

000.001
000.001

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6

H8410

EQU
IF
TITLE
ELSE
ENDIF

1
H8410

DON'T ASSEMBLE FOR H8-4 CARD

'AYDUB' - AT: DEVICE DRIVER, FOR H8-4 MULTI PORT SERIAL I/O

```

8 *** ATDVD - AT DEVICE DRIVER.
9 *
10 * J.G. LETWIN
11 *
12 * G. Chandler 78.10
13 * 79.11
14 * 79.12
    
```

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16 ** ATDVD IS THE DEVICE DRIVER FOR THE DEVICE
17 *
18 * AT:
19 *
20 * IF H8410=0
21 * THEN
22 * PORT = 374-5
23 * ELSE
24 * PORT = 320-7
25 *
26
27
    
```

000.000

28 XTEXT ASCII

30X ** ASCII CHARACTER EQUIVALENCES.

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31X
000.015 32X CR EQU 13 CARRIAGE RETURN
000.012 33X LF EQU 10 LINE FEED
000.200 34X NULL EQU 2000 PAD CHARACTER
000.000 35X NUL2 EQU 0
000.007 36X BELL EQU 7 BELL CHARACTER
000.177 37X RUBOUT EQU 1770
000.010 38X BKSP EQU 100 CTL-H
000.026 39X C.SYN EQU 260 SYNC
000.002 40X C.STX EQU 2 STX
000.047 41X QUOTE EQU 470
000.011 42X TAB EQU 110
000.033 43X ESC EQU 330
000.012 44X NL EQU 120 NEW LINE (HDOS SYSTEMS)
000.212 45X ENL EQU NL+2000 NL + END-OF-LINE-FLAG
000.014 46X FF EQU 140 FORM FEED
000.001 47X CTLA EQU 010 CTL-A
000.002 48X CTLB EQU 020 CTL-B
000.003 49X CTLC EQU 030 CTL-C
000.004 50X CTLD EQU 040 CTL-D
000.017 51X CTLE EQU 170 CTL-E
000.020 52X CTLP EQU 200 CTL-P
000.021 53X CTLQ EQU 210 CTL-Q
000.023 54X CTLS EQU 230 CTL-S
000.032 55X CTLZ EQU 320 CTL-Z
000.000 56 XTEXT DDEF
    
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58X ** DEVICE DRIVER COMMUNICATION FLAGS.

	59X *				
	60X				
000.000	61X	ORG	0		
	62X				
000.000	63X	DC.REA	DS	1	READ
000.001	64X	DC.WRI	DS	1	WRITE
000.002	65X	DC.RER	DS	1	READ REGARDLESS
000.003	66X	DC.OPR	DS	1	OPEN FOR READ
000.004	67X	DC.OPW	DS	1	OPEN FOR WRITE
000.005	68X	DC.OPU	DS	1	OPEN FOR UPDATE
000.006	69X	DC.CLO	DS	1	CLOSE
000.007	70X	DC.ABT	DS	1	ABORT
000.010	71X	DC.MOU	DS	1	MOUNT DEVICE
000.011	72X	DC.LOD	DS	1	LOAD DEVICE DRIVER
000.012	73X	DC.MAX	DS	1	MAXIMUM ENTRY INDEX
000.013	74	XTEXT	HTR		

77X ** MTR - PAM/B EQUIVALENCES.

78X *
79X * THIS DECK CONTAINS SYMBOLIC DEFINITIONS USED TO
80X * MAKE USE OF THE PAM/B CODE AND CONTROL BYTES.

82X ** IO PORTS

83X
000.360 84X IP.PAD EQU 3600 PAD INPUT PORT
000.360 85X OP.CTL EQU 3600 CONTROL OUTPUT PORT
000.360 86X OP.DIG EQU 3600 DIGIT SELECT OUTPUT PORT
000.361 87X OP.SEG EQU 3610 SEGMENT SELECT OUTPUT PORT

89X ** FRONT PANEL CONTROL BITS.

90X
000.020 91X CB.SSI EQU 00010000B SINGLE STEP INTERRUPT
000.040 92X CB.MTL EQU 00100000B MONITOR LIGHT
000.100 93X CB.CLI EQU 01000000B CLOCK INTERRUPT ENABLE
000.200 94X CB.SPK EQU 10000000B SPEAKER ENABLE

96X ** MONITOR MODE FLAGS.

97X
000.000 98X DM.MR EQU 0 MEMORY READ
000.001 99X DM.MW EQU 1 MEMORY WRITE
000.002 100X DM.RR EQU 2 REGISTER READ
000.003 101X DM.RW EQU 3 REGISTER WRITE

103X ** USER OPTION BITS.

104X *
105X * THESE BITS ARE SET IN CELL .MFLAG.
106X
000.200 107X UD.HLT EQU 10000000B DISABLE HALT PROCESSING
000.100 108X UD.NFR EQU CB.CLI NO REFRESH OF FRONT PANEL
000.002 109X UD.BDU EQU 00000010B DISABLE DISPLAY UPDATE
000.001 110X UD.CLK EQU 00000001B ALLOW PRIVATE INTERRUPT PROCESSING

112X ** MONITOR IDENTIFICATION FLAGS

113X *
114X * THESE BYTES IDENTIFY THE ROM MONITOR.
115X * THEY ARE THE VARIOUS VALUES OF LOCATION .IDENT
116X
000.021 117X M.PAMB EQU 0210 'LXI' INSTRUCTION AT 000.000 IN PAM-B
000.303 118X M.FOX EQU 3030 'JMP' INSTRUCTION AT 000.000 IN FOX ROM

120X ** ROUTINE ENTRY POINTS.

	121X *				
	122X				
000.000	123X	.IDENT	EQU	0000A	IDENTIFICATION LOCATION
000.053	124X	.DLY	EQU	0053A	DELAY
001.267	125X	.LOAD	EQU	1267A	TAPE LOAD
001.374	126X	.DUMP	EQU	1374A	TAPE DUMP
002.136	127X	.ALARM	EQU	2136A	ALARM ROUTINE
002.140	128X	.HORN	EQU	2140A	HORN
002.172	129X	.CTC	EQU	2172A	CHECK TAPE CHECKSUM
002.205	130X	.TPERR	EQU	2205A	TAPE ERROR ROUTINE
002.264	131X	.PCHL	EQU	2264A	PCHL INSTRUCTION
002.265	132X	.SRS	EQU	2265A	SCAN RECORD START
002.325	133X	.RNP	EQU	2325A	READ NEXT PAIR
002.331	134X	.RNB	EQU	2331A	READ NEXT BYTE
002.347	135X	.CRC	EQU	2347A	CRC-16 CALCULATOR
003.017	136X	.WNP	EQU	3017A	WRITE NEXT PAIR
003.024	137X	.WNB	EQU	3024A	WRITE NEXT BYTE
003.122	138X	.DDB	EQU	3122A	DECODE FOR OCTAL DISPLAY
003.260	139X	.RCK	EQU	3260A	READ CONSOLE KEYS
003.356	140X	.DDBA	EQU	3356A	SEGMENT CODE TABLE

142X ** RAM CELLS USED BY H8MTR.

	143X *				
	144X				
040.000	145X	.START	EQU	40000A	START DUMP ADDRESS
040.002	146X	.IOWRK	EQU	40002A	IN OR OUT INSTRUCTION
040.005	147X	.REGI	EQU	40005A	DISPLAYED REGISTER INDEX
040.006	148X	.DSPROT	EQU	40006A	PERIOD FLAG BYTE
040.007	149X	.DSPMOD	EQU	40007A	DISPLAY MODE
040.010	150X	.MFLAG	EQU	40010A	USER OPTION BYTE
040.011	151X	.CTLFLG	EQU	40011A	PANEL CONTROL BYTE
040.013	152X	.ALEDS	EQU	40013A	ABUSS LEDS
040.021	153X	.DLEDS	EQU	40021A	DBUSS LEDS
040.024	154X	.ABUSS	EQU	40024A	ABUSS REGISTER
040.027	155X	.CRCSUM	EQU	40027A	CRC SUM WORD
040.031	156X	.TPERRX	EQU	40031A	TAPE ERROR EXIT VECTOR
040.033	157X	.TICCNT	EQU	40033A	CLOCK TICK COUNTER
040.035	158X	.REGPTR	EQU	40035A	REGISTER POINTER
040.037	159X	.UIVEC	EQU	40037A	USER INTERRUPT VECTORS
000.013	160	.XTXT	HOSEQU		

162X ** HDOS SYSTEM EQUIVALENCES.

	163X *				
	164X				
024.000	165X	S.GRT0	EQU	24000A	SYSTEM AREA FOR GRT0
025.000	166X	S.GRT1	EQU	25000A	SYSTEM AREA FOR GRT1
026.000	167X	S.GRT2	EQU	26000A	SYSTEM AREA FOR GRT2
	168X				
030.000	169X	ROMBOOT	EQU	30000A	ROM BOOT ENTRY
	170X				

040.100	171X	ORG	40100A	FREE SPACE FROM PAN-8
	172X			
040.100	173X	DS	8	JUMP TO SYSTEM EXIT
040.110	174X	D.CON	1A	DISK CONSTANTS
040.130	175X	SYDD	*	SYSTEM DISK ENTRY POINT
040.130	176X	D.VEC	24*3	SYSTEM ROM ENTRY VECTORS
040.240	177X	D.RAM	31	SYSTEM ROM WORK AREA
040.277	178X	S.VAL	36	SYSTEM VALUES
040.343	179X	S.INT	115	SYSTEM INTERNAL WORK AREAS
041.126	180X	DS	16	
041.146	181X	S.SOVN	2	STACK OVERFLOW WARNING
041.150	182X	DS	42200A-*	SYSTEM STACK
001.032	183X	STACKL	*-S.SOVN	STACK SIZE
	184X			
042.200	185X	STACK	*	LWA+1 SYSTEM STACK
042.200	186X	USERFWA	*	USER FWA
042.200	187	XTEXT	ESVAL	

189X ** S.VAL - SYSTEM VALUE DEFINITIONS.

190X *

191X * THESE VALUES ARE SET AND MAINTAINED BY THE SYSTEM.

192X *

193X * THE DECK HDOSERU MUST BE MODIFIED WHEN THIS IS MODIFIED.

194X

195X

040.277	196X	ORG	S.VAL	
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	197X			
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040.277	198X	S.DATE	DS	9	SYSTEM DATE (IN ASCII)
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040.310	199X	S.DATC	DS	2	CODED DATE
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040.312	200X	S.TIME	DS	4	TIME FROM MIDNIGHT (IN TICS)
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040.316	201X	S.HIMEM	DS	2	HARDWARE HIGH MEMORY ADDRESS+1
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	202X				
040.320	203X	S.SYSM	DS	2	FWA RESIDENT SYSTEM

	204X				
040.322	205X	S.USRM	DS	2	LWA USER MEMORY

	206X				
040.324	207X	S.OMAX	DS	2	MAX OVERLAY SIZE FOR SYSTEM

	208X				
	209X				
	210X	**			THE FOLLOWING FIVE CELLS SHOULD BE MODIFIED/READ ONLY VIA THE .CONSL SYSCALL

	211X				
000.200	212X	CSL.ECH	EQU	10000000B	SUPPRESS ECHO

000.002	213X	CSL.WRF	EQU	00000010B	WRAP LINES AT WIDTH
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000.001	214X	CSL.CHR	EQU	00000001B	OPERATE IN CHARACTER MODE
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	215X				
000.000	216X	I.CSLMD	EQU	0	S.CSLMD IS FIRST BYTE

040.326	217X	S.CSLMD	DS	1	CONSOLE MODE
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	218X				
000.200	219X	CTP.BKS	EQU	10000000B	TERMINAL PROCESSES BACKSPACES

000.040	220X	CTP.MLI	EQU	00100000B	MAP LOWER CASE TO UPPER ON INPUT
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000.020	221X	CTP.MLO	EQU	00010000B	MAP LOWER CASE TO UPPER ON OUTPUT
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000.010	222X	CTP.2SB	EQU	00001000B	TERMINAL NEEDS TWO STOP BITS
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000.002	223X	CTP.BKM	EQU	00000010B	MAP BKSP. (UPON INPUT) TO RUBOUT
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000.001	224X	CTP.TAB	EQU	00000001B	TERMINAL SUPPORTS TAB CHARACTERS
	225X				
000.001	226X	I.CONTY	EQU	1	S.CONTY IS 2ND BYTE
000.000	227X		ERRNZ	*-S.CSLMD-I.CONTY	
040.327	228X	S.CONTY	DS	1	CONSOLE TYPE FLAGS
000.002	229X	I.CUSOR	EQU	2	S.CUSOR IS 3RD BYTE
000.000	230X		ERRNZ	*-S.CSLMD-I.CUSOR	
040.330	231X	S.CUSOR	DS	1	CURRENT CURSOR POSITION
000.003	232X	I.CONWI	EQU	3	S.CONWI IS 4TH BYTE
000.000	233X		ERRNZ	*-S.CSLMD-I.CONWI	
040.331	234X	S.CONWI	DS	1	CONSOLE WIDTH
	235X				
000.001	236X	CU.FLG	EQU	00000001B	CTL-0 FLAG
000.200	237X	CS.FLG	EQU	10000000B	CTL-S FLAG
	238X				
000.004	239X	I.CONFL	EQU	4	S.CONFL IS 5TH BYTE
000.000	240X		ERRNZ	*-S.CSLMD-I.CONFL	
040.332	241X	S.CONFL	DS	1	CONSOLE FLAGS
	242X				
040.333	243X	S.CAADR	DS	2	ADDRESS FOR ABORT PROCESSING (>256 IF VALID)
040.335	244X	S.CCTAB	DS	6	ADDR FOR CTL-A, CTL-B, CTL-C PROCESSING
040.343	245	XTEXT	ECDEF		

247X ** ERROR CODE DEFINITIONS.

	248X				
000.000	249X	DRG	DS	0	NO ERROR #0
000.000	250X		DS	1	END OF FILE
000.001	251X	EC.EOF	DS	1	END OF MEDIA
000.002	252X	EC.EOM	DS	1	ILLEGAL SYSCALL CODE
000.003	253X	EC.ILC	DS	1	CHANNEL NOT AVAILABLE
000.004	254X	EC.CNA	DS	1	DEVICE NOT SUITABLE
000.005	255X	EC.DNS	DS	1	ILLEGAL DEVICE NAME
000.006	256X	EC.IDN	DS	1	ILLEGAL FILE NAME
000.007	257X	EC.IFN	DS	1	NO ROOM FOR DEVICE DRIVER
000.010	258X	EC.NRD	DS	1	CHANNEL NOT OPEN
000.011	259X	EC.FNO	DS	1	ILLEGAL REQUEST
000.012	260X	EC.YLR	DS	1	FILE USAGE CONFLICT
000.013	261X	EC.FUC	DS	1	FILE NAME NOT FOUND
000.014	262X	EC.FNF	DS	1	UNKNOWN DEVICE
000.015	263X	EC.UND	DS	1	ILLEGAL CHANNEL NUMBER
000.016	264X	EC.ICN	DS	1	DIRECTORY FULL
000.017	265X	EC.DIF	DS	1	ILLEGAL FILE CONTENTS
000.020	266X	EC.IFC	DS	1	NOT ENOUGH MEMORY
000.021	267X	EC.NEM	DS	1	READ FAILURE
000.022	268X	EC.RF	DS	1	WRITE FAILURE
000.023	269X	EC.WF	DS	1	WRITE PROTECTION VIOLATION
000.024	270X	EC.WPV	DS	1	DISK WRITE PROTECTED
000.025	271X	EC.WP	DS	1	FILE ALREADY PRESENT
000.026	272X	EC.FAP	DS	1	DEVICE DRIVER ABORT
000.027	273X	EC.BDA	DS	1	FILE LOCKED
000.030	274X	EC.FL	DS	1	FILE ALREADY OPEN
000.031	275X	EC.FAO	DS	1	ILLEGAL SWITCH
000.032	276X	EC.YS	DS	1	UNKNOWN UNIT NUMBER
000.033	277X	EC.UUN	DS	1	

ECDEF

000.034	278X	EC.FNR	DS	1	FILE NAME REQUIRED
000.035	279X	EC.DIW	DS	1	DEVICE IS NOT WRITABLE (OR WRITE LOCKED)
000.036	280X	EC.UNA	DS	1	UNIT NOT AVAILABLE
000.037	281X	EC.ILV	DS	1	ILLEGAL VALUE
000.040	282X	EC.ILD	DS	1	ILLEGAL OPTION
000.041	283X	EC.VPM	DS	1	VOLUME PRESENTLY MOUNTED ON DEVICE
000.042	284X	EC.NVM	DS	1	NO VOLUME PRESENTLY MOUNTED
000.043	285X	EC.FOD	DS	1	FILE OPEN ON DEVICE
000.044	286X	EC.NPM	DS	1	NO PROVISIONS MADE FOR REMOUNTING MORE DISKS
000.045	287X	EC.DNI	DS	1	DISK NOT INITIALIZED
000.046	288X	EC.DNR	DS	1	DISK IS NOT READABLE
000.047	289X	EC.DSC	DS	1	DISK STRUCTURE IS CORRUPT
000.050	290X	EC.NCV	DS	1	NOT CORRECT VERSION OF HDOS
000.051	291X	EC.NOS	DS	1	NO OPERATING SYSTEM MOUNTED
000.052	292X	EC.IOI	DS	1	ILLEGAL OVERLAY INDEX
000.053	293X	EC.OTL	DS	1	OVERLAY TO LARGE
000.054	294	XTEXT	PICDEF		

296X ** PIC FORMAT EQUIVALENCES.

000.000	297X				
	298X	ORG		0	
	299X				
000.000	300X	PIC.ID	DS	1	377Q = BINARY FILE FLAG
000.001	301X		DS	1	FILE TYPE (FT.PIC)
000.002	302X	PIC.LEN	DS	2	LENGTH OF ENTIRE RECORD
000.004	303X	PIC.PTR	DS	2	INDEX OF START OF PIC TABLE
	304X				
000.006	305X	PIC.COD	DS	0	CODE STARTS HERE
000.006	306	XTEXT	DEVDEF		

308X ** DEVICE TABLE ENTRIES.

	309X				
000.000	310X	ORG		0	
	311X				
000.000	312X	DEV.NAM	DS	2	DEVICE NAME
000.000	313X	DV.EL	ERU	00000000B	END OF DEVICE LIST FLAG
000.001	314X	DV.NU	ERU	00000001B	DEVICE ENTRY NOT IN USE
	315X				
000.002	316X	DEV.RES	DS	1	DRIVER RESIDENCE CODE
000.001	317X	DR.IM	ERU	00000001B	DRIVER IN MEMORY
000.002	318X	DR.PR	ERU	00000010B	DRIVER PERMINANTLY RESIDENT
	319X				
000.003	320X	DEV.JMP	DS	1	JMP TO PROCESSOR
000.004	321X	DEV.DDA	DS	2	DRIVER ADDRESS
000.006	322X	DEV.FLG	DS	1	FLAG BYTE
000.001	323X	DT.DD	ERU	00000001B	DIRECTORY DEVICE
000.002	324X	DT.CR	ERU	00000010B	CAPABLE OF READ OPERATION
000.004	325X	DT.CW	ERU	00000100B	CAPABLE OF WRITE OPERATION
	326X				
000.007	327X	DEV.SPG	DS	1	SECTORS PER GROUP THIS DEVICE
000.010	328X	DEV.MUM	DS	1	MOUNTED UNIT MASK

DEV

000.011	329X	DEV.MNU	DS	1	MAXIMUM NUMBER OF UNITS
000.012	330X	DEV.UNT	DS	2	ADDRESS OF UNIT SPECIFIC DATA TABLE
	331X				
000.014	332X	DEV.DVL	DS	2	DRIVER BYTE LENGTH
000.016	333X	DEV.DVB	DS	1	DRIVER ROUTINE GROUP ADDRESS
	334X				
000.017	335X	DEVELEN	EQU	*	DEVICE TABLE ENTRY LENGTH

337X ** UNIT SPECIFIC DEVICE DATA TABLE ENTRIES

	338X				
000.000	339X		ORG	0	
	340X				
000.000	341X	UNT.FLG	DS	1	UNIT SPECIFIC *DEV.FLG*
000.001	342X	UNT.GRT	DS	2	ADDRESS OF GROUP RESERVATION TABLE (IF DT.DD)
000.003	343X	UNT.GTS	DS	2	GRT SECTOR NUMBER
000.005	344X	UNT.DIS	DS	2	DIRECTORY FIRST SECTOR NUMBER
	345X				
000.007	346X	UNT.SIZ	EQU	*	SIZE OF UNIT SPECIFIC DATA TABLE PER UNIT
000.007	347		XTEXT	DVDDEF	

349X ** DEVICE DRIVER EQUIVALENCES.

	350X				
000.307	351X	DVD.FLV	EQU	3070	DEVICE DRIVER FLAG VALUE
	352X				
000.006	353X		ORG	PIC.COD	STARTS AT PIC CODE AREA
	354X				
000.006	355X	DVD.DVD	DS	1	MUST BE DVD.FLV, FLAGS TO HDOS AS DRIVER
000.007	356X	DVD.CAP	DS	1	DEVICE CAPABILITY FLAG
000.010	357X	DVD.MUM	DS	1	MOUNTED UNIT MASK
000.011	358X	DVD.MNU	DS	1	MAXIMUM NUMBER OF UNITS
000.012	359X	DVD.UFL	DS	8	UNIT SUB-CAPABILITY FLAGS FOR UNITS 0-7
000.022	360X	DVD.SET	DS	1	= DVD.FLV IFF DRIVER WILL TAKE SET OPTIONS
000.023	361X		DS	24	RESERVED, MUST BE 0
000.053	362X	DVD.STE	EQU	*	ENTRY FOR SET INVOCATION
	363X				
002.000	364X	DVD.ENT	EQU	2000A	DRIVER ENTRY POINT (MUST BE MULT OF 256)
000.053	365		XTEXT	SETCAL	

367X ** SETCAL - FIXED ADDRESS ROUTINES IN SET

	368X	*			
	369X	*			THESE VECTORS ARE FIXED ENTRY POINTS INTO THE
	370X	*			SET PROGRAM TO UTILIZED BY DEVICE DRIVERS IN
	371X	*			PROCESSING SET COMMANDS.
	372X	*			
	373X				
042.201	374X		ORG	USERFWA+1	
	375X				

042.201	376X	\$SNA	DS	3	
	377X				
042.204	378X	\$DCS	DS	3	
	379X				
042.207	380X	\$CNA	DS	3	
	381X				
042.212	382X	\$FST	DS	3	
	383X				
042.215	384X	\$TBLS	DS	3	
	385X				
042.220	386X	\$WTBLS	DS	3	
	387X				
042.223	388X	\$LBD	DS	3	
	389X				
042.226	390X	\$SOP	DS	3	
	391X				
042.231	392X	\$PBF	DS	3	
	393X				
042.234	394X	\$PBV	DS	3	
	395X				
042.237	396X		DS	60	RESERVED
042.333	397	XTEXT		UB250	

399X ** B250 UART CONTROL AND BIT DEFINITIONS.

	400X				
000.350	401X	SC.ACE	EQU	3500	SYSTEM CONSOLE PORT IF B250 ACE
000.156	402X	AC.DLY	EQU	110	220 MIL. SEC. DELAY FOR B250
	403X				
000.000	404X	UR.RBR	EQU	0	RECEIVER BUFFER REGISTER (READ ONLY)
	405X				
000.000	406X	UR.THR	EQU	0	TRANSMITTER HOLDING REGISTER (WRITE ONLY)
	407X				
000.000	408X	UR.DLL	EQU	0	DIVISOR LATCH (LEAST SIGNIFICANT)
	409X				
000.001	410X	UR.DLM	EQU	1	DIVISOR LATCH (MOST SIGNIFICANT)
	411X				
000.001	412X	UR.IER	EQU	1	INTERRUPT ENABLE REGISTER
000.001	413X	UC.EDA	EQU	00000001B	ENABLE RECEIVED DATA AVAILABLE INTERRUPT
000.002	414X	UC.TRE	EQU	00000010B	ENABLE TRANSMIT HOLD REGISTER EMPTY INTERRUPT
000.004	415X	UC.RSI	EQU	00000100B	ENABLE RECEIVE STATUS INTERRUPT
000.010	416X	UC.MSI	EQU	00001000B	ENABLE MODEM STATUS INTERRUPT
	417X				
000.002	418X	UR.IIR	EQU	2	INTERRUPT IDENTIFICATION REGISTER
000.001	419X	UC.IIP	EQU	00000001B	INVERTED INTERRUPT PENDING (0 MEANS PENDING)
000.006	420X	UC.IID	EQU	00000110B	INTERRUPT ID
	421X				
000.003	422X	UR.LCR	EQU	3	LINE CONTROL REGISTER
000.000	423X	UC.SBW	EQU	00000000B	5 BIT WORDS
000.001	424X	UC.6BW	EQU	00000001B	6 BIT WORDS
000.002	425X	UC.7BW	EQU	00000010B	7 BIT WORDS
000.003	426X	UC.8BW	EQU	00000011B	8 BIT WORDS
000.004	427X	UC.2SB	EQU	00000100B	TWO STOP BITS SELECTED
000.010	428X	UC.PEN	EQU	00001000B	PARITY COMPUTATION ENABLED

000.020	429X UC.EFS	EQU	00010000B	EVEN PARITY SELECT
000.040	430X UC.SKP	EQU	00100000B	STICK PARITY
000.100	431X UC.SB	EQU	01000000B	SET BREAK
000.200	432X UC.DLA	EQU	10000000B	DIVISOR LATCH ACCESS
	433X			
000.004	434X UR.MCR	EQU	4	MODEM CONTROL REGISTER
000.001	435X UC.DTR	EQU	00000001B	DATA TERMINAL READY
000.002	436X UC.RTS	EQU	00000010B	REQUEST TO SEND
000.004	437X UC.OU1	EQU	00000100B	OUT 1
000.010	438X UC.OU2	EQU	00001000B	OUT 2
000.020	439X UC.LOO	EQU	00010000B	LOOP
	440X			
000.005	441X UR.LSR	EQU	5	LINE STATUS REGISTER
000.001	442X UC.DR	EQU	00000001B	DATA READY
000.002	443X UC.OR	EQU	00000010B	OVERRUN
000.004	444X UC.PE	EQU	00000100B	PARITY ERROR
000.010	445X UC.FE	EQU	00001000B	FRAMING ERROR
000.020	446X UC.BI	EQU	00010000B	BREAK INTERRUPT
000.040	447X UC.THE	EQU	00100000B	TRANSMITTER HOLDING REGISTER EMPTY
000.100	448X UC.TSE	EQU	01000000B	TRANSMITTER SHIFT REGISTER EMPTY
	449X			
000.006	450X UR.MSR	EQU	6	MODEM STATUS REGISTER
000.001	451X UC.DCS	EQU	00000001B	DELTA CLEAR TO SEND
000.002	452X UC.DDR	EQU	00000010B	DELTA DATA SET READY
000.004	453X UC.YER	EQU	00000100B	TRAILING EDGE OF RING
000.010	454X UC.DRL	EQU	00001000B	DELTA RECEIVE LINE SIGNAL DETECT
000.020	455X UC.CTS	EQU	00010000B	CLEAR TO SEND
000.040	456X UC.DSR	EQU	00100000B	DATA SET READY
000.100	457X UC.RI	EQU	01000000B	RING INDICATOR
000.200	458X UC.RLS	EQU	10000000B	RECEIVED LINE SIGNAL DETECT
042.333	459	XTEXT	UB251	

```

462X **      8251 USART BIT DEFINITIONS.
463X *
464X
465X **      PORT ADDRESSES
466X
000.000      467X UDR   EQU    0      DATA REGISTER IS EVEN
000.001      468X USR   EQU    1      STATUS REGISTER IS NEXT
469X
000.372      470X SCUART EQU   3720    CONSOLE USART ADDRESS (IFF 8251)
471X
472X
473X **      MODE INSTRUCTION CONTROL BITS.
474X
000.100      475X UMI.1B EQU   01000000B    1 STOP BIT
000.200      476X UMI.HB EQU   10000000B    1 1/2 STOP BITS
000.300      477X UMI.2B EQU   11000000B    2 STOP BITS
000.040      478X UMI.PE EQU   00100000B    EVEN PARITY
000.020      479X UMI.PA EQU   00010000B    USE PARITY
000.000      480X UMI.L5 EQU   00000000B    5 BIT CHARACTERS
000.004      481X UMI.L6 EQU   00000100B    6 BIT CHARACTERS
000.010      482X UMI.L7 EQU   00001000B    7 BIT CHARACTERS
000.014      483X UMI.L8 EQU   00001100B    8 BIT CHARACTERS
000.001      484X UMI.1X EQU   00000001B    CLOCK X 1
000.002      485X UMI.16X EQU  00000010B    CLOCK X 16
000.003      486X UMI.64X EQU   00000011B    CLOCK X 64
487X
488X **      COMMAND INSTRUCTION BITS.
489X
000.100      490X UCI.IR EQU   01000000B    INTERNAL RESET
000.040      491X UCI.R0 EQU   00100000B    READER-ON CONTROL FLAG
000.020      492X UCI.ER EQU   00010000B    ERROR RESET
000.004      493X UCI.RE EQU   00000100B    RECEIVE ENABLE
000.002      494X UCI.IE EQU   00000010B    ENABLE INTERRUPTS FLAG
000.001      495X UCI.TE EQU   00000001B    TRANSMIT ENABLE
496X
497X **      STATUS READ COMMAND BITS.
498X
000.040      499X USR.FE EQU   00100000B    FRAMING ERROR
000.020      500X USR.OE EQU   00010000B    OVERRUN ERROR
000.010      501X USR.PE EQU   00001000B    PARITY ERROR
000.004      502X USR.TXE EQU   00000100B    TRANSMITTER EMPTY
000.002      503X USR.RXR EQU   00000010B    RECEIVER READY
000.001      504X USR.TXR EQU   00000001B    TRANSMITTER READY
505
506
041.061      507 AIO.UNI EQU   041061A    ADDRESS OF I/O UNIT NUMBER
508
509
510 *      CODE HEADER
511
512          CODE    PIC
513
000.006 307      514          DB      DVDFLV    DEVICE DRIVER FLAG VALUE
000.007 006      515          DB      DT.CR+DT.CM    DEVICE CAPABILITY; READ AND WRITE
000.010 001      516          DB      00000001B    MOUNTED UNIT MASK
000.011 001      517          DB      1          ONLY 1 UNIT
    
```

000.012	006	518	DB	DT.CR+DT.CW	0:	CAPABLE OF WRITE
000.013		519	DS	7	1-7:	IGNORED
000.022	307	520	DB	DVDFLO		
		521				
000.000		522	ERRNZ	*-023G		
000.023		523	DS	DVD.STE-023G		RESERVED AREAS

```
526 *** ASSEMBLY CONSTANTS
527 *
528 *
529 *
530 ** DEFAULT DEVICE DEFINITIONS
531 *
532 *
000.001 533 IF H8410
534 DFLT.AT EQU 3200 PORT ADDRESS
535 DFLT.BD EQU 1200A 300 BAUD
536 ELSE
000.374 537 DFLT.AT EQU 3740 PORT ADDRESS
000.000 538 DFLT.BD EQU 000A
539 ENDF
540 *
000.000 541 DFLT.PD EQU 0 DEFAULT NUMBER OF PAD CHARACTERS
000.120 542 DFLT.WD EQU 80 80 COLUMN WIDTH
000.001 543 DFLT.CX EQU 1 INITIAL COLUMN INDEX
000.000 544 DFLT.CS EQU 0 DEFAULT CTL-S SETTING

546 **
547 *
548 *
000.000 549 SB.1 EQU 0000000B ONE STOP BIT
000.200 550 SB.2 EQU 10000000B TWO STOP BITS
551 *
000.000 552 MLC EQU 0000000B MAP LOWER CASE
000.001 553 NONLC EQU 00000001B NO MAP OF LOWER CASE
```

```
556 *** SET CODE ENTRY POINT
557 *
558 * SET COMMANDS ENTER HERE
559 *
560 *
561 * ENTRY: (DE) = LINE POINTER
562 * (A) = UNIT NUMBER
563 *
564 * EXIT: 'C' CLEAR IF OK
565 * 'C' SET IF ERROR
566 * (A) = ERROR CODE
567 *
568 * USES: ALL
569 *
570 *
000.053 571 SETNTR EQU *
000.000 572 ERRN2 *-DVD.STE
000.053 247 573 ANA A
000.054 302 103 000 574 JNZ SET1
000.057 102 575 MOV B,D
000.060 113 576 MOV C,E (BC) = PARAMETER LIST ADDRESS
000.061 021 166 001 577 LXI D,PRCTAB (DE) = PROCESSOR TABLE ADDRESS
000.064 041 044 001 578 LXI H,OPTTAB (HL) = OPTION TABLE ADDRESS
000.067 315 226 042 579 CALL $SOP
000.072 330 580 RC
000.073 315 201 042 581 CALL $SNA
000.076 310 582 RZ AT END OF LINE
000.077 076 040 583 MVI A,EC,ILO ILLEGAL OPTION SPECIFICATION
000.101 067 584 STC
000.102 311 585 RET
586
000.103 076 033 587 SET1 MVI A,EC,UUN UNKNOWN UNIT NUMBER
000.105 067 588 STC
000.106 311 589 RET
```

591 *** PROCESSORS
 592 *

594 ** FLAG - PROCESS FLAG OPTIONS
 595 *
 596 * ENTRY, EXIT, AND USE THE SAME AS PBF.
 597 *
 598
 000.107 303 231 042 599 FLAG JMP \$PRF

601 ** VAL - PROCESS VALUE OPTIONS
 602 *
 603 * ENTRY, EXIT, AND USE THE SAME AS PBF.
 604 *
 605
 000.112 303 234 042 606 VAL JMP \$PBV
 000.001 607 IF HB410
 608 BAUD SPACE 4,10
 609 ** BAUD - PROCESS BAUD RATE OPTION SPECIFICATION
 610 *
 611 *
 612 * ENTRY: (BC) = TEXT ADDRESS
 613 *
 614 * EXIT: (BC) = TEXT ADDRESS UPDATED
 615 * 'C' CLEAR IF OK
 616 * 'C' SET IF ERROR
 617 * (A) = ERROR CODE
 618 *
 619 * USES: ALL
 620 *
 621
 622 BAUD MVI A,10 (A) = DEFAULT RADIX
 623 CALL \$CNA
 624 JC BAU1
 625 XCHG (DE) = BAUD RATE VALUE
 626 CALL \$LBD
 627 JNZ BAU1
 628 SHLD TAT,BAU SET BAUD RATE WORD
 629 RET
 630
 631 BAU1 MVI A,\$C.ILV
 632 STC
 633 RET
 634 ENDIF


```
636 **      HELP - PROCESS HELP OPTION
637 *
638 *      TYPE VALID OPTIONS ON USER CONSOLE
639 *
640
000.115 315 136 031 641 HELP CALL $TYPTX
000.120 012 012 123 642 DB NL,NL; "Set Options",NL,NL
000.140 061 123 102 643 DB '1SB One stop bit',NL
000.162 082 123 102 644 DB '2SB Two stop bits',NL
000.205 115 114 103 645 DB 'MLC Map Lower Case',NL
000.231 116 117 115 646 DB 'NOMLC No mapping of Lower Case',NL
000.271 127 111 104 647 DB 'WIDTH n Page width',NL
000.314 120 101 104 648 DB 'PAD n Number of Pad characters for <CR>',NL
000.364 120 117 122 649 DB 'PORT n Port address',NL
000.001 650 IF HB410
651 DB 'BAUD n Baud rate',NL
652 ENDIF
001.010 110 105 114 653 DB 'HELP Type this message',NL
001.040 012 212 654 DB NL,ENL
001.042 257 655 XRA A CLEAR CARRY
001.043 311 656 RET
```

658 *** TABLES
 659 *
 660 *

662 ** OPTTAB - OPTION TABLE
 663 *
 664

SET CODE	START ADDRESS	END ADDRESS	TABLE NAME	DATA TYPE	TABLE ADDRESS	END ADDRESS OF TABLE	NUMBER OF DATA BYTES
001.044	165	001	OPTTAB	DW	OPTTABE		
001.046	006			DB	6		
001.047	061	123 302		DB	'1S', 'R'+2000, FLAG1, SR, 1!SR, 2, SR, 1		
001.055	241	003		DW	TAT, SB		
001.057	000			DB	0		
001.060	062	123 302		DB	'2S', 'R'+2000, FLAG1, SR, 1!SR, 2, SR, 2		
001.066	241	003		DW	TAT, SB		
001.070	000			DB	0		
001.071	115	114 303		DB	'ML', 'C'+2000, FLAG1, MLC!NOMLC, MLC		
001.077	242	003		DW	TAT, CON		
001.101	000			DB	0		
001.102	116	117 115		DB	'NOML', 'C'+2000, FLAG1, MLC!NOMLC, NOMLC		
001.112	242	003		DW	TAT, CON		
001.114	000			DB	0		
001.115	127	111 104		DB	'WIDT', 'H'+2000, VALI, 10, 20, 132		
001.126	244	003		DW	TAT, WID		
001.130	120	101 304		DB	'PA', 'D'+2000, VALI, 10, 0, 15		
001.137	243	003		DW	TAT, PAD		
001.141	120	117 122		DB	'POR', 'T'+2000, VALI, 8, 0, 3770		
001.151	237	003		DW	TAT, POR		
000.001				IF	H8410		
				DB	'BAU', 'B'+2000, BAUDI		
				DB	0, 0, 0, 0, 0		
				ENDIF			
001.153	110	105 114		DB	'HEL', 'P'+2000, HELPI		
001.160	000	000 000		DB	0, 0, 0, 0, 0		
001.165	000		OPTTABE	DB	0		END OF TABLE


```

732 *** ATDVD ENTRY POINT.
733 *
734 * ENTRY (A) = PROCESS CODE
735 * (BC) = BYTE COUNT (USUALLY)
736 * (DE) = MEMORY ADDRESS (USUALLY)
737 * EXIT 'C' CLEAR IF OK
738 * 'C' SET IF ERROR
739 * (A) = ERROR CODE
740 * USES ALL
741 *
742
002.000 743 ATDVD EQU * ENTRY POINT
000.000 744 ERRNZ *-DVD.ENT
002.000 315 076 031 745 CALL $TBRA ENTER PROCESSOR
002.003 054 746 DB ATREAD-* READ
002.004 121 747 DB ATWRITE-* WRITE
002.005 010 748 DB ATABTR-* READR
002.006 021 749 DB ATOPE-* OPENR
002.007 020 750 DB ATOPE-* OPENW
002.010 005 751 DB ATABTR-* OPENU
002.011 041 752 DB ATNOP-* CLOSE
002.012 007 753 DB ATABT-* ABORT
002.013 002 754 DB ATABTR-* MOUNT
002.014 011 755 DB ATLDAD-* LOAD
  
```

```

757 ** ATABTR - ISSUE DEVICE DRIVER ABORT TO REQUEST.
002.015 076 027 758
759 ATABTR MVI A,EC.DDA DEVICE DRIVER ABORT
002.017 067 760
002.020 311 761 RET
  
```

```

763 ** ATABT - ABORT DEVICE DRIVER
764 *
765
002.021 315 366 002 766 ATABT CALL CRLF
002.024 311 767 RET
  
```

```

769 ** ATLOAD - LOAD DEVICE DRIVER
770 *
771
002.025 772 ATLOAD EQU *
002.025 247 773 ANA A CLEAR CARRY
002.026 311 774 RET
  
```

```
776 ** ATOPE - OPEN (READ OR WRITE)
777 *
778
779
002.027 257 780 ATOPE XRA A
002.030 062 124 002 781 STA EOFFLG CLEAR EOF ON INPUT FLAG
002.033 072 237 003 782 LDA TAT:POR
002.036 052 240 003 783 LHLD TAT:BAU
000.001 784 IF HBAY0
785 CALL IB250
786 ELSE
002.041 315 123 003 787 CALL IB251
788 ENDIF
002.044 076 015 789 MVI A,CR
002.046 315 146 002 790 CALL TCH RESET COLUMN INDEX, AND RETURN CARRIAGE
002.051 311 791 RET
```

```
793 ** ATNOP - IGNORE REQUEST.
794
795
002.052 247 796 ATNOP ANA A
002.053 311 797 RET DO NOTHING
```

ATREAD - READ

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```

800 **      ATREAD - READ DATA FROM CONSOLE.
801 *
802 *      ATREAD READS BYTES UNTIL THE REQUEST IS SATISFIED,
803 *      OR A CTL-D IS STRUCK. THE CTL-D IS TAKEN AS EOF.
804
002.054 022 805 ATR2 STAX D          STORE CHAR
002.055 023 806      INX  D
002.056 013 807      DCX  B
808
002.057      809 ATREAD EQU  *
002.057 072 124 002 810      LDA  EOFFLG
002.062 037 811      RAR
002.063 330 812      RC          IS EOF
813
002.064 170 814      MOV  A,B
002.065 261 815      ORA  C
002.066 310 816      RZ          ALL DONE
817
818 *      TAKE A CHAR
819
002.067 315 222 002 820 ATR1 CALL RCHAR READ CHARACTER
002.072 332 102 002 821      JC  ATREOF
002.075 376 004 822      CPI  04
002.077 302 054 002 823      JNE  ATR2 NOT CTL-D
824
825 *      HAVE EOF CHARACTER. FILL THIS SECTOR WITH 0'S
826
002.102 076 003 827 ATREOF MVI A,EC.EOF#2+1
002.104 062 124 002 828      STA  EOFFLG FLAG EOF
002.107 257 829 ATR4 XRA A
002.110 022 830      STAX D STORE 0
002.111 023 831      INX  D
002.112 013 832      DCX  B
002.113 171 833      MOV  A,C
002.114 261 834      ORA  C
002.115 302 107 002 835      JNZ  ATR4
002.120 076 001 836      MVI  A,EC.EOF
002.122 067 837      STC SET EOF
002.123 311 838      RET
839
840
002.124 000 841 EOFFLG DB 0 EOF FLAG
    
```

```

844
845 *** ATWRITE - WRITE TO AT DEVICE.
846 *
847 * ATWRITE WRITES THE DATA TO THE AT DEVICE.
848 *
849 * THE SPECIAL CHARACTERS:
850 *
851 * TAB
852 * FF
853 * NULL
854 * NL
855 *
856 * ARE TREATED SEPERATELY.
857 *
858 * IF AN ABORT IS POSTED BEFORE THE OPERATION COMPLETS,
859 * ATWRITE EXITS.
860
861
002.125 862 ATWRITE EQU *
002.125 072 334 040 863 LDA S,CAADR+1 SEE IF ADDRESS
002.130 247 864 ANA A
002.131 300 865 RNZ ABORT, CLAIM ALL DONE
002.132 170 866 MOV A,B
002.133 261 867 ORA C CHECK BYTE COUNT LEFT
002.134 310 868 RZ ALL DONE
869
870 * (A) = CHARACTER. SEE IF NEEDS SPECIAL PROCESSING:
871 *
872 * NULL
873 * NL
874 * TAB
875 * FF
876
002.135 032 877 LDAX D
002.136 315 148 002 878 CALL TCH TYPE CHARACTER
002.141 023 879 ATW2 INX D INCREMENT POINTER
002.142 013 880 DCX B DECREMENT COUNT
002.143 303 125 002 881 JMP ATWRITE

883 ** TCH - TYPE CHARACTER
884 *
885 * (A) = CHARACTER
886 * EXIT NONE
887 * USES A,F
888
002.146 247 889 TCH ANA A
002.147 310 890 RZ IS NULL
002.150 376 012 891 CPI NL
002.152 312 364 002 892 JE CRLF IS NEW LINE
002.155 376 014 893 CPI FF
002.157 302 176 002 894 JNE TCH2 IS NOT FF
002.162 076 006 895 MVI A,6
002.164 365 896 TCH1 PUSH PSW
  
```

ATWRITE - WRITE JO. AT

TCH

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```

002.165 315 366 002 897      CALL  CRLF
002.170 361          898      POP   PSW
002.171 075          899      DCR   A
002.172 302 164 002 900      JNZ   TCH1
002.175 311          901      RET
                                902
002.176 376 011      903 TCH2  CPI   TAB
002.200 302 271 002 904      JNE   WCHAR      IS NOT TAB, JUST PRINT IT
002.203 076 040      905 WCH3  MVI   A, ' '
002.205 315 271 002 906      CALL  WCHAR      WRITE BLANK
002.210 072 245 003 907      LDA   TAT.CX
002.213 075          908      DCR   A
002.214 346 007      909      ANI   7
002.216 302 203 002 910      JNZ   WCH3
002.221 311          911      RET
    
```



```

915 **      RCHAR - READ CHARACTER.
916 *
917 *      ENTRY  NONE
918 *      EXIT   'C' CLEAR IF CHARACTER
919 *            (A) = CHARACTER
920 *            'C' SET IF USER CONSOLE INTERRUPT
921 *      USES   A,F
922
923
002.222 072 334 040 924 RCHAR LDA   S,CAADR+1
002.225 247          925      ANA   A
002.226 067          926      STC
002.227 300          927      RNZ           CONSOLE INTERRUPT
928
002.230 315 022 003 929      CALL  INCHAR
002.233 312 222 002 930      JZ    RCHAR
002.236 346 177          931      ANI   1770           MASK OUT HIGH ORDER BIT
932
002.240 376 015          933      CPI   CR
002.242 302 247 002    934      JNE   RCHAR2           NOT CR
002.245 076 012          935      MVI   A,NL
936
002.247 365          937 RCHAR2 PUSH  PSW
002.250 072 242 003    938      LDA   TAT,CON
002.253 346 001          939      ANI   MLCINOMLC
002.255 302 265 002    940      JNZ   RCHAR3           NO MAPPING OF LOWER CASE
002.260 361          941      POP  PSW
002.261 315 225 003    942      CALL  $MCU
002.264 365          943      PUSH PSW
944
002.265 361          945 RCHAR3 POP  PSW
002.266 247          946      ANA   A           CLEAR CARRY
002.267 311          947      RET
948
949 **      WAIT - WAIT FOR THE HANDSHAKE
950 *
951
002.270          952 WAIT  EQU   *
002.270 311      953      RET
954
955 **      WCHAR - WRITE CHARACTER
956 *
957 *      ENTRY  (A) = CHARACTER
958 *      EXIT   NONE
959 *      USES   A,F
960
961
002.271 365          962 WCHAR PUSH  PSW
002.272 376 040      963      CPI   7
002.274 332 315 002  964      JC    WCHAR0           NOT PRINTABLE, SO SKIP COUNT CHECK!
  
```

```

002.277 072 245 003 965 LDA TAT,CX
002.302 075 966 DCR A
002.303 041 244 003 967 LXI H,TAT,WID
002.306 274 968 CMP M
002.307 332 315 002 969 JC WCHAR0 TAT,CX-1 < TAT,WID
002.312 315 366 002 970 CALL CRLF
002.315 072 242 003 971 WCHAR0 LDA TAT,CON
002.320 346 001 972 ANI MLC,NDMLC
002.322 302 332 002 973 JNZ WCHAR1 NO MAPPING
002.325 361 974 POP PSW
002.326 315 225 003 975 CALL $MCU
002.331 365 976 PUSH PSW
977
002.332 361 978 WCHAR1 POP PSW
979
002.333 315 055 003 980 CALL OUTCHAR
981
002.336 374 015 982 CPI CR
002.340 312 360 002 983 JZ WCHAR2
002.343 374 040 984 CPI '
002.345 332 365 002 985 JC WCHAR3 NOT PRINTABLE
002.350 072 245 003 986 LDA TAT,CX
002.353 074 987 INR A
002.354 062 245 003 988 STA TAT,CX
002.357 311 989 RET
990
002.360 076 001 991 WCHAR2 MVI A,1
002.362 062 245 003 992 STA TAT,CX
002.365 311 993 WCHAR3 RET
  
```

995 ** CRLF = TYPE CRLF

996 *

997

998

```

002.366 074 015 999 CRLF MVI A,CR
002.370 315 271 002 1000 CALL WCHAR
002.373 074 012 1001 MVI A,LF
002.375 315 271 002 1002 CALL WCHAR
003.000 072 243 003 1003 LDA TAT,PAD
003.003 267 1004 ORA A
003.004 312 021 003 1005 CRLF1 JZ CRLF2
003.007 365 1006 PUSH PSW
003.010 257 1007 XRA A
003.011 315 271 002 1008 CALL WCHAR
003.014 361 1009 POP PSW
003.015 075 1010 DCR A
003.016 303 004 003 1011 JNE CRLF1
003.021 311 1012 CRLF2 RET
003.022 1013 XTEXT DWDIO
  
```

```

1015X **      INCHAR - INPUT CHARACTER
1016X *
1017X *      INPUT CHARACTER FROM SPECIFIED DEVICE
1018X *
1019X *      ENTRY  NONE
1020X *
1021X *      EXIT  (PSW) = 'Z' CLEAR IF THERE IS A CHARACTER
1022X *              (A) = CHARACTER
1023X *              'Z' SET  IF THERE IS NOT A CHARACTER
1024X *
1025X *      USES  (PSW)
1026X *
1027X
003.022      1028X INCHAR ERU *
003.022 345  1029X PUSH H
003.023 072 237 003 1030X LDA D,PORT
003.026 147  1031X MOV H,A
1032X
1033X *      CHECK FOR DATA
1034X
000.001      1035X IF HS4ID
1036X
1037X MVI L,OR.LSR
1038X CALL IN
1039X ANI UC,DR 'Z' SET IF THERE IS DATA
1040X JZ INC1 NO DATA
1041X MVI L,UR,RBR
1042X CALL IN
1043X JMP INC2
1044X
1045X ELSE
1046X
003.027 056 001  1047X MVI L,USR
003.031 315 203 003 1048X CALL IN
003.034 346 002  1049X ANI USR,RXR 'Z' SET IF THERE IS NO DATA
003.036 312 052 003 1050X JZ INC1 NO DATA
003.041 056 000  1051X MVI L,UDR
003.043 315 203 003 1052X CALL IN
003.046 247  1053X ANA A IGNORE NULL CHARACTERS
003.047 303 053 003 1054X JMP INC2
1055X
1056X ENDIF
1057X
003.052 067  1058X INC1 STC
1059X
003.053 341  1060X INC2 POP H
003.054 311  1061X RET
    
```

```

1063X **      OUTCHAR - OUTPUT CHARACTER
1064X *
1065X *      OUTPUT CHARACTER TO SPECIFIED DEVICE
1066X *
1067X *      ENTRY (A) = CHARACTER
1068X *
1069X *      EXIT NONE
1070X *
1071X *      USES (PSW)
1072X *
1073X
003.055      1074X OUTCHAR EQU *
003.055 345  1075X PUSH H
1076X
003.056 365  1077X PUSH PSW
003.057 072 237 003 1078X LDA D,PORT
003.062 147  1079X MOV H,A
1080X
000.001      1081X IF HB4IO
1082X
1083X MVI L,UR,LSR
1084X CALL WAIT WAIT FOR THE HAND-SHAKE! /79,11.GC/
1085X OUTC0 LDA S,CADDR+1
1086X ANA A
1087X JNZ OUTC1 IF CTL-Z,-A,-B,-C HIT
1088X CALL IN
1089X ANI UC,THE
1090X JZ OUTC0 IF NOT READY FOR TRANSMIT
1091X POP PSW
1092X MVI L,UR,THR
1093X CALL OUT
1094X JMP OUTC2
1095X
1096X ELSE
1097X
003.063 056 001 1098X MVI L,USR
003.065 315 270 002 1099X CALL WAIT WAIT FOR THE HAND-SHAKE /79,11.GC/
003.070 072 334 040 1100X OUTC0 LDA S,CADDR+1
003.073 247  1101X ANA A
003.074 302 120 003 1102X JNZ OUTC1 IF CTL-Z,-A,-B,-C HIT
003.077 315 203 003 1103X CALL IN
003.102 346 001  1104X ANI USR,TXR
003.104 312 070 003 1105X JZ OUTC0 IF NOT READY FOR TRANSMIT
003.107 361  1106X POP PSW
003.110 056 000  1107X MVI L,UDR
003.112 315 213 003 1108X CALL OUT
003.115 303 121 003 1109X JMP OUTC2
1110X
1111X ENDF
1112X
003.120 361  1113X OUTC1 POP PSW
1114X
003.121 341  1115X OUTC2 POP H
003.122 311  1116X RET
000.001      1117X IF HB4IO
1118X IB250 SPACE 4,10

```

```

1119X **      I8250 - INITIALIZE 8250
1120X *
1121X *      INITIALIZE AN 8250 PORT.  STOLEN AS CAP FROM CONSL. DRIVER.
1122X *
1123X *      ENTRY      (A)          = PORT ADDRESS
1124X *      (HL)[0-14] = NEW BAUD RATE
1125X *      (HL)[15]   = 1 IF TWO STOP BITS
1126X *
1127X *      EXIT      NONE
1128X *
1129X *      USES      (A)
1130X *
1131X
1132X I8250 EQU *
1133X PUSH D
1134X
1135X XCHG
1136X MOV  H,A
1137X MVI  L,UR,IER          /79.02.6C/
1138X XRA  A                /79.02.6C/
1139X CALL OUT              /79.02.6C/
1140X MVI  L,UR,MCR          /79.01.6C/
1141X MVI  A,UC,LOO          /79.01.6C/
1142X CALL OUT              SET LOOP-BACK /79.01.6C/
1143X MVI  L,UR,LCR
1144X MVI  A,UC,DLA
1145X CALL OUT
1146X MVI  L,UR,DLL
1147X MOV  A,E
1148X CALL OUT
1149X MVI  L,UR,DLK
1150X MOV  A,D
1151X ANI  1770
1152X CALL OUT
1153X MVI  L,UR,LCR
1154X MOV  A,D
1155X RLC
1156X RLC
1157X RLC
1158X ERRNZ UC,2SB-4
1159X ANI  UC,2SB
1160X ORI  UC,8BH
1161X CALL OUT              8 BIT WORDS
1162X MVI  L,UR,RBR
1163X CALL IN
1164X MVI  A,AC,DLY          REMOVE GARBAGE /79.01.6C/
1165X CALL .DLY             /79.01.6C/
1166X MVI  L,UR,MCR          /79.01.6C/
1167X CALL IN              /79.01.6C/
1168X ANI  3770-UC,LOO      /79.01.6C/
1169X CALL OUT              TURN OFF LOOP-BACK /79.01.6C/
1170X
1171X POP  D
1172X RET
1173X ELSE

```

```

1175X **      I8251 - INITIALIZE 8251
1176X *
1177X *      INITIALIZE AN 8251 PORT
1178X *
1179X *      ENTRY      (A)      = PORT ADDRESS
1180X *      (HL)[15] = 1 IF TWO STOP BITS
1181X *
1182X *      EXIT      NONE
1183X *
1184X *      USES      ALL
1185X *
1186X
003.123      1187X I8251 EQU *
003.123 353 1188X      XCHG
003.124 147 1189X      MOV      H,A
003.125 056 001 1190X      MVI      L,USR
003.127 172 1191X      MOV      A,D
003.130 346 200 1192X      ANI      200H          (A) = 200H IF TWO STOP BITS
000.000 1193X      ERRNZ   200H+UMI.1B-UMI.2B
003.132 366 116 1194X      ORI      UMI.1B+UMI.LB+UMI.16X
003.134 062 201 003 1195X      STA      I8251.B
003.137 001 172 003 1196X      LXI      B,I8251.A
003.142 012 1197X I8251.1 LDAX  B
003.143 376 377 1198X      CPI      #377H
003.145 312 157 003 1199X      JZ      I8251.2
003.150 315 213 003 1200X      CALL   OUT
003.153 003 1201X      INX   B
003.154 303 142 003 1202X      JMP   I8251.1
003.157 076 025 1203X I8251.2 MVI  A,UCI.ER+UCI.TE+UCI.RE
003.161 315 213 003 1204X      CALL   OUT
003.164 056 000 1205X      MVI   L,UDR
003.166 315 203 003 1206X      CALL   IN
003.171 311 1207X      RET
003.172 000 000 000 000 1208X I8251.A DB   0,0,0,0,0,0
003.200 100 1209X      DB   UCI.IR
003.201 000 1210X I8251.B DB   0
003.202 377 1211X      DB   377H          CONFIGURATION BYTE
1212X      ENDIF
    
```

```

1214X **      IN - INPUT
1215X *
1216X *      INPUT BYTE FROM SPECIFIED PORT
1217X *
1218X *      ENTRY      (H)      = PORT ADDRESS
1219X *      (L)      = OFFSET
1220X *
1221X *      EXIT      (A)      = BYTE READ
1222X *
1223X *      USES      (PSW)
1224X *
1225X
003.203      1226X IN      EQU      *
003.203 174 1227X      MOV      A,H
    
```

```

003.204 205      1228X      ADD  L
003.205 062 211 003 1229X      STA  IN,ADD
003.210 333 000      1230X      IN   *-*
003.211      1231X  IN,ADD  EQU   *-1
003.212 311      1232X      RET
    
```

```

1234X **      OUT - OUTPUT
1235X *
1236X *      OUTPUT BYTE TO SPECIFIED PORT
1237X *
1238X *      ENTRY (A) = BYTE TO BE WRITTEN
1239X *      (H) = PORT ADDRESS
1240X *      (L) = OFFSET
1241X *
1242X *      EXIT  NONE
1243X *
1244X *      USES  NONE
1245X *
1246X
    
```

```

003.213      1247X  OUT  EQU   *
003.213 365      1248X      PUSH  PSW
003.214 174      1249X      MOV   A,H
003.215 205      1250X      ADD  L
003.216 062 223 003 1251X      STA  OUT,ADD
003.221 361      1252X      POP   PSW
003.222 323 000      1253X      OUT  *-*
003.223      1254X  OUT,ADD EQU  *-1
003.224 311      1255X      RET
003.225      1256      XTEXT  MCU
    
```

```

1258X **      MCU - MAP LOWER CASE TO UPPER CASE.
1259X *
1260X *      MCU MAPS A LOWER CASE ALPHABETIC TO UPPER
1261X *      CASE.
1262X *
1263X *      ENTRY (A) = CHARACTER
1264X *      EXIT (A) = CHARACTER RESULT
1265X *      USES  A,F
1266X
1267X
    
```

```

003.225 376 141      1268X $MCU  CFI   'a'
003.227 330      1269X      RC
003.230 376 173      1270X      CFI   'z'-'z'
003.232 320      1271X      RNC
003.233 326 040      1272X      SUI   'a'-'a'
003.235 311      1273X      RET
    
```

```

1275 *** TAT.UNT - TABLE AT: UNIT CONSTANTS
1276 *
1277
003.236 1278 TAT.UNA EQU *
1279
003.236 000 1280 TAT.UNT DB 0 UNIT NUMBER
1281
003.236 1282 TAT.AS EQU TAT.UNT [?] = 1 IF ASSIGNED
1283
003.237 374 1284 TAT.POR DB DFLT.AT PORT NUMBER
003.237 1285 D.POR EQU TAT.POR
1286
003.240 000 000 1287 TAT.BAU DW DFLT.BD BAUD RATE
003.241 1288 TAT.SB EQU *-1 [?] = 1 IF TWO STOP BITS
1289
003.242 000 1290 TAT.CON DB MLC CONFIGURATION BYTE
1291
003.243 000 1292 TAT.PAD DB DFLT.PD NUMBER OF PAD CHAR. FOR <CR>
1293
003.244 120 1294 TAT.WID DB DFLT.WD TERMINAL WIDTH
1295
003.245 001 1296 TAT.CX DB DFLT.CX COLUMN INDEX
1297
003.246 000 1298 TAT.CTS DB DFLT.CS CTL-S FLAG
  
```


003.247

1301 XTEXT TBRA

1303X ** \$TBRA - BRANCH RELATIVE THOUGH TABLE.
 1304X *
 1305X * \$TBRA USES THE SUPPLIED INDEX TO SELECT A BYTE FROM THE
 1306X * JUMP TABLE. THE CONTENTS OF THIS BYTE ARE ADDED TO THE
 1307X * ADDRESS OF THE BYTE, YEILDING THE PROCESSOR ADDRESS.
 1308X *
 1309X * CALL \$TBRA
 1310X * DB LAB1-* INDEX = 0 FOR LAB1
 1311X * DB LAB2-* INDEX = 1 FOR LAB2
 1312X * DB LABN-* INDEX = N-1 FOR LABN
 1313X *
 1314X * ENTRY (A) = INDEX
 1315X * (RET) = TABLE FWA
 1316X * EXIT TO COMPUTED ADDRESS
 1317X * USES F,H,L
 1318X
 1319X

031.076
 003.247

1320X \$TBRA EQU 31076A IN H17 ROM
 1321 XTEXT TYPTX

1323X ** \$TYPTX - TYPE TEXT.
 1324X *
 1325X * \$TYPTX IS CALLED TO TYPE A BLOCK OF TEXT ON THE SYSTEM CONSOLE.
 1326X *
 1327X * IMBEDDED ZERO BYTES INDICATE A CARRIAGE RETURN LINE FEED,
 1328X * A BYTE WITH THE 2000 BIT SET IS THE LAST BYTE IN THE MESSAGE.
 1329X *
 1330X * ENTRY (RET) = TEXT
 1331X * EXIT TO (RET+LENGTH)
 1332X * USES A,F
 1333X
 1334X

031.136

1335X \$TYPTX EQU 31136A IN H17 ROM

031.144

1337X \$TYPTX EQU 31144A IN H17 ROM

003.247 114 122
 003.251

1338
 1339 DW /RL DUMMY ADDRESS FOR RELOCATION
 1340 DS 64 PATCH AREA
 1341
 1342 LDN 0
 1343

003.351 055 000 062
 000 065 000
 044 001 055
 001 066 001
 077 001 112
 001 126 001
 137 001 151

1344 END

001 166 001
170 001 172
001 022 002
031 002 034
002 037 002
042 002 047
002 060 002
070 002 073
002 100 002
105 002 116
002 137 002
144 002 153
002 160 002
166 002 173
002 201 002
206 002 211
002 217 002
231 002 234
002 243 002
251 002 256
002 262 002
275 002 300
002 304 002
310 002 313
002 316 002
323 002 327
002 334 002
341 002 346
002 351 002
355 002 363
002 371 002
376 002 001
003 005 003
012 003 017
003 024 003
032 003 037
003 044 003
050 003 060
003 066 003
075 003 100
003 105 003
113 003 116
003 135 003
140 003 146
003 151 003
155 003 162
003 167 003
204 003 217
003 000 000

ASSEMBLY COMPLETE

1344 STATEMENTS

0 ERRORS DETECTED

12564 BYTES FREE

*CNA	042207	380L			
*DCS	042204	378L			
*FST	042212	382L			
*LBD	042223	388L			
*MCU	003225	942	975	1268L	
*PBF	042231	392L	599		
*PBU	042234	394L	606		
*SNA	042201	376L	581		
*SOP	042226	390L	579		
*TBL5	042215	384L			
*TBRA	031076	745	1320E		
*TYPTX	031136	641	1335E		
*TYPTX	031144	1337E			
*WTBL5	042220	386L			
.	001260	727S	728	729	
.ABUSS	040024	154E			
.ALARM	002136	127E			
.ALEDS	040013	152E			
.CRC	002347	135E			
.CRCSUM	040027	155E			
.CTC	002172	129E			
.CTLFLG	040011	151E			
.DLEDS	040021	153E			
.DLY	000053	124E			
.DOD	003122	138E			
.DODA	003356	140E			
.DSPMOD	040007	149E			
.DSPROT	040006	148E			
.DUMP	001374	126E			
.HORN	002140	128E			
.IDENT	000000	123E			
.IOWRK	040002	146E			
.LOAD	001267	125E			
.MFLAG	040010	150E			
.PCHL	002264	131E			
.RCK	003260	139E			
.REGI	040005	147E			
.REGPTR	040035	158E			
.RMB	002331	134E			
.RNP	002325	133E			
.SRS	002265	132E			
.START	040000	145E			
.TICCNT	040033	157E			
.TPERR	002205	130E			
.TFERRX	040031	156E			
.UIVEC	040037	159E			
.UNB	003024	137E			
.UNP	003017	136E			
AC.DLY	000156	402E			
AIO.UNI	041061	507E			
ATABT	002021	753	766L		
ATABTR	002015	748	751	754	759L
ATDVD	002000	743E			
ATLOAD	002025	755	772E		
ATNOP	002052	752	796L		
ATOPE	002027	749	750	780L	
ATR1	002067	820L			
ATR2	002054	805L	823		

CROSS REFERENCE TABLE

ATRA	002107'	829L	835				
ATREAD	002057'	746	809E				
ATREOF	002102'	821	827L				
ATW2	002141'	879L					
ATWRITE	002125'	747	842E	881			
BELL	000007	36E					
BKSP	000010	38E					
C.STX	000002	40E					
C.SYN	000026	39E					
CB.CLI	000100	93E	108				
CB.MTL	000040	92E					
CB.SPK	000200	94E					
CB.SSI	000020	91E					
CD.FLG	000001	236E					
CR	000015	32E	789	933	982	999	
CRLF	002366'	766	892	897	970	999L	
CRLF1	003004'	1005L	1011				
CRLF2	003021'	1005	1012L				
CS.FLG	000200	237E					
CSL.CHR	000001	214E					
CSL.ECH	000200	212E					
CSL.WRP	000002	213E					
CTLA	000001	47E					
CTLB	000002	48E					
CTLC	000003	49E					
CTLD	000004	50E					
CTLQ	000017	51E					
CTLP	000020	52E					
CTLR	000021	53E					
CTLS	000023	54E					
CTLZ	000032	55E					
CTP.2SB	000010	222E					
CTP.BKM	000002	223E					
CTP.BKS	000200	219E					
CTP.HLI	000040	220E					
CTP.MLO	000020	221E					
CTP.TAB	000001	224E					
D.CON	040110	174L					
D.FORT	003237'	1030	1078	1285E			
D.RAM	040240	177L					
D.VEC	040130	176L					
DC.ABT	000007	70L					
DC.CLD	000006	69L					
DC.LOD	000011	72L					
DC.MAX	000012	73L					
DC.MOU	000010	71L					
DC.DPR	000003	66L					
DC.OPU	000005	68L					
DC.DPW	000004	67L					
DC.REA	000000	63L					
DC.RER	000002	65L					
DC.WRI	000001	64L					
DEV.DDA	000004	321L					
DEV.DVG	000016	333L					
DEV.DVL	000014	332L					
DEV.FLG	000006	322L					
DEV.JMP	000003	320L					
DEV.MNU	000011	329L					

CROSS REFERENCE TABLE

DEV.MUM	000010	328L		
DEV.NAM	000000	312L		
DEV.RES	000002	316L		
DEV.SPG	000007	327L		
DEV.UNT	000012	330L		
DEVELEN	000017	335E		
DFLT.AT	000374	537E	1284	
DFLT.BD	000000	538E	1287	
DFLT.CS	000000	544E	1298	
DFLT.CX	000001	543E	1296	
DFLT.PD	000000	541E	1292	
DFLT.WD	000120	542E	1294	
DM.MR	000000	98E		
DM.MW	000001	99E		
DM.RR	000002	100E		
DM.RW	000003	101E		
DR.IM	000001	317E		
DR.PR	000002	318E		
DT.CR	000002	324E	515	518
DT.CW	000004	325E	518	518
DT.DD	000001	323E		
DV.EL	000000	313E		
DV.NU	000001	314E		
DVD.CAP	000007	356L		
DVD.DVD	000006	355L		
DVD.ENT	002000	364E	729	744
DVD.MNU	000011	358L		
DVD.MUM	000010	357L		
DVD.SET	000022	360L		
DVD.STE	000053	362E	523	572
DVD.UFL	000012	359L		
DVD.FLV	000307	351E	514	520
EC.CNA	000004	254L		
EC.DDA	000027	273L	759	
EC.DIF	000017	265L		
EC.DIW	000035	279L		
EC.DNI	000045	287L		
EC.DNR	000046	288L		
EC.DNS	000005	255L		
EC.DSC	000047	289L		
EC.EOF	000001	251L	827	836
EC.EOM	000002	252L		
EC.FAO	000031	275L		
EC.FAP	000026	272L		
EC.FL	000030	274L		
EC.FNF	000014	262L		
EC.FNO	000011	259L		
EC.FNR	000034	278L		
EC.FOD	000043	285L		
EC.FUC	000013	261L		
EC.ICN	000016	264L		
EC.IDN	000006	256L		
EC.IFC	000020	266L		
EC.IFN	000007	257L		
EC.ILC	000003	253L		
EC.YLO	000040	282L	583	
EC.ILR	000012	260L		
EC.ILV	000037	281L		

OUTC0	003070	1100L	1105				
OUTC1	003120	1102	1113L				
OUTC2	003121	1109	1115L				
OUTCHAR	003055	980	1074E				
PIC.COD	000006	305L	353				
PIC.ID	000000	300L					
PIC.LEN	000002	302L					
PIC.PTR	000004	303L					
PRCTAB	001166	577	706L	708	711	719	
ROUTE	000047	41E					
RCHAR	002222	820	924L	930			
RCHAR2	002247	934	937L				
RCHAR3	002265	940	945L				
ROMBOOT	030000	169E					
RUBOUT	000177	37E					
S.CADDR	040333	243L	863	924	1100		
S.CCTAB	040335	244L					
S.CONFL	040332	241L					
S.CONTY	040327	228L					
S.CONUI	040331	234L					
S.CSLMD	040326	217L	227	230	233	240	
S.CUSOR	040330	231L					
S.DATC	040310	199L					
S.DATE	040277	198L					
S.GRT0	024000	165E					
S.GRT1	025000	166E					
S.GRT2	026000	167E					
S.HIMEM	040316	201L					
S.INT	040343	179L					
S.DMAX	040324	207L					
S.SOVR	041146	181L	183				
S.SYSM	040320	203L					
S.TIME	040312	200L					
S.USRM	040322	205L					
S.VAL	040277	178L	196				
SB.1	000000	549E	668	668	672		
SB.2	000200	550E	668	672	672		
SC.ACE	000350	401E					
SC.UART	000372	470E					
SET1	000103	574	587L				
SETNTR	000053	571E					
STACK	042200	185E					
STACKL	001032	183E					
SYDD	040130	175E					
TAB	000011	42E	903				
TAT.AS	003236	1282E					
TAT.BAU	003240	783	1287L				
TAT.CON	003242	677	681	938	971	1290L	
TAT.CTS	003246	1298L					
TAT.CX	003245	907	965	986	988	992	1296L
TAT.FAD	003243	688	1003	1292L			
TAT.FOR	003237	691	782	1284L	1285		
TAT.SB	003241	669	673	1288E			
TAT.UNA	003236	1278E					
TAT.UNT	003236	1280L	1282				
TAT.WID	003244	685	967	1294L			
TCH	002146	790	878	889L			
TCHI	002164	896L	900				

CROSS REFERENCE TABLE

TCH2	002176	894	903L		
UC.2SB	000004	427E			
UC.5BW	000000	423E			
UC.6BW	000001	424E			
UC.7BW	000002	425E			
UC.8BW	000003	426E			
UC.BI	000020	446E			
UC.CTS	000020	455E			
UC.DCS	000001	451E			
UC.DDR	000002	452E			
UC.DLA	000200	432E			
UC.DR	000001	442E			
UC.DRL	000010	454E			
UC.DSR	000040	456E			
UC.DTK	000001	435E			
UC.EBA	000001	413E			
UC.EFS	000020	429E			
UC.FE	000010	445E			
UC.IID	000006	420E			
UC.IIP	000001	419E			
UC.LDD	000020	439E			
UC.MSI	000010	416E			
UC.OR	000002	443E			
UC.OU1	000004	437E			
UC.OU2	000010	438E			
UC.PE	000004	444E			
UC.PEN	000010	428E			
UC.RI	000100	457E			
UC.RLR	000200	458E			
UC.RSI	000004	415E			
UC.RTS	000002	436E			
UC.SB	000100	431E			
UC.SKP	000040	430E			
UC.TER	000004	453E			
UC.THE	000040	447E			
UC.TRE	000002	414E			
UC.TSE	000100	448E			
UCI.ER	000020	492E	1203		
UCI.IE	000002	494E			
UCI.IR	000100	490E	1209		
UCI.RE	000004	493E	1203		
UCI.RO	000040	491E			
UCI.TE	000001	495E	1203		
UDR	000000	467E	1051	1107	1205
UMI.1AX	000002	485E	1194		
UMI.1B	000100	475E	1193	1194	
UMI.1X	000001	484E			
UMI.2B	000300	477E	1193		
UMI.64X	000003	486E			
UMI.HB	000200	476E			
UMI.L5	000000	480E			
UMI.L6	000004	481E			
UMI.L7	000010	482E			
UMI.L8	000014	483E	1194		
UMI.PA	000020	479E			
UMI.PE	000040	478E			
UNT.DIS	000005	344L			
UNT.FLG	000000	341L			

UNT.GRT	000001	342L					
UNT.GTS	000003	343L					
UNT.SIZ	000007	346E					
UD.CLK	000001	110E					
UD.DDU	000002	109E					
UD.HLT	000200	107E					
UD.NFR	000100	108E					
UR.DLL	000000	408E					
UR.DLM	000001	410E					
UR.IER	000001	412E					
UR.IIR	000002	418E					
UR.LCR	000003	422E					
UR.LSR	000005	441E					
UR.NCR	000004	434E					
UR.MSR	000006	450E					
UR.RBR	000000	404E					
UR.THR	000000	406E					
USERFWA	042200	186E	374				
USR	000001	468E	1047	1098	1190		
USR.FE	000040	499E					
USR.OE	000020	500E					
USR.FE	000010	501E					
USR.RXR	000002	503E	1049				
USR.TXE	000004	502E					
USR.TXR	000001	504E	1104				
VAL	000112	606L	712				
VALI	000001	684	687	690	711E		
WAIT	002270	952E	1099				
WCH3	002203	905L	910				
WCHAR	002271	904	906	962L	1000	1002	1008
WCHAR0	002315	964	969	971L			
WCHAR1	002332	973	978L				
WCHAR2	002360	983	991L				
WCHAR3	002365	985	993L				

27144 BYTES FREE

