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FIELD MAINTENANCE PRINT SET

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B-DD-VT78-Ø	VT78 DRAWING DIRECTORY
E-UA-VT78-Ø-Ø	UNIT ASSY (VT78)
C-PL-VT78-Ø-5	VT78 FAMILY (CONFIGURATION LIST)
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C-PL-7013844-Ø-Ø	TERMINAL ASSY (PL)
A-PL-VT78-Ø	VT78 SHIPPING LIST
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E-UA-5412660-0-0	CMOS 8 UNIT ASSY (SHEET 1 ONLY)
B-PL-5412660-0-0	CMOS 8 (PL)
D-CS-5412660-0-1	CMOS 8
D-UA-5412691-0-0	BOARD, MEMORY UNIT ASSY (SHEET 1 ONLY)
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D-CS-5412691-0-1	BOARD, MEMORY
D-UA-5412861-0-0	BOARD, I/O DISTRIBUTION UNIT ASSY (SHEET 1 ONLY)
B-PL-5412861-0-0	BOARD, I/O DISTRIBUTION (PL)
D-CS-5412861-0-1	BOARD, I/O DISTRIBUTION
B-PL-5411170-0-0	KEYBOARD (PL)
D-CS-5411170-0-1	KEYBOARD

UNIT VARIATIONS COVERED BY THIS PRINT SET
VT78-AA
VT78-AB
VT78-BA
VT78-BB
VT78-WA
VT78-WB
VT78-WC
VT78-WD

VT78 FAMILY
Field Maintenance Print Set

Digital Equipment Corporation

PRINT SET ORDER NO.

MPØØ468

REVISIONS		
DATE	CHG. NO.	REV.
5-78	VT78-2	A
1-79	VT78-ML0006	B
4-79	VT78-ML0007	C
10 79	VT78 ML0008	D

EN-0124-16-M76 (227)

DRB 124

USED ON OPTION/MODEL	
VT78	

SHEET I OF 2

DRN. C Drayton	DATE 21 Dec 77	TITLE: VT78
CHK'D David Zopf	DATE 14-MAR-78	digital
PROJ. ENG. David Zopf	DATE 14-MAR-78	
FIELD SERV. Carl Clark	DATE 22-MAR-78	

SIZE	CODE	NUMBER	REV.
B	TC	VT78-Ø-1	D

DIST.

ML

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B-PL-5411743-0-0	BOARD, R.U.T. (PL)
D-CS-5411743-0-1	BOARD, R.U.T.
B-UA-5411745	BOARD, DATA PATH (UA) (SHEET 1 ONLY)
B-PL-5411745-0-0	BOARD, DATA PATH (PL)
D-CS-5411745-0-1	BOARD, DATA PATH
D-CS-5411815-0-1	BOARD, CHARACTER GENERATOR
D-CS-5411444-0-1	BOARD, MONITOR
Ø-UA-H7832-Ø-Ø	POWER SUPPLY UNIT ASSY
D-UA-5412973-0-0	POWER SUPPLY UNIT ASSY (SHEET 1 ONLY)
B-PL-5412973-0-0	POWER SUPPLY (PL)
D-CS-5412973-0-1	POWER SUPPLY
D-UA-H978-Ø-Ø	TERMINAL STAND
MPØØ469	RX78-P PRINT SET (MP)
MPØØ552	MR78 PRINT SET (MP)
MPØØ71Ø	DP78 PRINT SET (MP)
A-SP-3700184-0-0	PACKAGING INSTRUCTIONS
B-PL-5411985-0-0	8K PROM UV
E-UA-5411985-0-0	8K PROM UV
D-CS-5411985-0-1	8K PROM UV

TITLE		SIZE	CODE	NUMBER	REV
VT78	SHEET 2 OF 2	B	TC	VT78-Ø-1	D

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DRAWING DIRECTORY

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FOR FIELD MAINTENANCE PRINT SET REFER TO:

B-TC-VT78-Ø-1

UNIT VARIATIONS

VAR	TITLE
VT78-AA	VIDEO TERMINAL 115V
VT78-AB	VIDEO TERMINAL 23ØV
VT78-BA	VT78-AA W/DEC. DATA SYSTEM LOGO
VT78-BB	VT78-AB W/DEC. DATA SYSTEM LOGO
VT78-WA	VT78-AA W/WORD PROCESSING KEYBOARD 115V
VT78-WB	VT78-AB W/WORD PROCESSING KEYBOARD 23ØV
VT78-WC	VT78-WA W/UK KEYCAP AND ROM 115V
VT78-WD	VT78-WD W/UK KEYCAP AND ROM 230V

REVISIONS	REV.	CHANGE NO.	CHK
	A	VT78-2	JA
	B	VT78-ML007	SM
	C	VT78-ML008	Rora

USED ON OPTION/MODEL: VT78

SHEET 1 OF 4

DRN.	C Drayton	DATE 21 Dec 77
CHK'D.	Dave Jaffe	DATE 14-MAR-78
PROJ. ENG.	David Jaffe	DATE 14-MAR-78
PROD.	John Kennedy	DATE 5/14/78

TITLE: VT78 DRAWING DIRECTORY

digital

SIZE	CODE	NUMBER	REV
B	DD	VT78-Ø	C

DIST.

DRB 106A

111-5

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(1) UNIT ASSEMBLY (VT78)
E-UA-VT78-Ø-Ø

(2) TERMINAL ASSY
Ø-AD-7013844-0-0

(3) KEYBOARD VT61/VT5ØH
B-DD-5411170-0

(4) ROM UART TIMING
B-DD-5411743-0

(5) DATA PATHS MEMORY AND DECODERS
B-DD-5411745-0

(6) VT61 MONITOR BOARD
D-CS-5411444-0-1

(7) 8K CHARACTER GENERATOR BD.
D-CS-5411815-0-1

(8) H7832 POWER SUPPLY
B-DD-H7832-Ø

(9) SHELL REWORKED
1-IA-7415074-0-0

(10) CRT GROUNDING ASSY
1-IA-7011197-0-0

(11) CRT ASSY
Ø-AD-7010859-0-0

(12) WIREFORM CRT
1-IA-7415319-0-0

(13) BRACKET CRT MTG. (LEFT)
1-IA-7415433-0-0

(14) BRACKET CRT MTG.(RIGHT)
1-IA-7415434-0-0

(15) PLATE MTG ASSY
D-AD-7013846-0-0

(16) PROCESSOR ASSY
1-AD-7013891-0-0

(17) MEMORY/PROCESSOR BOARD ASSY
Ø-AD-KK8-B-Ø

(18) CMOS-8
B-DD-5412660-0

(19) MEMORY BD. ASSY
B-DD-5412691-0

(20) I/O DISTRIBUTION PANEL
B-DD-5412861-0

(21) BASE PAN WELDMENT
D-IA-7013890-0-0

(22) MR78 DRAWING DIRECTORY
B-DD-MR78-0

(23) RX78-P DRAWING DIRECTORY
B-DD-RX78-P

(24) H978 DRAWING DIRECTORY
B-DD-H978-Ø

(25) PACKAGING INSTRUCTIONS
A-SP-3700184-0-0

(27) 8K PROM UV
D-UA-5411985-0-0

TITLE			SIZE	CODE	NUMBER	REV
VT78 DRAWING DIRECTORY	SHEET 2 OF 4		B	DD	VT78-Ø	C

FIND NO.	DRAWING NO.	DESCRIPTION	TYPE
1	B-TC-VT78-Ø-1	VT78 FIELD MAINTENANCE PRINT SET (TC)	-
	MPØØ468	VT78 PRINT SET (MP)	-
	E-UA-VT78-Ø-Ø	UNIT ASSY VT78	E/M
	A-PL-VT78-Ø	VT78 SHIPPING LIST	-
	K-SP-VT78-Ø-2	VT78 ROM LISTING (23003E1)	-
	K-SP-VT78-Ø-3	VT78 ROM LISTING (23001E1)	-
	A-SP-VT78-Ø-4	VT78 ENGINEERING SPEC.	-
	A-PS-3613210-00	SERIAL TAG ELECTRICAL DATA (VT78-AA)	-
	A-PS-3613210-01	SERIAL TAG ELECTRICAL DATA (VT78-AB)	-
	D-MD-1214579-0-0	PLATE FACE VT78	M
	E-MD-1214456-0-0	KEYBOARD BEZEL	M
	C-PL-VT78-Ø-5	VT78 FAMILY (CONFIGURATION LIST)	-
	K-SP-VT78-Ø-4	VT78 ROM LISTING (23005E1)	-
2	Ø-AD-7013844-0-0	TERMINAL ASSEMBLY	E/M
	Ø-IA-7418566-0-0	HEAT SINK	M
	B-MD-7414751-0-0	FOAM. SUPPORT	M
	B-MD-7412573-0-0	COVER, FIXED BLANK	M
	E-MD-7412574-0-0	COPIER, COVER	M
	2-MD-7415342-0-0	CLIP BOARD MTG.	M
	2-MD-7417802-0-0	SPACER, SWITCH	M
	A-PS-3612680-00	DECAL, GROUND SYMBOL	M
	A-PS-3614166-00	LABEL, ON OFF	M
	2-MD-7417806-0-0	COVER SLIDE	M
	C-IA-7418251-0-0	CABLE, SAFETY GND	M
	D-IA-7418991-0-0	SCREEN, SHIELD	M
	2-MD-7415345-0-0	NUT, P.C. BD. WING	M
	D-IA-7013843-0-0	HARNESS DC (VT78)	E/M
3	B-DD-5411170-0	KEYBOARD VT61/VT5Ø	E/M
4	B-DD-5411743-0	ROM UART TIMING	E/M
5	B-DD-5411745-0	DATA PATHS, MEMORY AND DECODERS	E/M

FIND NO.	DRAWING NO.	DESCRIPTION	TYPE
6	D-CS-5411444-0-1	VT61 MONITOR BD.	E/M
7	D-CS-5411815-0-1	8K CHARACTER GENERATOR BD.	E/M
8	B-DD-H7832-Ø	H7832 POWER SUPPLY	E/M
9	1-IA-7415074-0-0	SHELL REWORKED	M
	E-MD-7411340-0-0	SHELL VT5Ø	M
	2-MD-7415344-0-0	SCREWS THUMB	M
10	1-IA-7011197-0-0	CRT GROUNDING ASSY	M
	2-MD-7413757-0-0	SUPPORT GRT GROUNDING	M
	2-MD-7413956-0-0	STRAP GROUND	M
11	Ø-AD-7010859-0-0	CRT ASSY	E/M
	A-PS-3610967-00	DECAL HIGH VOLTAGE	M
	2-AD-7010906-0-0	YOKE, ASSEMBLY	M
12	1-IA-7415319-0-0	WIREFORM CRT	M
	2-MD-7415430-0-0	STRAP GROUND	M

TYPE: E ELECTRICAL
M MECHANICAL
E/M ELECTRO/MECHANICAL

digital

TITLE VT78 DRAWING DIRECTORY | SHEET 3 OF 4 | SIZE B | CODE DD | NUMBER VT78-Ø | REV C

DRB 108A

ML

FIND NO.	DRAWING NO.	DESCRIPTION	TYPE
13	1-IA-7415433-0-0	BRACKET, CRT MTG. (LEFT)	M
	1-IA-7415431-0-0	PLATE MTG.	M
	2-MD-7415427-0-0	SUPPORT WIRE	M
	B-MD-7415426-0-0	BRACKET, KEYBOARD SUPPORT	M
	B-MD-7415428-0-0	NUT, WELD (UPPER)	M
	B-MD-7415429-0-0	NUT, WELD (LOWER)	M
14	1-IA-7415434-0-0	BRACKET, CRT MTG (RIGHT)	M
	1-IA-7415432-0-0	PLATE MOUNTING	M
	2-MD-7415427-0-0	SUPPORT WIRE	M
	B-MD-7415429-0-0	NUT WELD (LOWER)	M
	B-MD-7415428-0-0	NUT WELD (UPPER)	M
15	D-AD-7013846-0-0	PLATE, MTG ASSY	M
	D-IA-7418448-0-0	PLATE, MTG. VT78	M
	C-IA-7418251-0-0	CABLE SAFETY GND	E/M
	A-PS-3612680-0-0	DECAL GROUND SYMBOL	M
	D-IA-7013845-0-0	START SWITCH & VT78 CABLE ASSY	E/M
16	E-AD-7013891-0-0	PROCESSOR ASSEMBLY	M
	E-MD-7411539-0-0	BASE VT5Ø	M
	1-IA-7413322-0-0	SCREEN, BASE FRONT	M
	B-MD-7418565-0-0	PLATE COVER	M
	A-PS-3614274-00	DECAL, CONN. PANEL	M
	D-IA-7418460-0-0	BRACKET, MOD SUPPORT	M
	C-IA-7418251-0-0	CABLE, GND	M
	A-PS-3612680-0-0	DECAL GND	M
17	Ø-AD-KK8-B-Ø	MEMORY/PROCESSOR BOARD ASSEMBLY	E/M
	D-IA-7419062-0-0	BOARD STIFFNER	M

FIND NO.	DRAWING NO.	DESCRIPTION	TYPE
18	B-DD-5412660-0	C-MOS 8	E/M
19	B-DD-5412691-0	MEMORY BD.	E/M
20	B-DD-5412861-0-0	I/O DISTRIBUTION PANEL	E/M
21	D-IA-7013890-0-0	BASE PAN WELDMENT	M
	E-IA-7418523-0-0	BASE PAN REAR	M
	D-IA-7418314-0-0	BASE PLATE	M
22	B-DD-MR78-Ø	MR78 DRAWING DIRECTORY	E/M
23	B-DD-RZ78-Ø	RX78 DRAWING DIRECTORY	E/M
24	B-DD-H978-Ø	H978 DRAWING DIRECTORY	E/M
25	A-SP-3700184-0-0	PACKAGING INSTRUCTIONS	-
26	B-DD-DP78	DP78 DRAWING DIRECTORY	
27	B-PL-5411985-0-0	8K PROM UV	
	E-UA-5411985-0-0	8K PROM UV	
	D-CS-5411985-0-1	8K PROM UV	
	E-AH-5411985-0-5	8K PROM UV	
	B-MH-5411985-0-6	8K PROM UV	

TYPE: E ELECTRICAL
M MECHANICAL
E/M ELECTRO/MECHANICAL

digital

TITLE VT78 DRAWING DIRECTORY | SHEET 4 OF 4 | SIZE B | CODE DD | NUMBER VT78-0 | REV C

DRB 108A

ML 9

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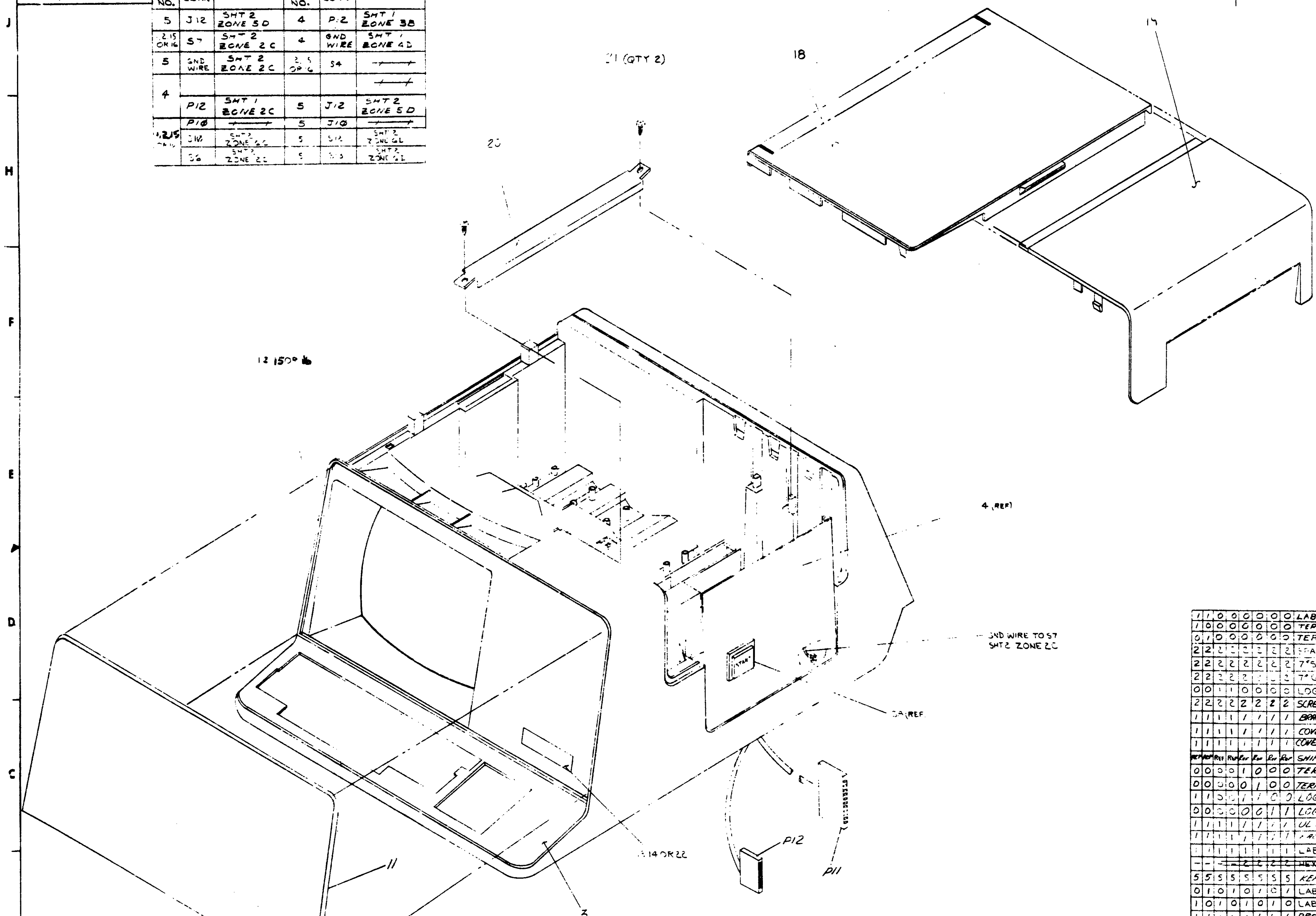
WIRE TABLE

FROM ITEM NO.	FROM CONN	REMARKS	TO ITEM NO.	TO CONN	REMARKS
5	J12	SHT 2 ZONE 5D	4	P12	SHT 1 ZONE 3B
2,15 OR 16	S7	SHT 2 ZONE 2C	4	GND WIRE	SHT 1 ZONE 4D
5	GND WIRE	SHT 2 ZONE 2C	2,15 OR 16	S4	—
4					—
	P12	SHT 1 ZONE 2C	5	J12	SHT 2 ZONE 5D
	P10	—	5	J10	—
2,15 OR 16	S10	SHT 2 ZONE 6C	5	S12	SHT 2 ZONE 6C
	S6	SHT 2 ZONE 2C	5	S13	SHT 2 ZONE 6C

NOTES:
1. REFER TO E-DD-VT78-0 DRAWING DIRECTORY.



REF TO SHEET 2 D-UA-VT78-0-0 10/29/79

VT78-WD	VT78-WC	VT78-BB	VT78-BA	VT78-WB	VT78-WA	VT78-AB	VT78-AA	DESCRIPTION	DWG./PART NO.	ITEM NO.
1	1	0	0	0	0	0	0	LABEL, BRIT CHAR GEN INST	3615?06-00	28
1	0	0	0	0	0	0	0	TERMINAL ASSY	E-AD-7013844-5	27
0	1	0	0	0	0	0	0	TERMINAL ASSY	E-AD-7013844-4	26
2	2	2	2	2	2	2	2	SPACER SWITCH	7417302-00	25
2	2	2	2	2	2	2	2	7" SHEATHING	7413599-01	24
2	2	2	2	2	2	2	2	7" GND STRAP	9009830-01	23
0	0	1	1	0	0	0	0	LOGO	B-DC 3615204	22
2	2	2	2	2	2	2	2	SCREW, THD ROLLING #10-32	9009681-05	21
1	1	1	1	1	1	1	1	BRACKET, COPIER, WELL	7413400-00	20
1	1	1	1	1	1	1	1	COVER, COPIER	7412574-01	19
1	1	1	1	1	1	1	1	COVER, BLANK FIXED ASSY	7412573-00	18
REF	REF	REF	REF	REF	REF	REF	REF	SHIP & PKG INST		17
0	0	0	0	1	0	0	0	TERMINAL ASSY	E-AD-7013844-3	16
0	0	0	0	0	1	0	0	TERMINAL ASSY	E-AD-7013844-2	15
1	1	0	0	1	1	0	0	LOGO	B-DC 3614572-0	14
0	0	0	0	0	0	1	1	LOGO	B-DC 3614573-0	13
1	1	1	1	1	1	1	1	UL DECAL	A-DC-7414213	12
1	1	1	1	1	1	1	1	FACE PLATE, VT78	D-1214579-0-0	11
1	1	1	1	1	1	1	1	LABEL, CSA	3613211-01	10
~~—~~	~~—~~	~~—~~	~~—~~	~~2~~	~~2~~	~~2~~	~~2~~	~~HEX NUT #8-32~~	~~9006561~~	~~9~~
5	5	5	5	5	5	5	5	KEPNUT #10-32	9006565	8
0	1	0	1	0	1	0	1	LABEL, CONFIG 115V	3613239-03	7
1	0	1	0	1	0	1	0	LABEL, CONFIG 230V	3613239-02	6
1	1	1	1	1	1	1	1	PROCESSOR ASSEMBLY	E-AD-7013891	5
REF	REF	REF	REF	REF	REF	REF	REF	MTG PLATE ASSY	D-AD-7013896	4
1	1	1	1	1	1	1	1	KEYBOARD BEZEL	E-MD-1214956-0-0	3
0	0	1	0	0	0	1	0	TERMINAL ASSY 230V 50/60 HZ	E-AD-7013844-1	2
0	0	0	1	0	0	0	1	TERMINAL ASSY 115V 50/60 HZ	E-AD-7013844-0	1

QUANTITY & VARIATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

THIRD ANGLE PROJECTION

REMOVE BURRS AND BREAK SHARP CORNERS

DO NOT SCALE DWG

MATERIAL: SEE PARTS LIST

FINISH: —

NEXT HIGHER ASSY: B-DD-VT78-0

SCALE: NONE

SHEET 1 OF 2

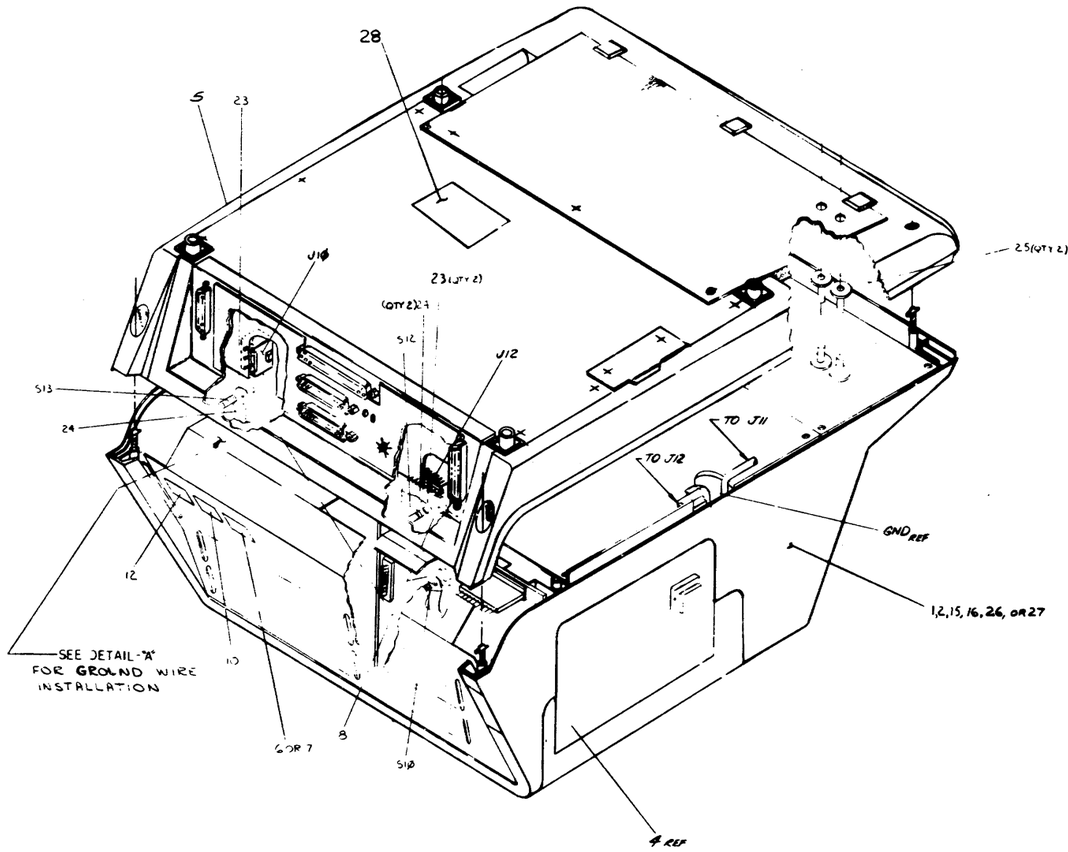
FIRST USED ON: VT78

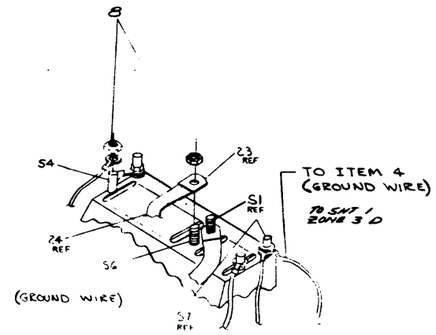
digital

TITLE: UNIT ASSEMBLY, VT78

SIZE: E | CODE: UA | NUMBER: VT78-0-0 | REV: D

977





DETAIL -"A"

REF TO SHEET 1 E-UA-VT78-0-0 10/29/79

REVISIONS		
ONE	CHANGE NO.	REV.

TITLE: UNIT ASSEMBLY VT78				
SCALE:	SHEET 2 OF 2	DRAWING NUMBER: ØUA VT78-Ø-Ø		REV: D
DIST:				

ML

Ø UA VT78-Ø-Ø D

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			78/4Ø-AA	78/4Ø-AC	78/4Ø-AD	78/4Ø-BA	78/4Ø-BC	78/4Ø-BD	78/4Ø-CA	78/4Ø-CC	78/4Ø-CD	78/4Ø-DA	78/4Ø-DC	78/4Ø-DD	78/5Ø-BA	78/5Ø-BC	78/5Ø-BD	78/5Ø-CA	78/5Ø-CC	78/5Ø-CD	78/5Ø-DA	78/5Ø-DC	78/5Ø-DD	78/5Ø-FA	78/5Ø-FC	78/5Ø-FD	78/5Ø-LA	78/5Ø-LC	78/5Ø-LD	78/5Ø-MA	78/5Ø-MC	78/5Ø-MD	78/6Ø-DA	78/6Ø-DC	78/6Ø-DD	7Ø/7Ø-DA	78/7Ø-DC	78/7Ø-DD	78/7Ø-FA	78/7Ø-FC	78/7Ø-FD	78/7Ø-LA	78/7Ø-LC	78/7Ø-LD	78/7Ø-MA	78/7Ø-MC	78/7Ø-MD
1	D-UA-VT78-AA	VIDEO TERMINAL, 115V, 6ØHZ	1	1	-	1	1	-	1	1	-	1	1	-	1	1	-	1	1	-	1	1	-	1	1	-	1	1	-	1	1	-	1	1	-	1	1	-	1	1	-	1	1	-	1	1	-
2	D-UA-VT78-AB	VIDEO TERMINAL, 23ØV, 5ØHZ	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1
3	D-UA-RX78-PA	RXØ1-LA, TABLE TOP ENCLOSURE, 115V, 6ØHZ	1	-	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	D-UA-RX78-PC	RXØ1-LC, TABLE TOP ENCLOSURE, 115V, 5ØHZ	-	1	-	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
5	D-UA-RX78-PD	RXØ1-LD, TABLE TOP ENCLOSURE, 23ØV, 5ØHZ	-	-	1	-	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
6	D-UA-H978-AA	STAND, TERMINAL, 115V	-	-	-	-	-	-	1	1	-	1	1	-	-	-	-	-	-	-	1	1	-	1	1	-	1	1	-	1	1	-	1	1	-	1	1	-	1	1	-	1	1	-	1	1	-
7	D-UA-H978-AB	STAND, TERMINAL, 23ØV	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1
8	D-UA-RX78-RA	RXØ2-LA, TABLE TOP ENCLOSURE, 115V, 6ØHZ	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	-	-	2	-	-	2	-	-	2	-	-	2	-	-
9	D-UA-RX78-RC	RXØ2-LC, TABLE TOP ENCLOSURE, 115V, 5ØHZ	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	-	-	2	-	-	2	-	-	2	-	-	2	-
10	D-UA-RX78-RD	RXØ2-LD, TABLE TOP ENCLOSURE, 23ØV, 5ØHZ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	-	-	2	-	-	2	-	-	2	-	-	2
11	D-IA-BC8ØD-1H-Ø	CABLE, RX78 TO VT78	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	D-IA-BC8ØD-5K-Ø	CABLE, RX78 TO VT78	1	1	1	1	1	1	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	E-IA-BC8ØE-YA-Ø	CABLE, VT78 TO TWO (2) RX78'S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1
14	E-UA-LA78-PA	PARALLEL PRINTER, 12ØV, 6ØHZ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
15	E-UA-LA78-PC	PARALLEL PRINTER, 12ØV, 5ØHZ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
16	E-UA-LA78-PD	PARALLEL PRINTER, 24ØV, 5ØHZ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
17	BX-Q2ØØ2-TA	OS78 SOFTWARE	-	-	-	1	1	1	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
18	BX-Q2Ø2Ø-TA	LICENSE ONLY BOX OS78V2B, COS31ØV8	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	1	1	1	-	-	-	1	1	1	-	-	-	-	-	1	1	1	-	-	-	1	1	1	-	-	-	-
19	BX-Q2Ø14-TA	SUPPORTED BOX OS78V2B, COS31ØV8 (2XØ2)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	1	1	1	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-
20	BX-Q2ØØ1-TA	OS78 SOFTWARE	1	1	1	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

REVISIONS		
CHK	CHANGE NO.	REV.
DSM	VT78 - ML007	B

Yuck Spivey 22-MAR-79

R. MEACHAM

Richard E. Meacham 26MAR79

DRN. G.DRAYTON	16FEB7Ø
CHK'D D.ZOPF	12APR7Ø
ENG. D. ZOPF	12APR7Ø
PROJ. ENGD.ZOPF	12APR7Ø
PROD. J.DIENST	12APR7Ø
NEXT HIGHER ASSY.	
B-TC-VT78-Ø-1	
SCALE	
SHEET 1 OF 1	

FIRST USED ON: VT78

digital

TITLE: VT78 FAMILY (CONFIGURATION LIST)

SIZE	CODE	NUMBER	REV.
C	PL	VT78-Ø-5	B

DIST.

12 DEC FORM NO.

WIRE TABLE

FROM ITEM NO	FROM CONN	FROM REMARKS	TO ITEM NO	TO CONN	TO REMARKS
12	P4	SHT 1 ZONE 2H	9	J4	SHT 3 ZONE 2E
5	J6	SHT 1 ZONE 6B	10	P6	SHT 3 ZONE 6C
	P3	SHT 1 ZONE 5B	8	J3	SHT 1 ZONE 5H
	P2	SHT 1 ZONE 6C		J2	SHT 1 ZONE 5F
	C1	SHT 1 ZONE 7B & C		D1	SHT 1 ZONE 6B & C
7	P9	SHT 1 ZONE 1D	10	J9	SHT 3 ZONE 7D
	J8	SHT 1 ZONE 7C	3 OR 4	P8	SHT 1 ZONE 7D
	P7	SHT 1 ZONE 6C	5	J7	SHT 1 ZONE 6E

WIRE TABLE

FROM ITEM NO	FROM CONN	FROM REMARKS	TO ITEM NO	TO CONN	TO REMARKS
5	P1	SHT 1 ZONE 5E	13	J1	SHT 1 ZONE 3D
2	S2	SHT 1 ZONE 7C	3 OR 4	S5	SHT 1 ZONE 7D
	S7	SHT. 1 ZONE 7D	28	S3	SHT 1 ZONE 6C
3 OR 4	S7	SHT. 1 ZONE 7D	15	GND WIRE	SHT. 2 ZONE 3C
	S1	SHT. 1 ZONE 7D	2	S9	SHT. 1 ZONE 8C
15	P11	SHT. 2 ZONE 4C	9	J11	SHT. 3 ZONE 3E
2	S8	SHT. 1 ZONE 7C	15	S11	SHT. 3 ZONE 3C

NOTES

1. BASE (ITEM 2) IS PLACED OVER SCREWS IN SHELL AND 1/4 TURN TO THE RIGHT IS MADE ON SCREWS TO SECURE BASE

VIEW A-A
SCALE: NONE

DETAIL-'B'
SCALE: NONE

DETAIL-C
SCALE: NONE

METRIC DIMENSIONS

OFF SHEET PARTS LIST REFER TO C-HL-7J13844-0-0

DRAWN	5-2-77
CHECKED	7/8/77
ENGR APPROVED	7/11/77
MFG APPROVED	7/11/77
NEXT HIGHER ASSY	
APPLICATION	VT78
TITLE	TERMINAL ASSY
SIZE	A
CAGE CODE	80009
DWG NO	AD7013844-0-0
REV	J
SCALE	NONE
SHEET	1 OF 3

SEE PARTS LIST

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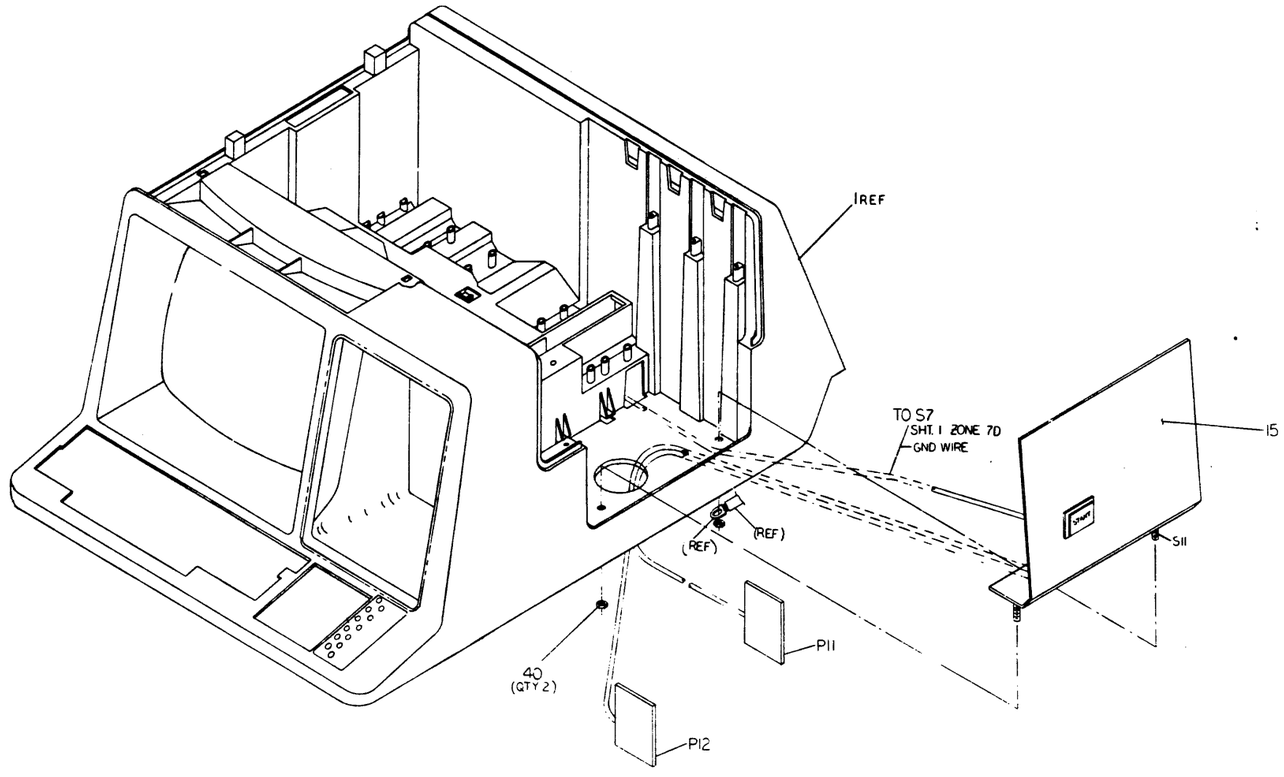

REVISIONS		
CHG	CHANGE NO	REV

TITLE	TERMINAL ASSY		
SCALE	NONE	SHEET 2 OF 3	
DOCUMENT NUMBER	AD-7013844-0-0		REV J
DIST			

AD-7013844-0-0 J

14

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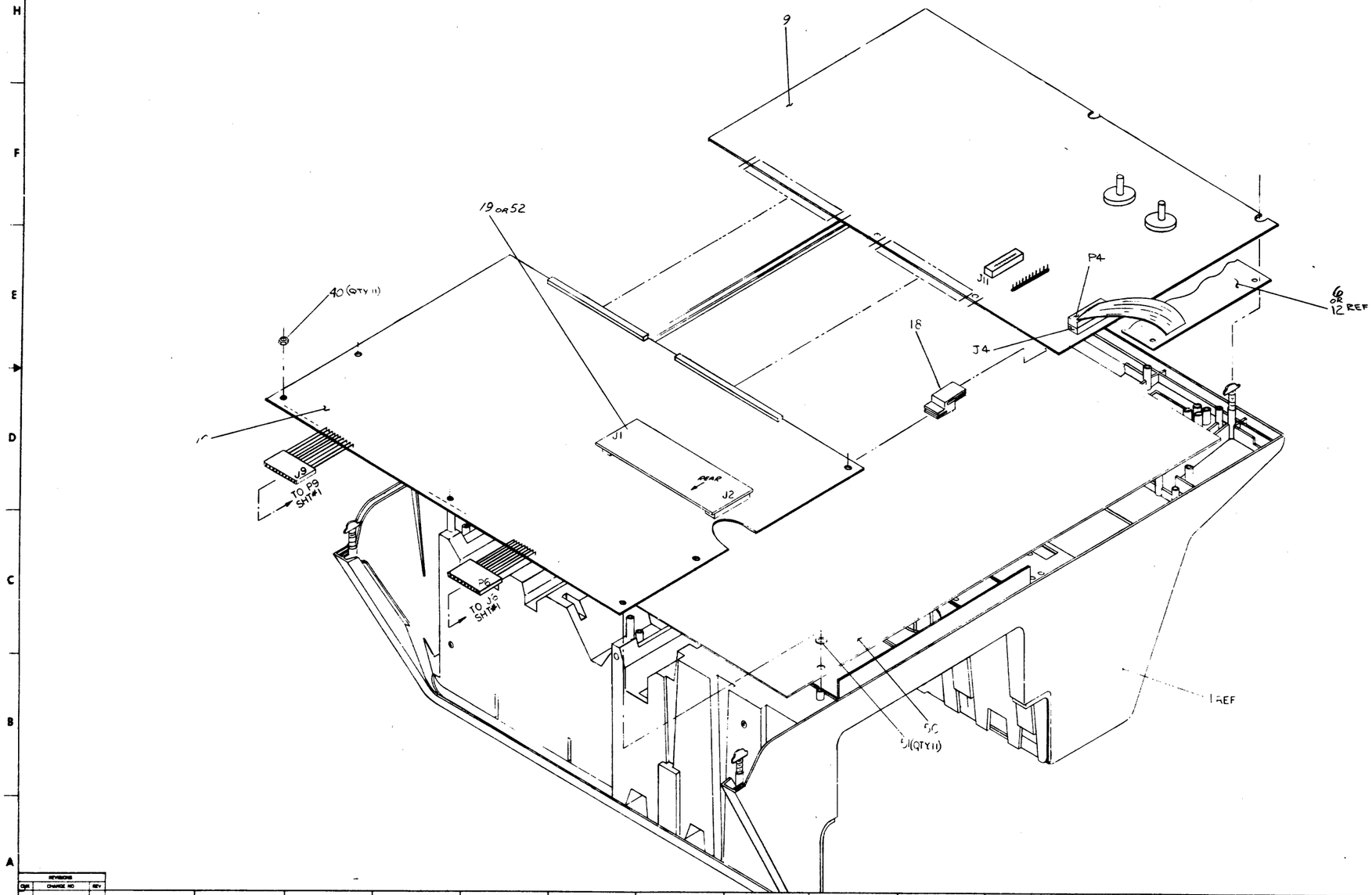

REVISIONS		
QPL	CHANGE NO	REV

TITLE	TERMINAL ASSY		
SCALE	SHEET 3 OF 3	SIZE	B
DRAWING NUMBER	AD7013844-0-0	REV.	J
DIST.			

B AD7013844-0-0 J

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ITEM NO.	DWG. NO./PART NO.	DESCRIPTION	115V 60 HB	230V 50 HB	WA 115V	WB 230V	WC 115V	WD 230V
1	7011540	SHELL	1	1	1	1	1	1
2	Ø-IA-7418566-Ø-Ø	HEAT SINK	1	1	1	1	1	1
3	Ø-UA-H7832-A	H7832 POWER SUPPLY 115V	1	0	1	0	1	0
4	Ø-UA-H7832-B	H7832 POWER SUPPLY 230V	0	1	0	1	0	1
5	D-UA-5411444-Ø-1	BOARD MONITOR	1	1	1	1	1	1
6	D-UA-5411170-00	KEYBOARD	0	0	1	1	0	0
7	7013843	HARNESS, DC (VT78)	1	1	1	1	1	1
8	7010859-00	CRT ASSEMBLY	1	1	1	1	1	1
9	5411743-00	BOARD, ROM/UART	1	1	1	1	1	1
10	5411745-00	BOARD, DATA PATH	1	1	1	1	1	1
11	7414751-00	SUPPORT FOAM	1	1	1	1	1	1
12	5411170-04	KEYBOARD	1	1	0	0	0	0
13	7011197-0-0	CRT, GROUNDING ASSEMBLY	1	1	1	1	1	1
~~14~~	~~9006832~~	~~SPACER #8-32 x .88~~	~~1~~	~~1~~	~~1~~	~~1~~		
15	7013846-00	MTG PLATE ASSY	1	1	1	1	1	1
16	3613210-00	ELEC DATA LABEL	1	1	1	1	1	1
~~17~~	~~9006833-00~~	~~WASHER, FLAT #8~~	~~1~~	~~1~~	~~1~~	~~1~~		
18	7415382-00	CLIP, BOARD MOUNTING	1	1	1	1	1	1
19	5411815-00	BOARD, 8 CHARACTER GENERATOR	1	1	1	1	0	0
~~20~~	~~7417802-00~~	~~SPACER, SWITCH~~	~~2~~	~~2~~	~~2~~	~~2~~		
21	3612680-00	DECAL, GROUND SYMBOL	2	2	2	2	2	2
22	3614166-00	LABEL, ON, OFF (115V)	1	0	1	0	1	0
23	3614166-01	LABEL, ON, OFF (230V)	0	1	0	1	0	1
24	7417806-0-0	COVER, SLIDE	1	1	1	1	1	1
25	1213771-00	SPRING, SLIDE COVER	1	1	1	1	1	1
26	7418251-00	CABLE, SAFETY GROUND	1	1	1	1	1	1
27	7418251-03	CABLE, SAFETY GROUND	1	1	1	1	1	1
28	7015022	SCREEN ASSEMBLY	1	1	1	1	1	1
29	9006012-01	SCREW #4-40 x .437 PH	1	1	1	1	1	1
30	9006793	SPACER #6 x .188	1	1	1	1	1	1
31	9009681-05	SCREW THD ROLLING #10 x .38 lg	14	14	14	14	14	14
32	9006843	SPACER #4-40 x .38	1	1	1	1	1	1
33	9009873-00	SCREW HEX HEAD SELFTAP #4	2	2	2	2	2	2
34	9009671-00	WASHER METAL W/GASKET	2	2	2	2	2	2
35	9006565-00	KEP NET #10-32	7	7	7	7	7	7
36	9008032-01	SCREW HEX #4-40 x .19 PH	3	3	3	3	3	3
37	9009683-01	SCREW HEX WASHER (BLK) #8 - 32 x .38	3	3	3	3	3	3
38	9009333	"SPACER" #4-40 x .25 SPACER	2	2	2	2	2	2
39	9006011-01	SCREW #4-40 x .38 PH	3	3	3	3	3	3
40	9006563-00	NUT, KEP 8-32	13	13	13	13	13	13
41	9006305-10	SCREW, SET SCK HD 8-32 x .62 LG	8	8	8	8	8	8
42	9006655	WASHER FLT #4	3	3	3	3	3	3
43	9006632	WASHER, LOCK, INT TOOTH	3	3	3	3	3	3
44	9009672-00	1/4" SPACER	2	2	2	2	2	2
45	7415344	SCREWS, THUMB	5	5	5	5	5	5
			-0	-1	-2	-3	-4	-5

REVISIONS	CHANGE NO.	REV.
CHK	7013844-00001	A
J. WALLS 17 OCT 77	7013844-00002	B
P. GARDNER	7013844-00003	C
P. GARDNER	7013844-00004	D
J. WALLS 10 JAN 78	7013844-00005	E
J. WALLS	7013844-00006	F
P. GARDNER	7013844-00007	H
P. GARDNER 7-4-78	VT78 - ML008	J
B. MEACHAM		

DRN. R. RILEY	16JUN77	FIRST USED ON VT78
CHK'D	7/19/77	digital
ENG	19 Jul 77	TITLE TERMINAL ASSY
PROJ. ENG	19 Jul 77	
PROD	7/19/77	
NEXT HIGHER ASSY. E-UA-VT78-Ø-Ø		SIZE C / CODE PL / NUMBER 7013844-0 / REV. J
SCALE		DIST.
SHEET 1 OF 2		

16 DEC FORM NO. DRC 110 A

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			115V 60 HZ	230V 50 HZ	WA 115V	WB 230V	WC 115V	WD 230V
46	9009830-00	STRAP, GND. 5"	1	1	1	1	1	1
47	9009830-01	STRAP, GND. 7"	1	1	1	1	1	1
48	7419599-00	SLEEVE GND, STRAP 5"	1	1	1	1	1	1
49	7419599-01	SLEEVE GND, STRAP 7"	1	1	1	1	1	1
50	7419543-02	SHIELD, RFI	1	1	1	1	1	1
51	9006713-00	WASHER, NYLON	11	11	11	11	11	11
52	5411985-02	BOARD, 8K PROM UV	0	0	0	0	1	1
53	5411170-14	KEYBOARD	0	0	0	0	1	1

-0 -1 -2 -3 -4 -5

REVISIONS

REV.	CHANGE NO.	CHK

DRN. R. RILEY	6-16-77
CHK'D R. RILEY	7-19-77
ENG. P. GARDNER	7-19-77
PROJ. ENG. P. GARDNER	7-19-77
PROD. J. DIENST	7-19-77
NEXT HIGHER ASSY.	E-UA-VT78-Ø-Ø
SCALE	
SHEET 2 OF 2	

FIRST USED ON: VT78

digital

TITLE: TERMINAL ASSY

SIZE	CODE	NUMBER	REV.
C	PL	7013844-0	U

DIST.

REV. J

NUMBER 7013844-0

SIZE C CODE PL

DEC FORM NO. DRC 110 A

17

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS
PARTS LIST

MADE BY C. Drayton DATE 21 Dec 77	CHECKED DATE David Zopf 3/14/78	SECTION 1
ENG DATE David Zopf 14-MAR-78	PROD DATE John Leonard 3/14/78	ISSUED SECT. 1

ITEM NO.	DWG NO./PART NO.	DESCRIPTION	QUANTITY VARIATION											
			VT78-AA	VT78-AB	VT78-BA	VT78-BB	VT78-WA	VT78-WB	VT78-WC	VT78-WD				
1	MPØØ468	VT78 FIELD MAINTENANCE PRINT SET	*	*	*	*	*	*	*	*				
2	EK-VTX78-UG-ØØ1	DEC STATION USER'S GUIDE	1	1	1	1	1	1	1	1				
3	EK-VTX78-TM-ØØ1	TECH. MANUAL	1	1	1	1	1	1	1	1				
4	ZFØ14-RZ	VT78-Ø DIAGNOSTIC KIT (DOCUMENTS ONLY)	*	*	*	*	*	*	*	*				
5	ZFØ14-RY	VT78-Ø DIAGNOSTIC KIT(DOCUMENTS & FLOPPY)	1	1	1	1	1	1	1	1				
6	ZFØ14-PY	VT78-Ø DIAGNOSTIC KIT (FLOPPY ONLY)	*	*	*	*	*	*	*	*				
7	ZFØ14-PB	VT78-Ø DIAGNOSTIC KIT (PAPER TAPE ONLY)	*	*	*	*	*	*	*	*				
8	ZFØ14-RB	VT78-Ø DIAGNOSTIC KIT (PAPER TAPE & DOCUMENTS)	*	*	*	*	*	*	*	*				

* THIS ITEM IS AN OPTION AND IS TO BE SHIPPED ONLY WHEN PURCHASED AS A SEPARATE ITEM.

TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV	ECO NO.
VT78 SHIPPING LIST	B-TC-VT78-Ø-1	A	PL	VT78-Ø	B	VT78-ML008
	SHEET 1 OF 1	DIST				

DEC FORM DRA 110

FIRST USED ON OPTION MODEL: KK8-B		DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	
DRN. DAVID ZOPF	DATE 14-APR-78		
CHK'D DAVID ZOPF	DATE 14-APR-78	TITLE: PANEL MEMORY CODE	
ENG. JOHN KIRK	DATE 14-APR-78		
P.ENG. JOHN KIRK	DATE 14-APR-78		
PROD. JOE DIENST	DATE 14-APR-78	SIZE: K / CODE: SP / NUMBER: VT78-0-2	REV: *
NEXT HIGHER ASSEMBLY: 54-12660		DIST.	

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```
                /KK8-B PANEL MEMORY CODE  23-003G1-00
                /D.A.WHITE 21-SEP-77
                /ASSEMBLE THIS FILE WITH PANROM.BI--THIS MAKES THE ROM CHECKSUM
                /COME OUT CORRECTLY.

          4216  ROMSUM=4216
          6073  PRQ=6073                  /MAKE PANEL REQUEST
                /IMPORTANT ROUTINES, CALLED BY THE GENERAL CALL
                /       PRQ
                /       ADDRESS
                /THESE ADDRESSES SHOULD REMAIN FIXED, DESPITE REVISIONS:
                /BEGIN=6201--RUN MR78 LOADER.  SR0 NOT TESTED.
                //(INTERRUPT SHOULD BE OFF, OR CAF SHOULD BE FIRST INSTRUCTION EXECUTED IN MAIN
                /RX01=6200--BOOTSTRAP RX01 (INTERRUPT MUST BE OFF, OR CAF FIRST INSTRUCTION
                //EXECUTED IN MAIN MEMORY.)
                /START=6003--FLOPPY DISK (RX01) OR MR78, DEPENDING ON MR78 JUMPER.
                //GIVE "START" MESSAGE
                /HYPHEN=6002--RETURN TO "DUMB TERMINAL" MODE
          6071  PRS=6071                  /READ PANEL STATUS TO AC 0-3
                                                /AC0=STARTUP CONDITION
                                                /AC1=BOOTSTRAP BUTTON
                                                /AC2=PROGRAM HLT
                                                /AC3=PROGRAM REQUEST
          6072  PST=6072                  /COMPLEMENT THE RUN FLIP-FLOP
          6074  PER=6074                  /TURN ERROR LIGHT ON
          6043  TSB=6043                  /SET LOCAL-TERMINAL BAUD RATE PER AC 8-11
                /SOME MAGIC NUMBERS FOR IOT ABOVE:
                /       BAUD RATE       AC8-11          BAUD RATE       AC8-11
                /       50              0               1800            10
                /       75              1               2000            11
                /       110             2               2400            12
                /       134.5           3               3600            13
                /
                /       150             4               4800            14
                /       300             5               7200            15
                /       600             6               9600            16
                /       1200            7               19200           17
          6037  KLB=6037                  /SET LOOPBACK IF AC11=1; CLEAR LOOPBACK IF AC11=0

                /LAS INSTRUCTION PICKS UP THE FOLLOWING BITS:
                /       AC0=1 IF MR78 BOARD INSERTED
                /       AC1=1 IF APT TEST
                /       AC2=SELECT LOCAL TERMINAL BAUD RATE (0=9600 BAUD; 1=300 BAUD)
                /       AC<3:5>=NBR OF MR78 PROGRAMS TO LOAD-1
                /       AC<6:7>=UNDEFINED (DO NOT ASSUME ANYTHING--MASK OFF IF IN DOUBT)
                /       AC<8:11>=BAUD RATE (SEE TSB IOT ABOVE)
```

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	KK8-B PANEL MEMORY CODE	SIZE: K / CODE: SP	NUMBER: VT78-0-2	REV: *

```
                /RX01 FLOPPY DISK IOTS

          6751  LCD=6751        /LOAD COMMAND REGISTER
          6752  XDR=6752        /TRANSFER DATA REGISTER
          6753  STR=6753        /SKIP ON TRANSFER REQUEST, CLEAR FLAG
          6754  SER=6754        /SKIP ON ERROR FLAG, CLEAR FLAG
          6755  SDN=6755        /SKIP ON DONE FLAG, CLEAR FLAG
          6757  INIT=6757       /INITIALIZE RX01, RECALIBRATE DRIVES

                NOPUNCH
          0000  *0                      /TEMPORARIES IN PANEL READ-WRITE MEMORY
 00000    0000  ORIGIN, 0               /POINTER TO MAIN MEMORY
 00001    0000  PSTAT,  0               /PANEL STATUS WORD
 00002    0000  ACSAV,  0
          0005  *5              / **** DON'T CHANGE--DEFINES BAUD RATE CONSTANT ALSO ****
 00005    0000  STATUS, 0               /FLAGS--LINK, INT BUS, INT ENA, I.F., D.F.

                /AUTO INDEX LOCATIONS ARE 10-17

          0020  *20
 00020    0000  FLDCHG, 0               /ENTRY TO FIELD CHANGE SUBROUTINE
 00021    0000  MEMFLD, 0               /CDF OR CDIF INSTRUCTION GOES HERE
          0022  RAREA=.
                /THIS AREA IS FILLED FROM ROM WITH SUBROUTINE LINKS AND CONSTANTS
                /       (SEE PAGE 9)
          0070  *70
                /NOW FOR SOME VARIABLE STORAGE
 00070    0000  CHAR,   0
 00071    0000  PCOUNT, 0
 00072    0000  WORD1,  0
 00073    0000  WORD2,  0
 00074    0000  CKSUM,  0
 00075    0000  OTEMP,  0
 00076    0000  OCTR,   0
 00077    0000  DELAY1, 0
                ENPUNCH
          6000  *6000
 06000    6074  CRASH,  PER             /IN CASE R/W MEMORY GOES BESERK, WE MIGHT "AND"
 06001    5200          JMP .-1         /UP THRU MEMORY TO HERE.  HANG AND TURN OFF "CPU OK" LIGHT
 06002    5354  HYPHEN, JMP END3
 06003    5275  START,  JMP BOOT

                ////////////////////////  PANEL CALL HANDLER  ////////////////////////////////
 06004    3002  PANEL,  DCA ACSAV       /SAVE ALL PERTINENT REGISTERS, SUCH AS AC
 06005    6004          GTF
 06006    0303          AND PK7700      /LINK, INT BUS, INT ENABLE
 06007    3005          DCA STATUS
 06010    6214          RDF
 06011    7110          RAR CLL
 06012    7012          RTR
 06013    6224          RIF             /INSTRUCTION AND DATA FIELDS
 06014    1005          TAD STATUS
 06015    3005  PK05,   DCA STATUS      /CONSTANT DEPENDS ON STATUS WORD BEING IN
 06016    7604          LAS                     /CORRECT PLACE
```



```
 06017    7006          RTL             /EXAMINE SR BIT 2 TO SEE WHICH BAUD RATE
 06020    7700          SMA CLA
 06021    1224          TAD PK11
 06022    1215          TAD PK05        /4 LSB ARE 16 (IF SR2 WAS 0) OR 5 (IF SR2 WAS 1)
 06023    6043          TSB             /SET LOCAL TERMINAL BAUD RATE
 06024    6271  PK11,   CDF 70          /THAT'S US, FOLKS!!
 06025    7200          CLA             /FOR SAFETY'S SAKE, IN CASE C0 IS BAD
 06026    6071          PRS             /GET PANEL STATUS BITS
 06027    7450          SNA
 06030    5200          JMP CRASH       /NO STATUS BITS AROUND--BAD!!!
 06031    7510          SPA             /AC0 = 1 MEANS FIRST START AFTER POWER ON
 06032    5652          JMP I STRT      /FILL PANEL PAGE 0 AND RUN DIAGNOSTIC
 06033    7006          RTL
 06034    3001          DCA PSTAT       /SAVE HLT BIT (IT'S AC 0).  WE'LL NEED IT LATER.
 06035    1001          TAD PSTAT
 06036    7730          SZL SPA CLA     /SKIP IF LINK AND AC0 BOTH ZERO
 06037    5271          JMP BTORHT      /EITHER A PROGRAM HALT OR DEPRESSED BOOSTRAP BUTTON
 06040    1335          TAD KCDF        /PANEL CALL FROM PROGRAM (BY DEFAULT)
 06041    6224          RIF
 06042    3021          DCA MEMFLD
 06043    4020          JMS FLDCHG      /EXECUTE A CDF TO CALLING FIELD
 06044    1400          TAD I ORIGIN    /GET ARGUMENT--SEE WHERE IN PAN MEM TO GO
 06045    3020          DCA FLDCHG
 06046    6271          CDF 70          /NOW BACK TO THIS FIELD
 06047    2000          ISZ ORIGIN      /INCREMENT RETURN
 06050    0215  PK215,  215             /YE CARRIAGE RETURN; ALSO WRAPAROUND PROTECTION
 06051    5420          JMP I FLDCHG    /NOW GO TO CALLED ROUTINE

 06052    6471  STRT,   STRTUP
                ////////////////////////  PRINT REGISTERS ////////////////////////////////
 06053    1005  PCACMQ, TAD STATUS      /GET L, INT BUS, INT ENA, INSTRUCTION AND DATA FIELDS
 06054    4034          JMS OCTPNT      /PRINT THEM
 06055    1000          TAD ORIGIN      /NOW PRINT THE PC,
 06056    4034          JMS OCTPNT
 06057    4037          JMS MSG
 06060    7340          TEXT %; AC,MQ%  /THIS MESSAGE,
 06061    0103
 06062    5415
 06063    2100
 06064    1002          TAD ACSAV       /AC,
 06065    4034          JMS OCTPNT
 06066    7701          MQA CLA
 06067    4034          JMS OCTPNT      /AND THE MQ
 06070    5445          JMP I PCPNT

                ////////////////////////  HLT AND BOOTSTRAP BUTTON PROCESSOR  ////////////////////
 06071    4050  BTORHT, JMS DELAY       /TIME OUT TO LET ANY INPROCESS CHAR XMIT
 06072    6037          KLB             /CLEAR THE LOOP-BACK FLIP FLOP IN CASE IT'S SET
 06073    7420          SNL             /LINK IS SET IF BOOTSTRAP BUTTON WAS PUSHED
 06074    5310          JMP HLTCHK      /OTHERWISE WE'RE HERE BECAUSE OF PROGRAM HALT
 06075    4031  BOOT,   JMS CRLF        /       /(BOOTSTRAP OVER-RIDES HALT)
 06076    4037          JMS MSG
 06077    2324          TEXT %START%    /PRINT THIS MESSAGE
 06100    0122
 06101    2400
 06102    1001          TAD PSTAT
```

```
158   06103  7700  PK7700, SMA CLA          /(BYPASS PRINTING OF REGISTERS IF IN HLT)
159   06104  4045          JMS PCPNT        /AND PRINT THE FLAGS, FIELDS, PC, AC AND MQ
160   06105  7001          IAC
161   06106  3063          DCA HLTFLG
162   06107  5465          JMP I KBOOT1
163
164   06110  1063  HLTCHK, TAD HLTFLG
165   06111  7700          SMA CLA          /ARE WE TESTING THE HLT INSTRUCTION?
166   06112  5317          JMP HLTD1        /NO--THIS IS A REAL LIVE HALT
167   06113  1000          TAD ORIGIN       /YES--MAKE SURE ADDRESS CORRECT
168   06114  1064          TAD HLTADR
169   06115  7650          SNA CLA          /COMPARE ORIGIN WITH EXPECTED
170   06116  5334          JMP HLTOK        /HALT INSTRUCTION WORKED.  BACK TO DIAGNOSTIC
171   06117  4031  HLTD1,  JMS CRLF
172   06120  4037          JMS MSG          /PROGRAM HALT--PRINT
173   06121  1014          TEXT %HLT%       /THIS MESSAGE,
174   06122  2400
175   06123  4045          JMS PCPNT        /AND THE STATE OF THE MACHINE
176   06124  1063          TAD HLTFLG       /INITIALLY, HLTFLG = -1 (WHEN PANEL PG 0 IS FILLED)
177                                         /HENCE THE "SMA CLA" AT HLTCHK+1 SKIPS..
178                                         /AFTER HLT INSTRUCTION TESTED, HLTFLG=0
179   06125  7750          SNA SPA CLA      /HENCE DIAGNOSTIC HLT PRINTS MESSAGE AND RESTARTS
180   06126  5652          JMP I STRT       /DIAGNOSTIC.  AFTER DIAGNOSTIC, HLTFLG=1 AND THE
181                                         /"SNA SPA CLA" SKIPS, CAUSING A WAIT FOR BOOTSTRAP
182                                         /BUTTON.
183   06127  6071  HLTD2,  PRS
184   06130  7006          RTL
185   06131  7620          SNL CLA          /ONLY THE BOOTSTRAP BUTTON GETS US OUT OF HALT
186   06132  5327          JMP HLTD2        /HANG UNTIL IT IS PUSHED.
187   06133  5275          JMP BOOT
188
189   06134  3063  HLTOK,  DCA HLTFLG       /HLT INSTRUCTION TESTS OUT OK--BUMP HLTFLG
190   06135  6201  KCDF,   CDF 0
191   06136  2000          ISZ ORIGIN       /       (WILL NEVER SKIP, SINCE ORIGIN=HLTADR)
192   06137  5466          JMP I PSTAR2     /AND GO BACK TO THE REST OF THE DIAGNOSTIC
193
194                ////////////// CHARACTER ECHO TEST, DRAW LINE OF HYPHENS //////////////////
195   06140  4031  END,    JMS CRLF
196   06141  5344          JMP .+3
197   06142  6036  ECHO,   KRB             /GET CHARACTER
198   06143  4026          JMS TYPE         /ECHO IT
199   06144  1062          TAD PM110        /-200 (OCTAL) TO AC
200   06145  3071          DCA PCOUNT       /RESET TIMEOUT COUNTER
201   06146  6031  END1,   KSF
202   06147  7410          SKP
203   06150  5342          JMP ECHO         /CHARACTER SEEN.  ECHO IT, AND RESET TIMEOUT
204   06151  4050          JMS DELAY
205   06152  2071          ISZ PCOUNT
206   06153  5346          JMP END1
207   06154  4031  END3,   JMS CRLF        /TIME-OUT OCCURED.
208   06155  1062          TAD PM110
209   06156  3074          DCA CKSUM
210   06157  1061  END2,   TAD PK255       /DRAW A LINE OF HYPHENS ACROSS PAGE
211   06160  4026          JMS TYPE
212   06161  2074          ISZ CKSUM
213   06162  5357          JMP END2
```



```
214   06163  4031          JMS CRLF
215   06164  4023          JMS MOVE
216   06165  6672          STDIAG-1
217   06166  0065          DIAG-1
218   06167  6706          DIAG-LAST
219   06170  1123          NULJOB           /MOVE IN THE ENTIRE DIAGNOSTIC (PERHAPS AGAIN), AND
220                                         /START AT "NULJOB"
221
222   06171  7200  CRLF1,  CLA             /TYPE CARRIAGE RETURN AND LINE FEED
223   06172  1250          TAD PK215
224   06173  4026          JMS TYPE
225   06174  1060          TAD PK212
226   06175  4026          JMS TYPE
227   06176  5431          JMP I CRLF
228   06177  0000  ZBLOCK 6200-.
229          6200  *6200
230   06200  5331  RX01,   JMP FLOPPY
231
232                ////////////////////////// BINARY LOADER FOR MR78 //////////////////////
233                /WORKS LIKE STANDARD BINARY LOADER, EXCEPT
234                /       1. USES ONLY HIGH-SPEED "PAPER TAPE" INPUT
235                /       2. USES SR3-5 TO DETERMINE HOW MANY PROGRAMS TO LOAD
236                /       3. EXPECTS A FIELD AND ORIGIN STATEMENT AT THE END
237                /          OF "TAPE" IN ORDER TO DEFINE START OF PROGRAM.
238                /       4. NO PROVISION FOR RUBOUT.
239                /       5. TAPES MUST BE CONTIGUOUS--NO HALTS (NO CONTINUE BUTTON!!)
240
241   06201  6016  BEGIN,  RRB RFC           /WE START THE READ THIS WAY SO
242                                         /THE INTERFACE USES ONLY 2 IOTS
243   06202  7604          LAS              /(THROW AWAY FIRST WORD--IT'S ALWAYS L-T)
244   06203  7002          BSW              /GET BITS 3-5.
245   06204  0057          AND PK7
246   06205  7040          CMA
247   06206  3071          DCA PCOUNT       /COMPLEMENT AND SAVE AS NUMBER OF PGMS TO LOAD
248   06207  6203  KCDIF,  CDF CIF          /IN CASE NO FIRST FIELD STATEMENT
249   06210  4054          JMS BEGG         /CALL LEADER-TRAILER EXTRACT ROUTINE
250   06211  5210          JMP .-1          /AND HANG IN THERE UNTIL PAST LEADER
251
252   06212  3074  GO,     DCA CKSUM        /CLEAR OR ACCUMULATE CHECKSUM
253   06213  4020          JMS FLDCHG       /MAKE SURE FIELD IS UP TO DATE
254   06214  1070          TAD CHAR         /GET CHARACTER
255   06215  3072          DCA WORD1        /SAVE AS FIRST CHARACTER
256   06216  6011          RSF              /OF A 12-BIT WORD
257   06217  5216          JMP .-1
258   06220  6016          RRB RFC          /READ SECOND CHARACTER
259   06221  3073          DCA WORD2        /AND SAVE
260   06222  4054          JMS BEGG         /LOOK AHEAD AT NEXT CHARACTER
261   06223  5244          JMP BEND         /TRAILER--END--CHECK CHECKSUM AND COUNT
262   06224  1072          TAD WORD1        /ORIGIN OR DATA--GO ON
263   06225  7106          CLL RTL
264   06226  7006          RTL
265   06227  7006          RTL
266   06230  1073          TAD WORD2        /ASSEMBLE 12-BIT WORD.  WORD IS DATA IF L = 0
267   06231  7420          SNL              /SKIP IF ORIGIN STATEMENT
268   06232  5240          JMP DEPOS        /DATA STATEMENT--DEPOSIT
269   06233  3000          DCA ORIGIN       /ORIGIN--SAVE AT "ORIGIN" LOCATION
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270   06234  1072  CHEX,   TAD WORD1
271   06235  1073          TAD WORD2
272   06236  1074          TAD CKSUM       /COMPUTE CHECKSUM
273   06237  5212          JMP GO
274
275   06240  3400  DEPOS,  DCA I ORIGIN    /DATA--DEPOSIT IN DATA FIELD, AT LOC ADDRESSED BY ORIGIN
276   06241  2000          ISZ ORIGIN
277   06242  0070  FMASK,  70              /ALSO SERVES AS A NOP IN CASE OF WRAP-AROUND!!
278   06243  5234          JMP CHEX
279
280   06244  4020  BEND,   JMS FLDCHG
281   06245  1072          TAD WORD1       /TRAILER SEEN--
282   06246  7002          BSW
283   06247  1073          TAD WORD2       /ASSEMBLE THE CHECKSUM FROM INPUT
284   06250  7041          CIA
285   06251  1074          TAD CKSUM       /COMPARE WITH COMPUTED VALUE
286   06252  7640          SZA CLA         /RESULT BETTER BE ZERO!!!
287   06253  5305          JMP BADRD       /ELSE COMPLAIN
288   06254  2071          ISZ PCOUNT      /SEE IF LAST PROGRAM
289   06255  5210          JMP KCDIF+1     /NO--KEEP READING
290   06256  1001  PSTART, TAD PSTAT
291   06257  7710          SPA CLA         /IS CPU HALTED?
292   06260  6072          PST             /YEAH.  START IT.
293   06261  6007          CAF             /CLEAR THE I/O WORLD
294   06262  6001  PSTAR1, ION             /AND GET OUT OF PANEL MODE
295   06263  5400          JMP I ORIGIN
296   06264  5662          JMP I PSTAR1    /WE DID NOT GET OUT OF PANEL MEMORY!!!!
297                                        /JMP I PSTAR1 SAVES A LOC, AND GETS US TO "CRASH"!!
298
299                /EXTRACT LEADER/TRAILER, HANDLE FIELD.
300                /UNLIKE PAPER TAPE BINARY LOADER OF OLD, THIS PROGRAM DOES NOT
301                /HANDLE RUBOUTS.
302                /       RETURNS TO CALL + 1 IF LEADER-TRAILER
303                /       RETURNS TO CALL + 2 IF ORIGIN OR DATA
304                /       HANDLES FIELD STATEMENTS INTERNALLY
305   06265  6011  BEGG1,  RSF
306   06266  5265          JMP .-1
307   06267  6016          RRB RFC         /READ CHARACTER
308   06270  3070          DCA CHAR        /SAVE CHARACTER
309   06271  1070          TAD CHAR
310   06272  7042          BSW CMA         /COMPLEMENT BITS--MAKES BIT TESTING EASIER
311   06273  7012          RTR             /HOLE 8 IN LINK, HOLE 7 IN AC0
312   06274  7430          SZL             /SKIP IF FIELD OR L-T
313   06275  2054          ISZ BEGG        /DATA OR ORIGIN--RETURN TO CALL+2
314   06276  7730          SZL SPA CLA     /SKIP IF BOTH LINK AND SIGN ARE 0 (IE, FIELD)
315   06277  5454          JMP I BEGG      /BACK TO MAIN PROGRAM--NOT FIELD
316   06300  1070  FLD,    TAD CHAR        /IT'S A FIELD STATEMENT
317   06301  0242          AND FMASK       /ISOLATE FIELD BITS
318   06302  1207          TAD KCDIF       /AND SAVE INSTRUCTION IN READ-WRITE MEMORY
319   06303  3021          DCA MEMFLD      /NOTE: DO NOT ADD CHARACTER TO CHECKSUM!!
320   06304  5265          JMP BEGG1       /NOW GET NEXT CHARACTER
321
322   06305  4031  BADRD,  JMS CRLF        /BINARY LOADER CHECKSUM ERROR.
323   06306  4037          JMS MSG
324   06307  1404          TEXT %LD ER%    /WARN OPERATOR AND
325   06310  4005
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326   06311  2200
327   06312  5713          JMP I .+1       /WAIT FOR BOOTSTRAP BUTTON
328   06313  6127          HLTD2
                  ////////////////////////////  MORE BOOTSTRAP STUFF  ////////////////////////////
329
330   06314  4023  BOOT1,  JMS MOVE        /TURN INTERRUPT OFF BY EXITING TO MAIN MEMORY
331   06315  6320          INTOFF-1
332   06316  0003          3               /AND EXECUTING "IOF"
333   06317  7775          -3
334   06320  0004          4               /THEN BACK TO BOOT2 TO SEE WHAT TO DO NEXT
335   06321  6002  INTOFF, IOF             /THIS GOES IN LOC 4,5,6 OF FIELD 0---
336   06322  6073          PRQ             /SINCE THESE LOCATIONS ARE USED BY ODT BKPNT, THIS
337   06323  6324          BOOT2           /CAUSES THE LEAST ANNOYANCE.
338   06324  7604  BOOT2,  LAS             /MR78 LOADER IS CALLED IF EITHER SR0 OR SR1 IS 1
339   06325  6313          TSB1            /SET BAUD RATE FROM SWITCHES
340   06326  7004          RAL             ///***WATCH OUT--CF IS 0 BECAUSE OF LAST MOVE***
341   06327  7730          SPA SZL CLA     /SKIPS ONLY IF BOTH L AND AC0 ARE ZERO
342   06330  5201          JMP BEGIN       /MR78.  RUN BINARY LOADER.
343                  ////////////////////  BOOTSTRAP (START) THE FLOPPY DISK  ////////////////////
344   06331  4023  FLOPPY, JMS MOVE
345   06332  6335          PFLBT-1         /FROM
346   06333  0023          FBOOT-1         /TO
347   06334  7742          FBOOT-X6030-1   /-NUMBER OF WORDS
348   06335  0033          HANGGG          /STARTING ADDRESS OF BOOTSTRAP
349
350          6336  PFLBT=.          / ** CAUTION **  DON'T TRY TO USE ODT BREAKPOINT WITH THE
351          0024  RELOC 24         /RX01 BOOTSTRAP.  THE SECONDARY BOOT OVERLAYS THE BKPT LINKAGE.
352          0002  BOOTST=2                 /FIRST LOCATION OF RX01 SECONDARY BOOTSTRAP
353                ///////  THE ACTUAL BOOTSTRAP--THIS IS LOADED INTO FIELD 0 AND RUN THERE  ////
354   00024* 7126  FBOOT,  STL RTL          /AC=2 IN LSB
355   00025* 1060          TAD UNIT        /PLUS UNIT = READ COMMAND
356   00026* 6751          LCD             /LOAD THE COMMAND
357   00027* 7201          CLA IAC         /AC=1
358   00030* 4053          JMS LOAD        /LOAD TRACK 1
359   00031* 4053          JMS LOAD        /AND SECTOR 1
360   00032* 7104          CLL RAL         /AC = 2--READ
361   00033* 6755  HANGGG, SDN             /SKIP IF FLOPPY DONE.  BOOT STARTS HERE.
362   00034* 5054          JMP LOAD+1      /STILL WAITING.  TRY TRANSFER FLAG.
363   00035* 6754          SER             /TEST FOR ERROR
364   00036* 7450          SNA
365   00037* 7610          SKP CLA
366   00040* 5046          JMP GOODRD      /NO ERRORS, FLOPPY DONE--GO EMPTY BUFFER
367   00041* 1060          TAD UNIT        /ERROR--SET UP FOR OTHER UNIT
368   00042* 7041          CIA
369   00043* 1061          TAD X6030       /  (TRICKY ARITHMETIC HERE!!)
370   00044* 3060          DCA UNIT
371   00045* 5024          JMP FBOOT       /AND TRY AGAIN
372   00046* 6751  GOODRD, LCD             /CLEARS AC
373   00047* 4053  LP,     JMS LOAD        /GET A DATA WORD
374   00050* 3002          DCA BOOTST      /STORE IT
375   00051* 2050          ISZ .-1         /AND BUMP POINTER
376   00052* 5047          JMP LP          /DO IT AGAIN, UNTIL SECONDARY BOOTSTRAP OVERLAYS THIS CODE
377   00053* 0000  LOAD,   0
378   00054* 6753          STR             /SKIP IF OK TO TRANSFER
379   00055* 5033          JMP HANGGG      /NO--HANG IN FIGURE 8 LOOP
380   00056* 6752          XDR             /TRANSFER THE DATA (AC NOT CLEARED)
381   00057* 5453          JMP I LOAD
```

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382   00060* 7024  UNIT,   7024            /"UNIT" EQUALS 7004 OR 7024
383   00061* 6030  X6030,  6030            /YE MAGIC CONSTANT
384          6374  RELOC
385                /START-UP STUFF.  FILL PANEL R/W MEMORY WITH SUB LINKS AND CONSTANTS.
386
387   06374  0000  ZBLOCK 6400-.
388          6400  *6400
389   06400  7733  KRELSZ, -OFFSET
390   06401  0021  KRAREA, RAREA-1
391   06402  6402  PZREL,  .
392
393          0022  RELOC RAREA
394
395                /JUST A REMINDER--
396                /*20
397                /FLDCHG,        0       /ENTRY TO FIELD CHANGE SUBROUTINE
398                /MEMFLD,        0       /BECOMES CDF OR CDF CIF
399                /THIS NEXT STUFF GETS MOVED ONTO PANEL PAGE 0
400
401                //////////  PANEL PAGE 0 SUBROUTINE LINKS AND CONSTANTS  /////////////////
402   00022* 5420          JMP I FLDCHG
403
404   00023* 0000  MOVE,   0               /COLLECT ARGUMENTS FOLLOWING CALL.  MOVE CODE TO
405   00024* 5425          JMP I .+1       /FIELD 0, THEN START THE CODE.
406   00025* 6573          MOVE1
407
408   00026* 0000  TYPE,   0               /TYPE THE CHARACTER IN THE AC, RETURN WITH 0 AC
409   00027* 5430          JMP I .+1       /LINK PRESERVED
410   00030* 6616          TYPE1
411
412   00031* 0000  CRLF,   0               /TYPE A CARRIAGE RETURN AND LINE FEED
413   00032* 5433          JMP I .+1       /AC IGNORED, RETURNS 0.  LINK PRESERVED.
414   00033* 6171          CRLF1
415
416   00034* 0000  OCTPNT, 0               /TYPE THE CONTENTS OF THE AC AS OCTAL DIGITS
417   00035* 5436          JMP I .+1       /CAUTION--LINK MODIFIED
418   00036* 6623          OCTPN1
419
420   00037* 0000  MSG,    0               /PRINT THE TEXT STRING FOLLOWING THE CALL
421   00040* 5441          JMP I .+1       /AC MUST BE 0 AT CALL, RETURNS 0.  LINK PRESERVED.
422   00041* 6644          MSG1
423
424   00042* 0000  PCHAR,  0               /CONVERT SIX-BIT CHAR TO ASCII AND TYPE
425   00043* 5444          JMP I .+1       /ENTER WITH CHAR IN AC.  RETURNS 0 AC,
426   00044* 6656          PCHAR1          /PRESERVED LINK
427
428   00045* 0000  PCPNT,  0               /PRINT FLAGS, PC, AC, MQ
429   00046* 5447          JMP I .+1       /ENTER WITH 0 AC.  RETURNS 0 AC, LINK MODIFIED.
430   00047* 6053          PCACMQ
431
432   00050* 0000  DELAY,  0               /.063 SEC DELAY
433   00051* 2077          ISZ DELAY1
434   00052* 5051          JMP .-1
435   00053* 5450          JMP I DELAY
436
437   00054* 0000  BEGG,   0               /BIN LOADER L/T EXTRACT
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438   00055* 5456          JMP I .+1
439   00056* 6265          BEGG1
440   00057* 0007  PK7,    7
441   00060* 0212  PK212,  212
442   00061* 0255  PK255,  255             /ASCII HYPHEN
443   00062* 7670  PM110,  -110
444   00063* 7777  HLTFLG, -1
445   00064* 7633  HLTADR, -PGMHLT-1
446   00065* 5314  KBOOT1, BOOT1
447   00066* 6256  PSTAR2, PSTART
448
449          0045  OFFSET=.-RAREA
450
451          6450  RELOC
452   06450  7701  PM77,   -77
453   06451  6000  PK6000, 6000            /YE BOTTOME ROM ADDRESS; ALSO LOCATION OF "CRASH" ROUTINE
454   06452  4037  CKSUM1, -3741
455   06453  4216  CKSUM2, ROMSUM
456   06454  6560  KMMER,  MMER
457
458   06455  3002  MMERR,  DCA ACSAV              /OFFENDING BITS IN AC
459   06456  6271          CDF 70
460   06457  1010          TAD 10
461   06460  7421          MQL             /ADDRESS IN MQ
462   06461  3005          DCA STATUS
463   06462  1254          TAD KMMER
464   06463  3000          DCA ORIGIN
465   06464  5665          JMP I .+1
466   06465  6117          HLT01
467
468   06466  7001  APT,    IAC             /MAKE HLTFLG 1, SO STRAY HALTS WILL HANG UP CPU
469   06467  3063          DCA HLTFLG
470   06470  5465          JMP I KBOOT1    /NOW RUN MR78
471
472                //////////////////  BEGINNING OF THE INTERNAL DIAGNOSTIC  //////////////////////
473                ////////////////////////THIS PART RUNS IN PANEL MEMORY  ////////////////////////
474   06471  7200  STRTUP, CLA
475   06472  3000          DCA ORIGIN
476   06473  1000  CPLOOP, TAD ORIGIN       /FILL CP RAM (ADDRESSES 1-77) WITH ADDRESS
477   06474  3400          DCA I ORIGIN
478   06475  2000          ISZ ORIGIN
479   06476  5273          JMP CPLOOP
480   06477  2000  CPRAM,  ISZ ORIGIN       /PERFORM CHECKSUM ON CP RAM
481   06500  1400          TAD I ORIGIN     /USING LOCATION 0 AS ADDRESS POINTER
482   06501  1001          TAD PSTAT        /AND LOCATION 1 AS CHECKSUM ACCUMULATOR
483   06502  3001          DCA PSTAT
484   06503  1000          TAD ORIGIN
485   06504  1250          TAD PM77
486   06505  7710          SPA CLA
487   06506  5277          JMP CPRAM        /NOT DONE YET--GO BACK FOR MORE
488   06507  1001          TAD PSTAT        /COMPARE ACCUMULATED SUM WITH EXPECTED
489   06510  1252          TAD CKSUM1       /IS RESULT CORRECT?
490   06511  7440          SZA
491   06512  5651          JMP I PK6000     /NO--CP RAM FAILURE--TURN OFF "OK" LIGHT
492   06513  7330          CLA STL RAR      /4000 TO AC
493   06514  3001          DCA PSTAT        /SET "HLT" BIT IN PANEL STATUS WORD
```

24

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494   06515  1251  CPROM,  TAD PK6000      /NOW TRY A CHECKSUM ON THIS ROM.
495   06516  3000          DCA ORIGIN
496   06517  1400          TAD I ORIGIN
497   06520  2000          ISZ ORIGIN
498   06521  5317          JMP .-2
499   06522  7440          SZA                   /CKSUM2 IS SUCH THAT RESULT BETTER BE 0
500   06523  5651          JMP I PK6000    /IT ISN'T--TURN OFF "OK" LIGHT.
501   06524  1202  PAGE0,  TAD PZREL       /MOVE PANEL PAGE 0 INTO PLACE
502   06525  3010          DCA 10
503   06526  1201          TAD KRAREA
504   06527  3011          DCA 11
505   06530  1200          TAD KRELSZ
506   06531  3012          DCA 12
507   06532  1410          TAD I 10
508   06533  3411          DCA I 11
509   06534  2012          ISZ 12
510   06535  5332          JMP .-3
511   06536  7604          LAS
512   06537  7004          RAL
513   06540  7710          SPA CLA
514   06541  5266          JMP APT           /SR SAYS THE APT LINE IS LOOKING FOR A BOOTSTRAP
515   06542  7344          STA CLL RAL
516   06543  6313          TSB1              /SET SLU2 AND SLU3 TO 9600 BAUD
517   06544  6333          TSB2
518   06545  6201  MMFLD0, CDF 0             /NOW PERFORM AN ADDRESS TEST ON MAIN MEMORY
519   06546  7240          STA
520   06547  3010          DCA 10
521   06550  1000          TAD ORIGIN
522   06551  3410          DCA I 10
523   06552  2000          ISZ ORIGIN
524   06553  5350          JMP .-3
525   06554  1410  FLD0CK, TAD I 10          /COMPARE CONTENTS
526   06555  7041          CIA
527   06556  1000          TAD ORIGIN        /WITH EXPECTED
528   06557  7440          SZA
529   06560  5255  MMER,   JMP MMERR         /NOT SAME--COMPLAIN
530   06561  2000          ISZ ORIGIN        /AND DO ALL ADDRESSES
531   06562  5354          JMP FLD0CK
532   06563  4031          JMS CRLF
533   06564  4037          JMS MSG
534   06565  0100          TEXT %A%          /TYPE "A"--PANEL R/W MEMORY FILLED
535   06566  4023          JMS MOVE          /LOAD AND RUN THE DIAGNOSTIC
536   06567  6672          STDIAG-1          /FROM
537   06570  0065          DIAG-1            /TO
538   06571  6706          DIAG-LAST         /SIZE
539   06572  0141          OPRAT2            /STARTING ADDRESS
540
541                 ///////////////  MISCELLANEOUS SUBROUTINES IN PANEL MEMORY  ///////////////////
542   06573  6271  MOVE1,  CDF 70            /FIX DF IN CASE BOOTSTRAPPING FLOPPY AFTER IOF
543   06574  1423          TAD I MOVE
544   06575  3010          DCA 10            /"FROM"
545   06576  2023          ISZ MOVE
546   06577  1423          TAD I MOVE
547   06600  3011          DCA 11            /"TO"
548   06601  2023          ISZ MOVE
549   06602  1423          TAD I MOVE
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550   06603  3012          DCA 12            /"-NUMBER OF WORDS"
551   06604  2023          ISZ MOVE
552   06605  1423          TAD I MOVE
553   06606  3000          DCA ORIGIN        /STARTING ADDRESS IN MAIN MEMORY
554   06607  6271  MOVE2,  CDF 70
555   06610  1410          TAD I 10
556   06611  6203          CDF CIF 0
557   06612  3411          DCA I 11
558   06613  2012          ISZ 12
559   06614  5207          JMP MOVE2
560   06615  5466          JMP I PSTAR2
561
562   06616  6046  TYPE1,  TLS               /REST OF TYPE CHARACTER ROUTINE
563   06617  6041          TSF
564   06620  5217          JMP .-1
565   06621  7200          CLA
566   06622  5426          JMP I TYPE
567
568   06623  7004  OCTPN1, RAL               /OCTAL PRINT OF C(AC)
569   06624  3075          DCA OTEMP         /SHIFT AC ONE PLACE (ACCOUNT FOR LINK)
570   06625  1267          TAD PM4
571   06626  3076          DCA OCTR          /SET UP COUNTER FOR NUMBER OF DIGITS
572   06627  1271          TAD PK240
573   06630  4026          JMS TYPE
574   06631  1075  OCTPN2, TAD OTEMP         /GET WORD
575   06632  7006          RTL
576   06633  7004          RAL               /ROTATE LEFT 3 PLACES
577   06634  3075          DCA OTEMP
578   06635  1075          TAD OTEMP         /SAVE
579   06636  0057          AND PK7           /KEEP ONLY OCTAL DIGIT
580   06637  1272          TAD PK260         /CONVERT TO ASCII DIGIT
581   06640  4026          JMS TYPE
582   06641  2076          ISZ OCTR          /KEEP GOING UNTIL ALL 4 DIGITS PRINTED
583   06642  5231          JMP OCTPN2
584   06643  5434          JMP I OCTPNT
585
586   06644  6271  MSG1,   CDF 70
587   06645  1437          TAD I MSG         /PRINT TEXT FOLLOWING CALL--GET PIECE OF TEXT
588   06646  2037          ISZ MSG                 /INCREMENT RETURN
589   06647  3074          DCA CKSUM         /AS GOOD A PLACE FOR TEMP STORAGE AS ANY!
590   06650  1074          TAD CKSUM
591   06651  7002          BSW
592   06652  4042          JMS PCHAR         /PROCESS LEFT HALF--STRIP OFF UNWANTED BITS, CONVERT
593   06653  1074          TAD CKSUM
594   06654  4042          JMS PCHAR         /DO SAME FOR RIGHT HALF
595   06655  5244          JMP MSG1          /GO BACK FOR MORE
596
597   06656  0270  PCHAR1, AND PK77                /THROW AWAY WRONG HALF OF WORD
598   06657  7450          SNA
599   06660  5437          JMP I MSG         /IF RESULTING CHARACTER IS 0, END OF MESSAGE
600   06661  1271          TAD PK240               /OTHERWISE, COMPLEMENT BIT 6
601   06662  0270          AND PK77
602   06663  1271          TAD PK240         /CONVERT TO ASCII
603   06664  4026          JMS TYPE          /AND TYPE
604   06665  5442          JMP I PCHAR
605
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606   06666  7700  PM100,  -100
607   06667  7774  PM4,    -4
608   06670  0077  PK77,   77
609   06671  0240  PK240,  240
610   06672  0260  PK260,  260
611
612          0066  DIAG=66          /CHANGE WITH CAUTION!!  WATCH PAGE BOUNDARIES.
613
614                /SOME PAGE ZERO VARIABLES AND FUNNY OPERATES FOR OPRATE AND MRI TESTS
615          7401  MQNOP=7401
616          7601  MQCLA=7601
617                /THE FOLLOWING RESIDE IN PAGE 0, FIELD 0 OF MAIN MEMORY
618          0020  REGA=20
619          0021  REGB=21
620          0022  A=22
621          0023  B=23
622          0024  C=24
623          0026  KLTRS=26
624          0025  D=25
625
626          6673  STDIAG=.                /START OF THE DIAGNOSTIC STUFF
627          0066  RELOC DIAG
628
629                ////////////////  CONTINUATION OF THE INTERNAL DIAGNOSTIC  ////////////////////
630                //////////  THIS PART IS MOVED INTO MAIN MEMORY, AND RUN THERE.  ////////////
631   00066* 7402  HALT,   HLT             /PROTECTION FOR WRAP-AROUND, ETC
632   00067* 0067  ESCSEQ, .
633   00070* 7745          -33             /ESCAPE SEQUENCE FOR BOOTSTRAP FROM DOWN-LINE
634   00071* 7735          -43             /SEQ IS ESC--NBR SIGN--SPACE--0
635   00072* 7740          -40             /NOTICE--NO "200" BIT
636   00073* 7720          -60
637   00074* 0007  K7,      7              /ALSO TERMINATES ESCAPE LIST BECAUSE IT'S +
638                /CONSTANTS
639   00075* 0100  M7700,  -7700
640   00076* 7401  M377,   -377
641   00077* 7750  M30,    -30
642   00100* 7765  M13,    -13
643   00101* 7772  M6,     -6
644   00102* 0010  K10,    10
645   00103* 0011  K11,    11
646   00104* 0077  K77,    77
647   00105* 0200  K200,   200
648   00106* 0300  K300,   300
649   00107* 7400  K7400,  7400
650   00110* 7700  K7700,  7700
651   00111* 0374  TAD1P,  TAD1
652   00112* 0710  XADDP,  XTDADD
653   00113* 1032  XTNP2,  KHLT+1
654   00114* 5515  INTJMP, JMP I INTLNK
655   00115* 0613  INTLNK, INTCHN
656   00116* 1007  KPRET,  PRET            /MUST FOLLOW INTLNK
657   00117* 1401  TLIMIT, -TBUF-400+1
658   00120* 5777  TTYBUF, TBUF-1
659   00121* 4200  KJMSC,  4200            /JMS CURRENT PAGE
660   00122* 0465  KRETUR, RETUR-1
661   00123* 4000  STRTBF, STRBUF
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662   00124* 0027  MODE2,  27
663   00125* 3777  KSTRBF, STRBUF-1
664   00126* 4263  R1,     4263
665   00127* 2634  R2,     2634
666   00130* 0302  KLTR,   "B
667   00131* 0000  TYPEIT, 0               /PRINT NEXT LETTER AT TERMINAL
668   00132* 1026          TAD KLTRS
669   00133* 6046          TLS
670   00134* 2026          ISZ KLTRS       /GO TO NEXT LETTER NEXT TIME AROUND
671   00135* 6041          TSF
672   00136* 5135          JMP .-1
673   00137* 7677  K7677,   7677            /SINCE THE EAE BITS ARE UNUSED, THIS IS SAME AS "CAM"
674   00140* 5531          JMP I TYPEIT
675                //////////////////////  DIAGNOSTIC--CPU OPERATE TEST  //////////////////////
676   00141* 6002  OPRAT2, IOF              /IN CASE WE RESTART AFTER SLU TEST HLT
677   00142* 1130          TAD KLTR        /SET UP PRINTOUT--ALLOWS RESTART WITH ODT
678   00143* 3026          DCA KLTRS
679   00144* 7402  PGMHLT, HLT             /MAKE SURE HALT IS WORKING
680   00145* 5145          JMP .           /HANG HERE IF IT DOESN'T
681   00146* 4131          JMS TYPEIT      /TYPE "B"--DIAGNOSTIC LOADED AND STARTED
682   00147* 7320  SKPTST, CLA CLL CML     /SOME STUFF FROM DEC/X8 OPRATE MODULE
683   00150* 7010          RAR
684   00151* 7440          SZA             /ROTATE A "1" RIGHT UNTIL AC=0, LINK=1
685   00152* 5150          JMP .-2
686   00153* 7041          CMA IAC         /NOW CIA--LINK SHOULD COMPLEMENT
687   00154* 7420          SNL
688   00155* 7440          SZA
689   00156* 7402          HLT             /SNL OR SZA PROBLEM
690
691   00157* 7020          CML             /DO SAME SORT OF THING AGAIN, THIS TIME GOING LEFT
692   00160* 7004          RAL
693   00161* 7450          SNA
694   00162* 7410          SKP
695   00163* 5160          JMP .-3
696   00164* 7061          CMA CML IAC
697   00165* 7430          SZL
698   00166* 7440          SZA
699   00167* 7402          HLT             /SZL OR SNA PROBLEM
700
701   00170* 7320          CLA CLL CML     /COMBINED SKIPS
702   00171* 7570          SPA SNA SZL
703   00172* 7560          SMA SZA SNL
704   00173* 7402          HLT             /PROBLEM WITH ONE OF THE ABOVE 2 INSTRUCTIONS
705   00174* 7070          CML CMA RAR
706   00175* 7570          SPA SNA SZL
707   00176* 7560          SMA SZA SNL
708   00177* 7402          HLT             /SKIP FAILURE--ONE OF 2 ABOVE INSTR
709   00200* 7141          CLL CMA IAC
710   00201* 7570          SPA SNA SZL
711   00202* 7560          SMA SZA SNL
712   00203* 7402          HLT             /SKIP FAILURE
713   00204* 7040          CMA
714   00205* 7560          SMA SZA SNL
715   00206* 7770          SPA SNA SZL CLA
716   00207* 7402          HLT             /YET ANOTHER SKIP FAILURE
717   00210* 7440          SZA
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718   00211* 7402          HLT             /DID THAT CLA BIT ABOVE REALLY CLEAR THE AC??
719   00212* 7001          IAC
720   00213* 7760          SMA SZA SNL CLA
721   00214* 7440          SZA
722   00215* 7402          HLT             /CLA DID NOT WORK??
723
724   00216* 7360 RUNIR,   CLA CLL CMA CML /COMBINED INCREMENT AND ROTATE TEST
725   00217* 7367          CLA CLL CMA CML IAC RTL /AC, LINK BOTH 0
726   00220* 7420          SNL
727   00221* 7440          SZA
728   00222* 7402          HLT             /IAC OR ROTATE FAILED
729   00223* 7060          CMA CML
730   00224* 7373          CLA CLL CMA CML IAC RTR /AC, LINK BOTH 0
731   00225* 7420          SNL
732   00226* 7440          SZA
733   00227* 7402          HLT             /IAC OR ROTATE FAILED
734   00230* 3020          DCA REGA
735   00231* 1020 RUNRT,   TAD REGA
736   00232* 7165          CLL CML CMA IAC RAL
737   00233* 7010          RAR
738   00234* 7073          CML CMA IAC RTR
739   00235* 7006          RTL
740   00236* 7071          CML CMA IAC RAR
741   00237* 7004          RAL
742   00240* 7067          CML CMA IAC RTL
743   00241* 7012          RTR
744   00242* 7041          CIA
745   00243* 1020          TAD REGA
746   00244* 7430          SZL
747   00245* 7440          SZA
748   00246* 7402          HLT             /COMBINED IAC, ROTATE DID NOT WORK
749   00247* 2020          ISZ REGA
750   00250* 5231          JMP RUNRT
751
752   00251* 1020 RNMQBS,   TAD REGA        /CHECK MQ AND BSW INSTRUCTIONS--GET NUMBER
753   00252* 7106          RTL CLL
754   00253* 7006          RTL             /SIMULATE BSW
755   00254* 7006          RTL
756   00255* 0110          AND K7700
757   00256* 3021          DCA REGB
758   00257* 1020          TAD REGA
759   00260* 7112          RTR CLL
760   00261* 7012          RTR
761   00262* 7012          RTR
762   00263* 0104          AND K77
763   00264* 1021          TAD REGB
764   00265* 7002          BSW             /NOW DO A REAL BSW TO GET ORIGINAL VALUE BACK
765   00266* 7041          CIA
766   00267* 1020          TAD REGA        /AND COMPARE WITH ORIGINAL
767   00270* 7440          SZA
768   00271* 7402          HLT             /BSW FAILED
769   00272* 1020          TAD REGA        /NOW TEST MQ INSTRUCTIONS
770   00273* 7040          CMA
771   00274* 3021          DCA REGB
772   00275* 1020          TAD REGA
773   00276* 7421          MQL
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774   00277* 7440          SZA
775   00300* 7402          HLT             /MQL DID NOT CLEAR AC
776   00301* 1021          TAD REGB
777   00302* 7521          SWP
778   00303* 7401          MQNOP           /MQ NOP = 7401
779   00304* 7041          CIA
780   00305* 1020          TAD REGA
781   00306* 7640          SZA CLA
782   00307* 7402          HLT             /MQ NOP DID SOMETHING ??
783   00310* 1020          TAD REGA
784   00311* 7601          MQCLA           /GROUP 3 CLA
785   00312* 7440          SZA
786   00313* 7402          HLT             /WELL, IT SHOULD HAVE, BUT IT DIDN'T CLEAR AC
787   00314* 1020          TAD REGA
788   00315* 7701          CLA MQA
789   00316* 7041          CIA
790   00317* 1021          TAD REGB
791   00320* 7440          SZA
792   00321* 7402          HLT             /CLA MQA COMBINATION BAD
793   00322* 1021          TAD REGB
794   00323* 7501          MQA
795   00324* 7041          CIA
796   00325* 1021          TAD REGB
797   00326* 7440          SZA
798   00327* 7402          HLT             /PROBLEM WITH MQA
799   00330* 1020          TAD REGA
800   00331* 7501          MQA
801   00332* 7040          CMA
802   00333* 7440          SZA
803   00334* 7402          HLT             /YET MORE PROBLEMS WITH MQA
804   00335* 1020          TAD REGA
805   00336* 7621          CLA MQL
806   00337* 7440          SZA
807   00340* 7402          HLT             /AC NOT ZEROED BY MQL
808   00341* 7701          CLA MQA
809   00342* 7440          SZA
810   00343* 7402          HLT             /MQ CAME BACK NOT ZERO
811   00344* 1020          TAD REGA
812   00345* 7421          MQL
813   00346* 1021          TAD REGB
814   00347* 7721          CLA SWP
815   00350* 7041          CIA
816   00351* 1020          TAD REGA
817   00352* 7440          SZA
818   00353* 7402          HLT             /PROBLEM WITH SWP ??
819   00354* 7701          CLA MQA
820   00355* 7440          SZA
821   00356* 7402          HLT             /PROBLEM WITH SWP ??--AC WAS OK BUT MQ BAD??
822   00357* 2020          ISZ REGA
823   00360* 5251          JMP RNMQBS      /DO ANOTHER NUMBER
824
825                ////////////////////  DIAGNOSTIC--CPU MRI TEST  ////////////////////////////
826   00361* 3024 TADTST,   DCA C           /SET UP COUNT
827   00362* 1126          TAD R1          /THIS STUFF DOES NOTHING SPECIAL ON A SINGLE PASS.
828   00363* 7104          CLL RAL         /BUT CAN BE USED AS A RANDOM NUMBER GENERATOR IF YOU
829   00364* 7430          SZL             /WANT TO PATCH TADTST AND ANDTST WITH ODT.
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00365* 7001          IAC                /JUST PUT AN EFFECTIVE JMP I (TADTST AT JMSTST
00366* 3126          DCA R1             /THEN START RUNNING AT OR BEFORE TADTST.
00367* 1127          TAD R2             /MACHINE WILL THEN RUN THE AND-TAD TESTS UNTIL HALTED.
00370* 1126          TAD R1
00371* 3127          DCA R2
00372* 1127          TAD R2
00373* 3025          DCA D
00374* 1127  TAD1,    TAD R2             /HERE'S THE REAL MEAT OF THE PROGRAM.  R2
00375* 1024          TAD C              /PLUS COUNT
00376* 7041          CMA IAC
00377* 1025          TAD D              /MINUS (R2+COUNT)
00400* 7440          SZA                /SHOULD BE ZERO
00401* 7402          HLT                /TAD TEST FAILURE
00402* 2025          ISZ D              /BUMP (R2+COUNT)
00403* 7000          NOP
00404* 2024          ISZ C              /BUMP COUNT
00405* 5511          JMP I TAD1P        /AND BACK WE GO

00406* 7240  ANDTST, CLA CMA            /PARTIAL "AND" SIMULATION OF PREVIOUS TAD TEST
00407* 0127          AND R2             /R2
00410* 3025          DCA D              /TO D
00411* 7240          CLA CMA
00412* 0127          AND R2             /R2 "AND" C
00413* 0024          AND C
00414* 7104          CLL RAL            /*2
00415* 3022          DCA A              /TO "A" [CARRY IS GENERATED ONLY ON 1+1]
00416* 7240          CLA CMA
00417* 0127          AND R2             /THE NEXT BUNCH OF CODE
00420* 7040          CMA
00421* 0024          AND C
00422* 7040          CMA
00423* 3023          DCA B              /FORMS THE XOR OF R2 AND "C"
00424* 7240          CLA CMA
00425* 0024          AND C
00426* 7040          CMA
00427* 0127          AND R2
00430* 7040          CMA
00431* 0023          AND B
00432* 7040          CMA                /IN THE ACCUMULATOR, PERFORMING A HALF-ADD
00433* 1022          TAD A              /ADD IN CARRY ---> RESULT IN AC
00434* 7041          CIA
00435* 1025          TAD D              /RESULT SHOULD EQUAL D
00436* 7640          SZA CLA
00437* 7402          HLT                /AND TEST FAILURE
00440* 2025          ISZ D
00441* 7000          NOP
00442* 2024          ISZ C
00443* 5211          JMP ANDTST+3

        0017  AUTO=17

                                        /TEST JMS INSTRUCTION
00444* 1265  JMSTST, TAD KBUFF          /BUFFER SIZE (CANNOT EXCEED ONE PAGE)
00445* 3023          DCA B
00446* 1125          TAD KSTRBF         /START OF BUFFER--MUST BE START OF PAGE
00447* 3017  AUA,     DCA AUTO
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00450* 1121          TAD KJMSC
00451* 3025          DCA D
00452* 1025          TAD D
00453* 3417  AUB,     DCA I AUTO         /FILL BUFFER WITH "JMS  .", EXCEPT LAST INST
00454* 2025          ISZ D
00455* 2023          ISZ B
00456* 5252          JMP .-4
00457* 1264          TAD KJMPIA         /LAST INSTRUCTION IS "JMP I AUTO"
00460* 3417  AUC,     DCA I AUTO
00461* 1122          TAD KRETUR         /NOW MAKE AUTO = RETUR-1
00462* 3017  AUD,     DCA AUTO
00463* 5523          JMP I STRTBF       /AND GO EXECUTE WHAT'S IN BUFFER
00464* 5417  KJMPIA, JMP I AUTO
00465* 7601  KBUFF,  1+STRBUF-STPBUF
00466* 1265  RETUR,  TAD KBUFF
00467* 3023          DCA B
00470* 1125          TAD KSTRBF
00471* 3017  AUE,     DCA AUTO
00472* 7126          STL RTL
00473* 1017  AUF,     TAD AUTO           /CONTENTS OF EACH LOCATION IN BUFFER
00474* 7041          CIA                /SHOULD EQUAL ADDRESS + 1 (EXCEPT FINAL JUMP, OF COURSE)
00475* 1417  AUG,     TAD I AUTO
00476* 7440          SZA
00477* 7402          HLT                /JMS FAILURE
00500* 2023          ISZ B
00501* 5272          JMP .-7
00502* 4131          JMS TYPEIT         /TYPE "C"--CPU TESTS OK

        4000  STRBUF=4000
        4200  STPBUF=4200


              /BUNCH OF IOT DEFINITIONS FOR SLU TESTS.  MOST IOTS DIFFER FROM CORRESPONDING
              /LOCAL TERMINAL IOTS BY THE ADDITION OF A 1 OR 2 AFTER IOT.
        6040  SPF=6040
              /SLU #2
        6301  KSF1=6301
        6306  KRB1=6306
        6307  KRB01=6307               /LOAD CONTROL BITS INTO UART (SLU #2 ONLY)
        6310  SPF1=6310
        6311  TSF1=6311
        6312  TCF1=6312
        6313  TSB1=6313                /SEE FIRST PAGE FOR BAUD RATE MAGIC NUMBERS
        6316  TLS1=6316
              /SLU #3
        6321  KSF2=6321
        6326  KRB2=6326
        6330  SPF2=6330
        6331  TSF2=6331
        6332  TCF2=6332
        6333  TSB2=6333                /SEE PAGE 1 FOR MAGIC NUMBERS
        6336  TLS2=6336

        6000  TBUF=6000

              ////////////////////  DIAGNOSTIC--SLU TEST  ////////////////////////////////
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```
942                     /TEST THE 3 SERIAL LINE UNITS BY LOOPING BACK AND SENDING ALL POSSIBLE
943                     /CHARACTERS.  USE INTERRUPT SYSTEM.
944   00503* 2020 SLTST,  ISZ REGA        /WAIT FOR ANY IN-PROCESS CHARACTER TO TRANSMIT
945   00504* 5303         JMP .-1
946   00505* 7344         STA CLL RAL     /4 LSB = 16--SET SLU1 TO 9600 BAUD, SO THE SLU TEST
947   00506* 6043         TSB                 /WILL BE FAST REGARDLESS OF TERMINAL
948   00507* 6042         TCF             /CLEAR THE ONLY TWO FLAGS WHICH COULD
949   00510* 6032         KCC             /CAUSE AN INTERRUPT.  ALSO CLEAR AC.
950   00511* 1124         TAD MODE2
951   00512* 6037         KLB             /SET UP LOOPBACK (WORKS BECAUSE AC 11 = 1)
952   00513* 6307         KMD1            /SET UP 8-BIT ASCII MODE ON LINE 2
953   00514* 6003         SRQ             /ANYTHING ON THE INTERRUPT BUS??
954   00515* 7610         SKP CLA
955   00516* 7402         HLT             /YES--WE GOT TROUBLE!
956   00517* 1114         TAD INTJMP      /SET UP INTERRUPT JMP = JMP I (INTCHN
957   00520* 3001         DCA 1
958   00521* 1120         TAD TTYBUF      /CREATE A BUFFER CONSISTING OF 8-BIT CHARACTERS
959   00522* 3010         DCA 10
960   00523* 1076         TAD M377        /1,2,3,4,----376,377,0
961   00524* 3023         DCA B
962   00525* 1023         TAD B
963   00526* 0353         AND K377
964   00527* 3410         DCA I 10
965   00530* 2023         ISZ B
966   00531* 5325         JMP .-4
967   00532* 3410         DCA I 10        /FILL LAST CHARACTER
968   00533* 1101         TAD M6          /SET UP 6 AUTO INDEX REGISTERS SO THEY ALL
969   00534* 3022         DCA A           /POINT TO FIRST WORD OF BUFFER
970   00535* 1074         TAD K7
971   00536* 3017         DCA 17
972   00537* 1120 FILAI,   TAD TTYBUF
973   00540* 3417         DCA I 17
974   00541* 2022         ISZ A
975   00542* 5337         JMP FILAI
976   00543* 6001         ION             /TURN ON INTERRUPT
977   00544* 6330         SPF2            /AND START UP XMITTERS
978   00545* 6310         SPF1
979   00546* 6040         SPF
980   00547* 7240 NULL,    STA             /NULL JOB CONSISTS OF COUNTING DOWN "A",
981   00550* 1022         TAD A
982   00551* 3022         DCA A
983   00552* 2023         ISZ B           /ISZ'ING B
984   00553* 0377 K377,    377
985   00554* 1022         TAD A
986   00555* 1023         TAD B
987   00556* 7440         SZA             /AND COMPARING THE TWO FOR EQUALITY
988   00557* 7402         HLT             /SOMETHING INTERFERED WITH NULL JOB (INT INH BAD ??)
989   00560* 1117         TAD TLIMIT      /ALL IS DONE WHEN ALL RECR AI = TBUF+400
990   00561* 1013         TAD 13
991   00562* 7640         SZA CLA         /SLU1 DONE?
992   00563* 5347         JMP NULL        /NO--JUMP BACK TO NULL JOB
993   00564* 7001         IAC
994   00565* 7421         MQL             /INDICATE SLU 1 DONE BY PUTTING "1" IN MQ
995   00566* 1117         TAD TLIMIT      /(IF WE HANG UP, PUSHING "START" BUTTON WILL DISPLAY MQ)
996   00567* 1014         TAD 14
997   00570* 7640         SZA CLA         /SLU2 DONE?
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 998   00571* 5347         JMP NULL
 999   00572* 7105         IAC CLL RAL
1000   00573* 7421         MQL             /INDICATE SLU 2 DONE (IF SLU 3 GOOD, TEST COMPLETES)
1001   00574* 1117         TAD TLIMIT
1002   00575* 1015         TAD 15
1003   00576* 7640         SZA CLA         /SLU3 DONE?
1004   00577* 5347         JMP NULL
1005   00600* 6002         IOF
1006   00601* 6037         KLB             /JOB DONE--CLEAR LOOPBACK FF
1007   00602* 7604         LAS             /RESET TERMINAL BAUD RATE, PER AC2
1008   00603* 7006         RTL
1009   00604* 7700         SMA CLA         /IF AC2 WAS 0, MAKE BAUD RATE 9600
1010   00605* 1103         TAD K11
1011   00606* 1100         TAD M13         /THIS CONSTANT USED BECAUSE 4 LSB ARE = 5
1012   00607* 6043         TSB             /AC 8-11 EITHER 5 (300 BAUD) OR 16 (9600 BAUD)
1013   00610* 7200         CLA
1014   00611* 4131 SLDONE, JMS TYPEIT       /"D"--SLU TEST COMPLETE
1015   00612* 5512         JMP I XADDP
1016
1017   00613* 3024 INTCHN, DCA C           /YE SKIPPE CHAINE
1018   00614* 7204         GLK
1019   00615* 3025         DCA D
1020   00616* 7240         STA             /SET AC.  IF KRB FAILS TO JAM TRANSFER,
1021   00617* 6031         KSF             /EXTRA BITS WILL THEN APPEAR DURING RECEIVER SERVICE
1022   00620* 7410         SKP
1023   00621* 5266         JMP RLN1        /RECEIVER, LINE 1
1024   00622* 6301         KSF1
1025   00623* 7410         SKP
1026   00624* 5274         JMP RLN2        /RECEIVER, LINE 2
1027   00625* 6321         KSF2
1028   00626* 7410         SKP
1029   00627* 5302         JMP RLN3        /RECEIVER, LINE 3
1030   00630* 7200         CLA
1031   00631* 6041         TSF
1032   00632* 7410         SKP
1033   00633* 5247         JMP TLN1        /TRANSMITTER, LINE 1
1034   00634* 6311         TSF1
1035   00635* 7410         SKP
1036   00636* 5254         JMP TLN2        /TRANSMITTER, LINE 2
1037   00637* 6331         TSF2
1038   00640* 7402         HLT             /UNDEFINED INTERRUPT
1039   00641* 5261         JMP TLN3        /TRANSMITTER, LINE 3
1040   00642* 1025 DISMIS, TAD D
1041   00643* 7110         RAR CLL
1042   00644* 1024         TAD C
1043   00645* 6001         ION
1044   00646* 5400         JMP I 0         /EXIT FROM INTERRUPT
1045
1046   00647* 1410 TLN1,    TAD I 10        /SERVICE SLU #1 XMITR
1047   00650* 6046         TLS
1048   00651* 7650         SNA CLA
1049   00652* 6042         TCF             /ZERO CHARACTER IS LAST ONE TRANSMITTED--SHUT DOWN XMITER
1050   00653* 5242         JMP DISMIS
1051
1052   00654* 1411 TLN2,    TAD I 11        /SERVICE SLU #2 XMITR
1053   00655* 6316         TLS1
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1054   00656* 7650          SNA CLA
1055   00657* 6312          TCF1                /SHUT DOWN XMTER
1056   00660* 5242          JMP DISMIS
1057
1058   00661* 1412  TLN3,    TAD I 12            /SERVICE SLU #3 XMITR
1059   00662* 6336          TLS2
1060   00663* 7650          SNA CLA
1061   00664* 6332          TCF2                /SHUT DOWN XMITER
1062   00665* 5242          JMP DISMIS
1063
1064   00666* 6036  RLN1,    KRB                 /SERVICE SLU #1 RECVR
1065   00667* 7041          CIA
1066   00670* 1413          TAD I 13
1067   00671* 7440          SZA
1068   00672* 7402          HLT                 /RECEIVED CHARACTER NOT EQUAL TO TRANSMITTED ONE--LINE 1
1069   00673* 5242          JMP DISMIS
1070
1071   00674* 6306  RLN2,    KRB1                /SERVICE SLU #2 RECVR
1072   00675* 7041          CIA
1073   00676* 1414          TAD I 14
1074   00677* 7440          SZA
1075   00700* 7402          HLT                 /REC'D CHARACTER NOT EQUAL TO XMITED ONE--LINE 2
1076   00701* 5242          JMP DISMIS
1077
1078   00702* 6326  RLN3,    KRB2                /SERVICE SLU #3 RECVR
1079   00703* 7041          CIA
1080   00704* 1415          TAD I 15
1081   00705* 7440          SZA
1082   00706* 7402          HLT                 /REC'D CHARACTER NOT EQUAL TO XMITED ONE--LINE 3
1083   00707* 5242          JMP DISMIS
1084
1085                /////////////////  DIAGNOSTIC--EXTENDED MEMORY TEST  ///////////////////////
1086
1087                /FILL FIELD 1 WITH ADDRESS; FILL FIELD 2
1088                /WITH ADDRESS + 200; FILL FIELD 3 WITH ADDRESS + 400.  THEN CHECK
1089                /THE WHOLE MESS.
1090
1091   00710* 7240  XTDADD, STA
/SET UP AUTO INDEX FOR ADDRESS 0
1092   00711* 3010          DCA 10
1093   00712* 3022          DCA A               /CLEAR COUNTER
1094   00713* 7421          MQL                 /CLEAR MQ
1095   00714* 7346          STA CLL RTL         /-3 TO AC
1096   00715* 3012          DCA 12
1097   00716* 6211          CDF 10
1098   00717* 7501  XTDFIL, MQA                 /MQ
1099   00720* 1022          TAD A               /PLUS ADDRESS
1100   00721* 3410          DCA I 10            /TO ADDRESS
1101   00722* 2022          ISZ A
1102   00723* 5317          JMP XTDFIL          /KEEP GOING--FIELD NOT FILLED YET
1103   00724* 2012          ISZ 12              /FIELD COMPLETED--BUMP FIELD COUNT
1104   00725* 4330          JMS NXTFLD          /SET UP NEXT FIELD.
1105   00726* 5342          JMP XTDCHK          /ALL FIELDS FILLED.  GO TO CHECK.
1106   00727* 5317          JMP XTDFIL          /NXTFLD RETURNS HERE--FILL ANOTHER FIELD
1107
1108   00730* 0000  NXTFLD, 0                   /SET UP NEXT FIELD--
1109   00731* 7501          MQA
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1110   00732* 1105          TAD K200            /ADD 200 TO MQ
1111   00733* 7421          MQL
1112   00734* 1102          TAD K10             /AND 10 TO CDF
1113   00735* 1337          TAD XTDFLD
1114   00736* 3337          DCA XTDFLD
1115   00737* 6211  XTDFLD, CDF 10              /CDF 10, CDF 20 OR CDF 30
1116   00740* 2330          ISZ NXTFLD          /MAKES CODING MORE CONCISE BECAUSE THIS SUB
1117   00741* 5730          JMP I NXTFLD        /FOLLOWS ISZ OF FIELD COUNTER
1118
1119   00742* 7346  XTDCHK, STA CLL RTL         /CHECK ALL ADDRESSES FOR CORRECT VALUE
1120   00743* 3012          DCA 12              /SET UP FIELD COUNTER
1121   00744* 7421          MQL                 /SET UP OFFSET CONSTANT
1122   00745* 1347          TAD KCDF10          /RESET NXTFLD SUBROUTINE
1123   00746* 3337          DCA XTDFLD
1124   00747* 6211  KCDF10, CDF 10              /RESET DATA FIELD TO FIELD 1
1125   00750* 7501  XCKGET, MQA                 /GET OFFSET
1126   00751* 1022          TAD A               /PLUS ADDRESS
1127   00752* 7041          CIA
1128   00753* 1410          TAD I 10            /COMPARE WITH WORD FROM MEMORY
1129   00754* 7640          SZA CLA
1130   00755* 5364          JMP MEMERR          /COMPARE FAILED
1131   00756* 2022          ISZ A               /THROUGH FIELD YET?
1132   00757* 5350          JMP XCKGET          /NO
1133   00760* 2012          ISZ 12              /YES - BUMP FIELD COUNTER
1134   00761* 4330          JMS NXTFLD          /BUMP MQ, CDF
1135   00762* 5370          JMP XCKDUN          /ALL DONE--GO TO NEXT TEST
1136   00763* 5350          JMP XCKGET          /GO BACK FOR ANOTHER FIELD (NXTFLD RETURNS HERE)
1137
1138   00764* 1422  MEMERR, TAD I A             /BAD DATA IN MQ
1139   00765* 7421          MQL
1140   00766* 1022          TAD A               /OFFENDING ADDRESS IN AC (DF TELLS WHICH MEMORY)
1141   00767* 7402          HLT                 /TRAP BACK TO PANEL
1142
1143   00770* 6211  XCKDUN, CDF 10              /NOW CHEDK INTERRUPT AND CIF STUFF
1144   00771* 1066          TAD HALT
1145   00772* 3412          DCA I 12            /FILL ALL FIELD 1 WITH HALTS
1146   00773* 2022          ISZ A
1147   00774* 5371          JMP .-3
1148   00775* 6231          CDF 30
1149   00776* 6212          CIF 10              /TRY TO GO TO FIELD 1
1150   00777* 2001          ISZ 1               /NOTE: HALT AT THIS ADDRESS IN FLD 1=PREMATURE
1151                                            /INSTRUCTION FIELD CHANGE
1152                                            /SET UP NEW INTERRUPT RETURN
1153   01000* 6001          ION                 /NOTE: TTO FLAG WAS SET AT END OF SLU TEST
1154   01001* 6214          RDF                 /MAKE SURE DF RIGHT
1155   01002* 1077          TAD M30
1156   01003* 7440          SZA
1157   01004* 7402          HLT                 /BAD DATA FIELD BITS.  CHECK RDF MUX.
1158   01005* 5206          JMP .+1             /AT THIS POINT, WE SHOULD START TO GO TO FIELD 1
1159                                            /AND INTERRUPT BEFORE WE GET THERE
1160   01006* 7402          HLT                 /GUESS WE DION'T--INT INH FAILED TO CLEAR??
1161   01007* 6234  FRET,   RIB                 /SHOULD COME BACK TO HERE AFTER INTERRUPT
1162   01010* 1100          TAD M13
1163   01011* 7440          SZA
1164   01012* 7402          HLT                 /SAVE FIELD WRONG
1165   01013* 1000          TAD 0
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1166   01014* 7040          CMA
1167   01015* 1116          TAD KFRET
1168   01016* 7440          SZA
1169   01017* 7402          HLT             /INTERRUPT WRONG ADDRESS--INT INH BAD??
1170   01020* 6214          RDF
1171   01021* 7440          SZA
1172   01022* 7402          HLT             /DATA FIELD WAS NOT RESET ON INTERRUPT
1173   01023* 6213          CIF CDF 10
1174   01024* 1233          TAD KCIF        /HLT AT THIS LOC IN FIELD 1 INDICATES XTN
1175                                        /DID NOT WAIT FOR JMP OR JMS
1176   01025* 3632          DCA I KHLT1     /KHLT
1177   01026* 1234          TAD JMPXA
1178   01027* 3513          DCA I XTNP2     /KHLT+1
1179                 ////////////////////////////////////////////////////////////////////////////
1180                 /FIELD 1 NOW HAS HLT IN ALL LOCATIONS EXCEPT:
1181                 /       KHLT,   CIF 0
1182                 /       KCIF,   JMP XA
1183                 ////////////////////////////////////////////////////////////////////////////
1184   01030* 5632          JMP I KHLT1     /CHECK THAT JMP I DOES CHANGE FIELD CORRECTLY
1185                                        /(JMP DIRECT CHECKED COMMING BACK FROM FIELD 1)
1186   01031* 7402  KHLT,   HLT             /SHOULD HAVE CHANGED INST FIELD, DID NOT.
1187   01032* 1031  KHLT1,  KHLT
1188   01033* 6203  KCIF,   CIF CDF 0
1189   01034* 5235  JMPXA,  JMP XA
1190   01035* 4131  XA,     JMS TYPEIT      /COME BACK TO HERE IF ALL IS OK.  TYPE "E"
1191                 /////////////////  DIAGNOSTIC--FLOPPY INTERFACE TEST  //////////////////////
1192                 /AS MUCH AS WE CAN DO WITHOUT CORRUPTING DISK
1193                 /WILL ALSO RUN CORRECTLY IF NO RX01 ON SYSTEM.
1194
1195   01036* 1105  FPYTST, TAD K200        /MAINTENANCE BIT--MUST ALWAYS BE SET, ELSE CODE
1196   01037* 7421          MQL             /ON FLOPPY GETS SMASHED
1197   01040* 7501          MQA
1198   01041* 6751          6751            /SET UP MAINTENANCE MODE
1199   01042* 7201  FLOPY2, CLA IAC
1200   01043* 3022          DCA A
1201   01044* 1022  FLOPY1, TAD A           /CODE MAKES 2 PASSES.  FIRST PASS SLIDES A "1" THRU AC.
1202   01045* 7501          MQA             /SECOND PASS FILLS AC WITH 1'S FROM RT TO LEFT.
1203   01046* 0137          AND K7677       /ZERO THE "8-BIT MODE" BIT
1204   01047* 3023          DCA B
1205   01050* 1023          TAD B
1206   01051* 6751          6751            /IN EITHER CASE, 200 IS "OR"ED WITH AC (TO KEEP
1207                                        /MAINT BIT SET).  FLOPPY REGISTER IS LOADED,
1208                                        /READ BACK AND CHECKED FOR CORRECTNESS.
1209   01052* 7440          SZA
1210   01053* 7402          HLT             /IOT SHOULD HAVE CLEARED AC, DID NOT.
1211   01054* 6752          6752
1212   01055* 7041          CIA
1213   01056* 1023          TAD B
1214   01057* 7640          SZA CLA
1215   01060* 7402          HLT             /FLOPPY DATA REGISTER ERROR
1216   01061* 1022          TAD A
1217   01062* 7104  KINST1, RAL CLL         /BECOMES "RAL STL" ON SECOND PASS
1218   01063* 3022          DCA A
1219   01064* 7420          SNL             /WHEN A "1" APPEARS IN LINK, PASS IS DONE.
1220   01065* 5244          JMP FLOPY1
1221   01066* 1273  KOUT1,  TAD KINST       /BECOMES "JMP FLOPY3" ON SECOND PASS
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1222   01067* 3262          DCA KINST1
1223   01070* 1274          TAD KOUT        /SET UP SECOND PASS
1224   01071* 3266          DCA KOUT1
1225   01072* 5242          JMP FLOPY2      /AND GO AGAIN
1226
1227   01073* 7124  KINST,  RAL STL
1228   01074* 5275  KOUT,   JMP FLOPY3
1229
1230   01075* 1106  FLOPY3, TAD K300
1231   01076* 6751          6751            /NOW SET UP MAINT, 8-BIT MODE
1232   01077* 7440          SZA
1233   01100* 7402          HLT             /6751 SHOULD HAVE CLEARED THE AC, BUT DIDN'T
1234   01101* 1107          TAD K7400       /SET 4 HIGH-ORDER BITS
1235   01102* 6752          6752            /NOW READ BACK 8 LOW-ORDER BITS
1236   01103* 1075          TAD M7700
1237   01104* 7440          SZA
1238   01105* 7402          HLT             /ANSWER NOT RIGHT
1239   01106* 7240          STA
1240   01107* 6751          6751            /NOW THROW ALL 1'S AT THE INTERFACE
1241   01110* 7440          SZA
1242   01111* 7402          HLT             /ONCE AGAIN, 6751 SHOULD CLEAR AC, BUT DIDN'T
1243   01112* 6752          6752
1244   01113* 1076          TAD M377        /SHOULD GET BACK 8 LOW-ORDER BITS
1245   01114* 7440          SZA
1246   01115* 7402          HLT             /DIDN'T
1247   01116* 6757          6757            /INITIALIZE THE DISK IF IT IS THERE
1248   01117* 4131          JMS TYPEIT      /"E"--FLOPPY INTERFACE TESTED
1249   01120* 6073          PRQ             /TRAP BACK TO PANEL MODE
1250   01121* 6140          END             /TO TEST FOR POSSIBLE ECHO AND EXIT TO NULL JOB
1251   01122* 7402          HLT             /IN CASE PRQ IOT FAILS, WE HIT THIS HALT
1252                 ////////////////////////  END OF THE DIAGNOSTIC  ////////////////////////////
1253
1254                 //////////  HERE'S WHAT WE DO WHILE WAITING FOR BOOTSTRAP BUTTON  /////////////
1255   01123* 6002  NULJOB, IOF             /JUST IN CASE!!  WE MIGHT BE COMING HERE FROM USER PGM
1256   01124* 6040          SPF             /SET XMIT FLAGS
1257   01125* 6310          SPF1
1258   01126* 1067  RESESC, TAD ESCSEQ      /AND INITIALIZE ESCAPE SEQUENCE CHECKER
1259   01127* 3010          DCA 10          /SEQUENCE IS 33--43--40--60 (ESCAPE,NBR SIGN,SPACE,0)
1260   01130* 1410  TERM01, TAD I 10        /PICK UP NEXT ESCAPE CHARACTER
1261   01131* 7500          SMA             /TEST FOR LIST TERMINATOR
1262   01132* 5356          JMP ESCAPE      /TERMINATOR IS A POSITIVE WORD
1263   01133* 3022          DCA A           /STORE NEXT ITEM ON LIST
1264   01134* 7604  TERMI0, LAS             /SET SLU2 BAUD RATE FROM SWITCHES "ON THE FLY"
1265   01135* 6313          TSB1            /IN CASE SOMEONE CHANGES SWITCH WHILE NULJOB RUNNING
1266   01136* 6031          KSF
1267   01137* 5344          JMP TERMI1
1268   01140* 6036  TERMIN, KRB             /PASS KEYBOARD CHARACTER TO LINE
1269   01141* 6311          TSF1
1270   01142* 5341          JMP .-1
1271   01143* 6316          TLS1
1272   01144* 6031  TERMI1, KSF1
1273   01145* 5334          JMP TERMI0
1274   01146* 6306  TERMOU, KRB1            /GET CHARACTER FROM LINE
1275   01147* 6041          TSF
1276   01150* 5347          JMP .-1
1277   01151* 6046          TLS             /PRINT IT ON SCREEN
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1278   01152* 1022          TAD A           /COMPARE WITH CURRENT ESCAPE CHARACTER
1279   01153* 7640          SZA CLA
1280   01154* 5326          JMP RESESC      /NOT SAME--RESET ESCAPE SEQUENCE
1281   01155* 5330          JMP TERMO1
1282
1283   01156* 6073  ESCAPE, PRQ             /TRAP BACK TO THE BOOTSTRAP IN PANEL MEM
1284   01157* 6003          START
1285
1286           1160  LAST=.
1287           7765  RELOC
1288   07765   0000  ZBLOCK 7776-.
1289                 ////////////  THE CPU ALWAYS STORES ITS PC IN LOCATION 0 OF PANEL MEMORY  ///////
1290                 ///////////  AND TAKES ITS FIRST INSTRUCTION FROM LOCATION 7777 WHEN A  ////////
1291                 ////////////////////////  CONTROL PANEL REQUEST IS GENERATED.  ////////////////////
1292           7776  *7776
1293   07776   6004          PANEL           /JUMP TO THE START OF EVERYTHING
1294   07777   5776          JMP I .-1       /PANEL REQUESTS START EXECUTING CODE HERE
1295
1296                 $$$
```



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A       0022    FLOPY2 1042    K377   0553    PK260  6672
ACSAV   0032    FLOPY3 1075    K7     0074    PK5300 6451
ANDTST 0406     FMASK  6242    K7400  0107    PK7    0057
APT     6466    FPYTST 1036    K7677  0137    PK77   5670
AUA     0447    FRET   1007    K77    0104    PK7700 6103
AUB     0453    GO     6212    K7700  0110    PM100  6656
AUC     0460    GOODRD 0046    LAST   1160    PM110  0062
AUD     0462    HALT   0066    LCD    6751    PM4    6667
AUE     0471    HANGGG 0033    LOAD   0053    PM77   6450
AUF     0473    HLTADR 0064    LP     0047    PRQ    6073
AUG     0475    HLTCHK 6110    MEMERR 0764    PRS    5071
AUTO    0017    HLTD1  6117    MEMFLD 0021    PST    6072
B       3023    HLTD2  6127    MMER   6560    PSTART 6256
BADRD   6305    HLTFLG 0063    MMERR  6455    PSTAR1 6262
BEGG    0054    HLTOK  6134    MMFLD0 6545    PSTAR2 0065
BEGG1   6265    HYPHEN 6002    MODE2  0124    PSTAT  0001
BEGIN   6201    INIT   6757    MOVE   0023    PZREL  6402
BEND    6244    INTCHN 0613    MOVE1  6573    RAREA  0022
BOOT    6075    INTJMP 0114    MOVE2  6607    REGA   0020
BOOTST  0002    INTLNK 0115    MQCLA  7601    REGB   0021
BOOT1   6314    INTOFF 6321    MQNOP  7401    RESESC 1126
BOOT2   6324    JMPXA  1034    MSG    0037    RETUR  0456
BTDRHT  6071    JMSTST 0444    MSG1   6644    RLN1   0656
C       0024    KBOOT1 0055    M13    0100    RLN2   0674
CHAR    0070    KBUFF  0465    M30    0077    RLN3   0702
CHEX    6234    KCDF   6135    M377   0076    RNMQBS 0251
CKSUM   0074    KCDF10 0747    M6     0101    ROMSUM 4216
CKSUM1 6452     KCDIF  6207    M7700  0075    RUNIR  0215
CKSUM2 6453     KCIF   1033    NULJOB 1123    RUNRT  0231
CPLOOP 6473     KFRET  0116    NULL   0547    RX01   6200
CPRAM  6477     KHLT   1031    NXTFLD 0730    R1     0126
CPROM  6515     KHLT1  1032    OCTPNT 0034    R2     0127
CRASH  6000     KINST  1073    OCTPN1 6623    SDN    5755
CRLF   0031     KINST1 1062    OCTPN2 6631    SER    6754
CRLF1  6171     KJMPIA 0464    OCTR   0076    SKPTST 0147
D       0025    KJMSC  0121    OFFSET 0045    SLDONE 0611
DELAY   0050    KLB    6037    OPRAT2 0141    SLTST  0503
DELAY1 0077     KLTR   0130    ORIGIN 0000    SPF    5040
DEPOS   6240    KLTRS  0026    OTEMP  0075    SPF1   6310
DIAG    0066    KMD1   6307    PAGE0  6524    SPF2   6330
DISMIS 0642     KMMER  6454    PANEL  6004    START  6003
ECHO    6142    KOUT   1074    PCACMQ 6053    STATUS 0005
END     6140    KOUT1  1065    PCHAR  0042    STDIAG 6573
END1    6146    KRAREA 6401    PCHAR1 5656    STPBUF 4200
END2    6157    KRB1   6306    PCOUNT 0071    STR    6753
END3    6154    KRB2   6326    PCPNT  0045    STRBUF 4300
ESCAPE 1156     KRELS2 6400    PER    6074    STRT   6052
ESCSEQ 0067     KRETUR 0122    PFLBT  5336    STRTBF 0123
FBOOT   0024    KSF1   6301    PG4HLT 0144    STRTUP 6471
FILAI   0537    KSF2   5321    PK05   6015    TADTST 0361
FLD     6300    KSTRBF 0125    PK11   6024    TAD1   0374
FLDCHG 0020     KLD    0102    PK212  0060    TAD1P  0111
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32.

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FLD0CK 6554      K11    0103      PK215  5050      TBUF   6000
FLOPPY 6331      K200   0105      PK240  6671      TCP1   6312
FLOPY1 1044      K300   0106      PK255  0061      TCP2   6332
TERMIN 1140
TERMI0 1134
TERMI1 1144
TERMOU 1146
TERMO1 1130
TLIMIT 0117
TLN1   0647
TLN2   0654
TLN3   0661
TLS1   6316
TLS2   6336
TS8    6043
TSB1   6313
TS32   6333
TSF1   6311
TSF2   6331
TTYBUF 0120
TYPE   0026
TYPEIT 0131
TYPE1  6616
UNIT   0060
WORD1  0072
WORD2  0073
XA     1035
XADDP  0112
XCKDUN 0770
XCKGET 0750
XDR    6752
XTDADD 0710
XTDCHK 0742
XTDFIL 0717
XTDFLD 0737
XTNP2  0113
X6030  0061

ERRORS DETECTED: 0
LINKS GENERATED: 0
```

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE KK8-B PANEL MEMORY CODE	SIZE K	CODE SP	NUMBER VT78-0-2	REV *


```
A          620#  855   869   969   974   981   982   935  1093  1099
          1101  1126  1131  1138  1140  1146  1200  1201  1216  1218
          1263  1278
ACSAV       61#   91   141   458
ANDTST     848#  877
APT        468#  514
AUA        885#
AUB        889#
AUC        894#
AUD        896#
AUE        903#
AUF        905#
AUG        907#
AUTO       879#  885   989   994   896   998   903   905   907
B          621#  861   967   883   891   901   910   961   962   955
           983   986  1204  1205  1213
BADRD      287   322#
BEGG       249   260   313   315   437#
BEGG1      305#  320   439
BEGIN      241#  342
BEND       261   280#
BOOT        88   152#  187
BOOTST     352#  374
BOOT1      330#  446
BOOT2      337   338#
BTORHT     118   148#
C          622#  826   938   945   853   859   863   876  1017  1042
CHAR        75#  254   308   309   316
CHEX       270#  278
CKSUM       79#  209   212   252   272   285   589   590   593
CKSUM1     454#  489
CKSUM2     455#
CPLOOP     476#  479
CPRAM      480#  487
CPROM      494#
CRASH       85#  111
CRLF       152   171   195   207   214   227   322   412#  532
CRLF1      222#  414
D          624#  836   840   843   950   871   874   897   889   990
          1019  1040
DELAY      148   204   432#  435
DELAY1      82#  433
DEPOS      268   275#
DIAG       217   218   537   538   612#  627
DISMIS    1040# 1050  1056  1062  1069  1076  1083
ECHO       197#  203
END        195# 1250
END1       201#  206
END2       210#  213
END3        87   207#
ESCAPE    1262  1283#
ESCSEQ     632# 1258
FBOOT      346   347   354#  371
FILAI      972#  975
FLD        316#
```


DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE KK8-B PANEL MEMORY CODE	SIZE K	CODE SP	NUMBER VT78-0-2	REV *

FLDCHG 68# 122 124 128 253 280 402
FLDØCK 525# 531
FLOPPY 230 344#
FLOPY1 1201# 1220
FLOPY2 1199# 1225
FLOPY3 1228 1230#
FMASK 277# 317
FPYTST 1195#
FRET 656 1161#
GO 252# 273
GOODRD 366 372#
HALT 631# 1144
HANGGG 348 361# 379
HLTADR 168 445#
HLTCHK 151 164#
HLTD1 166 171# 466
HLTD2 183# 186 328
HLTFLG 161 164 176 189 444# 469
HLTOK 170 189#
HYPHEN 87#
INIT 55#
INTCHN 655 1017#
INTJMP 654# 956
INTLNK 654 655#
INTOFF 331 335#
JMPXA 1177 1189#
JMSTST 892#
KBOOT1 162 446# 470
KBUFF 882 899# 900
KCDF 119 190#
KCDF10 1122 1124#
KCDIF 248# 289 318
KCIF 1174 1188#
KFRET 656# 1167
KHLT 653 1186# 1187
KHLT1 1176 1184 1187#
KINST 1221 1227#
KINST1 1217# 1222
KJMPIA 893 898#
KJMSC 659# 886
KLB 38# 149 951 1006
KLTR 666# 677
KLTRS 623# 668 670 678
KMD1 924# 952
KMMER 456# 463
KOUT 1223 1228#
KOUT1 1221# 1224
KRAREA 390# 503
KRB1 923# 1071 1274
KRB2 932# 1078
KRELSZ 389# 505
KRETUR 660# 895
KSF1 922# 1024 1272
KSF2 931# 1027
KSTRBF 663# 884 902

K10 644# 1112
K11 645# 1010
K200 647# 1110 1195
K300 648# 1230
K377 963 934#
K7 637# 970
K7400 649# 1234
K7677 673# 1203
K77 646# 762
K7700 650# 756
LAST 218 538 1286#
LCD 50# 356 372
LOAD 358 359 362 373 377# 381
LP 373# 376
MEMERR 1130 1138#
MEMFLD 69# 121 319
MMER 456 529#
MMERR 458# 529
MAFLD0 518#
MODE2 662# 950
MOVE 215 330 344 404# 535 543 545 546 548 549
551 552
MOVE1 406 542#
MOVE2 554# 559
MQCLA 616# 784
MQNOP 615# 778
MSG 136 153 172 323 420# 533 587 588 599
MSG1 422 586# 595
M13 642# 1011 1162
M30 641# 1155
M377 640# 960 1244
M6 643# 968
M7700 539# 1236
NULJOB 219 1255#
NULL 930# 992 998 1004
NXFLD 1104 1108# 1116 1117 1134
OCTPNT 133 135 142 144 416# 584
OCTPN1 419 568#
OCTPN2 574# 583
OCTR 81# 571 582
OFFSET 389 449#
OPRAT2 539 676#
ORIGIN 59# 123 126 134 167 191 269 275 276 295
464 475 476 477 478 480 481 484 495 496
497 521 523 527 530 553
OTEMP 80# 569 574 577 578
PAGE0 501#
PANEL 91# 1293
PCACHQ 132# 430
PCHAR 424# 592 594 604
PCHAR1 426 597#
PCOUNT 76# 200 205 247 238
PCPNT 145 159 175 428#
PER 25# 85
PFLBT 345 350#
PGMHLT 445 679#
PK05 100# 105
PK11 104 107#

```
PK212      225   441#
PK215      127#  223
PK240      572   600   602   609#
PK255      210   442#
PK260      580   610#
PK6000     453#  491   494   500
PK7        245   440#  579
PK77       537   601   608#
PK7700      93   158#
PM100      606#
PM110      199   208   443#
PM4        570   607#
PM77       452#  485
PRQ          7#  336  1249  1293
PRS         19#  109   183
PST         24#  292
PSTART     290#  447
PSTAR1     294#  296
PSTAR2     192   447#  560
PSTAT       60#  115   116   157   290   482   483   488   493
PZREL      391#  501
RAREA       70#  390   393   449
REGA       618#  734   735   745   749   752   758   766   769   772
           780   783   787   799   804   811   816   822   944
REGB       619#  757   763   771   776   790   793   796   913
RELOC      351   384   393   451   627  1287
RESESC    1259#  1280
RETUR      660   900#
RLN1      1023  1064#
RLN2      1026  1071#
RLN3      1029  1078#
RNMQBS     752#  823
ROMSUM       6#  455
RUNIR      724#
RUNRT      735#  750
RX01       230#
R1         664#  827   831   833
R2         665#  832   834   835   837   849   852   957   965
SDN         54#  361
SER         53#  363
SKPTST     682#
SLDONE    1014#
SLTST      944#
SPF        920#  979  1256
SPF1       925#  978  1257
SPF2       933#  977
START       88#  1284
STATUS      63#   94    99   100   132   462
STDIAG     216   536   626#
STPBUF     899   915#
STR         52#  378
STRBUF     661   663   899   914#
STRT       113   130#  180
STRTBF     661#  897
STRTUP     130   474#
TADTST     826#
```



```
TAD1       651   837#
TAD1P      651#  846
TBUF       657   658   939#
TCF1       927#  1055
TCF2       935#  1061
TERMIN    1268#
TERMI0    1264#  1273
TERMI1    1267   1272#
TERMOU    1274#
TERMO1    1260#  1281
TLIMIT     657#   989   995  1001
TLN1      1033   1046#
TLN2      1036   1052#
TLN3      1039   1058#
TLS1       929#  1053  1271
TLS2       937#  1059
TSB         26#   106   947  1012
TSB1       339    516   928#  1265
TSB2       517    936#
TSF1       926#  1034  1269
TSF2       934#  1037
TTYBUF     658#   958   972
TYPE       198    211   224   226   403#  566   573   581   603
TYPEIT     667#   674   681   912  1014  1190  1248
TYPE1      410    562#
UNIT       355    367   370   382#
WORD1       77#   255   262   270   281
WORD2       78#   259   266   271   283
XA         1189  1190#
XADDP       652#  1015
XCKDUN     1135  1143#
XCKGET     1125#  1132  1136
XDR          51#  380
XTDADD      652   1091#
XTDCHK     1105  1119#
XTDFIL     1098#  1102  1106
XTDFLD     1113  1114  1115#  1123
XTNP2       553#  1178
X5030       347   369   393#
```

V5A

!R!IREV!	!FIRST USED ON OPTION MODEL			
!E! C !	! KK8-B	!	DIGITAL EQUIPMENT CORPORATION	
!V! H !	!	!	MAYNARD, MASSACHUSETTS	
!I! A !	!DRN. DAVID ZOPF	!DATE 14-APR-78 !		
!S! N !	!CHK'D DAVID ZOPF	!DATE 14-APR-78 !	!TITLE	
!O! G !	!ENG. JOHN KIRK	!DATE 14-APR-78 !	PANEL MEMORY CODE	
!N! E !	!P.ENG. JOHN KIRK	!DATE 14-APR-78 !		
! !ChK!	!PROD. JOE DIENST	!DATE 14-APR-78 !	!SIZE !CODE ! NUMBER	!REV
	!NEXT HIGHER ASSEMBLY		! K ! SP ! VT78-0-3	! *
	!	54-12660	!DIST. ! ! ! ! ! ! ! ! !	

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```
1                /KK8-B PANEL MEMORY CODE
2                /D.A.WHITE 7-MAR-1977
3                /ASSEMBLE THIS FILE WITH PANROM.BI--THIS MAKES THE ROM CHECKSUM
4                /COME OUT CORRECTLY.
5
6           5667 ROMSUM=5667
7           6073 PRQ=6073                  /MAKE PANEL REQUEST
8                /IMPORTANT ROUTINES, CALLED BY THE GENERAL CALL
9                /       PRQ
10               /       ADDRESS
11               /THESE ADDRESSES SHOULD REMAIN FIXED, DESPITE REVISIONS:
12               /BEGIN=6201--RUN EPI LOADER.  SR0 NOT TESTED.
13               //(INTERRUPT SHOULD BE OFF, OR CAF SHOULD BE FIRST INSTRUCTION EXECUTED IN MAIN
14               /RX01=DEPENDING ON EPI JUMPER.
17               //GIVE "START" MESSAGE
18               /HYPHEN=6002--RETURN TO "DUMB TERMINAL" MODE
19          6071 PRS=6071                  /READ PANEL STATUS TO AC 0-3
20                                                 /AC0=STARTUP CONDITION
21                                                 /AC1=BOOTSTRAP BUTTON
22                                                 /AC2=PROGRAM HLT
23                                                 /AC3=PROGRAM REQUEST
24          6072 PST=6072                  /COMPLEMENT THE RUN FLIP-FLOP
25          6074 PER=6074                  /TURN ERROR LIGHT ON
26          6043 TSB=6043                  /SET LOCAL-TERMINAL BAUD RATE PER AC 8-11
27               /SOME MAGIC NUMBERS FOR IOT ABOVE:
28               /       BAUD RATE       AC8-11          BAUD RATE       AC8-11
29               /       50              0               1800            10
30               /       75              1               2000            11
31               /       110             2               2400            12
32               /       134.5           3               3600            13
33               /
34               /       150             4               4800            14
35               /       300             5               7200            15
36               /       600             6               9600            16
37               /       1200            7               19200           17
38          6037 KLB=6037                  /SET LOOPBACK IF AC11=1; CLEAR LOOPBACK IF AC11=0
39
40               /LAS INSTRUCTION PICKS UP THE FOLLOWING BITS:
41               /       AC0=1 IF EPI BOARD INSERTED
42               /       AC1=1 IF APT TEST
43               /       AC2=UNDEFINED (DO NOT ASSUME ANYTHING--MASK OFF.)
44               /       AC<3:5>=NBR OF EPI PROGRAMS TO LOAD-1
45               /       AC<6:7>=UNDEFINED (DO NOT ASSUME ANYTHING--MASK OFF)
46               /       AC<8:11>=BAUD RATE (SEE TSB IOT ABOVE)
47
```

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE: KK8-B PANEL MEMORY CODE	SIZE: K	CODE: SP	NUMBER: VT78-0-3	REV: *


```
48                NOPUNCH
49          0000  *0                       /TEMPORARIES IN PANEL READ-WRITE MEMORY
50    00000 0000  ORIGIN, 0                /POINTER TO MAIN MEMORY
51    00001 0000  PSTAT,  0                /PANEL STATUS WORD
52    00002 0000  ACSAV,  0
53    00003 0000  STATUS, 0                /FLAGS--LINK, INT BUS, INT ENA, I.P., D.F.
54
55                /AUTO INDEX LOCATIONS ARE 10-17
56
57          0020  *20
58    00020 0000  FLDCHG, 0                /ENTRY TO FIELD CHANGE SUBROUTINE
59    00021 0000  MEMFLD, 0                /CDF OR CDIF INSTRUCTION GOES HERE
60          0022  RAREA=.
61                /THIS AREA IS FILLED FROM ROM WITH SUBROUTINE LINKS AND CONSTANTS
62                /       (SEE PAGE 9)
63          0070  *70
64                /NOW FOR SOME VARIABLE STORAGE
65    00070 0000  CHAR,   0
66    00071 0000  PCOUNT, 0
67    00072 0000  WORD1,  0
68    00073 0000  WORD2,  0
69    00074 0000  CKSUM,  0
70    00075 0000  OTEMP,  0
71    00076 0000  OCTR,   0
72    00077 0000  DELAY1, 0
73                ENPUNCH

74          6000  *6000
75    06000 6074  CRASH,  PER              /IN CASE R/W MEMORY GOES BESERK, WE MIGHT "AND"
76    06001 5200          JMP .-1          /UP THRU MEMORY TO HERE.  HANG AND TURN OFF "^PU OK" LIGHT
77    06002 5346  HYPHEN, JMP END3
78    06003 5314  START,  JMP BOOT
79    06004 3002  PANEL,  DCA ACSAV        /SAVE ALL PERTINENT REGISTERS, SUCH AS AC
80    06005 6004          GIF
81    06006 0322          AND PK7700       /LINK, INT BUS, INT ENABLE
82    06007 3003          DCA STATUS
83    06010 6214          RDF
84    06011 7110          RAR CLL
85    06012 7012          RTR
86    06013 6224          RIF              /INSTRUCTION AND DATA FIELDS
87    06014 1003          TAD STATUS
88    06015 3003          DCA STATUS
89    06016 7344          STA CLL RAL      /LSB=16
90    06017 6043          TSB              /SET LOCAL TERMINAL BAUD RATE TO 9600
91    06020 6271          CDF 70           /THAT'S US, FOLKS!!
92    06021 7200          CLA              /FOR SAFETY'S SAKE, IN CASE C0 IS BAD
93    06022 6071          PRS              /GET PANEL STATUS BITS
94    06023 7450          SNA
95    06024 5200          JMP CRASH        /NO STATUS BITS AROUND--BAD!!!
96    06025 7510          SPA              /AC0 = 1 MEANS FIRST START AFTER POWER ON
97    06026 5727          JMP I STRT       /FILL PANEL PAGE 0 AND RUN DIAGNOSTIC
98    06027 7006          RTL
99    06030 3001          DCA PSTAT        /SAVE HLT BIT (IT'S AC 0).  WE'LL NEED IT LATER.
100   06031 1001          TAD PSTAT
101   06032 7730          SZL SPA CLA      /SKIP IF LINK AND AC0 BOTH ZERO
102   06033 5310          JMP BTORHT       /EITHER A PROGRAM HALT OR DEPRESSED BOOSTRAP BUTTON
```

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE: KK8-B PANEL MEMORY CODE	SIZE: K	CODE: SP	NUMBER: VT78-0-3	REV: *

```
103   06034  1364           TAD KCDF         /PANEL CALL FROM PROGRAM (BY DEFAULT)
104   06035  6224           RIF
105   06036  3021           DCA MEMFLD
106   06037  4020           JMS FLDCHG       /EXECUTE A CDF TO CALLING FIELD
107   06040  1400           TAD I ORIGIN     /GET ARGUMENT--SEE WHERE IN PAN MEM TO GO
108   06041  3020           DCA FLDCHG
109   06042  6271           CDF 70           /NOW BACK TO THIS FIELD
110   06043  2000           ISZ ORIGIN       /INCREMENT RETURN
111   06044  0215  PK215,   215              /YE CARRIAGE RETURN; ALSO WRAPAROUND PROTECTION
112   06045  5420           JMP I FLDCHG     /NOW GO TO CALLED ROUTINE
113                                          /DISPLAY CONTENTS OF REGISTERS
114   06046  1003  PCACMQ,  TAD STATUS       /GET L, INT BUS, INT ENA, INSTRUCTION AND DATA FIELDS
115   06047  4034           JMS OCTPNT       /PRINT THEM
116   06050  1000           TAD ORIGIN       /NOW PRINT THE PC,
117   06051  4034           JMS OCTPNT
118   06052  4037           JMS MSG
119   06053  7340           TEXT %; AC,MQ%   /THIS MESSAGE,
120   06054  0103
121   06055  5415
122   06056  2100
123   06057  1002           TAD ACSAV        /AC,
124   06060  4034           JMS OCTPNT
125   06061  7701           MQA CLA
126   06062  4034           JMS OCTPNT       /AND THE MQ
127   06063  5445           JMP I PCPNT
128
129   06064  1061  HLTCHK,  TAD HLTFLG
130   06065  7700           SMA CLA          /ARE WE TESTING THE HLT INSTRUCTION?
131   06066  5273           JMP HLTD1        /NO--THIS IS A REAL LIVE HALT
132   06067  1000           TAD ORIGIN       /YES--MAKE SURE ADDRESS CORRECT
133   06070  1062           TAD HLTADR
134   06071  7650           SNA CLA          /COMPARE ORIGIN WITH EXPECTED
135   06072  5363           JMP HLTOK        /HALT INSTRUCTION WORKED.  BACK TO DIAGNOSTIC
136   06073  4031  HLTD1,   JMS CRLF
137   06074  4037           JMS MSG          /PROGRAM HALT--PRINT
138   06075  1014           TEXT %HLT%       /THIS MESSAGE,
139   06076  2400
140   06077  4045           JMS PCPNT        /AND THE STATE OF THE MACHINE
141   06100  1061           TAD HLTFLG       /INITIALLY, HLTFLG = -1 (WHEN PANEL PG 0 IS FILLED)
142                                          /HENCE THE "SMA CLA" AT HLTCHK+1 SKIPS..
143                                          /AFTER HLT INSTRUCTION TESTED, HLTFLG=0
144   06101  7750           SNA SPA CLA      /HENCE DIAGNOSTIC HLT PRINTS MESSAGE AND RESTARTS
145   06102  5727           JMP I STRT       /DIAGNOSTIC.  AFTER DIAGNOSTIC, HLTFLG=1 AND THE
146                                          /"SNA SPA CLA" SKIPS, CAUSING A WAIT FOR BOOTSTRAP
147                                          /BUTTON.
148   06103  6071  HLTD2,   PRS
149   06104  7006           RTL
150   06105  7620           SNL CLA          /ONLY THE BOOTSTRAP BUTTON GETS US OUT OF HALT
151   06106  5303           JMP HLTD2        /HANG UNTIL IT IS PUSHED.
152   06107  5314           JMP BOOT
153
154   06110  4050  BTORHT,  JMS DELAY        /TIME OUT TO LET ANY INPROCESS CHAR XMIT
155   06111  6037           KLB              /CLEAR THE LOOP-BACK FLIP FLOP IN CASE IT'S SET
156   06112  7420           SNL              /LINK IS SET IF BOOTSTRAP BUTTON WAS PUSHED
157   06113  5264           JMP HLTCHK       /OTHERWISE WE'RE HERE BECAUSE OF PROGRAM HALT
158   06114  4031  BOOT,    JMS CRLF         /       /(BOOTSTRAP OVER-RIDES HALT)
159   06115  4037           JMS MSG
```



```
160   06116  2324           TEXT %START%     /PRINT THIS MESSAGE
161   06117  0122
162   06120  2400
163   06121  1001           TAD PSTAT
164   06122  7700  PK7700,  SMA CLA          /(BYPASS PRINTING OF REGISTERS IF IN HLT)
165   06123  4045           JMS PCPNT        /AND PRINT THE FLAGS, FIELDS, PC, AC AND MQ
166   06124  7001           IAC
167   06125  3061           DCA HLTFLG
168   06126  5463           JMP I KBOOT1
169
170   06127  6467  STRT,    STRTUP
171   06130  0212  PK212,   212
172   06131  7670  PM110,   -110
173
174   06132  4031  END,     JMS CRLF
175   06133  5336           JMP .+3
176   06134  6036  ECHO,    KRB              /GET CHARACTER
177   06135  4026           JMS TYPE         /ECHO IT
178   06136  1331           TAD PM110        /-200 (OCTAL) TO AC
179   06137  3071           DCA PCOUNT       /RESET TIMEOUT COUNTER
180   06140  6031  END1,    KSF
181   06141  7410           SKP
182   06142  5334           JMP ECHO         /CHARACTER SEEN.  ECHO IT, AND RESET TIMEOUT
183   06143  4050           JMS DELAY
184   06144  2071           ISZ PCOUNT
185   06145  5340           JMP END1
186   06146  4031  END3,    JMS CRLF         /TIME-OUT OCCURED.
187   06147  1331           TAD PM110
188   06150  3074           DCA CKSUM
189   06151  1060  END2,    TAD PK255        /HYPHEN ACROSS PAGE
190   06152  4026           JMS TYPE
191   06153  2074           ISZ CKSUM
192   06154  5351           JMP END2
193   06155  4031           JMS CRLF
194   06156  4023           JMS MOVE
195   06157  6676           STDIAG-1
196   06160  0065           DIAG-1
197   06161  6720           DIAG-LAST
198   06162  1111           NULJOB           /MOVE IN THE ENTIRE DIAGNOSTIC (PERHAPS AGAIN), AND
199                                          /START AT "NULJOB"
200
201   06163  3061  HLTOK,   DCA HLTFLG
202   06164  6201  KCDF,    CDF 0
203   06165  2000           ISZ ORIGIN       /WILL NEVER SKIP, SINCE ORIGIN=HLTADR
204   06166  5464           JMP I PSTAR2
205
206   06167  7200  CRLF1,   CLA              /TYPE CARRIAGE RETURN AND LINE FEED
207   06170  1244           TAD PK215
208   06171  4026           JMS TYPE
209   06172  1330           TAD PK212
210   06173  4026           JMS TYPE
211   06174  5431           JMP I CRLF
212   06175  0000  ZBLOCK 6200-.
213          6200  *6200
214   06200  5326  RX01,    JMP FLOPPY
215                /BINARY LOADER FOR EPI BOARDS
216                /WORKS LIKE STANDARD BINARY LOADER, EXCEPT
```

```
                /       1. USES ONLY HIGH-SPEED "PAPER TAPE" INPUT
                /       2. USES SR3-5 TO DETERMINE HOW MANY PROGRAMS TO LOAD
                /       3. EXPECTS A FIELD AND ORIGIN STATEMENT AT THE END
                /             OF "TAPE" IN ORDER TO DEFINE START OF PROGRAM.
                /       4. NO PROVISION FOR RUBOUT.
                /       5. TAPES MUST BE CONTIGUOUS--NO HALTS (NO CONTINUE BUTTON!!)

06201  6016  BEGIN,  RRB RFC          /WE START THE READ THIS WAY SO
                                      /THE INTERFACE USES ONLY 2 IOTS
06202  7604          LAS
06203  7002          BSW              /GET BITS 3-5.
06204  0057          AND PK7
06205  7040          CMA
06206  3071          DCA PCOUNT       /COMPLEMENT AND SAVE AS NUMBER OF PGMS TO LOAD
06207  6203  KCDIF,  CDF CIF          /IN CASE NO FIRST FIELD STATEMENT
06210  4054          JMS BEGG         /CALL LEADER-TRAILER EXTRACT ROUTINE
06211  5210          JMP .-1          /AND HANG IN THERE UNTIL PAST LEADER

06212  3074  GO,     DCA CKSUM        /CLEAR OR ACCUMULATE CHECKSUM
06213  1070          TAD CHAR         /GET CHARACTER
06214  3072          DCA WORD1        /SAVE AS FIRST CHARACTER
06215  6011          RSF              /OF A 12-BIT WORD
06216  5215          JMP .-1
06217  6016          RRB RFC          /READ SECOND CHARACTER
06220  3073          DCA WORD2        /AND SAVE
06221  4054          JMS BEGG         /LOOK AHEAD AT NEXT CHARACTER
06222  5243          JMP BEND         /TRAILER--END--CHECK CHECKSUM AND COUNT
06223  1072          TAD WORD1        /ORIGIN OR DATA--GO ON
06224  7106          CLL RTL
06225  7006          RTL
06226  7006          RTL
06227  1073          TAD WORD2        /ASSEMBLE 12-BIT WORD.  WORD IS DATA IF L = 0
06230  7420          SNL              /SKIP IF ORIGIN STATEMENT
06231  5237          JMP DEPOS        /DATA STATEMENT--DEPOSIT
06232  3000          DCA ORIGIN       /ORIGIN--SAVE AT "ORIGIN" LOCATION
06233  1072  CHEX.   TAD WORD1
06234  1073          TAD WORD2
06235  1074          TAD CKSUM        /COMPUTE CHECKSUM
06236  5212          JMP GO

06237  3400  DEPOS,  DCA I ORIGIN     /DATA--DEPOSIT IN DATA FIELD, AT LOC ADDRESSED BY ORIGIN
06240  2000          ISZ ORIGIN
06241  0070  FMASK,  70               /ALSO SERVES AS A NOP IN CASE OF WRAP-AROUND!!
06242  5233          JMP CHEX

06243  1072  BEND,   TAD WORD1        /TRAILER SEEN--
06244  7002          BSW
06245  1073          TAD WORD2        /ASSEMBLE THE CHECKSUM FROM INPUT
06246  7041          CIA
06247  1074          TAD CKSUM        /COMPARE WITH COMPUTED VALUE
06250  7640          SZA CLA          /RESULT BETTER BE ZERO!!!
06251  5305          JMP BADRD        /ELSE COMPLAIN
06252  2071          ISZ PCOUNT       /SEE IF LAST PROGRAM
06253  5210          JMP KCDIF+1      /NO--KEEP READING
06254  1001  PSTART, TAD PSTAT
06255  7710          SPA CLA          /IS CPU HALTED?
06256  6072          PST              /YEAH.  START IT.
```

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE KK8-B PANEL MEMORY CODE	SIZE K	CODE SP	NUMBER VT78-0-3	REV *


```
06257  6007          CAF              /CLEAR THE I/O WORLD
06260  6001  PSTAR1, ION              /AND GET OUT OF PANEL MODE
06261  5400          JMP I ORIGIN
06262  5660          JMP I PSTAR1     /WE DID NOT GET OUT OF PANEL MEMORY!!!!
                                      /JMP I PSTAR1 SAVES A LOC, AND GETS US TO "CRASH"!!

                /EXTRACT LEADER/TRAILER, HANDLE FIELD.
                /UNLIKE PAPER TAPE BINARY LOADER OF OLD, THIS PROGRAM DOES NOT
                /HANDLE RUBOUTS.
                /       RETURNS TO CALL + 1 IF LEADER-TRAILER
                /       RETURNS TO CALL + 2 IF ORIGIN OR DATA
                /       HANDLES FIELD STATEMENTS INTERNALLY
06263  6011  BEGG1,  RSF
06264  5263          JMP .-1
06265  6016          RRB RFC          /READ CHARACTER
06266  3070          DCA CHAR         /SAVE CHARACTER
06267  1070          TAD CHAR
06270  7002          BSW
06271  7012          RTR              /HOLE 8 IN LINK, HOLE 7 IN AC0
06272  7060          CMA CML          /COMPLEMENT BITS--MAKES BIT TESTING EASIER
06273  7430          SZL              /SKIP IF FIELD OR L-T
06274  2054          ISZ BEGG         /DATA OR ORIGIN--RETURN TO CALL+2
06275  7730          SZL SPA CLA      /SKIP IF BOTH LINK AND SIGN ARE 0 (IE, FIELD)
06276  5454          JMP I BEGG       /BACK TO MAIN PROGRAM--NOT FIELD
06277  1070  FLD,    TAD CHAR         /IT'S A FIELD STATEMENT
06300  0241          AND FMASK        /ISOLATE FIELD BITS
06301  1207          TAD KCDIF        /AND SAVE INSTRUCTION IN READ-WRITE MEMORY
06302  3021          DCA MEMFLD       /NOTE: DO NOT ADD CHARACTER TO CHECKSUM!!
06303  4020          JMS FLDCHG       /EXECUTE THE DATA FIELD CHANGE
06304  5263          JMP BEGG1        /NOW GET NEXT CHARACTER

06305  4031  BADRD,  JMS CRLF         /BINARY LOADER CHECKSUM ERROR.
06306  4037          JMS MSG
06307  1404          TEXT %LD ER%     /WARN OPERATOR AND
06310  4005
06311  2200
06312  5713          JMP I .+1        /WAIT FOR BOOTSTRAP BUTTON
06313  6103          HLTD2
06314  4023  BOOT1,  JMS MOVE         /TURN INTERRUPT OFF BY EXITING TO MAIN MEMORY
06315  6332          INTOFF-1
06316  0017          17               /AND EXECUTING "IOF"
06317  7774          -4
06320  0020          20               /THEN BACK TO BOOT2 TO SEE WHAT TO DO NEXT
06321  7604  BOOT2,  LAS              /EPI LOADER IS CALLED IF EITHER SR0 OR SR1 IS 1
06322  6313          TSB1             /SET BAUD RATE FROM SWITCHES
06323  7004          RAL              ///***WATCH OUT--DF IS 0 BECAUSE OF LAST MOVE***
06324  7730          SPA SZL CLA      /SKIPS ONLY IF BOTH L AND AC0 ARE ZERO
06325  5201          JMP BEGIN        /EPI.  RUN BINARY LOADER.

                /BOOTSTRAP THE FLOPPY DISK
06326  4023  FLOPPY, JMS MOVE
06327  6336          PFLBT-1          /FROM
06330  0023          23               /TO
06331  7742          -36              /-NUMBER OF WORDS
06332  0033          33               /STARTING ADDRESS OF BOOTSTRAP

06333  6002  INTOFF, IOF
06334  6073          PRQ
```

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE KK8-B PANEL MEMORY CODE	SIZE K	CODE SP	NUMBER VT78-0-3	REV *

```
331   06335  6321          BOOT2
332   06336  7402          HLT
333
334   06337  7126  PFLBT,  7126            /YE FLOPPIE BOOTSTRAPPE--LOCATION 24, FLD 0
335   06340  1060          1060
336   06341  6751          6751
337   06342  7201          7201
338   06343  4053          4053            /LOC 30
339   06344  4053          4053
340   06345  7104          7104
341   06346  6755  FLPYST, 6755            /YE BOOTSTRAPPE STARTE
342   06347  5054          5054
343   06350  6754          6754
344   06351  7450          7450
345   06352  7610          7610
346   06353  5046          5046            /LOC 40
347   06354  1060          1060
348   06355  7041          7041
349   06356  1061          1061
350   06357  3060          3060
351   06360  5024          5024
352   06361  6751          6751
353   06362  4053          4053
354   06363  3002          3002            /LOC 50
355   06364  2050          2050
356   06365  5047          5047
357   06366  0000          0
358   06367  6753          6753
359   06370  5033          5033
360   06371  6752          6752
361   06372  5453          5453
362   06373  7024          7024            /LOC 60
363   06374  6030          6030            /END OF FLOPPY BOOTSTRAP
364                /START-UP STUFF.  FILL PANEL R/W MEMORY WITH SUB LINKS AND CONSTANTS.
365
366   06375  0000  ZBLOCK 6400-.
367          6400  *6400
368   06400  7735  KRELSZ, -OFFSET
369   06401  0021  KRAREA, RAREA-1
370   06402  6402  PZREL,  .
371
372          0022  RELOC RAREA
373
374                /JUST A REMINDER--
375                /*20
376                /FLDCHG,        0       /ENTRY TO FIELD CHANGE SUBROUTINE
377                /MEMFLD,        0       /BECOMES CDF OR CDF CIF
378                /THIS NEXT STUFF GETS MOVED ONTO PANEL PAGE 0
379   00022* 5420          JMP I FLDCHG
380
381   00023* 0000  MOVE,   0               /COLLECT ARGUMENTS FOLLOWING CALL.  MOVE CODE TO
382   00024* 5425          JMP I .+1       /FIELD 0, THEN START THE CODE.
383   00025* 6571          MOVE1
384
385   00026* 0000  TYPE,   0               /TYPE THE CHARACTER IN THE AC, RETURN WITH 0 AC
386   00027* 5430          JMP I .+1       /LINK PRESERVED
387   00030* 6614          TYPE1
```

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```
388
389   00031* 0000  CRLF,   0               /TYPE A CARRIAGE RETURN AND LINE FEED
390   00032* 5433          JMP I .+1       /AC IGNORED, RETURNS 0.  LINK PRESERVED.
391   00033* 6167          CRLF1
392
393   00034* 0000  OCTPNT, 0               /TYPE THE CONTENTS OF THE AC AS OCTAL DIGITS
394   00035* 5436          JMP I .+1       /CAUTION--LINK MODIFIED
395   00036* 6627          OCTPN1
396
397   00037* 0000  MSG,    0               /PRINT THE TEXT STRING FOLLOWING THE CALL
398   00040* 5441          JMP I .+1       /AC MUST BE 0 AT CALL, RETURNS 0.  LINK PRESERVED.
399   00041* 6650          MSG1
400
401   00042* 0000  PCHAR,  0               /CONVERT SIX-BIT CHAR TO ASCII AND TYPE
402   00043* 5444          JMP I .+1       /ENTER WITH CHAR IN AC.  RETURNS 0 AC,
403   00044* 6662          PCHAR1          /PRESERVED LINK
404
405   00045* 0000  PCPNT,  0               /PRINT FLAGS, PC, AC, MQ
406   00046* 5447          JMP I .+1       /ENTER WITH 0 AC.  RETURNS 0 AC, LINK MODIFIED.
407   00047* 6046          PCACMQ
408
409   00050* 0000  DELAY,  0               /.063 SEC DELAY
410   00051* 2077          ISZ DELAY1
411   00052* 5051          JMP .-1
412   00053* 5450          JMP I DELAY
413
414   00054* 0000  BEGG,   0               /BIN LOADER L/T EXTRACT
415   00055* 5456          JMP I .+1
416   00056* 6263          BEGG1
417   00057* 0007  PK7,    7
418   00060* 0255  PK255,  255             /ASCII HYPHEN
419   00061* 7777  HLTFLG, -1
420   00062* 7634  HLTADR, -PGMHLT-1
421   00063* 6314  KBOOT1, BOOT1
422   00064* 6254  PSTAR2, PSTART
423
424          0043  OFFSET=.-RAREA
425
426          6446  RELOC
427   06446  7701  PM77,   -77
428   06447  6000  PK6000, 6000            /YE BOTTOME ROM ADDRESS; ALSO LOCATION OF "CRASH" ROUTINE
429   06450  4037  CKSUM1, -3741
430   06451  5667  CKSUM2, ROMSUM
431   06452  6556  KMMER,  MMER
432
433   06453  3002  MMERR,  DCA ACSAV              /OFFENDING BITS IN AC
434   06454  6271          CDF 70
435   06455  1010          TAD 10
436   06456  7421          MQL             /ADDRESS IN MQ
437   06457  3003          DCA STATUS
438   06460  1252          TAD KMMER
439   06461  3000          DCA ORIGIN
440   06462  5663          JMP I .+1
441   06463  6073          HLTD1
442
443   06464  7001  APT,    IAC             /MAKE HLTFLG 1, SO STRAY HALTS WILL HANG UP CPU
444   06465  3061          DCA HLTFLG
```

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```
445   06466  5463          JMP I KBOOT1     /NOW RUN EPI
446
447   06467  7200  STRTUP, CLA
448   06470  3000          DCA ORIGIN
449   06471  1000  CPLOOP, TAD ORIGIN       /FILL CP RAM (ADDRESSES 1-77) WITH ADDRESS
450   06472  3400          DCA I ORIGIN
451   06473  2000          ISZ ORIGIN
452   06474  5271          JMP CPLOOP
453   06475  2000  CPRAM,  ISZ ORIGIN       /PERFORM CHECKSUM ON CP RAM
454   06476  1400          TAD I ORIGIN     /USING LOCATION 0 AS ADDRESS POINTER
455   06477  1001          TAD PSTAT        /AND LOCATION 1 AS CHECKSUM ACCUMULATOR
456   06500  3001          DCA PSTAT
457   06501  1000          TAD ORIGIN
458   06502  1246          TAD PM77
459   06503  7710          SPA CLA
460   06504  5275          JMP CPRAM        /NOT DONE YET--GO BACK FOR MORE
461   06505  1001          TAD PSTAT        /COMPARE ACCUMULATED SUM WITH EXPECTED
462   06506  1250          TAD CKSUM1       /IS RESULT CORRECT?
463   06507  7440          SZA
464   06510  5647          JMP I PK6000     /NO--CP RAM FAILURE--TURN OFF "OK" LIGHT
465   06511  7330          CLA STL RAR      /4000 TO AC
466   06512  3001          DCA PSTAT        /SET "HLT" BIT IN PANEL STATUS WORD
467   06513  1247  CPROM,  TAD PK6000       /NOW TRY A CHECKSUM ON THIS ROM.
468   06514  3000          DCA ORIGIN
469   06515  1400          TAD I ORIGIN
470   06516  2000          ISZ ORIGIN
471   06517  5315          JMP .-2
472   06520  7440          SZA              /CKSUM2 IS SUCH THAT RESULT BETTER BE 0
473   06521  5647          JMP I PK6000     /IT ISN'T--TURN OFF "OK" LIGHT.
474   06522  1202  PAGE0,  TAD PZREL        /MOVE PANEL PAGE 0 INTO PLACE
475   06523  3010          DCA 10
476   06524  1201          TAD KRAREA
477   06525  3011          DCA 11
478   06526  1200          TAD KRELSZ
479   06527  3012          DCA 12
480   06530  1410          TAD I 10
481   06531  3411          DCA I 11
482   06532  2012          ISZ 12
483   06533  5330          JMP .-3
484   06534  7604          LAS
485   06535  7004          RAL
486   06536  7710          SPA CLA
487   06537  5264          JMP APT          /SR SAYS THE APT LINE IS LOOKING FOR A BOOTSTRAP
488   06540  7344          STA CLL RAL
489   06541  6313          TSB1             /SET SLU2 AND SLU3 TO 9600 BAUD
490   06542  6333          TSB2
491   06543  6201  MMFLD0, CDF 0            /NOW PERFORM AN ADDRESS TEST ON MAIN MEMORY
492   06544  7240          STA
493   06545  3010          DCA 10
494   06546  1000          TAD ORIGIN
495   06547  3410          DCA I 10
496   06550  2000          ISZ ORIGIN
497   06551  5346          JMP .-3
498   06552  1410  FLD0CK, TAD I 10         /COMPARE CONTENTS
499   06553  7041          CIA
500   06554  1000          TAD ORIGIN       /WITH EXPECTED
501   06555  7440          SZA
```

	TITLE	SIZE	CODE	NUMBER	REV
DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	KK8-B PANEL MEMORY CODE	K	SP	VT78-0-3	*


```
502   06556  5253  MMER,   JMP MMERR        /NOT SAME--COMPLAIN
503   06557  2000          ISZ ORIGIN       /AND DO ALL ADDRESSES
504   06560  5352          JMP FLD0CK
505   06561  4031          JMS CRLF
506   06562  4037          JMS MSG
507   06563  0100          TEXT %A%         /TYPE "A"--PANEL R/W MEMORY FILLED
508   06564  4023          JMS MOVE         /LOAD AND RUN THE DIAGNOSTIC
509   06565  6676          STDIAG-1         /FROM
510   06566  0065          DIAG-1           /TO
511   06567  6720          DIAG-LAST        /SIZE
512   06570  0140          OPRAT2           /STARTING ADDRESS
513
514   06571  6271  MOVE1,  CDF 70           /FIX DF IN CASE BOOTSTRAPPING FLOPPY AFTER IOF
515   06572  1423          TAD I MOVE
516   06573  3010          DCA 10           /"FROM"
517   06574  2023          ISZ MOVE
518   06575  1423          TAD I MOVE
519   06576  3011          DCA 11           /"TO"
520   06577  2023          ISZ MOVE
521   06600  1423          TAD I MOVE
522   06601  3012          DCA 12           /"-NUMBER OF WORDS"
523   06602  2023          ISZ MOVE
524   06603  1423          TAD I MOVE
525   06604  3000          DCA ORIGIN       /STARTING ADDRESS IN MAIN MEMORY
526   06605  6271  MOVE2,  CDF 70
527   06606  1410          TAD I 10
528   06607  6203          CDF CIF 0
529   06610  3411          DCA I 11
530   06611  2012          ISZ 12
531   06612  5205          JMP MOVE2
532   06613  5464          JMP I PSTAR2
533
534   06614  6046  TYPE1,  TLS              /REST OF TYPE CHARACTER ROUTINE
535   06615  7200          CLA              /DON'T TRY TO BE SMART AND DO THIS WITH A FUNNY OPERATE--
536   06616  1272          TAD PM100        /YOU'LL FOUL UP OCTPNT (IT NEEDS THE LINK PRESERVED)
537   06617  3072          DCA WORD1
538   06620  2072          ISZ WORD1        /TIME OUT FOR 1 CHARACTER TIME
539   06621  5220          JMP .-1          /NOW FLAG BETTER BE SET
540   06622  6041          TSF              /IT ISN'T--SLU MALFUNCTION
541   06623  7410          SKP
542   06624  5426          JMP I TYPE
543   06625  6074          PER              /TURN OFF LIGHT
544   06626  5225          JMP .-1          /AND HANG
545
546   06627  7004  OCTPN1, RAL              /OCTAL PRINT OF C(AC)
547   06630  3075          DCA OTEMP        /SHIFT AC ONE PLACE (ACCOUNT FOR LINK)
548   06631  1273          TAD PM4
549   06632  3076          DCA OCTR         /SET UP COUNTER FOR NUMBER OF DIGITS
550   06633  1275          TAD PK240
551   06634  4026          JMS TYPE
552   06635  1075  OCTPN2, TAD OTEMP        /GET WORD
553   06636  7006          RTL
554   06637  7004          RAL              /ROTATE LEFT 3 PLACES
555   06640  3075          DCA OTEMP
556   06641  1075          TAD OTEMP        /SAVE
557   06642  0057          AND PK7          /KEEP ONLY OCTAL DIGIT
558   06643  1276          TAD PK260        /CONVERT TO ASCII DIGIT
```

	TITLE	SIZE	CODE	NUMBER	REV
DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	KK8-B PANEL MEMORY CODE	K	SP	VT78-0-3	*

```
559   06644  4026          JMS TYPE
560   06645  2076          ISZ OCTR        /KEEP GOING UNTIL ALL 4 DIGITS PRINTED
561   06646  5235          JMP OCTPN2
562   06647  5434          JMP I OCTPNT
563
564   06650  6271  MSG1,   CDF 70
565   06651  1437          TAD I MSG       /PRINT TEXT FOLLOWING CALL--GET PIECE OF TEXT
566   06652  2037          ISZ MSG                 /INCREMENT RETURN
567   06653  3074          DCA CKSUM       /AS GOOD A PLACE FOR TEMP STORAGE AS ANY!
568   06654  1074          TAD CKSUM
569   06655  7002          BSW
570   06656  4042          JMS PCHAR       /PROCESS LEFT HALF--STRIP OFF UNWANTED BITS, CONVERT
571   06657  1074          TAD CKSUM
572   06660  4042          JMS PCHAR       /DO SAME FOR RIGHT HALF
573   06661  5250          JMP MSG1        /GO BACK FOR MORE
574
575   06662  0274  PCHAR1, AND PK77                /THROW AWAY WRONG HALF OF WORD
576   06663  7450          SNA
577   06664  5437          JMP I MSG       /IF RESULTING CHARACTER IS 0, END OF MESSAGE
578   06665  1275          TAD PK240               /OTHERWISE, COMPLEMENT BIT 6
579   06666  0274          AND PK77
580   06667  1275          TAD PK240       /CONVERT TO ASCII
581   06670  4026          JMS TYPE        /AND TYPE
582   06671  5442          JMP I PCHAR
583
584   06672  7700  PM100,  -100
585   06673  7774  PM4,    -4
586   06674  0077  PK77,   77
587   06675  0240  PK240,  240
588   06676  0260  PK260,  260
589
590          0066  DIAG=66          /CHANGE WITH CAUTION!!  WATCH PAGE BOUNDARIES.
591
592                /SOME PAGE ZERO VARIABLES AND FUNNY OPERATES FOR OPRATE AND MRI TESTS
593          7401  MQNOP=7401
594          7601  MQCLA=7601
595                /THE FOLLOWING RESIDE IN PAGE 0, FIELD 0 OF MAIN MEMORY
596          0020  REGA=20
597          0021  REGB=21
598          0022  A=22
599          0023  B=23
600          0024  C=24
601          0026  KLTRS=26
602          0025  D=25
603
604          6677  STDIAG=.                /START OF THE DIAGNOSTIC STUFF
605          0066  RELOC DIAG
606
607   00065* 7402  HALT,   HLT             /PROTECTION FOR WRAP-AROUND, ETC
608   00067* 0067  ESCSEQ, .
609   00070* 7745          -33             /ESCAPE SEQUENCE FOR BOOTSTRAP FROM DOWN-LINE
610   00071* 7735          -43             /SEQ IS ESC--NBR SIGN--SPACE--0
611   00072* 7740          -40             /NOTICE--NO "200" BIT
612   00073* 7720          -60
613   00074* 0007  K7,      7               /ALSO TERMINATES ESCAPE LIST BECAUSE IT'S +
614                /CONSTANTS
615   00075* 0100  M7700,  -7700
```

	TITLE	SIZE	CODE	NUMBER	REV
DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	KK8-B PANEL MEMORY CODE	K	SP	VT78-0-3	*


```
616   00076* 7401  M377,   -377
617   00077* 7750  M30,    -30
618   00100* 7765  M13,    -13
619   00101* 7772  M6,     -6
620   00102* 0010  K10,    10
621   00103* 0077  K77,    77
622   00104* 0200  K200,   200
623   00105* 0300  K300,   300
624   00106* 7400  K7400,  7400
625   00107* 7700  K7700,  7700
626   00110* 0373  TAD1P,  TAD1
627   00111* 0676  XADDP,  XTDADD
628   00112* 1020  XTNP2,  KHLT+1
629   00113* 5514  INTJMP, JMP I INTLNK
630   00114* 0601  INTLNK, INTCHN
631   00115* 0775  KFRET,  FRET            /MUST FOLLOW INTLNK
632   00116* 1401  TLIMIT, -TBUF-400+1
633   00117* 5777  TTYBUF, TBUF-1
634   00120* 4200  KJMSC,  4200            /JMS CURRENT PAGE
635   00121* 0464  KRETUR, RETUR-1
636   00122* 4000  STRTBF, STRBUF
637   00123* 0027  MODE2,  27
638   00124* 3777  KSTRBF, STRBUF-1
639   00125* 4263  R1,     4263
640   00126* 2634  R2,     2634
641   00127* 0302  KLTR,   "B
642   00130* 0000  TYPEIT, 0               /PRINT NEXT LETTER AT TERMINAL
643   00131* 1026          TAD KLTRS
644   00132* 6046          TLS
645   00133* 2026          ISZ KLTRS       /GO TO NEXT LETTER NEXT TIME AROUND
646   00134* 6041          TSF
647   00135* 5134          JMP .-1
648   00136* 7677  K7677,  7677            /SINCE THE EAE BITS ARE UNUSED, THIS IS SAME AS "CAM"
649   00137* 5530          JMP I TYPEIT
650   00140* 6002  OPRAT2, IOF             /IN CASE WE RESTART AFTER SLU TEST HLT
651   00141* 1127          TAD KLTR        /SET UP PRINTOUT--ALLOWS RESTART WITH ODT
652   00142* 3026          DCA KLTRS
653   00143* 7402  PGMHLT, HLT             /MAKE SURE HALT IS WORKING
654   00144* 5144          JMP .           /HANG HERE IF IT DOESN'T
655   00145* 4130          JMS TYPEIT      /TYPE "B"--DIAGNOSTIC LOADED AND STARTED
656   00146* 7320  SKPTST, CLA CLL CML     /SOME STUFF FROM DEC/X8 OPRATE MODULE
657   00147* 7010          RAR
658   00150* 7440          SZA             /ROTATE A "1" RIGHT UNTIL AC=0, LINK=1
659   00151* 5147          JMP .-2
660   00152* 7041          CMA IAC         /NOW CIA--LINK SHOULD COMPLEMENT
661   00153* 7420          SNL
662   00154* 7440          SZA
663   00155* 7402          HLT             /SNL OR SZA PROBLEM
664
665   00156* 7020          CML             /DO SAME SORT OF THING AGAIN, THIS TIME GOING LEFT
666   00157* 7004          RAL
667   00160* 7450          SNA
668   00161* 7410          SKP
669   00162* 5157          JMP .-3
670   00163* 7061          CMA CML IAC
671   00164* 7430          SZL
672   00165* 7440          SZA
```

	TITLE	SIZE	CODE	NUMBER	REV
DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	KK8-B PANEL MEMORY CODE	K	SP	VT78-0-3	*

```
00166* 7402          HLT             /SZL OR SNA PROBLEM

00167* 7320          CLA CLL CML     /COMBINED SKIPS
00170* 7570          SPA SNA SZL
00171* 7560          SMA SZA SNL
00172* 7402          HLT             /PROBLEM WITH ONE OF THE ABOVE 2 INSTRUCTIONS
00173* 7070          CML CMA RAR
00174* 7570          SPA SNA SZL
00175* 7560          SMA SZA SNL
00176* 7402          HLT             /SKIP FAILURE--ONE OF 2 ABOVE INSTR
00177* 7141          CLL CMA IAC
00200* 7570          SPA SNA SZL
00201* 7560          SMA SZA SNL
00202* 7402          HLT             /SKIP FAILURE
00203* 7040          CMA
00204* 7560          SMA SZA SNL
00205* 7770          SPA SNA SZL CLA
00206* 7402          HLT             /YET ANOTHER SKIP FAILURE
00207* 7440          SZA
00210* 7402          HLT             /DID THAT CLA BIT ABOVE REALLY CLEAR THE AC??
00211* 7001          IAC
00212* 7760          SMA SZA SNL CLA
00213* 7440          SZA
00214* 7402          HLT             /CLA DID NOT WORK??

00215* 7360  RUNIR,  CLA CLL CMA CML /COMBINED INCREMENT AND ROTATE TEST
00216* 7367          CLA CLL CMA CML IAC RTL /AC, LINK BOTH 0
00217* 7420          SNL
00220* 7440          SZA
00221* 7402          HLT             /IAC OR ROTATE FAILED
00222* 7060          CMA CML
00223* 7373          CLA CLL CMA CML IAC RTR /AC, LINK BOTH 0
00224* 7420          SNL
00225* 7440          SZA
00226* 7402          HLT             /IAC OR ROTATE FAILED
00227* 3020          DCA REGA
00230* 1020  RUNRT,  TAD REGA
00231* 7165          CLL CML CMA IAC RAL
00232* 7010          RAR
00233* 7073          CML CMA IAC RTR
00234* 7006          RTL
00235* 7071          CML CMA IAC RAR
00236* 7004          RAL
00237* 7067          CML CMA IAC RTL
00240* 7012          RTR
00241* 7041          CIA
00242* 1020          TAD REGA
00243* 7430          SZL
00244* 7440          SZA
00245* 7402          HLT             /COMBINED IAC, ROTATE DID NOT WORK
00246* 2020          ISZ REGA
00247* 5230          JMP RUNRT

00250* 1020  RNMQBS, TAD REGA        /CHECK MQ AND BSW INSTRUCTIONS--GET NUMBER
00251* 7106          RTL CLL
00252* 7006          RTL             /SIMULATE BSW
00253* 7006          RTL
```

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE KK8-B PANEL MEMORY CODE	SIZE K	CODE SP	NUMBER VT78-0-3	REV *


```
00254* 0107          AND K7700
00255* 3021          DCA REGB
00256* 1020          TAD REGA
00257* 7112          RTR CLL
00260* 7012          RTR
00261* 7012          RTR
00262* 0103          AND K77
00263* 1021          TAD REGB
00264* 7002          BSW             /NOW DO A REAL BSW TO GET ORIGINAL VALUE BACK
00265* 7041          CIA
00266* 1020          TAD REGA        /AND COMPARE WITH ORIGINAL
00267* 7440          SZA
00270* 7402          HLT             /BSW FAILED
00271* 1020          TAD REGA        /NOW TEST MQ INSTRUCTIONS
00272* 7040          CMA
00273* 3021          DCA REGB
00274* 1020          TAD REGA
00275* 7421          MQL
00276* 7440          SZA
00277* 7402          HLT             /MQL DID NOT CLEAR AC
00300* 1021          TAD REGB
00301* 7521          SWP
00302* 7401          MQNOP           /MQ NOP = 7401
00303* 7041          CIA
00304* 1020          TAD REGA
00305* 7640          SZA CLA
00306* 7402          HLT             /MQ NOP DID SOMETHING ??
00307* 1020          TAD REGA
00310* 7601          MQCLA           /GROUP 3 CLA
00311* 7440          SZA
00312* 7402          HLT             /WELL, IT SHOULD HAVE, BUT IT DIDN'T CLEAR AC
00313* 1020          TAD REGA
00314* 7701          CLA MQA
00315* 7041          CIA
00316* 1021          TAD REGB
00317* 7440          SZA
00320* 7402          HLT             /CLA MQA COMBINATION BAD
00321* 1021          TAD REGB
00322* 7501          MQA
00323* 7041          CIA
00324* 1021          TAD REGB
00325* 7440          SZA
00326* 7402          HLT             /PROBLEM WITH MQA
00327* 1020          TAD REGA
00330* 7501          MQA
00331* 7040          CMA
00332* 7440          SZA
00333* 7402          HLT             /YET MORE PROBLEMS WITH MQA
00334* 1020          TAD REGA
00335* 7621          CLA MQL
00336* 7440          SZA
00337* 7402          HLT             /AC NOT ZEROED BY MQL
00340* 7701          CLA MQA
00341* 7440          SZA
00342* 7402          HLT             /MQ CAME BACK NOT ZERO
00343* 1020          TAD REGA
00344* 7421          MQL
```

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE KK8-B PANEL MEMORY CODE	SIZE K	CODE SP	NUMBER VT78-0-3	REV *

```
787   00345* 1021          TAD REGB
788   00346* 7721          CLA SWP
789   00347* 7041          CIA
790   00350* 1020          TAD REGA
791   00351* 7440          SZA
792   00352* 7402          HLT               /PROBLEM WITH SWP ??
793   00353* 7701          CLA MQA
794   00354* 7440          SZA
795   00355* 7402          HLT               /PROBLEM WITH SWP ??--AC WAS OK BUT MQ BAD??
796   00356* 2020          ISZ REGA
797   00357* 5250          JMP RNMQBS        /DO ANOTHER NUMBER
798
799   00360* 3024  TADTST,  DCA C             /SET UP COUNT
800   00361* 1125          TAD R1            /THIS STUFF DOES NOTHING SPECIAL ON A SINGLE PASS.
801   00362* 7104          CLL RAL           /BUT CAN BE USED AS A RANDOM NUMBER GENERATOR IF YOU
802   00363* 7430          SZL               /WANT TO PATCH TADTST AND ANDTST WITH ODT.
803   00364* 7001          IAC               /JUST PUT AN EFFECTIVE JMP I (TADTST AT JMSTST
804   00365* 3125          DCA R1            /THEN START RUNNING AT OR BEFORE TADTST.
805   00366* 1126          TAD R2            /MACHINE WILL THEN RUN THE AND-TAD TESTS UNTIL HALTED.
806   00367* 1125          TAD R1
807   00370* 3126          DCA R2
808   00371* 1126          TAD R2
809   00372* 3025          DCA D
810   00373* 1126  TAD1,    TAD R2            /HERE'S THE REAL MEAT OF THE PROGRAM.  R2
811   00374* 1024          TAD C             /PLUS COUNT
812   00375* 7041          CMA IAC
813   00376* 1025          TAD D             /MINUS (R2+COUNT)
814   00377* 7440          SZA               /SHOULD BE ZERO
815   00400* 7402          HLT               /TAD TEST FAILURE
816   00401* 2025          ISZ D             /BUMP (R2+COUNT)
817   00402* 7000          NOP
818   00403* 2024          ISZ C             /BUMP COUNT
819   00404* 5510          JMP I TAD1P       /AND BACK WE GO
820
821   00405* 7240  ANDTST,  CLA CMA           /PARTIAL "AND" SIMULATION OF PREVIOUS TAD TEST
822   00406* 0126          AND R2            /R2
823   00407* 3025          DCA D             /TO D
824   00410* 7240          CLA CMA
825   00411* 0126          AND R2            /R2 "AND" C
826   00412* 0024          AND C
827   00413* 7104          CLL RAL           /*2
828   00414* 3022          DCA A             /TO "A" [CARRY IS GENERATED ONLY ON 1+1]
829   00415* 7240          CLA CMA
830   00416* 0126          ANL R2            /THE NEXT BUMCH OF CODE
831   00417* 7040          CMA
832   00420* 0024          AND C
833   00421* 7040          CMA
834   00422* 3023          DCA B             /FORMS THE XOR OF R2 AND "C"
835   00423* 7240          CLA CMA
836   00424* 0024          AND C
837   00425* 7040          CMA
838   00426* 0126          AND R2
839   00427* 7040          CMA
840   00430* 0023          AND B
841   00431* 7040          CMA               /IN THE ACCUMULATOR, PERFORMING A HALF-ADD
842   00432* 1022          TAD A             /ADD IN CARRY ---> RESULT IN AC
843   00433* 7041          CIA
```



```
844   00434* 1025          TAD D             /RESULT SHOULD EQUAL D
845   00435* 7640          SZA CLA
846   00436* 7402          HLT               /AND TEST FAILURE
847   00437* 2025          ISZ D
848   00440* 7000          NOP
849   00441* 2024          ISZ C
850   00442* 5210          JMP ANDTST+3
851
852           0017  AUTO=17
853
854                                          /TEST JMS INSTRUCTION
855   00443* 1264  JMSTST,  TAD KBUFF         /BUFFER SIZE (CANNOT EXCEED ONE PAGE)
856   00444* 3023          DCA B
857   00445* 1124          TAD KSTRBF        /START OF BUFFER--MUST BE START OF PAGE
858   00446* 3017  AUA,     DCA AUTO
859   00447* 1120          TAD KJMSC
860   00450* 3025          DCA D
861   00451* 1025          TAD D
862   00452* 3417  AUB,     DCA I AUTO        /FILL BUFFER WITH "JMS  .", EXCEPT LAST INST
863   00453* 2025          ISZ D
864   00454* 2023          ISZ B
865   00455* 5251          JMP .-4
866   00456* 1263          TAD KJMPIA        /LAST INSTRUCTION IS "JMP I AUTO"
867   00457* 3417  AUC,     DCA I AUTO
868   00460* 1121          TAD KRETUR        /NOW MAKE AUT0 = RETUR-1
869   00461* 3017  AUD,     DCA AUTO
870   00462* 5522          JMP I STRTBF      /AND GO EXECUTE WHAT'S IN BUFFER
871   00463* 5417  KJMPIA, JMP I AUTO
872   00464* 7601  KBUFF,  1+STRBUF-STPBUF
873   00465* 1264  RETUR,  TAD KBUFF
874   00466* 3023          DCA B
875   00467* 1124          TAD KSTRBF
876   00470* 3017  AUE,     DCA AUTO
877   00471* 7126          STL RTL
878   00472* 1017  AUF,     TAD AUTO          /CONTENTS OF EACH LOCATION IN BUFFER
879   00473* 7041          CIA               /SHOULD EQUAL ADDRESS + 1 (EXCEPT FINAL JUMP, OF COURSE)
880   00474* 1417  AUG,     TAD I AUTO
881   00475* 7440          SZA
882   00476* 7402          HLT               /JMS FAILURE
883   00477* 2023          ISZ B
884   00500* 5271          JMP .-7
885   00501* 4130          JMS TYPEIT        /TYPE "C"--CPU TESTS OK
886
887           4000  STRBUF=4000
888           4200  STPBUF=4200
889
890
891                 /BUNCH OF IOT DEFINITIONS FOR SLU TESTS.  MOST IOTS DIFFER FROM CORRESPONDING
892                 /LOCAL TERMINAL IOTS BY THE ADDITION OF A 1 OR 2 AFTER IOT.
893           6040  SPF=6040
894                 /SLU #2
895           6301  KSF1=6301
896           6306  KRB1=6306
897           6307  KMD1=6307               /LOAD CONTROL BITS INTO UART (SLU #2 ONLY)
898           6310  SPF1=6310
899           6311  TSF1=6311
900           6312  TCF1=6312
```

```
                6313  TSB1=6313               /SEE FIRST PAGE FOR BAUD RATE MAGIC NUMBERS
                6316  TLS1=6316
                      /SLU #3
                6321  KSF2=6321
                6326  KRB2=6326
                6330  SPF2=6330
                6331  TSF2=6331
                6332  TCF2=6332
                6333  TSB2=6333               /SEE PAGE 1 FOR MAGIC NUMBERS
                6336  TLS2=6336

                6000  TBUF=6000

                      /TEST THE 3 SERIAL LINE UNITS BY LOOPING BACK AND SENDING ALL POSSIBLE
                      /CHARACTERS.  USE INTERRUPT SYSTEM.
00502* 2020   SLTST,  ISZ REGA               /WAIT FOR ANY IN-PROCESS CHARACTER TO TRANSMIT
00503* 5302          JMP .-1
00504* 1123          TAD MODE2
00505* 6037          KLB                     /SET UP LOOPBACK (WORKS BECAUSE AC 11 = 1)
00506* 6307          KMD1                    /SET UP 8-BIT ASCII MODE ON LINE 2
00507* 6042          TCF                     /CLEAR THE ONLY TWO FLAGS WHICH COULD
00510* 6032          KCC                     /CAUSE AN INTERRUPT
00511* 6003          SRQ                     /ANYTHING ON THE INTERRUPT BUS??
00512* 7410          SKP
00513* 7402          HLT                     /YES--WE GOT TROUBLE!
00514* 1113          TAD INTJMP              /SET UP INTERRUPT JMP = JMP I (INTCHN
00515* 3001          DCA 1
00516* 1117          TAD TTYBUF              /CREATE A BUFFER CONSISTING OF 8-BIT CHARACTERS
00517* 3010          DCA 10
00520* 1076          TAD M377                /1,2,3,4,----376,377,0
00521* 3023          DCA B
00522* 1023          TAD B
00523* 0350          AND K377
00524* 3410          DCA I 10
00525* 2023          ISZ B
00526* 5322          JMP .-4
00527* 3410          DCA I 10                /FILL LAST CHARACTER
00530* 1101          TAD M6                  /SET UP 6 AUTO INDEX REGISTERS SO THEY ALL
00531* 3022          DCA A                   /POINT TO FIRST WORD OF BUFFER
00532* 1074          TAD K7
00533* 3017          DCA 17
00534* 1117  FILAI,  TAD TTYBUF
00535* 3417          DCA I 17
00536* 2022          ISZ A
00537* 5334          JMP FILAI
00540* 6001          ION                     /TURN ON INTERRUPT
00541* 6330          SPF2                    /AND START UP XMITTERS
00542* 6310          SPF1
00543* 6040          SPF
00544* 7240  NULL,    STA                     /NULL JOB CONSISTS OF COUNTING DOWN "A",
00545* 1022          TAD A
00546* 3022          DCA A
00547* 2023          ISZ B                   /ISZ'ING B
00550* 0377  K377,    377
00551* 1022          TAD A
00552* 1023          TAD B
00553* 7440          SZA                     /AND COMPARING THE TWO FOR EQUALITY
```

	TITLE	SIZE	CODE	NUMBER	REV
DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	KK8-B PANEL MEMORY CODE	K	SP	VT78-0-3	*


```
00554* 7402          HLT                     /SOMETHING INTERFERED WITH NULL JOB (INT INH BAD ??)
00555* 1116          TAD TLIMIT              /ALL IS DONE WHEN ALL RECR AI = TBUF+400
00556* 1013          TAD 13
00557* 7640          SZA CLA                 /SLU1 DONE?
00560* 5344          JMP NULL                /NO--JUMP BACK TO NULL JOB
00561* 7001          IAC
00562* 7421          MQL                     /INDICATE SLU 1 DONE BY PUTTING "1" IN MQ
00563* 1116          TAD TLIMIT              /(IF WE HANG UP, PUSHING "START" BUTTON WILL DISPLAY MQ)
00564* 1014          TAD 14
00565* 7640          SZA CLA                 /SLU2 DONE?
00566* 5344          JMP NULL
00567* 7105          IAC CLL RAL
00570* 7421          MQL                     /INDICATE SLU 2 DONE (IF SLU 3 GOOD, TEST COMPLETES)
00571* 1116          TAD TLIMIT
00572* 1015          TAD 15
00573* 7640          SZA CLA                 /SLU3 DONE?
00574* 5344          JMP NULL
00575* 6002          IOF
00576* 6037          KLB                     /JOB DONE--CLEAR LOOPBACK FF
00577* 4130  SLDONE, JMS TYPEIT              /"D"--SLU TEST COMPLETE
00600* 5511          JMP I XADDP

00601* 3024  INTCHN, DCA C                   /YE SKIPPE CHAINE
00602* 7204          GLK
00603* 3025          DCA D
00604* 7240          STA                     /SET AC.  IF KRB FAILS TO JAM TRANSFER,
00605* 6031          KSF                     /EXTRA BITS WILL THEN APPEAR DURING RECEIVER SERVICE
00606* 7410          SKP
00607* 5254          JMP RLN1                /RECEIVER, LINE 1
00610* 6301          KSF1
00611* 7410          SKP
00612* 5262          JMP RLN2                /RECEIVER, LINE 2
00613* 6321          KSF2
00614* 7410          SKP
00615* 5270          JMP RLN3                /RECEIVER, LINE 3
00616* 7200          CLA
00617* 6041          TSF
00620* 7410          SKP
00621* 5235          JMP TLN1                /TRANSMITTER, LINE 1
00622* 6311          TSF1
00623* 7410          SKP
00624* 5242          JMP TLN2                /TRANSMITTER, LINE 2
00625* 6331          TSF2
00626* 7402          HLT                     /UNDEFINED INTERRUPT
00627* 5247          JMP TLN3                /TRANSMITTER, LINE 3
00630* 1025  DISMIS, TAD D
00631* 7110          RAR CLL
00632* 1024          TAD C
00633* 6001          ION
00634* 5400          JMP I 0                 /EXIT FROM INTERRUPT

00635* 1410  TLN1,    TAD I 10                /SERVICE SLU #1 XMITR
00636* 6046          TLS
00637* 7650          SNA CLA
00640* 6042          TCF                     /ZERO CHARACTER IS LAST ONE TRANSMITTED--SHUT DOWN XMITER
00641* 5230          JMP DISMIS
```

	TITLE	SIZE	CODE	NUMBER	REV
DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	KK8-B PANEL MEMORY CODE	K	SP	VT78-0-3	*

```
1015   00642* 1411  TLN2,    TAD I 11        /SERVICE SLU #2 XMITR
1016   00643* 6316            TLS1
1017   00644* 7650            SNA CLA
1018   00645* 6312            TCF1            /SHUT DOWN XMTER
1019   00646* 5230            JMP DISMIS
1020
1021   00647* 1412  TLN3,    TAD I 12        /SERVICE SLU #3 XMITR
1022   00650* 6336            TLS2
1023   00651* 7650            SNA CLA
1024   00652* 6332            TCF2            /SHUT DOWN XMITER
1025   00653* 5230            JMP DISMIS
1026
1027   00654* 6036  RLN1,    KRB             /SERVICE SLU #1 RECVR
1028   00655* 7041            CIA
1029   00656* 1413            TAD I 13
1030   00657* 7440            SZA
1031   00660* 7402            HLT             /RECEIVED CHARACTER NOT EQUAL TO TRANSMITTED ONE--LINE 1
1032   00661* 5230            JMP DISMIS
1033
1034   00662* 6306  RLN2,    KRB1            /SERVICE SLU #2 RECVR
1035   00663* 7041            CIA
1036   00664* 1414            TAD I 14
1037   00665* 7440            SZA
1038   00666* 7402            HLT             /REC'D CHARACTER NOT EQUAL TO XMITED ONE--LINE 2
1039   00667* 5230            JMP DISMIS
1040
1041   00670* 6326  RLN3,    KRB2            /SERVICE SLU #3 RECVR
1042   00671* 7041            CIA
1043   00672* 1415            TAD I 15
1044   00673* 7440            SZA
1045   00674* 7402            HLT             /REC'D CHARACTER NOT EQUAL TO XMITED ONE--LINE 3
1046   00675* 5230            JMP DISMIS
1047
1048                 /EXTENDED MEMORY ADDRESS TEST.  FILL FIELD 1 WITH ADDRESS; FILL FIELD 2
1049                 /WITH ADDRESS + 200; FILL FIELD 3 WITH ADDRESS + 400.  THEN CHECK
1050                 /THE WHOLE MESS.
1051
1052   00676* 7240  XTDADD,  STA             /SET UP AUTO INDEX FOR ADDRESS 0
1053   00677* 3010            DCA 10
1054   00700* 3022            DCA A           /CLEAR COUNTER
1055   00701* 7421            MQL             /CLEAR MQ
1056   00702* 7346            STA CLL RTL     /-3 TO AC
1057   00703* 3012            DCA 12
1058   00704* 6211            CDF 10
1059   00705* 7501  XTDFIL,   MQA             /MQ
1060   00706* 1022            TAD A           /PLUS ADDRESS
1061   00707* 3410            DCA I 10        /TO ADDRESS
1062   00710* 2022            ISZ A
1063   00711* 5305            JMP XTDFIL      /KEEP GOING--FIELD NOT FILLED YET
1064   00712* 2012            ISZ 12          /FIELD COMPLETED--BUMP FIELD COUNT
1065   00713* 4316            JMS NXTFLD      /SET UP NEXT FIELD.
1066   00714* 5330            JMP XTDCHK      /ALL FIELDS FILLED.  GO TO CHECK.
1067   00715* 5305            JMP XTDFIL      /NXTFLD RETURNS HERE--FILL ANOTHER FIELD
1068
1069   00716* 0000  NXTFLD,   0               /SET UP NEXT FIELD--
1070   00717* 7501            MQA
1071   00720* 1104            TAD K200        /ADD 200 TO MQ
```

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE KK8-B PANEL MEMORY CODE	SIZE K	CODE SP	NUMBER VT78-0-3	REV *


```
1072   00721* 7421            MQL
1073   00722* 1102            TAD K10         /AND 10 TO CDF
1074   00723* 1325            TAD XTDFLD
1075   00724* 3325            DCA XTDFLD
1076   00725* 6211  XTDFLD,   CDF 10          /CDF 10, CDF 20 OR CDF 30
1077   00726* 2316            ISZ NXTFLD      /MAKES CODING MORE CONCISE BECAUSE THIS SUB
1078   00727* 5716            JMP I NXTFLD    /FOLLOWS ISZ OF FIELD COUNTER
1079
1080   00730* 7346  XTDCHK,   STA CLL RTL     /CHECK ALL ADDRESSES FOR CORRECT VALUE
1081   00731* 3012            DCA 12          /SET UP FIELD COUNTER
1082   00732* 7421            MQL             /SET UP OFFSET CONSTANT
1083   00733* 1335            TAD KCDF10      /RESET NXTFLD SUBROUTINE
1084   00734* 3325            DCA XTDFLD
1085   00735* 6211  KCDF10,   CDF 10          /RESET DATA FIELD TO FIELD 1
1086   00736* 7501  XCKGET,   MQA             /GET OFFSET
1087   00737* 1022            TAD A           /PLUS ADDRESS
1088   00740* 7041            CIA
1089   00741* 1410            TAD I 10        /COMPARE WITH WORD FROM MEMORY
1090   00742* 7640            SZA CLA
1091   00743* 5352            JMP MEMERR      /COMPARE FAILED
1092   00744* 2022            ISZ A           /THROUGH FIELD YET?
1093   00745* 5336            JMP XCKGET      /NO
1094   00746* 2012            ISZ 12          /YES - BUMP FIELD COUNTER
1095   00747* 4316            JMS NXTFLD      /BUMP MQ, CDF
1096   00750* 5356            JMP XCKDUN      /ALL DONE--GO TO NEXT TEST
1097   00751* 5336            JMP XCKGET      /GO BACK FOR ANOTHER FIELD (NXTFLD RETURNS HERE)
1098
1099   00752* 1422  MEMERR,   TAD I A         /BAD DATA IN MQ
1100   00753* 7421            MQL
1101   00754* 1022            TAD A           /OFFENDING ADDRESS IN AC (DF TELLS WHICH MEMORY)
1102   00755* 7402            HLT             /TRAP BACK TO PANEL
1103
1104   00756* 6211  XCKDUN,   CDF 10          /NOW CHEDK INTERRUPT AND CIF STUFF
1105   00757* 1066            TAD HALT
1106   00760* 3412            DCA I 12        /FILL ALL FIELD 1 WITH HALTS
1107   00761* 2022            ISZ A
1108   00762* 5357            JMP .-3
1109   00763* 6231            CDF 30
1110   00764* 6212            CIF 10          /TRY TO GO TO FIELD 1
1111   00765* 2001            ISZ 1           /NOTE: HALT AT THIS ADDRESS IN FLD 1=PREMATURE
1112                                          /INSTRUCTION FIELD CHANGE
1113                                          /SET UP NEW INTERRUPT RETURN
1114   00766* 6001            ION             /NOTE: TTO FLAG WAS SET AT END OF SLU TEST
1115   00767* 6214            RDF             /MAKE SURE DF RIGHT
1116   00770* 1077            TAD M30
1117   00771* 7440            SZA
1118   00772* 7402            HLT             /BAD DATA FIELD BITS.  CHECK RDF MUX.
1119   00773* 5374            JMP .+1         /AT THIS POINT, WE SHOULD START TO GO TO FIELD 1
1120                                          /AND INTERRUPT BEFORE WE GET THERE
1121   00774* 7402            HLT             /GUESS WE DIDN'T--INT INH FAILED TO CLEAR??
1122   00775* 6234  FRET,     RIB             /SHOULD COME BACK TO HERE AFTER INTERRUPT
1123   00776* 1100            TAD M13
1124   00777* 7440            SZA
1125   01000* 7402            HLT             /SAVE FIELD WRONG
1126   01001* 1000            TAD 0
1127   01002* 7040            CMA
1128   01003* 1115            TAD KFRET
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DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE KK8-B PANEL MEMORY CODE	SIZE K	CODE SP	NUMBER VT78-0-3	REV *

```
1129   01004* 7440          SZA
1130   01005* 7402          HLT             /INTERRUPT WRONG ADDRESS--INT INH BAD??
1131   01006* 6214          RDF
1132   01007* 7440          SZA
1133   01010* 7402          HLT             /DATA FIELD WAS NOT RESET ON INTERRUPT
1134   01011* 6213          CIF CDF 10
1135   01012* 1221          TAD KCIF        /HLT AT THIS LOC IN FIELD 1 INDICATES XTN
1136                                        /DID NOT WAIT FOR JMP OR JMS
1137   01013* 3620          DCA I KHLT1     /KHLT
1138   01014* 1222          TAD JMPXA
1139   01015* 3512          DCA I XTNP2     /KHLT+1
1140                 ////////////////////////////////////////////////////////////////////////////
1141                 /FIELD 1 NOW HAS HLT IN ALL LOCATIONS EXCEPT:
1142                 /       KHLT,   CIF 0
1143                 /       KCIF,   JMP XA
1144                 ////////////////////////////////////////////////////////////////////////////
1145   01016* 5620          JMP I KHLT1     /CHECK THAT JMP I DOES CHANGE FIELD CORRECTLY
1146                                        /(JMP DIRECT CHECKED COMMING BACK FROM FIELD 1)
1147   01017* 7402  KHLT,   HLT             /SHOULD HAVE CHANGED INST FIELD, DID NOT.
1148   01020* 1017  KHLT1,  KHLT
1149   01021* 6203  KCIF,   CIF CDF 0
1150   01022* 5223  JMPXA,  JMP XA
1151   01023* 4130  XA,     JMS TYPEIT      /COME BACK TO HERE IF ALL IS OK.  TYPE "E"
1152                 /FLOPPY INTERFACE TEST--AS MUCH AS WE CAN DO WITHOUT CORRUPTING DISK
1153                 /WILL ALSO RUN CORRECTLY IF NO RX01 ON SYSTEM.
1154
1155   01024* 1104  FPYTST, TAD K200        /MAINTENANCE BIT--MUST ALWAYS BE SET, ELSE CODE
1156   01025* 7421          MQL             /ON FLOPPY GETS SMASHED
1157   01026* 7501          MQA
1158   01027* 6751          6751            /SET UP MAINTENANCE MODE
1159   01030* 7201  FLOPY2, CLA IAC
1160   01031* 3022          DCA A
1161   01032* 1022  FLOPY1, TAD A           /CODE MAKES 2 PASSES.  FIRST PASS SLIDES A "1" THRU AC.
1162   01033* 7501          MQA             /SECOND PASS FILLS AC WITH 1'S FROM RT TO LEFT.
1163   01034* 0136          AND K7677       /ZERO THE "8-BIT MODE" BIT
1164   01035* 3023          DCA B
1165   01036* 1023          TAD B
1166   01037* 6751          6751            /IN EITHER CASE, 200 IS "OR"ED WITH AC (TO KEEP
1167                                        /MAINT BIT SET).  FLOPPY REGISTER IS LOADED,
1168                                        /READ BACK AND CHECKED FOR CORRECTNESS.
1169   01040* 7440          SZA
1170   01041* 7402          HLT             /IOT SHOULD HAVE CLEARED AC, DID NOT.
1171   01042* 6752          6752
1172   01043* 7041          CIA
1173   01044* 1023          TAD B
1174   01045* 7640          SZA CLA
1175   01046* 7402          HLT             /FLOPPY DATA REGISTER ERROR
1176   01047* 1022          TAD A
1177   01050* 7104  KINST1, RAL CLL         /BECOMES "RAL STL" ON SECOND PASS
1178   01051* 3022          DCA A
1179   01052* 7420          SNL             /WHEN A "1" APPEARS IN LINK, PASS IS DONE.
1180   01053* 5232          JMP FLOPY1
1181   01054* 1261  KOUT1,  TAD KINST       /BECOMES "JMP FLOPY3" ON SECOND PASS
1182   01055* 3250          DCA KINST1
1183   01056* 1262          TAD KOUT        /SET UP SECOND PASS
1184   01057* 3254          DCA KOUT1
1185   01060* 5230          JMP FLOPY2      /AND GO AGAIN
```

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE KK8-B PANEL MEMORY CODE	SIZE K	CODE SP	NUMBER VT78-0-3	REV *


```
1186
1187   01061* 7124  KINST,  RAL STL
1188   01062* 5263  KOUT,   JMP FLOPY3
1189
1190   01063* 1105  FLOPY3, TAD K300
1191   01064* 6751          6751            /NOW SET UP MAINT, 8-BIT MODE
1192   01065* 7440          SZA
1193   01066* 7402          HLT             /6751 SHOULD HAVE CLEARED THE AC, BUT DIDN'T
1194   01067* 1106          TAD K7400       /SET 4 HIGH-ORDER BITS
1195   01070* 6752          6752            /NOW READ BACK 8 LOW-ORDER BITS
1196   01071* 1075          TAD M7700
1197   01072* 7440          SZA
1198   01073* 7402          HLT             /ANSWER NOT RIGHT
1199   01074* 7240          STA
1200   01075* 6751          6751            /NOW THROW ALL 1'S AT THE INTERFACE
1201   01076* 7440          SZA
1202   01077* 7402          HLT             /ONCE AGAIN, 6751 SHOULD CLEAR AC, BUT DIDN'T
1203   01100* 6752          6752
1204   01101* 1076          TAD M377        /SHOULD GET BACK 8 LOW-ORDER BITS
1205   01102* 7440          SZA
1206   01103* 7402          HLT             /DIDN'T
1207   01104* 6757          6757            /INITIALIZE THE DISK IF IT IS THERE
1208   01105* 4130          JMS TYPEIT      /"F"--FLOPPY INTERFACE TESTED
1209   01106* 6073          PRQ             /TRAP BACK TO PANEL MODE
1210   01107* 6132          END             /TO TEST FOR POSSIBLE ECHO AND EXIT TO NULL JOB
1211   01110* 7402          HLT             /IN CASE PRQ IOT FAILS, WE HIT THIS HALT
1212
1213                 /CANNOT TEST PARALLEL INTERFACE, BECAUSE TOO MANY VARIETIES
1214                 /OF PERIPHERALS COULD BE THERE.
1215
1216                 /HERE'S WHAT WE DO WHILE WAITING FOR BOOTSTRAP BUTTON
1217   01111* 6002  NULJOB, IOF             /JUST IN CASE!!  WE MIGHT BE COMING HERE FROM USER PGM
1218   01112* 6040          SPF             /SET XMIT FLAGS
1219   01113* 6310          SPF1
1220   01114* 1067  RESESC, TAD ESCSEQ      /AND INITIALIZE ESCAPE SEQUENCE CHECKER
1221   01115* 3010          DCA 10          /SEQUENCE IS 33--43--40--60 (ESCAPE,NBR SIGN,SPACE,0)
1222   01116* 1410  TERMO1, TAD I 10        /PICK UP NEXT ESCAPE CHARACTER
1223   01117* 7500          SMA             /TEST FOR LIST TERMINATOR
1224   01120* 5344          JMP ESCAPE      /TERMINATOR IS A POSITIVE WORD
1225   01121* 3022          DCA A           /STORE NEXT ITEM ON LIST
1226   01122* 7604  TERMI0, LAS             /SET SLU2 BAUD RATE FROM SWITCHES "ON THE FLY"
1227   01123* 6313          TSB1            /IN CASE SOMEONE CHANGES SWITCH WHILE NULJOB RUNNING
1228   01124* 6031          KSF
1229   01125* 5332          JMP TERMI1
1230   01126* 6036  TERMIN, KRB             /PASS KEYBOARD CHARACTER TO LINE
1231   01127* 6311          TSF1
1232   01130* 5327          JMP .-1
1233   01131* 6316          TLS1
1234   01132* 6301  TERMI1, KSF1
1235   01133* 5322          JMP TERMI0
1236   01134* 6306  TERMOU, KRB1            /GET CHARACTER FROM LINE
1237   01135* 6041          TSF
1238   01136* 5335          JMP .-1
1239   01137* 6046          TLS             /PRINT IT ON SCREEN
1240   01140* 1022          TAD A           /COMPARE WITH CURRENT ESCAPE CHARACTER
1241   01141* 7640          SZA CLA
1242   01142* 5314          JMP RESESC      /NOT SAME--RESET ESCAPE SEQUENCE
```

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE KK8-B PANEL MEMORY CODE	SIZE K	CODE SP	NUMBER VT78-0-3	REV *

```
1243   01143* 5316          JMP TERMO1
1244
1245   01144* 6073  ESCAPE, PRQ              /TRAP BACK TO THE BOOTSTRAP IN PANEL MEM
1246   01145* 6003          START
1247
1248          1146  LAST=.
1249          7757  RELOC
1250   07757  0000  ZBLOCK 7776-.
1251          7776  *7776
1252   07776  6004          PANEL            /JUMP TO THE START OF EVERYTHING
1253   07777  5776          JMP I .-1        /PANEL REQUESTS START EXECUTING CODE HERE
1254
1255
1256                  $$$
A       0022      FLPYST 6346      K7700  0107      PRS    6071
ACSAV   0002      FMASK  6241      LAST   1146      PST    6072
ANDTST  0405      FPYTST 1024      MEMERR 0752      PSTART 6254
APT     6464      FRET   0775      MEMFLD 0021      PSTAR1 6260
AUA     0446      GO     6212      MMER   6556      PSTAR2 0064
AUB     0452      HALT   0066      MMERR  6453      PSTAT  0001
AUC     0457      HLTADR 0062      MMFLD0 6543      PZREL  6402
AUD     0461      HLTCHK 6064      MODE2  0123      RAREA  0022
AUE     0470      HLTD1  6073      MOVE   0023      REGA   0020
AUF     0472      HLTD2  6103      MOVE1  6571      REGB   0021
AUG     0474      HLTFLG 0061      MOVE2  6605      RESESC 1114
AUTO    0017      HLTOK  6163      MQCLA  7601      RETUR  0465
B       0023      HYPHEN 6002      MQNOP  7401      RLN1   0654
BADRD   6305      INTCHN 0601      MSG    0037      RLN2   0662
BEGG    0054      INTJMP 0113      MSG1   6650      RLN3   0670
BEGG1   6263      INTLNK 0114      M13    0100      RNMQBS 0250
BEGIN   6201      INTOFF 6333      M30    0077      ROMSUM 5667
BEND    6243      JMPXA  1022      M377   0076      RUNIR  0215
BOOT    6114      JMSTST 0443      M6     0101      RUNRT  0230
BOOT1   6314      KBOOT1 0063      M7700  0075      RX01   6200
BOOT2   6321      KBUFF  0464      NULJOB 1111      R1     0125
BTORHT  6110      KCDF   6164      NULL   0544      R2     0126
C       0024      KCDF10 0735      NXTFLD 0716      SKPTST 0146
CHAR    0070      KCDIF  6207      OCTPNT 0034      SLDONE 0577
CHEX    6233      KCIF   1021      OCTPN1 6627      SLTST  0502
CKSUM   0074      KFRET  0115      OCTPN2 6635      SPF    6040
CKSUM1  6450      KHLT   1017      OCTR   0076      SPF1   6310
CKSUM2  6451      KHLT1  1020      OFFSET 0043      SPF2   6330
CPLOOP  6471      KINST  1061      OPRAT2 0140      START  6003
CPRAM   6475      KINST1 1050      ORIGIN 0000      STATUS 0003
CPROM   6513      KJMPIA 0463      OTEMP  0075      STDIAG 6677
CRASH   6000      KJMSC  0120      PAGE0  6522      STPBUF 4200
CRLF    0031      KLB    6037      PANEL  6004      STRBUF 4000
CRLF1   6167      KLTR   0127      PCACMQ 6046      STRT   6127
D       0025      KLTRS  0026      PCHAR  0042      STRTBF 0122
DELAY   0050      KMD1   6307      PCHAR1 6662      STRTUP 6467
DELAY1  0077      KMMER  6452      PCOUNT 0071      TADTST 0360
DEPOS   6237      KOUT   1062      PCPNT  0045      TAD1   0373
DIAG    0066      KOUT1  1054      PER    6074      TAD1P  0110
DISMIS  0630      KRAREA 6401      PFLBT  6337      TBUF   6000
ECHO    6134      KRB1   6306      PGMHLT 0143      TCF1   6312
END     6132      KRB2   6326      PK212  6130      TCF2   6332
END1    6140      KRELSZ 6400      PK215  6044      TERMIN 1126
```

	TITLE	SIZE	CODE	NUMBER	REV
DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	KK8-B PANEL MEMORY CODE	K	SP	VT78-0-3	*


```
END2    6151      KRETUR 0121      PK240  6675      TERMI0 1122
END3    6146      KSF1   6301      PK255  0060      TERMI1 1132
ESCAPE  1144      KSF2   6321      PK260  6676      TERMOU 1134
ESCSEQ  0067      KSTRBF 0124      PK6000 6447      TERMO1 1116
FILAI   0534      K10    0102      PK7    0057      TLIMIT 0116
FLD     6277      K200   0104      PK77   6674      TLN1   0635
FLDCHG  0020      K300   0105      PK7700 6122      TLN2   0642
FLD0CK  6552      K377   0550      PM100  6672      TLN3   0647
FLOPPY  6326      K7     0074      PM110  6131      TLS1   6316
FLOPY1  1032      K7400  0106      PM4    6673      TLS2   6336
FLOPY2  1030      K7677  0136      PM77   6446      TSB    6043
FLOPY3  1063      K77    0103      PRQ    6073      TSB1   6313
TSB2    6333
TSF1    6311
TSF2    6331
TTYBUF  0117
TYPE    0026
TYPEIT  0130
TYPE1   6614
WORD1   0072
WORD2   0073
XA      1023
XADDP   0111
XCKDUN  0756
XCKGET  0736
XTDADD  0676
XTDCHK  0730
XTDFIL  0705
XTDFLD  0725
XTNP2   0112


ERRORS DETECTED: 0
LINKS GENERATED: 0


A        598#  828   842   939   944   951   952   955  1054  1060
        1062  1087  1092  1099  1101  1107  1160  1161  1176  1178
        1225  1240
ACSAV      52#   79   123   433
ANDTST   821#  850
APT      443#  487
AUA      858#
AUB      862#
AUC      867#
AUD      869#
AUE      876#
AUF      878#
AUG      880#
AUTO     852#  858   862   867   869   871   876   878   880
B        599#  834   840   856   864   874   883   931   932   935
         953   956  1164  1165  1173
BADRD    268   305#
BEGG     232   242   295   297   414#
BEGG1    286#  303   416
BEGIN    224#  321
BEND     243   262#
```

	TITLE	SIZE	CODE	NUMBER	REV
DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	KK8-B PANEL MEMORY CODE	K	SP	VT78-0-3	*

BOOT 78 152 158#
BOOT1 312# 421
BOOT2 317# 331
BTORHT 102 154#
C 600# 799 811 818 826 832 836 849 980 1005
CHAR 65# 236 289 290 298
CHEX 252# 260
CKSUM 69# 188 191 235 254 266 567 568 571
CKSUM1 429# 462
CKSUM2 430#
CPLOOP 449# 452
CPRAM 453# 460
CPROM 467#
CRASH 75# 95
CRLF 136 158 174 186 193 211 305 389# 505
CRLF1 206# 391
D 602# 809 813 816 823 844 847 860 861 863
982 1003
DELAY 154 183 409# 412
DELAY1 72# 410
DEPOS 250 257#
DIAG 196 197 510 511 590# 605
DISMIS 1003# 1013 1019 1025 1032 1039 1046
ECHO 176# 182
END 174# 1210
END1 180# 185
END2 189# 192
END3 77 186#
ESCAPE 1224 1245#
ESCSEQ 608# 1220
FILAI 942# 945
FLD 298#
FLDCHG 58# 106 108 112 302 379
FLDØCK 498# 504
FLOPPY 214 323#
FLOPY1 1161# 1180
FLOPY2 1159# 1185
FLOPY3 1188 1190#
FLPYST 341#
FMASK 259# 299
FPYTST 1155#
FRET 631 1122#
GO 235# 255
HALT 607# 1105
HLTADR 133 420#
HLTCHK 129# 157
HLTD1 131 136# 441
HLTD2 148# 151 311
HLTFLG 129 141 167 201 419# 444
HLTOK 135 201#
HYPHEN 77#
INTCHN 630 980#
INTJMP 629# 926
INTLNK 629 630#
INTOFF 313 329#
JMPXA 1138 1150#
JMSTST 855#

KBOOT1 168 421# 445
KBUFF 855 872# 873
KCDF 103 202#
KCDF10 1063 1085#
KCDIF 231# 270 300
KCIF 1135 1149#
KFRET 631# 1128
KHLT 628 1147# 1148
KHLT1 1137 1145 1148#
KINST 1181 1187#
KINST1 1177# 1192
KJMPIA 866 871#
KJMSC 634# 859
KLB 38# 155 919 976
KLTR 641# 651
KLTRS 601# 643 645 652
KMD1 897# 920
KMMER 431# 438
KOUT 1183 1188#
KOUT1 1181# 1184
KRAREA 369# 476
KRB1 896# 1034 1236
KRB2 905# 1041
KRELSZ 368# 478
KRETUR 635# 868
KSF1 895# 987 1234
KSF2 904# 990
KSTRBF 638# 857 875
K10 620# 1073
K200 622# 1071 1155
K300 623# 1190
K377 933 954#
K7 613# 940
K7400 624# 1194
K7677 648# 1163
K77 621# 736
K7700 625# 730
LAST 197 511 1248#
MEMERR 1091 1099#
MEMFLD 59# 105 301
MMER 431 502#
MMERR 433# 502
MMFLD0 491#
MODE2 637# 918
MOVE 194 312 323 381# 508 515 517 518 520 521
523 524
MOVE1 383 514#
MOVE2 526# 531
MQCLA 594# 758
MQNOP 593# 752
MSG 118 137 159 306 397# 506 565 566 577
MSG1 399 564# 573
M13 618# 1123
M30 617# 1116
M377 616# 930 1204
M6 619# 938
M7700 615# 1196

NULJOB 198 1217#
NULL 950# 962 968 974
NXTFLD 1065 1069# 1077 1078 1095
OCTPNT 115 117 124 126 393# 562
OCTPN1 395 546#
OCTPN2 552# 561
OCTR 71# 549 560
OFFSET 368 424#
OPRAT2 512 650#
ORIGIN 50# 107 110 116 132 203 251 257 258 276
439 448 449 450 451 453 454 457 468 469
470 494 496 500 503 525
OTEMP 70# 547 552 555 556
PAGE0 474#
PANEL 79# 1252
PCACMQ 114# 407
PCHAR 401# 570 572 582
PCHAR1 403 575#
PCOUNT 66# 179 184 230 269
PCPNT 127 140 165 405#
PER 25# 75 543
PFLBT 324 334#
PGMHLT 420 653#
PK212 171# 209
PK215 111# 207
PK240 550 578 580 587#
PK255 189 418#
PK260 558 588#
PK6000 428# 464 467 473
PK7 228 417# 557
PK77 575 579 586#
PK7700 81 164#
PM100 536 584#
PM110 172# 178 187
PM4 548 585#
PM77 427# 458
PRQ 7# 330 1209 1245
PRS 19# 93 148
PST 24# 273
PSTART 271# 422
PSTAR1 275# 277
PSTAR2 204 422# 532
PSTAT 51# 99 100 163 271 455 456 461 466
PZREL 370# 474
RAREA 60# 369 372 424
REGA 596# 708 709 719 723 726 732 740 743 746
754 757 761 773 778 785 790 796 916
REGB 597# 731 737 745 750 764 767 770 787
RELOC 372 426 605 1249
RESESC 1220# 1242
RETUR 635 873#
RLN1 986 1027#
RLN2 989 1034#
RLN3 992 1041#
RNMQBS 726# 797
ROMSUM 6# 430
RUNIR 698#

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE: KK8-B PANEL MEMORY CODE	SIZE: K	CODE: SP	NUMBER: VT78-0-3	REV: *

RUNRT 709# 724
RX01 214#
R1 639# 800 804 806
R2 640# 805 807 808 810 822 825 830 838
SKPTST 656#
SLDONE 977#
SLTST 916#
SPF 893# 949 1218
SPF1 898# 948 1219
SPF2 906# 947
START 78# 1246
STATUS 53# 82 87 88 114 437
STDIAG 195 509 604#
STPBUF 872 888#
STRBUF 636 638 872 887#
STRT 97 145 170#
STRTBF 636# 870
STRTUP 170 447#
TADTST 799#
TAD1 626 810#
TAD1P 626# 819
TBUF 632 633 912#
TCF1 900# 1018
TCF2 908# 1024
TERMIN 1230#
TERMI0 1226# 1235
TERMI1 1229 1234#
TERMOU 1236#
TERMO1 1222# 1243
TLIMIT 632# 959 965 971
TLN1 996 1009#
TLN2 999 1015#
TLN3 1002 1021#
TLS1 902# 1016 1233
TLS2 910# 1022
TSB 26# 90
TSB1 318 489 901# 1227
TSB2 490 909#
TSF1 899# 997 1231
TSF2 907# 1000
TTYBUF 633# 928 942
TYPE 177 190 208 210 385# 542 551 559 581
TYPEIT 642# 649 655 885 977 1151 1208
TYPE1 387 534#
WORD1 67# 237 244 252 262 537 538
WORD2 68# 241 248 253 264
XA 1150 1151#
XADDP 627# 978
XCKDUN 1096 1104#
XCKGET 1086# 1093 1097
XTDADD 627 1052#
XTDCHK 1066 1080#
XTDFIL 1059# 1063 1067
XTDFLD 1074 1075 1076# 1084
XTNP2 628# 1139

V3

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE: KK8-B PANEL MEMORY CODE	SIZE: K	CODE: SP	NUMBER: VT78-0-3	REV: *

```
TLN3      1002  1021#
TLS1       902# 1016  1233
TLS2       910# 1022
TSB         26#   90
TSB1       318   489   901# 1227
TSB2       490   909#
TSF1       899#  997  1231
TSF2       907# 1000
TTYBUF     633#  928   942
TYPE       177   190   208   210   385#  542   551   559   581
TYPEIT     642#  649   655   885   977  1151  1208
TYPE1      387   534#
WORD1       67#  237   244   252   262   537   538
WORD2       68#  241   248   253   264
XA        1150  1151#
XADDP      627#  978
XCKDUN    1096  1104#
XCKGET    1086# 1093  1097
XTDADD     627  1052#
XTDCHK    1066  1080#
XTDFIL    1059# 1063  1067
XTDFLD    1074  1075  1076# 1084
XTNP2      628# 1139

V3
```

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE KK8-B PANEL MEMORY CODE	SIZE K	CODE SP	NUMBER VT78-0-3	REV *

REVISIONS			
REV	CHK		
		FIRST USED ON OPTION MODEL KK8-B	
		DRN. B. MEACHAM DATE: 12/1/78	DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS
		CHK,D. B. MEACHAM DATE: 12/1/78	TITLE
		ENG. B. MEACHAM DATE: 12/1/78	PANEL MEMORY CODE
		P. ENG. B. MEACHAM DATE: 12/1/78	
		PROD. J. DIENST DATE: 12/1/78	SIZE: K / CODE: SP / NUMBER: VT78-0-4 / REV: *
		NEXT HIGHER ASSEMBLY 54-12660	DIST.

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```
                /KK8-B PANEL MEMORY CODE  23-005G1-00
                /D.A.WHITE      21-SEP-77
                /D.L.RIIKONEN   27-MAR-78, RENAMED TO 005G1 25-APR-78
                /B.E.MEACHAM    12-1-78, FORMAT REVISIONS TO 005G1 25-APR-78
                /ASSEMBLE THIS FILE WITH PANROM.BI--THIS MAKES THE ROM CHECKSUM
                /COME OUT CORRECTLY.

3020  ROMSUM=3020
6073  PRQ=6073                  /MAKE PANEL REQUEST
                /IMPORTANT ROUTINES, CALLED BY THE GENERAL CALL
                /       PRQ
                /       ADDRESS
                /THESE ADDRESSES SHOULD REMAIN FIXED, DESPITE REVISIONS:
                /BEGIN=6201--RUN MR78 LOADER.  SR0 NOT TESTED.
                //(INTERRUPT SHOULD BE OFF, OR CAF SHOULD BE FIRST INSTRUCTION EXECUTED IN MAIN
                /RX01=6200--BOOTSTRAP RX01 (INTERRUPT MUST BE OFF, OR CAF FIRST INSTRUCTION
                //EXECUTED IN MAIN MEMORY.)
                /START=6003--FLOPPY DISK (RX01) OR MR78, DEPENDING ON MR78 JUMPER.
                //GIVE "START" MESSAGE
                /HYPHEN=6002--RETURN TO "DUMB TERMINAL" MODE
6071  PRS=6071                  /READ PANEL STATUS TO AC 0-3
                                        /AC0=STARTUP CONDITION
                                        /AC1=BOOTSTRAP BUTTON
                                        /AC2=PROGRAM HLT
                                        /AC3=PROGRAM REQUEST
6072  PST=6072                  /COMPLEMENT THE RUN FLIP-FLOP
6074  PER=6074                  /TURN ERROR LIGHT ON
6043  TSB=6043                  /SET LOCAL-TERMINAL BAUD RATE PER AC 8-11
                /SOME MAGIC NUMBERS FOR IOT ABOVE:
                /       BAUD RATE       AC8-11          BAUD RATE       AC8-11
                /       50              0               1800            10
                /       75              1               2000            11
                /       110             2               2400            12
                /       134.5           3               3600            13
                /
                /       150             4               4800            14
                /       300             5               7200            15
                /       600             6               9600            16
                /       1200            7               19200           17
6037  KLB=6037                  /SET LOOPBACK IF AC11=1; CLEAR LOOPBACK IF AC11=0

                /LAS INSTRUCTION PICKS UP THE FOLLOWING BITS:
                /       AC0=1 IF MR78 BOARD INSERTED
                /       AC1=1 IF APT TEST
                /       AC2=SELECT LOCAL TERMINAL BAUD RATE (0=9600 BAUD; 1=300 BAUD)
                /       AC<3:5>=NBR OF MR78 PROGRAMS TO LOAD-1
                /       AC<6:7>=UNDEFINED (DO NOT ASSUME ANYTHING--MASK OFF IF IN DOUBT)
                /       AC<8:11>=BAUD RATE (SEE TSB IOT ABOVE)

                /RX01 FLOPPY DISK IOTS

6751  LCD=6751          /LOAD COMMAND REGISTER
6752  XDR=6752          /TRANSFER DATA REGISTER
```

DIGITAL EQUIPMENT CORPORATION MAYNARD,MASSACHUSETTS	TITLE: VT78 PANROM LISTING	SIZE: K	CODE: SP	NUMBER: VT78-0-4	REV: *

```
                6753  STR=6753          /SKIP ON TRANSFER REQUEST, CLEAR FLAG
                6754  SER=6754          /SKIP ON ERROR FLAG, CLEAR FLAG
                6755  SDN=6755          /SKIP ON DONE FLAG, CLEAR FLAG
                6757  INIT=6757         /INITIALIZE RX01, RECALIBRATE DRIVES

                      NOPUNCH
                0000  *0                          /TEMPORARIES IN PANEL READ-WRITE MEMORY
00000           0000  ORIGIN, 0                   /POINTER TO MAIN MEMORY
00001           0000  PSTAT,  0                   /PANEL STATUS WORD
00002           0000  ACSAV,  0
                0005  *5                  / **** DON'T CHANGE--DEFINES BAUD RATE CONSTANT ALSO ****
00005           0000  STATUS, 0                   /FLAGS--LINK, INT BUS, INT ENA, I.F., D.F.

                      /AUTO INDEX LOCATIONS ARE 10-17

                0020  *20
00020           0000  FLDCHG, 0                   /ENTRY TO FIELD CHANGE SUBROUTINE
00021           0000  MEMFLD, 0                   /CDF OR CDIF INSTRUCTION GOES HERE
                0022  RAREA=.
                      /THIS AREA IS FILLED FROM ROM WITH SUBROUTINE LINKS AND CONSTANTS
                      /       (SEE PAGE 9)
                0070  *70
                      /NOW FOR SOME VARIABLE STORAGE
00070           0000  CHAR,   0
00071           0000  PCOUNT, 0
00072           0000  WORD1,  0
00073           0000  WORD2,  0
00074           0000  CKSUM,  0
00075           0000  OTEMP,  0
00076           0000  OCTR,   0
00077           0000  DELAY1, 0
                      ENPUNCH
                6000  *6000
06000           6074  CRASH,  PER               /IN CASE R/W MEMORY GOES BESERK, WE MIGHT "AND"
06001           5200          JMP .-1           /UP THRU MEMORY TO HERE.  HANG AND TURN OFF "CPU OK" LIGHT
06002           5354  HYPHEN, JMP END3
06003           5275  START,  JMP BOOT

                      ////////////////////////  PANEL CALL HANDLER  ////////////////////////////////
06004           3002  PANEL,  DCA ACSAV         /SAVE ALL PERTINENT REGISTERS, SUCH AS AC
06005           6004          GTF
06006           0303          AND PK7700        /LINK, INT BUS, INT ENABLE
06007           3005          DCA STATUS
06010           6214          RDF
06011           7110          RAR CLL
06012           7012          RTR
06013           6224          RIF               /INSTRUCTION AND DATA FIELDS
06014           1005          TAD STATUS
06015           3005  PK05,   DCA STATUS        /CONSTANT DEPENDS ON STATUS WORD BEING IN
06016           7604          LAS                       /CORRECT PLACE
06017           7006          RTL               /EXAMINE SR BIT 2 TO SEE WHICH BAUD RATE
06020           7700          SMA CLA
06021           1224          TAD PK11
06022           1215          TAD PK05          /4 LSB ARE 16 (IF SR2 WAS 0) OR 5 (IF SR2 WAS 1)
```

DIGITAL EQUIPMENT CORPORATION MAYNARD,MASSACHUSETTS	TITLE: VT78 PANROM LISTING	SIZE: K	CODE: SP	NUMBER: VT78-0-4	REV: *

```
108   06023  6043          TSB             /SET LOCAL TERMINAL BAUD RATE
109   06024  6271  PK11,   CDF 70          /THAT'S US, FOLKS!!
110   06025  7200          CLA             /FOR SAFETY'S SAKE, IN CASE C0 IS BAD
111   06026  6071          PRS             /GET PANEL STATUS BITS
112   06027  7450          SNA
113   06030  5200          JMP CRASH       /NO STATUS BITS AROUND--BAD!!!
114   06031  7510          SPA             /AC0 = 1 MEANS FIRST START AFTER POWER ON
115   06032  5652          JMP I STRT      /FILL PANEL PAGE 0 AND RUN DIAGNOSTIC
116   06033  7006          RTL
117   06034  3001          DCA PSTAT       /SAVE HLT BIT (IT'S AC 0).  WE'LL NEED IT LATER.
118   06035  1001          TAD PSTAT
119   06036  7730          SZL SPA CLA     /SKIP IF LINK AND AC0 BOTH ZERO
120   06037  5271          JMP BTORHT      /EITHER A PROGRAM HALT OR DEPRESSED BOOSTRAP BUTTON
121   06040  1335          TAD KCDF        /PANEL CALL FROM PROGRAM (BY DEFAULT)
122   06041  6224          RIF
123   06042  3021          DCA MEMFLD
124   06043  4020          JMS FLDCHG      /EXECUTE A CDF TO CALLING FIELD
125   06044  1400          TAD I ORIGIN    /GET ARGUMENT--SEE WHERE IN PAN MEM TO GO
126   06045  3020          DCA FLDCHG
127   06046  6271          CDF 70          /NOW BACK TO THIS FIELD
128   06047  2000          ISZ ORIGIN      /INCREMENT RETURN
129   06050  0215  PK215,  215             /YE CARRIAGE RETURN; ALSO WRAPAROUND PROTECTION
130   06051  5420          JMP I FLDCHG    /NOW GO TO CALLED ROUTINE
131
132   06052  6471  STRT,   STRTUP
133                ////////////////////////  PRINT REGISTERS ////////////////////////////////
134   06053  1005  PCACMQ, TAD STATUS      /GET L, INT BUS, INT ENA, INSTRUCTION AND DATA FIELDS
135   06054  4034          JMS OCTPNT      /PRINT THEM
136   06055  1000          TAD ORIGIN      /NOW PRINT THE PC,
137   06056  4034          JMS OCTPNT
138   06057  4037          JMS MSG
139   06060  7340          TEXT %; AC,MQ%  /THIS MESSAGE,
140   06061  0103
141   06062  5415
142   06063  2100
143   06064  1002          TAD ACSAV       /AC,
144   06065  4034          JMS OCTPNT
145   06066  7701          MQA CLA
146   06067  4034          JMS OCTPNT      /AND THE MQ
147   06070  5445          JMP I PCPNT
148
149                ////////////////////  HLT AND BOOTSTRAP BUTTON PROCESSOR  ////////////////////
150   06071  4050  BTORHT, JMS DELAY       /TIME OUT TO LET ANY INPROCESS CHAR XMIT
151   06072  6037          KLB             /CLEAR THE LOOP-BACK FLIP FLOP IN CASE IT'S SET
152   06073  7420          SNL             /LINK IS SET IF BOOTSTRAP BUTTON WAS PUSHED
153   06074  5310          JMP HLTCHK      /OTHERWISE WE'RE HERE BECAUSE OF PROGRAM HALT
154   06075  4031  BOOT,   JMS CRLF        /       /(BOOTSTRAP OVER-RIDES HALT)
155   06076  4037          JMS MSG
156   06077  2324          TEXT %START%    /PRINT THIS MESSAGE
157   06100  0122
158   06101  2400
159   06102  1001          TAD PSTAT
160   06103  7700  PK7700, SMA CLA         /(BYPASS PRINTING OF REGISTERS IF IN HLT)
161   06104  4045          JMS PCPNT       /AND PRINT THE FLAGS, FIELDS, PC, AC AND MQ
```

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```
162   06105  7001          IAC
163   06106  3063          DCA HLTFLG
164   06107  5465          JMP I KBOOT1
165
166   06110  1063  HLTCHK, TAD HLTFLG
167   06111  7700          SMA CLA          /ARE WE TESTING THE HLT INSTRUCTION?
168   06112  5317          JMP HLTD1        /NO--THIS IS A REAL LIVE HALT
169   06113  1000          TAD ORIGIN       /YES--MAKE SURE ADDRESS CORRECT
170   06114  1064          TAD HLTADR
171   06115  7650          SNA CLA          /COMPARE ORIGIN WITH EXPECTED
172   06116  5334          JMP HLTOK        /HALT INSTRUCTION WORKED.  BACK TO DIAGNOSTIC
173   06117  4031  HLTD1,  JMS CRLF
174   06120  4037          JMS MSG          /PROGRAM HALT--PRINT
175   06121  1014          TEXT %HLT%       /THIS MESSAGE,
176   06122  2400
177   06123  4045          JMS PCPNT        /AND THE STATE OF THE MACHINE
178   06124  1063          TAD HLTFLG       /INITIALLY, HLTFLG = -1 (WHEN PANEL PG 0 IS FILLED)
179                                         /HENCE THE "SMA CLA" AT HLTCHK+1 SKIPS..
180                                         /AFTER HLT INSTRUCTION TESTED, HLTFLG=0
181   06125  7750          SNA SPA CLA      /HENCE DIAGNOSTIC HLT PRINTS MESSAGE AND RESTARTS
182   06126  5652          JMP I STRT       /DIAGNOSTIC.  AFTER DIAGNOSTIC, HLTFLG=1 AND THE
183                                         /"SNA SPA CLA" SKIPS, CAUSING A WAIT FOR BOOTSTRAP
184                                         /BUTTON.
185   06127  6071  HLTD2,  PRS
186   06130  7006          RTL
187   06131  7620          SNL CLA          /ONLY THE BOOTSTRAP BUTTON GETS US OUT OF HALT
188   06132  5327          JMP HLTD2        /HANG UNTIL IT IS PUSHED.
189   06133  5275          JMP BOOT
190
191   06134  3063  HLTOK,  DCA HLTFLG       /HLT INSTRUCTION TESTS OUT OK--BUMP HLTFLG
192   06135  6201  KCDF,   CDF 0
193   06136  2000          ISZ ORIGIN       /       (WILL NEVER SKIP, SINCE ORIGIN=HLTADR)
194   06137  5466          JMP I PSTAR2     /AND GO BACK TO THE REST OF THE DIAGNOSTIC
195
196                ////////////  CHARACTER ECHO TEST, DRAW LINE OF HYPHENS  ////////////////////
197   06140  4031  END,    JMS CRLF
198   06141  5344          JMP .+3
199   06142  6036  ECHO,   KRB             /GET CHARACTER
200   06143  4026          JMS TYPE         /ECHO IT
201   06144  1062          TAD PM110        /-200 (OCTAL) TO AC
202   06145  3071          DCA PCOUNT       /RESET TIMEOUT COUNTER
203   06146  6031  END1,   KSF
204   06147  7410          SKP
205   06150  5342          JMP ECHO         /CHARACTER SEEN.  ECHO IT, AND RESET TIMEOUT
206   06151  4050          JMS DELAY
207   06152  2071          ISZ PCOUNT
208   06153  5346          JMP END1
209   06154  4031  END3,   JMS CRLF         /TIME-OUT OCCURED.
210   06155  1062          TAD PM110
211   06156  3074          DCA CKSUM
212   06157  1061  END2,   TAD PK255        /DRAW A LINE OF HYPHENS ACROSS PAGE
213   06160  4026          JMS TYPE
214   06161  2074          ISZ CKSUM
215   06162  5357          JMP END2
```

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```
216   06163  4031          JMS CRLF
217   06164  4023          JMS MOVE
218   06165  6672          STDIAG-1
219   06166  0065          DIAG-1
220   06167  6677          DIAG-LAST
221   06170  1123          NULJOB          /MOVE IN THE ENTIRE DIAGNOSTIC (PERHAPS AGAIN), AND
222                                        /START AT "NULJOB"
223
224   06171  7200  CRLF1,  CLA             /TYPE CARRIAGE RETURN AND LINE FEED
225   06172  1250          TAD PK215
226   06173  4026          JMS TYPE
227   06174  1060          TAD PK212
228   06175  4026          JMS TYPE
229   06176  5431          JMP I CRLF
230   06177  0000  ZBLOCK 6200-.
231          6200  *6200
232   06200  5331  RX01,   JMP FLOPPY
233
234                ////////////////////////// BINARY LOADER FOR MR78 //////////////////////
235                /WORKS LIKE STANDARD BINARY LOADER, EXCEPT
236                /       1. USES ONLY HIGH-SPEED "PAPER TAPE" INPUT
237                /       2. USES SR3-5 TO DETERMINE HOW MANY PROGRAMS TO LOAD
238                /       3. EXPECTS A FIELD AND ORIGIN STATEMENT AT THE END
239                /             OF "TAPE" IN ORDER TO DEFINE START OF PROGRAM.
240                /       4. NO PROVISION FOR RUBOUT.
241                /       5. TAPES MUST BE CONTIGUOUS--NO HALTS (NO CONTINUE BUTTON!!)
242
243   06201  6016  BEGIN,  RRB RFC          /WE START THE READ THIS WAY SO
244                                        /THE INTERFACE USES ONLY 2 IOTS
245   06202  7604          LAS             /(THROW AWAY FIRST WORD--IT'S ALWAYS L-T)
246   06203  7002          BSW             /GET BITS 3-5.
247   06204  0057          AND PK7
248   06205  7040          CMA
249   06206  3071          DCA PCOUNT      /COMPLEMENT AND SAVE AS NUMBER OF PGMS TO LOAD
250   06207  6203  KCDIF,  CDF CIF         /IN CASE NO FIRST FIELD STATEMENT
251   06210  4054          JMS BEGG        /CALL LEADER-TRAILER EXTRACT ROUTINE
252   06211  5210          JMP .-1         /AND HANG IN THERE UNTIL PAST LEADER
253
254   06212  3074  GO,     DCA CKSUM       /CLEAR OR ACCUMULATE CHECKSUM
255   06213  4020          JMS FLDCHG      /MAKE SURE FIELD IS UP TO DATE
256   06214  1070          TAD CHAR        /GET CHARACTER
257   06215  3072          DCA WORD1       /SAVE AS FIRST CHARACTER
258   06216  6011          RSF             /OF A 12-BIT WORD
259   06217  5216          JMP .-1
260   06220  6016          RRB RFC         /READ SECOND CHARACTER
261   06221  3073          DCA WORD2       /AND SAVE
262   06222  4054          JMS BEGG        /LOOK AHEAD AT NEXT CHARACTER
263   06223  5244          JMP BEND        /TRAILER--END--CHECK CHECKSUM AND COUNT
264   06224  1072          TAD WORD1       /ORIGIN OR DATA--GO ON
265   06225  7106          CLL RTL
266   06226  7006          RTL
267   06227  7006          RTL
268   06230  1073          TAD WORD2       /ASSEMBLE 12-BIT WORD.  WORD IS DATA IF L = 0
269   06231  7420          SNL             /SKIP IF ORIGIN STATEMENT
```

```
270   06232  5240          JMP DEPOS       /DATA STATEMENT--DEPOSIT
271   06233  3000          DCA ORIGIN      /ORIGIN--SAVE AT "ORIGIN" LOCATION
272   06234  1072  CHEX,   TAD WORD1
273   06235  1073          TAD WORD2
274   06236  1074          TAD CKSUM       /COMPUTE CHECKSUM
275   06237  5212          JMP GO
276
277   06240  3400  DEPOS,  DCA I ORIGIN    /DATA--DEPOSIT IN DATA FIELD, AT LOC ADDRESSED BY ORIGIN
278   06241  2000          ISZ ORIGIN
279   06242  0070  FMASK,  70              /ALSO SERVES AS A NOP IN CASE OF WRAP-AROUND!!
280   06243  5234          JMP CHEX
281
282   06244  4020  BEND,   JMS FLDCHG
283   06245  1072          TAD WORD1       /TRAILER SEEN--
284   06246  7002          BSW
285   06247  1073          TAD WORD2       /ASSEMBLE THE CHECKSUM FROM INPUT
286   06250  7041          CIA
287   06251  1074          TAD CKSUM       /COMPARE WITH COMPUTED VALUE
288   06252  7640          SZA CLA         /RESULT BETTER BE ZERO!!!
289   06253  5305          JMP BADRD       /ELSE COMPLAIN
290   06254  2071          ISZ PCOUNT      /SEE IF LAST PROGRAM
291   06255  5210          JMP KCDIF+1     /NO--KEEP READING
292   06256  1001  PSTART, TAD PSTAT
293   06257  7710          SPA CLA         /IS CPU HALTED?
294   06260  6072          PST             /YEAH.  START IT.
295   06261  6007          CAF             /CLEAR THE I/O WORLD
296   06262  6001  PSTAR1, ION             /AND GET OUT OF PANEL MODE
297   06263  5400          JMP I ORIGIN
298   06264  5662          JMP I PSTAR1    /WE DID NOT GET OUT OF PANEL MEMORY!!!!
299                                        /JMP I PSTAR1 SAVES A LOC, AND GETS US TO "CRASH"!!
300
301                /EXTRACT LEADER/TRAILER, HANDLE FIELD.
302                /UNLIKE PAPER TAPE BINARY LOADER OF OLD, THIS PROGRAM DOES NOT
303                /HANDLE RUBOUTS.
304                /       RETURNS TO CALL + 1 IF LEADER-TRAILER
305                /       RETURNS TO CALL + 2 IF ORIGIN OR DATA
306                /       HANDLES FIELD STATEMENTS INTERNALLY
307   06265  6011  BEGG1,  RSF
308   06266  5265          JMP .-1
309   06267  6016          RRB RFC         /READ CHARACTER
310   06270  3070          DCA CHAR        /SAVE CHARACTER
311   06271  1070          TAD CHAR
312   06272  7042          BSW CMA         /COMPLEMENT BITS--MAKES BIT TESTING EASIER
313   06273  7012          RTR             /HOLE 8 IN LINK, HOLE 7 IN AC0
314   06274  7430          SZL             /SKIP IF FIELD OR L-T
315   06275  2054          ISZ BEGG        /DATA OR ORIGIN--RETURN TO CALL+2
316   06276  7730          SZL SPA CLA     /SKIP IF BOTH LINK AND SIGN ARE 0 (IE, FIELD)
317   06277  5454          JMP I BEGG      /BACK TO MAIN PROGRAM--NOT FIELD
318   06300  1070  FLD,    TAD CHAR        /IT'S A FIELD STATEMENT
319   06301  0242          AND FMASK       /ISOLATE FIELD BITS
320   06302  1207          TAD KCDIF       /AND SAVE INSTRUCTION IN READ-WRITE MEMORY
321   06303  3021          DCA MEMFLD      /NOTE: DO NOT ADD CHARACTER TO CHECKSUM!!
322   06304  5265          JMP BEGG1       /NOW GET NEXT CHARACTER
323
```

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```
                                BADRD,  JMS CRLF        /BINARY LOADER CHECKSUM ERROR.
                                        JMS MSG
                                        TEXT %LD ER%    /WARN OPERATOR AND


                                        JMP I .+1       /WAIT FOR BOOTSTRAP BUTTON
                                        HLTD2
                                ////////////////////////// MORE BOOTSTRAP STUFF //////////////////////////
                                BOOT1,  JMS MOVE        /TURN INTERRUPT OFF BY EXITING TO MAIN MEMORY
                                        INTOFF-1
                                        3               /AND EXECUTING "IOF"
                                        -3
                                        4               /THEN BACK TO BOOT2 TO SEE WHAT TO DO NEXT
                                INTOFF, IOF             /THIS GOES IN LOC 4,5,6 OF FIELD 0---
                                        PRQ             /SINCE THESE LOCATIONS ARE USED BY ODT BKPNT, THIS
                                        BOOT2           /CAUSES THE LEAST ANNOYANCE.
                                BOOT2,  LAS             /GET BAUD RATE FROM BAUD RATE SWITCH
                                        TSB1            /LOAD SLU2 BAUD RATE FROM SWITCHES
                                        RAL             ///***WATCH OUT--DF IS 0 BECAUSE OF LAST MOVE***
                                        SPA SZL CLA     /SKIPS ONLY IF BOTH L AND AC0 ARE ZERO
                                        JMP BEGIN       /MR78.  RUN BINARY LOADER.
                                ////////////////// BOOTSTRAP (START) THE FLOPPY DISK //////////////////////
                                FLOPPY, JMS MOVE
                                        PFLBT-1         /FROM
                                        FBOOT-1         /TO
                                        FBOOT-UNIT-1    /-NUMBER OF WORDS
                                        STRXBT          /STARTING ADDRESS OF BOOTSTRAP

                                6336    PFLBT=.         / ** CAUTION **  DON'T TRY TO USE ODT BREAKPOINT WITH THE
                                0020    RELOC 20        /RX01, RX02, RX04 BOOTSTRAP.
                                                        /  THE SECONDARY BOOT OVERLAYS THE BKPT LINKAGE.
                                0002    BOOTST=2                /FIRST LOCATION OF RX01 SECONDARY BOOTSTRAP
                                ///////  THE ACTUAL BOOTSTRAP--THIS IS LOADED INTO FIELD 0 AND RUN THERE  ////
                                7301    AC1=CLL CLA IAC                 /SET AC TO 1
                                7327    AC6=CLL CLA CML IAC RTL         /SET AC TO 6

                                        FBOOT,
00020*  1061    READ,   TAD     UNIT            /GENERATE UNIT AND DENSITY
00021*  1046            TAD     CON360
00022*  0060            AND     CON420
00023*  3061            DCA     UNIT            /0400 OR 0420 OR 0000 OR 0020
00024*  7327            AC6                     /GENERATE READ SECTOR COMMAND
00025*  1061            TAD     UNIT
00026*  6751            LCD
00027*  7301            AC1                     /SET AC TO TRACK, SECTOR ADDRESS
00030*  4053            JMS     LOAD            /TRANSFER TRACK, SECTOR ADDRESS
00031*  4053            JMS     LOAD
00032*  7004    LTERAL, RAL                     /SET AC TO EMPTY BUFFER COMMAND
                                                /ALSO USED AS CONSTANT


00033*  6755    STRXBT, SDN
00034*  5054            JMP     LOAD+1
00035*  6754            SER
00036*  7450            SNA
```

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```
00037* 5020          JMP     READ

00040* 1061          TAD     UNIT            /OR UNIT AND DENSITY WITH COMMAND
                  /DENSITY DETERMINES NUMBER WORDS TRANSFERRED FOR RX02/4 PIO
00041* 6751          LCD
00042* 1061          TAD     UNIT            /SETUP LOC 60 FOR RX01 SECONDARY BOOT
00043* 0046          AND     CON360
00044* 1032          TAD     LTERAL
00045* 3060          DCA     RX1SAV
00046* 0360  CON360, 360                     /CONSTANT = 0360 (EXECUTES AS AND)
00047* 4053          JMS     LOAD
00050* 3002          DCA     2
00051* 2050          ISZ     50
00052* 5047          JMP     47

00053* 0000  LOAD,   0
00054* 6753          STR
00055* 5033          JMP     STRXBT
00056* 6752          XDR
00057* 5453          JMP     I LOAD

                  CON420,                     /CONSTANT = 0420
00060* 0420  RX1SAV, 0420                    /LINK WITH RX01 SECONDARY BOOT
00061* 0020  UNIT,   0020                    /LINK WITH RX02/4 SECONDARY BOOT
                                            /SPECIFIES DENSITY AND UNIT

        6400  RELOC
              /START-UP STUFF.  FILL PANEL R/W MEMORY WITH SUB LINKS AND CONSTANTS.

              ZBLOCK 6400-.
        6400  *6400
06400   7733  KRELSZ, -OFFSET
06401   0021  KRAREA, RAREA-1
06402   6402  PZREL,  .

        0022  RELOC RAREA

              /JUST A REMINDER--
              /*20
              /FLDCHG,        0       /ENTRY TO FIELD CHANGE SUBROUTINE
              /MEMFLD,        0       /BECOMES CDF OR CDF CIF
              /THIS NEXT STUFF GETS MOVED ONTO PANEL PAGE 0

              /////////  PANEL PAGE 0 SUBROUTINE LINKS AND CONSTANTS  ////////////////
00022* 5420          JMP I FLDCHG

00023* 0000  MOVE,   0               /COLLECT ARGUMENTS FOLLOWING CALL.  MOVE CODE TO
00024* 5425          JMP I .+1       /FIELD 0, THEN START THE CODE.
00025* 6573          MOVE1

00026* 0000  TYPE,   0               /TYPE THE CHARACTER IN THE AC, RETURN WITH 0 AC
00027* 5430          JMP I .+1       /LINK PRESERVED
00030* 6616          TYPE1
```

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```
                00031* 0000  CRLF,   0                /TYPE A CARRIAGE RETURN AND LINE FEED
                00032* 5433          JMP I .+1        /AC IGNORED, RETURNS 0.  LINK PRESERVED.
                00033* 6171          CRLF1

                00034* 0000  OCTPNT, 0                /TYPE THE CONTENTS OF THE AC AS OCTAL DIGITS
                00035* 5436          JMP I .+1        /CAUTION--LINK MODIFIED
                00036* 6623          OCTPN1

                00037* 0000  MSG,    0                /PRINT THE TEXT STRING FOLLOWING THE CALL
                00040* 5441          JMP I .+1        /AC MUST BE 0 AT CALL, RETURNS 0.  LINK PRESERVED.
                00041* 6644          MSG1

                00042* 0000  PCHAR,  0                /CONVERT SIX-BIT CHAR TO ASCII AND TYPE
                00043* 5444          JMP I .+1        /ENTER WITH CHAR IN AC.  RETURNS 0 AC,
                00044* 6656          PCHAR1           /PRESERVED LINK

                00045* 0000  PCPNT,  0                /PRINT FLAGS, PC, AC, MQ
                00046* 5447          JMP I .+1        /ENTER WITH 0 AC.  RETURNS 0 AC, LINK MODIFIED.
                00047* 6053          PCACMQ

                00050* 0000  DELAY,  0                /.063 SEC DELAY
                00051* 2077          ISZ DELAY1
                00052* 5051          JMP .-1
                00053* 5450          JMP I DELAY

                00054* 0000  BEGG,   0                /BIN LOADER L/T EXTRACT
                00055* 5456          JMP I .+1
                00056* 6265          BEGG1
                00057* 0007  PK7,    7
                00060* 0212  PK212,  212
                00061* 0255  PK255,  255              /ASCII HYPHEN
                00062* 7670  PM110,  -110
                00063* 7777  HLTFLG, -1
                00064* 7633  HLTADR, -PGMHLT-1
                00065* 6314  KBOOT1, BOOT1
                00066* 6256  PSTAR2, PSTART

                       0045  OFFSET=.-RAREA

                       6450  RELOC
                06450  7701  PM77,   -77
                06451  6000  PK6000, 6000             /YE BOTTOME ROM ADDRESS; ALSO LOCATION OF "CRASH" ROUTINE
                06452  4037  CKSUM1, -3741
                06453  3020  CKSUM2, ROMSUM
                06454  6560  KMMER,  MMER

                06455  3002  MMERR,  DCA ACSAV              /OFFENDING BITS IN AC
                06456  6271          CDF 70
                06457  1010          TAD 10
                06460  7421          MQL                /ADDRESS IN MQ
                06461  3005          DCA STATUS
                06462  1254          TAD KMMER
                06463  3000          DCA ORIGIN
                06464  5665          JMP I .+1
```

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```
                HLTD1

APT,    IAC             /MAKE HLTFLG 1, SO STRAY HALTS WILL HANG UP CPU
        DCA HLTFLG
        JMP I KBOOT1    /NOW RUN MR78

        ////////////////// BEGINNING OF THE INTERNAL DIAGNOSTIC //////////////////
        ////////////////////THIS PART RUNS IN PANEL MEMORY //////////////////////
STRTUP, CLA
        DCA ORIGIN
CPLOOP, TAD ORIGIN      /FILL CP RAM (ADDRESSES 1-77) WITH ADDRESS
        DCA I ORIGIN
        ISZ ORIGIN
        JMP CPLOOP
CPRAM,  ISZ ORIGIN      /PERFORM CHECKSUM ON CP RAM
        TAD I ORIGIN    /USING LOCATION 0 AS ADDRESS POINTER
        TAD PSTAT       /AND LOCATION 1 AS CHECKSUM ACCUMULATOR
        DCA PSTAT
        TAD ORIGIN
        TAD PM77
        SPA CLA
        JMP CPRAM       /NOT DONE YET--GO BACK FOR MORE
        TAD PSTAT       /COMPARE ACCUMULATED SUM WITH EXPECTED
        TAD CKSUM1      /IS RESULT CORRECT?
        SZA
        JMP I PK6000    /NO--CP RAM FAILURE--TURN OFF "OK" LIGHT
        CLA STL RAR     /4000 TO AC
        DCA PSTAT       /SET "HLT" BIT IN PANEL STATUS WORD
CPROM,  TAD PK6000      /NOW TRY A CHECKSUM ON THIS ROM.
        DCA ORIGIN
        TAD I ORIGIN
        ISZ ORIGIN
        JMP .-2
        SZA             /CKSUM2 IS SUCH THAT RESULT BETTER BE 0
        JMP I PK6000    /IT ISN'T--TURN OFF "OK" LIGHT.
PAGE0,  TAD PZREL       /MOVE PANEL PAGE 0 INTO PLACE
        DCA 10
        TAD KRAREA
        DCA 11
        TAD KRELSZ
        DCA 12
        TAD I 10
        DCA I 11
        ISZ 12
        JMP .-3
        LAS
        RAL
        SPA CLA
        JMP APT         /SR SAYS THE APT LINE IS LOOKING FOR A BOOTSTRAP
        STA CLL RAL
        TSB1            /SET SLU2 AND SLU3 TO 9600 BAUD
        TSB2
MMFLD0, CDF 0           /NOW PERFORM AN ADDRESS TEST ON MAIN MEMORY
        STA
```

```
540   06547  3010          DCA 10
541   06550  1000          TAD ORIGIN
542   06551  3410          DCA I 10
543   06552  2000          ISZ ORIGIN
544   06553  5350          JMP .-3
545   06554  1410  FLD0CK, TAD I 10        /COMPARE CONTENTS
546   06555  7041          CIA
547   06556  1000          TAD ORIGIN      /WITH EXPECTED
548   06557  7440          SZA
549   06560  5255  MMER,   JMP MMERR       /NOT SAME--COMPLAIN
550   06561  2000          ISZ ORIGIN      /AND DO ALL ADDRESSES
551   06562  5354          JMP FLD0CK
552   06563  4031          JMS CRLF
553   06564  4037          JMS MSG
554   06565  0100          TEXT %A%        /TYPE "A"--PANEL R/W MEMORY FILLED
555   06566  4023          JMS MOVE        /LOAD AND RUN THE DIAGNOSTIC
556   06567  6672          STDIAG-1        /FROM
557   06570  0065          DIAG-1          /TO
558   06571  6677          DIAG-LAST       /SIZE
559   06572  0141          OPRAT2          /STARTING ADDRESS
560
561                 ////////////////  MISCELLANEOUS SUBROUTINES IN PANEL MEMORY  ////////////////////
562   06573  6271  MOVE1,  CDF 70          /FIX DF IN CASE BOOTSTRAPPING FLOPPY AFTER IOF
563   06574  1423          TAD I MOVE
564   06575  3010          DCA 10          /"FROM"
565   06576  2023          ISZ MOVE
566   06577  1423          TAD I MOVE
567   06600  3011          DCA 11          /"TO"
568   06601  2023          ISZ MOVE
569   06602  1423          TAD I MOVE
570   06603  3012          DCA 12          /"-NUMBER OF WORDS"
571   06604  2023          ISZ MOVE
572   06605  1423          TAD I MOVE
573   06606  3000          DCA ORIGIN      /STARTING ADDRESS IN MAIN MEMORY
574   06607  6271  MOVE2,  CDF 70
575   06610  1410          TAD I 10
576   06611  6203          CDF CIF 0
577   06612  3411          DCA I 11
578   06613  2012          ISZ 12
579   06614  5207          JMP MOVE2
580   06615  5466          JMP I PSTAR2
581
582   06616  6046  TYPE1,  TLS             /REST OF TYPE CHARACTER ROUTINE
583   06617  6041          TSF
584   06620  5217          JMP .-1
585   06621  7200          CLA
586   06622  5426          JMP I TYPE
587
588   06623  7004  OCTPN1, RAL             /OCTAL PRINT OF C(AC)
589   06624  3075          DCA OTEMP       /SHIFT AC ONE PLACE (ACCOUNT FOR LINK)
590   06625  1267          TAD PM4
591   06626  3076          DCA OCTR        /SET UP COUNTER FOR NUMBER OF DIGITS
592   06627  1271          TAD PK240
593   06630  4026          JMS TYPE
```

```
594   06631  1075  OCTPN2, TAD OTEMP       /GET WORD
595   06632  7006          RTL
596   06633  7004          RAL             /ROTATE LEFT 3 PLACES
597   06634  3075          DCA OTEMP
598   06635  1075          TAD OTEMP       /SAVE
599   06636  0057          AND PK7         /KEEP ONLY OCTAL DIGIT
600   06637  1272          TAD PK260       /CONVERT TO ASCII DIGIT
601   06640  4026          JMS TYPE
602   06641  2076          ISZ OCTR        /KEEP GOING UNTIL ALL 4 DIGITS PRINTED
603   06642  5231          JMP OCTPN2
604   06643  5434          JMP I OCTPNT
605
606   06644  6271  MSG1,   CDF 70
607   06645  1437          TAD I MSG       /PRINT TEXT FOLLOWING CALL--GET PIECE OF TEXT
608   06646  2037          ISZ MSG                 /INCREMENT RETURN
609   06647  3074          DCA CKSUM       /AS GOOD A PLACE FOR TEMP STORAGE AS ANY!
610   06650  1074          TAD CKSUM
611   06651  7002          BSW
612   06652  4042          JMS PCHAR       /PROCESS LEFT HALF--STRIP OFF UNWANTED BITS, CONVERT
613   06653  1074          TAD CKSUM
614   06654  4042          JMS PCHAR       /DO SAME FOR RIGHT HALF
615   06655  5244          JMP MSG1        /GO BACK FOR MORE
616
617   06656  0270  PCHAR1, AND PK77                /THROW AWAY WRONG HALF OF WORD
618   06657  7450          SNA
619   06660  5437          JMP I MSG       /IF RESULTING CHARACTER IS 0, END OF MESSAGE
620   06661  1271          TAD PK240               /OTHERWISE, COMPLEMENT BIT 6
621   06662  0270          AND PK77
622   06663  1271          TAD PK240       /CONVERT TO ASCII
623   06664  4026          JMS TYPE        /AND TYPE
624   06665  5442          JMP I PCHAR
625
626   06666  7700  PM100,  -100
627   06667  7774  PM4,    -4
628   06670  0077  PK77,   77
629   06671  0240  PK240,  240
630   06672  0260  PK260,  260
631
632          0066  DIAG=66         /CHANGE WITH CAUTION!!  WATCH PAGE BOUNDARIES.
633
634                /SOME PAGE ZERO VARIABLES AND FUNNY OPERATES FOR OPRATE AND MRI TESTS
635          7401  MQNOP=7401
636          7601  MQCLA=7601
637                /THE FOLLOWING RESIDE IN PAGE 0, FIELD 0 OF MAIN MEMORY
638          0020  REGA=20
639          0021  REGB=21
640          0022  A=22
641          0023  B=23
642          0024  C=24
643          0026  KLTRS=26
644          0025  D=25
645
646          6673  STDIAG=.                /START OF THE DIAGNOSTIC STUFF
647          0066  RELOC DIAG
```

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                        ///////////////  CONTINUATION OF THE INTERNAL DIAGNOSTIC  ////////////////////
                        /////////  THIS PART IS MOVED INTO MAIN MEMORY, AND RUN THERE.  ////////////
00066* 7402  HALT,   HLT             /PROTECTION FOR WRAP-AROUND, ETC
00067* 0067  ESCSEQ, .
00070* 7745          -33             /ESCAPE SEQUENCE FOR BOOTSTRAP FROM DOWN-LINE
00071* 7735          -43             /SEQ IS ESC--NBR SIGN--SPACE--0
00072* 7740          -40             /NOTICE--NO "200" BIT
00073* 7720          -60
00074* 0007  K7,     7               /ALSO TERMINATES ESCAPE LIST BECAUSE IT'S +
                     /CONSTANTS
00075* 0100  M7700,  -7700
00076* 7401  M377,   -377
00077* 7750  M30,    -30
00100* 7765  M13,    -13
00101* 7772  M6,     -6
00102* 0010  K10,    10
00103* 0011  K11,    11
00104* 0077  K77,    77
00105* 0200  K200,   200
00106* 0300  K300,   300
00107* 7400  K7400,  7400
00110* 7700  K7700,  7700
00111* 0374  TAD1P,  TAD1
00112* 0710  XADDP,  XTDADD
00113* 1032  XTNP2,  KHLT+1
00114* 5515  INTJMP, JMP I INTLNK
00115* 0613  INTLNK, INTCHN
00116* 1007  KFRET,  FRET            /MUST FOLLOW INTLNK
00117* 1401  TLIMIT, -TBUF-400+1
00120* 5777  TTYBUF, TBUF-1
00121* 4200  KJMSC,  4200            /JMS CURRENT PAGE
00122* 0465  KRETUR, RETUR-1
00123* 4000  STRTBF, STRBUF
00124* 0027  MODE2,  27
00125* 3777  KSTRBF, STRBUF-1
00126* 4263  R1,     4263
00127* 2634  R2,     2634
00130* 0302  KLTR,   "B
00131* 0000  TYPEIT, 0               /PRINT NEXT LETTER AT TERMINAL
00132* 1026          TAD KLTRS
00133* 6046          TLS
00134* 2026          ISZ KLTRS       /GO TO NEXT LETTER NEXT TIME AROUND
00135* 6041          TSF
00136* 5135          JMP .-1
00137* 7677  K7677,  7677            /SINCE THE EAE BITS ARE UNUSED, THIS IS SAME AS "CAM"
00140* 5531          JMP I TYPEIT
                     ////////////////////  DIAGNOSTIC--CPU OPERATE TEST  ////////////////////
00141* 6002  OPRAT2, IOF             /IN CASE WE RESTART AFTER SLU TEST HLT
00142* 1130          TAD KLTR        /SET UP PRINTOUT--ALLOWS RESTART WITH ODT
00143* 3026          DCA KLTRS
00144* 7402  PGMHLT, HLT             /MAKE SURE HALT IS WORKING
00145* 5145          JMP .           /HANG HERE IF IT DOESN'T
00146* 4131          JMS TYPEIT      /TYPE "B"--DIAGNOSTIC LOADED AND STARTED
```

```
00147* 7320  SKPTST, CLA CLL CML     /SOME STUFF FROM DEC/X8 OPRATE MODULE
00150* 7010          RAR
00151* 7440          SZA             /ROTATE A "1" RIGHT UNTIL AC=0, LINK=1
00152* 5150          JMP .-2
00153* 7041          CMA IAC         /NOW CIA--LINK SHOULD COMPLEMENT
00154* 7420          SNL
00155* 7440          SZA
00156* 7402          HLT             /SNL OR SZA PROBLEM

00157* 7020          CML             /DO SAME SORT OF THING AGAIN, THIS TIME GOING LEFT
00160* 7004          RAL
00161* 7450          SNA
00162* 7410          SKP
00163* 5160          JMP .-3
00164* 7061          CMA CML IAC
00165* 7430          SZL
00166* 7440          SZA
00167* 7402          HLT             /SZL OR SNA PROBLEM

00170* 7320          CLA CLL CML     /COMBINED SKIPS
00171* 7570          SPA SNA SZL
00172* 7560          SMA SZA SNL
00173* 7402          HLT             /PROBLEM WITH ONF OF THE ABOVE 2 INSTRUCTIONS
00174* 7070          CML CMA RAR
00175* 7570          SPA SNA SZL
00176* 7560          SMA SZA SNL
00177* 7402          HLT             /SKIP FAILURE--ONE OF 2 ABOVE INSTR
00200* 7141          CLL CMA IAC
00201* 7570          SPA SNA SZL
00202* 7560          SMA SZA SNL
00203* 7402          HLT             /SKIP FAILURE
00204* 7040          CMA
00205* 7560          SMA SZA SNL
00206* 7770          SPA SNA SZL CLA
00207* 7402          HLT             /YET ANOTHER SKIP FAILURE
00210* 7440          SZA
00211* 7402          HLT             /DID THAT CLA BIT ABOVE REALLY CLEAR THE AC??
00212* 7001          IAC
00213* 7760          SMA SZA SNL CLA
00214* 7440          SZA
00215* 7402          HLT             /CLA DID NOT WORK??

00216* 7360  RUNIR,  CLA CLL CMA CML /COMBINED INCREMENT AND ROTATE TEST
00217* 7367          CLA CLL CMA CML IAC RTL /AC, LINK BOTH 0
00220* 7420          SNL
00221* 7440          SZA
00222* 7402          HLT             /IAC OR ROTATE FAILED
00223* 7060          CMA CML
00224* 7373          CLA CLL CMA CML IAC RTR /AC, LINK BOTH 0
00225* 7420          SNL
00226* 7440          SZA
00227* 7402          HLT             /IAC OR ROTATE FAILED
00230* 3020          DCA REGA
00231* 1020  RUNRT,  TAD REGA
```

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```
00232* 7165          CLL CML CMA IAC RAL
00233* 7010          RAR
00234* 7073          CML CMA IAC RTR
00235* 7006          RTL
00236* 7071          CML CMA IAC RAR
00237* 7004          RAL
00240* 7067          CML CMA IAC RTL
00241* 7012          RTR
00242* 7041          CIA
00243* 1020          TAD REGA
00244* 7430          SZL
00245* 7440          SZA
00246* 7402          HLT             /COMBINED IAC, ROTATE DID NOT WORK
00247* 2020          ISZ REGA
00250* 5231          JMP RUNRT

00251* 1020  RNMQBS, TAD REGA        /CHECK MQ AND BSW INSTRUCTIONS--GET NUMBER
00252* 7106          RTL CLL
00253* 7006          RTL             /SIMULATE BSW
00254* 7006          RTL
00255* 0110          AND K7700
00256* 3021          DCA REGB
00257* 1020          TAD REGA
00260* 7112          RTR CLL
00261* 7012          RTR
00262* 7012          RTR
00263* 0104          AND K77
00264* 1021          TAD REGB
00265* 7002          BSW             /NOW DO A REAL BSW TO GET ORIGINAL VALUE BACK
00266* 7041          CIA
00267* 1020          TAD REGA        /AND COMPARE WITH ORIGINAL
00270* 7440          SZA
00271* 7402          HLT             /BSW FAILED
00272* 1020          TAD REGA        /NOW TEST MQ INSTRUCTIONS
00273* 7040          CMA
00274* 3021          DCA REGB
00275* 1020          TAD REGA
00276* 7421          MQL
00277* 7440          SZA
00300* 7402          HLT             /MQL DID NOT CLEAR AC
00301* 1021          TAD REGB
00302* 7521          SWP
00303* 7401          MQNOP           /MQ NOP = 7401
00304* 7041          CIA
00305* 1020          TAD REGA
00306* 7640          SZA CLA
00307* 7402          HLT             /MQ NOP DID SOMETHING ??
00310* 1020          TAD REGA
00311* 7601          MQCLA           /GROUP 3 CLA
00312* 7440          SZA
00313* 7402          HLT             /WELL, IT SHOULD HAVE, BUT IT DIDN'T CLEAR AC
00314* 1020          TAD REGA
00315* 7701          CLA MQA
00316* 7041          CIA
```

```
810   00317* 1021          TAD REGB
811   00320* 7440          SZA
812   00321* 7402          HLT             /CLA MQA COMBINATION BAD
813   00322* 1021          TAD REGB
814   00323* 7501          MQA
815   00324* 7041          CIA
816   00325* 1021          TAD REGB
817   00326* 7440          SZA
818   00327* 7402          HLT             /PROBLEM WITH MQA
819   00330* 1020          TAD REGA
820   00331* 7501          MQA
821   00332* 7040          CMA
822   00333* 7440          SZA
823   00334* 7402          HLT             /YET MORE PROBLEMS WITH MQA
824   00335* 1020          TAD REGA
825   00336* 7621          CLA MQL
826   00337* 7440          SZA
827   00340* 7402          HLT             /AC NOT ZEROED BY MQL
828   00341* 7701          CLA MQA
829   00342* 7440          SZA
830   00343* 7402          HLT             /MQ CAME BACK NOT ZERO
831   00344* 1020          TAD REGA
832   00345* 7421          MQL
833   00346* 1021          TAD REGB
834   00347* 7721          CLA SWP
835   00350* 7041          CIA
836   00351* 1020          TAD REGA
837   00352* 7440          SZA
838   00353* 7402          HLT             /PROBLEM WITH SWP ??
839   00354* 7701          CLA MQA
840   00355* 7440          SZA
841   00356* 7402          HLT             /PROBLEM WITH SWP ??--AC WAS OK BUT MQ BAD??
842   00357* 2020          ISZ REGA
843   00360* 5251          JMP RNMQBS      /DO ANOTHER NUMBER
844
845                ////////////////////  DIAGNOSTIC--CPU MRI TEST  ////////////////////////////
846   00361* 3024  TADTST, DCA C           /SET UP COUNT
847   00362* 1126          TAD R1          /THIS STUFF DOES NOTHING SPECIAL ON A SINGLE PASS.
848   00363* 7104          CLL RAL         /BUT CAN BE USED AS A RANDOM NUMBER GENERATOR IF YOU
849   00364* 7430          SZL             /WANT TO PATCH TADTST AND ANDTST WITH ODT.
850   00365* 7001          IAC             /JUST PUT AN EFFECTIVE JMP I (TADTST AT JMSTST
851   00366* 3126          DCA R1          /THEN START RUNNING AT OR BEFORE TADTST.
852   00367* 1127          TAD R2          /MACHINE WILL THEN RUN THE AND-TAD TESTS UNTIL HALTED.
853   00370* 1126          TAD R1
854   00371* 3127          DCA R2
855   00372* 1127          TAD R2
856   00373* 3025          DCA D
857   00374* 1127  TAD1,    TAD R2          /HERE'S THE REAL MEAT OF THE PROGRAM.  R2
858   00375* 1024          TAD C           /PLUS COUNT
859   00376* 7041          CMA IAC
860   00377* 1025          TAD D           /MINUS (R2+COUNT)
861   00400* 7440          SZA             /SHOULD BE ZERO
862   00401* 7402          HLT             /TAD TEST FAILURE
863   00402* 2025          ISZ D           /BUMP (R2+COUNT)
```

```
00403* 7000          NOP
00404* 2024          ISZ C              /BUMP COUNT
00405* 5511          JMP I TAD1P        /AND BACK WE GO

00406* 7240  ANDTST, CLA CMA            /PARTIAL "AND" SIMULATION OF PREVIOUS TAD TEST
00407* 0127          AND R2             /R2
00410* 3025          DCA D              /TO D
00411* 7240          CLA CMA
00412* 0127          AND R2             /R2 "AND" C
00413* 0024          AND C
00414* 7104          CLL RAL            /*2
00415* 3022          DCA A              /TO "A" [CARRY IS GENERATED ONLY ON 1+1]
00416* 7240          CLA CMA
00417* 0127          AND R2             /THE NEXT BUMCH OF CODE
00420* 7040          CMA
00421* 0024          AND C
00422* 7040          CMA
00423* 3023          DCA B              /FORMS THE XOR OF R2 AND "C"
00424* 7240          CLA CMA
00425* 0024          AND C
00426* 7040          CMA
00427* 0127          AND R2
00430* 7040          CMA
00431* 0023          AND B
00432* 7040          CMA                /IN THE ACCUMULATOR, PERFORMING A HALF-ADD
00433* 1022          TAD A              /ADD IN CARRY ---> RESULT IN AC
00434* 7041          CIA
00435* 1025          TAD D              /RESULT SHOULD EQUAL D
00436* 7640          SZA CLA
00437* 7402          HLT                /AND TEST FAILURE
00440* 2025          ISZ D
00441* 7000          NOP
00442* 2024          ISZ C
00443* 5211          JMP ANDTST+3

              0017  AUTO=17

                                       /TEST JMS INSTRUCTION
00444* 1265  JMSTST, TAD KBUFF          /BUFFER SIZE (CANNOT EXCEED ONE PAGE)
00445* 3023          DCA B
00446* 1125          TAD KSTRBF         /START OF BUFFER--MUST BE START OF PAGE
00447* 3017  AUA,     DCA AUTO
00450* 1121          TAD KJMSC
00451* 3025          DCA D
00452* 1025          TAD D
00453* 3417  AUB,     DCA I AUTO         /FILL BUFFER WITH "JMS  .", EXCEPT LAST INST
00454* 2025          ISZ D
00455* 2023          ISZ B
00456* 5252          JMP .-4
00457* 1264          TAD KJMPIA         /LAST INSTRUCTION IS "JMP I AUTO"
00460* 3417  AUC,     DCA I AUTO
00461* 1122          TAD KRETUR         /NOW MAKE AUT0 = RETUR-1
00462* 3017  AUD,     DCA AUTO
00463* 5523          JMP I STRTBF       /AND GO EXECUTE WHAT'S IN BUFFER
```

```
00464* 5417  KJMPIA, JMP I AUTO
00465* 7601  KBUFF,  1+STRBUF-STPBUF
00466* 1265  RETUR,  TAD KBUFF
00467* 3023         DCA B
00470* 1125         TAD KSTRBF
00471* 3017  AUE,    DCA AUTO
00472* 7126         STL RTL
00473* 1017  AUF,    TAD AUTO        /CONTENTS OF EACH LOCATION IN BUFFER
00474* 7041         CIA             /SHOULD EQUAL ADDRESS + 1 (EXCEPT FINAL JUMP, OF COURSE)
00475* 1417  AUG,    TAD I AUTO
00476* 7440         SZA
00477* 7402         HLT             /JMS FAILURE
00500* 2023         ISZ B
00501* 5272         JMP .-7
00502* 4131         JMS TYPEIT      /TYPE "C"--CPU TESTS OK

        4000  STRBUF=4000
        4200  STPBUF=4200


              /BUNCH OF IOT DEFINITIONS FOR SLU TESTS.  MOST IOTS DIFFER FROM CORRESPONDING
              /LOCAL TERMINAL IOTS BY THE ADDITION OF A 1 OR 2 AFTER IOT.
        6040  SPF=6040
              /SLU #2
        6301  KSF1=6301
        6306  KRB1=6306
        6307  KMD1=6307              /LOAD CONTROL BITS INTO UART (SLU #2 ONLY)
        6310  SPF1=6310
        6311  TSF1=6311
        6312  TCF1=6312
        6313  TSB1=6313              /SEE FIRST PAGE FOR BAUD RATE MAGIC NUMBERS
        6316  TLS1=6316
              /SLU #3
        6321  KSF2=6321
        6326  KRB2=6326
        6330  SPF2=6330
        6331  TSF2=6331
        6332  TCF2=6332
        6333  TSB2=6333              /SEE PAGE 1 FOR MAGIC NUMBERS
        6336  TLS2=6336

        6000  TBUF=6000

              ////////////////////  DIAGNOSTIC--SLU TEST  ////////////////////////////////
              /TEST THE 3 SERIAL LINE UNITS BY LOOPING BACK AND SENDING ALL POSSIBLE
              /CHARACTERS.  USE INTERRUPT SYSTEM.
00503* 2020  SLTST,  ISZ REGA        /WAIT FOR ANY IN-PROCESS CHARACTER TO TRANSMIT
00504* 5303         JMP .-1
00505* 7344         STA CLL RAL     /4 LSB = 16--SET SLU1 TO 9600 BAUD, SO THE SLU TEST
00506* 6043         TSB                     /WILL BE FAST REGARDLESS OF TERMINAL
00507* 6042         TCF             /CLEAR THE ONLY TWO FLAGS WHICH COULD
00510* 6032         KCC             /CAUSE AN INTERRUPT.  ALSO CLEAR AC.
00511* 1124         TAD MODE2
00512* 6037         KLB             /SET UP LOOPBACK (WORKS BECAUSE AC 11 = 1)
```

```
 972   00513* 6307          KMD1            /SET UP 8-BIT ASCII MODE ON LINE 2
 973   00514* 6003          SRQ             /ANYTHING ON THE INTERRUPT BUS??
 974   00515* 7610          SKP CLA
 975   00516* 7402          HLT             /YES--WE GOT TROUBLE!
 976   00517* 1114          TAD INTJMP      /SET UP INTERRUPT JMP = JMP I (INTCHN
 977   00520* 3001          DCA 1
 978   00521* 1120          TAD TTYBUF      /CREATE A BUFFER CONSISTING OF 8-BIT CHARACTERS
 979   00522* 3010          DCA 10
 980   00523* 1076          TAD M377        /1,2,3,4,----376,377,0
 981   00524* 3023          DCA B
 982   00525* 1023          TAD B
 983   00526* 0353          AND K377
 984   00527* 3410          DCA I 10
 985   00530* 2023          ISZ B
 986   00531* 5325          JMP .-4
 987   00532* 3410          DCA I 10        /FILL LAST CHARACTER
 988   00533* 1101          TAD M6          /SET UP 6 AUTO INDEX REGISTERS SO THEY ALL
 989   00534* 3022          DCA A           /POINT TO FIRST WORD OF BUFFER
 990   00535* 1074          TAD K7
 991   00536* 3017          DCA 17
 992   00537* 1120  FILAI,  TAD TTYBUF
 993   00540* 3417          DCA I 17
 994   00541* 2022          ISZ A
 995   00542* 5337          JMP FILAI
 996   00543* 6001          ION             /TURN ON INTERRUPT
 997   00544* 6330          SPF2            /AND START UP XMITTERS
 998   00545* 6310          SPF1
 999   00546* 6040          SPF
1000   00547* 7240  NULL,    STA             /NULL JOB CONSISTS OF COUNTING DOWN "A",
1001   00550* 1022          TAD A
1002   00551* 3022          DCA A
1003   00552* 2023          ISZ B           /ISZ'ING B
1004   00553* 0377  K377,    377
1005   00554* 1022          TAD A
1006   00555* 1023          TAD B
1007   00556* 7440          SZA             /AND COMPARING THE TWO FOR EQUALITY
1008   00557* 7402          HLT             /SOMETHING INTERFERED WITH NULL JOB (INT INH BAD ??)
1009   00560* 1117          TAD TLIMIT      /ALL IS DONE WHEN ALL RECR AI = TBUF+400
1010   00561* 1013          TAD 13
1011   00562* 7640          SZA CLA         /SLU1 DONE?
1012   00563* 5347          JMP NULL        /NO--JUMP BACK TO NULL JOB
1013   00564* 7001          IAC
1014   00565* 7421          MQL             /INDICATE SLU 1 DONE BY PUTTING "1" IN MQ
1015   00566* 1117          TAD TLIMIT      /(IF WE HANG UP, PUSHING "START" BUTTON WILL DISPLAY MQ)
1016   00567* 1014          TAD 14
1017   00570* 7640          SZA CLA         /SLU2 DONE?
1018   00571* 5347          JMP NULL
1019   00572* 7105          IAC CLL RAL
1020   00573* 7421          MQL             /INDICATE SLU 2 DONE (IF SLU 3 GOOD, TEST COMPLETES)
1021   00574* 1117          TAD TLIMIT
1022   00575* 1015          TAD 15
1023   00576* 7640          SZA CLA         /SLU3 DONE?
1024   00577* 5347          JMP NULL
1025   00600* 6002          IOF
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1026   00601* 6037          KLB             /JOB DONE--CLEAR LOOPBACK FF
1027   00602* 7604          LAS             /RESET TERMINAL BAUD RATE, PER AC2
1028   00603* 7006          RTL
1029   00604* 7700          SMA CLA         /IF AC2 WAS 0, MAKE BAUD RATE 9600
1030   00605* 1103          TAD K11
1031   00606* 1100          TAD M13         /THIS CONSTANT USED BECAUSE 4 LSB ARE = 5
1032   00607* 6043          TSB             /AC 8-11 EITHER 5 (300 BAUD) OR 16 (9600 BAUD)
1033   00610* 7200          CLA
1034   00611* 4131  SLDONE, JMS TYPEIT      /"D"--SLU TEST COMPLETE
1035   00612* 5512          JMP I XADDP
1036
1037   00613* 3024  INTCHN, DCA C           /YE SKIPPE CHAINE
1038   00614* 7204          GLK
1039   00615* 3025          DCA D
1040   00616* 7240          STA             /SET AC.  IF KRB FAILS TO JAM TRANSFER,
1041   00617* 6031          KSF             /EXTRA BITS WILL THEN APPEAR DURING RECEIVER SERVICE
1042   00620* 7410          SKP
1043   00621* 5266          JMP RLN1        /RECEIVER, LINE 1
1044   00622* 6301          KSF1
1045   00623* 7410          SKP
1046   00624* 5274          JMP RLN2        /RECEIVER, LINE 2
1047   00625* 6321          KSF2
1048   00626* 7410          SKP
1049   00627* 5302          JMP RLN3        /RECEIVER, LINE 3
1050   00630* 7200          CLA
1051   00631* 6041          TSF
1052   00632* 7410          SKP
1053   00633* 5247          JMP TLN1        /TRANSMITTER, LINE 1
1054   00634* 6311          TSF1
1055   00635* 7410          SKP
1056   00636* 5254          JMP TLN2        /TRANSMITTER, LINE 2
1057   00637* 6331          TSF2
1058   00640* 7402          HLT             /UNDEFINED INTERRUPT
1059   00641* 5261          JMP TLN3        /TRANSMITTER, LINE 3
1060   00642* 1025  DISMIS, TAD D
1061   00643* 7110          RAR CLL
1062   00644* 1024          TAD C
1063   00645* 6001          ION
1064   00646* 5400          JMP I 0         /EXIT FROM INTERRUPT
1065
1066   00647* 1410  TLN1,   TAD I 10        /SERVICE SLU #1 XMITR
1067   00650* 6046          TLS
1068   00651* 7650          SNA CLA
1069   00652* 6042          TCF             /ZERO CHARACTER IS LAST ONE TRANSMITTED--SHUT DOWN XMITER
1070   00653* 5242          JMP DISMIS
1071
1072   00654* 1411  TLN2,   TAD I 11        /SERVICE SLU #2 XMITR
1073   00655* 6316          TLS1
1074   00656* 7650          SNA CLA
1075   00657* 6312          TCF1            /SHUT DOWN XMTER
1076   00660* 5242          JMP DISMIS
1077
1078   00661* 1412  TLN3,   TAD I 12        /SERVICE SLU #3 XMITR
1079   00662* 6336          TLS2
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DIGITAL EQUIPMENT CORPORATION MAYNARD,MASSACHUSETTS	TITLE VT78 PANROM LISTING	SIZE K	CODE SP	NUMBER VT78-0-4	REV *

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1080   00663* 7650          SNA CLA
1081   00664* 6332          TCF2            /SHUT DOWN XMITER
1082   00665* 5242          JMP DISMIS
1083
1084   00666* 6036  RLN1,    KRB             /SERVICE SLU #1 RECVR
1085   00667* 7041          CIA
1086   00670* 1413          TAD I 13
1087   00671* 7440          SZA
1088   00672* 7402          HLT             /RECEIVED CHARACTER NOT EQUAL TO TRANSMITTED ONE--LINE 1
1089   00673* 5242          JMP DISMIS
1090
1091   00674* 6306  RLN2,    KRB1            /SERVICE SLU #2 RECVR
1092   00675* 7041          CIA
1093   00676* 1414          TAD I 14
1094   00677* 7440          SZA
1095   00700* 7402          HLT             /REC'D CHARACTER NOT EQUAL TO XMITED ONE--LINE 2
1096   00701* 5242          JMP DISMIS
1097
1098   00702* 6326  RLN3,    KRB2            /SERVICE SLU #3 RECVR
1099   00703* 7041          CIA
1100   00704* 1415          TAD I 15
1101   00705* 7440          SZA
1102   00706* 7402          HLT             /REC'D CHARACTER NOT EQUAL TO XMITED ONE--LINE 3
1103   00707* 5242          JMP DISMIS
1104
1105                ////////////////  DIAGNOSTIC--EXTENDED MEMORY TEST  ////////////////////
1106
1107                /FILL FIELD 1 WITH ADDRESS; FILL FIELD 2
1108                /WITH ADDRESS + 200; FILL FIELD 3 WITH ADDRESS + 400.  THEN CHECK
1109                /THE WHOLE MESS.
1110
1111   00710* 7240  XTDADD, STA             /SET UP AUTO INDEX FOR ADDRESS 0
1112   00711* 3010          DCA 10
1113   00712* 3022          DCA A           /CLEAR COUNTER
1114   00713* 7421          MQL             /CLEAR MQ
1115   00714* 7346          STA CLL RTL     /-3 TO AC
1116   00715* 3012          DCA 12
1117   00716* 6211          CDF 10
1118   00717* 7501  XTDFIL, MQA             /MQ
1119   00720* 1022          TAD A           /PLUS ADDRESS
1120   00721* 3410          DCA I 10        /TO ADDRESS
1121   00722* 2022          ISZ A
1122   00723* 5317          JMP XTDFIL      /KEEP GOING--FIELD NOT FILLED YET
1123   00724* 2012          ISZ 12          /FIELD COMPLETED--BUMP FIELD COUNT
1124   00725* 4330          JMS NXTFLD      /SET UP NEXT FIELD.
1125   00726* 5342          JMP XTDCHK      /ALL FIELDS FILLED.  GO TO CHECK.
1126   00727* 5317          JMP XTDFIL      /NXTFLD RETURNS HERE--FILL ANOTHER FIELD
1127
1128   00730* 0000  NXTFLD, 0               /SET UP NEXT FIELD--
1129   00731* 7501          MQA
1130   00732* 1105          TAD K200        /ADD 200 TO MQ
1131   00733* 7421          MQL
1132   00734* 1102          TAD K10         /AND 10 TO CDF
1133   00735* 1337          TAD XTDFLD
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	TITLE		SIZE	CODE	NUMBER	REV
DIGITAL EQUIPMENT CORPORATION MAYNARD,MASSACHUSETTS		VT78 PANROM LISTING	K	SP	VT78-0-4	*

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1134   00736* 3337          DCA XTDFLD
1135   00737* 6211  XTDFLD, CDF 10          /CDF 10, CDF 20 OR CDF 30
1136   00740* 2330          ISZ NXTFLD      /MAKES CODING MORE CONCISE BECAUSE THIS SUB
1137   00741* 5730          JMP I NXTFLD    /FOLLOWS ISZ OF FIELD COUNTER
1138
1139   00742* 7346  XTDCHK, STA CLL RTL     /CHECK ALL ADDRESSES FOR CORRECT VALUE
1140   00743* 3012          DCA 12          /SET UP FIELD COUNTER
1141   00744* 7421          MQL             /SET UP OFFSET CONSTANT
1142   00745* 1347          TAD KCDF10      /RESET NXTFLD SUBROUTINE
1143   00746* 3337          DCA XTDFLD
1144   00747* 6211  KCDF10, CDF 10          /RESET DATA FIELD TO FIELD 1
1145   00750* 7501  XCKGET, MQA             /GET OFFSET
1146   00751* 1022          TAD A           /PLUS ADDRESS
1147   00752* 7041          CIA
1148   00753* 1410          TAD I 10        /COMPARE WITH WORD FROM MEMORY
1149   00754* 7640          SZA CLA
1150   00755* 5364          JMP MEMERR      /COMPARE FAILED
1151   00756* 2022          ISZ A           /THROUGH FIELD YET?
1152   00757* 5350          JMP XCKGET      /NO
1153   00760* 2012          ISZ 12          /YES - BUMP FIELD COUNTER
1154   00761* 4330          JMS NXTFLD      /BUMP MQ, CDF
1155   00762* 5370          JMP XCKDUN      /ALL DONE--GO TO NEXT TEST
1156   00763* 5350          JMP XCKGET      /GO BACK FOR ANOTHER FIELD (NXTFLD RETURNS HERE)
1157
1158   00764* 1422  MEMERR, TAD I A         /BAD DATA IN MQ
1159   00765* 7421          MQL
1160   00766* 1022          TAD A           /OFFENDING ADDRESS IN AC (DF TELLS WHICH MEMORY)
1161   00767* 7402          HLT             /TRAP BACK TO PANEL
1162
1163   00770* 6211  XCKDUN, CDF 10          /NOW CHEDK INTERRUPT AND CIF STUFF
1164   00771* 1066          TAD HALT
1165   00772* 3412          DCA I 12        /FILL ALL FIELD 1 WITH HALTS
1166   00773* 2022          ISZ A
1167   00774* 5371          JMP .-3
1168   00775* 6231          CDF 30
1169   00776* 6212          CIF 10          /TRY TO GO TO FIELD 1
1170   00777* 2001          ISZ 1           /NOTE: HALT AT THIS ADDRESS IN FLD 1=PREMATURE
1171                                        /INSTRUCTION FIELD CHANGE
1172                                        /SET UP NEW INTERRUPT RETURN
1173   01000* 6001          ION             /NOTE: TTO FLAG WAS SET AT END OF SLU TEST
1174   01001* 6214          RDF             /MAKE SURE DF RIGHT
1175   01002* 1077          TAD M30
1176   01003* 7440          SZA
1177   01004* 7402          HLT             /BAD DATA FIELD BITS.  CHECK RDF MUX.
1178   01005* 5206          JMP .+1         /AT THIS POINT, WE SHOULD START TO GO TO FIELD 1
1179                                        /AND INTERRUPT BEFORE WE GET THERE
1180   01006* 7402          HLT             /GUESS WE DIDN'T--INT INH FAILED TO CLEAR??
1181   01007* 6234  FRET,   RIB             /SHOULD COME BACK TO HERE AFTER INTERRUPT
1182   01010* 1100          TAD M13
1183   01011* 7440          SZA
1184   01012* 7402          HLT             /SAVE FIELD WRONG
1185   01013* 1000          TAD 0
1186   01014* 7040          CMA
1187   01015* 1116          TAD KFRET
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01016* 7440          SZA
01017* 7402          HLT             /INTERRUPT WRONG ADDRESS--INT INH BAD??
01020* 6214          RDF
01021* 7440          SZA
01022* 7402          HLT             /DATA FIELD WAS NOT RESET ON INTERRUPT
01023* 6213          CIF CDF 10
01024* 1233          TAD KCIF        /HLT AT THIS LOC IN FIELD 1 INDICATES XTN
                                     /DID NOT WAIT FOR JMP OR JMS
01025* 3632          DCA I KHLT1     /KHLT
01026* 1234          TAD JMPXA
01027* 3513          DCA I XTNP2     /KHLT+1
                     ////////////////////////////////////////////////////////////////////////
                     /FIELD 1 NOW HAS HLT IN ALL LOCATIONS EXCEPT:
                     /       KHLT,   CIF 0
                     /       KCIF,   JMP XA
                     ////////////////////////////////////////////////////////////////////////
01030* 5632          JMP I KHLT1     /CHECK THAT JMP I DOES CHANGE FIELD CORRECTLY
                                     /(JMP DIRECT CHECKED COMMING BACK FROM FIELD 1)
01031* 7402  KHLT,   HLT             /SHOULD HAVE CHANGED INST FIELD, DID NOT.
01032* 1031  KHLT1,  KHLT
01033* 6203  KCIF,   CIF CDF 0
01034* 5235  JMPXA,  JMP XA
01035* 4131  XA,     JMS TYPEIT      /COME BACK TO HERE IF ALL IS OK.  TYPE "E"
                     ////////////////  DIAGNOSTIC--FLOPPY INTERFACE TEST  ////////////////////
                     /AS MUCH AS WE CAN DO WITHOUT CORRUPTING DISK
                     /WILL ALSO RUN CORRECTLY IF NO RX01 ON SYSTEM.

01036* 1105  FPYTST, TAD K200        /MAINTENANCE BIT--MUST ALWAYS BE SET, ELSE CODE
01037* 7421          MQL             /ON FLOPPY GETS SMASHED
01040* 7501          MQA
01041* 6751          6751            /SET UP MAINTENANCE MODE
01042* 7201  FLOPY2, CLA IAC
01043* 3022          DCA A
01044* 1022  FLOPY1, TAD A           /CODE MAKES 2 PASSES.  FIRST PASS SLIDES A "1" THRU AC.
01045* 7501          MQA             /SECOND PASS FILLS AC WITH 1'S FROM RT TO LEFT.
01046* 0137          AND K7677       /ZERO THE "8-BIT MODE" BIT
01047* 3023          DCA B
01050* 1023          TAD B
01051* 6751          6751            /IN EITHER CASE, 200 IS "OR"ED WITH AC (TO KEEP
                                     /MAINT BIT SET).  FLOPPY REGISTER IS LOADED,
                                     /READ BACK AND CHECKED FOR CORRECTNESS.
01052* 7440          SZA
01053* 7402          HLT             /IOT SHOULD HAVE CLEARED AC, DID NOT.
01054* 6752          6752
01055* 7041          CIA
01056* 1023          TAD B
01057* 7640          SZA CLA
01060* 7402          HLT             /FLOPPY DATA REGISTER ERROR
01061* 1022          TAD A
01062* 7104  KINST1, RAL CLL         /BECOMES "RAL STL" ON SECOND PASS
01063* 3022          DCA A
01064* 7420          SNL             /WHEN A "1" APPEARS IN LINK, PASS IS DONE.
01065* 5244          JMP FLOPY1
01066* 1273  KOUT1,  TAD KINST       /BECOMES "JMP FLOPY3" ON SECOND PASS
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1242   01067* 3262          DCA KINST1
1243   01070* 1274          TAD KOUT          /SET UP SECOND PASS
1244   01071* 3266          DCA KOUT1
1245   01072* 5242          JMP FLOPY2        /AND GO AGAIN
1246
1247   01073* 7124  KINST,   RAL STL
1248   01074* 5275  KOUT,    JMP FLOPY3
1249
1250   01075* 1106  FLOPY3, TAD K300
1251   01076* 6751          6751              /NOW SET UP MAINT, 8-BIT MODE
1252   01077* 7440          SZA
1253   01100* 7402          HLT               /6751 SHOULD HAVE CLEARED THE AC, BUT DIDN'T
1254   01101* 1107          TAD K7400         /SET 4 HIGH-ORDER BITS
1255   01102* 6752          6752              /NOW READ BACK 8 LOW-ORDER BITS
1256   01103* 1075          TAD M7700
1257   01104* 7440          SZA
1258   01105* 7402          HLT               /ANSWER NOT RIGHT
1259   01106* 7240          STA
1260   01107* 6751          6751              /NOW THROW ALL 1'S AT THE INTERFACE
1261   01110* 7440          SZA
1262   01111* 7402          HLT               /ONCE AGAIN, 6751 SHOULD CLEAR AC, BUT DIDN'T
1263   01112* 6752          6752
1264   01113* 1076          TAD M377          /SHOULD GET BACK 8 LOW-ORDER BITS
1265   01114* 7440          SZA
1266   01115* 7402          HLT               /DIDN'T
1267   01116* 6757          6757              /INITIALIZE THE DISK IF IT IS THERE
1268   01117* 4131          JMS TYPEIT        /"F"--FLOPPY INTERFACE TESTED
1269   01120* 6073          PRQ               /TRAP BACK TO PANEL MODE
1270   01121* 6140          END               /TO TEST FOR POSSIBLE ECHO AND EXIT TO NULL JOB
1271   01122* 7402          HLT               /IN CASE PRQ IOT FAILS, WE HIT THIS HALT
1272                 ////////////////////////  END OF THE DIAGNOSTIC  ////////////////////////////
1273
1274                 /////////  HERE'S WHAT WE DO WHILE WAITING FOR BOOTSTRAP BUTTON  ////////////
1275   01123* 6002  NULJOB, IOF               /JUST IN CASE!!  WE MIGHT BE COMING HERE FROM USER PGM
1276   01124* 6040          SPF               /SET XMIT FLAGS
1277   01125* 6310          SPF1
1278   01126* 1067  RESESC, TAD ESCSEQ        /AND INITIALIZE ESCAPE SEQUENCE CHECKER
1279   01127* 3010          DCA 10            /SEQUENCE IS 33--43--40--60 (ESCAPE,NBR SIGN,SPACE,0)
1280   01130* 1410  TERM01, TAD I 10          /PICK UP NEXT ESCAPE CHARACTER
1281   01131* 7500          SMA               /TEST FOR LIST TERMINATOR
1282   01132* 5364          JMP ESCAPE        /TERMINATOR IS A POSITIVE WORD
1283   01133* 3022          DCA A             /STORE NEXT ITEM ON LIST
1284   01134* 7604  TERMI0, LAS               /SET SLU2 BAUD RATE FROM SWITCHES "ON THE FLY"
1285   01135* 6313          TSB1              /LOAD SLU2 BAUD RATE FROM SWITCHES
1286   01136* 1346          TAD     TERMIN    /DON WHITE SAID THIS IS OK
1287   01137* 0366          AND     K17       /MASK HIGH ORDER 8 BITS
1288   01140* 7650          SNA CLA           /SKIP IF SLU2 NOT 110 BAUD
1289   01141* 1102          TAD     K10       /SET 2 STOP BITS
1290   01142* 1124          TAD     MODE2     /SET OTHER SLU2 MODE BITS
1291   01143* 6307          KMD1              /LOAD SLU2 MODE BITS
1292   01144* 6031          KSF
1293   01145* 5352          JMP TERMI1
1294   01146* 6036  TERMIN, KRB               /PASS KEYBOARD CHARACTER TO LINE
1295   01147* 6311          TSF1
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	TITLE	SIZE	CODE	NUMBER	REV
DIGITAL EQUIPMENT CORPORATION MAYNARD,MASSACHUSETTS	VT78 PANROM LISTING	K	SP	VT78-0-4	*

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1296   01150* 5347          JMP .-1
1297   01151* 6316          TLS1
1298   01152* 6301  TERMI1, KSF1
1299   01153* 5334          JMP TERMI0
1300   01154* 6306  TERMOU, KRB1              /GET CHARACTER FROM LINE
1301   01155* 6041          TSF
1302   01156* 5355          JMP .-1
1303   01157* 6046          TLS                /PRINT IT ON SCREEN
1304   01160* 1022          TAD A              /COMPARE WITH CURRENT ESCAPE CHARACTER
1305   01161* 7640          SZA CLA
1306   01162* 5326          JMP RESESC         /NOT SAME--RESET ESCAPE SEQUENCE
1307   01163* 5330          JMP TERMO1
1308
1309   01164* 6073  ESCAPE, PRQ                /TRAP BACK TO THE BOOTSTRAP IN PANEL MEM
1310   01165* 6003          START
1311   01166* 0017  K17,     17                 /CONSTANT = 000017
1312
1313
1314           1167  LAST=.
1315           7774  RELOC
1316   07774   0000  ZBLOCK 7776-.
1317                 ////////////  THE CPU ALWAYS STORES ITS PC IN LOCATION 0 OF PANEL MEMORY  ///////
1318                 //////////  AND TAKES ITS FIRST INSTRUCTION FROM LOCATION 7777 WHEN A  ////////
1319                 ////////////////////  CONTROL PANEL REQUEST IS GENERATED.  ////////////////////
1320           7776  *7776
1321   07776   6004          PANEL              /JUMP TO THE START OF EVERYTHING
1322   07777   5776          JMP I .-1          /PANEL REQUESTS START EXECUTING CODE HERE
1323
1324                 $$$

A       0022      FLDCHG 0020      K17    1166      PK215  6050
ACSAV   0002      FLD0CK 6554      K200   0105      PK240  6671
AC1     7301      FLOPPY 6331      K300   0106      PK255  0061
AC6     7327      FLOPY1 1044      K377   0553      PK260  6672
ANDTST  0406      FLOPY2 1042      K7     0074      PK6000 6451
APT     6466      FLOPY3 1075      K7400  0107      PK7    0057
AUA     0447      FMASK  6242      K7677  0137      PK77   6670
AUB     0453      FPYTST 1036      K77    0104      PK7700 6103
AUC     0460      FRET   1007      K7700  0110      PM100  6666
AUD     0462      GO     6212      LAST   1167      PM110  0062
AUE     0471      HALT   0066      LCD    6751      PM4    6667
AUF     0473      HLTADR 0064      LOAD   0053      PM77   6450
AUG     0475      HLTCHK 6110      LTERAL 0032      PRQ    6073
AUTO    0017      HLTD1  6117      MEMERR 0764      PRS    6071
B       0023      HLTD2  6127      MEMFLD 0021      PST    6072
BADRD   6305      HLTFLG 0063      MMER   6560      PSTART 6256
BEGG    0054      HLTOK  6134      MMERR  6455      PSTAR1 6262
BEGG1   6265      HYPHEN 6002      MMFLD0 6545      PSTAR2 0066
BEGIN   6201      INIT   6757      MODE2  0124      PSTAT  0001
BEND    6244      INTCHN 0613      MOVE   0023      PZREL  6402
BOOT    6075      INTJMP 0114      MOVE1  6573      RAREA  0022
BOOTST  0002      INTLNK 0115      MOVE2  6607      READ   0020
BOOT1   6314      INTOFF 6321      MQCLA  7601      REGA   0020
BOOT2   6324      JMPXA  1034      MQNOP  7401      REGB   0021
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DIGITAL EQUIPMENT CORPORATION MAYNARD,MASSACHUSETTS	TITLE VT78 PANROM LISTING	SIZE K	CODE SP	NUMBER VT78-0-4	REV *

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BTORHT 6071      JMSTST 0444      MSG    0037      RESESC 1126
C      0024      KBOOT1 0065      MSG1   6644      RETUR  0466
CHAR   0070      KBUFF  0465      M13    0100      RLN1   0666
CHEX   6234      KCDF   6135      M30    0077      RLN2   0674
CKSUM  0074      KCDF10 0747      M377   0076      RLN3   0702
CKSUM1 6452      KCDIF  6207      M6     0101      RNMQBS 0251
CKSUM2 6453      KCIF   1033      M7700  0075      ROMSUM 3020
CON360 0046      KFRET  0116      NULJOB 1123      RUNIR  0216
CON420 0060      KHLT   1031      NULL   0547      RUNRT  0231
CPLOOP 6473      KHLT1  1032      NXTFLD 0730      RX01   6200
CPRAM  6477      KINST  1073      OCTPNT 0034      RX1SAV 0060
CPROM  6515      KINST1 1062      OCTPN1 6623      R1     0126
CRASH  6000      KJMPIA 0464      OCTPN2 6631      R2     0127
CRLF   0031      KJMSC  0121      OCTR   0076      SDN    6755
CRLF1  6171      KLB    6037      OFFSET 0045      SER    6754
D      0025      KLTR   0130      OPRAT2 0141      SKPTST 0147
DELAY  0050      KLTRS  0026      ORIGIN 0000      SLDONE 0611
DELAY1 0077      KMD1   6307      OTEMP  0075      SLTST  0503
DEPOS  6240      KMMER  6454      PAGE0  6524      SPF    6040
DIAG   0066      KOUT   1074      PANEL  6004      SPF1   6310
DISMIS 0642      KOUT1  1066      PCACMQ 6053      SPF2   6330
ECHO   6142      KRAREA 6401      PCHAR  0042      START  6003
END    6140      KRB1   6306      PCHAR1 6656      STATUS 0005
END1   6146      KRB2   6326      PCOUNT 0071      STDIAG 6673
END2   6157      KRELSZ 6400      PCPNT  0045      STPBUF 4200
?r?rEND3   6154      KRETUR 0122      PER    6074      STR    6753
ESCAPE 1164      KSF1   6301      PFLBT  6336      STRBUF 4000
ESCSEQ 0067      KSF2   6321      PGMHLT 0144      STRT   6052
FBOOT  0020      KSTRBF 0125      PK05   6015      STRTBF 0123
FILAI  0537      K10    0102      PK11   6024      STRTUP 6471
FLD    6300      K11    0103      PK212  0060      STRXBT 0033
TADTST 0361
TAD1   0374
TAD1P  0111
TBUF   6000
TCF1   6312
TCF2   6332
TERMIN 1146
TERMI0 1134
TERMI1 1152
TERMOU 1154
TERMO1 1130
TLIMIT 0117
TLN1   0647
TLN2   0654
TLN3   0661
TLS1   6316
TLS2   6336
TSB    6043
TSB1   6313
TSB2   6333
TSF1   6311
TSF2   6331
TTYBUF 0120
```

DIGITAL EQUIPMENT CORPORATION MAYNARD,MASSACHUSETTS	TITLE VT78 PANROM LISTING	SIZE K	CODE SP	NUMBER VT78-0-4	REV *

```
TYPE   0026
TYPEIT 0131
TYPE1  6616
UNIT   0061
WORD1  0072
WORD2  0073
XA     1035
XADDP  0112
XCKDUN 0770
XCKGET 0750
XDR    6752
XTDADD 0710
XTDCHK 0742
XTDFIL 0717
XTDFLD 0737
XTNP2  0113


ERRORS DETECTED: 0
LINKS GENERATED: 0


A          640#  875   889   989   994  1001  1002  1005  1113  1119
          1121  1146  1151  1158  1160  1166  1220  1221  1436  1238
          1283  1304
ACSAV       63#   93   143   478
AC1        357#  368
AC6        358#  365
ANDTST     868#  897
APT        488#  534
AUA        905#
AUB        909#
AUC        914#
AUD        916#
AUE        923#
AUF        925#
AUG        927#
AUTO       899#  905   909   914   916   918   923   925   927
B          641#  881   887   903   911   921   930   981   982   985
          1003  1006  1224  1225  1233
BADRD       289   324#
BEGG        251   262   315   317   457#
BEGG1       307#  322   459
BEGIN       243#  344
BEND        263   282#
BOOT         90   154#  189
BOOTST      355#
BOOT1       332#  466
BOOT2       339   340#
BTORHT      120   150#
C           642#  846   858   865   873   879   883   896  1037  1062
CHAR         77#  256   310   311   318
CHEX        272#  280
CKSUM        81#  211   214   254   274   287   609   610   613
```

DIGITAL EQUIPMENT CORPORATION MAYNARD,MASSACHUSETTS	TITLE VT78 PANROM LISTING	SIZE K	CODE SP	NUMBER VT78-0-4	REV *

```
CKSUM1      474#  509
CKSUM2      475#
CON360      362   384   387#
CON420      363   399#
CPLOOP      496#  499
CPRAM       500#  507
CPROM       514#
CRASH        87#  113
CRLF        154   173   197   209   216   229   324   432#  552
CRLF1       224#  434
D           644#  856   860   863   870   891   894   907   908   910
           1039  1060
DELAY       150   206   452#  455
DELAY1       84#  453
DEPOS       270   277#
DIAG        219   220   557   558   632#  647
DISMIS     1060# 1070  1076  1082  1089  1096  1103
ECHO        199#  205
END         197# 1270
END1        203#  208
END2        212#  215
END3         89   209#
ESCAPE     1282  1309#
ESCSEQ      652# 1278
FBOOT       348   349   360#
FILAI       992#  995
FLD         318#
FLDCHG       70#  124   126   130   255   282   422
FLD0CK      545#  551
FLOPPY      232   346#
FLOPY1     1221# 1240
FLOPY2     1219# 1245
FLOPY3     1248  1250#
FMASK       279#  319
FPYTST     1215#
FRET        676  1181#
GO          254#  275
HALT        651# 1164
HLTADR      170   465#
HLTCHK      153   166#
HLTD1       168   173#  486
HLTD2       185#  188   330
HLTFLG      163   166   178   191   464#  489
HLTOK       172   191#
HYPHEN       89#
INIT         57#
INTCHN      675  1037#
INTJMP      674#  976
INTLNK      674   675#
INTOFF      333   337#
JMPXA      1197  1209#
JMSTST      902#
KBOOT1      164   466#  490
KBUFF       902   919#  920
```

DIGITAL EQUIPMENT CORPORATION MAYNARD,MASSACHUSETTS	TITLE: VT78 PANROM LISTING	SIZE: K	CODE: SP	NUMBER: VT78-0-4	REV: *

```
KCDF        121   192#
KCDF10     1142  1144#
KCDIF       250#  291   320
KCIF       1194  1208#
KFRET       676# 1187
KHLT        673  1206# 1207
KHLT1      1196  1204  1207#
KINST      1241  1247#
KINST1     1237# 1242
KJMPIA      913   918#
KJMSC       679#  906
KLB          40#  151   971  1026
KLTR        686#  697
KLTRS       643#  688   690   698
KMD1        944#  972  1291
KMMER       476#  483
KOUT       1243  1248#
KOUT1      1241# 1244
KRAREA      410#  523
KRB1        943# 1091  1300
KRB2        952# 1098
KRELSZ      409#  525
KRETUR      680#  915
KSF1        942# 1044  1298
KSF2        951# 1047
KSTRBF      683#  904   922
K10         664# 1132  1289
K11         665# 1030
K17        1287  1311#
K200        667# 1130  1215
K300        668# 1250
K377        983  1004#
K7          657#  990
K7400       669# 1254
K7677       693# 1223
K77         666#  782
K7700       670#  776
LAST        220   558  1314#
LCD          52#  367   382
LOAD        369   370   375   388   393#  397
LTERAL      371#  385
MEMERR     1150  1158#
MEMFLD       71#  123   321
MMER        476   549#
MMERR       478#  549
MMFLD0      538#
MODE2       682#  970  1290
MOVE        217   332   346   424#  555   563   565   566   568   569
            571   572
MOVE1       426   562#
MOVE2       574#  579
MQCLA       636#  804
MQNOP       635#  798
MSG         138   155   174   325   440#  553   607   608   619
```

DIGITAL EQUIPMENT CORPORATION MAYNARD,MASSACHUSETTS	TITLE VT78 PANROM LISTING	SIZE K	CODE SP	NUMBER VT78-0-4	REV *

80

MSG1 442 606# 615
M13 662# 1031 1182
M30 661# 1175
M377 660# 980 1264
M6 663# 988
M7700 659# 1256
NULJOB 221 1275#
NULL 1000# 1012 1018 1024
NXTFLD 1124 1128# 1136 1137 1154
OCTPNT 135 137 144 146 436# 604
OCTPN1 438 588#
OCTPN2 594# 603
OCTR 83# 591 602
OFFSET 409 469#
OPRAT2 559 696#
ORIGIN 61# 125 128 136 169 193 271 277 278 297
484 495 496 497 498 500 501 504 515 516
517 541 543 547 550 573
OTEMP 82# 589 594 597 598
PAGE0 521#
PANEL 93# 1321
PCACMQ 134# 450
PCHAR 444# 612 614 624
PCHAR1 446 617#
PCOUNT 78# 202 207 249 290
PCPNT 147 161 177 448#
PER 27# 87
PFLBT 347 352#
PGMHLT 465 699#
PK05 102# 107
PK11 106 109#
PK212 227 461#
PK215 129# 225
PK240 592 620 622 629#
PK255 212 462#
PK260 600 630#
PK6000 473# 511 514 520
PK7 247 460# 599
PK77 617 621 628#
PK7700 95 160#
PM100 626#
PM110 201 210 463#
PM4 590 627#
PM77 472# 505
PRQ 9# 338 1269 1309
PRS 21# 111 185
PST 26# 294
PSTART 292# 467
PSTAR1 296# 298
PSTAR2 194 467# 580
PSTAT 62# 117 118 159 292 502 503 508 513
PZREL 411# 521
RAREA 72# 410 413 469
READ 361# 378

REGA 638# 754 755 765 769 772 778 786 789 792
800 803 807 819 824 831 836 842 964
REGB 639# 777 783 791 796 810 813 816 833
RELOC 353 404 413 471 647 1315
RESESC 1278# 1306
RETUR 680 920#
RLN1 1043 1084#
RLN2 1046 1091#
RLN3 1049 1098#
RNMQBS 772# 843
ROMSUM 8# 475
RUNIR 744#
RUNRT 755# 770
RX01 232#
RX1SAV 386 400#
R1 684# 847 851 853
R2 685# 852 854 855 857 869 872 877 885
SDN 56# 374
SER 55# 376
SKPTST 702#
SLDONE 1034#
SLTST 964#
SPF 940# 999 1276
SPF1 945# 998 1277
SPF2 953# 997
START 90# 1310
STATUS 65# 96 101 102 134 482
STDIAG 218 556 646#
STPBUF 919 935#
STR 54# 394
STRBUF 681 683 919 934#
STRT 115 132# 182
STRTBF 681# 917
STRTUP 132 494#
STRXBT 350 374# 395
TADTST 846#
TAD1 671 857#
TAD1P 671# 866
TBUF 677 678 959#
TCF1 947# 1075
TCF2 955# 1081
TERMIN 1286 1294#
TERMI0 1284# 1299
TERMI1 1293 1298#
TERMOU 1300#
TERMO1 1280# 1307
TLIMIT 677# 1009 1015 1021
TLN1 1053 1066#
TLN2 1056 1072#
TLN3 1059 1078#
TLS1 949# 1073 1297
TLS2 957# 1079
TSB 28# 108 967 1032
TSB1 341 536 948# 1285

```
TSB2        537   956#
TSF1        946#  1054  1295
TSF2        954#  1057
TTYBUF      678#   978   992
TYPE        200    213   226   228   428#  586   593   601   623
TYPEIT      687#   694   701   932  1034  1210  1268
TYPE1       430    582#
UNIT        349    361   364   366   380   383   401#
WORD1        79#   257   264   272   283
WORD2        80#   261   268   273   285
XA         1209  1210#
XADDP       672#  1035
XCKDUN     1155  1163#
XCKGET     1145#  1152  1156
XDR          53#   396
XTDADD       672  1111#
XTDCHK     1125  1139#
XTDFIL     1118#  1122  1126
XTDFLD     1133  1134  1135# 1143
XTNP2       673#  1198

V5A
```

DIGITAL EQUIPMENT CORPORATION MAYNARD,MASSACHUSETTS	TITLE VT78 PANROM LISTING	SIZE K	CODE SP	NUMBER VT78-0-4	REV *

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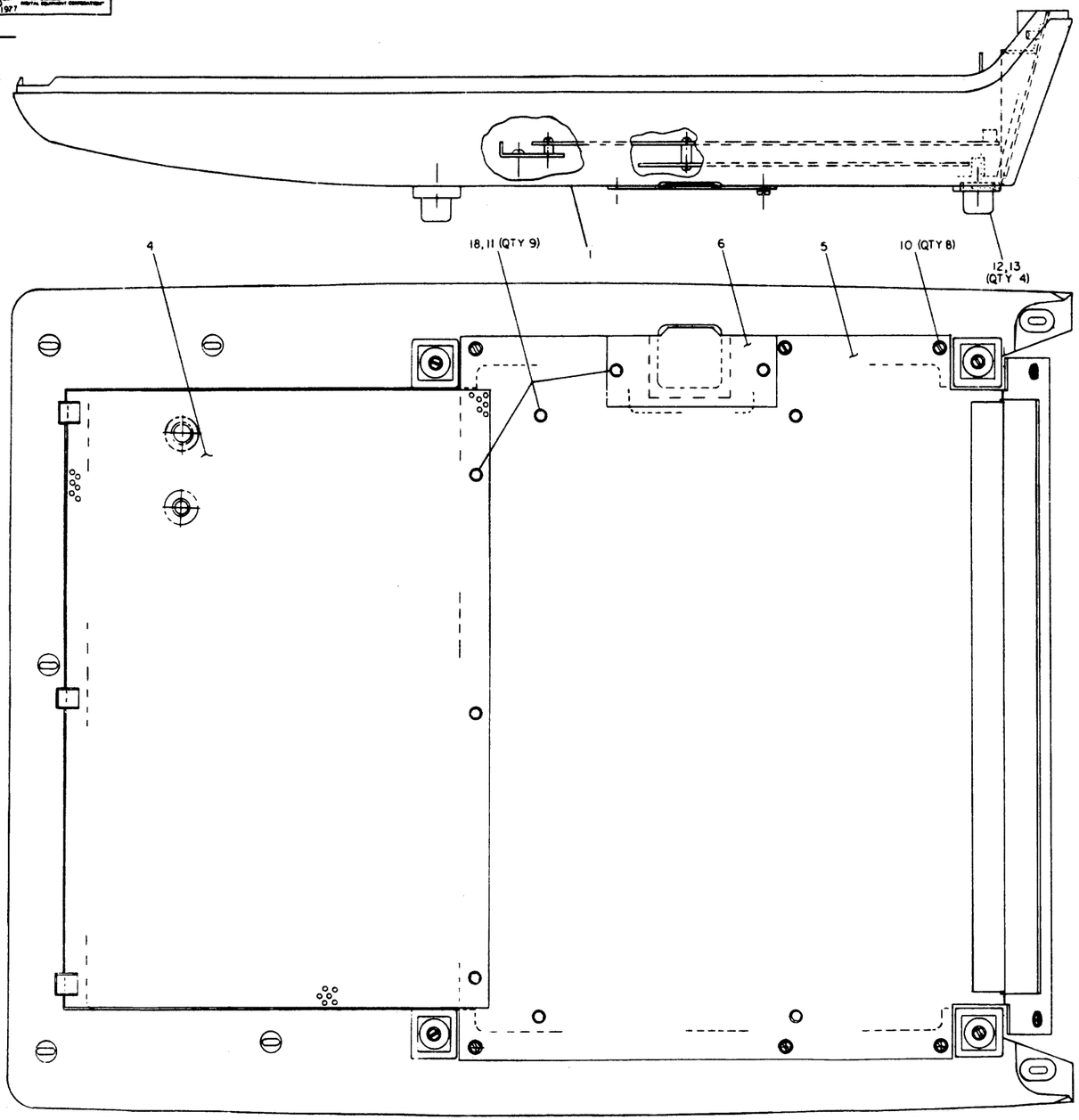
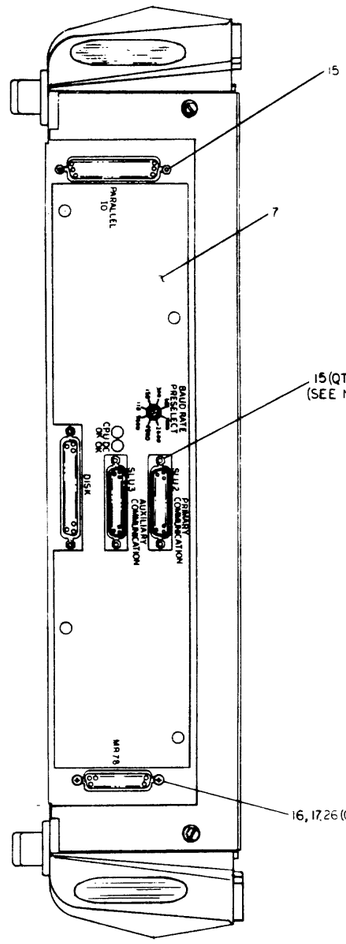
NOTES:
1. FLAT WASHERS, LOCKWASHERS AND NUTS SUPPLIED WITH SCREW LOCK ASSY (ITEM 15) NOT REQ'D.
2. PLACE WASHER (ITEM 27) BETWEEN KEP NUT (ITEM 22) AND CABLE, SAFTEY GND (ITEM 20)

A (SHEET 2)





1	WASHER FLAT #10	9006664-00	27
2	WASHER, SPLIT LOCK #4	9006688-00	26
2	WASHER, EXT. TOOTH #10	9007651-00	25
2	SCREW, PHTP-HD 10-32×5/8	9006074-03	24
2	NUT, TINNERMAN	9007878-00	23
2	KEPS NUT #10-32	9006565-00	22
2	DECAL, GND.	A-PS-3612680-00	21
1	CABLE, GND.	C-IA-7418251-00	20
1	CABLE, GND.	C-IA-7418251-02	19
9	LOCKWASHER #8	9008072-00	16
2	WASHER, FLAT #4	9008172-00	17
2	SCREW, PH. PN. HD 4-40×3/2	9006010-01	16
8	SCREW LOCK ASSY	9008451-00	15
4	GUIDE, CARD	1211630-00	14
4	SCREW, WASHER HD #10	9009681-03	13
4	BUMPER, RUBBER, BLACK	9000023-01	12
9	SCREW, HEX HD 8-32×.38	9009683-01	11
8	SCREW, WASHER HD. #10	9009681-05	10
1	BRACKET, MOD. SUPT. RH	D-IA-7418460-00	9
1	BRACKET, MOD. SUPT. LH	D-IA-7418460-01	8
1	DECAL, CONN. PANEL	3614279-00	7
1	PLATE, COVER	B-MD-7418565-00	6
1	BASE PAN WELDM'T	D-IA 7013890-00	5
1	SCREEN, BASE, FRONT	I-IA-7413322-01	4
1	IO DIST. PANEL ASSY.	A-PL-5412861-00	3
1	MEM/PROC. BD. ASSY.	KK8-B	2
1	BASE, VT50	E-MD-7411539-01	1
	DESCRIPTION	DWG./PART NO.	ITEM NO.

REVISIONS			
Ltr	CHANGE NR		
A	7013891-00001	9 Wells 21 Dec 77	
B	7013891-00002	6 Anderson 29 Mar 78	
C	7013891-00003	18 Anderson 10 Jul 78	

DRN	5-30-77	FIRST USED ON: VT78
CHK'D	6-9-77	
ENGR	6/14/77	TITLE: PROCESSOR ASSEMBLY
MFGR	6/14/77	
NEXT HIGHER ASSY		
SCALE	1/1	SIZE: 1 CODE: AD NUMBER: 7013891-00 REV: C
SHEET	1 OF 3	

SEE PARTS LIST

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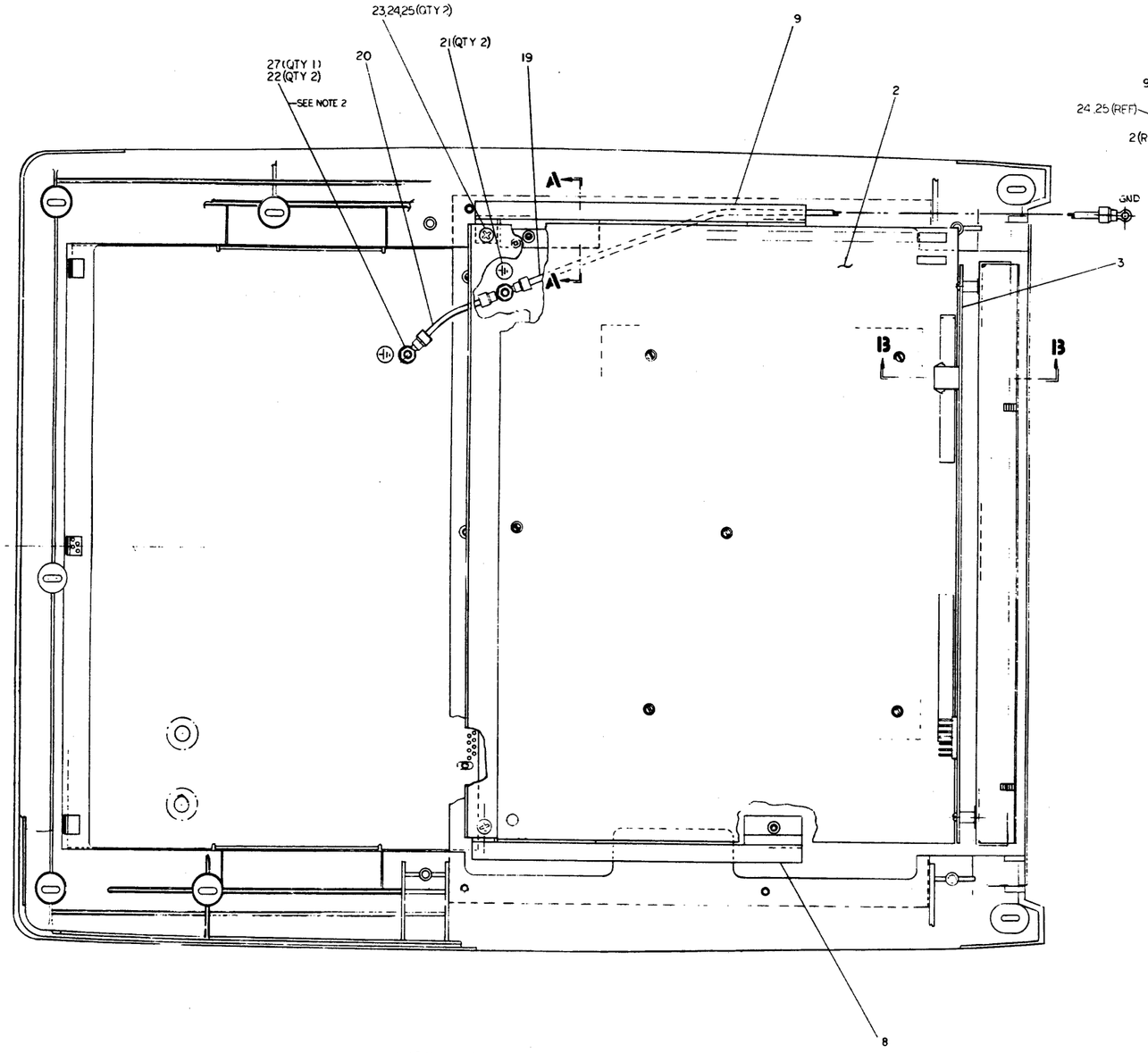
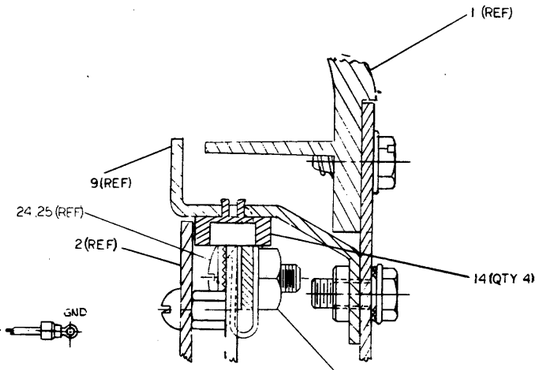
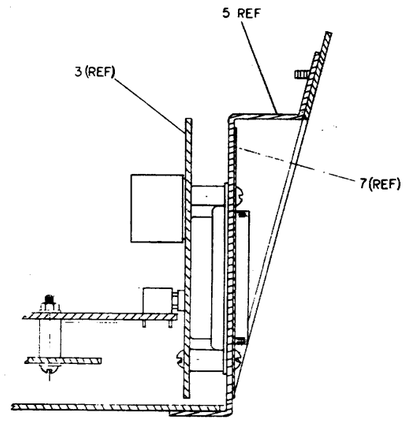


VIEW A-A



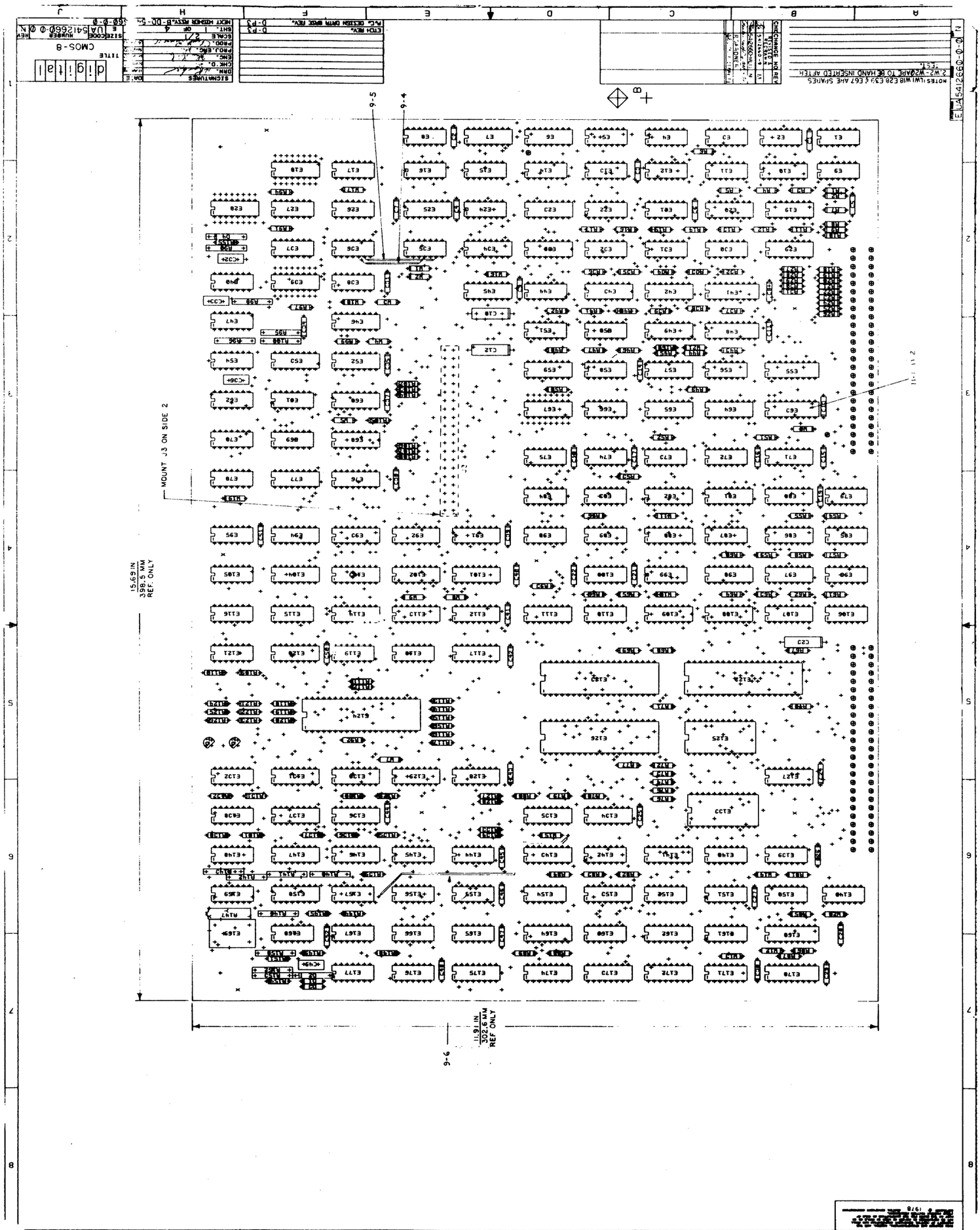
SECTION A-A
SCALE: 4/1



SECTION B B
SCALE: 2/1

REVISIONS		
CHG	CHANGE NO.	REV.

TITLE: PROCESSOR ASSEMBLY								SIZE: E	NUMBER: AD 7013891-C-0
SCALE 1/1 & NOTED	SHEET 2 OF 2							DIST	REV. C


MOUNT J3 ON SIDE 2
15.69 IN
398.5 MM
REF. ONLY
15.69 IN
398.5 MM
REF. ONLY
CMOS-8

LINE	ITEM	DOCUMENT NUMBER	PART NUMBER	DESCRIPTION	QTY PER VARIATION 00	REFERENCE DESIGNATOR
1	1	D-MD-5012659-0-0	5012659-00	5412660	1	
2	2		1005306-00	6.8MFD 35V 10% S.TANT	3	C10,C12,C23
3	3		1010279-00	.47 MFD 25V 20% 2C023 CER,	1	C49
4	4		1012121-00	220.0 MMF 100V 1%200PPM DM15S	3	C32,C33,C36
5	5		1012784-00	.047 MFD 50V -20+80 CER	44	C1-C9,C11,C13-C19,C21,C22,
					CONT	C24-C31,C34,C35,C37-C48,C50,C51,
					CONT	C52
6	6		1100114-00	D 664 QS\75PCB PIV= 25V SP	2	D1,D3
7	7		1105508-00	1N 823 VZ= 6.2 5% .40W Y	1	D2
8	8		1110994-00	1N 751A VZ= 5.1 5% .40W	1	D4
9	9		1300316-00	470 1/4W 5% CC	1	R154
10	10		1300365-00	1 K 1/4W 5% CC	3	R17,R32,R37
11	11		1300391-00	1.5 K 1/4W 5% CC	7	R131,R52,R110,R111,R112,R124,
					CONT	R148
12	12		1300447-00	4.7 K 1/4W 5% CC	35	R65,R66,R93,R99,R101,R105,R122,
					CONT	R126,R132,R138,R33,R34,R36,
					CONT	R38-R44,R49,R51,R113,R115,
					CONT	R117-R120,R129,R130,R135-R137,
					CONT	R139,R160
13	13		1300496-00	15 K 1/4W 5% CC	38	R114,R116,R121,R128,R125,R127,
					CONT	R133,R134,R149,R156,R35,R45,R48,
					CONT	R50,R67-R87,R92,R97,R109
14	14		1301322-00	180 1/4W 5% CC	19	R1,R3,R7,R10,R12,R16,R18,
					CONT	R20-R24,R27,R28,R54,R57,R60,R62,
					CONT	R64
15	15		1301401-00	750 1/4W 5% CC	6	R5,R47,R53,R89,R91,R145
16	16		1301522-00	27 1/4W 5% CC	6	R102,R103,R104,R106,R107,R108
17	17		1301972-00	270 1/4W 5% CC	1	R155
18	18		1302411-00	*** THIS ITEM IS NOT USED ***	-	

REVISION HISTORY			BASIC PART NO: 5412660										
ENG	ECO NUMBER	REV	SECTION A OF A	DRN: R.BUREAU	DATE: 20-FEB-78		D	I	G	I	T	A	L
						TITLE	PARTS LIST						
B,C	00004	F	SECTION,VARIATION INDEX	CHK'D: J.KIRK	DATE: 20-FEB-78								
-	00005	H	[A] 00			CMOS-8							
JK	00006	J	[B]										
E,R	00007	K	[C]	DES,ENG: J.KIRK	DATE: 20-FEB-78								
---	ML008	L	[D]										
C,L	ML009	M	[E]			DOCUMENT NUMBER							
F,G	5412660-ML011	N	[F]	RESP,ENG,: J.KIRK	DATE: 20-FEB-78								
			[H]			SIZE	CODE	NUMBER			REV		
			[J]										
			[K]	MFG,ENG,: B.DAVILLI	DATE: 20-FEB-78	K	PL	5412660-0-DBP			N		
			[L]										
			[M]	ASSEMBLY NUMBER:				FILE NAME:			EDIT #		
			[N]	E-UA-5412660-0-0				Z0328N,PLS			24		

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LINE	ITEM	DOCUMENT NUMBER	PART NUMBER	DESCRIPTION	QTY PER VARIATION 00	REFERENCE DESIGNATOR
19	19		1302466-00	100 K 1/4W 5% CC	1	R151
20	20		1302872-00	681 1/4W 1% RN55D-F 100PPM	1	R153
21	21		1303047-00	464 1/4W 1% RN55D-F 100PPM	1	R150
22	22		1303312-00	10.0 K 1/4W 1% RN55D-F 100PPM	2	R140,R146
23	23		1304855-00	9.09 K 1/4W 1% RN55D-F 100PPM	1	R141
24	24		1305108-00	1.47 K 1/4W 1% RN55D-F 100PPM	4	R95,R96,R98,R100
25	25		1305322-00	7.5 K 1/4W 1% RN55D-F 100PPM	1	R143
26	26		1305419-00	31.6 K 1/4W 1% RN55D-F 100PPM	1	R152
27	27		1309143-04	100 3/4W10% POT 100PPM	1	R147
28	28		1214061-00	CONN 50POS RT ANGLE	2	J1,J2
29	29		1214060-00	HEADER,150 40POS	1	J3
30	30		1503100-00	DEC3009B NPN 200MW SI 20 25	1	Q2
31	31		1503409-01	DEC6534B PNP 310MW SI 40 90 P	1	Q1
32	32		1811660-14	OSCILLATOR, CRYSTAL 20.277 MHZ	1	E169
33	33		1909615-00	DEC 8271 SHIFT REG,,4BIT PARA	1	E120
34	34		1909701-00	74154 1 OF 16,BINA	1	E125
35	35		1909705-00	DEC 8881 NAND GATE-QUAD 2IN O	3	E1,E12,E50
36	36		1909928-00	7416 INVERTER GATE-HEX 1I	3	E30,E54,E140
37	37		1910153-00	DEC 74150 MUX 1 OF 16	1	E133
38	38		1910268-00	DEC 75107B RECEIVER,LINE,DUAL,	2	E40,E47
39	39		1910532-00	74800 NAND GATE-QUAD 2IN8	1	E176
40	40		1910534-00	74804 INVERTER GATE-HEX 1I	3	E150,E165,E166
41	41		1910837-00	8093 BUFFER GATE-QUAD 2IN	2	E73,E155
42	42		1911469-00	DEC 8640 RECEIVER,BUS,QUAD,U	4	E85,E96,E149,E171
43	43		1911527-00	8097 BUFFER GATE-HEX 2INP	10	E60,E80,E81,E86,E91,E98,E101,
					CONT	E117,E127,E174
44	44	SEE NOTE 97	1911330-01	74173N FF-D QUAD,TRI-STATE	5	E71,E97,E103,E107,E108
45	45		1912099-00	8833 TRANSCEIVER,BUS,QUA	9	E42,E43,E64,E92,E130,E134,E135,
					CONT	E136,E146
46	46		1912108-00	339 VOLT CMPRTR,QUAD	1	E148
47	47		1912395-00	DM 8136 COMPARATOR-6BIT UNIF	1	E111
48	48		1912643-00	8613 FF-D QUAD	7	E20,E23,E94,E102,E104,E162,E172
49	49		1912646-00	LS253 MUX 1 OF 4 (DUAL)	3	E53,E76,E77
50	50		1912647-00	LS257 MUX 1 OF 2 (QUAD)	4	E52,E93,E141,E153
51	51		1912648-00	LS251 MUX 8 INPUT,TRI-STA	1	E68
52	52		1912697-00	LS174 FF-D HEX W/CLEAR	3	E128,E137,E175
53	53		1912799-00	LS00 NAND-GATE-QUAD 2IN,P	10	E15,E16,E58,E105,E115,E138,E151,
					CONT	E156,E177,E110
54	54		1912800-00	LS01 NAND-GATE-QUAD 2IN,P	2	E8,E35
55	55		1912801-00	LS02 NOR-GATE-QUAD 2IN	7	E9,E11,E32,E37,E62,E79,E144
56	56		1912803-00	LS04 INVERTER GATE-HEX 1I	12	E13,E21,E36,E51,E56,E69,E95,
					CONT	E100,E119,E132,E142,E163
57	57		1912805-00	LS08 AND GATE-QUAD 2IN,PO	6	E22,E74,E118,E159,E161,E152
58	58		1912807-00	LS10 NAND GATE-TRIPLE 3IN	3	E24,E116,E168
59	59		1912808-00	LS11 AND GATE-TRIPLE 3IN	1	E154
60	60		1912810-00	LS20 NAND GATE-DUAL 4IN	2	E44,E75
61	61		1912813-00	LS27 NOR GATE-TRIPLE 3IN	2	E4,E31

D	I	G	I	T	A	L	TITLE	SECTION	SIZE	CODE	DOCUMENT NUMBER	REV
							CMOS-8	A OF A	K	PL	5412660-0-DBP	N

LINE	ITEM	DOCUMENT NUMBER	PART NUMBER	DESCRIPTION	QTY PER VARIATION 00	REFERENCE DESIGNATOR
62	62		1912816-00	LS32 OR GATE-QUAD 2IN,POS	4	E5,E121,E139,E167
63	63		1912824-00	LS74 FF-D DUAL,EDGE TRIGG	14	E2,E3,E14,E26,E27,E61,E70,E83,
					CONT	E84,E89,E106,E145,E157,E66
64	64		1912829-00	LS86 X-OR GATE-QUAD 2IN	4	E72,E87,E90,E99
65	65		1912834-00	LS112 FF-JK DUAL,EDGE TRIG	1	E7
66	66		1912842-00	LS138 DECODER-THREE INPUT,	1	E34
67	67		1912843-00	LS139 DECODER, 2 OF 4(DUAL	2	E46,E173
68	68		1912847-00	LS157 MUX 1 OF 2(QUAD)	1	E114
69	69		1912848-00	LS158 MUX 1 OF 2 (QUAD)	2	E10,E19
70	70		1912849-00	LS161 COUNTER,SYNCHR,4BIT	1	E6
71	71		1912853-00	LS175 FF-D QUAD	1	E82
72	72		2112623-00	DUAL BAUD RATE GEN/PROG DIVIDER,	2	E160,E170
73	73		2113936-00	HM 6561 1K CMOS RAM 350NS 18	3	E41,E48,E55
74	74		2113937-00	UART 200K BAUD = TO 19-10459-01	3	E122,E123,E126
75	75		2113938-01	CPU CMOS-12BIT 3.4MH	1	E124
76	76		23005G1-00	G1-01	1	E63
77	77		1912367-00	8096N BUFFER GATE-HEX 1IN	8	E29,E49,E57,E59,E65,E131,E147,
					CONT	E158
78	78		1914115-00	DM 8546N SHIFT REG,,8BIT UNIV	2	E25,E33
79	79		1913949-00	LS93 COUNTER,DECADE,4BIT	3	E17,E38,E78
80	80		23200A1-00	A1-07 X	1	E129
81	81		23419A2-00	A2-05	1	E112
82	82		23199A1-00	A1-07 X	1	E113
83	83		23420A2-00	A2-05	1	E143
84	84		23201A1-00	A1-07	1	E164
85	85		23213A1-00	A1-07 X	1	E109
86	86		23197A1-00	A1-07	1	E88
87	87		23418A2-00	A2-05	1	E45
88	88		9009185-00	JUMPER, WIRE, INSULATED, BLACK B	20	W2-W21
89	89		1300295-00	330 1/4W 5% CC	6	R6,R46,R56,R88,R94,R144
90	90		1300309-00	390 1/4W 5% CC	19	R2,R4,R8,R9,R11,R13,R14,R15,R19,
					CONT	R25,R26,R29,R30,R31,R55,R58,R59,
					CONT	R61,R63
91	91		9105740-55	WIRE(WRAP)30AWG UL1423	A/R	
92	92		1211666-00	SOCKET 18PIN IC LOW PROFILE	1	E63
93	93		1212385-00	SOCKET 40PIN IC LOW PROFILE,	1	E124
94	94		1300479-00	10 K 1/4W 5% CC	1	R123
95	95		1303114-00	1.0 K 1/4W 1% RN55D-F 100PPM	1	R90
96	96		1305420-00	33.2 K 1/4W 1% RN55D-F 100PPM	1	R142

0 NOTE: SEE "COMP, SUB, CHART" ON D-CS-5412660-0-1 (SHT, 14) FOR ALLOWABLE SUB, FOR THIS PART
1 NOTE: PART NO, 9009185-00 MUST BE HAND INSERTED AFTER TEST

D	I	G	I	T	A	L	TITLE	SIZE	CODE	DOCUMENT NUMBER	REV
							CMOS-8	K	PL	5412660-0-DBP	N
							SECTION A OF A				

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8 7 6 5 4 3 2 1

D C B A

DI LXMARX — 8096 E138 — DI LXMAR L
DI XTBX — 8096 E138 — DI XTB L
DI XTAX — 8096 E138 — DI XTA L
DI XTCK — 8096 E138 — DI XTC L
DI DEVSELX — 8096 E138 — DI DEV SEL H
DI CPSELX — 8096 E138 — DI CP SEL H
MAINT L — 74LS04 E135 — 8096 E138 — DI BMAINT
74LS04 E140 — DI DC LO L
DI BXTC — 74LS04 E132 — 74LS00 E138 — DI I/O READ L
74LS08 E159 — DI I/O CLOCK H
D2 SET RUN/HLT
D2 CPCLK
D2 CPREQ
+5V R131 1.5K
+5V R114 15K R92 15K R109 15K
+5V R116 15K R121 15K R125 15K
Q1 6534
+5V R122 4.7K R126 4.7K
R136 10.0K C49 .47 µF R151 100K
Q2 3009
R152 31.6K
+12V D1 D664 R154 470 R153 681 D2 1N823 R147 100 R150 464 D3 D664
-12V R143 75K R142 33.2K
+5V R141 9.09K R140 10.0K
+5V R123 10K R124 1.5K TEST POINT
J2 22 APT RST N R101 4.7K
339 E128

6100 E124
VCC
DMAREQ
CP REQ
RUN/HLT
RESET
INTREQ
WAIT
OSC OUT
OSC IN
C0
C1
C2
SKP
GND

DX0 DX1 DX2 DX3 DX4 DX5 DX6 DX7 DX8 DX9 DX10 DX11

RUN
DMAGNT
XTA
LXMAR
XTB
XTC
LXMR
DEVSEL
SW SEL
IFETCH
MEM SEL
CP SEL
INTGNT
DATA F

SKIP L
C1 L
C0 L
IRQ L

+5V R52 1.5K R111 1.5K R112 1.5K R109 1.5K

+5V R115 4.7K R117 4.7K R139 4.7K R136 4.7K R137 4.7K R135 4.7K R130 4.7K R129 4.7K
R119 4.7K R118 4.7K R113 4.7K R120 4.7K

8833 E130 R1 R2 R3 R4 — DI XTA L, DI XTB L
8833 E136 R1 R2 R3 R4
8833 E130 R1 R2 R3 R4

DI XTBX — 74LS04 E132 — DI BRUN L
DI XTCK — 74LS04 E132
DI BMAINT — 8096 E131
+5V R44 330 — +3VA R145 750

J3
DX0 DX1 DX2 DX3 DX4 DX5 DX6 DX7 DX8 DX9 DX10 DX11

8096 E131 — DI MEM SEL H
8096 E131 — DI SW SEL H
8096 E131 — DI IFETCH H
8096 E131 — DI INTGNT L
8096 E131 — DI DATA F L
8096 E131 — DI RUN H

DI CP SEL H — 74LS32 E147 — DI BXTC — 74LS04 E139 — DI MEM READ N
74LS04 E132 — 74LS04 E132 — 74LS04 E133 — 74LS04 E132 — 74LS04 E132 — J2 1 MN L

(CPU 1)

REVISIONS		
CHK	CHANGE NO.	REV
P CARDNER	A 5412660 0000 5 H	
J KIRK	A 5412660 0000 6 H	
P CARDNER	A 5412660 0000 7 K	
J KIRK	A 5412660 0000 8 L	
J KIRK	A 5412660 0000 9 M	

DRN R.T.B. 12 AUG 77
CHK'D
ENG.
PROJ. ENG.
PROD.
NEXT HIGHER ASSY. E-UA-5412660-0-0
SCALE
SHEET 1 OF 14

FIRST USED ON VT78
digital
TITLE CMOS-9 (DI)
SIZE D CODE CS NUMBER 5412660-0-1 REV F
DIST.

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DI DC LØ L

+3VA

DI BRUN L

CLR BTSTP L

SET BTSTP L

DI LXMAR L

D2 CPREQ

DX0

DX1

DX2

DX3

D2 SET RUN/HLT

PWR UP FF

CØ L

C1 L

ERROR FF

ERR L

J2

DC LØ H

D2 RSF H

D2 RRB H

DI I/O READ L

D2 A

D2 B

D2 C

D2 D

W7

DI I/O CLOCK H

74LS174 E137

MAR Ø

MAR 1

MAR 2

MAR 3

MAR 4

MAR 5

DX 4

DX 5

+3V

DI LXMAR L

74LS174 E128

MAR 6

MAR 7

MAR 8

MAR 9

MAR 10

MAR 11

DX 6

DX 7

DX 8

DX 9

DX 10

DX 11

CLR CLK

23d19A2 E112

D2 A

D2 B

D2 C

D2 D

W8

DI I/Ø READ L

23J19A1 E113

D2 MAR<6:8>IN

D2 LOAD IB L

D2 LOAD DF L

D2 SF OUT L

D2 RDF+RIF L

D2 SF-AC L

D2 RTF L

D2 CAF L

W9

74LS174 E175

D2 CPCLK

D2 SLU CLK

OSCILLATOR 20.277 MHZ

+5V

R108 1.5K

CLOCK DISABLE L

A B C D	FUNCTION
L L L L	NULL
L L L H	CAF
L L H L	GTF + RIB
L L H H	RTF
L H L L	CDF
L H L H	CIF
L H H L	CDIF
L H H H	RDF + RIF
H L L L	RMF
H L L H	READ PANEL STATUS
H L H L	START/STOP CPU
H L H H	REQUEST PANEL MODE
H H L L	SET ERROR FF
H H L H	-NOT USED-
H H H L	RFC
H H H H	RRB. RFC

REVISIONS

CHK	CHANGE NO	REV

(CPU 2)

TITLE: CMOS 8 (D2)

SIZE D | CODE DCS | NUMBER 5412660-0-1 | REV. P

SCALE — | SHEET 2 OF 14 | DIST.

DEC FORM NO DRD 138

91

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DI LXMAR L
DI DC LO L
INT INH. FF
DI INTGNT L
D3 INTGNT H
DI I/Ø CLK H
R11Ø 1.5K
+5V
INTREQ L
D3 IRQ L
DI DATAF L
DI IFETCH N
D3 IFERN L
SHF
D3 DIRECT JMP + JMS
D3 JMP + JMS
D2 LOAD IB L
IB
IF
DF
DI DC LO L
+3V A
DI MEM READ N
D2 CAF L
PRESET
MAR 6
MAR 7
MAR 8
D2 LOAD DF L
D3 INTGNT H
DI DC LO L
D2 MAR<6:8>IN
DI INTGNT L
D2 SF OUT L
SF
D3 EMAR Ø
D3 EMAR 1
D3 EMAR 2
D3 INTGNT N
D3 DIRECT JMP + JMS
D3 JMP + JMS
D2 SF → AC L
D2 RDF + RIF L
MAR 4
C Ø L
C1 L
DX Ø
DX 1
DX 2
DX 3
DX 4
DX 5
DX 6
DX 9
DX 11
DX 1Ø
DX 8
DX 7
D2 RTF L
D2 SF → AC L

(MEM XTN CTRL)

REVISIONS		
CHK	CHANGE NO	REV

TITLE	SIZE	CODE	NUMBER	REV.
CMOS-8 (D3)	D	DCS	5412660-0-1	P
SCALE	SHEET 3 OF 14	DIST.		

DEC FORM NO. DRD 138 92

DCS5412660-0-1 REV P

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DI XTC L

DI MEM SEL H
DI EMAR 2
DI EMAR 1
DI EMAR Ø

DI CPSEL H

DI XTB L

DI LXMAR L

+5V

W6

R49 4.7K
R51 4.7K
R43 4.7K
R44 4.7K

R39 4.7K
R38 4.7K
R33 4.7K
R34 4.7K

R42 4.7K
R41 4.7K
R40 4.7K
R36 4.7K

R32 1K
R37 1K

R35 15K

8833 E64 — DX Ø, DX 1, DX 2, DX 3
8833 E62 — DX 4, DX 5, DX 6, DX 7
8833 E63 — DX 8, DX 9, DX 10, DX 11

6312 E63 — RSEL, CE, OEH, OEL, R Ø–R11 — CP ROM

DB ACCESS L

6561 E55, E48, E61, E51 — CP RAM

(CP MEMORY)

REVISIONS		
CHK	CHANGE NO	REV

TITLE	SIZE	CODE	NUMBER	REV.
CMOS-8 (D4)	D	CS	5412660-0-1	P
SCALE —	SHEET 4 OF 14	DIST.		

DEC FORM NO. DRD 138

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DX0
DX1
DX2
DX3
DX4
DX5
DX6
DX7
DX8
DX9
DX10
DX11

+3V8
+5V
R05 15K
R1GD 4.7K
W21
R50 15K
R48 15K
D2 RRB H
C1 L
D1 SWSEL H
D2 RSF H
D5 SKIP L
D3 RESET H
D2 RRB H
D9 I/O READ H
J1
J2
CHARACTER READY L
P2 L
P1 L
P0 L
PI BD L
SR11 L
SR10 L
SR9 L
SR8 L
HOLE 1 L
HOLE 2 L
HOLE 3 L
HOLE 4 L
HOLE 5 L
HOLE 6 L
HOLE 7 L
HOLE 8 L
RD EN H
RESET L
GET CHAR L
APT EN L
+5V
R46 330
R47 750
+3V8

(MR78 INTERFACE)

REVISIONS		
CHK	CHANGE NO	REV

TITLE	SIZE	NUMBER	REV.
CMOS-8 (D5)	D	CS 5412660-0-1	P
SCALE	SHEET 5 OF 14	DIST.	

DEC FORM NO. DRD 138
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8 7 6 5 4 3

D C B A

J2 LOOP BACK L

DX 11 — 74LS04 E163

B613 E172 — DO RO(0), D1 R1(1), D2 R2(0), D3 R3(1) — 74LS04 E162

74LS139 E173 — A1 A2 A3 — FA0 FA1 FA2 FA3 — FB0 FB1 FB2 FB3 — E1(3) E2(3) E1(2) E2(2)

LD0 LD1 LD2 LD3 CLK CLR

B640 E149 — B640 E171 — B640 E171

DG T FLAG 1 — DT R FLAG 1 — DG T FLAG 2 — DT R FLAG 2 — DG T FLAG 3 — DT R FLAG 3

74LS10 E140 — 74LS10 E140 — 74LS10 E140

DG INT REQ L

DI I/O READ L — B640 E149 — 74LS10 E140 — DG SKIP L

74150 E133 — D0 D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14 D15 — STB — S3 S2 S1 S0

DT R FLG 1 — DT R FLG 2 — DT R FLG 3

B613 E162 — DX10 — DG EN RD ERR

DT T FLG 1 — DT T FLG 2 — DT T FLG 3

74LS08 E161 — DG T FLAG 1 — DG T FLAG 2 — DG T FLAG 3

D3 RESET H

+5V — R73 R74 R68 R75 R84 R77 R76 R71 R67 15K

+3VC — DX6 — E106 74LS74 — J1

D11 B RESET L

74LS04 E123 — F0 F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 F13 F14 F15

DG SET BR 1
DG R CLR 1
DG READ 1
DG LOAD XMT 1
DG SET BR2
DG R CLR 2
DG READ 2
DG LOAD XMT 2
DG SET BR3
DG R CLR 3
DG READ 3
DG LOAD XMT 3

DG L DC NTR L

8097 E174 — +3VC — (15)

256K4 TRISTATE ROM 2332DA2 E163 — MAR 3 MAR 4 MAR 5 MAR 6 MAR 7 MAR 8

* THIS JUMPER INSERTED FOR NORMAL OPERATION. — W15

32K8 TRISTATE ROM 2332DA1 E164 — DI XTC L — MAR 9 MAR 10 MAR 11

74LS11 E154

74LS257 E133 — A0 B0 A1 B1 A2 B2 A3 B3 — OUT CONT — S0

DI DEVSEL H — 74LS04 E163

DG L DC NTR L — LINE 1 IN — LINE 2 IN — LINE 3 IN

+5V — R81 R72 R70 15K — 8097 E127 — DG SI 1 — DG SI 2 — DG SI 3

J2 — DT SO1 — DT SO2 — DT SO3 — LINE 1 OUT — LINE 2 OUT — LINE 3 OUT

(SLU CONTROL 1)

REVISIONS		
CHK	CHANGE NO	REV

TITLE	SIZE	CODE	NUMBER	REV.
CMOS-8 (D6)	D	DCS	5412660-0-1	P
SCALE —	SHEET 6 OF 14	DIST.		

DEC FORM

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DG SET BR 2
DG SET BR 1
DG SET BR 3
D2 SLU CLOCK
D3 RESET N
DG READ 1
DG SI 1
DG LD XMT 1
DG R CLR 1
DG LD CNTRL
DG R CLR 2
DG READ 2
DG SI 2
DG LD XMT 2
DG R CLR 3
DG READ 3
DG SI 3
DG LD XMT 3
D1 DC LO L
D7 TICK
W12
W13
W14
W2Ø
J2
D7 R FLG 1
D7 S0 1
D7 T FLG 1
DG READ 2
D7 R FLG 2
D7 S0 2
D7 T FLG 2
D7 R FLG 3
F.E.3
D7 S03
D7 T FLG 3
DG EN RD ERR
DG READ 1
DG READ 3
D1 I/Ø CLK H
D1 XTBL
C1 L
DX Ø
DX 1
DX 2
DX 3
DX 4
DX 5
DX 6
DX 7
DX 8
DX 9
DX 1Ø
DX 11
+5V
+3VC
R86 15K
R87 15K
R88 33Ø
R89 75Ø
R83 15K
R85 15K
R134
R133
R128
R127
R78
R79
R129
R130
UART CA02 E123
UART CA02 E122
UART CA02 E126
DEV/CODE Ø3/Ø4
DEV CODE 32/33
DEV CODE 3Ø/31
QUAD TRANSCEIVER
8833 E135
8833 E134
(SLU CONTROL 2)

REVISIONS

CHK	CHANGE NO	REV

TITLE	SIZE	CODE	NUMBER	REV.
CMOS-8 (D7)	D	CS	5412660-0-1	F
SCALE —	SHEET 1 OF 10	DIST.		

DEC FORM NO DRD 138
96

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NOTES:
* IN FOR 4K CHIP
** IN FOR 16K CHIP
W18, W19 INSERTED FOR NORMAL OPERATION.

D3 ENAR Ø
D1 MEM SEL H
8 MEM SEL
D8 REF
+5V
+3VD
R9Ø 1.47K, 1%
C32 22Ø pf
D1 RUN H
D1 IFETCH H
W1 **
W2 *
W18
D3 EMAR 1
D3 EMAR 2
W3 *
W4 *
R97 4.7K
R99 4.7K
D8 ACCESS L
R98 1.47K 1%
R95 1.47K 1%
C33 22Ø pf
R1ØØ 1.47K 1%
C34 Ø.Ø47 µf
D1 XTC L
D1 LXMAR L
R94 33Ø
R91 75Ø
D4 1N751A
-5V
R115 27Ø
-12V
D1 XTB L
D8 XTB H
R94 1.27K 1%
C34Ø 22Ø pf
D8 REF
ROW SEL Ø
ROW SEL 1
ROW SEL 2
ROW SEL 3
W19
R1Ø8 27
R1Ø3 27
R1Ø7 27
R1Ø2 27
R1Ø6 27
R1Ø4 27
WP Ø
WP 1
WP 2
WP 3
COL SEL A
COL SEL B
W5 *
R105 4.7K
+5V
MAR 6 DX Ø
MAR 7 DX 1
MAR 8 DX 2
MAR 9 DX 3
MAR 10 DX 4
MAR 11 DX 5
ADDR Ø
ADDR 1
ADDR 2
ADDR 3
ADDR 4
ADDR 5
ADDR 6

REVISIONS		
CHK	CHANGE NO	REV

TITLE	C1105-8 (D8)	SIZE	CODE	NUMBER	REV.
SCALE	SHEET 8 OF 14	D	DCS	5412660-0-1	P
		DIST			

DEC FORM NO DRD 138

(M1)

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D6 RUN L
D6 RUN 1 L
D9 CLA ENH
D9 MODE (Ø)
D9 MODE
D9 LCD TOT
D9 KDR TOT
D9 DONE H
D9 READ
D9 UNIT H
D9 UNIT L
D9 INT ENA
D9 MAINT H
D9 LD RQST H
D9 I/O CLK L
D3 RESET
D9 SKIP L
D9 I/O READ H
INTREQ L
RX DATA L
RX DATA 1 L
RX 12 BIT L
RX 12 BIT 1 L
RX INIT L
RX INIT 1 L
D1 XTC L
D1 I/O CLK
D1 I/O READ L
+3VE
+5V
+3VF
MAR 9
MAR 10
MAR 11
MAR 3
MAR 4
MAR 5
MAR 6
MAR 7
MAR 8
DX 11
DX 4
DX 5
DX 3
DX 2
DX 1
DX Ø
D1Ø DATA IN
D1Ø CLK
D1Ø LOAD EN L
D1Ø ENA
D1Ø ENB
D1Ø EN PARITY
D1Ø CLK A
D1Ø EN READ L
D9 XDR TOT
D1 I/O READ L
DEVCOD: 75

REVISIONS		
CHK	CHANGE NO	REV

TITLE		SIZE	CODE	NUMBER	REV.
CMOS-F (D9)		D	DCS	5412660-0-1	P
SCALE	SHEET 9 OF 14	DIST.			

DEC FORM NO DRD 138
98

(F1)

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DIØ WRT
D9 I/O READ H
DI XTC L
+3VE
DIØ LOAD EN L
DIØ EN READ L
DIØ DATA IN
D9 UNIT H
DIØ K
DIØ L
DIØ M
DIØ N
D9 MAINT
D9 DONE H
DI XTA L
C1 L
D9 CLAEN H
D9 MODE (Ø)
D9 I/O READ H
CØ L
D9 LCD IOT
D9 XDR IOT
D9 LCD IOT
DIØ CLK
D9 I/O CLK L
DIØ CLKA
DI XTC L
D9 READ
DIØ ENA
D9 LCD IOT
D9 MODE (Ø)
DIØ ENB
DX5
R17 1K
+5V
+3VE
DIØ EN PARITY
D9 LD RQST H
DIØ WRT

J1

DONE L	39	+5V	R23 180 R30 390 — DIØ A
XFR RQST L	37		R21 180 R26 390 — DIØ C
OUT L	38		R24 180 R31 390 — DIØ E
ERROR L	40		R22 180 R29 390 — DIØ H
RX DATA L	48		R10 180 R9 390 — DIØ K
SHIFT L	41		R20 180 R25 390 — DIØ M

J1

DONE 1 L	45	+5V	R12 180 R11 390 — DIØ B
XFR RQST 1 L	46		R16 180 R15 390 — DIØ D
OUT 1 L	50		R1 180 R2 390 — DIØ F
ERROR 1 L	42		R18 180 R19 390 — DIØ J
RX DATA 1 L	47		R3 180 R4 390 — DIØ L
SHIFT 1 L	49		R7 180 R8 390 — DIØ N

REVISIONS		
CHK	CHANGE NO	

(.52)

TITLE	SIZE	CODE	NUMBER	REV.
CMOS-8 (DIØ)	D	DCS	5412660-0-1	F
SCALE — SHEET 10 OF 14	DIST.			

DLC FORM NO DRD 138

99

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REVISIONS		
CHK	CHANGE NO	REV

TITLE	SIZE	CODE	NUMBER	REV.
CMOS-8	D	CS	5412660-0-1	P
SCALE — SHEET 11 OF 14	DIST.			

(IPI)

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(32x8 TRISTATE ROM)

23213A1 E109

MAR 11
MAR 10
MAR 9

1 — DI2 EN DATA → AC
2 — DI2 EN STATUS REG → AC
3 — DI2 SKIP ON FLAG
4
5 — DI2 C0 SEL
6 — DI2 C1 SEL
7
9
15 — W10 *

23197A1 E88 (32x8 TRISTATE ROM)

1 — DI2 EN AC → DATA REGISTER
2 — DI2 EN AC → STAT REG
3
4
5
6
7
9
13 — W11 *

DI XTC L

8136 E111

MAR 3
+3VF
MAR 4
MAR 5
MAR 6
MAR 7
MAR 8

D1 D2 D3 D4 D5 D6 — OUT 9 — STB 7

+5V — R65 4.7K

74LS04 E112 — DI2 LQP/LA

DI LA/LQP

74LS00 E110 — DI I/O CLK H

74LS04 E109 — DI I/O READ L

74LS00 E110

74LS74 E106

+3VF

D3 IFETCH L

D8 XTB H

74LS08 E74 — DI2 SET FLAG

74LS00 E110 — DI2 CLR FLAG

74LS04 E69 — DI2 IOT OUTPUT N

T4173-01 CMOS E88

DATA ENA 9, 10
DATA ENB 11, 12, 13, 14
OUT CONT 1, 2
CLK 7
CLR 15

DO — RO(L) 6
D1 — E1(L) 5
D2 — R2(L) 4
D3 — R3(L) 3

DI2 IOT OUTPUT L

J1

+12V — 1
-12V — 11

J2

+5V — 47

J3

-12V — 33
+12V — 35
+5V — 36

J2

25 — PAPER STROBE
24 — CARRIAGE STROBE
23 — CHARACTER STROBE
26 — RESTORE

* JUMPERS INSERTED FOR NORMAL OPERATION.

REVISIONS		
CHK	CHANGE NO	REV

(IP2)

TITLE	SIZE	CODE	NUMBER	REV.
CMOS-8 (D12)	D	CS	5412660-0-1	P
SCALE —	SHEET 12 OF 14	DIST.		

DEC FORM NO. DRD 138

101

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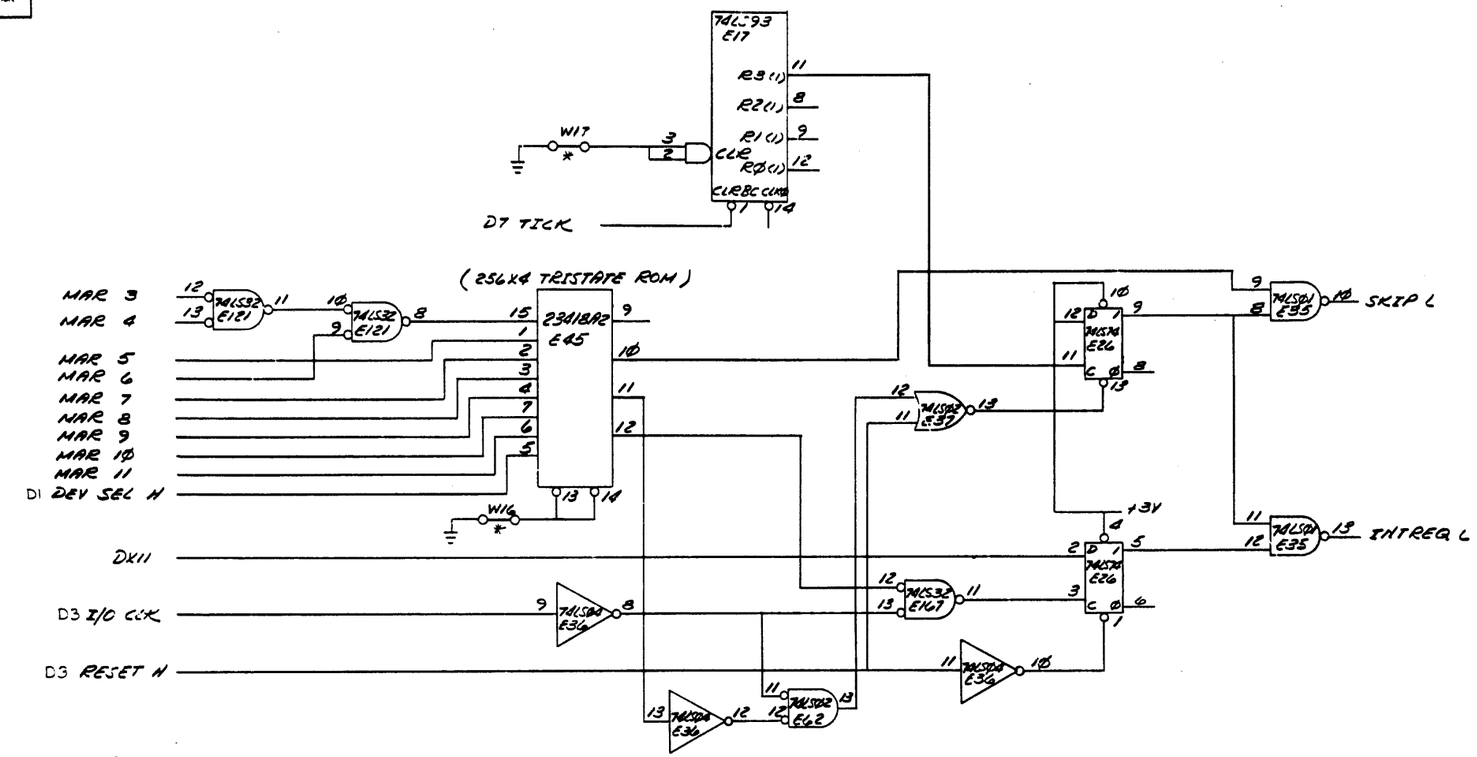
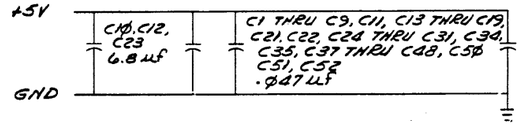


* JUMPERS INSERTED FOR NORMAL OPERATION.



(CLOCK)

REVISIONS		
CHK	CHANGE NO	REV

TITLE	SIZE	CODE	NUMBER	REV.
CMOS – 8 (D13)	D	CS	5412660-0-1	P
SCALE	SHEET 13 OF 14	DIST.		

DEC FORM NO. DRD 138
102

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D.C. LOW, CIRCUIT ADJ. PROCEDURE

STEP 1. WITH A D.V.M. MEASURE THE +5V AT E148 PIN 3 WITH GROUND ON PIN 12.
STEP 2. SUBTRACT 4.74 FROM THE VALUE OBTAINED IN STEP 1.
STEP 3. DIVIDE THIS NUMBER BY 2.
STEP 4. WITH THE D.V.M MEASURE THE VOLTAGE BETWEEN E148 PIN 8(+) AND PIN 9(−). ADJUST R147 UNTIL THIS VOLTAGE IS EQUAL TO THE VOLTAGE OBTAINED IN STEP 3.

CONTROL PANEL ROM/RX78 COMPATIBILITY

E63	USE WITH
23ØØ3GI-ØØ	RX 78-PA,PC,PD (RXØ1 ONLY) RX 78-UA,UC,UD
23ØØ3GI-ØØ	RX 78-PA,PC,PD (RXØ1 ONLY) RX 78-UA,UC,UD
23ØØ5GI-ØØ	RX 78-PA,PC,PD (RXØ1, RXØ2) RX 78-RA,RC,RD RX 78-SA,SC,SD RX 78-UA,UC,UD

5	1911330-01	DEC. IC 74173-01	5	1911711	DEC IC 8T10
QTY.	PART NO.	DESCRIPTION	QTY.	PART NO.	DESCRIPTION
PART CALLED FOR			SUBSTITUTE PART		

COMPONENT SUBSTITUTION CHART

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE	CODE	NUMBER	REV.
CMOS - 8	D	CS	5412660 - Ø - 1	D
SCALE	SHEET 14 OF 14	DIST.		

DEC FORM NO. 5000 1/80

ML

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COMPONENT SIDE VIEW

1044 IN REF
265.1MM

841 IN REF
213.6MM

TH1 TH2

E52 E48 E44 E40 E36 E32 E28 E24 E20 E16 E12 E8 E4
E51 E47 E43 E39 E35 E31 E27 E23 E19 E15 E11 E7 E3
E50 E46 E42 E38 E34 E30 E26 E22 E18 E14 E10 E6 E2
E49 E45 E41 E37 E33 E29 E21 E17 E13 E9 E5 E1
E25

+C78+ +C74+ +C70+ +C66+ +C62+ +C58+ +C54+ +C50+ +C46+ +C42+ +C38+ +C34+
+C77+ +C73+ +C69+ +C65+ +C61+ +C57+ +C53+ +C49+ +C45+ +C41+ +C37+ +C33+
€102 €100 +C98+ +C96+ +C94+ +C92+ +C90+ +C88+ +C86+ +C84+ +C82+ +C80+
+C76+ +C72+ +C68+ +C64+ +C60+ +C56+ +C52+ +C48+ +C44+ +C40+ +C36+ +C32+
+C75+ +C71+ +C67+ +C63+ +C59+ +C55+ +C47+ +C43+ +C39+ +C35+ +C31+ +C30+
€101 €99 €97 €95 €93 €91 €87 €85 €83 €81 €79
€114 €113 €112 €111 €110 €109 €107 €108 €105 €104 €103
+C51+ +C89+ €108

C121 C120 C117 C115
C122 C119 C118 C116

J1

SEE NOTE 1

R2 W1 D1 R1 C29

V U T S R P N M L K J H F E D C B A

NOTES:
1. MOUNT J1 ON SIDE 2

CH	CHANGE NO	REV
EK	C0001	B
EK	5412691-M.2	C

B. METCALF 2-JAN-79
J. KIRK 6-NOV-78

ETCH REV. C-P1
P.C. DESIGN DATA BASE REV. CL1/CM1

SIGNATURES	DATE
DRN.	5-24-78
CHK'D. J.C. Pellegrini	3-10-78
ENG.	
PROJ.ENG.	
PROD.	

digital

TITLE
CMOS-8 MEMORY

SCALE 2/1 SIZE D CODE UA NUMBER 5412691-0-0 REV C
SHT. 1 OF 3
NEXT HIGHER ASSY. 6 DD F412691-0

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FIELD Ø

MB1/MB2 BIT 11 OUT L | MB1/MB2 BIT 10 OUT L | MB1/MB2 BIT Ø9 OUT L | MB1/MB2 BIT Ø8 OUT L | MB1/MB2 BIT Ø7 OUT L | MB1/MB2 BIT Ø6 OUT L

E8 | E12 | E16 | E20 | E24 | E28

J1
WP Ø — BE1 12
ROW SEL Ø — BK1 8

J1
ADDR Ø — BU1 1
ADDR 2 — BR1 3
ADDR 1 — BS1 5
ADDR 5 — BM1 6
ADDR 4 — BN1 5
ADDR 3 — BP1 2

FIELD 2

MB4 BIT 11 IN L | MB4 BIT 10 IN L | MB4 BIT Ø9 IN L | MB4 BIT Ø8 IN L | MB4 BIT Ø7 IN L | MB4 BIT Ø6 IN L

E7 | E11 | E15 | E19 | E23 | E27

J1
ROW SEL 1 — BJ1 3
ADDR 9 — BL1 7
COL SEL A — BA1 16
WP 1 — BD1 13

NOTES:
1. USE 2113735-01, 2113914-01, 2114475-01 OR 2114469-01 CHIPS WITH 5012690 ETCH, REV. C ONLY
2. 2112726 OR 2113787-01 MAY BE USED WITH 5012690, ETCH REV. B OR REV. C.

PIN 1 -5V
PIN 8 +12V
PIN 9 +5V
PIN 16 GND

REVISIONS			
CHK	CHANGE NO.	REV.	
	1 200201	B	
BMEACHAM			
	5412691-ML002	C	
J.KIRK	6 NOV 78		

DRN. R. Kopperud	4-6-77	FIRST USED ON VT78 digital
CHK	7-21-77	
ENG.	23-Jun-77	TITLE 16K X 12 MEMORY BOARD (MB1)
PROJ. ENG.	23-Jun-77	
PROD.	21-Jul-77	
NEXT HIGHER ASSY.		
D-UA-5412691-0-0		SIZE D CODE CS NUMBER 5412691-0-1 REV. C
SCALE		
SHEET 1 OF 4		DIST.

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MB1/MB2 BIT 11 OUT L
MB1/MB2 BIT 10 OUT L
MB1/MB2 BIT 09 OUT L
MB1/MB2 BIT 08 OUT L
MB1/MB2 BIT 07 OUT L
MB1/MB2 BIT 06 OUT L

FIELD 1

J1
WP2 BC1 14
ROW SEL 2 BH1 10

E6 E10 E14 E18 E22 E26

ADDR 0 (BU1)
ADDR 2 (BR1)
ADDR 1 (BS1)
ADDR 5 (BM1)
ADDR 4 (BN1)
ADDR 3 (BP1)

FIELD 3

MB4 BIT 11 IN L
MB4 BIT 10 IN L
MB4 BIT 09 IN L
MB4 BIT 08 IN L
MB4 BIT 07 IN L
MB4 BIT 06 IN L

E5 E9 E13 E17 E21 E25

J1
ROW SEL 3 BF1 11
ADDR 6 (BL1)
COL SEL B AS1 17
WP 3 BB1 15

REVISIONS		
CHK	CHANGE NO	REV

TITLE 16K X 12 MEMORY BOARD (MB2)
SIZE D CODE CS NUMBER 5412691-0-1 REV. C
SCALE — SHEET 2 OF 4 DIST.

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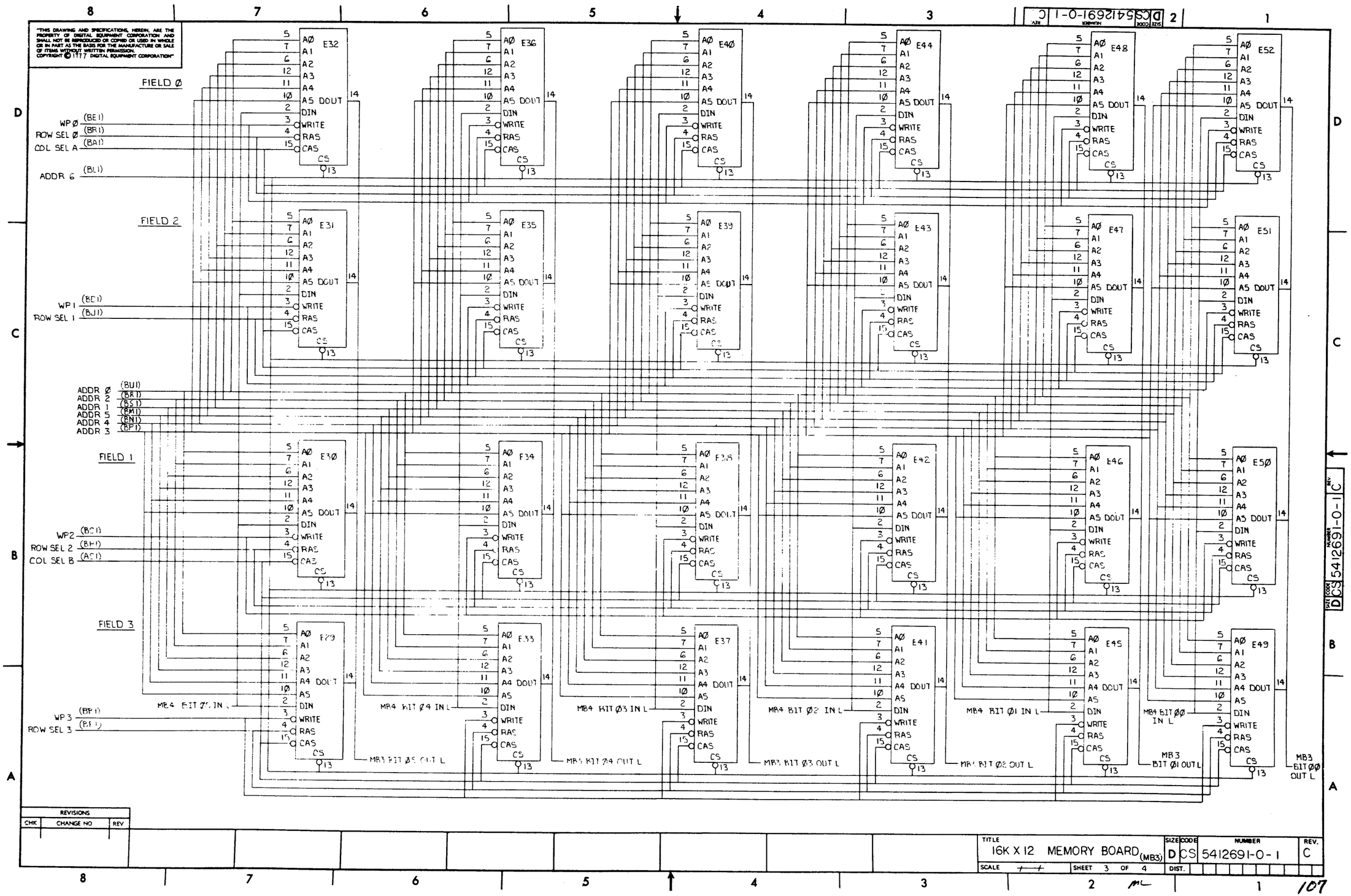

REVISIONS		
CHK	CHANGE NO	REV

TITLE: 16K X 12 MEMORY BOARD (MB3)		SIZE/CODE: D CS	NUMBER: 5412691-0-1
SCALE	SHEET 3 OF 4	DIST.	REV. C

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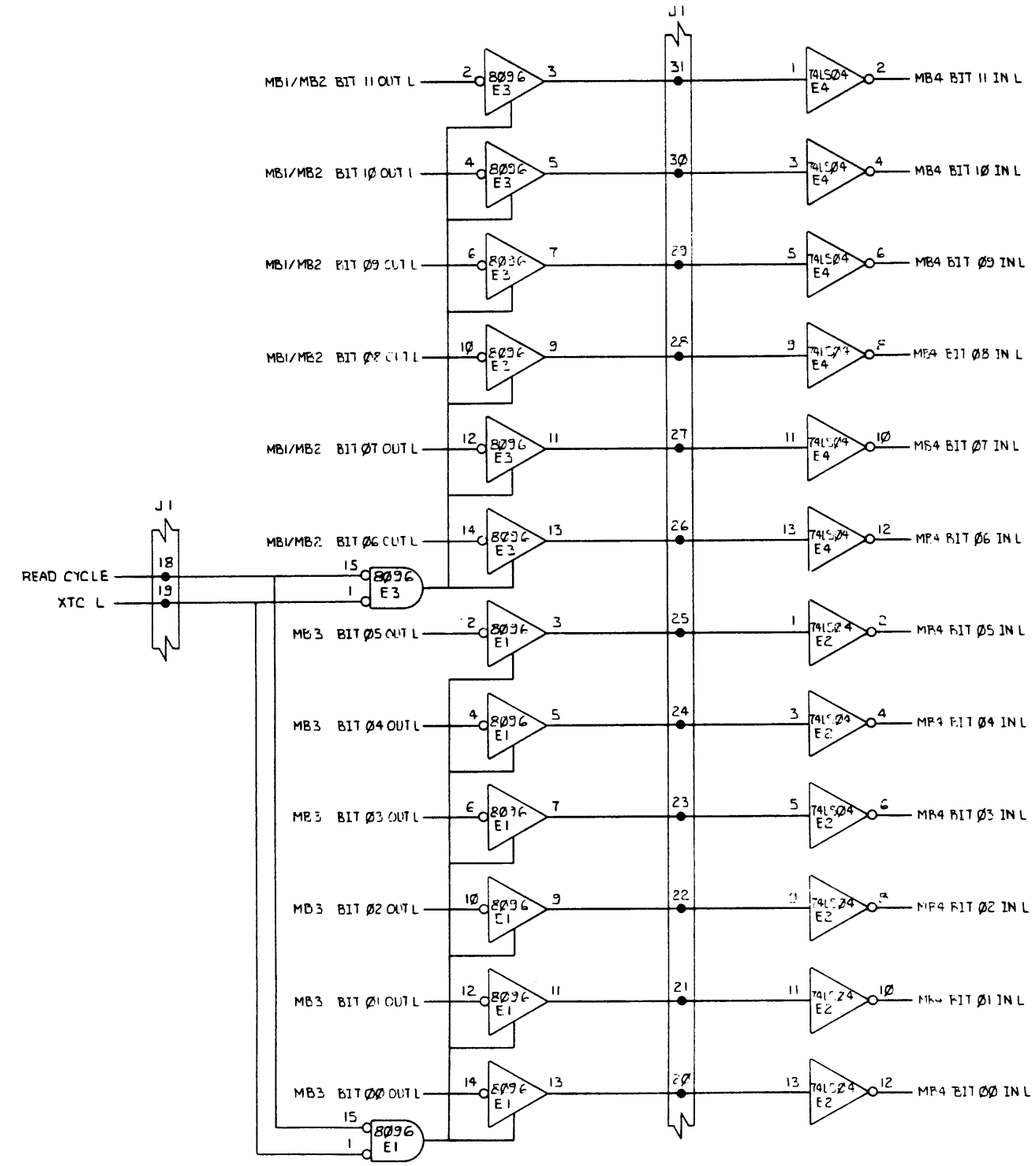

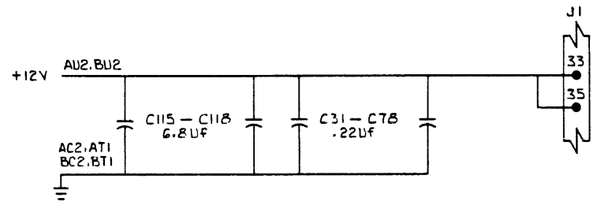

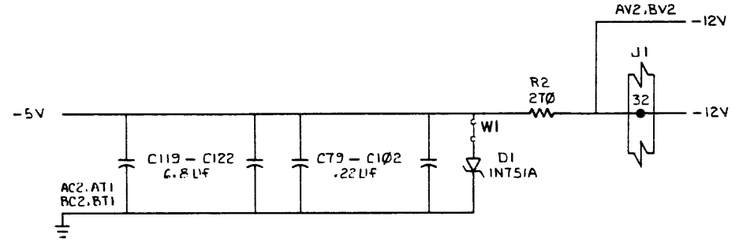

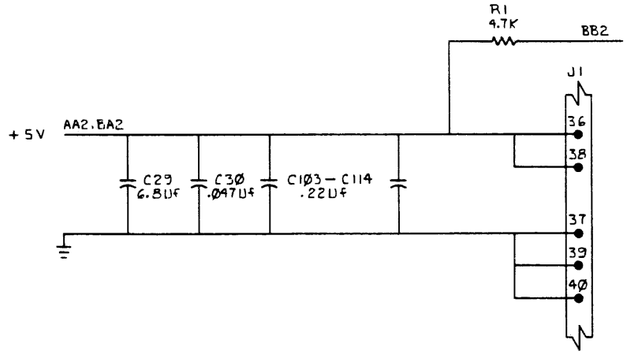

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE	CODE	NUMBER	REV.
16K X 12 MEMORY BOARD (MB4)	D	CS	5412691-0-1	C
SCALE —	SHEET 4 OF 4	DIST.		

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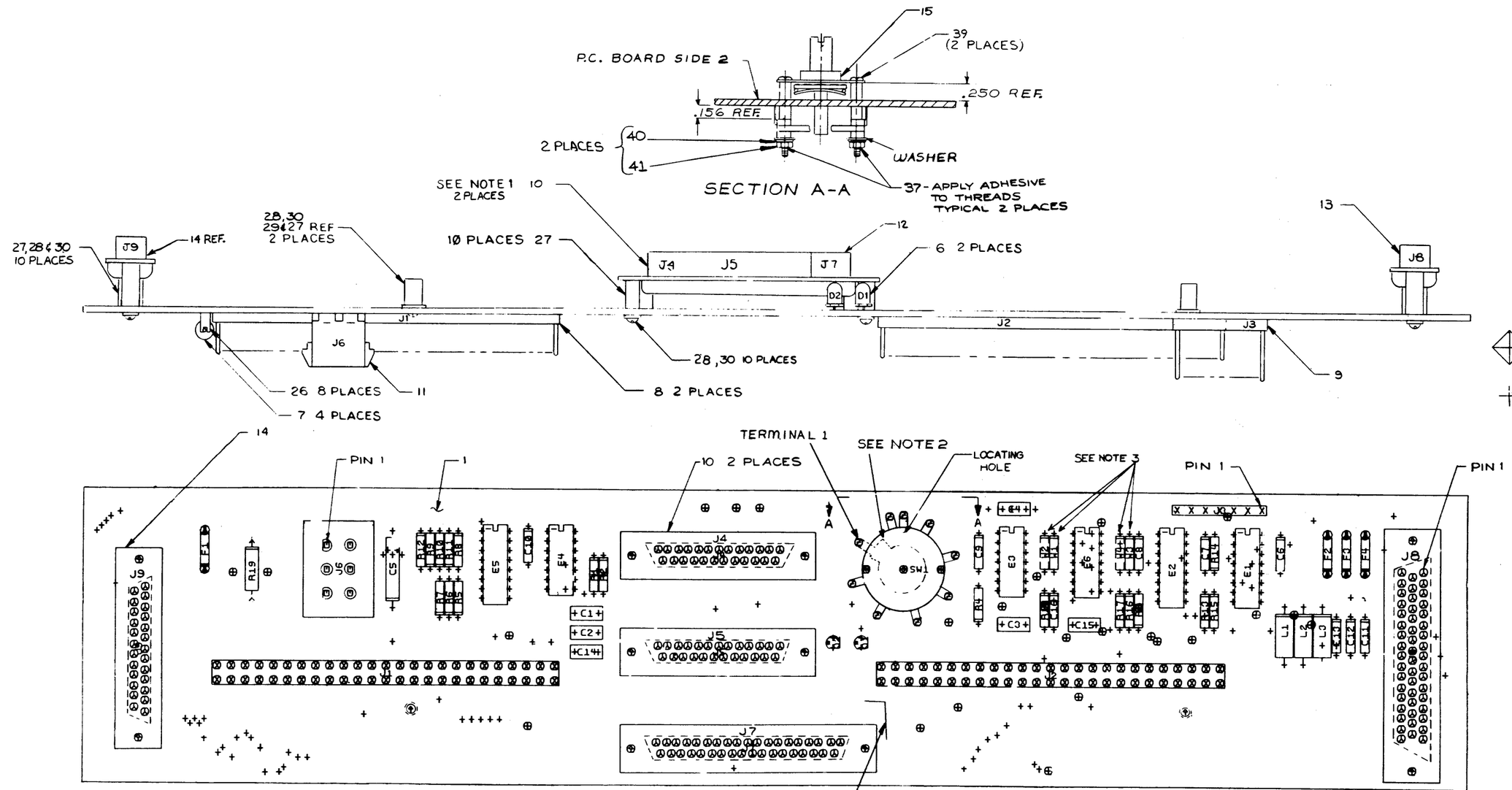
COMPONENT SIDE VIEW



NOTES:
1. TYPICAL MOUNTING J4, J5, J7, J8, J9
2. SWITCH WAFER MUST BE POSITIONED WITH WIPER ON TERMINAL 1.
3. W1, W3 INSERTED FOR TTL OPERATION
   W2, W4 INSERTED FOR EIA OPERATION

CHK	CHANGE NO	REV
	ML0004	D
CARTER		
D. ZOPF		
	3-5361-ML5	E
B. MEACHAM		

ETCH REV. C-P2
P.C. DESIGN DATA BASE REV. CL

SIGNATURES	DATE
DRN. J. CARTER	4-12-78
CHK'D.	6-1-78
ENG.	11-27-78
PROJ. ENG.	11-27-78
PROD.	11-27-78
SCALE 2/1	
SHT. 1 OF 4	
NEXT HIGHER ASSY. 3-DD-5412861-Ø	

digital

TITLE: I/O DIST. PANEL

SIZE	CODE	NUMBER	REV
D	UA	5412861-Ø-Ø	E

LINE	ITEM	DOCUMENT NUMBER	PART NUMBER	DESCRIPTION	QTY PER VARIATION 00	REFERENCE DESIGNATOR
1	1	D-MD-5012860-0-0	5012860-00	5412861	0	
2	2		1012784-00	.047 MFD 50V -20+80 CER	6	C6-C10,C16
3	3		1005306-00	6.8MFD 35V 10% S.TANT	1	C5
4	4		1001631-00	390.0 MMF 100V 5%200PPM DM15S	3	C1,C2,C14
5	5		1000024-00	470.0 MMF 100V 5%200PPM DM15S	3	C3,C4,C15
6	6		1110324-00	LED 1MCD@10MA PIV=3	2	D1,D2
7	7		1210929-02	FUSE, SUB-MINI 1.000A, 125V, A	4	F1-F4
8	8		1214063-01	HEADER.150 50POS STRAIGHT	2	J1,J2
9	9		1212519-05	HEADER.150 7POS STRAIGHT	1	J3
10	10		1211352-02	CONN,D SUB 25PIN SOCKET PC MNT	2	J4,J5
11	11		1212297-05	MATE-N-LOK 6PIN UNIV.	1	J6
12	12		1214062-00	CONN 37POS STRAIGHT	1	J7
13	13		1214062-01	CONN 50POS STRAIGHT	1	J8
14	14		1214062-02	CONN 25POS STRAIGHT	1	J9
15	15		1212560-02	SW,ROT 1P .5A 8POS	1	SW1
16	16		1300271-00	220 1/4W 5% CC	2	R1,R2
17	17		1305346-00	27 K 1/4W 5% CC	3	R3,R4,R18
18	18		1300447-00	4.7 K 1/4W 5% CC	9	R5-R13
19	19		1300295-00	330 1/4W 5% CC	1	R14
20	20		1301401-00	750 1/4W 5% CC	1	R15
21	21		1912847-00	LS157 MUX 1 OF 2(QUAD)	1	E1
22	22		1912845-00	LS153 MUX 1 OF 4 (DUAL)	1	E2
23	23		1910323-00	DEC 1489L RECEIVER,LINE,QUAD,	1	E3
24	24		1910322-00	DEC 1488L DRIVER,LINE,QUAD,EI	1	E4
25	25		23439A2-00	A2-05	1	E5
26	26		9006735-00	EYELET, FUNNEL FLANGE, .059 OD X	8	
27	27		9009835-01	SPACER, RND ALUM 1/4 OD X7/16	12	
28	28		9008301-01	SCREW,PAN ,PHIL, 4-40X 1/4	12	
29	29		9006655-00	WASHER, FLAT, .312 O.D. X .125 I	2	
30	30		9006632-00	WASHER,LOCK,INT,.2600D X .120ID	12	

REVISION HISTORY			BASIC PART NO: 5412861										
ENG	ECO NUMBER	REV	SECTION A OF A	DRN: R.KOPPENAL	DATE: 09-JAN-79		D	I	G	I	T	A	L
C.L	5412861-ML004	D	SECTION.VARIATION INDEX	CHK'D: K.GLEASON	DATE: 09-JAN-79	TITLE PARTS LIST							
B.M	5412861-ML005	E	[A] 00			I/O DISTRIBUTION PANEL							
			[B]	DES.ENG: J.KING	DATE: 09-JAN-79								
			[C]			DOCUMENT NUMBER							
			[D]										
			[E]	RESP.ENG.: J.KING	DATE: 09-JAN-79	SIZE	CODE	NUMBER				REV	
			[F]			K	PL	5412861-0-DBP				E	
			[H]	MFG.ENG.: B.DAVILLI	DATE: 09-JAN-79								
			[J]										
			[K]	ASSEMBLY NUMBER:	TOP DOCUMENT NUMBER:	FILE NAME:						EDIT #	
			[L]	D-UA-5412861-0-0		Z0578E.PLS						5	
			[M]										
			[N]										

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LINE	ITEM	DOCUMENT NUMBER	PART NUMBER	DESCRIPTION	QTY PER VARIATION 00	REFERENCE DESIGNATOR
31	31		1013466-09	1000.0 MMF 50V 10% CER.	3	C11-C13
32	32		1611257-01	CHOKE(CERAMIC BEAD)AXIAL LEAD,ON	3	L1-L3
33	33		1911324-00	7414 INVERTER,HEX 1IN SCH	1	E6
34	34		1300296-00	330 1/2W 5% CC	1	R19
35	35		1300365-00	1 K 1/4W 5% CC	2	R16,R17
36	36		9009185-00	JUMPER, WIRE, INSULATED, BLACK B	2	W1,W3
37	37		4901093-00	ADHESIVE, ANAEROBIC, RESIN BASE	A/R	
38	38		9107560-03	WIRE,BUSS,18AWG	A/R	
39	39		9008027-01	SCREW,PAN ,PHIL, 2-56X 7/8 S	2	
40	40		9006631-00	WASHER,LOCK,INT,.1800D X .096ID	2	
41	41		9006555-00	NUT,HEX , 2-56X3/16AF X 1/	2	

D	I	G	I	T	A	L	TITLE	SECTION	SIZE	CODE	DOCUMENT NUMBER	REV
							I/O DISTRIBUTION PANEL	A OF A	K	PL	5412861-0-DBP	E

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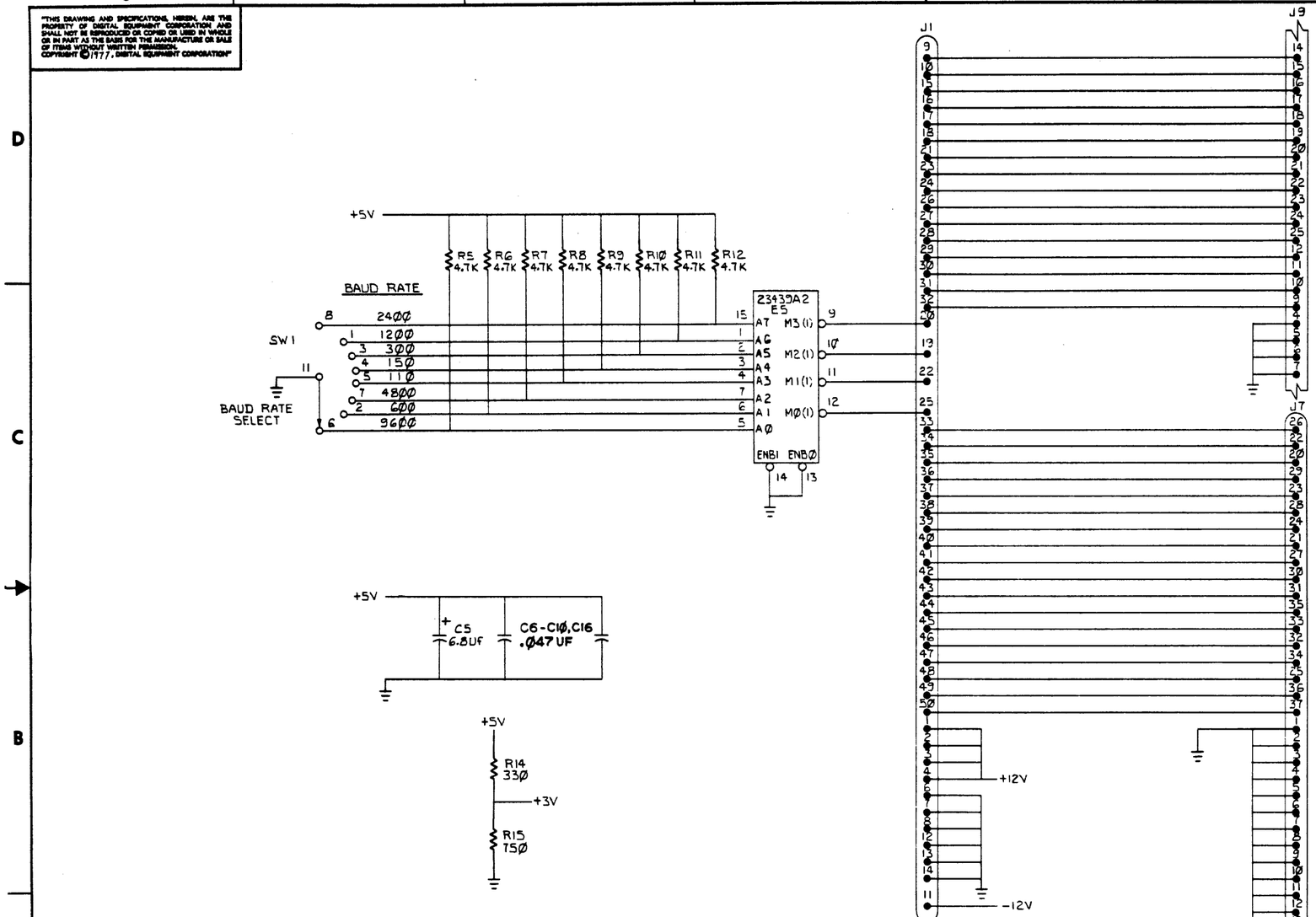

REVISIONS			
CHK.	CHANGE NO.	REV.	
[illegible]	5412861-00001	B	
D. ZBUICKER	21 OCT 77		
D. ZOPF			
[illegible]	21 Nov-77		
E.P.	5412861-ML003	C	
D. Zbuicker	30 Oct 78		
R. GARDNER	22-Nov-78		
[illegible]		D	
[illegible]	ML004		
J. CARTER			
DAVE ZOPF			
Dave Zopf			
DU	5412861-ML005	E	
M.E. Zbuicker	29 MAY 79		
BRUCE MEACHAM			
[illegible]			

DRN. P. Hyland	5-3-77	FIRST USED ON	VT78
CHK. [illegible]	2/6/77		
ENG. [illegible]	18-Jan-77	TITLE	I/O DISTRIBUTION PANEL
PROJ. ENG. [illegible]	18-Jan-77		
PROD. [illegible]	24-Jan-77		
NEXT HIGHER ASSY.			
D-UA-5412861-0-0		SIZE D	CODE CS
SCALE		NUMBER	5412861-0-1
SHEET 1 OF 2		DIST.	REV. E

digital

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PARALLEL I/O

J8

J3

J6

+12V
-12V

E.P.I.
J9

R1 220Ω
F1 1A
NO ERROR
D1 MN5054
D2 MN5054
R2 220Ω
+5V
DC OK

F2 1A
F3 1A
F4 1A
+5V

F.E. 3
APT RSTH
APT EN L

R16 1K
+5V

7414 E6

W1
W2
1489 E3
-12V
R18 27K
C15 470 PF

R17 1K
+5V
L2
L1
L3
C13 1ØØØ PF
C12 1ØØØ PF
C11 1ØØØ PF

START SWITCH S.L.U. 1 IN

J5
S.L.U. 3

J1
+12V
R19 33Ø Ω 1/2W

J4
S.L.U. 2

R3 27K
-12V
C3 47Ø PF
1489 E3
1488 E4

C1 39Ø PF

74LS157 E1
R3
A3
B2
A2
B1
A1
BØ
AØ
SØ
STB
fØ
f1
f2
f3

74LS153 E2
STB1
STBØ
A1
B1
C1
D1
DØ
CØ
BØ
AØ
S1
SØ
fØ
f1
+3V

W3
W4
S.L.U. 1 OUT
C14 39Ø pF

J3

C2 39ØPF

R4 27K
-12V
C4 47Ø PF

J2

J5
S.L.U. 3

R13 4.7K
+5V

REVISIONS

CHK	CHANGE NO.	REV

DEC FORM NO. "D 128

TITLE	SIZE	CODE	NUMBER	REV.
I/O DISTRIBUTION PANEL	D	CS	5412861-0-1	E
SCALE	SHEET 2 OF 2	DIST.		

DIGITAL EQUIPMENT CORPORATION
PARTS LIST

MADE BY HAL DENSMORE	CHECKED [illegible]	SECTION
DATE 6-27-77	DATE 5JUL77	
ENG J. DESUK	PROD G. Marcaccio	ISSUED SECTION
DATE 10.25.1977	DATE 07-OCT-77	

ITEM NO.	DRAWING NO.	PART NO.	DESCRIPTION	QUANTITY / VARIATION 5411170-10	5411170-08	5411170-06	5411170-04	5411170-02	5411170-00	5411170-12	5411170-14 SEE NOTE 1					NOTES: REF DESIGNATION
1	K-CO-5411170-0-4		X-Y COORDINATE HOLE LOCATION	REF												
2	[illegible]		[illegible]													
3	B-MI-5411170-0-6		MODULE ECO HISTORY	REF												
4		5011169	ETCHED CIRCUIT BOARD	1	1	1	1	1	1	1	1					
5		1001610-01	CAP .01 UF,100V,20%,DISC	6	6	6	6	6	6	6	6					C1-C6
6		1001796	CAP .50 UF, 25V	1	1	1	1	1	1	1	1					C7
7		1212287-C5	KEYCAPS (1SET)	-	-	-	1	1	-	-	-					63 KEY ARRAY
8		7009939-1	SPACE BAR,BLUE	1	1	1	1	1	1	1	1					
9		1212287-D0	KEYCAPS (1SET)	-	-	-	1	1	-	-	-					19 KEY ARRAY
10		1110864	DIODE, MV5054-1 LED	8	-	8	-	-	8	-	-					D1-D3
11		1300365	RES.,1K, ¼W, 5%	2	-	2	-	-	2	-	-					R9,R10
12		1300295	RES.,330,¼W,5%	8	-	8	-	-	8	-	-					R1-R8
13		1910046	IC DEC 7442	1	1	1	1	1	1	1	1					E6
14		1910153	IC DEC 74150	1	1	1	1	1	1	1	1					E5
15		1905578	IC DEC 7430	10	10	10	10	10	10	10	10					E1,E2,E7-E14
16		1910651	IC DEC 74175	2	-	2	-	-	2	-	-					E3,E4
17		7009892	63 KEY SWITCH ASS'Y	1	1	1	1	1	1	1	1					S1-S63
18		7009890	19 KEY SWITCH ASS'Y	1	1	1	1	1	1	1	1					S65-S83
19		9107560-01	JUMPER	10	10	10	10	10	10	10	10					W1-W10
20	D-IA-7010912-0-0		CABLE KEYBOARD VT50/VT50H	-	1	-	1	1	-	1	1					
21	1-IA-7012013-0-0		INTERCONN.,KEYBOARD,VT61	1	-	1	-	-	1	-	-					
22		9006633	WASHER, INT. TOOTH	3	3	3	3	3	3	3	3					
23		1212287-E1	KEYCAPS (1SET)	-	-	-	-	1	-	-	-					
24		1212287-M5	KEYCAPS (1SET)	-	-	-	-	-	1	-	-					
25		1212287-R0	KEYCAPS (1SET)	-	-	-	1	-	-	-	-					
26		1212287-R1	KEYCAPS (1SET)	-	-	1	-	-	-	-	-					
27		1212287-5B	KEYCAPS (1SET)	-	1	-	-	-	-	-	1					
28		1212287-6E	KEYCAPS (1SET)	1	-	-	-	-	-	-	-					

E.C.O. NO. 008A PN009 PN010 ML011

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TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV.
KEYBOARD VT61/VT50H	D-UA-5411170-0-0	B	PL	5411170-0-0	N
	SHEET 1 OF 2	INSERTION PARTS LIST DATA BASE REV			

DIGITAL EQUIPMENT CORPORATION
PARTS LIST

MADE BY KAL DENSMORE DATE 6-27-77	CHECKED DATE	SECTION
ENG C. DESUR DATE 10-25-77	PROD G. MARCEAU DATE 10-25-77	ISSUED SECTION

ITEM NO.	DRAWING NO.	PART NO.	DESCRIPTION	QUANTITY / VARIATION												REF DESIGNATION
				5411170-10	5411170-03	5411170-05	5411170-04	5411170-02	5411170-00	5411170-12	5411170-14					
29		1212287-3J	KEYCAPS (1 SET)	-	-	-	-	-	-	1	-					
30		1212287-U2	KEYCAP	-	-	-	-	-	-	-	1					

NOTES:

1. Variation 14 utilizes the keycap set Item 27 with the exception of position S-4 which the keycap Item 30 will replace

E.C.O. NO.

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TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV.
KEYBOARD VT61/VT50H	D-UA-5411170-0-0	B	PL	5411170-0-0	N
	SHEET 2 OF 2	INTERCOM PARTS LIST DATA BASE REV			

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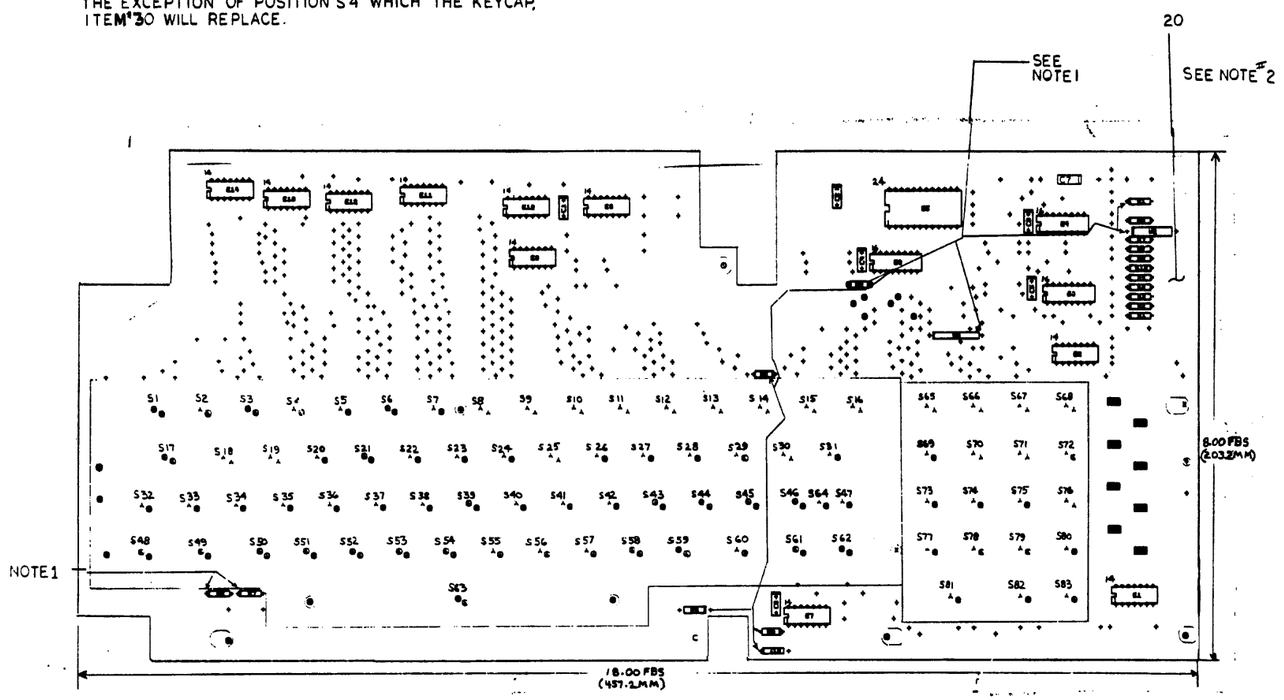
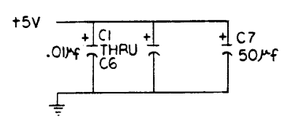
NOTES:

1. OPTIONAL JUMPERS : SEE SHEET 2 FOR CONFIGURATION TABLE.
2. SEE SHEET 3 OF 5 FOR WIRING TABLE.
3. SEE SHEETS 4 & 5 FOR VARIATION KEYCAP PLACEMENT.
4. NOTE THAT THE B.O.M. FOR ALL VARIATIONS OF THIS BOARD MAY REQUIRE UPDATING ON ANY ECO.
5. VARIATION 14 UTILIZES THE KEYCAP SET, ITEM #27 WITH THE EXCEPTION OF POSITION S4 WHICH THE KEYCAP, ITEM #30 WILL REPLACE.



VARIATION EXPLANATION	
VARIATION	COMMENT
54111170 - 0	VT61
54111170 - 1	HEAT CYCLED, SYSTEM TESTED 54111170-0
54111170 - 2	BASIC VT50H
54111170 - 3	HEAT CYCLED, SYSTEM TESTED 54111170-2
54111170 - 4	VT52
54111170 - 5	HEAT CYCLED, SYSTEM TESTED 54111170-4
54111170 - 6	VT61T
54111170 - 7	HEAT CYCLED, SYSTEM TESTED 54111170-6
54111170 - 8	VT52-W
54111170 - 9	HEAT CYCLED, SYSTEM TESTED 54111170-8
54111170 -10	VT62
54111170 -11	HEAT CYCLED, SYSTEM TESTED 54111170-10
54111170 - 12	VT52 - N
54111170 - 13	HEAT CYCLED, SYSTEM TESTED 54111170-12
54111170 - 14	VT52 - W W/UK KEYCAP-S4
54111170 - 15	HEAT CYCLED, SYSTEM TESTED 54111170-14



DEC IC 7442	8	16
DEC IC 74175	8	16
DEC IC 74150	12	24
IC TYPE	GND	+5V

GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY EXCEPTIONS ARE STATED ABOVE

IC PIN LOCATIONS

SEE OFF SHEET PARTS LIST

QTY	REF. DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.
		PARTS LIST		

FIRST USED ON OPTION MODEL: VT61/VT50

ETCH BOARD REV: D

DEC NO.	EIA NO.	DEC NO.	EIA NO.

SEMICONDUCTOR CONVERSION CHART

ECN	ECO	REMARKS
K	54111170-00008	CHANGE U29
L	54111170-PI0009	
M	54111170-PI0010	
N	54111170-ML0011	

B. KLEACH 10-20-77
J. DESUK 6-27-77
J. DESUK 4 FEB 78
J. DESUK 31 JAN 78
E. I. GUGLIERI 6 FEB 78
J. DESUK 6-27-77

NEXT HIGHER ASSY: 0-UA-VT52-0-0-0

DSN. J. Desuk DATE 6-27-77
CHKD. [illegible] DATE [illegible]
ENGR. [illegible] DATE [illegible]
PROJ. [illegible] DATE [illegible]
PROD. [illegible] DATE

TITLE: KEYBOARD VT61/VT50H

SIZE D | CODE CS | NUMBER 54111170-0-1 | REV. N

SHEET 1 OF 5

DIGITAL

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NOTE: NUMBERS 000 THRU 117 REPRESENT THE OCTAL AC ADDRESS OF EACH KEY.

JUMPER	VT50H,J 5411170-2	VT52-N VT52,52-W 5411170-4 5411170-8 5411170-12	VT61/VT61T/VT62 5411170-0 5411170-6 5411170-10
W1	IN	IN	OUT
W2	IN	IN	OUT
W3	IN	IN	OUT
W4	IN	IN	OUT
W5	OUT	OUT	IN
W6	IN	OUT	IN
W7	OUT	IN	OUT
W8	OUT	IN	OUT
W9	OUT	IN	IN
W10	OUT	OUT	IN

NOTE: SEE SHEET 3 FOR WIRE TABLES

FCI CONN

1 — CAPS LOCK L
2 — +5V
3 — KEY UP H
4 — GND
5 — ACT
6 — LD LED FLAGS
7 — AC6
8 — AC5
9 — AC4
10 — AC3
11 — AC2
12 — AC1
13 — AC0
14 — +5V
15 — GND
16 — GND

7442 E6

74150 E5

74175 E4

74175 E3

NOTE: THIS CIRCUITRY INSTALLED ONLY ON VT61, VT61T, AND VT62.

REVISIONS		
CHK	CHANGE NO.	REV

TITLE	SIZE	CODE	NUMBER	REV.
KEYBOARD VT61/VT50H	D	CS	5411170-0-1	A
SCALE —	SHEET 2 OF 5	DIST.		

DEC FORM NO BRD 130

117

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WIRE TABLE (54111170-2,4,8,12)

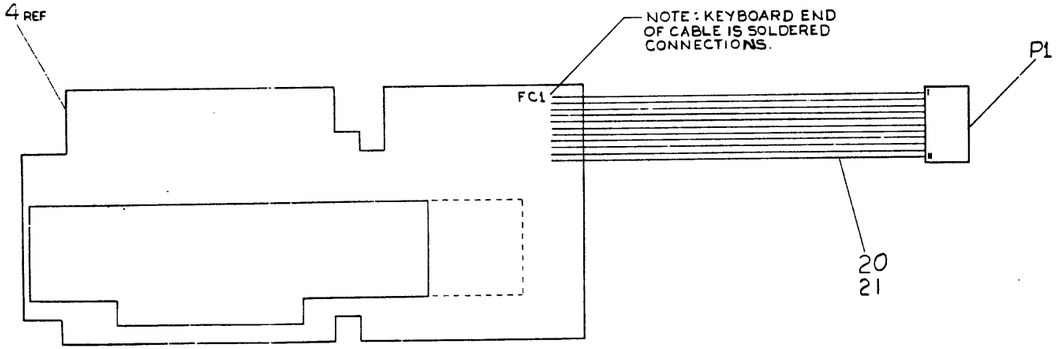
ITEM NO	DESCRIPTION AWG	COLOR	FROM CONNECTION	TO CONNECTION	REMARKS
21	#22	BLK	P1-1	FC1-2	+5V
↓	↓	BRN	P1-2	FC1-3	KEY UP H
		RED	P1-3	FC1-4	GND
		ORN	P1-4	FC1-8	AC5
		YEL	P1-5	FC1-9	AC4
		GRN	P1-6	FC1-10	AC3
		BLU	P1-7	FC1-11	AC2
		VIO	P1-8	FC1-12	AC1
		GRY	P1-9	FC1-13	AC Ø
↓	↓	WHT	P1-10	FC1-6	BRK KEY
21	#22	BLU	P1-11	FC1-7	AC6

WIRE TABLE (54111170-0,6,10)

ITEM NO.	DESCRIPTION AWG	COLOR	FROM CONNECTION	TO CONNECTION	REMARKS
22	22	BLK	P1-1	FC1-1	CAPS LOGIC
↓	↓	BRN	P1-2	FC1-2	+5V
		RED	P1-3	FC1-3	KEYUP
		ORN	P1-4	FC1-4	GND
		YEL	P1-5	FC1-5	AC7
		GRN	P1-6	FC1-6	LO LED FLAGS
		BLU	P1-7	FC1-7	AC6
		VIO	P1-8	FC1-8	AC5
		GRY	P1-9	FC1-9	AC4
		WHT	P1-10	FC1-10	AC3
		WHT/BLK	P1-11	FC1-11	AC2
		WHT/BRN	P1-12	FC1-12	AC1
		WHT/RED	P1-13	FC1-13	AC0
		WHT/ORN	P1-14	FC1-14	+5V
↓	↓	WHT/YEL	P1-15	FC1-15	GND
22	22	WHT/GRN	P1-16	FC1-16	GND

4 REF

NOTE: KEYBOARD END OF CABLE IS SOLDERED CONNECTIONS.



INCH

REVISIONS	CHANGE NO.	REV.
CHK		

DEC FORM NO. DRD 100-0

118

QUANTITY & VARIATION	DESCRIPTION	DWG./PART NO. / ITEM NO.
THIRD ANGLE PROJECTION	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	
REMOVE BURRS AND BREAK SHARP CORNERS	DRN.	FIRST USED ON: VT50H/VT61
DO NOT SCALE DWG	CHK.	TITLE: KEYBOARD /T61/VT50H (CABLE CONN)
MATERIAL	ENG.	SIZE D / CODE CS / NUMBER 54111170-0-1 / REV. AN
FINISH	PROJ. ENG.	SCALE
	PRG.	SHEET 3 OF 5
	NEXT HIGHER ASSY.	DIST.

ANGLES ±0° 30' — SURFACE QUALITY IN MICROINCHES (✓) — CLASS OF ACCURACY (CHECK ONE)

	NOMINAL DIMENSION RANGE INCHES: OVER 0 TO 0.2	OVER 0.2 TO 1.2	OVER 1.2 TO 4.0	OVER 4.0 TO 12.0	OVER 12.0 TO 40.0	OVER 40.0 TO 80.0
MEDIUM ☐	±.004	±.008	±.012	±.016	±.024	±.04
PREFERRED ☐	±.002	±.016	±.025	±.04	±.063	±0.1

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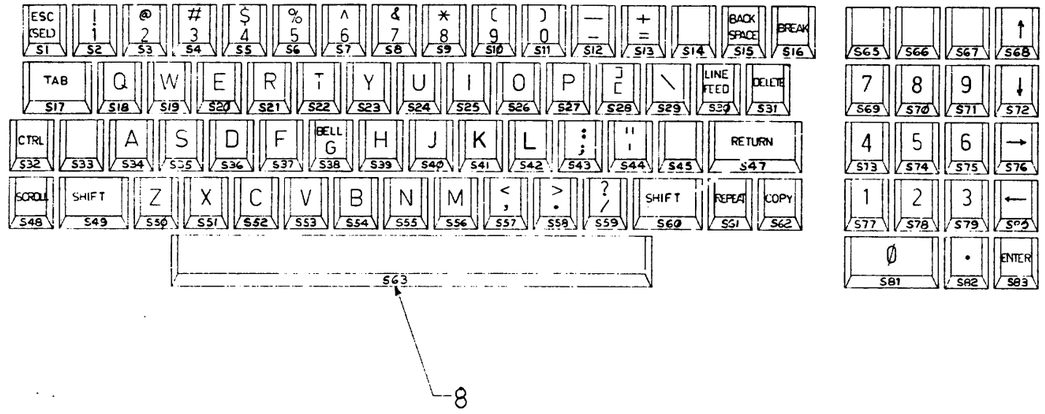
NOTES:
1. THE KEYCAP PLACEMENT ON THIS SHEET REPRESENTS THE VT50H, VT50J PLACEMENT. TO FIND KEYCAP LOCATIONS FOR OTHER VARIATIONS MATCH THE SWITCH NUMBERS (EXAMPLE S9) ON EACH KEYCAP ON THIS SHEET WITH THE CORRESPONDING SWITCH NUMBER FOR THE DESIRED VARIATION ON SHEET 5.
2. SEE PARTS LIST FOR ITEM NUMBERS FOR DESIRED VARIATIONS.

SEE NOTE 2



8

REVISIONS	REV.	CHANGE NO	CHK

DRN.		
CHK'D		
ENG.		
PROJ. ENG.		
PROJ. MGR.	Barr	
MFG. ENGR. ACCEPT.		
SCALE NONE		
SHEET 4 OF 5		

FIRST USED ON: VT50H/VT61

TITLE: KEYBOARD VT61/VT50H (KEYCAP VARIATIONS)

SIZE	CODE	NUMBER	REV.
D	CS	54-11170-0-1	N

DIST.

DO NOT FOLD

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COLOR GUIDE

NO NUMBER : GRAY
1 : RED
2 : BLUE
3 : WHITE
4 : GOLD
5 : GRAY LIGHT

NOTE: 1) LEGENDS IN LOWER PORTION OF BOX ARE ON THE FRONT FACE OF THE KEY.
2) LEGEND ON SIDE IS ON SIDE OF KEY.

KEYCAP PLACEMENT

SWITCH NUMBER

VARIATION	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30	S31	S32	S33	S34	S35	S36	S37	S38	S39	S40	S41	S42
54111170-0 (VT61)	ESC (SEL)	! 1 F1	@ 2 F2	# 3 F3	$ 4 F4	% 5 F5	^ 6 F6	& 7 F7	* 8 F8	(9 F9	) 0 F10	— -	+ =	~ `	BACK SPACE	BREAK	TAB	Q Home	W End Tx	E CEmph	R Cl Jus	T Cmd	Y A Prf	U Hld Sc	I Insrt	O	P	[	\ Cancl	LINE FEED	DELETE	CTRL	CAPS LOCK	A Parag	S DelCh	D DelLn	F InsLn	G CpyLn	H PrtSc	J PrtLn	K Edit K	L
54111170-2 (VT50H)	ESC (SEL)	! 1	@ 2	# 3	$ 4	% 5	^ 6	& 7	* 8	(9	) 0	— -	+ =		BACK SPACE	BREAK	TAB	Q	W	E	R	T	Y	U	I	O	P	[	\	LINE FEED	DELETE	CTRL		A	S	D	F	BELL G	H	J	K	L
54111170-4 (VT52)	ESC (SEL)	! 1	@ 2	# 3	$ 4	% 5	^ 6	& 7	* 8	(9	) 0	— -	+ =	~ `	BACK SPACE	BREAK	TAB	Q	W	E	R	T	Y	U	I	O	P	[	\	LINE FEED	DELETE	CTRL	CAPS LOCK	A	S	D	F	BELL G	H	J	K	L
54111170-6 (VT61)	ESC (SEL)	! 1 F1	@ 2 F2	# 3 F3	$ 4 F4	% 5 F5	^ 6 F6	& 7 F7	* 8 F8	(9 F9	) 0 F10	— -	+ =	~ `	BACK SPACE		TAB	Q Begin Text	W End Text	E Block Start	R	T Cmd	Y	U	I Insrt	O	P	[	\ Reset	LINE FEED	DELETE	CTRL	CAPS LOCK	A Parag	S DelCh	D DelLn	F InsLn	G CpyLn	H	J	K	L
54111170-8 (VT52-W)	ESC (SEL)	! 1	@ 2	# 3	$ 4	% 5	^ 6	& 7	* 8	(9	) 0	— PRINT HYPH	+ = ABBRV	HALT	HYPH PUSH / HYPH PULL	BREAK	TAB CENTER	Q SUPER SCRIPT	W	E	R RULER	T TOP DOCMT	Y	U	I	O	P PAGE MARKER	] [	\ DATE & TIME	RUB WORD OUT / RUB SENT	RUB CHAR OUT / RUB LINE	CTRL	CAPS LOCK	A SUB SCRIPT	S	D DEAD KEY	F FILE DOCMT	G GET DOCMT	H	J	K	L LIBRY
54111170-10 (VT62)	SELECT / DE SELECT	! 1	@ 2	# 3	$ 4	% 5	^ 6	& 7	* 8	(9	) 0	— -	+ =	~ `	HOME / FORM / HOME DISP	CLEAR	ERROR RESET	Q	W	E	R	T	Y	U	I	O	P	] [	\	DELETE FIELD	ERASE CHAR	DELETE CHAR	CAPS LOCK	A	S	D	F	G	H	J	K	L
54111170-12 (VT52-N)	ESC (SEL)	! 1	@ 2	# 3	$ 4	% 5	^ 6	& 7	* 8	(9	) 0	— -	+ =	~ `	BACK SPACE	BREAK	TAB	Q	W	E	R	T	Y	U	I	O	P	] [	\	DEL FIELD / LF	DEL CHAR / DEL	CTRL	CAPS LOCK	A	S	D	F	BELL G	H	J	K	L
54111170-14 (VT52-W)	ESC (SEL)	! 1	@ 2	# 3	$ 4	% 5	^ 6	& 7	* 8	(9	) 0	— PRINT HYPH	+ = ABBRV	HALT	HYPH PUSH / HYPH PULL	BREAK	TAB CENTER	Q SUPER SCRIPT	W	E	R RULER	T TOP DOCMT	Y	U	I	O	P PAGE MARKER	] [	\ DATE & TIME	RUB WORD OUT / RUB SENT	RUB CHAR OUT / RUB LINE	CTRL	CAPS LOCK	A SUB SCRIPT	S	D DEAD KEY	F FILE DOCMT	G GET DOCMT	H	J	K	L LIBRY

SWITCH NUMBER (CONT.)

VARIATION	S43	S44	S45	S46	S47	S48	S49	S50	S51	S52	S53	S54	S55	S56	S57	S58	S59	S60	S61	S62	S63	S64	S65	S66	S67	S68	S69	S70	S71	S72	S73	S74	S75	S76	S77	S78	S79	S80	S81	S82	S83
54111170-0	: ;	" '	{ [		RETURN	SCROLL	SHIFT	Z er EOS	X er EOL	C Ruler	V Tx Jus	B Xm Ln	N Xm Dat	M Xm Mss	< ,	> .	? /	SHIFT	REPEAT	COPY	SPACE BAR		FCN	BK FLD	FW FLD	↑	7 F1	8 F2	9 Home	↓	4 F3	5 F4	6 I/R	→	1 Tx Jus	2 Xm Mss	3 Cmd	←	Ø Delete Char	. CE mm	ENTER Xm Dat
54111170-2	: ;	" '	-		RETURN	SCROLL	SHIFT	Z	X	C	V	B	N	M	< ,	> .	? /	SHIFT	REPEAT	COPY	SPACE BAR					↑	7	8	9	↓	4	5	6	→	1	2	3	←	Ø	.	ENTER
54111170-4	: ;	" '	{ [		RETURN	SCROLL	SHIFT	Z	X	C	V	B	N	M	< ,	> .	? /	SHIFT	REPEAT	COPY	SPACE BAR					↑	7	8	9	↓	4	5	6	→	1	2	3	←	Ø	.	ENTER
54111170-6	: ;	" '	{ [		RETURN		SHIFT	Z er EOS	X er EOL	C	V Word Wrap	B	N Xm Dat	M	< ,	> .	? /	SHIFT	REPEAT	COPY	SPACE BAR		BACK FIELD Done	WORD WRAP Move	BLOCK START Block End	MAKE ROOM	1 DELETE LINE	PREV PAGE First Page	XMIT FIELD Cmdr Check	NEXT PAGE Last Page	1 DELETE WORD	2 BEGIN TEXT	3 ↑ Top Line	3 END TEXT	1 DELETE CHAR	3 ← Begin Line	3 ↓ Bottm Line	3 → End Line	EXECUTE Dir	CMD Reset	FCN
54111170-8 (VT52-W)	: ;	" ' REPLC	{ [CMND		RETURN LINE MARKER	SCROLL	SHIFT	Z	X	C CENTER	V VIEW	B HOT DOCMT	N NEW PAGE	M MENU	< , SRCH	> . CONT SRCH	? / ERASE SCRN ADDL	SHIFT	REPEAT	COPY	(SPACE BAR)	4	PAGE BFLD	SWAP FFLD	1 DEL CHAR ↑	2 SENT 7	2 TAB POS 8	3 UNDER LINE 9	1 DEL WORD ↓	4 WORD	2 PARA 5	3 BOLD 6	→	1 CUT	3 BACK UP 1	2 LINE 2	3 UPPER CASE 3	PASTE ←	1 ADVANCE Ø	SEL .	2 <> ENTER
54111170-10 (VT62)	: ;	" '	{ [		2 NEXT FIELD	2 INSERT MODE	SHIFT	Z	X	C	V	B	N	M	< ,	> .	? /	1 SHIFT	2 REPEAT	PF45	(SPACE BAR)	2 ←	1 BACK FIELD	1 FWD FIELD	2 →	3 7 ABORT	3 8 PF3	3 9 PF4	2 STOP REPEAT PF44	3 4 PF4	3 5 PF5	3 6 PF6	2 CLOSE PF44	3 / PF1	3 2 PF2	3 3 PF3	2 AFFIRM PF42	3 0 PF0	3 . PF10	2 ENTER PF41
54111170-12 (VT52-N)	: ;	" '	{ [		RETURN	SCROLL	SHIFT	Z	X	C	V	B	N	M	< ,	> .	? /	SHIFT	REPEAT	COPY	(SPACE BAR)	4	BACK FIELD	ADV FIELD	2 ↑ HOME FLAG FIELD	5 7 BT	5 8 BT	5 9 BT	2 ↓ EOS & CLR EOS & CLR	5 4 BT	5 5 BT	5 6 BT	1 ADV CHAR F/W RECORD	5 1 BT	5 2 BT	5 3 BT	2 BACK CHAR MODE CHANGE	2 Ø BACK SCREEN	2 .	2 ENTER EXIT FORMAT
54111170-14 (VT52-W)	: ;	" ' REPLC	{ [CMND		RETURN LINE MARKER	SCROLL	SHIFT	Z	X	C CENTER	V VIEW	B HOT DOCMT	N NEW PAGE	M MENU	< , SRCH	> . CONT SRCH	? / ERASE SCRN ADDL	SHIFT	REPEAT	COPY	(SPACE BAR)	4	PAGE BFLD	SWAP FFLD	1 DEL CHAR ↑	2 SENT 7	2 TAB POS 8	3 UNDER LINE 9	1 DEL WORD ↓	4 WORD	2 PARA 5	3 BOLD 6	→	1 CUT	3 BACK UP 1	2 LINE 2	3 UPPER CASE 3	PASTE ←	3 ADVANCE Ø	SEL .	2 <> ENTER

REVISIONS		
CHG	CHANGE NO	BY

TITLE	SIZE	CODE	NUMBER	REV.
KEYBOARD, VT61/VT50H (KEYCAP PLACEMENT)	D	CS	54111170-0-1	N
SCALE	SHEET 5 OF 5		DIST.	

DEC FORM NO. DRD 138

DIGITAL EQUIPMENT CORPORATION

PARTS LIST

MADE BY	T. Misitano	CHECKED	R. Fucci	SECTION	1
DATE	4-16-75	DATE	9-22-75		
ENG	M. Morganstern	PROD	R. Fucci	ISSUED SECTION	1
DATE	9-24-75	DATE	9-24-75		

ITEM NO	DRAWING NO.	PART NO.	DESCRIPTION	QUANTITY/VARIATION 5411743-00	5411743-01	5411743-02	5411743-03	5411743-04	5411743-04	5411743-05	5411743-06	5411743-07				NOTES: REF DESIGNATION
1	E-MD-5011742-0-Ø		DRILL & ETCH DWG	REF	-	-	-	-	-	-	-	-				
2	E-UA-5411743-Ø-Ø		ROM, UART AND TIMING ASSY	REF	-	-	-	-	-	-	-	-				
3	B-MH-5411743-Ø-6		MODULE ECO HISTORY	REF	-	-	-	-	-	-	-	-				
4		5011742	ETCHED CIRCUIT BOARD	1	1	1	1	1	1	1	1	1				
5		1001610-01	CAP .01 uf, 100V ± 20%	32	32	32	32	32	32	32	32	32				C1thruC31 C35
6		1000076	CAP 39 uf 10V ± 10%	1	1	1	1	1	1	1	1	1				C32
7		1001796	CAP 50 uf 25V	2	2	2	2	2	2	2	2	2				C33 C34
8		1210919	SWITCH, SLIDE	2	2	2	2	2	2	2	2	2				S3 S4
9		1212937	SWITCH, ROTARY	2	2	2	2	2	2	2	2	2				S1 S2
10		1300365	RES 1K ¼W ± 5%	13	13	13	13	13	13	13	13	13				R1thruR8.R13 R27 R36 R45 R46
11		1300447	RES 4.7K ¼W ± 5%	17	17	17	17	17	17	17	17	17				R9thruR12 R14 R15 R17thruR20 R23thruR26 R37 R38 R41
12		1302514	RES 39K ¼W ± 5%	1	1	1	1	1	1	1	1	1				R16
13		1300417	RES 2.2K ¼W ± 5%	2	2	2	2	2	2	2	2	2				R21 R22
14		1509338	TRANSISTOR DEC 0531B	1	1	1	1	1	1	1	1	1				Q1
15		1812131	OSCILLATOR 13.824 MHZ	1	1	1	1	1	1	1	1	1				E1
16		1910041	IC DEC 74164	1	1	1	1	1	1	1	1	1				E2
17		1905578	IC DEC 7430	1	1	1	1	1	1	1	1	1				E3
18		1909686	IC DEC 7404	1	1	1	1	1	1	1	1	1				E4
19		1910650	IC DEC 74161	6	6	6	6	6	6	6	6	6				E5 E7.E27 E38 E45 E46
20		1909004	IC DEC 7402	3	3	3	3	3	3	3	3	3				E6.E10 E19
21		1905575	IC DEC 7400	9	9	9	9	9	9	9	9	9				E8 E9 E13 E15 E16 E30 E34 E35 E39
22		1909054	IC DEC 7493	2	2	2	2	2	2	2	2	2				E11, E12
23		1909051	IC DEC 7490	1	1	1	1	1	1	1	1	1				E18
24		1909057	IC DEC 74H10	1	1	1	1	1	1	1	1	1				E14

E.C.O. NO.	CC005	CC004	PN006	PN007	PN008	PN009A

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TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV
ROM, UART AND TIMING	E-UA-5411743-Ø-Ø	B	PL	5411743-Ø-Ø	K
	SHEET 1 OF 3	INSERTION PARTS LIST DATA BASE REV			

DIGITAL EQUIPMENT CORPORATION

PARTS LIST

MADE BY T. Misitano	CHECKED R. Pucci	SECTION 1
DATE 4-16-75	DATE 9-22-75	
ENG M. Morganstern	PROD R. Pucci	ISSUED SECTION 1
DATE 9-24-75	DATE 9-24-75	

ITEM NO	DRAWING NO.	PART NO.	DESCRIPTION	QUANTITY/VARIATION 5411743-00	5411743-01	5411743-02	5411743-03	5411743-04	5411743-05	5411743-06	5411743-07	NOTES: REF DESIGNATION
25		1905547	IC DEC 7474	3	3	3	3	3	3	3	3	E20 E22,E42
26		1909937	IC DEC 74153	4	4	4	4	4	4	4	4	E24 E28 E32 E36
27		1909267	IC DEC 74H11	1	1	1	1	1	1	1	1	E25
28		1909060	IC DEC 74H50	1	1	1	1	1	1	1	1	E31
29		1909055	IC DEC 7495	2	2	2	2	2	2	2	2	E41, E40
30		1910459-01	IC DEC 1402,UART	1	1	1	1	1	1	1	1	E44
31		23-119A9-00	ROM, 512x4, COPIER	1	1							E29
32		23-120A9-00	ROM, 512x4, COPIER	1	1							E26
33		23-121A9-00	ROM, 512x4, COPIER	1	1							E37
34		23-122A9-00	ROM, 512x4, COPIER	1	1							E21
35		23-124A9-00	ROM, 512x4, STANDARD, PRINTER					1	1			E29
36		23-125A9-00	ROM, 512x4,STANDARD, PRINTER					1	1			E26
37		23-126A9-00	ROM, 512x4,STANDARD, PRINTER					1	1			E37
38		23-127A9-00	ROM, 512x4,STANDARD, PRINTER					1	1			E21
39		23-128A9-00	ROM, 512x4, VT55			1	1					E37
40		23-129A9-00	ROM, 512x4, VT55			1	1					E29
41		23-130A9-00	ROM, 512x4, VT55			1	1					E26
42		23-131A9-00	ROM, 512x4, VT55			1	1					E21
43		23-132A9-00	ROM, 512x4, VT51							1	1	E29
44		23-133A9-00	ROM, 512x4, VT51							1	1	E26

E.C.O. NO

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TITLE: ROM, UART AND TIMING

ASSY NO. [illegible]

SIZE B | CODE PL | NUMBER 5411743-Ø-Ø | REV. K

INSERTION PARTS LIST DATA BASE REV

ENGINEERING MASTER ORB 123

DIGITAL EQUIPMENT CORPORATION

PARTS LIST

MADE BY	T. Misitano	CHECKED	R. Pucci	SECTION	1
DATE	4-16-75	DATE	9-22-75		
ENG	M. Morganstern	PROD	R. Pucci	ISSUED SECTION	1
DATE	9-24-75	DATE	9-24-75		

ITEM NO	DRAWING NO.	PART NO.	DESCRIPTION	QUANTITY/VARIATION 5411743-00	5411743-01	5411743-02	5411743-03	5411743-04	5411743-05	5411743-06	5411743-07	NOTES: REF DESIGNATION
45		1212519	CONN, HEADER	1	1	1	1	1	1	1	1	J3,J5 J6
46		1212151	CONN, TOP ENTRY 11 PIN	1	1	1	1	1	1	1	1	J4
47		1211313-02	SOCKET, IC	4	4	4	4	4	4	4	4	E21 E26 E29 E37
48		9009607	PINS "F"	77	77	77	77	77	77	77	77	J1-J2
49		9009747	STANDOFF	1	1	1	1	1	1	1	1	FOR MOUNTING 20mA or E1A MODULE
~~50~~		~~9107780-01~~	~~WIRE BUSS #22~~	~~AR~~	~~AR~~	~~AR~~	~~AR~~	~~AR~~	~~AR~~	~~AR~~	~~AR~~	~~W2 W4 W3 W11 thru W255 P1 4199~~
~~51~~		~~9107366-55~~	~~WIRE #18 AWG INSULATED~~	~~AR~~	~~AR~~	~~AR~~	~~AR~~	~~AR~~	~~AR~~	~~AR~~	~~AR~~	
~~52~~		~~9007830-00~~	~~TERMINAL, RING TONGUE~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	
53		9107560-01	JUMPER, INSERTABLE 22 AWG	12	12	12	12	12	12	12	12	W1 THRU W12

ECO NO.

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TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV.
ROM, UART AND TIMING	[illegible]	B	PL	5411743-0-0	K
	SHEET 3 OF 3	INSERTION PARTS LIST DATA BASE REV			

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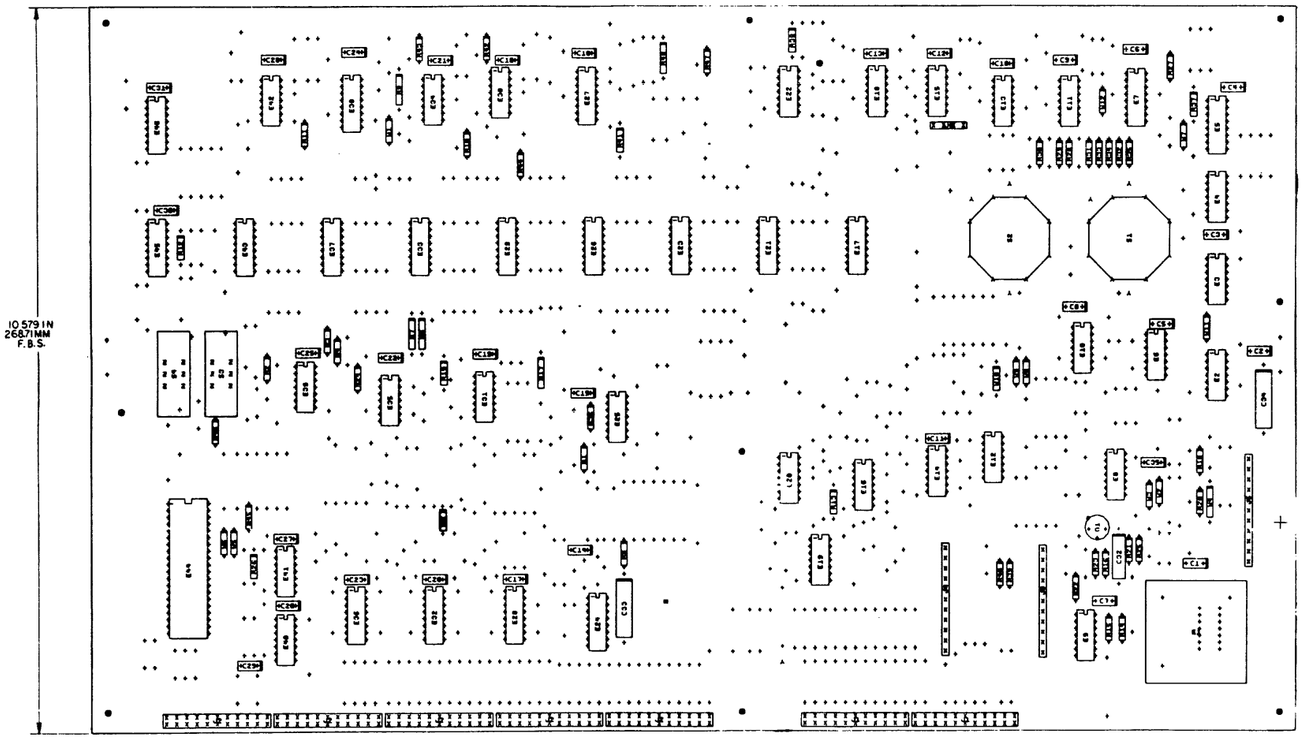
NOTES:

1. COMPONENTS NOT TO BE INSERTED:
   R28-R35, R39, R40 R42-R44
2. OPTIONAL JUMPERS: W1- W12

10.579 IN
268.71MM
F.B.S.



J1 DATA PATH CONN		J2 DATA PATH CONN		J3 DOT X-OR CONN	J5 KEYBOARD CONN
1 HORIZ L		1 +5V	29 AC 3	1 —	1 CTRL KEY L
2 SYNC L		2 KEY CLICK L	30 B3	2 —	2 BRK KEY L
3 CURSOR LD H		3 BUF L	31 B2	3 —	3 AC Ø
4 AUTO INC X H		4 UR	32 AC 2	4 —	4 AC 1
5 SVID		5 UT	33 B	5 —	5 AC 2
6 SCFF		6 MTU L	34 DI 2	6 VID Z H	6 AC 3
7 ZCAV		7 EOC	35 DI 1	7 VID Z H	7 AC 4
8 MODE IL		8 +5V	36 C	8 GND	8 AC 5
9 T2H		9 GND	37 AC 1	9 DIS OSC L	9 GND
10 TF		10 GND	38 B1	10 R INIT H	10 KEY UP H
11 TG		11 DO 6	39 BØ	11 EXT H	11 +5V
12 TE		12 DO 5	40 ACØ		
13 VSR LD H		13 DO 4	41 H	J4 20MA/EIA CONN.	J6 GRAPHICS CONN.
14 GØHJ		14 DOØ	42 DIØ	1 +5V	1 GND
15 KEY UP H		15 DO 1	43 MUX A	2 -12V	2 H FLY H
16 GND		16 DO 2	44 MUX B	3 +15V	3 EN CYCLE L
17 +15V		17 DO 3	45 GND	4 GND	4 INIT L
18 -12V		18 M2BL	46 +5V	5 REC. DATA H	
19 +5V		19 AC 6	47 A	6 —	
20 VID Z H		20 DI 6	48 BB	7 TRANS DATA L	
21 VID Z H		21 DI 5	49 BC	8 —	
22 B OSC A		22 AC 5	50 VERT H	9 —	
		23 B4	51 I ROM	10 —	
		24 AC 4	52 TSC L	11 —	
		25 D	53 FLAG L		
		26 DI 4	54 TW		
		27 DI 3	55 TH		
		28 E			

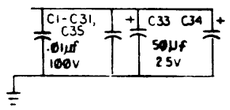
LEGEND

VARIATION	DESCRIPTION
5411743-00	VT52 COPIER ROMS
5411743-01	HEAT AND SYSTEM TESTED 5411743-00
5411743-02	VT55 BASIC
5411743-03	HEAT AND SYSTEM TESTED 5411743-02
5411743-04	VT52 BASIC, PRINTER ROMS
5411743-05	HEAT AND SYSTEM TESTED 5411743-04
5411743-06	VT51 BASIC
5411743-07	HEAT AND SYSTEM TESTED 5411743-06

JUMPER WIRE, TABLE

	VT 52		VT 51	VT 55
W1	OUT	IN		OUT
W2	OUT	IN		OUT
W3	IN	OUT		IN
W4	IN	OUT		IN

SEE OFF SHEET PARTS LIST



1402	3	1
6306A	8	16
74153	6	16
7490	10	5
7493	10	5
74161	8	16
IC TYPE	GND	+5V

GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY EXCEPTIONS ARE STATED ABOVE

IC PIN LOCATIONS

REV.	CHANGE NO.	CHK	DATE	REVISIONS
A	5411743-00001		13 JAN 76	ORIGINATED
B	5411743-00002		13 JAN 76	M.MORGANSTERN S.CHILYPAWA
C	5411743-00003		13 JAN 76	M.MORGANSTERN M.MORGANSTERN
D	5411743-00004		13 JAN 76	M.MORGANSTERN REVISED E REDRAWN
E	5411743-00005		18 JAN 77	M.WHITTLESEY J.CARTER
F	5411743-PN006		8-FEB-77	M.WHITTLESEY
G	5411743-PN007		23 FEB 77	M WHITTLESEY B CHASEN
H	5411743-PN008		4 APR 77	M.WHITTLESEY
J	5411743-PN009		2-MAY-77	M WHITTLESEY
K	5411743-PN010		10 MAY 77	J. DESUK
L	5411743-PN009		19 MAY 77	J. BITTO

FIRST USED ON OPTION MODEL
VT52

DEC NO.	EIA NO.	DEC NO.	EIA NO.

SEMICONDUCTOR CONVERSION CHART

QTY	REF. DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.
		PARTS LIST		
		ETCH BOARD REV. D		

DRN. Tom Mistiano	DATE	4-16-75
CHK'D. R. Pucci	DATE	9-22-75
ENG. Tom Mistiano	DATE	3-22-75
PROJ. ENG. M. Morganstern	DATE	9-22-75
PROD. R. Pucci	DATE	9-24-75
NEXT HIGHER ASSY		
SCALE		
SHEET 1 OF 4		

digital

TITLE: ROM, UART AND TIMING

SIZE	CODE	NUMBER	REV.
D	CS	5411743-0-1	L

DIST.

724

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1.3µS CYCLE TIME
72 NS
T2H, TE, TF, TW, T2H TG TH, TJ
Ø 1 2 3 4 5 6 7 8 Ø 1 2 3 4 5 6 7 8

TE - DO "E" INSTRUCTIONS (EN BY E·Ā·TE)
TF - DO "F" INSTRUCTIONS (EN BY F·Ā·TF)
TW - DO "Q" INSTRUCTIONS (EN BY Ā·E·F·G·H·TW)
- WRITE ENABLE (SELECTED BY A2M, U2M, B2M
- [TEST FLAGS] & ROM TO RAM)
TG - CLEAR WRITE FLIP FLOP
TH - DO "G" INSTRUCTIONS M2A, M2B, M2U & M2X.
- [INC PC] (EN BY G·Ā·TH)
TJ - CONDITIONAL PC INC (SKIP)
OR
LOAD PC FROM ROM (JUMP)
OR
DO NOTHING

SPARE GATE
7404 E4

T2H	W8	W9	W10
VSR LD H	Ø	1	1
VSR LD H	1	Ø	1
VSR LD H	1	1	Ø

LEGEND:
Ø = JUMPER INSERTED
1 = JUMPER NOT INSERTED

FUNCTION	W7
GØHZ UNIT	1
5ØHZ UNIT	Ø

LEGEND:
Ø = JUMPER INSERTED
1 = JUMPER NOT INSERTED

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE: ROM, UART & TIMING (RUT1)
SIZE: D
CODE: CS
NUMBER: 5411743 -Ø-1
REV: L
SCALE:
SHEET 2 OF 4
DIST.

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LEGEND:
Ø = JUMPER INSERTED/SWITCH CLOSED
1 = JUMPER NOT INSERTED/SWITCH OPEN
X = DON'T CARE

KEYBOARD BEING USED	W2	W3	W4
VT61/VT5ØH 5411170	1	Ø	Ø
VT51 5410893	Ø	1	1

FUNCTION	W5	W6	S3
DATA BIT 7 MARKING	1	X	1
DATA BIT 7 SPACING	Ø	X	1
EVEN PARITY	X	1	Ø
ODD PARITY	X	Ø	Ø

NOTE: SWITCHES S1 AND S2 ARE SHOWN SET FOR 6ØØ BAUD, OFF-LINE USE. FOR OTHER CONFIGURATIONS SEE LABLE ON BASE OF UNIT.

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE: ROM, UART & TIMING (RUT2)				
SIZE: D	CODE: CS	NUMBER: 5411743-Ø-1	REV: L	
SCALE:	SHEET 3 OF 4	DIST.		

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ROM ORGANIZATION

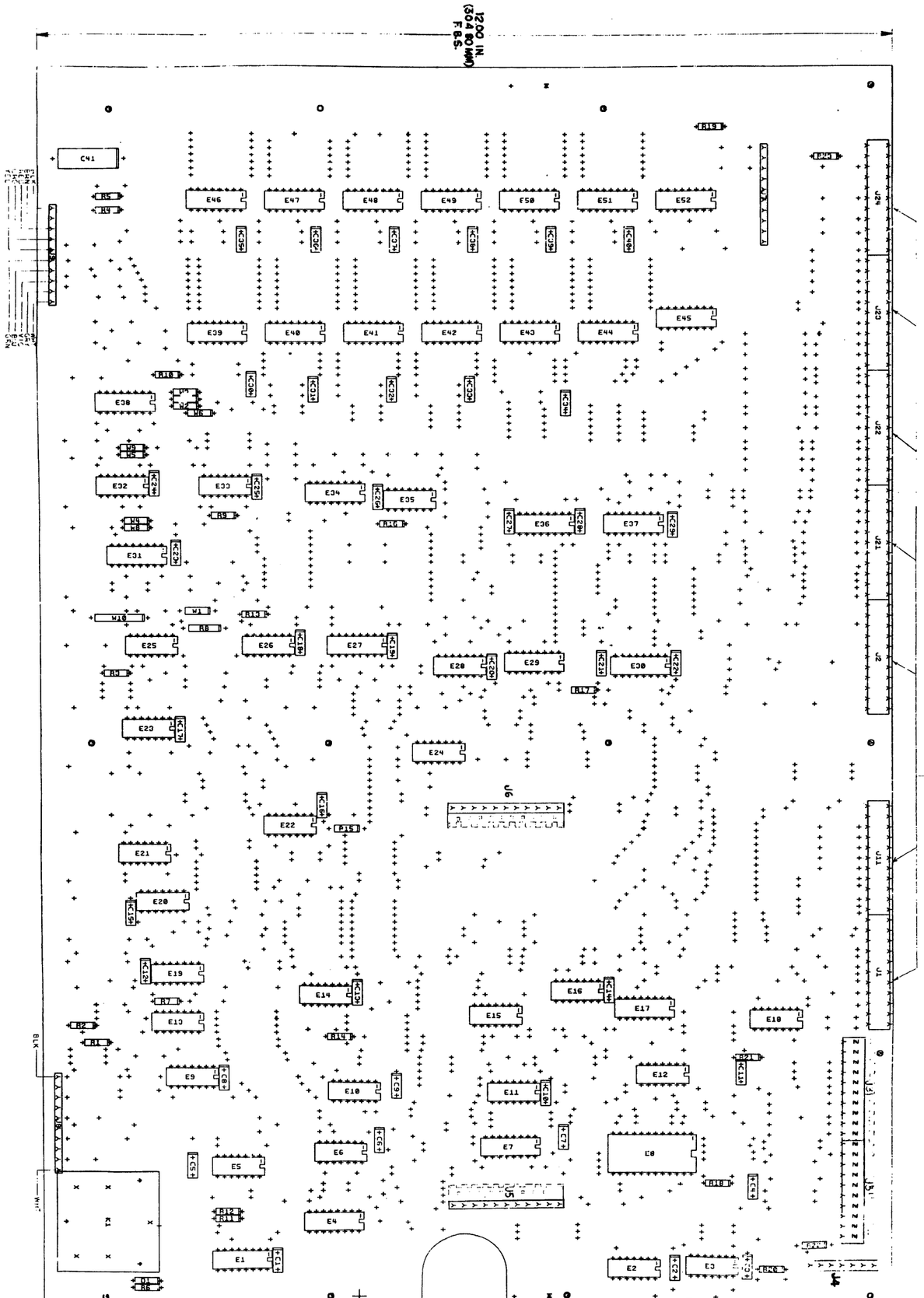
	A B C D	E F G H	PC 98 765 432 10
PAGE 1	UP TO 256 X	8 BIT WORDS	PC = 00 XXX XXX XX
PAGE 2	UP TO 512 X	8 BIT WORDS	PC = 01 XXX XXX XX
PAGE 3	UP TO 768 X	8 BIT WORDS	PC = 10 XXX XXX XX
PAGE 4	UP TO 1024 X	8 BIT WORDS	PC = 11 XXX XXX XX

PROGRAM WORD LENGTH	W1
OVER 512 WORDS	1
512 WORDS OR UNDER	0

LEGEND:
0 = W1 INSERTED
1 = W1 NOT INSERTED

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE	CODE	NUMBER	REV.
ROM, UART & TIMING (RUT3)	D	CS	5411743-0-1	L
SCALE —	SHEET 4 OF 4	DIST.		



NOTES

1. NO CLUSTER; NO TITLE TAPE
2. DO NOT DUPLICATE ECO MASTER HOLES
THESE ARE ARE DIA HOLES
3. W1-W8 ARE OPTIONAL, DO NOT INSERT
4. P&P - DO NOT INSERT

ECH REV. B.3
P&H DESIGN DATA BASE REV.E

SIGNATURES	DATE
DRN. P NICHOLLS	
CHK'D.	
ENG.	
PROJECT.	
PROD.	
QC'D	
APPR.	
MGT.	

SIZE E | CODE | NUMBER 54117450

digital

TITLE DATA PATHS
MEMORY & DECODERS

DIGITAL EQUIPMENT CORPORATION
PARTS LIST

MADE BY	T. MISITANO	CHECKED	R. PUCCI	SECTION	1
DATE	14-JUL-75	DATE	20-JUL-75		
ENG	T. MISITANO	PROD	R. PUCCI	ISSUED SECTION	1
DATE	24-SEP-75	DATE	24-SEP-75		

ITEM NO.	DRAWING NO.	PART NO.	DESCRIPTION	QUANTITY/VARIATION 5411745-00	5411745-01	5411745-02	5411745-03	NOTES: REF DESIGNATION
1	E-MD-5011744-0-C		DRILL AND ETCH DRAWING	REF				
2	E-UA-5411745-0-0		ASSY/DATA PATHS, MEMORY DECODER	REF				
3	B-MH-5411745-0-S		MODULE ECO HISTORY	REF				
4		5011744	ETCHED CIRCUIT BOARD	1	1	1	1	
5		1001610-01	CAP. .01uf, 100V, DISC.	40	40	40	40	C1 thru C40
6		1001796	CAP. 50uf, 25V, AL. EL.	1	1	1	1	C41
7		1100114	DIODE, D664	1	1	1	1	D1
8		1211851	CONN, PC CARD SIDE ENTRY 11 CIRCUIT	7	7	7	7	J1, J2, J11, J21 THRU J24
9		1211850	CONN, PC CARD, BOT. ENTRY 10 CIRCUIT	2	2	2	2	J3, J31
10		1212151	CONN, TOP ENTRY, 11PIN	2	2	2	2	J5, J6
11		1212519	CONN , STRAIGHT POST HEADER	1	1	1	1	J4 J7
12	C-AD-7011144-0-0		CABLE ASSEMBLY	2	2	2	2	J8. J9
13		1212049	RELAY, GP, SPST, 12V COIL 5A CONTACT	1	1	1	1	K1
14		1300365	RES, 1K, ¼W, 5%	7	7	7	7	R1, R2, R13, R15, R16, R19, R23
15		1300447	RES. 4.7K ¼W, 5%	11	11	11	11	R3, R7, R10, R11, R12, R14, R17, R18, R20, R21, R22
16		1300417	RES. 2.2K, ¼W, 5%	1	1	1	1	R4
17		1300202	RES. 47 , ¼W, 5%	1	1	1	1	R5
18		1300229	RES. 100 , ¼W, 5%	1	1	1	1	R6
19		1910046	I.C. DEC 7442	3	3	3	3	E1, E4, E17

E.C.O. NO. 00001 PN005 PN006 PN008

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TITLE: DATA PATH, MEMORY and DECODERS

ASSY NO. D-CS-5411745-0-1

SHEET 1 OF 2

SIZE	CODE	NUMBER	REV
B	PL	5411745-0-0	H

INSERTION PARTS LIST DATA BASE REV

DIGITAL EQUIPMENT CORPORATION

PARTS LIST

MADE BY	T. MISITANO	CHECKED	R. PUCCI	SECTION	1
DATE	14-JUL-75	DATE	20-JUL-75		
ENG	T. MISITANO	PROD	R. PUCCI	ISSUED SECTION	1
DATE	24-SEP-75	DATE	24-SEP-75		

ITEM NO.	DRAWING NO.	PART NO.	DESCRIPTION	QUANTITY / VARIATION 5411745-00	5411745-01	5411745-02	5411745-03									NOTES: REF DESIGNATION
20		1909055	I.C. DEC 7495	4	4	4	4									E3 E2 E26 E33
21		1905575	I.C. DEC 7400	10	10	10	10									E5, E9, E11, E12, E15, E16, E18, E19, E20, E23
22		1909267	I.C. DEC 74H11	2	2	2	2									E6, E24
23		1910656	I.C. DEC 74155	1	1	1	1									E7
24		1910153	I.C. DEC 74150	1	1	1	1									E8
25		1909004	I.C. DEC 7402	1	1	1	1									E10
26		1905547	I.C. DEC 7474	2	2	2	2									E13, E25
27		1909057	I.C. DEC 74H10	2	2	2	2									E14, E21
28		1910741	I.C. DEC 7406	1	1	1	1									E22
29		1910018	I.C. DEC 74193	5	5	5	5									E27, E30, E31, E34. E37
30		1909712	I.C. DEC 8242	2	2	2	2									E28, E35
31		1910224	I.C. DEC 7485	2	2	2	2									E29, E36
32		1909060	I.C. DEC 74H50	1	1	1	1									E32
33		1910655	I.C. DEC 74157	1	1	1	1									E38
34		2111318-01	I.C. DEC 2102-1 (500 NS ACCESS)	14	14	-	-									E39 thru E52
35		2111318-01	I.C. DEC 2102-1 (500 NS ACCESS)	-	-	7	7									E46 thru E52
36		9107560-01	WIRE, BUSS, 22 AWG	5	5	-	-									W6 thru W10
37		9107560-01	WIRE, BUSS, 22 AWG	-	-	5	5									W1 thru W5

E.C.O. NO.

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TITLE: DATA PATH, MEMORY and DECODERS

ASSY NO. D-CS-5411745-0-1 | SIZE B | CODE PL | NUMBER 5411745 0-0 | REV. H

SHEET 2 OF 2 | INSERTION PARTS LIST DATA BASE REV

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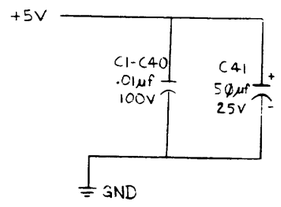
NOTES:

1. COMPONENTS NOT TO BE INSERTED: R8, R9.
2. FOR VT51 (VARIATION -2/-3) E29 THRU E45 WILL BE DELETED. JUMPER WIRES W6 THRU W10 WILL BE DELETED AND JUMPER WIRES W1 THRU W5 WILL BE INSERTED.

LEGEND	
NUMBER	VARIATION
5411745-0	BASIC VT52
5411745-1	HEAT CYCLED, SYSTEM TESTED 5411745 0
5411745-2	BASIC VT51
5411745-3	HEAT CYCLED, SYSTEM TESTED 5411745-2

REV. J | NUMBER 5411745-0-1 | SIZE D | CODE CS | 2 | 1



7442	8	16
74155	8	16
74150	12	24
74193	8	16
7485	8	16
74157	8	16
2102	9	10
IC TYPE	GND	+5V

GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY EXCEPTIONS ARE STATED ABOVE

IC PIN LOCATIONS

SEE B-PL-5411745-0-0

QTY	REF. DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.
		PARTS LIST		

FIRST USED ON OPTION MODEL: VT51 VT52

ETCH BOARD REV. E

REV.	CHK	CHANGE NO.	REVISIONS
D	SZ	5411745 00004	REVISED & REDRAWN
		9 JUN 76	M. WHITTLESEY
E		5411745-PN006	M. WHITTLESEY
F		5411745-PN006	G. CHRISTIANSEN

DEC NO.	EIA NO.	DEC NO.	EIA NO.

SEMICONDUCTOR CONVERSION CHART

		DATE
DRN.	T. MISITANO	7-14-75
CHK'D.	R. PUCCI	7-20-75
ENG.	T. MISITANO	8-4-75
PROJ. ENG.	M. MORGANSTERN	8-4-75
PROD.	R. PUCCI	8-29-75

NEXT HIGHER ASSY

SCALE - → —

SHEET 1 OF 5

digital

TITLE

DATA PATH, MEMORY AND DECODERS

SIZE	CODE	NUMBER	REV.
D	CS	5411745-0-1	J

DIST.

DEC FORM NO 209 1359

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DP3 - PAGE 1 SEL L

DP1 - A Ø
DP1 - A 1
DP3 - Y 1
DP3 - Y Ø
DP1 - A 4
DP1 - A 5
DP3 - X 3
DP3 - X 2
DP3 - X 1
DP3 - X Ø

2102 E46 — TP J2-20 → DI 6
2102 E47 — TP J2-21 → DI 5
2102 E48 — TP J2-26 → DI 4
2102 E49 — TP J2-27 → DI 3
2102 E50 — TP J2-34 → DI 2
2102 E51 — TP J2-35 → DI 1
2102 E52

DP2 - LD RAM L
TP

DP3 - PAGE 2 SEL L

*2102 E39
*2102 E40
*2102 E41
*2102 E42
*2102 E43
*2102 E44
*2102 E45 — J2-42 TP → DI Ø

74157 B3 E38 (STB SØ)
DP3 - Y2 → A3 — f3 → DP1 - A1 TP
DP3 - X4 → B2 — f2 → DP1 - A5 TP
DP3 - X5 → B1 — f1 → DP1 - A 4 TP
DP3 - Y3 → A1
R1Ø 4.7K +5V → BØ
AØ — fØ → DP1 - AØ TP
DP3 - X6 → 74H5Ø E32

MEMORY BUFFER 7495 E33
D Ø, D1, D2, D3 — R Ø(1), R 1(1), R 2(1), R3(1)
RSHF CLK1 CLKØ DSØ
TP J2 - 17 → DO 3
J6 - 7 → DO 3
J7 - 1Ø → DO 3
J2 - 13 → DO 4
J6 - 5 → DO 4
J7 - 6 → DO 4
J2 - 12 → DO 5
J6 - 6 → DO 5
J7 - 5 → DO 5
J2 - 11 → DO 6
J6 - 4 → DO 6
J7 - 4 → DO 6

MEMORY BUFFER 7495 E26
DP3 - CURSOR H → D3
RSHF CLK1 CLKØ DSØ
TP J2 - 14 → DO Ø
J6 - 1Ø → DO Ø
J7 - 7 → DO Ø
J2 - 15 → DO 1
J6 - 8 → DO 1
J7 - 8 → DO 1
J2 - 16 → DO 2
J6 - 9 → DO 2
J7 - 9 → DO 2
R3(1) → DP1 - B CURSOR H
TP J1 - 9 → T2H
R13 1K +5V

* DELETE E39 — E45 FOR VT51.

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	(DP1)	SIZE	CODE	NUMBER	REV.
DATA PATHS, MEMORY AND DECODERS		D	CS	5411745-Ø-1	J
SCALE	SHEET 2 OF 5	DIST.			

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DP2 - LD RAM L
DP2 - MODE Ø L
DP3 - AC< RAM
DONE FLIP FLOP
SPARES
TE
TF
TH
TW
BB
BC
D
MODE FLIP FLOP
DP2 - MODE Ø L
DP2 - DAC H
DP2 - IYH
DP2 - M2B L
DP2 - M2X L
DP2 - M2AC L
DP2 - AC2M
DP2 - CX8
DP2 - IACH
DP2 - B2Y
DP2 - ZX H
DP2 - ZAC H
DP2 - ZY H
DP2 - IXH
DP2 - DXH
DP2 - DYH
DP2 - LD RAM L
DP2 - MODE Ø L
DP3 - AC = RAM
DP3 - AC < RAM
DP3 - TAB
ADX
MODE 1 L
AUTO INC X H
I ROM
GRAPHIC L
M2U L
MUX B
MUX A
C EN L
C LD L
ZCAV
SCFF
SVID
RUF L
KEY CLICK L
FLAG L
MODE Ø
DP3 - AC = RAM
DP3 - AC < RAM
DP3 - TAB
KEY UP H
SYNC L
EOC
UT
CSF L
TSC L
COP L
CCFL
60HZ
TRW2
UR
J1-8
J1-12
J1-10
J1-11
J1-15
J1-2
J2-51
J2-55
J2-54
J2-48
J2-49
J2-41
J2-47
J2-28
J2-33
J2-36
J2-25
J2-43
J2-44
J2-6
J2-4
J2-53
J2-52
J2-3
J2-2
J3-9
J3-10
J3-17
J3-1
J3-11
J4-7
J4-3
J4-1
J4-4
J4-6
J1-4
J1-7
J1-6
J2 5
J2-7
J8-3
+5V
R11 4.7K
R12 4.7K
R14 4.7K
R15 1K
R18 4.7K
R21 4.7K
R22 4.7K
R23 1K
R2 1K
R7 4.7K
R1 1K
R6 100
L1
D1 D664
K1
TP
7400 E15
7400 E19
7400 E20
7400 E5
7400 E9
7400 E10
7400 E11
7400 E12
7400 E16
7400 E18
74H10 E21
74H10 E14
74H11 E6
7402 E10
7402 E9
7406 E22
7442 E1
7442 E4
7442 E17
74155 E7
7474 E13
7415Ø E8
STB
FLAG SEL. MODE 1
MODE Ø
WRITE F/F
BELL F/F
DECODER
S3 S2 S1 SØ

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE	CODE	NUMBER	REV.
DATA PATHS, MEMORY AND DECODERS (DP2)	D	CS	5411745-0-1	J
SCALE	SHEET 3 OF 5	DIST.		

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+5V: J1-19, J2-1-8-45, J3-7, J6-11, J7-1, J8-1, J9-5-6.

GND: J1-16, J2-9-10-45, J3-6, J4-2, J5-11, J7-2-3, J8-2-4-6-8, J9-8-9-10.

NOTE: JUMPERS W6 - W10 INSTALLED FOR VT52 24 LINE OPERATION.

JUMPERS W1 - W5 RESERVED FOR 12 LINE OPERATION.

VERT H, HORIZ L, DOT L, GND SENSE, +5V SENSE, R5 47, R4 2.2K

-5V, -12V, +15V

DP3-ADX, DP3-CURSOR H, DP3-TAB

VID Z H, VIDEO SHIFT REG 7495 E3, E2

R20 4.7K, R16 1K, R17 4.7K, R19 1K

J5: CD6, CD5, CD4, CD3, CD2, CD1, CD0

J1: B OSC A, CURSOR LD H, B CURSOR H, VSR LD H

DP3-AC<RAM, DP3-AC=RAM

MAGNITUDE COMPARATOR 7485 E36, E29

J6: AC2, AC1, AC0

J2: AC6, AC5, AC4, AC3, AC2, AC1, AC0

DP3-X6, DP3-X5, DP3-X4, DP3-X3, DP3-X2, DP3-X1, DP3-X0

DP2-ZCAV

AC REG. 74193 E37, AC REG 74193 E30

DP2-D AC H, DP2-I AC H, DP2-M2AC L, DP2-Z AC H

DP1-DO 6, DP1-DO 5, DP1-DO 4, DP1-DO 3, DP1-DO 2, DP1-DO 1, DP1-DO 0

X REG 74193 E34, E27

DP2-CXB, DP2-DXH, DP2-IXH, DP2-M2X, DP2-ZXH

Y REG 74193 E31

DP3-PAGE 2 SEL L, DP3-PAGE 1 SEL L

DP2-DYH, DP2-IYH, DP2-B2Y, DP2-ZYH

B4, B3, B2, B1, B0

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE	CODE	NUMBER	REV.
DATA PATHS, MEMORY AND DECODERS (DP3)	D	CS	5411745-0-1	J
SCALE	SHEET 4 OF 5	DIST.		

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WIRE TABLE

ITEM NO	DESCRIPTION AWG	COLOR	FROM CONNECTION	TO CONNECTION
40	22	BLK		J9-1
		BRN		2
		RED		3
		ORN		4
		YEL		5
		GRN		6
		BLU		7
		VIO		8
		GRY		9
40		WHT		J9-10
40		BLK		J8-1
		BRN		2
		RED		3
		ORN		4
		YEL		5
		GRN		6
		BLU		7
		VIO		8
		GRY		9
40	22	WHT		J8-10

J1 RUT CONN.
1 HORIZ L
2 SYNC L
3 CURSOR LD H
4 AUTO INC X H
5 SOVID
6 SCFF
7 ZCAV
8 MODE I L
9 T2H
10 TF
11 TG
12 TE
13 VSR LD H
14 GOHJ
15 KEY UP H
16 GND
17 +15V
18 -12V
19 +5V
20 VID Z H
21 VID Z H
22 B OSC A

J2 RUT CONN.
1 +5V
2 KEYCLK L
3 RUF L
4 UR
5 UT
6 M2UL
7 EOC
8 +5V
9 GND
10 GND
11 DO6
12 DO5
13 DO4
14 DOØ
15 DO1
16 DO2
17 DO3
18 M2BL
19 AC6
20 DI6
21 DI5
22 AC5
23 B4
24 AC4
25 D
26 DI4
27 DI3
28 E
29 AC3
30 B3
31 B2
32 AC2
33 F
34 DI2
35 DI1
36 G
37 AC1
38 B1
39 BØ
40 ACØ
41 H
42 DIØ
43 MUX A
44 MUX B
45 GND
46 +5V
47 A
48 BB
49 BC
50 VERT H
51 I ROM
52 TSC L
53 FLAG L
54 TW
55 TH

J3 COPIER - CONN.
1 CCFL
2 CD2
3 CD3
4 CD4
5 CD5
6 GND
7 +5V
8 CD6
9 C LD L
10 C EN L
11 CSFL
12 DOT L
13 CD1
14 CDØ
15 —
16 —
17 COPL
18 —
19 —
20 —

J4 GRAPHICS - CONN.
1 CCFL
2 GND
3 CENL
4 CSFL
5 DOTL
6 TSC L
7 GRAPHIC L

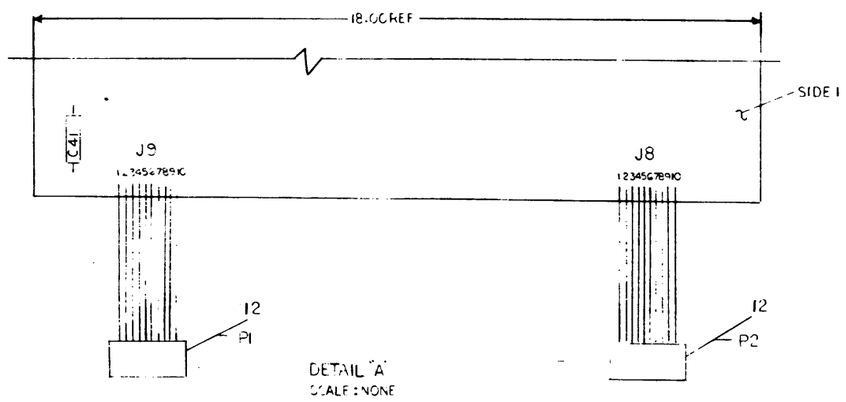
J5 CHAR. GEN. CONN.
1 CDØ
2 CD1
3 CD2
4 CD3
5 CD4
6 CD5
7 CD6
8 +15V
9 -5V
10 -12V
11 GND

J6 CHAR. GEN. CONN.
1 AC1
2 ACØ
3 AC2
4 DD6
5 DD4
6 DD5
7 DD3
8 DD1
9 DD2
10 DDØ
11 +5V

J7 GRAPHICS - CONN.
1 +5V
2 GND
3 GND
4 DD6
5 DD5
6 DD4
7 DDØ
8 DD1
9 DD2
10 DD3

J8 MONITOR - CONN.
1 +5V
2 GND
3 SYNC L
4 GND
5 HORIZ L
6 GND
7 VID Z H
8 GND
9 VERT H
10 +15V

J9 POWER CONN.
1
2 -12V
3 -5V
4 +5V SENSE
5 +5V
6 +5V
7 GND SENSE
8 GND
9 GND
10 GND



DETAIL "A"
SCALE: NONE

REVISIONS		
CHK	CHANGE NO	REV

TITLE	SIZE	CODE	NUMBER	REV.
DATA PATHS MEMORY AND DECODERS	D	CS	5411745-0-1	J
SCALE —/—/— SHEET 5 OF 5	DIST.			

5411745-0-1 J D CS

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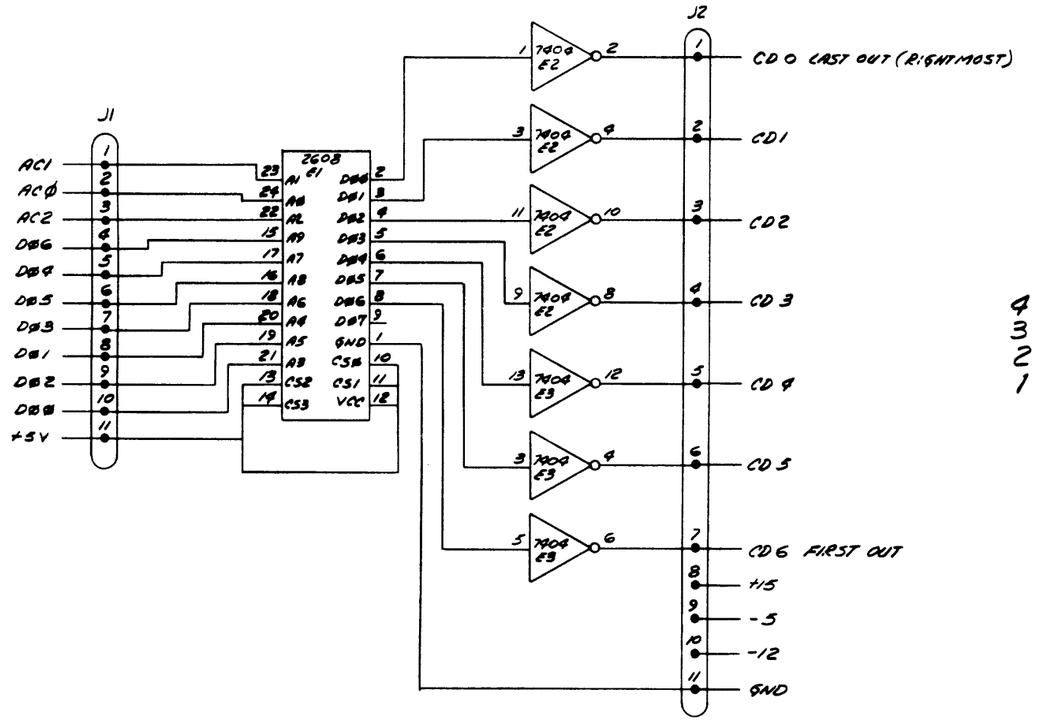
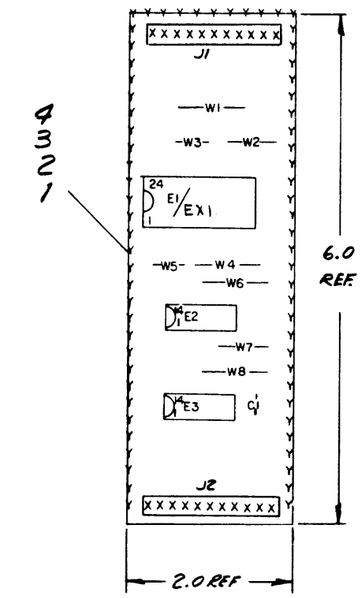
NOTES:

1. JUMPERS W3, W5 ON .9 CENTERS
   JUMPERS W2, W7 ON .6 CENTERS
   JUMPERS W1, W4, W6, W8 ON .8 CENTERS





REF	REF		X-Y COORDINATE HOLE LOCATION	X-CO-5911815-0-9	1
REF	REF		ASSY/DRILLING HOLE LAYOUT	E-AN-5911815-0-3	2
REF	REF		MODULE ECO HISTORY	B-AN-5911815-0-6	3
1	1		ETCHED CIRCUIT BOARD	3011818	4
1	1	C1	CAP. .01MF 100V 20% DISC	1001610-01	5
2	2	E2,E3	I.C. DEC 7404	1909686	6
—	1	E1	I.C. DEC 2608	23002B4	7
A/R	A/R	W1 THRU W8	JUMPER	9107180-C	8
A/R	A/R	J1, J2	HEADER, 11 POSITION	1818519	9
1	—	EX1	SOCKET, IC 24 PIN	1210693-00	10

2608	1	12
IC TYPE	GND	+5V

GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY EXCEPTIONS ARE STATED ABOVE

IC PIN LOCATIONS

REV.	CHANGE NO.	CHK	REVISIONS
D	5411815-PN004		M. WHITTLESEY 2-MAR-77
C	5411815-PN003		M. WHITTLESEY 8-FEB-77
B	5411815-PN002		M. WHITTLESEY 11-JAN-77
A	5411815-00001		DESIGNATED

J. BESUK 16-DEC-77

MUNCHANDERN

DEC NO.	EIA NO.	DEC NO.	EIA NO.
SEMICONDUCTOR CONVERSION CHART			

5411815-YA	5411815-0-0	QTY	REF. DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.

FIRST USED ON OPTION MODEL: VT52

PARTS LIST

ETCH BOARD REV. A

DRN.		DATE 8/29/75
CHKD.		DATE 8/29/75
ENG.		DATE 8/27/75
PROJ. ENG.		DATE 8/27/75
PROJ. LDR.		DATE 8/27/75

NEXT HIGHER ASSY: Ø-UA-VT52-Ø-Ø

SCALE NONE

SHEET 1 OF 1

digital

TITLE: 8K CHARACTER GENERATOR

SIZE	CODE	NUMBER	REV.
D	CS	5411815-Ø-1	D

DIST.

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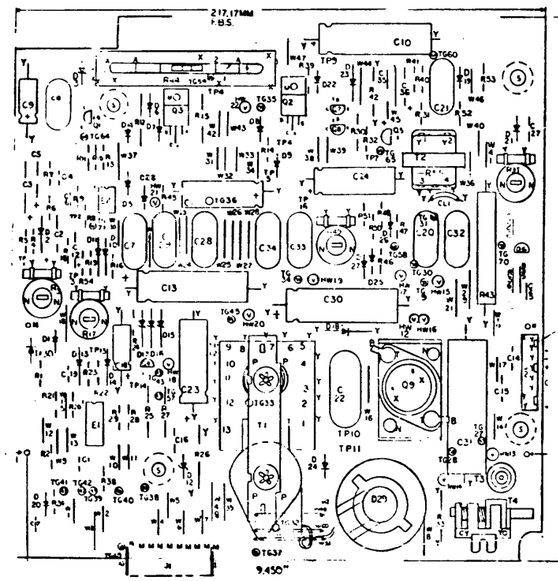
NOTES:

1. THERE IS NO ETCH TO D29. CONNECTIONS ARE HARD WIRED.
2. ETCH AND PUNCH/DRILL FOR TB-5 AND TB-22B.
3. CURRENT LOOP 4 INCH LENGTH #22 AWG WIRE.
4. ⏚ MUST BE CONNECTED TO A POINT GROUND.
5. UNLESS OTHERWISE NOTED: RESISTANCE IS IN OHMS, CAPACITANCE IS IN PICOFARADS.
6. W21, W35, AND W48 ARE OPTIONAL.
7. * THESE COMPONENTS USED ON -0 VARIATION ONLY.
8. FOR VARIATION-01, THE FOLLOWING PARTS ARE NOT USED. R36, R34, D28, D21, C27, C25 AND Q6.
9. LOCATION J1-10 NOT USED ON -1 VARIATION. BERG IC PIN HEADER TO BE INSERTED STARTING AT LOCATION J1-9 WITH BLANK PIN LOCATED TO THE LEFT OF J1-1 (-1 VARIATION ONLY).



QTY	QTY	REF. DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.
2	2	R25,R27	RES. 2.7K, 1W, 10%	1309023-00	53
1	1	R45	RES. 1M, 1/4W, 5%	1300595 00	54
1	1	R43	RES. 1.5 OHM, 10W 5%	1303135-00	55
—	1	R37	RES POT 2K	1311653-03	56
1	1	R8	RES. 39K, 1/4W, 5%	1302394-00	57
1	1	R44	RES POT 25BK	1311844 00	58
1	1	R17	RES POT 500	1311853-00	59
1	1	R3	RES POT 50K	1311853-01	60
1	1	R49	RES POT 1M	1311853-02	61
1	1	R15	RES. .47 2 W 5%	1305258 00	62
1	1	Q5	TRANSISOTR, 2N2904A	1501913 00	63
* 2	3	Q4,Q6,Q7	TRANSISTOR, 2N3904	1509524-00	64
1	1	Q3	TRANSISTOR, D45C8	1510414-00	65
2	2	Q1,Q8	TRANSISTOR, 2N3725	1510959-00	66
1	1	Q9	TRANSISTOR, BUY 69C	1511852-00	67
1	1	Q2	TRANSISTOR, D44C8	1510421 00	68
1	1	T1	TRANSFORMER, AT2072	1811898-00	69
1	1	T2	TRANSFORMER, U9737	1811897-01	70
1	1	T3	TRANSFORMER, U9934	1811898 00	71
1	1	T4	TRANSFORMER, AT4072	1811899-00	72
1	1	E1	I.C. DEC 7406	1910741 00	73
1	1	E2	I.C DEC 741 OP AMP	1910258-00	74
1	1		HEAT SINK, WAKEFIELD, 632-3P	1211980 00	75
	133	J1	STRAIGHT PINS HEADER	1212519-00	76
2	2	ITEM #75	KEYNUT #4-40	9008557 00	77
3	3		TIE WRAP	9007131	78
2	2		TERMINAL	9009876-00	79
44	44	W1-W19,W22-W34 W36 W47	WIRE JUMPER AWG*22	9107560-01	80
1	1	CL1	WIRE JUMPER AWG*22	9107350-00	81
1	1	USED WITH ITEM 32	CAP. PLASTIC FOR DIODE	1212125 00	82
1	1		HARNESS CRT	0-1A-7012096 J-0	83
1	1		HARNESS, YOKE	D1A7011870-0	84
2	2	ITEM #15	SCR. PHILLIPS PAN HD #4-40 X .250	9008901-01	85
A/R	A/R	ITEM #75	COMPOUND, THERMAL	9008268 00	68
1	1	J2	CONNECTOR	1212619 00	87
A/R	A/R	W49	INSULATED JUMPER	9107776-66	88
1	1	R55	RES 39 OHM 1/4W, 5%	1302377	89
1	1	D30	DIODE IN754A	1109991-00	90
1	—	W52	WIRE ECO AWG-30	9105740 55	91
-01	-00				

REF	REF		X-Y COORDINATE HOLE LOCATION		
REF	REF		ASSY DRILLING HOLE LAYOUT	D-AH-5411444-0-5	2
REF	REF		MODULE ECO HISTORY	B-MH-5411444-0-6	3
1	1		VT61 MONITOR PANEL	MO 5011443 00	4
* 2	3	C1,C19,C25	CAP., 100PF 100V, 5%	1000018 00	5
1	1	C17	CAP., 39PF 100V, 5%	1000310 00	6
1	1	C4	CAP., 27PF, 100V, 5%	1000022 00	7
1	1	C6	CAP. 47PF, 100V, 5%	1000024 00	8
* 3	4	C14,C15,C16,C27	CAP. .1UF, 100V, 20%	1000030 00	9
1	1	C11	CAP. .47UF, 100V, 10%	1000040 00	10
1	1	C9	CAP. 25UF, 25V	1000075 00	11
—	1	C26	CAP. 56PF, 100V, 5%	1000012 00	12
1	1	C12	CAP., 1UF, 35V, 10%	1001776 00	13
1	1	C35	CAP., 15UF, 20V, 10%	1004812 00	14
1	1	C3	CAP., 6.8UF, 35V, 10%	1005308 00	15
2	2	C5,C36	CAP. .33UF, 20V, 10%	1005328 00	16
1	1	C2	CAP. .47UF, 35V, 10%	1005965-00	17
1	1	C31	CAP. .12UF, 200V	1011848-01	18
9	9	C7,C8,C28,C21,C20,C29,C32, C33,C34	CAP., .022UF	1011846 00	19
1	1	C22	CAP., .056UF, 63V	1011847 00	20
2	2	C23,C24	CAP., 25UF, 15V	1011849-00	21
3	3	C10,C13,C30	CAP., 100UF 16V	1011849-02	22
4	4	D1,D2,D10,D11	DIODE, DC84	1100114 00	23
1	1	D3	DIODE, 1N687A	1110088 00	24
1	1	D12	DIODE, IN751A	1110994-00	25
* 5	7	D5,D13,D14,D20,D21,D23, D26	DIODE, G372	1105275 00	26
8	8	D4,D6,D7,D8,D9,D22,D25,D27	DIODE, IN4C24	1105798-00	27
1	1	D18	DIODE, MR552	1109634-01	28
3	3	D15,D16,D17	DIODE, 1N2343	1109888-00	29
2	2	D19,D24	DIODE, MV312	1111854-00	30
1	1	D28	DIODE, MV317	1111854-01	31
1	1	D29	DIODE, H-V ASSY	1112553-00	32
1	1	R31	RES. 220 OHM, 1/4W, 5%	1300271-00	33
2	2	R18,R22	RES. 330 OHM, 1/4W, 5%	1300295-00	34
1	1	R38	RES. 360 OHM, 1/2W, 5%	1300308-00	35
3	3	R11,R34,R52	RES. 470 OHM, 1/4W, 5%	1300316-00	36
1	1	R12	RES. 600 OHM, 1W, 10%	1300348 00	37
9	10	R1,R10,R20,R24,R28,R29,R32, R33,R38,R46	RES. 1K, 1/4W, 5%	1300385-00	38
1	1	R53	RES. 15 OHM, 1/4W, 5%	1301421 00	39
—	1	R35	RES 3K, 1/4W, 5%	1300432 00	40
4	4	R2,R9,R21,R39	RES. 10K, 1/4W, 5%	1300479-00	41
2	2	R4,R41	RES. 12UK, 1/4W, 5%	1300539 00	42
3	3	R16, R47, R48	RES 27CK, 1/4W, 5%	1301310 00	43
2	2	R19, R54	RES. 10 OHM, 1/4W, 5%	1301317 00	44
2	2	R13,R14	RES. 27 OHM, 1/4W, 5%	1301522-00	45
1	1	R33	RES. 120 OHM, 1W, 5%	1301838 00	46
1	1	R42	RES. 47 OHM, 1W, 5%	1302189 00	47
1	1	R20	RES. 2K, 1/4W, 5%	1302388-00	48
2	2	R50,R51	RES. 47CK, 1/4W, 5%	1302398-00	49
3	3	R7,R9,R40	RES. 100K, 1/4W, 5%	1302488-00	50
1	1	R5	RES. 620 OHM, 1/4W, 5%	1303178-00	51
1	1	R26	RES. 82 OHM, 2W 10%	1301654-00	52
QTY		REF. DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.

SEE NOTE 8

IC TYPE	GND	+5V
GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY EXCEPTIONS ARE STATED ABOVE		

IC PIN LOCATIONS

PARTS LIST

ETCH BOARD REV. E

DEC NO.	EIA NO.	DEC NO.	EIA NO.

SEMICONDUCTOR CONVERSION CHART

REV	CHANGE NO.	ORIGINATED	DATE	BY
J		5411444-0-0004	10-15-75	J DESUK
H		5411444-0-0003	10-15-75	J DESUK
E		5411444 0000	10-15-75	J BUZYNSKI
C			10-15-75	J BUZYNSKI

DRN		DATE 10-15-75
CHKD		DATE 12-5-75
ENGR		DATE 12-5-75
PROJ		DATE 12-15-75
MGR		DATE

NEXT HIGHER ASSY: D-UA-VT61-0

SCALE 1/1

SHEET 1 OF 3

digital

TITLE: VT61 MONITOR

SIZE D | CODE CS | NUMBER 5411444-0-1 | REV. J

DIST.

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J1 SYNC L 1 2 — +5V R39 1K — 7406 E1 — TG39 — J2 — 5V 65.1ms

C22 11.4000 — R34 47Ω — D23 DG72 — D14 — R40 20K — C36 .33μf — R41 20K — Q7 2N3904 — Q8 2N3725 — C35 15μf — +12V — R43 1.5 10W — R42 47 1W — C30 .1000μf 16V — C31 7μf 200V — TG28 HW14 — TP15 11V TYP — H YOKE 100Ω min .2Ω — Q9 BUY69C — D24 MRB12 — T1

TP10 — TG65 — SEE NOTE #3 — CL1 — H. SIZE — TG27 HW13 — T3 — T4 — R33 12Ω 1W — TP11 — D18 MRB52 — C22 .068μf — C23 25μf 150V — T2 6:1 TURNS RATIO — C21 .022μf — R31 22Ω — R55 39Ω 1/4W — Q5 2N2904A — R32 1K — P30 3/4K W — TP8 — J1 HORIZ L 4 — +5V R28 1K — 7406 E1 — TG40 — 5V 65.1ms — +5V R29 1K — 7406 E1

+12V — R26 82Ω 2W — TG38 — C16 .1μf — +5V — D12 5.1V — +5.2V — R20 1K — J1 VID OUT H 6 — TG42 — 7406 E1 — +5.2V — R21 10K — C17 390P — 7406 E1 — 5V

TG18 — TG37 — SEE NOTE #4

W52 — W55 — W48 — J2 SYNC L 1 — SYNC L — TG70 — TO POWER SUPPLY 2 — C14 .1μf — -12V — 4 — C15 .1μf — +12V — 5 — 6

TG57 — TP7 — R27 2.7K 1W — R25 2.7K 1W — D13 DG72 — R22 330 — C19 100 PF — R23 2K — R24 1K — Q4 2N3904 — D14 DG72 — D15 IN9648 — D16 IN9648 — D17 IN9648 — TP6

+12V — D30 IN754A — +5.2V — C24 25μf 150V — +80V TYP — TP12 — D19 MRB12 — R52 47Ω — TG33 — TP13 — R46 1K — D26 MRB17 — D25 IN6624 — D27 IN6624 — C28 .022μf — R48 25K — INTENSITY — C25 100PF — R35 3K — R36 1K — C26 5UPF — Q6 2N3904 — C29 .022μf — R37 2K — +12V — D21 DG72 — REVERSE VIDEO INTENSITY — C27 .1μf — D20 DG72 — PV7 LOW INT H IO — TG69 — J1 1 — NOTE 7.

SEE NOTE #1 — D29 2.6KV — 11KV — TO CRT ANODE CONNECTOR — +360V — R47 270K — C32 .022μf — TG58 — R50 47ΩK — R51 47ΩK — TG29 HW15 — 1K GRID SCREEN PIN 6

+450V — R38 270K — R49 1M — FOCUS — TG59 — TP16 — C33 .022μf — C34 .022μf — TG39 HW19 — 1K GRID FOCUS PIN 7

-80V — R45 1M63 — TG36 HW21 — 1K GRID 1 INTENSITY PIN 1

W21 — -12 — W20 — TG30 HW17 — PIN 3 — PIN 4 — TG31 HW16 — FILIMENT — 22Ω .022μf — HW12

1K TO CATHCOLE PIN 2

NOTE: THE ABOVE 1K RESISTORS ARE INSTALLED IN THE CRT CONN.

J1 VERT H 8 — 5V 16.7ms — R1 1K — C1 100pf — 7406 E1 — TG61 — D1 DG64 — V-LINEARITY — R3 50K — D2 DG64 — TP1 — +12V — TG60 — TG44 — R4 12.8K — R5 620 — C3 68μf — C4 270pf — R6 10K — C5 .33μf — R7 12.2K — R2 10K — TG71 — R9 100K — C6 470pf — C7 .022μf — 7401 E2 — TP2 — R10 1K — R11 470 — R8 30K — TG64 — Q1 2N3725 — R13 27 — C10 1000μf 16V — -12V — R53 15 — D3 IN967A — C8 .022μf — C9 25μf 25V

D4 IN6624 — D5 DG72 — D6 IN6624 — D7 IN6624 — D8 IN6624 — R12 680 1W — R14 27 — Q2 DG4CB (SEE NOTE #2) — R15 .47 1W — Q3 DA5C6 — C11 .47μf 100V — D9 IN9639 — TP4 — TP3 — HW22 TG35 — V YOKE 16Ω 30 mh — HW20 TG45 — D10 DG64 — D11 DG64 — R16 270K — C12 1μf — V-SIZE — TP5 — R17 5ΩΩ — R18 330 — R19 1Ω — R54 1Ω — C13 1000μf 16V

NOTE: #1 SEE VIDEO AMP SCHEMATIC FOR DETAILS
#2 Q2 MAY BE 2N3904 OR DA5C6

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE	CODE	NUMBER	REV.
VT61 MONITOR	D	CS	5411444-Φ-1	J
SCALE NONE	SHEET 2 OF 3	DIGT.		

5411444-01 D CS

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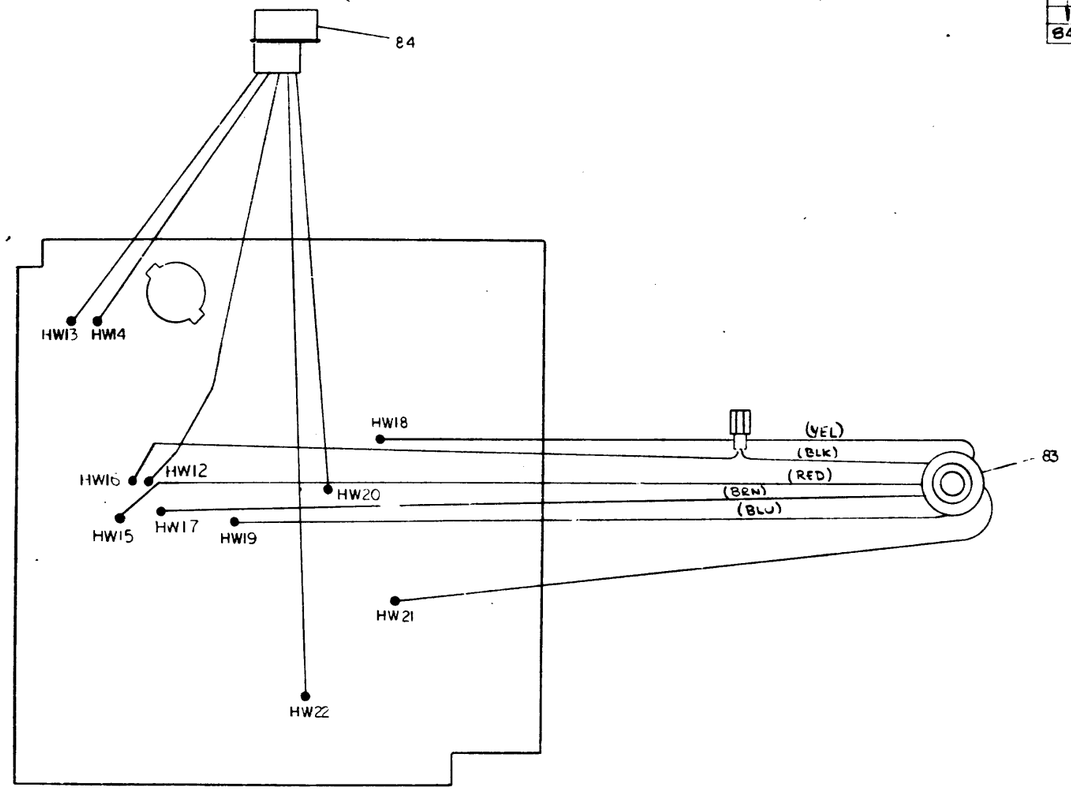
WIRE TABLE

ITEM NO	DESCRIPTION AWG	COLOR	FROM POINT	FROM CONNECTION	FROM WITH	TO POINT	TO CONNECTION	TO WITH
B3	18	GRN	10	PIN-1	—	HW12	—	SOLD
↑	22	BLK	9	PIN-3	—	HW20	—	↑
↑	TWP	RED	8	PIN-6	—	HV22	—	↑
↓	22	WHT	7	PIN 5	—	HW14	—	↑
B3	TWP	BLU	6	PIN-2	—	HW13	—	↑
B4	22	GRN	—	—	—	HW21	—	↑
↑	↑	YEL	—	—	—	HW18	—	↑
↑	↑	BRN	—	—	—	HW17	—	↑
↑	↑	BLK	—	—	—	HW16	—	↑
↓	↓	RED	—	—	—	HW15	—	↓
B4	22	BLU	—	—	—	HW19	—	SOLD



REVISIONS

CHK	CHANGE NO	REV

TITLE: VT61 MONITOR PANEL
SIZE: D | CODE: CS | NUMBER: 5411444 Ø-1 | REV: J
SCALE: NONE | SHEET 3 OF 3 | DIST:

DEC FORM NO DRD 137

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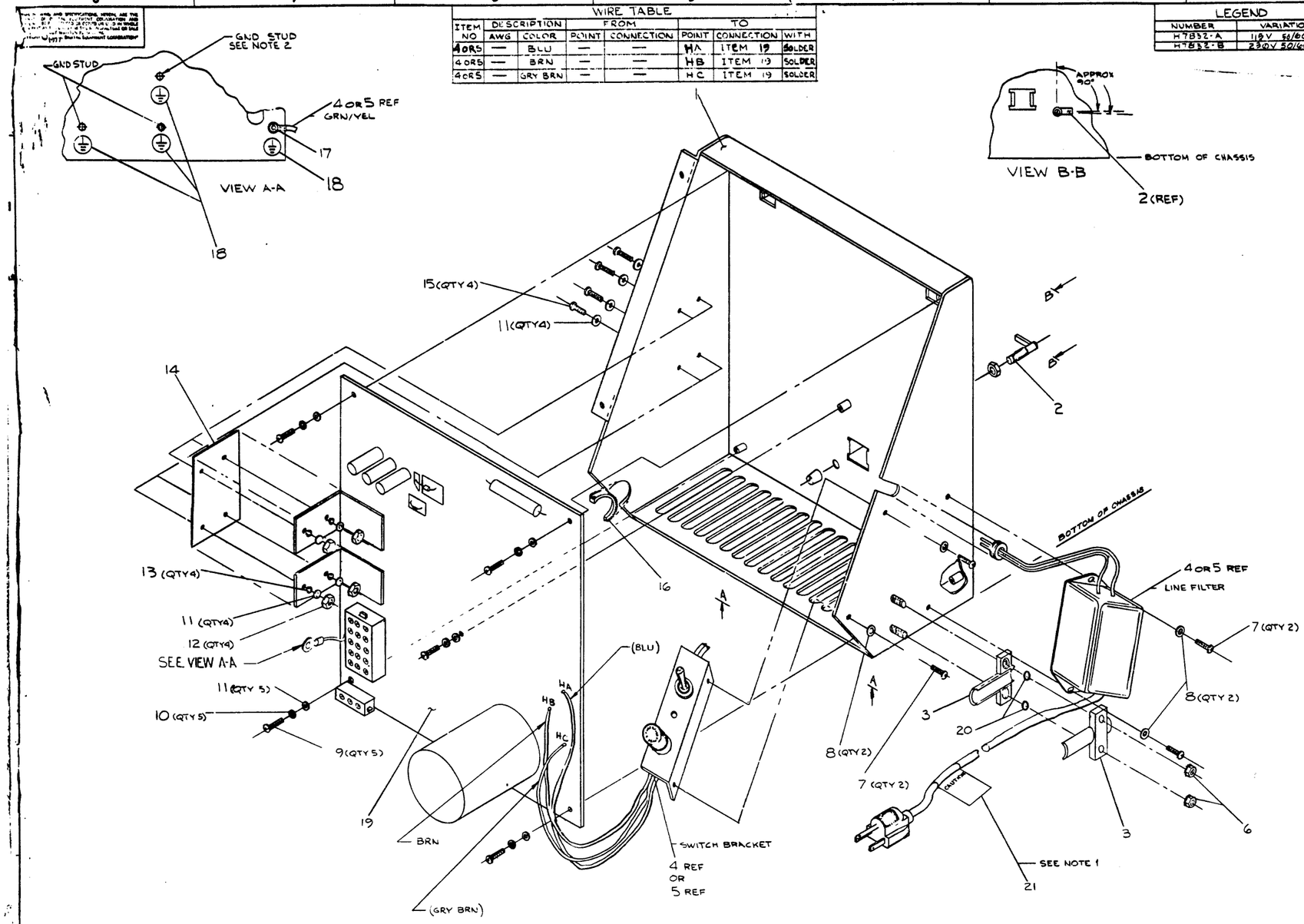
WIRE TABLE

ITEM NO	DESCRIPTION AWG	COLOR	FROM POINT	FROM CONNECTION	TO POINT	TO CONNECTION	WITH
4 OR 5	—	BLU	—	—	HA	ITEM 19	SOLDER
4 OR 5	—	BRN	—	—	HB	ITEM 19	SOLDER
4 OR 5	—	GRY BRN	—	—	HC	ITEM 19	SOLDER

LEGEND

NUMBER	VARIATION
H7832-A	115V 50/60HZ
H7832-B	230V 50/60HZ

NOTE :
1. ATTACH DECAL (ITEM #21) TO POWER CORD PART OF (ITEM #4 OR #5).
2. CONNECT RING TERMINAL FROM GROUND ETCH TO GROUND STUD BEFORE CONNECTING ANY OTHER TERMINALS TO THIS GROUND STUD.



1	1	LABEL, WARNING AC, CORD	36111448-00	21
2	2	O-RING 9/32.00 × 5/32 ID	9007016-00	20
1	1	POWER SUPPLY BOARD	5412973	19
4	4	DECAL	36126880-00	18
1	1	KEPNUT #10-32	9006565-00	17
2	2	GROMMETS, CAT.	9007035-00	16
4	4	SCR PHL PAN HD #6-32 X 7/16	9006023-01	15
1	1	INSULATOR	1213071-04	14
4	4	BUSHING, INSULATED	9008421-00	13
4	4	KEPNUT #6-32	9006567-00	12
13	13	WASHER, FLAT	9006633-00	11
5	5	WASHER, INT TOOTH #6	9006633-00	10
5	5	SCR PHL PAN HD #6-32 X .31 LG	9006021-01	9
4	4	WASHER, INT TOOTH #8	9006634-00	8
6	6	SCR PHL FAN HD #8-32 X .31 LG	9006036-01	7
2	2	KEPNUT #8-32	9006568-00	6
1	–	WIRING ASSY, H7832	70 IA 7418596-01	5
–	1	WIRING ASSY, H7832	70 IA 7418596-30	4
–	2	STRAIN RELIEF, POWER CORD	2MD 7418509-00	3
1	1	ADJUSTABLE GRIP LTCH	12120939-03	2
1	1	CHASSIS S & S	70 IA 7418560-00	1
		DESCRIPTN	DWG PART NO	ITEM NO.

H7832-B
H7832-A

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS

ANGLES ±0°30'
SURFACE QUALITY 125
QUANTITY & VARIATION

CLASS OF SCREW ± (CHECK ONE)

	over	thru	over	thru	over	thru
	0	3	3	6	6	10
ME 26MM	.01	.02	.03	.04	.08	.10
PREFERRED	.02	.04	.04	.06	.10	.12

MFR NUMBERS

THIRD ANGLE PROJECTION
REMOVE BURRS AND BREAK SHARP CORNERS
DO NOT SCALE DWG
MATERIAL SEE PARTS LIST
FINISH

DRWN	[illegible]	1/11/77
CHK'D	[illegible]	
ENG	[illegible]	
PROJ E:	[illegible]	
PROJ:	[illegible]	
NEXT HIGHER ASSY		
⌀ CAVT62 0-0		
SCALE NONE		
SHEET 1 OF 1		

FIRST USE ON VT62

TITLE H7832 POWER SUPPLY (VT62)

SIZE	CODE	NUMBER	REV
D	UA	H7832-0-0	A

DIST

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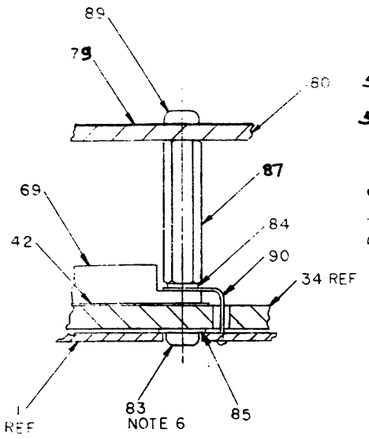
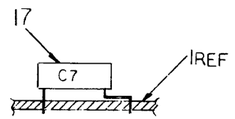
* DELETE THE FOLLOWING PARTS FROM THE -YA VARIATION:
C19, C25, C34, D21, R56, J2, F2, ITEM 33.

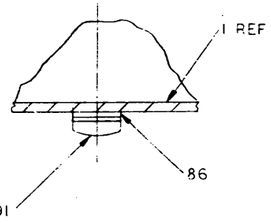
REWORK INSTRUCTIONS
ECO #1
COMPONENT DELETES SIDE 1
1-1. D32 (P/N 1112595-02)
E.C.O. #5
COMPONENT DELETES SIDE 1:
5-1 DELETE C7, (P/N 1013203-00)
COMPONENT ADDS SIDE 1:
5-2 ADD C7, (P/N 1011847-02)
ECO #6
COMPONENT DELETE SIDE 1:
6-1 DELETE E4 (P/N 1914075)
COMPONENT ADD SIDE 1:
6-2 ADD E4 (P/N 1912098-04)



PARTIAL SECTION A-A
ROTATED 45° CCW

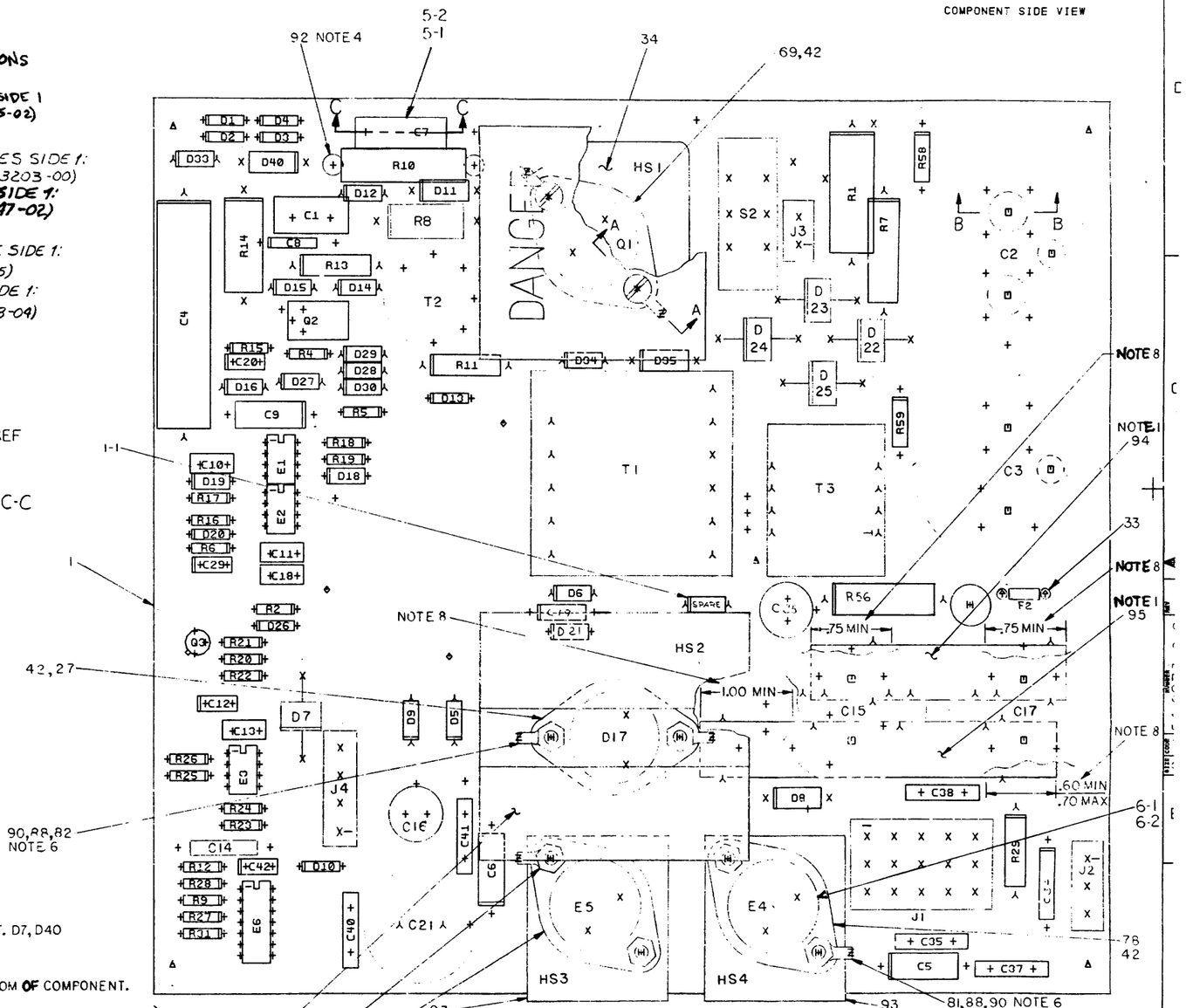


PARTIAL SECTION C-C
SCALE: NONE



PARTIAL SECTION B-B
TYPICAL 8 PLACES
AT C2, C3, C15, C17

COMPONENT SIDE VIEW



8-SOLDER BUS BAR TO ETCH ON COMPONENT SIDE IN AREAS INDICATED
7-POWER DIODES TO BE MOUNTED .40 TO .50 FROM TOP OF BD TO BOTTOM OF COMPONENT. D7, D40
6-TORQUE REQUIREMENTS FOR MOUNTING SCREWS.
FOR D17, E4, E5, Q1 TORQUE IS 6-8 INCH LBS.
FOR C2, C3, C15, C17 TORQUE IS 18-22 INCH LBS.
5-POWER RESISTORS AND DIODES TO BE MOUNTED .12 TO .25 FROM TOP OF BD TO BOTTOM OF COMPONENT.
R1, R7, R8, R11, R13, R14, R29, D5, D6, D9, D11, D12, D22-25, R56

NOTES:
1-ITEMS 94, 95 ARE UNDER C15, C17 ON SIDE 1
2-THIS BOARD MUST MEET U/L REQUIREMENTS
3-POLARITY OF D40 IS REVERSED 180° IN RELATION TO OTHER DIODES
4-PIO MOUNTED OFF BOARD USING ITEM 92

CHK	CHANGE NO	REV
	5412973-1	C
	5412973-2	D
	5412973-3	E
	5412973-4	F
	5412973-5	H
	5412973-6	J

ETCH REV. C
P.C. DESIGN DATA BASE REV. C

SIGNATURES	DATE
DRN.	21MAY77
CHK'D.	22AUG77
ENG.	15JUN77
PROJ.ENG.	15JUN77
PROD.	21JUN77
SCALE 2/1	
SHT. 1 OF 3	
NEXT HIGHER ASSY'S	54-DD-5412973-A

digital

TITLE: VT61, VT62, VT78, FDCT POWER SUPPLY

SIZE	CODE	NUMBER	REV
D	04	5412973-00	L

MS# 124115

LINE	ITEM	DOCUMENT NUMBER	PART NUMBER	DESCRIPTION	QTY PER VARIATION 00	YA	REFERENCE DESIGNATOR
1	1	D-MD-5012972-0-0	5012972-00	5412973	1	1	
2	2		1000009-00	33.0 MMF 100V 5%200PPM DM15S	1	1	C13
3	3		1000030-00	.1 MFD 100V 20% Z5U DISC	5	5	C35,C37,C38,C40,C41
4	4		1000042-00	1000.0 MMF 100V 5%200PPM DM15S	3	3	C10,C11,C18
5	5		1000055-00	2200. MMF 250V 20% Y5S DISC	1	1	C20
6	6		1000061-00	8200.0 MMF 100V 10% 663UW MYLR	1	1	C14
7	7		1001610-01	.01 MFD 100V +20+80 Z5U DISC	3	3	C12,C29,C42
8	8		1003055-00	.27 MFD 250V 20% MET. *MYLR	1	0	C34
9	9		1005507-00	1 MFD 100V E% 30D AL EL	3	3	C5,C6,C9
10	10		1005784-00	.01 MFD 100V 10% 663VW MYLR	1	1	C8
11	11		1009964-00	.68 MFD 35V 10% 150D S.TA	1	0	C19
12	12		1011849-01	600. MFD 25V G%500D AL EL	1	1	C4
13	13		1012607-04	270 MFD 40V H% 672D AL EL	1	1	C16
14	14		1012607-05	20MFD 200V H% 672D AL EL	1	0	C25
15	15		1012740-00	3900 MFD 6V 432D AL EL	2	2	C15,C17
16	16		1012744-00	590 MFD 200V E% 36D AL EL	2	2	C2,C3
17	17		1011847-02	.01 MFD 600V 10% POLYPROP	1	*	C7
18	18		1013280-00	680.0 MMF1000V 5%200PPM	1	1	C1
19	19		1014070-00	680 MFD 40V H% 673D AL EL	1	1	C21
20	20		1100114-00	D 664 QS\75PCB PIV= 25V SP	2	2	D18,D19
21	21		1100125-00	1N 758A VZ= 10.0 5% .40W PPE	1	1	D26
22	22		1105796-00	1N 4004 PIV=400 I= 1A D041 SP	6	6	D1-D4,D10,D13
23	23		1105873-00	4M5-1AZ1 VZ= 5.1 1% .400W	1	1	D20
24	24		1110420-00	1N 5624 PIV=200 I= 5A	1	1	D8
25	25		1110488-00	1N 4733 VZ= 5.1 10% 1W N	1	0	D21
26	26		1110615-01	PIV=600 I=6A SI	4	4	D22-D25
27	27		1114781-00	UE8601 PIV=50 I=30A	1	1	D17
28	28		1112594-02	A115M PIV=600 I= 3A	2	2	D11,D40
29	29		1112595-01	A114B PIV=200 I= 1A	11	11	D5,D6,D9,D14-D16,D27-D30,D33

REVISION HISTORY			BASIC PART NO: 5412973										
ENG	ECO NUMBER	REV	SECTION A OF A	DRN: R.BUREAU	DATE: 06-FEB-78		D	I	G	I	T	A	L
WH	00005	H	SECTION.VARIATION INDEX	CHK'D: K.GLEEZEN	DATE: 06-FEB-78	TITLE	PARTS LIST						
ER	00006	J	[A] 00,YA			VT61,VT62,VT78,FDCT POWER SPLY							
D.C	5412973-ML008	L	[B]	DES.ENG: B.STANDISH	DATE: 06-FEB-78								
			[C]			DOCUMENT NUMBER							
			[D]	RESP.ENG.: B.STANDISH	DATE: 06-FEB-78	SIZE	CODE	NUMBER					REV
			[E]										
			[F]	MFG.ENG.: R.POWERS	DATE: 06-FEB-78	K	PL	5412973-0-DBP					L
			[H]										
			[J]	ASSEMBLY NUMBER:				FILE NAME:					EDIT #
			[K]	D-UA-5412973-0-0				12973L.PLS					19
			[L]										
			[M]										
			[N]										

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LINE	ITEM	DOCUMENT NUMBER	PART NUMBER	DESCRIPTION	QTY PER VARIATION 00	QTY PER VARIATION YA	REFERENCE DESIGNATOR
30	30		1112595-02	A114M PIV=600 I= 1A	2	2	D12,D34
31	31		1113123-00	1.5K3200 VOLT,TRANS,SUPRESS, 220	1	1	D35
32	32		1114069-00	MR 822 PIV=200 I= 6A	1	1	D7
33	33		1209336-01	JACK, 1LINE	2	0	
34	34		1210012-02	HT SINK W/HOLES 1.81X1.81	1	1	
35	35		1210929-02	FUSE, SUB-MINI 1.000A, 125V, A	1	0	F2
36	36		1212297-00	MATE-N-LOK 2PIN UNIV HEADER	1	1	J3
37	37		1212297-03	MATE-N-LOK 3PIN UNIV HEADER	1	0	J2
38	38		1212297-01	MATE-N-LOK 4PIN UNIV HEADER	0	1	J4
39	39		1212297-04	MATE-N-LOK 15PIN UNIV HEADER	1	1	J1
40	40		1212794-00	SW,SLIDE 2P 3A PCB MTG	1	1	S2
41	41		1212941-00	HEAT SINK,H783,2.5"LX2.25"WX1.52	1	1	
42	42		1213071-02	INSULATOR,RUBBER SILICONE SM	4	4	
43	43		1300219-00	68 1/4W 5% CC	2	2	R2,R4
44	44		1300288-00	270 2W 10% CC	1	1	R14
45	45		1300295-00	230 1/4W 5% CC	2	2	R5,R15
46	46		1300298-00	330 1W 10% CC	1	1	R13
47	47		1300365-00	1 K 1/4W 5% CC	2	2	R25,R26
48	48		1300447-00	4.7 K 1/4W 5% CC	1	1	R17
49	49		1300479-00	10 K 1/4W 5% CC	1	1	R20
50	50		1300544-00	180 K 1/2W 10% CC	2	2	R58,R59
51	51		1301317-00	10 1/4W 5% CC	1	1	R23
52	52		1301392-00	1 K 2W 10% CC	1	1	R8
53	53		1302395-00	56 K 1/4W 5% CC	1	1	R24
54	54		1302514-00	39 K 1/4W 5% CC	1	1	R16
55	55		1303114-00	1.0 K 1/4W 1% RN55D-F 100PPM	1	1	R31
56	56		1305428-00	1.0 2W 5% WW	1	1	R11
57	57		1304856-00	4.64 K 1/4W 1% RN55D-F 100PPM	1	1	R22
58	58		1305123-00	215 1/4W 1% RN55D-F 100PPM	2	2	R21,R28
59	59		1305265-00	39.2 K 1/4W 1% RN55D-F 100PPM	1	1	R19
60	60		1309418-00	24.3 K 1/4W 1% RN55D-F 100PPM	1	1	R18
61	61		1309422-00	5.1 1/4W 5% CC	2	2	R6,R27
62	62		1309595-00	1 M 1/4W 5% CC	1	1	R9
63	63		1309680-00	2.7 M 1/4W 5% CC	1	1	R12
64	64		1312994-00	.7 6-1/2W 5% WW	2	2	R1,R7
65	65		1312995-00	10 K 6.5W 5% WW	1	0	R56
66	66		1313014-00	.01 3-3/4W 3% WW	1	1	R29
67	67		1313191-00	1 K 9W 5% WW	1	1	R10
68	68		1510706-00	XA 55 PNP 500MW SI 60 50 P	1	1	Q3
69	69		1512782-06	NPN 100W 51325 15	1	1	Q1
70	70		1512790-00	D 44C11 NPN 30W SI 80 40	1	1	Q2
71	71		1612890-01	/OBSOLETE	1	0	T1
72	72		1614778-00	XFMR P-AB S=6.0@ 100MA	1	1	T3
73	73		1612920-02	PULSE XFMR 30KHZ VT61	1	1	T2
74	74		1910282-00	301AN OP AMP	1	1	E3
75	75		1911944-00	555CN TIMER,FUNCT,BLOCK	2	2	E1,E2
76	76		1912048-00	DEC 7812-00 VOLT,REG,FIX +1	1	*	E5

D	I	G	I	T	A	L	TITLE	SECTION	SIZE	CODE	DOCUMENT NUMBER	REV
							VT61,VT62,VT78,FDCT POWER SPLY	A OF A	K	PL	541297?-0-DBP	L

LINE	ITEM	DOCUMENT NUMBER	PART NUMBER	DESCRIPTION	QTY PER VARIATION 00	YA	REFERENCE DESIGNATOR
			CONT		-	2	E4,E5
77	77		1912108-00	339 VOLT CMPRTR,QUAD	1	1	E6
78	78		1912048-04	DEC 7812-04 VOLT.REG,FIX +1	1	0	E4
79	79		3610267-00	DECAL, ADHESIVE BACK -DANGER HIG	1	1	
80	80		7416423-00	PLASTIC SAFETY COVER	1	1	
81	81		9006021-01	SCREW,PAN ,PHIL, 6-32X 5/16	4	4	
82	82		9006022-01	SCREW,PAN ,PHIL, 6-32X 3/8	2	2	
83	83		9006024-01	SCREW,PAN ,PHIL, 6-32X 1/2	2	2	
84	84		9006633-00	WASHER,LOCK,INT,.280OD X .146ID	2	2	
85	85		9006653-00	WASHER, FLAT, .375 O.D. X .156 I	2	2	
86	86		9006660-00	WASHER, FLAT, .375 O.D. X .187 I	8	8	
87	87		9007985-00	SPACER, HEX, ALUM, 6-32, .250 X	2	2	
88	88		9008185-00	NUT,KEP , 6-32X1/4 AF	6	6	
89	89		9008212-00	SCREW, NYLON, SLTD PAN HD, 6-32	2	2	
90	90		9009676-00	TERM LUG 1POS SOLDER	6	6	
91	91		9009795-00	SCREW, SEMS, SLOTTED PAN HD 10-	8	8	
92	92		9009798-00	SPACER, CERAMIC, .186 ODX,078 ID	2	2	
93	93	B-MD-7415206-0-0	7415206-00	HEAT SINK	2	2	
94	94	B-MD-7415614-0-0	7415614-00	BUS BAR	1	1	
95	95	B-MD-7415615-0-0	7415615-00	BUS BAR	1	1	
96	96		1613904-00	XFMR P=240-360V S=5V@14A	0	1	T1
97	97		9009747-02	SUPPORT CIRCUIT BOARD, LOCKING,	0	3	

DIGITAL	TITLE	SECTION	SIZE	CODE	DOCUMENT NUMBER	REV
	VT61,VT62,VT78,FDCT POWER SPLY	A OF A	K	PL	5412973-0-DBP	L

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NOTES:

1. ALL RESISTORS ARE 1/4 W, 5% UNLESS OTHERWISE SPECIFIED. ALL CAP. IN UF. UNLESS OTHERWISE SPECIFIED.
2. (⏚) POWER GND & (▽) SENSE GND ; ARE CONNECTED AT J1.
3. POINTS A,B,& C ARE INPUT CONNECTIONS TO P.C. BOARD

NOTES CONT

4. THIS SECTION IS ONLY USED FOR -0 VAR. THE FOLLOWING PARTS ARE DELETED FROM -YA VAR: C19, C25, C34, D21, R56, J2, F2
5. LM 340K (7812) IS USED ON -YA VARIATION.
6. J4 IS USED ON -YA VARIATION.
7. 300 V TRANSFORMER WINDING IS ONLY PRESENT ON -YA VARIATION.

REVISIONS			
CHK	CHANGE NO.	REV.	
RLS	DCS412973-0001	C	
	B. STANDISH		
	DCS412973-00002	D	
	B. STANDISH		
	DCS412973-00003	E	
	M. BLAKE D. GUSS		
	DCS412973-00005	F	
	B. STANDISH		
	DCS412973-0004	H	
	B. STANDISH		
	DCS412973-MLA209	J	
	B. HAZEN		

DRWN		4/20/77
CHK		7/11/77
ENG.		7/28/77
PROJ. ENG.		8/10/77
PROD.		8/11/77
NEXT HIGHER ASSY.	D-UA-5412973-0-0	
SCALE		
SHEET	OF	

FIRST USED ON: VT62 / VT68

TITLE: VT61, VT62, VT78 FDCT POWER SUPPLY

SIZE D | CODE CS | NUMBER 5412973-0-1 | REV. K | DIST.

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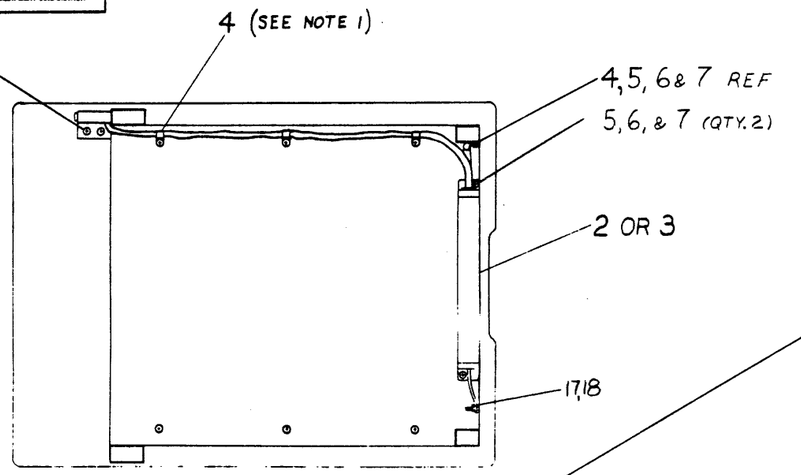

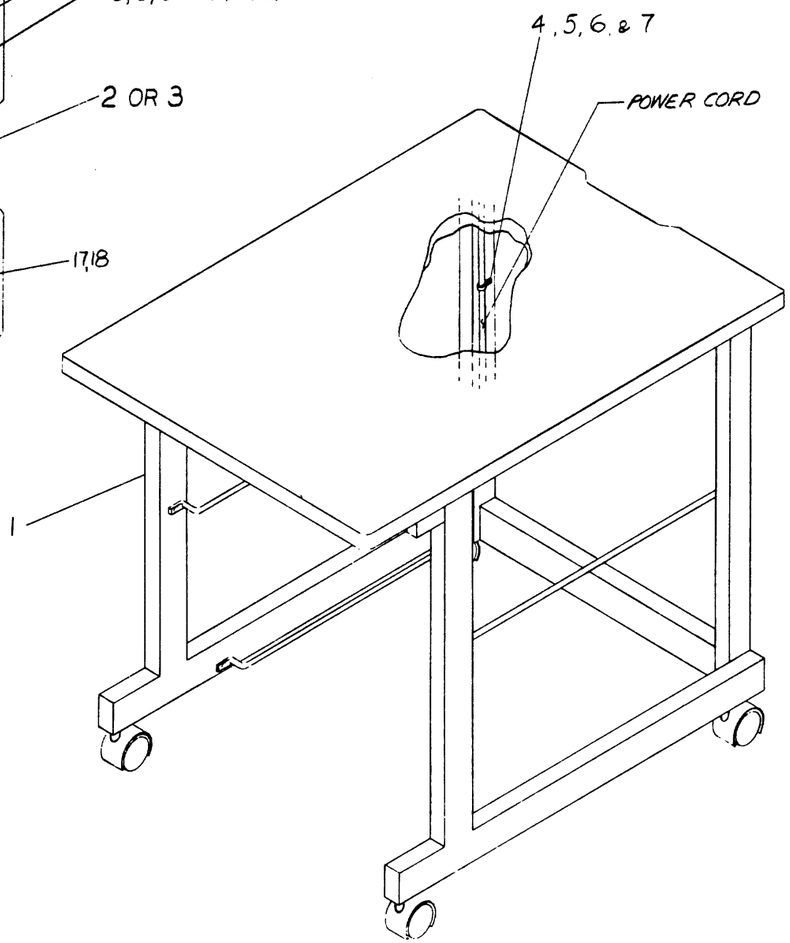

LEGEND	
VARIATION NO.	DESCRIPTION
- AA	115 V
- AB	230 V
- AC	115 V, PANELS & SHELF
- AD	230 V, PANELS & SHELF
- BA	PANELS & SHELF

NOTES:

1. HARDWARE FOR MOUNTING TABLE TOP TO FRAME IS CALLED OUT ON E-PS-3414188.
2. KWIK CLIP INSTALLATION: ATTACH CLIPS (ITEM 15) TO RAILS AT THE MOST FOWARD & REAR POSITIONS WITH PAD SIDE UP (AS SHOWN). PEEL PROTECTIVE PAPER FROM PADS. PLACE LOWER SHELF (ITEM 11) IN ITS PROPER POSITION IN CABINET AND APPLY PRESSURE DOWNWARD ON SHELF TO AFFIX CLIP PADS.
3. UNIT SHALL BE ELECTRICALLY TESTED PER DEC SPECIFICATION A-SP-7663277-0-0 (CONTINUITY AND DIELECTRIC STRENGTH TEST). TEST MUST OCCUR AT A CSA CERTIFIED SITE.

H978-BA	H978-AD	H978-AC	H978-AB	H978-AA	DESCRIPTION	DWG./PART NO.	ITEM NO.
-	1	1	1	1	WASHER, EXT. TOOTH LOCK #10	9007651	18
-	1	1	1	1	NUT, KEP, #10-32	9006565-00	17
-	-	-	1	1	SCREW, PHL TRUSS HD	9006071-03	16
4	4	4	-	-	KWIK KLIP	1210518-01	15
10	10	10	-	-	MAGNETIC CATCH	1212908-01	14
1	1	1	-	-	DECORATIVE PANEL RH.	D-MD-7014655-01	13
1	1	1	-	-	DECORATIVE PANEL LH.	D-MD-7014655-00	12
1	1	1	-	-	LOWER SHELF	D-MD-7419466-00	11
1	2	2	2	2	LOCK WASHER INT. #8	90066-34	10
1	2	2	2	2	FLAT WASHER	90066-60	9
1	2	2	2	2	SCREW, PHL TRUSS HD	9009689-03	8
1	5	5	5	5	LOCK WASHER INT. #10	90-06835	7
1	5	5	5	5	FLAT WASHER	90-06664	6
1	5	5	5	5	SCR., PHL, PAN HD #10-32 X .75 SST	9006075-01	5
1	4	4	4	4	CABLE CLAMP	90-07083	4
1	1	1	1	-	POWER STRIP 230 V	1214216-01	3
1	-	1	-	1	POWER STRIP 115 V	1214216-00	2
1	1	1	1	1	STAND	3414188	1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

ANGLES ±0° 30'	CLASS OF ACCURACY (CHECK ONE)	NOMINAL DIMENSION RANGE INCHES: OVER 0 TO 0.2	OVER 0.2 TO 1.2	OVER 1.2 TO 4.0	OVER 4.0 TO 12.0	OVER 12.0 TO 40.0	OVER 40.0 TO 80.0
SURFACE QUALITY IN ✓ MICROINCHES	MEDIUM ☐	±.004	±.008	±.012	±.016	±.024	±.04
	PREFERRED ☐	±.012	±.016	±.025	±.04	±.063	±0.1

QUANTITY & VARIATION

THIRD ANGLE PROJECTION

REMOVE BURRS AND BREAK SHARP CORNERS

DO NOT SCALE DWG

MATERIAL

FINISH

DRN. R. Cusack	12 JUL 77	FIRST USED ON digital
CHK'D D. Wilson	2 Aug. 77	
ENG. S. Wells	2 Aug. 77	TITLE
PROJ. [illegible]	23 Aug. 77	TERMINAL STAND
NEXT HIGHER ASSY.		
SCALE NONE	SIZE D	CODE UA
SHEET 1 OF 2	DIST.	NUMBER H978-0-0
		REV. B

REVISIONS			
CHK	CHANGE NO.	REV.	
[illegible]	H978-00001	A	23 Aug 77
J. WALLS			
[illegible]	H978-ML0002	B	23 Dec 77
P. GARDNER			5 DEC 78

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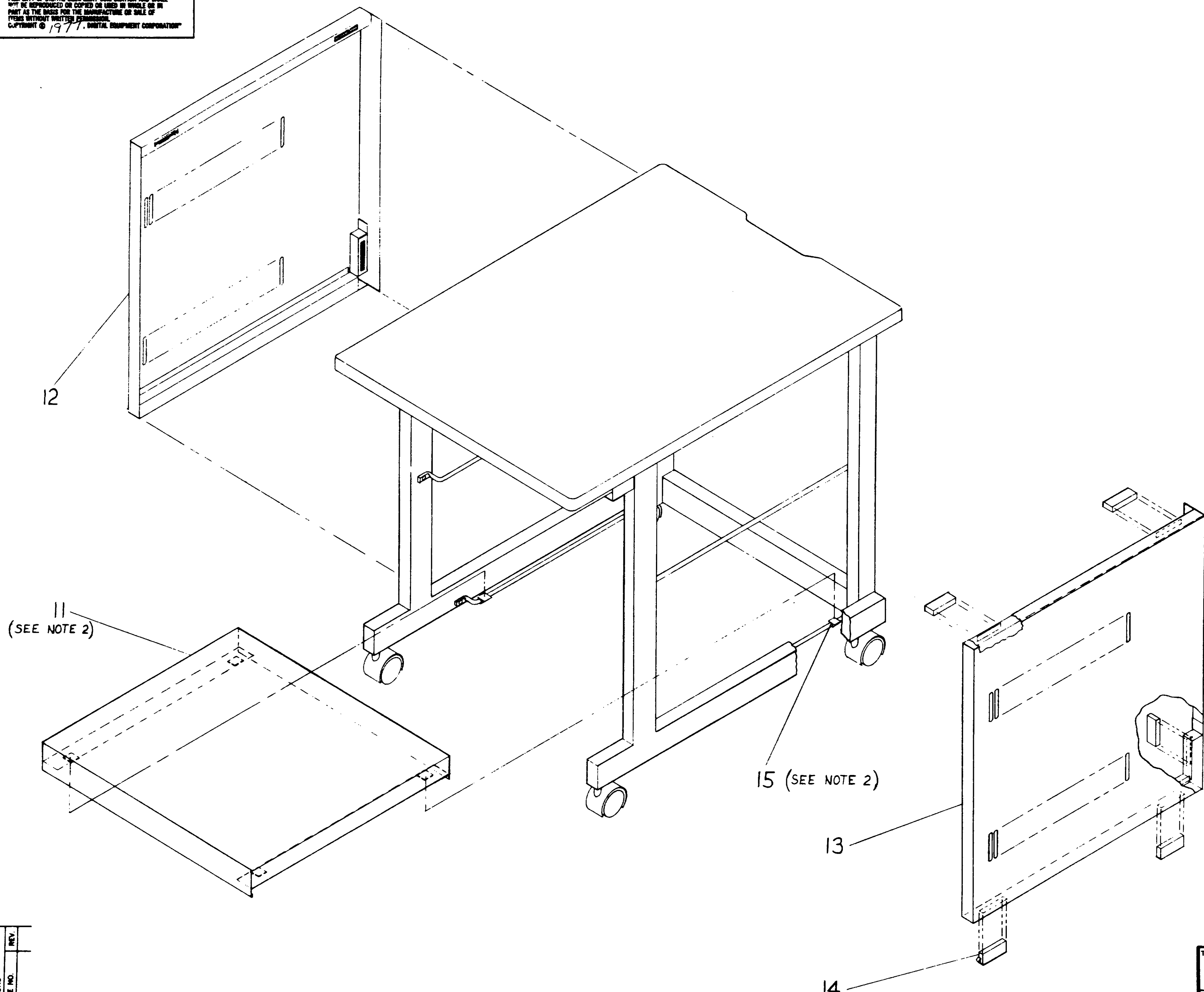

REVISIONS		
REV.	CHANGE NO.	CHK.

DESCRIPTION	DWG./PART NO.	ITEM NO.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

ANGLES ±0° 30'

SURFACE QUALITY IN MICROINCHES

CLASS OF ACCURACY (CHECK ONE)	OVER 0 TO 0.2	OVER 0.2 TO 1.2	OVER 1.2 TO 4.0	OVER 4.0 TO 12.0	OVER 12.0 TO 40.0	OVER 40.0 TO 80.0
MEDIUM	±.004	±.008	±.012	±.016	±.024	±.04
PREFERRED	±.012	±.016	±.025	±.04	±.063	±0.1

QUANTITY & VARIATION

THIRD ANGLE PROJECTION

REMOVE BURRS AND BREAK SHARP CORNERS

DO NOT SCALE DWG

MATERIAL

FINISH

DRN.	R. Cieslak	12 JUL 77
CHK'D	SEE	
ENG.	SHEET	
PROJ. ENG.	1	
PROD.		

NEXT HIGHER ASSY.

SCALE NONE

SHEET 2 OF 2

FIRST USED ON

digital

TITLE

SIZE	CODE	NUMBER	REV.
D	UA	H978-Ø-Ø	B

DIST.

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FIELD MAINTENANCE PRINT SET

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TABLE OF CONTENTS

B-TC-RX78-P-1	FIELD MAINTENANCE PRINT SET (TC)
E-UA-RX78-P-Ø	UNIT ASSY (RX78-P)
E-UA-RXØ1-Ø-Ø	RXØ1 FLOPPY DISK DRIVE ASSY
K-SP-RXØ1-Ø-2	RXØ1 FIRMWARE LISTING
A-PL-RXØ1-Ø-Ø	RXØ1 FLOPPY DISK DRIVE ASSY (PL)
D-CS-M7726-Ø-1	FLOPPY DISK CONTROL BD.
D-CS-M7727-Ø-1	READ/WRITE CONTROL BD.
E-UA-H771-Ø-Ø	H771 POWER SUPPLY ASSY
D-CS-H771-A-1	H771-A CIRCUIT SCHEMATIC
D-CS-H771-C-1	H771-C CIRCUIT SCHEMATIC
D-CS-H771-D-1	H771-D CIRCUIT SCHEMATIC
D-AD-7010718-Ø-Ø	RXØ1 POWER BOARD ASSY
D-CS-5411398-Ø-1	RXØ1 POWER SUPPLY BD.
A-SP-3700312-Ø-Ø	PACKAGING INSTRUCTIONS

UNIT VARIATIONS COVERED BY THIS PRINT SET
RX78-PA
RX78-PC
RX78-PD

RX78
Field Maintenance
Print Set

Digital Equipment Corporation

PRINT SET ORDER NO.

MPØØ469

REVISIONS	REV.	CHG. NO.	DATE
EN-01124-16-NF (127)			

USED ON OPTION/MODEL	
RX78-P	

SHEET 1 OF 1

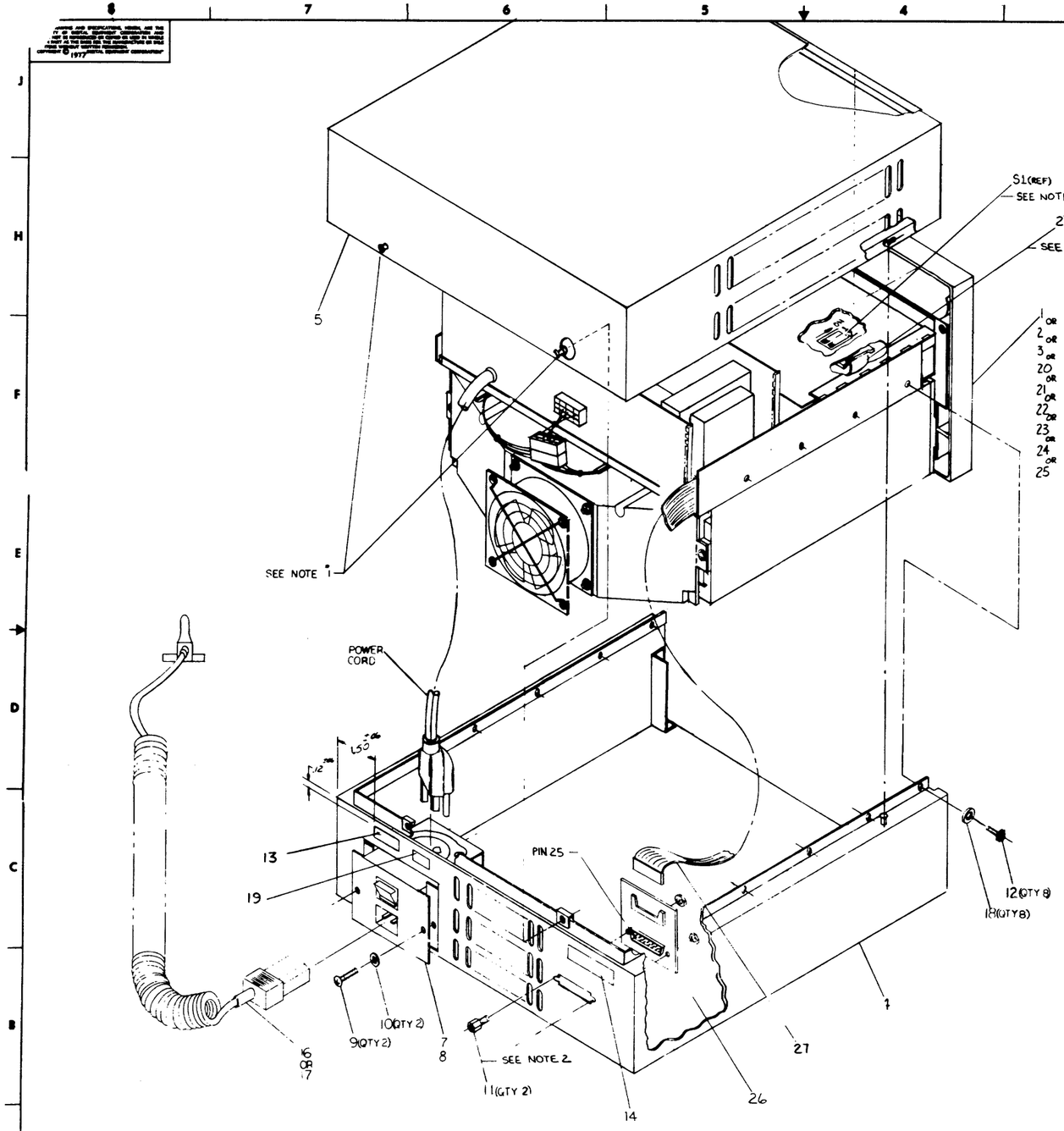
DRN. G Drayton	DATE 10 78	
CHK'D	DATE	
PROJ. ENG.	DATE	
FIELD SERV.	DATE	

TITLE: RX78-P

SIZE	CODE	NUMBER	REV.
B	TC	RX78-P-1	

DIST.

DRB 124



LEGEND	
NUMBER	VARIATION
RX78-PA	115V-60 HZ
RX78-PC	115V-50 HZ
RX78-PD	230V-50HZ
RX78-RA	115V-60 HZ
RX78-RC	115V-50 HZ
RX78-RD	230V 50 HZ
RX78-SA	115V-60HZ
RX78-SC	115V-50HZ
RX78-SD	230V-50HZ
RX78-UA	115V-60HZ
RX78-UC	115V-50HZ
RX78-UD	230V-50HZ

NOTE:

1. MAKE 1/4 TURN TO THE RIGHT TO SECURE COVER (ITEM 5) TO BASE (ITEM 4)
2. WASHERS SUPPLIED WITH SCREW LOCK ASSY (ITEM 11) ARE NOT USED.
3. SET S1 ON M7744 (NOT APPLICABLE TO RX78-PA, PC, PD) AS FOLLOWS:

VARIATION	S1-1	S1-2	MODE
RX78-RA	OFF	OFF	RX02
RX78-RC	OFF	OFF	RX02
RX78-RD	OFF	OFF	RX02
RX78-SA	OFF	OFF	RX02
RX78-SC	OFF	OFF	RX02
RX78-SD	OFF	OFF	RX02
RX78-UA	ON	OFF	RX01
RX78 UC	ON	OFF	RX01
RX78-UD	ON	OFF	RX01

4. INSTALL CABLE (ITEM 11) TO (J1) OF BOARD (M7726 OR M7744) SMOOTH SIDE UP AS SHOWN. AT BOARD, CABLE MUST BE FOLDED APPROX. 4 INCHES OUT FROM THE CONNECTOR AT 45° ANGLE FOR THE M7744 OR M7726 TO CLOSE PROPERLY.

RX78-UD	RX78-UC	RX78-UA	RX78-SD	RX78-SC	RX78-SA	RX78-RD	RX78-RC	RX78-RA	RX78-PD	RX78-PC	RX78-PA	DESCRIPTION	DWG./PART NO.	ITEM NO.
												CABLE, INT. RX78	BC08R-02	27
												BOARD, JUMPER RX78	5414168-00	26
												FLOPPY DISK DRIVE (230V-50HZ)	RX02-ND	25
												FLOPPY DISK DRIVE (115V-50HZ)	RX02-NC	24
												FLOPPY DISK DRIVE (115V-60HZ)	RX02-NA	23
												FLOPPY DISK DRIVE (230V-50HZ)	RX02-LD	22
												FLOPPY DISK DRIVE (115V-50HZ)	RX02-LC	21
												FLOPPY DISK DRIVE (115V-60HZ)	RX02-LA	20
												LABEL, CSA	3613211-01	19
8	8	8	8	8	8	8	8	8	8	8	8	WASHER FLAT #10	9006664	18
1			1			1			1			POWER CORD, 230 V	1700106-01	17
				1			1			1		POWER CORD, 115V	1700106-00	16
												SNAP PRGT INST.	3700312	15
												LABEL ELEC. DATA	3613210-60	14
												LABEL U.L.	ADC 74M213-0-0	13
8	8	8	8	8	8	8	8	8	8	8	8	SCR, SEMS PHL PAN 10-32 X 3/8	9009228-10	12
2	2	2	2	2	2	2	2	2	2	2	2	SCR. LOCK ASSY	9008451-00	11
2	2	2	2	2	2	2	2	2	2	2	2	LOCKWASHER #6 INT	9006633-00	10
2	2	2	2	2	2	2	2	2	2	2	2	SCR, PHIL PAN HD, 6-32 X 5/16	9006021-01	9
			1			1			1			INPUT BOX ASSY. 230V	DAD-7013858-01	8
				1			1			1		INPUT BOX ASSY. 115V	DAD-7013858-00	7
												~~INTERNAL CABLE ASSY.~~	~~DCK-7014038-00~~	~~6~~
1	1	1	1	1	1	1	1	1	1	1	1	COVER ASSY	DAD-7013892-0-0	5
1	1	1	1	1	1	1	1	1	1	1	1	BASE ASSY	DAD-7013702-0-0	4
												FLOPPY DISC DRIVE (230V-50HZ)	RX01-LD	3
												FLOPPY DISC DRIVE (115V-50HZ)	RX01-LC	2
												FLOPPY DISC DRIVE (115V-60HZ)	RX01-LA	1

QUANTITY & VARIATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

	CLASS OF ACCURACY	NOMINAL DIMENSION RANGE INCHES					
		0 TO 6	OVER 6 TO 30	OVER 30 TO 120	OVER 120 TO 315	OVER 315 TO 1000	OVER 1000 TO 2000
SURFACE QUALITY	MEDIUM	± .004	± .008	± .012	± .016	± .031	± .062
ANGULARITY	PREFERRED	± .002	± .004	± .008	± .016	± .031	± .062

THIRD ANGLE PROJECTION

REMOVE BURRS AND BREAK SHARP CORNERS

DO NOT SCALE DWG

MATERIAL SEE PARTS LIST

FINISH

DRAWN 6/77

CHK'D 6/77

ENG APPR 6/77

PROD CONTROL 6/77

NEXT HIGHER ASSY. E-UA-V78-0-0

SCALE 1/2

SHEET 1 OF 1

FIRST USED ON RX78P

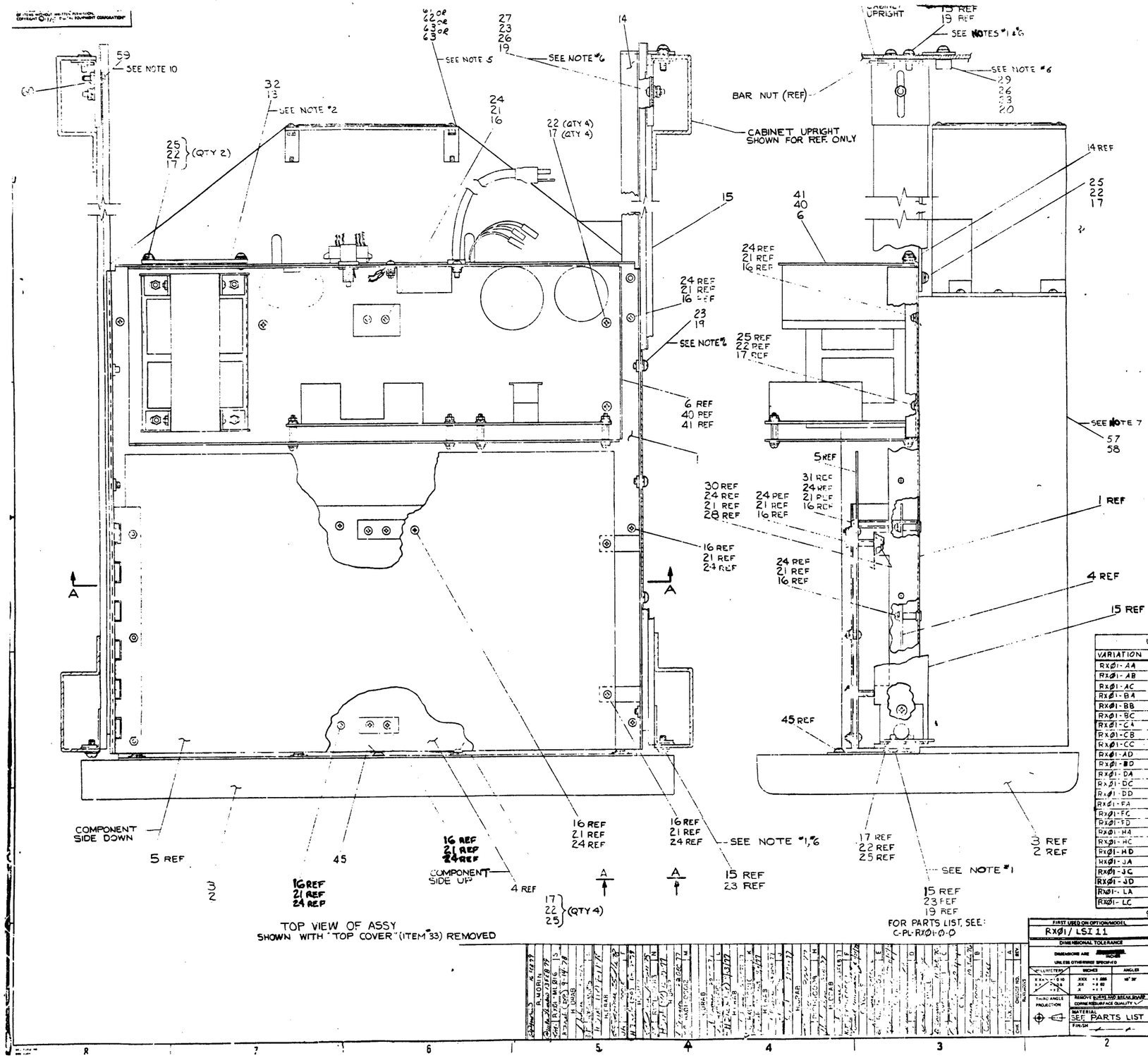
TITLE UNIT ASSY (RX78)

SIZE E | CODE UA | NUMBER RX78-0-0 | REV F

DIST.

UA RX78-0-0

ML 151



1. FOR "10-32 BB LOCK WASHER" & "10-32 PAN HEAD" & "10-32 BAR NUTS" ARE SUPPLIED WITH EACH SET OF CHASSIS SLIDES" (ITEM *15) TO MOUNT THE SLIDES TO THE CABINET UPRIGHTS. 1 "LOCKWASHER" (ITEM *23) SHOULD BE INSTALLED WITH EACH OF THE SCREWS AS SHOWN.
2. THE "BCØ5 CABLE" (ITEM *12) MUST HAVE THE RED STRIPE FACING THE FRONT OF THE CHASSIS (PIN A SIDE OF CONN) WHEN IT IS PLUGED INTO THE CONTROL BOARD. DRESS THE CABLE AGAINST THE WALL OF THE CHASSIS, & ROUTE THE CABLE OUT OF THE REAR OF THE CHASSIS THEN DOWN THROUGH THE "CABLE CLAMP" (ITEM * 13).
3. WITH A SINGLE DRIVE SYSTEM, FASTEN CONNECTOR DESIGNATED "PWR SPLY-PWR HARN-P3" TO REAR OF POWER SUPPLY USING A TIE WRAP.
4. TO SELECT VOLTAGE ON 50HZ VARIATIONS SEE LEGEND ON POWER SUPPLY DRAWING NO. E-UA-H771-0-0
5. PLENUM/FAN ASSY (ITEMS *61,62,63, & 64) SHOWN ON THIS DRAWING. FOR MOUNTING INSTRUCTIONS, SEE DRAWING E-UA-2015422-0-0.
6. FOR LA, LC, LD VARIATIONS RACK MTG. HARDWARE & CABINET MOUNTING IS NOT USED.
7. ITEM 57 CONSISTS OF FOUR ACCEPTABLE POSSIBILITIES IN THEIR ORDER OF PREFERENCE. ANY ONE TYPE IS ACCEPTABLE ON AN RXØ1. DO NOT MIX DRIVE STYLES ON A DUAL DRIVE UNIT FOR COSMETIC UNIFORMITY. THE SAME COMMENTS APPLY TO ITEM *58.
8. ON EARLY 3012304, 7010646-1K-2 CABLE ADAPTER IS REQUIRED TO EXTEND EXISTING CABLE.
9. IF NO FAN ASSEMBLY (ITEMS 61,62,63,64) IS USED, A BLANK FEMALE HOUSING ON END OF FAN PLUG (P4) IS PROVIDED.
10. TO FULLFILL C.S.A. REQUIREMENTS, ITEMS 59 & 60 MUST BE IN PLACE WHENEVER DRIVE IS IN SERVICE. ITEMS 59 & 60 MAY BE REMOVED FOR MAINTENANCE PURPOSES, BUT MUST BE REPLACED WHEN RESTORING DRIVE TO NORMAL SERVICE.
11. FOR EARLIER VERSIONS OF PLENUM FAN ASSY (TYPE WITH BOXER FAN) REFER TO E-UA-RXØ1-0-0 REV. M

UNIT VARIATIONS

VARIATION	TITLE
RXØ1-AA	SINGLE FLOPPY DISK SYSTEM 115V 60HZ
RXØ1-AB	NOT AVAILABLE
RXØ1-AC	SINGLE FLOPPY DISK SYSTEM, 115V, 50HZ
RXØ1-BA	DUAL FLOPPY DISK SYSTEM, 115V, 60HZ
RXØ1-BB	NOT AVAILABLE
RXØ1-BC	DUAL FLOPPY DISK SYSTEM, 50HZ
RXØ1-CA	SINGLE REPLACEMENT DRIVE, 60HZ
RXØ1-CB	NOT AVAILABLE
RXØ1-CC	SINGLE REPLACEMENT DRIVE, 50HZ
RXØ1-AD	SINGLE FLOPPY DISK SYSTEM 230V, 50HZ
RXØ1-BD	DUAL FLOPPY DISK SYSTEM, 230V, 50HZ
RXØ1-DA	DUAL FLOPPY DISK SYSTEM, 115V, 60HZ NO BEZEL
RXØ1-DC	DUAL FLOPPY DISK SYSTEM, 115V, 50HZ NO BEZEL
RXØ1-DD	DUAL FLOPPY DISK SYSTEM, 230V 50HZ NO BEZEL
RXØ1-FA	RXØ1-AA W/O PLENUM ASSY
RXØ1-FC	RXØ1-AC W/O PLENUM ASSY
RXØ1-FD	RXØ1-AD W/O PLENUM ASSY
RXØ1-HA	RXØ1-BA W/O PLENUM ASSY
RXØ1-HC	RXØ1-BC W/O PLENUM ASSY
RXØ1-HD	RXØ1-BD W/O PLENUM ASSY
RXØ1-JA	RXØ1-DA W/O PLENUM ASSY
RXØ1-JC	RXØ1-DC W/O PLENUM ASSY
RXØ1-JD	RXØ1-DD W/O PLENUM ASSY
RXØ1-LA	DUAL FLOPPY DISK SYSTEM, 115V, 60HZ (VK 78)
RXØ1-LC	DUAL FLOPPY DISK SYSTEM, 115V, 50HZ (VK 78)

CONT. ON SHEET 2

FIRST USED ON OPTION/MODEL	RXØ1/ LSI 11	QTY	DESCRIPTION
DIMENSIONAL TOLERANCE	DIMENSIONS ARE INCHES UNLESS OTHERWISE SPECIFIED		
MATERIAL	SEE PARTS LIST		
FINISH			
NEXT HIGHER ASSY.	B-DD-RXØ1-Ø		
SIZE	CODE	NUMBER	REV.
		E UA RXØ1-B-Ø	S
SCALE	NONE	SHEET 1 OF 5	

digital

TITLE: RXØ1 FLOPPY DISK DRIVE ASSY

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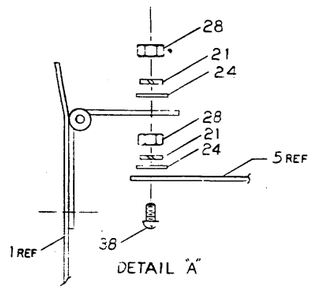
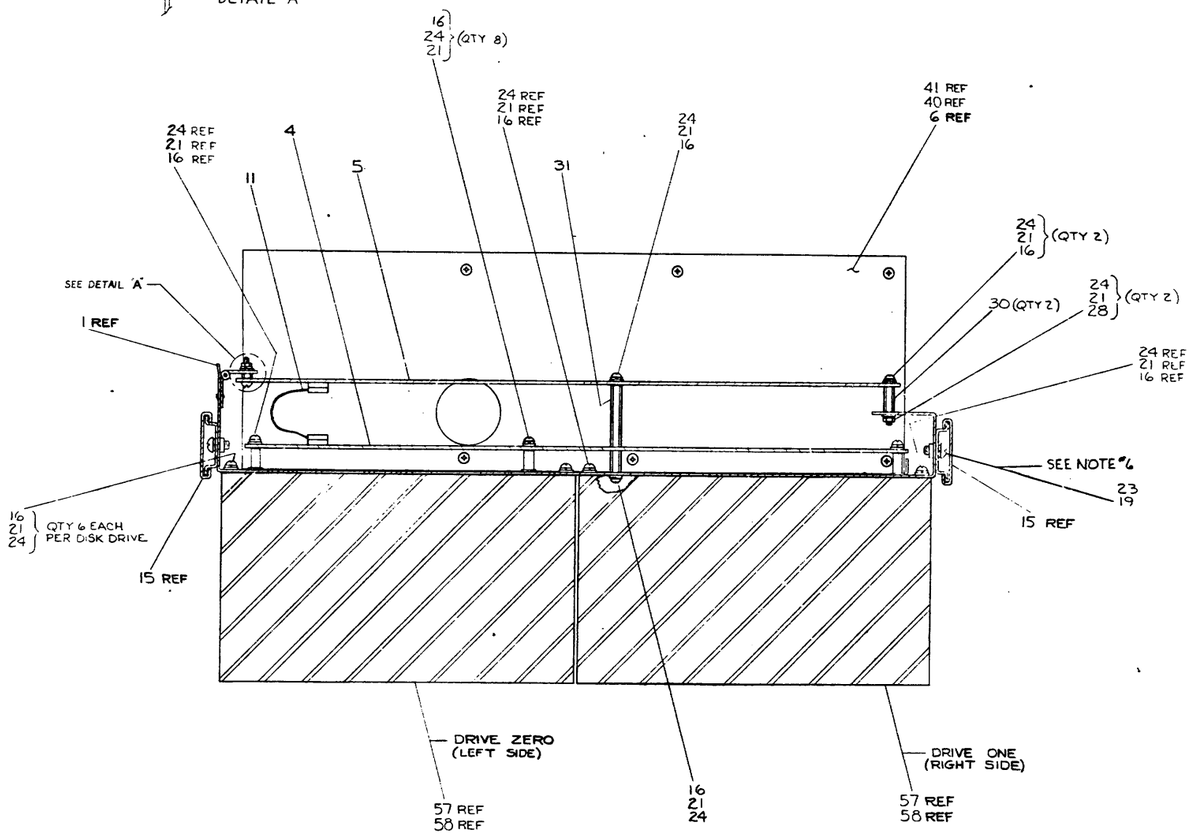
DO NOT SCALE DRAWING

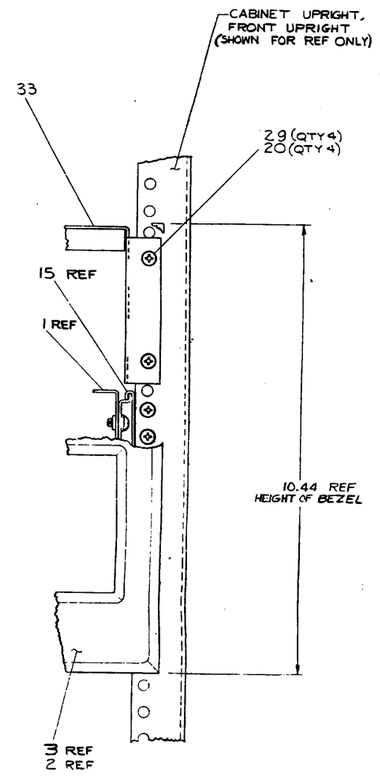
UNIT VARIATIONS	
RXØ1-LD	DUAL FLOPPY DISK SYSTEM 230V 50HZ (VX 78)
RXØ1-VA	SINGLE FLOPPY DISK SYSTEM FOR KC 78Ø 110V, 60HZ
RXØ1-VC	SINGLE FLOPPY DISK SYSTEM FOR KC 78Ø 110V, 50HZ
RXØ1-VD	SINGLE FLOPPY DISK SYSTEM FOR KC 78Ø 230V, 50HZ



DETAIL "A"



SECTION A-A
SCALE : NONE
SHOWN WITH "TOP COVER" (ITEM# 33) REMOVED



VIEW A-A
SCALE : NONE

REVISIONS		
ECR	CHANGE NO	REV

TITLE	RXØ1 FLOPPY DISK DRIVE ASSY			
SCALE	NONE	SIZE	CODE	NUMBER / REV.
SHEET	2 OF 5	E	UA	RXØ1-Ø-Ø / S.1
		DIST.		

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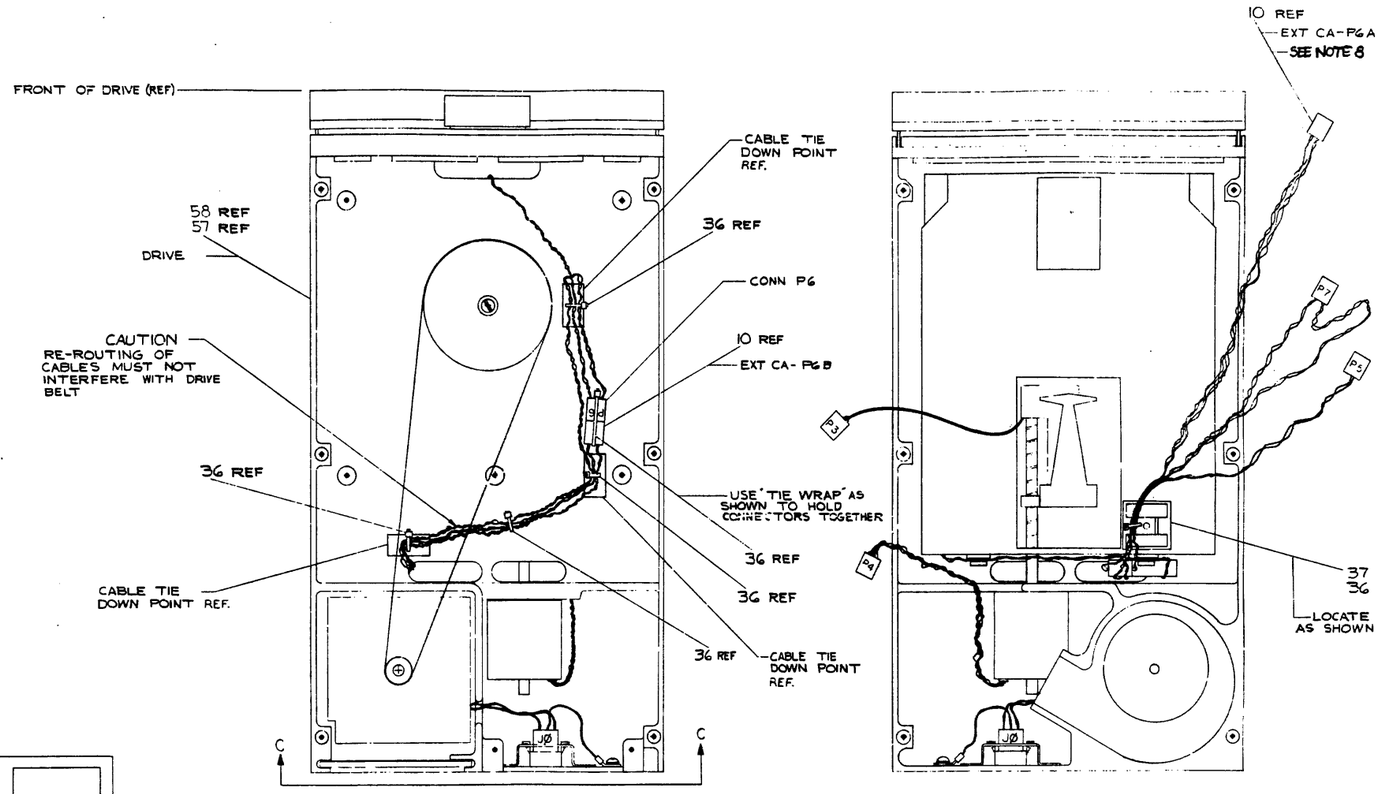
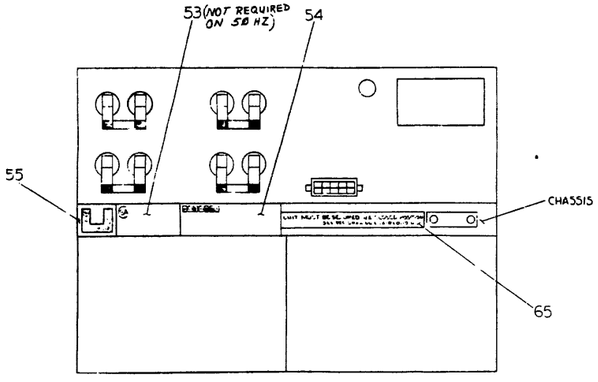


BOTTOM VIEW OF "DISK DRIVE" (ITEMS "57 & 58) WITH BOTTOM COVER REMOVED. REPLACE BOTTOM COVER AFTER RE-ROUTING OF CABLES.

TOP VIEW OF "DISK DRIVE" (ITEMS "57 & 58) WITH TOP COVER REMOVED. DO NOT REPLACE TOP COVER AFTER RE-ROUTING OF CABLES.

WIRE RE-ROUTING
ALL CABLES MUST BE RE-ROUTED AS SHOWN BEFORE INSTALLING THE DRIVE INTO THE RXØ1 ASSY



VIEW C-C
SCALE: NONE

REVISIONS		
DR	CHANGE NO	REV

TITLE	RXØ1 FLOPPY DISK DRIVE ASSY			
SCALE	SHEET 3 OF 5	SIZE/CODE E	NUMBER UA RXØ1-Ø-Ø	REV. 5
		DIST.		

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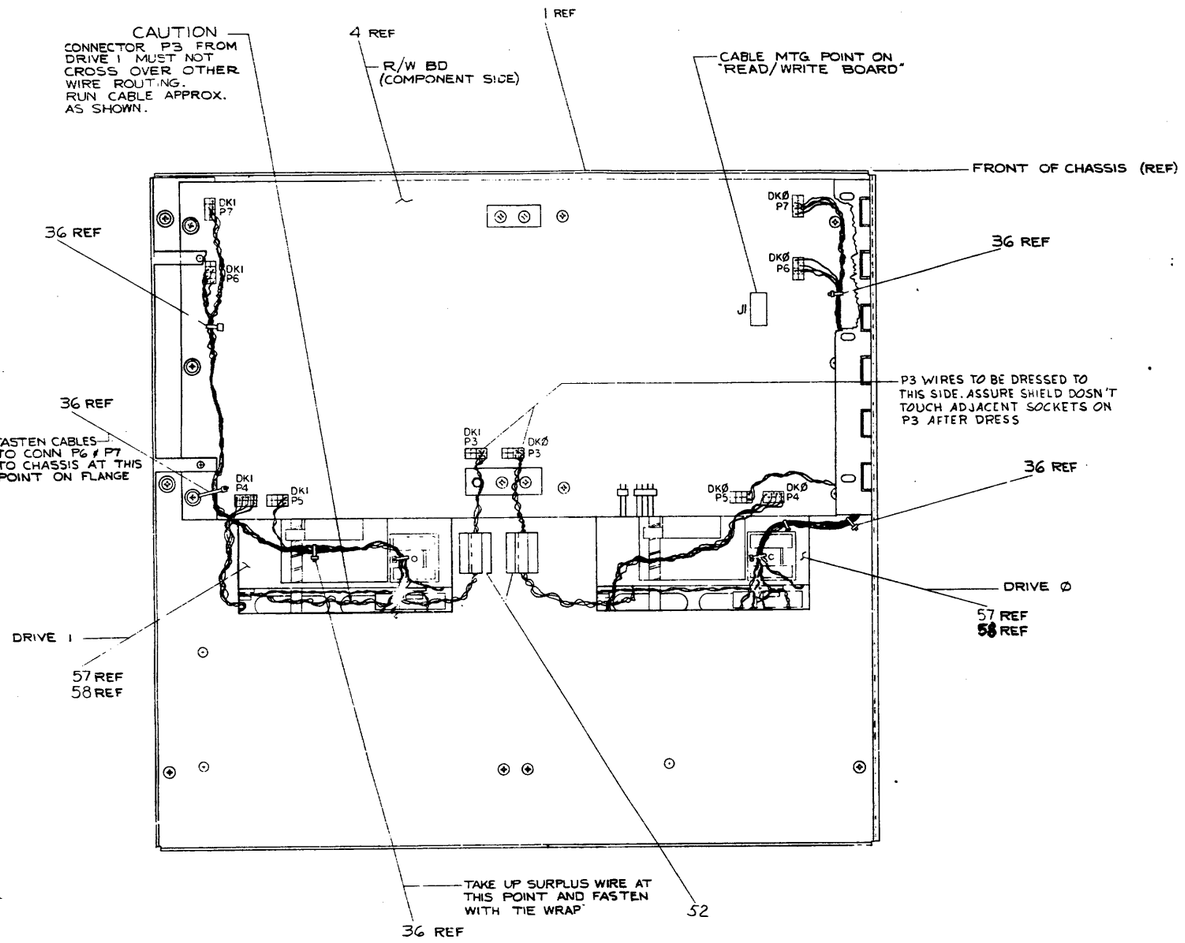


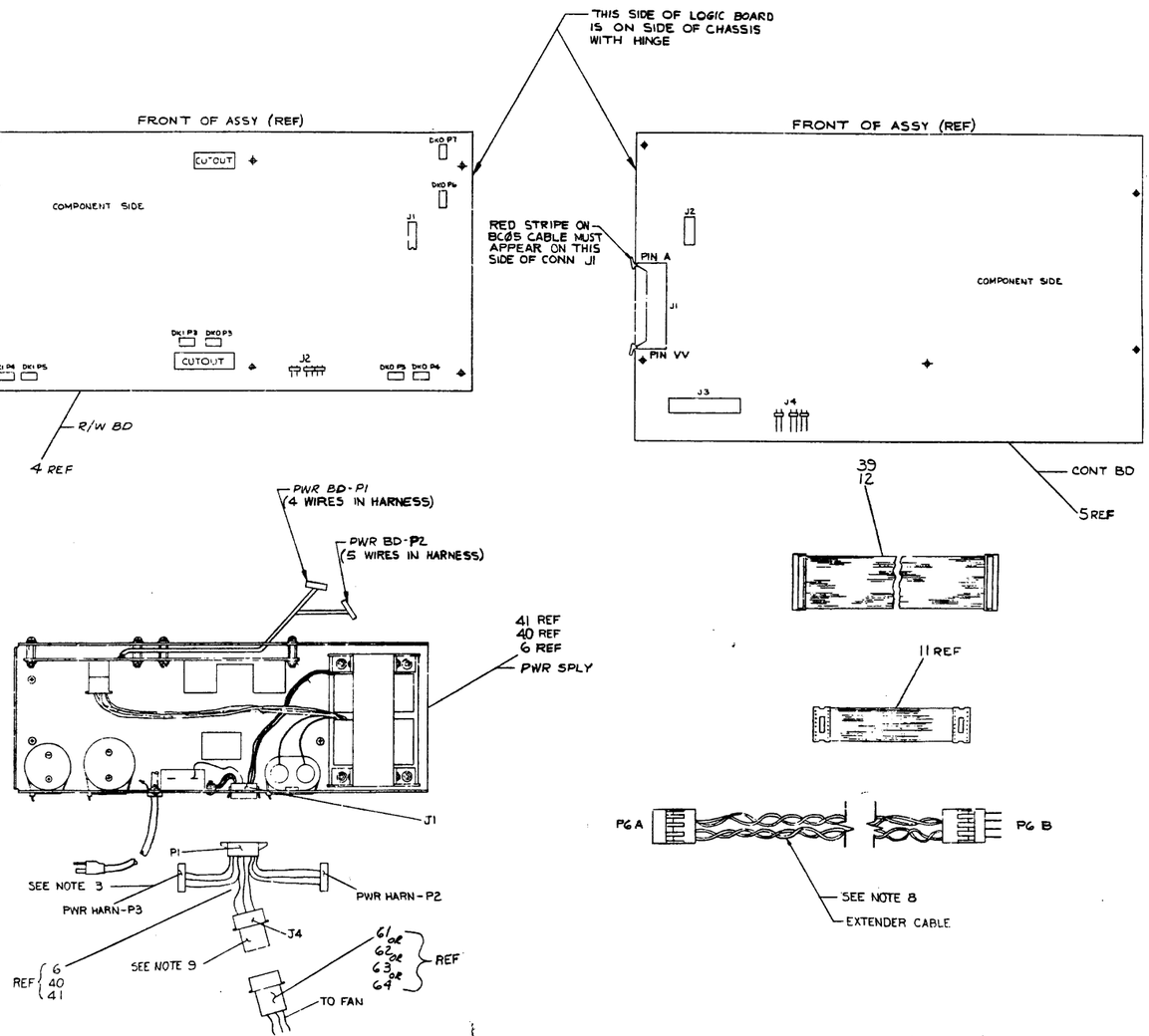
TOP VIEW OF CRITICAL WIRE ROUTING (SCALE : APPROX. 1/1)

ALL WIRES FROM 'DRIVE Ø' & 'DRIVE 1' MUST BE ROUTED AS SHOWN.

REVISIONS		
CHG	CHANGE NO	REV

TITLE	RXØ1 FLOPPY DISK DRIVE ASSY	
SIZE/CODE	E UA	NUMBER RXØ1 Ø-Ø REV
SCALE	SHEET 4 OF 5	DIST

ITEM NO	DESCRIPTION AWG	COLOR	FROM CONNECTION	WITH	TO CONNECTION	WITH	REMARKS
			DRIVE Ø - P3		R/W BD-DKØ-P3		
			DRIVE Ø - P4		R/W BD-DKØ-P4		
			DRIVE Ø - P5		R/W BD-DKØ-P5		
			DRIVE Ø - P7		R/W BD-DKØ-P7		
57 OR 58			DRIVE Ø - P6		R/W BD-DKØ-P6		SEE NOTE 8
			DRIVE 1 - P3		R/W BD-DK1-P3		THIS WIRING IS ONLY ON DUAL DRIVE SYSTEMS
			DRIVE 1 - P4		R/W BD-DK1-P4		
			DRIVE 1 - P5		R/W BD-DK1-P5		
			DRIVE 1 - P7		R/W BD-DK1-P7		
			DRIVE 1 - P6		R/W BD-DK1-P6		SEE NOTE 8
11			R/W BD - J1	11	CONT BD - J2	11	
6 OR 40 OR 41			PWR SPLY-PWR BD-P1		CONT BD - J4		
			PWR SPLY-PWR BD-P2		R/W BD - J2		
			PWR SPLY-PWR HARN-P2		DRIVE Ø - J0		
			PWR SPLY-PWR HARN-P3		DRIVE 1 - J0		SEE NOTE 3
12 OR 39			CONT BD-J1		SEE NOTE 2		



REVISIONS		
CHG	CHANGE NO	REV

TITLE RXØ1 FLOPPY DISK DRIVE ASSY		SIZE/CODE E UA	NUMBER RXØ1-Ø-Ø	REV 5
SCALE	SHEET 5 OF 5	DIST.		

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REV.	NUMBER	SIZE	CODE
	RXØ1-Ø-2	K	SP

FIRST USED ON OPTION MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
RXØ1		PARTS LIST		

DRN	DATE 19 FEB. 76	digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS
CHK'D	DATE 19 FEB. 76	
ENG.	DATE 2/19/76	TITLE: FLOPPY CONTROLLER FIRMWARE
PROJ. ENG.	DATE 2/23/76	
PROD.	DATE 2/23/76	
NEXT HIGHER ASSEMBLY		
SCALE		SIZE K · CODE SP · NUMBER RXØ1-Ø-2 · REV.
SHEET 1 OF 1		DIST.

REVISIONS	REV.	CHANGE NO.	CHK

DEC FORM NO. DRB 109

158

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                /RX01 FLOPPY CONTROLLER FIRMWARE


                /THIS SYMBOL TABLE REPLACES THE NORMAL PAL SYMBOL TABLE AND DEFINES
                /THE INSTRUCTIONS POSSIBLE BY THE RX01 CONTROLLER



                /DO INSTRUCTIONS

0002    SET=2
0000    CLR=0
0002    ONE=2
0000    ZERO=0

0000    IO80=0                  /INTERFACE=DISK BUSS OUTPUT BUFFER
0004    IO81=4
0010    IO82=10
0014    IO83=14
0020    IO84=20
0024    IO85=24
0030    IO86=30

0000    INTERF=CLR IO80         /IO80 SELECTS EITHER INTERFACE OR DISK BUSS.  CLR= INTERFACE
0002    DISK=SET IO80           /SET=DISK

                                /INTERFACE BUFFER DEFINITIONS
0004    ERR=IO81                /SET TO INDICATE THAT AN RX01 ERROR HAS OCCURED
0010    XREQ=IO82               /SET TO REQUEST AN RX01 WORD TRANSFER
0014    IOOUT=IO83              /DIRECTION FOR DATA LINE,  SET=TO INTERFACE
0020    DONE=IO84               /SET TO INDICATE RX01 READYNESS TO ACCEPT A COMMAND
0024    SHIFT=IO85              /SHIFT FOR DATA LINE
0030    SECDAT=IO86             /SELECTS SOURCE FOR DATA OUT OF CONTROLLER ON DATA LINE
                                /SET=SECTOR BUFFER   CLR=SHIFT REGISTER MOST SIG BIT

                                /DISK BUFFER DEFINITIONS
0004    WGATE=IO81              /WRITE CURRET ENABLE WHEN SET
0010    STPHD=IO82              /HEAD STEP,  TWO PULSES REQUIRED FOR EACH TRACK
0014    HDOUT=IO83              /DIRECTION OF HEAD MOTION
0020    EGATE=IO84              /ERASE CURRENT ENABLE
0024    LWCUR=IO85              /SPECIFIES WRITE CURRENT LEVEL

0034    UNIT=34                 /SELECTS ONE OF TWO DRIVES,  UNIT (ZERO)(ONE)

0042    UNHD=42                 /DEACTIVATES HEAD LOAD SOLONOID OF SELECTED DRIVE
0042    LDHD=42                 /ACTIVATES HEAD LOAD SOLONOID OF SELECTED DRIVE

0044    BAR=44                  /SECTOR BUFFER ADDRESS REGISTER CONTROL
0001    LONG=1                  /FORMAT:  CLR BAR (SHORT)(LONG)
0000    SHORT=0                 /SHORT PRESETS FOR COUNT OF 1024
0002    INCR=2                  /LONG PRESETS FOR COUNT OF 4096
                                /FORMAT:  INCR BAR    INCREMENT THE BUFFER ADDRESS REG.
```



```
0053    WRTBUF=53               /SECTOR BUFFER WRITE CLOCK
0003    START=3                 /FORMAT:  (START)(FIN) WRTBUF
0000    FIN=0                   /A 750NS MINIMUM PULSE IS REQUIRED

                                /CRC REGISTER CONTROL
0054    CRC=54                  /FORMAT:  CRC (ONE)(ZERO)   SPECIFIES DATA TO
                                /BE JAMMED INTO CRC GENERATOR/CHECKER
0057    PRECRC=57               /PRESETS CRC REG TO ALL ONES
0055    DATCRC=55               /SHIFTS SEPERATED DATA INTO CRC CIRCUIT

                                /GENERAL PURPOSE FLAG CONTROL
0060    FLAG=60                 /FORMAT:  FLAG (ON)(OFF)(TOG)
0002    ON=2                    /SET FLAG
0001    OFF=1                   /CLR FLAG
0003    TOG=3                   /TOGGLE FLAG

0064    LSP=64                  /LOAD OPEN SCRATCHPAD REG WITH CONTENTS OF SHIFT REG

0070    LCT=70                  /LOAD COUNTER WITH CONTENTS OF NEXT ROM LOCATION
0071    ESP=71                  /LOAD COUNTER WITH CONTENTS OF OPEN SCRATCHPAD
0073    ICT=73                  /INCREMENT COUNTER

                                /SHIFT REGISTER CONTROL
0074    ROTATE=74               /FORMAT: ROTATE(ONE)(ZERO)
                                /SHIFTS SHIFT REG TOWARDS MOST SIGNIFICANT BIT
                                /WHILE INSERTING A ONE OR ZERO INTO THE LEAST
                                /SIGNIFICANT BIT
0075    LSR=75                  /LOAD SHIFT REGISTER WITH CONTENTS OF COUNTER
0077    DATSR=77                /SHIFT REG TOWARDS MSB WHILE INSERTING SEPERATED
                                /DATA INTO LSB
```

```
                        /BRANCH INSTRUCTIONS AND CONDITIONS

0100    BR=100          /FORMAT: BR COND (T)(F)(ONE)(ZERO)
                        /IF CONDITION IS MET, A BRANCH IS MADE WITHIN
                        /THE CURRENT FIELD USING THE CONTENTS OF THE
                        /NEXT ROM LOCATION AS THE BRANCH ADDRESS
                        /IF THE CONDITION IS NOT MET, THE NEXT ROM LOCATION
                        /IS IGNORED AND THE FOLLOWING INSTRUCTION IS EXECUTED
2300    WBR=300         /FORMAT: WBR COND (T)(ONE)
                        /THE COUNTER IS INCREMENTED WITH EVERY EXECUTION OF
                        /THIS INSTRUCTION, THE WBR IS REPEATEDLY
                        /EXECUTED UNTILL EITHER THE COUNTER OVERFLOWS OR
                        /THE CONDITION IS MET. IF THE CONDITION IS MET
                        /THE BRANCH IS MADE, IF THE COUNTER OVERFLOWS
                        /THE BRANCH ADDRESS IS IGNORED AND THE NEXT INSTRUCTION
                        /IS EXECUTED
0000    F=ZERO          /REQUIRES THE CONDITION TO BE FALSE
0002    T=ONE           /REQUIRES THE CONDITION TO BE TRUE
0001    IND=1           /IF APPENDED TO THE JUMP, BR OR WBR INSTRUCTION,
                        /CAUSES THE BRANCH ADDRESS TO BE TAKEN FROM THE
                        /OPEN SCRATCHPAD RATHER THAN FROM THE NEXT ROM LOCATION

0002    RUN=2           /WHEN ASSERTED INDICATES THAT THE INTERFACE HAS
                        /SERVICED A TRANSFER REQUEST, OR THAT A COMMAND
                        /IS PENDING
0004    IOB3OT=4        /INTERF/DISK OUTPUT BUFFER BIT 3
0010    DATAIN=10       /BIDIRECTIONAL DATA LINE BETWEEN INTERFACE AND CONTROLLER
0014    INDX=14         /DRIVE INDEX LATCH
0020    SR7=20          /SHIFT REGISTER MOST SIGNIFICANT BIT
0024    COFL=24         /OVERFLOW (ALL ONES) OF THE COUNTER
0030    CRC16=30        /BIT 16 OF CRC GENERATOR/CHECKER
0034    HOME=34         /TRACK ZERO OF SELECTED DRIVE ANDED WITH HEAD
                        /DIRECTION BEING OUT
0040    WRTEN=40        /WRITE ENABLED STATUS OF THE SELECTED DRIVE
0044    SEPCLK=44       /SEPERATED CLOCK FROM DISK DATA
0050    XIIBIT=50       /ASSERTED IF INTERFACE TRANSFERS ARE TO BE AS
                        /12 BIT WORDS RATHER THAN 8 BIT BYTES
0054    DEQSR7=54       /SEPERATED DATA EQUAL TO SHIFT REG BIT 7
0060    BARCFL=60       /OVERFLOW CONDITION (ALL ONES) OF THE SECTOR BUFFER
                        /ADDRESS REGISTER
0064    MCEQSR=64       /MISSING CLOCK EQUAL TO SHIFT REG BIT 7
0070    BDATAO=70       /OUTPUT OF SECTOR BUFFER
0074    FLAGO=74        /STATE OF GENERAL PURPOSE FLAG
```



```
                        /SCRATCHPAD REGISTER SELECTION

0200    OPEN=200        /FORMAT: OPEN X  WHERE X IS ONE OF THE SCRATCHPAD REG
                        /THIS INSTRUCTION MAKES THE NAMED SCRATCHPAD
                        /ACCESSABLE VIA THE LSP AND ESP COMMANDS

0000    R0=0            /DEFINITIONS OF SCRATCHPADS BY R#
0004    R1=4
0010    R2=10
0014    R3=14
0020    R4=20
0024    R5=24
0030    R6=30
0034    R7=34
0040    R8=40
0044    R9=44
0050    R10=50
0054    R11=54
0060    R12=60
0064    R13=64
0070    R14=70
0074    R15=74

                        /DEFINITION OF SCRATCHPADS BY MNEUMONICS
0000    CURTK0=R0       /CURRENT TRACK ADDRESS OF DRIVE 0
0004    CURTK1=R1       /CURRENT TRACK ADDRESS OF DRIVE 1
0010    ERREG=R2        /DEFINITIVE ERROR CODE IF ANY
0014    STAT=R3         /STATUS WORD OF RX01
0020    TARTRK=R4       /TARGET TRACK OF CURRENT DISK ACCESS
0024    TARSEC=R5       /TARGET SECTOR OF CURRENT DISK ACCESS
0030    TEMPA=R6        /TEMPORARY STORAGE
0034    TEMPB=R7        /TEMPORARY STORAGE
0040    TEMPC=R8        /TEMPORARY STORAGE
0044    TEMPD=R9        /BIT 7 IS UNIT SELECT BIT, 0 MEANS UNIT 1
0050    TEMPE=R10       /BIT 7 IS HEAD LOADED BIT, 1 MEANS HEAD LOADED
0054    TEMPF=R11       /TEMPORARY STORAGE
0060    TEMPG=R12       /TEMPORARY STORAGE
0064    RTNB=R13        /RETURN ADDRESS FOR 3RD LEVEL NESTED SUBROUTINES
0070    RTNA=R14        /RETURN ADDRESS FOR 2ND LEVEL NESTED SUBROUTINES
0074    RTN=R15         /RETURN ADDRESS FOR 1ST LEVEL SUBROUTINES
```

```
                        /JUMP INSTRUCTION AND JUMP FIELD DEFINITIONS
                        
0202    JUMP=202        /FORMAT:  JUMP FX (IND)
                        /CAUSES A BRANCH TO ONE OF SIX ROM FIELDS (0-5)
                        /SPECIFIED BY X.  THE BRANCH ADDRESS IS TAKEN FROM
                        /THE ROM LOCATION FOLLOWING THE JUMP INSTRUCTION.
                        /IF IND IS APPENDED, THE BRANCH ADDRESS
                        /IS TAKEN FROM THE OPEN SCRATCH PAD
                        
0000    F0=3
0004    F1=4
0010    F2=10
0014    F3=14
0020    F4=20
0024    F5=24
```



```
                        /TABLE OF DEFINITIVE ERROR CODES
                        
0210    KMXDV2=10       /DRIVE 0 FAILED TO SEE HOME ON INITIALIZE
0220    KMXDV1=20       /DRIVE 1 FAILED TO SEE HOME ON INITIALIZE,  DOES NOT CAUSE ERROR
0230    KMRONG=30       /FOUND HOME WHEN STEPPING IN 10 TRACKS FOR INIT
0240    KERTRK=40       /TRIED TO ACCESS A TRACK GREATER THAN 76
0250    KHOMERR=50      /HOME WAS FOUND BEFORE DESIRED TRACK WAS REACHED
0260    KSELFER=60      /SELF DIAGNOSTIC ERR
0270    KMXHDR=70       /DESIRED SECTOR COULD NOT BE FOUND AFTER LOOKING
                        /AT 52 HEADERS
0100    KMPROT=100      /WRITE FUNCTION ATTEMPTED ON A WRITE PROTECTED DISK
0110    KTIMERR=110     /MORE THAN 40 MICROSECONDS AND NO SEPCLOCK SEEN
0120    KNXPRAM=120     /A PREAMBLE COULD NOT BE FOUND
0130    KMXIDAM=130     /PREAMBLE FOUND BUT NO ID MARK FOUND WITHIN ALLOWABLE TIME
0140    KMCRCER=140     /CRC ERROR ON WHAT APPEARED TO BE A HEADER,  ERROR IS NOT ASSERTED
0150    KTKSMER=150     /THE TRACK ADDRESS OF A GOOD HEADER DOES NOT COMPARE
                        /WITH THE DESIRED TRACK
0160    KXSTRYS=160     /TOO MANY TRIES FOR AN IDAM
0170    KNODAM=170      /DATA AM NOT FOUND IN ALLOTTED TIME
0200    KDCRCER=200     /CRC ERROR ON READING THE SECTOR FROM THE DISK
0210    KPARER=210      /PARITY ERROR ON SOME WORD FROM THE INTERFACE
```

```
                        /[ROUTINE: INITIALIZE]  IF A HOST PROCESSOR INITIALIZE OR AN
                        /RX01 POWER LOW IS DETECTED, THE PC IS CLEARED AND THE RX01 TIMING
                        /STOPS.  UPON THE NEGATION OF INITIALIZE, TIMING RESUMES AND A SELF TEST OF
                        /INTERNAL DATA PATHS IS MADE.  IF AN ERROR OCCURS HERE,  ERROR AND
                        /DONE ARE SET, BUT ERREG IS NOT ALTERED.  THEN IF NO ERROR HAS OCCURRED AN ATTEMPT
                        /IS MADE TO RECALABRATE DRIVE 1 THEN DRIVE 0.  IF DRIVE 0 FAILS TO RECALIBRATE,
                        /THE ERROR CODE IS LOADED INTO ERREG AND ERROR IS SET.  IF DRIVE
                        /0 RECALIBRATES AND IS READY (DISK LOADED) SECTOR ONE OF TRACK ONE
                        /IS READ INTO THE SECTOR BUFFER.  IT IS POSSIBLE FOR A READ ERROR
                        /TO OCCUR WHILE READING THIS SECTOR.


          0000  *2000
                        DECIMAL

0000  0210             OPEN ERREG      /CLEAR ERROR REGISTER
0001  0264             LSP

0002  0222             JUMP F4         /GO DO THE INITIALIZE DIAGNOSTIC ROUTINE
0003  2352             TEST

0004  0270   TSTRTN,   LCT             /RETURN FROM SUCCESSFUL DIAGNOSTIC ROUTINE
                        OCTAL
0005  0004             4
                        DECIMAL
0006  0275             LSR             /SET THE INIT DONE BIT OF STAT
0007  0214             OPEN STAT
0010  0264             LSP

0011  0070             LCT             /SET UP SOME SCRATCHPAD REGISTERS
0012  0377             -1
0013  0275             LSR
0014  0244             OPEN TEMPD      /UNIT 0 TO SOFT UNIT BIT
0015  0264             LSP
0016  0200             OPEN CURTK0     /NEG ZERO TO BOTH CURRENT TRACK ADDRESSES
0017  0064             LSP
0020  0204             OPEN CURTK1
0021  0264             LSP

0022  0074             ROTATE ZERO     /NEG ONE TO TARGET SECTOR
0023  0224             OPEN TARSEC
0024  0064             LSP
0025  0220             OPEN TARTRK     /NEG ONE TO TARGET TRACK FOR INITIALIZE BOOTSTRAP
0026  0064             LSP

0027  0202             DISK            /SELECT DISK BUS

0030  0070             LCT             /CALL SUBROUTINE TO LOAD HEAD AND WAIT 25 MS
0031  0034             RECAL1          /TO ALLOW POWER UP DRIVE SETTLE TIME
0032  0222             JUMP F4
0033  2145             DLY25

0034  0036   RECAL1,   UNIT ONE        /SELECT UNIT ONE FOR RECALIBRATE

0035  0214   RECAL2,   CLR HDOUT       /STEP HEAD IN 1? TRACKS TO ASSURE IT IS NOT BEHIND TRACK 0
```



```
0036  0372             LCT
0037  0365             -10-1
0040  0275             LSR
0041  0270             LCT
0042  0045             INIT
0043  0222             JUMP F4
0044  2100             STEPHD

0045  0226   INIT,     JUMP F5         /ERROR,  HOME WAS SEEN WHILE STEPPING IN.
0046  2621             WRONG

0047  0214             SET HDOUT       /STEP OUT AS MANY AS 80 TRACKS IN SEARCH OF HOME
0050  0270             LCT
0051  0257             -80-1
0052  0275             LSR
0053  0270             LCT
0054  0060             RCALOK
0055  0040             UNHD
0056  0222             JUMP F4
0057  2100             STEPHD

0060  0202   RCALOK,   JUMP F0         /HOME WAS FOUND OK
0061  0275             WHCHDR

0062  0174             BR FLAGO F      /IF FLAG=0 RECALIBRATE WAS ON DRIVE 1
0063  0070             NXDRV1

0064  0070   NXDRV0,   LCT             /RECALABRATE FAILURE WAS ON DRV 0
0065  0210             KNXDV0
0066  0226             JUMP F5
0067  2612             GOERDN

0070  0070   NXDRV1,   LCT             /RECAL FAILURE WAS ON DRV 1, LOG ERROR
0071  0220             KNXDV1          /AND CONTINUE RECALIBRATION
0072  0275             LSR
0073  0210             OPEN ERREG
0074  0064             LSP

0075  0176   WHCHDR,   BR FLAGO T      /IF FLAG=1 BOTH DRIVES HAVE BEEN RECALIBRATED
0076  0372             PUNRCL

0077  0062             FLAG ON         /SET FLAG TO INDICATE DRV 0 IS BEING RECALIBRATED

0100  0034             UNIT ZERO

0101  0202             JUMP F0         /GO BACK AND RECALIBRATE DRV0
0102  0035             RECAL0
```

```
                        /[SUBROUTINE; FINDTRACK]
                        /THIS SUBROUTINE IS USED TO LOCATE A SPECIFIED SECTOR. IT PICKS
                        /UP THE TRACK AND SECTOR ADDRESS FROM THE INTERFACE, CHECKS THAT
                        /THE TRACK ADDRESS IS LEGAL (NOT GREATER THAN 114 OCTAL.), MOVES THE
                        /HEAD OF THE SELECTED DRIVE TO THE SPECIFIED TRACK, VERIFIES
                        /TRACK POSITION, AND LOCATES THE CORRECT SECTOR. EXIT FROM
                        /THIS SUBROUTINE OCCURS AT WRITE TURN ON TIME OF THE SELECTED,
                        /SECTOR. ENTRANCE IS MADE WITH THE RETURN ADDRESS IN THE COUNTER


0103  0075  FINDTR,  LSR             /SAVE THE RETURN ADDRESS
0104  0274          OPEN RTN
0105  0064          LSP

0106  0270          LCT             /CLEAR THE ERROR REGISTER
0107  0000          0
0110  0275          LSR
0111  0210          OPEN ERREG
0112  0064          LSP

0113  0244          OPEN TEMPD      /SOFT UNIT BIT TO SR
0114  0071          ESP
0115  0075          LSR

0116  0122          BR SR7 ONE      /IF SR=1  DRIVE 0 IS CURRENTLY SELECTED
0117  0127          UZERO

0120  0174  UONE,    BR FLAGO ZERO   /IF FLAG=0 DRIVE 1 IS DESIRED AND ALREADY SELECTED
0121  0141          USAME

0122  0034          UNIT ZERO       /DRIVE 0 IS DESIRED AND DRIVE1 WAS SELECTED,  SELECT 0

0123  0070          LCT             /SET UP SOFT UNIT SELECT AS DRIVE 0
                    OCTAL
0124  0200          200
                    DECIMAL

0125  0202          JUMP F0         /GO STORE SOFT UNIT BIT
0126  0134          UDIF

0127  0176  UZERO,   BR FLAGO ONE    /IF FLAG=1 DRIVE 0 IS DESIRED AND ALREADY SELECTED
0130  0141          USAME

0131  0036          UNIT ONE        /DRIVE 1 IS DESIRED BUT DRIVE0 IS SELECTED, SELECT DRIVE 1
0132  0070          LCT             /SET UP SOFT UNIT SELECT BIT AS DRIVE 1
0133  0001          1

0134  0075  UDIF,    LSR             /STORE SOFT UNIT SELECT BIT
0135  0064          LSP

0136  0074          ROTATE ZERO     /CLR SOFT HD LOAD BIT BECAUSE UNITS CHANGED
```



```
0137  0250          OPEN TEMPE
0140  0064          LSP

0141  0070  USAME,   LCT             /CALL GETWORD SUBROUTINE FOR THE SECTOR ADDRESS
0142  0145          PUTSEC
0143  0222          JUMP F4
0144  2000          GETWRD


0145  0070  PUTSEC,  LCT             /MAKE FIRST BIT OF COMPLIMENTED SECTOR ADDRESS A 1 REGARDLESS OF DATA
0146  2370          -7-1
0147  0076          ROTATE ONE
0150  0126          BR COFL T
0151  0160          .+7
0152  0073          ICT
0153  0122          BR SR7 T
0154  0147          .-5
0155  0074          ROTATE ZERO
0156  0202          JUMP F0
0157  0150          .-7

0160  0224          OPEN TARSEC     /PUT THE TARGET SECTOR AWAY
0161  0064          LSP

0162  0070          LCT             /CALL GETWRD SUBROUTINE FOR TRACK ADDRESS
0163  0166          PUTTRK
0164  0222          JUMP F4
0165  2000          GETWRD


0166  0220  PUTTRK,  OPEN TARTRK     /STASH THE TRACK ADDRESS
0167  0064          LSP

0170  0254          OPEN TEMPF      /START SETUP FOR COMPARING THE
0171  3064          LSP             /TARGET TRACK AND TRACK 76
0172  0260          OPEN TEMPG      /F= TARGET TRACK
0173  0070          LCT             /G= 77
0174  0262          -77-1
0175  0075          LSR
0176  0064          LSP

0177  2070          LCT             /CALL SUBR MAGCOM TO SEE IF TARGET TRACK
0200  0206          ILTRK           /IS GREATER THAN 114 OCTAL,  76 DECIMAL.
0201  0075          LSR
0202  0270          OPEN RTNA
0203  0064          LSP
0204  0226          JUMP F5
0205  2400          MAGCOM


0206  0202  ILTRK,   JUMP F0         /TARGET TRACK IS 77, ILLEGAL ADDRESS
0207  0242          ERTRK           /GO, REPORT THE ERROR
0210  0202          JUMP F0         /TARGET TRACK IS GREATER THAN 77
0211  0242          ERTRK           /GO, REPORT THE ERROR
```

```
 432   0212  0244            OPEN TEMPD      /TARGET TRACK IS OK, GET THE DRIVE
 433   0213  0271            ESP             /SELECT FROM TEMPD
 434   0214  0275            LSR
 435
 436   0215  3200            OPEN CURTK0     /PRESELECT UNIT 0
 437
 438   0216  0002            DISK            /SELECT DISK RUNS
 439
 440   0217  0122            BR SR7 ONE      /WHICH UNIT SELECTED? BIT7=0 MEANS UNIT ONE
 441   0220  0222            .+2             /ZERO, SKIP UNIT 1 SETUP
 442   0221  0204            OPEN CURTK1
 443
 444   0222  0271            ESP             /PASS SELECTED CURRENT TRACK TO MAGCOM SUBR
 445   0223  0275            LSR
 446   0224  0260            OPEN TEMPG
 447   0225  0264            LSP
 448
 449   0226  0220            OPEN TARTRK     /PASS TARGET TRACK TO MAGCOM SUBROUTINE
 450   0227  0271            ESP
 451   0230  0275            LSR
 452   0231  0254            OPEN TEMPF
 453   0232  0264            LSP
 454   0233  0270            LCT             /CALL SUBROUTINE MAGCOM TO SEE IF TARGET
 455   0234  0246            TRKEQ           /IS SAME AS CURRENT TRACK,  F=TARGET,  G=CURRENT
 456   0235  0275            LSP
 457   0236  0270            OPEN RTNA
 458   0237  0264            LSP
 459   0240  0226            JUMP F5
 460   0241  2403            MAGCOM
 461
 462
 463   0242  0670  ERTRK,    LCT
 464   0243  0040            KERTRK          /TRIED TO ACCESS A TRACK GREATER THAN 76 DECIMAL
 465   0244  0226            JUMP F5
 466   0245  2610            GOERDN
 467
 468
 469   0246  0222  TRKEQ,    JUMP F0         /TARGET EQUALS THE CURRENT TRACK, NO
 470   0247  0357            NOSTPS          /STEPS ARE REQUIRED
 471   0250  0270            OPEN RTNA       /NOOP;  TARGET > ACTUAL RETURN
 472   0251  0270            OPEN RTNA       /NOOP
 473
 474   0252  0270  BOOT,     OPEN RTNA       /TARGET IS LESS THAN ACTUAL, STEPS NEEDED ALSO START OF
 475   0253  0670            LCT             /OF BOOT SUBROUTINE,  SET UP RETURN FROM DIF SUBR
 476   0254  0275            STPOUT
 477   0255  0275            LSP
 478   0256  0264            LSP
 479
 480   0257  0244            OPEN TEMPD      /SOFT UNIT SELECT BIT TO SR7
 481   0260  0271            ESP
 482   0261  0275            LSR
 483
 484   0262  0204            OPEN CURTK1     /PRESELECT UNIT 1
 485
 486   0263  0120            BR SR7 ZERO     /SR7=0 MEANS UNIT ONE
```



```
 487   0264  0266            .+2
 488   0265  0220            OPEN CURTK0
 489
 490   0266  0271            ESP             /PASS SELECTED CURRENT TRACK TO DIFF SUBR VIA SR
 491   0267  0275            LSR
 492
 493   0270  0220            OPEN TARTRK     /PASS TARGET TRACK TO DIF VIA CNTR
 494   0271  0071            ESP
 495
 496   0272  0016            SET HDOUT       /ASSUME A STEP OUT
 497
 498   0273  0226            JUMP F5         /GO TO THE SUBROUTINE DIF TO CALCULATE THE STEPS NEEDED
 499   0274  2462            DIF
 500
 501
 502   0275  0202  STPOUT,    JUMP F0         /TARGET TRACK IS LESS THAN
 503   0276  0300            .+2             /THE ACTUAL,  MOVE OUT IS NECESSARY
 504
 505   0277  0014            CLR HDOUT       /TARGET IS GREATER THAN ACTUAL,  STEPS IN NEEDED
 506
 507   0300  0670            LCT             /COMPLEMENT OF STEPS REQUIRED IS IN THE
 508   0301  0305            DUMSTP          /SHIFT REG.  SET UP RETURN FROM STPHD SUBR
 509
 510   0302  0040            UNHD            /UNLOAD HEAD BEFORE MOVING
 511
 512   0303  2222            JUMP F4         /CALL SUBROUTINE STEPHD
 513   0304  2120            STEPHD
 514
 515
 516   0305  0226  DUMSTP,    JUMP F5         /HOME FOUND BEFORE LAST STEP TAKEN
 517   0306  2456            HOMERR
 518
 519   0307  0244            OPEN TEMPD      /SOFT UNIT BIT TO SR7
 520   0310  0271            ESP
 521   0311  0275            LSR
 522   0312  0220            OPEN TARTRK     /GET READY TO PASS TARGET TRK TO PROPER
 523   0313  0071            ESP             /CURRENT TRACK
 524
 525   0314  0200            OPEN CURTK0     /OPEN PROPER CURRENT TRACK REGISTER
 526   0315  0122            BR SR7 ONE      /BIT7=0 MEANS UNIT ONE
 527   0316  0320            .+2
 528   0317  0204            OPEN CURTK1
 529
 530   0320  0075            LSR             /UPDATE THE CURRENT TRACK ADDRESS
 531   0321  0064            LSP
 532
 533
 534   0322  0220  HDSETL,    OPEN TARTRK     /HEAD IS SETTLED DETERMINE IF ABOVE TRACK 43 DECIMAL
 535   0323  0071            ESP             /PASS TARGET TO MAGCOM VIA TEMPF
 536   0324  0075            LSR
 537   0325  0254            OPEN TEMPF
 538   0326  0064            LSP
 539
 540   0327  0670            LCT             /PASS 44 TO MAGCOM VIA TEMPG
 541   0330  0323            -44-1
```

```
0331  0075          LSR
0332  0260          OPEN TEMPG
0333  0064          LSP

0334  0026          SET LO=CUR      /ASSUME TARGET GREATER THAN 43

0335  0070          LCT             /CALL MAGCOM SUBROUTINE
0336  0344          ABV43           /RETURN ADDRESS
0337  0075          LSR
0340  0270          OPEN RTNA
0341  0064          LSP
0342  0226          JUMP F5
0343  2400          MAGCOM

0344  0202  ABV43,  JUMP F0         /NOOP F=G RETURN, ABOVE TRK 43
0345  0346          .+1             /NOOP

0346  0202          JUMP F0         /F<G; ABOVE TRACK 43
0347  0351          .+2

0350  0024          CLR LO=CUR      /F>G;  BELOW TRACK 43,  WRITE WITH HIGH CURRENT

0351  0070  CFIN=SE, LCT            /CALL FINDSEC SUBROUTINE TO LOCATE THE DESIRED SECTOR
0352  0355          RFINTR
0353  0206          JUMP F1
0354  0714          FINDSE

0355  0274  RFIN=TR, OPEN RTN       /RETURN FROM FINDTR SUBROUTINE
0356  0207          JUMP F1  IND

0357  0250  NOSTPS, OPEN TEMPE      /NO STEPS REQUIRED
0360  0071          ESP             /SOFT HEAD LOAD BIT TO SR7
0361  0075          LSR

0362  0122          BR SR7 ONE      /IS HEAD LOADED?
0363  0322          HDSETL          /YES, GO UPDATE CURRENT CONTROL

0364  0070          LCT             /NO, GO LOAD HEAD AND WAIT FOR 20MS SETTLE TIME
0365  0322          HDSETL          /RETURN ADDR FROM DLY25 SUBROUTINE
0366  0222          JUMP F4
0367  2145          DLY25

0370  0212  PFUNCT, JUMP F2         /POINTER FROM GETWORD SUBROUTINE TO
0371  1236          FUNCT           /FUNCTION DECODE

0372  0226  PDRCL,  JUMP F5         /POINTER TO DRV= CHECK DONE AFTER RECALABRATE
0373  2625          DRCAL

0374  0000          0               /SPARE LOCATIONS
0375  0000          0               /OPEN
0376  0000          0               /OPEN
0377  0000          0               /OPEN
```



```
                /[ROUTINE: WRITE SECTOR]
                /THIS ROUTINE TURNS ON WRITE GATE AT WRITE TURN ON TIME,
                /WRITES A PREAMBLE OF 6 BYTES OF ZEROES, A DATA OR DELETED DATA MARK,
                /THEN TURNS ON ERASE GATE.  ENTER WITH CNTR=100 IF
                /DELETED DATA, CNTR=0 IF NORMAL DATA MARK.  THE DATA MARK, DATA FIELD,  CRC
                /AND ONE BYTE POSTAMBLE ARE WRITTEN.  WRITE CURRENT IS TURNED OFF.
                /511 MICRO SECONDS LATER ERASE CURRENT IS TURNED OFF.  A HEADER MUST
                /THEN BE READ TO INSURE DISK IS STILL UP TO SPEED BEFORE  THE WRITE
                /SECTOR FUNCTION IS COMPLETE.


0400  0214  WRTSEC, OPEN STAT       /DEL DATA BIT TO STAT6
0401  0075          LSR
0402  0064          LSP

0403  0070          LCT             /CALL SUBROUTINE TO FIND DESIRED TRACK AND SECTOR
0404  0407          S=GATE
0405  0202          JUMP F0
0406  0103          FINDTR

0407  0061  S=GATE, FLAG OFF        /ALWAYS START WRITING WITH WRITE FLOP CLEARED

0410  0140          BR WRTEN F      /GO REPORT ERROR IF NO WRITE ENABLE
0411  0503          PRTERR

0412  0214          OPEN STAT       /DEL DATA BIT TO SR7 AND ENABLE WRT CURRENT
0413  0071          ESP
0414  0006          SET WGATE
0415  0075          LSR
0416  0074          ROTATE ZERO

0417  0234          OPEN TEMPB      /USE TEMPB FOR SECOND HALF DATA AM PATTERN

0420  0057          PRECRC          /JAM THE CRC GENERATOR WITH FIRST 6 BITS OF DATA AM
0421  0056          CRC ONE
0422  0056          CRC ONE
0423  0056          CRC ONE
0424  0056          CRC ONE
0425  0056          CRC ONE
0426  0054          CRC ZERO

0427  0120          BR SR7 ZERO     /DELETED DATA?
0430  0460          DAMSUP          /NO, REGULAR DATA MARK

0431  0070          LCT             /YES, SECOND HALF OF DELETED DATA MARK TO CNTR
                    OCTAL
0432  0325          325             /FLUX PATTERN
                    DECIMAL

0433  0054          CRC ZERO        /JAM LAST 2 BITS OF DELETED DATA MARK TO CRC GEN.
0434  0054          CRC ZERO
0435  0002          DISK            /NOOP
0436  0002          DISK            /NOOP
```

```
      0437  0063    STASH,  TOG FLAG        /END OF THE FIRST 0 BIT

      0440  0075            LSR             /PUT SECOND HALF OF THE DESIRED MARK IN THE TEMPB
      0441  0064            LSP

      0442  0070            LCT             /SET UP RETURN FROM WRITE ZEROS SUBROUTINE
      0443  0466            HLFDLY
      0444  0075            LSR

      0445  0070            LCT             /STALL 1.8 MICRO SECONDS
      0446  0374            -3-1
      0447  0073            ICT
      0450  0124            BR COFL F
      0451  0447            .-2
      0452  0002            DISK            /NOOP

      0453  0070            LCT             /SPECIFY 22 ZEROS TO BE WRITTEN BY WRT0S SUBROUTINE
      0454  0351            -22-1

      0455  0263            TOG FLAG        /WRITE SECOND CLOCK TRANSITION

      0456  0212            JUMP F2         /CALL WRITE ZEROS SUBROUTINE
      0457  1322            WRT0S

      0460  0070    DAMSUP, LCT             /LOAD SECOND HALF OF NORMAL DATA MARK
                            OCTAL
      0461  0337            337
                            DECIMAL

      0462  0056            CRC ONE         /JAM LAST 2 BITS OF DATA MARK TO CRC GENERATOR
      0463  0256            CRC ONE

      0464  0206            JUMP F1         /GO PUT AWAY THE SECOND HALF OF THE DATA MARK
      0465  0437            STASH

      0466  0002    HLFDLY, DISK            /NOOP

      0467  0070            LCT
      0470  0514            WRTDAM          /SET UP RETURN FROM WRITE ZEROS SUBROUTINE
      0471  0075            LSR

      0472  0270            LCT             /NOOP WASTE .8 MICRO SECONDS
      0473  0351            -22-1           /NOOP
      0474  0270            LCT             /NOOP
      0475  0351            -22-1           /NOOP

      0476  0270            LCT             /SPECIFY 22 BITS TO BE WRITTEN BY WRT0S SUBROUTINE
      0477  0351            -22-1

      0520  0263            TOG FLAG        /WRITE THE 25TH CLOCK TRANSITION

      0521  0212            JUMP F2         /CALL WRT0S SUBROUTINE
      0522  1322            WRT0S
```



```
      0503  0270    PRTERR, LCT             /SET WRITE PROTECT BIT OF STAT BECAUSE A WRITE FUNCTION WAS ATTEMPTED ON
                                            /ON A WRITE PROTECTED DISKETTE
                            OCTAL
      0504  0010            10
                            DECIMAL
      0505  0075            LSR
      0506  0214            OPEN STAT
      0507  0064            LSP

      0510  0070            LCT             /ERROR CODE FOR WRT PROTECT ERROR
      0511  0100            WRPROT
      0512  0226            JUMP F5
      0513  2610            GOERDN



                    /THIS ROUTINE WILL WRITE EITHER A DATA MARK OR A
                    /DELETED DATA MARK. THE FIRST HALF OF BOTH MARKS ARE
                    /IDENTICAL. THE SECOND HALF IS SPECIFIED BEFORE ENTRY BY
                    /PUTTING THE SECOND HALF BIT PATTERN IN TEMPB


      0514  2070    WRTDAM, LCT             /WASTE 2.0 MICRO SECONDS
      0515  0375            -2-1
      0516  0073            ICT
      0517  0075            LSR
      0520  0124            BR COFL F
      0521  0516            .-3

      0522  0263            TOG FLAG        /WRITE A CLOCK BIT AS END OF 48TH ZERO

      0523  2070            LCT             /FIRST HALF OF DATA MARK PATTERN TO SR
                            OCTAL
      0524  0352            352
                            DECIMAL
      0525  0075            LSR

      0526  0070            LCT             /SET TRANSITION LOOP COUNTER FOR 8 LOOPS
      0527  0370            -7-1
      0530  0002            DISK            /NOOP

      0531  0120    AGAIN,  BR SR7 ZERO     /WHATS THE BIT?
      0532  0562            A               /ZERO, NO TRANSITION

      0533  2344            CLR BAR         /ONE, RESET THE BUFFER ADDR REG TO 0

      0534  0063            TOG FLAG        /WRITE FLUX TRANSITION

      0535  0126    ABACK,  BR COFL T       /CHECK TRANSITION LOOP COUNT
      0536  0543            SECHLF          /GO GET SECOND HALF

      0537  0074            ROTATE          /SHIFT NEXT TRANSITION TO SR7

      0540  0073            ICT             /BUMP TRANSITION LOOP COUNTER
```

```
 762   0541  0206          JUMP F1         /DO ANOTHER LOOP
 763   0542  0531          AGAIN
 764
 765   0543  0234    SECHLF, OPEN TEMPB    /SECOND HALF OF DATA MARK TO SR
 766   0544  0071          ESP
 767   0545  0075          LSR
 768
 769   0546  0070          LCT             /SET TRANSITION LOOP COUNTER FOR 8 LOOPS
 770   0547  0370          -7-1
 771
 772
 773   0550  0120    AGAIN1, BR SR7 ZERO    /SHALL WE WRITE A TRANSITION?
 774   0551  0564          B               /NO
 775
 776   0552  0063          TOG FLAG        /YES
 777   0553  0002          DISK            /NOOP
 778
 779   0554  0126    BBACK,  BR COPL T       /DONE DATA MARK?
 780   0555  0566          WRTDAT          /YES, GO WRITE DATA
 781
 782   0556  0073          ICT             /NO, BUMP THE LOOP COUNTER
 783
 784   0557  0074          ROTATE          /BRING UP NEXT HALF BIT TO SR7
 785
 786   0560  0206          JUMP F1         /DO ANOTHER LOOP
 787   0561  0550          AGAIN1
 788
 789   0562  0206    A,      JUMP F1       /WASTE 2 CYCLES TO SKIP FLUX TRANSITION
 790   0563  0535          ABACK
 791
 792   0564  0206    B,      JUMP F1       /WASTE 2 CYCLES TO SKIP FLUX TRANSITION
 793   0565  0554          BBACK
 794
 795
 796
 797
 798                 /THIS ROUTINE WRITES THE CONTENTS OF THE SECTOR BUFFER,
 799
 800
 801   0566  0022    WRTDAT, SET EGATE       /TURN ON ERASE CURRENT AT START OF DATA FIELD
 802   0567  0073          ICT             /NOOP; WASTE 2 CYCLES
 803   0570  0073          ICT             /NOOP
 804
 805   0571  0170    DATAA,  BR BDATAO ZERO  /WHATS THE DATA BIT?
 806   0572  0615          C               /ZERO, GO WRITE NOTHING
 807
 808   0573  0056          CRC ONE         /ONE, UPDATE THE CRC WITH 1
 809
 810   0574  0063          TOG FLAG        /WRITE A DATA TRANSITION
 811   0575  0073          ICT             /NOOP FOR BIT CELL TIMING
 812
 813   0576  0162    CBACK,  BR BAROFL T     /DONE ENTIRE SECTOR?
 814   0577  0624          WRTCRC          /YES, GO WRITE THE CRC
 815
 816   0600  0346          INCR BAR        /NO, BRING UP NEXT DATA BIT FROM SEC BUFFER
```



```
 817
 818   0601  0070          LCT             /NOOP = WASTE 5 CYCLES WITH
 819   0602  0376          -2              /NOOP = A SELF TEST OF THE COUNTER
 820   0603  0073          ICT             /NOOP
 821   0604  0124          BR COPL F       /NOOP
 822   0605  0622          SELFER          /NOOP
 823
 824   0606  0063          TOG FLAG        /WRITE A CLOCK TRANSITION
 825
 826   0607  0074          LCT             /NOOP = WASTE 4 CYCLES WITH
 827   0610  0377          -1              /NOOP = A SELF TEST OF THE COUNTER
 828   0611  0124          BR COPL F       /NOOP
 829   0612  0622          SELFER          /NOOP
 832
 831   0613  0206          JUMP F1         /GO WRITE ANOTHER DATA BIT
 832   0614  0571          DATAA
 833
 834   0615  0054    C,      CRC ZERO      /UPDATE CRC WITH 0 AND SKIP DATA TRANSITION
 835   0616  0206          JUMP F1
 836   0617  0576          CBACK
 837
 838
 839   0620  0070    SELFER, LCT           /A SELF DIAGNOSTIC HAS FAILED
 840   0621  0260          WSELFER
 841   0622  0226          JUMP F5
 842   0623  0610          GOERDN
 843
 844
 845                 /THIS ROUTINE WRITES THE 16 BIT CRC GENERATED FOR THE
 846                 /PRECEEDING DATA FIELD,
 847
 848
 849   0624  0070    WRTCRC, LCT           /PRESET BIT COUNTER FOR 16 BITS
 850   0625  0357          -16-1
 851
 852   0626  0075          LSR             /NOOP WASTE 4 CYCLES AND SELF TEST THE SR
 853   0627  0232    E,      DISK          /NOOP
 854   0630  0120          BR SR7 ZERO     /NOOP
 855   0631  0620          SELFER          /NOOP
 856
 857   0632  0063          TOG FLAG        /WRITE A CLOCK TRANSITION
 858
 859   0633  0076          ROTATE ONE      /NOOP WASTE 6 CYCLES WITH MORE SELFTEST
 860   0634  0076          ROTATE ONE      /NOOP
 861   0635  0076          ROTATE ONE      /NOOP
 862   0636  0076          ROTATE ONE      /NOOP
 863   0637  0120          BR SR7 ZERO     /NOOP
 864   0640  0620          SELFER          /NOOP
 865
 866   0641  0130          BR CRC16 ZERO   /WHAT IS THE CRC BIT
 867   0642  0653          D               /ZERO, DO NOT WRITE ANYTHING
 868
 869   0643  0056          CRC ONE         /ONE, BRING UP THE NEXT BIT
 870
 871   0644  0063          TOG FLAG        /WRITE A DATA TRANSITION
```

```
 872  0645  0076          ROTATE ONE      /NOOP
 873
 874  0646  0273  DBACK,  ICT             /BUMP THE BIT COUNTER
 875
 876  0647  0126          BR COFL T       /DONE CRC YET?
 877  0650  0656          .+RTPST         /YES, GO +RITE A POSTAMBLE
 878
 879  0651  0206          JUMP F1         /NO, GO +RITE ANOTHER CRC BIT
 880  0652  0627          E
 881
 882  0653  0054  D,      CRC ZERO        /BRING UP NEXT CRC BIT AND SKIP DATA TRANSITION
 883  0654  0206          JUMP F1
 884  0655  0646          DBACK
 885
 886
 887                      /THIS ROUTINE +RITES THE ONE BYTE POSTAMBLE, TURNS OFF
 888                      /+RITE CURRENT, DELAYS 511 MICRO SEC AND TURNS OFF ERASE
 889                      /CURRENT. IT UTILIZES THE +RITE ZEROES SUBROUTINE.
 890
 891
 892
 893  0656  0272  +RTPST, LCT             /SETUP TO CALL +RT0S TO +RITE 8 BITS OF ZEROES
 894  0657  0666          C+GATE
 895  0660  0075          LSR
 896  0661  0270          LCT
 897  0662  0367          -8-1
 898
 899  0663  0063          TOG FLAG        /+RITE LAST CLOCK TRANSITION OF THE CRC FIELD
 900
 901  0664  0212          JUMP F2         /CALL THE SUBROUTINE +RITE ZEROES
 902  0665  1322          +RT0S
 903
 904
 905  0666  0004  C+GATE, CLR +GATE       /DISABLE +RITE CURRENT
 906
 907  0667  0270          LCT             /CALL +RT0S FOR 127 BITS (511.2 MICRO SEC)
 908  0670  0676          CEGATE          /DELAY TO ERASE TURN OFF
 909  0671  0075          LSR
 910  0672  0270          LCT
 911  0673  0200          -127-1
 912  0674  0212          JUMP F2
 913  0675  1322          +RT0S
 914
 915
 916  0676  0002  CEGATE, CLR EGATE       /DISABLE ERASE CURRENT
 917
 918  0677  0270          LCT             /CALL +RT0S FOR 25 BIT (101 MICRO SEC) DELAY
 919  0700  0700          READOK          /BEFORE TRYING TO READ
 920  0701  0075          LSR
 921  0702  0270          LCT
 922  0703  0346          -25-1
 923  0704  0212          JUMP F2
 924  0705  1322          +RT0S
 925
 926  0706  0670  READOK, LCT             /CALL FIND HEADER ROUTINE TO INSURE
```



```
 927  0707  0712          GODONE          /THAT THE DISK IS STILL MOVING
 928  0710  0216          JUMP F3
 929  0711  1400          FINDHD
 930
 931  0712  0212  GODONE, JUMP F2         /+RITE SECTOR FUNCTION IS COMPLETE
 932  0713  1006          OKDONE
 933
 934
 935                      /[SUBROUTINE: FINDSECTOR]
 936                      /SUBROUTINE TO FIND A SPECIFIC SECTOR.  ENTER WITH RETURN ADDRESS
 937                      /IN CNTR,  DESIRED TRACK ADDRESS IN TARTRK AND DESIRED SECTOR ADDRESS
 938                      /IN TARSEC.  THIS SUBROUTINE ASSUMES THAT THE TARGET TRACK HAS ALREADY
 939                      /BEEN REACHED.
 940
 941
 942  0714  0276  FINDSE, OPEN RTNA        /SAVE RETURN ADDRESS
 943  0715  0075          LSR
 944  0716  0064          LSP
 945
 946  0717  0266          OPEN TEMPG      /PRESET SECTOR TRY COUNT TO 52 TRIES
 947  0720  0270          LCT
 948  0721  0313          -52-1
 949
 950  0722  0075  AGAIN2, LSR             /STORE SECTOR TRY COUNT
 951  0723  0064          LSP
 952
 953  0724  0270          LCT             /CALL SUBROUTINE TO FIND A HEADER
 954  0725  0730          CHKSEC
 955  0726  0216          JUMP F3
 956  0727  1400          FINDHD
 957
 958  0730  0174  CHKSEC, BR FLAGO ZERO   /CORRECT SECTOR? FLAG=1 IF NO
 959  0731  0743          WAIT            /YES, GO WAIT FOR PREAMBLE
 960
 961  0732  0260          OPEN TEMPG      /NO, RECALL SECTOR TRY COUNT AND INCREMENT IT
 962  0733  0071          ESP
 963  0734  0073          ICT
 964
 965  0735  0124          BR COFL F       /52 TRIES MADE FOR SECTOR YET?
 966  0736  0722          AGAIN2          /NO, TRY ANOTHER SECTOR
 967
 968  0737  0270  NXHDR,  LCT             /YES, CANNOT FIND THE SECTOR
 969  0740  0070          KNXHDR
 970  0741  0226          JUMP F5
 971  0742  2610          GOERDN
 972
 973  0743  0070  WAIT,   LCT             /STALL 323.2 MICRO SECONDS TO WAIT FOR DATA PREAMBLE
 974  0744  0345          -26-1
 975  0745  0073          ICT
 976  0746  0124          BR COFL F
 977  0747  0745          .-2
 978  0750  0073          ICT
 979  0751  0124          BR COFL F
 980  0752  0750          .-2
 981  0753  0073          ICT
```

```
 982    0754  0124          BR COFL F
 983    0755  0753          .-2
 984
 985    0756  0270          OPEN RTNA       /RETURN FROM THIS SUBROUTINE AT WRITE TURN ON TIME
 986    0757  0203          JUMP F0 IND     /OF THE DESIRED SECTOR
 987
 988
 989
 990                  /[ROUTINE: READ SECTOR]
 991
 992    0760  0074  RDSEC,  ROTATE ZERO     /ZERO THE STAT
 993    0761  0074          ROTATE ZERO
 994    0762  0214          OPEN STAT
 995    0763  0064          LSP
 996
 997    0764  0070          LCT             /CALL THE FIND TRACK SUBROUTINE TO LOCATE DESIRED SECTOR
 998    0765  0770          GOREAD
 999    0766  0202          JUMP F0
1000    0767  0103          FINDTR
1001
1002    0770  0222  GOREAD, JUMP F4         /GO READ THE DATA FIELD
1003    0771  2167          READ
1004
1005
1006    0772  0000          0               /OPEN  FREE LOCATIONS
1007    0773  0000          0               /OPEN
1008    0774  0000          0               /OPEN
1009    0775  0000          0               /OPEN
1010    0776  0000          0               /OPEN
1011    0777  0000          0               /OPEN
```



```
1012                  /[ROUTINE: DONE AND ERROR DONE]
1013
1014
1015    1000  0220  ERDONE, CLR DONE
1016    1001  0010          CLR XREG
1017
1018    1002  0000          INTERF          /SELECT INTERFACE BUSS
1019
1020    1003  0006          SET ERR         /ASSERT ERROR LINE
1021
1022    1004  0212          JUMP F2         /SKIP NEXT INSTRUCTION
1023    1005  1007          .+2
1024
1025    1006  0204  OKDONE, CLR ERR         /NEGATE ERROR LINE
1026
1027    1007  0214          OPEN STAT       /OPEN STAT TO MOVE TO INTERFACE
1028
1029    1010  0071          ESP             /STAT OR ERREG TO SR
1030    1011  0075          LSR
1031
1032    1012  0024          CLR SHIFT       /CLEAR INTERFACE OUTPUT BUFFER
1033    1013  0020          CLR DONE
1034    1014  0010          CLR XREG
1035
1036    1015  0000          INTERF          /SELECT INTERFACE OUTPUT BUSS
1037
1038    1016  0230          CLR SECDAT      /SELECT SR AS DATA LINE SOURCE
1039
1040    1017  0016          SET IOOUT       /DEFINE DATA DIRECTION AS OUT (TO INTERFACE)
1041
1042    1020  0070          LCT             /MOVE SR TO INTERFACE SERIALLY
1043    1021  0367          -8-1
1044    1022  0026          SET SHIFT
1045    1023  0024          CLR SHIFT
1046    1024  0073          ICT
1047    1025  0074          ROTATE ZERO
1048    1026  0124          BR COFL F
1049    1027  1022          .-5
1050
1051    1030  0014          CLR IOOUT       /NEXT TRANSFER WILL BE FROM INTERFACE
1052
1053    1031  0022  STDONE, SET DONE        /FUNCTION IS DONE
1054    1032  0070          LCT             /CALL GET COMMAND SUBROUTINE TO GET NEXT FUNCTION
1055    1033  0370          PFUNCT
1056    1034  0222          JUMP F4
1057    1035  2001          GETCMD
1058
1059    1036  0074  FUNCT,  ROTATE          /MOVE UNIT SELECT BIT TO SR7
1060    1037  0074          ROTATE
1061    1040  0074          ROTATE
1062    1041  0122          BR SR7 ONE      /FLAG IS ALREADY SET,  SAVE UNIT IN FLAG, ON=UNIT 0
1063    1042  1044          .+2
1064    1043  0061          FLAG OFF
1065
1066    1044  0074          ROTATE          /GET FIRST FUNCTION BIT TO SR7
```

```
1067
1068    1045  0120          BR SR7 ZERO
1069    1046  1066          FUNCT4          /FUNCTION 4 OR GREATER
1070
1071    1047  0074          ROTATE          /GET 2ND FUNCTION BIT
1072
1073    1050  0120          BR SR7 ZERO
1074    1051  1057          FUNCT2          /FUNCTION CODE IS 2 OR 3
1075
1076
1077    1052  0074          ROTATE          /GET LAST FUNCTION BIT
1078
1079    1053  0120          BR SR7 ZERO
1080    1054  1107          EMPTYBUF        /FUNCTION CODE 1
1081
1082    1055  0212          JUMP F2         /FUNCTION CODE 0
1083    1056  1110          FILLBUF
1084
1085    1057  0074    FUNCT2, ROTATE        /GET LAST FUNCTION BIT
1086
1087    1060  0120          BR SR7 ZERO
1088    1061  1105          PRDSEC          /FUNCTION CODE 3
1089
1090    1062  0070          LCT             /CLR CNTR BIT6 TO INDICATE NORMAL DATA
1091    1063  0000          0
1092    1064  0206          JUMP F1         /FUNCTION 2
1093    1065  0400          WRTSEC
1094
1095    1066  0074    FUNCT4, ROTATE        /GET 2ND FUNCTION BIT
1096
1097    1067  0120          BR SR7 ZERO
1098    1070  1076          FUNCT6          /FUNCTION CODE IS 6 OR GREATER
1099
1100    1071  0074          ROTATE          /GET LAST FUNCTION BIT
1101
1102    1072  0120          BR SR7 ZERO
1103    1073  1224          RDSTAT          /FUNCTION 5
1104
1105    1074  0212          JUMP F2
1106    1075  1243          CLRID           /FUNCTION 4=UNUSED
1107
1108    1076  0074    FUNCT6, ROTATE        /GET LAST FUNCTION BIT
1109
1110    1077  0120          BR SR7 ZERO
1111    1100  1275          RDEREG          /FUNCTION 7
1112
1113    1101  0070          LCT             /SET CNTR6 TO INDICATE DELETED DATA
1114                        OCTAL
1115    1102  0127          100
1116                        DECIMAL
1117    1103  0206          JUMP F1
1118    1104  0422          WRTSEC          /FUNCTION 6
1119
1120    1105  0206    PRDSEC, JUMP F1       /POINTER TO READ SECTOR FUNCTION
1121    1106  0760          RDSEC
```



```
1122
1123
1124
1125
1126
1127
1128
1129                /[ROUTINE] FILL AND EMPTY BUFFER]
1130
1131
1132    1107  0016    EMPTYBUF,SET IODUT     /IODUT IS CLEARED,  SET IT TO INDICATE DATA IS
1133                                          /MOVING TO THE INTERFACE
1134
1135    1110  0074    FILLBUF,ROTATE ZERO    /CLEAR STAT
1136    1111  0274          ROTATE ZERO
1137    1112  0214          OPEN STAT
1138    1113  0064          LSP
1139
1140    1114  0210          OPEN ERREG       /CLEAR ERREG
1141    1115  0064          LSP
1142
1143    1116  0061          FLAG OFF         /NOOP
1144
1145    1117  0044          CLR BAR SHORT    /ADDRESS THE 1ST BIT OF SECTOR BUFFER
1146
1147    1120  0070          LCT              /SET UP BYTE COUNT TO 128 (8 BIT) OR 64 (12 BIT)
1148    1121  0177          =128-1
1149    1122  0152          BR XIIBIT F
1150    1123  1126          .+3
1151    1124  0070          LCT
1152    1125  0277          =64-1
1153    1126  0230          OPEN TEMPA
1154
1155    1127  0106          BR IOB3OT T      /WHICH FUNCTION IS THIS?
1156    1130  1210          EMPTY1           /EMPTYBUF
1157
1158    1131  0012    XFRQ,   SET XREQ       /REQUEST DATA TRANSFER
1159
1160    1132  0073          ICT              /INCREMENT BYTE COUNT AND RESTORE
1161    1133  0075          LSR
1162    1134  0064          LSP
1163
1164    1135  0070          LCT              /CALL WAITRUN SUBR TO WAIT FOR DATA TRANSFER
1165    1136  1141          NEWORD
1166    1137  0222          JUMP F4
1167    1140  2312          WAITRN
1168
1169    1141  0230    NEWORD, OPEN TEMPA     /REOPEN THE BYTE COUNT REGISTER BECAUSE WAITRUN CLOSED IT
1170    1142  0070          LCT              /SET UP BIT COUNT IN CNTR TO 8 BITS OR 12 BITS
1171    1143  0367          =8-1
1172    1144  0150          BR XIIBIT F
1173    1145  1150          .+3
1174    1146  0070          LCT
1175    1147  0363          =12-1
1176
```

```
1177    1150  0104            BR IOB3DT F     /WHICH FUNCTION IS THIS?
1178    1151  1175            FILL1           /FILLBUF
1179
1180
1181    1152  0026    BYTEOUT,SET SHIFT       /EMPTYBUF,  MOVE A BYTE FROM SECTOR BUFFER
1182    1153  0046            INCR BAR        /TO INTERFACE SERIALLY
1183    1154  0024            CLR SHIFT
1184    1155  0073            ICT
1185    1156  0124            BR COFL F
1186    1157  1152            BYTEOUT
1187
1188    1160  0071            ESP             /CHECK BYTE COUNT
1189    1161  0124            BR COFL F
1190    1162  1131            XFRQ            /NOT DONE, GO REQUEST A DATA TRANSFER
1191
1192    1163  0212            SET XREQ        /DONE, REQUEST TRANSFER OF LAST BYTE
1193
1194    1164  0100            BR RUN F        /WAIT FOR TRANSFER COMPLETION
1195    1165  1164            .-1
1196
1197    1166  0010            CLR XREQ
1198
1199    1167  0212            JUMP F2         /EMPTYBUF FUNCTION IS COMPLETE
1200    1170  1006            OKDONE
1201
1202    1171  0050            FIN WRTBUF      /END SECTOR BUFR WRT PULSE (800 NS)
1203
1204    1172  0046            INCR BAR        /ADDRESS NEXT CELL OF SECTOR BUFFER
1205
1206    1173  0026            SET SHIFT       /SHIFT NEXT BIT FROM INTERFACE
1207    1174  0024            CLR SHIFT
1208
1209    1175  0053    FILL1,  START WRTBUF    /START SECTOR BUFR WRT PULSE
1210
1211    1176  0073            ICT             /LAST BIT OF BYTE?
1212    1177  0124            BR COFL F
1213    1200  1171            .-7             /NO, DO ANOTHER BIT
1214
1215    1201  0250            FIN WRTBUF      /LAST BIT, END SECTOR BUFR WRT PULSE
1216
1217    1202  0046            INCR BAR        /ADDRESS NEXT CELL OF SECTOR BUFFER
1218
1219    1203  0071            ESP             /CHECK BYTE COUNT
1220    1204  0124            BR COFL F
1221    1205  1131            XFRQ            /NOT DONE, GO GET ANOTHER BYTE
1222
1223    1206  0212            JUMP F2         /DONE FILLBUF FUNCTION
1224    1207  1006            OKDONE
1225
1226    1210  0032    EMPTY1, SET SECDAT      /SELECT SECTOR BUFR AS DATA LINE SOURCE
1227
1228    1211  0073            ICT             /INCREMENT AND SAVE THE BYTE COUNT
1229    1212  0075            LSR
1230    1213  0064            LSP
1231
```



```
1232    1214  0270            LCT             /SET UP THE BIT COUNT TO 8 BITS OR 12 BITS
1233    1215  0367            -8-1
1234    1216  0150            BR XIIBIT F
1235    1217  1152            BYTEOUT
1236    1220  0270            LCT
1237    1221  0363            -12-1
1238
1239    1222  0212            JUMP F2         /GO MOVE A BYTE TO INTERFACE
1240    1223  1152            BYTEOUT
1241
1242
1243
1244                    /[ROUTINE: READ STATUS]
1245
1246
1247    1224  0244    RDSTAT, OPEN TEMPD      /SELECT THE SOFT UNIT SCRATCH PAD
1248
1249    1225  0036            UNIT ONE        /PRESELECT UNIT ONE
1250    1226  0270            LCT
1251    1227  0000            0
1252
1253    1230  0174            BR FLAGO ZERO   /WHICH UNIT?  FLAG=0=UNIT 1
1254    1231  1235            .+4             /UNIT 1,  SKIP UNIT 0 SETUP
1255
1256    1232  0034            UNIT ZERO       /SELECT UNIT ZERO
1257    1233  0270            LCT
1258                          OCTAL
1259    1234  0200            200
1260                          DECIMAL
1261
1262    1235  0075            LSR             /STORE SOFT UNIT BIT
1263    1236  0064            LSP
1264
1265    1237  0270            LCT             /CALL CHECKRDY SUBROUTINE, RETURN TO CLRID
1266    1240  1765            PNTRDY
1267    1241  0226            JUMP F5
1268    1242  2640            CHKRDY
1269
1270
1271
1272    1243  0214    CLRID,  OPEN STAT       /CLEAR INIT DONE BIT OF STAT
1273    1244  0071            ESP             /STATUS TO SHIFT REG
1274    1245  0075            LSR
1275
1276    1246  0061            FLAG OFF
1277    1247  0070            LCT             /END AROUND SHIFT OF FIRST 5 BITS
1278    1250  0372            -5-1
1279    1251  0122    ROT,    BR SR7 T
1280    1252  1256            .+4
1281    1253  0074            ROTATE ZERO
1282    1254  0212            JUMP F2
1283    1255  1257            .+2
1284    1256  0076            ROTATE ONE
1285    1257  0073            ICT
1286    1260  0124            BR COFL F
```

```
1287  1261  1251          .=8
1288
1289  1262  0176          BR FLAGO T      /IF FLAG IS SET THEN ROTATE IS DONE
1290  1263  1272          GODUN
1291
1292  1264  0362          FLAG ON         /IF NOT, CLEAR INIT DONE AND FINISH ROTATE
1293  1265  0274          ROTATE ZERO
1294  1266  0070          LCT
1295  1267  0375          -2-1
1296  1270  0212          JUMP F2
1297  1271  1251          ROT
1298
1299
1300  1272  2264  GODUN,  LSP             /RESTORE STAT AND GO DONE
1301  1273  0212          JUMP F2
1302  1274  1206          OKDONE
1303
1304                      /[ROUTINE: READ ERROR REGISTER]
1305
1306
1307
1308  1275  0212  RDEREG, OPEN ERREG
1309  1276  0212          JUMP F2
1310  1277  1010          OKDONE+2
1311
1312
1313                      /[SUBROUTINE: DELAY], THIS SUBROUTINE PROVIDES DELAYS IN MULTIPLES
1314                      /OF .1MS. ENTER WITH RETURN ADDRESS IN THE SHIFT REG,
1315                      /AND MULTIPLIER IN THE COUNTER
1316
1317
1318  1300  0264  DELAY,  OPEN RTNB       /SAVE THE RETURN ADDRESS
1319  1301  0064          LSP
1320
1321  1302  0075          LSR             /MULTPLIER TO SHIFT REGISTER
1322
1323  1303  2070          LCT             /DELAY 490 CYCLES (98 MICRO SECONDS)
1324  1304  0205          -122-1
1325  1305  0273          ICT
1326  1306  0264          OPEN RTNB
1327  1307  0124          BR COFL F
1328  1310  1305          .-3
1329
1330  1311  0071          ESP             /MOVE MULTIPLIER TO CNTR VIA RTNB
1331  1312  0264          LSP
1332  1313  0075          LSR
1333  1314  0071          ESP
1334  1315  0264          LSP
1335
1336  1316  0273          ICT             /INCREMENT THE MULTIPLIER
1337
1338  1317  0124          BR COFL F       /ANY MORE .1MS LOOPS?
1339  1320  1301          DELAY+1         /YES, GO TO IT
1340
1341  1321  0223          JUMP F4 IND     /NO, RETURN FROM SUBROUTINE
```



```
1342
1343                      /[SUBROUTINE: WRITE ZEROES]
1344                      /THIS SUBROUTINE WRITES A SPECIFIED NUMBER OF ZEROS IF
1345                      /WRITE GATE IS ON. IF WRITE GATE IS OFF IT ACTS AS A
1346                      /DELAY OF 4.5 BITS. ENTRANCE IS MADE WITH RETURN ADDRESS
1347                      /IN THE SR, NUMBER OF BITS IN THE CNTR, AND A CLOCK
1348                      /TRANSITION OCCURRING IMMEDIATLY PRIOR TO THE JUMP INTO
1349                      /THIS SUBROUTINE.
1350
1351
1352  1322  0274  WRTZS,  OPEN RTN         /SAVE RETURN ADDRESS
1353  1323  0064          LSP
1354
1355  1324  0075          LSR             /PUT BIT COUNTER IN SR
1356
1357  1325  0230          OPEN TEMPA      /TEMPA IS THE PATH THROUGH THE SP
1358
1359  1326  2070  LOOP,   LCT             /STALL 2.6 MICRO SECONDS
1360  1327  0374          -3-1
1361  1330  0273          ICT
1362  1331  0124          BR COFL F
1363  1332  1332          .-2
1364  1333  0264          LSP             /NOOP
1365  1334  0071          ESP             /NOOP
1366
1367  1335  0063          TOG FLAG        /WRITE A CLOCK TRANSITION IF WRT GATE IS SET
1368
1369  1336  0064          LSP             /PUT BIT COUNT IN THE COUNTER
1370  1337  0071          ESP
1371
1372  1340  0073          ICT             /INCREMENT BIT COUNT
1373
1374  1341  0075          LSR             /PUT UPDATED BIT COUNT BACK IN SR
1375
1376  1342  0124          BR COFL F       /DONE ALL BITS?
1377  1343  1326          LOOP            /NO
1378
1379  1344  0274          OPEN RTN        /YES, RETURN FROM SUBROUTINE
1380  1345  0227          JUMP IND F1
1381
1382
1383  1346  0222  PGOTIT, JUMP F4         /POINTER TO GOTWORD FROM WAITRUN
1384  1347  2010          GOTIT
1385
1386
1387                      /[ROUTINE: INITIALIZE CONT.]
1388
1389  1350  0261  TEST2,  FLAG OFF        /CLEAR FLAG TO INDICATE R10 IS BEING TESTED
1390
1391  1351  0070  TEST1,  LCT             /LOOP TO TEST THAT SR IS 252 AND THAT
1392  1352  0372          -5-1            /IT CAN BE SHIFTED,
1393  1353  0122  TSTAGN, BR SR7 ZERO
1394  1354  1374          INTER1          /TEST FAILURE
1395  1355  0076          ROTATE ONE
1396  1356  0122          BR SR7 ONE
```

```
1397    1357  1374          INTER1          /TEST FAILURE
1398    1360  0074          ROTATE ZERO
1399    1361  0073          ICT
1400    1362  0124          BR COFL F
1401    1363  1353          TSTAGN
1402
1403    1364  0250          OPEN R10        /CONTENTS OF R10 TO SR,  SHOULD BE 125
1404    1365  0071          ESP
1405    1366  0075          LSR
1406
1407    1367  0074          ROTATE ZERO     /SHIFT SR ONCE TO CHANGE 125 TO 252
1408
1409    1370  0176          BR FLAGO ONE    /HAS R10 BEEN TESTED ALREADY?
1410    1371  1350          TEST2           /NO
1411
1412    1372  0202    TESTDN, JUMP F0       /YES, RETURN TO REMAINING INITIALIZE ROUTINE
1413    1373  0024          TSTRTN
1414
1415    1374  0006    INTER1, SET ERR       /SELF TEST ERROR, SET ERROR AND GO SET DONE
1416    1375  0212          JUMP F2
1417    1376  1031          STDONE
1418
1419    1377  2000          0               /OPEN
```



```
1420                  /[SUBROUTINE: FINDHEADER AND FIND DATA ADDRESS MARK]
1421                  /SUBROUTINE TO LOCATE A LEGAL HEADER (CORRECT CRC AND TRACK #)
1422                  /ENTER WITH THE RETURN ADDRESS IN CNTR.  ALSO ROUTINE TO FIND A DATA MARK
1423                  /OR DELETED DATA MARK.
1424
1425                                        /THIS ROUTINE LOCATES A SIX BYTE PREAMBLE OF ZEROES,
1426
1427
1428    1400  0264    FINDHD, OPEN RTNB     /STORE RETURN ADDRESS
1429    1401  0075          LSR
1430    1402  2464          LSP
1431
1432    1403  0230          OPEN TEMPA      /256 TO BAD START INNER COUNT
1433    1404  0072          LCT
1434    1405  0377          -1
1435    1406  0075          LSR
1436    1407  0064          LSP
1437
1438    1410  0234          OPEN TEMPB      /3 TO CNTR FOR BAD START OUTER COUNT,  768 BAD STARTS ALLOWED
1439    1411  0070          LCT
1440    1412  0374          -3-1
1441
1442    1413  0075    TRYAGN, LSR           /RESTORE BAD START COUNT
1443    1414  0064          LSP
1444
1445    1415  0045          CLR BAR LONG    /RESET FOR A COUNT OF 4096 AS PREAMBLE FAILURE COUNT
1446
1447    1416  0240          OPEN TEMPC      /24 TO CNTR AS ZERO BIT COUNT
1448    1417  0072          LCT
1449    1420  0347          -24-1
1450    1421  0075    MOREOS, LSR           /RESTORE ZERO BIT COUNT
1451    1422  0064          LSP
1452
1453    1423  0070          LCT             /PUT 0 IN SR7 FOR DATA COMPARISONS, ALSO CONSTANT FOR 40 MICRO SEC WAIT BRANCH
1454    1424  0067          -200-1
1455    1425  0075          LSR
1456
1457    1426  0346          WBR SEPCLK T    /WAIT 40 MICRO SECONDS FOR SEP CLK
1458    1427  1432          .+3
1459
1460    1430  0216          JUMP F3         /ERROR,NO SEP CLK
1461    1431  1667          TIMERR
1462
1463    1432  0154          BR DEQSR7 F     /WHAT IS SEP DATA?
1464    1433  1746          NOZERO          /ONE, GO CHECK PREAMBLE FAILURES
1465
1466    1434  0071          ESP             /ZERO FOUND, CHECK ZERO COUNT
1467    1435  0073          ICT
1468    1436  0124          BR COFL F
1469    1437  1421          MOREOS          /NEED MORE ZEROES FOR PREAMBLE
1470    1440  0061          FLAG OFF        /FOUND PREAMBLE, CLR FLAG TO INDICATE SEARCH FOR IDAM
1471
1472    1441  0045    GETDAM, CLR BAR LONG  /START SEARCH FOR IDAM OR DATA AM, BAR IS NOSTART COUNTER
1473
1474    1442  0070          LCT             /WAIT 40 MICRO SEC FOR SEP CLK
```

```
1475    1443  0067            -200-1
1476    1444  0346            WBR SEPCLK T
1477    1445  1450            .+3
1478    1446  0216            JUMP F3         /TIMING ERROR
1479    1447  1667            TIMERR
1480
1481    1450  0156            BR DEQSR7 T     /WHAT IS SEP DATA?
1482    1451  1755            NOTYET          /ZERO, GO DETERMINE IF TO MANY STARTS
1483
1484    1452  0164            BR MCEQSR F     /ONE, MISSING CLOCK?
1485    1453  1673            BADSRT          /YES, SHOULDN'T HAVE BEEN
1486
1487    1454  0057            PRECRC          /JAM 1ST TWO BITS OF CRC
1488    1455  0056            CRC ONE
1489    1456  0056            CRC ONE
1490
1491    1457  0070            LCT             /WAIT 40 MICRO SECONDS FOR SECOND CELL.
1492    1460  0067            -200-1
1493    1461  0346            WBR SEPCLK T
1494    1462  1465            .+3
1495    1463  0216            JUMP F3
1496    1464  1667            TIMERR
1497
1498    1465  0156            BR DEQSR7 T     /DATA SHOULD BE 1, MISSING CLK SHOULD BE T
1499    1466  1673            BADSRT
1500    1467  0166            BR MCEQSR T
1501    1470  1673            BADSRT
1502
1503    1471  0056            CRC ONE         /JAM 3 MORE CRC BITS
1504    1472  0056            CRC ONE
1505    1473  0056            CRC ONE
1506
1507    1474  0070            LCT             /WAIT FOR THIRD BIT CELL
1508    1475  0067            -200-1
1509    1476  0346            WBR SEPCLK T
1510    1477  1502            .+3
1511    1500  0216            JUMP F3
1512    1501  1667            TIMERR
1513
1514    1502  0154            BR DEQSR7 F     /DATA SHOULD BE 0, MISSING CLK SHOULD BE F
1515    1503  1673            BADSRT
1516    1504  0164            BR MCEQSR F
1517    1505  1673            BADSRT
1518
1519    1506  0070            LCT             /CLEAR SR
1520    1507  0000            0
1521    1510  0075            LSR
1522
1523    1511  0070            LCT             /WAIT FOR 4TH BIT CELL
1524    1512  0067            -200-1
1525    1513  0346            WBR SEPCLK T
1526    1514  1517            .+3
1527    1515  0216            JUMP F3
1528    1516  1667            TIMERR
1529
```



```
1530    1517  0154            BR DEQSR7 F     /DATA SHOULD BE 0, MISSING CLK SHOULD BE F
1531    1520  1673            BADSRT
1532    1521  0042            LDMD            /NOOP FOR LONG SEP CLOCK
1533    1522  0042            LDMD            /NOOP FOR LONG SEP CLOCK
1534    1523  0164            BR MCEQSR F
1535    1524  1673            BADSRT
1536
1537    1525  0070            LCT             /WAIT FOR FIFTH BIT CELL
1538    1526  0067            -200-1
1539    1527  0346            WBR SEPCLK T
1540    1530  1533            .+3
1541    1531  0216            JUMP F3
1542    1532  1667            TIMERR
1543
1544    1533  0156            BR DEQSR7 T     /DATA SHOULD BE 1
1545    1534  1673            BADSRT
1546
1547    1535  0176            BR FLAGO T      /IF FLAG SET FINISH LOOKING FOR DATA AM
1548    1536  1675            DAM
1549
1550    1537  0164            BR MCEQSR F     /FINISH IDAM, MISSING CLK SHOULD BE F
1551    1540  1673            BADSRT
1552
1553    1541  0056            CRC ONE         /JAM 6TH CRC BIT OF IDAM
1554
1555    1542  0070            LCT             /WAIT FOR SIXTH BIT CELL
1556    1543  0067            -200-1
1557    1544  0346            WBR SEPCLK T
1558    1545  1550            .+3
1559    1546  0216            JUMP F3
1560    1547  1667            TIMERR
1561
1562    1550  0156            BR DEQSR7 T     /DATA SHOULD BE 1, MISSING CLK SHOULD BE F
1563    1551  1673            BADSRT
1564    1552  0164            BR MCEQSR F
1565    1553  1673            BADSRT
1566
1567    1554  0042            LDMD            /NOOP FOR LONG SEP CLOCK
1568
1569    1555  0056            CRC ONE         /JAM 7TH CRC BIT OF IDAM
1570
1571    1556  0070            LCT             /WAIT FOR SEVENTH BIT CELL
1572    1557  0067            -200-1
1573    1560  0346            WBR SEPCLK T
1574    1561  1564            .+3
1575    1562  0216            JUMP F3
1576    1563  1667            TIMERR
1577
1578    1564  0156            BR DEQSR7 T     /DATA SHOULD BE 1, MISSING CLK SHOULD BE T
1579    1565  1673            BADSRT
1580    1566  0166            BR MCEQSR T
1581    1567  1673            BADSRT
1582
1583    1570  0054            CRC ZERO        /IDAM FOUND, JAM LAST CRC BIT
1584
```

```
1585
1586
1587
1588
1589                        /THIS ROUTINE COMPARES THE HEADER TRACK ADDRESS TO THE
1590                        /DESIRED TRACK ADDRESS ON THE FLY.  IT IS ENTERED AFTER
1591                        /FINDING THE IDAM, ERREG BIT 9 IS SET IF AN ERROR IS DETECTED.
1592
1593
1594   1571  2220   HDRCOM, OPEN TARTRK     /TARGET TRACK ADDRESS TO SR
1595   1572  0071           ESP
1596   1573  0075           LSR
1597
1598   1574  0070           LCT             /SET BIT COUNTER TO 8
1599   1575  0367           -8-1
1600
1601   1576  0144   AGAIN3, BR SEPCLK F     /WAIT FOR BIT CELL
1602   1577  1576           .-1
1603
1604   1600  0156           BR DEQSR7 T     /SEP DATA EQUAL TO SR7?
1605   1601  1605           .+4             /NO, TRACK COMPARE ERROR
1606
1607   1602  0074           ROTATE ZERO     /YES, GET NEXT TRACK ADRESS BIT
1608   1603  0216           JUMP F3
1609   1604  1610           .+4
1610
1611   1605  3210           OPEN ERREG      /SET ERREG BIT 9 TO INDICATE TRACK ERROR
1612   1606  0076           ROTATE ONE
1613   1607  2264           LSP
1614
1615   1610  2055           DATCRC          /UPDATE THE CRC
1616
1617   1611  0073           ICT             /INCREMENT AND TEST THE BIT COUNTER
1618   1612  0124           BR COFL F
1619   1613  1576           AGAIN3          /GO DO NEXT BIT
1620
1621   1614  2070           LCT             /TRACK COMPARED, SET UP BIT COUNTER FOR  0 BYTE
1622   1615  0367           -8-1
1623
1624   1616  0144   AGAIN4, BR SEPCLK F     /WAIT FOR BIT
1625   1617  1616           .-1
1626
1627   1620  0061           FLAG OFF        /CLEAR FLAG FOR NEXT ROUTINE
1628   1621  2261           FLAG OFF        /NOOP FOR LONG SEP CLK
1629   1622  2261           FLAG OFF        /NOOP FOR LONG SEP CLK
1630   1623  0061           FLAG OFF        /NOOP FOR LONG SEP CLK
1631
1632   1624  0055           DATCRC          /UPDATE CRC
1633
1634   1625  0073           ICT             /INCREMENT AND TEST BIT COUNT
1635   1626  0124           BR COFL F
1636   1627  1616           AGAIN4          /GO DO ANOTHER BIT
1637                                        /CONTINUE
1638
1639
```



```
1640                        /THIS ROUTINE COMPARES THE HEADER SECTOR ADDRESS WITH THE
1641                        /TARGET SECTOR ADDRESS ON THE FLY.  IT IS ENTERED FROM
1642                        /THE TRACK COMPARE ROUTINE.  A MISMATCH WILL SET THE FLAG.
1643
1644
1645   1630  0224           OPEN TARSEC     /TARGET SECTOR ADDRESS TO SR
1646   1631  0071           ESP
1647   1632  0075           LSR
1648
1649   1633  0070           LCT             /SET UP BIT COUNTER FOR 8 BITS
1650   1634  0367           -8-1
1651
1652   1635  0144   AGAIN5, BR SEPCLK F     /WAIT FOR A BIT
1653   1636  1635           .-1
1654
1655   1637  0156           BR DEQSR7 T     /HOW DO THEY COMPARE?
1656   1640  1643           .+3             /BAD, GO SET THE FLAG
1657
1658   1641  2216           JUMP F3         /GOOD, SKIP THE ERROR FLAG.
1659   1642  1644           .+2
1660
1661   1643  2262           FLAG ON         /SET FLAG TO INDICATE MISMATCH
1662
1663   1644  0074           ROTATE ZERO     /BRING UP NEXT BIT
1664
1665   1645  0055           DATCRC          /UPDATE THE CRC
1666   1646  0073           ICT             /BUMP THE BIT COUNTER
1667   1647  0124           BR COFL F       /ALL BITS COMPARED?
1668   1650  1635           AGAIN5          /NO, LOOP BACK
1669
1670   1651  0070           LCT             /YES, SETUP TO WAIT FOR END OF
1671   1652  0347           -24-1           /CRC
1672
1673   1653  0144   AGAIN6, BR SEPCLK F     /WAIT FOR BIT
1674   1654  1653           .-1
1675
1676   1655  0074           ROTATE ZERO     /NOOP FOR LONG SEP CLK
1677   1656  0074           ROTATE ZERO     /NOOP FOR LONG SEP CLK
1678   1657  0074           ROTATE ZERO     /NOOP FOR LONG SEP CLK
1679   1660  0074           ROTATE ZERO     /NOOP FOR LONG SEP CLK
1680
1681   1661  0055           DATCRC          /UPDATE CRC
1682
1683   1662  0073           ICT             /BUMP THE BIT COUNTER
1684   1663  0124           BR COFL F       /ALL DONE?
1685   1664  1653           AGAIN6          /NO, LOOP BACK
1686
1687   1665  0226           JUMP F5         /YES, GO CHECK IF CRC IS ALL ZEROES
1688   1666  2515           CKHCRC
1689
1690
1691   1667  0070   TIMERR, LCT             /40 MICROSEC PASSED AND NO SEP CLOCK WAS SEEN
1692   1670  0110           KTIMERR
1693   1671  0226           JUMP F5
1694   1672  2610           GOERDN
```

```
1695
1696
1697    1673  0226    BADSRT, JUMP F5          /POINTER TO BADSTART ON IDAM OR DATA AM
1698    1674  2555            BDSRT
1699
1700
1701
1702
1703
1704
1705
1706
1707
1708    1675  0166    DAM,    BR MCEQSR T      /MISSING CLK SHOULD BE T
1709    1676  1673            BADSRT
1710
1711    1677  0054            CRC ZERO         /JAM 6TH CRC BIT OF DATA AM
1712
1713    1700  0070            LCT              /WAIT FOR SIXTH BIT CELL
1714    1701  0067            =200=1
1715    1702  0346            #BR SEPCLK T
1716    1703  1706            .+3
1717    1704  0216            JUMP F3
1718    1705  1667            TIMERR
1719
1720    1706  0164            BR MCEQSR F      /MISSING CLK SHOULD BE F
1721    1707  1673            BADSRT
1722    1710  0242            LDMD             /NOOP FOR LONG SEP CLK
1723
1724    1711  0156            BR DEQSR7 T      /IF DATA=0 THEN LOOK FOR DELETED DATA AM
1725    1712  1727            DELDAT
1726
1727    1713  0056            CRC ONE          /JAM 7TH BIT OF DATA AM
1728
1729    1714  0070            LCT              /WAIT FOR SEVENTH BIT OF DATA AM
1730    1715  0067            =200=1
1731    1716  0346            #BR SEPCLK T
1732    1717  1722            .+3
1733    1720  0216            JUMP F3
1734    1721  1667            TIMERR
1735
1736    1722  0056            CRC ONE          /JAM LAST BIT OF DATA AM
1737
1738    1723  0154            BR DEQSR7 F      /DATA SHOULD BE 1
1739    1724  1742            ENDDAM           /FLAG IS SET TO INDICATE NORMAL DATA MARK
1740
1741    1725  0216            JUMP F3          /LAST DATA BIT WAS BAD
1742    1726  1673            BADSRT
1743
1744
1745    1727  0054    DELDAT, CRC ZERO         /JAM 7TH CRC BIT OF DEL DATA AM
1746
1747    1730  0070            LCT              /WAIT FOR 7TH CELL OF DEL DATA AM
1748    1731  0067            =200=1
1749    1732  0346            #BR SEPCLK T
```



```
1750    1733  1736            .+3
1751    1734  0216            JUMP F3
1752    1735  1667            TIMERR
1753
1754    1736  0061            FLAG OFF         /CLR FLAG TO INDICATE DELETED DATA MARK
1755
1756    1737  0054            CRC ZERO         /JAM LAST CRC BIT OF DEL DATA AM
1757
1758    1740  0154            BR DEQSR7 F      /DATA SHOULD BE 0
1759    1741  1673            BADSRT
1760
1761    1742  0164    ENDDAM, BR MCEQSR F      /MISSING CLK SHOULD BE F FOR BOTH DATA AMS
1762    1743  1673            BADSRT
1763
1764    1744  0222            JUMP F4          /GO PICK UP DATA FIELD
1765    1745  2266            DATA
1766
1767
1768    1746  0046    NOZERO, INCR BAR         /INCREMENT AND TEST PREAMBLE FAILURE COUNT
1769    1747  0160            BR BAROFL F
1770    1750  1416            TRYAGN+3         /OK, TRY AGAIN FOR A PREAMBLE
1771
1772    1751  0070    NXPRAM, LCT              /TOO MANY BITS WITH NO ZEROES
1773    1752  0120            KNXPRAM
1774    1753  0226            JUMP F5
1775    1754  2610            GOERDN
1776
1777
1778    1755  0246    NOTYET, INCR BAR         /INCR AND TEST IDAM OR DATA AM START FAILURE COUNT
1779    1756  0042            LDMD                    /NOOP FOR LONG SEP CLK
1780    1757  0160            BR BAROFL F
1781    1760  1442            GETDAM+1         /OK, TRY AGAIN
1782
1783    1761  0070    NXIDAM, LCT              /TOO MANY ZEROES WHILE LOOKING FOR START OF
1784    1762  0130            KNXIDAM          /IDAM OR DATA AM
1785    1763  0226            JUMP F5
1786    1764  2610            GOERDN
1787
1788
1789    1765  0212    PNTRDY, JUMP F2          /POINTERS FROM CHECKRDY SUBROUTINE TO RDSTAT ROUTINE
1790    1766  1243            CLRID
1791    1767  0212    PNSRDY, JUMP F2
1792    1770  1243            CLRID
1793
1794    1771  0212    PNORDY, JUMP F2          /POINTERS FROM CHECK RDY TO INITIALIZE ROUTINE
1795    1772  1026            OKDONE
1796    1773  0226            JUMP F5
1797    1774  2631            INTRDY
1798
1799    1775  0000            0                /OPEN
1800    1776  0000            0                /OPEN
1801    1777  0000            0                /OPEN
1802
```

```
1803                    /[SUBROUTINES: GETWORD AND GETCOMMAND]
1804                    /SUBROUTINE TO GET AN EIGHT BIT WORD FROM THE INTERFACE.
1805                    /IF TALKING TO A PDP8 INTERFACE IN 12 BIT MODE, THERE
1806                    /WILL BE FOUR MEANINGLESS BITS PRECEDING THE DESIRED EIGHT
1807                    /BIT WORD, ENTER THIS SUBROUTINE WITH THE RETURN ADDRESS
1808                    /IN THE COUNTER. EXIT WITH THE ONES COMPLIMENT OF THE
1809                    /DESIRED WORD IN THE SHIFT REGISTER. PARITY IS COMPUTED AND
1810                    /CHECKED ON ALL WORDS.
1811
1812
1813    2000  0012    GETWRD, SET XREQ          /REQUEST A WORD FROM INTERFACE
1814
1815    2001  0075    GETCMD, LSR               /STASH THE RETURN ADDRESS
1816    2002  0270            OPEN RTNA
1817    2003  0064            LSP
1818
1819    2004  2070            LCT               /CALL SUBR WAITRN TO WAIT FOR A WORD
1820    2005  1346            PGOTIT
1821    2006  0222            JUMP F4
1822    2007  2312            WAITRN
1823
1824    2010  0061    GOTIT,  OFF FLAG          /CLEAR FLAG FOR PARITY CHECK
1825
1826    2011  0004            CLR ERR           /IN CASE RUN WAS A RESPONSE TO DONE
1827    2012  0020            CLR DONE
1828
1829    2013  0070            LCT               /SET UP BIT COUNT IN CNTR,  8 BIT OR 12 BIT
1830    2014  0367            =8-1
1831    2015  0150            BR XIIBIT  F
1832    2016  2021            .+3
1833    2017  0070            LCT
1834    2020  0363            =12-1
1835
1836    2021  0112    WATDAT, BR DATAIN ONE     /WHAT IS THE DATA BIT?
1837    2022  2030            GOTONE            /ITS A ONE, GO SAVE IT
1838
1839    2023  0126            BR COFL T         /ITS A ZERO, WAS IT THE PARITY BIT (9TH BIT)?
1840    2024  2041            CHKPAR            /YES, GO CHECK PARITY
1841
1842    2025  0076            ROTATE ONE        /NO SAVE THE DATA BIT COMPLIMENTED IN SR
1843
1844    2026  0222            JUMP F4           /GO SHIFT UP ANOTHER BIT.
1845    2027  2034            NUTHER
1846
1847
1848
1849
1850    2030  0063    GOTONE, TOG FLAG          /COMPLIMENT THE PARITY GENERATOR
1851
1852    2031  0126            BR COFL T         /WAS IT THE PARITY BIT?
1853    2032  2041            CHKPAR            /YES, GO CHECK PARITY
1854
1855    2033  0074            ROTATE ZERO       /NO, SAVE THE COMPLIMENTED DATA BIT IN SR
1856
1857    2034  0026    NUTHER, SET SHIFT         /SHIFT PULSE AND INCREMENT BIT COUNT
```



```
1858    2035  0273            ICT
1859    2036  0024            CLR SHIFT
1860
1861    2037  0222            JUMP F4           /GO TEST THIS BIT.
1862    2040  2021            WATDAT
1863
1864
1865    2041  0176    CHKPAR, BR  FLAGO ONE     /WHERE THERE AN ODD NO. OF ONES?
1866    2042  2076            GOTWRD            /YES, PARITY WAS GOOD
1867
1868    2043  0214            OPEN STAT         /NO, STAT TO SR
1869    2044  0071            ESP
1870    2045  2275            LSR
1871
1872    2046  0070            LCT               /END AROUND SHIFT OF UPPER 5 BITS OF STAT IN SR
1873    2047  0372            =5-1
1874    2050  0122            BR SR7 T
1875    2051  2055            .+4
1876    2052  0074            ROTATE ZERO
1877    2053  0222            JUMP F4
1878    2054  2056            .+2
1879    2055  0076            ROTATE ONE
1880    2056  0073            ICT
1881    2057  0124            BR COFL F
1882    2060  2050            .-8
1883
1884    2061  0074            ROTATE ZERO       /CLEAR INIT DONE
1885    2062  0076            ROTATE ONE        /SET PARITY ERROR
1886
1887    2063  0122            BR SR7 T          /END AROUND SHIFT OF CRC ERROR BIT OF STAT IN SR
1888    2064  2070            .+4
1889    2065  0074            ROTATE ZERO
1890    2066  0222            JUMP F4
1891    2067  2071            .+2
1892    2070  0076            ROTATE ONE
1893
1894    2071  0064            LSP               /RESTORE STAT TO SCRATCH PAD
1895
1896    2072  0070            LCT               /ERRCODE FOR PARITY ERROR
1897    2073  0210            KPARER
1898    2074  0226            JUMP F5
1899    2075  2610            GOERDN
1900
1901    2076  0270    GOTWRD, OPEN RTNA         /WORD WAS GOOD, EXIT FROM GETWRD, GETCMD
1902    2077  0203            JUMP F0 IND
```

```
1903
1904                    /[SUBROUTINE: STEPHEAD]
1905                    /THIS SUBROUTINE WILL STEP THE SPECIFIED NUMBER OF TRACKS IN THE
1906                    /SPECIFIED DIRECTION.  DIRECTION IS DETERMINED BY THE HD DIR FLOP
1907
1908                    /THE NUMBER OF STEPS IS IN THE SR.  RETURN ADDRESS IS IN THE CNTR.
1909                    /EXIT IS TO THE RETURN ADDRESS IF HOME IS DETECTED.  EXIT IS TO RETURN
1910                    /PLUS 2 IF THE LAST STEP HAS BEEN TAKEN.  AFTER THE LAST STEP IS TAKEN,
1911                    /THE HEAD IS LOADED AND A 25MS DELAY IS EXECUTED FOR HEAD SETTLE TIME
1912
1913
1914
1915
1916    2100  0270    STEPHD, OPEN RTNA       /STORE RETURN ADDR AND MOVE STEP COUNT TO CNTR
1917    2101  0064            LSP
1918    2102  0075            LSR
1919    2103  0071            ESP
1920    2104  0064            LSP
1921
1922    2105  0136    CKHOME, BR HOME T       /IS THE HEAD HOME?
1923    2106  2150            OUT             /YES, GO EXIT
1924
1925    2107  0073            ICT             /NO, INCREMENT STEP COUNT AND STORE IN TEMPA
1926    2110  0075            LSR
1927    2111  0230            OPEN TEMPA
1928    2112  0064            LSP
1929
1930    2113  0270            LCT             /PASS 30 TO DELAY SUBR FOR 3MS DELAY
1931    2114  2124            SECPLS
1932    2115  0075            LSR
1933    2116  0270            LCT
1934    2117  0341            -30-1
1935
1936    2120  0012            SET STPHD       /ISSUE STEP PULSE
1937    2121  0010            CLR STPHD
1938
1939    2122  0212            JUMP F2         /CALL DELAY SUBR
1940    2123  1300            DELAY
1941
1942    2124  0012    SECPLS, SET STPHD       /ISSUE SECOND STEP PULSE
1943    2125  0010            CLR STPHD
1944
1945    2126  0270            LCT             /CALL DELAY FOR 3MS DELAY
1946    2127  2135            DONSTP
1947    2130  0075            LSR
1948    2131  0270            LCT
1949    2132  0341            -30-1
1950    2133  0212            JUMP F2
1951    2134  1300            DELAY
1952
1953    2135  0230    DONSTP, OPEN TEMPA      /CHECK STEP COUNT
1954    2136  0071            ESP
1955    2137  0124            BR COFL F
1956    2140  2125            CKHOME          /NOT DONE, GO CHECK IF HOME
1957
```



```
1958    2141  0270            OPEN RTNA       /DONE STEPPING, INCREMENT RETURN ADDRESS BY 2
1959    2142  0071            ESP
1960    2143  0073            ICT
1961    2144  0073            ICT
1962
1963    2145  0270    DLY25,  OPEN RTNA       /STORE RETURN ADDRESS ALSO START OF 25MS DELAY SUBROUTINE
1964    2146  0075            LSR
1965    2147  0064            LSP
1966
1967    2150  0042    OUT,    LDHD            /LOAD HEAD
1968    2151  3250            OPEN TEMPE      /SET SOFT HD LOAD BIT
1969    2152  0070            LCT
1970                          OCTAL
1971    2153  0200            200
1972                          DECIMAL
1973    2154  0075            LSR
1974    2155  0064            LSP
1975
1976    2156  0270            LCT             /CALL DELAY SUBR FOR 25MS DELAY
1977    2157  2165            DONDLY
1978    2160  0075            LSR
1979    2161  0270            LCT
1980    2162  0000            -255-1
1981    2163  0212            JUMP F2
1982    2164  1300            DELAY
1983
1984    2165  0270    DONDLY, OPEN RTNA       /RETURN FROM STEP HEAD OR DELAY 25MS SUBROUTINE
1985    2166  0203            JUMP F0 IND
1986
1987
1988
1989
1990
1991
1992
1993                    /[ROUTINE: READ SECTOR CONT.]
1994
1995    2167  0070    READ,   LCT             /3 TO DATA MARK TRY COUNTER
1996    2170  0374            -3-1
1997    2171  0234            OPEN TEMPB
1998    2172  0075            LSR
1999    2173  0064            LSP
2000
2001    2174  0070            LCT             /STALL FOR 96 MICRO SEC (3 BYTES) TO AVOID WRT TURN ON SPLASH
2002    2175  0207            -120-1
2003    2176  0073            ICT
2004    2177  0062            FLAG ON         /SET THE FLAG TO SPECIFY DATA AM IN FIND AM ROUTINE
2005    2200  0124            BR COFL F
2006    2201  2176            .-3
2007
2008    2202  0073            ICT             /CLR COUNTER AND SR
2009    2203  0075            LSR
2010
2011    2204  0216            JUMP F3         /GO TRY FIND THE ADDRESS MARK
2012    2205  1441            GETDAM
```

```
2013
2014
2015                    /THIS ROUTINE FOLLOWS THE DISCOVERY OF A DATA MARK OR
2016                    /A DELETED DATA MARK,  IT MOVES THE NEXT 1024 BITS
2017                    /INTO THE SECTOR BUFFER, THEN PICKS UP AND CHECKS THE CRC.
2018
2019    2206  0044    DATA,   CLR BAR         /CLEAR THE BUFFER ADDRESS REGISTER
2020
2021    2207  0144            BR SEPCLK F     /WAIT FOR CLOCK
2022    2210  2207            .-1
2023
2024    2211  0053            START WRTBUF    /START THE WRITE PULSE FOR THIS BIT
2025
2026    2212  0055            DATCRC          /UPDATE THE CRC WITH SEP DATA
2027
2028    2213  0162            BR BAROFL T     /IS BUFFER FULL YET?
*2029   2214  2221            GETCRC          /YES, GO GET THE CRC
2030
2031    2215  0050            FIN WRTBUF      /NO, END THE WRITE PULSE
2032
2033    2216  0046            INCR BAR        /ADDRESS NEXT SECTOR BUFFER CELL
2034
2035    2217  0222            JUMP F4         /LOOP BACK FOR NEXT BIT
2036    2220  2207            DATA+1
2037
2038    2221  0050    GETCRC, FIN WRTBUF      /END THE WRITE PULSE FOR THE LAST BIT
2039
2040    2222  0070            LCT             /SET BIT COUNT TO 16 FOR 2 BYTE CRC
2041    2223  0357            -16-1
2042
2043    2224  0144            BR SEPCLK F     /WAIT FOR NEXT BIT
2044    2225  2224            .-1
2045
2046    2226  0042            LDMD            /4 NOOPS FOR LONG SEP CLOCK
2047    2227  0042            LDMD
2048    2230  0042            LDMD
2049    2231  0042            LDMD
2050
2051    2232  0055            DATCRC          /PUT CRC BIT IN THE CRC GENERATOR
2052    2233  0073            ICT             /INCREMENT AND TEST BIT COUNT
2053    2234  0124            BR COFL F
2054    2235  2224            .-9             /NOT DONE, GET ANOTHER
2055
2056    2236  0214            OPEN STAT       /STATUS TO SHIFT REG
2057    2237  0071            ESP
2058    2240  0075            LSR
2059
2060    2241  0122            BR SR7 T        /END AROUND SHIFT OF DRV RDY BIT OF STAT IN SR
2061    2242  2246            .+4
2062    2243  0074            ROTATE ZERO
2063    2244  0222            JUMP F4
2064    2245  2247            .+2
2065    2246  0076            ROTATE ONE
2066
2067    2247  0176            BR FLAGO T      /SET DEL DATA BIT OF STAT IF FLAG=0
```



```
2068    2250  2254            .+4
2069    2251  0076            ROTATE ONE
2070    2252  0222            JUMP F4
2071    2253  2255            .+2
2072    2254  0074            ROTATE ZERO
2073
2074    2255  0070            LCT             /END AROUND SHIFT OF NEXT 5 BITS OF STAT IN SR
2075    2256  0372            -5-1
2076    2257  0122            BR SR7 T
2077    2260  2264            .+4
2078    2261  0074            ROTATE ZERO
2079    2262  0222            JUMP F4
2080    2263  2265            .+2
2081    2264  0076            ROTATE ONE
2082    2265  0073            ICT
2083    2266  0124            BR COFL F
2084    2267  2257            .-8
2085
2086    2270  0070            LCT             /SET BIT COUNTER TO  16 FOR CRC TEST
2087    2271  0357            -16-1
2088
2089    2272  0132            BR CRC16 ONE    /IS THIS CRC BIT OK
2090    2273  2304            DCRCER          /NO, GO REPORT DATA CRC ERROR
2091
2092    2274  0054            CRC ZERO        /YES, BRING UP NEXT CRC BIT
2093
2094    2275  0073            ICT             /INCREMENT AND TEST BIT COUNTER
2095    2276  0124            BR COFL F
2096    2277  2272            .-5             /GO CHECK ANOTHER
2097
2098    2300  0074            ROTATE ZERO     /CRC WAS GOOD, CLR CRC ERR BIT OF STAT IN SR
2099
2100    2301  0064            LSP             /PUT THE STATUS WORD BACK IN SCRATCHPAD
2101
2102    2302  0212            JUMP F2         /EXIT TO DONE
2103    2303  1006            OKDONE
2104
2105    2304  0076    DCRCER, ROTATE ONE      /INSERT 1 INTO CRC ERROR BIT
2106
2107    2305  0064            LSP             /PUT THE STAT WORD BACK
2108
2109    2306  0070            LCT             /ERROR CODE FOR CRC ERROR
2110    2307  0200            KDCRCER
2111    2310  0226            JUMP F5
2112    2311  2610            GOERDN
```

```
2113                    /[SUBROUTINE: WAIT FOR RUN]
2114                    /THIS SUBROUTINE WILL WAIT FOR RUN,  IF 46MS ELAPSES, THE HEAD IS UNLOADED
2115                    /AND THE ROUTINE CONTINUES WAITING FOR RUN,  RETURN ADDRESS IS PASSED
2116                    /VIA THE COUNTER
2117
2118
2119    2312  0264      WAITRN, OPEN RTNB       /STASH THE RETURN ADDRESS
2120    2313  0075              LSR
2121    2314  0064              LSP
2122
2123    2315  0102              BR RUN T        /GOT RUN?
2124    2316  2347              GOTRUN
2125
2126    2317  0240              OPEN TEMPC      /PRESET LOOP COUNTER TO 0
2127    2320  0070              LCT
2128    2321  0000              0
2129
2130    2322  0075      BACK,   LSR             /RESTORE LOOP COUNT
2131    2323  0064              LSP
2132
2133    2324  0302              WBR RUN T       /TIME WHILE WAITING FOR RUN
2134    2325  2347              GOTRUN
2135    2326  0302              WBR RUN T
2136    2327  2347              GOTRUN
2137    2330  0302              WBR RUN T
2138    2331  2347              GOTRUN
2139    2332  0302              WBR RUN T
2140    2333  2347              GOTRUN
2141
2142    2334  0071              ESP             /INCREMENT AND TEST LOOP COUNT
2143    2335  0073              ICT
2144    2336  0124              BR COPL F
2145    2337  2322              BACK            /46MS NOT ELAPSED YET
2146
2147    2340  0250              OPEN TEMPE      /TIME IS EXPIRED (45.8 MS), CLEAR THE SOFT HOLD BIT AND UNLOAD THE HEAD
2148    2341  0073              ICT
2149    2342  0075              LSR
2150    2343  0064              LSP
2151    2344  0042              UNHD
2152
2153    2345  0120              BR RUN F        /WAIT FOR RUN, FOREVER IF NECESSARY
2154    2346  2345              .-1
2155
2156    2347  0010      GOTRUN, CLR XREQ        /IF RUN WAS RESPONSE TO XFREQ
2157
2158    2350  0264              OPEN RTNB       /RETURN FROM WAITRUN SUBROUTINE
2159    2351  0213              JUMP IND F2
2160
2161
```



```
2162                    /[ROUTINE: INITIALIZE CONT.]
2163                    /CONTINUATION OF THE INITIALIZE SELF TEST
2164
2165    2352  0070      TEST,   LCT             /LOAD R5 WITH TEST PATTERN 252
2166                            OCTAL
2167    2353  0252              252
2168                            DECIMAL
2169    2354  0075              LSR
2170    2355  0224              OPEN R5
2171    2356  0064              LSP
2172
2173    2357  0070              LCT             /LOAD R10 WITH TEST PATTERN 125
2174                            OCTAL
2175    2360  0125              125
2176                            DECIMAL
2177    2361  0075              LSR
2178    2362  0250              OPEN R10
2179    2363  0064              LSP
2180
2181    2364  0062              FLAG ON         /SET FLAG AND TEST IT
2182    2365  0176              BR FLAGO T
2183    2366  2371              .+3
2184    2367  0212              JUMP F2
2185    2370  1374              INTER1          /FLAG FAILURE
2186
2187    2371  0224              OPEN R5         /CONTENTS OF R5 TO SR,  SHOULD BE 252
2188    2372  0071              ESP
2189    2373  0075              LSR
2190
2191    2374  0212              JUMP F2         /GO CONTINUE INIT TEST IN FLD 2
2192    2375  1351              TEST1
2193
2194
2195    2376  0000              0               /OPEN
2196    2377  0000              0               /OPEN
```

```
2197                    /[SUBROUTINE: MAGNITUDE COMPARISON]
2198                    /THIS SUBROUTINE COMPARES THE EIGHT BIT NUMBERS IN REGISTERS F AND G
2199                    / EXIT IS TO THE RETURN ADDRESS IF F=G.  IF F<G, RETURN IS TO RTNA+2,
2200                    /IF F>G, RETURN IS TO RTNA+4.  CONTENTS OF F AND G ARE UNDEFINED AT
2201                    /THE END OF THE SUBROUTINE
2202
2203
2204
2205
2206    2400  0230    MAGCOM, OPEN TEMPA      /FOR BIT COUNT
2207
2208    2401  0070            LCT             /BIT COUNT IS 8
2209    2402  0367            -8-1
2210
2211    2403  0075            LSR             /RESTORE BIT COUNT
2212    2404  0064            LSP
2213
2214    2405  0254            OPEN TEMPF      /F TO SR
2215    2406  0071            ESP
2216    2407  0075            LSR
2217
2218    2410  0120            BR SR7 ZERO     /TEST F
2219    2411  2443            TSTG0           /ITS 0
2220
2221    2412  0076            ROTATE ONE      /ITS 1, BRING UP NEXT BIT
2222
2223    2413  0064            LSP             /RESTORE F
2224
2225    2414  0260            OPEN TEMPG      /G TO SR
2226    2415  0071            ESP
2227    2416  0075            LSR
2228
2229    2417  0120            BR SR7 ZERO     /TEST G
2230    2420  2432            GLESSF          /ITS 0, G IS LESS THAN F
2231
2232    2421  0074    NEXTG,  ROTATE ZERO     /ITS 1, BRING UP NEXT G BIT
2233
2234    2422  0064            LSP             /RESTORE G
2235
2236    2423  0230            OPEN TEMPA      /INCREMENT AND TEST BIT COUNT
2237    2424  0071            ESP
2238    2425  0073            ICT
2239    2426  0124            BR COFL F
2240    2427  2403            MAGCOM+3        /GO COMPARE ANOTHER BIT
2241
2242    2430  0270            OPEN RTNA       /ALL BITS COMPARED, NO DIFFERENCE
2243    2431  0203            JUMP F0 IND
2244
2245    2432  0270    GLESSF, OPEN RTNA       /G IS LESS THAN F RETURN TO RTNA +4
2246    2433  0071            ESP
2247    2434  0073            ICT
2248    2435  0073            ICT
2249    2436  0073            ICT
2250    2437  0073            ICT
2251    2440  0075            LSR
```



```
2252    2441  0064            LSP
2253    2442  0203            JUMP F0 IND
2254
2255    2443  0074    TSTG0,  ROTATE ZERO     /F WAS 0, BRING UP NEXT BIT
2256
2257    2444  0064            LSP             /RESTORE F
2258
2259    2445  0260            OPEN TEMPG      /G TO SR
2260    2446  0071            ESP
2261    2447  0075            LSR
2262
2263    2450  0120            BR SR7 ZERO     /TEST G
2264    2451  2421            NEXTG           /MATCHS F, GO BRING UP NEXT G BIT
2265
2266    2452  0270            OPEN RTNA       /G IS LESS THAN F,  RETURN TO RTNA +2
2267    2453  0071            ESP
2268    2454  0226            JUMP F5
2269    2455  2436            GLESSF+4
2270
2271
2272
2273                    /[SUBROUTINE: FIND TRACK CONT.]
2274
2275    2456  0070    HOMERR, LCT             /HOME FOUND BEFORE LAST STEP TAKEN
2276    2457  0050            KHOMERR
2277    2460  0226            JUMP F5
2278    2461  2610            GOERDN
2279
2280
2281                    /[SUBROUTINE: DIFFERENCE]
2282                    /THIS SUBROUTINE COMPUTES THE DIFFERENCE BETWEEN TWO EIGHT BIT
2283                    /NUMBERS. ENTER WITH THE RETURN ADDRESS IN RTN, A IN THE
2284                    /COUNTER AND B IN THE SHIFT REGISTER. EXIT IS MADE WITH THE
2285                    /COMPLIMENT OF THE DIFFERENCE IN THE SHIFT REGISTER.
2286                    /EXIT IS TO RTN IF A>=B.  EXIT IS TO RTN+2 IF A<B
2287
2288
2289
2290
2291    2462  0230    DIF,    OPEN TEMPA      /OPEN TEMPORARY PATH THRU THE SP
2292
2293    2463  0126            BR COFL T       /HAS A REACHED ALL ONES YET?
2294    2464  2501            DIFB            /YES, GO GET B FOR THE DIFFERENCE
2295
2296    2465  0064            LSP             /NO, GET B
2297    2466  0075            LSR             /A INTO SHIFT REG
2298    2467  0071            ESP             /B INTO COUNTER
2299
2300    2470  0126            BR COFL T       /HAS B REACHED ALL ONES YET?
2301    2471  2503            DIFA            /YES, GO GET A FOR THE DIFFERENCE
2302
2303    2472  0073            ICT             /INCREMENT B
2304    2473  0064            LSP             /, BRING BACK A
2305    2474  0075            LSR             /B INTO SHIFT REG
2306    2475  0071            ESP             /A INTO COUNTER
```

```
2307    2476  0073            ICT             /INCREMENT A
2308    2477  0226            JUMP F5         /GO BACK TO TEST A AGAIN
2309    2500  2463            DIF+1
2310
2311
2312    2501  0270    DIFB,   OPEN RTNA       /B IS THE COMPLEMENT OF THE DIFFERENCE
2313    2502  0203            JUMP F0 IND     /EXIT A>=B
2314
2315
2316    2503  0270    DIFA,   OPEN RTNA       /A IS THE COMPLEMENT OF THE DIFFERENCE
2317    2504  0071            ESP             /INCREMENT THE RETURN ADDRESS BY 2
2318    2505  0073            ICT
2319    2506  0073            ICT
2320
2321    2507  0064            LSP             /RESTORE RETURN ADDRESS TO SCRATCHPAD AND A TO SR
2322    2510  0075            LSR
2323    2511  0071            ESP
2324    2512  0064            LSP
2325    2513  0075            LSR
2326
2327    2514  0203            JUMP F0  IND    /EXIT A<B
2328
2329
2330                    /[ROUTINE: FIND HEADER CONT.]
2331                    /THIS ROUTINE CHECKS THE CRC, AND THE RESULTS OF THE TRACK
2332
2333                    /AND SECTOR COMPARISONS.
2334
2335
2336
2337
2338    2515  0070    CKHCRC, LCT             /PRESET BIT COUNT TO 16 FOR CRC
2339    2516  0357            -16-1
2340
2341    2517  2132            BR CRC16 ONE    /IS CRC ZERO
2342    2520  2546            HCRCER          /NO, LOG ERROR AND TRY AGAIN
2343
2344    2521  0073            ICT             /YES, CRC GOOD SO FAR, BUMP BIT CNTR
2345
2346    2522  0254            CRC ZERO        /BRING UP NEXT CRC BIT
2347
2348    2523  0124            BR COFL F       /ALL BITS TESTED?
2349    2524  2517            .-5             /NO, BRANCH BACK
2350
2351    2525  0210            OPEN ERREG      /YES, CRC WAS GOOD, CHECK TRK COMP
2352    2526  0271            ESP
2353    2527  0075            LSR
2354
2355    2530  0370            LCT             /ROTATE BIT 0 TO BIT 7
2356    2531  0377            -7-1
2357    2532  0074            ROTATE ZERO
2358    2533  0273            ICT
2359    2534  0124            BR COFL F       /DONE ROTATING?
2360    2535  2532            .-3             /NO
2361
```



```
2362    2536  0122            BR SR7 ONE      /YES, WAS THERE A BAD COMPARE
2363    2537  2542            TKSKER          /YES, GO REPORT A TRACK SEEK ERROR
2364
2365    2540  0264            OPEN RTNB       /CORRECT TRACK, EXIT FROM FIND HDR SUBR
2366    2541  0207            JUMP F1 IND
2367
2368
2369
2370
2371    2542  0070    TKSKER, LCT             /HEADER CRC WAS GOOD BUT TRACK
2372    2543  0150            KTKSKER         /ADDRESS DID NOT COMPARE, MUST
2373    2544  0226            JUMP F5         /EXIT TO ERROR DONE
2374    2545  2610            GOERDN
2375
2376
2377    2546  0070    HCRCER, LCT             /HEADER CRC WAS NOT CORRECT
2378    2547  0140            KHCRCER
2379    2550  0275            LSR
2380    2551  0210            OPEN ERREG      /LOG THE ERROR
2381    2552  0064            LSP
2382
2383    2553  0226            JUMP F5         /GO TRY ANOTHER HEADER
2384    2554  2557            BADHDR
2385
2386
2387
2388
2389    2555  0176    BDSRT,  BR FLAGD T      /BAD START ON DATA AM OR IDAM?
2390    2556  2577            BADDAM
2391
2392    2557  0230    BADHDR, OPEN TEMPA      /IDAM, INCREMENT AND TEST BAD START INNER COUNT
2393    2560  0071            ESP
2394    2561  0073            ICT
2395    2562  0275            LSR
2396    2563  0064            LSP
2397    2564  0124            BR COFL F
2398    2565  2615            PTRYAG          /NO OVERFLOW, GO TRY ANOTHER HEADER
2399    2566  0234            OPEN TEMPB      /INCREMENT AND TEST BAD START OUTER COUNT
2400    2567  0071            ESP
2401    2570  0073            ICT
2402    2571  0124            BR COFL F
2403    2572  2615            PTRYAG          /NO OVERFLOW, GO TRY AGAIN
2404    2573  0270    XSTRYS, LCT             /TOO MANY TRIES FOR A HEADER
2405    2574  0160            KXSTRYS
2406    2575  0226            JUMP F5
2407    2576  2610            GOERDN
2408
2409
2410    2577  0234    BADDAM, OPEN TEMPB      /BAD START ON DATA AM, INCREMENT AND TEST BAD START COUNT
2411    2600  0071            ESP
2412    2601  0073            ICT
2413    2602  0075            LSR
2414    2603  0064            LSP
2415    2604  0124            BR COFL F
2416    2605  2617            PGETDA          /NO OVERFLOW GO TRY FOR DATA AM AGAIN
```

```
2417  2606 0070  NODAM,  LCT              /TRIED 3 IMES FOR DATA AM, GO FLAG THE ERROR
2418  2607 0170          KNODAM
2419  2610 0210  GOERON, OPEN ERREG
2420  2611 0075          LSR
2421  2612 0064          LSP
2422  2613 0212          JUMP F2
2423  2614 1000          ERDONE
2424
2425  2615 0216  PTRYAG, JUMP F3          /POINTER TO FIND AN IDAM
2426  2616 1413          TRYAGN
2427
2428
2429  2617 0216  PGETDA, JUMP F3          /POINTER TO FIND DATA AM
2430  2620 1441          GETDAM
2431
2432
2433
2434                     /[ROUTINE: INITIALIZE CONT.]
2435  2621 0070  WRONG,  LCT              /HOME WAS FOUND WHILE STEPPING OUT
2436  2622 0030          KWRONG
2437  2623 0226          JUMP F5
2438  2624 2610          GOERON
2439
2440  2625 0070  DNRCAL,  LCT            /CALL CHECK READY SUBROUTINE
2441  2626 1771          PNORDY
2442  2627 0226          JUMP F5
2443  2630 2640          CHKRDY
2444
2445  2631 0070  INTRDY, LCT              /DRV 0 IS READY CALL BOOT SUBROUTINE TO
2446  2632 0770          GOREAD           /MOVE TO TRACK 1, THEN GO TO READ ROUTINE TO
2447  2633 0274          OPEN RTN         /PICK UP SECTOR 1
2448  2634 0075          LSR
2449  2635 0064          LSP
2450  2636 0202          JUMP F0
2451  2637 0252          BOOT
2452
2453
2454
2455
```



```
2456                     /[SUBROUTINE: CHECKREADY]
2457
2458                     /SUBROUTINE TO CHECK THE SELECTED DRIVE TO SEE IF THE
2459                     /DISK IS INSERTED AND UP TO SPEED.  THIS IS DONE BY CHECKING TO SEE IF
2460                     /THE INTERVAL BETWEEN 2 INDEX PULSES IS BETWEEN 150 MS AND 180 MS.  RETURN
2461                     /ADDRESS IS PLACED IN THE COUNTER BEFORE ENTRY.  NOT READY RETURN IS
2462                     /TO THE RETURN ADDRESS.  READY RETURN IS TO THE RETURN ADDRESS PLUS 2
2463
2464
2465
2466                     /
2467  2640 0274  CHKRDY, OPEN RTN         /SAVE RETURN ADDRESS
2468  2641 0075          LSR
2469  2642 0064          LSP
2470
2471  2643 0070          LCT              /2 TO CNTR FOR INDEX PASS COUNT
2472  2644 0375          =2-1
2473
2474  2645 0230          OPEN TEMPA       /FOR INDEX PASS COUNT
2475
2476  2646 0075  NEWPAS, LSR              /RESTORE INDEX PASS COUNT
2477  2647 0064          LSP
2478
2479  2650 0061          FLAG OFF         /CLOSE INDEX WINDOW
2480
2481  2651 0042          LDHD             /TO CLEAR INDEX FLOP
2482
2483  2652 0070          LCT              /FOR 15 TIMES THROUGH 10MS LOOP
2484  2653 0360          =15-1
2485
2486  2654 0234  STDLY,  OPEN TEMPB       /RESTORE OUTER COUNT
2487  2655 0075          LSR
2488  2656 0064          LSP
2489
2490  2657 0070          LCT              /FOR 40 TIMES THROUGH ,25MS LOOP
2491  2660 0327          =40-1
2492
2493  2661 0240          OPEN TEMPC
2494  2662 0075  SPBACK, LSR              /RESTORE INNER COUNT
2495  2663 0064          LSP
2496
2497  2664 0070          LCT              /WAIT ,25 MS FOR INDEX
2498  2665 0005          =250-1
2499  2666 0116          BR INDX T
2500  2667 2714          SAWIND           /FOUND INDEX
2501  2670 0073          ICT
2502  2671 0124          BR COFL F
2503  2672 2666          .-4
2504
2505  2673 0240          OPEN TEMPC       /INCREMENT AND TEST  INNER COUNT
2506  2674 0071          ESP
2507  2675 0073          ICT
2508  2676 0124          BR COFL F
2509  2677 2662          SPBACK
2510
```

```
2511    2700  0234          OPEN TEMPB      /INCREMENT AND TEST OUTER COUNT
2512    2701  0071          ESP
2513    2702  0073          ICT
2514    2703  0124          BR COFL F
2515    2704  2655          STDLY+1
2516
2517    2705  0176          BR FLAGO ONE    /WAS INDEX WINDOW OPEN?
2518    2706  2767          UNRDY           /YES, NO INDEX WITHIN 180MS
2519
2520    2707  0062          FLAG ON         /NO, OPEN WINDOW
2521
2522    2710  0070          LCT             /FOR 3 TIMES THROUGH 10 MS LOOP
2523    2711  0374          -3-1            /THE WINDOW IS 30 MS WIDE
2524
2525    2712  0226          JUMP F5         /GO LOOK FOR INDEX
2526    2713  2654          STDLY
2527
2528
2529    2714  0230  SAWIND, OPEN TEMPA      /INCREMENT AND TEST INDEX PASS COUNT
2530    2715  0071          ESP
2531    2716  0073          ICT
2532    2717  0124          BR COFL F
2533    2720  2646          NEWPAS          /THIS WAS 1ST INDEX, GO LOOK FOR SECOND
2534
2535    2721  0174          BR FLAGO ZERO   /THIS WAS 2ND INDEX, WAS THE WINDOW OPEN?
2536    2722  2767          UNRDY           /NO, INDEX OCCURRED TOO SOON
2537
2538    2723  0274          OPEN RTN        /YES, INDEX OCCURRED BETWEEN 150 AND 180 MS, INCREMENT
2539    2724  0071          ESP             /RETURN ADDRESS BY 2
2540    2725  0073          ICT
2541    2726  0073          ICT
2542    2727  0075          LSR
2543    2730  0064          LSP
2544
2545    2731  0214          OPEN STAT       /SET DRV RDY BIT OF STAT IN SR
2546    2732  0071          ESP
2547    2733  0075          LSR
2548
2549    2734  0076          ROTATE ONE
2550
2551    2735  0061          FLAG OFF        /FLAG OFF TO INDICATE FIRST PASS
2552
2553    2736  0070  ROT3,   LCT             /END AROUND SHIFT OF THE NEXT 3 BITS OF STAT IN SR
2554    2737  0374          -3-1
2555    2740  0122          BR SR7 T
2556    2741  2745          .+4
2557    2742  0074          ROTATE ZERO
2558    2743  0226          JUMP F5
2559    2744  2746          .+2
2560    2745  0076          ROTATE ONE
2561    2746  0073          ICT
2562    2747  0124          BR COFL F
2563    2750  2740          .-8
2564
2565    2751  0176          BR FLAGO T      /WAS IT FIRST 3 OR LAST 3
```



```
2566    2752  2764          EXCHRY          /LAST, GO EXIT
2567
2568    2753  0140          BR WRTEN F      /UPDATE WRITE PROTECT BIT OF STAT IN SR
2569    2754  2760          .+4
2570    2755  0074          ROTATE ZERO
2571    2756  0226          JUMP F5
2572    2757  2761          .+2
2573    2760  0076          ROTATE ONE
2574
2575    2761  0062          FLAG ON         /GO SHIFT AROUND LAST 3 BITS
2576    2762  0226          JUMP F5
2577    2763  2736          ROT3
2578
2579    2764  0064  EXCHRY, LSP             /RESTORE THE STAT
2580
2581    2765  0274          OPEN RTN        /RETURN FROM CHKRDY SUBROUTINE
2582    2766  0217          JUMP F3 IND
2583
2584    2767  0214  UNRDY,  OPEN STAT       /CLEAR DRV READY BIT OF STAT IN SR
2585    2770  0071          ESP
2586    2771  0075          LSR
2587    2772  0074          ROTATE ZERO
2588
2589    2773  0226          JUMP F5         /GO UPDATE REST OF STAT IN SR
2590    2774  2735          ROT3-1
2591
2592    2775  0000          0               /OPEN
2593    2776  0000          0               /OPEN
2594    2777  0000          0               /OPEN
2595
2596
2597                  $
```

```
0000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

0200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

0400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

0600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

3000
3100

3200
3300

3400
3500

3600
3700
```



```
4000
4100

4200
4300

4400
4500

4600
4700

5000
5100

5200
5300

5400
5500

5600
5700

6000
6100

6200
6300

6400
6500

6600
6700

7000
7100

7200
7300

7400
7500

7600
7700
```

A	0562	ERTRK	0242	PFUNCT	0370	WHCMDR	0075
ABACK	0535	EXCMRY	2764	PGETDA	2617	WRONG	2621
ABV43	0344	FILL1	1175	PGOTIT	1346	WRT0S	1322
AGAIN	0531	FILLBU	1110	PNORDY	1771	WRTCRC	0624
AGAIN1	0550	FINDMD	1400	PNTRDY	1765	WRTDAM	0514
AGAIN2	0722	FINDSE	0714	PRDSEC	1105	WRTDAT	0566
AGAIN3	1576	FINDTR	0103	PRTERR	0503	WRTPST	0656
AGAIN4	1616	FUNCT	1036	PTRYAG	2615	WRTSEC	0400
AGAIN5	1635	FUNCT2	1057	PUTSEC	0145	XFRQ	1131
AGAIN6	1653	FUNCT4	1066	PUTTRK	0166	XSTRYS	2573
B	0564	FUNCT6	1076	PYSRDY	1767		
BACK	2322	GETCMD	2001	RCALOK	0060		
BADDAM	2577	GETCRC	2221	RDEREG	1275		
BADHDR	2557	GETDAM	1441	RDSEC	0760		
BADSRT	1673	GETWRD	2000	RDSTAT	1224		
BBACK	0554	GLESSF	2432	READ	2167		
BDSRT	2555	GODONE	0712	READOK	0706		
BOOT	0252	GODUN	1272	RECALB	0035		
BYTEOU	1152	GOERDN	2610	RECAL1	0034		
C	0615	GOREAD	0770	RFINTR	0355		
CBACK	0576	GOTIT	2010	ROT	1251		
CEGATE	0676	GOTONE	2032	ROT3	2736		
CFINSE	0351	GOTRUN	2347	SAWIND	2714		
CHKPAR	2041	GOTWRD	2276	SECHLF	0543		
CHKRDY	2640	HCRCER	2546	SECPLS	2124		
CHKSEC	0730	HDRCOM	1571	SELFER	0620		
CKHCRC	2515	HDSETL	0322	SPBACK	2662		
CKHOME	2105	HLFDLY	0466	STASH	0437		
CLRID	1243	HOMERR	2456	STDLY	2654		
CNGATE	0666	ILTRK	0206	STDONE	1031		
D	0653	IN10	0245	STEPHD	2100		
DAM	1675	INTER1	1374	STPOUT	0275		
DAMSUP	0460	INTRDY	2631	SWGATE	0407		
DATA	2206	LOOP	1326	TEST	2352		
DATAA	0571	MAGCOM	2400	TEST1	1351		
DBACK	0646	MORE2S	1421	TEST2	1350		
DCRCER	2304	NEWCRD	1141	TESTDN	1372		
DELAY	1300	NEWPAS	2646	TIMERR	1667		
DELDAT	1727	NEXTG	2421	TKSKER	2542		
DIF	2462	NODAM	2600	TRKEQ	0246		
DIFA	2503	NOSTPS	0357	TRYAGN	1413		
DIFB	2501	NOTYET	1755	TSTAGN	1353		
DLY25	2145	NOZERO	1746	TSTGO	2443		
DNRCAL	2625	NUTHER	2034	TSTRTN	0004		
DONDLY	2165	NXDRVC	0064	UDIF	0134		
DONSTP	2135	NXDRV1	0070	UNRDY	2767		
DUNSTP	0305	NXHDR	0737	UONE	0120		
E	0627	NXIDAM	1761	USAME	0141		
EMPTY1	1210	NXPRAM	1751	UZERO	0127		
EMPTYB	1107	OKDONE	1006	WAIT	0743		
ENDDAM	1742	OUT	2150	WAITRN	2312		
ERDONE	1700	PDMRCL	0372	WATDAT	2021		

ERRORS DETECTED: 0

LINKS GENERATED: 0

RUN-TIME: 18 SECONDS

3K CORE USED

SA1/

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ITEM NO.	DWG NO./PART NO.	DESCRIPTION	RXØ1-AA	RXØ1-AB	RXØ1-AC	RXØ1-BA	RXØ1-BB	RXØ1-BC	RXØ1-CA	RXØ1-CB	RXØ1-CC	RXØ1-DA	RXØ1-DC	RXØ1-DD	RXØ1-AD	RXØ1-BD	RXØ1-FA	RXØ1-FC	RXØ1-FD	RXØ1-HA	RXØ1-HC	RXØ1-HD	RXØ1-JA	RXØ1-JC	RXØ1-JD	RXØ1-LA	RXØ1-LC	RXØ1-LD	RXØ1-VA	RXØ1-VC	RXØ1-VD
1	D-IA-7010679-0-0	CHASSIS W/HINGE	1	-	1	1	-	1	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	D-AD-7010721-1-0	BEZEL ASSY, SINGLE DRIVE	1	-	1	-	-	-	-	-	-	-	-	-	1	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-
3	D-AD-7010721-2-0	BEZEL ASSY, DUAL DRIVE	-	-	-	1	-	1	-	-	-	-	-	-	-	1	-	-	-	1	1	1	-	-	-	1	1	1	-	-	-
4	D-CS-M7727-Ø-1	READ/WRITE CONTROL BOARD	1	-	1	1	-	1	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	D-CS-M7726-Ø-1	FLOPPY DISK CONTROL BOARD	1	-	1	1	-	1	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6	E-UA-H771-A-Ø	H771-A POWER SUPPLY (6Ø HZ)	1	-	-	1	-	-	-	-	-	1	-	-	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-
~~7~~	~~E-UA-H771-B-Ø~~	~~H771-B POWER SUPPLY (6Ø HZ)~~			1			1																				-	-	-
~~8~~	~~3012304-00~~	~~DISK DRIVE, 6Ø HZ~~	1	-	-	2	-	-	1	-	-	2	-	-	-	-	1	-	-	2	-	-	2	-	-	2	-	-	-	-	-
~~9~~	~~3012304-01~~	~~DISK DRIVE, 5Ø HZ~~	-	-	1	-	-	2	-	-	1	-	2	2	1	2	-	1	1	-	2	2	-	2	2	-	2	2	-	-	-
~~10~~	~~D-IA-7010646-1K-0~~	~~CABLE, EXTENSION, RXØ1~~	1	-	1	2	-	2	1	-	1	2	2	2	1	2	1	1	1	2	2	2	2	2	2	-	-	-	-	-	-
11	C-IA-7008612-0F-0	CABLE, KEYBOARD, 6 INCHES	1	-	1	1	-	1	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	1	1	1
12	D-UA-BCØ5L-15-Ø	CABLE, JUMPER, 15 FT.	1	-	1	1	-	1	-	-	-	-	-	-	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-
13	C-MD-7409479-0-0	PLATE, PRESSURE	1	-	1	1	-	1	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	1	1	1
14	C-MD-7413350-0-0	SHIPPING BRACKET, RXØ1	1	-	1	1	-	1	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	1	1	1
15	1212157	SLIDE, CHASSIS	1	-	1	1	-	1	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-
16	9006023-01	SCR, PHL PAN HD. #6-32 x .44 LG	18	-	18	24	-	24	6	-	6	24	24	24	18	24	18	18	18	24	24	24	24	24	24	24	24	24	18	18	18
17	9006039-01	SCR, PHL PAN HD. #8-32 x .50 LG	10	-	10	10	-	10	-	-	-	6	6	6	10	10	10	10	10	10	10	10	6	6	6	7	7	7	6	6	6
~~18~~	~~9008017-01~~	~~SCR, PHL PAN HD. #10-34 x .50 LG~~	1	-	1	1	-	1	-	-	-	1	1	1	1	1												-	-	-
19	9006071-01	SCR, PHL PAN HD. #10-32 x .38 LG	10	-	10	10	-	10	-	-	-	10	10	10	10	10	10	10	10	10	10	10	10	10	10	-	-	-	-	-	-
20	9006074-03	SCR, PHL TRUSS HD, #10-32 x .62 LG	5	-	5	5	-	5	-	-	-	1	1	1	5	5	5	5	5	5	5	5	1	1	1	-	-	-	1	1	1
21	9007801-00	WASHER, SPRING LOCK, #6	26	-	26	32	-	32	6	-	6	32	32	32	26	32	26	26	26	32	32	32	32	32	32	32	32	32	26	26	26
22	9006690-00	WASHER, SPRING LOCK, #8	10	-	10	10	-	10	-	-	-	10	10	10	10	10	10	10	10	10	10	10	10	10	10	7	7	7	6	6	6
23	9007906-00	WASHER, SPRING LOCK, #10	19	-	19	19	-	19	-	-	-	19	19	19	19	19	19	19	19	19	19	19	19	19	19	-	-	-	1	1	1
24	9006653-00	WASHER, FLAT #6	29	-	29	35	-	35	6	-	6	35	35	35	29	35	29	29	29	35	35	35	35	35	35	35	35	35	29	29	29
25	9006666-00	WASHER, FLAT #8	7	-	7	7	-	7	-	-	-	7	7	7	7	7	7	7	7	7	7	7	7	7	7	4	4	4	3	3	3
26	9009024-00	WASHER, FLAT #10	3	-	3	3	-	3	-	-	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	1	1	1
27	9006564-00	NUT, HEX #10-32	2	-	2	2	-	2	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-
28	9006558-00	NUT, HEX #6-32	8	-	8	8	-	8	-	-	-	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
29	9007786-00	TINNERMAN NUTS, #10-32	5	-	5	5	-	5	-	-	-	5	5	5	5	5	5	5	5	5	5	5	5	5	5	-	-	-	1	1	1
30	9009120-02	STANDOFF, MALE/FEMALE #6-32 x .50 LG	2	-	2	2	-	2	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
31	9007604-00	SPACER, #6-32 x 2.0 LG	1	-	1	1	-	1	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
32	9107245	TUBING, EXTRUDED .375 I.D. (BLACK)	A/R	-	A/R	A/R	-	A/R	-	-	-	A/R	A/R	A/R	A/R	A/R	-	-	-	-	-	-	-	-	-	-	-	-	A/R	A/R	A/R
33	E-IA-7412666-0-0	COVER, TOP	1	-	1	1	-	1	-	-	-	-	-	-	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-
34	3612408-00	DISKETTE	1	-	1	2	-	2	-	-	-	2	2	2	1	2	1	1	1	2	2	2	2	2	2	2	2	2	1	1	1
35	D-IA-7412853-0-0	PLATE, FRONT, DUAL DRIVES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	9007031-00	TIE WRAP	9	-	9	18	-	18	6	-	6	18	18	18	9	18	9	9	9	18	18	18	18	18	18	18	18	18	9	9	9
37	9008264-00	MOUNT, TIE WRAP	1	-	1	2	-	2	1	-	1	2	2	2	1	2	1	1	1	2	2	2	2	2	2	2	2	2	1	1	1
38	9006024-01	SCR, PHL PAN HD. #6-32 x .50 LG	3	-	3	3	-	3	-	-	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
39	D-UA-BCØ5L-8	CABLE JUMPER 8FT	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-	1	1	1	-	-	-	1	1	1
40	E-UA-H771-C-Ø	H771-C POWER SUPPLY 115V 50HZ	-	-	1	-	-	1	-	-	-	-	1	-	-	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-
41	E-UA-H771-D-Ø	H771-D POWER SUPPLY 230V 50HZ	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1
42	A-SP-3700185-0-0	PACKAGING INSTRUCTIONS RXØ1 IN PLANT	1	-	1	1	-	1	-	-	-	-	-	-	1	1	1	1	1	1	1	1	-	-	-	1	1	1	-	-	-
43	A-SP-3700193-0-0	PACKAGING INSTRUCTIONS RXØ1 CUSTOMER	1	-	1	1	-	1	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

REVISIONS			
CHK	CHANGE NO.		REV.
B.C.	RXØ1-00012		M
REVISED AND REDRAWN			
H. DRAB 6 JAN 78			
H. DRAB (DP) 12-30-77			N
RXØ1-00013			
H.DRAB 6 JAN 78			
H.DRAB (DP) 6-23-78			P
JH RXØ1-00014			
H. DRAB (DP) 8-17-78			
H. DRAB (DP) 8-17-78			R
JH RXØ1-ML015			
H. DRAB 9-14-78			S
JH RXØ1-ML016			
R.MORIN 16 FEB 79			

DRN. W.MCCARTHY	1/22/75	FIRST USED ON RXØ1
CHK'D W.MCCARTHY	2/6/75	digital
ENG. C.YOUSE		TITLE . RXØ1 FLOPPY DISK DRIVE ASSY
PROJ. ENG.		
PROD. J.MILLER	3/18/75	
NEXT HIGHER ASSY. B-DD-RXØ1-Ø		SIZE C / CODE PL / NUMBER RXØ1-Ø-Ø / REV S
SCALE		DIST.
SHEET 1 OF 2		

REV. NUMBER SIZE CODE

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ITEM NO.	DWG NO./PART NO.	DESCRIPTION	RXØ1-AA	RXØ1-AB	RXØ1-AC	RXØ1-BA	RXØ1-BB	RXØ1-BC	RXØ1-CA	RXØ1-CB	RXØ1-CC	RXØ1-DA	RXØ1-DC	RXØ1-DD	RXØ1-AD	RXØ1-BD	RXØ1-FA	RXØ1-FC	RXØ1-FD	RXØ1-HA	RXØ1-HC	RXØ1-HD	RXØ1-JA	RXØ1-JC	RXØ1-JD	RXØ1-LA	RXØ1-LC	RXØ1-LD	RXØ1-VA	RXØ1-VC	RXØ1-VD
44	A-SP-3700229-0-0	PACKAGING INSTRUCTIONS RXØ1 DRIVES	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	9009813-00	SCR, PHL PAN HD. #10-24 x .38 LG TAPTITE	1	-	1	1	-	1	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-
~~46~~	~~A-PC-3612063-0-0~~	~~LABEL, ADHESIVE BACKED, UL PRINTED~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~
~~47~~	~~7013503-0-4~~	~~PLENUM, ASSY W/O PACKAGING 115VAC~~	~~-~~	~~-~~	~~-~~	~~1~~	~~-~~	~~1~~	~~-~~	~~-~~	~~-~~	~~1~~	~~1~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~1~~	~~1~~	~~-~~	~~-~~	~~-~~	~~-~~
~~48~~	~~7013503-0-5~~	~~PLENUM ASSY W/O PACKAGING 230VAC~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~1~~	~~-~~	~~1~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~1~~	~~-~~	~~-~~	~~-~~
~~49~~	~~7013503-0-6~~	~~PLENUM ASSY W/O PACKAGING 115VAC~~	~~1~~	~~-~~	~~1~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~
~~50~~	~~7013503-0-7~~	~~PLENUM ASSY W/O PACKAGING 230VAC~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~1~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~
51	A-SP-3700185-1	PACKAGING INSTR. RXØ1 W/O BEZEL ASSY	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
52	9008341	PVC CLIP, DESKLASP, 1"W x .750" LG	2	2	2	2	2	2	-	2	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
53	3613211-00	LABEL, CSA	1	-	-	1	-	-	1	-	-	1	-	-	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	-	-
54	3613210-00	DECAL, SERIAL TAG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
55	3612063-00	U-UL RECOGNIZED LABEL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
~~56~~	~~9006020-1~~	~~SCREW, P.P.H. #6-32 x 1/14~~	~~8~~	~~-~~	~~8~~	~~8~~	~~-~~	~~8~~	~~-~~	~~-~~	~~-~~	~~8~~	~~8~~	~~8~~	~~8~~	~~8~~	~~8~~	~~8~~	~~8~~	~~8~~	~~8~~	~~8~~	~~8~~	~~8~~	~~8~~	~~8~~	~~8~~	~~-~~	~~-~~	~~-~~	~~-~~
57	E-UA-7013077-04	FLEXIBLE DISK DRIVE 60HZ (PREFERRED)	1	-	-	2	-	-	1	-	-	2	-	-	-	-	1	-	-	2	-	-	2	-	-	2	-	-	1	-	-
	E-UA-7013077-00	FLEXIBLE DISK DRIVE 60HZ (OPTIONAL)																													
	A-PL-7014300-00	FLEXIBLE DISK DRIVE 60HZ (OPTIONAL)																													
	A-PS-3012304-00	FLEXIBLE DISK DRIVE 60HZ (OPTIONAL)																													
58	E-UA-7013077-05	FLEXIBLE DISK DRIVE 50HZ (PREFERRED)	-	-	1	-	-	2	-	-	1	-	2	2	1	2	-	1	1	-	2	2	-	2	2	-	2	2	-	1	1
	E-UA-7013077-01	FLEXIBLE DISK DRIVE 50HZ (OPTIONAL)																													
	A-PL-7014300-01	FLEXIBLE DISK DRIVE 50HZ (OPTIONAL)																													
	A-PS-3012304-01	FLEXIBLE DISK DRIVE 50HZ (OPTIONAL)																													
59	9006074-03	SCR. PHL TRUSS HD #10-32 x 5/8 (TO HOLD CHASSIS TRACK)	1	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-
60	9006565-00	NUT KEP (TO HOLD CHASSIS TRACK)	1	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-
61	7015622-0-4	PLENUM ASSY W/O PACK. 115VAC NEW STYLE	-	-	-	1	-	1	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-
62	7015622-0-5	PLENUM ASSY W/O PACK. 230VAC NEW STYLE	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
63	7015622-0-6	PLENUM ASSY W/O PACK. 115VAC NEW STYLE	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
64	7015622-0-7	PLENUM ASSY W/O PACK. 230VAC NEW STYLE	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65	36-15996	DECAL, UNIT MUST BE SECURED IN CLOSED POSITION	1	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

REVISIONS

REV.	CHANGE NO.	CHK

DRN. W.MCCARTHY	1/22/75	FIRST USED ON: RXØ1
CHK'D W.MCCARTHY	2/6/75	TITLE: RXØ1 FLOPPY DISK DRIVE ASSY
ENG. C. YOUSE		
PROJ. ENG.		
PROD. J. MILLER	3/18/75	
NEXT HIGHER ASSY.		
B-DD-RXØ1-Ø		SIZE: C; CODE: PL; NUMBER: RXØ1-Ø-Ø; REV.: S
SCALE		DIST.
SHEET 2 OF 2		

digital

DEC FORM NO. A

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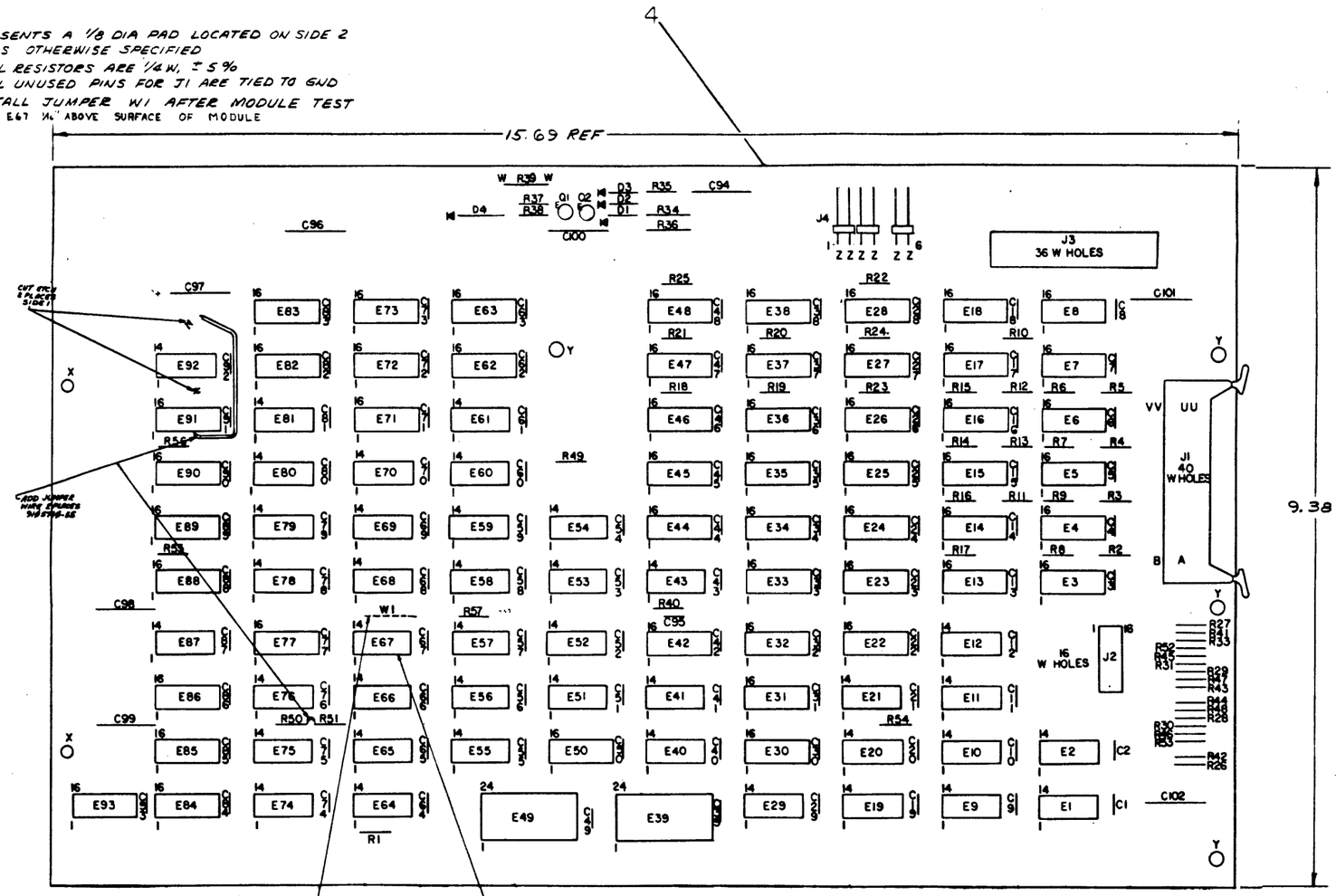
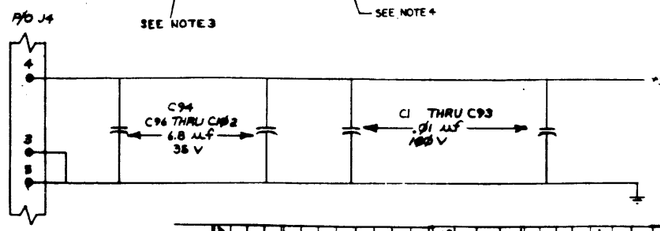
NOTES:

1. ◉ REPRESENTS A 1/8 DIA PAD LOCATED ON SIDE 2
2. UNLESS OTHERWISE SPECIFIED
   A. ALL RESISTORS ARE 1/4 W, ± 5 %
   B. ALL UNUSED PINS FOR J1 ARE TIED TO GND
3. INSTALL JUMPER W1 AFTER MODULE TEST
4. MOUNT E67 1/4" ABOVE SURFACE OF MODULE





23-XXXA2	8	16
2102	9	10
8640	1	8
74175	8	16
74174	8	16
74161	8	16
74194	8	16
74123	8	16
74H103	11	4
74H106	13	5
7489	8	16
74150	12	24
7442	8	16
8266	8	16
74193	8	16
74154	12	24
IC TYPE	GND	+5V

GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY EXCEPTIONS ARE STATED ABOVE

IC PIN LOCATIONS

REV.	CHANGE NO.	CHK	DATE	BY
J	M7726-00007	GB	11-OCT-77	H. DRAB
H	M7726-00006	SG	29 MAR 77	H. DRAB
F	M7726-00005	EZ	4 JAN 76	C. YOUSE
E	M7726-00004	JC	12-15-75	CHARLES YOUSE
D	M7726-00003	JC	7-30-75	C. YOUSE
C	M7726-00002	JC	6/24/75	P. KOTSCHENTHER
B	M7726-00001	JC	4-15-75	P. KOTSCHENTHER

REVISIONS

QTY	REF. DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.

PARTS LIST

FIRST USED ON OPTION MODEL: M7726
ETCH BOARD REV: B

DEC NO.	EIA NO.	DEC NO.	EIA NO.

SEMICONDUCTOR CONVERSION CHART

DRN.	Don Metzger	DATE	11/12/74
CHK'D.		DATE	11/9/75
PROJ. ENG.		DATE	11/21/75
MFG.		DATE	11/25/75

NEXT HIGHER ASSY
SCALE
SHEET 1 OF 9

digital

TITLE: FLOPPY DISK CONTROLLER

SIZE	CODE	NUMBER	REV.
D	CS	M7726-Ø-1	J

DIST.

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PARTS LIST

QTY	REF DESIGNATION	DESCRIPTION	PART NO.	ITEM
REF		X-Y COORDINATE HOLE LOCATION	K-CO-M7726-Ø-4	1
REF		ASSY/DRILLING HOLE LAYOUT	D-AH-M7726-Ø-5	2
REF		MODULE ECO HISTORY	B-MH-M7726-Ø-6	3
1		ETCHED CIRCUIT BOARD	5011390	4
1	J3	RECEP 36 PIN (REWORK)	B-MD-5509 071-1	5
1	J2,	I.C SOCKET, 16 PIN GOLD, LOW PROFILE	12118/3-02	6
1	R37	RES 10K 1/4W 5% CC	1300479-00	7
8	C 94, C96 — C102	CAP 6.8 µf 35V 10% S.TANT	1005306-00	8
93	C1 - C93	CAP .01µf 50V AXIAL CER	1001610-00	9
1	C95	CAP 12PF 100V 5%	1002087-00	10
3	D1 - D3	DIODE IN4004	1105796-00	11
1	D4	DIODE IN746A 3.3V 5%	1104860-00	12
1	R 35	RES 100 1/2W 5% CC	1300228-00	13
3	J4	HEADER, 2PIN (MALE)	1212804-00	14
8	R2, R4, R6, R9, R10 R12, R14, R16	RES 47Ø 1/4W 5% CC	1300316-00	15
8	R27, R29, R31, R97, R52 R43, R41, R45	RES 390 1/4W 5% CC	1300309-00	16
5	R1, R49 - R51, R57	RES 3K 1/4W 5% CC	1300432-00	17
9	R26, R28, R30, R38 R92, R44 R46, R48, R53	RES 180 1/4W 5% CC	1301322-00	18
8	R3, R5, R7, R9, R11 R13, R15, R17	RES 82Ø 1/4W 5% CC	1301775-00	19
1	R35	RES 30Ø 1/4W 5% CC	1301425-00	20
8	R18 — R25	RES 2K 1/4W 5% CC	1302388-00	21
1	R34	RES 261 1/4W 1% MF	1302873-00	22
1	R 36	RES 287 1/4W 1% MF	1305124-00	23
1	R40	RES 8.2K 1/4W 5% CC	1303179-00	24
3	R54 — R56	RES 1K 1/4W 5% CC	1300365-00	25
1	Q2	TRANS MX AA05	1510705-00	26
1	Q1	TRANS MX AA55	1510706-00	27
3	E19, E20 E21, E29 E40	I.C 7474	1905547-00	28
3	E9, E57, E59	I.C. 7400	1905575-00	29
2	E43, E60	I.C 7410	1905576-00	30
1	E75	I.C. 7450	1905580-00	31
1	E55	I.C. 74H20	1905635-00	32
1	E54	I.C 7402	1909004-00	33
2	E68, E72	I.C. 74H00	1909056-00	34
2	E56, E70	I.C. 74H11	1909267-00	35
5	E58, E69, E78, E79, E82	I.C 74H74	1909667-00	36
2	E64, E76	I.C. 7404	1909686-00	37
1	E39	IC 74154	1909701-00	38
2	E1, E2	I.C. 8881	1909705-00	39
1	E61	I.C. 74H04	1909931-00	40
2	E74, E92	I.C. 7486	1910011-00	41
4	E88, E89, E90, E91	I.C 74193	1910018-00	42
2	E27, E37	I.C 8266	1909934-00	43
1	E22	I C 7402	1910046-00	44
1	E65	I C 7437	1910091-00	45
1	E49	I.C 7415Ø	1910153-00	46
2	E11, E12	I.C 7408	1910155-00	47
2	E97, E98	I.C. 7489	1910396-00	48
1	E5Ø	I.C 74H10G	1910408-00	49
3	E80, E81, E87	I.C 74H103	1910409-00	50
1	E42	I.C 74123	1910436-00	51

PARTS LIST

QTY	REF DESIGNATION	DESCRIPTION	PART NO	ITEM
2	E45, E46	I.C 74194	1910623-00	52
8	E23, E24, E25, E26 E30, E31, E32, E36	IC. 74161	1910650-01	53
3	E84, E85, E86	I.C. 74174	1910652-00	54
1	E53	I.C 7427	1910878-00	55
3	E28, E38, E44	I.C. 74175	1910651-00	56
2	E10, E66	I.C. 8640	1911469-00	57
1	E33	I.C 2102 680 NS	2111318 -02	58
				59
6	E35, E34, E62, E63 E73, E83	SAME IC SPACES		60
1	E67	CRYSTAL OSCILLATOR 20MHZ	1811660-00	61
4	E41, E71, E93, E52	IC. 74S74	1910544-00	62
1	E51	I.C. 74H10	1909057-00	63
1	E77	I.C. 74H40	1905586-00	64
				65
N/R		#30 AWG SOLID WIRE (WEL)	9/08740-55	66
1	J1	CONN 40 PIN RT ANG HDR	1209941-02	67
1	(J1)	LATCH, LEFT FOR RT ANG HDR	1209941-03	68
1	(J1)	LATCH, RIGHT FOR RT ANG HDR	1209941-04	69
1	E13	I C 256 X 4 ROM FLD0L	23111A2	70
1	E3	I C 256 X 4 ROM FLD0H	2342 A2	71
1	E14	I C 256 X 4 ROM FLD1L	23257A2	72
1	E4	I.C 256 X 4 ROM FLD1H	23258A2	73
1	E15	I C 256 X 4 ROM FLD2L	23115 A2	74
1	E5	I C 256 X 4 ROM FLD2H	23116A2	75
1	E16	I C 256 X 4 ROM FLD3L	23117A2	76
1	E6	I C 256 X 4 ROM FLD3H	23118A2	77
1	E17	I C 256 X 4 ROM FLD4L	23259A2	78
1	E7	I.C. 256 X 4 ROM FLD4H	23260A2	79
1	E18	I C. 256 X 4 ROM FLD 5L	23121A2	80
1	E8	I C 256 X 4 ROM FLD 5H	23122A2	81
1	R33	RES 150 1/4W 5% CC	1300250-00	82

SPARE I.C. GATES

TYPE	LOCATION	PINS	DESCRIPTION
74H04	E61	1,2	INVERTER
7404	E64	12, 13	INVERTER
7404	E76	12, 13	INVERTER
7408	E11	1,2,3 8,9,10	2 INPUT AND
74H00	E72	1,2,3 4,5,6 8,9,10	2 INPUT NAND
7437	E65	8, 9, 10	2 INPUT NAND BUFFER
8881	E2	8, 9, 10	2 INPUT NAND O.C.
74H10	E51	3, 4, 5, 6	3 INPUT NAND
74H40	E77	1, 2, 4, 5, 6	4 INPUT NAND BUFFER
7402	E54	4, 5, 6	2 INPUT NOR
8640	E66	2, 6, 7 11, 12, 13 14, 15	2 INPUT NOR RCVR
7427	E53	1, 2, 12, 13	3 INPUT NOR
7486	E92	4 5 6	2 INPUT XOR
7486	E74	1, 2, 3, 4 5 6	2 INPUT XOR
74S74	E93	1, 2, 3, 4, 5, 6	D TYPE FLIP FLOP
74H106	E50	1, 2, 3, 4, 14, 15, 16	J K FLIP FLOP
74123	E42	1, 2, 3, 4, 13, 14, 15	ONE SHOT

ALLOWABLE SUBSTITUTIONS

PREFERRED			REPLACEMENT	
TYPE	ITEM #	P.N.	TYPE	P.N.
7489	48	1910396-00	3101A	1910653-00
7489	48	1910396-00	8225	1911162-00

REVISIONS

CHK	CHANGE NO	REV

TITLE	SIZE	CODE	NUMBER	REV.
FLOPPY DISK CONTROLLER	D	DCS	M7726-Ø-1	J
SCALE — SHEET 2 OF 9	DIST.			

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ROM OUT 7
ROM OUT 6
ROM OUT 5
ROM OUT 4
ROM OUT 3
ROM OUT 2
ROM OUT 1
ROM OUT Ø

8266 E27 — MUX OUT 7, MUX OUT 6, MUX OUT 5, MUX OUT 4
8266 E37 — MUX OUT 3, MUX OUT 2, MUX OUT 1, MUX OUT Ø

COUNTER MOST SIG HALF 74161 E26
COUNTER LEAST SIG HALF 74161 E36
HIGH 1
CNTR OVFLW H
P/O J3
INIT + PC AL
C1(1) H
C0(1) H
CLK CNTR L
WBE CLK CNTR L
74H11 E56
74H04 E61
C1(1) AH

MEMORY BUFFER 74175 E28
INST 1(1) L
INST Ø(1) L
INST 1(1) H
INST Ø(1) H
SEL 3(1) H
SEL 2(1) H
MEMORY BUFFER 74175 E38
SEL 1(1) H
SELØ(1) H
C1(1) L
C1(1) H
CØ(1) L
CØ(1) H
LD MB + CLK PC L

DSØ SØ SI SHIFT REG MOST SIG HALF 74194 E45
SI SØ DSØ SHIFT REG LEAST SIG HALF 74194 E46
SR MSB (1) H
SR LOAD H
CLK SR L
INIT + PC AL

SCRATCH PAD ADDR REGISTER 74175 E44
INIT + PC AL
CLK SP ADDR REG L

LD SCRATCH PAD L
WR ENB SCRATCH PAD MOST SIG HALF 7489 E48
ENB WR SCRATCH PAD LEAST SIG HALF 7489 E47
A3 A2 A1 AØ
+5V
R25, 2K
R24, 2K
R23, 2K
R22, 2K
R21, 2K
R2Ø, 2K
R19, 2K
R18, 2K

CØ(1) L
C1(1) H
74ØØ E59
74Ø2 E54
SR LOAD H
CØ(1) H
SEP DATA(1) H
74Ø8 E60

REVISIONS

CHK	CHANGE NO.	REV.

TITLE	SIZE	CODE	NUMBER	REV.
FLOPPY DISK CONTROLLER (D3)	D	CS	M7726-Ø-1	J
SCALE	SHEET 3 OF 9	DIST.		

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HIGH 3
20 MHZ CLK
HIGH 3
END WIND L
HIGH 3
20 MHZ CLK
INIT + PC H
INIT + PC H
END WIND L
MIS CLK (1) L
INIT + PC AL
INIT + PC AL
SEP DATA (1) H
SEP DATA (1) L
INIT + PC AL
P/O J2
DEV RAW DATA L
SEP CLK (1) H
BTP 3 H
HIGH 2
DEV BUSS H
DATA I L
SEP DATA (1) L
C Ø (1) L
INIT + PC L
C1 (1) A H
CLK BAR L
HIGH 1
CLK SEC BUF L
SEC BUF OVFLW H
HIGH 1
C Ø (1) H
SEC BUF OUT (1) H

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE	CODE	NUMBER	REV.
FLOPPY DISK CONTROLLER (D4)	D	CS	M7726-Ø-1	J
SCALE —	SHEET 4 OF 9	DIST.		

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HIGH 1
C1 (1) L
7404 E64
7474 E19
7474 E20
7474 E21
7474 E29
7474 E41
DRV BUSS H
INTERF BUSS H
OB1 (1) H
OB3 (1) H
SEC BUF H
SEC BUF OUT (1) H
SR MSB (1) H
SR H
7400 E9
7400 E9
7400 E9
HIGH 2
C1 (1) AH
CØ (1) H
INIT+PC L
SEC BUF H
SR H
SYN INDEX (1) H
BTP 3 H
74154 E39
DO PULSE GEN
SEL 3 (1) H
SEL 2 (1) H
SEL 1 (1) H
SEL Ø (1) H
TP3 L
DO INST L
CLK BAR L
CLK SEC BUF L
CLK CRC L
CLK CNTR L
CLK SR L
+5V
C95 12pf
R49 8.2K
HIGH 2
74LS123 E42
LD SCRATCH PAD L
+5V
8881 E1
8881 E1
8881 E1
8881 E1
8881 E2
8881 E2
R41, 390
R42, 180
R43, 390
R44, 180
R45, 390
R46, 180
R47, 390
R48, 180
RX ERROR L
RX TRANSFER REQUEST
RX OUT L
RX DONE L
RX SHIFT L
RX DATA (1) L
7400 E12
7400 E9
7400 E12
7400 E12
7400 E11
7400 E11
FLAG (1) H
HOME H
DRV WT GATE H
DRV STEP L
DRV OUT H
DRV ERASE H
DRV ABOVE TK 43 H
DRV WT DATA
DRV SEL TRK Ø H
DRV SEL DK I H
DRV LOAD HEAD H
DRV SEL INDX H
P/O J1
P/O J2

TITLE	FLOPPY DISK CONTROLLER (D5)	SIZE/CODE	NUMBER	REV.
SCALE	SHEET 3 OF 3	D	CS M7726-Ø-1	J
DIST.				

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+5V
R1 3K
DISABLE ROMS L
7404 E64
7442 E22 FIELD DECODER
FLD 5 L
FLD 4 L
FLD 3 L
FLD 2 L
FLD 1 L
FLD Ø L
R2 470
R3 820
R4 470
R5 820
R6 470
R7 820
R8 470
R9 820
R10 470
R11 820
R12 470
R13 820
R14 470
R15 820
R16 470
R17 820
ROMOUT 7
ROMOUT 6
ROMOUT 5
ROMOUT 4
ROMOUT 3
ROMOUT 2
ROMOUT 1
ROMOUT Ø
SEL 3(1) H
SEL 2(1) H
SEL 1(1) H
SEL Ø(1) H
FIELD COUNTER E23 74161
JUMP L
P/O J3
MUX OUT 7
MUX OUT 6
MUX OUT 5
MUX OUT 4
PROGRAM COUNTER MS HALF E25 74161
INIT + PC AL
MUX OUT 3
MUX OUT 2
MUX OUT 1
MUX OUT Ø
PROGRAM COUNTER LS HALF E24 74161
INIT + PC L
PC LOAD EN L
LD MB + CLK PC L
HIGH 1
FLD 5 L
FLD 4 HI E7
FLD 4 LO E17
FLD 2 HI E5
FLD 2 LO E15
FLD 4 L
FLD 3 HI E6
FLD 3 LO E16
FLD 3 L
FLD 1 HI E4
FLD 1 LO E14
FLD 1 L
FLD Ø HI E3
FLD Ø LO E13
FLD Ø L
P/O J3
PC7(1) H
PC6(1) H
PC5(1) H
PC4(1) H
PC3(1) H
PC2(1) H
PC1(1) H
PCØ(1) H

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE	CODE	NUMBER	REV.
FLOPPY DISK CONTROLLER (D6)	D	CS	M7726-Ø-1	J
SCALE	SHEET 6 OF 9	DIST.		

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+5V
20 MHZ OSCILLATOR EG7
W1
NOTE 3
74H00 E77
20 MHZ CLK
INIT + PC H
7400 ES9
HIGH 2
TP3 H
TP4 H
TP3 L
TP4 L
74H74 E78
74H74 E79
74H04 EG1
BTP 3 H
74H00 EG8
INIT + PC AL
74H11 E78
74H74 EG9
P/O J3
HALT H
CONTIN L
HALT L
R49 3K
R50 3K
7404 E76
7400 ES9
74H00 EG8
ERROR HALT ENABLE L
R51 3K
7410 EG0
INTERF BUSS H
OB I (1) H
C0 (1) H
C1 (1) H
PRESET CEC L
CLK CEC L
SHIFT CEC L
C0 (1) L
C1 (1) L
SEP DATA (1) L
CEC 1G(1) L
7450 E75
7486 E92
CEC 1G(1) H
CEC 1 CEC 2 CEC 3 CEC 4
CEC 5 CEC 6 CEC 7 CEC 8 CEC 9 CEC 10
CEC 11 CEC 12 CEC 13 CEC 14 CEC 15 CEC 16
74174 E84
74174 E85
74174 E86

+5V R54 1K — HIGH 1 (21 LOADS)
R55 1K — HIGH 2 (21 LOADS)
R56 1K — HIGH 3 (20 LOADS)

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE	CODE	NUMBER	REV.
FLOPPY DISK CONTROLLER (D7)	D	CS	M7726-Ø-1	J
SCALE —	SHEET 7 OF 9	DIST.		

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HIGH 2
+5V
BTP 3 H
P/O J1
RX RUN L
RX 12 BIT L
RX DATA (1) L
E31 39Ø
E30 18Ø
E29 39Ø
E28 18Ø
E27 39Ø
E26 18Ø
8640 E10
7404 E64
DATA I L
SEP DATA (1) L
SR MSB (1) H
MIS CLK (1) L
7486 E74
SRMSB EQ SEP DATA H
MIS CLK EQ SRMSB H
STB
7415Ø E49
DØ
DI Ø
D2 CONDITION
D11 SELECTOR
D13
SYN INDEX (1) H
SR MSB (1) H
CNTR OVFLW H
CRC 16 (1) H
HOME H
SEP CLK (1) H
SEC BUF OVFLW H
SEC BUF OUT (1) H
FLAG (1) H
OB3 (1) H
D3
D4
D5
D6
D7
D8
D9
D12
D14
D15
D1
S3 S2 S1 SØ
SEL 3 (1) H
SEL 2 (1) H
SEL 1 (1) H
SELØ (1) H
P/O J2
DRV SEL
WT PROT L
INST DIS H
INST Ø (1) L
INST DIS L
INST 1 (1) L
INST Ø (1) H
7402 E54
7410 E93
7427 E53
7400 E57
DO INST L
CLK SF ADDR REG L
WBR H
CBR L
CNTR OVFLW H
CI (1) AH
CI (1) L
TP3 H
74H10 E51
74H11 E56
74H20 E55
PC LOAD EN L
LDMB +CLK PC L
TP4 H
WBR CLK CNTR L
JUMP L
RX INIT L
R33 150
8881 E2
PRY INIT + PC
P/O J4
+1Ø V
D1 IN4004
D2 IN4004
D3 IN4004
R37 10K
Q1 A55
R38 18Ø
R39 1ØØ ½W
Q2 A96
R34 2Ø1 1%
R35 3ØØ
R36 287 1%
D4 IN746A 3.3V
P/O J3
B1
A2
C2
+7V
+5V
GND
8640 E66
INIT + PC H
7437 E65
INIT + PC L
INIT + PC A L
CLK CNTR L
7404 E61
CØ (1) L
74H74 E58
R57 3K
MAINT DISABLE L
INST DIS H
INST DIS L
TP4 L
INIT + PC AL

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE	CODE	NUMBER	REV.
FLOPPY DISK CONTROLLER (D8)	D	CS	M7726-Ø-1	J
SCALE	SHEET 8 OF 9	DIST.		

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THIS LIST GIVES THE SOURCE AND DESTINATIONS OF SIGNAL NAMES WITHIN THE M7726 PRINT SET. SIGNAL NAMES THAT DO NOT APPEAR ON THIS LIST ARE PRESENT FOR INFORMATION ONLY. THEY DO NOT INDICATE CONNECTIONS TO OTHER POINTS IN THE PRINT SET.

INTERFACE	REFERS TO SIGNALS ON THE INTERFACE BUSS
DRIVE	REFERS TO SIGNALS ON THE DRIVE BUSS
POWER SUPPLY	REFERS TO VOLTAGES FROM THE POWER SUPPLY
KM11	REFERS TO SIGNALS ON J3 THE MAINTANENCE CONNECTOR

SIGNAL NAME	ORIGIN	DESTINATION
BTP J H	D7-C1	D4-A5,D5-A6,D8-D6
CLK BAR L	D5-C7	D4-A3
CLK CNTR L	D5-B7	D3-B7,D8-A4
CLK CPC L	D5-C7	D7-B7
CNTR OVFLW H	D3-C5	D8-D4,D8-C6,D8-B4
CLK SEC BUF L	D5-C7	D4-B2
CLK SP ADDR REG L	D8-B3	D3-A4
CLK SR L	D5-B7	D3-B4
CONTIN L	KM11	D7-C7
CRC16 (1) H	D7-B1	D8-C6
CRC16 (1) L	D7-A1	D7-B7
C1 (1) AH	D3-A6	D4-B3,D5-B4,D8-D4,D8-C4
C1 (1) H	D3-A6	D3-C6,D3-B2,D7-B8
C1 (1) L	D3-A6	D5-D6,D7-B8,D8-D4,D8-B4
C0 (1) H	D3-A6	D3-C7,D3-A2,D4-B1,D5-B4,D7-B8
C0 (1) L	D3-A6	D3-B2,D4-B3,D7-B8,D8-B3
DATA I L	D8-D5	D4-A2
DISABLE ROMS L	TEST PAD	D8-D8
DO INST L	D8-B4	D5-H8
DRV BUSS H	D5-D4	D4-A4
DRV ERASE H	D5-B1	DRIVE
DRV OUT H	D5-C1	DRIVE
DRV LOAD HEAD H	D5-A1	DRIVE
DRV STEP L	D5-C1	DRIVE
DRV INIT + PC	D8-B6	DRIVE
DRV ABOVE TK 43 H	D5-B1	DRIVE
DRV RAW DATA L	DRIVE	D4-A8
DRV SEL DK 1 H	D5-B1	DRIVE
DRV SEL INDX H	DRIVE	D5-A1
DRV SEL TRK 0 H	DRIVE	D5-B1
DRV WT DATA	D5-B1	DRIVE
DRV WT GATE H	D5-C1	DRIVE
DRV SEL WT PROT L	DRIVE	D8-C8
END WIND L	D4-D3	D4-D8
ERROR HLT ENABLE L	KM11	D7-C7
FLAG (1) H	D5-B3	D8-B6
FLD 0 L	D6-D6	D4-A3,D6-A2
FLD 1 L	D6-D6	D6-B3,D6-B2
FLD 2 L	D6-D6	D6-C3,D6-C2
FLD 3 L	D6-D6	D6-A6,D6-A4
FLD 4 L	D6-D6	D6-B6,D6-B4
FLD 5 L	D6-D6	D6-C6,D6-C4
HALT H	D7-C3	KM11
HALT L	KM11	D7-C7
HIGH 1	D7-C4	D3-D6,D3-D4,D3-C6,D3-C4,D4-A3 D4-B1,D5-D5,D6-A8
HIGH 2	D7-B4	D4-A5,D5-B7,D5-A7,D5-B4,D7-D5 D7-D4,D7-C4,D7-C5,D8-D5,D8-B3 D8-A5
HIGH 3	D7-B4	D4-D8,D4-C8,D4-D7,D4-D5,
HOME H	D5-B2	D8-C6
INIT +PC A L	D8-A4	D3-C6,D3-B4,D3-A6,D3-A7,D4-B6 D4-B5,D4-B8,D7-C5,D8-B2
INIT + PC H	D8-A4	D4-D5,D4-C5,D7-D4
INIT + PC L	D8-A4	D4-B3,D5-B5,D6-A8
INST 0 (1) H	D3-B6	KM11,D8-B5
INST 0 (1) L	D3-B6	D8-C5
INST 1 (1) H	D3-B6	KM11
INST 1 (1) L	D3-B6	D8-H5
INST DIS H	D8-B1	D8-C5
INST DIS L	D8-A1	D8-H5
INTERF BUSS H	D5-D4	D7-B8
JUMP L	D8-C3	D4-C8
LD MA + CLK PC L	D8-C1	D4-A8,D3-A8
LD SCRATCH PAD L	D5-H4	D3-H3
MAINT DIS L	TEST PAD	D8-B1
M18 CLK (1) L	D4-C4	D8-C8
MUX OUT 0	D3-C7	D4-A8
MUX OUT 1	D3-C7	D4-A8
MUX OUT 2	D3-C7	D4-A8
MUX OUT 3	D3-C7	D4-B8
MUX OUT 4	D3-C7	D4-B8
MUX OUT 5	D3-D7	D4-B8
MUX OUT 6	D3-D7	D4-B8
MUX OUT 7	D3-D7	D4-B8
OB1 (1) H	D5-D4	D7-B8
OB3 (1) H	D5-C4	D8-B6
PC 0 (1) H	D6-A1	KM11
PC 1 (1) H	D6-A1	KM11
PC 2 (1) H	D6-A1	KM11
PC 3 (1) H	D6-A1	KM11
PC 4 (1) H	D6-A1	KM11
PC 5 (1) H	D6-A1	KM11
PC 6 (1) H	D6-A1	KM11
PC 7 (1) H	D6-A1	KM11
PC LOAD KM L	D8-D1	D6-A8
ROM OUT 0	D6-D1	D3-C8
ROM OUT 1	D6-D1	D3-C8
ROM OUT 2	D6-D1	D3-C8
ROM OUT 3	D6-D1	D3-C8
ROM OUT 4	D6-D1	D3-C8
ROM OUT 5	D6-D1	D3-D8
ROM OUT 6	D6-D1	D3-D8
ROM OUT 7	D6-D1	D3-D8
RX DATA (1) L	D5-C1,INTERFACE	INTERFACE,D8-D8
RX DONE L	D5-D1	INTERFACE
RX ERROR L	D5-D1	INTERFACE
RX INIT L	INTERFACE	D8-B8
RX OUT L	D5-D1	INTERFACE
RX RUN L	INTERFACE	D8-D8
RX SHIFT L	D5-C1	INTERFACE
RX TRANSFER REQUEST	D5-D1	INTERFACE
RX 12 BIT L	INTERFACE	D8-D8
SEC BUF OVFLW H	D4-A1	D8-C6
SEC BUF OUT (1) H	D4-C1	D5-C4,D8-B6
SEC BUF H	D5-H4	D5-C4
SEL 0 (1) H	D3-A6	D5-C8,D6-C8,D8-B6,KM11
SEL 1 (1) H	D3-A6	D5-C8,D6-C8,D8-B6,KM11
SEL 2 (1) H	D3-B6	D5-C8,D6-C8,D8-B6,KM11
SEL 3 (1) H	D3-B6	D5-C8,D6-C8,D8-B6,KM11
SEP CLK (1) H	D4-B4	D8-C6
SEP DATA (1) H	D4-B5	D3-A2
SEP DATA (1) L	D4-B5	D4-A2,D7-A8,D8-C8
SH H	D5-B4	D5-C4
SR LOAD H	D3-B1	D3-C4
SR MSB (1) H	D3-D3	D5-C4,D8-C8,D8-C6
SYN INDEX (1) H	D5-A5	D8-C6
TP3 H	D7-D3	D7-C6,D8-B4,D8-C5
TP3 L	D7-D3	D5-B8
TP4 H	D7-D2	D8-C3
TP4 L	D7-D3	D8-B2
WAR CLK CNTR L	D8-C2	D3-B7
20 MHZ CLK	D7-C5	D4-C8,D4-D7
GND	POWER SUPPLY	D1-A4
+5V	POWER SUPPLY	D1-A4,D8-A7
+7V	D8-A7	KM11
+10V	POWER SUPPLY	D8-B8

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE	CODE	NUMBER	REV.
FLOPPY DISK CONTROLLER	D	CS	M7726-Ø-1	J
SCALE —	SHEET 9 OF 9	DIST.		

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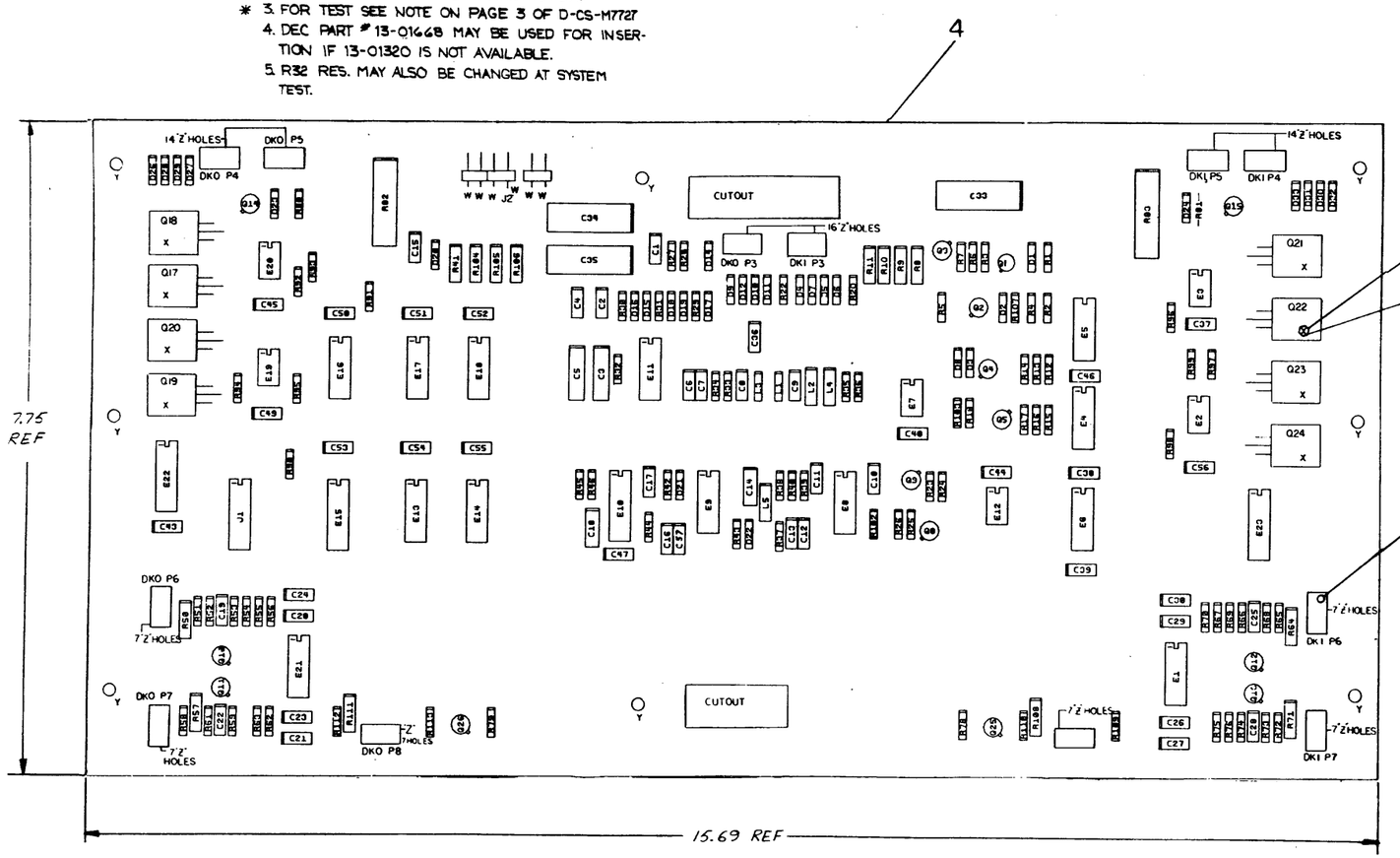
NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   A. ALL RESISTORS ARE 1/4W, ±5%.
2. WASHER TO BE USED BETWEEN ITEMS 57 AND 58 WILL BE SUPPLIED WITH THE D44C8 TRANSISTOR ONLY BY G.E.. THE WASHER IS ONLY REQUIRED WHEN USING THE G.E. TYPE TRANSISTOR.
3. * FOR TEST SEE NOTE ON PAGE 3 OF D-CS-M7727
4. DEC PART # 13-01668 MAY BE USED FOR INSERTION IF 13-01320 IS NOT AVAILABLE.
5. R32 RES. MAY ALSO BE CHANGED AT SYSTEM TEST.



7473	11	4
7545I	4	8
74157	8	16
75452	4	8
74123	8	16
IC TYPE	GND	+5V

GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY EXCEPTIONS ARE STATED ABOVE

IC PIN LOCATIONS

REV	DESCRIPTION	DATE	APPROVED
E	M7727-00004	3-31-76	H.DIAB
D	M7727-00003	3-24-76	D. BUCKER
C	M7727-00002	3-9-76	G. YOUSE
B	M7727-00001	2-25-76	W. SMITH
A	CHANGE NO.		

REVISIONS

DEC NO.	EIA NO.	DEC NO.	EIA NO.

SEMICONDUCTOR CONVERSION CHART

FIRST USED ON OPTION MODEL: M7727

QTY	REF. DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.

PARTS LIST

ETCH BOARD REV. B

DRN.	K. Vaughan	DATE 12/31/74
CHK'D	J. Brannon	DATE 1/24/75
ENG.		DATE 2-24-76
PROJ. ENG.		DATE 1/24/75
PROD.		DATE 2/4/75

NEXT HIGHER ASSY

SCALE

SHEET 1 OF 6

digital

TITLE: READ/WRITE CONTROL

SIZE	CODE	NUMBER	REV.
D	CS	M7727-0-1	E

DIST.

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PARTS LIST

QTY	REF DESIGNATION	DESCRIPTION	PART NO.	ITEM
		X-Y COORDINATE HOLE LOCATION	K-CO-M7727-0-4	1
		ASSY/ DRILL HOLE LAYOUT	D-AH-M7727-0-5	2
		MODULE ECO HISTORY	B-MH-M7727-0-6	3
1		ETCHED CIRCUIT BOARD	D-IA-5011370-00	4
2	C17, C18	CAP 100 pf	1000016-00	5
1	C9	CAP 180 pf	1000020-00	6
2	C8, C14	CAP 220 pf	1000021-00	7
32	C1, C2, C4, C10, C11, C15 C16, C20, C21, C23, C24 C26, C27, C29, C30, C37, C38, C39, C40 C43 C44, C45, C46, C47 C49 - C57	CAP .01 µf	1001610-00	8
2	C3, C5	CAP 6.8 µf 35V	1005306-00	9
2	C34, C35	CAP 100 µf	1009433-00	10
1	C33	CAP 50 µf	1000080-00	11
4	C7, C6, C12, C13	CAP .047 µf	1010978-32	12
5	C19, C25, C22, C28, C36	CAP .005 µf	1001765-00	13
10	D4, D7, D9, D12, D14 D15, D16, D17, D18, D19	DIODE D671	1103309-00	14
8	D3, D5, D6 D8 D10 D11, D21, D22	DIODE D672	1105275-00	15
10	D23, D24 D26, D27 D28, D29, D30, D31 D32, D33	DIODE IN4004	1105796-00	16
1	D20	DIODE IN4742 12V	1109502-00	17
2	D1, D2	DIODE 5.1V.	1110713-00	18
9	R90, R92 — R99	RES 150 1/4W 5%	1300250-00	19
4	R101, R104, R105, R106	RES 680 1/2W 5%	1300347-00	20
12	R6, R14, R17, R23, R24, R26, R46 R78, R79, R80, R81 R91,	RES 1K 1/4W 5%	1300365-00	21
4	R8 — R11	RES 1.2K 1/2W 5%	1300385-00	22
6	R50, R57, R64, R71, R108 R111	RES 68 1/2W 5%	1309405-00	23
7	R13, R16, R53, R62 R68, R75, R102	RES 1.5K 1/4W 5%	1300391-00	24
4	R35, R36, R39, R40	RES 511 1/8W 1%	1302411-00	25
1	R5	RES 2.74K 1/8W 1%	1304868-00	26
11	R2, R4, R7, R12, R15 R18, R103 R25, R27 R42, R43	RES 3.3K 1/4W 5%	1300439-00	27
9	R1, R20, R22, R44 R45, R107	RES 10K 1/4W 5%	1300479-00	28
11	R3, R37, R38, R52 R58, R63, R66, R72 R76, R109 R112	RES 1.21K 1/8W 1%	1302871-00	29
1	R32	RES 220Ω ±5%, 1/4W	1300271-00	30 *
2	R33, R34	RES 464 1/8W 1%	1303047-00	31
2	R28, R29	RES 34.8K 1/8W 1%	1303156-00	32
4	R51, R61, R65, R73	RES 10K 1/8W 1%	1303312-00	33
2	R82, R83	RES 100 5W 5%	1309094-00	34
2	R30, R31	RES 19.6 K 1/8W 1%	1309419-00	35
6	R55, R59, R67, R74 R110, R113	RES 4.64K 1/4W 1%	1304856-00	36

PARTS LIST

QTY	REF DESIGNATION	DESCRIPTION	PART NO.	ITEM
1	L5	CHOKE 1000 MHY	1602723-00	37
2	L2, L4	CHOKE 39 MH Y	1601759-00	38
2	L1, L3	CHOKE 120 MH Y	1610663-00	39
1	E17	I.C. 7450	1905580-00	40
2	E16, E18	I.C. 7473	1905587-00	41
1	E14	I.C 7402	1909004-00	42
1	E13	I.C 7404	1909686-00	43
2	E4, E6	I.C 7408	1910155-00	44
3	E1, E9, E21	I.C. 1414	1910337-00	45
5	E2, E3, E12, E19, E20	I.C 75451	1910406-00	46
1	E10	I.C 74123	1910436-00	47
2	E8, E11	I.C. 72733	1910644-00	48
1	E15	I.C. 74157	1910655-00	49
1	E5	I.C. 7406	1910741-00	50
1	J1	I.C SOCKET 16 PIN	1211813-02	51
9	Q9 THRU Q15, Q25 Q26	TRANS MXAA05	1510705-00	52
6	Q1 — Q5, Q8	TRANS MXAA55	1510706-00	53
8	Q17 — Q24	TRANS D44CB	1510421-00	54
86	".2" HOLES	WIRE WRAP PIN	1210385-01	55
3	J2	CONN 2 POS	1212204-00	56
8	"X" HOLES	SCREW, PAN HD 4/40 X 5/16	9006010-01	57
8	"X" HOLES	NUT, KEP 4/40 X 1/4 X 3/32	9006557-00	58
1	E7	I.C. 75452	1910695-00	59
4	R54, R56, R69, R70	RES 14.7K 1/4W 1%	1302941-00	60

REVISIONS

CHK	CHANGE NO	REV

TITLE	READ/WRITE CONTROL		
SCALE		SHEET 2 OF 6	

SIZE	CODE	NUMBER	REV.
D	CS	M7727-0-1	E
DIST.			

SIZE D CODE CS NUMBER M7727-0-1 REV E

198

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DG WT GATE H
DG ABOVE TK 43 H
DG SEL WT PROT L
DG ERASE H
DG WT DATA H
DG SEL DK 0 H
DG DC LO L
DG SEL DK 1 H

+24V R1 10K D1 5.1V R3 1.21K 1% R4 3.3K D2 5.1V R5 2.74K 1% R6 1K Q3 A55 Q1 A55 Q2 A55 R2 3.3K R7 3.3K

R8 1.2K 1/2W R9 1.2K 1/2W R10 1.2K 1/2W R11 1.2K 1/2W C36 .005µf

D10 672 D5 672 D3 672 D14 671 D15 671 R/W BUS +

D9 671 D4 671 D11 672 D6 672 DK 0 HEAD P3 DK 1 HEAD P3 D12 671 D7 671 D8 672 D16 671 D19 671

R18 3.3K R22 10K R20 10K R27 3.3K R28 34.8K 1% R30 19.6K 1% R29 34.8K 1% R31 19.6K 1% C1 .01µf -5V

Q4 A55 R13 1.5K R12 3.3K R14 1K R15 3.3K R17 1K R16 1.5K Q5 A55 R103 3.3K

D17 671 D18 671 R/W BUS -

+5V R23 1K Q8 A55 Q9 A05 R24 1K R25 3.3K R26 1K -5V

R32, 560Ω USE IF E11-7 IS < THAN 2.0
R32, 680Ω USE IF E11-7 IS < THAN 2.0
R32, 820Ω USE IF E11-7 IS < THAN 2.0 (Vp-H)
R32, 1.0K USE IF E11-7 IS < THAN 2.0 (Vp-H)
R32, 220Ω (NOMINAL)
R32, 1.5K USE IF E11-7 IS > THAN 3.2 (Vp-P)

APPLY 12 MX BETWEEN E11-1 AND E11-14. THEN SELECT R32 FOR E11-7, OR E11-8 TO BE 2.0 TO 3.2 (Vp-P)

+24V R104 680 1/2W R105 680 1/2W R106 680 1/2W R41 680 1/2W +12V D20 IN4742 C15 .01µf

+5V C17 100 pf R44 10K C18 100 pf R45 10K R46 1K D3 RAW DATA L

+5V C2 .01µf C3 6.8µf C4 .01µf C5 6.8µf C10 .01µf C11 .01µf -5V

R/W BUS + R/W BUS - R32 220Ω (NOMINAL) C6 .047µf R33 464 1% C7 .047µf R34 464, 1% L1 120µhy L2 33µhy C8 220pf L3 120µhy C9 180pf L4 33µhy R35 511 1% R36 511 1%

C12 .047 C13 .047 R39 511, 1% R37 1.21K 1% R38 1.21K 1% R40 511 1% L5 1000 µhy C14 220pf

D21 672 D22 672 R42 3.3K R43 3.3K

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	READ / WRITE CONTROL (D3)	SIZE	CODE	NUMBER	REV.
SCALE	SHEET 3 OF 6	D	CS	M7727-0-1	E
	DIST.				

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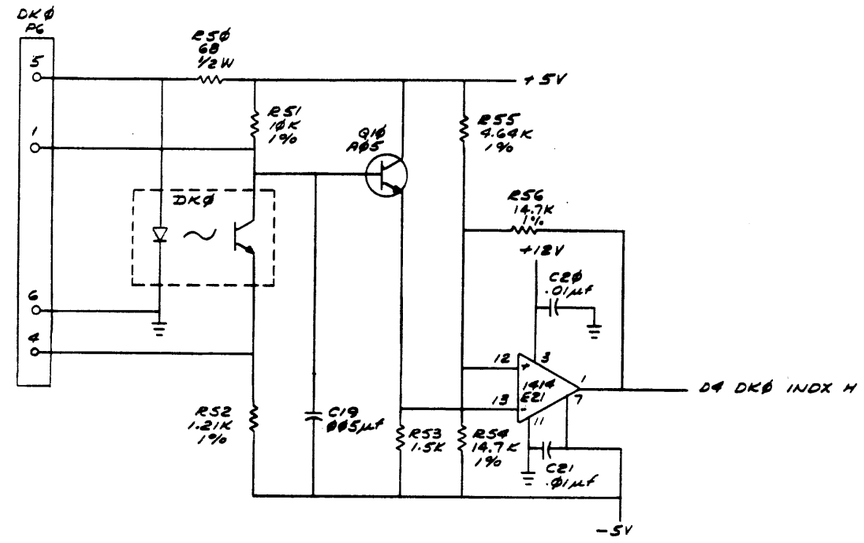

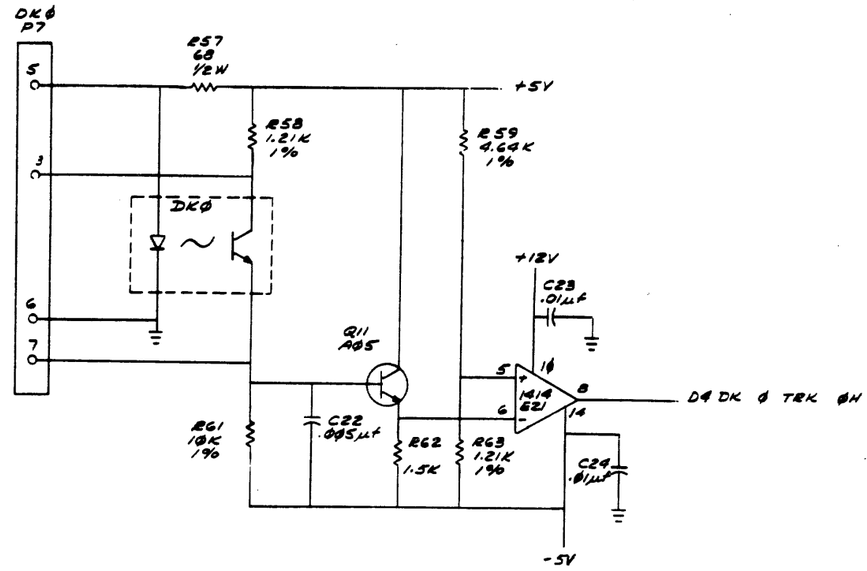

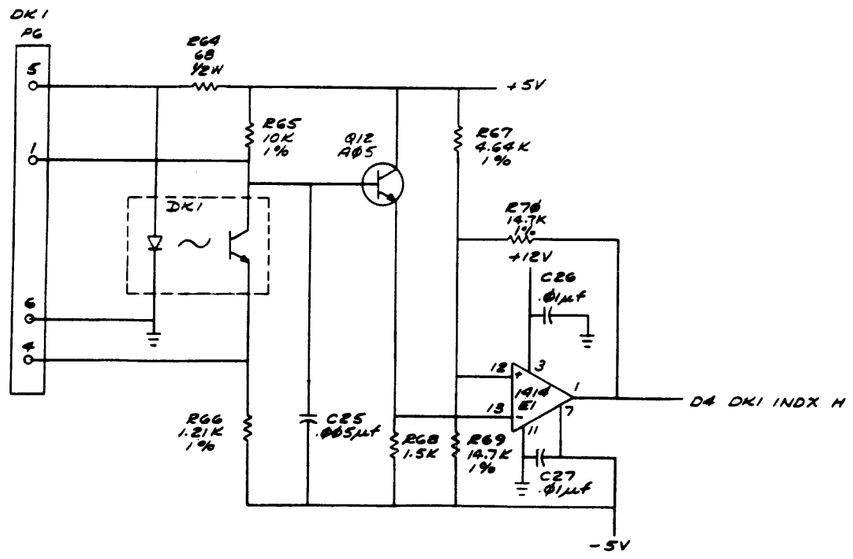

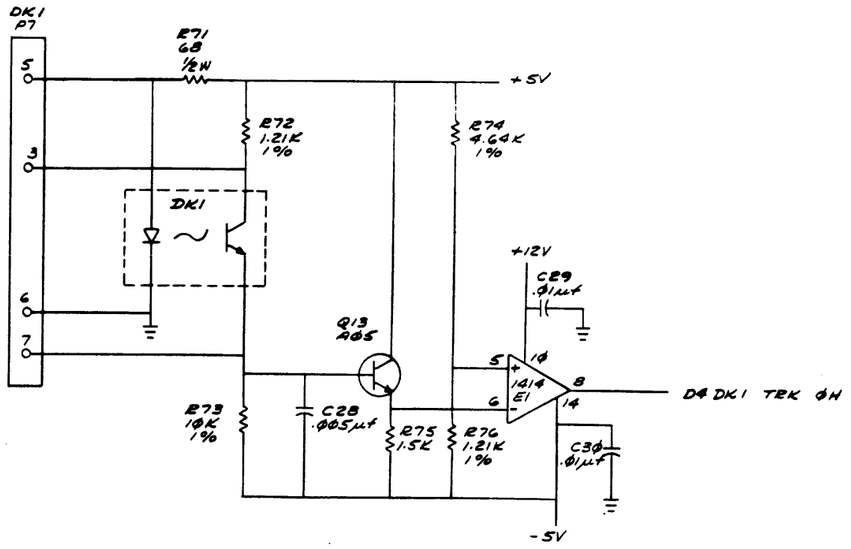

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE	CODE	NUMBER	REV.
READ / WRITE CONTROL (D4)	D	CS	M7727-Ø-1	E
SCALE —	SHEET 4 OF 6	DIST.		

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DS INIT L
DG SEL DK 1 H
DG STEP L
DG OUT H
DG SEL DK Ø H
DG DC LØ L
DS INIT L
+5V
E91 1K
E90 150
7473 E18
7473 E16
7450 E17
7402 E14
7404 E13
75451 E20
75451 E19
75451 E3
75451 E2
E92 150
E93 150
E95 150
E94 150
E96 150
E97 150
E98 150
E99 150
Q17 D44C8
Q18 D44C8
Q19 D44C8
Q20 D44C8
Q21 D44C8
Q22 D44C8
Q23 D44C8
Q24 D44C8
D29
D27
D26
D28
D33
D31
D30
D32
DKØ PA
DK1 PA
DKØ HEAD STEPPER
+24V

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE	CODE	NUMBER	REV.
READ / WRITE CONTROL (D5)	D	CS	M7727-Ø-1	E
SCALE —— SHEET 5 OF 6	DIST.			

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DK0 P8
R111 68 1/2W
+5V
R112 1.21K 1%
R79 1K
R113 4.64K 1%
Q26 A05
74157 E15
D4 DK1 TRK 0 H
D4 DK0 TRK 0 H
D4 DK1 INDX H
D4 DK0 INDX H
DG SEL WT PROT L
DG SEL TRK 0 H
DG SEL INDX H
DG SEL DK 0 H
DG OUT H
DG ERASE H
DG WT GATE H
DG STEP L
D3 RAW DATA L
DG WT DATA H
I.C. SOCKET J1
DG DC LO L
DG SEL DK 1 H
DG ABOVE TK 43 H
DG LOAD HEAD H
DG SEL TRK 0 H
DG SEL INDX H

DK1 P8
R108 68 1/2W
+5V
R109 1.21K 1%
R78 1K
R110 4.64K 1%
Q25 A05
74LS51 E12
R80 1K
R81 1K
+5V
Q14 A05
Q15 A05
DG SEL DK 1 H
7404 E13
DG LOAD HEAD H
DS INIT L
7408 E6
74LS51 E12

+24V
DK0 HEAD LOAD SOLENOID
DK0 PS
D23 IN4004
R82 10Ω 5W
DK1 HEAD LOAD SOLENOID
DK1 PS
D24 IN4004
R83 10Ω 5W

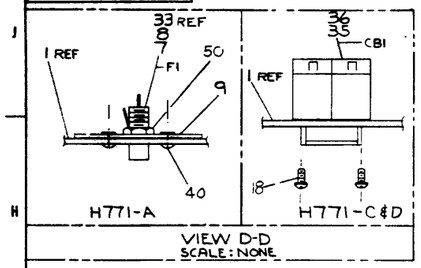
+24V +5V -5V
C33 5Ø µF
C34 15Ø µF
C37-C40 C43-C47 C49-C56 .01 µF
C35 15Ø µF

J2
N/C
-5V
GND
+5V
+24V RETURN
+24V

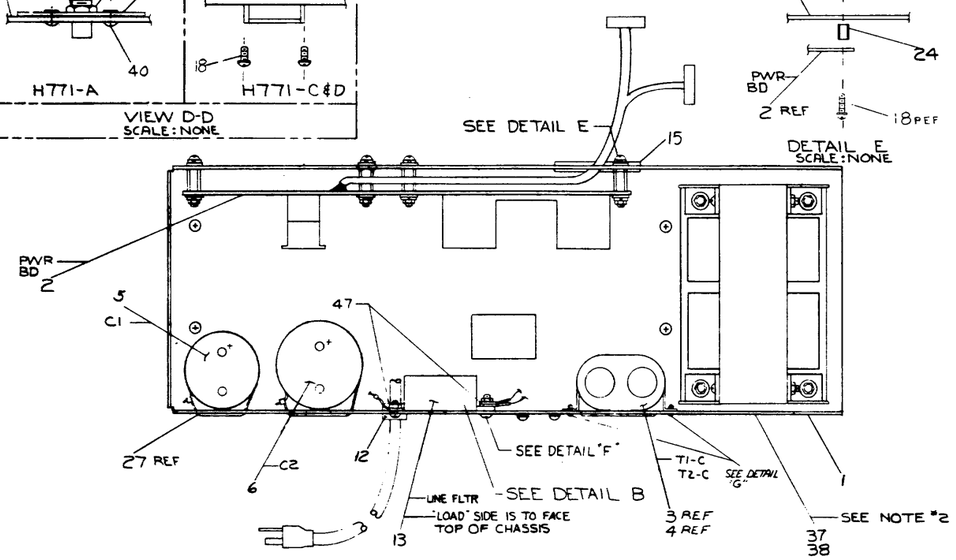
REVISIONS		
CHK	CHANGE NO.	REV.

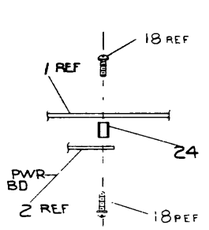
TITLE	SIZE	CODE	NUMBER	REV.
READ / WRITE CONTROL (D6)	D	CS	M7727-Ø-1	E
SCALE	SHEET 6 OF 6	DIST.		

DO NOT SCALE DRAWING

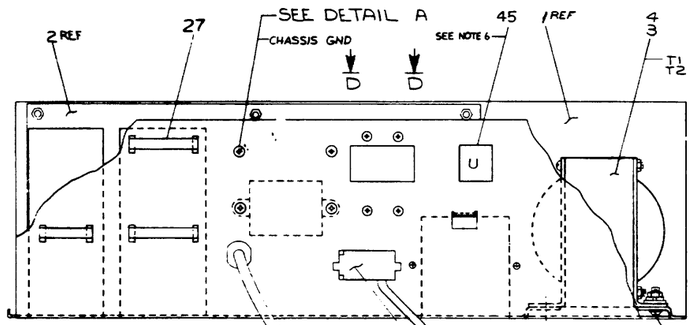


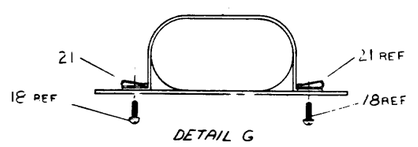
VIEW D-D
SCALE: NONE



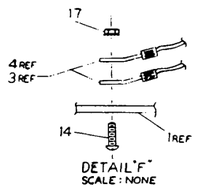


DETAIL E
SCALE: NONE

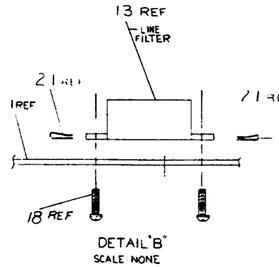




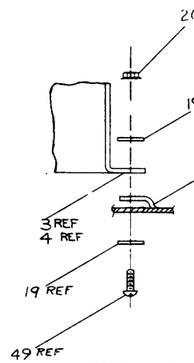
DETAIL G



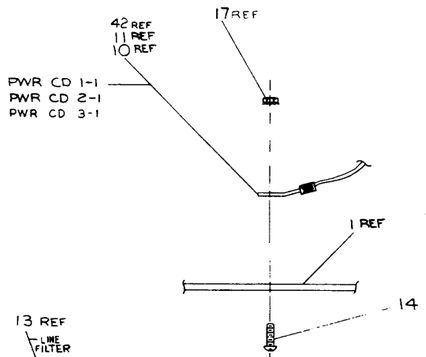
DETAIL 'F'
SCALE: NONE



DETAIL 'B'
SCALE NONE



DETAIL C
SCALE: NONE



DETAIL A
SCALE: NONE
(CHASSIS GND)

NOTES (CONTINUED):

~~4. ALL "SHRINK TUBING" (ITEM #34) IS TO BE 5 IN LONG SO THAT IT COMPLETELY COVERS EXPOSED METAL PORTIONS OF FASTONS WHERE IT IS USED (NOT USED ON CONN "T1-T2").~~

5. USE "TIE WRAPS" (ITEM #41) APPROXIMATELY EVERY 1.5 IN. WHEN NECESSARY.
6. LOCATE DECAL (ITEM #45) APPROXIMATELY AS SHOWN.

NOTES:

1. CAPACITORS DESIGNATED "T1-C" & "T2-C" ARE SUPPLIED WITH THE "TRANSFORMER ASSYS" (ITEMS # 3 & 4) ALONG WITH PROTECTIVE COVERS TO BE PLACED ON TOP OF THE CAPACITOR.
2. LOCATE DECAL ON THIS SURFACE.
3. PLACE "SHRINK TUBING" (ITEM #33) OVER "FUSE HOLDER" (ITEM #7) SO THAT BOTH TERMINALS ARE COMPLETELY COVERED.

LEGEND

NUMBER VARIATION	TITLE	VOLTAGE RANGE	VARIATIONS ITEM DESIGNATION	VARIATIONS PART NUMBER
H771-A	RXØ1 POWER SUPPLY, 60 HZ	90-132 V	POWER HARNESS	7010696-2
H771-C	RXØ1 POWER SUPPLY, 50HZ	90-126 V	POWER HARNESS	7010696-2
			CIRCUIT BREAKER, 3.5 AMPS	1212873-01
		100-132 V	POWER HARNESS	7010696-1
			CIRCUIT BREAKER, 3.5 AMPS	1212873-01
H771-D	RXØ1 POWER SUPPLY, 50HZ	180-240V	POWER HARNESS	7010696-4
			CIRCUIT BREAKER, 1.75 AMPS	1212873-00
		200-264V	POWER HARNESS	7010696-3
			CIRCUIT BREAKER, 1.75 AMPS	1212873-00

H771-C	H771-D	H771-A			
1	1	1	CAPACITOR BRACKET	1211236-01	48
2	2	2	DECAL	3612680-01	47
1	1	–	JUMPER, 5 1/2", BRN	7010972-06	46
–	–	1	DECAL, UL	3612063-00	45
~~A~~	~~A~~	~~–~~	~~SCR 6-32 - .25L~~	~~9000596-1~~	~~44~~
1	–	–	DECAL VOLTAGE H771-C	A-DC-7414250	43
1	–	–	POWER CORD 115V	C-AD-7001697-3	42
6	6	6	TIE, CABLE	9007031-00	41
–	–	4	RIVET, POP, .125 DIA	9006458-00	40
1	1	–	JUMPER, 5 1/2", BLU	D-AD-7010972-5-0	39
–	1	–	DECAL, VOLTAGE, H771-D	A-DC-7413251-0-0	38
–	–	1	DECAL, VOLTAGE, H771-A	A-DC-7413403-0-0	37
1	–	–	CIRCUIT BREAKER, 3.5A	1212873-01	36
–	1	–	CIRCUIT BREAKER, 1.75 A	1212873-00	35
A/R	A/R	A/R	SHRINK TUBING, .25 DIA	9107253-09	34
–	–	A/R	SHRINK TUBING, .75 DIA	9107250-09	33
–	1	–	HARNESS, POWER, 180-264 V	D-AD-7010696-4-0	32
–	1	–	HARNESS, POWER, 200-264 V	D-AD-7010696-3-0	31
1	–	1	HARNESS, POWER, 90-126 V	D-AD-7010696-2-0	30
1	–	–	HARNESS, POWER, 100-132 V	D-AD-7010696-1-0	29
2	2	2	~~WASHER, EXT TOOTH, #10~~	~~9006761-00~~	~~28~~
4	4	4	TIE, CABLE	9009350-00	27
~~16~~	~~16~~	~~16~~	~~WASHER, SPLIT LOCK, #6~~	~~9007801-00~~	~~26~~
~~6~~	~~6~~	~~6~~	~~NUT, HEX, 4-40~~	~~9006588-00~~	~~25~~
6	6	6	SPACER, 1/2" - 6-32	9006851-00	24
~~12~~	~~12~~	~~12~~	~~WASHER, FLAT~~	~~9006658-00~~	~~23~~
~~6~~	~~6~~	~~6~~	~~SCR, PHL PAN HD 6-32 X .25 LG~~	~~9000597-00~~	~~22~~
4	4	4	NUT, SPRING	9006584-00	21
4	4	4	NUT, KEPS, 8-32	9010154-00	20
8	8	8	WASHER FLAT, SOD S/ST, 10 X.032 THK	9006666-00	19
20	20	20	SCR, SEMS 6-32 X 5/16	9010155-00	18
2	2	2	NUT, KEPS 10-32	9006565-00	17
~~2~~	~~2~~	~~2~~	~~WASHER, SPLIT LOCK #10~~	~~9007806-00~~	~~16~~
A/R	A/R	A/R	GROMMET, CATERPILLAR	9007035-00	15
2	2	2	SCR, PHL PAN HD 10-32 X .38 LG	9006071-01	14
1	1	1	LINE FILTER	1212877-00	13
1	1	1	STRAIN RELIEF	9008492-02	12
–	1	–	POWER CORD, 230 V	G-AD-7010697-2-0	11
–	–	1	POWER CORD 115 V	C-AD-7006971-1-0	10
–	–	1	FUSE MTG BRKT	C-TB-7413344-0-0	9
–	–	1	FUSE, 2A SB	9007216-00	8
–	–	1	FUSE HOLDER	1211638-00	7
1	1	1	CAP, 18,000 uF, +25V	1011693-00	6
1	1	1	CAP, 14,000 uF, +40 V	1010187-00	5
–	–	1	TRANSFORMER ASSY, 50 HZ	D-AD-7010704-0-0	4
–	–	1	TRANSFORMER ASSY, 60 HZ	D-AD-7010680-0-0	3
1	1	1	POWER BOARD ASSY	D-AD-7010718-0-0	2
1	1	1	CHASSIS, POWER SUPPLY	E-MD-7412647-0-0	1
H771-C	H771-D	H771-A			
4	4	4	WASHER, LCK, INT TOOTH #8	9000636	51
–	–	1	WASHER, LCK, INT TOOTH #8	9008980	50
4	4	4	SCR PHL PAN HD 8-32 X .50 LG	9006039-01	49

FIRST USED ON OPTION/MODEL	QTY.	QTY.	DESCRIPTION	PART NO.	ITEM NO.
RXØ1			PARTS LIST		

DIMENSIONAL TOLERANCE
DIMENSIONS ARE ■■■■■ UNLESS OTHERWISE SPECIFIED

MILLIMETER	INCHES	ANGLES
X ± 0.5	X ± .02	■■° ■■'
.X ± 0.25	.XX ± .010	
.XX ± 0.13	.XXX ± .005	

THIRD ANGLE PROJECTION

REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓

MATERIAL: SEE PARTS LIST
FINISH

DRAWN 9-20-78
CHECKED 9-20-78
ENGR APPD 9-20-78
MFG APPD 9-20-78
NEXT HIGHER ASSY: B-DD-H771-0-0
SCALE 1 TO 1
SHEET 1 OF 1

digital

TITLE: H771 POWER SUPPLY ASSY

SIZE	CODE	NUMBER	REV.
E	UA	H771-0-0	F

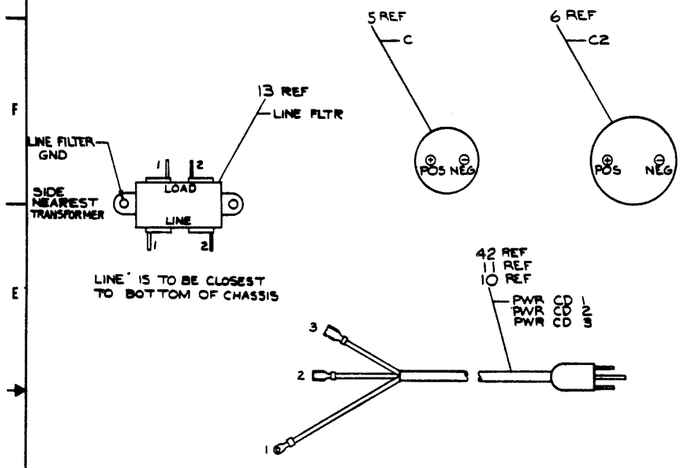
DIST

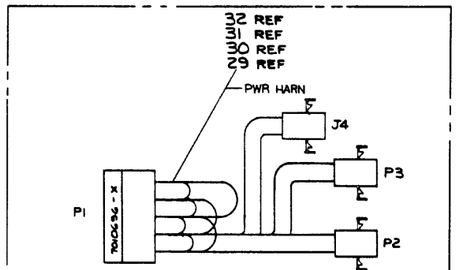
H771-0-0 F

203

ITEM NO	DESCRIPTION AWG	COLOR	FROM CONNECTION	WITH	TO CONNECTION	WITH	REMARKS
10	18	GRN	PWR CD 1-1	—	CHASSIS GND	—	
	18	WHT	PWR CD 1-2	—	LINE FLTR-LINE 2	—	
	18	BLK	PWR CD 1-3	—	LINE FLTR-LINE 1	—	
2	14	RED	PWR BD-P3	—	C1-POS	—	
	14	BLK	PWR BD-P5	—	C2-NEG	—	
	14	ORN	PWR BD-P4	—	C2-POS	—	
	14	BLK	PWR BD-P6	—	C1-NEG	—	
29-32	—	—	PWR HARN-P1	—	T1-J1	—	
3	—	—	T1-P1	—	PWR BD-J1	—	
	20	RED	T1-P2	—	T1-C	—	
	20	RED	T1-P3	—	T1-C	—	
	18	GRN/YEL	T1-P4	—	LINE FILTER-GND	—	
	18	GRN/YEL	T1-P5	—	LINE FILTER-GND	—	
	18	BLK	T1-P7	—	F1-2	33	SEE NOTE 3/4
	18	WHT	T1-P6	—	LINE FLTR-LOAD 2	—	
	18	BLK	T1-P8	—	LINE FLTR-LOAD 1	—	
	18	BLK	T1-P9	—	F1-1	33	SEE NOTE 3

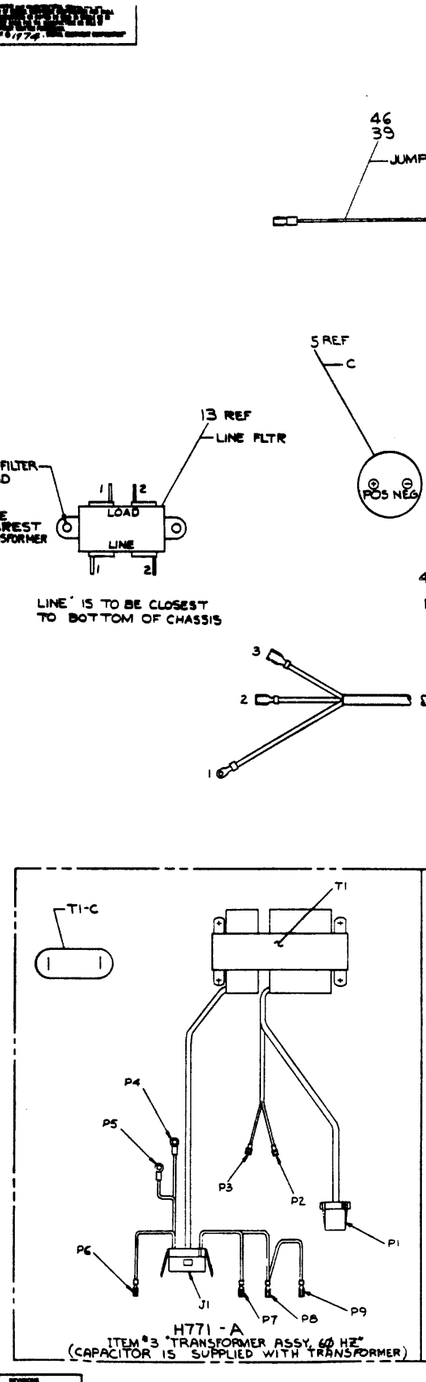
ITEM NO	DESCRIPTION AWG	COLOR	FROM CONNECTION	WITH	TO CONNECTION	WITH	REMARKS
11	18	GRN/YEL	PWR CD 2-1	—	CHASSIS GND	—	
	18	BLU	PWR CD 2-2	—	LINE FLTR-LINE 2	—	
	18	BRN	PWR CD 2-3	—	LINE FLTR-LINE 1	—	
2	14	RED	PWR BD-P3	—	C1-POS	—	
	14	BLK	PWR BD-P5	—	C2-NEG	—	
	14	ORN	PWR BD-P4	—	C2-POS	—	
	14	BLK	PWR BD-P6	—	C1-NEG	—	
29-32	—	—	PWR HARN-P1	—	T2-J1	—	
4	—	—	T2-P1	—	PWR BD-J1	—	
	20	RED	T2-P2	—	T2-C	—	
	20	RED	T2-P3	—	T2-C	—	
	18	GRN/YEL	T2-P4	—	LINE FILTER-GND	—	
	18	GRN/YEL	T2-P5	—	LINE FILTER-GND	—	
	18	BLU	T2-P6	—	CB1-CONTACT-LOAD	—	
	18	BRN	T2-P7	—	CB1-LOAD	—	
	18	GRN/YEL	T2-P8	—	CB1-SHUNT	—	
35	18	BLU	LINE FLTR-LOAD 2	—	CB1-CONTACT-LINE	—	
46	18	BRN	LINE FLTR-LOAD 1	—	CB1-CONTACT-LINE	—	



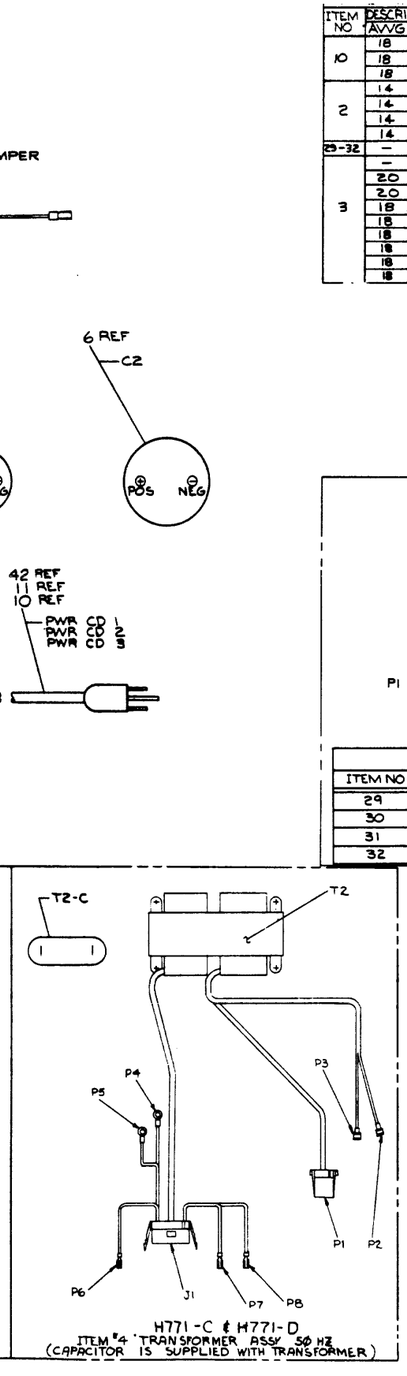


VOLTAGE TABLE (P1)

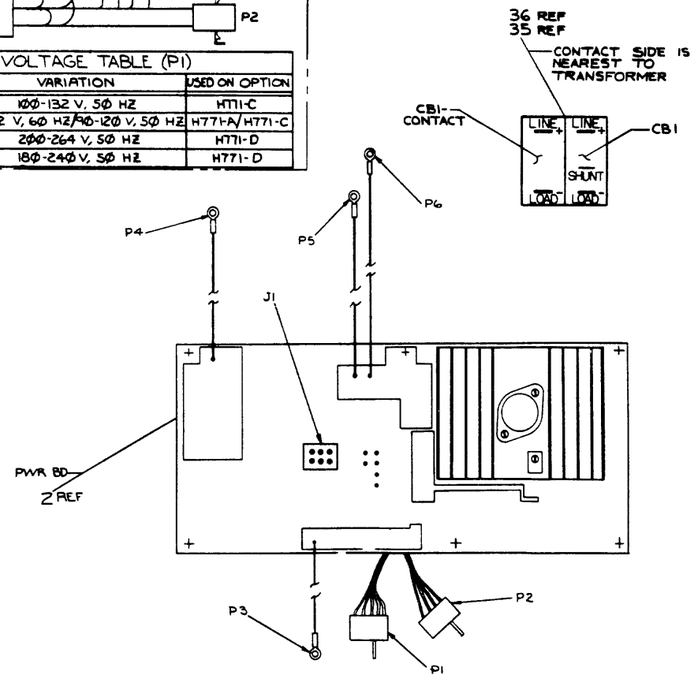
ITEM NO	VARIATION	USED ON OPTION
29	100-132 V, 50 HZ	H711-C
30	90-132 V, 60 HZ/90-120 V, 50 HZ	H771-A/H771-C
31	200-264 V, 50 HZ	H771-D
32	180-240 V, 50 HZ	H771-D

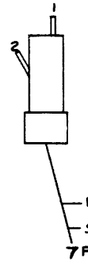


H771-A
ITEM #3 "TRANSFORMER ASSY, 60 HZ"
(CAPACITOR IS SUPPLIED WITH TRANSFORMER)



H771-C & H771-D
ITEM #4 "TRANSFORMER ASSY 50 HZ
(CAPACITOR IS SUPPLIED WITH TRANSFORMER)





REVISIONS		
ORD	CHANGE NO	REV

TITLE	SCALE	SHEET 2 OF 2	SYSTEM CODE	NUMBER	REV
H771 POWER SUPPLY ASSY			E UA	H771-0-0	F
			DIST.		

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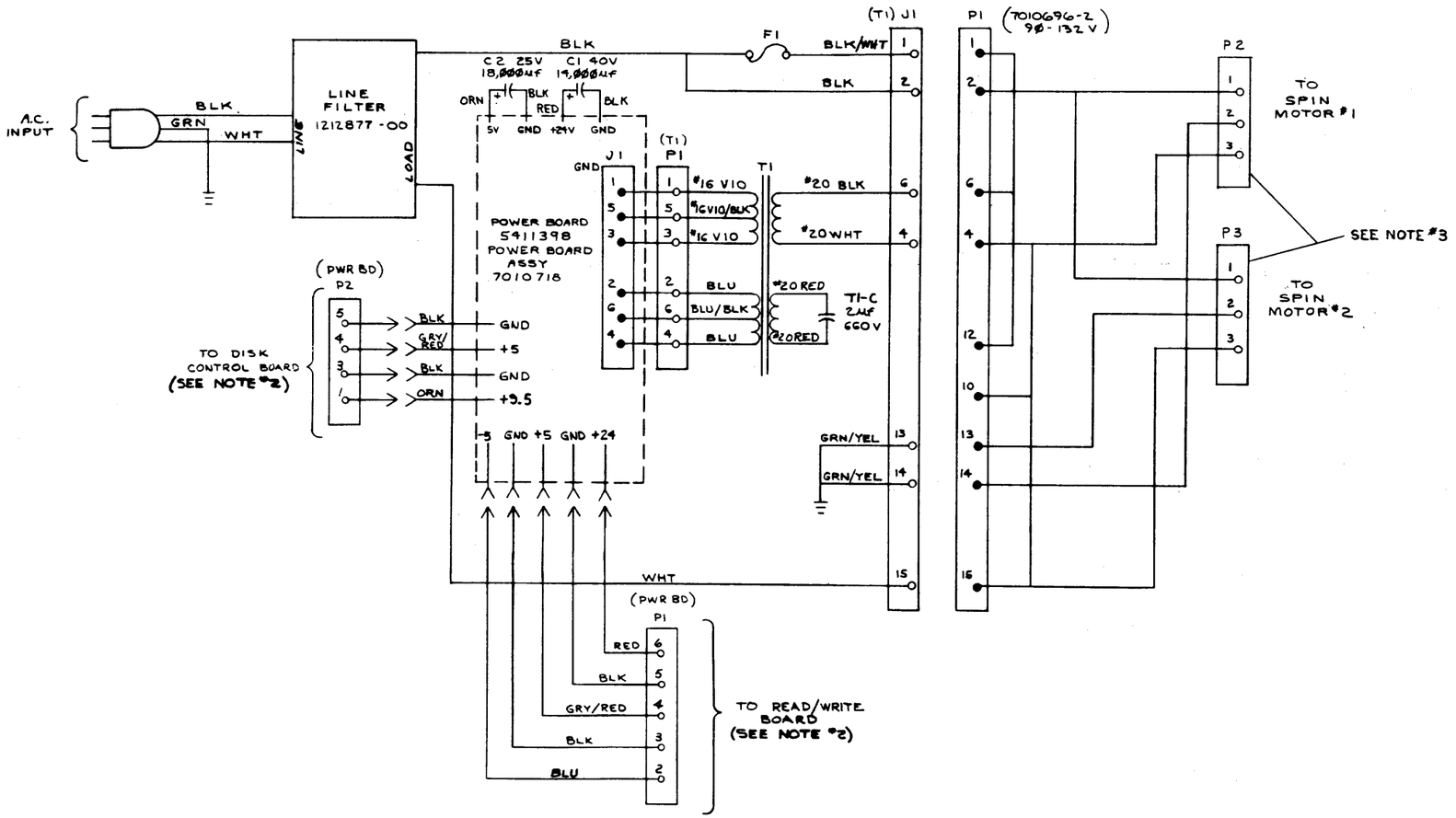
NOTES:
1. ALL WIRE TO BE #18 AWG UNLESS OTHERWISE SPECIFIED.
2. SLOT BETWEEN P1-4 + P1-5 CONTAINS A DUMMY PIN. SLOT BETWEEN P2-4 + P2-5 ALSO CONTAINS A DUMMY PIN.
3. NO DOUBLE CRIMPS ARE ALLOWED IN MOLEX CONNECTOR(S) TO MOTOR(S).



REVISIONS			
ENGR	CHANGE NO.	REV.	
BM	H771-00001	A	2-20-76 B. HAZEN
BM	H771-00004	B	3-12-76 B. HAZEN

DRN. D.E. Olsen	1/22/75	FIRST USED ON RXØ1
CHK'D WFM Cook	2/10/75	digital
ENG. Bill Hazen	2-18-75	TITLE H771-A POWER CONNECTIONS
PROJ. ENG.	2-18-75	
PROD.	3/14/75	
NEXT HIGHER ASSY.		
B-DD-H771-Ø		SIZE D CODE CS NUMBER H771-A-1 REV. B
SCALE NONE		
SHEET 1 OF 1		DIST.

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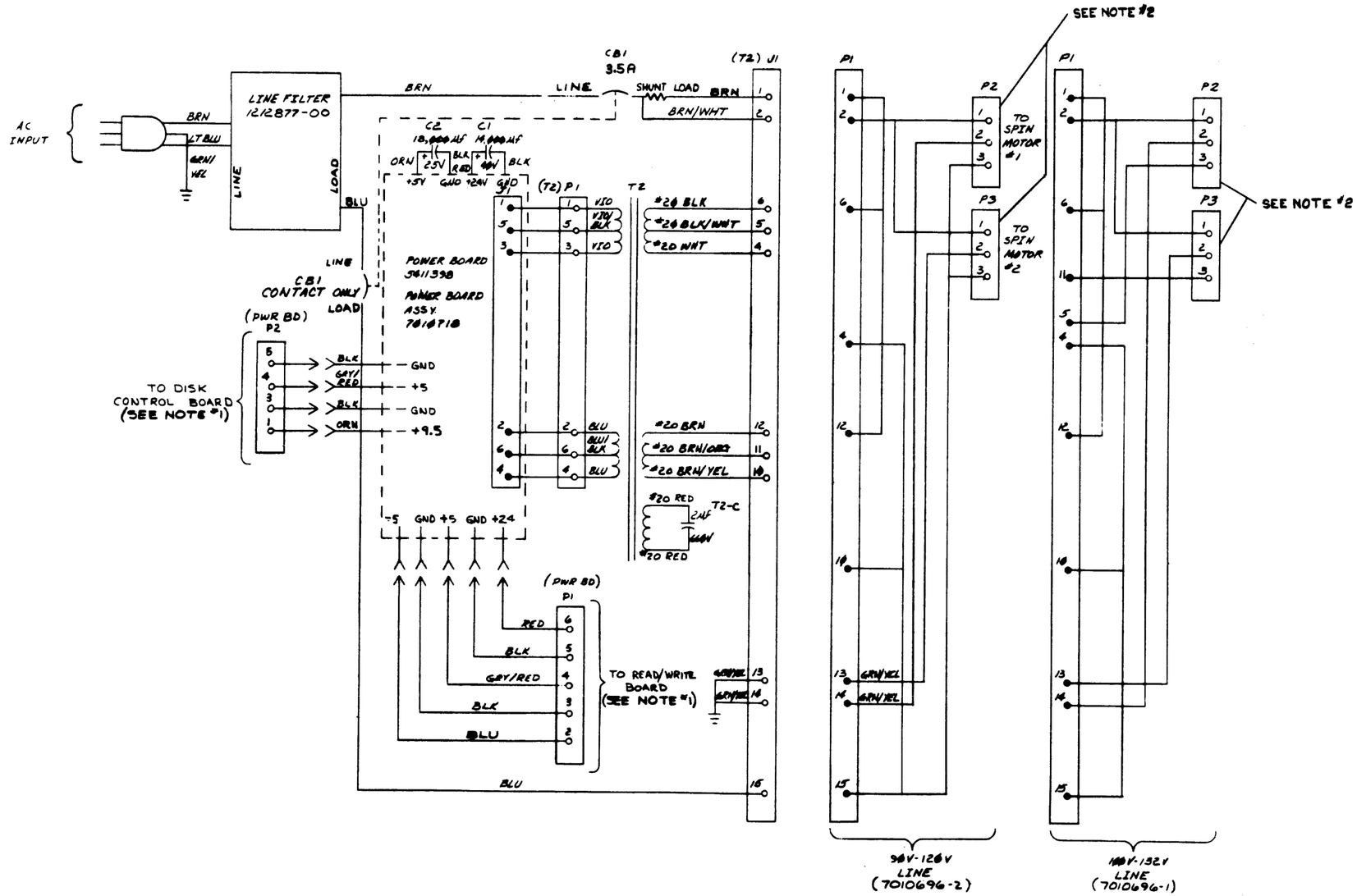
NOTES:
1. SLOT BETWEEN P1-4 AND P1-5 CONTAINS A DUMMY PIN. SLOT BETWEEN P2-4 AND P2-5 ALSO CONTAINS A DUMMY PIN.
2. NO DOUBLE CRIMPS ALLOWED IN MOLEX CONNECTOR(S) TO MOTOR(S).
3. ALL WIRES TO BE #18 AWG UNLESS OTHERWISE SPECIFIED.



REVISIONS		
ECO	CHANGE NO.	REV.
—	H771-00001	*
	ORIGINATED	
20	H771-00002	A
	B. HAZEN	
30	H771-00003	B
	B. HAZEN	
40	H771-00004	C
	B. HAZEN	

DRN.		7-31-75
CHK.	E REMOND	8-5-75
ENGR.		8-12-75
PROJ. ENGR.		9-12-75
PROD.		9-12-75
NEXT HIGHER ASSY.	B-DD-H771-0	
SCALE		
SHEET	1 OF 1	

FIRST USED ON: RXØ1
SIZE D | CODE CS | NUMBER H771-C-1 | REV. C
DIST.

TITLE: H771-C POWER CONNECTIONS

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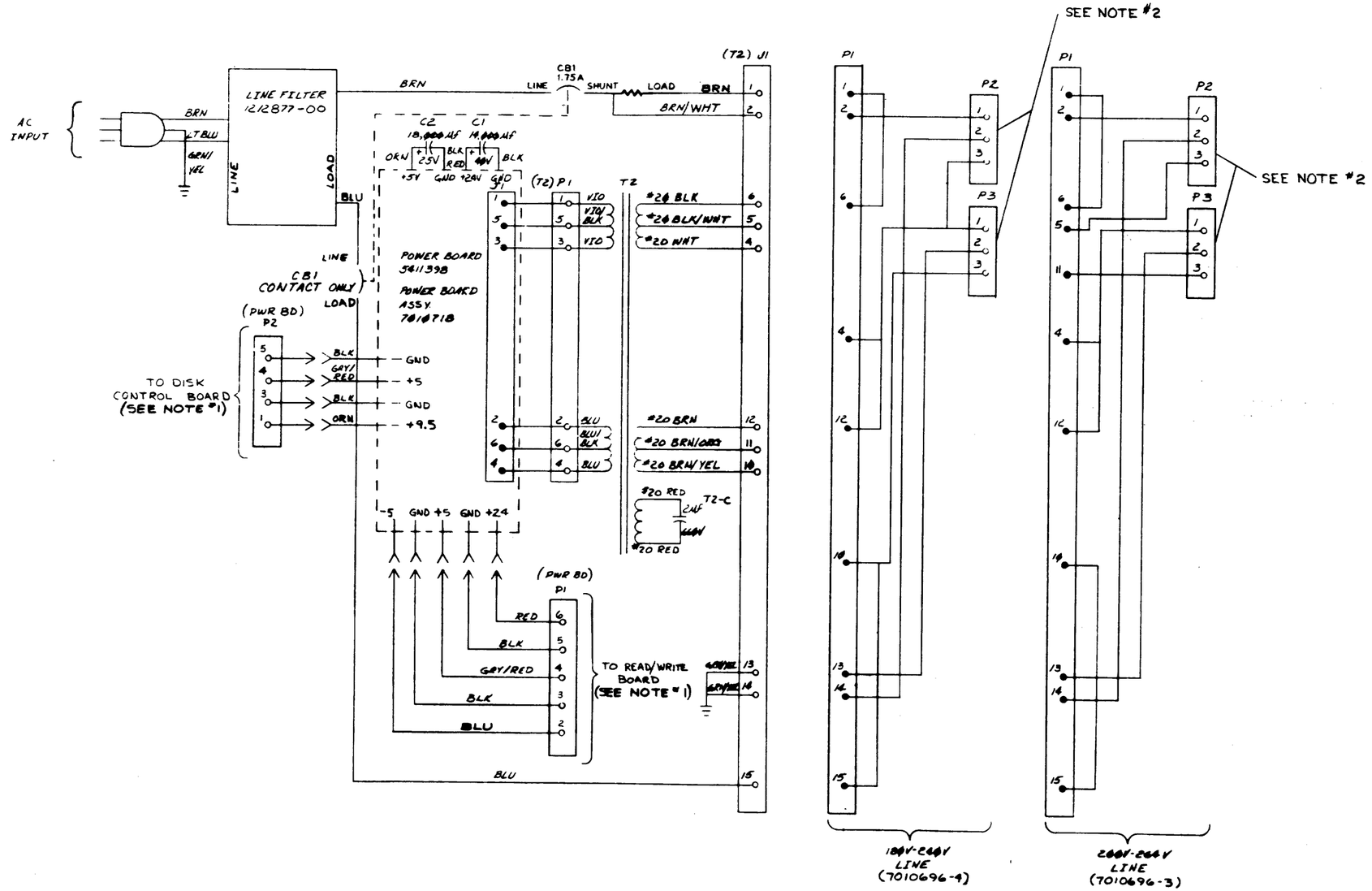
NOTES:
1. SLOT BETWEEN P1-4 AND P1-5 CONTAINS A DUMMY PIN. SLOT BETWEEN P2-4 AND P2-5 ALSO CONTAINS A DUMMY PIN.
2. NO DOUBLE CRIMPS ALLOWED IN MOLEX CONNECTOR(S) TO MOTOR(S).
3. ALL WIRES TO BE #18AWG UNLESS OTHERWISE SPECIFIED.



REVISIONS			
SYM	CHANGE NO.		REV.
—	H771-00001	ORIGINATED	*
A	H771-00002	2 Wrong 43 AWG 15 B. HAZEN	A
B	H771-00003	A. Yen 8 Oct 75	B
C	H771-00004	B. HAZEN 12-9-75	C

DRN.	J. Fisher	7-30-75
CHK'D	E. Reimer	8-5-75
ENG.		8-12-75
PROJ. ENGR.		8-12-75
PROD.		8-12-75
NEXT HIGHER ASSY.		
B-DD-H771-0		
SCALE		
SHEET	1 OF 1	

FIRST USED ON: RX01

TITLE: H771-D POWER CONNECTIONS

SIZE	CODE	NUMBER	REV.
D	CS	H771-D-1	C

DIST.

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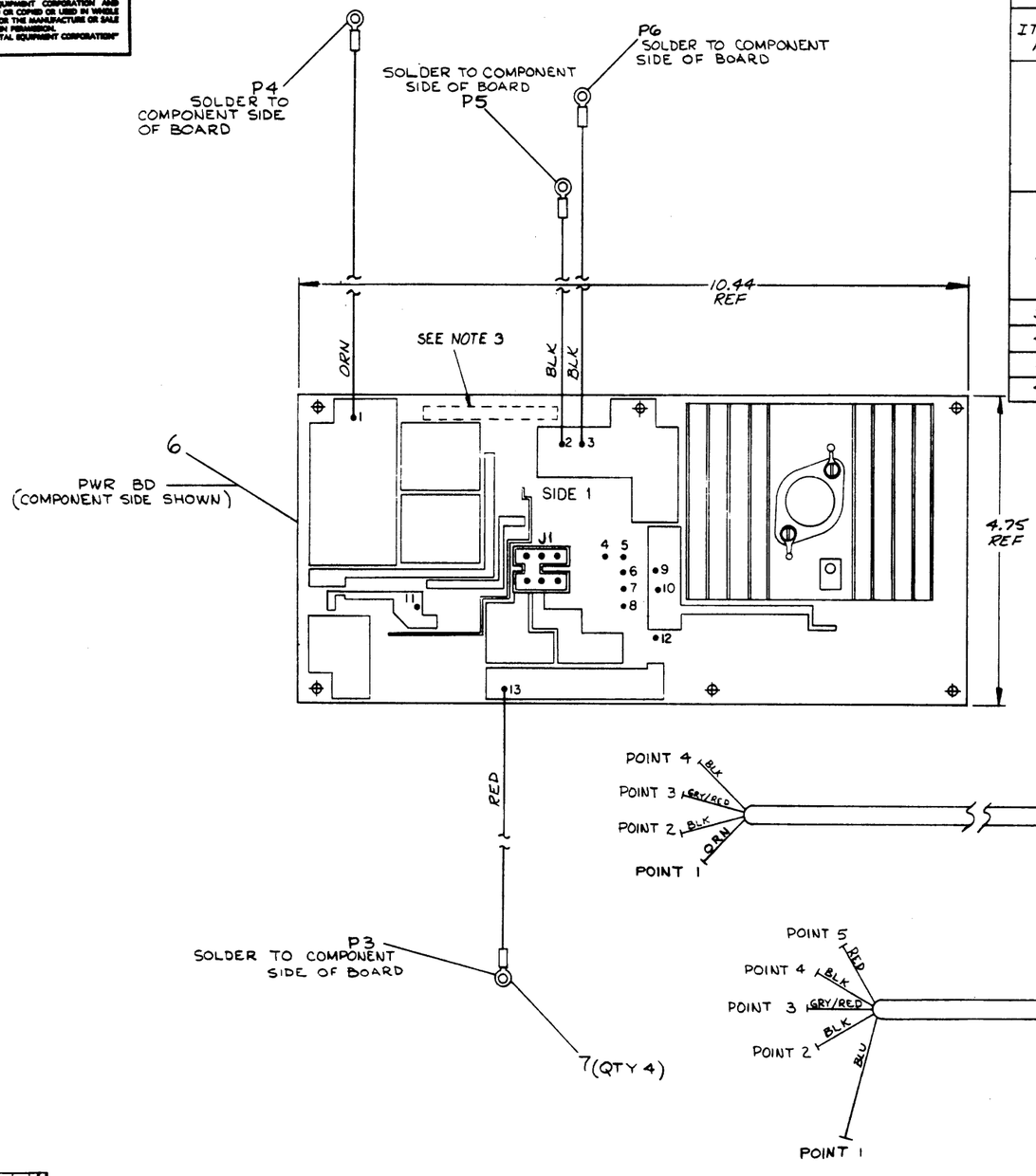

WIRE TABLE

ITEM NO.	DESCRIPTION AWG	DESCRIPTION COLOR	FROM CONN	FROM TERM	TO CONN	TO TERM	LENGTH
1	18	BLU	P1 POINT 1	——	PWR BD #11	SOLDER	——
	↓	BLK	P1 POINT 2	——	PWR BD #6	↓	——
		GRY/RED	P1 POINT 3	——	PWR BD #9		——
		BLK	P1 POINT 4	——	PWR BD #5		——
		RED	P1 POINT 5	——	PWR BD #12		——
2		ORN	P2 POINT 1	——	PWR BD #4		——
		BLK	P2 POINT 2	——	PWR BD #7		——
	↓	GRY/RED	P2 POINT 3	——	PWR BD #10		——
	18	BLK	P2 POINT 4	——	PWR BD #8		——
3	14	RED	P3	ITEM 7	PWR BD #13		13 IN ±.25
4	14	BLK	P5	ITEM 7	PWR BD #2		7 IN ±.25
5	14	ORN	P4	ITEM 7	PWR BD #1	↓	11 IN ±.25
4	14	BLK	P6	ITEM 7	PWR BD #3	SOLDER	9 IN ±.25

NOTES:

1. STRIP LENGTH FOR ITEMS 3, 4 & 5 ARE TO BE .16 LONG.
2. THE BLACK WIRES ON P1 & P2 CAN BE INTERCHANGED BETWEEN POINTS 5, 6, 7, & 8 ON THE POWER BOARD.
3. INK STAMP ASS'Y NO. 7010718 IN [illegible]

4	CONN, SOLDERLESS	9007928-00	7
1	POWER SUPPLY BOARD, RXØ1	D-ES-5411398-0-1	6
A/R	WIRE, #14 AWG, IPVC, ORANGE	9107370-33	5
A/R	WIRE, #14 AWG, IPVC, BLACK	9107370-00	4
A/R	WIRE, #14 AWG, IPVC, RED	9107370-22	3
1	HARNESS, DISK CONTROL BOARD	D-IA-7010853-0-0	2
1	HARNESS, READ/WRITE BOARD	D-IA-7010854-0-0	1

DESCRIPTION	DWG./PART NO.	ITEM NO.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

ANGLES ±0° 30'	BASIS OF ACCURACY (CHECK ONE)	NOMINAL DIMENSION RANGE INCHES: OVER 0 TO 0.2	OVER 0.2 TO 1.2	OVER 1.2 TO 4.0	OVER 4.0 TO 12.0	OVER 12.0 TO 40.0	OVER 40.0 TO 80.0
SURFACE QUALITY IN ✓ MICROINCHES	MEDIUM ☐	±.005	±.009	±.017	±.018	±.024	±.04
	PREFERRED ☐	±.012	±.016	±.026	±.04	±.063	±0.1

QUANTITY & VARIATION

THIRD ANGLE PROJECTION

REMOVE BURRS AND BREAK SHARP CORNERS

DO NOT SCALE DWG

MATERIAL SEE PARTS LIST

FINISH

DRN. T. Quillen 1-28-75
CHK'D A. McCarthy 2/5/75
ENG. [illegible] 3-18-75
PROJ. ENG. [illegible] 3-18-75
PROD. [illegible] 3/18/75
NEXT HIGHER ASSY. E-UA-H771-Ø-Ø
SCALE 1/1
SHEET 1 OF 1

FIRST USED ON H771 digital

TITLE RXØI POWER BOARD ASS'Y

SIZE D | CODE AD | NUMBER 7010718-0-0 | REV. B | DIST.

REVISIONS	CHANGE NO.	REV.
ORIG.	RXØI-00001	A
	H771-00001	B

C. YOUSE 7-14-75
B. HAZEN 2-20-75
D.W. Hyde A.K. 8-12-75

SIZE D | CODE AD | NUMBER 7010718-0-0 | REV. B

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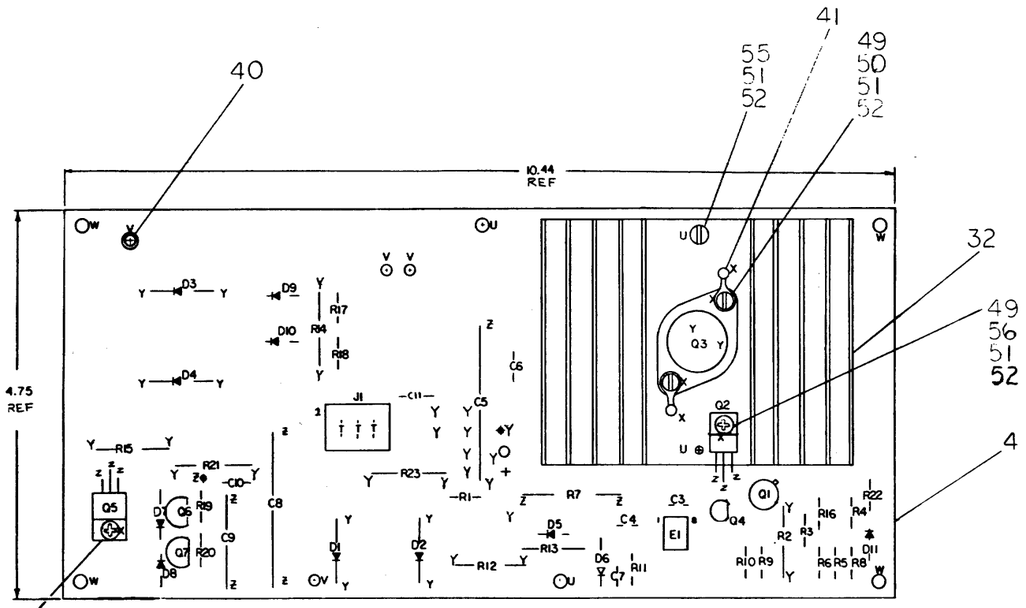
NOTES:

1. UNLESS OTHERWISE SPECIFIED
   A. ALL RESISTORS ARE 1/4W, ± 5%.
2. DOTTED AREAS COMPONENT NOT ON BOARD.
3. AT TIME OF MODULE ASSY, ITEM 49 SHOULD BE APPLIED BENEATH Q2, Q3 & Q5.
4. AT TIME OF ASSEMBLY, Q2,Q3 AND Q5 MOUNTING HARDWARE MUST BE TORQUED TO 4 TO 6 INCH POUNDS.
5. Q4, Q6 AND Q7 OUTLINES CORRESPOND TO GENERAL ELECTRIC TYPE TRANSISTORS.
6. FLAT RECTANGULAR WASHER SUPPLIED BY VENDOR TO BE MOUNTED UNDER Q2 AND Q5 SCREWHEAD.



QTY	REF. DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.
		X-Y COORDINTE HOLE LOCATION	KCO-5411398-0-1	1
REF		ASSY/DRILLING HOLE LAYOUT	D-AH-5411398-0-5	2
REF		MODULE ECO HISTORY	B-MH-5411398-0-6	3
1		ETCHED CIRCUIT BOARD	5011397-00	4
3	C3, C4, C7	CAP .01 µf 100V 20% DISC	1001610-01	5
2	C5, C8	CAP 1000 µf 16V ELEC	1011849-02	6
3	C6, C10, C11	CAP .1 µf 100V 20% DISC.	1000030-00	7
1	C9	CAP 190 µf 12V 10% ELEC	1009433-00	8
2	D1, D2	DIODE A1SB (INS624)	1110420-00	9
2	D3, D4	DIODE MR752	1110615-00	10
1	D5	DIODE IN4744 15V 10%	1105648-00	11
				12
2	D7, D6	DIODE .4MS.121, 5.1V 1%	1105873-00	13
1	D8	DIODE D664	1100114-00	14
2	D9, D10	DIODE IN4004	1105796-00	15
1	D11	DIODE IN754A 6.8V 5%	1109991-00	16
1	E5,	RES 39 1/4 W 5% CC	1302377-00	17
1	E6	RES 470 1/4W 5% CC	1300316-00	18
1	E7	RES .08 5W 3%	1311603-00	19
1	E8	RES 47 1/4W 5% CC	1300202-00	20
1	E9	RES 1M 1/4W 5% CC	1309595-00	21
1	E12	RES 270 2W 5% CC	1305380-00	22
1	E13	RES 511 3/4W 1%	1300324-00	23
1	E14	RES 10 2W 10% CC	1300172-00	24
1	E15	RES 180 1W 5% CC	1300262-00	25
1	E16	RES 10 1/4 W 5% CC	1301317-00	26
				27
1	E18	RES 120 1/4W 5% CC	1300247-00	28
2	E19, E20	RES 1K 1/4W 5% CC	1300365-00	29
1	E22	RES 220 1/4W 5%	1300271-00	30
1	E21	RES 120 1W 5%	1301838-00	31
1		HEAT SINK	1212201-00	32
1	Q1	TRANS DEC 2219-2	1501883-00	33
1	Q2	TRANS D44C3	1510171-01	34
1	Q3	TRANS DEC 3715	1503068-00	35
2	Q4, Q6	TRANS MXAA05	1510705-00	36
1	Q5	TRANS D45H8	1510708-01	37
1	Q7	TRANS MXAA55	1510706-00	38
1	E1	I.C. DEC 301AN	1910282-00	39
4		EYELET	9007836-00	40
2		TERMINAL LUG, SOLDER	9009676-00	41
1	J1	CONNECTOR 6 PIN	1211342-06	42
				43
1	R4	RES 560 1/4W 5% CC	1301890-00	44
1	R23	RES 75 1W 5% CC	1305281-00	45
3	R1, R10, R11	RES 10K 1/4W 5% CC	1300479-00	46
1	R2	RES 390 2W 5% CC	1301864-00	47
1	R3	RES 620 1/4W 5% CC	1303178-00	48
A/R		THERMAL COMPOUND	9008268-00	49
2		SCREW 4-40 X 1/2	9006013-04	50
5		KEPNUT 4-40	9006557-00	51
5		WASHER FLAT 4-40	9006655-00	52
				53
1		SCREW 4-40 X 5/16 (PHILLIPS HD)	9006011-1	54
1		SCREW 4-40 X 7/16	9006012-04	55
1		SCREW 4-40 X 1/2 (PHLLIPS HD)	9006013-1	56
1		RES. 22 1/4 W 5%	1301969-00	57

PARTS LIST

FIRST USED ON OPTION MODEL: RX01

ETCH BOARD REV. D

	IC TYPE	GND	+5V
	301A	4	7

GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY EXCEPTIONS ARE STATED ABOVE

IC PIN LOCATIONS

REV.	CHANGE NO.	CHK.	DATE
C	5411398-0000F		2/1/75
B	5411396-0000		4-3-75
D	5411398-ML003		27 DEC 74
E	5411398 ML004		21 MARCH 75

REVISIONS

DEC NO.	EIA NO.	DEC NO.	EIA NO.

SEMICONDUCTOR CONVERSION CHART

		DATE
DRN.	Ron Mercer	11/27/74
CHK'D.		1/8/75
ENG.		1/24/75
PROJ. ENG.		1/24/75
PROG.		1-24-75
NEXT HIGHER ASSY		
SCALE		
SHEET	1 OF 2	

digital

TITLE: RX01 POWER SUPPLY

SIZE	CODE	NUMBER	REV.
D	CS	5411398-0-1	E

DIST.

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SEE NOTE 2

J1

D1 A15B
D2 A15B
C1 10000µf 40V
R1 10K
+24V 2A

D11 IN754A 6.8V, 5%
R22 220
R4 560

D3 ME752
D4 ME752
+5V 5A

Q3 DEC3715
R2 390 2W 10%
Q1 DEC 2219-2
Q2 D44C3
R16 10
R5 39
R7 5W 3%
R8 47
R6 470
Q4 MXAA05
R9 1M
R10 10K
C5 1000µf 16V
C6 0.1µf 100V
R23 75 1W

+15V
C4 .01 UF 100V
DEC 3011AN E1
C3 .01 UF 100V
R11 10K

D10 IN4004
D9 IN4004
R3 620
R12 270 2W
R13 511 1/2W 1%
+9.5V 1A RAW DC

C2 10000µf 25V
C11 0.1UF 100V
D5 IN4744 15V ± 10%
D6 .4M5.121 5.1V 1%
C7 .01UF 100
GND

R14 10 2W 10%
Q6 MXAA05
C8 1000µf 16V
R17 22
R18 120
R15 180 1W
Q5 D45H8
C10 .1µf
R19 1K
R20 1K
Q7 MXAA55
D7 .4M5.121 5.1V 1%
D8 D664
R21 120 1W
C9 190µf 12V
-5V .2A

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE	CODE	NUMBER	REV.
RX01 POWER SUPPLY	D	DCS	5411398-0-1	E
SCALE —	SHEET 2 OF 2		DIST.	

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FIELD MAINTENANCE PRINT SET

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TABLE OF CONTENTS

B-TC-MR78-Ø-1	MR78 FIELD MAINTENANCE PRINT SET
B-DD-MR78-Ø	MR78 DRAWING DIRECTORY
D-UA-MR78-Ø-Ø	MR78 UNIT ASSY
A-PL-MR78-Ø	MR78 SHIPPING LIST
D-UA-5412953-0-0	MR78 BD. #1
B-PL-5412953-0-0	MR78 BD. #1
D-CS-5412953-0-1	MR78 BD. #1
D-UA-5412951-0-0	MR78 BD. #2
B-PL-5412951-0-0	MR78 BD. #2
D-CS-5412951-0-1	MR78 BD. #2
A-SP-3700339-0-0	PACKAGING INSTRUCTIONS

UNIT VARIATIONS COVERED BY THIS PRINT SET
MR78-AA
MR78-AB
MR78-BA
MR78-BB
MR78-BC
MR78-BD
MR78-CA
MR78-BE
MR78-BF
MR78-BH

MR78
Field Maintenance Print Set

Digital Equipment Corporation

PRINT SET ORDER NO.
MPØØ552

REVISIONS	REV.	CHG. NO.	DATE

USED ON OPTION/MODEL
MR78

SHEET I OF 1

DRN. G Drayton	DATE 21 Dec 77	TITLE: MR78
CHK'D David Zopf	DATE 14-MAR-78	
PROJ. ENG. David Zopf	DATE 14-MAR-78	
FIELD SERV. Carl Cruz	DATE 21-Mar-78	

digital

SIZE	CODE	NUMBER	REV.
B	TC	MR78-Ø-1	
DIST.			

EN-01124-16-N675-(327)

DRB 124

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DRAWING DIRECTORY

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FOR FIELD MAINTENANCE PRINT SET REFER TO:

B-TC-MR78-Ø-1

UNIT VARIATIONS

VAR	TITLE
MR78-AA	4K X 8 ROM UNBLASTED
MR78-AB	8K X 8 ROM UNBLASTED
MR78-BA	4K X 8 ROM APT. PROTOCAL
MR78-BB	4K X 8 ROM F.S. DIAGNOSTIC AID
MR78-BC	1K X 8 ROM, WORD PROCESSING & COMM
MR78-CA	8K X 8 W/NO ROM CHIPS
MR78-BE	1K X 8 ROM WORD PROCESSING & COS 308
MR78-BF	1K X 8 ROM WORK PROCESSING, COS 308, & COMM
MR78-BH	1K X 8 ROM, BUSINESS PRODUCTS

REVISIONS

REV.	CHANGE NO.	CHK

USED ON OPTION/MODEL: MR78

SHEET 1 OF 3

DRN. GBrayton	DATE 21 Dec 77	
CHK'D. David Zopf	DATE 14 MAR 78	
PROJ. ENG. David Zopf	DATE 14-MAR-78	
PROD. J.H. Swenson	DATE 3/14/78	

TITLE: MR78 DRAWING DIRECTORY

digital

SIZE	CODE	NUMBER	REV
B	DD	MR78-Ø	

DIST.

DRB 106A

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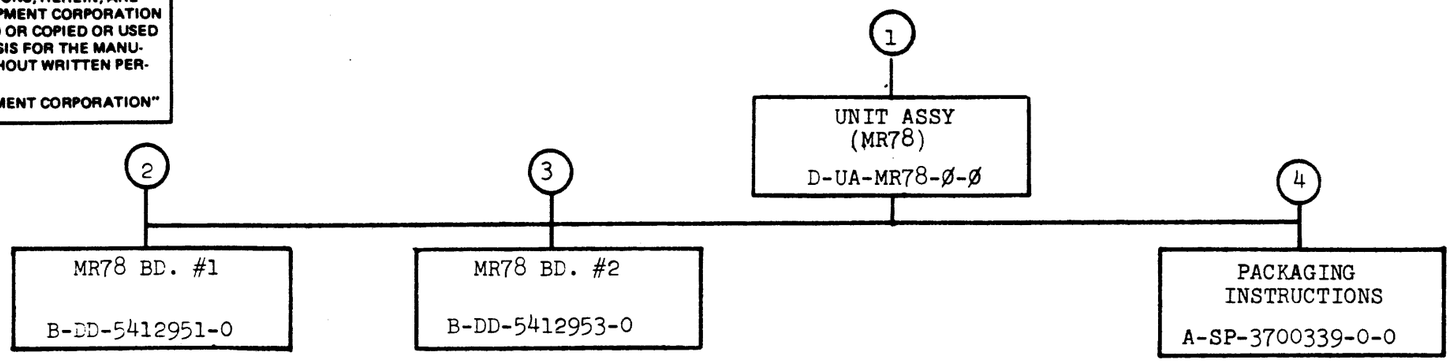

TITLE			SIZE	CODE	NUMBER	REV
MR78 DRAWING DIRECTORY	SHEET 2 OF 3		B	DD	MR78-Ø	

FIND NO.	DRAWING NO.	DESCRIPTION	TYPE
1	MPØØ552	MR78 FIELD MAINTENANCE PRINT SET (MP)	-
	B-TC-MR78-Ø-1	MR78 PRINT SET (TC)	-
	D-UA-MR78-Ø-Ø	UNIT ASSY MR78	E/M
	A-PL-MR78-Ø	MR78 SHIPPING LIST	-
	A-PL-MR78-Ø-2	MR78 ENGINEERING SPEC.	-
	A-SP-3613210-ØØ	ELECTRICAL SERIAL TAG	-
2	B-DD-5412951-Ø	MR78 BD. #1	E/M
3	B-DD-5412953-Ø	MR78 BD. #2	E/M
4	A-SP-3700339-Ø-Ø	PACKAGING INSTRUCTIONS	-

FIND NO.	DRAWING NO.	DESCRIPTION	TYPE

TYPE: E ELECTRICAL
M MECHANICAL
E/M ELECTRO/MECHANICAL

digital

TITLE MR78 DRAWING DIRECTORY

SHEET 3 OF 3 | SIZE B | CODE DD | NUMBER MR78-Ø | REV

DRB 108A

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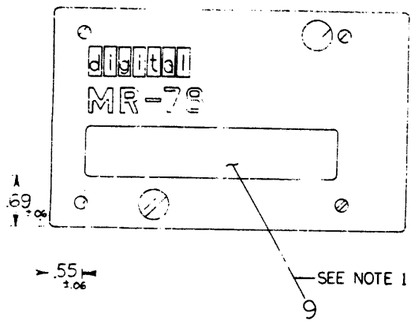
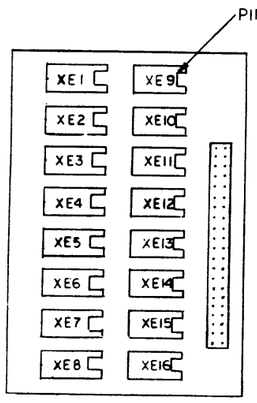
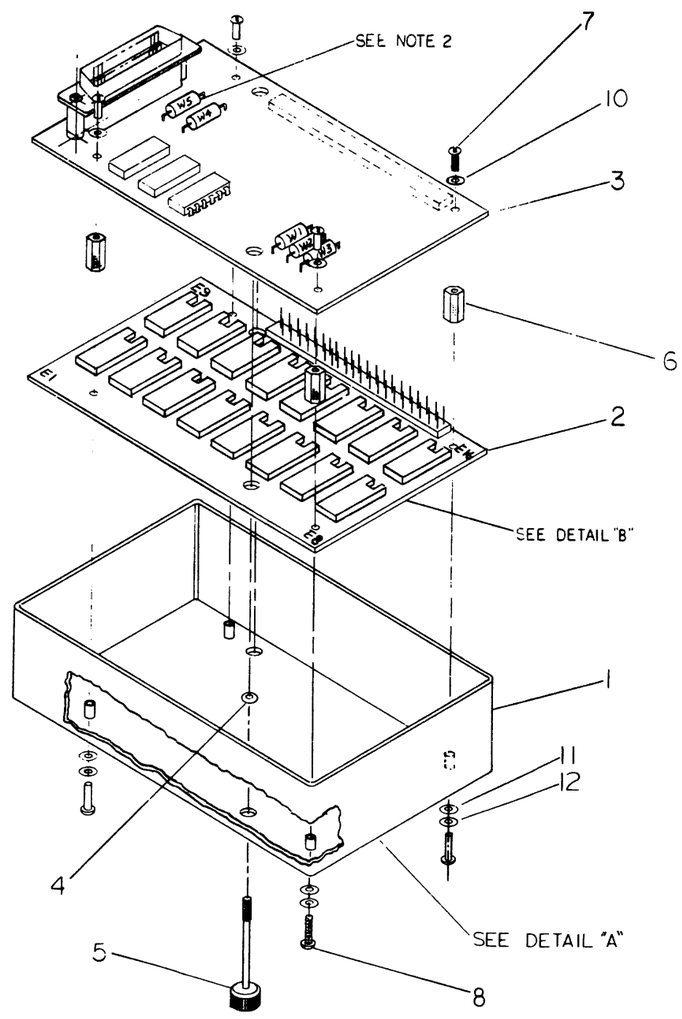
NOTES:
1. LABEL TO BE MARKED WITH MODEL NO. PER C-PL-MR78-Ø-Ø
2. ON EARLY REVISION 5412953, W5 IS NOT PRESENT.



DETAIL "A"



DETAIL "B"
SCALE: NONE



FOR PARTS LIST SEE C-PL-MR78-Ø-Ø

REVISIONS			
CHK	CHANGE NO.	REV.	
AE	MR78-00301	A	27 JUL 77 P GARDNER

DESCRIPTION	DWG./PART NO.	ITEM NO.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		

ANGLES ±0° 30'	CLASS OF ACCURACY (CHECK ONE)	NOMINAL DIMENSION RANGE INCHES: OVER 0 TO 0.2	OVER 0.2 TO 1.2	OVER 1.2 TO 4.0	OVER 4.0 TO 12.0	OVER 12.0 TO 40.0	OVER 40.0 TO 80.0
SURFACE QUALITY IN MICROINCHES	MEDIUM ☐	±.006	±.008	±.012	±.016	±.024	±.04
	PREFERRED ☐	±.012	±.016	±.025	±.04	±.063	±0.1

QUANTITY & VARIATION

THIRD ANGLE PROJECTION

REMOVE BURRS AND BREAK SHARP CORNERS

DO NOT SCALE DWG

MATERIAL SEE PARTS LIST

FINISH N/A

DRN. P. Cushman	7-5-77	FIRST USED ON MR 78
CHK'D [illegible]	9/12/77	digital
ENG. [illegible]	9 Nov 77	
APPROV. ENG. [illegible]	14 Aug 78	TITLE MR 78
PROD. M.E. [illegible]	29 Aug 78	
NEXT HIGHER ASSY.		
SCALE NONE		SIZE D CODE UA NUMBER MR 78-Ø-Ø REV. A
SHEET 1 OF 1		DIST.

MK 1

2/6

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS
PARTS LIST

MADE BY C. Drayton DATE 21 Dec 77	CHECKED David Zopf DATE 3/14/78	SECTION 1
ENG David Zopf DATE 3/14/78	PROD [signature] DATE 3/14/78	ISSUED SECT. 1

QUANTITY VARIATION

ITEM NO.	DWG NO./PART NO.	DESCRIPTION	MR78-AA	MR78-AB	MR78-BA	MR78-BB	MR78-BC	MR78-BD	MR78-CA	MR78-BE	MR78-BF	MR78-BH		
1	MPØØ552	MR78 MAINTENANCE PRINT SET	*	*	*	*	*	*	*	*	*	*		
		*THIS ITEM IS AN OPTION AND IS TO BE												
		SHIPPED ONLY WHEN PURCHASED AS A												
		SEPARATE ITEM.												

TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV	ECO NO.
MR78 SHIPPING LIST	D-UA-MR78-Ø-Ø SHEET 1 OF 1	A	PL	MR78-Ø		

DEC FORM
DRA 110

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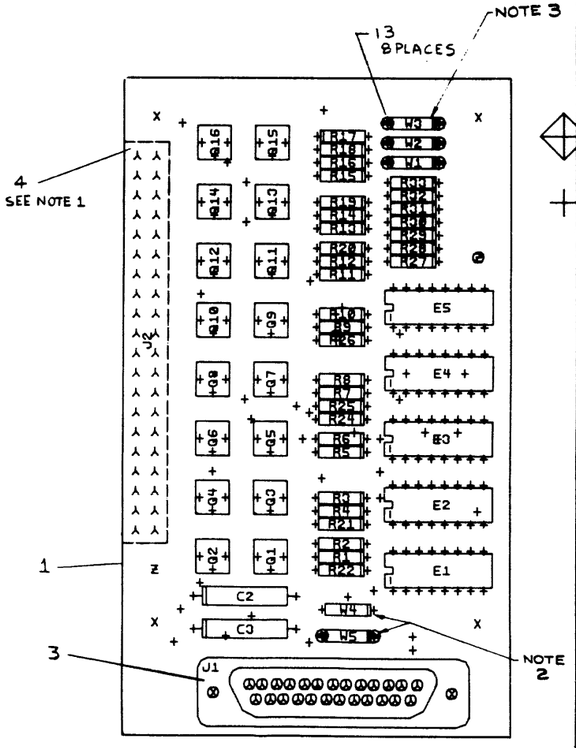
COMPONENT SIDE VIEW



NOTES:
1. J2 MOUNTED ON SIDE 2
2. INSTALL W4 & W5 AT ASSEMBLY.
3. FOR W1, W2 & W3 SEE DWG. D-UA-MR78-0

REV	CHANGE NO	CHK
	ML0031 3A	J. CARTER
		J. KIRK

ETCH REV. C-P2
P.C. DESIGN DATA BASE REV. C

SIGNATURES	DATE
DRN. J CARTER	5 DEC 77
CHK'D.	7 DEC 77
ENG.	4 JAN 78
PROJ. ENG.	4 JAN 78
PROD	5 JAN 78
SCALE 2/1	
SHT. 1 OF 3	
NEXT HIGHER ASSY. B-DD-5412953-Ø	

digital

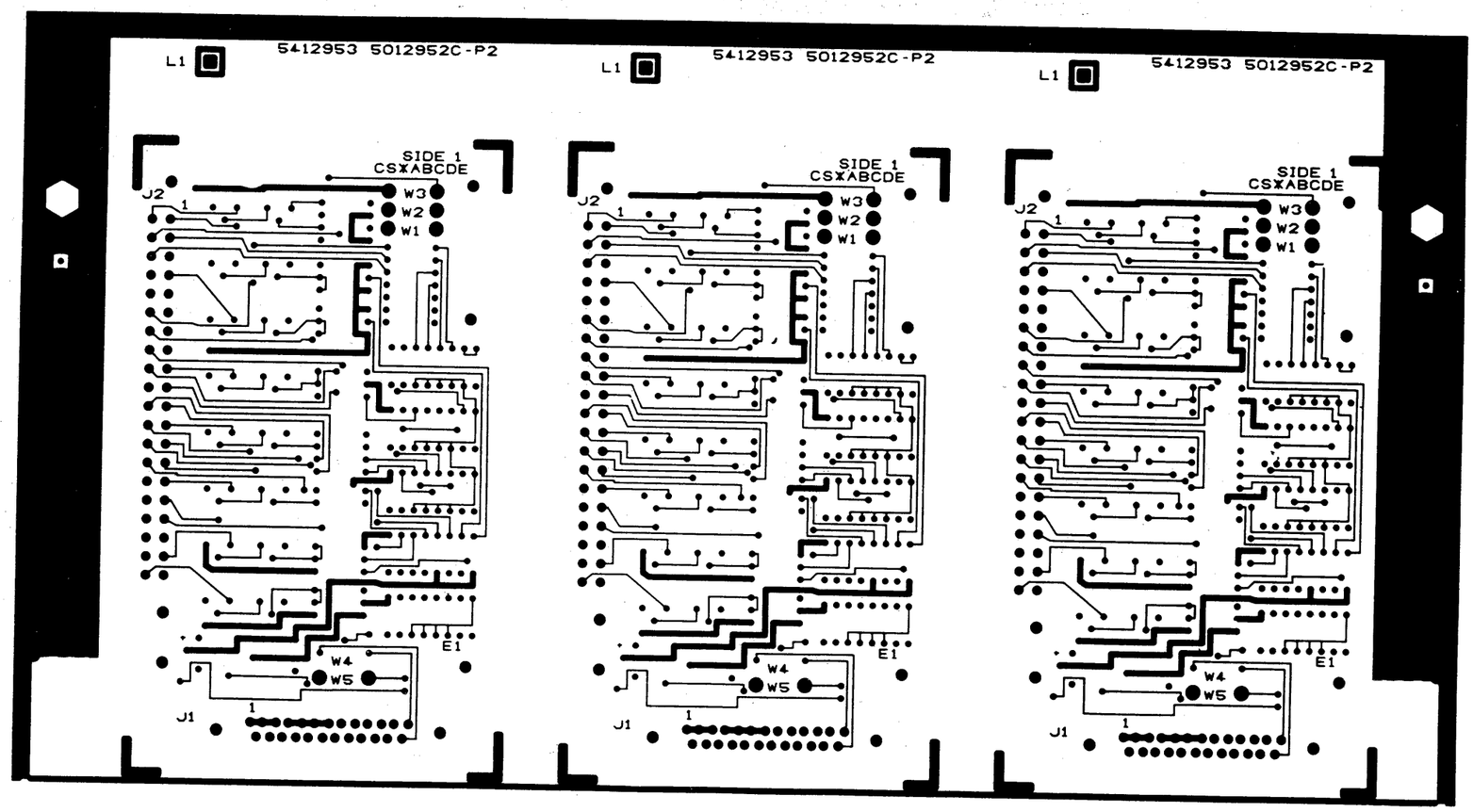
TITLE
MR78 BD#1

SIZE	CODE	NUMBER	REV
D	UA	5412953-Ø-Ø	D

ML 1 MS#

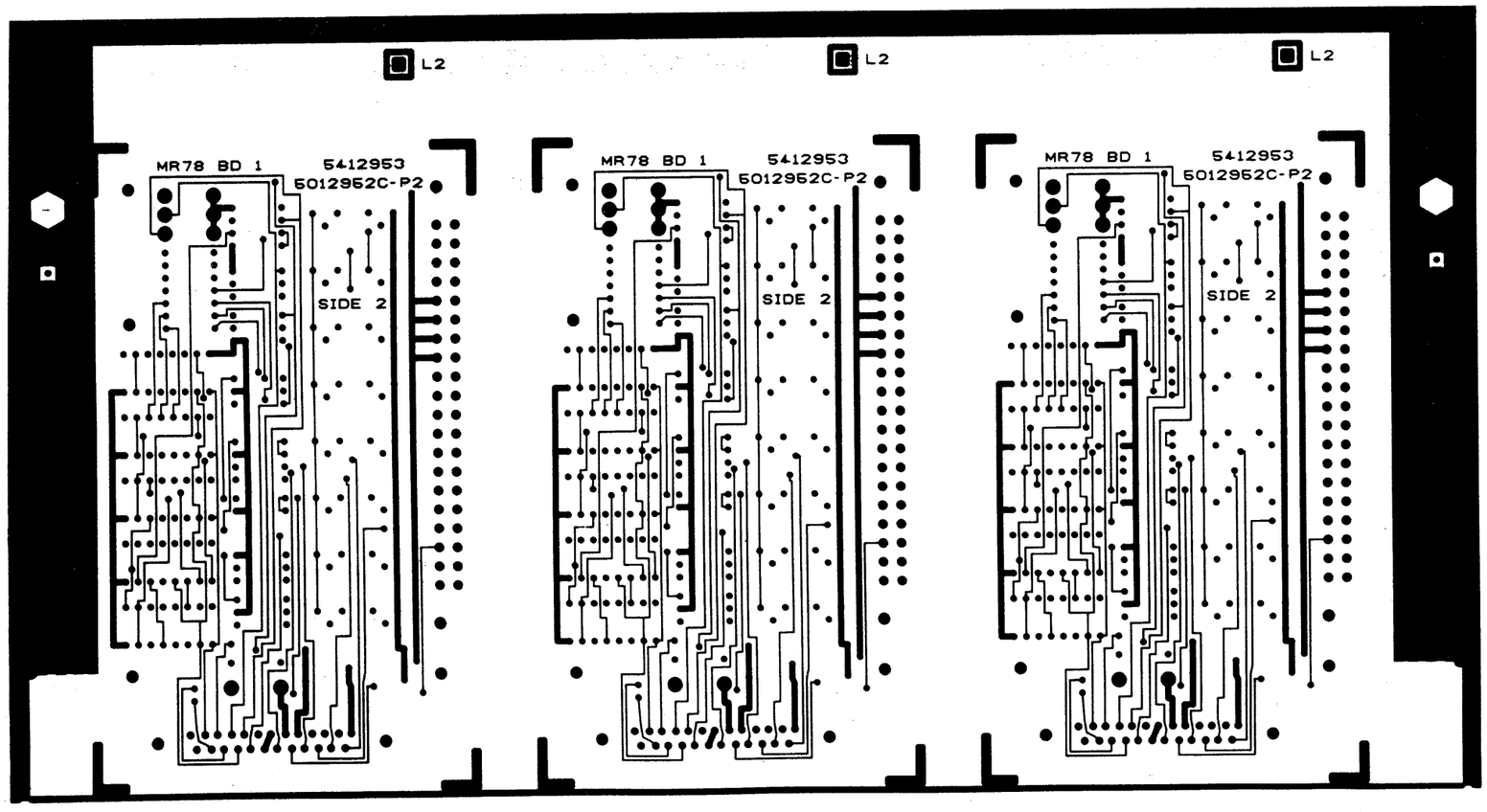
D | UA | 5412953-Ø-Ø | D

©1978



TITLE	SIZE	CODE	NUMBER	REV.
MR78 BD #1	D	UA	5412953-Ø-Ø	D
	SHEET 2/1	SHEET 2 OF 3	DIST	

©1978



MR78 BD #1	SIZE D	CODE UA	NUMBER 5412953-Ø-Ø	REV. D
2/1	SHEET 3 OF 3	DIST		

D UA 5412953-Ø-Ø D

220

AUTOMATED BY PRTLST.2E(3)

P A R T S L I S T

LINE	ITEM	DOCUMENT NUMBER	PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATOR
1	1	D-MD-5012952-0-0	5012952-00	5412953	1	
2	2		1005306-00	6.8MFD 35V 10% S.TANT	2	C2,C3
3	3		1211352-02	CONN,D SUB 25PIN SOCKET PC MNT	1	J1
4	4		1214060-00	HEADER.150 40POS	1	J2
5	5		1301972-00	270 1/4W 5% CC	11	R17,R24-R33
6	6		1300426-00	2.7 K 1/4W 5% CC	12	R2,R4,R6,R8,R10,R12,R14,R16,R18-R21
7	7		1300479-00	10 K 1/4W 5% CC	8	R1,R3,R5,R7,R9,R11,R13,R15
8	8		1503409-00	DEC6534D PNP 310MW SI 40 90	16	Q1-Q16
9	9		9105740-55	*** THIS ITEM IS NOT USED ***	-	
10	10		1912842-00	LS138 DECODER-THREE INPUT,	1	E2
11	11		1912849-00	LS161 COUNTER,SYNCHR,4BIT	4	E1,E3,E4,E5
12	12		9006735-00	EYELET, FUNNEL FLANGE, .059 OD X	8	
13	13		9006407-05	SCREW, NYLON, SLTD ROUND HD, 4-4	4	
14	14		9009306-00	SPACER, FIBER, HEX, 4-40, .250 X	2	
15	15		1301317-00	10 1/4W 5% CC	1	R22
16	16		9107560-01	WIRE,BUSS,22AWG	2	W4,W5

REVISION HISTORY			BASIC PART NO: 5412953											
ENG	ECO NUMBER	REV	SECTION 1 OF 1	DRN: R. KOPPENAL	DATE: 14-AUG-78		D	I	G	I	T	A	L
BHF	00002	C	SECTION.VARIATION INDEX	CHK'D: K. S.	DATE: 14-AUG-78	TITLE: PARTS LIST							
C.L	5412953-ML003	D	[1] 00			MR78 BD #1							
			[2]	DES.ENG: JOHN KIRK	DATE: 14-AUG-78								
			[3]										
			[4]										
			[5]			DOCUMENT NUMBER							
			[6]	RESP.ENG.: JOHN KIRK	DATE: 14-AUG-78	SIZE: K	CODE: PL	NUMBER: 5412953-0-DBP				REV: D	
			[7]										
			[8]										
			[9]	MFG.ENG.: BARRY DAVILLI	DATE: 14-AUG-78								
			[10]										
			[11]	ASSEMBLY NUMBER:				FILE NAME:				EDIT #:	
			[12]	D-UA-5412953-0-0				12953D.PLS				7	

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J1
R22 10Ω
R18 2.7K
R19 2.7K
R20 2.7K
W1
W2
W3
W4
W5
MM L
READ EN H
PI BD L
CHARACTER RDY L

J1 J2
BIT 11 → AC
BIT 10 → AC
BIT 9 → AC
BIT 8 → AC
BIT 7 → AC
BIT 6 → AC
BIT 5 → AC
BIT 4 → AC

J1
RESET L
GET CHARACTER L

R21 2.7K
74LS161 E5
74161 E4
74161 E3
74LS161 E1
D0 D1 D2 D3
R0(1) R1(1) R2(1) R3(1)
CLR LD CLK CNT EN CRY EN CO

74LS138 E2
SEL A SEL B SEL C
D0 D1 D2 D3 D4 D5 D6 D7

(10) 270Ω
R31 R30 R32 R33 R26 R27 R28 R29 R24 R25

C2 6.8UF
C3 6.8UF

J2
ADDR 0
ADDR 1
ADDR 2
ADDR 3
ADDR 4
ADDR 5
ADDR 6
ADDR 7
ADDR 8
ADDR 9
VCC 0
VCC 1
VCC 2
VCC 3
VCC 4
VCC 5
VCC 6
VCC 7

R1 10K
R2 2.7K
R3 10K
R4 2.7K
R5 10K
R6 2.7K
R7 10K
R8 2.7K
R9 10K
R10 2.7K
R11 10K
R12 2.7K
R13 10K
R14 2.7K
R15 10K
R16 2.7K
R17 270

Q1 6534D
Q2 6534D
Q3 6534D
Q4 6534D
Q5 6534D
Q6 6534D
Q7 6534D
Q8 6534D
Q9 6534D
Q10 6534D
Q11 6534D
Q12 6534D
Q13 6534D
Q14 6534D
Q15 6534D
Q16 6534D

REVISIONS			
CHK	CHANGE NO.	REV.	
M	5412953-00001	B	STONEHITTLE GARETH P.GARDNER 16 Aug 78
M	ML0903 & 3A	C	J.CARTER J. KIRK 4 JAN 79

DRN. R. Hayward	5-12-77	FIRST USED ON VT78
CHK.		TITLE MR78 BD #1
ENG.	20-JUL-77	
PROJ. ENG.	20-JUL-77	
PROD.	21-JUL-77	
NEXT HIGHER ASSY. D-UA-5412953-0-0		SIZE D CODE CS NUMBER 5412953-0-1 REV. C
SCALE		
SHEET 1 OF 1		DIST.

DCS 5412953-0-1 REV. C

222 ML

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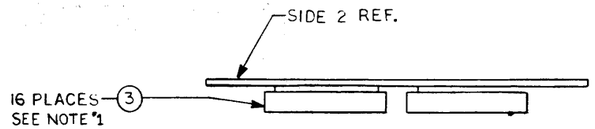
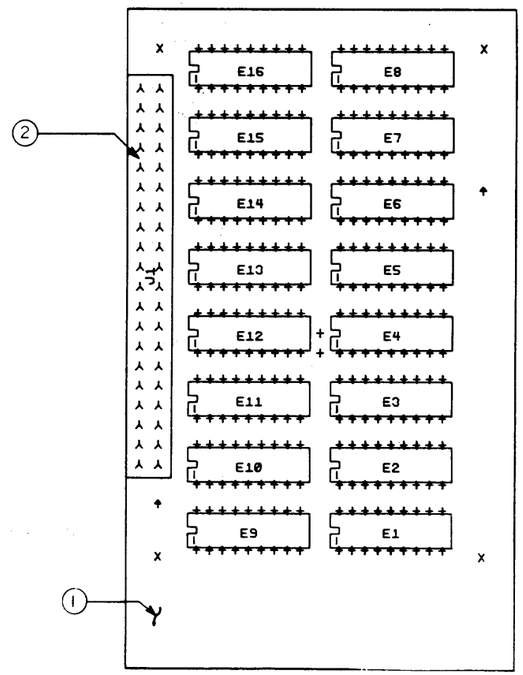
COMPONENT SIDE VIEW





NOTES: 1. REFER TO: C-PL-MR78-0-0 FOR PROMS TO BE USED IN E1-E16.

CHK	CHANGE NO	REV
JM	5412951-1	B

P. GARDNER

ETCH REV.	B
P.C. DESIGN DATA BASE REV.	B

SIGNATURES	DATE
DRN.	
CHK'D.	27-JAN-77
ENG.	27-JAN-77
PROJ. ENG.	27-JAN-77
PROD.	27-JAN-77
SCALE 2/1	
SHT. 1 OF 3	
NEXT HIGHER ASSY. B-DD-5412951-0	

digital

TITLE
MR78 BD *2

SIZE	CODE	NUMBER	REV
D	UA	5412951-0-0	B

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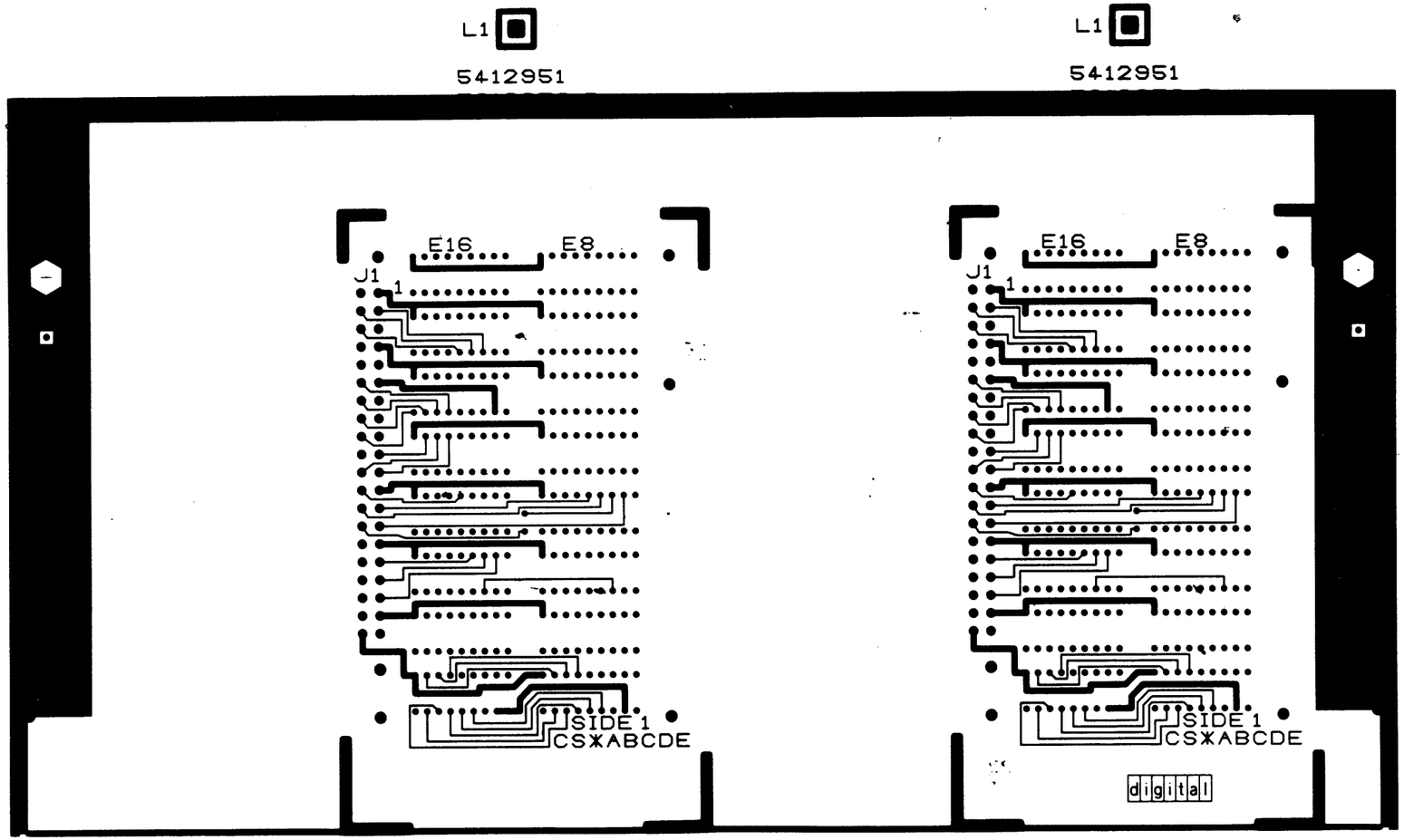

VIEWED FROM SIDE 1

REVISIONS		
CHK	CHANGE NO	REV

TITLE	SIZE	CODE	NUMBER	REV.
MR78 BD* 2	D	UA	5412951 -0-0	B
SCALE 2:1 SHEET 2 OF 3	DIST			

DUA 5412951 -0-0 B

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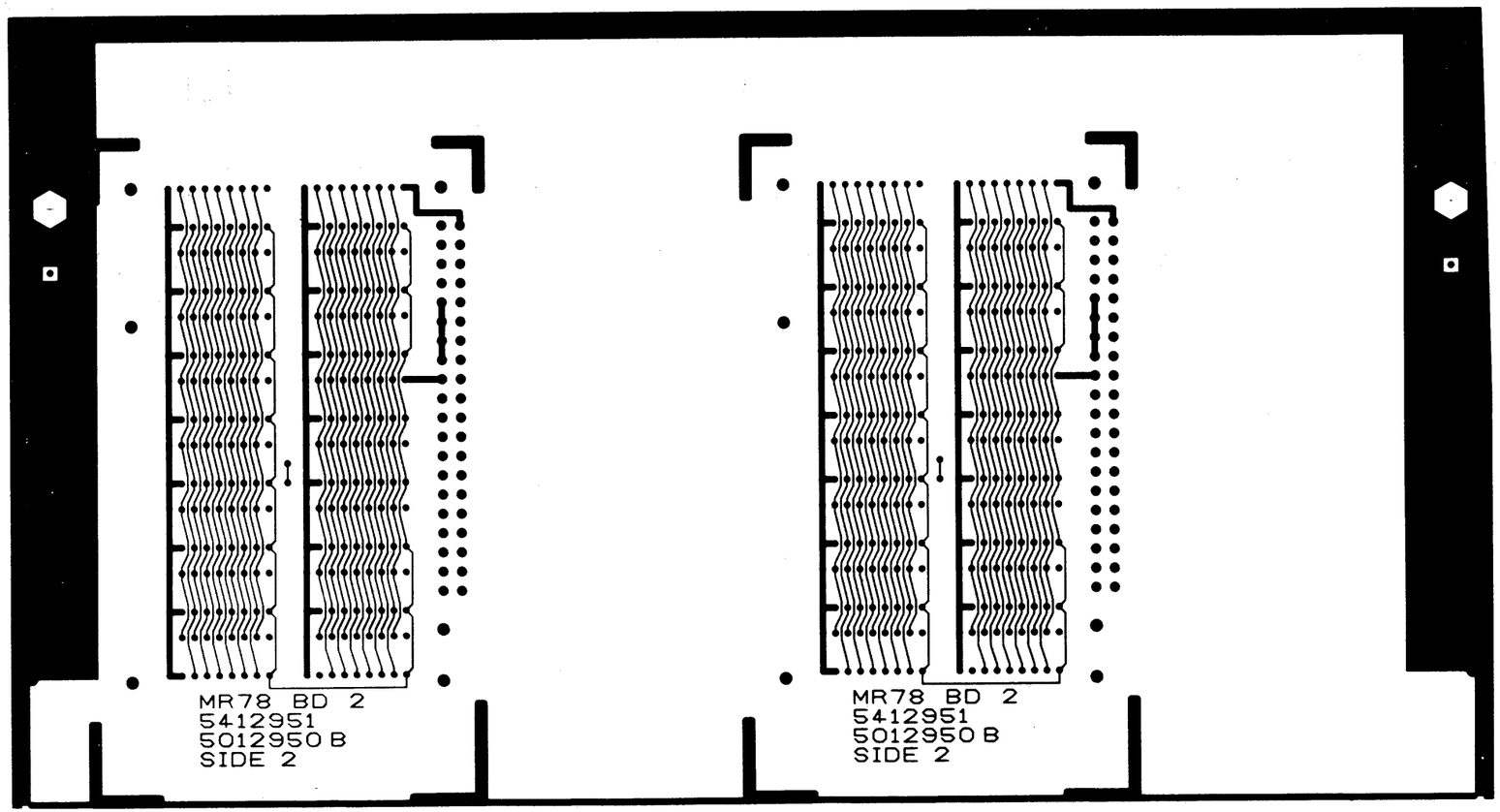
L2



L2

VIEWED FROM SIDE 2

REVISIONS		
CHK	CHANGE NO	REV

TITLE	SIZE	CODE	NUMBER	REV
MR78 BD* 2	D	UA	5412951 -0-0	B
SCALE 2:1 SHEET 3 OF 3	DIST			

DUA 5412951 -0-0 B

DIGITAL EQUIPMENT CORPORATION
PARTS LIST

MADE BY R. KOPPENAL DATE 20 MAY 77	CHECKED DATE 5/21/77	SECTION 1
ENG John Neil DATE 20-JUL-77	PROD Barry Lavelle DATE 21-JUL-77	ISSUED SECTION 1

ITEM NO.	DRAWING NO.	PART NO.	DESCRIPTION	QUANTITY / VARIATION 5412951-0-0	REF DESIGNATION
1	D-MD-5012950-0-0	5012950	ETCHED BOARD	1	
2		1214063	CONN, 40 PIN	1	J1
3		1211666	SOCKET, 18 PIN	16	XE1-XE16
~~4~~	~~23000F1-03~~	~~I.C. 6353~~		~~16~~	~~E1-E16~~

NOTES:

E.C.O. NO. 00001

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TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV.
MR78 BD #2	D-UA-5412951-0-0	B	PL	5412951-0-0	B
	SHEET 1 OF 1	INSERTION PARTS LIST DATA BASE REV B			

DRB 125

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8 7 6 5 4 3 2 1

SIZE D CODE CS NUMBER 5412951-0-1 REV. B

J1 — VCC Ø, VCC 1, VCC 2, VCC 3

J1 — HOLE 4, HOLE 3, HOLE 2, HOLE 1

J1 — HOLE 8, HOLE 7, HOLE 6, HOLE 5

J1 — VCC 4, VCC 5, VCC 6, VCC 7

J1 — ADDR 9, ADDR 8, ADDR 7, ADDR 6, ADDR 5, ADDR 4, ADDR 3, ADDR 2, ADDR 1, ADDR Ø

E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15 E16 — 6353

6353 pin map: A9 A8 A7 A6 A5 A4 A3 A2 A1 AØ; D3 D2 D1 DØ; VCC EN1 EN2

E1 HOLE 4 · E2 HOLE 3 · E3 HOLE 2 · E4 HOLE 1

E5 HOLE 4 · E6 HOLE 3 · E7 HOLE 2 · E8 HOLE 1

E9 HOLE 8 · E10 HOLE 7 · E11 HOLE 6 · E12 HOLE 5

E13 HOLE 8 · E14 HOLE 7 · E15 HOLE 6 · E16 HOLE 5

E4 ADDR 9 · E12 ADDR 8 · E3 ADDR 7 · E11 ADDR 6 · E2 ADDR 5 · E10 ADDR 4 · E1 ADDR 3 · E9 ADDR 2 · E8 ADDR 1 · E7 ADDR Ø

E16 ADDR 9 · E15 ADDR 8 · E14 ADDR 7 · E13 ADDR 6 · E12 ADDR 5 · E11 ADDR 4 · E10 ADDR 3 · E9 ADDR 2 · E6 ADDR 1 · E5 ADDR Ø

REVISIONS			
	CHANGE NO.	REV.	
CHK	1241295I-COOOI	B	STEVE HIRE 1-JUN-78
		C	P GARDNER 4 APR 78

DRN. P. Kyparal	5-9-77	FIRST USED ON VT78
CHK. M. Rice	5/25/77	TITLE MR78 BD #2
ENG.	29-JUL-77	
PROJ. ENG.	29-JUL-77	
PROD.		
NEXT HIGHER ASSY.		
D-UA-5412951-C-0		SIZE D CODE CS NUMBER 5412951-0-1 REV. B
SCALE		
SHEET 1 OF 1		DIST.

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DIGITAL EQUIPMENT CORPORATION
MAYNARD MASSACHUSETTS

PACKAGING INSTRUCTION — REV: _____ DATE: _____

TITLE: INSTR PKG MEMORY MR78

LEGEND	
3700339-00	MR78-AA
-01	-AB
-02	-BA
-03	-BB
-04	-BC
-05	-BD
-06	MR78-CA
-07	-BH

MATERIAL REQUIREMENTS

3700339-00 (MR78-AA)

Quantity	Purchase Specification No.	Description
1	9906182-02	Die-Cut Carton W/Foam
1 ft	9905729	Tape, Carton Sealing
1	3615060-00	Label

3700339-01 (MR78-AB)

1	9906182-02	Die-Cut Carton W/Foam
1 ft	9905729	Tape, Carton Sealing
1	3615060-01	Label

3700339-02 (MR78-BA)

1	9906182-02	Die-Cut Carton W/Foam
1 ft	9905729	Tape, Carton Sealing
1	3615060-02	Label

ENG	APPD	SIZE	CODE	NUMBER	REV
R.H.P. Spinelli 29 Jul 78	L.J. Nielsen 1-25-78	A	SP	3700339-0-0	

DEC 8-(551)-1031-1-R671
DRA - 129

SHEET 1 OF 4

PACKAGING INSTRUCTION — CONTINUATION SHEET

TITLE: INSTR PKG MEMORY MR78 (Cont)

Quantity	Purchase Specification No.	Description
	3700339-03 (MR78-BB)	
1	9906182-02	Die-Cut Carton W/Foam
1 ft	9905729	Tape, Carton Sealing
1	3615060-03	Label
	3700339-04 (MR78-BC)	
1	9906182-02	Die-Cut Carton W/Foam
1 ft	9905729	Tape, Carton Sealing
1	3615060-04	Label
	3700339-05 (MR78-BD)	
1	9906182-02	Die-Cut Carton W/Foam
1 ft	9905729	Tape, Carton Sealing
1	3615060-05	Label
	3700339-06 (MR78-CA)	
1	9906182-02	Die-Cut Carton W/Foam
1 ft	9905729	Tape, Carton Sealing
1	3615060-06	Label
	3700339-07 (MR78-BH)	
1	9906182-02	Die-Cut Carton W/Foam
1 ft	9905729	Tape, Carton Sealing
1	3615060-07	Label

R.H.P. Spinelli	L.J. Nielsen 1-25-78	SIZE A	CODE SP	NUMBER 3700339-0-0	REV

DEC8-1031

SHEET 2 OF 4

PACKAGING INSTRUCTION — CONTINUATION SHEET

TITLE: INSTR PKG MEMORY MR78

PACKAGING INSTRUCTIONS

Step	Procedure
1.	Open Die-Cut Carton (9906182-00) and remove top piece of Convoluted Foam (9906182-01).
2.	Place MR78 Memory inside Carton, approximately in center.
3.	Reposition Convoluted Foam inside Carton.
4.	Close Die-Cut Carton (flap inside) and tape using Carton Sealing Tape (9905729).
5.	Fix appropriate Label (3615060-XX) on Die-Cut Carton. *Make sure that the label variation agrees with the memory serial no. variation.*

R.H.P. Spinelli	L.J. Nielsen 1-25-78	SIZE A	CODE SP	NUMBER 3700339-0-0	REV

DEC8-1031

SHEET 3 OF 4

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PACKAGING INSTRUCTION — REV: _____ DATE: _____

TITLE: INSTR PKG MEMORY MR78

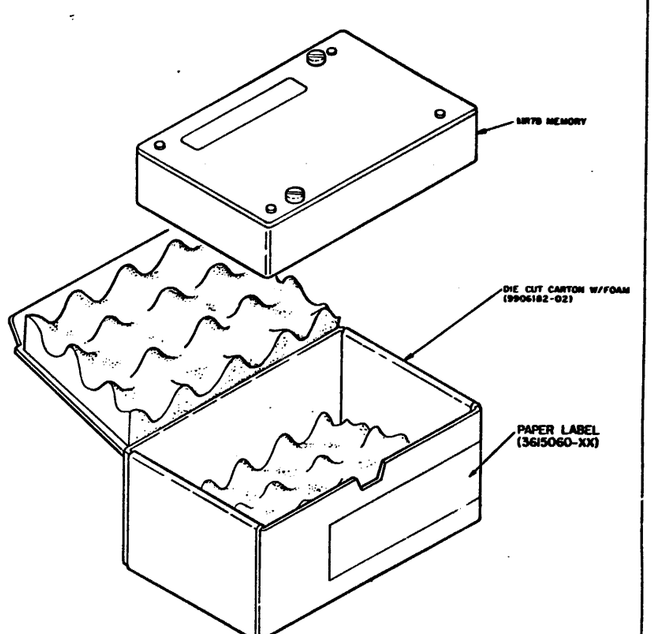

FIGURE 1

PACKAGED DIMENSIONS & WEIGHTS

	U.S.A.	METRIC
WEIGHT	1.0 lb	0.45 KILO
LENGTH	7.75 in	197 mm
WIDTH	4.88 in	124 mm
HT	3.25 in	83 mm
UBC	0.07 cu ft	0.002 cu m
DENSITY	14.29 lb/cu ft	229 Kg/cu m

NOTE:
Make changes on "C" size original only and rephotograph.

ENG.	APPD.	SIZE	CODE	NUMBER	REV.
R.H.P. Spinelli 29 Jul 78	L.J. Nielsen 28 Jul 78	A	SP	3700339-0-0	

DEC-108

SHEET 4 OF 4

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FIELD MAINTENANCE PRINT SET

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TABLE OF CONTENTS

B-TC-DP78-0-1	DP78
D-UA-DP78-0-0	DP78 UNIT ASSY
B-PL-DP78-0-0	DP78
D-UA-5413542-0-0	DP78 INTERFACE BOARD
D-CS-5413542-0-1	DP78 INTERFACE BOARD
B-DD-5413542-0	DP78 INTERFACE BOARD
K-PL-5413542-0-DBP	DP78 INTERFACE BOARD
D-UA-5413540-0-0	DP78 COMM BOARD
D-CS-5413540-0-1	DP78 COMM BOARD
B-DD-5413540-0	DP78 COMM BOARD
K-PL-5413540-0-DBP	DP78 COMM BOARD

UNIT VARIATIONS COVERED BY THIS PRINT SET
DP78-0-0

DP78
Field Maintenance Print Set

Digital Equipment Corporation

FOR PRINT SET
ORDER NO. MP00710

REV.

SIZE B | CODE TC | NUMBER DP78-0-1

REVISIONS

REV	CHG. NO.	DATE

USED ON OPTION/MODEL	
DP78	

SHEET 1 OF 1

DRN. A. COLON	DATE 10CT78	TITLE: DP78
CHK'D	DATE	
PROJ. ENG.	DATE	
FIELD SERV.	DATE	

SIZE	CODE	NUMBER	REV.
B	TC	DP78-0-1	

DIST.

DRB 124

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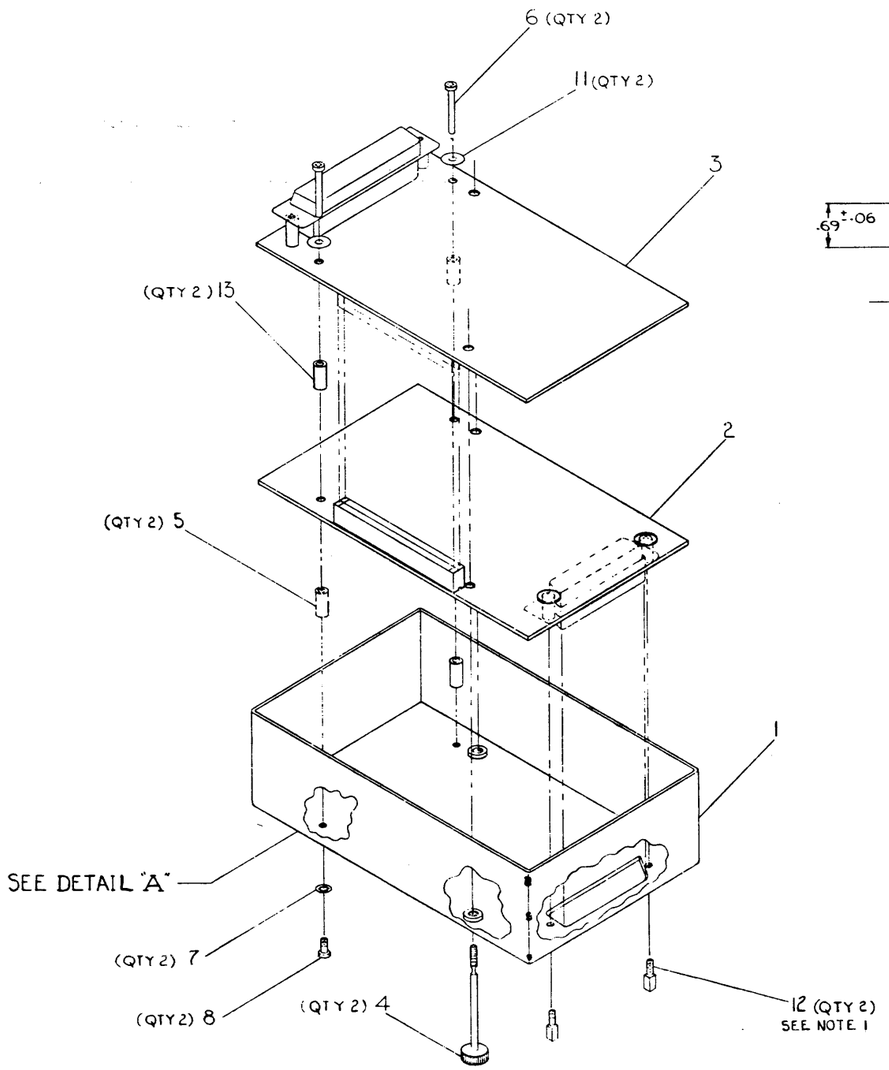
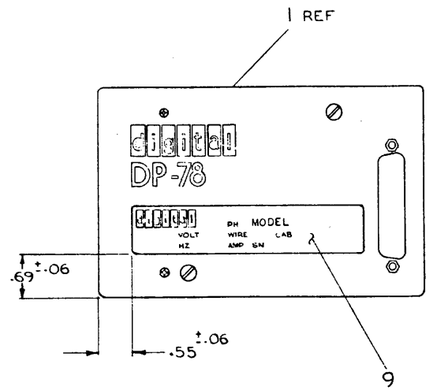
NOTES:
1. INSTALL ITEM 12 (SCREW LOCK ASSY) WITHOUT WASHERS AND NUTS.





DETAIL "A"
(BOTTOM SIDE OF ENCLOSURE)

CAUTION OFF SHEETS PARTS LIST
EXIST B-PL-DP78-0-0

REVISIONS		
CHK	CHANGE NO.	REV
		A

B. MEACHAM

DESCRIPTION	DWG./PART NO.	ITEM NO.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

ANGLES ±0° 30'	CLASS OF ACCURACY (CHECK ONE)	NOMINAL DIMENSION RANGE INCHES					
		OVER 0 TO 0.2	OVER 0.2 TO 1.2	OVER 1.2 TO 4.0	OVER 4.0 TO 12.0	OVER 12.0 TO 40.0	OVER 40.0 TO 80.0
SURFACE QUALITY IN MICROINCHES ✓	MEDIUM ☐	±.004	±.008	±.012	±.016	±.024	±.04
	PREFERRED ☐	±.012	±.016	±.025	±.04	±.063	±0.1

QUANTITY & VARIATION

THIRD ANGLE PROJECTION

REMOVE BURRS AND BREAK SHARP CORNERS

DO NOT SCALE DWG.

		DATE
DRN	[illegible]	5/78
CHK'D		
ENG.		
PROJ. ENG.		
PROD. [illegible]		

NEXT HIGHER ASSY.

FIRST USED ON: DP78

TITLE: DP78 UNIT ASSY

MATERIAL	SIZE	CODE	NUMBER	REV.
SEE PARTS LIST	D	UA	DP78-0-0	A
FINISH: NONE	SCALE: 1/1			
	SHEET 1 OF 1		DIST.	

231

DIGITAL EQUIPMENT CORPORATION
PARTS LIST

MADE BY A. COLON DATE 5 OCT 78	CHECKED DATE	SECTION 1
ENG DATE	PROD DATE	ISSUED SECTION 1

ITEM NO.	DRAWING NO.	PART NO.	DESCRIPTION	QUANTITY / VARIATION	REF DESIGNATION
1	D-IA-7422274-0-0	7422274-00	COVER ENCLOSURE	1	
2	D-UA-5413540-0-0	5413540-00	DP78 COMM. BOARD	1	
3	D-UA-5413542-0-0	5413542-00	DP78 INTERFACE BOARD	1	
4		9010111-00	SCREW, CAPTIVE 8-32 X 2.00 LG	2	
5		9009306-00	SPACER, FIBER 4-40, .250 X .44 LG	2	
6		9006015-04	SCREW BINDER HD 4-40 X .75 LG	2	
7		9006632-00	WASHER, LOCK INT. TOOTH #4	2	
8		9008301-01	SCREW, PAN HD, 4-40 X .25 LG	2	
9	A-PS-3613210-0-0	3613210-01	LABEL, ELECTRICAL DATA	1	
10	A-SP-3700399-0-0	3700399-00	PACKAGING INSTRUCTION	REF	
11		9006706-00	WASHER, FLAT NYLON #4	2	
12		9008451-00	SCREW LOCK ASSY	2	
13		9007613-00	SPACER, FIBER CLEAR #6 X .44 LG	2	

NOTES:

E.C.O. NO.

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TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV.
DP78 UNIT ASSY	D-UA-DP78-0-0	B	PL	DP78-0-0	
	SHEET 1 OF 1	INSERTION PARTS LIST DATA BASE REV			

DRB 125

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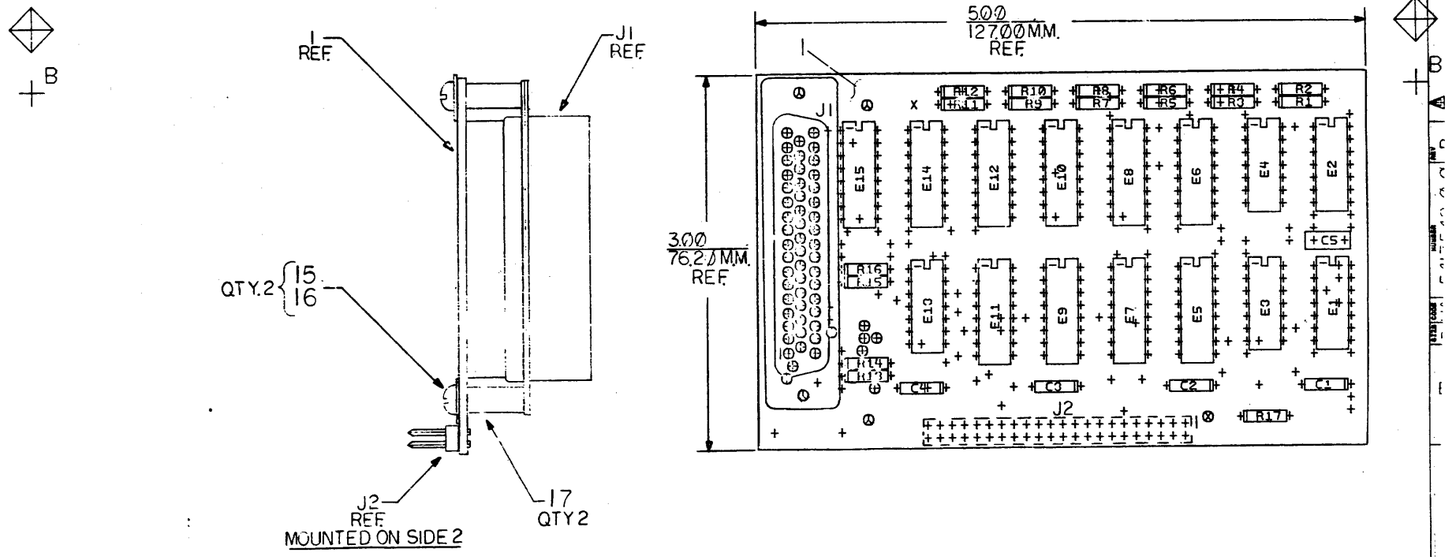
COMPONENT SIDE VIEW



NOTES:

CHK	CHANGE NO	REV

ETCH REV. C
P.C. DESIGN DATA BASE REV. C

SIGNATURES	DATE
DRN. [illegible]	9-27-78
CHK'D. [illegible]	[illegible]
ENG. [illegible]	15 DEC 78
PROJ.ENG. [illegible]	15 DEC 78
PROD. [illegible]	[illegible]

digital

TITLE DP78 INTERFACE BD

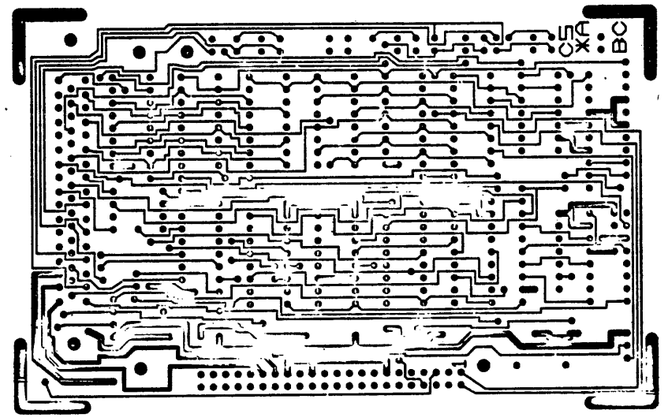
SCALE 2/1 SIZE D CODE 18042 NUMBER 54-13542-0-0 REV B

SHT. 1 OF 3

NEXT HIGHER ASSY. B-DD-54-13542-0-0

MS# 180205

L1 5013541C 5413542



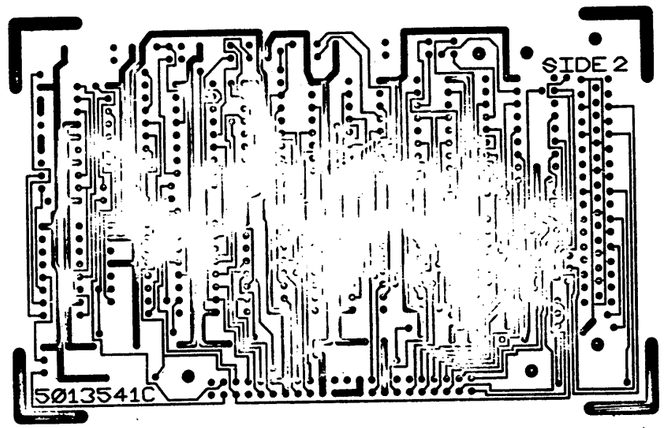
REVISIONS		
CHK	CHANGE NO	REV

TITLE	SIZE	CODE	NUMBER	REV.
DP78 INTERFACE BD.	D		LA5413542-0-0	B
SCALE 2- SHEET 2 OF 3	DIST.			

DLA5413542-0-0 B

234

5413542 L2



REVISIONS		
CHK	CHANGE NO.	REV

TITLE	SIZE	CODE	NUMBER	REV
DP78 INTERFACE BD.	D		5413512-0-0	B
SCALE 2-1 SHEET 3 OF 3				

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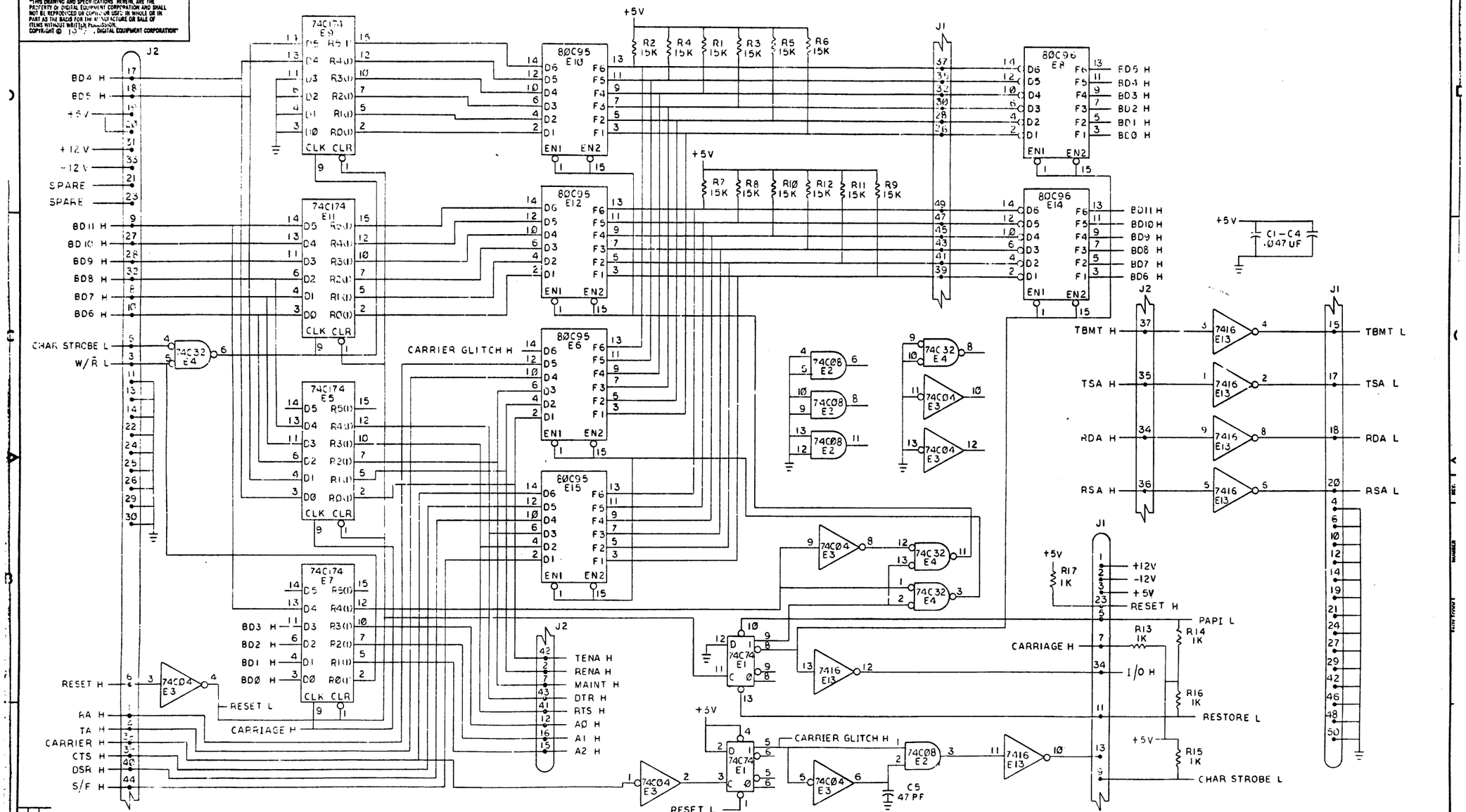

DRN.		9-78	FIRST USED ON: DP78
CHK'D			TITLE: DP78 INTERFACE BOARD
ENG.			
PROJ. ENG.			
PROD.			
NEXT HIGHER ASSY.			
D-DD-5413542-0			SIZE D · CODE CS · NUMBER 5413542-0-1 · REV. B
SCALE NONE			
SHEET 1 OF 1			DIST.

REVISIONS: REV. | CHANGE NO. | CHK

SIZE	CODE	NUMBER	REV.
B	DD	5413542-0	B

DRAWING NO.	NO. OF SHTS.	PART NO.	DESCRIPTION	REVISIONS
D-UA-5413542-0-0	3		DP78 INTERFACE BOARD	B
K-PL-5413542-0-DBP	-		PARTS LIST DATA BASE TAPE	B
D-CS-5413542-0-1	1		DP78 INTERFACE BOARD	B
D-MD-5013541-0-0	4		DRILL AND ETCH DRAWING	B
		5013541	ETCHED BOARD	C
K-PC-5413542-Ø-DBC			P.C. DESIGN DATA BASE	C

NOTES:

REVISIONS	CHG NO.	REV.
DATE		

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USED ON OPTION/MODEL	DRN.	CHK'D	ENG.	PROD.
DP78	A. COLON			
	13JUN78			12/11/78

TITLE: DP78 INTERFACE BOARD

SIZE	CODE	NUMBER	REV.
B	DD	5413542-0	B

SHEET 1 OF 1

DRB 126

AUTOMATED BY PRTLST,3F(12)

PARTS LIST

LINE	ITEM	DOCUMENT NUMBER	PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATOR
1	1	D-MD-5013541-0-0	5013541-00	ETCHED CIRCUIT BD.	1	
2	2		1000011-00	47.0 MMF 100V 5%200PPM DM15S	1	C5
3	3		1012784-00	.047 MFD 50V -20+80 CER	4	C1-C4
4	4		1213488-03	CONN 44POS	1	J2
5	5		1214874-00	CONN 50POS	1	J1
6	6		1300496-00	15 K 1/4W 5% CC	12	R1-R12
7	7		1909928-00	7416 INVERTER GATE-HEX 1I	1	E13
8	8		2112145-00	MM 74C04 HEX INVRTR GATE	1	E3
9	9		2114018-00	MM 74C74 FF-D DUAL 10MHZ,CMOS	1	E1
10	10		2114663-00	MM 80C95 BUFFER-GATE-HEX TRIS	4	E6,E10,E12,E15
11	11		2114665-00	MM 74C32 OR GATE-QUAD 2IN CMO	1	E4
12	12		2114669-00	MM 74C08 AND GATE-QUAD 2IN CM	1	E2
13	13		2114760-00	MM 80C96 INVERTER GATE-HEX CM	2	E8,E14
14	14		2114807-00	MM 74C174 FF-D HEX,CMOS	4	E5,E7,E9,E11
15	15		9006010-01	SCREW,PAN ,PHIL, 4-40X 5/16	2	
16	16		9006706-00	WASHER, NYLON, FLAT #4 .375 OD	2	
17	17		9009306-00	SPACER, FIBER, HEX, 4-40, .250 X	2	
18	18		1300365-00	1 K 1/4W 5% CC	5	R13-R17

REVISION HISTORY		
ENG.	ECO NUMBER	REV
---	INIT	B

SECTION 1 OF 1

SECTION, VARIATION INDEX

1.00
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.

RESP.ENG.: BRUCE MEACHAM — DATE: 05-DEC-78

MADE BY: MIKE CICCONE — DATE: 05-DEC-78

CHECKED: R NICHOLSON — DATE: 05-DEC-78

DSN.ENG.: AL TSHUDY — DATE: 05-DEC-78

PROD.: B DAVILLI — DATE: 05-DEC-78

ASSEMBLY NUMBER: D-UA-5413542-0-0

DIGITAL

TITLE: PARTS LIST

DP78 INTERFACE BOARD

SIZE	CODE	DOCUMENT NUMBER	REV
K	PL	5413542-0-DBP	B

PART NUMBER: 5413542 — EDIT # 3

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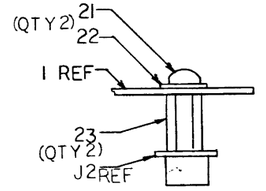
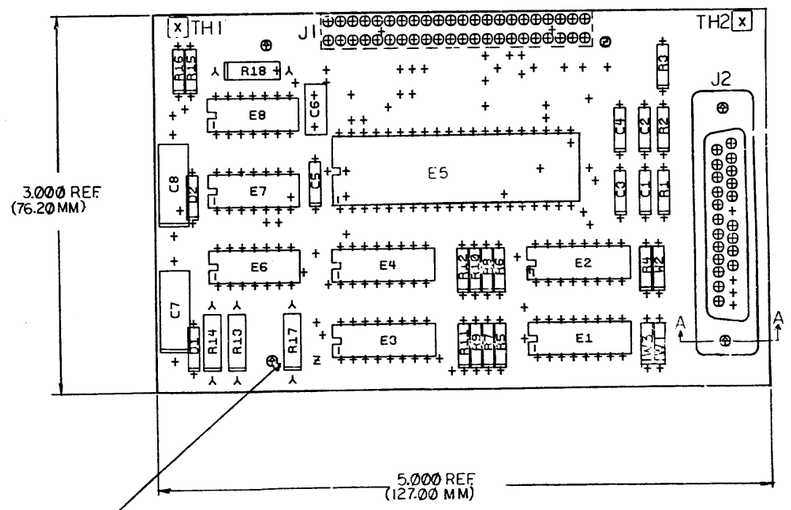
COMPONENT SIDE VIEW



VIEW AA



NOTES:

* 1. R17 MUST BE HAND-INSERTED *
2. DO NOT INSERT W1 & W2

*ALLOW .125 CLEARANCE BETWEEN THRU HOLE CENTER AND R17

CHK	CHANGE NO	REV

ETCH REV. B
P.C. DESIGN DATA BASE REV. B

SIGNATURES	DATE
DRN.	
CHK'D.	
ENG.	
PROJ. ENG.	
MFG.	

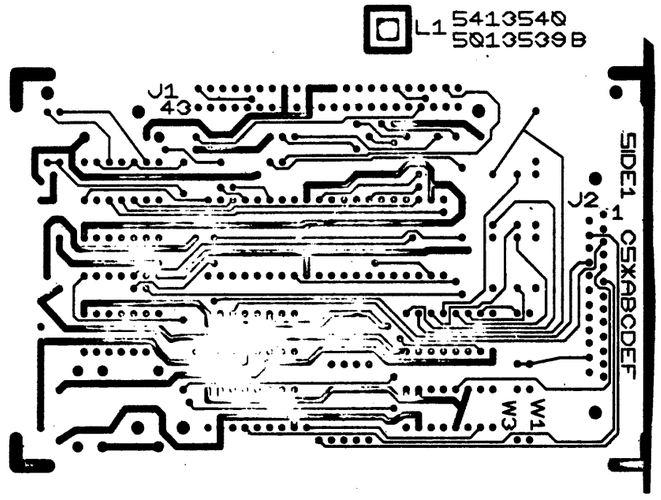
SCALE 2/1
SHT. 1 OF 3
N.H. PRINTER ASSY. B-DD-5413540-0-0

digital

TITLE
DP78 COMM. BD.

SIZE	CODE	NUMBER	REV
D	UA	5413540-0-0	A

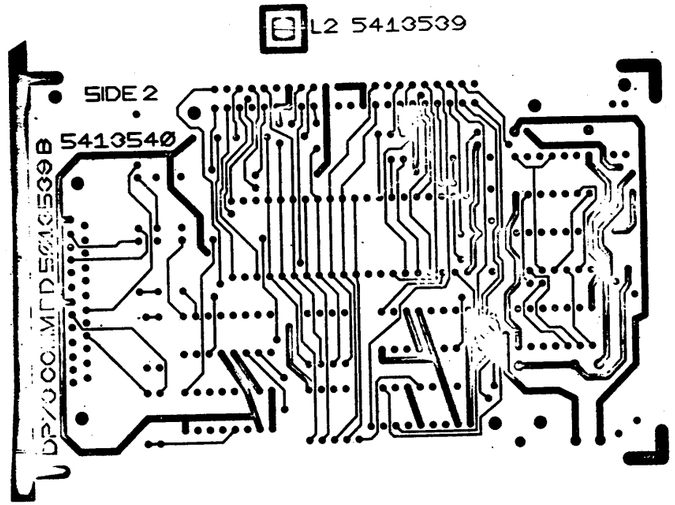
1 MS#180204



REVISIONS		
SYM	CHANGE NO	REV

TITLE	SIZE	CODE	NUMBER	REV.
DP78 COMM. BD.	D		LA5413540-0-0	A
SCALE 2-1 SHEET 2 OF 3	DIST			

240



REVISIONS		
CHK	CHANGE NO	REV

TITLE	SIZE	CODE	NUMBER	REV
DP78 COMM. BD.	D		DUAL413540-0-0	A
SCALE 2 - SHEET 2 OF 3			LIST	

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+5V

J2
SCR (DD)
RD (BB)
CARRIER (CF) H
RING (CE) H
CS (CB) H
DSR (CC) H
SCT (DB)

W3
W1

E4 88C120
E4 88C120
E1 88C120
E1 88C120
E3 88C120
E3 88C120

RC
RD
SCT

J1
TENA H
RENA H
CHAR STROBE L
A2 H
A1 H
A0 H
CARRIER H
W/R H
MAINT H
RESET H
CTS H
DSR H
+12V

74C04 E8

5025 E5
RX CLK
RSI
TX CLK
TX ENA
RX ENA
SYNC
DP ENA
ADR SEL 2
ADR SEL 1
ADR SEL 0
BYTE OP
WR TO LSI
MAINT SEL
RESET
VCC VDD GND
TSO
TBEMTY
TXACT
TERR
RDATRY
RSTARY
RXACT
+ADR COMP
DP15 DP14 DP13 DP12 DP11 DP10 DP09 DP08 DP07 DP06 DP05 DP04 DP03 DP02 DP01 DP00

+5V

R17 330 1/2W 5%
R13 330 1/2W 5%
+5.6V
C8 6.8UF
D2 IN4734A
D1 IN4734A
-5.6V
C7 6.8UF
R14 390 1/2W 5%
R18 390 1/2W 5%

74C08 E7
74C08 E7
74C32 E6
TC

+5V
C5 .047UF

74C04 E8
74C04 E8
74C04 E8
R15 2K
C6 .047
R16 6.8K

R11 15K
R9 15K
R12 15K
R10 15K
R7 15K
R8 15K
R5 15K
R6 15K
+5V

TO INTER BOARD
J1
TBMT H
TA H
TSA H
RDA H
RSA H
RA H
S/F H
BD4 H
BD5 H
BD6 H
BD7 H
BD8 H
BD9 H
BDI0 H
BDI1 H
+5V

74C04 E8
+5.8V
3691 E2
C1 100PF
R1 300
SD (BA) H

J1
DTR H
RTS H
-12V
3691 E2
C4 100PF
R3 300
TR (CD) H
3691 E2
C2 100PF
R2 300
RS (CA) H
3691 E2
C3 100PF
R4 7.5K
W2
SCTE
-5.8V

J2

DRN.		6-12-78
CHK'D		12/15/78
ENG.		12-7-78
PROJ. ENG.		12-22-78
PROD.		12/27/78
NEXT HIGHER ASSY.		
B-DD-5413540-()		
SCALE		
SHEET 1 OF 1		

FIRST USED ON DP78

TITLE
DP78 COMM BOARD

SIZE	CODE	NUMBER	REV.
D	CS	5413540-0-1	A

DIST.

REVISIONS | REV. | CHANGE NO. | CHK.

242

SIZE	CODE	NUMBER	REV.
B	DD	5413540-0	A

DRAWING NO.	NO. OF SHTS.	PART NO.	DESCRIPTION	REVISIONS
D-UA-5413540-0-0	3		DP78 COMM BD.	A
K-PL-5413540-0-DBP	-		PARTS LIST DATA BASE	A
D-CS-5413540-0-1	1		DP78 COMM BD.	A
D-MD-5013539-0-0	4		DRILL & ETCHED DRAWING	A
		5013539	ETCHED BOARD	B
K-PC-5413540-0-DBG	-		P.C. DESIGN DATA BASE	B

NOTES:

REVISIONS	REV.
CHG NO.	
DATE	

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digital

USED ON OPTION/MODEL	
DP78	

DRN.	PEG TESLA	9JUN78
CHK'D		
ENG.		
PROD.		

TITLE: DP78 COMM BD

SIZE	CODE	NUMBER	REV.
B	DD	5413540-0	A

SHEET 1 OF 1

DRB 123

LINE	ITEM	DOCUMENT NUMBER	PART NUMBER	DESCRIPTION	QTY	REFERENCE DESIGNATOR
1	1	D-MD-5013539-0-0	5013539-00	ETCHED CIRCUIT BD.	1	
2	2		1013466-06	100.0 MMF 50V 5% CER.	4	C1,C2,C3,C4
3	3		1005306-00	6.8MFD 35V 10% S.TANT	2	C7,C8
4	4		1010978-32	.047 MFD 50V 10% 2C067CER.	1	C6
5	5		1012784-00	.047 MFD 50V -20+80 CER	1	C5
6	6		1109197-00	1N 4734A VZ= 5.6 5% 1W Y	2	D1,D2
7	7		1211044-03	SOCKET,100 44POS	1	J1
8	8		1211352-02	CONN,D SUB 25PIN SOCKET PC MNT	1	J2
9	9		1300296-00	330 1/2W 5% CC	2	R13,R17
10	10		1301423-00	6.8 K 1/4W 5% CC	1	R16
11	11		1300496-00	15 K 1/4W 5% CC	8	R5-R12
12	12		1301422-00	7.5 K 1/4W 5% CC	1	R4
13	13		1301425-00	300 1/4W 5% CC	3	R1,R2,R3
14	14		1302388-00	2 K 1/4W 5% CC	1	R15
15	15		1915125-00	3691 DRIVER,QUAD,EIA RS-	1	E2
16	16		2112145-00	MM 74C04 HEX INVRTR GATE	1	E8
17	17		2112517-50	RECEIVER/TRANSMITTER	1	E5
18	18		2114665-00	MM 74C32 OR GATE-QUAD 2IN CMO	1	E6
19	19		2114669-00	MM 74C08 AND GATE-QUAD 2IN CM	1	E7
20	20		2114806-00	88C120 RECEIVER,DUAL,EIA R	3	E1,E3,E4
21	21		9006010-01	SCREW,PAN ,PHIL, 4-40X 5/16	2	
22	22		9006706-00	WASHER, NYLON, FLAT #4 .375 OD	2	
23	23		9009306-00	SPACER, FIBER, HEX, 4-40, .250 X	2	
24	24		9009185-00	JUMPER, WIRE, INSULATED, BLACK B	1	W3
25	25		1300308-00	390 1/2W 5% CC	2	R14,R18

REVISION HISTORY																							
ENG	ECO NUMBER	REV	SECTION 1 OF 1	RESP.ENG.: B MEACHAM	DATE: 05-DEC-78		D	I	G	I	T	A	L										
	INIT	A	SECTION, VARIATION INDEX	MADE BY: MIKE CICCONE	DATE: 05-DEC-78	TITLE PARTS LIST																	
			1.00																				
			2.	CHECKED: R NICHOLSON	DATE: 05-DEC-78	DP78 COMM. BOARD																	
			3.																				
			4.	DSN.ENG.: A TSHUDY	DATE: 05-DEC-78																		
			5.			SIZE	CODE	DOCUMENT NUMBER														REV	
			6.																				
			7.	PROD.: P LASKOW	DATE: 15-DEC-78	K	PL	5413540-0-DBP														A	
			8.																				
			9.																			EDIT #	
			10.	ASSEMBLY NUMBER: D-UA-5413540-0-0		PART NUMBER: 5413540																2	
			11.																				
			12.																				

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DIGITAL EQUIPMENT CORPORATION
MAYNARD MASSACHUSETTS

PACKAGING INSTRUCTION REV: B C DATE: 9-76 11/77

TITLE VT50 FAMILY OF TERMINALS WITH AND WITHOUT COPIER

LEGEND
3700184-00 — Terminal Without Copier
3700184-01 — Terminal With Copier

MATERIAL REQUIREMENTS

3700184-00 – Terminal Without Copier

Quantity	Purchase Specification No.	Description
1	9905698	Regular Slotted Carton
1 (Set)	9905699	Foam Pieces (1 Set Equals 6 Pieces)
1	9905639	Laminated Buildup
14 ft.	9905729	Carton Sealing Tape
2 ft.	9009634	Tape (Scotch, Y-8921)

PACKAGING INSTRUCTIONS

3700184-00 – Terminal Without Copier

Step	Procedure
1.	Set up Regular Slotted Carton (9905698). Tape with one (1) strip of Carton Sealing Tape (9905729) across the middle and one (1) strip across each end.
2.	Place Laminated Buildup (9905639) on top of keyboard. Place one (1) strip of tape (9009634) on each end of the buildup. Pull tape downward and secure to base of VT50.
3.	Place VT50 into front and rear bottom foam pieces (9905699). Place assembly into Regular Slotted Carton.
4.	Place right-rear and left-vertical foam pieces (9905699) into position on VT50.
5.	Place top-right and left foam pieces (9905699) into position on VT50.
6.	Place power cord into void alongside VT50.
7.	Place User's Manual on top of VT50 Terminal.
8.	Close and seal Regular Slotted Carton using one (1) strip of Carton Sealing Tape (9905729) across the top and one (1) strip across each end panel.

ENG	APPD	SIZE	CODE	NUMBER	REV
R. B. Clemis 15 Sep 76	J. Melen 9-15-76	A	SP	3700184-0-0	C

DEC 8-(SS)-1031-1-R671 DRA - 129

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DIGITAL EQUIPMENT CORPORATION
MAYNARD MASSACHUSETTS

PACKAGING INSTRUCTION REV: B C DATE: 9/76 11/77

TITLE INSTR PACKAGING
VT50 FAMILY OF TERMINALS WITH AND WITHOUT COPIER

MATERIAL REQUIREMENTS

3700184-01 – Terminal With Copier

Quantity	Purchase Specification No.	Description
1	9905698	Regular Slotted Carton
1 (Set)	9905699	Foam Pieces (1 Set Equals 6 Pieces)
1	9905639	Laminated Buildup
14 ft.	9905729	Carton Sealing Tape
2 ft.	9009634	Tape (Scotch, Y-8921)
1	9905935	3/8 Square Wood Dowel
1	9905937	Taped Tube
2	9007032	Tie Wrap 6 3/4 in Long
1	9905936	Convoluted Polyurethane Foam Pad
1	9905938	Paper Tube

PACKAGING INSTRUCTIONS

3700184-01 – Terminal With Copier

Step	Procedure
1.	Set up Regular Slotted Carton (9905698). Tape with one (1) strip of Carton Sealing Tape (9905729) across the middle and one (1) strip across each end.
2.	Place Laminated Buildup (9905639) on top of keyboard. Place one (1) strip of tape (9009634) on each end of the buildup. Pull tape downward and secure to base of VT50.
3.	Remove Terminal Cover to expose Copier.
4.	Place (2) Anodes (12-12199) in Paper Tube and Cap (9905938). Place in Paper Roll Compartment under Paper Drag Roller in Copier.
5.	Tie Anode Holder to Copier Chassis using (2) Tie Wraps (9007032).
6.	Fold Convoluted Foam (9905936) as shown in Figure 2.
7.	Pick up Anode Carrier and place the 2 inch folded section of Foam under the Anode Holder.
8.	Close Anode Holder onto folded Foam.
9.	Wrap remaining Foam over Anode Carrier.
10.	Tape Anode Holder down with (2) strips of STAIN RESISTANT TAPE 15 Inches Long.
11.	Tape Detent Lever down to Unit with (1) strip of STAIN RESISTANT TAPE 5 Inches Long.

ENG	APPD	SIZE	CODE	NUMBER	REV
R. B. Clemis 7 Dec 77		A	SP	3700184-0-0	C

DEC 8-(SS)-1031-1-R671 DRA - 129

PACKAGING INSTRUCTION CONTINUATION SHEET

TITLE INSTR PACKAGING
VT50 FAMILY OF TERMINALS WITH AND WITHOUT COPIER

PACKAGING INSTRUCTIONS

3700184-01 – Terminal With Copier

Step	Procedure
12.	Replace Terminal Cover.
13.	Place VT50 Terminal into front and rear Foam Pieces (9905699). Place Assembly into Regular Slotted Carton (9905690).
14.	Place right and left rear vertical Foam Pieces (9905699) into position on VT50 Terminal.
15.	Place top right and top left Foam Pieces (9905699) into position on VT50.
16.	Place Power Cord into void alongside VT50 Terminal.
17.	Place Users Manual on top of VT50 Terminal.
18.	Slide Roll of Paper (3612418) and Square Wood Dowel (9905935) into Taped Tube (9905937). Push in Finger Tabs to immobilize Paper Roll.
19.	Slide Square Wood Dowel into slots in Top Foam Pieces and tape into slots using (2) strips of tape (9009634) on each Foam Piece.
20.	Close and seal Regular Slotted Carton using (1) Strip of Carton Sealing Tape (9905729) across top and (1) strip across each end panel.

		SIZE	CODE	NUMBER	REV
R. B. Clemis 2 DEC 77		A	SP	3700184-0-0	C

DEC8-1031

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PACKAGING INSTRUCTION REV: C DATE: 11/77

TITLE VT50 FAMILY OF TERMINALS WITH AND WITHOUT COPIER

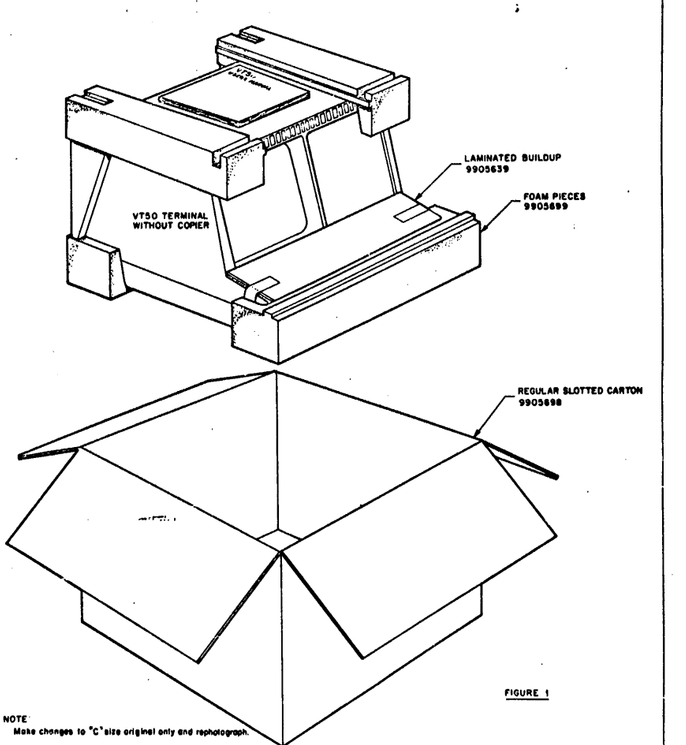

FIGURE 1

NOTE
Make changes to "C" size original only and rephotograph.

ENG.	APPD	SIZE	CODE	NUMBER	REV
Ellen Kropf 4/5/76	R. B. Clemis 8 Apr 76	A	SP	3700184-0-0	C

DEC-108

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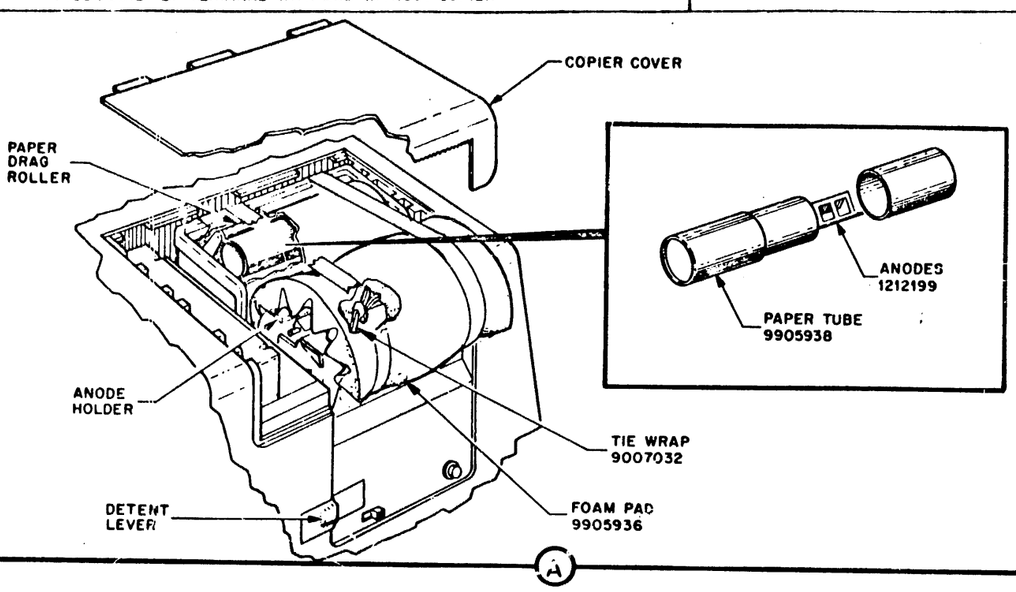
PACKAGING INSTRUCTION

REV: C DATE: 11/77

TITLE

VT50 FAMILY OF TERMINAL WITH AND WITHOUT COPIER



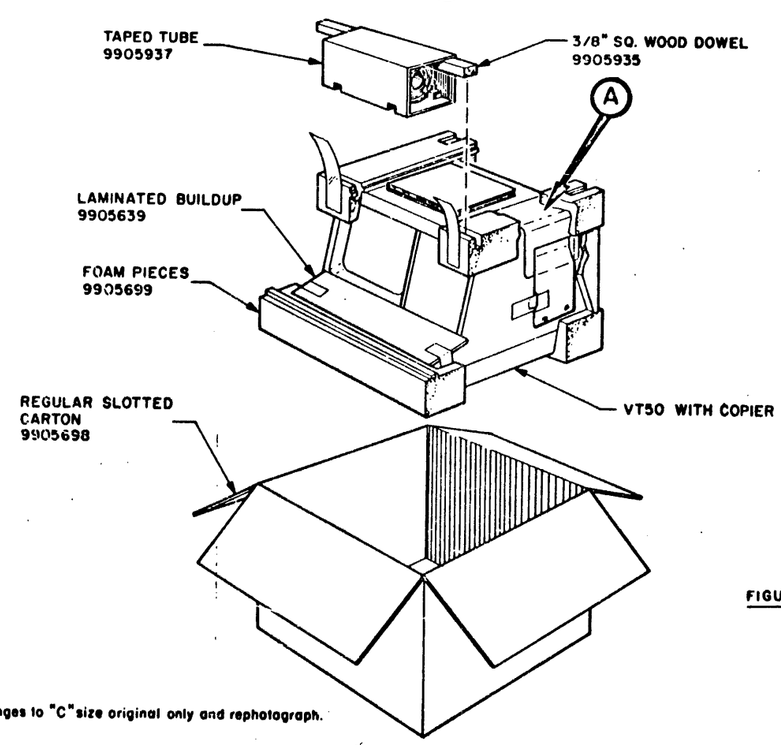


FIGURE 2

NOTE:
Make changes to "C" size original only and rephotograph.

ENG.	APPD.	SIZE	CODE	NUMBER	REV
R. S. Levinson 15 SEP 76	L. J. Nielsen 9-15-76	A	SP	3700184-0-0	C

DRC-107

SHEET 5 OF 5

DIGITAL EQUIPMENT CORPORATION

PARTS LIST

MADE BY P. BURNELL
DATE 14 OCT 75
ENG [illegible]
DATE 3-25-76

CHECKED [illegible]
DATE 3-25-76
PROD [illegible]
DATE 3-25-76

SECTION 1
ISSUED SECTION 1

ITEM NO	DRAWING NO.	PART NO.	DESCRIPTION	QUANTITY / VARIATION -Ø	-1	-2	REF DESIGNATION
1	D-CS-5411985-0-1		CIRCUIT SCHEMATIC	REF	REF	REF	
2	K-CO-5411985-0-4		X-Y COORDINATE HOLE LAYOUT	REF	REF	REF	
3	E-AH-5411985-0-5		ASSY/DRILLING HOLE LAYOUT	REF	REF	REF	
4	B-MH-5411985-0-6		MODULE ECO HISTORY	REF	REF	REF	
5		5011984	ETCHED CIRCUIT BOARD	1	1	1	
6		1001610-01	CAP .Ø1 Uf 100V DISC	3	3	3	C1-C3
7		1100113	DIODE D662	4	4	4	D1-D4
8		1105873	DIODE 4M5.1Z1	1	1	1	D5
9		1212519-04	CONN 11 PIN	2	2	2	J1, J2
10		1210693	SOCKET IC 24 PIN	1	1	1	XE3
11		1302381	RES. 200 1/2W 5%	1	1	1	R1
12		9107560-01	JUMPER, UNINSULATED	5	5	5	W1-W5 (W1,W2,W5 .6") (W3,W4 .8")
13		1909686	IC DEC 7404	2	2	2	E1, E2
14		23014B7	PROM (FRENCH)	-	1	-	E3
15		23026F3	PROM (BRITISH)	-	-	1	E3

NOTES:

E.C.O. NO. 00001 MKØØ2

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TITLE: 8K PROM UV

ASSY NO. E-UA-5411985-0-0
SHEET 1 OF 1

SIZE B | CODE PL | NUMBER 5411985-0-0 | REV. C

INSERTION PARTS LIST DATA BASE REV A

MK 247

NOTES:

REVISIONS			
	CHANGE NO	REV	
A	S45 00001	B	5411985-MKB62 C
	[illegible]		[illegible]
	C. ADAIR		C. ADAIR

SIGNATURES	DATE
DRN [illegible]	[illegible]
CHK D [illegible]	[illegible]
ENG. [illegible]	[illegible]
PROJ. ENG. [illegible]	[illegible]
PROD. [illegible]	[illegible]
SCALE 2:1	
SHT. 1 OF 1	
ETCH REV B	LAST USED ON

digital

TITLE
8K PROM UV

SIZE	CODE	NUMBER	REV.
E	UA	5411985-0-0	C

DIST.

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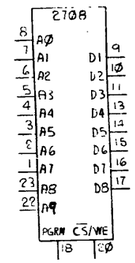
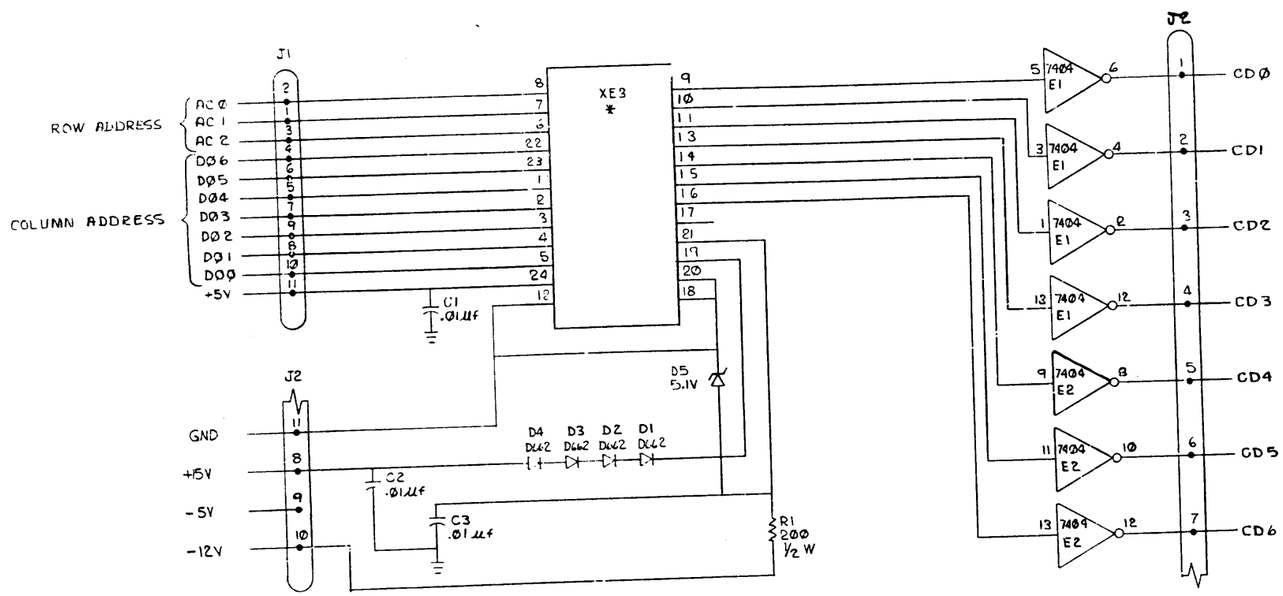
NOTE:
* XE3 IS A 24 PIN IC SOCKET. THE INTEL 2708, AN ERASABLE AND REPROGRAMABLE PROM IS NOT SUPPLIED, WITH VARIATION -Ø
CONSULT PARTS LIST (B-PL-5411985-0-0) FOR PROM SUPPLIED WITH OTHER VARIATIONS.

LOGIC SYMBOL FOR PROM 2708



VBB PIN 21
VCC PIN 24
VDD PIN 19
VSS PIN 12



REVISIONS		
CHK	CHANGE NO.	REV.
JM	M11985-00001	B
	CHANGE MODEL NUMBER TO 2708 PER ECO M11985-MK-0132	
	G. ADAIR	
JM	5411985-MK-0132	C
	ADD CHANGE NUMBERS	
	G. ADAIR	

DRN [illegible] 12/24/75
CHK'D [illegible] 2/1/76
ENG. [illegible] 2/1/76
PROJ. ENGR. [illegible] 2/1/76
PROD'N [illegible] 2/1/76
NEXT HIGHER ASSY
D-LJ-5411983-0-0
SCALE
SHEET 1 OF 1

FIRST USED ON VT52

digital

TITLE 8K PROM (UV)

SIZE D | CODE CS | NUMBER 5411985-0-1 | REV. C

DIST.

MK 1 249