDMP50	
1553	01	0049B	69100475			BCS,1	ZDMP10	DUMP

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
1554	01	0049C	E8C0059C			B	*P15	COMPLETE
1555	01	C049D	21700007	A	ZDMP30	CI,X7	7	
1556	01	0049E	682004A1			BCR,2	$+3	
1557	01	C049F	33F0058E			MTW,-1	P1	
1558	01	C04A0	68000496			B	ZDMP24	
1559	01	004A1	3310059B			MTW,1	P14	
1560	01	C04A2	6AF004B6			BAL,R15	ZDMP50	
1561	01	C04A3	69100481			BCS,1	ZDMP20	
1562	01	C04A4	33F0058E			MTW,-1	P1	
1563	01	C04A5	33F0059B			MTW,-1	P14	
1564	01	C04A6	69200488			BCS,2	ZDMP22	
1565	01	004A7	B2C0058E			LW,R12	*P1	
1566	01	C04A8	6AF003F5		ZDMP40	BAL,R15	ZBTH	SET NON-DUPLICATE
1567	01	C04A9	33100007	A		MTW,1	X7	WORD FOR OUTPUT
1568	01	C04AA	226FFFF8	A		LI,X6	-8	
1569	01	004AB	25C00308	A		SCD,P12	8	
1570	01	C04AC	75DE059E			STB,R13	ZDMPA,X7	
1571	01	C04AD	33100007	A		MTW,1	X7	
1572	01	004AE	656004AB			BIR,X6	$-3	
1573	01	004AF	22F0004C	A		LI,R15	X'40'	
1574	01	004B0	75FE059E			STB,R15	ZDMPA,X7	
1575	01	004B1	2170004E	A		CI,X7	78	
1576	01	004B2	69200496			BCS,2	ZDMP24	
1577	01	004B3	6AF004B6			BAL,R15	ZDMP50	
1578	01	004B4	69100481			BCS,1	ZDMP20	
1579	01	004B5	68000496			B	ZDMP24	
1580	01	004B6	32C0058E		ZDMP50	LW,R12	P1	
1581	01	004B7	3310058E			MTW,1	P1	
1582	01	004B8	31C0058F			CW,R12	P2	
1583	01	004B9	E800000F	A		B	*R15	
1584	01	004BA	10001678	A	ZDMP70	ZFMW	1,0,0,BA(ZDMPA)	
1585					*			
1586					* TRANSMIT MESSAGE ONLY IF KEYBOARD INPUT DEVICE			
1587					*			
1588	01	004BB	52D20426		ZTMNCR	LH,R13	ZDCR+1,X1	
1589	01	004BC	51D2036A			CH,R13	ZMFRDA,X1	
1590	01	004BD	E830000F	A		BCR,3	*R15	
1591					*			
1592					* LOAD CONDITIONS FOR TYPEWRITER ONLY MESSAGE LEVEL 5			
1593					*			
1594	01	004BE	02300040	A	ZSML40	LCFI	4	
1595						PAGE		
1596					*			
1597					* COMMON TYPEWRITER/LINE PRINTER OUTPUT ROUTINE			
1598					*			
1599	01	004BF	E8C0000F	A	ZTWLP	BCR,12	*R15	
1600	01	C04C0	7400000F	A		STCF	R15	
1601	01	004C1	35F00420			STW,R15	ZCSRL	
1602	01	C04C2	6AF0041B			BAL,R15	ZSCIR	
1603	01	004C3	72F00420			LB,R15	ZCSRL	
1604	01	004C4	25F0047C	A		SAS,R15	-4	
1605	01	C04C5	48F00003	A		AND,R15	R3	
1606	01	C04C6	683004CB			BCR,3	ZTWLP01	
1607	01	C04C7	6C000010	A		RD,0	X'10'	
1608	01	004C8	E9100420			BCS,1	*ZCSRL	
1609	01	004C9	21F00004	A	ZMSGKEY	CI,R15	4	
1610	01	C04CA	E9200420			BCS,2	*ZCSRL	SUPPRESSED
1611	01	004CB	55C20514		ZTWLP01	STH,R12	ZTWLP12,X1	
1612	01	004CC	52C0000C	A		LH,R12	R12	
1613	01	004CD	75C60515			STB,R12	ZTWLP12+1,X3	
1614	01	004CE	72C4000C	A		LB,R12	R12,X2	
1615	01	004CF	22D0000F	A		LI,R13	15	
1616	01	004D0	48D0000C	A		AND,R13	R12	
1617	01	004D1	25C0047C	A		SAS,R12	-4	
1618	01	004D2	75C60511			STB,R12	ZTWLP10+1,X3	
1619	01	004D3	32C0000C	A		LW,R12	R12	
1620	01	004D4	68300406			BCR,3	$+2	
1621	01	004D5	55020513			STH,R0	ZTWLP11+1,X1	
1622	01	004D6	5CD20513			AH,R13	ZTWLP11+1,X1	
1623	01	004D7	55D20513			STH,R13	ZTWLP11+1,X1	
1624	01	004D8	75100512			STB,R1	ZTWLP11	

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
1625	01	004D9	32FC0423			LW,R15	ZDKB+1	
1626	01	004DA	72C00420			LB,R12	ZCSRL	
1627	01	004DB	25C0047A	A		SAS,R12	-6	
1628	01	004DC	33F0000C	A		MTW,-1	R12	
1629	01	004DD	683004F3			BCR,3	ZTW	
1630	01	004DE	22F00002	A		LI,R15	2	
1631	01	004DF	33F0000C	A		MTW,-1	R12	
1632	01	004E0	683004E4			BCR,3	ZLPD	
1633	01	004E1	22F00002	A	ZTWLP8	LI,R15	2	
1634	01	004E2	31F00423			CW,R15	ZDKB+1	
1635	01	004E3	683004F3			BCR,3	ZTW	
1636	01	004E4	55F20507		ZLPD	STH,R15	ZTWLPA,X1	
1637	01	004E5	22000289			LI,R0	DA(ZTWLP11)	
1638	01	004E6	72C60511			LB,R12	ZTWLP10+1,X3	
1639	01	004E7	693004E9			BCS,3	$+2	
1640	01	004E8	22C000A0	A		LI,R12	X'A0'	
1641	01	004E9	33F0000C	A		MTW,-1	R12	
1642	01	004EA	683004EF			BCR,3	ZLPD10	
1643	01	004EB	20CC00C1	A		AI,R12	X'C1'	
1644	01	004EC	75C00010	A		STB,R12	ZML10	
1645	01	004ED	75160511			STB,R1	ZTWLP10+1,X3	
1646	01	004EE	22000288			LI,R0	DA(ZTWLP10)	
1647	01	004EF	72C60513		ZLPD10	LB,R12	ZTWLP11+1,X3	
1648	01	004F0	693004F2			BCS,3	$+2	
1649	01	004F1	73700512			MTB,7	ZTWLP11	
1650	01	004F2	68000507			B	ZTWLPA	
1651	01	004F3	55F20507		ZTW	STH,R15	ZTWLPA,X1	
1652	01	004F4	2200028A			LI,R0	DA(ZTWLP12)	
1653	01	004F5	72C60511			LB,R12	ZTWLP10+1,X3	
1654	01	004F6	68300507			BCR,3	ZTWLPA	
1655	01	004F7	73700512			MTB,7	ZTWLP11	
1656	01	004F8	22F00015	A		LI,R15	X'15'	
1657	01	004F9	22100000	A		LI,R1	0	
1658	01	004FA	75F20010	A		STB,R15	ZML10,X1	
1659	01	004FB	33100001	A		MTW,1	R1	
1660	01	004FC	64C004FA			BDR,R12	$-2	
1661	01	004FD	22F00040	A		LI,R15	X'40'	
1662	01	004FE	72C60513			LB,R12	ZTWLP11+1,X3	
1663	01	004FF	68300505			BCR,3	ZTW10	
1664	01	00500	4BC004BF			AND,R12	ZTWLP	
1665	01	00501	73160511			MTB,1	ZTWLP10+1,X3	
1666	01	00502	75F20010	A		STB,R15	ZML10,X1	
1667	01	00503	33100001	A		MTW,1	R1	
1668	01	00504	64C00501			BDR,R12	$-3	
1669	01	00505	22100001	A	ZTW10	LI,R1	1	
1670	01	00506	22000288			LI,R0	DA(ZTWLP10)	
1671	01	00507	4CC00001	A	ZTWLPA	SIB,R12	1	
1672	01	00508	69C00507			BCS,12	$-1	
1673	01	00509	CDC00507			TIB,R12	*ZTWLPA	
1674	01	0050A	69C00509			BCS,12	$-1	
1675	01	0050B	52020515			LH,R0	ZTWLP12+1,X1	
1676	01	0050C	50020513			AH,R0	ZTWLP11+1,X1	
1677	01	0050D	55020513			STH,R0	ZTWLP11+1,X1	
1678	01	0050E	E8000420			B	*ZCSRL	
1679						BBUND 8		
1680	01	00510	05000040	A	ZTWLP10	ZFCP	5,X'40'	
1681	01	00511	80C00000	A		ZFCP	X'80',0	
1682	01	00512	0000028A		ZTWLP11	DATA	DA(ZTWLP12)	
1683	01	00513	81000000	A		ZFCP	X'81',0	
1684	01	00514	01000000	A	ZTWLP12	ZFCP	1,0	
1685	01	00515	00000000	A		DATA	0	
1686						PAGE		
1687					*			
1688					* THIS SECTION OF CODE COMPRISES THE EXECUTIVE PROGRAM			
1689					* EXECUTION OF SPECIFIED SUB-ROUTINES WHICH EXIST IN EXTBL			
1690					*			
1691	01	00516	B2B0058A		ZEX00	LW,R11	*ZEXPT1	
1692	01	00517	6AF00398			BAL,R15	ZSTCRC	
1693	01	00518	6AF00418		ZEX01	BAL,R15	ZSCIR	
1694	01	00519	6AF00524			BAL,R15	ZMPTWA	
1695	01	0051A	22F0002C	A		LI,R15	X'20'	

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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL     OPERATION  OPERAND      COMMENTS
1696      01            0051B           6DF01100         A                WD,R15    X'1100'
1697      01            0051C           6DF01500         A                WD,R15    X'1500'
1698      01            0051D           22F00010         A                LI,R15    X'10'
1699      01            0051E           6DF01200         A                WD,R15    X'1200'
1700      01            0051F           6D000022         A                WD,0      X'22'
1701      01            00520           B2F00589                          LW,R15    *ZEXPTO
1702      01            00521           EAF0000F         A                BAL,R15   *R15
1703                                                                       *
1704                                                                       * SUBROUTINES RETURN CONTROL HERE
1705                                                                       *
1706      01            00522           68000538                          B         ZRETN1          NORMAL
1707      01            00523           68000543                          B         ZRETN2          ABORT/CONDITIONAL
1708                                                                       PAGE
1709                                                                       *
1710                                                                       * MOVE PARAMETERS TO LABELED WORK AREA P1-P15
1711                                                                       *
1712      01            00524           F2B00589                 ZMPTWA   LB,R11    *ZEXPTO
1713      01            00525           22C00000         A               LI,R12    0
1714      01            00526           21B00008         A               CI,R11    8
1715      01            00527           68400529                         BCR,4     $+2
1716      01            00528           D2C2058A                         LH,R12    *ZEXPT1,X1
1717      01            00529           35C0003C         A               STW,R12   ZFTF
1718      01            0052A           32E0058A                         LW,R14    ZEXPT1
1719      01            0052B           21B0000C         A               CI,R11    X'C'
1720      01            0052C           6840052E                         BCR,4     $+2
1721      01            0052D           3310000E         A               MTW,1     R14
1722      01            0052E           25B0047C         A               SAS,R11   -4
1723      01            0052F           227FFFF1         A               LI,X7     -15
1724      01            00530           22C00000         A               LI,R12    0
1725      01            00531           33F0000B         A               MTW,-1    R11
1726      01            00532           69100535                         BCS,1     $+3
1727      01            00533           B2C0000E         A               LW,R12    *R14
1728      01            00534           3310000E         A               MTW,1     R14
1729      01            00535           35CE059D                         STW,R12   P15+1,X7
1730      01            00536           65700530                         BIR,X7    $-6
1731      01            00537           E800000F         A               B         *R15
1732                                                                       PAGE
1733                                                                       *
1734                                                                       * NORMAL RETURN ONE
1735                                                                       *
1736      01            00538           6AF0041B                 ZRETN1   BAL,R15   ZSCIR
1737      01            00539           6AF0054A                          BAL,R15   ZBPT1
1738      01            0053A           F2B00589                          LB,R11    *ZEXPTO
1739      01            0053B           21B00008         A                CI,R11    8
1740      01            0053C           68400541                          BCR,4     ZRETN1A
1741      01            0053D           B310058A                          MTW,1     *ZEXPT1
1742      01            0053E           D2B2058A                          LH,R11    *ZEXPT1,X1
1743      01            0053F           D1B0058A                          CH,R11    *ZEXPT1
1744      01            00540           68200518                          BCR,2     ZEXO1
1745      01            00541           6AF00398                 ZRETN1A  BAL,R15   ZADCRC
1746      01            00542           68000518                          B         ZEXO1
1747                                                                       *
1748                                                                       * ABORT AND/OR CONDITIONAL RETURN
1749                                                                       *
1750      01            00543           6AF0041B                 ZRETN2   BAL,R15   ZSCIR
1751      01            00544           6AF0054A                          BAL,R15   ZBPT1
1752      01            00545           F2B00589                          LB,R11    *ZEXPTO
1753      01            00546           21B00004         A                CI,R11    4
1754      01            00547           68400541                          BCR,4     ZRETN1A
1755      01            00548           22F00516                          LI,R15    ZEXCO
1756      01            00549           6800056E                          B         ZLKSET
1757                                                                       PAGE
1758                                                                       *
1759                                                                       * CHECK BREAKPOINT NO. 1
1760                                                                       *  RESET CONTINUE EXECUTION OF DIRECTIVES IN CONTROL LINE
1761                                                                       *  SET   STOP EXECUTION OF DIRECTIVES RETURN FOR DIRECTIVE INPUT
1762                                                                       *
1763      01            0054A           6C000010         A       ZBPT1    RD,0      X'10'
1764      01            0054B           E880000F         A                BCR,8     *R15
1765                                                                       *
1766                                                                       * CONSOLE INTERRUPT INITIATED BY OPERATOR
1767                                                                       *  STOP EXECUTION OF DIRECTIVES RETURN FOR DIRECTIVE INPUT
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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL     OPERATION  OPERAND          COMMENTS
1768                                                                       *
1769      01            0054C          22F00030         A               ZC0NINT   LI,R15     X'30'
1770      01            0054D          6DFC1300         A                         WD,R15     X'1300'
1771      01            0054E          6DF01100         A                         WD,R15     X'1100'
1772      01            0054F          CF000507                                   MI0,R0     *ZTXLPA
1773      01            00550          68000183                                   B          ZPC010
1774                                                                       .        PAGE
1775                                                                       *
1776                                                                       * 0PEN L00P PR0CESS0R
1777                                                                       *  CLEARS CURRENT L00P RE-ITERATI0N C0UNT
1778                                                                       *   ADVANCES T0 NEXT 0PERATI0N
1779                                                                       *
1780      01            00551          08000541         A               ZLPPR0    ZFST2      0,2,0,ZRETN1A
1781                                                                       *
1782                                                                       * CL0SE L00P PR0CESS0R
1783                                                                       *  CHECKS IF 0PEN L00P RE-ITERATI0N C0UNT C0MPLETE
1784                                                                       *   IF C0MPLETE ADVANCE T0 NEXT 0PERATI0N
1785                                                                       *    IF N0T UPDATE C0UNT AND RESTART L00P
1786                                                                       *
1787      01            00552          04000553         A                         ZFST2      0,1,0,ZRPPR0
1788      01            00553          B2C0058A                         ZRPPR0    LW,R12     *ZEXPT1
1789      01            00554          331000CC         A                         MTW,1      R12
1790      01            00555          B31000CC         A                         MTW,1      *R12
1791      01            00556          D2B2000C         A                         LH,R11     *R12,X1
1792      01            00557          D180000C         A                         CH,R11     *R12
1793      01            00558          69200541                                   BCS,2      ZRETN1A
1794      01            00559          B280058A                                   LW,R11     *ZEXPT1
1795      01            0055A          35B00589                                   STW,R11    ZEXPT0
1796      01            0055B          68000541                                   B          ZRETN1A
1797                                                                       .        PAGE
1798                                                                       *
1799                                                                       * G0 DIRECTIVE PR0CESS0R T0 C0NTINUE EXECUTI0N 0F DIRECTIVES
1800                                                                       *
1801      01            0055C          22C00105         A               ZG0PR0    LI,R12     X'105'
1802      01            0055D          22B00000         A               ZG0PTR    LI,R11     0
1803      01            0055E          68300377                                   BCR,3      ZSNER
1804      01            0055F          68000517                                   B          ZEX00+1
1805                                                                       *
1806                                                                       * END 0F LINE PR0CESS0R F0R F0RWARD SLASH
1807                                                                       *
1808      01            00560          04000561         A                         ZFST2      0,1,0,ZFSPR0
1809      01            00561          6AF0054A                         ZFSPR0    BAL,R15    ZBPT1
1810      01            00562          6AF0056E                                   BAL,R15    ZLKSET
1811      01            00563          68000516                                   B          ZEX00
1812                                                                       *
1813                                                                       * ABS0LUTE TRANSFER PR0CESS0R
1814                                                                       *  SAVES CURRENT EXECUTE TABLE P0INTER VALUE AS LINK
1815                                                                       *    RESETS P0INTERS T0 TRANSFER L0CATI0N
1816                                                                       *
1817      01            00564          04000565         A                         ZFST2      0,1,0,ZASPR0
1818      01            00565          68000562                         ZASPR0    B          ZFSPR0+1
1819                                                                       *
1820                                                                       * LINK RETURN TRANSFER PR0CESS0R
1821                                                                       *  CHECK IF LINK TABLE EMPTY; IF S0 ABORT WITH ERR0R MESSAGE
1822                                                                       *   IF N0T REM0VE LAST LINK ENTRY, REDUCE LINK P0INTER BY 0NE
1823                                                                       *    TRANSFER T0 NEW 0PERATI0N
1824                                                                       *
1825      01            00566          22C00111         A               ZLKAS     LI,R12     X'111'
1826      01            00567          32B00583                                   LW,R11     ZLKPTR
1827      01            00568          31B00582                                   CW,R11     ZLKADR
1828      01            00569          68200377                                   BCR,2      ZSNER
1829      01            0056A          33FC0583                                   MTW,+1     ZLKPTR
1830      01            0056B          B2B00583                                   LW,R11     *ZLKPTR
1831      01            0056C          35B00589                                   STW,R11    ZEXPT0
1832      01            0056D          68000541                                   B          ZRETN1A
1833                                                                       .        PAGE
1834                                                                       *
1835                                                                       * PURGE AND/0R INSERT EXECUTE TABLE P0INTER AS LINK ADDRESS T0
1836                                                                       *  LINK TABLE, CHECK IF TABLE FULL; IF S0 ABORT WITH ERR0R MSG
1837                                                                       *
1838      01            0056E          32C00583                         ZLKSET    LW,R12     ZLKPTR
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LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
1839	01	0056F	32B00589			LW,R11	ZEXPTO	
1840	01	00570	33F0000C	A		MTW,-1	R12	
1841	01	00571	31C00582			CW,R12	ZLKADR	
1842	01	00572	69100576			BCS,1	$+4	
1843	01	00573	B1B0000C	A		CW,R11	*R12	
1844	01	00574	69300570			BCS,3	$-4	
1845	01	00575	35C00583			STW,R12	ZLKPTR	
1846	01	00576	22C00110	A		LI,R12	X'110'	
1847	01	00577	32D00583			LW,R13	ZLKPTR	
1848	01	00578	3310000D	A		MTW,1	R13	
1849	01	00579	31D00584			CW,R13	ZPMADR	
1850	01	0057A	69200377			BCS,2	ZSNER	
1851	01	0057B	B5B00583			STW,R11	*ZLKPTR	
1852	01	0057C	33100583			MTW,1	ZLKPTR	
1853	01	0057D	E800000F	A		B	*R15	
1854						PAGE		
1855					*			
1856					* COMPUTE MEMORY SIZE AND ASSIGN TABLE LENGTHS AND I/O ADDRESS			
1857					* EXECUTE TABLE LENGTH = MS/4*96			
1858					* LINK TABLE LENGTH = MS/4*16			
1859					* PLACE MARKER TABLE LENGTH = MS/4*16			
1860					* THIS CODE IS THEN OVERLAYED BY TRANSLATOR			
1861					* REMAINDER OF AREA AVAILABLE AS INPUT/OUTPUT AREA			
1862					*			
1863	01	0057E	00020FFF	A	ZEMS	DATA	X'20FFF'	LAST MEMORY LOCATION
1864						BOUND 8		
1865	01	00580	0E00058E		ZCMS	LPSD,0	ZCMST40+2	
1866	01	00581	32A0057E			LW,R10	ZEMS	
1867	01	00582	38A0058B			SW,R10	ZCMS6	
1868	01	00583	35A0057E			STW,R10	ZEMS	
1869	01	00584	B5A0000A	A		STW,R10	*R10	
1870	01	00585	3310000A	A		MTW,1	R10	
1871	01	00586	25A00478	A		SAS,R10	-8	
1872	01	00587	35A0000B	A		STW,R10	R11	
1873	01	00588	25A00403	A		SAS,R10	3	
1874	01	00589	35A00587			STW,R10	ZIOADR	
1875	01	0058A	30A00FEF			AW,R10	ZEXADR	
1876	01	0058B	35A00586			STW,R10	ZMFRIOAD	
1877	01	0058C	66A00587			AWM,R10	ZIOADR	
1878	01	0058D	38A0000B	A		SW,R10	R11	
1879	01	0058E	35A00584			STW,R10	ZPMADR	
1880	01	0058F	35A00585			STW,R10	ZPMPTR	
1881	01	00590	38A0000B	A		SW,R10	R11	
1882	01	00591	35A00582			STW,R10	ZLKADR	
1883	01	00592	35A00583			STW,R10	ZLKPTR	
1884	01	00593	32A0057E			LW,R10	ZEMS	
1885	01	00594	38A00587			SW,R10	ZIOADR	
1886	01	00595	35A00588			STW,R10	ZIOWDS	
1887	01	00596	22B00040	A		LI,R11	X'40'	
1888	01	00597	32A0057E			LW,R10	ZEMS	
1889	01	00598	38A0000B	A		SW,R10	R11	
1890	01	00599	35A0058C			STW,R10	ZLBADR	
1891	01	0059A	35A00581			STW,R10	ZLBPTR	
1892	01	0059B	32A0058A			LW,R10	ZCMS5	
1893	01	0059C	35A00040	A		STW,R10	64	
1894	01	0059D	227FFF20	A		LI,X7	-224	
1895	01	0059E	32A0005F			LW,R10	ZIL5F	
1896	01	0059F	35AE0140			STW,R10	ZIL5F+225,X7	
1897	01	005A0	6570059F			BIR,X7	$-1	
1898	01	005A1	6AF0041B			BAL,R15	ZSCIR	
1899	01	005A2	3500003D	A		STW,0	ZDSFLG	
1900	01	005A3	32B00FEF			LW,R11	ZEXADR	
1901	01	005A4	6AF00390			BAL,R15	ZSTPTR	
1902	01	005A5	32C005A8			LW,R12	ZCMS2	
1903	01	005A6	6AF004BE			BAL,R15	ZSML40	
1904	01	005A7	6800C183			B	ZPC010	
1905	01	005A8	2040164A	A	ZCMS2	ZFMW	2,0,64,BA(ZCMS3)	
1906	01	005A9	E2C9C7D4	A	ZCMS3	TEXT	'SIGMA 5/7 EXTENDED PERFORMANCE RAD TESTN704978C00'	
	01	005AA	C140F561	A				
	01	005AB	F740C5E7	A				
	01	005AC	E3C5D5C4	A				
	01	005AD	C5C440D7	A				

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LINE  MEM PROT  MEMORY    MEMORY     ABS OR REL ORIG  LABEL     OPERATION  OPERAND          COMMENTS
NO.   KEY       ADDRESS   CONTENTS
      01 005AE  C5D9C6D6 A
      01 005AF  D9D4C1D5 A
      01 005B0  C3C540D9 A
      01 005B1  C1C440E3 A
      01 005B2  C5E2E315 A
      01 005B3  F7F0F4F9 A
      01 005B4  F7F8C3F0 A
      01 005B5  F0404040 A
1907  01 005B6  4CD4C1D5 A           TEXT       ' MANUAL 901540C'
      01 005B7  E4C1D340 A
      01 005B8  F9F0F1F5 A
      01 005B9  F4F0C340 A
1908  01 005BA  0F000140      ZCMS5   XPSD,0     ZT40
1909  01 005BB  00001000 A    ZCMS6   DATA       X'1000'
1910                                   BOUND      8
1911  01 005BC  00000000 A    ZCMST40 DATA       0
1912  01 005BD  00000000 A            DATA       0
1913  01 005BE  00000581               DATA       ZCMS+1
1914  01 005BF  00000000 A            DATA       0
1915                                   PAGE
1916                           *
1917                           * EQUATE STATEMENTS TO OVERLAY CODE FOR COMPUTING MEMORY SIZE
1918                           *  AND ASSIGNING LENGTH AND BASE ADDRESSES FOR TABLES ETC
1919                           *
1920        01 00580           ZLBADR  EQU        ZCMS             OPEN LOOP ADDRESS
1921        01 00581           ZLBPTR  EQU        ZLBADR+1         AND POINTER
1922        01 00582           ZLKADR  EQU        ZLBPTR+1         LINK TABLE ADDRESS
1923        01 00583           ZLKPTR  EQU        ZLKADR+1         AND POINTER
1924        01 00584           ZPMADR  EQU        ZLKPTR+1         PLACE MARKER ADDRESS
1925        01 00585           ZPMPTR  EQU        ZPMADR+1         AND POINTER
1926        01 00586           ZMFRIOAD EQU       ZPMPTR+1         MAIN FETCH INPUT/OUTPUT ADDRESS
1927        01 00587           ZIOADR  EQU        ZMFRIOAD+1       INPUT/OUTPUT BASE ADDRESS
1928        01 00588           ZIOWDS  EQU        ZIOADR+1         AND NUMBER OF WORDS
1929        01 00589           ZEXPTO  EQU        ZIOWDS+1         EXECUTE TABLE BASE
1930        01 0058A           ZEXPT1  EQU        ZEXPTO+1         AND VARIABLE POINTERS
1931        01 0058B           ZTEMP   EQU        ZEXPT1+1         TEMPORARY
1932        01 0058C           ZTEMP1  EQU        ZTEMP+1          LOCATIONS
1933        01 0058D           P0      EQU        ZTEMP1+1
1934        01 0058E           P1      EQU        P0+1             LABELED
1935        01 0058F           P2      EQU        P1+1             PARAMETER
1936        01 00590           P3      EQU        P2+1             AREA FOR
1937        01 00591           P4      EQU        P3+1             SUBROUTINES
1938        01 00592           P5      EQU        P4+1
1939        01 00593           P6      EQU        P5+1
1940        01 00594           P7      EQU        P6+1
1941        01 00595           P8      EQU        P7+1
1942        01 00596           P9      EQU        P8+1
1943        01 00597           P10     EQU        P9+1
1944        01 00598           P11     EQU        P10+1
1945        01 00599           P12     EQU        P11+1
1946        01 0059A           P13     EQU        P12+1
1947        01 0059B           P14     EQU        P13+1
1948        01 0059C           P15     EQU        P14+1
1949        01 0059D           PX      EQU        P15+1
1950        01 0059E           ZDMPA   EQU        PX+1               DUMP
1951  01 005C0                       RES        10                 AREA
1952                                   PAGE
1953                           *
1954                           * SUB-ROUTINE TABLE WITH FORM DIRECTIVE
1955                           *  TWO WORDS PER SUB-ROUTINE DIVIDED AS FOLLOWSO
1956                           *   FIRST WORD = MNEMONIC NAME,FOUR ALPHA CHARACTERS MAXIMUM
1957                           *   SECOND WORD = SUB-ROUTINE INFO AND ENTRY ADDRESS
1958                           *
1959        01 005CA           ZSRBEG  EQU        $
1960  01 005CA     00C3D3D9 A          DATA       X'C3D3D9'        CLR
1961  01 005CB     D9C5E3D5 A          DATA       X'D9C5E3D5'      RETN
1962  01 005CC     00C0C7D6 A          DATA       X'C7D6'          GO
1963  01 005CD     00C4D2C2 A          DATA       X'C4D2C2'        DKB
1964  01 005CE     00C4C3D9 A          DATA       X'C4C3D9'        DCR
1965  01 005CF     00E2D4D3 A          DATA       X'E2D4D3'        SML
1966  01 005D0     00E2D4C4 A          DATA       X'E2D4C4'        SMD
1967  01 005D1     00C1D3E3 A          DATA       X'C1D3E3'        ALT
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LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
1968	01	005D2	00C4D4D7	A		DATA	X'C4D4D7'	DMP
1969	01	005D3	00E3E8D7	A		DATA	X'E3E8D7'	TYP
1970	01	005D4	00C8D3E3	A		DATA	X'C8D3E3'	HLT
1971	01	005D5	C1C4C4D9	A		DATA	X'C1C4C4D9'	ADDR
1972	01	005D6	00C1C9D6	A		DATA	X'C1C9D6'	AIO
1973	01	005D7	C2C1C3D2	A		DATA	X'C2C1C3D2'	BACK
1974	01	005D8	C3C3C8D5	A		DATA	X'C3C3C8D5'	CCHN
1975	01	005D9	C3D4D7D9	A		DATA	X'C3D4D7D9'	CMPR
1976	01	005DA	C3D4D7E6	A		DATA	X'C3D4D7E6'	CMPW
1977	01	005DB	C3D5E3D9	A		DATA	X'C3D5E3D9'	CNTR
1978	01	005DC	C4C3C8D5	A		DATA	X'C4C3C8D5'	DCHN
1979	01	005DD	00C4D3E8	A		DATA	X'C4D3E8'	DLY
1980	01	005DE	00C5D9C9	A		DATA	X'C5D9D9'	ERR
1981	01	005DF	00C8C9D6	A		DATA	X'C8C9D6'	HIO
1982	01	005E0	D1E4D4D7	A		DATA	X'D1E4D4D7'	JUMP
1983	01	005E1	00D3C5D5	A		DATA	X'D3C5D5'	LEN
1984	01	005E2	D4C1D9D2	A		DATA	X'D4C1D9D2'	MARK
1985	01	005E3	D7C1E3E3	A		DATA	X'D7C1E3E3'	PATT
1986	01	005E4	D7C3E8C3	A		DATA	X'D7C3E8C3'	PCYC
1987	01	005E5	00000D8	A		DATA	X'D8'	Q
1988	01	005E6	D9C5C1C4	A		DATA	X'D9C5C1C4'	READ
1989	01	005E7	00D9C9D6	A		DATA	X'D9C9D6'	RIO
1990	01	005E8	E2C5C5D2	A		DATA	X'E2C5C5D2'	SEEK
1991	01	005E9	E2C5D5E2	A		DATA	X'E2C5D5E2'	SENS
1992	01	005EA	00E2C9D6	A		DATA	X'E2C9D6'	SIO
1993	01	005EB	E2E3C5D7	A		DATA	X'E2E3C5D7'	STEP
1994	01	005EC	E2E3D6D7	A		DATA	X'E2E3D6D7'	STOP
1995	01	005ED	E3C3C4C1	A		DATA	X'E3C3C4C1'	TCDA
1996	01	005EE	00E3C4E5	A		DATA	X'E3C4E5'	TDV
1997	01	005EF	00E3C9D6	A		DATA	X'E3C9D6'	TIO
1998	01	005F0	00E3D9E8	A		DATA	X'E3D9E8'	TRY
1999	01	005F1	E3E8D7C2	A		DATA	X'E3E8D7C2'	TYPB
2000	01	005F2	E3E8D7C3	A		DATA	X'E3E8D7C3'	TYPC
2001	01	005F3	E4D5C9E3	A		DATA	X'E4D5C9E3'	UNIT
2002	01	005F4	E4D7C1C4	A		DATA	X'E4D7C1C4'	UPAD
2003	01	005F5	00E6D9E3	A		DATA	X'E6D9E3'	WRT
2004	01	005F6	E7C3E6E3	A		DATA	X'E7C3E6E3'	XCWT
2005	01	005F7	E7C7C5D5	A		DATA	X'E7C7C5D5'	XGEN
2006	01	005F8	E7D9C4E2	A		DATA	X'E7D9C4E2'	XRDS
2007	01	005F9	E7E6D9E3	A		DATA	X'E7E6D9E3'	XWRT
2008		01	005FA		ZSRTBL	EQU	$	
2009		00000030			ZSRLEN	EQU	$-ZSRBEG	
2010						PAGE		
2011					*			
2012					*	SUBROUTINE ADDRESS TABLE WITH CONTROL INFORMATION		
2013					*			
2014					*	BITS 0-3	PARAMETER COUNT	
2015					*	BITS 4-5	RE-ITERATION/IDENTIFIER CODE	
2016					*		00 NO LEADING DECIMAL SUBFIELD PERMITTED	
2017					*		01 PLACE MARKER IDENTIFIER REQUEST	
2018					*		10 REITERATION COUNT	
2019					*		11 ILLEGAL	
2020					*	BITS 6-7	EXECUTION MODE KEYS	
2021					*		00 UNCONDITIONAL	
2022					*		01 CONTROL LINE MODE ONLY	
2023					*		10 IMMEDIATE MODE ONLY	
2024					*		11 OPTIONAL CONTROL OR IMMEDIATE MODE	
2025					*	BITS 8-14	RESERVED	
2026					*	BITS 15-31	SUBROUTINE ADDRESS	
2027					*			
2028	01	005FA	0000019A	A		ZFSAT	0,0,0,0,ZPC200	CLR
2029	01	005FB	0300054C	A		ZFSAT	0,0,3,0,ZCONINT	RETN
2030	01	005FC	0200055C	A		ZFSAT	0,0,2,0,ZGOPRO	GO
2031	01	005FD	12000422	A		ZFSAT	1,0,2,0,ZDKB	DKB
2032	01	005FE	12000425	A		ZFSAT	1,0,2,0,ZDCR	DCR
2033	01	005FF	1300042F	A		ZFSAT	1,0,3,0,ZSML	SML
2034	01	00600	13000434	A		ZFSAT	1,0,3,0,ZSMD	SMD
2035	01	00601	00000448	A		ZFSAT	0,0,0,0,ZALT	ALT
2036	01	00602	33000462	A		ZFSAT	3,0,3,0,ZDMP	DMP
2037	01	00603	3300045C	A		ZFSAT	3,0,3,0,ZTYP	TYP
2038	01	00604	17000439	A		ZFSAT	1,1,3,0,ZHLT	HLT

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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL     OPERATION  OPERAND          COMMENTS
2039      01            00605           3300064D         A                ZFSAT     3,0,3,0,ADDR     ADDR
2040      01            00606           17000699         A                ZFSAT     1,1,3,0,AIB      AIB
2041      01            00607           030006A8         A                ZFSAT     0,0,3,0,BACK     BACK
2042      01            00608           180006CD         A                ZFSAT     1,2,3,0,CCHN     CCHN
2043      01            00609           17000783         A                ZFSAT     1,1,3,0,CMPR     CMPR
2044      01            0060A           270007C3         A                ZFSAT     2,1,3,0,CMPW     CMPW
2045      01            0060B           57000818         A                ZFSAT     5,1,3,0,CNTR     CNTR
2046      01            0060C           9800095A         A                ZFSAT     9,2,3,0,DCHN     DCHN
2047      01            0060D           280009D3         A                ZFSAT     2,2,3,0,DLY      DLY
2048      01            0060E           130009F1         A                ZFSAT     1,0,3,0,ERR      ERR
2049      01            0060F           27000A0A         A                ZFSAT     2,1,3,0,HIB      HIB
2050      01            00610           AB000A30         A                ZFSAT     10,2,3,0,JUMP    JUMP
2051      01            00611           23000A36         A                ZFSAT     2,0,3,0,LEN      LEN
2052      01            00612           13000A7B         A                ZFSAT     1,0,3,0,MARK     MARK
2053      01            00613           23000A9B         A                ZFSAT     2,0,3,0,PATT     PATT
2054      01            00614           18000AD0         A                ZFSAT     1,2,3,0,PCYC     PCYC
2055      01            00615           17000C0A         A                ZFSAT     1,1,3,0,Q        Q
2056      01            00616           28000C90         A                ZFSAT     2,2,3,0,READ     READ
2057      01            00617           03000CCD         A                ZFSAT     0,0,3,0,RIB      RIB
2058      01            00618           23000CD2         A                ZFSAT     2,0,3,0,SEEK     SEEK
2059      01            00619           13000CED         A                ZFSAT     1,0,3,0,SENS     SENS
2060      01            0061A           57000D22         A                ZFSAT     5,1,3,0,SIB      SIB
2061      01            0061B           0B000DCC         A                ZFSAT     0,2,3,0,STEP     STEP
2062      01            0061C           13000DDE         A                ZFSAT     1,0,3,0,STBP     STBP
2063      01            0061D           03000DED         A                ZFSAT     0,0,3,0,TCDA     TCDA
2064      01            0061E           27000DFE         A                ZFSAT     2,1,3,0,TDV      TDV
2065      01            0061F           27000E11         A                ZFSAT     2,1,3,0,TIB      TIB
2066      01            00620           13000E23         A                ZFSAT     1,0,3,0,TRY      TRY
2067      01            00621           23000E4C         A                ZFSAT     2,0,3,0,TYPB     TYPB
2068      01            00622           13000E66         A                ZFSAT     1,0,3,0,TYPC     TYPC
2069      01            00623           93000E7C         A                ZFSAT     9,0,3,0,UNIT     UNIT
2070      01            00624           03000EB9         A                ZFSAT     0,0,3,0,UPAD     UPAD
2071      01            00625           28000EE5         A                ZFSAT     2,2,3,0,WRT      WRT
2072      01            00626           0B000F3F         A                ZFSAT     0,2,3,0,XCWT     XCWT
2073      01            00627           83000F22         A                ZFSAT     8,0,3,0,XGEN     XGEN
2074      01            00628           0B000F49         A                ZFSAT     0,2,3,0,XRDS     XRDS
2075      01            00629           0B000F44         A                ZFSAT     0,2,3,0,XWRT     XWRT
2076                    01 0062A                         ZSRADR   EQU       *
2077                                                     PAGE
2078                                                     *****************************************************
2079                                                     *                                                   *
2080                                                     *                                                   *
2081                                                     *                  S I G M A   5 / 7                *
2082                                                     *                                                   *
2083                                                     *                                                   *
2084                                                     *          H I G H   C A P A C I T Y   R A D        *
2085                                                     *                                                   *
2086                                                     *                                                   *
2087                                                     *                T E S T   P R B G R A M            *
2088                                                     *                                                   *
2089                                                     *                                                   *
2090                                                     *****************************************************
2091                                                     SPACE    5
2092      01 0062A                                       PTCHAREA RES      32
2093                                                     PAGE
2094                                                     *THIS WILL SELECT THE ENTRIES IN THE UNIT LIST WHICH WILL BE MADE    *
2095                                                     *ACTIVE. A STARTING BAND AND SECTOR ADDRESS FOR THE FIRST ACTIVE     *
2096                                                     *UNIT MAY ALSO BE ENTERED IN PARAMETERS D2 AND D3 RESPECTIVELY.      *
2097                                                     *                                                                    *
2098      01 0064A        40000000 A                     DATA     X'40000000'      P1=RUN #8,7,6,5,4,3,2,1 OF UNITLIST
2099      01 0064B        20000000 A                     DATA     X'20000000'      P2=TRACK ADDRESS
2100      01 0064C        20000000 A                     DATA     X'20000000'      P3=SECTOR ADDRESS
2101      01 0064D        35F00677                ADDR   STW,R15  ADDREXIT
2102      01 0064E        22B00000 A                     LI,R11   0
2103      01 0064F        22D00000 A                     LI,R13   0
2104      01 00650        35B00859                       STW,R11  COUNTER+8
```

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
2105	01	00651	32A00590			LW,R10	P3	
2106	01	00652	25A0057C	A		SAD,R10	=4	
2107	01	00653	32A0058F			LW,R10	P2	
2108	01	00654	25A00574	A		SAD,R10	=12	
2109	01	00655	224FFFF8	A		LI,R4	=8	
2110	01	00656	32C0058E			LW,R12	P1	
2111	01	00657	21C00001	A		CI,R12	1	
2112	01	00658	69400665			BCS,4	ADDR00	RUN THIS UNIT
2113	01	00659	32E80EA7			LW,R14	UNITLIST+8,X4	NO=CLEAR
2114	01	0065A	4BE00FFC			AND,R14	=X'FFFF7FFF'	ACTIVE
2115	01	0065B	35E80EA7			STW,R14	UNITLIST+8,X4	BIT
2116	01	0065C	25C0047F	A		SAS,R12	=1	
2117	01	0065D	65400657		ADDR02	BIR,R4	$=6	8 BITS YET
2118	01	0065E	33000000D	A		MTW,0	R13	YES
2119	01	0065F	68100661			BCR,1	$+2	WERE ANY UNITS ACTIVATED
2120	01	00660	E8000677			B	*ADDREXIT	YES=EXIT
2121	01	00661	32C00678			LW,R12	ADDR01	NO=TYPE MESSAGE
2122	01	00662	6AF00E35			BAL,R15	TYPE01	
2123	01	00663	2E000000	A	WAIT1	WAIT		INEXISTENT DEV ADDR HAS BEEN ENTRD
2124	01	00664	68000660			B	$=4	
2125	01	00665	32E80EA7		ADDR00	LW,R14	UNITLIST+8,X4	
2126	01	00666	21E04000	A		CI,R14	X'4000'	
2127	01	00667	69400669			BCS,4	$+2	IS THERE AN ENTRY HERE
2128	01	00668	6800065C			B	ADDR02=1	NO
2129	01	00669	4BE00FF1			AND,R14	=X'7FFF'	
2130	01	0066A	49B0000E	A		ER,R11	R14	
2131	01	0066B	20808000	A		AI,R11	X'8000'	
2132	01	0066C	35B80EA7			STW,R11	UNITLIST+8,X4	
2133	01	0066D	33000000D	A		MTW,0	R13	
2134	01	0066E	69100675			BCS,1	ADDR03	
2135	01	0066F	35B00EBE			STW,R11	CDA	
2136	01	00670	35B00EC0			STW,R11	SDA	
2137	01	00671	35B00AE7			STW,R11	WORKADDR	
2138	01	00672	35400EBF			STW,R4	CDAPNTR	
2139	01	00673	35400EC1			STW,R4	SDAPNTR	
2140	01	00674	33F0000D	A		MTW,=1	R13	
2141	01	00675	22B00000	A	ADDR03	LI,R11	0	
2142	01	00676	6800065C			B	ADDR02=1	
2143	01	00677	00000000	A	ADDREXIT	DATA	0	
2144	01	00678	100C19E4	A	ADDR01	ZFMW	1,0,12,BA(NOUNITS)	
2145	01	00679	D5D640E4	A	NOUNITS	TEXT	'NO UNITS SEL'	
	01	0067A	D5C9E3E2	A				
	01	0067B	40E2C5D3	A				
2146						PAGE		
2147					*			*
2148					*THIS WILL GENERATE THE CURRENT DEVICE ADDRESS IN THE FOLLOWING			*
2149					*FORMAT: U/T/S WHERE U=UNIT ADDRESS (0-FF), T=TRACK ADDRESS (0-1023),			*
2150					*AND S=SECTOR ADDRESS (0-11).			*
2151					*			
2152	01	0067C	35F00693		ADDRGEN	STW,R15	ADRGNXIT	
2153	01	0067D	35C00694			STW,R12	ADRGNSAV	
2154	01	0067E	4BC00FF2			AND,R12	=X'7FF'	
2155	01	0067F	6AF00931			BAL,R15	HEXCNVRT	
2156	01	00680	25D00008	A		SLS,R13	8	
2157	01	00681	20D00061	A		AI,R13	X'61'	
2158	01	00682	35D00695			STW,R13	ADRGNSAV+1	
2159	01	00683	32D00694			LW,R13	ADRGNSAV	
2160	01	00684	25C0050C	A		SAD,R12	12	
2161	01	00685	4BC00FF3			AND,R12	=X'FFF'	
2162	01	00686	6AF00925			BAL,R15	DECCNVRT	
2163	01	00687	35D00696			STW,R13	ADRGNSAV+2	
2164	01	00688	32D00694			LW,R13	ADRGNSAV	
2165	01	00689	25C00510	A		SAD,R12	16	
2166	01	0068A	4BC00FF4			AND,R12	=X'F'	
2167	01	0068B	6AF00925			BAL,R15	DECCNVRT	
2168	01	0068C	25D00408	A		SAS,R13	8	
2169	01	0068D	30D00FF5			AW,R13	=X'21000000'	
2170	01	0068E	20D00061	A		AI,R13	X'61'	
2171	01	0068F	35D00697			STW,R13	ADRGNSAV+3	
2172	01	00690	32D00FF6			LW,R13	=X'40404061'	
2173	01	00691	35D00694			STW,R13	ADRGNSAV	

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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL      OPERATION  OPERAND          COMMENTS
2174      01            00692           E8000693                          B          *ADRGNXIT
2175      01            00693           00000000         A       ADRGNXIT  DATA       0
2176      01            00694                                    ADRGNSAV  RES        4
2177                                                               PAGE
2178                                                             *
2179                                                             *THIS EXECUTES AN AIO AND OUTPUTS THE STATUS AT MESSAGE LEVEL 3.  *
2180                                                             *IF ANY BITS OF PARAMETER X1 COMPARE WITH ANY BITS OF THE STATUS  *
2181                                                             *RESPONSE, A PLACEMARK BRANCH WILL BE TAKEN IF SPECIFIED IN THE   *
2182                                                             *CONTROL LINE.                                                    *
2183                                                             *                                                                 *
2184      01            00698           40000000         A                  DATA       X'40000000'      P1=STATUS COMPARISON WORD
2185      01            00699           35F006A5                 AIO       STW,R15    AIOEXIT          SAVE RETURN
2186      01            0069A           3280058E                           LW,R8      P1
2187      01            0069B           358006A7                           STW,R8     STCMPSAV
2188      01            0069C           6ED00000         A                 AIO,R13    0
2189      01            0069D           74000000         A                 STCF       R12
2190      01            0069E           32B00AE1                           LW,R11     TEXTAIO
2191      01            0069F           6AF0006C                           BAL,R15    STATTYPE
2192      01            006A0           25D00474         A                 SAS,R13    -12
2193      01            006A1           31D006A7                           CW,R13     STCMPSAV
2194      01            006A2           684006A4                           BCR,4      $+2              ANY BITS COMPARE
2195      01            006A3           331006A5                           MTW,1      AIOEXIT          YES
2196      01            006A4           E80006A5                           B          *AIOEXIT         NO
2197      01            006A5           00000000         A       AIOEXIT   DATA       0
2198      01            006A6           C1C9D640         A       AIOHDG    TEXT       'AIO '
2199      01            006A7           00000000         A       STCMPSAV  DATA       0
2200                                                               PAGE
2201                                                             *                                                                 *
2202                                                             *THIS RESETS THE CURRENT DEVICE ADDRESS TO THE STARTING DEVICE     *
2203                                                             *ADDRESS. (SDA---->CDA)                                           *
2204                                                             *                                                                 *
2205      01            006A8           12800EC0                 BACK      LD,R8      SDA
2206      01            006A9           15800EBE                           STD,R8     CDA
2207      01            006AA           E800000F         A                 B          *R15
2208                                                               PAGE
2209                                                             *                                                                 *
2210                                                             *THIS CHECKS WHETHER THE NEXT READ OR WRITE OPERATION WILL EXCEED THE *
2211                                                             *CAPACITY OF THE CURRENTLY SELECTED UNIT. IF IT WILL, THE UNIT LIST IS*
2212                                                             *SCANNED TO FIND THE NEXT ACTIVE UNIT, AND THE OPERATION IS PERFORMED *
2213                                                             *THERE. THE CDA IS NOT AFFECTED.                                  *
2214                                                             *                                                                 *
2215      01            006AB           32900EBE                 CAPCHECK  LW,R9      CDA
2216      01            006AC           32A00009         A                 LW,R10     R9
2217      01            006AD           22E00000         A                 LI,R14     0
2218      01            006AE           35F006CA                           STW,R15    CPCHKXIT
2219      01            006AF           6AF00E28                           BAL,R15    TSUPDATE
2220      01            006B0           330000DC                           MTW,0      STEPIND
2221      01            006B1           683006B3                           BEZ        $+2
2222      01            006B2           20A10000         A                 AI,R10     X'10000'
2223      01            006B3           32B00FF7                           LW,R11     =X'FFFF0000'
2224      01            006B4           21900800         A                 CI,R9      X'800'
2225      01            006B5           694006B8                           BCS,4      $+3              IS THIS AN XX UNIT
2226      01            006B6           45A00FF8                           CS,R10     =X'80000000'     NO=TEST FOR 2048
2227      01            006B7           680006B9                           B          $+2
2228      01            006B8           45A00FF9                           CS,R10     =X'20000000'     YES=TEST FOR > 511
2229      01            006B9           682006C2                           BCR,2      CAPCHK00         WAS CAPACITY EXCEEDED
2230      01            006BA           32100EBF                           LW,R1      CDAPNTR          YES
2231      01            006BB           651006BD                           BIR,R1     $+2
2232      01            006BC           221FFFF8         A                 LI,R1      -8
2233      01            006BD           32E20EA7                           LW,R14     UNITLIST+8,X1
2234      01            006BE           21E08000         A                 CI,R14     X'8000'          IS THIS UNIT
2235      01            006BF           694006C1                           BCS,4      $+2               AN ACTIVE ONE
2236      01            006C0           680006BB                           B          $-5              NO=CHECK NEXT ENTRY
2237      01            006C1           3290000E         A                 LW,R9      R14
2238      01            006C2           35900AE7                 CAPCHK00  STW,R9     WORKADDR
2239      01            006C3           21100001         A                 CI,R1      1
2240      01            006C4           683006C7                           BE         $+3              IS R1 = 1
2241      01            006C5           35100000         A                 STW,R1     R13              NO.
2242      01            006C6           680006C8                           B          $+2
2243      01            006C7           32D00EBF                           LW,R13     CDAPNTR          YES.
2244      01            006C8           22100001         A                 LI,R1      1
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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL      OPERATION  OPERAND          COMMENTS
2245      01 006C9      E80006CA                          B          *CPCHKXIT
2246      01 006CA      00000000 A        CPCHKXIT DATA     0
2247      01 006CB      00000000 A        SKWRPIND DATA     0
2248                                      PAGE
2249                                      *                                                                    *
2250                                      *THIS TESTS THE COMMAND CHAINING CAPABILITIES OF THE UNIT AND CONTROL-*
2251                                      *LER. IT WILL START AT THE CDA AND READ OR WRITE 1024 BYTES (PARAME- *
2252                                      *TER D1=0, READ; D1=1, WRITE). THE PATTERN IS THE PARTICULAR TRACK    *
2253                                      *AND SECTOR ADDRESS. AS THIS GROUP ADDRESS REQUIRES 2 BYTES, IT WILL *
2254                                      *BE WRITTEN 512 TIMES. AT THE COMPLETION OF THIS OPERATION, THE TRACK *
2255                                      *AND SECTOR ADDRESSES (CDA) ARE BOTH INCREMENTED BY 1. THIS IS THEN   *
2256                                      *THE ADDRESS OF THE NEXT DATA GROUP. THIS IS DONE 16 TIMES. THE RESULT*
2257                                      *IS THAT THE DATA IS WRITTEN ON THE DISC IN A SPIRAL FASHION.         *
2258                                      *                                                                    *
2259      01 006CC      20000000 A                DATA      X'20000000'      P1
2260      01 006CD      35F00701          CCHN    STW,R15   CCHNEXIT
2261      01 006CE      227FFFF4 A                LI,R7     -12
2262      01 006CF      22800C00 A                LI,R8     3072
2263      01 006D0      31800588                  CW,R8     ZIBWDS
2264      01 006D1      682006D4                  BCR,2     $+3
2265      01 006D2      208FFF00 A                AI,R8     -256
2266      01 006D3      657006D0                  BIR,R7    $-3
2267      01 006D4      35700754                  STW,R7    NSECTCNT
2268      01 006D5      228FFFFF A                LI,R8     -1
2269      01 006D6      3300058E                  MTW,0     P1
2270      01 006D7      683006DB                  BCR,3     $+4
2271      01 006D8      35800F19                  STW,R8    WRTIND
2272      01 006D9      12C00ACE                  LD,R12    WRTORDER
2273      01 006DA      680006DD                  B         $+3
2274      01 006DB      35800CCA                  STW,R8    READIND
2275      01 006DC      12C00AC0                  LD,R12    RDSORDER
2276      01 006DD      12A00AD2                  LD,R10    SEEKORDR
2277      01 006DE      22800744                  LI,R8     SK00
2278      01 006DF      32900587                  LW,R9     ZIBADR
2279      01 006E0      25800502 A                SAD,R8    2
2280      01 006E1      49A00008 A                BR,R10    R8
2281      01 006E2      49C00009 A                BR,R12    R9
2282      01 006E3      32900EBE                  LW,R9     CDA
2283      01 006E4      25800510 A                SAD,R8    16
2284      01 006E5      32900EBE                  LW,R9     CDA
2285      01 006E6      25800510 A                SAD,R8    16
2286      01 006E7      22900744                  LI,R9     SK00
2287      01 006E8      30B00FFA                  AW,R11    =X'10000002'
2288      01 006E9      30D00FFB                  AW,R13    =X'10000400'
2289      01 006EA      22600000 A                LI,R6     0
2290      01 006EB      15A00704          CCHN00  STD,R10   CHANLIST,X6
2291      01 006EC      15C00706                  STD,R12   CHANLIST+2,X6
2292      01 006ED      B5800009 A                STW,R8    *R9
2293      01 006EE      33200006 A                MTW,2     R6
2294      01 006EF      20C00400 A                AI,R12    1024
2295      01 006F0      20A00004 A                AI,R10    4
2296      01 006F1      6AF00797                  BAL,R15   CHDTAUPD
2297      01 006F2      20900001 A                AI,R9     1
2298      01 006F3      657006EB                  BIR,R7    CCHN00
2299      01 006F4      33E00C06 A                MTW,-2    R6
2300      01 006F5      30D00FFC                  AW,R13    =X'F0000000'
2301      01 006F6      20CFFC00 A                AI,R12    -1024
2302      01 006F7      15C00706                  STD,R12   CHANLIST+2,X6
2303      01 006F8      33000CCA                  MTW,0     READIND
2304      01 006F9      693006FB                  BCS,3     $+2
2305      01 006FA      6AF007A3                  BAL,R15   CHNGEN00
2306      01 006FB      6AF00755                  BAL,R15   CHANEXEC
2307      01 006FC      6AF00764                  BAL,R15   CHDTACHK
2308      01 006FD      22800000 A                LI,R8     0
2309      01 006FE      35800CCA                  STW,R8    READIND
2310      01 006FF      35800F19                  STW,R8    WRTIND
2311      01 00700      E8000701                  B         *CCHNEXIT
2312      01 00701      00000000 A        CCHNEXIT DATA     0
2313                                      *
2314                                                BOUND     8
2315      01 00702      08000382          CHAINTIC ZFCP     X'08',DA(CHANLIST)
2316      01 00703      00000000 A                DATA      0
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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL      OPERATION  OPERAND      COMMENTS
2317      01            00704                           CHANLIST   RES        64
2318      01            00744                           SK00       RES        16
2319      01            00754           00000000  A     NSECTCNT:  DATA       0
2320                                                    PAGE
2321                                                    *
2322                                                    *THIS ROUTINE  ACTUALLY COMMANDS THE EXECUTION OF THE CCHN DIRECTIVE.  *
2323                                                    *SHOULD ANY ERROR OCCUR, THE ERROR COUNTERS WILL BE UPDATED, AN ERROR  *
2324                                                    *MESSAGE WILL BE OUTPUT, AND A PLACEMARK BRANCH WILL BE TAKEN, IF      *
2325                                                    *SO SPECIFIED IN THE CONTROL LINE.                                     *
2326                                                    *                                                                      *
2327      01            00755           35F00763        CHANEXEC   STW,R15    CHNEXXIT
2328      01            00756           32800EBE                   LW,R8      CDA
2329      01            00757           35800AF7                   STW,R8     WORKADDR
2330      01            00758           22800758                   LI,R8      CHNEXE00
2331      01            00759           22900759                   LI,R9      CHNEXE00+1
2332      01            0075A           15800ACC                   STD,R8     NORMRETN
2333      01            0075B           12800702                   LD,R8      CHAINTIC
2334      01            0075C           15800ABE                   STD,R8     COMMPAIR
2335      01            0075D           68000AAF                   B          EXECUTE
2336      01            0075E           E8000763        CHNEXE00   B          *CHNEXXIT
2337      01            0075F           6AF00A08                   BAL,R15    ERRORCNT
2338      01            00760           6AF00A34                   BAL,R15    ERRORTYP
2339      01            00761           33100763                   MTW,1      CHNEXXIT
2340      01            00762           E8000763                   B          *CHNEXXIT
2341      01            00763           00000000  A     CHNEXXIT   DATA       0
2342                                                    PAGE
2343                                                    *THIS ROUTINE CHECKS, FOR THE CCHN DIRECTIVE, WHETHER OR NOT THE 16TH  *
2344                                                    *SECTOR OF THE 16TH TRACK HAS BEEN OPERATED UPON.                      *
2345                                                    *                                                                      *
2346      01            00764           35F0078C        CHDTACHK   STW,R15    CHDTAXIT
2347      01            00765           32600754                   LW,R6      NSECTCNT
2348      01            00766           32800EBE                   LW,R8      CDA
2349      01            00767           25800570  A                SAD,R8     -16
2350      01            00768           32900EBE                   LW,R9      CDA
2351      01            00769           25800510  A                SAD,R8     16
2352      01            0076A           32900587                   LW,R9      ZIOADR
2353      01            0076B           22A00000  A                LI,R10     0
2354      01            0076C           6800076E                   B          $+2
2355      01            0076D           6AF00797        CHDTA00    BAL,R15    CHDTAUPD
2356      01            0076E           227FFF00  A                LI,R7      -256
2357      01            0076F           20900100  A                AI,R9      256
2358      01            00770           20AFFF00  A                AI,R10     -256
2359      01            00771           B18E0009  A                CW,R8      *R9,X7
2360      01            00772           69300776                   BCS,3      $+4
2361      01            00773           65700771        CHDTA01    BIR,R7     $-2
2362      01            00774           6560076D                   BIR,R6     CHDTA00
2363      01            00775           E800078C                   B          *CHDTAXIT
2364      01            00776           32C00009  A                LW,R12     R9
2365      01            00777           38C00587                   SW,R12     ZIOADR
2366      01            00778           30C0000A  A                AW,R12     R10
2367      01            00779           6AF00925                   BAL,R15    DECCNVRT
2368      01            0077A           35C00794                   STW,R12    CHAINMSG+6
2369      01            0077B           35D00795                   STW,R13    CHAINMSG+7
2370      01            0077C           32C0078D                   LW,R12     CHAINCTL
2371      01            0077D           6AF00E35                   BAL,R15    TYPE01
2372      01            0077E           32C00008  A                LW,R12     R8
2373      01            0077F           6AF00931                   BAL,R15    HEXCNVRT
2374      01            00780           35C005A0                   STW,R12    ZDMPA+2
2375      01            00781           35D005A1                   STW,R13    ZDMPA+3
2376      01            00782           B2CE0009  A                LW,R12     *R9,X7
2377      01            00783           6AF00931                   BAL,R15    HEXCNVRT
2378      01            00784           35C005A3                   STW,R12    ZDMPA+5
2379      01            00785           35D005A4                   STW,R13    ZDMPA+6
2380      01            00786           32C0094D                   LW,R12     EBCBLNK
2381      01            00787           35C0059F                   STW,R12    ZDMPA+1
2382      01            00788           35C005A2                   STW,R12    ZDMPA+4
2383      01            00789           32C00796                   LW,R12     CHANCTLC
2384      01            0078A           6AF00E35                   BAL,R15    TYPE01
2385      01            0078B           68000773                   B          CHDTA01
2386      01            0078C           00000000  A     CHDTAXIT   DATA       0
2387      01            0078D           10201E38  A     CHAINCTL   ZFMW       1,0,32,BA(CHAINMSG)
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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL     OPERATION  OPERAND          COMMENTS
2388      01            0078E           C3C3C8D5         A                CHAINMSG  TEXT       'CCHN COMPARE ERROR #'
          01            0078F           40C3D6D4         A
          01            00790           D7C1D9C5         A
          01            00791           40C5D9D9         A
          01            00792           D6D9407C         A
          01            00793           40404040         A
          01            00794           40404040         A
          01            00795           40404040         A
2389      01            00796           101C1678         A                CHANCTLO  ZFMW       1,0,28,BA(ZDMPA)
2390                                                                      PAGE
2391                                                                      *                                                              *
2392                                                                      *THIS ROUTINE INCREMENTS BOTH TRACK AND SECTOR ADDRESSES BY 1, FOR *
2393                                                                      *USE IN THE CCHN DIRECTIVE.                                    *
2394                                                                      *                                                              *
2395      01            00797           55F2079E                         CHDTAUPD  STH,R15    CHUPDXIT,X1
2396      01            00798           22E0000B         A               LI,R14    11
2397      01            00799           22F0000F         A               LI,R15    15
2398      01            0079A           30800FFD                         AW,R8     *X'00110011'
2399      01            0079B           45E00008         A               CS,R14    R8                 IS R8 LESS THAN
2400      01            0079C           6810079E                         BCR,1     $+2                 OR EQUAL TO 11
2401      01            0079D           30800FFE                         AW,R8     *X'FFF3FFF4'       NO-CORRECT SUM
2402      01            0079E           68000000         A               CHUPDXIT  B          0                  YES-EXIT
2403                                                                      PAGE
2404                                                                      *                                                              *
2405                                                                      *THIS ROUTINE WAITS FOR THE COMPLETION OF AN SIO APPROXIMATELY  *
2406                                                                      *5 SECONDS. IF CHANNEL END HAS NOT OCCURRED IN THAT TIME, THE RAD *
2407                                                                      *IS DISCONNECTED AND AN ERROR MESSAGE IS OUTPUT.                *
2408                                                                      *                                                              *
2409      01            0079F           327007A2                         CHENDCHK  LW,R7     CHENDLAY
2410      01            007A0           647007A0                         LOOP1     BDR,R7    $                  WAITING FOR CHANNEL END INTERRUPT
2411      01            007A1           68000889                                   B         NOCHEND
2412      01            007A2           0032DCD5         A               CHENDLAY  DATA      3333333
2413                                                                      PAGE
2414                                                                      *                                                              *
2415                                                                      *THIS ROUTINE GENERATES DATA, AS DESCRIBED IN FRONT OF THE CCHN *
2416                                                                      *DIRECTIVE.                                                    *
2417                                                                      *                                                              *
2418      01            007A3           55F207B1                         CHNGENOO  STH,R15    CHNGXIT,X1
2419      01            007A4           32700754                         LW,R7     NSECTCNT
2420      01            007A5           32800EBE                         LW,R8     CDA
2421      01            007A6           25800570         A               SAD,R8    *16
2422      01            007A7           32900EBE                         LW,R9     CDA
2423      01            007A8           25800510         A               SAD,R8    16
2424      01            007A9           32900587                         LW,R9     ZIOADR
2425      01            007AA           209FFFFF         A               AI,R9     *1
2426      01            007AB           22600100         A               LI,R6     256
2427      01            007AC           B58C0009         A               CHNGENO1  STW,R8    *R9,X6
2428      01            007AD           646007AC                         BDR,R6    $-1
2429      01            007AE           6AF00797                         BAL,R15   CHDTAUPD
2430      01            007AF           20900100         A               AI,R9     256
2431      01            007B0           657007AB                         BIR,R7    CHNGENO1-1
2432      01            007B1           68000000         A               CHNGXIT   B         0
2433                                                                      PAGE
2434                                                                      *THIS WILL READ A RECORD FROM THE RAD AS SPECIFIED BY THE CDA AND THE *
2435                                                                      *LENGTH DIRECTIVE. IT WILL THEN BE COMPARED WITH THE PATTERN SPECIFIED*
2436                                                                      *BY THE PATT DIRECTIVE. A PLACEMARK BRANCH IS TAKEN ON ERROR, IF *
2437                                                                      *SPECIFIED IN THE CONTROL LINE.                                 *
2438                                                                      *                                                              *
2439      01            007B2           20000000         A               DATA      X'20000000'        P1
2440      01            007B3           35F007C0                 CMPR    STW,R15   CMPREXIT
2441      01            007B4           3280058E                         LW,R8     P1
2442      01            007B5           35800AE8                         STW,R8    SKWRPROT
2443      01            007B6           22800001         A               LI,R8     1
2444      01            007B7           3580058F                         STW,R8    P2
2445      01            007B8           6AF00C90                         BAL,R15   READ
2446      01            007B9           33000CC8                         MTW,0     RDSERIND
2447      01            007BA           6930079E                         BCS,3     CMPR00             READ ERROR
2448      01            007BB           6AF00868                         BAL,R15   COMPARE             NO
2449      01            007BC           330008DE                         MTW,0     CMPERIND
2450      01            007BD           683007BF                         BCR,3     $+2                COMPARE ERROR
2451      01            007BE           331007C0                 CMPR00  MTW,1     CMPREXIT           YES
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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL      OPERATION  OPERAND          COMMENTS
2452      01            007BF           E80007C0                          B          *CMPREXIT
2453      01            007C0           00000000         A       CMPREXIT  DATA       0
2454                                                                PAGE
2455                                                      *                                                              *
2456                                                      *THIS WILL COMPARE DATA IN DISC STORAGE WITH DATA IN CORE WITHOUT *
2457                                                      *READING DATA INTO CORE. A PLACEMARK BRANCH IS TAKEN ON ERROR, IF *
2458                                                      *SPECIFIED IN THE CONTROL LINE.                                  *
2459                                                      *IF PARAMETER F1=0, EXECUTE CHECKWRITE ON ALL TRACKS; IF F1=1, SKIP *
2460                                                      *WRITE PROTECTED TRACKS.                                         *
2461                                                      *IF PARAMETER D2 IS 1 THROUGH 8, THE CONTENTS OF THE COUNTER SPECIFIED*
2462                                                      *BY D2 IS USED AS THE STARTING BYTE ADDRESS FOR THE OPERATION.    *
2463                                                      *                                                              *
2464      01            007C1           20000000         A                 DATA       X'20000000'      P1
2465      01            007C2           20000000         A                 DATA       X'20000000'      P2
2466      01            007C3           35F0080A                  CMPW    STW,R15    CMPWEXIT
2467      01            007C4           328C0AE6                          LW,R8      TEXTCWRT
2468      01            007C5           358C0EE2                          STW,R8     WRPRORDR
2469      01            007C6           228C0000         A                LI,R8      0
2470      01            007C7           358C0812                          STW,R8     CWERRIND
2471      01            007C8           3280058E                          LW,R8      P1
2472      01            007C9           358C0AE8                          STW,R8     SKWRPROT
2473      01            007CA           328C0E26                          LW,R8      RETRYCNT
2474      01            007CB           358C0E27                          STW,R8     RETRYCTR
2475      01            007CC           330C058F                          MTW,O      P2
2476      01            007CD           693C07D1                          BCS,3      CMPW02
2477      01            007CE           330C08C6                          MTW,O      PATTERN1
2478      01            007CF           693C07D1                          BCS,3      $+2
2479      01            007D0           6AF00B9F                          BAL,R15    PATTENT1
2480      01            007D1           6AF006AB                  CMPW02  BAL,R15    CAPCHECK
2481      01            007D2           330C0AE8                          MTW,O      SKWRPROT
2482      01            007D3           683C07D6                          BCR,3      $+3
2483      01            007D4           6AF00EC2                          BAL,R15    WRPRTCHK
2484      01            007D5           680C07D9                          B          $+4
2485      01            007D6           228C0000         A                LI,R8      0
2486      01            007D7           358C0811                          STW,R8     CWRTIND
2487      01            007D8           6AF008F1                          BAL,R15    COUPLE
2488      01            007D9           228FFFFF         A                LI,R8      -1
2489      01            007DA           358C0811                          STW,R8     CWRTIND
2490      01            007DB           32A00587                          LW,R10     ZIOADR
2491      01            007DC           25A00402         A                SAS,R10    2
2492      01            007DD           30A00C02                          AW,R10     SAVEBITS
2493      01            007DE           49A00AD6                          OR,R10     CWRTORDR
2494      01            007DF           35A00ABE                          STW,R10    COMMPAIR
2495      01            007E0           32A00B6B                          LW,R10     RECLNGTH
2496      01            007E1           49A00AD7                          OR,R10     CWRTORDR+1
2497      01            007E2           49A00B70                          OR,R10     SILIND
2498      01            007E3           35A00ABF                          STW,R10    COMMPAIR+1
2499      01            007E4           228C07E8                          LI,R8      CMPW00
2500      01            007E5           229C07E9                          LI,R9      CMPW00+1
2501      01            007E6           15800AC0                          STD,R8     NORMRETN
2502      01            007E7           68000AAF                          B          EXECUTE
2503      01            007E8           68000806                  CMPW00  B          CMPW03
2504      01            007E9           328C0ACD                          LW,R8      AIOSTAT+1
2505      01            007EA           3183CFFF                          CW,R8      =X'4000000'
2506      01            007EB           684007FE                          BCR,4      CMPW01           TRANS ERR
2507      01            007EC           227FFFFB         A                LI,R7      -5               YES
2508      01            007ED           328E0810                          LW,R8      CMPWEMSG+5,X7
2509      01            007EE           358E05A3                          STW,R8     ZDMPA+5,X7
2510      01            007EF           657007ED                          BIR,R7     $-2
2511      01            007F0           32C00AE7                          LW,R12     WORKADDR
2512      01            007F1           6AF0067C                          BAL,R15    ADDRGEN
2513      01            007F2           227FFFFD         A                LI,R7      -3
2514      01            007F3           328E0698                          LW,R8      ADRGNSAV+4,X7
2515      01            007F4           358E05A6                          STW,R8     ZDMPA+8,X7
2516      01            007F5           657007F3                          BIR,R7     $-2
2517      01            007F6           32C00ACB                          LW,R12     TDVSTAT+1
2518      01            007F7           45C01000                          AND,R12    =X'FFFF'
2519      01            007F8           6AF00925                          BAL,R15    DECCNVRT
2520      01            007F9           35C005A6                          STW,R12    ZDMPA+8
2521      01            007FA           35D005A7                          STW,R13    ZDMPA+9
2522      01            007FB           32C00810                          LW,R12     CMPWECTL
2523      01            007FC           6AF00E35                          BAL,R15    TYPE01
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LINE NO. MEM PROT KEY MEMORY ADDRESS MEMORY CONTENTS ABS OR REL ORIG LABEL    OPERATION OPERAND            COMMENTS
2524     01           007FD 33100812           MTW,1     CWERRIND
2525     01           007FE 6AF00A34     CMPW01 BAL,R15   ERR0RTYP
2526     01           007FF 6AF00A08            BAL,R15   ERR0RCNT
2527     01           00800 33F00E27            MTW,-1    RETRYCTR
2528     01           00801 69100803            BCS,1     $+2
2529     01           00802 680007D2            B         CMPW02+1
2530     01           00803 33C00812            MTW,0     CWERRIND
2531     01           00804 68300R06            BCR,3     $+2
2532     01           00805 3310080A            MTW,1     CMPWEXIT
2533     01           00806 22800000 A   CMPW03 LI,R8     0
2534     01           00807 35800811            STW,R8    CWRTIND
2535     01           00808 35800C02            STW,R8    SAVEBITS
2536     01           00809 E800080A            B         *CMPWEXIT
2537     01           0080A 00000000 A   CMPWEXIT DATA    0
2538     01           0080B E6D5E340 A   CMPWEMSG TEXT    'WRT C0MPARE ERR0R @ '
         01           0080C C3D6D4D7 A
         01           0080D C1D9C540 A
         01           0080E C5D9D9D6 A
         01           0080F D9407C40 A
2539     01           00810 10281678 A   CMPWECTL ZFMW    1,0,40,BA(ZDMPA)
2540     01           00811 00000000 A   CWRTIND  DATA    0
2541     01           00812 00000000 A   CWERRIND DATA    0
2542                                      PAGE
2543                                      *                                                                *
2544                                      *THERE ARE 20 C0UNTERS IN THIS PR0GRAM, 1 THR0UGH 8 F0R THE USER'S *
2545                                      *C0NVENIENCE, AND 9 THR0UGH 20 USED BY THE PR0GRAM AS ERR0R C0UNTERS.*
2546                                      *THIS DIRECTIVE ALL0WS FR0M 1 T0 20 C0UNTERS T0 BE SET, RESET,   *
2547                                      *INCREMENTED, DECREMENTED, 0R TESTED F0R A SPECIFIC VALUE. IF THE TEST*
2548                                      *C0NDITION IS TRUE, A PLACEMARK BRANCH IS TAKEN, IF SPECIFIED IN THE *
2549                                      *C0NTR0L LINE.                                                   *
2550                                      *
2551     01           00813 40000000 A             DATA      X'40000000'     P1=SELECT C0UNTERS
2552     01           00814 50000000 A             DATA      X'50000000'     P2=ADD,SUBT, 0R SET (A,S,0)
2553     01           00815 20000000 A             DATA      X'20000000'     P3=AM0UNT T0 A,S, 0R SET
2554     01           00816 20000000 A             DATA      X'20000000'     P4=TEST VALUE
2555     01           00817 20000000 A             DATA      X'20000000'     P5=TYPE 0N TEST C0MPARE (1 0R 0)
2556     01           00818 35F00849     CNTR      STW,R15   CNTREXIT
2557     01           00819 22800000 A             LI,R8     0
2558     01           0081A 3580084A               STW,R8    PLBRIND
2559     01           0081B 226FFFEC A             LI,R6     -20
2560     01           0081C 22700001 A             LI,R7     1
2561     01           0081D 3280058E               LW,R8     P1
2562     01           0081E 21800001 A   CNTR04   CI,R8     1
2563     01           0081F 68400842               BCR,4     CNTR00          IS BIT SET
2564     01           00820 32CC0865               LW,R12    C0UNTER+20,X6   YES
2565     01           00821 32D0058F               LW,R13    P2
2566     01           00822 68300829               BCR,3     CNTR01          P2 = 0,
2567     01           00823 21D00001 A             CI,R13    1               N0
2568     01           00824 69400827               BCS,4     $+3             P2 = A
2569     01           00825 38C00590               SW,R12    P3              N0
2570     01           00826 6800082A               B         $+4
2571     01           00827 30C00590               AW,R12    P3
2572     01           00828 6800082A               B         $+2
2573     01           00829 32C00590     CNTR01    LW,R12    P3
2574     01           0082A 35CC0865               STW,R12   C0UNTER+20,X6
2575     01           0082B 6910082F               BCS,1     $+4             IS CTR NEGATIVE
2576     01           0082C 32D00591               LW,R13    P4              N0
2577     01           0082D 31C00000 A             CW,R12    R13
2578     01           0082E 68200842               BCR,2     CNTR00          CNTR < 0R = P4
2579     01           0082F 22EFFFFF A             LI,R14    -1
2580     01           00830 35E0084A               STW,R14   PLBRIND
2581     01           00831 32CC0865               LW,R12    C0UNTER+20,X6
2582     01           00832 32D00592               LW,R13    P5
2583     01           00833 68300842               BCR,3     CNTR00
2584     01           00834 356C0865     CNTR02    STW,R6    CNTRSAVE
2585     01           00835 357C0866               STW,R7    CNTRSAVE+1
2586     01           00836 35800867               STW,R8    CNTRSAVE+2
2587     01           00837 6AF00925               BAL,R15   DECCNVRT
2588     01           00838 35C0084E               STW,R12   CNTRMSG+3
2589     01           00839 35D0084F               STW,R13   CNTRMSG+4
2590     01           0083A 32C00866               LW,R12    CNTRSAVE+1
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LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
2591	01	0083B	6AF00925			BAL,R15	DECCNVRT	
2592	01	0083C	35D0084C			STW,R13	CNTRMSG+1	
2593	01	0083D	32C00850			LW,R12	CNTRMCTL	
2594	01	0083E	6AF00E35			BAL,R15	TYPE01	
2595	01	0083F	32600865			LW,R6	CNTRSAVE	
2596	01	00840	32700866			LW,R7	CNTRSAVE+1	
2597	01	00841	32800867			LW,R8	CNTRSAVE+2	
2598	01	00842	2580047F	A	CNTR00	SAS,R8	=1	
2599	01	00843	65700844			BIR,R7	$+1	
2600	01	00844	6560081E			BIR,R6	CNTR04	
2601	01	00845	328008AA			LW,R8	PLBRIND	
2602	01	00846	68300848			BCR,3	$+2	
2603	01	00847	33100849			MTW,1	CNTREXIT	
2604	01	00848	E8000849			B	*CNTREXIT	
2605	01	00849	00000000	A	CNTREXIT	DATA	0	
2606	01	0084A	00000000	A	PLBRIND	DATA	0	
2607	01	0084B	C3D5E3D9	A	CNTRMSG	TEXT	'CNTR	
	01	0084C	40404040	A				
	01	0084D	40404040	A				
	01	0084E	40404040	A				
	01	0084F	40404040	A				
2608	01	00850	1014212C	A	CNTRMCTL	ZFMW	1,0,20,BA(CNTRMSG)	
2609	01	00851			COUNTER	RES	20	
2610	01	00865			CNTRSAVE	RES	3	
2611						PAGE		
2612					*			*
2613					*THIS COMPARES THE PATT DATA TO THE BUFFER DATA.			*
2614					*			*
2615	01	00868	35F008CD		COMPARE	STW,R15	CMPAREXT	
2616	01	00869	3A50086F			LCW,R5	RECWDCNT	
2617	01	0086A	32800587			LW,R8	ZIBADR	
2618	01	0086B	3080086F			AW,R8	RECWDCNT	
2619	01	0086C	30801001			AW,R8	=X'328A0000'	
2620	01	0086D	35800875			STW,R8	COMPAR03	
2621	01	0086E	22800000	A		LI,R8	0	
2622	01	0086F	358008DF			STW,R8	CPAS1IND	
2623	01	00870	358008DE			STW,R8	CMPERIND	
2624	01	00871	227FFFF0	A		LI,R7	-16	
2625	01	00872	358E08DE			STW,R8	DROPS+16,X7	
2626	01	00873	65700872			BIR,R7	$-1	
2627	01	00874	3A4008C5			LCW,R4	P2STORE	
2628	01	00875	00000000	A	COMPAR03	DATA	0	
2629	01	00876	B188089C			CW,R8	*PATTLOAD,X4	
2630	01	00877	68300882			BCR,3	COMPAR00	
2631	01	00878	32900008	A		LW,R9	R8	
2632	01	00879	B2A809BC			LW,R10	*PATTLOAD,X4	
2633	01	0087A	4B80000A	A		AND,R8	R10	SAVE GOOD BITS
2634	01	0087B	4880000A	A		EOR,R8	R10	
2635	01	0087C	48A01002			EOR,R10	=-1	
2636	01	0087D	4B90000A	A		AND,R9	R10	GEN PICKED BITS
2637	01	0087E	226FFFFC	A		LI,R6	-4	
2638	01	0087F	227FFFF8	A		LI,R7	-8	COUNT
2639	01	00880	31800FF8		COMPAR01	CW,R8	=X'80000000'	PICKED
2640	01	00881	68400883			BCR,4	$+2	AND
2641	01	00882	331E08D6			MTW,1	DROPS+8,X7	DROPPED
2642	01	00883	31900FF8			CW,R9	=X'80000000'	BITS
2643	01	00884	68400886			BCR,4	$+2	
2644	01	00885	331E08DE			MTW,1	PICKS+8,X7	
2645	01	00886	25800301	A		SCD,R8	1	
2646	01	00887	65700880			BIR,R7	COMPAR01	
2647	01	00888	6560087F			BIR,R6	COMPAR01-1	
2648	01	00889	227FFFFC	A		LI,R7	-4	SET UP
2649	01	0088A	328E0810			LW,R8	CMPWEMSG+5,X7	ERROR
2650	01	0088B	358E05A2			STW,R8	ZDMPA+4,X7	MESSAGE
2651	01	0088C	6570088A			BIR,R7	$-2	
2652	01	0088D	330008DF			MTW,0	CPAS1IND	
2653	01	0088E	69200895			BCS,2	COMPAR02	1ST TIME HERE
2654	01	0088F	32C00AE7			LW,R12	WORKADDR	
2655	01	00890	6AF0067C			BAL,R15	ADDRGEN	
2656	01	00891	227FFFFD	A		LI,R7	=3	
2657	01	00892	328E0698			LW,R8	ADRGNSAV+4,X7	

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
2658	01	00893	358E08EA			STW,R8	TXTSUMRY+5,X7	
2659	01	00894	65700892			BIR,R7	$-2	
2660	01	00895	227FFFFC	A	C8MPAR02	LI,R7	-4	
2661	01	00896	328E08EB			LW,R8	TXTSUMRY+6,X7	
2662	01	00897	358E05A6			STW,R8	ZDMPA+8,X7	
2663	01	00898	65700896			BIR,R7	$-2	
2664	01	00899	32C008E1			LW,R12	CPERCTL0	
2665	01	0089A	6AF00E35			BAL,R15	TYPE01	
2666	01	0089B	32C00005	A		LW,R12	R5	
2667	01	0089C	30C00B6F			AW,R12	RECWDCNT	
2668	01	0089D	20C00001	A		AI,R12	1	
2669	01	0089E	6AF00925			BAL,R15	DECCNVRT	
2670	01	0089F	35D0059E			STW,R13	ZDMPA	
2671	01	008A0	22700008	A		LI,R7	8	
2672	01	008A1	B2C80BBC			LW,R12	*PATTL8AD,X4	
2673	01	008A2	6AF00931			BAL,R15	HEXCNVRT	
2674	01	008A3	35C005A0			STW,R12	ZDMPA+2	
2675	01	008A4	35D005A1			STW,R13	ZDMPA+3	
2676	01	008A5	B2CA0875			LW,R12	*C8MPAR03,X5	
2677	01	008A6	6AF00931			BAL,R15	HEXCNVRT	
2678	01	008A7	35C005A3			STW,R12	ZDMPA+5	
2679	01	008A8	35D005A4			STW,R13	ZDMPA+6	
2680	01	008A9	32F0094D			LW,R15	EBCBLNK	
2681	01	008AA	35F0059F			STW,R15	ZDMPA+1	
2682	01	008AB	35F005A2			STW,R15	ZDMPA+4	
2683	01	008AC	32C00BE2			LW,R12	CPERCTL1	
2684	01	008AD	6AF00E35			BAL,R15	TYPE01	
2685	01	008AE	228FFFFF	A		LI,R8	-1	
2686	01	008AF	358008DE			STW,R8	CMPERIND	
2687	01	008B0	6C000010	A		RD,0	X'10'	TYPE ONLY FIRST ERR AND
2688	01	008B1	E92008CD			BCS,2	*CMPAREXT	SUPRESS SUMMARY TYPE
2689	01	008B2	654008B4		C8MPAR00	BIR,R4	$+2	
2690	01	008B3	3A400BC5			LCW,R4	P2ST8RE	
2691	01	008B4	65500875			BIR,R5	C8MPAR03	
2692	01	008B5	330008DE			MTW,0	CMPERIND	
2693	01	008B6	E83008CD			BCR,3	*CMPAREXT	
2694	01	008B7	32C008E3			LW,R12	CPERCTL2	
2695	01	008B8	6AF00E39			BAL,R15	TYPE11	
2696	01	008B9	32C008EB			LW,R12	SMHDGCTL	
2697	01	008BA	6AF00E39			BAL,R15	TYPE11	
2698	01	008BB	3280094D			LW,R8	EBCBLNK	
2699	01	008BC	3580059F			STW,R8	ZDMPA+1	
2700	01	008BD	358005A1			STW,R8	ZDMPA+3	
2701	01	008BE	227FFFF8	A		LI,R7	-8	
2702	01	008BF	22C00008	A	C8MPAR04	LI,R12	8	
2703	01	008C0	30C00007	A		AW,R12	R7	
2704	01	008C1	6AF00925			BAL,R15	DECCNVRT	
2705	01	008C2	35D0059E			STW,R13	ZDMPA	
2706	01	008C3	32CE08D6			LW,R12	DR8PS+8,X7	
2707	01	008C4	6AF00925			BAL,R15	DECCNVRT	
2708	01	008C5	35D005A0			STW,R13	ZDMPA+2	
2709	01	008C6	32CE08DE			LW,R12	PICKS+8,X7	
2710	01	008C7	6AF00925			BAL,R15	DECCNVRT	
2711	01	008C8	35D005A2			STW,R13	ZDMPA+4	
2712	01	008C9	32C008F4			LW,R12	CPERCTL3	
2713	01	008CA	6AF00E39			BAL,R15	TYPE11	
2714	01	008CB	657008BF			BIR,R7	C8MPAR04	
2715	01	008CC	E80008CD			B	*CMPAREXT	
2716	01	008CD	00000000	A	CMPAREXT	DATA	0	
2717	01	008CE			DR8PS	RES	8	
2718	01	008D6			PICKS	RES	8	
2719	01	008DE	00000000	A	CMPERIND	DATA	0	
2720	01	008DF	00000000	A	CPAS1IND	DATA	0	
2721	01	008E0	00000000	A	C8MPRTMP	DATA	0	
2722	01	008E1	10201678	A	CPERCTL0	ZFMW	1,0,32,BA(ZDMPA)	
2723	01	008E2	101C1678	A	CPERCTL1	ZFMW	1,0,28,BA(ZDMPA)	
2724	01	008E3	10142394	A	CPERCTL2	ZFMW	1,0,20,BA(TXTSUMRY)	
2725	01	008E4	10141678	A	CPERCTL3	ZFMW	1,0,20,BA(ZDMPA)	
2726	01	008E5	E2E4D4D4	A	TXTSUMRY	TEXT	'SUMMARY	
	01	008E6	C1D9E840	A				
	01	008E7	40404040	A				
	01	008E8	40404040	A				

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LINE  MEM PROT  MEMORY    MEMORY     ABS OR REL ORIG  LABEL     OPERATION  OPERAND          COMMENTS
NO.   KEY       ADDRESS   CONTENTS
      01 008E9  40404040  A
      01 008EA  40404040  A
2727  01 008EB  1C1423BC  A          SMHDGCTL  ZFMW     1,0,20,BA(SMHDGMSG)
2728  01 008EC  C2C9E340  A          SMHDGMSG  TEXT     'BIT  DR8PPED  PICKED'
      01 008ED  40C4D9D6  A
      01 008EE  D7D7C5C4  A
      01 008EF  4040D7C9  A
      01 008F0  C3D2C5C4  A
2729                                        PAGE
2730                                  *                                                    *
2731                                  *THIS D8ES A SEEK AND A SENSE, THEN C8MPARES THE SENSE DATA T8 THE    *
2732                                  *SEEK. IF THEY D8 N8T C8MPARE, A MESSAGE IS 8UTPUT AND IF SENSE      *
2733                                  *SWITCH 2 IS SET A WAIT WILL 8CCUR. IF SENSE SWITCH 2 IS N8T SET, THE *
2734                                  *PR8GRAM C8NTINUES.                                  *
2735                                  *                                                    *
2736  01 008F1  35F00907                C8UPLE    STW,R15  C8UPLXIT
2737  01 008F2  22800000  A                       LI,R8    0
2738  01 008F3  3580058F                          STW,R8   P2
2739  01 008F4  35800913                          STW,R8   CPLERIND
2740  01 008F5  32800AE7                          LW,R8    W8RKADDR
2741  01 008F6  25800470  A                       SAS,R8   -16
2742  01 008F7  48801000                          AND,R8   *X'FFFF'
2743  01 008F8  3580058E                          STW,R8   P1
2744  01 008F9  6AF00CD2                          BAL,R15  SEEK
2745  01 008FA  22800000  A                       LI,R8    0
2746  01 008FB  3580058E                          STW,R8   P1
2747  01 008FC  6AF00912                          BAL,R15  SENSALT
2748  01 008FD  32800D1A                          LW,R8    SENSSAVE
2749  01 008FE  32901003                          LW,R9    *X'7FFF0000'
2750  01 008FF  45800AE7                          CS,R8    W8RKADDR
2751  01 00900  E8300907                          BCR,3    *C8UPLXIT
2752  01 00901  6AF00908                          BAL,R15  CPLERTYP
2753  01 00902  33F0091B                          MTW,-1   CPLERIND
2754  01 00903  6C000010  A                       RD,0     16
2755  01 00904  68400906                          BCR,4    $+2
2756  01 00905  2E000000  A             WAIT2     WAIT                          C8UPLER ERR8R. SS2 IS SET
2757  01 00906  E8000907                          B        *C8UPLXIT
2758  01 00907  00000000  A             C8UPLXIT  DATA     0
2759                                        PAGE
2760                                  *                                                    *
2761                                  *THIS R8UTINE WILL 8UTPUT A MESSAGE, SH8ULD A C8UPLER ERR8R 8CCUR.    *
2762                                  *                                                    *
2763  01 00908  35F0091A                CPLERTYP  STW,R15  CPLREXIT
2764  01 00909  32C00C8D                          LW,R12   QMSGCTLE
2765  01 0090A  6AF00E35                          BAL,R15  TYPE01
2766  01 0090B  32C00AE7                          LW,R12   W8RKADDR
2767  01 0090C  6AF0067C                          BAL,R15  ADDRGEN
2768  01 0090D  32800696                          LW,R8    ADRGNSAV+2
2769  01 0090E  3580091E                          STW,R8   CPLERMSG+1
2770  01 0090F  32800697                          LW,R8    ADRGNSAV+3
2771  01 00910  3580091F                          STW,R8   CPLERMSG+2
2772  01 00911  32C00D1A                          LW,R12   SENSSAVE
2773  01 00912  6AF0067C                          BAL,R15  ADDRGEN
2774  01 00913  32800696                          LW,R8    ADRGNSAV+2
2775  01 00914  35800922                          STW,R8   CPLERMSG+5
2776  01 00915  32800697                          LW,R8    ADRGNSAV+3
2777  01 00916  35800923                          STW,R8   CPLERMSG+6
2778  01 00917  32C0091C                          LW,R12   CPLERCTL
2779  01 00918  6AF00E35                          BAL,R15  TYPE01
2780  01 00919  E800091A                          B        *CPLREXIT
2781  01 0091A  00000000  A             CPLREXIT  DATA     0
2782  01 00918  00000000  A             CPLERIND  DATA     0
2783  01 0091C  1C202474  A             CPLERCTL  ZFMW     1,0,32,BA(CPLERMSG)
2784  01 0091D  E2C5C5D2  A             CPLERMSG  TEXT     'SEEK              SENS            '
      01 0091E  40404040  A
      01 0091F  40404040  A
      01 00920  40404040  A
      01 00921  E2C5D5E2  A
      01 00922  40404040  A
      01 00923  40404040  A
      01 00924  40404040  A
```

MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
					PAGE		
				*			*
				*THE DECCNVRT ROUTINE CONVERTS A BINARY WORD TO A 4-BIT DECIMAL WORD.			*
				*THE HEXCNVRT ROUTINE CONVERTS IT TO HEXADECIMAL FORMAT BY INSERTING			*
				*THE ZONE BITS. LEADING ZEROES ARE SUPPRESSED.			*
				*			*
01	00925	35F0094B		DECCNVRT	STW,R15	CNVTEXIT	
01	00926	6AF00AEC			BAL,R15	GRSAVE	
01	00927	3300000C	A		MTW,0	R12	
01	00928	6810092C			BCR,1	$+4	NEG
01	00929	22DFFFFF	A		LI,R13	-1	YES
01	0092A	3AC0000C	A		LCW,R12	R12	
01	0092B	6800092D			B	$+2	
01	0092C	22D00000	A		LI,R13	0	
01	0092D	35D0094F			STW,R13	NEGIND	
01	0092E	6AF003EC			BAL,R15	ZBTD	
01	0092F	32C0058B			LW,R12	ZTEMP	
01	00930	68000933			B	$+3	
01	00931	35F0094B		HEXCNVRT	STW,R15	CNVTEXIT	
01	00932	6AF00AEC			BAL,R15	GRSAVE	
01	00933	22800000	A		LI,R8	0	
01	00934	3580094F			STW,R8	NEGIND	
01	00935	6AF003F5			BAL,R15	ZBTH	
01	00936	31C0094C			CW,R12	EBCZERO	
01	00937	6830093B			BCR,3	$+4	WORD = 0
01	00938	6AF00402			BAL,R15	ZSUP	NO
01	00939	15C00AD8			STD,R12	DBLWDTMP	
01	0093A	68000944			B	CNVT00	
01	0093B	32C0094D			LW,R12	EBCBLNK	
01	0093C	25C00320	A		SCD,R12	32	
01	0093D	31C0094C			CW,R12	EBCZERO	
01	0093E	68300941			BCR,3	$+3	WORD = 0
01	0093F	6AF00402			BAL,R15	ZSUP	NO
01	00940	68000942			B	$+2	
01	00941	32C0094E			LW,R12	EBCBLNK+1	
01	00942	25C00320	A		SCD,R12	32	
01	00943	15C00AD8			STD,R12	DBLWDTMP	
01	00944	6AF00AE9		CNVT00	BAL,R15	GRRSTR	
01	00945	12C00AD8			LD,R12	DBLWDTMP	
01	00946	3300094F			MTW,0	NEGIND	
01	00947	6830094A			BCR,3	$+3	
01	00948	4BC01004			AND,R12	=X'FFFFFF'	
01	00949	49C00950			OR,R12	TEXTMNUS	
01	0094A	E800094B			B	*CNVTEXIT	
01	0094B	00000000	A	CNVTEXIT	DATA	0	
01	0094C	F0F0F0F0	A	EBCZERO	DATA	X'F0F0F0F0'	
01	0094D	40404040	A	EBCBLNK	DATA	X'40404040'	
01	0094E	404040F0	A		DATA	X'404040F0'	
01	0094F	00000000	A	NEGIND	DATA	0	
01	00950	60000000	A	TEXTMNUS	DATA	X'60000000'	
					PAGE		
				*			*
				*THIS WILL INITIATE UP TO 30 DATA CHAINING OPERATIONS, WITH EITHER			*
				*READ OR WRITE, AND WITH OR WITHOUT REQUEST FOR INTERRUPT ON ZERO			*
				*BYTE COUNT, DEPENDING ON THE PARAMETER SETTINGS.			*
				*			*
01	00951	20000000	A		DATA	X'20000000'	P1 IF=0 READ, IF=1 WRITE
01	00952	20000000	A		DATA	X'20000000'	P2 IS COUNT D CHAIN IS TO BE DONE
01	00953	20000000	A		DATA	X'20000000'	P3 IF=1 IZC FLAG WILL BE SET
01	00954	20000000	A		DATA	X'20000000'	P4 NUMB OF BYTES IN 1ST COMM DB WRD
01	00955	20000000	A		DATA	X'20000000'	P5 NUMB OF BYTES IN 2ND COMM DB WRD
01	00956	20000000	A		DATA	X'20000000'	P6 NUMB OF BYTES IN 3RD COMM DB WRD
01	00957	20000000	A		DATA	X'20000000'	P7 NUMB OF BYTES IN 4TH COMM DB WRD
01	00958	20000000	A		DATA	X'20000000'	P8 NUMB OF BYTES IN 5TH COMM DB WRD
01	00959	20000000	A		DATA	X'20000000'	P9 NUMB OF BYTES IN 6TH COMM DB WRD
01	0095A	55F20992		DCHN	STH,R15	DCHNEXIT,X1	
01	0095B	3A70058F			LCW,R7	P2	
01	0095C	6830095F			BEZ	$+3	IFD CHAIN COUNT
01	0095D	217FFFE2	A		CI,X7	-30	IS > 1
01	0095E	68100960			BGE	$+2	OR < 30
01	0095F	227FFFFA	A		LI,X7	-6	SET IT TO 6

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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL     OPERATION  OPERAND          COMMENTS
2856      01            00960           25700401         A                SAS,X7    1                SET UP INDEX FOR DCHNPAIR LIST
2857      01            00961           35700300                          STW,X7    NP2SAVE          SAVE INDEX FOR DCHNPAIR LIST
2858      01            00962           20700002         A                AI,X7     2
2859      01            00963           33000590                          MTW,0     P3               IS IZC FLAG TO BE SET
2860      01            00964           69300967                          BNEZ      $+3
2861      01            00965           32801005                          LW,R8     =X'9E000000'     NO-SET DC,ICE,HTE,IVE,SIL FLAGS
2862      01            00966           68000968                          B         $+2
2863      01            00967           32801006                          LW,R8     =X'CE000000'     YES-SET DC,IZC,HTE,IVE,SIL FLAGS
2864      01            00968           358E09CF                          STW,R8    DCHNPAIR+59,X7   SET FLAGS
2865      01            00969           33100007         A                MTW,1     R7                IN ALL BUT LAST
2866      01            0096A           65700968                          BIR,X7    $-2                DCHNPAIR WORDS
2867      01            0096B           22800900                          LI,R8     DCHNPAIR+60      SET UP
2868      01            0096C           30800900                          AW,R8     NP2SAVE           DOUBLE WORD ADDRESS
2869      01            0096D           25800478         A                SAS,R8    -1                AND TIC
2870      01            0096E           30801007                          AW,R8     =X'08000000'      IN
2871      01            0096F           35800A8E                          STW,R8    COMMPAIR           COMMPAIR
2872      01            00970           32700900                          LW,X7     NP2SAVE
2873      01            00971           20700001         A                AI,X7     1
2874      01            00972           226FFFFF         A                LI,X6     -1
2875      01            00973           328C0592                 DCHNPARM LW,R8     P4+1,X6
2876      01            00974           69200976                          BGZ       $+2              B IF BYTE COUNT > 0
2877      01            00975           22800400         A                LI,R8     1024             ELSE, FORCE IT TO 1024
2878      01            00976           329E09D0                          LW,R9     DCHNPAIR+60,X7
2879      01            00977           42901008                          AND,R9    =X'FF000000'
2880      01            00978           30800009         A                AW,R8     R9               STORE BYTE COUNTS
2881      01            00979           358E09D0                          STW,R8    DCHNPAIR+60,X7    IN 2ND WORDS
2882      01            0097A           20600001         A                AI,X6     1                  OF
2883      01            0097B           21600005         A                CI,X6     5                *  IF PARAMETER LIST IS
2884      01            0097C           6910097E                          BL        $+2              *   EXHAUSTED, USE
2885      01            0097D           226FFFFF         A                LI,X6     -1               *    IT OVER AGAIN
2886      01            0097E           33100007         A                MTW,1     R7               DCHNPAIR
2887      01            0097F           65700973                          BIR,X7    DCHNPARM          LIST
2888      01            00980           32700900                          LW,X7     NP2SAVE
2889      01            00981           32800587                          LW,R8     ZIOADR           SET
2890      01            00982           25800402         A                SAS,R8    2                 UP
2891      01            00983           330005BE                          MTW,0     P1                 FIRST
2892      01            00984           68300987                          BEZ       $+3                 WORDS
2893      01            00985           30801009                          AW,R8     =X'01000000'         WITH WRITE ORDER
2894      01            00986           6800098A                          B         $+4                   OR
2895      01            00987           3080100A                          AW,R8     =X'02000000'           READ ORDER
2896      01            00988           22900000         A                LI,R9     0
2897      01            00989           359003C6                          STW,R9    PATTERN1
2898      01            0098A           358E09D0                          STW,R8    DCHNPAIR+60,X7   IN
2899      01            0098B           33100007         A                MTW,1     R7                DCHNPAIR
2900      01            0098C           6570098A                          BIR,X7    $-2
2901      01            0098D           22800992                          LI,R8     DCHNEXIT
2902      01            0098E           22900991                          LI,R9     DCHNO1
2903      01            0098F           15800AC0                          STD,R8    NORMRETN
2904      01            00990           68000AAF                          B         EXECUTE
2905      01            00991           6AF00A34                 DCHNO1   BAL,R15   ERRORTYP
2906      01            00992           68000000         A       DCHNEXIT B         0
2907                                                                 BOUND     8
2908      01            00994                            .       DCHNPAIR RES       58
2909      01            009CE           00000000         A                DATA      0
2910      01            009CF           1E000000         A                ZFCP      X'1E',0
2911      01            009D0           00000000         A       NP2SAVE  DATA      0                INDEX FOR DCHNPAIR LIST
2912                                                                 PAGE
2913                                                       *                                                                  *
2914                                                       *THIS GENERATES A FIXED DELAY OF D2 PULSES X D1 COUNTER FREQUENCY. IF *
2915                                                       *D1 AND D2 ARE ZERO, A 34 MS DELAY IS GENERATED.                    *
2916                                                       *                                                                  *
2917      01            009D1           20000000         A                DATA      X'20000000'      P1-STANDARD CTR SELECTION(1,2,3,4,)
2918      01            009D2           20000000         A                DATA      X'20000000'      P2-NUMBER OF PULSES AT CTR FREQ
2919      01            009D3           328005BF                 DLY      LW,R8     P2
2920      01            009D4           693009D6                          BCS,3     $+2              IS P1 =0
2921      01            009D5           22800011         A                LI,R8     17               YES
2922      01            009D6           327005BE                          LW,R7     P1
2923      01            009D7           69300909                          BCS,3     $+2
2924      01            009D8           22700004         A                LI,R7     4
2925      01            009D9           35F009E2                          STW,R15   DLYEXIT
2926      01            009DA           3290090E3                         LW,R9     DLYRETN
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LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
2927	01	009DB	359E0057	A		STW,R9	X'57',X7	
2928	01	009DC	329009EC			LW,R9	DLYSTEP	
2929	01	009DD	359E0051	A		STW,R9	X'51',X7	
2930	01	009DE	32EEC9E3			LW,R14	DLYARM-1,X7	
2931	01	009DF	6DE01200	A		WD,R14	X'1200'	
2932	01	009E0	2E000000	A	WAIT3	WAIT		EXECUTE DELAY
2933	01	009E1	680009E0			B	$-1	
2934	01	009E2	00000000	A	DLYEXIT	DATA	0	
2935	01	009E3	0FC009E8		DLYRETN	XPSD,0	DLYXPSD	
2936	01	009E4	00008200	A	DLYARM	DATA	X'8200'	
2937	01	009E5	00004100	A		DATA	X'4100'	
2938	01	009E6	00002080	A		DATA	X'2080'	
2939	01	009E7	00001040	A		DATA	X'1040'	
2940						BOUND	8	
2941	01	009E8	00000000	A	DLYXPSD	DATA	0	
2942	01	009E9	00000000	A		DATA	0	
2943	01	009EA	000009ED			DATA	DLYICLR	
2944	01	009EB	00000000	A		DATA	0	
2945	01	009EC	33F00008	A	DLYSTEP	MTW,-1	R8	
2946	01	009ED	32EEC9E3		DLYICLR	LW,R14	DLYARM-1,X7	
2947	01	009EE	6DE01100	A		WD,R14	X'1100'	
2948	01	009EF	E80009E2			B	*DLYEXIT	
2949						PAGE		
2950					*			*
2951					*THIS WILL OUTPUT THE ERROR COUNTERS WHEN IT HAS BEEN EXECUTED			*
2952					*D1+1 TIMES.			*
2953					*			*
2954	01	C09F0	20000000	A		DATA	X'20000000'	P1=REPORT FREQUENCY
2955	01	009F1	35F00A03		ERR	STW,R15	ERREXIT	
2956	01	009F2	22600000	A		LI,R6	0	
2957	01	009F3	3560084A			STW,R6	PLBRIND	
2958	01	009F4	32800S8E			LW,R8	P1	
2959	01	009F5	683009FD			BEZ	ERR001	IS P1 > 0
2960	01	009F6	33100A04			MTW,1	ERRPSCNT	YES=ADD 1 TO PASS CNT
2961	01	009F7	31800A04			CW,R8	ERRPSCNT	IS P1 > OR = ERRPSCNT
2962	01	009F8	E8100A03			BGE	*ERREXIT	YES=EXIT
2963	01	009F9	32801008			LW,R8	=X'FFF00'	NO
2964	01	009FA	35800S8E			STW,R8	P1	
2965	01	009FB	6AF00E66			BAL,R15	TYPC	TYPE CTRS 9-20
2966	01	009FC	68000A00			B	$+4	
2967	01	009FD	32801008		ERR001	LW,R8	=X'FFF00'	CLEAR
2968	01	009FE	3580058E			STW,R8	P1	COUNTERS
2969	01	009FF	6AF00818			BAL,R15	CNTR	9-20
2970	01	00A00	22800000	A		LI,R8	0	CLEAR
2971	01	00A01	3580CA04			STW,R8	ERRPSCNT	PASS COUNT
2972	01	00A02	E8000A03			B	*ERREXIT	
2973	01	00A03	00000000	A	ERREXIT	DATA	0	
2974	01	00A04	00000000	A	ERRPSCNT	DATA	0	
2975	01	00A05			IXSAVE	RES	3	
2976						PAGE		
2977					*			*
2978					*THIS STEPS THE ERROR COUNTERS.			*
2979					*			*
2980	01	00A08	33000CCA		ERRORCNT	MTW,0	READIND	
2981	01	00A09	68300A0B			BEZ	$+2	
2982	01	00A0A	3310085A			MTW,1	COUNTER+9	YES
2983	01	00A0B	33000F19			MTW,0	WRTIND	NO
2984	01	00A0C	68300A0E			BEZ	$+2	
2985	01	00A0D	33100858			MTW,1	COUNTER+10	YES
2986	01	00A0E	32A00AC9			LW,R10	HIBSTAT+1	NO
2987	01	00A0F	31A01007			CW,R10	=X'8000000'	
2988	01	00A10	68400A12			BCR,4	$+2	UNUS END
2989	01	00A11	33100864			MTW,1	COUNTER+19	YES
2990	01	00A12	31A00FFF			CW,R10	=X'400000'	NO
2991	01	00A13	68400A15			BCR,4	$+2	TRANS DATA ERR
2992	01	00A14	3310085E			MTW,1	COUNTER+13	YES
2993	01	00A15	31A0100C			CW,R10	=X'200000'	NO
2994	01	00A16	68400A18			BCR,4	$+2	TRANS MEM ERR
2995	01	00A17	3310085F			MTW,1	COUNTER+14	YES
2996	01	00A18	31A0100D			CW,R10	=X'100000'	NO
2997	01	00A19	68400A1B			BCR,4	$+2	MEM ADDR ERR

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LINE NO. MEM PROT KEY MEMORY ADDRESS MEMORY CONTENTS ABS OR REL ORIG LABEL    OPERATION OPERAND          COMMENTS
2998     01           00A1A 33100860                 MTW,1     C0UNTER+15      YES
2999     01           00A1B 31A0100E                 CW,R10    =X'80000'       N0
3000     01           00A1C 68400A1E                 BCR,4     $+2             I0P MEM ERR
3001     01           00A1D 33100861                 MTW,1     C0UNTER+16      YES
3002     01           00A1E 31A0100F                 CW,R10    =X'40000'       N0
3003     01           00A1F 6840CAP1                 BCR,4     $+2             I0P CTRL ERR -
3004     01           00A20 33100862                 MTW,1     C0UNTER+17      YES
3005     01           00A21 32A01010                 LW,R10    =X'10000000'    N0
3006     01           00A22 31A00AC8                 CW,R10    TDVSTAT+1
3007     01           00A23 69400A26                 BCS,4     $+3             WP VI0L -
3008     01           00A24 31A00ACD                 CW,R10    AI0STAT+1
3009     01           00A25 6840CA27                 BCR,4     $+2             WP VI0L -
3010     01           00A26 3310085C                 MTW,1     C0UNTER+11      YES
3011     01           00A27 32A0CFF9                 LW,R10    =X'20000000'    N0
3012     01           00A28 31A0CAC8                 CW,R10    TDVSTAT+1
3013     01           00A29 69400A2C                 BCS,4     $+3             SECT UNAV
3014     01           00A2A 31A00ACD                 CW,R10    AI0STAT+1       N0
3015     01           00A2B 68400A2D                 BCR,4     $+2             SECT UNAV
3016     01           00A2C 3310085D                 MTW,1     C0UNTER+12      YES
3017     01           00A2D 32A0CFF8                 LW,R10    =X'80000000'    N0
3018     01           00A2E 31A00AC8                 CW,R10    TDVSTAT+1
3019     01           00A2F 69400A32                 BCS,4     $+3             RATE ERR
3020     01           00A30 31A00ACD                 CW,R10    AI0STAT+1       N0
3021     01           00A31 68400A33                 BCR,4     $+2             RATE ERR
3022     01           00A32 33100863                 MTW,1     C0UNTER+18      YES
3023     01           00A33 E8000C0F A               B         *R15            N0
3024                                                 PAGE
3025                                  *                                                    *
3026                                  *THIS 0UTPUTS THE STANDARD ERR0R MESSAGE.            *
3027                                  *                                                    *
3028     01           00A34 35F00AA6  ERR0RTYP      STW,R15   ERTYEXIT
3029     01           00A35 3280CACA                 LW,R8     TDVSTAT         GET CURR C0MM DW ADR
3030     01           00A36 2580C4C1 A               SAS,R8    1               GEN W0RD ADDR
3031     01           00A37 82720008 A               LW,R7     *R8,X1
3032     01           00A38 4870100C                 AND,R7    =X'FFFF'
3033     01           00A39 3570CAA7                 STW,R7    ELENGTH
3034     01           00A3A 82700008 A               LW,R7     *R8             GET 0RDER
3035     01           00A3B 22600000 A               LI,R6     0                AND PULL
3036     01           00A3C 2560C5C8 A               SAD,R6    8                 C0RRECT
3037     01           00A3D 48601011                 AND,R6    =7
3038     01           00A3E 21600001 A               CI,R6     1                   TEXT MSG
3039     01           00A3F 68100441                 BCR,1     $+2
3040     01           00A40 68000A43                 B         $+3
3041     01           00A41 21600005 A               CI,R6     5
3042     01           00A42 68200A45                 BCR,2     $+3
3043     01           00A43 3280CAAD                 LW,R8     TEXTILEG
3044     01           00A44 6800CA46                 B         $+2
3045     01           00A45 328C0AE1                 LW,R8     TEXTWRT+1,X6
3046     01           00A46 3580059E                 STW,R8    ZDMPA           SAVE 0PER IN 0UTPUT
3047     01           00A47 3280094D                 LW,R8     EBCBLNK         SAVE BYTE CT
3048     01           00A48 358005A1                 STW,R8    ZDMPA+3
3049     01           00A49 32CC0AA7                 LW,R12    ELENGTH
3050     01           00A4A 6AFCC925                 BAL,R15   DECCNVRT         C0NVERT T0 DECIMAL
3051     01           00A4B 35C0059F                 STW,R12   ZDMPA+1
3052     01           00A4C 35D005A0                 STW,R13   ZDMPA+2
3053     01           00A4D 32C00AE7                 LW,R12    W0RKADDR
3054     01           00A4E 6AF0067C                 BAL,R15   ADDRGEN
3055     01           00A4F 227FFFFD A               LI,R7     -3
3056     01           00A50 328EC698                 LW,RR     ADRGNSAV+4,X7
3057     01           00A51 358EC5A5                 STW,R8    ZDMPA+7,X7
3058     01           00A52 65700A50                 BIR,R7    $-2
3059     01           00A53 32F0094D                 LW,R15    EBCBLNK
3060     01           00A54 35F0059F                 STW,R15   ZDMPA+1
3061     01           00A55 52C20AC8                 LH,R12    TDVSTAT+1,X1
3062     01           00A56 4BC01000                 AND,R12   =X'FFFF'
3063     01           00A57 6AFC0925                 BAL,R15   DECCNVRT
3064     01           00A58 35C005A5                 STW,R12   ZDMPA+7
3065     01           00A59 35D005A6                 STW,R13   ZDMPA+8
3066     01           00A5A 32C00AAE                 LW,R12    ERTYP000
3067     01           00A5B 6AF00E35                 BAL,R15   TYPE01
3068     01           00A5C 224FFFFC A               LI,R4     -4              SET UP
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LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
3069	01	00A5D	3288CAAD			LW,R8	CURCMHDG+4,X4	CURRENT
3070	01	00A5E	3588C5A2			STW,R8	ZDMPA+4,X4	COMMAND
3071	01	00A5F	65400A5D			BIR,R4	$-2	HEADING
3072	01	00A60	32800ACA			LW,R8	TDVSTAT	SET UP
3073	01	00A61	25800401	A		SAS,R8	1	CURRENT
3074	01	00A62	92C00008	A		LD,R12	*R8	COMMAND
3075	01	00A63	15C00ADA			STD,R12	DBLWDTMP+2	
3076	01	00A64	6AF00931			BAL,R15	HEXCNVRT	
3077	01	00A65	32F00C94D			LW,R15	EBCBLNK	
3078	01	00A66	35F005A2			STW,R15	ZDMPA+4	
3079	01	00A67	35C005A3			STW,R12	ZDMPA+5	
3080	01	00A68	35D005A4			STW,R13	ZDMPA+6	
3081	01	00A69	32C00ADB			LW,R12	DBLWDTMP+3	
3082	01	00A6A	6AF00931			BAL,R15	HEXCNVRT	
3083	01	00A6B	32F00940			LW,R15	EBCBLNK	
3084	01	00A6C	35F005A5			STW,R15	ZDMPA+7	
3085	01	00A6D	35C005A6			STW,R12	ZDMPA+8	
3086	01	00A6E	35D005A7			STW,R13	ZDMPA+9	
3087	01	00A6F	32C00AA8			LW,R12	CURCMCTL	TYPE CURRENT
3088	01	00A70	6AF00E37			BAL,R15	TYPE10	COMM DBLWORD
3089	01	00A71	32800AC9			LW,R8	HIOSTAT+1	
3090	01	00A72	31801007			CW,R8	=X'8000000'	
3091	01	00A73	68400A76			BCR,4	$+3	UNUS END
3092	01	00A74	32C00C87			LW,R12	QMSGCTL8	YES
3093	01	00A75	6AF00E37			BAL,R15	TYPE10	
3094	01	00A76	32800FF8			LW,R8	=X'80000000'	
3095	01	00A77	31800ACB			CW,R8	TDVSTAT+1	
3096	01	00A78	69400A7B			BCS,4	$+3	RATE ERROR
3097	01	00A79	31800ACD			CW,R8	AIOSTAT+1	NO
3098	01	00A7A	68400A7D			BCR,4	$+3	RATE ERROR
3099	01	00A7B	32C00C8A			LW,R12	QMSGCTLB	YES
3100	01	00A7C	6AF00E37			BAL,R15	TYPE10	
3101	01	00A7D	32801010			LW,R8	=X'10000000'	
3102	01	00A7E	31800ACB			CW,R8	TDVSTAT+1	
3103	01	00A7F	69400A82			BCS,4	$+3	WRT PROT VIOL
3104	01	00A80	31800ACD			CW,R8	AIOSTAT+1	NO
3105	01	00A81	68400A84			BCR,4	$+3	WRT PROT VIOL
3106	01	00A82	32C00C88			LW,R12	QMSGCTL9	YES
3107	01	00A83	6AF00E37			BAL,R15	TYPE10	
3108	01	00A84	32800FF9			LW,R8	=X'20000000'	
3109	01	00A85	31800ACB			CW,R8	TDVSTAT+1	
3110	01	00A86	69400A89			BCS,4	$+3	SECT UNAV
3111	01	00A87	31800ACD			CW,R8	AIOSTAT+1	NO
3112	01	00A88	68400A8B			BCR,4	$+3	SECT UNAV
3113	01	00A89	32C00C89			LW,R12	QMSGCTLA	YES
3114	01	00A8A	6AF00E37			BAL,R15	TYPE10	
3115	01	00A8B	32801012			LW,R8	=X'800000'	
3116	01	00A8C	31800ACB			CW,R8	TDVSTAT+1	
3117	01	00A8D	69400A90			BCS,4	$+3	INC LEN
3118	01	00A8E	31800ACD			CW,R8	AIOSTAT+1	NO
3119	01	00A8F	68400A92			BCR,4	$+3	INC LEN
3120	01	00A90	32C00C8C			LW,R12	QMSGCTLD	YES
3121	01	00A91	6AF00E37			BAL,R15	TYPE10	
3122	01	00A92	32800FFF			LW,R8	=X'400000'	
3123	01	00A93	31800ACB			CW,R8	TDVSTAT+1	
3124	01	00A94	69400A97			BCS,4	$+3	TRANS ERR
3125	01	00A95	31800ACD			CW,R8	AIOSTAT+1	NO
3126	01	00A96	68400A99			BCR,4	$+3	TRANS ERR
3127	01	00A97	32C00C8B			LW,R12	QMSGCTLC	YES
3128	01	00A98	6AF00E37			BAL,R15	TYPE10	
3129	01	00A99	12C00ACC		ERRTYP00	LD,R12	AIOSTAT	
3130	01	00A9A	68300A9D			BCR,3	$+3	
3131	01	00A9B	32B00AE1			LW,R11	TEXTAIO	
3132	01	00A9C	6AF00D6C			BAL,R15	STATTYPE	
3133	01	00A9D	12C00ACA			LD,R12	TDVSTAT	
3134	01	00A9E	68300AA1			BCR,3	$+3	
3135	01	00A9F	32B00AE0			LW,R11	TEXTTDV	
3136	01	00AA0	6AF00D6C			BAL,R15	STATTYPE	
3137	01	00AA1	12C00AC8			LD,R12	HIOSTAT	
3138	01	00AA2	68300AA5			BCR,3	$+3	
3139	01	00AA3	32B00ADF			LW,R11	TEXTHIO	

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LINE NO. MEM PROT KEY MEMORY ADDRESS MEMORY CONTENTS ABS OR REL ORIG LABEL    OPERATION OPERAND          COMMENTS
3140     01           00AA4          6AF00D6C          BAL,R15   STATTYPE
3141     01           00AA5          E800AA6           B         *ERTYEXIT
3142     01           00AA6          00000000  A       ERTYEXIT  DATA      0
3143     01           00AA7          00000000  A       ELENGTH   DATA      0
3144     01           00AA8          10281678  A       CURCMCTL  ZFMW      1,0,40,BA(ZDMPA)
3145     01           00AA9          C3E4D9D9  A       CURCMHDG  TEXT      'CURRENT COMMAND'
         01           00AAA          C5D5E340  A
         01           00AAB          C3D6D4D4  A
         01           00AAC          C1D5C440  A
3146     01           00AAD          C9D3C5C7  A       TEXTILEG  TEXT      'ILEG'
3147     01           00AAE          10241678  A       ERTYP000  ZFMW      1,0,36,BA(ZDMPA)
3148                                                    PAGE
3149                                                    *                                                                *
3150                                                    *THIS WILL CAUSE THE ORDER STORED IN THE IOCD TO BE EXECUTED.    *
3151                                                    *                                                                *
3152     01           00AAF          6AF00D67          EXECUTE   BAL,R15   STATCLR
3153     01           00AB0          22F00000  A               LI,R15    0
3154     01           00AB1          35F0091B                  STW,R15   CPLERIND
3155     01           00AB2          6AF00D51          LOOP2     BAL,R15   SIOPSCHK           IS SIO POSSIBLE
3156     01           00AB3          6800AB2                   B         $-1               NO
3157     01           00AB4          6AF0CB1C                  BAL,R15   IOARMENB          YES
3158     01           00AB5          2200055F                  LI,RC     DA(COMMPAIR)
3159     01           00AB6          CCA0AE7                   SIO,R10   *WORKADDR
3160     01           00AB7          15A00AC4                  STD,R10   SIOSTAT
3161     01           00AB8          7400DAC4                  STCF      SIOSTAT
3162     01           00AB9          68C00ABC                  BCR,12    $+3               SUCCESSFUL START
3163     01           00ABA          6AF00EA7          LOOP3     BAL,R15   UNSTRTYP           NO.
3164     01           00ABB          6800AAF                   B         EXECUTE
3165     01           00ABC          6800079F                  B         CHENDCHK
3166                                                    *
3167                                                    *
3168                                                              BOUND     8
3169     01           00ABE                            COMMPAIR  RES       2
3170     01           00AC0                            NORMRETN  RES       1
3171     01           00AC1                            ERRORETN  RES       1
3172     01           00AC2                            NORMSAVE  RES       2
3173     01           00AC4                            SIOSTAT   RES       2
3174     01           00AC6                            TIOSTAT   RES       2
3175     01           00AC8                            HIOSTAT   RES       2
3176     01           00ACA                            IOVSTAT   RES       2
3177     01           00ACC                            AIOSTAT   RES       2
3178     01           00ACE          01000000  A       WRTORDER  ZFCP      1,0
3179     01           00ACF          1C000000  A                 ZFCP      X'1C',0
3180     01           00AD0          02000000  A       RDSORDER  ZFCP      2,0
3181     01           00AD1          1C000000  A                 ZFCP      X'1C',0
3182     01           00AD2          03000000  A       SEEKORDR  ZFCP      3,0
3183     01           00AD3          1C000000  A                 ZFCP      X'1C',0
3184     01           00AD4          04000000  A       SENSORDR  ZFCP      4,0
3185     01           00AD5          1C000000  A                 ZFCP      X'1C',0
3186     01           00AD6          05000000  A       CWRTORDR  ZFCP      5,0
3187     01           00AD7          1C000000  A                 ZFCP      X'1C',0
3188     01           00AD8                            DBLWDTMP  RES       4
3189                                                    *
3190                                                    *
3191     01           00ADC          40406140  A       TEXTSPCE  TEXT      '  / '
3192     01           00ADD          E2C9D640  A       TEXTSIO   TEXT      'SIO '
3193     01           00ADE          E3C9D640  A       TEXTTIO   TEXT      'TIO '
3194     01           00ADF          C8C9D640  A       TEXTHIO   TEXT      'HIO '
3195     01           00AE0          E3C4E540  A       TEXTTDV   TEXT      'TDV '
3196     01           00AE1          C1C9D640  A       TEXTAIO   TEXT      'AIO '
3197     01           00AE2          E6D9E340  A       TEXTWRT   TEXT      'WRT '
3198     01           00AE3          D9C5C1C4  A       TEXTREAD  TEXT      'READ'
3199     01           00AE4          E2C5C5D2  A       TEXTSEEK  TEXT      'SEEK'
3200     01           00AE5          E2C5D5E2  A       TEXTSENS  TEXT      'SENS'
3201     01           00AE6          C3E6D9E3  A       TEXTCWRT  TEXT      'CWRT'
3202     01           00AE7          00000000  A       WORKADDR  DATA      0
3203     01           00AE8          00000000  A       SKWRPRBT  DATA      0
3204                                                              PAGE
3205                                                    *                                                                *
3206                                                    *THIS WILL RESTORE THE GENERAL-PURPOSE REGISTERS.                 *
3207                                                    *                                                                *
3208     01           00AE9          022000F0  A       GRRSTR    LCI       X'F'
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LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
3209	01	00AEA	0A000AF6			PLM,R0	GRPSHMW	
3210	01	00AEB	E800000F	A		B	*R15	
3211						PAGE		
3212					*			
3213					*THIS WILL SAVE THE CONTENTS OF THE GENERAL-PURPOSE REGISTERS			*
3214					*			*
3215	01	00AEC	35F00AF8		GRSAVE	STW,R15	GRSAVL0C	
3216	01	00AED	22F00AF8			LI,R15	GRSAVL0C	
3217	01	00AEE	35F00AF6			STW,R15	GRPSHMW	
3218	01	00AEF	22F1001F	A		LI,R15	X'1001F'	
3219	01	00AF0	25F0040F	A		SAS,R15	15	
3220	01	00AF1	35F00AF7			STW,R15	GRPSHMW+1	
3221	01	00AF2	32F00AF8			LW,R15	GRSAVL0C	
3222	01	00AF3	022000FC	A		LCI	X'F'	
3223	01	00AF4	08000AF6			PSM,R0	GRPSHMW	
3224	01	00AF5	E800000F	A		B	*R15	
3225						BOUND	8	
3226	01	00AF6	00000AF8		GRPSHMW	ZFBT	0,0,GRSAVL0C	
3227	01	00AF7	00100000	A		ZAP1	16,0	
3228	01	00AF8			GRSAVL0C	RES	16	
3229						PAGE		
3230					*			
3231					*THIS EXECUTES AN HIO AND OUTPUTS THE STATUS AT MESSAGE LEVEL 3. IF			*
3232					*ANY BITS OF THE COMPARE DATA TEST TRUE, A PLACE-MARK BRANCH IS TAKEN,			*
3233					*IF SPECIFIED IN THE CONTROL LINE.			*
3234					*			*
3235	01	00B08	40000000	A		DATA	X'40000000'	P1-ADDRESS
3236	01	00B09	40000000	A		DATA	X'40000000'	P2-STATUS COMPARE BITS
3237	01	00B0A	35F00B1B		HIO	STW,R15	HIOEXIT	SAVE EXIT
3238	01	00B0B	3280058F			LW,R8	P2	
3239	01	00B0C	358006A7			STW,R8	STCMPSAV	
3240	01	00B0D	6AF00D67			BAL,R15	STATCLR	CLR STATUS LOCS
3241	01	00B0E	CFC0058E			HIO,R12	*P1	
3242	01	00B0F	15C00AC8			STD,R12	HIOSTAT	SAVE HIO STATUS
3243	01	00B10	74000AC8			STCF	HIOSTAT	SAVE CC
3244	01	00B11	3280058E			LW,R8	P1	
3245	01	00B12	35800AE7			STW,R8	WORKADDR	
3246	01	00B13	32800ADF			LW,R11	TEXTHIO	
3247	01	00B14	12C00AC8			LD,R12	HIOSTAT	
3248	01	00B15	6AF00D6C			BAL,R15	STATTYPE	TYPE STATUS
3249	01	00B16	25D00474	A		SAS,R13	-12	
3250	01	00B17	31D0058F			CW,R13	P2	
3251	01	00B18	68400B1A			BCR,4	$+2	ANY BITS COMPARE
3252	01	00B19	33100B1B			MTW,1	HIOEXIT	YES
3253	01	00B1A	E8000B1B			B	*HIOEXIT	NO
3254	01	00B1B	00000000	A	HIOEXIT	DATA	0	
3255						PAGE		
3256					*			
3257					*THIS ARMS AND ENABLES THE I/O INTERRUPT.			*
3258					*			*
3259	01	00B1C	32800B21		IOARMENB	LW,R8	SAIOXPSD	SET UP
3260	01	00B1D	3580005C	A		STW,R8	X'5C'	I/O
3261	01	00B1E	22E00020	A		LI,R14	X'20'	INTERRUPT
3262	01	00B1F	6CE01200	A		WD,R14	X'1200'	LOCATION
3263	01	00B20	E800000F	A		B	*R15	EXIT
3264	01	00B21	0F000B22		SAIOXPSD	XPSD,0	STNDAIO	
3265						BOUND	8	
3266	01	00B22	00000000	A	STNDAIO	DATA	0	
3267	01	00B23	00000000	A		DATA	0	
3268	01	00B24	00000DA1			DATA	STDAIO	
3269	01	00B25	00000000	A		DATA	0	
3270						PAGE		
3271					*			
3272					*THIS ALLOWS USER SUBROUTINES TO INTERFACE WITH THE DCP.			*
3273					*			*
3274	01	00B26	40000000	A		DATA	X'40000000'	P1-MEMORY ADDR OF USER SUB-ROUTINE
3275	01	00B27	40000000	A		DATA	X'40000000'	P2- INPUT
3276	01	00B28	40000000	A		DATA	X'40000000'	P3- PARAMETERS
3277	01	00B29	40000000	A		DATA	X'40000000'	P4- FOR
3278	01	00B2A	40000000	A		DATA	X'40000000'	P5- USE
3279	01	00B2B	40000000	A		DATA	X'40000000'	P6- BY

MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
01	00B2C	40000000	A		DATA	X'40000000'	P7- USER
01	00B2D	40000000	A		DATA	X'40000000'	P8- SUPPLIED
01	00B2E	40000000	A		DATA	X'40000000'	P9- SUBROUTINE
01	00B2F	40000000	A		DATA	X'40000000'	P10-
01	00B30	35F00B33		JUMP	STW,R15	JUMPEXIT	
01	00B31	EAF0058E			BAL,R15	*P1	
01	00B32	E8000B33			B	*JUMPEXIT	
01	00B33	00000000	A	JUMPEXIT	DATA	0	
					PAGE		
				*			
				*THIS ESTABLISHES THE RECORD LENGTH FOR READ, WRITE, CHECKWRITE OR			*
				*COMPARE OPERATIONS. PARAMETER D1 IS THE BYTE COUNT DESIGNATING			*
				*LOGICAL RECORD LENGTH. IF D1 EXCEEDS THE MAXIMUM NUMBER OF BYTES			*
				*AVAILABLE IN THE I/O BUFFER, A MESSAGE WILL BE OUTPUT, AND THE			*
				*LENGTH WILL BE SET TO THE MAXIMUM VALUE.			*
				*IF D2=0, SET SUPPRESS INCORRECT LENGTH FLAG IF LENGTH IS NOT AN			*
				*INTEGRAL MULTIPLE OF 1024 BYTES. IF D2=1, THEN SET SUPPRESS INCORRECT			*
				*LENGTH FLAG=0.			*
				*			*
01	00B34	20000000	A		DATA	X'20000000'	P1-BYTE COUNT
01	00B35	20000000	A		DATA	X'20000000'	P2-SIL FLAG CTL
01	00B36	35F00B6A		LEN	STW,R15	LENEXIT	SAVE RETURN
01	00B37	32A00588			LW,R10	Z10WDS	GET BFR WD CT
01	00B38	25A00402	A		SAS,R10	2	MAKE IT A BYTE CT
01	00B39	21A0FFFF	A		CI,R10	65535	
01	00B3A	68200B3C			BCR,2	$+2	IS BYTE CT > 65535
01	00B3B	22A0FFFF	A		LI,R10	65535	YES
01	00B3C	35A00B6B			STW,R10	RECLNGTH	NO-SAVE IT
01	00B3D	32A0058E			LW,R10	P1	
01	00B3E	69300B40			BCS,3	$+2	P1 > 0
01	00B3F	22A00400	A		LI,R10	1024	
01	00B40	32C00B6B			LW,R12	RECLNGTH	GET IO BFR BYTE CT
01	00B41	31A0000C	A		CW,R10	R12	LENGTH
01	00B42	68200B49			BCR,2	LEN00	> I/O AREA
01	00B43	6AF00925			BAL,R15	DECCNVRT	
01	00B44	35C00B76			STW,R12	MXLNMSG+4	
01	00B45	35D00B77			STW,R13	MXLNMSG+5	
01	00B46	32C00B71			LW,R12	MXLNMCTL	TYPE OUT
01	00B47	6AF00E35			BAL,R15	TYPE01	MESSAGE
01	00B48	32A00B6B			LW,R10	RECLNGTH	GET MAX BFR BYTES
01	00B49	35A00B6B		LEN00	STW,R10	RECLNGTH	
01	00B4A	3280000A	A		LW,R8	R10	
01	00B4B	21800003	A		CI,R8	3	
01	00B4C	68400B4E			BCR,4	$+2	
01	00B4D	20800004	A		AI,R8	4	
01	00B4E	2580047E	A		SAS,R8	-2	
01	00B4F	35800B6F			STW,R8	RECWDCNT	
01	00B50	22B00000	A		LI,R11	0	
01	00B51	35B00BC6			STW,R11	PATTERNI	
01	00B52	21A00000	A		CI,R10	0	
01	00B53	68200B57			BCR,2	$+4	< 0
01	00B54	20AFFC00	A		AI,R10	-1024	NO
01	00B55	3310000B	A		MTW,1	R11	
01	00B56	68000B52			B	$-4	
01	00B57	35B00B6C			STW,R11	SECTRCNT	SAVE SECTOR CNT
01	00B58	3300058F			MTW,0	P2	
01	00B59	68300B5C			BCR,3	$+3	
01	00B5A	22A00000	A		LI,R10	0	
01	00B5B	68000B5F			B	$+4	
01	00B5C	3300000A	A		MTW,0	R10	
01	00B5D	68300B5F			BCR,3	$+2	
01	00B5E	32A0100A			LW,R10	=X'02000000'	
01	00B5F	35A00B70			STW,R10	SILIND	
01	00B60	22B00000	A		LI,R11	0	
01	00B61	32A00B6C			LW,R10	SECTRCNT	
01	00B62	20AFFFF4	A		AI,R10	-12	
01	00B63	69100B66			BCS,1	$+3	IS SECTOR CNT NEG
01	00B64	3310000B	A		MTW,1	R11	NO
01	00B65	68000B62			B	$-3	
01	00B66	20A0000C	A		AI,R10	12	YES-RESTORE SECTORS
01	00B67	35A00B6E			STW,R10	SECTORS	

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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL      OPERATION  OPERAND          COMMENTS
3351      01            00B68           35800B6D                          STW,R11    TRACKS
3352      01            00B69           E8000B6A                          B          *LENEXIT
3353      01            00B6A           00000000         A        LENEXIT   DATA       0
3354      01            00B6B           00000000         A        RECLNGTH  DATA       0
3355      01            00B6C           00000000         A        SECTRCNT  DATA       0
3356      01            00B6D           00000000         A        TRACKS    DATA       0
3357      01            00B6E           00000000         A        SECTORS   DATA       0
3358      01            00B6F           00000000         A        RECWDCNT  DATA       0
3359      01            00B70           00000000         A        SILIND    DATA       0
3360      01            00B71           101E2DC8         A        MXLNMCTL  ZFMW       1,0,30,BA(MXLNMSG)
3361      01            00B72           D4C1E740         A        MXLNMSG   TEXT       'MAX REC LENGTH  00000000 BYTES'
          01            00B73           D9C5C340         A
          01            00B74           D3C5D5C7         A
          01            00B75           E3C84040         A
          01            00B76           F0F0F0F0         A
          01            00B77           F0F0F0F0         A
          01            00B78           40C2E8E3         A
          01            00B79           C5E24040         A
3362                                                               PAGE
3363                                                     *                                                                    *
3364                                                     *THIS IS TO MARK A PLACE IN A CONTROL LINE. H1 IS THE MARK IDENTIFIER.*
3365                                                     *                                                                    *
3366      01            00B7A           60000000         A                  DATA       X'60000000'
3367      01            00B7B           35F00B84                 MARK      STW,R15    MARKEXIT
3368      01            00B7C           3280058E                           LW,R8      P1
3369      01            00B7D           32900940                           LW,R9      EBCBLNK
3370      01            00B7E           25800378         A                 SCD,R8     -8
3371      01            00B7F           35800B87                           STW,R8     TEXTMARK+1
3372      01            00B80           35900B88                           STW,R9     TEXTMARK+2
3373      01            00B81           32C00B85                           LW,R12     MARKCNTL
3374      01            00B82           64F00E33                           BAL,R15    TYPE00
3375      01            00B83           E8000B84                           B          *MARKEXIT
3376      01            00B84           00000000         A        MARKEXIT  DATA       0
3377      01            00B85           10092E18         A        MARKCNTL  ZFMW       1,0,9,BA(TEXTMARK)
3378      01            00B86           D4C1D9D2         A        TEXTMARK  TEXT       'MARK      '
          01            00B87           40404040         A
          01            00B88           40404040         A
3379                                                               PAGE
3380                                                     *                                                                    *
3381                                                     *THIS WILL OUTPUT A MESSAGE WHEN CHANNEL END IS EXPECTED BUT NOT      *
3382                                                     *RECEIVED.                                                           *
3383                                                     *                                                                    *
3384      01            00B89           CEA00AE7                 NOCHEND   TDV,R10    *WORKADDR        GET DEV DATA
3385      01            00B8A           15A00ACA                           STD,R10    TDVSTAT          SAVE STATUS
3386      01            00B8B           74000ACA                           STCF       TDVSTAT          SAVE CC
3387      01            00B8C           CFA00AE7                           HIO,R10    *WORKADDR        RESET DEV AND CTLR
3388      01            00B8D           15A00AC8                           STD,R10    HIOSTAT          SAVE STATUS
3389      01            00B8E           74000AC8                           STCF       HIOSTAT          SAVE CC
3390      01            00B8F           32C00B92                           LW,R12     NOCHECTL
3391      01            00B90           6AF00E35                           BAL,R15    TYPE01
3392      01            00B91           680000AF                           B          STDAIBOC-2       EXIT
3393      01            00B92           1C152E4C         A        NOCHECTL  ZFMW       1,0,21,BA(NOCHEMSG)
3394      01            00B93           C3C8C1D5         A        NOCHEMSG  TEXT       'CHAN END NOT RECEIVED'
          01            00B94           40C5D5C4         A
          01            00B95           40D5D6E3         A
          01            00B96           40D9C5C3         A
          01            00B97           C5C9E5C5         A
          01            00B98           C4404040         A
3395                                                               PAGE
3396                                                     *                                                                    *
3397                                                     *THIS GENERATES A TEST PATTERN AND SPREADS IT THRUGH THE I/O BUFFER.  *
3398                                                     *                                                                    *
3399      01            00B99           40000000         A                  DATA       X'40000000'
3400      01            00B9A           20000000         A                  DATA       X'20000000'
3401      01            00B9B           32C0058E                 PATT      LW,R12     P1
3402      01            00B9C           32D0058F                           LW,R13     P2
3403      01            00B9D           35C00BC4                           STW,R12    P1ST0RE
3404      01            00B9E           35D00BC5                           STW,R13    P2ST0RE
3405      01            00B9F           3240058C5                PATTENT1  LW,R4      P2ST0RE
3406      01            00BA0           32B00BC4                           LW,R11     P1ST0RE
3407      01            00BA1           25A0037C         A                 SCD,R10    -4
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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL     OPERATION  OPERAND          COMMENTS
3408      01            00BA2           64400BA1                          BDR,R4    $-1
3409      01            00BA3           22400000         A                LI,R4     0
3410      01            00BA4           226FFFE0         A                LI,R6     -32
3411      01            00BA5           32D000CA         A                LW,R13    R10
3412      01            00BA6           32500BC5                          LW,R5     P2STORE
3413      01            00BA7           25C00304         A      PATTOO    SCD,R12   4
3414      01            00BA8           64500BAB                          BDR,R5    $+3
3415      01            00BA9           32500BC5                          LW,R5     P2STORE
3416      01            00BAA           32D000CA         A                LW,R13    R10
3417      01            00BAB           25C00304         A                SCD,R12   4
3418      01            00BAC           64500BAF                          BDR,R5    $+3
3419      01            00BAD           32500BC5                          LW,R5     P2STORE
3420      01            00BAE           32D000CA         A                LW,R13    R10
3421      01            00BAF           75C80BC7                          STB,R12   PATTSAVE,X4
3422      01            00BB0           654000B1                          BIR,R4    $+1
3423      01            00BB1           656000A7                          BIR,R6    PATTOO
3424      01            00BB2           32500BC5                          LW,R5     P2STORE
3425      01            00BB3           20500BC7                          AI,R5     PATTSAVE
3426      01            00BB4           30501C01                          AW,R5     *X'328A0000'
3427      01            00BB5           35500BBC                          STW,R5    PATTLOAD
3428      01            00BB6           32500B6F                          LW,R5     RECWDCNT
3429      01            00BB7           30500587                          AW,R5     ZI9ADR
3430      01            00BB8           30501013                          AW,R5     *X'35880000'
3431      01            00BB9           35500BED                          STW,R5    PATSTORE
3432      01            00BBA           3A400B6F                          LCW,R4    RECWDCNT
3433      01            00BBB           3A500BC5                          LCW,R5    P2STORE
3434      01            00BBC           00000000         A      PATTLOAD  DATA      0
3435      01            00BBD           00000000         A      PATSTORE  DATA      0
3436      01            00BBE           655003C0                          BIR,R5    $+2
3437      01            00BBF           3A500BC5                          LCW,R5    P2STORE
3438      01            00BC0           654000BC                          BIR,R4    PATTLOAD
3439      01            00BC1           224FFFFF         A                LI,R4     -1
3440      01            00BC2           35400BC6                          STW,R4    PATTERNI
3441      01            00BC3           E800000F         A                B         *R15
3442      01            00BC4           00000000         A      P1STORE   DATA      0
3443      01            00BC5           00000000         A      P2STORE   DATA      0
3444      01            00BC6           00000000         A      PATTERNI  DATA      0
3445      01            00BC7                            PATTSAVE  RES       8
3446                                                      PAGE
3447                                                      *                                                                                *
3448                                                      *THIS WILL CYCLE THE PATTERN RIGHT 1 BIT, OR ADD TO IT IF X1 IS A                 *
3449                                                      *NON-ZERO VALUE.                                                                 *
3450                                                      *                                                                                *
3451      01            00BCF           40000000         A                DATA      X'40000000'
3452      01            00BD0           35F00BE2                 PCYC     STW,R15   PCYCEXIT
3453      01            00BD1           32700BC5                          LW,R7     P2STORE
3454      01            00BD2           3280058E                          LW,R8     P1
3455      01            00BD3           68300BD6                          BCR,3     $+3                 P1 = 0
3456      01            00BD4           30800BC4                          AW,R8     P1STORE             NO
3457      01            00BD5           68000BDF                          B         PCYC00
3458      01            00BD6           32800BC4                          LW,R8     P1STORE
3459      01            00BD7           22900000         A                LI,R9     0
3460      01            00BD8           2580037F         A                SCD,R8    -1
3461      01            00BD9           25700402         A                SAS,R7    2
3462      01            00BDA           207FFFE0         A                AI,R7     -32
3463      01            00BDB           683000DE                          BEZ       $+3
3464      01            00BDC           2590027F         A                SCS,R9    -1
3465      01            00BDD           65700BDC                          BIR,R7    $-1
3466      01            00BDE           30800009         A                AW,R8     R9
3467      01            00BDF           35800BC4                 PCYC00   STW,R8    P1STORE
3468      01            00BE0           6AF00B9F                          BAL,R15   PATTERN1
3469      01            00BE1           E8000BE2                          B         *PCYCEXIT
3470      01            00BE2           00000000         A      PCYCEXIT  DATA      0
3471                                                      PAGE
3472                                                      *                                                                                *
3473                                                      *THIS WILL MOVE A PORTION OF THE PROGRAM INTO THE I/O BUFFER TO BE                *
3474                                                      *USED AS THE PATTERN.                                                            *
3475                                                      *                                                                                *
3476      01            00BE3           55F20001                 PROGMOVE  STW,R15   PROGEXIT,X1
3477      01            00BE4           32700588                          LW,R7     ZI6WDS              COMPUTE LAST
3478      01            00BE5           30700587                          AW,R7     ZI9ADR               BYTE ADDRESS
3479      01            00BE6           25700002         A                SLS,R7    2                     OF I/O BUFFER
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LINE NO. MEM PROT KEY MEMORY ADDRESS MEMORY CONTENTS ABS OR REL ORIG LABEL    OPERATION OPERAND          COMMENTS
3480     01           00BE7          22800850          LI,R8     COUNTER+1       GET THE STARTING BYTE ADDRESS
3481     01           00BE8          30800580          AW,R8     P2               FROM THE COUNTER SPECIFIED
3482     01           00BE9          B2900008  A       LW,R9     *R8               IN P2, INTO R9
3483     01           00BEA          32800009  A       LW,R8     R9                AND R8
3484     01           00BEB          30900868          AW,R9     RECLNGTH        IS STARTING BYTE ADDR+RECLNGTH
3485     01           00BEC          31700009  A       CW,R7     R9               > LAST BYTE ADDR OF I/O BUFFER
3486     01           00BED          68100BF2          BGE       $+5             NO+
3487     01           00BEE          32C00C03          LW,R12    MXPRCTL         YES+
3488     01           00BEF          6AF00E33          BAL,R15   TYPE00            THEN TYPE
3489     01           00BF0          33100001          MTW,1     PR0GEXIT          OUT MESSAGE
3490     01           00BF1          68000001          B         PR0GEXIT          AND EXIT
3491     01           00BF2          35900868          SW,R9     RECLNGTH
3492     01           00BF3          48901014          AND,R9    =X'3'           SAVE THE 2 LEAST
3493     01           00BF4          35900002          STW,R9    SAVEBITS         SIGNIFICANT BITS
3494     01           00BF5          25800075  A       SLS,R8    =2              MAKE THE START BYTE ADDR A WORD ADD
3495     01           00BF6          30800B6F          AW,R8     RECWDCNT
3496     01           00BF7          558208FC          STH,R8    WRTPR0G,X1
3497     01           00BF8          32800587          LW,R8     ZI0ADR
3498     01           00BF9          30800B6F          AW,R8     RECWDCNT
3499     01           00BFA          558208FD          STH,R8    WRTPR0G+1,X1
3500     01           00BFB          3A700B6F          LCW,R7    RECWDCNT
3501     01           00BFC          328E0000  A WRTPR0G LW,R8     0,X7            MOVE A NUMBER OF BYTES EQUAL TO THE
3502     01           00BFD          358E0000  A       STW,R8    0,X7             RECORD LENGTH INTO THE I/O BUFFER
3503     01           00BFE          65700BFC          BIR,R7    $-2
3504     01           00BFF          228FFFFF  A       LI,R8     -1
3505     01           00C00          35800BC6          STW,R8    PATTERN1
3506     01           00C01          68000000  A PR0GEXIT B        0
3507     01           00C02          00000000  A SAVEBITS DATA     0
3508     01           00C03          10143010  A MXPRCTL  ZFMW     1,0,20,BA(MXPRMSG)
3509     01           00C04          C1C4C4D9  A MXPRMSG  TEXT     'ADDRESS OUT OF RANGE'
         01           00C05          C5E2E240  A
         01           00C06          D6E4E340  A
         01           00C07          D6C640D9  A
         01           00C08          C1D5C7C5  A
3510                                          PAGE
3511                                 *                                                                    *
3512                                 *THIS ALLOWS FOR CERTAIN RAD CONDITIONS TO BE TESTED. IF ANY OF THE  *
3513                                 *TEST CONDITIONS ARE TRUE, A PLACEMARK BRANCH WILL BE TAKEN IF       *
3514                                 *SPECIFIED IN THE CONTROL LINE.                                      *
3515                                 *                                                                    *
3516     01           00C09          40000000  A       DATA      X'40000000'
3517     01           00C0A          35F00C53          Q         STW,R15   QEXIT
3518     01           00C0B          CDC00EBE          TIB,R12   *CDA
3519     01           00C0C          74000009  A       STCF      R9
3520     01           00C0D          25C00510  A       SAD,R12   16
3521     01           00C0E          21C06000  A       CI,R12    X'6000'
3522     01           00C0F          69400C12          BCS,4     $+3               READY
3523     01           00C10          22800000  A       LI,R8     0                 YES
3524     01           00C11          68000C1B          B         Q001
3525     01           00C12          22800001  A       LI,R8     1                 NO
3526     01           00C13          21C02000  A       CI,R12    X'2000'
3527     01           00C14          69400C16          BCS,4     $+2               NOT BPTL OR BUSY
3528     01           00C15          68000C1B          B         Q001              NO
3529     01           00C16          21C04000  A       CI,R12    X'4000'           YES
3530     01           00C17          69400C1A          BCS,4     $+3               BUSY
3531     01           00C18          20800002  A       AI,R8     2                 NO
3532     01           00C19          68000C1B          B         Q001
3533     01           00C1A          20800004  A       AI,R8     4                 YES
3534     01           00C1B          21C00200  A Q001    CI,R12    X'200'
3535     01           00C1C          68400C1E          BCR,4     $+2               NOT READY OR BUSY
3536     01           00C1D          20800008  A       AI,R8     8                 YES
3537     01           00C1E          21C00600  A       CI,R12    X'600'
3538     01           00C1F          68400C21          BCR,4     $+2               BUSY
3539     01           00C20          20800010  A       AI,R8     16                YES
3540     01           00C21          25900202  A       SCS,R9    2
3541     01           00C22          21900001  A       CI,R9     1
3542     01           00C23          68400C25          BCR,4     $+2               SIO PASS ( CC 2 )
3543     01           00C24          20800020  A       AI,R8     X'20'             NO
3544     01           00C25          21900002  A       CI,R9     2                 YES
3545     01           00C26          68400C28          BCR,4     $+2               ADDR REC   ( CC 1 )
3546     01           00C27          20800040  A       AI,R8     X'40'             NO
3547     01           00C28          21C08000  A       CI,R12    X'8000'           YES
```

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
3548	01	00C29	68400C2B			BCR,4	$+2	INT PDG
3549	01	00C2A	20800080	A		AI,R8	X'80'	YES
3550	01	00C2B	32C00AC9			LW,R12	HIBSTAT+1	
3551	01	00C2C	25C00210	A		SCS,R12	16	
3552	01	00C2D	21C00800	A		CI,R12	X'800'	
3553	01	00C2E	68400C30			BCR,4	$+2	UNUS END
3554	01	00C2F	20800100	A		AI,R8	X'100'	YES
3555	01	00C30	21C00080	A		CI,R12	X'80'	NO
3556	01	00C31	68400C33			BCR,4	$+2	INC LENGTH
3557	01	00C32	20802000	A		AI,R8	X'2000'	YES
3558	01	00C33	21C00040	A		CI,R12	X'40'	NO
3559	01	00C34	68400C36			BCR,4	$+2	TRANS ERR
3560	01	00C35	20801000	A		AI,R8	X'1000'	YES
3561	01	00C36	32D00ACD			LW,R13	AIBSTAT+1	
3562	01	00C37	25CC0510	A		SAD,R12	16	
3563	01	00C38	21C01000	A		CI,R12	X'1000'	
3564	01	00C39	68400C3B			BCR,4	$+2	WRT PRBT VIBL
3565	01	00C3A	20800200	A		AI,R8	X'200'	YES
3566	01	00C3B	21C02000	A		CI,R12	X'2000'	NO
3567	01	00C3C	68400C3E			BCR,4	$+2	SECTOR UNAV
3568	01	00C3D	20800400	A		AI,R8	X'400'	YES
3569	01	00C3E	21C08000	A		CI,R12	X'8000'	NO
3570	01	00C3F	68400C41			BCR,4	$+2	RATE ERROR
3571	01	00C40	20800800	A		AI,R8	X'800'	YES
3572	01	00C41	33000918			MTW,0	CPLERIND	NO
3573	01	00C42	68100C44			BCR,1	$+2	COUPLER ERROR
3574	01	00C43	20804000	A		AI,R8	X'4000'	YES
3575	01	00C44	227FFFF1	A		LI,R7	-15	COMPARE P1
3576	01	00C45	68000C47			B	$+2	
3577	01	00C46	258C047F	A	Q003	SAS,R8	-1	
3578	01	00C47	21800001	A		CI,R8	1	
3579	01	00C48	68400C4C			BCR,4	$+4	
3580	01	00C49	32CE0C8E			LW,R12	QMSGCTL0+15,X7	YES-TYPE APPROPRIATE
3581	01	00C4A	64F00E35			BAL,R15	TYPE01	MESSAGE
3582	01	00C4B	33F00C54			MTW,-1	PBRIND	SET IND FOR PLACEMARK BRANCH
3583	01	00C4C	25900401	A		SAS,R9	1	POSITION MASK FOR NEXT BIT
3584	01	00C4D	65700C46			BIR,R7	Q003	ALL BITS CHECKED
3585	01	00C4E	33000C54			MTW,0	PBRIND	YES-TAKE PLACEMARK
3586	01	00C4F	68300C51			BCR,3	$+2	BRANCH
3587	01	00C50	33100C53			MTW,1	QEXIT	YES
3588	01	00C51	3570C54			STW,R7	PBRIND	NO
3589	01	00C52	E8000C53			B	*QEXIT	
3590	01	00C53	00000000	A	QEXIT	DATA	0	
3591	01	00C54	00000000	A	PBRIND	DATA	0	
3592	01	00C55	C4C5E540	A	QMSG0000	TEXT	'DEV NOT RDY'	
	01	00C56	D5D6E340	A				
	01	00C57	D9C4E840	A				
3593	01	00C58	C4C5E540	A	QMSG0001	TEXT	'DEV NOT BPTL'	
	01	00C59	D5D6E340	A				
	01	00C5A	D6D7E3D3	A				
3594	01	00C5B	C4C5E540	A	QMSG0002	TEXT	'DEV BUSY'	
	01	00C5C	C2E4E2E8	A				
3595	01	00C5D	C3E3D3D9	A	QMSG0003	TEXT	'CTLR NOT BPTL'	
	01	00C5E	40D5D6E3	A				
	01	00C5F	40D6D7E3	A				
	01	00C60	D3404040	A				
3596	01	00C61	C3E3D3D9	A	QMSG0004	TEXT	'CTLR BUSY'	
	01	00C62	40C2E4E2	A				
	01	00C63	E8404040	A				
3597	01	00C64	E2C9D640	A	QMSG0005	TEXT	'SIB NOT PRSS'	
	01	00C65	D5D6E340	A				
	01	00C66	D7D6E2E2	A				
3598	01	00C67	D5D640C1	A	QMSG0006	TEXT	'NO ADDR REC'	
	01	00C68	C4C4D940	A				
	01	00C69	D9C5C340	A				
3599	01	00C6A	C9D5E340	A	QMSG0007	TEXT	'INT PDG'	
	01	00C6B	D7C4C740	A				
3600	01	00C6C	E4D5E4E2	A	QMSG0008	TEXT	'UNUS END'	
	01	00C6D	40C5D5C4	A				
3601	01	00C6E	E6D9E340	A	QMSG0009	TEXT	'WRT PRBT VIBL'	
	01	00C6F	D7D9D6E3	A				
	01	00C70	40E5C9D6	A				

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
	01	00C71	D3404040	A				
3602	01	00C72	E2C5C3E3	A	GMSG000A	TEXT	'SECT UNAV'	
	01	00C73	40E4D5C1	A				
	01	00C74	E5404040	A				
3603	01	00C75	D9C1E3C5	A	GMSG000B	TEXT	'RATE ERR'	
	01	00C76	40C5D9D9	A				
3604	01	00C77	E3D9C1D5	A	GMSG000C	TEXT	'TRANS ERR'	
	01	00C78	E240C5D9	A				
	01	00C79	D9404040	A				
3605	01	00C7A	C9D5C340	A	GMSG000D	TEXT	'INC LENGTH'	
	01	00C7B	D3C5D5C7	A				
	01	00C7C	E3C84040	A				
3606	01	00C7D	C3D7D3D9	A	GMSG000E	TEXT	'CPLR ERR'	
	01	00C7E	40C5D9D9	A				
3607	01	00C7F	100B3154	A	GMSGCTL0	ZFMW	1,0,11,BA(GMSG0000)	
3608	01	00C80	100C316C	A	GMSGCTL1	ZFMW	1,0,12,BA(GMSG0001)	
3609	01	00C81	1008316C	A	GMSGCTL2	ZFMW	1,0,8,BA(GMSG0002)	
3610	01	00C82	100D3174	A	GMSGCTL3	ZFMW	1,0,13,BA(GMSG0003)	
3611	01	00C83	10093184	A	GMSGCTL4	ZFMW	1,0,9,BA(GMSG0004)	
3612	01	00C84	100C3190	A	GMSGCTL5	ZFMW	1,0,12,BA(GMSG0005)	
3613	01	00C85	100B319C	A	GMSGCTL6	ZFMW	1,0,11,BA(GMSG0006)	
3614	01	00C86	100731A8	A	GMSGCTL7	ZFMW	1,0,7,BA(GMSG0007)	
3615	01	00C87	100831B0	A	GMSGCTL8	ZFMW	1,0,8,BA(GMSG0008)	
3616	01	00C88	100D31B8	A	GMSGCTL9	ZFMW	1,0,13,BA(GMSG0009)	
3617	01	00C89	100931C8	A	GMSGCTLA	ZFMW	1,0,9,BA(GMSG000A)	
3618	01	00C8A	100831D4	A	GMSGCTLB	ZFMW	1,0,8,BA(GMSG000B)	
3619	01	00C8B	100931DC	A	GMSGCTLC	ZFMW	1,0,9,BA(GMSG000C)	
3620	01	00C8C	100A31E8	A	GMSGCTLD	ZFMW	1,0,10,BA(GMSG000D)	
3621	01	00C8D	100831F4	A	GMSGCTLE	ZFMW	1,0,8,BA(GMSG000E)	
3622						PAGE		
3623					*			*
3624					*THIS WILL READ A RECORD FROM THE RAD INTO THE I/O BUFFER AREA.			*
3625					*IF PARAMETER F1=0, READ ALL TRACKS. IF F1=1, SKIP WRITE PROT TRACKS.			*
3626					*IF F2=0, DISCONNECT AT END OF RECORD IN ERROR. IF F2=1, DISCONNECT			*
3627					*AT END OF SECTOR IN ERROR.			*
3628					*			*
3629	01	00C8E	20000000	A		DATA	X'20000000'	P1
3630	01	00C8F	20000000	A		DATA	X'20000000'	P2
3631	01	00C90	35F00CC9		READ	STW,R15	READEXIT	SAVE EXIT
3632	01	00C91	32800AE3			LW,R8	TEXTREAD	
3633	01	00C92	35800EE2			STW,R8	WRPRORDR	
3634	01	00C93	B2800587			LW,R8	*ZIOADR	CLEAR
3635	01	00C94	48801004			AND,R8	=X'FFFFFF'	FIRST
3636	01	00C95	B5800587			STW,R8	*ZIOADR	AND
3637	01	00C96	3270036F			LW,X7	RECWDCNT	LAST
3638	01	00C97	30700587			AW,X7	ZIOADR	BYTE
3639	01	00C98	328E0000	A		LW,R8	0,X7	OF BUFFER
3640	01	00C99	48801004			AND,R8	=X'FFFFFF'	ONE RECORD
3641	01	00C9A	358E0000	A		STW,R8	0,X7	LONG
3642	01	00C9B	3280058E			LW,R8	P1	
3643	01	00C9C	35800AE8			STW,R8	SKWRPROT	
3644	01	00C9D	22800000	A		LI,R8	0	
3645	01	00C9E	3380058F			MTW,0	P2	
3646	01	00C9F	6B800CA1			BCR,3	$+2	
3647	01	00CA0	30801010			AW,R8	=X'10000000'	
3648	01	00CA1	35800CCC			STW,R8	RDMODIFY	
3649	01	00CA2	32800E26			LW,R8	RETRYCNT	
3650	01	00CA3	35800E27			STW,R8	RETRYCTR	LOAD RETRY CTR
3651	01	00CA4	6AF006AB		READ02	BAL,R15	CAFCHECK	
3652	01	00CA5	33000AE8			MTW,0	SKWRPROT	
3653	01	00CA6	68300CA9			BCR,3	$+3	
3654	01	00CA7	6AF00EC2			BAL,R15	WRPRTCHK	
3655	01	00CA8	68000CAC			B	$+4	
3656	01	00CA9	22800000	A		LI,R8	0	
3657	01	00CAA	35800CCA			STW,R8	READIND	
3658	01	00CAB	6AF008F1			BAL,R15	COUPLE	
3659	01	00CAC	228FFFFF	A		LI,R8	-1	SET READ
3660	01	00CAD	35800CCA			STW,R8	READIND	INDICATOR
3661	01	00CAE	22800CBB			LI,R8	READ00	
3662	01	00CAF	22900CC0			LI,R9	READ01	
3663	01	00CB0	15800AC0			STD,R8	NORMRETN	

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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL     OPERATION  OPERAND     COMMENTS
3664      01            00CB1          32A00587                          LW,R10    ZIBADR
3665      01            00CB2          25A00402         A                SAS,R10   2
3666      01            00CB3          49A00AD0                          BR,R10    RDSBRDER
3667      01            00CB4          49A00CCC                          BR,R10    RDMBDIFY
3668      01            00CB5          35A00ABE                          STW,R10   CBMMPAIR
3669      01            00CB6          32A00B6R                          LW,R10    RECLNGTH
3670      01            00CB7          49A00AD1                          BR,R10    RDSBRDER+1
3671      01            00CB8          49A00B70                          BR,R10    SILIND
3672      01            00CB9          35A00ABF                          STW,R10   CBMMPAIR+1
3673      01            00CBA          68000AAF                          B         EXECUTE           PERFBRM BPERATIBN
3674      01            00CBB          22800000         A       READ00    LI,R8     0
3675      01            00CBC          35800CCB                          STW,R8    RDSERIND
3676      01            00CBD          35800CCA                          STW,R8    READIND
3677      01            00CBE          358008C6                          STW,R8    PATTERNI
3678      01            00CBF          E8000CC9                          B         *READEXIT         BACK TB DCP
3679      01            00CC0          6AF00A08         A       READ01    BAL,R15   ERRBRCNT
3680      01            00CC1          6AF00A34                          BAL,R15   ERRBRTYP
3681      01            00CC2          33F00E27                          MTW,-1    RETRYCTR
3682      01            00CC3          69100CC5                          BCS,1     $+2               RETRY CTR =0
3683      01            00CC4          68000CA5                          B         READ02+1          NB
3684      01            00CC5          228FFFFF         A                LI,R8     -1
3685      01            00CC6          35800CCB                          STW,R8    RDSERIND
3686      01            00CC7          22800000         A                LI,R8     0
3687      01            00CC8          68000CBD                          B         READ00+2
3688      01            00CC9          00000000         A       READEXIT  DATA      0
3689      01            00CCA          00000000         A       READIND   DATA      0
3690      01            00CCB          00000000         A       RDSERIND  DATA      0
3691      01            00CCC          00000000         A       RDMBDIFY  DATA      0
3692                                                              PAGE
3693                                                    *                                                  *
3694                                                    *THIS WILL RESET THE I/B SYSTEM.                   *
3695                                                    *                                                  *
3696      01            00CCD          6D000042         A       RIB       WD,R0     X'42'
3697      01            00CCE          6D000042         A                 WD,R0     X'42'
3698      01            00CCF          E800000F         A                 B         *R15
3699                                                              PAGE
3700                                                    *                                                  *
3701                                                    *THIS EXECUTES A SEEK TB THE UNIT CURRENTLY ADDRESSED BY THE PRBGRAM  *
3702                                                    *(CDA). X1 IS THE DATA (2 BYTES) THAT IS SENT TB THE RAD ADDRESS      *
3703                                                    *REGISTER. D2 IS THE BYTE CBUNT; IF IT IS 0, A CBUNT BF 2 IS USED.    *
3704                                                    *                                                  *
3705      01            00CD0          40000000         A                 DATA      X'40000000'       P1-ADDRESS TB SEEK
3706      01            00CD1          20000000         A                 DATA      X'20000000'       P2-BYTE CBUNT
3707      01            00CD2          35F00CE8         A       SEEK      STW,R15   SEEKEXIT
3708      01            00CD3          3280058E                           LW,R8     P1
3709      01            00CD4          25800578         A                 SAD,R8    -8
3710      01            00CD5          15800CEA                           STD,R8    SEEKSAVE
3711      01            00CD6          12800AD2                           LD,R8     SEEKBRDR
3712      01            00CD7          22A00CEA                           LI,R10    SEEKSAVE
3713      01            00CD8          25A00402         A                 SAS,R10   2                 GEN BYTE ADDR
3714      01            00CD9          20A00003         A                 AI,R10    3
3715      01            00CDA          4980000A         A                 BR,R8     R10
3716      01            00CDB          32A0058F                           LW,R10    P2                GET CT
3717      01            00CDC          69300CDE                           BCS,3     $+2               CT=0
3718      01            00CDD          22A00002         A                 LI,R10    2                 YES
3719      01            00CDE          4990000A         A                 BR,R9     R10               NB
3720      01            00CDF          15800ABE                           STD,R8    CBMMPAIR
3721      01            00CE0          22800CE4                           LI,R8     SEEK00            SET UP NBRMAL
3722      01            00CE1          22900CE5                           LI,R9     SEEK00+1           AND ERRBR
3723      01            00CE2          15800AC0                           STD,R8    NBRMRETN            RETURNS
3724      01            00CE3          68000AAF                           B         EXECUTE
3725      01            00CE4          E8000CE8                 SEEK00    B         *SEEKEXIT
3726      01            00CE5          6AF00A08                           BAL,R15   ERRBRCNT
3727      01            00CE6          6AF00A34                           BAL,R15   ERRBRTYP
3728      01            00CE7          68000CE4                           B         $-3
3729      01            00CE8          00000000         A       SEEKEXIT  DATA      0
3730                                                              BBUND     8
3731      01            00CEA          00000000         A       SEEKSAVE  DATA      0
3732      01            00CEB          00000000         A                 DATA      0
3733                                                              PAGE
3734                                                    *                                                  *
3735                                                    *THIS EXECUTES A SENSE BRDER TB THE CURRENTLY ADDRESSED RAD UNIT (CDA).*
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LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
3736						*D1 IS THE BYTE COUNT, AND IF IT IS 0, THE COUNT IS SET TO 3.		*
3737						*		*
3738	01	00CEC	20000000	A		DATA	X'20000000'	P1=BYTE COUNT
3739	01	00CED	35F00D18		SENS	STW,R15	SENSEXIT	
3740	01	00CEE	32A0058E			LW,R10	P1	
3741	01	00CEF	69300CF1			BCS,3	$+2	
3742	01	00CF0	22A00003	A		LI,R10	3	
3743	01	00CF1	12800AD4			LD,R8	SENSBRDR	
3744	01	00CF2	4990000A	A		BR,R9	R10	
3745	01	00CF3	22A00D1A			LI,R10	SENSSAVE	
3746	01	00CF4	25A00402	A		SAS,R10	2	
3747	01	00CF5	20A00002	A		AI,R10	2	
3748	01	00CF6	4980000A	A		BR,R8	R10	
3749	01	00CF7	15800ABE			STD,R8	COMMPAIR	
3750	01	00CF8	22800CFC			LI,R8	SENS00	
3751	01	00CF9	22900CFD			LI,R9	SENS00+1	
3752	01	00CFA	15800AC0			STD,R8	NORMRETN	
3753	01	00CFB	68000AAF			B	EXECUTE	
3754	01	00CFC	68000CFF		SENS00	B	$+3	
3755	01	00CFD	6AF00A08			BAL,R15	ERRBRCNT	
3756	01	00CFE	6AF00A34			BAL,R15	ERRBRTYP	
3757	01	00CFF	12800D1A			LD,R8	SENSSAVE	
3758	01	00D00	25800510	A		SAD,R8	16	
3759	01	00D01	35800D1A			STW,R8	SENSSAVE	
3760	01	00D02	33000D17			MTW,0	SKSNSTYP	
3761	01	00D03	6930000F			BCS,3	SENS01	SKIP TYPE
3762	01	00D04	32C00D1A			LW,R12	SENSSAVE	NO
3763	01	00D05	25C00478	A		SAS,R12	-8	
3764	01	00D06	6AF00931			BAL,R15	HEXCNVRT	
3765	01	00D07	35C005A0			STW,R12	ZDMPA+2	
3766	01	00D08	35D005A1			STW,R13	ZDMPA+3	
3767	01	00D09	32C0094D			LW,R12	EBCBLNK	
3768	01	00D0A	35C0059F			STW,R12	ZDMPA+1	
3769	01	00D0B	32800AE5			LW,R8	TEXTSENS	
3770	01	00D0C	3580059E			STW,R8	ZDMPA	
3771	01	00D0D	32C00D1C			LW,R12	SENSECTL	
3772	01	00D0E	6AF00E35			BAL,R15	TYPE01	
3773	01	00D0F	22800000	A	SENS01	LI,R8	0	
3774	01	00D10	35800D17			STW,R8	SKSNSTYP	
3775	01	00D11	E8000D18			B	*SENSEXIT	
3776	01	00D12	228FFFFF	A	SENSALT	LI,R8	-1	
3777	01	00D13	35800D17			STW,R8	SKSNSTYP	
3778	01	00D14	22800000	A		LI,R8	0	
3779	01	00D15	3580058E			STW,R8	P1	
3780	01	00D16	68000CED			B	SENS	
3781	01	00D17	00000000	A	SKSNSTYP	DATA	0	
3782	01	00D18	00000000	A	SENSEXIT	DATA	0	
3783						BBUND	8	
3784	01	00D1A	00000000	A	SENSSAVE	DATA	0	
3785	01	00D1B	00000000	A		DATA	0	
3786	01	00D1C	10101678	A	SENSECTL	ZFMW	1,0,16,BA(ZDMPA)	
3787						PAGE		
3788						*		*
3789						*THIS WILL PERFORM THE ORDER SPECIFIED BY THE INPUT PARAMETERS. THE		*
3790						*SIO STATUS WILL BE OUTPUT, AND IF ANY BITS OF THE STATUS COMPARE WITH*		
3791						*X5 A PLACEMARK BRANCH IS TAKEN, IF SPECIFIED IN THE CONTROL LINE.		*
3792						*		*
3793	01	00D1D	40000000	A		DATA	X'40000000'	P1=DEVICE ADDRESS
3794	01	00D1E	40000000	A		DATA	X'40000000'	P2=ORDER
3795	01	00D1F	40000000	A		DATA	X'40000000'	P3=FLAG BITS
3796	01	00D20	20000000	A		DATA	X'20000000'	P4=BYTE COUNT
3797	01	00D21	40000000	A		DATA	X'40000000'	P5=STAT COMP BITS
3798	01	00D22	35F00D50		SIO	STW,R15	SIOEXIT	
3799	01	00D23	6AF00D67			BAL,R15	STATCLR	
3800	01	00D24	32800592			LW,R8	P5	
3801	01	00D25	358006A7			STW,R8	STCMPSAV	
3802	01	00D26	32800EBE			LW,R8	CDA	
3803	01	00D27	48800FF7			AND,R8	=X'FFFF000C'	
3804	01	00D28	4980058E			BR,R8	P1	
3805	01	00D29	35800AE7			STW,R8	WORKADDR	
3806	01	00D2A	32800591			LW,R8	P4	

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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL     OPERATION  OPERAND          COMMENTS
3807      01            00D2B           25800568         A                SAD,R8    -24
3808      01            00D2C           32800590                          LW,R8     P3
3809      01            00D2D           25800578         A                SAD,R8    -8
3810      01            00D2E           35900ABF                          STW,R9    C8MMPAIR+1
3811      01            00D2F           32800587                          LW,R8     ZI8ADR
3812      01            00D30           2580056A         A                SAD,R8    -22
3813      01            00D31           32800580                          LW,R8     P2
3814      01            00D32           25800578         A                SAD,R8    -8
3815      01            00D33           35900ABE                          STW,R9    C8MMPAIR
3816      01            00D34           32801015                          LW,R8     *X'1C000000'
3817      01            00D35           31800ABF                          CW,R8     C8MMPAIR+1
3818      01            00D36           68400044                          BCR,4     SI800             WAIT FOR COMPLETION
3819      01            00D37           22800040                          LI,R8     SI801             YES
3820      01            00D38           22900041                          LI,R9     SI801+1
3821      01            00D39           15800ACC                          STD,R8    NORMRETN
3822      01            00D3A           6AF00B1C                          BAL,R15   I8ARMENB
3823      01            00D3B           22000055F                         LI,R0     DA(C8MMPAIR)
3824      01            00D3C           CCA0058E                          SI8,R10   *P1
3825      01            00D3D           15A00AC4                          STD,R10   SI8STAT
3826      01            00D3E           74000AC4                          STCF      SI8STAT
3827      01            00D3F           6800079F                          B         CHENDCHK
3828      01            00D40           68000048         SI801            B         SI802
3829      01            00D41           6AF00A08                          BAL,R15   ERR8RCNT
3830      01            00D42           6AF00A34                          BAL,R15   ERR8RTYP
3831      01            00D43           68000048                          B         SI802
3832      01            00D44           22000055F        SI800            LI,R0     DA(C8MMPAIR)
3833      01            00D45           CCA0058E                          SI8,R10   *P1
3834      01            00D46           15A00AC4                          STD,R10   SI8STAT
3835      01            00D47           74000AC4                          STCF      SI8STAT
3836      01            00D48           32800ADD         SI802            LW,R11    TEXTSI8
3837      01            00D49           12C00AC4                          LD,R12    SI8STAT
3838      01            00D4A           6AF00D6C                          BAL,R15   STATTYPE
3839      01            00D4B           25D00474         A                SAS,R13   -12
3840      01            00D4C           31D006A7                          CW,R13    STCMPSAV
3841      01            00D4D           68400D4F                          BCR,4     $+2
3842      01            00D4E           33100D50                          MTW,1     SI8EXIT
3843      01            00D4F           E8000D50                          B         *SI8EXIT
3844      01            00D50           00000000         A   SI8EXIT      DATA      0
3845                                                                       PAGE
3846                                                       *                                                                                *
3847                                                       *THIS CHECKS IF A SUCCESSFUL SI8 IS POSSIBLE. IF IT IS NOT, A MESSAGE *
3848                                                       *IS OUTPUT AND A HALT OCCURS IF SENSE SWITCH 2 IS SET. IF SENSE       *
3849                                                       *SWITCH 2 IS NOT SET, CHECK FOR SI8 POSSIBLE AGAIN.                   *
3850                                                       *                                                                    *
3851      01            00D51           35F00D66         SI8PSCHK STW,R15   SI8PSEXT
3852      01            00D52           CDA00AE7                  TI8,R10   *WORKADDR
3853      01            00D53           68800D56                  BCR,8     $+3
3854      01            00D54           69400D56                  BCS,4     $+2
3855      01            00D55           68000D52                  B         $-3
3856      01            00D56           15A00AC6                  STD,R10   TI8STAT
3857      01            00D57           74000AC6                  STCF      TI8STAT
3858      01            00D58           68C00D64                  BCR,12    SI8PS00
3859      01            00D59           32C00C84                  LW,R12    QMSGCTL5
3860      01            00D5A           6AF00E35                  BAL,R15   TYPE01
3861      01            00D5B           32800ADE                  LW,R11    TEXTTI8
3862      01            00D5C           12C00AC6                  LD,R12    TI8STAT
3863      01            00D5D           6AF00D6C                  BAL,R15   STATTYPE
3864      01            00D5E           6C000010         A        RD,0      X'10'
3865      01            00D5F           68400D61                  BCR,4     $+2
3866      01            00D60           2E0C0000         A   WAIT4        WAIT                        SI8 NOT POSS. SS2 IS SET
3867      01            00D61           CFA00EBE                  HI8,R10   *CDA
3868      01            00D62           15A00AC8                  STD,R10   HI8STAT
3869      01            00D63           E8000D66                  B         *SI8PSEXT
3870      01            00D64           33100D66         SI8PS00  MTW,1     SI8PSEXT
3871      01            00D65           68000D63                  B         $-2
3872      01            00D66           00000000         A   SI8PSEXT     DATA      0
3873                                                                       PAGE
3874                                                       *                                                                    *
3875                                                       *THIS CLEARS ALL SAVED STATUSES.                                     *
3876                                                       *                                                                    *
3877      01            00D67           224FFFF6         A   STATCLR      LI,R4     -10
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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL      OPERATION  OPERAND          COMMENTS
3878      01            00D68           22800000         A                LI,R8      0
3879      01            00D69           35880ACE                          STW,R8     SIOSTAT+10,X4
3880      01            00D6A           65400069                          BIR,R4     $-1
3881      01            00D6B           E800000F         A                B          *R15
3882                                                                       PAGE
3883                                                       *
3884                                                       *THIS TYPES OUT STATUSES
3885                                                       *
3886      01            00D6C           35F00D92                 STATTYPE  STW,R15    STTYEXIT
3887      01            00D6D           35B00D93                           STW,R11    STATHDG
3888      01            00D6E           25C00470         A                 SAS,R12    -16
3889      01            00D6F           4BC01016                           AND,R12    *X'C000'
3890      01            00D70           4BD01017                           AND,R13    *X'FFFF3FFF'
3891      01            00D71           49D0000C         A                 OR,R13     R12
3892      01            00D72           35D00D9E                           STW,R13    STATSAVE         SAVE STATUS
3893      01            00D73           32C00D9F                           LW,R12     STHDGCTL         TYPE MESSAGE
3894      01            00D74           6AF00E39                           BAL,R15    TYPE11            HEADING
3895      01            00D75           224FFFEC         A                 LI,R4      -20
3896      01            00D76           225FFFF8         A                 LI,R5      -5
3897      01            00D77           32D00D9E                           LW,R13     STATSAVE
3898      01            00D78           22C00078         A        STT00    LI,R12     X'78'            FORMAT
3899      01            00D79           25C00501         A                 SAD,R12    1                 STATUS
3900      01            00D7A           65500D7E                           BIR,R5     $+4                DATA
3901      01            00D7B           25C0057F         A                 SAD,R12    -1                  FOR
3902      01            00D7C           225FFFF8         A                 LI,R5      -5                    OUTPUT
3903      01            00D7D           22C00040         A                 LI,R12     X'40'
3904      01            00D7E           75C805A4                           STB,R12    ZDMPA+6,X4
3905      01            00D7F           65400D78                           BIR,R4     STT00
3906      01            00D80           224FFFFE         A                 LI,R4      -2               SET UP
3907      01            00D81           22C00078         A                 LI,R12     X'78'             COND
3908      01            00D82           25C00501         A                 SAD,R12    1                  CODE
3909      01            00D83           75C805A6                           STB,R12    ZDMPA+8,X4           BITS 1&2
3910      01            00D84           65400D81                           BIR,R4     $-3
3911      01            00D85           32800D93                           LW,R8      STATHDG
3912      01            00D86           31800AE1                           CW,R8      TEXTAIO
3913      01            00D87           69300D8A                           BCS,3      $+3
3914      01            00D88           32C00ACD                           LW,R12     AIOSTAT+1
3915      01            00D89           68000D8B                           B          $+2
3916      01            00D8A           32C00AE7                           LW,R12     WORKADDR         SET UP
3917      01            00D8B           4BC00FF2                           AND,R12    *X'7FF'           ADDRESS
3918      01            00D8C           6AF00931                           BAL,R15    HEXCNVRT           IN HEX
3919      01            00D8D           35D005A7                           STW,R13    ZDMPA+9             FOR
3920      01            00D8E           32C00DA0                           LW,R12     STDTACTL              TYPEOUT
3921      01            00D8F           6AF00E39                           BAL,R15    TYPE11           TYPE STAT DATA
3922      01            00D90           32D00D9E                           LW,R13     STATSAVE         GET SAVED STATUS
3923      01            00D91           E800OD92                           B          *STTYEXIT
3924      01            00D92           00000000         A        STTYEXIT  DATA       0
3925      01            00D93           40404040         A        STATHDG   TEXT       '    0123 4567 8901 2345   CC1,2    ADDRESS'
          01            00D94           F0F1F2F3         A
          01            00D95           40F4F5F6         A
          01            00D96           F740F8F9         A
          01            00D97           F0F140F2         A
          01            00D98           F3F4F540         A
          01            00D99           4040C3C3         A
          01            00D9A           F16BF240         A
          01            00D9B           404040C1         A
          01            00D9C           C4C4D9C5         A
          01            00D9D           E2E24040         A
3926      01            00D9E           00000000         A        STATSAVE  DATA       0
3927      01            00D9F           102A364C         A        STHDGCTL  ZFMW       1,0,42,BA(STATHDG)
3928      01            00DA0           10281678         A        STDTACTL  ZFMW       1,0,40,BA(ZDMPA)
3929                                                               PAGE
3930                                                       *
3931                                                       *THIS PROCESSES THE CHANNEL END INTERRUPTS FOR ALL I/O OPERATIONS.
3932                                                       *
3933      01            00DA1           6EA00000         A        STDAIO    AIO,R10    0
3934      01            00DA2           35A00ACD                           STW,R10    AIOSTAT+1         SAVE STATUS
3935      01            00DA3           74000ACC                           STCF       AIOSTAT           SAVE CC
3936      01            00DA4           31AC100D                           CW,R10     *X'100DCO'
3937      01            00DA5           694000A7                           BCS,4      $+2               CHAN END
3938      01            00DA6           0E300B22                           LPSD,3     STNDAIO           NO
3939      01            00DA7           70300ACC                           LCF        AIOSTAT           YES
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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL      OPERATION  OPERAND          COMMENTS
3940      01            00DA8           684000B1                          BCR,4      STDAIB00         ERROR
3941      01            00DA9           CEA00AE7                          TDV,R10    *WORKADDR        YES-GET DEVICE INFO
3942      01            00DAA           15A00ACA                          STD,R10    TDVSTAT          SAVE STATUS
3943      01            00DAB           74000ACA                          STCF       TDVSTAT          SAVE CC
3944      01            00DAC           CFA00AE7                          HIO,R10    *WORKADDR        RESET DEVICE AND CONTROLLER
3945      01            00DAD           15A00AC8                          STD,R10    HIOSTAT          SAVE STATUS
3946      01            00DAE           74000AC8                          STCF       HIOSTAT          SAVE CC
3947      01            00DAF           32F00AC1                          LW,R15     ERRORETN         SET UP ERROR RETURN
3948      01            00DB0           680000B2                          B          $+2
3949      01            00DB1           32F00AC0         STDAIB00         LW,R15     NORMRETN         SET UP NORMAL RETURN
3950      01            00DB2           55F200C9                          STH,R15    STDEXIT,X1
3951      01            00DB3           22E01060  A                       LI,R14     X'1060'          CLEAR I/O
3952      01            00DB4           6DE01100  A                       WD,R14     X'1100'           INTERRUPT
3953      01            00DB5           32800CCA                          LW,R8      READIND
3954      01            00DB6           30800F19                          AW,R8      WRTIND
3955      01            00DB7           30800811                          AW,R8      CWRTIND
3956      01            00DB8           68300DBA                          BCR,3      $+2
3957      01            00D99           33100859                          MTW,1      COUNTER+8        STEP RECORD CTR
3958      01            00DBA           70300ACC                          LCF        AIOSTAT
3959      01            00DBB           68400DC9                          BCR,4      STDEXIT
3960      01            00DBC           72800ABE                          LB,R8      COMMPAIR
3961      01            00DBD           21800005  A                       CI,R8      5
3962      01            00DBE           69100DC9                          BL         STDEXIT
3963      01            00DBF           220006E5                          LI,R0      DA(STDSENSE)
3964      01            00DC0           CCA00AE7                          SIO,R10    *WORKADDR
3965      01            00DC1           CDA00AE7                          TIO,R10    *WORKADDR
3966      01            00DC2           684000C4                          BIOSP      $+2
3967      01            00DC3           680000C1                          B          $-2
3968      01            00DC4           6AF00F8B                          BAL,R15    SENSDECR
3969      01            00DC5           32900AE7                          LW,R9      WORKADDR
3970      01            00DC6           25900210  A                       SCS,R9     16
3971      01            00DC7           25800310  A                       SCD,R8     16
3972      01            00DC8           35800AE7                          STW,R8     WORKADDR
3973      01            00DC9           680000000 A      STDEXIT          B          0
3974                                                                       BOUND      8
3975      01            00DCA           04003468         STDSENSE         ZFCP       4,BA(SENSSAVE)
3976      01            00DCB           00000003  A                       ZFCP       0,3
3977                                                                  PAGE
3978                                                  *                                                                    *
3979                                                  *THIS ADDS THE NUMBER OF SECTORS REQUIRED TO CONTAIN THE CURRENT      *
3980                                                  *RECORD LENGTH TO THE CURRENT TRACK AND SECTOR ADDRESS. IF THE NEW     *
3981                                                  *TRACK AND SECTOR ADDRESS EXCEEDS THE CURRENT UNIT'S CAPACITY, THE     *
3982                                                  *NEXT ACTIVE UNIT IN THE UNIT LIST IS SELECTED AT ITS STARTING         *
3983                                                  *ADDRESS.                                                              *
3984                                                  *                                                                    *
3985      01            00DCC           35F00DDB         STEP             STW,R15    STEPEXIT
3986      01            00DCD           228FFFFF  A                       LI,R8      -1
3987      01            00DCE           35800DDC                          STW,R8     STEPIND
3988      01            00DCF           6AF006AB                          BAL,R15    CAPCHECK         SEE IF CURRENT LENGTH EXCEEDS CAP
3989      01            00DD0           3300000E  A                       MTW,0      R14
3990      01            00DD1           69300DD4                          BNEZ       $+3              NEW UNIT
3991      01            00DD2           20AF0000  A                       AI,R10     X'F00000'
3992      01            00DD3           32E0000A  A                       LW,R14     R10              NO
3993      01            00DD4           35E00EBE                          STW,R14    CDA              YES
3994      01            00DD5           35E00AE7                          STW,R14    WORKADDR
3995      01            00DD6           35D00EBF                          STW,R13    CDAPNTR
3996      01            00DD7           22800000  A                       LI,R8      0
3997      01            00DD8           35800DDC                          STW,R8     STEPIND
3998      01            00DD9           22100001  A                       LI,R1      1
3999      01            00DDA           E800D0DB                          B          *STEPEXIT
4000      01            00DDB           00000000  A      STEPEXIT         DATA       0
4001      01            00DDC           00000000  A      STEPIND          DATA       0
4002                                                                  PAGE
4003                                                  *                                                                    *
4004                                                  *THIS ALLOWS THE USER TO HALT DURING THE EXECUTION OF A CONTROL LINE. *
4005                                                  *H1 IS THE STOP IDENTIFIER.                                            *
4006                                                  *                                                                    *
4007      01            00DDD           60000000  A                       DATA       X'60000000'
4008      01            00DDE           35F00DE8         STOP             STW,R15    STOPEXIT
4009      01            00DDF           32800580                          LW,R8      P1
4010      01            00DE0           32900940                          LW,R9      EBCBLNK
4011      01            00DE1           25800378  A                       SCD,R8     -8
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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL      OPERATION  OPERAND          COMMENTS
4012      01            00DE2           35800DEB                          STW,R8     TEXTST0P+1
4013      01            00DE3           35900DEC                          STW,R9     TEXTST0P+2
4014      01            00DE4           32C00DE9                          LW,R12     ST0PCTL
4015      01            00DE5           6AF00E35                          BAL,R15    TYPE01
4016      01            00DE6           2E000000  A       WAIT5           WAIT                        EXECUTE ST0P
4017      01            00DE7           E800DDE8                          B          *ST0PEXIT
4018      01            00DE8           00000000  A       ST0PEXIT        DATA       0
4019      01            00DE9           100937A8  A       ST0PCTL         ZFMW       1,0,9,BA(TEXTST0P)
4020      01            00DEA           E2E3D6D7  A       TEXTST0P        TEXT       'ST0P       '
          01            00DEB           40404040  A
          01            00DEC           40404040  A
4021                                                                      PAGE
4022                                                      *                                                                    *
4023                                                      *THIS OUTPUTS THE CURRENT DEVICE ADDRESS.                            *
4024                                                      *                                                                    *
4025      01            00DED           35F00DF9                TCDA      STW,R15    TCDAEXIT
4026      01            00DEE           32C00E8E                          LW,R12     CDA
4027      01            00DEF           6AFCC67C                          BAL,R15    ADDRGEN
4028      01            00DF0           328C00FB                          LW,R8      TEXTCDA
4029      01            00DF1           3580059E                          STW,R8     ZDMPA
4030      01            00DF2           227FFFFC  A                       LI,R7      -4
4031      01            00DF3           328E0698                          LW,R8      ADRGNSAV+4,X7
4032      01            00DF4           358E05A3                          STW,R8     ZDMPA+5,X7
4033      01            00DF5           65700DF3                          BIR,R7     $-2
4034      01            00DF6           32C00DFA                          LW,R12     TCDACTL
4035      01            00DF7           6AF00E35                          BAL,R15    TYPE01
4036      01            00DF8           E800DDF9                          B          *TCDAEXIT
4037      01            00DF9           00000000  A       TCDAEXIT        DATA       0
4038      01            00DFA           10101678  A       TCDACTL         ZFMW       1,0,16,BA(ZDMPA)
4039      01            00DFB           C3C4C140  A       TEXTCDA         TEXT       'CDA '
4040                                                                      PAGE
4041                                                      *                                                                    *
4042                                                      *THIS EXECUTES A TDV AND OUTPUTS THE STATUS AT MESSAGE LEVEL 3. IF ANY*
4043                                                      *BITS OF THE COMPARE DATA TEST TRUE, A PLACEMARK BRANCH IS TAKEN, IF  *
4044                                                      *SPECIFIED IN THE CONTROL LINE.                                       *
4045                                                      *                                                                    *
4046      01            00DFC           40000000  A                       DATA       X'40000000'          P1=ADDRESS
4047      01            00DFD           40000000  A                       DATA       X'40000000'          P2=COMPARE DATA
4048      01            00DFE           35F00E0E                TDV       STW,R15    TDVEXIT              SAVE EXIT
4049      01            00DFF           3280058F                          LW,R8      P2
4050      01            00E00           358006A7                          STW,R8     STCMPSAV
4051      01            00E01           CEC0058E                          TDV,R12    *P1
4052      01            00E02           15C00ACA                          STD,R12    TDVSTAT              SAVE STATUS
4053      01            00E03           74000ACA                          STCF       TDVSTAT              SAVE CC
4054      01            00E04           3280058E                          LW,R8      P1
4055      01            00E05           358C0AE7                          STW,R8     W0RKADDR
4056      01            00E06           32B00AE0                          LW,R11     TEXTTDV              LOAD HEADING
4057      01            00E07           12C00ACA                          LD,R12     TDVSTAT
4058      01            00E08           6AF00D6C                          BAL,R15    STATTYPE             TYPE STATUS
4059      01            00E09           25D00474  A                       SAS,R13    -12
4060      01            00E0A           31D0058F                          CW,R13     P2
4061      01            00E0B           6840CE0D                          BCR,4      $+2                  ANY COMPARES
4062      01            00E0C           33100ECE                          MTW,1      TDVEXIT              YES
4063      01            00E0D           E800CECE                          B          *TDVEXIT             NO
4064      01            00ECE           00000000  A       TDVEXIT         DATA       0
4065                                                                      PAGE
4066                                                      *                                                                    *
4067                                                      *THIS EXECUTES A TIO AND OUTPUTS THE STATUS AT MESSAGE LEVEL 3. IF ANY*
4068                                                      *BITS OF THE COMPARE DATA TEST TRUE, A PLACEMARK BRANCH IS TAKEN, IF  *
4069                                                      *SPECIFIED IN THE CONTROL LINE.                                       *
4070                                                      *                                                                    *
4071      01            00E0F           40000000  A                       DATA       X'40000000'          P1=ADDRESS
4072      01            00E10           40000000  A                       DATA       X'40000000'          P2=COMPARE DATA
4073      01            00E11           35F00E21                TIO       STW,R15    TIOEXIT              SAVE EXIT
4074      01            00E12           3280058F                          LW,R8      P2
4075      01            00E13           358006A7                          STW,R8     STCMPSAV
4076      01            00E14           CDC0058E                          TIO,R12    *P1
4077      01            00E15           15C00AC6                          STD,R12    TIOSTAT              SAVE STATUS
4078      01            00E16           74000AC6                          STCF       TIOSTAT              SAVE CC
4079      01            00E17           3280058E                          LW,R8      P1
4080      01            00E18           358C0AE7                          STW,R8     W0RKADDR
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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL     OPERATION  OPERAND      COMMENTS
4081      01            00E19          32B00ADE                          LW,R11    TEXTTIB      LOAD HEADING
4082      01            00E1A          12C00AC6                          LD,R12    TIBSTAT
4083      01            00E1B          6AF00D6C                          BAL,R15   STATTYPE      TYPE STATUS
4084      01            00E1C          25D00474  A                       SAS,R13   -12
4085      01            00E1D          31D006A7                          CW,R13    STCMPSAV
4086      01            00E1E          68400E20                          BCR,4     $+2          ANY COMPARES
4087      01            00E1F          33100E21                          MTW,1     TIBEXIT      YES
4088      01            00E20          E8000E21                          B         *TIBEXIT     NO
4089      01            00E21          00000000  A     TIBEXIT   DATA      0
4090                                                                     PAGE
4091                                                   *                                                    *
4092                                                   *THIS SETS AN ERROR RETRY COUNT. IF AN ERROR IS ENCOUNTERED ON A READ*
4093                                                   *WRITE OR CHECKWRITE OPERATION, THE OPERATION IS REPEATED UNTIL EITHER*
4094                                                   *IT IS SUCCESSFUL OR THE RETRY COUNTER IS STEPPED TO 0.               *
4095                                                   *                                                    *
4096      01            00E22          20000000  A                       DATA      X'20000000'  P1
4097      01            00E23          32800588          TRY             LW,R8     P1
4098      01            00E24          35800E26                          STW,R8    RETRYCNT
4099      01            00E25          E8C0000F  A                       B         *R15
4100      01            00E26          00000000  A     RETRYCNT  DATA      0
4101      01            00E27          00000000  A     RETRYCTR  DATA      0
4102                                                                     PAGE
4103                                                   *                                                    *
4104                                                   *THIS UPDATES THE TRACK AND SECTOR ADDRESS BY THE NUMBER OF SECTORS   *
4105                                                   *REQUIRED TO HOLD THE CURRENT BYTE COUNT.                             *
4106                                                   *                                                    *
4107      01            00E28          22800000  A     TSUPDATE  LI,R11    0
4108      01            00E29          25A0020C  A               SCS,R10   12
4109      01            00E2A          30A0086D                  AW,R10    TRACKS
4110      01            00E2B          25A00304  A               SCD,R10   4
4111      01            00E2C          30B0086E                  AW,R11    SECTORS
4112      01            00E2D          21B0000B  A               CI,R11    11
4113      01            00E2E          68200E30                  BCR,2     $+2
4114      01            00E2F          20B00004  A               AI,R11    4
4115      01            00E30          30A0000B  A               AW,R10    R11
4116      01            00E31          25A00210  A               SCS,R10   16
4117      01            00E32          E800000F  A               B         *R15
4118                                                                     PAGE
4119                                                   *                                                    *
4120                                                   *THIS IS THE COMMON TYPE-OUT ROUTINE FOR ALL MESSAGES.               *
4121                                                   *                                                    *
4122      01            00E33          022000C0  A     TYPE00    LCI       12
4123      01            00E34          68000E3A                  B         TWLPGB
4124      01            00E35          022000D0  A     TYPE01    LCI       13
4125      01            00E36          68000E3A                  B         TWLPGB
4126      01            00E37          022000E0  A     TYPE10    LCI       14
4127      01            00E38          68000E3A                  B         TWLPGB
4128      01            00E39          022000F0  A     TYPE11    LCI       15
4129      01            00E3A          35F00E48          TWLPGB  STW,R15   TYPEXIT
4130      01            00E3B          74000E49                  STCF      STCFSAVE
4131      01            00E3C          6AF00AEC                  BAL,R15   GRSAVE
4132      01            00E3D          22F00E4C                  LI,R15    TYPEOXIT
4133      01            00E3E          70300E49                  LCF       STCFSAVE
4134      01            00E3F          680004BF                  B         ZTALP
4135      01            00E40          6AF00AE9          TYPEOXIT BAL,R15    GRRSTR
4136      01            00E41          35100E49                  STW,R1    STCFSAVE
4137      01            00E42          221FFFE2  A               LI,R1     -30
4138      01            00E43          32C00940                  LW,R12    EBCBLNK
4139      01            00E44          35C205BC                  STW,R12   ZDMPA+30,X1
4140      01            00E45          65100E44                  BIR,R1    $-1
4141      01            00E46          32100E49                  LW,R1     STCFSAVE
4142      01            00E47          E8000E48                  B         *TYPEXIT
4143      01            00E48          00000000  A     TYPEXIT   DATA      0
4144      01            00E49          00000000  A     STCFSAVE  DATA      0
4145                                                                     PAGE
4146                                                   *                                                    *
4147                                                   *THIS CAUSES THE I/O BUFFER TO BE DUMPED. D1 AND D2 ARE RESPECTIVELY  *
4148                                                   *THE FIRST AND LAST RELATIVE LOCATIONS TO BE DUMPED.                  *
4149                                                   *                                                    *
4150      01            00E4A          20000000  A               DATA      X'20000000'  P1=
4151      01            00E4B          20000000  A               DATA      X'20000000'  P2=
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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL     OPERATION  OPERAND          COMMENTS
4152      01            00E4C          35F00E60         TYPB      STW,R15    TYPBEXIT
4153      01            00E4D          6AF00ED          BAL,R15    TCDA             TYPE CDA
4154      01            00E4E          32C00E62         LW,R12     REL8CCTL         TYPE
4155      01            00E4F          6AF00E35         BAL,R15    TYPE01            HEADING
4156      01            00E50          3280058E         LW,R8      P1
4157      01            00E51          35800590         STW,R8     P3               SET
4158      01            00E52          208FFFFF  A              AI,R8      -1                UP
4159      01            00E53          30800587         AW,R8      ZI8ADR             PARAMETERS
4160      01            00E54          3580058E         STW,R8     P1                  FOR
4161      01            00E55          3280058F         LW,R8      P2                   ZDMP
4162      01            00E56          30800587         AW,R8      ZI8ADR                ROUTINE
4163      01            00E57          208FFFFF  A              AI,R8      -1
4164      01            00E58          32900588         LW,R9      ZI8WDS
4165      01            00E59          30900587         AW,R9      ZI8ADR
4166      01            00E5A          31900008  A              CW,R9      R8               WILL CT EXCEED
4167      01            00E5B          69200E5D         BCS,2      $+2               I/8 AREA
4168      01            00E5C          25800320  A              SCD,R8     32               YES=SAVE MAX
4169      01            00E5D          3580058F         STW,R8     P2               NO=SAVE CT
4170      01            00E5E          6AF00462         BAL,R15    ZDMP
4171      01            00E5F          E8000E60         B          *TYPBEXIT
4172      01            00E60          00000000  A      TYPBEXIT   DATA      0
4173      01            00E61          10101A50  A      ADRGNCTL   ZFMW      1,0,16,BA(ADRGNSAV)
4174      01            00E62          1007398C  A      REL8CCTL   ZFMW      1,0,7,BA(REL8CMSG)
4175      01            00E63          D9C5D340  A      REL8CMSG   TEXT      'REL L8C'
          01            00E64          D3D6C340  A
4176                                                     PAGE
4177                                                     *                                                                    *
4178                                                     *THIS OUTPUTS THE CONTENTS OF THE COUNTERS SELECTED BY X1.            *
4179                                                     *                                                                    *
4180      01            00E65          40000000  A              DATA      X'40000000'      P1=SELECT COUNTERS FOR OUTPUT
4181      01            00E66          35F00E72         TYPC       STW,R15    TYPCEXIT         SAVE EXIT
4182      01            00E67          228000C1  A              LI,R8      X'C1'            SET
4183      01            00E68          3580058F         STW,R8     P2                   UP
4184      01            00E69          22800000  A              LI,R8      0                  PARAMETERS
4185      01            00E6A          35800590         STW,R8     P3                   AND
4186      01            00E6B          228FD8F1  A              LI,R8      -9999               GO
4187      01            00E6C          35800591         STW,R8     P4                   TO
4188      01            00E6D          228000E3  A              LI,R8      X'E3'               CNTR
4189      01            00E6E          35800592         STW,R8     P5                   ROUTINE
4190      01            00E6F          6AF00818         BAL,R15    CNTR
4191      01            00E70          02000000  A              NOP
4192      01            00E71          E8000E72         B          *TYPCEXIT        EXIT
4193      01            00E72          00000000  A      TYPCEXIT   DATA      0
4194                                                     PAGE
4195                                                     *                                                                    *
4196                                                     *THIS SETS UP THE UNIT LIST. UP TO 8 UNITS CAN BE ENTERED IN THE UNIT *
4197                                                     *LIST. THE ENTRY OF UNITS HERE MEANS THAT THEY ARE AVAILABLE FOR      *
4198                                                     *TESTING ONLY. THE ADDR DIRECTIVE SPECIFIES WHICH UNITS WILL BE MADE  *
4199                                                     *ACTIVE. IF PARAMETER P1=0, CLEAR OLD ENTRIES AND ENTER THE NEW ONES; *
4200                                                     *IF P1=1, ATTEMPT TO ADD UNITS TO THE LIST.                           *
4201                                                     *                                                                    *
4202      01            00E73          40000000  A              DATA      X'40000000'      P1=GEN OR ADD TO LIST CONTROL
4203      01            00E74          40000000  A              DATA      X'40000000'      P2=UNIT
4204      01            00E75          40000000  A              DATA      X'40000000'      P3= ADDRESSES
4205      01            00E76          40000000  A              DATA      X'40000000'      P4=  AND
4206      01            00E77          40000000  A              DATA      X'40000000'      P5=   CAPACITIES
4207      01            00E78          40000000  A              DATA      X'40000000'      P6=    FOR UP TO
4208      01            00E79          40000000  A              DATA      X'40000000'      P7=     8 UNITS
4209      01            00E7A          40000000  A              DATA      X'40000000'      P8=
4210      01            00E7B          40000000  A              DATA      X'40000000'      P9=
4211      01            00E7C          35F00E99         UNIT       STW,R15    UNITEXIT         SAVE RETURN
4212      01            00E7D          32D0058E         LW,R13     P1
4213      01            00E7E          69300E82         BNEZ       UNIT00           P1=0
4214      01            00E7F          224FFFF8  A              LI,R4      -8               YES=CLEAR
4215      01            00E80          35D80EA7         STW,R13    UNITLIST+8,X4      UNIT
4216      01            00E81          65400E80         BIR,R4     $-1                LIST
4217      01            00E82          224FFFF8  A      UNIT00     LI,R4      -8
4218      01            00E83          225FFFF8  A              LI,R5      -8
4219      01            00E84          32C80597         LW,R12     P2+8,X4
4220      01            00E85          69300E88         BNEZ       $+3              PARAMETER=0
4221      01            00E86          65400E84         UNIT01     BIR,R4     $-2              YES
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LINE NO. MEM PROT KEY MEMORY ADDRESS MEMORY CONTENTS ABS OR REL ORIG LABEL    OPERATION OPERAND          COMMENTS
4222     01 00E87     E8000E99        B         *UNITEXIT
4223     01 00E88     21C0000F A      CI,R12    15
4224     01 00E89     6840OE8C        BCR,4     $+3              IS THIS AN XX UNIT
4225     01 00E8A     22D04800 A      LI,R13    X'4800'          YES-SET ENTRY BIT AND CAP IND
4226     01 00E8B     6800OE8D        B         $+2
4227     01 00E8C     22D04000 A      LI,R13    X'4000'
4228     01 00E8D     25C0007C A      SLS,R12   -4
4229     01 00E8E     49C000OD A      BR,R12    R13
4230     01 00E8F     22D04000 A      LI,R13    X'4000'
4231     01 00E90     31DA0EA7        CW,R13    UNITLIST+8,X5
4232     01 00E91     6940OE95        BCS,4     $+4
4233     01 00E92     35CA0EA7        STW,R12   UNITLIST+8,X5
4234     01 00E93     33100005 A      MTW,1     R5
4235     01 00E94     6800OE86        B         UNIT01
4236     01 00E95     6550OE90        BIR,R5    $-5              ARE THERE 8 ENTRIES IN THIS LIST
4237     01 00E96     32C0OE9A        LW,R12    UNIT02           YES
4238     01 00E97     6AF00E35        BAL,R15   TYPE01
4239     01 00E98     E800OE99        B         *UNITEXIT
4240     01 00E99     0000OOOO A      UNITEXIT  DATA      0
4241     01 00E9A     100E3A6C A      UNIT02    ZFMW      1,0,14,BA(ULISTFUL)
4242     01 00E9B     E4D5C9E3 A      ULISTFUL  TEXT      'UNIT LIST FULL'
         01 00E9C     40D3C9E2 A
         01 00E9D     E340C6E4 A
         01 00E9E     D3D34040 A
4243     01 00E9F                     UNITLIST  RES       8
4244                                  PAGE
4245                                  *                                                              *
4246                                  *THIS WILL OUTPUT A MESSAGE ON AN UNSUCCESSFUL START, AND IF SENSE  *
4247                                  *SWITCH 2 IS SET, THE PROGRAM WILL COME TO A HALT. IF SENSE SWITCH 2 *
4248                                  *IS NOT SET, THE PROGRAM WILL CONTINUE.                         *
4249                                  *                                                              *
4250     01 00EA7     35F00EB4        UNSTRTYP  STW,R15   USTRTEXT
4251     01 00EA8     CFA0OAE7        HIO,R10   *WORKADDR
4252     01 00EA9     15A0OAC8        STD,R10   HIOSTAT
4253     01 00EAA     7400OAC8        STCF      HIOSTAT
4254     01 00EAB     32C0OEB5        LW,R12    USTRTCTL
4255     01 00EAC     6AF0OE35        BAL,R15   TYPE01
4256     01 00EAD     12C0OAC4        LD,R12    SIOSTAT
4257     01 00EAE     32B0OADD        LW,R11    TEXTSIO
4258     01 00EAF     6AF0OD6C        BAL,R15   STATTYPE
4259     01 00EB0     6C000010 A      RD,0      X'10'
4260     01 00EB1     6840OEB3        BCR,4     $+2
4261     01 00EB2     2E000000 A      WAIT6     WAIT                       UNSUCCESSFUL START. SS2 IS SET
4262     01 00EB3     E80OOEB4        B         *USTRTEXT
4263     01 00EB4     0000OOOO A      USTRTEXT  DATA      0
4264     01 00EB5     1C0C3AD8 A      USTRTCTL  ZFMW      1,0,12,BA(USTRTMSG)
4265     01 00EB6     E4D5E2E4 A      USTRTMSG  TEXT      'UNSUCC START'
         01 00EB7     C3C340E2 A
         01 00EB8     E3C1D9E3 A
4266                                  PAGE
4267 *                                *                                                              *
4268                                  *THIS SETS THE STARTING DEVICE ADDRESS (SDA) EQUAL TO THE CURRENT    *
4269                                  *DEVICE ADDRESS (CDA).                                         *
4270                                  *                                                              *
4271     01 00EB9     1280OEBE        UPAD      LD,R8     CDA
4272     01 00EBA     1580OEC0        STD,R8    SDA
4273     01 00EBB     22800000 A      LI,R8     0
4274     01 00EBC     35800859        STW,R8    COUNTER+8
4275     01 00EBD     E800000F A      B         *R15
4276                                  BOUND     8
4277     01 00EBE     00000000 A      CDA       DATA      0
4278     01 00EBF     00000000 A      CDAPNTR   DATA      0
4279     01 00EC0     00000000 A      SDA       DATA      0
4280     01 00EC1     00000000 A      SDAPNTR   DATA      0
4281                                  PAGE
4282                                  *                                                              *
4283                                  *THIS CHECKS FOR WRITE PROTECTED TRACKS AND SKIPS THESE UNTIL ONE IS  *
4284                                  *FOUND THAT IS NOT WRITE PROTECTED.                             *
4285                                  *                                                              *
4286     01 00EC2     35FC0EF0        WRPRTCHK  STW,R15   WRPRTXIT
4287     01 00EC3     6AFC08F1        BAL,R15   COUPLE
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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL      OPERATION  OPERAND          COMMENTS
4288      01            00EC4          32800D1A                          LW,R8      SENSSAVE
4289      01            00EC5          E810CEE0                          BCR,1      *WRPRTXIT
4290      01            00EC6          32C00AE7                          LW,R12     W0RKADDR         YES=GEN AND TYPE MESSAGE
4291      01            00EC7          6AF00C7C                          BAL,R15    ADDRGEN          SET
4292      01            00EC8          227FFFFD  A                       LI,R7      -3                UP
4293      01            00EC9          328EC698                          LW,R8      ADRGNSAV+4,X7      ADDRESS
4294      01            00ECA          358E05A4                          STW,R8     ZDMPA+6,X7          FOR
4295      01            00ECB          65700EC9                          BIR,R7     $-2                   OUTPUT
4296      01            00ECC          32800EE2                          LW,R8      WRPR0RDR
4297      01            00ECD          3580059E                          STW,R8     ZDMPA
4298      01            00ECE          32C00B6B                          LW,R12     RECLNGTH         SET
4299      01            00ECF          6AF00925                          BAL,R15    DECCNVRT          UP
4300      01            00ED0          35D005A0                          STW,R13    ZDMPA+2            RECORD
4301      01            00ED1          30C00FF5                          AW,R12     =X'21000000'        LENGTH
4302      01            00ED2          35C0059F                          STW,R12    ZDMPA+1               FOR OUTPUT
4303      01            00ED3          32800C6E                          LW,R8      QMSG0009         SET
4304      01            00ED4          32900C6F                          LW,R9      QMSG0009+1        UP
4305      01            00ED5          358005A4                          STW,R8     ZDMPA+6            WRT
4306      01            00ED6          359005A5                          STW,R9     ZDMPA+7             PRBT
4307      01            00ED7          32C00EE1                          LW,R12     WRPRTCTL         TYPE
4308      01            00ED8          6AF00E37                          BAL,R15    TYPE10            MESSAGE
4309      01            00ED9          32900AE7                          LW,R9      W0RKADDR
4310      01            00EDA          6AF0064C                          BAL,R15    CAPCHECK+1
4311      01            00EDB          33000000E A                       MTW,0      R14
4312      01            00EDC          68300EDE                          BEZ        $+2
4313      01            00EDD          32A0000E  A                       LW,R10     R14
4314      01            00EDE          35AC0AE7                          STW,R10    W0RKADDR
4315      01            00EDF          68000EC3                          B          WRPRTCHK+1
4316      01            00EE0          00000000  A       WRPRTXIT DATA      0
4317      01            00EE1          10201678  A       WRPRTCTL ZFMW      1,0,32,BA(ZDMPA)
4318      01            00EE2          00000000  A       WRPR0RDR DATA      0
4319                                                       PAGE
4320                                                     *                                                                    *
4321                                                     *THIS WILL WRITE A RECORD AT THE SPECIFIED LOCATION ON THE RAD.       *
4322                                                     *IF F1=0, WRITE ALL TRACKS. IF F1=1, SKIP WRITE PROTECTED TRACKS.     *
4323                                                     *IF D2 IS 1 THROUGH 8, THE CONTENTS OF THE COUNTER SPECIFIED BY D2 IS *
4324                                                     *USED AS THE STARTING BYTE ADDRESS FOR THE OPERATION.                 *
4325                                                     *                                                                    *
4326      01            00EE3          20000000  A                 DATA       X'20000000'      P1
4327      01            00EE4          20000000  A                 DATA       X'20000000'      P2
4328      01            00EE5          35F00F18          WRT       STW,R15    WRTEXIT          SAVE EXIT
4329      01            00EE6          32800AE2                    LW,R8      TEXTWRT
4330      01            00EE7          358C0EE2                    STW,R8     WRPR0RDR
4331      01            00EE8          3300058F                    MTW,0      P2
4332      01            00EE9          683C0EED                    BEZ        WRT03
4333      01            00EEA          6AF008E3                    BAL,R15    PR0GM0VE
4334      01            00EEB          68000EED                    B          WRT03
4335      01            00EEC          E8000F18                    B          *WRTEXIT
4336      01            00EED          32800E26          WRT03     LW,R8      RETRYCNT
4337      01            00EEE          35800E27                    STW,R8     RETRYCTR         LOAD RETRY COUNTER
4338      01            00EEF          3280058E                    LW,R8      P1
4339      01            00EF0          35800AE8                    STW,R8     SKWRPRBT
4340      01            00EF1          330008C6                    MTW,0      PATTERN1
4341      01            00EF2          69300EF4                    BCS,3      $+2
4342      01            00EF3          6AF0C39F                    BAL,R15    PATTERN1         GEN PATTERN
4343      01            00EF4          6AF006AB          WRT02     BAL,R15    CAPCHECK
4344      01            00EF5          3300CAE8                    MTW,0      SKWRPRBT
4345      01            00EF6          6830CEF9                    BCR,3      $+3
4346      01            00EF7          6AF0CEC2                    BAL,R15    WRPRTCHK
4347      01            00EF8          680C0EFC                    B          $+4
4348      01            00EF9          22800000  A                 LI,R8      0
4349      01            00EFA          358C0F19                    STW,R8     WRTIND
4350      01            00EFB          6AF008F1                    BAL,R15    COUPLE
4351      01            00EFC          228FFFFF  A                 LI,R8      -1
4352      01            00EFD          35800F19                    STW,R8     WRTIND
4353      01            00EFE          2280CF03                    LI,R8      WRT00
4354      01            00EFF          2290CF0E                    LI,R9      WRT01
4355      01            00F00          158C0ACC                    STD,R8     NORMRETN
4356      01            00F01          32A00587                    LW,R10     ZIOADR
4357      01            00F02          25A00402  A                 SAS,R10    2
4358      01            00F03          30A00C02                    AW,R10     SAVEBITS
4359      01            00F04          49A00ACE                    BR,R10     WRT0RDER
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LINE NO.  MEM PROT KEY  MEMORY ADDRESS  MEMORY CONTENTS  ABS OR REL ORIG  LABEL     OPERATION  OPERAND      COMMENTS
4360      01            00F05           35A00ABE                          STW,R10   COMMPAIR
4361      01            00F06           32A00B6B                          LW,R10    RECLNGTH
4362      01            00F07           49A00ACF                          BR,R10    WRTORDER+1
4363      01            00F08           49A00B70                          BR,R10    SILIND
4364      01            00F09           35A00ABF                          STW,R10   COMMPAIR+1
4365      01            00F0A           68000AAF                          B         EXECUTE          PERFORM OPERATION
4366      01            00F0B           22800000  A       WRT00     LI,R8     0
4367      01            00F0C           35800F19                          STW,R8    WRTIND
4368      01            00F0D           E8000F18                          B         *WRTEXIT         BACK TO DCP
4369      01            00F0E           6AF00AC8          WRT01           BAL,R15   ERRORCNT
4370      01            00F0F           6AF00A34                          BAL,R15   ERRORTYP
4371      01            00F10           33F00E27                          MTW,-1    RETRYCTR
4372      01            00F11           69100F13                          BCS,1     $+2              RETRY CTR =0
4373      01            00F12           68000EF5                          B         WRT02+1          NO
4374      01            00F13           22800000  A                       LI,R8     0
4375      01            00F14           35800F19                          STW,R8    WRTIND
4376      01            00F15           35800AE8                          STW,R8    SKWRPRST
4377      01            00F16           35800C02                          STW,R8    SAVEBITS
4378      01            00F17           E8000F18                          B         *WRTEXIT
4379      01            00F18           00000000  A       WRTEXIT DATA      0
4380      01            00F19           00000000  A       WRTIND  DATA      0
4381                                                       PAGE
4382                                                       *                                                                *
4383                                                       *THIS WILL GENERATE A LIST OF 4 UNITS MAXIMUM, AS WELL AS A LIST OF   *
4384                                                       *THEIR RESPECTIVE STARTING ADDRESSES. PARAMETERS ARE ENTERED AS   *
4385                                                       *FOLLOWS : UNIT ADDRESS, STARTING TRACK.                          *
4386                                                       *AS THIS IS AN ENVIRONMENTAL TYPE OF DIRECTIVE, IT SHOULD BE PERFORMED*
4387                                                       *BEFORE THE FIRST XCWT,XRDS OR XWRT IS ATTEMPTED.                 *
4388                                                       *                                                                *
4389      01            00F1A           40000000  A                 DATA      X'40000000'      X1
4390      01            00F1B           20000000  A                 DATA      X'20000000'      D2
4391      01            00F1C           40000000  A                 DATA      X'40000000'      X3
4392      01            00F1D           20000000  A                 DATA      X'20000000'      D4
4393      01            00F1E           40000000  A                 DATA      X'40000000'      X5
4394      01            00F1F           20000000  A                 DATA      X'20000000'      D6
4395      01            00F20           40000000  A                 DATA      X'40000000'      X7
4396      01            00F21           20000000  A                 DATA      X'20000000'      D8
4397      01            00F22           55F20F34          XGEN            STH,R15   XGENEXIT,X1
4398      01            00F23           33100F3E                          MTW,1     XGENFLG          SET XGENFLG TO INDICATE THAT XGEN *B
4399      01            00F24           22800000  A                       LI,R8     0
4400      01            00F25           227FFFF8  A                       LI,R7     -8
4401      01            00F26           35800F35                          STW,R8    XXCNTR           CLEAR XX UNIT COUNTER
4402      01            00F27           358E0F3E                          STW,R8    XXULIST+8,X7     CLEAR XX UNIT AND START ADDR LISTS
4403      01            00F28           65700F27                          BIR,R7    $-1
4404      01            00F29           227FFFF8  A                       LI,R7     -8
4405      01            00F2A           226FFFFC  A                       LI,R6     -4
4406      01            00F2B           328E0596          LOOXUNIT        LW,R8     P1+8,X7          GET NEXT XX UNIT ADDRESS
4407      01            00F2C           68300F34                          BEZ       XGENEXIT         IF THIS PARAM = 0, EXIT
4408      01            00F2D           358C0F3A                          STW,R8    XXULIST+4,X6
4409      01            00F2E           328E0597                          LW,R8     P2+8,X7          GET NEXT XX STARTING ADDRESS
4410      01            00F2F           2580007C  A                       SLS,8     -4               NORMALIZE ADDRESS TO RIGHT       *B
4411      01            00F30           358C0F3E                          STW,R8    XXSTADDR+4,X6
4412      01            00F31           33200007  A                       MTW,2     R7
4413      01            00F32           33100F35                          MTW,1     XXCNTR           INCREMENT XX UNIT COUNTER
4414      01            00F33           65600F28                          BIR,R6    LOOXUNIT
4415      01            00F34           68000000  A       XGENEXIT B        0
4416      01            00F35           00000000  A       XXCNTR   DATA     0
4417      01            00F36                             XXULIST  RES      4
4418      01            00F3A                             XXSTADDR RES      4
4419      01            00F3E           00000000  A       XGENFLG  DATA     0                XGEN SUBROUTINE ENTRY FLAG       *B
4420                                                       PAGE
4421                                                       *                                                                *
4422                                                       *THIS CHECK-WRITES 6144 SECTORS USING DATA CHAINING               *
4423                                                       *                                                                *
4424      01            00F3F           55F20FDA          XCWT            STH,R15   XWCREXIT,X1
4425      01            00F40           33000F3E                          MTW,0     XGENFLG          HAS XGEN BEEN USED               *B
4426      01            00F41           68200F4E                          BCR,2     BPERR            NO, GO TO ERROR MSG              *B
4427      01            00F42           22800005  A                       LI,R8     X'05'
4428      01            00F43           68000F69                          B         XWRCMBN
4429                                                       SPACE     5
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MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS	
				*				*
				*THIS	WRITES	6144 SECTØRS USING DATA CHAINING		*
				*				*
01	00F44	55F20FDA		XWRT	STH,R15	XWCREXIT,X1		
01	00F45	33000F3E			MTW,0	XGENFLG	HAS XGEN BEEN USED	*E
01	00F46	68200F4E			BCR,2	ØPERR	NØ, GØ TØ ERRØR MSG	*E
01	00F47	22800001	A		LI,R8	X'01'		
01	00F48	68000F69			B	XWRCMØN		
					SPACE	5		
				*				*
				*THIS	READS	6144 SECTØRS USING DATA CHAINING		*
				*				*
01	00F49	55F20FDA		XRDS	STH,R15	XWCREXIT,X1		
01	00F4A	33000F3E			MTW,0	XGENFLG	HAS XGEN BEEN USED	*E
01	00F4B	68200F4E			BCR,2	ØPERR	NØ, GØ TØ ERRØR MSG	*E
01	00F4C	22800012	A		LI,R8	X'12'		
01	00F4D	68000F69			B	XWRCMØN		
01	00F4E	32C00F51		ØPERR	LW,R12	ØPERMSGC		*E
01	00F4F	6AF00E33			BAL,R15	TYPE00		*E
01	00F50	68000FDA			B	XWCREXIT		*E
01	00F51	105A3D48	A	ØPERMSGC	ZFMW	1,0,90,BA(ØPERMSG)		*E
01	00F52	C3D6D5E3	A	ØPERMSG	TEXT	'CØNTRØL ERRØR. XGEN DIRECTIVE MUST BE USEDN'		*E
01	00F53	D9D6D340	A					
01	00F54	C5D9D9D6	A					
01	00F55	D960407F	A					
01	00F56	E7C7C5D5	A					
01	00F57	7F40C4C9	A					
01	00F58	D9C5C3E3	A					
01	00F59	C9E5C540	A					
01	00F5A	D4E4E2E3	A					
01	00F5B	40C2C540	A					
01	00F5C	E4E2C5C4	A					
01	00F5D	15404040	A					
01	00F5E	C2C5C6D6	A		TEXT	'BEFØRE DIRECTIVES XCWT , XRDS ØR XWRT '		*E
01	00F5F	D9C540C4	A					
01	00F60	C9D9C5C3	A					
01	00F61	E3C9E5C5	A					
01	00F62	E2407FE7	A					
01	00F63	C3E6E37F	A					
01	00F64	6B7FE7D9	A					
01	00F65	C4E27F40	A					
01	00F66	D6D9407F	A					
01	00F67	E7E6D9E3	A					
01	00F68	7F40404C	A					
					PAGE			
				*				*
				*THIS CØNTRØLS THE ØPERATIØN ØF READING, WRITING AND CHECKWRITING ØF				*
				*THE RAD BY DATA CHAINING.				*
				*				*
01	00F69	25800278	A	XWRCMØN	SCS,R8	-8		
01	00F6A	32900587			LW,R9	ZIØADR		
01	00F6B	25900402	A		SAS,R9	2		
01	00F6C	30800009	A		AW,R8	R9		
01	00F6D	35800FE2			STW,R8	XØRDER		
01	00F6E	3A600F35			LCW,R6	XXCNTR		
01	00F6F	35600FEC			STW,R6	XUNITCTR		
01	00F70	22900F36			LI,R9	XXULIST		
01	00F71	35900FED			STW,R9	XUNITPTR		
01	00F72	B2900FED			LW,R9	*XUNITPYR		
01	00F73	35900AE7			STW,R9	WØRKADDR		
01	00F74	22900F3A			LI,R9	XXSTADDR		
01	00F75	35900FEE			STW,R9	XXADDPTR		
01	00F76	228FE802	A		LI,R8	-6142		
01	00F77	35800FEB			STW,R8	XSCTTEMP		
01	00F78	32800FE6		XXUNITGØ	LW,R8	XDCHNFLG		
01	00F79	35800FE3			STW,R8	XØRDER+1		

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL C R I G	LABEL	OPERATION	OPERAND	COMMENTS
4475	01	00F7A	32800FEB			LW,R8	XSCTTEMP	
4476	01	00F7B	35800FE8			STW,R8	XSECTCNT	
4477	01	00F7C	33000BC6			MTW,0	PATTERN1	
4478	01	00F7D	69300F7F			BNEZ	$+2	
4479	01	00F7E	6AF00B9F			BAL,R15	PATTENT1	
4480	01	00F7F	3A800E26			LCW,R8	RETRYCNT	
4481	01	00F80	35800E27			STW,R8	RETRYCTR	
4482	01	00F81	B2800FEE			LW,R8	*XXADDPTR	
4483	01	00F82	3580058E			STW,R8	P1	
4484	01	00F83	6AF00CD2			BAL,R15	SEEK	
4485	01	00F84	6AF00D51		GB	BAL,R15	SIGPSCHK	
4486	01	00F85	68000F84			B	$-1	
4487	01	00F86	22800F8E			LI,R8	XWAIT+1	
4488	01	00F87	22900FA3			LI,R9	XSENSAVE	
4489	01	00F88	15800AC0			STD,R8	N8RMRETN	
4490	01	00F89	6AF00B1C			BAL,R15	I8ARMENB	
4491	01	00F8A	6AF00D67			BAL,R15	STATCLR	
4492	01	00F8B	220007F1			LI,R0	DA(X8RDER)	
4493	01	00F8C	CCA00AE7			SIO,R10	*W8RKADDR	
4494	01	00F8D	25000000	A	XWAIT	WAIT		
4495	01	00F8E	CDA00AE7			TIO,R10	*W8RKADDR	
4496	01	00F8F	68800F92			BCR,8	$+3	
4497	01	00F90	69400F92			BCS,4	$+2	
4498	01	00F91	68000F8E			B	$-3	
4499	01	00F92	15A00AC6			STD,R10	TIOSTAT	
4500	01	00F93	4B800FE9			AND,R11	XMASK1	
4501	01	00F94	31800FE9			CW,R11	XMASK1	
4502	01	00F95	69300F9F			BNE	XN8TBUSY	
4503	01	00F96	32800ACB			LW,R8	TDVSTAT+1	
4504	01	00F97	4B800FEA			AND,R8	XMASK2	
4505	01	00F98	69300FC6			BCS,3	HALTI8	
4506	01	00F99	3A800E26			LCW,R8	RETRYCNT	
4507	01	00F9A	35800E27			STW,R8	RETRYCTR	
4508	01	00F9B	33100FE8			MTW,1	XSECTCNT	
4509	01	00F9C	68300FC8			BEZ	SETINTFL	
4510	01	00F9D	6AF00B1C			BAL,R15	I8ARMENB	
4511	01	00F9E	68000F8D			B	XWAIT	
4512	01	00F9F	32800ACB		XN8TBUSY	LW,R8	TDVSTAT+1	
4513	01	00FA0	4B800FEA			AND,R8	XMASK2	
4514	01	00FA1	69300FA3			BCS,3	XSENSAVE	
4515	01	00FA2	68000FD1			B	XWEXIT	
4516	01	00FA3	227FFFFD	A	XSENSAVE	LI,X7	-3	
4517	01	00FA4	128E0ACE			LD,R8	HI8STAT+6,X7	
4518	01	00FA5	158E0FE2			STD,R8	XSTATSAV+6,X7	
4519	01	00FA6	65700FA4			BIR,X7	$-2	
4520	01	00FA7	6AF00D12			BAL,R15	SENSALT	
4521	01	00FA8	6AF00FBB			BAL,R15	SENSDECR	
4522	01	00FA9	32900AE7			LW,R9	W8RKADDR	
4523	01	00FAA	25900210	A		SCS,R9	16	
4524	01	00FAB	25800310	A		SCD,R8	16	
4525	01	00FAC	35800AE7			STW,R8	W8RKADDR	
4526	01	00FAD	227FFFFD	A		LI,X7	-3	
4527	01	00FAE	128E0FE2			LD,R8	XSTATSAV+6,X7	
4528	01	00FAF	158E0ACE			STD,R8	HI8STAT+6,X7	
4529	01	00FB0	65700FAE			BIR,X7	$-2	
4530	01	00FB1	6AF00A34			BAL,R15	ERR8RTYP	
4531	01	00FB2	33000E26			MTW,0	RETRYCNT	
4532	01	00FB3	68300FCD			BCR,3	STEPCNT	
4533	01	00FB4	33000E27			MTW,0	RETRYCTR	
4534	01	00FB5	68300FCB			BEZ	L8DRETRY	
4535	01	00FB6	33100E27			MTW,1	RETRYCTR	
4536	01	00FB7	32800AE7			LW,R8	W8RKADDR	
4537	01	00FB8	25800210	A		SCS,R8	16	
4538	01	00FB9	3580058E			STW,R8	P1	
4539	01	00F8A	68000FC4			B	HALTI8-2	
4540	01	00FBB	52800D1A		SENSDECR	LH,R8	SENSSAVE	
4541	01	00FBC	4B800FF4			AND,R8	=X'F'	
4542	01	00FBD	68300FC0			BEZ	$+3	
4543	01	00FBE	228FFFFF	A		LI,R8	-1	
4544	01	00FBF	68000FC1			B	$+2	
4545	01	00FC0	228FFFFB	A		LI,R8	X'FFFFFB'	

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
4546	01	00FC1	50800D1A			AH,R8	SENSSAVE	
4547	01	00FC2	3580058E			STW,R8	P1	
4548	01	00FC3	E800000F	A		B	*R15	
4549	01	00FC4	6AF00CD2			BAL,R15	SEEK	
4550	01	00FC5	68000F84			B	GO	
4551	01	00FC6	CFA00AE7		HALTIO	HIO,R10	*WORKADDR	
4552	01	00FC7	68000FA3			B	XSENSAVE	
4553	01	00FC8	32800FE7		SETINTFL	LW,R8	XFLAGS	
4554	01	00FC9	3580CFF3			STW,R8	XORDER+1	
4555	01	00FCA	68000F8D			B	XWAIT	
4556	01	00FCB	3A800E26		LOORETRY	LCW,R8	RETRYCNT	
4557	01	00FCC	3580CE27			STW,R8	RETRYCTR	
4558	01	00FCD	33100FE8		STEPCNT	MTW,1	XSECTCNT	
4559	01	00FCE	3280CFE8			LW,R8	XSECTCNT	
4560	01	00FCF	21800002	A		CI,R8	2	
4561	01	00FD0	6910CF84			BL	GO	
4562	01	00FD1	22800000	A	XWEXIT	LI,R8	0	
4563	01	00FD2	35800BC6			STW,R8	PATTERNI	
4564	01	00FD3	3310CFEC			MTW,1	XUNITCTR	
4565	01	00FD4	6830CFDA			BEZ	XWCREXIT	
4566	01	00FD5	3310CFEE			MTW,1	XXADDPTR	
4567	01	00FD6	3310CFED			MTW,1	XUNITPTR	
4568	01	00FD7	B280CFED			LW,R8	*XUNITPTR	
4569	01	00FD8	3580CAE7			STW,R8	WORKADDR	
4570	01	00FD9	68000F78			B	XXUNITGO	
4571	01	00FDA	68000000	A	XWCREXIT	B	0	
4572					*			
4573						BOUND	8	
4574	01	00FDC			XSTATSAV	RES	6	
4575	01	00FE2	00000000	A	XORDER	DATA	0	
4576	01	00FE3	00000000	A		DATA	0	
4577	01	00FE4	080007F1			ZFCP	X'08',DA(XORDER)	
4578	01	00FE5	00000000	A		DATA	0	
4579	01	00FE6	DC000400	A	XDCHNFLG	ZFCP	X'DC',1024	
4580	01	00FE7	1C000400	A	XFLAGS	ZFCP	X'1C',1024	
4581	01	00FE8	00000000	A	XSECTCNT	DATA	0	
4582	01	00FE9	60000000	A	XMASK1	DATA	X'60000000'	
4583	01	00FEA	B0FF0000	A	XMASK2	DATA	X'B0FF0000'	
4584	01	00FEB	00000000	A	XSCTTEMP	DATA	0	
4585	01	00FEC	00000000	A	XUNITCTR	DATA	0	
4586	01	00FED	00000000	A	XUNITPTR	DATA	0	
4587	01	00FEE	00000000	A	XXADDPTR	DATA	0	
4588		01	00FEF		ZEXADR	EQU	$	
4589	01	00FEF	00001018			DATA	L(ZEXADR)	BASE TABLE ADDRESS
4590		01	00580			END	ZCMS	TO COMPUTE MEMORY SIZE
	01	00FF0	FFFF7FFF	A				
	01	00FF1	00007FFF	A				
	01	00FF2	000007FF	A				
	01	00FF3	00000FFF	A				
	01	00FF4	0000000F	A				
	01	00FF5	21000000	A				
	01	00FF6	40404061	A				
	01	00FF7	FFFF0000	A				
	01	00FF8	80000000	A				
	01	00FF9	20000000	A				
	01	00FFA	10000002	A				
	01	00FFB	10000400	A				
	01	00FFC	F0000000	A				
	01	00FFD	00110011	A				
	01	00FFE	FFF3FFF4	A				
	01	00FFF	00400000	A				
	01	01000	0000FFFF	A				
	01	01001	328A0000	A				
	01	01002	FFFFFFFF	A				
	01	01003	7FFF0000	A				
	01	01004	00FFFFFF	A				
	01	01005	9E000000	A				
	01	01006	CE000000	A				
	01	01007	08000000	A				
	01	01008	FF000000	A				
	01	01009	01000000	A				
	01	0100A	02000000	A				

LINE NO.	MEM PROT KEY	MEMORY ADDRESS	MEMORY CONTENTS	ABS OR REL ORIG	LABEL	OPERATION	OPERAND	COMMENTS
	01	0100B	000FFF00	A				
	01	0100C	00200000	A				
	01	0100D	00100000	A				
	01	0100E	00080000	A				
	01	0100F	00040000	A				
	01	01010	10000000	A				
	01	01011	00000007	A				
	01	01012	00800000	A				
	01	01013	35880000	A				
	01	01014	00000003	A				
	01	01015	10000000	A				
	01	01016	00000000	A				
	01	01017	FFFF3FFF	A				
	01	01018	00000FEF					
CONTROL SECTION SUMMARY: 01 01019 PT 0								

SECTION V
CONCORDANCE LISTING

SIGMA 5/7 EXTENDED PERFORMANCE RAD TEST 704978-51C0D

```
L00P03
        122*DATA
L00P1
        118/DATA        2410*BDR
L00P2
        120/DATA        3155*BAL
L00P3
        122/DATA        3163*BAL
MARK
         56/DATA        2052/ZFSAT      3367*STW
MARKCNTL
        3373/LW         3377*ZFMW
MARKEXIT
        3367/STW        3375/B*         3376*DATA
MARKINDX
         56*DATA
MXLNMCTL
        3317/LW         3360*ZFMW
MXLNMSG
        3315/STW        3316/STW        3360/ZFMW       3361*TEXT
MXPRCTL
        3487/LW         3508*ZFMW
MXPRMSG
        3508/ZFMW       3509*TEXT
NEGIND
        2799/STW        2806/STW        2824/MTW        2833*DATA
NOCHECTL
        3390/LW         3393*ZFMW
NOCHEMSG
        3393/ZFMW       3394*TEXT
NOCHEND
        2411/B          3384*TDV
NORMRETN
        2332/STD        2501/STD        2903/STD        3170*RES        3663/STD        3723/STD        3752/STD
        3821/STD        3949/LW         4355/STD        4489/STD
NORMSAVE
        3172*RES
NOUNITS
        2144/ZFMW       2145*TEXT
NP2SAVE
        2857/STW        2868/AW         2872/LW         2888/LW         2911*DATA
NSECTCNT
        2267/STW        2319*DATA       2347/LW         2419/LW
OPERMSGC
        4447/LW         4450*ZFMW
OPERMSG
        4450/ZFMW       4451*TEXT
OPERR
        4426/BCR        4435/BCR        4444/BCR        4447*LW
PAGE
         21/OPEN
PAGE
         21/OPEN         22*CNAME
PATSTORE
        3431/STW        3435*DATA
PATT
         58/DATA        2053/ZFSAT      3401*LW
PATTENT1
        2479/BAL        3405*LW         3468/BAL        4342/BAL        4479/BAL
PATTERNI
        2477/MTW        2897/STW        3328/STW        3440/STW        3444*DATA       3505/STW        3677/STW
        4340/MTW        4477/MTW        4563/STW
PATTINDX
         58*DATA
PATTLOAD
        2629/CW*        2632/LW*        2672/LW*        3427/STW        3434*DATA       3438/BIR
PATTSAVE
        3421/STB        3425/AI         3445*RES
PATTOO
        3413*SCD        3423/BIR
PBRIND
```

```
        3582/MTW        3585/MTW        3588/STW        3591*DATA
PCYC
          60/DATA       2054/ZFSAT      3452*STW
PCYCEXIT
        3452/STW        3469/B*         3470*DATA
PCYCINDX
          60*DATA
PCYC00
        3457/B          3467*STW
PICKS
        2644/MTW        2709/LW         2718*RES
PLBRIND
        2558/STW        2580/STW        2601/LW         2606*DATA       2957/STW
PR0GEXIT
        3476/STH        3489/MTW        3490/B          3506*B
PR0GM0VE
        3476*STH        4333/BAL
PTCHAREA
         128/DATA       2092*RES
PTCHINDX
         128*DATA
PX
        1321/STW        1328/S*         1329/MTW        1334/S*         1949*EQU        1950/EQU
P0
         603/STW         608/LI          619/MTW         621/LI         1933*EQU        1934/EQU
P1
        1420/AND        1431/LW         1440/AND        1449/LW         1456/AND        1512/LW         1515/LW
        1527/LW*        1528/CW*        1534/LW         1543/LW*        1557/MTW        1562/MTW        1565/LW*
        1580/LW         1581/MTW        1934*EQU        1935/EQU        2110/LW         2186/LW         2269/MTW
        2441/LW         2471/LW         2561/LW         2743/STW        2746/STW        2891/MTW        2922/LW
        2958/LW         2964/STW        2968/STW        3241/H10*       3244/LW         3285/BAL*       3308/LW
        3368/LW         3401/LW         3454/LW         3642/LW         3708/LW         3740/LW         3779/STW
        3804/BR         3824/S10*       3833/S10*       4009/LW         4051/TDV*       4054/LW         4076/T10*
        4079/LW         4097/LW         4156/LW         4160/STW        4212/LW         4338/LW         4406/LW
        4483/STW        4538/STW        4547/STW
P1ST0RE
        3403/STW        3406/LW         3442*DATA       3456/AW         3458/LW         3467/STW
P10
        1943*EQU        1944/EQU
P11
        1944*EQU        1945/EQU
P12
        1945*EQU        1946/EQU
P13
        1946*EQU        1947/EQU
P14
        1526/STW        1530/MTW        1559/MTW        1563/MTW        1947*EQU        1948/EQU
P15
        1448/STW        1457/BCR*       1459/B*         1498/STW        1554/B*         1729/STW        1948*EQU
        1949/EQU
P2
        1505/LW         1509/MTW        1582/CW         1935*EQU        1936/EQU        2107/LW         2444/STW
        2475/MTW        2565/LW         2738/STW        2851/LCW        2919/LW         3238/LW         3250/CW
        3335/MTW        3402/LW         3481/AW         3645/MTW        3716/LW         3813/LW         4089/LW
        4060/CW         4074/LW         4161/LW         4169/STW        4183/STW        4219/LW         4331/MTW
        4409/LW
P2ST0RE
        2627/LCW        2690/LCW        3404/STW        3405/LW         3412/LW         3415/LW         3419/LW
        3424/LW         3433/LCW        3437/LCW        3443*DATA       3453/LW
P3
        1500/LW         1502/STW        1510/LW         1513/SW         1514/STW        1516/SW         1535/SW
        1936*EQU        1937/EQU        2105/LW         2569/SW         2571/AW         2573/LW         2859/MTW
        3808/LW         4157/STW        4185/STW
P4
        1937*EQU        1938/EQU        2576/LW         2875/LW         3806/LW         4187/STW
P5
        1938*EQU        1939/EQU        2582/LW         3800/LW         4189/STW
P6
        1939*EQU        1940/EQU
P7
        1940*EQU        1941/EQU
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P8
        1941*EQU        1942/EQU
P9
        1942*EQU        1943/EQU
Q
          62/DATA       2055/ZFSAT      3517*STW
QEXIT
        3517/STW        3587/MTW        3589/B*         3590*DATA
QINDX
          62*DATA
QMSGCTLE
        2764/LW         3621*ZFMW
QMSGCTL8
        3092/LW         3615*ZFMW
QMSGCTL9
        3106/LW         3616*ZFMW
QMSGCTLB
        3099/LW         3618*ZFMW
QMSGCTL7
        3614*ZFMW
QMSGCTL6
        3613*ZFMW
QMSGCTL5
        3612*ZFMW       3859/LW
QMSGCTL4
        3611*ZFMW
QMSGCTL3
        3610*ZFMW
QMSGCTL2
        3609*ZFMW
QMSGCTL1
        3608*ZFMW
QMSGCTLC
        3127/LW         3619*ZFMW
QMSGCTL0
        3580/LW         3607*ZFMW
QMSGCTLD
        3120/LW         3620*ZFMW
QMSGCTLA
        3113/LW         3617*ZFMW
QMSG0000
        3592*TEXT       3607/ZFMW
QMSG0001
        3593*TEXT       3608/ZFMW
QMSG0003
        3595*TEXT       3610/ZFMW
QMSG0002
        3594*TEXT       3609/ZFMW
QMSG000B
        3603*TEXT       3618/ZFMW
QMSG000A
        3602*TEXT       3617/ZFMW
QMSG0009
        3601*TEXT       3616/ZFMW       4303/LW         4304/LW
QMSG0008
        3600*TEXT       3615/ZFMW
QMSG0007
        3599*TEXT       3614/ZFMW
QMSG0006
        3598*TEXT       3613/ZFMW
QMSG0005
        3597*TEXT       3612/ZFMW
QMSG0004
        3596*TEXT       3611/ZFMW
QMSG000E
        3606*TEXT       3621/ZFMW
QMSG000D
        3605*TEXT       3620/ZFMW
QMSG000C
        3604*TEXT       3619/ZFMW
Q001
```

	2496/BR	2497/BR	2498/STW	2632/LW	2633/AND	2634/EBR	2635/EBR
	2636/AND	2986/LW	2987/CW	2990/CW	2993/CW	2996/CW	2999/CW
	3002/CW	3005/LW	3006/CW	3008/CW	3011/LW	3012/CW	3014/CW
	3017/LW	3018/CW	3020/CW	3159/SIB	3160/STD	3302/LW	3303/SAS
	3304/CI	3306/LI	3307/STW	3308/LW	3310/LI	3312/CW	3319/LW
	3320/STW	3321/LW	3329/CI	3331/AI	3337/LI	3339/MTW	3341/LW
	3342/STW	3344/LW	3345/AI	3349/AI	3350/STW	3384/TDV	3385/STD
	3387/HIB	3388/STD	3407/SCD	3411/LW	3416/LW	3420/LW	3664/LW
	3665/SAS	3666/BR	3667/BR	3668/STW	3669/LW	3670/BR	3671/BR
	3672/STW	3712/LI	3713/SAS	3714/AI	3715/BR	3716/LW	3718/LI
	3719/BR	3740/LW	3742/LI	3744/BR	3745/LI	3746/SAS	3747/AI
	3748/BR	3824/SIB	3825/STD	3833/SIB	3834/STD	3852/TIB	3856/STD
	3867/HIB	3868/STD	3933/AIB	3934/STW	3936/CW	3941/TDV	3942/STD
	3944/HIB	3945/STD	3964/SIB	3965/TIB	3991/AI	3992/LW	4108/SCS
	4109/AW	4110/SCD	4115/AW	4116/SCS	4251/HIB	4252/STD	4313/LW
	4314/STW	4356/LW	4357/SAS	4358/AW	4359/BR	4360/STW	4361/LW
	4362/BR	4363/BR	4364/STW	4493/SIB	4495/TIB	4499/STD	4551/HIB
R11							
	262=EQU	520/LI	521/STW	522/LW	523/STW	524/LW	525/STW
	526/LW	528/LW	529/STW	541/LW	542/CB	552/LW	553/CB
	558/BAL*	608/LI	610/STW	611/LI	612/STW	621/LI	624/LW
	625/BAL*	629/LI	630/STW	631/LW	658/LW	776/LW	777/SAS
	780/CI	782/CW	786/CI	788/AI	789/CW	791/LI	792/AND
	793/STW	797/AND	798/CW	802/LW	803/STW	805/LW	807/STW
	821/LW	822/MTW	823/CW	825/STW	843/LW	844/STW	851/CB
	853/SCS	854/SAS	855/STB	871/CB	873/SCS	874/SAS	875/STB
	889/LW	890/STW	891/STW	892/LB	893/SAS	894/STW	895/STB
	896/LH	897/SW	898/STW	920/STW	926/LW	927/CB	932/LW
	933/SW	934/SAS	938/BR	939/STB	983/LW	984/STW	986/LW
	987/CW	989/STW	991/LW	992/CW	1001/LW	1003/LW	1003/LW*
	1004/STH	1182/LB	1183/AI	1184/SAS	1185/AW	1190/STW	1191/STW
	1196/LW	1197/CW	1220/LB	1221/CI	1223/LH	1224/SAS	1225/STW
	1233/LB	1234/CI	1236/CI	1246/AND	1247/STB	1691/LW	1712/LB
	1714/CI	1719/CI	1722/SAS	1725/MTW	1738/LB	1739/CI	1742/LH
	1743/CH	1752/LB	1753/CI	1791/LH	1792/CH	1794/LW	1795/STW
	1802/LI	1826/LW	1827/CW	1830/LW	1831/STW	1839/LW	1843/CW
	1851/STW	1872/STW	1878/SW	1881/SW	1887/LI	1889/SW	1900/LW
	2102/LI	2104/STW	2130/BR	2131/AI	2132/STW	2135/STW	2136/STW
	2137/STW	2141/LI	2190/LW	2223/LW	2287/AW	3131/LW	3135/LW
	3139/LW	3246/LW	3327/LI	3328/STW	3332/MTW	3334/STW	3343/LI
	3347/MTW	3351/STW	3406/LW	3836/LW	3861/LW	3887/STW	4056/LW
	4081/LW	4107/LI	4111/AW	4112/CI	4114/AI	4115/AW	4257/LW
	4500/AND	4501/CW					
R12							
	263=EQU	450/LW	462/LW	467/LW	472/LW	479/LW	481/STW
	482/LW	500/LW	530/LW	556/LI	644/LI	660/LI	661/STW
	662/LW	686/LI	722/LI	784/LI	820/LI	841/LI	845/LB
	846/AND	850/LI	870/LI	911/LI	930/LI	985/LI	990/LI
	998/LI	1005/LH	1006/STH	1007/LW	1059/XW	1061/XW	1136/TIB
	1139/SIB	1141/TIB	1156/LI	1162/LH	1163/STH	1164/LW	1199/LI
	1245/LI	1246/AND	1251/LW	1252/SAS	1253/STW	1264/LI	1277/LI
	1284/LI	1292/XW	1308/XW	1320/XW	1321/STW	1322/LI	1323/STW
	1324/LI	1327/DW	1328/S	1330/AWM	1332/LW	1333/XW	1334/S
	1335/BR	1336/STW	1348/SCD	1354/LW	1367/CB	1370/STB	1373/STW
	1383/MTW	1384/CI	1386/CI	1388/MTW	1389/SCS	1391/LW	1449/LW
	1452/LW	1500/LW	1501/AND	1502/STW	1510/LW	1515/LW	1516/SW
	1519/STH	1520/SCD	1521/STW	1527/LW	1528/CW	1532/LI	1533/STB
	1534/LW	1535/SW	1538/STH	1539/SCD	1540/STW	1543/LW	1545/STW
	1549/LW	1565/LW	1569/SCD	1580/LW	1582/CW	1611/STH	1612/LH
	1612/LH	1613/STB	1614/LB	1614/LB	1616/AND	1617/SAS	1618/STB
	1619/LW	1619/LW	1626/LB	1627/SAS	1628/MTW	1631/MTW	1638/LB
	1640/LI	1641/MTW	1643/AI	1644/STB	1647/LB	1653/LB	1660/BDR
	1662/LB	1664/AND	1668/BDR	1671/SIB	1673/TIB	1713/LI	1716/LH
	1717/STW	1724/LI	1727/LW	1729/STW	1788/LW	1789/MTW	1790/MTW*
	1791/LH*	1792/CH*	1801/LI	1825/LI	1838/LW	1840/MTW	1841/CW
	1843/CW*	1845/STW	1846/LI	1902/LW	2110/LW	2111/CI	2116/SAS
	2121/LW	2153/STW	2154/AND	2160/SAD	2161/AND	2165/SAD	2166/AND
	2189/STOF	2272/LD	2275/LD	2281/BR	2291/STD	2294/AI	2301/AI
	2302/STD	2364/LW	2365/SW	2366/AW	2368/STW	2370/LW	2372/LW
	2374/STW	2376/LW	2378/STW	2380/LW	2381/STW	2382/STW	2383/LW
	2511/LW	2517/LW	2518/AND	2520/STW	2522/LW	2564/LW	2569/SW

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2571/AW     2573/LW     2574/STW    2577/CW     2581/LW     2588/STW    2590/LW
2593/LW     2654/LW     2664/LW     2666/LW     2667/AW     2668/AI     2672/LW
2674/STW    2676/LW     2678/STW    2683/LW     2694/LW     2696/LW     2702/LI
2703/AW     2706/LW     2709/LW     2712/LW     2764/LW     2766/LW     2772/LW
2778/LW     2793/MTW    2796/LCW    2796/LCW    2801/LW     2808/CW     2811/STD
2813/LW     2814/SCD    2815/CW     2819/LW     2820/SCD    2821/STD    2823/LD
2826/AND    2827/BR     3049/LW     3051/STW    3053/LW     3061/LW     3062/AND
3064/STW    3066/LW     3074/LD     3075/STD    3079/STW    3081/LW     3085/STW
3087/LW     3092/LW     3099/LW     3106/LW     3113/LW     3120/LW     3127/LW
3129/LD     3133/LD     3137/LD     3241/H18    3242/STD    3247/LD     3311/LW
3312/CW     3315/STW    3317/LW     3373/LW     3390/LW     3401/LW     3403/STW
3413/SCD    3417/SCD    3421/STB    3487/LW     3518/T18    3520/SAD    3521/CI
3526/CI     3529/CI     3534/CI     3537/CI     3547/CI     3550/LW     3551/SCS
3552/CI     3555/CI     3558/CI     3562/SAD    3563/CI     3566/CI     3569/CI
3580/LW     3762/LW     3763/SAS    3765/STW    3767/LW     3768/STW    3771/LW
3837/LD     3859/LW     3862/LD     3888/SAS    3889/AND    3891/BR     3893/LW
3898/LI     3899/SAD    3901/SAD    3903/LI     3904/STB    3907/LI     3908/SAD
3909/STB    3914/LW     3916/LW     3917/AND    3920/LW     4014/LW     4026/LW
4034/LW     4051/TDV    4052/STD    4057/LD     4076/T18    4077/STD    4082/LD
4138/LW     4139/STW    4154/LW     4219/LW     4223/CI     4228/SLS    4229/BR
4233/STW    4237/LW     4254/LW     4256/LD     4290/LW     4298/LW     4301/AW
4302/STW    4307/LW     4447/LW
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R13

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 264=EQU    1142/LB     1142/LB     1143/CI     1158/SCS    1159/STW    1318/STW
1319/LI     1320/XW     1325/CI     1333/XW     1347/LI     1349/CI     1351/AI
1352/STB    1355/LW     1451/STW    1505/LW     1506/MTW    1507/CW     1522/STW
1541/STW    1546/STW    1570/STB    1588/LW     1589/CW     1615/LI     1616/AND
1622/AW     1623/STW    1847/LW     1848/MTW    1849/CW     2103/LI     2118/MTW
2133/MTW    2140/MTW    2156/SLS    2157/AI     2158/STW    2159/LW     2163/STW
2164/LW     2168/SAS    2169/AW     2170/AI     2171/STW    2172/LW     2173/STW
2188/AI8    2152/SAS    2193/CW     2241/STW    2243/LW     2288/AW     2300/AW
2369/STW    2375/STW    2379/STW    2521/STW    2565/LW     2567/CI     2576/LW
2577/CW     2582/LW     2589/STW    2592/STW    2670/STW    2675/STW    2679/STW
2705/STW    2708/STW    2711/STW    2795/LI     2798/LI     2799/STW    3052/STW
3065/STW    3080/STW    3086/STW    3249/SAS    3250/CW     3316/STW    3402/LW
3404/STW    3411/LW     3416/LW     3420/LW     3561/LW     3766/STW    3839/SAS
3840/CW     3890/AND    3891/BR     3892/STW    3897/LW     3919/STW    3922/LW
3995/STW    4059/SAS    4060/CW     4084/SAS    4085/CW     4212/LW     4215/STW
4225/LI     4227/LI     4229/BR     4230/LI     4231/CW     4300/STW
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R14

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 265=EQU    1016/STW    1033/LB     1034/LW     1034/LW=    1037/SAD    1039/STW
1046/BAL    1052/BAL    1067/BAL    1073/BAL    1080/BAL    1083/BAL    1089/BAL
1092/BAL    1206/STW    1213/STW    1215/LW     1408/BAL    1414/BAL    1421/STW=
1718/LW     1721/MTW    1727/LW=    1728/MTW    2113/LW     2114/AND    2115/STW
2125/LW     2126/CI     2129/AND    2130/BR     2217/LI     2233/LW     2234/CI
2237/LW     2396/LI     2399/CS     2579/LI     2580/STW    2930/LW     2931/WD
2946/LW     2947/WD     3261/LI     3262/WD     3951/LI     3952/WD     3989/MTW
3992/LW     3993/STW    3994/STW    4311/MTW    4313/LW
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R15

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 266=EQU    483/BAL     489/BAL     490/LW      491/STW     492/LI      493/WD
 494/LW     495/SAS     496/STH     497/STH     498/LH      499/STH     501/BAL
 503/BAL    505/LI      506/STH     508/BAL     516/BAL     527/BAL     531/BAL
 539/BAL    550/BAL     558/BAL     559/BAL     601/STW     602/BAL     606/LW
 607/STW    609/BAL     617/STW     618/BAL     622/BAL     623/BAL     625/BAL
 627/BAL    632/BAL     643/STW     645/LW      646/CB      648/BAL     657/STW
 659/BAL    663/BAL     673/STW     674/BAL     676/BAL     699/STW     700/BAL
 701/LW     702/STW     703/BAL     704/LI      707/LW      708/STW     712/BAL
 719/STW    720/BAL     721/BAL     723/LW      724/CW      726/LW      727/STW
 729/LW     731/STW     732/BAL     741/STW     742/BAL     743/BAL     744/BAL
 753/STW    754/BAL     755/LI      756/STW     759/LW      760/STW     761/BAL
 762/BAL    763/BAL     772/STW     794/BAL     796/LI      797/AND     801/LW
 803/STW=   818/BAL     836/STW     856/BAL     857/BAL     858/LI      861/BAL
 864/LI     876/BAL     877/BAL     878/LI      888/STW     917/BAL     935/LI
 937/AND    945/BAL     946/BAL     947/BAL     948/BAL     949/BAL     950/BAL
 951/BAL    952/BAL     979/STW     980/BAL     996/BAL     997/BAL     1002/BAL
1008/BAL    1017/STW    1018/BAL    1023/LI     1024/CW     1031/LW     1035/SCS
1038/LB     1039/STW=   1057/STW    1058/BAL    1060/BAL    1099/STW    1100/BAL
1102/LH     1103/STW    1104/BAL    1115/STW    1129/LH     1130/CH     1157/BAL
1160/LI     1161/STB    1165/BAL    1166/LB     1167/CI     1169/LH     1170/CH
1172/LI     1198/BCS=   1206/STW    1207/BAL    1213/STW    1214/BAL    1215/LW
1222/BCR=   1226/B=     1248/B=     1263/BCS=   1270/BCR=   1276/BCR=   1283/BCR=
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	1292/XW	1293/STW	1294/AND	1295/SCS	1296/MI	1297/AW	1298/STW
	1299/AND	1300/SCS	1301/MI	1302/AW	1303/STW	1304/LW	1304/LW
	1305/MI	1306/AW	1307/STW	1308/XW	1309/B*	1337/B*	1357/B*
	1363/STW	1366/LI	1367/CB	1369/LI	1370/STB	1393/B*	1401/B*
	1425/B*	1434/B*	1442/B*	1448/STW	1450/BAL	1454/BAL	1455/LI
	1456/AND	1466/STW	1467/BAL	1468/BAL	1469/BAL	1470/LI	1471/AND
	1475/BAL	1476/BAL	1482/BCR*	1498/STW	1504/BAL	1517/BAL	1518/LI
	1519/STW	1523/STB	1525/LI	1526/STW	1536/BAL	1537/LI	1538/STW
	1542/STB	1544/BAL	1551/BAL	1552/BAL	1560/BAL	1566/BAL	1573/LI
	1574/STB	1577/BAL	1583/B*	1590/BCR*	1599/BCR*	1600/STCF	1601/STW
	1602/BAL	1603/LB	1604/SAS	1605/AND	1609/CI	1625/LW	1630/LI
	1633/LI	1634/CW	1636/STW	1651/STW	1656/LI	1658/STB	1661/LI
	1666/STB	1692/BAL	1693/BAL	1694/BAL	1695/LI	1696/WD	1697/WD
	1698/LI	1699/WD	1701/LW	1702/BAL	1702/BAL*	1731/B*	1736/BAL
	1737/BAL	1745/BAL	1750/BAL	1751/BAL	1755/LI	1764/BCR*	1769/LI
	1770/WD	1771/WD	1809/BAL	1810/BAL	1853/B*	1898/BAL	1901/BAL
	1903/BAL	2101/STW	2122/BAL	2152/STW	2155/BAL	2162/BAL	2167/BAL
	2185/STW	2191/BAL	2207/B*	2218/STW	2219/BAL	2260/STW	2296/BAL
	2305/BAL	2306/BAL	2307/BAL	2327/STW	2337/BAL	2338/BAL	2346/STW
	2355/BAL	2367/BAL	2371/BAL	2373/BAL	2377/BAL	2384/BAL	2395/STW
	2397/LI	2418/STW	2429/BAL	2440/STW	2445/BAL	2448/BAL	2466/STW
	2479/BAL	2480/BAL	2483/BAL	2487/BAL	2512/BAL	2519/BAL	2523/BAL
	2525/BAL	2526/BAL	2556/STW	2587/BAL	2591/BAL	2594/BAL	2615/STW
	2655/BAL	2665/BAL	2669/BAL	2673/BAL	2677/BAL	2680/LW	2681/STW
	2682/STW	2684/BAL	2695/BAL	2697/BAL	2704/BAL	2707/BAL	2710/BAL
	2713/BAL	2736/STW	2744/BAL	2747/BAL	2752/BAL	2763/STW	2765/BAL
	2767/BAL	2773/BAL	2779/BAL	2791/STW	2792/BAL	2800/BAL	2803/STW
	2804/BAL	2807/BAL	2810/BAL	2817/BAL	2822/BAL	2855/STW	2905/BAL
	2925/STW	2955/STW	2965/BAL	2969/BAL	3023/B*	3028/STW	3050/BAL
	3054/BAL	3059/LW	3060/STW	3063/BAL	3067/BAL	3076/BAL	3077/LW
	3078/STW	3082/BAL	3083/LW	3084/STW	3088/BAL	3093/BAL	3100/BAL
	3107/BAL	3114/BAL	3121/BAL	3128/BAL	3132/BAL	3136/BAL	3140/BAL
	3152/BAL	3153/LI	3154/STW	3155/BAL	3157/BAL	3163/BAL	3210/B*
	3215/STW	3216/LI	3217/STW	3218/LI	3219/SAS	3220/STW	3221/LW
	3224/B*	3237/STW	3240/BAL	3248/BAL	3263/B*	3284/STW	3285/BAL
	3301/STW	3314/BAL	3318/BAL	3367/STW	3374/BAL	3391/BAL	3441/B*
	3452/STW	3468/BAL	3476/STW	3488/BAL	3517/STW	3581/BAL	3631/STW
	3651/BAL	3654/BAL	3658/BAL	3679/BAL	3680/BAL	3698/B*	3707/STW
	3726/BAL	3727/BAL	3739/STW	3755/BAL	3756/BAL	3764/BAL	3772/BAL
	3798/STW	3799/BAL	3822/BAL	3829/BAL	3830/BAL	3838/BAL	3851/STW
	3860/BAL	3863/BAL	3881/B*	3886/STW	3894/BAL	3918/BAL	3921/BAL
	3947/LW	3949/LW	3950/STW	3968/BAL	3985/STW	3988/BAL	4008/STW
	4015/BAL	4025/STW	4027/BAL	4035/BAL	4048/STW	4058/BAL	4073/STW
	4083/BAL	4099/B*	4117/B*	4129/STW	4131/BAL	4132/LI	4135/BAL
	4152/STW	4153/BAL	4155/BAL	4170/BAL	4181/STW	4190/BAL	4211/STW
	4238/BAL	4250/STW	4255/BAL	4258/BAL	4275/B*	4286/STW	4287/BAL
	4291/BAL	4299/BAL	4308/BAL	4310/BAL	4328/STW	4333/BAL	4342/BAL
	4343/BAL	4346/BAL	4350/BAL	4369/BAL	4370/BAL	4397/STW	4424/STW
	4433/STW	4442/STW	4448/BAL	4479/BAL	4484/BAL	4485/BAL	4490/BAL
	4491/BAL	4510/BAL	4520/BAL	4521/BAL	4530/BAL	4548/B*	4549/BAL
R2							
	253=EQU	871/CB					
R3							
	254=EQU	846/AND	1432/AND	1605/AND			
R4							
	255=EQU	2109/LI	2117/BIR	2138/STW	2139/STW	2627/LCW	2689/BIR
	2690/LCW	3068/LI	3071/BIR	3405/LW	3408/BDR	3409/LI	3422/BIR
	3432/LCW	3438/BIR	3439/LI	3440/STW	3877/LI	3880/BIR	3895/LI
	3905/BIR	3906/LI	3910/BIR	4214/LI	4216/BIR	4217/LI	4221/BIR
R5							
	256=EQU	2616/LCW	2666/LW	2691/BIR	3412/LW	3414/BDR	3415/LW
	3418/BDR	3419/LW	3424/LW	3425/AI	3426/AW	3427/STW	3428/LW
	3429/AW	3430/AW	3431/STW	3433/LCW	3436/BIR	3437/LCW	3896/LI
	3900/BIR	3902/LI	4218/LI	4234/MTW	4236/BIR		
R6							
	257=EQU	2289/LI	2293/MTW	2299/MTW	2347/LW	2362/BIR	2426/LI
	2428/BDR	2559/LI	2584/STW	2595/LW	2600/BIR	2637/LI	2647/BIR
	2956/LI	2957/STW	3035/LI	3036/SAD	3037/AND	3038/CI	3041/CI
	3410/LI	3423/BIR	4405/LI	4414/BIR	4463/LCW	4464/STW	
R7							
	258=EQU	446/STCF	447/LB	447/LB	448/SAS	902/LB	909/CI

913/SAS	936/LB	937/AND	938/BR	1118/LI	1119/CI	1121/STW
1547/LI	1548/STB	2261/LI	2266/BIR	2267/STW	2298/BIR	2356/LI
2361/BIR	2409/LW	2410/BDR	2419/LW	2431/BIR	2507/LI	2510/BIR
2513/LI	2516/BIR	2560/LI	2585/STW	2596/LW	2599/BIR	2624/LI
2626/BIR	2638/LI	2646/BIR	2648/LI	2651/BIR	2656/LI	2659/BIR
2660/LI	2663/BIR	2671/LI	2701/LI	2703/AW	2714/BIR	2851/LCW
2865/MTW	2886/MTW	2899/MTW	2922/LW	2924/LI	3031/LW	3032/AND
3033/STW	3034/LW	3055/LI	3058/BIR	3453/LW	3461/SAS	3462/AI
3465/BIR	3477/LW	3478/AW	3479/SLS	3485/CW	3500/LCW	3503/BIR
3575/LI	3584/BIR	3588/STW	4030/LI	4033/BIR	4292/LI	4295/BIR
4400/LI	4403/BIR	4404/LI	4412/MTW			

R8

259=EQU	538/LI	549/LW	675/LW	677/MTW	681/CW	691/STW
834/MTW	838/CW	862/LI	895/LI	901/STW	1082/LI	1091/LI
1275/MTW	2186/LW	2187/STW	2205/LD	2206/STD	2262/LI	2263/CW
2265/AI	2268/LI	2271/STW	2274/STW	2277/LI	2279/SAD	2280/BR
2283/SAD	2285/SAD	2292/STW	2308/LI	2309/STW	2310/STW	2328/LW
2329/STW	2330/LI	2332/STD	2333/LD	2334/STD	2348/LW	2349/SAD
2351/SAD	2359/CW	2372/LW	2398/AW	2399/CS	2401/AW	2420/LW
2421/SAD	2423/SAD	2427/STW	2441/LW	2442/STW	2443/LI	2444/STW
2467/LW	2468/STW	2469/LI	2470/STW	2471/LW	2472/STW	2473/LW
2474/STW	2485/LI	2486/STW	2488/LI	2489/STW	2499/LI	2501/STD
2504/LW	2505/CW	2508/LW	2509/STW	2514/LW	2515/STW	2533/LI
2534/STW	2535/STW	2557/LI	2558/STW	2561/LW	2562/CI	2586/STW
2597/LW	2598/SAS	2601/LW	2617/LW	2618/AW	2619/AW	2620/STW
2621/LI	2622/STW	2623/STW	2625/STW	2629/CW	2631/LW	2633/AND
2634/EBR	2639/CW	2645/SCD	2649/LW	2650/STW	2657/LW	2658/STW
2661/LW	2662/STW	2685/LI	2686/STW	2698/LW	2699/STW	2700/STW
2737/LI	2738/STW	2739/STW	2740/LW	2741/SAS	2742/AND	2743/STW
2745/LI	2746/STW	2748/LW	2750/CS	2768/LW	2769/STW	2770/LW
2771/STW	2774/LW	2775/STW	2776/LW	2777/STW	2805/LI	2806/STW
2861/LW	2863/LW	2864/STW	2867/LI	2868/AW	2869/SAS	2870/AW
2871/STW	2875/LW	2877/LI	2880/AW	2881/STW	2889/LW	2890/SAS
2893/AW	2895/AW	2898/STW	2901/LI	2903/STD	2919/LW	2921/LI
2945/MTW	2958/LW	2961/CW	2963/LW	2964/STW	2967/LW	2968/STW
2970/LI	2971/STW	3029/LW	3030/SAS	3031/LW*	3034/LW*	3043/LW
3045/LW	3046/STW	3047/LW	3048/STW	3056/LW	3057/STW	3069/LW
3070/STW	3072/LW	3073/SAS	3074/LD*	3089/LW	3090/CW	3094/LW
3095/CW	3097/CW	3101/LW	3102/CW	3104/CW	3108/LW	3109/CW
3111/CW	3115/LW	3116/CW	3118/CW	3122/LW	3123/CW	3125/CW
3238/LW	3239/STW	3244/LW	3245/STW	3259/LW	3260/STW	3321/LW
3322/CI	3324/AI	3325/SAS	3326/STW	3368/LW	3370/SCD	3371/STW
3454/LW	3456/AW	3458/LW	3460/SCD	3466/AW	3467/STW	3480/LI
3481/AW	3482/LW*	3483/LW	3494/SLS	3495/AW	3496/STW	3497/LW
3498/AW	3499/STW	3501/LW	3502/STW	3504/LI	3505/STW	3523/LI
3525/LI	3531/AI	3533/AI	3536/AI	3539/AI	3563/AI	3546/AI
3549/AI	3554/AI	3557/AI	3560/AI	3565/AI	3568/AI	3571/AI
3574/AI	3577/SAS	3578/CI	3632/LW	3633/STW	3634/LW	3635/AND
3636/STW	3639/LW	3640/AND	3641/STW	3642/LW	3643/STW	3644/LI
3647/AW	3648/STW	3649/LW	3650/STW	3656/LI	3657/STW	3659/LI
3660/STW	3661/LI	3663/STD	3674/LI	3675/STW	3676/STW	3677/STW
3684/LI	3685/STW	3686/LI	3708/LW	3709/SAD	3710/STD	3711/LD
3715/BR	3720/STD	3721/LI	3723/STD	3743/LD	3748/BR	3749/STD
3750/LI	3752/STD	3757/LD	3758/SAD	3759/STW	3769/LW	3770/STW
3773/LI	3774/STW	3776/LI	3777/STW	3778/LI	3779/STW	3800/LW
3801/STW	3802/LW	3803/AND	3804/BR	3805/STW	3806/LW	3807/SAD
3808/LW	3809/SAD	3811/LW	3812/SAD	3813/LW	3814/SAD	3816/LW
3817/CW	3819/LI	3821/STD	3878/LI	3879/STW	3911/LW	3912/CW
3953/LW	3954/AW	3955/AW	3960/LB	3961/CI	3971/SCD	3972/STW
3986/LI	3987/STW	3996/LI	3997/STW	4009/LW	4011/SCD	4012/STW
4028/LW	4029/STW	4031/LW	4032/STW	4049/LW	4050/STW	4054/LW
4055/STW	4074/LW	4075/STW	4079/LW	4080/STW	4097/LW	4098/STW
4156/LW	4157/STW	4158/AI	4159/AW	4160/STW	4161/LW	4162/AW
4163/AI	4166/CW	4168/SCD	4169/STW	4182/LI	4183/STW	4184/LI
4185/STW	4186/LI	4187/STW	4188/LI	4189/STW	4271/LD	4272/STD
4273/LI	4274/STW	4288/LW	4293/LW	4294/STW	4296/LW	4297/STW
4303/LW	4305/STW	4329/LW	4330/STW	4336/LW	4337/STW	4338/LW
4339/STW	4348/LI	4349/STW	4351/LI	4352/STW	4353/LI	4355/STD
4366/LI	4367/STW	4374/LI	4375/STW	4376/STW	4377/STW	4399/LI
4401/STW	4402/STW	4406/LW	4408/STW	4409/LW	4411/STW	4427/LI
4436/LI	4445/LI	4458/SCS	4461/AW	4462/STW	4471/LI	4472/STW

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        4473/LW     4474/STW    4475/LW     4476/STW    4480/LCW    4481/STW    4482/LW
        4483/STW    4487/LI     4489/STD    4503/LW     4504/AND    4506/LCW    4507/STW
        4512/LW     4513/AND    4517/LD     4518/STD    4524/SCD    4525/STW    4527/LD
        4528/STD    4536/LW     4537/SCS    4538/STW    4540/LH     4541/AND    4543/LI
        4545/LI     4546/AW     4547/STW    4553/LW     4554/STW    4556/LCW    4557/STW
        4559/LW     4560/CI     4562/LI     4563/STW    4568/LW     4569/STW
R9
         260*EQU     502/LI      603/STW     675/LW      683/CW      688/CW      705/MTW
         710/MTW     757/MTW     771/AI      778/CI      782/CW      789/CW      798/CW
         810/CI      812/SAS     813/BR      816/SAS     817/BR      819/STW     863/LI
         900/LI      915/STW     918/MTW     994/MTW    1045/LI     1051/LI     1059/XW
        1061/XW     1066/LI     1072/LI     1079/LI     1088/LI     1105/LW     1238/MTW
        1240/CI     1243/MTW    1249/CI     1251/LW     1260/MTW    1262/CI     1269/MTW
        1471/AND    1472/CW     1474/STW    1477/STW    1479/LW     2215/LW     2216/LW
        2224/CI     2237/LW     2238/STW    2278/LW     2281/BR     2282/LW     2284/LW
        2286/LI     2292/STW*   2297/AI     2331/LI     2350/LW     2352/LW     2357/AI
        2359/CW*    2364/LW     2376/LW*    2422/LW     2424/LW     2425/AI     2427/STW*
        2430/AI     2500/LI     2631/LW     2636/AND    2642/CW     2749/LW     2878/LW
        2879/AND    2880/AW     2896/LI     2897/STW    2902/LI     2928/LW     2927/STW
        2928/LW     2929/STW    3369/LW     3372/STW    3459/LI     3464/SCS    3466/AW
        3482/LW     3483/LW     3484/AW     3485/CW     3491/SW     3492/AND    3493/STW
        3519/STCF   3540/SCS    3541/CI     3544/CI     3583/SAS    3662/LI     3719/BR
        3722/LI     3744/BR     3751/LI     3810/STW    3815/STW    3820/LI     3969/LW
        3970/BCS    4010/LW     4013/STW    4164/LW     4165/AW     4166/CW     4304/LW
        4306/STW    4309/LW     4354/LI     4459/LW     4460/SAS    4461/AW     4465/LI
        4466/STW    4467/LW     4468/STW    4469/LI     4470/STW    4488/LI     4522/LW
        4523/SCS
SAIBXPSD
        3259/LW     3264*XPSD
SAVEBITS
        2492/AW     2535/STW    3493/STW    3507*DATA   4358/AW     4377/STW
SDA
        2136/STW    2205/LD     4272/STD    4279*DATA
SDAPNTR
        2139/STW    4280*DATA
SECTORS
        3350/STW    3357*DATA   4111/AW
SECTRCNT
        3334/STW    3344/LW     3355*DATA
SEEK
          66/DATA   2058/ZFSAT  2744/BAL    3707*STW    4484/BAL    4549/BAL
SEEKEXIT
        3707/STW    3725/B*     3729*DATA
SEEKINDX
          66*DATA
SEEKBRDR
        2276/LD     3182*ZFCP   3711/LD
SEEKSAVE
        3710/STD    3712/LI     3731*DATA
SEEKOO
        3721/LI     3722/LI     3725*B
SENS
          68/DATA   2059/ZFSAT  3739*STW    3780/B
SENSALT
        2747/BAL    3776*LI     4520/BAL
SENSDECR
        3968/BAL    4521/BAL    4540*LH
SENSECTL
        3771/LW     3786*ZFMW
SENSEXIT
        3739/STW    3775/B*     3782*DATA
SENSINDX
          68*DATA
SENSBRDR
        3184*ZFCP   3743/LD
SENSSAVE
        2748/LW     2772/LW     3745/LI     3757/LD     3759/STW    3762/LW     3784*DATA
        3975/ZFCP   4288/LW     4540/LH     4546/AW
SENSOO
        3750/LI     3751/LI     3754*B
SENSOI
```

```
STEPIND
       2220/MTW        3987/STW        3997/STW        4001*DATA
STHDGCTL
       3893/LW         3927*ZFMW
STNDAIB
       3264/XPSD       3266*DATA       3938/LPSD
STOP
         75/DATA       2062/ZFSAT      4008*STW
STOPCTL
       4014/LW         4019*ZFMW
STOPEXIT
       4008/STW        4017/B*         4018*DATA
STOPINDX
         75*DATA
STTYEXIT
       3886/STW        3923/B*         3924*DATA
STTOO
       3898*LI         3905/BIR
TCDA
         77/DATA       2063/ZFSAT      4025*STW        4153/BAL
TCDAEXIT
       4025/STW        4036/B*         4037*DATA
TCDAINDX
         77*DATA
TCDAMCTL
       4034/LW         4038*ZFMW
TDV
         78/DATA       2064/ZFSAT      4048*STW
TDVEXIT
       4048/STW        4062/MTW        4063/B*         4064*DATA
TDVINDX
         78*DATA
TDVSTAT
       2517/LW         3006/CW         3012/CW         3018/CW         3029/LW         3061/LH         3072/LW
       3095/CW         3102/CW         3109/CW         3116/CW         3123/CW         3133/LD         3176*RES
       3385/STD        3386/STCF       3942/STD        3943/STCF       4052/STD        4053/STCF       4057/LD
       4503/LW         4512/LW
TEXTAIB
       2190/LW         3131/LW         3196*TEXT       3912/CW
TEXTCDA
       4028/LW         4039*TEXT
TEXTCWRT
       2467/LW         3201*TEXT
TEXTHIB
       3139/LW         3194*TEXT       3246/LW
TEXTILEG
       3043/LW         3146*TEXT
TEXTMARK
       3371/STW        3372/STW        3377/ZFMW       3378*TEXT
TEXTMNUS
       2827/BR         2834*DATA
TEXTREAD
       3198*TEXT       3632/LW
TEXTSEEK
       3199*TEXT
TEXTSENS
       3200*TEXT       3769/LW
TEXTSIB
       3192*TEXT       3836/LW         4257/LW
TEXTSPCE
       3191*TEXT
TEXTSTOP
       4012/STW        4013/STW        4019/ZFMW       4020*TEXT
TEXTTDV
       3135/LW         3195*TEXT       4056/LW
TEXTTIB
       3193*TEXT       3861/LW         4081/LW
TEXTWRT
       3045/LW         3197*TEXT       4329/LW
TIB
         80/DATA       2065/ZFSAT      4073*STW
```

```
USTRTEXT
        4250/STW        4262/B*         4263*DATA
USTRTMSG
        4264/ZFHW       4265*TEXT
WAIT01
         103*DATA
WAIT02
         105*DATA
WAIT03
         107*DATA
WAIT04
         109*DATA
WAIT05
         111*DATA
WAIT06
         113*DATA
WAIT07
         115*DATA
WAIT1
         103/DATA       2123*WAIT
WAIT2
         105/DATA       2756*WAIT
WAIT3
         107/DATA       2932*WAIT
WAIT4
         109/DATA       3866*WAIT
WAIT5
         111/DATA       4016*WAIT
WAIT6
         113/DATA       4261*WAIT
WBRKADDR
        2137/STW        2238/STW        2329/STW        2511/LW         2654/LW         2740/LW         2750/CS
        2766/LW         3053/LW         3159/SIB*       3202*DATA       3245/STW        3384/TDV*       3387/HIB*
        3805/STW        3852/TIB*       3916/LW         3941/TDV*       3944/HIB*       3964/SIB*       3965/TIB*
        3969/LW         3972/STW        3994/STW        4055/STW        4080/STW        4251/HIB*       4290/LW
        4309/LW         4314/STW        4468/STW        4493/SIB*       4495/TIB*       4522/LW         4525/STW
        4536/LW         4551/HIB*       4569/STW
WRPRBRDR
        2468/STW        3633/STW        4296/LW         4318*DATA       4330/STW
WRPRTCHK
        2483/BAL        3654/BAL        4286*STW        4315/B          4346/BAL
WRPRTCTL
        4307/LW         4317*ZFHW
WRPRTXIT
        4286/STW        4289/BCR*       4316*DATA
WRT
          88/DATA       2071/ZFSAT      4328*STW
WRTEXIT
        4328/STW        4335/B*         4368/B*         4378/B*         4379*DATA
WRTIND
        2271/STW        2310/STW        2983/MTW        3954/AW         4349/STW        4352/STW        4367/STW
        4375/STW        4380*DATA
WRTINDX
          88*DATA
WRTBRDER
        2272/LD         3178*ZFCP       4359/BR         4362/BR
WRTPRBG
        3496/STH        3499/STH        3501*LW
WRT00
        4353/LI         4366*LI
WRT01
        4354/LI         4369*BAL
WRT02
        4343*BAL        4373/B
WRT03
        4332/BEZ        4334/B          4336*LW
XCWT
          89/DATA       2072/ZFSAT      4424*STH
XCWTINDX
          89*DATA
XDCHNFLG
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        242*EQU     1021/CB     1399/LI     1614/LB
X3
        243*EQU      895/STB     907/CB      922/CB     1101/STB    1161/STB    1400/LI
       1497/STCF    1613/STB    1618/STB    1638/LB    1645/STB    1647/LB     1653/LB
       1662/LB      1665/MTB
X4
        244*EQU     2113/LW     2115/STW    2125/LW    2132/STW    2629/CW     2632/LW
       2672/LW      3069/LW     3070/STW    3421/STB    3879/STW    3904/STB    3909/STB
       4215/STW     4219/LW
X5
        245*EQU     2676/LW     4231/CW     4233/STW
X6
        246*EQU      680/STW     691/STW    1568/LI     1572/BIR    2290/STD    2291/STD
       2302/STD     2427/STW    2564/LW    2574/STW    2581/LW     2874/LI     2875/LW
       2882/AI      2883/CI     2885/LI    3045/LW     4408/STW    4411/STW
X7
        247*EQU      449/LW      540/LI      541/LW      544/BIR     551/LI      552/LW
        555/BIR      679/LI      680/STW     681/CW      683/CW      685/BIR     688/CW
        690/BIR      773/LW      774/SW      776/LW      792/AND     801/LW      806/MTW
        807/STW      809/BIR     837/LI      838/CW      840/BIR     843/LW      914/EXU
        925/LI       926/LW      929/BIR    1032/LCW    1035/SCS    1036/LW     1037/SAD
       1145/LB      1499/LI     1500/LW     1502/STW    1503/BIR    1524/LI     1533/STB
       1555/CI      1567/MTW    1570/STB    1571/MTW    1574/STB    1575/CI     1723/LI
       1729/STW     1730/BIR    1894/LI     1896/STW    1897/BIR    2359/CW     2376/LW
       2508/LW      2509/STW    2514/LW     2515/STW    2625/STW    2641/MTW    2644/MTW
       2649/LW      2650/STW    2657/LW     2658/STW    2661/LW     2662/STW    2706/LW
       2709/LW      2853/CI     2855/LI     2856/SAS    2857/STW    2858/AI     2864/STW
       2866/BIR     2872/LW     2873/AI     2878/LW     2881/STW    2887/BIR    2888/LW
       2898/STW     2900/BIR    2927/STW    2929/STW    2930/LW     2946/LW     3056/LW
       3057/STW     3501/LW     3502/STW    3580/LW     3637/LW     3638/AW     3639/LW
       3641/STW     4031/LW     4032/STW    4293/LW     4294/STW    4402/STW    4406/LW
       4409/LW      4516/LI     4517/LD     4518/STD    4519/BIR    4526/LI     4527/LD
       4528/STD     4529/BIR
ZADCRC
       1206*STW     1745/BAL
ZADPTR
        712/BAL      732/BAL     763/BAL     861/BAL    1182*LB     1207/BAL
ZALT
       1466*STW     2035/ZFSAT
ZALT05
       1472*CW      1480/B
ZALT10
       1467/BAL     1469/BAL    1476/BAL    1481*CI
ZAP1
        336*CNAME
ZAS
        582*ZFBT
ZASLNK
        282*EQU      753/STW     764/B*
ZASPRB
        759/LW      1817/ZFST2  1818*B
ZASTRN
        582/ZFBT     753*STW
ZASTRN10
        758/BCR      763*BAL
ZBPT1
       1737/BAL     1751/BAL    1763*RD     1809/BAL
ZBTD
       1318*STW     2800/BAL
ZBTD10
       1324*LI      1331/B
ZBTD20
       1326/BCS     1332*LW
ZBTD30
       1327/DW      1338*DATA
ZBTH
       1157/BAL     1345*STW    1353/BIR    1450/BAL    1517/BAL    1536/BAL    1544/BAL
       1566/BAL     2807/BAL
ZCFR
       1016*STW     1040/B      1046/BAL    1052/BAL    1067/BAL    1073/BAL    1080/BAL
       1083/BAL     1089/BAL    1092/BAL
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        3086/STW        3144/ZFMW       3147/ZFMW       3765/STW        3766/STW        3768/STW        3770/STW
        3786/ZFMW       3904/STB        3909/STB        3919/STW        3928/ZFMW       4029/STW        4032/STW
        4038/ZFMW       4139/STW        4294/STW        4297/STW        4300/STW        4302/STW        4305/STW
        4306/STW        4317/ZFMW
ZDMP10
        1515*LW         1553/BCS
ZDMP20
        1527*LW         1561/BCS        1578/BCS
ZDMP22
        1534*LW         1564/BCS
ZDMP24
        1497/STCF       1548*STB        1558/B          1576/BCS        1579/B
ZDMP30
        1529/BCR        1555*CI
ZDMP40
        1531/BCR        1566*BAL
ZDMP50
        1552/BAL        1560/BAL        1577/BAL        1580*LW
ZDMP70
        1548/STB        1549/LW         1584*ZFMW
ZDS
         510/ZFMW        580*ZFBT
ZDSFLG
         302*EQU         518/STW         604/MTW         610/STW         628/STW         848/MTW         981/MTW
        1282/MTW        1899/STW
ZDSLNK
         292*EQU         601/STW         613/B*          617/STW         633/B*
ZDSPTR
         293*EQU         607/STW         631/LW
ZDSSET
         508/BAL         611/LI          617*STW
ZDSSET10
         620/BCR         628*STW
ZDSTRN
         503/BAL         580/ZFBT        601*STW
ZDTB
        1060/BAL        1292*XW
ZDTB10
        1294/AND        1310*DATA
ZDTB20
        1299/AND        1311*DATA
ZEMS
        1472/CW         1501/AND        1507/CW         1863*DATA       1866/LW         1868/STW        1884/LW
        1888/LW
ZEQ
         586*ZFBT
ZEQLNK
         276*EQU         673/STW         692/B*
ZEQTRN
         586/ZFBT        673*STW
ZEQTRN10
         678/BCR         682/BCR         686*LI          689/BCR
ZEQTRN20
         684/BCR         690*BIR
ZEXADR
         526/LW          986/LW          1875/AW         1900/LW         4588*EQU        4589/DATA
ZEXPT0
         606/LW          624/LW*         658/LW          661/STW*        702/STW*        707/LW          727/STW*
         756/STW*        760/STW*        802/LW          813/BR          844/STW*        845/LB*         855/STB*
         875/STB*        892/LB*         896/LH*         936/LR*         939/STB*        984/STW*        987/CW
        1001/LW         1182/LB*        1185/AW         1190/STW        1220/LB*        1233/LB*        1247/STB*
        1701/LW*        1712/LB*        1738/LB*        1752/LR*        1795/STW        1831/STW        1839/LW
        1929*EQU        1930/EQU
ZEXPT1
         731/STW*        793/STW*        817/BR          889/LW          901/STW*        915/STW*        989/STW*
        1103/STW*       1105/LW*        1108/MTB*       1191/STW        1195/MTW        1196/LW         1223/LH*
        1225/STW*       1253/STW*       1691/LW*        1716/LH*        1718/LW         1741/MTW*       1742/LH*
        1743/CH*        1788/LW*        1794/LW*        1930*EQU        1931/EQU
ZEX00
        1009/B          1691*LW         1755/LI         1804/B          1811/B
ZEX01
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ZLKA8
        755/LI          1825*LI
ZLKPTR
        525/STW         1826/LW         1829/MTW        1830/LW*        1838/LW         1845/STW        1847/LW
       1851/STW*        1852/MTW        1883/STW        1923*EQU        1924/EQU
ZLKSET
       1756/B           1810/BAL        1838*LW
ZLP
        581*ZF8T
ZLPD
       1632/BCR         1636*STH
ZLPD10
       1642/BCR         1647*LB
ZLPLNK
        278*EQU          699/STW         711/BCR*        713/B*
ZLPPR8
        701/LW          1780*ZFST2
ZLPTRN
        581/ZF8T         699*STW
ZLSTCH
        300*EQU          645/LW         1117/STW
ZMFRCW0
       1121/STH         1138/LI         1150*ZFCP
ZMFRCW1
       1133/STH         1151*ZFCP
ZMFRDA
        499/STH         1130/CH         1136/TI8*       1139*SI8        1141/TI8*       1170/CH         1422/STH
       1589/CH
ZMFRI8AD
        494/LW           823/CW         1876/STW        1926*EQU        1927/EQU
ZMFRI8F
       1125/BCR         1156*LI
ZMFRLNK
        297*EQU         1115/STW        1148/B*
ZMFRNBA
        497/STH         1006/STH        1119*CI         1124/SH         1135/STH        1163/STH        1424/STH
ZMFRTCBA
       1120/BCS         1145*LB
ZMFRX7
        496/STH         1005/LH         1102/LH         1118*LI         1134/AH         1147/MTW        1162/LH
       1423/LH
ZML1E
        273*EQU
ZML1F
        274*EQU
ZML10
        271*EQU         1644/STB        1658/STB        1666/STB
ZML14
        272*EQU
ZMPTWA
        623/BAL         1694/BAL        1712*LB
ZMS
        577*ZF8T         859/CB          860/BCR*        879/CB          880/BCR*        1173/B*
ZMSGKEY
       1433/STH         1609*CI
ZMSLNK
        277*EQU          657/STW         664/B*
ZMSTRN
        577/ZF8T         657*STW
ZNL
        532/LB          561/ZFMW        574*ZF8T        646/CB          649/CB
Z8PBEG
        570*EQU         579/EQU         596/EQU
Z8PLEN
        540/LI          551/LI          596*EQU
Z8PLN2
        579*EQU         925/LI
Z8PTBL
        541/LW          552/LW          595*EQU
Z8PTB2
        578*EQU         926/LW
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ZPCHK
        290*EQU         890/STW         933/SW
ZPCHK1
        291*EQU         891/STW         920/STW         932/LW
ZPCNT
        289*EQU         894/STW         897/SW          903/MTW
ZPC010
        489*BAL         511/B           1168/BCS        1171/BCR        1773/B          1904/B
ZPC020
        500*LW          509/B
ZPC030
        505/LI          508*BAL
ZPC050
        500/LW          510*ZFMW
ZPC200
        516*BAL         2028/ZFSAT
ZPC210
        507/B           532*LB
ZPC5
        950/BAL         1079*LI
ZPC6
        951/BAL         1088*LI
ZPC7
        952/BAL         1099*STW
ZPC7LNK
        296*EQU         1099/STW        1107/BCR*
ZPC7M
        895/STB         907/CB          922/CB          1101/STB        1106*CI
ZPD
        584*ZF8T
ZPDLNK
        281*EQU         741/STW         745/B*
ZPDTRN
        584/ZF8T        741*STW
ZPL
        575*ZF8T
ZPLLNK
        286*EQU         836/STW         869/B*
ZPLTRN
        573/ZF8T        574/ZF8T        575/ZF8T        576/ZF8T        583/ZF8T        720/BAL         834*MTW
        980/BAL
ZPLTRN20
        839/BCR         843*LW
ZPLTRN30
        849/BCS         870*LI
ZPMADR
        522/LW          773/LW          1849/CW         1879/STW        1924*EQU        1925/EQU
ZPMEN
        744/BAL         772*STW         808/B
ZPMEN10
        776*LW          809/BIR
ZPMEN20
        779/BCS         786*CI
ZPMEN30
        781/BCS         796*LI
ZPMEN40
        775/BCR         783/BCS         787/BCS         790/BCS         799/BCS         810*CI
ZPMLNK
        283*EQU         772/STW         795/B*          826/B*
ZPMPTR
        523/STW         774/SW          776/LW*         792/AND*        801/LW*         804/MTW         805/LW*
        807/STW*        819/STW*        821/LW          825/STW         1880/STW        1925*EQU        1926/EQU
ZPMRQ
        762/BAL         771*AI          997/BAL         1242/B
ZPRTYP
        914/EXU         945*BAL
ZPTY
        288*EQU         898/STW         902/LB*         916/MTW
ZRECOV
        490/LW          511*B
ZTN1
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        1706/B          1736*BAL
ZRETN1A
        1740/BCR        1745*BAL        1754/BCR        1780/ZFST2      1793/BCS        1796/B          1832/B
ZRETN2
        1707/B          1750*BAL
ZRP
         571*ZFBT        867/CB          868/BCR*
ZRPLNK
         279*EQU         719/STW         730/BCR*        733/B*
ZRPPRB
         726/LW         1787/ZFST2      1788*LW
ZRPTRN
         571/ZFBT        719*STW
ZSCIR
         489/BAL         516/BAL         618/BAL         627/BAL        1397*LI         1504/BAL        1602/BAL
        1693/BAL        1736/BAL        1750/BAL        1898/BAL
ZSMD
        1439*LI         2034/ZFSAT
ZSML
        1431*LW         2033/ZFSAT
ZSML40
         483/BAL        1165/BAL        1594*LCFI       1903/BAL
ZSNER
         557/B           647/BCS         687/B           725/BCR         785/B           824/BCS         842/B
         852/BCR         872/BCR         912/B           931/B           988/BCR         993/BCS        1000/BCS
        1157*BAL        1200/B          1265/B          1278/B          1285/B          1803/BCR        1828/BCR
        1850/BCS
ZSNERMW
        1164/LW         1174*ZFMW
ZSNMSG
        1159/STW        1161/STB        1166/LB         1174/ZFMW       1175*TEXT
ZSP
         573*ZFBT
ZSRADR
         843/LW         2076*EQU
ZSRBEG
        1959*EQU        2009/EQU
ZSRLEN
         679/LI          837/LI         2009*EQU
ZSRTBL
         681/CW          683/CW          688/CW          691/STW         838/CW         2008*EQU
ZSTCRC
        1213*STW        1692/BAL
ZSTPTR
         527/BAL         609/BAL         622/BAL         632/BAL         659/BAL        1002/BAL        1190*STW
        1214/BAL        1901/BAL
ZSUP
        1363*STW        1371/BIR        2810/BAL        2817/BAL
ZTEMP
        1293/STW        1297/AW         1298/STW        1302/AW         1303/STW        1306/AW         1307/STW
        1323/STW        1330/AWM        1335/BR         1336/STW        1354/LW         1364/STW        1372/LW
        1373/STW        1381/STW        1392/XW         1474/STW        1477/STW*       1478/MTW        1479/LW
        1931*EQU        1932/EQU        2801/LW
ZTEMP1
        1352/STB        1355/LW         1932*EQU        1933/EQU
ZTLHLT
         444/DATA        484*WAIT
ZTLMSG
         451/B           463/B           468/B           473/B          480*STW
ZTL40
         420/DATA        446*STCF
ZTL40M
         449/LW          450/LW          452*TEXT        480/STW         481/STW        482/LW
ZTL40M1
         457*TEXT        459/ZFMW
ZTL41
         424/DATA        461*LW
ZTL41M
         461/LW          462/LW          464*TEXT
ZTL43
         428/DATA        466*LW
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ZTL43M
466/LW 467/LW 469*TEXT
ZTL46
432/DATA 471*LW
ZTL46M
471/LW 472/LW 474*TEXT
ZTMNCR
501/BAL 531/BAL 663/BAL 1008/BAL 1588*LH
ZTRN10
520/LI 538*LI 559/BAL 560/B 629/LI
ZTRN100
530/LW 561*ZFMW 662/LW 1007/LW
ZTRN40
546/BCS 548/BCS 556*LI 587/ZFBT 588/ZFBT 589/ZFBT 590/ZFBT
591/ZFBT 592/ZFBT 593/ZFBT 594/ZFBT
ZTRN50
543/BCR 554/BCR 558*BAL 847/BCR
ZTRN60
506/STH 521/STH 559*BAL 612/STH 630/STH 858/LI 864/LI
878/LI 881/B 1172/LI
ZTLNK
298*EQU
ZTST1
703/BAL 856/BAL 1233*LB
ZTST1A
1237/BCS 1243*MTW
ZTST1AA
1239/BCR 1245*LI
ZTST1B
1244/BCS 1249*CI
ZTST1C
1253*STW
ZTST2
743/BAL 761/BAL 996/BAL 1260*MTW
ZTST2A
1241/BCS 1250/BCS 1261/BCR 1264*LI 1271/B
ZTST3
602/BAL 674/BAL 835/BCR 876/BAL 1235/BCR 1269*MTW
ZTST4
794/BAL 818/BAL 917/BAL 1195*MTW 1254/B
ZTST6
1275*MTW
ZTST7
700/BAL 721/BAL 742/BAL 754/BAL 1282*MTW
ZTW
1629/BCR 1635/BCR 1651*STH
ZTWLP
1454/BAL 1551/BAL 1599*BCR 1664/AND 4134/B
ZTWLPA
1636/STH 1650/B 1651/STH 1654/BCR 1671*SIB 1673/TIB* 1772/WIB*
ZTWLP0
1441/STH 1633*LI
ZTWLP01
1606/BCR 1611*STH
ZTWLP10
1618/STB 1638/LB 1645/STB 1646/LI 1653/LB 1665/MTB 1670/LI
1680*ZFCP
ZTWLP11
1621/STH 1622/AH 1623/STH 1624/STB 1637/LI 1647/LB 1649/MTB
1655/MTB 1662/LB 1676/AH 1677/STH 1682*DATA
ZTWLP12
1611/STH 1613/STB 1652/LI 1675/LW 1682/DATA 1684*ZFCP
ZTW10
1663/BCR 1669*LI
ZTYP
1491*LCFI 2037/ZFSAT
ZT40
418*DATA 1908/XPSD
ZT41
376/XPSD 422*DATA

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        378/XPSD        426=DATA
Z?46
        381/XPSD        430=DATA
ZUDFPM
        287=EQU         517/STW         800/MTW         815/MTW         999/MTW
$
        504/B           544/BIR         555/BIR         570/EQU         578/EQU         579/EQU         595/EQU
        596/EQU         605/BCS         626/B           650/BCS         685/BIR         690/BIR         706/BCR
        811/BCS         814/B           840/BIR         923/BCS         929/BIR         995/BCR        1025/BCS
       1027/BCS        1109/B          1127/BCS        1131/BCS        1137/BCS        1140/BCS        1144/BCS
       1150/ZFCP       1208/B          1350/BCS        1368/BCS        1385/BCR        1387/BCR        1390/BIR
       1503/BIR        1508/BCR        1511/BCR        1556/BCR        1572/BIR        1620/BCR        1639/BCS
       1648/BCS        1660/BDR        1668/BDR        1672/BCS        1674/BCS        1715/BCR        1720/BCR
       1726/BCS        1730/BIR        1842/BCS        1844/BCS        1897/BIR        1959/EQU        2008/EQU
       2009/EQU        2076/EQU        2117/BIR        2119/BCR        2124/B          2127/BCS        2194/BCR
       2221/BEZ        2225/BCS        2227/B          2231/BIR        2235/BCS        2236/B          2240/BE
       2242/B          2264/BCR        2266/BIR        2270/BCR        2273/B          2304/BCS        2354/B
       2360/BCS        2361/BIR        2400/BCR        2410/BDR        2428/BDR        2450/BCR        2478/BCS
       2482/BCR        2484/B          2510/BIR        2516/BIR        2528/BCS        2531/BCR        2568/BCS
       2570/B          2572/B          2575/BCS        2599/BIR        2602/BCR        2626/BIR        2640/BCR
       2643/BCR        2651/BIR        2659/BIR        2663/BIR        2689/BIR        2755/BCR        2794/BCR
       2797/B          2802/B          2809/BCR        2816/BCR        2818/B          2825/BCR        2852/BEZ
       2854/BGE        2860/BNEZ       2862/B          2866/BIR        2876/BGZ        2884/BL         2892/BEZ
       2894/B          2900/BIR        2920/BCS        2923/BCS        2933/B          2966/B          2981/BEZ
       2984/BEZ        2988/BCR        2991/BCR        2994/BCR        2997/BCR        3000/BCR        3003/BCR
       3007/BCS        3009/BCR        3013/BCS        3015/BCR        3019/BCS        3021/BCR        3039/BCR
       3040/B          3042/BCR        3044/B          3058/BIR        3071/BIR        3091/BCR        3096/BCS
       3098/BCR        3103/BCS        3105/BCR        3110/BCS        3112/BCR        3117/BCS        3119/BCR
       3124/BCS        3126/BCR        3130/BCR        3134/BCR        3138/BCR        3156/B          3162/BCR
       3251/BCR        3305/BCR        3309/BCS        3323/BCR        3330/BCR        3333/B          3336/BCR
       3338/B          3340/BCR        3346/BCS        3348/B          3408/BDR        3414/BDR        3418/BDR
       3422/BIR        3436/BIR        3455/BCR        3463/BEZ        3465/BIR        3486/BGE        3503/BIR
       3522/BCS        3527/BCS        3530/BCS        3535/BCR        3538/BCR        3542/BCR        3545/BCR
       3548/BCR        3553/BCR        3556/BCR        3559/BCR        3564/BCR        3567/BCR        3570/BCR
       3573/BCR        3576/B          3579/BCR        3586/BCR        3646/BCR        3653/BCR        3655/B
       3682/BCS        3717/BCS        3728/B          3741/BCS        3754/B          3841/BCR        3853/BCR
       3854/BCS        3855/B          3865/BCR        3871/B          3880/BIR        3900/BIR        3910/BIR
       3913/BCS        3915/B          3937/BCS        3948/B          3956/BCR        3966/BIOSP      3967/B
       3990/BNEZ       4033/BIR        4061/BCR        4086/BCR        4113/BCR        4140/BIR        4167/BCS
       4216/BIR        4220/BNEZ       4221/BIR        4224/BCR        4226/B          4232/BCS        4236/BIR
       4260/BCR        4295/BIR        4312/BEZ        4341/BCS        4345/BCR        4347/B          4372/BCS
       4403/BIR        4478/BNEZ       4486/B          4496/BCR        4497/BCS        4498/B          4513/BIR
       4529/BIR        4542/BEZ        4544/B          4588/EQU
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