FIELD MAINTENANCE PRINT SET

TABLE OF CONTENTS

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

REV.	CHG. NO.	DATE
A	VT78-2	5-78
B	VT78-MLØØ6	1-79
C	VT78-MLØØ7	4-79
D	VT78 MLØØ8	10 79

USED ON OPTION/MODEL	VT78
DRN.	C. Drayton
DATE	21 Dec 77
CHK'D	David Zopf
DATE	14-MAR-78
PROJ. ENG.	David Zopf
DATE	14-MAR-78
FIELD SERV.	Carl Clark
DATE	22 MAR 78
TITLE	VT78
SIZE	B
CODE	TC
NUMBER	VT78-Ø-1
REV.	D

SHEET 1 OF 2

digital

EN 01174 18 N 875 (32)

DRB 124

ML

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

DRAWING DIRECTORY

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	[illegible]
C	VT78-ML008	[illegible]

USED ON OPTION/MODEL: VT78

SHEET 1 OF 4

DRN.	G Drayton	DATE 21 Dec 77
CHK'D.	[illegible]	DATE 14-MAR-78
PROJ. ENG.	David [illegible]	DATE 14-MAR-78
PROD.	[illegible]	DATE 3/14/78

TITLE: VT78 DRAWING DIRECTORY

digital

SIZE	CODE	NUMBER	REV
B	DD	VT78-Ø	C

DIST.

DRB 106A

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
- 15 PLATE MTG ASSY D-AD-7013846-0-0
  - 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
  - 27 8K PROM UV D-UA-5411985-0-0
- 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

TITLE	SHEET	SIZE	CODE	NUMBER	REV
VT78 DRAWING DIRECTORY	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 (23003G1)	-
	K-SP-VT78-Ø-3	VT78 ROM LISTING (23001G1)	-
	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

DRB 108A

digital

TITLE VT78 DRAWING DIRECTORY

SHEET 4 OF 4

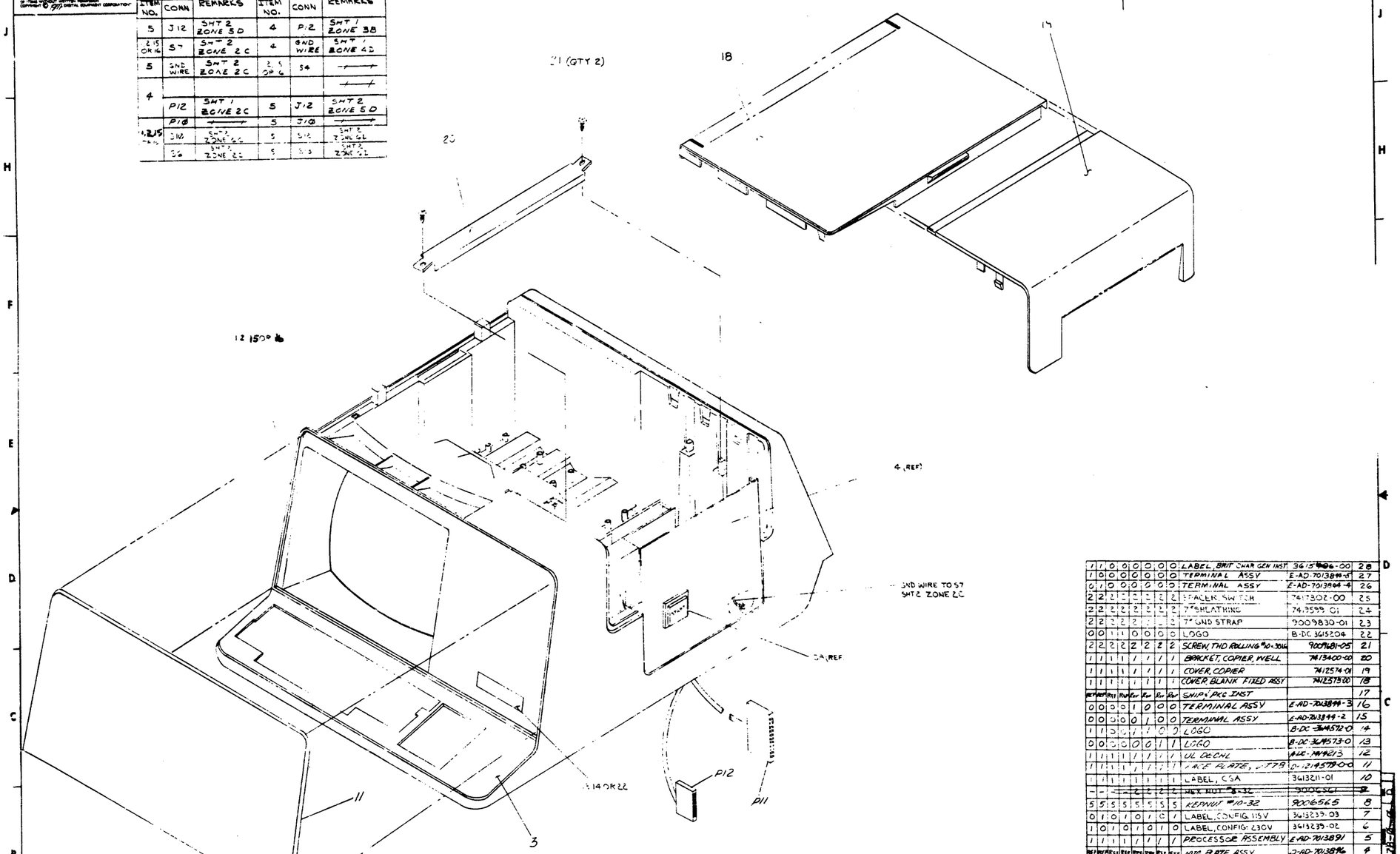
SIZE	CODE	NUMBER	REV
B	DD	VT78-0	C

ML 9

WIRE TABLE

FROM			TO		
ITEM NO.	CONN	REMARKS	ITEM NO.	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	—|—
1,2,15 OR 16	J16	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.



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	3615406-00	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 #10×3/8	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-LC-MN4213	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-1214560-0-0	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

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 4.8	OVER 4.8 TO 12.0	OVER 12.0 TO 48.0	OVER 48.0 TO 96.0
MEDIUM ☐	±.004	[illegible]	±.012	±.016	[illegible]	±.04
PREFERRED ☐	±.012	±.016	[illegible]	[illegible]	[illegible]	±0.1

THIRD ANGLE PROJECTION

REMOVE BURRS AND BREAK SHARP CORNERS

DO NOT SCALE DWG

DRN.		7-8-77
CHKD		7-8-77
ENG.		7/19/77
		7-19-77
PROD.		7/19/77

NEXT HIGHER ASSY. B-DD-VT78-0

MATERIAL SEE PARTS LIST

FINISH —//—

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

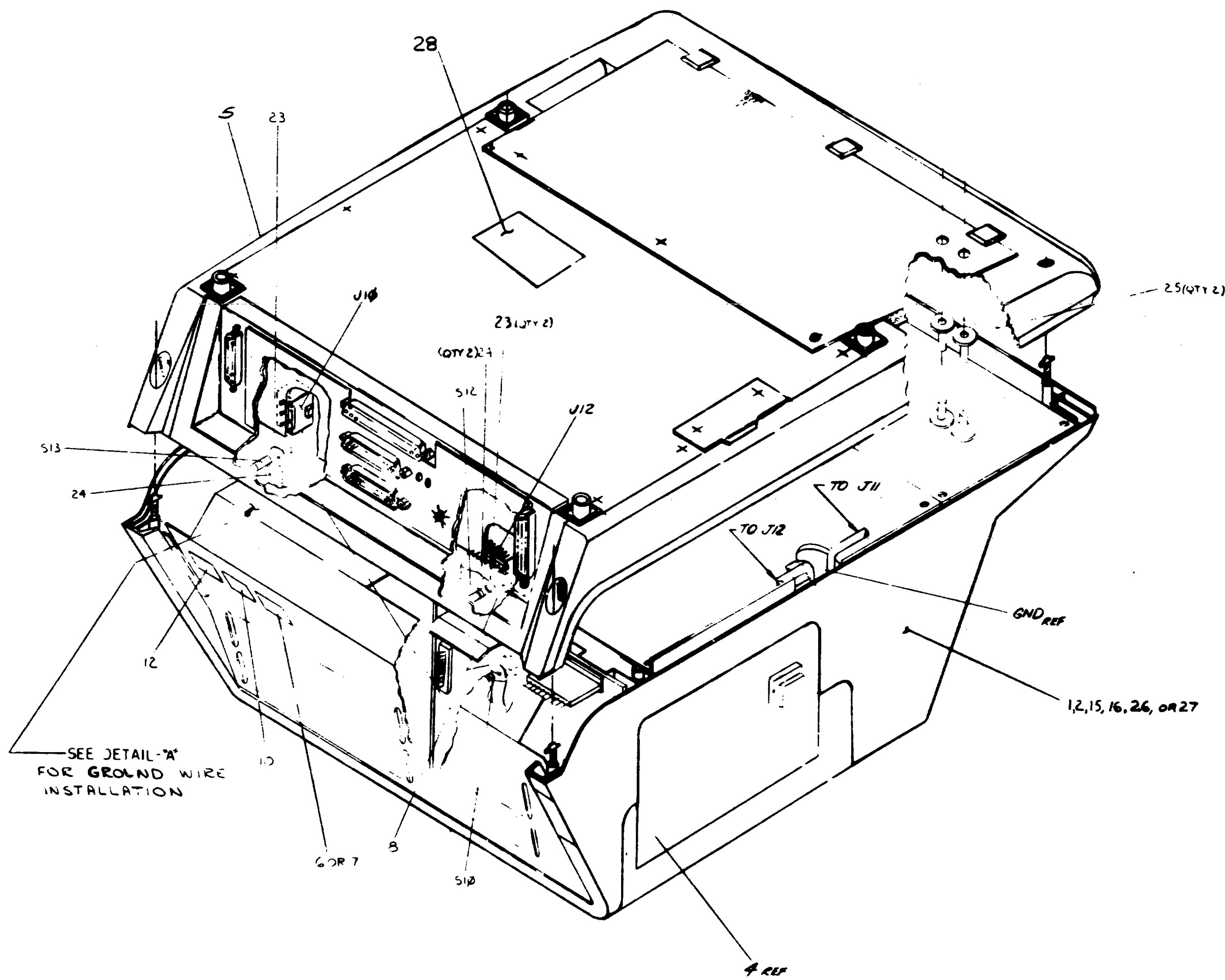
DIST.

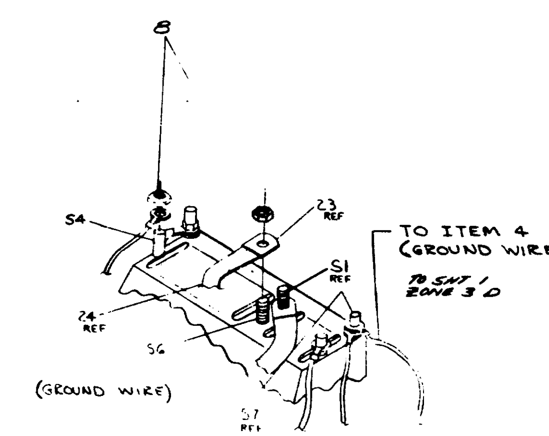
REF TO SHEET 2 D-UA-VT78-0-0 10/29/79

REVISIONS

REV	CHANGE NO.	
A	VT78 [illegible]	GARDNER
D	VT78-M-338	B, NI A, HAM

10





DETAIL -"A"

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

REVISIONS		
CHG	CHANGE NO.	REV

TITLE	SIZE/CODE	NUMBER	REV
UNIT ASSEMBLY VT78	Ø UA	VT78-Ø-Ø	D
SCALE	SHEET 2 OF 2	DIST.	

11

			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	78/7Ø-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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	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	1	1
14	E-UA-LA78-PA	PARALLEL PRINTER, 12ØV, 6ØHZ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-
15	E-UA-LA78-PC	PARALLEL PRINTER, 12ØV, 5ØHZ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	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	-	-	-	1	1	1
20	BX-Q2ØØ1-TA	OS78 SOFTWARE	1	1	1	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

REVISIONS

REV.	CHANGE NO.	CHK
B	VT78-MLØØ7 Yude Spivey [illegible] R. MEACHAM [illegible]	[illegible]

DRN. G.DRAYTON	16FEB7
CHK'D D.ZOPF	12APR7
ENG. D. ZOPF	12APR7
PROJ. ENG. D.ZOPF	12APR7
PROD. J.DIENST	12APR7
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.

 DEC FORM NO.

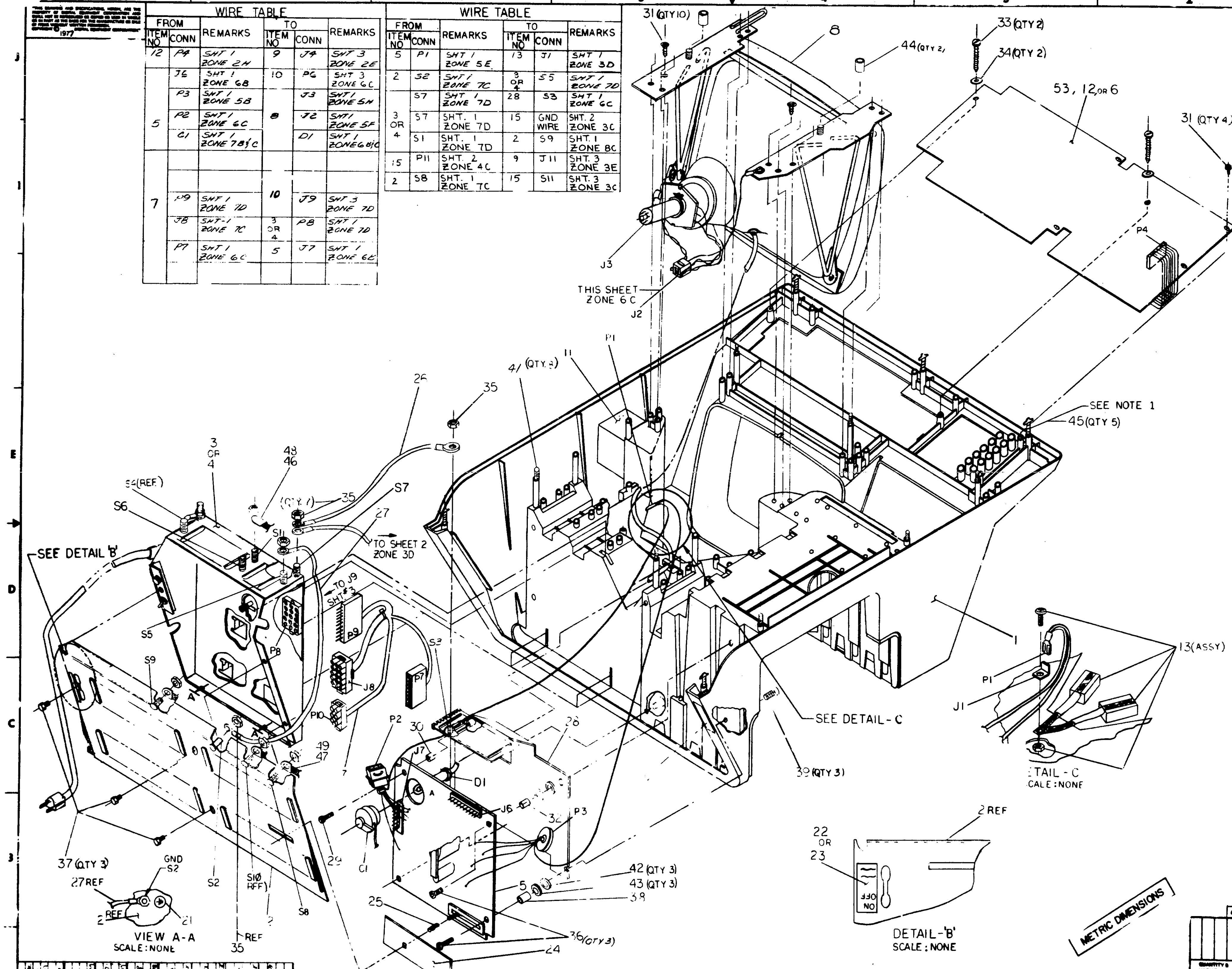
FROM ITEM NO	FROM CONN	REMARKS	TO ITEM NO	TO CONN	REMARKS
12	P4	SHT 1 ZONE 2H	9	J4	SHT 3 ZONE 2E
5	J6	SHT 1 ZONE 6B	10	P6	SHT 3 ZONE 6C
5	P3	SHT 1 ZONE 5B	8	J3	SHT 1 ZONE 5H
5	P2	SHT 1 ZONE 6C	8	J2	SHT 1 ZONE 5F
5	C1	SHT 1 ZONE 7B&C	8	D1	SHT 1 ZONE 6B&C
7			10		
7			10		
7	P9	SHT 1 ZONE 7D	10	J9	SHT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

WIRE TABLE

FROM ITEM NO	FROM CONN	REMARKS	TO ITEM NO	TO CONN	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
3 OR 4	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
3 OR 4	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



OFF SHEET PARTS LIST REFER TO C-PL-7013844-0-0

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS

DO NOT SCALE DWG

MATERIAL: SEE PARTS LIST

FIRST USED ON: VT78

NEXT HIGHER ASSY: E-UA-VT78-0-0

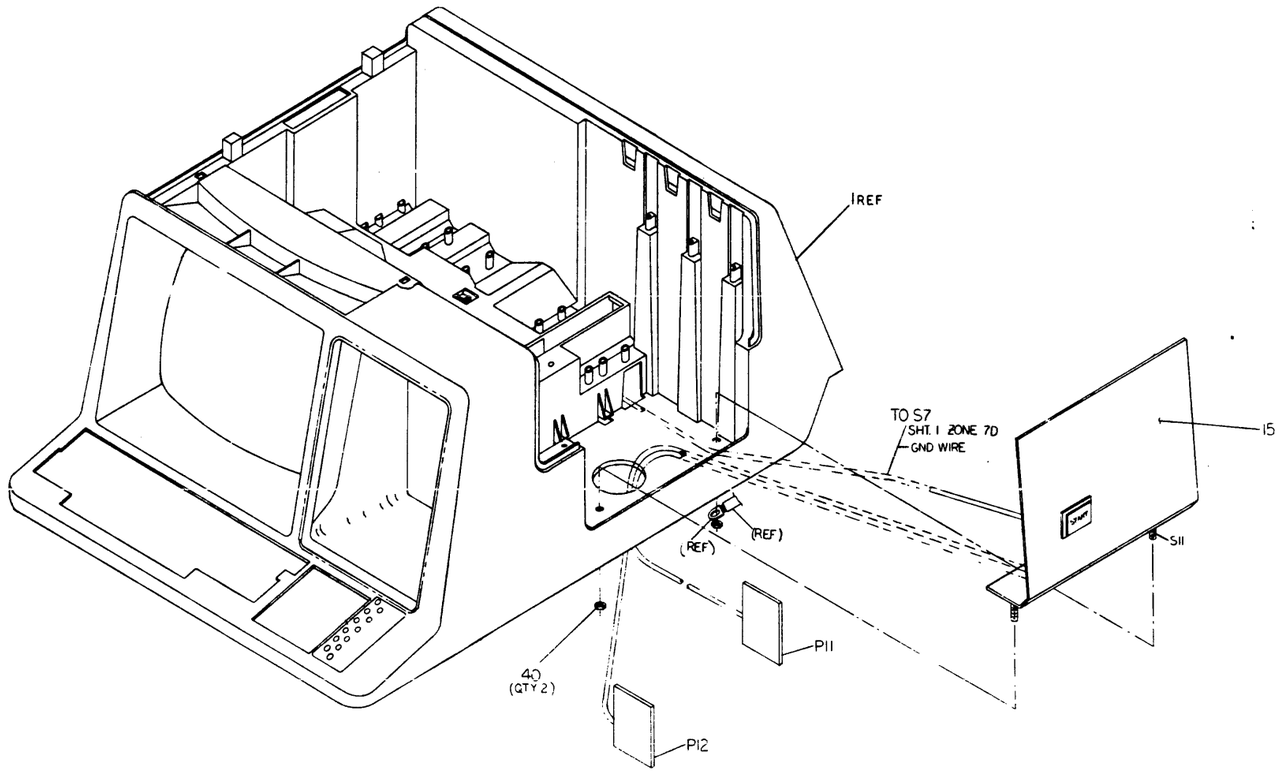
TITLE: TERMINAL ASSY

SCALE: NONE

SHEET 1 OF 3

AD 7013844-0-0 REV. J

AD 7013844-C-0 J



REVISIONS		
CHG	CHANGE NO	REV

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

AD-7013844-0-0 J

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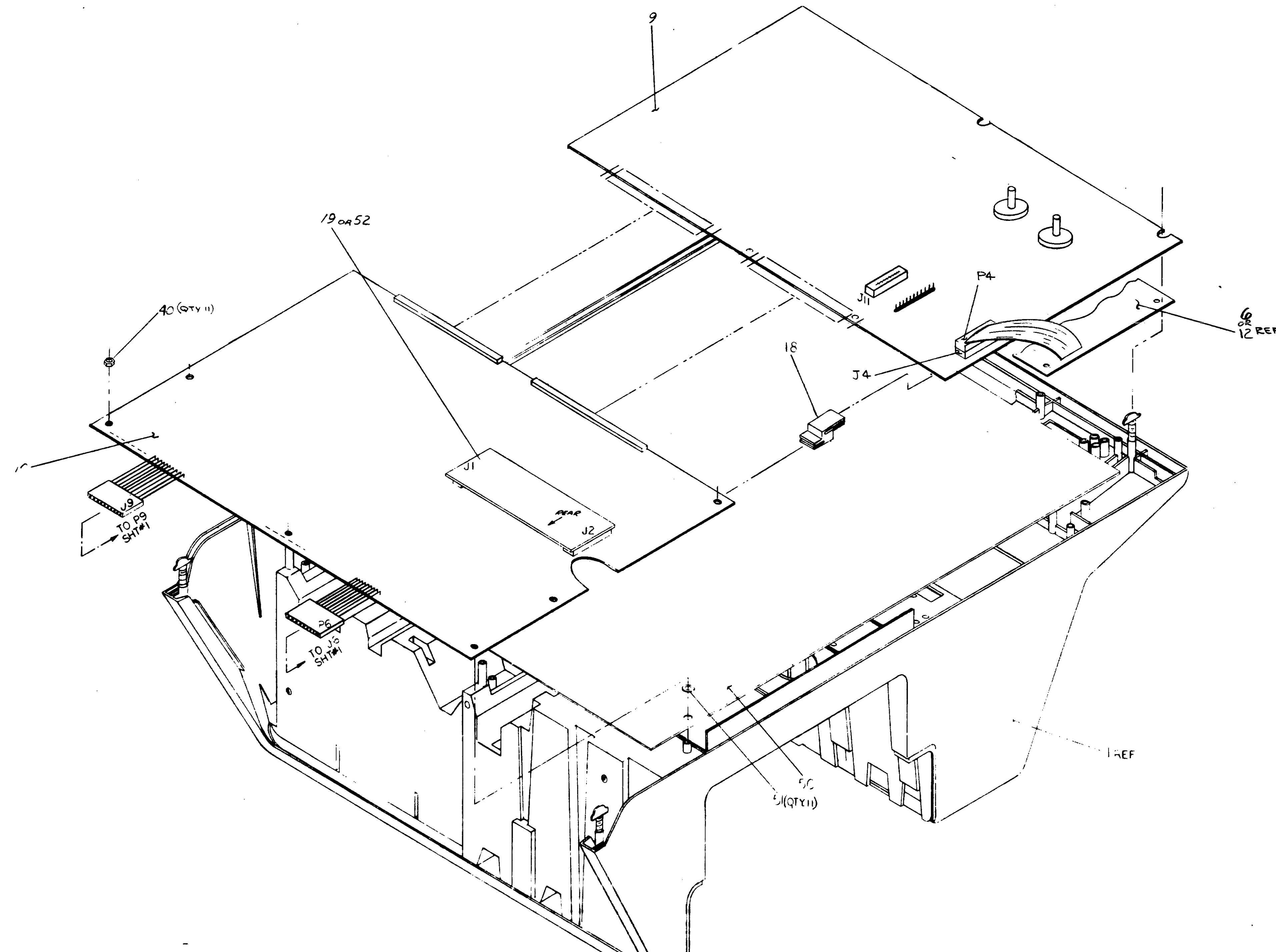

TITLE TERMINAL ASSY	AD 7013844-0-0	REV. J
SCALE —	SHEET 3 OF 3	

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 23ØV	0	1	0	1	0	1
5	D-UA-5411444-Ø-1	BOARD MONITOR	1	1	1	1	1	1
6	D-UA-5411170-~~ØØ~~	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~~	~~9006852~~	~~SPACER #6-32 x .50~~	~~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~~	~~9006653-00~~	~~WASHER, FLAT #6~~	~~1~~	~~1~~	~~1~~	~~1~~		
18	7415342-00	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

REV.	CHANGE NO.		
A	7013844-00001	J. WALLS	22 SEPT 77 / 27 OCT 77
B	7013844-00002	F. GARDNER	1 NOV 77
C	7013844-00003	P GARDNER	2 DEC 77
D	7013844-00004	J. WALLS	10 JAN 78 / 1/11/78
E	7013844-00005	J. WALLS	30 JAN 78 / 22 Feb 78
F	7013844-00006	P. GARDNER	21-MAY-78
H	7013844 00007	P. GARDNER	7-14-78 / 1 Aug 78
J	VT78 - ML008	B. MEACHAM	22 OCT 79 / 11-1-79

DRN.	R. RILEY	16JUN77
CHK'D		7/19/77
ENG.		19 July 77
PROJ. ENG.		19 July 77
PROD.		7/19/77

FIRST USED ON: VT78

digital

TITLE: TERMINAL ASSY

NEXT HIGHER ASSY.: E-UA-VT78-Ø-Ø

SIZE: C | CODE: PL | NUMBER: 7013844-0 | REV.: J

SCALE

SHEET 1 OF 2

DIST.

REV. J

C PL 7013844-0

DEC FORM NO. DRC 110 A

			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 J 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				

18 DEC FORM DRA 110

REVISIONS	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: *
CHK	NEXT HIGHER ASSEMBLY: 54-12660	DIST.	


```
                /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	TITLE: 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  KDR=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
```

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


```
 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
```


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```
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
```



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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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22
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
329                 ////////////////////////////  MORE BOOTSTRAP STUFF  ////////////////////////////
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--DF 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          XOR             /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          HLTD1
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
```

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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   06507  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   00666  7700  PM100,  -100
607   00667  7774  PM4,    -4
608   00670  0077  PK77,   77
609   00671  0240  PK240,  240
610   00672  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  KFRET,  FRET            /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
755   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
```



```
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  KRB1=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  ////////////////////////////////
```

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

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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 DIDN'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* 6301  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 TERM01
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                 $$$
```



```
A       0022    FLOPY2 1042    K377   0553    PK260  6672
ACSAV   0032    FLOPY3 1075    K7     0074    PK6300 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  6556
AUC     0460    GOODRD 0046    LAST   1160    PM110  0062
AUD     0462    HALT   0066    LCD    6751    PM4    6567
AUE     0471    HANGSG 0033    LOAD   0053    PM77   6450
AUF     0473    HLTADR 0064    LP     2047    PRQ    6073
AUG     0475    HLTCHK 6110    MEMERR 0764    PRS    5071
AUTO    0017    HLTD1  6117    MEMFLD 0021    PST    6072
B       0023    HLTD2  6127    MMER   6560    PSTART 6256
BADRD   6305    HLTFLG 0063    MMERR  6455    PSTAR1 6262
BEGG    0054    HLTOK  6134    MMFLD0 6545    PSTAR2 0066
BEGG1   6265    HYPHEN 6032    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
BTJRHT  6071    JMSTST 0444    MSG1   6644    RLN1   0656
C       0024    KBOOT1 0065    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 6656    STPBUF 4200
END2    6157    KRB1   6305    PCOUNT 0071    STR    6753
END3    6154    KRB2   6326    PCPNT  0045    STRBUF 4000
ESCAPE  1156    KRELSZ 6400    PER    6074    STRT   6052
ESCSEQ  0067    KRETUR 0122    PFLBT  5336    STRTBF 0123
FBOOT   0024    KSF1   6301    PGMHLT 0144    STRTUP 6471
FILA1   0537    KSF2   5321    PK05   6015    TADTST 0361
FLD     6300    KSPRBF 0125    PK11   6024    TAD1   0374
FLDCHG  0020    K10    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      TCF1   6312
FLOPY1 1044      K300   0106      PK255  0061      TCF2   6332
TERMIN 1140
TERMI0 1134
TERMI1 1144
TERMOU 1146
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
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
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DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE KK8-B PANEL MEMORY CODE	SIZE K	CODE SP	NUMBER VT78-0-2	REV *


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A          620#  855   869   969   974   981   982   985  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   959   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   850   871   874   897   889   890
          1019  1040
DELAY      148   204   432#  435
DELAY1      82#  433
DEPOS      269   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 *

V5A

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	
ENG. JOHN KIRK	DATE 14-APR-78	PANEL MEMORY CODE	
P.ENG. JOHN KIRK	DATE 14-APR-78		
PROD. JOE DIENST	DATE 14-APR-78	SIZE: K / CODE: SP / NUMBER: VT78-0-3	REV: *
NEXT HIGHER ASSEMBLY	54-12660	DIST.	

```
                /KK8-B PANEL MEMORY CODE
                /D.A.WHITE 7-MAR-1977
                /ASSEMBLE THIS FILE WITH PANROM.BI--THIS MAKES THE ROM CHECKSUM
                /COME OUT CORRECTLY.

          5667  ROMSUM=5667
          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 EPI LOADER.  SR0 NOT TESTED.
                //(INTERRUPT SHOULD BE OFF, OR CAF SHOULD BE FIRST INSTRUCTION EXECUTED IN MAIN
                /RX01=DEPENDING ON EPI 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 EPI BOARD INSERTED
                /       AC1=1 IF APT TEST
                /       AC2=UNDEFINED (DO NOT ASSUME ANYTHING--MASK OFF.)
                /       AC<3:5>=NBR OF EPI PROGRAMS TO LOAD-1
                /       AC<6:7>=UNDEFINED (DO NOT ASSUME ANYTHING--MASK OFF)
                /       AC<8:11>=BAUD RATE (SEE TSB IOT ABOVE)
```

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


```
                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
00003     0000  STATUS, 0                /FLAGS--LINK, INT BUS, INT ENA, I.P., 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     5346  HYPHEN, JMP END3
06003     5314  START,  JMP BOOT
06004     3002  PANEL,  DCA ACSAV         /SAVE ALL PERTINENT REGISTERS, SUCH AS AC
06005     6004          GTF
06006     0322          AND PK7700        /LINK, INT BUS, INT ENABLE
06007     3003          DCA STATUS
06010     6214          RDF
06011     7110          RAR CLL
06012     7012          RTR
06013     6224          RIF               /INSTRUCTION AND DATA FIELDS
06014     1003          TAD STATUS
06015     3003          DCA STATUS
06016     7344          STA CLL RAL       /LSB=16
06017     6043          TSB               /SET LOCAL TERMINAL BAUD RATE TO 9600
06020     6271          CDF 70            /THAT'S US, FOLKS!!
06021     7200          CLA               /FOR SAFETY'S SAKE, IN CASE C0 IS BAD
06022     6071          PRS               /GET PANEL STATUS BITS
06023     7450          SNA
06024     5200          JMP CRASH         /NO STATUS BITS AROUND--BAD!!!
06025     7510          SPA               /AC0 = 1 MEANS FIRST START AFTER POWER ON
06026     5727          JMP I STRT        /FILL PANEL PAGE 0 AND RUN DIAGNOSTIC
06027     7006          RTL
06030     3001          DCA PSTAT         /SAVE HLT BIT (IT'S AC 0).  WE'LL NEED IT LATER.
06031     1001          TAD PSTAT
06032     7730          SZL SPA CLA       /SKIP IF LINK AND AC0 BOTH ZERO
06033     5310          JMP BTORHT        /EITHER A PROGRAM HALT OR DEPRESSED BOOSTRAP BUTTON
```

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

```
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
```

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


```
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
```

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

```
                /       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 *

```
06335  6321          BOOT2
06336  7402          HLT

06337  7126  PFLBT,  7126            /YE FLOPPIE BOOTSTRAPPE--LOCATION 24, FLD 0
06340  1060          1060
06341  6751          6751
06342  7201          7201
06343  4053          4053            /LOC 30
06344  4053          4053
06345  7104          7104
06346  6755  FLPYST, 6755            /YE BOOTSTRAPPE STARTE
06347  5054          5054
06350  6754          6754
06351  7450          7450
06352  7610          7610
06353  5046          5046            /LOC 40
06354  1060          1060
06355  7041          7041
06356  1061          1061
06357  3060          3060
06360  5024          5024
06361  6751          6751
06362  4053          4053
06363  3002          3002            /LOC 50
06364  2050          2050
06365  5047          5047
06366  0000          0
06367  6753          6753
06370  5033          5033
06371  6752          6752
06372  5453          5453
06373  7024          7024            /LOC 60
06374  6030          6030            /END OF FLOPPY BOOTSTRAP
               /START-UP STUFF.  FILL PANEL R/W MEMORY WITH SUB LINKS AND CONSTANTS.

06375  0000  ZBLOCK 6400-.
       6400  *6400
06400  7735  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
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* 6571          MOVE1

00026* 0000  TYPE,   0               /TYPE THE CHARACTER IN THE AC, RETURN WITH 0 AC
00027* 5430          JMP I .+1       /LINK PRESERVED
00030* 6614          TYPE1
```

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


```
00031* 0000  CRLF,   0               /TYPE A CARRIAGE RETURN AND LINE FEED
00032* 5433          JMP I .+1       /AC IGNORED, RETURNS 0.  LINK PRESERVED.
00033* 6167          CRLF1

00034* 0000  OCTPNT, 0               /TYPE THE CONTENTS OF THE AC AS OCTAL DIGITS
00035* 5436          JMP I .+1       /CAUTION--LINK MODIFIED
00036* 6627          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* 6650          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* 6662          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* 6046          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* 6263          BEGG1
00057* 0007  PK7,    7
00060* 0255  PK255,  255             /ASCII HYPHEN
00061* 7777  HLTFLG, -1
00062* 7634  HLTADR, -PGMHLT-1
00063* 6314  KBOOT1, BOOT1
00064* 6254  PSTAR2, PSTART

       0043  OFFSET=.-RAREA

       6446  RELOC
06446  7701  PM77,   -77
06447  6000  PK6000, 6000            /YE BOTTOME ROM ADDRESS; ALSO LOCATION OF "CRASH" ROUTINE
06450  4037  CKSUM1, -3741
06451  5667  CKSUM2, ROMSUM
06452  6556  KMMER,  MMER

06453  3002  MMERR,  DCA ACSAV              /OFFENDING BITS IN AC
06454  6271          CDF 70
06455  1010          TAD 10
06456  7421          MQL               /ADDRESS IN MQ
06457  3003          DCA STATUS
06460  1252          TAD KMMER
06461  3000          DCA ORIGIN
06462  5663          JMP I .+1
06463  6073          HLTD1

06464  7001  APT,    IAC               /MAKE HLTFLG 1, SO STRAY HALTS WILL HANG UP CPU
06465  3061          DCA HLTFLG
```

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

```
00445  06466  5463           JMP I KBOOT1    /NOW RUN EPI
00446
00447  06467  7200  STRTUP,  CLA
00448  06470  3000           DCA ORIGIN
00449  06471  1000  CPLOOP,  TAD ORIGIN      /FILL CP RAM (ADDRESSES 1-77) WITH ADDRESS
00450  06472  3400           DCA I ORIGIN
00451  06473  2000           ISZ ORIGIN
00452  06474  5271           JMP CPLOOP
00453  06475  2000  CPRAM,   ISZ ORIGIN      /PERFORM CHECKSUM ON CP RAM
00454  06476  1400           TAD I ORIGIN    /USING LOCATION 0 AS ADDRESS POINTER
00455  06477  1001           TAD PSTAT       /AND LOCATION 1 AS CHECKSUM ACCUMULATOR
00456  06500  3001           DCA PSTAT
00457  06501  1000           TAD ORIGIN
00458  06502  1246           TAD PM77
00459  06503  7710           SPA CLA
00460  06504  5275           JMP CPRAM       /NOT DONE YET--GO BACK FOR MORE
00461  06505  1001           TAD PSTAT       /COMPARE ACCUMULATED SUM WITH EXPECTED
00462  06506  1250           TAD CKSUM1      /IS RESULT CORRECT?
00463  06507  7440           SZA
00464  06510  5647           JMP I PK6000    /NO--CP RAM FAILURE--TURN OFF "OK" LIGHT
00465  06511  7330           CLA STL RAR     /4000 TO AC
00466  06512  3001           DCA PSTAT       /SET "HLT" BIT IN PANEL STATUS WORD
00467  06513  1247  CPROM,   TAD PK6000     /NOW TRY A CHECKSUM ON THIS ROM.
00468  06514  3000           DCA ORIGIN
00469  06515  1400           TAD I ORIGIN
00470  06516  2000           ISZ ORIGIN
00471  06517  5315           JMP .-2
00472  06520  7440           SZA             /CKSUM2 IS SUCH THAT RESULT BETTER BE 0
00473  06521  5647           JMP I PK6000    /IT ISN'T--TURN OFF "OK" LIGHT.
00474  06522  1202  PAGE0,   TAD PZREL      /MOVE PANEL PAGE 0 INTO PLACE
00475  06523  3010           DCA 10
00476  06524  1201           TAD KRAREA
00477  06525  3011           DCA 11
00478  06526  1200           TAD KRELSZ
00479  06527  3012           DCA 12
00480  06530  1410           TAD I 10
00481  06531  3411           DCA I 11
00482  06532  2012           ISZ 12
00483  06533  5330           JMP .-3
00484  06534  7604           LAS
00485  06535  7004           RAL
00486  06536  7710           SPA CLA
00487  06537  5264           JMP APT         /SR SAYS THE APT LINE IS LOOKING FOR A BOOTSTRAP
00488  06540  7344           STA CLL RAL
00489  06541  6313           TSB1            /SET SLU2 AND SLU3 TO 9600 BAUD
00490  06542  6333           TSB2
00491  06543  6201  MMFLD0,  CDF 0           /NOW PERFORM AN ADDRESS TEST ON MAIN MEMORY
00492  06544  7240           STA
00493  06545  3010           DCA 10
00494  06546  1000           TAD ORIGIN
00495  06547  3410           DCA I 10
00496  06550  2000           ISZ ORIGIN
00497  06551  5346           JMP .-3
00498  06552  1410  FLD0CK,  TAD I 10        /COMPARE CONTENTS
00499  06553  7041           CIA
00500  06554  1000           TAD ORIGIN      /WITH EXPECTED
00501  06555  7440           SZA
```



```
00502  06556  5253  MMER,    JMP MMERR       /NOT SAME--COMPLAIN
00503  06557  2000           ISZ ORIGIN      /AND DO ALL ADDRESSES
00504  06560  5352           JMP FLD0CK
00505  06561  4031           JMS CRLF
00506  06562  4037           JMS MSG
00507  06563  0100           TEXT %A%        /TYPE "A"--PANEL R/W MEMORY FILLED
00508  06564  4023           JMS MOVE        /LOAD AND RUN THE DIAGNOSTIC
00509  06565  6676           STDIAG-1        /FROM
00510  06566  0065           DIAG-1          /TO
00511  06567  6720           DIAG-LAST       /SIZE
00512  06570  0140           OPRAT2          /STARTING ADDRESS
00513
00514  06571  6271  MOVE1,   CDF 70          /FIX DF IN CASE BOOTSTRAPPING FLOPPY AFTER IOF
00515  06572  1423           TAD I MOVE
00516  06573  3010           DCA 10          /"FROM"
00517  06574  2023           ISZ MOVE
00518  06575  1423           TAD I MOVE
00519  06576  3011           DCA 11          /"TO"
00520  06577  2023           ISZ MOVE
00521  06600  1423           TAD I MOVE
00522  06601  3012           DCA 12          /"-NUMBER OF WORDS"
00523  06602  2023           ISZ MOVE
00524  06603  1423           TAD I MOVE
00525  06604  3000           DCA ORIGIN      /STARTING ADDRESS IN MAIN MEMORY
00526  06605  6271  MOVE2,   CDF 70
00527  06606  1410           TAD I 10
00528  06607  6203           CDF CIF 0
00529  06610  3411           DCA I 11
00530  06611  2012           ISZ 12
00531  06612  5205           JMP MOVE2
00532  06613  5464           JMP I PSTAR2
00533
00534  06614  6046  TYPE1,   TLS             /REST OF TYPE CHARACTER ROUTINE
00535  06615  7200           CLA             /DON'T TRY TO BE SMART AND DO THIS WITH A FUNNY OPERATE--
00536  06616  1272           TAD PM100       /YOU'LL FOUL UP OCTPNT (IT NEEDS THE LINK PRESERVED)
00537  06617  3072           DCA WORD1
00538  06620  2072           ISZ WORD1
00539  06621  5220           JMP .-1         /TIME OUT FOR 1 CHARACTER TIME
00540  06622  6041           TSF             /NOW FLAG BETTER BE SET
00541  06623  7410           SKP             /IT ISN'T--SLU MALFUNCTION
00542  06624  5426           JMP I TYPE
00543  06625  6074           PER             /TURN OFF LIGHT
00544  06626  5225           JMP .-1         /AND HANG
00545
00546  06627  7004  OCTPN1,  RAL             /OCTAL PRINT OF C(AC)
00547  06630  3075           DCA OTEMP       /SHIFT AC ONE PLACE (ACCOUNT FOR LINK)
00548  06631  1273           TAD PM4
00549  06632  3076           DCA OCTR        /SET UP COUNTER FOR NUMBER OF DIGITS
00550  06633  1275           TAD PK260
00551  06634  4026           JMS TYPE
00552  06635  1075  OCTPN2,  TAD OTEMP       /GET WORD
00553  06636  7006           RTL
00554  06637  7004           RAL             /ROTATE LEFT 3 PLACES
00555  06640  3075           DCA OTEMP
00556  06641  1075           TAD OTEMP       /SAVE
00557  06642  0057           AND PK7         /KEEP ONLY OCTAL DIGIT
00558  06643  1276           TAD PK260       /CONVERT TO ASCII DIGIT
```

```
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
```

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```
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
```

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```
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* 7075          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
```

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```
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
```

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```
00345* 1021          TAD REGB
00346* 7721          CLA SWP
00347* 7041          CIA
00350* 1020          TAD REGA
00351* 7440          SZA
00352* 7402          HLT                 /PROBLEM WITH SWP ??
00353* 7701          CLA MQA
00354* 7440          SZA
00355* 7402          HLT                 /PROBLEM WITH SWP ??--AC WAS OK BUT MQ BAD??
00356* 2020          ISZ REGA
00357* 5250          JMP RNMQBS          /DO ANOTHER NUMBER

00360* 3024  TADTST, DCA C               /SET UP COUNT
00361* 1125          TAD R1              /THIS STUFF DOES NOTHING SPECIAL ON A SINGLE PASS.
00362* 7104          CLL RAL             /BUT CAN BE USED AS A RANDOM NUMBER GENERATOR IF YOU
00363* 7430          SZL                 /WANT TO PATCH TADTST AND ANDTST WITH ODT.
00364* 7001          IAC                 /JUST PUT AN EFFECTIVE JMP I (TADTST AT JMSTST
00365* 3125          DCA R1              /THEN START RUNNING AT OR BEFORE TADTST.
00366* 1126          TAD R2              /MACHINE WILL THEN RUN THE AND-TAD TESTS UNTIL HALTED.
00367* 1125          TAD R1
00370* 3126          DCA R2
00371* 1126          TAD R2
00372* 3025          DCA D
00373* 1126  TAD1,   TAD R2              /HERE'S THE REAL MEAT OF THE PROGRAM.  R2
00374* 1024          TAD C               /PLUS COUNT
00375* 7041          CMA IAC
00376* 1025          TAD D               /MINUS (R2+COUNT)
00377* 7440          SZA                 /SHOULD BE ZERO
00400* 7402          HLT                 /TAD TEST FAILURE
00401* 2025          ISZ D               /BUMP (R2+COUNT)
00402* 7000          NOP
00403* 2024          ISZ C               /BUMP COUNT
00404* 5510          JMP I TAD1P         /AND BACK WE GO

00405* 7240  ANDTST, CLA CMA             /PARTIAL "AND" SIMULATION OF PREVIOUS TAD TEST
00406* 0126          AND R2              /R2
00407* 3025          DCA D               /TO D
00410* 7240          CLA CMA
00411* 0126          AND R2              /R2 "AND" C
00412* 0024          AND C
00413* 7104          CLL RAL             /*2
00414* 3022          DCA A               /TO "A" [CARRY IS GENERATED ONLY ON 1+1]
00415* 7240          CLA CMA
00416* 0126          ANL R2              /THE NEXT BUMCH OF CODE
00417* 7040          CMA
00420* 0024          AND C
00421* 7040          CMA
00422* 3023          DCA B               /FORMS THE XOR OF R2 AND "C"
00423* 7240          CLA CMA
00424* 0024          AND C
00425* 7040          CMA
00426* 0126          AND R2
00427* 7040          CMA
00430* 0023          AND B
00431* 7040          CMA                 /IN THE ACCUMULATOR, PERFORMING A HALF-ADD
00432* 1022          TAD A               /ADD IN CARRY ---> RESULT IN AC
00433* 7041          CIA
```

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```
00434* 1025          TAD D               /RESULT SHOULD EQUAL D
00435* 7640          SZA CLA
00436* 7402          HLT                 /AND TEST FAILURE
00437* 2025          ISZ D
00440* 7000          NOP
00441* 2024          ISZ C
00442* 5210          JMP ANDTST+3

          0017  AUTO=17

                                        /TEST JMS INSTRUCTION
00443* 1264  JMSTST, TAD KBUFF          /BUFFER SIZE (CANNOT EXCEED ONE PAGE)
00444* 3023          DCA B
00445* 1124          TAD KSTRBF          /START OF BUFFER--MUST BE START OF PAGE
00446* 3017  AUA,    DCA AUTO
00447* 1120          TAD KJMSC
00450* 3025          DCA D
00451* 1025          TAD D
00452* 3417  AUB,    DCA I AUTO          /FILL BUFFER WITH "JMS  .", EXCEPT LAST INST
00453* 2025          ISZ D
00454* 2023          ISZ B
00455* 5251          JMP .-4
00456* 1263          TAD KJMPIA          /LAST INSTRUCTION IS "JMP I AUTO"
00457* 3417  AUC,    DCA I AUTO
00460* 1121          TAD KRETUR          /NOW MAKE AUTO = RETUR-1
00461* 3017  AUD,    DCA AUTO
00462* 5522          JMP I STRTBF        /AND GO EXECUTE WHAT'S IN BUFFER
00463* 5417  KJMPIA, JMP I AUTO
00464* 7601  KBUFF,  1+STRBUF-STPBUF
00465* 1264  RETUR,  TAD KBUFF
00466* 3023          DCA B
00467* 1124          TAD KSTRBF
00470* 3017  AUE,    DCA AUTO
00471* 7126          STL RTL
00472* 1017  AUF,    TAD AUTO            /CONTENTS OF EACH LOCATION IN BUFFER
00473* 7041          CIA                 /SHOULD EQUAL ADDRESS + 1 (EXCEPT FINAL JUMP, OF COURSE)
00474* 1417  AUG,    TAD I AUTO
00475* 7440          SZA
00476* 7402          HLT                 /JMS FAILURE
00477* 2023          ISZ B
00500* 5271          JMP .-7
00501* 4130          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
```

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

```
                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
```

	TITLE	SIZE	CODE	NUMBER	REV
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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
```

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

```
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
```



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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
```

```
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
```



```
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#  858
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#
```

```
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     600# 1220
FILAI      942#  945
FLD        298#
FLDCHG      50#  106   108   112   302   379
FLD0CK     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#
```

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


```
KBOOT1     168   421#  445
KBUFF      855   872#  873
KCDF       103   202#
KCDF10    1083  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
```

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

```
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          115#  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 *

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

```
                /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
```

```
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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```
06163  4031          JMS CRLF
06164  4023          JMS MOVE
06165  6672          STDIAG-1
06166  0065          DIAG-1
06167  6677          DIAG-LAST
06170  1123          NULJOB          /MOVE IN THE ENTIRE DIAGNOSTIC (PERHAPS AGAIN), AND
                                     /START AT "NULJOB"

06171  7200  CRLF1,  CLA             /TYPE CARRIAGE RETURN AND LINE FEED
06172  1250          TAD PK215
06173  4026          JMS TYPE
06174  1060          TAD PK212
06175  4026          JMS TYPE
06176  5431          JMP I CRLF
06177  0000  ZBLOCK 6200-.
       6200  *6200
06200  5331  RX01,   JMP FLOPPY

              ////////////////////////  BINARY LOADER FOR MR78  //////////////////////
              /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             /(THROW AWAY FIRST WORD--IT'S ALWAYS L-T)
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  4020          JMS FLDCHG      /MAKE SURE FIELD IS UP TO DATE
06214  1070          TAD CHAR        /GET CHARACTER
06215  3072          DCA WORD1       /SAVE AS FIRST CHARACTER
06216  6011          RSF             /OF A 12-BIT WORD
06217  5216          JMP .-1
06220  6016          RRB RFC         /READ SECOND CHARACTER
06221  3073          DCA WORD2       /AND SAVE
06222  4054          JMS BEGG        /LOOK AHEAD AT NEXT CHARACTER
06223  5244          JMP BEND        /TRAILER--END--CHECK CHECKSUM AND COUNT
06224  1072          TAD WORD1       /ORIGIN OR DATA--GO ON
06225  7106          CLL RTL
06226  7006          RTL
06227  7006          RTL
06230  1073          TAD WORD2       /ASSEMBLE 12-BIT WORD.  WORD IS DATA IF L = 0
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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```
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  6127           HLTD2
              ////////////////////////////  MORE BOOTSTRAP STUFF  ///////////////////////////
06314  4023   BOOT1,  JMS MOVE        /TURN INTERRUPT OFF BY EXITING TO MAIN MEMORY
06315  6320           INTOFF-1
06316  0003           3               /AND EXECUTING "IOF"
06317  7775           -3
06320  0004           4               /THEN BACK TO BOOT2 TO SEE WHAT TO DO NEXT
06321  6002   INTOFF, IOF             /THIS GOES IN LOC 4,5,6 OF FIELD 0---
06322  6073           PRQ             /SINCE THESE LOCATIONS ARE USED BY ODT BKPNT, THIS
06323  6324           BOOT2           /CAUSES THE LEAST ANNOYANCE.
06324  7604   BOOT2,  LAS             /GET BAUD RATE FROM BAUD RATE SWITCH
06325  6313           TSB1            /LOAD SLU2 BAUD RATE FROM SWITCHES
06326  7004           RAL             ///***WATCH OUT--DF IS 0 BECAUSE OF LAST MOVE***
06327  7730           SPA SZL CLA     /SKIPS ONLY IF BOTH L AND AC0 ARE ZERO
06330  5201           JMP BEGIN       /MR78.  RUN BINARY LOADER.
              //////////////////  BOOTSTRAP (START) THE FLOPPY DISK  ////////////////////
06331  4023   FLOPPY, JMS MOVE
06332  6335           PFLBT-1         /FROM
06333  0017           FBOOT-1         /TO
06334  7736           FBOOT-UNIT-1    /-NUMBER OF WORDS
06335  0033           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
```

```
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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```
06465  6117          HLTD1
06466  7001  APT,    IAC             /MAKE HLTFLG 1, SO STRAY HALTS WILL HANG UP CPU
06467  3063          DCA HLTFLG
06470  5465          JMP I KBOOT1    /NOW RUN MR78

                     ////////////////// BEGINNING OF THE INTERNAL DIAGNOSTIC //////////////////
                     ////////////////////THIS PART RUNS IN PANEL MEMORY ////////////////////
06471  7200  STRTUP, CLA
06472  3000          DCA ORIGIN
06473  1000  CPLOOP, TAD ORIGIN      /FILL CP RAM (ADDRESSES 1-77) WITH ADDRESS
06474  3400          DCA I ORIGIN
06475  2000          ISZ ORIGIN
06476  5273          JMP CPLOOP
06477  2000  CPRAM,  ISZ ORIGIN      /PERFORM CHECKSUM ON CP RAM
06500  1400          TAD I ORIGIN    /USING LOCATION 0 AS ADDRESS POINTER
06501  1001          TAD PSTAT       /AND LOCATION 1 AS CHECKSUM ACCUMULATOR
06502  3001          DCA PSTAT
06503  1000          TAD ORIGIN
06504  1250          TAD PM77
06505  7710          SPA CLA
06506  5277          JMP CPRAM       /NOT DONE YET--GO BACK FOR MORE
06507  1001          TAD PSTAT       /COMPARE ACCUMULATED SUM WITH EXPECTED
06510  1252          TAD CKSUM1      /IS RESULT CORRECT?
06511  7440          SZA
06512  5651          JMP I PK6000    /NO--CP RAM FAILURE--TURN OFF "OK" LIGHT
06513  7330          CLA STL RAR     /4000 TO AC
06514  3001          DCA PSTAT       /SET "HLT" BIT IN PANEL STATUS WORD
06515  1251  CPROM,  TAD PK6000      /NOW TRY A CHECKSUM ON THIS ROM.
06516  3000          DCA ORIGIN
06517  1400          TAD I ORIGIN
06520  2000          ISZ ORIGIN
06521  5317          JMP .-2
06522  7440          SZA             /CKSUM2 IS SUCH THAT RESULT BETTER BE 0
06523  5651          JMP I PK6000    /IT ISN'T--TURN OFF "OK" LIGHT.
06524  1202  PAGE0,  TAD PZREL       /MOVE PANEL PAGE 0 INTO PLACE
06525  3010          DCA 10
06526  1201          TAD KRAREA
06527  3011          DCA 11
06530  1200          TAD KRELSZ
06531  3012          DCA 12
06532  1410          TAD I 10
06533  3411          DCA I 11
06534  2012          ISZ 12
06535  5332          JMP .-3
06536  7604          LAS
06537  7004          RAL
06540  7710          SPA CLA
06541  5266          JMP APT         /SR SAYS THE APT LINE IS LOOKING FOR A BOOTSTRAP
06542  7344          STA CLL RAL
06543  6313          TSB1            /SET SLU2 AND SLU3 TO 9600 BAUD
06544  6333          TSB2
06545  6201  MMFLD0, CDF 0           /NOW PERFORM AN ADDRESS TEST ON MAIN MEMORY
06546  7240          STA
```

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```
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
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```
06631  1075  OCTPN2, TAD OTEMP       /GET WORD
06632  7006          RTL
06633  7004          RAL             /ROTATE LEFT 3 PLACES
06634  3075          DCA OTEMP
06635  1075          TAD OTEMP       /SAVE
06636  0057          AND PK7         /KEEP ONLY OCTAL DIGIT
06637  1272          TAD PK260       /CONVERT TO ASCII DIGIT
06640  4026          JMS TYPE
06641  2076          ISZ OCTR        /KEEP GOING UNTIL ALL 4 DIGITS PRINTED
06642  5231          JMP OCTPN2
06643  5434          JMP I OCTPNT

06644  6271  MSG1,   CDF 70
06645  1437          TAD I MSG       /PRINT TEXT FOLLOWING CALL--GET PIECE OF TEXT
06646  2037          ISZ MSG                 /INCREMENT RETURN
06647  3074          DCA CKSUM       /AS GOOD A PLACE FOR TEMP STORAGE AS ANY!
06650  1074          TAD CKSUM
06651  7002          BSW
06652  4042          JMS PCHAR       /PROCESS LEFT HALF--STRIP OFF UNWANTED BITS, CONVERT
06653  1074          TAD CKSUM
06654  4042          JMS PCHAR       /DO SAME FOR RIGHT HALF
06655  5244          JMP MSG1        /GO BACK FOR MORE

06656  0270  PCHAR1, AND PK77                /THROW AWAY WRONG HALF OF WORD
06657  7450          SNA
06660  5437          JMP I MSG       /IF RESULTING CHARACTER IS 0, END OF MESSAGE
06661  1271          TAD PK240               /OTHERWISE, COMPLEMENT BIT 6
06662  0270          AND PK77
06663  1271          TAD PK240       /CONVERT TO ASCII
06664  4026          JMS TYPE        /AND TYPE
06665  5442          JMP I PCHAR

06666  7700  PM100,  -100
06667  7774  PM4,    -4
06670  0077  PK77,   77
06671  0240  PK240,  240
06672  0260  PK260,  260

       0066  DIAG=66          /CHANGE WITH CAUTION!!  WATCH PAGE BOUNDARIES.

             /SOME PAGE ZERO VARIABLES AND FUNNY OPERATES FOR OPRATE AND MRI TESTS
       7401  MQNOP=7401
       7601  MQCLA=7601
             /THE FOLLOWING RESIDE IN PAGE 0, FIELD 0 OF MAIN MEMORY
       0020  REGA=20
       0021  REGB=21
       0022  A=22
       0023  B=23
       0024  C=24
       0026  KLTRS=26
       0025  D=25

       6673  STDIAG=.                /START OF THE DIAGNOSTIC STUFF
       0066  RELOC DIAG
```

```
                        ///////////////  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
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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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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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756   00232* 7165          CLL CML CMA IAC RAL
757   00233* 7010          RAR
758   00234* 7073          CML CMA IAC RTR
759   00235* 7006          RTL
760   00236* 7071          CML CMA IAC RAR
761   00237* 7004          RAL
762   00240* 7067          CML CMA IAC RTL
763   00241* 7012          RTR
764   00242* 7041          CIA
765   00243* 1020          TAD REGA
766   00244* 7430          SZL
767   00245* 7440          SZA
768   00246* 7402          HLT                 /COMBINED IAC, ROTATE DID NOT WORK
769   00247* 2020          ISZ REGA
770   00250* 5231          JMP RUNRT
771
772   00251* 1020  RNMQBS,  TAD REGA           /CHECK MQ AND BSW INSTRUCTIONS--GET NUMBER
773   00252* 7106          RTL CLL
774   00253* 7006          RTL                 /SIMULATE BSW
775   00254* 7006          RTL
776   00255* 0110          AND K7700
777   00256* 3021          DCA REGB
778   00257* 1020          TAD REGA
779   00260* 7112          RTR CLL
780   00261* 7012          RTR
781   00262* 7012          RTR
782   00263* 0104          AND K77
783   00264* 1021          TAD REGB
784   00265* 7002          BSW                 /NOW DO A REAL BSW TO GET ORIGINAL VALUE BACK
785   00266* 7041          CIA
786   00267* 1020          TAD REGA            /AND COMPARE WITH ORIGINAL
787   00270* 7440          SZA
788   00271* 7402          HLT                 /BSW FAILED
789   00272* 1020          TAD REGA            /NOW TEST MQ INSTRUCTIONS
790   00273* 7040          CMA
791   00274* 3021          DCA REGB
792   00275* 1020          TAD REGA
793   00276* 7421          MQL
794   00277* 7440          SZA
795   00300* 7402          HLT                 /MQL DID NOT CLEAR AC
796   00301* 1021          TAD REGB
797   00302* 7521          SWP
798   00303* 7401          MQNOP               /MQ NOP = 7401
799   00304* 7041          CIA
800   00305* 1020          TAD REGA
801   00306* 7640          SZA CLA
802   00307* 7402          HLT                 /MQ NOP DID SOMETHING ??
803   00310* 1020          TAD REGA
804   00311* 7601          MQCLA               /GROUP 3 CLA
805   00312* 7440          SZA
806   00313* 7402          HLT                 /WELL, IT SHOULD HAVE, BUT IT DIDN'T CLEAR AC
807   00314* 1020          TAD REGA
808   00315* 7701          CLA MQA
809   00316* 7041          CIA
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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)
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```
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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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
```

```
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
```

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

```
1188   01016* 7440          SZA
1189   01017* 7402          HLT             /INTERRUPT WRONG ADDRESS--INT INH BAD??
1190   01020* 6214          RDF
1191   01021* 7440          SZA
1192   01022* 7402          HLT             /DATA FIELD WAS NOT RESET ON INTERRUPT
1193   01023* 6213          CIF CDF 10
1194   01024* 1233          TAD KCIF        /HLT AT THIS LOC IN FIELD 1 INDICATES XTN
1195                                        /DID NOT WAIT FOR JMP OR JMS
1196   01025* 3632          DCA I KHLT1     /KHLT
1197   01026* 1234          TAD JMPXA
1198   01027* 3513          DCA I XTNP2     /KHLT+1
1199                 ////////////////////////////////////////////////////////////////////////
1200                 /FIELD 1 NOW HAS HLT IN ALL LOCATIONS EXCEPT:
1201                 /       KHLT,   CIF 0
1202                 /       KCIF,   JMP XA
1203                 ////////////////////////////////////////////////////////////////////////
1204   01030* 5632          JMP I KHLT1     /CHECK THAT JMP I DOES CHANGE FIELD CORRECTLY
1205                                        /(JMP DIRECT CHECKED COMMING BACK FROM FIELD 1)
1206   01031* 7402  KHLT,   HLT             /SHOULD HAVE CHANGED INST FIELD, DID NOT.
1207   01032* 1031  KHLT1,  KHLT
1208   01033* 6203  KCIF,   CIF CDF 0
1209   01034* 5235  JMPXA,  JMP XA
1210   01035* 4131  XA,     JMS TYPEIT      /COME BACK TO HERE IF ALL IS OK.  TYPE "E"
1211                 /////////////////  DIAGNOSTIC--FLOPPY INTERFACE TEST  //////////////////////
1212                 /AS MUCH AS WE CAN DO WITHOUT CORRUPTING DISK
1213                 /WILL ALSO RUN CORRECTLY IF NO RX01 ON SYSTEM.
1214
1215   01036* 1105  FPYTST, TAD K200        /MAINTENANCE BIT--MUST ALWAYS BE SET, ELSE CODE
1216   01037* 7421          MQL             /ON FLOPPY GETS SMASHED
1217   01040* 7501          MQA
1218   01041* 6751          6751            /SET UP MAINTENANCE MODE
1219   01042* 7201  FLOPY2, CLA IAC
1220   01043* 3022          DCA A
1221   01044* 1022  FLOPY1, TAD A           /CODE MAKES 2 PASSES.  FIRST PASS SLIDES A "1" THRU AC.
1222   01045* 7501          MQA             /SECOND PASS FILLS AC WITH 1'S FROM RT TO LEFT.
1223   01046* 0137          AND K7677       /ZERO THE "8-BIT MODE" BIT
1224   01047* 3023          DCA B
1225   01050* 1023          TAD B
1226   01051* 6751          6751            /IN EITHER CASE, 200 IS "OR"ED WITH AC (TO KEEP
1227                                        /MAINT BIT SET).  FLOPPY REGISTER IS LOADED,
1228                                        /READ BACK AND CHECKED FOR CORRECTNESS.
1229   01052* 7440          SZA
1230   01053* 7402          HLT             /IOT SHOULD HAVE CLEARED AC, DID NOT.
1231   01054* 6752          6752
1232   01055* 7041          CIA
1233   01056* 1023          TAD B
1234   01057* 7640          SZA CLA
1235   01060* 7402          HLT             /FLOPPY DATA REGISTER ERROR
1236   01061* 1022          TAD A
1237   01062* 7104  KINST1, RAL CLL         /BECOMES "RAL STL" ON SECOND PASS
1238   01063* 3022          DCA A
1239   01064* 7420          SNL             /WHEN A "1" APPEARS IN LINK, PASS IS DONE.
1240   01065* 5244          JMP FLOPY1
1241   01066* 1273  KOUT1,  TAD KINST       /BECOMES "JMP FLOPY3" ON SECOND PASS
```

```
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  TERMO1, 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
```

```
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
```

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

```
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
TYPEl   6616
UNIT    0061
WORDl   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  1236  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#
BEGGl      307#  322   459
BEGIN      243#  344
BEND       263   282#
BOOT        90   154#  189
BOOTST     355#
BOOTl      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 *

```
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
```

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

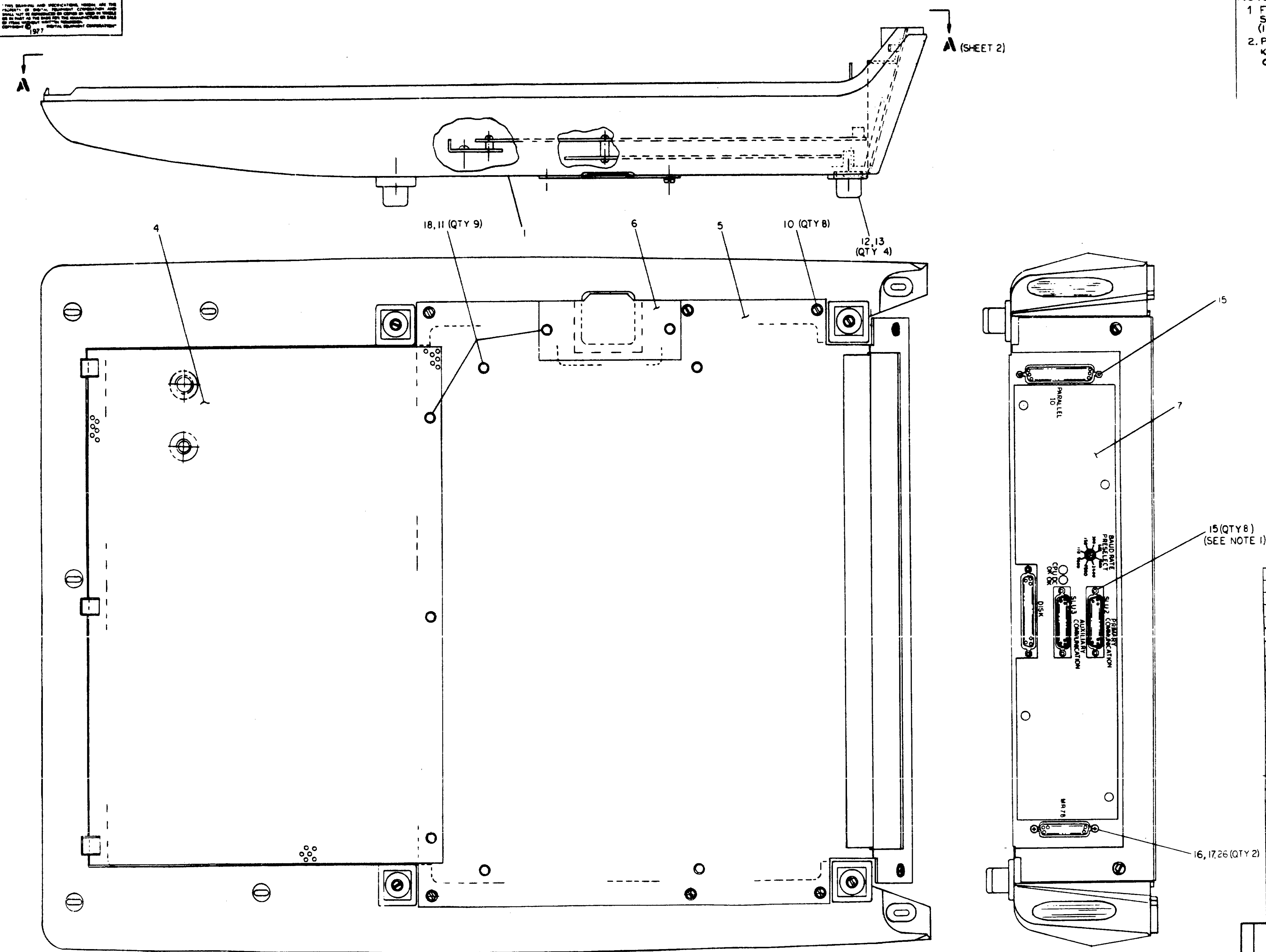
```
TSB2        537   956#
TSF1        946#  1054  1295
TSF2        954#  1057
TTYBUF      678#   978   992
TYPE        200    213   226   228   428#  586   593   601   623
TYPEIT      687#   694   701   932  1034  1210  1268
TYPE1       430    582#
UNIT        349    361   364   366   380   383   401#
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 *

NOTES:

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



QTY	DESCRIPTION	DWG./PART NO.	ITEM NO.
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, PH TR. HD 10-32×5/8	9006074-03	24
2	NUT TINNERMAN	9007786-00	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	9008172-0 0	17
2	SCREW, PH. PN. HD. 4-40×312	9006010-01	16
8	SCREW LOCK ASSY	9008451-0-0	15
4	GUIDE, CARD	1211630-0-0	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	3614279-0-0	7
1	PLATE, COVER	B-MD-7418565-0-0	6
1	BASE PAN WELDM'T	D-IA 7013890-0-0	5
1	SCREEN, BASE, FRONT	I-IA-7413322-01	4
1	IO DIST. PANEL ASSY.	A-PL-5412861-0-0	3
1	MEM./PROC. BD. ASSY.	KK8-B	2
1	BASE, VT5Ø	E-MD-7411539-0-1	1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS

FIRST USED ON: VT78

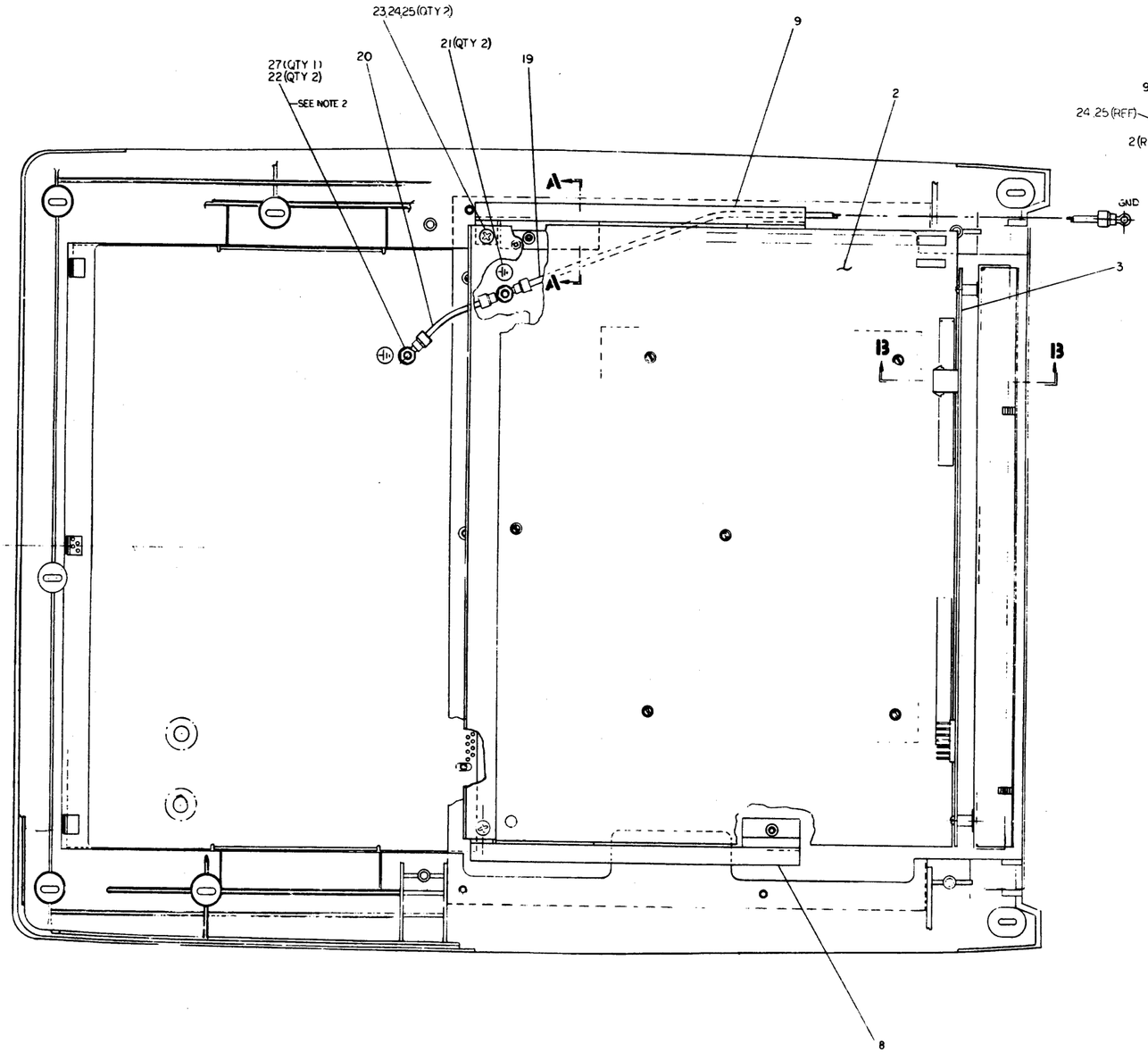
TITLE: PROCESSOR ASSEMBLY

MATERIAL: SEE PARTS LIST

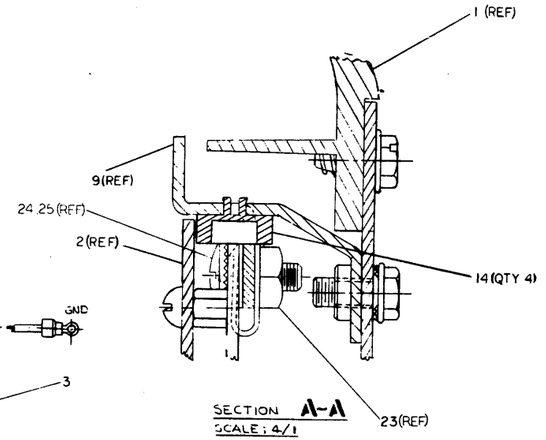
SCALE 1/1 — SHEET 1 OF 2

SIZE 1 AD — NUMBER 7013891-0-0 — REV. C

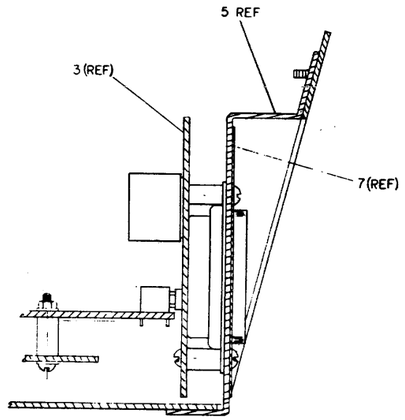
DO NOT SCALE DWG



VIEW A-A



SECTION A-A
SCALE: 4/1



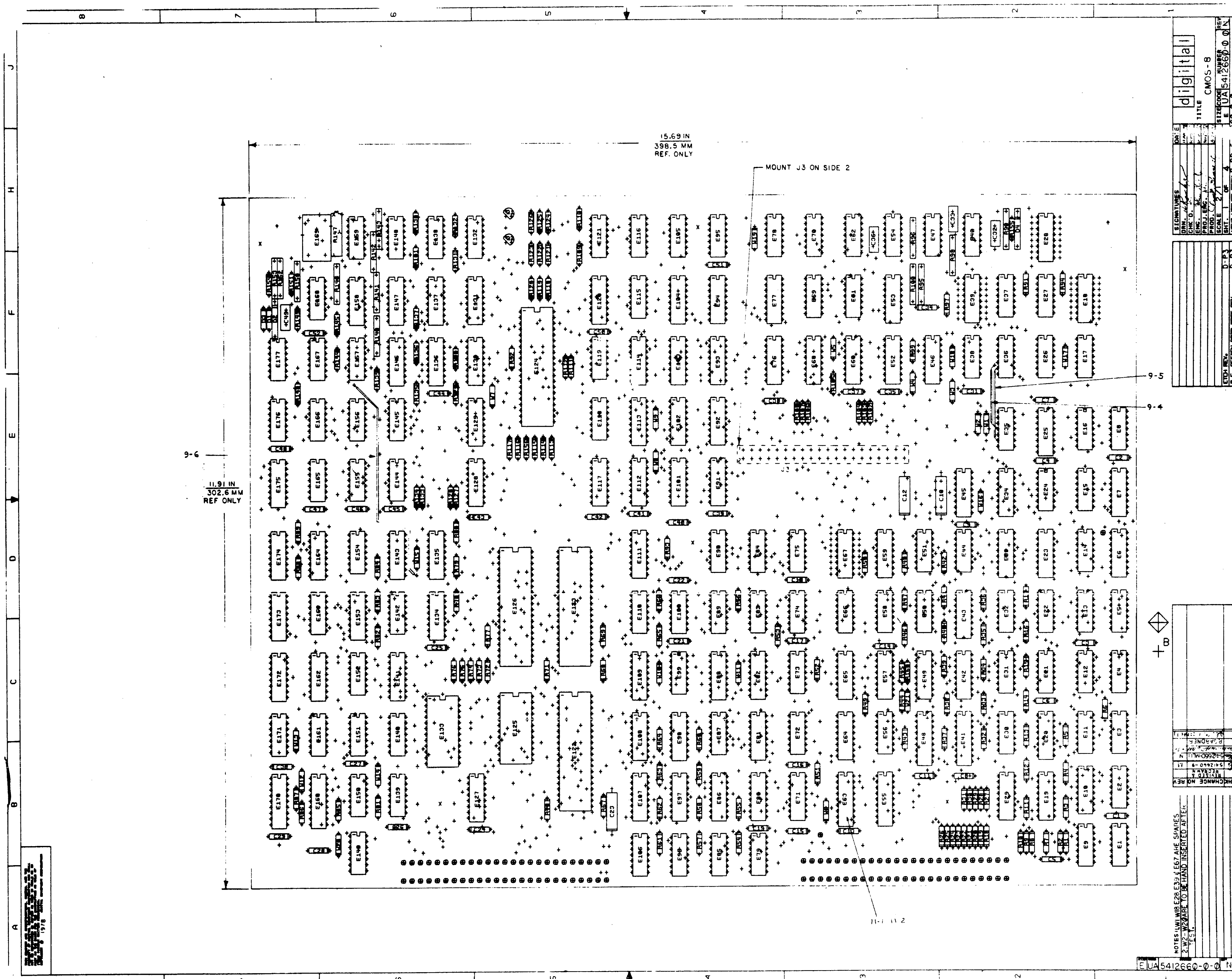
SECTION B B
SCALE: 2/1

REVISIONS		
CHG	CHANGE NO	REV

TITLE: PROCESSOR ASSEMBLY
SCALE 1/1 & NOTED | SHEET 2 OF 2
SIZE: B | CODE | NUMBER: AD 7015891-C-0 | REV: C
DIST

AD 7013891-C-0 REV C

85


15.69 IN
398.5 MM
REF. ONLY
MOUNT J3 ON SIDE 2
11.91 IN
302.6 MM
REF ONLY
9-6
9-5
9-4
digital
TITLE CMOS-8
SIZE E CODE UA NUMBER 5412660-0-0 REV N
SIGNATURES
DRN.
CHK'D.
ENG.
PROJ. ENG.
PROD.
SCALE 2/1
SHT. 1 OF 4
NEXT HIGHER ASSY. B-DD-54
ETCH REV. D-P3
P.C. DESIGN DATA BASE REV. D-P3
E UA 5412660-0-0 N

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		
B,C	00004	F	SECTION,VARIATION INDEX	CHK'D: J.KIRK	DATE: 20-FEB-78	TITLE	PARTS LIST								
-	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	

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 2IN$	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 A OF A
							CMOS-8	

SIZE	CODE	DOCUMENT NUMBER	REV
K	PL	5412660-0-DBP	N

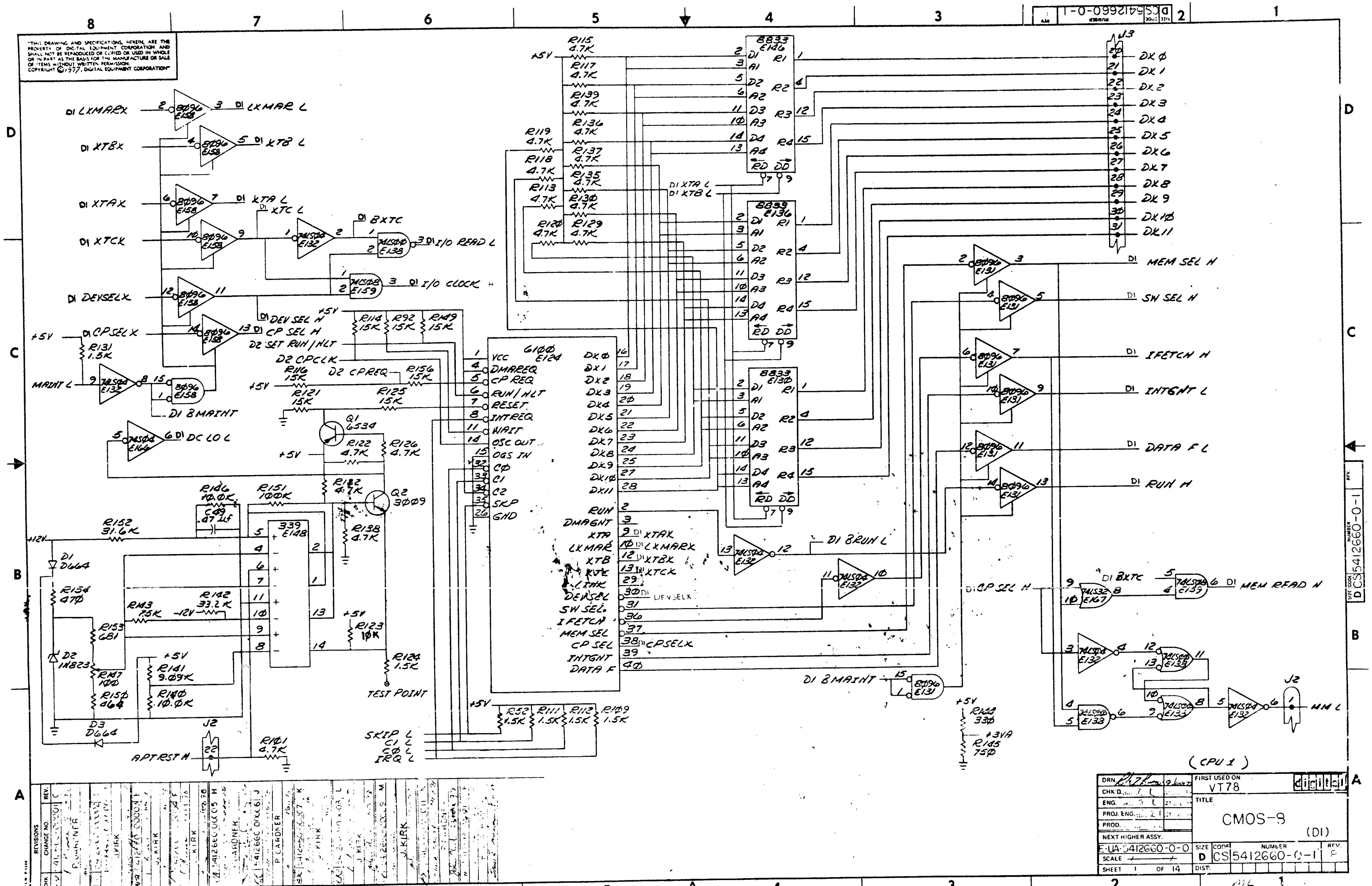
P A R T S L I S T

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-C8-5412660-0-1 (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	SECTION A OF A
							CMOS-8	

SIZE	CODE	DOCUMENT NUMBER	REV
K	PL	5412660-0-DBP	N



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DI LXMARX
DI LXMAR L
DI XTBX
DI XTB L
DI XTAX
DI XTA L
DI XTC L
DI XTCK
DI 8XTC
DI I/O READ L
DI I/O CLOCK H
DI DEVSELX
DI DEV SEL H
DI CPSELX
DI CP SEL H
D2 SET RUN/HLT
D2 CPCLK
D2 CPREQ
MAINT L
DI 8MAINT
DI DC LO L
6100 E124
VCC
DMAREQ
CP REQ
RUN/HLT
RESET
INTREQ
WAIT
OSC OUT
OSC IN
C0
C1
C2
SKP
GND
RUN
DMAGNT
XTA
LXMAR
XTB
XTC
LINK
DEVSEL
SW SEL
IFETCH
MEM SEL
CP SEL
INTGNT
DATA F
DX0
DX1
DX2
DX3
DX4
DX5
DX6
DX7
DX8
DX9
DX10
DX11
8833 E146
8833 E136
8833 E130
DI XTA L
DI XTB L
J3
DI MEM SEL H
DI SW SEL H
DI IFETCH H
DI INTGNT L
DI DATA F L
DI RUN H
DI 8RUN L
DI 8XTC
DI CP SEL H
DI MEM READ H
DI 8MAINT
MM L
J2
Q1 6534
Q2 3009
339 E148
D1 D664
D2 1N823
D3 D664
TEST POINT
SKIP L
C1 L
C0 L
IRQ L
APT RST H
+5V
+12V
-12V
+3VA
(CPU 1)
FIRST USED ON VT78
TITLE CMOS-8 (DI)
NEXT HIGHER ASSY. E-UA-5412660-0-0
SIZE D
CODE CS
NUMBER 5412660-0-1
REV. P
SHEET 1 OF 14
D CS 5412660-0-1
digital

DI DC LØ L

+3VA

DI BRUN L

CLR BTSTP L

SET BTSTP L

DI LXMAR L

D2 SET RUN/HLT

PWR UP FF

ERROR FF

D2 CPREQ

DXØ

DX1

DX2

DX3

CØ L

C1 L

ERR L

DC LØ H

D2 RSF H

D2 RRB H

DI I/Ø READ L

DI I/O CLOCK H

D2 A

D2 B

D2 C

D2 D

74LS/74 E137

74LS/74 E128

74LS/74 E175

MAR Ø

MAR 1

MAR 2

MAR 3

MAR 4

MAR 5

MAR 6

MAR 7

MAR 8

MAR 9

MAR 1Ø

MAR 11

DX 4

DX 5

DX 6

DX 7

DX 8

DX 9

DX 1Ø

DX 11

+3V DI LXMAR L

D2 CPCLK

D2 SLU CLK

OSCILLATOR 2Ø.277 MHZ

+5V

R1Ø 1.5K

CLOCK DISABLE L

W7

W8

W9

DI I/Ø READ 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	ECL

(CPU 2)

TITLE: CMOS 8 (D2)

SIZE: D | CODE: CS | NUMBER: 5412660-0-1 | REV: P

SCALE: | SHEET 2 OF 14 | DIST:

DEC FORM NO. DRD 138

91

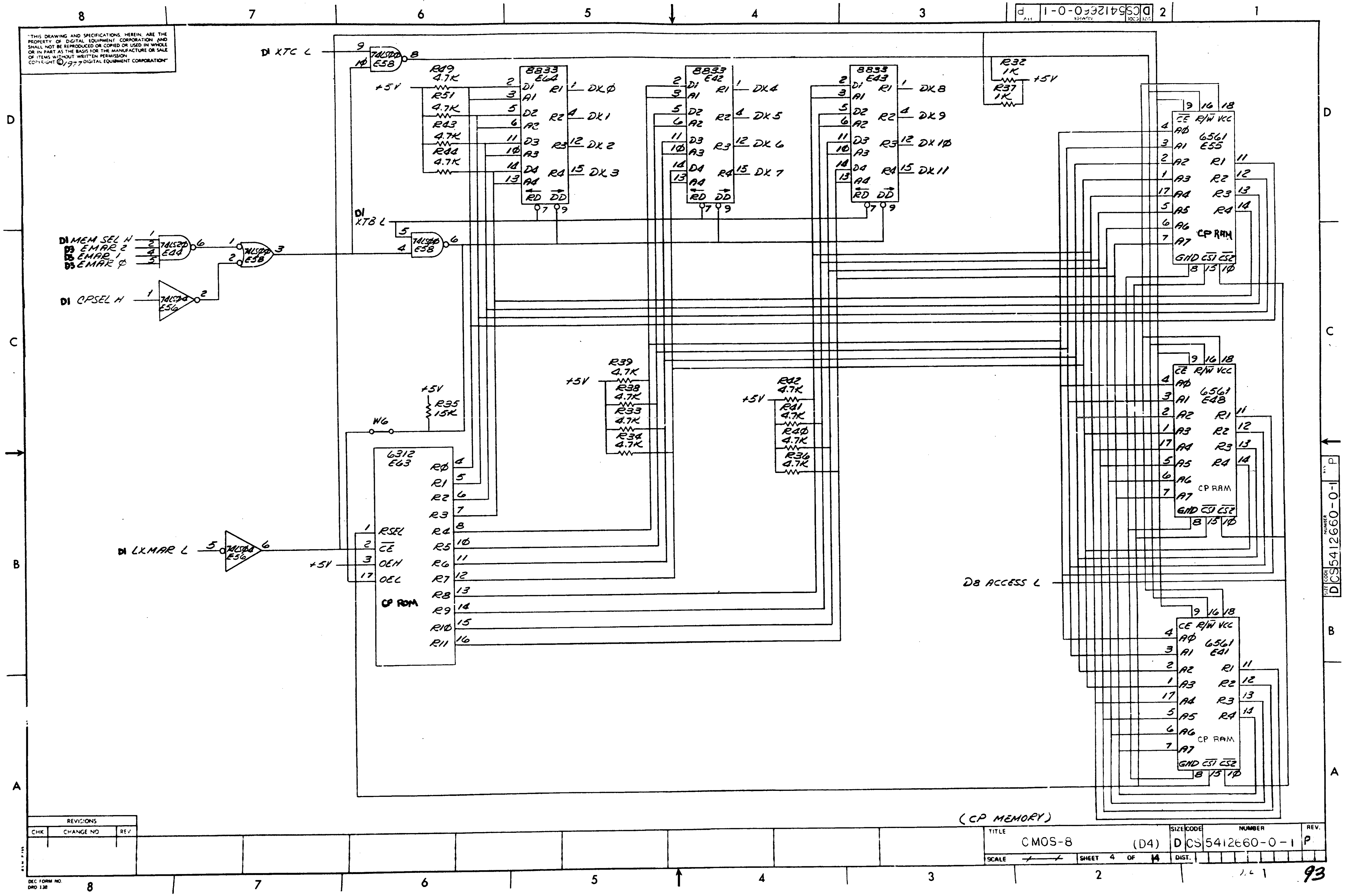
D1 LXMAR L
D1 I/Φ CLK H
D1 IFETCH N
D3 IFERH L
D3 DIRECT JMP + JMS
D3 JMP + JMS
D1 DC LO L
+5V A
D1 MEM READ H
D2 CAF L
MAR 6
MAR 7
MAR 8
D2 MAR<6:8>IN
D1 DC LO L
INT INH. FF
INTREQ L
R11Φ 1.5K
+5V
D2 LOAD IB L
D1 INTGNT L
D3 INTGNT H
D3 IRQ L
D1 DATAF L
D2 LOAD DF L
D3 INTGNT N
D1 DC LO L
D2 SF OUT L
D1 RESET
D3 DIRECT JMP + JMS
D3 JMP + JMS
D2 SF → AC L
D2 RDF + RIF L
MAR 4
CΦ L
C1 L
DX Φ
DX 1
DX 2
DX 3
DX 4
DX 5
DX 6
DX 9
DX 11
DX 10
DX 8
DX 7
D3 EMAR Φ
D3 EMAR 1
D3 EMAR 2
D3 INTGNT N
D2 RTF L
D2 SF → AC L
(MEM XTN CTRL)

REVISIONS		
CHK	CHANGE NO	REV

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

DEC FORM NO. DRD 138 92 8

DCS5412660-0-1 P



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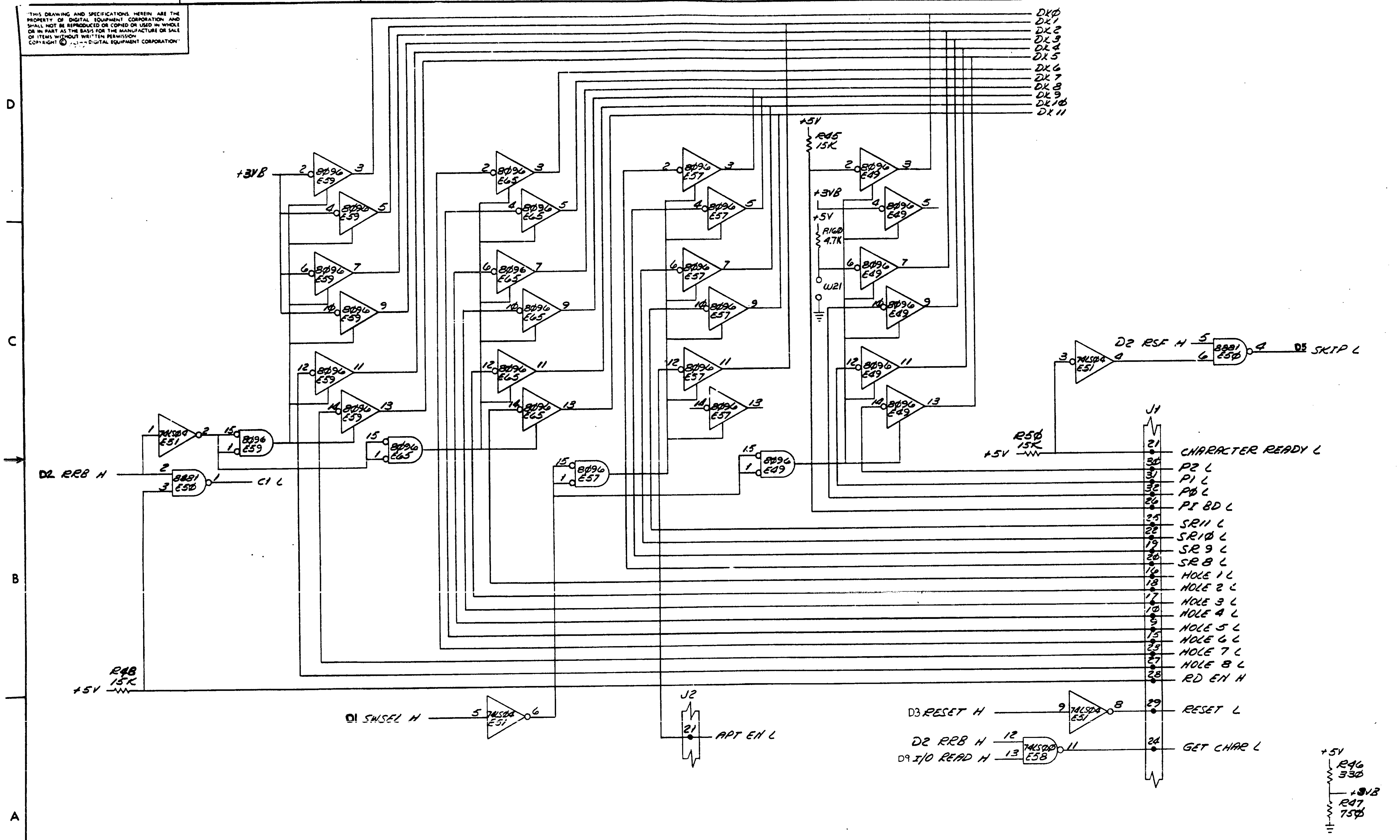
D1 XTC L
74LS00 E58
8833 E42
8833 E42
8833 E43
DX Ø
DX 1
DX 2
DX 3
DX 4
DX 5
DX 6
DX 7
DX 8
DX 9
DX 1Ø
DX 11
R32 1K
R37 1K
+5V
6561 E55
CP RAM
D1 MEM SEL H
D3 EMAR 2
D3 EMAR 1
D3 EMAR Ø
74LS20 E44
D1 XTB L
D1 CPSEL H
74LS04 E56
R35 15K
W6
6312 E63
CP ROM
RSEL
D1 LXMAR L
R39 4.7K
R38 4.7K
R33 4.7K
R34 4.7K
R42 4.7K
R41 4.7K
R4Ø 4.7K
R36 4.7K
6561 E48
D8 ACCESS L
6561 E41
(CP MEMORY)
REVISIONS
CHK
CHANGE NO
REV
TITLE
CMOS-8 (D4)
SIZE D
CODE CS
NUMBER 5412660-0-1
REV. P
SCALE
SHEET 4 OF 14
DIST.
DEC FORM NO. DRD 138


DKØ
DK1
DK2
DK3
DK4
DK5
DK6
DK7
DK8
DK9
DK1Ø
DK11
+3VB
8Ø96 E59
8Ø96 E65
8Ø96 E57
8Ø96 E49
+5V
R45 15K
R16Ø 4.7K
W21
D2 RSF H
74LSØ4 E51
8881 E5Ø
D5 SKIP L
J1
R5Ø 15K
CHARACTER READY L
P2 L
P1 L
PØ L
PI BD L
SR11 L
SR1Ø L
SR 9 L
SR 8 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
D2 RRB H
C1 L
R48 15K
D1 SWSEL H
J2
APT EN L
D3 RESET H
RESET L
D2 RRB H
D9 I/O READ H
74LSØØ E58
GET CHAR L
R46 33Ø
R47 75Ø
(MR78 INTERFACE)

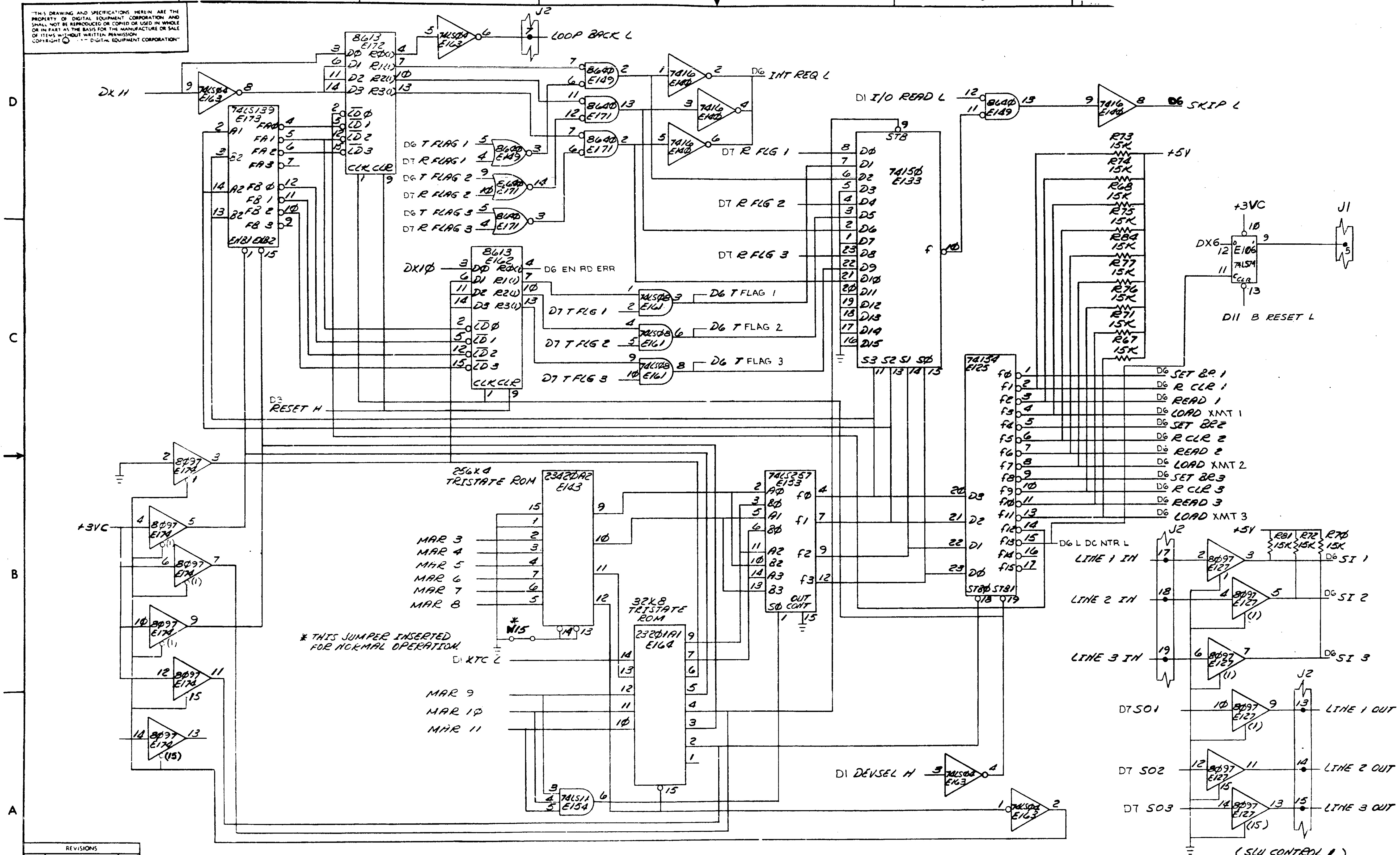
REVISIONS		
CHK	CHANGE NO	REV

TITLE: CMOS-8 (D5)

SIZE: D | CODE: CS | NUMBER: 5412660-0-1 | REV: P

SCALE: — | SHEET 5 OF 14 | DIST.

DEC FORM NO. DRD 138

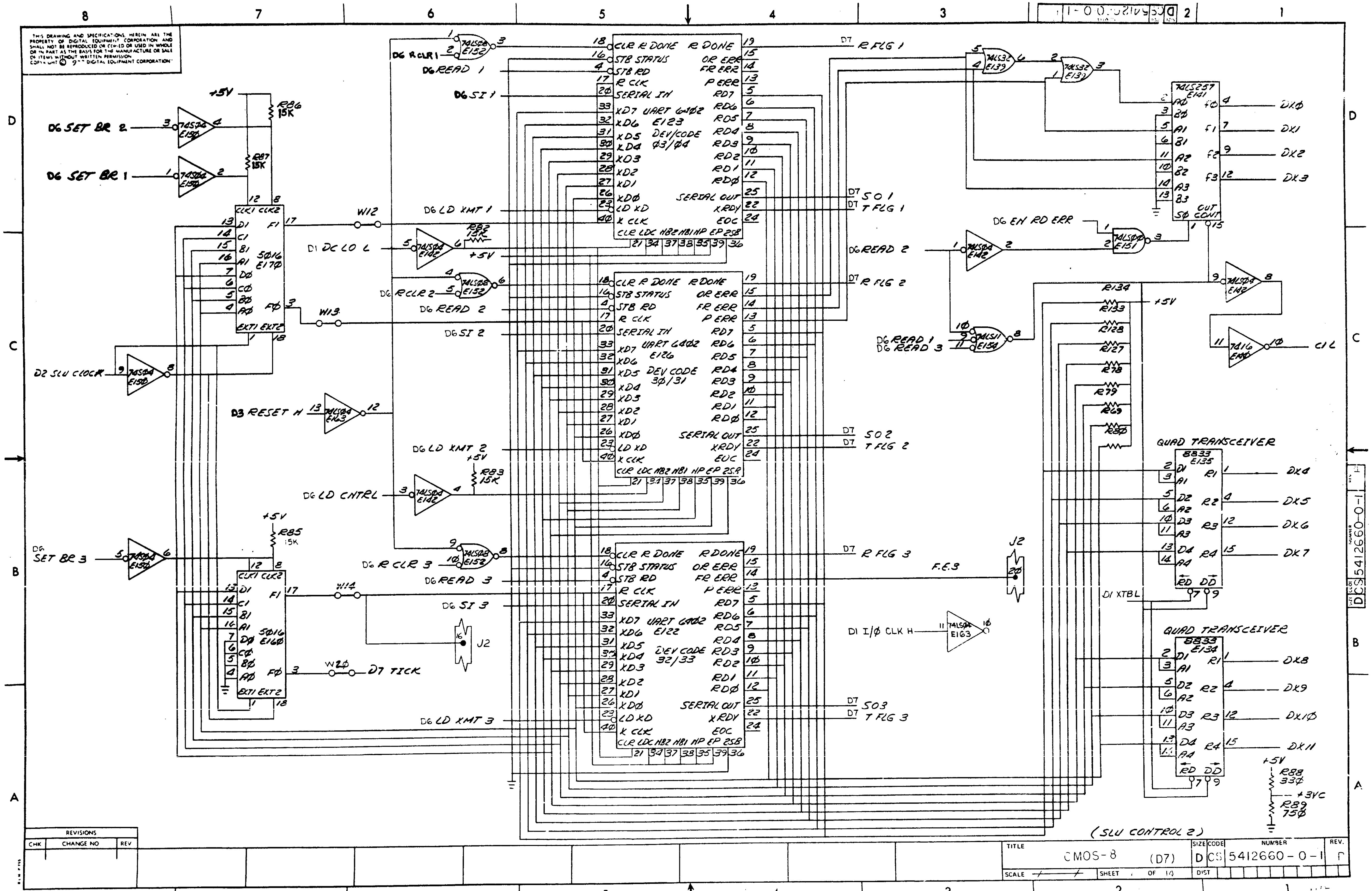

LOOP BACK L
DX 11
INT REQ L
D1 I/O READ L
D6 SKIP L
D6 T FLAG 1
D7 R FLAG 1
D6 T FLAG 2
D7 R FLAG 2
D6 T FLAG 3
D7 R FLAG 3
D7 R FLG 1
D7 R FLG 2
D7 R FLG 3
DX10
D6 EN RD ERR
D7 T FLG 1
D7 T FLG 2
D7 T FLG 3
D3 RESET H
+5V
+3VC
DX6
J1
D11 B RESET L
SET BR 1
R CLR 1
READ 1
LOAD XMT 1
SET BR 2
R CLR 2
READ 2
LOAD XMT 2
SET BR 3
R CLR 3
READ 3
LOAD XMT 3
D6 L DC NTR L
256x4 TRISTATE ROM
32Kx8 TRISTATE ROM
MAR 3
MAR 4
MAR 5
MAR 6
MAR 7
MAR 8
MAR 9
MAR 10
MAR 11
* THIS JUMPER INSERTED FOR NORMAL OPERATION
W15
D1 XTC L
D1 DEVSEL H
LINE 1 IN
LINE 2 IN
LINE 3 IN
SI 1
SI 2
SI 3
D7 SO1
D7 SO2
D7 SO3
LINE 1 OUT
LINE 2 OUT
LINE 3 OUT
(SLU CONTROL 1)

REVISIONS		
CHK	CHANGE NO	REV

TITLE: CMOS-8 (D6)

SIZE: D | CODE: CS | NUMBER: 6412660-0-1 | REV: P

SCALE | SHEET 6 OF 14 | DIST.



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D6 SET BR 2
D6 SET BR 1
D2 SLU CLOCK
D3 RESET H
D6 SET BR 3
D6 RCLR 1
D6 READ 1
D6 SI 1
D6 LD XMT 1
D1 DC LO L
D6 RCLR 2
D6 READ 2
D6 SI 2
D6 LD XMT 2
D6 LD CNTRL
D6 R CLR 3
D6 READ 3
D6 SI 3
D6 LD XMT 3
D7 TICK
UART 6402 E123 DEV/CODE 03/04
UART 6402 E126 DEV CODE 30/31
UART 6402 E122 DEV CODE 32/33
D7 R FLG 1
D7 S0 1
D7 T FLG 1
D7 R FLG 2
D7 S0 2
D7 T FLG 2
D7 R FLG 3
D7 S0 3
D7 T FLG 3
F.E.3
J2
D6 EN RD ERR
D6 READ 2
D6 READ 1
D6 READ 3
D1 I/O CLK H
C1 L
QUAD TRANSCEIVER 8833 E135
QUAD TRANSCEIVER 8833 E134
D1 XTBL
DX0
DX1
DX2
DX3
DX4
DX5
DX6
DX7
DX8
DX9
DX10
DX11
+3VC
(SLU CONTROL 2)

REVISIONS

CHK	CHANGE NO	REV

TITLE	SIZE	CODE	NUMBER	REV.
CMOS-8 (D7)	D	CS	5412660-0-1	

SCALE — SHEET OF 14 DIST

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

D3 EMAR Ø
D1 MEM SEL N
D8 MEM SEL
D8 REF
+5V
R9Ø 1.47K, 1%
C32 22Ø pf
+3VD
D1 RUN N
D1 IFETCH N
D1 XTC L
D1 LXMAR L
D3 EMAR 1
D3 EMAR 2
D8 ACCESS L
D1 XTB L
D8 XTB N
ROW SEL Ø
ROW SEL 1
ROW SEL 2
ROW SEL 3
WP Ø
WP 1
WP 2
WP 3
COL SEL A
COL SEL B
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
R94 33Ø
R91 75Ø
D4 1N751A
-5V
R115 27Ø
-12V
R94 1.47K 1%
C34Ø 22Ø pf
R97 4.7K
R93 4.7K
R98 1.47K 1%
R95 1.47K 1%
C33 22Ø pf
R1ØØ 1.47K 1%
C33 Ø.Ø47 uf
R1Ø8 27
R1Ø3 27
R1Ø7 27
R1Ø2 27
R1Ø6 27
R1Ø4 27
R105 4.7K
W1 **
W2 *
W3 *
W4 *
W5 *
W18
W19

REVISIONS		
CHK	CHANGE NO	REV

TITLE	CM105-B (D8)		SIZE	CODE / NUMBER / REV
SCALE	SHEET 8 OF 14		DIST	DCS5412660-0-11 D

DEC FORM NO DRD 138

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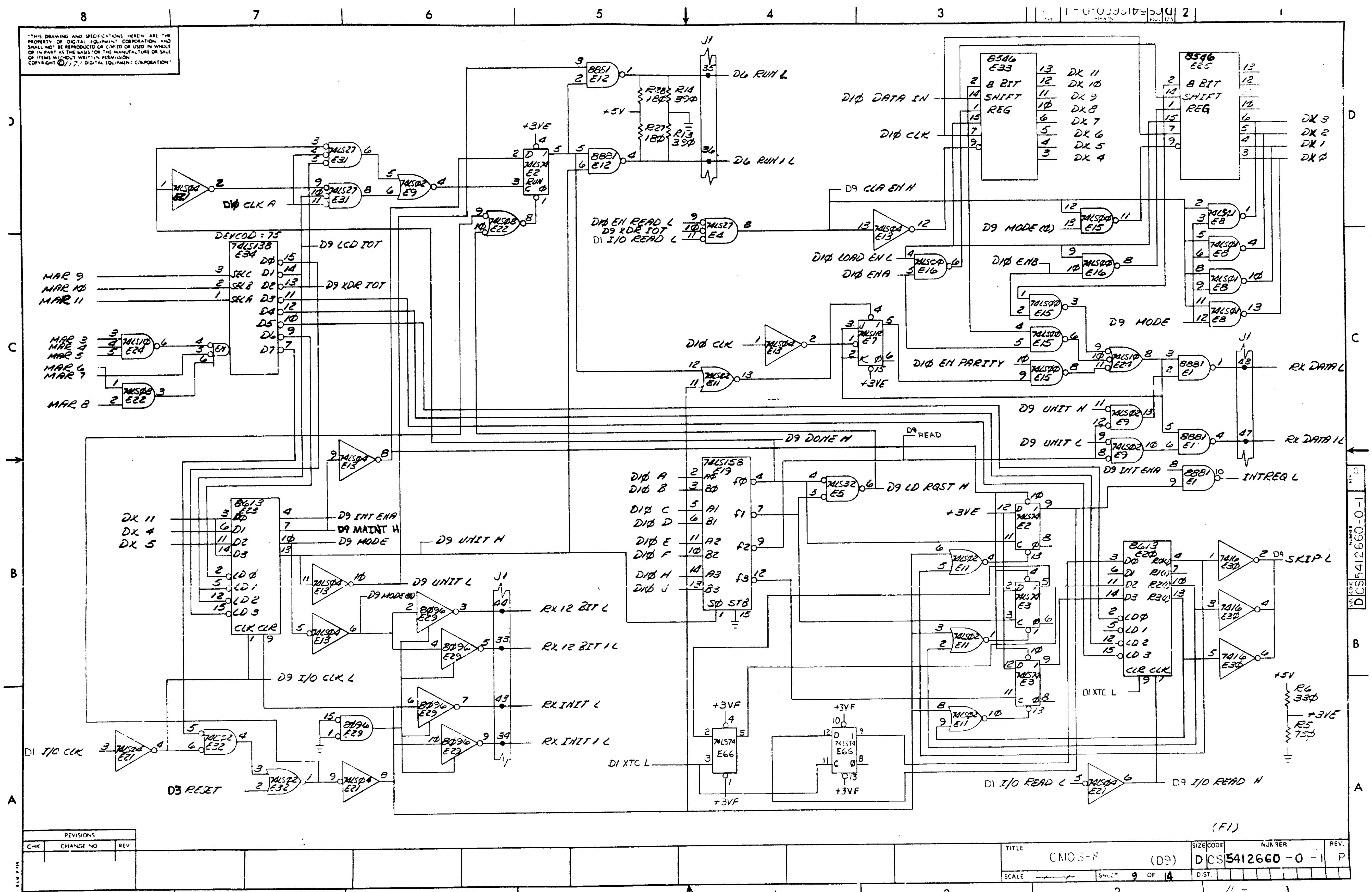

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D6 RUN L
D6 RUN 1 L
+5V
R28 180
R14 390
R27 180
R13 390
+3VE
74LS74 E2
74LS27 E31
74LS02 E9
74LS04 E13
D10 CLK A
74LS08 E22
DEVCOD: 75
74LS138 E34
D9 LCD IOT
D9 KDR IOT
MAR 9
MAR 10
MAR 11
MAR 3
MAR 4
MAR 5
MAR 6
MAR 7
MAR 8
74LS10 E24
D10 EN READ L
D9 KDR IOT
D1 I/O READ L
74LS27 E4
8546 E33
8 BIT SHIFT REG
D10 DATA IN
D10 CLK
DK 11
DK 10
DK 9
DK 8
DK 7
DK 6
DK 5
DK 4
8546 E25
DK 3
DK 2
DK 1
DK 0
D9 CLA EN H
D9 MODE (0)
D10 LOAD EN L
D10 ENA
D10 ENB
74LS00 E16
74LS00 E15
74LS01 E8
D9 MODE
74LS112 E7
D10 EN PARITY
74LS10 E27
8881 E1
RK DATA L
RK DATA 1 L
D9 UNIT H
D9 UNIT L
D9 INT ENA
INTREQ L
D9 DONE H
D9 READ
74LS158 E19
D10 A
D10 B
D10 C
D10 D
D10 E
D10 F
D10 H
D10 J
74LS32 E5
D9 LD RQST H
8613 E23
DK 11
DK 4
DK 5
D9 INT ENA
D9 MAINT H
D9 MODE
D9 UNIT H
D9 UNIT L
D9 MODE (0)
8096 E29
8096 E23
RK 12 BIT L
RK 12 BIT 1 L
RK INIT L
RK INIT 1 L
D9 I/O CLK L
D1 I/O CLK
74LS04 E21
74LS32 E32
D3 RESET
+3VF
74LS74 E66
D1 XTC L
74LS02 E11
74LS74 E3
8613 E20
D1 XTC L
7416 E30
D9 SKIP L
+5V
R6 330
+3VE
R5 750
D1 I/O READ L
D9 I/O READ H
(F1)
REVISIONS
CHK
CHANGE NO
REV
TITLE
CMOS-8 (D9)
SIZE D
CODE CS
NUMBER 5412660-0-1
REV. P
SCALE
SHEET 9 OF 14
DIST.
DEC FORM NO DRD 138

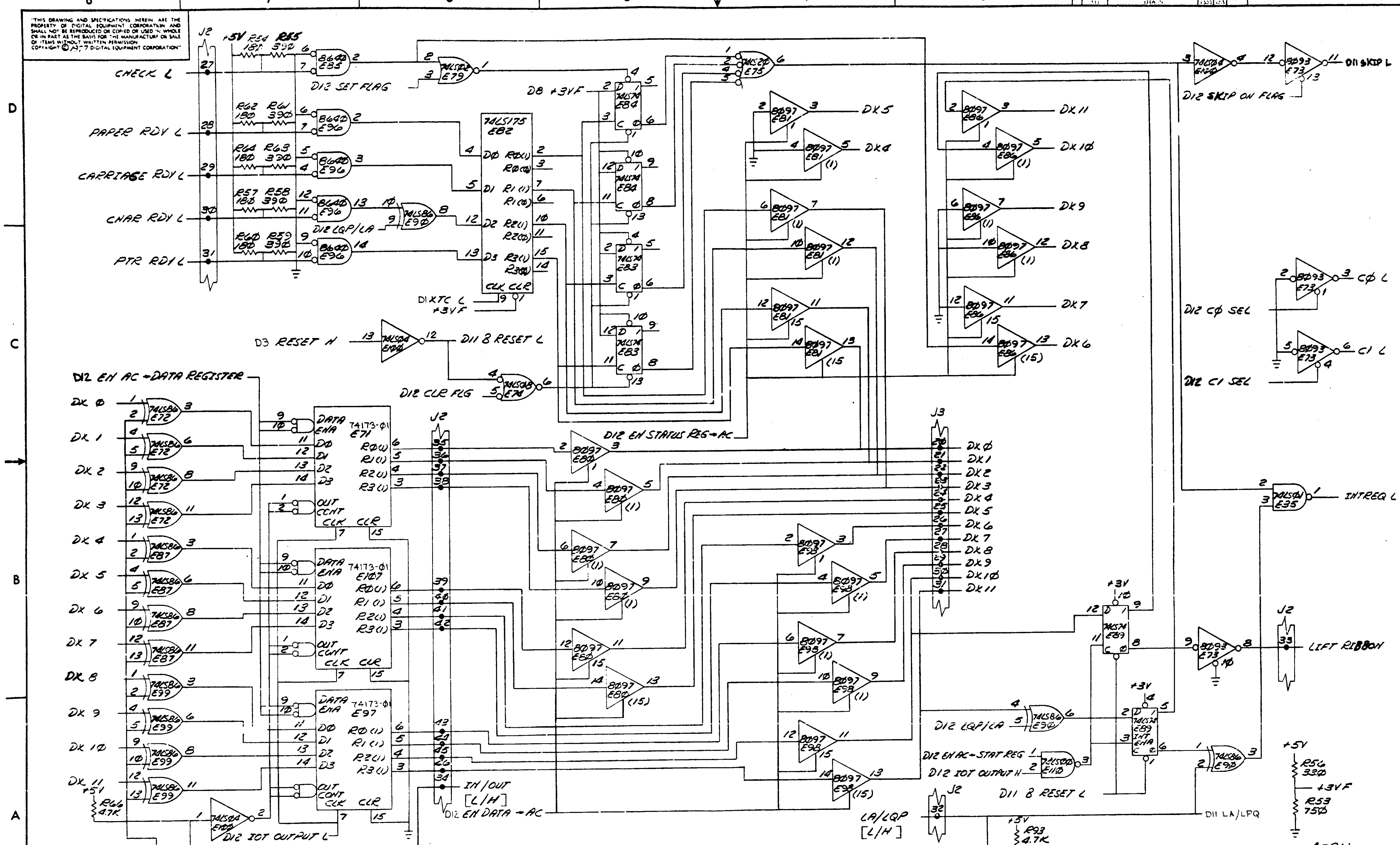
DIØ WRT
D9 I/O READ H
DI XTC L
+3VE
DIØ LOAD EN L
D9 MAINT
D9 DONE H
DIØ EN READ L
DIØ DATAIN
DIØ K
DIØ L
DIØ M
DIØ N
D9 UNIT H
D9 XDR IOT
D9 LCD IOT
D9 I/O CLK L
DIØ CLKA
DIØ CLK
DI XTA L
C1 L
D9 CLAEN H
D9 MODE (Ø)
CØ L
D9 READ
DIØ ENA
DIØ ENB
DIØ EN PARITY
+5V
R17 1K
DX5
D9 LD RQST H
DIØ WRT
J1
DONE L
XFR RQST L
OUT L
ERROR L
RX DATA L
SHIFT L
R23 R30 180 390
R21 R26 180 390
R24 R31 180 390
R22 R29 180 390
R10 R9 180 390
R20 R25 180 390
DIØ A
DIØ C
DIØ E
DIØ H
DIØ K
DIØ M
DONE 1 L
XFR RQST 1 L
OUT 1 L
ERROR 1 L
RX DATA 1 L
SHIFT 1 L
R12 R11 180 390
R14 R15 180 390
R1 R2 180 390
R13 R19 180 390
R3 R4 180 390
R7 R8 180 390
DIØ B
DIØ D
DIØ F
DIØ J
DIØ L
DIØ N

REVISIONS		
CHK	CHANGE NO	REV

(.52)

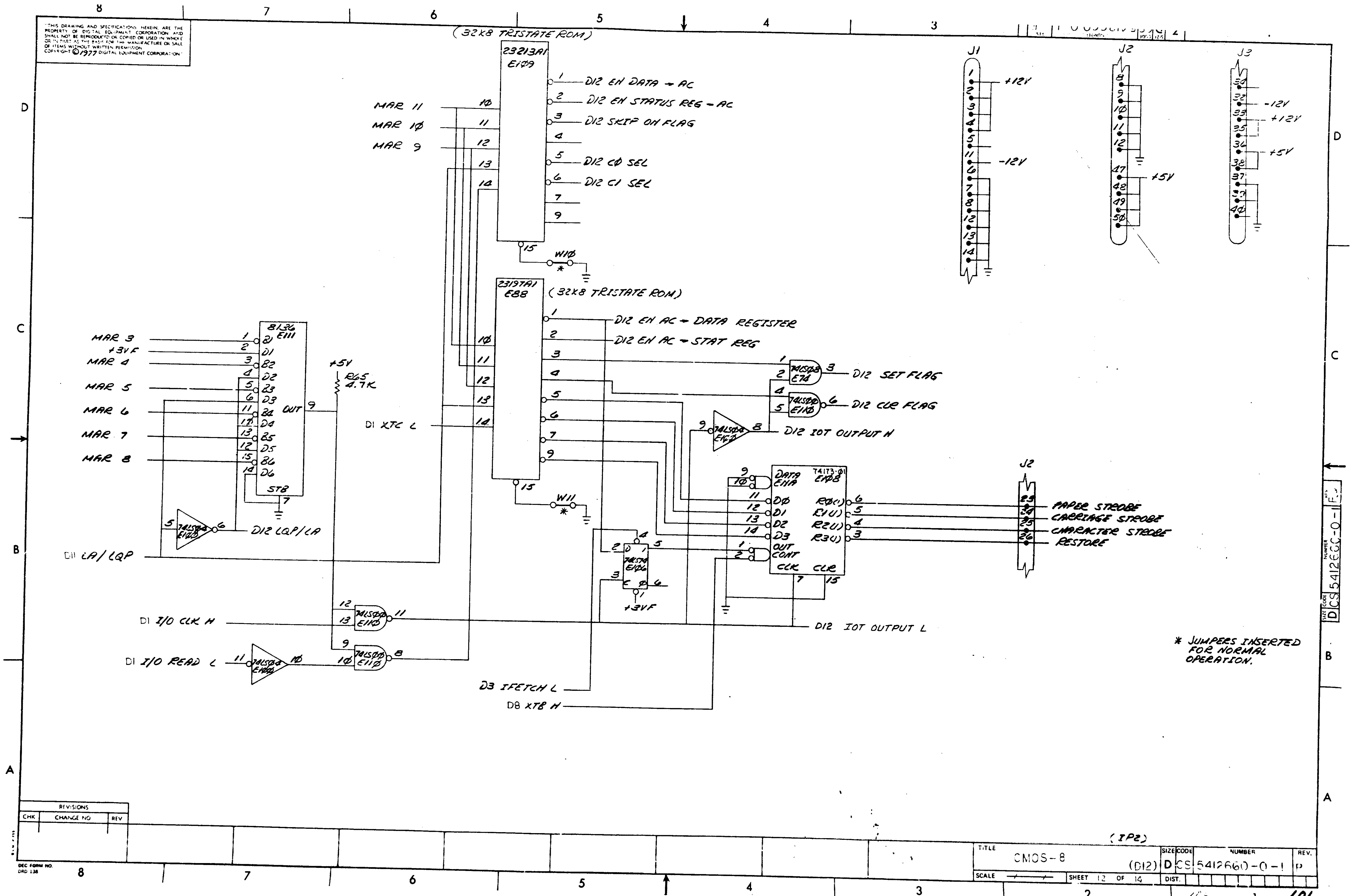
TITLE	SIZE	CODE	NUMBER	REV
CMOS-8 (DIØ)	D	DCS	5412660-0-1	F
SCALE	SHEET 10 OF 14	DIST		

DEC FORM NO DRD 138


CHECK L
PAPER RDY L
CARRIAGE RDY L
CHAR RDY L
PTR RDY L
D12 SET FLAG
D12 LQP/LA
D8 +3VF
74LS175 E82
D1XTC L
D3 RESET H
D11 B RESET L
D12 CLR FLG
D12 EN AC → DATA REGISTER
D12 EN STATUS REG → AC
DX 5
DX 4
DX 11
DX 10
DX 9
DX 8
DX 7
DX 6
D12 SKIP ON FLAG
D11 SKIP L
D12 C0 SEL
D12 C1 SEL
C0 L
C1 L
INTREQ L
LIFT RIBBON
74173-01 E71
74173-01 E107
74173-01 E97
IN/OUT [L/H]
D12 EN DATA → AC
D12 IOT OUTPUT L
D12 LQP/LA
D12 EN AC → STAT REG
D12 IOT OUTPUT H
D11 B RESET L
D11 LA/LPQ
LA/LQP [L/H]
DX 0
DX 1
DX 2
DX 3
DX 4
DX 5
DX 6
DX 7
DX 8
DX 9
DX 10
DX 11
J2
J3

REVISIONS	TITLE CMOS-8	SIZE D	CODE CS	NUMBER 5412660-0-1
CHK / CHANGE NO / REV	SCALE	SHEET 11 OF 14	DIST.	REV. P

(IP1)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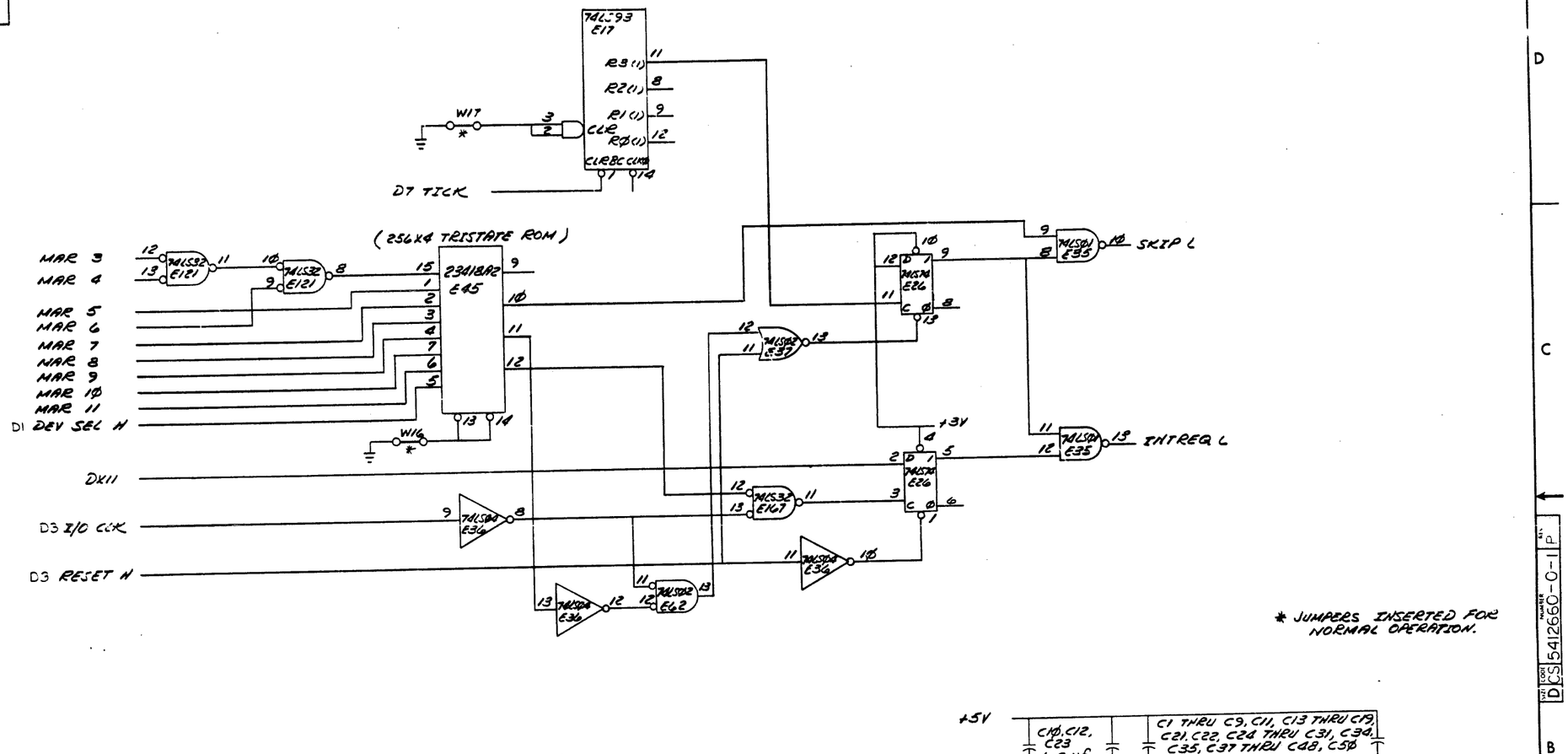
(32X8 TRISTATE ROM)
23213A1
E109
DI2 EN DATA → AC
DI2 EN STATUS REG → AC
DI2 SKIP ON FLAG
DI2 C0 SEL
DI2 C1 SEL
MAR 11
MAR 10
MAR 9
W10
23197A1
E88
(32X8 TRISTATE ROM)
DI2 EN AC → DATA REGISTER
DI2 EN AC → STAT REG
DI2 SET FLAG
DI2 CLR FLAG
DI2 IOT OUTPUT H
W11
MAR 3
+3VF
MAR 4
MAR 5
MAR 6
MAR 7
MAR 8
8136
E111
OUT
STB
+5V
R65
4.7K
DI XTC L
DI2 LQP/LA
DI1 LA/LQP
74LS08
E74
74LS00
E110
74LS04
E102
74173-01
E108
DATA ENA
OUT CONT
CLK
CLR
74S74
E106
+3VF
J2
PAPER STROBE
CARRIAGE STROBE
CHARACTER STROBE
RESTORE
DI I/O CLK H
DI I/O READ L
DI2 IOT OUTPUT L
D3 IFETCH L
D8 XTB H
J1
J2
J3
+12V
-12V
+5V
* JUMPERS INSERTED FOR NORMAL OPERATION.
REVISIONS
CHK
CHANGE NO
REV
DEC FORM NO. DRD 138
TITLE
CMOS-8
(IP2)
(DI2)
SIZE D
CODE CS
NUMBER 5412660-0-1
REV. P
SCALE
SHEET 12 OF 14
DIST.



(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

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
23001G1-ØØ	RX 78-PA,PC,PD (RXØ1 ONLY) RX 78-UA,UC,UD
23003G1-ØØ	RX 78-PA,PC,PD (RXØ1 ONLY) RX 78-UA,UC,UD
23ØØ5G1-ØØ	RX 78-PA,PC,PD (RXØ1, RXØ2) RX 78-RA,RC,RD RX 78-SA,SC,SD RX 78-UA,UC,UD

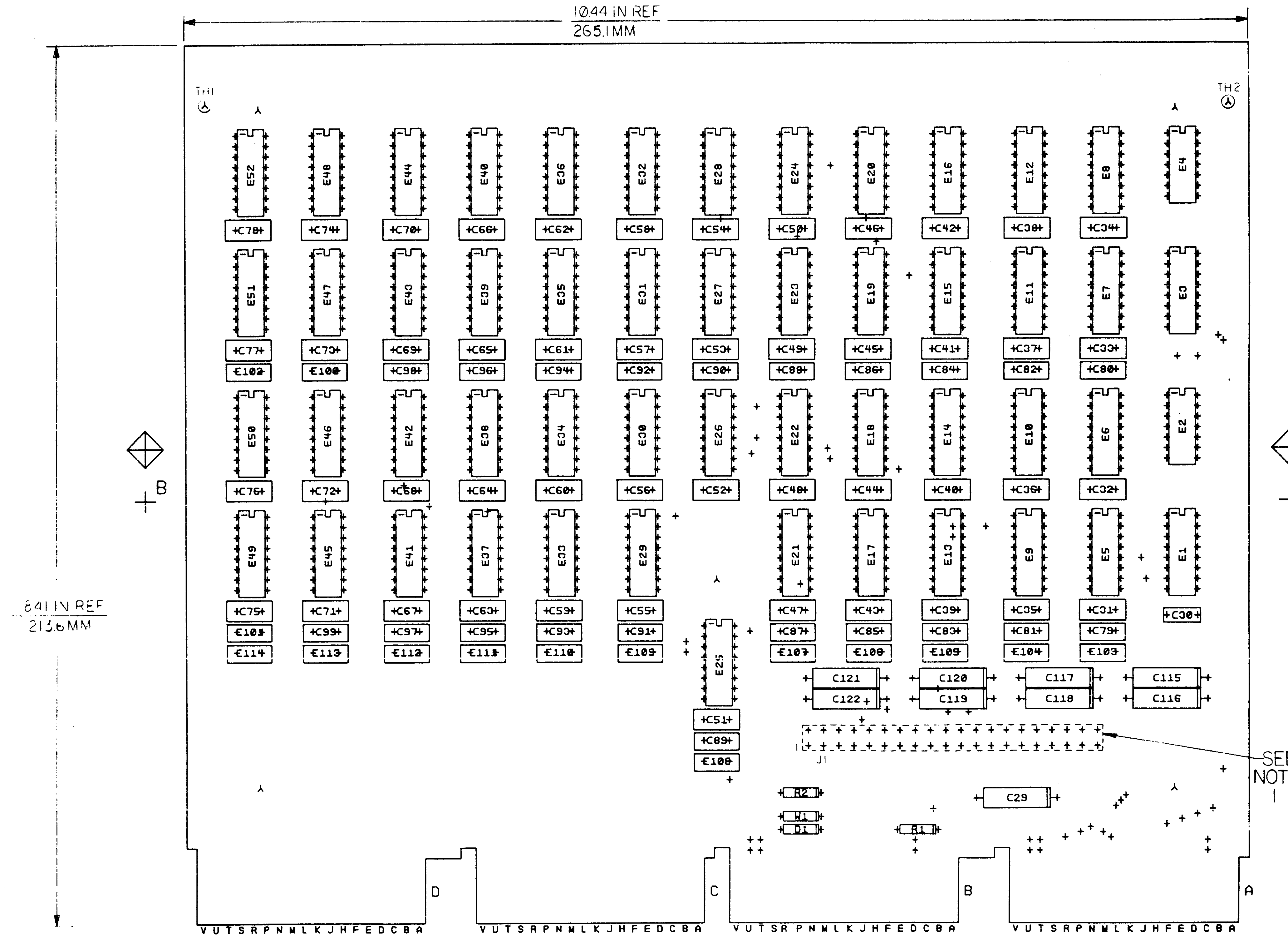
COMPONENT SUBSTITUTION CHART

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

REVISIONS: CHK | CHANGE NO | REV

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

COMPONENT SIDE VIEW



NOTES:

1. MOUNT J1 ON SIDE 2

CHK	CHANGE NO	REV
	C0001	B
	5412691-ML2	C

SIGNATURES		DATE
DRN.		2-24-78
CHK'D.	J.C. Pelletier	3-10-78
ENG.		
PROJ.ENG.		
PROD.		
SCALE	2/1	
SHT.	1 OF 3	

ETCH REV. C-P1

P.C. DESIGN DATA BASE REV. CL1/CM1

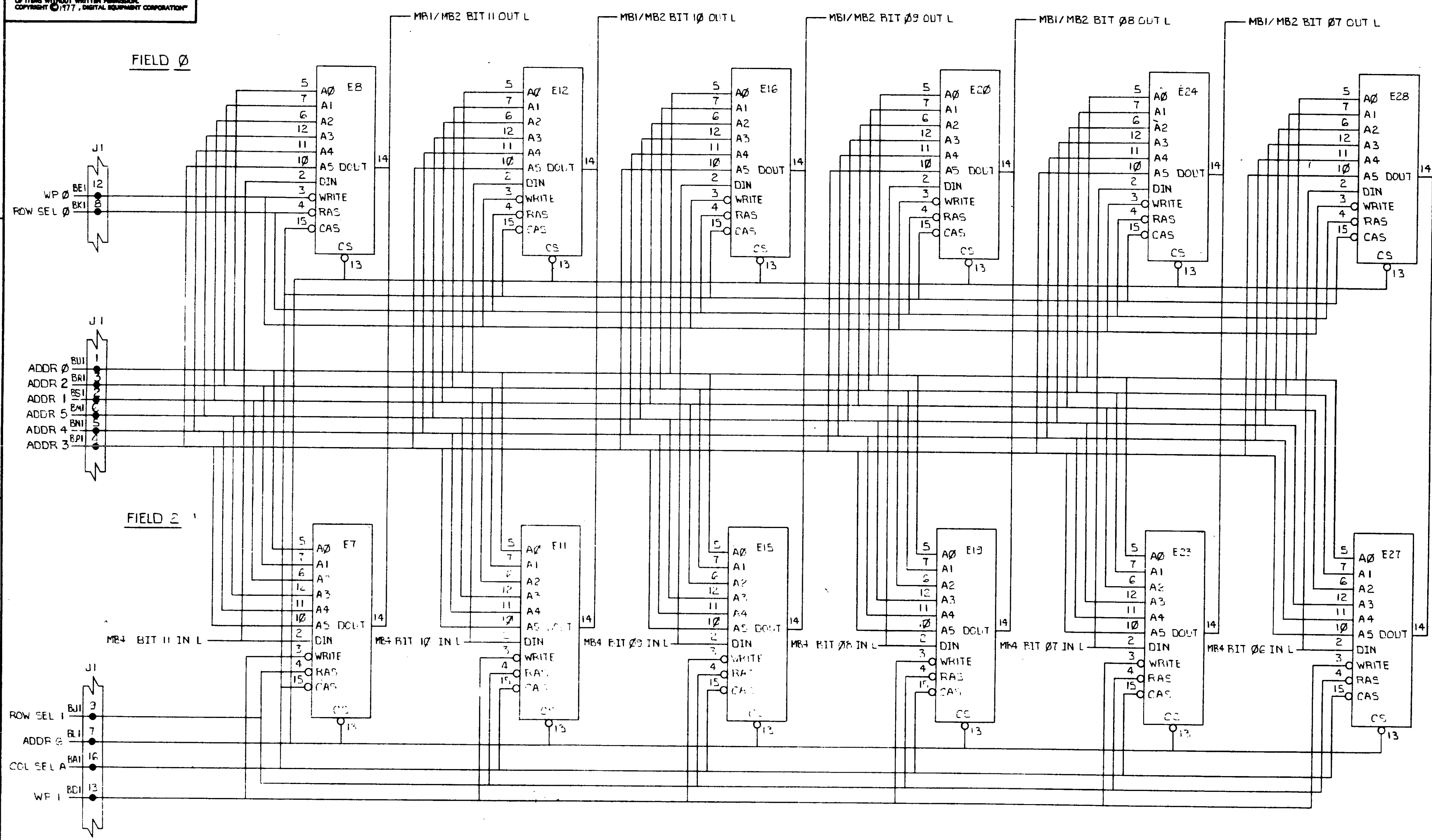
NEXT HIGHER ASSY. B DD 5412691-0

digital

TITLE CMOS-8 MEMORY

SIZE	CODE	NUMBER	REV
D	UA	5412691-0-0	C

MS# 261871



NOTES:

1. USE 2113735-Ø1, 2113914-Ø1, 2114475-Ø1 OR 2114469-Ø1 CHIPS WITH 5Ø1269Ø ETCH, REV. C ONLY
2. 2112726 OR 2113787-Ø1 MAY BE USED WITH 5Ø1269Ø, ETCH REV. B OR REV. C.

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

REV.	CHANGE NO.	CHK	REVISIONS
B	20201		
C	5412691-ML002		J. KIRK

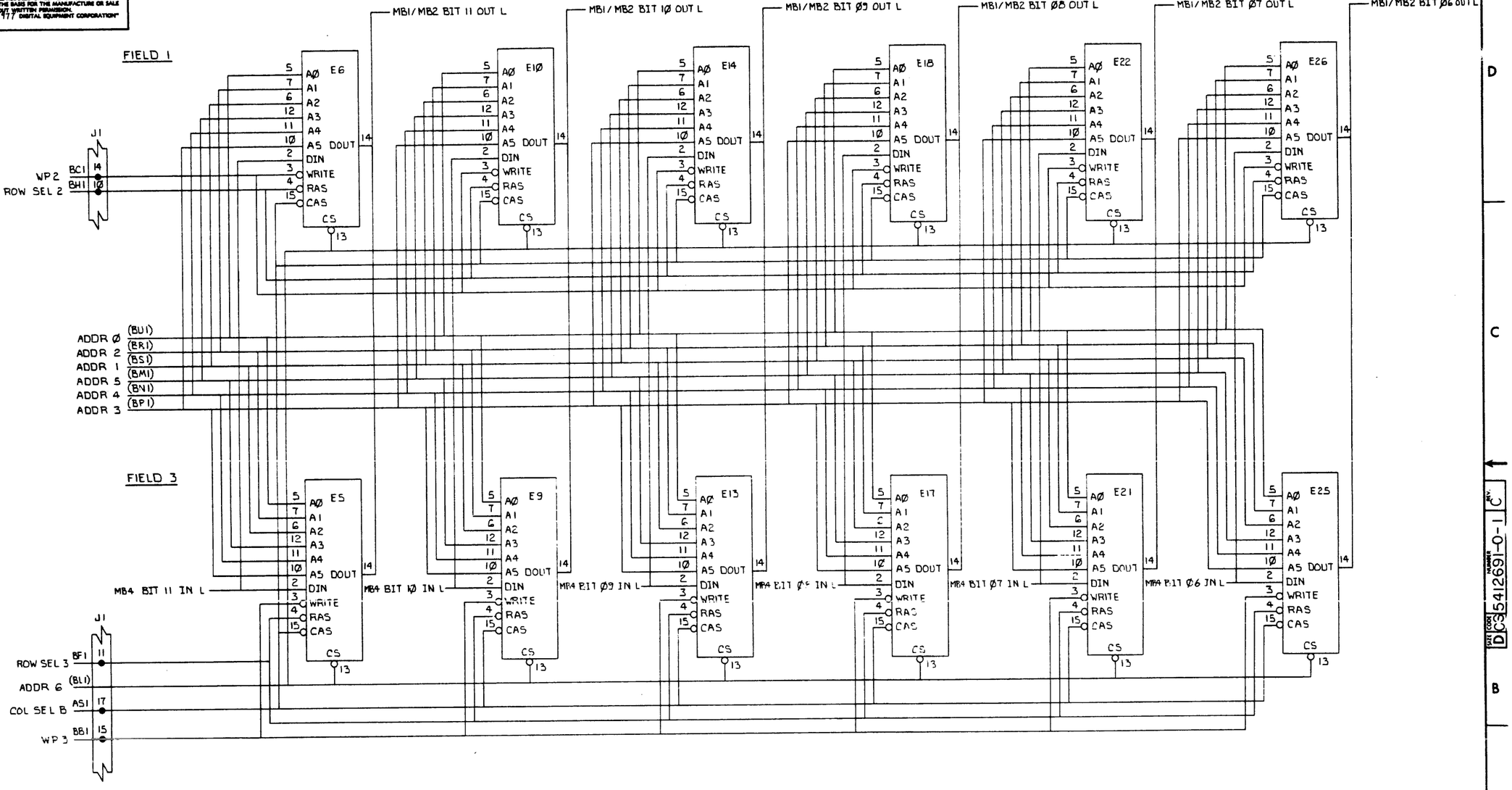
DRN. R. Koppenal	9-26-77
CHK'D	7-21-77
ENG.	23-Jun-77
PROJ. ENG.	23-Jun-77
PROD.	23-Jun-77
NEXT HIGHER ASSY.	D-UA-5412691-0-0
SCALE	—
SHEET	1 OF 4

FIRST USED ON: VT78

digital

TITLE: 16K X 12 MEMORY BOARD (MB1)

SIZE	CODE	NUMBER	REV.
D	CS	5412691-0-1	C



REVISIONS		
CHK	CHANGE NO	REV

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

DEC 5412691-0-1 REV C

106

FIELD Ø

WP Ø (BE1)
ROW SEL Ø (BR1)
COL SEL A (BA1)
ADDR 6 (BL1)

FIELD 2

WP 1 (BC1)
ROW SEL 1 (BJ1)

ADDR Ø (BU1)
ADDR 2 (BR1)
ADDR 1 (BS1)
ADDR 5 (BN1)
ADDR 4 (BN1)
ADDR 3 (BF1)

FIELD 1

WP2 (BC1)
ROW SEL 2 (BH1)
COL SEL B (AC1)

FIELD 3

WP 3 (BP1)
ROW SEL 3 (BJ1)

E32 E36 E40 E44 E48 E52
E31 E35 E39 E43 E47 E51
E30 E34 E38 E42 E46 E50
E29 E33 E37 E41 E45 E49

Each chip: AØ A1 A2 A3 A4 A5 DOUT DIN WRITE RAS CAS CS 13 14

MB4 BIT Ø7 IN L
MB4 BIT Ø6 IN L
MB4 BIT Ø5 IN L
MB4 BIT Ø4 IN L
MB4 BIT Ø3 IN L
MB4 BIT Ø2 IN L
MB4 BIT Ø1 IN L
MB4 BIT ØØ IN L

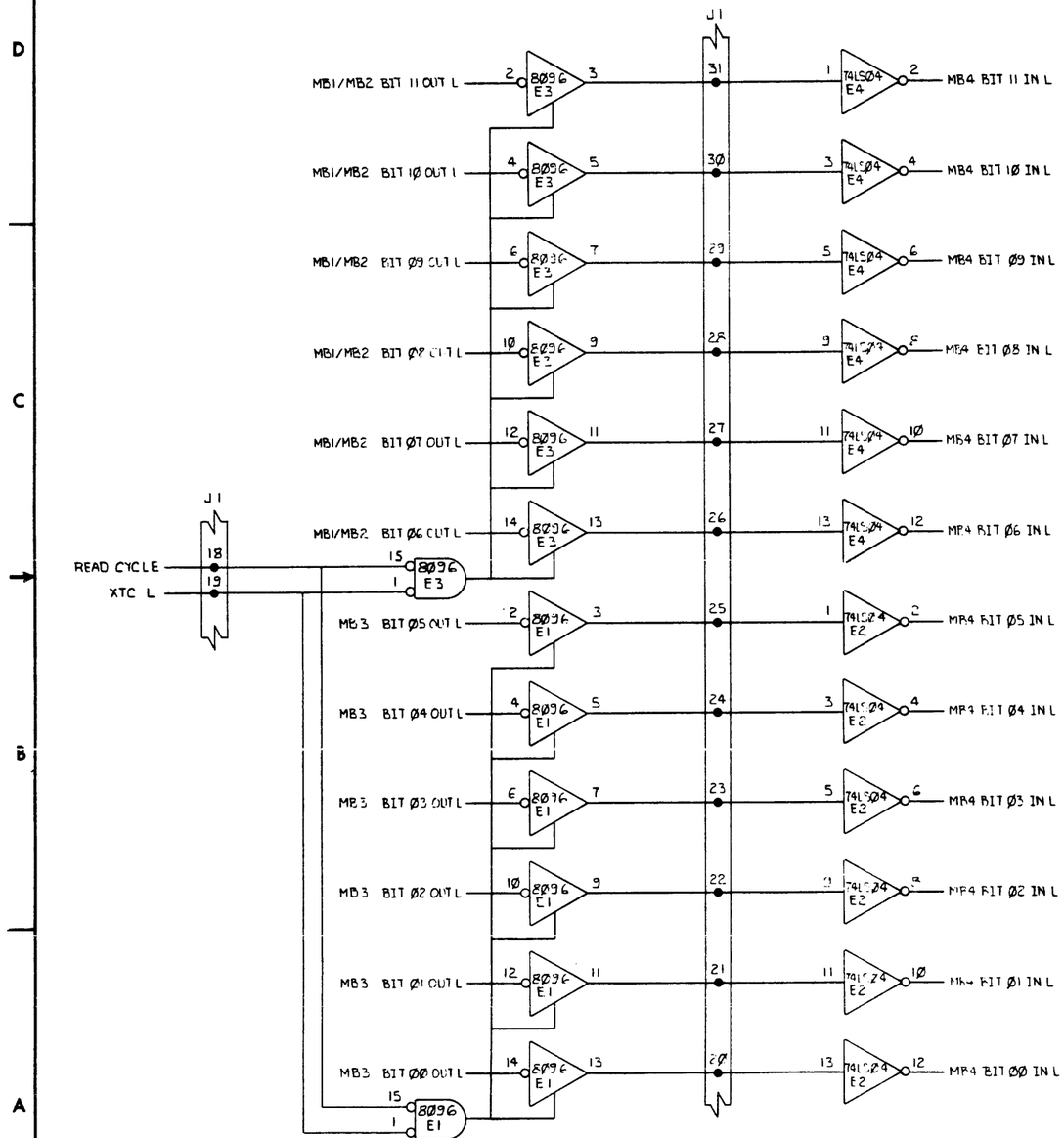
MB3 BIT Ø5 OUT L
MB3 BIT Ø4 OUT L
MB3 BIT Ø3 OUT L
MB3 BIT Ø2 OUT L
MB3 BIT Ø1 OUT L
MB3 BIT ØØ OUT L

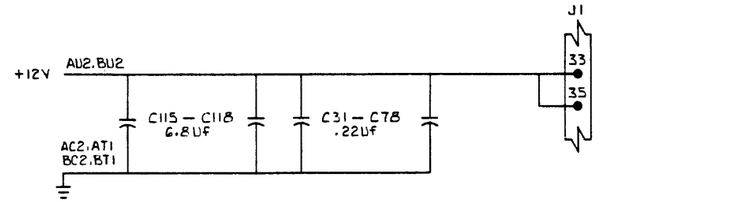
REVISIONS		
CHK	CHANGE NO	REV

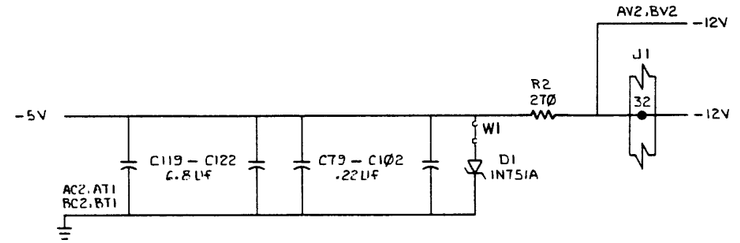
TITLE: 16K X 12 MEMORY BOARD (MB3)		SIZE: D	CODE: CS	NUMBER: 5412691-0-1
SCALE: —	SHEET 3 OF 4	DIST.		REV: C

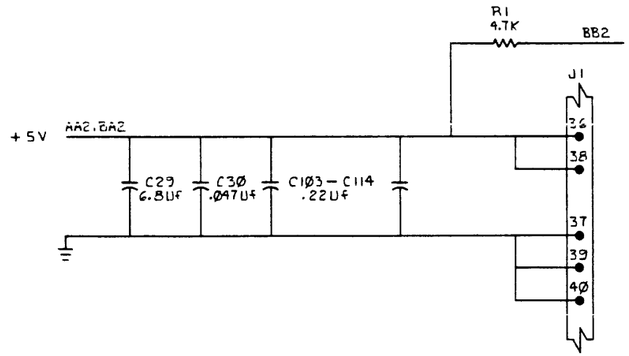
DCS 5412691-0-1 C

107







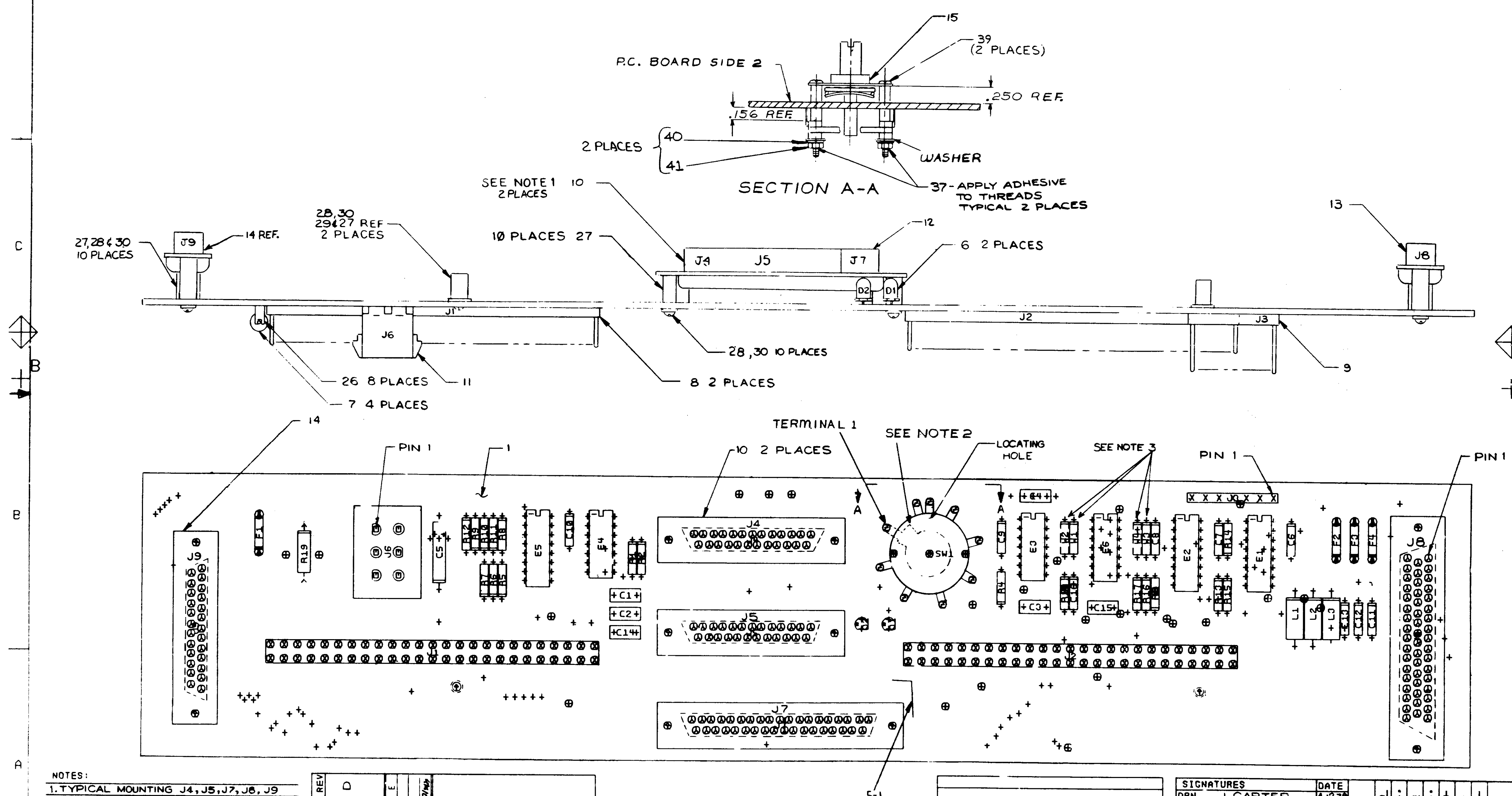


REVISIONS		
CHK	CHANGE NO	REV

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

D UA 5412861-Ø-Ø E

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

REV	CHANGE NO				CHK
D	MLØØ4	CARTER	D. ZOPF		
E	...861-ML5		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

P A R T S L I S T

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,.260OD X .120ID	12	

REVISION HISTORY			BASIC PART NO: 5412861
ENG	ECO NUMBER	REV	SECTION A OF A
C.L	5412861-ML004	D	SECTION.VARIATION INDEX
B.M	5412861-ML005	E	[A] 00
			[B]
			[C]
			[D]
			[E]
			[F]
			[H]
			[J]
			[K]
			[L]
			[M]
			[N]

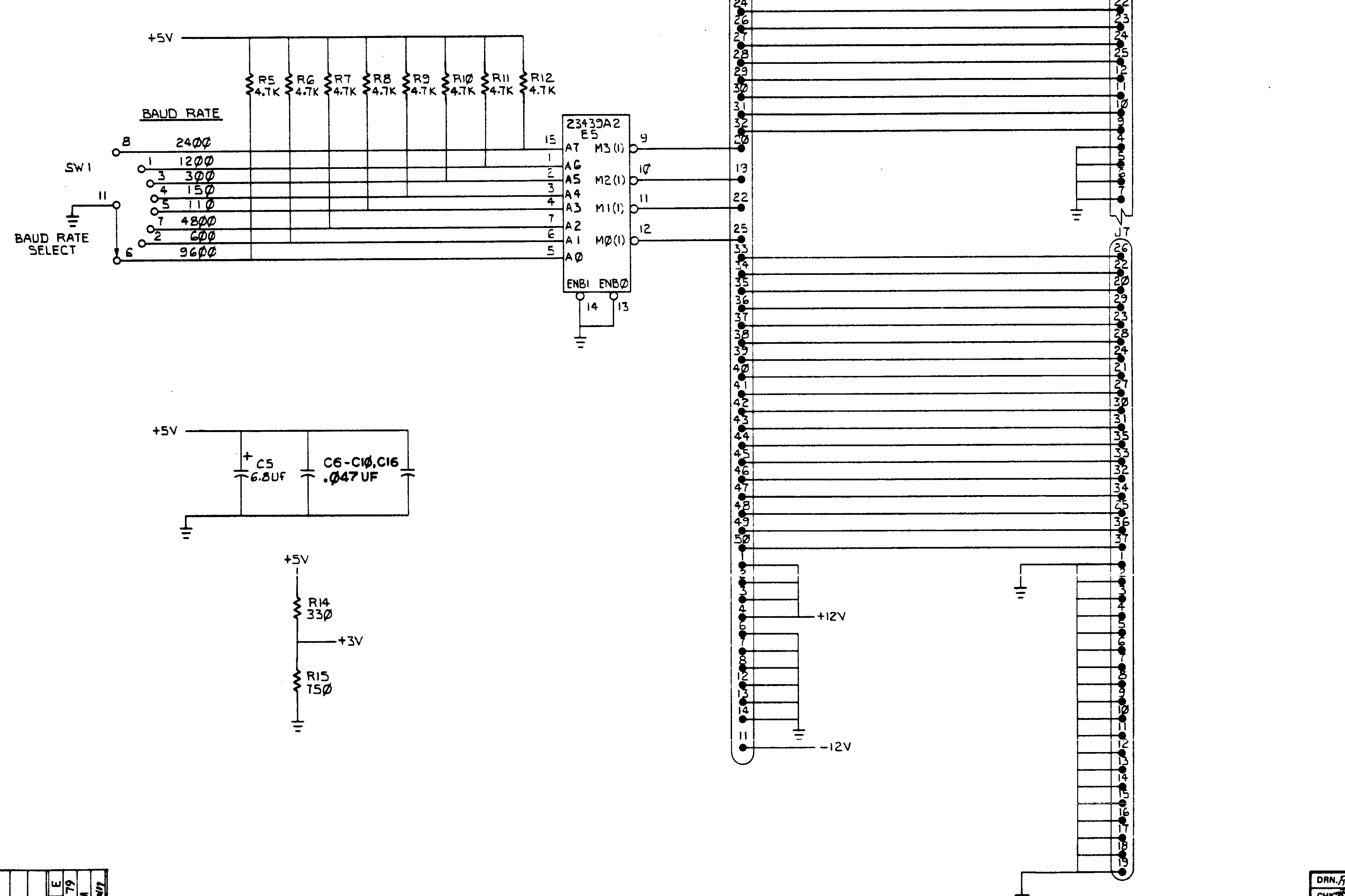
	D	I	G	I	T	A	L				
DRN: R.KOPPENAL	DATE: 09-JAN-79										
CHK'D: K.GLEASON	DATE: 09-JAN-79	TITLE: PARTS LIST I/O DISTRIBUTION PANEL									
DES.ENG: J.KING	DATE: 09-JAN-79										
RESP.ENG.: J.KING	DATE: 09-JAN-79	DOCUMENT NUMBER									
MFG.ENG.: B.DAVILLI	DATE: 09-JAN-79	SIZE: K	CODE: PL	NUMBER: 5412861-0-DBP	REV: E						
ASSEMBLY NUMBER: D-UA-5412861-0-0	TOP DOCUMENT NUMBER:	FILE NAME: Z0578E.PLS	EDIT #: 5								

AUTOMATED BY PRTLST.3G(17)

P A R T S L I S T

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,.180OD X .096ID	2	
41	41		9006555-00	NUT,HEX , 2-56X3/16AF X 1/	2	

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



REVISIONS			
CHK	CHANGE NO.	REV.	
	5412861-00001	B	D. ZWICKER 21 OCT 77, D. ZOPF, 21 Nov 77
	5412861-MLØØ3	C	30 Oct 78, P. GARDNER, 22-Nov-78
	MLØØ4	D	J. CARTER, DAVE ZOPF
	5412861-MLØØ5	E	29 MAY 79, BRUCE MEACHAM

DRN. R. Koppenal	5-3-77	FIRST USED ON	VT78		digital
CHK'D	7/21/77	TITLE	I/O DISTRIBUTION PANEL		
ENG.	13-JUN-77				
PROJ. ENG.	13-JUN-77				
PROD. Barry Smith	-JUL-77				
NEXT HIGHER ASSY.		SIZE	CODE	NUMBER	REV.
D-UA-5412861-0-0		D	CS	5412861-0-1	E
SCALE					
SHEET 1 OF 2		DIST.			

PARALLEL I/O

J8

J3 7

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

J6
+12V
-12V

R1 220Ø
NO ERROR
D1 MV5Ø54
D2 MV5Ø54
DC OK
R2 220Ø
+5V

F1 1A

E.P.I.
J9

J2

F.E. 3
APT RST H
APT EN L

R13 4.7K
+5V

R16 1K
+5V

7414 E6

R17 1K
+5V

W1
W2

1489 E3
R18 27K
-12V
C15 47ØPF

C13 1ØØØ PF
C12 1ØØØ PF
C11 1ØØØ PF

L2
L1
L3

J3
START SWITCH S.L.U. 1 IN

J5
S.L.U. 3

J1
5

+12V
R19 33Ø Ω 1/2W

J4
S.L.U. 2

R3 27K
-12V
C3 47ØPF

1488 E4
C1 39Ø PF

74LS157 E1
B3 A3 B2 A2 B1 A1 BØ AØ
SØ STB
f3 f2 f1 fØ

J3
W3
S.L.U. 1 OUT
W4

C14 39ØpF

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

C2 39ØPF

R4 27K
-12V
C4 47ØPF

J2
16

J5
S.L.U. 3

REVISIONS		
CHK	CHANGE NO	REV

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

DEC FORM NO. "D 128

DIGITAL EQUIPMENT CORPORATION
PARTS LIST

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

ITEM NO.	DRAWING NO.	PART NO.	DESCRIPTION	QUANTITY / VARIATION 5411170-10	5411170-03	5411170-05	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. 000BA PN009 PN010 ML011

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			

DRB 125

DIGITAL EQUIPMENT CORPORATION
PARTS LIST

MADE BY KAL DESMOND 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											
				5411170-10	5411170-03	5411170-05	5411170-04	5411170-02	5411170-00	5411170-12	SEE NOTE 1 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 8-4 which the keycap Item 30 will replace

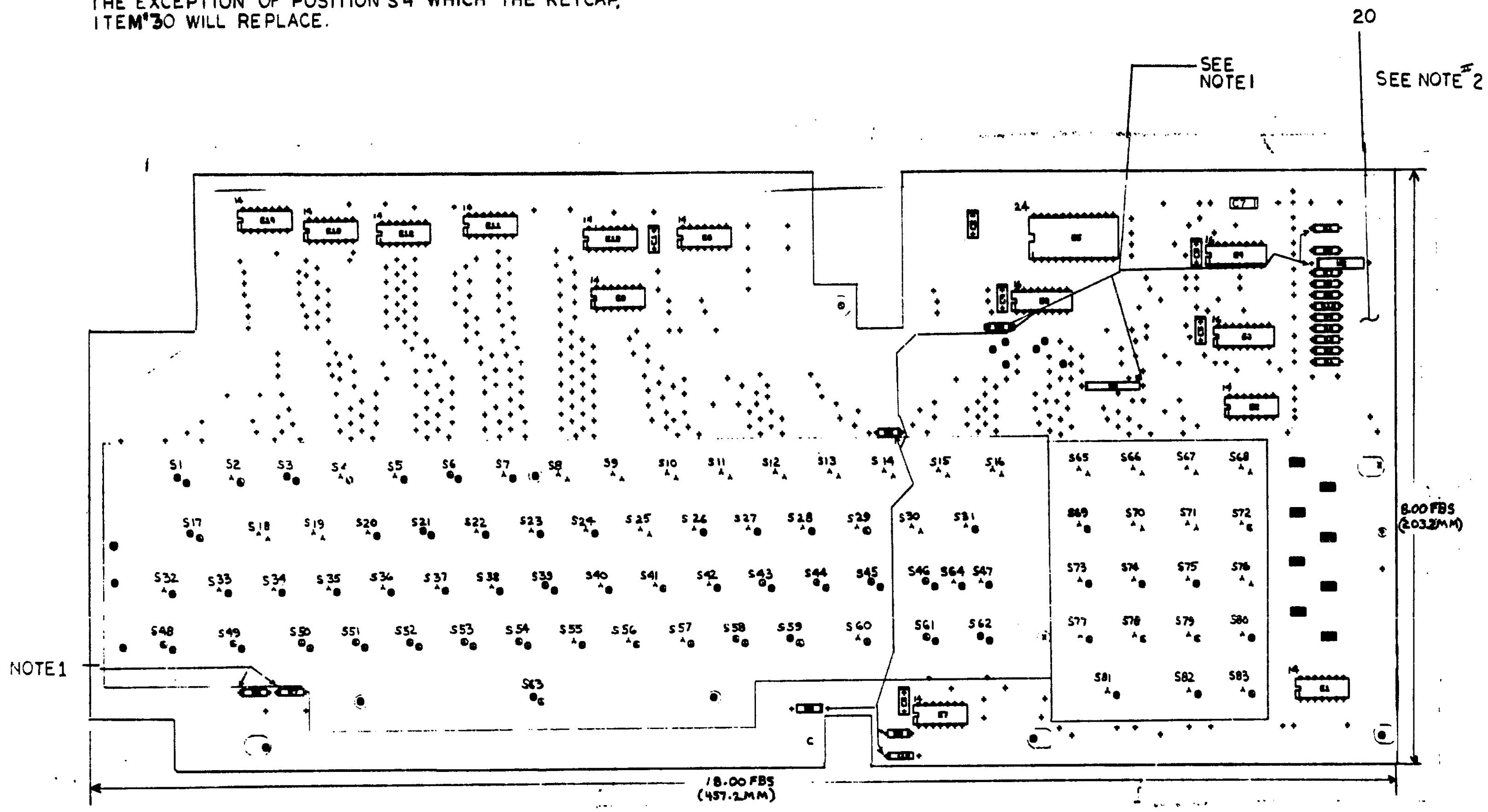
REF DESIGNATION

E.C.O. NO.

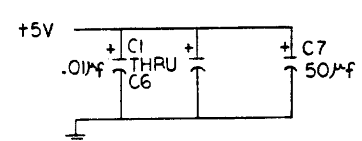
TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV.
KEYBOARD VT61/VT50H	D-UA-5411170-0-0	B	PL	5411170-0-0	N
	SHEET 2 OF 2	INTERFACE PARTS LIST DATA BASE REV			

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
5411170 - 0	VT61
5411170 - 1	HEAT CYCLED, SYSTEM TESTED 5411170-0
5411170 - 2	BASIC VT50H
5411170 - 3	HEATCYCLED, SYSTEM TESTED 5411170-2
5411170 - 4	VT52
5411170 - 5	HEAT CYCLED, SYSTEM TESTED 5411170-4
5411170 - 6	VT61T
5411170 - 7	HEAT CYCLED, SYSTEM TESTED 5411170-6
5411170 - 8	VT52-W
5411170 - 9	HEAT CYCLED, SYSTEMTESTED 5411170-8
5411170 - 10	VT62
5411170 - 11	HEAT CYCLED, SYSTEM TESTED 5411170-10
5411170 - 12	VT52 - N
5411170 - 13	HEAT CYCLED, SYSTEM TESTED 5411170-12
5411170 - 14	VT52 - W W/UK KEYCAP-S4
5411170 - 15	HEAT CYCLED, SYSTEM TESTED 5411170-14



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

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

DRN. DATE 6-27-77

NEXT HIGHER ASSY 0-UA-VT50-0-0

TITLE KEYBOARD VT61/VT50H

SIZE D CODE CS NUMBER 5411170-0-1 REV. N

SHEET 1 OF 5

SEMICONDUCTOR CONVERSION CHART

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

REV. K 5411170-00008 CHANGE NO. REVISIONS

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 5411170-6 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 — AC7
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	N
SCALE —	SHEET 2 OF 5		DIST.	

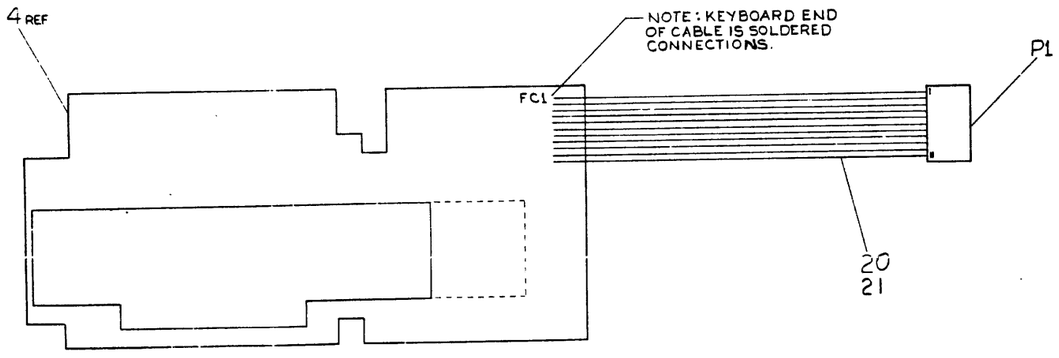
117

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



INCH

REVISIONS		
REV.	CHANGE NO.	CHK

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 .2	OVER .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.
CHK'E
ENG.
PROJ. ENG.
PROJ. MGR.
NEXT HIGHER ASSY.

FIRST USED ON: VT50H / VT61

TITLE: KEYBOARD /T61/VT50H (CABLE CONN)

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

SCALE

SHEET 3 OF 5

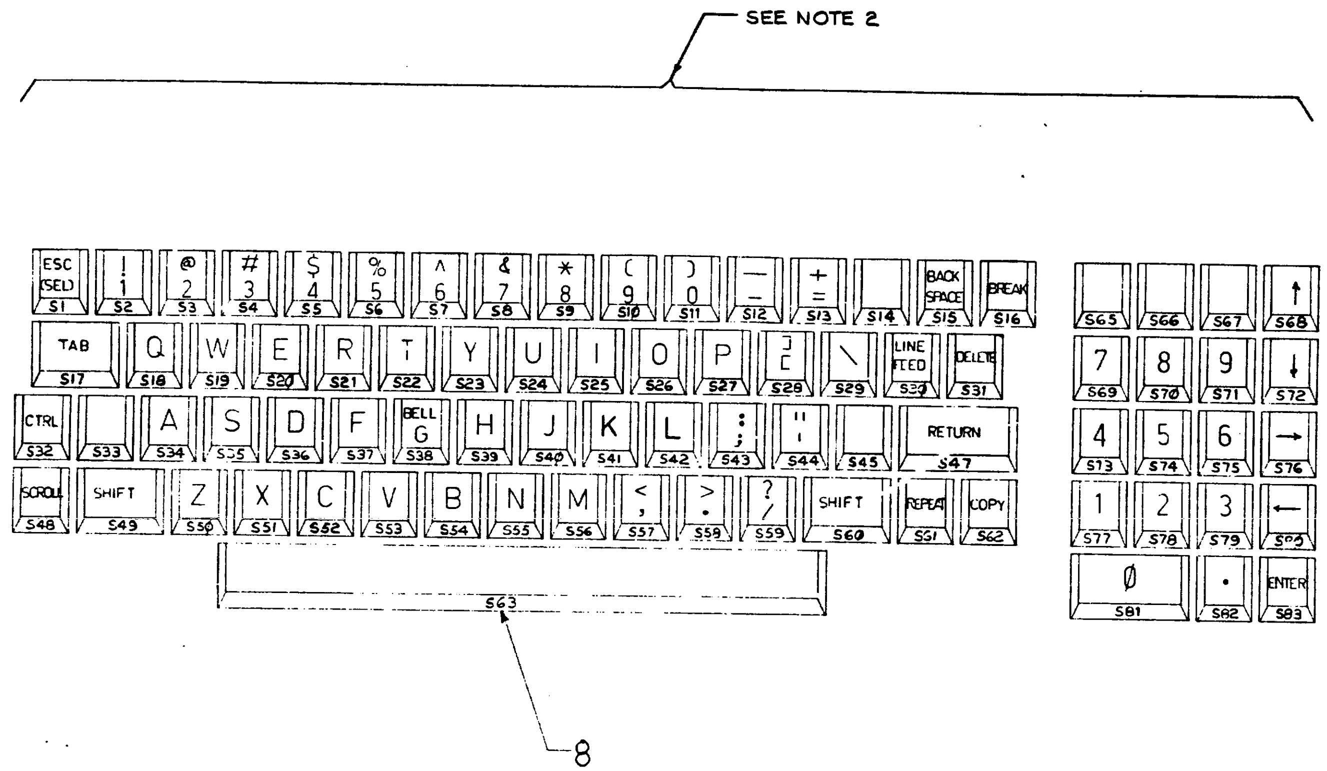
DIST.

DEC FORM NO. DRD 100-C

118

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.



DRN.		FIRST USED ON VT50 H/ VT61
CHK'D		TITLE
ENG.		KEYBOARD VT61/VT50H (KEYCAP VARIATIONS)
PROJ. ENG.		
PROJ.		
NEXT HIGHER ASSY.		
SCALE NONE		SIZE D CODE CS NUMBER 54 11170-0-1 REV. N
SHEET 4 OF 5		DIST.

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	— -	+ =	~ `	2 BACK SPACE	1 BREAK	2 TAB	Q Home	W End Tx	E C Emph	R C Jus	T Cmd	Y A Prf	U Hld Sc	I Insert	O	P	[	] Cancl	2 LINE FEED	2 DELETE	1 CTRL	2 CAPS LOCK	A Para	S Del Ch	D Del Ln	F Ins Ln	BELL G Cpy Ln	H Prt Sc	J Prt Ln	K Edit K	L
54111170-2 (VT50H)	ESC (SEL)	! 1	@ 2	# 3	$ 4	% 5	^ 6	& 7	* 8	(9	) 0	— -	+ =		2 BACK SPACE	1 BREAK	2 TAB	Q	W	E	R	T	Y	U	I	O	P	[	]	LINE FEED	2 DELETE	1 CTRL	2	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	— -	+ =	~ `	2 BACK SPACE	1 BREAK	2 TAB	Q	W	E	R	T	Y	U	I	O	P	[	]	LINE FEED	2 DELETE	1 CTRL	2 CAPS LOCK	A	S	D	F	BELL G	H	J	K	L
54111170-6 (VT61)	ESC (SEL) F1	! 1 F2	@ 2 F3	# 3 F4	$ 4 F5	% 5 F6	^ 6 F7	& 7 F8	* 8 F9	(9 F10	) 0	— -	+ =	~ `	2 BACK SPACE	1	2 TAB	Q Begin Text	W End Text	E Block Start	R	T Cmd	Y	U	I Insert	O	P	[	] Reset	LINE FEED	2 DELETE	1 CTRL	2 CAPS LOCK	A Para	S Del Ch	D Del Ln	F Ins Ln	BELL G Cpy Ln	H	J	K	L
54111170-8 (VT52-W)	ESC (SEL)	! 1	@ 2	# 3	$ 4	% 5	^ 6	& 7	* 8	(9	) 0	— - PRINT HYPH	+ = ABBRV	~ ` HALT	2 HYPH PUSH HYPH PULL	1 BREAK	2 TAB TAB CENTER	Q SUPER SCRIPT	W	E	R RULER	T TOP DOCMT	Y	U	I	O	P PAGE MARKER	]	\ DATE & TIME	2 RUB WORD OUT RUB SENT	2 RUB CHAR OUT RUB LINE	1 CTRL	2 CAPS LOCK	A SUB SCRIPT	S	D DEAD KEY	F FILE DOCMT	G GET DOCMT	H	J	K	L LIBRY
54111170-10 (VT62)	2 SELECT DE SELECT	! 1	@ 2	# 3	$ 4	% 5	^ 6	& 7	* 8	(9	) 0	— -	+ =	~ `	2 HOME FORM HOME DISP	2 CLEAR	2 ERROR RESET	Q	W	E	R	T	Y	U	I	O	P	]	\	2 DELETE FIELD	2 ERASE CHAR	2 DELETE CHAR	2 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	— -	+ =	~ `	2 BACK SPACE	1 BREAK	2 TAB	Q	W	E	R	T	Y	U	I	O	P	]	\	2 DEL FIELD LF	2 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	2 HYPH PUSH HYPH PULL	1 BREAK	2 TAB 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	2 RUB CHAR OUT RUB LINE	1 CTRL	2 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	: ;	" '	? /		2 RETURN	1 SCROLL	2 SHIFT	Z or EOS	X or EOL	C Ruler	V Tx Jus	B Xm Ln	N Xm Dat	M Xm Msg	< ,	> .	? /	2 SHIFT	2 REPEAT	1 COPY	2 SPACE BAR		2 FCN	BK FLD	FW FLD	↑	7 F1	8 F2	9 Home	↓	4 F3	5 F4	6 I/R	→	1 Tx Jus	2 Xm Msg	3 Cmd	←	Ø Delete Char	• CE mm	ENTER Xm Dat
54111170-2	: ;	" '	-		2 RETURN	1 SCROLL	2 SHIFT	Z	X	C	V	B	N	M	< ,	> .	? /	2 SHIFT	2 REPEAT	1 COPY	2 SPACE BAR		2	1		↑	7	8	9	↓	4	5	6	→	1	2	3	←	Ø	•	ENTER
54111170-4	: ;	" '	? /		2 RETURN	1 SCROLL	2 SHIFT	Z	X	C	V	B	N	M	< ,	> .	? /	2 SHIFT	2 REPEAT	1 COPY	2 SPACE BAR		2	1		↑	7	8	9	↓	4	5	6	→	1	2	3	←	Ø	•	ENTER
54111170-6	: ;	" '	? /		2 RETURN	1	2 SHIFT	Z or EOS	X or EOL	C	V Word Wrap	B	N XmDat	M	< ,	> .	? /	2 SHIFT	2 REPEAT	1 COPY	2 SPACE BAR		2 BACK FIELD Done	WORD WRAP Move	BLOCK START Block End	MAKE ROOM	1 DELETE LINE	PREV PAGE First Page	XMIT FIELD Cmplt Check	NEXT PAGE Last Page	1 DELETE WORD	3 BEGIN TEXT	3 ↑ Top Line	3 END TEXT	1 DELETE CHAR	3 ← Begin Line	3 ↓ Bottm Line	3 → End Line	EXPAND Dir	CMD Reset	2 (FCN)
54111170-8 (VT52-W)	: ;	" ' REPLC	? / CMND		2 RETURN LINE MARKER	SCROLL	SHIFT	Z	X	C CENTER	V VIEW	B HOT DOCMT	N NEW PAGE	M MENU	< , SRCH	> . CONT SRCH	? / CONT SRCH ABRT	2 SHIFT	2 REPEAT	1 COPY	2 (SPACE BAR)		4	2 PAGE BFLD	SWAP FFLD	1 DEL CHAR ↑	2 SENT 7	2 TAB POS 8	3 UNDER LINE 9	1 DEL WORD ↓	2 WORD 4	2 PARA 5	3 BOLD 6	→	1 CUT 1	3 BACK UP 2	2 LINE 3	3 UPPER CASE ←	PASTE Ø	ADVANCE •	SEL ENTER	<> ENTER
54111170-10 (VT62)	: ;	" '	? /		2 NEXT FIELD	2 ENTER MODE	1 SHIFT	Z	X	C	V	B	N	M	< ,	> .	? /	2 SHIFT	2 REPEAT	PF45	3 (SPACE BAR)		2 ←	1 BACK FIELD	1 FWD FIELD	2 → ABORT	3 7 F8	3 8 PF9	3 9 PF10	2 STOP REPEAT PF44	5 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)	: ;	" '	? /		2 RETURN	SCROLL	2 SHIFT	Z	X	C	V	B	N	M	< ,	> .	? /	2 SHIFT	2 REPEAT	1 COPY	4 (SPACE BAR)		4	2 BACK FIELD	2 ADV FIELD	2 HOME FLAG FIELD	5 7 BT	5 8 BT	5 9 BT	2 ↓ EOS & CLR	5 4 BT	5 5 BT	5 6 BT	3 ADV CHAR F/W RECORD	3 ↑ 1 BT	5 2 BT	5 3 BT	4 BACK CHAR MODE CHANGE	2 Ø BACK SCREEN	2 •	2 ENTER EXIT FORMAT
54111170-14 (VT52-W)	: ;	" ' REPLC	? / CMND		2 RETURN LINE MARKER	SCROLL	SHIFT	Z	X	C CENTER	V VIEW	B HOT DOCMT	N NEW PAGE	M MENU	< , SRCH	> . CONT SRCH	? / CONT SRCH ABRT	2 SHIFT	2 REPEAT	1 COPY	2 (SPACE BAR)		4	2 PAGE BFLD	SWAP FFLD	1 DEL CHAR ↑	2 SENT 7	2 TAB POS 8	3 UNDER LINE 9	1 DEL WORD ↓	2 WORD 4	2 PARA 5	3 BOLD 6	→	1 CUT 1	3 BACK UP 2	2 LINE 3	3 UPPER CASE ←	PASTE Ø	3 AD-VANCE •	3 SEL ENTER	2 <> ENTER

REVISIONS		
CHG	CHANGE NO	REV

TITLE KEYBOARD, VT61/VT52H (KEYCAP PLACEMENT)
SIZE D | CODE CS | NUMBER 54111170-0-1 | REV N
SCALE — | SHEET 5 OF 5 | UIST.

DEC FORM NO DRD 138
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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											NOTES:
				5411743-00	5411743-01	5411743-02	5411743-03	5411743-04	5411743-04	5411743-05	5411743-06	5411743-07			REF DESIGNATION
1	E-MD-5011742-0-0 ~~5411743-1~~		DRILL & ETCH DWG ~~ASSEMBLY DRILLING LOCATION~~	REF	-	-	-	-	-	-	-	-			
2	E-UA-5411743-0-0		ROM, UART AND TIMING ASSY ~~PRINTED WIRING ASSEMBLY~~	REF	-	-	-	-	-	-	-	-			
3	B-MII-5411743-0-6		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	AN005A

TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV
ROM, UART AND TIMING	E-UA-5411743-0-0	B	PL	5411743-0-0	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	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

NOTES:

E.C.O. NO.

TITLE: ROM, UART AND TIMING

ASSY NO.

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

SHEET 2 OF 3

INSERTION PARTS LIST DATA BASE REV

ENGINEERING DRAWING DRB 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. Morgenstern	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 EIA MODULE
50		9107780-01	WIRE BUSS #22	A/R	A/R	A/R	A/R	A/R	A/R	A/R	A/R	W2 W4 W3 W11thruW255 W1 W199
51		9107360-55	WIRE #18 AWG INSULATED	A/R	A/R	A/R	A/R	A/R	A/R	A/R	A/R	
52		9007930-00	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

E.C.O. NO.

TITLE: ROM, UART AND TIMING

ASSY NO.

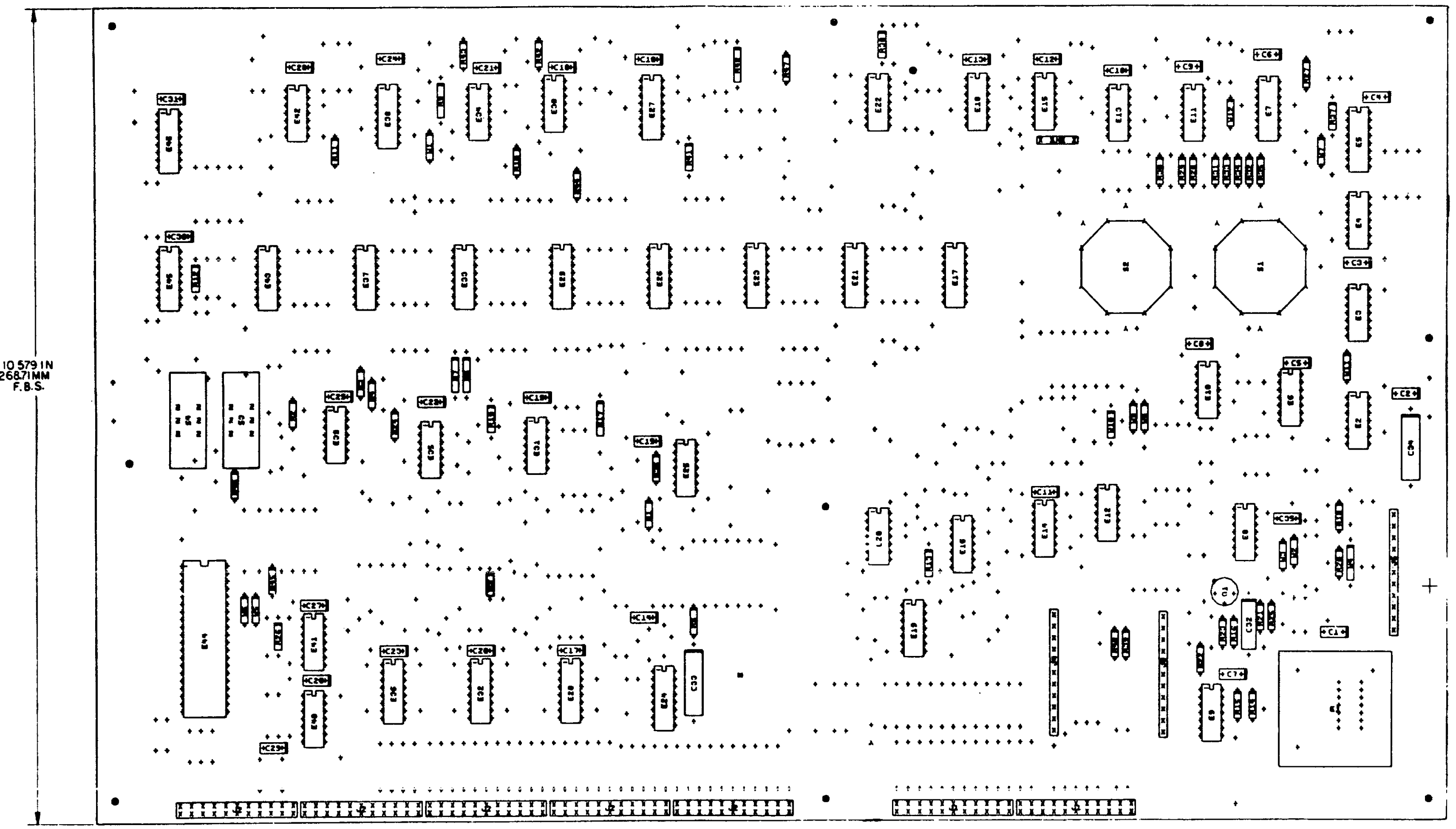
SIZE: D | CODE: PL | NUMBER: 5411743-0-0 | REV: K

SHEET 3 OF 3

INSERTION PARTS LIST DATA BASE REV

NOTES:

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



J1 DATA PATH CONN

1	HORIZ L
2	SYNC L
3	CURSOR LD H
4	AUTO INC X H
5	SVID
6	SCFF
7	ZCAV
8	MODE I L
9	T2H
10	TF
11	TG
12	TE
13	VSR LD H
14	60HJ
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 DATA PATH CONN

1	+5V	29	AC 3
2	KEY CLICK L	30	B3
3	RUF L	31	B2
4	UR	32	AC 2
5	UT	33	F
6	MTU L	34	DI 2
7	EOC	35	DI 1
8	+5V	36	G
9	GND	37	AC 1
10	GND	38	B1
11	DO6	39	BØ
12	DO5	40	ACØ
13	DO4	41	H
14	DOØ	42	DI Ø
15	DO1	43	MUX A
16	DO2	44	MUX B
17	DO3	45	GND
18	M2B L	46	+5V
19	AC 6	47	A
20	DI6	48	BB
21	DI5	49	BC
22	AC5	50	VERT H
23	B4	51	I ROM
24	AC4	52	TSC L
25	D	53	FLAG L
26	DI4	54	TW
27	DI3	55	TH
28	E		

J3 DOT X-OR CONN

1	—
2	—
3	—
4	—
5	—
6	VID Z H
7	VID Z H
8	GND
9	DIS OSC L
10	R INIT H
11	EXT H

J4 20MA/EIA CONN.

1	+5V
2	-12V
3	+15V
4	GND
5	REC. DATA H
6	—
7	TRANS DATA L
8	—
9	—
10	—
11	—

J5 KEYBOARD CONN

1	CTRL KEY L
2	BRK KEY L
3	AC Ø
4	AC 1
5	AC 2
6	AC 3
7	AC 4
8	AC 5
9	GND
10	KEY UP H
11	+5V

J6 GRAPHICS CONN.

1	GND
2	H FLY H
3	EN CYCLE L
4	INIT L

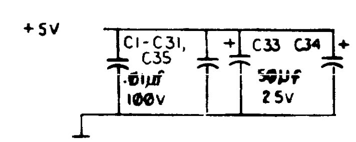
LEGEND

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



IC PIN LOCATIONS

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

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

REVISIONS

REV.	CHANGE NO.	ORIGINATED	CHK
L	5411743-PN009	J. BITTO 22 AUG 78	
K	5411743-PN008A	J. DESUK	
H	5411743-PN007	M. WHITTLESEY 4 APR 77	
F	5411743-PN006	M. WHITTLESEY 23 FEB 77	
E	5411743-00005	J. CARTER 18 JAN 77	
D	5411743-00004	M. MORGANSTERN 6-17-76	
C	5411743-00003 / REVISED & REDRAWN	M. MORGANSTERN 4-21-76	
B	5411743-00002	S. CHLYPAWKA	
A	5411743-00001	M. MORGANSTERN 13 JAN 76	

SEMICONDUCTOR CONVERSION CHART

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

FIRST USED ON OPTION MODEL: VT52

ETCH BOARD REV. D

PARTS LIST

QTY	REF. DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.

DRN.	TOM MISITANO	DATE 4-16-75
CHK'D.	R. PUCCI	DATE 9-22-75
ENG.	TOM MISITANO	DATE 9-22-75
PROJ. ENG.	M. MORGANSTERN	DATE 9-23-75
PROD.	R. PUCCI	DATE 9-24-75

NEXT HIGHER ASSY

digital

TITLE: ROM, UART AND TIMING

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

SCALE — SHEET 1 OF 4

DIST.

1.3 µS CYCLE TIME
72 NS

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

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
60HZ UNIT	1
50HZ 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 -0-1 | REV: L
SCALE: — | SHEET 2 OF 4 | DIST:

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

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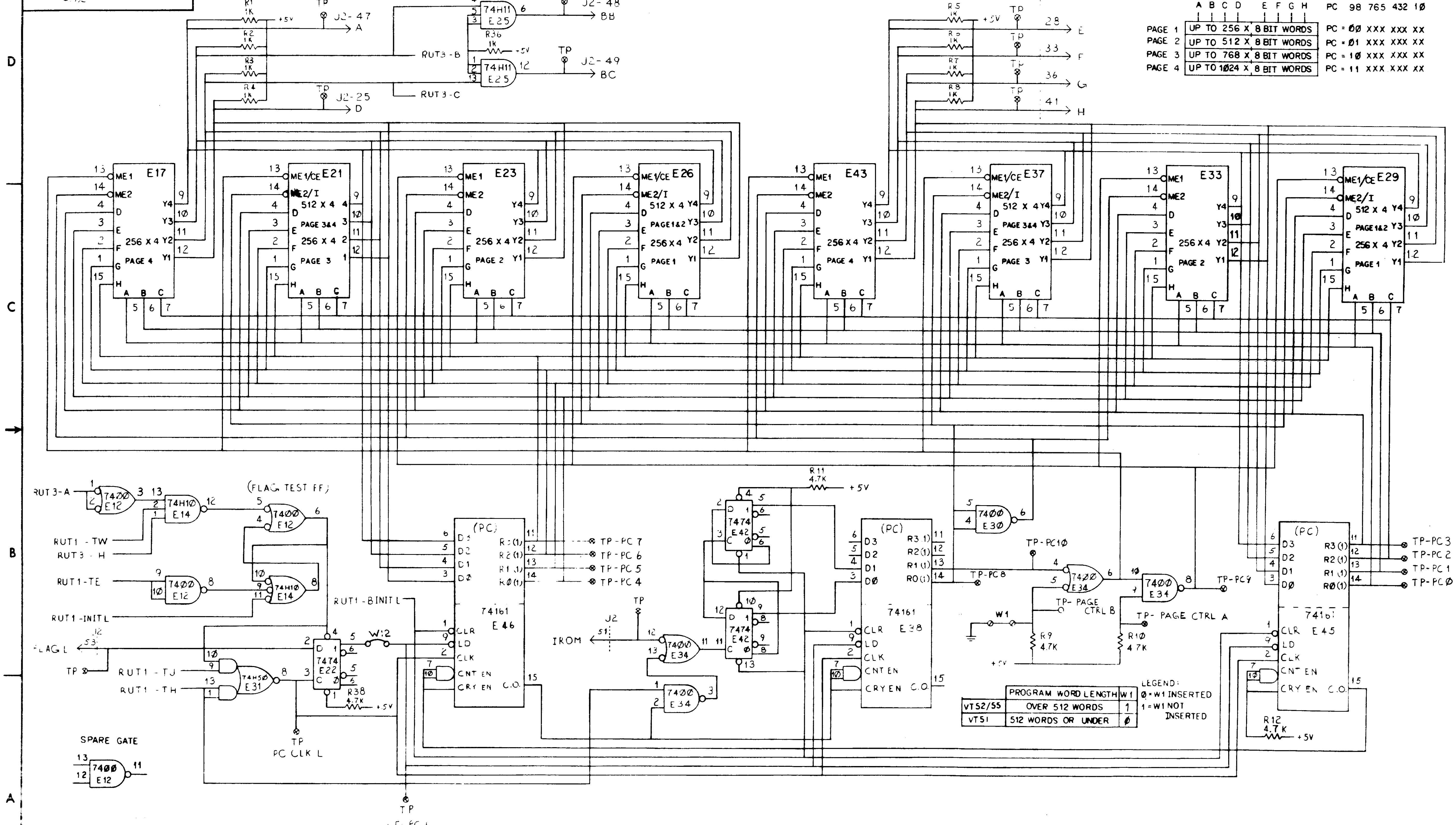
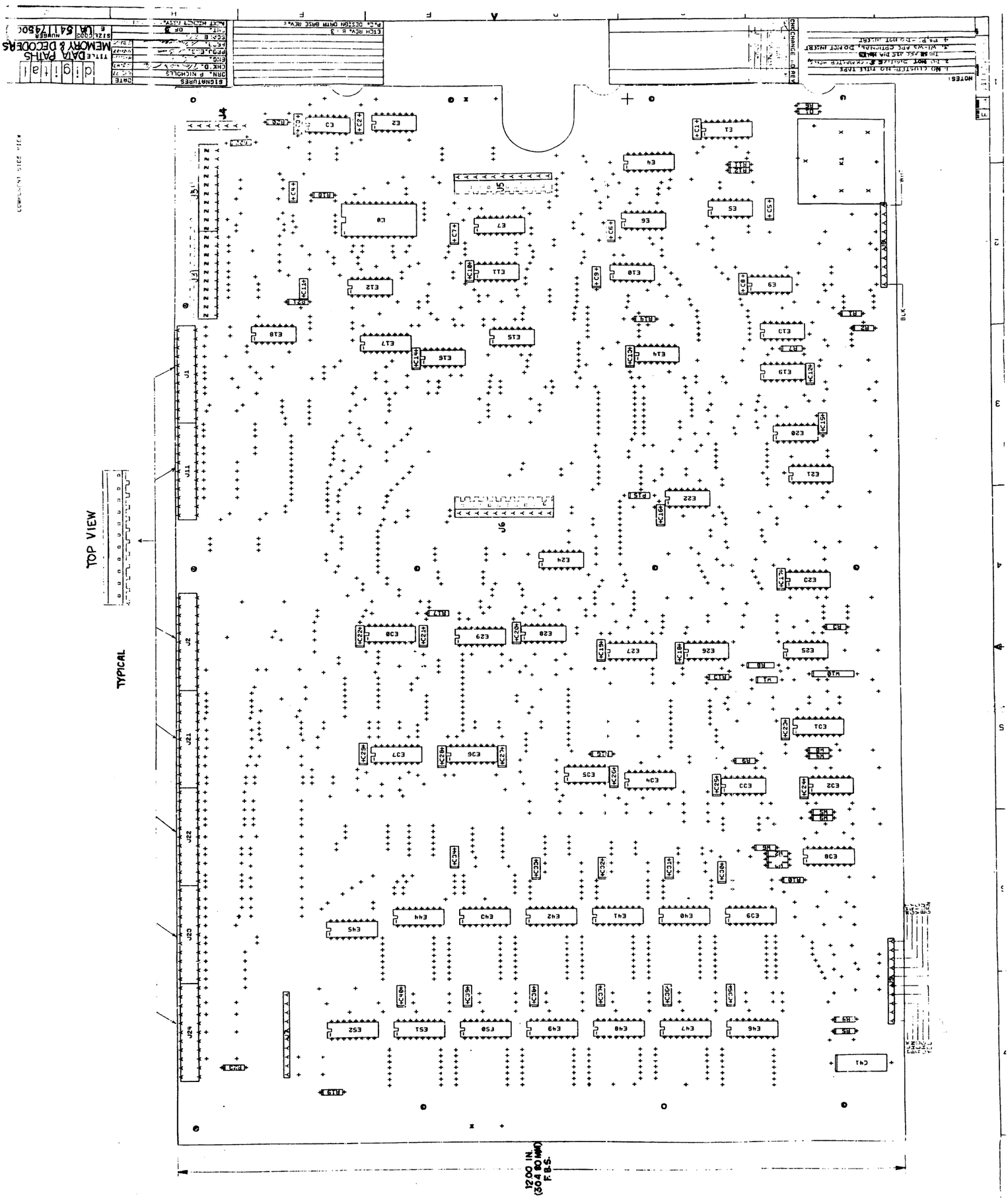

ROM ORGANIZATION
PAGE 1 UP TO 256 X 8 BIT WORDS PC = 00 XXX XXX XX
PAGE 2 UP TO 512 X 8 BIT WORDS PC = 01 XXX XXX XX
PAGE 3 UP TO 768 X 8 BIT WORDS PC = 10 XXX XXX XX
PAGE 4 UP TO 1024 X 8 BIT WORDS PC = 11 XXX XXX XX
E17 256 X 4 PAGE 4
E21 512 X 4 PAGE 3&4 256 X 4 PAGE 3
E23 256 X 4 PAGE 2
E26 512 X 4 PAGE 1&2 256 X 4 PAGE 1
E43 256 X 4 PAGE 4
E37 512 X 4 PAGE 3&4 256 X 4 PAGE 3
E33 256 X 4 PAGE 2
E29 512 X 4 PAGE 1&2 256 X 4 PAGE 1
(FLAG TEST FF)
74161 E46
74161 E38
74161 E45
SPARE GATE
PROGRAM WORD LENGTH W1
VT52/55 OVER 512 WORDS 1
VT51 512 WORDS OR UNDER 0
LEGEND:
0 = W1 INSERTED
1 = W1 NOT INSERTED
TP LD PC L
TP PC CLK L

REVISIONS		
CHK	CHANGE NO	REV.

TITLE ROM, UART & TIMING (RUT3)

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

SCALE — SHEET 4 OF 4


TOP VIEW
TYPICAL
12.00 IN.
(304.80 MM)
F.B.S.

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

TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV
DATA PATH, MEMORY and DECODERS	D-CS-5411745-0-1	B	PL	5411745-0-0	H
	SHEET 1 OF 2	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-ØØ	5411745-Ø1	5411745-Ø2	5411745-Ø3									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.

TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV.
DATA PATH, MEMORY and DECODERS	D-CS-5411745-0-1	B	PL	5411745 0-0	H
	SHEET 2 OF 2	INSERTION PARTS LIST DATA BASE REV			

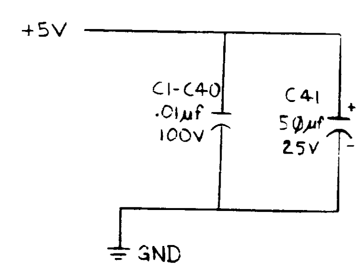
(N 01140A-16 R2761325) DRB 125

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



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

REVISIONS: G. CHRISTIANSEN; 5411745-PN006; M. WHITTLESEY; M. WHITTLESEY; REVISED & REDRAWN; 5411745 00004 D

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

SEMICONDUCTOR CONVERSION CHART

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

NEXT HIGHER ASSY

digital

TITLE: DATA PATH, MEMORY AND DECODERS

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

SCALE — SHEET 1 OF 5

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

DP2 - LD RAM L

TP

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

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
DP3 - X4
DP3 - X5
DP3 - Y3
R1Ø 4.7K +5V
DP3 - X6
74H5Ø E32
DP1 - A1 TP
DP1 - A5 TP
DP1 - A4 TP
DP1 - AØ TP

* DELETE E39 — E45 FOR VT51.

MEMORY BUFFER 7495 E33
DØ D1 D2 D3 RSHF CLK1 CLKØ DSØ
RØ(1) R1(1) R2(1) R3(1)
TP J2 - 17 / J6 - 7 / J7 - 1Ø → DO 3
TP J2 - 13 / J6 - 5 / J7 - 6 → DO 4
TP J2 - 12 / J6 - 6 / J7 - 5 → DO 5
TP J2 - 11 / J6 - 4 / J7 - 4 → DO 6

MEMORY BUFFER 7495 E26
DP3 - CURSOR H
DP1 - B CURSOR H
TP J2 - 14 / J6 - 1Ø / J7 - 7 → DO Ø
TP J2 - 15 / J6 - 8 / J7 - 8 → DO 1
TP J2 - 16 / J6 - 9 / J7 - 9 → DO 2
TP J1 - 9 → T2H
R13 1K +5V

REVISIONS		
CHK	CHANGE NO.	REV.

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

5411745-Ø-1 REV J

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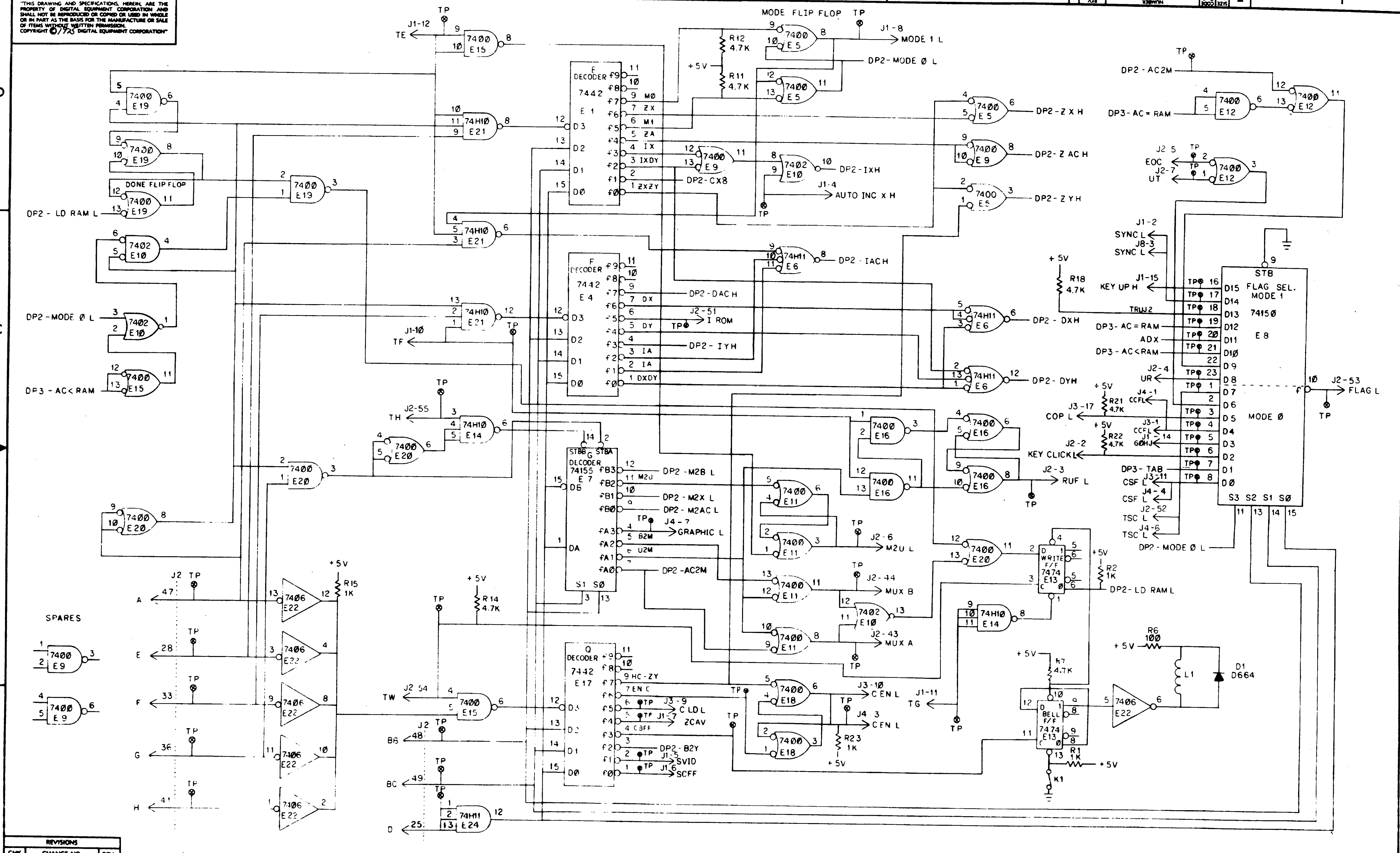

TITLE DATA PATHS, MEMORY AND DECODERS (DP2)

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

SCALE — | SHEET 3 OF 5

+5 V: J1-19, J2-1-8-46, 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 J2-50 → J8-9 VERT H
HORIZ L J1-1 → J8-5 HORIZ L
DOT L J3-12 → J4-5 DOT L
GND SENSE J9-7
+5V SENSE J9-4 — R5 4.7 — +5V; R4 2.2K
J9-3 -5V → J5-9 -5V
J1-18 -12V → J5-10 → J9-2 -12V
J1-17 +15V → J5-8 +15V; J8-10 +15V

J1 VID Z H 20, VID Z H 21, VID Z H J8-7 → 7400 E18

R3(1) R2(1) R1(1) RØ(1) VIDEO SHIFT REG 7495 E3: DS Ø, CLK Ø, CLK 1, RSHF, D3 D2 D1 DØ
R3(1) R2(1) R1(1) RØ(1) VIDEO SHIFT REG 7495 E2: DS Ø, CLK Ø, CLK 1, RSHF, D3 D2 D1 DØ
TP J1-13 VSR LD H

J5 +5V — R20 4.7K
CD6 J5-7, CD5 J5-6, CD4 J5-5, CD3 J5-4, CD2 J5-3, CD1 J5-2, CDØ J5-1
CD6 8 J3, CD5 5, CD4 4, CD3 3, CD2 2, CD1 13, CDØ 14

J1 B OSC A 22, CURSOR LD H 3, B CURSOR H
7400 E18, 7400 E15

DP3 - ADX → 7400 E12 → DP3 - CURSOR H

DP3-TAB → 74H10 E14
8242 E35: DP3-X6, DP3-X5, DP3-X4, DP3-X3, DP3-X2
8242 E28: DP3-X1, DP3-XØ
R16 1K — +5V

DP3 - AC<RAM
DP3 - AC=RAM

MAGNITUDE COMPARATOR 7485 E36: A>B A=B A<B, IN<, IN=, IN>, B3 A3 B2 A2 B1 A1 BØ AØ
MAGNITUDE COMPARATOR 7485 E29: A>B A=B A<B, IN<, IN=, IN>, B3 A3 B2 A2 B1 A1 BØ AØ
R17 4.7K — +5V

J6: AC2, AC1, ACØ
J2: AC6, AC5, AC4, AC3, AC2, AC1, ACØ

7474 E25: DP3-Y3, DP3-Y2, DP3-Y1, DP3-YØ; W10 W9 W8 W7 W6 W5 W4 W3 W2 W1
7400 E23: DP3 - PAGE 2 SEL L, DP3 - PAGE 1 SEL L
74H50 E32, 74H11 E24
R3(1) R2(1) R1(1) RØ(1) Y REG 74193 E31: BRW, CRY, CDN, CUP, LD, CLR, D3 D2 D1 DØ
DP2 - DYH, DP2 - IYH, DP2 - B2Y, DP2 - ZYH
7400 E23, 7400 E23

B4 J2-23, B3 J2-30, B2 J2-31, B1 J2-38, BØ J2-39

74H11 E24: DP2 - ZCAV
R3(1) R2(1) R1(1) RØ(1) AC REG. 74193 E37: BRW, CRY, CDN, CUP, LD, CLR, D3 D2 D1 DØ
R3(1) R2(1) R1(1) RØ(1) AC REG 74193 E30: BRW, CRY, CDN, CUP, LD, CLR, D3 D2 D1 DØ
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 Ø

DP3-X0, DP3-X1, DP3-X2, DP3-X3, DP3-X4, DP3-X5, DP3-X6
R19 1K — +5V; 8242 E28
R3 4.7K — +5V; 7474 E25
DP2-CX8
R3(1) R2(1) R1(1) RØ(1) X REG 74193 E34: BRW, CRY, CDN, CUP, LD, CLR, D3 D2 D1 DØ
R3(1) R2(1) R1(1) RØ(1) X REG 74193 E27: BRW, CRY, CDN, CUP, LD, CLR, D3 D2 D1 DØ
DP2-DXH, DP2-IXH, DP2-M2X
7400 E23
DP2-ZXH

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE (DP3) DATA PATHS, MEMORY AND DECODERS		SIZE D	CODE CS	NUMBER 5411745-Ø-1	REV. 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 SVID
6 SCFF
7 2CAV
8 MODE I L
9 T2H
10 TF
11 TG
12 TE
13 VSR LD H
14 GØHJ
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	29	AC3
2	KEYCLK L	30	B3
3	RUF L	31	B2
4	UR	32	AC 2
5	UT	33	F
6	M2UL	34	DI 2
7	EOC	35	DI1
8	+5V	36	G
9	GND	37	AC1
10	GND	38	B1
11	DO6	39	B0
12	DO5	40	AC0
13	DO4	41	H
14	DO3	42	DI0
15	DO1	43	MUX A
16	DO2	44	MUX B
17	DO3	45	GND
18	M2BL	46	+5V
19	AC6	47	A
20	DI6	48	BB
21	DI5	49	BC
22	AC5	50	VERT H
23	B4	51	I ROM
24	AC4	52	TSC L
25	D	53	FLAG L
26	DI4	54	TW
27	DI3	55	TH
28	E		

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 C EN L
4 CSFL
5 DOT L
6 TSC L
7 GRAPHIC L

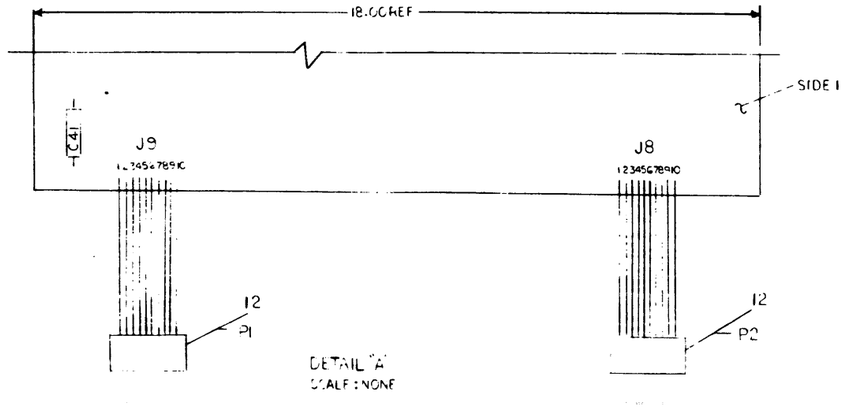
J5 CHAR. GEN. CONN.
1 CDØ
2 CD1
3 CD2
4 CD3
5 CD4
6 CD5
7 CD6
8 +15V
9 -5V
10 -12V
11 GND

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

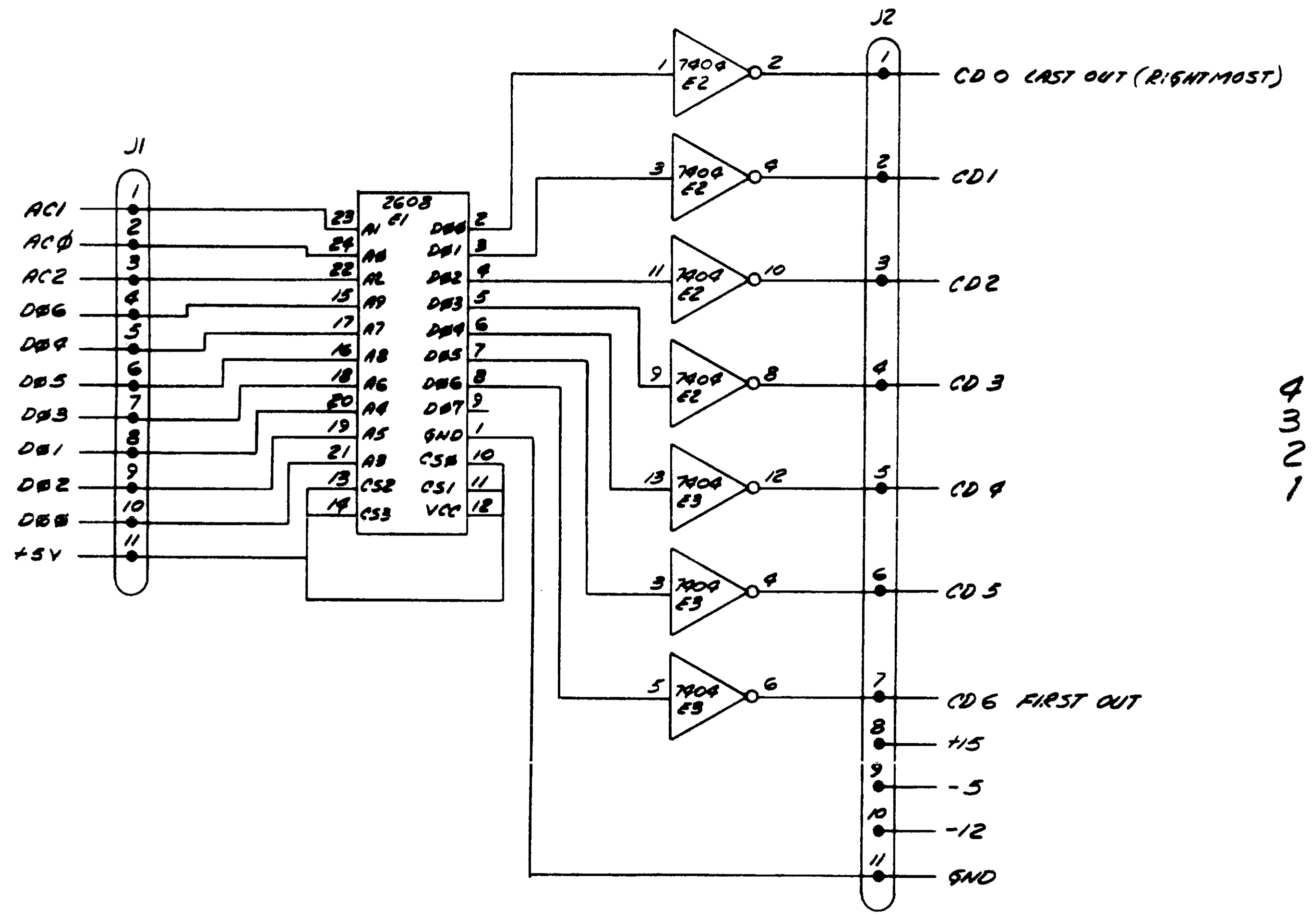
REVISIONS		
CHK	CHANGE NO	REV.

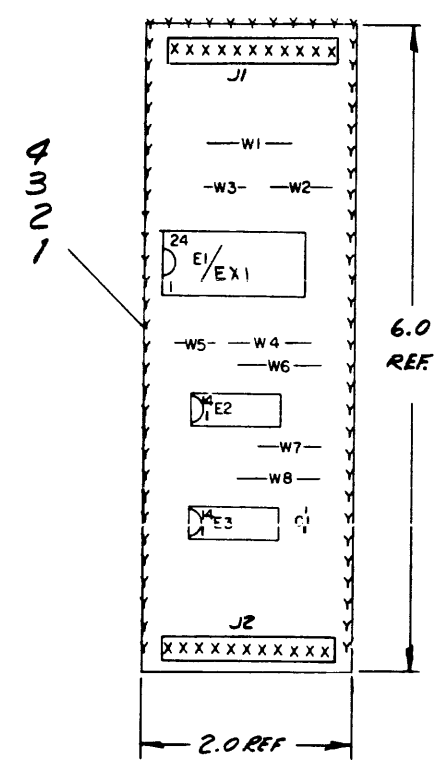
TITLE DATA PATHS
MEMORY AND DECODERS
SCALE —/—/— SHEET 5 OF 5
SIZE D CODE CS NUMBER 5411745-0-1 REV. J
DIST.

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

NOTES:

1. JUMPERS W3, W5 ON .4 CENTERS
JUMPERS W2, W7 ON .6 CENTERS
JUMPERS W1, W4, W6, W8 ON .8 CENTERS





2608	1	12
IC TYPE	GND	+5V

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

IC PIN LOCATIONS

QTY 5411815-YA	QTY 5411815-0-0	REF. DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.
REF	REF		X-Y COORDINATE HOLE LOCATION	K-CO-5411815-0-4	1
REF	REF		ASSY/DRILLING HOLE LAYOUT	E-AN-5411815-0-5	2
REF	REF		MODULE ECO HISTORY	B-AN-5411815-0-6	3
1	1		ETCHED CIRCUIT BOARD	5011814	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	2300284	7
A/R	A/R	W1 THRU W8	JUMPER	9107180-[illegible]	8
A/R	A/R	J1, J2	HEADER, 11 POSITION	1212519	9
1	—	EX1	SOCKET, IC 24 PIN	1210693-00	10

PARTS LIST

FIRST USED ON OPTION MODEL: V752

ETCH BOARD REV. A

REV.	CHANGE NO.		
A	5411815-00001	ORIGINATED	M. MORGAN... 2-24-76
B	5411815-PN002	M. WHITTLESEY	11 JAN 77
C	5411815-PI1003	M. WHITTLESEY	18 FEB 77
D	5411815-PN004	J. BESUK	16-DEC-77

REVISIONS

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

SEMICONDUCTOR CONVERSION CHART

DRN. DATE 8/21/75
CHKD. DATE 8/29/75
ENG. DATE 8/27/75
PROJ. ENG. DATE 8/27/75
PROD. DATE

NEXT HIGHER ASSY Ø-UA-VT52-Ø-Ø

SCALE NONE
SHEET 1 OF 1

digital

TITLE
8K CHARACTER GENERATOR

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

DIST.

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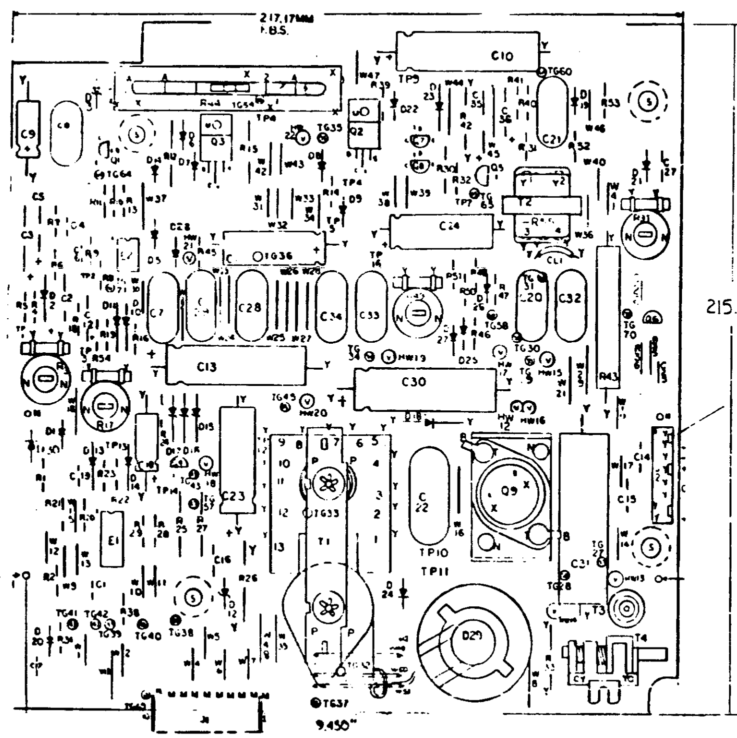
NOTES:

1. THERE IS NO ETCH TO D29. CONNECTIONS ARE HARD WIRED.
2. ETCH AND PUNCH/DRILL FOR TO-5 AND TO-220.
3. CURRENT LOOP 4 INCH LENGTH #22 AWG WIRE.
4. (symbol) 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 Ø VARIATION ONLY.
8. FOR VARIATION-01, THE FOLLOWING PARTS ARE NOT USED. R36, R34, D2Ø, D21, C27, C25 AND Q6.
9. LOCATION J1-1Ø 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).



-01	-00 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%	1302595-00	54
1	1	R43	RES. 1.5 OHM, 10W 5%	1303735-00	55
—	1	R37	RES POT 2K	1311653-03	56
1	1	R8	RES. 30K, 1/4W, 5%	1302394-00	57
1	1	R44	RES POT 250K	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, D45C6	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	1611898-00	69
1	1	T2	TRANSFORMER, U9737	1611897-01	70
1	1	T3	TRANSFORMER, U9934	1611898-00	71
1	1	T4	TRANSFORMER, AT4072	1611899-00	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
	1 33	J1	STRAIGHT PINS HEADER	1212519-00	76
2	2	ITEM #75	KEYNUT #4-40	9008557-00	77
3	3		TIE WRAP	9007031	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	D-IA-7012096-0-0	83
1	1		HARNESS, YOKE	D IA 7011187-0-0	84
2	2	ITEM #75	SCR. PHILLIPS PAN HD #4-40 X .250	9008301-01	85
A/R	A/R	ITEM #75	COMPOUND, THERMAL	9008268-00	68
1	1	J2	CONNECTOR	1212619-00	37
A/R	A/R	W49 51	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

 # SEE NOTE 8

-01	-00 QTY	REF. DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.
REF	REF		X-Y COORDINATE HOLE LOCATION	K-CO-5411444-0-4	1
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	1 MO 5011443-00	4
* 2	3	C1,C19,C25	CAP., 100PF 100V, 5%	1000016-00	5
1	1	C17	CAP., 39PF 100V, 5%	1000010-00	6
1	1	C4	CAP., 270PF, 100V, 5%	1000022-00	7
1	1	C6	CAP., 470PF, 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%	1005306-00	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,C20,C21,C28,C29,C32, C33,C34	CAP., .022UF	1011846-00	19
1	1	C22	CAP., .068UF, 600V	1011847-00	20
2	2	C23,C24	CAP., 25UF, 150V	1011849-00	21
3	3	C10,C13,C30	CAP., 1000UF 16V	1011849-02	22
4	4	D1,D2,D10,D11	DIODE, D384	1100114-00	23
1	1	D3	DIODE, 1N287A	1110068-00	24
1	1	D12	DIODE, 1N751A	1110994-00	25
* 5	7	D5,D13,D14,D20,D21,D23, D26	DIODE, D372	1105275-00	26
8	8	D4,D6,D7,D8,D9,D22,D25,D27	DIODE, 1N4004	1105798-00	27
1	1	D18	DIODE, M9652	1109634-01	28
3	3	D15,D16,D17	DIODE, 1N5343	1109988-00	29
2	2	D19,D24	DIODE, MR312	1111654-00	30
1	1	D28	DIODE, MR317	1111654-01	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
* 2	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,R36,R46	RES. 1K, 1/4W, 5%	1300365-00	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,R6,R21,R39	RES. 10K, 1/4W, 5%	1300479-00	41
2	2	R4,R41	RES. 120K, 1/4W, 5%	1300539-00	42
3	3	R16, R47, R48	RES 270K, 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%	1302199-00	47
1	1	R23	RES. 2K, 1/4W, 5%	1302388-00	48
2	2	R50,R51	RES. 470K, 1/4W, 5%	1302390-00	49
3	3	R7,R9,R40	RES. 160K, 1/4W, 5%	1302486-00	50
1	1	R5	RES. 820 OHM, 1/4W, 5%	1303178-00	51
1	1	R26	RES. 82 OHM, 2W 10%	1301654-00	52

PARTS LIST

ETCH BOARD REV. E

IC TYPE	GND	+5V

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

IC PIN LOCATIONS

VT61

CHK	ORIGINATED	CHANGE NO.	REVISIONS	REV.
	J. BUZYNSKI	5411444 C0001		C
	J. BUZYNSKI			F
		5411444-PN003	DESUK	H
		5411444-PN004	DESUK	J

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

SEMICONDUCTOR CONVERSION CHART

DRN. DATE 10-8-75
CHKD. DATE
DATE
DATE

NEXT HIGHER ASSY D UA-VT61-0

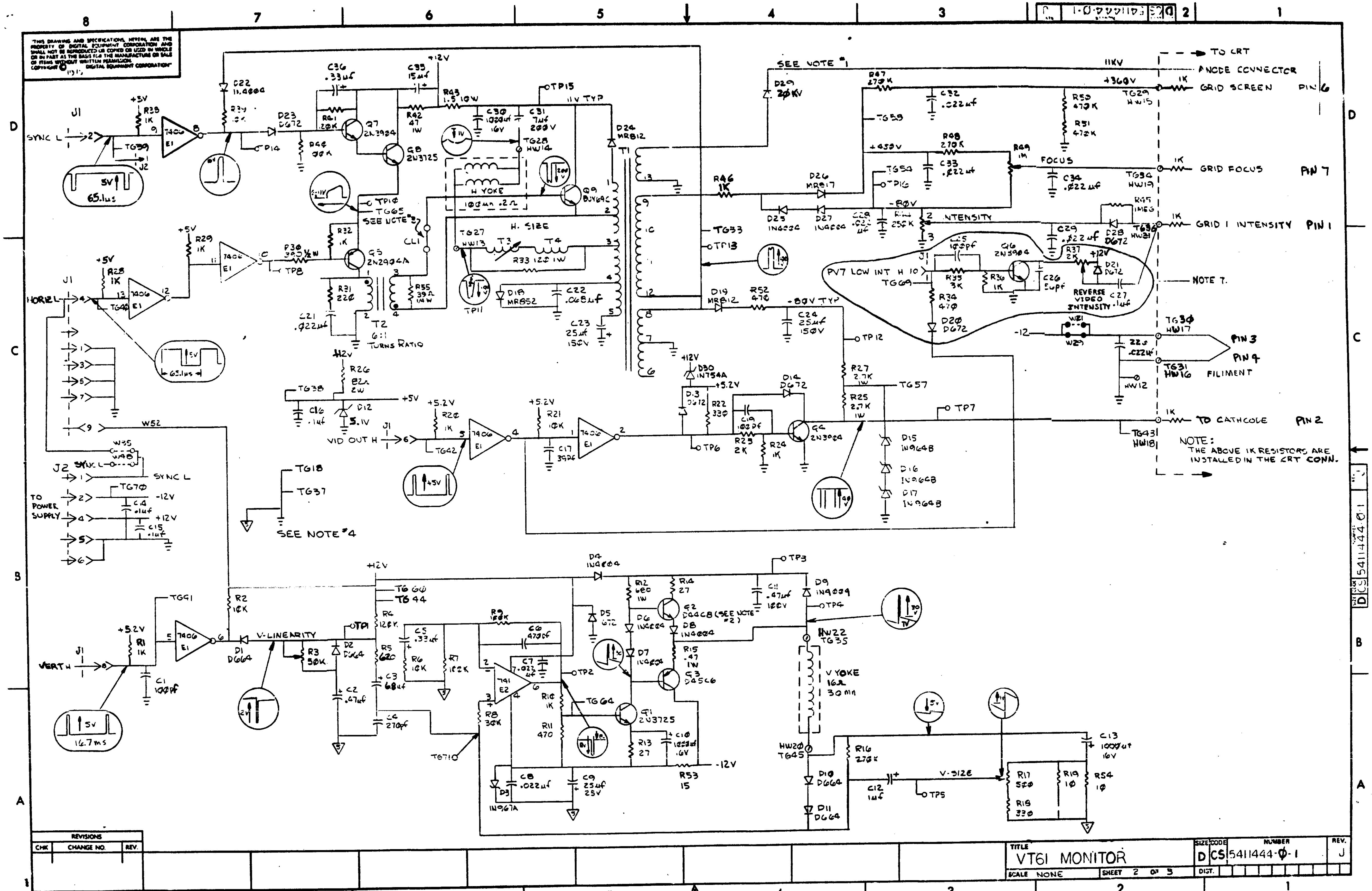
digital

TITLE VT61 MONITOR

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

SCALE SHEET 1 OF 3

DIST.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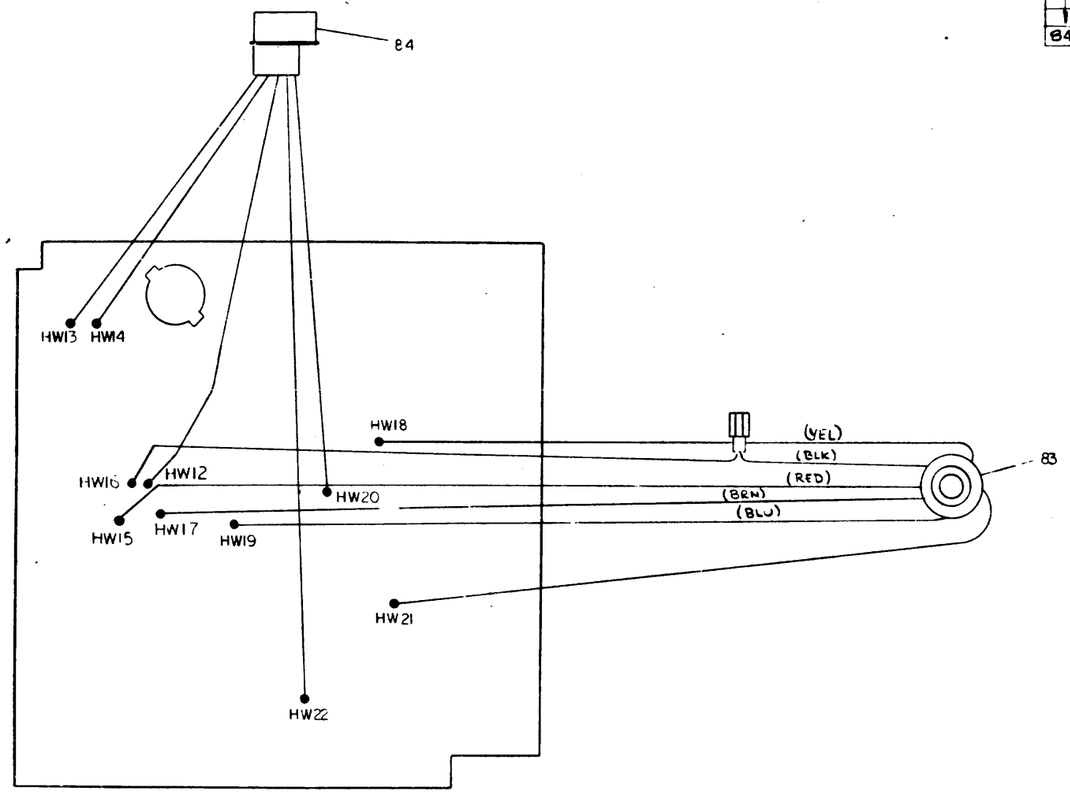
SYNC L
HORIZ L
VERT H
VID OUT H
TO POWER SUPPLY
SEE NOTE #4
SEE NOTE #1
H YOKE
H. SIZE
T2 6:1 TURNS RATIO
V-LINEARITY
V YOKE 16Ω 30mh
V-SIZE
TO CRT
ANODE CONNECTOR
GRID SCREEN PIN 6
FOCUS
GRID FOCUS PIN 7
INTENSITY
GRID 1 INTENSITY PIN 1
PV7 LOW INT H
REVERSE VIDEO INTENSITY
NOTE 7.
PIN 3
PIN 4
FILIMENT
TO CATHCODE PIN 2
NOTE: THE ABOVE 1K RESISTORS ARE INSTALLED IN THE CRT CONN.
REVISIONS
CHK
CHANGE NO.
REV.
TITLE VT61 MONITOR
SCALE NONE
SHEET 2 OF 3
SIZE D
CODE CS
NUMBER 5411444-0-1
REV. J

WIRE TABLE

ITEM NO	DESCRIPTION AWG	DESCRIPTION COLOR	FROM POINT	FROM CONNECTION	FROM WITH	TO POINT	TO CONNECTION	TO WITH
83	18	GRN	10	PIN-1	——	HW12	——	SOLD
↓	22	BLK	9	PIN-3	——	HW20	——	↓
	TWP	RED	8	PIN-6	——	HV 22	——	
↓	22	WHT	7	PIN 5	——	HW14	——	
83	TWP	BLU	6	PIN-2	——	HW13	——	
84	22	GRN	—	——	——	HW21	——	
↑	↓	YEL	—	——	——	HW18	——	
		BRN	—	——	——	HW17	——	
		BLK	—	——	——	HW16	——	
↓	↓	RED	—	——	——	HW15	——	
84	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

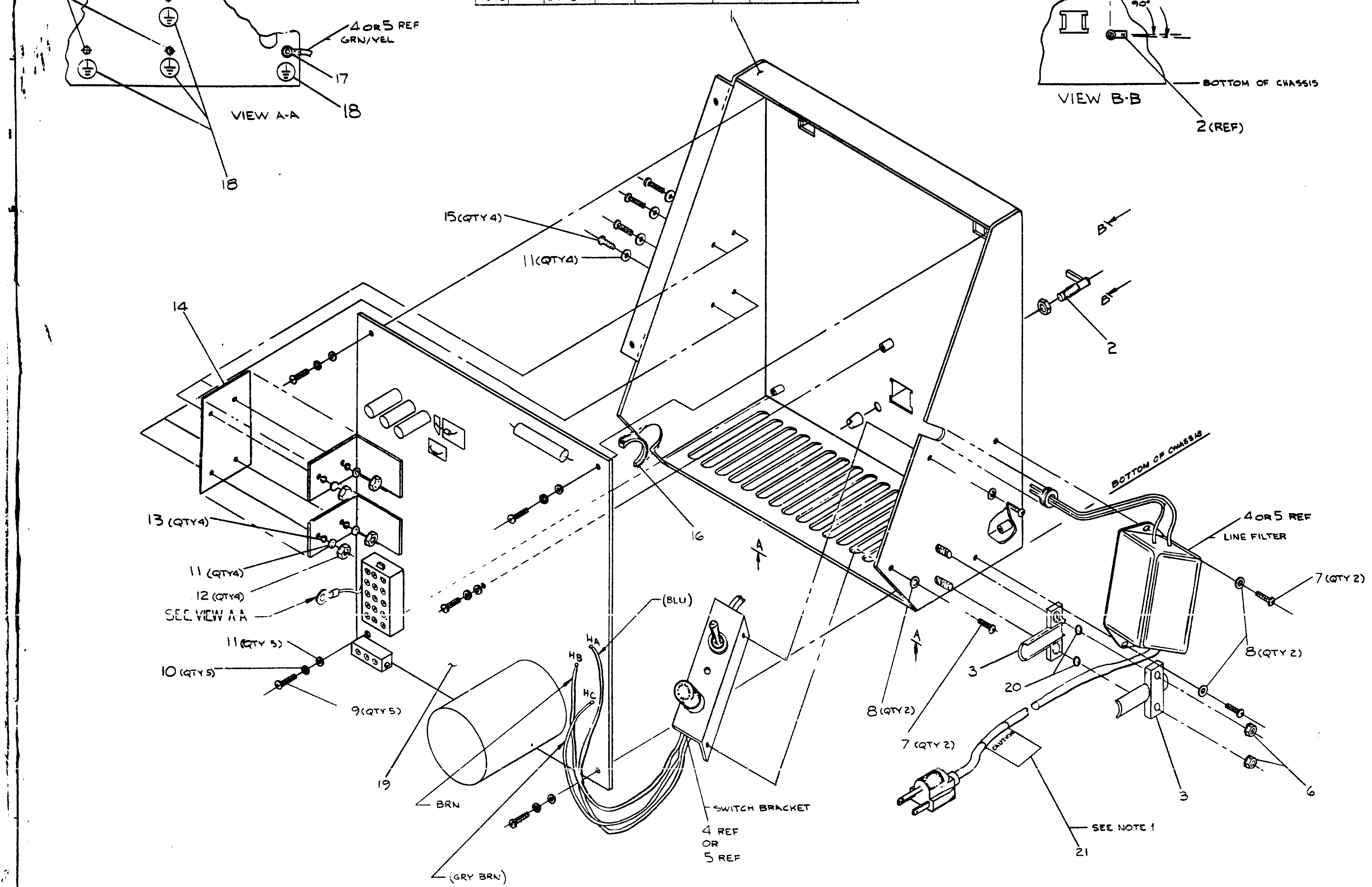
DEC FORM NO DRG 137

WIRE TABLE							
ITEM NO	DESCRIPTION		FROM		TO		
	AWG	COLOR	POINT	CONNECTION	POINT	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.



H7832-B	H7832-A	DESCRIPTION	DWG/PART NO.	ITEM NO.
1	1	LABEL, WARNING AC, CORD	3611448-0 0	21
2	2	O-RING 9/32 OD × 5/32 ID	9007616-00	20
1	1	POWER SUPPLY BOARD	5412973	19
4	4	DECAL	3612680-00	18
1	1	KEPNUT #10-32	9006565-00	17
3/4	3/4	GROMMETS, CAT.	9007035-00	16
4	4	SCR PHL FAN HD #6-32 × 7/16	9006023-01	15
1	1	INSULATOR	1213071-04	14
4	4	BUSHING, INSULATED	9008421-00	13
4	4	KEPNUT #6-32	[illegible]	12
13	13	WASHER, FLAT	9006653-00	11
5	5	WASHER, INT TOOTH #6	[illegible]	10
5	5	SCR PHL PAN HD #6-32 X .31 LG	9006021-01	9
4	4	WASHER, INT TOOTH #8	9006634-00	8
4	4	SCR, PHL FAN HD #8-32 X .31 LG	9006036-01	7
2	2	KEPNUT #8-32	9006563-00	6
1	-	WIRING ASSY, H7832	Ø IA7418696 0-1	5
-	1	WIRING ASSY, H7832	[illegible]	4
2	2	STRAIN RELIEF, POWER CORD	2-MD7418504-0 0	3
1	1	ADJUSTABLE GRIP LTCH	1212939-03	2
1	1	CHASSIS, S.E.S.	D-IA-7418560-0-0	1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS

QUANTITY & VARIATION

THIRD ANGLE PROJECTION

REMOVE BURRS AND BREAK SHARP CORNERS

DO NOT SCALE DWG

FIRST USED ON: VT62

TITLE: H7832 POWER SUPPLY (VT62)

NEXT HIGHER ASSY: ØUA-VT62-Ø-Ø

MATERIAL: SEE PARTS LIST

SIZE	CODE	NUMBER	REV
D	UA	H7832-Ø-Ø	A

SCALE: NONE

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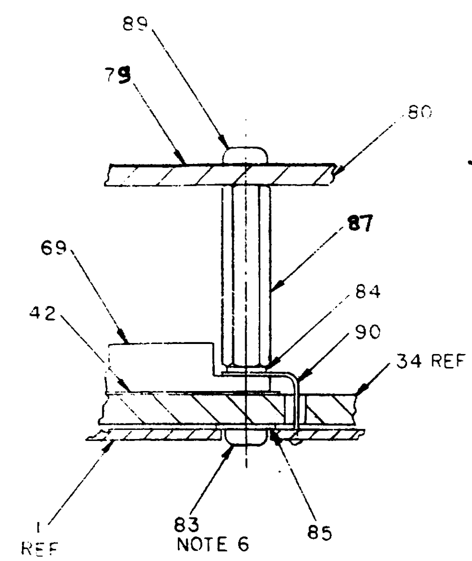
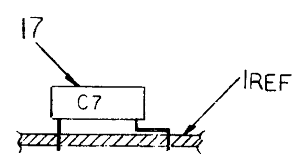
* DELETE THE FOLLOWING PARTS FROM THE -YA VARIATION:
C19, C25, C34, D21, R56, J2, F2, ITEM 33.

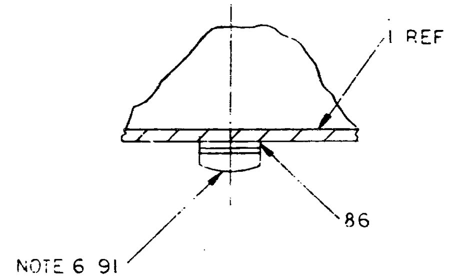
REWORK INSTRUCTIONS
ECO #1
COMPONENT DELETES SIDE 1
1-1. D32 (P/N 1112595-02)
E.C.O. #5
COMPONENT DELETES SIDE 1:
5-1 DELETE C7, (P/N 1013203-00)
COMPONENT ADDS SIDE 1:
5-2 ADD C7, (P/N 1011847-02)
ECO #6
COMPONENT DELETE SIDE 1:
6-1 DELETE E4 (P/N 1914075)
COMPONENT ADD SIDE 1:
6-2. ADD E4 (P/N 1912098-04)



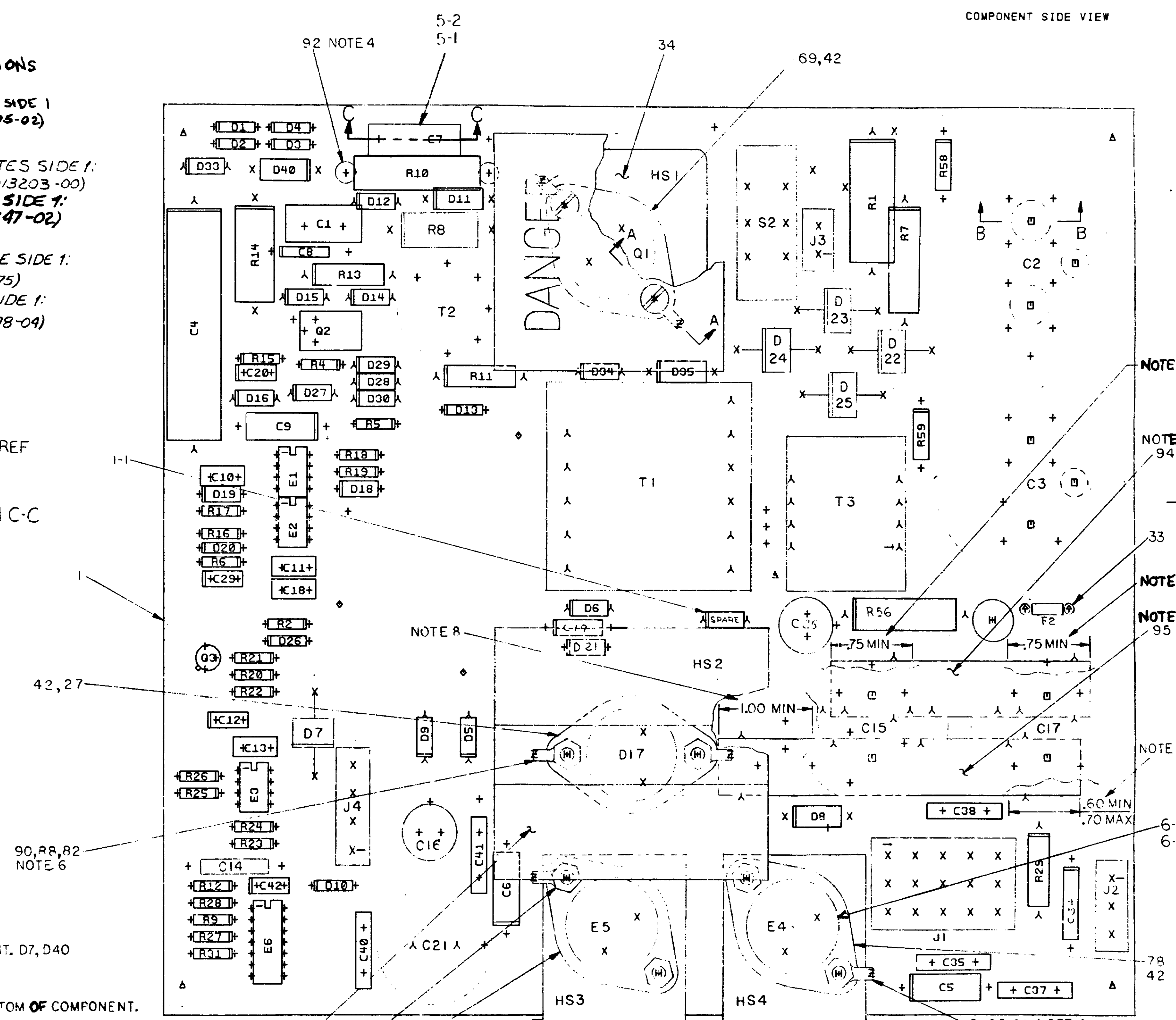
PARTIAL SECTION A-A
ROTATED 45° CCW



PARTIAL SECTION C-C
SCALE: NONE



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



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- R10 MOUNTED OFF BOARD USING ITEM 92

REV	CHANGE NO	CHK
C	5412973-1	B. STANDISH
D	5412973-2	
E	5412973-3	B. STANDISH
F	5412973-4	M. BLAKE
G		D. GLUSS
H	5412973-5	B. STANDISH
J	5412973-6	B. STANDISH
K	5412973 [illegible]	B. STANDISH
L	5412973 [illegible]	B. HAZEN

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

SIGNATURES	DATE
DRN. G.C. [illegible]	21 MAR 77
CHK. D. [illegible] STANDISH	22 MAR 77
ENG. [illegible]	15 JUN 77
PROJ. ENG. [illegible]	15 JUN 77
PROD. [illegible]	
SCALE 2/1	
SHT. 1 OF 3	
NEXT HIGHER ASSY. B-DD-5412973-0	

digital

TITLE VT61, VT62, VT78, FDCT POWER SUPPLY

SIZE	CODE	NUMBER	REV
D	UA	5412973-0-0	L

MS# 12415

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 +20-00 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\75P%B 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	UES601 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	DRN: R.BUREAU	DATE: 06-FEB-78	D I G I T A L
ENG	ECO NUMBER	REV	SECTION A OF A	CHK'D: K.GLEEZEN	DATE: 06-FEB-78	TITLE PARTS LIST
WH	00005	H	SECTION,VARIATION INDEX	DES,ENG: B.STANDISH	DATE: 06-FEB-78	VT61,VT62,VT78,FDCT POWER SPLY
ER	00006	J	[A] 00,YA	RESP,ENG,: B.STANDISH	DATE: 06-FEB-78	DOCUMENT NUMBER
D.C	5412973-ML008	L	[B]	MFG.ENG.: R.POWERS	DATE: 06-FEB-78	SIZE: K CODE: PL NUMBER: 5412973-0-DBP REV: L
			[C]	ASSEMBLY NUMBER: D-UA-5412973-0-0		FILE NAME: 12973L,PLS EDIT #: 19
			[D]			
			[E]			
			[F]			
			[H]			
			[J]			
			[K]			
			[L]			
			[M]			
			[N]			

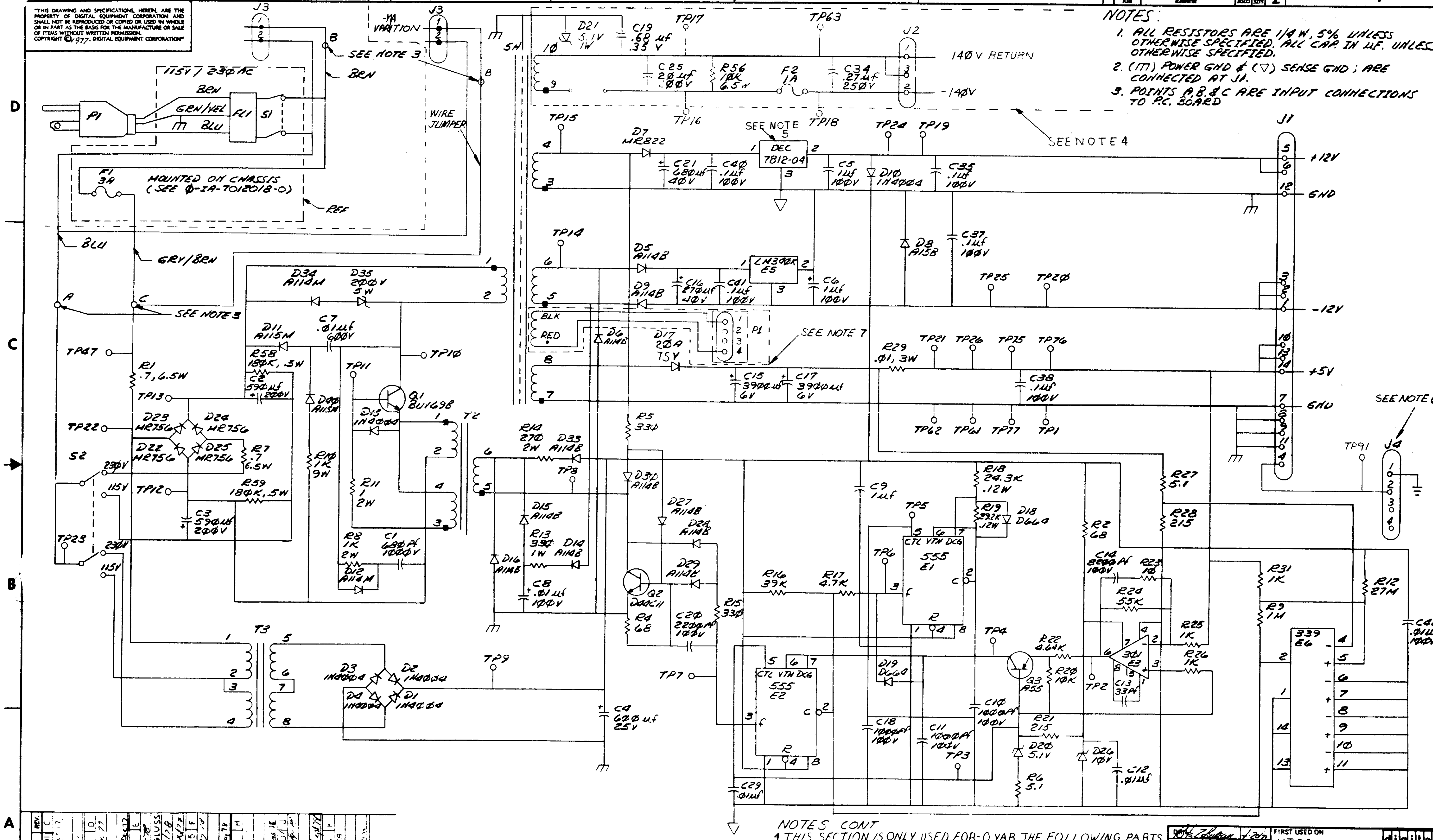
P A R T S L I S T

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	330 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		1512782-00	NPN 100W S1325 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

DIGITAL	TITLE	SIZE	CODE	DOCUMENT NUMBER	REV
	VT61,VT62,VT78,FDCT POWER SPLY SECTION A OF A	K	PL	541297[illegible]-0-DBP	L

LINE	ITEM	DOCUMENT NUMBER	PART NUMBER	DESCRIPTION	QTY PER VARIATION 00	QTY PER VARIATION 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	0	0	
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	

D	I	G	I	T	A	L	TITLE	SECTION A OF A	SIZE	CODE	DOCUMENT NUMBER	REV
							VT61,VT62,VT78,FDCT POWER SPLY		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 µF. 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. LM340K (7812) IS USED ON -YA VARIATION.
6. J4 IS USED ON -YA VARIATION.
7. 300 V TRANSFORMER WINDING IS ONLY PRESENT ON -YA VARIATION.

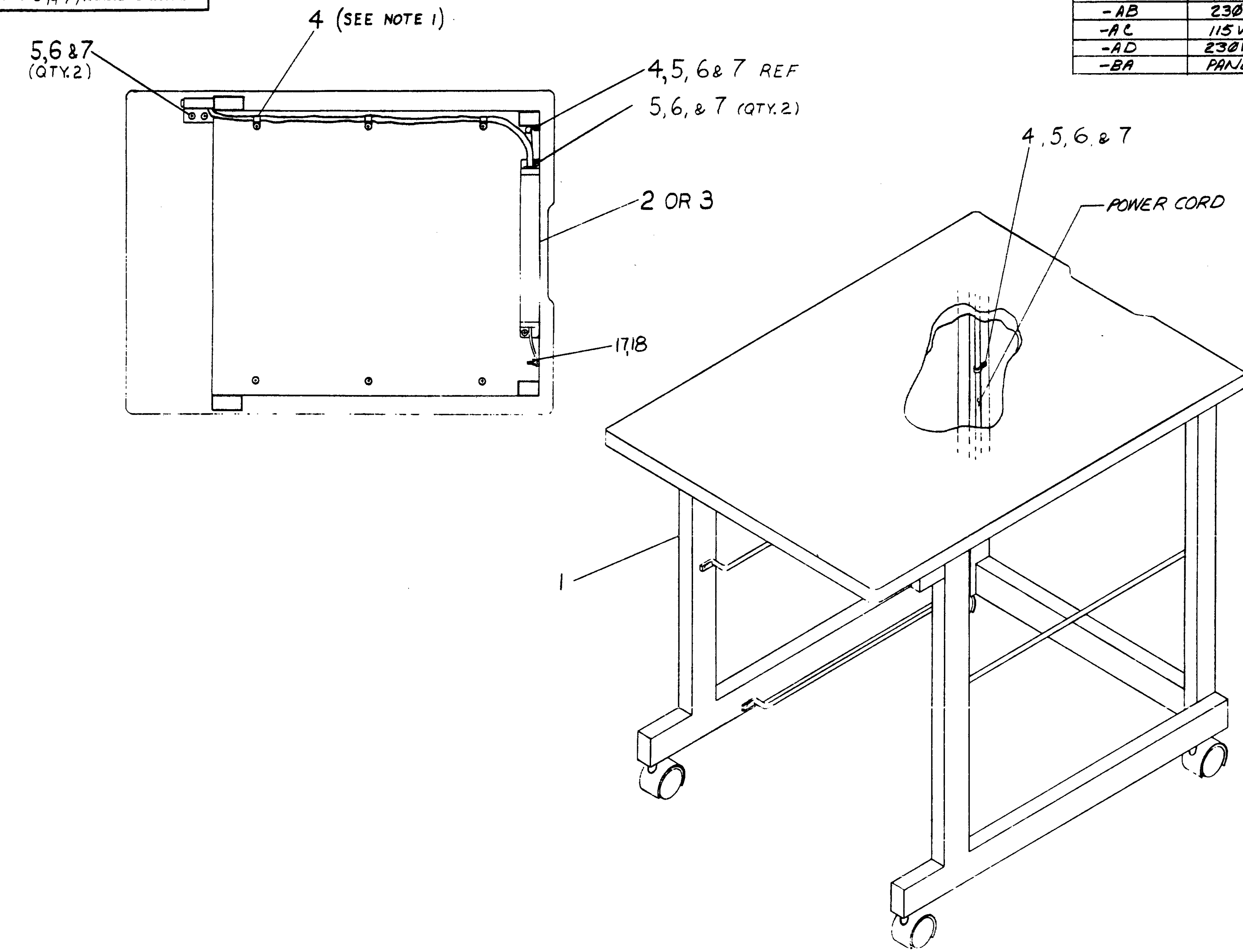
FIRST USED ON: VT62 / VT68

TITLE: VT61, VT62, VT78 FDCT POWER SUPPLY

NEXT HIGHER ASSY: D-UA-5412973-0-0

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

digital



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-7665277-0-0 (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~~	~~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 R.H.	D-MD-7014655-01	13
1	1	1	-	-	DECORATIVE PANEL L.H.	D-MD-7014655-00	12
1	1	1	-	-	LOWER SHELF	D-MD-7419466-0-0	11
~~-~~	~~2~~	~~2~~	~~2~~	~~2~~	~~LOCK WASHER INT. #8~~	~~9006634~~	~~10~~
~~-~~	~~2~~	~~2~~	~~2~~	~~2~~	~~FLAT WASHER~~	~~9006660~~	~~9~~
~~-~~	~~2~~	~~2~~	~~2~~	~~2~~	~~SCREW, PHL TRUSS HD~~	~~9009483-03~~	~~8~~
-	5	5	5	5	LOCK WASHER INT. #10	90-06635	7
-	5	5	5	5	FLAT WASHER	90-06664	6
-	5	5	5	5	SCR., PHL, PAN HD #10-32 X.75 SST	9006075-01	5
-	4	4	4	4	CABLE CLAMP	90-07083	4
-	1	-	1	-	POWER STRIP 230 V	1214216-01	3
-	-	1	-	1	POWER STRIP 115 V	1214216-00	2
-	1	1	1	1	STAND	3414188	1
QUANTITY & VARIATION							

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

THIRD ANGLE PROJECTION

REMOVE BURRS AND BREAK SHARP CORNERS

DO NOT SCALE DWG

MATERIAL

FINISH

DRN.	R. Cieslak	12 JUL 77
CHK'D	B. Wilson	2 Aug. 77
ENG.	J. Walls	2 Aug 77
PROJ. ENG.		16 Aug 77
PROD.		23 Aug 77

NEXT HIGHER ASSY.

SCALE NONE

SHEET 1 OF 2

FIRST USED ON

digital

TITLE

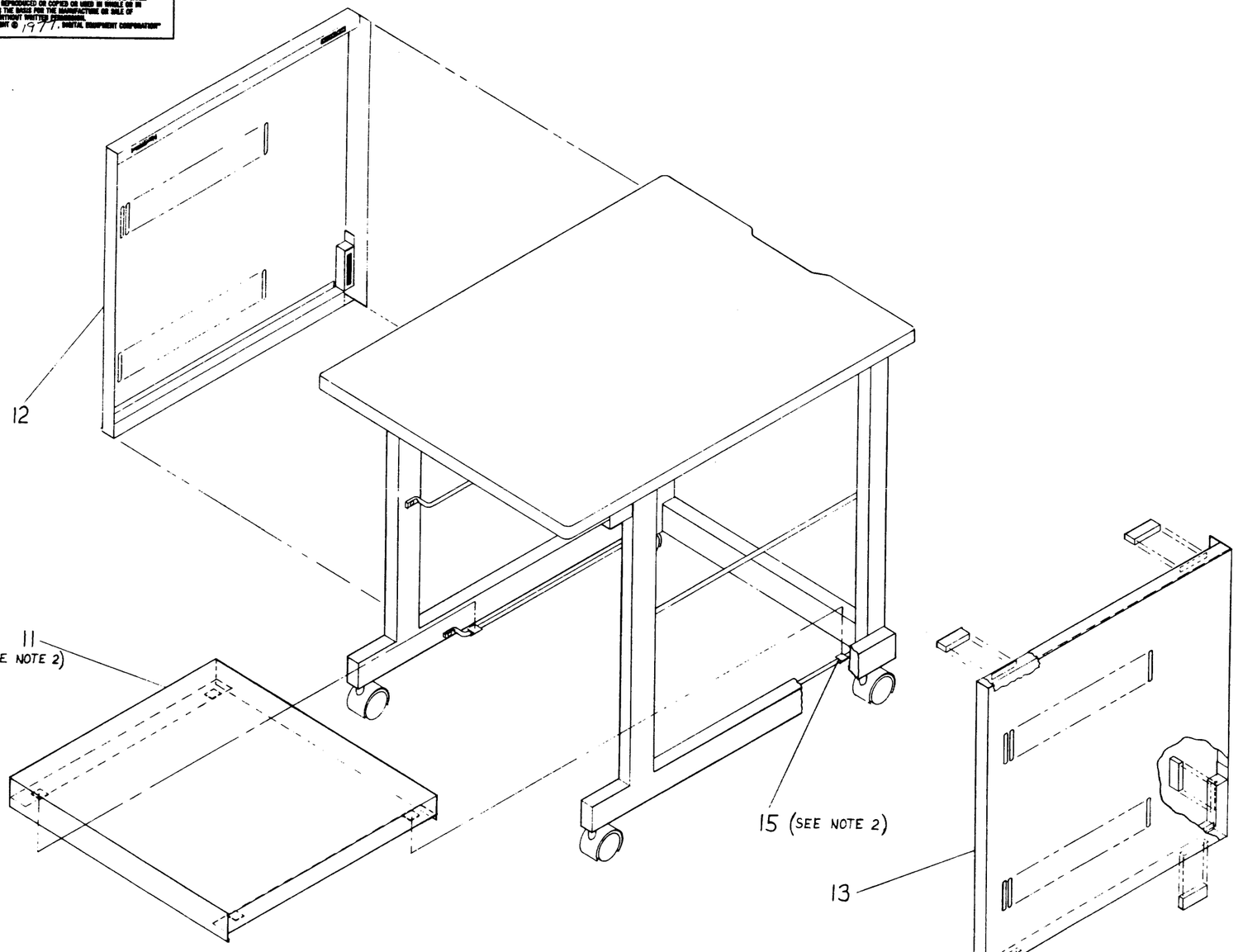
TERMINAL STAND

SIZE	CODE	NUMBER	REV.
D	UA	H978-Ø-Ø	B

DIST.

REVISIONS

CHK	CHANGE NO.	REV.
	H978-00001 J. WALLS	A
	H978-ML002 P. GARDNER 5-DEC-78	B



REVISIONS	REV	CHANGE NO.	CHK

	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

MATERIAL

FINISH

DRN. R. Caulk 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	H978-0-0	B

DIST.

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. S. Clemens	15 Sep 76	F. J. Melez	9-15-76	A	SP	3700184-0-0	C

DEC 8-(151)-1031-1-R671
DRA - 129

SHEET 1 OF 5

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. S. Clemens	7 Dec 77		A	SP	3700184-0-0	C

DEC 8-(151)-1031-1-R671
DRA - 129

SHEET 2 OF 5

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. S. Clemens 7 Dec 77	A	SP	3700184-0-0	C

DEC8-1031

SHEET 3 OF 5

PACKAGING INSTRUCTION

REV: C — DATE: 11/77

TITLE VT50 FAMILY OF TERMINALS WITH AND WITHOUT COPIER

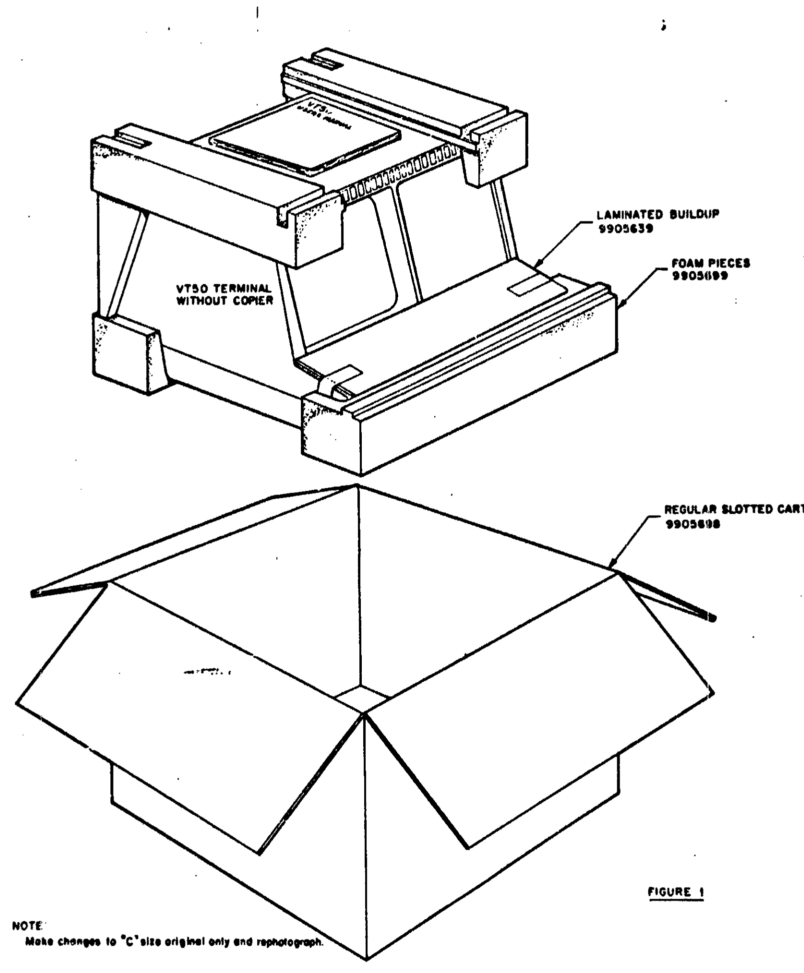


FIGURE 1

NOTE
Make changes to "C" size original only and rephotograph.

ENG.		APPD		SIZE	CODE	NUMBER	REV
Ellen Kurf	4/8/76	R. S. Clemens	8 Apr 76	A	SP	3700184-0-0	C

DEC-108

SHEET 4 OF 5

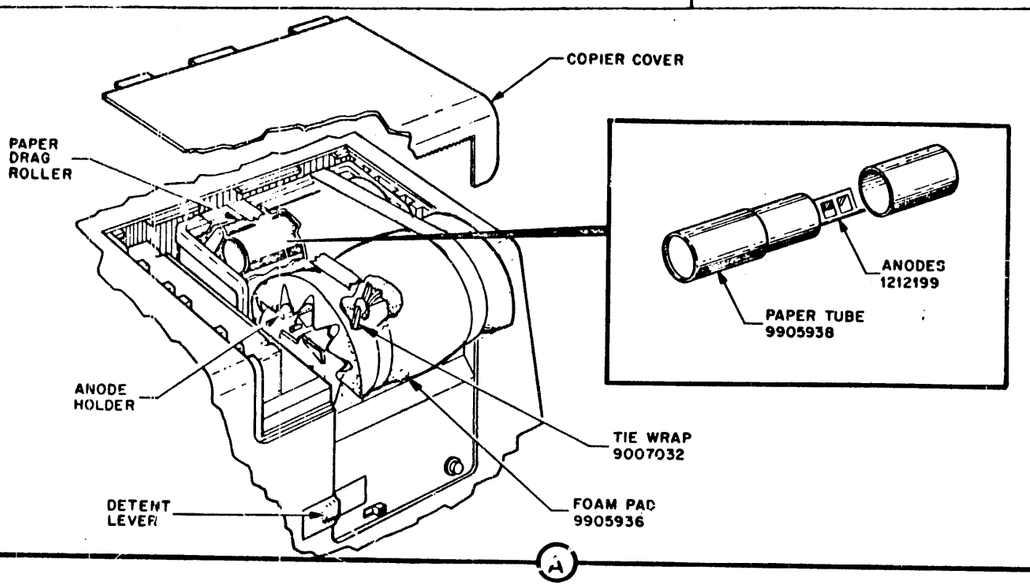
246

PACKAGING INSTRUCTION

REV: C DATE: 11/77

TITLE

VT50 FAMILY OF TERMINAL WITH AND WITHOUT COPIER



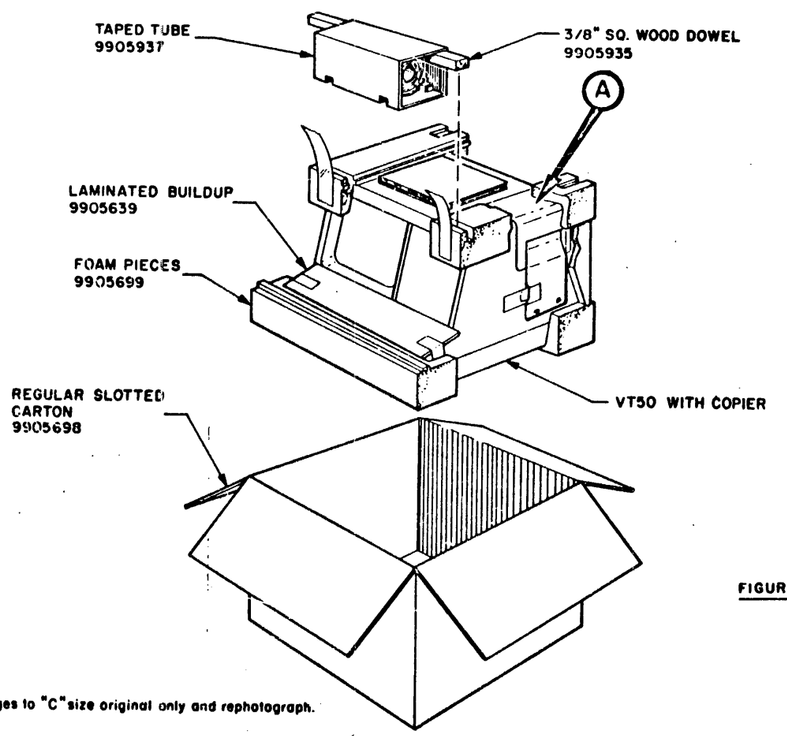


FIGURE 2

NOTE:
Make changes to "C" size original only and rephotograph.

ENG.	APPD.	SIZE	CODE	NUMBER	REV
R. S. Reimer 15 SEP 76	L. J. Nelson 9-15-76	A	8P	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 3/26/76
PROD [illegible]
DATE 3-24-76

SECTION 1
ISSUED SECTION 1

NOTES:

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

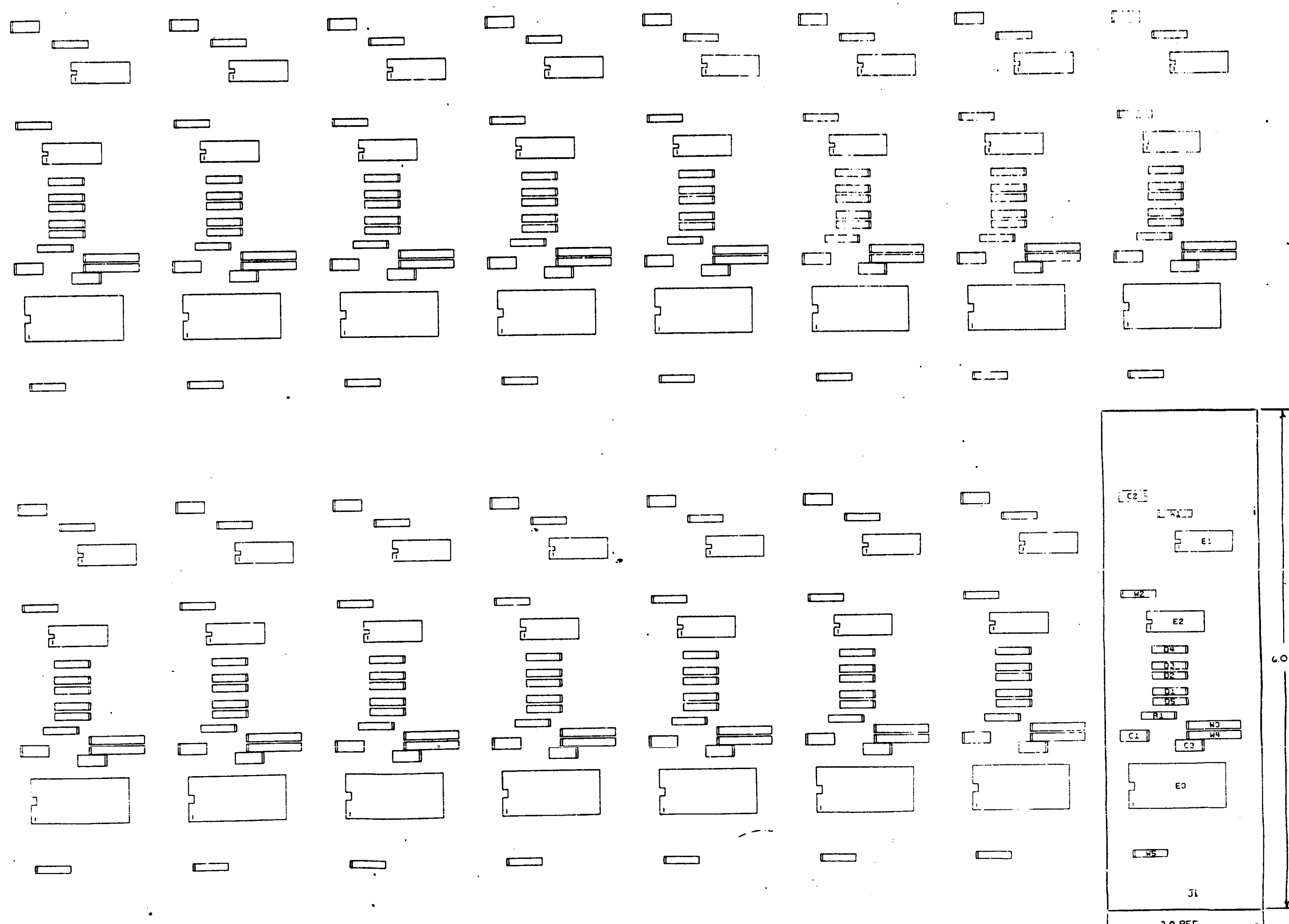
E.C.O. NO. 00001 MKØØ2

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



NOTES:

SIGNATURES	DATE
DRN.	
CHK D	
ENG.	2/12/76
PROJ. ENG.	
PROD.	
SCALE 2 : 1	
SHT. 1 OF 1	
ETCH REV B	FIRST USED ON

digital

TITLE
8K PROM UV

SIZE	CODE	NUMBER	REV.
E	UA	5411985-0-0	C

DIST.

REVISIONS

CHANGE NO	REV
00001	B
5411985-MK002	C

G. ADAIR

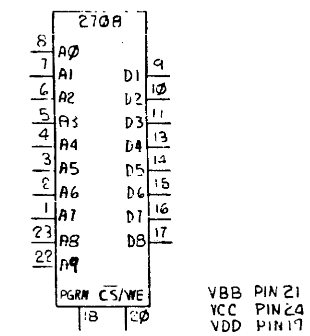
G. ADAIR

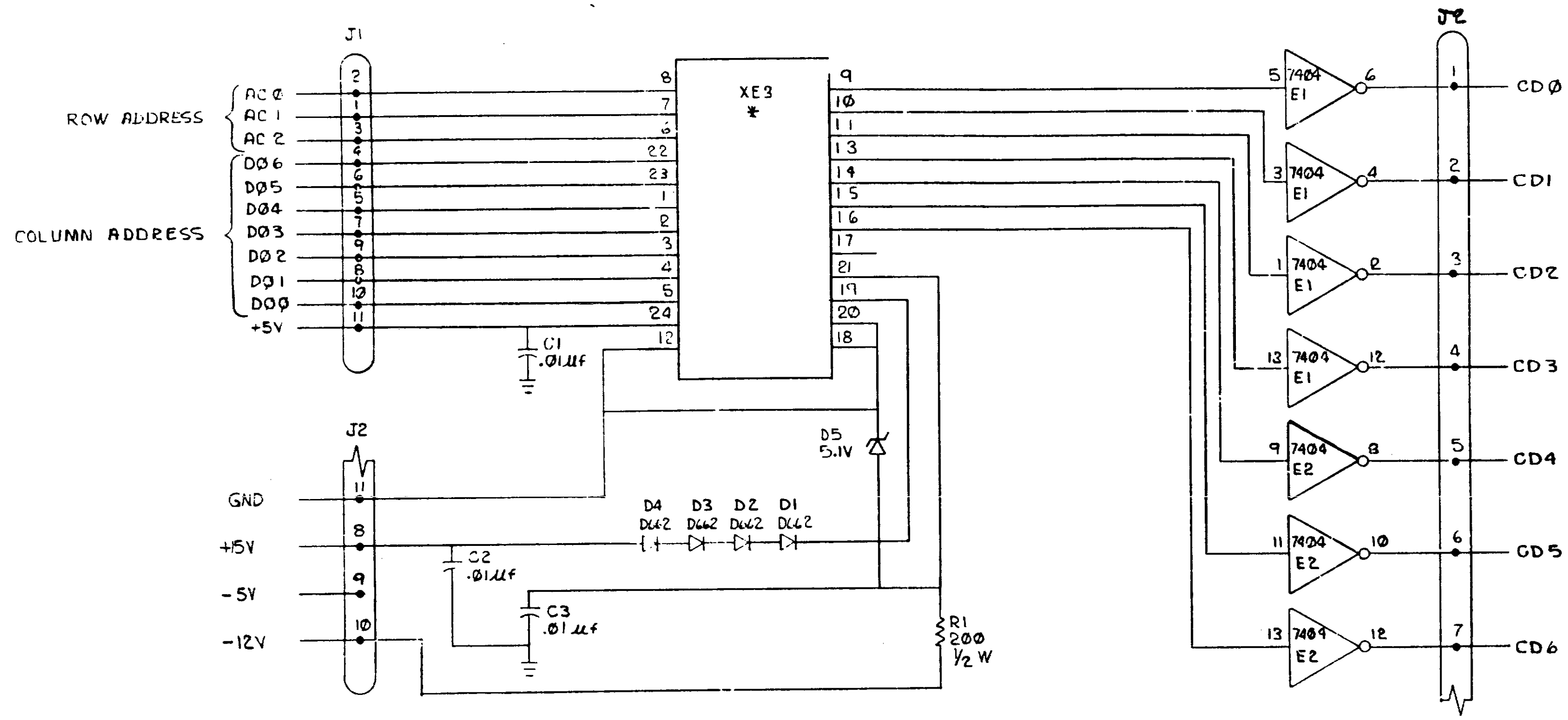
248

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





REVISIONS		
CHK.	CHANGE NO.	REV.
	5411985-0001	B
	G. ADAIR	
	5411985-MK0002	C
	G. ADAIR	

DRN.		FIRST USED ON VT52
CHK'D		TITLE 8K PROM (UV)
ENG.		
PROJ. ENG.		
PROD.		
NEXT HIGHER ASSY		
D-UA-5411985-0-0		SIZE D CODE CS NUMBER 5411985-Ø-1 REV. C
SCALE		
SHEET 1 OF 1		DIST.

MK 1 249