SORBUS SR HANDBOOK

FOR

BASIC FOUR

S-HDBK-211

INDEX

MISCELLANEOUS

MACHINE LANGUAGE

OPERATING SYSTEM FORMATS

SORBUS EQUIPMENT TYPES

SORBUS TYPE	B/4 MODEL	DESCRIPTION
4200		General System
4201		Cabinet CPU/Disc
4208	1345	CPU, for Model 410C W/96K
4209	1340/1345	CPU, for Model 410B W/64K
4210	1340/1345	CPU, for Model 410A W/48K
4211	1100/1110	CPU, Microdata 820
4212	1200	CPU, Microdata 1600 (BBI)
4213	1200	CPU, Microdata 1600(BBII) Model 600
4214	1300	CPU, for System Model 350, 400
4215	1300	CPU, for System Model 600
4216	1320	CPU, for System Model 700
4217	1350	CPU, for Model 730 W/96K
4218	1340/1345	CPU, for Model 410 W/40K
4219	2580	Disc, Calcomp T80, 75MB
4222	2100/2200	Disc, Iomec 2002 (100TPI/1500RPM) 4.2MB
4223	2150/2250	Disc, Caelus (100TPI/1500RPM) 4.2MB
4225	2115/2215	Disc, Iomec 3002 (100TPI/1500RPM) 4.2MB
4226	2315	Disc, Iomec 3004 (200TPI/1500RPM) 8.4MB
4227	2324	Disc, Iomec 3004 (200TPI/2400RPM) 10MB
4228	2224	Disc, Iomec 3004 (200TPI/2400RPM) 5MB
4229	2401	Disc, Memorex 20MB
4230	2410	Disc, Memorex 14MB
4231	3100/3101	Printer, Centronics 101A
4232	3300	Printer, Odec
4233	3400	Printer, Digitronics
4234	3410	Printer, Digitronics (Silencing Cover)
4235	3510/0918	Printer, Printronix 300 LPM
4236	3150/3151/3152	Printer, Printronix 150 LPM
4237	5100/5120	Paper Tape Reader, Superior
4238	3233	Printer, Data Royal 160 CPS, Remote
4239	1320	CPU, for Model 610A W/48K
4240	1320	CPU, for Model 610B W/64K
4241	4100/4200	Card Reader, Bridge
4252	5110	Paper Tape Reader, Remex
4253	5200	Paper Tape Punch, Facit
4261	6100/6200/6210	Magnetic Tape, Wang
4266	2411	Disc, Memorex 28MB
4267	2412	Disc, Memorex 42MB
4272	7300/7301	TTY, ASR/KSR 33
4273	7200	VDT, Hazeltine 2000A
4274	7400	EDT, Executive Display Terminal
4275	7200	VDT, Hazeltine 2000B
4277	7220/7230	VDT, LSI
4278	3101	Printer, Centronics Remote
4279	3500/0913/0919	Printer, Dataproducts 300 LPM
4280	3600/0916/0920	Printer, Dataproducts 600 LPM
4281	1950	AC Line Conditioner
4282	1320	CPU, for Model 610 W/40K
4283	2530	Disc, Calcomp T80, 35MB
4284	3230	Printer, Data Royal 160 CPS, Parallel
4285	7250	VDT, Basic/Four
4286	1340	CPU, for Model 200 W/32K
4287	2400	Disc, Memorex 10MB
4288	3220	Printer, Data Royal 120 CPS, Parallel
4289	6403	Cartridge Tape Drive
4290	1340	CPU, for Model 200E W/40K
4292	3233	Printer, Data Royal 160 CPS, Serial
4293	3223	Printer, Data Royal 120 CPS, Serial

FEATURES

Description	Feature Number
Synchronous Communications	8129
Communications, Asynchronous	8100
CPU to Modem Cable Kit, Asynchronous	8204
96 Character Drum Data Products Printer 300 LPM	3922
96 Character Drum Data Products Printer 600 LPM	3923
Formatter/Controller for 75 MB Disc	4211
Foreign Device I/O Features	
Mag Tape Controller Part No. 400147	8580
Card Reader Controller Part No. 900350	8581
General Purpose I/O Controller	8582
Printer Controller Part No. 900763	8583

ASCII CHART

CHAR	CODE	NO.		CHAR	CODE	NO.
NUL	80	128	:	0	B0	176
SOH	81	129	:	1	B1	177
STX	82	130	:	2	B2	178
ETX	83	131	:	3	B3	179
EOT	84	132	:	4	B4	180
ENQ	85	133	:	5	B5	181
ACK	86	134	:	6	B6	182
BEL	87	135	:	7	B7	183
BS	88	136	:	8	B8	184
HT	89	137	:	9	B9	185
LF	8A	138	:	:	BA	186
VT	8B	139	:	;	BB	187
FF	8C	140	:	<	BC	188
CR	8D	141	:	=	BD	189
SO	8E	142	:	>	BE	190
SI	8F	143	:	?	BF	191
DLE	90	144	:	@	C0	192
DC1	91	145	:	A	C1	193
DC2	92	146	:	B	C2	194
DC3	93	147	:	C	C3	195
DC4	94	148	:	D	C4	196
NAK	95	149	:	E	C5	197
SYN	96	150	:	F	C6	198
ETB	97	151	:	G	C7	199
CAN	98	152	:	H	C8	200
EM	99	153	:	I	C9	201
SUB	9A	154	:	J	CA	202
ESC	9B	155	:	K	CB	203
FS	9C	156	:	L	CC	204
GS	9D	157	:	M	CD	205
RS	9E	158	:	N	CE	206
US	9F	159	:	O	CF	207
SPACE	A0	160	:	P	D0	208
!	A1	161	:	Q	D1	209
"	A2	162	:	R	D2	210
#	A3	163	:	S	D3	211
$	A4	164	:	T	D4	212
%	A5	165	:	U	D5	213
&	A6	166	:	V	D6	214
'	A7	167	:	W	D7	215
(	A8	168	:	X	D8	216
)	A9	169	:	Y	D9	217
*	AA	170	:	Z	DA	218
+	AB	171	:	[	DB	219
,	AC	172	:	®	DC	220
-	AD	173	:	]	DD	221
.	AE	174	:	©	DE	222
/	AF	175	:		DF	223

HEX TO DECIMAL CONVERSION

BYTE				BYTE			
HEX	DEC	HEX	DEC	HEX	DEC	HEX	DEC
0	0	0	0	0	0	0	0
1	4,096	1	256	1	16	1	1
2	8,192	2	512	2	32	2	2
3	12,288	3	768	3	48	3	3
4	16,384	4	1,024	4	64	4	4
5	20,480	5	1,280	5	80	5	5
6	24,576	6	1,536	6	96	6	6
7	28,672	7	1,792	7	112	7	7
8	32,768	8	2,048	8	128	8	8
9	36,864	9	2,304	9	144	9	9
A	40,960	A	2,560	A	160	A	10
B	45,056	B	2,816	B	176	B	11
C	49,152	C	3,072	C	192	C	12
D	53,248	D	3,328	D	208	D	13
E	57,344	E	3,584	E	224	E	14
F	61,440	F	3,840	F	240	F	15
4		3		2		1	

HEX TO BINARY CONVERSION

HEX	BINARY	HEX	BINARY
0	0000	8	1000
1	0001	9	1001
2	0010	A	1010
3	0011	B	1011
4	0100	C	1100
5	0101	D	1101
6	0110	E	1110
7	0111	F	1111

EIA RS 232 INTERFACE

PIN	NAME	DESCRIPTION
1	AA	PROTECTIVE GROUND
2	BA	TRANSMITTED DATA
3	BB	RECEIVED DATA
4	CA	REQUEST TO SEND
5	CB	CLEAR TO SEND
6	CC	DATA SET READY
7	AB	SIGNAL GROUND
8	CF	REC SIGNAL DETECT(CARRIER ON)
9		RESERVED FOR DATA SET TESTING
10		RESERVED FOR DATA SET TESTING
11		UNASSIGNED
12	SCF	SECONDARY REC SIGNAL DETECT
13	SCB	SECONDARY CLEAR TO SEND
14	SBA	SECONDARY TRANSMITTED DATA
15	DB	TRANSMIT CLOCK (EXT. SOURCE)
16	SBB	SECONDARY RECEIVED DATA
17	DD	RECEIVE CLOCK (EXT. SOURCE)
18		UNASSIGNED
19	SCA	SECONDARY REQUEST TO SEND
20	CD	DATA TERMINAL READY
21	CG	SIGNAL QUALITY DETECTOR
22	CE	RING INDICATOR
23	CH/CI	DATA SIG.RATE SELECT(INT/EXT)
24	DA	TRANSMIT CLOCK (INTERNAL)
25		UNASSIGNED

NOTE 1 ON MODEMS AND VDT PORT ON B/4
PIN 2 IS AN INPUT
PIN 3 IS AN OUTPUT

NOTE 2 ON ALL OTHER DATA TERMINAL EQU
IPMENT,INCLUDING B/4 SCF PORT
PIN 2 IS AN OUTPUT
PIN 3 IS AN INPUT

COMMONLY USED CABLES ON B/4

900901	B/4 TO LEAR VDT
900301	B/4 TO HAZELTINE VDT
900488	B/4 TO MODEM (ASYNCHRONOUS)
900901	MODEM TO LEAR VDT
900489	MODEM TO HAZELTINE VDT
900846	MODEM TO B/4(SCF FEATURE)
900744	MODEM TO REMOTE PRINTER (CEN)
900680	B/4 TO REM.PRINTER (IN HOUSE)
900901	MODEM TO "Y" CONNECTOR BOX TO LEAR VDT TO REMOTE PTR (CEN)

CONTROLLER ADDRESS JUMPERING

PRINTER CONTROLLERS

LP (HEX 0A)	P1 (HEX 08)
E17 TO E12	E17 TO E10
E2 TO E5	E2 TO E8

V.D.T. CONTROLLER P/N MM060271

CTLR #1 (HEX 1B)	CTLR #2 (HEX 1A)
9 TO 4	9 TO 3
12 TO 10	12 TO 10
15 TO 13	15 TO 13
18 TO 17	18 TO 17

V.D.T. CONTROLLER P/N MM081020

CTRL #1 (HEX 1B)	CTLR #2 (HEX 1A)
3S TO 2S	3S TO 1S
3T TO 2T	3T TO 2T
3E TO 1E	3E TO 2E
3F TO 1F	3F TO 1F
3R TO 2R	3R TO 2R

LEAR VDT BAUD RATES (O/S BOARD)

BAUD RATE	DIODES INSTALLED
110	C D E I K
150	A B C D E F H I J
300	A B C D E G H I
600	A B C D F G H
1000	A B C D H
1200	A B C E F G
1800	A B C D G
2000	A B C G
2400	A B D E F
3600	A B C F
4800	A C D E
7200	A B E
9600	B C D

MEMORY MODULE ADDRESSING

BANK	C4	C3	C2	C1	MEM. SIZE	HEX RANGE
0	0	0	0	0	0K- 8K	0000-1FFF
0	0	0	0	1	8K- 16K	2000-3FFF
0	0	0	1	0	16K- 24K	4000-5FFF
0	0	0	1	1	24k- 32K	6000-7FFF
1	0	1	0	0	32K- 40K	8000-9FFF
1	0	1	0	1	40K- 48K	A000-BFFF
1	0	1	1	0	48K- 56K	C000-DFFF
1	0	1	1	1	56K- 64K	E000-FFFF
2	1	0	0	0	64K- 72K	10000-11FFF
2	1	0	0	1	72K- 80K	12000-13FFF
2	1	0	1	0	80K- 88K	14000-15FFF
2	1	0	1	1	88K- 96K	16000-17FFF
3	1	1	0	0	96K-104K	18000-19FFF
3	1	1	0	1	104K-112K	1A000-1BFFF
3	1	1	1	0	112K-120K	1C000-1DFFF
3	1	1	1	1	120K-128K	1E000-1FFFF

NOTE: 1. 8K MOS MEMORY LOCATED AFTER 16K MOS BOARDS.

2. ON 1200 CPU 16K CORE IS LOCATED AFTER 8K MEMORY BOARDS.

32K MEMORY MODULE ADDRESSING

BANK	C4	C3	C2	C1	MEM. SIZE	HEX RANGE
0	1	1	1	1	0K- 16K	0000-3FFF
0	0	1	1	1	16K- 32K	4000-7FFF
1	1	0	1	1	32K- 48K	8000-BFFF
1	0	0	1	1	48K- 64K	C000-FFFF
2	1	1	0	1	64K- 80K	10000-13FFF
2	0	1	0	1	80K- 96K	14000-17FFF
3	1	0	0	1	96K-112K	18000-1BFFF
3	0	0	0	1	112K-128K	1C000-1FFFF

ADDRESSING 32K MEMORY PCB'S FOR 128K AND ABOVE

ALL 32K MEMORY PC BOARDS CAN BE USED IN SYSTEMS WITH UP TO 256K TOTAL CAPACITY. THE SWITCH SETTINGS SHOWN ON THE PCB SILK-SCREENED TABLE DO NOT REFLECT ADDRESSING ABOVE 128K, HOWEVER TURNING SWITCH C4 TO THE 0 POSITION WILL ALLOW THE BOARD TO OPERATE AT ADDRESSES BETWEEN 128K AND 256K, DEPENDENT ON THE SETTINGS OF C2 AND C3. THE SETTING OF C2 AND C3 WILL SELECT THE SAME RELATIVE LOCATION AS THEY WILL IN THE LOWER 128K. FOR EXAMPLE SWITCH SETTING C2 = 1, C3 = 1, C4 = 0 WILL CAUSE THE 32K BOARD TO BE SELECTED AT ADDRESSES FROM 128 to 160K. SWITCH C1 REMAINS A "DONT CARE."

DEDICATED MEMORY

ADDRESS	DESCRIPTION
00-09	PAPER TAPE READER SA
0A-0B	PAPER TAPE READER EA
0C-0D	PAPER TAPE PUNCH SA
0E-0F	PAPER TAPE PUNCH EA
10-11	CARD READER SA
12-13	CARD READER EA
18-19	PJN BASE ADDRESS
20-21	2ND LINE PRINTER (08) SA
22-23	2ND LINE PRINTER (08) EA
24-25	MAGNETIC TAPE (WANG) SA
26-27	MAGNETIC TAPE (WANG) EA
28-29	LINE PRINTER (0A) SA
2A-2B	LINE PRINTER (0A) EA
30-31	SYNC. COMM. INPUT SA
32-33	SYNC. COMM. INPUT EA
34-35	SYNC. COMM. OUTPUT SA
36-37	SYNC. COMM. OUTPUT EA
58	DMA/DISC STATUS WORD
60-61	DMA/DISC BUFFER SA
62-63	DMA/DISC BUFFER EA
70	CARTRIDGE TAPE SA bits (16,17)
72-72	CARTRIDGE TAPE EA
73-74	CARTRIDGE TAPE BYTE COUNT
80-81	CONSOLE INTERRUPT (5)
82-83	DMA/DISC INTERRUPT (4)
84-85	REAL-TIME CLOCK INTERRUPT
86-87	REAL-TIME CLOCK INTERRUPT (3)
88-89	STACK OVERFLOW INTERRUPT
8A-8B	EXTENED MODE BASE
8C-8D	PUCH DOWN STACK POINTER
8E-8F	POWER FAIL INTERRUPT (2)
90-91	POWER RESTART INTERRUPT (1)
91-93	USED IN GNB AND PJN INSTS.
104-105	PAPER TAPE READER
106-107	PAPER TAPE PUNCH
108-109	CARD READER
110-111	2ND LINE PRINTER (08)
112-113	MAGNETIC TAPE (WANG)
114-115	LINE PRINTER (0A)
116-117	CARTRIDGE TAPE
118-119	SYNC. COMM. INPUT
11A-11B	SYNC. COMM. OUTPUT

DEDICATED MEMORY

INT. ADD. OUT-INP			DEVICE NO.
4/8 WAY TERM. CONTROLLER			
160-170	CHANNEL	0	1B
162-172		1	3B
164-174		2	5B
166-176		3	7B
168-178		4	9B
16A-17A		5	BB
16C-17C		6	DB
16E-17E		7	FB
2ND 4/8 WAY TERM. CONTROLLER			
140-150	CHANNEL	8	1A
142-152		9	3A
144-154		A	5A
146-156		B	7A
148-158		C	9A
14A-15A		D	BA
14C-15C		E	DA
14E-15E		F	FA
1340 CPU ACCESSORY BOARD			
100-102	CHANNEL	0	00
10C-10E		1	20

C.P.U. SENSE SWITCH FUNCTIONS

SENSE SWITCHES #4	#3	#2	#1	
				1100 & 1200 C.P.U.
1	0	0	1	ROMBUG VDT BOOT
1	0	0	0	DISC BOSS LOADER
1	1	0	0	DISC DCP LOADER
				1300 C.P.U.
1	0	0	0	DISC BOSS LOADER
1	1	0	0	DISC ALTERNATE LOAD
1	0	0	1	VDT BOOT LOADER
				1320 C.P.U.
1	0	1	0	DISC BOSS LOADER
1	1	1	0	DISC ALTERNATE LOAD
1	0	0	1	VDT BOOT LOADER
				1340 C.P.U.
0	0	0	0	DISC BOSS LOADER
0	1	0	0	DISC ALTERNATE LOAD
1	0	1	1	TAPE BOSS LOADER (LEVEL 5G AND LOWER)
1	1	1	1	TAPE ALTERNATE LOAD
1	0	0	1	VDT BOOT LOADER

NOTE
1. ON 1300 SERIES C.P.U. SWITCH ON POSITION IS TOWARDS THE BOARD.
2. SENSE SWITCH #1 IS AT THE TOP OF THE BOARD.
3. ON 1340 AND 1320 CPU VDT BOOT CLEARS MEMORY FROM 0 to FF AND 0601 TO 7FFF

DCP OPERATORS

OPERATOR	DESCRIPTION
A XXXX-NNNN (CR)	DISPLAY CONTENTS OF THE A REG.,CHANGE THE CONTENTS TO NNNN AND TERMINATE OPERATION.
B XXXX-(CR)	DISPLAY CONTENTS OF THE B REG., LEAVE THE B REG. UNALTERED AND TERMINATE OPERATION.
C	READ FORMATTED CARDS. CONTROL WILL RETURN TO DCP THROUGH SIMULATED TRAP TO THE EXECUTION ADDRESS.
D SSSS,TTTT (CR)	DUMP THE CONTENTS OF MEMORY LOCATIONS SSSS THROUGH TTTT TO THE CONTROL TERMINAL. EACH LINE WILL CONTAIN AN ADDRESS AND UP TO 16 BYTES OF HEX. VALUES.
E SSSS (CR)	WRITE AN END OF TAPE RECORD INTO FORMATTED PAPER TAPE WITH AN EXECUTION ADDRESS OF SSSS. IF SSSS IS OMITTED, A ZERO ADDRESS WILL BE USED.
G (CR)	CONTROL PASSES TO ADDRESS IN P REGISTER.
G SSSS (CR)	CONTROL PASSES TO LOCATION SSSS.
G SSSS,TTTT (CR)	CONTROL PASSES TO LOCATION SSSS; A TRAP IS SET AT LOCATION TTTT.
G SSSS,TTTT,UUUU (CR)	CONTROL PASSES TO LOCATION SSSS; TRAPS ARE SET AT LOCATION TTTT AND UUUU.

DCP OPERATORS

OPERATOR	DESCRIPTION
G,TTTT (CR)	CONTROL PASSES TO ADDRESS IN P REG; A TRAP IS SET AT LOC. TTTT.
G,TTTT,UUUU (CR)	CONTROL PASSES TO ADDRESS IN P REG; TRAPS ARE SET AT LOCATIONS TTTT AND UUUU.
H TTTT,UUUU, SSSS DDDD	DISPLAY SUM AND DIFFERENCE OF TTTT & UUUU.
IFFFFFF	INPUT FORMATTED PROG. FROM DISC AND RETURN CONTROL TO DCP BY SIMULATED TRAP FROM THE EXECUTION ADDRESS.
JFFFFFF	LOAD AND EXECUTE PROG. FROM DISC 0.
KFFFFFF	INPUT FORMATTED PROG. FROM DISC 1.
L	PUNCH SIX INCHES OF PAPER TAPE LEADER (CHANNEL 8 ONLY)
M SSSS,XX-NN, XX- (CR)	DISPLAY THE CONTENTS OF MEMORY LOC. SSSS AND CHANGE THE CONTENTS TO NN. DISPLAY THE CONTENTS OF LOC. SSSS+1, LEAVE THE LOC. UNALTERED AND TERMINATE THE OPERATION.
O XXXX-(SPACE, COMMA OR (CR))	DISPLAY CONTENTS OF THE OV/W REG, LEAVE THE OV/W REG.UNALTERED AND TERMINATE THE OPERATION.
P XXXX-NNNN, XXXX-(CR)	DISPLAY THE CONTENTS OF THE P REG.,CHANGE THE CONTENTS TO NNNN AND DISPLAY CONTENTS OF THE A REG. LEAVE THE A REG. UNALTERED AND TERMINATE THE OP.

DCP OPERATORS

OPERATOR	DESCRIPTION
Q SSSS,EEEE, MMMM,VVVV	SEARCH LOCATIONS SSSS THROUGH EEEE MASKING THE VALUE TO MMMM. IF THE MASKED VALUE EQUALS VVVV,THEN PRINT THE LOCATION AND THE ACTUAL VALUE.
R	READ A PROGRAM FROM FORMATTED PAPER TAPE CONTROL WILL RETURN TO DCP BY A SIMULATED TRAP TO THE EXECUTION ADDRESS.
S SSSS,NN,NN, NN (CR)	STORE HEXADECIMAL VALUES STARTING AT MEMORY LOCATION SSSS AND CONTINUE UNTIL A CR IS ENTERED.A VOID VALUE WILL BE STORED AS A ZERO BYTE.
T TA TNA TCN	TRANSFER CONTROL.
U VVVV	SET BIAS VALUE TO VVVV
W SSSS,TTTT (CR)	WRITE THE CONTENTS OF MEMORY LOCATIONS SSSS THROUGH TTTT INTO FORMATTED PAPER TAPE.
X XXXX-,XXXX-(CR)	DISPLAY CONTENTS OF THE X REG.,LEAVE THE X REG. UNALTERED AND DISPLAY CONTENTS OF THE OV/W REG. LEAVE THE OV/W REG.UNALTERED & TERMINATE OPERATION
Z	LOAD MEMORY FROM DISC 0, BEGINNING AT CYL.1.

1200 C.P.U. PCB LOCATIONS

LOCATION	MODULE
J1	C.P.U. INTERFACE PCB
J2	C.P.U. CONTROL PCB
J3	C.P.U. DATA PCB
J4 - J8	CORE MEMORY
J5 - J9	R.O.M. PCB
J6 - J10	TERMINAL CONTROLLERS
J7 - J11	SYNC. COMM. CTLR (BB2 ONLY)
J7 - J16	MAGNETIC TAPE CTLR
J7 - J16	PAPER TAPE CONTROLLER
J7 - J16	CARD READER CTLR
J7 - J16	PRINTER CONTROLLERS
J15- J16	MICRO PROCESSOR (BB2 ONLY)
J17	DISC CONTROLLER
J18	POWER EXTENDER BOARD

NOTE 1. 8K CORE MUST BE LOCATED BEFORE ANY 16K MODULES.

2. ALL PCB'S MUST BE PLUGGED INTO THE LOWEST POSSIBLE SLOT AND THE ABOVE PRIORITY SEQUENCE MAINTANED

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1300 C.P.U. PCB LOCATIONS

LOCATION	MODULE
J1 - J8	MOS MEMORY
J5 - J9	MICRO PROCESSOR
J6 - J10	DISC CONTROLLER
J7 - J11	C.P.U. PCB
J8 - J12	C.P.U. ACCESSORY PCB
J9 - J14	TERMINAL CONTROLLERS
J10- J15	SYNC. COMM. CONTROLLER
J10- J17	MAGNETIC TAPE CONTROLLER
J10- J18	PAPER TAPE READER CONTROLLER
J10- J19	CARD READER CONTROLLER
J10- J19	PRINTER CONTROLLERS

NOTE 1. LARGER MEMORY MODULES MUST BE LOCATED FIRST. E.G. 16K BEFORE 8K

2. ALL PCB'S MUST BE LOCATED IN THE LOWEST POSSIBLE SLOT AND THE ABOVE PRIORITY MAINTANED.

1320 C.P.U. PCB LOCATIONS (610 SYS)

LOCATION	MODULE
J1 - J8	MOS MEMORY
J7	C.P.U. BOARD
J8	C.P.U. ACCESSORY BOARD
J9	CARTRIDGE TAPE CTLR
J10	DMA
J11	DISK ADDAPTER
J12	TERMINAL CONTROLLER
J13 -J19	I/O CONTROLLERS

NOTE 1. SLOT J9 IS DEDICATED TO THE TAPE CONTROLLER. A SPECIAL DUMMY BOARD MUST BE PUT IN J9 IF THE TAPE CONTROLLER IS NOT INSTALLED.

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1320 C.P.U. PCB LOCATIONS (700 SYS)

LOCATION	MODULE
J1 - J8	MOS MEMORY
J5 - J9	DMA
J6 - J10	DISK ADDAPTER BOARD
J7 - J11	C.P.U. BOARD
J8 - J12	C.P.U. ACCESSORY BOARD
J9 - J14	TERMINAL CONTROLLERS
J9 - J15	SYNCRONOUS COMMUNICATIONS CTLR
J9 - J19	I/O CONTROLLERS

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DISK CONTROLLER CAGE

LOCATION	MODULE
J1	NOT USED
J2	FORMATTER RADIAL BOARD
J3	FORMATTER PROCESSOR
J4	FORMATTER BUS

1340 C.P.U. PCB LOCATIONS (200 SYS)

LOACTION	MODULE
J1	MEMORY POWER SUPPLY
J2	32K MEMORY
J3	8K MEMORY ** 200-E ONLY***
J4	CPU PCB
J5	CPU ACCESSORY PCB
J6	DISC CONTROLLER PCB
J7	CARTIDGE TAPE CONTROLLER
J8 - J11	OPTIONAL I/O CONTROLLER
J12	CPU POWER SUPPLY

1340 C.P.U. PCB LOCATIONS (410 SYS)

LOACTION	MODULE
J1	MEMORY POWER SUPPLY
J2	32K MEMORY
J3	32K MEMORY
J4	CPU PCB
J5	CPU ACCESSORY PCB
J6	DISC CONTROLLER PCB
J7	CARTIDGE TAPE CONTROLLER
J8	4 - WAY TERMINAL CONTROLLER
J9	PRINTER CONTROLLER
J10 - J11	OPTIONAL I/O CONTROLLER
J12	CPU POWER SUPPLY

1350 CPU PCB LOCATIONS (730 SYSTEM)

UPPER CARD CAGE

J1 - J6	MOS MEMORY
J7	CPU BOARD
J8	CPU ACCESSORY BOARD
J9 - J10	CARTRIDGE TAPE CONTROLLERS OR DUMMY BOARDS
J11	HS DMA BOARD
J12	ADAPTER BUS BOARD
J13	TERMINAL CONTROLLER BOARD
J14 - J19	I/O CONTROLLERS

Note 1. SLOTS J9 & J10 ARE DEDICATED TO THE CARTRIDGE TAPE CONTROLLER. TWO DUMMY BOARDS MUST BE USED IF THE CARTRIDGE TAPE CONTROLLER IS NOT USED.

LOWER CARD CAGE

J1	NOT USED
J2	FORMATTER RADIAL BOARD
J3	FORMATTER PROCESSOR BOARD
J4	FORMATTER BUS BOARD

NOTE 2. J1 IS TO THE LEFT IN LOWER CARD CAGE.

CPU STATUS

BIT	STATUS
0	CONSOLE INTERRUPT
1	DMA TERMINATION INTERRUPT
2	REAL TIME CLOCK INTERRUPT
3	CPU BANK SEL. 2
4	CPU BANK SEL. 1
5	MEMORY PARITY ERROR INTERRUPT
6	CONSOLE HALT INTERRUPT
7	POWER FAIL/RESTART INTERRUPT

CPU STATUS

THIS STATUS IS ONLY AVAILABLE THROUGH MACHINE LANGUAGE PROGRAM #1-8,GOOD STATUS IS 08, ONLY CPU BANK SEL 1 ON. FOR MORE INFORMATION SEE SM MANUAL 1020 PAGE 1-8.

ERROR= 03 DISC= 0 SECTOR= 100 SIZE= 110 STATUS= 06 76

PRIMARY STATUS= 0 6 ALTERNATE STATUS 1 6

0	0	0	0	0	1	1	0

0	0	0	1	0	1	1	0

This error occurred during a read operation and would indicate a CRC error. Since there is no address errors, it is probable that the data was written or read incorrectly.

Hex	Binary	Hex	Binary
0	0000	8	1000
1	0001	9	1001
2	0010	A	1010
3	0011	B	1011
4	0100	C	1100
5	0101	D	1101
6	0110	E	1110
7	0111	F	1111

PRIMARY STATUS BYTE

0	0	0	0	0	1	1	0
7	6	5	4	3	2	1	0

Drive Status Byte Format

Device Status Bit No.	Description
0	DMA Idle. This bit is a 1 when the DMA channel logic is in major activity sequence state 0.
1	Ready to Seek, Read or Write. This bit is a 1 when all of the following status conditions exist: a. The controller is not busy. b. The DRIVE READY status signal from the disc drive is active. c. The ACCESS READY status signal from the disc drive is active. d. The SEEK INCOMPLETE and WRITE UNSAFE status signals from the disc drive are both inactive.
2	Read Error. This bit is a 1 when a CRC or address error is detected at the end of a read operation. During a write operation, a 1 in this bit indicates that a read error was detected in the sector preceding the sector in which data is to be written.
3	Access Not Ready. This bit is a 1 when the ACCESS READY status signal from the disc drive is inactive, indicating that a command to move the heads to another cylinder is being executed.
4	Seek Incomplete. This bit is a 1 when the SEEK INCOMPLETE status signal from the disc drive is active, indicating that a seek operation was not completed due to a malfunction.
5	Write Unsafe. This bit is a 1 when the WRITE UNSAFE status signal from the disc drive is active, indicating that an abnormal condition exists in the disc drive or the external power supplies, and writing of records may not be possible.
6	Disc Drive Ready. This bit is a 1 when the DRIVE READY status signal from the disc drive is active, indicating that: a. The drive is properly supplied with power. b. The drive is loaded with a disc cartridge. c. The load/unload switch is in the load position. d. The green ready light is not on.
7	End of Block. This bit is a 1 when the DMA detects and end of block condition.

ALTERNATE STATUS BYTE

0	0	0	1	0	1	1	0
7	6	5	4	3	2	1	0

Controller Status Byte Format

Device Status Bit No.	Description
0	DMA Idle. This bit is a 1 when the DMA channel logic is in major activity sequence state 0.
1	Ready to Seek, Read or Write. Same as bit 1 of drive status byte.
2	*Read Error. Same as bit 2 of drive status byte.
3	Access Not Ready. Same as bit 3 of drive status byte.
4	*CRC Error. This bit is a 1 when a CRC error is detected during a read operation.
5	*Cylinder Address Error. This bit is a 1 when a discrepancy exists between the cylinder address read from the disc and the cylinder address received from the CPU.
6	Sector Address Error. This bit is a 1 when a discrepancy exists between the disc/head/sector data read from the disc and the disc/head/sector data received from the CPU.
7	End of Block. This bit is a 1 when the DMA channel logic detects an end of block condition.

*For a write operation, these bits indicate error status for the sector preceding the sector in which a write operation is to be performed.

BBI (100 TPI) CYLINDER, HEAD AND SECTOR NUMBERS

CYL NO.	HEAD 0 SECTORS	HEAD 1 SECTORS	CYL NO.	HEAD 0 SECTORS	HEAD 1 SECTORS
0	0 - 47	48 - 95	50	4800 - 4847	4848 - 4895
1	96 - 143	144 - 191	51	4896 - 4943	4944 - 4991
2	192 - 239	240 - 287	52	4992 - 5039	5040 - 5087
3	288 - 335	336 - 383	53	5088 - 5135	5136 - 5183
4	384 - 431	432 - 479	54	5184 - 5231	5232 - 5279
5	480 - 527	528 - 575	55	5280 - 5327	5328 - 5375
6	576 - 623	624 - 671	56	5376 - 5423	5424 - 5471
7	672 - 719	720 - 767	57	5472 - 5519	5520 - 5567
8	768 - 815	816 - 863	58	5568 - 5615	5616 - 5663
9	864 - 911	912 - 959	59	5664 - 5711	5712 - 5759
10	960 - 1007	1008 - 1055	60	5760 - 5807	5808 - 5855
11	1056 - 1103	1104 - 1151	61	5856 - 5903	5904 - 5951
12	1152 - 1199	1200 - 1247	62	5952 - 5999	6000 - 6047
13	1248 - 1295	1296 - 1343	63	6048 - 6095	6096 - 6143
14	1344 - 1391	1392 - 1439	64	6144 - 6191	6192 - 6239
15	1440 - 1487	1488 - 1535	65	6240 - 6287	6288 - 6335
16	1536 - 1583	1584 - 1631	66	6336 - 6383	6384 - 6431
17	1632 - 1679	1680 - 1727	67	6432 - 6479	6480 - 6527
18	1728 - 1775	1776 - 1823	68	6528 - 6575	6576 - 6623
19	1824 - 1871	1872 - 1919	69	6624 - 6671	6672 - 6719
20	1920 - 1967	1968 - 2015	70	6720 - 6767	6768 - 6815
21	2016 - 2063	2064 - 2111	71	6816 - 6863	6864 - 6911
22	2112 - 2159	2160 - 2207	72	6912 - 6959	6960 - 7007
23	2208 - 2255	2256 - 2303	73	7008 - 7055	7056 - 7103
24	2304 - 2351	2352 - 2399	74	7104 - 7151	7152 - 7199
25	2400 - 2447	2448 - 2495	75	7200 - 7247	7248 - 7295
26	2496 - 2543	2544 - 2591	76	7296 - 7343	7344 - 7391
27	2592 - 2639	2640 - 2687	77	7392 - 7439	7440 - 7487
28	2688 - 2735	2736 - 2783	78	7488 - 7535	7536 - 7583
29	2784 - 2831	2832 - 2879	79	7584 - 7631	7632 - 7679
30	2880 - 2927	2928 - 2975	80	7680 - 7727	7728 - 7775
31	2976 - 3023	3024 - 3071	81	7776 - 7823	7824 - 7871
32	3072 - 3119	3120 - 3167	82	7872 - 7919	7920 - 7967
33	3168 - 3215	3216 - 3263	83	7968 - 8015	8016 - 8063
34	3264 - 3311	3312 - 3359	84	8064 - 8111	8112 - 8159
35	3360 - 3407	3408 - 3455	85	8160 - 8207	8208 - 8255
36	3456 - 3503	3504 - 3551	86	8256 - 8303	8304 - 8351
37	3552 - 3599	3600 - 3647	87	8352 - 8399	8400 - 8447
38	3648 - 3695	3696 - 3743	88	8448 - 8495	8496 - 8543
39	3744 - 3791	3792 - 3839	89	8544 - 8591	8592 - 8639
40	3840 - 3887	3888 - 3935	90	8640 - 8687	8688 - 8735
41	3936 - 3983	3984 - 4031	91	8736 - 8783	8784 - 8831
42	4032 - 4079	4080 - 4127	92	8832 - 8879	8880 - 8927
43	4128 - 4175	4176 - 4223	93	8928 - 8975	8976 - 9023
44	4224 - 4271	4272 - 4319	94	9024 - 9071	9072 - 9119
45	4320 - 4367	4368 - 4415	95	9120 - 9167	9168 - 9215
46	4416 - 4463	4464 - 4511	96	9216 - 9263	9264 - 9311
47	4512 - 4559	4560 - 4607	97	9312 - 9359	9360 - 9407
48	4608 - 4655	4656 - 4703	98	9408 - 9455	9456 - 9503
49	4704 - 4751	4752 - 4799	99	9504 - 9551	9552 - 9599

BB 1 CYL.	(200 TPI) CYL, HEAD 0	HEAD & SECTOR # HEAD 1	DR#
0	0- 47	48- 95	0
1	48- 95	0- 47	1
2	96- 143	144- 191	0
3	144- 191	96- 143	1
4	192- 239	240- 287	0
5	240- 287	192- 239	1
6	288- 335	336- 383	0
7	336- 383	288- 335	1
8	384- 431	432- 479	0
9	432- 479	384- 431	1
10	480- 527	528- 575	0
11	528- 575	480- 527	1
12	576- 623	624- 671	0
13	624- 671	576- 623	1
14	672- 719	720- 767	0
15	720- 767	672- 719	1
16	768- 815	816- 863	0
17	816- 863	768- 815	1
18	864- 911	912- 959	0
19	912- 959	864- 911	1
20	960- 1007	1008- 1055	0
21	1008- 1055	960- 1007	1
22	1056- 1103	1104- 1151	0
23	1104- 1151	1056- 1103	1
24	1152- 1199	1200- 1247	0
25	1200- 1247	1152- 1199	1
26	1248- 1295	1296- 1343	0
27	1296- 1343	1248- 1295	1
28	1344- 1391	1392- 1439	0
29	1392- 1439	1344- 1391	1
30	1440- 1487	1488- 1535	0
31	1488- 1535	1440- 1487	1
32	1536- 1583	1584- 1631	0
33	1584- 1631	1536- 1583	1
34	1632- 1679	1680- 1727	0
35	1680- 1727	1632- 1679	1
36	1728- 1775	1776- 1823	0
37	1776- 1823	1728- 1775	1
38	1824- 1871	1872- 1919	0
39	1872- 1919	1824- 1871	1
40	1920- 1967	1968- 2015	0
41	1968- 2015	1920- 1967	1
42	2016- 2063	2064- 2111	0
43	2064- 2111	2016- 2063	1
44	2112- 2159	2160- 2207	0
45	2160- 2207	2112- 2159	1
46	2208- 2255	2256- 2303	0
47	2256- 2303	2208- 2255	1
48	2304- 2351	2352- 2399	0
49	2352- 2399	2304- 2351	1
50	2400- 2447	2448- 2495	0
51	2448- 2495	2400- 2447	1
52	2496- 2543	2544- 2591	0
53	2544- 2591	2496- 2543	1
54	2592- 2639	2640- 2687	0
55	2640- 2687	2592- 2639	1
56	2688- 2735	2736- 2783	0
57	2736- 2783	2688- 2735	1
58	2784- 2831	2832- 2879	0
59	2832- 2879	2784- 2831	1
60	2880- 2927	2928- 2975	0
61	2928- 2975	2880- 2927	1

BB 1 CYL.	(200 TPI) CYL, HEAD 0	HEAD & SECTOR # HEAD 1	DR#
62	2976- 3023	3024- 3071	0
63	3024- 3071	2976- 3023	1
64	3072- 3119	3120- 3167	0
65	3120- 3167	3072- 3119	1
66	3168- 3215	3216- 3263	0
67	3216- 3263	3168- 3215	1
68	3264- 3311	3312- 3359	0
69	3312- 3359	3264- 3311	1
70	3360- 3407	3408- 3455	0
71	3408- 3455	3360- 3407	1
72	3456- 3503	3504- 3551	0
73	3504- 3551	3456- 3503	1
74	3552- 3599	3600- 3647	0
75	3600- 3647	3552- 3599	1
76	3648- 3695	3696- 3743	0
77	3696- 3743	3648- 3695	1
78	3744- 3791	3792- 3839	0
79	3792- 3839	3744- 3791	1
80	3840- 3887	3888- 3935	0
81	3888- 3935	3840- 3887	1
82	3936- 3983	3984- 4031	0
83	3984- 4031	3936- 3983	1
84	4032- 4079	4080- 4127	0
85	4080- 4127	4032- 4079	1
86	4128- 4175	4176- 4223	0
87	4176- 4223	4128- 4175	1
88	4224- 4271	4272- 4319	0
89	4272- 4319	4224- 4271	1
90	4320- 4367	4368- 4415	0
91	4368- 4415	4320- 4367	1
92	4416- 4463	4464- 4511	0
93	4464- 4511	4416- 4463	1
94	4512- 4559	4560- 4607	0
95	4560- 4607	4512- 4559	1
96	4608- 4655	4656- 4703	0
97	4656- 4703	4608- 4655	1
98	4704- 4751	4752- 4799	0
99	4752- 4799	4704- 4751	1
100	4800- 4847	4848- 4895	0
101	4848- 4895	4800- 4847	1
102	4896- 4943	4944- 4991	0
103	4944- 4991	4896- 4943	1
104	4992- 5039	5040- 5087	0
105	5040- 5087	4992- 5039	1
106	5088- 5135	5136- 5183	0
107	5136- 5183	5088- 5135	1
108	5184- 5231	5232- 5279	0
109	5232- 5279	5184- 5231	1
110	5280- 5327	5328- 5375	0
111	5328- 5375	5280- 5327	1
112	5376- 5423	5424- 5471	0
113	5424- 5471	5376- 5423	1
114	5472- 5519	5520- 5567	0
115	5520- 5567	5472- 5519	1
116	5568- 5615	5616- 5663	0
117	5616- 5663	5568- 5615	1
118	5664- 5711	5712- 5759	0
119	5712- 5759	5664- 5711	1
120	5760- 5807	5808- 5855	0
121	5808- 5855	5760- 5807	1
122	5856- 5903	5904- 5951	0
123	5904- 5951	5856- 5903	1

BB 1 CYL.	(200 TPI) CYL, HEAD 0	HEAD & SECTOR # HEAD 1	DR#
124	5952- 5999	6000- 6047	0
125	6000- 6047	5952- 5999	1
126	6048- 6095	6096- 6143	0
127	6096- 6143	6048- 6095	1
128	6144- 6191	6192- 6239	0
129	6192- 6239	6144- 6191	1
130	6240- 6287	6288- 6335	0
131	6288- 6335	6240- 6287	1
132	6336- 6383	6384- 6431	0
133	6384- 6431	6336- 6383	1
134	6432- 6479	6480- 6527	0
135	6480- 6527	6432- 6479	1
136	6528- 6575	6576- 6623	0
137	6576- 6623	6528- 6575	1
138	6624- 6671	6672- 6719	0
139	6672- 6719	6624- 6671	1
140	6720- 6767	6768- 6815	0
141	6768- 6815	6720- 6767	1
142	6816- 6863	6864- 6911	0
143	6864- 6911	6816- 6863	1
144	6912- 6959	6960- 7007	0
145	6960- 7007	6912- 6959	1
146	7008- 7055	7056- 7103	0
147	7056- 7103	7008- 7055	1
148	7104- 7151	7152- 7199	0
149	7152- 7199	7104- 7151	1
150	7200- 7247	7248- 7295	0
151	7248- 7295	7200- 7247	1
152	7296- 7343	7344- 7391	0
153	7344- 7391	7296- 7343	1
154	7392- 7439	7440- 7487	0
155	7440- 7487	7392- 7439	1
156	7488- 7535	7536- 7583	0
157	7536- 7583	7488- 7535	1
158	7584- 7631	7632- 7679	0
159	7632- 7679	7584- 7631	1
160	7680- 7727	7728- 7775	0
161	7728- 7775	7680- 7727	1
162	7776- 7823	7824- 7871	0
163	7824- 7871	7776- 7823	1
164	7872- 7919	7920- 7967	0
165	7920- 7967	7872- 7919	1
166	7968- 8015	8016- 8063	0
167	8016- 8063	7968- 8015	1
168	8064- 8111	8112- 8159	0
169	8112- 8159	8064- 8111	1
170	8160- 8207	8208- 8255	0
171	8208- 8255	8160- 8207	1
172	8256- 8303	8304- 8351	0
173	8304- 8351	8256- 8303	1
174	8352- 8399	8400- 8447	0
175	8400- 8447	8352- 8399	1
176	8448- 8495	8496- 8543	0
177	8496- 8543	8448- 8495	1
178	8544- 8591	8592- 8639	0
179	8592- 8639	8544- 8591	1
180	8640- 8687	8688- 8735	0
181	8688- 8735	8640- 8687	1
182	8736- 8783	8784- 8831	0
183	8784- 8831	8736- 8783	1
184	8832- 8879	8880- 8927	0
185	8880- 8927	8832- 8879	1

BB 1 CYL.	(200 TPI) CYL, HEAD 0	HEAD & SECTOR # HEAD 1	DR#
186	8928- 8975	8976- 9023	0
187	8976- 9023	8928- 8975	1
188	9024- 9071	9072- 9119	0
189	9072- 9119	9024- 9071	1
190	9120- 9167	9168- 9215	0
191	9168- 9215	9120- 9167	1
192	9216- 9263	9264- 9311	0
193	9264- 9311	9216- 9263	1
194	9312- 9359	9360- 9407	0
195	9360- 9407	9312- 9359	1
196	9408- 9455	9456- 9503	0
197	9456- 9503	9408- 9455	1
198	9504- 9551	9552- 9599	0
199	9552- 9599	9504- 9551	1
200	9600- 9647	9648- 9695	0
201	9648- 9695	9600- 9647	1
202	9696- 9743	9744- 9791	0
203	9744- 9791	9696- 9743	1
204	9792- 9839	9840- 9887	0
205	9840- 9887	9792- 9839	1
206	9888- 9935	9936- 9983	0
207	9936- 9983	9888- 9935	1
208	9984- 10031	10032- 10079	0
209	10032- 10079	9984- 10031	1
210	10080- 10127	10128- 10175	0
211	10128- 10175	10080- 10127	1
212	10176- 10223	10224- 10271	0
213	10224- 10271	10176- 10223	1
214	10272- 10319	10320- 10367	0
215	10320- 10367	10272- 10319	1
216	10368- 10415	10416- 10463	0
217	10416- 10463	10368- 10415	1
218	10464- 10511	10512- 10559	0
219	10512- 10559	10464- 10511	1
220	10560- 10607	10608- 10655	0
221	10608- 10655	10560- 10607	1
222	10656- 10703	10704- 10751	0
223	10704- 10751	10656- 10703	1
224	10752- 10799	10800- 10847	0
225	10800- 10847	10752- 10799	1
226	10848- 10895	10896- 10943	0
227	10896- 10943	10848- 10895	1
228	10944- 10991	10992- 11039	0
229	10992- 11039	10944- 10991	1
230	11040- 11087	11088- 11135	0
231	11088- 11135	11040- 11087	1
232	11136- 11183	11184- 11231	0
233	11184- 11231	11136- 11183	1
234	11232- 11279	11280- 11327	0
235	11280- 11327	11232- 11279	1
236	11328- 11375	11376- 11423	0
237	11376- 11423	11328- 11375	1
238	11424- 11471	11472- 11519	0
239	11472- 11519	11424- 11471	1
240	11520- 11567	11568- 11615	0
241	11568- 11615	11520- 11567	1
242	11616- 11663	11664- 11711	0
243	11664- 11711	11616- 11663	1
244	11712- 11759	11760- 11807	0
245	11760- 11807	11712- 11759	1
246	11808- 11855	11856- 11903	0
247	11856- 11903	11808- 11855	1

BBI (100 TPI) CYLINDER, HEAD AND SECTOR NUMBERS

CYL NO.	HEAD 0 SECTORS	HEAD 1 SECTORS	CYL NO.	HEAD 0 SECTORS	HEAD 1 SECTORS
100	9600 - 9647	9648 - 9695	150	14400 - 14447	14448 - 14495
101	9696 - 9743	9744 - 9791	151	14496 - 14543	14544 - 14591
102	9792 - 9839	9840 - 9887	152	14592 - 14639	14640 - 14687
103	9888 - 9935	9936 - 9983	153	14688 - 14735	14736 - 14783
104	9984 - 10031	10032 - 10079	154	14784 - 14831	14832 - 14879
105	10080 - 10127	10128 - 10175	155	14880 - 14927	14928 - 14975
106	10176 - 10223	10224 - 10271	156	14976 - 15023	15024 - 15071
107	10272 - 10319	10320 - 10367	157	15072 - 15119	15120 - 15167
108	10368 - 10415	10416 - 10463	158	15168 - 15215	15216 - 15263
109	10464 - 10511	10512 - 10559	159	15264 - 15311	15312 - 15359
110	10560 - 10607	10608 - 10655	160	15360 - 15407	15408 - 15455
111	10656 - 10703	10704 - 10751	161	15456 - 15503	15504 - 15551
112	10752 - 10799	10800 - 10847	162	15552 - 15599	15600 - 15647
113	10848 - 10895	10896 - 10943	163	15648 - 15695	15696 - 15743
114	10944 - 10991	10992 - 11039	164	15744 - 15791	15792 - 15839
115	11040 - 11087	11088 - 11135	165	15840 - 15887	15888 - 15935
116	11136 - 11183	11184 - 11231	166	15936 - 15983	15984 - 16031
117	11232 - 11279	11280 - 11327	167	16032 - 16079	16080 - 16127
118	11328 - 11375	11376 - 11423	168	16128 - 16175	16176 - 16223
119	11424 - 11471	11472 - 11519	169	16224 - 16271	16272 - 16319
120	11520 - 11567	11568 - 11615	170	16320 - 16367	16368 - 16415
121	11616 - 11663	11664 - 11711	171	16416 - 16463	16464 - 16511
122	11712 - 11759	11760 - 11807	172	16512 - 16559	16560 - 16607
123	11808 - 11855	11856 - 11903	173	16608 - 16655	16656 - 16703
124	11904 - 11951	11952 - 11999	174	16704 - 16751	16752 - 16799
125	12000 - 12047	12048 - 12095	175	16800 - 16847	16848 - 16895
126	12096 - 12143	12144 - 12191	176	16896 - 16943	16944 - 16991
127	12192 - 12239	12240 - 12287	177	16992 - 17039	17040 - 17087
128	12288 - 12335	12336 - 12383	178	17088 - 17135	17136 - 17183
129	12384 - 12431	12432 - 12479	179	17184 - 17231	17232 - 17279
130	12480 - 12527	12528 - 12575	180	17280 - 17327	17328 - 17375
131	12576 - 12623	12624 - 12671	181	17376 - 17423	17424 - 17471
132	12672 - 12719	12720 - 12767	182	17472 - 17519	17520 - 17567
133	12768 - 12815	12816 - 12863	183	17568 - 17615	17616 - 17663
134	12864 - 12911	12912 - 12959	184	17664 - 17711	17712 - 17759
135	12960 - 13007	13008 - 13055	185	17760 - 17807	17808 - 17855
136	13056 - 13103	13104 - 13151	186	17856 - 17903	17904 - 17951
137	13152 - 13199	13200 - 13247	187	17952 - 17999	18000 - 18047
138	13248 - 13295	13296 - 13343	188	18048 - 18095	18096 - 18143
139	13344 - 13391	13392 - 13439	189	18144 - 18191	18192 - 18239
140	13440 - 13487	13488 - 13535	190	18240 - 18287	18288 - 18335
141	13536 - 13583	13584 - 13631	191	18336 - 18383	18384 - 18431
142	13632 - 13679	13680 - 13727	192	18432 - 18479	18480 - 18527
143	13728 - 13775	13776 - 13823	193	18528 - 18575	18576 - 18623
144	13824 - 13871	13872 - 13919	194	18624 - 18671	18672 - 18719
145	13920 - 13967	13968 - 14015	195	18720 - 18767	18768 - 18815
146	14016 - 14063	14064 - 14111	196	18816 - 18863	18864 - 18911
147	14112 - 14159	14160 - 14207	197	18912 - 18959	18960 - 19007
148	14208 - 14255	14256 - 14303	198	19008 - 19055	19056 - 19103
149	14304 - 14351	14352 - 14399	199	19104 - 19151	19152 - 19199

STATUS = 7707

Hex	Binary	Hex	Binary
0	0000	8	1000
1	0001	9	1001
2	0010	A	1010
3	0011	B	1011
4	0100	C	1100
5	0101	D	1101
6	0110	E	1110
7	0111	F	1111

8421	8421	8421	8421
0111	0111	0000	0111

INPUT DEVICE STATUS

7	6	5	4	3	2	1	0

- 0: DMA READY
- 1: SYSTEM READY
- 2: SELECTED DRIVE READY
- 3: SPARE
- 4: CRC ERROR
- 5: PO ERROR
- 6: P1 ERROR
- 7: SPARE (FIRST BIT TRANSMITTED)

INPUT ALTERNATE DEVICE STATUS

7	6	5	4	3	2	1	0

- 0: SEEK COMPLETE SELECTED DRIVE
- 1: SEEK COMPLETE DRIVE 0
- 2: SEEK COMPLETE DRIVE 1
- 3: SEEK COMPLETE DRIVE 2
- 4: SEEK COMPLETE DRIVE 3
- 5: SEEK INCOMPLETE SELECTED DRIVE
- 6: SPARE
- 7: SPARE (FIRST BIT TRANSMITTED)

ORDER OF BIT TRANSMISSION →

1 SECTOR

PREAMBLE FIELD				DATA FIELD	POSTAMBLE FIELD		
28 BYTE ALL ZERO SYNC	SYNC BYTE	2 BYTE PREAMBLE	ZERO BYTE	256 DATA BYTES	2 BYTES CRC	ZERO BYTES	8 BYTE ERASE GAP

FIRST BYTE

Z

PO P1

0	7	0	1	2	3	4	5	6	7
LOW ORDER 8 BITS CYLINDER ADDRESS									

- MSB OF CYLINDER ADDRESS
- DISC SELECT; 1 = FIXED, 0 = REMOVABLE
- HEAD SELECT; 1 = BOTTOM, 0 = TOP
- MSB
- SECTOR ADDRESS
- LSB

BIT	0	1	2	3	4	5	6	7
	0	0	0	0	0	0	0	1

BB 1 CYL.	(200 TPI) CYL, HEAD 0	HEAD & SECTOR # HEAD 1	DR#
248	11904- 11952	11952- 11999	0
249	11952- 11952	11904- 11951	1
250	12000- 12048	12048- 12095	0
251	12048- 12048	12000- 12047	1
252	12096- 12144	12144- 12191	0
253	12144- 12144	12096- 12143	1
254	12192- 12240	12240- 12287	0
255	12240- 12240	12192- 12239	1
256	12288- 12336	12336- 12383	0
257	12336- 12336	12288- 12335	1
258	12384- 12432	12432- 12479	0
259	12432- 12432	12384- 12431	1
260	12480- 12528	12528- 12575	0
261	12528- 12528	12480- 12527	1
262	12576- 12624	12624- 12671	0
263	12624- 12624	12576- 12623	1
264	12672- 12720	12720- 12767	0
265	12720- 12720	12672- 12719	1
266	12768- 12816	12816- 12863	0
267	12816- 12816	12768- 12815	1
268	12864- 12912	12912- 12959	0
269	12912- 12912	12864- 12911	1
270	12960- 13008	13008- 13055	0
271	13008- 13008	12960- 13007	1
272	13056- 13104	13104- 13151	0
273	13104- 13104	13056- 13103	1
274	13152- 13200	13200- 13247	0
275	13200- 13200	13152- 13199	1
276	13248- 13296	13296- 13343	0
277	13296- 13296	13248- 13295	1
278	13344- 13392	13392- 13439	0
279	13392- 13392	13344- 13391	1
280	13440- 13488	13488- 13535	0
281	13488- 13488	13440- 13487	1
282	13536- 13584	13584- 13631	0
283	13584- 13584	13536- 13583	1
284	13632- 13680	13680- 13727	0
285	13680- 13680	13632- 13679	1
286	13728- 13776	13776- 13823	0
287	13776- 13776	13728- 13775	1
288	13824- 13872	13872- 13919	0
289	13872- 13872	13824- 13871	1
290	13920- 13968	13968- 14015	0
291	13968- 13968	13920- 13967	1
292	14016- 14064	14064- 14111	0
293	14064- 14064	14016- 14063	1
294	14112- 14160	14160- 14207	0
295	14160- 14160	14112- 14159	1
296	14208- 14256	14256- 14303	0
297	14256- 14256	14208- 14255	1
298	14304- 14352	14352- 14399	0
299	14352- 14352	14304- 14351	1
300	14400- 14448	14448- 14495	0
301	14448- 14448	14400- 14447	1
302	14496- 14544	14544- 14591	0
303	14544- 14544	14496- 14543	1
304	14592- 14640	14640- 14687	0
305	14640- 14640	14592- 14639	1
306	14688- 14736	14736- 14783	0
307	14736- 14736	14688- 14735	1
308	14784- 14832	14832- 14879	0
309	14832- 14832	14784- 14831	1

BB 1 CYL.	(200 TPI) CYL, HEAD 0	HEAD & SECTOR # HEAD 1	DR#
310	14880- 14928	14928- 14975	0
311	14928- 14928	14880- 14927	1
312	14976- 15024	15024- 15071	0
313	15024- 15024	14976- 15023	1
314	15072- 15120	15120- 15167	0
315	15120- 15120	15072- 15119	1
316	15168- 15216	15216- 15263	0
317	15216- 15216	15168- 15215	1
318	15264- 15312	15312- 15359	0
319	15312- 15312	15264- 15311	1
320	15360- 15408	15408- 15455	0
321	15408- 15408	15360- 15407	1
322	15456- 15504	15504- 15551	0
323	15504- 15504	15456- 15503	1
324	15552- 15600	15600- 15647	0
325	15600- 15600	15552- 15599	1
326	15648- 15696	15696- 15743	0
327	15696- 15696	15648- 15695	1
328	15744- 15792	15792- 15839	0
329	15792- 15792	15744- 15791	1
330	15840- 15888	15888- 15935	0
331	15888- 15888	15840- 15887	1
332	15936- 15984	15984- 16031	0
333	15984- 15984	15936- 15983	1
334	16032- 16080	16080- 16127	0
335	16080- 16080	16032- 16079	1
336	16128- 16176	16176- 16223	0
337	16176- 16176	16128- 16175	1
338	16224- 16272	16272- 16319	0
339	16272- 16272	16224- 16271	1
340	16320- 16368	16368- 16415	0
341	16368- 16368	16320- 16367	1
342	16416- 16464	16464- 16511	0
343	16464- 16464	16416- 16463	1
344	16512- 16560	16560- 16607	0
345	16560- 16560	16512- 16559	1
346	16608- 16656	16656- 16703	0
347	16656- 16656	16608- 16655	1
348	16704- 16752	16752- 16799	0
349	16752- 16752	16704- 16751	1
350	16800- 16848	16848- 16895	0
351	16848- 16848	16800- 16847	1
352	16896- 16944	16944- 16991	0
353	16944- 16944	16896- 16943	1
354	16992- 17040	17040- 17087	0
355	17040- 17040	16992- 17039	1
356	17088- 17136	17136- 17183	0
357	17136- 17136	17088- 17135	1
358	17184- 17232	17232- 17279	0
359	17232- 17232	17184- 17231	1
360	17280- 17328	17328- 17375	0
361	17328- 17328	17280- 17327	1
362	17376- 17424	17424- 17471	0
363	17424- 17424	17376- 17423	1
364	17472- 17520	17520- 17567	0
365	17520- 17520	17472- 17519	1
366	17568- 17616	17616- 17663	0
367	17616- 17616	17568- 17615	1
368	17664- 17712	17712- 17759	0
369	17712- 17712	17664- 17711	1
370	17760- 17808	17808- 17855	0
371	17808- 17808	17760- 17807	1

BB 1 CYL.	(200 TPI) CYL, HEAD 0	HEAD & SECTOR # HEAD 1	DR#
372	17856- 17903	17904- 17951	0
373	17904- 17951	17856- 17903	1
374	17952- 17999	18000- 18047	0
375	18000- 18047	17952- 17999	1
376	18048- 18095	18096- 18143	0
377	18096- 18143	18048- 18095	1
378	18144- 18191	18192- 18239	0
379	18192- 18239	18144- 18191	1
380	18240- 18287	18288- 18335	0
381	18288- 18335	18240- 18287	1
382	18336- 18383	18384- 18431	0
383	18384- 18431	18336- 18383	1
384	18432- 18479	18480- 18527	0
385	18480- 18527	18432- 18479	1
386	18528- 18575	18576- 18623	0
387	18576- 18623	18528- 18575	1
388	18624- 18671	18672- 18719	0
389	18672- 18719	18624- 18671	1
390	18720- 18767	18768- 18815	0
391	18768- 18815	18720- 18767	1
392	18816- 18863	18864- 18911	0
393	18864- 18911	18816- 18863	1
394	18912- 18959	18960- 19007	0
395	18960- 19007	18912- 18959	1
396	19008- 19055	19056- 19103	0
397	19056- 19103	19008- 19055	1
398	19104- 19151	19152- 19199	0
399	19152- 19199	19104- 19151	1

```
0001 REM :"THIS PROGRAM PRINTS CYL, HEAD SECTOR LIST FOR 4226 (BB I  2
0001:00 TPI DISK)"
0005 OPEN (1)"LP"
0006 LET B$="####0",A$="##0"
0010 LET A=0,B=0,C=48
0011 PRINT (1)'FF',"BB 1 (200 TPI) CYL, HEAD & SECTOR #"
0012 PRINT (1)"CYL.      HEAD 0          HEAD 1    DR#"
0013 PRINT (1)"----      ------          ------    ---"
0019 LET L=0
0020 PRINT (1)A:A$,@(5),B:B$,"-",B+47,@(20),C:B$,"-",C+47,@(33),"0"
0021 LET L=L+1
0025 LET A=A+1
0030 PRINT (1)A:A$,@(5),C:B$,"-",C+47,@(20),B:B$,"-",B+47,@(33),"1"
0035 LET A=A+1
0036 LET B=B+96,C=C+96
0037 LET L=L+1
0038 IF L=62GOTO11
0039 IF B=19200END
0040 GOTO 20
```

8011 (200 TPI) CYLINDER,HEAD AND SECTOR NUMBERS

CYL NO.	HEAD 0 SECTORS	HEAD 1 SECTORS	CYL NO.	HEAD 0 SECTORS	HEAD 1 SECTORS
204	9792 - 9815	9816 - 9839	255	12240 - 12263	12264 - 12287
205	9840 - 9863	9864 - 9887	256	12288 - 12311	12312 - 12335
206	9888 - 9911	9912 - 9935	257	12336 - 12359	12360 - 12383
207	9936 - 9959	9960 - 9983	258	12384 - 12407	12408 - 12431
208	9984 - 10007	10008 - 10031	259	12432 - 12455	12456 - 12479
209	10032 - 10055	10056 - 10079	260	12480 - 12503	12504 - 12527
210	10080 - 10103	10104 - 10127	261	12528 - 12551	12552 - 12575
211	10128 - 10151	10152 - 10175	262	12576 - 12599	12600 - 12623
212	10176 - 10199	10200 - 10223	263	12624 - 12647	12648 - 12671
213	10224 - 10247	10248 - 10271	264	12672 - 12695	12696 - 12719
214	10272 - 10295	10296 - 10319	265	12720 - 12743	12744 - 12767
215	10320 - 10343	10344 - 10367	266	12768 - 12791	12792 - 12815
216	10368 - 10391	10392 - 10415	267	12816 - 12839	12840 - 12863
217	10416 - 10439	10440 - 10463	268	12864 - 12887	12888 - 12911
218	10464 - 10487	10488 - 10511	269	12912 - 12935	12936 - 12959
219	10512 - 10535	10536 - 10559	270	12960 - 12983	12984 - 13007
220	10560 - 10583	10584 - 10607	271	13008 - 13031	13032 - 13055
221	10608 - 10631	10632 - 10655	272	13056 - 13079	13080 - 13103
222	10656 - 10679	10680 - 10703	273	13104 - 13127	13128 - 13151
223	10704 - 10727	10728 - 10751	274	13152 - 13175	13176 - 13199
224	10752 - 10775	10776 - 10799	275	13200 - 13223	13224 - 13247
225	10800 - 10823	10824 - 10847	276	13248 - 13271	13272 - 13295
226	10848 - 10871	10872 - 10895	277	13296 - 13319	13320 - 13343
227	10896 - 10919	10920 - 10943	278	13344 - 13367	13368 - 13391
228	10944 - 10967	10968 - 10991	279	13392 - 13415	13416 - 13439
229	10992 - 11015	11016 - 11039	280	13440 - 13463	13464 - 13487
230	11040 - 11063	11064 - 11087	281	13488 - 13511	13512 - 13535
231	11088 - 11111	11112 - 11135	282	13536 - 13559	13560 - 13583
232	11136 - 11159	11160 - 11183	283	13584 - 13607	13608 - 13631
233	11184 - 11207	11208 - 11231	284	13632 - 13655	13656 - 13679
234	11232 - 11255	11256 - 11279	285	13680 - 13703	13704 - 13727
235	11280 - 11303	11304 - 11327	286	13728 - 13751	13752 - 13775
236	11328 - 11351	11352 - 11375	287	13776 - 13799	13800 - 13823
237	11376 - 11399	11400 - 11423	288	13824 - 13847	13848 - 13871
238	11424 - 11447	11448 - 11471	289	13872 - 13895	13896 - 13919
239	11472 - 11495	11496 - 11519	290	13920 - 13943	13944 - 13967
240	11520 - 11543	11544 - 11567	291	13968 - 13991	13992 - 14015
241	11568 - 11591	11592 - 11615	292	14016 - 14039	14040 - 14063
242	11616 - 11639	11640 - 11663	293	14064 - 14087	14088 - 14111
243	11664 - 11687	11688 - 11711	294	14112 - 14135	14136 - 14159
244	11712 - 11735	11736 - 11759	295	14160 - 14183	14184 - 14207
245	11760 - 11783	11784 - 11807	296	14208 - 14231	14232 - 14255
246	11808 - 11831	11832 - 11855	297	14256 - 14279	14280 - 14303
247	11856 - 11879	11880 - 11903	298	14304 - 14327	14328 - 14351
248	11904 - 11927	11928 - 11951	299	14352 - 14375	14376 - 14399
249	11952 - 11975	11976 - 11999	300	14400 - 14423	14424 - 14447
250	12000 - 12023	12024 - 12047	301	14448 - 14471	14472 - 14495
251	12048 - 12071	12072 - 12095	302	14496 - 14519	14520 - 14543
252	12096 - 12119	12120 - 12143	303	14544 - 14567	14568 - 14591
253	12144 - 12167	12168 - 12191	304	14592 - 14615	14616 - 14639
254	12192 - 12215	12216 - 12239	305	14640 - 14663	14664 - 14687

8011 (200 TPI) CYLINDER,HEAD AND SECTOR NUMBERS

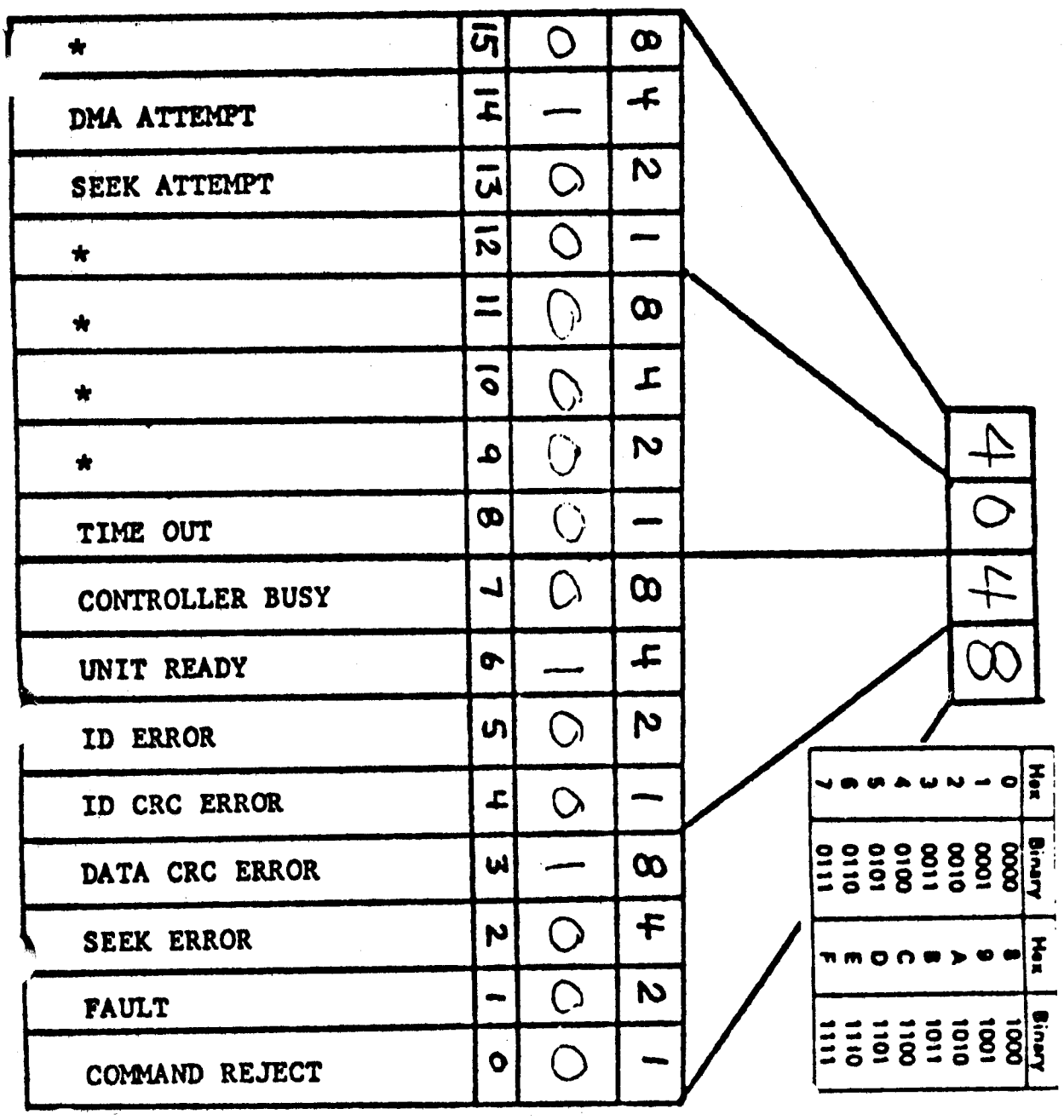
CYL NO.	HEAD 0 SECTORS	HEAD 1 SECTORS	CYL NO.	HEAD 0 SECTORS	HEAD 1 SECTORS
306	14688 - 14711	14712 - 14735	357	17136 - 17159	17160 - 17183
307	14736 - 14759	14760 - 14783	358	17184 - 17207	17208 - 17231
308	14784 - 14807	14808 - 14831	359	17232 - 17255	17256 - 17279
309	14832 - 14855	14856 - 14879	360	17280 - 17303	17304 - 17327
310	14880 - 14903	14904 - 14927	361	17328 - 17351	17352 - 1737
311	14928 - 14951	14952 - 14975	362	17376 - 17399	17400 - 17423
312	14976 - 14999	15000 - 15023	363	17424 - 17447	17448 - 17471
313	15024 - 15047	15048 - 15071	364	17472 - 17495	17496 - 17519
314	15072 - 15095	15096 - 15119	365	17520 - 17543	17544 - 17567
315	15120 - 15143	15144 - 15167	366	17568 - 17591	17592 - 17615
316	15168 - 15191	15192 - 15215	367	17616 - 17639	17640 - 17663
317	15216 - 15239	15240 - 15263	368	17664 - 17687	17688 - 1771
318	15264 - 15287	15288 - 15311	369	17712 - 17735	17736 - 17759
319	15312 - 15335	15336 - 15359	370	17760 - 17783	17784 - 17807
320	15360 - 15383	15384 - 15407	371	17808 - 17831	17832 - 17855
321	15408 - 15431	15432 - 15455	372	17856 - 17879	17880 - 17903
322	15456 - 15479	15480 - 15503	373	17904 - 17927	17928 - 17951
323	15504 - 15527	15528 - 15551	374	17952 - 17975	17976 - 17999
324	15552 - 15575	15576 - 15599	375	18000 - 18023	18024 - 18047
325	15600 - 15623	15624 - 15647	376	18048 - 18071	18072 - 18095
326	15648 - 15671	15672 - 15695	377	18096 - 18119	18120 - 18143
327	15696 - 15719	15720 - 15743	378	18144 - 18167	18168 - 18191
328	15744 - 15767	15768 - 15791	379	18192 - 18215	18216 - 18239
329	15792 - 15815	15816 - 15839	380	18240 - 18263	18264 - 18287
330	15840 - 15863	15864 - 15887	381	18288 - 18311	18312 - 18335
331	15888 - 15911	15912 - 15935	382	18336 - 18359	18360 - 18383
332	15936 - 15959	15960 - 15983	383	18384 - 18407	18408 - 18431
333	15984 - 16007	16008 - 16031	384	18432 - 18455	18456 - 18479
334	16032 - 16055	16056 - 16079	385	18480 - 18503	18504 - 18527
335	16080 - 16103	16104 - 16127	386	18528 - 18551	18552 - 18575
336	16128 - 16151	16152 - 16175	387	18576 - 18599	18600 - 1862
337	16176 - 16199	16200 - 16223	388	18624 - 18647	18648 - 1867
338	16224 - 16247	16248 - 16271	389	18672 - 18695	18696 - 18719
339	16272 - 16295	16296 - 16319	390	18720 - 18743	18744 - 18767
340	16320 - 16343	16344 - 16367	391	18768 - 18791	18792 - 18815
341	16368 - 16391	16392 - 16415	392	18816 - 18839	18840 - 18863
342	16416 - 16439	16440 - 16463	393	18864 - 18887	18888 - 1891
343	16464 - 16487	16488 - 16511	394	18912 - 18935	18936 - 1895
344	16512 - 16535	16536 - 16559	395	18960 - 18983	18984 - 19007
345	16560 - 16583	16584 - 16607	396	19008 - 19031	19032 - 19055
346	16608 - 16631	16632 - 16655	397	19056 - 19079	19080 - 19103
347	16656 - 16679	16680 - 16703	398	19104 - 19127	19128 - 19151
348	16704 - 16727	16728 - 16751	399	19152 - 19175	19176 - 19199
349	16752 - 16775	16776 - 16799	400	19200 - 19223	19224 - 19247
350	16800 - 16823	16824 - 16847	401	19248 - 19271	19272 - 1929
351	16848 - 16871	16872 - 16895	402	19296 - 19319	19320 - 1934
352	16896 - 16919	16920 - 16943	403	19344 - 19367	19368 - 19391
353	16944 - 16967	16968 - 16991	404	19392 - 19415	19416 - 19439
354	16992 - 17015	17016 - 17039	405	19440 - 19463	19464 - 19487
355	17040 - 17063	17064 - 17087			
356	17088 - 17111	17112 - 17135			

BBII (200 TPI) CYLINDER,HEAD AND SECTOR NUMBERS

CYL NO.	HEAD 0 SECTORS	HEAD 1 SECTORS	CYL NO.	HEAD 0 SECTORS	HEAD 1 SECTORS
0	0 - 23	24 - 47	51	2448 - 2471	2472 - 2495
1	48 - 71	72 - 95	52	2496 - 2519	2520 - 2543
2	96 - 119	120 - 143	53	2544 - 2567	2568 - 2591
3	144 - 167	168 - 191	54	2592 - 2615	2616 - 2639
4	192 - 215	216 - 239	55	2640 - 2663	2664 - 2687
5	240 - 263	264 - 287	56	2688 - 2711	2712 - 2735
6	288 - 311	312 - 335	57	2736 - 2759	2760 - 2783
7	336 - 359	360 - 383	58	2784 - 2807	2808 - 2831
8	384 - 407	408 - 431	59	2832 - 2855	2856 - 2879
9	432 - 455	456 - 479	60	2880 - 2903	2904 - 2927
10	480 - 503	504 - 527	61	2928 - 2951	2952 - 2975
11	528 - 551	552 - 575	62	2976 - 2999	3000 - 3023
12	576 - 599	600 - 623	63	3024 - 3047	3048 - 3071
13	624 - 647	648 - 671	64	3072 - 3095	3096 - 3119
14	672 - 695	696 - 719	65	3120 - 3143	3144 - 3167
15	720 - 743	744 - 767	66	3168 - 3191	3192 - 3215
16	768 - 791	792 - 815	67	3216 - 3239	3240 - 3263
17	816 - 839	840 - 863	68	3264 - 3287	3288 - 3311
18	864 - 887	888 - 911	69	3312 - 3335	3336 - 3359
19	912 - 935	936 - 959	70	3360 - 3383	3384 - 3407
20	960 - 983	984 - 1007	71	3408 - 3431	3432 - 3455
21	1008 - 1031	1032 - 1055	72	3456 - 3479	3480 - 3503
22	1056 - 1079	1080 - 1103	73	3504 - 3527	3528 - 3551
23	1104 - 1127	1128 - 1151	74	3552 - 3575	3576 - 3599
24	1152 - 1175	1176 - 1199	75	3600 - 3623	3624 - 3647
25	1200 - 1223	1224 - 1247	76	3648 - 3671	3672 - 3695
26	1248 - 1271	1272 - 1295	77	3696 - 3719	3720 - 3743
27	1296 - 1319	1320 - 1343	78	3744 - 3767	3768 - 3791
28	1344 - 1367	1368 - 1391	79	3792 - 3815	3816 - 3839
29	1392 - 1415	1416 - 1439	80	3840 - 3863	3864 - 3887
30	1440 - 1463	1464 - 1487	81	3888 - 3911	3912 - 3935
31	1488 - 1511	1512 - 1535	82	3936 - 3959	3960 - 3983
32	1536 - 1559	1560 - 1583	83	3984 - 4007	4008 - 4031
33	1584 - 1607	1608 - 1631	84	4032 - 4055	4056 - 4079
34	1632 - 1655	1656 - 1679	85	4080 - 4103	4104 - 4127
35	1680 - 1703	1704 - 1727	86	4128 - 4151	4152 - 4175
36	1728 - 1751	1752 - 1775	87	4176 - 4199	4200 - 4223
37	1776 - 1799	1800 - 1823	88	4224 - 4247	4248 - 4271
38	1824 - 1847	1848 - 1871	89	4272 - 4295	4296 - 4319
39	1872 - 1895	1896 - 1919	90	4320 - 4343	4344 - 4367
40	1920 - 1943	1944 - 1967	91	4368 - 4391	4392 - 4415
41	1968 - 1991	1992 - 2015	92	4416 - 4439	4440 - 4463
42	2016 - 2039	2040 - 2063	93	4464 - 4487	4488 - 4511
43	2064 - 2087	2088 - 2111	94	4512 - 4535	4536 - 4559
44	2112 - 2135	2136 - 2159	95	4560 - 4583	4584 - 4607
45	2160 - 2183	2184 - 2207	96	4608 - 4631	4632 - 4655
46	2208 - 2231	2232 - 2255	97	4656 - 4679	4680 - 4703
47	2256 - 2279	2280 - 2303	98	4704 - 4727	4728 - 4751
48	2304 - 2327	2328 - 2351	99	4752 - 4775	4776 - 4799
49	2352 - 2375	2376 - 2399	100	4800 - 4823	4824 - 4847
50	2400 - 2423	2424 - 2447	101	4848 - 4871	4872 - 4895

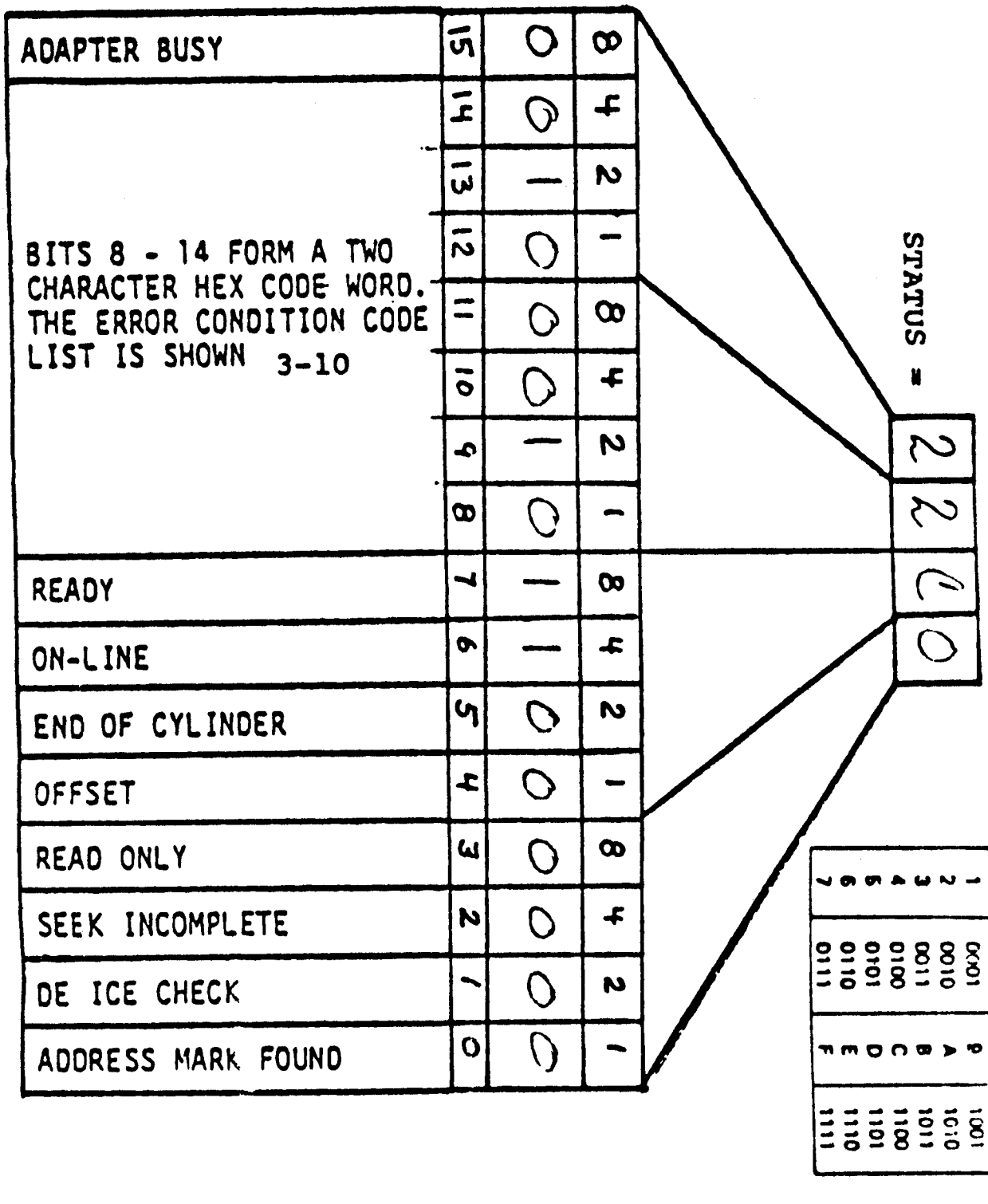
BBII (200 TPI) CYLINDER,HEAD AND SECTOR NUMBERS

CYL NO.	HEAD 0 SECTORS	HEAD 1 SECTORS	CYL NO.	HEAD 0 SECTORS	HEAD 1 SECTORS
102	4896 - 4919	4920 - 4943	153	7344 - 7367	7368 - 7391
103	4944 - 4967	4968 - 4991	154	7392 - 7415	7416 - 7439
104	4992 - 5015	5016 - 5039	155	7440 - 7463	7464 - 7487
105	5040 - 5063	5064 - 5087	156	7488 - 7511	7512 - 7535
106	5088 - 5111	5112 - 5135	157	7536 - 7559	7560 - 7583
107	5136 - 5159	5160 - 5183	158	7584 - 7607	7608 - 7631
108	5184 - 5207	5208 - 5231	159	7632 - 7655	7656 - 7679
109	5232 - 5255	5256 - 5279	160	7680 - 7703	7704 - 7727
110	5280 - 5303	5304 - 5327	161	7728 - 7751	7752 - 7775
111	5328 - 5351	5352 - 5375	162	7776 - 7799	7800 - 7823
112	5376 - 5399	5400 - 5423	163	7824 - 7847	7848 - 7871
113	5424 - 5447	5448 - 5471	164	7872 - 7895	7896 - 7919
114	5472 - 5495	5496 - 5519	165	7920 - 7943	7944 - 7967
115	5520 - 5543	5544 - 5567	166	7968 - 7991	7992 - 8015
116	5568 - 5591	5592 - 5615	167	8016 - 8039	8040 - 8063
117	5616 - 5639	5640 - 5663	168	8064 - 8087	8088 - 8111
118	5664 - 5687	5688 - 5711	169	8112 - 8135	8136 - 8159
119	5712 - 5735	5736 - 5759	170	8160 - 8183	8184 - 8207
120	5760 - 5783	5784 - 5807	171	8208 - 8231	8232 - 8255
121	5808 - 5831	5832 - 5855	172	8256 - 8279	8280 - 8303
122	5856 - 5879	5880 - 5903	173	8304 - 8327	8328 - 8351
123	5904 - 5927	5928 - 5951	174	8352 - 8375	8376 - 8399
124	5952 - 5975	5976 - 5999	175	8400 - 8423	8424 - 8447
125	6000 - 6023	6024 - 6047	176	8448 - 8471	8472 - 8495
126	6048 - 6071	6072 - 6095	177	8496 - 8519	8520 - 8543
127	6096 - 6119	6120 - 6143	178	8544 - 8567	8568 - 8591
128	6144 - 6167	6168 - 6191	179	8592 - 8615	8616 - 8639
129	6192 - 6215	6216 - 6239	180	8640 - 8663	8664 - 8687
130	6240 - 6263	6264 - 6287	181	8688 - 8711	8712 - 8735
131	6288 - 6311	6312 - 6335	182	8736 - 8759	8760 - 8783
132	6336 - 6359	6360 - 6383	183	8784 - 8807	8808 - 8831
133	6384 - 6407	6408 - 6431	184	8832 - 8855	8856 - 8879
134	6432 - 6455	6456 - 6479	185	8880 - 8903	8904 - 8927
135	6480 - 6503	6504 - 6527	186	8928 - 8951	8952 - 8975
136	6528 - 6551	6552 - 6575	187	8976 - 8999	9000 - 9023
137	6576 - 6599	6600 - 6623	188	9024 - 9047	9048 - 9071
138	6624 - 6647	6648 - 6671	189	9072 - 9095	9096 - 9119
139	6672 - 6695	6696 - 6719	190	9120 - 9143	9144 - 9167
140	6720 - 6743	6744 - 6767	191	9168 - 9191	9192 - 9215
141	6768 - 6791	6792 - 6815	192	9216 - 9239	9240 - 9263
142	6816 - 6839	6840 - 6863	193	9264 - 9287	9288 - 9311
143	6864 - 6887	6888 - 6911	194	9312 - 9335	9336 - 9359
144	6912 - 6935	6936 - 6959	195	9360 - 9383	9384 - 9407
145	6960 - 6983	6984 - 7007	196	9408 - 9431	9432 - 9455
146	7008 - 7031	7032 - 7055	197	9456 - 9479	9480 - 9503
147	7056 - 7079	7080 - 7103	198	9504 - 9527	9528 - 9551
148	7104 - 7127	7128 - 7151	199	9552 - 9575	9576 - 9599
149	7152 - 7175	7176 - 7199	200	9600 - 9623	9624 - 9647
150	7200 - 7223	7224 - 7247	201	9648 - 9671	9672 - 9695
151	7248 - 7271	7272 - 7295	202	9696 - 9719	9720 - 9743
152	7296 - 7319	7320 - 7343	203	9744 - 9767	9768 - 9791



0 and 3 indicate flagged bad track

*** MODEL 700 DISK UNIT STATUS ***
(at the present time only unit status
is displayed on the screen)



MACHINE LANGUAGE

	OP CODE	NAME	INST LEN	DESCRIPTION
	00	HLT	1	HALT
	01	TRP	1	TRAP
	02	ESW	1	ENTER SENSE SWITCHES
	03	TBA	1	TRANSFER B TO A
	04	DIN	1	DISABLE INTERUPT SYSTEM
	05	EIN	1	ENABLE INTERUPT SYSTEM
	06	TAB	1	TRANSFER A TO B
	07	RMV	1	REVERSE MOVE
	08	R01	1	RESET OVERFLOW OP LEN = 1
=	08	SMT	1	STRING MULT. BY TEN
*	09	RO2	1	RESET OVERFLOW, OP LEN = 2
*	0A	RO3	1	RESET OVERFLOW OP LEN = 3
	0A	GNB	1	GET NEXT BYTE
	0B	RO4	1	RESET OVERFLOW OP LEN = 4
=	0B	PJI	2	PUSH P & JUMP
	0C	SO1	1	SET OVERFLOW, OP LEN = 1
=	0C	JIT	2	JUMP INDIRECT THRU TABLE
*	0D	SO2	1	SET OVERFLOW, OP LEN = 2
=	0D	BBN	3	BRANCH IF BYTE NOT EQUAL
*	0E	SO3	1	SET OVERFLOW OP LEN = 3
=	0E	BBE	3	BRANCH IF BYTE EQUAL
*	0F	SO4	1	SET OVERFLOW, OP LEN = 4
=	0F	SDT	1	STRING DIVIDE BY TEN
	10	JOV	2	JUMP IF OVERFLOW SET
	11	JAZ	2	JUMP IF A EQUAL ZERO
	12	JBZ	2	JUMP IF B EQUAL ZERO
	13	JXZ	2	JUMP IF X EQUAL ZERO
	14	JAN	2	JUMP IF A NEGATIVE
	15	JXN	2	JUMP IF X NEGATIVE
	16	JAB	2	JUMP IF A EQUAL TO B
	17	JAX	2	JUMP IF A EQUAL TO X
	18	NOV	2	JUMP IF OVERFLOW NOT SET
	19	NAZ	2	JUMP IF A <> ZERO
	1A	NBZ	2	JUMP IF B <> ZERO
	1B	NXZ	2	JUMP IF X <> ZERO
	1C	NAN	2	JUMP IF A NOT NEGATIVE
	1D	NXN	2	JUMP IF X NOT NEGATIVE
	1E	NAB	2	JUMP IF A <> B
	1F	NAX	2	JUMP IF A <> X
	20	LLA	2	LOGICAL LEFT A
	21	LLB	2	LOGICAL LEFT B
	22	LLL	2	LOGICAL LEFT LONG
*	23	RRT	1	RECURSIVE RETURN (1200)

LEGEND
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	OP CODE	NAME	INST LEN	DESCRIPTION
>	23	PLP	1	PULL P
	24	LRA	2	LOGICAL RIGHT A
	25	LRB	2	LOGICAL RIGHT B
	26	LRL	2	LOGICAL RIGHT LONG
	27	DML	1	DECIMAL DIGIT MULTIPLY
	28	ALA	2	ARITHMETIC LEFT A
	29	ALB	2	ARITHMETIC LEFT B
	2A	ALL	2	ARITHMETIC LEFT LONG
	2B	DDV	1	DECIMAL DIGIT DIVIDE
	2C	ARA	2	ARITHMETIC RIGHT A
	2D	ARB	2	ARITHMETIC RIGHT B
	2E	ARL	2	ARITHMETIC RIGHT LONG
	2F	DCB	1	DECREMENT B
	30	ADB	3	ADD TO B
	31	IBA	2	INPUT BYTE TO A
	32	IBB	2	INPUT BYTE TO B
	33	IBM	4	INPUT BYTE TO MEMORY
	34	NOP	1	NO OPERATION
*	35	RCL	1	RECURSIVE CALL (1200)
>	35	PPJ	3	PUSH P AND JUMP
	36	DDY	3	DETERMINE DECIMAL CARRY
	37	NBN	2	JUMP IF B NOT NEGATIVE
	38	JBN	2	JUMP IF B NEGATIVE
	39	OBA	2	OUTPUT BYTE FROM A
	3A	OBB	2	OUTPUT BYTE FROM B
	3B	OBM	4	OUTPUT BYTE FROM MEMORY
	3C	DDC	2	DECIMAL DIGIT CONVERSION
	3D	JBX	2	JUMB IF B EQUALS X
	3E	NBX	2	JUMP IF B <> X
	3F			SEE 3FXX INSTRUCTIONS
	40	ORA	1	OR B WITH A
	41	XRA	1	EXCLUSIVE OR B WITH A
	42	ORB	1	OR A WITH B
	43	XRB	1	EXCLUSIVE OR A WITH B
	44	INX	1	INCREMENT X
	45	DCX	1	DECREMENT X
*	46	AWX	1	ADD OPERAND LEN. TO X
>	46	PJN	1	PUSH P & JUMP USING NEXT
*	47	SWX	1	SUBTRACT OP LENGTH FROM X
	48	INA	1	INCREMENT A

LEGEND
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	OP CODE	NAME	INST LEN	DESCRIPTION
	49	INB	1	INCREMENT B
	4A	OCA	1	ONE'S COMPLEMENT A
	4B	OCB	1	ONE'S COMPLEMENT B
	4C	TAX	1	TRANSFER A TO X
	4D	TBX	1	TRANSFER B TO X
	4E	TXA	1	TRANSFER X TO A
	4F	TXB	1	TRANSFER X TO B
	50	RTN	1	RETURN
	51	CAL	3	CALL
	52	PLX	1	PULL X
	53	PSX	1	PUSH X
	54	PLA	1	PULL A
	55	PSA	1	PUSH A
	56	PLB	1	PULL B
	57	PSB	1	PUSH B
*	58	MST	1	MULTIPLY STEP
>	58	MAB	1	MULTIPLY A BY B
	59	ADX	3	ADD TO X
	5A	JEP	2	JUMP IF EVEN PARITY
	5B	EBX	1	EXCHANGE B AND X
	5C	MOV	1	MOVE
	5D	GCC	1	GENERATE CYCLIC CODE
	5E	SCH	1	SEARCH
	5F	GAP	1	GENERATE ASCII PARITY
	60	JMP	2	JUMP - DIRECT PAGE 0
	61	JMP	2	JUMP - DIRECT RELATIVE
	62	JMP	2	JUMP - INDIRECT PAGE 0
	63	JMP	2	JUMP - INDIRECT RELATIVE
	64	JMP	1	JUMP - INDEXED
>	64	JMP	2	JUMP - T-BASE INDEX + BIAS
	65	JMP	2	JUMP - INDEXED + BIAS
	66	JMP	3	JUMP - EXTENDED ADDRESS
	67	JMP	3	JUMP - LITERAL
	68	RTJ	2	RETURN JUMP - DIR. PAGE 0
	69	RTJ	2	RTN JUMP - INDIRECT REL.
	6A	RTJ	2	RTN JUMP - INDIRECT PAGE 0
	6B	RTJ	2	RTN JUMP - INDIRECT REL.

LEGEND
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	OP CODE	NAME	INST LEN	DESCRIPTION
	6C	RTJ	1	RTN JUMP - INDEXED
>	6C	RTJ	2	RTN JUMP-T-BASE INDEX +BIAS
	6D	RTJ	2	RTN JUMP - INDEXED + BIAS
	6E	RTJ	3	RTN JUMP - EXTENDED ADDRESS
	6F	RTJ	3	RTN JUMP - LITERAL
	70	IWM	2	INCR WD IN MEM DIR PAGE 0
	71	IWM	2	INCR WD IN MEM DIR RELATIVE
	72	IWM	2	INCR WD IN MEM IND PAGE 0
	73	IWM	2	INCR WD IN MEM IND RELATIVE
	74	IWM	1	INCR WD IN MEM INDEXED
>	74	IWM	2	INCR WD IN MEM T-BASE IND+BIAS
	75	IWM	2	INCR WD IN MEM IND. + BIAS
	76	IWM	3	INCR WD IN MEM EXT ADDRESS
	77	IWM	3	INCR WD IN MEM - LITERAL
	78	DWM	2	DECR WD IN MEM - PAGE 0
	79	DWM	2	DECR WD IN MEM - DIR. REL.
	7A	DWM	2	DECR WD IN MEM - IND.PAGE 0
	7B	DWM	2	DECR WD IN MEM - IND. REL.
	7C	DWM	1	DECR WD IN MEM - INDEXED
>	7C	DWM	2	DECR WD IN MEM T-BASE IND+BIAS
	7D	DWM	2	DECR WD IN MEM - IND + BIAS
	7E	DWM	3	DECR WD IN MEM - EXT. ADD
	7F	DWM	3	DECR WD IN MEM - LITERAL
	80	LDX	2	LOAD X - DIRECT PAGE 0
	81	LDX	2	LOAD X - DIRECT RELATIVE
	82	LDX	2	LOAD X - IND. PAGE 0
	83	LDX	2	LOAD X - IND. RELATIVE
	84	LDX	1	LOAD X - INDEXED
>	84	LDX	2	LOAD X - T-BASE IND + BIAS
	85	LDX	2	LOAD X - IND. WITH BIAS
	86	LDX	3	LOAD X - EXTENDED ADDRESS
	87	LDX	3	LOAD X - LITERAL
	88	STX	2	STORE X - DIRECT PAGE 0
	89	STX	2	STORE X - DIRECT RELATIVE
	8A	STX	2	STORE X - INDIRECT PAGE 0
	8B	STX	2	STORE X - INDIRECT REL.
	8C	STX	1	STORE X - INDEXED
>	8C	STX	2	STORE X -T-BASE IND + BIAS
	8D	STX	2	STORE X - IND. WITH BIAS
	8E	STX	3	STORE X - EXTENDED ADDRESS
	8F	STX	3	STORE X - LITERAL

LEGEND
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	OP CODE	NAME	INST LEN	DESCRIPTION
	90	LDB	2	LOAD B - DIRECT PAGE 0
	91	LDB	2	LOAD B - DIRECT RELATIVE
	92	LDB	2	LOAD B - IND. PAGE 0
	93	LDB	2	LOAD B - IND. RELATIVE
	94	LDB	1	LOAD B - INDEXED
>	94	LDB	2	LOAD B - T-BASE INDEX +BIAS
	95	LDB	2	LOAD B - IND. WITH BIAS
	96	LDB	3	LOAD B - EXTENDED ADDRESS
	97	LDB	3	LOAD B - LITERAL
	98	STB	2	STORE B - DIRECT PAGE 0
	99	STB	2	STORE B - DIRECT RELATIVE
	9A	STB	2	STORE B - IND. PAGE 0
	9B	STB	2	STORE B - IND. RELATIVE
	9C	STB	1	STORE B - INDEXED
>	9C	STB	2	STORE B -T-BASE INDEX +BIAS
	9D	STB	2	STORE B - INDEXED + BIAS
	9E	STB	3	STORE B - EXTENDED ADDRESS
	9F	STB	3	STORE B - LITERAL
	A0	ADA	2	ADD TO A - DIRECT PAGE 0
	A1	ADA	2	ADD TO A - DIRECT RELATIVE
	A2	ADA	2	ADD TO A - IND. PAGE 0
	A3	ADA	2	ADD TO A - IND. RELATIVE
	A4	ADA	1	ADD TO A - INDEXED
>	A4	ADA	2	ADD TO A -T-BASE INDEX +BIAS
	A5	ADA	2	ADD TO A - INDEXED + BIAS
	A6	ADA	3	ADD TO A - EXTENDED ADD.
	A7	ADA	3	ADD TO A - LITERAL
	A8	ADV	2	ADD VARIABLE - DIR. PAGE 0
	A9	ADV	2	ADD VAR - DIRECT RELATIVE
	AA	ADV	2	ADD VAR - IND. PAGE 0
	AB	ADV	2	ADD VAR - IND. RELATIVE
	AC	ADV	1	ADD VAR - INDEXED
>	AC	ADV	2	ADD VAR.- T-BASE INDEX +BIAS
	AD	ADV	2	ADD VAR - INDEXED + BIAS
	AE	ADV	3	ADD VAR - EXTENDED ADDRESS
	AF	ADV	2	ADD VAR - LITERAL
	B0	SBA	2	SUB FROM A - DIR. PAGE 0
	B1	SBA	2	SUB FROM A - DIR. RELATIVE
	B2	SBA	2	SUB FROM A - IND. PAGE 0
	B3	SBA	2	SUB FROM A - IND. RELATIVE
	B4	SBA	1	SUB FROM A - INDEXED
>	B4	SBA	2	SUB FROM A-T-BASE IND+BIAS

LEGEND
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= 1320 CPU ONLY

	OP CODE	NAME	INST LEN	DESCRIPTION
	B5	SBA	2	SUB FROM A - INDEXED + BIAS
	B6	SBA	3	SUB FROM A - EXTENDED ADD.
	B7	SBA	3	SUB FROM A - LITERAL
	B8	SBV	2	SUB VARIABLE - DIR. PAGE 0
	B9	SBV	2	SUB VAR - DIRECT RELATIVE
	BA	SBV	2	SUB VAR - IND. PAGE 0
	BB	SBV	2	SUB VAR - IND. RELATIVE
	BC	SBV	1	SUB VAR - INDEXED
>	BC	SBV	2	SUB VAR.-T-BASE IND +BIAS
	BD	SBV	2	SUB VAR - INDEXED + BIAS
	BE	SBV	3	SUB VAR - EXTENDED ADDRESS
	BF	SBV	2	SUB VAR - LITERAL
	C0	CPA	2	COMPARE A - DIR. PAGE 0
	C1	CPA	2	COMP. A - DIRECT RELATIVE
	C2	CPA	2	COMP. A - IND. PAGE 0
	C3	CPA	2	COMP. A - IND. RELATIVE
	C4	CPA	1	COMP. A - INDEXED
>	C4	CPA	2	COMP.A -T-BASE INDEX +BIAS
	C5	CPA	2	COMP. A - INDEXED + BIAS
	C6	CPA	3	COMP. A - EXTENDED ADDRESS
	C7	CPA	3	COMP. A - LITERAL
	C8	CPV	2	COMP. VARIABLE - PAGE 0
	C9	CPV	2	COMP. VAR.- DIR. RELATIVE
	CA	CPV	2	COMP. VAR.- IND. PAGE 0
	CB	CPV	2	COMP. VAR.- IND. RELATIVE
	CC	CPV	1	COMP. VAR.- INDEXED
>	CC	CPV	2	COMP.VAR.- T-BASE IND.+BIAS
	CD	CPV	2	COMP. VAR.- INDEXED + BIAS
	CE	CPV	3	COMP. VAR.- EXTENDED ADD.
	CF	CPV	2	COMP. VAR. - LITERAL
	D0	ANA	2	AND A - DIRECT PAGE 0
	D1	ANA	2	AND A - DIRECT RELATIVE
	D2	ANA	2	AND A - INDIRECT PAGE 0
	D3	ANA	2	AND A - INDIRECT RELATIVE
	D4	ANA	1	AND A - INDEXED
>	D4	ANA	2	AND A - T-BASE INDEX +BIAS
	D5	ANA	2	AND A - INDEXED WITH BIAS
	D6	ANA	3	AND A - EXTENDED ADDRESS
	D7	ANA	3	AND A - LITERAL

LEGEND
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	OP CODE	NAME	INST LEN	DESCRIPTION
	D8	ANV	2	AND VARIABLE - DIR. PAGE 0
	D9	ANV	2	AND VAR.- DIRECT RELATIVE
	DA	ANV	2	AND VAR.- INDIRECT PAGE 0
	DB	ANV	2	AND VAR.- INDIRECT REL.
	DC	ANV	1	AND VAR.- INDEXED
	DC	ANV	2	AND VAR.- T-BASE IND.+BIAS
	DD	ANV	2	AND VAR.- INDEXED + BIAS
	DE	ANV	3	AND VAR.- EXTENDED ADDRESS
	DF	ANV	2	AND VAR.- LITERAL
	E0	LDA	2	LOAD A - DIRECT PAGE 0
	E1	LDA	2	LOAD A - DIRECT RELATIVE
	E2	LDA	2	LOAD A - INDIRECT PAGE 0
	E3	LDA	2	LOAD A - INDIRECT RELATIVE
	E4	LDA	1	LOAD A - INDEXED
>	E4	LDA	2	LOAD A - T-BASE IND. +BIAS
	E5	LDA	2	LOAD A - INDEXED + BIAS
	E6	LDA	3	LOAD A - EXTENDED ADDRESS
	E7	LDA	3	LOAD A - LITERAL
	E8	LDV	2	LOAD VARIABLE - DIR.PAGE 0
	E9	LDV	2	LOAD VAR.- DIRECT RELATIVE
	EA	LDV	2	LOAD VAR.- IND. PAGE 0
	EB	LDV	2	LOAD VAR.- IND. RELATIVE
	EC	LDV	1	LOAD VAR,- INDEXED
>	EC	LDV	2	LOAD VAR.- T-BASE IND.+BIAS
	ED	LDV	2	LOAD VAR.- INDEXED + BIAS
	EE	LDV	3	LOAD VAR.- EXTENDED ADD.
	EF	LDV	2	LOAD VAR.- LITERAL
	F0	STA	2	STORE A - DIRECT PAGE 0
	F1	STA	2	STORE A - DIRECT RELATIVE
	F2	STA	2	STORE A - INDIRECT PAGE 0
	F3	STA	2	STORE A - INDIRECT REL.
	F4	STA	1	STORE A - INDEXED
>	F4	STA	2	STORE A -T-BASE IND.+ BIAS
	F5	STA	2	STORE A - INDEXED + BIAS
	F6	STA	3	STORE A - EXTENDED ADDRESS
	F7	STA	3	STORE A - LITERAL
	F8	STV	2	STORE VAR.- DIRECT PAGE 0
	F9	STV	2	STORE VAR.- DIRECT REL.
	FA	STV	2	STORE VAR.- IND. PAGE 0

LEGEND
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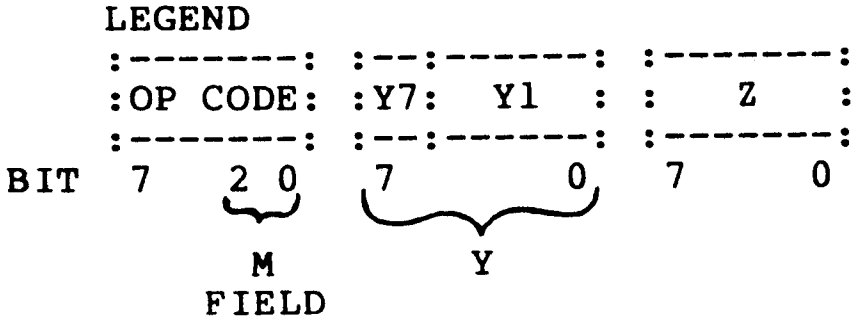
	OP CODE	NAME	INST LEN	DESCRIPTION
	FB	STV	2	STORE VAR.- IND. RELATIVE
	FC	STV	1	STORE VAR.- INDEXED
>	FC	STV	2	STORE VAR.-T-BASE IND.+BIAS
	FD	STV	2	STORE VAR.- INDEXED + BIAS
	FE	STV	3	STORE VAR.- EXTENDED ADD.
	FF	STV	3	STORE VAR.- LITERAL
=	3C00	UPK	2	DECIMAL DIGIT CONV.(UNPACK)
	3CFF	DDC	2	DECIMAL DIGIT CONVERSION
	3F0X	SCP	2	STRING COMPARE
	3F2X	CCP	2	CHARACTER COMPARE
	3F46	DRT	2	DISABLE REAL-TIME CLOCK
*	3F57	LEM	2	LEAVE EXTENDED MEM. (1200)
*	3F5D	BCS	2	BLANK CHARACTER SCAN (1200)
#	3F5D	GNB	2	GET NEXT BYTE (1300)
=	3F5D	HSH	2	HASH
	3F7E	ERT	2	ENABLE REAL-TIME CLOCK
	3F8X	KCP	2	KEY COMPARE
=	3FAX	VCP	2	VARIABLE KEY COMPARE
	3FC2	DGT	2	DIGIT TEST
	3FCF	AVB	2	DIVIDE UNSIGNED A BY B
	3FDB	LTT	2	LETTER TEST
>	3FEA	SIS	2	STROBE INTERNAL STATUS
*	3FEB	EEM	2	ENTER EXTENDED MEM (1200)
=	3FEB	TUM	2	TIE UP MEMORY
>	3FEC	TAO	2	TRANSFER A TO O
>	3FED	IMV	2	INTERBANK MOVE
>	3FEE	DBS	2	DMA MEMORY BANK SELECT
>	3FEF	CBS	2	CPU MEMORY BANK SELECT
>	4700	DMA	2	DECIMAL MULTIPLY AND ADD
>	4709	SRE	2	STRING RANGE EQUAL
>	470D	SRN	2	STRING RANGE NOT EQUAL
>	4740	DMS	2	DECIMAL MULTIPLY & SUB.
>	4760	DMI	2	DECIMAL MULT. & INVERT
>	4780	BSA	2	BINARY STRING ADD
>	47C0	BSS	2	BINARY STRING SUBTRACT
>	47C1	SMO	2	STRING OR
>	47D1	SMX	2	STRING MASK EXCLUSIVE OR
>	47E1	SMA	2	STRING MASK AND

LEGEND
* 1200 CPU ONLY
# 1300 CPU ONLY
> 1300 & 1320 CPU
= 1320 CPU ONLY

EFFECTIVE ADDRESS COMPUTATION

MODE	M FIELD	EFF. ADD	BYTES OF ADD	
DIRECT PAGE 0	0	Y	1	
DIRECT RELATIVE	1	P∓Y1	1	
INDIRECT PAGE 0	2	[Y]	1	
INDIRECT RELATIVE	3	[P∓Y1]	1	
INDEXED	4	X	0	*
T-BASED INDEX + BIAS	4	Y+[8A,8B]	2	=
O REG BIT 1 = 0	4	X	2	#
O REG BIT 1 = 1	4	Y+[8A,8B]	2	#
INDEXED WITH BIAS	5	Y+X	1	
EXTENDED ADDRESS	6	Y,Z	2	>
EM BIT =0, Y7 = 0	6	Y1,Z	2	*
EM BIT =0, Y7 = 1	6	Y1,Z+X	2	*
EM BIT =1, Y7 = 0	6	Y1,Z	2	*
EM BIT =1, Y7 = 1	6	Y,Z	2	*
LITERAL	7	P	1-2	
JUMP & RTN JUMPS	7	[Y,Z]	2	>
EM BIT =0, Y7 = 0	7	[Y1,Z]	2	*
EM BIT =0, Y7 = 1	7	[Y1,Z]+X	2	*
EM BIT =1, Y7 = 0	7	[Y1,Z]	2	*
EM BIT =1, Y7 = 1	7	[Y,Z]	2	*

LEGEND



NOTE - Y1 = Y ON ALL CPU'S EXCEPT 1200

X = CONTENTS OF X REGISTER

P = CONTENTS OF P REGISTER

[ ] = CONTENTS OF SYMBOL (TWO BYTES)

EM = EXTENDED MEMORY, (BIT 4 OF O REGISTER - 1200 ONLY)

> 1300 & 1320 CPU ONLY
* 1200 CPU ONLY
= 1320 CPU ONLY
1300 CPU ONLY

```
    DEVICE              :4 CHANNEL CONTROLLER
    ADDRESS             :  1B
INTERRUPT ADDRESSES:       IN          OUT
                  T0 :     170         160
                  T1 :     172         162
                  T2 :     174         164
                  T3 :     176         166
COMMANDS              :
  INPUT DATA BYTE     :   313B
  INPUT STATUS        :   315B
  DISARM INTERRUPT    :   31BB
  OUTPUT DATA BYTE    :T0 393B      T2 39BB
                      :T1 397B      T3 39FB
  SELECT BAUD RATE    :T0 391B      T2 399B
                      :T1 395B      T3 39DB
  BAUD RATE CODE      : 2400  07    300  3F
    (IN A REG.)       : 1200  0F    110  AE
STATUS        GOOD    :   00
               BAD    :   01

*****************************************

    DEVICE              :  CPU ACCESSORY BOARD
    ADDRESS             :  00
INTERRUPT ADDRESS       :     IN          OUT
                CH0     :    102          100
                CH1     :    10E          10C
COMMANDS                :
  INPUT DATA BYTE       :   3120
  INPUT STATUS          :   3140
  OUTPUT DATA BYTE      :   3900 CH0    3920 CH1
                        :
STATUS BYTE             : 7 6 5 4 3 2 1 0
  NOT USED--------------:-:-:-:-: : : :
  PARITY ERROR----------------------: : :
  FRAMING ERROR---------------------: :
  DATA OVERRUN ERROR----------------:
```

```
    DEVICE          :  TTY CTLR (SCC)
    ADDRESS         :  00 HEX
CONC.START ADDRESS:  00
CONC END   ADDRESS:  02
INTERRUPT  ADDRESS:  100
COMMANDS            :
INPUT STATUS        :  3120
INPUT DATA BYTE     :  3100
OUTPUT DATA BYTE    :  3900
CONC. INPUT         :  3940
CONC. OUTPUT        :  39C0
ARM  INTERRUPT      :  3960
DISARM INTERRUPT    :  39A0
ALTERNATE FUNCTION:  39E0
DISCONNECT CONC.    :  3980
INPUT ALT. STATUS   :  31E0

STATUS BYTE         :    7 6 5 4 3 2 1 0
                    :    : : : : : : : :
TEST ALT STATUS--------: : : : : : : :
ALWAYS ZERO------------: : : : : : : :
PARITY ERROR-----------: : : : : : :
FRAMING ERROR----------: : : : : :
OVERRUN ERROR----------: : : : :
READY TO RECEIVE-------: : : :
INPUT WORD READY-------: : :
CONCURRENT MODE--------: :
*****************************************
```

```
   DEVICE           :  8-CHANNEL CTLR.
                          IN          OUT
   ADDRESS          :  1B  1A      1B  1A
INTERRUPT ADD.T0    :  170/150     160/140
               T1   :  172/152     162/142
               T2   :  174/154     164/144
               T3   :  176/156     166/146
               T4   :  178/158     168/148
               T5   :  17A/15A     16A/14A
               T6   :  17C/15C     16C/14C
               T7   :  17E/15E     16E/14E
COMMANDS            :
INPUT DATA BYTE     :  313B
INPUT STATUS        :  315B
DISARM INTERRUPT    :  31BB
OUTPUT DATA BYTE    :  391B T0   393B T1
                    :  395B T2   397B T3
                    :  399B T4   39BB T5
                    :  39DB T6   39FB T7
STATUS BYTE         :    7 6 5 4 3 2 1 0
NOT USED--------------:-:-:-:-: : : :
PARITY ERROR----------------------: : :
FRAMING ERROR---------------------: :
OVERRUN ERROR---------------------:
```

PRINTER CTLR ADDR.	:	0A	#1	08 #2
CONC.START ADDRESS	:	28		20
CONC. END ADDRESS	:	2A		22
INTERRUPT ADDRESS	:	114		110
COMMANDS	:			
INPUT STATUS	:	312A		3128
OUTPUT DATA BYTE	:	390A		3908
ARM INTERRUPT	:	396A		3968
DISCONNECT CONC.	:	398A		3988
DISARM INTERRUPT	:	39AA		39A8
CONC. OUTPUT	:	39CA		39C8

STATUS BYTE	:	7	6	5	4	3	2	1	0
ALWAYS ZERO	:	-	-	:	:	:	:	:	:
CONC. MODE	:				:	:	:	:	:
NOT OPERABLE	:					:	:	:	:
OUTPUT FLAG	:						:	:	:
PAPER OUT	:							:	:
READY	:								:

****

DEVICE	:	CARD READER CTLR.
ADDRESS	:	04
CONC.START ADDRESS	:	10
CONC. END ADDRESS	:	12
INTERRUPT ADDRESS	:	108
COMMANDS		
INPUT DATA BYTE	:	3104
INPUT STATUS	:	3124
ARM INTERRUPT	:	3944
DISARM INTERRUPT	:	3964
DISCONNECT CONC.	:	3984
CONC. INPUT	:	39A4
PICK ONE CARD	:	39C4
SET BINARY MODE	:	39E4

STATUS BYTE	:	7	6	5	4	3	2	1	0
ALWAYS ZERO	:	:	:	:	:	:	:	:	:
HOLLERITH ERROR	:		:	:	:	:	:	:	:
96 COLUMN	:			:	:	:	:	:	:
M/C ALERT	:				:	:	:	:	:
READ ALERT	:					:	:	:	:
HOPPER EMPTY	:						:	:	:
DATA BYTE READY	:							:	:
READY	:								:

DEVICE	:	MAG. TAPE CTLR.
ADDRESS	:	09
CONC.START ADDRESS	:	24
CONC. END ADDRESS	:	26
INTERRUPT ADDRESS	:	112
COMMANDS	:	
DATA TRANSFER IN	:	3109
DATA TRANSFER OUT	:	3909
STATUS INPUT	:	3129
INPUT ALT. STATUS	:	31E9
EXECUTE FUNCTION	:	3929
CONC. INPUT	:	3949
ARM INTERRUPT	:	3969
DISCONNECT CONC.	:	3989
DISARM INTERRUPT	:	39A9
CONC. OUTPUT	:	39C9
ALT. FUNCTION	:	39E9

STD FUNCTION	:	BYTE	ALT.FUNCTION
WRITE FILE MARK	:	01	SEL #1
BACKSPACE	:	02	SEL #2
REWIND	:	04	SEL #3
WRITE	:	08	SEL #4
INITIALIZE	:	10	N/A
N/A	:	20	SET 7 TRK
N/A	:	40	SET 9 TRK
READ	:	80	N/A

STATUS BYTE	:	7	6	5	4	3	2	1	0
FILE PROTECT	:	:	:	:	:	:	:	:	:
BOT/EOT	:	:	:	:	:	:	:	:	
SENSE TAPE GAP	:	:	:	:	:	:	:		
SENSE FILE MARK	:	:	:	:	:	:			
PARITY ERROR	:	:	:	:	:				
CONC. MODE	:	:	:	:					
BUFFER READY	:	:	:						
TAPE READY	:								

ALTERNATE STATUS	:	7	6	5	4	3	2	1	0
REWINDING	:	:	:	:	:	:	:	:	:
SPARE	:	:	:	:	:	:	:	:	
7 TRACK	:	:	:	:	:	:	:		
SPARE	:	:	:	:	:	:			
UNIT #4 SEL	:	:	:	:	:				
UNIT #3 SEL	:	:	:	:					
UNIT #2 SEL	:	:	:						
UNIT #1 SEL	:								

DEVICE	: PAPER TAPE CTLR.	
ADDRESS	: 02 READ	03 PUNCH
CONC START ADDRESS:	08	0C
CONC END ADDRESS:	0A	0E
INTERRUPT ADDRESS:	104	106
COMMANDS		
DATA TRANSFER	: 3102	3903
INPUT STATUS	: 3122	3123
SEL.CONC.& ARM INT:	3942	--
ARM INTERRUPT	: 3962	3963
DISCONNECT CONC.	: 3982	3983
DISARM INTERRUPT	: 39A2	39A3
START RDR / PUNCH	: 39C2	39C3

STATUS BYTE (READ):	7	6	5	4	3	2	1	0
NOT USED	:	:	:	:	:	:	:	:
READ ERROR	:	:	:	:	:	:	:	
ALWAYS ZERO	:	:	:	:	:	:		
READ BUFFER READY	:	:	:	:	:			
CONCURRENT MODE	:							

STATUS BYTE PUNCH :	7	6	5	4	3	2	1	0
NOT USED	:	:	:	:	:	:	:	:
EXTERNAL CONTROL	:	:	:	:	:	:	:	
TAPE LOW	:	:	:	:	:	:		
PUNCH ERROR	:	:	:	:	:			
PUNCH READY	:	:	:	:				
ALWAYS ZERO	:	:	:					
CONCURRENT MODE	:							

```
    DEVICE          :  DISK/DMA (BB1)
    ADDRESS         :  06
CONC START ADDRESS:  60
CONC  END  ADDRESS:  62
INTERRUPT ADDRESS :  82
COMMANDS
SELECT DRIVE        :  3906
INPUT STATUS        :  3916 (TO LOC 58 H)
SELECT CYLINDER     :  3926
SELECT READ         :  3946
SELECT WRITE        :  3966
SEL INITIAL WRITE   :  3986
START DMA TRANSFER:  3976
DISCONNECT DMA      :  3996
RESET STATUS        :  39A6
SEL ALT STATUS      :  39C6
RECONNECT DMA       :  39E6

FUNCTION BYTE       :  7 6 5 4 3 2 1 0
DISK/HEAD/SECTOR    :  D H S S S S S S
CYLINDER            :  C C C C C C C C
DRIVE SELECT        :                D D

STATUS BYTE         :  7 6 5 4 3 2 1 0
EOB INTERRUPT--------: : : : : : : :
DISK DRIVE NOT READY---: : : : : : :
WRITE UNSAFE-----------: : : : : :
SEEK INCOMPLETE----------: : : : :
ACCESS NOT READY----------: : : :
CRC ERROR----------------------: : :
READY TO SEEK READ OR WRITE------: :
DMA BUSY---------------------------:

ALTERNATE STATUS    :  7 6 5 4 3 2 1 0
EOB INTERRUPT--------: : : : : : : :
SECTOR ADDRESS ERROR---: : : : : : :
CYL. ADDRESS ERROR-------: : : : : :
CRC ERROR-----------------: : : : :
ACCESS NOT READY----------: : : :
CRC OR ADDRESS ERROR-----------: : :
READY--------------------------: :
DMA BUSY---------------------------:
```

```
   DEVICE            :  DISK CTLR (BB2)
   ADDRESS           :  06
CONC START ADDRESS:  60
CONC END   ADDRESS:  62
INTERRUPT ADDRESS :  82
COMMANDS
SELECT DRIVE         :  3906
INPUT STATUS         :  3916(TO LOC 58 H)
SEL CYL (LO BYTE)  :  3926
SEL CYL (HI BYTE)  :  3936
START READ           :  3946
KEYSEARCH            :  3956
START WRITE          :  3966
START DMA            :  3976
RESET CNTRLR         :  3986
DISCONNECT DMA       :  3996
RESET STATUS         :  39A6
INPUT ALT STATUS   :  39C6(TO LOC 58 H)
INPUT KEYSEARCH    :  39D6

FUNCTION BYTE      :  7 6 5 4 3 2 1 0
FMATT/DISK/HD/SEC  :  F D H S S S S S
CYLINDER(LO BYTE)  :  C C C C C C C C
CYLINDER(HI BYTE)  :                 C
DRIVE SELECT       :                 D D

STATUS BYTE        :  7 6 5 4 3 2 1 0
OVERRUN ERROR--------: : : : : : : :
HEAD/SECTOR ERR (P1)---: : : : : : :
CYL ADDRESS ERR (P0)-----: : : : : :
CRC ERROR------------------: : : : :
MODEL FLAG--------------------: : : :
SELECTED DRIVE READY-----------: : :
SYSTEM READY---------------------: :
DMA ACTIVE--------------------------:

ALTERNATE STATUS   :  7 6 5 4 3 2 1 0
SPARE----------------: : : : : : : :
SPARE------------------: : : : : : :
SEEK INCOMPLETE SEL DRV--: : : : : :
SEEK COMPLETE DRIVE 3------: : : : :
SEEK COMPLETE DRIVE 2--------: : : :
SEEK COMPLETE DRIVE 1----------: : :
SEEK COMPLETE DRIVE 0------------: :
SEEK COMPLETE SELECTED DRIVE-------:
```

DEVICE	:	DISK CTLR(M 200)
ADDRESS	:	07
CONC. START ADDRESS	:	60-61
BANK SELECT	:	62
BYTE COUNT	:	63-64
INTERRUPT ADDRESS	:	82

COMMANDS		
DMA TRANSFER	:	3907
INPUT STATUS	:	3117
SET LOW CYL	:	3927
SPECIAL TRANSFER	:	3937
SET HI CYL	:	3947
SET LO CYL ALT	:	3957
SET HEAD	:	3967
SET HI CYL ALT	:	3977
SET OFFSETS	:	3987
INPUT HI CYL ALT	:	31A7
INPUT LO CYL ALT	:	31B7
RESET INTERRUPT	:	39C7
SET INTERRUPT ENA.	:	39D7
RESET CTLR	:	39E7

FUNCTION BYTE	:	7	6	5	4	3	2	1	0
RD/WR/FMT/SECTOR	:	R	W	F	S	S	S	S	S
LO CYL	:	C	C	C	C	C	C	C	C
REZERO/HI CYL	:	R							C
HEAD	:					H	H	H	H
STB/OFFSETS	:		L	E				+	-
HI CYL ALT	:	H	H	H	H				C
SPEC STATUS	:			S					

CONTROLLER STATUS	:	7	6	5	4	3	2	1	0
BUSY	:	:	:	:	:	:	:	:	:
UNIT READY	:	:	:	:	:	:	:	:	
ID ERROR	:	:	:	:	:	:	:		
ID CRC ERROR	:	:	:	:	:	:			
DATA CRC ERROR	:	:	:	:	:				
SEEK ERROR	:	:	:	:					
FAULT	:	:	:						
COMMAND REJECT	:	:							

DEVICE	:	6400 TAPE
ADDRESS	:	0B
CONC START ADDRESS	:	70-71-72
BYTE COUNT	:	73-74
RECORD I.D.	:	75-76
INTERRUPT ADDRESS	:	116

COMMANDS

INPUT MAIN STATUS	:	318B
DISABLE INTERRUPTS	:	390B
ENABLE COMMAND INT	:	392B
ENABLE ATTN INT	:	394B
ENABLE ALL INT	:	396B
RESET	:	39EB
EXECUTE COMMAND	:	398B

FUNCTION BYTE	:	7	6	5	4	3	2	1	0
COMMAND/UNIT/TRK	:	C	C	C	C	U	U	T	T
SPACE REV RECORD	:	0	0	0	0	U	U	T	T
SPACE FWD RECORD	:	0	0	0	1	U	U	T	T
SPACE REV FILE	:	0	0	1	0	U	U	T	T
SPACE FWD FILE	:	0	0	1	1	U	U	T	T
REQU SPEC STATUS	:	0	1	0	0	U	U	T	T
WRITE GAP	:	0	1	0	1	U	U	T	T
UNLOAD	:	0	1	1	0	U	U	T	T
WRITE FILE MARK	:	0	1	1	1	U	U	T	T
READ	:	1	0	0	1	U	U	T	T
READ FORMAT	:	1	0	1	1	U	U	T	T
SPEC READ	:	1	0	1	0	U	U	T	T
SPEC WRITE	:	1	0	0	0	U	U	T	T
TEST	:	1	1	0	0	U	U	T	T
WRITE DATA	:	1	1	0	1	U	U	T	T
REWIND	:	1	1	1	0	U	U		
CLEAR INTERRUPT	:	1	1	1	1				

MAIN STATUS	:	7	6	5	4	3	2	1	0
BUSY FLAG	:	:	:	:	:	:	:	:	:
COMM COMP INT/0=ATT INT	:	:	:	:	:	:	:	:	:
FILE MARK	:	:	:	:	:	:	:	:	:
FILE PROTECTED	:	:	:	:	:	:	:	:	:
BOT	:	:	:	:	:	:	:	:	:
EOT	:	:	:	:	:	:	:	:	:
CRC ERROR	:	:	:	:	:	:	:	:	:
ABNORMAL CONDITION	:	:	:	:	:	:	:	:	:

DISC STATUS 700 SYSTEM

UNIT STATUS

```
 LOW BYTE                  7 6 5 4 3 2 1 0
READY.....................: : : : : : : :
ON-LINE...................: : : : : : : :
END OF CYLINDER...........: : : : : : :
OFF SET...................: : : : : :
READ ONLY.................: : : : :
SEEK INCOMPLETE...........: : : :
DEVICE CHECK..............: : :
ADDRESS MARK FOUND........: :


 HIGH BYTE                 7 6 5 4 3 2 1 0
ADAPTER BUSY..............: : : : : : : :
                             : : : : : : :

ERROR CONDITION CODE.....:
```

****

FORMATTER STATUS

```
 LOW BYTE                  7 6 5 4 3 2 1 0
ATTENTION UNIT 7..........: : : : : : : :
        ::                                :
        ::                                :
ATTENTION UNIT 0..........................:

 HIGH BYTE                 7 6 5 4 3 2 1 0
ADAPTER BUSY..............: : : : : : : :
DEVICE BUSY...............: : : : : : : :
OPERATION IN ERROR........: : : : : : :
ZERO......................: : : : : :
ZERO......................: : : : :
LOGICAL ADDRESS (4).......: : : :
LOGICAL ADDRESS (2).......: : :
LOGICAL ADDRESS (1).......: :
```

ERROR CONDITION CODES

01--LOAD TABLE COUNT ERROR
02--READ STROBE COMMAND ERROR.
03--NO LOGICAL DEVICE FOUND.
04--BUFFER ERROR.
05--COMMAND DECODE ERROR.
06--FORMAT INDEX ERROR.
07--FORMAT GAP ERROR.
08--WRITE PROTECT ERROR.
09--CYLINDER MISCOMPARE.
0A--HEAD MISCOMPARE.
11--INDEX ERROR.
12--RE-ORIENTATION ERROR.
13--NO RECORD FOUND.
14--SPEED BUFFER ERROR.
15--WRITE ID/DATA COUNT ERROR.
16--DEFECTIVE TRACK.
17--ALTERNATE TRACK.
21--ID ECC ERROR.
22--READ DATA ERROR.
23--UNCORRECTABLE ECC ERROR IN ID FIELD.
24--UNCORRECTABLE ECC ERROR IN DATA FIELD.
25--ECC ERROR IN DATA FIELD ECC BITS.

ALL OF THE FOLLOWING ERROR CODES INCLUDE THE OCCURRENCE OF AN UNEXPECTED DEVICE STATUS ERROR.

41--DEVICE STATUS ERROR.
42--DEVICE OFF-LINE.
43--DEVICE BUSY.

NOTE---ALL OF THE REMAINING ERROR CODES ARE THE SAME AS THE ERROR CODE WHERE BIT 14 IS NOT SET. THE FACT THAT BIT 14 IS ALSO SET IMPLIES THAT IN addition TO THE INDICATED ERROR, A DEVICE STATUS ERROR WAS ALSO DETECTED.

FORMATTER COMMANDS (700 SYSTEM)

CMDS	BITS
	1 1 1 1 1 1 5 4 3 2 1 0 9 8 7 6 5 4 3 2 1 0
UNIT SELECT	1 0 0 0 0 0 0 0 0 0 0 0 S U U U S=0 FORMATTER STATUS. S=1 UNIT STATUS.
REZERO	1 0 0 0 0 0 1 0 A 0 0 0 0 0 0 0 A=1 INHIBIT ATTENTION.
CLEAR DEV.CHECK	1 0 0 0 0 0 1 1 X X X X X X X X
SET OR RESET RD STROBE	1 0 0 0 0 1 0 1 0 0 0 0 0 0 E L E=1 EARLY STROBE. L=1 LATE STROBE.
LOAD WORD COUNT	1 0 0 0 0 1 1 0 X X X X X X X X
CLEAR ATTENTION	1 0 0 0 0 1 1 1 X X X X X X X X
FORMAT TRACK	1 1 0 0 0 0 0 0 F F 0 0 F F F F
WRITE DATA	1 1 0 0 0 0 0 1 W R R R R R R R R= RECORD NO. W=1 WRAPAROUND W=0 NEXT TRACK
READ ID	1 1 0 0 0 0 1 0 N R R R R R R R N=1 NEXT RECORD N=0 SPECIFIED RECORD
VERIFY ID	1 1 0 0 0 0 1 1 0 R R R R R R R
READ DATA	1 1 0 0 0 1 0 0 W R R R R R R R
VERIFY DATA	1 1 0 0 0 1 0 1 0 R R R R R R R
REQUEST ECC	1 1 0 0 0 1 1 0 X X X X X X X X
SELECT OFFSET HEAD	1 1 0 0 1 0 0 1 S D 0 0 0 H H H S=0 NO OFFSET S=1 OFFSET D=0 OUTWARD D=1 INWARD H= HEAD

FORMATTER COMMANDS (700 SYSTEM)

CMDS	BITS															
	1 5	1 4	1 3	1 2	1 1	1 0	9	8	7	6	5	4	3	2	1	0
FORMTR RESET BYTE	0	0	0	0	0	0	0	0	X	X	X	X	X	X	X	X
LOAD TABLE (TBL MODE)	0	0	1	0	0	0	0	0	0	W	W	W	W	W	W	W
	W= WORD COUNT															
LOAD TABLE (DEV MODE)	0	0	1	0	0	0	1	0	0	0	0	0	0	D	D	D
	D= DEVICE NUMBER															
LD TABLE (WD MODE)	0	0	1	0	0	0	0	1	0	A	A	A	A	A	A	A
	A= ADDRESS															
RD TABLE (TBL MODE)	0	0	1	1	0	0	0	0	0	W	W	W	W	W	W	W
	W= WORD COUNT															
RD TABLE (WD MODE)	0	0	1	1	0	0	0	1	0	A	A	A	A	A	A	A
	A= ADDRESS															
RD TABLE (DEV MODE)	0	0	1	1	0	0	1	0	0	0	0	0	0	D	D	D
	D= DEVICE NUMBER															
SEEK CMD	0	1	0	1	A	0	C	C	C	C	C	C	C	C	C	C
	A=1 INHIBIT ATTENTION															
	C= CYLINDER															
WRITE ID DATA	0	1	1	0	F	F	F	F	0	R	R	R	R	R	R	R
	R= RECORD NUMBER															

ADAPTER COMMANDS (700 SYSTEM)

	COXX	DOXX	DIXX
SET INTERUPT ENABLES	07	XXXXXDAR A=1 ENABLE ATTN INT. R=1 ENABLE FMTER READY INTERRUPT D=1 ENABLE DMA INT.	
READ STATUS	07		STATUS L-BYTE
CLEAR CTLR	27	XXXXXXXX	
READ STATUS	27		STATUS H-BYTE BIT 15=1-BUSY
CMD FORMATTER LOWER BYTE	47	CMD L-BYTE	
READ DATA LOW BYTE	47		DATA L-BYTE
CMD FORMATTER HIGH BYTE	67	CMD H-BYTE	
READ DATA HIGH BYTE	67		DATA H-BYTE
CLEAR INTERUPT	C7	XXXXXXXX	
DMA START	E7	XXWKRXXX W= WRITE TRANSFER K= KEYSEARCH START R= READ TRANSFER	

DMA ADDRESS BUFFER FORMAT (700 SYS)

MEMORY ADDRESS

0060	STARTING ADDRESS	1
0062	FLAGS/BYTE COUNT	1
0064	STARTING ADDRESS	2
0066	FLAGS/BYTE COUNT	2
0068	STARTING ADDRESS	3
006A	FLAGS/BYTE COUNT	3
006C	STARTING ADDRESS	4
006E	FLAGS/BYTE COUNT	4

BITS	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	I	C	1 TO [16K-1] BYTE COUNT													

I=0 NORMAL BYTE COUNT FIELD
I=1 IGNORE DATA DURING READ OPERATION
C=0 TERMINATE WHEN THIS COUNT DONE.
C=1 CONTINUE WHEN THIS COUNT DONE

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ACTIVATING THE VDT BOOT LOADER

SET SENSE SWITCHES 1 AND 4 ON. (2&3 off)

DEPRESS THE LOAD SWITCH ON THE CPU PANEL.

THE TERMINAL TO BE USED MUST BE CONNECTED TO CHANNEL 0.

THE TERMINAL SHOULD BE IN HALF-DUPLEX MODE.

TERMINATION OF ANY INPUT SHOULD BE DONE WITH THE IV KEY.

ONLY HEX CHARACTERS MAY BE ENTERED.NO SPACE OR BACKSPACE CHARACTERS.

THE FIRST FOUR CHARACTERS ENTERED ARE THE ADDRESS IN MEMORY OF WHERE THE DATA IS TO BE STORED. CHARACTERS FOLLOWING ARE THE PROGRAM DATA YOU WISH TO ENTER.

FOLLOWING IS AN EXAMPLE OF ENTERING THE DISC ALIGNMENT PROGRAM:

```
0300EF009700D2870000039063A264E394600IV
```

STARTING MEMORY ADDRESS — PROGRAM DATA — TERMINATION CHARACTER

TO BEGIN EXECUTION OF A PROGRAM, TYPE IN THE STARTING ADDRESS FOLLOWED BY IV KEY.

EXAMPLE-TO BEGIN EXECUTION OF THE ABOVE PROGRAM:

```
0300IV
```

STARTING ADDRESS — TERMINATION CHARACTER

```
**************************************************
* A VERY SIMPLE CHECK OF THE OPERATION OF THE    *
* VDT & CPU CAN BE DONE BY THE FOLLOWING WAY.    *
* ENTER:                                         *
*          000000IV                              *
*          0000IV   TO EXECUTE                   *
*                                                *
* THE SYSTEM SHOULD GO INTO A HALT               *
**************************************************
```

GENERAL INFORMATION

ON THE 1300 CPU'S DEPRESSING THE LOAD KEY WITH SENSE SWITCHES 1 AND 4 ON WILL NOT CLEAR ANY MEMORY.

ON THE 1320 & 1340 CPU'S DEPRESSING THE LOAD KEY WITH SENCE SWITCHES 1 AND 4 ON WILL CLEAR MEMORY LOCATIONS 00 TO FF, AND FROM 601 TO 7FFF.

WHEN TO USE THE VDT LOADER

THE VDT BOOT IS DESIGN TO GIVE THE SR A WAY OF TESTING THE BASIC/FOUR WITHOUT BOSS.

WE NOW HAVE A WAY OF RUNNING MACHINE LANGUAGE PROGRAMS WITHOUT THE USE OF A DISC DRIVE. THIS SHOULD MAKE IT POSSIBLE TO DETERMINE CPU OR DISC DRIVE PROBLEM, WITHOUT THE NEED FOR A SCOPE.

VDT & CPU CHECKER
ALL CPU'S

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0300	04	DIN	DISABLE INTERRUPTS
0301	87FFBF	LDX=	LOAD X WITH END MASK (FFBF)
0304	EFAF	LDV=	LOAD A WITH 'AF'(1ST CHAR -1)
0306	48	INA	INCREMENT A FOR FIRST CHAR
0307	391B	OBA	OUTPUT A TO CHAN. 0
0309	97E000	LDB=	LOAD B WITH DELAY COUNT
030C	49	INB	INCREMENT B
030D	1AFD	NBZ	LOOP UNTIL B = ZERO
030F	1FF5	NAX	IF A=X END OF CHAR. STRING
0311	61EE	JMP	GO DO IT AGAIN

TERMINAL SHOULD RESPOND WITH 0123456789:;<=>?
AND LOOP CONTINUOUSLY.

```
****************************************
* FOR 1340 CPU'S CHANGE 0308 TO '00' *
****************************************
```


DISPLAY SENSE SWITCHES
ALL CPU'S

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0300	04	DIN	DISABLE INTERRUPTS
0301	02	ESW	ENTER SENSE SWITCHES TO A
0302	2610	LRL	SHIFT A 10 POS TO RIGHT
0304	2A04	ALL	RETURN 4 BITS TO A
0306	BF0A	SBV=	CHECK FOR OUT OF ASCII RANGE
0308	1402	JAN	4 BITS ARE ASCII/HEX
030A	AF07	ADV=	SKIP IF NOT ASCII
030C	AFBA	ADV=	RESTORE ASCII/HEX CHAR.
030E	391B	OBA	OUTPUT TO CHAN. 0
0310	61EE	JMP	GOT DO IT AGAIN

THE TERMINAL WILL PRINT THE HEX VALUE
OF THE SENSE SWITCHES.

```
****************************************
* FOR 1340 CPU'S CHANGE 030F TO '00' *
****************************************
```

CLEAR MEMORY

ON ALL CPU'S

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0000	04	DIN	DISABLE INTERRUPTS
0001	87002D	LDX=	LOAD X WITH FIRST MEMORY ADDRESS TO BE MOVED FROM.
0004	E7002F	LDA=	LOAD A WITH FIRST MEMORY ADDRESS TO BE MOVED TO.
0007	977FFF	LDB=	LOAD B WITH LAST MEMORY ADDRESS TO BE MOVED TO.
000A	5C	MOV	MOVE FROM X TO A UNTIL B
000B	97FFFD	LDB=	LOAD B WITH LAST MEMORY ADDRESS TO BE MOVED TO.
000E	EF08	LDV=	LOAD A TO SELECT BANK 1
0010	690E	RTJ	JUMP FOWARD TO SELECT BANK
0012	EF10	LDV=	LOAD A TO SELECT BANK 2
0014	690A	RTJ	JUMP FOWARD TO SELECT BANK
0016	EF18	LDV=	LOAD A TO SELECT BANK 3
0018	6906	RTJ	JUMP FOWARD TO SELECT BANK
001A	EF47	LDV=	LOAD A WITH "G"
001C	391B	OBA	OUTPUT A TO CHAN. 0
001E	61E1	JMP	JUMP BACK AND START OVER
0020	0000		STORE RETURN ADDRESS
0022	3FEF	CBS	SELECT BANK
0024	877F00	LDX=	RESET X TO CLEAR NEXT BANK
0026	E77FFF	LDA=	RESET A TO CLEAR NEXT BANK
002A	5C	MOV	MOVE FROM X TO A UNTILL B
002B	63F3	RTJ	JUMP BACK FOR NEXT BANK
002D	0000		DATA TO BE MOVED

THIS PROGRAM WILL INITIALIZE UP TO 128K OF MEMORY TO CORRECT PARITY.

THE TERMINAL SHOULD RESPOND WITH G ON EVERY PASS OF MEMORY.

****
* FOR 1340 CPU'S CHANGE 001D TO '00' *
****

NOTE1: ON 1320 & 1340 CPU'S IF YOU STOP THIS PROGRAM IT WILL BE CLEARED FROM MEMORY.

WRITE & READ MEMORY FOR ALL CPU'S

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0000	04	DIN	DISABLE INTERRUPTS
0001	3434	NOP	NO OPERATION
0003	3434	NOP	NO OPERATION
0005	E7XXXX	LAD=	LOAD A WITH HIGHEST MEMORY ADDRESS (XXXX)
0008	4C	TAX	TRANSFER A TO X
0009	E7ZZZZ	LDV=	LOAD A WITH DATA FOR MEM.
000C	45	DCX	DECREMENT X
000D	F500	STV+	STORE A IN MEM. INDEXED ON X
000F	9500	LDB+	LOAD B FROM MEM. INDEXED ON X
0011	45	DCX	DECREMENT X
0012	7F2000	DWM=	DECREMENT MEM. LOCATION
0015	1E0F	NAB	NO GOOD GO OUTPUT A "B"
0017	91FA	LDB	LOAD B FROM LOCATION (0013)
0019	1AF1	NBZ	GO BACK STORE NEXT LOCATION
001B	EF47	LDV=	LOAD A WITH '47' (G = GOOD)
001D	391B	OBA	OUTPUT RESULTS TO CHAN. 0
001F	972000	LDB=	LOAD B FOR COUNT OF 16K
0022	99EF	STB	STORE B AT MEM.LOCATION(000F)
0024	61DE	JMP	JUMP BACK TO START OVER
0026	EF42	LDV=	LOAD A WITH '42' (B = BAD)
0028	391B	OBA	OUTPUT RESULTS TO CHAN. 0
002A	61DD	JMP	GO BACK & TRY NEXT LOCATION

THIS PROGRAM WILL WRITE AND READ DATA, FOR 16K OF MEMORY STARTING AT HIGHEST MEMORY ADDRESS ENTERED.

PROGRAM WILL DISPLAY A "G" ON EVERY PASS, AND WILL DISPLAY A "B" ON EVERY MISCOMPARE.

SET 0006-0007 TO THE HIGHEST MEMORY LOCATION
SET 000A-000B TO THE PATTERN YOU WISH TO WRITE

****
* FOR 1340 CPU'S CHANGE 001E & 0029 TO '00' *
****

NOTE1:
IF SERVICE SWITCH WAS OFF YOU MUST RUN #1-3 FIRST.
NOTE2:
ON 1320 & 1340 CPU'S IF YOU STOP THIS PROGRAM IT WILL BE CLEARED FROM MEMORY
NOTE3:
TO SELECT BANK 2 TYPE IN AT 0001-EF10 & 0003-3FEF.
TO SELECT BANK 3 TYPE IN AT 0001-EF18 & 0003-3FEF.
ALSO TO BE IN BANK 1,2 OR 3 MEMORY ADDRESS MUST BE FROM 7FFF TO FFFF.

TEST MEMORY WITH RANDOM DATA ON ALL CPU'S

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0500	04	DIN	DISABLE INTERRUPTS
0501	3434	NOP	NO OPERATION
0503	3434	NOP	NO OPERATION
0505	871FFF	LDX=	SET X WITH COUNT OF 8K
0508	4F	TXB	INIT B WITH ANY VALUE
0509	03	TXA	INIT A WITH ANY VALUE
050A	59XXXX	ADX	XXXX = STARTING ADDRESS
050D	41	XRA	EXCL OR B WITH A
050E	2603	LRL	SHIFT A AND B RIGHT 3 POS
0510	FD00	STV+	SAVE RESULT IN TEST AREA
0502	45	DCX	DECR MEMORY ADDRESS
0503	4E	TXA	SET A FOR END OF BLK TEST
0514	B1F5	SUB	TEST FOR END OF PATTERN GEN
0516	1CF5	NAN	JUMP IF NOT FINISHED
0518	EFC4	LDV=	SET BELL CODE IN A
051A	A70043	ADA=	SET "C" IF A=0 OTHERWISE RB
051D	391B	OBA	OUTPUT TO CHAN 0
051F	91EA	LDB	LOAD B WITH START ADDRESS
0521	4D	TBX	TRANS. START ADDR. TO X
0522	301FFF	ADB	ADD (1FFF) FOR END ADDRESS
0525	2810	ALA	CLEAR A
0527	5D	GCC	GEN CRC FOR 8K IN X & B
0528	BFD3	SBV	COMPARE D3 TO GEN CRC
052A	11EE	JAZ	JUMP IF CRC'S MATCH
052C	61EA	JMP	JUMP IF IN ERROR

THIS PROGRAM WILL TEST 8K WITH RANDOM DATA
IT WILL DISPLAY A "C" FOR EVERY PASS AND
RING BELL ON CHAN.0 ON EVERY MEMORY FAILURE.

SET 050B-050C TO LOWEST MEMORY ADDRESS
****
* FOR 1340 CPU'S CHANGE 051E TO '00' *
****
NOTE1:
TO TEST FROM 0000 PROGRAM MUST START ABOVE 2000.
NOTE2:
IF SERVICE SWITCH WAS OFF YOU MUST RUN #1-3 FIRST.
NOTE3:
TO CHANGE BELL TO A DISPLAYABLE CHAR. SUCH AS "E"
CHANGE LOCATION 0519 TO '02'.
NOTE4:
ONE RING BELL IS NORMAL ON FIRST PASS.
NOTE5:
TO SELECT BANK 2 TYPE IN AT 0501-EF10 & 0503-3FEF.
TO SELECT BANK 3 TYPE IN AT 0501-EF18 & 0503-3FEF.
ALSO TO BE IN BANK 1,2 OR 3 MEMORY ADDRESS MUST
BE FROM 7FFF TO FFFF.

DISPLAY MEMORY

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0300	04	DIN	DISABLE INTERRUPTS
0301	3434	NOP	NO OPERATION
0303	3434	NOP	NO OPERATION
0305	87XXXX	LDX	LOAD X WITH MEM. START ADD.
0308	ED00	LDV=	LOAD A WITH DATA
030A	2808	ALA	SHIFT A 8 POSITIONS LEFT
030C	240C	LRA	SHIFT A 12 POSITIONS RIGHT
030E	690F	RTJ	GO PROCESS DATA BYTE
0310	ED00	LDV=	LOAD A WITH DATA
0312	280C	ALA	SHIFT A 12 POSITIONS LEFT
0314	240C	LRA	SHIFT A 12 POSITIONS RIGHT
0316	6907	RTJ	GO PROCESS DATA BYTE
0318	EFF0	LDV=	LOAD A WITH 'FO'
031A	6903	RTJ	GO PROCESS DATA BYTE
031C	44	INX	INC. X FOR NEXT MEM. ADD.
031D	61E9	JMP	GO FOR NEXT BYTE OF DATA
031F	0000		
0321	BF0A	SBV=	TEST FOR UNDER 9
0323	1402	JAN	JUMP IF UNDER 9
0325	AF07	ADV=	ADD 7 IF OVER 9
0327	AFBA	ADV=	MODIFY FOR ASCII CHAR.
0329	391B	OBA	OUTPUT DATA TO CHANNEL 0
032B	971000	LDB	LOAD B FOR DELY COUNT
032E	2F	DCB	DECREMENT B FOR DELY
032F	1AFD	NBZ	GO BACK UNTIL B = 0
0331	63EC	JMP	GET ANOTHER CHAR.

THIS PROGRAM WILL DISPLAY DATA AT CONSECUTIVELY HIGHER MEMORY LOCATIONS UNTIL YOU DEPRESS LOAD KEY.

```
****************************************
* FOR 1340 CPU'S CHANGE 032A TO '00' *
****************************************
```

NOTE1:
IF SERVICE SWITCH WAS OFF YOU MUST RUN # 1-3 FIRST.
NOTE2:
TO SELECT BANK 2 TYPE IN AT 0301-EF10 & 0303-3FEF.
TO SELECT BANK 3 TYPE IN AT 0301-EF18 & 0303-3FEF.
ALSO TO BE IN BANK 1, 2 OR 3 MEMORY ADDRESS MUST BE FROM 7FFF TO FFFF.

PRINT MEMORY ON ALL CPU'S

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0300	04	DIN	DISABLE INTERRUPTS
0301	3434	NOP	NO OPERATION
0303	3434	NOP	NO OPERATION
0305	87XXXX	LDX=	XXXX=STARTING MEMORY ADDRESS
0308	970010	LDB=	LOAD B FOR START OF LINE
030B	ED00	LDV=	LOAD A WITH DATA
030D	2808	ALA	SHIFT A 8 POSITIONS TO LEFT
030F	240C	LRA	SHIFT A 12 POSITIONS TO RIGHT
0311	6914	RTJ	GO OUTPUT 1ST 1/2 OF BYTE
0313	ED00	LDV=	LOAD A WITH DATA
0315	280C	ALA	SHIFT A 12 POSITIONS TO LEFT
0317	240C	LRA	SHIFT A 12 POSITIONS TO RIGHT
0319	690C	RTJ	GO OUTPUT 2ND 1/2 OF BYTE
031B	EFF0	LDV=	LOAD A WITH SPACE CHAR.
031D	6908	RTJ	GO OUTPUT SPACE
031F	44	INX	INCREMENT X FOR NEXT MEM.ADD.
0320	2F	DCB	DECREMENT B FOR LINE COUNT
0321	1AE8	NBZ	TEST FOR FULL LINE JMP IF NOT
0323	6916	RTJ	GO PRINT LINE OF DATA
0325	61E1	JMP	GO START NEXT LINE
0328	0000		
0329	BF0A	SBV=	TEST FOR HEX
032B	1402	JAN	JUMP IF UNDER 9
032D	AF07	ADV=	MODIFY FOR CHAR. OVER 9
032F	AFBA	ADV=	MODIFY FOR ASCII CHAR.
0331	390A	OBA	OUTPUT DATA TO PRINTER
0323	E7F800	LDA=	LOAD A WITH LOAD COUNT
0336	48	INA	INCREMENT A
0337	19FD	NAZ	GO BACK UNTIL DELAY IS OVER
0339	63EC	JMP	GO GET NEXT CHAR.
033B	0000		
033D	EF0A	LDV=	LOAD A WITH LINE FEED CHAR.
033F	390A	OBA	OUTPUT 'LF' CHAR. TO "LP"
0341	312A	IBA	INPUT STATUS FROM PTR.
0343	BF05	SBV=	TEST FOR READY STATUS
0345	19FA	JMP	JUMP IF STATUS NOT READY
0347	AF05	ADV=	RESTORE CHAR.
0349	63F0	JMP	GO BACK FOR NEXT LINE

THIS PROGRAM WILL PRINT DATA AT CONSECUTIVELY HIGHER MEMORY LOCATIONS UNTIL YOU DEPRESS LOAD KEY.

NOTE1:
IF SERVICE SWITCH WAS OFF YOU MUST RUN #1-3 FIRST.

NOTE2:
FOR DATA PRODUCTS PRINTER CHANGE 0344 & 0348 TO 45.
FOR DIGITRONICS CHANGE 0344 & 0348 TO 25.

NOTE3:
TO SELECT BANK 2 TYPE IN AT 0301-EF10 & 0303-3FEF.
TO SELECT BANK 3 TYPE IN AT 0301-EF18 & 0303-3FEF.
ALSO TO BE IN BANK 1,2 OR 3 MEMORY ADDRESS MUST BE FROM 7FFF TO FFFF

VDT BOOT PROGRAMS

DISPLAY CPU INTERNAL STATUS

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0300	04	DIN	DISABLE INTERRUPTS
0301	EF00	LDV=	CLEAR A
0303	3FEA	SIS	STORE INTERNAL STATUS TO A
0305	2608	LRL	SHIFT A 8 POSITIONS RIGHT
0307	870002	LDX=	SET X TO OUTPUT BYTE COUNT
030A	2204	LLL	RETURN 4 BITS TO A
030C	BF0A	SBV=	CHECK FOR OUT OF RANGE
030E	1402	JAN	4 BITS ARE ASCII/HEX
0310	AF07	ADV=	SKIP NOT ASCII
0312	AFBA	ADV=	RESTORE ASCII/HEX CHAR.
0314	391B	OBA	OUTPUT TO CHAN. 0
0316	E77000	LDA=	LOAD A WITH DELAY COUNT
0319	48	INA	INCREMENT A
031A	1CFD	NAN	LOOP UNTIL DELAY COMPLETE
031C	45	DCX	DECREMENT X (OUTPUT COUNT)
031D	1BEB	NXZ	GO BACK FOR NEXT BYTE
031F	00	HLT	END

THIS PROGRAM WILL DISPLAY TWO CHARACTERS
AND CPU WILL HALT. GOOD STATUS IS '08'.
STATUS INFORMATION IS ON PAGE 01-16.

```
*****************************************
* FOR 1340 CPU'S CHANGE 0315 TO '00' *
*****************************************
```

PRINT PROGRAM FOR ALL CPU'S

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0300	04	DIN	DISABLE INTERRUPTS
0301	E700A0	LDA=	SET A TO FIRST CHARACTER
0304	97FAFF	LDB=	SET B TO BELAY COUNT
0307	49	INB	INCREMENT B
0308	1AFD	NBZ	GO BACK UNTIL DELAY OVER
030A	390A	OBA	OUTPUT CHAR. TO PRINTER
030C	48	INA	INCREMENT A (CHARACTER)
030D	BFFF	SBV=	TEST FOR END OF CHAR. STRING
030F	1104	JMP	GO PRINT IF LINE IS FULL
0311	AFFF	ADV=	RESTORE CHAR.
0313	61EF	JMP	GO OUTPUT NEXT CHARACTER
0315	EF0A	LDV=	PUT 'LF' IN A
0317	390A	OBA	OUTPUT 'LF' TO PRINTER
0319	312A	IBA	INPUT STATUS TO A
031B	BF05	SBV=	TEST STATUS FOR PRT. READY
031D	19FA	NAZ	GO BACK IF PRT. IS NOT READY
031F	AF05	ADV=	RESTORE CHARACTER
0321	61DE	JMP	GO BACK TO OUTPUT NEXT LINE

PROGRAM WILL PRINT
!"#$&'()*+,-./0to9:;<=>?@AtoZ[\]
CONTINUOUSLY.

THIS PROGRAM IS FOR THE CENTRONICS,
PRINTRONICS & DATAROYAL PRINTERS.

TO MODIFY THE PROGRAM FOR OTHER PRINTERS,
CHANGE THE FOLLOWING POSITIONS.

	031B	031F
DATA PRODUCTS	45	45
DIGITRONICS	25	25

NOTE1: WILL ONLY WORK ON "LP"

OUTPUT TO PRINTER 'LP'

CONCURRENT I/O

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
002A	0565		STORE END I/O
008C	02FF		STACK POINTER
0170	0304		VDT INPUT INTERRUPT
0114	0317		PRINTER INTERRUPT
0300	05	EIN	ENABLE INTERRUPT
0301	34	NOP	NO OPERATION
0302	61FC	JMP	WAIT FOR INTERRUPT
0304	04	DIN	DISABLE INTERRUPTS
0305	313B	IBA	INPUT BYTE TO A
0307	970500	LDB	LOAD B WITH START OF STRING
030A	870565	LDX	LOAD X WITH END OF STRING
030D	45	DNX	DECREMENT X
030E	FD00	STV=	STORE A
0310	3EFB	NBX	JUMP BACK IF B NOT EQUAL X
0312	EF0A	LDV=	LOAD A WITH LINE FEED
0314	FE0565	STA	STORE A AT END OF STRING
0317	970500	LDB	LOAD B WITH STARTING ADD.
031A	9828	STB	STORE B AT 0028
031C	39CA	OBA	START OUTPUT OF STRING
031E	50	RTN	RETURN

THIS PROGRAM WILL PRINT CONTINUOUSLY FULL LINE OF THE CHARACTERS THAT IS KEYED IN ON THE VDT.

DISC ALIGNMENT

FOR 1300 CPU

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0300	EF00	LDV=	SET A FOR DRIVE SELECT
0302	9700D2	LDB=	SET B FOR CYLINDER SELECT
0305	870000	LDX=	SET X FOR HEAD SELECT
0308	3906	OBA	SELECT DRIVE
030A	3A26	OBB	SELECT CYLINDER
030C	4E	TXA	READY A FOR HEAD SELECT
030D	3946	OBA	SELECT HEAD AND READ DISC
030F	00	HLT	END

NOTE: TO SET OTHER DRIVES, CYLINDERS & HEADS:

DRIVE SELECT 0301	CYLINDER SELECT 0304	HEAD SELECT 0307
00 = DRIVE 0	00 = CYL 0	00 = UPPER HD.
01 = DRIVE 1	C8 = CYL 200	20 = LOWER HD.
02 = DRIVE 2	D2 = CYL 210	40 = UPPER HD. FIXED
03 = DRIVE 3	DC = CYL 220	60 = LOWER HD. FIXED

INCREMENTAL SEEK PROGRAM

1300 CPU'S ONLY

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0300	877CD4	LDX=	SET X TO TOTAL CYL.COUNT
0303	97FF00	LDB=	SET B TO COUNT 256 CYL'S
0306	4E	TXA	TRANSFER X TO A
0307	3936	OBA	OUTPUT HIGH CYL. ADDRESS
0309	44	INX	INCREMENT X
030A	1511	JXN	GO TO END AFTER FULL SEEK
030C	44	INX	INCREMENT X
030D	3A26	OBB	OUTPUT LOW CYL. ADDRESS
030F	39C6	OBA	INPUT ALTERNATE STATUS
0311	F858	LDV	LOAD A WITH STATUS AT (0058)
0313	BF03	SBV=	CHECK STATUS FOR SEEK COMP.
0315	19F8	NAZ	GO BACK UNTIL SEEK COMP.
0317	49	INB	INCREMENT LOW CYL. ADD.
0318	1AEC	NBZ	GO BACK FOR CYL. BELOW 256
031A	44	INX	INCREMENT HIGH CYL. ADD.
031B	61E9	JMP	GO BACK TO SEEK CYL'S ABOVE 256
031D	00	HLT	END
031E	E1		

THIS PROGRAM WILL INCREMENTALLY SEEK FROM CYLINDER 00 TO 406 AND HALT.

NOTE1: FOR CONTINUOUS OPERATION CHANGE THE DATA AT LOCATION 031D TO '61'

DISPLAY DISC STATUS

IOMEC DISC ONLY

```
MEM    MACH     MNE
ADRS   CODE     FIELD        COMMENT

0300   04       DIN     DISABLE INTERRUPTS
0301   EF00     LDV=    LOAD A FOR DRIVE SELECT
0303   3906     OBA     SELECT DRIVE
0305   3916     QBA     INPUT DRIVE PRIMARY STATUS
0307   E858     LDV     LOAD A WITH STATUS
0309   6907     RTJ     GO PROCESS STATUS BYTE
030B   39C7     OBA     INPUT DRIVE ALTERNATE STATUS
030D   E858     LDV     LOAD A WITH STATUS
030F   6901     RTJ     GO PROCESS STATUS BYTE
0311   00       HLT     END
0312   0000             LOCATION FOR RETURN ADDRESS
0314   870002   LDX=    LOAD X TO BYTE COUNT
0317   2608     LRL     SAVE STATUA BYTE IN B
0319   EF00     LDV=    CLEAR A
031B   2A04     ALL     SHIFT 4 BITS FROM B TO A
031D   BF0A     SBV=    TEST FOR HEX
031F   1402     JAN     GOOD GO MODIFY
0321   AF07     ADV=    NO GOOD SKIP
0323   AFBA     ADV=    MODIFY FOR ASCII CHAR.
0325   391B     OBA     OUTPUT CHAR. TO CHAN. 0
0327   45       DCX     DECREMENT OUTPUT BYTE COUNT
0328   E77000   LDA=    LOAD A FOR DELAY
032B   48       INA     INCREMENT A
032C   1CFD     NAN     GO BACK UNTIL DELAY OVER
032E   1BE9     NXZ     GO BACK GET ANOTHER BYTE
0330   63E0     JMP     GOT GET ANOTHER STATUS BYTE
```

THIS PROGRAM WILL DISPLAY PRIMARY AND ALTERNATE STATUS. IF THIS STATUS IS GOOD THAN YOU CAN RUN PROGRAM #1-2-B AND CHECK STATUS AFTER A READ OR A WRITE. STATUS INFORMATION IS ON PAGE 03-06.

NOTE1:
TO SELECT ANOTHER DRIVE. SET 0302 AS FOLLOWS.

00 = DRIVE 0	02 = DRIVE 2
01 = DRIVE 1	03 = DRIVE 3

****
* SEE NEXT PAGE FOR A READ/WRITE STATUS CHECK *
****

DISPLAY READ (OR WRITE) DISC STATUS

IOMEC DISC ONLY

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0332	04	DIN	DISABLE INTERRUPTS
0333	EF00	LDV=	SET A FOR DRIVE SELECT
0335	3906	OBA	SELECT DRIVE
0337	EF00	LDV=	SET A FOR CYLINDER SELECT
0339	3926	OBA	SEEK TO SELECTED CYLINDER
033B	EF00	LDV=	SET A FOR READ SELECT
033D	3946	OBA	READ FROM SELECTED CYL & HEAD
033F	3976	OBA	CONNECT DMA CHANNEL
0340	34	NOP	DO NOTHING
0341	61FD	JMP	WAIT FOR DMA INTERRUPT
0343	61BF	JMP	GO BACK TO STATUS DISPLAY

THIS PROGRAM WILL DISPLAY PRIMARY AND ALTERNATE STATUS AFTER A READ (OR WRITE) TO THE DISC. FOR STATUS INFORMATION TURN TO PAGE 03-06.

NOTE1:

BEFORE EXECUTION SET THE FOLLOWING LOCATIONS:

0060 TO 100010FF
0082 TO 0305

NOTE2:

FOR OTHER DRIVES, CYL. & HEADS SET THE FOLLOWING:

DRIVE SELECT 0334	CYLINDER SELECT 0338	HEAD SELECT 033C
00=DRIVE 0	00=CYL 0	00=UPPER HEAD
01=DRIVE 1	C8=CYL 200	20=LOWER HEAD
02=DRIVE 2	D2=CYL 210	
03=DRIVE 3	DC=CYL 220	

NOTE3:

THE DATA THAT IS READ WILL BE IN MEM. LOCATION 1000 thru 10FF.IF YOU DO A WRITE OPERATION, LOCATION 1000 THRU 10FF MUST CONTAIN THE DATA YOU WISH TO WRITE BEFORE YOU BEGIN EXECUTION.

TO DO A WRITE (INSTEAD OF READ) SET 033E TO '66'.

*****EXECUTION BEGINS AT LOCATION 0332*********

BASIC / FOUR 1320 CPU

DISC STATUS DISPLAY

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0200	04	DIN	DISABLE INTERRUPTS
0201	978008	LDB=	LOAD B WITH DRIVE SELECT
0204	3A47	OBB	OUTPUT LOW BYTE TO FORMATTER
0206	2508	LRB	SHIFT B 8 POSITIONS RIGHT
0208	3A67	OBB	OUTPUT HIGH BYTE TO FORMATTER
020A	3FEB	TUM	TIE UP MEMORY (DELAY)
020C	3127	IBA	INPUT LOW STATUS BYTE TO A
020E	2008	LLA	SHIFT A 8 POSITIONS LEFT
0210	3107	IBA	INPUT HIGH STATUS BYTE TO A
0212	260C	LRL	SHIFT A 12 POSITIONS RIGHT
0214	870004	LDX=	SET X TO BYTE COUNT
0217	BF0A	SBV=	CHECK FOR ASCII RANGE
0219	1402	JAN	GOOD GO MODIFY
021B	AF07	ADV=	NO GOOD SKIP
021D	AFBA	ADV=	MODIFY FOR ASCII CHAR.
021F	391B	OBA	OUTPUT BYTE TO CHAN. 0
0221	45	DCX	DECREMENT BYTE COUNT
0222	3FEB	TUM	TIE UP MEMORY (DELAY)
0224	EF00	LDV=	CLEAR A
0226	2A04	ALL	SHIFT A & B 4 POSITIONS LEFT
0228	1BED	NXZ	GO BACK FOR ANOTHER BYTE
022A	00	HLT	END

THIS PROGRAM WILL DISPLAY FOUR CHARACTERS
AND CPU WILL HALT. DISC STATUS INFORMATION
IS ON PAGE 1-4. FORMATTER STATUS IS ON
PAGE 03-09 & 03-10.

NOTE1:
SET 0202-0203 TO THE FOLLOWING FOR OTHER DRIVERS:

8000 FOR FORMATTER
8008 FOR DRIVE 0
8009 FOR DRIVE 1
800A FOR DRIVE 2
800B FOR DRIVE 3

SEE 04-43

BASIC / FOUR 1320 CPU

SHORT HEAD ALIGNMENT PROGRAM

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0200	04	DIN	DISABLE INTERRUPTS
0201	E78008	LDA=	LOAD A WITH DRIVE SELECT
0204	6906	RTJ	GO OUTPUT COMMAND
0206	E759F0	LDA=	LOAD A WITH CYLINDER SELECT
0209	6901	RTJ	GO OUT COMMAND
020B	00	HLT	HALT
020C	0000		START OF OUTPUT COMMAND
020E	3947	OBA	OUTPUT LO BYTE TO FORMATTER
0210	2408	LRA	SHIFT A 8 POSITIONS RIGHT
0212	3967	OBA	OUTPUT HI BYTE TO FORMATTER
0214	63F6	JMP	RETURN FOR CYLINDER SELECT

THE DRIVE WILL SEEK TO CYLINDER AND CPU
WILL HALT TO SELECT HEAD GROUND APPROPRIATE
PIN. SEE TECH TALK 115.

NOTE1: SET 0202 TO 8008 FOR DRIVE 0
8009 FOR DRIVE 1
800A FOR DRIVE 2
800B FOR DRIVE 3

NOTE2: SET 0207 TO 59F0 FOR CYLINDER 496
5808 FOR CYLINDER 008
5B20 FOR CYLINDER 800

ALTERNATE SEEK PROGRAM

FOR 1320 CPU

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0300	04	DIN	DISABLE INTERRUPTS
0301	E78008	LDA=	LOAD A WITH DRIVE SELECT
0304	690C	RTJ	GO OUTPUT COMMAND
0306	E75B2E	LDA=	LOAD A WITH CYLINDER SELECT
0309	6907	RTJ	GO OUTPUT COMMAND
030B	E75800	LDA=	LOAD A WITH CYLINDER SELECT
030E	6902	RTJ	GO OUTPUT COMMAND
0310	61F4	JMP	GO BACK AND DO IT AGAIN
0312	0000		START OF OUTPUT COMMAND
0314	3947	OBA	OUTPUT LO BYTE TO FORMATTER
0316	2408	LRA	SHIFT A 8 POSITIONS RIGHT
0318	3967	OBA	OUTPUT HI BYTE TO FORMATTER
031A	E7EB00	LDA=	LOAD A WITH DELAY COUNT
031D	48	INA	INCREMENT A
031E	19FD	NAZ	LOOP UNTIL A = 0
0320	63F0	JMP	RETURN FOR CYLINDER SELECT

THIS PROGRAM WILL ALTERNATELY SEEK FORM CYL. 0 TO SELECTED CYLINDER.

NOTE1: SET 0302 TO 8008 FOR DRIVE 0
8009 FOR DRIVE 1
800A FOR DRIVE 2
800B FOR DRIVE 3

NOTE2: SET 0307 TO 5B2E FOR CYLINDER 814
5803 FOR CTLINDER 003

ONE SECTOR DISC READ

1320 CPU

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0060	8000		STORE BUFFER ADDRESS
0062	0400		STORE BYTE COUNT
0082	0532		STORE DMA INT. ADD.
0500	04	DIN	DISABLE INTERRUPT
0501	39C7	OBA	CLEAR CONTROLLER
0503	EF04	LDV=	ENABLE DMA INTERRUPT
0505	3907	OBA	SET INT. ENABLES
0507	E78008	LDA=	LOAD A WITH UNIT SEL.
050A	691C	RTJ	RETURN JUMP +1C(HEX)
050C	E75800	LDA=	LOAD A WITH CYL. SEL.
050F	6917	RTJ	RETURN JUMP +17(HEX)
0511	E7C900	LDA=	LOAD A WITH HEAD SEL.
0514	6912	RTJ	RETURN JUMP +12(HEX)
0516	97F000	LDB=	LOAD B WITH DELAY COUNT
0519	49	INB	INCR. B REG.
051A	1AFD	NBZ	JUMP IF B ZERO
051C	EF08	LDV=	LOAD A WITH START DMA CMD.
051E	39E7	OBA	START DMA
0520	E7C400	LDA=	LOAD A WITH READ CMD.
0523	6903	RTJ	RETURN JUMP +03(HEX)
0525	34	NOP	NO OPERATION
0526	61FD	JMP	WAIT FOR DMA INTERRUPT
0528	0000		RETURN JUMP ADDRESS
052A	3947	OBA	OUTPUT FMTR LO BYTE
052C	2408	LRA	SHIFT A REG RIGHT 8 POS.
052E	3967	OBA	OUTPUT FMTR HI BYTE
0530	63F6	JMP	RETURN JUMP
0532	04	DIN	ENABLE INTERRUPT
0533	39C7	OBA	CLEAR INTERRUPT
0535	00	HLT	HALT

THIS PROGRAM WILL READ ONE SECTOR FROM DISC
AND STORE IT STARTING AT MEMORY ADDRESS 8000.

NOTE1: SET 0508 TO 8008 FOR DRIVE 0
8009 FOR DRIVE 1
800A FOR DRIVE 2
800B FOR DRIVE 3

NOTE2: FOR A WRITE,CHANGE 051C TO EF20
0520 TO E7C100

DISPLAY PRIMARY DISC STATUS

1340 CPU

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0300	04	DIN	DISABLE INTERRUPTS
0301	3117	IBA	GET PRIMARY STATUS BYTE
0303	2608	LRL	SAVE STATUS IN B
0305	870002	LDX	SET X TO CHAR. COUNT
0308	EF00	LDV=	CLEAR A
030A	2204	LLL	SHIFT 4 BITS LEFT FROM B
030C	BF0A	SBV=	CHECK FOR ASCII RANGE
030E	1402	JAN	CHAR=0TO9 GO MODIFY
0310	AF07	ADV=	CHAR=AtoF ADD 7
0312	A7E0BA	ADA	MODIFY FOR ASCII CHAR.
0315	3900	OBA	OUTPUT CHAR. TO CHANNEL 0
0317	48	INA	INCREMENT A FOR DELAY
0318	19FD	NAZ	GO BACK UNTIL A=0
031A	45	DCX	DECREMENT X BYTE COUNT
031B	1BED	NXZ	GO BACK FOR NEXT CHAR.
031D	00	HLT	END

THIS PROGRAM WILL DISPLAY TWO CHARACTERS. GOOD STATUS IS 40. FOR MORE INFORMATION SEE PAGE 03-07.

DISPLAY EXTENED AND PRIMARY DISC STATUS

FOR 1340 CPU

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0300	04	DIN	DISABLE INTERRUPTS
0301	39C7	OBA	CLEAR INTERRUPT/MASK REG.
0303	33170001	IBM	INPUT PRI. STATUS TO LOC. 0001
0307	EF20	LDV=	GET EXTENED STATUS RQST. CMD.
0309	3907	OBA	OUTPUT SS RQST. CMD.TO CONT.
030B	EF04	LDV	LOAD A WITH BYTE COUNT
030D	F901	STA	STORE A REG.
030F	E804	LDV=	GET A BYTE OF STATUS
0311	2608	LRL	SAVE STATUS BYTE IN B REG
0313	79FA	DWM	REDUCE PAGE 0 ADDRESS BY 1
0315	6905	RTJ	GO PRINT STATUS BYTE
0317	E9F7	LDV	GET STATUS BYTE ADDRESS
0319	19F4	NAZ	GO BACK FOR NEXT BYTE
031B	00	HLT	END
031C	0000		ENTRY
031E	870002	LDX=	LOAD X WITH BYTE COUNT
0321	48	INA	INCREMENT A FOR DELAY
0322	19FD	NAZ	GO BACK UNTIL A = 0
0324	2204	LLL	MOVE 4 BITS OF B TO A
0326	BF0A	SBV=	TEST FOR HEX
0328	1402	JAN	HEX = 0 TO 9 GO MODIFY
032A	AF07	ADV=	HEX NO GOOD SKIP
032C	AFBA	ADV=	MODIFY FOR ASCII CHAR.
032E	3900	OBA	OUTPUT ASCII CHAR.
0330	45	DCX	REDUCE OUTPUT BYTE COUNT
0331	1BEE	NXZ	NOT DONE, GET NEXT CHAR.
0333	63E7	RTJ	RETURN DONE WITH THIS BYTE

THIS PROGRAM WILL DISPLAY EXTENED STATUS FIRST, THAN PRIMARY STATUS AND CPU WILL HALT.

NOTE1:
YOUR SYSTEM MUST HAVE GONE THROUGH A HARDWARE AND FIRMWARE CHANGE FOR THIS PROGRAM TO DISPLAY TRUE STATUS.

ALTERNATE SEEK PROGRAM

FOR 1340 CPU

MEM ADRS	MACH CODE	MNE FIELD	COMMENT
0300	04	DIN	DISABLE INTERRUPTS
0301	EF00	LDV=	LOAD A WITH RESET COMAND
0303	39C7	OBA=	OUTPUT A TO RESET CONTROLLER
0305	870040	LDX=	LOAD X FOR STATUS CHECK
0308	3117	IBA	INPUT STATUS IN A
030A	1702	JAX	JUMP FOWARD IF STATUS IS GOOD
030C	61FA	JMP	JUMP BACK TO CHECK STATUS AGAIN
030E	EF00	LDV=	LOAD A REG FOR CYC. 0
0310	1205	JBZ	JUMP TO SEEK TO CYC. 105
0312	970000	LDB=	LOAD B REG FOR CYC. 0
0315	6105	JMP	JUMP TO SEEK TO CYC. 0
0317	EF00	LDV=	LOAD A TO HI BYTE OF CYC ADD.
0319	970069	LDB=	LOAD B TO LO BYTE OF CYC ADD.
031C	3A27	OBB	OUTPUT LO BYTE OF B TO CTRL.
031E	3947	OBA	OUTPUT LO BYTE OF A TO CTRL.
0320	61DF	JMP	GO BACK AND START OVER

THIS PROGRAM WILL DO ALTERNATE SEEKS FROM 0 TO 105.

NOTE1:
TO CHANGE FROM TRACK 105 TO 349 CHANGE THE DATA
AT THE FOLLOWING LOCATIONS.

$\frac{0318}{01}$ & $\frac{031B}{5D}$

SEE TECH TALKS AND TSIB'S

READ CARTRIDGE TAPE AND DISPLAY STATUS

1340 CPU

MEM ADRS	MACH CODE	NAME FIELD	COMMENTS
0070	2000		DMA ADDRESS
0072	00		BNK ADDRESS
0073	1400		SET MAX BYTE COUNT
008C	07FF		STACK POINTER
0100	0559		VDT INTERRUPT ADD
0116	0559		TAPE INTERRUPT ADD
0500	396B	OBA	ENABLE TAPE INTERRUPT
0502	EF90	LDV=	LOAD READ COMMAND
0504	398B	OBA	OUTPUT READ COMMAND
0506	6951	RTJ	JUMP TO DELAY
0508	EF4D	LDV=	LOAD A REG WITH M
050A	6935	RTJ	JUMP TO OUTPUT A REG
050C	318B	IBA	INPUT MAIN STATUS
050E	6913	RTJ	JUMP TO OUT STATUS
0510	EF41	LDV=	LOAD A REG WITH A
0512	692D	RTJ	JUMP TO OUTPUT A REG
0514	EF40	LDV=	INPUT AUXILIARY STATUS
0516	398B	OBA	OUTPUT COMMAND
0518	6935	RTJ	JUMP TO DELAY
051A	871FFF	LDX	LOAD MEMORY ADDRESS
051D	E500	LDA	LOAD A WITH AUX STATUS
051F	6902	RTJ	JUMP TO OUTPUT STATUS
0521	61DD	JMP	START OVER
0523	0000		OUTPUT STATUS
0525	2608	LRL	SHIFT 8 BITS TO B REG
0527	870002	LDX	LOAD X WITH CHAR COUNT
052A	2A04	ALL	SHIFT 4 BITS TO A REG
052C	BF0A	SBV=	SUB. A FROM A REG
052E	1402	JAN	TEST IF NEG
0530	AF07	ADV=	ADD 7 TO A REG IF NEG.
0532	AFBA	ADV=	ADD 2A TO A REG
0534	3900	OBA	OUTPUT A REG
0536	6917	RTJ	JUMP TO DELAY
0538	45	DCX	SUB. 1 FROM CHAR COUNT
0539	1BEF	NXZ	JUMP BACK IF COUNT = 0
053B	EF20	LDV=	LOAD SPACE IN A REG
053D	6902	RTJ	JUMP TO OUT PUT A REG
053F	63E2	JMP	RETURN

READ CARTRIDGE TAPE AND DISPLAY STATUS

1340 CPU

MEM ADRS	MACH CODE	NAME FIELD	COMMENTS
0541	0000		OUTPUT A REG & SPACE
0543	3900	OBA	OUTPUT A REG
0545	6908	RTJ	JUMP TO DELAY
0547	EF20	LDV=	LOAD SPACE IN A REG
0549	3900	OBA	OUTPUT A REG
054B	6902	RTJ	JUMP TO DELAY
054D	63F2	JMP	RETURN
054F	0000		DELAY
0551	27E000	LDA	LD A WITH DELAY COUNT
0554	48	INA	INCREMENT A REG
0555	19FD	NAZ	JUMP BACK IF = ZERO
0557	63F6	JMP	RETURN
0559	0000		
055B	870004	LDX	LOAD 1ST STAGE DELAY
055E	EF00	LDV=	LOAD 2ND STAGE DELAY
0560	48	INA	INCREMENT A REG
0561	19FD	NAZ	JUMP BACK IF A = ZERO
0563	45	DCX	DECREMENT X REG
0564	1BF8	NXZ	JUMP BACK IF X = ZERO
0566	63F1	JMP	RETURN
0568	50	RTN	RETURN

This program will read track zero one record at a time up to 5120 bytes then display main status and axiliary status. The program will continue to the end of tape.

NOTE 1: To change the track, change these loactions

	track 1	track 2	track 3
0502 to	EF91	EF92	EF93
0514 to	EF41	EF42	EF43

COMPLETE DISC SCAN

1340 CPU

MEM ADRS	MACH CDOE	NAME FIELD	COMMENTS
00F4	0000		STARTING HEAD ADD. IN HEX
00F6	0000		STARTING CYL. ADD. IN HEX
0300	04	DIN	DISABLE INERRUPTS
0301	E70383	LDA	LOAD DMA INTERRUPT ADDRESS
0304	F082	STA	STORE DMA INTERRUPT ADDRESS
0306	E707FF	LDA	LOAD STACK POINTER
0309	F08C	STA	STORE STACK POINTER
030B	EF00	LDV=	CLEAR REG
030D	39C7	OBA	CLEAR INTERRUPS
030F	E0F6	LDA	LOAD CYL. ADD. INTO A REG.
0311	693C	RTJ	GO OUTPUT CYL. ADD. TO DISC
0313	90F6	LDB	LOAD CYL. ADD. INTO B REG.
0315	EF00	LDV=	CLEAR A REG
0317	6942	RTJ	GO OUTPUT CYL. ADD. TO 'LP'
0319	E71000	LDA	LOAD MEMORY ADD. FOR DATA
031C	F060	STA	STORE MEMORY ADD.
031E	F862	STA	STORE MEMORY ADD.
0320	E74000	LDA	LOAD BYTE COUNT
0323	F063	STA	STORE STARTING ADD.
0325	E0F4	LDA	LOAD HEAD ADD. INTO A REG.
0327	3967	OBA	SELECT HEAD
0329	EF80	LDV=	LOAD READ COMMAND
032B	3907	OBA	OUTPUT READ COMMAND
032D	694A	RTJ	LOOP TILL DMA INTERRUPT
032F	70F4	IWM	ADD ONE TO HEAD COUNT
0331	3217	IBA	INPUT STATUS
0333	6926	RTJ	GO OUTPUT STATUS TO 'LP'
0335	EF07	LDV=	HIGHEST HEAD ADD. IN HEX
0337	B0F4	SBA	SUB. HEAD COUNT FROM A REG.
0339	1CDE	NAZ	JUMP TO SET DMA IF NOT ZERO
033B	EF00	LDV=	CLEAR A REG.
033D	F0F4	STA	SET HEAD COUNT TO ZERO
033F	EF8A	LDV=	LOAD A REG. WITH 'LF'
0341	390A	OBA	OUTPUT A REG.
0343	693F	RTJ	JUMP TO DELAY
0345	EF8D	LDV=	LOAD A REG. WITH 'CR'
0347	390A	OBA	OUTPUT A REG.
0349	6939	RTJ	JUMP TO DELAY
034B	70F6	IWM	ADD ONE TO CYL COUNT
034D	61BC	JMP	JUMP BACK FOR NEXT CYL.
034F	0000		
0351	3927	OBA	OUTPUT HIGH CYL. ADDRESS
0353	2408	LRA	SHIFT A REG.
0355	3947	OBA	OUTPUT LOW CYL. ADDRESS
0357	6920	RTJ	JUMP FOR DELAY
0359	63F4	JMP	RETURN

COMPLETE DISC SCAN

1340 CPU

MEM ADRS	MACH CDOE	NAME FIELD	COMMENTS
035B	0000		
035D	870004	LDX	LOAD X WITH BYTE COUNT
0360	2A04	ALL	SHIFT 4 POS. OF B TO A
0362	BF0A	SBA	CHECK IF HIGHER THAN 9
0364	1402	JAN	JUMP IF OUT OF RANGE
0366	AF07	ADV=	ADD 7 IF HIGHER THAN 9
0368	AFBA	ADV=	CHANGE TO ASCII CHAR.
036A	390A	OBA	OUTPUT TO PRINTER "LP"
036C	6916	RTJ	JUMP FOR DELAY
036E	45	DCX	DECREMENT BYTE COUNT
036F	1BEF	NXZ	JUMP BACK IF NOT ZERO
0371	EFA0	LDV=	LOAD A REG. WITH SPACE
0373	390A	OBA	OUTPUT A REG TO "LP"
0375	690D	RTJ	JUMP FOR DELAY
0377	63E2	JMP	RETURN
0379	0000		
037B	E7E800	LDA	LOAD DELAY COUNT FOR DMA
037E	48	INA	INCREMENT DELAY COUNT
037F	19FD	NAZ	JUMP BACK IF NOT DONE
0381	63F6	JMP	RETURN
0383	50	RTN	RETURN AFTER DMA INT.
0384	0000		
0386	312A	IBA	LOAD "LP" STATUS
0388	BF05	SBV=	TEST IF GOOD
038A	19FA	NAZ	JUMP BACK IF NOT
038C	63F6	JMP	RETURN

THIS PROGRAM PRINT THE CYLINDER NUMBER AND THE STATUS OF THE DISC AFTER IT READS EACH TRACK. WILL ONLY PRINT ON PARRLE PRINTERS. WILL NOT STOP WHEN IT REACHES THE END OF THE DISC.

NOTE 1: SET 0336 TO 03 FOR 4 HEAD DISC
07 FOR 8 HEAD DISC
0C FOR 12 HEAD DISC

NOTE 2. SET 0374 TO 08 FOR THE P1 PARALLEL PRINTER
036B TO 08 FOR THE P1 PARALLEL PRINTER
0348 TO 08 FOR THE P1 PARALLEL PRINTER
0342 TO 08 FOR THE P1 PARALLEL PRINTER

NOTE 3: SET 00F6 TO STARTING CYLINDER ADDRESS IN HEX.

EXAMPLE: SET 00F6 TO 0040 TO START AT CYLINDER 64.

OUTPUT ON SERIAL PRINTERS

1340 CPU

MEM ADRS	MACH CDOE	NAME FIELD	COMMENTS
00F4	0000		STARTING HEAD ADD. IN HEX
00F6	0000		STARTING CYL. ADD. IN HEX
0300	04	DIN	DISABLE INERRUPTS
0301	E7039E	LDA	LOAD DMA INTERRUPT ADDRESS
0304	F082	STA	STORE DMA INTERRUPT ADDRESS
0306	E707FF	LDA	LOAD STACK POINTER
0309	F08C	STA	STORE STACK POINTER
030B	EF00	LDV=	CLEAR REG
030D	39C7	OBA	CLEAR INTERRUPS
030F	6603A9	JMP	JUMP TO START SERIAL PRT
0312	E0F6	LDA	LOAD CYL. ADD. INTO A REG.
0314	6950	RTJ	GO OUTPUT CYL. ADD. TO DISC
0316	EF02	LDV=	LOAD A WITH START OF TEXT
0318	6942	RTJ	GO OUTPUT A REG
031A	EF0D	LDV=	LOAD A WITH START OF TEXT
031C	693E	RTJ	GO OUTPUT A REG
031E	90F6	LDB	LOAD CYL. ADD. INTO B REG.
0320	6950	RTJ	GO OUTPUT CYL. ADD. TO 'LP'
0322	E71000	LDA	LOAD MEMORY ADD. FOR DATA
0325	F060	STA	STORE MEMORY ADD.
0327	F862	STA	STORE MEMORY ADD.
0329	E74000	LDA	LOAD BYTE COUNT
032C	F063	STA	STORE STARTING ADD.
032E	E0F4	LDA	LOAD HEAD ADD. INTO A REG.
0330	3967	OBA	SELECT HEAD
0332	EF80	LDV=	LOAD READ COMMAND
0334	3907	OBA	OUTPUT READ COMMAND
0336	695C	RTJ	LOOP TILL DMA INTERRUPT
0338	70F4	IWM	ADD ONE TO HEAD COUNT
033A	3217	IBA	INPUT STATUS
033C	6934	RTJ	GO OUTPUT STATUS TO 'LP'
033E	EF07	LDV=	HIGHEST HEAD ADD. IN HEX
0340	B0F4	SBA	SUB. HEAD COUNT FROM A REG.
0342	1CDE	NAZ	JUMP TO SET DMA IF NOT ZERO
0344	EF00	LDV=	CLEAR A REG.
0346	F0F4	STA	SET HEAD COUNT TO ZERO
0348	EF8A	LDV=	LOAD A REG. WITH 'LF'
034A	6910	RTJ	JUMP TO DELAY
034C	EF8D	LDV=	LOAD A REG. WITH 'CR'
034E	690C	RTJ	JUMP TO DELAY
0350	EF04	LDV=	LOAD A WITH END OF TEXT
0352	6908	RTJ	GO OUTPUT A REG
0354	EF04	LDV=	LOAD A WITH END OF TEXT
0556	6904	RTJ	GO OUTPUT A REG
0358	70F6	IWM	ADD ONE TO CYL COUNT
035A	61B6	JMP	JUMP BACK FOR NEXT CYL.

COMPLETE DISC SCAN

OUTPUT ON SERIAL PRINTERS

1340 CPU

MEM ADRS	MAC CODE	NAME FIELD	COMMENTS
035C	0000		
035E	3920	OBA	OUTPUT A TO SERIAL PRT
0360	3900	OBA	OUTPUT TO TERMINAL ZERO
0362	693B	RTY	JUMP TO PRT DELAY
0364	63F6	JMP	RETURN
0366	0000		
0368	3927	OBA	OUTPUT HIGH CYL. ADDRESS
036A	2408	LRA	SHIFT A REG.
036C	3947	OBA	OUTPUT LOW CLY. ADDRESS
036E	6924	RTJ	JUMP FOR DELAY
0370	63F4	JMP	RETURN
0372	0000		
0374	870004	LDX	LOAD X WITH BYTE COUNT
0377	2A04	ALL	SHIFT 4 POS. OF B TO A
0379	BF0A	SBA	CHECK IF HIGHER THAN 9
037B	1402	JAN	JUMP IF OUT OF RANGE
037D	AF07	ADV=	ADD 7 IF HIGHER THAN 9
037F	AFBA	ADV=	CHANGE TO ASCII CHAR.
0381	3920	OBA	OUTPUT TO PRINTER "LP"
0383	3900	OBA	OUTPUT TO TERMINAL ZERO
0385	6918	RTJ	JUMP TO PRT DELAY
0387	45	DCX	DECREMENT BYTE COUNT
0388	1BED	NXZ	JUMP BACK IF NOT ZERO
038A	EFA0	LDV=	LOAD A REG. WITH SPACE
038C	3920	OBA	OUTPUT A REG TO "LP"
038E	3900	OBA	OUTPUT TO TERMINAL ZERO
0390	690D	RTJ	JUMP TO PRT DELAY
0392	63DE	JMP	RETURN
0394	0000		
0396	E7E800	LDA	LOAD DELAY COUNT FOR DMA
0399	48	INA	INCREMENT DELAY COUNT
039A	19FD	NAZ	JUMP BACK IF NOT DONE
039C	63F6	JMP	RETURN
039E	50	RTN	RETURN AFTER DMA INT.

COMPLETE DISC SCAN

OUTPUT ON SERIAL PRINTERS

1340 CPU

MEM ADRS	MACH CODE	NAME FIELD	COMMENTS
039F	0000		
03A1	27FA00	LDA	LOAD DELAY COUNT FOR PRT
03A4	48	INA	INCREMENT DELAY COUNT
03A5	19FD	NAZ	JUMP BACK IF NOT DONE
03A7	63F6	JMP	RETURN
03A9	EF01	LVD=	LOAD STATUS REQ. TO PRT.
03AB	69AF	RTJ	GO OUTPUT STATUS REQ.
03AD	EF20	LVD=	
03AF	69AB	RTJ	
03B1	EF20	LVD=	
03B3	69A7	RTJ	
03B5	EF02	LVD=	
03B7	69A3	RTJ	
03B9	660312	JMP	GO START DISC SCAN

THIS PROGRAM PRINT THE CYLINDER NUMBER AND THE STATUS OF THE DISC AFTER IT READS EACH TRACK. WILL ONLY PRINT ON SERIAL PRINTERS. WILL NOT STOP WHEN IT REACHES THE END OF THE DISC.

NOTE 1: SET 033F TO 03 FOR 4 HEAD DISC
07 FOR 8 HEAD DISC
0C FOR 12 HEAD DISC

THE PROGRAM PRINT TO THE SERIAL PRINTER ON THE ACCESSORY BOARD. CHANGE THE FOLLOWING FOR PORTS ON THE 4/8 WAY.

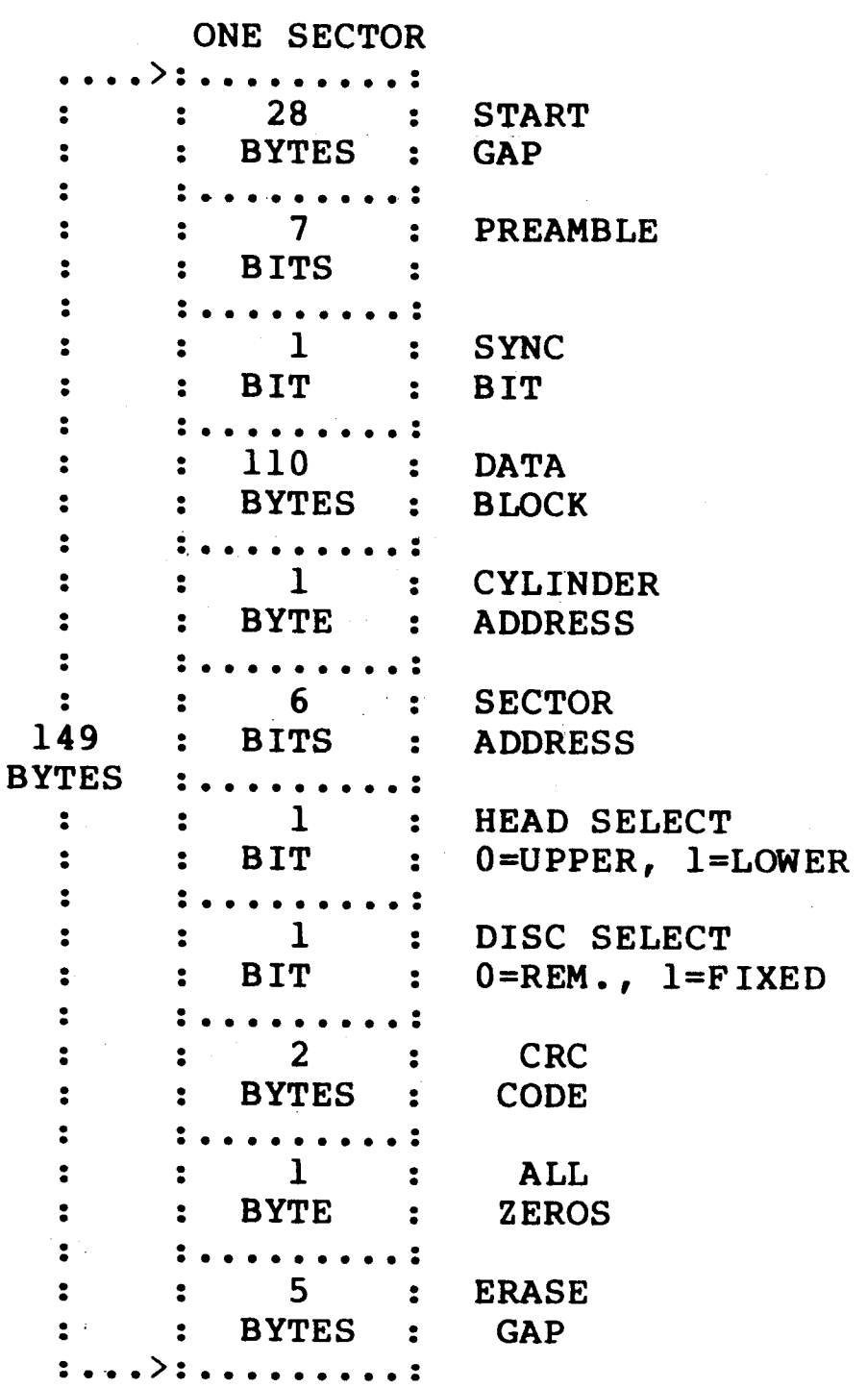
NOTE 2: SET 035F TO 1B IF PRINTER ON 1ST PORT OF 4/8 WAY
0382 TO 1B IF PRINTER ON 1ST PORT OF 4/8 WAY
038D TO 1B IF PRINTER ON 1ST PORT OF 4/8 WAY

(3B FOR 2nd PORT) (5B FOR 3rd PORT) (7B FOR 4th PORT) etc.

NOTE 3: SET 00F6 TO STARTING CYLINDER ADDRESS IN HEX.

EXAMPLE: SET 00F6 TO 0040 TO START AT CYLINDER 64.

BB1 SECTOR FORMAT



B B I STATEMENT FORMATS

STATEMENT	DESCRIPTION / EXAMPLE
CONSOLE MODE OPERATIONS	
ESCAPE	PROGRAM MODE ONLY RETURNS VDT TO PROG. MODE.
RELEASE	CLOSES ALL FILES & DEVICES ENABLES DISCS, RELEASES CORE.
NEW	NEW 20,9 ASSIGNES 20 PROGRAM AND 9 DATA PAGES TO VDT. CLEARS USER AREA CLOSES FILES & DEVICES SETS PRECISSION 2.
LOAD	LOAD "AABBCC"
RUN	RUN RUNS PROG. IN CORE. RUN"AABBCC" LOADS PROG. AABBCC AND RUNS.
BACKGROUND	PUTS TASK FROM FORGROUND TO BACKGROUND OR FROM BACKGROUND TO FORGROUND
B-RUN	B-RUN "AABBCC" TASK IS SWITCHED FROM FORGROUND TO BACKGROUND THEN THE PROG. IS LOADED AND RUN.
EDIT	EDIT STNO ("DIRECTIVE") (,C[COPY])(,D[DELETE])(,R[REPLACE])(,[ADD]).
REM AND !	100 REM " TEST PROG" 150 ! "IF E8=2 THE RECORDS ARE OUT OF ORDER" USED FOR INSERTING A COMM- ENT IN THE PROGRAM.
DELETE	DELETE 150..DELETE 150,160 DELETES STATEMENT 150 OR 150 THROUGH 160.
LIST	LIST (N(,ERR=ERRSTNO.)) (STNOA)(,)(STNOB)

MERGE	MERGE (1,ERR=100) MERGES A LISTED PROG. FROM DISC WITH A PROG. IN CORE.
SETTRACE	SETTRACE[(N)] N = THE NO. OF THE FILE OR DEVICE TO RECORD THE STATEMENTS.
ENDTRACE	TERMINATES THE LISTING OF STATEMENTS BEING EXECUTED IN THE SETTRACE MODE

DATA HANDLING OPERATIONS

LET	LET A= 1234 LET A$=B$
DIM	DIMA(3) DIMA$(110) DIMA$(110,"C")
PRECISION	PRECISISON 2
FLOATING POINT	MAINTAINS 14 DIGIT ACCURACY. NUMBERS WILL BE PRINTED IN FLOATING POINT NOTATION UNLESS MASKED.
IF	IF X=1 AND (Y=10 OR Z=3) GO TO 425

DATA HANDLING FUNCTIONS

DEF FNX	10 DEF FNA (A$,B$)=B$+"," +A$
ABS	ABS(12) ABS (-12) BOTH EXAMPLES RETURN THE VALUE 12
INT	INT(25.50) RETURNS THE VALUE 25
SGN	SGN(-6.2) RETURNS THE VAL. -1, SGN(0) RETURNS VALUE 0 , SGN(10) RETURNS +1.
FPT	FPT(25.50) RETURNS THE VALUE .50.

EPT	X=EXP(55.2), ASSIGNS X=2 SINCE 55.2= .552*10↑2.
LEN	PRINTLEN(A$) RETURNS THE NUMERIC VALUE INDICATING NUMBER OF CHARACTERS IN A$
POS	A$="ABCDEFGH" POS("DEF",A$) RETURNS THE VALUE 4.
NUM	IF A$= A NUMERIC VALUE B=NUM(A$) RETURNS THE VAL. OF A$ TO B
STR	STR(X) PROVIDES THE STRING VALUE OF X.
ASC	ASC("A") RETURNS THE ASCII VALUE OF THE CHARACTER "A" WHICH IS 193.
CHR	CHR(193) RETURNS THE VAL. OF "A".

SYSTEM DATA ACCESS FUNCTION

KEY	A$=KEY(1,ERR=100,END=50)
CRC	CRC("ABCD") RETURNS THE CRC OF STRING "ABCD" A$=CRC(B$),A=ASC(A$(1,1)* 256+ASC(A$(2))

SYSTEM VARIABLES

PSZ	PRINT PSZ
DSZ	PRINT DSZ
DAY	8 BYTE VARIABLE USED TO STORE DAY,MONTH & YEAR. 10/25/72 SET WITH SETDAY DIRECTIVE.
TIM	(TIME OF DAY) CONTINUALLY UPDATED BY BOSS & SET WITH SETTIME DIRECTIVE.

TASK VARIABLES

ERR	READ(1,ERR=100)A$	
CTL	PRINT CTL	
	CR & LF	CTL 0
	I OR SHIFT CTL L	CTL 1
	II OR SHIFT CTL M	CTL 2
	111 OR SHIFT CTL N	CTL 3
	IV OR SHIFT CTL O	CTL 4
BKG	BACKGROUND TASK VARIABLE.	

SYSTEM DIRECTIVES

SETDAY	SETDAY"01/01/73"
SETTIME	SETTIME H+M/60+S/3600

INPUT OUTPUT OPERATIONS.

OPEN	OPEN(1,ERR=100)"AA"
CLOSE	CLOSE(1,ERR=100) CLOSE(1,IND=0) MAG TAPE
READ	READ(1,IND=A$,ERR=10,END= 100)B$,C$
WRITE	WRITE(1,IND=A$,ERR=10,END= 100)A$,B$.
INPUT	INPUT@(5,7),"PRICE ",P
PRINT	PRINT(1)@(25),A:A$ A$="+##,##0.00"
READUSING	READUSING TBL STNO (DEV NO [,IND=EXP][,ERR=STNO][,EN =STNO]) LIST OF VARIABLE
WRITEUSING	WRITEUSING TBL STNO(DEV NO ,IND = EXP [,ERR=STNO][, END= STNO]) LIST OF VAR.
TABLE	HEX CONVERSION MASK AND HEX CONVERSION TABLE.

DISC OPERATIONS

SAVE	SAVE"AA" SAVE"AA",3300,0,100

ERASE	ERASE"AA"
SEQUENTIAL	SEQUENTIAL"AA",1000,110,0 ,15000,ERR=100.
DIRECT	DIRECT"AA",7,500,110,0, 1000,ERR=50
EXTRACT	EXTRACT(1,IND=A$,ERR=100, END=200)B$,C$
REKEY	REKEY(1,IND=A$) REKEY(1,IND=A$)B$
GET	GET0,15000,A$
PUT	PUT0,1500,ERR=100,A$,B$

PROGRAM CONTROL OPERATIONS

RESET	LOW LEVEL SYSTEM RESET RESETS ERR & CTL, GOSUB & FOR/NEXT LOOPS. SETS PRECISION 2.
CLEAR	SAME AS RESET PLUS IT CLEARS USERS DATA AREA.
BEGIN	HIGHEST LEVEL SYSTEM RESET
STOP	TERMINATES PROG. & RESETS
END	END
GOTO	GOTO100
ON/GOTO	100 ON A GOTO 200,300,400
GOSUB	GOSUB100
RETURN	RETURN
FOR	FORA=1TO1000STEP10
NEXT	NEXTA

BBI PACK FORMAT

SECTOR NO.	ENTRY
0-1	BOSS SYSTEM LOADER
2-9	CONCORDANCE
10-95	FILE DIRECTORY
96-480	BOSS SYSTEM
480-4799	UTILITIES, SERVICE DIAGNOSTICS AND RESERVED AREA
4800-19199	UNUSED

USER DATA PACK

0-9	CONCORDANCE
10-95	FILE DIRECTORY
96-19199	USER DATA

FILE DIRECTORY ENTRY (BB1)

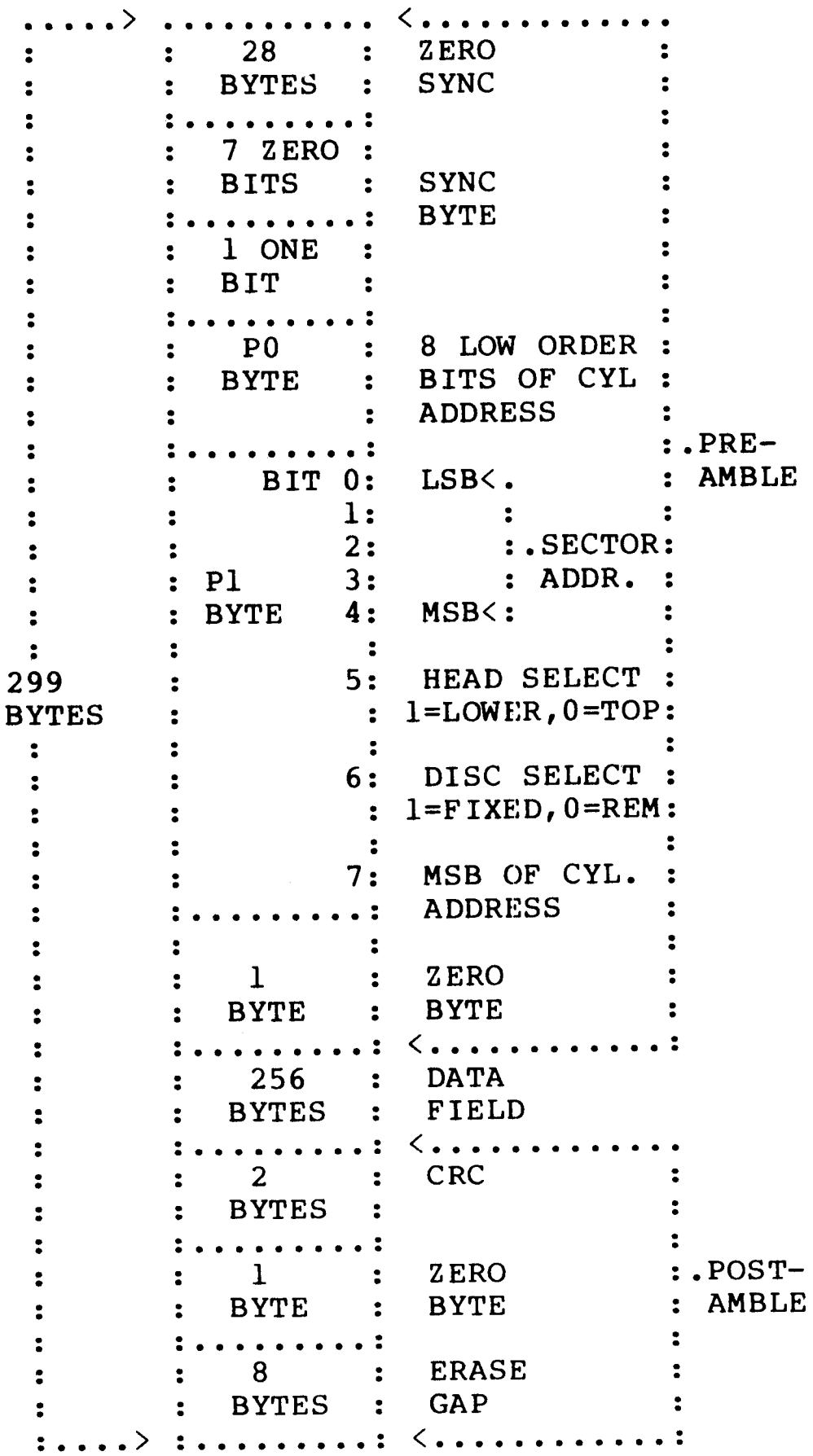
	BYTE LOCATION
FILE NAME	1
	2
ACCESS PASSWORD	3
	4
PROTECT PASSWORD	5
	6
STATUS	7
RESERVED AREA	8
KEY SIZE : DISC #	9
NUMBER OF RECORDS	10
	11
SECTORS PER RECORD	12
STARTING FILE	13
LOCATION	14
FIRST (NEXT) DATA	15
RECORD LOCATION	16

KEY ENTRY

DATA RECORD PTR
2 BYTES
FORWARD LINK
2 BYTES
BACKWARD LINK
2 BYTES
RECORD KEY
7-49 CHARACTERS

$$\text{REL SECTOR (DEC)} = \frac{\text{LINK (DEC)}}{8} - 1$$

B B 2 SECTOR FORMAT



BBII STATEMENT FORMATS

STATEMENT	DESCRIPTION/EXAMPLE
RELEASE	RELEASES ALLOCATION OF DATA & PROG AREA FOR TASK
NEW [N]	N=N0 OF PAGES DATA & PROG
LOAD "N"	N= FILE IDENT
RUN "N"	N= FILE IDENT
BACKGROUND	MOVES CURRENT TASK TO BACKGROUND AREA
B-RUN "N"	RUNS TASK N IN BACKGROUND
EDIT	EDIT100C[P],D[Q],R[S],[T] COPY,DELETE,REPLACE,ADD
DELETE	DELETE100,200 (DELETES FM STNO 100 TO STN0 200)
LIST	LIST(1,ERR=P,TBL=Q,)10,20
MERGE	MERGE(1,ERR=P,TBL=Q)
SETTRACE	SETTRACE (1) [PRNTS OUT ON DEVICE 1]
ENDTRACE	ENDS SETTRACE

DATA HANDLING OPERATIONS

LET	LETA=10,B$="AD",V(1,1)=2
DIM	DIMA$(256,"A")
PRECISION	PRECISION 14 [ARITH ROUNDING TO 14 PL. AFTER DEC.)
FLOATING POINT	CHANGES NOTATION TO E.G. 5 BECOMES .5E+01

LOGICAL OPERATIONS

IF	IFX=1GOTO100
	IFY<5PRINT(1)"W"
	IFY$="R"ANDX=90ESCAPE
	IFA$(1,1)="D"ORC=1STOP

DATA HANDLING FUNCTIONS

INT	Y=INT(1.6),,ASSIGNS Y=1
SGN	Y=SGN(X),,Y=0 OR -1 IF X IS POS OR NEG NO.
FPT	Y=FPT(1.7),,ASSIGNS Y=.7
EPT	X=EPT(55.2),,ASSIGNS X=2 (SINCE 55.2=.55*10©2)
POS	PRINT POS("5"=<A$) IFA$="ABCDEFG" PRINTS 5
NUM	X=NUM(A$),,X=12 IFA$="12"
STR	A$=STR(A),,A$="23" IFA=23
ASC	X=ASC("A") ,,X=193
CHR	A$=CHR(194),,A$="B"

CPL	B$=CPL(A$),,REV.OF LIST
LST	A$=LST(B$)
ABS	X=ABS(-6) ASSIGNS 6 TO X
LEN	X=LEN("ABC") X=3
FNX	DEF FNA(A$,B$)=B$+", ",+A$ X$="JOHN",Y$="DOE" PRINTFNA(X$,Y$) RETURNS DOE, JOHN

SYSTEM DATA ACCESS FUNCTIONS

FID	FID(1) RETURNS DEVICE NAME ASSIGNED TO (1)
KEY	PRINTKEY(1) RETURNS NEXT SEQ. KEY OF DIR. FILE (1)
IND	PRINTIND(1) RETURNS NEXT INDEX VALUE ON INDEXED FILES, RETURNS NEXT RECORD TO BE READ ON DIRECT FILES

SYSTEM VARIABLES

PSZ	PRINTPSZ RETURNS SIZE OF USER PROGRAM.
DSZ	PRINT DSZ RETURNS UNUSED CORE IN USER TASK AREA.
DAY	8 BYTE VARIABLE USED TO STORE DAY,MONTH & YEAR. 10/25/72 SET WITH SETDAY DIRECTIVE.
TIM	(TIME OF DAY) CONTINUALLY UPDATED BY BOSS & SET WITH SETTIME DIRECTIVE.

TASK VARIABLES

ERR	STORES THE ERROR NO. WHEN AN ERROR IS DETECTED IF USED IN THE STATEMENT.
CTL	PRINTCTL RETURNS A NO. FROM 0 TO 4 DEPENDING ON TYPE OF TERMINATOR USED ON THE INPUT STATEMENT.
BKG	INDICATES STATUS OF BACKGROUND TASK.

SYSTEM DIRECTIVES.

SETDAY	SETDAY"01/01/73"
SETTIME	SETTIME H+M/60+S/3600

DISC OPERATIONS.

INDEXED	INDEXED "AB",100,256,0,350
PROGRAM	PROGRAM "AA";2000,1,1000
DIRECT	DIRECT"AA",5,500,300,2,105
SORT	SORT "AA",15,100,1,350 (KEYS ONLY FILE)
SAVE	SAVE "AA",3000,0,100 SAVE "AA"
ERASE	ERASE "AA"
DISABLE	DISABLE 0
ENABLE	ENABLE 0
GET	GET D,S,ERR=1000,A$,B$
PUT	PUT D,S,ERR=1000,A$,B$

INPUT/OUTPUT OPERATIONS.

OPEN	OPEN(1)"LP"
CLOSE	CLOSE(1)
LOCK	LOCK(1) PREVENTS OTHER USERS FROM USING THE FILE
UNLOCK	UNLOCK(1)

INPUT/OUTPUT OPTIONS.

DOM	CONTAINS STNO. JUMPED TO IF A DUPLICATE OR MISSING KEY EXISTS.
END	CONTAINS STNO. JUMPED TO IF OPERATION IS OUTSIDE PARAMETERS OF FILE.
IND	NUMERIC EXPRESSION THAT INDICATES POSITION OF RECORD IN A FILE.
IOL	CONTAINS STNO. OF IOLIST STATEMENT. 0100 IOLIST A$,B$, IOL=200 0200 IOLIST C$,D$.
KEY	CONTAINS THE KEY VALUE OF A DIRECT OR SORT FILE.
SIZ	NUMERIC VARIABLE DENOTING THE SIZE OF A RECORD TO BE WRITTEN TO MAG. TAPE.

TBL	CONTAINS THE STNO. OF A TABLE.
IOLIST	10 IOLIST A$,B$,IOL=200 200 IOLIST C$,D$,E.
TABLE	TABLE 7F 00 01 02 03....0D 7F IS A MASK BYTE.

OUTPUT DIRECTIVES.

PRINT	PRINT(1)@(1),A$:"#,##0.00"
WRITE	WRITE(1,DOM=10,END=20,ERR=30,KEY=A$)A$,B$,C$ WRITE(1,IND=A)A$,B$
WRITERECORD	WRITERECORD(1,KEY=A$)B$
PUT	PUT0,1000,A$ CAN BE USED ON AN AREA OF DISC WHICH HAS BEEN LOCKED OR IF THE DISC IS DISABLED.

INPUT DIRECTIVES.

INPUT	10 INPUT @(10,3),"PRICE",A INPUT A$:(LEN=1,6) INPUT A$:("L"=100,"N"=200)
READ	READ(1,IND="12")A$ READ(1,KEY=A$)B$
EXTRACT	EXTRACT(1,KEY=A$)A$,B$
READRECORD	READRECORD(1,KEY=A$)B$ READS COMPLETE RECORD INTO VARIABLE B$.
FIND	SAME AS READ EXCEPT IT DOES NOT UPDATE FILE INDEX TO NEXT HIGHEST KEY WHEN KEY NOT FOUND.
GET	GET(N[,ERR=ERRSTNO]) REL. SEC. IN FILE,INPUT VAR.
REMOVE	REMOVE(1,KEY=A$)

PROGRAM INITIALIZATION & TERMINATION.

RESET	RESET
CLEAR	CLEAR
BEGIN	BEGIN
STOP	STOP
END	END

PROGRAM SEQUENCE CONTROL.

GOTO	GOTO 120
ON/GOTO	ON A GOTO 100,200,300
GOSUB	GOSUB 1000 PROG EXECUTES STNO 1000 NEXT.
RETURN	PROG. RETURNS FROM SUB-ROUTINE & EXECUTES NEXT STNO.
FOR	10 FOR A=0TO10STEP2
NEXT	NEXTA USED IN CONJUNCTION WITH FOR STATEMENT.
SETERR	100 SETERR 500 CAUSES PROGRAM TO BRANCH TO STNO 500 IF AN ERROR OCCURRS WHEN EXECUTING A STATEMENT AN ERROR EXIT OVERIDES THE SETERR OPTION.
RETRY	100 RETRY CAUSES SYSTEM TO BRANCH BACK TO ORIGINAL STATEMENT WHERE ERROR OCCURRED.
RESERVE	RESERVE 0 RESERVES DISC FOR ONLY THE TASK THAT RESERVED IT.
EXITTO	SAME AS 'GOTO' EXCEPT THAT FOR/NEXT & GOSUB LOOPS ARE RESET.

BINARY FUNCTIONS (IF CONFIGURED)

BIN	X$=BIN(50,2);X$ IS 0032
DEC	X =DEC(64);X IS 100
HTA	A$=HTA("ABC");A$ IS"C1C2C3"
ATH	A$=ATH("B0B1B2");A$ IS"012"
GAP	GENERATES ASCII PARITY
LRC	COMPUTE LRC CHECK CHAR. A$=LRC($1C4D27$);A$ IS 76
MOD(X,Y)	COMPUTES REMAINDER OF X/Y X=MOD(26,7);X IS 5

BB2 PACK FORMAT

SYSTEM PACK (LEVEL 1)

SECTOR NO.	ENTRY
0	BOOTSTRAP
1-23	DICTIONARY
24-191	SYSTEM
192-1999	UTILITIES AND DIAG.
2000-4999	GAMES (IF CONFIGURED)
5000-19487	AVAILABLE

USER PACK (LEVEL 1)

SECTOR NO.	ENTRY
0	NOT USED
1-23	DICTIONARY
24-19487	USER DATA

SYSTEM PACK (LEVEL 2)

SECTOR NO.	ENTRY
0	BOOTSTRAP
1-47	DICTIONARY
48-71	LOADER
72-239	SYSTEM
240-499	M/C LANG. DIAG.
500-XXXX	UTILITIES, GAMES ETC.
XXXX-19487	AVAILABLE

USER PACK (LEVEL 2)

SECTOR NO.	ENTRY
0	NOT USED
1-XXX	DICTIONARY
XXX-19487	USER DATA

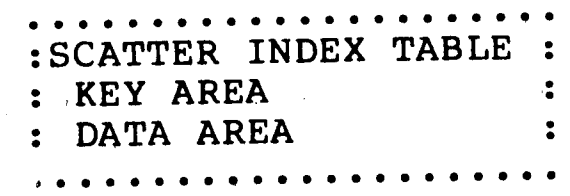
(XXX = AS REQUIRED FOR NO. OF FILES)

BB2 PACK FORMAT

SECTOR 1 OF LEVEL 2 PACK

BYTE	SYSTEM USE
****	**********
1	FE
2-6	NOT USED
7	02
8	15
9-10	NUMBER OF FILES DEFINED
11-12	0000
13-14	0002
15-16	LAST SECTOR OF DICTIONARY + 1
17-32	$DEAADEAADEAA00004C08010000184C20$
33-240	UNUSED
241-256	16 BYTES OF FF

RECT FILE FORMAT



SCATTER INDEX TABLE

0-1	2-3	4-5	6-7
REM CHAIN PTR	NEXT AVAIL PTR	PTR TO LOWEST KEY	NO OF RECORDS IN USE	SCATTER INDEX TABLE

KEY AREA

KEY	FWD KEY POINTER	DUPLICATE SCATTER INDEX POINTER

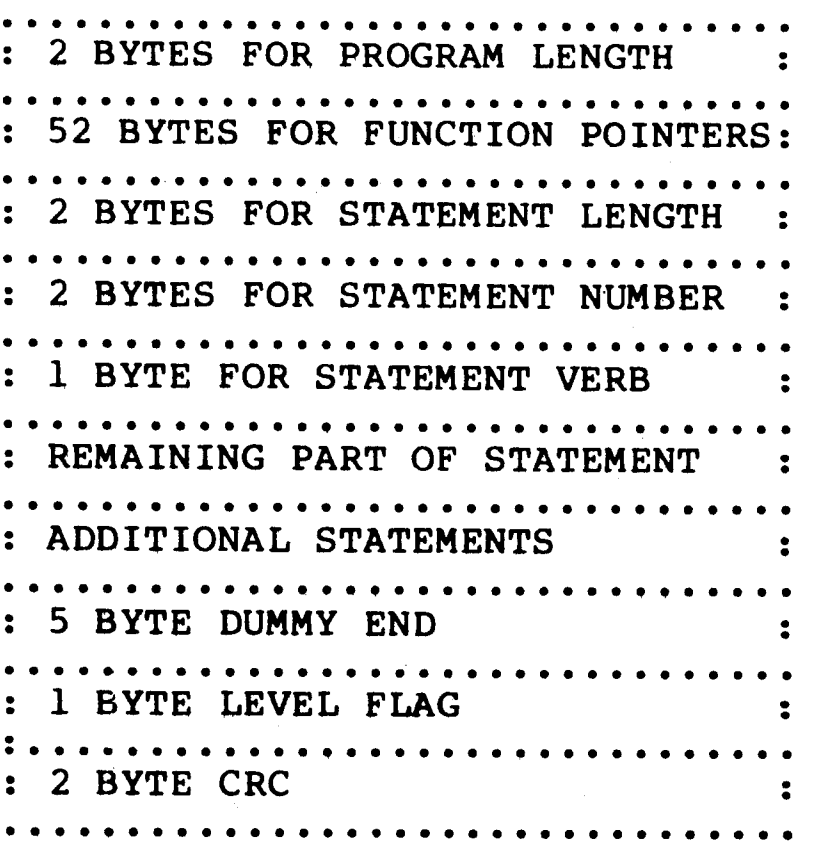
DISK DIRECTORY ENTRY (LEVEL 1 ONLY)

	BYTE LOCATION
FILE NAME	1
	2
	3
	4
	5
	6
FILE TYPE	7
KEY SIZE	8
NUMBER OF RECORDS	9
	10
NO OF BYTES PER RECORD	11
	12
STARTING FILE LOCATION	13
	14
LAST SECTOR OF FILE + 1	15
	16

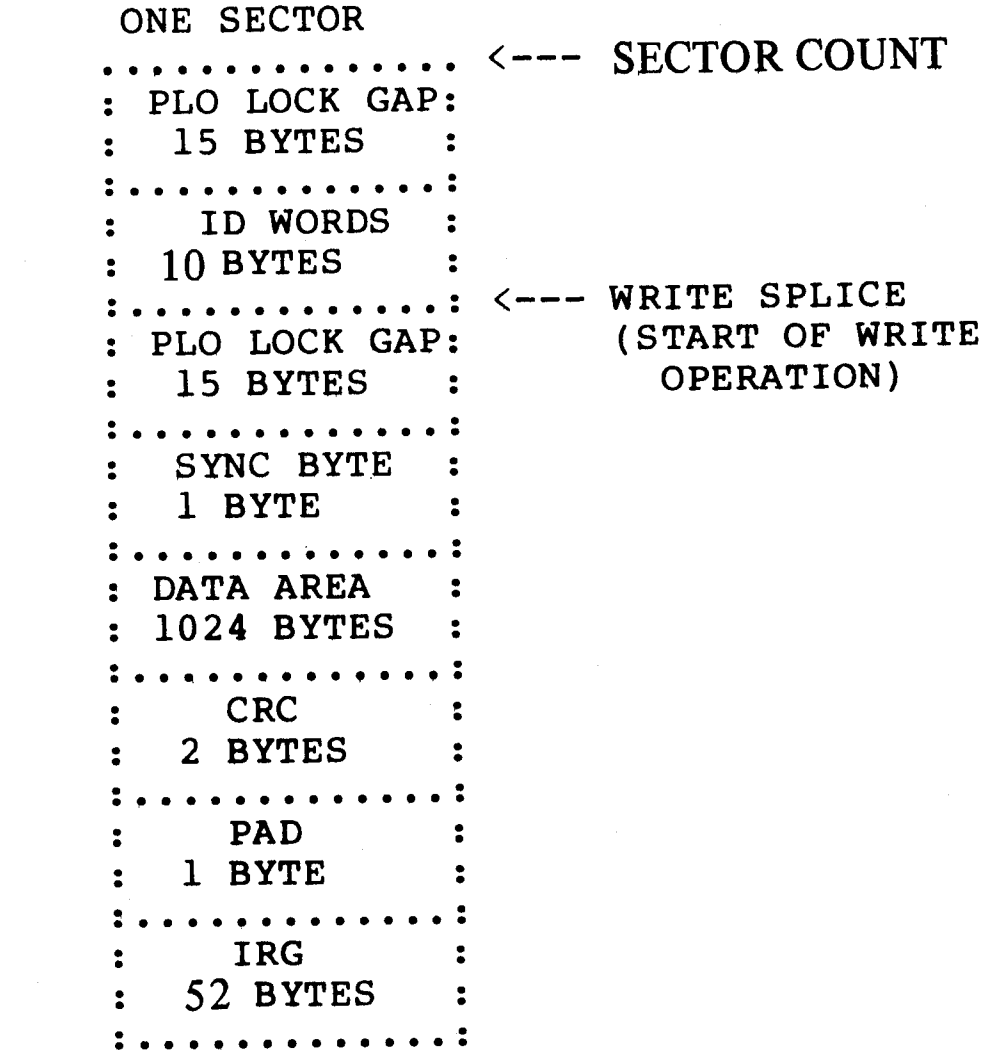
DISK DIRECTORY ENTRY
(LEVEL 2 ONLY)

	BYTE LOCATION
STARTING SECTOR OF FILE	1 2
	3
	4
FILE NAME	5
	6
	7
	8
FILE TYPE	9
KEY SIZE	10
NUMBER OF RECORDS	11 12
BYTES PER RECORD	13 14
LAST SECTOR OF FILE + 1	15 16
RESERVED	17
FORWARD KEY POINTER	18 19
DUPLICATE SCATTER INDEX POINTER	20 21

PROGRAM FORMAT (BB1 & BB2)



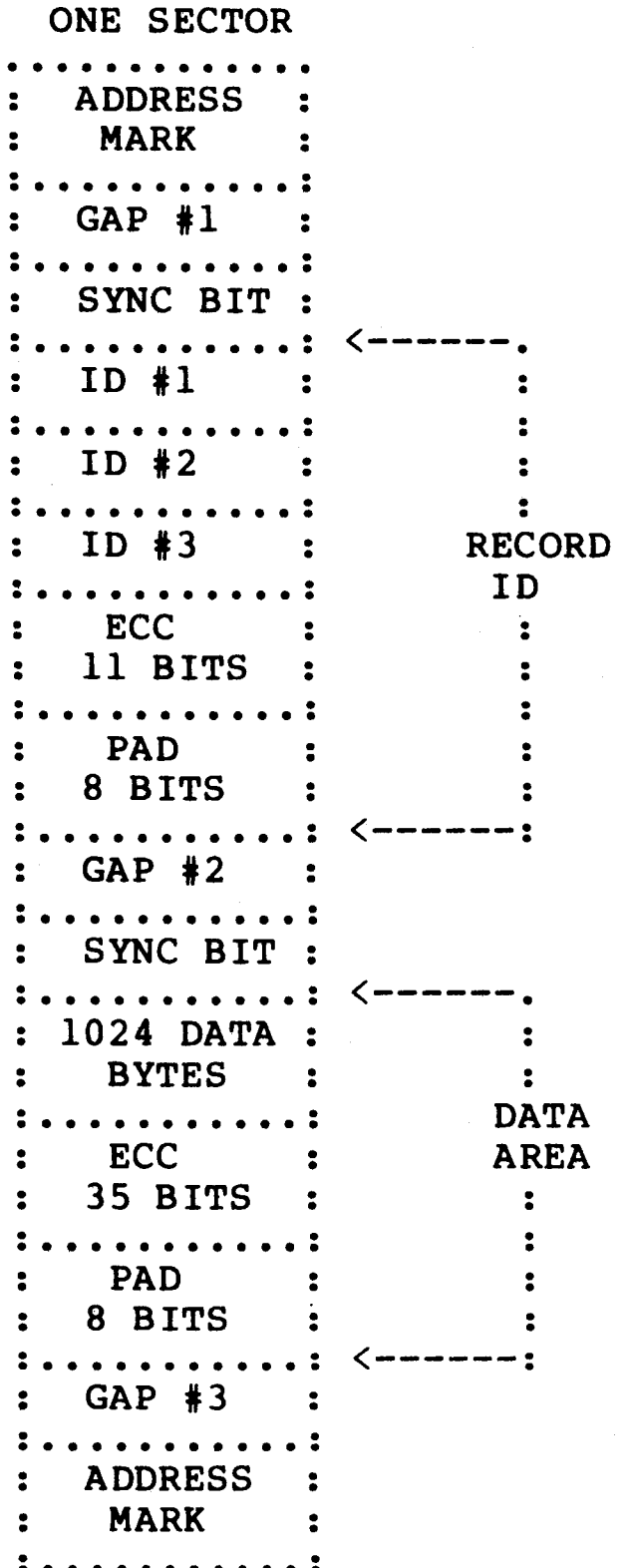
BB3 SECTOR FORMAT (200 SYSTEM)



ID WORD FORMAT

BYTE 0 - SYNC BYTE	BYTE 5 - HIGH ALT. CYLINDER
BYTE 1 - SECTOR NUMBER	BYTE 6 - LOW ALT. CYLINDER
BYTE 2 - HEAD NUMBER	BYTE 7 - HIGH CRC
BYTE 3 - HIGH CYLINDER	BYTE 8 - LOW CRC
BYTE 4 - LOW CYLINDER	BYTE 9 - PAD

BB3 SECTOR FORMAT (700 SYSTEM)



BITS

15 . . . . . 8 0

```
ID #1   0 R R R R R R R F F 0 0 F F F F
          RECORD NUMBER         FLAGS
ID #2   C C C C C C C C 0 C C 0 0 H H H
          CYLINDER                HEAD
ID #3   C C C C C C C C 0 C C 0 0 H H H
          ALT. CYLINDER          ALT HEAD
```

THE FOLLOWING IS THE SECTOR USAGE FOR SYSTEMS SUPPORTED UNDER LEVEL 5

200 SYSTEM	START	SEC/#	SECS
BOOTSTRAP		0	1
HEADER		1	1
LOADER		2	5
DIRECTORY & FILES		7	10937
700 SYSTEM			
BOOTSTRAP		0	1
HEADER		1	1
LOADER (BOSS PACKS ONLY)		2	5
DIRECTORY & FILES (BOSS PACKS)		7	72706
DIRECTORY & FILES (DATA PACKS)		2	72711
HSA = 72719			
610 SYSTEM			
BOOTSTRAP		0	1
HEADER		1	1
LOADER (BOSS PACKS ONLY		2	5
DIRECOTRY & FILES (BOSS PACKS)		7	34193
DIRECTORY & FILES (DATA PACKS)		2	34198
HSA = 34199			

HEADER

BYTES	DESCRIPTION
1-3	FIRST DIRECTORY SECTOR(2 OR 7)
4-9	NAME OF DISK PACK(USER SPEC.)
10	TYPE (0A FOR DIRECTORY)
11	KEYSIZE (24 FOR DIRECTORY)
12-14	NUMBER OF RECORDS(USER SPEC)
15-16	RESERVED
17-19	LAST DIRECTORY SECTOR+1
20	LEVEL NUMBER
21-22	DUMMY (FORWARD POINTER=0)
23-24	DUMMY (DUP SIT POINTER=0)

REMAINDER OF SECTOR 1 MAY BE USED BY THE DISK LABEL UTILITIES

DISK DIRECTORY ENTRY

1-3	STARTING SECTOR
4-9	NAME (PADDED WITH NULLS)
10	TYPE (BITS 0-3) 0=INDEXED ;1=SERIAL 2=DIRECT OR SORT ; 4=PROGRAM
11	KEYSIZE
12-14	NUMBER OF RECORDS
15-16	RECORD(OR PROGRAM) SIZE
17-19	END SECTOR + 1
20	RESERVED
21-22	FORWARD KEY POINTER(POINTS TO NEXT KEY SORTED ON STARTING SEC)

NOTE THE DISK DIRECTORY LOOKS LIKE A SORT FILE,EXCEPT ONLY THE NAME FIELD IS USED TO COMPUTE SIT VALUE ,RATHER THAN WHOLE KEY.

SERIAL FILE HEADER

1-3	NEXT AVAILABLE INDEX
4-7	# OF BYTES IN FILE + HEADER
8-9	0000
10	"S"= CODE CHECK
11	01=LEVEL #

RESERVED FOR BB3 FILE INFORMATION

THE FOLLOWING ARE IN ADDITION TO ,OR
REDEFINE CODES AVAILABLE UNDER BB2(SEC 6)

STATEMENT	DESCRIPTION/EXAMPLE
START	STARTX,ERR=,BNK=,"Y","Z" X=NO OF PAGES,ERR=STNO Y=PROGRAM ID,OR "" Z=TASK ID,T0-TF,OR G0-G3 BNK=BANK NO(IF NOT SPEC ALLOTS IN ORDER 3,2,1
IF/ELSE	IF(LOG EXP)STNO ELSE STNO MAY BE NESTED,ELSE REFERS TO MOST RECENT IF
EXECUTE	STNO EXECUTE STR-ARGUMENT 0010A$="PRINTERR" 0020EXECUTE"0050+A$" WILL ADD OR OVERLAY STNO 50 0050 PRINTERR IF NO STNO,PRINTERR WILL BE EXECUTED IN CONSOLE MODE
ERR	ON ERR(11,12,47)GOTO10,20,30
RELEASE	RELEASE(TO-TF OR G0-G3) CLOSES FILES AND FREES MEMORY
SETESC	PERMITS ESC KEY PROGRAMMING 0010 SETESC 9000 ESC KEY CAUSES GOSUB TO 9000
WAIT	0010 WAIT X SUSPEND TASK FOR X SECONDS
SERIAL	SERIAL"NAME",AV RECORDS , AV REC SIZE, DISK,SECTOR
BLK=	OPEN(1,BLK=X)"NAME" X=MAX BUFFER SIZE
ISZ=	OPEN(1,ISZ=X)"NAME" X=RECORD SIZE
TIM	0010INPUT(0,TIM=30)A$ ERROR 00 AFTER 30 SECS
IOR	A$=IOR($0F$,$DC$)=$DF$
XOR	A$=XOR($0F$,$DC$)=$D3$
AND	A$=AND($0F$,$DC$)=$0C$
NOT	A$=NOT($DC$)=$23$
HSA	HSA(0) PRINT HIGHEST USER SECTOR ADDRESS OF DISK 0
SSZ	SSZ(0) RETURNS SECTOR SIZE
FID	FID(X) RETURNS DEVICE NO. OR 20 BYTES OF FILE INFO
SSN	RETURNS 9 BYTES SYSTEM-SERIAL#
FILE	FILEA$ DEFINE FILE WITH INFO IN A$

PUBLIC PROGRAMMING

CALL	CALL"ID",ERR= ,ARG. LIST ONE OR MORE VARIABLES OR EXPRESSOINS,SEP BY COMMA
EXIT	RETURN FROM CALLED PROG
ENTER	ENTER VARIABLE-LIST USED IN CALLED PROG TO DEFINE VARIABLES.WHICH CORRESPOND POSITIONALLY TO THE CALL VAR. LIST
ADD	ADD"ID",ERR=,BNK= PROG IS LOADED WHEN CALLED
ADDR	ADDR"ID",ERR=,BNK= PROG WILL BE RESIDENT
DROP	DROP"ID",ERR= REMOVES AN ADDED PROGRAM

MAPPING

BSZ	BSZ(BANK) RETURNS BYTES AVAILABLE
TSK	TSK(BANK) RETURNS 6 BYTES FOR EACH TASK LOCATED IN BANK 1-2 STARTING LOC. 3-4 LENGTH IN BYTES 5-6 NAME
TSK(0)	RETURNS A STATUS STRING OF 3 BYTES FOR ALL TASKS AND DEVICES ON SYSTEM 1-2 NAME ;3 = STATUS STATUS BYTE: 0 DEVICE INACTIVE 1 RELEASED VDT HAS ESCPD 2 DEVICE IN USE
PUB	PUB(BANK) RETURNS 11 BYTES FOR EACH PUBLIC PROG RESIDENT 1-2 START LOC 3-4 LENGTH 5-10 NAME 11 00 PUBLIC PROG 01 COMPILER 02 LISTER 03 OSSPOL PROG

PROGRAM AND EQUIPMENT ERROR CODES

ERROR CODE		DESCRIPTION
INPUT/OUTPUT		
00		FILE/RECORD/DEVICE BUSY
01		END OF RECORD
02		END OF FILE
03		DISC READ
04		DISC DRIVE SELECT
05		PERIPHERAL DATA TRANSMISSION
06	BB1	DISC DICTIONARY DISCREPANCY
07		SECTOR NUMBER OUT OF RANGE
08		DISC WRITE VERIFICATION
09		POWER FAILURE
FILE USAGE		
10		FILE IDENT SIZE OR KEY USAGE
11		INVALID PARAMETER/MISSING KEY
12		UNDEFINED OR DUPLICATE FILE
13		FILE/DEVICE ACCESS
14		FILE/DEVICE USAGE
15		DISC ALLOCATION
16		DISC DICTIONARY CAPACITY
17	BB2/3	INVALID PARAMETER
18	BB3	ILLEGAL CONTROL OPERATION
19		PROGRAM FORMAT OR SIZE
STRUCTURE		
20		STATEMENT STRUCTURE
21		STATEMENT NUMBER SIZE
22	BB1/2	STATEMENT NUMBER MISSING
23		VARIABLE MISSING
24		FUNCTION NAME DEFINITION
25		UNDEFINED FUNCTION
26		VARIABLE USAGE
27		RETURN WITHOUT GOSUB
28		NEXT WITHOUT FOR
29		UNDEFINED MNEMONIC CONSTANT
LIMIT		
30	BB1	USER PROGRAM AREA OVERFLOW
30	BB2/3	USER PROGRAM CRC
31	BB1	USER DATA AREA OVERFLOW
31	BB2/3	USER AREA OVERFLOW
32		1/0 INTERUPT OVERFLOW
33		MEMORY CAPACITY
34	BB1	FOR/GOSUB NESTING LIMIT
34	BB3	VDT DATA OVERRUN
35		PARENTHETIC EXPRESSION LIMIT

PROGRAM EQUIPMENT ERROR CODES

ERROR CODE		DESCRIPTION
EXECUTION		
36		TASK AREA NOT AVAILABLE
36	BB3	CALL/ENTER MISMATCH
37	BB3	RESTRICTED FUNCTION
38	BB3	ILLEGAL COMMAND IN PUBLIC PGM.
39	BB3	ESCAPE IN PUBLIC PROGRAM
40		NUMERIC VALUE OVERFLOW
41		INTEGER RANGE
42		NONEXISTANT SUBSCRIPT
43		FORMAT MASK
44		STEP SIZE ZERO
45		STATEMENT USAGE
46		STRING SIZE
47		INVALID SUBSTRING REFERENCE
48	BB2/3	INVALID DATA ENTERED FROM VDT
49	BB3	NON TRANSLATABLE STATEMENT
50	BB3	BLOCK ERROR
51	BB3	COMPILE OR LIST OPERATION WITHOUT COMPILER/LISTER PGM
52	BB3	SPOOL FILE CLOSED IN CONSOLE MODE
63	BB1	DISC DRIVE MALFUNCTION IN PROCESSING OF DIRECT FILE
64	BB1	DISC DRIVE NOT READY IN PROCESSING OF DIRECT FILE
68	BB1	DISC VERIFICATION ERROR IN PROCESSING OF DIRECT FILE
72	BB3	PHYSICAL END OF TAPE (MAG.TAPE)
102	BB2	ERROR WHILE RD/WR IN DICTIONARY
103	BB2	DISC DRIVE READ ERROR IN PROCESSING OF DIRECT FILE
104	BB2	DISC DRIVE NOT READY IN PROCESSING OF DIRECT FILE
108	BB2	DISC VERIFICATION ERROR
112	BB3	CLOSE OF FILE OPENED BY OSERR
114	BB3	OPEN TO DEVICE ALREADY IN USE
122	BB3	CONTROL TASK PERFORMED A RELEASE
124	BB2/3	PARITY ERROR - SYSTEM AREA
125	BB2/3	PARITY ERROR - USER AREA
126	BB2/3	PARITY ERROR - UNDETERMINED
127	BB3	ESC. KEY OR START WITH NULL NAME

PROGRAM EQUIPMENT ERROR CODES

SYNCRONOUS COMMUNICATION FEATURE

ERROR CODE	DESCRIPTION
)	DEVICE BUSY / TIMEOUT
01	END OF RECORD
02	END OF FILE / TRANSMISSION
05	DEVICE ERROR
13	ACCESS ERROR
72	ALTERNATE END OF FILE
75	NEGATIVE BID RESPONSE
7	REVERSE INTERRUPT
80	INVALID EXPECTED BID
81	BID RECEIVE TIMEOUT
82	BID RESPONSE RETRY LIMIT
83	INVALID I.D. SEQUENCE
84	PRIMARY / SECONDARY ASSIGNMENT
85	DATA TIMEOUT
7	RESPONSE TO DATA RETRY LIMIT
88	RETRANSMISSION LIMIT
89	ACKNOWLEDGEMENT PHASE
95	DEVICE ERROR