

SECTION 21. IEEE INTERFACE BOARD (A13) — OPTION B

21.1 GENERAL

An IEEE-488 bus and the IEEE Interface board provide remote control of the system. The IEEE Interface board provides the interface for the 488 bus, thus allowing processor-control of most of the functions normally controlled from the front panel. The IEEE Interface board also contains a multipurpose input/output (I/O) port, which can be used to control equipment, to output data, or to monitor data.

A block diagram of the IEEE Interface board is shown at the end of the section in Figure 21-1, a schematic in Figure 21-2, and the printed wiring board assembly and parts list in Figure 21-3. Figure 21-4 shows the assembly and parts list of the A17 RF Input module's IEEE option.

21.2 THEORY OF OPERATION

21.2.1 IEEE BUS INTERFACE

The IEEE bus interface circuit provides for bus buffering and interface protocol as defined by the IEEE-488 specification. The system processor accesses the interface directly through its address, data, and control busses, which are used for reading from or writing to the IEEE bus.

The address of the System Analyzer's IEEE bus is set on the IEEE Interface board via the top four switches on a dip switch. The least significant bit is the top switch. Using the binary equivalent of the address number, the operator can set the address. Setting the switches to ON gives a logic 1.

21.2.2 RF-LEVEL CONTROL

The circuitry for RF-level control selects either the 5 VDC + AM MOD input for remote control or the AM MOD + DC REF (I) input for local control. For remote control, the 5 VDC + AM MOD input is electronically attenuated to provide the requested RF output level. For local control, the attenuator is programmed for unity gain so that the AM MOD + DC REF (I) signal from the front panel's RF-level potentiometer controls the RF output level.

For the IEEE control option, an electronically programmable RF step attenuator is installed in the system. The processor then controls the attenuator through the address-decode and control-latch circuitry on the IEEE Interface board.

21.2.3 MODULATION CONTROL

The IEEE Interface board can individually control each of the three modulation sources. For remote control, the respective modulation input — INT MOD (I), EXT MOD (I), and 1 KHz SINE (I) — is switched to a programmable attenuator. The system processor selects the level of attenuation necessary to provide the requested level of modulation. For local control, the attenuators are programmed for unity gain, and the respective modulation signal from the front panel's level control — INT MOD RTN (I), EXT MOD RTN (I) and 1 KHz SINE RTN (I) — is selected and sent to the attenuator to control the modulation level.

21.2.4 ADDRESS-DECODE AND CONTROL-LATCH CIRCUITRY

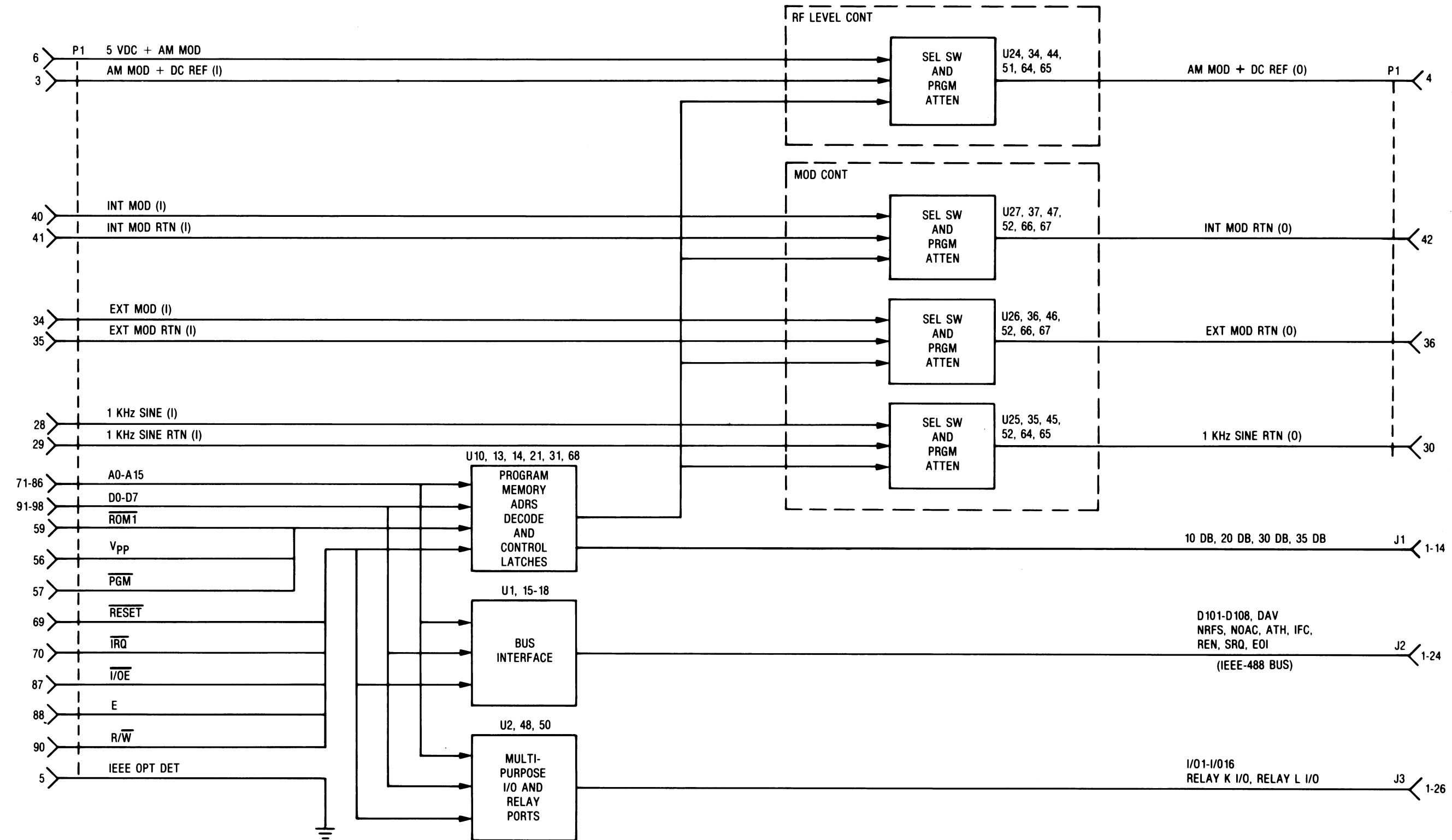
With the address-decode and control-latch circuitry, the system processor has direct control over the programmable attenuators on the board. Control data on the data bus (D0-D7) is latched at the control latch indicated by the address bus (A0-A15).

21.2.5 MULTIPURPOSE INPUT/OUTPUT AND RELAY PORTS

A side-panel connector provides 16 multipurpose input/output (I/O) ports and two pairs of relay ports. The I/O ports can be configured as either inputs or outputs. Data is written to or read from these ports via the IEEE bus. All these ports meet TTL logic-level requirements for positive logic. As inputs, I/O 1 to I/O 8 represent no more than two standard TTL loads each, while I/O 9 to I/O 16 are high-impedance loads. As outputs, each port can drive up to two standard TTL loads. I/O 9 to I/O 16 can also supply a minimum of 1 mA at 1.5V.

Two pairs of ports are connected to relays in such a way that the two ports of each set are normally unconnected. However, when the relay is activated, the ports are shorted together. Each relay port can switch a maximum of 28 Vdc at 0.8A. Each relay port is also isolated from the system chassis to a voltage level of 500 Vdc.


IEEE INTERFACE BOARD (A13)
OPTION B
 (RTC-1013A)
 Figure 21-1. Block Diagram

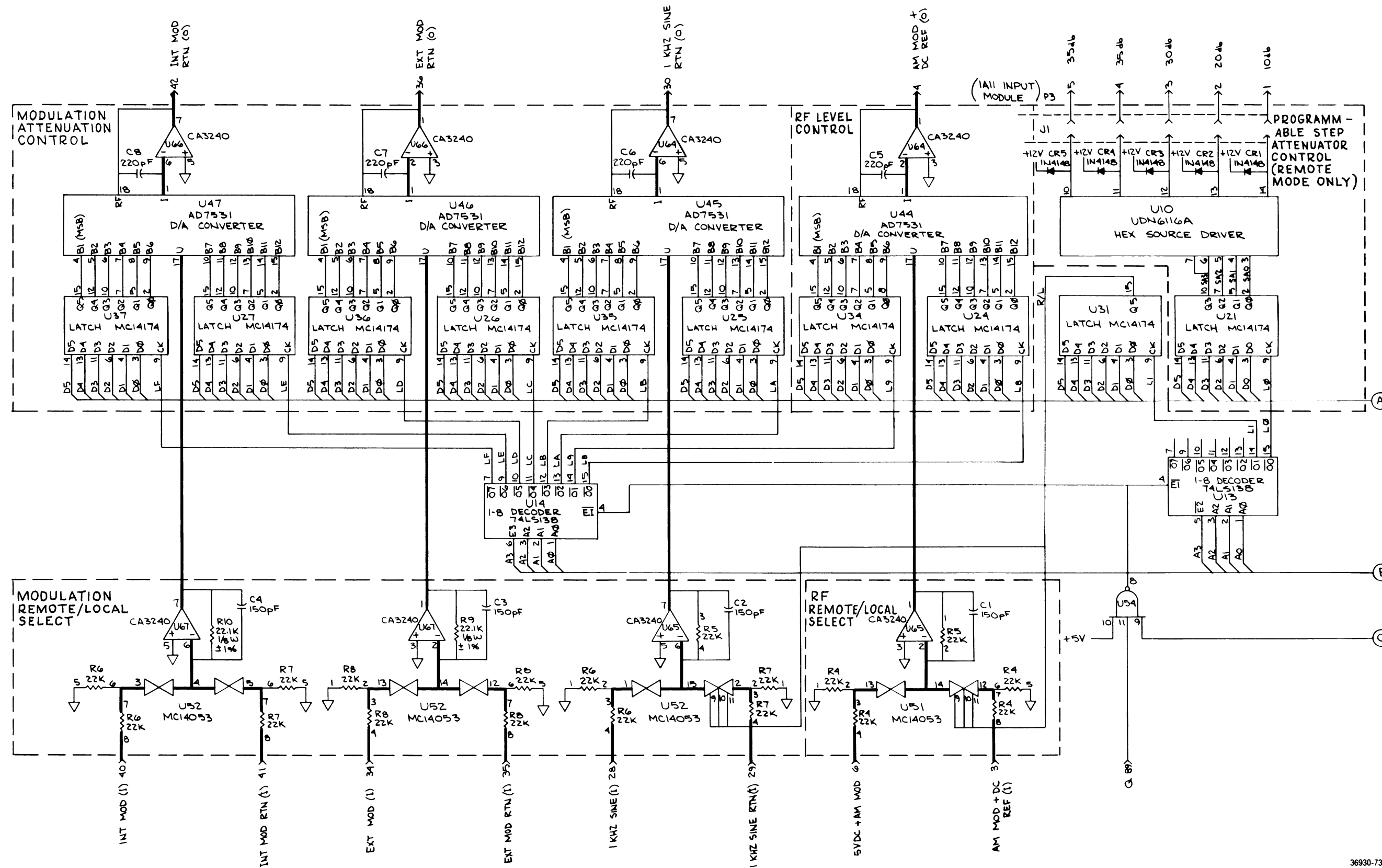


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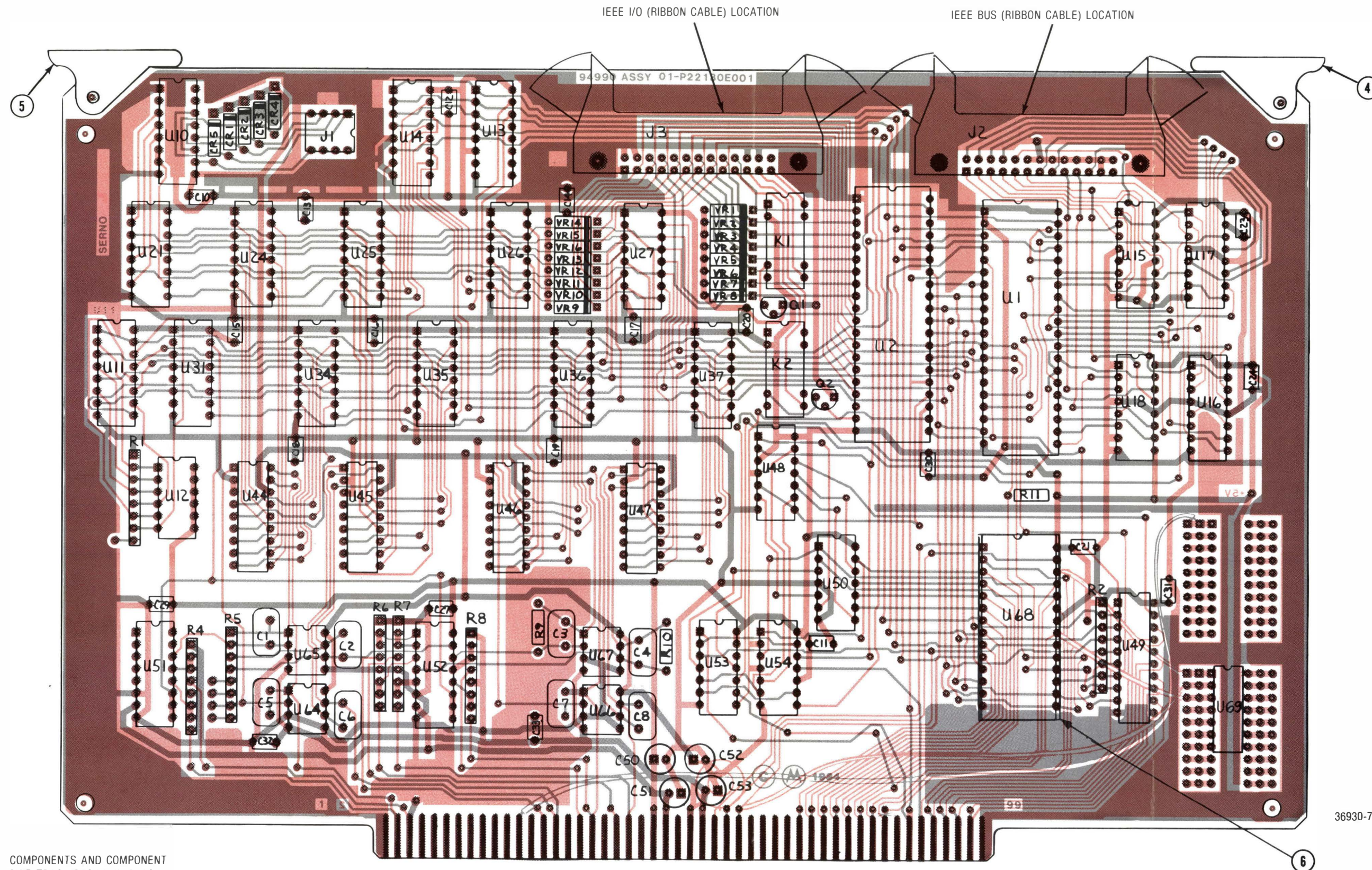
IEEE INTERFACE BOARD (A13)
 OPTION B
 (RTC-1013A)
 Figure 21-2b. Schematic (Sheet 2 of 2)

REF DES	TYPE	GND	+5V	-5V	+12V	-12V	+33V	NO CONN
U1	MC6848B	1,2,40	20					15,24
U2	MC6821	1,23	20					16,37,38,40
U10	UDN6116A	1,8			9			15,16,2
U11	74LS369	B						16
U12	206-6			7,10,12				
U13	74LS13B	B		6,16				7,9,13
U14	74LS13B	5,8		16				
U15	MC3448B	4,8,12		16				
U16	MC3448B	4,8,12		16				
U17	MC3448B	4,8,12,15		16				
U18	MC3448B	1,4,7,8,12		9,16				
U21	MC14174	B		1,16				12,15
U24	MC14174	B		1,16				
U25	MC14174	B		1,16				
U26	MC14174	B		1,16				
U27	MC14174	B		1,16				
U31	MC14174	B		1,16				2,5,7,10,12
U34	MC14174	B		1,16				
U35	MC14174	B		1,16				
U36	MC14174	B		1,16				
U37	MC14174	B		1,16				
U44	AD7531	2,3			16			
U45	AD7531	2,3			16			
U46	AD7531	2,3			16			
U47	AD7531	2,3			16			
U48	74LS11	7		3,14				
U49	74LS245	10		20				
U50	74LS27	4,7		14				
U51	MC14053	4,8		16	7			1-5,15
U52	MC14053	4,8		16	7			
U53	74LS04	7		13,14				12
U54	74LS10	7		14,10				
U64	CA3240							
U65	CA3240							
U66	CA3240							
U67	CA3240							
U68	MC146874L	14,22	28					
U69	SN74LS08J	7	14					4-6,8-13

 WARNING:
 STATIC-SENSITIVE PARTS
 HANDLE APPROPRIATELY



36930-73 B



COMPONENTS AND COMPONENT SIDE TRACK SHOWN IN BLACK. SOLDER-SIDE TRACK SHOWN IN ORANGE

**IEEE INTERFACE BOARD (A13)
OPTION B
RTC-1013A**

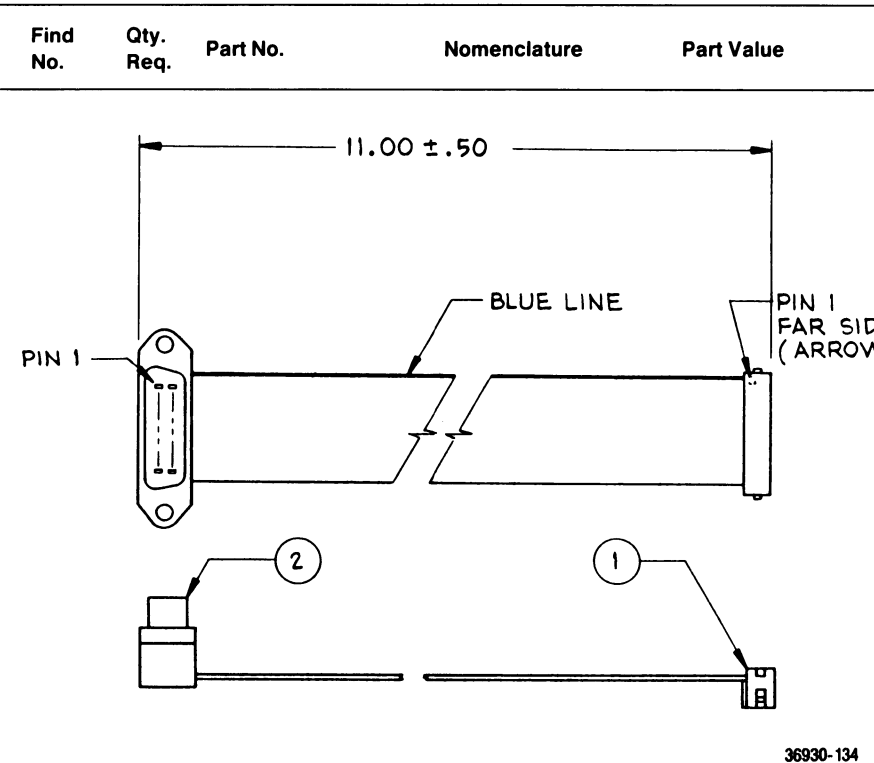
Find No.	Qty. Req.	Part No.	Nomenclature	Part Value
004	1	45-80339B28	CARD EJECTOR	
005	1	45-80339B32	CARD EJECTOR	MARKED
006	1	09-80339B81	SOCKET	28 PIN
C 001	1	21-80369A94	CAPACITOR	150PF-5-500
C 002	1	21-80369A94	CAPACITOR	150PF-5-500
C 003	1	21-80369A94	CAPACITOR	150PF-5-500
C 004	1	21-80369A94	CAPACITOR	150PF-5-500
C 005	1	21-80339B26	CAPACITOR	220PF-5-500
C 006	1	21-80339B26	CAPACITOR	220PF-5-500
C 007	1	21-80339B26	CAPACITOR	220PF-5-500
C 008	1	21-80339B26	CAPACITOR	220PF-5-500
C 010	1	21-80342B09	CAPACITOR	01UF-20-50
C 011	1	21-80342B09	CAPACITOR	01UF-20-50
C 012	1	21-80342B09	CAPACITOR	01UF-20-50
C 013	1	21-80342B09	CAPACITOR	01UF-20-50
C 014	1	21-80342B09	CAPACITOR	01UF-20-50
C 015	1	21-80342B09	CAPACITOR	01UF-20-50
C 016	1	21-80342B09	CAPACITOR	01UF-20-50
C 017	1	21-80342B09	CAPACITOR	01UF-20-50
C 018	1	21-80342B09	CAPACITOR	01UF-20-50
C 019	1	21-80342B09	CAPACITOR	01UF-20-50
C 020	1	21-80342B09	CAPACITOR	01UF-20-50
C 021	1	21-80342B09	CAPACITOR	01UF-20-50
C 023	1	21-80342B09	CAPACITOR	01UF-20-50
C 024	1	21-80342B09	CAPACITOR	01UF-20-50
C 027	1	21-80342B09	CAPACITOR	01UF-20-50
C 029	1	21-80342B09	CAPACITOR	01UF-20-50
C 030	1	21-80342B09	CAPACITOR	01UF-20-50
C 031	1	21-80342B09	CAPACITOR	01UF-20-50
C 032	1	21-80342B09	CAPACITOR	01UF-20-50
C 033	1	21-80342B09	CAPACITOR	01UF-20-50
C 050	1	23-80341B15	CAPACITOR	10UF-20-50
C 051	1	23-80341B15	CAPACITOR	10UF-20-50
C 052	1	23-80341B15	CAPACITOR	10UF-20-50
C 053	1	23-80341B15	CAPACITOR	10UF-20-50
CR001	1	48-84463K02	DIODE	
CR002	1	48-84463K02	DIODE	
CR003	1	48-84463K02	DIODE	
CR004	1	48-84463K02	DIODE	
CR005	1	48-84463K02	DIODE	
J 001	1	09-80331A95	SOCKET,SOLDER DIP	8 PIN
J 002	1	28-80343B51	CONNECTOR	26 PIN HEADER
J 003	1	28-80343B51	CONNECTOR	26 PIN HEADER
K 001	1	80-80339B76	RELAY,ELECTRONIC	
K 002	1	80-80339B76	RELAY,ELECTRONIC	
L 001	1	25-80342B79	COIL,TOROID	
Q 001	1	48-80341B23	TRANSISTOR	
Q 002	1	48-80341B23	TRANSISTOR	
R 001	1	51-80343B80	RESISTOR NETWORK	HEX SIP 470
R 002	1	06-80340B11	RESISTOR NETWORK	HEX SIP 22K
R 004	1	51-80368A78	RESISTOR NETWORK	QUAD SIP 22K
R 005	1	51-80368A78	RESISTOR NETWORK	QUAD SIP 22K
R 006	1	51-80368A78	RESISTOR NETWORK	QUAD SIP 22K
R 007	1	51-80368A78	RESISTOR NETWORK	QUAD SIP 22K
R 008	1	51-80368A78	RESISTOR NETWORK	QUAD SIP 22K
R 009	1	06-10621D25	RESISTOR	22 1K-1-1/4
R 010	1	06-10621D25	RESISTOR	22 1K-1-1/4
R 011	1	06-11009C81	RESISTOR	22K-5-1/4
U 001	1	51-80340B22	INTEGRATED CIRCUIT	
U 002	1	51-82807K20	INTEGRATED CIRCUIT	
U 010	1	51-80346A63	INTEGRATED CIRCUIT	
U 011	1	51-80340B82	INTEGRATED CIRCUIT	
U 012	1	40-80369A07	SWITCH,6 STATION	
U 013	1	51-84561L41	INTEGRATED CIRCUIT	
U 014	1	51-84561L41	INTEGRATED CIRCUIT	
U 015	1	51-80340B20	INTEGRATED CIRCUIT	
U 016	1	51-80340B20	INTEGRATED CIRCUIT	
U 017	1	51-80340B20	INTEGRATED CIRCUIT	
U 018	1	51-80340B20	INTEGRATED CIRCUIT	
U 021	1	51-83627M89	INTEGRATED CIRCUIT	
U 024	1	51-83627M89	INTEGRATED CIRCUIT	
U 025	1	51-83627M89	INTEGRATED CIRCUIT	
U 026	1	51-83627M89	INTEGRATED CIRCUIT	
U 027	1	51-83627M89	INTEGRATED CIRCUIT	
U 031	1	51-83627M89	INTEGRATED CIRCUIT	
U 034	1	51-83627M89	INTEGRATED CIRCUIT	
U 035	1	51-83627M89	INTEGRATED CIRCUIT	
U 036	1	51-83627M89	INTEGRATED CIRCUIT	
U 037	1	51-83627M89	INTEGRATED CIRCUIT	
U 044	1	51-80345A98	INTEGRATED CIRCUIT	AD7531JPN SCREENED
U 045	1	51-80345A98	INTEGRATED CIRCUIT	AD7531JPN SCREENED

**IEEE INTERFACE BOARD (A13)
OPTION B
(RTC-1013A)**

Figure 21-3. Printed Wiring Board Assembly and Parts List

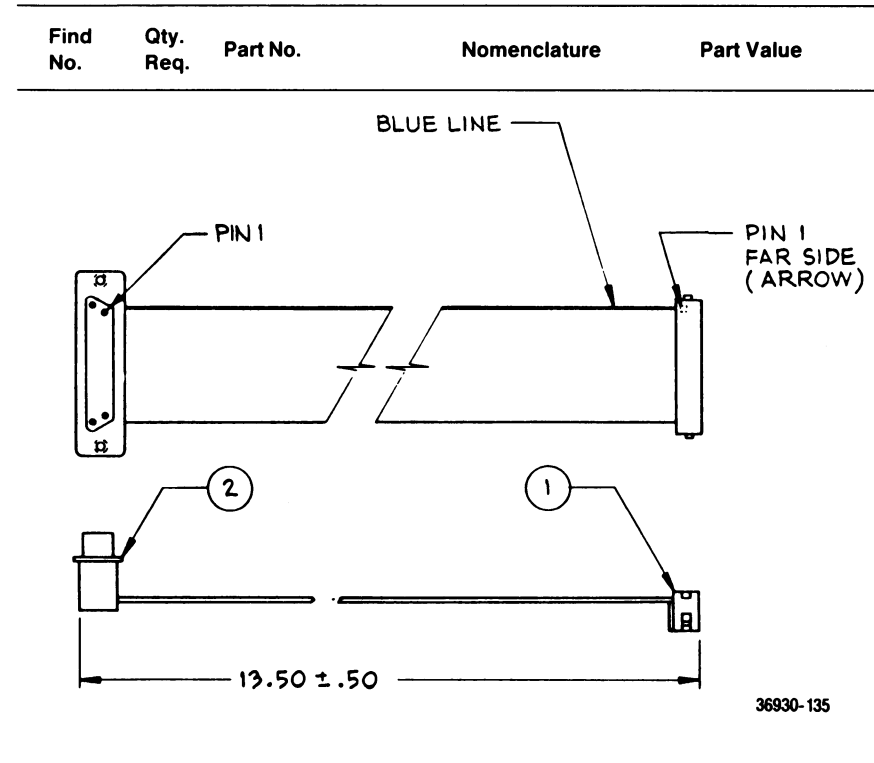
**IEEE INTERFACE BOARD (A13)
OPTION B (Cont)
RTC-1013A**

Find No.	Qty. Req.	Part No.	Nomenclature	Part Value
U 046	1	51-80345A98	INTEGRATED CIRCUIT	AD7531JPN SCREENED
U 047	1	51-80345A98	INTEGRATED CIRCUIT	AD7531JPN SCREENED
U 048	1	51-84561L44	INTEGRATED CIRCUIT	
U 049	1	51-82609M57	INTEGRATED CIRCUIT	
U 050	1	51-84561L38	INTEGRATED CIRCUIT	
U 051	1	51-05467G01	INTEGRATED CIRCUIT	
U 052	1	51-05467G01	INTEGRATED CIRCUIT	
U 053	1	51-84561L03	INTEGRATED CIRCUIT	
U 054	1	51-84561L08	INTEGRATED CIRCUIT	
U 064	1	51-80345A04	INTEGRATED CIRCUIT	CA3240E SCREENED
U 065	1	51-80345A04	INTEGRATED CIRCUIT	CA3240E SCREENED
U 066	1	51-80345A04	INTEGRATED CIRCUIT	CA3240E SCREENED
U 067	1	51-80345A04	INTEGRATED CIRCUIT	CA3240E SCREENED
U 068	1	51-90019B01	INTEGRATED CIRCUIT	CA3240E SCREENED EPROM
U 069	1	51-84561L07	INTEGRATED CIRCUIT	
VR001	1	RG-1N5235B	DIODE,ZENER	
VR002	1	RG-1N5235B	DIODE,ZENER	
VR003	1	RG-1N5235B	DIODE,ZENER	
VR004	1	RG-1N5235B	DIODE,ZENER	
VR005	1	RG-1N5235B	DIODE,ZENER	
VR006	1	RG-1N5235B	DIODE,ZENER	
VR007	1	RG-1N5235B	DIODE,ZENER	
VR008	1	RG-1N5235B	DIODE,ZENER	
VR009	1	RG-1N5235B	DIODE,ZENER	
VR010	1	RG-1N5235B	DIODE,ZENER	
VR011	1	RG-1N5235B	DIODE,ZENER	
VR012	1	RG-1N5235B	DIODE,ZENER	
VR013	1	RG-1N5235B	DIODE,ZENER	
VR014	1	RG-1N5235B	DIODE,ZENER	
VR015	1	RG-1N5235B	DIODE,ZENER	
VR016	1	RG-1N5235B	DIODE,ZENER	



**Cable Assembly, IEEE Bus
30-80343B92**

Find No.	Qty. Req.	Part No.	Nomenclature	Part Value
001	1	09-80343B52	SOCKET, CLOSED END	26 PIN
002	1	09-80343B49	CONNECTOR, FEMALE	24 PIN



**Cable Assembly, IEEE I/O
30-80343B93**

Find No.	Qty. Req.	Part No.	Nomenclature	Part Value
001	1	09-80343B52	SOCKET, CLOSED END	26 PIN
002	1	09-80343B50	SOCKET	25 PIN

IEEE Interface Kit

Find No.	Qty. Req.	Part No.	Nomenclature	Part Value
001	1	RTC-1013A	OPTION B BD ASSY(A13)	
002	1	RTL-1023A	RF INPUT MODULE ASSY(A17)	
003	1	30-80344B14	CABLE ASSEMBLY	A17A1 TO A13J1
004	1	30-80343B92	CABLE ASSEMBLY(IEEE BUS)	
005	1	30-80343B93	CABLE ASSEMBLY(IEEE I/O)	
008	4	04-80335A99	WASHER	156
011	1	36-80335A88	KNOB, SKIRTED	
014	2	03-80343B58	JACKSOCKET ASSEMBLY	

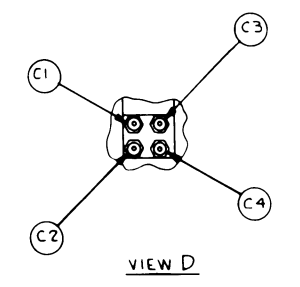
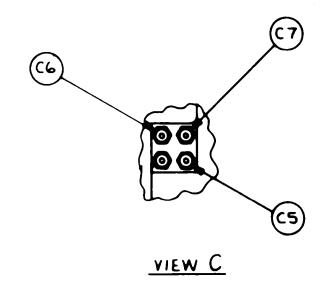
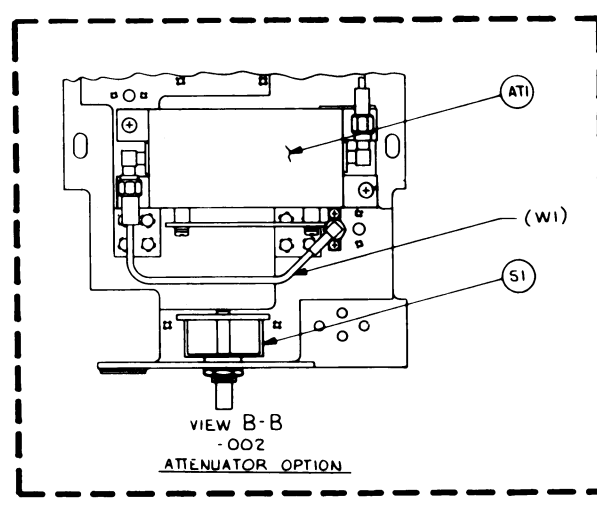
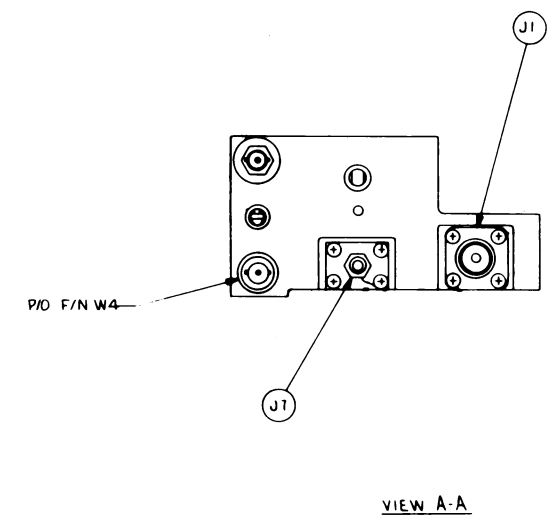
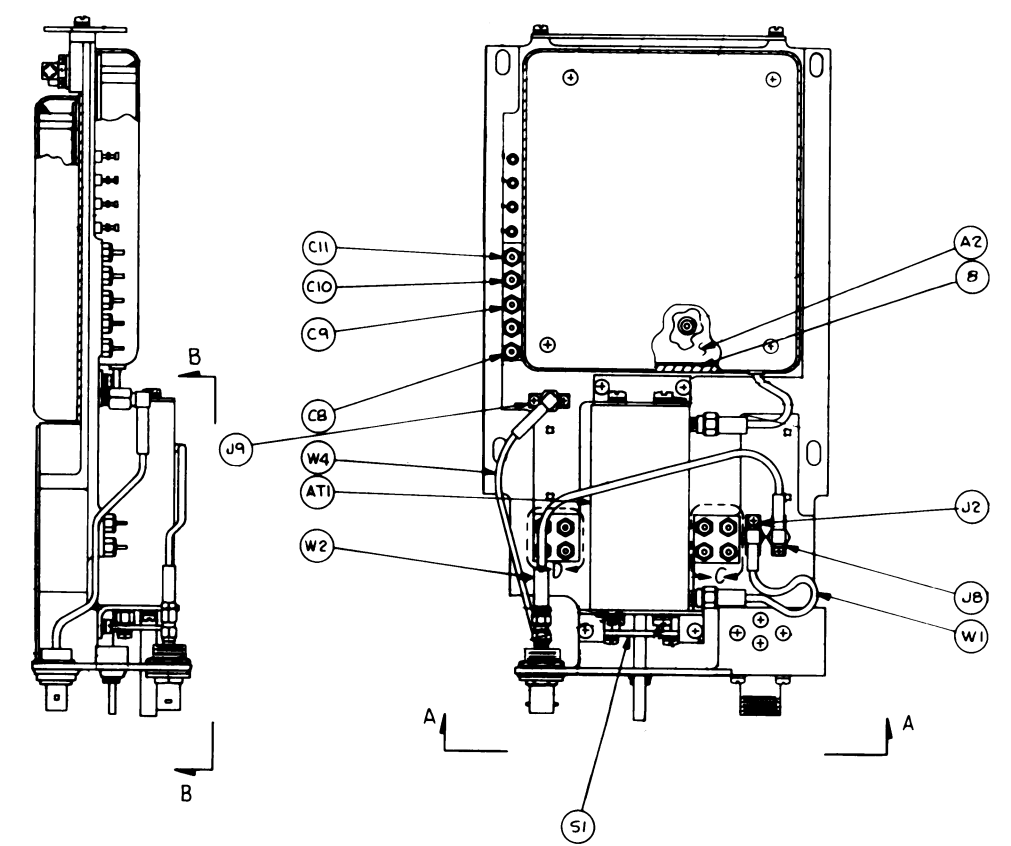
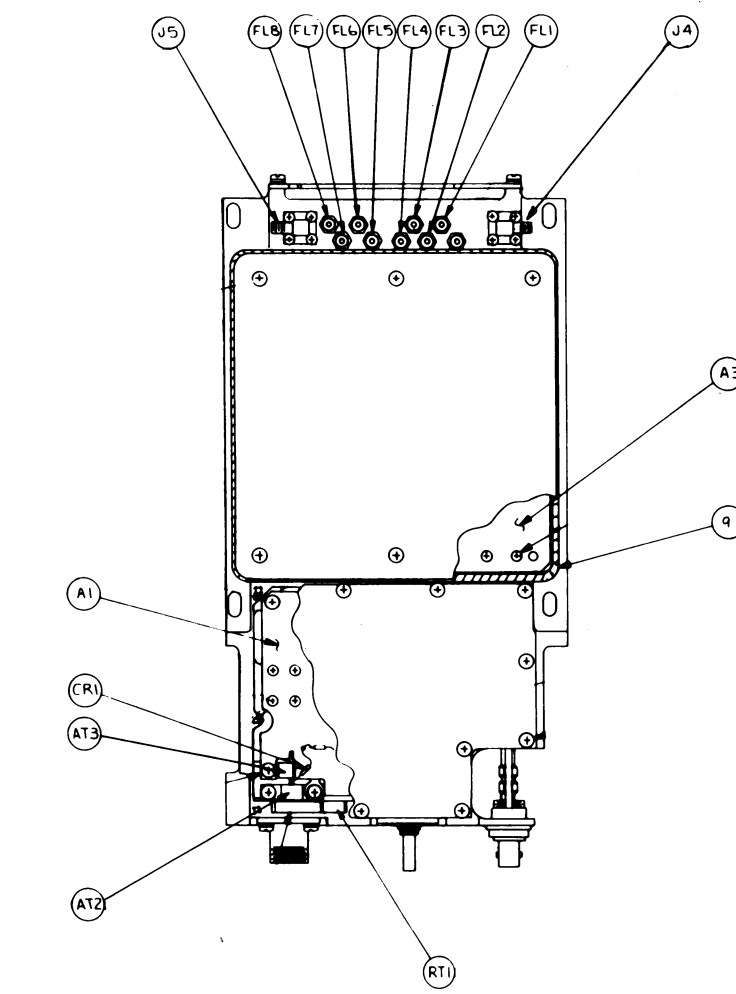
Front Cover IEEE Kit

Find No.	Qty. Req.	Part No.	Nomenclature	Part Value
002	1	30-80336A36	CORD, LINE	
003	1	TEKA-24A	ANTENNA	
004	1	15-80342B27	COVER	CRT-SUN
005	1	RTL-4011A	SCOPE PROBE	
006	1	RTM-4000B	TEST MIKE	
007	1	RTL-4055B	WATTMETER ADAPTER	
008	1	54-80338A82	WARRANTY CARD	
009	1	68-80309A54	PPR CARD	

IEEE Accessory Kit

Find No.	Qty. Req.	Part No.	Nomenclature	Part Value
001	1	15-10811A08	CONNECTOR, 4 PIN	
002	1	15-10812A01	CLAMP	

Find No.	Qty. Req.	Part No.	Nomenclature	Part Value
IEEE Connector Kit				
001	1	RTC-4047A	PRINTED WIRING BOARD ASSY	JUMPER CARD
006	2	04-80335A99	WASHER	156
Jumper Card (Option B) RTC-4047A				
004	1	45-80339B28	CARD EJECTOR	
005	1	45-80339B31	CARD EJECTOR	MARKED
006	3	30-80344B18	JUMPER,WIRE	



**RF INPUT MODULE (IEEE OPTION)
RTL-1023A**

Find No.	Qty. Req.	Part No.	Nomenclature	Part Value
008	1	32-80342B94	GASKET, EMI	
009	1	32-80342B95	GASKET, EMI	
A 001	1	RTL-4158A	WATT METER ASSY(A17A1)	
A 002	1	RTL-4156A	WIDE BND AMPL ASSY(A17A2)	
A 003	1	RTL-4157A	DUPLEX GEN ASSY(A17A3)	
AT001	1	01-80343B84	ATTENUATOR	
AT002	1	17-80377A95	ATTENUATOR, POWER	
AT003	1	01-80343B81	ATTENUATOR, 16DB	
C 001	1	21-80342B51	CAPACITOR	5000PF-6MV-500
C 002	1	21-80342B51	CAPACITOR	5000PF-6MV-500
C 003	1	21-80342B51	CAPACITOR	5000PF-6MV-500
C 004	1	21-80342B51	CAPACITOR	5000PF-6MV-500
C 005	1	21-80342B51	CAPACITOR	5000PF-6MV-500
C 006	1	21-80342B51	CAPACITOR	5000PF-6MV-500
C 007	1	21-80342B51	CAPACITOR	5000PF-6MV-500
C 008	1	21-80342B51	CAPACITOR	5000PF-6MV-500
C 009	1	21-80342B51	CAPACITOR	5000PF-6MV-500
C 010	1	21-80342B51	CAPACITOR	5000PF-6MV-500
C 011	1	21-80342B51	CAPACITOR	5000PF-6MV-500
CR001	1	48-87643C01	DIODE	
FL001	1	91-80342B25	FILTER	
FL002	1	91-80342B25	FILTER	
FL003	1	91-80342B25	FILTER	
FL004	1	91-80342B25	FILTER	
FL005	1	91-80342B25	FILTER	
FL006	1	91-80342B25	FILTER	
FL007	1	91-80342B25	FILTER	
FL008	1	91-80342B25	FILTER	
FL009	1	91-80342B25	FILTER	
FL010	1	91-80342B25	FILTER	
FL011	1	91-80342B25	FILTER	
FL012	1	91-80342B25	FILTER	
J 001	1	28-80342B87	CONNECTOR, MODIFIED	
J 002	1	28-80342B88	CONNECTOR	MODIFIED
J 004	1	28-80342B89	CONNECTOR	MODIFIED
J 005	1	28-80342B89	CONNECTOR	MODIFIED
J 007	1	09-80331A70	CONNECTOR	PHONE JACK
J 008	1	28-80342B88	CONNECTOR	MODIFIED
J 009	1	28-80342B88	CONNECTOR	MODIFIED
J 010	1	09-80340B39	CONNECTOR	
R 003	1	06-00185A19	RESISTOR	56-5-1/8
RT001	1	06-83600K05	THERMISTOR	
S 001	1	40-80369A08	WAFER SWITCH, 14 POS	
S 002	1	40-80335A80	SWITCH, TOGGLE	SPDT
W 001	1	30-80344B06	CABLE ASSEMBLY-W1	
W 002	1	30-80344B08	CABLE ASSEMBLY-W2	ANTENNA/A1
W 004	1	30-80344B09	CABLE ASSEMBLY-W4	

**W001 Cable Assembly (W1)
30-80344B06**

P 001 1 09-80331A75 CONNECTOR
P 002 1 09-80343B86 CONNECTOR

**W002 Cable Assembly (W2)
30-80344B08**

P 002 1 09-80331A75 CONNECTOR

**W004 Cable Assembly (W4, Duplex/A3)
30-80344B09**

J 006 1 28-80342B90 CONNECTOR, BNC
P 001 1 09-80331A75 CONNECTOR

**RF INPUT MODULE (A17)
IEEE OPTION
(RTL-1023A)
Figure 21-4. Assembly and Parts List**

