

MASTER DRAWING LIST

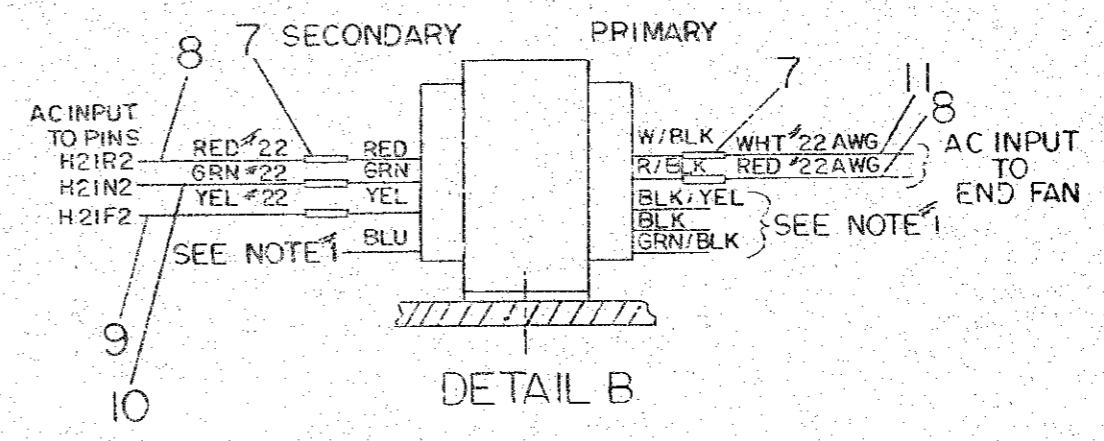
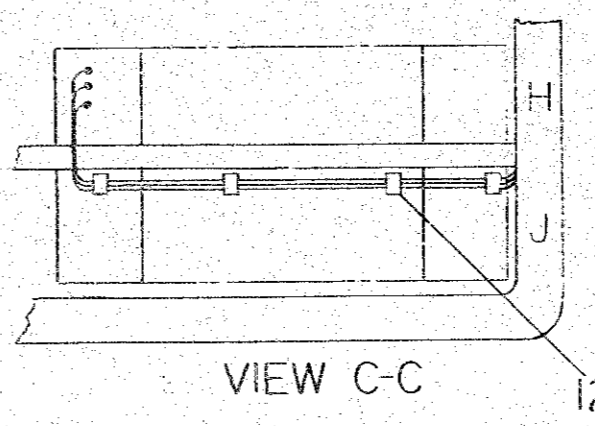
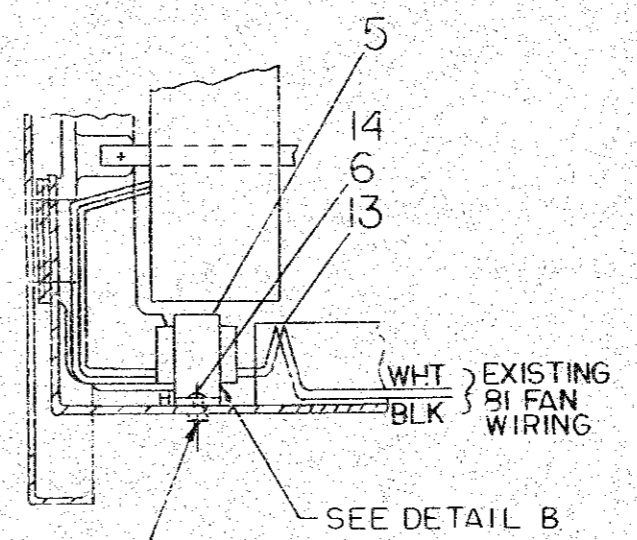
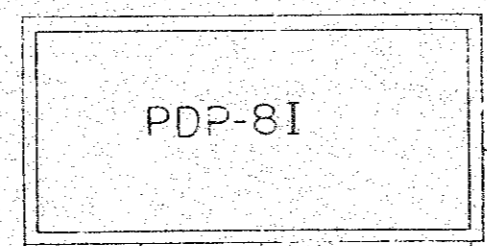
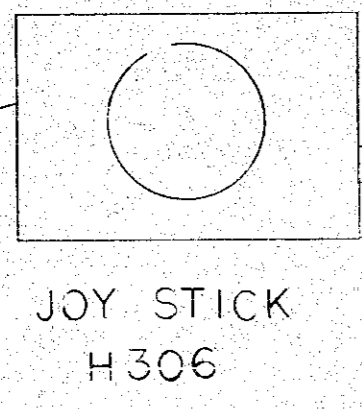
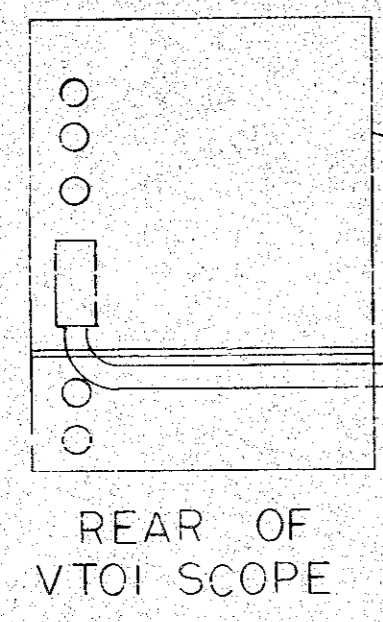
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DWG. NO.	REV. LET.	NO. OF SHEETS	TITLE
D-UR-KV8I-0-0		1	KV8I DISPLAY CONTROL
A-PL-KV8I-0-0		1	KV8I DISPLAY CONTROL (PL)
A-WL-KV8I-0-1	A	1	WIRE LIST
D-BS-KV8I-0-2	A	1	KV8I CONTROL LOGIC
C-MU-KV8I-0-3		1	MODULE UTILIZATION
A-PL-KV8I-0-3		1	MODULE UTILIZATION (PL)
D-DI-KV8I-0-4		1	DRAWING INDEX KV8I
D-CS-A612-0-1	////	1	D/A CONVERTER
B-CS-A712-0-1	////	1	VOLTAGE REGULATOR
D-CS-A312-0-1	////	1	ANALOG FUNCTION GENERATOR
D-CS-M712-0-1	////	1	TIMING GENERATOR
A-SP-KV8I-0-5	A	3	DISPLAY ACCEPTANCE PROCEDURE
A-SP-KV8I-0-7			PERFORMANCE SPECIFICATIONS
REF. FOR FIELD SERVICE			
A-WL-KV8I-0-5		3	PDPS/I LOGIC WIRING FOR KV8I OPTION

REVISIONS				DATE	DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	
REV.	DATE	CHG. NO.	APP'D.	DATE	TITLE DISPLAY CONTROL KV8I	
A	8/69	00001	M.R.	4/1/69		
B	8/69	00002	B.M.	4/8/69		
C	1/70	81-93	M.A.			
				PROJ. ENG.	DATE	
				PROD.	DATE	
				FIRST USED ON		
				SCALE	#	
				SHEET	1 OF 1	
				SIZE CODE	A ML	
				NUMBER	KV8I-0	
				REV.	C	
				DIST.		

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NOTES
 1. DO NOT CUT TRANSFORMER LEADS NOT USED. TAPE ENDS



REV.	
CHANGE NO.	
CHK.	

FIRST USED ON OPT/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
KV81				
UNLESS OTHERWISE SPECIFIED				
DIMENSION IN INCHES				
TOLERANCES				
DECIMALS	FRACTIONS	ANGLES		
± .005		± 0°30'		
FINAL SURFACE QUALITY				
REMOVE BURRS AND BREAK SHARP CORNERS				
MATERIAL	FIRST USED ON	DATE		
FINISH	SCALE	NONE		
SHEET 1 OF 1		PARTS LIST		
		EQUIPMENT CORPORATION MATHEW, MASSACHUSETTS		
		KV81 DISPLAY CONTROL		
		SIZE CODE	NUMBER	REV.
		DUA	KV81-0-0	

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS
PARTS LIST

QUANTITY / VARIATION

MADE BY D.K. CRABBE	CHECKED K. RUSS	SECTION
DATE 2/5/69	DATE 4/8/69	1
ENG <i>J. J. P...</i>	PROD <i>Wren Miller</i>	ISSUED SECT.
DATE 5/22/69	DATE 6-1-69	1

ITEM NO.	DWG NO. / PART NO.	DESCRIPTION												
1	D-UA-PDP8-I-0-0	PDP8-I ASSY	1											
2	D-UA-VT01-C-0	VT01 ASSY	1											
3	D-UA-H306-0-0	H306 ASSY	1											
4	D-IA-7006289-0-0	DISPLAY CONTROL CABLE	1											
5	1602498	TRANSFORMER F91X TRIAD	1											
6	9006021-1	SCR PHL PAN HD #6-32 x 5/16 SST	2											
7	9007199	SPLICE SODERLESS #34071	5											
8	9107350-22	#22 AWG STRD TEF INS (RED)	A/R											
9	9107350-44	#22 AWG STRD TEF INS (YEL)	A/R											
10	9107350-55	#22 AWG STRD TEF INS (GRN)	A/R											
11	9107350-99	#22 AWG STRD TEF INS (WHT)	A/R											
12	9007031	TY WRAP #SST-1-B PANDUIT	4											
13	9107254	TUBING SHRINKABLE WHT 3/16	A/R											
14	9007649	WASH EXT TOOTH #6	2											

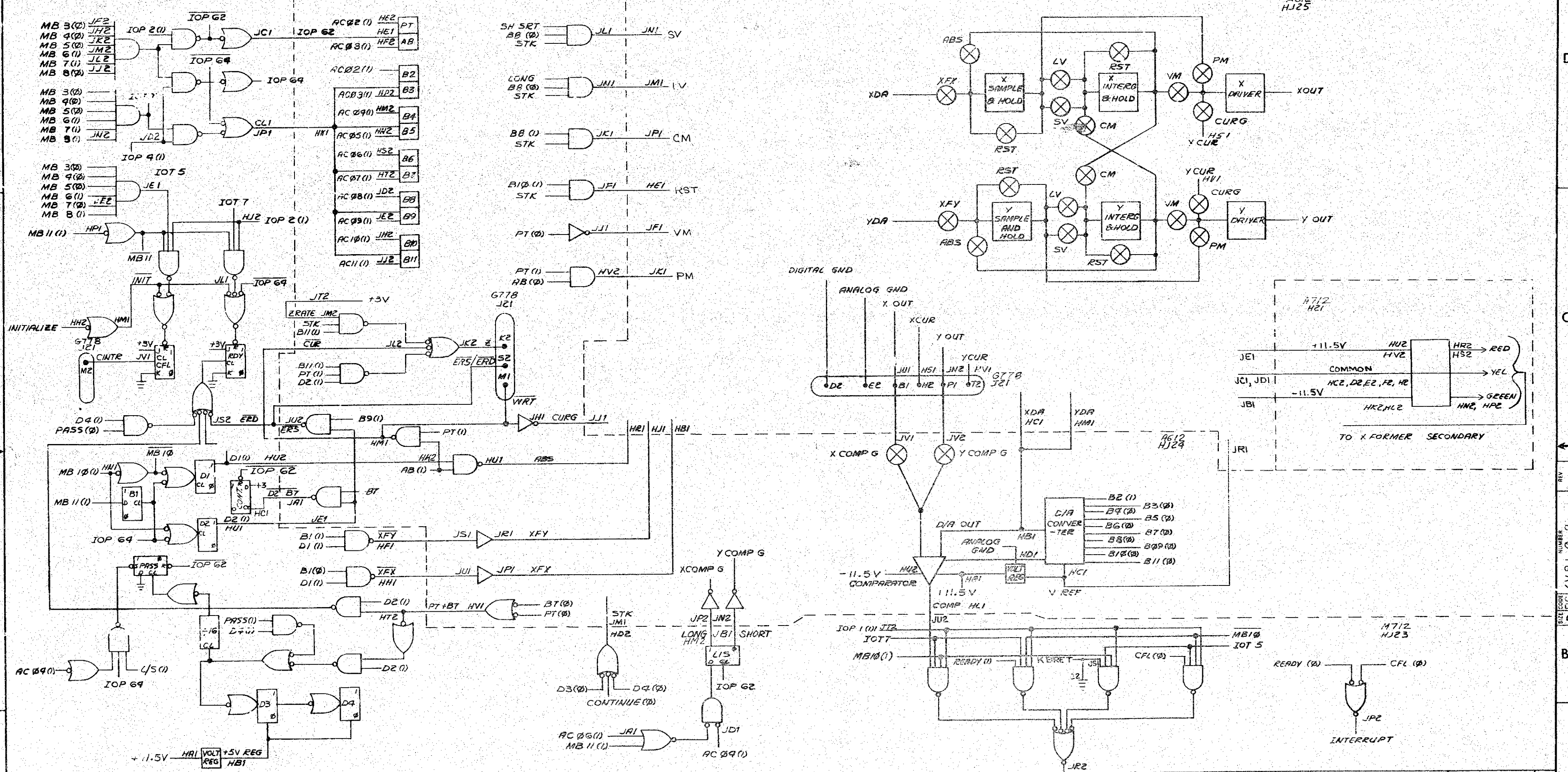
TITLE	ASSY NO.	SIZE CODE	NUMBER	REV.	ECO NO.
KV81 DISPLAY CONTROL	D-UA-KV81-0-0	A PL	KV81-0-0		
	SHEET 1 OF 1	DIST.			

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SIGNAL NAME	FROM PIN	TO PIN	COLOR	REMARKS
+12V	H21U2	J25E1		#24 WIPE
"	H21U2	H24A1		"
"	H21V2	H23A1		"
"	H21V2	J21D1		(#30 WIRE)
-12V	H21K2	J25B1		#24 WIRE
"	H21K2	H24U2		"
"	H21L2	J21V2		(#30 WIRE)
ANALOG GND	H21C2	H21D2		SOLID BUS STRAP
	H21D2	H21E2		"
	H21E2	H21F2		"
	H21F2	H21H2		"
	H21E2	J25C1		#24 WIRE
	J25C1	J25D1		SOLID BUS
	H21E2	H24D1		#24 WIRE
VREF	H24C1	J25R1		
AC INPUT	H21N2	AC SECONDARY	GREEN	FROM TRIAX P91X
AC INPUT	H21F2	AC SECONDARY	YELLOW	MOUNTED AT END OF
AC INPUT	H21R2	AC SECONDARY	RED	FANS
AC INPUT	FAN PWR AC	AC PRIMARY	BLK/WHI	"
AC INPUT	FAN PWR AC	AC PRIMARY	BLK/RED	"

REVISIONS				DRN.	DATE	EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS
REV.	DATE	CHG. NO.	APP'D.	DATE	DATE	
ORIG.	2/24/69	8I-00036	A.M.	2-24-69	2-27-69	
A	6/2/69	8I-C0056	W.F.C.	3/3/69	3/3/69	
				CHK'D.	DATE	SIZE CODE A WL
				ENG.	DATE	
				PROJ. ENG.	DATE	NUMBER KV8I-0-1
				PROJ. G.	DATE	
				FIRST USED ON		REV. A
				SCALE		DIST.
				SHEET	OF	

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A312 HJ25

A712 H21

A612 HJ29

A712 HJ23

READY (0) CFL (0)

INTERRUPT

QTY.	DESCRIPTION	PART NO.	ITEM NO.
	PARTS LIST		
	EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS		
	TITLE KV81 CONTROL LOGIC		
	NEXT HIGHER ASSY D-UA-KV81-0-0		
	SCALE	NUMBER	REV.
	7 OF 7	DBS:KV81-0-2	
	SHEET	DIST.	

REV.	CHANGE NO.

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NOTES

I. SLOT HJ22 RESERVED FOR KV OPTION

SEE NOTE I

		21		22		23		24		25	
		A712				M712		A612		A312	
USAGE	1	2	1	2	1	2	1	2	1	2	
H		VOL REG			TIMING GEN	TIMING GEN		D/A CONV	D/A CONV	ANAL FUNC GEN	ANAL FUNC GEN
		G778									
J		DIG-ITAL GND	X OUT WRT YOUT								
		ANALOG GND									
		X CUR									
		Z CINTRERS/ERD									
		Y CUR									

FIRST USED ON OPT/ MODEL KV81	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES DECIMALS FRACTIONS ANGLES ± .005 ± 1/64 ± 0°30'	DATE 4/2/69	EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS		
UNLESS OTHERWISE SPECIFIED FINISH SURFACE QUALITY REMOVE BURRS AND BREAK SHARP CORNERS	DATE 4/17/69	TITLE MODULE UTILIZATION KV81		
MATERIAL + +	DATE 5/23/69	SIZE CODE NUMBER C MU KV81-0-3		
FINISH + +	DATE 6-1-69	REV.		
	NEXT HIGHER ASSY A-ML-KV81-0	SCALE + + +		
		SHEET 1 OF 1		

REV.	
CHANGE NO.	
CHK	

REV. NUMBER
KV81-0-3
C MU

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS
PARTS LIST

QUANTITY / VARIATION

MADE BY D.K. CRABBE

CHECKED K. RUSS

SECTION

DATE 4/2/69

DATE 4/8/69

1

ENG *M. Fisher*

PROD *W. Smith*

ISSUED SECT.

DATE 5/22/69

DATE 6-1-69

1

ITEM NO.	DWG NO. / PART NO.	DESCRIPTION	QUANTITY	VAR.
1	A312	ANALOG FUNCTION GENERATOR	1	
2	A712	VOLTAGE REGULATOR	1	
3	A612	D/A CONVERTER	1	
4	M712	TIMING GENERATOR	1	

TITLE
MODULE UTILIZATION

ASSY NO.
C-MU-KV8I-0-3
SHEET 1 OF 1

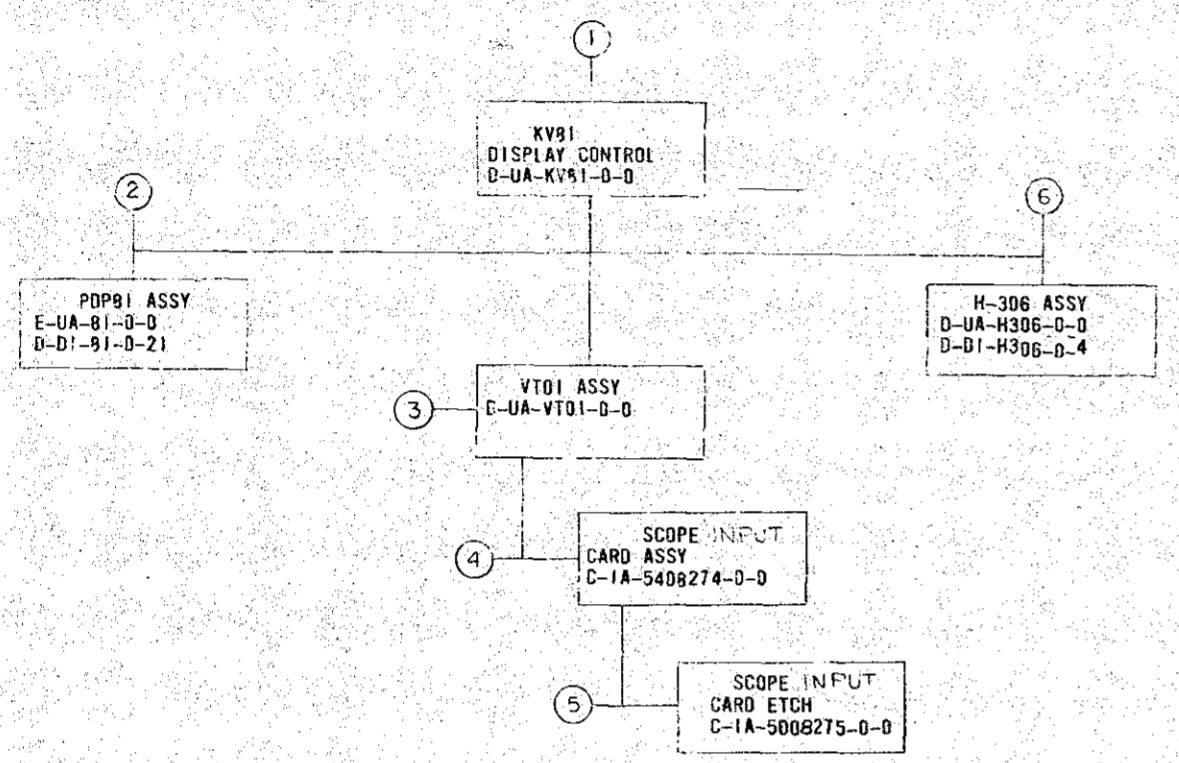
SIZE CODE
A PL
DIST.

NUMBER
KV8I-0-3

REV. ECO NO.

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4-0-18/1010 2



FIND NO	MECHANICAL DESCRIPTION	PART NO.	DEPT USAGE		
			PROD	CUST	F/C
1	KV81 DISPLAY CONTROL KV81 DISPLAY CONTROL (PL) DISPLAY CONTROL CABLE	D-UA-KV81-0-0 A-PL-KV81-0-0 D-1A-7006289-0-0			
2	PDP81 ASSY PDP81 ASSY (PL) DRAWING INDEX	E-UA-81-0-0 A-PL-81-0-0 D-D1-81-0-21			
3	VTO1 ASSY VTO1 ASSY (PL)	D-UA-VTO1-0-0 A-PL-VTO1-0-0			
4	SCOPE CARD ASSY	C-1A-5408274-0-0			
5	SCOPE CARD FTCH ASSY DRILLING HOLE LAYOUT	C-1A-5008275-0-0 C-AH-5008275-0-5			
6	H-306 JOYSTICK ASSY H306 JOYSTICK ASSY (PL) DRAWING INDEX	D-UA-H306-0-0 A-PL-H306-0-0 C-D1-H306-0-4			

FIND NO	ELECTRICAL DESCRIPTION	PART NO.	DEPT USAGE		
			PROD	CUST	F/C
1	MASTER DRAWING LIST WIRE LIST KV81 CONTROL LOGIC MODULE UTILIZATION MODULE UTILIZATION (PL) OPTION HAND WIRING USE ONLY IF 81 IS NOT PREWIRED FOR OPTION	A-WI-KV81-0 A-WI-KV81-0-1 D-BS-KV81-0-2 C-MU-KV81-0-3 A-PL-KV81-0-3 A-WI-KV81-0-5			
	ACCEPTANCE PROCEDURE PERFORMANCE SPEC.	A-SP-KV81-0-6 A-SP-KV81-0-7			
4	SCOPE CARD CIRCUIT SCHEMATIC	C-CS-5408274-0-1			

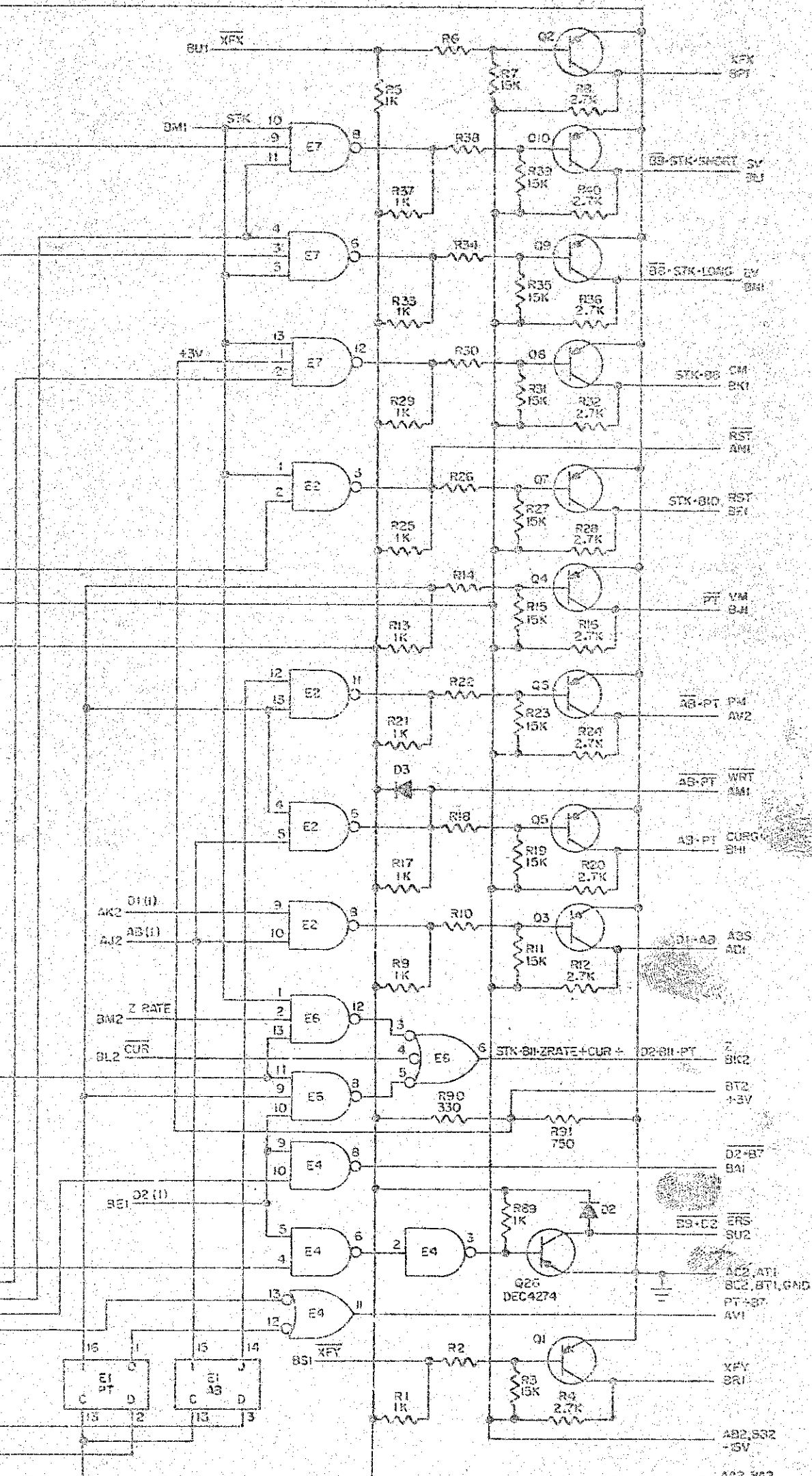
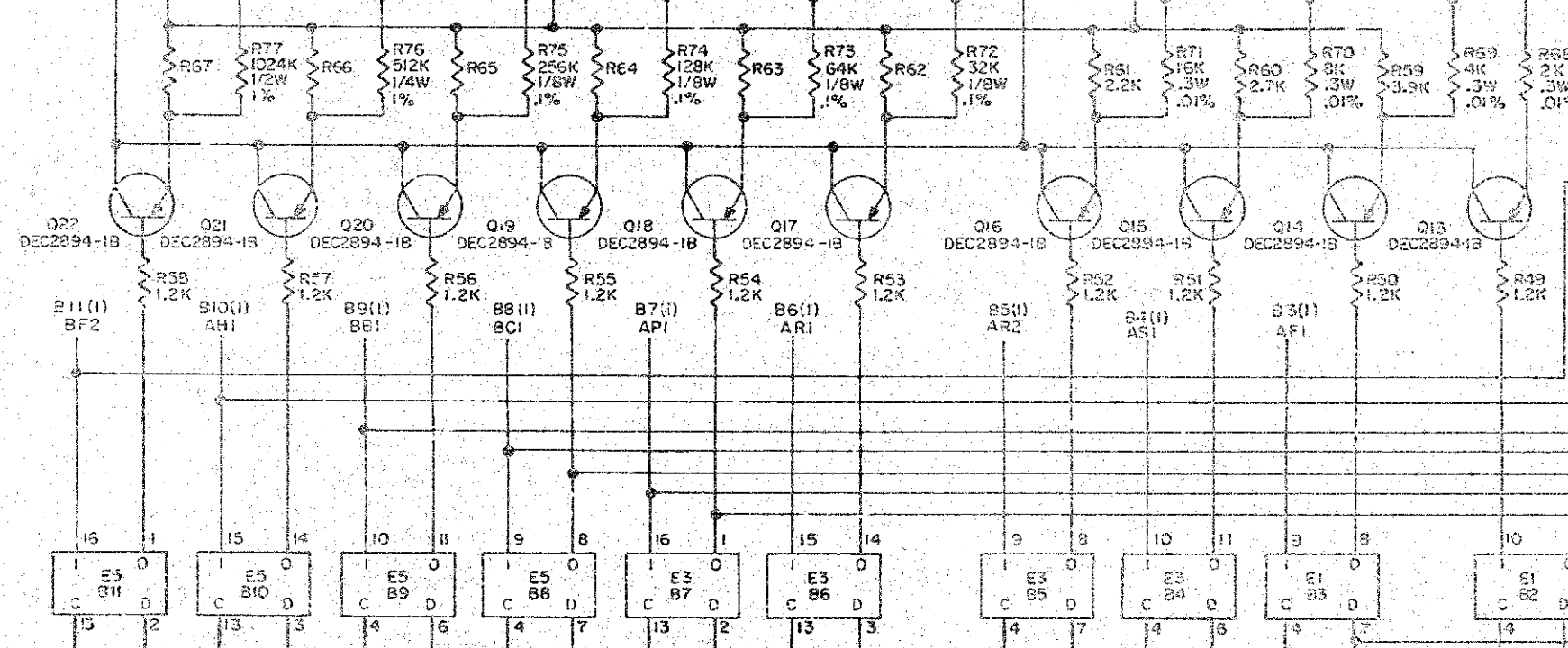
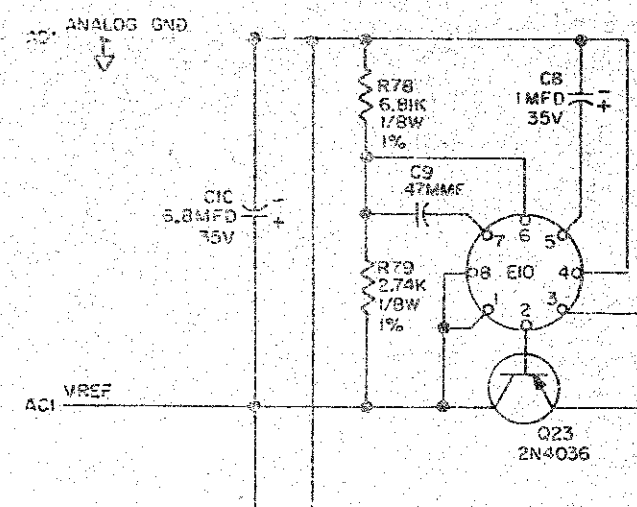
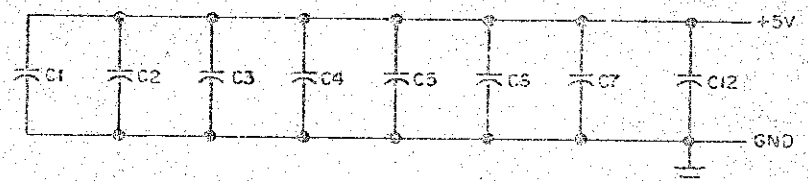
REVISIONS
NO
CHK
CHANGE NO
REV

FIRST USED ON PART/MODEL KV81	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED	DRN. DATE	digital EQUIPMENT CORPORATION MAYHARD, MASSACHUSETTS		
UNLESS OTHERWISE SPECIFIED	CHK'D. DATE	DRAWING INDEX KV81		
DIMENSION IN INCHES	DATE			
TOLERANCES	DATE			
DECIMALS FRACTIONS ANGLES	DATE			
± .005 ± .004 ± .0005	PROJ. ENG. DATE	NEXT HIGHER ASSY		
FINAL SURFACE QUALITY	PROD. DATE	D-UA-KV81-0-0		
REMOVE BURRS AND BREAK SHARP CORNERS		SCALE		
MATERIAL		SHEET 1 OF 1		
FINISH		SIZE CODE NUMBER REV.		
		DIDI KV81-0-4		
		DIST. G		

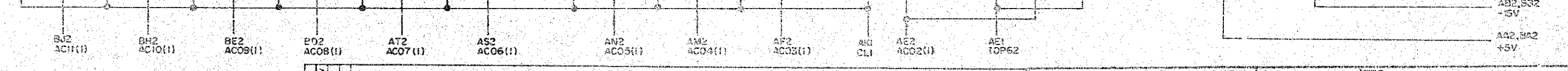
REV
NUMBER
DIDI KV81-0-4

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3 1-0-218W 50 0 1



UNLESS OTHERWISE INDICATED:
 RESISTORS ARE 1/4W, 5%
 RESISTORS ARE 2K
 CAPACITORS ARE .01MFD
 DIODES ARE 0564
 TRANSISTORS ARE DEC3638
 *PIN 14 ON EACH IC EXCEPT E1, E3, E5 = +5V
 PIN 7 ON EACH IC EXCEPT E1, E3, E5 = GND
 E8 IS A LM305
 E9 IS A LM307
 E10 IS A LM300
 E1, E3, E5 ARE SN7475N
 E6, E7 ARE SN7410N
 E2, E4 ARE SN7410N
 Q13 THRU Q17 VEC MATCHED TO 1MV AT 10-HZ AND 10-HZ - GOLD
 Q18 THRU Q22 - VEC MATCHED TO ABOVE WITHIN 10MV AT SAME CONDITIONS - SILVER



REVISIONS	DATE	BY	CHKD
1	10/10/62		

TRANSISTOR & DIODE CONVERSION CHART				TITLE	
TRANSISTOR	DIODE	TRANSISTOR	DIODE	D/A CONVERTER AS12	
2N4036	1N4001	2N4036	1N4001	EQUIPMENT CORPORATION	
2N4038	1N4002	2N4038	1N4002	CORPORATION	
2N4040	1N4003	2N4040	1N4003	MADE IN MASSACHUSETTS	
2N4042	1N4004	2N4042	1N4004	PRINTED CIRCUIT BOARD	
2N4044	1N4005	2N4044	1N4005	REV. 1	
2N4046	1N4006	2N4046	1N4006	DISTRIBUTION	
2N4048	1N4007	2N4048	1N4007	DATE	
2N4050	1N4008	2N4050	1N4008	BY	
2N4052	1N4009	2N4052	1N4009	NO.	
2N4054	1N4010	2N4054	1N4010	REV.	
2N4056	1N4011	2N4056	1N4011	BY	
2N4058	1N4012	2N4058	1N4012	NO.	
2N4060	1N4013	2N4060	1N4013	REV.	
2N4062	1N4014	2N4062	1N4014	BY	
2N4064	1N4015	2N4064	1N4015	NO.	
2N4066	1N4016	2N4066	1N4016	REV.	
2N4068	1N4017	2N4068	1N4017	BY	
2N4070	1N4018	2N4070	1N4018	NO.	
2N4072	1N4019	2N4072	1N4019	REV.	
2N4074	1N4020	2N4074	1N4020	BY	
2N4076	1N4021	2N4076	1N4021	NO.	
2N4078	1N4022	2N4078	1N4022	REV.	
2N4080	1N4023	2N4080	1N4023	BY	
2N4082	1N4024	2N4082	1N4024	NO.	
2N4084	1N4025	2N4084	1N4025	REV.	
2N4086	1N4026	2N4086	1N4026	BY	
2N4088	1N4027	2N4088	1N4027	NO.	
2N4090	1N4028	2N4090	1N4028	REV.	
2N4092	1N4029	2N4092	1N4029	BY	
2N4094	1N4030	2N4094	1N4030	NO.	
2N4096	1N4031	2N4096	1N4031	REV.	
2N4098	1N4032	2N4098	1N4032	BY	
2N4100	1N4033	2N4100	1N4033	NO.	

DEC 1962

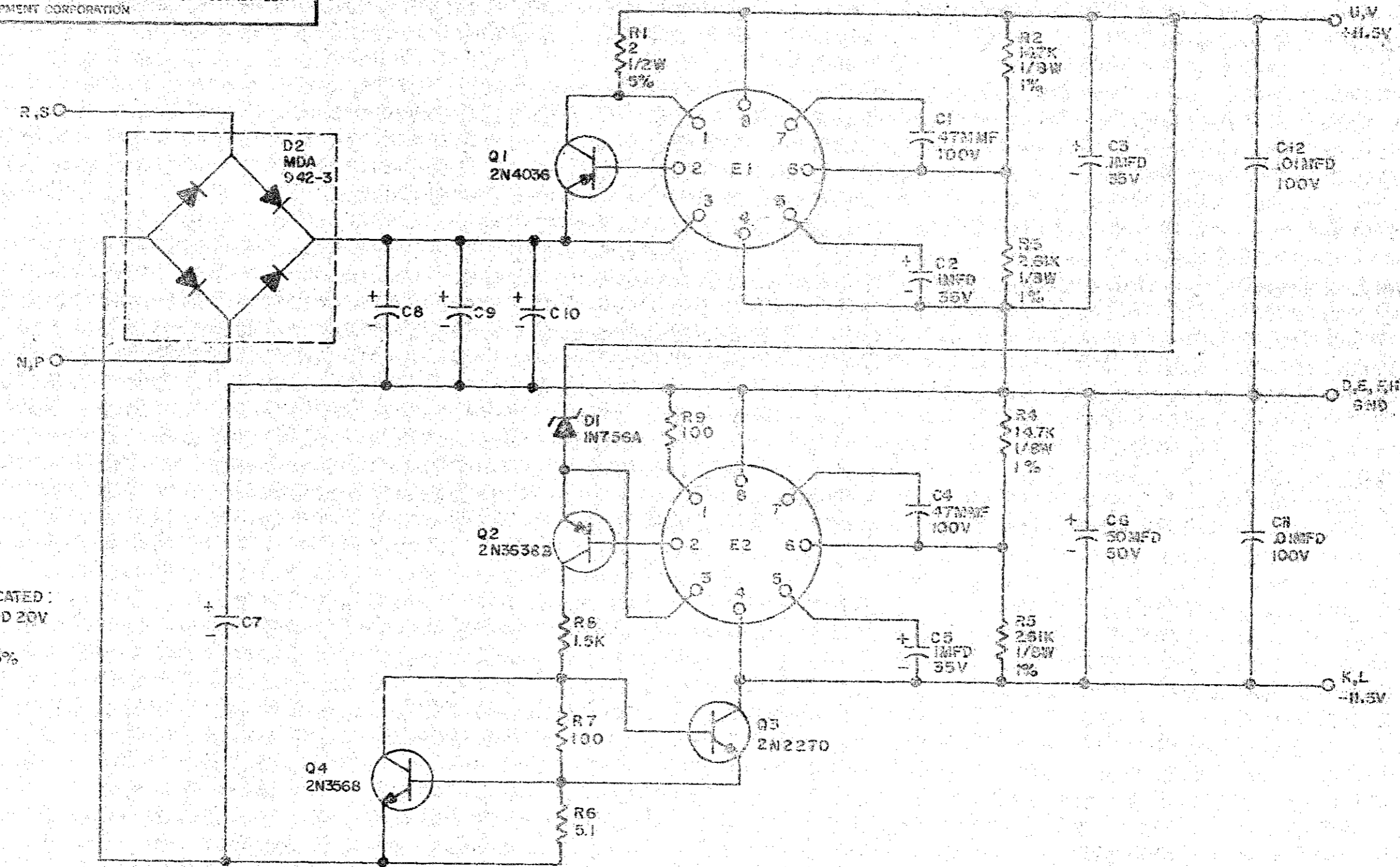
REV. 1

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REV. 1-0-1
 E CS
 1-0-1-0-1
 GENERAL

TO F9K TRIAD TRANSFORMER

UNLESS OTHERWISE INDICATED:
 CAPACITORS ARE 100 MFD 20V
 E1, E2 ARE 1A7300
 RESISTORS ARE 1/4 W 5%



REV. NO.	REV.

DRN <i>W. Smith</i>	DATE 4-5-60
CHK'D <i>M. Mansfield</i>	DATE 4-7-60
ENG. <i>M. Mansfield</i>	DATE 7-13-60
PROD <i>W. Smith</i>	DATE 7-24-60

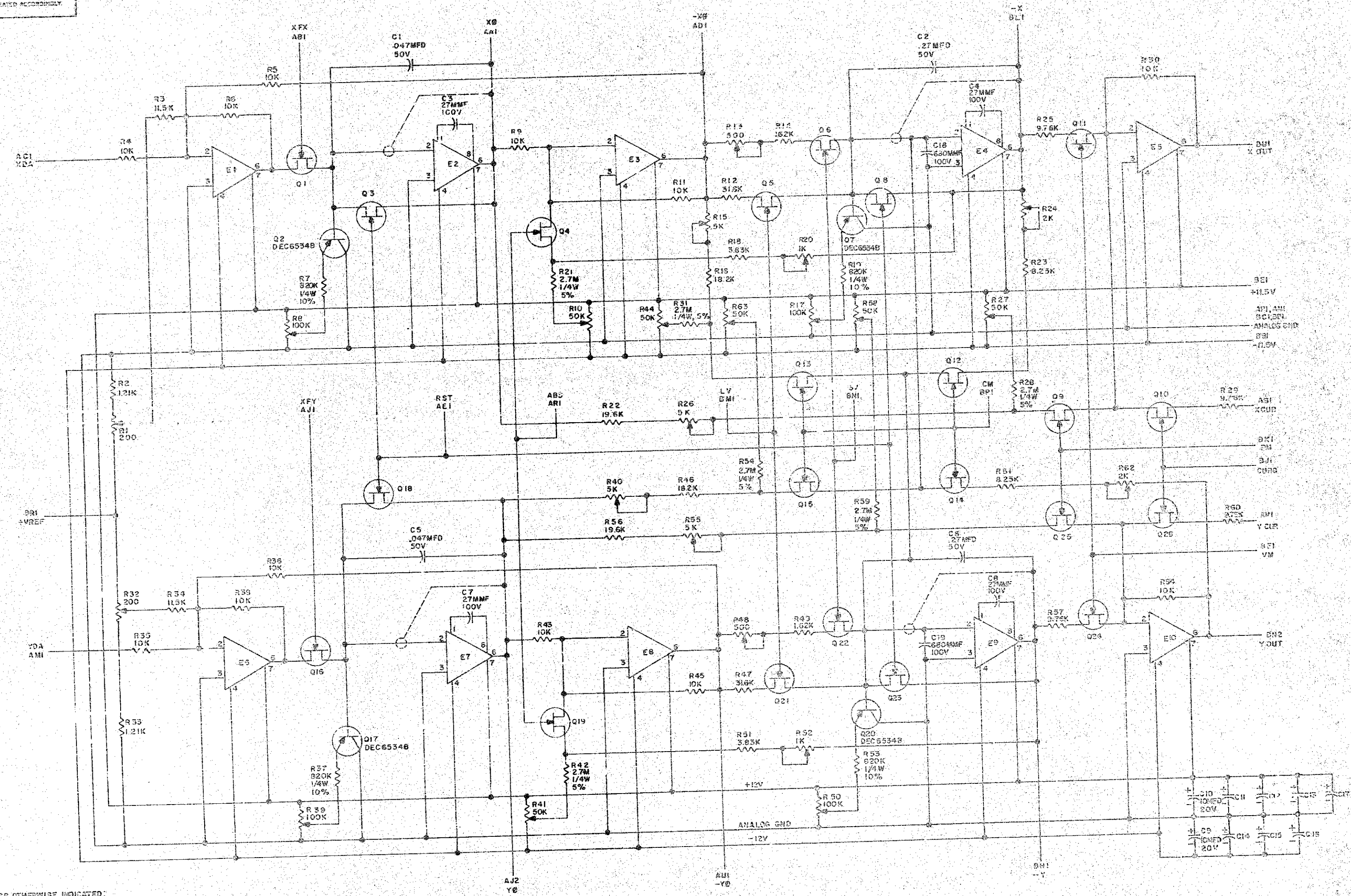
TRANSISTOR & DIODE CONVERSION CHART			
DEC	EIA	DEC	EIA
1N756A	SAME	2N3533	SAME
MOA942-3	NONE		
2N4036	NONE		
2N2270	NONE		
2N3533	NONE		

EQUIPMENT CORPORATION		MAYFORD, MASSACHUSETTS	
TITLE VOLTAGE REGULATOR A712			
SIZE	CODE	NUMBER	REV.
B	CS	A712-0-1	
PRINTED CIRCUIT REV.			A

OLD FORM, INC.
 DRB 102

DIST 324, 434, 435³ PAK 5

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UNLESS OTHERWISE INDICATED:
 CAPACITORS ARE 1MFD 50V
 E1 - E10 ARE LM307
 TRANSISTORS ARE 2N 3459 PNP
 RESISTORS ARE 1%, 1/4W
 R1, R6, R17, R32, R33, R39 ARE MELTRIM POT TYPE 70 PR
 ALL OTHER POTTS ARE HELIUM TYPE 62 PR

REV.	DATE	BY	CHKD.
1			

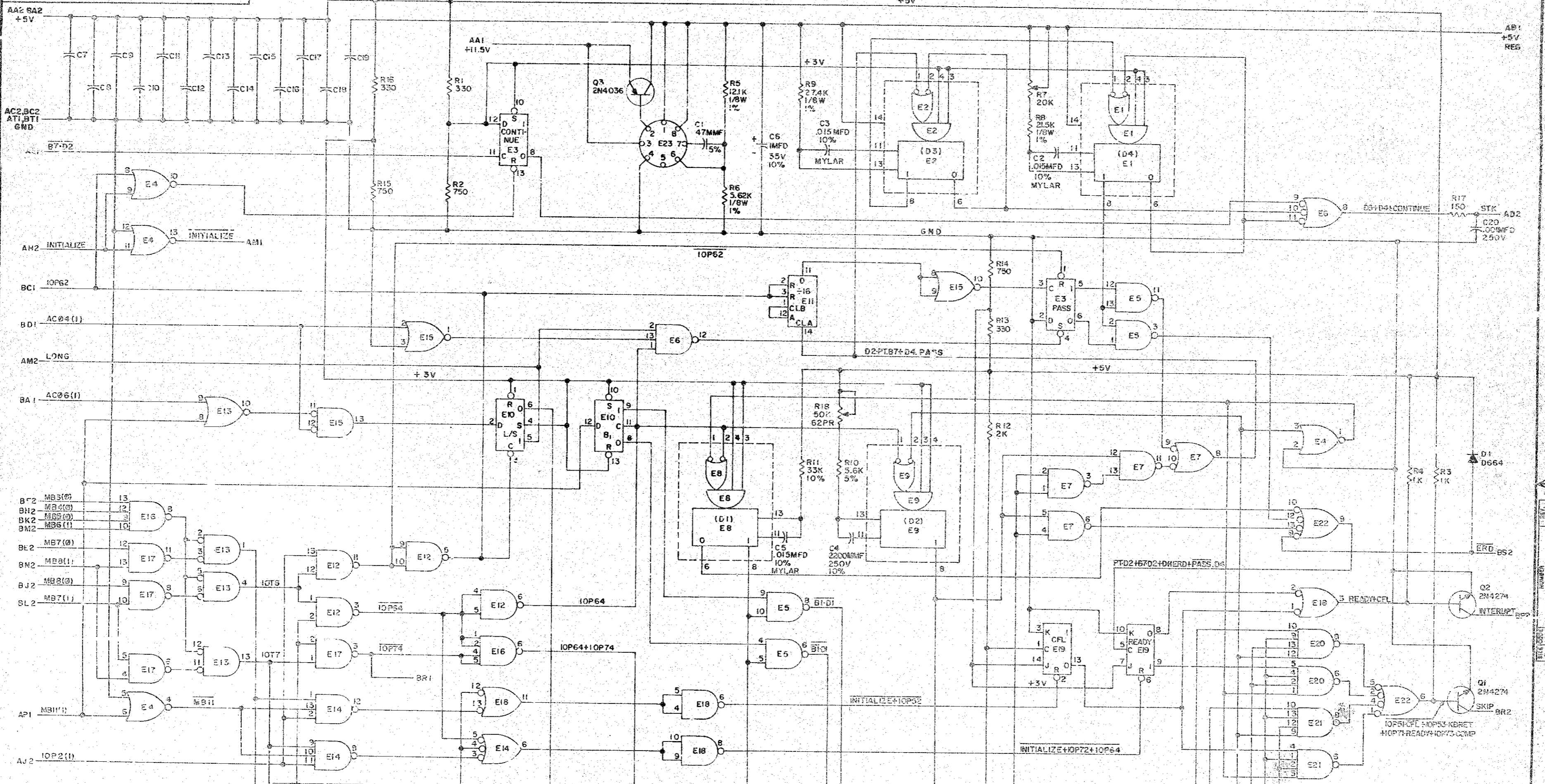
TRANSISTOR & DIODE CONVERSION CHART			
TRANSISTOR	DIODE	TRANSISTOR	DIODE
2N 3459	1N4001	2N 3459	1N4001
2N 3459	1N4001	2N 3459	1N4001

ANALOG FUNCTION GENERATOR	
A312	
DATE	REV.
DEC 1965	1
SONY CORPORATION	
D CS A312-0-1	

017 327, 438, 435 PINK 5

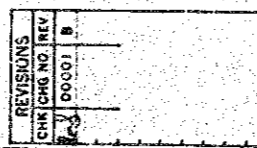
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9 1-0-0128 30 0
 138704 138705



UNLESS OTHERWISE INDICATED:
 CAPACITORS ARE .01MFD, 100V, 20%
 RESISTORS ARE 1/4W 5%
 R7 IS MELTRIM POT TYPE 73P2
 E1, C2, C3, E3 ARE TTL 3501
 E3, E10 ARE DEC7474N
 E4, E13, E15 ARE DEC7402N
 E5, E12, E17, E18 ARE DEC7400N
 E6, E14 ARE DEC7410N
 E11 IS DEC7493M
 E16, E20, E21, E22 ARE DEC7420N
 E19 IS DEC7473M
 E23 IS LM309
 PINS ON E11 = GND
 PIN 10 ON E18 = +5V
 PIN 4 ON E19 = +5V
 PIN 11 ON E9 = GND

PIN 7 ON EACH IC (EXCEPT E1, E10) = GND
 PIN 14 ON EACH IC (EXCEPT E1, E18) = +5V



DATE		TRANSISTOR & DIODE CONVERSION CHART		TITLE	
DESIGNED	DATE	DEC	GA	DEC	EN
DRN R. R. P. [Signature]	11/11/69	DEC	GA	DEC	EN
CHKD R. R. P. [Signature]	11/11/69	DEC	GA	DEC	EN
APP'D R. R. P. [Signature]	11/11/69	DEC	GA	DEC	EN
REV	DATE	BY	CHKD	DATE	BY
1	11/11/69				

EQUIPMENT
 CORPORATION
 TIMING GENERATOR M712

DISC 327, 434, 455 P.H.K.

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SIGNAL NAME	FROM PIN	TO PIN	COLOR	REMARKS
B7 - D2	H23C1	J24A1		
XFY	H23F1	J24S1		
XFX	H23H1	J24T1		
IOP 1(1) 1	J33F2	J23M2		
INIT	H23M1	J23L1		
D2 (1)	H23U1	J24E1		
D1 (1)	H23U2	H24K2		
PT + B7	H23T2	H24V1		
LONG	H23M2	J24P2		
STK	H23E2	J24M1		
AC06(1)	J23A1	H24S2		
SHORT	J23B1	J24N2		
AC04(1)	J23D1	H24M2		
IOP62	J23C1	H24E1		
CL1	J23P1	H24K1		
ERD/ERS	J24U2	J21S2		
ERD/ERS	J23S2	J24U2		
COMP	J23U2	H24L1		
Z	J24K2	J21K2		
WRT	H24M1	J21M1		
CUR INTR	J23V1	J21M2		
K BRST	J23S1	J23C2		
DIGITAL GND	H21H2	J21D2		
ANALOG GND	H21F2	J21E2		
CTR	H24M1	J24L2		
XD/A	H24P1	H25M1		

REVISIONS

REV.	DATE	CHG. NO.	APPD.

DRN. K. RUSS DATE 4/8/69
 CHK'D. K. RUSS DATE 5/8/69
 ENG. DATE 5/8/69
 PROJ. ENG. DATE 5/8/69
 PROD. DATE 5/8/69
 FIRST USED ON 6-1-69

SCALE #
SHEET 1 OF 3

SIZE CODE A W/L KVB7-0-5
DIST.

REV.

DIGITAL EQUIPMENT CORPORATION
MAYFORD, MASSACHUSETTS

GENERAL WIRING SHEET
KV81

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SIGNAL NAME	FROM PIN	TO PIN	COLOR	REMARKS
XD/A	H25C1	H25C1		
ABS	H24U1	H25R1		
CURG	J24H1	J25J1		
VM	J24J1	J25P1		
PM	H24V2	H25K1		
SV	J24L1	J25M1		
LV	J24N1	J25M1		
XFX	J24P1	H25B1		
XFY	J24K1	H25J1		
CM	J24K1	J25P1		
RST	J24P1	H25F1		
Z RATE	J24M2	J24T2		
X OUT	J24V1	J25U1		
X OUT	J25U1	J21B1		
Y OUT	J24V2	J25N2		
Y OUT	J25N2	J21P1		
X CUR	H25S1	J21H2		
Y CUR	H25V1	J21T2		
+3V	D10P2	E09M1		REMOVE IF PRESENT
	E09V1	E09L2		
	E09J2	E09M1		
	E09M1	E09P1		
+3V	E09P1	E09P2		
IOP 1 (0)	E09M2	E19R2		M113 REQ'D IN E09
IOP 2 (0)	E09R1	E19U1		IF NOT PRESENT
IOP 4 (0)	E09R2	E19V1		

REVISIONS

REV.	DATE	CHG. NO.	APPD.

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 CHK'D. K. RUSS DATE 4/8/69
 ENG. DATE 4/8/69
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SCALE #
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SIZE CODE A W/L KV81-0-5
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DIGITAL EQUIPMENT CORPORATION
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GENERAL WIRING SHEET
KV81

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SIGNAL NAME	FROM PIN	TO PIN	COLOR	REMARKS
IOP 1 (1) 1	E09R2	J33P2		
IOP 2 (1) 1	E09S1	J33H2		
IOP 4 (1) 1	E09S2	J33P1		

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 ENG. DATE 4/8/69
 PROJ. ENG. DATE 4/8/69
 PROD. DATE 4/8/69
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SHEET 3 OF 3

SIZE CODE A W/L KV81-0-5
DIST.

REV.

DIGITAL EQUIPMENT CORPORATION
MAYFORD, MASSACHUSETTS

GENERAL WIRING SHEET
KV81

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS				DATE 5/15/69	
ENGINEERING SPECIFICATION					
TITLE KV8/I Display Acceptance Procedure					
REVISIONS					
REV	DESCRIPTION	CHG NO	ORIG	DATE	APPD BY
A		0001	-----	-----	<i>C.F.P.</i> 8/8/69

ENG *M. DeLoe* APPD *M. DeLoe* SIZE CODE **A** SP **A** NUMBER **KV8I-0-6** REV **A**
 DEC FORM NO. DRA 107 SHEET **1** OF **3**

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ENGINEERING SPECIFICATION				CONTINUATION SHEET		
TITLE						
<p>5) Unit is accepted when steps 2 thru 4 can be successfully completed and performance specs for KV8/I controller writeup, is met. Error halts greater than 500 is rep 2 can be corrected by suitable realignment performed in step 1.</p> <p>Shipping hardware:</p> <ol style="list-style-type: none"> 1) PDP8/I computer wired for KV8/I with Triad P9IX transformer. PDP8/I may or may not be already installed. 2) KV8/I display option (modules M712, A612, A312, A712). 3) VT01 Storage Display Unit in special shipping container. 4) H306 Joystick Control. 5) 20 ft. display system dual cable. <p>Shipping Software:</p> <ol style="list-style-type: none"> 1) KV8/I Display System Software Package 2) KV Maintenance Manual. 3) Tektronix 611 Manual. 4) Complete set of prints. 						
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				SIZE CODE A SP A	NUMBER KV8I-0-6	REV A
				SHEET 1 OF 3		

ENGINEERING SPECIFICATION				CONTINUATION SHEET		
TITLE						
<p>Scope: to define the procedure to accept a KV8/I system for shipment.</p> <p>Test Hardware:</p> <ol style="list-style-type: none"> 1) PDP8/I computer wired for KV8/I option and with Teletype. 2) KV8/I display option modules (M712, A612, A312, A712). 3) VT01 Storage Display Unit (modified Tektronix 611). 4) H306 Joystick Control. 5) Display system, dual cable. <p>Test Software:</p> <p>KV8/I Display Diagnostic - Binary tape Maindec-8/I-DC6A-PB(L), writeup, 8/I-DC6B-D(D), and listing.</p> <p>Procedure:</p> <ol style="list-style-type: none"> 1) Perform Q inspection. 2) Check KV8/I and VT01 alignment using diagnostic (Sec. 5.3.1. thru 5.3.3), and touchup where required. Patterns must meet the performance specs given in performance specs for KV8/I controller writeup. 3) Run the main diagnostic (Sec. 5.3.5.1, S/A200) for ten minutes. 4) Run the cursor diagnostic (Sec. 5.3.5.2) for approximately 20 interrupts. 						
DEC FORM NO. DRA 108						
				SIZE CODE A SP A	NUMBER KV8I-0-6	REV A
				SHEET 2 OF 3		

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

ENGINEERING SPECIFICATION

DATE 5/15/69

TITLE Performance Specifications for KV8/I Controller and VT01 Display

REV	DESCRIPTION	REVISIONS		
		CHG NO	ORIG	DATE

ENG *M. DeLucca* APPD *M. Nelson* SIZE CODE A SP NUMBER KV8I-O-7 REV
DEC FORM NO. DRA 108 SHEET 1 OF 10

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ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE

A.1.4.1.1. A long vector execution is required if the vector length exceeds 3/8". A long vector execution of less than 3/8" will cause deterioration in line quality (excess line width and lower resolution).

A.1.4.2. A short vector execution exceeding 3/8" length violates the storage capability of the VT01 and the accuracy of the KV controller. Short vectors of less than 3/8" will meet all accuracy specifications stated herein.

A.2.1. Circular arc vectors shall be drawn by a stroke method. Such vectors are addressed by giving the x,y coordinates of the center of a circular arc. The present location of the integrators (which may be established by an invisible absolute linear vector) defines the starting location of the arc and hence a point on the circumference.

A.2.2. Maximum radius of a stored arc vector should not exceed 3" to guarantee storage.

A.2.3.1. Circular arc vectors up to 6 inches diameter shall close within .02 inches radially and within .02 inches circumferentially.

A.2.3.2. Circular arc vectors shall center (rotate about) the selected screen location within an accuracy of .02 in. (A zero radius circle may just begin to show an open center).

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CONTINUATION SHEET

TITLE

A.2.4. Circularity of circular vectors shall be $\pm 5\%$ (i.e. semi-major and semi-minor axis not to differ by more than $\pm 5\%$).

A.2.5.1. Circular arc vectors shall be $90^\circ \pm 1^\circ$ for long vector execution or $5.625^\circ \pm .07^\circ$ for short vector execution.

A.2.5.2. Circular arc vectors shall rotate at a radian rate of .1 per 4.5 us adjustable $\pm 10\%$.

A.2.5.3. All circular vectors rotate clockwise from their starting location about the selected center.

A.3.1. Point plot mode shall store a dot addressed as X,Y.

A.3.2. Maximum point plot range is ± 12 " about origin (± 511 to -512 decimal coordinates).

A.3.3. Point plot shall position within .02" of an address referenced by a long linear absolute vector.

B. The KV controller shall provide a hardware reset function.
B.1. Reset will position a subsequent point plot of linear vector to within .04" of the true origin (i.e. a θ, θ absolute linear vector) when executed from a position not to exceed 6" from the origin using long vector execution.
B.2. Reset shall recover from a latch-up condition (integrators or sample-holds saturated at power supply potential) in less than .5 seconds, when issued as

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CONTINUATION SHEET

TITLE

I. Line Drawing Capability (1), (2) - Controller.

A. Scope - The KV8/I controller shall be capable of drawing linear vectors, circular vectors, or point plotting.

A.1.1. Linear vectors shall be drawn using a stroke method. Such vectors may either be addressed in absolute mode, giving the x,y coordinates of the end point of the vector, or in relative mode, giving $\Delta x, \Delta y$ coordinates of the end point of the vector relative to the present location.

A.1.2. Maximum length of any stored vector should not exceed 8" to guarantee storage.

A.1.3. Linear absolute vectors shall close within .02" for vectors up to 6".

A.1.3.1. There is no guaranteed closure for linear relative vectors.

A.1.4. Linear vectors may be executed at two execution rates, short vector 275 us ± 10 us or long vector (4.08 ms).

(1) All performance specifications stated herein are only valid after the KV controller has been aligned according to the procedures outlined in the KV diagnostic write up (Maindec-81-D6CA)

(2) All performance specifications as given are only valid for the temperature at which the system was initially aligned, except where stated otherwise. See Section VI of this writeup.

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TITLE

- reset-continue.
- C. The KV controller shall provide a vector-continue function.
- C.1 The vector continue permits disabling of the hardware timer allowing auxiliary timing of the reset and circular arc vectors.
- C.2 Reset continue shall be permitted in cursor display mode.

II. Line Drawing Capability - VT01 Display

- A. Line Quality
- A.1.1 The VT01 shall provide a resolution of at least 300 stored line pairs in point plot mode (line width of .01 inches) measured along the X or Y axis.
- A.1.2 The VT01 shall provide a resolution of at least 150 stored line pairs in linear vector mode (.02 in line width) measured along the X or Y axis.
- A.2 Maximum variation in line width shall not exceed 3:1 over the quality area of the scope (6" by 7 1/2") for long or short vectors executed under the definition of Par. I.A.1.4.
- A.3 Line straightness deviation from the mean shall not exceed $\pm 1.5\%$ of line length.
- A.4 Line continuity: dropout shall not exceed .01" per dropout for each dropout area.

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TITLE

- A.5 Line smoothness: noise and wiggle amplitude not to exceed $\pm .015$ "
- B. VT01 Cursor
- B.1 Cursor intensity shall be at least 2 ft. lamberts without causing storage of the cursor within the quality area.
- C. Warmup and Stabilization
- C.1 The VT01 shall require a maximum of 30 minutes warmup to provide stable cursor write-thru and vector storage properties.
- D. All other VT01 specs are given in the Tektronix 611 manual except where such specs conflict with those given here.
- III. Scope Control Functions
- A. The KV controller shall provide means for programmed erasure of the VT01 display with hardware lockout of the ready flag performed by the VT01.
- B. The KV controller shall provide means to activate and display the VT01 write-thru cursor. Such cursor will appear as an ellipse of approximately .1" major axis and will respond to the application of $\pm .5$ volt analog signals to the external cursor input terminals of the controller, producing full screen deflection of the cursor.
- C. The controller shall provide for programmed control of the Z axis (intensify) function of the VT01.

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TITLE

IV. Timing Functions

- A. The KV control shall provide two hardware timing functions - long (~ 4 ms) and short ($\sim .25$ ms).
- B. The KV control provides a delay of 100 us ± 30 us to allow input data to settle.
- C. Drift Rates.
- C.1 The input (sample-and-hold) registers shall not drift greater than ± 30 coordinates (.36" for pt plot) per second. (This means the maximum permitted time between the load data and execute commands should not exceed 15 ms).
- C.2 The output (integrator) registers shall not drift greater than ± 6 coordinates (.072" in vector mode) per second. (This means absolute vectors should be executed at least 10 vectors per second, and relative vectors should be executed at the full speed rates of Par. D. below).

D. Vector Execution Rates

- D.1 Linear vectors may be executed up to 1750 short vectors/sec. or 225 long vectors/sec.
- D.2 Points may be executed up to 3000 pts./sec.
- D.3 Circles require 16.2 ms per circle, or an angular rate of .1 degree per 4.5 us. This time is invariant (i.e. all circles are executed

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ENGINEERING SPECIFICATION CONTINUATION SHEET

TITLE

- V. D/A and A/D Facilities
- A. The controller shall contain a 10 bit digital to analog converter producing 0 to -4 volts $\pm 5\%$ for a 0777 to 10000 two's complement input range (0000 produces -2 volts nominally). The reference for this D/A shall be internally supplied and shall be 2.45 volts $\pm .1$ volts.
- B. The KV controller shall provide an analog comparator and suitable switching paths to measure any of six analog sources (X or Y sample-and-hold, X or Y integrators, and X or Y external (cursor) input). This comparator shall provide an accuracy of at least 1% (± 4 digital counts) of the true input, when used with a successive approximation A to D conversion subroutine program.
- B.1 The external (cursor) inputs shall accept ± 1 volt $\pm 10\%$ input signals to provide the full +511 to -512 coordinate range.
- B.2 The comparator shall require at least 50 us per successive approximation step (or approximately 1 ms to make a complete 10 bit reading) to permit the comparator to settle to the accuracy stated above.

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ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE

VI. Environmental

- A. Maximum permitted operating temperature range 10°C to 40°C.
- B. Maximum temperature deviation before readjustment of system may be required $\pm 3^{\circ}\text{C}$ ($\pm 5^{\circ}\text{F}$) about temperature when initially calibrated.
- C. Maximum humidity not to exceed 70% to meet above specs.
- D. Controller cannot tolerate shock or vibration since the alignment is likely to change.

VII. Power Supply

- A. A 712 power supply requires an input of 28 volts CT AC ± 2.8 Volts @ 47 to 63 Hz. This is normally supplied by a TRIAD F91X/transformer mounted to receive power off the fan power bus of the computer.
- B. The A712 supplies +11.5V $\pm 1\text{V}$ @ 100 ma and -11.5 $\pm 1\text{V}$ @ 100 ma with ripple not to exceed 50 mv.
- C. It is preferred to use KV8/I graphic system on AC power lines free of inductive loads.
- D. Total dissipation of the KV controller is less than 5 watts.
- E. The KV controller requires + 5V @ 395 ma and - 15V @ 37 ma supplies in addition to the AC supply above.

VIII. Physical

- A. The basic controller consists of 4 Flip Chip Modules:
A712 - Power Supply: Standard size Flip Chip module

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CONTINUATION SHEET

TITLE

M712 - Timing Generator - Double height standard size Flip Chip module.

M612 - D/A Converter - Double height standard size Flip Chip module.

A312 - Analog Function Generator - Double height standard size Flip Chip module.

In the PDP 8/I, these modules occupy the following locations:

H21	A712
HJ23	M712
HJ24	A612
HJ25	A312

- b. The KV8/I requires a special cable connector type G778 which occupies slot J21.
- c. The KV controller in addition requires a TRIAD F91X, trans. mounted next to the fan housing.

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