

APPENDIX D

8607A/21.4AMP

21.4 MHz AMPLIFIER/10 MHz REFERENCE OPTION

WJ P/N 181694-001, Revision A

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8607A/21.4AMP 21.4 MHz AMPLIFIER/10 MHz REFERENCE OPTION

APPENDIX D

REVISION RECORD

Revision	Description	Date
A	Initial issue.	7/99

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21.4 MHz AMPLIFIER/10 MHz REFERENCE OPTION**

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APPENDIX D

**TYPE 8607A/21.4AMP
21.4 MHz AMPLIFIER/10 MHz REFERENCE OPTION**

D.1 ELECTRICAL DESCRIPTION

The 8607A/21.4AMP 21.4 MHz Amplifier/10 MHz Reference option provides two additional functions to the WJ-8607A Receiver: it provides a means of amplifying the 21.4 MHz output of the receiver by 30 dB, and provides the receiver’s 10 MHz reference signal at an external connector. When this option is installed, the 21.4 MHz IF output at the front panel of the Miniceptor is routed to a rear panel SMA connector via an external cable. The option then amplifies the IF signal by 30 dB before being routed to another rear panel SMA connector.

A third rear panel SMA connector provides a 10 MHz reference output at –14 dBm minimum. This 10 MHz reference is the same signal used by the receiver’s internal synthesizer. This reference can be used to phase match an external signal monitor or other device with the receiver.

Table D-1 provides a list of specifications for the 8607A/21.4AMP option.

D.2 MECHANICAL DESCRIPTION

The 8607A/21.4AMP option attaches to the rear of the Miniceptor adding 2.85 inches to the overall length of the unit (see **paragraph D.3** for installation instructions). Cables are provided with the option for internal electrical connection of the option to the Miniceptor. External cables are not provided.

The option consists of internal cabling and one 21.4 MHz IF Amplifier PC Assembly, enclosed in an aluminum chassis.

Table D-1. Specifications for the 8607A/21.4AMP Option

21.4 MHz Amplifier Gain	30 dB (±2 dB)
21.4 MHz 3 dB Bandwidth.....	8 MHz
3rd Order Output Intercept Point.....	+26 dBm minimum
10 MHz Reference Output.....	-14 dBm
Power Requirements	+12 Vdc at 130 mA (supplied from receiver)
Dimensions	1.5" x 6.5" x 2.85" (3.8 x 16.5 x 7.3 cm)
Weight	1.5 pounds (680 grams)

D.3 INSTALLATION

The 8607A/21.4AMP option may be installed at the factory or in the field. For field installation perform the following procedures:

WARNING

A shock hazard exists when performing the following procedures with power applied to the Miniceptor. Ensure power is removed from the Miniceptor before proceeding.

1. Disconnect all cabling from the Miniceptor.
2. Referring to **Figure D-1**, remove all screws to detach the rear panel of the Miniceptor.
3. Remove all screws to detach the front panel.
4. Carefully lift the top half of the unit from the bottom half and spread open clockwise, similar to opening a book (see **Figure D-2**).
5. Referring to **Figure D-3**, align the 8607A/21.4AMP Option with the rear top half of the Miniceptor and hand tighten the retaining screw of the option into the Miniceptor's chassis.
6. Connect option cable W1 to connector J3 of the Synthesizer module.
7. Connect option plug P1 to connector J4 of the Digital Controller module. The pin identified with a white dot on P1 inserts to pin receptacle 1 of J4. Refer to **Figure D-4** for wiring detail of plug P1.

CAUTION

Damage may occur to internal cabling and wiring if pinched or bent sharply when re-installing the top half of the unit to the bottom half. Ensure cables are properly positioned when reinstalling.

8. Ensuring all cabling is positioned properly, realign the bottom half of the Miniceptor with the top half.
9. Tighten the two retaining screws on the rear of the 8607A/21.4AMP option to secure it to the Miniceptor's chassis.

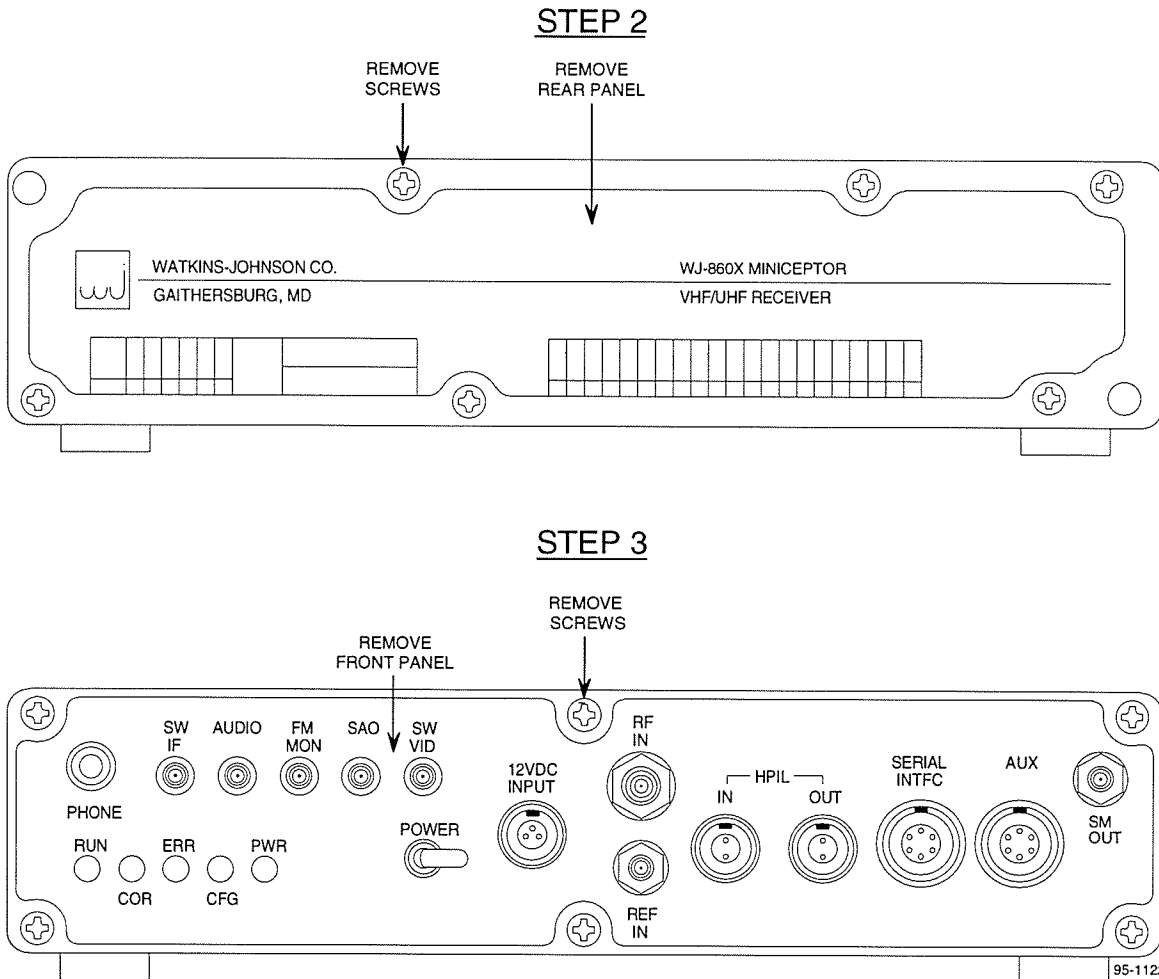


Figure D-1. Removing the Minicaptor’s Front and Rear Panels

10. Using a scribing tool, mark the option label on the rear panel of the 8607A/21.4AMP option. Mark the same option and IF bandwidths that were marked on the rear panel that was removed in **step 2**. Write the serial number of the receiver in the space provided at the serial number location on the rear panel.
11. Reinstall the front panel with the screws that were removed in **step 3**. The Minicaptor may now be reconnected for operation.

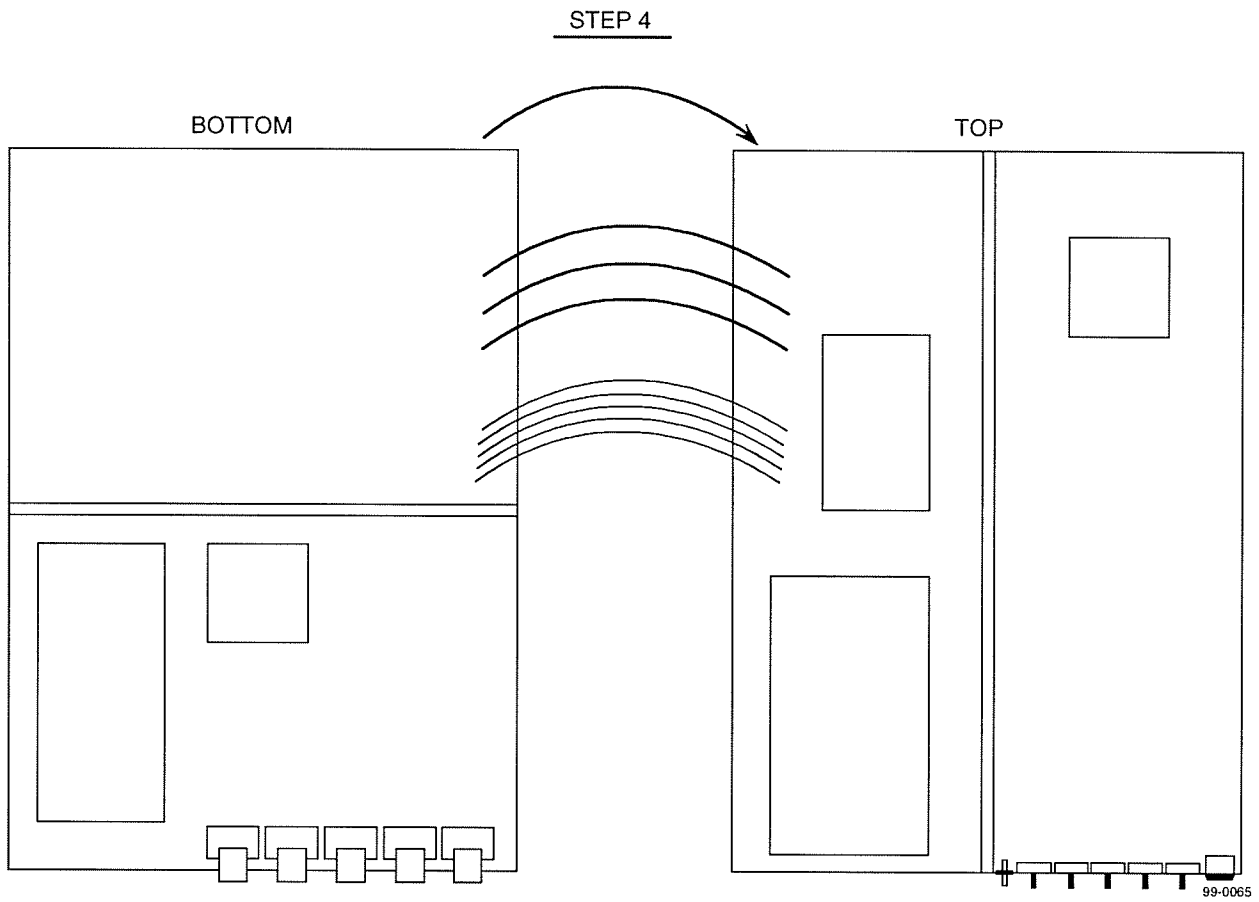


Figure D-2. Opening the Miniceptor

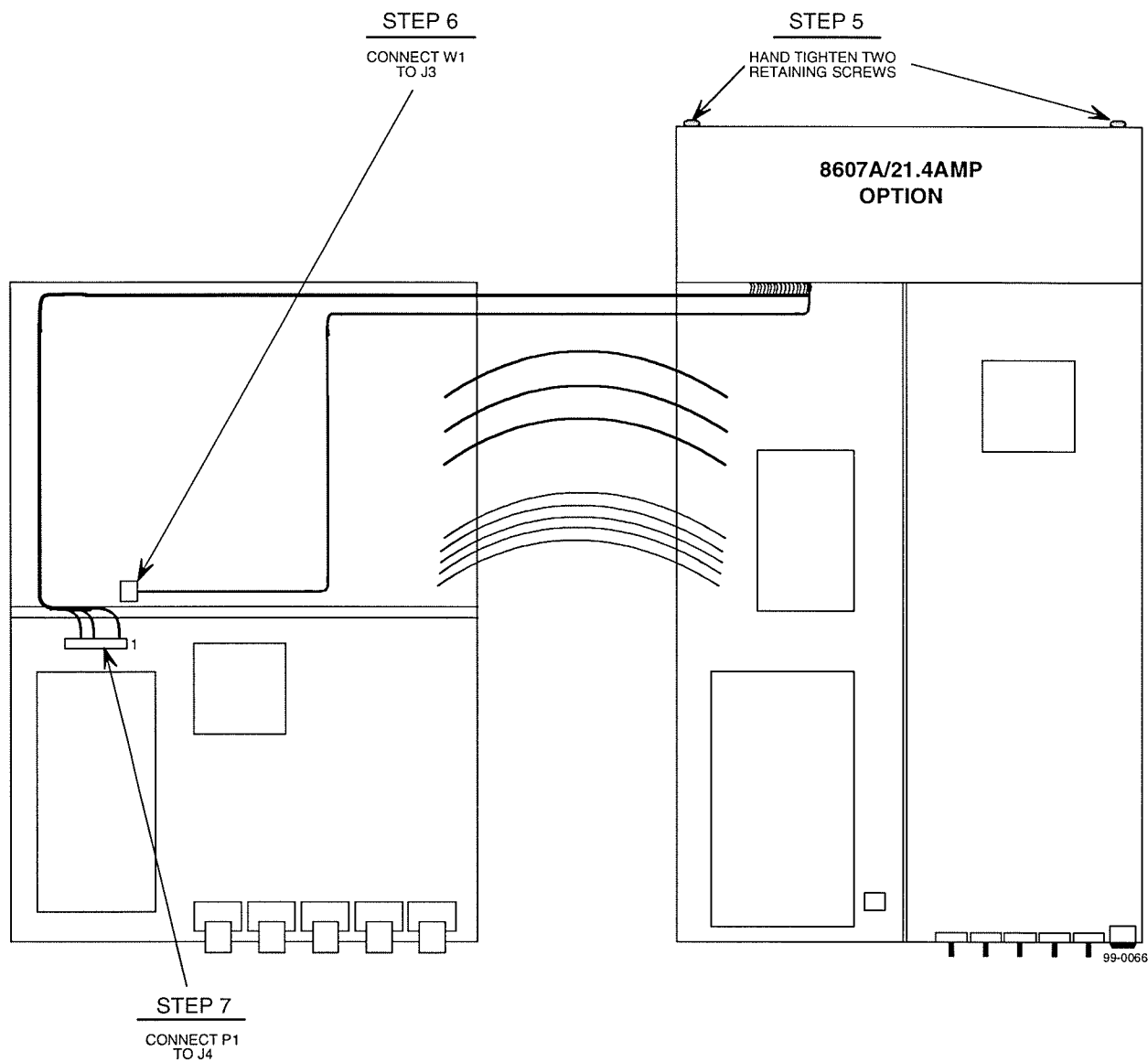


Figure D-3. Installing the Option and Connecting Internal Cables

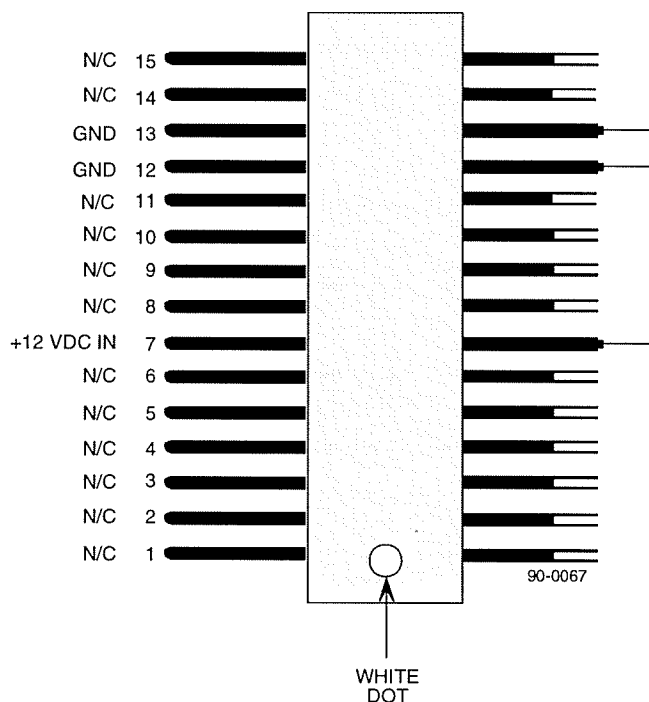


Figure D-4. Wiring Detail of Internal Plug P1

D.4 INPUT AND OUTPUT CONNECTORS

Three additional external connectors are provided when the 8607A/21.4AMP option is installed. **Figure D-5** shows the location of these connectors on the option's rear panel. The following paragraphs provide details on the connectors and their signals.

D.4.1 10 MHz REFERENCE OUTPUT (J1)

This SMA connector provides the 10 MHz, -14 dBm reference from the Miniceptor's internal reference generator. The output impedance at this female connector is 50 ohms.

D.4.2 21.4 MHz IF INPUT (A1J1)

This connector accepts the 21.4 MHz switched IF input signal from the Miniceptor's front panel SW IF connector. An external SMA-to-SMA cable is required. Nominal input impedance at this female connector is 50 ohms.

D.4.3 **21.4 MHz IF OUTPUT (A1J2)**

This SMA connector provides the amplified 21.4 MHz IF output of the option. The output level is 30 dB greater than what is input at the 21.4 MHz IF Input connector (A1J1). The signal is centered at 21.4 MHz with a bandwidth of 8 MHz. The output impedance at this female connector is 50 ohms.

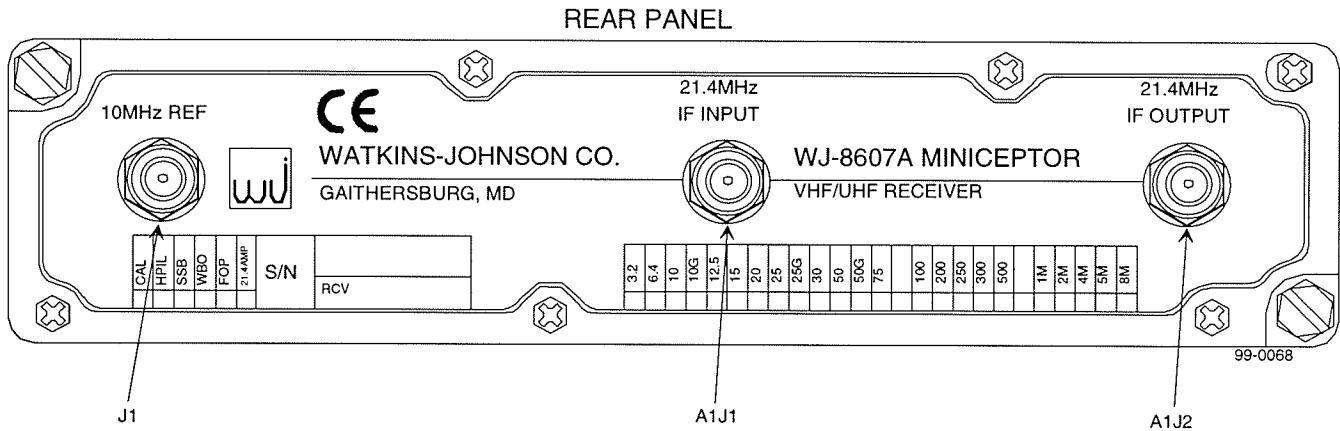


Figure D-5. Location of Rear Panel Connectors on the 8607A/21.4 AMP Option

D.5 **FUNCTIONAL DESCRIPTION**

Figure D-6 is a functional block diagram of the 8607A/21.4AMP option. The 21.4 MHz SW IF output of the Miniceptor is connected to the 21.4 MHz IF INPUT connector on the rear panel of the option. From here, the input is applied to two amplifiers, each providing 20 dB of gain to the signal, and an 8 dB attenuator. The amplifiers are powered by +8Vdc. This voltage is received from an onboard +8 Vdc voltage regulator that uses a +12 Vdc input from the Miniceptor’s power supply circuits. After being amplified, the 21.4 MHz IF signal is applied to a 8 MHz bandpass filter, which provides 2 dB loss to the signal. The resultant 8 MHz wide, 21.4 MHz IF signal is then output at the options’ rear panel 21.4 MHz IF OUTPUT connector A1J2. Its overall gain is +30 dB.

As shown in **Figure D-6**, the 10 MHz reference output signal at the option’s rear panel 10 MHz REF connector J1 is routed directly from the Miniceptor’s reference generator via internal cables. This output is the same reference signal used by the receiver’s internal local oscillators and has a nominal level of -14 dBm.

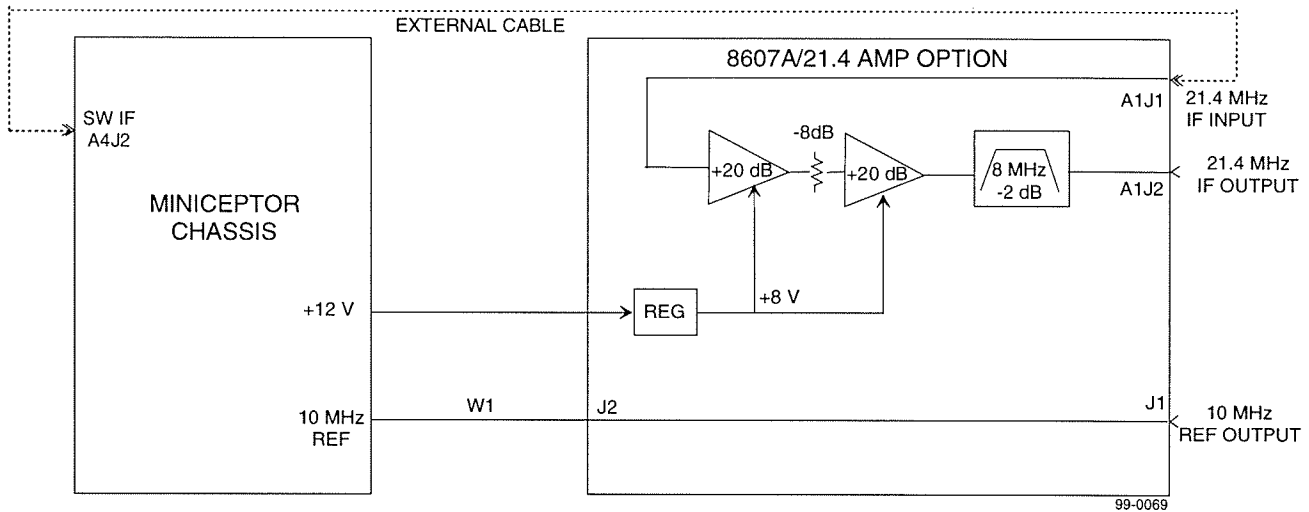


Figure D-6. Functional Block Diagram

D.6 UNIT NUMBERING METHOD

The method of numbering used throughout the unit is assigning reference designations (electrical symbol numbers) to identify: assemblies, subassemblies, modules within a subassembly, and discrete components. An example of the unit numbering method used is as follows:

Subassembly Designation A1

R1 Class and No. of Item

Identify from right to left as:

First (1) resistor (R) of
first (1) subassembly (A)

On the main chassis schematic, components which are an integral part of the main chassis have no subassembly designations.

D.7 REFERENCE DESIGNATION PREFIX

The use of partial reference designations are used on the equipment and on the manual illustrations. This partial reference designation consists of the component type letter(s) and the identifying component number. The complete reference designation may be obtained by placing the proper prefix before the partial reference designation. Reference designation prefixes are included on the drawings and illustrations in the figure titles (in parenthesis).

D.8 LIST OF MANUFACTURERS

<u>Code</u>	<u>Name and Address</u>	<u>Mfr. Code</u>	<u>Name and Address</u>
0GP12	Radiall, Inc. 150 Long Beach Blvd. Stratford, CT 06497	17826	Techno Components Corp. 7803 Lemona Avenue Van Nuys, CA 91405-1193
0SRA2	Interconnection Products Ltd Pevevil House Castleton Sheffield S30 2wr United Kingdom	19505	Applied Eng. Products Co. Division of Samarious, Inc. 300 Seymour Avenue Derby, CT 06418
00779	AMP, Inc. P.O. Box 3608 Harrisburg, PA 17150	25088	Siemens America, Inc. 186 Wood Avenue S. Iselin, NJ 08830
03550	Vanguard Electronics Co. Inc. 1480 West 178th St. Gardena, CA 90248-3202	29990	American Technical Ceramics One Norden Lane Huntington Station, NY 11746
04713	Motorola Incorporated Semiconductor Products Div. 5005 East McDowell Road Phoenix, AZ 85008	31433	Kemet Electronics Corp 2835 Kemet Way Simpsonville, SC 29681-2457
14632	Watkins-Johnson Company 700 Quince Orchard Road Gaithersburg, MD 20878-1794	59660	Tusonix Inc. 7741 N Business Park Drive P.O. Box 37144 Tucson, AZ 85740-7144
15542	Mini-Circuits Laboratory 13 Neptune Avenue P.O. Box 350165 Brooklyn, NY 11235	72982	Erie Technological Products 644 West 12th Street Erie, PA 16512

D.9 PARTS LIST

The following parts lists contain the major electrical components used in the 8607A/21.4AMP Option, along with mechanical parts which may be subject to unusual wear or damage. **Paragraph D.10** provides the parts listing for the option. When ordering replacement parts from the Watkins-Johnson Company, specify the unit type, the serial number, and the option configuration. Also include the reference designation and the description of each item ordered. The list of manufacturers, provided in the base manual, and the manufacturer's part number, provided in **paragraph D.10**, are supplied as a guide to aid the user of the equipment while in the field. However, the parts listed may not necessarily be identical with the parts installed in the unit. However, the parts listed in **paragraph D.10** will provide for satisfactory unit operation.

Replacement parts may be obtained from any manufacturer provided that the physical characteristics and electrical parameters of the replacement item are compatible with the original part. In the case where components are defined by a military or industrial specification, a vendor which can provide the necessary component is suggested as a convenience to the user.

NOTE

As improvements in semiconductors are made, it is the policy of Watkins-Johnson to incorporate them in proprietary products. As a result, some transistors, diodes and integrated circuits which are installed in the unit may not agree with the parts lists or schematic diagrams of this manual. However, substitution of the semiconductor devices listed in this manual may be substituted with satisfactory results.

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
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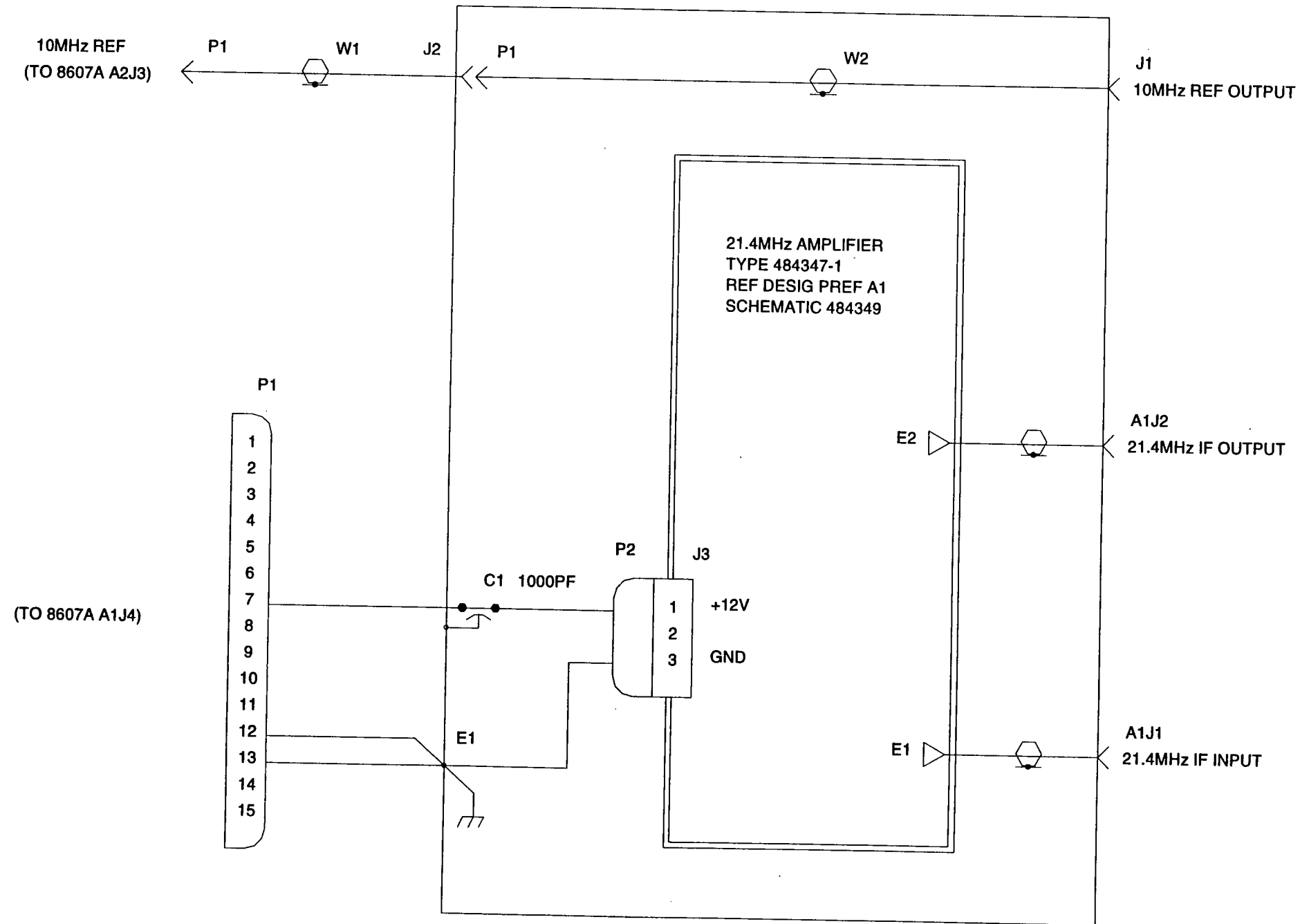
D.10 **8607A/21.4AMP 21.4 MHz AMPLIFIER/10 MHz
REFERENCE OPTION**

MAIN CHASSIS

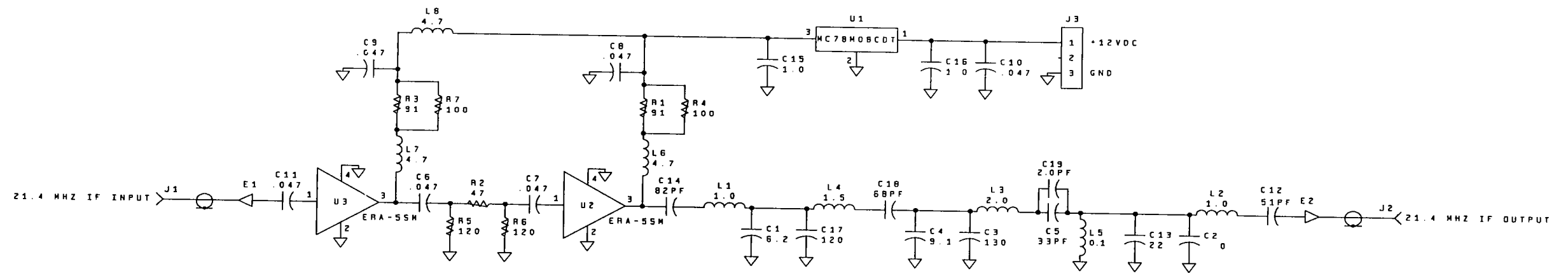
Revision 01

A1	21.4 MHz IF Amplifier PC Assembly	1	484347-001	14632	
C1	Capacitor, Feedthru, EMI, 1000 pF, 100V, 10A	1	4400-077	59660	
E1	Terminal, Feedthru	1	160-2004-02-01	0SRA2	
P1	Connector, Strip, Modification	1	28220-002	14632	
P2	Connector, Plug, Multipin	1	102241-1	00779	
W1	Cable Assembly	1	17300-786-001	14632	
W1J2	Connector, Jack, SMC, Straight, Male	1	1003-7571-019	19505	
W1P1	Connector, MCX Right Angle	1	R113-182	0GP12	
W2	Cable Assembly	1	17300-786-002	14632	
W2J1	Connector, Jack, SMA, Right Angle, Male	1	9613-9523-019	19505	
W2P1	Connector, Plug, Right Angle	1	1105-1521-019	19505	

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
D.10.1	TYPE 484347-001 21.4 MHz IF AMPLIFIER PC ASSEMBLY				REF DESIG A1
	Revision B				
C1	Capacitor, Ceramic: 6.2 pF, $\pm 1\%$, 150 V	1	ATC100A6R2BW150X	29990	
C2	Capacitor, Ceramic: 510 pF, $\pm 2\%$, 50 V NPO	1	841416-066	14632	
C3	Capacitor, Ceramic: 130 pF, $\pm 2\%$, 50 V NPO	1	C0805C131G5GAC	31433	
C4	Capacitor, Ceramic: 9.1 pF, $\pm 1\text{pF}$, 150 V	1	ATC100A9R1BW150X	29990	
C5	Capacitor, Ceramic: 33 pF, $\pm 2\%$, 50 V NPO	1	C0805C330G1GAC	31433	
C6	Capacitor, Ceramic: .047 μF , $\pm 10\%$, 50 V	6	GRM40X7R473K050BD	72982	
C7					
thru	Same as C6				
C11					
C12	Capacitor, Ceramic: 51 pF, $\pm 2\%$, 50 V NPO	1	C0805C510G1GAC	31433	
C13	Capacitor, Ceramic: 22 pF, $\pm 2\%$, 50 V NPO	1	GRM40COG220G050BD	72982	
C14	Capacitor, Ceramic: 82 pF, $\pm 2\%$, 50 V NPO	1	C0805C820G1GAC	31433	
C15	Capacitor, Tantalum: 1.0 μF 20% 35V	2	841293-33	14632	
C16	Same as C15				
C17	Capacitor, Ceramic: 120 pF, $\pm 2\%$, 50 V NPO	1	C0805C121G1GAC	31433	
C18	Capacitor, Ceramic: 168 pF, $\pm 2\%$, 50 V NPO	1	GRM40COG680G050BD	72982	
C19	Capacitor, Ceramic: 2.0 pF, $\pm 1\text{ pF}$, 50 V NPO	1	841416-008	14632	
E1	Terminal, Cable, Right Angle, PC Mount	2	8145-7521-019	19505	
E2	Same as E1				
J1	Connector, Jack, SMA, Straight	2	9230-9553-019	19505	
J2	Same as J1				
J3	Connector, Header, Receptacle, 3-Pin	1	103361-1	00779	
L1	Inductor: 1000 nH, $\pm 5\%$	2	26024NT	03550	
L2	Same as L1				
L3	Inductor: 2000 nH, $\pm 5\%$	1	841438-056	14632	
L4	Inductor: 1500 nH, $\pm 5\%$	1	26026NT	03550	
L5	Inductor: 100 nH, $\pm 5\%$	1	26012NT	03550	
L6	Inductor: 4.7 μH , $\pm 20\%$	3	B82412-A1472-K	25088	
L7	Same as L6				
L8	Same as L6				
R1	Resistor, Fixed: 91 Ω , 5%, 1/8 W	2	841296-040	14632	
R2	Resistor, Fixed: 47 Ω , 5%, 1/10 W	1	CRCW0805470J	17826	
R3	Same as R1				
R4	Resistor, Fixed: 100 Ω , 5%, 1/8 W	2	CRCW1206101J	17826	
R5	Resistor, Fixed: 120 Ω , 5%, 1/10 W	2	CRCW0805121J	17826	
R6	Same as R5				
R7	Same as R4				
U1	Regulator, Voltage, +8V	1	MC78M08CDT	04713	
U2	Amplifier	2	ERA-5SM	15542	
U3	Same as U2				



FO-D-1. Type 8607A/21.4AMP 21.4 MHz Amplifier/10 MHz Reference Option, Main Chassis Schematic Diagram 384775 (01)
FP-D-1/(FP-D-2 blank)



FO-D-2. Type 484347-001 21.4 MHz IF Amplifier PC Assembly, A1
Schematic Diagram 484349 (B)
FP-D-3/(FP-D-4 blank)