

Model 330

Slot Saver III Controller

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216-T25-RR2-01

REVISION HISTORY		
ECO #	DATE	DESCRIPTION
0328	6/28/84	New ZETACO Cover

CUSTOMER SERVICE

Our warranty attests the quality of materials and workmanship in our products. If malfunction does occur, our service personnel will assist in any way possible. If the difficulty can not be eliminated by use of the following service instructions and technical advise is required, please phone the Custom Systems sales department (612-941-9480) giving the serial number, board name, model number, and problem description. You will be placed in contact with the appropriate technical assistance.

PRODUCT RETURN

Pre-return Checkout.

If controller malfunction is suspected, the use of test software is needed to determine if the controller is the problem and what in particular is wrong with the controller. The tests applicable to this board are listed on the next page of the manual. Please run the test sequence before considering product return.

Returned Material Authorization.

Before returning a product to Custom Systems for repair, please ask our sales secretary for a "Returned Material Authorization" number. Each product returned requires a separate RMA number. Use of this number in correspondence and on a tag attached to the product will ensure proper handling and avoid unnecessary delays.

Returned Material Information.

Information concerning the problem description, system configuration, diagnostic program name, revision level, and results, i.e., error program counter number should be included with the returning material. A form is provided for this information on the next page of the manual.

Packaging.

To safeguard your materials during shipment, please use packaging that is adequate to protect it from damage. Mark the box "Delicate Instrument" and indicate the RMA number(s) on the shipping label.

MATERIAL RETURN INFORMATION

All possible effort to test a suspected malfunctioning controller should be made before returning the controller to Custom Systems, Inc. for repair. This will: 1) Determine if in fact the board is defective (many boards returned for repair are not defective, causing the user unnecessary system down-time, paper work, and handling while proper testing would indicate the board is working properly). 2) Increase the speed and accuracy of a product's repair which is often dependent upon a complete understanding of the user checkout test results, problem characteristics, and the user system configuration. Checkout results for the Slot Saver III should be obtained by performing the following tests. (Include error program counter #'s and accumulator contents if applicable).

<u>TEST</u>	<u>RESULTS</u>
CSS C13	

Other tests performed:

Please allow our service department to do the best job possible by answering the following questions thoroughly and returning this sheet with the malfunctioning board.

1. Does the problem appear to be intermittent or heat sensitive? (If yes, explain).

2. What operating system are you running under? (AOS RDOS, DDOS, DTOS).

3. Describe the system configuration (i.e., peripherals, I/O controllers, model of computer, etc).

4. Has the controller been returned before? _____ Same problem? _____

To be filled out by CUSTOMER:

Model #: _____

Serial #: _____

RMA #: _____

Returned by: _____
(company name)

1.0 GENERAL DESCRIPTION

The Custom Systems Model 338 Synchronous Line Adapter is the equivalent of the Data General Model 4074. The Model 338 Synchronous/Bisynchronous Controller provides the required interface between a Data General computer and a synchronous data set (modem). The 338 is a single line interface, complete with all necessary modem control circuitry to interface full- or half-duplex auto-answer data sets.

2.0 OPERATION

The basic function of the 338 is to interface between the processor and the line, performing character assembly and disassembly into the serial bit stream. Assembled characters are passed to the processor on a program interrupt basis. One complete character of buffering is provided on both reception and transmission so that the program has a full character time to respond without losing input data or reducing transmission rate. SYN and DLE characters (or character sequences) are detected by the hardware on reception and inserted as needed on transmission. On reception, an I/O instruction reads a word containing a line number, a character, and control information. On transmission, an I/O instruction reads a line number indicating that a character has been transmitted; the program must respond by outputting a word containing the line number and the next character.

The transmission code structure (character size, SYN, and DLE characters) are selectable by the user under program control so that an installation can be reconfigured with no hardware change. The SLA enforces no control discipline; that is entirely up to the program.

The clock is provided for systems requiring an external clock for their modems or in the case that no modem is used. Square waves are available at 19.2K baud, 9600 baud, 4800 baud, 2400 baud, and 1200 baud. A pair of synchronous line adapters installed in computers up to a few hundred feet apart provide a data path not requiring a modem.

3.0 PROGRAMMING

A receiver indicator (RI) and a transmit indicator (TI) are associated with each line. The receiver indicator is set when a character has been assembled from the serial input stream; it is cleared under program control. The transmit indicator is set whenever the line unit circuitry has accepted a character for transmission and is ready to accept another. Since the transmitter circuitry includes double buffering, it is ready again quickly after accepting the first character following a long idle period. At maximum transmission rate, the transmit indicator is set once for each character output by the program, it is cleared under program control. The receive indicator is set once for each character received. Since the receiver is also double buffered, two interrupts can occur in quick succession.

The synchronous line adapter controller contains conventional DONE flags for interface to a NOVA line I/O bus. DONE is set if the input line has completely assembled a character ready for reading by the processor (some RI=1) or if the output line has transmitted a character and can accept new characters (some TI=1).

The DIA instruction, which reads input characters and line control information, also clears the receiver indicator. Upon issuance of DIAC AC, SLA, DONE will be cleared if indicators are 0.

The DOA AC, SLA instruction, which supplies a character for output enables the line for transmission and clears the transmit indicator. Transmission will not actually begin when the unit is used with modem until Clear-to-Send is raised. DOA or DOB will clear DONE.

The DOB AC, SLA instruction is also used to establish the transmission code characters. Character size must be established by I/O instruction; 6, 7 and 8 unit codes may be used, a character must be selected for line synchronization (SYN), and a character must be selected for use as DLE. The DLE character is significant in programming transparent mode binary synchronous communications (BSC)

as described below and in certain BSC control sequences. At the beginning of a block transmission, the receiver circuitry scans the incoming line for the SYN character for that line.

In BSC, transmission occurs in two modes, non-transparent and transparent. If accumulator bit 0 is set when a character (CHAR) is output to the SLA using the DOA instruction, a DLE will be inserted first, transmitting the sequence DLE, CHAR.

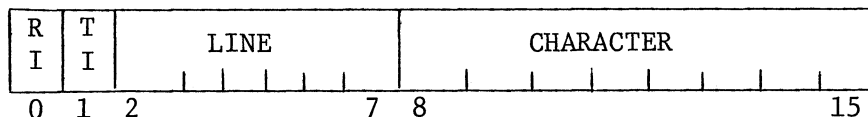
It is up to the program to place a series of SYN characters at the beginning of a block of characters, four to six are recommended, to insert whatever control characters are required, and to calculate and append whatever cyclic (or other) redundancy check characters that are necessary.

When two successive SYN characters have been seen, the receiver circuitry commences assembling the bit stream into characters. When the program decides that a block of data has been completed, a pair of DOB instructions are used to drop synchronization and re-enable scanning for the SYN characters at the beginning of the next block.

Synchronous line adapters also contain a conventional NOVA Busy flag. SLA BUSY is set whenever output is occurring. It clears when all characters awaiting transmission have been sent.

I/O Instructions

DIAC AC, SLA reads the following word:



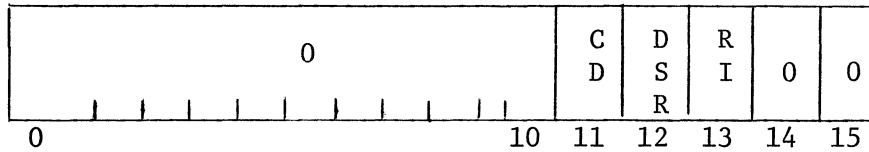
RI Receive Indicator--a character has been assembled and appears in bits 8-15, right justified. Both RI and TI may be set.

TI Transmit Indicator--a character previously sent to the transmitter has been accepted for transmission and a new character may be sent. Both RI and TI may be set; th program should service the receiver first as TI will stay up and cause a second interrupt.

LINE The line number to which the indicators apply (must be zero on Model 338).

CHARACTER The character just received on the indicated line if RI is set.

DIB AC, SLA reads the following word:

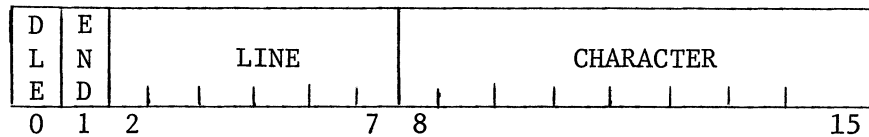


CD Carrier Detect

DSR Data Set Ready

RI Ring Indicator

DOA AC, SLA writes the following word:



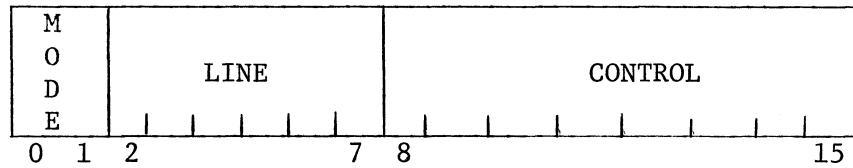
LINE The line number on which the character is to be transmitted and for which the transmit indicator is to be cleared (must be zero on Model 338).

DLE If one, transmit a DLE character before the data character and enter transparent mode.

END If one, leave transparent mode after transmitting the specified character.

CHARACTER The character to be sent on indicated line.

DOB AC, SLA performs the specified operation depending on mode selected.



Mode 00 Change transmitter status, clear TI, leave transparent mode, and effect the line according to the control field as follows:

CONTROL BIT	ACTION
12 (0)	Stop transmitting and drop Request to Send.
12 (1)	Stop transmitting and raise Request to Send.
13 (1)	Change character size according to bits 14, 15.
	<u>14 15</u>
	00 8 Bits
	01 7 Bits
	10 6 Bits
	11 5 Bits
13 (0)	Leave character size unchanged.

Mode 01 Change receiver status on the specified line according to the control field.

CONTROL BIT	ACTION
12 (0)	Drop receiver synchronization, disable receiver.
12 (1)	Enable receiver.
13 (0)	Drop data terminal ready.
13 (1)	Set data terminal ready.

- Mode 10 Set the DLE character on the selected line according to bits 8-15.
- Mode 11 Set the SYN character on the selected line according to bits 8-15.

NOTE: Loading of the SYN and DLE characters must be sequential with the loading of the SYN character first.

MODEM CABLE

(CANNON 25S)

<u>FUNCTION</u>	<u>BACKPANEL</u>	<u>MODEM</u>
1. TRANSMITTED DATA	A-69	2
2. RECEIVED DATA	A-71	3
3. REQUEST TO SEND	A-67	4
4. CLEAR TO SEND	A-75	5
5. DATA SET READY	A-61	6
6. GROUND	A-99	7
7. CARRIER DETECT	A-59	8
8. SERIAL CLOCK X'MTR	A-73	15
9. SERIAL CLOCK R'CVR	A-76	17
10. DATA TERMINAL READY	A-65	20
11. RING INDICATOR	A-63	22
12. EXTERNAL CLOCK	A-77	24


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01 ;*****
02 ; 901-030-03 ***** C55C13. SR *****
03 ; CUSTOM SYSTEMS INC. MINNEAPOLIS, MN.
04 ; TITLE - SYNCHRONOUS COMMUNICATIONS INTERFACE
05 ; DIAGNOSTIC AND RELIABILITY TEST
06 ; REVISION 00 12/19/79
07 ; REVISION 01 2/11/80 TEST A41
08 ; REVISION 02 9/30/80 TEST A07
09 ; REVISION 03 10/23/80 TEST A53
10 ;*****
11 ; .TITL C55C13
12 ; THIS PROGRAM PROVIDES BOTH A DIAGNOSTIC AND
13 ; A RELIABILITY TEST FOR THE MODEL 336
14 ; SYNCHRONOUS COMMUNICATIONS INTERFACE.
15 ;
16 ; THE DIAGNOSTIC PORTION OF THE PROGRAM ASSUMES
17 ; A MALFUNCTION MAY EXIST AND ASKS THE OPERATOR
18 ; TO ENTER SOME PARAMETERS. THE RELIABILITY
19 ; PORTION ASSUMES THAT THE SCI IS FUNCTIONING
20 ; PROPERLY AND THEREFORE PERFORMS ITS OWN
21 ; PARAMETER TESTS.
22 ;
23 ; WHERE POSSIBLE THE DIAGNOSTIC TESTS THE
24 ; HARDWARE GATE BY GATE. DUE TO THE COMPLEXITY
25 ; OF THE LOGIC AND THE FACT THAT A LOT OF
26 ; THE FUNCTIONS ARE PERFORMED WITHIN THE USART
27 ; CHIP, IT IS NOT POSSIBLE TO ISOLATE EVERY POSSIBLE
28 ; FAILURE VIA THE PROGRAM. IF THERE IS DIFFICULTY
29 ; IN LOCATING A FAILURE, IT IS SOMETIMES HELPFUL
30 ; TO SET THE CONSOLE SWITCH TO PROCEED FROM AN
31 ; ERROR LOOP AND GO THRU SEVERAL OR ALL ERROR
32 ; HALTS AS SOMETIMES MULTIPLE ERROR MESSAGES WILL
33 ; AID IN LOCATING THE FAILURE.
34 ;
35 ; THE RELIABILITY PORTION OF THE PROGRAM TRANSMITS
36 ; A SERIES OF PSEUDO-RANDOM DATA WORDS. THE
37 ; NUMBER OF WORDS TO BE SENT, THE NUMBER OF
38 ; BITS/CHARACTER AND THE MODE ARE ALL SELECTED
39 ; IN A RANDOM SEQUENCE.
40 ;
41 ;****MACHINE REQUIREMENTS
42 ; ANY NOVA(1) OR ECLIPSE(1) COMPUTER
43 ; 8K OF MEMORY
44 ; CONSOLE DEVICE
45 ; TEST PLUG
46 ; (1)NOVA AND ECLIPSE ARE REGISTERED TRADEMARKS
47 ; OF THE DATA GENERAL CORPORATION.
48 ;
49 ;****SWITCH SETTINGS
50 ; DIAGNOSTIC STARTING ADDRESS = 2
51 ; RELIABILITY STARTING ADDRESS = 4
52 ; DIAGNOSTIC ---
53 ; SW 0 = 1 PROCEED TO NEXT TEST FROM FAILURE LOOP
54 ; SW 1 = 1 INHIBIT PRINTING ON CONSOLE
55 ; SW 2 = 1 PRINT THE FAILURE RATE
56 ; RELIABILITY --
57 ; SW 0 = 1 PROCEED TO NEW DATA AFTER FAILURE.
58 ;
59 ;****RUNNING TIMES
60 ; BOTH PARTS OF THIS TEST WILL RUN UNTIL

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01 ; STOPPED MANUALLY. IF AN ERROR OCCURS IN
02 ; THE DIAGNOSTIC A SCOPE LOOP WILL BE
03 ; ENTERED BY PRESSING CONTINUE AFTER THE
04 ; ERROR HALT. THE ERROR CODE ADDRESS WILL
05 ; THEN BE PRINTED ON THE CONSOLE. SINCE IN
06 ; MANY CASES THE SUBTESTS HAVE MULTIPLE
07 ; ERROR HALTS, THE FAILING PERCENTAGE IS
08 ; NOT CALCULATED, RATHER THE NUMBER OF
09 ; ERRORS OCCURING IN "N" PASSES THROUGH
10 ; THE LOOP WILL BE PRINTED IF SW 0 = 0
11 ; AND SW 2 = 1.
12 ;
13 ;*****TEST PLUG
14 ; A WRAP AROUND TEST PLUG MUST BE INSTALLED
15 ; TO EXECUTE THIS PROGRAM. THE TEST PLUG
16 ; CONNECTS TOGETHER ALL NECESSARY SIGNALS
17 ; WHICH PERMIT THE SCA TO COMMUNICATE
18 ; WITH ITSELF THUS SIMULATING A
19 ; COMMUNICATIONS ENVIRONMENT.
20 ; SINCE A TEST PLUG SEEMS TO ALWAYS GET
21 ; LOST, THE NECESSARY INFORMATION TO PRODUCE
22 ; ANOTHER ONE IS PROVIDED.
23 ; CONNECT A 25 PIN PLUG AS FOLLOWS
24 ; 2 TO 3 RCV DATA TO XMT DATA A71-A69
25 ; 15 TO 17 TO 24 RCV-XMT-INTERNAL CLOCK A76-A73-A77
26 ; 4 TO 6 TO 8 RTS-DSR-CO A67-A61-A59
27 ; 20 TO 22 DTR-RI A65-A63
28 ; THE EQUIVALENT CONNECTIONS MAY ALSO BE
29 ; MADE ON THE BACKPLANE IF DESIRED HOWEVER
30 ; A 25 PIN CONNECTOR PLACED AT THE END OF
31 ; THE MODEM CABLE IS RECOMMENDED.
32 ;
33 000000 .LOC 0
34 00000 063077 HALT
35 00001 004056 INTERRUPT
36 00002 002216 JMP @XFOO ;START OF THE DIAGNOSTIC
37 00003 000004 JMP .+1
38 00004 002076 JMP @RELST ;START OF RELIABILITY
39 00005 000045 .LOC 45
40 00045 000046 EGGS
41 00046 000000 EGGS: 0 ;HEN FLAG
42 00047 000000 0 ;DEVICE CODE THIS RUN
43 00050 000001 1 ;SWITCH
44 00051 000000 0 ;# OF PASSES THIS RUN
45 00052 000000 0 ;RETURN ADDR THIS RUN
46 000020 IDX0=20
47 00053 000000 GPCTR: 0
48 00054 000000 ICTR: 0
49 00055 000000 HIRET: 0
50 00056 000000 HICT: 0
51 00057 000000 .100MS: 0
52 00060 000000 ALIN: 0
53 00061 000000 LINUM: 0
54 00062 000000 FLTSW: 0
55 00063 000000 ERRET: 0
56 00064 000000 STRET: 0
57 00065 000000 RADRET: 0
58 00066 000000 TCTR: 0
59 00067 004056 IINT: INTER
60 00070 004131 TINT: TINTR

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0003 CS501
01 00071 123456 RANDOM: 123456
02 00072 123456 CONST: 123456
03 00073 006101 AREC: RCVB0-1
04 00074 005501 AXMT: XMTB0-1
05 00075 007602 APEND: PRGEND
06 00076 003065 RELST: ..STB
07 00077 003463 ..INR: WLUP1+2
08 00100 003746 ACL: CKLIN
09 00101 004447 .GET
10 006101 GET=JSR @ -1
11 00102 004454 .PUT
12 006102 PUT=JSR @ -1
13 00103 005126 CRLF
14 006103 PCRLF=JSR @ -1
15 00104 004764 MESS
16 006104 MESSAGE=JSR @ -1
17 00105 005007 ZOCT
18 006105 TYP21=JSR @ -1
19 00106 005013 PDEC
20 006106 TYPDEC=JSR @ -1
21 00107 002703 GOGO
22 006107 SETLINE=JSR @ -1
23 00110 002734 HIT1
24 006110 STRTLINE=JSR @ -1
25 00111 002763 HIT2
26 006111 STRTSYN=JSR @ -1
27 00112 005010 POCT
28 006112 TYPAC1=JSR @ -1
29 00113 004732 RAN
30 006113 RAND=JSR @ -1
31 00114 004720 MULT
32 006114 MUL12=JSR @ -1
33 00115 004704 DIVID
34 006115 DIV012=JSR @ -1
35 00116 003017 HIT3
36 006116 TITST=JSR @ -1
37 00117 003023 HIT4
38 006117 RITST=JSR @ -1
39 00120 003027 HIT5
40 006120 RECOFF=JSR @ -1
41 00121 003034 HIT6
42 006121 RECON=JSR @ -1
43 00122 003043 RTIME
44 006122 TIMIT=JSR @ -1
45 00123 004630 ERR
46 006123 EHALT=JSR @ -1
47 00124 003057 LINIT
48 006124 LINCH=JSR @ -1
49 00125 002064 MODIR
50 006125 DLEMOD=JSR @ -1
51 00126 004423 INT5
52 006126 FILUM=JSR @ -1
53 00127 004157 .GET1
54 006127 GETONE=JSR @ -1
55 00130 004201 .BUMP
56 006130 BUMPIT=JSR @ -1
57 00131 004221 .STRT
58 006131 STRTI=JSR @ -1
59 00132 004230 FIL1
60 006132 FILIT=JSR @ -1

0004 CSSCI

01 00133 004556 CYCLE
02 006133 LOOP=JSR @ -1
03 00134 004541 ENTER
04 006134 SETUP=JSR @ -1
05 00135 003664 DLY
06 006135 PAUSE=JSR @ -1
07 000030 SLA=30
08 000071 SYST1=71
09 00136 000320 SYNWD: 320
10 00137 000000 .. RET: 0
11 00140 000300 DLEWD: 300
12 00141 000000 TEMP: 0
13 00142 000000 CKLRET: 0
14 00143 100001 CX1: 100001
15 00144 100002 CX2: 100002
16 00145 100003 CX3: 100003
17 00146 000000 CT?R: 0
18 00147 000030 DEVICE: SLA
19 00150 000000 DEVRET: 0
20 00151 000000 ERRSW: 0
21 00152 000451 FIRST: 000
22 00153 000004 HOW: 4
23 00154 004375 IADIG: ASSDIG
24 00155 004320 IDCODE: DCODE
25 00156 004461 IDVCD: DEVCD
26 00157 004247 IPRIN: PRIN
27 00160 007502 IRTAB: RTAB
28 00161 003166 TSTUP: STUP
29 00162 007402 ITTAB: TTAB
30 00163 004311 LAST: CDDA+1
31 00164 000000 LINE1: 0
32 00165 000000 LINE2: 0
33 00166 000000 LINES: 0
34 00167 000000 LIN1: 0
35 00170 000000 LIN2: 0
36 00171 000000 LN1CT: 0
37 00172 000000 LN2CT: 0
38 00173 000000 MCTR: 0
39 00174 000000 MSAV: 0
40 00175 000004 NCHR: .BLK 4
41 00201 000000 PRSW: 0
42 00202 000000 PRET: 0
43 00203 000000 SAV0: 0
44 00204 000000 SAV1: 0
45 00205 000000 SAV2: 0
46 00206 000001 SNGSW: 1 ;
47 00207 000001 SGLIN: 1 ;
48 00210 004526 TIME: DELAY
49 00211 000000 TIMEX: 0
50 00212 000000 TINRET: 0
51 00213 000001 TRNSW: 1
52 00214 000001 WHAT: 1
53 00215 177400 WHICH: 177400
54 00216 000440 XFOO: BEGIN
55 00217 000000 XORDEV: 0
56 00220 000030 K30: 30
57 00221 000031 K31: 31
58 00222 000070 K70: 70
59 00223 000071 K71: 71
60 00224 177000 M1000: -1000

0005 CSSCI

01	00225	177700	M100:	-100
02	00226	177720	M60:	-60
03	00227	177760	M20:	-20
04	00230	000002	C2:	2
05	00231	000003	C3:	3
06	00232	000004	C4:	4
07	00233	000005	C5:	5
08	00234	000006	C6:	6
09	00235	000007	C7:	7
10	00236	000010	C8:	8
11	00237	000010	C10:	10
12	00240	000012	C10:	10
13	00241	000012	C12:	12
14	00242	000014	C14:	14
15	00243	000015	C15:	15
16	00244	000016	C16:	16
17	00245	000020	C20:	20
18	00246	000024	C20:	20
19	00247	000025	C21:	21
20	00250	000030	C24:	24
21	00251	000034	C28:	28
22	00252	000030	C30:	30
23	00253	000037	C37:	37
24	00254	000040	C40:	40
25	00255	000060	C60:	60
26	00256	000072	C72:	72
27	00257	000077	C77:	77
28	00260	000100	C100:	100
29	00261	000177	C177:	177
30	00262	000200	C200:	200
31	00263	000212	C212:	212
32	00264	000215	C215:	215
33	00265	000300	C300:	300
34	00266	000320	C320:	320
35	00267	000377	C377:	377
36	00270	000400	C400:	400
37	00271	001000	C1000:	1000
38	00272	001750	C1K:	1000
39	00273	005400	C54H:	5400
40	00274	007777	C7777:	7777
41	00275	040000	CB1:	40000
42	00276	100000	C100K:	100000
43	00277	140000	C1400:	140000
44	00300	017400	C174H:	17400
45	00301	037400	C374H:	37400
46	00302	000000	MUL1:	0
47	00303	000400	FLT1:	400
48	00304	000200	FLT12:	200
49	00305	000000	TRET:	0
50	00306	000144	ITR:	144
51	00307	000000	LINS:	0
52	00310	000000	RPTSW:	0
53	00311	000000	RECWD:	0
54	00312	000000	SNDWD:	0
55	00313	000000	TEMP0:	0
56	00314	000000	TEMP1:	0
57	00315	000000	TEMP2:	0
58	00316	000000	TEMP3:	0
59	00317	000000	TEMP4:	0
60	00320	000000	TEMP5:	0

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0006 C5501
01 00321 000000 TEMP6: 0
02 00322 000000 TEMP7: 0
03 00323 000212 DAT0: 212
04 00324 000000 ITSW: 0
05 00325 003651 IRST: RST
06 00326 102440 HERE: SUB0 0,0
07 00327 030047 LDA 2,EGGS+1
08 00330 024147 LDA 1,DEVICE
09 00331 132435 SUBZ# 1,2,SNR
10 00332 002076 JMP @RELST
11 00333 050147 STA 2,DEVICE
12 00334 006156 JSR @IDVCD
13 00335 002076 JMP @RELST
14 00336 000003 SYOCT: 3 ;MAX SYNC COUNT
15 00337 000003 MAXSC: 3 ;MAX SYNC COUNT
16 00340 000000 RCYND: 0 ;SUPPOSED RECEIVE WORD
17 ;START OF THE DIAGNOSTIC PROGRAM
18 000440 .LOC 440
19 00440 060477 BEGIN: READS 0
20 00441 101100 MOVL 0,0
21 00442 020214 LDA 0,WHAT
22 00443 101067 MOVC 0,0,5BN
23 00444 006155 JSR @IDCODE
24 00445 020164 LDA 0,LINE1
25 00446 040061 STA 0,LINUM
26 00447 101300 MOVS 0,0
27 00450 040307 STA 0,LINS
28 00451 024240 A00: LDA 1,C10.
29 00452 044306 STA 1,ITR
30 00453 006134 A00A: SETUP ;THE I/O RESET IN SETUP
31 00454 063700 SKPDZ 0 ;SHOULD CLEAR ALL DONE
32 00455 006123 EHALLT ;FLAGS. CHECK SELD LINE (A00)
33 00456 006133 LOOP ;IN THE SLA INTERFACE.
34 00457 006134 A01: SETUP ;I/O RESET IN SETUP SHOULD
35 00460 063500 SKPBZ 0 ;CLEAR ALL BUSY FLAGS.
36 00461 006123 EHALLT ;CHECK SELB LINE (A02) IN
37 00462 006133 LOOP ;SLA INTERFACE.
38 00463 006134 A02: SETUP ;THE I/O RESET SHOULD CLEAR
39 00464 126520 SUBZL 1,1 ;ALL DONE FLAGS. THE MSKO
40 00465 125120 MOVZL 1,1 ;SHOULD MAKE INT ENABLE NOT
41 00466 066077 MSKO 1 ;TRUE. CHECK INTR LINE
42 00467 063577 SKPBZ CPU ;(B29) IN THE SLA INTERFACE.
43 00470 006123 EHALLT
44 00471 006133 LOOP
45 00472 006134 A03: SETUP ;THE SLA DONE FLOP SHOULD
46 00473 063730 SKPDZ SLA ;BE CLEARED. CHECK FLOP AND INPUTS.
47 00474 006123 EHALLT ;CHECK O. C. GATE TO PRODUCE
48 00475 006133 LOOP ;SELD (A00).
49 00476 006134 A04: SETUP ;THE SLA X-ON FLOPS SHOULD
50 00477 063530 SKPBZ SLA ;BE CLEARED. CHECK FLOPS
51 00500 006123 EHALLT ;CHECK O. C. GATE TO PRODUCE
52 00501 006133 LOOP ;SELB (A02).
53 00502 102620 SUBZR 0,0
54 00503 040001 STA 0,1 ;SET RETURN ADDR FOR INTERRUPT
55 00504 006134 A05: SETUP ;THE I/O RESET SHOULD CLEAR
56 00505 060177 NIOS CPU
57 00506 000401 JMP .+1
58 00507 063477 SKPBN CPU ;THE DONE FLAGS, AND INT ENABLE.
59 00510 006123 EHALLT ;CHECK DONE FLOPS AND O. C.
60 00511 006133 LOOP ;GATES TO PRODUCE INTR.

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0007 CSSCI

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01 00512 006134 A06:  SETUP                ;NOTHING HAS BEEN DONE
02 00513 006135      PAUSE
03 00514 064630      DIAC      1, SLA          ;A DIA SHOULD RETURN A
04 00515 020215      LDA      0, WHICH      ;
05 00516 107400      AND      0, 1          ;
06 00517 125004      MOV      1, 1, SZR      ;ZERO WORD.
07 00520 006123      EHALT                ;
08 00521 006133      LOOP
09 00522 020207      LDA      0, SNGLINE
10 00523 101005      MOV      0, 0, SNR
11 00524 000414      JMP      A08
12 00525 006134 A07:  SETUP                ;NOTHING HAS BEEN DONE
13 00526 126400      SUB      1, 1
14 00527 066030      DOB      1, SLA          ;FIRST UNDO WHAT SETUP DID TO US
15 00530 024275      LDA      1, CB1          ;DROP THE DTR
16 00531 066030      DOB      1, SLA
17 00532 006135      PAUSE
18 00533 006135      PAUSE
19 00534 065430      DIB      1, SLA          ;A DIB SHOULD RETURN ALL ZEROS.
20 00535 125004      MOV      1, 1, SZR      ;DATIB AND SLA SELECT
21 00536 006123      EHALT                ;CAUSED DATA 11, 12, OR 13 TO
22 00537 006133      LOOP                ;GO HIGH WITHOUT OTHER INPUTS?
23                ;  IN THE FOLLOWING TESTS OF THE BUSY FLAG, THE FOLLOWING
24                ;  CONDITIONS MUST BE TRUE IF SELB IS TO BE A ONE.
25                ;  BOTH INPUTS TO THE O. C. AND GATE MUST BE ONE. THESE ARE
26                ;  THE ONE OUTPUT OF THE X-ON FLOP, AND THE SLA
27                ;  SELECT SIGNAL.
28                ;  FOR THE X-ON FLOP TO BE SET TO ONE, BOTH THE DOA SLA
29                ;  AND THE UNITY INPUTS TO THE AND GATE FEEDING
30                ;  THE SET INPUT TO THE X-ON FLOP MUST BE
31                ;  A ONE.
32                ;  THE DOA SLA SIGNAL WILL ONLY BE A ONE IF (DATOR) (CARD
33                ;  SELECT) (SLA SELECT) ARE ALL ONES.
34                ;  THE SLA SELECT SIGNAL COMES FROM
35                ;  THE STANDARD TYPE OF DEVICE CODE DECODING
36                ;  MATRIX.
37                ;  EITHER IORST OR A DOB MODE 0 CMD SHOULD CLR
38                ;  THE X-ON FLOP AND SELB. CLRING
39                ;  THE X-ON FLOP SHOULD CLEAR THE T. I.
40                ;  FLOP.
41 00540 006134 A08:  SETUP                ;A DOA CMD SHOULD SET THE X-ON
42 00541 020307      LDA      0, LINS          ;FLOP AND THEREFORE SELB.
43 00542 061030      DOA      0, SLA          ;IORST SHOULD CLEAR BOTH.
44 00543 006210      JSR      @TIME
45 00544 063430      SKPBN  SLA
46 00545 101002      MOV      0, 0, SZC
47 00546 006123      EHALT
48 00547 062677      IORST
49 00550 063530      SKPBZ  SLA
50 00551 006123      EHALT
51 00552 006133      LOOP
52 00553 006134 A09:  SETUP                ;SELB SHOULD NOT RESPOND W/O
53 00554 020307      LDA      0, LINS          ;SLA SELECT
54 00555 061030      DOA      0, SLA
55 00556 063500      SKPBZ  0
56 00557 006123      EHALT
57 00560 006133      LOOP
58 00561 006134 A11:  SETUP                ;DOA SHOULD SET X-ON AND SELB
59 00562 020307      LDA      0, LINS          ;DOB MODE 0 SHOULD CLR BOTH.
60 00563 061030      DOA      0, SLA

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0000 CSSCI
01 00564 063430      SKPBN  SLA
02 00565 006123      EHALT
03 00566 062030      DOB    0, SLA
04 00567 063530      SKPBN  SLA
05 00570 006123      EHALT
06 00571 006133      LOOP
07 00572 006134 A12:  SETUP                ;A DOB MODE 0 W/O SLA SELECT
08 00573 020307      LDA     0, LINS        ; SHOULD HAVE NO EFFECT.
09 00574 061030      DOR    0, SLA
10 00575 063430      SKPBN  SLA
11 00576 006123      EHALT
12 00577 062000      DOB    0, 0
13 00600 063430      SKPBN  SLA
14 00601 006123      EHALT
15 00602 006133      LOOP
16 00603 020207      LDA     0, SNGLINE
17 00604 101004      MOV    0, 0, SZR
18 00605 000427      JMP    A14
19 00606 020271      LDA     0, C1000
20 00607 040217      STA     0, XORDEV
21 00610 006134 A13:  SETUP                ;TEST (DOB MODE0)(UNITX) AND GATE
22 00611 020307      LDA     0, LINS        ;UNITX INPUT
23 00612 061030      DOR    0, SLA
24 00613 024217      LDA     1, XORDEV
25 00614 131000      MOV    1, 2
26 00615 113520      ANDZL  0, 2
27 00616 107000      ADD    0, 1
28 00617 146400      SUB    2, 1
29 00620 063430      SKPBN  SLA
30 00621 006123      EHALT                ;BUSY FAILED TO SET
31 00622 066030      DOB    1, SLA
32 00623 063430      SKPBN  SLA
33 00624 006123      EHALT                ;DOB WITH WRONG UNIT CLRED BUSY
34 00625 006133      LOOP
35 00626 020217      LDA     0, XORDEV
36 00627 101300      MOVS   0, 0
37 00630 101225      MOVZR  0, 0, SNR
38 00631 000403      JMP    A14
39 00632 101300      MOVS   0, 0
40 00633 000754      JMP    A13-1
41 00634 006134 A14:  SETUP                ;DOR SETS SELB AND X-ON
42 00635 020307      LDA     0, LINS        ;DOB MODE 1, 2, AND 3 SHOULD HAVE
43 00636 061030      DOR    0, SLA        ;NO EFFECT
44 00637 063430      SKPBN  SLA
45 00640 000777      JMP    -1
46 00641 126620      SUBZR  1, 1
47 00642 107000      ADD    0, 1
48 00643 066030      DOB    1, SLA
49 00644 063430      SKPBN  SLA
50 00645 006123      EHALT
51 00646 024275      LDA     1, CB1
52 00647 107000      ADD    0, 1
53 00650 066030      DOB    1, SLA
54 00651 063430      SKPBN  SLA
55 00652 006123      EHALT
56 00653 024277      LDA     1, C1400
57 00654 107000      ADD    0, 1
58 00655 066030      DOB    1, SLA
59 00656 063430      SKPBN  SLA
60 00657 006123      EHALT

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0009 CSSCI

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01 00660 006133      LOOP
02 00661 020320      LDA      0, 320
03 00662 040136      STA      0, SYNMD
04 00663 020265      LDA      0, C300
05 00664 040140      STA      0, DLEWD
06 00665 020232      LDA      0, C4
07 00666 040153      STA      0, HOW
08 00667 006107      SETLINE
09 00670 020254      LDA      0, C40
10 00671 040217      STA      0, XORDEV
11 00672 006134 A15:  SETUP      ;SLA SELECT SHOULD ONLY BE TRUE FOR
12 00673 020307      LDA      0, LINS      ;THE PROPER DEVICE CODE.
13 00674 061030      DOB      0, SLA
14 00675 020417      LDA      0, CDOB
15 00676 024217      LDA      1, XORDEV
16 00677 131000      MOV      1, 2
17 00700 113520      ANDZL   0, 2
18 00701 107000      ADD      0, 1
19 00702 146400      SUB      2, 1
20 00703 044401      STA      1, +1
21 00704 000000      0
22 00705 063430      SKPBN   SLA
23 00706 006123      EHALT
24 00707 006133      LOOP
25 00710 020217      LDA      0, XORDEV
26 00711 101224      MOVZR   0, 0, SZR
27 00712 000757      JMP      A15-1
28 00713 000402      JMP      , +2
29 00714 062030 CDOB:  DOB      0, SLA
30 00715 020206      LDA      0, SNGSN      ;SET ALL UNUSED LINES TO 6 BITS/CHAR.
31 00716 101004      MOV      0, 0, SZR      ;SET LUT TO 8 BITS/CHAR.
32 00717 000427      JMP      A15A
33 00720 024220      LDA      1, K30
34 00721 044140      STA      1, DLEWD
35 00722 024221      LDA      1, K31
36 00723 044136      STA      1, SYNMD
37 00724 020307      LDA      0, LINS
38 00725 040313      STA      0, TEMP0
39 00726 020164      LDA      0, LINE1
40 00727 040061      STA      0, LINUM
41 00730 101300      MOVS    0, 0
42 00731 040307      STA      0, LINS
43 00732 020234      LDA      0, C6
44 00733 040153      STA      0, HOW
45 00734 006107      SETLINE
46 00735 006124      LINCH
47 00736 020061      LDA      0, LINUM
48 00737 024165      LDA      1, LINE2
49 00740 106434      SUBZ#   0, 1, SZR
50 00741 000773      JMP      , -5
51 00742 020313      LDA      0, TEMP0
52 00743 040307      STA      0, LINS
53 00744 101300      MOVS    0, 0
54 00745 040061      STA      0, LINUM
55 00746 020232 A15A:  LDA      0, C4
56 00747 040153      STA      0, HOW
57 00750 024265      LDA      1, C300
58 00751 044140      STA      1, DLEWD
59 00752 024266      LDA      1, C320
60 00753 044136      STA      1, SYNMD

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01 00754 006107 SETLINE
02 00755 006120 RECOFF
03 ; IN THE FOLLOWING TESTS OF THE DONE FLAG, THE
04 ; NECESSARY CONDITIONS FOR DONE TO SET ARE
05 ; AS FOLLOWS (THESE FIRST TESTS ARE DESIGNED
06 ; SO THAT R. I. WILL NOT SET.)
07 ; THE INPUTS TO THE SELD O.C. AND GATE ARE (SLA SELECT)
08 ; AND THE ONE SIDE OF THE DONE FLOP.
09 ; FOR THE DONE FLOP TO BE A ONE, THE D INPUT WHICH
10 ; IS THE OUTPUT OF AN (OR) OF THE ZERO SIDES
11 ; OF THE T. I. AND R. I. FLOPS INVERTED MUST
12 ; BE A ONE. THE CLK INPUT CALLED SYNC MUST HAVE
13 ; A POSITIVE GOING EDGE WHEN THE D INPUT IS
14 ; HIGH TO SET THE DONE FLOP.
15 ; FOR THE T. I. FLOP TO SET THE D INPUT MUST BE HIGH,
16 ; WHICH REQUIRES THAT EITHER SET T. I. FROM THE
17 ; XMIT ROM IS A ONE OR THAT THE FLOP IS ALREADY
18 ; SET. (THE FLOP IS ONLY CLEARED BY A DOA OR DOB
19 ; MODE 0 CMD.) THE CLK INPUT WHICH IS THE AND
20 ; OF (NOT CLK) (NOT XCLK) MUST HAVE A POSITIVE
21 ; TRANSITION WHEN THE D INPUT IS HIGH TO SET THE
22 ; FLOP.
23 ; THE XCLK INPUT IS THE MULTIPLEXED OUTPUT OF EITHER
24 ; THE QUAD LATCH OR 1. THE INPUT TO THE QUAD
25 ; LATCH IS THE INVERTED X-ON BUS CLOCKED IN
26 ; BY THE LATCH SIGNAL. IT IN TURN IS THE MUXED
27 ; OUTPUT OF THE X-ON FLOP OR THE XMIT CLK DETECT
28 ; FLOP. A LATCH TIME THE X-ON BUS IS THE OUT PUT
29 ; OF THE XMIT CLK DETECT FLOP.
30 ; FOR THE XMIT CLK DETECT FLOP TO SET, THE CLEAR TO
31 ; SEND INPUT A75 MUST BE HIGH FROM
32 ; THE MODEM, OR HELD HIGH BY BEING TIED TO +15V.
33 ; FOR THE SET T. I. OUTPUT OF THE XMIT ROM TO BE TRUE
34 ; RESET COUNT MUST BE A 1 AND THE INVERSE OF
35 ; (NEW CHAR BUS)(XSPARENT ON BUS)(--) MUST
36 ; ALSO BE A ONE. ((THIS STATEMENT IS ONLY TRUE
37 ; FOR THE FIRST SET T. I. AFTER THE XMITTER IS
38 ; STARTED. XSPARENT ON BUS IS ZERO AT THIS TIME.
39 ; WHILE THE NEW CHAR BUS IS ONE.))
40 ; FOR RESET COUNT TO BE A ONE, XCLK MUST BE A ONE
41 ; AND EITHER (A=B) OR (XSTATE1)(XSTATE2)
42 ; MUST BE ONE TO SET THE END CHAR FLOP TO
43 ; ONE. XSTATE1 AND XSTATE2 WILL BE ONE IF
44 ; THE LAST LOAD FROM THE XMIT ROM SET OUTPUTS
45 ; 5 AND 7 OF THE SHIFT REGISTER TO ONE (I. E. IF
46 ; NEWSTATE1 AND NEWSTATE2 WERE ONE). A=B WILL BE
47 ; ONE WHEN THE COUNTER FORMED BY THE SHIFT
48 ; REGISTER AND THE ALU HAVE COUNDED THROUGH
49 ; ONE CHARACTER TIME. XSTATE1=XSTATE2=1 IN
50 ; STATES 3 OR 7 WHEN THE TRANSMITTER HAS BEEN
51 ; OFF. A=B CAUSES THE END OF CHAR FLOP TO
52 ; SET OTHERWISE.
53 00756 006134 A16: SETUP ;START XMITTING, OUTPUT A CHAR.
54 00757 020307 LDA 0,LINS ;T. I. SHOULD SET CAUSING DONE TO SET
55 00760 061030 DOA 0,SLA
56 00761 006210 JSR @TIME
57 00762 063630 SKPDN SLA
58 00763 101002 MOV 0,0,SZC
59 00764 006123 EHALL
60 00765 006133 LOOP

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0011 CSSCI
01 00766 006134 A17:  SETUP                ; SELD RESPONDS W/O SLA SELECT
02 00767 020307      LDA      0, LINS          ; CHECK O. C. GATE TO FORM SELD
03 00770 061030      DOR      0, SLA
04 00771 006210      JSR      @TIME
05 00772 063600      SKPDN    0
06 00773 101003      MOV      0, 0, SNC
07 00774 006123      EHALLT
08 00775 006133      LOOP
09 00776 006134 A18:  SETUP                ; DONE SETTING SHOULD CAUSE AN INTR.
10 00777 060277      INTDS
11 01000 020307      LDA      0, LINS
12 01001 061030      DOR      0, SLA
13 01002 006210      JSR      @TIME
14 01003 063630      SKPDN    SLA
15 01004 060177      INTEN
16 01005 000401      JMP      . +1
17 01006 063577      SKPBZ   CPU
18 01007 006123      EHALLT
19 01010 006133      LOOP
20 01011 006134 A19:  SETUP                ; MSKO SHOULD BLOCK INTR.
21 01012 060277      INTDS
22 01013 020230      LDA      0, C2
23 01014 062077      MSKO    0
24 01015 060177      INTEN
25 01016 020307      LDA      0, LINS
26 01017 061030      DOR      0, SLA
27 01020 006210      JSR      @TIME
28 01021 063630      SKPDN    SLA
29 01022 063477      SKPBN   CPU
30 01023 006123      EHALLT
31 01024 006133      LOOP
32 01025 006134 A20:  SETUP                ; DONE SHOULD SET. IORST SHOULD
33 01026 020307      LDA      0, LINS          ; CLEAR DONE.
34 01027 061030      DOR      0, SLA
35 01030 006210      JSR      @TIME
36 01031 063630      SKPDN    SLA
37 01032 101002      MOV      0, 0, SZC
38 01033 006123      EHALLT
39 01034 062677      IORST
40 01035 063730      SKPDZ   SLA
41 01036 006123      EHALLT
42 01037 006133      LOOP
43 01040 006134 A21:  SETUP                ; DONE SHUD SET ANOTHER DOR SHUD CLR
44 01041 024307      LDA      1, LINS
45 01042 065030      DOR      1, SLA
46 01043 006210      JSR      @TIME
47 01044 063630      SKPDN    SLA
48 01045 101002      MOV      0, 0, SZC
49 01046 006123      EHALLT          ; DONE NEVER SET
50 01047 065030      DOR      1, SLA
51 01050 063730      SKPDZ   SLA
52 01051 006123      EHALLT          ; DONE SHOULD BE CLEARED
53 01052 006133      LOOP
54 01053 006134 A22:  SETUP                ; DONE SET WHEN XMIT STATE 5 FINISHED?
55 01054 024307      LDA      1, LINS
56 01055 065030      DOR      1, SLA
57 01056 006210      JSR      @TIME
58 01057 063630      SKPDN    SLA
59 01060 101002      MOV      0, 0, SZC
60 01061 006123      EHALLT

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0012 CSSCI
01 01062 065030      DOR      1, SLA
02 01063 006210      JSR      @TIME
03 01064 063630      SKPDN   SLA
04 01065 101002      MOV      0, 0, SZC
05 01066 006123      EHALT
06 01067 006133      LOOP
07 01070 006134 A23:  SETUP      ; TIME FOR 1ST DONE < TIME
08 01071 006135      PAUSE
09 01072 030307      LDA      2, LINS      ; FOR 2ND DONE? SHOULD BE IF
10 01073 071030      DOR      2, SLA      ; XSTATE1=XSTATE2=1 SET END CHAR
11 01074 006210      JSR      @TIME      ; FLOP FOR 1ST AND A=B SET IT FOR
12 01075 063630      SKPDN   SLA          ; SECOND
13 01076 101002      MOV      0, 0, SZC
14 01077 006123      EHALT
15 01100 040313      STA      0, TEMP0
16 01101 071030      DOR      2, SLA
17 01102 006210      JSR      @TIME
18 01103 063630      SKPDN   SLA
19 01104 101002      MOV      0, 0, SZC
20 01105 006123      EHALT      ; DONE NEVER SET
21 01106 024313      LDA      1, TEMP0
22 01107 106032      ADCZ#   0, 1, SZC
23 01110 006123      EHALT
24 01111 006133      LOOP
25 01112 006134 A24:  SETUP      ; TIME BETWEEN T. I. S. SHOULD BE
26 01113 030307      LDA      2, LINS      ; EQUAL AFTER THE FIRST ONE.
27 01114 071030      DOR      2, SLA
28 01115 006210      JSR      @TIME
29 01116 063630      SKPDN   SLA
30 01117 101002      MOV      0, 0, SZC
31 01120 006123      EHALT      ; DONE NEVER SET
32 01121 071030      DOR      2, SLA
33 01122 006210      JSR      @TIME
34 01123 063630      SKPDN   SLA
35 01124 105002      MOV      0, 1, SZC
36 01125 006123      EHALT      ; DONE NEVER SET
37 01126 071030      DOR      2, SLA
38 01127 006210      JSR      @TIME
39 01130 063630      SKPDN   SLA
40 01131 030246      LDA      2, C20.
41 01132 106423      SUBZ    0, 1, SNC
42 01133 124000      COM     1, 1
43 01134 132033      ADCZ#   1, 2, SNC
44 01135 006123      EHALT
45 01136 006133 LOOP
46 01137 006134 A25:  SETUP      ; DOES T. I. SET AFTER STATE 1?
47 01140 020230      LDA      0, C2
48 01141 040146      STA      0, CT?R
49 01142 024307      LDA      1, LINS
50 01143 065030      DOR      1, SLA
51 01144 006210      JSR      @TIME
52 01145 063630      SKPDN   SLA
53 01146 014146      DSZ     CT?R
54 01147 000774      JMP     .-4
55 01150 065030      DOR      1, SLA
56 01151 006210      JSR      @TIME
57 01152 063630      SKPDN   SLA
58 01153 101002      MOV      0, 0, SZC
59 01154 006123      EHALT
60 01155 006133      LOOP

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0013 CSSCI

01	01156	006134	A26:	SETUP		; T. I. SHOULD APPEAR ON THE DATA BUS
02	01157	020307		LDA	0, LINS	; TESTS T. I. AND ENABLE
03	01160	061030		DOR	0, SLA	
04	01161	006210		JSR	@TIME	
05	01162	063630		SKPDN	SLA	
06	01163	064630		DIAC	1, SLA	
07	01164	127133		ADDZL#	1, 1, SNC	
08	01165	006123		EHALT		
09	01166	006133		LOOP		
10	01167	006134	A27:	SETUP		; CORRECT LINE NO SHOULD BE ON
11	01170	020307		LDA	0, LINS	; DATA BUS WITH T. I.
12	01171	061030		DOR	0, SLA	
13	01172	006210		JSR	@TIME	
14	01173	063630		SKPDN	SLA	
15	01174	101002		MOV	0, 0, SZC	
16	01175	006123		EHALT		
17	01176	064630		DIAC	1, SLA	
18	01177	020301		LDA	0, C374H	
19	01200	107700		ANDS	0, 1	
20	01201	020061		LDA	0, LINUM	
21	01202	106434		SUBZ#	0, 1, SZR	
22	01203	006123		EHALT		
23	01204	006133		LOOP		
24	01205	020207		LDA	0, SNGLINE	
25	01206	101004		MOV	0, 0, SZR	
26	01207	000437		JMP	A20A	
27	01210	020230		LDA	0, C2	
28	01211	040306		STA	0, ITR	
29	01212	020433		LDA	0, C20K	
30	01213	040217		STA	0, XORDEV	
31	01214	006134	A27A:	SETUP		; TEST THAT THIS LINE DOES NOT
32	01215	020307		LDA	0, LINS	; RESPOND TO ANOTHER LINE CODE.
33	01216	024217		LDA	1, XORDEV	
34	01217	131000		MOV	1, 2	
35	01220	113520		ANDZL	0, 2	
36	01221	107000		ADD	0, 1	
37	01222	146400		SUB	2, 1	
38	01223	065030		DOR	1, SLA	
39	01224	006210		JSR	@TIME	
40	01225	063630		SKPDN	SLA	
41	01226	101002		MOV	0, 0, SZC	
42	01227	000407		JMP	A27A2	
43	01230	070630		DIAC	2, SLA	
44	01231	034301		LDA	3, C374H	
45	01232	173400		AND	3, 2	
46	01233	020307		LDA	0, LINS	
47	01234	112435		SUBZ#	0, 2, SNR	
48	01235	006123		EHALT		
49	01236	006133	A27A2:	LOOP		
50	01237	020217		LDA	0, XORDEV	
51	01240	101300		MOVS	0, 0	
52	01241	101225		MOVZR	0, 0, SNR	
53	01242	000404		JMP	A28A	
54	01243	101300		MOVS	0, 0	
55	01244	000747		JMP	A27A-1	
56	01245	020000	C20K:	20000		
57	01246	020240	A28A:	LDA	0, C10	
58	01247	040306		STA	0, ITR	
59	01250	020207		LDA	0, SNGLINE	
60	01251	101004		MOV	0, 0, SZR	

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0014 CS501
01 01252 000462      JMP      A29
02 01253 020061      LDA      0, LINUM
03 01254 105300      MOVS     0, 1
04 01255 044313      STA      1, TEMP0
05 01256 030164      LDA      2, LINE1
06 01257 112435      SUBZ#    0, 2, SNR
07 01260 000454      JMP      A29
08 01261 050061      STA      2, LINUM
09 01262 151300      MOVS     2, 2
10 01263 050307      STA      2, LINS
11 01264 006134 A28:  SETUP                      ;SEE IF PRI FOR LOWER NUMBERED
12 01265 030307      LDA      2, LINS                ;LINES BLOCKS HIGHER NUMBER LINES.
13 01266 071030      DOR      2, SLA
14 01267 020313      LDA      0, TEMP0
15 01270 112435      SUBZ#    0, 2, SNR
16 01271 000406      JMP      ,+6
17 01272 006210      JSR      @TIME
18 01273 060000      NIO      0
19 01274 020270      LDA      0, C400
20 01275 113000      ADD      0, 2
21 01276 000770      JMP      A28+2
22 01277 020164      LDA      0, LINE1
23 01300 101300      MOVS     0, 0
24 01301 040307      STA      0, LINS
25 01302 006210 A28Z:  JSR      @TIME
26 01303 063630      SKPDN    SLA
27 01304 064630      DIAC     1, SLA
28 01305 127133      ADDZL#   1, 1, SNC
29 01306 006123      EHALT                      ;FALSE DONE FLAG
30 01307 020307      LDA      0, LINS
31 01310 030301      LDA      2, C374H
32 01311 147400      AND      2, 1
33 01312 106434      SUBZ#    0, 1, SZR
34 01313 006123      EHALT                      ;FIRST RESPONSE SHOULD BE LINE0
35 01314 066030      DOB      1, SLA
36 01315 034270      LDA      3, C400
37 01316 163000      ADD      3, 0
38 01317 040307      STA      0, LINS
39 01320 034313      LDA      3, TEMP0
40 01321 136434      SUBZ#    1, 3, SZR                ;ALL LINS DONE?
41 01322 000760      JMP      A28Z
42 01323 024164      LDA      1, LINE1
43 01324 044061      STA      1, LINUM
44 01325 125300      MOVS     1, 1
45 01326 044307      STA      1, LINS
46 01327 006133      LOOP
47 01330 020313      LDA      0, TEMP0
48 01331 040307      STA      0, LINS
49 01332 101300      MOVS     0, 0
50 01333 040061      STA      0, LINUM
51 01334 006134 A29:  SETUP                      ;AFTER AN IO RESET INTR
52 01335 061477      INTR      0                      ;SHOULD READ BACK ALL ZEROS.
53 01336 101004      MOV      0, 0, SZR
54 01337 006123      EHALT
55 01340 006133      LOOP
56 01341 006134 A30:  SETUP                      ;SET TI AND DONE. AN INTR
57 01342 020307      LDA      0, LINS                ;SHOULD RETURN THE DEVICE CODE.
58 01343 061030      DOR      0, SLA
59 01344 006210      JSR      @TIME
60 01345 063630      SKPDN    SLA

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0015 C9501
01 01346 101002      MOV      0,0,SZC
02 01347 006123      EHALT                      ;DONE NEVER SET
03 01350 061477      INTA      0
04 01351 024147      LDA      1,DEVICE
05 01352 106434      SUBZ#    0,1,SZR
06 01353 006123      EHALT
07 01354 006133      LOOP
08 01355 006134 A31:  SETUP                      ;A MSKO WITH BIT 15 SET SHOULD
09 01356 126520      SUBZL    1,1
10 01357 066077      MSKO     1
11 01360 024307      LDA      1,LINS
12 01361 065030      DOR      1,SLA              ;NOT AFFECT INTA.
13 01362 006210      JSR      @TIME
14 01363 063630      SKPDN    SLA
15 01364 061477      INTA      0
16 01365 024147      LDA      1,DEVICE
17 01366 106434      SUBZ#    0,1,SZR
18 01367 006123      EHALT
19 01370 006133      LOOP
20 01371 006134 A32:  SETUP                      ;A MSKO WITH BIT 14 SET SHOULD
21 01372 126520      SUBZL    1,1
22 01373 125120      MOVZL    1,1
23 01374 066077      MSKO     1
24 01375 024307      LDA      1,LINS              ;BLOCK AN INTA
25 01376 065030      DOR      1,SLA
26 01377 006210      JSR      @TIME
27 01400 063430      SKPBN    SLA
28 01401 061477      INTA      0
29 01402 024147      LDA      1,DEVICE
30 01403 106435      SUBZ#    0,1,SNR
31 01404 006123      EHALT
32 01405 006133      LOOP
33 01406 006134 A33:  SETUP                      ;INTR DISABLE FLOP WAS SET WITH
34 01407 126520      SUBZL    1,1
35 01410 125120      MOVZL    1,1
36 01411 066077      MSKO     1
37 01412 101000      MOV      0,0
38 01413 062677      IORST
39 01414 024307      LDA      1,LINS              ;A MSKO, THEN CLEARED WITH IORST
40 01415 065030      DOR      1,SLA              ;INTA WAS BLOCKED. CHECK THAT FLOP
41 01416 006210      JSR      @TIME
42 01417 063630      SKPDN    SLA
43 01420 061477      INTA      0                  ;IS CLEARED WITH IORST
44 01421 024147      LDA      1,DEVICE
45 01422 106434      SUBZ#    0,1,SZR
46 01423 006123      EHALT
47 01424 006133      LOOP
48 01425 006134 A34:  SETUP                      ;TEST XMITER CYCLES THROUGH
49 01426 020234      LDA      0,DS              ;THE PROPER SET OF STATES (7-
50 01427 040146      STA      0,CT?R            ;5-1-5-1-ETC.) NON-TRANSPARENT
51 01430 020307      LDA      0,LINS            ;MODE. A00 NOT EQ SYNWD, R. I. SHUD
52 01431 061030      DOR      0,SLA            ;NOT SET. XMIT ROM ADR = EDCBA.
53 01432 006210      JSR      @TIME            ;WHERE BCD = PRESENT STATE.
54 01433 063630      SKPDN    SLA              ;FOR CHANGE IN STATE A=0, E=1.
55 01434 101002      MOV      0,0,SZC
56 01435 006123      EHALT                      ;DONE NEVER SET
57 01436 064630      DIAC     1,SLA            ;FOR NO CHANGE A=E=1. X-ON BUS
58 01437 127133      ADDZL#   1,1,SNC          ;= AN ENABLE. TI SHOULD SET FOR
59 01440 006123      EHALT                      ;EACH STATE.
60 01441 014146      DSZ      CT?R

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0016 C5501
01 01442 000766      JMP      A34+3
02 01443 006133      LOOP
03 01444 006134 A36:  SETUP                ;A DOB MODE 0 WITH BIT 13 CLEARED
04 01445 020242      LDA      0, C14          ;SHOULD NOT CHANGE CHAR SIZE
05 01446 006122      TIMIT
06 01447 101002      MOV     0, 0, SZC
07 01450 006123      EHALT                ;TIMEOUT ERROR
08 01451 040313      STA     0, TEMP0
09 01452 020241      LDA     0, C12
10 01453 006122      TIMIT
11 01454 101002      MOV     0, 0, SZC
12 01455 006123      EHALT                ;TIMEOUT ERROR
13 01456 024313      LDA     1, TEMP0
14 01457 030252      LDA     2, C30
15 01460 106423      SUBZ   0, 1, SNC
16 01461 124000      COM
17 01462 132033      ADCZ#  1, 2, SNC
18 01463 006123      EHALT                ;TIMES ARE DIFFERENT
19 01464 006133      LOOP
20 01465 020241      LDA     0, C12
21 01466 040306      STA     0, ITR
22 01467 006134 A37:  SETUP                ;CHANGING THE CHARACTER SIZE SHOULD
23 01470 020242      LDA     0, C14          ;CHANGE THE LENGTH OF TIME IT TAKES
24 01471 006122      TIMIT                ;TO SEND A CHARACTER. CHECK ADDRESSING
25 01472 101002      MOV     0, 0, SZC      ;OF SCRATCH MEMORY, DOB GATES, ALU UNIT.
26 01473 006123      EHALT                ;TIMEOUT ERROR
27 01474 040313      STA     0, TEMP0      ;TIME TO SEND 8 BITS
28 01475 020243      LDA     0, C15
29 01476 006122      TIMIT
30 01477 101002      MOV     0, 0, SZC
31 01500 006123      EHALT
32 01501 040314      STA     0, TEMP1      ;TIME TO SEND 7 BITS
33 01502 020244      LDA     0, C16
34 01503 006122      TIMIT
35 01504 101002      MOV     0, 0, SZC
36 01505 006123      EHALT
37 01506 040315      STA     0, TEMP2      ;TIME TO SEND 6 BITS
38 01507 105000      MOV     0, 1
39 01510 030251      LDA     2, C28.        ;28. X TEMP2 =
40 01511 006114      MUL12
41 01512 044321      STA     1, TEMP6
42 01513 024314      LDA     1, TEMP1
43 01514 030250      LDA     2, C24.        ;24. X TEMP1 =
44 01515 006114      MUL12
45 01516 044320      STA     1, TEMP5
46 01517 024313      LDA     1, TEMP0
47 01520 030247      LDA     2, C21.        ;21. X TEMP0. BUT MAKE COMPARISON
48 01521 006114      MUL12                ;TO WITHIN + OR - 10 PERCENT.
49 01522 044322      STA     1, TEMP7
50 01523 030240      LDA     2, C10.
51 01524 006115      DIV012
52 01525 101102      MOVL   0, 0, SZC
53 01526 125400      INC     1, 1
54 01527 030322      LDA     2, TEMP7
55 01530 133000      ADD     1, 2
56 01531 050317      STA     2, TEMP4      ;= TIME FOR 8 BITS + 10 PERCENT
57 01532 030322      LDA     2, TEMP7
58 01533 132400      SUB     1, 2
59 01534 050316      STA     2, TEMP3      ;= TIME FOR 8 BITS - 10 PERCENT
60 01535 024321      LDA     1, TEMP6

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0017 05801
01 01536 020317 LDA 0,TEMP4
02 01537 106437 SUBZ# 0,1,5BN
03 01540 146433 SUBZ# 2,1,SNC
04 01541 006123 EHALLT ;6 BIT TIME OUT OF TOLERANCE
05 01542 024320 LDA 1,TEMP5
06 01543 106437 SUBZ# 0,1,5BN
07 01544 146433 SUBZ# 2,1,SNC
08 01545 006123 EHALLT ;7 BIT TIME OUT OF TOLERANCE
09 01546 006133 LOOP
10 01547 006107 SETLINE
11 01550 102440 SUBO 0,0
12 01551 024313 LDA 1,TEMP0 ;INITIALIZE FOR NEXT TWO TESTS
13 01552 030240 LDA 2,C10.
14 01553 006115 DIV012
15 01554 101102 MOVL 0,0,SZC
16 01555 125400 INC 1,1
17 01556 020313 LDA 0,TEMP0
18 01557 111000 MOV 0,2
19 01560 122400 SUB 1,0
20 01561 133000 ADD 1,2
21 01562 040315 STA 0,TEMP2 ;NOMINAL - 10 %
22 01563 050314 STA 2,TEMP1 ;NOMINAL + 10 %
23 01564 024313 LDA 1,TEMP0
24 01565 125120 MOVZL 1,1
25 01566 044320 STA 1,TEMP5 ;TWO TIMES NOMINAL
26 01567 102440 SUBO 0,0
27 01570 030240 LDA 2,C10.
28 01571 006115 DIV012
29 01572 101102 MOVL 0,0,SZC
30 01573 125400 INC 1,1
31 01574 020320 LDA 0,TEMP5
32 01575 111000 MOV 0,2
33 01576 122400 SUB 1,0
34 01577 133000 ADD 1,2
35 01580 040317 STA 0,TEMP4 ;TWO TIMES - 10%
36 01581 050316 STA 2,TEMP3 ;TWO TIMES + 10 %
37 01582 006134 A38: SETUP ;SEE IF THE TIME BETWEEN T.I.'S IS
38 01583 030241 LDA 2,C12 ;TWICE AS LONG FOR XPARENT MODE.
39 01584 050146 STA 2,CT?R ;SEE IF IT RETURNS TO NOMINAL FOR
40 01585 030307 LDA 2,LINS ;NON-XPARENT MODE.
41 01586 071030 DOR 2,SLA ;A TEST OF NEW CHAR FLOP, XPARENT
42 01587 006210 JSR @TIME ;MODE OFF AND ON FLOPS, AND XPARENT
43 01510 063630 SKPDN SLA ;MODE LINE X FLOP.
44 01511 014146 DSZ CT?R
45 01512 000774 JMP .-4
46 01513 101002 MOV 0,0,SZC
47 01514 006123 EHALLT ;TIMEOUT ERROR
48 01515 040320 STA 0,TEMP5
49 01516 024241 LDA 1,C12
50 01517 044146 STA 1,CT?R
51 01520 030307 LDA 2,LINS
52 01521 126620 SUBZR 1,1
53 01522 133000 ADD 1,2
54 01523 071030 DOR 2,SLA
55 01524 006210 JSR @TIME
56 01525 063630 SKPDN SLA
57 01526 014146 DSZ CT?R
58 01527 000774 JMP .-4
59 01530 101002 MOV 0,0,SZC ;TIMEOUT ERROR
60 01531 006123 EHALLT

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0018 05501

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01 01632 024316 LDA 1, TEMP3
02 01633 030317 LDA 2, TEMP4
03 01634 112437 SUBZ# 0, 2, SBN
04 01635 122436 SUBZ# 1, 0, SEZ
05 01636 006123 EHALT
06 01637 020320 LDA 0, TEMP5
07 01640 024314 LDA 1, TEMP1
08 01641 030315 LDA 2, TEMP2
09 01642 112437 SUBZ# 0, 2, SBN
10 01643 122436 SUBZ# 1, 0, SEZ
11 01644 006123 EHALT
12 01645 006133 LOOP
13 01646 006134 R39: SETUP ; SAME AS R38 EXCEPT FORCE A DLE
14 01647 030241 LDA 2, C12 ; FOR EACH DATA CHAR.
15 01650 050146 STA 2, CT?R
16 01651 030307 LDA 2, LINS
17 01652 071030 DOR 2, SLA
18 01653 006210 JSR @TIME
19 01654 063630 SKPDN SLA
20 01655 071030 DOR 2, SLA
21 01656 006210 JSR @TIME
22 01657 063630 SKPDN SLA
23 01660 024277 LDA 1, C1400
24 01661 133000 ADD 1, 2
25 01662 071030 DOR 2, SLA
26 01663 006210 JSR @TIME
27 01664 063630 SKPDN SLA
28 01665 014146 DSZ CT?R
29 01666 000774 JMP .-4
30 01667 101002 MOV 0, 0, SZC
31 01670 006123 EHALT ; TIMEOUT ERROR
32 01671 040320 STA 0, TEMP5
33 01672 024241 LDA 1, C12
34 01673 044146 STA 1, CT?R
35 01674 030307 LDA 2, LINS
36 01675 071030 DOR 2, SLA
37 01676 006210 JSR @TIME
38 01677 063630 SKPDN SLA
39 01700 014146 DSZ CT?R
40 01701 000774 JMP .-4
41 01702 101002 MOV 0, 0, SZC ; TIMEOUT ERROR
42 01703 006123 EHALT
43 01704 024314 LDA 1, TEMP1
44 01705 030315 LDA 2, TEMP2
45 01706 112437 SUBZ# 0, 2, SBN
46 01707 122436 SUBZ# 1, 0, SEZ
47 01710 006123 EHALT
48 01711 020320 LDA 0, TEMP5
49 01712 024316 LDA 1, TEMP3
50 01713 030317 LDA 2, TEMP4
51 01714 112437 SUBZ# 0, 2, SBN
52 01715 122436 SUBZ# 1, 0, SEZ
53 01716 006123 EHALT
54 01717 006133 LOOP
55 ;
56 ; NOW IT IS TIME TO SYNCHRONIZE THE RECEIVER
57 ;
58 01720 020303 LDA 0, FLT1
59 01721 101220 MOVZR 0, 0
60 01722 040136 STA 0, SYNMD
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0019 09501
01 01723 040140 STA 0,DLEWD
02 01724 006134 A40: SETUP ;SEE IF SYNC CAN BE ESTABLISHED
03 01725 006107 SETLINE
04 01726 006110 STRLINE
05 01727 111000 MOV 0,2
06 01730 024234 LDA 1,06
07 01731 044146 STA 1,CT?R
08 01732 071030 DOR 2,SLA
09 01733 006210 JSR @TIME
10 01734 063630 SKPDN SLA
11 01735 064630 DIAC 1,SLA
12 01736 125132 MOVZL# 1,1,SZC ;SKIP IF NO R. I
13 01737 000406 JMP .+6
14 01740 127133 ADDZL# 1,1,SNC ;SKIP IF T. I. THERE
15 01741 006123 EHALT ;FALSE DONE FLAG
16 01742 014146 DSZ CT?R
17 01743 000767 JMP .-9.
18 01744 006123 EHALT ;R. I. DID NOT SET AFTER SYN WORD
19 01745 006133 LOOP ;SENT SIX TIMES
20 01746 020136 LDA 0,SYNWD
21 01747 101224 MOVZR 0,0,SZR
22 01750 000752 JMP A40-2
23 01751 020266 LDA 0,C320
24 01752 040136 STA 0,SYNWD
25 01753 040140 STA 0,DLEWD
26 01754 006134 A41: SETUP ;TEST RSR AND XCOUNT 0,1,2 BY SENDING
27 01755 006107 SETLINE ;FLOATING 1 PATTERN.
28 01756 006110 STRLINE
29 01757 020303 LDA 0,FLT1
30 01760 040312 STA 0,SNDWD
31 01761 040311 STA 0,RECMD
32 01762 101220 MOVZR 0,0
33 01763 040340 STA 0,RCVWD ;SAVE WHAT WE SHOULD BE RECEIVING
34 A41P6:
35 01764 030337 LDA 2,MAXSC ;LOAD MAX SYNC COUNT
36 01765 050336 STA 2,SYOCT
37 01766 020312 LDA 0,SNDWD
38 01767 101015 MOV# 0,0,SNR ;HAVE WE SENT ZERO YET?
39 01770 000406 JMP A41A ;WE HAVE, DON'T SEND ANY MORE DATA
40 ;UNTIL WE HAVE RECEIVED THE ZERO BYTE
41 01771 030307 LDA 2,LINS
42 01772 101220 MOVZR 0,0
43 01773 040312 STA 0,SNDWD
44 01774 143000 ADD 2,0
45 01775 061030 DOR 0,SLA
46 A41A:
47 01776 063630 SKPDN SLA
48 01777 000777 JMP .-1
49 02000 101000 MOV 0,0
50 ;
51 ; NOW CHECK FOR RCVR DONE FLAG
52 ;
53 A41C:
54 02001 064630 DIAC 1,SLA ;GET THE FLAGS AND DATA
55 02002 125132 MOVZL# 1,1,SZC ;IS THE RECEIVER DONE BIT SET?
56 02003 000404 JMP A41B ;YES, PROCESS THE RECEIVER
57 02004 127133 ADDZL# 1,1,SNC ;IS TRANS. DONE BIT SET?
58 02005 000774 JMP A41C ;DONE SET, NOT EITHER?????
59 ;
60 ; TRANS DONE SET, SEND NEXT CHARACTER

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0020 05501
01 ;
02 02006 000756      JMP      A41P6          ;SEND NEXT CHAR
03 ;
04 ; CHECK WHAT WE GOT
05 ;
06 ; RECEIVER DONE, IS IT A SYNC?
07 A41B:
08 02007 020267      LDA      0,C377        ;FIRST MASK OFF THE RI AND TI
09 02010 123400      AND      1,0          ;1 NOW CONTAINS THE CHARACTER RECEIVED
10 02011 030136      LDA      2,SYNWD      ;NOW SEE IF IT IS A SYNC CHARACTER
11 02012 112415      SUB#    0,2,SNR       ;IS IT?
12 02013 000411      JMP      LABSY        ;YES, TOO MANY OF THEM?
13 ;
14 ; SOMETHING OTHER THAN SYNC, WAS IT WHAT WE SENT?
15 ;
16 02014 030340      LDA      2,RCVWD      ;WHAT WERE WE SUPPOSED TO RECEIVE
17 02015 112414      SUB#    0,2,SZR       ;WHAT DID WE GET?
18 02016 006123      EHALT                    ;ERROR HALT-NOT WHAT WE SENT
19 ;
20 ; ARE WE RECEIVING ZEROS YET-ALL DONE INDICATOR
21 ;
22 02017 151015      MOV#    2,2,SNR
23 02020 000410      JMP      LABLP        ;ALL DONE, LOOP
24 02021 151220      MOVZR   2,2          ;SHIFT WHAT WE ARE TO RECEIVE NEXT
25 02022 050340      STA      2,RCVWD      ;AND SAVE IT
26 02023 000753      JMP      A41A        ;NOT DONE YET, DO IT TO THE NEXT CHARACTER
27 ;
28 ; WE GOT A SYNC CHARACTER, IGNORE IT AND COUNT TO SEE IF WE HAVE SENT
29 ; TOO MANY--CURRENTLY 3 MAXIMUM
30 ;
31 LABSY:
32 02024 014336      D5Z     SYOOT        ;BUMP IT DOWN
33 02025 000751      JMP      A41A        ;NOT YET, CONTINUE
34 ;
35 ; FAILURE--TOO MANY SYNCs
36 ;
37 02026 006123      EHALT
38 02027 000735      JMP      A41P6
39 ;
40 ; HERE WE GO LOOP DE LOOP
41 ;
42 LABELP:
43 02030 006133      LOOP                    ;DO IT TO IT
44 02031 020304      LDA      0,FLT12
45 02032 040431      STA      0,XORSYN
46 02033 006134 A42:  SETUP                    ;TEST SYNC MATRIX AND FLOP
47 02034 020241      LDA      0,C12
48 02035 040146      STA      0,CT?R
49 02036 006125      DLEMOD
50 02037 006107      SETLINE
51 02040 006111      STRTSYN                ;BY SETTING DLE = XDR 1 BIT
52 02041 006117      RITST                  ;DIFFERENT THAN SYNWD.
53 02042 006120      RECOFF                 ;START SENDING. TURN OFF REC
54 02043 006116      TITST                  ;TURN IT BACK ON. SYNC SHOULD
55 02044 006121      RECON                  ;NOT BE ESTABLISHED AGAIN.
56 02045 006210 A42:  JSR      @TIME
57 02046 063630      SKPDN   SLA
58 02047 064630      DIAC    1,SLA
59 02050 125132      MOVZL#  1,1,SZC
60 02051 006123      EHALT                    ;R. I. SHOULD NEVER BE SET

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01 02052 014146 DSZ CT?R
02 02053 000772 JMP A42Z
03 02054 006133 LOOP
04 02055 020406 LDA 0, XORSYN
05 02056 101224 MOVZR 0, 0, SZR
06 02057 000753 JMP A42-1
07 02058 020265 LDA 0, C300
08 02061 040140 STA 0, DLEWD
09 02062 000412 JMP A43-2
10 02063 000000 XORSYN: 0
11 02064 020136 MODIR: LDA 0, SYNWD
12 02065 024776 LDA 1, XORSYN
13 02066 131000 MOV 1, 2
14 02067 113520 ANDZL 0, 2
15 02070 107000 ADD 0, 1
16 02071 146400 SUB 2, 1
17 02072 044140 STA 1, DLEWD
18 02073 001400 JMP 0, 3
19 ; FOR R. I. TO SET CAUSING DONE TO SET, THE OUTPUT OF THE
20 ; AND GATE DRIVING THE CLK INPUT TO THE R. I. FLOP
21 ; MUST HAVE A POSITIVE TRANSITION. THIS WILL
22 ; HAPPEN WHEN THE NOT WRITE BUFFER GOES LOW
23 ; AND THE PROCESS LINE X INPUT IS LOW. THE
24 ; FORMER IS THE AND OF CLK WITH THE OUTPUT
25 ; OF THE WRITE BUFFER FLIP FLOP WITH LOAD
26 ; ENABLE AND SET R. I. AS THE D INPUTS TO
27 ; THE FLOP. SET R. I. IS AN OUTPUT OF THE
28 ; REC ROM AND OCCURS ON THE 1 - 0 STATE CHANGE.
29 ; AT THE SAME TIME THE DIRECT RESET INPUT TO THE R. I.
30 ; FLOP MUST BE HIGH. THIS WILL BE TRUE WHEN
31 ; IORST*B = 0, AND THE OUTPUT OF THE (CLR
32 ; SLA) (ENAB0) AND GATE IS LOW.
33 02074 020240 LDA 0, C10.
34 02075 040306 STA 0, ITR
35 02076 006134 A43: SETUP ; DOES RECEIPT OF A CHAR SET R. I.
36 02077 006107 SETLINE ; AND DONE FLOP?
37 02100 006110 STRTLINE
38 02101 024232 LDA 1, C4
39 02102 044146 STA 1, CT?R
40 02103 006210 JSR @TIME
41 02104 063630 SKPDN SLA
42 02105 101002 MOV 0, 0, SZC
43 02106 000410 JMP . +10
44 02107 064630 DIAC 1, SLA
45 02110 125132 MOVZL# 1, 1, SZC
46 02111 000406 JMP . +6 ; R. I. CAUSED DONE
47 02112 020307 LDA 0, LINS
48 02113 061030 DOR 0, SLA
49 02114 014146 DSZ CT?R ; T. I. CAUSED DONE
50 02115 000766 JMP A43+5
51 02116 006123 EHALT ; TOO MANY T. I. 'S
52 02117 006133 LOOP
53 02120 006134 A44: SETUP ; R. I. SHOULD SET FOR FIRST CHAR
54 02121 006107 SETLINE ; RECEIVED AFTER SYNC IS ESTABLISHED.
55 02122 006110 STRTLINE
56 02123 101400 INC 0, 0
57 02124 061030 DOR 0, SLA
58 02125 006116 TITST
59 02126 061030 DOR 0, SLA
60 02127 006116 TITST

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0022 03501
01 02130 061030      DOR      0, SLA
02 02131 006210      JSR      @TIME
03 02132 063630      SKPDN   SLA
04 02133 064630      DIAC    1, SLA
05 02134 125133      MOVZL#  1, 1, SNC
06 02135 006123      EHALLT                      ; NO R. I. SET
07 02136 006133      LOOP
08 02137 006134 A45:  SETUP                      ; CLR PULSE SHOULD CLEAR R. I.
09 02140 006107      SETLINE
10 02141 006110      STRTLIN
11 02142 101400      INC      0, 0
12 02143 061030      DOR      0, SLA
13 02144 063630      SKPDN   SLA
14 02145 000777      JMP      .-1
15 02146 064630      DIAC    1, SLA
16 02147 125133      MOVZL#  1, 1, SNC          ; WAIT FOR R. I. DONE
17 02150 000773      JMP      .-5
18 02151 064430      DIA     1, SLA
19 02152 125132      MOVZL#  1, 1, SZC
20 02153 006123      EHALLT                      ; R. I. NOT CLEARED BY CLR PULSE
21 02154 006133      LOOP
22 02155 006134 A46:  SETUP                      ; CLR W/O SLA SELECT SHOULD HAVE
23 02156 006107      SETLINE                      ; NO EFFECT
24 02157 006110      STRTLIN
25 02160 101400      INC      0, 0
26 02161 061030      DOR      0, SLA
27 02162 006210      JSR      @TIME
28 02163 063630      SKPDN   SLA
29 02164 064430      DIA     1, SLA
30 02165 125133      MOVZL#  1, 1, SNC
31 02166 000773      JMP      .-5
32 02167 064600      DIAC    1, 0
33 02170 064430      DIA     1, SLA
34 02171 125133      MOVZL#  1, 1, SNC
35 02172 006123      EHALLT
36 02173 006133      LOOP
37 02174 006134 A47:  SETUP                      ; CHECK FOR PROPER LINE NO WHEN
38 02175 020241      LDA     0, C12
39 02176 040146      STA     0, CT?R          ; R. I. IS SET. IF LINE NO IS WRONG
40 02177 006107      SETLINE                      ; OR MORE THAN ONE APPEARS CHECK
41 02200 006110      STRTLIN                      ; AND GATE FEEDING CLK INPUT TO
42 02201 111400      INC      0, 2          ; R. I. FLOP AND PROCESS LINE
43 02202 071030      DOR      2, SLA          ; X MATRIX.
44 02203 006210      JSR      @TIME
45 02204 063630      SKPDN   SLA
46 02205 064430      DIA     1, SLA
47 02206 125133      MOVZL#  1, 1, SNC
48 02207 000773      JMP      .-5
49 02210 064630      DIAC    1, SLA
50 02211 020301      LDA     0, C374H
51 02212 107400      AND     0, 1
52 02213 020307      LDA     0, LINS
53 02214 106434      SUBZ#   0, 1, SZR
54 02215 006123      EHALLT
55 02216 014146      DSZ     CT?R
56 02217 000764      JMP      .-12
57 02220 006133      LOOP
58 02221 006134 A49:  SETUP                      ; ESTABLISH SYNC. DON'T SEND DATA CHAR.
59 02222 020241      LDA     0, C12
60 02223 040146      STA     0, CT?R

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0023 05501
01 02224 006107      SETLINE                ;BD SHOULD CONTINUE TO SEND SYN CHAR.
02 02225 006110      STRTLINE              ;IS REC CHAR = SYN CHAR ?????
03 02226 006210      JSR      @TIME
04 02227 063630      SKPDN   SLA
05 02230 006117      RITST
06 02231 030267      LDA      2,C377
07 02232 020136      LDA      0,SYNMD
08 02233 147400      AND      2,1
09 02234 106434      SUBZ#   0,1,SZR
10 02235 006123      EHALT
11 02236 014146      DSZ     CT?R
12 02237 000767      JMP     R49+5
13 02240 006133      LOOP
14 02241 000410      JMP     R51-3
15 02242 063630 TST: SKPDN   SLA
16 02243 000777      JMP     .-1
17 02244 064430      DIAC   1,SLA
18 02245 125133      MOVZL# 1,1,SNC
19 02246 000774      JMP     .-4
20 02247 064630      DIAC   1,SLA
21 02250 001400      JMP     0,3
22 02251 152520      SUBZL  2,2
23 02252 151120      MOVZL  2,2
24 02253 050306      STA     2,ITR
25 02254 006134 R51:  SETUP                ;SEE IF FIRST FOUR CHAR ARE RECVD
26 02255 030074      LDA     2,AXMT        ;A TEST OF ADR SELECT FLOP, RAO
27 02256 050020      STA     2,20         ;RAL, STATE SCRATCH MEM ETC
28 02257 024232      LDA     1,C4
29 02260 044146      STA     1,CT?R
30 02261 006107      SETLINE
31 02262 006110      STRTLINE
32 02263 152440      SUBO   2,2
33 02264 024307      LDA     1,LINS
34 02265 133000      ADD     1,2
35 02266 151400      INC     2,2
36 02267 071030      DOR    2,SLA
37
38 02270 006210      JSR     @TIME
39 02271 063630      SKPDN   SLA
40 02272 064630      DIAC   1,SLA
41 02273 127132      ADDZL# 1,1,SZC
42 02274 000772      JMP     .-6
43 02275 125133      MOVZL# 1,1,SNC
44 02276 006123      EHALT                ;FALSE DONE FLAG
45
46
47 02277 034267      LDA     3,C377
48 02300 137400      AND     1,3
49 02301 020136      LDA     0,SYNMD
50 02302 116415      SUB#   0,3,SNR
51 02303 000765      JMP     L0100
52
53
54 02304 046020      STA     1,020
55 02305 014146      DSZ     CT?R
56 02306 000762      JMP     L0100
57 02307 062677      IORST
58 02310 030232      LDA     2,C4
59 02311 050146      STA     2,CT?R
60 02312 152440      SUBO   2,2

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01	02313	020074	LDA	0, AXMT	
02	02314	040020	STA	0, 20	
03	02315	022020	LDA	0, 020	
04	02316	024267	LDA	1, C377	
05	02317	123400	AND	1, 0	
06	02320	151400	INC	2, 2	
07	02321	112434	SUBZ#	0, 2, SZR	
08	02322	006123	EHALT		; RECDV CHAR IN ERROR!
09	02323	014146	DSZ	CT?R	
10	02324	000771	JMP	.-7	
11	02325	006133	LOOP		
12	02326	101001	MOV	0, 0, SKP	
13	02327	000252	DAT1:	252	
14	02330	006134	A52:	SETUP	; SEE IF THIS LINE WILL XMIT &
15	02331	020241	LDA	0, C12	
16	02332	040146	STA	0, CT?R	
17	02333	006107	SETLINE		; RECVE A CHAR
18	02334	006110	STRTLINE		
19	02335	006135	PAUSE		
20		L0400:			
21	02336	020307	LDA	0, LINS	
22	02337	030770	LDA	2, DAT1	
23	02340	143000	ADD	2, 0	
24		L0410:			
25	02341	061030	DOR	0, SLA	
26	02342	063630	SKPDN	SLA	
27	02343	000777	JMP	.-1	
28	02344	004676	JSR	TST	
29	02345	030267	LDA	2, C377	
30	02346	147400	AND	2, 1	
31	02347	030136	LDA	2, SYNWD	
32	02350	132435	SUBZ#	1, 2, SNR	
33	02351	000770	JMP	L0410	
34	02352	030755	LDA	2, DAT1	
35	02353	132434	SUBZ#	1, 2, SZR	
36	02354	006123	EHALT		
37	02355	014146	DSZ	CT?R	
38	02356	000763	JMP	L0410	
39	02357	006133	LOOP		
40	02360	020231	LDA	0, C3	
41	02361	040053	STA	0, GPCTR	
42	02362	040306	STA	0, ITR	
43	02363	006134	A53:	SETUP	; SEE IF WE CAN XMIT 16 CHAR ON THIS
44	02364	020245	LDA	0, C20	; LINE AND REC THEM CORRECTLY.
45	02365	040146	STA	0, CT?R	
46	02366	020074	LDA	0, AXMT	
47	02367	040020	STA	0, 20	
48	02370	006107	SETLINE		
49	02371	006110	STRTLINE		
50	02372	024276	LDA	1, C100K	; DELAY FOR RECEIVE
51	02373	125404	INC	1, 1, SZR	; SYNCHRONIZATION
52	02374	000777	JMP	.-1	
53	02375	030223	LDA	2, DAT0	
54	02376	024307	LDA	1, LINS	
55	02377	133000	ADD	1, 2	
56	02400	071030	A532:	DOR	2, SLA
57		L0200:			
58	02401	006210	JSR	@TIME	
59	02402	063630	SKPDN	SLA	
60	02403	064630	DIAC	1, SLA	

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0025 C5501
01 02404 125132      MOVZL# 1, 1, SZC
02 02405 000405      JMP      .+5
03 02406 127132      ADDZL# 1, 1, SZC
04 02407 000771      JMP      A532
05 02410 006123      EHALT                      ;FALSE DONE FLAG
06 02411 000426      JMP      LUP0
07                      ;===== HANDLE INITIAL SYNC5
08                      ;
09 02412 034267      LDA      3, C377
10 02413 137400      AND      1, 3
11 02414 020136      LDA      0, SYNMD
12 02415 116415      SUB#     0, 3, SNR
13 02416 000763      JMP      L0200
14                      ;
15                      ;=====
16 02417 046020      STA      1, 020
17 02420 014146      DSZ      CT?R
18 02421 000760      JMP      A532+1
19 02422 062677      IORST
20 02423 020245      LDA      0, C20
21 02424 040146      STA      0, CT?R
22 02425 020074      LDA      0, AXMT
23 02426 040020      STA      0, 20
24 02427 024323      LDA      1, DAT0
25 02430 034267      LDA      3, C377
26 02431 022020      LDA      0, 020
27 02432 163400      AND      3, 0
28 02433 106434      SUB2#    0, 1, SZR
29 02434 006123      EHALT                      ;INCORRECT CHARACTER
30 02435 014146      DSZ      CT?R
31 02436 000773      JMP      .-5
32 02437 006133 LUP0:  LOOP
33 02440 020153      LDA      0, HOW
34 02441 101400      INC      0, 0
35 02442 024235      LDA      1, C7
36 02443 106435      SUB2#    0, 1, SNR
37 02444 020232      LDA      0, C4
38 02445 040153      STA      0, HOW
39 02446 020323      LDA      0, DAT0
40 02447 101220      MOVZR    0, 0
41 02450 040323      STA      0, DAT0
42 02451 020136      LDA      0, SYNMD
43 02452 101220      MOVZR    0, 0
44 02453 040136      STA      0, SYNMD
45 02454 014053      DSZ      GPCTR
46 02455 000706      JMP      A53
47 02456 020263      LDA      0, C212
48 02457 040323      STA      0, DAT0
49 02460 020232      LDA      0, C4
50 02461 040153      STA      0, HOW
51 02462 006134 A54:  SETUP                      ;WILL THIS LINE SEND AND REC IN
52 02463 102400      SUB      0, 0
53 02464 040173      STA      0, MCTR
54 02465 020245      LDA      0, C20                      ;XPARENT MODE
55 02466 040146      STA      0, CT?R
56 02467 020074      LDA      0, AXMT
57 02470 040020      STA      0, 20
58 02471 006107      SETLINE
59 02472 006110      STRTLINE
60 02473 030323      LDA      2, DAT0

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0026 05501
01 02474 126620      SUBZR  1,1
02 02475 133000      ADD    1,2
03 02476 024307      LDA    1,LINS
04 02477 133000      ADD    1,2
05 02500 071030 A54Z: DOA    2,SLA
06                L0300:
07 02501 006210      JSR    @TIME
08 02502 063630      SKPDN  SLA
09 02503 064630      DIAC   1,SLA
10 02504 125132      MOVZL# 1,1,SZC
11 02505 000405      JMP    .+5
12 02506 127132      ADDZL# 1,1,SZC
13 02507 000771      JMP    A54Z
14 02510 006123      EHALT                ;FALSE DONE FLAG
15 02511 000437      JMP    LUP4
16                ;===== HANDLE THE EXTRA SYNC CHARS
17                ;
18 02512 034267      LDA    3,C377
19 02513 137400      AND    1,3
20 02514 020136      LDA    0,SYNWD
21 02515 116415      SUB#   0,3,SNR
22 02516 000763      JMP    L0300
23                ;
24                ;=====
25 02517 046020      STA    1,020
26 02520 014146      DSZ    CT?R
27 02521 000760      JMP    A54Z+1
28 02522 062677      IORST
29 02523 020245      LDA    0,C20
30 02524 040146      STA    0,CT?R
31 02525 020074      LDA    0,AXMT
32 02526 040020      STA    0,20
33 02527 024323      LDA    1,DAT0
34 02530 030140      LDA    2,DLEND
35 02531 022020      LDA    0,020
36 02532 034267      LDA    3,C377
37 02533 163400      AND    3,0
38 02534 112434      SUBZ#  0,2,SZR
39 02535 000403      JMP    .+3
40 02536 010173      ISZ    MCTR
41 02537 000403      JMP    .+3
42 02540 106434      SUBZ#  0,1,SZR
43 02541 006123      EHALT                ;NOT DATA OR DLE WD
44 02542 014146      DSZ    CT?R
45 02543 000766      JMP    .-12
46 02544 020173      LDA    0,MCTR
47 02545 024237      LDA    1,C10
48 02546 106434      SUBZ#  0,1,SZR      ;SHOULD BE 8 DLE CHAR
49 02547 006123      EHALT
50 02550 006133 LUP4: LOOP
51 02551 020240      LDA    0,C10
52 02552 040306      STA    0,ITR
53 02553 020207      LDA    0,SNGLINE
54 02554 101005      MOV    0,0,SNR
55 02555 000474      JMP    ENDIT
56 02556 006134 S01: SETUP                ;O.C. GATE TO DATA 12 PRECEEDING
57 02557 020237      LDA    0,C10      ;INVERTERS OR FLOP DOES NOT
58 02560 062030      DOB    0,SLA      ;RESPOND. OR COMMON DIB-SLA SELECT
59 02561 065430      DIB    1,SLA
60 02562 123415      AND#   1,0,SNR

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0027 05501

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01 02563 006123      EHALT
02 02564 006133      LOOP
03 02565 006134 502:  SETUP                ; O. C. GATE TO DATA 11 PRECEDING
04 02566 020237      LDA          0, C10          ; INVERTERS OR FLOP DOES NOT
05 02567 062030      DOB          0, SLA        ; RESPOND TO DOB.
06 02570 101120      MOVZL        0, 0
07 02571 065430      DIB          1, SLA
08 02572 107415      AND#         0, 1, SNR
09 02573 006123      EHALT
10 02574 006133      LOOP
11 02575 006134 503:  SETUP                ; DOB SHOULD SET IORST SHOULD
12 02576 020237      LDA          0, C10          ; CLEAR.
13 02577 062030      DOB          0, SLA
14 02600 065430      DIB          1, SLA
15 02601 020252      LDA          0, C30
16 02602 107415      AND#         0, 1, SNR
17 02603 006123      EHALT
18 02604 062677      IORST
19 02605 065430      DIB          1, SLA
20 02606 107414      AND#         0, 1, SZR
21 02607 006123      EHALT
22 02610 006133      LOOP
23 02611 006134 504:  SETUP                ; SAME THING FOR DATA 13
24 02612 020232      LDA          0, C4
25 02613 030275      LDA          2, CB1
26 02614 143000      ADD          2, 0
27 02615 062030      DOB          0, SLA
28 02616 065430      DIB          1, SLA
29 02617 123415      AND#         1, 0, SNR
30 02620 006123      EHALT
31 02621 006133      LOOP
32 02622 006134 505:  SETUP                ; DIB SHOULD NOT RESPOND W/O
33 02623 020237      LDA          0, C10
34 02624 062030      DOB          0, SLA          ; SLA SELECT
35 02625 065400      DIB          1, 0
36 02626 123414      AND#         1, 0, SZR
37 02627 006123      EHALT
38 02630 006133      LOOP
39 02631 006134 506:  SETUP                ; DOB SHOULD SET ALL THREE
40 02632 020237      LDA          0, C10          ; IORST SHOULD CLEAR ALL THREE
41 02633 062030      DOB          0, SLA
42 02634 030275      LDA          2, CB1
43 02635 101220      MOVZL        0, 0
44 02636 143000      ADD          2, 0
45 02637 062030      DOB          0, SLA
46 02640 020251      LDA          0, C28
47 02641 065430      DIB          1, SLA
48 02642 106434      SUBZ#        0, 1, SZR
49 02643 006123      EHALT
50 02644 062677      IORST
51 02645 065430      DIB          1, SLA
52 02646 106435      SUBZ#        0, 1, SNR
53 02647 006123      EHALT
54 02650 006133      LOOP
55 02651 006103  ENDIT: PCRLF
56 02652 006104      MESSAGE
57 02653 005361      MSG6                ; "LINE
58 02654 006104      MESSAGE
59 02655 005364      MSG7                ; TESTED"
60 02656 020207      LDA          0, SNGLINE
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01 02657 101004      MOV     0,0,SZR
02 02660 000420      JMP     END1
03 02661 020061      LDA     0,LINUM
04 02662 030165      LDA     2,LINE2
05 02663 112434      SUBZ#  0,2,SZR
06 02664 000406      JMP     .+6
07 02665 024046      LDA     1,EGGS
08 02666 125005      MOV     1,1,SNR
09 02667 000403      JMP     .+3
10 02670 002401      JMP     @,+1
11 02671 003066      INT0
12 02672 112424      SUBZ   0,2,SZR
13 02673 101401      INC     0,0,SKP
14 02674 020164      LDA     0,LINE1
15 02675 040061      STA     0,LINUM
16 02676 101300      MOVS   0,0
17 02677 040307      STA     0,LINS
18
19 02700 002401      END1:  JMP     @,+1
20 02701 000451      A00
21
22 02702 001400      CRCDG: JMP     0,3                ;RETURN
23 02703 024307      GOGO:  LDA     1,LINS
24 02704 020242      LDA     0,C14                ;HOW = # OF BITS/CHAR + RTS
25 02705 123000      ADD     1,0
26 02706 062030      DOB    0,SLA
27 02707 020237      LDA     0,C10
28 02710 030275      LDA     2,CB1
29 02711 143000      ADD     2,0
30 02712 123000      ADD     1,0
31 02713 062030      DOB    0,SLA                ;TURN ON THE RECVR
32 02714 020136      LDA     0,SYNMD
33 02715 030277      LDA     2,C1400
34 02716 133000      ADD     1,2
35 02717 113000      ADD     0,2
36 02720 072030      DOB    2,SLA                ;SET SYN WORD
37 02721 020140      LDA     0,DLEWD
38 02722 152620      SUBZR  2,2
39 02723 133000      ADD     1,2
40 02724 113000      ADD     0,2
41 02725 072030      DOB    2,SLA                ;SET DLE WORD
42 02726 020136      LDA     0,SYNMD
43 02727 030277      LDA     2,C1400
44 02730 133000      ADD     1,2
45 02731 113000      ADD     0,2
46 02732 123000      ADD     1,0
47 02733 001400      JMP     0,3
48 02734 054055      HIT1: STA     3,HIRET
49 02735 050205      STA     2,SAV2
50 02736 024230      LDA     1,C2
51 02737 044056      STA     1,HICT
52 02740 111000      MOV     0,2
53 02741 071030      DOB    2,SLA                ;START LINE NON-XPARENT MODE
54 02742 006210      JSR    @TIME
55 02743 063630      SKPDN  SLA
56 02744 101002      MOV     0,0,SZC
57 02745 006123      EHALT                ;DONE NEVER SET
58 02746 064630      DIAC   1,SLA
59 02747 127133      ADDZL# 1,1,SNR
60 02750 000772      JMP     .-6

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0029 05501
01 02751 020301 LDA 0,C374H
02 02752 123400 AND 1,0
03 02753 034307 LDA 3,LINS
04 02754 116434 SUBZ# 0,3,SZR
05 02755 000765 JMP .-11.
06 02756 014056 DSZ HICT
07 02757 000762 JMP .-14.
08 02760 141000 MOV 2,0
09 02761 030205 LDA 2,SAV2
10 02762 002055 JMP @HIRET
11 02763 044204 HIT2: STA 1,SAV1 ;START LINE XPARENT MODE
12 02764 050205 STA 2,SAV2
13 02765 054055 STA 3,HIRET
14 02766 111000 MOV 0,2
15 02767 071030 DOR 2,SLA
16 02770 006210 JSR @TIME
17 02771 053630 SKPDN SLA
18 02772 101002 MOV 0,0,SZC
19 02773 006123 EHALT ;DONE NEVER SET
20 02774 064630 DIAC 1,SLA
21 02775 127133 ADDZL# 1,1,SNC
22 02776 000772 JMP .-6
23 02777 071030 DOR 2,SLA
24 03000 006210 JSR @TIME
25 03001 053630 SKPDN SLA
26 03002 101002 MOV 0,0,SZC
27 03003 006123 EHALT ;DONE NEVER SET
28 03004 064630 DIAC 1,SLA
29 03005 127133 ADDZL# 1,1,SNC
30 03006 000772 JMP .-6
31 03007 126620 SUBZR 1,1
32 03010 133000 ADD 1,2
33 03011 151400 INC 2,2
34 03012 071030 DOR 2,SLA
35 03013 141000 MOV 2,0
36 03014 030205 LDA 2,SAV2
37 03015 024204 LDA 1,SAV1
38 03016 002055 JMP @HIRET
39 03017 064630 HIT3: DIAC 1,SLA ;CHECK FOR T. I.
40 03020 127133 ADDZL# 1,1,SNC
41 03021 000776 JMP .-2
42 03022 001400 JMP 0,3
43 03023 064630 HIT4: DIAC 1,SLA ;CHECK FOR R. I.
44 03024 125133 MOVZL# 1,1,SNC
45 03025 000776 JMP .-2
46 03026 001400 JMP 0,3
47 03027 020307 HIT5: LDA 0,LINS ;TURN RECVR OFF
48 03030 024275 LDA 1,CB1
49 03031 123000 ADD 1,0
50 03032 062030 DOB 0,SLA
51 03033 001400 JMP 0,3
52 03034 020307 HIT6: LDA 0,LINS ;TURN RECVR ON
53 03035 024275 LDA 1,CB1
54 03036 123000 ADD 1,0
55 03037 024242 LDA 1,C14
56 03040 123000 ADD 1,0
57 03041 062030 DOB 0,SLA
58 03042 001400 JMP 0,3
59 03043 054305 RTIME: STA 3,TRET ;SUBROUTINE TO TIME BETWEEN T. I.
60 03044 024241 LDA 1,C12 ;DONE FLAGS. AC0=NO OF BITS PER

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0000 05501
01 03045 044146 STA 1,CT?R ;CHAR (4=8, 5=7, AND 6=6).
02 03046 024307 LDA 1,LINS
03 03047 123000 ADD 1,0
04 03050 062030 DOB 0,SLA
05 03051 065030 DOA 1,SLA
06 03052 006210 JSR @TIME
07 03053 063630 SKPDN SLA
08 03054 014146 DSZ CT?R
09 03055 000774 JMP .-4
10 03056 002305 JMP @TRET
11 03057 024061 LINIT: LDA 1,LINUM
12 03060 125400 INC 1,1
13 03061 044061 STA 1,LINUM
14 03062 125300 MOVS 1,1
15 03063 044307 STA 1,LINS
16 03064 001400 JMP 0,3
17 ;START OF THE RELIABILITY PART OF THE PROGRAM.
18 ;FIND WHICH PROCESSOR IS IN USE AND
19 ;SET TIME BASE
20 03065 040310 . . STB: STA 0,RPTSW
21 ;INITIALIZATION
22 03066 062677 INT0: IORST
23 03067 102440 SUB0 0,0
24 03070 040203 STA 0,SAV0
25 03071 040062 STA 0,FLTSW
26 03072 040151 STA 0,ERRSW
27 03073 040213 STA 0,TRNSW
28 03074 034075 LDA 3,APEND ;CLEAR ALL BUFFERS TO 0
29 03075 030074 LDA 2,AXMT
30 03076 041000 STA 0,0,2
31 03077 151400 INC 2,2
32 03100 156434 SUBZ# 2,3,SZR
33 03101 000775 JMP .-3
34 03102 020072 LDA 0,CONST ;SET INITIAL CONDITIONS
35 03103 040071 STA 0,RANDOM
36 03104 020232 LDA 0,C4
37 03105 040153 STA 0,HOW
38 03106 020266 LDA 0,C320
39 03107 040136 STA 0,SYNMD
40 03110 020265 LDA 0,C300
41 03111 040140 STA 0,DLEMD
42 03112 102400 INT1: SUB 0,0 ;SET LINE CONDITIONS.
43 03113 040307 STA 0,LINS
44 03114 040061 STA 0,LINUM
45 03115 020260 LDA 0,C100
46 03116 040053 STA 0,GPCTR
47 03117 006107 SETLINF
48 03120 006124 LINCH
49 03121 014053 DSZ GPCTR
50 03122 000775 JMP .-3
51 03123 102400 INT2: SUB 0,0
52 03124 040307 STA 0,LINS
53 03125 040061 STA 0,LINUM ;WORKING LINE #
54 03126 040060 STA 0,ALIN ;LINES ACTIVE SW
55 03127 024232 INT3: LDA 1,C4
56 03130 044066 STA 1,TCTR
57 03131 006100 JSR @ACL ;CHECK LINE IN (LINUM)
58 03132 006124 LINCH
59 03133 020061 LDA 0,LINUM
60 03134 024260 LDA 1,C100

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0031 05501
01 03135 123405 AND 1,0,SNR ;ALL 64 LINES TRIED?
02 03136 000771 JMP INT3
03 03137 020060 LDA 0,ALIN
04 03140 101004 MOV 0,0,SZR ;NO LINES THAT DEV CODE TRY NEXT
05 03141 000425 JMP STUP
06 03142 030147 INT4: LDA 2,DEVICE ;CHECK OTHER DEVICE CODES
07 03143 020223 LDA 0,K71 ;IF IT WAS 30 MAKE IT 71
08 03144 024222 LDA 1,K70
09 03145 034221 LDA 3,K31
10 03146 112415 SUB# 0,2,SNR
11 03147 020223 LDA 0,K70 ;IF IT WAS 71, MAKE IT 70
12 03150 132415 SUB# 1,2,SNR
13 03151 020221 LDA 0,K31 ;IF IT WAS 70 MAKE IT 31
14 03152 172415 SUB# 3,2,SNR
15 03153 020220 LDA 0,K30 ;IF IT WAS 31 MAKE IT 30
16 03154 040147 STA 0,DEVICE
17 03155 006156 JSR @IDVCD
18 03156 102400 SUB 0,0
19 03157 040061 STA 0,LINUM
20 03160 010062 ISZ FLTSM
21 03161 030062 LDA 2,FLTSM
22 03162 024232 LDA 1,C4 ;ALL POSSIBLE CODES TRIED?
23 03163 146414 SUB# 2,1,SZR
24 03164 000726 JMP INT1
25 03165 000401 JMP STUP
26 ;GET TEST PARAMETERS & LINE NUMBERS
27 ;FOR LINES UNDER TEST IF ANY ACTIVE LINES
28 ;WERE FOUND
29 03166 062677 STUP: IORST
30 03167 020060 LDA 0,ALIN ;ANY LINS TO TEST?
31 03170 101004 MOV 0,0,SZR
32 03171 000413 JMP INIT1
33 03172 006103 PCRLF
34 03173 006104 MESSAGE ;NO!!
35 03174 005427 MSG14 ;"NO ACTIVE LINES"
36 03175 024046 LDA 1,EGGS
37 03176 125005 MOV 1,1,SNR
38 03177 000403 JMP .+3
39 03200 034052 LDA 3,EGGS+4
40 03201 001400 JMP 0,3
41 03202 063077 HALT
42 03203 000777 JMP .-1 ;RESTART!!
43 ;SET MODE, # BITS/CHAR, AND # CHAR TO SEND
44 03204 024070 INIT1: LDA 1,TINT
45 03205 044001 STA 1,1
46 03206 060177 INTEN
47 03207 020071 LDA 0,RANDOM ;GET A RANDOM WORD
48 03210 006113 RAND
49 03211 101133 MOVZL# 0,0,SNC ;IF BIT 0 = 1, SET XPARENT SWITCH
50 03212 000403 JMP .+3
51 03213 126520 SUBZL 1,1
52 03214 044213 STA 1,TRNSW
53 03215 024231 LDA 1,C3
54 03216 107400 AND 0,1
55 03217 030232 LDA 2,C4
56 03220 125236 MOVZR# 1,1,SEZ ;USE BITS 14 & 15 TO SET BITS/CHAR
57 03221 126440 SUBO 1,1 ;IF = 3, USE 8 BITS/CHAR
58 03222 133000 ADD 1,2
59 03223 050153 STA 2,HOW
60 03224 030267 LDA 2,C377

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0032 05501
01 03225 125005      MOV     1, 1, SNR
02 03226 000405      JMP     .+5
03 03227 151220      MOVZR  2, 2
04 03230 125225      MOVZR  1, 1, SNR
05 03231 000402      JMP     .+2
06 03232 151220      MOVZR  2, 2
07 03233 151300      MOVS   2, 2
08 03234 050215      STA     2, WHICH      ; STORE CHAR MASK
09 03235 024266      LDA     1, C320
10 03236 030153      LDA     2, HOW
11 03237 034232      LDA     3, 04
12 03240 156435      SUB2#  2, 3, SNR
13 03241 000406      JMP     .+6
14 03242 125220      MOVZR  1, 1
15 03243 175400      INC     3, 3
16 03244 156435      SUB2#  2, 3, SNR
17 03245 000402      JMP     .+2
18 03246 125220      MOVZR  1, 1
19 03247 044136      STA     1, SYNWD
20 03250 030245      LDA     2, C20
21 03251 146400      SUB     2, 1
22 03252 044140      STA     1, DLEWD
23 03253 006113      RAND           ; GET ANOTHER
24 03254 024257      LDA     1, C77
25 03255 107400      AND     0, 1
26 03256 125005      MOV     1, 1, SNR
27 03257 125400      INC     1, 1
28 03260 125400      INC     1, 1
29 03261 044175      STA     1, NCHR      ; USE LAST FIVE BITS FOR # OF CHAR
30 03262 024301      LDA     1, C374H     ; TO SEND ON LINE 1
31 03263 107700      ANDS   0, 1
32 03264 125005      MOV     1, 1, SNR   ; USE FIRST HALF TO SET # OF CHAR
33 03265 125400      INC     1, 1       ; TO SEND ON LINE 2
34 03266 125400      INC     1, 1
35 03267 044176      STA     1, NCHR+1
36 03270 040071      STA     0, RANDOM
37                      ; SELECT THE TWO LINS TO TEST
38 03271 102440      SUB0   0, 0
39 03272 040151      STA     0, ERRSW
40 03273 040061      STA     0, LINUM
41 03274 040167      STA     0, LIN1
42 03275 040170      STA     0, LIN2
43 03276 024310      LDA     1, RPTSW
44 03277 125004      MOV     1, 1, SZR
45 03300 000440      JMP     INIT8
46 03301 040166      STA     0, LINES
47 03302 040206      STA     0, SNGSW
48 03303 006101 .BEG: GET
49 03304 007102      MSKBUF
50 03305 101223      MOVZR  0, 0, SNC     ; COUNT THE ACTIVE LINES
51 03306 000407      JMP     .DONE
52 03307 020166      LDA     0, LINES
53 03310 024061      LDA     1, LINUM
54 03311 044165      STA     1, LINE2
55 03312 101005      MOV     0, 0, SNR
56 03313 044164      STA     1, LINE1
57 03314 010166      ISZ    LINES
58 03315 010061 .DONE: ISZ    LINUM
59 03316 020061      LDA     0, LINUM
60 03317 024260      LDA     1, C100

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0033 09501
01 03320 106434 SUBZ# 0,1, SZR ; FINISHED LOOKING AT ALL LINES?
02 03321 000762 JMP .BEG
03 03322 014166 DSZ LINES
04 03323 000401 JMP .+1
05 03324 020166 LDA 0, LINES
06 03325 101015 MOV# 0, 0, SNR ; SKIP IF MORE THAN ONE LINE IN SYSTEM
07 03326 010206 ISZ SNOSW
08 03327 101015 MOV# 0, 0, SNR
09 03330 101400 INC 0, 0
10 03331 126520 SUBZL 1, 1
11 03332 106433 SUBZ# 0, 1, SNC ; SKIP IF LESS THAN 3 LINES IN SYSTEM
12 03333 000416 JMP INIT2
13 03334 020164 LDA 0, LINE1
14 03335 040167 STA 0, LIN1
15 03336 024165 LDA 1, LINE2
16 03337 000420 JMP INIT4-1
17 03340 020166 INIT8: LDA 0, LINES
18 03341 126520 SUBZL 1, 1
19 03342 106433 SUBZ# 0, 1, SNC
20 03343 000406 JMP INIT2
21 03344 020164 LDA 0, LINE1
22 03345 040167 STA 0, LIN1
23 03346 024165 LDA 1, LINE2
24 03347 044170 STA 1, LIN2
25 03350 000411 JMP INIT4+1
26 03351 005127 INIT2: GETONE ; THREE OR MORE ACTIVE LINES
27 03352 044167 STA 1, LIN1 ; AVAILABLE. RANDOMLY SELECT TWO OF
28 03353 006127 INIT3: GETONE ; THEM.
29 03354 034167 LDA 3, LIN1
30 03355 136435 SUBZ# 1, 3, SNR
31 03356 000775 JMP INIT3
32 03357 044170 STA 1, LIN2
33 03360 020167 INIT4: LDA 0, LIN1
34 03361 122032 ADCZ# 1, 0, SZC ; SKIP UNLESS (AC1) < (AC0)
35 03362 000407 JMP INIT6
36 03363 044167 STA 1, LIN1
37 03364 040170 STA 0, LIN2
38 03365 024175 LDA 1, NCHR
39 03366 020176 LDA 0, NCHR+1
40 03367 040175 STA 0, NCHR
41 03370 044176 STA 1, NCHR+1
42 ; GET CHAR TO BE TRANSMITTED
43 03371 006126 INIT6: FILUM ; FILL XMT BUFFER WITH RANDOM NUMBERS
44 03372 034213 LDA 3, TRNSW ; IF XPARENT SWITCH SET, SET BIT0 IN
45 03373 175005 MOV 3, 3, SNR ; EACH WORD OF THE BUFFER
46 03374 000414 JMP INIT7
47 03375 030270 LDA 2, C400
48 03376 050146 STA 2, CT?R
49 03377 024074 LDA 1, AXMT
50 03400 044020 STA 1, 20
51 03401 044021 STA 1, 21
52 03402 176620 SUBZR 3, 3
53 03403 022020 LDA 0, 020
54 03404 163000 ADD 3, 0
55 03405 042021 STA 0, 021
56 03406 014146 DSZ CT?R
57 03407 000774 JMP .-4
58 ; ACTIVATE THE LINES UNDER TEST
59 03410 060277 INIT7: INTDS
60 03411 006325 JSR @IRST ; IORST WITH DELAY

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0034 05501
01 03412 030213 LDA 2, TRNSW
02 03413 151004 MOV 2, 2, SZR
03 03414 000403 JMP .+3
04 03415 030136 LDA 2, SYNWD
05 03416 050140 STA 2, DLEWD
06 03417 024067 LDA 1, IINT ;SET INTERRUPT ADDR
07 03420 044001 STA 1, 1
08 03421 020074 LDA 0, AXMT ;SET COUNTERS AND START LINES
09 03422 040020 STA 0, 20
10 03423 020073 LDA 0, AREC
11 03424 040021 STA 0, 21
12 03425 102440 SUB0 0, 0
13 03426 040146 STA 0, CT?R
14 03427 024175 LDA 1, NCHR
15 03430 020167 LDA 0, LIN1 ;1ST ACTIVE LINE TO BE TESTED
16 03431 006132 FILIT
17 03432 006131 STRTIT
18 03433 020206 LDA 0, SNGSW
19 03434 101014 MOV# 0, 0, SZR
20 03435 000405 JMP WLUP ;1 ACTIVE LINE IN THE SYSTEM
21 03436 020170 LDA 0, LIN2
22 03437 024176 LDA 1, NCHR+1 ;2ND ACTIVE LINE TO BE TESTED
23 03440 006132 FILIT
24 03441 006131 STRTIT
25 03442 030232 WLUP: LDA 2, 04
26 03443 050306 STA 2, ITR
27 03444 050054 STA 2, ICTR
28 03445 063630 SKPDN SLA
29 03446 000777 JMP .-1
30 03447 064630 DIAC 1, SLA
31 03450 125133 MOVZL# 1, 1, SNC ;WAIT FOR 4 R. I. 'S ON LAST LINE
32 03451 000774 JMP .-4 ;STARTED.
33 03452 030301 LDA 2, C374H
34 03453 133400 AND 1, 2
35 03454 034307 LDA 3, LINS
36 03455 156434 SUBZ# 2, 3, SZR
37 03456 000767 JMP .-9.
38 03457 014054 DSZ ICTR
39 03460 000765 JMP .-11.
40 ; IDLE TIME WAIT LOOP
41 03461 102440 WLUP1: SUB0 0, 0 ;PRESET COUNTER
42 03462 040053 STA 0, GPCTR
43 03463 060177 INTEN ;TURN ON INTERRUPT HERE ONLY
44 03464 000401 JMP .+1
45 03465 010053 ISZ GPCTR ;NO INTERRUPTS FOR SOME TIME
46 03466 000775 JMP .-3
47 03467 014306 DSZ ITR
48 03470 000771 JMP WLUP1 ;ALL LINES FINISHED OR THEY
49 03471 060277 INTDS ;DIDN'T WORK
50 ;TEST THE RESULTS OF THIS PASS
51 03472 024070 CHKRES: LDA 1, TINT ;CHECK THE RESULTS
52 03473 044001 STA 1, 1
53 03474 060177 INTEN
54 03475 020074 LDA 0, AXMT
55 03476 040020 STA 0, 20
56 03477 020073 LDA 0, AREC
57 03500 040021 STA 0, 21
58 03501 102440 SUB0 0, 0
59 03502 040324 STA 0, ITSW
60 03503 040171 STA 0, LN1CT

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0035 05501

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01 03504 040172 STA 0, LN2CT
02 03505 030206 LDA 2, SNGSW
03 03506 151014 MOV# 2, 2, SZR
04 03507 000406 JMP . +6
05 03510 030074 LDA 2, AXMT
06 03511 021001 LDA 0, 1, 2
07 03512 025002 LDA 1, 2, 2
08 03513 041002 STA 0, 2, 2
09 03514 045001 STA 1, 1, 2
10 03515 034140 CHK1: LDA 3, DLEND ; RECDV CHAR = DLE ??
11 03516 030267 LDA 2, C377
12 03517 026021 LDA 1, @21
13 03520 133400 AND 1, 2
14 03521 156435 SUBZ# 2, 3, SNR
15 03522 000774 JMP CHK1+1 ; YES GET NEXT CHAR
16 03523 030267 LDA 2, C377
17 03524 155000 MOV 2, 3
18 03525 022020 LDA 0, @20 ; NO, WAS IT THE NEXT CHAR SENT?
19 03526 113400 AND 0, 2
20 03527 137400 AND 1, 3
21 03530 156434 SUBZ# 2, 3, SZR
22 03531 004543 JSR ERROR ; NO, IT WASN'T AN ERROR OCCURED
23 03532 020167 LDA 0, LIN1 ; YES, WHICH LINE HANDLED IT?
24 03533 030301 LDA 2, C374H
25 03534 133700 ANDS 1, 2
26 03535 112434 SUBZ# 0, 2, SZR
27 03536 000403 JMP . +3
28 03537 010171 ISZ LN1CT ; COUNT THE CHAR ON EACH LINE
29 03540 000416 JMP CHK2
30 03541 020170 LDA 0, LIN2
31 03542 030301 LDA 2, C374H
32 03543 133700 ANDS 1, 2
33 03544 112434 SUBZ# 0, 2, SZR
34 03545 000403 JMP . +3
35 03546 010172 ISZ LN2CT
36 03547 000407 JMP CHK2
37 03550 044204 STA 1, SAV1 ; CANNOT IDENTIFY THE LINE NUMBER
38 03551 006103 PCRLF
39 03552 006104 MESSAGE
40 03553 005457 MSG25 ; UNIDENTIFIABLE WORD
41 03554 024204 LDA 1, SAV1
42 03555 006112 TYPAC1
43 03556 014146 CHK2: DSZ CT?R
44 03557 000736 JMP CHK1
45 03560 102440 CHK3: SUBO 0, 0
46 03561 040324 STA 0, ITSW
47 03562 020167 LDA 0, LIN1 ; DO NUMBER OF CHAR SENT = # RECDV?
48 03563 024171 LDA 1, LN1CT
49 03564 030175 LDA 2, NCHR
50 03565 132434 SUBZ# 1, 2, SZR
51 03566 004547 JSR LNLOSS ; LOSS OF ACTIVITY LINE1
52 03567 006130 BUMPIT ; ADD TO XMT AND RCV CTRS
53 03570 020206 LDA 0, SNGSW
54 03571 101014 MOV# 0, 0, SZR
55 03572 000407 JMP CHK4 ; 1 LINE IN THE SYSTEM
56 03573 020170 LDA 0, LIN2
57 03574 024172 LDA 1, LN2CT
58 03575 030176 LDA 2, NCHR+1
59 03576 132434 SUBZ# 1, 2, SZR
60 03577 004536 JSR LNLOSS ; LOSS OF ACTIVITY LINE 2
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0036 CSSCI
01 03600 006130      BUMPIT
02 03601 020201  CHK4: LDA      0, PRSW      ; INCREMENT XMT & RCY COUNTERS
03 03602 101004      MOV      0, 0, SZR      ; DID ANY COUNTER OVERFLOW?
04 03603 006157      JSR      @IPRIN
05 03604 020201      LDA      0, PRSW
06 03605 101005      MOV      0, 0, SNR
07 03606 000412      JMP      CHK6
08 03607 030162      LDA      2, ITTAB      ; YES PRINT STATISTICS
09 03610 024270      LDA      1, 0400
10 03611 044306      STA      1, ITR
11 03612 126440      SUBO    1, 1
12 03613 045200      STA      1, -200, 2
13 03614 151400      INC      2, 2
14 03615 014306      DSZ     ITR
15 03616 000775      JMP      . -3
16 03617 044201      STA      1, PRSW
17 03620 024046  CHK6: LDA      1, EGG5
18 03621 125005      MOV      1, 1, SNR
19 03622 000413      JMP      . +11
20 03623 014050      DSZ     EGG5+2
21 03624 000402      JMP      . +2
22 03625 002446      JMP      @CHK7
23 03626 014051      DSZ     EGG5+3
24 03627 000406      JMP      . +6
25 03630 062677      IORST
26 03631 034052      LDA      3, EGG5+4
27 03632 020051      LDA      0, EGG5+3
28 03633 041776      STA      0, -2, 3
29 03634 001400      JMP      0, 3
30 03635 024151      LDA      1, ERRSW
31 03636 125005      MOV      1, 1, SNR      ; DID ANY ERRORS OCCUR?
32 03637 000404      JMP      . +4          ; NO START OVER
33 03640 074477      READS   3          ; YES, LOOK AT BIT 0 TO SEE IF
34 03641 175133      MOVZL#  3, 3, SNC      ; WE SHUD LOOP OR START OVER
35 03642 002406      JMP      @CHK5        ; BIT0 = 0, LOOPIT
36 03643 102440      SUBO    0, 0          ; CLEAR ERROR SWITCH AND START OVER
37 03644 040151      STA      0, ERRSW
38 03645 040213      STA      0, TRNSW
39 03646 002401      JMP      0, +1
40 03647 003204      INIT1
41 03650 003410  CHK5: INIT7
42 03651 054421  RST:  STA      3, CIRET      ; IORST FOLLOWED BY 100 USEC DELAY
43 03652 034416      LDA      3, CITR
44 03653 054416      STA      3, CITR1
45 03654 062677      IORST
46 03655 060000      NIO     0
47 03656 014413      DSZ     CITR1
48 03657 000776      JMP      . -2
49 03660 034237      LDA      3, C10
50 03661 076030      DOB     3, SLA
51 03662 176440      SUBO    3, 3
52 03663 002407      JMP      @CIRET
53 03664 034224  DLY:  LDA      1, M1000
54 03665 125404      INC      1, 1, SZR
55 03666 000777      JMP      . -1
56 03667 001400      JMP      0, 3
57 03670 000031  CTR:  25.
58 03671 000000  CTR1:  0
59 03672 000000  CIRET:  0
60 03673 000444  CHK7:  A00-5

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01 ;PRINT ERRORS AS THEY ARE FOUND
02 03674 054063 ERROR: STA 3,ERRET ;AN ERROR OCCURED
03 03675 040203 STA 0,SAV0
04 03676 044204 STA 1,SAV1
05 03677 020324 LDA 0,ITSM
06 03700 101004 MOV 0,0,SZR
07 03701 000404 JMP .+4
08 03702 006103 PCRLF
09 03703 006104 MESSAGE
10 03704 005472 MSG26 ;LINE GOOD BAD
11 03705 034324 LDA 3,ITSM
12 03706 030231 LDA 2,C3
13 03707 172033 ADCZ# 3,2,SNC
14 03710 002063 JMP @ERRET
15 03711 006103 PCRLF
16 03712 024204 LDA 1,SAV1
17 03713 030301 LDA 2,C374H
18 03714 147700 ANDS 2,1
19 03715 006106 TYPDEC ;PRINT LINE NUMBER
20 03716 024203 LDA 1,SAV0
21 03717 030267 LDA 2,C377
22 03720 147400 AND 2,1
23 03721 006112 TYPAC1 ;PRINT GOOD CHAR
24 03722 024204 LDA 1,SAV1
25 03723 030267 LDA 2,C377
26 03724 147400 AND 2,1
27 03725 006112 TYPAC1 ;PRINT BAD CHAR
28 03726 006103 PCRLF
29 03727 126520 SUBZL 1,1
30 03730 044151 STA 1,ERRSW
31 03731 010324 ISZ ITSM
32 03732 000401 JMP .+1
33 03733 024204 LDA 1,SAV1
34 03734 002063 JMP @ERRET
35 ; NO OF CHAR RECVD < # OF CHAR SENT ON THIS LINE
36 03735 054063 LNLOSS: STA 3,ERRET
37 03736 040204 STA 0,SAV1
38 03737 006103 PCRLF
39 03740 006104 MESSAGE
40 03741 005413 MSG13 ;LOSS OF ACTIVITY LINE
41 03742 024204 LDA 1,SAV1
42 03743 006106 TYPDEC
43 03744 020204 LDA 0,SAV1
44 03745 002063 JMP @ERRET
45 ;SEE IF THE LINE IN (LINUM) IS PRESENT
46 ;AND WIRED FOR CLOSED LOOP TESTING.
47 03746 054142 CKLIN: STA 3,CKLRET ;SYNC THE LINE IF POSSIBLE
48 03747 024307 LDA 1,LINS
49 03750 065030 DOR 1,SLA
50 03751 000401 JMP .+1 ;WAIT (NO-OP)
51 03752 063430 SKPBN SLA
52 03753 002142 JMP @CKLRET ;BUSY NEVER SET - RETURN
53 03754 006210 JSR @TIME
54 03755 063630 SKPDN SLA
55 03756 101002 MOV 0,0,SZC ;RETURN IF DONE NEVER SET
56 03757 002142 JMP @CKLRET
57 03760 065030 DOR 1,SLA
58 03761 006210 JSR @TIME
59 03762 063630 SKPDN SLA
60 03763 101002 MOV 0,0,SZC

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0038 C5501
01 03764 002142      JMP      @CKLRET
02 03765 034301      LDA      3, C374H
03 03766 070430      DRA      2, SLA
04 03767 173400      AND      3, 2
05 03770 132434      SUB2#    1, 2, SZR
06 03771 002142      JMP      @CKLRET      ;LINE NO'S ARE DIFFERENT
07 03772 066030      DOB      1, SLA      ;TURN OFF THE XMITTER
08 03773 020340      LDA      0, C10.
09 03774 040146      STA      0, CT?R
10 03775 020246      LDA      0, C20.
11 03776 040173      STA      0, MCTR
12 03777 006107      SETLINE
13 04000 006110      STRTLIN
14 04001 020267      LDA      0, C377
15 04002 024307      LDA      1, LINS
16 04003 107000      ADD      0, 1
17 04004 010060      ISZ      ALIN
18 04005 065030      DOR      1, SLA
19 04006 006210      JSR      @TIME
20 04007 063630      SKPDN    SLA
21 04010 060630      DIAC     0, SLA
22 04011 103132      ADD2L#   0, 0, SZC
23 04012 000773      JMP      .-5
24 04013 014173      DSZ      MCTR      ;20 T. I. S W/O R. I. ? LINE NOT
25 04014 101133      MOV2L#   0, 0, SNC ;AH 50, IT IS CLOSED LOOP
26 04015 000425      JMP      EREX      ;FALSE DONE FLAG, TRANS ERROR
27 04016 014146      DSZ      CT?R      ;TRY 10TH CHARACTER
28 04017 000767      JMP      .-9.
29 04020 006325      JSR      @IRST
30 04021 030301      LDA      2, C374H  ;READ CHAR RECEIVED
31 04022 113700      AND5     0, 2      ;LINE # MASK
32 04023 050302      STA      2, MUL1   ;SAVE LINE # FOR PRINTING
33 04024 024267      LDA      1, C377
34 04025 107400      AND      0, 1
35 04026 006102      PUT      ;SAVE THE CHAR RECEIVED
36 04027 007102      MSKBUF   ;FOR A MASK
37 04030 006103      PCRLF
38 04031 006104      MESSAGE
39 04032 005450      MSG19    ;DEVICE CODE
40 04033 024147      LDA      1, DEVICE
41 04034 006105      TYP21
42 04035 006104      MESSAGE
43 04036 005361      MSG6     ;"LINE"
44 04037 024302      LDA      1, MUL1
45 04040 006106      TYPDEC   ;LINE NUMBER
46 04041 002142      JMP      @CKLRET
47 04042 006103 EREX: PCRLF
48 04043 006104      MESSAGE
49 04044 005374      MSG9     ;TRANSMISSION ERROR
50 04045 102400      SUB      0, 0
51 04046 006102      PUT
52 04047 007102      MSKBUF
53 04050 014060      DSZ      ALIN
54 04051 000401      JMP      .+1
55 04052 014066      DSZ      TCTR
56 04053 002402      JMP      @.+2
57 04054 002142      JMP      @CKLRET
58 04055 003747      CKLIN+1
59      ;SLA INTERRUPT HANDLER
60 04056 063630 INTER: SKPDN    SLA      ;SLA INTERRUPTS ONLY !!

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0039 CSSCI

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01 04057 002000      JMP      @0
02 04060 064630      DIAC     1, SLA
03 04061 125132      MOVZL#  1, 1, SZC
04 04062 000425      JMP     IRCV
05 04063 127133      ADDZL#  1, 1, SNC
06 04064 002077      JMP     @. . INR
07 04065 020301 IXMT: LDA     0, C374H      ; TRANSMITTER INTERRUPT
08 04066 123700      ANDS    1, 0
09 04067 030162      LDA     2, ITTAB
10 04070 113000      ADD     0, 2
11 04071 015000      DSZ     0, 2      ; COUNT WDS SENT
12 04072 000410      JMP     . +8
13 04073 024136      LDA     1, SYNWD      ; IF ALL DATA XMITTED SEND SYNWD
14 04074 101300      MOVS    0, 0
15 04075 152620      SUBZR   2, 2
16 04076 143000      ADD     2, 0
17 04077 123000      ADD     1, 0
18 04100 061030      DOR     0, SLA
19 04101 002077      JMP     @. . INR
20 04102 026020      LDA     1, @20      ; GET NEW CHAR
21 04103 101300      MOVS    0, 0
22 04104 123000      ADD     1, 0      ; ADD LINE NUMBER
23 04105 061030      DOR     0, SLA      ; SEND IT
24 04106 002077      JMP     @. . INR      ; RETURN
25                                ; RECEIVER INTERRUPT
26 04107 030136 IRCV: LDA     2, SYNWD      ; IS RCVD CHAR = SYN??
27 04110 034267      LDA     3, C377
28 04111 137400      AND     1, 3
29 04112 156435      SUBZ#   2, 3, SNR
30 04113 002077      JMP     @. . INR      ; YES, RETURN
31 04114 046021      STA     1, @21      ; NO, STORE IT
32 04115 020301      LDA     0, C374H
33 04116 123700      ANDS    1, 0
34 04117 030160      LDA     2, IRTAB
35 04120 113000      ADD     0, 2
36 04121 015000      DSZ     0, 2      ; ALL CHAR RECVD THIS LINE?
37 04122 002077      JMP     @. . INR      ; NO, RETURN
38 04123 101300      MOVS    0, 0      ; YES, TURN OFF THE RECVR
39 04124 062030      DOB     0, SLA      ; AND THE TRANSMITER
40 04125 024275      LDA     1, CB1
41 04126 123000      ADD     1, 0
42 04127 062030      DOB     0, SLA
43 04130 002077      JMP     @. . INR
44                                ; TELETYPE INTERRUPT HANDLER
45 04131 063610 TINTR: SKPDN   TTI      ; TELETYPE INTERRUPTS ONLY
46 04132 002000      JMP     @0
47 04133 060210      NIOC    TTI
48 04134 040416      STA     0, SV0      ; SAVE THE ACCUMULATOR CONTENTS
49 04135 101100      MOVL    0, 0
50 04136 040420      STA     0, . . SVC
51 04137 044414      STA     1, SV1
52 04140 050414      STA     2, SV2
53 04141 054414      STA     3, SV3
54 04142 006157      JSR     @IPRIN      ; PRINT THE STATISTICS
55 04143 020413      LDA     0, . . SVC      ; RESTORE THE ACCUMULATORS
56 04144 101200      MOVR    0, 0
57 04145 020405      LDA     0, SV0
58 04146 024405      LDA     1, SV1
59 04147 030405      LDA     2, SV2
60 04150 034405      LDA     3, SV3

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0040 05501
01 04151 002000      JMP      @0          ;RETURN TO THE MAIN PROGRAM
02 04152 000000 SV0:  0
03 04153 000000 SV1:  0
04 04154 000000 SV2:  0
05 04155 000000 SV3:  0
06 04156 000000 ..SVC: 0
07                    ;GETONE
08 04157 054063 .GET1: STA      3,ERRET      ;GET A RANDOM LINE NO BETWEEN
09 04160 020071      LDA      0,RANDOM      ;0 AND 63, IT MUST BE LESS THAN OR
10 04161 006113      RAND                    ;EQUAL TO THE HIGHEST LINE
11 04162 040071      STA      0,RANDOM      ;IN THE SYSTEM, AND MUST BE ACTIVE
12 04163 024301      LDA      1,C374H
13 04164 107700      ANDS     0,1
14 04165 030165      LDA      2,LINE2
15 04166 146032      ADCZ#   2,1,SZC
16 04167 000771      JMP      .GET1+1
17 04170 030164      LDA      2,LINE1
18 04171 132032      ADCZ#   1,2,SZC
19 04172 000766      JMP      .GET1+1
20 04173 044061      STA      1,LINUM
21 04174 006101      GET
22 04175 007102      MSKBUF
23 04176 101223      MOVZR   0,0,SNC
24 04177 000761      JMP      .GET1+1
25 04200 002063      JMP      @ERRET
26                    ;BUMPIT
27 04201 054063 .BUMP: STA      3,ERRET      ;AND THE # OF CHAR SENT AND RECD
28 04202 050205      STA      2,SAV2      ;TO THE XMTCTR AND RCVCTR.
29 04203 040061      STA      0,LINUM     ;AC0 = LINE #
30 04204 006101      GET
31 04205 007202      RCVCTR      ;AC1 = # OF RECD CHARS
32 04206 123000      ADD      1,0
33 04207 041000      STA      0,0,2      ;AC2 = # OF CHAR SENT
34 04210 024260      LDA      1,C100
35 04211 133000      ADD      1,2
36 04212 024205      LDA      1,SAV2
37 04213 021000      LDA      0,0,2
38 04214 123000      ADD      1,0
39 04215 041000      STA      0,0,2
40 04216 103132      ADDZL#   0,0,SZC      ; IF # OF CHAR > 16384 SET PRSW
41 04217 010201      ISZ     PRSW
42 04220 002063      JMP      @ERRET
43                    ;STRTIT
44 04221 054064 .STRT: STA      3,STRET      ;START THE LINE WHOSE NUMBER
45 04222 040061      STA      0,LINUM     ;IS IN AC0.
46 04223 101300      MOVS     0,0
47 04224 040307      STA      0,LINS
48 04225 006107      SETLINE
49 04226 006110      STRTLINE
50 04227 002064      JMP      @STRET
51                    ;FILIT
52 04230 054064 FIL1: STA      3,STRET      ;AC0 = LINE #, AC1 = NCHR THIS LINE
53 04231 030146      LDA      2,CT?R
54 04232 133000      ADD      1,2
55 04233 050146      STA      2,CT?R      ;INCREMENT THE TOTAL CHAR CTR
56 04234 030160      LDA      2,IRTAB
57 04235 113000      ADD      0,2
58 04236 034213      LDA      3,TRNSW     ;SET XMT & RCV CNTRS
59 04237 175004      MOV      3,3,SZR
60 04240 125120      MOVZL   1,1          ; IF XPARFNT MODE INCLUDE DLE CHARS

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0041 05501
01 04241 045000   STA   1,0,2           ;STORE THE # OF CHAR TO BE RCVD
02 04242 175004   MOV   3,3,SZR        ;ON THIS LINE.
03 04243 125220   MOVZR 1,1
04 04244 125400   INC   1,1           ;INCLUDE DUMMY CHAR IN XMIT CTR
05 04245 045300   STA   1,-100,2      ;STORE THE # OF CHAR TO BE XMITTED
06 04246 002064   JMP   @STRET
07 04247 054202 PRIN: STA   3,PRET          ;PRINT THE STATS
08 04250 006103   PCRLF
09 04251 006104   MESSAGE
10 04252 005437   MSG18              ;"LINE SENT RECVD"
11 04253 102400   SUB   0,0
12 04254 040061   STA   0,LINUM
13 04255 006101 SUS1: GET
14 04256 007102   MSKBUF
15 04257 101203   MOVR  0,0,SNC
16 04260 000405   JMP   SUS2          ;ACTIVE LINES ONLY
17 04261 006101   GET
18 04262 007302   XMTCTR
19 04263 101004   MOV   0,0,SZR
20 04264 000410   JMP   SUS3          ;LINES UNDER TEST ONLY
21 04265 010061 SUS2: ISZ   LINUM
22 04266 020061   LDA   0,LINUM
23 04267 024260   LDA   1,C100
24 04270 122404   SUB   1,0,SZR
25 04271 000764   JMP   SUS1
26 04272 006103   PCRLF
27 04273 002202   JMP   @PRET
28 04274 006103 SUS3: PCRLF
29 04275 024061   LDA   1,LINUM
30 04276 006106   TYPDEC
31 04277 006101   GET
32 04300 007302   XMTCTR
33 04301 105000   MOV   0,1
34 04302 006106   TYPDEC              ;# OF CHAR SENT
35 04303 006101   GET
36 04304 007202   RCVCTR
37 04305 105000   MOV   0,1
38 04306 006106   TYPDEC              ;# OF CHAR RCVD
39 04307 000756   JMP   SUS2
40 04310 061000 CDOA: DOA   0,0
41
42
43 04311 005131 .CR:  CRLF+3
44 04312 004767 .MS:  MESS+3
45 04313 005021 .NUM:  TNUM
46 04314 005050 .OCT:  OCTAB
47 04315 005060 .DEC:  DECTB
48 04316 005070 ACHAR: CHAR.
49 04317 000045 .PCT:  "%"
50
51 04320 054441   STA   3,DCRET
52 04321 006103   PCRLF
53 04322 006104   MESSAGE
54 04323 005206   IDENT
55 04324 060210   NIOC   TTI
56 04325 006103   PCRLF
57 04326 006104   MESSAGE
58 04327 005161   DEVNUM              ;"ENTER TWO DIGIT OCTAL DEVICE
59 04330 006154   JSR   @IADIG        ;CODE AND CR"
60 04331 000770   JMP   DCODE+1

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0042 05501
01 04332 020220 LDA 0,K30
02 04333 112435 SUBZ# 0,2,SNR
03 04334 000412 JMP .+10 ;DEVICE CODE = 30
04 04335 020221 LDA 0,K31
05 04336 112435 SUBZ# 0,2,SNR
06 04337 000407 JMP .+7 ;DEVICE CODE = 31
07 04340 020222 LDA 0,K70
08 04341 112435 SUBZ# 0,2,SNR
09 04342 000404 JMP .+4 ;DEVICE CODE = 70
10 04343 020223 LDA 0,K71
11 04344 112434 SUBZ# 0,2,5ZR
12 04345 000754 JMP @CODE+1 ;ERROR, ILLEGAL DEVICE CODE
13 04346 050147 STA 2,DEVICE
14 04347 006103 D1: PCRLF
15 04350 020147 D3: LDA 0,DEVICE
16 04351 024411 LDA 1,WHOIS
17 04352 106434 SUBZ# 0,1,5ZR
18 04353 006156 JSR @IDVCD
19 04354 020147 LDA 0,DEVICE
20 04355 040405 STA 0,WHOIS
21 04356 102000 ADC 0,0
22 04357 040214 STA 0,WHAT
23 04360 002401 JMP @DCRET
24 04361 000000 DCRET: 0
25 04362 000070 WHOIS: 70
26 04363 054212 TIN: STA 3,TINRET
27 04364 063610 SKPDN TTI
28 04365 000777 JMP .-1
29 04366 060610 DIAC 0,TTI
30 04367 061111 DORS 0,TTD
31 04370 034261 LDA 3,C177
32 04371 163400 AND 3,0
33 04372 063511 SKPBZ TTD
34 04373 000777 JMP .-1
35 04374 002212 JMP @TINRET
36 04375 054425 ASSDIG: STA 3,ASSRET ;ASSEMBLE IN OCTAL
37 04376 152400 SUB 2,2 ;A NUMBER IN AC1
38 04377 126400 SUB 1,1 ;DECIMAL IN AC2
39 04400 004763 JSR TIN
40 04401 034256 LDA 3,C72
41 04402 116032 ADC2# 0,3,5ZC ;EXIT+1 IF ERROR
42 04403 034226 LDA 3,M60 ;EXIT+2 IF OK
43 04404 117046 ADD0 0,3,5EZ ;EXIT ON CARRIAGE RETURN
44 04405 000411 JMP ASS1
45 04406 121000 MOV 1,0 ;AC(1)*10
46 04407 127120 ADDZL 1,1
47 04410 107120 ADDZL 0,1
48 04411 167000 ADD 3,1
49 04412 151123 MOVZL 2,2,SNC
50 04413 153120 ADDZL 2,2
51 04414 173003 ADD 3,2,SNC
52 04415 000763 JMP ASSDIG+3
53 04416 034243 ASS1: LDA 3,C15
54 04417 116415 SUB# 0,3,SNR
55 04420 010402 ISZ ASSRET
56 04421 002401 JMP @ASSRET
57 04422 000000 ASSRET: 0
58 ;FILUM
59 04423 054212 INT5: STA 3,TINRET ;FILL THE XMT BUFFER WITH RANDOM #5
60 04424 020074 LDA 0,AXMT

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0043 C5SCI
01 04425 040020 STA 0,IDX0
02 04426 020270 LDA 0,C400
03 04427 040053 STA 0,GPCTR
04 04430 020071 LDA 0,RANDOM
05 04431 006113 RAND
06 04432 040071 STA 0,RANDOM
07 04433 024215 LDA 1,WHICH
08 04434 123700 ANDS 1,0
09 04435 030136 LDA 2,SYNWD
10 04436 112435 SUBZ# 0,2,SNR
11 04437 000771 JMP .-7
12 04440 030140 LDA 2,DLEWD
13 04441 112435 SUBZ# 0,2,SNR
14 04442 000766 JMP .-10
15 04443 042020 STA 0,@IDX0
16 04444 014053 DSZ GPCTR
17 04445 000763 JMP INT5+5
18 04446 002212 JMP @TINRET
19 ;GET SUBROUTINE
20 ; CALL GET
21 ; TABLE ADDRESS
22 ; RETURN (AC0) = (TABLE+(LINUM))
23 ; (AC2) = TABLE POINTER
24 ;(LINUM) = INDEX TO TABLE
25 04447 031400 .GET: LDA 2,0,3
26 04450 020061 LDA 0,LINUM
27 04451 113000 ADD 0,2
28 04452 021000 LDA 0,0,2
29 04453 001401 JMP 1,3
30 ;PUT SUBROUTINE
31 ; CALL PUT
32 ; TABLE ADDRESS
33 ; RETURN (AC0) STORED IN TABLE = (LINUM)
34 ; (AC2) = TABLE POINTER
35 ;(LINUM) = INDEX TO TABLE
36 04454 031400 .PUT: LDA 2,0,3
37 04455 024061 LDA 1,LINUM
38 04456 133000 ADD 1,2
39 04457 041000 STA 0,0,2
40 04460 001401 JMP 1,3
41 04461 054150 DEVC0: STA 3,DEVRET ;FIX DEVICE CODE
42 04462 030152 LDA 2,FIRST
43 04463 021000 LDA 0,0,2
44 04464 024433 LDA 1,CLOT ;160077
45 04465 123400 AND 1,0
46 04466 034434 LDA 3,KSLA ;060070
47 04467 024431 LDA 1,CSLA ;060030
48 04470 116414 SUB# 0,3,5ZR
49 04471 106415 SUB# 0,1,SNR
50 04472 000416 JMP DEVC2 ;A SLA INSTRUCTION
51 04473 024430 LDA 1,KSLA+1 ;060071
52 04474 034425 LDA 3,CSLA+1 ;060031
53 04475 116414 SUB# 0,3,5ZR
54 04476 106415 SUB# 0,1,SNR
55 04477 000411 JMP DEVC2
56 04500 151400 DEVC1: INC 2,2
57 04501 020423 LDA 0,DTEMP
58 04502 112415 SUB# 0,2,SNR
59 04503 030422 LDA 2,DTEM2
60 04504 020163 LDA 0,LAST

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0044 CSSCI
01 04505 112434 SUBZ# 0,2,SZR
02 04506 000755 JMP DEVC2+2
03 04507 002150 JMP @DEVRET
04 04510 021000 DEVC2: LDA 0,0,2 ;CHANGE INSTRUCTION
05 04511 024225 LDA 1,M100
06 04512 123400 AND 1,0 ;MASK DEVICE CODE
07 04513 024147 LDA 1,DEVICE
08 04514 123000 ADD 1,0 ;NEW DEVICE CODE
09 04515 041000 STA 0,0,2
10 04516 000762 JMP DEVC1
11 04517 160077 CIOT: 160077
12 04520 060030 CSLA: 060030
13 04521 060031 060031
14 04522 060070 KSLA: 060070
15 04523 060071 060071
16 04524 002700 DTEMP: END1
17 04525 002703 DTEM2: GOGO
18 04526 021400 DELAY: LDA 0,0,3 ;CALL VIA JSR @TIME
19 04527 040406 STA 0,+6 ;STORE AN I/O SKIP INST.
20 04530 102040 ADCO 0,0 ;TIME STORED IN REGISTER
21 04531 040211 STA 0,TIMEX ;TIMEX UPON EXIT
22 04532 101000 MOV 0,0
23 04533 101402 INC 0,0,SZC
24 04534 000403 JMP .+3 ;CARRY IS 0 IF NO
25 04535 000000 0 ;TIME OVERFLOW OCCURRED
26 04536 000774 JMP .-4 ;CARRY IS 1 FOR OVERFLOW
27 04537 040211 STA 0,TIMEX
28 04540 001401 JMP 1,3
29 04541 054414 ENTER: STA 3,LOOPR ;LOOP ITERATE RETURN
30 04542 034306 LDA 3,ITR ;THIS ROUTINE INITIALIZES
31 04543 054406 STA 3,ITRCT ;EACH TEST
32 04544 176400 SUB 3,3
33 04545 054405 STA 3,ESWIT
34 04546 054405 STA 3,ERRCT
35 04547 006325 JSR @IRST ;I/O RESET
36 04550 002405 JMP @LOOPR
37 04551 000000 ITRCT: 0
38 04552 000000 ESWIT: 0
39 04553 000000 ERRCT: 0
40 04554 000000 RETURN: 0
41 04555 000000 LOOPR: 0
42 04556 054776 CYCLE: STA 3,RETURN ;END OF TEST ITERATION
43 04557 050205 STA 2,SAV2 ;ROUTINE
44 04560 044204 STA 1,SAV1 ;SAVE THE ACS'
45 04561 040203 STA 0,SAV0
46 04562 014767 DSZ ITRCT
47 04563 000433 JMP CYCTS ;NOT 100 TIMES ITERATED
48 04564 034306 LDA 3,ITR ;RESET ITERATION CNTR
49 04565 054764 STA 3,ITRCT
50 04566 074477 READS 3
51 04567 030763 LDA 2,ESWIT ;IF SWITCH 2=(1)
52 04570 175120 MOVZL 3,3 ;AND A ERROR HAS OCCURED
53 04571 175100 MOVL 3,3 ;THE ERROR RATE WILL
54 04572 151005 MOV 2,2,SNR ;BE PRINTED
55 04573 000415 JMP NDEX
56 04574 175103 MOVL 3,3,SNC
57 04575 000417 JMP .+17
58 04576 006103 PCRLF ;PRINT CARRIAGE
59 04577 024754 LDA 1,ERRCT
60 04600 006106 TYPDEC

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0045 CSSCI
01 04601 006104 MESSAGE
02 04602 005370 MSG8 ; ERRORS
03 04603 024306 LDA 1, ITR
04 04604 006106 TYPDEC
05 04605 006104 MESSAGE
06 04606 005407 MSG10 ; PASSES
07 04607 000405 JMP .+5
08 04610 020203 NDEX: LDA 0, SAV0 ; NORMAL EXIT, NO ERR
09 04611 024204 LDA 1, SAV1
10 04612 030205 LDA 2, SAV2
11 04613 002741 JMP @RETURN
12 04614 102400 SUB 0, 0
13 04615 040736 STA 0, ERRCT ; RESET ERROR COUNT
14 04616 020203 CYCTS: LDA 0, SAV0 ; RESTORE ACS
15 04617 030205 LDA 2, SAV2
16 04620 006325 JSR @IRST ; I/O RESET WITH DELAY
17 04621 024204 LDA 1, SAV1
18 04622 034730 LDA 3, ESWIT
19 04623 175004 MOV 3, 3, SZR
20 04624 074477 READS 3
21 04625 175113 MOVL# 3, 3, SNC ; SWITCH 0
22 04626 002727 JMP @LOOPR ; (1)=LOOP ROUTINE
23 04627 002725 JMP @RETURN ; (0)=PROCEED TO NEXT TEST
24 04630 054724 ERR: STA 3, RETURN ; ERROR SUBROUTINE
25 04631 050205 STA 2, SAV2
26 04632 044204 STA 1, SAV1
27 04633 040203 STA 0, SAV0
28 04634 034716 LDA 3, ESWIT
29 04635 175005 MOV 3, 3, SNR
30 04636 000407 JMP ERR1
31 04637 030205 ERET: LDA 2, SAV2 ; RESTORE ACS
32 04640 024204 LDA 1, SAV1
33 04641 020203 LDA 0, SAV0
34 04642 010711 ISZ ERRCT
35 04643 000401 JMP .+1 ; COUNT THE ERRORS
36 04644 002710 JMP @RETURN ; EXIT
37 04645 034707 ERR1: LDA 3, RETURN ; ERROR. C(3)=PC
38 04646 004407 JSR AUTOER ; OPERATOR, SET SWITCHES!
39 04647 054703 STA 3, ESWIT
40 04650 074477 READS 3
41 04651 175100 MOVL 3, 3
42 04652 175113 MOVL# 3, 3, SNC ; LOOK AT SWITCH 1
43 04653 004416 JSR EPRINT ; PRINT ERROR DATA
44 04654 000763 JMP ERET
45 04655 054413 AUTOER: STA 3, AA03
46 04656 024046 LDA 1, EGGS
47 04657 125004 MOV 1, 1, SZR
48 04660 000405 JMP .+5
49 04661 024204 LDA 1, SAV1
50 04662 034672 LDA 3, RETURN
51 04663 063077 HALT
52 04664 002404 JMP @ AA03
53 04665 004404 JSR EPRINT
54 04666 034052 LDA 3, EGGS+4
55 04667 001400 JMP 0, 3
56 04670 000000 AA03: 0
57 04671 054661 EPRINT: STA 3, ESWIT ; ERROR MESSAGE PRINTER
58 04672 006103 PCRLF ; PRINT CARRIAGE
59 04673 006104 MESSAGE ; AND HEADER
60 04674 004702 HEADER

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0046 CSSCI
01 04675 020657 LDA 0, RETURN
02 04676 126000 ADC 1, 1
03 04677 107000 ADD 0, 1
04 04700 006112 TYPAC1 ; PC OF ERROR
05 04701 002651 JMP @ESWIT ; RETURN TO CALL
06 004702 HEADER: .TXT !
07 04702 041520 PC !
08 000011
09 04704 054174 DIVID: STA 3, MSAV ; DIVIDE
10 04705 142432 SUBZ# 2, 0, SZC
11 04706 002174 JMP @MSAV
12 04707 034227 LDA 3, M20
13 04710 125120 MOVZL 1, 1
14 04711 101100 DLOOP: MOVL 0, 0
15 04712 142412 SUB# 2, 0, SZC
16 04713 142400 SUB 2, 0
17 04714 125100 MOVL 1, 1
18 04715 175404 INC 3, 3, SZR
19 04716 000773 JMP DLOOP
20 04717 002174 JMP @MSAV
21 04720 102460 MULT: SUBC 0, 0 ; MULTIPLY
22 04721 054174 STA 3, MSAV
23 04722 034227 LDA 3, M20
24 04723 125203 MLOOP: MOVR 1, 1, SNC
25 04724 101201 MOVR 0, 0, SKP
26 04725 143220 ADDZR 2, 0
27 04726 175404 INC 3, 3, SZR
28 04727 000774 JMP MLOOP
29 04730 125260 MOVCR 1, 1
30 04731 002174 JMP @MSAV
31 ; RANDOM NUMBER GENERATOR
32 04732 054426 RAN: STA 3, UD03 ; GENERATE A RANDOM
33 04733 050424 STA 2, UD02
34 04734 044422 STA 1, UD01
35 04735 004406 JSR .UD50 ; NUMBER IN AC0
36 04736 034424 LDA 3, UD20
37 04737 163000 ADD 3, 0
38 04740 030417 LDA 2, UD02
39 04741 024415 LDA 1, UD01
40 04742 002416 JMP @.UD03
41 04743 024420 .UD50: LDA 1, UD21 ; RANDOM CONTINUED
42 04744 044415 STA 1, UD10
43 04745 105120 MOVZL 0, 1
44 04746 125120 MOVZL 1, 1
45 04747 014412 DSZ .UD10
46 04750 000776 JMP .-2
47 04751 107000 ADD 0, 1
48 04752 125120 MOVZL 1, 1
49 04753 125120 MOVZL 1, 1
50 04754 123000 ADD 1, 0
51 04755 001400 JMP 0, 3
52 04756 000000 .UD01: 0
53 04757 000000 .UD02: 0
54 04760 000000 .UD03: 0
55 04761 000000 .UD10: 0
56 04762 033031 .UD20: 33031
57 04763 000010 .UD21: 10
58 ; TIO NON INTERRUPT PACKAGE
59 ; "MESS" PRINTS ASCII MESSAGES AS SPECIFIED BY ASSEMBLER
60 ; "CHAR" PRINTS ASCII CHARACTER, 0(0)R, 0(0)L MUST BE 0

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01          ;WILL RETURN +2 IF C(0)R=0, CORRECTS THE PARITY, 33 SIMULATE
02          ;"TYPE" PRINTS C(0)R. MUST HAVE PROPER PARITY. RETURN IS
03          ;TO CALL+1. REPLACE THIS ROUTINE WITH INTERRUPT TYPE IF DESIRED.
04          ;"CRLF" PRINTS A CARRIAGE RETURN
05          ;"POCT" PRINTS C(1) IN OCTAL FOLLOWED BY A TAB
06          ;"PDEC" PRINTS C(1) IN DECIMAL. LEADING ZEROS SUPPRESSED.
07          ;FOLLOWED BY A TAB.
08 04764 070477 MESS:  READS  2
09 04765 153102      ADDL   2,2,SZC      ;NO PRINT IF SW1=1
10 04766 001401      JMP    1,3
11 04767 054562      STA    3,MESSR
12 04770 010561      ISZ    MESSR
13 04771 031400      LDA    2,0,3      ;C(2) POINTS TO MESSAGE
14 04772 024267      LDA    1,C377     ;A 8 BIT MASK
15 04773 021000 MES.1: LDA    0,0,2      ;C(2)=DATA WORD
16 04774 125112      MOVL#  1,1,SZC
17 04775 123701      ANDS   1,0,SKP
18 04776 123401      AND    1,0,SKP      ;C(0)=DATA CHARACTR RIGHT
19 04777 151400      INC    2,2      ;INC TO NEXT WORD
20 05000 124000      COM    1,1      ;FLIP MASK
21 05001 004467      JSR    CHAR.      ;PRINT
22 05002 000771      JMP    MES.1      ;ANOTHER
23 05003 063511      SKPBZ  TTD
24 05004 000777      JMP    .-1
25 05005 060211      NIOC   TTD
26 05006 002543      JMP    @MESSR     ;LAST
27 05007 102401 ZOCT:  SUB    0,0,SKP
28 05010 020255 POCT:  LDA    0,C60
29 05011 030437      LDA    2,OCTAB     ;PRINT C(1) IN OCTAL
30 05012 000403      JMP    .+3
31 05013 030445 PDEC:  LDA    2,DECTB     ;PRINT C(1) IN DECIMAL
32 05014 102400      SUB    0,0
33 05015 054065      STA    3,RADRET   ;BOTH ENTRYS PRINT NUMBER
34 05016 074477      READS  3
35 05017 177102      ADDL   3,3,SZC     ;NO PRINT IF SW1=1
36 05020 002065      JMP    @RADRET
37 05021 040446 TNUM:  STA    0,ZSUPP     ;THEN TAB TO NEXT POSITION
38 05022 050401      STA    2,+.1
39 05023 000000 DECOCT: 0      ;A "LDA 2, TABLE" INSTRUCTION
40 05024 010777      ISZ    .-1
41 05025 034065      LDA    3,RADRET   ;SETUP "TAB" AT END
42 05026 020515      LDA    0,CHTAB
43 05027 151005      MOV    2,2,SNR   ;IF TABLE ENTRY=0
44 05030 000440      JMP    CHAR.      ;EXIT WITH TAB
45 05031 034436      LDA    3,ZSUPP   ;ZEROS SUPPRESS STUF
46 05032 102400      SUB    0,0
47 05033 146512 DECO:  SUBL#  2,1,SZC
48 05034 000405      JMP    DECP
49 05035 146400      SUB    2,1      ;FORM THE DIGIT
50 05036 034255      LDA    3,C60
51 05037 101400      INC    0,0
52 05040 000773      JMP    DECO:
53 05041 151235 DECP:  MOVZR#  2,2,SNR
54 05042 034255      LDA    3,C60
55 05043 054424      STA    3,ZSUPP   ;C(0)=DIGIT
56 05044 163000      ADD    3,0      ;MAKE ASCII
57 05045 175004      MOV    3,3,SZR
58 05046 004422      JSR    CHAR.      ;PRINT
59 05047 000754      JMP    DECOCT    ;GET NEXT DIGIT
60 05050 030426 OCTAB: LDA    2,+.1,-DECOCT

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0048 CSSCI

01	05051	100000	100000		
02	05052	010000	10000		
03	05053	001000	1000		
04	05054	000100	100		
05	05055	000010	10		
06	05056	000001	1		
07	05057	000000	0		
08	05060	030436	DECTB: LDA	2, .+1+.	-DECOCT
09		000012	.RDX 10		
10	05061	023420	10000		
11	05062	001750	1000		
12	05063	000144	100		
13	05064	000012	10		
14	05065	000001	1		
15	05066	000000	0		
16		000010	.RDX 8		
17	05067	000000	ZSUPP: 0		
18	05070	054454	CHAR. : STA	3, CHRET	; PRINT C(0) RIGHT
19	05071	101325	MOVZS	0, 0, SNR	; RETURN +2 IF NULL
20	05072	001401	JMP	1, 3	
21	05073	040452	STA	0, CHSAV	
22	05074	176000	ADC	3, 3	; COMPUTE THE PARITY
23	05075	117000	ADD	0, 3	
24	05076	163404	AND	3, 0, SZR	
25	05077	000775	JMP	.-3	
26	05100	176660	SUBCR	3, 3	; COMBINE PARITY WITH CHAR
27	05101	020444	LDA	0, CHSAV	
28	05102	163300	ADDS	3, 0	
29	05103	034440	CHAR1: LDA	3, CHTAB	; IS THIS A TAB
30	05104	116415	SUB#	0, 3, SNR	
31	05105	000407	JMP	.-7	; YES
32	05106	004444	JSR	TYPE	; NO PRINT IT
33	05107	000413	JMP	CHAR2+1	; EXIT
34	05110	020436	LDA	0, CHORZ	; SIMULATE A TAB
35	05111	034236	LDA	3, 08.	; VIA 1 TO 8 SPACES
36	05112	162426	SUBZ	3, 0, SEZ	
37	05113	000777	JMP	.-1	
38	05114	101005	MOV	0, 0, SNR	
39	05115	000404	JMP	CHAR2	
40	05116	020431	LDA	0, CH240	
41	05117	004433	JSR	TYPE	
42	05120	000770	JMP	.-10	
43	05121	040425	CHAR2: STA	0, CHORZ	
44	05122	063511	SKPBZ	TTO	
45	05123	000777	JMP	.-1	
46	05124	060211	NIOC	TTO	
47	05125	002417	JMP	@CHRET	
48	05126	060477	CRLF: READS	0	
49	05127	103102	ADDL	0, 0, SZC	; NO PRINT IF SW1=1
50	05130	001400	JMP	0, 3	
51	05131	054417	STA	3, CRLFR	; SAVE RETURN
52	05132	020264	LDA	0, C215	
53	05133	004735	JSR	CHAR.	; PRINT CARRIAGE AND LF
54	05134	020263	LDA	0, C212	
55	05135	004733	JSR	CHAR.	
56	05136	020267	LDA	0, C377	; PRINT RUB
57	05137	004731	JSR	CHAR.	
58	05140	102400	SUB	0, 0	
59	05141	040405	STA	0, CHORZ	; CLEAR HORZ POSITION
60	05142	002406	JMP	@CRLFR	; EXIT

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01 05143 000011 CHTAB: 11
02 05144 000000 CHRET: 0
03 05145 000000 CHSRV: 0
04 05146 000000 CHORZ: 0
05 05147 000240 CH240: 240
06 05150 000000 CRLFR: 0
07 05151 000000 MESSR: 0
08 05152 054406 TYPE: STA 3, TYPRET ;TYPE THE C(0)R IF
09 05153 010773 ISZ CHORZ
10 05154 063511 SKPBZ TTD
11 05155 000777 JMP .-1
12 05156 061111 DORS 0, TTD
13 05157 002401 JMP @TYPRET
14 05160 000000 TYPRET: 0
15 ;ENTER DEVICE CODE
16 05161 047305 DEVNUM: .TXTE !ENTER IN OCTAL 2 DIGIT DEVICE CODE & CR !
17 142724
18 120322
19 047311
20 147640
21 152303
22 146101
23 131240
24 042240
25 043711
26 152311
27 042240
28 053305
29 141711
30 120305
31 147703
32 142504
33 123240
34 141640
35 004722
36 000000
37 ;DIAGNOSTIC IDENTIFICATION
38 05206 120240 IDENT: .TXTE ! CUSTOM SYSTEMS INC. <15><12>
39 120240
40 120240
41 120240
42 120240
43 120240
44 120240
45 120240
46 120240
47 120240
48 120240
49 120240
50 120240
51 120240
52 120240
53 141640
54 051525
55 147724
56 120115
57 054523
58 152123
59 046705
60 120123
```


0050 05501

01 047311
02 027303
03 005215
04 05240 120240
05 120240
06 120240
07 120240
08 120240
09 120240
10 120240
11 120240
12 120240
13 120240
14 120240
15 120240
16 120240
17 051640
18 047131
19 044303
20 147722
21 147516
22 051525
23 146240
24 047311
25 120305
26 047311
27 142724
28 143322
29 141501
30 106705

SYNCHRONOUS LINE INTERFACE<15><12>

31 05273 120012
32 120240
33 120240
34 120240
35 120240
36 120240
37 120240
38 120240
39 120240
40 120240
41 120240
42 120240
43 042240
44 040711
45 047107
46 051717
47 144724
48 120303
49 047101
50 120104
51 142722
52 144714
53 041101
54 146311
55 152311
56 120131
57 142724
58 152123
59 106523
60 05330 120012

DIAGNOSTIC AND RELIABILITY TESTS<15><12>

0051 CSSCI
01 120240
02 120240
03 120240
04 120240
05 120240
06 120240
07 120240
08 120240
09 120240
10 120240
11 120240
12 120240
13 120240
14 120240
15 120240
16 120240
17 120240
18 120240
19 142722
20 120126
21 031460
22 005215
23 005215
24 000000
25 ;LINE
26 05361 144714 MSG6: .TXTE !LINE !
27 142516
28 000240
29 ;TESTED
30 05364 142724 MSG7: .TXTE !TESTED!
31 152123
32 042305
33 000000
34 ;ERRORS
35 05370 151305 MSG8: .TXTE !ERRORS !
36 147722
37 051722
38 000011
39 ;TRANSMISSION ERROR
40 05374 120240 MSG9: .TXTE ! TRANSMISSION ERROR !
41 151324
42 047101
43 046523
44 051711
45 144523
46 047317
47 142640
48 151322
49 151317
50 000240
51 ;PASSES
52 05407 040520 MSG10: .TXTE !PASSES!
53 051523
54 051705
55 000000
56 ;LOSS OF ACTIVITY, LINE
57 05413 147714 MSG13: .TXTE !LOSS OF ACTIVITY, LINE !
58 051523
59 147640
60 120306

0052 C5501

01 141501
02 144724
03 144526
04 054724
05 120254
06 144714
07 142516
08 000240

09 ;NO ACTIVE LINES

10 05427 147516 MSG14: .TXTE !NO ACTIVE LINES!

11 040640
12 152303
13 053311
14 120305
15 144714
16 142516
17 000123

18 ;LINE SENT RECEIVED

19 05437 144714 MSG18: .TXTE !LINE SENT RECVD !

20 142516
21 051411
22 047305
23 004724
24 142722
25 053303
26 004504
27 000000

28 ;DEVICE CODE

29 05450 142504 MSG19: .TXTE !DEVICE CODE !

30 144526
31 142703
32 141640
33 042317
34 120305
35 000000

36 ;UNIDENTIFIABLE WORD !

37 05457 047125 MSG25: .TXTE !UNIDENTIFIABLE WORD !

38 042311
39 047305
40 144724
41 144706
42 041101
43 142714
44 153640
45 151317
46 004504
47 000000

48 ;LINE # GOOD BAD

49 05472 144714 MSG26: .TXTE !LINE GOOD BAD!

50 142516
51 040411
52 147717
53 120104
54 041011
55 042101
56 000000

57 05502 000400 XMTB0: .BLK 400 ;TRANSMIT RANDOM NUMBERS

58 06102 001000 RCVB0: .BLK 1000 ;RECEIVED RANDOM NUMBERS

59 07102 000100 MSKBUF: .BLK 64 ;RH=CODE LEVEL MASK

60 07202 000100 RCVCTR: .BLK 64 ;TOTAL RECEIVED CHAR COUNT

0053 CSSCI

01	07302	000100	XMTCTR:	.BLK	64.	; TOTAL TRANSMITTED CHAR COUNT
02	07402	000100	TTAB:	.BLK	100	; # OF CHAR TO BE XMITED THIS PASS
03	07502	000100	RTAB:	.BLK	100	; # OF CHAR TO BE RECVD THIS PASS
04	07602	000000	PRGEND:	0		
05		007623		.LOC	.+20	
06	07623	000006		.BLK	6	
07	07631	000002			2	
08	07632	000326		HERE		
09	07633	000024			20.	
10	07634	000000			0	
11	07635	000100			100	
12	07636	000000			0	
13	07637	000000			0	
14	07640	100030			100030	
15			.END			; END OF SOURCE TAPE

**00000 TOTAL ERRORS; 00000 PASS 1 ERRORS

A00	000451	4/21	6/28	28/20	36/60
A00A	000453	6/30			
A01	000457	6/34			
A02	000463	6/38			
A03	000472	6/45			
A04	000476	6/49			
A05	000504	6/55			
A06	000512	7/01			
A07	000525	7/12			
A08	000540	7/11	7/41		
A09	000553	7/52			
A11	000561	7/58			
A12	000572	8/07			
A13	000610	8/21	8/40		
A14	000634	8/18	8/38	8/41	
A15	000672	9/11	9/27		
A15A	000746	9/32	9/55		
A16	000756	10/53			
A17	000766	11/01			
A18	000776	11/09			
A19	001011	11/20			
A20	001025	11/32			
A21	001040	11/43			
A22	001053	11/54			
A23	001070	12/07			
A24	001112	12/25			
A25	001137	12/46			
A26	001156	13/01			
A27	001167	13/10			
A27A	001214	13/31	13/55		
A27AZ	001236	13/42	13/49		
A28	001264	14/11	14/21		
A28A	001246	13/26	13/53	13/57	
A28Z	001302	14/25	14/41		
A29	001334	14/01	14/07	14/51	
A30	001341	14/56			
A31	001355	15/08			
A32	001371	15/20			
A33	001406	15/33			
A34	001425	15/48	16/01		
A36	001444	16/03			
A37	001467	16/22			
A38	001602	17/37			
A39	001646	18/13			
A40	001724	19/02	19/22		
A41	001754	19/26			
A41A	001776	19/39	19/46	20/26	20/33
A41B	002007	19/56	20/07		
A41C	002001	19/53	19/58		
A41P6	001764	19/34	20/02	20/38	
A42	002033	20/46	21/06		
A42Z	002045	20/56	21/02		
A43	002076	21/09	21/35	21/50	
A44	002120	21/53			
A45	002137	22/08			
A46	002155	22/22			
A47	002174	22/37			
A49	002221	22/58	23/12		
A51	002254	23/14	23/25		

A52	002330	24/14							
A53	002363	24/43	25/46						
A53Z	002400	24/56	25/04	25/18					
A54	002462	25/51							
A54Z	002500	26/05	26/13	26/27					
ACHAR	004316	41/48							
ACL	000100	3/08	30/57						
ALIN	000060	2/52	30/54	31/03	31/30	38/17	38/53		
APEND	000075	3/05	30/28						
AREC	000073	3/03	34/10	34/56					
ASS1	004416	42/44	42/53						
ASSDI	004375	4/23	42/36	42/52					
ASSRE	004422	42/36	42/55	42/56	42/57				
AUTOE	004655	45/38	45/45						
AXMT	000074	3/04	23/26	24/01	24/46	25/22	25/56	26/31	
		30/29	33/49	34/08	34/54	35/05	42/60		
BEGIN	000440	4/54	6/19						
BUMPI	006130	3/56	35/52	36/01					
C10	000237	5/11	26/47	26/57	27/04	27/12	27/33	27/40	
		28/27	36/49						
C100	000260	5/28	30/45	30/60	32/60	40/34	41/23		
C1000	000271	5/37	8/19						
C100K	000276	5/42	24/50						
C10.	000240	5/12	6/28	13/57	16/50	17/13	17/27	21/33	
		26/51	38/08						
C12	000241	5/13	16/09	16/20	17/38	17/49	18/14	18/33	
		20/47	22/38	22/59	24/15	29/60			
C14	000242	5/14	16/04	16/23	28/24	29/55			
C1400	000277	5/43	8/56	18/23	28/33	28/43			
C15	000243	5/15	16/28	42/53					
C16	000244	5/16	16/33						
C174H	000300	5/44							
C177	000261	5/29	42/31						
C1K.	000272	5/38							
C2	000230	5/04	11/22	12/47	13/27	28/50			
C20	000245	5/17	24/44	25/20	25/54	26/29	32/20		
C200	000262	5/30							
C20K	001245	13/29	13/56						
C20.	000246	5/18	12/40	38/10					
C212	000263	5/31	25/47	48/54					
C215	000264	5/32	48/52						
C21.	000247	5/19	16/47						
C24.	000250	5/20	16/43						
C28.	000251	5/21	16/39	27/46					
C3	000231	5/05	24/40	31/53	37/12				
C30	000252	5/22	16/14	27/15					
C300	000265	5/33	9/04	9/57	21/07	30/40			
C320	000266	5/34	9/59	19/23	30/38	32/09			
C37	000253	5/23							
C374H	000301	5/45	13/18	13/44	14/31	22/50	29/01	32/30	
		34/33	35/24	35/31	37/17	38/02	38/30	39/07	
		39/32	40/12						
C377	000267	5/35	20/08	23/06	23/47	24/04	24/29	25/09	
		25/25	26/18	26/36	31/60	35/11	35/16	37/21	
		37/25	38/14	38/33	39/27	47/14	48/56		
C4	000232	5/06	9/06	9/55	21/38	23/28	23/58	25/37	
		25/49	27/24	30/36	30/55	31/22	31/55	32/11	
		34/25							

C40	000254	5/24	9/09						
C400	000270	5/36	14/19	14/36	33/47	36/09	43/02		
C5	000233	5/07							
C54H	000273	5/39							
C6	000234	5/08	9/43	15/49	19/06				
C60	000255	5/25	47/28	47/50	47/54				
C7	000235	5/09	25/35						
C72	000256	5/26	42/40						
C77	000257	5/27	32/24						
C7777	000274	5/40							
C8.	000236	5/10	48/35						
CB1	000275	5/41	7/15	8/51	27/25	27/42	28/28	29/48	
		29/53	39/40						
CD0A	004310	4/30	41/40						
CD0B	000714	9/14	9/29						
CH240	005147	48/40	49/05						
CHAR1	005103	48/29							
CHAR2	005121	48/33	48/39	48/43					
CHAR.	005070	41/48	47/21	47/44	47/58	48/18	48/53	48/55	
		48/57							
CHK1	003515	35/10	35/15	35/44					
CHK2	003556	35/29	35/36	35/43					
CHK3	003560	35/45							
CHK4	003601	35/55	36/02						
CHK5	003650	36/35	36/41						
CHK6	003620	36/07	36/17						
CHK7	003673	36/22	36/60						
CHKRE	003472	34/51							
CHORZ	005146	48/34	48/43	48/59	49/04	49/09			
CHRET	005144	48/18	48/47	49/02					
CHSAV	005145	48/21	48/27	49/03					
CHTAB	005143	47/42	48/29	49/01					
CIOT	004517	43/44	44/11						
CIRET	003672	36/42	36/52	36/59					
CITR	003670	36/43	36/57						
CITR1	003671	36/44	36/47	36/58					
CKLIN	003746	3/08	37/47	38/58					
CKLRE	000142	4/13	37/47	37/52	37/56	38/01	38/06	38/46	
		38/57							
CONST	000072	3/02	30/34						
CRCOG	002702	28/21							
CRLF	005126	3/13	41/43	48/48					
CRLFR	005150	48/51	48/60	49/06					
CSLA	004520	43/47	43/52	44/12					
CT?R	000146	4/17	12/48	12/53	15/50	15/60	17/39	17/44	
		17/50	17/57	18/15	18/28	18/34	18/39	19/07	
		19/16	20/48	21/01	21/39	21/49	22/39	22/55	
		22/60	23/11	23/29	23/55	23/59	24/09	24/16	
		24/37	24/45	25/17	25/21	25/30	25/55	26/26	
		26/30	26/44	30/01	30/08	33/48	33/56	34/13	
		35/43	38/09	38/27	40/53	40/55			
CX1	000143	4/14							
CX2	000144	4/15							
CX3	000145	4/16							
CYCLE	004556	4/01	44/42						
CYCTS	004616	44/47	45/14						
D1	004347	42/14							
D3	004350	42/15							

DAT0	000323	6/03 26/33	24/53	25/24	25/39	25/41	25/48	25/60
DAT1	002327	24/13	24/22	24/34				
DCODE	004320	4/24	41/50	41/60	42/12			
DCRET	004361	41/51	42/23	42/24				
DECOD	005023	47/39	47/59	47/60	48/08			
DECOT	005033	47/47	47/52					
DECP	005041	47/48	47/53					
DECTB	005060	41/47	47/31	48/08				
DELAY	004526	4/48	44/18					
DEVC1	004500	43/56	44/10					
DEVC2	004510	43/50	43/55	44/04				
DEVCD	004461	4/25	43/41	44/02				
DEVIC	000147	4/18 31/06	6/08 31/16	6/11 38/40	15/04 42/13	15/16 42/15	15/29 42/19	15/44 44/07
DEVNU	005161	41/58	49/16					
DEVRE	000150	4/19	43/41	44/03				
DIV01	006115	3/34	16/51	17/14	17/28			
DIVID	004704	3/33	46/09					
DLEMD	006125	3/50	20/49					
DLEMD	000140	4/11 21/17 43/12	9/05 26/34	9/34 28/37	9/58 30/41	19/01 32/22	19/25 34/05	21/08 35/10
DLOOP	004711	46/14	46/19					
DLY	003664	4/05	36/53					
DTEM2	004525	43/59	44/17					
DTEMP	004524	43/57	44/16					
EGGS	000046	2/40 36/20	2/41 36/23	6/07 36/26	28/07 36/27	31/36 45/46	31/39 45/54	36/17
EHALT	006123	3/46 7/07 8/11 9/23 11/49 12/31 13/48 15/31 16/26 18/05 19/18 22/35 25/29 27/21 29/27	6/32 7/21 8/14 10/59 11/52 12/36 14/29 15/46 16/31 18/11 20/18 22/54 26/14 27/30	6/36 7/47 8/30 11/07 11/60 12/44 14/34 15/56 16/36 18/31 20/37 23/10 26/43 27/37	6/43 7/50 8/33 11/18 12/05 12/59 14/54 15/59 17/04 18/42 20/60 23/44 26/49 27/49	6/47 7/56 8/50 11/30 12/14 13/08 15/02 16/07 17/08 18/47 21/51 24/08 27/01 27/53	6/51 8/02 8/55 11/38 12/20 13/16 15/06 16/12 17/47 18/53 22/06 24/36 27/09 28/57	6/59 8/05 8/60 11/41 12/23 13/22 15/18 16/18 17/60 19/15 22/20 25/05 27/17 29/19
END1	002700	28/02	28/18	44/16				
ENDIT	002651	26/55	27/55					
ENTER	004541	4/03	44/29					
EPRIN	004671	45/43	45/53	45/57				
ERET	004637	45/31	45/44					
EREX	004042	38/26	38/47					
ERR	004630	3/45	45/24					
ERR1	004645	45/30	45/37					
ERRCT	004553	44/34	44/39	44/59	45/13	45/34		
ERRET	000063	2/55 40/25	37/02 40/27	37/14 40/42	37/34	37/36	37/44	40/08
ERROR	003674	35/22	37/02					
ERRSM	000151	4/20	30/26	32/39	36/30	36/37	37/30	
ESMIT	004552	44/33	44/38	44/51	45/18	45/28	45/39	45/57

K30	000220	4/56	9/33	31/15	42/01				
K31	000221	4/57	9/35	31/09	31/13	42/04			
K70	000222	4/58	31/08	31/11	42/07				
K71	000223	4/59	31/07	42/10					
KSLR	004522	43/46	43/51	44/14					
L0100	002270	23/37	23/51	23/56					
L0200	002401	24/57	25/13						
L0300	002501	26/06	26/22						
L0400	002336	24/20							
L0410	002341	24/24	24/33	24/38					
LAELP	002030	20/23	20/42						
LABSY	002024	20/12	20/31						
LAST	000163	4/30	43/60						
LIN1	000167	4/34	32/41	33/14	33/22	33/27	33/29	33/33	
		33/36	34/15	35/23	35/47				
LIN2	000170	4/35	32/42	33/24	33/32	33/37	34/21	35/30	
		35/56							
LINCH	006124	3/48	9/46	30/48	30/58				
LINE1	000164	4/31	6/24	9/39	14/05	14/22	14/42	28/14	
		32/56	33/13	33/21	40/17				
LINE2	000165	4/32	9/48	28/04	32/54	33/15	33/23	40/14	
LINES	000166	4/33	32/46	32/52	32/57	33/03	33/05	33/17	
LINIT	003057	3/47	30/11						
LINS	000307	5/51	6/27	7/42	7/53	7/59	8/08	8/22	
		8/42	9/12	9/37	9/42	9/52	10/54	11/02	
		11/11	11/25	11/33	11/44	11/55	12/09	12/26	
		12/49	13/02	13/11	13/32	13/46	14/10	14/12	
		14/24	14/30	14/38	14/45	14/48	14/57	15/11	
		15/24	15/39	15/51	17/40	17/51	18/16	18/35	
		19/41	21/47	22/52	23/33	24/21	24/54	26/03	
		28/17	28/23	29/03	29/47	29/52	30/02	30/15	
		30/43	30/52	34/35	37/48	38/15	40/47		
LINUM	000061	2/53	6/25	9/40	9/47	9/54	13/20	14/02	
		14/08	14/43	14/50	28/03	28/15	30/11	30/13	
		30/44	30/53	30/59	31/19	32/40	32/53	32/58	
		32/59	40/20	40/29	40/45	41/12	41/21	41/22	
		41/29	43/26	43/37					
LN1CT	000171	4/36	34/60	35/28	35/48				
LN2CT	000172	4/37	35/01	35/35	35/57				
LNLOS	003735	35/51	35/60	37/36					
LOOP	006133	4/02	6/33	6/37	6/44	6/48	6/52	6/60	
		7/08	7/22	7/51	7/57	8/06	8/15	8/34	
		9/01	9/24	10/60	11/08	11/19	11/31	11/42	
		11/53	12/06	12/24	12/45	12/60	13/09	13/23	
		13/49	14/46	14/55	15/07	15/19	15/32	15/47	
		16/02	16/19	17/09	18/12	18/54	19/19	20/43	
		21/03	21/52	22/07	22/21	22/36	22/57	23/13	
		24/11	24/39	25/32	26/50	27/02	27/10	27/22	
		27/31	27/38	27/54					
LOOPR	004555	44/29	44/36	44/41	45/22				
LUP0	002437	25/06	25/32						
LUP4	002550	26/15	26/50						
M100	000225	5/01	44/05						
M1000	000224	4/60	36/53						
M20	000227	5/03	46/12	46/23					
M60	000226	5/02	42/42						
MAXSC	000337	6/15	19/35						
MCTR	000173	4/38	25/53	26/40	26/46	30/11	38/24		

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MESS	004764	3/15	41/44	47/08				
MESSA	006104	3/16	27/56	27/58	31/34	35/39	37/09	37/39
		38/38	38/42	38/48	41/09	41/53	41/57	45/01
		45/05	45/59					
MESSR	005151	47/11	47/12	47/26	49/07			
MES. 1	004773	47/15	47/22					
ML00P	004723	46/24	46/28					
MODIR	002064	3/49	21/11					
MSRV	000174	4/39	46/09	46/11	46/20	46/22	46/30	
MSG10	005407	45/06	51/52					
MSG13	005413	37/40	51/57					
MSG14	005427	31/35	52/10					
MSG18	005437	41/10	52/19					
MSG19	005450	38/39	52/29					
MSG25	005457	35/40	52/37					
MSG26	005472	37/10	52/49					
MSG6	005361	27/57	38/43	51/26				
MSG7	005364	27/59	51/30					
MSG8	005370	45/02	51/35					
MSG9	005374	38/49	51/40					
MSKBU	007102	32/49	38/36	38/52	40/22	41/14	52/59	
MUL1	000302	5/46	38/32	38/44				
MUL12	006114	3/32	16/40	16/44	16/48			
MULT	004720	3/31	46/21					
NCHR	000175	4/40	32/29	32/35	33/38	33/39	33/40	33/41
		34/14	34/22	35/49	35/58			
NDEX	004610	44/55	45/08					
OCTAB	005050	41/46	47/29	47/60				
PAUSE	006135	4/06	7/02	7/17	7/18	12/08	24/19	
PCRLF	006103	3/14	27/55	31/33	35/38	37/08	37/15	37/28
		37/38	38/37	38/47	41/08	41/26	41/28	41/52
		41/56	42/14	44/58	45/58			
PDEC	005013	3/19	47/31					
POCT	005010	3/27	47/28					
PRET	000202	4/42	41/07	41/27				
PRGEN	007602	3/05	53/04					
PRIN	004247	4/26	41/07					
PRSW	000201	4/41	36/02	36/05	36/16	40/41		
PUT	006102	3/12	38/35	38/51				
RADRE	000065	2/57	47/33	47/36	47/41			
RAN	004732	3/29	46/32					
RAND	006113	3/30	31/48	32/23	40/10	43/05		
RAND0	000071	3/01	30/35	31/47	32/36	40/09	40/11	43/04
		43/06						
RCVB0	006102	3/03	52/58					
RCVCT	007202	40/31	41/36	52/60				
RCVMD	000340	6/16	19/33	20/16	20/25			
RECOF	006120	3/40	10/02	20/53				
RECON	006121	3/42	20/55					
RECMD	000311	5/53	19/31					
RELST	000076	2/38	3/06	6/10	6/13			
RETUR	004554	44/40	44/42	45/11	45/23	45/24	45/36	45/37
		45/50	46/01					
RITST	006117	3/38	20/52	23/05				
RPTSW	000310	5/52	30/20	32/43				
RST	003651	6/05	36/42					
RTAB	007502	4/27	53/03					
RTIME	003043	3/43	29/59					

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S01	002556	26/56							
S02	002565	27/03							
S03	002575	27/11							
S04	002611	27/23							
S05	002622	27/32							
S06	002631	27/39							
SAW0	000203	4/43	30/24	37/03	37/20	44/45	45/08	45/14	
		45/27	45/33						
SAW1	000204	4/44	29/11	29/37	35/37	35/41	37/04	37/16	
		37/24	37/33	37/37	37/41	37/43	44/44	45/09	
		45/17	45/26	45/32	45/49				
SAW2	000205	4/45	28/49	29/09	29/12	29/36	40/28	40/36	
		44/43	45/10	45/15	45/25	45/31			
SETLI	006107	3/22	9/08	9/45	10/01	17/10	19/03	19/27	
		20/50	21/36	21/54	22/09	22/23	22/40	23/01	
		23/30	24/17	24/48	25/58	30/47	38/12	40/48	
SETUP	006134	4/04	6/30	6/34	6/38	6/45	6/49	6/55	
		7/01	7/12	7/41	7/52	7/58	8/07	8/21	
		8/41	9/11	10/53	11/01	11/09	11/20	11/32	
		11/43	11/54	12/07	12/25	12/46	13/01	13/10	
		13/31	14/11	14/51	14/56	15/08	15/20	15/33	
		15/48	16/03	16/22	17/37	18/13	19/02	19/26	
		20/46	21/35	21/53	22/08	22/22	22/37	22/58	
		23/25	24/14	24/43	25/51	26/56	27/03	27/11	
		27/23	27/32	27/39					
SLA	000030	4/07	4/18	6/46	6/50	7/03	7/14	7/16	
		7/19	7/43	7/45	7/49	7/54	7/60	8/01	
		8/03	8/04	8/09	8/10	8/13	8/23	8/29	
		8/31	8/32	8/43	8/44	8/48	8/49	8/53	
		8/54	8/58	8/59	9/13	9/22	9/29	10/55	
		10/57	11/03	11/12	11/14	11/26	11/28	11/34	
		11/36	11/40	11/45	11/47	11/50	11/51	11/56	
		11/58	12/01	12/03	12/10	12/12	12/16	12/18	
		12/27	12/29	12/32	12/34	12/37	12/39	12/50	
		12/52	12/55	12/57	13/03	13/05	13/06	13/12	
		13/14	13/17	13/38	13/40	13/43	14/13	14/26	
		14/27	14/35	14/58	14/60	15/12	15/14	15/25	
		15/27	15/40	15/42	15/52	15/54	15/57	17/41	
		17/43	17/54	17/56	18/17	18/19	18/20	18/22	
		18/25	18/27	18/36	18/38	19/08	19/10	19/11	
		19/45	19/47	19/54	20/57	20/58	21/41	21/44	
		21/48	21/57	21/59	22/01	22/03	22/04	22/12	
		22/13	22/15	22/18	22/26	22/28	22/29	22/33	
		22/43	22/45	22/46	22/49	23/04	23/15	23/17	
		23/20	23/36	23/39	23/40	24/25	24/26	24/56	
		24/59	24/60	26/05	26/08	26/09	26/58	26/59	
		27/05	27/07	27/13	27/14	27/19	27/27	27/28	
		27/34	27/41	27/45	27/47	27/51	28/26	28/31	
		28/36	28/41	28/53	28/55	28/58	29/15	29/17	
		29/20	29/23	29/25	29/28	29/34	29/39	29/43	
		29/50	29/57	30/04	30/05	30/07	34/28	34/30	
		36/50	37/49	37/51	37/54	37/57	37/59	38/03	
		38/07	38/18	38/20	38/21	38/60	39/02	39/18	
		39/23	39/39	39/42					
SNDND	000312	5/54	19/30	19/37	19/43				
SNGLI	000207	4/47	7/09	8/16	13/24	13/59	26/53	27/60	
SNGSM	000206	4/46	9/30	32/47	33/07	34/18	35/02	35/53	
STRET	000064	2/56	40/44	40/50	40/52	41/06			

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STRTI 006131	3/58	34/17	34/24				
STRTL 006110	3/24	19/04	19/28	21/37	21/55	22/10	22/24
	22/41	23/02	23/31	24/18	24/49	25/59	38/13
	40/49						
STRTS 006111	3/26	20/51					
STUP 003166	4/28	31/05	31/25	31/29			
SUS1 004255	41/13	41/25					
SUS2 004265	41/16	41/21	41/39				
SUS3 004274	41/20	41/28					
SV0 004152	39/48	39/57	40/02				
SV1 004153	39/51	39/58	40/03				
SV2 004154	39/52	39/59	40/04				
SV3 004155	39/53	39/60	40/05				
SYDCT 000336	6/14	19/36	20/32				
SYNMD 000136	4/09	9/03	9/36	9/60	18/60	19/20	19/24
	20/10	21/11	23/07	23/49	24/31	25/11	25/42
	25/44	26/20	28/32	28/42	30/39	32/19	34/04
	39/13	39/26	43/09				
SYST1 000071	4/08						
TCTR 000066	2/58	30/56	38/55				
TEMP 000141	4/12						
TEMP0 000313	5/55	9/38	9/51	12/15	12/21	14/04	14/14
	14/39	14/47	16/08	16/13	16/27	16/46	17/12
	17/17	17/23					
TEMP1 000314	5/56	16/32	16/42	17/22	18/07	18/43	
TEMP2 000315	5/57	16/37	17/21	18/08	18/44		
TEMP3 000316	5/58	16/59	17/36	18/01	18/49		
TEMP4 000317	5/59	16/56	17/01	17/35	18/02	18/50	
TEMP5 000320	5/60	16/45	17/05	17/25	17/31	17/48	18/06
	18/32	18/48					
TEMP6 000321	6/01	16/41	16/60				
TEMP7 000322	6/02	16/49	16/54	16/57			
TIME 000210	4/48	7/44	10/56	11/04	11/13	11/27	11/35
	11/46	11/57	12/02	12/11	12/17	12/28	12/33
	12/38	12/51	12/56	13/04	13/13	13/39	14/17
	14/25	14/59	15/13	15/26	15/41	15/53	17/42
	17/55	18/18	18/21	18/26	18/37	19/09	20/56
	21/40	22/02	22/27	22/44	23/03	23/38	24/58
	26/07	28/54	29/16	29/24	30/06	37/53	37/58
	38/19						
TIMEX 000211	4/49	44/21	44/27				
TIMIT 006122	3/44	16/05	16/10	16/24	16/29	16/34	
TIN 004363	42/26	42/39					
TINRE 000212	4/50	42/26	42/35	42/59	43/18		
TINT 000070	2/60	31/44	34/51				
TINTR 004131	2/60	39/45					
TITST 006116	3/36	20/54	21/58	21/60			
TNUM 005021	41/45	47/37					
TRET 000305	5/49	29/59	30/10				
TRNSW 000213	4/51	30/27	31/52	33/44	34/01	36/38	40/58
TST 002242	23/15	24/28					
TSTUP 000161	4/28						
TTAB 007402	4/29	53/02					
TYPAC 006112	3/28	35/42	37/23	37/27	46/04		
TYPDE 006106	3/20	37/19	37/42	38/45	41/30	41/34	41/38
	44/60	45/04					
TYPE 005152	48/32	48/41	49/08				
TYPRE 005160	49/08	49/13	49/14				

TYPZ1	006105	3/18	38/41						
WHAT	000214	4/52	6/21	42/22					
WHICH	000215	4/53	7/04	32/08	43/07				
WHOIS	004362	42/16	42/20	42/25					
WLUP	003442	34/20	34/25						
WLUP1	003461	3/07	34/41	34/48					
XF00	000216	2/36	4/54						
XMTB0	005502	3/04	52/57						
XMTCT	007302	41/18	41/32	53/01					
XORDE	000217	4/55	8/20	8/24	8/35	9/10	9/15	9/25	
		13/30	13/33	13/50					
XORSY	002063	20/45	21/04	21/10	21/12				
ZOCT	005007	3/17	47/27						
ZSUPP	005067	47/37	47/45	47/55	48/17				
.100M	000057	2/51							
.AA03	004670	45/45	45/52	45/56					
.BEG	003303	32/48	33/02						
.BUMP	004201	3/55	40/27						
.CR	004311	41/43							
.DEC	004315	41/47							
.DONE	003315	32/51	32/58						
.GET	004447	3/09	43/25						
.GET1	004157	3/53	40/08	40/16	40/19	40/24			
.MS	004312	41/44							
.NUM	004313	41/45							
.OCT	004314	41/46							
.PCT	004317	41/49							
.PUT	004454	3/11	43/36						
.STRT	004221	3/57	40/44						
.UD01	004756	46/34	46/39	46/52					
.UD02	004757	46/33	46/38	46/53					
.UD03	004760	46/32	46/40	46/54					
.UD10	004761	46/42	46/45	46/55					
.UD20	004762	46/36	46/56						
.UD21	004763	46/41	46/57						
.UD50	004743	46/35	46/41						
.INR	000077	3/07	39/06	39/19	39/24	39/30	39/37	39/43	
.RET	000137	4/10							
.STB	003065	3/06	30/20						
.SVC	004156	39/50	39/55	40/06					