



PARTS LIST

FINAL CHASSIS ASSY.

MODEL
2720GS

DWG NO
2720-400

REV
C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2			Initial Chassis Assy.	Valhalla	2720-404	1				
3			Front Assy.	Valhalla	2720-401	1				
4		5-10291	Plug, Hole, .375", black	SMith	3091	6				
5			Output Amplifier Assy.	Valhalla	2720-403	1				
6			H. V. Power Supply Assy.	Valhalla	2720-613	1				
7			L. V. Power Supply Assy.	Valhalla	2720-602	1				
8			Main Microprocessor Assy.	Valhalla	2720-603	1				
9			Reference Module Assy.	Valhalla	2720-604	3				
10			Nullmeter Assy.	Valhalla	2720-607	1				
11			Output System Assy.	Valhalla	2720-609	1				
12		4-10582	High Voltage Cover	Valhalla	2720-225	1				
13		5-10489	Output Sys. Insulator	Valhalla	2720-223	1				
14		4-10440	Ref PCB Enclosure Cover	Valhalla	2720-204	1				
15		4-10466	Baffle-Airstream	Valhalla	2720-218	1				
16			Screw Phil flat 82°		4-40 x 1/4	5				
17			Screw, Phil pan blk		6-32 x 3/8	2				
18		5-10496	Standoff, Modified 8-32	Valhalla	2720-226	7				
19			Screw, Phil pan, SS		6-32 x 3/8"	7				
20			Washer, internal star		#6	12				
21			Nut, Radio Hex		6-32	7				
22			Washer, split lock		#6	2				
23			Washer, flat		#6	2				

NOTES: Sheet 1 is assembly drawing

SHT 2 OF 2



PARTS LIST

FRONT ASSEMBLY

MODEL

2720

DWG NO

2720-401

REV

B

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2		4-10451	Front Panel	53504	2720-213	1				
3										
4		--	I/O Processor Board	53504	2720-601	1				
5		--	Display Board	53504	2720-606	1				
6										
7										
8	SW1	5-03062	Key Operated Switch	C & K	Y201-13-0-A1-01-Q4	1				
9										
10		5-10101	Spacer, 3/8"Lg, 1/4"Dia.#6	Smith	2101	6				
11		5-10465	Spacer, 5/16"Lg, 1/4"Dia.#6	Smith	9208	6				
12										
13		--	Washer Internal Star	--	#6	6				
14		--	Nut, Radio Hex	--	6-32	6				
15										
16		--	Shrink Tube, 1/8" dia.	--		1 1/2"				
17		--	Wire, Brown, 22AWG	--		6"				
18										
19										
20										
21										
22										
23										

NOTES: Sheet 2 of 2 is assembly drawing



PARTS LIST

REAR PANEL ASSY.

MODEL

2720

DWG NO

2720-402

REV

C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1		4-10447	Rear Panel	53504	2720-209	1				
2		5-10018	Fuse Holder, panel	75915	342004A	1				
3		5-10166	Receptacle, AC Filter	CORCOM	6EF1	1				
4		5-03034	Switch, Slide 115/230	82389	47227LFR	1				
5		5-10137	Binding Post, Gold	83330	151B	1				
6		5-10333	Cable assy. 15 pin	53504	2703-055	1				
7		4-10580	Support Bracket H.V.cover	Valhalla	2720-224	1				
8		5-10302	Housing 10 way	Molex	09-50-7101	1				
9		5-10301	Terminal	Molex	08-50-0106	10				
10		5-10086	Solder Lug #8	Smith	1412-6	1				
11		5-10491	Filter fan guard 3 1/4		FF325A/30 or 45PPI	1				
12										
13		5-10019	Ty-wraps, 4" x 1/8"	16956	WRN-4	10				
14			Screw, Phil, pan, SS		6-32 x 3/8"	2				
15										
16			Screw, Phil, pan SS		4-40 x 1/2"	2				
17			Washer split lock		#6	2				
18			Washer, split lock		#4	6				
19			Nut, radio hex		#4-40	6				
20			Screw Phil, flat 82°		6-32 x 3/8	4				
21										

NOTES: Sheet 3 is assembly drawing

SHT 1 OF 3



PARTS LIST

REAR PANEL ASSY.

MODEL
2720

DWG NO
2720-402

REV
C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
22										
23	Either	5-04011	Fuse, 3 amp, slo-blo	75915	313-003	1				
	or	5-04013	Fuse, 1.5 amp, slo-blo	75915	313-01.5					
25			Shrink tubing		1/4 dia.	2"				
26			Shrink Tubing		1/8 dia	12"				
27			Wire:							
28			BRN 12"		18 AWG	12"				
29			RED 12"		18 AWG	12"				
30			ORN 12"		18 AWG	12"				
31			YLO 12"		18 AWG	12"				
32			GRN 12"		18 AWG	12"				
33			BLU 12"		18 AWG	12"				
34			VLT 12"		18 AWG	12"				
35			GRY 12"		18 AWG	12"				
36			WHT 12"		18 AWG	12"				
37			BLK 12"		18 AWG	12"				
38			GRN 12"		16 AWG	12"				
39			BLK 4"		16 AWG	4"				
40										
41										
42										
43										
44										

NOTES:



PARTS LIST

AMPLIFIER ASSY.

MODEL
2720

DWG NO
2720-403

REV
D

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1			Output Amp. Assy.	Valhalla	2720-611	1				
2			Output Amp. Driver Assy.	Valhalla	2720-612	1				
3										
4		4-10450	Heatsink, output	Valhalla	2720-212	2				
5		4-10449	Fan Bracket	Valhalla	2720-211	1				
6		4-10501	Transistor Support Bar	Valhalla	2720-222	4				
7		4-10536	Insulator, Heatsink	Valhalla	2720-220	4				
8		5-10469	Fan, 3 1/8", 24VDC	Rotron	5D24B2	1				
9		5-10019	Cable Tie, 4" x 1/8"	Panduit	WRN-4	2				
10		5-10328	Bracket, Angle	Zierick	251	4				
11	TR101-106,201-220	3-10030	NPN Transistor	--	2N6499	26				
12										
13										
14			Screw, Phil, Pan SS		6-32 x 3/8"	4				
15			Screw, Phil, Pan SS		4-40 x 3/8"	8				
16			Screw, Phil, Pan SS		4-40 x 1/2"	16				
17										
18			Washer, flat		#4	16				
19			Washer, split lock		#6	8				
20			Washer, split lock		#4	16				
21			Nut, Radio Hex		6-32	8				
22										

NOTES: Sht. 1 of 3 is assembly drawing

SHT 2 OF 3



PARTS LIST

INITIAL CHASSIS ASSY.

MODEL

2720

DWG NO

2720-404

REV

C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2			Rear Panel Assy.	Valhalla	2720-402	1				
3			Bottom plate assy.	Valhalla	2720-405	1				
4										
5		4-10456	Side Rail	Valhalla	2300-223	2				
6		4-10457	Side Rail	Valhalla	2300-224	2				
7		4-10437	Support Angle	Valhalla	2720-201	2				
8		4-10370	Chassis Support Bar	Valhalla	2703-212	2				
9		4-10333	Bezel (4-hole)	Valhalla	2724-205	4				
10										
11		5-10361	Foot, hard, rubber, gray	Acc.Rub	2095W-017-Grey	4				
12		5-10496	Standoff Modified 8-32	Valhalla	2720-226	3				Made from 5-10438
13										
14		5-10437	Block, Adhesive, Ribbon, cable	Icorally	FRC-1	1				
15										
16			Screw Flat, 82°, Stain		6-32 x 9/16"	8				
17			Washer, Internal Star		#6	6				
18			Screw, Flat, 82°, Stain		6-32 x 3/8"	20				
19			Screw, Flat, 82°, Stain		6-32 x 1/4"	8				
20			Screw, Phil, Pan, Stain		6-32 x 1/2"	6				
21										
22										
23										

NOTES: Sheet 1 is assembly drawing



PARTS LIST

BOTTOM PLATE ASSY.

MODEL
2720

DWG NO
2720-405

REV
C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2										
3		4-10448	Bottom Plate	53504	2720-210	1				
4		4-10462	P. C. B. Spacer L.	53504	2720-214	1				
5		4-10461	P. C. B. Spacer R.	53504	2720-215	1				
6			Mother Bd. Assy.	53504	2720-600	1				
7		4-10443	Analog Wrap	53504	2720-205	1				
8		4-10444	Enclosure Ref. Bd.	53504	2720-206	1				
9										
10										
11		4-10439	LV-HV PCB Bracket	53504	2720-203	1				
12		4-20047	HV Transformer	53504	2720-011	1				
13		4-20046	LV Transformer	53504	2720-010	1				
14		5-10437	Ribbon Cable TY-Block	Icorally	FRC-1	5				
15		5-10423	Ribbon Cable Assy.	53504	2720-050	1				
16		5-10468	U-Channel, Rubber, .15x.12	Accu-Rub.	924	12"				
17										
18	PLD, PLE	5-10439	Molex Housing, 4 Pin	Molex	09-50-7041	2				
19	PLA	5-10302	Molex Housing, 10 pin	Molex	09-50-7101	2				
20	PLB	5-10440	Molex Housing, 11 Pin	Molex	09-50-7111	1				
21										
22		5-10261	Ty-Wrap Block, Large	06383	ABM25-A	2				
23		5-10019	Ty-Wrap 4" x 1/8"		WRN-4	36				

NOTES: Shts 1 & 2 are assembly drawings



PARTS LIST

BOTTOM PLATE ASSY.

MODEL

2720

DWG NO

2720-405

REV

C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
24		5-10485	Standoff, 1/4Hex,1/2Lg.,8-	32 Smith	8443 or 2327	4				
25		5-10409	Card Guide 2.5"	Amerlok	PCG-5250	2				
26		5-10318	Stand off, snap-in	83330	3922	5				
27		5-10301	Molex Terminal	Molex	08-50-0106	34				
28			Shrink Tubing		1/8" diameter	2"				
29		5-10354	Solder Lub #8	Smith	1412-8	2				
30			Washer, Int. Star		#8	12				
31			Nut, Raido Hex		8-32	12				
32			Screw, self tapping		#4 x 1/4"	2				
33			Washer, Int. Star		#6	11				
34			Nut, Radio, Hex		#6	11				
35			Washer, split		#8	4				
36			Screw, Phil, Pan SS		#8 x 1/4"	3				
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										

NOTES:



PARTS LIST

OPTION "BAT"

MODEL
2720

DWG NO
2720-407

REV
B

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2			Bat Board Assy.	Valhalla	2720-615	1				
3										
4		4-10452	Battery Pack Box	Valhalla	2720-207	1				
5		4-10500	Battery Strap	Valhalla	2720-221	1				
6										
7										
8		5-10250	Hole Plug	Smith	3090 BLK	2				
9		5-10018	Fuse Holder, Panel Mt.	Little Fuse	342004A	1				
10			Screw, Phil pan, SS		8-32 x 1/2"	4				
11			Screw, Phil pan, SS		6-32 x 3/8"	2				
12			Screw, Phil pan, SS		10-24 x 4 1/2"	4				
13			Washer, Internal Star		#6	2				
14			Washer split lock		#10	4				
15			Washer, split lock		#8	4				
16	B1, 2, 3	5-10457	Battery, 6V, lead acid 4.8 AHK	Panasonic	LCR-456P	3				
17		5-10266	Rubber Strip, 1/2W	Acc. Rub.	1/2 x 3/16 Neoprene	36"				
18		5-04001	Fuse 2 amp	Little Fuse	312-002	1				
19			Shrink tubing 1/4" dia.		Black, 1/4" dia.	3"				
20		5-10395	Disconnect Insulated	Waldom	KST-2188	6				
21		5-10468	Rubber "U" Channel	Acc. Rub.	924	36"				
22			Wire, Red, 16 AWG, 48"			1				
23										

NOTES: Sheet 1 is the assembly drawing

SHT 2 OF 2



PARTS LIST

MOTHER BOARD

MODEL

2720

DWG NO

2720-600

REV

C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2										
3		4-30127	PCB Mother Board	53504	2720-700	1				
4										
5										
6	SK 13	5-10310	10 Way Socket	Molex	22-16-2101	3				
7	PL1-5, 10-12	5-10313	10-way pins, .56 lg.	Molex	22-10-2101	50				
8	PLD, E	5-10427	4 pin wafer assy.	Molex	09-67-1043	2				
9	PLB	5-10428	11 pin wafer assy.	Molex	09-6701113	1				
10	PLA, C	5-10300	10 Pin Wafer Assy.	Molex	09-6701113	2				
11		5-10330	Bead Pin	Molex	R62-3	2				
12	SK14	5-10042	24 Pin IC Socket	T. I.	8524-01	1				
13	SW2	5-03080	8 Pos. Rgt. angle switch	Grayhill	1 76PSB08	1				
14		4-10463	Spacer, Power Switch	Valhalla	2720-216	1				
15	SK15	5-10243	Connector, GPIB	AMP	552791-1	1				
16	SW1	5-03061	Switch, power, 4A	Schadow	ZFNE152U	1				
17					EE11010106B					
18	SK6, 7, 8, 9	5-10453	Connector 120 pin	EDAC	345-120-524-2-78	4				
19										
20		5-10464	Grommet Rubber	Smith	91118	2				
21		5-10019	Cable Tie 4"	Panduit	WRN-4	18				
22		5-10441	Tie Wrap Block Small	Panduit	ABMM-AT	7				
23		5-10261	Tie Wrap Block, Lg.	Panuit	ABM25-A	1				

NOTES: Sht. 3 of 3 is assembly drawing

SHT 1 OF 3



PARTS LIST

I/O PROCESSOR

MODEL
2720

DWG NO
2720-601

REV
E

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2		4-30121	I/O Processor PCB	Valhalla	2720-701	1				
3										
4	B101	5-10458	Batter 3.9V 1Ahr.	Elect. Indust.	BCX72-3B50		1			
5	B21	5-10442	Beeper Piezo PCB Mount	TDK	PB3120UP002A	1				
6										
7										
8	C1, 4	2-30001	10uf 25V TANT	--	--	2				
9	C2, 3	2-20014	20pf 500V MICA	--	CM05FD200J03	2				
10	C8, 9, 11-16	2-60004	0.01uf 630V Mylar	--	--	8				
11	C5, 6	2-60002	0.1uf 100V Mylar	--	--	2				
12										
13	C10,101, 108	2-40026	10uf 50V Alum Radial	--	--	3				
14	C102	2-20018	33pf Mica 500V	--	CM05FD330J03	1				
15	C103, 107	2-2	Factory Select	--	CM05		2			
16	C104, 106	2-20012	10pf MICA 500V	--	CM05FD100J03	2				
17	C105	2-70004	12-100pf VArIable	Mouser	24AA067	1				
18	C7, 109	2-40029	100uf 25V Alum Radial	--	--	2				
19										
20										
21										
22	D2, 101,102,103	3-20028	Diode Signal Schottky	--	1N5711	4				
23										

NOTES: Sht. 1 is the assy. drawing

SHT 2 OF 5



PARTS LIST

I/O PROCESSOR

MODEL 2720

DWG NO
2720-601

REV
E

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
24										
25	IC1, 15	3-30157	Octal GPIB Transceiver	Moto	MC3447P3					
26	May use either one	3-30332	Octal GPIB Transceiver	Moto	MC3447P	2				
27	IC2	3-30158	GPIB/MPU Interface	Moto	MC68488P	1				
28	IC3	3-30182	Binary 1 of 16 Decoder	T. I.	SN74154N	1				
29	IC4	3-30155	1 of 8 Decoder	T. I.	SN47LS138N	1				
30										
31	IC8	3-30373	CMOS 8K x 8 static RAM	Hitach	HM6264LP-15	1				
32	IC9	3-30344	Octal Latch, Trans, 3-state T.I.		74LS373N	1				
33	IC10	3-30342	Micro-P+RAM/PTM/ACIA/PIA	Moto	MC6803G	1				
34	IC11, 23	3-30185	Quad Opto-Isolator	Litron	x ILQ-74	2				
35	IC12	3-30093	Fast Opto Isolator	H. P.	HCPL-2601	1				
36	IC13	3-30375	Dual Med Opto Isolator	H. P.	HCPL-2530	1				
37	IC14	3-30184	HEX Inverter	T. I.	74LS04N	1				
38	IC16	3-30162	Octal Transceiver 3 state	T. I.	74LS245N	1				
39	IC17, 18	3-30156	Octal 3 state Buffer	T. I.	74LS541N	2				
40	IC19, 20	3-30177	Octal Latch 3 state	T. I.	74LS374N	2				
41	IC21, 22	3-30173	Hex Inverter 15V O/C	T. I.	7406 or 7416	2				
42	IC24	3-30061	Quad 2 I/P AND	T. I.	74LS08N	1				
43	IC25	3-50028	2720/IC25 (Main ROM)	Valhalla	3-30367		1			Programmed in test
44	IC101	3-30362	CMOS 1 of 8 Decoder	T. I.	74HC138	1				
45	IC102	3-30363	Real time clock & RAM	Moto	MC146818	1				
46	IC103	3-30149	CMOS HEX inverter		CD40106	1				

NOTES:



PARTS LIST

I/O PROCESSOR

MODEL
2720

DWG NO
2720-601

REV
E

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
47										
48	PL1	5-10443	Wafer 15 way .1sp., .56Lg.	Molex	22-03-2151	1				
49	PL2	5-10360	Wafer 10 way .1sp., .70Lg.	Molex	22-03-2102	3				
50										
51										
52										
53	R5-11	1-01033	470 ohm 5% 1/4W	--	RC07GF471J	7				
54	R13, 14	1-01061	10K ohm 5% 1/4W	--	RC07GF103J	2				
55	R101, 102, 103	1-01081	100K ohm 5% 1/4W	--	RC07GF104J	3				
56	R104	1-01041	1 K ohm 5% 1/4W	--	RC07GF102J	1				
57	R105	1-01113	5.6M ohm 5% 1/4W	--	RC07GF565J	1				
58	R106	1-01083	150 K ohm 5% 1/4W	--	RC07GF154J	1				
59	R107	1-01086	220 K ohm 5% 1/4W	--	RC07GF224J	1				
60	R108, 110	1-01100	1 M ohm 5% 1/4W	--	RC07GF105J	2				
61	R109	1-01021	100 ohm 5% 1/4W	--	RC07GF101J	1				
62										
63										
64	RN1, 3	1-40003	15 x 10K ohm	--	316A-103	2				
65	RN2	1-40001	8 x 470 ohm	--	316B-471	1				
66										
67										
68	RV1	1-50010	50 ohm single turn	CTS	110-50 ohm	1				
69										

NOTES:



PARTS LIST

I/O PROCESSOR

MODEL
2720

DWG NO
2720-601

REV
E

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
70										
71	SK1, 2	5-10321	Socket 10 way bottom entry Molex		22-17-2102	3				
72	SK3, XIC102	5-10042	Socket 11 24 Pin	T. I.	8524-01	2				
73	XIC2, 10	5-10246	Socket DIL 40 pin	Burndy	DILB40P-11	2				
74	XIC7, 8, 25	5-10295	Socket DIL 28 Pin	Burndy	DILB28P-108	3				
75										
76										
77	TR1	3-10026	N-Channel VMOS	--	VN10KM	1				
78	TR101	3-10010	Transistor PNP	--	2N4402	1				
79										
80										
81	TP101, 102	5-10290	Test Point Hook	Vector	K32-2	2				
82										
83										
84	Y1	5-02004	Crystal MPU 4 MHz.	--	HC18-4MHz.	1				
85	Y101	5-02009	Crystal 32.76800KHz.	--	--	1				
86										
87										
88		--	Screw Phil pan SS	--	4-40 x 3/8	2				
89		--	Nut Radio Hex	--	4-40	2				
90		--	Washer Internal Star	--	#4	2				
91										
92		--	R. T. V.	--	--	A/R				

NOTES:



PARTS LIST

LOW VOLTAGE
POWER SUPPLY

MODEL

2720

DWG NO

2720-602

REV

C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2										
3		4-30123	PCB, Low Voltage P. S.		2720-702	1				
4										
5										
6										
7	C2	2-40012	15000uf, 10V, Alum.		159TTA010	1				
8	C1	2-40036	220uf, 63V, Alum.		227TTA063	1				
9	C105	2-40016	22000uf, 10V, Alum.		229TTA010	1				
10	C106, C3	2-40029	100uf, 25V, Alum. Radial		--	1				
11	C4, 9, 113	2-60002	0.1uf, 100V, Mylar			3				
12	C5	2-40017	2200uf, 35V, Alum.		228TTA035	1				
13	C6, 7, 103	2-40026	10uf, 50V, Alum. Radial		--	7				
	104, 107, 110, 111									
15	C101	2-40018	4700uf, 35V, Alum.		478TTA035	1				
16	C112	2-40004	2200uf, 16V, Alum.		228TTA016	1				
17	C102, 108, 109	2-40035	1000uf, 35V, Alum.		108TTA035	3				
18										
19	C8	2-40010	1000uf, 25V, Alum.		108TTA025	1				
20										
21										
22										
23										

NOTES: Sheet 5 is the assembly drawing



PARTS LIST

LOW VOLTAGE
POWER SUPPLY

MODEL

2720

DWG NO

2720-602

REV

C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
24										
25	D1,4,101,105	3-20027	Bridge, 1A, 100V		3N247	4				
26	D2,3,6,14	3-20021	Rectifier, 3A, 30V		1N5821	6				
27	102, 103									
28	D5	3-20000	Diode, Signal		1N4148	1				
29	D7,8,11,104	3-20002	Diode Rectifier		1N4001-1N4007	7				
30	107-109									
31										
32	IC103	3-30355	Regulator,+5V,3A(to 3 STL)		LM323KC	1				
33	IC2	3-30356	Regulator,+Adj,1.5A,To 3		LM317KC	1				
34	IC104	3-30369	Regulator,+6V,1A		7806CT	1				
35	IC1	3-30042	Regulator,+5V, 1.5A		LM7805CK	1				
36	IC101	3-30370	Regulator,+18V,1.5A		7818CK	1				
37	IC102	3-30358	Regulator,-18V,1.5A		7918CK	1				
38	IC105	3-30171	Regulator,+18V,1.0A		7818CT	1				
39	IC106	3-30172	Regulator,-18V, 1A		7918CT	1				
40	R1	1-01061	10K ohm, 5%, 1/4W		RC07GF103J	1				
41	R2	1-01051	3.9K, 5%, 1/4W		RC07GF392J	1				
42	R3	1-01028	270 ohm, 5%, 1/4W		RC07GF271J	1				
43										
44										
45										
46										

NOTES:



PARTS LIST

LOW VOLTAGE
POWER SUPPLY

MODEL

2720

DWG NO

2720-602

REV

C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
47										
48	RV1	1-50022	1K ohm End Adjust	Beckman	89PK1K	1				
49										
50										
51										
52	SK1	5-10310	Socket, Rt. Angle, 10way, gold Molex		22-16-2101	9				
53	SK2	5-10008	Socket, DIL, 16 pin	T. I.	C8516-01	1				
54	T1	4-20048	Pwr XFMR, 24VCT, 1.5A	Signal	DST7-24	1				
55		5-10449	Cable tie, 14"x.15	Panduit	PLT41-M	2				
56		5-10315	Socket, To -3	Smith	6243	5				
57										
58		4-10446	Heatsink, Power Supply		2720-208	1				
59		5-10232	Washer, Insulator, to 3	Bergquist	7403-09FR-06	5				
60		5-10288	Spacer, 1/4" dia x 1/2" lg. x #6 Alum	Smith	8503	9				
61			Nut, Radio Hex		#4	3				
62			Screw, Phil pan, SS		6-32 x 9/16"	10				
63			Screw, Phil pan, SS		6-32 x 3/4"	5				
64			Screw, Phil pan, SS		4-40 x 1/4"	3				
65										
66										
67			Washer, Internal Star		#6	19				
68			Washer, Flat		#6	4				
69			Washer, Int. Star		#4	3				

NOTES:

SHT 3 OF 5



PARTS LIST

MAIN MICROPROCESSOR

MODEL 2720

DWG NO 2720-603

REV C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1		4-30128	Main MPU PC Board	Valhalla	2720-703	1				
2	C208, 213, 219, 224 304, 318, 319	2-40026	10uf, 50V, Alum. Radial		--	7				
3	C207	2-60001	.22 uf, 100V, Mylar		--	1				
4	C218, 317	2-10013	1uf, 50V, Ceramic		8131/050/651/105M	2				
5	C209	2-60009	0.022uf, 400V, Mylar	Wima	MKC-4 .022	1				
6	C217	2-10006	0.01uf, 100V, Ceramic		--	1				
7	C325	2-40037	220uf, 10V, Alum. Radial		--	1				
8	C3	2-30004	1 uf, 10V, Tantalum Bead			1				
9										
10	C4	2-40028	47 uf, Alum. Radial		--	1				
11	C18-20, 7	2-40029	100uf, 25V, Alum. Radial		--	4				
12	C2, 8-17, 216	2-60004	0.01uf, 630V, Mylar			22				
	C220-223, 202, 314									
	C315, 316, 322-324									
15										
16	C203-204, 303 307, 310, 312, 313	2-60002	0.1 uf, 100V, Mylar			7				
18	C305, 306	2-20002	50pf, 500V, MICA			2				
19	C205	2-20013	100pf, 500V, MICA			1				
20	C210, 211, 214, 215	2-20019	200pf, 500V, MICA			6				
21	301, 302									
22	C328, 326	2-90002	0.5uf, 50V, Polycarbonate		--	2				
23	C308, 309, 311	2-90005	0.1uf, 50V, Polycarbonate		--	3				

NOTES: Sheet 6 of 6 is the assembly drawing

SHT 1 OF 6



PARTS LIST

MAIN MICROPROCESSOR

MODEL 2720

DWG NO
2720-603

REV
C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
24	C201	2-90003	5uf, 50V, Polycarbonate		--	1				
25	D1	3-20036	Transient, Supply, 6V		1N5908	1				
26	D2-6,302-305	3-20028	Diode, Signal, Schottky		1N5711	9				
27	D201, 202'	3-20041	Diode, Reference, 6.3V		1N825	2				
28	D203	3-20000	Diode, Signal		1N4148	1				
29										
30										
31	IC1-4	3-30155	1 of 8 Decoder		74LS138N	4				
32	IC5	3-30061	Quad 2 I/P AND		74LS08N	1				
33	IC6	3-30023	CMOS, Quad, Analog Switch		4066BF (Ceramic)	1				
34	IC7	3-30213	RAM, 2048X8, 300ns		TMS4016-30NL	1				
35	IC8	3-50031	2720 Main ROM		3-30367 (27128)	1				
36	IC9	3-30187	Microprocessor, 1.5MHz.		MC68A09P	1				
37	IC10	3-30350	A. C. I. A., 1.5MHz.		MC68A50P	1				
38	IC12	3-30351	PTM, 1.5MHz.		MC68A40P	1				
39	IC101-104	3-30159	Peripheral Interface Adapt.		MC6821P	4				
40	IC13	3-30149	CMOS Hex Invertor (Schmidt)		40106BE	1				
41	IC15, 11, 210	3-30184	Hex Invertor		74LS04N	3				
42	IC201	3-30322	Dual Op-Amp, JFET		LF353N	1				
43	IC202, 315	3-30336	Chopper Amp Lo Noise		ICL7652CPD	2				
44	IC203	3-30173	Hex Inverter, 15V, 0/C		7406-7416	1				
45	IC205	3-30170	OP-Amp, Low Noise		OP-07DP	1				
46	IC206, 207, 313	3-30090	Op-Amp, Bi-Fet		LF356N	5				

NOTES: 204,314



PARTS LIST

MAIN MICROPROCESSOR

MODEL
2720

DWG NO
2720-603

REV
C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
47	IC208	3-30073	Comparator, JFET		LF311H or TL311	1				
48	IC209	3-30175	Dual Monostable Retriggerable		74LS123N	1				
49	IC216	3-30174	Quad, 2 I/P OR		7432	1				
50	IC211, 215, 310, 311		Dual D-Type		74ALS74	4				
51	IC212, 213	3-30339	8 Bit Counter + Latch		74LS590N	2				
52	IC301-304	3-30340	8 Bit Comp. + Latch		74AS885N	4				
53	IC305-308	3-30194	4 Bit Sync. Counter		74LS163AN	4				
54	IC309	5-02008	Oscillator, 16.77216MHz, 0.01%			1				
55	IC214	3-30333	Temperature Sensor		AD590JH	1				
56	R101-104, R3, 203	1-01061	10K ohm, 5%, 1/4W	81349	RC07GF103J	25				
	204, 234, 236, 207, 226									
	208, 211, 212, 307									
	221, 223, 228, 231, 310									
	303, 306, 309, 312, 229									
61	R202, 205, 206	1-01081	100K ohm, 5%, 1/4W	81349	RC07GF104J	7				
	233, 235, 301, 304									
63	C320, 321, 327	2-10014	0.1uf, 50V, Ceramic			3				
64	R209, 210	1-01045	2K ohm, 5%, 1/4W	81349	RC07GF202J	2				
65	R213, 230, 227 225, 319	1-01021	100 ohm, 5%, 1/4W	81349	RC07GF101J	5				
66	R215, 232	1-01041	1K ohm, 5%, 1/4W	81349	RC07GF102J	2				
67	R216	1-10198	10K ohm, 1%, 10PPM	PRP	1/8W-10K-1%-10PPM	1				
68										
69	R219	1-10205	63.3K ohm, 0.05%, 5PPM	PRP	1/8W-63.3K-.05%-5PPM	1				

NOTES:

SHT 3 OF 6



PARTS LIST

MAIN MICROPROCESSOR

MODEL
2720

DWG NO
2720-603

REV
C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
70	R220	1-01069	30K ohm, 5%, 1/4W		RC07GF303J	1				
71										
72	R224	1-01053	4.7K ohm, 5%, 1/4W	81349	RC07GF472J	1				
73										
74										
75	R313, 314	1-10117	19.6K ohm, 1%		RN60C1962F	2				
76	R321, 222	1-10206	40K, .05%, 5PPM	PRP	18W-40K.05%-5PPM	2				
77	R315	1-10225	46.5K 1%		RN60C4652F	1				
78	R322	1-10226	15.4K 1%		RN60C1542F	1				
79	R316,317	1-01073	47K ohm, 5%, 1/4W	81349	RC07GF473J	2				
80	R323	1-20124	700K ohm,0.05%, 2PPM		GS802-700K-2PPM	1				
81	R320	1-20013	100 ohm, .05%, 5PPM 1°C	Goldstar	R127 100 ohm .05%	1				
82	RN1	1-40003	15x10K ohm		316A-103	1				
83	RV301	1-50043	200 ohm End adjust		89PR200 ohm	1				
84	SK1	5-10310	10-way socket	Molex	22-16-2101	13				
85	R1, 218	1-01100	1M ohm, 5%, 1/4W	81349	RC07GF0105J	2				
86	XIC7, 10	5-10042	Socket,DIL, 24 pin	T. I.	8524-01	2				
87	XIC8, 12	5-10295	Socket, DIL, 28 pin	Burndy	DILB28P-108	2				
88	XIC9,101-104	5-10246	Socket, DIL, 40 Pin	Burndy	DILB40P-11	5				
89	R318	1-10004	15K, 1%		RN60C1502F	1				
90	R2	1-01109	3.3M ohm, 5%, 1/4W	81349	RC07GF335J	1				
91	R237	1-10107	29.4K ohm, 1%	81349	RN60C2942F	1				
92	R302,305,308,311	1-01007	10 ohm, 5%, 1/4W	81349	RC07GF100J	4				

NOTES :



PARTS LIST

MAIN MICRORPOCESSOR

MODEL

2720

DWG NO

2720-603

REV

C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
93	TR101-105,107-116	3-10013	NPN Transistor (T092)		2N4401	15				
94	TR204,205	3-10033	N-Channel, UPIGFET		VN10LM	2				
95	TR309-312	3-10026	N-Channel, VMOS (T092)		VN10KM	4				
96	TR106	3-10032	NPN Darlington		MPSA-13	1				
97	TR201-203,211 206,207,210	3-10000	N-Channel JFET		U1899(E)	7				
98	TR208,209 301-304	3-10010	PNP Transistor (T092)		2N4402	6				
101										
102	TR305-308	3-10016	N-Channel VMOS (T05)		VN66AK	4				
103	XTR307,308	5-10229	Washer, Eeryllia, T05	Permag	CG-3835-1	2				
104										
105										
106	RN301	1-40011	Personality Res Net.	G. S.	2720-026	1				
107	IC316	3-30328	Op-Amp JFET		OPA103AM	1				
108	IC317	3-30169	Regulator, 5V, .1A		LM79L05CLP	1				
109	IC318	3-30168	Regulator, +5V, .1A		LM78L05ACL	1				
110	R217	1-10185	11.11K ohm, 0.1%, 5PPM	PRP	1/8W-11.11K-0.1%-5PPM	1				
111	IC319	3-30376	Dual High Speed Driver	Teledyne	TSC427CPA	1				
112	PL201	5-10398	Wafer, 2 Pin .56	Molex	22-03-2021	1				
113	XPL201	5-10488	Shorting Plug .1 sp.	Molex	15-29-1024	1				
114										
115										

NOTES:



PARTS LIST

OPTION EXR 1

MODEL 2720

DWG NO
2720-605

REV
A

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2										
3	C1, C2	2-10013	1 uf, 50V, Ceramic Disc		8131-050-651-105M	2				
4	C3, C4	2-90006	1 uf, 50V, Polycarb.			2				
5										
6	C7, C9	2-10014	0.1 uf, 50V, Ceramic Disc		8212-050-651-104M	2				
7	C8	2-40026	10 uf, 50V, Alum. Rad.			1				
8	C10	2-30011	4.7 uf, 35V, Tant.			1				
9										
10	D1	3-20024	Pair, Low leakage Diodes		DPAD10	1				
11	D2	3-20000	Diode, Signla		1N4148	1				
12										
13	IC1	3-30328	Op-Amp, JFET	Burr-Brown	OPA103AM	1				
14	IC2	3-30336	Chopper Amp, Low noise	Intersil	ICL7652CPD	1				
15	IC3	3-30031	Quad-Op Amp		LM324N	1				
16	IC5	3-30168	Reg., +5V, 0.1A, T092		LM78L05ACL	1				
17	IC6	3-30036	Reg., +15V, 0.5A, T0202		78M15CP	1				
18	IC7	3-30064	Reference, 2.5V, 1%	Motorola	MC1403	1				
19	IC8	3-30189	Novram, 256x4	Xicor	XC2212	1				
20										
21										
22										
23										

NOTES: Sheet 3 is the assembly drawing



PARTS LIST

OPTION EXR 1

MODEL
2720

DWG NO
2720-605

REV
A

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
24		5-10488	Shorting Plug, .1sp, gold	Molex	15-29-1024	3				
25										
26	R1	1-10008	10K ohm, 1%	81349	RN60C1002F	1				
27	R2	1-10016	8.45K ohm, 1%	81349	RN60C8451F	1				
28	R3	1-10061	4.99K ohm, 1%	81349	RN60C4991F	1				
29	R4	1-10006	100K ohm, 1%	81349	RN60C1003F	1				
30	R5	1-10277	2.37K ohm, 1%	81349	RN60C2371F	1				
31	R6	1-10278	2.05 K Ohm, 1%	81349	RN60C2051F	1				
32	R7	1-10017	9.09K ohm, 1%	81349	RN60C9091F	1				
33	R8	1-30023	7x10K ohm, Set	Vishay	2720-024	1				
34	R9	1-01061	10K ohm, 5%, 1/4W	81349	RC07GF103J	1				
35	R10	1-01021	100 ohm, 5%, 1/4W	81349	RC07GF101J	1				
36	R11	1-01073	47K ohm, 5%, 1/4W	81349	RC07GF473J	1				
37	R12, 13	1-01081	100K ohm, 5%, 1/4W	81349	RC07GF104J	2				
38										
39	RLA	5-03083	Relay, 2A+2B, 5V	Aromat	S2EB-5V	1				
40										
41	RV1	1-50034	500 ohm, end adjust	Beckman	89PR500 OHM	1				
42	TR1	3-10000	N-Channel, JFET		U1899E	1				
43	TR2	3-10013	NPN Transistor (T092)		2N4401	1				
44	TP1, TP2	5-10290	Test Hook, PCB	Vector	K32-2	2				
45	PL1	5-10313	Wafer, 10 way, Gold. 56 long	Molex	22-10-2101	1				
46	SK1	5-10310	Socket Rt. Angle 10 way	Molex	22-16-2101	4				

NOTES:



PARTS LIST

DISPLAY P. C. B. ASSY.

MODEL
2720

DWG NO
2720-606

REV
B

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2										
3										
4		4-30120	P. C. B. Display		2720-706	1				
5										
6	C1	2-30001	10 uf, 25V TANT			1				
7										
8										
9	DS4-35	5-01011	Led, Red	H. P.	5082-4655	32				
10	DS1, 2	5-01022	Display, V-F, 14 Seg., 16 digit Itron		FG169B2	2				
11	DS3	5-01023	Light Bar (16 pin DIL)	H. P.	HLMP2685	1				
12	XDS3	5-10008	Socket, 16 pin DIL		C8516-01	1				
13	IC1, 2	3-30353	32-bit VFD Driver	T. I.	SN75518N	2				
14	IC3-9	3-30354	6-bit LED driver & latch	National	DS8859 AN	7				
15										
16	R1	1-01039	8202, 5% 1/4W		RC07GF821J	1				
17										
18	PL1, 2	5-10332	Wafer, 10 pin, 1.23L, gold C. A.		CAS-10SP-230T -1.23	3				
19										
20	XDS4-35	5-10454	Spacer, Nylon, LED, 0.1" Lg	Bivar	908-100	32				
21										
22										

NOTES: Sheet 2 of 2 is assembly drawing

SHT 1 OF 2



PARTS LIST

NULLMETER

MODEL

2720

DWG NO

2720-607

REV

C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1		4-30125	Null Meter P. C. B.	53504	2720-707	1				
2										
3	C7, 10, 104	2-40029	100uf 25V, Alum Radial			3				
4	C2, 3, 1, 5	2-90006	1uf, 50V, Polycarb			4				
5	C102	2-30011	4.7uf 35V, Tant Bead			1				
6	C101, 103, 108	2-60002	.1uf, 100V Mylar			3				
7	C8	2-90009	.001uf, 50V, Polycarb			1				
8	C106, 109-112	2-30004	1uf, 25V, Tant Bead			6				
9	C6	2-90005	0.1uf, 50V, Polycarb			1				
10	C4	2-90002	0.5uf, 50V, Polycarb			1				
11										
12	D1	3-20024	Pair, Low leakage, Diode		DPAD10	1				
13	D2	3-20041	Zener Reference 6.3V		1N825	1				
14	D101-103	3-2000	Diode, Signal		1N4148	3				
15										
16										
17										
18										
19										
20										
21										

NOTES: Sheet 1 of 5 is assembly drawing

SHT 2 OF 5



PARTS LIST

NULLMETER

MODEL
2720

DWG NO
2720-607

REV
C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
22										
23										
24										
25	IC1	3-30336	Chopper, Amp, lo-noise	Intersil	ICL7652CPD	1				
26	IC2	3-30090	Op-Amp, BIFET		LF356N	1				
27	IC3	3-30371	V-F Converter	A. D.	AD537KD	1				
28	IC4	3-30093	Fast Opto-Isolator	H. P.	HCPL-2601	1				
29	IC5	3-30374	Novram, 64 x 4	XICOR	XC2210	1				
30	IC6	3-30328	Op-Amp, JFET	Burr Brn	OPA 103AM	1				
31	IC109	3-30348	AC Opto-Isolator	Litronix	IL250	1				
32	IC101	3-30185	Quad Opto-Isolator	Litronix	ILQ-74A	1				
33	IC102	3-30372	CMOS, 1 of 16 decoder	T. I.	74HC154	1				
34	IC103, 104	3-30084	Opto-Isolator		IL1 or TIL 111	2				
35	IC105	3-30036	Regulator +15V 0.5A		78M15CP	1				
36	IC106	3-30349	Dual Power Supply	Burr Brn	722	1				
37	IC107	3-30034	Regulator, +5V, 0.5A		78M05CP	1				
38	IC108	3-30169	Regulator, -5V, 0.1A		LM79L05CLP	1				
39										
40										
41										
42										
43										
44										

NOTES:



PARTS LIST

NULLMETER

MODEL
2720

DWG NO
2720-607

REV
C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
45	R1, 2	1-20127	10K 20% Low Thermal	G. S.	GS805-10K-20%	2				
46	R3	1-01056	6.2K ohm 5%, 1/4W	81349	RC07GF622J	1				
47	R4-6	1-01124	22M ohm, 5%, 1/4W	81349	RC07GF226J	3				
48	R105, 106	1-01061	10K ohm, 5%, 1/4W	81349	RC07GF103J	2				
50	R11, 109	1-01041	1 K Ohm, 5%, 1/4W	81349	RC07GF102J	2				
51	R12	1-10111	1.24M ohm, 1%	81349	RN60C1244F	1				
52	R13	1-10181	444.4K ohm, 1%, 10PPM	PRP	1/8W 444.4K 1% 10PPM	1				
53	R14	1-10154	73.2K ohm, 1%	81349	RN60C7322F	1				
54	R15	1-10007	1M ohm, 1%	81349	RN65C1004F	1				
55	R16, 7	1-01007	10 ohm, 5%, 1/4W	81349	RC07GF100J	2				
56	R17	1-10008	10K ohm, 1%	81349	RN60C1002F	1				
57	R107	1-01033	470 ohm, 5%, 1/4W	81349	RC07GF471J	1				
58	R20, 21	1-01081	100K 5%, 1/4W	81349	RC07GF104J	2				
59	R22	1-20007	900K ohm, 0.05%	Elliot	EI48-900K-.05%	1				
60	R23	1-20006	90K ohm, 0.05%	Elliot	EI27-90K-.05%	1				
61	R24	1-20005	9K ohm, 0.05%	Elliot	EI27-9K-.05%	1				
62	R25	1-20004	900 ohm, 0.05%	Elliot	EI27-900R-.05%	1				
63	R26	1-20013	100 ohm, 0.05%, 5PPM	G. S.	R127100R.05%5PPM	1				
64	R104	1-01039	820 ohm, 5%, 1/4W	81349	RC07GF821J	1				
65										
66										
67	R18	1-01046	2.2K, 5%, 1/4W	81349	RC07GF222J	1				

NOTES:



PARTS LIST

NULLMETER

MODEL

2720

DWG NO

2720-607

REV

C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
68	RN103	1-40008	8 x 1 K ohm	A. B.	316B-102	1				
69	RN102	1-40001	8 x 470 ohm	A. B.	316B-471	1				
70	RN101	1-40003	15 x 10K ohm	A. B.	316A-108	1				
71										
72	RLA, D, E,	5-03082	Relay, Latching, 2A+2B	Aromat	S2EBT-L2-5V	3				
73										
74	SK1	5-10310	Socket Rt. Angle 10 way, gold	Molex	22-16-2101	4				
76										
77	TR106-111	3-10010	PNP Transistor		2N4402	6				
78	TR113	3-10013	NPN Transistor		2N4401	1				
79	TR112	3-10032	NPN Darlington		MPSA-13	1				
80										
81			Wire Teflon, 20AWG		Red, Teflon	18'				
82			Wire, Teflon, 20 AWG		Black, Teflon	18'				
83										
84										
85		4-20043	Ferrite BEad	Amidon	FB-43-2401	2				
86										
87	XIC105	5-10404	Heatsink, T0202	Therm	6047B	1				
88										
89										
90										

NOTES:



PARTS LIST

OPTION EXR. 10

MODEL

2720

DWG NO
2720-608

REV
A

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2										
3	C1, C2	2-10013	1uf, 50V, Ceramic Disc		8131-050-651-105M	2				
4	C3, C4	2-90006	1uf, 50V, Polycarb			2				
5	C5, C6	2-60002	0.1uf, 100V, Mylar			2				
6	C7, C9	2-10014	0.1uf, 50V, Ceramic Disc		8121-050-651-104M	2				
7	C8	2-40026	10uf, 50V, Alum. Rad.			1				
8	C10	2-30011	4.7uf, 35V, Tant.			1				
9										
10	D1	3-20024	Pair, Low Leadage Diodes		DPAD10	1				
11	D2	3-20000	Diode, Signal		1N4148	1				
12										
13	IC1	3-30328	Op-Amp JFET	Burr-Brown	OPA103AM	1				
14	IC2 and 4	3-30336	Chopper Amp, Low Noise	Intersil	ICL7652CPD	2				
15	IC3	3-30031	Quad-Op Amp		LM324N	1				
16	IC5	3-30168	Reg., +5V, 0.1A, T092		LM78L05ACL	1				
17	IC6	3-30036	Reg.+15V, 0.5A, T0202		78M15CP	1				
18	IC7	3-30064	Reference, 2.5V, 1%	Motorola	MC1403	1				
19	IC8	3-30189	Novram, 256x4	Xicor	XC2212	1				
20										
21										
22										
23										

NOTES: Sheet 3 is the assembly drawing



PARTS LIST

OPTION EXR 10

MODEL

2720

DWG NO
2720-608

REV
A

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
24		5-10488	Shorting plug, .1sp.Gold	Molex	15-29-1024	3				
25										
26	R1	1-10008	10K ohm, 1%	81349	RN60C1002F	1				
27	R2	1-10016	8.45K ohm, 1%	81349	RN60C8451F	1				
28	R3	1-10061	4.99K ohm, 1%	81349	RN60C4991F	1				
29	R4	1-10006	100K ohm, 1%	81349	RN60C1003F	1				
30	R5	1-10277	2.37K ohm, 1%	81349	RN60C2371F	1				
31	R6	1-10278	2.05K ohm, 1%	81349	RN60C2051F	1				
32	R7	1-10017	9.09K ohm, 1%	81349	RN60C9091F	1				
33	R8	1-30023	7 x 10K ohm set	Vishay	2720-024	1				
34	R9	1-01061	10K ohm, 5%, 1/4W	81349	RC07GF103J	1				
35	R10	1-01021	100 ohm, 5%, 1/4W	81349	RC07GF101J	1				
36	R11	1-01073	47K ohm, 5%, 1/4W	81349	RC07GF473J	1				
37	R12, R13	1-01081	100K ohm, 5%, 1/4W	81349	RC07GF104J	2				
38										
39	RLA	5-03083	Relay, 2A +2B, 5V	Aromat	S2EB-5V	1				
40										
41	RV1	1-50034	500 ohm, End Adjust	BEckman	89PR500ohm	1				
42	TR1	3-10000	N-Channel, JFET		U1899E	1				
43	TR2	3-10013	NPN Transistor (T092)		2N4401	1				
44	TP1, TP2	5-10290	Test Hook, PCB	Vector	K32-2	2				
45	PL1	5-10313	Wafer, 10Way, Gold, .5611	ong Molex	22-10-2101	1				
46	SK1	5-10310	Socket Rt. Angle 10 Way	Molex	22-16-2101	4				

NOTES:



PARTS LIST

OUTPUT SYSTEM

MODEL

2720

DWG NO

2720-609

REV

C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2		4-30124	Output System P. C. B.		2720-709	1				
3	C6	2-60009	0.022uf, 400V, Mylar		--	1				
4	C202	2-10013	1 uf, 50V, Ceramic Disc							
5	C24,25,101,102	2-90006	1 uf, 50V, Polycarbonate			7				
	1, 9, 10									
6	C2, 3, 7, 8,117	2-40026	10 uf, 50V, Alum. Radial		--	5				
7	C4, 5, 23	2-60002	0.1 uf, 100V, Mylar			9				
	112, 113, 201									
	29, 111, 118									
8	C11, 119	2-40028	47 uf, 35V, Alum. Radial		--	2				
9	C103-110, 28	2-60004	0.01 uf, 630V, Mylar			9				
10	C114, 115	2-90004	0.01 uf, 50V, Polycarbonate			2				
11	C27	2-80003	0.22 uf, 20%, 1500V		EP37478	1				
12	C12-16	2-60010	0.47 uf, 250V, Mylar	Illinois	474MSR250K	5				
13	D1	3-20024	Pair Low-leakage diodes		DPAD10	1				
14	D3, 4, 123	3-20034	Diode, Zener, 13V, 10%		1N5243	3				
15	D5-8	3-20002	Diode, Rectifier, 1A		1N4001-4007	4				
16	D9, 10, 303, 304	5-01011	LED, red	H. P.	5082-4655	4				
17	D105-114 116-118, 120-122	3-20000	Diode, Signal		1N4148	16				
18	D119	3-20035	Diode, Zener, 8.2V, 10%, 1W		1N4738	1				
19	D302	3-20003	Diode, Zener, 10V, 10%		1N5240	1				
20	D306, 307	3-20007	Zener, reference, 6.3V		1N827	2				

NOTES:

Sheets 7 and 8 are assembly drawings

SHT 1 OF 8



PARTS LIST

OUTPUT SYSTEM

MODEL

2720

DWG NO

2720-609

REV

C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
21	D115	3-20041	Zener Reference, 6.3V		1N825	1				
22	C26	2-20011	1000pf,500V, Mica		CM06FD102J03	1				
23	IC103	3-30322	Dual Op-Amp , JFET		LF353N	1				
24										
25	IC5	3-30168	Regulator, +5V, 100mA		LM78L05ACL	1				
26	IC6	3-30169	Regulator, -5V, 100mA		LM79L05CLP	1				
27	IC4, 9	3-30336	Chopper Amp, Low Noise		ICL7652CPD or IJD	2				
28										
29	IC1, 7, 8, 10, 11 302, 305	3-30090	Op-Amp, BIFET		LF356N	7				
31	IC101	3-30133	Quad Comparator		LM339N	1				
32	IC106, 107	3-30364	V-F Converter		AD537JH or D	2				
33	IC104	3-30201	Dual Opto-Isolator		ILCT-6 or MCT6	1				
34	IC105	3-30375	Dual med-speed Opto-isolator		HCPL2530	1				
35	IC201-204	3-30189	Novram 256x4		XC2212	4				
36	IC209	3-30155	1 of 8 decoder		74LS138N	1				
37	IC303, 307	3-30333	Temperature Sensor		AD590JH	2				
38	IC2	3-30085	Regulator +8V .5A		LM78M08CP	1				
39	IC3	3-30086	Regulator -8V .5A		LM79M08CP	1				
40	XIC 201-204	5-10293	Socket, DIL, 18 pin	Burndy	DILB18P-108	4				
41										
42										
43										

NOTES:

SHT 2 OF 8



PARTS LIST

OUTPUT SYSTEM

MODEL
2720

DWG NO
2720-609

REV
C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
44										
45	R201,202,203	1-01081	100K, 5%, 1/4W		RC07GF104J	3				
46	R6,7,35,36	1-01061	10K ohm, 5%, 1/4 W		RC07GF103J	7				
	113, 116, 118									
47	R2	1-30026	10:1 Divider Network	Vishay	2720-021	11				
48	R125, 303	1-01041	1K ohm, 5%, 1/4W		RC07GF102J	2				
49	R101, 104	1-10003	59.0K ohm, 1%		RN60C5902F	2				
50	R34	1-01021	100 ohm, 5%, 1/4W		RC07GF101J	1				
51	R14, 16	1-30028	100/10:1 Divider set	Vishay	2720-020	1				
52	R18-27,9,10,11	1-01108	3M ohm, 5%, 1/4W		RC07GF305J	13				
53										
54										
55	R33	1-30000	1 ohm, 3 watt, 5%	Mills	MRP-2A-A IR 5%	1				
56	R102, 103	1-10001	1.00K, 1%		RN60C1001F	2				
57	R105	1-10222	28K ohm, 1%	81349	RN60C2802F	1				
58	R106, 108	1-10223	12.4K ohm, 1%	81349	RN60C1242F	2				
59	R107	1-10224	24.3K ohm, 1%		RN60C2432F	1				
60	R109-112, 117, 312	1-01046	2.2K ohm, 5%, 1/4W		RC07GF222J	9				
	301, 126, 314									
61	R325	1-01033	470 ohm, 5%, 1/4W		RC07GF471F	1				
62	R39,31	1-01080	91K, 5%, 1/4W		RC07GF913J	2				

NOTES:

SHT 3 OF 8



PARTS LIST

OUTPUT SYSTEM

MODEL
2720

DWG NO
2720-609

REV
C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
63										
64	R121, 122	1-01007	10 ohm, 5%, 1/4W	81349	RC07GF100J	2				
65	R304	1-01025	200 ohm, 5% 1/4W		RC07GF201J	1				
66	R119, 120, 123 124, 1, 13, 37	1-10008	10K ohm, 1%	81349	RN60C1002F	7				
67	R307, 308	1-30021	22 ohm, 5%, 2W		RC42GF220J	2				
68	R310	1-01119	10M ohm, 5%, 1/4W	81349	RC07GF106J	1				
69										
70	R311, 313	1-01064	18K ohm, 5%, 1/4W	81349	RC07GF183J	2				
71										
72										
73	RLA	5-03072	Relay, 2PDT, 5V, 1500V	Omron	G2V-2PUSDC5	1				
74	RLB,C,K,RLGA	5-03083	Relay, 2A+2B, 5V	Aromat	S2EB-5V	4				
75	RLD, E, H, L	5-03082	Relay, Latching 2A+2B,5V	Aromat	S2EBT-L2-5V	4				
76	RLG, M	5-03043	Relay, Reed, 1KV, Lo-Thermal	12V COTO	Cr3221-12-810 or 812	2				
77										
78										
79										
80	RV1	1-50035	50K ohm, end-adjust	Beckman	89PR-50K	1				
81	RV301,302	1-50042	5K ohm, end-adjust	Beckman	89PR-5K	2				
82										
83										
84										

NOTES:



PARTS LIST

OUTPUT SYSTEM

MODEL
2720

DWG NO
2720-609

REV
C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
85										
86										
87	TP1-6	5-10335	Wafer 6 pin, rt. angle	Molex	22-05-2061	1				
88		5-10488	Shorting Plug, .1 spacing	Molex	15-29-1024	1				
89	TR102, 104, 106 108	3-10026	N-Channel VMOS	--	VN10KM	4				
90	TR117, 301	3-10010	PNP Transistor		2N4402	2				
91	TR101, 103, 105 107, 109, 304 110, 111, 113, 114 115, 118, 119, 120	3-10013	NPN Transistor		2N4401	14				
93	TR302, 303	3-10024	NPN Transistor		TIP29A	2				
94										
95	SK1	5-10310	10 way rt. angle socket	Molex	22-16-2101	9				
96		5-10435	Connector, Housing, 3 Way, 0.1"	Molex	22-01-2031	2				
97		5-10340	Terminal, Crimp, Female	Molex	08-05-0114	6				
98										
99										
100										
101		4-10438	Binding Post-Bracket	53504	2720-202	2				
102		5-10191	Binding Post, Lt. Red	Pomona	3750-2	7				
103		5-10190	Binding post, Lt. Blk.	Pomona	3750-0	7				
104										
105										
106										

NOTES:



PARTS LIST

OUTPUT SYSTEM

MODEL

2720

DWG NO

2720-609

REV

C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
107										
108	FB1-4	4-20043	Ferrite Beads	Amidon	FB-43-2401	4				
109		5-10019	Cable tie 4" x 1/8"	Panduit	WRN-4	16				
110		5-10441	Tie Wrap, block, small	Panduit	ABMM-AT	4				
111		5-10433	Insulator, to-220	Berquist	7403-09FR-51	2				
112		5-10434	Washer, shoulder, to-220	Therm Alloy	7721-7PPS	2				
113		4-10464	Heatshield		2720-217	1				
114			20AWG Teflon wire		20AWG, Red, Tef	11	ft			
115			20AWG Teflon Wire		20AWG, Blk., Tef.	11	ft			
116			Wire, Red, 22AWG		22AWG, red	6"				
117			Wire, Brn, 22AWG		22AWG, Brn.	6"				
118			Wire, ORN, 22AWG		22AWG, Orn	6"				
119			Screw, Phil, Pan, SS		6-32 x 1/4"	4				
120										
121			Screw, Phil pan, SS		4-40 x 1/4"	6				
122			Washer, Internal Star		#6	4				
123			Washer, split		#4	2				
124			Washer, Internal Star		#4	4				
125			Wire Buss 14 AWG		14AWG Buss	10"				
126			Sleeving Clear		14AWG	10"				
127			Sleeving Clear		22AWG	4"				
128										
129										

NOTES:



PARTS LIST

OPTION EXR 7

MODEL 2720

DWG NO 2720-610

REV A

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2										
3	C1, C2	2-10013	1uf, 50V, Ceramic disc		8131-050-651-105M	2				
4	C3, C4	2-90006	1uf, 50V, Polycarb.			2				
5										
6	C7, C9	2-10014	0.1uf, 50V, Ceramic disc		8121-050-651-104M	2				
7	C8	2-40026	10uf, 50V, Alum Rad.			1				
8	C10	2-30011	4.7uf, 35V, Tant.			1				
9										
10	D1	3-20024	Pair, Low Leakage Diodes		DPAD10	1				
11	D2	3-20000	Diode, Signal		1N4148	1				
12										
13	IC1	3-30328	Op-Amp, JFET	Burr-Brown	OPA103AM	1				
14	IC2	3-30336	Chopper Amp, Low Noise	Intersil	ICL7652CPD	1				
15	IC3	3-30031	Quad-Op Amp		LM324N	1				
16	IC5	3-30168	Reg., +5V, 0.1A, T092		LM78L05ACLP	1				
17	IC6	3-30036	REG, +15V, 0.5A, T0202		78M15CP	1				
18	IC7	3-30064	Reference, 2.5V, 1%	Motorola	MC1403	1				
19	IC8	3-30189	Novram, 256x4	Xicor	XC2212	1				
20										
21										
22										
23										

NOTES: Sheet 3 is the assembly drawing



PARTS LIST

OPTION EXR 7

MODEL

2720

DWG NO

2720-610

REV

A

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
24		5-10488	Shorting plug, .1 sp gold	Molex	15-29-1024	3				
25										
26	R1	1-10008	10K ohm, 1%	81349	RN60C1002F	1				
27	R2	1-10016	8.45 K ohm, 1%	81349	RN60C8451F	1				
28	R3	1-10061	4.99K ohm, 1%	81349	RN60C4991F	1				
29	R4	1-10006	100K ohm, 1%	81349	RN60C1003F	1				
30	R5	1-10277	2.37K ohm, 1%	81349	RN60C2371F	1				
31	R6	1-10278	2.05K ohm, 1%	81349	RN60C2051F	1				
82	R7	1-10017	9.09K ohm, 1%	81349	RN60C9091F	1				
83										
34	R9	1-01061	10K ohm, 5%, 1/4W	81349	RC07GF103J	1				
35	R10	1-01021	100 ohm, 5%, 1/4W	81349	RC07GF101J	1				
36	R11	1-01073	47K ohm, 5%, 1/4W	81349	RC07GF473J	1				
37	R12, R13	1-01081	100 K ohm, 5%, 1/4W	81349	RC07GF104J	1				
38										
39	RLA	5-03083	Relay, 2A+2B,5V	Aromat	S2EB-5V	1				
40										
41	RV1	1-50034	500 ohm, end adjust	Beckman	89PR5000HM	1				
42	TR1	3-10000	N-Channel, JFET		U1899E	1				
43	TR2	3-10013	NPN Transistor (T092)		2N4401	1				
44	TP1, TP2	5-10290	Test Hook, PCB	Vector	K32-2	2				
45	PL1	5-10313	Wafer, 10way, gold.56 long	Molex	22-10-2101	1				
46	SK1	5-10310	Socket Rt.Angle, 10 way	Molex	22-16-2101	4				

NOTES:



PARTS LIST

OUTPUT AMPLIFIER

MODEL

2720

DWG NO
2720-611

REV
E

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2										
3		4-30119	Output Amplifier, PCB		2720-711	1				
4										
5										
6										
7	D107	3-20005	Diode, Zener, 6.2V, 10%		1N5234	1				
8	D108	3-20038	Diode, Zener, 6.2V, 10%, 1W		1N4735	1				
9	D209	3-20017	Diode Zener, 9.1V, 10%		1N5239	1				
10	D211	3-20030	Diode, Zener, 9.1V, 10% 5W		1N5346A	1				
11										
12	R103	1-30036	56K ohm, 5%, 2W		RC42GF563J	1				
13	R106, 107, 229-233	1-01041	1K ohm, 5%, 1/4W		RC07GF102J	7				
14	R112, 113	1-10010	82.5 ohm, 1%		RN60C82R5F	2				
15	R114, 115	1-01049	3K ohm, 5%, 1/4W		RC07GF302J	2				
16	R213-217	1-30033	100K ohm, 2W, 5%		RC42GF104J	5				
17	R235	1-10119	237 ohm, 1%		RN60C2370F	1				
18										
19	SK1	5-10310	Socket, Rt. Angle, 10way, gold Molex		22-16-2101	3				
20										
21										
22										
23										

NOTES: Sheet 1 is assembly drawing



PARTS LIST

OUTPUT AMP DRIVER

MODEL

2720

DWG NO

2720-612

REV

E

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2		4-30118	Output Amp Driver PCB		2720-712	1				
3	C102	2-60000	.0047uf 100V Mylar		--	1				
4	C206-210	2-20011	1000pf, 500V, MICA		CM06FD102J03	5				
5	C103	2-20002	50pf, 500V, MICA		CM05ED500J03	1				
6	C109	3-20005	Diode, Zener, 6.2V, 10%		1N5234	1				
7	D111-114	5-01011	LED, Red, Panel Mount	H. P.	5082-4655	4				
8	D210	3-20017	Diode, Zener, 9.1V, 10%		1N5239	1				
9										
10	IC101, 201	3-30359	Opto-Isolator, 75-150%CTR	Litronix	IL201	2				
11										
12	R104	1-30036	56 K Ohm, 5%, 2W		RC2GF563J	1				
13	R110,111	1-10010	82.5, 1%	81349	RN60C82R5F	2				
14	R105, 228	1-01021	100 ohm, 5%, 1/4 W	81349	RC07GF101J	2				
15	R116	1-01031	390 ohm 5% 1/4W	81349	RC07GF391J	1				
16	R210	1-01037	680 ohm, 5%, 1/4W	81349	RC07GF681J	1				
17	R218-222	1-30033	100K ohm, 2W, 5%	81349	RC42GF104J	5				
18	R223-227	1-01041	1K ohm, 5%, 1/4W	81349	RC07GF102J	12				
	236-240, 108,109									
19	R234	1-01045	2K ohm, 5%, 1/4W	81349	RC07GF202J	1				
20	R241	1-10119	237 ohm, 1%	81349	RN60C2370F	1				
21										
22										

NOTES: Sheet 1 is the assembly drawing

SHT 2 OF 3



PARTS LIST

HIGH VOLTAGE POWER SUPPLY

MODEL

2720

DWG NO

2720-613

REV

C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2		4-30122	High Voltage Power Sup. PCB		2720-713	1				
3	C9	2-90006	1 uf, 50V, Polycarb.			1				
4	C1	2-80004	0.02uf, 1600V, 10%	Sprague	16PS-S20	1				
5										
6	C3, 4	2-40029	100uf, 25V, Alum Radial			2				
7	C5, 6	2-40026	10uf., 50V, Alum Radial			2				
8	C7	2-20011	1000pf, 500V, MICA		CM06F0102J03	1				
9	C201-204	2-40009	47uf, 450V, Aluminum	Illinois	476TTA450	4				
10	C211, 212	2-80003	.22uf, 1500V, 20% MYLAR	Electron	EP37478	2				
11	D1, D2	3-20025	Diode, Zener, 4.7V, 10%, 1W		1N4732	2				
12	D3	3-20027	Bridge 1A, 100V		3N247	1				
13	D8, 5, 6, 7	3-20000	Diode, Signal		1N4148	4				
14	D201-212, 401-406	3-20015	Diode, Rectifier, 1A		1N40007	18				
15	C8	2-20001	1800pf, 500V, MICA		CM06FD182J03	1				
16	IC1, 2, 3	3-30170	Low noise op amp		Op-07DP	3				
17	IC4, 5	3-30348	AC Opto-Isolator		IL-250	2				
18	IC6	3-30171	+18V Regulator, 1.5A, to 220		MC7818CT	1				
19	IC7	3-30172	-18V Regulator 1.5A to 220		MC7918CT	1				
20	C401-406	2-40020	100uf, 250V, Alum	Illinois	107TTA250	6				
21	SG401, 402	3-20022	spark Gap, 350V	C.P. Clark	CG2-350L	2				
22	FS1, FS2	5-04000	Fuse .1A Slo-Blo	Little Fuse	313-.100	2				
23	FX1, FX2	5-10269	Fuse Clip, PCB Mtg.	Zierrick	926, 927 or 798	4				

NOTES: Sheet 1 is assembly drawing

SHT 2 OF 4



PARTS LIST

HIGH VOLTAGE
POWER SUPPLY

MODEL

2720

DWG NO

2720-613

REV

C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
24	R23	1-01007	Res., 10 ohm, 5% 1/4W		RC07GF100J	1				
25	R1	1-30020	4M ohm, 0.1%, 5PPM	Caddock	TF050N-4M-5PPM-.1%	1				
26	R2, 5	1-10212	20.1K ohm, 1%, 10PPM	PRP	18W 20.1K-1%-10PPM	2				
27										
28	R4	1-10213	381.9K ohm, 1%, 10PPM	PRP	18W-38.9K-1%-10PPM	1				
29	R6, 13, 14	1-01061	10K ohm, 5%, 1/4W		RC07GF103J	3				
30	R7	1-10137	1.82K ohm 1%	81349	RN60C1821F	1				
31	R8	1-10143	453ohm 1%	81349	RN60C4530F	1				
32										
33	R15, 16	1-01100	1M ohm, 5%, 1/4W	81349	RC07GF105J	2				
34	R201-204, 209, 211	1-30011	1K ohm, 10W (Axial)	Mills	MRP-10A	7				
35	R205-208	2-30030	220K ohm, 1W, 5%		RC32GF224J	4				
36	R9, 10	1-10008	10.0K ohm, 1%	81349	RN60C1002F	2				
37	R401, R402	1-30019	100K ohm, 1W, 5%	81349	RC32GF104J	2				
38	RLA, C, D, G	5-03072	Relay, 2PDT, 5V, 1500V	Omron	G2V-2PUSDC5	4				
39	RLB, E, F	5-03012	Relay, Reep, 5V, Coil, DIL	Sigma	191TE1A1-5S	3				
40	R3	1-01084	180K ohm, 5%, 1/4W		RC07G184J	1				
41	PL1	5-10300	Wafer, 10 pin, .156	Molex	09-67-1103	1				
42	SK1	5-10310	Socket, Rt. Angle, 10way, gold	Molex	22-16-2101	5				
43										
44										
45		5-10449	Cable tie, 14" x .15	Panduit	PLT 41-M	2				
46										

NOTES:

SHT 3 OF 4



PARTS LIST

OPTION "BAT" P. C. B.
ASSEMBLY

MODEL
2720

DWG NO
2720-615

REV
C

#	REF DES	VALHALLA PART NO	DESCRIPTION	CODE IDENT	MFG PART NO	QTY.				REMARKS
						I	N	I	N	
1										
2		4-30133	Option "BAT" PCB	Valhalla	2720-715	1				
3										
4	PL1	5-10466	Connector, 15 pin, D, PC MNT, Male	Cannon	DA15PU	1				
5		5-10467	Spacer, 1/4 dia, 3/16Lg#4	Smith	9200	2				
6	RLA	5-03012	Relay, Reed, 5V	Sigma	191TE1A1 -5S	1				
7	D1	3-20034	Diode, Zener, 23V, 10%		1N5243	1				
8	D2, 3, 4	3-20002	Diode, Rectifier, 1A		1N4001	3				
9	TR1, 2	3-10013	NPN Transistor		2N4401	2				
10	R1	1-01061	10K ohm, 5%, 1/4W		RC07GF103J	1				
11	R2	1-01071	39K ohm, 5%, 1/4W		RC07GF393J	1				
12	R3	1-01012	27 ohm, 5%, 1/4W		RC07GF270J	1				
13										
14										
15			Screw, Phil, pan SS		4-40 x 5/16	2				
16			Washer Internal, S.		#4	2				
17			Nut Radio Hex		4-40	2				
18										
19										
20										
21										
22										
23										

NOTES:

SHT 2 OF 2

Federal Supply Codes for Manufacturers

00656	Aerovox Corp. New Bedford, Massachusetts	04713	Motorola Inc. Phoenix, Arizona	08261	Spectra Strip Corp. Garden Grove, California	12697	Charostat Mfg. Co. Dover, New Hampshire
00686	Film Capacitors, Inc. Passaic, New Jersey	04946	Standard Wire & Cable Los Angeles, California	08530	Relliance Mica Corp. Brooklyn, New York	12969	Unitrode Corp. Watertown, Massachusetts
00779	AMP Inc. Harrisburg, Pennsylvania	05276	Pomona Electronics Co., Inc. Pomona, California	08806	General Electric Co. Cleveland, Ohio	13103	Thermalloy Co., Inc. Dallas, Texas
00853	Sargamo Electric Company Pickens, South Carolina	05277	Westinghouse Electric Corp. Youngwood, Pennsylvania	09026	Batcock Electronics Corp. Costa Mesa, California	13327	Sollitron Devices Inc. Tappan, New York
01121	Allen-Bradley Co. Milwaukee, Wisconsin	05397	Kemet Union Carbide Corp. New York, New York	09214	G. E. Co. Semi-Conductor Auburn, New York	13454	Texas Crystals River Grove, Illinois
01255	Litton Industries, Inc. Beverly Hills, California	05574	Viking Industries Chatsworth, California	09353	C and K Components Watertown, Massachusetts	13511	Amphenol Cadre Div. Los Gatos, California
01281	TRW Electronic Comp. Semiconductor Operations Lawndale, California	05820	Wakefield Engineering Inc. Wakefield, Massachusetts	09922	Burndy Corp. Norwalk, Connecticut	13606	Use 56289 Sprague Electric Co. Concord, New Hampshire
01295	Texas Instruments, Inc. Dallas, Texas	06001	General Electric Co. Columbia, South Carolina	09969	Dale Electronics Inc. Yankton, S. Dakota	14099	Semtech Corp. Newbury Park, California
01686	RCL Electronics Inc. Manchester, New Hampshire	06383	Panduit Corp. Tinley Park, Illinois	11236	CTS of Berne Berne, Indiana	14655	Corneil-Dudlier Electronics Newark, New Jersey
02114	Ferroxcube Corp. Saugerties, New York	06473	Bunker Ramo Corp. Chatsworth, California	11403	Best Products Co. Chicago, Illinois	14752	Electro Cube Inc. San Gabriel, California
02131	General Instrument Corp. Westwood, Maine	06555	Beebe Electrical Instrument Co. Penacook, New Hampshire	11503	Keystone Columbia Inc. Warren, Michigan	14936	General Instrument Corp. Hicksville, New York
02799	Aero Capacitors, Inc. Chatsworth, California	06743	Clevite Corp. Cleveland, Ohio	11532	Teledyne Relays Hawthorne, California	15801	Fernal Electronics Inc. Frammingham, Massachusetts
03508	General Electric Co. Syracuse, New York	07088	Keivin Electric Company Van Nuys, California	11711	General Instrument Corp. Hicksville, New York	15818	Teledyne Semiconductors Mountain View, California
03797	Genisco Technology Corp. Compton, California	07256	Silicon Transistor Corp. Chelmsford, Massachusetts	12014	Chicago River & Machine Co. Bellwood, Illinois	15849	Useco Inc. Van Nuys, California
03877	Transistron Electronic Corp. Wakefield, Massachusetts	07263	Fairchild Semiconductor Mountain View, California	12060	Diodes, Inc. Chatsworth, California	15898	International Business Machines Corp. Essex Junction, Vermont
03911	Chalfrex Corp. Mt. Vernon, New York	07344	Bircher Co., Inc. Rochester, New York	12136	Philadelphia Handle Co. Camden, New Jersey	16332	Replaced by 28478
04009	Arrow Hart Inc. Hartford, Connecticut	07597	Burndy Corp. Rochester, New York	12405	Hysol Corporation El Monte, California	16473	Cambridge Scientific Ind. Cambridge, Maryland
04217	Essex International Inc. Anaheim, California	07716	I R C Incorporated Burlington, Iowa	12406	Elpac, Incorporated Fullerton, California	16758	Delco Electronics Kokomo, Indiana
04222	AVX Corp. Myrtle Beach, Florida	07910	Teledyne Semiconductor Hawthorne, California	12615	U.S. Terminals Inc. Cincinnati, Ohio	17856	Siliconix, Inc. Santa Clara, California
04423	Telonic Industries Laguna Beach, California	08065	Accurate Rubber and Plastics Co. San Diego, California	12617	Hamlin Inc. Lake Mills, Wisconsin	18324	Signetics Corp. Sunnyvale, California

Federal Supply Codes for Manufacturers (cont.)

18612	Vishay Intertechnology Inc. Malvern, Pennsylvania	92539	Mura Corp. Great Neck, New York	63743	Ward Leonard Electric Co. Inc. Mount Vernon, New York	73899	JFD Electronics Co. Brooklyn, New York
18722	R C A Mountaintop, Pennsylvania	32897	Erie Technological Products, Inc. Carlisle, Pennsylvania	65092	Weston Instruments Inc. Newark, New Jersey	73949	Guardian Electric Mfg. Co. Chicago, Illinois
18927	GTE Sylvania Inc. Titusville, Pennsylvania	32997	Bourns Inc. Riverside, California	70563	Amperite Company Union City, New Jersey	74276	General Instrument Corp. Neptune, New Jersey
21604	Bucheye Stamping Co. Columbus, Ohio	33173	General Electric Co. Owensboro, Kentucky	70903	Belden Corp. Geneva, Illinois	74306	Piezo Crystal Co. Carlisle, Pennsylvania
21845	Soltron Devices Inc. Riveria Beach, Florida	34333	Silicon General Westminister, California	71279	Cambridge Thermionic Corp. Cambridge, Massachusetts	74970	Johnson E.F., Co. Waseca, Minnesota
22767	ITT Semiconductors Palo Alto, California	34335	Advanced Micro Devices Sunnyvale, California	71400	Busemann Mfg. Santi Louis, Missouri	75042	TRW Electronics Components IRC Fixed Resistors Philadelphia, Pennsylvania
23936	Pamrotor Div. Burlingham, California	34802	Electromotive Inc. Kenilworth, New Jersey	71450	CTS Corp. Elkhart, Indiana	75378	CTS Knights Inc. Sandwich, Illinois
24355	Analog Devices Inc. Norwood, Massachusetts	37942	P.R. Mallory & Co., Inc. Indianapolis, Indiana	71468	ITT Cannon Electric Inc. Santa Ana, California	75382	Kulka Electric Corp. Mount Vernon, New York
24655	General Radio Concord, Massachusetts	43543	Nytronics Inc. Geneva, New York	71482	Clare, C.P. & Co. Chicago, Illinois	75915	Littelfuse Inc. Des Plaines, Illinois
25088	Siemen Corp. Islen, New Jersey	44655	Omrite Mfg. Co. Skokie, Illinois	71590	Centrelab Electronics Milwaukee, Wisconsin	76055	Malory Controls Frankfort, Indiana
25403	Amperex Electronic Corp. Slatersville, Rhode Island	49671	FCA Corp. New York, New York	71707	Coto Coil Co. Inc. Providence, Rhode Island	76493	J.W. Miller Company Los Angeles, California
25684	Victoreen Instrument Co., Inc. Oak Lawn, Illinois	49956	Faytheon Company Lexington, Massachusetts	71744	Chicago Miniature Lamp Works Chicago, Illinois	76854	Oak Industries Inc. Crystal Lake, Illinois
27014	National Semiconductor Corp. Santa Clara, California	50088	Mostek Corp. Carrollton, Texas	71785	TRW Electronics Components Chicago, Illinois	77342	Potter & Brumfield Div. Princeton, Indiana
27555	IMB Electronic Products Santa Fe Springs, California	50579	Litronix Inc. Cupertino, California	72005	Wilber B. Driver Co. Newark, New Jersey	77638	General Instrument Corp. Rectifier Division Brooklyn, New York
27264	Molex Products Downers Grove, Illinois	51605	Scientific Components Inc. Linden, New Jersey	72259	Nytronics Inc. Pelham Manor, New Jersey	78488	Stackpole Carbon Co. Saint Marys, Pennsylvania
28213	Minnesota Mining & Mtg. Co. St. Paul, Minnesota	53021	Sengamo Electric Co. Springfield, Illinois	72619	Dialight Div. Brooklyn, New York	78553	Eaton Corp. Cleveland, Ohio
28480	Hewlett Packard Co. Palo Alto, California	53504	Valhalla Scientific, Inc. San Diego, California	72982	Erie Tech. Products Inc. Erie, Pennsylvania	80031	Electro-Midland Corp. Meppco Div. Norristown, New Jersey
29083	Monsanto Co., Inc. Santa Clara, California	54294	Cutter-Hammer Inc. Salma, North Carolina	73138	Bechman Instrument Inc. Helipot Division Fullerton, California	80294	Sprague Products North Adams, Massachusetts
29604	Stackpole Components Co. Raleigh, North Carolina	55026	Simpson Electric Co. Elgin, Illinois	73445	Amperex Electronic Corp. Hicksville, New York	81073	Grayhill, Inc. La Grange, Illinois
30323	Illinois Tool Works, Inc. Chicago, Illinois	56289	Sprague Electric Co. North Adams, Massachusetts	73734	Federal Screw Products, Inc. Chicago, Illinois		
30983	Electra/Midland San Diego, California	58474	Superior Electric Co. Bristol, Connecticut				

Federal Supply Codes for Manufacturers (cont.)

81095	Triad Transformer Corp. Venice, California	89730	G.E. Co. Newark, New Jersey	95348	Gordo's Corp. Bloomfield, New Jersey
81312	Winchester Electronics Div. of Litton Industries Inc. Oakville, Connecticut	90201	Mallory Capacitor Co. Indianapolis, Indiana	95712	Bendix Corp. Franklin, Indiana
81483	International Rectifier Corp. Los Angeles, California	56365	Square D Co. Chicago, Illinois	97913	Industrial Electronic Hardware Corp. New York, New York
81741	Chicago Lock Co. Chicago, Illinois	90303	Mallory Battery Co. Tarrytown, New York	97945	Penwalt Corp. SS White Industrial Products Div. Piscataway, New Jersey
82389	Switchcraft Inc. Chicago, Illinois	91094	Essex International Inc. Newmarket, New Hampshire	98278	Malco A. Microdot Co., Inc. Connector & Cable Div. Pasadena, California
82877	Rortron Inc. Woodstock, New York	91293	Johanson Mfg. Co. Bonton, New Jersey	98291	Sealectro Corp. Manaroneck, New York
82879	ITT Royal Electric Div. Pawtucket, Rhode Island	91506	Augat Inc. Attleboro, Massachusetts	98388	Royal Industries Products Div. San Diego, California
83003	Varo Inc. Garland, Texas	91637	Dale Electronics Inc. Columbus, Nebraska	98978	IERC Burbank, California
83298	Bendix Corp. Eatontown, New Jersey	91662	Elico Corp. Willow Grove, Pennsylvania	99120	Plastic Capacitors, Inc. Chicago, Illinois
83330	Herman H. Smith, Inc. Brooklyn, New York	71468	Gremar Mfg. Co., Inc. ITT Cannon/Gremar Santa Ana, California	99217	Bell Industries Elect Burbank, California
83594	Burroughs Corp. Plainfield, New Jersey	91802	Industrial Devices, Inc. Edgewater, New Jersey	99392	STM Oakland, California
83740	Union Carbide Corp. New York, New York	91833	Keystone Electronics Corp. New York, New York	99515	ITT Jennings Monrovia Plant Monrovia, California
84171	Arco Electronics Great Neck, New York	91929	Honeywell Inc. Micro Switch Div. Freeport, Illinois	99779	Use 29687 Bunker-Ramo Corp. Landsdowne, Pennsylvania
84411	TRW Electronic Components Ogallala, Nebraska	92194	Alpha Wire Corp. Elizabeth, New Jersey	99942	Centrelab Semiconductor El Monte, California
84613	Fuse Indicator Corp. Rockville, Maryland	93332	Sylvania Electric Products Woburn, Massachusetts		
84682	Essex International Inc. Peabody, Massachusetts	94988	Magner Electric Corp. Tung-Sol Div. Newark, New Jersey		
86684	Radio Corp. of America Harrison, New Jersey	95146	Alco Electronic Products Inc. Lawrence, Massachusetts		
88219	Gould Inc. Trenton, New Jersey	95275	Vitramon Inc. Bridgeport, Connecticut		
88245	Litton Systems Inc. Useco Div. Van Nuys, California	95303	RCA Corp. Receiving Tube Div. Cincinnati, Ohio		
88419	Cornell-Dubilier Electronic Div. Fuquay-Varian, North Carolina				

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