Errata

Title & Document Type: 11848A Phase Noise Interface Service Manual

Manual Part Number: 11848-90004

Revision Date: June 1990

HP References in this Manual

This manual may contain references to HP or Hewlett-Packard. Please note that Hewlett-Packard's former test and measurement, semiconductor products and chemical analysis businesses are now part of Agilent Technologies. We have made no changes to this manual copy. The HP XXXX referred to in this document is now the Agilent XXXX. For example, model number HP8648A is now model number Agilent 8648A.

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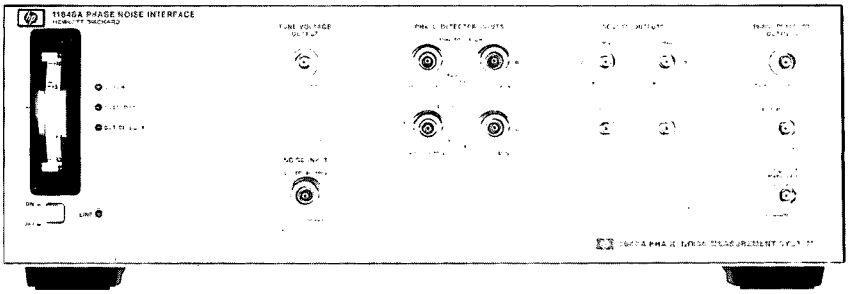
Agilent Technologies

SERVICE MANUAL

HP 11848A PHASE NOISE INTERFACE



June 1990
11848-90004

HEWLETT PACKARD

HP 11848A
PHASE NOISE INTERFACE
(Including Option 301)
Service Manual

SERIAL NUMBERS

This manual applies directly to instruments with serial numbers prefixed:

3138A and all *MAJOR* changes that apply to your instrument

rev.02NOV92

For additional important information about serial numbers, refer to "INSTRUMENTS COVERED BY THIS MANUAL" in Section 1.

Third Edition

EAST 24001 MISSION AVENUE, TAF C-34, SPOKANE, WASHINGTON, U.S.A. 99220

Service Manual HP Part 11848-90004

Microfiche Service Manual HP Part 11848-90011

Printed In U.S.A. : MAY 1990

HEWLETT PACKARD

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3						
2621A TO 3040A						
A3	11848-60103	3	1	ANALYZER INTERFACE ASSEMBLY (NEW)	28480	11848-60103
A3	11848-69103	1	1	ANALYZER INTERFACE ASSEMBLY (RESTORED)	28480	11848-69103
3138A and above						
A3	11848-60203	4	1	ANALYZER INTERFACE ASSEMBLY (NEW)	28480	11848-60203
A3C1	0160-5469	5	4	CAPACITOR-FXD 1UF 10% 50VDC	28480	0160-5469
A3C2	0160-5469	5		CAPACITOR-FXD 1UF 10% 50VDC	28480	0160-5469
A3C3	0160-4617	3	1	CAPACITOR-FXD 180PF +-5% 200VDC CER	28480	0160-4617
A3C4	0160-0128	3	3	CAPACITOR-FXD 2.2UF +-20% 50VDC CER	28480	0160-0128
A3C5	0160-4832	4	6	CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A3C6	0180-1746	5	28	CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C7				NOT ASSIGNED		
A3C8	0160-0128	3		CAPACITOR-FXD 2.2UF +-20% 50VDC CER	28480	0160-0128
A3C9	0160-0128	3		CAPACITOR-FXD 2.2UF +-20% 50VDC CER	28480	0160-0128
A3C10	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A3C11	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A3C12				NOT ASSIGNED		
A3C13				NOT ASSIGNED		
A3C14	0160-4822	2	9	CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4822
A3C15	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A3C16	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A3C17	0160-5568	5	3	CAPACITOR-FXD 4700PF +-5% 200VDC	28480	0160-5568
A3C18	0160-5568	5		CAPACITOR-FXD 4700PF +-5% 200VDC	28480	0160-5568
A3C19	0160-5568	5		CAPACITOR-FXD 4700PF +-5% 200VDC	28480	0160-5568
A3C20	0160-3324	7	17	CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C21	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C22	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C23	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C24	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C25	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C26	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C27	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C28	0160-5550	5	7	CAPACITOR-FXD .1UF +-5% 100VDC MET-POLYC	28480	0160-5550
A3C29	0160-5550	5		CAPACITOR-FXD .1UF +-5% 100VDC MET-POLYC	28480	0160-5550
A3C30	0160-5550	5		CAPACITOR-FXD .1UF +-5% 100VDC MET-POLYC	28480	0160-5550
A3C31	0160-5540	3	6	CAPACITOR-FXD .01UF +-5% 100VDC	84411	HEW-249
A3C32	0160-5540	3		CAPACITOR-FXD .01UF +-5% 100VDC	84411	HEW-249
A3C33	0160-5540	3		CAPACITOR-FXD .01UF +-5% 100VDC	84411	HEW-249
A3C34	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C35	0160-3563	8	1	CAPACITOR-FXD 10UF +-5% 50VDC MET-POLYC	28480	0160-3563
A3C36	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C37	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C38	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C39	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C40	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C41	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C42	0160-5550	5		CAPACITOR-FXD .1UF +-5% 100VDC MET-POLYC	28480	0160-5550
A3C43	0160-5550	5		CAPACITOR-FXD .1UF +-5% 100VDC MET-POLYC	28480	0160-5550
A3C44	0160-5550	5		CAPACITOR-FXD .1UF +-5% 100VDC MET-POLYC	28480	0160-5550
A3C45	0160-5540	3		CAPACITOR-FXD .01UF +-5% 100VDC	84411	HEW-249
A3C46	0160-5540	3		CAPACITOR-FXD .01UF +-5% 100VDC	84411	HEW-249
A3C47	0160-5540	3		CAPACITOR-FXD .01UF +-5% 100VDC	84411	HEW-249
A3C48	0160-4822	2		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4822
A3C49	0160-4822	2		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4822
A3C50	0160-4822	2		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4822

†Refer to Section 7 for update information. *Factory Selected Component (Refer to Section 5). Δ Errata part change.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3C51	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C53	0160-4787	8	3	CAPACITOR-FXD 22PF +-5% 100VDC CER 0+-30	28480	0160-4787
A3C54	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C55	0160-4822	2		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4822
A3C56	0160-4389	6	6	CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A3C57-200				NOT ASSIGNED		
A3C201	0180-0229	7		CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A3C202	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A3C203	0160-4801	7	8	CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801
A3C204	0160-4801	7		CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801
A3C205	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C206	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C207	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C208	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C209	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C210	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C211	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C212	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C213	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C214	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C215	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C216	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C217	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C218	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C219	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C220	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C221	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C222	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C223	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C224	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C225	0180-2207	5	2	CAPACITOR-FXD 100UF+-10% 10VDC TA	56289	150D107X9010R2
A3C226	0180-2667	1	1	CAPACITOR-FXD 150UF+-10% 20VDC TA	56289	152D157X9020S2
A3CR1	1901-0518	8	3	DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3CR2	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3CR3	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3CR4-7				NOT ASSIGNED		
A3CR8	1901-0418	7	4	DIODE-PWR RECT 400V 1.5A	28480	1901-0418
A3CR9	1901-0418	7		DIODE-PWR RECT 400V 1.5A	28480	1901-0418
A3CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3CR12	1901-0418	7		DIODE-PWR RECT 400V 1.5A	28480	1901-0418
A3CR13	1901-0418	7		DIODE-PWR RECT 400V 1.5A	28480	1901-0418
A3CR14	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3CR16-200				NOT ASSIGNED		
A3CR201	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3F1	2110-0757	1	9	FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A3F2	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A3F3	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A3F4	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062

†Refer to Table 7 for update information.

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3TP11	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP12	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP13	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP14	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP15	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP16	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP17	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP18	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP19	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP20	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP21	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP22	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP23	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP24	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP25	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP26	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP27	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP28	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP29	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP30	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP31	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP32	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP33	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP34	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP35	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP36	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP37	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP38	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP39	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP40	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP41	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP42	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP43	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP44	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP45	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP46	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP47	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP48-200				NOT ASSIGNED		
A3TP201	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP202	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP203	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP204	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP205	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP206	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP207	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3U1	1820-0270	7	1	IC WIDEBAND AMPL VID TO-100 PKG	07263	UA733HC
	1205-0095	0		HEAT SINK-SGL TO-5/TO-39-CS	30161	3225B
A3U2				NOT ASSIGNED		
A3U3				NOT ASSIGNED		
A3U4	1826-0065	0	2	IC COMPARATOR PRCN 8-DIP-P PKG	27014	LM311N
A3U5	1826-0065	0		IC COMPARATOR PRCN 8-DIP-P PKG	27014	LM311N
A3U6	1826-2005	2	11	IC OP AMP LOW-BIAS-H-IMPD 8-DIP-P PKG	27014	LF356N
A3U7	1826-1049	2	1	IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27GZ
A3U8	1826-0716	8	3	IC OP AMP LOW-NOISE DUAL 8-DIP-C PKG	18324	NE5532AFE
A3U9	1826-2005	2		IC OP AMP LOW-BIAS-H-IMPD 8-DIP-P PKG	27014	LF356N

†Refer to Section 7 for update information. *Factory Selected Component (Refer to Section 5). Δ Errata part change.

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3U10	1826-2005	2		IC OP AMP LOW-BIAS-H-IMPD 8-DIP-P PKG	27014	LF356N
A3U11	1826-2005	2		IC OP AMP LOW-BIAS-H-IMPD 8-DIP-P PKG	27014	LF356N
A3U12	1826-2005	2		IC OP AMP LOW-BIAS-H-IMPD 8-DIP-P PKG	27014	LF356N
A3U13	1826-2005	2		IC OP AMP LOW-BIAS-H-IMPD 8-DIP-P PKG	27014	LF356N
A3U14	1826-0783	9	7	IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A3U15	1820-1422	3	1	IC MV TTL LS MONOSTBL RETRIG	01295	SN74LS122N
A3U16	1826-1492	9	1	IC OP AMP PRCN 8-DIP-C PKG	06665	OP-16EZ
A3U17	1826-2005	2		IC OP AMP LOW-BIAS-H-IMPD 8-DIP-P PKG	27014	LF356N
A3U18	1826-2005	2		IC OP AMP LOW-BIAS-H-IMPD 8-DIP-P PKG	27014	LF356N
A3U19	1826-2005	2		IC OP AMP LOW-BIAS-H-IMPD 8-DIP-P PKG	27014	LF356N
A3U20	1826-2005	2		IC OP AMP LOW-BIAS-H-IMPD 8-DIP-P PKG	27014	LF356N
A3U21	1826-2005	2		IC OP AMP LOW-BIAS-H-IMPD 8-DIP-P PKG	27014	LF356N
A3U22	1826-1150	6	1	IC OP AMP INSTM DUAL 14-DIP-C PKG	06665	OP-227GY
A3U23	1826-0716	8		IC OP AMP LOW-NOISE DUAL 8-DIP-C PKG	18324	NE5532AFE
A3U24	1826-0606	5	14	IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U25	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U26	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U27	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U28	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U29	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U30	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U31	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U32	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U33	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U34-200				NOT ASSIGNED		
A3U201	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A3U202	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A3U203	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A3U204	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A3U205	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A3U206	1820-1281	2	3	IC DCDR TTL LS 2-TO-4-LINE DUAL	01295	SN74LS139AN
A3U207	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A3U208	1826-0188	8	3	D/A 8-BIT 16-CERDIP BPLR	04713	MC1408L-8
A3U209	1826-0188	8		D/A 8-BIT 16-CERDIP BPLR	04713	MC1408L-8
A3U210	1826-0785	1	2	IC OP AMP LOW-BIAS-H-IMPD DUAL 8-DIP-C	01295	TL072ACJG
A3U211	1820-1416	5		IC SCHMITT-TRIG TTL LS INV HEX 1-INP	01295	SN74LS14N
A3U212	1820-1281	2		IC DCDR TTL LS 2-TO-4-LINE DUAL	01295	SN74LS139AN
A3U213	1820-1416	5		IC SCHMITT-TRIG TTL LS INV HEX 1-INP	01295	SN74LS14N
A3U214	1820-1281	2		IC DCDR TTL LS 2-TO-4-LINE DUAL	01295	SN74LS139AN
A3U215	1820-1201	6		IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
2621A TO 2647A						
A3VR1				NOT ASSIGNED		
2649A AND ABOVE						
A3VR1	1902-0680	7	1	DIODE-ZNR 1N827 6.2V 5% DO-7 PD = .4W	24046	1N827
A3VR2	1902-0946	8	4	DIODE-ZNR 3.3V 5% DO-35 PD = .4W TC = -.039%	28480	1902-0946
A3VR3	1902-0946	8		DIODE-ZNR 3.3V 5% DO-35 PD = .4W TC = -.039%	28480	1902-0946
A3VR4	1902-0946	8		DIODE-ZNR 3.3V 5% DO-35 PD = .4W TC = -.039%	28480	1902-0946
A3VR5	1902-0946	8		DIODE-ZNR 3.3V 5% DO-35 PD = .4W TC = -.039%	28480	1902-0946

†Refer to Section 7 for update information. *Factory Selected Component (Refer to Section 5). Δ Errata part change.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4C213	0180-1794	3	2	CAPACITOR-FXD 22UF+-10% 35VDC TA	56289	150D226X9035R2
A4C214	0180-1794	3		CAPACITOR-FXD 22UF+-10% 35VDC TA	56289	150D226X9035R2
A4C215	0160-0168	1	3	CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A4C216	0160-0168	1		CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A4C217	0160-0168	1		CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A4C218	0160-4822	2		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4822
A4C219	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4C220	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4C221	0160-4805	1	1	CAPACITOR-FXD 47PF +-5% 100VDC CER 0+-30	28480	0160-4805
A4C222	0160-5348	9		CAPACITOR-FXD 51PF +-5% 100VDC CER 0+-30	28480	0160-5348
A4C223	0160-4787	8		CAPACITOR-FXD 22PF +-5% 100VDC CER 0+-30	28480	0160-4787
A4C224	0160-4801	7		CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801
A4C225	0160-4801	7		CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801
A4C226	0160-4787	8		CAPACITOR-FXD 22PF +-5% 100VDC CER 0+-30	28480	0160-4787
A4C227	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4C228	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4C229	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4C230Δ	0160-6616	6	1	CAPACITOR-FXD 6800PF +-10% 100VDC CER	28480	0160-6616
A4C231	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4CR1	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR2	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR3	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR4	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR5	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR6	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR7	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR8	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR9	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR10	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR11	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR12	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR13	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR14	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR15	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR16	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR17	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR18	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR19	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR20	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR21	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR22						
A4CR23						
A4CR24	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR25	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR26	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR27	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR28	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR29	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR30-200				NOT ASSIGNED		
A4CR201	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR202	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150

†Refer to Section 7 for update information. *Factory Selected Component (Refer to Section 5). Δ Errata part change.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4CR203	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR204	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR205				NOT ASSIGNED		
A4CR206				NOT ASSIGNED		
A4CR205	1902-0952	6	2	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A4CR206	1902-0952	6		DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A4CR207	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR208	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR209	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR210	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR211	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR212	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR213	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR214	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR215	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR216	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR217	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR218	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4E1	9170-0894	0	28	CORE-SHIELDING BEAD	28480	9170-0894
A4E2	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E3	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E4	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E5	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E6	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E7	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E8	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E9	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E10	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E11	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E12	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E13	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E14	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E15	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E16	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E17	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E18	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E19	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E20	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E21	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E22	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E23	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E24	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E25	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E26	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E27	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E28	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4F1	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A4F2	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A4F3	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A4F4	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A4F5				NOT ASSIGNED		
A4F6	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062

†Refer to Table 7 for update information.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4R96	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R97	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R98	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R99	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R100	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R101	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R102	0757-0461	2		RESISTOR 68.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-6812-F
A4R103	0757-0461	2		RESISTOR 68.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-6812-F
A4R104	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R105	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R106	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R107	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A4R108	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R109	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R110	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R111	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R112	0698-3447	4		RESISTOR 422 1% .125W F TC=0+-100	24546	CT4-1/8-T0-422R-F
A4R113-119				NOT ASSIGNED		
A4R120	0698-3150	6	4	RESISTOR 2.37K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2371-F
A4R121	0757-0279	0	1	RESISTOR 3.16K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3161-F
A4R122	0757-0338	2		RESISTOR 1K 1% .25W F TC=0+-100	24546	NA5-1/4-TO-1001-F
A4R123				NOT ASSIGNED		
A4R124	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R125	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2371-F
A4R126	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R127	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R128	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2371-F
A4R130	0757-0316	6		RESISTOR 42.2 1% .125W F TC=0+-100	28480	0757-0316
A4R131-200				NOT ASSIGNED		
A4R201Δ	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2870-F
A4R202	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-TO-101-F
A4R203	0698-4386	2	1	RESISTOR 59 1% .125W F TC=0+-100	24546	CT4-1/8-T0-59R0-F
A4R204	0698-4400	1	1	RESISTOR 93.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-93R1-F
A4R205	0698-3438	3	1	RESISTOR 147 1% .125W F TC=0+-100	24546	CT4-1/8-TO-147R-F
A4R206	0698-3486	1	1	RESISTOR 232 1% .125W F TC=0+-100	24546	CT4-1/8-T0-232R-F
A4R207	0757-0412	3	1	RESISTOR 365 1% .125W F TC=0+-100	24546	CT4-1/8-T0-365R-F
A4R208	0698-4458	9	1	RESISTOR 590 1% .125W F TC=0+-100	24546	CT4-1/8-T0-590R-F
A4R209	0698-4465	8	1	RESISTOR 931 1% .125W F TC=0+-100	24546	CT4-1/8-T0-931R-F
A4R210	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R211	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4640-F
A4R212	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R213	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-1961-F
A4R214	0757-0161	9	1	RESISTOR 604 1% .125W F TC=0+-100	24546	CT4-1/8-T0-604R-F
A4R215	0698-4413	6	1	RESISTOR 154 1% .125W F TC=0+-100	24546	CT4-1/8-T0-154R-F
A4R216	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	CT4-1/8-TO-196R-F
A4R217	0698-4421	6		RESISTOR 249 1% .125W F TC=0+-100	24546	CT4-1/8-T0-249R-F
A4R218	0698-4449	8	1	RESISTOR 309 1% .125W F TC=0+-100	24546	CT4-1/8-T0-309R-F
A4R219	0757-0413	4	1	RESISTOR 392 1% .125W F TC=0+-100	24546	CT4-1/8-T0-392R-F
A4R220	0698-3178	8	1	RESISTOR 487 1% .125W F TC=0+-100	24546	CT4-1/8-T0-487R-F
A4R221	0757-0418	9		RESISTOR 619 1% .125W F TC=0+-100	24546	CT4-1/8-T0-619R-F

†Refer to Section 7 for update information. *Factory Selected Component (Refer to Section 5). Δ Errata part change.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4R222	0757-0273	4	1	RESISTOR 3.01K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3011-F
A4R223	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A4R224	0698-3492	9	1	RESISTOR 2.67K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2671-F
A4R225	0698-4543	3	2	RESISTOR 487K 1% .125W F TC=0+-100	28480	0698-4543
A4R226	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R227	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R228	0698-3279	0	1	RESISTOR 4.99K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4991-F
A4R229	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2371-F
A4R230	0698-3223	4		RESISTOR 1.24K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1241-F
A4R231	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	CT4-1/8-T0-751-F
A4R232	0698-4421	6		RESISTOR 249 1% .125W F TC=0+-100	24546	CT4-1/8-T0-249R-F
A4R233	0698-4421	6		RESISTOR 249 1% .125W F TC=0+-100	24546	CT4-1/8-T0-249R-F
A4R234	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A4R235	0698-4421	6		RESISTOR 249 1% .125W F TC=0+-100	24546	CT4-1/8-T0-249R-F
A4R236	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A4R237	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A4R238	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A4R239	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R240	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A4R241	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R242				NOT ASSIGNED		
A4R243				NOT ASSIGNED		
A4R244	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R245	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A4R246	0698-3162	0		RESISTOR 46.4K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4642-F
A4R247	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	CT4-1/8-T0-215R-F
A4R248	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	CT4-1/8-T0-215R-F
A4R249	0698-3153	9	1	RESISTOR 3.83K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3831-F
A4R250	0698-3155	1	2	RESISTOR 4.64K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4641-F
A4R251	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-1961-F
A4R252	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R253	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A4R254	0698-3460	1		RESISTOR 422K 1% .125W F TC=0+-100	28480	0698-3460
A4R255	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A4R256	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A4R257	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R258	0757-0444	1		RESISTOR 12.1K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-1212-F
A4R259	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R260	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A4R261	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A4R262	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R263	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A4R264	0698-8958	2	1	RESISTOR 511K 1% .125W F TC=0+-100	28480	0698-8958
A4R265	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A4R266	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A4R267	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5112-F
A4R268	0698-3453	2	1	RESISTOR 196K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1963-F
A4R269	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	CT4-1/8-T0-215R-F
A4R270	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A4R271	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F

†Refer to Section 7 for update information. *Factory Selected Component (Refer to Section 5). Δ Errata part change.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4R272	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R273	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R274	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R275	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A4R276	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A4R277	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-1961-F
A4R278	2100-0554	5		RESISTOR-TRMR 500 10% C TOP-ADJ 1-TRN	28480	2100-0554
A4R279	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R280	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R281	0698-4543	3		RESISTOR 487K 1% .125W F TC=0+-100	28480	0698-4543
A4R282	0757-0467	8	1	RESISTOR 121K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1213-F
A4R283	0698-3582	8	1	RESISTOR 41.2K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4122-F
A4R284	0698-4480	7	1	RESISTOR 15.8K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1582-F
A4R285	0698-3497	4	1	RESISTOR 6.04K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-604R-F
A4R286	0698-4434	1	1	RESISTOR 2.32K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2321-F
A4R287	0698-3495	2	1	RESISTOR 866 1% .125W F TC=0+-100	24546	CT4-1/8-T0-866R-F
A4R288	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	CT4-1/8-T0-287R-F
A4R289	1810-0329	6	1	NETWORK-RES 10-SIP 7.5K OHM X 9	91637	CSC10A01-752G/MSP10A01-
A4R290	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A4R291	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	CT4-1/8-T0-215R-F
A4R292	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A4R293	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R294	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-1961-F
A4R295	0698-4475	0	1	RESISTOR 9.76K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-9761-F
A4R296	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4641-F
A4R297	0698-3162	0		RESISTOR 46.4K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4642-F
A4TP1Δ	1251-1998	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-1998
A4TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP10	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP11	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP12	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP13	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP14	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP15	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP16	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP17	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP18Δ	1251-1998	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-1998
A4TP19-200				NOT ASSIGNED		
A4TP201	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600

†Refer to Section 7 for update information. "Factory Selected Component (Refer to Section 5). Δ Errata part change.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4TP202	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP203	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP204	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP205	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP206	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP207	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP208	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP209	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP210	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP211	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP212	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP213	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP214	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP215	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP216	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP217-219				NOT ASSIGNED		
A4TP220	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4U1	0960-0640	0	1	U-WAVE MIXER 1.5 GHZ MAX	28480	0960-0640
A4U2				NOT ASSIGNED		
A4U3	1826-0412	1	3	IC COMPARATOR PRCN DUAL 8-DIP-P PKG	27014	LM393N
A4U4	1826-0783	9		IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A4U5	1826-0783	9		IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A4U6	1820-1201	6		IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A4U7	1858-0047	5	2	TRANSISTOR ARRAY 16-PIN PLSTC DIP	13606	ULN-2003A
A4U8	1858-0047	5		TRANSISTOR ARRAY 16-PIN PLSTC DIP	13606	ULN-2003A
A4U9	5081-2040	9	1	BURNIN 1826-0035	28480	5081-2040
A4U10-200				NOT ASSIGNED		
A4U201	1826-0188	8		D/A 8-BIT 16-CERDIP BPLR	04713	MC1408L-8
A4U202	1820-1547	3	3	IC MULTIPLXR 8-CHAN-ANLG 16-DIP-C PKG	04713	MC14051BCL
A4U203	1820-1547	3		IC MULTIPLXR 8-CHAN-ANLG 16-DIP-C PKG	04713	MC14051BCL
A4U204	1820-1547	3		IC MULTIPLXR 8-CHAN-ANLG 16-DIP-C PKG	04713	MC14051BCL
A4U205	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A4U206	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A4U207	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A4U208	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A4U209	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A4U210	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A4U211	1820-1112	8	1	IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A4U212	1826-0785	1		IC OP AMP LOW-BIAS-H-IMPD DUAL 8-DIP-C	01295	TL072ACJG
A4U213	1826-0783	9		IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A4U214	1826-0783	9		IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A4U215	1826-0753	3	2	IC OP AMP LOW-BIAS-H-IMPD QUAD 14-DIP-C	04713	MC34004BL
A4U216	1826-0759	9	1	IC COMPARATOR GP QUAD 14-DIP-C PKG	04713	LM339J
A4U217	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A4U218	1826-0753	3		IC OP AMP LOW-BIAS-H-IMPD QUAD 14-DIP-C	04713	MC34004BL
A4U219	1826-0716	8		IC OP AMP LOW-NOISE DUAL 8-DIP-C PKG	18324	NE5532AFE
A4VR1	1902-0952	6	2	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A4VR2	1902-0952	6		DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A4W1	35601-61622	6	1	SR 2.18 NO CONN	28480	35601-61622

†Refer to Table 7 for update information.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
MP34Δ	11848-00020	7	1	MIXER BRACKET (OPTION 201 ONLY)	28480	11848-00020
MP35	0515-0682	7	2	SCREW-MACH M3 X 0.5 18MM-LG PAN-HD (ATTACH MIXER (U6) TO BRACKET: OPTION 201 ONLY)	00000	ORDER BY DESCRIPTION
MP36	2190-0584	0	2	WASHER-LK HLCL 3.0 MM 3.1-MM-IC (OPTION 201 ONLY)	28480	2190-0584
MP37	0380-1739	0	2	STANDOFF-HEX 11-MM-LG M3.0 X 0.5 THD (UNDER MIXER BRACKET: OPTION 201 ONLY)	28480	0380-1739
MP38	0515-1246	1	19	SCREW-MACH M3 X 0.5 6MM-LG PAN-HD (ATTACH MIXER BRACKET TO DECK: OPTION 201 ONLY)	28480	0515-1246
MP39	1251-1249	3	1	ADAPTER-COAX RT-ANGLE F-SMA M-SMA (OPTION 201 ONLY)	28480	0515-1246
MP40	0515-1246	1	19	SCREW-MACH M3 X 0.5 6MM-LG PAN-HD (ATTACH A4 ASSEMBLY TO DECK)	28480	0515-1246
MP41	1400-0249	0	28	CABLE TIE .062-.625-DIA .091-WD NYL	28480	1400-0249
MP42	1400-0062	5	2	CLAMP-CABLE .375-DIA .38-WD SPR-STL	28480	1400-0062
MP43	1400-0611	0	6	CLAMP-FL-CA 1-WD	28480	1400-0611
MP44	11848-00004	7	2	REGULATOR BRACKET	28480	11848-00004
	1200-0819	6	10	SOCKET-XSTR 2-CONT TO-3 SLDR-EYE	28480	1200-0819
	08903-00024	2	1	STRIP CUSHION S	28480	08903-00024
MP45	0515-1246	1	19	SCREW-MACH M3 X 0.5 6MM-LG PAN-HD (ATTACH REGULATOR BRACKET TO SIDE RAIL)	28480	0515-1246
	0515-1402	1	30	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD (ATTACH REGULATOR BRACKET TO MAIN DECK)	00000	ORDER BY DESCRIPTION
MP46				NOT ASSIGNED		
MP47	1251-5036	6	1	CONNECTOR 2-PIN M UTILITY	28480	1251-5036
	1251-2097	3	2	CONTACT-CONN U/W-UTIL MALE CRP	28480	1251-2097
MP48	1251-5037	7	2	CONNECTOR 2-PIN F UTILITY	28480	1251-5037
	1251-2418	2	2	CONTACT-CONN U/W-UTIL FEM CRP	28480	1251-2418
MP49	1390-0365	8	2	FASTENER-SNAP IN PLUNGER	28480	1390-0365
MP50	1390-0366	9	2	FASTENER-SNAP IN GROMMET	28480	1390-0366
MP51	11848-00014	7	1	REFERENCE BRACE (INCLUDES ATTACHING HARDWARE)	28480	11848-00014
MP52	0890-0025	6	1	SPIRAL WRAP .188-2-DIA POLYETH (FOR CABLE HARNESS)	28480	11848-00014
MP53	0515-1382	6	6	SCREW-MACH M3.5 X 0.6 6MM-LG	28480	0515-1382
R1	0757-0408	7	4	RESISTOR 243 1% .125W F TC=0+-100	24546	CT4-1/8-T0-243R-F
R2	0698-3152	8	4	RESISTOR 3.48K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3481-F
R3	0757-0408	7		RESISTOR 243 1% .125W F TC=0+-100	24546	CT4-1/8-T0-243R-F
R4	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3481-F
S1	3101-2216	3		SWITCH-PD DPDT ALTNG 4A 250VAC	28480	3101-2216
T1	9100-4210	5	1	TRANSFORMER-POWER 100/120/220/240V	28480	9100-4210
	0362-0265	7		CONNECTOR SGL CONT SKT 1.14-MM-BSC-SZ	28480	0362-0265
	1400-0611	0	6	CLAMP-FL-CA 1-WD	28480	1400-0611
	3050-2007	1	4	WASHER-SHLDR NO. 6 .169-IN-ID .375-IN-OD	06540	2711-21562-PHF169-30
U1Δ	1826-1181	3	1	IC 340AK M1 P15V	28480	1826-1181
U2	1826-0169	5	1	IC V RGLTR TO-3	27014	LM320K-15
	0340-0580	3	3	INSULATOR-XSTR THRM-CNDCT	28480	0340-0580
U3	1820-0430	1	1	IC 309 V RGLTR TO-3	07263	LM309K
U4	1826-0523	5	1	IC 337 V RGLTR TO-3	27014	LM337K
	0340-0580	3	3	INSULATOR-XSTR THRM-CNDCT	28480	0340-0580
U5	1826-0423	4	1	IC V RGLTR TO-3	27014	LM317K
	0340-0580	3	3	INSULATOR-XSTR THRM-CNDCT	28480	0340-0580
U6	0955-0162	0	1	U-WAVE MIXER 26 GHZ MAX	28480	0955-0162
VR1	1902-1369	1	2	DIODE-ZNR 1N3316B 17V 5% PD=50W IR=5UA	28480	1902-1369
	0360-1700	3	2	TERMINAL-SLDR LUG LK-MTG FOR-#10-SCR	28480	0360-1700
VR2	1902-1369	1	2	DIODE-ZNR 1N3316B 17V 5% PD=50W IR=5UA	28480	1902-1369
	0360-0040	2	4	TERMINAL-SLDR LUG LK-MTG FOR-#1/4-SCR	28480	0360-0040
	0360-1089	1	2	TERMINAL-SLDR LUG PL-MTG FOR-#1/2-SCR	28480	0360-1089
VR3	1902-1217	8	1	DIODE-ZNR 6.2V 5% DO-4 PD=10W TC=+.035%	28480	1902-1217
	0360-0016	2	4	TERMINAL-SLDR LUG LK-MTG FOR-#4-SCR	28480	0360-0016

†Refer to Section 7 for update information. *Factory Selected Component (Refer to Section 5). Δ Errata part change.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W1	08660-60056	2	1	COAX CABLE ASSEMBLY F S,B-SMB A3J16 TO A4J204 (3)	28480	08660-60056
W2	11848-61006	7	1	COAX CABLE ASSEMBLY F SMB-SMB A3J1 TO A4J205 (1)	28480	11848-61006
W3	86601-60036	1	1	COAX CABLE ASSEMBLY F SMB-SMB A3J2 TO A4J201 (8)	28480	86601-60036
W4	86601-60069	0	1	COAX CABLE ASSEMBLY F SMB-SMB A3J3 TO A4J10 (89)	28480	86601-60069
W5	11848-61007	8	1	COAX CABLE ASSEMBLY F SMB-SMB A3J4 TO C1 (4)	28480	11848-61007
W6	11848-61008	9	1	COAX CABLE ASSEMBLY F BNC-SMB A3J5 TO REAR PANEL J17 (5)	28480	11848-61008
W7	11848-61009	0	1	COAX CABLE ASSEMBLY F BNC-SMB A3J6 TO REAR PANEL J14 (7)	28480	11848-61009
W8	11848-61010	3	1	COAX CABLE ASSEMBLY F BNC-SMB A3J7 TO FRONT PANEL J1 (80)	28480	11848-61010
	5040-7624	9	4	WASHER SHOULDER	28480	5040-7624
W9	11848-61011	4	1	COAX CABLE ASSEMBLY F BNC-SMB A3J8 TO FRONT PANEL J11 (87)	28480	11848-61011
W10	11848-61012	5	1	COAX CABLE ASSEMBLY F BNC-SMB A8J2 TO FRONT PANEL J7 (85)	28480	11848-61012
W11	11672-60004	1	1	COAX CABLE ASSEMBLY F SMB-SMB A3J10 TO A4J206 (2)	28480	11672-60004
W12	11848-61013	6	1	COAX CABLE ASSEMBLY F BNC-SMB A8J2 TO FRONT PANEL J8 (86)	28480	11848-61013
W13				NOT ASSIGNED		
W14	08954-60105	7	1	COAX CABLE ASSEMBLY F BNC-SMB A6J3 TO REAR PANEL J15 (6)	28480	08954-60105
W15	11848-61014	7	1	COAX CABLE ASSEMBLY F BNC-SMB A7J2 TO FRONT PANEL J9 (81)	28480	11848-61014
W16	11848-61015	8	1	COAX CABLE ASSEMBLY F BNC-SMB A8J2 TO FRONT PANEL J10 (83)	28480	11848-61015
W17	11848-61016	9	1	COAX CABLE ASSEMBLY F SMB-SMB A3J9 TO A7J3 (82)	28480	11848-61016
W18	11848-61017	0	1	COAX CABLE ASSEMBLY F BNC-SMB A4J9 TO REAR PANEL J18 (84)	28480	11848-61017
W19	11848-61018	1	1	COAX CABLE ASSEMBLY F BNC-SMB A4J2 TO FRONT PANEL J13 (96)	28480	11848-61018
W20	11848-61019	2	1	COAX CABLE ASSEMBLY F BNC-SMB A4J18 TO FRONT PANEL J12 (97)	28480	11848-61019

†Refer to Table 7 for update information.

CHANGES

2749A and Above	**On the A3 Component Locator:** • A3R208 - Change the reference designator of R208 to VR1. **On the A3 Schematic:** • A3R207, R208, R209 - Change the value of R207 to 1.33k. Change the value of R209 to 2.61k. Change the reference designator of R208 to VR1; connect the anode to ground. Connect the cathode to the line connecting R207 and pin 15 of U208.
3138A and Above	**On the A3 Schematic:** • Change the board number to 11848-60203.

Reserved for future changes.

All serial prefixes	**On the A3 schematic:** • **R36** - Change the value of R36 to 261K ohms. • **R41, R42, R51, R52** - Under 1 kHz LOW-PASS FILTER change R41 26.1K to R51 2.61K and change R42 4.22K to R52 422K. • **R41, R42, R56, R57** - Under 10 kHz LOW-PASS FILTER change R41 26.1K to R56 2.61K and change R42 4.22K to R57 422K. • **C34, R61** - Under AC/DC ADAPTIVE COUPLER locate U15 pin 13 and add R61 251K in series with the +5V supply. Add C34 15 uF between U15 pin 13 and R61. • **R76, R82** - Under 10 Hz HIGH-PASS FILTER connect R76 to R79. Under 100 Hz HIGH-PASS FILTER connect R82 to R85.
3138A and Above	**On the A3 Schematic:** • Change the board number to 11848-60203.

Reserved for future changes.

CHANGES

2717A and Above	**On the A3 Schematic:** • A3R110, R113 - Change the value of R110 to 2.5k. Change the value of R113 to 2.61k.
3138A and Above	**On the A3 Schematic:** • Change the board number to 11848-60203.

Reserved for future changes

CHANGES

All serial prefixes	**On the A4 schematic:** • C14 - In OVERLOAD DETECTOR, change the value of C14 to 18pF.
2830A and above	**On the schematic:** • L15 - In the upper right hand corner of the A4b schematic change the value of L15 to 100UH. • R35 - In the upper right hand corner of the A4b schematic change the value of R35 to 2.15K ohm.
Errata	**On the A4 Schematic:** • C230 - Under PROGRAMMABLE AMPLIFIERS, near TP201, change the value of C230 to 6800pF. • R201 - Under PROGRAMMABLE AMPLIFIERS, near TP201, change the value of R201 to 287Ω.

Reserved for future changes.

HP 11848A
PHASE NOISE INTERFACE
(Including Option 301)

Service Manual

SERIAL NUMBERS

This manual applies directly to instruments with serial numbers prefixed:

2621A and all *MAJOR* changes that apply to your instrument

rev.10JAN91

For additional important information about serial numbers, refer to "INSTRUMENTS COVERED BY THIS MANUAL" in Section 1.

Third Edition

EAST 24001 MISSION AVENUE, TAF C-34, SPOKANE, WASHINGTON, U.S.A. 99220

Service Manual HP Part 11848-90004

Microfiche Service Manual HP Part 11848-90011

Printed in U.S.A. : MAY 1990

HEWLETT PACKARD

ACCESSORIES SUPPLIED

The accessories supplied are pieces of equipment that are shipped with every Interface. The accessories are shown in Figure 1.

Line Power Cable. The line power cable may be supplied in several plug configurations, depending on the destination of the original shipment. Refer to *Power Cables* in the *Installation* section of this *Service* manual.

Fuses. Fuses with a 0.75A rating for 115 Vac (HP part number 2110-0063) and a 0.5A rating for 230 Vac (HP part number 2110-0012) are supplied. One fuse is factory installed according to the voltage available in the country of original destination. Refer to *Power Requirements* in the *Installation* of this *Service* manual.

HP 3048A Option 301 Software and Manual Set. The HP 3048A software and associated manuals are shipped with the Interface.

HP 3048A Software (HP part number 03048-10015).

HP 11848A Service Manual (HP part number 11848-90004).

HP 3048A Option 301 Installation Guide (HP part number 03048-90043).

HP 3048A Option 301 Operating Manual (HP part number 03048-90042).

HP 3048A Option 301 System Calibration Manual (HP part number 03048-90041).

HP 3048A Option 301 Reference Manual (HP part number 03048-90040).

50Ω Termination. This 50Ω load is used to terminate the Interface's Spectrum Analyzer output if no RF spectrum analyzer is available (HP part number 1250-0207).

Adapters, Type-N to BNC. Three adapters are provided for system operation (HP part number 1250-0780).

Cable Assemblies: BNC. Two 30 cm (12 in.) cables are provided for system operation (HP part number 8120-1838).

Noise Floor Test Fixture. This test fixture is used to run performance tests (HP part number 11848-61032).

Cable Assembly: BNC to SMB. This cable assembly can be used during troubleshooting (HP part number 08954-60105).

RECOMMENDED TEST EQUIPMENT

Table 1 lists the test equipment and accessories recommended for use in testing, adjusting, and servicing the Interface. If any of the recommended equipment is unavailable, instruments with equivalent minimum specifications may be substituted.

Tests for the Interface are performed during the HP 3048A Performance Tests which are available in the *HP 3048A Option 301 System Calibration Manual* in *Performance Tests.*

Table 1. Recommended Test Equipment

Instrument Type	Model Number	Use*
Dynamic Signal Analyzer	HP 3561A	A,C,P,T **
Counter (550 MHz)	HP 5383A, HP 5386A	P
Function Generator	HP 3312A, HP 3325A	P,T
Oscilloscope	HP 1740A	T
Power Meter and Sensor	HP 435B or HP 436A with HP 8481A or HP 8482A	T

* A = Adjustments, C = Functional Checks, P = Performance Tests, T = Troubleshooting
** The HP 3561A is included with the HP 3048A system.

OPTIONS AVAILABLE

Options are variations on the standard instrument which can be ordered during the purchase.

Electrical Options

Option 201: Add High Frequency Phase Detector. This option adds a 1.2 to 18 GHz phase detector to the Interface. This phase detector extends the range of carrier frequencies that can be demodulated within the Interface without external down conversion by the System. All of the HP 3048A specifications from 1.6 to 18 GHz carrier frequency are valid with this option.

Mechanical Options

Option 907: Front-Handle Kit. Front handles are provided when Option 907 is ordered. After shipment, you can order a Front-Handle Kit as HP part number 5061-9689.

Option 908: Rack-Flange Kit. Rack flanges are provided for the HP 11848A Phase Noise Interface when Option 908 is ordered. After shipment, you can order a Rack-Flange Kit as HP part number 5061-9677.

Option 909: Rack-Flange and Front-Handle Combination Kit. This is not a Front-Handle Kit and a Rack-Flange Kit packaged together; it is a unique part that combines both functions. Combination kits are provided for the HP 11848A Phase Noise Interface when Option 909 is ordered. After shipment, you can order a Rack-Flange and Front-Handle Combination Kit as HP part number 5061-9683.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3J1-11	1250-1255	1	14	CONNECTOR-RF SMB M PC 50 OHM	28480	1250-1255
A3J12Δ				NOT ASSIGNED		
A3J13	1250-1255	1	14	CONNECTOR-RF SMB M PC 50 OHM	28480	1250-1255
A3J14	1250-1255	1	14	CONNECTOR-RF SMB M PC 50 OHM	28480	1250-1255
	1205-0095	0	1	HEAT SINK SGL TO-5/TO-39-CS	30161	1205-0095
A3J15				NOT ASSIGNED		
A3J16	1251-4670	2		CONNECTOR 3-PIN M POST TYPE	28480	1251-4670
A3J201	1251-7264	6		CONN-POST TYPE .100-PIN-SPCG 34-CONT	28480	1251-7264
A3J202				NOT ASSIGNED		
A3J203	1251-3825	7		CONNECTOR 5-PIN M POST TYPE	28480	1251-3825
A3J204	1251-8472	0	1	CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1251-8472
A3L1	9100-1661	4	2	INDUCTOR RF-CH-MLD 2.2MH 5%	28480	9100-1661
A3L2-200				NOT ASSIGNED		
A3L201	9100-3560	6		INDUCTOR RF-CH-MLD 5.6UH 5%	28480	9100-3560
A3L202	9100-3560	6		INDUCTOR RF-CH-MLD 5.6UH 5%	28480	9100-3560
A3L203	9100-3560	6		INDUCTOR RF-CH-MLD 5.6UH 5%	28480	9100-3560
A3L204	9140-0210	1	25	INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L205	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L206	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L207	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L208	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L209	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L210	9140-0137	1	5	INDUCTOR RF-CH-MLD 1MH 5%	28480	9140-0137
A3L211	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L212	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L213	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L214	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L215	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L216	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L217	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L218	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L219	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L220	9140-0137	1		INDUCTOR RF-CH-MLD 1MH 5%	28480	9140-0137
A3MP1Δ	1251-1998	1	8	CONNECTOR-SGL CONT SKT .025-IN-BSC-SZ	28480	1251-1998
A3MP2	1390-0457	9		FASTENER-SNAP-IN PLGR 0.076 IN - .165 IN	28480	1390-0457
A3MP3	1390-0458	0		FASTENER-SNAP-IN GROM 0.076 IN - .165 IN	28480	1390-0458
A3Q1				NOT ASSIGNED		
A3Q2	1855-0410	0	3	TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0410
A3Q3	1855-0410	0		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0410
A3Q4	1855-0410	0		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0410
A3Q5-200				NOT ASSIGNED		
A3Q201	1855-0276	6	1	TRANSISTOR J-FET 2N4416A N-CHAN D-MODE	04713	2N4416A
A3R1	0757-0280	3	12	RESISTOR 1K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1001-F
A3R2				NOT ASSIGNED		
A3R3				NOT ASSIGNED		
A3R4	0698-3157	3	20	RESISTOR 19.6K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1962-F
A3R5	0698-3157	3		RESISTOR 19.6K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1962-F
A3R6	0698-3157	3		RESISTOR 19.6K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1962-F
A3R7	0698-3157	3		RESISTOR 19.6K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1962-F
A3R8	0698-3157	3		RESISTOR 19.6K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1962-F
A3R9	0698-3460	1	8	RESISTOR 422K 1% .125W F TC = 0 + -100	28480	0698-3460
A3R10	0698-3454	3	3	RESISTOR 215K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-2153-F
A3R11-14				NOT ASSIGNED		
A3R15	0757-0444	1	4	RESISTOR 12.1K 1% .125W F TC = 0 + -100	24546	CT4-1/8-TO-1212-F
A3R16	0698-3157	3		RESISTOR 19.6K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1962-F
A3R17	0698-3157	3		RESISTOR 19.6K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1962-F
A3R18	0698-3450	9	4	RESISTOR 42.2K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-4222-F

†Refer to Table 7 for update information. Δ Errata part change

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3R19	0757-0438	3	29	RESISTOR 5.11K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-5111-F
A3R20	0698-0084	9	8	RESISTOR 2.15K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-2151-F
A3R21	0698-8827	4	12	RESISTOR 1M 1% .125W F TC = 0 + -100	28480	0698-8827
A3R22	0757-0280	3		RESISTOR 1K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1001-F
A3R23	0698-3223	4	3	RESISTOR 1.24K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1241-F
A3R24	0757-0420	3	4	RESISTOR 750 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-751-F
A3R25	0698-4421	6	11	RESISTOR 249 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-249R-F
A3R26	0698-4421	6		RESISTOR 249 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-249R-F
A3R27	0698-4421	6		RESISTOR 249 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-249R-F
A3R28	0757-0422	5	2	RESISTOR 909 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-909R-F
A3R29	0757-0422	5		RESISTOR 909 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-909R-F
A3R30	0757-0417	8	1	RESISTOR 562 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-562R-F
A3R31	0757-0400	9	1	RESISTOR 90.9 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-90R9-F
A3R32	0698-0084	9		RESISTOR 2.15K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-2151-F
A3R33	0698-0084	9		RESISTOR 2.15K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-2151-F
A3R34	0698-3460	1		RESISTOR 422K 1% .125W F TC = 0 + -100	28480	0698-3460
A3R35	0698-3460	1		RESISTOR 422K 1% .125W F TC = 0 + -100	28480	0698-3460
A3R36	0698-3455	4	1	RESISTOR 261K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-2613-F
A3R37	0698-3450	9		RESISTOR 42.2K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-4222-F
A3R38	0757-0438	3		RESISTOR 5.11K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-5111-F
A3R39	0757-0438	3		RESISTOR 5.11K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-5111-F
A3R40	0698-3450	9		RESISTOR 42.2K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-4222-F
A3R41	0698-3159	5	1	RESISTOR 26.1K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-2612-F
A3R42	0698-3154	0	10	RESISTOR 4.22K 1% .125W F TC = 0 + -100	24546	CT4-1/8-TO-4221-F
A3R43	0757-0438	3		RESISTOR 5.11K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-5111-F
A3R44	0757-0438	3		RESISTOR 5.11K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-5111-F
A3R45	0698-3154	0		RESISTOR 4.22K 1% .125W F TC = 0 + -100	24546	CT4-1/8-TO-4221-F
A3R46	0698-0085	0	3	RESISTOR 2.61K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-2611-F
A3R47	0698-3447	4	5	RESISTOR 422 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-422R-F
A3R48	0757-0438	3		RESISTOR 5.11K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-5111-F
A3R49	0757-0438	3		RESISTOR 5.11K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-5111-F
A3R50	0698-3154	0		RESISTOR 4.22K 1% .125W F TC = 0 + -100	24546	CT4-1/8-TO-4221-F
A3R51	0698-0085	0		RESISTOR 2.61K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-2611-F
A3R52	0698-3447	4		RESISTOR 422 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-422R-F
A3R53	0757-0438	3		RESISTOR 5.11K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-5111-F
A3R54	0757-0438	3		RESISTOR 5.11K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-5111-F
A3R55	0698-3154	0		RESISTOR 4.22K 1% .125W F TC = 0 + -100	24546	CT4-1/8-TO-4221-F
A3R56	0698-0085	0		RESISTOR 2.61K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-2611-F
A3R57	0698-3447	4		RESISTOR 422 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-422R-F
A3R58	0757-0438	3		RESISTOR 5.11K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-5111-F
A3R59	0757-0438	3		RESISTOR 5.11K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-5111-F
A3R60	0698-4421	6		RESISTOR 249 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-249R-F
A3R61	0698-3454	3		RESISTOR 215K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-2153-F
A3R62	0698-0084	9		RESISTOR 2.15K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-2151-F
A3R63	0698-8827	4		RESISTOR 1M 1% .125W F TC = 0 + -100	28480	0698-8827
A3R64	0698-3460	1		RESISTOR 422K 1% .125W F TC = 0 + -100	28480	0698-3460
A3R65	0698-3154	0		RESISTOR 4.22K 1% .125W F TC = 0 + -100	24546	CT4-1/8-TO-4221-F
A3R66	0757-0438	3		RESISTOR 5.11K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-5111-F
A3R67	0757-0438	3		RESISTOR 5.11K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-5111-F
A3R68	2100-0558	9	6	RESISTOR-TRMR 20K 10% C TOP-ADJ 1-TRN	28480	2100-0558

†Refer to Table 7 for update information. Δ Errata part change

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4C213	0180-1794	3	2	CAPACITOR-FXD 22UF+-10% 35VDC TA	56289	150D226X9035R2
A4C214	0180-1794	3		CAPACITOR-FXD 22UF+-10% 35VDC TA	56289	150D226X9035R2
A4C215	0160-0168	1	3	CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A4C216	0160-0168	1		CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A4C217	0160-0168	1		CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A4C218	0160-4822	2		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4822
A4C219	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4C220	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4C221	0160-4805	1	1	CAPACITOR-FXD 47PF +-5% 100VDC CER 0+-30	28480	0160-4805
A4C222	0160-5348	9		CAPACITOR-FXD 51PF +-5% 100VDC CER 0+-30	28480	0160-5348
A4C223	0160-4787	8		CAPACITOR-FXD 22PF +-5% 100VDC CER 0+-30	28480	0160-4787
A4C224	0160-4801	7		CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801
A4C225	0160-4801	7		CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801
A4C226	0160-4787	8		CAPACITOR-FXD 22PF +-5% 100VDC CER 0+-30	28480	0160-4787
A4C227	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4C228	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4C229	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4C230	0160-4831	3	1	CAPACITOR-FXD 4700PF +-10% 100VDC CER	28480	0160-4831
A4C231	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4CR1	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR2	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR3	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR4	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR5	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR6	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR7	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR8	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR9	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR10	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR11	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR12	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR13	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR14	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR15	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR16	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR17	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR18	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR19	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR20	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR21	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR22						
A4CR23						
A4CR24	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR25	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR26	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR27	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR28	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR29	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR30-200				NOT ASSIGNED		
A4CR201	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR202	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4CR203	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR204	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR205				NOT ASSIGNED		
A4CR206				NOT ASSIGNED		
A4CR205	1902-0952	6	2	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A4CR206	1902-0952	6		DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A4CR207	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR208	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR209	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR210	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR211	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR212	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR213	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR214	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR215	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR216	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR217	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR218	1901-1098	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4E1	9170-0894	0	28	CORE-SHIELDING BEAD	28480	9170-0894
A4E2	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E3	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E4	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E5	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E6	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E7	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E8	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E9	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E10	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E11	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E12	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E13	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E14	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E15	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E16	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E17	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E18	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E19	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E20	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E21	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E22	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E23	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E24	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E25	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E26	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E27	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E28	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4F1	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A4F2	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A4F3	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A4F4	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A4F5				NOT ASSIGNED		
A4F6	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062

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Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4J1	1250-1255	1	12	CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J2	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J3-J5Δ				NOT ASSIGNED		
A4J6	5021-2826	3	3	RF FTTNG	28480	5021-2826
A4J7	5021-2826	3		RF FTTNG	28480	5021-2826
A4J8	5021-2826	3		RF FTTNG	28480	5021-2826
A4J9	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J10	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J11Δ				NOT ASSIGNED		
A4J12	1250-1707	8	1	CONNECTOR-RF SMA M PC 50-OHM	28480	1250-1707
A4J13	1251-3825	7		CONNECTOR 5-PIN M POST TYPE	28480	1251-3825
A4J14				NOT ASSIGNED		
A4J15	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J16	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J17-200				NOT ASSIGNED		
A4J201	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J202	1251-8929	2		CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-8929
A4J203	1252-0243	9		CONN-POST TYPE .100-PIN-SPCG 10-CONT	28480	1252-0243
A4J204	1251-4670	2		CONNECTOR 3-PIN M POST TYPE	28480	1251-4670
A4J205	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J206	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J207Δ				NOT ASSIGNED		
A4K1	0490-1318	4	7	RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-1318
A4K2	0490-1318	4		RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-1318
A4K3	0490-0916	6	7	RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A4K4	0490-0916	6		RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A4K5	0490-1515	3	2	RELAY-REED 1C 1A 150VDC 5VDC-COIL 3VA	71707	2911-05-300
A4K6	0490-0916	6		RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A4K7	0490-0916	6		RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A4K8	0490-1318	4		RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-1318
A4K9	0490-1318	4		RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-1318
A4K10	0490-0916	6		RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A4K11	0490-1318	4		RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-1318
A4K12	0490-1318	4		RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-1318
A4K13	0490-1515	3		RELAY-REED 1C 1A 150VDC 5VDC-COIL 3VA	71707	2911-05-300
A4K14	0490-1318	4		RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-1318
A4L1	9100-3818	7	1	INDUCTOR RF-CH-MLD 47NH 20%	28480	9100-3818
A4L2	9140-0637	6	1	INDUCTOR RF-CH-MLD 68NH 20% .166DX.385LG	28480	9140-0637
A4L3	9100-3807	4	1	INDUCTOR RF-CH-MLD 110NH 5%	28480	9100-3807
A4L4	9140-0638	7	1	INDUCTOR RF-CH-MLD 510NH 5%	28480	9140-0638
A4L5	9140-0262	3	2	INDUCTOR RF-CH-MLD 200NH 5%	28480	9140-0262
A4L6	9140-0262	3		INDUCTOR RF-CH-MLD 200NH 5%	28480	9140-0262
A4L7	9140-0261	2	1	INDUCTOR RF-CH-MLD 100NH 5%	28480	9140-0261
A4L8	9140-0399	7	1	INDUCTOR RF-CH-MLD 2.2UH 5%	28480	9140-0399
A4L9	9100-3913	3	1	INDUCTOR RF-CH-MLD 3.3UH 5%	28480	9100-3913
A4L10	9100-3912	2	1	INDUCTOR RF-CH-MLD 15UH 5%	28480	9100-3912
A4L11	9100-3561	7	2	INDUCTOR RF-CH-MLD 6.2UH 5%	28480	9100-3561
A4L12	9100-3561	7		INDUCTOR RF-CH-MLD 6.2UH 5%	28480	9100-3561
A4L13	9140-0285	0	1	INDUCTOR RF-CH-MLD 3UH 5%	28480	9140-0285
A4L14				NOT ASSIGNED		
2621A to 2815A						
A4L15	9140-0137	1		INDUCTOR RF-CH-MLD 1MH 5%	28480	9140-0137
2830A AND ABOVE						
A4L15	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210

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Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4L16				NOT ASSIGNED		
A4L17	9140-0636	5	1	INDUCTOR 40MH 5% .55DX.45LG	28480	9140-0636
A4L18	9140-0131	5	1	INDUCTOR RF-CH-MLD 10MH 5%	28480	9140-0131
A4L19	9100-1661	4		INDUCTOR RF-CH-MLD 2.2MH 5%	28480	9100-1661
A4L20	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A4L21	9100-3560	6		INDUCTOR RF-CH-MLD 5.6UH 5%	28480	9100-3560
A4L22	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A4L23	9140-0137	1		INDUCTOR RF-CH-MLD 1MH 5%	28480	9140-0137
A4L24	9140-0144	0	23	INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L25	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L26	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L27	9140-0137	1		INDUCTOR RF-CH-MLD 1MH 5%	28480	9140-0137
A4L28	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L29	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L30	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L31	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L32	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L33	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L34	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L35	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L36	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L37	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L38	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L39	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L40	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L41	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L42	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L43-45				NOT ASSIGNED		
A4L46	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L47	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L48	9140-0138	2	1	INDUCTOR RF-CH-MLD 180UH 5%	28480	9140-0138
A4MP1	0515-0655	4	2	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
A4MP2	0535-0004	9		NUT-HEX DBL-CHAM M3 X 0.5 2.4MM-THK	00000	ORDER BY DESCRIPTION
A4MP3	0535-0034	5	3	NUT-HEX DBL-CHAM M4 X 0.7 3.2MM-THK	28480	0535-0034
A4MP4Δ	1251-1998	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-1998
A4MP5	1251-5595	2		POLARIZING KEY-POST CONN	28480	1251-5595
A4MP6	2190-0584	0	2	WASHER-LK HLCL 3.0 MM 3.1-MM-ID	28480	2190-0584
A4MP7	3050-0891	7	2	WASHER-FL MTLC 3.0 MM 3.3-MM-ID	28480	3050-0891
A4MP8	35601-01209	9	1	BRACKET-MIXER-1	28480	35601-01209
2621A to 2924A A4MP9-MP12				NOT ASSIGNED		
2938A AND ABOVE A4MP9-MP10	0360-0535	0	4	TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A4Q1	1854-0247	9	6	TRANSISTOR NPN SI TO-39 PD = 1W FT = 800MHZ	28480	1854-0247
A4Q2	1854-0247	9		TRANSISTOR NPN SI TO-39 PD = 1W FT = 800MHZ	28480	1854-0247
A4Q3	1853-0354	7	2	TRANSISTOR PNP SI TO-92 PD = 350MW	28480	1853-0354
A4Q4	1854-0795	2	1	TRANSISTOR NPN SI TO-92 PD = 625MW	04713	MPSH10
A4Q5	1854-0247	9		TRANSISTOR NPN SI TO-39 PD = 1W FT = 800MHZ	28480	1854-0247
A4Q6	1854-0247	9		TRANSISTOR NPN SI TO-39 PD = 1W FT = 800MHZ	28480	1854-0247
A4Q7	1853-0354	7		TRANSISTOR PNP SI TO-92 PD = 350MW	28480	1853-0354
A4Q8	1854-0215	1	1	TRANSISTOR NPN SI TO-92 PD = 350MW	04713	2N3904
A4Q9	1854-0637	1	3	TRANSISTOR NPN 2N2219A SI TO-5 PD = 800MW	01295	2N2219A
A4Q10	1853-0459	3	9	TRANSISTOR PNP SI PD = 625MW FT = 200MHZ	28480	1853-0459

†Refer to Table 7 for update information. Δ Errata part change

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4R272	0757-0442	9		RESISTOR 10K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1002-F
A4R273	0698-3157	3		RESISTOR 19.6K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1962-F
A4R274	0698-3157	3		RESISTOR 19.6K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1962-F
A4R275	0757-0438	3		RESISTOR 5.11K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-5111-F
A4R276	0757-0438	3		RESISTOR 5.11K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-5111-F
A4R277	0698-0083	8		RESISTOR 1.96K 1% .125W F TC = 0 + -100	24546	CT4-1/8-TO-1961-F
A4R278	2100-0554	5		RESISTOR-TRMR 500 10% C TOP-ADJ 1-TRN	28480	2100-0554
A4R279	0757-0442	9		RESISTOR 10K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1002-F
A4R280	0698-3157	3		RESISTOR 19.6K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1962-F
A4R281	0698-4543	3		RESISTOR 487K 1% .125W F TC = 0 + -100	28480	0698-4543
A4R282	0757-0467	8	1	RESISTOR 121K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1213-F
A4R283	0698-3582	8	1	RESISTOR 41.2K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-4122-F
A4R284	0698-4480	7	1	RESISTOR 15.8K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1582-F
A4R285	0698-3497	4	1	RESISTOR 6.04K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-604R-F
A4R286	0698-4434	1	1	RESISTOR 2.32K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-2321-F
A4R287	0698-3495	2	1	RESISTOR 866 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-866R-F
A4R288	0698-3443	0		RESISTOR 287 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-287R-F
A4R289	1810-0329	6	1	NETWORK-RES 10-SIP 7.5K OHM X 9	91637	CSC10A01-752G/MSP10A01-
A4R290	0757-0199	3		RESISTOR 21.5K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-2152-F
A4R291	0698-3441	8		RESISTOR 215 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-215R-F
A4R292	0757-0199	3		RESISTOR 21.5K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-2152-F
A4R293	0698-3157	3		RESISTOR 19.6K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-1962-F
A4R294	0698-0083	8		RESISTOR 1.96K 1% .125W F TC = 0 + -100	24546	CT4-1/8-TO-1961-F
A4R295	0698-4475	0	1	RESISTOR 9.76K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-9761-F
A4R296	0698-3155	1		RESISTOR 4.64K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-4641-F
A4R297	0698-3162	0		RESISTOR 46.4K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-4642-F
A4TP1	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A4TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP10	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP11	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP12	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP13	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP14	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP15	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP16	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP17	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP18	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A4TP19-200				NOT ASSIGNED		
A4TP201	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600

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Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4TP202	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP203	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP204	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP205	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP206	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP207	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP208	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP209	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP210	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP211	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP212	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP213	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP214	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP215	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP216	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP217-219				NOT ASSIGNED		
A4TP220	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4U1△	11848-80007	8	1	MIXER-SELECTED	28480	11848-80007
A4U2				NOT ASSIGNED		
A4U3	1826-0412	1	3	IC COMPARATOR PRCN DUAL 8-DIP-P PKG	27014	LM393N
A4U4	1826-0783	9		IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A4U5	1826-0783	9		IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A4U6	1820-1201	6		IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A4U7	1858-0047	5	2	TRANSISTOR ARRAY 16-PIN PLSTC DIP	13606	ULN-2003A
A4U8	1858-0047	5		TRANSISTOR ARRAY 16-PIN PLSTC DIP	13606	ULN-2003A
A4U9	5081-2040	9	1	BURNIN 1826-0035	28480	5081-2040
A4U10-200				NOT ASSIGNED		
A4U201	1826-0188	8		D/A 8-BIT 16-CERDIP BPLR	04713	MC1408L-8
A4U202	1820-1547	3	3	IC MULTIPLXR 8-CHAN-ANLG 16-DIP-C PKG	04713	MC14051BCL
A4U203	1820-1547	3		IC MULTIPLXR 8-CHAN-ANLG 16-DIP-C PKG	04713	MC14051BCL
A4U204	1820-1547	3		IC MULTIPLXR 8-CHAN-ANLG 16-DIP-C PKG	04713	MC14051BCL
A4U205	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A4U206	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A4U207	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A4U208	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A4U209	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A4U210	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A4U211	1820-1112	8	1	IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A4U212	1826-0785	1		IC OP AMP LOW-BIAS-H-IMPD DUAL 8-DIP-C	01295	TL072ACJG
A4U213	1826-0783	9		IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A4U214	1826-0783	9		IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A4U215	1826-0753	3	2	IC OP AMP LOW-BIAS-H-IMPD QUAD 14-DIP-C	04713	MC34004BL
A4U216	1826-0759	9	1	IC COMPARATOR GP QUAD 14-DIP-C PKG	04713	LM339J
A4U217	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A4U218	1826-0753	3		IC OP AMP LOW-BIAS-H-IMPD QUAD 14-DIP-C	04713	MC34004BL
A4U219	1826-0716	8		IC OP AMP LOW-NOISE DUAL 8-DIP-C PKG	18324	NE5532AFE
A4VR1				NOT ASSIGNED		
A4VR2				NOT ASSIGNED		
A4W1	35601-61622	6	1	SR 2.18 NO CONN	28480	35601-61622

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Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A9						
A9	11848-60109	9	1	400MHZ OSCILLATOR ASSEMBLY	28480	11848-60109
A9C1				NOT ASSIGNED		
A9C2	0160-4522	9	1	CAPACITOR-FXD 13PF +-5% 200VDC CER 0+-30	28480	0160-4522
A9C3	0160-3873	1	1	CAPACITOR-FXD 4.7PF +-.5PF 200VDC CER	28480	0160-3873
A9C4	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A9C5	0160-4382	9	1	CAPACITOR-FXD 3.3PF +-.25PF 200VDC CER	28480	0160-4382
A9C6	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A9C7	0180-2821	9		CAPACITOR-FXD 22UF+-20% 35VDC TA	28480	0180-2821
A9C8	0180-2815	1		CAPACITOR-FXD 100UF+-20% 10VDC TA	28480	0180-2815
A9C9	0180-2821	9		CAPACITOR-FXD 22UF+-20% 35VDC TA	28480	0180-2821
A9C10				NOT ASSIGNED		
A9C11	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A9C12				NOT ASSIGNED		
A9C13	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A9C14Δ	0160-3877	5		CAPACITOR-FXD 100PF +-5% 200VDC CER	28480	0160-3877
A9C15Δ	0160-3877	5		CAPACITOR-FXD 100PF +-5% 200VDC CER	28480	0160-3877
A9C16	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A9C17Δ	0160-3877	5		CAPACITOR-FXD 100PF +-5% 200VDC CER	28480	0160-3877
A9C18	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A9C19Δ	0160-3877	5		CAPACITOR-FXD 100PF +-5% 200VDC CER	28480	0160-3877
A9C20	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A9C21	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A9C22	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A9C23	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A9C24				NOT ASSIGNED		
A9C25	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A9CR1-4				NOT ASSIGNED		
A9CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A9J1	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A9J2	1250-1611	3		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1611
A9J3	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A9J4	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A9L1				NOT ASSIGNED		
A9L2	9140-1253	4	1	INDUCTOR-ADJ 2-1/2 TURN 12NH NOMINAL	28480	9140-1253
A9L3	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10%	28480	9100-2251
A9L4				NOT ASSIGNED		
A9L5	9140-0129	1		INDUCTOR RF-CH-MLD 220UH 5%	28480	9140-0129
A9L6				NOT ASSIGNED		
A9L7	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10%	28480	9100-2251
A9L8	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A9L9				NOT ASSIGNED		
A9L10	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10%	28480	9100-2251
A9L11	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10%	28480	9100-2251
A9L12	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A9L13	9100-3560	6		INDUCTOR RF-CH-MLD 5.6UH 5%	28480	9100-3560
A9L14	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A9MP1	1200-0173	5		INSULATOR-XSTR DAP-GL	28480	1200-0173
A9Q1	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A9Q2	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A9Q3	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A9Q4	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A9Q5	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A

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Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A9R1	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A9R2	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A9R3				NOT ASSIGNED		
A9R4	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A9R5				NOT ASSIGNED		
A9R6	0698-7271	0		RESISTOR 28.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2872-F
A9R7	0698-7271	0		RESISTOR 28.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2872-F
A9R8	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A9R9	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A9R10	0698-7212	9	3	RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A9R11	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A9R12	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A9R13				NOT ASSIGNED		
A9R14	0698-7206	1		RESISTOR 56.2 1% .05W F TC=0+-100	24546	C3-1/8-TO-56R2-F
A9R15	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A9R16	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A9R17	0698-7206	1		RESISTOR 56.2 1% .05W F TC=0+-100	24546	C3-1/8-TO-56R2-F
A9R18	0698-7206	1		RESISTOR 56.2 1% .05W F TC=0+-100	24546	C3-1/8-TO-56R2-F
A9R19	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A9R20	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A9R21	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A9R22	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A9R23	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A9R24	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A9R25	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A9R26	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A9R27	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A9TP1				NOT ASSIGNED		
A9TP2				NOT ASSIGNED		
A9TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A9TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A9TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A9TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A9TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A9TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A9TP9	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A9TP10	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A9TP11	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A9TP12	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A9TP13	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A9TP14	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A9TP15	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A9TP16	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A9U1	1813-0211	1	2	IC WIDEBAND AMPL TO-39 PKG	04713	MWA110
A9U2	1813-0211	1		IC WIDEBAND AMPL TO-39 PKG	04713	MWA110
A9U3	1813-0212	2	1	IC WIDEBAND AMPL TO-39 PKG	04713	MWA120
A9U4				NOT ASSIGNED		
A9U5	1826-0783	9		IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN

†Refer to Table 7 for update information. Δ Errata part change

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A10						
2621A ONLY						
A10	0960-0679	5	1	LINE POWER MODULE	28480	0960-0679
	02932-00038	1	2	COMPONENT CLIP	28480	02932-00038
2647A AND ABOVE						
A10	0960-0443	1	1	LINE POWER MODULE	28480	0960-0443

†Refer to Table 7 for update information. Δ Errata part change

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11	**35601-66562 – SERIAL PREFIX 3001A TO 2938A**					
A11	35601-66562	3	1	HP-IB CONNECTOR ASSEMBLY	28480	35601-66562
A11J1	1251-5768	1	1	CONN-RECT MICRORBN 24-CKT 24-CONT	28480	1251-5768
A11MP1	0380-1180	5	2	STANDOFF-HEX 5-MM-LG M3.5 X 0.6-THD	28480	0380-1180
A11MP2	0515-0105	9	2	SCREW-MACH M3 X 0.5 12MM-LG PAN-HD	28480	0515-0105
A11MP3	0535-0004	9		NUT-HEX DBL-CHAM M3 X 0.5 2.4MM-THK	00000	ORDER BY DESCRIPTION
A11MP4	1531-0076	8	2	MACHINED PART-BRS CLEVIS	28480	1531-0076
A11MP5	2190-0019	6	2	WASHER-LK HLCL NO. 4 .115-IN-ID	28480	2190-0019
A11MP6	2190-0034	5	2	WASHER-LK HLCL NO. 10 .194-IN-ID	28480	2190-0034
A11S1	3101-2215	2	1	SWITCH-RKR DIP-RKR-ASSY 7-1A .05A 30VDC	28480	3101-2215
A11W1	8120-3139	6	1	FLAT RIBBON ASSY 28-AWG 34-COND .16-M-LG	28480	8120-3139
A11W2	8150-4816	1	1	WIRE 22AWG 1X22 105C	28480	8150-4816
A11	**11848-60114 – SERIAL PREFIX 3040A AND ABOVE**					
A11	11848-60114	6	1	HP-IB CONNECTOR ASSY	28480	11848-60114
C1	0160-5962	3	13	CAPACITOR-FXD 15PF 50V	06352	C2012COG1H150J
C2	0160-5962	3	13	CAPACITOR-FXD 15PF 50V	06352	C2012COG1H150J
C3	0160-5962	3	13	CAPACITOR-FXD 15PF 50V	06352	C2012COG1H150J
C4	0160-5962	3	13	CAPACITOR-FXD 15PF 50V	06352	C2012COG1H150J
C5	0160-5962	3	13	CAPACITOR-FXD 15PF 50V	06352	C2012COG1H150J
C6	0160-5962	3	13	CAPACITOR-FXD 15PF 50V	06352	C2012COG1H150J
C7	0160-5962	3	13	CAPACITOR-FXD 15PF 50V	06352	C2012COG1H150J
C8	0160-5962	3	13	CAPACITOR-FXD 15PF 50V	06352	C2012COG1H150J
C9	0160-5962	3	13	CAPACITOR-FXD 15PF 50V	06352	C2012COG1H150J
C10	0160-5962	3	13	CAPACITOR-FXD 15PF 50V	06352	C2012COG1H150J
C11	0160-5962	3	13	CAPACITOR-FXD 15PF 50V	06352	C2012COG1H150J
C12	0160-5962	3	13	CAPACITOR-FXD 15PF 50V	06352	C2012COG1H150J
C13	0160-5962	3	13	CAPACITOR-FXD 15PF 50V	06352	C2012COG1H150J
L1	9140-1121	5	13	INDUCTOR 100UH +-5% 3.4W	06352	NL453232T-101J
L2	9140-1121	5	13	INDUCTOR 100UH +-5% 3.4W	06352	NL453232T-101J
L3	9140-1121	5	13	INDUCTOR 100UH +-5% 3.4W	06352	NL453232T-101J
L4	9140-1121	5	13	INDUCTOR 100UH +-5% 3.4W	06352	NL453232T-101J
L5	9140-1121	5	13	INDUCTOR 100UH +-5% 3.4W	06352	NL453232T-101J
L6	9140-1121	5	13	INDUCTOR 100UH +-5% 3.4W	06352	NL453232T-101J
L7	9140-1121	5	13	INDUCTOR 100UH +-5% 3.4W	06352	NL453232T-101J
L8	9140-1121	5	13	INDUCTOR 100UH +-5% 3.4W	06352	NL453232T-101J
L9	9140-1121	5	13	INDUCTOR 100UH +-5% 3.4W	06352	NL453232T-101J
L10	9140-1121	5	13	INDUCTOR 100UH +-5% 3.4W	06352	NL453232T-101J
L11	9140-1121	5	13	INDUCTOR 100UH +-5% 3.4W	06352	NL453232T-101J
L12	9140-1121	5	13	INDUCTOR 100UH +-5% 3.4W	06352	NL453232T-101J
L13	9140-1121	5	13	INDUCTOR 100UH +-5% 3.4W	06352	NL453232T-101J

†Refer to Table 7 for update information. Δ Errata part change

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A12						
A12	11848-60110	2	1	LNA2 ASSEMBLY	28480	11848-60110
A12C1	0160-0576	5	7	CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A12C2	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A12C3	0160-3873	1		CAPACITOR-FXD 4.7PF +-.5PF 200VDC CER	28480	0160-3873
A12C4	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A12C5	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A12C6	0160-3873	1		CAPACITOR-FXD 4.7PF +-.5PF 200VDC CER	28480	0160-3873
A12C7	0160-5469	5	1	CAPACITOR-FXD 1UF 10% 50VDC	28480	0160-5469
A12C8	0180-3771	0	2	CAPACITOR-FXD 1UF +-10% TA 0 OHM	28480	0180-3771
A12C9	0180-3831	3	4	CAPACITOR-FXD 10UF +-10% TA 0 OHM	28480	0180-3831
A12C10	0180-3831	3		CAPACITOR-FXD 10UF +-10% TA 0 OHM	28480	0180-3831
A12C11	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A12C12	0180-3831	3		CAPACITOR-FXD 10UF +-10% TA 0 OHM	28480	0180-3831
A12C13	0180-3771	0		CAPACITOR-FXD 1UF +-10% TA 0 OHM	28480	0180-3771
A12C14	0180-3831	3		CAPACITOR-FXD 10UF +-10% TA 0 OHM	28480	0180-3831
A12C15	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A12C16	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A12C17*Δ	0160-3874	2		CAPACITOR-FXD 10PF +-5% 200VDC CER 0+-30	28480	0160-3874
A12C18				NOT ASSIGNED		
A12C19-C21				SEE A12 MISCELLANEOUS PARTS		
A12J1, J2				SEE A12 MISCELLANEOUS PARTS		
A12K1	0490-1318	4	1	RELAY 2C 12VDC-COIL .5A 28 VDC	28480	0480-1318
A12L1	9100-3922	4	2	INDUCTOR-FIXED 120-1300 HZ 4.25 UH 41%	28480	9100-3922
A12L2	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ 4.25 UH 41%	28480	9100-3922
A12Q1	1854-0637	1	1	TRANSISTOR NPN 2N2219A SI TO-5 PD=800MW	01295	2N2219A
A12Q2	1853-0314	9	1	TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A12R1	0698-7205	0	6	RESISTOR 51.1 1% .05W F TC=0+-100	24546	CT3-1/8-TO-51R1-F
A12R2	0698-7236	7	5	RESISTOR 1K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-1001-F
A12R3	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-1001-F
A12R4	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	CT3-1/8-TO-51R1-F
A12R5	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	CT3-1/8-TO-51R1-F
A12R6	0698-7206	1	1	RESISTOR 56.2 1% .05W F TC=0+-100	24546	CT3-1/8-TO-56R2-F
A12R7	0698-7229	8	1	RESISTOR 511 1% .05W F TC=0+-100	24546	CT3-1/8-T0-511R-F
A12R8	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	CT3-1/8-TO-51R1-F
A12R9	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	CT3-1/8-TO-51R1-F
A12R10	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	CT3-1/8-TO-51R1-F
A12R11	0698-7260	7	2	RESISTOR 10K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-1002-F
A12R12	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-1002-F
A12R13	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-1001-F
A12R14	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-1001-F
A12R15	0698-7253	8	2	RESISTOR 5.11K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-5111-F
A12R16	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-1001-F
A12R17	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-5111-F
A12U1	1826-2081	4	2	IC 404AJ P1 OP AMP	28480	1826-2081
A12U2	1826-2081	4		IC 404AJ P1 OP AMP	28480	1826-2081
A12U3	1826-2074	5	1	IC 587J P1 VREF	28480	1826-2074
A12U4	1826-0716	8	3	IC OP AMP LOW-NOISE DUAL 8-DIP-C PKG	18324	NE5532AFE
A12W1				USE 24 AWG WIRE (RED)		
A12W2				USE 24 AWG WIRE (BROWN)		
A12W3				USE 24 AWG WIRE (BLUE)		

†Refer to Table 7 for update information. Δ Errata part change

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
				A12 Miscellaneous Parts		
A12C19	0160-2437	1	3	CAPACITOR-FEEDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A12C20	0160-2437	1	3	CAPACITOR-FEEDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A12C21	0160-2437	1	3	CAPACITOR-FEEDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A12J1	11848-20111	9	2	CONNECTOR SMA	28480	11848-20111
A12J2	11848-20111	9	2	CONNECTOR SMA	28480	11848-20111
A12MP10	11848-20114	2	1	CAN	28480	11848-20114
A12MP11	11848-20113	1	1	TOP COVER	28480	11848-20113
A12MP12	11848-20112	0	1	BOTTOM COVER	28480	11848-20112
A12MP13	11848-00030	9	1	ADHESIVE LABEL	28480	11848-00030
A12MP14	11848-00029	6	1	CLIP CONNECTOR	28480	11848-00029
A12MP15	11848-00029	6	1	CLIP CONNECTOR	28480	11848-00029
A12MP16	11848-XXXXX	X	1	NUT (PART NUMBER NOT YET AVAILABLE	28480	11848-XXXXX
A12MP17	11848-XXXXX	X	1	NUT (PART NUMBER NOT YET AVAILABLE	28480	11848-XXXXX
A12MP18	2200-0170	3	4	SCREW-MACH 4-40 .625-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A12MP19	2200-0170	3	4	SCREW-MACH 4-40 .625-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A12MP20	2200-0170	3	4	SCREW-MACH 4-40 .625-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A12MP21	2200-0170	3	4	SCREW-MACH 4-40 .625-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A12MP22	2190-0009	4	2	WASHER-LK INTL T NO. 8 .168-IN-ID	00000	ORDER BY DESCRIPTION
A12MP23	2190-0009	4	2	WASHER-LK INTL T NO. 8 .168-IN-ID	00000	ORDER BY DESCRIPTION
A12MP24	0360-0269	7	1	TERMINAL SLDR LUG LK-MTG FOR #8 SCR	00000	ORDER BY DESCRIPTION
A12MP25	2190-0068	5	2	WASHER-LK INTL T 1/2 IN .505-IN-ID	00000	ORDER BY DESCRIPTION
A12MP26	2190-0068	5	2	WASHER-LK INTL T 1/2 IN .505-IN-ID	00000	ORDER BY DESCRIPTION
A12W4-7, W19, W39	11848-61035	2	1	WIRING HARNESS	28480	11848-61035

†Refer to Table 7 for update information. Δ Errata part change

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
				MISCELLANEOUS PARTS		
B1	3160-0494	9	1	FAN TBAX 18-CFM	28480	3160-0494
	1251-2097	3	2	CONTACT-CONN U/W-UTIL MALE CRP	28480	1251-2097
C1	0180-0230	0		CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
C2	0180-0230	0		CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
C3	0180-0230	0		CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
C4	0180-0230	0		CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
C5	0180-0230	0		CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
C6	0180-0230	0		CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
C7	0180-0230	0		CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
C8	0180-0230	0	16	CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
2621A to 2720A						
C9	0160-3094	8	4	CAPACITOR-FXD .1UF +-10% 100VDC CER	28480	0160-3094
C10	0160-3094	8		CAPACITOR-FXD .1UF +-10% 100VDC CER	28480	0160-3094
2815A and above						
C9	0160-3670	6		CAPACITOR-FXD .1UF +-20% 200VDC CER	28480	0160-3670
C10	0160-3670	6		CAPACITOR-FXD .1UF +-20% 200VDC CER	28480	0160-3670
C11	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER (ATTACHED TO J11)	28480	0160-4835
	0515-0430	3	2	SCREW-MACHINE ASSEMBLY M3 X 0.5 6MM-LG	00000	ORDER BY DESCRIPTION
C12	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER (ATTACHED TO J1)	28480	0160-4835
	0515-0430	3	2	SCREW-MACHINE ASSEMBLY M3 X 0.5 6MM-LG	00000	ORDER BY DESCRIPTION
C13	0160-3036	8	15	CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C14	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C15	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C16	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C17	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C18	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C19	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C20	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C21	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C22	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C23	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C24	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C25	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C26	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C27	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C28	0160-4065			CAPACITOR-FXD .1UF +-20% 250VAC (RMS)	28480	0160-4065
C28	0160-4065			CAPACITOR-FXD .1UF +-20% 250VAC (RMS)	28480	0160-4065
CR1-17				NOT ASSIGNED		
CR18	1906-0065	0	2	DIODE-FW BRDG 100V 10A	28480	1906-0065
CR18J18	1251-7362	1	2	CONNECTOR BODY 4 PIN	28480	1251-7362
	1252-0470	4		CONTACT	28480	1252-0470
CR19	1906-0065	0	2	DIODE-FW BRDG 100V 10A	28480	1906-0065
CR19J19	1251-7362	1	2	CONNECTOR BODY 4 PIN	28480	1251-7362
	1252-0470	4		CONTACT	28480	1252-0470
F1	2110-0063	2	2	FUSE .75A 250V NTD 1.25X.25 UL (FOR 110/120V OPERATION)	28480	2110-0063
F1	2110-0012	1		FUSE .5A 250V NTD 1.25X.25 UL (FOR 220/240V OPERATION)	28480	2110-0012
H1	11848-61027	9	1	REFERENCE DECK HARDWARE ASSEMBLY	28480	11848-61027
				INCLUDES HARDWARE FOR A6-A9 ASSEMBLIES	28480	
	0380-0003	9	3	SPACER-RND .125-IN-LG .18-IN-ID	28480	0380-0003
	0515-1139	1	3	SCREW-MACH M4 X 0.7 12 MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
	0535-0082	3	3	NUT-HEX W/EXT-T-LKWR M4 X 0.7 3.2MM-THK	00000	ORDER BY DESCRIPTION
	2190-0124	4	11	WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9	11	NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
	3050-0893	9	3	WASHER-FL MTLC 4.0 MM 4.4-MM-ID	28480	3050-0893

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
J1				NOT SEPARATELY REPLACEABLE P/O W8		
	2950-0054	1	3	NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
	5040-7624	9	4	WASHER SHOULDER	28480	5040-7624
	0360-1089	1	2	TERMINAL-SLDR LUG PL-MTG FOR-#1/2-SCR	28480	0360-1089
J2	1250-1811	5	3	ADAPTER-COAX STR F-N F-SMA	28480	1250-1811
	2190-0054	9	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J3	1250-1811	5		ADAPTER-COAX STR F-N F-SMA	28480	1250-1811
	2190-0054	9	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J4	6960-0132	1	2	PLUG-HOLE FL-HD FOR .5-D-HOLE NYL (EXCEPT OPTION 201)	28480	6960-0132
J4	1250-1811	5		ADAPTER-COAX STR F-N F-SMA (OPTION 201 ONLY)	28480	1250-1811
	2190-0054	9		WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J5	1250-1811	5		ADAPTER-COAX STR F-N F-SMA	28480	1250-1811
	2190-0054	9		WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J6	6960-0132	1		PLUG-HOLE FL-HD FOR .5-D-HOLE NYL (EXCEPT OPTION 201)	28480	6960-0132
J6	1250-1811	5		ADAPTER-COAX STR F-N F-SMA (OPTION 201 ONLY)	28480	1250-1811
	2190-0054	9		WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J7				NOT SEPARATELY REPLACEABLE P/O W10		
	2190-0054	9	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J8				NOT SEPARATELY REPLACEABLE P/O W12		
	2190-0054	9	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J9				NOT SEPARATELY REPLACEABLE P/O W15		
	2190-0054	9	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J10				NOT SEPARATELY REPLACEABLE P/O W16		
	2190-0054	9	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J11				NOT SEPARATELY REPLACEABLE P/O W9		
	2950-0054	1	3	NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
	5040-7624	9	4	WASHER SHOULDER	28480	5040-7624
	0360-1089	1	2	TERMINAL-SLDR LUG PL-MTG FOR-#1/2-SCR	28480	0360-1089
J12				NOT SEPARATELY REPLACEABLE P/O W20		
	2190-0054	9	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J13				NOT SEPARATELY REPLACEABLE P/O W19		
	2190-0054	9	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J14				NOT SEPARATELY REPLACEABLE P/O W7		
	2190-0102	8	5	WASHER-LK INTL T 15/32 IN .472-IN-ID	28480	2190-0102
	2950-0035	8	13	NUT-HEX-DBL-CHAM 15/32-32-THD	00000	ORDER BY DESCRIPTION
J15				NOT SEPARATELY REPLACEABLE P/O W14		
	2190-0102	8	5	WASHER-LK INTL T 15/32 IN .472-IN-ID	28480	2190-0102
	2950-0035	8	13	NUT-HEX-DBL-CHAM 15/32-32-THD	00000	ORDER BY DESCRIPTION

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
J16				NOT SEPARATELY REPLACEABLE P/O W24		
	2190-0102	8	5	WASHER-LK INTL T 15/32 IN .472-IN-ID	28480	2190-0102
	2950-0035	8	13	NUT-HEX-DBL-CHAM 15/32-32-THD	00000	ORDER BY DESCRIPTION
J17				NOT SEPARATELY REPLACEABLE P/O W6		
	2190-0102	8	5	WASHER-LK INTL T 15/32 IN .472-IN-ID	28480	2190-0102
	2950-0035	8	13	NUT-HEX-DBL-CHAM 15/32-32-THD	00000	ORDER BY DESCRIPTION
J18				NOT SEPARATELY REPLACEABLE P/O W18		
	2190-0102	8	5	WASHER-LK INTL T 15/32 IN .472-IN-ID	28480	2190-0102
	2950-0035	8	13	NUT-HEX-DBL-CHAM 15/32-32-THD	00000	ORDER BY DESCRIPTION
J19	6960-0041	1		PLUG-HOLE FL-HD FOR .5-D-HOLE NYL	28480	6960-0041
M1	1120-1587	7	1	METER +- 1 MILLIAMP FULL SCALE; 0.1	28480	1120-1587
	0360-0036	6	2	TERMINAL-SLDR LUG PL-MTG FOR-#6-SCR	28480	0360-0036
	0515-0069	4	2	SCREW-MACH M3.5 X 0.6 25MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
	2190-0918	4	13	WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0918
	3050-0066	8	5	WASHER-FL MTLC NO. 6 .147-IN-ID	73734	1451
MP1	7120-4963	1	1	HP LOGO	28480	7120-4963
2621A to 2830A						
MP2				NO LONGER AVAILABLE, SEE SECTION 7		
2924A and above						
MP2	11848-00027	4	1	PANEL FRONT	28480	11848-00027
	0515-1246	1	4	SCREW-MACH M3 X 0.5 6MM-LG PAN-HD (ATTACH A2 TO FRONT PANEL)	00000	ORDER BY DESCRIPTION
MP3	11848-00003	6	1	FRONT SUB PANEL AND A4 ASSEMBLY SUB DECK	28480	11848-00003
	0400-0010	2	4	GROMMET-RND .25-IN-ID .375-IN-GRV-OD	28480	0400-0010
	0515-0430	3	2	SCREW-MACHINE ASSEMBLY M3 X 0.5 6MM-LG	00000	ORDER BY DESCRIPTION
	2190-0918	4	13	WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0918
	3050-0066	8	5	WASHER-FL MTLC NO. 6 .147-IN-ID	73734	1451
2621A to 2830A						
MP4				NO LONGER AVAILABLE, SEE SECTION 7		
MP5				NO LONGER AVAILABLE, SEE SECTION 7		
MP6				NO LONGER AVAILABLE, SEE SECTION 7		
MP7				NO LONGER AVAILABLE, SEE SECTION 7		
MP8				NO LONGER AVAILABLE, SEE SECTION 7		
MP9				NO LONGER AVAILABLE, SEE SECTION 7		
MP10				NO LONGER AVAILABLE, SEE SECTION 7		
MP11				NO LONGER AVAILABLE, SEE SECTION 7		
2924A and above						
MP4	5021-8403	4	1	FRONT FRAME	28480	5021-8403
MP5	5041-8802	9	1	TRIM, TOP	28480	5041-8802
MP6	5001-0539	9	2	TRIM, SIDE	28480	5001-0539
MP7	5062-3736	2	1	TOP COVER	28480	5062-3736
	7120-8607	2	4	LABEL: METRIC/ENGLISH HARDWARE	28480	7120-8607
MP8	5041-8819	8	2	HANDLE CAP, FRONT	28480	5041-8819
	0515-1331	5	4	SCREW-METRIC SPECIALTY M4 X 0.7 THD 6	28480	0515-1331
MP9	5062-3705	5	2	STRAP HANDLE	28480	5062-3705
MP10	5041-8820	1	2	HANDLE CAP, REAR	28480	5041-8820
	0515-1331	5		SCREW-METRIC SPECIALTY M4 X 0.7 THD 6	28480	0515-1331
MP11	5062-3838	5	2	SIDE COVER, PERFORATED	28480	5062-3838
MP12	5021-5838	3	4	CORNER STRUT (SIDE RAILS)	28480	5021-5838
2924A and above						
MP13				NO LONGER AVAILABLE, SEE SECTION 7		
2924A and above						
MP13	5041-8801	8	4	FOOT FULL-1/2 MOD	28480	5041-8801
MP14				NOT ASSIGNED		

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
2924A and above MP15				NO LONGER AVAILABLE, SEE SECTION 7		
2924A and above MP15	5062-3748	6	1	BOTTOM COVER	28480	5062-3748
MP16	5021-5804	3	1	REAR FRAME	28480	5021-5804
MP17	11848-00006	9	1	REAR PANEL	28480	11848-00006
MP18	0515-0212	9	27	SCREW-MACH M3.5 X 0.6 6MM-LG PAN-HD (ATTACH REAR PANEL TO REAR FRAME)	28480	0515-0212
	2190-0102	8	5	WASHER-LK INTL T 15/32 IN .472-IN-ID	28480	2190-0102
	2950-0035	8	13	NUT-HEX-DBL-CHAM 15/32-32-THD	00000	ORDER BY DESCRIPTION
MP19	5041-0201	6	1	KEY CAP, WHITE (LINE)	28480	5041-0201
2621A to 2649A MP20						
	11848-00007	0	1	LINE SWITCH BRACKET	28480	11848-00007
	0515-1412	3	2	SCREW-MACHINE ASSEMBLY M2.5 X 0.45 (ATTACH SWITCH TO BRACKET)	28480	0515-1412
	0515-1331	5	6	SCREW-METRIC SPECIALTY M4 X 0.7 THD 6 (ATTACH BRACKET TO FRONT FRAME)	28480	O515-1331
2703A and above MP20						
	11848-21001	8	1	LINE SWITCH BRACKET	28480	11848-00007
	0515-0367	5	2	SCREW-MACHINE ASSEMBLY M2.5 X 0.45 (ATTACH SWITCH TO BRACKET)	00000	ORDER BY DESCRIPTION
	0515-0657	6	6	SCREW-MACH M3X5 X 0.6 8-MM LG (ATTACH BRACKET TO FRONT FRAME)	28480	O515-0657
2621A to 2706A MP21						
	11848-00001	4	1	MAIN DECK (FOR A3 ASSEMBLY)	28480	11848-00001
	0515-1402	1	30	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD (ATTACH DECK TO SIDE RAIL)	00000	ORDER BY DESCRIPTION
	4040-1415	3	21	SPACER-INSULATING	28480	4040-1415
	1400-0611	0	6	CLAMP-FL-CA 1-WD	28480	1400-0611
	1400-2493	0	3	CABLE CLAMP	28480	1400-2493
2713A and above MP21						
	11848-00025	2	1	MAIN DECK (FOR A3 ASSEMBLY)	28480	11848-00025
	0515-1402	1	30	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD (ATTACH DECK TO SIDE RAIL)	00000	ORDER BY DESCRIPTION
	4040-1415	3	21	SPACER-INSULATING	28480	4040-1415
	1400-0611	0	6	CLAMP-FL-CA 1-WD	28480	1400-0611
	1400-2493	0	3	CABLE CLAMP	28480	1400-2493
MP22	11848-00010	5	1	SHIELD TOP (FOR A4 ASSEMBLY)	28480	11848-00010
MP23	11848-00009	2	1	SHIELD BOTTOM (FOR A4 ASSEMBLY)	28480	11848-00009
	0400-0010	2	4	GROMMET-RND .25-IN-ID .375-IN-GRV-OD	28480	0400-0010
MP24	5001-8232	5	1	GUSSET SIDE	28480	5001-8232
	0515-1331	5	8	SCREW-METRIC SPECIALTY M4 X 0.7 THD 6 (ATTACH GUSSET TO SIDE RAIL)	28480	O515-1331
MP25				NOT ASSIGNED		
MP26	11848-00008	1	1	TRANSFRMR/FAN/A10 SHIELD	28480	11848-00008
MP27	0515-0212	9	27	SCREW-MACH M3.5 X 0.6 6MM-LG PAN-HD	28480	0515-0212
MP28	3050-0066	8	5	WASHER-FL MTLC NO. 6 .147-IN-ID	73734	1451
MP29	11848-00005	8	1	BOARD DECK (FOR A1 ASSEMBLY)	28480	11848-00005
	0515-1402	1	30	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD (ATTACH DECK TO SIDE RAIL)	00000	ORDER BY DESCRIPTION
MP30	35601-04103	8	1	COVER XFMR	28480	35601-04103
MP31	0515-1408	7	4	SCREW-MACH M4 X 0.7 60MM-LG PAN-HD (ATTACH TRANSFORMER AND COVER TO REAR PANEL)	00000	ORDER BY DESCRIPTION
	3050-2007	1	4	WASHER-SHLDR NO. 6 .169-IN-ID .375-IN-OD	06540	2711-21562-PHF169-30
	2190-0009	4	4	WASHER-LK INTL T NO 8 .168-IN-ID	00000	ORDER BY DESCRIPTION
	3050-0071	5	5	WASHER-FL MTLC NO. 8 .169-IN-ID	28480	3050-0071
	0535-0082	3	4	NUT-HEX W/EXT-T-LKWR M4 X 0.7 3.2MM-THK	00000	ORDER BY DESCRIPTION
MP32	0515-0664	5	10	SCREW-MACHINE ASSEMBLY M3 X 0.5 12MM-LG (ATTACH FAN TO REAR PANEL)	00000	ORDER BY DESCRIPTION
	0535-0031	2	7	NUT-HEX W/LKWR M3 X 0.5 2.4MM-THK	00000	ORDER BY DESCRIPTION
MP33	0380-1677	5	4	STANDOFF-HEX 32-MM-LG M3.0 X 0.5-THD (FOR A4 ASSEMBLY SHIELD)	06540	19981-SS-0350

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
MP34	11848-00200	5	1	MIXER BRACKET (OPTION 201 ONLY)	28480	11848-00200
MP35	0515-0682	7	2	SCREW-MACH M3 X 0.5 18MM-LG PAN-HD (ATTACH MIXER (U6) TO BRACKET: OPTION 201 ONLY)	00000	ORDER BY DESCRIPTION
MP36	2190-0584	0	2	WASHER-LK HLCL 3.0 MM 3.1-MM-IC (OPTION 201 ONLY)	28480	2190-0584
MP37	0380-1739	0	2	STANDOFF-HEX 11-MM-LG M3.0 X 0.5 THD (UNDER MIXER BRACKET: OPTION 201 ONLY)	28480	0380-1739
MP38	0515-1246	1	19	SCREW-MACH M3 X 0.5 6MM-LG PAN-HD (ATTACH MIXER BRACKET TO DECK: OPTION 201 ONLY)	28480	0515-1246
MP39	1251-1249	3	1	ADAPTER-COAX RT-ANGLE F-SMA M-SMA (OPTION 201 ONLY)	28480	0515-1246
MP40	0515-1246	1	19	SCREW-MACH M3 X 0.5 6MM-LG PAN-HD (ATTACH A4 ASSEMBLY TO DECK)	28480	0515-1246
MP41	1400-0249	0	28	CABLE TIE .062-.625-DIA .091-WD NYL	28480	1400-0249
MP42	1400-0062	5	2	CLAMP-CABLE .375-DIA .38-WD SPR-STL	28480	1400-0062
MP43	1400-0611	0	6	CLAMP-FL-CA 1-WD	28480	1400-0611
MP44	11848-00004	7	2	REGULATOR BRACKET	28480	11848-00004
	1200-0819	6	10	SOCKET-XSTR 2-CONT TO-3 SLDR-EYE	28480	1200-0819
	08903-00024	2	1	STRIP CUSHION S	28480	08903-00024
MP45	0515-1246	1	19	SCREW-MACH M3 X 0.5 6MM-LG PAN-HD (ATTACH REGULATOR BRACKET TO SIDE RAIL)	28480	0515-1246
	0515-1402	1	30	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD (ATTACH REGULATOR BRACKET TO MAIN DECK)	00000	ORDER BY DESCRIPTION
MP46				NOT ASSIGNED		
MP47	1251-5036	6	1	CONNECTOR 2-PIN M UTILITY	28480	1251-5036
	1251-2097	3	2	CONTACT-CONN U/W-UTIL MALE CRP	28480	1251-2097
MP48	1251-5037	7	2	CONNECTOR 2-PIN F UTILITY	28480	1251-5037
	1251-2418	2	2	CONTACT-CONN U/W-UTIL FEM CRP	28480	1251-2418
MP49	1390-0365	8	2	FASTENER-SNAP IN PLUNGER	28480	1390-0365
MP50	1390-0366	9	2	FASTENER-SNAP IN GROMMET	28480	1390-0366
MP51	11848-00014	7	1	REFERENCE BRACE (INCLUDES ATTACHING HARDWARE)	28480	11848-00014
MP52	0890-0025	6	1	SPIRAL WRAP .188-2-DIA POLYETH (FOR CABLE HARNESS)	28480	11848-00014
MP53	0515-1382	6	6	SCREW-MACH M3.5 X 0.6 6MM-LG	28480	0515-1382
R1	0757-0408	7	4	RESISTOR 243 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-243R-F
R2	0698-3152	8	4	RESISTOR 3.48K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-3481-F
R3	0757-0408	7		RESISTOR 243 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-243R-F
R4	0698-3152	8		RESISTOR 3.48K 1% .125W F TC = 0 + -100	24546	CT4-1/8-T0-3481-F
S1	3101-2216	3		SWITCH-PD DPDT ALTNG 4A 250VAC	28480	3101-2216
T1	9100-4210	5	1	TRANSFORMER-POWER 100/120/220/240V	28480	9100-4210
	0362-0265	7		CONNECTOR SGL CONT SKT 1.14-MM-BSC-SZ	28480	0362-0265
	1400-0611	0	6	CLAMP-FL-CA 1-WD	28480	1400-0611
	3050-2007	1	4	WASHER-SHLDR NO. 6 .169-IN-ID .375-IN-OD	06540	2711-21562-PHF169-30
U1Δ	1826-1181	3	1	IC 340AK M1 P15V	28480	1826-1181
U2	1826-0169	5	1	IC V RGLTR TO-3	27014	LM320K-15
	0340-0580	3	3	INSULATOR-XSTR THRM-CNDCT	28480	0340-0580
U3	1820-0430	1	1	IC 309 V RGLTR TO-3	07263	LM309K
U4	1826-0523	5	1	IC 337 V RGLTR TO-3	27014	LM337K
	0340-0580	3	3	INSULATOR-XSTR THRM-CNDCT	28480	0340-0580
U5	1826-0423	4	1	IC V RGLTR TO-3	27014	LM317K
	0340-0580	3	3	INSULATOR-XSTR THRM-CNDCT	28480	0340-0580
U6	0955-0162	0	1	U-WAVE MIXER 26 GHZ MAX	28480	0955-0162
VR1	1902-1369	1	2	DIODE-ZNR 1N3316B 17V 5% PD = 50W IR = 5UA	28480	1902-1369
	0360-1700	3	2	TERMINAL-SLDR LUG LK-MTG FOR-#10-SCR	28480	0360-1700
VR2	1902-1369	1	2	DIODE-ZNR 1N3316B 17V 5% PD = 50W IR = 5UA	28480	1902-1369
	0360-0040	2	4	TERMINAL-SLDR LUG LK-MTG FOR-#1/4-SCR	28480	0360-0040
	0360-1089	1	2	TERMINAL-SLDR LUG PL-MTG FOR-#1/2-SCR	28480	0360-1089
VR3	1902-1217	8	1	DIODE-ZNR 6.2V 5% DO-4 PD = 10W TC = + .035%	28480	1902-1217
	0360-0016	2	4	TERMINAL-SLDR LUG LK-MTG FOR-#4-SCR	28480	0360-0016

†Refer to Table 7 for update information. Δ Errata part change

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W1	08660-60056	2	1	COAX CABLE ASSEMBLY F S,B-SMB A3J16 TO A4J204 (3)	28480	08660-60056
W2	11848-61006	7	1	COAX CABLE ASSEMBLY F SMB-SMB A3J1 TO A4J205 (1)	28480	11848-61006
W3	86601-60036	1	1	COAX CABLE ASSEMBLY F SMB-SMB A3J2 TO A4J201 (8)	28480	86601-60036
W4	86601-60069	0	1	COAX CABLE ASSEMBLY F SMB-SMB A3J3 TO A4J10 (89)	28480	86601-60069
W5	11848-61007	8	1	COAX CABLE ASSEMBLY F SMB-SMB A3J4 TO C1 (4)	28480	11848-61007
W6	11848-61008	9	1	COAX CABLE ASSEMBLY F BNC-SMB A3J5 TO REAR PANEL J17 (5)	28480	11848-61008
W7	11848-61009	0	1	COAX CABLE ASSEMBLY F BNC-SMB A3J6 TO REAR PANEL J14 (7)	28480	11848-61009
W8	11848-61010	3	1	COAX CABLE ASSEMBLY F BNC-SMB A3J7 TO FRONT PANEL J1 (80)	28480	11848-61010
	5040-7624	9	4	WASHER SHOULDER	28480	5040-7624
W9	11848-61011	4	1	COAX CABLE ASSEMBLY F BNC-SMB A3J8 TO FRONT PANEL J11 (87)	28480	11848-61011
W10	11848-61012	5	1	COAX CABLE ASSEMBLY F BNC-SMB A6J2 TO FRONT PANEL J7 (85)	28480	11848-61012
W11	11672-60004	1	1	COAX CABLE ASSEMBLY F SMB-SMB A3J10 TO A4J206 (2)	28480	11672-60004
W12	11848-61013	6	1	COAX CABLE ASSEMBLY F BNC-SMB A8J2 TO FRONT PANEL J8 (86)	28480	11848-61013
W13				NOT ASSIGNED		
W14	08954-60105	7	1	COAX CABLE ASSEMBLY F BNC-SMB A6J3 TO REAR PANEL J15 (6)	28480	08954-60105
W15	11848-61014	7	1	COAX CABLE ASSEMBLY F BNC-SMB A7J2 TO FRONT PANEL J9 (81)	28480	11848-61014
W16	11848-61015	8	1	COAX CABLE ASSEMBLY F BNC-SMB A8J2 TO FRONT PANEL J10 (83)	28480	11848-61015
W17	11848-61016	9	1	COAX CABLE ASSEMBLY F SMB-SMB A3J9 TO A7J3 (82)	28480	11848-61016
W18	11848-61017	0	1	COAX CABLE ASSEMBLY F BNC-SMB A4J9 TO REAR PANEL J18 (84)	28480	11848-61017
W19	11848-61018	1	1	COAX CABLE ASSEMBLY F BNC-SMB A4J2 TO FRONT PANEL J13 (96)	28480	11848-61018
W20	11848-61019	2	1	COAX CABLE ASSEMBLY F BNC-SMB A4J16 TO FRONT PANEL J12 (97)	28480	11848-61019

†Refer to Table 7 for update information. Δ Errata part change

Table 7. Update Information for Instrument Changes

Reference Designator	Serial Prefix	Description of Change
A1S1, A1S2, A1S3	2720A	Instruments with serial prefixes prior to 2720A have components A1S1, A1S2 and A1S3 installed. These switches are not used, and if improperly set can cause the instrument to malfunction. Any or all of the switches may be removed without affecting the operation of the instrument. These switches are not loaded in instruments with serial prefixes 2720A and above.
MP2, MP4-MP11, MP13, MP15	2924A	CABINET PARTS COLOR CHANGE Serial Prefix 2924A changes color of the instrument covers and accessories. The old color cover and accessories are no longer available. If your instrument has serial prefixes 2830A and below, and you must replace one of these parts, we recommend that you order the full set of covers and accessories. See table 5.
J1	All Prefixes	The voltage output from the rear panelat J1 is the opposite polarity of the front panel voltage. Silk screening has been added to the rear panel "Tune Voltage Output" which reads: "Caution: Inverted Output".

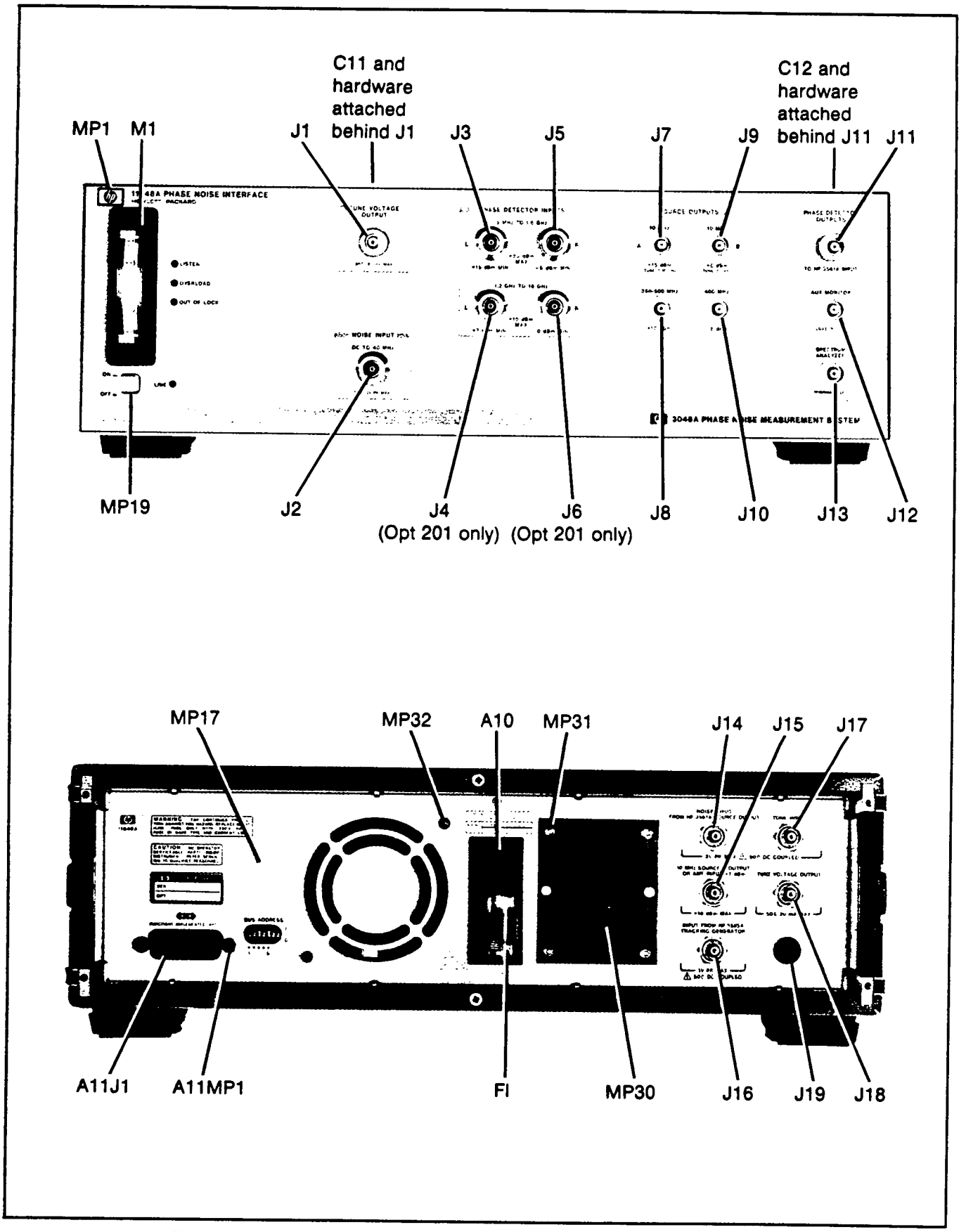


Figure 7. *Parts Identification (Front Panel View and Rear Panel View)*

Table 9. Cross Reference Index

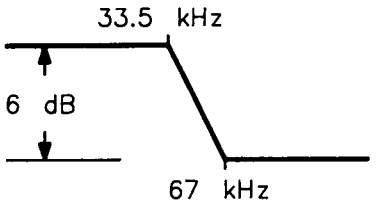
Reference Designator	Assembly Name	Schematic Service Sheet Number	Parts List Page No.
A1	HP-IB Interfacing/Power Supply Assembly	A1a, A1b	27
A2	LED Assembly	A4b	30
A3	Analyzer Interface Assembly	A3a, A3b, A3c	31
A4	Phase Detector Assembly	A4a, A4b, A4c, A4d	39
A5	Not Assigned		
A6	10 MHz VCXO A Assembly	A6	51
A7	10 MHz Modulated VCXO B Assembly	A7	54
A8	350-500 MHz VCO Assembly	A8	57
A9	400 MHz Oscillator Assembly	A9	59
A10	Line Power Module	A1b	61
A11	HP-IB Connector Assembly	A1a	62
A12	LNA2 Assembly	A12	62.1

Table 10. Factory Selected Components

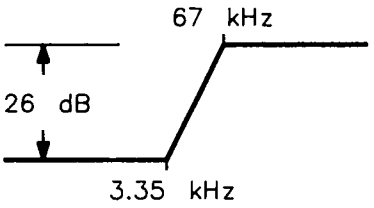
Reference Designator	Service Sheet	Range of Values	Basis of Selection
A12C17	A12	4.7pF to 22pF	Selected to provide optimum flatness in the X5 gain function of LNA2. Increase the value of C17 to provide more gain, and decrease peaking, at the high end (40 MHz) of the amplifier output. Decrease the value of C17 to compensate for excess roll-off at the high end. This will have little or no effect at the low end (<10 MHz). The input and output of LNA2 should be isolated from the 11848A signal paths to observe the most evident changes.

1. Switches on tlhe Block Diagram are shown in their HP-IB preset state. At Interface turn-on with no controller connected, the power-up state is the same as the HP-IB preset state except:
   a. ATTEN 1 is set to an open-circuit (non-programmable) state, and
   b. the switches of cluster S5 through S8 are all open.

2. The transfer function of GAIN 2 also has a lead-lag response as follows:



3. The transfer function of Lag-Lead Network 1 is as follows:



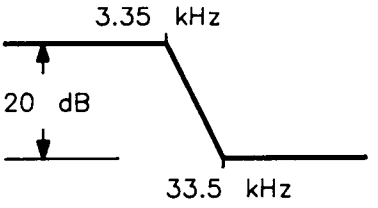
   To this transfer function is added a programmable lag-lead with the following poles and zeros:

Lag-Lead Number	Pole Frequency	Zero Frequency	Attenuation
0	4.82 Hz	9.95 Hz	6 dB
1	8.01 Hz	40.1 Hz	14 dB
2	9.17 Hz	115.9 Hz	22 dB
3	9.68 Hz	306 Hz	30 dB
4	9.95 Hz	784 Hz	38 dB
5	9.95 Hz	1.985 kHz	46 dB
6	9.95 Hz	5.00 kHz	54 dB
7	9.95 Hz	12.58 kHz	62 dB

4. Assemblies A6, A8, and A9 are controlled as follows:

Control Line	State		
	A6	A8	A9
L17	Off	On	On
L18	Off	On	Off
L17, L18	On	Off	Off

5. The transfer functions of Lag-Lead Network 2 on A4 and the Lag-Lead Network on A3 are both as follows:



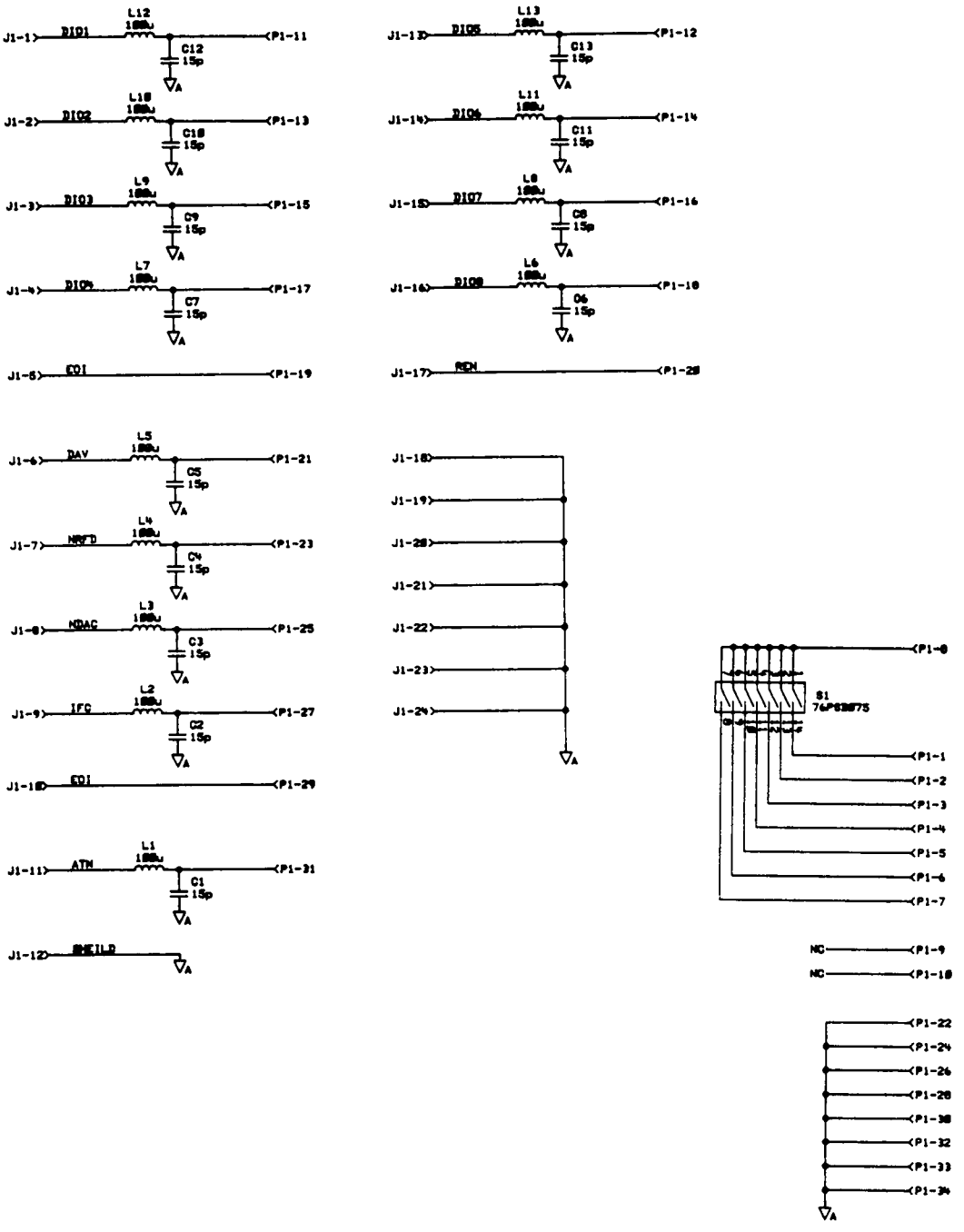
6. The passband gain of the High-Pass Filters is 2 (as measured from TP17 to the respective filter output). The gain settings of the GAIN 3 amplifier and attenuator include the passband gain of the High-Pass Filters.

Block Diagram Notes

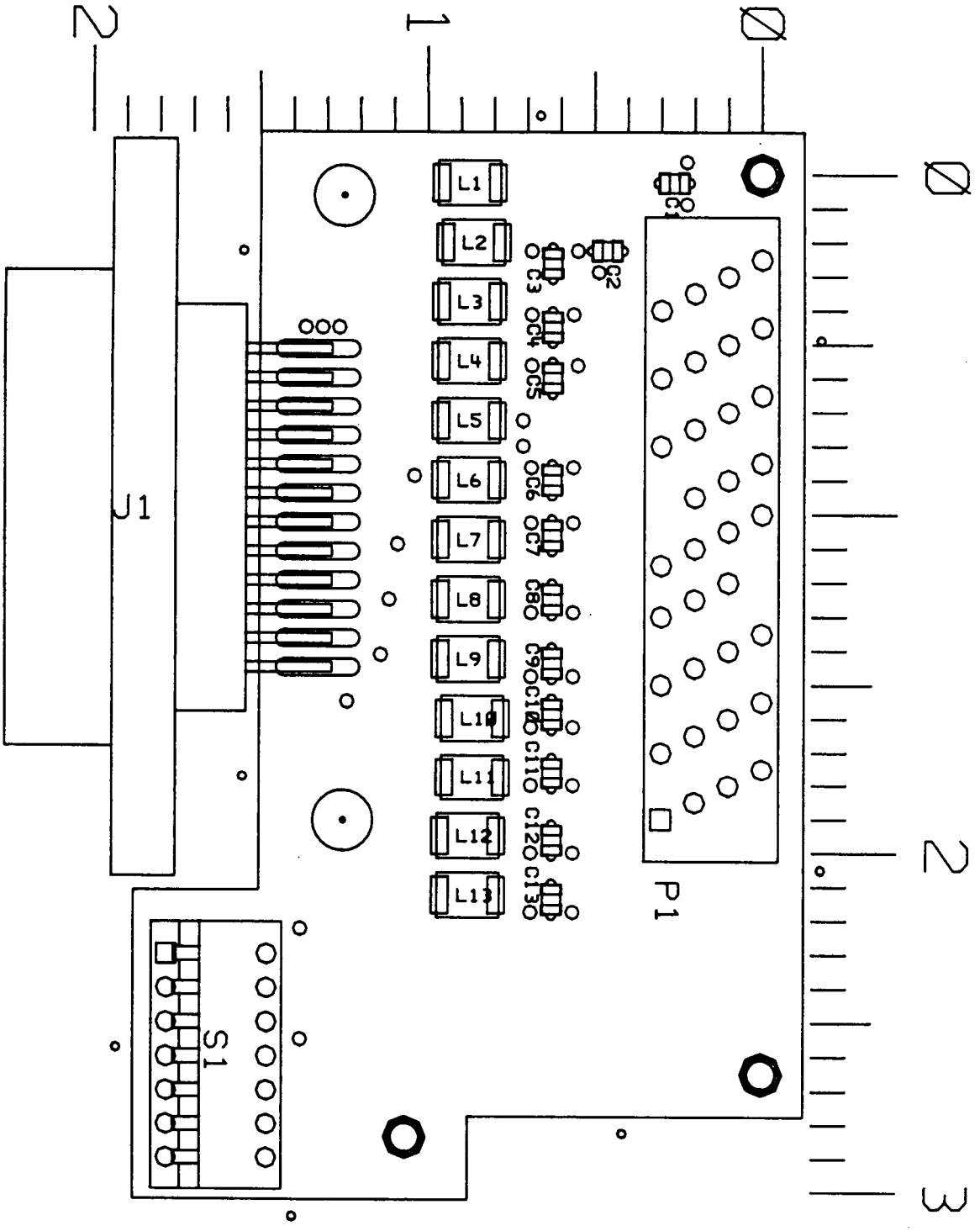
CHANGES

All Serial Prefixes	**On the A1 Component Locator:** • **A1S1, S2, S3** - Delete S1, S2 and S3. At serial prefix 2720A, A1S1, S2 and S3 were removed. These switches are not used (open) and could cause the instrument to fail or malfuntion if improperly set. Any or all of the switches may be removed without affecting the operation of the instrument. **On the A1 Schematic:** • **A1S1, S2, S3** - Delete S1, S2 and S3. At serial prefix 2720A, A1S1, S2 and S3 were removed. These switches are not used (open) and could cause the instrument to fail or malfuntion if improperly set. Any or all of the switches may be removed without affecting the operation of the instrument.
3040A and above	**On the Schematic:** • **A11** - Use the new schematic on page 92.3 for all references to the HP-IB Connector Assembly. **On the Component Locator:** • **A11** - Use the new component locator on page 92.4 for all references to the HP-IB Connector Assembly.

Reserved for Future Updates.



A11 Schematic – HP-IB Assembly
Serial Prefix 3040A and above



A11 Component Locator - HP-IB Assembly
Serial Prefix 3040A and above

CHANGES

All Serial Prefixes	On the A1b Schematic:
	• **J18, J19** - Change the reference designator of J18 to CR18J18, and J19 to CR19J19.

Reserved for future changes.

CHANGES

2749A and above	**On the A3 Component Locator:** • **A3R208** - Change the reference designator of R208 to VR1. **On the A3 Component Locator:** • **A3R207, R208, R209** - Change the value of R207 to 1.33k. Change the value of R209 to 2.61k. Change the reference designator of R208 to VR1; connect the anode to ground. Connect the cathode to the line connecting R207 and pin 15 of U208.

Reserved for future changes.

All serial prefixes	**On the A3 schematic:** • **R36** - Change the value of R36 to 261K ohms. • **R41, R42, R51, R52** - Under 1 kHz LOW-PASS FILTER change R41 26.1K to R51 2.61K and change R42 4.22K to R52 422K. • **R41, R42, R56, R57** - Under 10 kHz LOW-PASS FILTER change R41 26.1K to R56 2.61K and change R42 4.22K to R57 422K. • **C34, R61** - Under AC/DC ADAPTIVE COUPLER locate U15 pin 13 and add R61 251K in series with the +5V supply. Add C34 15 uF between U15 pin 13 and R61. • **R76, R82** - Under 10 Hz HIGH-PASS FILTER connect R76 to R79. Under 100 Hz HIGH-PASS FILTER connect R82 to R85.

CHANGES

2717A and above	**On the A3 Schematic:** • **A3R110, R113** - Change the value of R110 to 2.5k. Change the value of R113 to 2.61k.

Reserved for future changes

CHANGES

All serial prefixes	**On the A4 schematic:** • **C14** - In OVERLOAD DETECTOR, change the value of C14 to 18pF.
2830A and above	**On the schematic:** • **L15** - In the upper right hand corner of the A4b schematic change the value of L15 to 100UH. • **R35** - In the upper right hand corner of the A4b schematic change the value of R35 to 2.15K ohm.

CHANGES

All serial prefixes	**On the A7 schematic:** • In PHASE MODULATOR, draw a line to connect U3 pin 5 to R25.

CHANGES

All Serial Prefixes	On the A9 Schematic:
	• **C14** - Under 50dB PAD change the value of C14 to 100pF. • **C15, C17, C19** - Under AMPLIFIERS (42dB) change the value of C15, C17 and C19 to 100pF.

Reserved for future changes.

CHANGES

2938A and above	**A12 Component Locator:** • Use the new A12 component locator on page 118.3. **A12 Schematic:** • Use the new A12 schematic on page 119.
All Serial Prefixes	**On the A12 Schematic:** • C17 - Change C17 to a star value component by adding an asterisk (*) next to the reference designator. • C17 - Change the value of C17 to 10 pF. • C17 - Use *Table 10.Factory Selected Components* on page 89 for selection.

Reserved for future changes

HP 11848A
PHASE NOISE INTERFACE
(Including Option 301)

Service Manual

SERIAL NUMBERS

This manual applies directly to instruments with serial numbers prefixed:

2621A and all *MAJOR* changes that apply to your instrument

rev.15NOV90

For additional important information about serial numbers, refer to "INSTRUMENTS COVERED BY THIS MANUAL" in Section 1.

Third Edition

EAST 24001 MISSION AVENUE, TAF C-34, SPOKANE, WASHINGTON, U.S.A. 99220

Service Manual HP Part 11848-90004

Microfiche Service Manual HP Part 11848-90011

Printed in U.S.A. : MAY 1990

HEWLETT PACKARD

CERTIFICATION

Hewlett-Packard Company certifies that this product met its published specifications at the time of shipment from the factory. Hewlett-Packard further certifies that its calibration measurements are traceable to the United States National Bureau of Standards, to the extent allowed by the Bureau's calibration facility, and to the calibration facilities of other International Standards Organization members.

WARRANTY

This Hewlett-Packard instrument product is warranted against defects in material and workmanship for a period of one year from date of shipment. During the warranty period, Hewlett-Packard Company will at its option, either repair or replace products which prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by HP. Buyer shall prepay shipping charges to HP and HP shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to HP from another country.

HP warrants that its software and firmware designated by HP for use with an instrument will execute its programming instructions when properly installed on that instrument. HP does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error free.

LIMITATION OF WARRANTY

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

NO OTHER WARRANTY IS EXPRESSED OR IMPLIED. HP SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

EXCLUSIVE REMEDIES

THE REMEDIES PROVIDED HEREIN ARE BUYER'S SOLE AND EXCLUSIVE REMEDIES. HP SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON CONTRACT, TORT, OR ANY OTHER LEGAL THEORY.

ASSISTANCE

Product maintenance agreements and other customer assistance agreements are available for Hewlett-Packard products.

For any assistance, contact your nearest Hewlett-Packard Sales and Service Office. Addresses are provided at the back of this manual.

SAFETY CONSIDERATIONS

GENERAL

This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation.

This product is a Safety Class I instrument (provided with a protective earth terminal).

BEFORE APPLYING POWER

Verify that the product is set to match the available line voltage and the correct fuse is installed.

SAFETY EARTH GROUND

An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set.

SAFETY SYMBOLS

Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual (refer to Table of Contents).

Indicates hazardous voltages.

Indicates earth (ground) terminal.

WARNING The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

CAUTION The CAUTION sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

WARNING

Any interruption of the protective (grounding) conductor (inside or outside the instrument) or disconnecting the protective earth terminal will cause a potential shock hazard that could result in personal injury. (Grounding one conductor of a two conductor outlet is not sufficient protection).

Whenever it is likely that the protection has been impaired, the instrument must be made inoperative and be secured against any unintended operation.

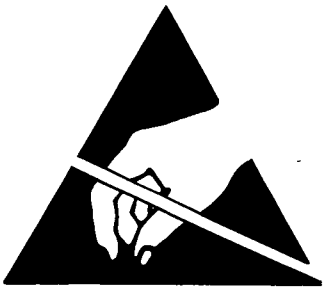
If this instrument is to be energized via an autotransformer (for voltage reduction) make sure the common terminal is connected to the earth terminal of the power source.

Servicing instructions are for use by service-trained personnel only. To avoid dangerous electric shock, do not perform any servicing unless qualified to do so.

Adjustments described in the manual are performed with power supplied to the instrument while protective covers are removed. Energy available at many points may, if contacted, result in personal injury.

Capacitors inside the instrument may still be charged even if the instrument has been disconnected from its source of supply.

For continued protection against fire hazard, replace the line fuse(s) only with 250V fuse(s) of the same current rating and type (for example, normal blow, time delay, etc.). Do not use repaired fuses or short circuited fuseholders.



ATTENTION
Static Sensitive Devices

This instrument was constructed in an ESD (electro-static discharge) protected environment. This is because most of the semiconductor devices used in this instrument are susceptible to damage by static discharge.

Depending on the magnitude of the charge, device substrates can be punctured or destroyed by contact or mere proximity of a static charge. The results can cause degradation of device performance, early failure, or immediate destruction.

These charges are generated in numerous ways such as simple contact, separation of materials, and normal motions of persons working with static sensitive devices.

When handling or servicing equipment containing static sensitive devices, adequate precautions must be taken to prevent device damage or destruction.

Only those who are thoroughly familiar with industry accepted techniques for handling static sensitive devices should attempt to service circuitry with these devices.

In all instances, measures must be taken to prevent static charge build-up on work surfaces and persons handling the devices.

For further information on ESD precautions, refer to "SPECIAL HANDLING CONSIDERATIONS FOR STATIC SENSITIVE DEVICES" in Section VIII Service Section.

TABLE OF CONTENTS

General Information

INTRODUCTION

This Service Manual contains information for installation of the Hewlett-Packard Model 11848A Phase Noise Interface.

The HP 11848A is the Phase Noise Interface for the HP 3048A Phase Noise Measurement System. The Interface supports several measurement techniques for phase noise and AM noise measurements. Inside the Interface are the phase detectors, amplifiers, filters, and switches necessary to measure phase noise over a frequency range of 5 MHz to 18 GHz. An input for an external phase detector outside that frequency range is also provided. The built-in sources allow the system to functionally check all of its signal handling circuits to insure proper operation before measurements are made.

INSTRUMENTS COVERED BY THIS MANUAL

Attached to the instrument is a serial number plate. The serial number is in the form 1234A00123. The first four digits and the letter are the serial prefix. The last five digits form the sequential suffix that is unique to each instrument.

SPECIFICATIONS

The specifications for the Interface are included in the specifications for the HP 3048A Phase Noise Measurement System which specifies the entire system. There are no specifications that apply to the Interface alone.

PERFORMANCE TESTS

The performance Tests for the Interface are included in the performance tests for the HP 3048A Phase Noise Measurement System. These tests can be found in the HP 3048A System Calibration Manual.

It is not necessary to run the System performance tests after the System is initially installed. These tests are performed at the factory before shipment. However, performance tests should be run every 12 months or whenever the Interface has been repaired.

CALIBRATION

The calibration of the Interface consists of generating correction factors for the various measurement paths and storing them on the software disc for corrections of 0 Hz to 100 kHz as CALDATALO and 100 kHz to 40 MHz as CALDATAHI. Stored with CALDATAHI are the nominal voltages (VNOMs) to set each internal source to its nominal frequency.

The calibration of the Interface is only part of the calibration of the HP 3048A Phase Noise Measurement System and must be done with the System. For calibration refer to the *HP 3048A Phase Noise Measurement System Calibration Manual.*

The complete calibration for a HP 3048A Phase Noise Measurement System includes the following:

1. HP 3561A Dynamic Signal Analyzer bench calibration.
2. RF Analyzer bench calibration. (If an RF analyzer is configured in the system.)
3. HP 3048A Functional Checks.
4. HP 11848A Adjustments. (The adjustments should only be run if the Functional Checks show a problem.)
5. HP 3048A System Calibration Option 2. (This is total calibration of the HP 11848A Interface's measurement paths.)
6. HP 3048A Performance Tests.

Before calibrating the System, the HP 3561A Dynamic Signal Analyzer and any configured RF analyzer should be separately bench calibrated if they are beyond their calibration period.

NOTE

Measurement of phase noise is a ratio measurement where both the numerator (the noise power) and the denominator (the carrier's power) of the ratio are measured by the same system spectrum analyzer(s). The accuracy of this relative measurement depends on the amplitude linearity of the spectrum analyzer. A precision attenuator is used, in turn, to verify the linearity specification of the spectrum analyzer. The amplitude linearity calibration of the spectrum analyzer will be traceable to the National Bureau of Standards (NBS) if the precision attenuator and other instrumentation used to perform the calibration is traceable to NBS.

The following are guidelines as to when the Interface hardware calibration and System performance tests should be run:

- It is not necessary to calibrate the Interface after the System is initially installed. The calibration procedure is done at the factory before shipment, and the unique calibration data for the Interface is stored on a software disc. This disc is included within the software set shipped with your Interface.
- Whenever the environment changes 10°C or more, Option 1 calibration should be run to generate new calibration data for the Interface to ensure accurate System performance.
- Once a year, after a repair of the Interface, or when a problem is suspected in the Interface the following test should be run to ensure accurate System measurement results:
  a. Functional Checks.
  b. Adjustments. (The adjustments should only be run if the Functional Checks show a problem.)
  c. Calibration Option 2. (This is a total calibration of the Interface measurement paths.)
  d. Performance Tests.

The performance tests can be run more often if desired to ensure that the system meets the published specifications contained in Section 1 of the *HP 3048A Operating Manual.*

It is suggested that the performance test be run in the following order:

1. Spur Accuracy Performance Test (spurious signal).
2. Noise Flatness Performance Test. (This test need only be run if an RF analyzer is included in the system configuration.)
3. Noise Floor Performance Test.

DOCUMENTATION UPDATING

An instrument manufactured after the printing of these manuals may have a serial-number prefix that is not listed on the manual title page. Having a serial-number prefix that is greater than that shown on the title page indicates that the instrument is slightly different from those documented in the manual. In this case, your manual may be provided with updating information to make it as current as possible. This updating information contains all major change information that applies to instruments beyond the serial-prefix range defined on the title page. Minor changes may not be included but will be covered in subsequent updates you can receive by joining the Documentation Update Service.

A Description of the Manual Update Packet

A *Manual Update* packet consists of replacement and addition pages which should be incorporated in your manual to bring it up to date. (An addition page results when new information won't fit on a replacement page.)

Signing Up for the Documentation Update Service

Hewlett-Packard offers a Documentation Update Service that will provide you with further updates and changes as they become available. If you have not received update information that matches the serial number of your instrument, you can receive this information through the Update Service.

If you operate or service instruments with different serial prefixes, we strongly recommend that you join this service immediately to ensure that your manual is kept current.

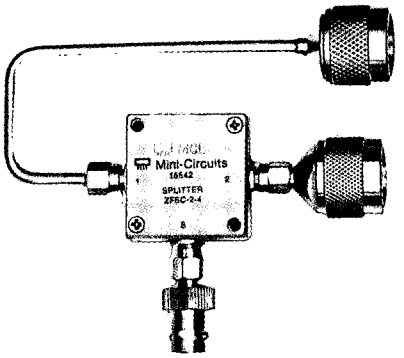
For more information, refer to the Documentation Update Service reply card included in this manual or contact:

Hewlett-Packard Company
Technical Writing Department
24001 E. Mission–TAF C-34
Spokane, WA 99220
(509) 922-4001

Also, if you join the update service, you can indicate whether you choose to be contacted in the future about the quality of the documentation you receive. We are constantly trying to provide the best documentation possible and periodically survey our customers as to their expectations and the usability of the manuals we provide.

SAFETY CONSIDERATIONS

The Interface is a Safety Class I instrument (that is, provided with a protective earth terminal). Before operation, look over the Phase Noise Interface and its related documentation to get familiar with safety markings and instructions. Refer to the *Safety Considerations* page found at the beginning of this manual for a summary of the safety information. Safety information that applies to the specific task at hand (for example, installation) is found in this manual.

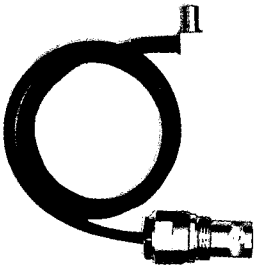


Noise Floor Test Fixture

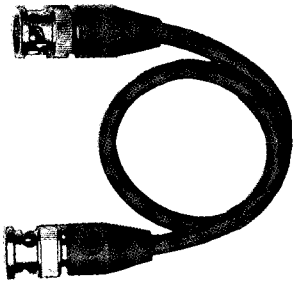
Fuses

50Ω Termination

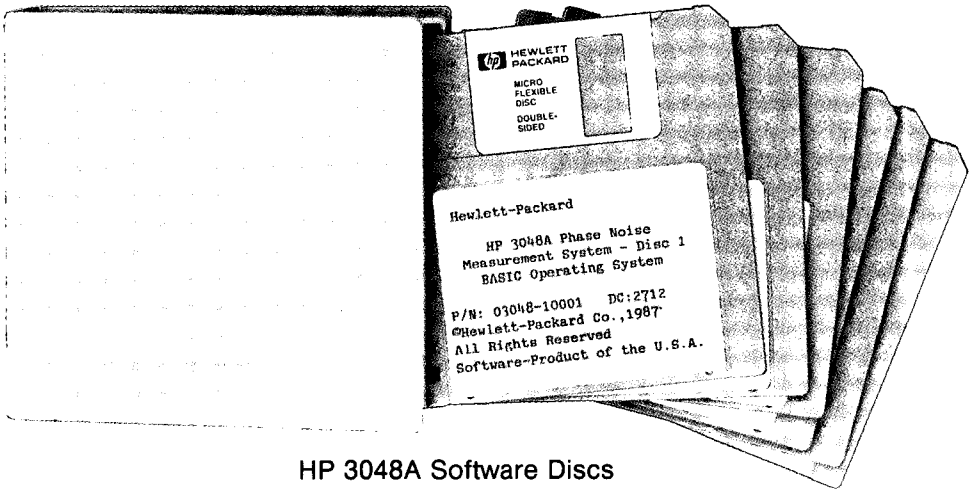
Adapters, Type-N to BNC



Cable Assembly; BNC to SMB



Cables Assemblies; BNC



HP 3048A Software Discs

Figure 1. *Accessories Supplied*

ACCESSORIES SUPPLIED

The accessories supplied are pieces of equipment that are shipped with every Interface. The accessories are shown in Figure 1.

Line Power Cable. The line power cable may be supplied in several plug configurations, depending on the destination of the original shipment. Refer to *Power Cables* in the *Installation* section of this *Service* manual.

Fuses. Fuses with a 0.75A rating for 115 Vac (HP part number 2110-0063) and a 0.5A rating for 230 Vac (HP part number 2110-0012) are supplied. One fuse is factory installed according to the voltage available in the country of original destination. Refer to *Power Requirements* in the *Installation* of this *Service* manual.

HP 3048A Software Discs and Manual Set. The HP 3048A software set and associated manuals are shipped with the Interface.

HP 3048A Software Set (HP part number 11848-61026).

HP 11848A Service Manual (HP part number 11848-90004).

HP 3048A Operating Manual (HP part number 03048-90001).

HP 3048A Reference Manual (HP part number 03048-90002).

50Ω Termination. This 50Ω load is used to terminate the Interface's Spectrum Analyzer output if no RF spectrum analyzer is available (HP part number 1250-0207).

Adapters, Type-N to BNC. Three adapters are provided for system operation (HP part number 1250-0780).

Cable Assemblies: BNC. Two 30 cm (12 in.) cables are provided for system operation (HP part number 8120-1838).

Noise Floor Test Fixture. This test fixture is used to run performance tests (HP part number 11848-61032).

Cable Assembly: BNC to SMB. This cable assembly can be used during troubleshooting (HP part number 08954-60105).

RECOMMENDED TEST EQUIPMENT

Table 1 lists the test equipment and accessories recommended for use in testing, adjusting, and servicing the Interface. If any of the recommended equipment is unavailable, instruments with equivalent minimum specifications may be substituted.

Tests for the Interface are performed during the HP 3048A Performance Tests which are available in the *HP 3048A Operating Manual* in *Appendix B, Performance Tests.*

Table 1. *Recommended Test Equipment*

Instrument Type	Model Number	Use*
Dynamic Signal Analyzer	HP 3561A	A,C,P,T **
Counter (550 MHz)	HP 5383A, HP 5386A	P
Function Generator	HP 3312A, HP 3325A	P,T
Oscilloscope	HP 1740A	T
Power Meter and Sensor	HP 435B or HP 436A with HP 8481A or HP 8482A	T

* A=Adjustments, C=Functional Checks, P=Performance Tests, T=Troubleshooting
** The HP 3561A is included with the HP 3048A system.

OPTIONS AVAILABLE

Options are variations on the standard instrument which can be ordered during the purchase.

Electrical Options

Option 201: Add High Frequency Phase Detector. This option adds a 1.2 to 18 GHz phase detector to the Interface. This phase detector extends the range of carrier frequencies that can be demodulated within the Interface without external down conversion by the System. All of the HP 3048A specifications from 1.6 to 18 GHz carrier frequency are valid with this option.

Mechanical Options

Option 907: Front-Handle Kit. Front handles are provided when Option 907 is ordered. After shipment, you can order a Front-Handle Kit as HP part number 5061-9689.

Option 908: Rack-Flange Kit. Rack flanges are provided for the HP 11848A Phase Noise Interface when Option 908 is ordered. After shipment, you can order a Rack-Flange Kit as HP part number 5061-9677.

Option 909: Rack-Flange and Front-Handle Combination Kit. This is not a Front-Handle Kit and a Rack-Flange Kit packaged together; it is a unique part that combines both functions. Combination kits are provided for the HP 11848A Phase Noise Interface when Option 909 is ordered. After shipment, you can order a Rack-Flange and Front-Handle Combination Kit as HP part number 5061-9683.

INSTALLATION

INTRODUCTION

This section provides the information needed to install the HP 11848A Phase Noise Interface. Included is information pertinent to initial inspection, power requirements, line voltage selection, power cables, environment, storage, and shipment.

INITIAL INSPECTION

WARNING

To avoid hazardous electrical shock, do not perform electrical tests when there are signs of shipping damage to any portion of the outer enclosure (covers and panels).

Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the instrument has been checked mechanically and electrically. Procedures for checking electrical performance are given in the *Confidence Check* found in the *HP 3048A Operating Manual.* If the contents are incomplete, if there is mechanical damage or defect, or if the instrument does not pass the electrical performance test, notify the nearest Hewlett-Packard office. If the shipping container is damaged, or the cushioning material shows signs of stress, notify the carrier as well as the Hewlett-Packard office. Keep the shipping materials for the carrier's inspection.

PREPARATION FOR USE

Power Requirements

The HP 11848A requires a power source of 100 Vac (90 to 105 Vac), 120 Vac (108 to 126 Vac), 220 Vac (198 to 231 Vac), or 240 Vac (216 to 252 Vac), 47.5 to 440 Hz single phase. Power consumption is 260 VA maximum.

WARNING

This is a Safety Class I product (i.e., provided with a protective earth terminal). An uninterrupted safety earth ground must be provided from the Mains power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the instrument must be made inoperative and be secured against any unintended operation.

If this instrument is to be energized via an external autotransformer for voltage reduction, make sure that the common terminal is connected to the earth pole of the power source.

CAUTION

BEFORE PLUGGING THIS INSTRUMENT into the Mains (line) voltage, be sure the correct voltage and fuse have been selected.

A rear-panel, line power module permits operation from 100, 120, 220, or 240 Vac. The number visible in the window (located on the module) indicates the nominal line voltage to which the instrument must be connected. Verify that the line voltage selection and the fuse are matched to the power source. Refer to Figure 2, Line Voltage and Fuse Selection.

Two fuses are supplied with each instrument. One fuse has the proper rating for 110/120 Vac line operation (HP part number 2110-0063; 0.75A, 250V, non-time-delay). The other fuse is rated for 200/220 Vac operation (HP part number 2110-0012; 0.5A, 250V, non-time-delay).

One fuse is installed in the instrument at the time of shipment. The rating of the installed fuse is selected according to the line voltage specified by the customer. If the voltage is not specified, the rating of the installed fuse will be selected according to the country of destination.

WARNING

For protection against fire hazard, the line fuse should only be a 250V normal blow fuse with the correct current rating.

Power Cables

WARNING

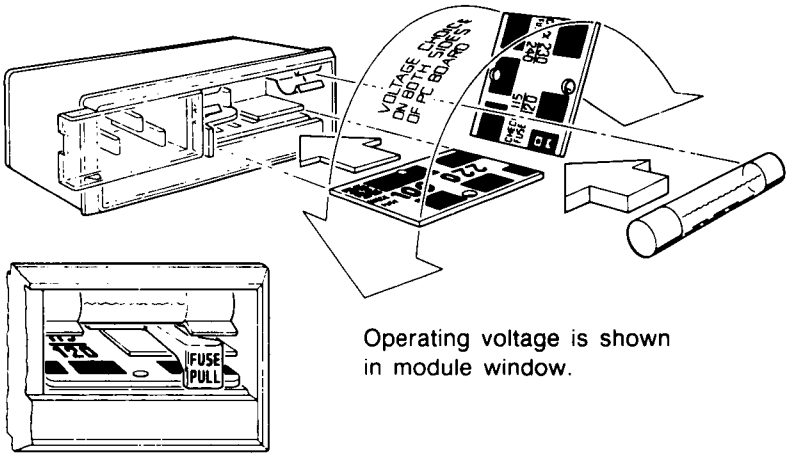
BEFORE CONNECTING THIS INSTRUMENT, the protective earth terminal of the instrument must be connected to the protective conductor of the (mains) power cord. The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. The protective action must not be negated by the use of an extension cord (power cable) without a protective conductor (grounding). Grounding one conductor of a two conductor outlet is not sufficient protection.

This instrument is equipped with a three-wire power cable. When connected to an appropriate ac power receptacle, this cable grounds the instrument cabinet. The type of power cable plug shipped with each instrument depends on the country of destination. Refer to Table 2 on for the part numbers of the power cables and Mains plugs available.

Mating Connectors

Coaxial Connectors. Coaxial mating connectors used with the Phase Noise Interface should be either the 50-ohm BNC male connectors or 50-ohm Type-N male connectors that are compatible with those specified in US MIL-C-39012.

The application note, "Principles of Microwave Connector Care" (HP part number 5958-7442) can help you improve measurements and reliability. Suggestions in the application note will help you get the best performance from all microwave connectors. It will show what to look for when cleaning and inspecting connectors (in order to preserve their precision and extend their life) and how to make the best possible microwave connections (improving the accuracy and repeatability of all your measurements).



Selection of Operating Voltage and Fuse Replacement

1. Open cover door, pull the FUSE PULL lever and rotate to left. Remove the fuse.
2. Remove the Line Voltage Selection Card. Position the card so the line voltage appears at top-left corner. Push the card firmly into the slot.
3. Rotate the FUSE PULL lever to its normal position. Insert a fuse of the correct value in the holder. Close the cover door.

Figure 2. *Line Voltage and Fuse Selection*

Operating Environment

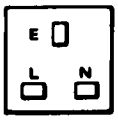
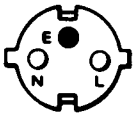
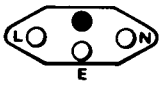
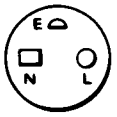
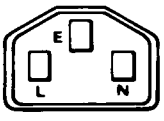
The operating environment should be within the following limitations:

Temperature	0°C to +55°C
Humidity	5% to 95% (maximum wet bulb temperature = 40°C)
Altitude	<4600 meters (15 000 feet)
Airflow	5.8 mm (0.23 in.) minimum clearance underneath the instrument and sufficient clearance behind the instrument for air flow that is not obstructed.

Rack Mounting

Rack mounting information is provided with the rack mounting kit. If the kit was not ordered with the instrument as an option, it may be ordered through the nearest Hewlett-Packard office. For rack-mount kit part numbers, refer to *Mechanical Options* in the *General Information* section of this manual.

Table 2. AC Power Cables Available

Plug Type	Cable HP Part Number	C D	Plug Description	Cable Length (inches)	Cable Color	For Use In Country
250V 	8120-1351 8120-1703	0 4	90°/STR BS1363A* 90°/90°	90 90	Mint Gray Mint Gray	United Kingdom, Cyprus, Nigeria, Rhodesia, Singapore
250V 	8120-1369 8120-0696	0 4	STR/STR NZSS198/ASC112* STR/90°	79 80	Gray Gray	Austrailia, New Zealand
250V 	8120-1689 8120-1692	7 2	STR/STR* STR/90°	79 79	Mint Gray Mint Gray	East and West Europe, Saudi Arabia, Egypt, (unpolarized in many nations)
125V 	8120-1378 8120-1521 8120-1751	1 6 1	STR/STR NEMA5-15P* STR/90° STR/STR	80 80 90	Jade Gray Jade Gray Jade Gray	United States, Canada, Mexico, Phillipines, Taiwan U.S./Canada
100V (Same plug as above)	8120-4753 8120-4754	2 3	STR/STR STR/90°	90 90	Dark Gray Dark Gray	Japan only Japan only
250V 	8120-2104 8120-2296 8120-3997	3 Type 12 4 4	STR/STR SEV1011 1959-24507 STR/90° STR/90°	79 79 177	Gray Gray Gray	Switzerland
250V 	8120-0698	6	STR/STR NEMA6-15P	90	Black	United States, Canada
250V 	8120-2956 8120-2957 8120-3997	3 4 4	90°/STR 90°/90° STR/STR	79	Gray	Denmark
250V 	8120-4211 8120-4600	7 8	STR/STR*IEC83-B1 STR/90°	79 79	Black Gray	South Africa, India
250V 	8120-1860 8120-1575 8120-2191 8120-4379	6 0 8 8	STR/STR*CEE22-V1 (Systems Cabinet Use) STR/STR STR/90° 90°/90°	59 31 59 80	Jade Gray Jade Gray Jade Gray Jade Gray	

* Part number shown for plug is industry identifier for plug only. Number shown for cable is HP Part Number for complete cable including plug. E = Earth Ground; L = Line; N = Neutral; STR = Straight

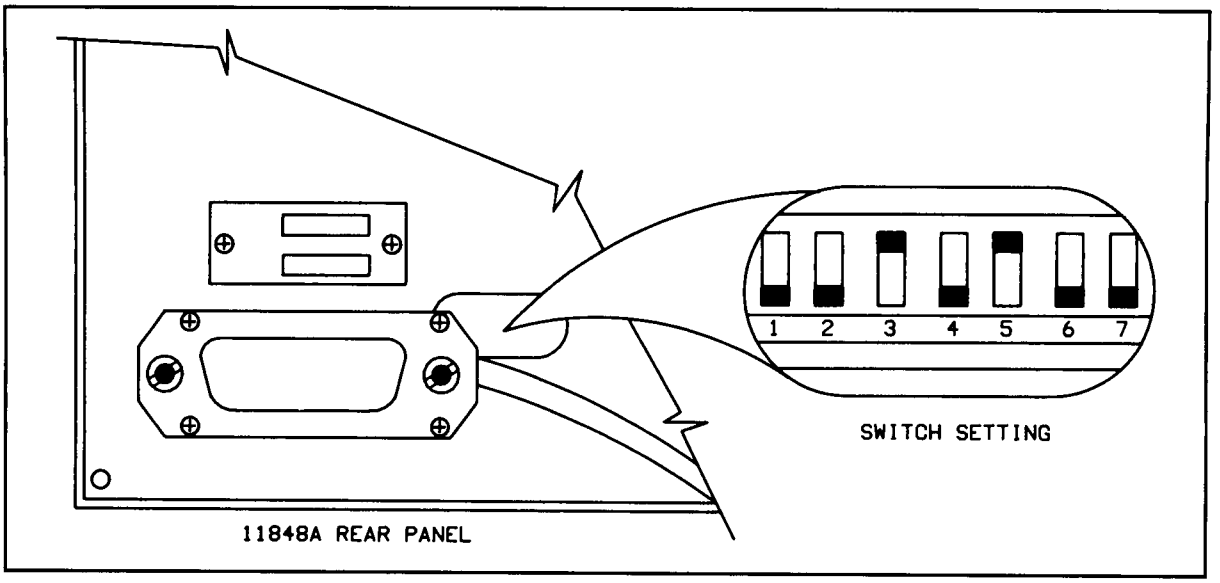


Figure 3. *HP-IB Address Switch*

HP-IB Address Selection

The HP-IB address is selectable using rocker switches on the rear-panel of the Phase Noise Interface. These rocker switches are set up in a binary format with switch number 1 as the least significant digit and switch number 5 as the most significant digit. (Switches 6 and 7 are not used.) Any one of 31 HP-IB addresses can be set (00 through 30).

The address of the HP 11848A is set to 20 at the factory (switches 3 and 5 high; 16 + 4 = 20). Refer to Figure 3.

STORAGE AND SHIPMENT

Environment

The instrument should be stored in a clean, dry environment. The following environmental limitations apply to both storage and shipment:

Temperature ..... −55°C to +75°C
Humidity ..... 5% to 95% (maximum wet-bulb temperature = 40°C)
Altitude ..... 15 300 meters (50 000 feet)

Packaging

Original Packaging. Containers and materials identical to those used in factory packaging are available through Hewlett-Packard offices. If the instrument is being returned to Hewlett-Packard for servicing, attach a tag indicating the type of service required, return address, model number, and full serial number. Also mark the container FRAGILE to assure careful handling. In any correspondence refer to the instrument by model number and full serial number.

Other Packaging. The following general instructions should be used for repackaging with commercially available materials:

1. Wrap the instrument in heavy paper or plastic. (If shipping to a Hewlett-Packard office or service center, attach a tag indicating the service required, return address, model number, and full serial number.)
2. Use a strong shipping container. A double wall carton made of 2.4 MPa (350 psi) test material is adequate.
3. Use enough shock-absorbing material (75 to 100 mm layer; 3 to 4 in.) around all sides of the instrument to provide firm cushion and prevent movement in the container. Protect the front panel with cardboard.
4. Seal the shipping container securely.
5. Mark the shipping container FRAGILE to ensure careful handling.

Principles of Operation for the Block Diagram

General

The HP 11848A Phase Noise Interface is the central instrument in the HP 3048A Phase Noise Measurement System. It is a collection of circuits configured under computer control to make accurate phase-noise measurements on a wide variety of devices-under-test and using several test methods. Besides the Interface, the System includes:

- a Fast-Fourier-Transform (FFT) spectrum analyzer (the HP 3561A Dynamic Signal Analyzer) that measures the demodulated phase noise as a function of frequency offset from the carrier,
- optionally, an additional RF spectrum analyzer that extends the frequency-offset measurement range,
- optionally, reference sources with high spectral purity, and
- the system controller.

Some of the interface circuits in the HP 11848A Phase Noise Interface include:

- numerous signal-routing switches,
- an RF phase detector and optionally a microwave phase detector (1) for demodulation of phase noise to be measured by the spectrum analyzers and (2) to provide a tune voltage to phase lock the input sources in quadrature when the phase-noise-using-a-phase-lock-loop method is used,
- various networks which process the phase detector output for voltage control of the input sources,
- various networks which process the noise for measurement by the spectrum analyzer,
- detectors which sense erroneous measurement conditions,
- four RF sources for system calibration verification, and
- control circuits which interface with the controller via HP-IB.

The maximum frequency offset from the carrier that can be measured by the system is 100 kHz for the standard system and 40 MHz with an additional RF spectrum analyzer (such as the HP 3585A) supported by the system.

NOTE

In the text that follows, the primary discussion of a functional circuit is indicated by lettering the circuit description in boldface, for example, **RF Phase Detector**. *The term "Interface" refers to the HP 11848A Phase Noise Interface; "System" refers to the HP 3048A Phase Noise Measurement System. An RF spectrum analyzer is assumed to be connected to the System.*

Measurement Modes

To clearly understand the functions of the Interface, it is helpful to see the relationship of the Interface to the other System instruments and the device-under-test in a phase noise measurement. Refer to Figure 4.

Figure 4 shows the most basic measurement mode where the noise on the source has been demodulated externally and fed into the front-panel NOISE INPUT. In this mode of operation the Interface serves mainly to condition (amplify and filter) the noise. The conditioned noise is then measured (in the frequency domain) by the spectrum analyzers. The measured noise is then analyzed, mathematically manipulated, and plotted by the controller. The noise need not be exclusively phase noise; it could also be AM (from an AM detector), FM (from an FM discriminator), or baseband (0.01 Hz to 40 MHz) noise.

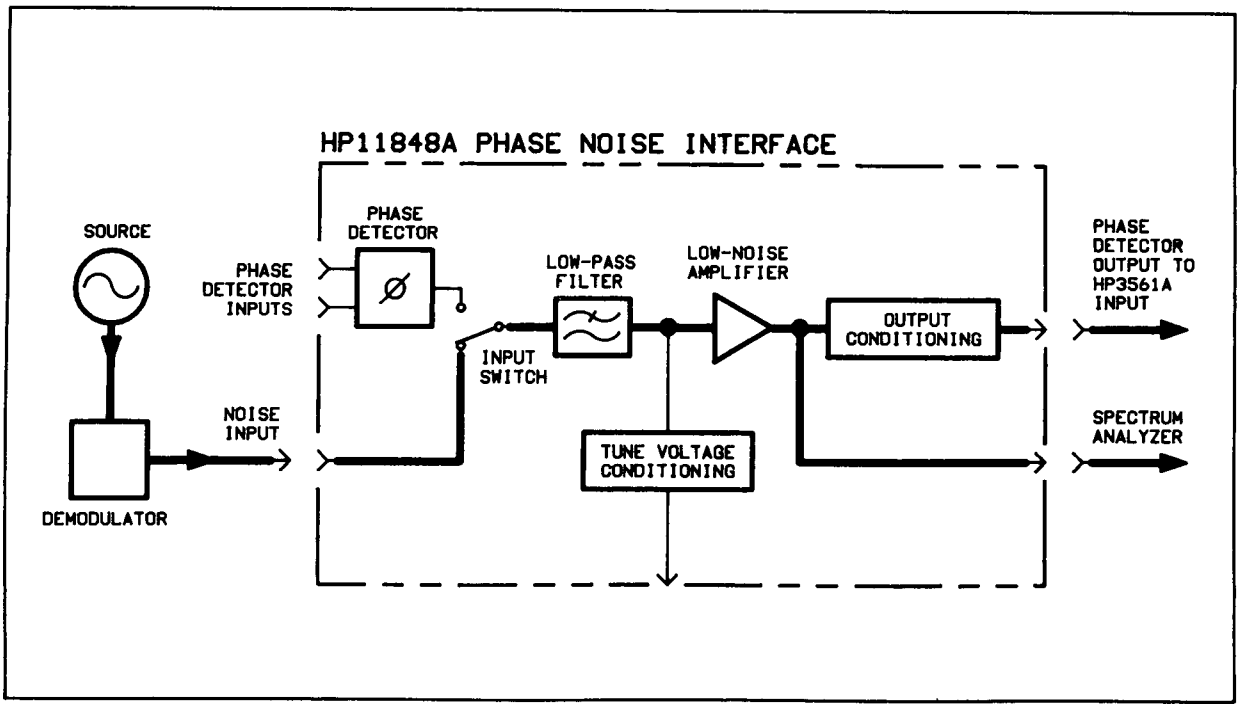


Figure 4. *Noise Measurement with an External Demodulator*

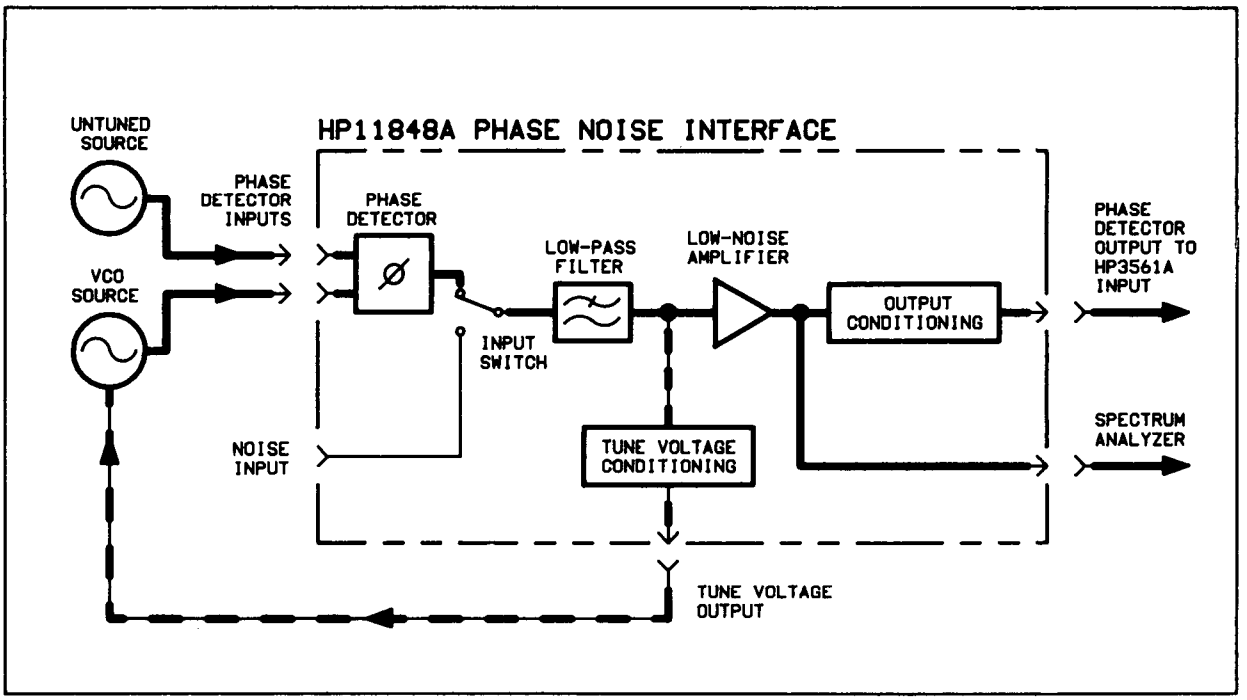


Figure 5. *Noise Measurement with the Internal Phase Demodulator*

In the diagram, the **Low-Pass Filter** removes carrier-related signals to reject them from the circuits that follow. The **Low-Noise Amplifier** improves the measurement noise floor. The **Output Conditioning** circuits set the proper level to the FFT spectrum analyzer and limit the frequency range of the noise for the frequency segment being measured.

Figure 5 shows the more common measurement mode where two RF sources are phase-locked together in quadrature (that is, the phase difference of the sources is 90°). In this situation the **Phase Detector** outputs a signal proportional to the sum of the phase fluctuations on the two sources. The output from the Phase Detector is switched (by the **Input Switch)** into the same path as in the previous example. For this method to give valid results several conditions must be met.

- The L and R ports of the Phase Detector may be interchanged, and either source may be the local oscillator (the higher level "L" source). Neither source should exceed the specified maximum level.
- Either source can be the VCO (Voltage-Controlled Oscillator), but it must be tuneable with dc (dc FM) and compatible with the other source and the Interface.
- The VCO must be characterized (its tuning constant measured) before valid measurements can be made. This is done by the software after some general characteristics are input by the user.
- The two signals must remain in quadrature during the measurement. The Interface meter (not shown) is useful for visually monitoring phase quadrature drift between the two sources.
- The rms sum of the phase noise of both sources is measured inseparably.
- The conditioning circuits within the Interface must have been characterized before any measurements are made with the Interface. This is usually done annually; calibration data is stored in mass storage.

NOTE

When configuring the system for a phase-noise measurement, one source is arbitrarily defined as the "Device-under-Test" (DUT) and the other source as the "Reference". Either source can be the L source and either source can be the VCO.

Characterization of the phase-lock loop (PLL) is critical. If the loop is incorrectly set up, the loop may not acquire lock, may be unstable or even oscillate (create discrete FM), may track out the phase noise, or may generate erroneous results. Selection of the proper loop parameters is the task of the controller which, based on measured and user-input data, chooses the device parameters in the **Tune Voltage Conditioning** circuits which best match the VCO. The parameters that the controller can manipulate in the PLL are gain, offset, and frequency-response shaping (selection of poles and zeros).

A4 Phase Detector Assembly

Refer now to the main Block Diagram. The Phase Detector Assembly can conveniently be broken into three functional circuit blocks: (1) the phase demodulation circuits, (2) calibration signal routing circuits, and (3) tune-voltage conditioning circuits.

Phase Demodulation Circuits

If the phase noise on the device-under-test (DUT) has been demodulated externally, the demodulated phase noise is fed directly into the Interface via the front-panel NOISE INPUT connector. More commonly, the RF signal is demodulated by an internal RF or an optional microwave phase detector.

The phase detectors are doubly balanced mixers. The standard **RF Phase Detector** covers the RF input range 5 to 1600 MHz; the **Microwave Phase Detector** (a chassis-mounted part) covers the range 1.2 to 18 GHz. With either detector, when the LO (L) and signal (R) inputs are in quadrature (that is, when the phase difference between the two signals is 90°), the detector's output is proportional to sum of the phase fluctuations of the two sources. The phase detector is selected by switch **K13**.

At this point the demodulated phase noise is fed into circuits that condition the signal to be measured by the spectrum analyzers or for voltage control of an external, voltage-tuneable source. Switch **K1** selects either the phase detector output or an external input. K1 also routes the signal from the NOISE INPUT to switch K12 when an internal phase detector has been selected.

NOTE

The circuits in the following discussions process "low-frequency" baseband signals (actually dc to 40 MHz) which are the demodulated phase noise from the RF and microwave input sources. To relate these low-frequency signals to the signal from the input sources, the following convention is used: the "noise signal" refers to the demodulated phase noise, "level" refers to the phase deviation of the phase noise, and "frequency" refers to the offset from the carrier (corresponding to the rate of the phase modulation).

Two filters in series, the **200 MHz Low-Pass Filter** and the **60 MHz Low-Pass Filter**, remove unwanted high-frequency components from the input noise signal itself or the internal phase detectors. Both filters are constant-resistance (or diplexer) types which match the 50Ω source impedance in both the passband and stopband. The 200 MHz Low-Pass Filter is a simpler, single-pole type; it comes first since it more efficiently terminates high-frequency mixing products. The **2 MHz Low-Pass Filter** is switched in by **K8** and **K9** for carrier frequencies below 95 MHz. It too is a constant-resistance type.

The output of the 60 MHz Low-Pass Filter is sensed by the **Overload Detector**. Should the noise signal level at that point exceed 1V peak, the detector via the **Overload Flip-Flop** de-energizes switches K1, K12, K11, K14, and K10 (that is, they are set to the state shown in the block diagram), and the overloading noise signal is routed to the front-panel SPECTRUM ANALYZER connector. The overloading noise signal is thus prevented from overdriving the active circuits that follow. The Overload Flip-Flop also lights the front-panel OVERLOAD annunciator. The condition of the Overload Flip-Flop is read by the FFT spectrum analyzer (used as a dc voltmeter) via the 21.5 kΩ resistor and switch F6 in the A3 Analyzer Interface Assembly. This readback function is shared by the Out-of-Lock Flip-Flop.

The **Low-Noise Amplifier** (LNA) is switched in by **K11** and **K14** for maximum sensitivity whenever the noise signal level permits. The two switches are switched together. The gain of the amplifier is 40 dB open circuit.

For frequencies (that is, phase noise offsets) greater than 100 kHz, the measurement is made at the front-panel SPECTRUM ANALYZER connector where the RF spectrum analyzer is connected. The signal to this port comes from switch K9 through switches K11 and K14 (and the Low-Noise Amplifier when switched in) and switch K12. If an RF spectrum analyzer is not connected, the SPECTRUM ANALYZER connector must be terminated in 50Ω to preserve calibration.

For frequencies less than 100 kHz, the measurement is made at the front-panel TO HP 3561A INPUT connector, where the FFT spectrum analyzer is connected. When the Low-Noise Amplifier is switched in, the signal to this port comes from switch K9 through switch K11, the Low-Noise Amplifier, **S7**, and various switches, amplifiers, and filters in the A3 Analyzer Interface Assembly. When the Low-Noise Amplifier is bypassed, the path from switch K9 is through K11, K14, K12, S8, and the circuits in A3.

Switch **K12** routes the noise signal from K1 or K14 to the output paths to be discussed shortly. When the noise signal from K1 is selected, the output of the Low-Noise Amplifier (with its series 50Ω resistor) is terminated in 50Ω. Similarly, when the noise signal from K14 is selected, the signal from K1 is terminated in 50Ω.

The output from K12 is routed as follows:

- To the front-panel SPECTRUM ANALYZER connector through a high-pass filter formed by an RLC network. The filter prevents overloading the RF spectrum analyzer by blocking low-frequency signals (<50 kHz). (Note that phase noise typically increases as the offset frequency decreases.)
- To switch **S8** for further processing on the A3 Analyzer Interface Assembly eventually to reach the front-panel TO HP 3561A INPUT connector.
- To the front-panel AUX MONITOR connector via **Buffer 1**. The dc path for the noise signal is through the 5 kΩ resistor. The ac path is through the buffer amplifier and the 0.01 μF capacitor. The AUX MONITOR port is normally used to study (in the time domain) the quality of the noise signal being measured by the spectrum analyzer and to assist in obtaining a proper beat note during initial setup of the sources. The oscilloscope must have a high input impedance (>1 MΩ).
- To the 10 Hz/50 kHz High-Pass Filter on the A3 Analyzer Interface Assembly.

Calibration Signal Routing Circuits

During system hardware calibration (which is normally run annually to generate new calibration coefficients), the controller runs a series of tests to characterize the transfer function of many of the circuits in the Interface. The signal sources used during this calibration are the noise source in the FFT spectrum analyzer (when the frequency is less than 100 kHz) and the tracking generator in the RF spectrum analyzer (for frequencies to 40 MHz). The noise source in the FFT spectrum analyzer is also used when the Functional Tests are requested.

The noise source in the FFT spectrum analyzer is connected to the rear-panel NOISE INPUT FROM HP 3561A SOURCE OUTPUT connector. It is then routed through the A3 Analyzer Interface Assembly (through a 20 dB Pad) to switch K5. The tracking generator in the RF spectrum analyzer is connected to the rear-panel INPUT FROM HP 3585A TRACKING GENERATOR connector. It is then routed through switch **K7** and a 35 dB pad (**Pad 4**) to K5.

Switch **K5** routes the calibration input sources to K2 via a series of 3 dB pads and switches (**Pad 1**, **Pad 2**, **Pad 3**, and switches **K4** and **K3**). Having two switches and three pads improves the isolation in the open state. K4 and K3 switch together.

Tune-Voltage Conditioning Circuits

Refer now to switch **K10**, which is at the output of switch K9. When phase noise is measured using a phase-lock loop, the noise signal from K10 is the signal which, after further processing, tunes the external voltage-controlled oscillator (VCO) to phase lock it to a second source. The signal path splits at the output of Buffer 2 to drive two tuning ports: the front-panel and rear-panel TUNE VOLTAGE OUTPUT connectors. The path to the rear panel is for user convenience, and is inverted to that of the front-panel.

A fixed **12 dB Amplifier**, a programmable amplifier (**Gain 1**), a fixed 6 dB pad (**Pad 4**), and a second programmable amplifier (**Gain 2**) set the path gain up to the Integrator. The **Integrator** has very high gain at low-frequencies to hold the phase detector error near zero in the presence of source drift.

Noise signals in excess of 2.5V (positive or negative) at the input and output of the Integrator are sensed by the **Comparator** which trips the **Out-of-Lock Flip-Flop**. This condition occurs when the two input sources go out of lock or when the tune voltage exceeds 25% of its entered tuning range or when a phase transient exceeds 0.25 rad even though the sources are still locked. The flip-flop shorts the feedback path of the Integrator (forcing it to unity gain) and lights the front-panel OUT OF LOCK annunciator. The condition of the Out-of-Lock Flip-Flop is read by the FFT spectrum analyzer (used as a dc voltmeter) via the 46.4 kΩ resistor and switch F6 in the A3 Analyzer Interface Assembly. This readback function is shared by the Overload Flip-Flop.

The output of the Integrator, where the panel **Meter** is placed, is the most sensitive point to monitor phase quadrature error. When a measurement is made using a phase-lock loop, the meter indicates whether or not the control voltage being sent to an external VCO is in an acceptable range. In particular, it warns the user when one of the input sources is drifting (before the loop unlocks). Note, however, that the meter will also read near zero when phase lock is broken because the average dc voltage in a beatnote between two sources is near zero and the Out-of-Lock Flip-Flop forces the Integrator to unity gain.

Switch **S3** (with switch K10) closes the phase-lock loop. S3 is opened when a noise measurement is made without using a phase-lock loop to uncouple the output circuits but leave the Meter in. **Attenuator 2** can be set to either 0 or 6 dB; it controls the signal level into the Summing Junction.

The **Summing Junction** has several functions:

- It sums the phase-error signal with a programmable dc output from **DAC 1** which tunes the external VCO.
- It routes the noise source from the FFT spectrum analyzer (via switch **S1**) to the output circuits when the error transfer function of the closed phase-lock loop is measured. From this measurement, correction factors are calculated in the phase-noise measurement. (**S2** is unused.)
- It enables the **Search Oscillator** when switch **S4** is closed and the phase-lock loop is unlocked. The oscillator starts automatically when the loop goes out of lock and provides a 1.6 Hz search signal which sweeps the external VCO until the VCO is captured by the loop. When the Search Oscillator is oscillating, the **Oscillation Detector** sets the Out-of-Lock Flip-Flop.

Before the tune voltage is applied to the VCO (connected to the rear-panel TUNE VOLTAGE OUTPUT connector), it passes through programmable **Lag-Lead Network 1**, **Buffer 2**, programmable **Attenuator 1**, **Buffer 3**, and **Lag-Lead Network 2**. The latter three circuits are duplicated in the A3 Analyzer Interface Assembly which output the tune voltage to the front-panel TUNE VOLTAGE OUTPUT connector. (The front-panel output is preferred because of a floating amplifier which breaks potential ground loops.)

The lag-lead networks shape the tune voltage to give the phase-lock loop maximum low-frequency gain (for good drift tracking) while maintaining loop stability. The frequency responses of the lag-lead networks are shown in the block diagram notes. Lag-Lead Network 1 is programmable; the controller selects the optimum pole and zero frequencies based on the measured tuning characteristics of the VCO.

A3 Analyzer Interface Assembly

The primary function of the A3 Analyzer Interface Assembly is to condition the output noise signal to be measured by the FFT spectrum analyzer. The noise signal is routed from the A4 Phase Detector Assembly through switches S7 and S8 in that assembly. The noise signal passes through a series of amplifiers and filters.

Gain stage **Gain 3** has two parts: (1) a programmable-gain amplifier (6, 12, 20, and 26 dB) with an output at switch **L4** and (2) an additional 6 dB attenuator with its output through switch **L3**. (The gains stated for Gain 3 are for the entire path from the input of the amplifier to the output of the High-Pass Filters. The High-Pass Filters have a passband gain of 6 dB.) The controller sets the gain so as to present an optimum level for the input to the FFT spectrum analyzer.

After passing through **Buffer 1**, the signal is low-pass filtered. Since the measurement range of the FFT spectrum analyzer is 100 kHz, the signal is filtered by the **100 kHz Low-Pass Filter** then passed through one of a set of decade-spaced **Low-Pass Filters** as selected by switches **F0** through **F5**. The filters match the default sweep ranges of the FFT spectrum analyzer and remove the high-frequency, out-of-range components. (The filters match the default sweep ranges even when sweep segments other than default are selected.)

After passing through **Buffer 2**, the signal is high-pass filtered. The decade-spaced **High-Pass Filters**, selected by **H1** through **H5**, are set to block low-frequency components from dc to one-tenth the sweep range of the FFT spectrum analyzer. This is necessary because the noise signal frequently has very large, low-frequency components due to the nature of phase noise. (As with the Low-Pass Filters, these filters match the default sweep ranges when other sweep segments are selected.) The **AC/DC Adaptive Coupler**, when set to dc, restores the dc component of the noise signal when the need arises to measure it with the FFT spectrum analyzer. In the ac mode, the AC/DC Adaptive Coupler is a 16 MHz high-pass filter.

The noise signal is finally sent to the front-panel TO HP 3561A INPUT connector via **Floating Amplifier 2** which has a gain of −1. Having a floating output improves rejection of line-related signals resulting from ground loops.

The remaining circuits in the A3 Analyzer Interface Assembly do not directly relate to the measurement of the noise signal by the FFT spectrum analyzer.

The **Calibration Oscillator** outputs a 100 kHz squarewave. It is switched on when a new measurement is selected to compare the amplitude calibration of the RF spectrum analyzer relative to the FFT spectrum analyzer. (The frequency ranges of the two spectrum analyzers overlap at 100 kHz.)

The **10 Hz/50 kHz High-Pass Filter**, **Peak Detector**, and **Peak Hold** circuits have three functions: (1) to sense the presence of a beatnote when measuring phase noise using a phase lock loop, (2) to determine whether to insert the Low-Noise Amplifier in the A4 Phase Detector Assembly, and (3) to provide signal level information for ranging the RF spectrum analyzer. The first two functions use the 10 Hz high-pass filter; the third function uses the 50 kHz filter (which matches filtering to the RF analyzer input provided by the 0.068 μF capacitor at J2 on A4.)

DAC 2, **DAC 3**, and the **DAC SUMMING JUNCTION** output a programmable dc voltage to tune three VCOs: (1) the 400 MHz VCO on A8, (2) the 10 MHz VCXO on A7, and (3) the 10 MHz VCXO on A6. DAC 3 has 1 mV resolution; DAC 2 has 50 mV resolution. Switch **L11** enables the same three VCOs to be tuned as the VCO in a measurement of phase noise using a phase-lock loop. Note that the VCOs are all tuned simultaneously. (See the discussions below about the function of these VCOs.)

Attenuator 3, **Floating Amplifier 1**, and the **Lag-Lead Network** duplicate the function of Attenuator 1, Buffer 3, and Lag-Lead Network 2 on the A4 Phase Detector Assembly. The path is enabled by switch **L10**. Floating Amplifier 1 breaks up ground loops on the VCO tune voltage and makes the front-panel TUNE VOLTAGE OUTPUT the preferred output. (See the discussion on Lag-Lead Network 2 on A4 for the function of the Lag-Lead Network.)

Switch **L8** routes the rear-panel TONE INPUT or the NOISE INPUT FROM HP 3561A SOURCE OUTPUT to the Phase Modulator in the A7 10 MHz Modulated VCXO B Assembly.

A6 10 MHz VCXO A Assembly

The **10 MHz ±100 Hz VCXO** (voltage controlled crystal oscillator) provides a very clean, tuneable source available at the front-panel 10 MHz A connector or the rear-panel 10 MHz SOURCE A OUTPUT OR AMP INPUT connector. This source can be used as a tuneable VCO for measurement of 10 MHz sources or in conjunction with the 10 MHz ±1 kHz VCXO in A7 for demonstration purposes. The **Power Amplifier** boosts the signal level high enough that it can serve as the signal to the L port of the input phase detectors.

The switch at the output of the oscillator allows the amplifier to be used by itself in other applications such as boosting the power level of the 10 MHz ± 1 kHz VCXO in A7.

A7 10 MHz Modulated VCXO B Assembly

The **10 MHz ±1 kHz VCXO** (voltage controlled crystal oscillator) provides a clean, tuneable source available at the front-panel 10 MHz B connector. This source can be used as a tuneable VCO for measurement of 10 MHz sources or in conjunction with the 10 MHz ±100 Hz VCXO in A6 for demonstration purposes. It can also be phase modulated by the **Phase Modulator** for testing phase noise accuracy in the system performance tests.

A8 400 MHz VCO Assembly

The **400 MHz VCO** provides a clean, wide-range, tuneable source available at the front-panel 350–500 MHz connector. This source can be used as a tuneable VCO for measurement of 350–500 MHz sources or in conjunction with the 400 MHz Oscillator in A9 to test flatness in phase-noise measurement or by itself for noise-floor testing using a power splitter and delay line.

Pad 1, **Amplifier 1**, **Pad 2**, **Amplifier 2**, and **Amplifier 3** provide the correct level to the front-panel connector for driving the input phase detector. The **550 MHz Low-Pass Filter** removes harmonics of the signal.

A9 400 MHz Oscillator Assembly

The **400 MHz Oscillator** provides a fixed source available at the front-panel 400 MHz connector. The **50 dB Pad** lowers the signal level to reduce the signal-to-noise ratio. The **Amplifiers** boost the signal level back up but also add noise of their own. This source is primarily used in conjunction with the 350–500 MHz VCO in A8 to check the flatness of the broadband noise beyond 500 kHz or for demonstration purposes.

A1 HP-IB Input/Output Assembly

The A1 HP-IB Input/Output Assembly (not shown in the block diagram) contains the digital circuitry to interface the controllable hardware with the controller via HP-IB. It also contains the power supplies. The power supplies are +5V, +15V, and −15V.

Troubleshooting

General

Troubleshooting the HP 11848A Phase Noise Interface usually begins with troubleshooting a problem in the HP 3048A Phase Noise Measurement System. Several programs in the System-supplied main software can assist in isolating the fault to a System device. Details on these programs are found in the *HP 3048A Reference Manual* for the System or in the main software under the Help function. Some general guidelines are discussed below. It is usually more efficient to use these programs until they point to the Interface as the faulty System device; the Diagnostic program is then loaded to troubleshoot the Interface itself.

Troubleshooting Helps in the Main System Software

Some of the features in the main software which are useful in isolating the faulty System device are found in the following list. To call these programs, go to the main menu and press the softkey labeled `Spcl. Funct'n`. A menu of Advanced-User Functions will appear from which the programs can be selected or other menus called.

Calibrate System. A series of transfer function measurements are made on various signal paths in the Interface. The measurement data is stored as calibration factors which the controller uses (either directly or in more involved calculations) to correct the measured phase noise data whenever that signal path is used. Normally the Calibrate System program is invoked only for the annual System calibration or when the Interface has been repaired. Any difficulties encountered when the calibration program is being run may point to the Interface. For example, a catastrophic failure of a high-pass filter in the Interface will generate data that is too far out of limits to be accepted as a legitimate transfer function; the program will then abort the measurement.

Performance Tests. To verify that the system meets its published specifications, a series of Performance Tests can be run. The failure of a test may contain enough clues to point to a failure in the Interface.

Internal Adjustments. Often small out-of-specification results of the Performance Tests or Functional Checks can be corrected by means of adjustments, particularly if the condition is due to a dc offset voltage that is out of limits.

Functional Checks. These tests are an extension of the Performance Tests that test the general operational integrity of the Interface itself. The test limits are generally loose. (The tests in the Diagnostic program are similar to the Functional Checks, but they attempt to diagnose the failure in addition to simply indicating out-of-limits data.)

HP 11848A Control. Arbitrary and complete control of the programmable functions of the Interface from the controller keyboard is provided by the HP 11848A Control program. A single display contains all the Interface state information. Because of the compactness of the state information, you should consult the *HP 3048A Reference Manual* when running the program. (The keyboard control feature of the Diagnostic program is similar to this program.)

Troubleshoot Mode. When the Troubleshoot Mode (a subset of Test Mode) is enabled, information beyond simple error messages can be invoked. For example, tests can be aborted to the HP 11848A Control mode which shows the Interface state when the abort occurred.

Running the Diagnostic Program

The Diagnostic program is independent of the main System software. To run the Diagnostic program:

1. Gather and connect the equipment. You will need, in addition to the faulty Interface, the following equipment:
   - HP 3561A Dynamic Signal Analyzer (preferably the one in the System),
   - HP Series 200 or 300 Computer with disc drive and HP-IB, and
   - optionally, a printer compatible with the System Controller.
2. Reset the computer. If the computer is not running BASIC, boot up BASIC 4.0. (BASIC 4.0 is the supplied operating system. BASIC 2.1 and 3.0 will also work.)
3. Key in `LOAD "Diagnostic"` and press `RUN`.
4. If a display appears which indicates that the HP 3561A, HP 11848A, or printer HP-IB addresses are not correct, you can (1) physically change the address of the device to match the displayed address or (2) change the displayed address of the device using the cursor control keys (the knob, arrow keys, tab keys, backspace key, or space bar); then press `ENTER`. If the display still indicates an incorrect address, then the device does not respond when it is addressed. (It may be broken or turned off.) If a printer is not available, it can be deleted at this time.
5. The display will now show the Task Selection menu screen. This is the main screen for the Diagnostic program. The program is now ready for troubleshooting the Interface.

Features of the Diagnostic Program

Most explanations you will need to use the program are part of the program itself either as prompts on the bottom line of the display or as entire displays of information.

Softkeys are not used in the program. Instead, highlighted (inverse video) characters are displayed; pressing a key matching the highlighted character initiates the selected action. Very often the letter "I" in the word "Information" will be highlighted. Pressing "I" immediately brings on to the display information pertinent to the current display. Use it often. It is the Operating Manual for the Diagnostic program.

The Diagnostic program is referenced to the Block Diagram found herein. Refer to it frequently.

The program has two basic modes of operation.

- It runs tests, displays results, and in many cases will attempt to pinpoint the failure.
- It gives you arbitrary control over any programmable circuit device in the Interface.

When you use the Diagnostic program to troubleshoot the Interface, the normal procedure is:

1. Run tests which you think might locate the fault. (When running the test for the first time, respond with "No" when prompted "Stop on failure?".)
2. When a failure is noted in a test, rerun the test and request stopping when a failure is detected. When stopped, request to view the Interface setup.
3. The display will now show the current state of the Interface and enables you to alter the state to check the functioning of a suspected circuit. Often a faulty control line will cause a circuit to malfunction. To check for this,
   - Press the key corresponding to the desired type of the circuit. (For example, press "A", for "Attenuator", if one of the programmable amplifiers is to be checked.)
   - Now press "I" to display the information for the circuit type (for example, programmable attenuators). The information will show the logic control states of all the circuits of that type. (At this point, if a printer is attached, you may wish to print the information display.)
   - Now return to the previous screen (press "X", for exit) and follow the logic levels through the control circuits to the (A1) control assembly.
4. Once the faulty circuit or control line has been isolated, you can continue isolation to the faulty component or replace the faulty assembly. (Some assemblies are on an exchange program.)

Option 301 Service Supplement

General Information

INTRODUCTION

This Service Manual contains information for installation of the Hewlett-Packard Model 11848A Phase Noise Interface.

The HP 11848A is the Phase Noise Interface for the HP 3048A Option 301 Phase Noise Measurement System. The Interface supports several measurement techniques for phase noise and AM noise measurements. Inside the Interface are the phase detectors, amplifiers, filters, and switches necessary to measure phase noise over a frequency range of 5 MHz to 18 GHz. An input for an external phase detector outside that frequency range is also provided. The built-in sources allow the system to functionally check all of its signal handling circuits to insure proper operation before measurements are made.

INSTRUMENTS COVERED BY THIS MANUAL

Attached to the instrument is a serial number plate. The serial number is in the form 1234A00123. The first four digits and the letter are the serial prefix. The last five digits form the sequential suffix that is unique to each instrument.

SPECIFICATIONS

The specifications for the Interface are included in the specifications for the HP 3048A Option 301 Phase Noise Measurement System which specifies the entire system. There are no specifications that apply to the Interface alone.

PERFORMANCE TESTS

The performance Tests for the Interface are included in the performance tests for the HP 3048A Option 301 Phase Noise Measurement System. These tests can be found in the HP 3048A Option 301 System Calibration Manual.

It is not necessary to run the System performance tests after the System is initially installed. These tests are performed at the factory before shipment. However, performance tests should be run every 12 months or whenever the Interface has been repaired.

CALIBRATION

The calibration of the Interface consists of generating correction factors for the various measurement paths and storing them on the software disc for corrections of 0 Hz to 100 kHz as LOWDATA.CAL and 100 kHz to 40 MHz as HIGHDATA.CAL. Also stored in these files are the nominal voltages to set each internal source to its nominal frequency.

The calibration of the Interface is only part of the calibration of the HP 3048A Option 301 Phase Noise Measurement System and must be done with the System. For calibration refer to the *HP 3048A Option 301 Phase Noise Measurement System Calibration Manual.*

The complete calibration for a HP 3048A Phase Noise Measurement System includes the following:

1. HP 3561A Dynamic Signal Analyzer bench calibration.
2. RF Analyzer bench calibration. (If an RF analyzer is configured in the system.)
3. HP 3048A Functional Checks.
4. HP 11848A Adjustments. (The adjustments should only be run if the Functional Checks show a problem.)
5. HP 3048A System Calibration Option 2. (This is total calibration of the HP 11848A Interface's measurement paths.)
6. HP 3048A Performance Tests.

Before calibrating the System, the HP 3561A Dynamic Signal Analyzer and any configured RF analyzer should be separately bench calibrated if they are beyond their calibration period.

NOTE

The measurement of phase noise, as implemented in the HP 3048A, is a ratio measurement where both the numerator (the noise power) and the denominator (the carrier's power) of the ratio are measured by the same system spectrum analyzer(s). The accuracy of this measured ratio depends on the amplitude linearity of the spectrum analyzer. The amplitude linearity calibration of the spectrum analyzer will be traceable to the National Institute of Standards (NIST) if the instrumentation used to perform the calibration is traceable to NIST.

The following are guidelines as to when the Interface hardware calibration and System performance tests should be run:

- It is not necessary to calibrate the Interface after the System is initially installed. The calibration procedure is done at the factory before shipment, and the unique calibration data for the Interface is stored on the software disc.
- Whenever the environment changes 10°C or more, Option 1 calibration should be run to generate new calibration data for the Interface to ensure accurate System performance.
- Once a year, after a repair of the Interface, or when a problem is suspected in the Interface the following test should be run to ensure accurate System measurement results:
  a. Functional Checks.
  b. Adjustments. (The adjustments should only be run if the Functional Checks show a problem.)
  c. Calibration Option 2. (This is a total calibration of the Interface measurement paths.)
  d. Performance Tests.

The performance tests can be run more often if desired to ensure that the system meets the published specifications contained in Section 1 of the *HP 3048A Option 301 Operating Manual.*

It is suggested that the performance test be run in the following order:

1. Spur Accuracy Test (spurious signal).
2. Noise Flatness Test. (This test need only be run if an RF analyzer is included in the system configuration.)
3. Internal Noise Floor.

DOCUMENTATION UPDATING

An instrument manufactured after the printing of these manuals may have a serial-number prefix that is not listed on the manual title page. Having a serial-number prefix that is greater than that shown on the title page indicates that the instrument is slightly different from those documented in the manual. In this case, your manual may be provided with updating information to make it as current as possible. This updating information contains all major change information that applies to instruments beyond the serial-prefix range defined on the title page. Minor changes may not be included but will be covered in subsequent updates you can receive by joining the Documentation Update Service.

A Description of the Manual Update Packet

A *Manual Update* packet consists of replacement and addition pages which should be incorporated in your manual to bring it up to date. (An addition page results when new information won't fit on a replacement page.)

Signing Up for the Documentation Update Service

Hewlett-Packard offers a Documentation Update Service that will provide you with further updates and changes as they become available. If you have not received update information that matches the serial number of your instrument, you can receive this information through the Update Service.

If you operate or service instruments with different serial prefixes, we strongly recommend that you join this service immediately to ensure that your manual is kept current.

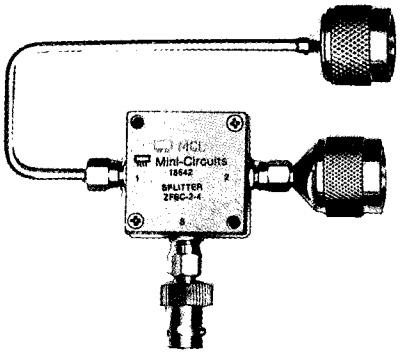
For more information, refer to the Documentation Update Service reply card included in this manual or contact:

Hewlett-Packard Company
Product Support Department
24001 E. Mission–TAF C-34
Spokane, WA 99220
(509) 921-4001

Also, if you join the update service, you can indicate whether you choose to be contacted in the future about the quality of the documentation you receive. We are constantly trying to provide the best documentation possible and periodically survey our customers as to their expectations and the usability of the manuals we provide.

SAFETY CONSIDERATIONS

The Interface is a Safety Class I instrument (that is, provided with a protective earth terminal). Before operation, look over the Phase Noise Interface and its related documentation to get familiar with safety markings and instructions. Refer to the *Safety Considerations* page found at the beginning of this manual for a summary of the safety information. Safety information that applies to the specific task at hand (for example, installation) is found in this manual.

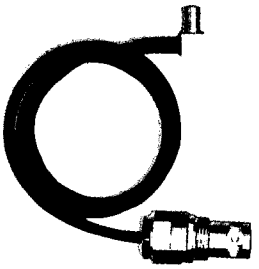


Noise Floor Test Fixture

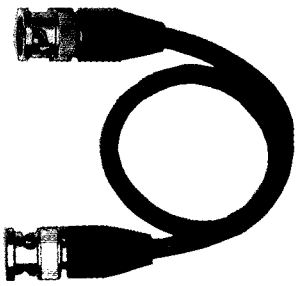
Fuses

50Ω Termination

Adapters, Type-N to BNC



Cable Assembly; BNC to SMB



Cables Assemblies; BNC

Figure 1. Accessories Supplied

ACCESSORIES SUPPLIED

The accessories supplied are pieces of equipment that are shipped with every Interface. The accessories are shown in Figure 1.

Line Power Cable. The line power cable may be supplied in several plug configurations, depending on the destination of the original shipment. Refer to *Power Cables* in the *Installation* section of this *Service* manual.

Fuses. Fuses with a 0.75A rating for 115 Vac (HP part number 2110-0063) and a 0.5A rating for 230 Vac (HP part number 2110-0012) are supplied. One fuse is factory installed according to the voltage available in the country of original destination. Refer to *Power Requirements* in the *Installation* of this *Service* manual.

HP 3048A Option 301 Software and Manual Set. The HP 3048A software and associated manuals are shipped with the Interface.

HP 3048A Software (HP part number 11838-10002).

HP 11848A Service Manual (HP part number 11848-90004).

HP 3048A Option 301 Installation Guide (HP part number 03048-90043).

HP 3048A Option 301 Operating Manual (HP part number 03048-90042).

HP 3048A Option 301 System Calibration Manual (HP part number 03048-90041).

HP 3048A Option 301 Reference Manual (HP part number 03048-90040).

50Ω Termination. This 50Ω load is used to terminate the Interface's Spectrum Analyzer output if no RF spectrum analyzer is available (HP part number 1250-0207).

Adapters, Type-N to BNC. Three adapters are provided for system operation (HP part number 1250-0780).

Cable Assemblies: BNC. Two 30 cm (12 in.) cables are provided for system operation (HP part number 8120-1838).

Noise Floor Test Fixture. This test fixture is used to run performance tests (HP part number 11848-61032).

Cable Assembly: BNC to SMB. This cable assembly can be used during troubleshooting (HP part number 08954-60105).

RECOMMENDED TEST EQUIPMENT

Table 1 lists the test equipment and accessories recommended for use in testing, adjusting, and servicing the Interface. If any of the recommended equipment is unavailable, instruments with equivalent minimum specifications may be substituted.

Tests for the Interface are performed during the HP 3048A Performance Tests which are available in the *HP 3048A Option 301 System Calibration Manual* in *Performance Tests.*

Table 1. Recommended Test Equipment

Instrument Type	Model Number	Use*
Dynamic Signal Analyzer	HP 3561A	A,C,P,T **
Counter (550 MHz)	HP 5383A, HP 5386A	P
Function Generator	HP 3312A, HP 3325A	P,T
Oscilloscope	HP 1740A	T
Power Meter and Sensor	HP 435B or HP 436A with HP 8481A or HP 8482A	T

* A = Adjustments, C = Functional Checks, P = Performance Tests, T = Troubleshooting
** The HP 3561A is included with the HP 3048A system.

OPTIONS AVAILABLE

Options are variations on the standard instrument which can be ordered during the purchase.

Electrical Options

Option 201: Add High Frequency Phase Detector. This option adds a 1.2 to 18 GHz phase detector to the Interface. This phase detector extends the range of carrier frequencies that can be demodulated within the Interface without external down conversion by the System. All of the HP 3048A specifications from 1.6 to 18 GHz carrier frequency are valid with this option.

Mechanical Options

Option 907: Front-Handle Kit. Front handles are provided when Option 907 is ordered. After shipment, you can order a Front-Handle Kit as HP part number 5061-9689.

Option 908: Rack-Flange Kit. Rack flanges are provided for the HP 11848A Phase Noise Interface when Option 908 is ordered. After shipment, you can order a Rack-Flange Kit as HP part number 5061-9677.

Option 909: Rack-Flange and Front-Handle Combination Kit. This is not a Front-Handle Kit and a Rack-Flange Kit packaged together; it is a unique part that combines both functions. Combination kits are provided for the HP 11848A Phase Noise Interface when Option 909 is ordered. After shipment, you can order a Rack-Flange and Front-Handle Combination Kit as HP part number 5061-9683.

INSTALLATION

INTRODUCTION

This section provides the information needed to install the HP 11848A Phase Noise Interface. Included is information pertinent to initial inspection, power requirements, line voltage selection, power cables, environment, storage, and shipment.

INITIAL INSPECTION

WARNING

To avoid hazardous electrical shock, do not perform electrical tests when there are signs of shipping damage to any portion of the outer enclosure (covers and panels).

Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the instrument has been checked mechanically and electrically. Procedures for checking electrical performance are given in the *Confidence Check* found in the *HP 3048A Option 301 Operating Manual.* If the contents are incomplete, if there is mechanical damage or defect, or if the instrument does not pass the electrical performance test, notify the nearest Hewlett-Packard office. If the shipping container is damaged, or the cushioning material shows signs of stress, notify the carrier as well as the Hewlett-Packard office. Keep the shipping materials for the carrier's inspection.

PREPARATION FOR USE

Power Requirements

The HP 11848A requires a power source of 100 Vac (90 to 105 Vac), 120 Vac (108 to 126 Vac), 220 Vac (198 to 231 Vac), or 240 Vac (216 to 252 Vac), 47.5 to 440 Hz single phase. Power consumption is 260 VA maximum.

WARNING

This is a Safety Class I product (i.e., provided with a protective earth terminal). An uninterrupted safety earth ground must be provided from the Mains power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the instrument must be made inoperative and be secured against any unintended operation.

If this instrument is to be energized via an external autotransformer for voltage reduction, make sure that the common terminal is connected to the earth pole of the power source.

CAUTION

BEFORE PLUGGING THIS INSTRUMENT into the Mains (line) voltage, be sure the correct voltage and fuse have been selected.

A rear-panel, line power module permits operation from 100, 120, 220, or 240 Vac. The number visible in the window (located on the module) indicates the nominal line voltage to which the instrument must be connected. Verify that the line voltage selection and the fuse are matched to the power source. Refer to Figure 2, Line Voltage and Fuse Selection.

Two fuses are supplied with each instrument. One fuse has the proper rating for 110/120 Vac line operation (HP part number 2110-0063; 0.75A, 250V, non-time-delay). The other fuse is rated for 200/220 Vac operation (HP part number 2110-0012; 0.5A, 250V, non-time-delay).

One fuse is installed in the instrument at the time of shipment. The rating of the installed fuse is selected according to the line voltage specified by the customer. If the voltage is not specified, the rating of the installed fuse will be selected according to the country of destination.

WARNING

For protection against fire hazard, the line fuse should only be a 250V normal blow fuse with the correct current rating.

Power Cables

WARNING

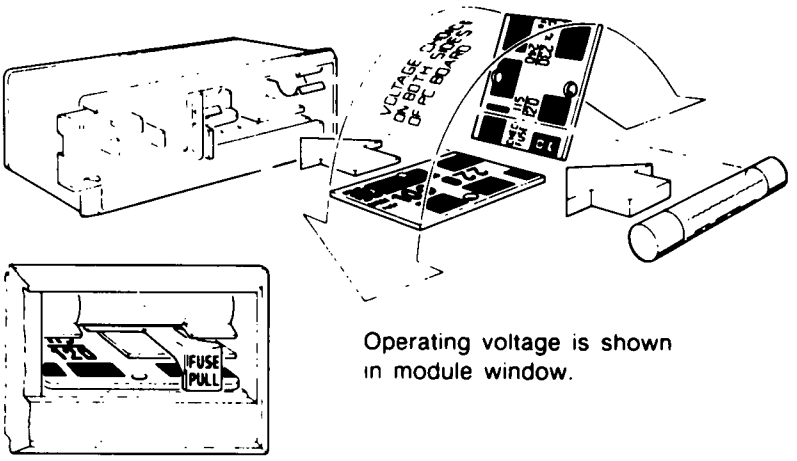
BEFORE CONNECTING THIS INSTRUMENT, the protective earth terminal of the instrument must be connected to the protective conductor of the (mains) power cord. The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. The protective action must not be negated by the use of an extension cord (power cable) without a protective conductor (grounding). Grounding one conductor of a two conductor outlet is not sufficient protection.

This instrument is equipped with a three-wire power cable. When connected to an appropriate ac power receptacle, this cable grounds the instrument cabinet. The type of power cable plug shipped with each instrument depends on the country of destination. Refer to Table 2 on for the part numbers of the power cables and Mains plugs available.

Mating Connectors

Coaxial Connectors. Coaxial mating connectors used with the Phase Noise Interface should be either the 50-ohm BNC male connectors or 50-ohm Type-N male connectors that are compatible with those specified in US MIL-C-39012.

The application note, "Principles of Microwave Connector Care" (HP part number 5958-7442) can help you improve measurements and reliability. Suggestions in the application note will help you get the best performance from all microwave connectors. It will show what to look for when cleaning and inspecting connectors (in order to preserve their precision and extend their life) and how to make the best possible microwave connections (improving the accuracy and repeatability of all your measurements).



Operating voltage is shown in module window.

Selection of Operating Voltage and Fuse Replacement

1. Open cover door. pull the FUSE PULL lever and rotate to left. Remove the fuse.
2. Remove the Line Voltage Selection Card. Position the card so the line voltage appears at top-left corner. Push the card firmly into the slot.
3. Rotate the FUSE PULL lever to its normal position. Insert a fuse of the correct value in the holder. Close the cover door.

Figure 2. Line Voltage and Fuse Selection

Operating Environment

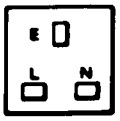
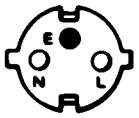
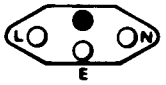
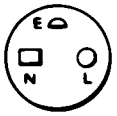
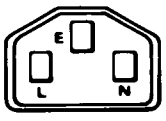
The operating environment should be within the following limitations:

Temperature	0°C to +55°C
Humidity	5% to 95% (maximum wet bulb temperature = 40°C)
Altitude	<4600 meters (15 000 feet)
Airflow	5.8 mm (0.23 in.) minimum clearance underneath the instrument and sufficient clearance behind the instrument for air flow that is not obstructed.

Rack Mounting

Rack mounting information is provided with the rack mounting kit. If the kit was not ordered with the instrument as an option, it may be ordered through the nearest Hewlett-Packard office. For rack-mount kit part numbers, refer to *Mechanical Options* in the *General Information* section of this manual.

Table 2. *AC Power Cables Available*

Plug Type	Cable HP Part Number	CD	Plug Description	Cable Length (inches)	Cable Color	For Use In Country
250V 	8120-1351 8120-1703	0 4	90°/STR BS1363A* 90°/90°	90 90	Mint Gray Mint Gray	United Kingdom, Cyprus, Nigeria, Rhodesia, Singapore
250V 	8120-1369 8120-0696	0 4	STR/STR NZSS198/ASC112* STR/90°	79 80	Gray Gray	Austrailia, New Zealand
250V 	8120-1689 8120-1692	7 2	STR/STR* STR/90°	79 79	Mint Gray Mint Gray	East and West Europe, Saudi Arabia, Egypt, (unpolarized in many nations)
125V 	8120-1378 8120-1521 8120-1751	1 6 1	STR/STR NEMA5-15P* STR/90° STR/STR	80 80 90	Jade Gray Jade Gray Jade Gray	United States, Canada, Mexico, Phillipines, Taiwan U.S./Canada
100V (Same plug as above)	8120-4753 8120-4754	2 3	STR/STR STR/90°	90 90	Dark Gray Dark Gray	Japan only Japan only
250V 	8120-2104 8120-2296 8120-3997	3 4 4	STR/STR SEV1011 1959-24507 Type 12 STR/90° STR/90°	79 79 177	Gray Gray Gray	Switzerland
250V 	8120-0698	6	STR/STR NEMA6-15P	90	Black	United States, Canada
250V 	8120-2956 8120-2957 8120-3997	3 4 4	90°/STR 90°/90° STR/STR	79	Gray	Denmark
250V 	8120-4211 8120-4600	7 8	STR/STR*IEC83-B1 STR/90°	79 79	Black Gray	South Africa, India
250V 	8120-1860 8120-1575 8120-2191 8120-4379	6 0 8 8	STR/STR*CEE22-V1 (Systems Cabinet Use) STR/STR STR/90° 90°/90°	59 31 59 80	Jade Gray Jade Gray Jade Gray Jade Gray	

* Part number shown for plug is industry identifier for plug only. Number shown for cable is HP Part Number for complete cable including plug. E = Earth Ground; L = Line; N = Neutral; STR = Straight

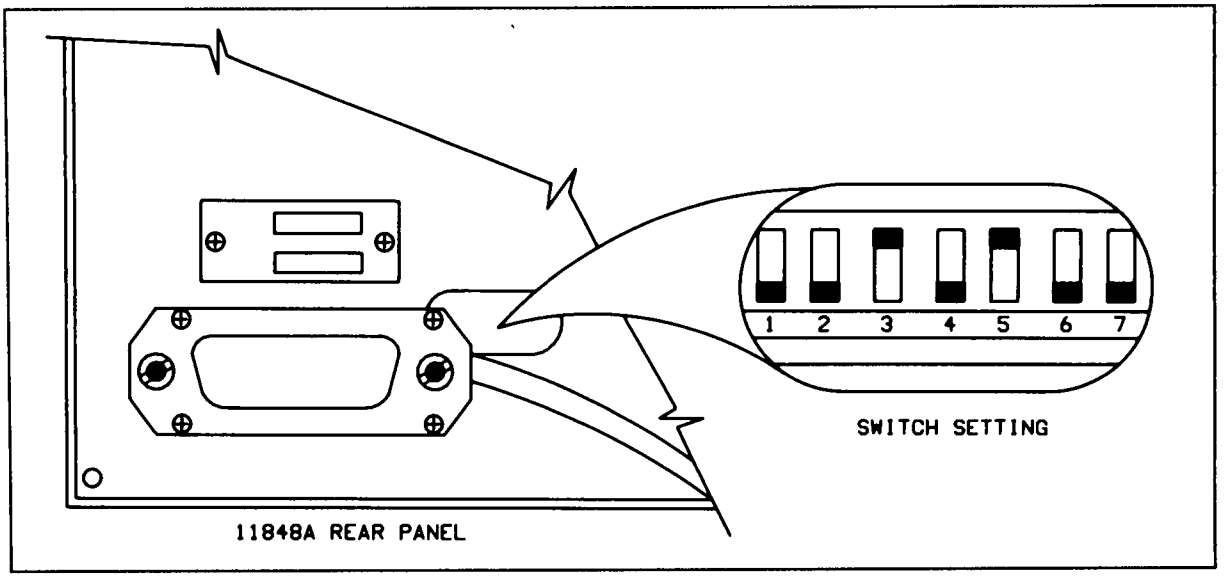


Figure 3. HP-IB Address Switch

HP-IB Address Selection

The HP-IB address is selectable using rocker switches on the rear-panel of the Phase Noise Interface. These rocker switches are set up in a binary format with switch number 1 as the least significant digit and switch number 5 as the most significant digit. (Switches 6 and 7 are not used.) Any one of 31 HP-IB addresses can be set (00 through 30).

The address of the HP 11848A is set to 20 at the factory (switches 3 and 5 high; 16 + 4 = 20). Refer to Figure 3.

STORAGE AND SHIPMENT

Environment

The instrument should be stored in a clean, dry environment. The following environmental limitations apply to both storage and shipment:

Temperature ..... −55°C to +75°C
Humidity ..... 5% to 95% (maximum wet-bulb temperature = 40°C)
Altitude ..... 15 300 meters (50 000 feet)

Packaging

Original Packaging. Containers and materials identical to those used in factory packaging are available through Hewlett-Packard offices. If the instrument is being returned to Hewlett-Packard for servicing, attach a tag indicating the type of service required, return address, model number, and full serial number. Also mark the container FRAGILE to assure careful handling. In any correspondence refer to the instrument by model number and full serial number.

Other Packaging. The following general instructions should be used for repackaging with commercially available materials:

1. Wrap the instrument in heavy paper or plastic. (If shipping to a Hewlett-Packard office or service center, attach a tag indicating the service required, return address, model number, and full serial number.)
2. Use a strong shipping container. A double wall carton made of 2.4 MPa (350 psi) test material is adequate.
3. Use enough shock-absorbing material (75 to 100 mm layer; 3 to 4 in.) around all sides of the instrument to provide firm cushion and prevent movement in the container. Protect the front panel with cardboard.
4. Seal the shipping container securely.
5. Mark the shipping container FRAGILE to ensure careful handling.

Troubleshooting

General

Troubleshooting the HP 11848A Phase Noise Interface usually begins with troubleshooting a problem in the HP 3048A Option 301 Phase Noise Measurement System. Some general guidelines are discussed below.

Troubleshooting Helps in the Main System Software

The HP 3048A Option 301 Software has two programs to calibrate and test the system. For information on using these programs, refer to the HP 3048A Option 301 System Calibration Manual.

Calibrate System. A series of transfer function measurements are made on various signal paths in the Interface. The measurement data is stored as calibration factors which the controller uses (either directly or in more involved calculations) to correct the measured phase noise data whenever that signal path is used. Normally the Calibrate System program is invoked only for the annual System calibration or when the Interface has been repaired. Any difficulties encountered when the calibration program is being run may point to the Interface. For example, a catastrophic failure of a high-pass filter in the Interface will generate data that is too far out of limits to be accepted as a legitimate transfer function; the program will then abort the measurement.

Performance Tests. To verify that the system meets its published specifications, a series of Performance Tests can be run. The failure of a test may contain enough clues to point to a failure in the Interface.

Internal Adjustments. Often small out-of-specification results of the Performance Tests or Functional Checks can be corrected by means of adjustments, particularly if the condition is due to a dc offset voltage that is out of limits.

Functional Checks. These tests are an extension of the Performance Tests that test the general operational integrity of the Interface itself. The test limits are generally loose.

HP 11848A Control. Arbitrary and complete control of the programmable functions of the Interface from the controller keyboard is provided by the HP 11848A Control program. A single display contains all the Interface state information. Because of the compactness of the state information, you should consult the *HP 3048A Option 301 Reference Manual* when running the program.

Troubleshoot Mode. When the Troubleshoot Mode (selected from the Advanced Functions Menu) is enabled, information beyond simple error messages can be invoked. For example, tests can be aborted to the HP 11848A Control mode which shows the Interface state when the abort occurred.

Replaceable Parts

INTRODUCTION TO THIS SECTION

This section contains information for ordering parts. Table 3 lists reference designations, and Table 4 lists abbreviations that are used in the Replaceable Parts List. Table 5 lists all replaceable parts in the instrument. Table 6 contains the names and addresses that correspond to the manufacturer's code numbers listed in Table 5. Also included in this section are photographs and drawings to aid in identifying and ordering chassis mounted parts and mechanical parts.

REFERENCE DESIGNATIONS AND ABBREVIATIONS USED IN THIS MANUAL

Table 3 lists the reference designation letters for electrical parts in the instrument. The letter designations found in Table 3 are coupled with numeric designations to provide a unique reference designation for each part in the instrument. For example A6R1 is the reference designation of a particular resistor R1 on assembly A6.

Table 4 lists abbreviations used in the parts list and on schematics.

REPLACEABLE PARTS LIST

Table 5 is a list of replaceable parts and is organized as follows:

a. Electrical assemblies and their components with reference designations in alphanumeric order.

b. Chassis-Mounted parts with reference designations in alphanumeric order.

c. Mechanical parts with reference designations in alphanumeric order.

Ordering Parts.

Instrument Serial Numbers.

Attached to the rear of the instrument is a serial-number plate. The first four digits and the letter are the instrument serial-number prefix. The last five digits (serial-number suffix) are unique to each instrument. When parts in the instrument are changed, the serial-number prefix of the instrument may also change. This means that sometimes a part will be listed more than once in the the replaceable parts list along with a serial-number prefix or range of serial-number prefixes. Find the serial-number prefix on the serial plate of your instrument and order the part listed under the corresponding prefix in the table. If no serial prefix information is listed, the part is compatible in instruments of all serial numbers.

NOTE

It is possible that some assemblies in your instrument have been updated (through service or retrofitting) to reflect changes made to instruments with serial-number prefixes later than that shown on your instrument serial-number tag. Be sure to note the board number of the assembly being repaired or replaced when ordering parts for your instrument.

How to Order

To order a part in the Replaceable Parts List, call or write the nearest Hewlett-Packard Sales Office. Have the following information ready to speed the ordering process:

1. The Hewlett-Packard part number with the check digit. (The check digit will ensure accurate and timely processing of your order.)
2. The quantity required.
3. An approved purchase order number. (Sometimes required.)

NOTE

Within the USA, it is better to order directly from the HP Parts Center in Mountain View California. Ask your nearest HP office for information and forms for the "Direct Order System".

Replaceable Parts List Updating (Manual Updates)

A "MANUAL UPDATES" packet is shipped with the manual, when necessary, to provide the most current information available at the time of shipment. These packets consist of replacement and addition pages which should be incorporated into the manual to bring it up to date.

Hewlett-Packard offers a Documentation Update Service that will provide you with further updates as they become available. If you operate or service instruments of different serial prefixes, we strongly recommend that you join this service immediately to ensure that you manual is kept current. For more information, refer to the Documentation Update Service reply card included in this manual, or call: Technical Writing Department (509) 922-4001,

or write:

Hewlett-Packard Company
Technical Writing Department
24001 E. Mission - TAF C-34
Spokane, WA 99220

MECHANICAL AND CHASSIS PART LOCATIONS AND REFERENCE DESIGNATIONS

Most mechanical parts are identified in Figures 6 to 10. These figures are located at the end of this section. Major mechanical parts have reference designations that begin with the letters MP. To find the part number and description of a mechanical part, find the part in one of the photographs or drawings, and then look up the reference designation in Table 5. Mechanical hardware not shown in the figures, such as screws, are listed under the part which they attach. For example, the screws that attach the fan (B1) to the rear panel are listed under B1. Many of the cable assemblies have their reference designation (for example, W21) and color codes (WHT/ORN) silkscreened on the board assembly next to the connector to which they attach. Since these cables are indicated in this way, their reference designators are not called out in the photographs.

RECOMMENDED SPARES LIST

Stocking spare parts for an instrument is often done to ensure quick return to service after a malfunction occurs. Hewlett-Packard has prepared a "Recommended Spares" list for this instrument. The contents of the list are based on failure reports and repair data. Quantities given are for one year of parts support. You can request a complimentary copy of the "Recommended Spares" list from your nearest Hewlett-Packard office.

When stocking parts to support more than one instrument or to support a variety of Hewlett-Packard instruments, it may be more economical to work from one consolidated list rather than simply adding together stocking quantities from the individual instrument lists. Hewlett-Packard will prepare consolidated "Recommended Spares" lists for any number or combination of instruments. Contact your nearest Hewlett-Packard office for details.

Table 3. Reference Designations

REFERENCE DESIGNATIONS

A ..... assembly	E ..... miscellaneous electrical part	P ..... electrical connector (movable portion); plug	U ..... integrated circuit; microcircuit
AT ..... attenuator; isolator; termination	F ..... fuse	Q ..... transistor; SCR; triode thyristor; FET	V ..... electron tube
B ..... fan; motor	FL ..... filter	R ..... resistor	VR ..... voltage regulator; breakdown diode
BT ..... battery	H ..... hardware	RT ..... thermistor	W ..... cable; transmission path; wire
C ..... capacitor	HY ..... circulator	S ..... switch	X ..... socket
CP ..... coupler	J ..... electrical connector (stationary portion); jack	T ..... transformer	Y ..... crystal unit (piezo-electric or quartz)
CR ..... diode; diode thyristor; varactor	K ..... relay	TB ..... terminal board	Z ..... tuned cavity; tuned circuit
DC ..... directional coupler	L ..... coil; inductor	TC ..... thermocouple	
DL ..... delay line	M ..... meter	TP ..... test point	
DS ..... annunciator; signaling device (audible or visual); lamp; LED	MP ..... miscellaneous mechanical part		

Table 4. Abbreviations (1 of 2)

ABBREVIATIONS

A ..... ampere	COEF ..... coefficient	EDP ..... electronic data processing	INT ..... internal
ac ..... alternating current	COM ..... common	ELECT ..... electrolytic	kg ..... kilogram
ACCESS ..... accessory	COMP ..... composition	ENCAP ..... encapsulated	kHz ..... kilohertz
ADJ ..... adjustment	COMPL ..... complete	EXT ..... external	k ..... kilohm
A/D ..... analog-to-digital	CONN ..... connector	F ..... farad	kV ..... kilovolt
AF ..... audio frequency	CP ..... cadmium plate	FET .... field-effect transistor	lb ..... pound
AFC ..... automatic frequency control	CRT ..... cathode-ray tube	F/F ..... flip-flop	LC ..... inductance-capacitance
AGC ..... automatic gain control	CTL ..... complementary transistor logic	FH ..... flat head	LED ..... light-emitting diode
AL ..... aluminum	CW ..... continuous wave	FIL H ..... fillister head	LF ..... low frequency
ALC ..... automatic level control	cw ..... clockwise	FM .... frequency modulation	LG ..... long
AM .... amplitude modulation	cm ..... centimeter	FP ..... front panel	LH ..... left hand
AMPL ..... amplifier	D/A ..... digital-to-analog	FREQ ..... frequency	LIM ..... limit
APC ..... automatic phase control	dB ..... decibel	FXD ..... fixed	LIN ..... linear taper (used in parts list)
ASSY ..... assembly	dBm ..... decibel referred to 1 mW	g ..... gram	LK WASH ..... lock washer
AUX ..... auxiliary	dc ..... direct current	GE ..... germanium	LO ..... low; local oscillator
avg ..... average	deg ..... degree (temperature interval or difference)	GHz ..... gigahertz	LOG ..... logarithmic taper (used in parts list)
AWG ..... American wire gauge	...° ..... degree (plane angle)	GL ..... glass	log ..... logarithm(ic)
BAL ..... balance	°C ..... degree Celsius (centigrade)	GRD ..... ground(ed)	LPF ..... low pass filter
BCD ..... binary coded decimal	°F ..... degree Fahrenheit	H ..... henry	LV ..... low voltage
BD ..... board	°K ..... degree Kelvin	h ..... hour	m ..... meter (distance)
BECU ..... beryllium copper	DEPC ..... deposited carbon	HET ..... heterodyne	mA ..... milliampere
BFO ..... beat frequency oscillator	DET ..... detector	HEX ..... hexagonal	MAX ..... maximum
BH ..... binder head	diam ..... diameter	HD ..... head	M ..... megohm
BKDN ..... breakdown	DIA ..... diameter (used in parts list)	HDW ..... hardware	MEG ..... meg (10^6) (used in parts list)
BP ..... bandpass	DIFF AMPL ..... differential amplifier	HF ..... high frequency	MET FLM ..... metal film
BPF ..... bandpass filter	div ..... division	HG ..... mercury	MET OX ..... metallic oxide
BRS ..... brass	DPDT ..... double-pole, double-throw	HI ..... high	MF ..... medium frequency; microfarad (used in parts list)
BWO ..... backware-wave oscillator	DR ..... drive	HP ..... Hewlett-Packard	MFR ..... manufacturer
CAL ..... calibrate	DSB ..... double sideband	HPF ..... high pass filter	mg ..... milligram
ccw ..... counter-clockwise	DTL ..... diode transistor logic	HR ..... hour (used in parts list)	MHz ..... megahertz
CER ..... ceramic	DVM ..... digital voltmeter	HV ..... high voltage	mH ..... millihenry
CHAN ..... channel	ECL ..... emitter coupled logic	Hz ..... Hertz	mho ..... mho
cm ..... centimeter	EMF ..... electromotive force	IC ..... integrated circuit	min ..... minute (time)
CMO ..... cabinet mount only		ID ..... inside diameter	...' ..... minute (plane angle)
COAX ..... coaxial		IF ..... intermediate frequency	MINAT ..... miniature
		IMPG ..... impregnated	mm ..... millimeter
		in ..... incandescent	
		INCL ..... include(s)	
		INP ..... input	
		INS ..... insulation	

NOTE

All abbreviations in the parts list will be in upper-case.

Table 4. *Abbreviations (2 of 2)*

MOD .... modulator
MOM ..... momentary
MOS ..... metal-oxide semiconductor
ms ..... millisecond
MTG ..... mounting
MTR ..... meter (indicating device)
mV ..... millivolt
mVac ..... millivolt, ac
mVdc ..... millivolt, dc
mVpk ..... millivolt, peak
mVp-p ..... millivolt, peak-to-peak
mVrms ..... millivolt, rms
mW ..... milliwatt
MUX ..... multiplex
MY ..... mylar
μA ..... microampere
μF ..... microfarad
μH ..... microhenry
μmho ..... micromho
μs ..... microsecond
μV ..... microvolt
μVac ..... microvolt, ac
μVdc ..... microvolt, dc
μVpk ..... microvolt, peak
μVp-p ..... microvolt, peak-to-peak
μVrms ..... microvolt, rms
μW ..... microwatt
nA ..... nanoampere
NC ..... no connection
N/C ..... normally closed
NE ..... neon
NEG ..... negative
nF ..... nanofarad
NI PL ..... nickel plate
N/O ..... normally open
NOM ..... nominal
NORM ..... normal
NPN ..... negative-positive-negative
NPO ..... negative-positive zero (zero temperature coefficient)
NRFR ..... not recommended for field replacement
NSR ..... not separately replaceable
ns ..... nanosecond
nW ..... nanowatt
OBD .... order by description
OD ..... outside diameter
OH ..... oval head
OP AMPL ..... operational amplifier
OPT ..... option
OSC ..... oscillator
OX ..... oxide
oz ..... ounce
Ω ..... ohm
P ..... peak (used in parts list)
PAM ..... pulse-amplitude modulation
PC ..... printed circuit
PCM .... pulse-code modulation; pulse-count modulation
PDM ..... pulse-duration modulation
pF ..... picofarad
PH BRZ .... phosphor bronze
PHL ..... Phillips
PIN ..... positive-intrinsic-negative
PIV ..... peak inverse voltage
pk ..... peak
PL ..... phase lock
PLO .... phase lock oscillator
PM ..... phase modulation
PNP ..... positive-negative-positive
P/O ..... part of
POLY ..... polystyrene
PORC ..... porcelain
POS ..... positive; position(s) (used in parts list)
POSN ..... position
POT ..... potentiometer
p-p ..... peak-to-peak
PP ..... peak-to-peak (used in parts list)
PPM ..... pulse-position modulation
PREAMPL ..... preamplifier
PRF ..... pulse-repetition frequency
PRR .... pulse repetition rate
ps ..... picosecond
PT ..... point
PTM ..... pulse-time modulation
PWM ..... pulse-width modulation
PWV ..... peak working voltage
RC ..... resistance-capacitance
RECT ..... rectifier
REF ..... reference
REG ..... regulated
REPL ..... replaceable
RF ..... radio frequency
RFI ..... radio frequency interference
RH ... round head; right hand
RLC ..... resistance-inductance-capacitance
RMO ..... rack mount only
rms ..... root-mean-square
RND ..... round
ROM ..... read-only memory
R&P ..... rack and panel
RWV ..... reverse working voltage
S ..... scattering parameter
s ..... second (time)
..." ..... second (plane angle)
S-B ..... slow-blow (fuse) (used in parts list)
SCR ..... silicon controlled rectifier; screw
SE ..... selenium
SECT ..... sections
SEMICON .... semiconductor
SHF .... superhigh frequency
SI ..... silicon
SIL ..... silver
SL ..... slide
SNR .... signal-to-noise ratio
SPDT ..... single-pole, double-throw
SPG ..... spring
SR ..... split ring
SPST ..... single-pole, single-throw
SS ..... Service Sheet
SSB ..... single sideband
SST ..... stainless steel
STL ..... steel
SQ ..... square
SWR .... standing-wave ratio
SYNC ..... synchronize
T ..... timed (slow-blow fuse)
TA ..... tantalum
TC ..... temperature compensating
TD ..... time delay
TERM ..... terminal
TFT ..... thin-film transistor
TGL ..... toggle
THD ..... thread
THRU ..... through
TI ..... titanium
TOL ..... tolerance
TRIM ..... trimmer
TSTR ..... transistor
TTL ..... transistor-transistor logic
TV ..... television
TVI .... television interference
TWT ..... traveling wave tube
U ..... micro (10^{-6}) (used in parts list)
UF ..... microfarad (used in parts list)
UHF ..... ultrahigh frequency
UNDEF ..... undefined
UNREG ..... unregulated
V ..... volt
VA ..... voltampere
Vac ..... volts, ac
VAR ..... variable
VCO ..... voltage-controlled oscillator
Vdc ..... volts, dc
VDCW ..... volts, dc, working (used in parts list)
V(F) ..... volts, filtered
VFO ..... variable-frequency oscillator
VHF ..... very-high frequency
Vpk ..... volts, peak
Vp-p ..... volts, peak-to-peak
Vrms ..... volts, rms
VSWR ..... voltage standing wave ratio
VTO ..... voltage-tune oscillator
VTVM ..... vacuum-tube voltmeter
V(X) ..... volts, switched
W ..... watt
W/ ..... with
WIV ..... working inverse voltage
WW ..... wirewound
W/O ..... without
YIG ..... yttrium-iron-garnet
Z_o ..... characteristic impedance

NOTE

All abbreviations in the parts list will be in upper-case.

MULTIPLIERS

Abbreviation	Prefix	Multiple
T	tera	10^{12}
G	giga	10^{9}
M	mega	10^{6}
k	kilo	10^{3}
da	deka	10
d	deci	10^{-1}
c	centi	10^{-2}
m	milli	10^{-3}
μ	micro	10^{-6}
n	nano	10^{-9}
p	pico	10^{-12}
f	femto	10^{-15}
a	atto	10^{-18}

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A1						
A1	11848-60101	1	1	HP-IB INPUT/OUTPUT ASSEMBLY	28480	11848-60101
A1C1	0160-4571	8	51	CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A1C2	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A1C3	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A1C4	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A1C5	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A1C6	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A1C7	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A1C8	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A1C9	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A1C10	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A1C11	0160-2204	0	2	CAPACITOR-FXD 100PF +-5% 300VDC MICA	28480	0160-2204
A1C12	0160-2204	0		CAPACITOR-FXD 100PF +-5% 300VDC MICA	28480	0160-2204
A1C13	0180-0229	7	2	CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A1C14	0180-0291	3	3	CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1C15	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A1C16	0180-0228	6	2	CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A1C17	0180-2396	3	2	CAPACITOR-FXD 1000UF+75-10% 75VDC AL	56289	39D108G075JP4
A1C18	0180-2396	3		CAPACITOR-FXD 1000UF+75-10% 75VDC AL	56289	39D108G075JP4
A1C19	0180-3961	0	1	CAPACITOR-FXD 5600U 35VDC AL	28480	0180-3961
A1CR1	1990-0486	6	8	LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A1CR2	1990-0486	6		LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A1CR3	1990-0486	6		LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A1CR4	1990-0486	6		LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A1CR5	1990-0486	6		LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A1CR6	1901-0050	3	53	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1CR7	1902-0958	2	2	DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.075%	28480	1902-0958
A1CR8	1901-0026	3	6	DIODE-PWR RECT 200V 750MA DO-29	28480	1901-0026
A1CR9	1901-0026	3		DIODE-PWR RECT 200V 750MA DO-29	28480	1901-0026
A1CR10	1902-0958	2		DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.075%	28480	1902-0958
A1CR11	1901-0026	3		DIODE-PWR RECT 200V 750MA DO-29	28480	1901-0026
A1CR12	1901-0026	3		DIODE-PWR RECT 200V 750MA DO-29	28480	1901-0026
A1CR13	1901-0026	3		DIODE-PWR RECT 200V 750MA DO-29	28480	1901-0026
A1CR14	1901-0026	3		DIODE-PWR RECT 200V 750MA DO-29	28480	1901-0026
A1CR15	1990-0486	6		LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A1CR16	1990-0486	6		LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A1CR17	1990-0486	6		LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A1F1	2110-0381	7	2	FUSE 3A 250V TD 1.25X.25	28480	2110-0381
	2110-0269	0	4	FUSEHOLDER-CLIP TYPE.25D-FUSE	28480	2110-0269
A1F2	2110-0381	7		FUSE 3A 250V TD 1.25X.25	28480	2110-0381
	2110-0269	0		FUSEHOLDER-CLIP TYPE.25D-FUSE	28480	2110-0269
A1J1	1251-5041	3	2	CONNECTOR 5-PIN M POST TYPE	22526	65500-105
A1J2	1251-8929	2	2	CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-8929
A1J3	1251-5041	3		CONNECTOR 5-PIN M POST TYPE	22526	65500-105
A1J4	1251-7264	6	3	CONN-POST TYPE .100-PIN-SPCG 34-CONT	28480	1251-7264
A1J5	1251-7264	6		CONN-POST TYPE .100-PIN-SPCG 34-CONT	28480	1251-7264

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A1J6	1251-3825	7	4	CONNECTOR 5-PIN M POST TYPE	28480	1251-3825
A1J7	1251-3750	7	1	CONNECTOR 10-PIN M POST TYPE	28480	1251-3750
A1J8	1251-3638	0	1	CONNECTOR 6-PIN M POST TYPE	28480	1251-3638
A1J9	1251-3825	7		CONNECTOR 5-PIN M POST TYPE	28480	1251-3825
A1J10-17				NOT ASSIGNED		
A1J18	1251-4969	2	2	CONNECTOR 4-PIN M POST TYPE	28480	1251-4969
A1J19	1251-4969	2		CONNECTOR 4-PIN M POST TYPE	28480	1251-4969
A1L1	9100-3560	6	11	INDUCTOR RF-CH-MLD 5.6UH 5%	28480	9100-3560
A1MP1	1390-0457	9	21	FASTENER-SNAP-IN PLGR 0.076 IN - .165 IN	28480	1390-0457
A1MP2	1390-0458	0	21	FASTENER-SNAP-IN GROM 0.076 IN - .165 IN	28480	1390-0458
A1MP3	1400-0482	3	1	CABLE TIE .062-3-DIA .14-WD NYL	28480	1400-0482
A1MP4	1251-5595	2	4	POLARIZING KEY-POST CONN	28480	1251-5595
A1MP5	1251-5595	2		POLARIZING KEY-POST CONN	28480	1251-5595
A1R1	0757-0442	9	23	RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A1R2	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A1R3	0698-3439	4	3	RESISTOR 178 1% .125W F TC=0+-100	24546	CT4-1/8-T0-178R-F
A1R4	0757-0317	7	8	RESISTOR 1.33K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1331-F
A1R5	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1331-F
A1R6	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1331-F
A1R7	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1331-F
A1R8	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1331-F
A1R9	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A1R10	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A1R11	0757-0461	2	4	RESISTOR 68.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-6812-F
A1R12	0698-3162	0	6	RESISTOR 46.4K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4642-F
A1R13	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1331-F
A1R14	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1331-F
A1R15	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1331-F
A1R16	1810-0269	3	2	NETWORK-RES 9-SIP 10.0K OHM X 8	28480	1810-0269
A1R17	1810-0269	3		NETWORK-RES 9-SIP 10.0K OHM X 8	28480	1810-0269
A1S1-S3 †				NOT ASSIGNED		
A1TP1	1251-0600	0	129	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1TP10	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1TP11	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A1U1	1820-1730	6	14	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A1U2	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A1U3	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A1U4	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A1U5	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N

†Refer to Table 7 for update information.

Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A1U6	1820-1689	4	4	IC TRANSCEIVER TTL INSTR-BUS IEEE-488	04713	MC3446AP
A1U7	1820-1689	4		IC TRANSCEIVER TTL INSTR-BUS IEEE-488	04713	MC3446AP
A1U8	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A1U9	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A1U10	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A1U11	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A1U12	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A1U13	1820-1689	4		IC TRANSCEIVER TTL INSTR-BUS IEEE-488	04713	MC3446AP
A1U14	1820-1689	4		IC TRANSCEIVER TTL INSTR-BUS IEEE-488	04713	MC3446AP
A1U15	1820-1216	3	4	IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A1U16	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A1U17	1820-1444	9	1	IC MUXR/DATA-SEL TTL LS 2-TO-1-LINE QUAD	01295	SN74LS298N
A1U18	1820-1470	1	2	IC MUXR/DATA-SEL TTL LS 2-TO-1-LINE QUAD	01295	SN74LS157N
A1U19	1820-1470	1		IC MUXR/DATA-SEL TTL LS 2-TO-1-LINE QUAD	01295	SN74LS157N
A1U20	1820-1917	1	1	IC DRVR TTL LS LINE OCTL	01295	SN74LS240N
A1U21	1820-1492	7	1	IC BFR TTL LS INV HEX 1-INP	01295	SN74LS368AN
A1U22	1820-1201	6	5	IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A1U23	1820-1419	8	2	IC COMPTR TTL LS MAGTD 4-BIT	01295	SN74LS85N
A1U24	1820-1201	6		IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A1U25	1820-1197	9	1	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A1U26	1820-1208	3	1	IC GATE TTL LS OR QUAD 2-INP	01295	SN74LS32N
A1U27	1820-1204	9	1	IC GATE TTL LS NAND DUAL 4-INP	01295	SN74LS20N
A1U28	1820-1199	1	4	IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A1U29	1820-1201	6		IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A1U30	1820-1207	2	1	IC GATE TTL LS NAND 8-INP	01295	SN74LS30N
A1U31	1820-1419	8		IC COMPTR TTL LS MAGTD 4-BIT	01295	SN74LS85N
A1U32	1820-1144	6	1	IC GATE TTL LS NOR QUAD 2-INP	01295	SN74LS02N
A1U33	1820-1423	4	1	IC MV TTL LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
A1U34	1820-1416	5	3	IC SCHMITT-TRIG TTL LS INV HEX 1-INP	01295	SN74LS14N

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A2						
A2	11848-60102	2	1	LED ASSEMBLY	28480	11848-60102
A2DS1	1990-0487	7	4	LED-LAMP LUM-INT=2MCD BVR=5V	28480	HLMP-1401
	0340-1195	2	4	MOUNT- L.E.D. .120 IN ID; .187 IN OD	32559	908-150
A2DS2	1990-0487	7		LED-LAMP LUM-INT=2MCD BVR=5V	28480	HLMP-1401
	0340-1195	2		MOUNT- L.E.D. .120 IN ID; .187 IN OD	32559	908-150
A2DS3	1990-0487	7		LED-LAMP LUM-INT=2MCD BVR=5V	28480	HLMP-1401
	0340-1195	2		MOUNT- L.E.D. .120 IN ID; .187 IN OD	32559	908-150
A2DS4	1990-0487	7		LED-LAMP LUM-INT=2MCD BVR=5V	28480	HLMP-1401
	0340-1195	2		MOUNT- L.E.D. .120 IN ID; .187 IN OD	32559	908-150
A2J1	1252-0243	9	2	CONN-POST TYPE .100-PIN-SPCG 10-CONT	28480	1252-0243
A2J2	1251-4670	2	3	CONNECTOR 3-PIN M POST TYPE	28480	1251-4670

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3						
A3	11848-60103	3	1	ANALYZER INTERFACE ASSEMBLY (NEW)	28480	11848-60103
A3	11848-69103	1	1	ANALYZER INTERFACE ASSEMBLY (RESTORED)	28480	11848-69103
A3C1	0160-5469	5	4	CAPACITOR-FXD 1UF 10% 50VDC	28480	0160-5469
A3C2	0160-5469	5		CAPACITOR-FXD 1UF 10% 50VDC	28480	0160-5469
A3C3	0160-4617	3	1	CAPACITOR-FXD 180PF +-5% 200VDC CER	28480	0160-4617
A3C4	0160-0128	3	3	CAPACITOR-FXD 2.2UF +-20% 50VDC CER	28480	0160-0128
A3C5	0160-4832	4	6	CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A3C6	0180-1746	5	28	CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C7				NOT ASSIGNED		
A3C8	0160-0128	3		CAPACITOR-FXD 2.2UF +-20% 50VDC CER	28480	0160-0128
A3C9	0160-0128	3		CAPACITOR-FXD 2.2UF +-20% 50VDC CER	28480	0160-0128
A3C10	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A3C11	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A3C12				NOT ASSIGNED		
A3C13				NOT ASSIGNED		
A3C14	0160-4822	2	9	CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4822
A3C15	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A3C16	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A3C17	0160-5568	5	3	CAPACITOR-FXD 4700PF +-5% 200VDC	28480	0160-5568
A3C18	0160-5568	5		CAPACITOR-FXD 4700PF +-5% 200VDC	28480	0160-5568
A3C19	0160-5568	5		CAPACITOR-FXD 4700PF +-5% 200VDC	28480	0160-5568
A3C20	0160-3324	7	17	CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C21	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C22	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C23	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C24	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C25	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C26	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C27	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C28	0160-5550	5	7	CAPACITOR-FXD .1UF +-5% 100VDC MET-POLYC	28480	0160-5550
A3C29	0160-5550	5		CAPACITOR-FXD .1UF +-5% 100VDC MET-POLYC	28480	0160-5550
A3C30	0160-5550	5		CAPACITOR-FXD .1UF +-5% 100VDC MET-POLYC	28480	0160-5550
A3C31	0160-5540	3	6	CAPACITOR-FXD .01UF +-5% 100VDC	84411	HEW-249
A3C32	0160-5540	3		CAPACITOR-FXD .01UF +-5% 100VDC	84411	HEW-249
A3C33	0160-5540	3		CAPACITOR-FXD .01UF +-5% 100VDC	84411	HEW-249
A3C34	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C35	0160-3563	6	1	CAPACITOR-FXD 10UF +-5% 50VDC MET-POLYC	28480	0160-3563
A3C36	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C37	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C38	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C39	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C40	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C41	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C42	0160-5550	5		CAPACITOR-FXD .1UF +-5% 100VDC MET-POLYC	28480	0160-5550
A3C43	0160-5550	5		CAPACITOR-FXD .1UF +-5% 100VDC MET-POLYC	28480	0160-5550
A3C44	0160-5550	5		CAPACITOR-FXD .1UF +-5% 100VDC MET-POLYC	28480	0160-5550
A3C45	0160-5540	3		CAPACITOR-FXD .01UF +-5% 100VDC	84411	HEW-249
A3C46	0160-5540	3		CAPACITOR-FXD .01UF +-5% 100VDC	84411	HEW-249
A3C47	0160-5540	3		CAPACITOR-FXD .01UF +-5% 100VDC	84411	HEW-249
A3C48	0160-4822	2		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4822
A3C49	0160-4822	2		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4822
A3C50	0160-4822	2		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4822

†Refer to Table 7 for update information.

Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3C51	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C53	0160-4787	8	3	CAPACITOR-FXD 22PF +-5% 100VDC CER 0+-30	28480	0160-4787
A3C54	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A3C55	0160-4822	2		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4822
A3C56	0160-4389	6	6	CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A3C57-200				NOT ASSIGNED		
A3C201	0180-0229	7		CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A3C202	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A3C203	0160-4801	7	8	CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801
A3C204	0160-4801	7		CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801
A3C205	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C206	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C207	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C208	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C209	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C210	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C211	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C212	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C213	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C214	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C215	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C216	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C217	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C218	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C219	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C220	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C221	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C222	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C223	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C224	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A3C225	0180-2207	5	2	CAPACITOR-FXD 100UF+-10% 10VDC TA	56289	150D107X9010R2
A3C226	0180-2667	1	1	CAPACITOR-FXD 150UF+-10% 20VDC TA	56289	152D157X9020S2
A3CR1	1901-0518	8	3	DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3CR2	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3CR3	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3CR4-7				NOT ASSIGNED		
A3CR8	1901-0418	7	4	DIODE-PWR RECT 400V 1.5A	28480	1901-0418
A3CR9	1901-0418	7		DIODE-PWR RECT 400V 1.5A	28480	1901-0418
A3CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3CR12	1901-0418	7		DIODE-PWR RECT 400V 1.5A	28480	1901-0418
A3CR13	1901-0418	7		DIODE-PWR RECT 400V 1.5A	28480	1901-0418
A3CR14	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3CR16-200				NOT ASSIGNED		
A3CR201	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3F1	2110-0757	1	9	FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A3F2	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A3F3	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A3F4	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062

†Refer to Table 7 for update information.

Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3J1-14	1250-1255	1	14	CONNECTOR-RF SMB M PC 50 OHM	28480	1250-1255
	1205-0095	0	1	HEAT SINK SGL TO-5/TO-39-CS	30161	1205-0095
A3J15				NOT ASSIGNED		
A3J16	1251-4670	2		CONNECTOR 3-PIN M POST TYPE	28480	1251-4670
A3J201	1251-7264	6		CONN-POST TYPE .100-PIN-SPCG 34-CONT	28480	1251-7264
A3J202				NOT ASSIGNED		
A3J203	1251-3825	7		CONNECTOR 5-PIN M POST TYPE	28480	1251-3825
A3J204	1251-8472	0	1	CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1251-8472
A3L1	9100-1661	4	2	INDUCTOR RF-CH-MLD 2.2MH 5%	28480	9100-1661
A3L2-200				NOT ASSIGNED		
A3L201	9100-3560	6		INDUCTOR RF-CH-MLD 5.6UH 5%	28480	9100-3560
A3L202	9100-3560	6		INDUCTOR RF-CH-MLD 5.6UH 5%	28480	9100-3560
A3L203	9100-3560	6		INDUCTOR RF-CH-MLD 5.6UH 5%	28480	9100-3560
A3L204	9140-0210	1	25	INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L205	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L206	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L207	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L208	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L209	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L210	9140-0137	1	5	INDUCTOR RF-CH-MLD 1MH 5%	28480	9140-0137
A3L211	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L212	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L213	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L214	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L215	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L216	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L217	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L218	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L219	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A3L220	9140-0137	1		INDUCTOR RF-CH-MLD 1MH 5%	28480	9140-0137
A3MP1	1251-2194	1	27	CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A3MP2	1390-0457	9		FASTENER-SNAP-IN PLGR 0.076 IN - .165 IN	28480	1390-0457
A3MP3	1390-0458	0		FASTENER-SNAP-IN GROM 0.076 IN - .165 IN	28480	1390-0458
A3Q1				NOT ASSIGNED		
A3Q2	1855-0410	0	3	TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0410
A3Q3	1855-0410	0		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0410
A3Q4	1855-0410	0		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0410
A3Q5-200				NOT ASSIGNED		
A3Q201	1855-0276	6	1	TRANSISTOR J-FET 2N4416A N-CHAN D-MODE	04713	2N4416A
A3R1	0757-0280	3	12	RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A3R2				NOT ASSIGNED		
A3R3				NOT ASSIGNED		
A3R4	0698-3157	3	20	RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A3R5	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A3R6	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A3R7	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A3R8	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A3R9	0698-3460	1	8	RESISTOR 422K 1% .125W F TC=0+-100	28480	0698-3460
A3R10	0698-3454	3	3	RESISTOR 215K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2153-F
A3R11-14				NOT ASSIGNED		
A3R15	0757-0444	1	4	RESISTOR 12.1K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-1212-F
A3R16	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A3R17	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A3R18	0698-3450	9	4	RESISTOR 42.2K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4222-F

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3R19	0757-0438	3	29	RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R20	0698-0084	9	8	RESISTOR 2.15K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2151-F
A3R21	0698-8827	4	12	RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A3R22	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A3R23	0698-3223	4	3	RESISTOR 1.24K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1241-F
A3R24	0757-0420	3	4	RESISTOR 750 1% .125W F TC=0+-100	24546	CT4-1/8-T0-751-F
A3R25	0698-4421	6	11	RESISTOR 249 1% .125W F TC=0+-100	24546	CT4-1/8-T0-249R-F
A3R26	0698-4421	6		RESISTOR 249 1% .125W F TC=0+-100	24546	CT4-1/8-T0-249R-F
A3R27	0698-4421	6		RESISTOR 249 1% .125W F TC=0+-100	24546	CT4-1/8-T0-249R-F
A3R28	0757-0422	5	2	RESISTOR 909 1% .125W F TC=0+-100	24546	CT4-1/8-T0-909R-F
A3R29	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	CT4-1/8-T0-909R-F
A3R30	0757-0417	8	1	RESISTOR 562 1% .125W F TC=0+-100	24546	CT4-1/8-T0-562R-F
A3R31	0757-0400	9	1	RESISTOR 90.9 1% .125W F TC=0+-100	24546	CT4-1/8-T0-90R9-F
A3R32	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2151-F
A3R33	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2151-F
A3R34	0698-3460	1		RESISTOR 422K 1% .125W F TC=0+-100	28480	0698-3460
A3R35	0698-3460	1		RESISTOR 422K 1% .125W F TC=0+-100	28480	0698-3460
A3R36	0698-3455	4	1	RESISTOR 261K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2613-F
A3R37	0698-3450	9		RESISTOR 42.2K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4222-F
A3R38	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R39	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R40	0698-3450	9		RESISTOR 42.2K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4222-F
A3R41	0698-3159	5	1	RESISTOR 26.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2612-F
A3R42	0698-3154	0	10	RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-4221-F
A3R43	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R44	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R45	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-4221-F
A3R46	0698-0085	0	3	RESISTOR 2.61K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2611-F
A3R47	0698-3447	4	5	RESISTOR 422 1% .125W F TC=0+-100	24546	CT4-1/8-T0-422R-F
A3R48	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R49	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R50	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-4221-F
A3R51	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2611-F
A3R52	0698-3447	4		RESISTOR 422 1% .125W F TC=0+-100	24546	CT4-1/8-T0-422R-F
A3R53	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R54	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R55	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-4221-F
A3R56	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2611-F
A3R57	0698-3447	4		RESISTOR 422 1% .125W F TC=0+-100	24546	CT4-1/8-T0-422R-F
A3R58	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R59	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R60	0698-4421	6		RESISTOR 249 1% .125W F TC=0+-100	24546	CT4-1/8-T0-249R-F
A3R61	0698-3454	3		RESISTOR 215K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2153-F
A3R62	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2151-F
A3R63	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A3R64	0698-3460	1		RESISTOR 422K 1% .125W F TC=0+-100	28480	0698-3460
A3R65	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-4221-F
A3R66	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R67	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R68	2100-0558	9	6	RESISTOR-TRMR 20K 10% C TOP-ADJ 1-TRN	28480	2100-0558

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Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3R69	0757-0465	6	10	RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A3R70	0698-3454	3		RESISTOR 215K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2153-F
A3R71	0698-3457	6	1	RESISTOR 316K 1% .125W F TC=0+-100	28480	0698-3457
A3R72	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R73	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R74	2100-0558	9		RESISTOR-TRMR 20K 10% C TOP-ADJ 1-TRN	28480	2100-0558
A3R75	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A3R76	0757-0199	3	13	RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A3R77	0698-3160	8	5	RESISTOR 31.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3162-F
A3R78	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R79	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R80	2100-0558	9		RESISTOR-TRMR 20K 10% C TOP-ADJ 1-TRN	28480	2100-0558
A3R81	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A3R82	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A3R83	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3162-F
A3R84	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R85	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R86	2100-0558	9		RESISTOR-TRMR 20K 10% C TOP-ADJ 1-TRN	28480	2100-0558
A3R87	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A3R88	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A3R89	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3162-F
A3R90	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R91	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R92	2100-0558	9		RESISTOR-TRMR 20K 10% C TOP-ADJ 1-TRN	28480	2100-0558
A3R93	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A3R94	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A3R95	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3162-F
A3R96	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R97	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R98	2100-0558	9		RESISTOR-TRMR 20K 10% C TOP-ADJ 1-TRN	28480	2100-0558
A3R99	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A3R100	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R101	0757-0401	0	12	RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-TO-101-F
A3R102	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-TO-101-F
A3R103	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3R104	0757-0316	6	4	RESISTOR 42.2 1% .125W F TC=0+-100	28480	0757-0316
A3R105	0698-3223	4		RESISTOR 1.24K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1241-F
A3R106	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	CT4-1/8-T0-751-F
A3R107	0698-4421	6		RESISTOR 249 1% .125W F TC=0+-100	24546	CT4-1/8-T0-249R-F
A3R108	0698-4421	6		RESISTOR 249 1% .125W F TC=0+-100	24546	CT4-1/8-T0-249R-F
A3R109	0698-4421	6		RESISTOR 249 1% .125W F TC=0+-100	24546	CT4-1/8-T0-249R-F
2621A TO 2713A						
A3R110	0698-0083	8	5	RESISTOR 1.96K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-1961-F
2717A AND ABOVE						
A3R110	0698-6250	3		RESISTOR 2.5K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-2501-F
A3R111	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-TO-101-F
A3R112	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-TO-101-F
2621A TO 2713A						
A3R113	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2151-F
2717A AND ABOVE						
A3R113	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2161-F
A3R114	0698-3430	5	16	RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A3R115	0698-3447	4		RESISTOR 422 1% .125W F TC=0+-100	24546	CT4-1/8-T0-422R-F
A3R116	0698-4037	0	2	RESISTOR 46.4 1% .125W F TC=0+-100	28480	0698-4037
A3R117				NOT ASSIGNED		
A3R118	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	CT4-1/8-T0-751-F

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Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3R119	0757-0395	1	1	RESISTOR 56.2 1% .125W F TC=0+-100	24546	CT4-1/8-T0-56R2-F
A3R120	0757-0416	7	5	RESISTOR 511 1% .125W F TC=0+-100	24546	CT4-1/8-T0-511R-F
A3R121	0698-4037	0		RESISTOR 46.4 1% .125W F TC=0+-100	28480	0698-4037
A3R122	0757-0316	6		RESISTOR 42.2 1% .125W F TC=0+-100	28480	0757-0316
A3R123	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A3R124	0698-3450	9		RESISTOR 42.2K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4222-F
A3R125	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-4221-F
A3R126	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-4221-F
A3R127	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-4221-F
A3R128	0698-3460	1		RESISTOR 422K 1% .125W F TC=0+-100	28480	0698-3460
A3R129	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A3R130	0698-3460	1		RESISTOR 422K 1% .125W F TC=0+-100	28480	0698-3460
A3R131	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-4221-F
A3R132	2100-3345	8	2	RESISTOR-TRMR 10 10% C TOP-ADJ 1-TRN	28480	2100-3345
A3R133	0757-0346	2	2	RESISTOR 10 1% .125W F TC=0+-100	28480	0757-0346
A3R134	2100-3345	8		RESISTOR-TRMR 10 10% C TOP-ADJ 1-TRN	28480	2100-3345
A3R135	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	28480	0757-0346
A3R136	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A3R137	0698-3460	1		RESISTOR 422K 1% .125W F TC=0+-100	28480	0698-3460
A3R138	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-4221-F
A3R139				NOT ASSIGNED		
A3R140	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A3R141				NOT ASSIGNED		
A3R142				NOT ASSIGNED		
A3R143	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A3R144	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A3R145-200				NOT ASSIGNED		
A3R201	0698-3162	0		RESISTOR 46.4K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4642-F
A3R202	0757-0461	2		RESISTOR 68.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-6812-F
A3R203	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A3R204	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A3R205	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2151-F
A3R206	2100-0554	5	4	RESISTOR-TRMR 500 10% C TOP-ADJ 1-TRN	28480	2100-0554
2621A TO 2647A						
A3R207	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A3R208	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A3R209	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2151-F
2649A AND ABOVE						
A3R207	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1331-F
A3R208				NOT ASSIGNED		
A3R209	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2611-F
A3R210	2100-0554	5		RESISTOR-TRMR 500 10% C TOP-ADJ 1-TRN	28480	2100-0554
A3R211	0698-3440	7	5	RESISTOR 196 1% .125W F TC=0+-100	24546	CT4-1/8-TO-196R-F
A3R212	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A3R213	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A3R214	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A3R215	0757-0421	4	1	RESISTOR 825 1% .125W F TC=0+-100	24546	CT4-1/8-TO-825R-F
A3R216	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A3TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP10	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600

†Refer to Table 7 for update information.

Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3TP11	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP12	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP13	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP14	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP15	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP16	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP17	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP18	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP19	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP20	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP21	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP22	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP23	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP24	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP25	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP26	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP27	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP28	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP29	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP30	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP31	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP32	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP33	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP34	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP35	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP36	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP37	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP38	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP39	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP40	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP41	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP42	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP43	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP44	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP45	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP46	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP47	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP48-200				NOT ASSIGNED		
A3TP201	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP202	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP203	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP204	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP205	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP206	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3TP207	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3U1	1820-0270	7	1	IC WIDEBAND AMPL VID TO-100 PKG	07263	UA733HC
	1205-0095	0		HEAT SINK-SGL TO-5/TO-39-CS	30161	3225B
A3U2				NOT ASSIGNED		
A3U3				NOT ASSIGNED		
A3U4	1826-0065	0	2	IC COMPARATOR PRCN 8-DIP-P PKG	27014	LM311N
A3U5	1826-0065	0		IC COMPARATOR PRCN 8-DIP-P PKG	27014	LM311N
A3U6	1826-1557	7	11	IC OP AMP LOW-BIAS-H-IMPD TO-99 PKG	27014	LF356H
A3U7	1826-1049	2	1	IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27GZ
A3U8	1826-0716	8	3	IC OP AMP LOW-NOISE DUAL 8-DIP-C PKG	18324	NE5532AFE
A3U9	1826-1557	7		IC OP AMP LOW-BIAS-H-IMPD TO-99 PKG	27014	LF356H

†Refer to Table 7 for update information.

Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3U10	1826-1557	7		IC OP AMP LOW-BIAS-H-IMPD TO-99 PKG	27014	LF356H
A3U11	1826-1557	7		IC OP AMP LOW-BIAS-H-IMPD TO-99 PKG	27014	LF356H
A3U12	1826-1557	7		IC OP AMP LOW-BIAS-H-IMPD TO-99 PKG	27014	LF356H
A3U13	1826-1557	7		IC OP AMP LOW-BIAS-H-IMPD TO-99 PKG	27014	LF356H
A3U14	1826-0783	9	7	IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A3U15	1820-1422	3	1	IC MV TTL LS MONOSTBL RETRIG	01295	SN74LS122N
A3U16	1826-1492	9	1	IC OP AMP PRCN 8-DIP-C PKG	06665	OP-16EZ
A3U17	1826-1557	7		IC OP AMP LOW-BIAS-H-IMPD TO-99 PKG	27014	LF356H
A3U18	1826-1557	7		IC OP AMP LOW-BIAS-H-IMPD TO-99 PKG	27014	LF356H
A3U19	1826-1557	7		IC OP AMP LOW-BIAS-H-IMPD TO-99 PKG	27014	LF356H
A3U20	1826-1557	7		IC OP AMP LOW-BIAS-H-IMPD TO-99 PKG	27014	LF356H
A3U21	1826-1557	7		IC OP AMP LOW-BIAS-H-IMPD TO-99 PKG	27014	LF356H
A3U22	1826-1150	6	1	IC OP AMP INSTM DUAL 14-DIP-C PKG	06665	OP-227GY
A3U23	1826-0716	8		IC OP AMP LOW-NOISE DUAL 8-DIP-C PKG	18324	NE5532AFE
A3U24	1826-0606	5	14	IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U25	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U26	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U27	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U28	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U29	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U30	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U31	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U32	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U33	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A3U34-200				NOT ASSIGNED		
A3U201	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A3U202	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A3U203	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A3U204	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A3U205	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A3U206	1820-1281	2	3	IC DCDR TTL LS 2-TO-4-LINE DUAL	01295	SN74LS139AN
A3U207	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A3U208	1826-0188	8	3	D/A 8-BIT 16-CERDIP BPLR	04713	MC1408L-8
A3U209	1826-0188	8		D/A 8-BIT 16-CERDIP BPLR	04713	MC1408L-8
A3U210	1826-0785	1	2	IC OP AMP LOW-BIAS-H-IMPD DUAL 8-DIP-C	01295	TL072ACJG
A3U211	1820-1416	5		IC SCHMITT-TRIG TTL LS INV HEX 1-INP	01295	SN74LS14N
A3U212	1820-1281	2		IC DCDR TTL LS 2-TO-4-LINE DUAL	01295	SN74LS139AN
A3U213	1820-1416	5		IC SCHMITT-TRIG TTL LS INV HEX 1-INP	01295	SN74LS14N
A3U214	1820-1281	2		IC DCDR TTL LS 2-TO-4-LINE DUAL	01295	SN74LS139AN
A3U215	1820-1201	6		IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
2621A TO 2647A						
A3VR1				NOT ASSIGNED		
2649A AND ABOVE						
A3VR1	1902-0680	7	1	DIODE-ZNR 1N827 6.2V 5% DO-7 PD=.4W	24046	1N827
A3VR2	1902-0946	8	4	DIODE-ZNR 3.3V 5% DO-35 PD=.4W TC=-.039%	28480	1902-0946
A3VR3	1902-0946	8		DIODE-ZNR 3.3V 5% DO-35 PD=.4W TC=-.039%	28480	1902-0946
A3VR4	1902-0946	8		DIODE-ZNR 3.3V 5% DO-35 PD=.4W TC=-.039%	28480	1902-0946
A3VR5	1902-0946	8		DIODE-ZNR 3.3V 5% DO-35 PD=.4W TC=-.039%	28480	1902-0946

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4						
A4	11848-60104	4	1	PHASE DETECTOR ASSEMBLY (NEW)	28480	11848-60104
A4	11848-69104	2	1	PHASE DETECTOR ASSEMBLY (RESTORED)	28480	11848-69104
A4C1	0160-3879	7	15	CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A4C2	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A4C3	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A4C4	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A4C5	0160-4383	0	2	CAPACITOR-FXD 6.8PF +-.5PF 200VDC CER	20932	5024E0200RD689D
A4C6	0160-3874	2	4	CAPACITOR-FXD 10PF +-.5PF 200VDC CER	28480	0160-3874
A4C7	0160-3874	2		CAPACITOR-FXD 10PF +-.5PF 200VDC CER	28480	0160-3874
A4C8	0160-4386	3	4	CAPACITOR-FXD 33PF +-5% 200VDC CER 0+-30	28480	0160-4386
A4C9	0160-4386	3		CAPACITOR-FXD 33PF +-5% 200VDC CER 0+-30	28480	0160-4386
A4C10	0160-4350	1	2	CAPACITOR-FXD 68PF +-5% 200VDC CER 0+-30	28480	0160-4350
A4C11	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A4C12	0160-4350	1		CAPACITOR-FXD 68PF +-5% 200VDC CER 0+-30	28480	0160-4350
A4C13	0160-3874	2		CAPACITOR-FXD 10PF +-.5PF 200VDC CER	28480	0160-3874
A4C14	0160-4791	4	3	CAPACITOR-FXD 10PF +-5% 100VDC CER 0+-30	28480	0160-4791
A4C15	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C16	0160-4791	4		CAPACITOR-FXD 10PF +-5% 100VDC CER 0+-30	28480	0160-4791
A4C17	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C18	0160-4791	4		CAPACITOR-FXD 10PF +-5% 100VDC CER 0+-30	28480	0160-4791
A4C19	0160-4822	2		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4822
A4C20	0160-4822	2		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4822
A4C21	0160-4819	7	3	CAPACITOR-FXD 2200PF +-5% 100VDC CER	28480	0160-4819
A4C22	0160-5100	1	1	CAPACITOR-FXD 2700PF +-5% 100VDC CER	16299	VAC05COG272J100A
A4C23	0160-4820	0	1	CAPACITOR-FXD 1800PF +-5% 100VDC CER	28480	0160-4820
A4C24	0160-4808	4	1	CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4808
A4C25	0160-4819	7		CAPACITOR-FXD 2200PF +-5% 100VDC CER	28480	0160-4819
A4C26	0160-4819	7		CAPACITOR-FXD 2200PF +-5% 100VDC CER	28480	0160-4819
A4C27	0160-4535	4	7	CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4C28	0180-0228	6		CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A4C29	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C30	0180-2207	5		CAPACITOR-FXD 100UF+-10% 10VDC TA	56289	150D107X9010R2
A4C31	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C32	0121-0451	3	1	CAPACITOR-V TRMR-AIR 1.7-11PF 175V	74970	187-0106-028
A4C33	0160-4383	0		CAPACITOR-FXD 6.8PF +-.5PF 200VDC CER	20932	5024E0200RD689D
A4C34	0160-3324	7		CAPACITOR-FXD 1UF +-5% 100VDC MET-POLYC	28480	0160-3324
A4C35	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A4C36	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A4C37	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A4C38	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A4C39	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C40	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C41	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C42	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A4C43	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C44	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C45	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571

†Refer to Table 7 for update information.

Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4C46	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C47	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C48	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C49	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C50	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C51	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C52	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C53	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C54	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C55	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C56	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C57	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C58	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C59	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C60	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C61	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C62	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C63	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C64	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C65	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C66	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C67	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C68	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C69	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C70	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C71	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C72	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C73	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C74	0160-0576	5	11	CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4C75	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4C76	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4C77	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A4C78	0160-4801	7		CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801
A4C80	0160-5549	2	1	CAPACITOR-FXD .068UF +-5% 100VDC	28480	0160-5549
A4C81	0160-4822	2		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4822
A4C83	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A4C84	0180-2815	1	3	CAPACITOR-FXD 100UF+-20% 10VDC TA	28480	0180-2815
A4C85-200				NOT ASSIGNED		
A4C201	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C202	0160-4571	8		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-4571
A4C203	0160-4803	9	1	CAPACITOR-FXD 68PF +-5% 100VDC CER 0+-30	28480	0160-4803
A4C204	0160-4801	7		CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801
A4C205	0160-4846	0	1	CAPACITOR-FXD 1500PF +-5% 100VDC CER	28480	0160-4846
A4C206	0160-3531	8	1	CAPACITOR-FXD 2UF +-5% 50VDC MET-POLYC	28480	0160-3531
A4C207	0160-4801	7		CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801
A4C208	0160-5527	6	1	CAPACITOR-FXD .033UF +-5% 100VDC	28480	0160-5527
A4C209	0160-5348	9	2	CAPACITOR-FXD 51PF +-5% 100VDC CER 0+-30	28480	0160-5348
A4C210	0160-4812	0	1	CAPACITOR-FXD 220PF +-5% 100VDC CER	28480	0160-4812
A4C211	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A4C212	0160-4801	7		CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801

†Refer to Table 7 for update information.

Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4C213	0180-1794	3	2	CAPACITOR-FXD 22UF+-10% 35VDC TA	56289	150D226X9035R2
A4C214	0180-1794	3		CAPACITOR-FXD 22UF+-10% 35VDC TA	56289	150D226X9035R2
A4C215	0160-0168	1	3	CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A4C216	0160-0168	1		CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A4C217	0160-0168	1		CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A4C218	0160-4822	2		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4822
A4C219	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4C220	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4C221	0160-4805	1	1	CAPACITOR-FXD 47PF +-5% 100VDC CER 0+-30	28480	0160-4805
A4C222	0160-5348	9		CAPACITOR-FXD 51PF +-5% 100VDC CER 0+-30	28480	0160-5348
A4C223	0160-4787	8		CAPACITOR-FXD 22PF +-5% 100VDC CER 0+-30	28480	0160-4787
A4C224	0160-4801	7		CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801
A4C225	0160-4801	7		CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801
A4C226	0160-4787	8		CAPACITOR-FXD 22PF +-5% 100VDC CER 0+-30	28480	0160-4787
A4C227	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4C228	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4C229	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4C230	0160-4831	3	1	CAPACITOR-FXD 4700PF +-10% 100VDC CER	28480	0160-4831
A4C231	0160-4535	4		CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A4CR1	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR5	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR6	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR12	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR13	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR14	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR16	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR17	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR18	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR19	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR20	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR21	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR22						
A4CR23						
A4CR24	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR25	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR26	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR27	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR28	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR29	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR30-200				NOT ASSIGNED		
A4CR201	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR202	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4CR203	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR204	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR205				NOT ASSIGNED		
A4CR206				NOT ASSIGNED		
A4CR207	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR208	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR209	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR210	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR211	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR212	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR213	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR214	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR215	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR216	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR217	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR218	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4E1	9170-0894	0	28	CORE-SHIELDING BEAD	28480	9170-0894
A4E2	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E3	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E4	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E5	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E6	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E7	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E8	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E9	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E10	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E11	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E12	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E13	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E14	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E15	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E16	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E17	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E18	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E19	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E20	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E21	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E22	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E23	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E24	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E25	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E26	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E27	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4E28	9170-0894	0		CORE-SHIELDING BEAD	28480	9170-0894
A4F1	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A4F2	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A4F3	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A4F4	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062
A4F5				NOT ASSIGNED		
A4F6	2110-0757	1		FUSE-SUBMINIATURE 0.63A 125V .28X.095 UL	75915	251.062

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Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4J1	1250-1255	1	12	CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J2	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J3	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J4				NOT ASSIGNED		
A4J5				NOT ASSIGNED		
A4J6	5021-2826	3	3	RF FTTNG	28480	5021-2826
A4J7	5021-2826	3		RF FTTNG	28480	5021-2826
A4J8	5021-2826	3		RF FTTNG	28480	5021-2826
A4J9	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J10	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J11	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J12	1250-1707	8	1	CONNECTOR-RF SMA M PC 50-OHM	28480	1250-1707
A4J13	1251-3825	7		CONNECTOR 5-PIN M POST TYPE	28480	1251-3825
A4J14				NOT ASSIGNED		
A4J15	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J16	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J17-200				NOT ASSIGNED		
A4J201	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J202	1251-8929	2		CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-8929
A4J203	1252-0243	9		CONN-POST TYPE .100-PIN-SPCG 10-CONT	28480	1252-0243
A4J204	1251-4670	2		CONNECTOR 3-PIN M POST TYPE	28480	1251-4670
A4J205	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J206	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4J207	1250-1255	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1255
A4K1	0490-1318	4	7	RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-1318
A4K2	0490-1318	4		RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-1318
A4K3	0490-0916	6	7	RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A4K4	0490-0916	6		RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A4K5	0490-1515	3	2	RELAY-REED 1C 1A 150VDC 5VDC-COIL 3VA	71707	2911-05-300
A4K6	0490-0916	6		RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A4K7	0490-0916	6		RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A4K8	0490-1318	4		RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-1318
A4K9	0490-1318	4		RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-1318
A4K10	0490-0916	6		RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A4K11	0490-1318	4		RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-1318
A4K12	0490-1318	4		RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-1318
A4K13	0490-1515	3		RELAY-REED 1C 1A 150VDC 5VDC-COIL 3VA	71707	2911-05-300
A4K14	0490-1318	4		RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-1318
A4L1	9100-3818	7	1	INDUCTOR RF-CH-MLD 47NH 20%	28480	9100-3818
A4L2	9140-0637	6	1	INDUCTOR RF-CH-MLD 68NH 20% .166DX.385LG	28480	9140-0637
A4L3	9100-3807	4	1	INDUCTOR RF-CH-MLD 110NH 5%	28480	9100-3807
A4L4	9140-0638	7	1	INDUCTOR RF-CH-MLD 510NH 5%	28480	9140-0638
A4L5	9140-0262	3	2	INDUCTOR RF-CH-MLD 200NH 5%	28480	9140-0262
A4L6	9140-0262	3		INDUCTOR RF-CH-MLD 200NH 5%	28480	9140-0262
A4L7	9140-0261	2	1	INDUCTOR RF-CH-MLD 100NH 5%	28480	9140-0261
A4L8	9140-0399	7	1	INDUCTOR RF-CH-MLD 2.2UH 5%	28480	9140-0399
A4L9	9100-3913	3	1	INDUCTOR RF-CH-MLD 3.3UH 5%	28480	9100-3913
A4L10	9100-3912	2	1	INDUCTOR RF-CH-MLD 15UH 5%	28480	9100-3912
A4L11	9100-3561	7	2	INDUCTOR RF-CH-MLD 6.2UH 5%	28480	9100-3561
A4L12	9100-3561	7		INDUCTOR RF-CH-MLD 6.2UH 5%	28480	9100-3561
A4L13	9140-0285	0	1	INDUCTOR RF-CH-MLD 3UH 5%	28480	9140-0285
A4L14				NOT ASSIGNED		
2621A to 2815A						
A4L15	9140-0137	1		INDUCTOR RF-CH-MLD 1MH 5%	28480	9140-0137
2830A and above						
A4L15	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210

†Refer to Table 7 for update information.

Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4L16				NOT ASSIGNED		
A4L17	9140-0636	5	1	INDUCTOR 40MH 5% .55DX.45LG	28480	9140-0636
A4L18	9140-0131	5	1	INDUCTOR RF-CH-MLD 10MH 5%	28480	9140-0131
A4L19	9100-1661	4		INDUCTOR RF-CH-MLD 2.2MH 5%	28480	9100-1661
A4L20	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A4L21	9100-3560	6		INDUCTOR RF-CH-MLD 5.6UH 5%	28480	9100-3560
A4L22	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A4L23	9140-0137	1		INDUCTOR RF-CH-MLD 1MH 5%	28480	9140-0137
A4L24	9140-0144	0	23	INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L25	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L26	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L27	9140-0137	1		INDUCTOR RF-CH-MLD 1MH 5%	28480	9140-0137
A4L28	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L29	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L30	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L31	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L32	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L33	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L34	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L35	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L36	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L37	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L38	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L39	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L40	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L41	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L42	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L43-45				NOT ASSIGNED		
A4L46	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L47	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A4L48	9140-0138	2	1	INDUCTOR RF-CH-MLD 180UH 5%	28480	9140-0138
A4MP1	0515-0655	4	2	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
A4MP2	0535-0004	9		NUT-HEX DBL-CHAM M3 X 0.5 2.4MM-THK	00000	ORDER BY DESCRIPTION
A4MP3	0535-0034	5	3	NUT-HEX DBL-CHAM M4 X 0.7 3.2MM-THK	28480	0535-0034
A4MP4	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A4MP5	1251-5595	2		POLARIZING KEY-POST CONN	28480	1251-5595
A4MP6	2190-0584	0	2	WASHER-LK HLCL 3.0 MM 3.1-MM-ID	28480	2190-0584
A4MP7	3050-0891	7	2	WASHER-FL MTLC 3.0 MM 3.3-MM-ID	28480	3050-0891
A4MP8	35601-01209	9	1	BRACKET-MIXER-1	28480	35601-01209
2621A to 2924A A4MP9-MP12 2938A and above A4MP9-MP10	0360-0535	0	4	NOT ASSIGNED TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A4Q1	1854-0247	9	6	TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A4Q2	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A4Q3	1853-0354	7	2	TRANSISTOR PNP SI TO-92 PD=350MW	28480	1853-0354
A4Q4	1854-0795	2	1	TRANSISTOR NPN SI TO-92 PD=625MW	04713	MPSH10
A4Q5	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A4Q6	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A4Q7	1853-0354	7		TRANSISTOR PNP SI TO-92 PD=350MW	28480	1853-0354
A4Q8	1854-0215	1	1	TRANSISTOR NPN SI TO-92 PD=350MW	04713	2N3904
A4Q9	1854-0637	1	3	TRANSISTOR NPN 2N2219A SI TO-5 PD=800MW	01295	2N2219A
A4Q10	1853-0459	3	9	TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459

†Refer to Table 7 for update information.

Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4Q11-13				NOT ASSIGNED		
A4Q14	1855-0235	7	1	TRANSISTOR J-FET N-CHAN D-MODE TO-52 SI	04713	U310(SELECTED)
A4Q15	1854-0637	1		TRANSISTOR NPN 2N2219A SI TO-5 PD=800MW	01295	2N2219A
A4Q16-200				NOT ASSIGNED		
A4Q201	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A4Q202	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A4Q203	1854-0810	2	9	TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A4R1	0757-0394	0	20	RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R2	0698-3443	0	8	RESISTOR 287 1% .125W F TC=0+-100	24546	CT4-1/8-T0-287R-F
A4R3	0757-0294	9	3	RESISTOR 17.8 1% .125W F TC=0+-100	19701	5033R-1/8-T0-17R8-F
A4R4	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	CT4-1/8-T0-287R-F
A4R5	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	CT4-1/8-T0-287R-F
A4R6	0757-0294	9		RESISTOR 17.8 1% .125W F TC=0+-100	19701	5033R-1/8-T0-17R8-F
A4R7	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	CT4-1/8-T0-287R-F
A4R8	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	CT4-1/8-T0-287R-F
A4R9	0757-0294	9		RESISTOR 17.8 1% .125W F TC=0+-100	19701	5033R-1/8-T0-17R8-F
A4R10	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	CT4-1/8-T0-287R-F
A4R11	0757-0398	4	1	RESISTOR 75 1% .125W F TC=0+-100	24546	CT4-1/8-T0-75R0-F
A4R12	0698-3437	2	1	RESISTOR 133 1% .125W F TC=0+-100	24546	CT4-1/8-T0-133R-F
A4R13	0698-3433	8	1	RESISTOR 28.7 1% .125W F TC=0+-100	03888	PME55-1/8-T0-2BR7-F
A4R14	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	CT4-1/8-TO-196R-F
A4R15	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R16	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-TO-101-F
A4R17	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-TO-101-F
A4R18	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-TO-101-F
A4R19	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-TO-101-F
A4R20	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R21	0698-3162	0		RESISTOR 46.4K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4642-F
A4R22	0698-3162	0		RESISTOR 46.4K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4642-F
A4R23	0699-0073	8	2	RESISTOR 10M 1% .125W F TC=0+-150	28480	0699-0073
A4R24	0698-3452	1	2	RESISTOR 147K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1473-F
A4R25	0698-3260	9	2	RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A4R26	0757-0444	1		RESISTOR 12.1K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-1212-F
A4R27	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A4R28	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R29	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A4R30	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A4R31	0757-0444	1		RESISTOR 12.1K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-1212-F
A4R32	0699-0073	8		RESISTOR 10M 1% .125W F TC=0+-150	28480	0699-0073
A4R33	0698-3452	1		RESISTOR 147K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1473-F
A4R34	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
2621A to 2815A						
A4R35	0698-3156	2	1	RESISTOR 14.7K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1472-F
2830A and above						
A4R35	0698-0084	9	1	RESISTOR 215K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A4R36	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-TO-101-F
A4R37	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R38	2100-3214	0	1	RESISTOR-TRMR 100K 10% C TOP-ADJ 1-TRN	28480	2100-3214
A4R39	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A4R40	0698-4123	5	1	RESISTOR 499 1% .125W F TC=0+-100	24546	CT4-1/8-T0-499R-F

†Refer to Table 7 for update information.

Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4R41	0757-0427	0	1	RESISTOR 1.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1501-F
A4R42	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R43	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R44	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-7501-F
A4R45	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-TO-101-F
A4R46	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	CT4-1/8-T0-511R-F
A4R47	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3162-F
A4R48	0757-0458	7	3	RESISTOR 51.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5112-F
A4R49	0698-3158	4	1	RESISTOR 23.7K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2372-F
A4R50	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5112-F
A4R51	2100-3252	6	1	RESISTOR-TRMR 5K 10% C TOP-ADJ 1-TRN	28480	2100-3252
A4R52	0698-3434	9	1	RESISTOR 34.8 1% .125W F TC=0+-100	28480	0698-3434
A4R53	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-TO-101-F
A4R54	0757-0418	9	2	RESISTOR 619 1% .125W F TC=0+-100	24546	CT4-1/8-T0-619R-F
A4R55				NOT ASSIGNED		
A4R56	0698-3429	2	2	RESISTOR 19.6 1% .125W F TC=0+-100	03888	PME55-1/8-T0-19R6-F
A4R57	0698-3429	2		RESISTOR 19.6 1% .125W F TC=0+-100	03888	PME55-1/8-T0-19R6-F
A4R58	0698-3441	8	5	RESISTOR 215 1% .125W F TC=0+-100	24546	CT4-1/8-T0-215R-F
A4R59				NOT ASSIGNED		
A4R60	0698-0082	7	5	RESISTOR 464 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4640-F
A4R61	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A4R62	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R63	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R64	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4640-F
A4R65	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R66	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	CT4-1/8-T0-511R-F
A4R67	2100-3409	5	1	RESISTOR-TRMR 20 10% C TOP-ADJ 1-TRN	28480	2100-3409
A4R68	0698-3151	7	1	RESISTOR 2.87K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-2871-F
A4R69	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R70	2100-0554	5		RESISTOR-TRMR 500 10% C TOP-ADJ 1-TRN	28480	2100-0554
A4R71	0698-3132	4	1	RESISTOR 261 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2610-F
A4R72	0757-0424	7	1	RESISTOR 1.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1101-F
A4R73	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	CT4-1/8-T0-511R-F
A4R74	0757-0440	7	1	RESISTOR 7.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-7501-F
A4R75	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2151-F
A4R76	0757-0419	0	1	RESISTOR 681 1% .125W F TC=0+-100	24546	CT4-1/8-T0-681R-F
A4R77	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4640-F
A4R78	0698-3444	1	1	RESISTOR 316 1% .125W F TC=0+-100	24546	CT4-1/8-T0-316R-F
A4R79	0757-0338	2	2	RESISTOR 1K 1% .25W F TC=0+-100	24546	NA5-1/4-TO-1001-F
A4R80	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A4R81	0757-0316	6		RESISTOR 42.2 1% .125W F TC=0+-100	28480	0757-0316
A4R82	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R83	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R84	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R85	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
2621A to 2815A						
A4R86	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	CT4-1/8-T0-511R-F
2830A and above						
A4R86	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A4R88				NOT ASSIGNED		
A4R88	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R89	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R90	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R91	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R92	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R93	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R94	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R95	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F

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Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4R96	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R97	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R98	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R99	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R100	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R101	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R102	0757-0461	2		RESISTOR 68.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-6812-F
A4R103	0757-0461	2		RESISTOR 68.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-6812-F
A4R104	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R105	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A4R106	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R107	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A4R108	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R109	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R110	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R111	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R112	0698-3447	4		RESISTOR 422 1% .125W F TC=0+-100	24546	CT4-1/8-T0-422R-F
A4R113-119				NOT ASSIGNED		
A4R120	0698-3150	6	4	RESISTOR 2.37K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2371-F
A4R121	0757-0279	0	1	RESISTOR 3.16K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3161-F
A4R122	0757-0338	2		RESISTOR 1K 1% .25W F TC=0+-100	24546	NA5-1/4-TO-1001-F
A4R123				NOT ASSIGNED		
A4R124	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R125	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2371-F
A4R126	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R127	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-51R1-F
A4R128	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2371-F
A4R130	0757-0316	6		RESISTOR 42.2 1% .125W F TC=0+-100	28480	0757-0316
A4R131-200				NOT ASSIGNED		
A4R201	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4640-F
A4R202	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	CT4-1/8-TO-101-F
A4R203	0698-4386	2	1	RESISTOR 59 1% .125W F TC=0+-100	24546	CT4-1/8-T0-59R0-F
A4R204	0698-4400	1	1	RESISTOR 93.1 1% .125W F TC=0+-100	24546	CT4-1/8-T0-93R1-F
A4R205	0698-3438	3	1	RESISTOR 147 1% .125W F TC=0+-100	24546	CT4-1/8-TO-147R-F
A4R206	0698-3486	1	1	RESISTOR 232 1% .125W F TC=0+-100	24546	CT4-1/8-T0-232R-F
A4R207	0757-0412	3	1	RESISTOR 365 1% .125W F TC=0+-100	24546	CT4-1/8-T0-365R-F
A4R208	0698-4458	9	1	RESISTOR 590 1% .125W F TC=0+-100	24546	CT4-1/8-T0-590R-F
A4R209	0698-4465	8	1	RESISTOR 931 1% .125W F TC=0+-100	24546	CT4-1/8-T0-931R-F
A4R210	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R211	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4640-F
A4R212	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R213	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-1961-F
A4R214	0757-0161	9	1	RESISTOR 604 1% .125W F TC=0+-100	24546	CT4-1/8-T0-604R-F
A4R215	0698-4413	6	1	RESISTOR 154 1% .125W F TC=0+-100	24546	CT4-1/8-T0-154R-F
A4R216	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	CT4-1/8-TO-196R-F
A4R217	0698-4421	6		RESISTOR 249 1% .125W F TC=0+-100	24546	CT4-1/8-T0-249R-F
A4R218	0698-4449	8	1	RESISTOR 309 1% .125W F TC=0+-100	24546	CT4-1/8-T0-309R-F
A4R219	0757-0413	4	1	RESISTOR 392 1% .125W F TC=0+-100	24546	CT4-1/8-T0-392R-F
A4R220	0698-3178	8	1	RESISTOR 487 1% .125W F TC=0+-100	24546	CT4-1/8-T0-487R-F
A4R221	0757-0418	9		RESISTOR 619 1% .125W F TC=0+-100	24546	CT4-1/8-T0-619R-F

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4R222	0757-0273	4	1	RESISTOR 3.01K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3011-F
A4R223	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A4R224	0698-3492	9	1	RESISTOR 2.67K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2671-F
A4R225	0698-4543	3	2	RESISTOR 487K 1% .125W F TC=0+-100	28480	0698-4543
A4R226	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R227	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R228	0698-3279	0	1	RESISTOR 4.99K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4991-F
A4R229	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2371-F
A4R230	0698-3223	4		RESISTOR 1.24K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1241-F
A4R231	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	CT4-1/8-T0-751-F
A4R232	0698-4421	6		RESISTOR 249 1% .125W F TC=0+-100	24546	CT4-1/8-T0-249R-F
A4R233	0698-4421	6		RESISTOR 249 1% .125W F TC=0+-100	24546	CT4-1/8-T0-249R-F
A4R234	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A4R235	0698-4421	6		RESISTOR 249 1% .125W F TC=0+-100	24546	CT4-1/8-T0-249R-F
A4R236	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A4R237	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A4R238	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A4R239	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R240	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A4R241	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R242				NOT ASSIGNED		
A4R243				NOT ASSIGNED		
A4R244	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R245	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A4R246	0698-3162	0		RESISTOR 46.4K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4642-F
A4R247	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	CT4-1/8-T0-215R-F
A4R248	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	CT4-1/8-T0-215R-F
A4R249	0698-3153	9	1	RESISTOR 3.83K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3831-F
A4R250	0698-3155	1	2	RESISTOR 4.64K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4641-F
A4R251	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-1961-F
A4R252	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R253	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A4R254	0698-3460	1		RESISTOR 422K 1% .125W F TC=0+-100	28480	0698-3460
A4R255	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A4R256	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A4R257	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R258	0757-0444	1		RESISTOR 12.1K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-1212-F
A4R259	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R260	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A4R261	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A4R262	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R263	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A4R264	0698-8958	2	1	RESISTOR 511K 1% .125W F TC=0+-100	28480	0698-8958
A4R265	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A4R266	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1003-F
A4R267	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5112-F
A4R268	0698-3453	2	1	RESISTOR 196K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1963-F
A4R269	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	CT4-1/8-T0-215R-F
A4R270	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F
A4R271	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1001-F

†Refer to Table 7 for update information.

Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4R272	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R273	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R274	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R275	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A4R276	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-5111-F
A4R277	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-1961-F
A4R278	2100-0554	5		RESISTOR-TRMR 500 10% C TOP-ADJ 1-TRN	28480	2100-0554
A4R279	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1002-F
A4R280	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R281	0698-4543	3		RESISTOR 487K 1% .125W F TC=0+-100	28480	0698-4543
A4R282	0757-0467	8	1	RESISTOR 121K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1213-F
A4R283	0698-3582	8	1	RESISTOR 41.2K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4122-F
A4R284	0698-4480	7	1	RESISTOR 15.8K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1582-F
A4R285	0698-3497	4	1	RESISTOR 6.04K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-604R-F
A4R286	0698-4434	1	1	RESISTOR 2.32K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2321-F
A4R287	0698-3495	2	1	RESISTOR 866 1% .125W F TC=0+-100	24546	CT4-1/8-T0-866R-F
A4R288	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	CT4-1/8-T0-287R-F
A4R289	1810-0329	6	1	NETWORK-RES 10-SIP 7.5K OHM X 9	91637	CSC10A01-752G/MSP10A01-
A4R290	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A4R291	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	CT4-1/8-T0-215R-F
A4R292	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-2152-F
A4R293	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-1962-F
A4R294	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	CT4-1/8-TO-1961-F
A4R295	0698-4475	0	1	RESISTOR 9.76K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-9761-F
A4R296	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4641-F
A4R297	0698-3162	0		RESISTOR 46.4K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-4642-F
A4TP1	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A4TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP10	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP11	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP12	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP13	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP14	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP15	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP16	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP17	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP18	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A4TP19-200				NOT ASSIGNED		
A4TP201	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600

†Refer to Table 7 for update information.

Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4TP202	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP203	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP204	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP205	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP206	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP207	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP208	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP209	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP210	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP211	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP212	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP213	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP214	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP215	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP216	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4TP217-219				NOT ASSIGNED		
A4TP220	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4U1	0960-0640	0	1	U-WAVE MIXER 1.5 GHZ MAX	28480	0960-0640
A4U2				NOT ASSIGNED		
A4U3	1826-0412	1	3	IC COMPARATOR PRCN DUAL 8-DIP-P PKG	27014	LM393N
A4U4	1826-0783	9		IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A4U5	1826-0783	9		IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A4U6	1820-1201	6		IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A4U7	1858-0047	5	2	TRANSISTOR ARRAY 16-PIN PLSTC DIP	13606	ULN-2003A
A4U8	1858-0047	5		TRANSISTOR ARRAY 16-PIN PLSTC DIP	13606	ULN-2003A
A4U9	5081-2040	9	1	BURNIN 1826-0035	28480	5081-2040
A4U10-200				NOT ASSIGNED		
A4U201	1826-0188	8		D/A 8-BIT 16-CERDIP BPLR	04713	MC1408L-8
A4U202	1820-1547	3	3	IC MULTIPLXR 8-CHAN-ANLG 16-DIP-C PKG	04713	MC14051BCL
A4U203	1820-1547	3		IC MULTIPLXR 8-CHAN-ANLG 16-DIP-C PKG	04713	MC14051BCL
A4U204	1820-1547	3		IC MULTIPLXR 8-CHAN-ANLG 16-DIP-C PKG	04713	MC14051BCL
A4U205	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A4U206	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A4U207	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A4U208	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A4U209	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A4U210	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A4U211	1820-1112	8	1	IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A4U212	1826-0785	1		IC OP AMP LOW-BIAS-H-IMPD DUAL 8-DIP-C	01295	TL072ACJG
A4U213	1826-0783	9		IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A4U214	1826-0783	9		IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A4U215	1826-0753	3	2	IC OP AMP LOW-BIAS-H-IMPD QUAD 14-DIP-C	04713	MC34004BL
A4U216	1826-0759	9	1	IC COMPARATOR GP QUAD 14-DIP-C PKG	04713	LM339J
A4U217	1826-0606	5		IC SWITCH ANLG QUAD 16-DIP-C PKG	17856	DG201BK
A4U218	1826-0753	3		IC OP AMP LOW-BIAS-H-IMPD QUAD 14-DIP-C	04713	MC34004BL
A4U219	1826-0716	8		IC OP AMP LOW-NOISE DUAL 8-DIP-C PKG	18324	NE5532AFE
A4VR1	1902-0952	6	2	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A4VR2	1902-0952	6		DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A4W1	35601-61622	6	1	SR 2.18 NO CONN	28480	35601-61622

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A5				NOT ASSIGNED		
A6						
A6	11848-60106	6	1	10MHZ VCXO A ASSEMBLY	28480	11848-60106
A6C1	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6C2	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A6C3	0160-4386	3		CAPACITOR-FXD 33PF +-5% 200VDC CER 0+-30	28480	0160-4386
A6C4	0160-3874	2		CAPACITOR-FXD 10PF +-.5PF 200VDC CER	28480	0160-3874
A6C5	0160-4387	4	6	CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A6C6	0160-4768	5	1	CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4768
A6C7	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A6C8	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A6C9	0160-4040	6	24	CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A6C10	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A6C11	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A6C12	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6C13	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6C14	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6C15	0180-2618	2	3	CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6C16	0180-0491	5	2	CAPACITOR-FXD 10UF+-20% 25VDC TA	28480	0180-0491
A6C17	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A6C18	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A6C19	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A6C20	0180-0197	8	2	CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A6CR1	0122-0167	0	8	DIODE-VVC 5.05PF 10% C3/C25-MIN=5	28480	0122-0167
A6CR2	0122-0167	0		DIODE-VVC 5.05PF 10% C3/C25-MIN=5	28480	0122-0167
A6CR3	0122-0167	0		DIODE-VVC 5.05PF 10% C3/C25-MIN=5	28480	0122-0167
A6CR4	1901-0539	3	6	DIODE-SM SIG SCHOTTKY	28480	1901-0539
A6CR5	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A6CR6	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A6CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A6J1	1250-1611	3	11	CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1611
A6J2	1250-1611	3		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1611
A6J3	1250-1611	3		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1611
A6J4	1250-1611	3		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1611
A6J5	1251-6341	8	15	CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A6J6	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A6J7	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A6J8	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A6K1	0490-0916	6		RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A6L1	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A6L2	9100-3560	6		INDUCTOR RF-CH-MLD 5.6UH 5%	28480	9100-3560
A6L3	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A6L4	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A6L5	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6L6	9100-3560	6		INDUCTOR RF-CH-MLD 5.6UH 5%	28480	9100-3560
A6L7	9100-3560	6		INDUCTOR RF-CH-MLD 5.6UH 5%	28480	9100-3560
A6L8	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A6Q1	1854-0345	8	4	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A6Q2	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A6Q3	1854-0809	9	2	TRANSISTOR NPN 2N2369A SI TO-18 PD=360MW	28480	1854-0809
A6Q4	1854-0378	7	1	TRANSISTOR NPN 2N5109 SI TO-39 PD=800MW	3L585	2N5109
A6Q5	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A6Q6	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A6Q7	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A6Q8	1853-0314	9	3	TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A6Q9	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A6R1	0698-7236	7	11	RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6R2	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6R3	0698-7228	7	20	RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A6R4	0698-7252	7	2	RESISTOR 4.64K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4641-F
A6R5	0698-7260	7	16	RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A6R6	0698-7195	7	16	RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A6R7	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A6R8	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A6R9	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A6R10	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A6R11	0698-7243	6	8	RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A6R12	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A6R13	0698-7267	4	5	RESISTOR 19.6K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1962-F
A6R14	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6R15	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A6R16	0698-7279	8	1	RESISTOR 61.9K 1% .05W F TC=0+-100	24546	C3-1/8-T0-6192-F
A6R17	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6R18	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6R19	0698-3439	4		RESISTOR 178 1% .125W F TC=0+-100	24546	CT4-1/8-T0-178R-F
A6R20	0698-7205	0	4	RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A6R21	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A6R22	0698-7272	1	1	RESISTOR 31.6K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3162-F
A6R23	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A6R24	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A6R25	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A6R26	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A6R27	0698-7284	5	6	RESISTOR 100K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1003-F
A6R28	0698-7284	5		RESISTOR 100K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1003-F
A6R29	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A6R30	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A6R31	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A6R32	0698-3439	4		RESISTOR 178 1% .125W F TC=0+-100	24546	CT4-1/8-T0-178R-F
A6R33	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A6R34	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6U1	1813-0216	6	2	IC WIDEBAND AMPL TO-39 PKG	04713	MWA230
A6U2	1826-0412	1		IC COMPARATOR PRCN DUAL 8-DIP-P PKG	27014	LM393N
A6Y1	0410-1857	8	1	CRYSTAL-QUARTZ 10.00 MHz	01409	8-337-5

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A7						
A7	11848-60107	7	1	10MHZ MODULATED VCXO B ASSEMBLY	28480	11848-60107
A7C1	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A7C2	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A7C3	0160-4386	3		CAPACITOR-FXD 33PF +-5% 200VDC CER 0+-30	28480	0160-4386
A7C4	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A7C5	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A7C6	0160-4030	4	1	CAPACITOR-FXD 820PF +-5% 100VDC CER	28480	0160-4030
A7C7	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A7C8	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A7C9	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A7C10	0160-0574	3	1	CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A7C11	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A7C12	0180-0491	5		CAPACITOR-FXD 10UF+-20% 25VDC TA	28480	0180-0491
A7C13	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A7C14				NOT ASSIGNED		
A7C15	0160-4527	4	1	CAPACITOR-FXD 56PF +-5% 200VDC CER 0+-30	28480	0160-4527
A7C16	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A7C17	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A7C18	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A7CR1	0122-0167	0		DIODE-VVC 5.05PF 10% C3/C25-MIN=5	28480	0122-0167
A7CR2	0122-0167	0		DIODE-VVC 5.05PF 10% C3/C25-MIN=5	28480	0122-0167
A7CR3	0122-0167	0		DIODE-VVC 5.05PF 10% C3/C25-MIN=5	28480	0122-0167
A7CR4	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A7CR5	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A7CR6	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A7J1	1250-1611	3		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1611
A7J2	1250-1611	3		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1611
A7J3	1250-1611	3		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1611
A7J4	1250-1611	3		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1611
A7J5	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A7J6	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A7J7	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A7J8	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A7L1	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A7L2	9100-3560	6		INDUCTOR RF-CH-MLD 5.6UH 5%	28480	9100-3560
A7L3	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144
A7L4	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A7L5	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A7L6	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5%	28480	9140-0210
A7L7	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0144

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A7MP1	1200-0173	5	3	INSULATOR-XSTR DAP-GL	28480	1200-0173
A7Q1	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A7Q2	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A7Q3	1854-0809	9		TRANSISTOR NPN 2N2369A SI TO-18 PD=360MW	28480	1854-0809
A7Q4	1854-0637	1		TRANSISTOR NPN 2N2219A SI TO-5 PD=800MW	01295	2N2219A
A7Q5	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A7Q6	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A7Q7	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A7Q8	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A7Q9	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A7Q10	1855-0421	3	1	TRANSISTOR J-FET 2N5114 P-CHAN D-MODE	17856	2N5114
A7R1	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A7R2	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A7R3	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A7R4	0698-7252	7		RESISTOR 4.64K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4641-F
A7R5	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A7R6	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A7R7	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A7R8	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A7R9	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A7R10	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A7R11	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A7R12	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A7R13	0698-7267	4		RESISTOR 19.6K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1962-F
A7R14	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A7R15	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A7R16	0698-7273	2	1	RESISTOR 34.8K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3482-F
A7R17	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A7R18	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	CT4-1/8-TO-196R-F
A7R19	0698-7284	5		RESISTOR 100K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1003-F
A7R20	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A7R21	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A7R22	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A7R23				NOT ASSIGNED		
A7R24	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A7R25	0698-7206	1	4	RESISTOR 56.2 1% .05W F TC=0+-100	24546	C3-1/8-TO-56R2-F
A7R26	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A7R27	0698-7284	5		RESISTOR 100K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1003-F
A7R28	0698-7284	5		RESISTOR 100K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1003-F
A7R29	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A7R30	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A7R31	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A7R32	0698-7284	5		RESISTOR 100K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1003-F
A7R33	0698-7267	4		RESISTOR 19.6K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1962-F
A7R34	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A7R35	0698-7267	4		RESISTOR 19.6K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1962-F
A7R36	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A7R37	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A7R38	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A7R39	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A7R40	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	CT4-1/8-TO-196R-F
A7R41	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A7R42	0698-7222	1	1	RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-TO-261R-F

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A7TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7U1	0955-0409	8	1	POWER SPLITTER 10MHZ 90-DEGREE	28480	0955-0409
A7U2	1826-0412	1		IC COMPARATOR PRCN DUAL 8-DIP-P PKG	27014	LM393N
A7U3	0955-0292	7	1	U-WAVE MIXER 600 MHZ MAX	28480	0955-0292
A7Y1	0410-0649	4	1	CRYSTAL-QUARTZ 10.000 MHZ	28480	0410-0649

†Refer to Table 7 for update information.

Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A8						
A8	11848-60108	8	1	400 MHZ VCO ASSEMBLY	28480	11848-60108
A8C1	0180-2821	9	5	CAPACITOR-FXD 22UF+-20% 35VDC TA	28480	0180-2821
A8C2	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8C3	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A8C4	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A8C5	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A8C6	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8C7	0180-2821	9		CAPACITOR-FXD 22UF+-20% 35VDC TA	28480	0180-2821
A8C8	0180-2815	1		CAPACITOR-FXD 100UF+-20% 10VDC TA	28480	0180-2815
A8C9	0180-2821	9		CAPACITOR-FXD 22UF+-20% 35VDC TA	28480	0180-2821
A8C10				NOT ASSIGNED		
A8C11	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A8C12	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A8C13	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A8C14	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A8C15	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A8C16	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A8C17	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A8C18	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A8C19	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A8C20	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A8C21	0160-3875	3	2	CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A8C22	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A8C23	0180-2619	3	2	CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A8C24	0160-5550	5		CAPACITOR-FXD .1UF +-5% 100VDC MET-POLYC	28480	0160-5550
A8C25	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8CR1	0122-0167	0		DIODE-VVC 5.05PF 10% C3/C25-MIN=5	28480	0122-0167
A8CR2	0122-0167	0		DIODE-VVC 5.05PF 10% C3/C25-MIN=5	28480	0122-0167
A8CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A8CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A8J1	1250-1611	3		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1611
A8J2	1250-1611	3		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1611
A8J3	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A8J4	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A8J5	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A8J6	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A8K1	0490-0916	6		RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A8L1	9100-2251	0	10	INDUCTOR RF-CH-MLD 220NH 10%	28480	9100-2251
A8L2	08901-00068	2	1	INDUCTOR	28480	08901-00068
A8L3	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10%	28480	9100-2251
A8L4				NOT ASSIGNED		
A8L5	9140-0129	1	2	INDUCTOR RF-CH-MLD 220UH 5%	28480	9140-0129
A8L6				NOT ASSIGNED		
A8L7	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10%	28480	9100-2251
A8L8	9100-3922	4	6	INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A8L9	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10%	28480	9100-2251
A8L10	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10%	28480	9100-2251
A8L11	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10%	28480	9100-2251
A8L12	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A8L13	9100-3560	6		INDUCTOR RF-CH-MLD 5.6UH 5%	28480	9100-3560
A8L14	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A8MP1	1200-0173	5		INSULATOR-XSTR DAP-GL	28480	1200-0173
A8Q1	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A8Q2	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A8Q3	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A8Q4	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A8R1	0698-7267	4		RESISTOR 19.6K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1962-F
A8R2	0698-7234	5	1	RESISTOR 825 1% .05W F TC=0+-100	24546	C3-1/8-T0-825R-F
A8R3	0698-7204	9	2	RESISTOR 46.4 1% .05W F TC=0+-100	24546	C3-1/8-TO-46R4-F
A8R4	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A8R5				NOT ASSIGNED		
A8R6	0698-7271	0	4	RESISTOR 28.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2872-F
A8R7	0698-7271	0		RESISTOR 28.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2872-F
A8R8	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A8R9	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	CT4-1/8-T0-287R-F
A8R10	0698-7204	9		RESISTOR 46.4 1% .05W F TC=0+-100	24546	C3-1/8-TO-46R4-F
A8R11	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A8R12	0698-7200	5	2	RESISTOR 31.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-31R6-F
A8R13	0698-7218	5	4	RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A8R14	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A8R15	0698-7211	8	1	RESISTOR 90.9 1% .05W F TC=0+-100	24546	C3-1/8-TO-90R9-F
A8R16	0698-7200	5		RESISTOR 31.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-31R6-F
A8R17	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A8R18	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A8R19	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A8R20	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A8R21	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A8R22	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A8R23	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A8R24	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A8R25	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A8R26	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A8TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A8TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A8TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A8TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A8TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A8TP6				NOT ASSIGNED		
A8TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A8TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A8TP9	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A8TP10	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A8TP11	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A8TP12	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A8TP13	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A8TP14	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A8TP15	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A8TP16	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A8U1	1813-0215	5	2	IC WIDEBAND AMPL TO-39 PKG	04713	MWA220
A8U2	1813-0215	5		IC WIDEBAND AMPL TO-39 PKG	04713	MWA220
A8U3	1813-0216	6		IC WIDEBAND AMPL TO-39 PKG	04713	MWA230
A8U4	0955-0410	1	1	550 MHZ LOW PASS FILTER	28480	0955-0410
A8U5	1826-0783	9		IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A9						
A9	11848-60109	9	1	400MHZ OSCILLATOR ASSEMBLY	28480	11848-60109
A9C1				NOT ASSIGNED		
A9C2	0160-4522	9	1	CAPACITOR-FXD 13PF +-5% 200VDC CER 0+-30	28480	0160-4522
A9C3	0160-3873	1	1	CAPACITOR-FXD 4.7PF +-.5PF 200VDC CER	28480	0160-3873
A9C4	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A9C5	0160-4382	9	1	CAPACITOR-FXD 3.3PF +-.25PF 200VDC CER	28480	0160-4382
A9C6	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A9C7	0180-2821	9		CAPACITOR-FXD 22UF+-20% 35VDC TA	28480	0180-2821
A9C8	0180-2815	1		CAPACITOR-FXD 100UF+-20% 10VDC TA	28480	0180-2815
A9C9	0180-2821	9		CAPACITOR-FXD 22UF+-20% 35VDC TA	28480	0180-2821
A9C10				NOT ASSIGNED		
A9C11	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A9C12				NOT ASSIGNED		
A9C13	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A9C14	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A9C15	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A9C16	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A9C17	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A9C18	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A9C19	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A9C20	0160-4040	6		CAPACITOR-FXD 1000PF +-5% 100VDC CER	28480	0160-4040
A9C21	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A9C22	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A9C23	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A9C24				NOT ASSIGNED		
A9C25	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A9CR1-4				NOT ASSIGNED		
A9CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A9J1	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A9J2	1250-1611	3		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1611
A9J3	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A9J4	1251-6341	8		CONNECTOR 2-PIN F POST TYPE	28480	1251-6341
A9L1				NOT ASSIGNED		
A9L2	9140-1253	4	1	INDUCTOR-ADJ 2-1/2 TURN 12NH NOMINAL	28480	9140-1253
A9L3	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10%	28480	9100-2251
A9L4				NOT ASSIGNED		
A9L5	9140-0129	1		INDUCTOR RF-CH-MLD 220UH 5%	28480	9140-0129
A9L6				NOT ASSIGNED		
A9L7	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10%	28480	9100-2251
A9L8	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A9L9				NOT ASSIGNED		
A9L10	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10%	28480	9100-2251
A9L11	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10%	28480	9100-2251
A9L12	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A9L13	9100-3560	6		INDUCTOR RF-CH-MLD 5.6UH 5%	28480	9100-3560
A9L14	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A9MP1	1200-0173	5		INSULATOR-XSTR DAP-GL	28480	1200-0173
A9Q1	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A9Q2	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A9Q3	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A9Q4	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A9Q5	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A

†Refer to Table 7 for update information.

Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A9R1	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A9R2	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A9R3				NOT ASSIGNED		
A9R4	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A9R5				NOT ASSIGNED		
A9R6	0698-7271	0		RESISTOR 28.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2872-F
A9R7	0698-7271	0		RESISTOR 28.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2872-F
A9R8	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A9R9	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A9R10	0698-7212	9	3	RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A9R11	0698-7195	7		RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-19R6-F
A9R12	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A9R13				NOT ASSIGNED		
A9R14	0698-7206	1		RESISTOR 56.2 1% .05W F TC=0+-100	24546	C3-1/8-TO-56R2-F
A9R15	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A9R16	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A9R17	0698-7206	1		RESISTOR 56.2 1% .05W F TC=0+-100	24546	C3-1/8-TO-56R2-F
A9R18	0698-7206	1		RESISTOR 56.2 1% .05W F TC=0+-100	24546	C3-1/8-TO-56R2-F
A9R19	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A9R20	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A9R21	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A9R22	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A9R23	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A9R24	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A9R25	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A9R26	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A9R27	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A9TP1				NOT ASSIGNED		
A9TP2				NOT ASSIGNED		
A9TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A9TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A9TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A9TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A9TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A9TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A9TP9	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A9TP10	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A9TP11	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A9TP12	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A9TP13	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A9TP14	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A9TP15	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A9TP16	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ	28480	1251-2194
A9U1	1813-0211	1	2	IC WIDEBAND AMPL TO-39 PKG	04713	MWA110
A9U2	1813-0211	1		IC WIDEBAND AMPL TO-39 PKG	04713	MWA110
A9U3	1813-0212	2	1	IC WIDEBAND AMPL TO-39 PKG	04713	MWA120
A9U4				NOT ASSIGNED		
A9U5	1826-0783	9		IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN

†Refer to Table 7 for update information.

Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A10						
2621A ONLY						
A10	0960-0679	5	1	LINE POWER MODULE	28480	0960-0679
	02932-00038	1	2	COMONENT CLIP	28480	02932-00038
2647A AND ABOVE						
A10	0960-0443	1	1	LINE POWER MODULE	28480	0960-0443

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11						
A11	35601-66562	3	1	HP-IB CONNECTOR ASSEMBLY	28480	35601-66562
A11J1	1251-5768	1	1	CONN-RECT MICRORBN 24-CKT 24-CONT	28480	1251-5768
A11MP1	0380-1180	5	2	STANDOFF-HEX 5-MM-LG M3.5 X 0.6-THD	28480	0380-1180
A11MP2	0515-0105	9	2	SCREW-MACH M3 X 0.5 12MM-LG PAN-HD	28480	0515-0105
A11MP3	0535-0004	9		NUT-HEX DBL-CHAM M3 X 0.5 2.4MM-THK	00000	ORDER BY DESCRIPTION
A11MP4	1531-0076	8	2	MACHINED PART-BRS CLEVIS	28480	1531-0076
A11MP5	2190-0019	6	2	WASHER-LK HLCL NO. 4 .115-IN-ID	28480	2190-0019
A11MP6	2190-0034	5	2	WASHER-LK HLCL NO. 10 .194-IN-ID	28480	2190-0034
A11S1	3101-2215	2	1	SWITCH-RKR DIP-RKR-ASSY 7-1A .05A 30VDC	28480	3101-2215
A11W1	8120-3139	6	1	FLAT RIBBON ASSY 28-AWG 34-COND .16-M-LG	28480	8120-3139
A11W2	8150-4816	1	1	WIRE 22AWG 1X22 105C	28480	8150-4816

Table 5. Replaceable Parts

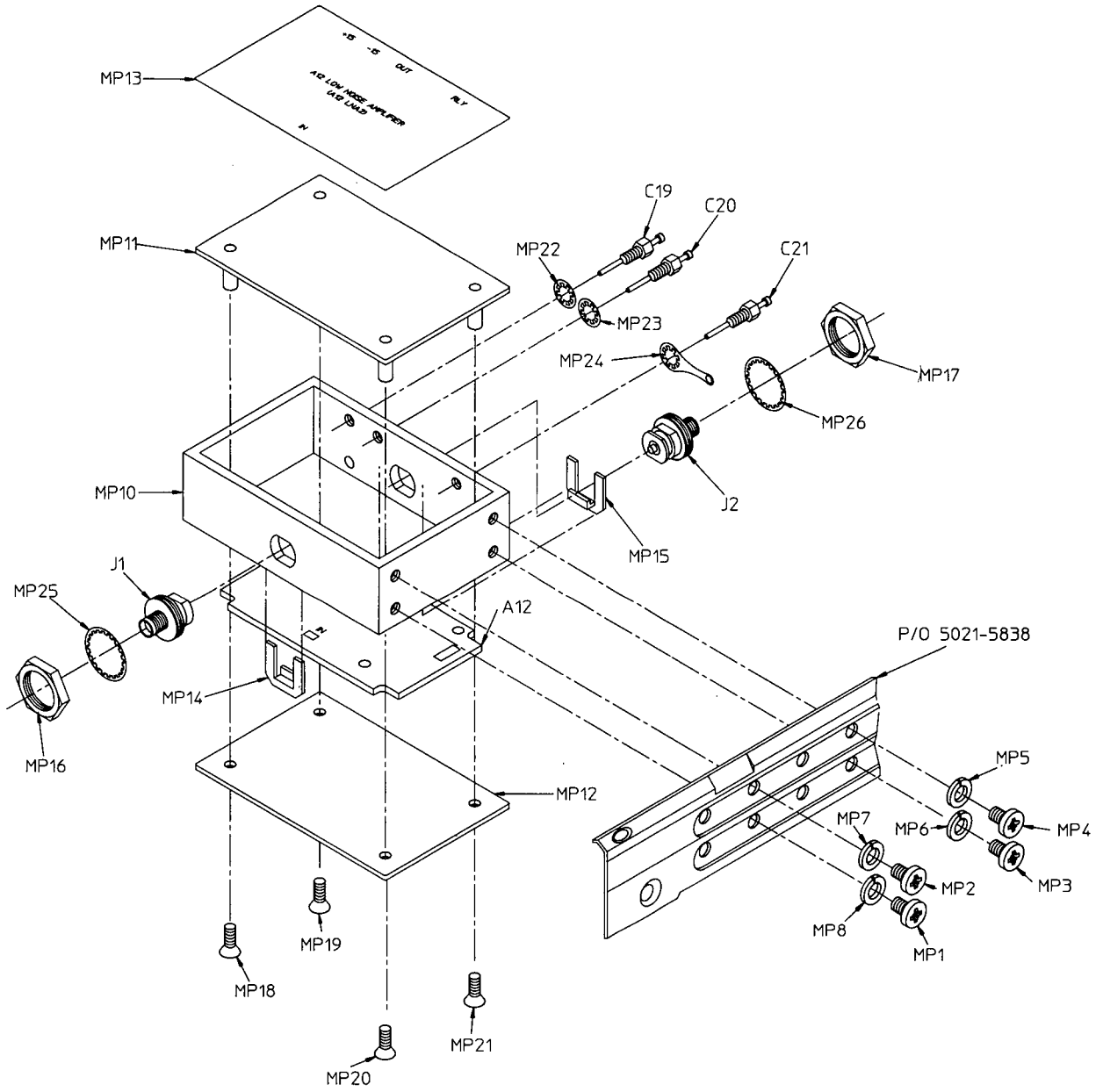
Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A12						
A12	11848-60110	2	1	LNA2 ASSEMBLY	28480	11848-60110
A12C1	0160-0576	5	7	CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A12C2	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A12C3	0160-3873	1		CAPACITOR-FXD 4.7PF +-.5PF 200VDC CER	28480	0160-3873
A12C4	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A12C5	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A12C6	0160-3873	1		CAPACITOR-FXD 4.7PF +-.5PF 200VDC CER	28480	0160-3873
A12C7	0160-5469	5	1	CAPACITOR-FXD 1UF 10% 50VDC	28480	0160-5469
A12C8	0180-3771	0	2	CAPACITOR-FXD 1UF +-10% TA 0 OHM	28480	0180-3771
A12C9	0180-3831	3	4	CAPACITOR-FXD 10UF +-10% TA 0 OHM	28480	0180-3831
A12C10	0180-3831	3		CAPACITOR-FXD 10UF +-10% TA 0 OHM	28480	0180-3831
A12C11	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A12C12	0180-3831	3		CAPACITOR-FXD 10UF +-10% TA 0 OHM	28480	0180-3831
A12C13	0180-3771	0		CAPACITOR-FXD 1UF +-10% TA 0 OHM	28480	0180-3771
A12C14	0180-3831	3		CAPACITOR-FXD 10UF +-10% TA 0 OHM	28480	0180-3831
A12C15	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A12C16	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A12C17	0160-4385	2		CAPACITOR-FXD 15PF +-5% 200VDC CER 0+-30	28480	0160-4385
A12C18				NOT ASSIGNED		
A12C19-C21				SEE A12 MISCELLANEOUS PARTS		
A12J1, J2				SEE A12 MISCELLANEOUS PARTS		
A12K1	0490-1318	4	1	RELAY 2C 12VDC-COIL .5A 28 VDC	28480	0480-1318
A12L1	9100-3922	4	2	INDUCTOR-FIXED 120-1300 HZ 4.25 UH 41%	28480	9100-3922
A12L2	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ 4.25 UH 41%	28480	9100-3922
A12Q1	1854-0637	1	1	TRANSISTOR NPN 2N2219A SI TO-5 PD=800MW	01295	2N2219A
A12Q2	1853-0314	9	1	TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A12R1	0698-7205	0	6	RESISTOR 51.1 1% .05W F TC=0+-100	24546	CT3-1/8-TO-51R1-F
A12R2	0698-7236	7	5	RESISTOR 1K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-1001-F
A12R3	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-1001-F
A12R4	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	CT3-1/8-TO-51R1-F
A12R5	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	CT3-1/8-TO-51R1-F
A12R6	0698-7206	1	1	RESISTOR 56.2 1% .05W F TC=0+-100	24546	CT3-1/8-TO-56R2-F
A12R7	0698-7229	8	1	RESISTOR 511 1% .05W F TC=0+-100	24546	CT3-1/8-T0-511R-F
A12R8	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	CT3-1/8-TO-51R1-F
A12R9	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	CT3-1/8-TO-51R1-F
A12R10	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	CT3-1/8-TO-51R1-F
A12R11	0698-7260	7	2	RESISTOR 10K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-1002-F
A12R12	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-1002-F
A12R13	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-1001-F
A12R14	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-1001-F
A12R15	0698-7253	8	2	RESISTOR 5.11K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-5111-F
A12R16	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-1001-F
A12R17	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	CT3-1/8-T0-5111-F
A12U1	1826-2081	4	2	IC 404AJ P1 OP AMP	28480	1826-2081
A12U2	1826-2081	4		IC 404AJ P1 OP AMP	28480	1826-2081
A12U3	1826-2074	5	1	IC 587J P1 VREF	28480	1826-2074
A12U4	1826-0716	8	3	IC OP AMP LOW-NOISE DUAL 8-DIP-C PKG	18324	NE5532AFE
A12W1				USE 24 AWG WIRE (RED)		
A12W2				USE 24 AWG WIRE (BROWN)		
A12W3				USE 24 AWG WIRE (BLUE)		

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
				A12 Miscellaneous Parts		
A12C19	0160-2437	1	3	CAPACITOR-FEEDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A12C20	0160-2437	1	3	CAPACITOR-FEEDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A12C21	0160-2437	1	3	CAPACITOR-FEEDTHRU 5000PF +80 -20% 200V	28480	0160-2437
A12J1	11848-20111	9	2	CONNECTOR SMA	28480	11848-20111
A12J2	11848-20111	9	2	CONNECTOR SMA	28480	11848-20111
A12MP10	11848-20114	2	1	CAN	28480	11848-20114
A12MP11	11848-20113	1	1	TOP COVER	28480	11848-20113
A12MP12	11848-20112	0	1	BOTTOM COVER	28480	11848-20112
A12MP13	11848-00030	9	1	ADHESIVE LABEL	28480	11848-00030
A12MP14	11848-00029	6	1	CLIP CONNECTOR	28480	11848-00029
A12MP15	11848-00029	6	1	CLIP CONNECTOR	28480	11848-00029
A12MP16	11848-XXXXX	X	1	NUT (PART NUMBER NOT YET AVAILABLE	28480	11848-XXXXX
A12MP17	11848-XXXXX	X	1	NUT (PART NUMBER NOT YET AVAILABLE	28480	11848-XXXXX
A12MP18	2200-0170	3	4	SCREW-MACH 4-40 .625-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A12MP19	2200-0170	3	4	SCREW-MACH 4-40 .625-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A12MP20	2200-0170	3	4	SCREW-MACH 4-40 .625-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A12MP21	2200-0170	3	4	SCREW-MACH 4-40 .625-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A12MP22	2190-0009	4	2	WASHER-LK INTL T NO. 8 .168-IN-ID	00000	ORDER BY DESCRIPTION
A12MP23	2190-0009	4	2	WASHER-LK INTL T NO. 8 .168-IN-ID	00000	ORDER BY DESCRIPTION
A12MP24	0360-0269	7	1	TERMINAL SLDR LUG LK-MTG FOR #8 SCR	00000	ORDER BY DESCRIPTION
A12MP25	2190-0068	5	2	WASHER-LK INTL T 1/2 IN .505-IN-ID	00000	ORDER BY DESCRIPTION
A12MP26	2190-0068	5	2	WASHER-LK INTL T 1/2 IN .505-IN-ID	00000	ORDER BY DESCRIPTION
A12W4-7, W19, W39	11848-61035	2	1	WIRING HARNESS	28480	11848-61035

†Refer to Table 7 for update information.



A12 Miscellaneous Parts

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
				MISCELLANEOUS PARTS		
B1	3160-0494	9	1	FAN TBAX 18-CFM	28480	3160-0494
	1251-2097	3	2	CONTACT-CONN U/W-UTIL MALE CRP	28480	1251-2097
C1	0180-0230	0		CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
C2	0180-0230	0		CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
C3	0180-0230	0		CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
C4	0180-0230	0		CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
C5	0180-0230	0		CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
C6	0180-0230	0		CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
C7	0180-0230	0		CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
C8	0180-0230	0	16	CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
2621A to 2720A						
C9	0160-3094	8	4	CAPACITOR-FXD .1UF +-10% 100VDC CER	28480	0160-3094
C10	0160-3094	8		CAPACITOR-FXD .1UF +-10% 100VDC CER	28480	0160-3094
2815A and above						
C9	0160-3670	6		CAPACITOR-FXD .1UF +-20% 200VDC CER	28480	0160-3670
C10	0160-3670	6		CAPACITOR-FXD .1UF +-20% 200VDC CER	28480	0160-3670
C11	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER (ATTACHED TO J11)	28480	0160-4835
	0515-0430	3	2	SCREW-MACHINE ASSEMBLY M3 X 0.5 6MM-LG	00000	ORDER BY DESCRIPTION
C12	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER (ATTACHED TO J1)	28480	0160-4835
	0515-0430	3	2	SCREW-MACHINE ASSEMBLY M3 X 0.5 6MM-LG	00000	ORDER BY DESCRIPTION
C13	0160-3036	8	15	CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C14	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C15	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C16	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C17	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C18	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C19	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C20	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C21	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C22	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C23	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C24	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C25	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C26	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C27	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
C28	0160-4065			CAPACITOR-FXD .1UF +-20% 250VAC (RMS)	28480	0160-4065
C28	0160-4065			CAPACITOR-FXD .1UF +-20% 250VAC (RMS)	28480	0160-4065
CR1-17				NOT ASSIGNED		
CR18	1906-0065	0	2	DIODE-FW BRDG 100V 10A	28480	1906-0065
CR18J18	1251-7362	1	2	CONNECTOR BODY 4 PIN	28480	1251-7362
	1252-0470	4		CONTACT	28480	1252-0470
CR19	1906-0065	0	2	DIODE-FW BRDG 100V 10A	28480	1906-0065
CR19J19	1251-7362	1	2	CONNECTOR BODY 4 PIN	28480	1251-7362
	1252-0470	4		CONTACT	28480	1252-0470
F1	2110-0063	2	2	FUSE .75A 250V NTD 1.25X.25 UL (FOR 110/120V OPERATION)	28480	2110-0063
F1	2110-0012	1		FUSE .5A 250V NTD 1.25X.25 UL (FOR 220/240V OPERATION)	28480	2110-0012
H1	11848-61027	9	1	REFERENCE DECK HARDWARE ASSEMBLY	28480	11848-61027
				INCLUDES HARDWARE FOR A6-A9 ASSEMBLIES	28480	
	0380-0003	9	3	SPACER-RND .125-IN-LG .18-IN-ID	28480	0380-0003
	0515-1139	1	3	SCREW-MACH M4 X 0.7 12 MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
	0535-0082	3	3	NUT-HEX W/EXT-T-LKWR M4 X 0.7 3.2MM-THK	00000	ORDER BY DESCRIPTION
	2190-0124	4	11	WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9	11	NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
	3050-0893	9	3	WASHER-FL MTLC 4.0 MM 4.4-MM-ID	28480	3050-0893

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
J1				NOT SEPARATELY REPLACEABLE P/O W8		
	2950-0054	1	3	NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
	5040-7624	9	4	WASHER SHOULDER	28480	5040-7624
	0360-1089	1	2	TERMINAL-SLDR LUG PL-MTG FOR-#1/2-SCR	28480	0360-1089
J2	1250-1811	5	3	ADAPTER-COAX STR F-N F-SMA	28480	1250-1811
	2190-0054	9	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J3	1250-1811	5		ADAPTER-COAX STR F-N F-SMA	28480	1250-1811
	2190-0054	9	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J4	6960-0132	1	2	PLUG-HOLE FL-HD FOR .5-D-HOLE NYL (EXCEPT OPTION 201)	28480	6960-0132
J4	1250-1811	5		ADAPTER-COAX STR F-N F-SMA (OPTION 201 ONLY)	28480	1250-1811
	2190-0054	9		WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J5	1250-1811	5		ADAPTER-COAX STR F-N F-SMA	28480	1250-1811
	2190-0054	9		WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J6	6960-0132	1		PLUG-HOLE FL-HD FOR .5-D-HOLE NYL (EXCEPT OPTION 201)	28480	6960-0132
J6	1250-1811	5		ADAPTER-COAX STR F-N F-SMA (OPTION 201 ONLY)	28480	1250-1811
	2190-0054	9		WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J7				NOT SEPARATELY REPLACEABLE P/O W10		
	2190-0054	9	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J8				NOT SEPARATELY REPLACEABLE P/O W12		
	2190-0054	9	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J9				NOT SEPARATELY REPLACEABLE P/O W15		
	2190-0054	9	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J10				NOT SEPARATELY REPLACEABLE P/O W16		
	2190-0054	9	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J11				NOT SEPARATELY REPLACEABLE P/O W9		
	2950-0054	1	3	NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
	5040-7624	9	4	WASHER SHOULDER	28480	5040-7624
	0360-1089	1	2	TERMINAL-SLDR LUG PL-MTG FOR-#1/2-SCR	28480	0360-1089
J12				NOT SEPARATELY REPLACEABLE P/O W20		
	2190-0054	9	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
J13				NOT SEPARATELY REPLACEABLE P/O W19		
	2190-0054	9	3	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0054
	2950-0054	1		NUT-HEX-DBL-CHAM 1/2-28-THD .125-IN-THK	00000	ORDER BY DESCRIPTION

†Refer to Table 7 for update information.

Table 5. *Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
J14				NOT SEPARATELY REPLACEABLE P/O W7		
	2190-0102	8	5	WASHER-LK INTL T 15/32 IN .472-IN-ID	28480	2190-0102
	2950-0035	8	13	NUT-HEX-DBL-CHAM 15/32-32-THD	00000	ORDER BY DESCRIPTION
J15				NOT SEPARATELY REPLACEABLE P/O W14		
	2190-0102	8	5	WASHER-LK INTL T 15/32 IN .472-IN-ID	28480	2190-0102
	2950-0035	8	13	NUT-HEX-DBL-CHAM 15/32-32-THD	00000	ORDER BY DESCRIPTION
J16				NOT SEPARATELY REPLACEABLE P/O W24		
	2190-0102	8	5	WASHER-LK INTL T 15/32 IN .472-IN-ID	28480	2190-0102
	2950-0035	8	13	NUT-HEX-DBL-CHAM 15/32-32-THD	00000	ORDER BY DESCRIPTION
J17				NOT SEPARATELY REPLACEABLE P/O W6		
	2190-0102	8	5	WASHER-LK INTL T 15/32 IN .472-IN-ID	28480	2190-0102
	2950-0035	8	13	NUT-HEX-DBL-CHAM 15/32-32-THD	00000	ORDER BY DESCRIPTION
J18				NOT SEPARATELY REPLACEABLE P/O W18		
	2190-0102	8	5	WASHER-LK INTL T 15/32 IN .472-IN-ID	28480	2190-0102
	2950-0035	8	13	NUT-HEX-DBL-CHAM 15/32-32-THD	00000	ORDER BY DESCRIPTION
J19	6960-0041	1		PLUG-HOLE FL-HD FOR .5-D-HOLE NYL	28480	6960-0041
M1	1120-1587	7	1	METER +- 1 MILLIAMP FULL SCALE; 0.1	28480	1120-1587
	0360-0036	6	2	TERMINAL-SLDR LUG PL-MTG FOR-#6-SCR	28480	0360-0036
	0515-0069	4	2	SCREW-MACH M3.5 X 0.6 25MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
	2190-0918	4	13	WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0918
	3050-0066	8	5	WASHER-FL MTLC NO. 6 .147-IN-ID	73734	1451
MP1	7120-4963	1	1	HP LOGO	28480	7120-4963
MP2	11848-00002	5	1	PANEL FRONT	28480	11848-00002
	0515-1246	1	4	SCREW-MACH M3 X 0.5 6MM-LG PAN-HD (ATTACH A2 TO FRONT PANEL)	00000	ORDER BY DESCRIPTION
MP3	11848-00003	6	1	FRONT SUB PANEL AND A4 ASSEMBLY SUB DECK	28480	11848-00003
	0400-0010	2	4	GROMMET-RND .25-IN-ID .375-IN-GRV-OD	28480	0400-0010
	0515-0430	3	2	SCREW-MACHINE ASSEMBLY M3 X 0.5 6MM-LG	00000	ORDER BY DESCRIPTION
	2190-0918	4	13	WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0918
	3050-0066	8	5	WASHER-FL MTLC NO. 6 .147-IN-ID	73734	1451
MP4	5021-5803	2	1	FRONT FRAME	28480	5021-5803
MP5	5040-7202	9	1	TRIM, TOP	28480	5040-7202
MP6	5001-0439	8	2	TRIM, SIDE	28480	5001-0439
MP7	5061-9436	9	1	TOP COVER	28480	5061-6436
	7120-8607	2	4	LABEL: METRIC/ENGLISH HARDWARE	28480	7120-8607
MP8	5041-6819	4	2	HANDLE CAP, FRONT	28480	5041-6819
	0515-1331	5	4	SCREW-METRIC SPECIALTY M4 X 0.7 THD 6	28480	O515-1331
MP9	5060-9805	4	2	STRAP HANDLE	28480	5060-6805
MP10	5041-6820	7	2	HANDLE CAP, REAR	28480	5041-6820
	0515-1331	5		SCREW-METRIC SPECIALTY M4 X 0.7 THD 6	28480	O515-1331
MP11	5060-9938	4	2	SIDE COVER, PERFORATED	28480	5060-6638
MP12	5021-5838	3	4	CORNER STRUT (SIDE RAILS)	28480	5021-5838
MP13	5040-7201	8	4	FOOT FULL-1/2 MOD	28480	5040-7201
MP14				NOT ASSIGNED		
MP15	5061-9448	3	1	BOTTOM COVER	28480	5061-9448
MP16	5021-5804	3	1	REAR FRAME	28480	5021-5804
MP17	11848-00006	9	1	REAR PANEL	28480	11848-00006
MP18	0515-0212	9	27	SCREW-MACH M3.5 X 0.6 6MM-LG PAN-HD (ATTACH REAR PANEL TO REAR FRAME)	28480	0515-0212
	2190-0102	8	5	WASHER-LK INTL T 15/32 IN .472-IN-ID	28480	2190-0102
	2950-0035	8	13	NUT-HEX-DBL-CHAM 15/32-32-THD	00000	ORDER BY DESCRIPTION

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
MP19	5041-0201	6	1	KEY CAP, WHITE (LINE)	28480	5041-0201
2621A TO 2649A						
MP20	11848-00007	0	1	LINE SWITCH BRACKET	28480	11848-00007
	0515-1412	3	2	SCREW-MACHINE ASSEMBLY M2.5 X 0.45 (ATTACH SWITCH TO BRACKET)	28480	0515-1412
	0515-1331	5	6	SCREW-METRIC SPECIALTY M4 X 0.7 THD 6 (ATTACH BRACKET TO FRONT FRAME)	28480	O515-1331
2703A AND ABOVE						
MP20	11848-21001	8	1	LINE SWITCH BRACKET	28480	11848-00007
	0515-0367	5	2	SCREW-MACHINE ASSEMBLY M2.5 X 0.45 (ATTACH SWITCH TO BRACKET)	00000	ORDER BY DESCRIPTION
	0515-0657	6	6	SCREW-MACH M3X5 X 0.6 8-MM LG (ATTACH BRACKET TO FRONT FRAME)	28480	O515-0657
2621A TO 2706A						
MP21	11848-00001	4	1	MAIN DECK (FOR A3 ASSEMBLY)	28480	11848-00001
	0515-1402	1	30	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD (ATTACH DECK TO SIDE RAIL)	00000	ORDER BY DESCRIPTION
	4040-1415	3	21	SPACER-INSULATING	28480	4040-1415
	1400-0611	0	6	CLAMP-FL-CA 1-WD	28480	1400-0611
	1400-2493	0	3	CABLE CLAMP	28480	1400-2493
2713A AND ABOVE						
MP21	11848-00025	2	1	MAIN DECK (FOR A3 ASSEMBLY)	28480	11848-00025
	0515-1402	1	30	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD (ATTACH DECK TO SIDE RAIL)	00000	ORDER BY DESCRIPTION
	4040-1415	3	21	SPACER-INSULATING	28480	4040-1415
	1400-0611	0	6	CLAMP-FL-CA 1-WD	28480	1400-0611
	1400-2493	0	3	CABLE CLAMP	28480	1400-2493
MP22	11848-00010	5	1	SHIELD TOP (FOR A4 ASSEMBLY)	28480	11848-00010
MP23	11848-00009	2	1	SHIELD BOTTOM (FOR A4 ASSEMBLY)	28480	11848-00009
	0400-0010	2	4	GROMMET-RND .25-IN-ID .375-IN-GRV-OD	28480	0400-0010
MP24	5001-8232	5	1	GUSSET SIDE	28480	5001-8232
	0515-1331	5	8	SCREW-METRIC SPECIALTY M4 X 0.7 THD 6 (ATTACH GUSSET TO SIDE RAIL)	28480	O515-1331
MP25				NOT ASSIGNED		
MP26	11848-00008	1	1	TRANSFRMR/FAN/A10 SHIELD	28480	11848-00008
MP27	0515-0212	9	27	SCREW-MACH M3.5 X 0.6 6MM-LG PAN-HD	28480	0515-0212
MP28	3050-0066	8	5	WASHER-FL MTLC NO. 6 .147-IN-ID	73734	1451
MP29	11848-00005	8	1	BOARD DECK (FOR A1 ASSEMBLY)	28480	11848-00005
	0515-1402	1	30	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD (ATTACH DECK TO SIDE RAIL)	00000	ORDER BY DESCRIPTION
MP30	35601-04103	8	1	COVER XFMR	28480	35601-04103
MP31	0515-1408	7	4	SCREW-MACH M4 X 0.7 60MM-LG PAN-HD (ATTACH TRANSFORMER AND COVER TO REAR PANEL)	00000	ORDER BY DESCRIPTION
	3050-2007	1	4	WASHER-SHLDR NO. 6 .169-IN-ID .375-IN-OD	06540	2711-21562-PHF169-30
	2190-0009	4	4	WASHER-LK INTL T NO 8 .168-IN-ID	00000	ORDER BY DESCRIPTION
	3050-0071	5	5	WASHER-FL MTLC NO. 8 .169-IN-ID	28480	3050-0071
	0535-0082	3	4	NUT-HEX W/EXT-T-LKWR M4 X 0.7 3.2MM-THK	00000	ORDER BY DESCRIPTION
MP32	0515-0664	5	10	SCREW-MACHINE ASSEMBLY M3 X 0.5 12MM-LG (ATTACH FAN TO REAR PANEL)	00000	ORDER BY DESCRIPTION
	0535-0031	2	7	NUT-HEX W/LKWR M3 X 0.5 2.4MM-THK	00000	ORDER BY DESCRIPTION
MP33	0380-1677	5	4	STANDOFF-HEX 32-MM-LG M3.0 X 0.5-THD (FOR A4 ASSEMBLY SHIELD)	06540	19981-SS-0350
MP34	11848-00200	5	1	MIXER BRACKET (OPTION 201 ONLY)	28480	11848-00200
MP35	0515-0682	7	2	SCREW-MACH M3 X 0.5 18MM-LG PAN-HD (ATTACH MIXER (U6) TO BRACKET: OPTION 201 ONLY)	00000	ORDER BY DESCRIPTION

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
MP36	2190-0584	0	2	WASHER-LK HLCL 3.0 MM 3.1-MM-IC (OPTION 201 ONLY)	28480	2190-0584
MP37	0380-1739	0	2	STANDOFF-HEX 11-MM-LG M3.0 X 0.5 THD (UNDER MIXER BRACKET: OPTION 201 ONLY)	28480	0380-1739
MP38	0515-1246	1	19	SCREW-MACH M3 X 0.5 6MM-LG PAN-HD (ATTACH MIXER BRACKET TO DECK: OPTION 201 ONLY)	28480	0515-1246
MP39	1251-1249	3	1	ADAPTER-COAX RT-ANGLE F-SMA M-SMA (OPTION 201 ONLY)	28480	0515-1246
MP40	0515-1246	1	19	SCREW-MACH M3 X 0.5 6MM-LG PAN-HD (ATTACH A4 ASSEMBLY TO DECK)	28480	0515-1246
MP41	1400-0249	0	28	CABLE TIE .062-.625-DIA .091-WD NYL	28480	1400-0249
MP42	1400-0062	5	2	CLAMP-CABLE .375-DIA .38-WD SPR-STL	28480	1400-0062
MP43	1400-0611	0	6	CLAMP-FL-CA 1-WD	28480	1400-0611
MP44	11848-00004	7	2	REGULATOR BRACKET	28480	11848-00004
	1200-0819	6	10	SOCKET-XSTR 2-CONT TO-3 SLDR-EYE	28480	1200-0819
	08903-00024	2	1	STRIP CUSHION S	28480	08903-00024
MP45	0515-1246	1	19	SCREW-MACH M3 X 0.5 6MM-LG PAN-HD (ATTACH REGULATOR BRACKET TO SIDE RAIL)	28480	0515-1246
	0515-1402	1	30	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD (ATTACH REGULATOR BRACKET TO MAIN DECK)	00000	ORDER BY DESCRIPTION
MP46	7120-8053		1	LABEL: FIRE WARNING	28480	7120-8053
MP47	1251-5036	6	1	CONNECTOR 2-PIN M UTILITY	28480	1251-5036
	1251-2097	3	2	CONTACT-CONN U/W-UTIL MALE CRP	28480	1251-2097
MP48	1251-5037	7	2	CONNECTOR 2-PIN F UTILITY	28480	1251-5037
	1251-2418	2	2	CONTACT-CONN U/W-UTIL FEM CRP	28480	1251-2418
MP49	1390-0365	8	2	FASTENER-SNAP IN PLUNGER	28480	1390-0365
MP50	1390-0366	9	2	FASTENER-SNAP IN GROMMET	28480	1390-0366
MP51	11848-00014	7	1	REFERENCE BRACE (INCLUDES ATTACHING HARDWARE)	28480	11848-00014
MP52	0890-0025	6	1	SPIRAL WRAP .188-2-DIA POLYETH (FOR CABLE HARNESS)	28480	11848-00014
MP53	0515-1382	6	6	SCREW-MACH M3.5 X 0.6 6MM-LG	28480	0515-1382
R1	0757-0408	7	4	RESISTOR 243 1% .125W F TC=0+-100	24546	CT4-1/8-T0-243R-F
R2	0698-3152	8	4	RESISTOR 3.48K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3481-F
R3	0757-0408	7		RESISTOR 243 1% .125W F TC=0+-100	24546	CT4-1/8-T0-243R-F
R4	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	CT4-1/8-T0-3481-F
S1	3101-2216	3		SWITCH-PD DPDT ALTNG 4A 250VAC	28480	3101-2216
T1	9100-4210	5	1	TRANSFORMER-POWER 100/120/220/240V	28480	9100-4210
	0362-0265	7		CONNECTOR SGL CONT SKT 1.14-MM-BSC-SZ	28480	0362-0265
	1400-0611	0	6	CLAMP-FL-CA 1-WD	28480	1400-0611
	3050-2007	1	4	WASHER-SHLDR NO. 6 .169-IN-ID .375-IN-OD	06540	2711-21562-PHF169-30
U1	1826-0203	8	1	IC 7815 V RGLTR TO-3	07263	7815KC
U2	1826-0169	5	1	IC V RGLTR TO-3	27014	LM320K-15
	0340-0580	3	3	INSULATOR-XSTR THRM-CNDCT	28480	0340-0580
U3	1820-0430	1	1	IC 309 V RGLTR TO-3	07263	LM309K
U4	1826-0523	5	1	IC 337 V RGLTR TO-3	27014	LM337K
	0340-0580	3	3	INSULATOR-XSTR THRM-CNDCT	28480	0340-0580
U5	1826-0423	4	1	IC V RGLTR TO-3	27014	LM317K
	0340-0580	3	3	INSULATOR-XSTR THRM-CNDCT	28480	0340-0580
U6	0955-~~0162~~ 0723	0	1	U-WAVE MIXER 26 GHZ MAX KAK AR Suffix ENGINEER	28480	0955-0162
VR1	1902-1369	1	2	DIODE-ZNR 1N3316B 17V 5% PD=50W IR=5UA	28480	1902-1369
	0360-1700	3	2	TERMINAL-SLDR LUG LK-MTG FOR-#10-SCR	28480	0360-1700
VR2	1902-1369	1	2	DIODE-ZNR 1N3316B 17V 5% PD=50W IR=5UA	28480	1902-1369
	0360-0040	2	4	TERMINAL-SLDR LUG LK-MTG FOR-#1/4-SCR	28480	0360-0040
	0360-1089	1	2	TERMINAL-SLDR LUG PL-MTG FOR-#1/2-SCR	28480	0360-1089
VR3	1902-1217	8	1	DIODE-ZNR 6.2V ~~5%~~ DO-4 PD=10W TC=+.035%	28480	1902-1217
	0360-0016	2	4	TERMINAL-SLDR LUG LK-MTG FOR-#4-SCR	28480	0360-0016

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W1	08660-60056	2	1	COAX CABLE ASSEMBLY F S,B-SMB A3J16 TO A4J204 (3)	28480	08660-60056
W2	11848-61006	7	1	COAX CABLE ASSEMBLY F SMB-SMB A3J1 TO A4J205 (1)	28480	11848-61006
W3	86601-60036	1	1	COAX CABLE ASSEMBLY F SMB-SMB A3J2 TO A4J201 (8)	28480	86601-60036
W4	86601-60069	0	1	COAX CABLE ASSEMBLY F SMB-SMB A3J3 TO A4J10 (89)	28480	86601-60069
W5	11848-61007	8	1	COAX CABLE ASSEMBLY F SMB-SMB A3J4 TO C1 (4)	28480	11848-61007
W6	11848-61008	9	1	COAX CABLE ASSEMBLY F BNC-SMB A3J5 TO REAR PANEL J17 (5)	28480	11848-61008
W7	11848-61009	0	1	COAX CABLE ASSEMBLY F BNC-SMB A3J6 TO REAR PANEL J14 (7)	28480	11848-61009
W8	11848-61010	3	1	COAX CABLE ASSEMBLY F BNC-SMB A3J7 TO FRONT PANEL J1 (80)	28480	11848-61010
	5040-7624	9	4	WASHER SHOULDER	28480	5040-7624
W9	11848-61011	4	1	COAX CABLE ASSEMBLY F BNC-SMB A3J8 TO FRONT PANEL J11 (87)	28480	11848-61011
W10	11848-61012	5	1	COAX CABLE ASSEMBLY F BNC-SMB A6J2 TO FRONT PANEL J7 (85)	28480	11848-61012
W11	11672-60004	1	1	COAX CABLE ASSEMBLY F SMB-SMB A3J10 TO A4J206 (2)	28480	11672-60004
W12	11848-61013	6	1	COAX CABLE ASSEMBLY F BNC-SMB A8J2 TO FRONT PANEL J8 (86)	28480	11848-61013
W13				NOT ASSIGNED		
W14	08954-60105	7	1	COAX CABLE ASSEMBLY F BNC-SMB A6J3 TO REAR PANEL J15 (6)	28480	08954-60105
W15	11848-61014	7	1	COAX CABLE ASSEMBLY F BNC-SMB A7J2 TO FRONT PANEL J9 (81)	28480	11848-61014
W16	11848-61015	8	1	COAX CABLE ASSEMBLY F BNC-SMB A8J2 TO FRONT PANEL J10 (83)	28480	11848-61015
W17	11848-61016	9	1	COAX CABLE ASSEMBLY F SMB-SMB A3J9 TO A7J3 (82)	28480	11848-61016
W18	11848-61017	0	1	COAX CABLE ASSEMBLY F BNC-SMB A4J9 TO REAR PANEL J18 (84)	28480	11848-61017
W19	11848-61018	1	1	COAX CABLE ASSEMBLY F BNC-SMB A4J2 TO FRONT PANEL J13 (96)	28480	11848-61018
W20	11848-61019	2	1	COAX CABLE ASSEMBLY F BNC-SMB A4J16 TO FRONT PANEL J12 (97)	28480	11848-61019

†Refer to Table 7 for update information.

Table 5. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W21	11848-61020	5	1	COAX CABLE ASSEMBLY F SMB-SMB A3J13 TO A4J15 (93)	28480	11848-61020
W22	86603-60012	5	1	COAX CABLE ASSEMBLY A7J4 TO A8J1 (0)	28480	86603-60012
W23	86603-60012	5	1	COAX CABLE ASSEMBLY A6J4 TO A7J1 (0)	28480	86603-60012
W24	11848-61021	6	1	COAX CABLE ASSEMBLY F BNC-SMB A4J1 TO REAR PANEL J16 (839)	28480	11848-61021
W25	35601-61621	5	1	CABLE ASSEMBLY MCNDCT 2CKT A3J16 TO A4J204 (8,2)	28480	35601-61621
W26	8120-3185	2	1	FLAT RIBBON ASSY 28-AWG 34-COND A3J201 TO A1J5	28480	8120-3185
W27	35601-61612	4	1	CABLE ASSEMBLY MCNDCT 4CKT A3J203 TO A1J6 (3,2,1,0)	28480	35601-61612
W28	35601-61614	6	1	CABLE ASSEMBLY MCNDCT 4CKT A1J9 TO A4J13 (3,2,1,0)	28480	35601-61614
W29	11848-61005	6	1	RIBBON CABLE ASSEMBLY 50CNDCT28AWG A4J202 TO A1J2	28480	11848-61005
W30	11848-61001	2	1	SEMI-RIGID CABLE ASSEMBLY 2.18 SMA-NONE A4J8 TO FRONT PANEL J2	28480	11848-61001
W31	11848-61002	3	2	SEMI-RIGID CABLE ASSEMBLY 2.18 SMA-NONE A4J6 TO FRONT PANEL J5	28480	11848-61002
W32	11848-61002	3	2	SEMI-RIGID CABLE ASSEMBLY 2.18 SMA-NONE A4J7 TO FRONT PANEL J3	28480	11848-61002
W33	11848-61004	5	2	SEMI-RIGID CABLE ASSEMBLY 2.18 SMA-NONE U6 TO FRONT PANEL J4 (OPTION 201 ONLY)	28480	11848-61004
W34	11848-61003	4	2	SEMI-RIGID CABLE ASSEMBLY 2.18 SMA-NONE U6 TO FRONT PANEL J6 (OPTION 201 ONLY)	28480	11848-61003
W35	11848-61024	9	1	RIBBON CABLE ASSEMBLY 10CNDCT28AWG A4J203 TO A2J1	28480	11848-61024
W36	35601-61620	4	1	CABLE ASSEMBLY MCNDCT 2CKT METER CABLE M1 TO A2J2 (3,4)	28480	35601-61620
2621A TO 2706A *W37*	11848-61022	7	1	RIBBON CABLE ASSEMBLY 26CNDCT28AWG A3J204 TO A1J1, A1J2, A6, A7, A8, A9	28480	11848-61022
2713A AND ABOVE *W37*	11848-61031	8	1	RIBBON CABLE ASSEMBLY 26CNDCT28AWG A3J204 TO A1J1, A1J2, A6, A7, A8, A9	28480	11848-61031
W38	35601-61610	2	1	CABLE ASSEMBLY MCNDCT 4CKT A10 TO FRONT PANEL POWER SWITCH	28480	35601-61610

Table 6. *Code List of Manufacturers*

Mfr. Code	Manufacturer Name	Address	Zip Code
00000	ANY SATISFACTORY SUPPLIER		
01295	TEXAS INSTR INC SEMICOND CMPNT DIV	DALLAS, TX	75222
03888	K D I PYROFILM CORP	WHIPPANY, NJ	07981
04713	MOTOROLA SEMICONDUCTOR PRODUCTS	PHOENIX, AZ	85008
05791	LYN-TRON INC	BURBANK, CA	91505
06383	PANDUIT CORP	TINLEY PARK, IL	60477
06540	AMATOM ELEK HARDWARE DIV OF MITE	NEW ROCHELLE, NY	06515
06665	PRECISION MONOLITHICS INC	SANTA CLARA, CA	95050
07263	FAIRCHILD SEMICONDUCTOR DIV	MOUNTAIN VIEW, CA	94042
13606	SPRAGUE ELECTRIC SEMICON DIV	CONCORD, NH	03301
16179	M/A-COM OMNI SPECTRA INC	MERRIMACK, NH	03054
16299	CORNING GLASS WKS COMPONENT DIV	RALEIGH, NC	27604
17856	SILICONIX INC	SANTA CLARA, CA	95054
18324	SIGNETICS CORP	SUNNYVALE, CA	94086
19701	MEPCO/ELECTRA CORP	MINERAL WELLS, TX	76067
20932	EMCON DIV ITW	SAN DIEGO, CA	92129
22526	DUPONT CONNECTOR SYSTEMS	CAMP HILL, PA	17011
24546	CORNING GLASS WORKS (BRADFORD)	BRADFORD, PA	16701
25088	SIEMENS CORP	ISELIN, NJ	08830
27014	NATIONAL SEMICONDUCTOR CORP	SANTA CLARA, CA	95051
27264	MOLEX PRODUCTS CO	LISLE, IL	60632
28480	HEWLETT-PACKARD CO CORPORATE HQ	PALO ALTO, CA	94304
3L585	RCA CORP SOLID STATE DIV	SOMERVILLE, NJ	
32559	BIVAR INC	SANTA ANA, CA	92705
52063	EXAR INTEGRATED SYSTEMS INC	SUNNYVALE, CA	94086
56289	SPRAGUE ELECTRIC CO	NORTH ADAMS, MA	01247
71707	COTO CORP	PROVIDENCE, RI	02905
73734	FEDERAL SCREW PRODUCTS CO	CHICAGO, IL	60618
74970	JOHNSON E F CO	WASECA, MN	56093
75915	LITTELFUSE INC	DES PLAINES, IL	60016
76680	FEDERAL-MOGUL CORP RBR & PLSTC GP	REDWOOD CITY, CA	94062
84411	TRW CAPACITOR DIV	OGALLALA, NE	69153
9N171	UNITRODE CORP	LEXINGTON, MA	02173
91637	DALE ELECTRONICS INC	COLUMBUS, NE	68601

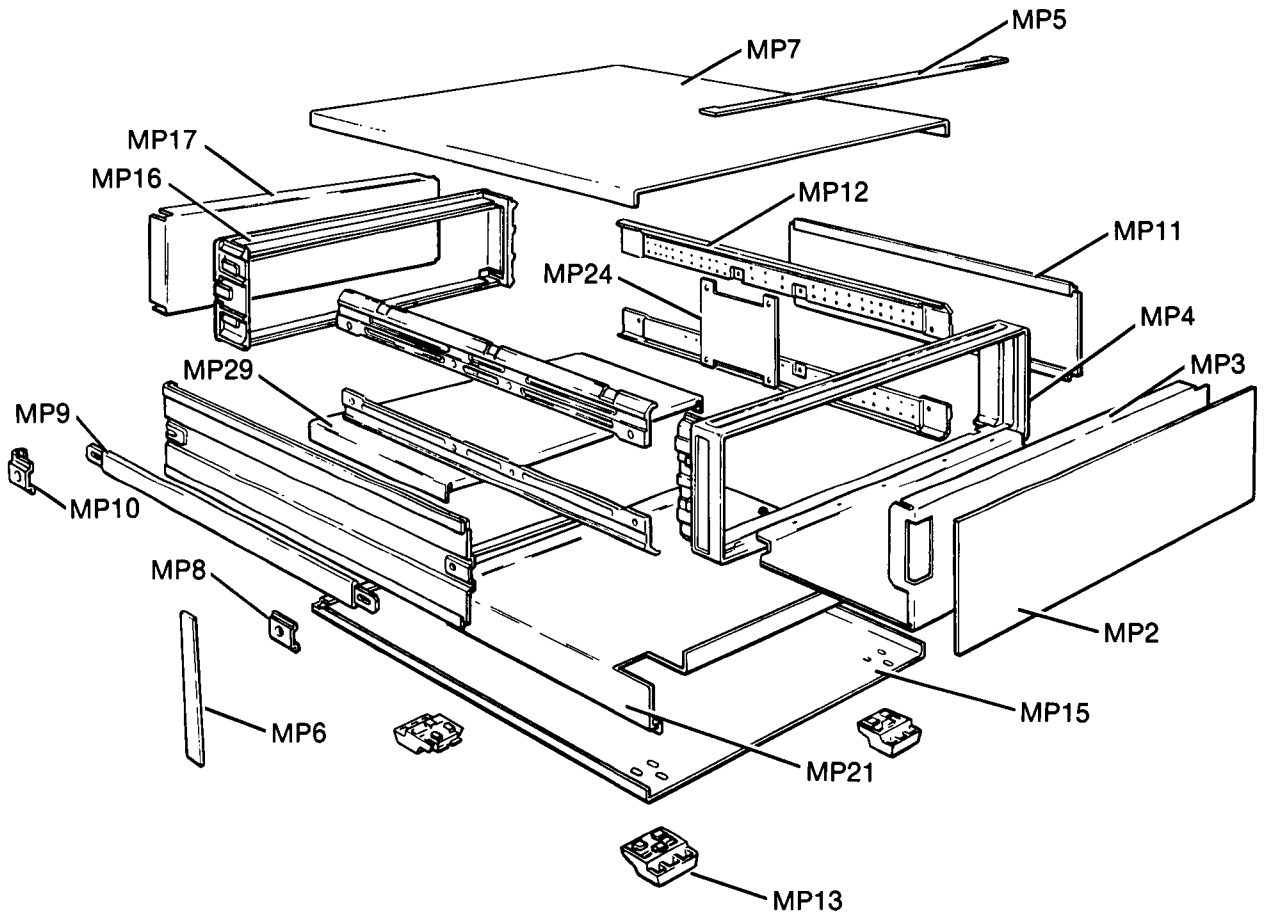


Figure 6. Cabinet Parts

Table 7. *Update Information for Instrument Changes*

Reference Designator	Serial Prefix	Description of Change
A1S1, A1S2, A1S3	2720A	Instruments with serial prefixes prior to 2720A have components A1S1, A1S2 and A1S3 installed. These switches are not used, and if improperly set can cause the instrument to malfunction. Any or all of the switches may be removed without affecting the operation of the instrument. These switches are not loaded in instruments with serial prefixes 2720A and above.

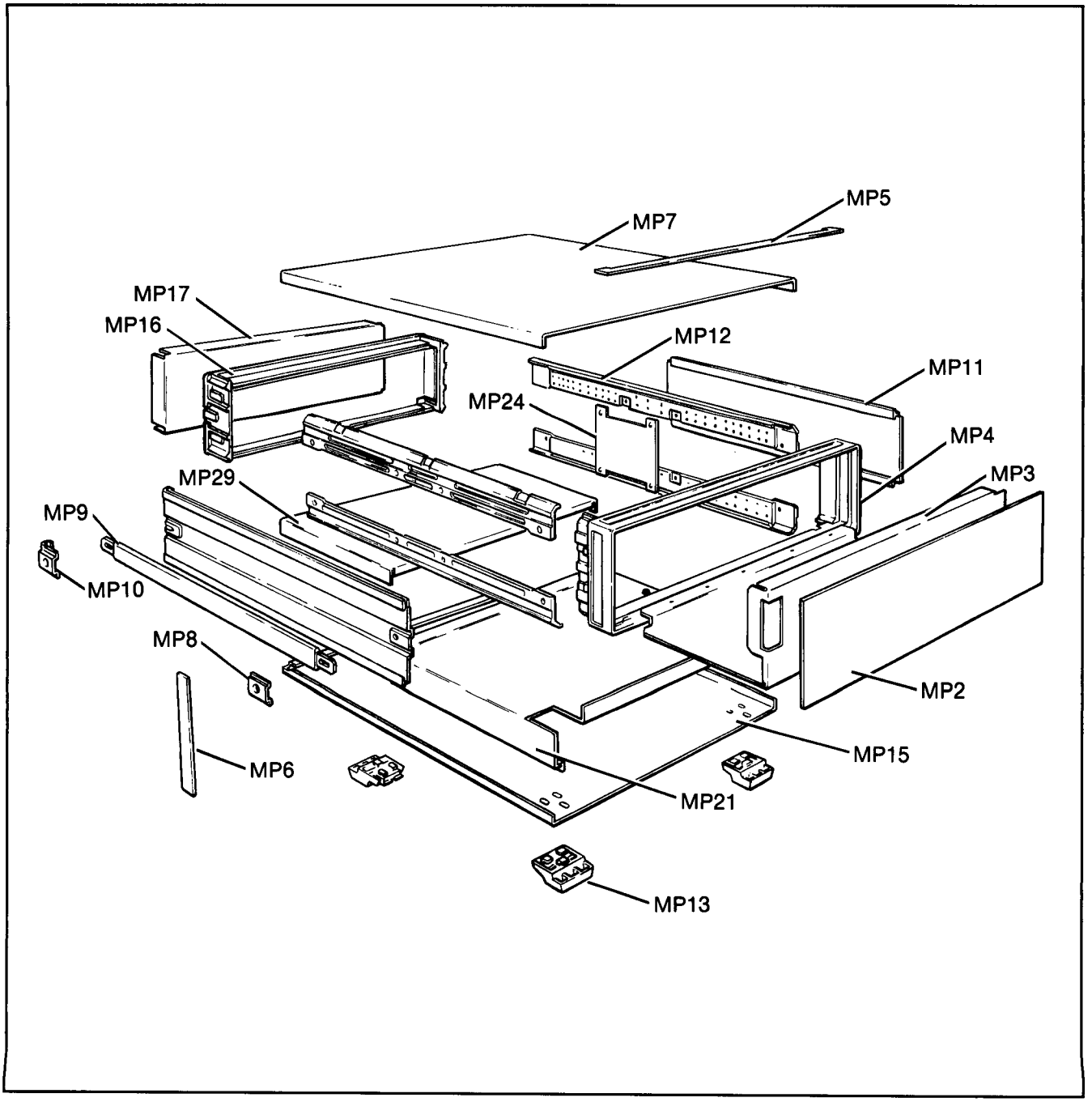


Figure 6. *Cabinet Parts*

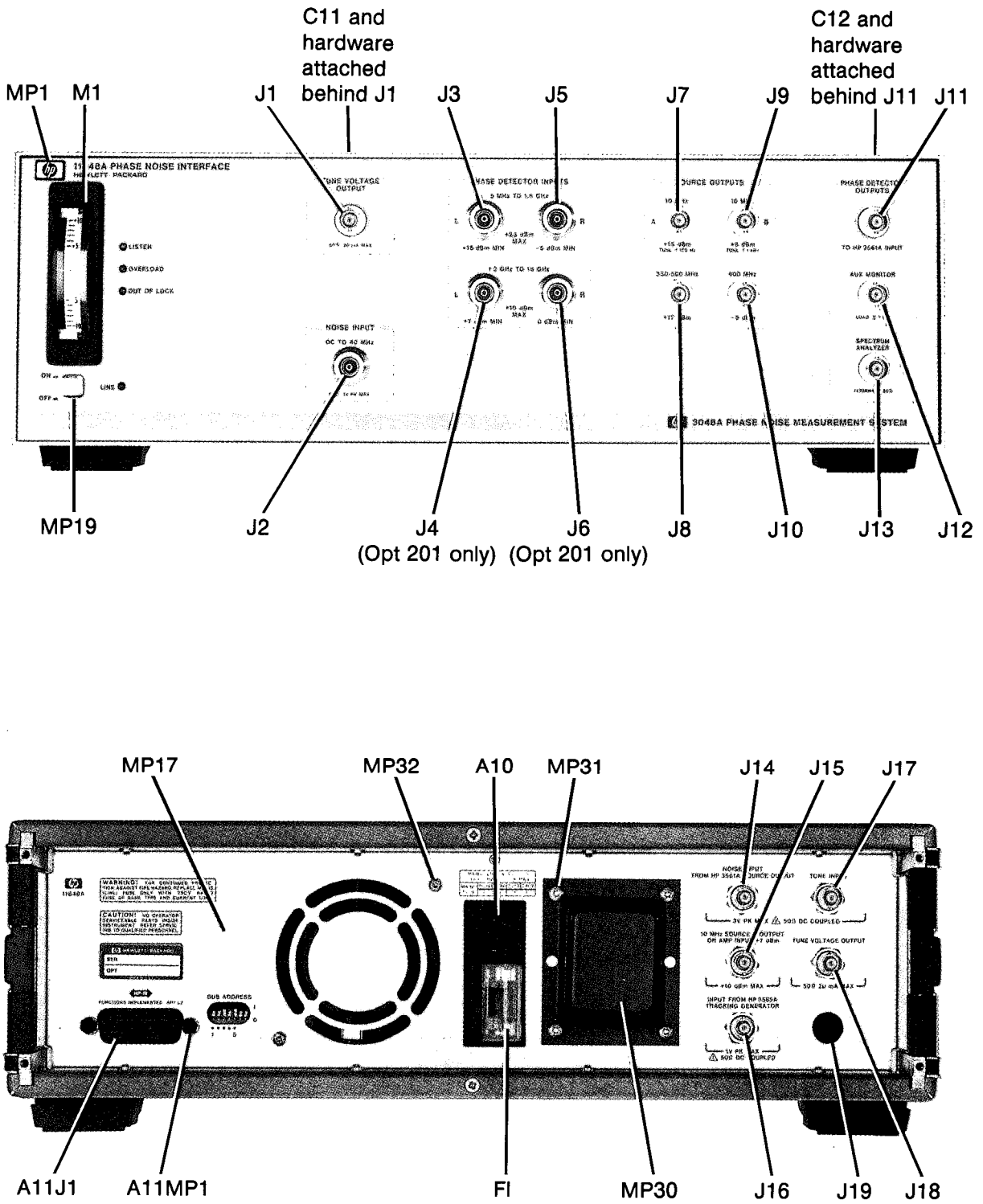


Figure 7. *Parts Identification (Front Panel View and Rear Panel View)*

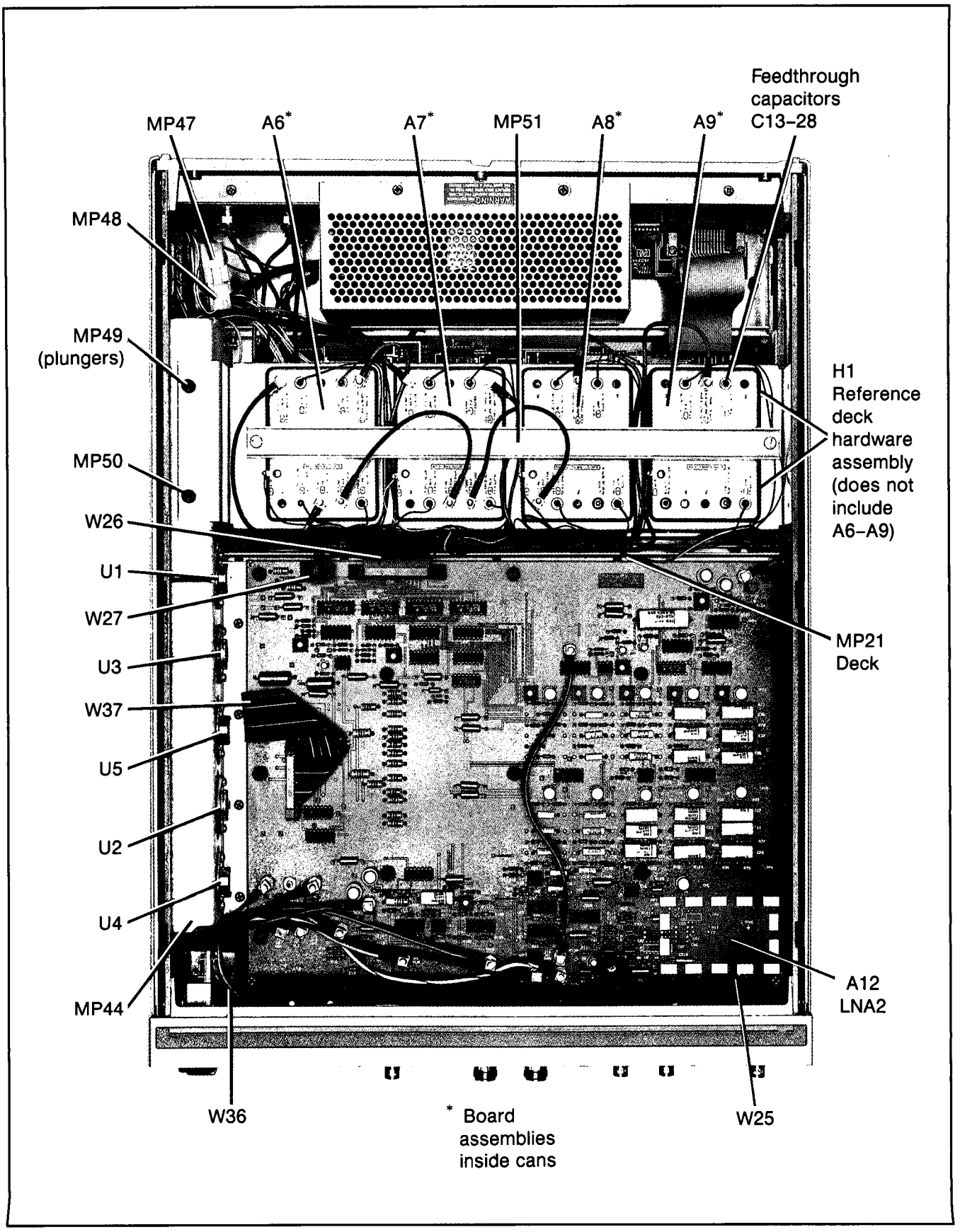


Figure 8. *Parts and Cable Identification (Top View)*

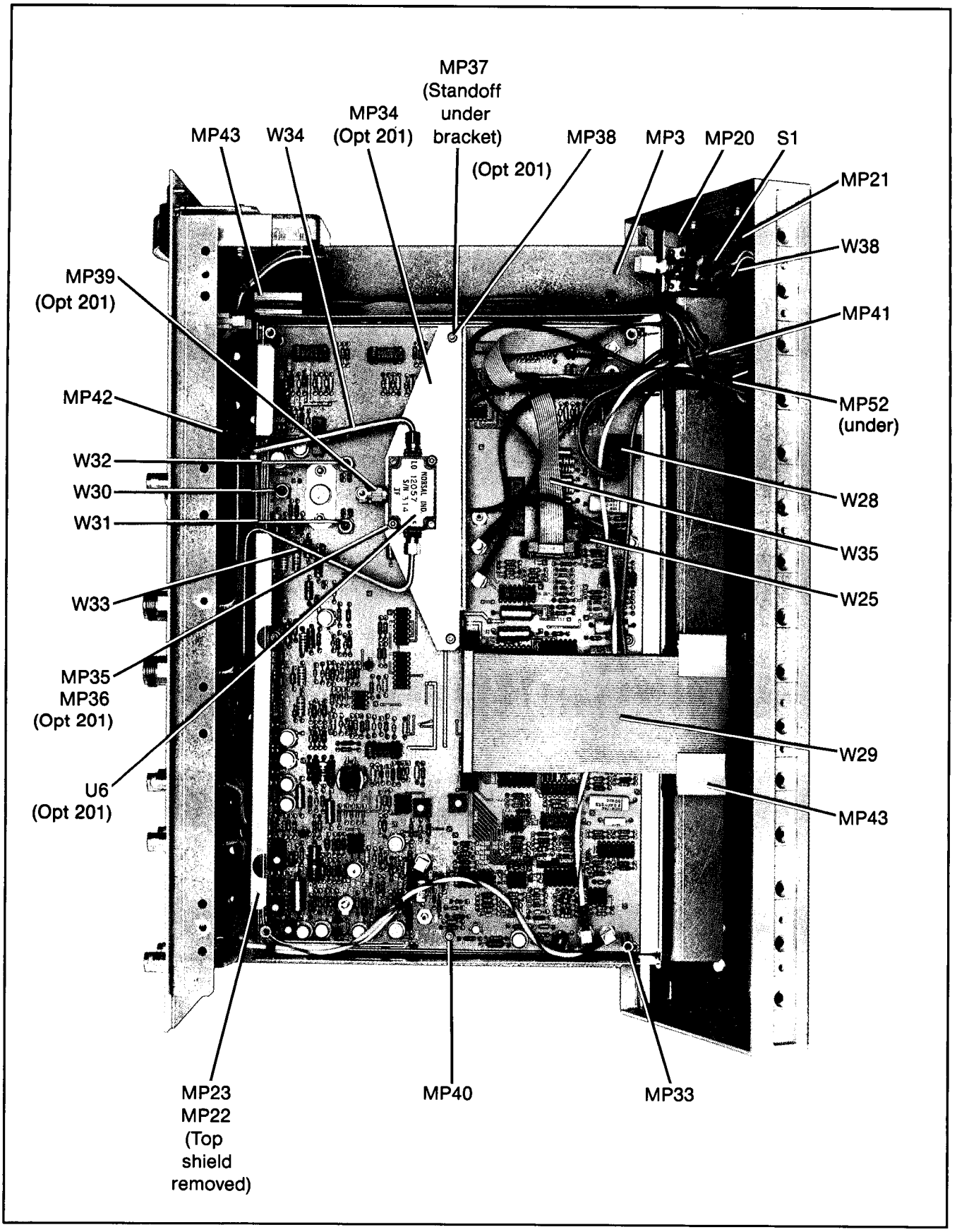


Figure 9. *Parts and Cable Identification (Top View)*

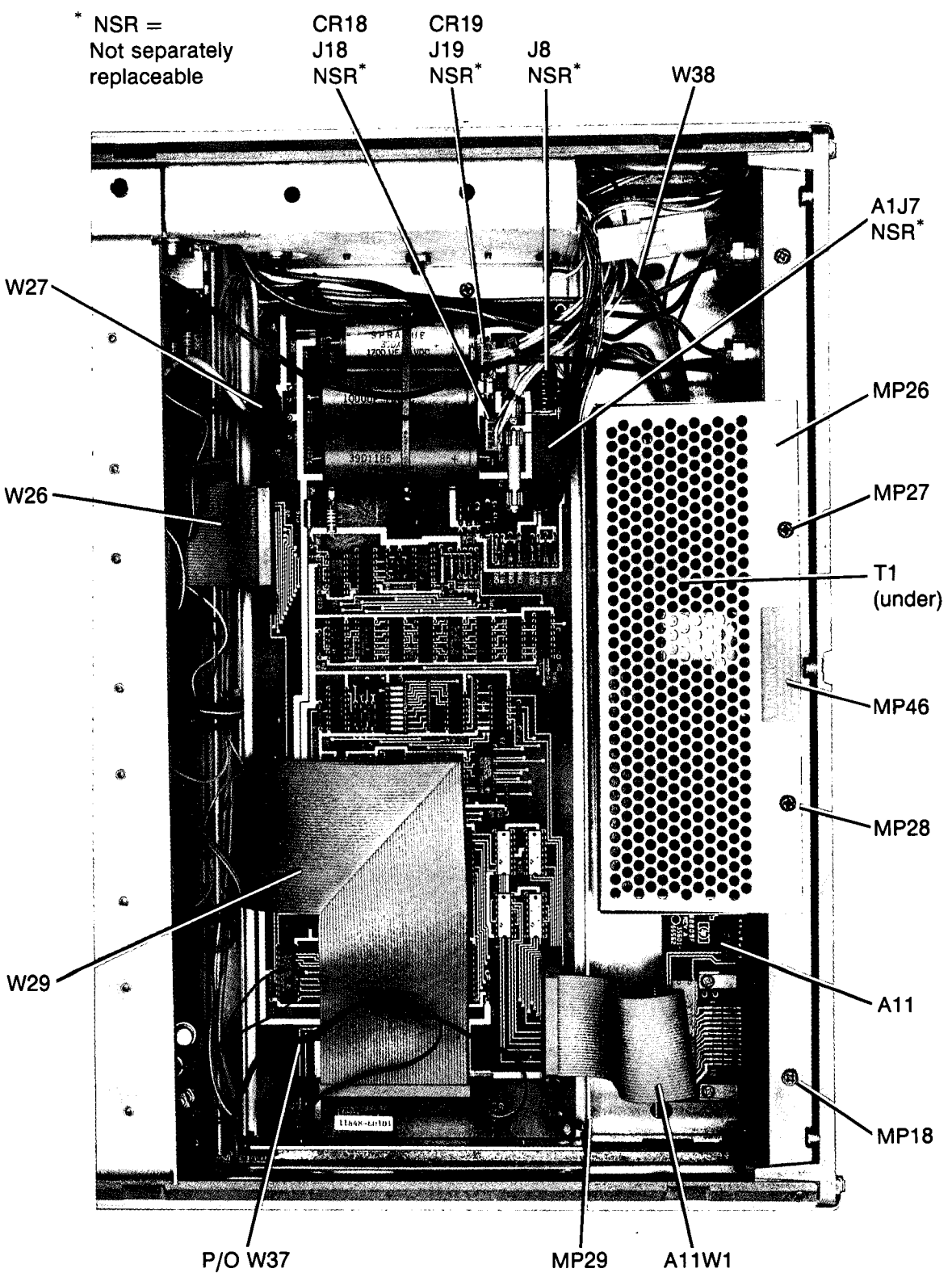


Figure 10. *Parts and Cable Identification (Top View)*

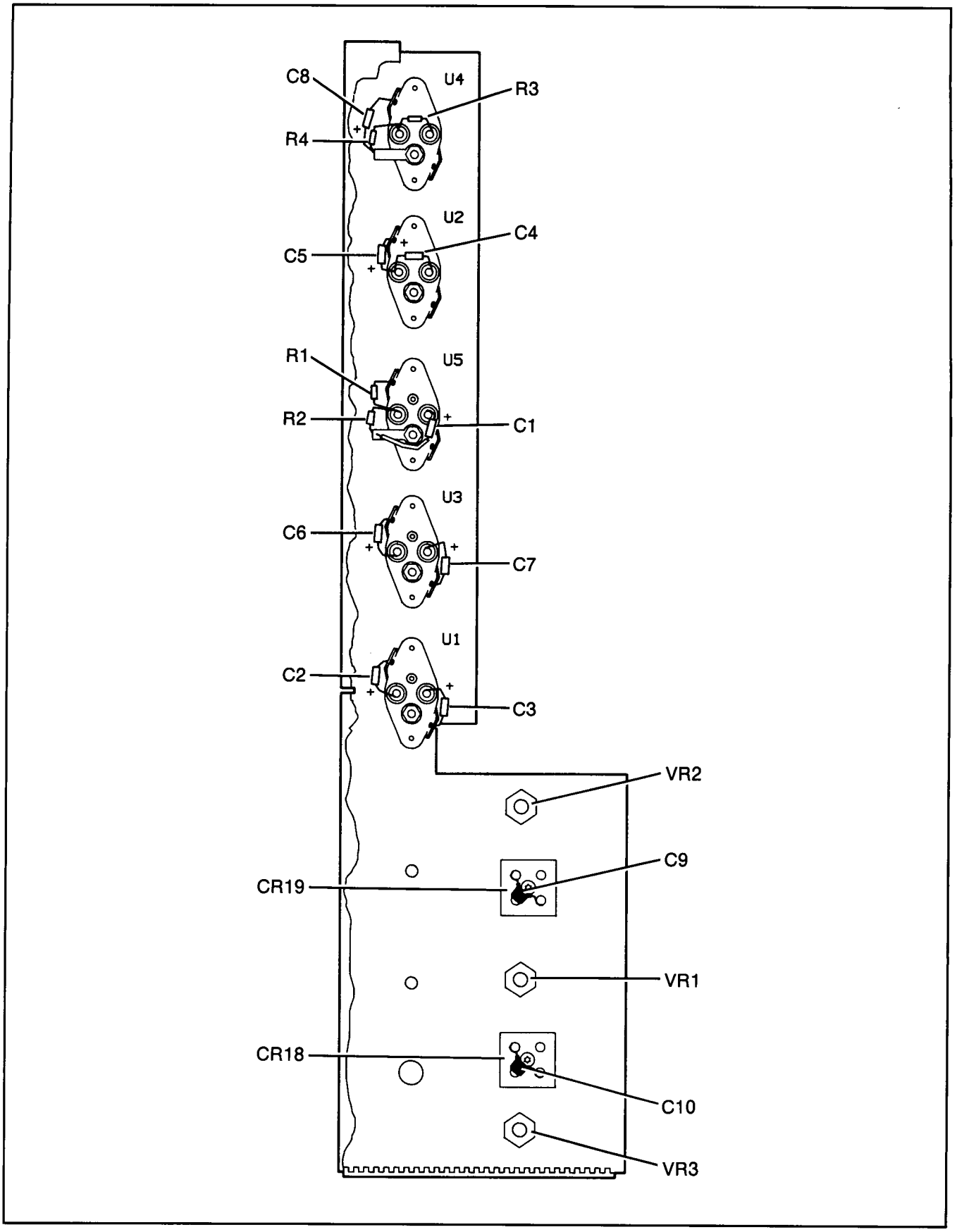
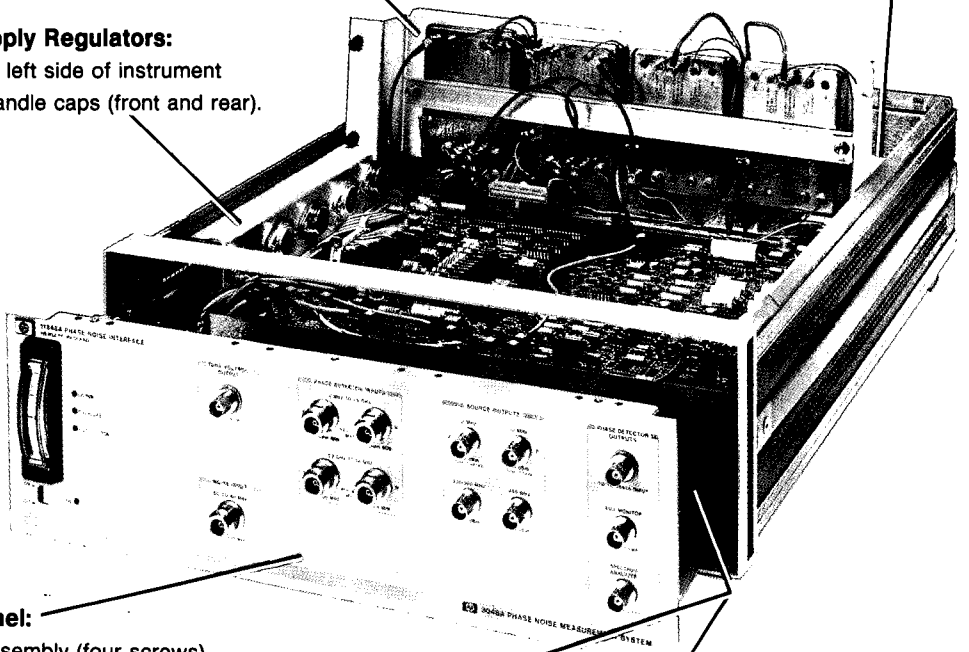


Figure 11. *Parts Identification (Regulator Assembly)*

To replace reference deck assembly:
Insert two small posts on right side of reference deck into bottom row of holes in top side rail. Line up black plastic plungers with their mounting holes. Press left side and plungers down into place.

To access A1 Assembly:
Pull up the two black plastic plungers on left side of reference deck and lift out reference deck assembly (A6-A9). Insert small post on right side of reference deck into hole in top row of side rail. Slide left side of reference deck into slot in bracket to stand upright.

To Access Power Supply Regulators:
Remove strap handle on left side of instrument (two screws). Remove handle caps (front and rear). Remove left side cover.



To close the front panel:
Replace shield on A4 Assembly (four screws). Align edges of deck with tracks in instrument and push front panel into place.

To remove A4 Assembly

1. Remove all flexible coax and ribbon cables.
2. Remove 5 screws mounting A4 Assembly to deck (3 screws, Option 201).
3. For Option 201 instruments remove semi-rigid cables W34, W35, right angle adapter, and two screws mounting mixer bracket.
4. Remove standoffs from four corners of A4 Assembly.
5. Disconnect semi-rigid cables W31 and W32 from their front panel connections J3 and J5.
6. Disconnect semi-rigid cable W30.

NOTE

J1 (TUNE VOLTAGE OUTPUT) and J11 (TO HP 3561A INPUT) are not connected to chassis ground.

To access A4 Assembly:
Remove plastic trim strip from top of front frame. Remove three screws in top of front frame. Remove three screws in bottom of front frame. Pull front panel out. Remove shield from A4 Assembly (four screws).

To replace A4 Assembly:
Reverse the order of the steps in the A4 removal procedure to replace the A4 Assembly.

Caution

The A4 Assembly should slide toward the rear of the instrument as this semi-rigid cable is loosened. If it does not, check to be sure that all mounting hardware (screws and standoffs) for A3 Assembly is removed.

HP 11848A Shown in Service Position

SCHEMATIC SYMBOLOGY AND SCHEMATIC DIAGRAM NOTES

Table 8 summarizes the symbology used in presenting many devices found in the instrument. The logic symbols used in this manual are based on the Institute of Electrical and Electronic Engineers (IEEE) in IEEE-STD 91-1984, *Graphic Symbols for Logic Functions*. This publication may be purchased from:

Institute of Electrical and Electronic Engineers
345 East 47th Street
New York, NY 10017

Table 8. *Schematic Diagram Notes (1 of 11)*

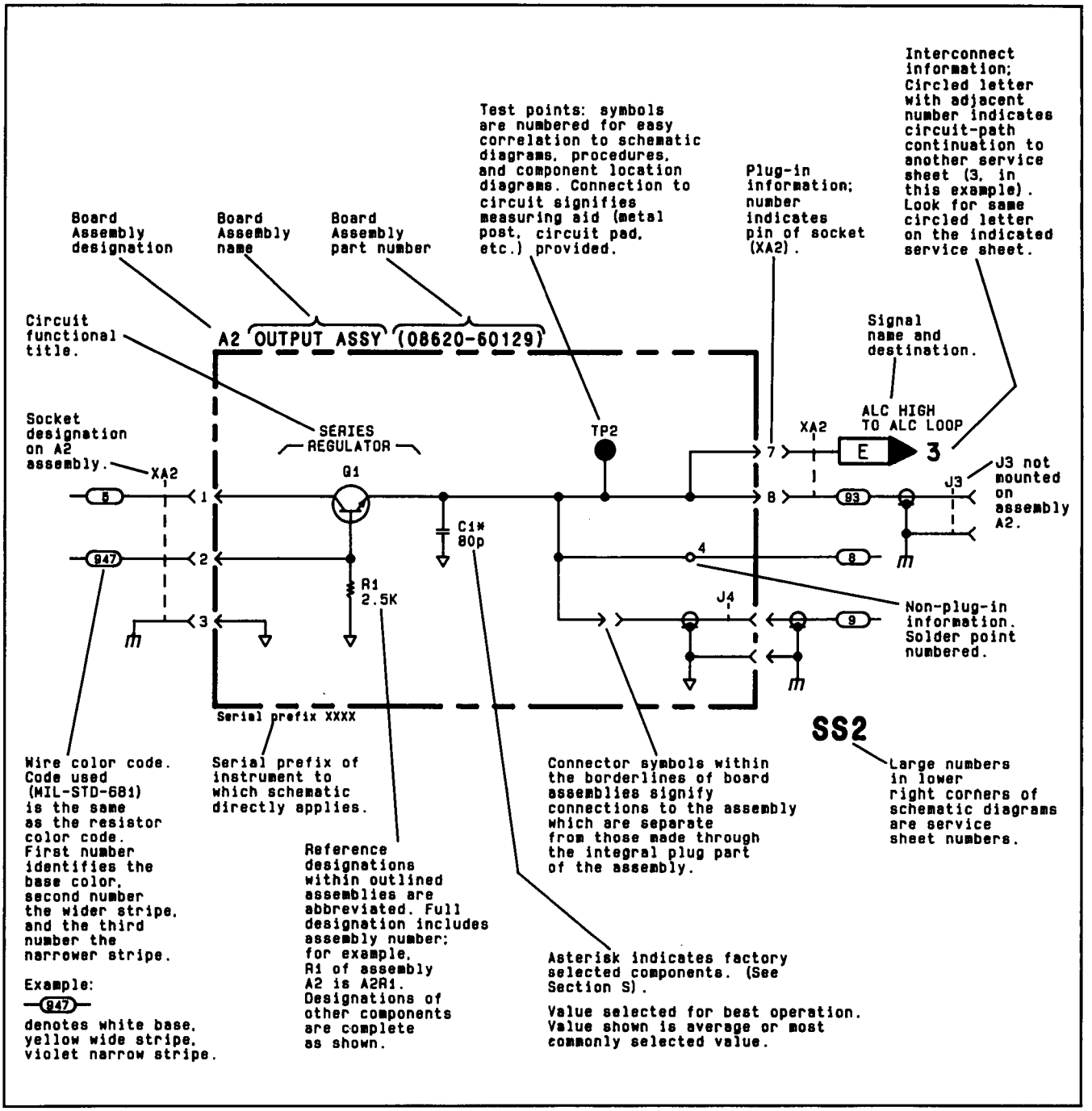


Table 8. *Schematic Diagram Notes (2 of 11)*

Values for all components are marked in units of farads, henries, and ohms unless otherwise specified.

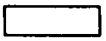
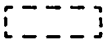
*	Asterisk denotes a factory-selected value. Value shown is typical. See Section V.
	Tool-aided adjustment.
	Encloses front-panel designation.
	Encloses rear-panel designation
	Circuit assembly borderline.
	Other assembly borderline.
	Heavy line with arrows indicates path and direction of main signal.
	Heavy dashed line with arrows indicates path and direction of main feedback.
	Indicates stripline (i.e., RF transmission line above ground).
	Wiper moves toward cw with clockwise rotation of control (as viewed from shaft or knob).
	Numbered Test Point measurement aid provided.
	Encloses wire or cable color code. Code used is the same as the resistor color code. First number identifies the base color, second number identifies the wider stripe, and the third number identifies the narrower stripe, e.g., (947) denotes white base, yellow wide stripe, violet narrow stripe.
	A direct conducting connection to earth, or a conducting connection to a structure that has a similar function (e.g., the frame of an air, sea, or land vehicle).
	A conducting connection to a chassis or frame.
	Common connections. All like-designation points are connected.
	Letter = off-page connection. Number = Service Sheet number for off-page connection. In the example, signal flow is continued on Service Sheet 12, at the point marked
	Number (only) = on-page connection.

Table 8. *Schematic Diagram Notes (3 of 11)*

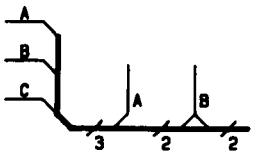
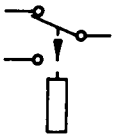
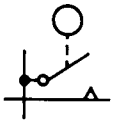
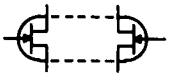
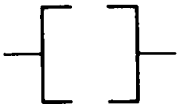
	Indicates multiple paths represented by only one line. Letters or names identify individual paths. Numbers indicate number of paths represented by the line.
	Coaxial or shielded cable.
	Ferrite bead. (Increases the self-inductance of the conductor passing through the bead.)
	Relay. Contact moves in direction of arrow when energized.
	Indicates a pushbutton switch with a momentary (ON) position.
	Feedthrough capacitor. (Acts as a feedthrough terminal when mounted on a chassis or a frame.)
	Indicates a PIN diode.
	Indicates a current regulation diode.
	Indicates a voltage regulation diode.
	Indicates a capacitive (varactor) diode.
	Indicates a Schottky (hot-carrier) diode.
	Light-emitting diode.
	Multiple transistors in a single package—physical location of the pins is shown in package outline on schematic.
	Identification of logic families as shown (in this case, ECL).

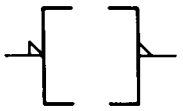
Table 8. Schematic Diagram Notes (4 of 11)

DIGITAL SYMBOLOGY REFERENCE INFORMATION

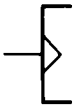
Input and Output Indicators



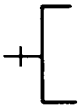
Implied Indicator—Absence of polarity indicator (see below) implies that the active state is a relative high voltage level. Absence of negation indicator (see below) implies that the active state is a relative high voltage level at the input or output.



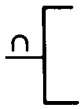
Polarity Indicator—The active state is a relatively low voltage level.



Dynamic Indicator—The active state is a transition from a relative low to a relative high voltage level.



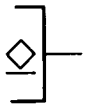
Inhibit Input—Input that, when active, inhibits (blocks) the active state outputs of a digital device.



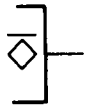
Analog Input—Input that is a continuous signal function (e.g., a sine wave).

Polarity Indicator used with Inhibit Indicator—Indicates that the relatively low level signal inhibits (blocks) the active state outputs of a digital device.

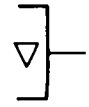
Output Delay—Binary output changes state only after the referenced input (m) returns to its inactive state (m should be replaced by appropriate dependency or function symbols).



Open Collector Output.



Open Emitter Output.



Three-state Output—Indicates outputs can have a high impedance (disconnect) state in addition to the normal binary logic states.

Table 8. *Schematic Diagram Notes (5 of 11)*

DIGITAL SYMBOLOGY REFERENCE INFORMATION

Combinational Logic Symbols and Functions

Σ	Summing Junction—Outputs added together at a common point.
&	AND—All inputs must be active for the output to be active.
≥1	OR—One or more inputs being active will cause the output to be active.
≥m	Logic Threshold—m or more inputs being active will cause the output to be active (replace m with a number).
=1	EXCLUSIVE OR—Output will be active when one (and only one) input is active.
=m	m and only m—Output will be active when m (and only m) inputs are active (replace m with a number).
=	Logic Identity—Output will be active only when all or none of the inputs are active (i.e., when all inputs are identical, output will be active).
	Amplifier—The output will be active only when the input is active (can be used with polarity or logic indicator at input or output to signify inversion).
X/Y	Signal Level Converter—Input level(s) are different than output level(s).
	Bilateral Switch—Binary controlled switch which acts as an on/off switch to analog or binary signals flowing in both directions. Dependency notation should be used to indicate affecting/affected inputs and outputs. Note: amplifier symbol (with dependency notation) should be read to indicate unilateral switching.
X→Y	Coder—Input code (X) is converted to output code (Y) per weighted values or a table.
(Functional Labels)	The following labels are to be used as necessary to ensure rapid identification of device function.
MUX	Multiplexer—The output is dependent only on the selected input.
DEMUX	Demultiplexer—Only the selected output is a function of the input.
CPU	Central Processing Unit

Table 8. Schematic Diagram Notes (6 of 11)

DIGITAL SYMBOLOGY REFERENCE INFORMATION

Sequential Logic Functions

1 	Monostable—Single shot multivibrator. Output becomes active when the input becomes active. Output remains active (even if the input becomes inactive) for a period of time that is characteristic of the device and/or circuit.
G 	Oscillator—The output is a uniform repetitive signal which alternates between the high and low state values. If an input is shown, then the output will be active if an only if the input is in the active state.
FF	Flip-Flop—Binary element with two stable states, set and reset. When the flip-flop is set, its outputs will be in their active states. When the flip-flop is reset, its outputs will be in their inactive states.
T	Toggle Input—When active, causes the flip-flop to change states.
S	Set Input—When active, causes the flip-flop to set.
R	Reset Input—When active, causes the flip-flop to reset.
J	J Input—Analogous to set input.
K	K Input—Analogous to reset input.
D	Data Input—Always enabled by another input (generally a C input—see Dependency Notation). When the D input is dependency-enabled, a high level at D will set the flip-flop; a low level will reset the flip-flop. Note: strictly speaking, D inputs have no active or inactive states—they are just enabled or disabled.
+m	Count-Up Input—When active, increments the contents (count) of a counter by "m" counts (m is replaced with a number).
−m	Count-Down Input—When active, decrements the contents (count) of a counter by "m" counts (m is replaced with a number).
→m	Shift Right (Down) Input—When active, causes the contents of a shift register to shift to the right or down "m" places (m is replaced with a number).
←m	Shift Left (Up) Input—When active, causes the contents of a shift register to shift to the left or up "m" places (m is replaced with a number).

NOTE

For the four functions shown above, if m is one, it is omitted.

(Functional Labels)	The following functional labels are to be used as necessary in symbol build-ups to ensure rapid identification of device function.
mCNTR	Counter—Array of flip-flops connected to form a counter with modules m (m is replaced with a number that indicates the number of states: 5 CNTR, 10 CNTR, etc.).

Table 8. Schematic Diagram Notes (7 of 11)

DIGITAL SYMBOLOGY REFERENCE INFORMATION

Sequential Logic Functions (Cont'd)

REG	Register—Array of unconnected flip-flops that form a simple register or latch.
SREG	Shift Register—Array of flip-flops that form a register with internal connections that permit shifting the contents from flip-flop to flip-flop.
ROM	Read Only Memory—Addressable memory with read-out capability only.
RAM	Random Access Memory—Addressable memory with read-in and read-out capability.

Dependency Notation

Cm	Control Dependency—Binary affecting input used where more than a simple AND relationship exists between the C input and the affected inputs and outputs (used only with D-type flip-flops).
Gm	Gate (AND) Dependency—Binary affecting input with an AND relationship to those inputs or outputs labeled with the same identifier. The m is replaced with a number or letter (the identifier).
Vm	OR Dependency—Binary affecting input with an OR relationship to those inputs or outputs labeled with the same identifier. The m is replaced with a number or the letter (the identifier).
mAm	Address Dependency—Binary affecting inputs of affected outputs. The m prefix is replaced with a number that differentiates between several address inputs, indicates dependency, or indicates demultiplexing of address inputs and outputs. The m suffix indicates the number of cells that can be addressed.
ENm	Enable Dependency—Binary affecting input which, when active enables all outputs. When inactive open-collector and open-emitter outputs are off, and three-state outputs are at an external high impedance state. When the enable input affects only certain inputs and outputs, they will be numbered to indicate the logic connection.
Xm	Transmission Dependency—Binary affecting input which bidirectionally connects dependent inputs and outputs.
Mm	Mode Dependency—Binary affecting input used to indicate that the effects of particular inputs and outputs of an element depend on the mode in which the element is operating. The m is replaced with a number or letter (the identifier).
Zm	Interconnection Dependency—Indicates the existence of internal logic connections between inputs, outputs, internal inputs, and/or internal outputs. The m is replaced with a number (the identifier).
,	Comma—AND Function.
/	Slant—OR Function.

NOTE

The identifier (m) is omitted if it is one—that is, when there is only one dependency relationship of that kind in a particular device. When this is done, the dependency indicator itself (G, C, EN, or V) is used to prefix or suffix the affected (dependent) input or output.

Table 8. Schematic Diagram Notes (8 of 11)

DIGITAL SYMBOLOGY REFERENCE INFORMATION

Miscellaneous

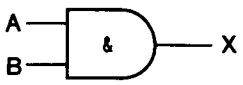
Schmitt Trigger—Input characterized by hysteresis; one threshold for positive going signals and a second threshold for negative going signals.

Active

Active State—A binary physical or logical state that corresponds to the true state of an input, an output, or a function. The opposite of the inactive state.

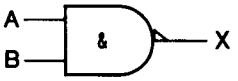
Table 8. *Schematic Diagram Notes (9 of 11)*

AND GATE



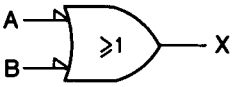
A	B	X
H	H	H
H	L	L
L	H	L
L	L	L

NAND GATE

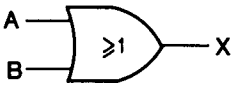


A	B	X
H	H	L
H	L	H
L	H	H
L	L	H

OR GATE WITH INVERTED INPUTS

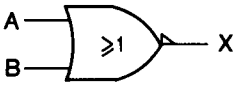


OR GATE



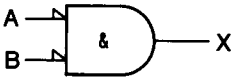
A	B	X
H	H	H
H	L	H
L	H	H
L	L	L

NOR GATE

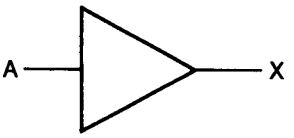


A	B	X
H	H	L
H	L	L
L	H	L
L	L	H

AND GATE WITH INVERTED INPUTS

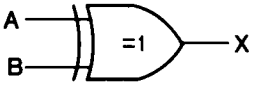


BUFFER

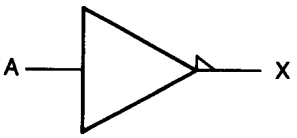


A	X
H	H
L	L

EXCLUSIVE-OR GATE



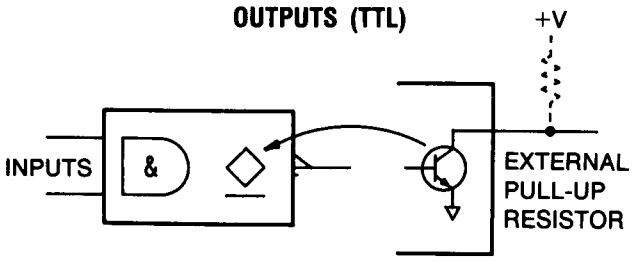
A	B	X
H	H	L
H	L	H
L	H	H
L	L	L



A	X
H	L
L	H

INVERTER

OPEN COLLECTOR OUTPUTS (TTL)



OPEN EMITTER OUTPUTS (ECL)

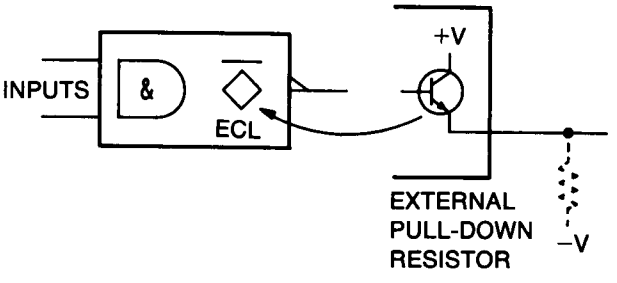
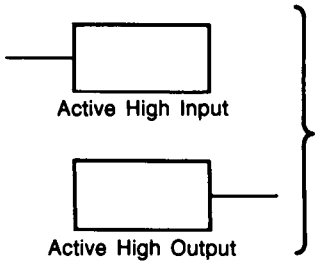
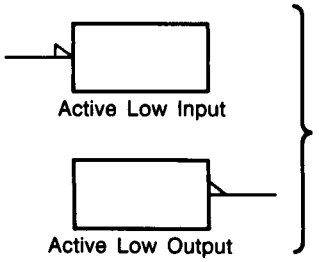


Table 8. *Schematic Diagram Notes (10 of 11)*

ACTIVE LEVELS

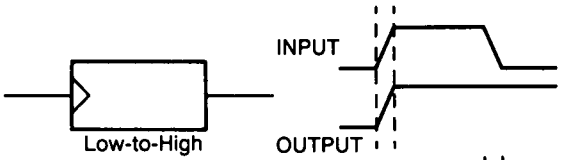


ACTIVE HIGH inputs and outputs are indicated by the absence of the polarity indicator symbol.

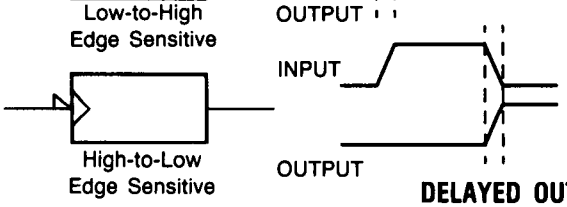


ACTIVE LOW inputs and outputs are indicated by the presence of the polarity indicator symbol (▷).

EDGE SENSITIVE INPUTS

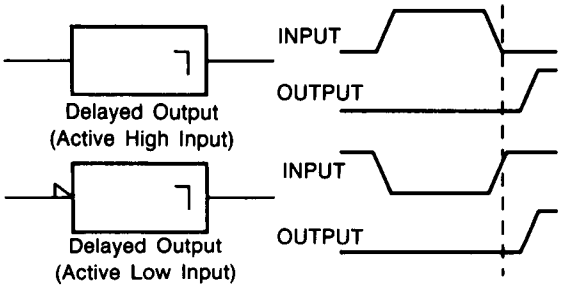


EDGE SENSITIVE (low-to-high) inputs are indicated by the presence of the dynamic indicator symbol (—▷).



EDGE SENSITIVE (high-to-low) inputs are indicated by the presence of both the dynamic indicator and the polarity indicator symbols (—▷).

DELAYED OUTPUT RESPONSE



OUTPUT DELAY indicator symbol (⌝) shows that the output becomes effective *after* the input signal returns to its inactive state.

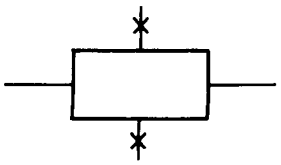
INHIBIT INPUTS

INHIBIT indicator symbol (+) indicates an input that, when active, inhibits (blocks) the output(s) from achieving their active states (the outputs remain inactive).

ANALOG LINES

ANALOG indicator symbol (∩) indicates a line that has an analog input or output.

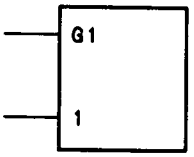
NONLOGIC CONNECTION



The Nonlogic Connection symbol (X) indicates a connection that does not carry any logic information.

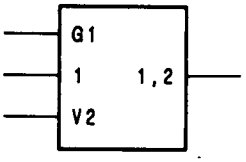
Table 8. *Schematic Diagram Notes (11 of 11)*

AND



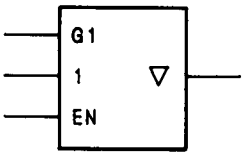
The input that controls or gates other inputs is labeled with a C or a G, followed by an identifying number.
The controlled or gated input or output is labeled with the same number. In this example, 1 is controlled by G1.

OR



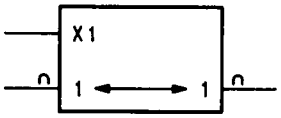
When a V input is active, the output will be in its active state. With the V input inactive, the device functions as if the V input doesn't exist.

ENABLE



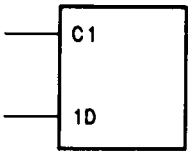
When the EN input is active, the output is enabled to function normally. When the EN input is inactive, the three-state output (▽), in this case, becomes a high impedance, effectively removing that device from the circuit.

TRANSMISSION

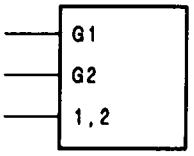


When the X1 input is active, the associated input-output pair are bi-directionally connected together. When X1 is inactive, the connection is broken.

CONTROL

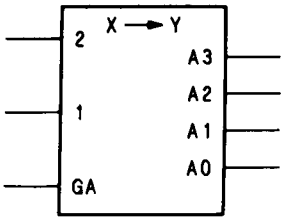


When the controlled or gated input or output already has a functional label (D is used here), that label will be prefixed by the identifying number.



If the input or output is affected by more than one gate or control input, then the identifying numbers of each gate or control input will appear separated by commas.

ADDRESS



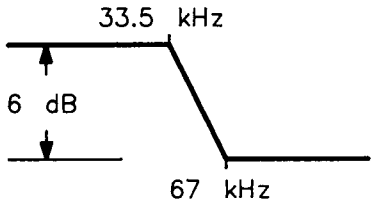
When GA is active, the active address line (0 through 3) is the decoded value of the 1 and 2 binary inputs. When the controlled address lines have a functional value, that value will be prefixed by the identifying letter.

Table 9. *Cross Reference Index*

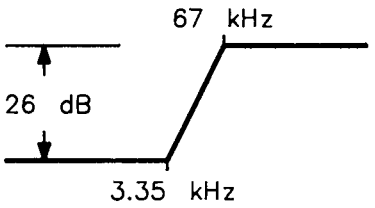
Reference Designator	Assembly Name	Schematic Service Sheet Number	Parts List Page No.
A1	HP-IB Interfacing/Power Supply Assembly	A1a, A1b	27
A2	LED Assembly	A4b	30
A3	Analyzer Interface Assembly	A3a, A3b, A3c	31
A4	Phase Detector Assembly	A4a, A4b, A4c, A4d	39
A5	Not Assigned		
A6	10 MHz VCXO A Assembly	A6	51
A7	10 MHz Modulated VCXO B Assembly	A7	54
A8	350-500 MHz VCO Assembly	A8	57
A9	400 MHz Oscillator Assembly	A9	59
A10	Line Power Module	A1b	61
A11	HP-IB Connector Assembly	A1a	62
A12	LNA2 Assembly	A12	62.1

1. Switches on tlhe Block Diagram are shown in their HP-IB preset state. At Interface turn-on with no controller connected, the power-up state is the same as the HP-IB preset state except:
   a. ATTEN 1 is set to an open-circuit (non-programmable) state, and
   b. the switches of cluster S5 through S8 are all open.

2. The transfer function of GAIN 2 also has a lead-lag response as follows:



3. The transfer function of Lag-Lead Network 1 is as follows:



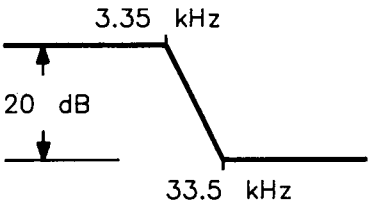
   To this transfer function is added a programmable lag-lead with the following poles and zeros:

Lag-Lead Number	Pole Frequency	Zero Frequency	Attenuation
0	4.82 Hz	9.95 Hz	6 dB
1	8.01 Hz	40.1 Hz	14 dB
2	9.17 Hz	115.9 Hz	22 dB
3	9.68 Hz	306 Hz	30 dB
4	9.95 Hz	784 Hz	38 dB
5	9.95 Hz	1.985 kHz	46 dB
6	9.95 Hz	5.00 kHz	54 dB
7	9.95 Hz	12.58 kHz	62 dB

4. Assemblies A6, A8, and A9 are controlled as follows:

Control Line	State		
	A6	A8	A9
L17	Off	On	On
L18	Off	On	Off
L17, L18	On	Off	Off

5. The transfer functions of Lag-Lead Network 2 on A4 and the Lag-Lead Network on A3 are both as follows:



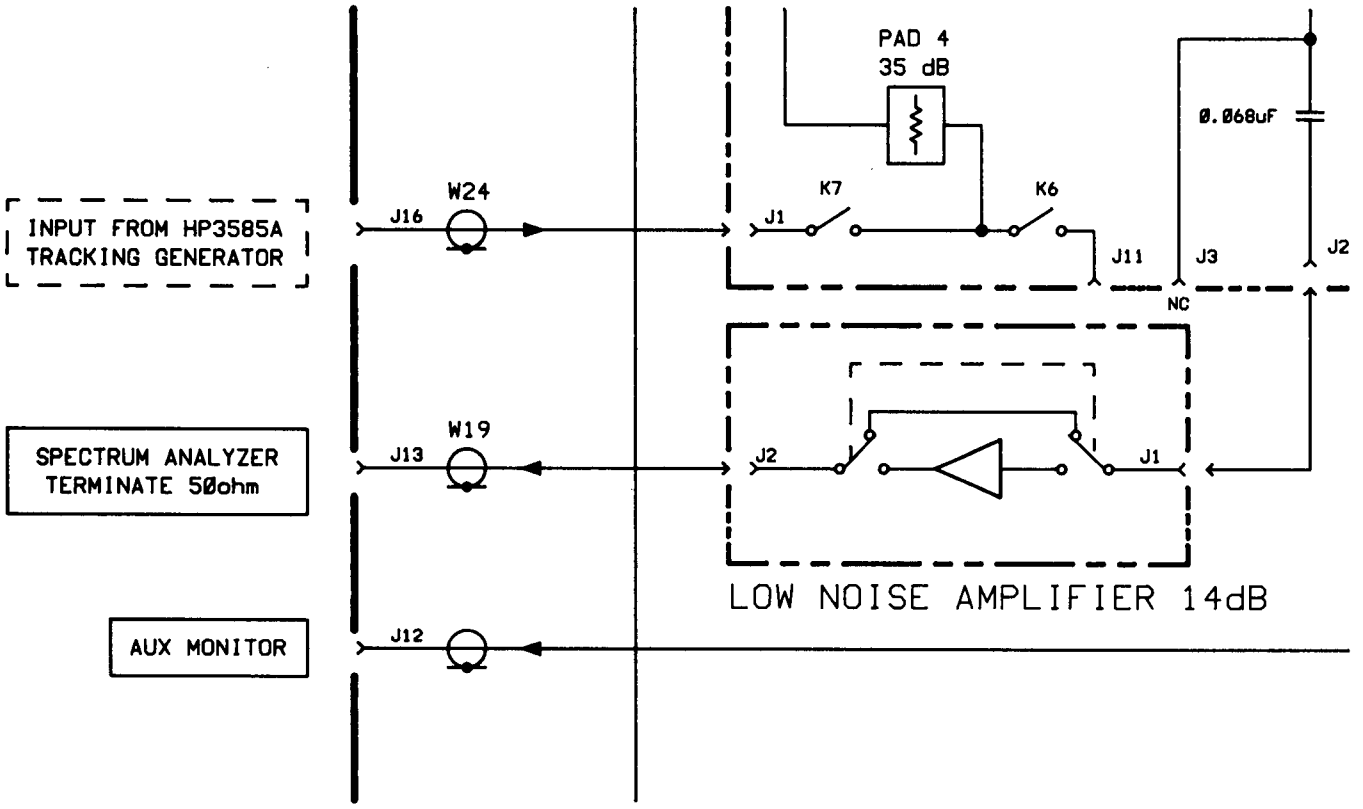
6. The passband gain of the High-Pass Filters is 2 (as measured from TP17 to the respective filter output). The gain settings of the GAIN 3 amplifier and attenuator include the passband gain of the High-Pass Filters.

Block Diagram Notes

CHANGES

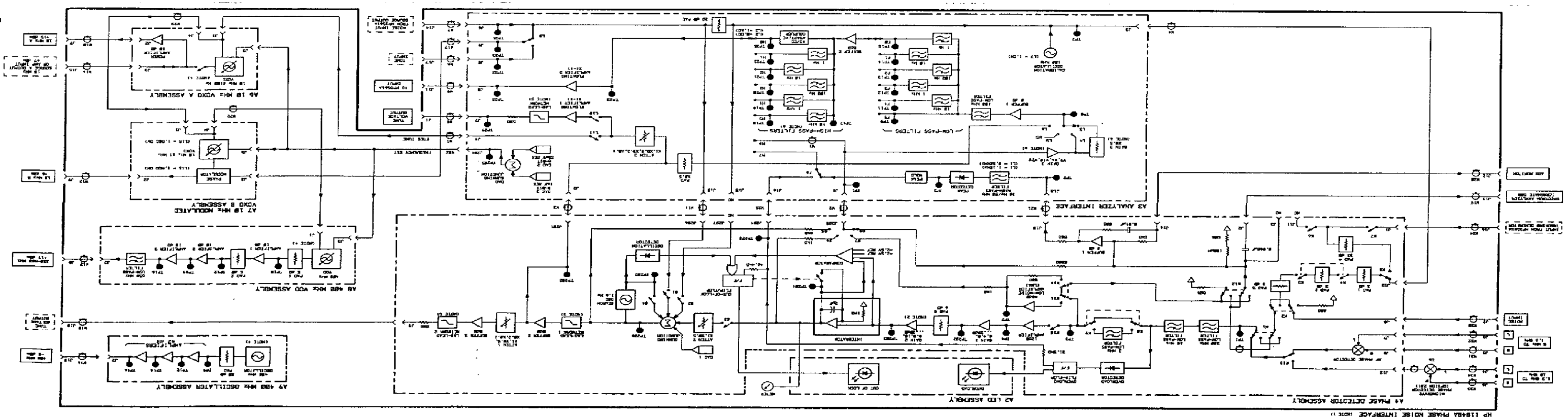
2938A and above	**On the schematic:** • Use the block diagram partial on page 90.3.

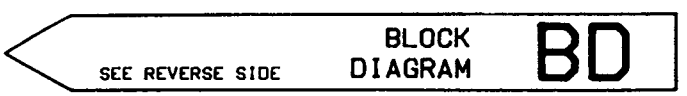
Reserved for future changes



BD1 Block Diagram Partial

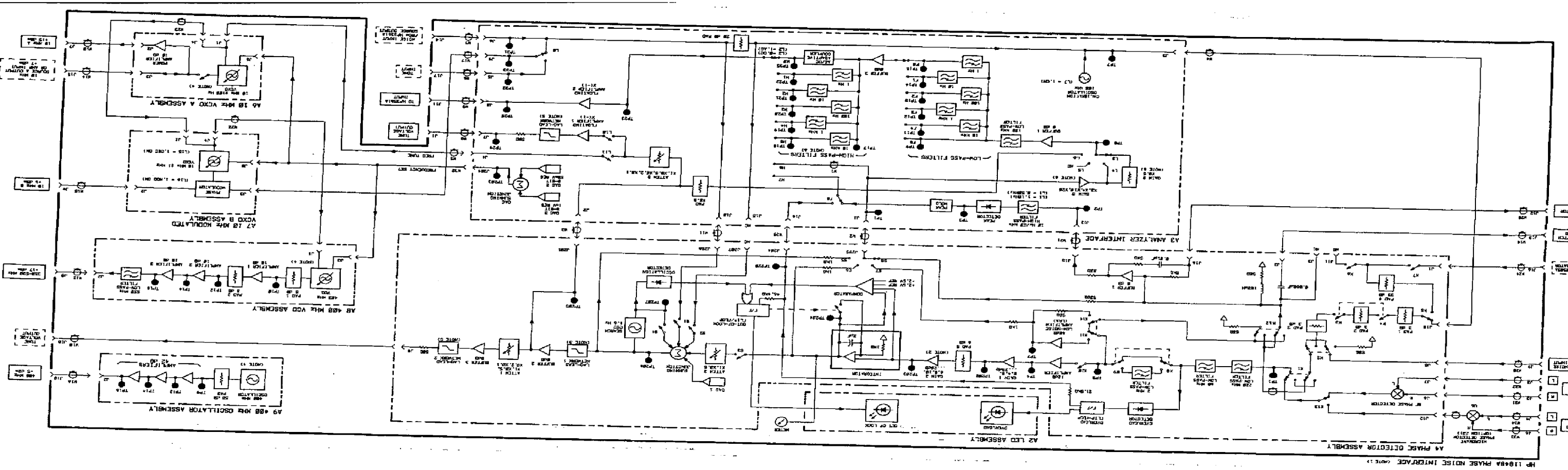
BD1

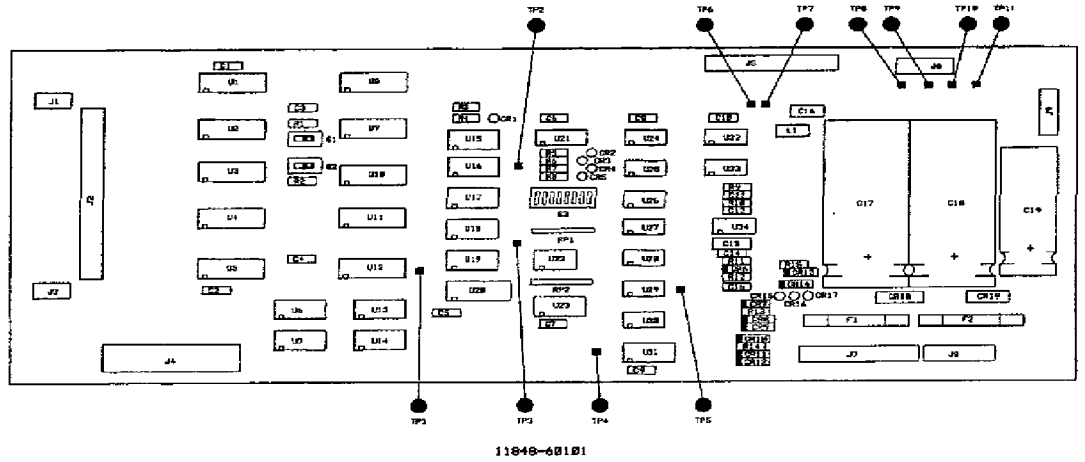




BLOCK DIAGRAM

801





Component Locator

Component Locator Drawing

BLOCK DIAGRAM BD1

CHANGES

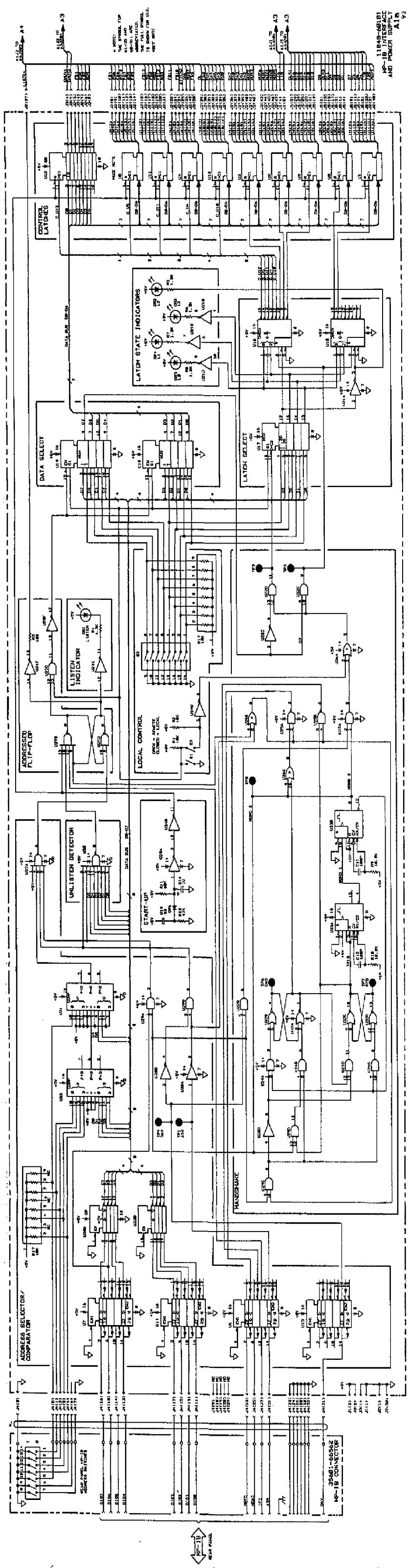
All serial prefixes

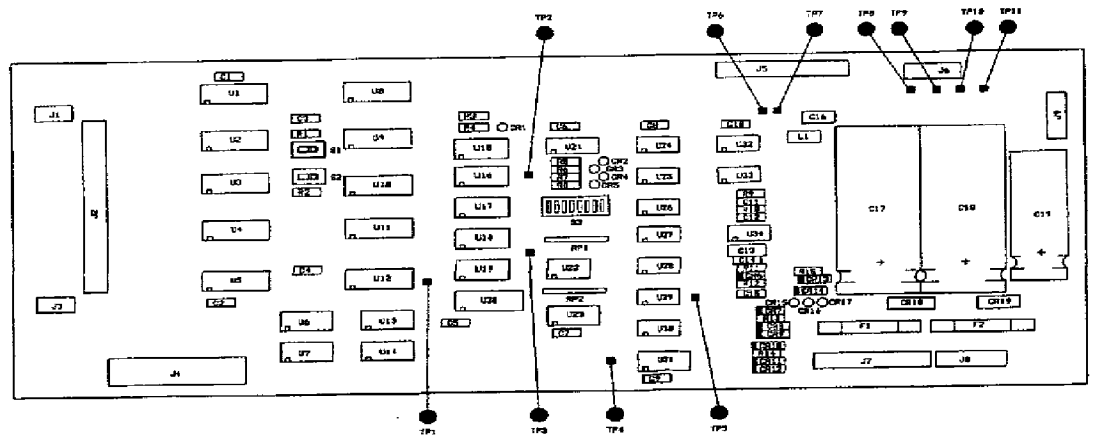
On the A1 component locator:

- A1S1, S2, S3 - Delete S1, S2, S3. At serial prefix 2720A A1S1, S2, and S3 were removed. These switches are not used (open) and could cause the instrument to fail or malfunction if improperly set. Any or all of the switches may be removed without affecting the operation of the instrument.

On the A1 schematic:

- A1S1, S2, S3 - Delete S1, S2 and S3. At serial prefix 2720A A1S1, S2, and S3 were removed. These switches are not used (open) and could cause the instrument to fail or malfunction if improperly set. Any or all of the switches may be removed without affecting the operation of the instrument.





Component Locator

Component Locator Drawing

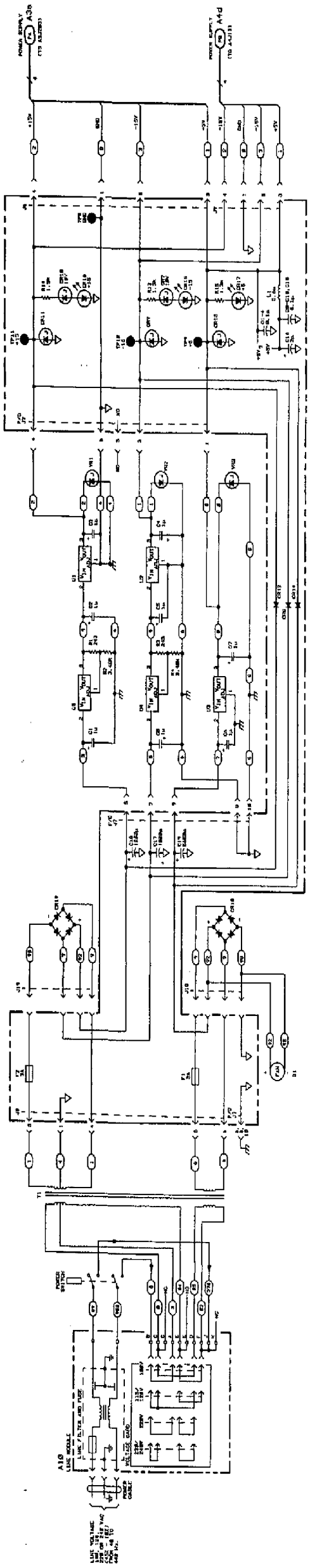
P/O A1 SEE REVERSE SIDE HPIB INTERFACE **A1a**

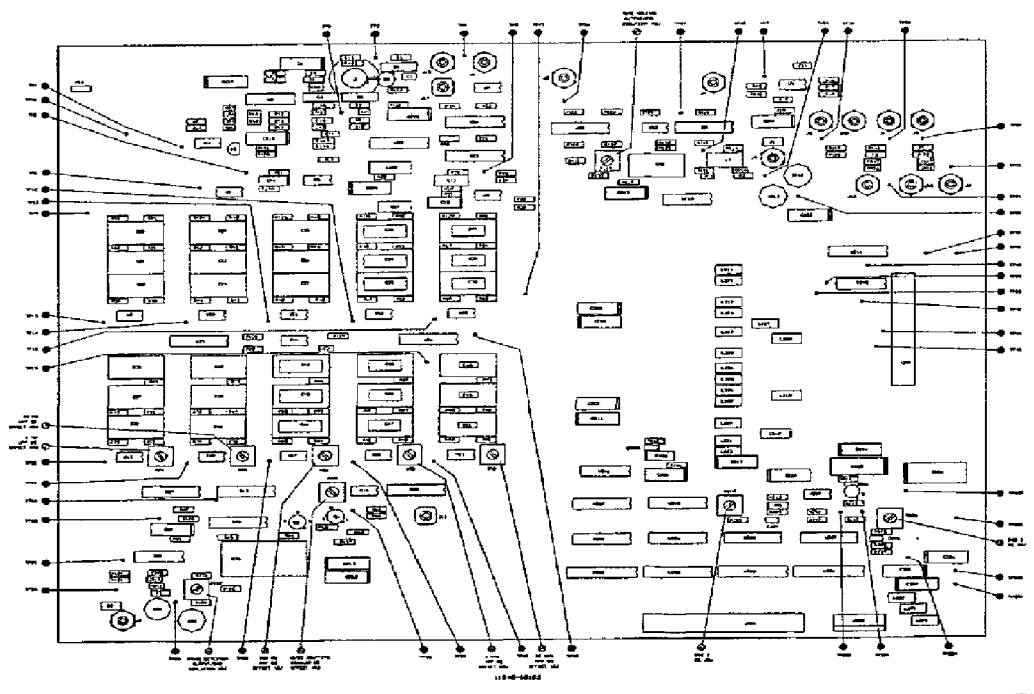
CHANGES

All serial prefixes

On the A1b schematic:

- J18, J19 - Change the reference designator J18 to CR18J18 and change the reference designator J19 to CR19J19.





Component Locator

Component Locator Drawing

P/O A1 SEE REVERSE SIDE POWER SUPPLY A1b

CHANGES

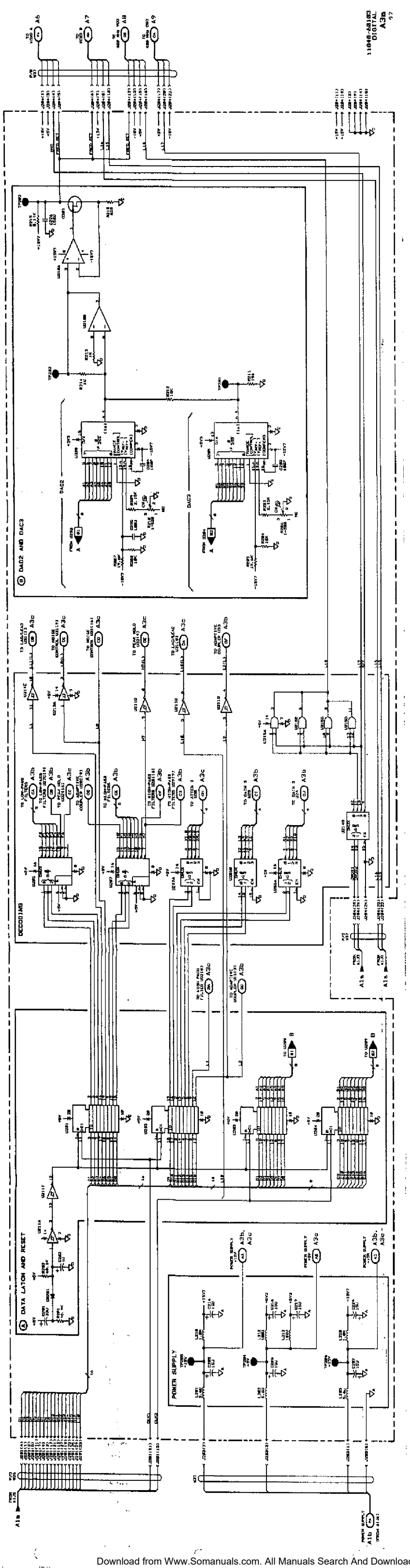
2749A and Above

On the A3 component locator:

- A3R208 - Change R208 to VR1.

On the A3 schematic:

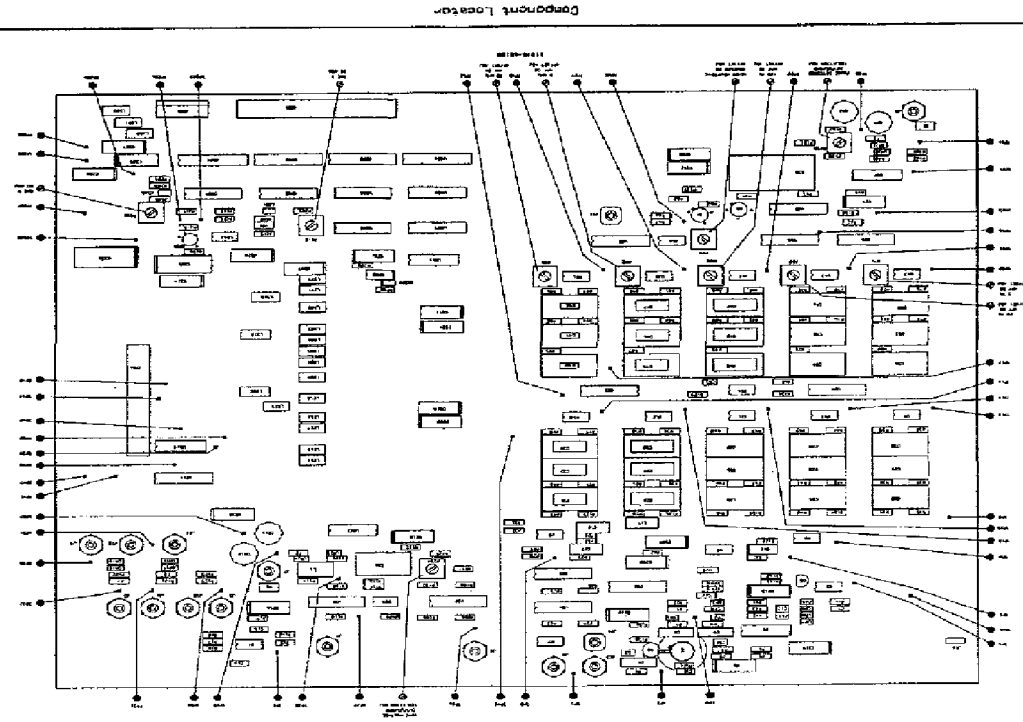
- A3R207, R208, R209 - Change the value of R207 to 1.33k. Change the value of R209 to 2.61k. Change R208 to VR1; connect the anode to ground and the cathode to the line connecting R207 and pin 15 of U208.

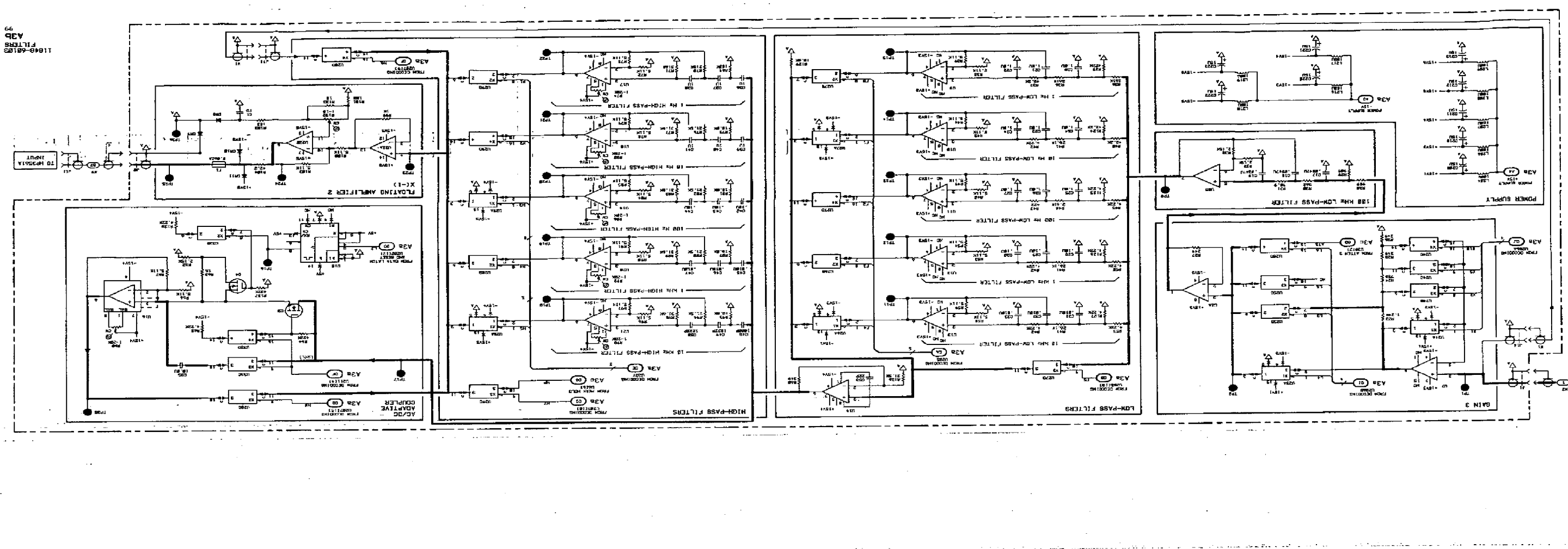


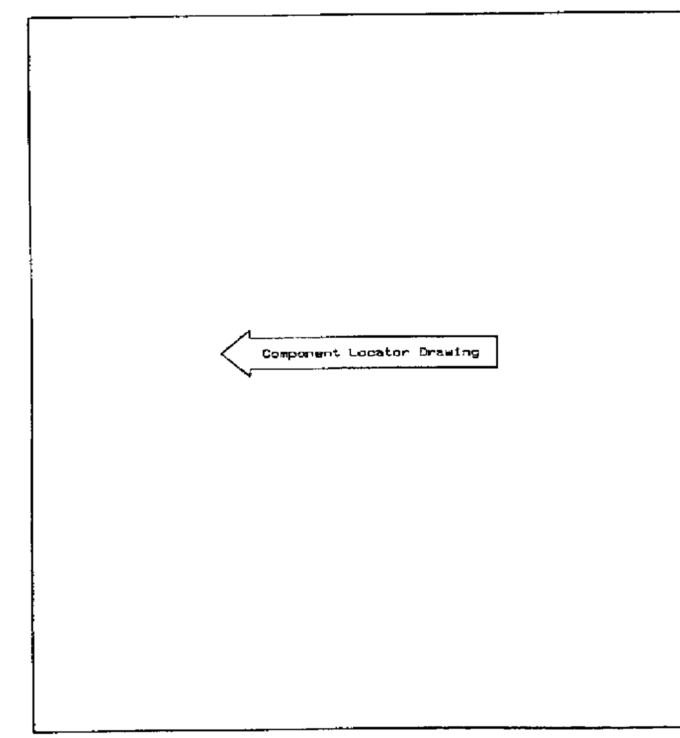
A3a DIGITAL P/O A3

Component Locator Drawing

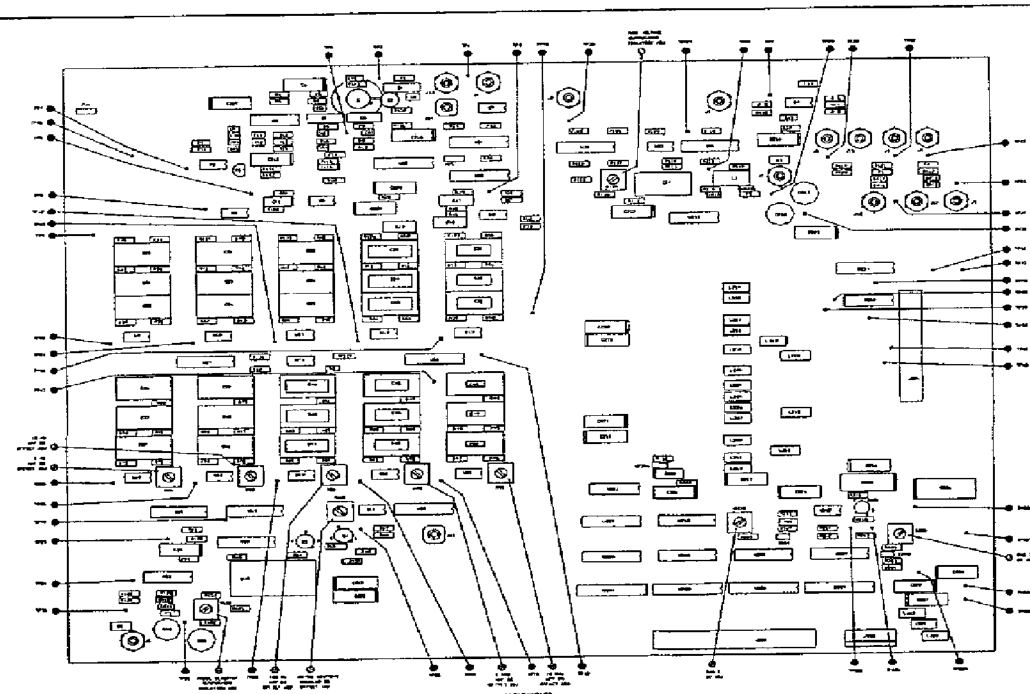
Component Locator







P/O A3 FILTERS A3b
SEE REVERSE SIDE



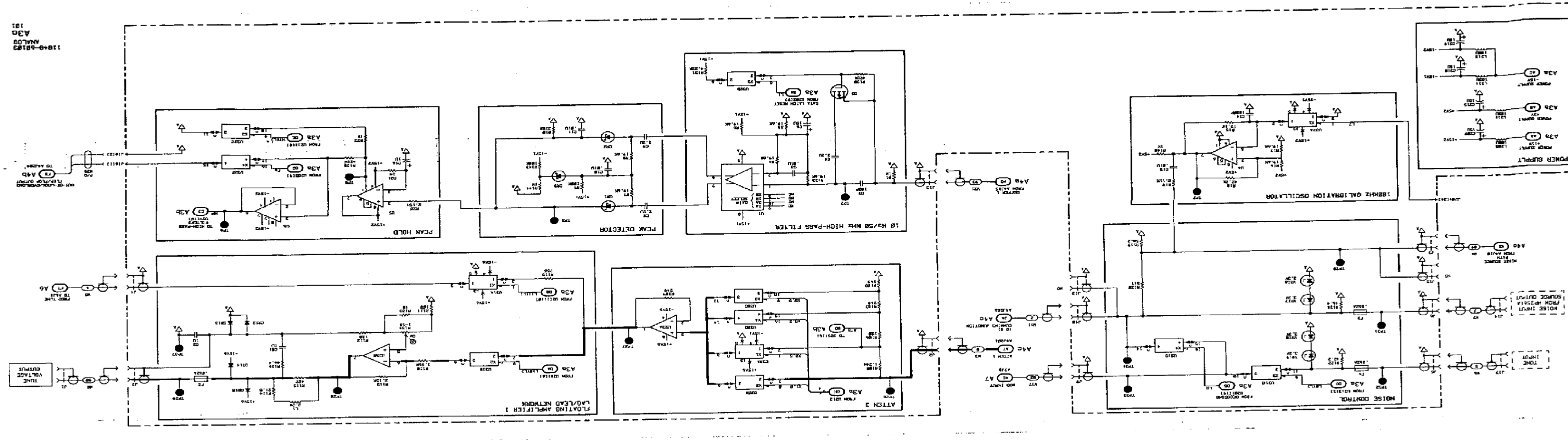
Component Locator

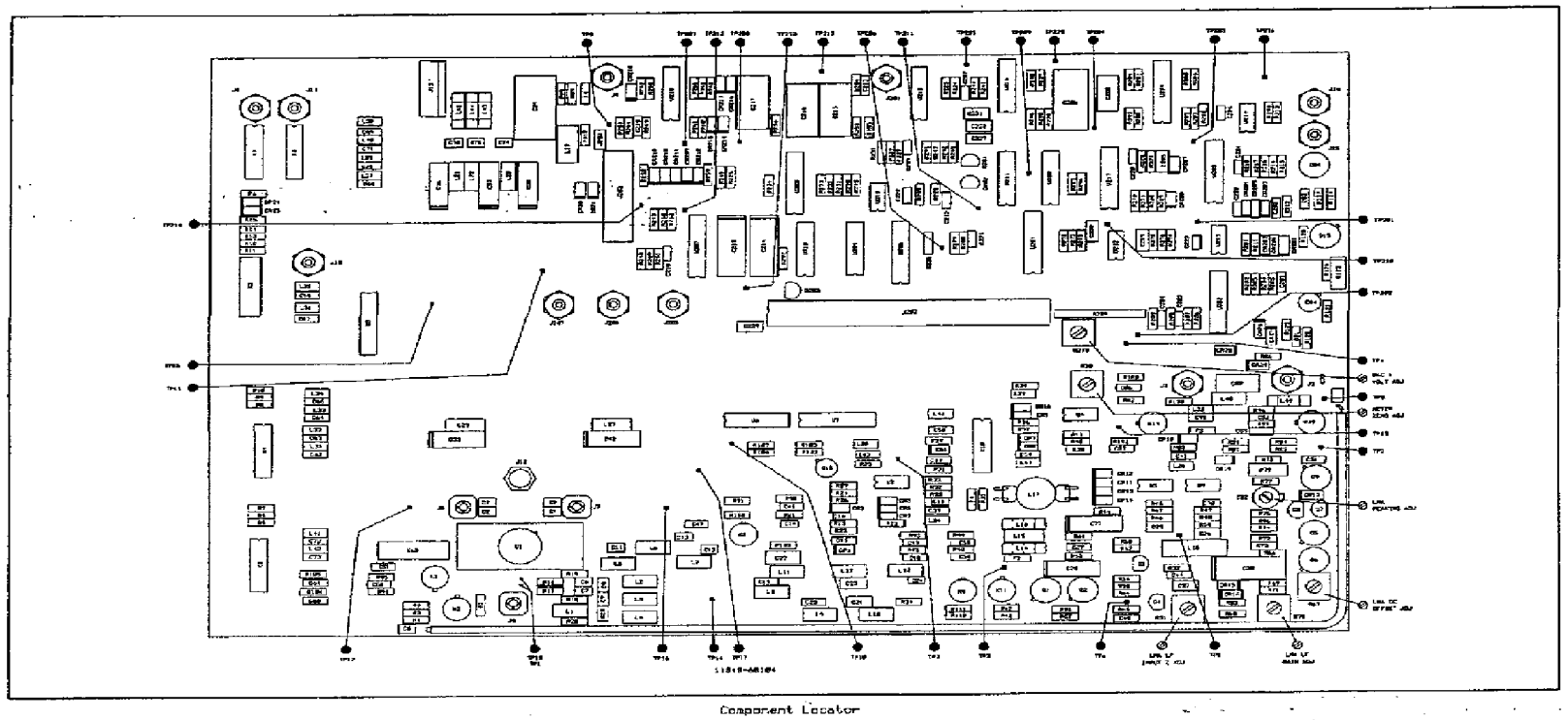
CHANGES

2717A and above

On the A3 schematic:

- A3R110, R113 - Change the value of R110 to 2.5k. Change the value of R113 to 2.61k.





Component Locator

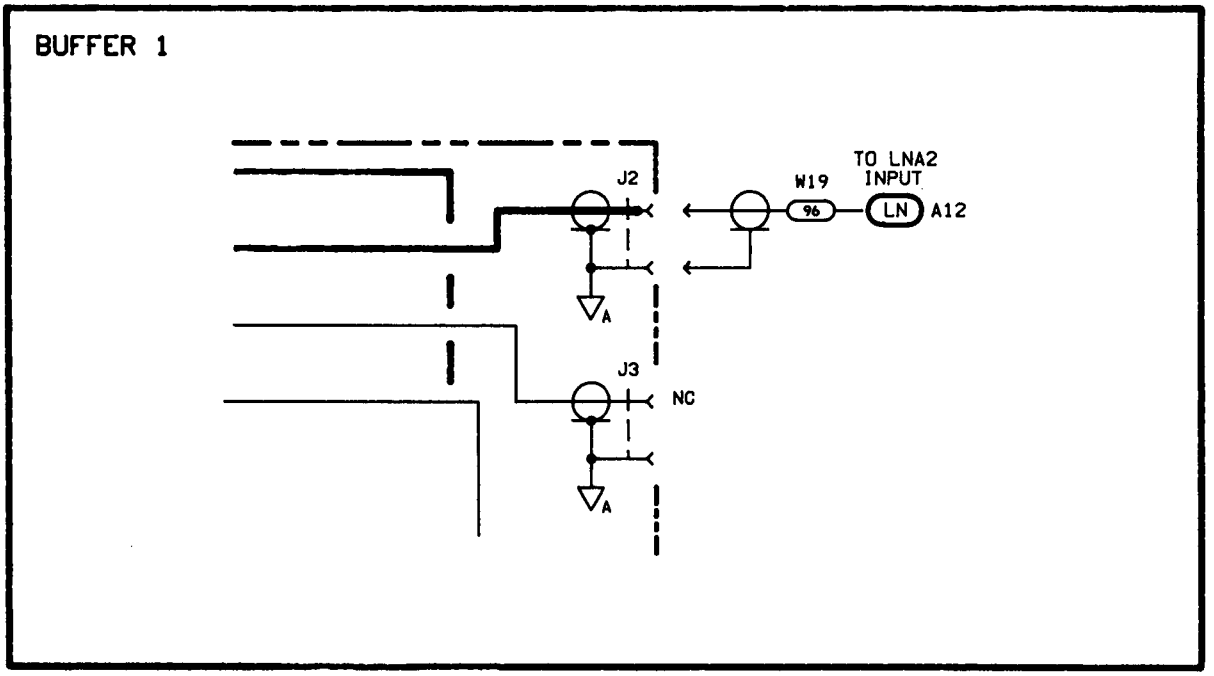
Component Locator Drawing

P/O A3
SEE REVERSE SIDE
ANALOG
A3c

CHANGES

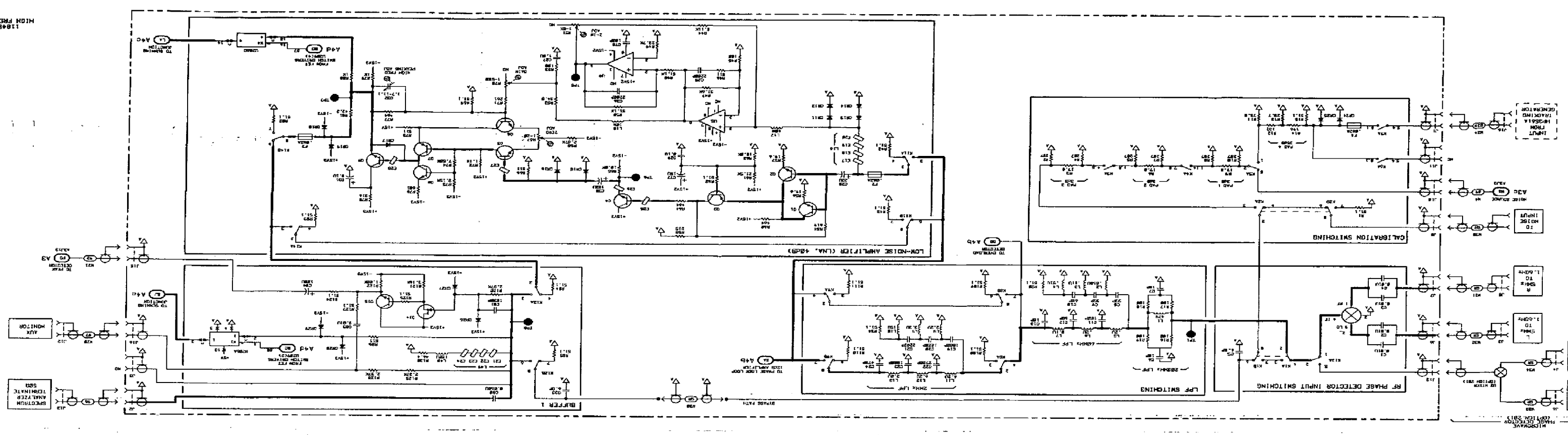
All serial prefixes	**On the A4 schematic:** • **R44** - Change the value of R44 to 7.5k ohms.
2830A and above	**On the schematic:** • **R86** - In the upper left hand corner of the A4a schematic change the value of R86 to 1K ohm.
2938A and above	**On the schematic:** • Use the schematic partial on page 102.3.

Reserved for future changes

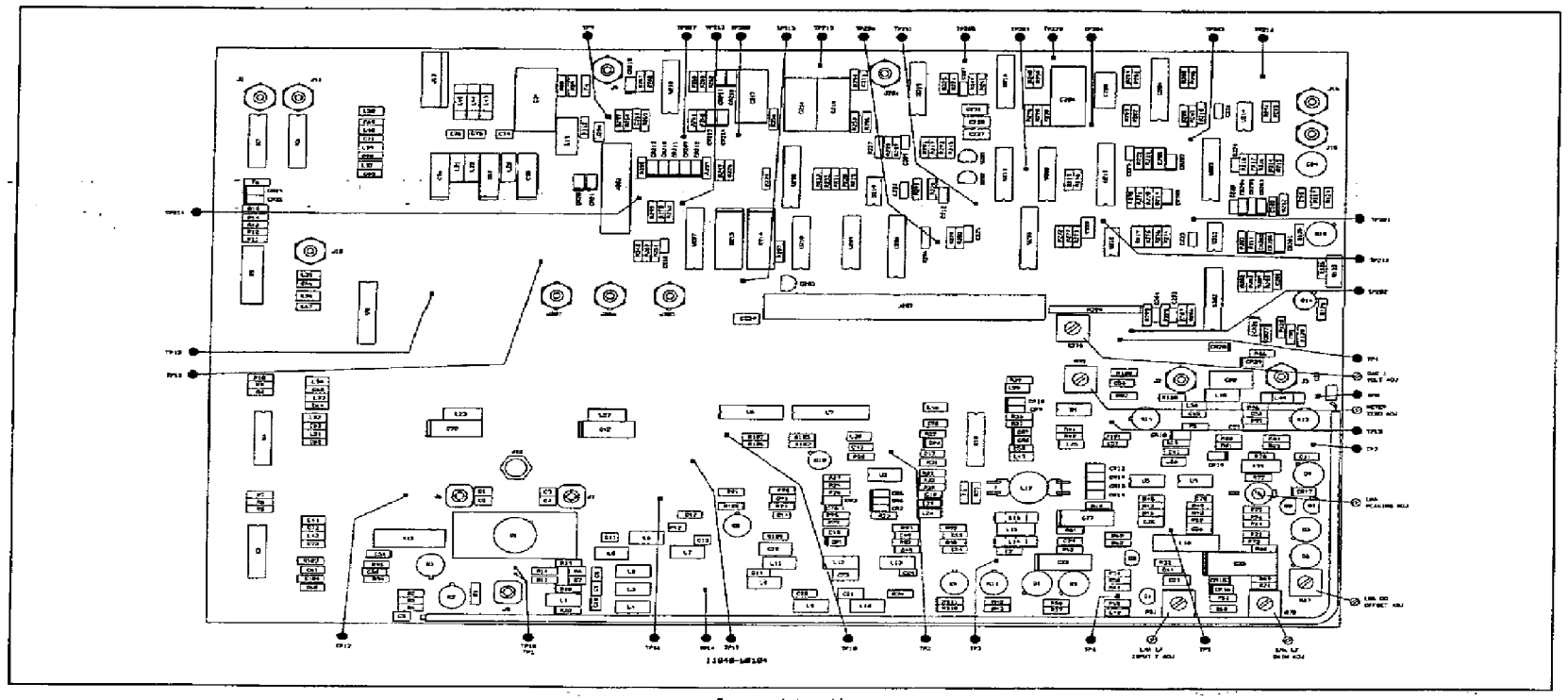


A4a Schematic Partial

A4a



11848-60104
HIGH FREQUENCY
A4a
103



Component Locator

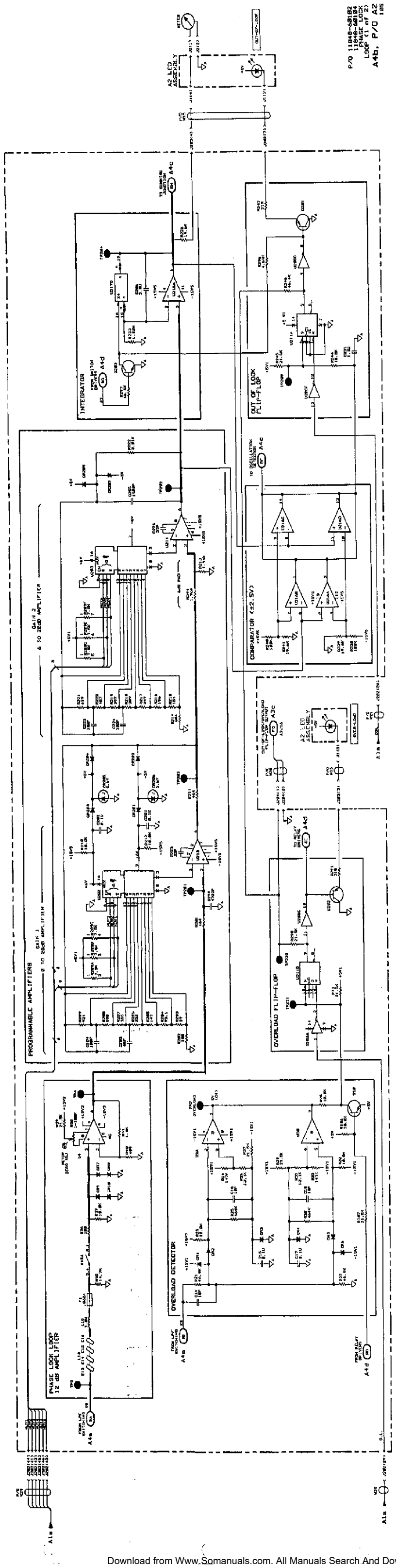
Component Locator Drawing

P/O A4 SEE REVERSE SIDE — HIGH FREQUENCY — A4a

CHANGES

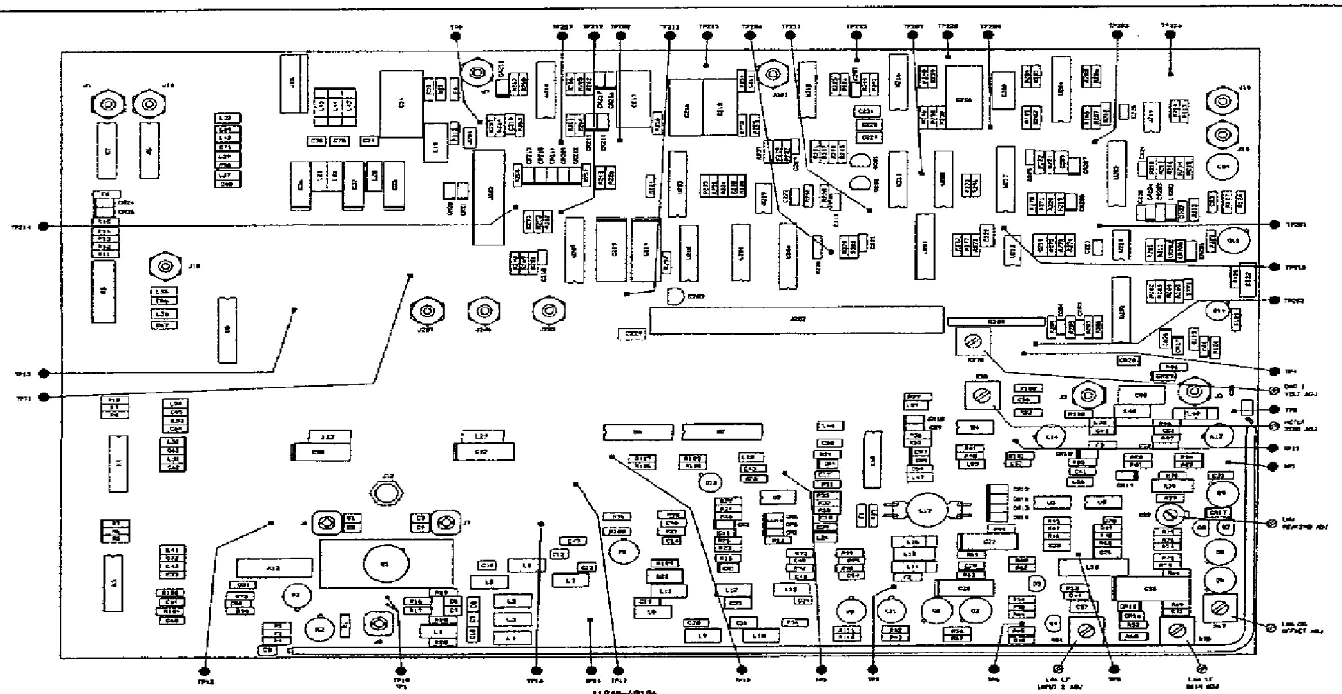
2830A and above	On the schematic: • L15 - In the upper right hand corner of the A4b schematic change the value of L15 to 100UH. • R35 - In the upper right hand corner of the A4b schematic change the value of R35 to 2.15K ohm.

P/O 11848-60182
11848-60184
PHASE LOCK
LOOP (1 of 2)
A4b, P/O A2
185



Component Locator Drawing

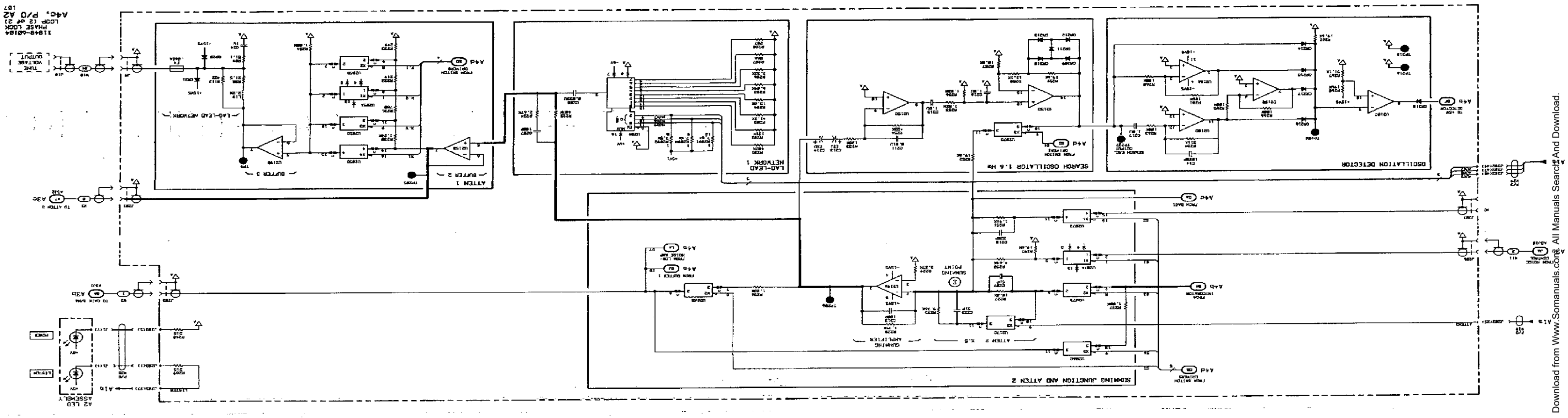
P/O A4 SEE REVERSE SIDE PHASE LOCK LOOP **A4b**

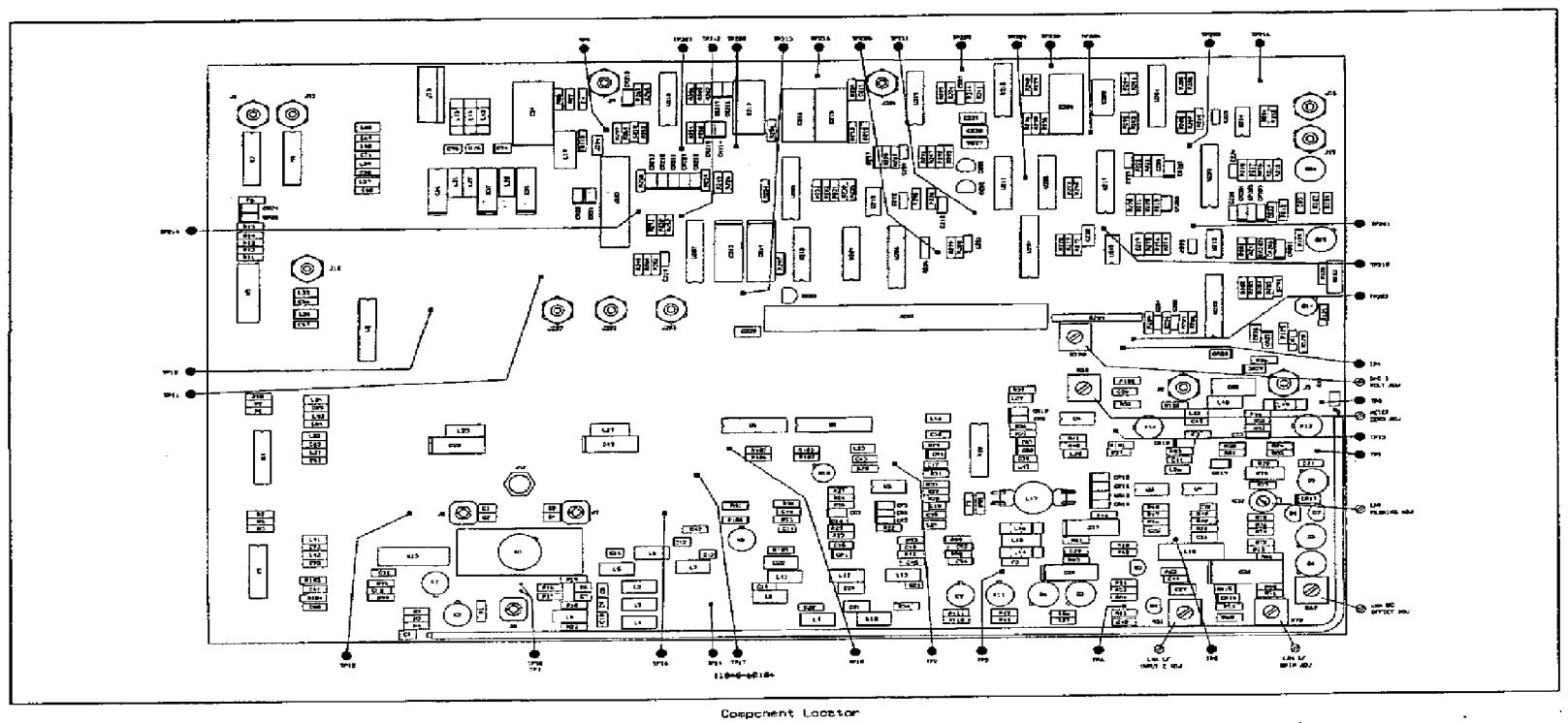


Component Locator

CHANGES

All serial prefixes	On the schematic: • BULLET 'GA' - In the upper right hand corner of the A4c schematic under the A2 LED ASSEMBLY change the bullet GA to CG that connects to the A3b schematic.





Component Locator

Component Locator Drawing

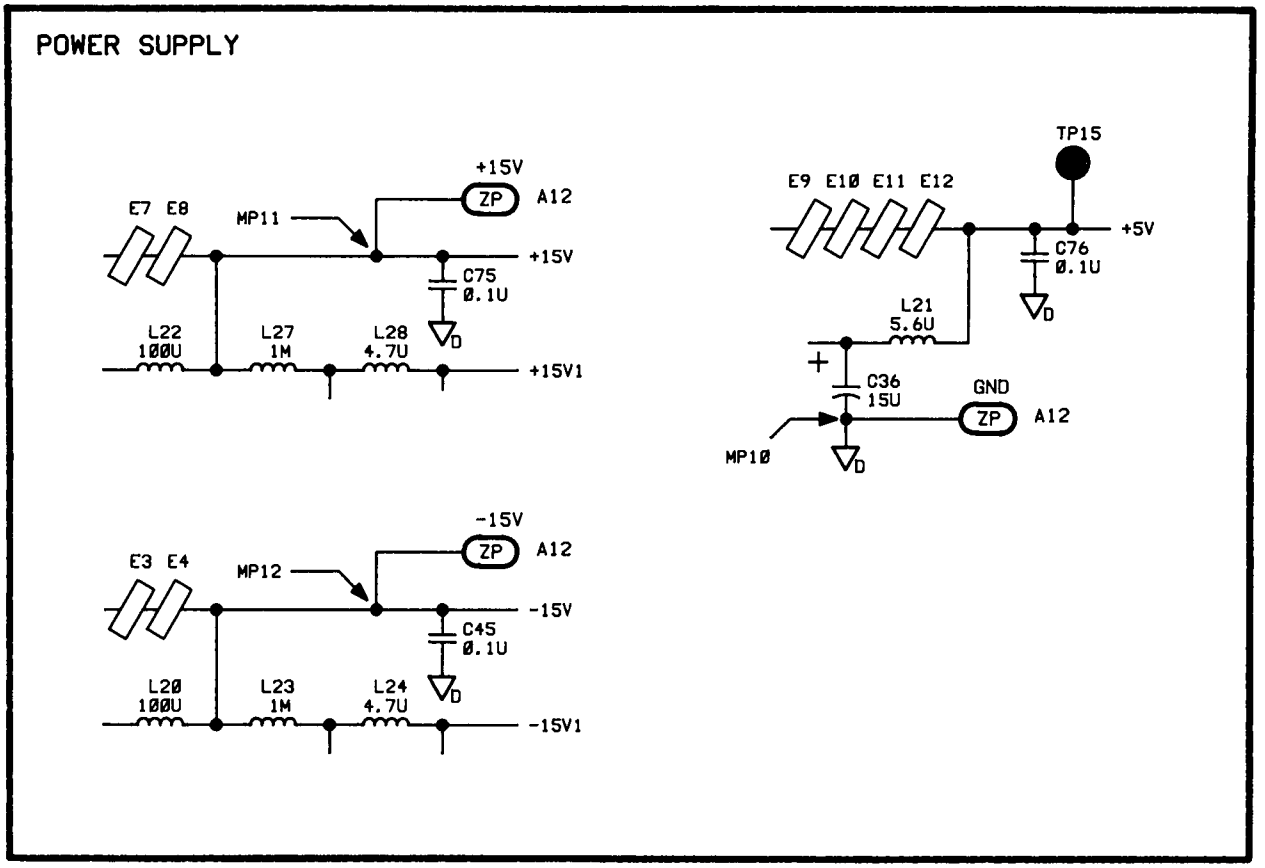
P/O A4
SEE REVERSE SIDE

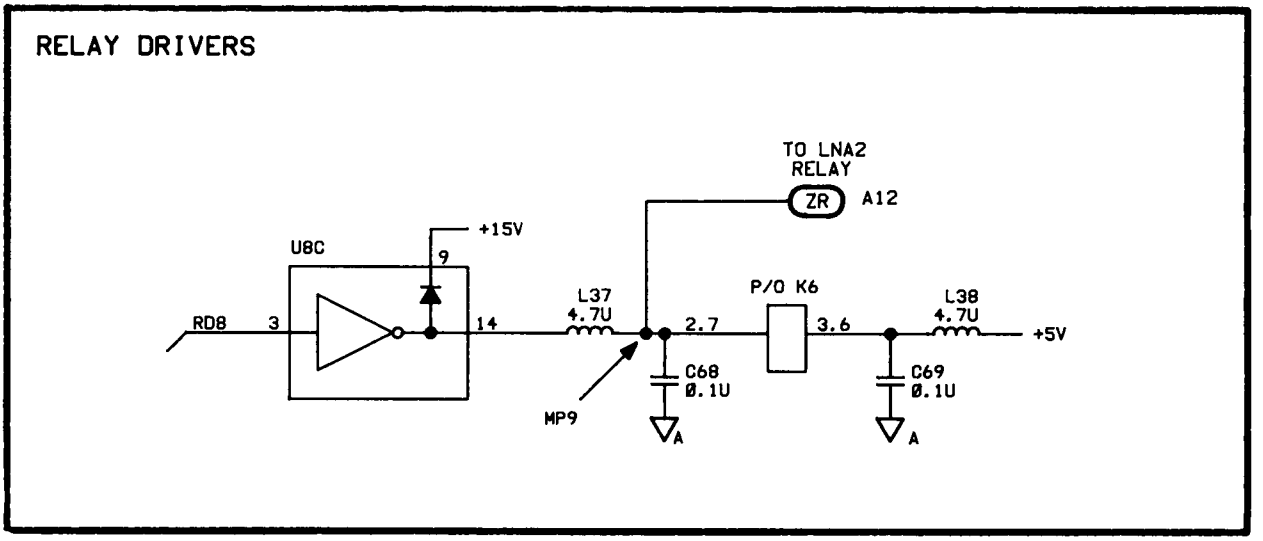
PHASE LOCK LOOP A4c

CHANGES

2938A and above	**On the schematic:** • Use the schematic partial on page 108.3.

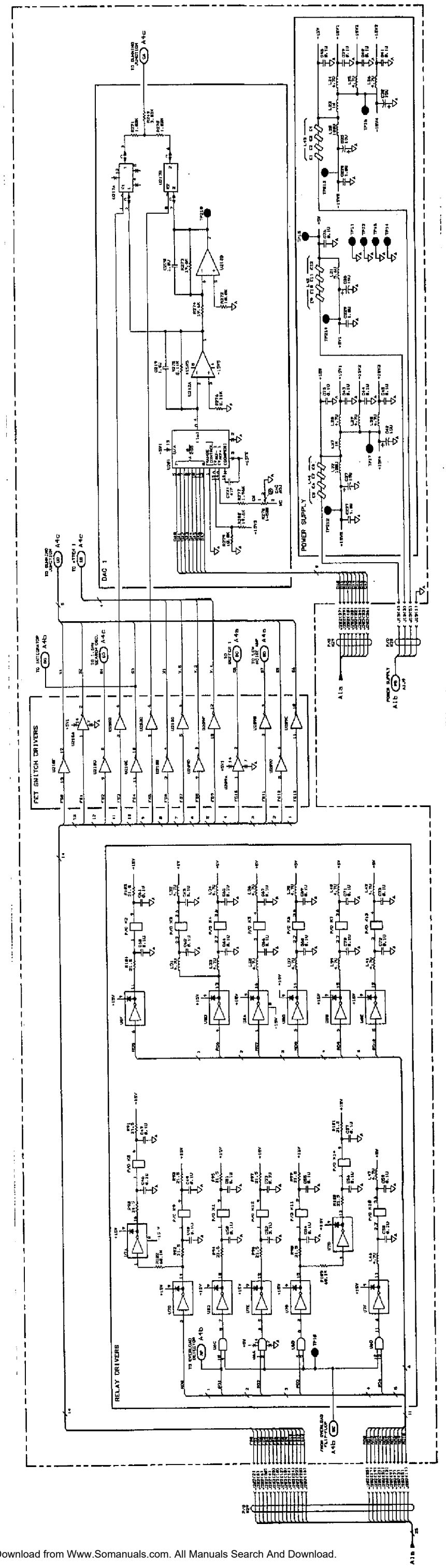
Reserved for future changes

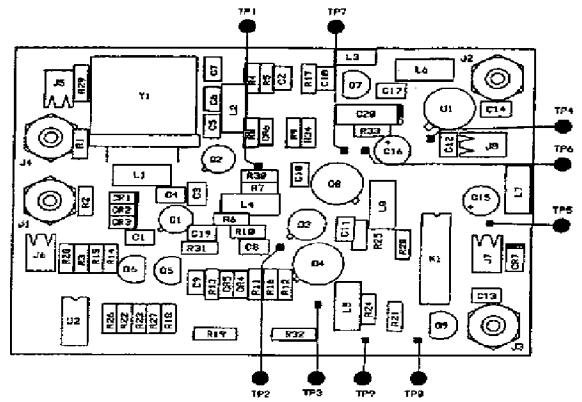




A4d Schematic Partial

A4d



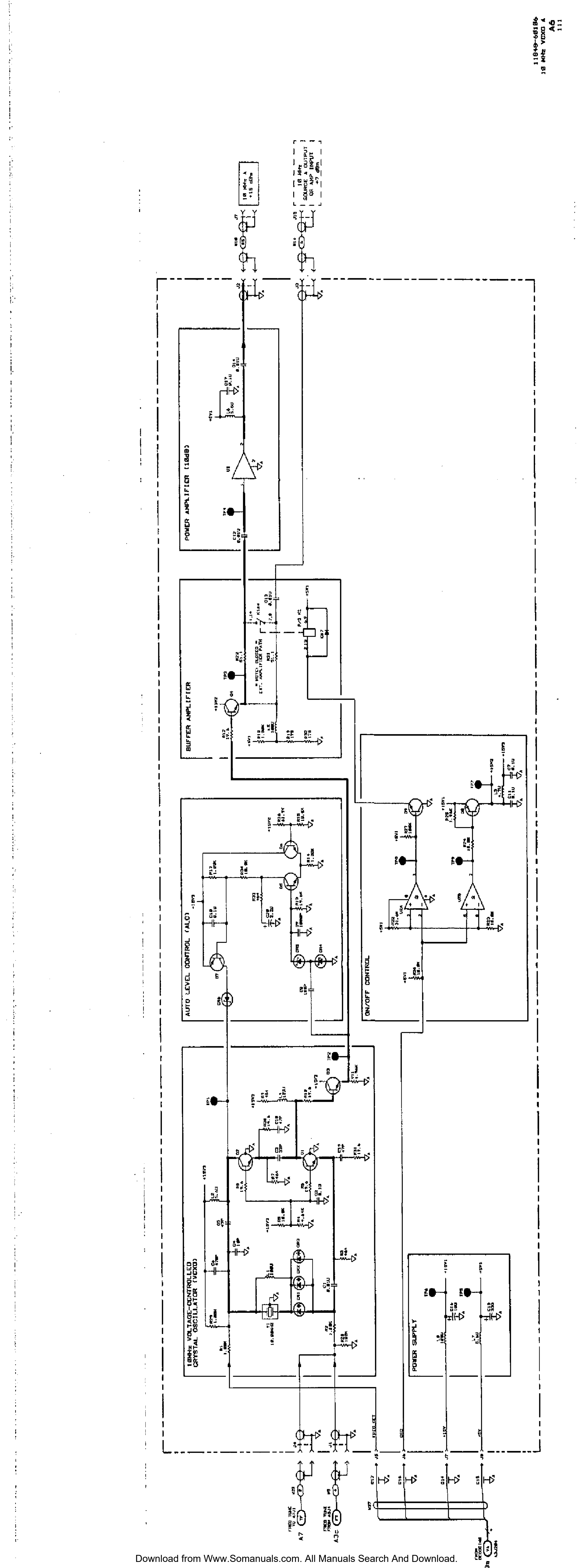


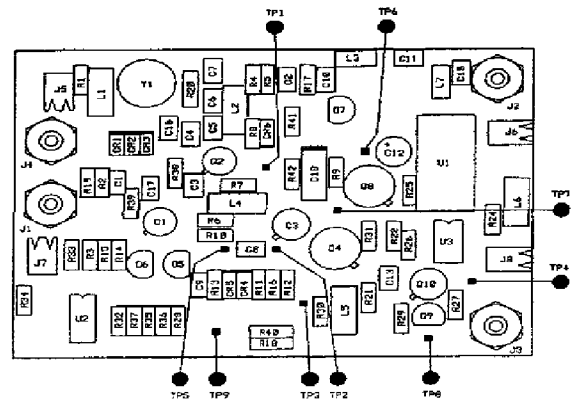
11848-60106

Component Locator

Component Locator Drawing

P/O A4 DIGITAL A4d
SEE REVERSE SIDE



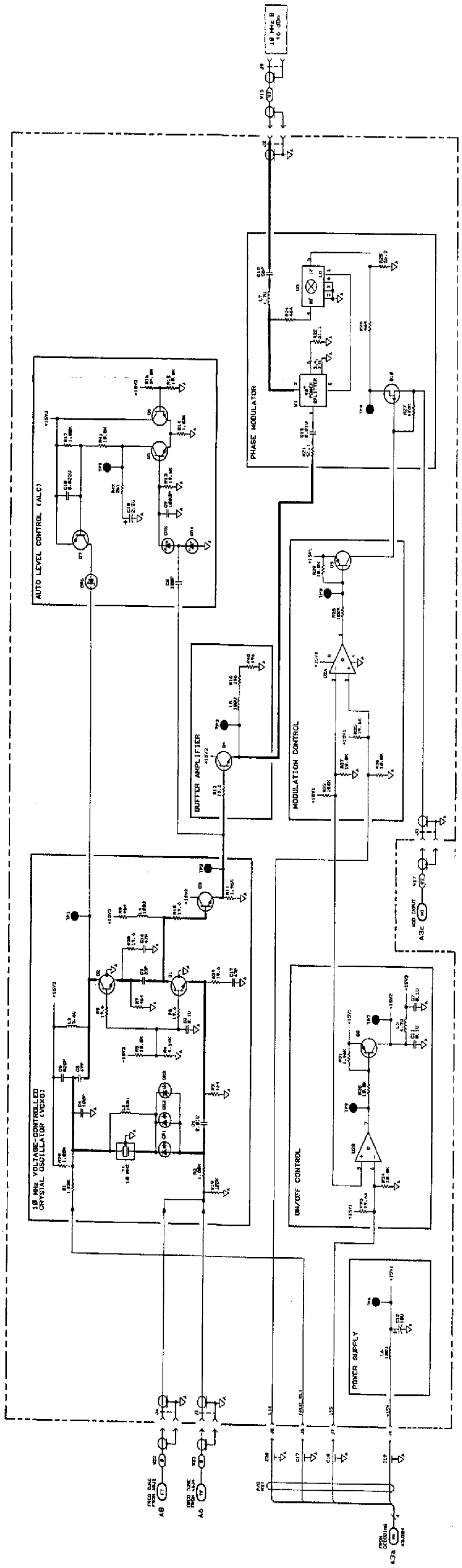


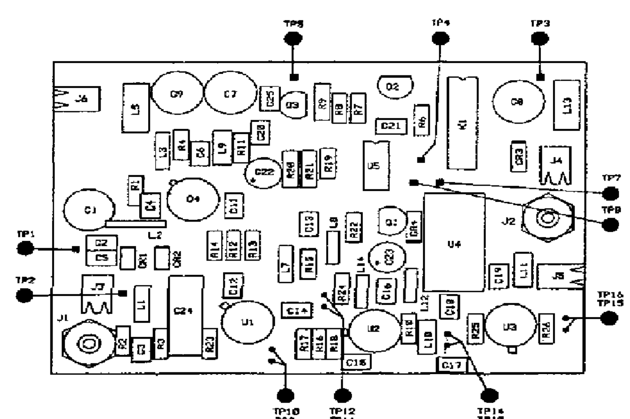
11848-60107

Component Locator

Component Locator Drawing

11848-60107
18 MHz MOD VCXO B
A7
113





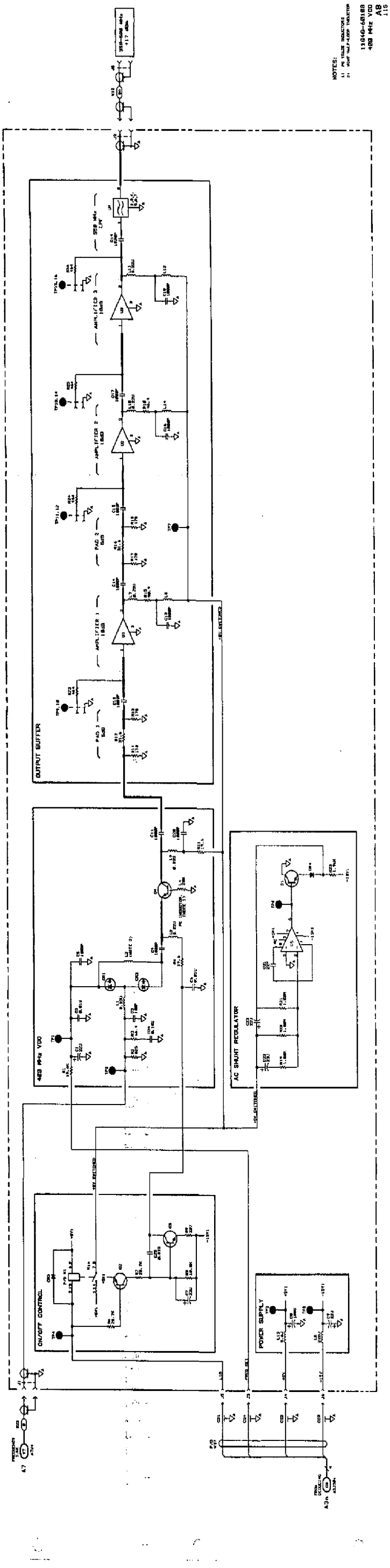
11848-60108

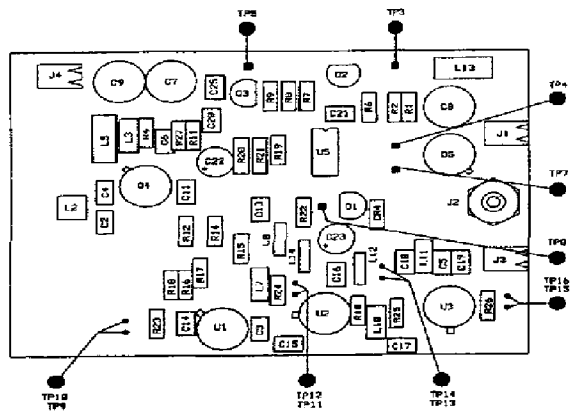
Component Locator

Component Locator Drawing

A7 SEE REVERSE SIDE

18 MHz MOD VCXO B A7

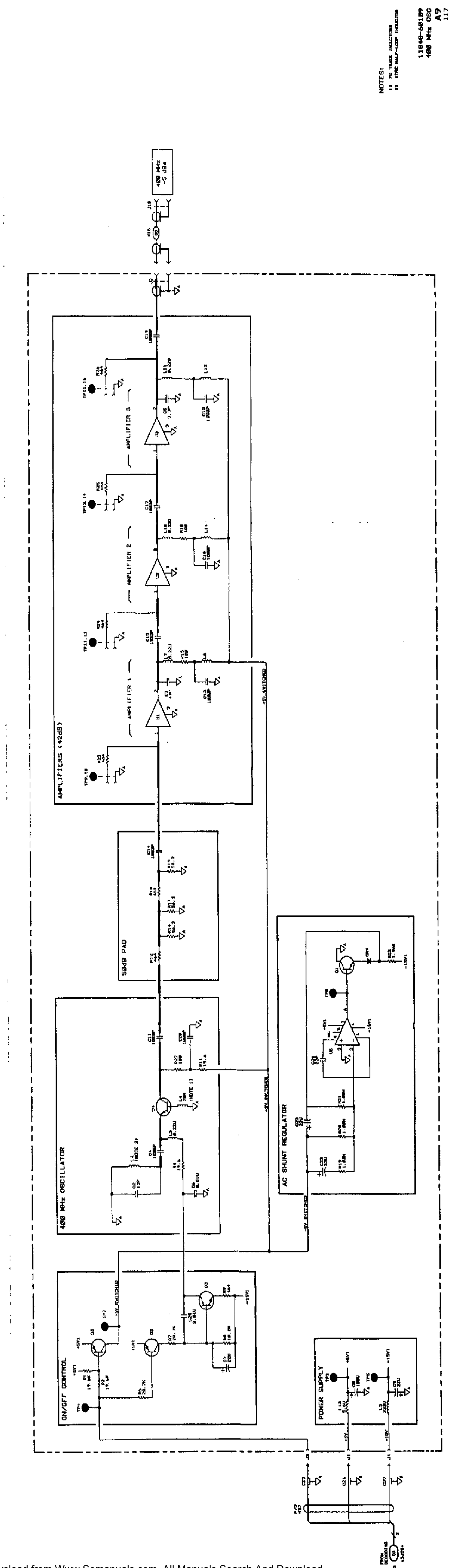




11848-62189

Component Locator

Component Locator Drawing



A9

SEE REVERSE SIDE

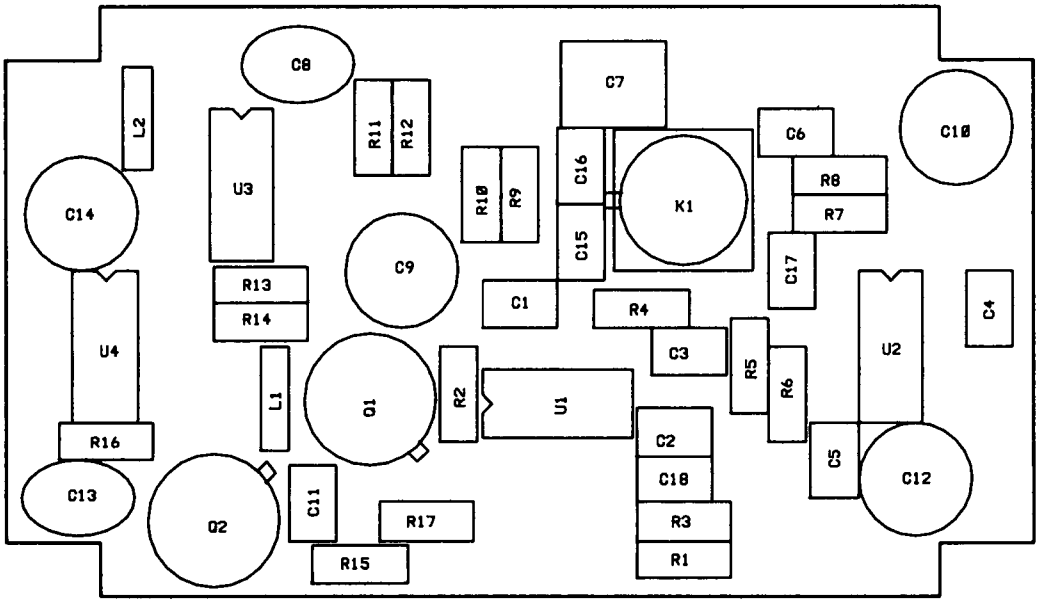
400 MHz OSC

A9

CHANGES

2938A and above	**Component Locator:** • Add the component locator, page 117. **Schematic:** • Add the new schematic, page 119.

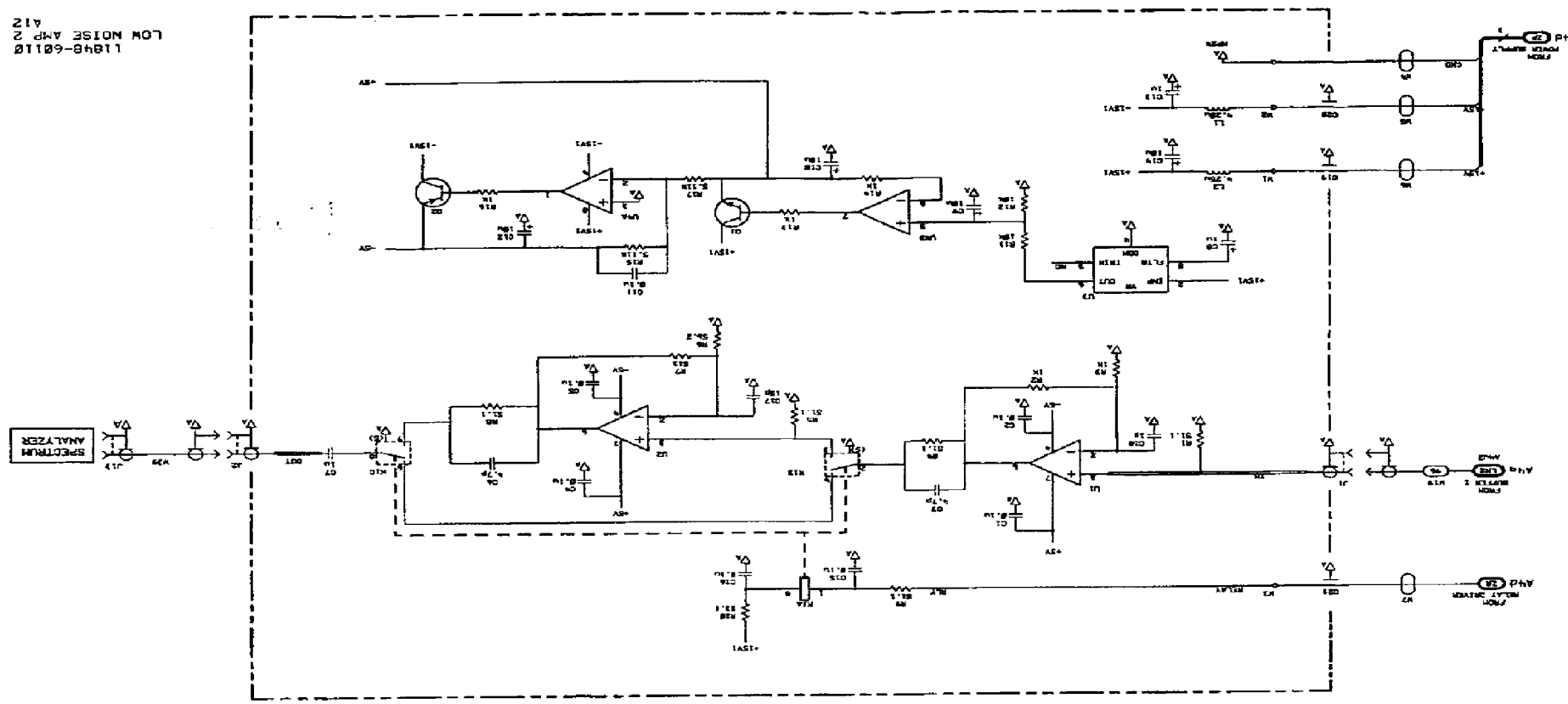
Reserved for future changes



Component Locator

A12

LOW NOISE AMP 2
A12
11848-60110



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S E R V I C E N O T E

SUPERSEDES

11848A Phase Noise Interface

Serial Numbers: 0000A00000/2938A00470

A9 Assembly/A9C14,C15,C17,C19

Modification to Eliminate Peak in Noise Flatness Test

To Be Performed By: HP-Qualified Personnel

Parts Required:

HP P/N	Description	Qty.
0160-3877	Capacitor, 100 pF 200V	4

Situation:

When performing the HP 3048A Noise Flatness Test, some instruments will exhibit a noise peak at approximately 2.2 MHz offset from the carrier. This noise peak is caused by the A9 400 MHz Oscillator Assembly and will only be observed durring the Noise Flatness Test. This modification will have no effect on other noise problems that may occur.

Continued

DATE 06 AUGUST 1990

ADMINISTRATIVE INFORMATION

SERVICE NOTE CLASSIFICATION:

MODIFICATION RECOMMENDED

ACTION CATEGORY:	☐ IMMEDIATELY ■ ON SPECIFIED FAILURE ☐ AGREEABLE TIME	STANDARDS: LABOR 2.0 HOURS	
LOCATION CATEGORY:	☐ CUSTOMER INSTALLABLE ☐ ON-SITE ■ HP LOCATION	SERVICE INVENTORY: ■ RETURN ☐ SCRAP ☐ SEE TEXT	USED PARTS: ■ RETURN ☐ SCRAP ☐ SEE TEXT
AVAILABILITY: PRODUCT'S SUPPORT LIFE		RESPONSIBLE ENTITY: 1000	UNTIL: SEPTEMBER 1993
AUTHOR: BH	ENTITY: 1000	ADDITIONAL INFORMATION:	

HEWLETT PACKARD

Solution/Action:

Replace A9C14,C15,C17,C19 with the HP part number noted above under parts required. Complete re-calibration of the instrument or system is not required. The HP 3048A Noise Flatness Test and Noise Floor Test may be performed to verify the repair.

S E R V I C E N O T E

SUPERSEDES: None

HP 11848A Phase Noise Interface

Serial Numbers: 3138A00888 / 9999A99999

Clarification of functional and diagnostic test failures due to an 11848A PC board modification (A3 board).

Duplicate Service Notes:3048A-02
3048MS-02

Situation:

In some applications using an unmodifed 11848A, where the peak tuning range is typically greater than 50 MHz, the phase lock loop (PLL) may not lock up. If it does lock up, there may be an otherwise unexplained noise peak displayed in the plot of phase noise for the device under test (DUT). This noise peak may have the appearance of a wide spurious signal several dB above the average noise floor, and typically shows up at an offset from the carrier of about 500 KHz to 2 MHz.

Starting in November 1992, the A3 board (p/n 11848-60203) in new 11848As was modified by cutting a trace. This eliminated a feedback path that was either generating noise or preventing lockup of the phase lock loop. While this modification did not affect the application measurement software for the 3048A, it did impact some test programs.

The 3048A Functional test #4 (Lag-Lead Transfer Functions Test) may fail depending upon what software revision is being used (see below).

Continued

DATE: August 1994

ADMINISTRATIVE INFORMATION

SERVICE NOTE CLASSIFICATION:

INFORMATION ONLY

AUTHOR:	ENTITY:	ADDITIONAL INFORMATION:
KD	5340	

HEWLETT PACKARD

11848A Diagnostic Software Tests will always fail since they attempt to test a circuit that uses the cut trace, and this diagnostic software (now obsolete) was never revised.

On the A3 board (p/n 11848-60203), the trace was cut between U25 (15) and U30 (2) on the component side of the board. All boards shipped in 11848As, serial numbers 3138A00888 and up, weremodified. In addition, all exchange assemblies (p/n 11848-69103) are being modified as they go through the repair process at the factory. Therefore, a user could send in a failed (unmodified) board for a different reason and receive a working modified one (cut trace) in return. Tests that did not fail previously may now fail.

Solution/Action:

This service note provides information on acceptable performance for the 11848A under certain known situations where some specific tests may fail but the 11848A is functioning normally. The user may either disregard test failures where the cause is known and the 3048A system is otherwise performing normally, or if that is unacceptable, the user may upgrade his 3048A software to the latest version.

Performance specifications and functionality of the 11848A are not affected by the cut trace since it was part of an unused circuit designed in for future enhancements of the 11848A that were never implemented. However, testing of that circuit was designed into the test software so some tests can fail.

For the 11848A Diagnostic program (now obsolete), some tests will always fail when the trace is cut since there was only one version of the program and it expects the trace to be a valid circuit path. The diagnostic program was only intended to be used as an aid for isolating failures uncovered by other means and not as a verification of system or instrument operational status. If the system checks in the 3048A software (as described in the 3048A System Calibra- tion manual) all pass, and the system makes valid phase noise measurements, the results of the diagnostic tests can be ignored.

For Functional Test #4 (Lag-lead test), the test results are determined by the 3048A software revision as follows:

3048A RMB Software Rev A.02.0x and a cut trace on A3:

Functional Test #4 fails. However, if the 10 MHz A vs B test (Quick Check) passes, there is a very high confidence level (90%) that the lag-lead circuits are OK so the test is not really needed.

3048A RMB Software Rev A.03.00:

Functional Test #4 (under investigation) was removed from the software so as not to hold up release of this revision. Therefore a cut trace on A3 will not cause a functional test failure with this revision.

3048A RMB Software Rev A.03.0x and a cut trace:

Functional Test #4 (modified) was put back in the software at Rev A.03.01 & up, but now it does not test the path where the trace was cut so it should pass as long as nothing else is wrong with the instrument.

3048A DOS Software (Option 301) Rev A.00.02:

Same as for RMB software Rev A.02.0x.

3048A DOS Software (Option 301) Rev A.01.0x:

Same as for RMB software Rev A.03.0x.

CAUTION:

Customers and HP personnel should not automatically assume that an uncut trace on an unmodified 11848A is causing a problem they may be seeing. Only the specific symptoms noted above have a high confidence level of being corrected by cutting the subject trace.

Cutting the trace, if it does not fix the problem, may disrupt test continuity and, in some cases, service traceability. The new test failures may also then mask valid failures later on. It is recommended that the factory be contacted first and the problem discussed before cutting the trace. It may be that an invalid application is contributing to the problem or that a software upgrade may be a wiser solution. The 3048A software system checks described in the 3048A Calibration manual should run to verify system operation. HP customers can receive needed technical support through their closest HP Sales or Service office.