APPENDIX B

TYPE WJ-8711/PRE

SUBOCTAVE PRESELECTOR OPTION

P/N 900826-001, Revision B

Signia-IDT, Inc.
700 Quince Orchard Road
Gaithersburg, Maryland 20878-1794

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PROPRIETARY STATEMENT

Unless otherwise noted, all references to the WJ-8711 references to the WJ-8711 Digital HF Receiver are also applicable to the WJ-8711A and WJ-2001 versions.

LIST OF EFFECTIVE PAGES

Page Number	Description	Revision
i	Cover	B
ii	Proprietary Statement	B
iii	List of Effective Pages	B
iv	Intentionally Blank	A
v	Revision Record	B
vi	Intentionally Blank	A
vii thru viii	Table of Contents	A
B-1 thru B-16	Appendix B	A
B-17	Appendix B	B
B-18 thru B-28	Appendix B	A
FP-i	Foldout Cover	A
FP-ii	Intentionally Blank	A
FP-B-1/(FP-B-2 blank)	Foldout	A
FP-B-3/(FP-B-4 blank)	Foldout	A

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TYPE WJ-8711/PRE SUBOCTAVE PRESELECTOR OPTION

REVISION RECORD

Revision	Description	Date
A	Initial Release	9/00
B	Incorporated ECO 042752.	01/03

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B.1 ELECTRICAL CHARACTERISTICS

The WJ-8711/PRE Suboctave Preselector option filters unwanted out-of-band signal energy from the RF applied to the WJ-8711 Digital HF Receiver. The WJ-8711/PRE option uses eleven preselector bands to improve WJ-8711 second and third order intercept performance. The WJ-8711 digitally selects the appropriate preselector filter based on the receiver's tuned frequency. The WJ-8711/PRE also features two RF overvoltage protection circuits. **Table B-1** lists the WJ-8711/PRE specifications.

Table B-1. WJ-8711/PRE Suboctave Preselector Option Specifications

Input Impedance	50 ohms, nominal
Output Impedance	50 ohms, nominal
Control	Digital, via multipin connector to the WJ-8711 tuner board
Second Order Intercept	> +60 dBm, typical
Third Order Intercept	> +30 dBm, typical
Input VSWR	2:1
Input Protection	Spark gap, > 1 watt relay threshold
Dimensions	6-1/4" x 5-5/8" x 1-5/16"
Operating Temperature Range	0°to +50°C
Power Requirements	+5 Vdc @ 200mA
	-12 Vdc @ 2 mA
	+12 Vdc @ 3 mA

B.2 MECHANICAL CHARACTERISTICS

The WJ-8711/PRE Suboctave Preselector option consists of the Type 797033-1 preselector assembly, one BNC cable assembly, and replacement EPROM A2U12. (EPROM A2U12 is only replaced in the WJ-8711 version.) The preselector assembly is housed in an aluminum chassis, which is installed inside the WJ-8711 on its rear panel.

The BNC cable measures six inches and has two male ends. This cable connects the preselector RF output to the WJ-8711 RF input.

EPROM A2U12 contains the internal control software necessary for the WJ-8711 to use the preselector. This chip replaces the current WJ-8711 A2U12 in units containing internal control software releases earlier than 1.40. (EPROM A2U12 is only replaced in the WJ-8711 version.)

B.3 CIRCUIT DESCRIPTIONS

B.3.1 TYPE 797033-1 PRESELECTOR ASSEMBLY, (A4)

Refer to the Type 797033-1 Preselector Assembly (A3) Block Diagram in **Figure B-1** as a reference for the following module description. For a more detailed component level illustration of the Preselector circuitry, refer to the Type 797033-1 Preselector Assembly schematic diagram, **FO-B-2**. RF is input to the Preselector from the rear panel at A4J1. K1 is normally energized which allows RF to be routed to one of the eleven filters. **Table B-2** lists the band, frequency range, insertion loss, 10 dB attenuation points, and type of each of the eleven filters. The receiver's operating frequency determines which filter is activated. Filter selection data from the Digital Assembly (A2), via the RF Assembly (A3), is loaded into a pair of shift registers. The outputs of the registers select the appropriate filter for the RF signal path. The RF is filtered and made available at A4J2 for use by the WJ-8711.

Power sensing at the preselector RF input protects the preselector and receiver from high-level RF signals. Power levels greater than 1W causes the input relay K1 to deenergize, opening the RF path. Spark gap protection at the preselector input shunts any voltages of 75 V or greater to ground.

B.3.1.1 Type 797033-1 Preselector Assembly Input Protection

Protection from high static voltages induced in the antenna is provided by the spark gap, V1. Levels exceeding 75V cause a "spark" to ground, discharging the hazardous voltages.

Controlling the state of the input relay, K1, performs protection from high-level RF signals. Under normal conditions Q2 is forward biased which applies a low DC voltage to one side of K1. This voltage energizes the input relay and allows RF to pass to the band filters. When the input RF at A4J1 reaches 1W, relay K1 is deenergized, removing the RF signal from the preselector. The input RF is scaled by R1 and R2, rectified by CR4, and filtered by C1 and R3 to produce a DC bias voltage to the base of Q1. When the input signal reaches 1W, the DC bias voltage is high enough to activate Q1. When Q1 is forward biased, a low is applied to the base of Q2, shutting the transistor off. With Q2 cut off, K1 deenergizes to protect the preselector and a logic high is sent to the Digital Assembly (A2), via the RF Assembly (A3) to indicate an overload (OVRLD) input condition.

B.3.1.2 Type 797033-1 Preselector Assembly Filter Selection

The appropriate filter or Band (A through K) is activated by control signals originating on the Digital Assembly (A2). These signals are routed to the Preselector Assembly (A4) anytime the Preselector option is installed in the WJ-8711 Receiver. A logic high PRE/OPT signal is sent to the Digital Assembly (A2), through the RF Assembly (A3), to inform the control microprocessor that frequency control data is required. The +5 Vdc, filtered by R46 and C233, provides the hard-wired PRE/OPT signal that is sent out P1, pin 9.

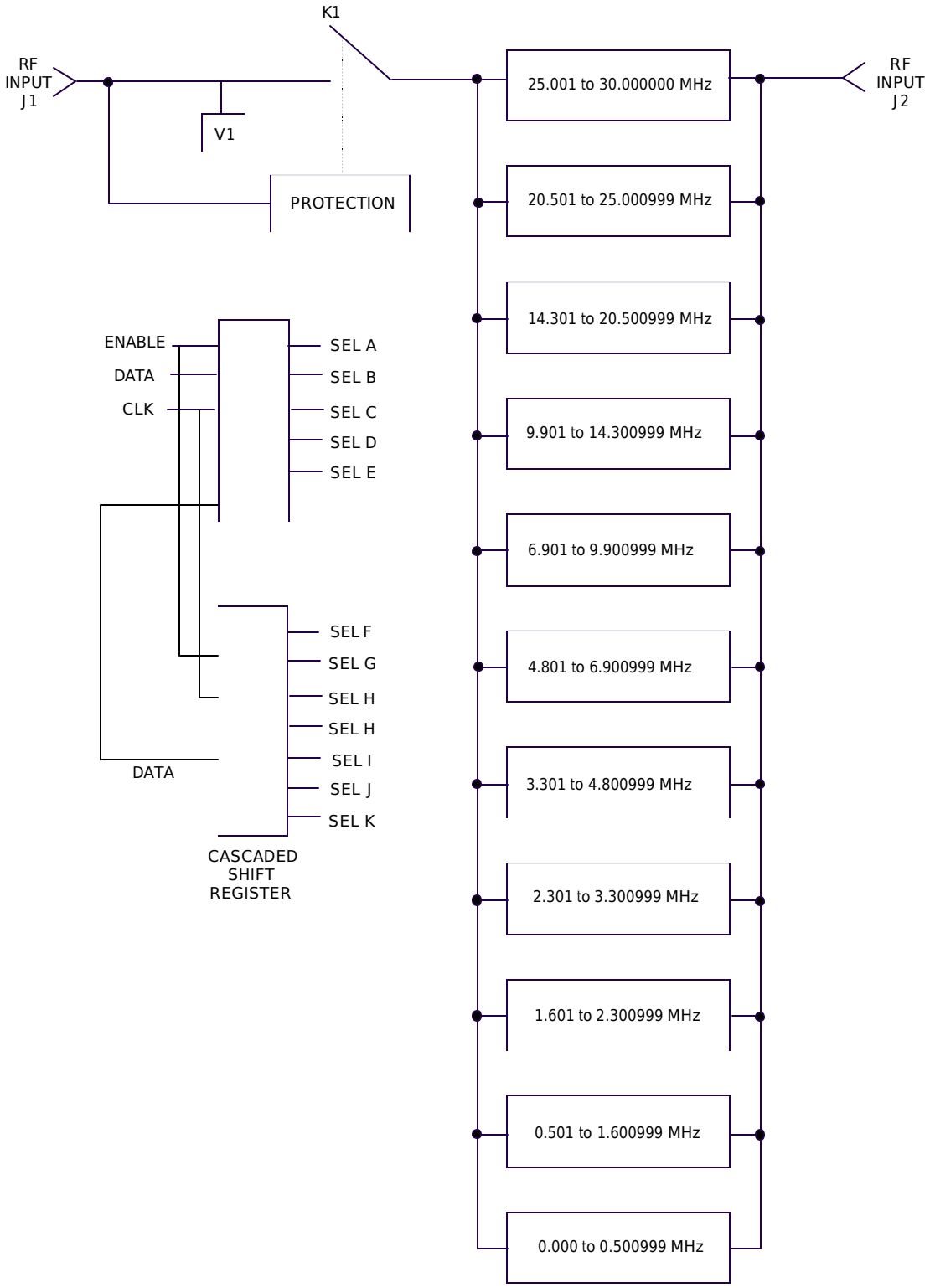

Figure B-1. Type 797033-1 Preselector Assembly (A4), Block Diagram

Table B-2. WJ-8711/PRE Suboctave Preselector Option Filter Information

Band	Frequency Range (MHz)	Insertion Loss (dB Typ.)	10 dB Attenuation Points (MHz Typ.)	Type
A	25.001 to 30.000000	2.5	18.7 and 36.9	Bandpass
B	20.501 to 25.000999	2.5	15.6 and 30.9	Bandpass
C	14.301 to 20.500999	2.0	8.4 and 30.8	Bandpass
D	9.901 to 14.300999	2.0	5.3 and 21.5	Bandpass
E	6.901 to 9.900999	2.0	3.7 and 14.9	Bandpass
F	4.801 to 6.900999	2.0	2.7 and 10.6	Bandpass
G	3.301 to 4.800999	2.0	1.9 and 7.1	Bandpass
H	2.301 to 3.300999	1.5	1.4 and 5.2	Bandpass
I	1.601 to 2.300999	1.5	0.9 and 3.6	Bandpass
J	0.501 to 1.600999	1.5	2.6	Lowpass
K	0.000 to 0.500999	2.0	0.8	Lowpass

The Digital Assembly (A2) routes three (3) control signals to the Preselector Assembly (A4) for filter selection: a Preselector Enable (PEN-#), a Preselector Clock (PCLK), and Preselector Data (PDATA). PEN-# is a strobe signal that is only active long enough to load data into the two shift registers, U1 and U2. When the signal is inactive (low), the outputs of U5-B and U5-C are held high, and the data and clock signals are disconnected from the shift registers. The clock signal, PCLK, is a sequence of eight-bit clock bursts that are used for timing of the serial data transfer. The PCLK signal is connected to the shift registers by U5-B. PDATA is a serial eight-bit data stream that is clocked into the shift registers during power-up and operating frequency changes.

U1 and U2 are cascaded together to form an eleven-bit shift register, with each output corresponding to a filter selection control signal. Once loaded into the shift register by receipt of the PEN-# strobe, the PDATA will cause a single low output of U1 (Q4 through Q8) or U2 (Q1 through Q6) for a band to be enabled. All other outputs of the shift register are high. The low output turns on the corresponding driver transistors (Q3 through Q13), which route approximately +3Vdc (SELA through SELK) to the required filter. This positive voltage forward biases the input and output diodes of the selected filter. For example, when the operating frequency is between 25.001 and 30.000 MHz, SELA is active and CR5 and CR6 is forward biased. At the same time, the input and output diodes of the other filters are held at cutoff by the applied –12Vdc.

B.3.1.3 Type 797033-1 Preselector Assembly RF Signal Path

The RF input from the antenna enters the Preselector Assembly (A4) at J1. The RF signal is routed through the normally closed contacts of K1, to a low pass filter, (L2, L3, C10, C13, C14, and C17). The low pass filter is designed to provide an input VSWR of < 2:1 for RF signals between 0 and 30 MHz. The RF is then passed through the activated filter, to the output of the Preselector Assembly (A4), at J2.

B.4 EQUIPMENT SUPPLIED

Equipment supplied with the WJ-8711/PRE Suboctave Preselector option consists of:

- 1 WJ-8711/PRE Suboctave Preselector Assembly (Type 797033-1)
- 1 six-inch BNC cable (WJ P/N 383140-1)
- Mounting hardware consisting of:
  a. Seven 4-40 x 5/16 large Pan Head Machine screws (P/N MS51957-14)
  b. Seven No. 4 Flat Washers (P/N MS15795-803)
  c. Seven No. 4 Lock Washers (P/N MS35338-135)
  d. Four Standoffs (P/N 20755-293)
  e. Two Star Washers
  f. Two BNC Mounting Nuts

B.5 EQUIPMENT REQUIRED BUT NOT SUPPLIED

A WJ-8711 Digital HF Receiver and a 50-ohm HF antenna are necessary to obtain full use of the WJ-8711/PRE Suboctave Preselector option.

B.6 INSTALLATION

The WJ-8711/PRE Suboctave Preselector option is installed in the WJ-8711 Digital HF Receiver at the factory when ordered with the receiver.

Follow the steps listed in **paragraph B.6.2** when back-fitting the WJ-8711 Digital HF Receiver with the WJ-8711/PRE Suboctave Preselector option.

B.6.1 CONNECTOR SIGNALS

When installed, all WJ-8711/PRE option external connectors are located on the rear panel of the WJ-8711. **Table B-3** lists these connectors and provides a brief description of each. **Figure B-2** shows the location of these connectors.

Table B-3. List of WJ-8711/PRE Option External Connectors

Connector	Reference Designation	Function
Preselector RF Input	A4J1	BNC female. RF input from antenna.
Preselector RF Output	A4J2	BNC female. Preselected RF output for use by the WJ-8711 RF IN connector (A3J1).

Connector A4P1 contains all the power and control signals necessary for WJ-8711/PRE option operation. **Table B-4** lists the pins, signal names, signal functions, and the signal directions for connector A4P1.

Table B-4. List of WJ-8711/PRE Option A4P1 Connector Signals

Pin	Signal	Function	Direction
1	PDAT	Preselector Selection Data	Input
2	PCLK	Preselector Clock	Input
3	PEN-#	Preselector Enable Strobe	Input
4	OVRLD	RF Overload	Output
5	+5 Vdc	+5 Vdc Supply	Input
6	+12 Vdc	+12 Vdc Supply	Input
7	-12 Vdc	-12 Vdc Supply	Input
8	GND	Ground	Input
9	PRE/OPT	Preselector Identification	Output
10	NOT USED		

B.6.2 **FIELD-INSTALLING THE WJ-8711/PRE OPTION INTO THE WJ-8711**

1. Deenergize the WJ-8711 and disconnect the power cord from FL1J1 on the WJ-8711 rear panel.

2. Remove the WJ-8711 top cover.

3. If connected, disconnect the user-provided antenna from the RF IN connector, A3J1, on the WJ-8711 rear panel.

4. WJ-8711s (serial numbers 688 and above) have two 0.532-inch diameter preselector connector holes and three 0.145-inch diameter preselector mounting holes as shown in **Figure B-**1. Earlier WJ-8711s do not have these holes. If the WJ-8711 does not have these holes, use the information in **Figure B-2**, or the template in **Figure B-3**, to measure and mark the necessary WJ-8711 rear panel.

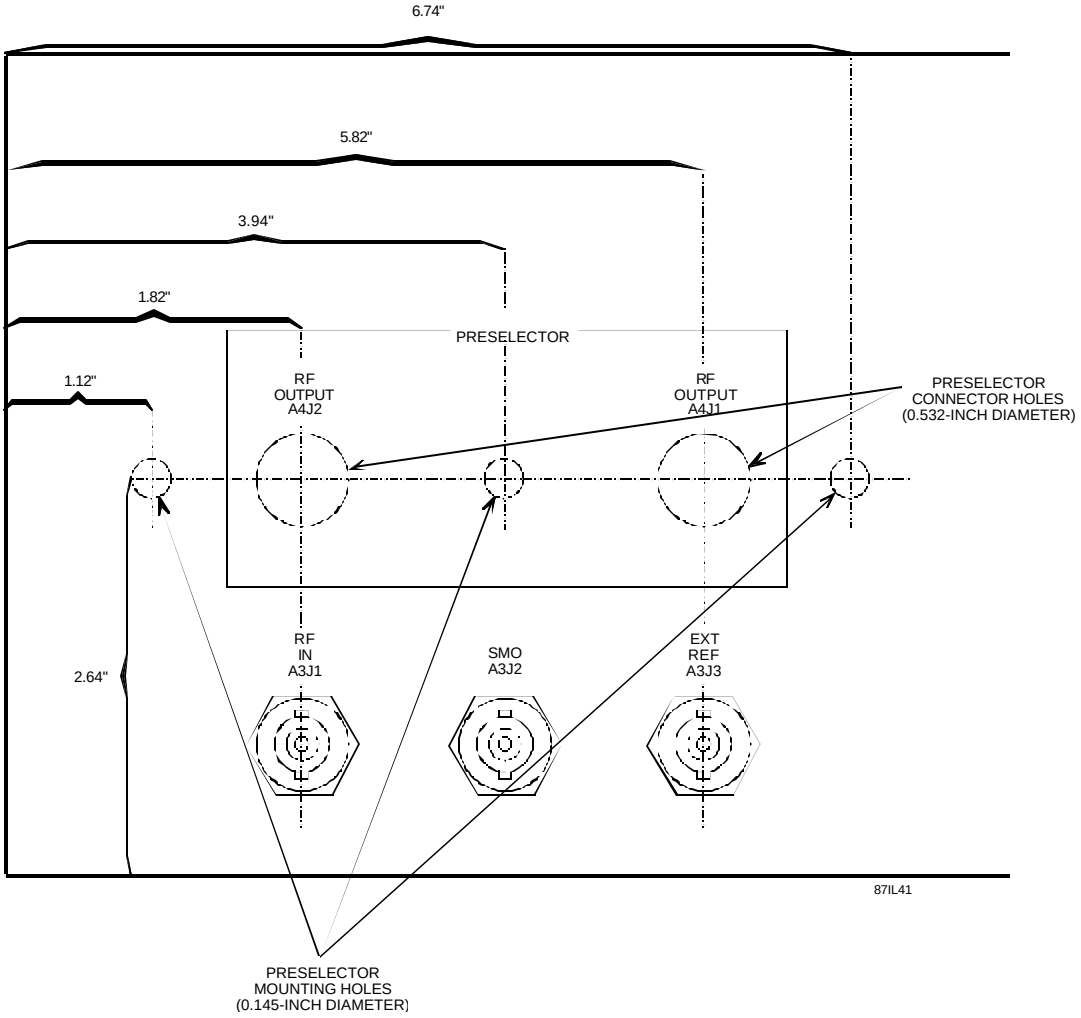

Figure B-2. WJ-8711 Rear Panel (Left Side) Showing Locations of Preselector Mounting and Connector Holes

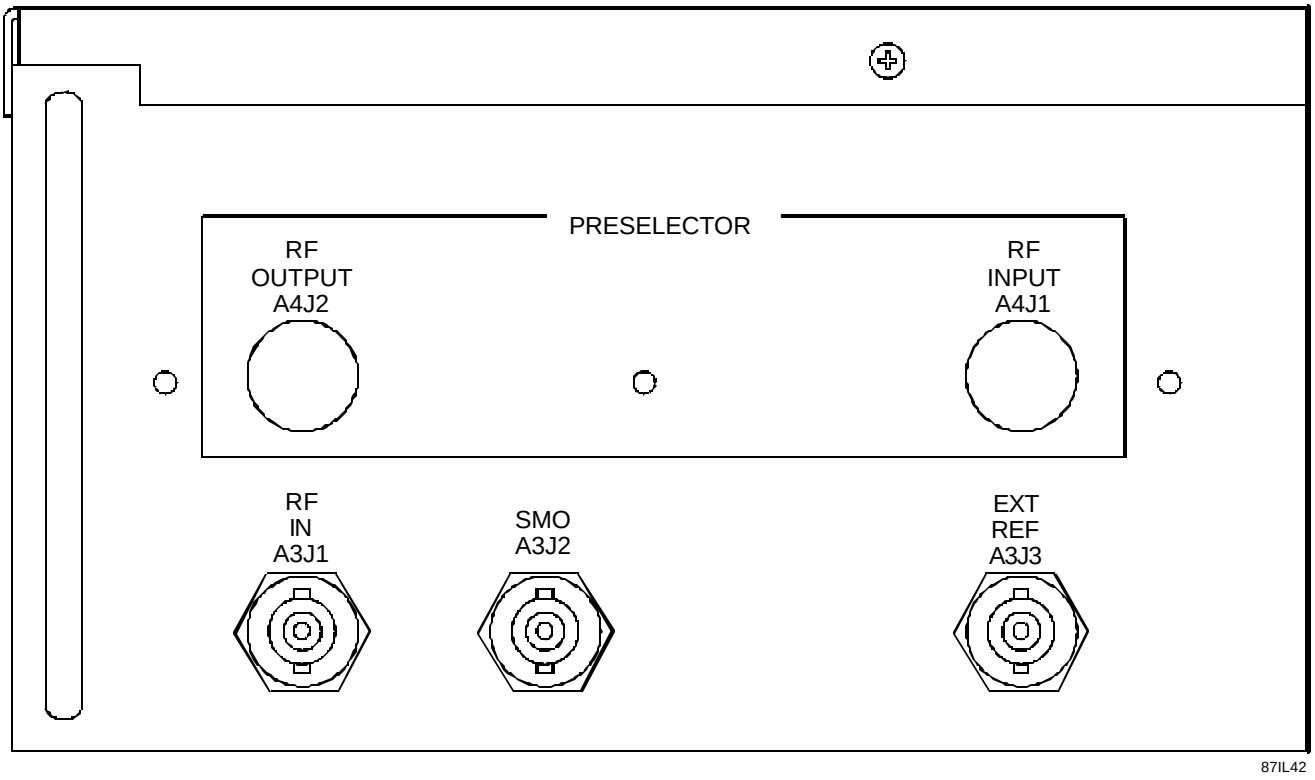

Figure B-3. WJ-8711/PRE Mounting Template

5. To use the template, photocopy the template. Cut out the five preselector holes, the three BNC holes, and the rear handle hole on the template photocopy. Place the template over the WJ-8711 rear panel (left side) and tape the template in place. Use a 0.532 inch drill bit to drill the two preselector connector holes and a 0.145-inch drill bit to drill the three preselector mounting holes in the WJ-8711 rear panel.

NOTE

Take care when drilling both the mounting holes and the connector holes. Ensure that no filings are introduced into the body of the receiver. The metal filings are conductive and can cause equipment malfunctions.

6. Remove the four screws from the RF assembly (A3) marked A, B, C, and D in **Figure B-4**.

7. Replace the four removed screws with the four provided standoffs. Mount each standoff with a lock washer and a flat washer between the standoff and the circuit board.

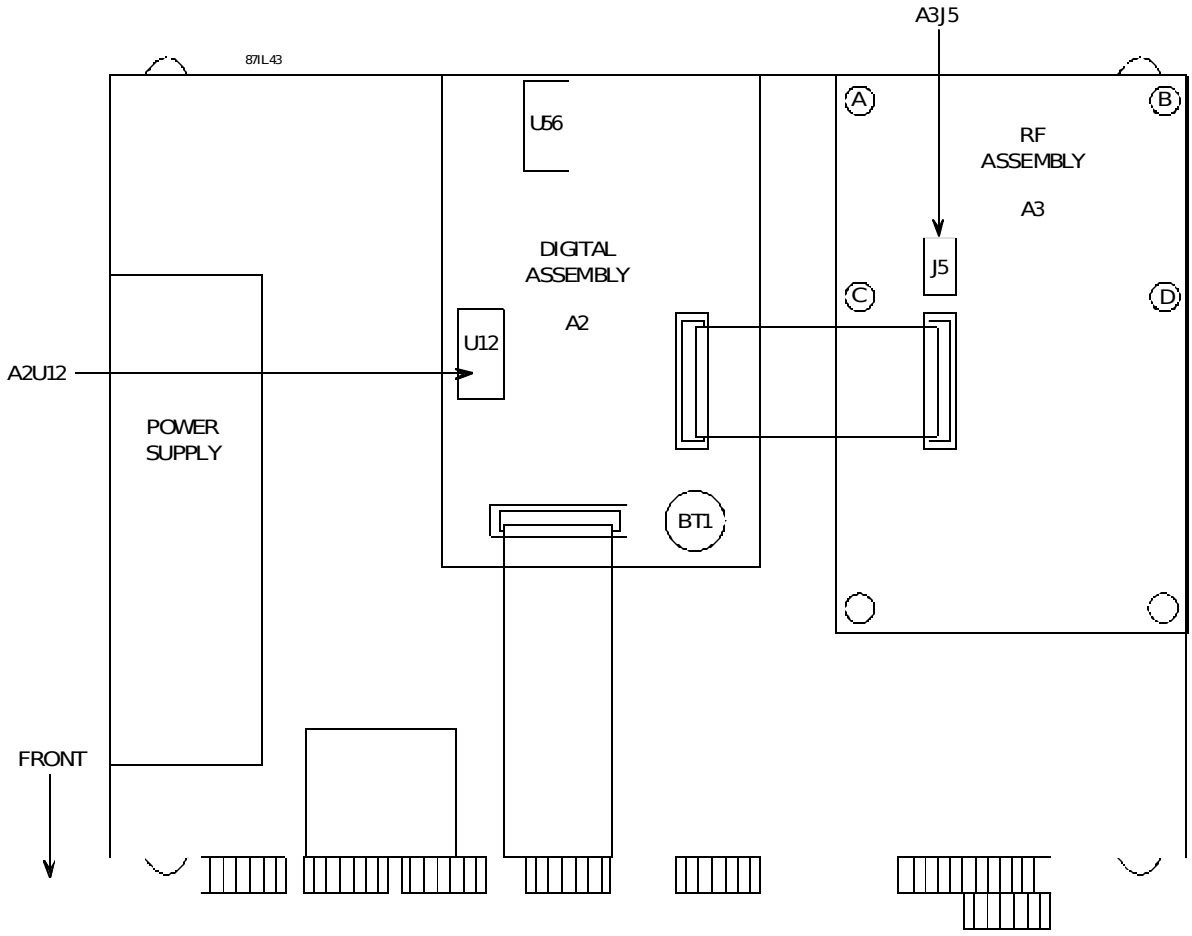

Figure B-4. WJ-8711 Top Down View (with Cover Removed) Showing Locations of A2U12 and A3J5

8. Lower the WJ-8711/PRE Suboctave Preselector assembly onto the standoffs, while ensuring that connectors A4J1 and A4J2 extend through the preselector connector holes (**Figure B-2**). Secure the preselector assembly to the standoffs using four of the provided screws and associated lock washers and flat washers. When installing the screws, ensure that a lock washer and a flat washer is installed between the screw and the preselector assembly.

9. Secure the preselector assembly to the rear panel of the WJ-8711 through the preselector mounting holes (**Figure B-2**) using three of the provided screws and associated lock washers.

10. Secure the preselector RF IN and RF OUT connectors to the WJ-8711 rear panel using the provided two star washers and two BNC mounting nuts.

11. Connect the free end of the preselector assembly-connected ribbon cable to A3J5 located on the Type 796949-1 RF assembly (A3) circuit board. Refer to **Figure B-4** for the location of A3J5.

12. Connect one end of the supplied BNC cable to the RF IN connector, A3J1, located on the WJ-8711 rear panel.

13. Connect the remaining end of the BNC cable to the preselector RF OUTPUT connector, A4J2, located on the WJ-8711 rear panel.

14. Visually check A2U12's software release. Refer to **Figure B-4** for the location of A2U12. If the release is earlier than 1.40, remove A2U12 and install the supplied A2U12 containing the necessary software release. If the release is later than 1.40, no replacement of A2U12 is needed.

15. Replace the WJ-8711 top cover.

16. Affix the Rear Panel Preselector Decal (**Figure B-5**) to the WJ-8711 rear panel as shown in **Figure B-2**.

17. Connect the user-provided antenna to the Preselector RF Input connector, A4J1, located on the WJ-8711 rear panel.

18. Connect the power cord to FL1J1 and energize the WJ-8711.

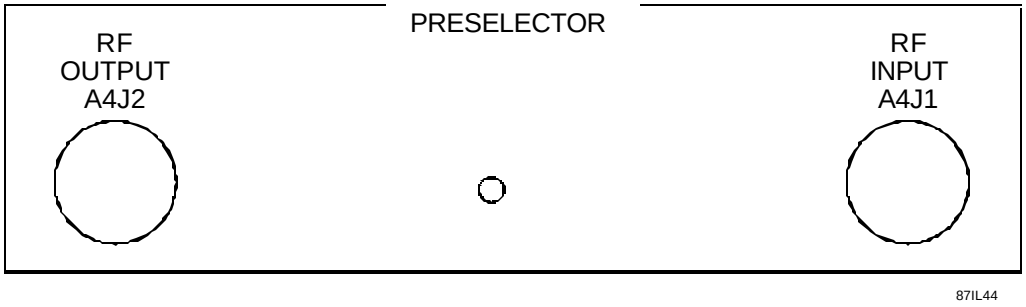

Figure B-5. WJ-8711/PRE Rear Panel Preselector Decal

B.7 OPERATION

Once installed, WJ-8711 digital control automatically detects and operates the WJ-8711/PRE Suboctave Preselector option.

B.7.1 PRESELECTOR OVERLOAD

During operations, the preselector continually checks its input for an overload condition. An overload condition exists when the power at the preselector RF Input (A4J1) is greater than one watt. When an overload exists, the WJ-8711 front panel displays the preselector overload message in the alphanumeric display in the Memory/Scan section of the front panel as shown below:

To reset the preselector overload message, press the CLEAR key, located in the Memory/Scan section of the WJ-8711 front panel.

During the overload, the overload-sensing circuit automatically protects the preselector by removing the applied RF signal from the preselector input. Accordingly, during the overload, the preselector sends no signal to the receiver. A preselector overload condition also sets bit 13 of the Device Dependent Error register. Refer to the base manual for more information on the Device Dependent Error register.

B.8 MAINTENANCE

B.8.1 TEST EQUIPMENT REQUIRED

Procedures for testing the WJ-8711/PRE Suboctave Preselector option have been developed for performance using a minimum of common test equipment. The test equipment listed in **Table B-5**, or equivalents, are required to perform the troubleshooting procedures and performance tests described in this section.

Table B-5. Required Test Equipment

Equipment	Recommended Type	Requirement
Signal Generator	Marconi 2031	Frequency Range to 30 MHz
Frequency Counter	Fluke 1953A	Frequency Range to 100 MHz
RF Millivoltmeter	Boonton 92B	dB Scale Referenced to 600 Ohm Load
RF Probe	Boonton 91-12F	
"T" Adapter	Boonton 91-14A	
50 Ohm Termination	Boonton 91-15A	
Digital Voltmeter	Fluke 8001A	DC Voltage Measurement

B.8.2 TROUBLESHOOTING AND FAULT ISOLATION

The test procedures that are provided in this section verify proper preselector operation and assist in fault isolation to a malfunctioning assembly or circuit. They have been developed to set known laboratory conditions that eliminate external conditions as a possible cause of the malfunction. Use performance tests in **paragraph B.8.3**, and the circuit descriptions in **paragraph B.3** to assist in fault isolation to a circuit within the Preselector Assembly (A4). The procedures provided assume the WJ-8711 Receiver functions properly with the WJ-8711/Pre Suboctave Preselector option removed.

B.8.3 WJ-8711/PRE SUBOCTAVE PRESELECTOR OPTION PERFORMANCE TESTS

1. Connect the WJ-8711 Receiver and test equipment as illustrated in **Figure B-6.**

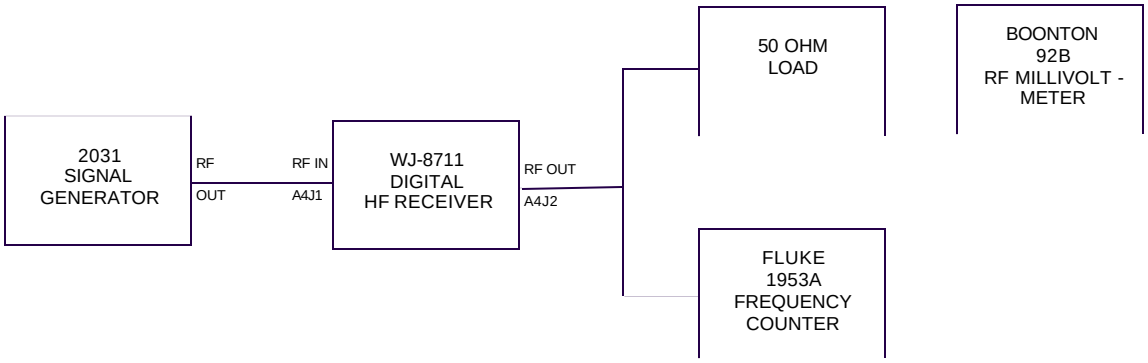

Figure B-6. WJ-8711/PRE Suboctave Preselector Option Test Equipment Connection

2. Set the signal generator as follows:

Frequency:	27.5000 MHz
Modulation:	OFF
Output Level:	-20 dBm

3. Set the WJ-2001 Receiver as follows:

Frequency:	27.5000 MHz

4. With the digital voltmeter measure the DC voltage at TP11. (Refer to **FO-B-1** for Test Point location.) The meter should indicate approximately +3 Vdc.

5. With the digital voltmeter measure the DC voltage at TP10 and TP12 through TP20. The meter should indicate approximately –12 Vdc.

6. Note the Preselector Assembly (A4) RF output level indicated by the RF millivoltmeter. The meter should indicate a signal level of greater than -23 dBm. (Refer to **Table B-2** for the expected insertion loss for each filter.)

7. Set the signal generator to 18.7000 MHz at -20 dBm. The RF millivoltmeter should indicate < -30 dBm.

8. Set the signal generator to 36.9000 MHz at -20 dBm. The RF millivoltmeter should indicate < -30 dBm.

9. Repeat **steps 2** through **8** for Bands B through K. Use the frequency and test points listed in **Table B-6**.

Table B-6. Performance Test Values and Parameters

Bands	Step 2	Step 3	Step 4	Step 5	Step 7	Step 8
B	22.5 MHz	22.5 MHz	TP12	TP10, TP11, TP13-TP20	15.6 MHz	30.9 MHz
C	17.5 MHz	17.5 MHz	TP13	TP10-TP12 & TP14-TP20	8.40 MHz	30.8 MHz
D	12.2 MHz	12.2 MHz	TP14	TP10-TP13 & TP15-TP20	5.30 MHz	21.5 MHz
E	8.40 MHz	8.40 MHz	TP15	TP10-TP14 & TP16-TP20	3.70 MHz	14.9 MHz
F	5.30 MHz	5.30 MHz	TP16	TP10-TP15 & TP17-TP20	2.70 MHz	10.6 MHz
G	4.00 MHz	4.00 MHz	TP17	TP10-TP16 & TP18-TP20	1.90 MHz	7.10 MHz
H	2.80 MHz	2.80 MHz	TP18	TP10-TP17 & TP19-TP20	1.40 MHz	5.20 MHz
I	1.90 MHz	1.90 MHz	TP19	TP10-TP18 & TP20	0.90 MHz	3.60 MHz
J	1.00 MHz	1.00 MHz	TP20	TP10-TP19	NA	2.60 MHz
K	0.25 MHz	0.25 MHz	TP10	TP11-TP20	NA	0.80 MHz

B.8.4 TROUBLESHOOTING PROCEDURES

1. Perform the test procedure in **paragraph B.8.3** noting which of the steps passed and which steps failed. It is important to complete the procedure for all eleven frequency Bands.

2. In **steps 4** and **5** of the performance test only one of the bands should measure +3 Vdc at the "SEL" test point while the remaining ten should measure –12 Vdc. Refer to **Table B-7** for the correct troubleshooting procedure.

Table B-7. Select Voltage Troubleshooting

All Bands passed **steps 4** and **5**	Voltages other than +3 Vdc and –12 Vdc are present.	Only one of the frequency bands failed **steps 4** and **5**.	Bands F through K failed **steps 4** and **5**.	All Bands failed **steps 4** and **5**.
Proceed to **step 9**	Proceed to **step 3**	Proceed to **step 6**	Proceed to **step 7**	Proceed to **step 8**

3. Voltages present other than +3 Vdc and –12 Vdc indicate a supply voltage problem. With a digital multimeter measure the DC voltage at TP8. If the digital multimeter does not indicate +5 Vdc proceed with **step 4**. If the voltage is correct, skip to **step 5**.

4. With a digital multimeter measure the DC voltage at either side of L61. If the digital multimeter does not indicate +12 Vdc the most likely faulty components are C225, C226, C227 or L61. If the DC voltage at L61 is correct, troubleshoot the U3/Q14 regulator circuit.

5. With a digital multimeter measure the DC voltage at TP3. If the digital multimeter does not indicate -12 Vdc the most likely faulty components are C228, C229, C230 or L60.

6. When only one of the frequency bands fail **steps 4** and **5**, the driver circuit is most likely faulty. The driver circuit for Band A consists of Q3, R8, C27 and C33. Refer to **Foldout FO-B-2** for the other ten circuits.

NOTE

It is possible for one of the shift register outputs to open. If the driver circuit is good, troubleshoot U1 or U2.

7. Replace U2.

8. If all frequency bands fail **steps 4** and **5**, either the Digital Assembly (A2) does not realize the preselector is installed or the control circuit is faulty. If E1 pin 9 is not a logic high (PRE/OPT), check R46, R70 and C233. If the PRE/OPT signal is present, troubleshoot U5, U1, U2 and R71.

9. **Steps 6** through **8** of the performance test, measure the preselector ability to filter in-band frequencies, with a minimal amount in **paragraph B.8.3** of insertion loss, while rejecting out-of-band signals. Refer to **Table B-8** for the correct troubleshooting procedure.

Table B-8. Frequency Response Troubleshooting

All Bands have no output. (**step 6**)	All bands have a low output. (**step 6**)	One band has no output. (**step 6**)	One band fails **steps 6, 7** or **8**.
Proceed to **step 10**.	Proceed to **step 11**.	Proceed to **step 12**.	Proceed to **step 13**.

10. When there is not an RF output present from the preselector, K1 is either faulty or deenergized. Check the DC voltage at TP2. If a low is present, check K1 and CR3. If a high is present at TP2, troubleshoot the Q1/Q2 circuit. Note: A secondary cause could be an open component in the RF path, i.e. C2, L2, L3 or C216.

11. Troubleshoot the low pass filter circuit L2, L3, C10, C13, C14 or C17.

12. When only one band fails to pass the RF signal, the fault circuit is most likely the input/output switch for that band. The input/output switch for Band A consists of CR5, CR6, R5, R6, R7, C21 and C36. Refer to **FO-B-2** for the other ten circuits. Note: A secondary cause could be an open component in the RF path, i.e. L4, C25, C30 or L6.

13. Failing **steps 6, 7** or **8** would indicate a faulty component in the filter circuit of the selected band. Refer to **FO-B-2** for the applicable components.

B.9 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).

B.10 LIST OF MANUFACTURERS

The manufacturers listed below are supply sources used for obtaining certain parts in the option, and are not listed in the base manual. All other manufacturers not listed below can be found in the base manual.

Mrf. Code	Name and Address
00779	AMP, Incorporated 2800 Fulling Mill Road P. O. Box 3608 Middletown, PA 17105-3608
16179	M/A-COM, Inc. M/A-COM Control Components Division 21 Continental Blvd. Merrimack, NH 03054
17540	Alpha Industries, Inc. Headquarters Semiconductor Division 20 Sylvan Road P. O. Box 1044 Woburn, MA 01801-1854
34371	Harris Corporation Semiconductor Sector 200 Palm Bay Blvd. P. O. Box 883 Melbourne, FL 32902-0833
71482	CP Clare Corporation 3101 W. Pratt Blvd. Chicago, IL 60645-4125
95348	Gordos Arkansas, Inc. 1000 N 2nd Street P. O. Box 824 Rogers, AR 72757

B.11 PARTS LIST

The following parts lists contain all the electrical components used in the unit, along with mechanical parts which may be subject to unusual wear or damage. When ordering replacement parts from the Signia-IDT, Inc., 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 **paragraph B.9**, and the manufacturer's part number, provided in **paragraph B.11.1**, are supplied as a guide to aid the user of the equipment while in the field. The parts listed may not necessarily be identical with the parts installed in the unit. The parts listed in **paragraph B.11.1** 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 Signia-IDT, Inc. 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, 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
B.11.1	**TYPE 8711/PRE PRESELECTOR OPTION**				
A4	Preselector Assembly	1	797033-1	14632	
	Resistor, Valriable, 10 KB Side Adjust Potentiometer	1	3269X-1-103	80294	
A4A1	Preselector PC Assy	1	482202-1	14632	

B.11.1.1 **Type 482202-1 Preselector PC Assy** REF DESIG PREFIX **A4A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
	Revision C1				
E1	Cable Assembly 10 POS M-4 IN LG GRAY 28AWG	1	IDMD-5-T-4-C-G	55322	
C1	Capacitor, Ceramic, .047µF ±10%, 50V 0805	41	841415-023	14632	
C2	Capacitor, Tantalum, 10µF ±20%, 35V	3	841293-17	14632	
C3					
Thru	Not Used				
C6					
C7	Capacitor, Tantalum, 68µF ±20%, 6.3V	2	841293-24	14632	
C8	Not Used				
C9	Not Used				
C10	Capacitor, Ceramic, 51pF ±2%, 50V 0805	2	841416-042	14632	
C11	Not Used				
C12	Not Used				
C13	Capacitor, Ceramic, 100pF ±2%, 50V 0805	10	841416-049	14632	
C14	Capacitor, Ceramic, 6.2pF ±.25pF 50V 0805	1	841416-020	14632	
C15	Not Used				
C16	Not Used				
C17	Same as C10				
C18					
Thru	Not Used				
C20					
C21	Same as C1				
C22	Capacitor, Ceramic, 33pF ±2%, 50V 0805	6	841416-037	14632	
C23	Capacitor, Ceramic, 6.8pF ±.25pF 50V 0805	7	841416-021	14632	
C24	Capacitor, Ceramic, 12pF ±2%, 50V 0805	5	841416-027	14632	
C25	Same as C23				
C26	Capacitor, Ceramic, 22pF ±2%, 50V 0805	5	841416-033	14632	
C27	Same as C1				
C28	Capacitor, Ceramic, 3.3pF ±.1pF 50V 0805	1	841416-013	14632	
C29	Same as C24				
C30	Capacitor, Ceramic, 4.7pF ±.1pF 50V 0805	1	841416-017	14632	
C31	Not Used				
C32	Same as C22				
C33	Capacitor, Tantalum, 6.8µF ±20%, 6.3V	10	841293-14	14632	
C34	Not Used				
C35	Not Used				
C36	Same as C1				
C37	Capacitor, Ceramic, 39pF ±2%, 50V 0805	4	841416-039	14632	
C38	Capacitor, Ceramic, 8.2pF ±.25pF 50V 0805	3	841416-023	14632	
C39	Same as C1				
C40	Capacitor, Ceramic, 56pF ±2%, 50V 0805	5	841416-043	14632	
C41	Same as C23				
C42	Same as C26				
C43	Same as C23				
C44	Capacitor, Ceramic, 27pF ±2%, 50V 0805	6	841416-035	14632	

REF DESIG PREFIX **A4A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
C45	Same as C38				
C46	Same as C26				
C47	Same as C23				
C48	Same as C1				
C49	Same as C33				
C50	Same as C23				
C51	Same as C40				
C52	Same as C38				
C53	Same as C37				
C54	Same as C1				
C55	Same as C26				
C56	Capacitor, Ceramic, 5.1pF ±.25pF 50V	2	841416-018	14632	
C57	Same as C1				
C58	Capacitor, Ceramic, 68pF ±2%, 50V 0805	5	841416-045	14632	
C59	Same as C24				
C60	Same as C13				
C61	Same as C44				
C62	Capacitor, Ceramic, 62pF ±2%, 50V 0805	5	841416-044	14632	
C63	Same as C23				
C64	Same as C13				
C65	Same as C44				
C66	Same as C24				
C67	Same as C58				
C68	Same as C1				
C69	Same as C33				
C70	Same as C56				
C71	Same as C26				
C72	Same as C1				
C73	Same as C13				
C74	Capacitor, Ceramic, 18pF ±2%, 50V 0805	3	841416-031	14632	
C75	Same as C1				
C76	Capacitor, Ceramic, 150pF ±2%, 50V 0805	6	841416-053	14632	
C77	Same as C44				
C78	Capacitor, Ceramic, 270pF ±2%, 50V 0805	7	841416-059	14632	
C79	Capacitor, Ceramic, 47pF ±2%, 50V 0805	8	841416-041	14632	
C80	Same as C1				
C81	Same as C58				
C82	Same as C24				
C83	Same as C79				
C84	Same as C78				
C85	Same as C44				
C86	Same as C33				
C87	Same as C76				
C88	Same as C74				
C89	Same as C13				

REF DESIG PREFIX **A4A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
C90	Same as C1				
C91	Same as C76				
C92	Same as C22				
C93	Same as C1				
C94	Capacitor, Ceramic, 220pF ±2%, 50V 0805	6	841416-057	14632	
C95	Same as C79				
C96	Capacitor, Ceramic, 330pF ±2%, 50V 0805	4	841416-061	14632	
C97	Capacitor, Ceramic, 82pF ±2%, 50V 0805	5	841416-047	14632	
C98	Same as C97				
C99	Same as C1				
C100	Same as C74				
C101	Same as C96				
C102	Same as C97				
C103	Same as C79				
C104	Same as C33				
C105	Same as C94				
C106	Same as C22				
C107	Same as C76				
C108	Same as C1				
C109	Capacitor, Ceramic, 180pF ±2%, 50V 0805	5	841416-055	14632	
C110	Same as C37				
C111	Same as C1				
C112	Same as C78				
C113	Same as C62				
C114	Capacitor, Ceramic, 470pF ±2%, 50V 0805	6	841416-065	14632	
C115	Same as C62				
C116	Same as C76				
C117	Same as C44				
C118	Same as C1				
C119	Same as C33				
C120	Same as C114				
C121	Same as C62				
C122	Same as C62				
C123	Same as C78				
C124	Same as C37				
C125	Same as C76				
C126	Same as C1				
C127	Same as C94				
C128	Same as C1				
C129	Same as C22				
C130	Same as C96				
C131	Same as C97				
C132	Same as C1				
C133	Capacitor, Ceramic, 680pF ±2%, 50V 0805	4	841416-069	14632	
C134	Same as C79				

REF DESIG PREFIX **A4A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
C135	Same as C78				
C136	Same as C79				
C137	Same as C133				
C138	Same as C79				
C139	Same as C97				
C140	Same as C33				
C141	Same as C96				
C142	Same as C22				
C143	Same as C94				
C144	Same as C1				
C145	Same as C78				
C146	Same as C58				
C147	Same as C1				
C148	Same as C114				
C149	Same as C13				
C150	Same as C1				
C151	Same as C1				
C152	Not Used				
C153	Not Used				
C154	Capacitor, Ceramic, 560pF ±2%, 50V 0805	1	841416-067	14632	
C155	Capacitor, Ceramic, 1000pF ±2%, 50V 0805	1	841416-073	14632	
C156	Same as C13				
C157	Same as C1				
C158	Same as C7				
C159	Same as C1				
C160	Capacitor, Ceramic, 820pF ±2%, 50V 0805	4	841416-071	14632	
C161	Capacitor, Ceramic, 120pF ±2%, 50V 0805	2	841416-051	14632	
C162	Capacitor, Ceramic, 390pF ±2%, 50V 0805	1	841416-063	14632	
C163	Same as C40				
C164	Same as C33				
C165	Same as C160				
C166	Same as C161				
C167	Same as C13				
C168	Same as C114				
C169	Same as C58				
C170	Same as C78				
C171	Same as C1				
C172	Same as C40				
C173	Same as C114				
C174	Same as C1				
C175	Same as C109				
C176	Same as C133				
C177	Same as C109				
C178	Capacitor, Ceramic, 1200pF ±2%, 50V 0805	4	841416-075	14632	
C179	Same as C79				

REF DESIG PREFIX **A4A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
C180	Same as C1				
C181	Same as C109				
C182	Same as C178				
C183	Same as C33				
C184	Same as C109				
C185	Same as C133				
C186	Same as C114				
C187	Same as C40				
C188	Same as C94				
C189	Same as C1				
C190	Capacitor, Ceramic, .015µF ±10%, 50V 0805	1	841415-020	14632	
C191	Same as C160				
C192	Capacitor, Ceramic, 1500pF ±2%, 50V 0805	4	841416-077	14632	
C193	Same as C1				
C194	Same as C178				
C195	Same as C33				
C196	Same as C178				
C197	Same as C192				
C198	Same as C94				
C199	Same as C160				
C200	Same as C1				
C201	Capacitor, Ceramic, 2700pF ±2%, 50 WV OR L3	2	841314-083	14632	
C202	Same as C201				
C203	Not Used				
C204	Not Used				
C205	Same as C2				
C206	Same as C192				
C207	Capacitor, Ceramic, 4700pF ±2%, 50 WV OR S3	2	841314-089	14632	
C208	Same as C192				
C209	Same as C207				
C210	Not Used				
C211	Not Used				
C212	Same as C1				
C213	Same as C1				
C214	Not Used				
C215	Not Used				
C216	Same as C2				
C217 Thru C223	Not Used				
C224	Same as C217				
C225	Same as C1				
C226	Capacitor, Tantalum, 4.7µF ±20%, 20V	4	841293-25	14632	
C227	Same as C226				
C228	Same as C1				

REF DESIG PREFIX **A4A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
C229	Same as C226				
C230	Same as C226				
C231	Same as C13				
C232	Same as C13				
C233	Same as C1				
C234					
Thru	Not Used				
C237					
C238					
Thru	Same as C1				
C240					
CR1	Not Used				
CR2	Diode/SWPIN Dual Switching Diode Reverse Voltage	2	MMBD7000LT1	04713	
CR3	OBS; Diode Use CN 630294;				
	General Purpose 100=V 25NA@20V	2	MMBD1203-HIGH	27014	
CR4	Same as CR3				
CR5	Diode VBR=300V RS=>10HM @ 100 MILLIGRAMS	20	SMP1300-99	17540	
CR6					
Thru	Same as CR5				
CR24					
CR25	Not Used				
CR26	Same as CR2				
CR27	Not Used				
CR28	Not Used				
CR29	Diode/PIN RS=0.5 C=2.2 TAU=6.0US POWER=7.5W	2	MA4P4001F	16179	
CR30	Same as CR29				
J1	Connector, Jack, BNC BNC RT ANG PCB/PANEL MT				
	W/SLDR MT POSTS	2	227677-1	00779	
J2	Same as J1				
J3	Not Used				
J4	Not Used				
JW1	Jumper .05 W MAX 1A MIN@70C	5	841417	14632	
JW2					
Thru	Same as JW1				
JW5					
K1	RELAY REED NOM COIL VOLT 5 COIL RES 380W				
	±10%, (MFR	1	SMJ1A05-S	95348	
L1	Not Used				
L2	Inductor, 220nH ±5%, Qmin-50@100MHz >550MHz=				
	SRF .10W=R	2	841438-033	14632	
L3	Same as L2				
L4	Inductor, 680nH ±5%, Qmin-50@25MHz >150MHz=				
	SRF .30W=RD	9	841438-045	14632	
L5	Same as L4				
L6	Same as L4				

REF DESIG PREFIX **A4A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
L7	Inductor, 330mH ±5%, Qmin-40@.79MHz 3.5MHz= SRF 14W=DCR 85	20	841444-061	14632	
L8	Same as L7				
L9	Same as L7				
L10 Thru L12	Same as L4				
L13	Same as L7				
L14	Same as L7				
L15	Inductor, 560nH ±5%, Qmin-50@25MHz >190MHz= SRF .26W=RD	3	841438-043	14632	
L16	Same as L15				
L17	Same as L15				
L18	Same as L7				
L19	Same as L7				
L20 Thru L22	Same as L4				
L23	Same as L7				
L24	Same as L7				
L25	Inductor, 1.0mH ±5%, Qmin-50@7.9MHz 100MHz= SRF .50W=DCR 6	3	841444-001	14632	
L26	Same as L25				
L27	Same as L25				
L28	Same as L7				
L29	Same as L7				
L30	Inductor, 1.5µH ±5%, Qmin-50@7.9MHz 70MHz= SRF .60W=DCR 50	3	841444-005	14632	
L31	Same as L30				
L32	Same as L30				
L33	Same as L7				
L34	Same as L7				
L35	Inductor, 2.2µH ±5%, Qmin-50@7.9MHz 55MHz= SRF .70W=DCR 48	3	841444-009	14632	
L36	Same as L35				
L37	Same as L35				
L38	Same as L7				
L39	Same as L7				
L40	Inductor, 3.3µH ±5%, Qmin-50@7.9MHz 45MHz= SRF .80W=DCR 46	3	841444-013	14632	
L41	Same as L40				
L42	Same as L40				
L43	Same as L7				
L44	Same as L7				

REF DESIG PREFIX **A4A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
L45	Inductor, 4.7µH ±5%, Qmin-50@7.9MHz 35MHz= SRF 1.00W=DCR 4	3	841444-017	14632	
L46	Same as L45				
L47	Same as L45				
L48	Same as L7				
L49	Same as L7				
L50	Inductor, 5600nH ±5%, Qmin-35@7.9MHz >39MHz= SRF 2.1W=R	2	841438-067	14632	
L51	Inductor, 6800nH ±5%, Qmin-35@7.9MHz >31MHz= SRF .27W=R	1	841438-069	14632	
L52	Same as L50				
L53	Same as L7				
L54	Inductor, 680µH ±5%, Qmin-30@.79MHz 3.0MHz= SRF 30W=DCR 60	5	841444-069	14632	
L55	Same as L54				
L56	Inductor, 12µH Q=45 F=2.5M FR=40M R=2.7 I=16OMA IRON CORE	2	1330-46	99800	
L57	Inductor, 27µH Q=45 F=2.5M FR=20M R=3.5 I=14OMA IRON CORE	1	1330-54	99800	
L58	Same as L56				
L59	Same as L54				
L60	Same as L54				
L61	Inductor, 47µH ±5%, Qmin-50@2.5MHz 10MHz= SRF 5.0W=DCR 160	1	841444-041	14632	
L62 Thru L65	Not Used				
L66	Same as L54				
Q1	Transistor	2	MMBT3904LT1	04713	
Q2	Same as Q1				
Q3	Transistor	11	MMBT2907ALT1	04713	
Q4 Thru Q13	Same as Q3				
Q14	Transistor	1	MTD10N05E	04713	
R1	Resistor, Fixed, 3.9kΩ ±5%, .1W 0805	1	841414-087	14632	
R2	Resistor, Fixed, 1.0kΩ ±5%, .1W 0805	8	841414-073	14632	
R3	Resistor, Fixed, 10kΩ ±5%, .1W 0805	13	841414-097	14632	
R4	Same as R3				
R5	Resistor, Fixed, 10Ω ±5%, .1W 0805	23	841414-025	14632	
R6	Same as R5				
R7	Same as R3				
R8	Resistor, Fixed, 330Ω ±5%, .1W 0805	15	841414-061	14632	
R9	Same as R5				
R10	Same as R5				

REF DESIG PREFIX **A4A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
R11	Same as R3				
R12	Same as R8				
R13	Same as R5				
R14	Same as R3				
R15	Same as R5				
R16	Same as R8				
R17	Same as R5				
R18	Same as R3				
R19	Same as R5				
R20	Same as R8				
R21	Same as R5				
R22	Same as R3				
R23	Same as R8				
R24	Same as R5				
R25	Same as R5				
R26	Same as R3				
R27	Same as R5				
R28	Same as R8				
R29	Same as R5				
R30	Same as R3				
R31	Same as R5				
R32	Same as R8				
R33	Same as R5				
R34	Same as R3				
R35	Same as R8				
R36	Same as R5				
R37	Same as R3				
R38	Same as R5				
R39	Same as R8				
R40	Same as R5				
R41	Same as R5				
R42	Same as R3				
R43	Same as R5				
R44	Same as R8				
R45	Not Used				
R46	Same as R2				
R47	Same as R2				
R48	Resistor, Fixed, 15kΩ ±5%, .1W 0805	1	841414-101	14632	
R49	Resistor, Fixed, 680kΩ ±5%, .1W 0805	1	841414-141	14632	
R50	Resistor, Fixed, 22kΩ ±5%, .1W 0805	1	841414-105	14632	
R51	Resistor, Fixed, 4.7kΩ ±5%, .1W 0805	1	841414-089	14632	
R52	Same as R5				
R53	Same as R3				
R54	Same as R5				
R55	Same as R8				

REF DESIG PREFIX **A4A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
R56	Not Used				
R57	Same as R8				
R58	Same as R8				
R59	Same as R8				
R60	Same as R2				
R61	Not Used				
R62	Not Used				
R63	Not Used				
R64	Same as R2				
R65	Not Used				
R66	Not Used				
R67	Same as R2				
R68	Same as R2				
R69	Same as R2				
R70	Same as R8				
R71	Same as R5				
U1	Integrated Circuit, CMOS, 8B BUS-COMPATIBLE SHF ST LCH	2	74HC4094 SO16	34371	
U2	Same as U1				
U3	Amplifier LOW PWR JFET INPUT OPERATIONAL Amplifier SO-8	1	TL061CD	04713	
U4	Not Used				
U5	Integrated Circuit, QUAD 2-INPUT NOR GATE	1	74HC02 SO14	02735	
V1	ARRESTER GAS DISCHARGE SURGE	1	CG75L	71482	

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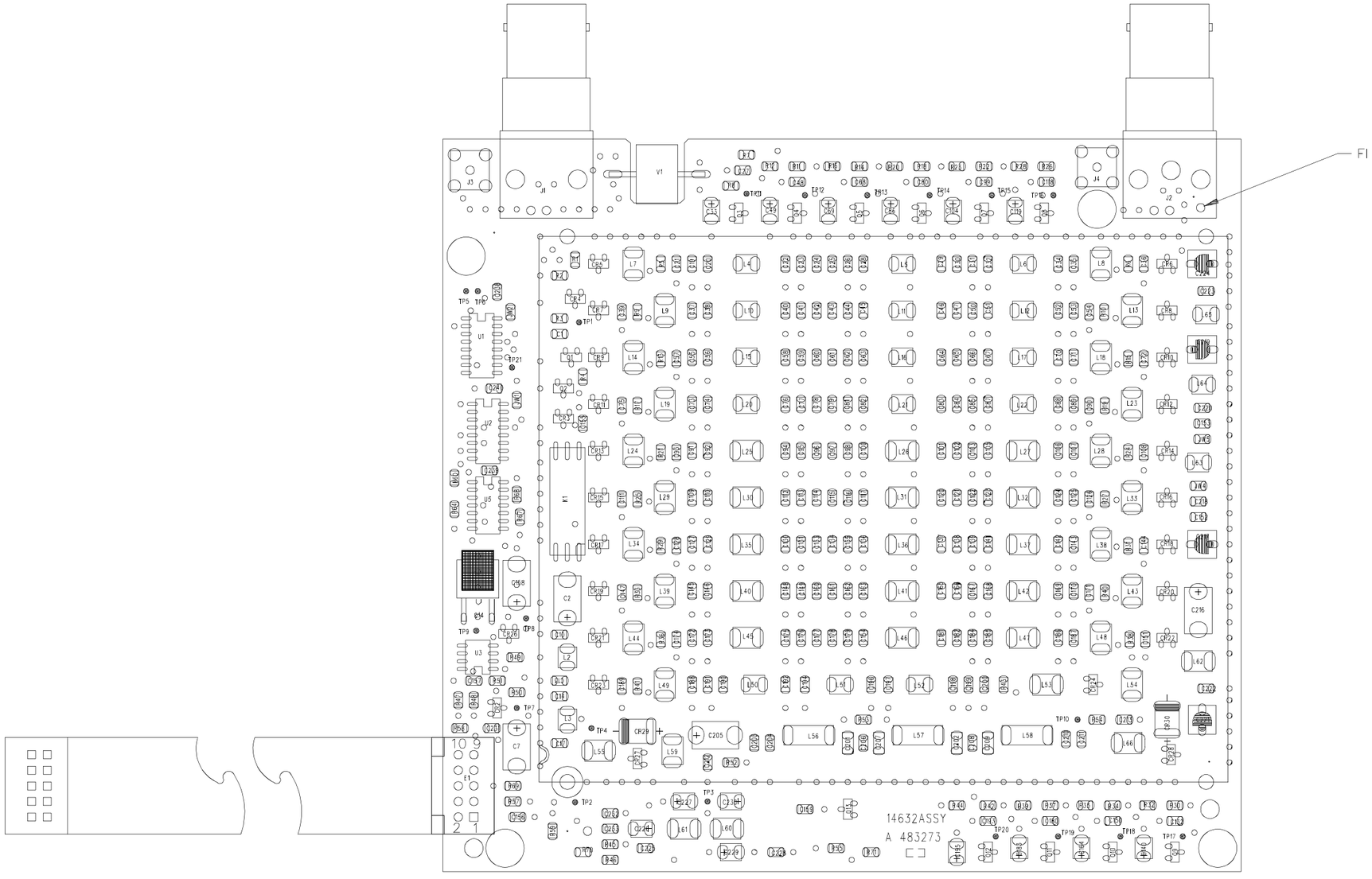
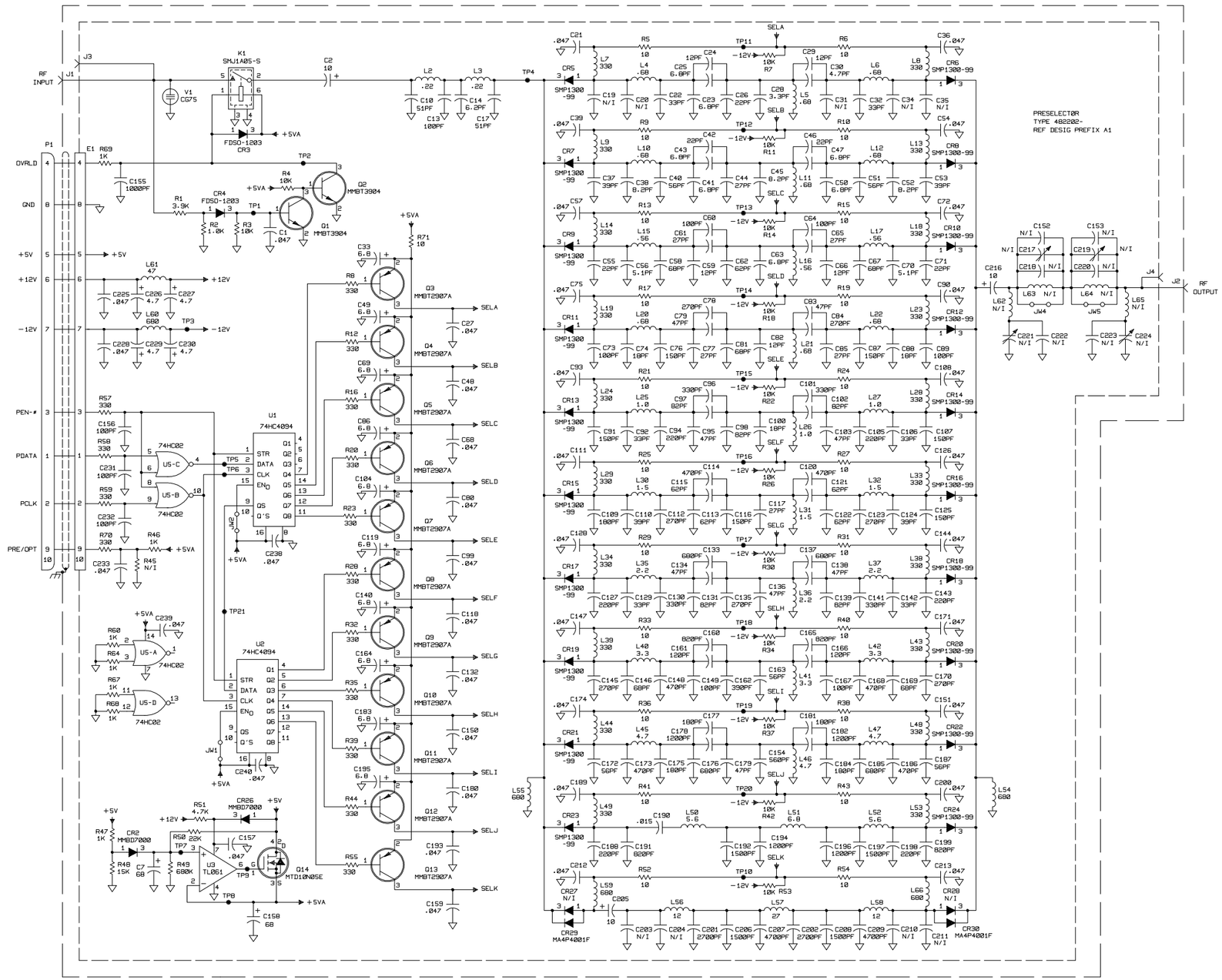


FO-B-1. Type 797033-1 Preselector Assembly (A4)
Component Location Drawing

NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   A) RESISTANCE IS IN OHMS, ±5%, 1/10W
   B) CAPACITANCE IS IN μF.
   C) INDUCTANCE IS IN μH.
2. A 14-PIN DIP SOCKET IS PROVIDED FOR INSTALLATION OF K2.



FO-B-2. Type 797033-1 Preselector Assembly (A4), Schematic Diagram 581356 (D)

APPENDIX C

WJ-8711A/COR CARRIER-OPERATED RELAY OPTION

WJ P/N 181282-001, Revision D

NOTE

The WJ-8711A/COR option requires the WJ-8711/PCSM Personal Computer Signal Monitor option to be installed in the WJ-8711A HF Digital Receiver.

WATKINS-JOHNSON COMPANY
700 QUINCE ORCHARD ROAD
GAITHERSBURG, MARYLAND 20878-1794

September 1998

WARNING

This equipment utilizes voltages which are potentially dangerous and may be fatal if con-tacted. Exercise extreme caution when working with the equipment with any protective cover removed.

PROPRIETARY STATEMENT

LIST OF EFFECTIVE PAGES

Page Number	Description	Revision
i	Cover	D
ii	Proprietary Statement	C
iii	List of Effective Pages	D
iv	Intentionally Blank	C
v	Revision Record	D
vi	Intentionally Blank	C
vii thru viii	Table of Contents	C
C-1 thru C-10	Appendix C	B
C-11 (C-12 blank)	Schematic	B
C-13 (C-14 blank)	Schematic	B

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LIST OF EFFECTIVE PAGES

Page Number	Description	Revision
i	Cover	D
ii	Proprietary Statement	C
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vi	Intentionally Blank	C
vii thru viii	Table of Contents	C
C-1 thru C-10	Appendix C	B
C-11 (C-12 blank)	Schematic	B
C-13 (C-14 blank)	Schematic	B

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APPENDIX C

WJ-8711A/COR CARRIER-OPERATED RELAY OPTION

LIST OF ILLUSTRATIONS

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APPENDIX C

WJ-8711A/COR CARRIER-OPERATED RELAY OPTION

C.1 ELECTRICAL CHARACTERISTICS

When installed in the WJ-8711A Digital HF Receiver, the WJ-8711A/COR Carrier-Operated Relay option provides a rear panel switching circuit with input and output connectors. This circuit is capable of transferring power (or other functions) supplied at the input connector to external equipment via the output connector only when received signal strengths exceed the defined squelch threshold level. Refer to **Figure C-1** for an outline drawing of the WJ-8711A rear panel showing the circuits LINE IN and LINE OUT connectors.

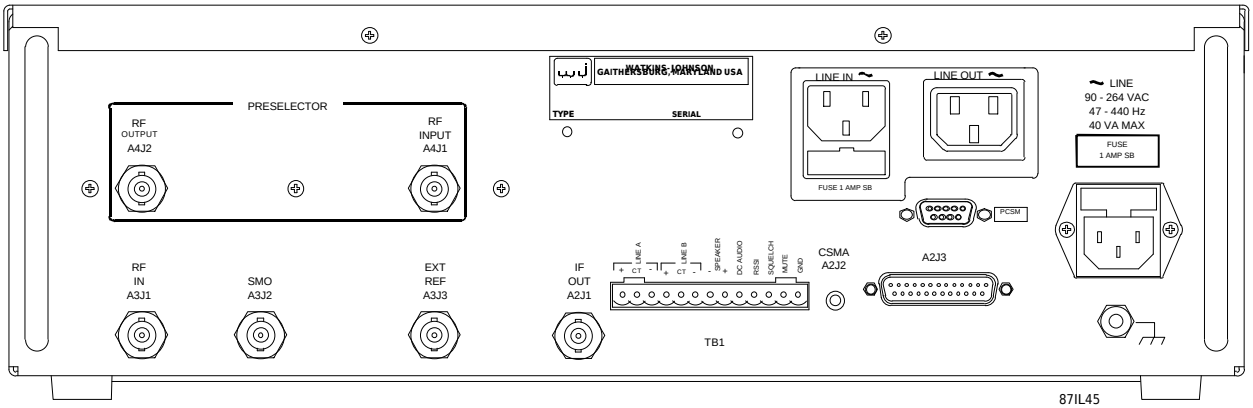

Figure C-1. WJ-8711A Rear Panel with WJ-8711A/COR Option Installed

C.2 MECHANICAL CHARACTERISTICS

Receivers equipped with the WJ-8711A/COR Carrier-Operated Relay option utilize the type 797214-3 Digital Control assembly (A2) and the type 797151-3 Digital Expansion assembly (A2A1). Standard input and output AC power connectors are installed on the rear panel of the receiver to implement external equipment switching functions. A dual-line fuseholder is provided with the LINE IN connector to allow overload protection. The double-pole configuration of the switching relay and the isolation of the LINE IN and LINE OUT connectors from all other receiver circuitry allows the WJ-8711A/COR option to control the delivery of signals from a variety of sources (AC/DC power supplies, controllers, function generators, etc.) to external equipment.

C.3 INSTALLATION

The WJ-8711A/COR Carrier-Operated Relay option is installed in the WJ-8711A Receiver at the factory when ordered with the receiver. The WJ-8711A/COR option requires the WJ-8711/PCSM Personal Computer Signal Monitor option to be installed in the WJ-8711A HF Digital Receiver. Refer to **Appendix G** for information on the WJ-8711/PCSM option.

C.4 OPERATION

Once installed, the WJ-8711A/COR option operates automatically. The operator is required to make the necessary connections to the rear panel LINE IN and LINE OUT connectors. A typical configuration using an external tape recorder (or threshold indicator light) is illustrated in **Figure C-2**. The receiver squelch level can be set from the front panel, or a user-supplied external squelch control may be input at the rear panel terminal block TB1. Refer to the base manual for information on setting the squelch level.

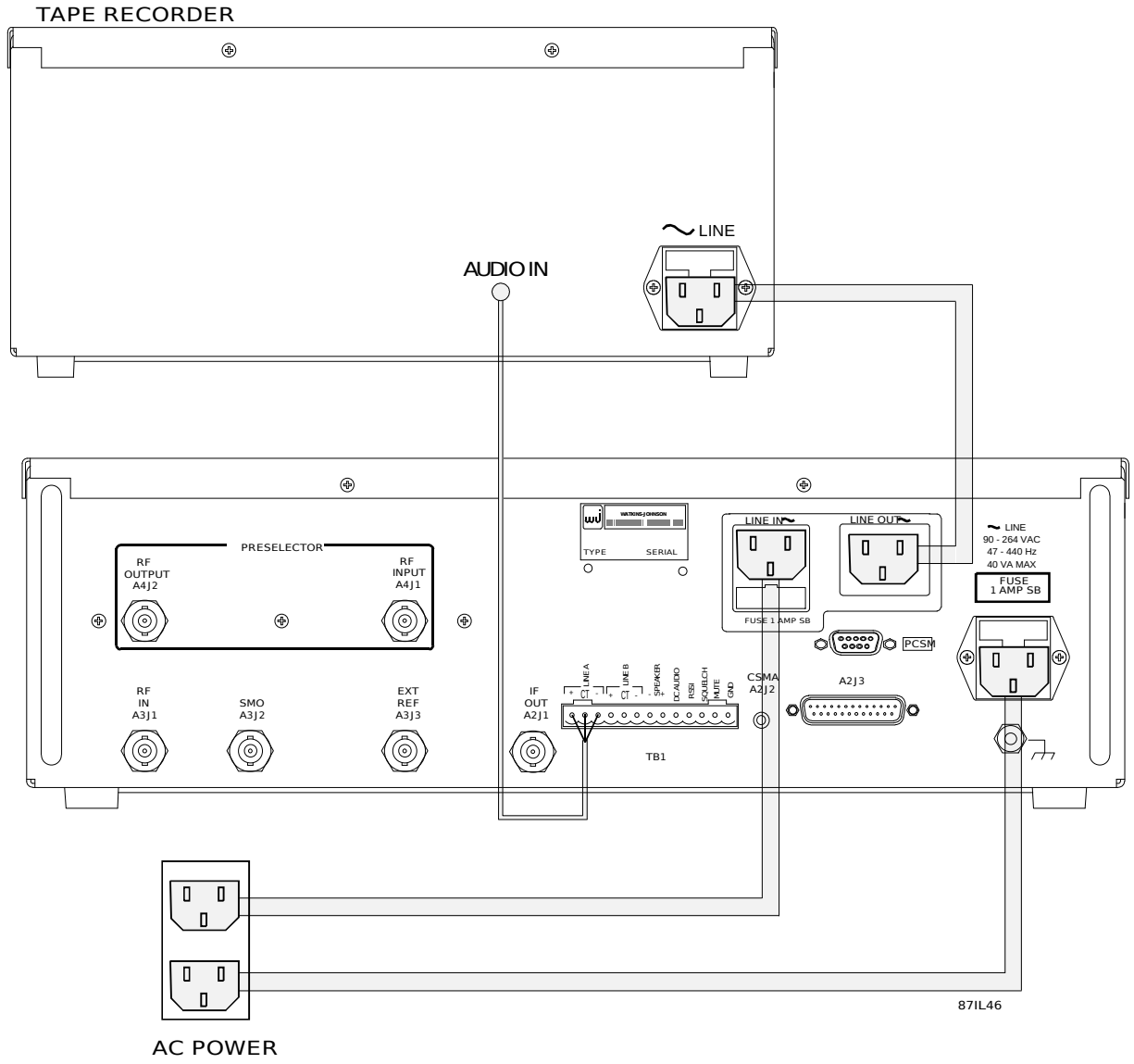

Figure C-2. Typical Equipment Configuration with WJ-8711A/COR Option Installed

C.5 REFERENCE DESIGNATION PREFIX

Partial reference designations are used on the equipment and on the manual illustrations. Each 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 parentheses).

C.6 LIST OF MANUFACTURERS

The manufacturers listed below are supply sources used for obtaining certain parts in the option, and are not listed in the base manual. All other manufacturers not listed below can be found in the base manual.

Mfr. Code	Name and Address	Mfr. Code	Name and Address
61935	Schurter, Inc. 1016 Clegg Court Petaluma, CA 94952-1152	61964	Omron Electronics, Inc. 1 E. Commerce Schaumburg, IL 60173

C.7 PARTS LIST

The following parts lists contain all the electrical components used in the option, along with mechanical parts which may be subject to unusual wear or damage. For a comprehensive listing of all parts and a list of manufacturers, refer also to the base manual. 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 **paragraph C.6**, and the manufacturer's part number, provided in **paragraph C.8**, are supplied as a guide to aid the user of the equipment while in the field. The parts listed may not necessarily be identical with the parts installed in the unit. The parts listed in **paragraph C.8** 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, the semiconductor devices listed in this manual may be substituted with satisfactory results.

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C.8 WJ-8711A/COR CARRIER-OPERATED RELAY OPTION

	Revision A			
A2	Digital Control Printed Circuit Assembly*	1	797214-3	14632
A2A1	Digital Expansion Printed Circuit Assembly	1	797151-3	14632
A2U12	EPROM, WJ-8711A	1	841921	14632
A2U56	EPROM, WJ-8711A	1	841922	14632
J1	Connector, Fused Power Entry	1	6220.5315	61935
J2	Connector, Power	1	6600.4315	61935
K1	Relay, 12 VDC Panel - Mount	1	G4W-22123T-US-TV5-HP-DC12	61964

*Refer to the base manual for the Digital Control PC Assembly Parts List. In the 797214-3 configuration J2 is not installed. Also refer to the base manual for the WJ-8711A Main Chassis Schematic Diagram.

C.8.1 TYPE 797151-3 DIGITAL EXPANSION PRINTED CIRCUIT ASSEMBLY

REF DESIG PREFIX **A2A1**

	Revision B1			
C1	Capacitor, Ceramic: .047 µF, 10%, 50 V	52	841415-023	14632
C2 Thru C17	Same as C1			
C18	Capacitor, Ceramic: 47 pF, 5%, 50 V	1	841415-005	14632
C19	Capacitor, Ceramic: 22 pF, 5%, 50 V	1	841415-003	14632
C20 Thru C28	Same as C1			
C29	Capacitor, Ceramic: .1 µF, 10%	1	841250-25	14632
C30	Same as C1			
C31	Capacitor, Tantalum: 33 µF, 20%, 16 V	1	841250-25	14632
C32	Capacitor, Tantalum: 15 µF, 20%, 25 V	2	841293-19	14632
C33	Same as C32			
C34 Thru C40	Same as C1			
C41	Not In Circuit			
C42	Not In Circuit			
C43	Capacitor, Ceramic: 100 pF, 5%, 50 V	44	841415-007	14632
C44 Thru C57	Same as C43			
C58	Not In Circuit			
C59	Not In Circuit			
C60 Thru C67	Same as C1			
C68 Thru C88	Same as C43			
C89	Same as C1			
C90 Thru C97	Same as C43			
C98	Not In Circuit			
C99 Thru C104	Same as C1			
C105	Capacitor, Ceramic: 27 pF, 2%, 50 V	2	841416-035	14632
C106	Same as C105			
C107	Same as C1			
C108	Not In Circuit			
C109	Same as C1			

REF DESIG PREFIX **A2A1**

C110	Same as C1			
C111	Capacitor, Tantalum: 4.7 µF, 20%, 20 V	1	841293-25	14632
CR1	Diode, Dual Switching	2	MMBD7000LT1	04713
CR2	Same as CR1			
DS1	LED, Red	2	MMBD7000LT1	04713
DS2	Same as DS1			
J1	Connector, PC Board	2	SWW-112-01-T-G-D	55322
J2	Same as J1			
J3	Connector, Header	1	TSW-106-14-G-D	55322
J4	Connector, Header	1	LPGM50DR-G40	TBD
J5	Not In Circuit			
J6	Connector, Receptacle	1	M80-8662622	TBD
J7	Connector, 4-pin	1	TSW-104-07-G-S	55322
J8	Connector, Receptacle	1	M80-8661022	TBD
J9	Not In Circuit			
L1	Inductor: 2900 nH, ±5%, 1.50Ω	1	841438-063	14632
Q1	Transistor	2	SI9430DY	17856
Q2	Same as Q1			
Q3	Transistor	1	MMBT2222ALT1	04713
R1	Resistor, Fixed: 10 kΩ, 5%, .1W, -55 +125C	10	841414-097	14632
R2	Same as R1			
R3	Same as R1			
R4	Jumper, .05Ω	34	841417	14632
R5	Not In Circuit			
R6	Not In Circuit			
R7	Same as R4			
R8	Not In Circuit			
R9				
Thru	Same as R4			
R13				
R14				
Thru	Not In Circuit			
R17				
R18	Same as R4			
R19	Same as R4			
R20	Not In Circuit			
R21	Same as R1			
R22	Not In Circuit			
R23				
Thru	Same as R1			
R26				
R27	Same as R4			
R28	Same as R4			

REF DESIG PREFIX **A2A1**

R29	Resistor, Fixed: 4.8kΩ, 5%, .1 W, -55 +125C	2	841414-089	14632
R30	Same as R29			
R31	Same as R4			
R32	Resistor, Fixed: 100 kΩ, 5%, .1 W, -55 +125C	1	841414-121	14632
R33 Thru R48	Not In Circuit			
R49	Resistor, Fixed: 1.0 kΩ, .1 W, -55 +125C	1	841414-073	14632
R50 Thru R65	Not In Circuit			
R66	Same as R4			
R67 Thru R87	Not In Circuit			
R88	Resistor, Fixed: 56Ω, .1 W, -55 +125C	8	841414-043	14632
R89 Thru R95	Same as R88			
R96	Resistor, Fixed: 2.0 kΩ, 5%, .1 W, -55 +125C	1	841414-080	14632
R97 Thru R101	Not In Circuit			
R102 Thru R106	Same as R4			
R107 Thru R110	Not In Circuit			
R111	Resistor, Fixed: 100Ω, 5%, 1 W, -55 +125C	7	841414-049	14632
R112 Thru R117	Same as R111			
R118 Thru R124	Not In Circuit			
R125 Thru R127	Same as R4			
R128	Not In Circuit			
R129	Not In Circuit			
R130	Same as R1			

REF DESIG PREFIX **A2A1**

R131	Same as R1			
R132				
Thru	Not In Circuit			
R135				
R136	Same as R4			
R137	Same as R4			
R138	Not In Circuit			
R139	Not In Circuit			
R140	Same as R4			
R143				
Thru	Not In Circuit			
R163				
R164				
Thru	Same as R4			
R172				
U1	Integrated Circuit	1	8674F245SOL20	14632
U2	Integrated Circuit, CMOS	1	TMS320C31-27	01295
U3	Integrated Circuit	1	8674F138S016	14632
U4	Integrated Circuit	1	8674F20S014	14632
U5	Integrated Circuit	1	8674F112S016U	14632
U6	Integrated Circuit, F-Logic	1	8674F02S014U	14632
U7	Integrated Circuit, SRAM	8	MT5C2568DJ-25	14632
U8				
Thru	Same as U7			
U14				
U15	Integrated Circuit	1	AT27C010L-15LC	TBD
U16	Integrated Circuit, CMOS	1	8674AC04SO14U	14632
U17	Integrated Circuit, CMOS	1	8674AC32S014U	14632
U18	Integrated Circuit	2	8674ACT373SOL20	14632
U19	Same as U18			
U20				
Thru	Not In Circuit			
U22				
U23	Integrated Circuit	1	EPM7096LC84-3	67183
U24	Integrated Circuit, CMOS	1	8674AC244S020U	07263
U25	Not In Circuit			
U26	Integrated Circuit	1	8674ACT04SO14U	14632
U27	Integrated Circuit, CMOS	4	8674ACT74S014U	14632
U28	Same as U27			
U29	Same as U27			
U30	Integrated Circuit	1	8674F08S014U	14632
U31	Integrated Circuit	1	SCC2692AC1A44	18324
U32	Same as U27			
U33	Integrated Circuit	1	8675C185SOL20	14632

REF DESIG PREFIX **A2A1**

U34	Not In Circuit			
Y1	Crystal	1	SMX-500-27.000MHz	30149
Y2	Crystal	1	NMS037-20	61441
XU15	Socket	1	NEP95-32-SMC-451	TBD
XU23	Socket, PLCC	1	PCS-084-SMU-11T	91506

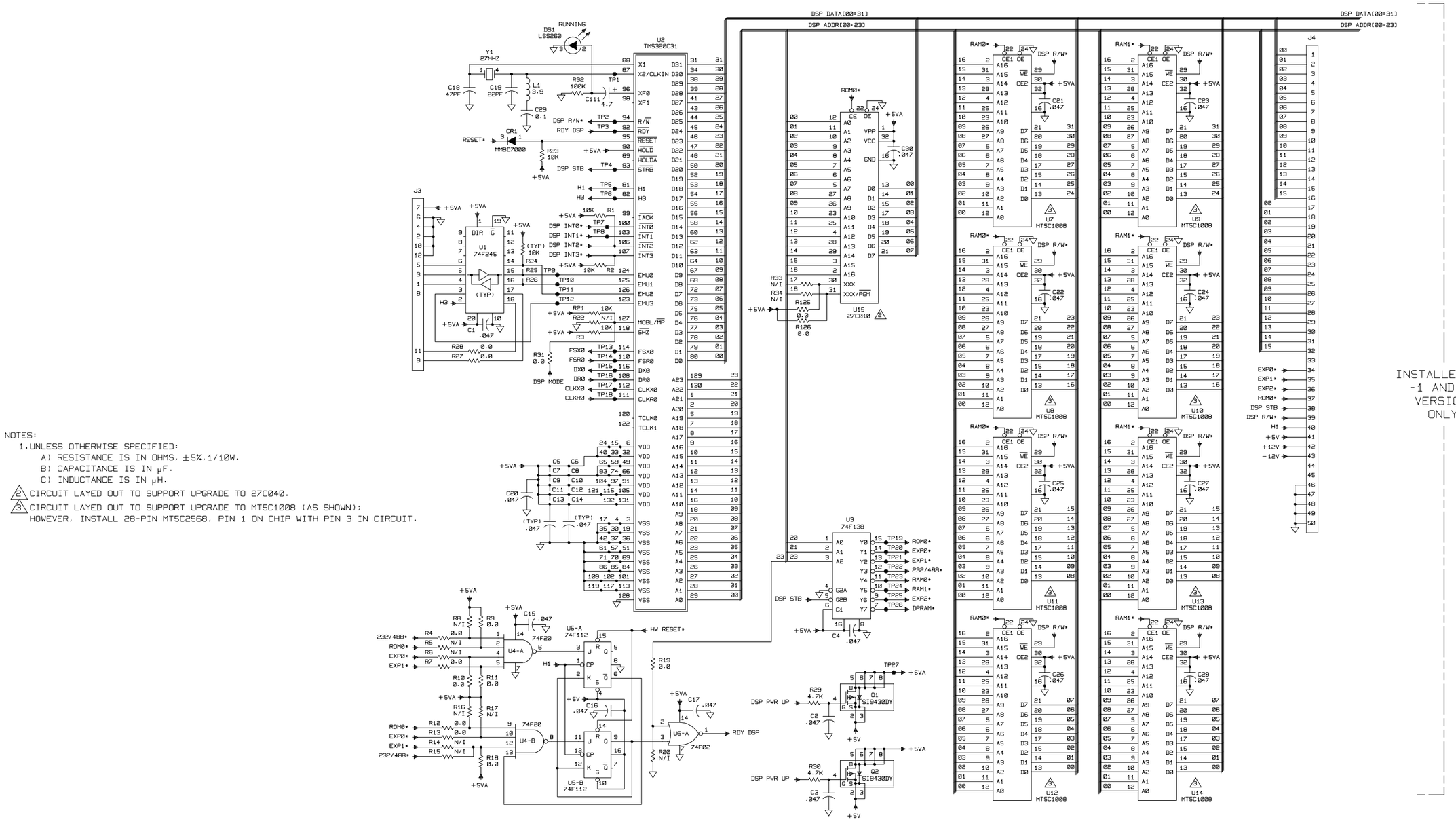

Figure C-3. Type 797151-3 Digital Expansion Assembly (A2A1), Schematic Diagram 581590 (Sheet 1 of 2) (B)

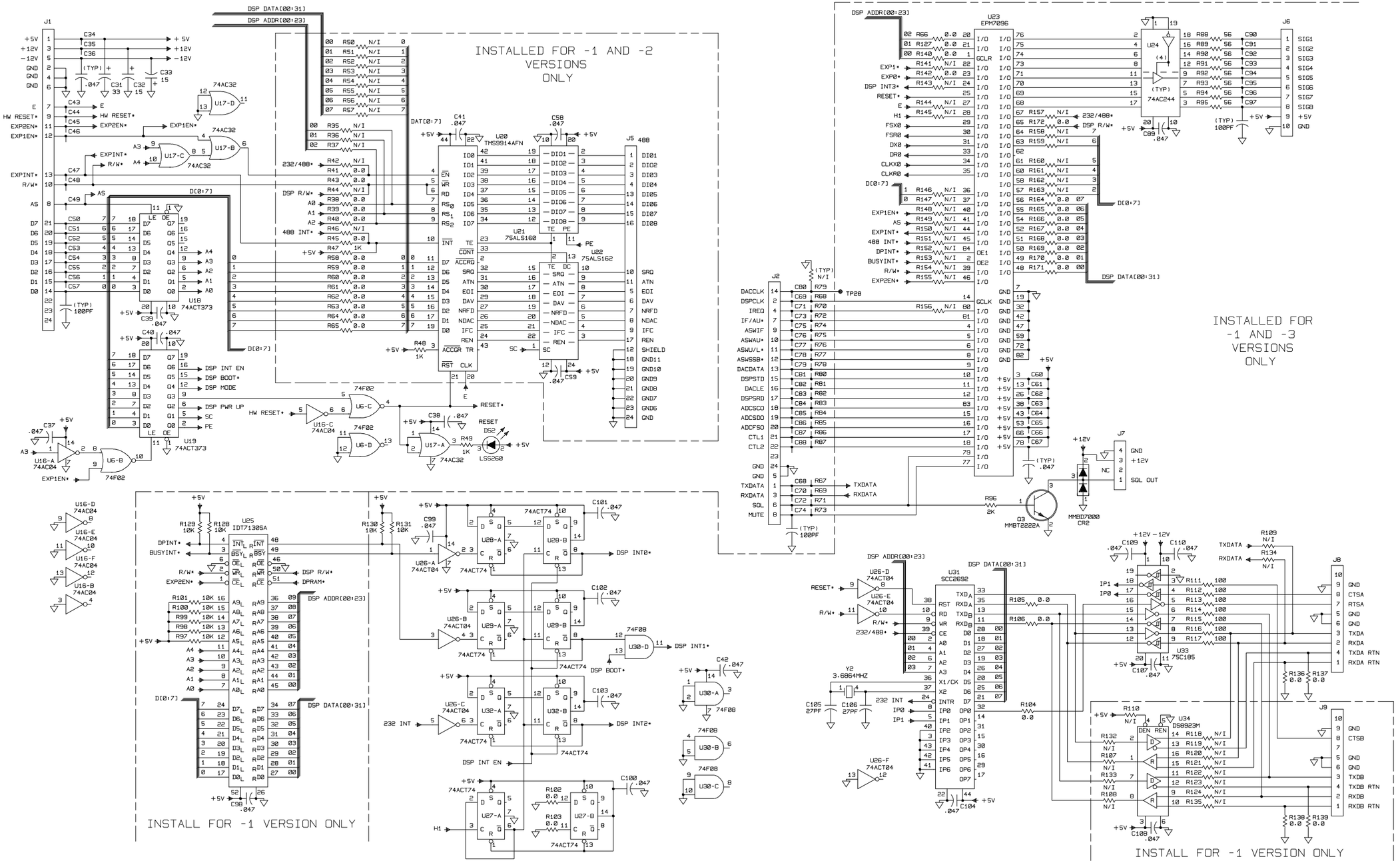

Figure C-3. Type 797151-3 Digital Expansion Assembly (A2A1), Schematic Diagram 581590 (Sheet 2 of 2) (B)

APPENDIX E

WJ-8711/488 AND WJ-8712/488 IEEE-488 INTERFACE OPTIONS

P/N 181283-001, Revision D

WATKINS-JOHNSON COMPANY
700 QUINCE ORCHARD ROAD
GAITHERSBURG, MARYLAND 20878-1794

September 1997

PROPRIETARY STATEMENT

LIST OF EFFECTIVE PAGES

Page Number	Description	Revision
i	Cover	E
ii	Proprietary Statement	E
iii	List of Effective Pages	E
iv	Intentionally Blank	E
v	Revision Record	E
vi	Intentionally Blank	E
vii thru viii	Table of Contents	E
E-1 thru E-22	Appendix E	D
E-23 (E-24 blank)	Schematic	D
E-25 (E-26 blank)	Schematic	D

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WJ-8711/488 AND WJ-8712/488 IEEE-488 INTERFACE OPTIONS

REVISION RECORD

Revision	Description	Date
A	Initial Issue.	9/93
B	Expand to detail various receiver models.	5/94
C	Add information about IF data spectrum inverstion.	6/94
D	Added table detailing DSO1 output functions versus mode.	12/94
E	Added WJ part number to the title page. Incorporated a List of Effective Pages. Added page numbers to section cover pages and their back pages. Removed "intentionally left blank" pages and replaced with "Notes" pages that are formatted with headers and page numbers.	9/97

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APPENDIX E

WJ-8711/488 AND WJ-8712/488 IEEE-488 INTERFACE OPTIONS

E.1 INTRODUCTION

This document describes the WJ-8711/488 and WJ-8712/488 IEEE Interface Options and includes the associated configuration setup procedures and remote operation instructions. This option is used on the WJ-8711A, WJ-8712A, and WJ-8712P Digital HF Receivers. When the IEEE-488 option is installed, standard remote operations via the CSMA interface are not available.

E.2 ELECTRICAL CHARACTERISTICS

The IEEE-488 Interface Option provides the communications link between a remote IEEE-488 interface-equipped controller and the receiver's host controller. The communications protocol incorporated into the IEEE-488 interface complies with the guidelines of the IEEE-488.2-1987 Interface specification. Operational details of this interface can be found in Section II of this manual.

The IEEE-488 interface is available via a standard 24-pin GPIB connector which is mounted on the rear panel of the receiver (refer to **Figure E-1(A)** & **(B))**.

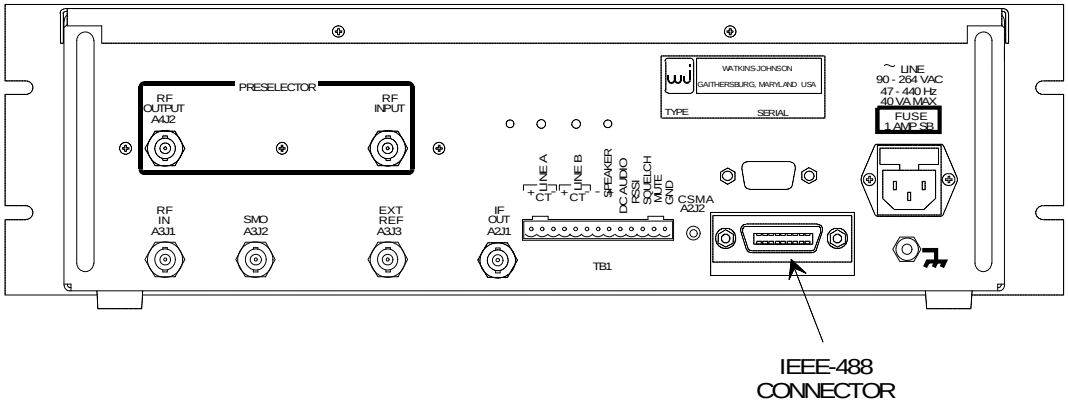
E.3 MECHANICAL CHARACTERISTICS

The IEEE-488 Interface Option consists of the Type 797201-2 488 Option PC Assembly (daughterboard) and a type 383522-1 Cable Assembly (W3) for routing signals to the rear panel of the receiver.

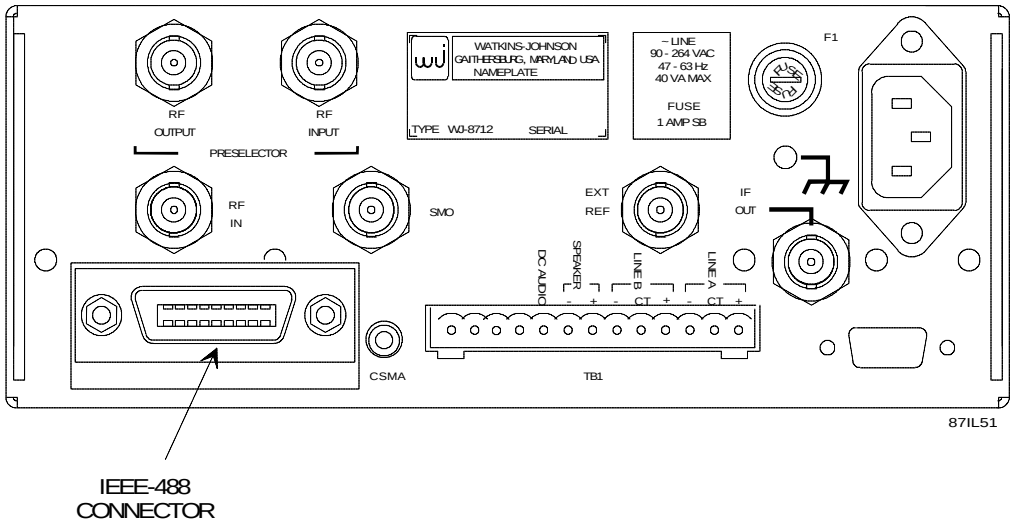
The IEEE-488 interface option daughterboard is piggyback mounted (via standoffs) to the receiver's Type 797214-2 Digital Control PC Assembly (a modified version of the 797214-1 PC Assembly which does not include connector J3). Two connectors (J1 and J2) on the daughterboard plug directly into mating connectors (J8 and J9) on the Digital Control PC Assembly. One end of the cable assembly attaches to the IEEE-488 connector mounted on the rear panel of the unit and the other end attaches to connector J5 on the daughterboard. Mounting hardware and mating connector hardware is provided to satisfy assembly and cabling requirements.

E.4 OVERALL FUNCTIONAL DESCRIPTION

The IEEE-488 Option allows a general purpose interface bus (GPIB) controller to handle data transfers to and from the host GPIB controller (via an eight-bit parallel data bus) in a bit-parallel, byte-serial format. Sixteen interconnecting lines plus eight ground and shield lines form the IEEE-488 interface.



(A) WJ-8711A



(B) WJ-8712A AND WJ-8712P

Figure E-1. Location of IEEE-488 Output Connector

The sixteen interconnecting lines consist of eight bi-directional bus lines, three data byte transfer lines, and five bus management lines. Data or address information is transferred between devices using the eight data bus lines (DI01 - DI08). The data byte transfer lines indicate the availability and validity of the information on the data bus (DAV), the readiness of the listening device to accept data (NRFD), and that the data has or has not been accepted (NDAC). The five bus management lines are ATN, EOI, SRQ, IFC, and REN. ATN is asserted by the controller to indicate that it is placing an address or control byte on data bus lines. The controller de-asserts ATN to allow a talker to place data on the bus. A talker may assert EOI simultaneously with the last byte of data to indicate end of data. SRQ may be asserted by any device to request the controller to take an action. The controller, in turn, conducts a serial poll to determine who is requesting service. IFC is asserted by the controller in order to initialize all bus devices to a known state. When the controller de-asserts IFC, it takes active control of the system. The REN line, which sets a device into remote local mode, has no effect on the unit in this implementation.

E.5 INSTALLATION

The IEEE-488 Interface Option is installed in the receiver at the factory when ordered with the receiver.

E.5.1 CONNECTOR SIGNALS

The IEEE-488 interface signals are available at the IEEE-488 connector located on the rear panel of the receiver (see **Figure E-1**). Refer **Figure E-2** for the pin configuration of the rear panel IEEE-488 interface connector.

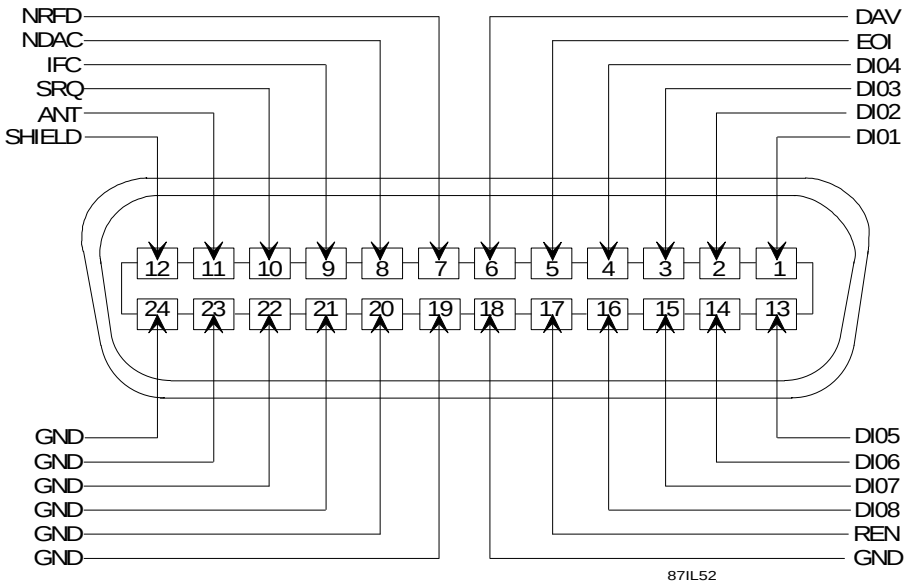


Figure E-2. IEEE-488 Interface Connector

E.6 IEEE-488 CONFIGURATION SETUP

The receiver contains a DIP switch that can be used to set the receiver's address on the IEEE-488 bus. This switch is designated S2 and is mounted on the Digital Control PC Assembly (A2). The DIP switch contains eight individual switches. Switches 1 through 5 of A2S2 are used to set the receiver's address (valid addresses are from 0 to 30). The individual switches within A2S2 are on when they are in the down position (toward front panel) and are off when in the up position (toward rear panel). Switch A2S2 must be on in accordance with **Table E-1** and may be accessed as explained in the following paragraphs.

NOTE

Receiver power must be cycled in order for switch settings to take effect.

E.6.1 ACCESSING DIP SWITCHES ON THE DIGITAL CONTROL PC ASSEMBLY

E.6.1.1 WJ-8711A Digital HF Receiver

Perform the following procedural steps to gain access to DIP switches A2S1 and A2S2:

a. Turn off the receiver and disconnect the power plug from the rear panel power connector.

b. Remove two pan-head screws from the rear edge of the top panel securing it to the chassis rear apron and two flat-head screws on the forward edge of the top panel.

c. Carefully remove top panel and disconnect the speaker leads.

d. Locate switches S1 and S2 on the A2 assembly (refer to **Figure E-3**).

e. Set the switches for the desired configuration in accordance with **Table E-1**.

f. Reconnect the speaker leads to the top panel and replace the top panel on the receiver. Secure the top panel with the screws removed in step b.

g. Reconnect power cord to the rear panel power connector.

Table E-1. Switch Settings of DIP Switch A2S2

A2S2, Positions 1 - 5 (IEEE-488 Address Selection)					
Address	Position 5	Position 4	Position 3	Position 2	Position 1
0	OFF	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	OFF	ON
2	OFF	OFF	OFF	ON	OFF
3	OFF	OFF	OFF	ON	ON
4	OFF	OFF	ON	OFF	OFF
5	OFF	OFF	ON	OFF	ON
6	OFF	OFF	ON	ON	OFF
7	OFF	OFF	ON	ON	ON
8	OFF	ON	OFF	OFF	OFF
9	OFF	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON	OFF
11	OFF	ON	OFF	ON	ON
12	OFF	ON	ON	OFF	OFF
13	OFF	ON	ON	OFF	ON
14	OFF	ON	ON	ON	OFF
15	OFF	ON	ON	ON	ON
16	ON	OFF	OFF	OFF	OFF
17	ON	OFF	OFF	OFF	ON
18	ON	OFF	OFF	ON	OFF
19	ON	OFF	OFF	ON	ON
20	ON	OFF	ON	OFF	OFF
21	ON	OFF	ON	OFF	ON
22	ON	OFF	ON	ON	OFF
23	ON	OFF	ON	ON	ON
24	ON	ON	OFF	OFF	OFF
25	ON	ON	OFF	OFF	ON
26	ON	ON	OFF	ON	OFF
27	ON	ON	OFF	ON	ON
28	ON	ON	ON	OFF	OFF
29	ON	ON	ON	OFF	ON
30	ON	ON	ON	ON	OFF

Note 1: Switches not listed are not used.
Note 2: As positioned on PC Assembly, ON is down (toward front panel); OFF is up (toward rear panel).

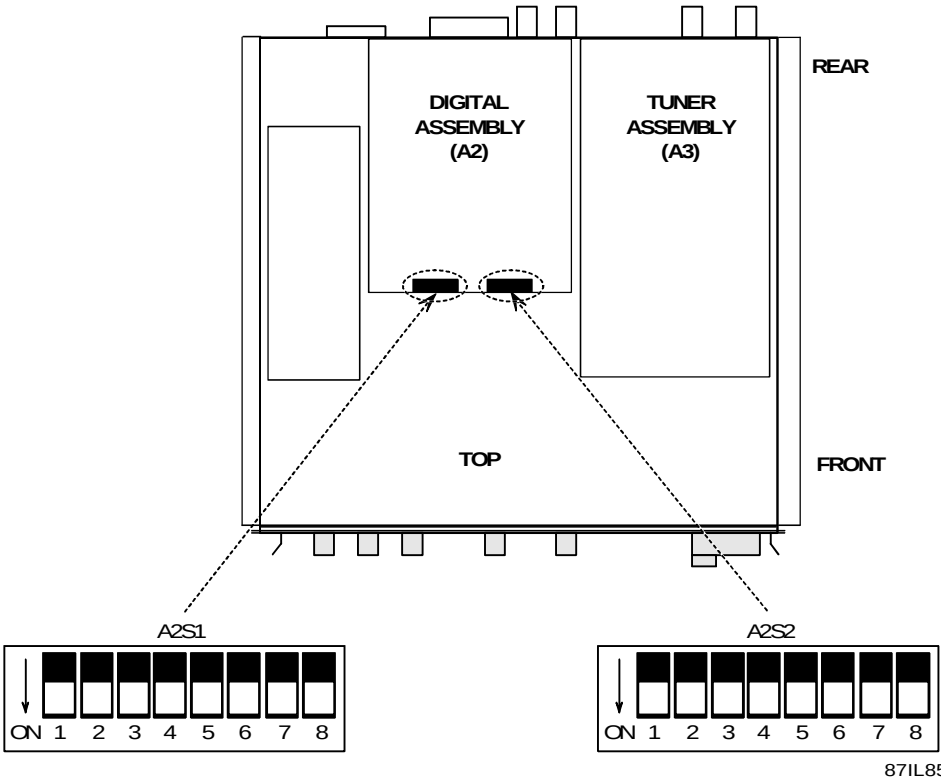


Figure E-3. Location of Switches A2S1 and A2S2 in the WJ-8711A

E.6.1.2 **WJ-8712A and WJ-8712P Digital HF Receivers**

Perform the following procedural steps to gain access to DIP switches A2S1 and A2S2:

a. Turn off the receiver and disconnect the power plug from the rear panel power connector.

b. Remove twelve (12) flat-head screws from the bottom cover and remove the bottom cover.

c. Locate switches S1 and S2 on the A2 assembly (refer to **Figure E-4**).

d. Set the switches for the desired configuration in accordance with **Table E-1**.

e. Replace the bottom cover and secure it in place with the twelve (12) screws removed in step b.

f. Reconnect power cord to the rear panel power connector.

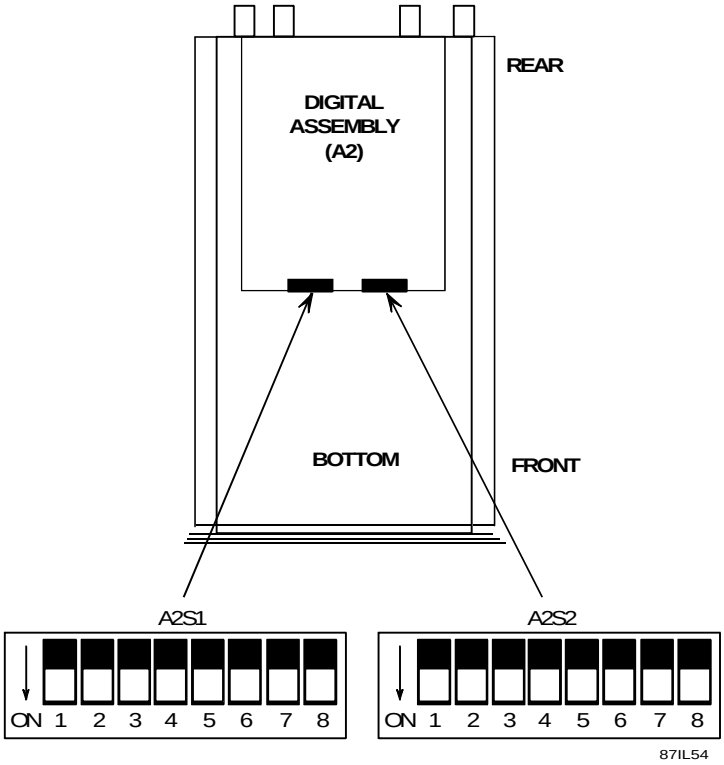


Figure E-4. Location of Switches A2S1 and A2S2 in the WJ-8712A and WJ-8712P

E.7 REMOTE OPERATION

With the IEEE-488 Interface Option installed, the WJ-8711A, WJ-8712A or WJ-8712P Digital HF Receiver may be controlled remotely by a computer or other controller device that is equipped with an IEEE-488 interface and capable of transmitting and receiving ASCII-standard encoded characters.

The WJ-8711A and WJ-8712P can be set for IEEE-488 remote control by selecting "GPIB" in the remote control entry mode with the front panel SPECIAL FUNCTION key (WJ-8711A) or the front panel MENU key (WJ-8712P), and then selecting the desired receiver address (0-30). Refer to Section III of the WJ-8711A or WJ-8712P Manual for details on using the SPECIAL FUNCTION key and MENU key, respectively. Also, the WJ-8711A, WJ-8712A, and WJ-8712P may be set for IEEE-488 remote operation by setting DIP switch A2S1 as explained in **paragraph E.6** above.

E.7.1 COMMUNICATIONS PROTOCOL

As implemented via the IEEE-488 Interface Option, the capabilities of the IEEE-488 interface include:

SH1	Source Handshake
AH1	Acceptor Handshake
T6	Basic Talker with Serial Poll
L4	Basic Listener
SR1	Service Request
DC1	Device Clear
RL2	No Remote Local Capability
PP0	No Parallel Poll
DT0	No Device Trigger
C0	No Controller Capability
E2	Tristate Drivers

This means that the unit can talk or listen when commanded by a controller. The unit can also request an SRQ from a controller and reply to controller's serial poll. The condition of the Remote Enable (REN) bus signal line has no effect on the unit. The unit is also capable of responding to SDC (selected device clear) and DCL (universal device clear).

E.7.2 COMMAND MESSAGE FORMAT

Command messages are exclusively ASCII-encoded data. Command headers consist of three-character mnemonics (refer to the command tables in **Section IV** of the main manual). "Common" commands are prefixed with the "*" character. All queries are suffixed with the "?" character. Also, all command arguments are in the "forgiving" numerical representation form. Multiple commands which are sent to the receiver must be separated with a semicolon (;) character. In addition, multiple arguments of a single command must be delimited with commas.

Messages may be terminated with any of the following combination of characters:

1. CR, LF
2. LF
3. CR, LF/EOI
4. CR/EOI
5. LF/EOI
6. EOI (on the last byte of the message)

Note that CR is essentially ignored and termination is confirmed on the receipt of a LF and/or EOI.

E.7.2.1 Message Processing

When the system receives a message, it is stored in the input buffer until a valid message termination is received. Then, the message is parsed and executed. Additional input data cannot be received until the execution of the message is finished.

The command message format is checked for validity as the message is parsed and executed. If the command message fails to meet the restrictions of the command message format, then an error is generated and the rest of the message is not processed.

E.7.2.2 Query Response Format

A fixed field format is used for query responses. Query responses begin with the mnemonic in upper case characters, followed by a numerical or string argument. Query responses separate the first argument from the mnemonic by a space. Numeric arguments are represented by the least number of digits possible, while still representing the entire range of the value. If a negative value is allowed for the argument, a sign is always given. Single queries that require multiple arguments are delimited by commas. Responses to multiple command queries are linked together in a series in the output buffer and delimited by semicolons. All output message terminations consist of a CR (carriage return) and a LF (line feed) with an EOI sequence.

E.7.2.3 I/O Buffer Control

The DCL (device clear) and SDC (selective device clear) bus commands and power-on are functionally similar in that all three clear both the input and output buffers. No other condition or action clears the input buffer. A query error is generated if the contents of the output buffer are discarded for any other reason.

Buffer sizing is based on the maximum reasonable message length, taking into consideration that the size of the input and output buffers are 1024 bytes each. If the input buffer becomes full, an execution error is set in the Event Status Register and the input buffer is cleared.

Detection of any invalid input command or data halts the execution of an input message, resets the input buffer and sets the appropriate error flag in the Event Status Register. Output buffer overflow causes the buffer to reset and the query flag to be set in the Event Status Register.

E.7.3 REPRESENTATION OF NUMERIC ARGUMENTS

Numeric arguments that are used with commands are accepted in a forgiving numeric representation. Refer to the **Section IV** of the main manual for details on numeric data representation.

E.7.4 MESSAGE CATEGORIES

The commands and queries used for remote operation of the receiver are contained in two main categories: Communication Messages and Device Messages. The applicable messages are identical to the RS-232 messages defined in **Section IV** of the main manual.

E.7.5 RECEIVER STATUS SUMMARY

With the addition of the IEEE-488 Interface Option, the architecture of the receiver's status registers (defined in Section IV of the main manual) reflect one additional parameter. With the IEEE-488 option installed, bit 4 of the Service Request Enable Register and bit 4 of the Status Byte Register (which were unused with the RS-232 interface) are used to represent the Message Available Bit. Bit 4 (enMAV) of the Service Request Enable Register and bit 4 (MAV) of the Status Byte Register are logically ANDed. The ANDed combination of these two bits (and the ANDed combination of bits 0 and 5 of these same two registers) are logically ORed to determine the setting of bit 6 (RQS) of the Status Byte Register.

The Message Available Bit (MAV), when set, indicates that data has been placed in the output buffer. This bit is cleared when the output buffer is empty.

E.8 IEEE-488 INTERFACE FUNCTIONAL DESCRIPTION

The IEEE-488 Interface Option basically consists of a General Purpose Interface Bus (GPIB) controller, address/data latches and transceivers as shown in **Figure E-5**. These circuits provide an interface between the receiver's host controller and the remote IEEE-488 interface equipped controller.

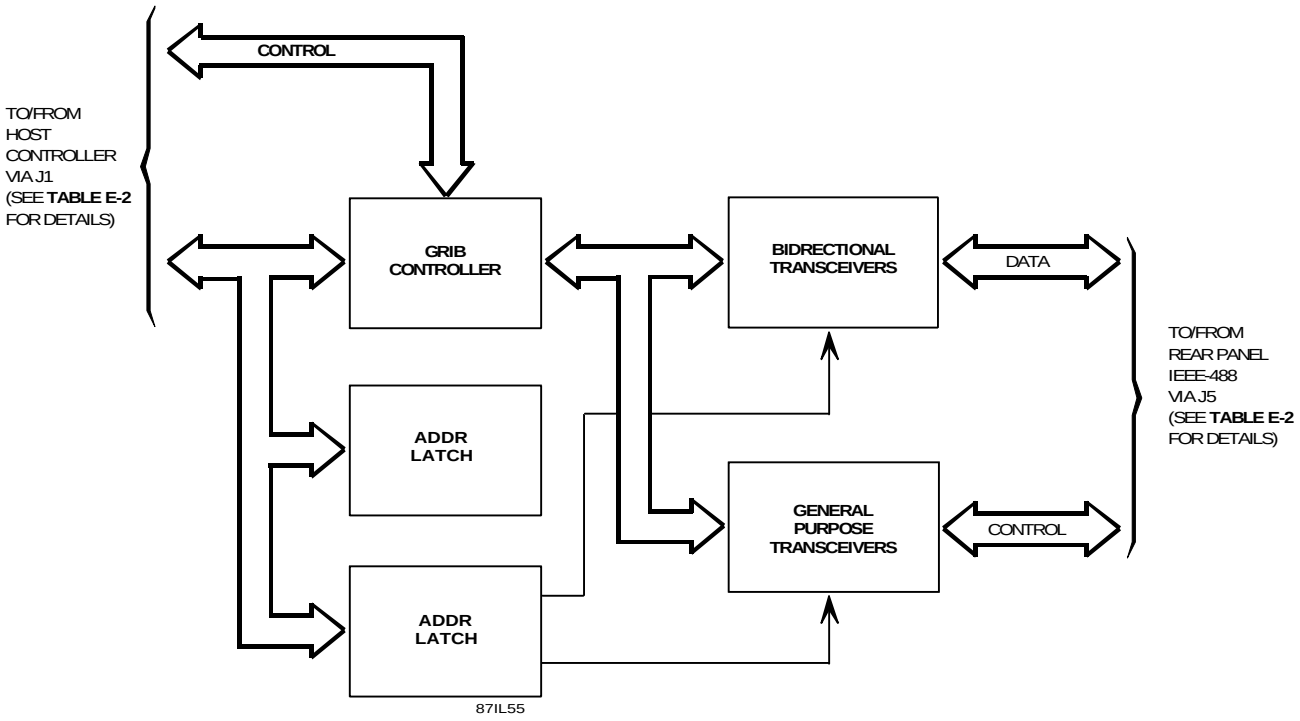


Figure E-5. IEEE-488 Interface Option Functional Block Diagram

The GPIB controller communicates directly with the receiver's host controller and essentially relieves the host controller of the task of providing the proper IEEE-488 protocol. Communication between the host controller and the GPIB controller is achieved via 8-bit memory mapped registers which are contained in the GPIB controller. These registers pass control data to and obtain status information from the device. All information is exchanged via a multiplexed data bus and is transferred in a bit-parallel, byte-serial format. Each memory mapped register is accessed when the appropriate address appears on the data bus and is stored in the address latch. This allows the appropriate register to be selected and accessed when the appropriate control (read or write) signal is sent from the host controller.

Communication between the GPIB controller and the remote IEEE-488 controller is achieved via the transceivers. Bidirectional transceivers are used to control the 8-line data bus. These transceivers allow all eight data lines to simultaneously transmit or receive data in a bit-parallel, byte-serial format (as determined by the GPIB controller). The bidirectional transceivers also provide totem-pole type outputs (allowing the fastest possible data rate). This type of output signal is selected by a control signal sent from the data latch (which stores the appropriate data bit sent from the host processor) during the receiver's initialization procedure.

The general purpose transceivers are used to control the 8-line control bus. These transceivers insure that the proper control line is enabled in the proper direction for exchange of bus management and handshaking signals (as determined by the GPIB controller). Three of the control lines (NDAC, NRFD and SRQ) have open-collector outputs and the remaining five control lines have totem-pole outputs as required by the IEEE-488 standard. Also, REN and IFC lines are configured so that the receiver may be used only as a slave device. This configuration is selected by a control signal sent from the data latch (which stores the appropriate data bit sent from the host processor) during the receiver's initialization.

The circuits which comprise the IEEE-488 Interface Option are located on the 488 Option PC Assembly (A1) which is mounted on the Digital Control PC Assembly (A2). The IEEE-488 interface circuits communicate with the receiver's host controller via connector J1 on the A1 assembly. The interface circuits are interfaced to the receiver's rear panel IEEE-488 connector via connector J5 (also located on the A1 assembly) and cable assembly W3. **Table E-2** provides details on the input and output signals which appear on connectors J1 and J5.

Table E-2. Pin Assignments for IEEE-488 Option PC Assembly (A1) Connectors J1 and J5

Connector/Pin	Function
J1 (pin 1)	+5 Vdc Power Input (+5 V)
J1 (pin 3)	+12 Vdc Power Input (+12 V)
J1 (pin 5)	-12 Vdc Power Input (-12 V)
J1 (pin 2)	Ground (GND)
J1 (pin 4)	Ground (GND)
J1 (pin 6)	Ground (GND)
J1 (pin 8)	Address Strobe from Host Controller (AS)
J1 (pin 9)	Hardware Reset from Host Controller (HW RESET)
J1 (pin 10)	Read/Write Control Signal from Host Controller (R/W*)
J1 (pin 12)	Expansion Bus Enable from Host Controller (EXP1EN)
J1 (pin 13)	Expansion Bus Interrupt to Host controller (EXPINT)

Table E-2. Pin Assignments for IEEE-488 Option PC Assembly (A1)
Connectors J1 and J5 (Continued)

Connector/Pin	Function
J1 (pin 14)	Parallel Data Bit 0 (D0)
J1 (pin 15)	Parallel Data Bit 1 (D1)
J1 (pin 16)	Parallel Data Bit 2 (D2)
J1 (pin 17)	Parallel Data Bit 3 (D3)
J1 (pin 18)	Parallel Data Bit 4 (D4)
J1 (pin 19)	Parallel Data Bit 5 (D5)
J1 (pin 20)	Parallel Data Bit 6 (D6)
J1 (pin 21)	Parallel Data Bit 7 (D7)
J2 (pin 1)	IEEE 488 Data Line 1 (DI01)
J2 (pin 2)	IEEE 488 Data Line 2 (DI02)
J2 (pin 3)	IEEE 488 Data Line 3 (DI03)
J2 (pin 4)	IEEE 488 Data Line 4 (DI04)
J2 (pin 13)	IEEE 488 Data Line 5 (DI05)
J2 (pin 14)	IEEE 488 Data Line 6 (DI06)
J2 (pin 15)	IEEE 488 Data Line 7 (DI07)
J2 (pin 16)	IEEE 488 Data Line 8 (DI08)
J2 (pin 10)	Service Request (SRQ)
J2 (pin 11)	Attention (ATN)
J2 (pin 5)	End or Identify (EOI)
J2 (pin 6)	Data Valid (DAV)
J2 (pin 7)	Not Ready for Data (NRFD)
J2 (pin 8)	Not Data Accepted (NDAC)
J2 (pin 9)	Interface Clear (IFC)
J2 (pin 17)	Remote Enable (REN)
J2 (pin 12)	Shield
J2 (pin 18)	Ground
J2 (pin 19)	Ground
J2 (pin 20)	Ground
J2 (pin 21)	Ground
J2 (pin 22)	Ground
J2 (pin 23)	Ground
J2 (pin 24)	Ground

Note: Connector pins not shown are not used.

E.9 IEEE-488 INTERFACE PERFORMANCE TEST

The performance test that follows is designed to verify proper operation of the IEEE-488 interface. In performance of the test, the receiver must be controlled by an external controlling computer connected to the rear panel IEEE-488 interface connector.

Table E-3. Required Test Equipment

Equipment	Recommended Type	Requirement
Frequency Counter	Fluke 1953A	Frequency Range to 100 MHz
Signal Generator	Marconi 2031	Frequency Range to 30 MHz
Control Computer	IBM PC Compatible	IEEE-488 Compatible

E.9.1 IEEE-488 PERFORMANCE TEST

1. Connect the receiver and test equipment as illustrated in **Figure E-6**.

2. Set the signal generator to produce a 10.000000 MHz CW signal at an output level of -40 dBm.

3. Using the remote IEEE-488 controller, set the receiver as follows:

Tuned Frequency:	10.000000 MHz	FRQ 10 <CR> <LF>
Detection Mode:	CW	DET 3 <CR> <LF>
BFO Offset:	+1.00 kHz	BFO 1000 <CR> <LF>
IF Bandwidth:	16.0 kHz	BWS 5 <CR> <LF>
Gain Control:	AGC Slow	AGC 1 <CR> <LF>
Squelch:	Off	SQL 136 <CR> <LF>

4. Set the frequency counter for 1.0 Hz resolution.

5. Note the frequency displayed on the frequency counter. The displayed frequency should be equal to the difference between the receiver and the signal generator frequencies plus the 1000 Hz BFO offset.

6. Using the remote IEEE-488 controller, query each of the parameters specified in step 3 above and confirm that the receiver is configured as specified.

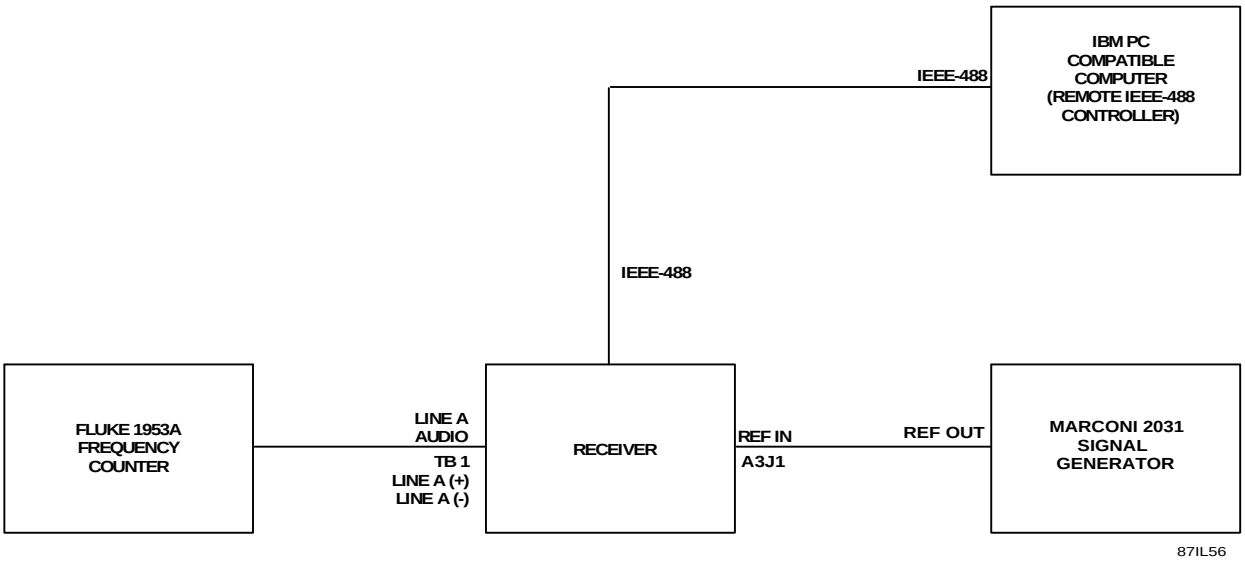


Figure E-6. IEEE-488 Performance Test Equipment Connections

E.10 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.

E.11 REFERENCE DESIGNATION PREFIX

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).

E.12 LIST OF MANUFACTURERS

The manufacturers listed below are supply sources used for obtaining certain parts in the option, and are not listed in the base manual. All other manufacturers not listed below can be found in the base manual.

Mfr. Code	Name and Address
34371	Harris Corporation Semiconductor Sector 200 Palm Bay Blvd. Melbourne, FL 32902-0883

E.13 PARTS LIST

The following parts lists contain all the electrical components used in this option, along with mechanical parts which may be subject to unusual wear or damage. 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 **paragraph E.12**, and the manufacturer's part number, provided in **paragraph E.13.1**, are supplied as a guide to aid the user of the equipment while in the field. The parts listed may not necessarily be identical with the parts installed in the unit. The parts listed in **paragraph E.13.1** 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. For this reason some transistors, diodes and integrated circuits installed in the equipment may not agree with those specified in the parts lists and schematic diagrams of this manual. However, the semiconductors designated in the manual may be substituted in every case with satisfactory results.

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REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR

E.13.1 TYPE WJ-8711/488 AND WJ-8712/488 IEEE-488 REMOTE INTERFACE OPTIONS

	Revision A				
A2	Digital Control PC Assembly*	1	797214-2	14632	
A2A1	488/DSP Option PC Assembly	1	797201-2	14632	
W3	Cable Assembly	1	383522-1	14632	

*Note: The 488 Interface option is used only with receivers that are equipped with the type 797214-2 PC assembly (a modified version of the 797214-1 PC Assembly which does not include connector J3). Refer to the base manual for WJ-8711A Main Chassis Schematic information.

E.13.1.1 **Type 797201-2 488 Option PC Assembly** REF DESIG PREFIX **A2A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
	Revision A				
C1	Capacitor, Ceramic, .047µF ±10%, 50V 0805	10	841415-023	14632	
C2	Same as C1				
C3					
Thru	Not Used				
C9					
C9	Same as C1				
C10					
Thru	Not Used				
C13					
C14	Same as C1				
C15	Not Used				
C16	Same as C1				
C17	Same as C1				
C18					
Thru	Note Used				
C29					
C30	Capacitor, Ceramic, 100pF ±5%, 50V 0805	33	841415-007	14632	
C31	Same as C30				
C32	Same as C30				
C33	Not Used				
C34	Not Used				
C35	Same as C30				
C36	Not Used				
C37					
Thru	Same as C30				
C41					
C42					
Thru	Not Used				
C49					
C50					
Thru	Same as C30				
C52					
C53	Not Used				
C54					
Thru	Same as C30				
C57					
C58	Not Used				
C59	Not Used				
C60	Same as C30				

REF DESIG PREFIX **A2A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
C61	Same as C30				
C62					
Thru	Not Used				
C65					
C66	Capacitor, Tantalum, 15µF ±20%, 25V	2	841293-19	14632	
C67	Same as C66				
C68	Not Used				
C69	Same as C1				
C70	Not Used				
C71	Not Used				
C72	Same as C1				
C73	Same as C1				
C74	Not Used				
C75	Same as C1				
C76					
Thru	Same as C30				
C83					
C84					
Thru	Not Used				
C88					
C89	Capacitor, Tantalum, 33µF ±20%, 16V	1	841293-22	14632	
C90					
Thru	Same as C30				
C96					
C97					
Thru	Not Used				
C113					
CR1					
Thru	Not Used				
CR6					
DS1	Not Used				
DS2	LED SM LED RED 5V=VR 12.5MA=1F	1	LSS260-DOE7502	25088	
J1	Connector, PC, Bd 24-Pin Skt For Use				
	W/.025 Sq Pin .10 Ctr	2	SSW-112-01-T-G-D	55322	
J2	Same as J1				
J3	Not Used				
J4	Not Used				
J5	Connector, Receptacle, 24Pin RT. Angle				
	Header Double Row .1X.1	1	65624-124	22526	

REF DESIG PREFIX **A2A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
J6					
Thru	Not Used				
J9					
L1	Not Used				
Q1	Not Used				
R1	Not Used				
R2	Resistor, Fixed, 10kΩ ±5%, .1W 0805	1	841414-097	14632	
R3	Not Used				
R4	Resistor, Fixed, 1.0kΩ ±5%, .1W 0805	2	841414-073	14632	
R5	Not Used				
R6	Not Used				
R7	Jumper .05 Ω Max 1A Min@70C	2	841417	14632	
R8					
Thru	Not Used				
R13					
R14	Same as R7				
R15+					
Thru	Not Used.				
R79					
R80	Same as R4				
R81					
Thru	Not Used				
R152					
U1	Integrated Circuit, /XCVR Octal Bus Transceiver W/3-St Outputs Sol-20 Wide	1	74F245 SOL20	01295	
U2	Not Used 132-PQFP				
U3	Not Used				
U4	Integrated Circuit, Dual 4-Input Positive NAND Gates	2	74F20 SO14	04713	
U5	Not Used				
U6	Integrated Circuit, /F-Logic Quad 2-Input NOR Gate	1	74F02 SO14	27014	
U7					
Thru	Not Used				
U15					
XU15	Not Used				
U16	Integrated Circuit, CMOS, Hex Inverters Active Outputs	1	74AC04 SO14	04713	
U17	Integrated Circuit, CMOS, Quad 2-Input OR Gate	1	74AC32 SO14	34371	
U18	Integrated Circuit, /Latch Octal Transparent Latch W/3-ST Output 24MA SOL-	1	74ACT373 SOL20	04713	

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
	REF DESIG PREFIX **A2A1**				
U19	Integrated Circuit, /FF Octal D Flip-Flop W/CLOCKΩ Enable Sol-20 Wide Pkg	1	74ACT377 SOL20	04713	
U20	OBS; IC GPIB Intfc IEEE-488 44-Pin PLCC Pkg	1	TMS9914AFNL	01295	
U21	Integrated Circuit, /INTRFC 8 Channel Bidirectional Transceiver Mono HI-SP	1	SN75ALS160DW	01295	
U22	Integrated Circuit, /XCVR Octal General Purpose Interface Bus Transceiver	1	SN75ALS162DW	01295	
U23	Not Used				
XU23	Not Used				
U24	Not Used				
U25	Integrated Circuit, Dual 1-OF-4 Decoder/Demultiplexer	1	74F139 SO16	04713	
U26 Thru U37	Not Used				
U38	Same as U4				
U39	Not Used				
U40 Thru U42	Not Used				
Y1	Not Used				
Y2	Not Used				

NOTES

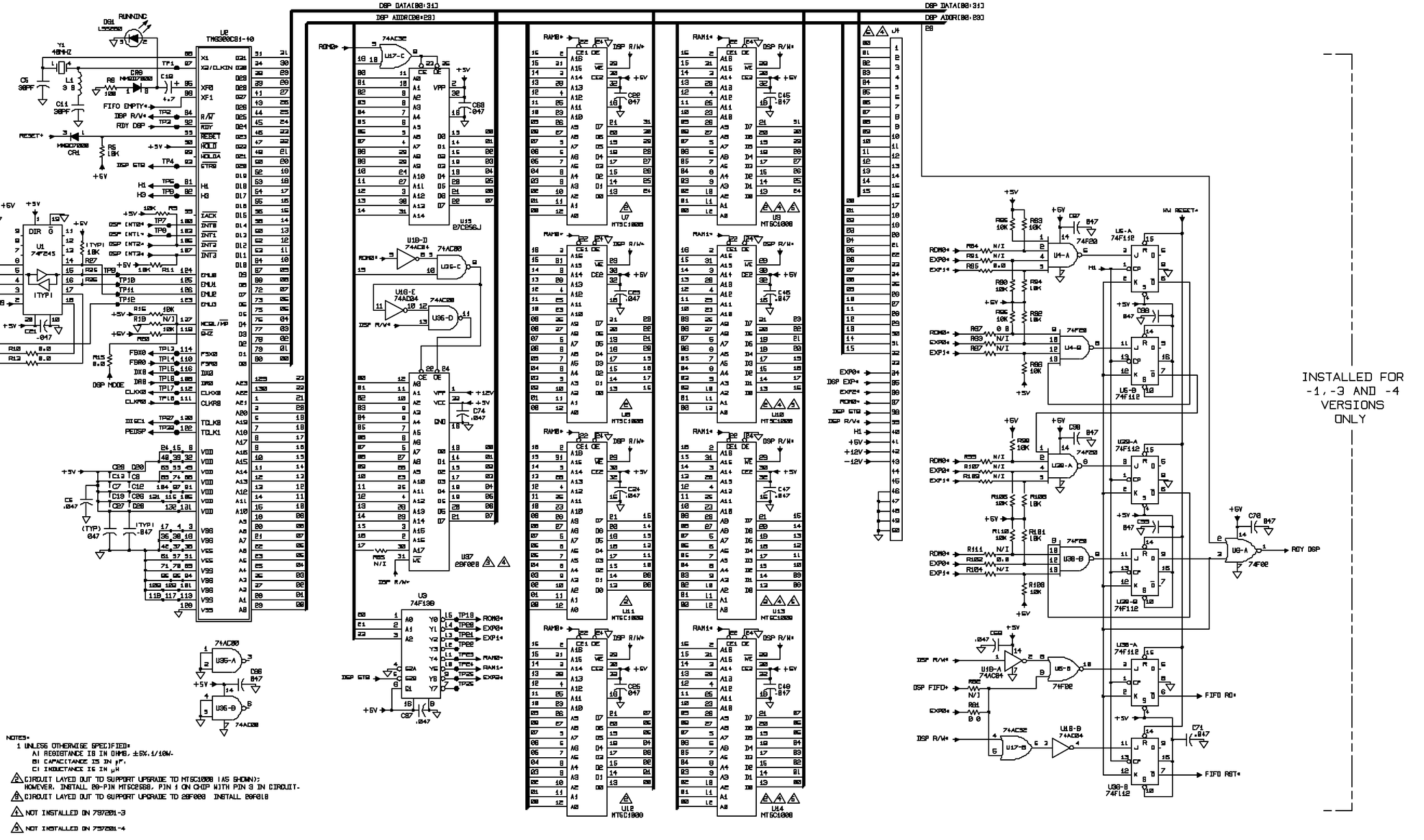

Figure E-7. Type 797201 -1, -2, -3, -4, 488/DSP Option PC Assembly (A2A1), Schematic Diagram 581811 (Sheet 1 of 2) (H)

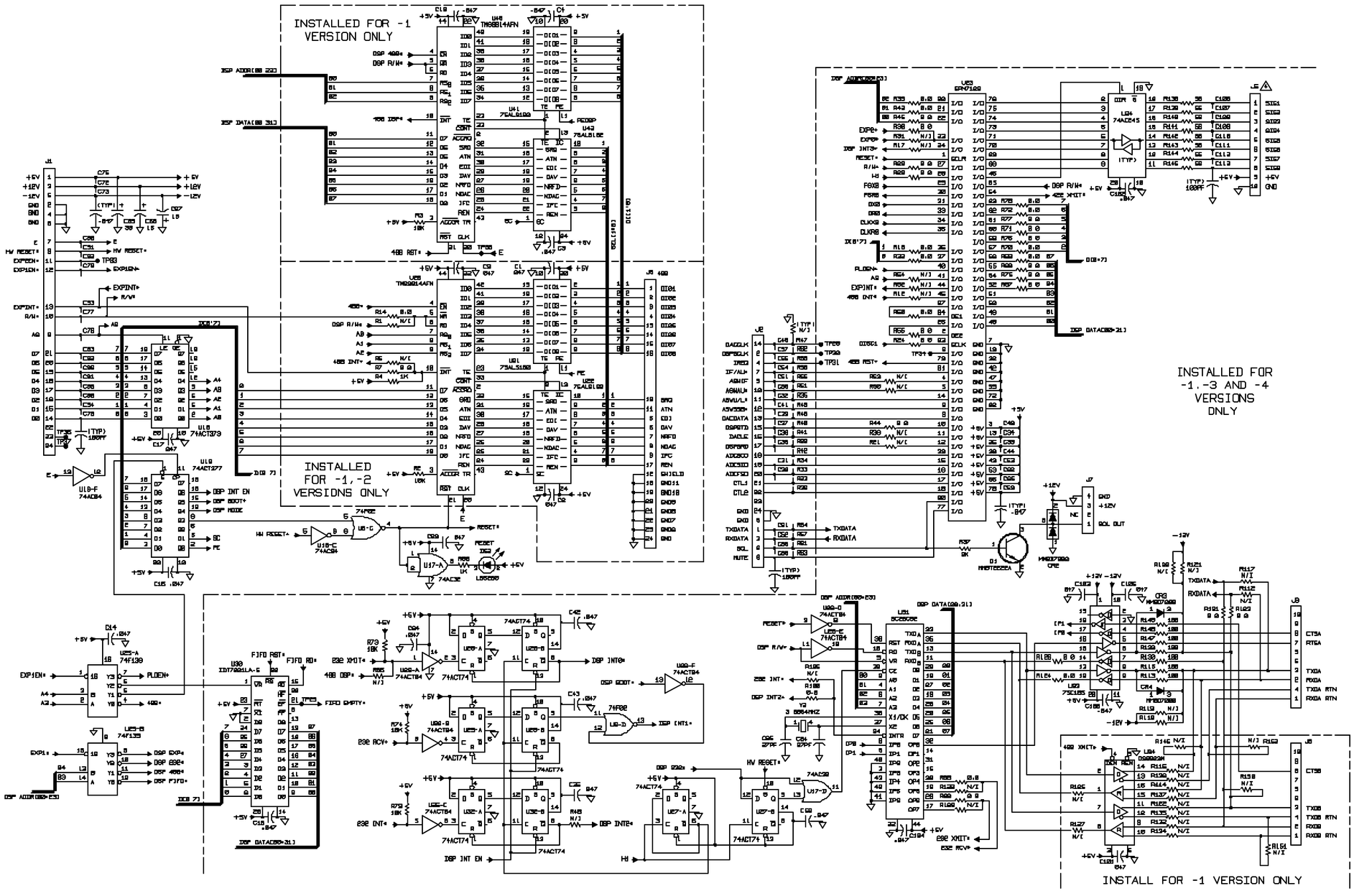

Figure E-7. Type 797201 -1, -2, -3, -4, 488/DSP Option PC Assembly (A2A1), Schematic Diagram 581811 (Sheet 2 of 2) (H)

WJ-871Y/8KRF 8 kHz ROOFING FILTER OPTION

APPENDIX F

WJ P/N 181284-001, Revision B

WATKINS-JOHNSON COMPANY
700 QUINCE ORCHARD ROAD
GAITHERSBURG, MARYLAND 20878-1794

September 1997

WARNING

This equipment utilizes voltages which are potentially dangerous and may be fatal if contacted. Exercise extreme caution when working with the equipment with any protective cover removed.

PROPRIETARY STATEMENT

LIST OF EFFECTIVE PAGES

Page Number	Description	Revision
i	Cover	B
ii	Proprietary Statement	B
iii	List of Effective Pages	B
iv	Intentionally Blank	B
v	Revision Record	B
vi	Intentionally Blank	B
vii thru viii	Table of Contents	B
F-1 thru F-2	Appendix F	A

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WJ-871Y/8KRF 8 kHz ROOFING FILTER OPTION

REVISION RECORD

Revision	Description	Date
A	Initial Issue.	12/93
B	Added WJ part number to the title page. Incorporated a List of Effective Pages. Added page numbers to section cover pages and their back pages. Removed "intentionally left blank" pages and replaced with "Notes" pages that are formatted with headers and page numbers.	9/97

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APPENDIX F

LIST OF TABLES

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APPENDIX F

WJ-871Y/8KRF 8 kHz ROOFING FILTER OPTION

F.1 ELECTRICAL CHARACTERISTICS

The WJ-871Y/8KRF 8 kHz Roofing Filter Option improves the reception of weak signals which are in the presence of large signals at nearby adjacent frequencies. With this option installed, the receiver's RF bandwidth is reduced to 8 kHz and the number of selectable IF bandwidths is reduced to 58 (extending from 58 Hz to 8 kHz). This option also limits the bandwidth of the receiver's Signal Monitor Output to 8 kHz. **Table F-1** provides a list of specifications associated with this option.

F.2 INSTALLATION

F.2.1 SMO, SIGNAL MONITOR OUTPUT

With the WJ-871Y/8KRF Option installed, the signal monitor output connector continues to provide a sample of the 2nd intermediate frequency, centered at 455 kHz. However, the nominal (-6 dB) bandwidth of this signal is reduced from 30 kHz to 8 kHz. The nominal output impedance remains at 50 ohms with approximately 30 dB of gain from the antenna input.

F.3 LOCAL OPERATION OF THE WJ-8711AAND WJ-8712P

When the WJ-871Y/8KRF Option is installed in the WJ-8711A or WJ-8712P Digital HF Receiver, the number of available IF bandwidths (which may be selected via the front panel controls) is reduced to 58. **Table F-1** shows the IF bandwidths which are available. Refer to the base manual for details on selecting the desired IF bandwidth via the receiver's front panel controls.

F.4 REMOTE OPERATION OF THE WJ-8711A, WJ-8710A, WJ-8712P AND WJ-8712A

When the WJ-871Y/8KRF Option is installed in the WJ-8711A, WJ-8710A, WJ-8712P, or WJ-8712A Digital HF Receiver, the number of available IF bandwidths which may be remotely selected (via the RS-232 serial interface or other optional remote control interface) is reduced to 58. **Table F-1** shows the IF bandwidths which are available. Refer to the base manual for details on selecting the desired IF bandwidth via remote control.

Table F-1. WJ-871Y/8KRF 8 kHz Roofing Filter Option Specifications

IF Bandwidths

3dB Bandwidth	Typical Shape Factor (3/60 dB)	3 dB Bandwidths	Typical Shape Factor (3/60 dB)
.056 kHz	1.45:1	.700 kHz	1.35:1
.063 kHz	1.40:1	.750 kHz	1.35:1
.069 kHz	1.40:1	.800 kHz	1.30:1
.075 kHz	1.35:1	.900 kHz	1.45:1
.081 kHz	1.35:1	1.000 kHz	1.30:1
.088 kHz	1.35:1	1.100 kHz	1.40:1
.094 kHz	1.35:1	1.200 kHz	1.35:1
.100 kHz	1.30:1	1.300 kHz	1.35:1
.113 kHz	1.45:1	1.400 kHz	1.35:1
.125 kHz	1.40:1	1.500 kHz	1.35:1
.138 kHz	1.40:1	1.600 kHz	1.30:1
.150 kHz	1.35:1	1.800 kHz	1.45:1
.163 kHz	1.35:1	2.000 kHz	1.40:1
.175 kHz	1.35:1	2.200 kHz	1.40:1
.188 kHz	1.35:1	2.400 kHz	1.35:1
.200 kHz	1.30:1	2.600 kHz	1.35:1
.225 kHz	1.45:1	2.800 kHz	1.35:1
.250 kHz	1.40:1	3.000 kHz	1.35:1
.275 kHz	1.40:1	3.200 kHz	1.30:1
.300 kHz	1.35:1	3.600 kHz	1.45:1
.325 kHz	1.35:1	4.000 kHz	1.40:1
.350 kHz	1.35:1	4.400 kHz	1.40:1
.375 kHz	1.35:1	4.800 kHz	1.35:1
.400 kHz	1.30:1	5.200 kHz	1.35:1
.450 kHz	1.45:1	5.600 kHz	1.35:1
.500 kHz	1.40:1	6.000 kHz	1.35:1
.550 kHz	1.40:1	6.400 kHz	1.30:1
.600 kHz	1.35:1	7.200 kHz	1.25:1
.650 kHz	1.35:1	8.000 kHz	1.20:1

Signal Monitor Output

Center Frequency..... 455 kHz, nominal
Bandwidth ..... 8kHz (-6 dB) minimum
Output Level..... 30 dB above RF Input, nominal
Output Impedance ..... 50 ohms, nominal
Connector Type..... BNC female

APPENDIX G

871Y/PCSM2 PERSONAL COMPUTER

SIGNAL MONITOR OPTION

P/N 181517-001, Revision B

DRS TECHNOLOGIES
DRS SIGNAL SOLUTIONS, INC.
700 QUINCE ORCHARD ROAD
GAITHERSBURG, MARYLAND 20878-1794

October 2004

PROPRIETARY STATEMENT

EXPORT STATEMENT

WARRANTY

Seller warrants for a period of one year from the date of shipment, unless a different period has been agreed upon and incorporated into the Contract, that the products delivered or services rendered will conform to the specifications and be free from defects in workmanship and materials. THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY, FITNESS FOR PURPOSE, OR OTHER WARRANTIES OR GUARANTIES OF ANY KIND OR DESCRIPTION, WHETHER STATUTORY, EXPRESS, OR IMPLIED. If the goods delivered or services performed fail to conform to the warranty stated in this clause, Seller will correct the nonconformity at its expense by such repair, adjustment, modification, or replacement of the goods or services, as Seller deems expedient. THE FOREGOING REMEDY OF BUYER FOR ANY FAILURE OF THE GOODS OR SERVICES TO MEET ANY WARRANTY IS EXCLUSIVE. BUYER EXPRESSLY AGREES THAT THE LIABILITY OF SELLER UNDER ANY WARRANTY SHALL NOT INCLUDE DAMAGE TO OR LOSS OF PROPERTY OTHER THAN THE GOODS COVERED BY THE CONTRACT; LOSS OF PROFITS OR REVENUE; INCREASED COSTS OF ANY KIND; CLAIMS OF CUSTOMERS OF BUYER; OR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES. As to goods or components where the customer has funded the repair, Seller will warrant as limited above, the repaired portion of the unit for three months from the date of reshipment. EQUIPMENT OR PARTS DESCRIBED AS BEING MANUFACTURED BY OTHERS ARE SOLD BY SELLER AS IS and Buyer must look to the respective manufacturer for any and all claims with regard to said equipment or parts.

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APPENDIX G

871Y/PCSM2 PERSONAL COMPUTER

SIGNAL MONITOR OPTION

REVISION RECORD

Revision	Description	Date
A	Initial release.	04/1995
B	Released under ECO control per ECO 045148.	10/2004

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APPENDIX G

871Y/PCSM2 PERSONAL COMPUTER SIGNAL MONITOR OPTION

G.1 ELECTRICAL CHARACTERISTICS

The 871Y/PCSM2 Personal Computer Signal Monitor option enables the user to perform receiver control and monitoring functions via an IBM PC-compatible computer. Receiver parameters are displayed and modified using the 871Y/PCSM2 Control and Monitoring Application software provided with the 871Y/PCSM2 option. This software is a Microsoft© Windows-compatible program, which drives the interface and provides an easy-to-use desk-type control program, allowing the operator to perform receiver control functions with simplicity, flexibility, and speed. In addition, a real time IF panoramic display is available for use as a receiver tuning aid.

G.2 MECHANICAL CHARACTERISTICS

The 871Y/PCSM2 Personal Computer Signal Monitor option consists of a Digital Expansion PC Assembly (P/N 797201-003), a cable assembly (P/N 283254-001) for routing signals to the rear panel of the receiver, five standoffs for mounting the assembly, and an accessory kit. The option may be installed at the factory at the time of order or field installed in units equipped with software versions 4.01.02 or greater. Units must have a Type 797012 Digital Control Assembly (A2) with a dash 3 or greater type number suffix, or a Type 797214-001 or 904978-002 or higher Digital Control Assembly (A2) installed. This option functions with any option configuration except for configurations containing the 871Y/SEU or 871Y/DSO options.

The Digital Expansion PC Assembly is a daughterboard, which is piggyback-mounted (via standoffs) to the receiver's Digital Control PC Assembly. One end of the cable assembly (W1) is connected to the 9-pin D-type connector on the rear panel of the unit (refer to **Figure G-1**) while the other end is connected to the daughterboard. Mounting hardware and mating connector hardware is provided to satisfy assembly and cabling requirements.

RS-232 cable assemblies, a null modem adapter, and an Arnet type POR-0002-XX-2321 I/O Communications board are accessory kit items that are provided for connecting the receiver to the computer. The I/O Communications board is to be installed in any available expansion slot of the Computer where the control program will reside.

G.3 INSTALLATION

The 871Y/PCSM2 Personal Computer Signal Monitor option is installed in the WJ-871Y Digital HF Receiver at the factory when ordered with the receiver. This option may be installed in the field for units equipped with software versions 4.01.02 or greater (refer to **paragraph G.2** for further details). In both cases, the user must install the supplied I/O Communications Board and the 87lY/PCSM2 Control and Monitoring Application software in the computer, which will be controlling the receiver.

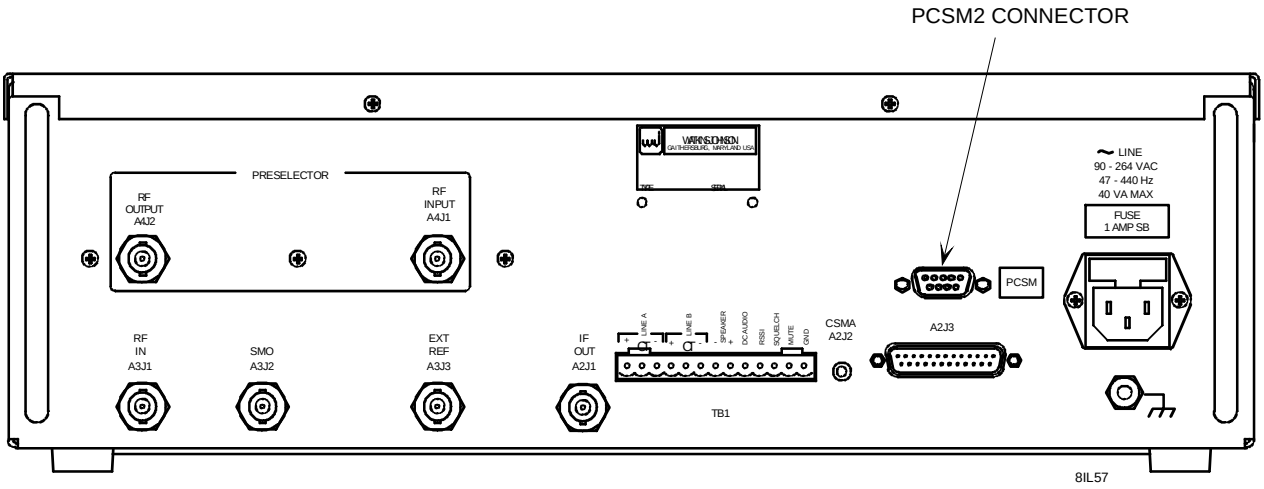


Figure G-1. WJ-871Y Rear Panel with PCSM2 Option Installed

The Application software (provided by both 5 1/4" and 3 1/2" floppy discs) can be run from any IBM PC-compatible computer equipped with the supplied I/O Communications board and the following:

- 386/20 microprocessor or higher,
- VGA display,
- 40 MB hard disk drive or greater,
- 5 1/4" or 3 1/2" floppy disc drive,
- mouse,
- 4 MB total RAM or greater,
- DOS Version 5.0 or higher,
- and Microsoft Windows Version 3.1 or higher.

A mouse must be used with the 871Y/PCSM2 Control and Monitoring Application software. To use a mouse, the PC must be equipped with two COM ports or one COM port and a mouse port. The mouse is connected to the mouse port or to an available COM port.

Perform the procedures described in **paragraph G.3.1** to install the I/O Communications Board and **paragraph G.3.2** to install the software. Refer to **paragraph G.3.3** for field installation procedures for the Type 797201-003 Digital Expansion Assembly, if required.

G.3.1 INSTALLING THE I/O COMMUNICATIONS BOARD

WARNING

Before proceeding with installation of the I/O Communications board, remove power from the computer.

The 871Y/PCSM2 option requires that the supplied I/O Communications board be installed into one of the computer's 16-bit expansion slots. Perform the following procedures to install the I/O Communications board and cabling:

I/O Board

1. Remove the top cover from the computer to expose the computer's expansion slots (refer to the computer's instruction manual for more information).

2. Remove the blank card bracket and hold-down screw from the expansion slot selected for installation.

3. Insert the I/O Communications board into the expansion slot socket and gently push the board firmly into place.

4. Replace the hold-down screw to secure the board (**Figure G-2**).

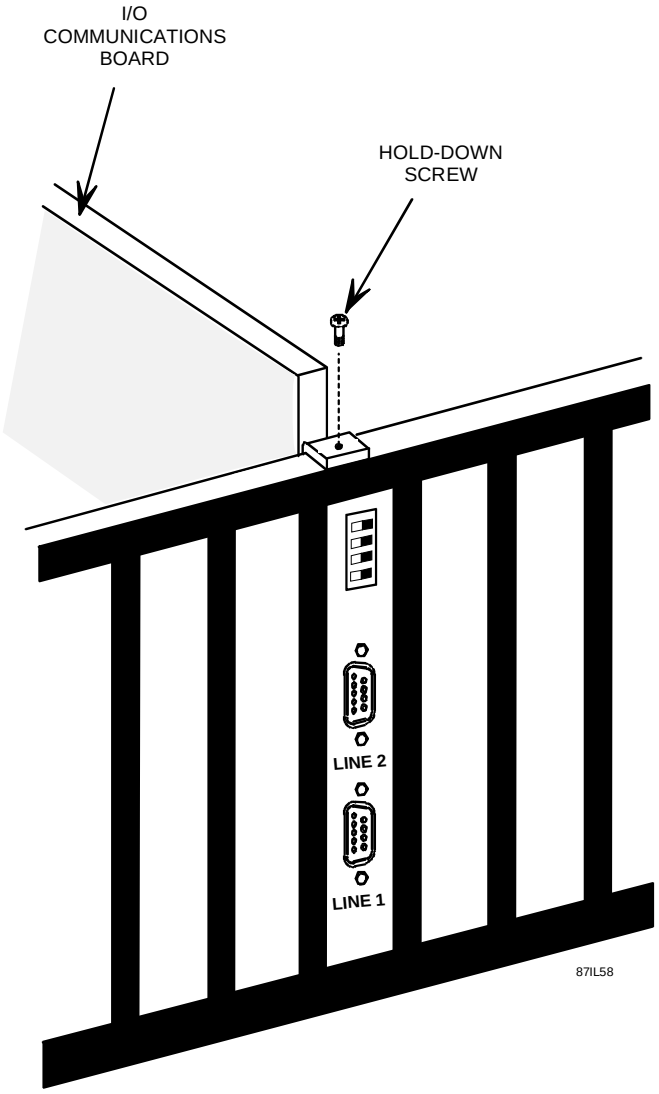


Figure G-2. Securing the I/O Communications Board

5. Replace the computer's top cover.

6. Determine the desired starting I/O address of the I/O Communications board.

NOTE

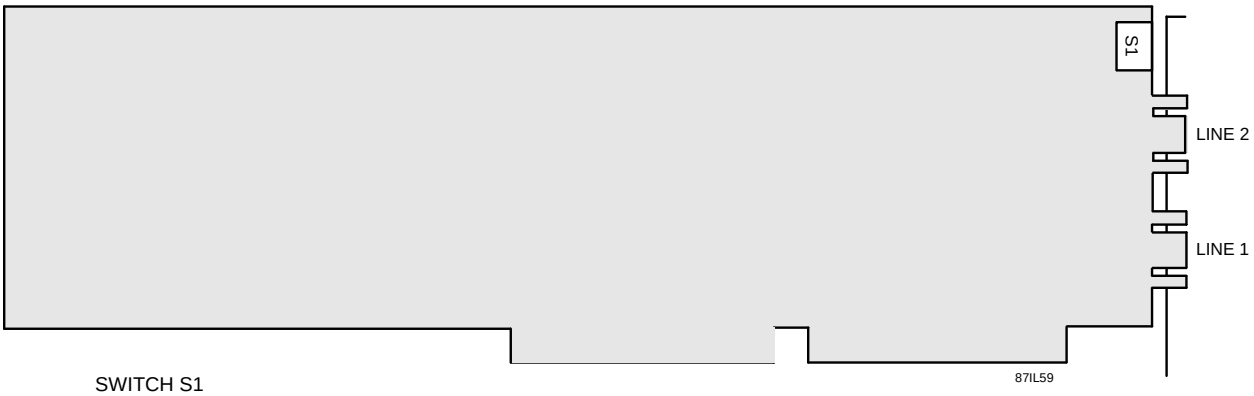
The Switch S1 on the I/O Communications board is factory set to select address 320H and should only be altered if this address is occupied by another board.

If the I/O address must be altered from the factory set address, perform the following:

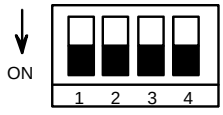
a. Install the supplied Arnet Configuration software. The Arnet icon should appear on the desktop.

b. Set switch S1 on the I/O Communications board (see **Figure G-3**) to the desired I/O address.

c. Double click the Arnet icon to initialize the Arnet Configuration program and select the applicable program options.



SWITCH S1



1 = ON (CLOSED)
0 = OFF (OPEN)

S1 POSITIONS 1	2	3	4	I/O ADDRESS
0	0	1	1	100H
0	1	0	1	110H
0	1	1	1	120H
1	0	0	1	200H
1	0	1	1	220H
1	1	0	1	300H
1	1	1	1	320H

Figure G-3. Setting I/O Address Switch S1 on the I/O Communications Board

Cabling

7. Connect LINE 1 of the I/O Communications board (DB-9 port) to connector A2J3 on the rear of the receiver (DB-25 port) using the 9-pin to 25-pin null modern adapter cable and a 25-pin to 9-pin through connector (see **Figure G-4**).

8. Connect LINE 2 of the I/O Communications board (DB-9 port) to the PCSM2 connectors on the rear panel of the receiver (DB-9 port) using the 9-pin to 25-pin null modem adapter cable and a 25-pin to 9-pin through connector (see **Figure G-4**).

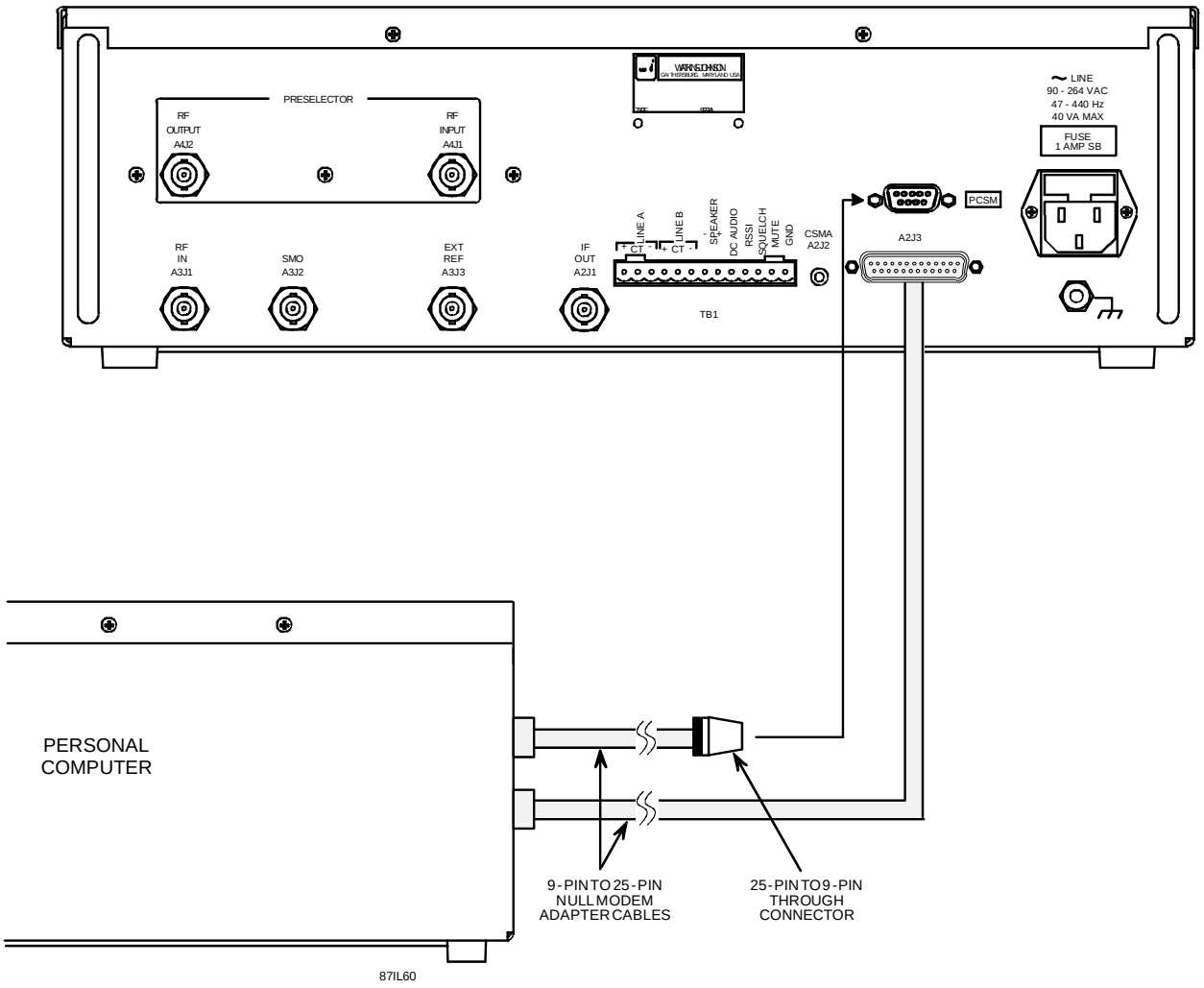


Figure G-4. Connecting the Computer to the Receiver

G.3.2 INSTALLING THE WJ-871Y/PCSM2 CONTROL AND MONITORING APPLICATION

The 87lY/PCSM2 Control and Monitoring Application software must be installed on the PC-compatible computer under Microsoft© Windows 3.1 or higher. Perform the following steps to install the programs:

1. Install Microsoft© Windows 3.1 or higher following the instructions provided with its documentation package.

2. Start Windows by typing WIN at the DOS prompt.

3. Insert the 87lY/PCSM2 Control and Monitoring Application floppy disk into drive a: (or drive b:). The program disk contains the following files:

   - PCSM.EXE — The main executable program.
   - INSTALL.EXE — The executable to install the application.
   - WJ871Y.DRV — The driver file used by WJ871Y.EXE.
   - XWMBA400.DLL — A dynamic link library file required to run WJ871Y.EXE.
   - XWMHN400.DLL — A dynamic link library file required to run WJ871Y.EXE.
   - XWMTE400.DLL — A dynamic link library file required to run WJ871Y.EXE.
   - CONFIG.DEV — The copy configuration file.
   - DISCLAIM.DOC — Text file with a disclaimer statement.
   - README.DOC — Text file with important information that may not be included in the manual.

4. Select **Run** from the Program Manager **File** menu.

5. Type a:install (or b:install, if the disk is in drive b:). The WJ87lY Install screen should appear on the desktop (refer to **Figure G-5**).

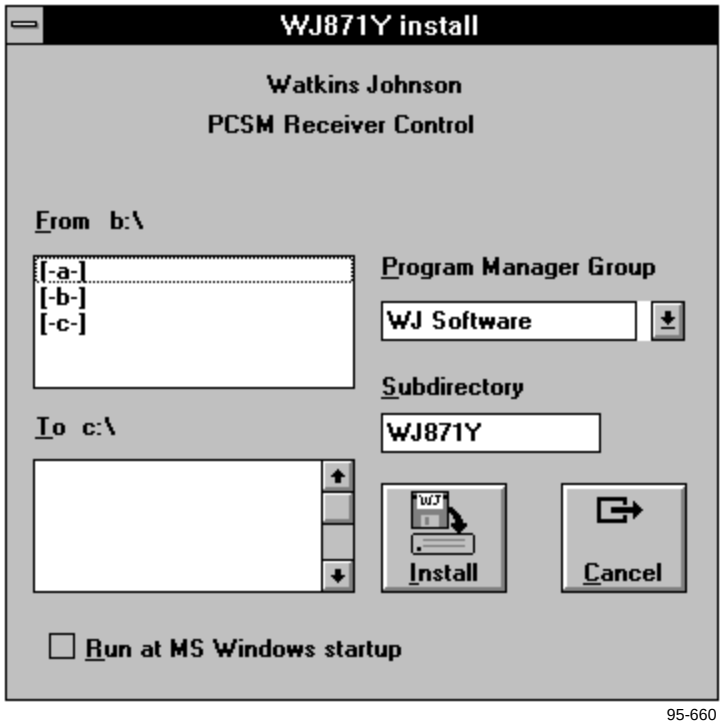


Figure G-5. WJ871Y Install Screen

6. To accept the default installation configuration (recommended), select the Install button. Edit fields are provided allowing the user to custom select the source and destination drive specifications, Program Manager group, and target subdirectory. In addition, the user is given the option of configuring the application to run automatically at Windows startup.

After the installation routine is completed, a message indicating success or failure of the program installation will appear. Once the 871Y/PCSM2 software is successfully installed, Windows must be restarted to ensure that all changes in configuration take effect.

G.3.3 FIELD INSTALLATION PROCEDURE FOR TYPE 797201-003 DIGITAL EXPANSION ASSEMBLY

Installation of the Type 797201-003 Digital Expansion Assembly consists of mounting the daughterboard onto the receiver's Digital assembly. All of the necessary installation hardware is included with the option. The installation procedure is detailed in the following steps.

1. Remove the top cover form the receiver to gain access to the receiver's Digital Control Assembly (A2).

2. Remove five of the six mounting screws and their associated washers from the Digital Assembly, identified as items 1 through 5 in **Figure G-6**.

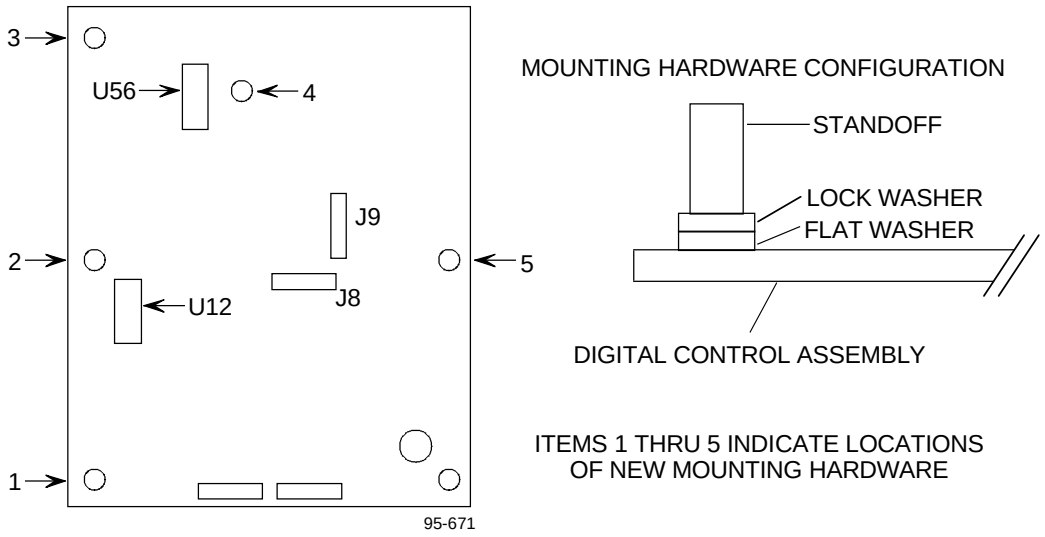


Figure G-6. Mounting Hardware Installation

3. At each mounting location install one standoff, one flat washer, and one lock washer. Refer to the Mounting Hardware Configuration in **Figure G-6** for the orientation of these parts.

4. Orient the Type 797201-003 Digital Expansion Assembly as illustrated in **Figure G-7**, with the component side facing down and J8 pointing toward the front of the receiver. Carefully connect sockets J1 and J2 with J8 and J9 on the Digital Control Assembly (A2). Using slight pressure, seat the Digital Expansion Assembly into place.

5. At each of the five mounting holes on the Type 797201-003 Digital Expansion Assembly, install one mounting screw, one flat washer and one lock washer. Refer to the mounting hardware configuration in **Figure G-7** for the orientation of these parts.

6. On the rear panel of the receiver, locate the existing 9-pin D-type "knock-out" that is directly above connector A2J3 (refer to **Figure G-4**). Carefully remove and discard the "knock-out", taking care not to damage any receiver connectors or assemblies.

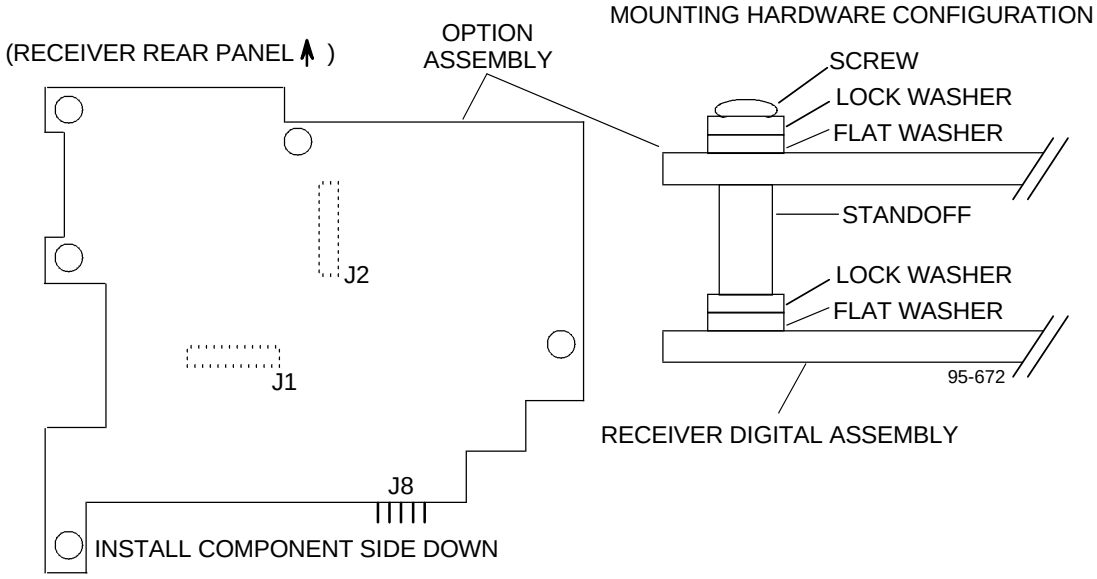


Figure G-7. Type 797201-003 Digital Expansion Assembly Hardware Illustration

7. Install option cable W1 (supplied with the 871Y/PCSM2 Option) as follows:

   - Mount connector W1J1 to the rear panel of the receiver using the provided hardware: Part Number 205817-1, Screw/Lock Kit. Affix the supplied label, "PCSM2", next to this connector as shown in **Figure G-4**.

   - Connect WIPI to A2J8 of the receiver's Digital Control Assembly.

8. Replace the receiver's top cover.

G.4 OPERATION

Performing receiver operations with the 871Y/PCSM2 Control and Monitoring Application software requires the user to start the program, configure the receiver, and select an operation mode. The following paragraphs provide information on these and other operational functions.

G.4.1 STARTING THE PROGRAM

The 871Y/PCSM2 Control and Monitoring Application software must be run from within Microsoft© Windows. Windows can be started by typing WIN and pressing <Enter>. From the Program Manager desktop, open the program group labeled "WJ CONTROL". (This assumes the default installation configuration parameters were selected in **paragraph G.3.2, step 6**.) Two icons should be displayed in the group box -- one for starting the applications program and one for opening the read-me file. The read-me file contains any last minute program changes that may not be included in this version of the manual. To open the read-me file, double-click on the WJ-871Y notepad icon.

Double-click the WJ-871Y/PCSM2 icon to initialize the 871Y/PCSM2 Control and Monitoring Application program. The program automatically enters the Main control window shown in **Figure G-8**.

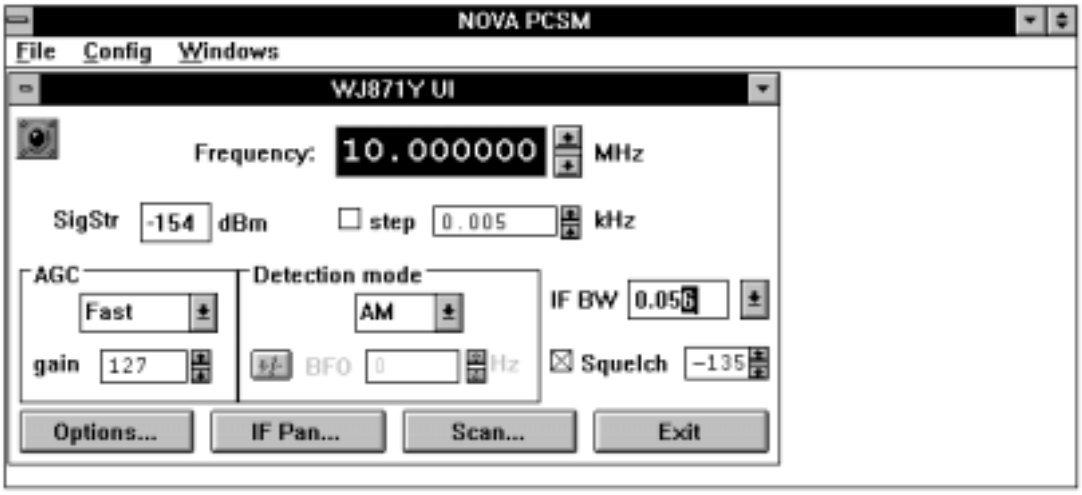


Figure G-8. The Main Control Window

During the initialization routine, the program learns the receiver's configuration. The receiver powers up to the same configuration that was set prior to the last power-down.

G.4.2 EXITING THE PROGRAM

The 871Y/PCSM2 Control and Monitoring Applications program is exited by selecting the Exit button located in the lower right comer of the Main control window or by selecting the Exit menu item from the **File** menu (refer to **Figure G-9**). The program can also be exited by using the <ALT F4> hot-key combination within the application window (refer to **paragraph G.4.3.3**). This returns control to the Windows program.

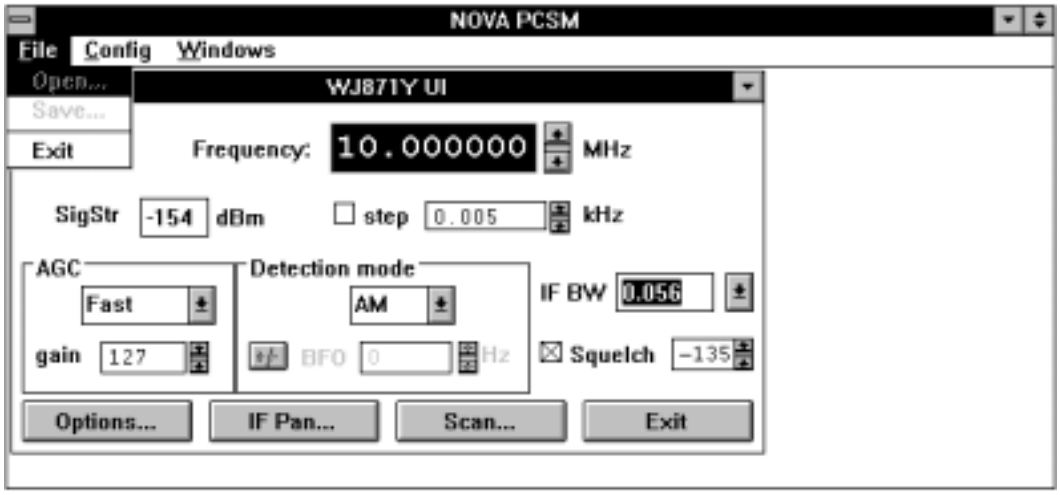


Figure G-9. Exiting the Applications Program

G.4.3 GENERAL WINDOWS FEATURES

The 871Y/PCSM2 Control and Monitoring Application is a Windows-type program that uses the same general window features, such as menus and windows, found in other commercial Windows programs. The following paragraphs provide an overview of the general features.

G.4.3.1 Basic Window Structure

Figure G-10 is an example of a window provided in the Applications Program. Every window has some common elements; however, not all windows use all the elements. The common window elements are: the control menu button, the title bar, the scroll bar, the maximize and minimize buttons, the data area, the mouse pointer, and the hot-key identifiers.

The control menu button is located in the upper-left comer of each window. This menu is useful if using a keyboard is preferred when working with the windows. Control menu commands are available for restoring, moving, resizing, minimizing, maximizing, and closing windows. Refer to **paragraph G.4.3.5.3** for more information on using the control menu.

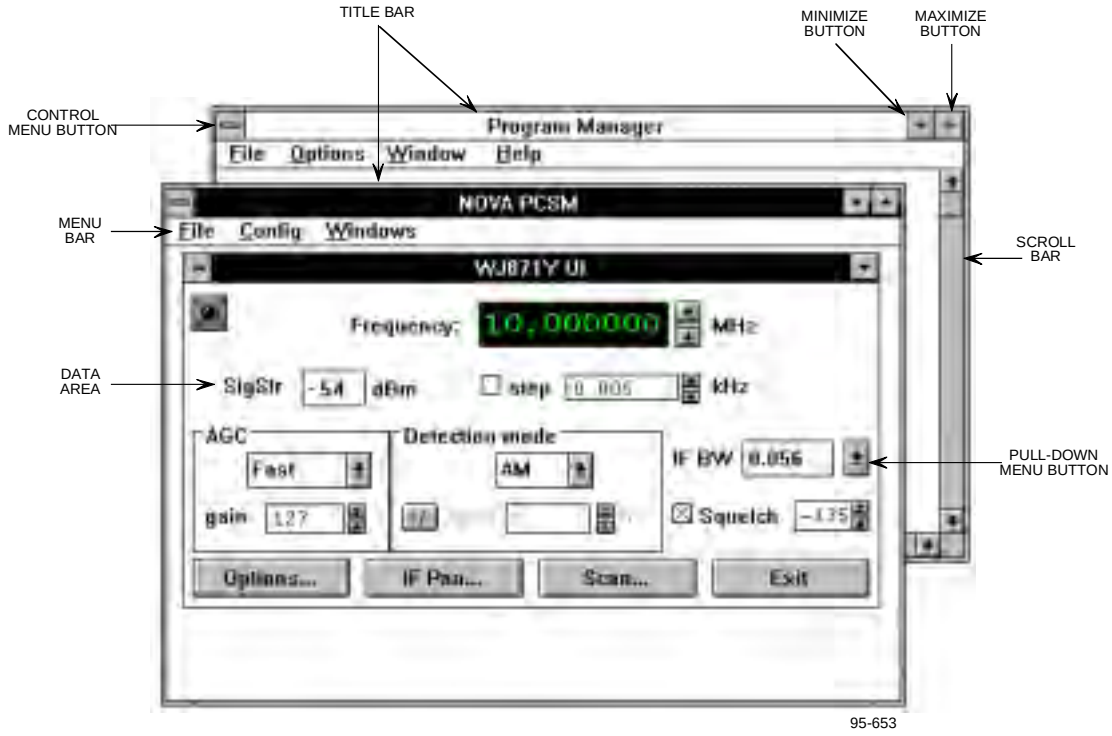


Figure G-10. Basic Components of a Window

The title bar shows the name of the window. If more than one window is open at one time, the background of the title bar for the active window is dark with the letters of the title being light. The title bars for inactive windows have gray-shade backgrounds with dark title letters.

The menu bar lists the available menus and options for the window. Hot-keys are identified as underlined letters in each menu title.

The scroll bar allows for scrolling through the contents of a window when the entire window cannot be displayed at once. Refer to **paragraph G.4.3.7.3** for more information on using the scroll bar.

The maximize and minimize buttons can be used to enlarge the active window to fill the entire desktop or shrink the window to an icon. After a window is enlarged with the maximize button the function of the button changes to the restore button. The restore button can be used to return the window to its original size. Refer to **paragraph G.4.3.7.1** for more information on changing the size of a window.

The data area contains the data elements of the window. Some fields in the data area can be edited while others are read-only. Pull-down menu buttons are displayed in certain edit fields, allowing the user to select a new value for the edit field by simply clicking the button instead of accessing items from the menu bar.

An arrow-shaped mouse pointer appears if a mouse is installed. The pointer is used to indicate items to be selected or chosen with the mouse.

G.4.3.2 Mouse Control

A mouse is required when running the 871Y/PCSM2 Control and Monitoring Applications software. When a mouse is installed, an arrow-shaped pointer is present on the screen. Moving and clicking the mouse can move and resize windows and can select menus, menu items, buttons, and data fields.

Menus can be opened by placing the mouse pointer over the menu name in the menu bar of the window and clicking the left mouse button. Menu items can be selected by clicking the left mouse button over the desired menu item.

Buttons in windows, such as the MINIMIZE and MAXIMIZE buttons or decision buttons such as OK and CANCEL, can be activated by placing the mouse pointer over the button and pressing the left mouse button.

Windows can be moved by first placing the mouse pointer over the title bar of the window, then holding the left mouse button and dragging the window to the desired location.

G.4.3.3 Keyboard Control

Menu items available from the Menu Bar of the 871Y/PCSM2 applications program may be accessed via the keyboard if desired. As seen in the menu bar of the window in **Figure G-10,** each menu item has an underlined letter. These are referred to as hot-keys. Hot-keys are used in conjunction with the ALT key to select the menus. For example, to select the File menu, press and hold the ALT key. Then, while holding the ALT key, press the "F" key. Several function keys can be used to facilitate working with the Application window as defined below:

<ALT Spacebar>	Open Control Menu
<ALT Spacebar S>	Sizes Application Window
<ALT F4>	Exits Application

G.4.3.4 Operator Input Error Audible Beep

An audible beep is sounded when an invalid operator action has occurred. When the beep is sounded, the operator action is ignored and control is returned to wherever the invalid action was attempted.

G.4.3.5 Working With Menus

All commands for the Applications Program are listed in menus. The Applications Program contains a Main menu that is accessed as soon as the program is entered. This menu is always present at the top of the display. A control menu, or system menu, opens from a small box in the upper-left comer of all windows. Other menus are represented by names in the menu bar at the top of each window. The following paragraphs provide further details on working with menus.

G.4.3.5.1 Selecting and Canceling Menus

A menu can be selected and opened with a mouse by placing the mouse pointer over the menu name in the menu bar and then pressing the left mouse button.

A menu in an active window can be selected and opened with the keyboard by either of two ways: by simply typing the menu name's hot-key identifier while holding the ALT key, or by using the left or right arrow key to highlight the menu name and then pressing the ENTER key or the down arrow key.

To cancel a menu with a mouse, place the mouse pointer anywhere outside the menu and click the left mouse button. To cancel with the keyboard, press the ESC (escape) key.

G.4.3.5.2 Choosing Menu Items

A menu item in a selected menu can be chosen with the mouse by simply clicking on the menu item. Choosing a menu item with the keyboard involves using the up or down arrow keys until the menu item is selected and then press the ENTER key.

Menu items that access sub-menus are indicated by a right arrow (▸). Choosing such a menu item automatically displays the corresponding sub-menu. Sub-menu items are selected in the same way that other menu items are selected.

The text of some menu items may appear lighter in intensity than others, depending on the menu accessed. A lighter intensity menu item indicates that it cannot be selected under the current setup or conditions.

G.4.3.5.3 Using the Control Menu

A control menu, or system menu as referred to in some windows programs, is accessible from all control windows. This menu provides access to general window control functions such as minimizing windows, maximizing windows, restoring windows to their original size, moving windows, and closing windows.

The control menu can be accessed by clicking on the control menu button with the mouse (refer to **Figure G-10**). Or, it can be accessed with the keyboard by pressing the spacebar while holding down the ALT key.

G.4.3.6 **Pop-Up Windows**

Several pop-up windows are available which are automatically activated and displayed to alert the operator of certain conditions or decisions when situations occur. These pop-up windows (Error, Confirmation, and Messages) are further described in the following paragraphs.

G.4.3.6.1 **The Error Pop-Up Window**

The Error pop-up window (refer to **Figure G-11)** is provided to alert the operator when an error has occurred. The error will generally be explained in the data area of the window to aid the operator to determine the error. No other windows can be accessed while the Error window is displayed. The error can be cleared and the window closed by selecting the appropriate button in the window. If the error persists, the Error window will be redisplayed.

Figure G-11. Example of the Error Pop-Up Window

G.4.3.6.2 **The Confirmation Window**

Certain operator actions which require a simple yes/no decision to be made cause the Confirmation pop-up window to open. This window is provided to allow the operator to confirm that the action taken in the window is necessary or wanted. Messages are displayed in the window such as "Overwrite Exiting Files?". Types of actions causing the Confirmation pop-up window to open are those such as overwriting or deleting files, clearing scan setups, etc. To confirm the decision and the action, select the ACCEPT or OK button in the pop-up window. Confirmation can also be made by pressing the ENTER key. To abort the action select the CANCEL button. Canceling can also be done by pressing the ESC key. Canceling returns control back to the active window.

G.4.3.6.3 **The Messages Pop-Up Window**

The Messages window provides a dialog box which is used to alert the operator to something that has occurred on the system.

G.4.3.7 **Working With A Window**

The following paragraphs provide details on the general control of windows.

G.4.3.7.1 **Changing the Size of a Window**

The size of a window can be changed to accommodate the room available on the desktop. A window can be stretched with the mouse by clicking on a window corner or border and dragging until the desired size is displayed. When using a keyboard, the window size can be changed by first accessing the window's control menu (<ALT><spacebar>) and selecting the Size menu item. Using the left or right arrow keys stretches the window horizontally and using the up and down arrow keys stretches it vertically.

The window can also be maximized to full display size or minimized to icon size. To maximize the window with a mouse, click on the maximize button (▲). To minimize the window click on the minimize button (▼).

To maximize a window with the keyboard, open the window's control menu and select the Maximize menu item. To minimize it select the Minimize menu item.

To restore the window back to its pre-minimized or pre-maximized size, access the window's control menu and select the Restore menu item.

G.4.3.7.2 **Moving Windows, Window Icons, and Pop-Up Windows**

A window can be moved with the mouse by first placing the mouse pointer over the title bar of the window, then holding down the left mouse button and dragging the window to the desired location.

An active open window can also be moved with the keyboard. This is done by first opening the window's control menu and selecting the Move menu item. The window can then be moved in any direction on the display with the up, down, left, and right arrow keys. Once the window is at the desired location, press the Enter key to exit the move function.

G.4.3.7.3 **Using the Scroll Bars**

Some windows provided in the program, especially those that contain lists, have scroll bars (refer to **Figure G-10**). These are convenient for scrolling through lists of data to more easily reach the desired information. Each scroll bar has a scroll-down button, a scroll-up button, and a scroll box. Clicking once on the scroll-down button scrolls the list down by one line. Clicking and holding the mouse button down on the scroll-down button continues scrolling down through the list until the last line is reached. The scroll-up button works identically except is scrolls up through the list.

The scroll box is used for fast scrolling. The location of the box in the scroll bar indicates the general position in the list that the current displayed lines are located. The scroll box can be moved by clicking and dragging it up or down the scroll bar. Dragging up scrolls up through the list and dragging down scrolls down. When the box is at the top of the scroll bar, the top of the list is displayed. When at the bottom of the scroll bar, the bottom of the list is displayed.

G.4.4 RECEIVER CONTROL FUNCTIONS

Control of the WJ-871Y receiver can be accessed via the 871Y/PCSM2 software's graphic user interface (GUI). **Figure G-12** shows the Main NOVA PCSM Display Window and the active default window (WJ871Y UI). Both windows are entered when the 871Y/PCSM2 applications program is initiated. **Table G-1** lists the receiver commands available to the Main NOVA PCSM and the WJ871Y UI display windows.

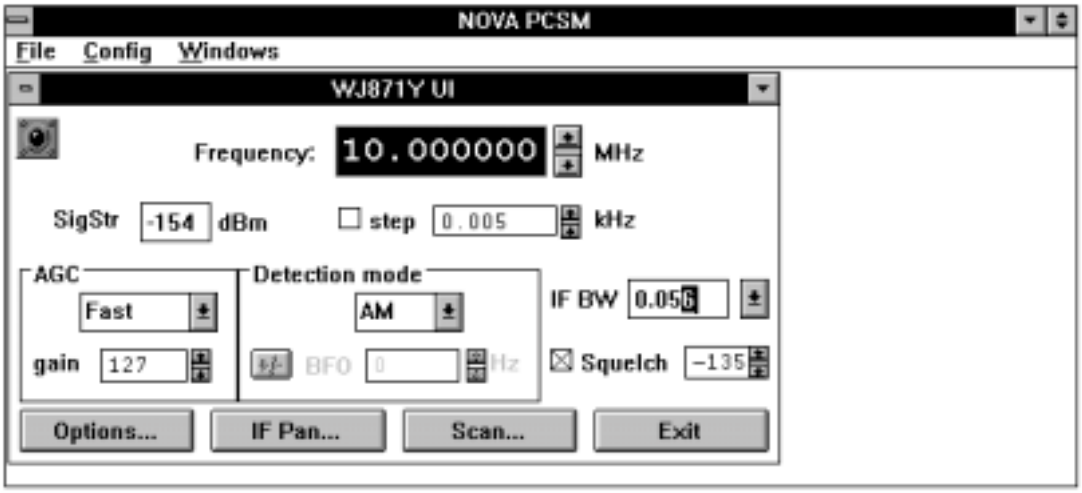


Figure G-12. The Main NOVA PCSM Display Window

Table G-1. List of NOVA PCSM Control Functions

Control Function	Description	Paragraph Ref.
Window Selection	Selects active control window, Main or Scan	G.4.4.1
Options	Selects PC COM port	G.4.4.2
Receiver Configuration	RF Input Path	G.4.4.3
Local/Remote Control	Selects local, remote, or remote with local lockout	G.4.4.4
Frequency	Sets the receiver's tuned frequency	G.4.4.5
Step Control	Enables/disables the operator selected step tune size	G.4.4.6
Signal Strength	Displays Signal Strength	G.4.4.7
AGC	Selects Manual/Automatic Gain Control	G.4.4.8
Detection Mode	Selects receiver detection mode AM/SAM/CW/FM/USB/LSB/ISB	G.4.4.9
BFO	Sets the BFO frequency	G.4.4.9.1
IF Bandwidth	Selects the Receiver IF Bandwidth, 66 filters are available	G.4.4.10
Squelch	Selects On/Off and level	G.4.4.11
IF Pan	Opens IF Pan display	G.4.4.12
Scan	Activates frequency Scan window	G.4.4.13

The functions listed in **Table G-1** are described in detail in the following paragraphs.

G.4.4.1 Activating 871Y/PCSM2 Control Windows

There are two control windows associated with the 871Y/PCSM2 Control software: the WJ871Y UI control window and the Scan control window. These windows are accessed via the Windows pulldown menu of the main NOVA PCSM window. To open the Windows pull-down menu, select the Windows menu item from the Menu Bar with the left mouse button. This opens the pull-down menu shown in **Figure G-13.**

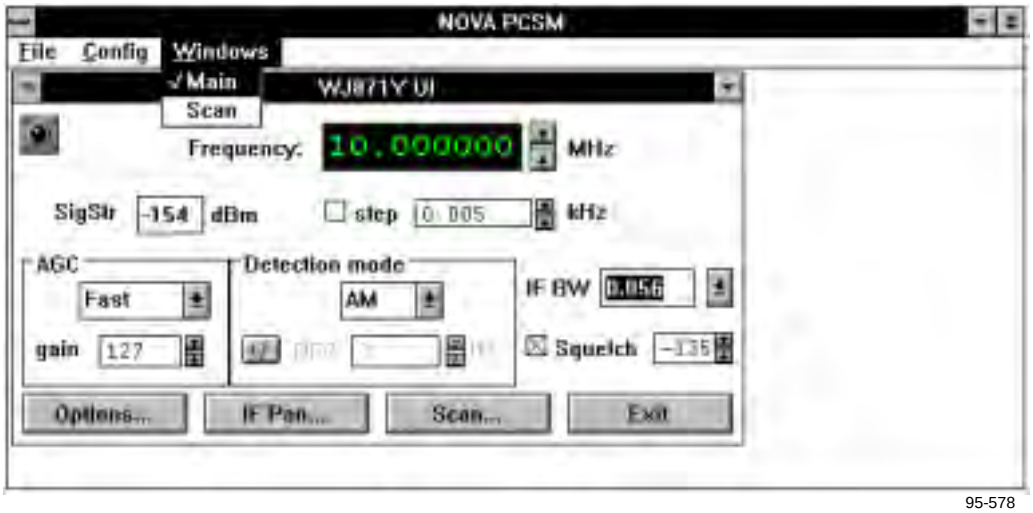


Figure G-13. The Windows Pull-Down Menu

Two selections, Main and Scan, are provided in the Windows pull-down menu. The currently active control window is identified by a check mark to the left side of the menu item.

Selecting the Main menu item activates the WJ871Y UI control window shown in **Figure G-12**. This window is the default window for the 871Y/PCSM2 applications program and provides access to receiver parameters used during manual receiver operations. Receiver parameters such as the control mode, tuned frequency, step tune size, gain control mode, detection mode, IF bandwidth, and squelch setting can be viewed or changed. Additionally, the Scan control window and the IF Pan display may be accessed from the WJ871Y UI (Main) control window. For further details on setting receiver parameters from the WJ871Y UI (Main) window refer to **paragraphs G.4.4.13** through **G.4.4.11.** For information on the IF Pan display and the Scan control window, refer to **paragraphs G.4.4.12** and **G.4.4.13,** respectively.

Selecting the Scan menu item from the Windows pull-down menu activates the Scan window. The Scan window permits placing the receiver in the scan operating mode. The scan mode allows the receiver to tune between identified start and stop frequencies at a predetermined tuning increment. For details on the Scan window and the scan mode of operation, refer to **paragraph G.4.4.13**.

G.4.4.2 Selecting the Communications Port for RS-232 Control

The Options button, located in the lower left portion of the WJ871Y UI (Main) control window, is used to select the computer communications port for the RS-232 input signal from the receiver. Clicking on this button produces the Options window shown in **Figure G-14**.

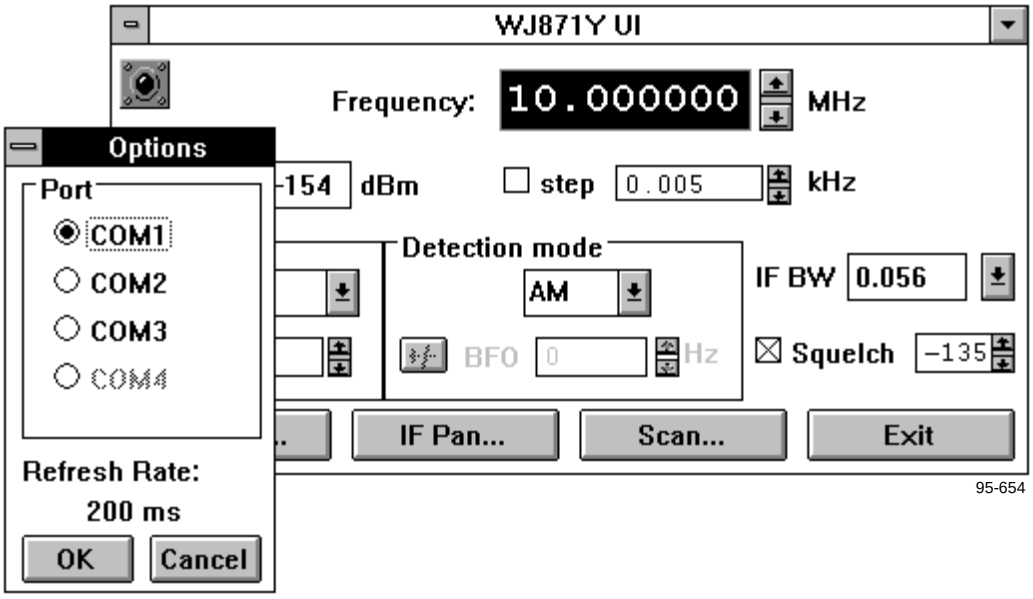


Figure G-14. The Options Window

To select the communications port for the receiver, use the computer mouse to click on the desired selection. Confirm the selection by clicking on the Option window's OK button. Clicking on the Cancel button will result in no change to the COM port selection. The default COM port for the 871Y/PCSM2 software is COM2. COM4 is not available for selection.

During receiver control via the 871Y/PCSM2 software, the receiver's front panel displays are updated at a rate of once every 200 mS. This "Refresh Rate" is displayed in the lower portion of the Options window. This field is read-only.

G.4.4.3 RF Input Path Selection

Three RF input path selections are available for the WJ-87 I Y receiver. These selections permit enabling the receiver's preamplifier, attenuator, or normal RF signal paths. The currently selected RF input path can be viewed or changed from the RF Input pull-down menu of the main NOVA PCSM control window.

The RF Input pull-down menu is accessed by first selecting the Config menu item in the Menu Bar of the Main NOVA PCSM control window. This opens the Config pull-down menu consisting of one menu item: RF Input. Selecting the RF Input menu item opens the RF Input pull-down menu shown in **Figure G-15**.

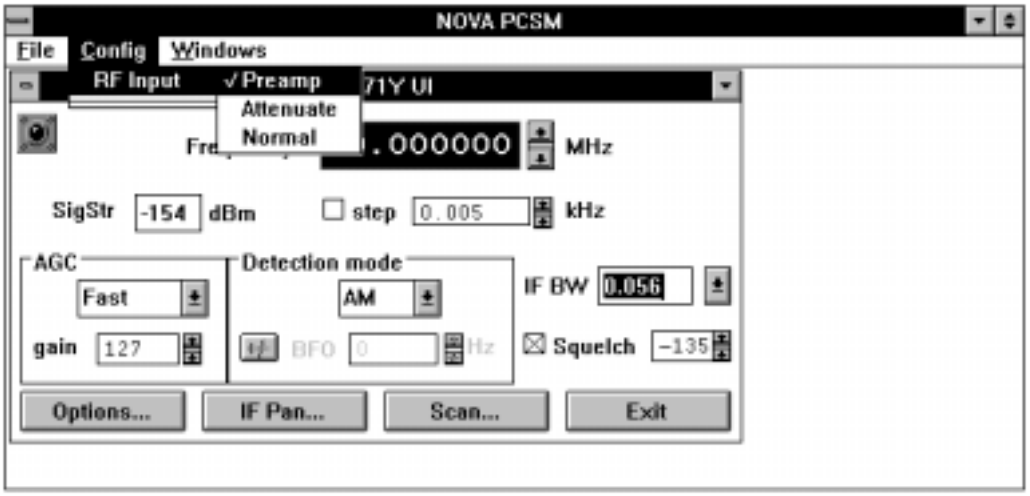


Figure G-15. RF Input Pull-Down Menu

The currently active RF Input path is identified by a check mark to the left side of the active setting. When Preamp is selected, the RF input to the receiver is amplified approximately 10 dB. Selecting Attenuate provides approximately 15 dB of attenuation to the RF input signal. When Normal is selected, the RF input signal is routed through its normal path without any amplification or attenuation. To change the RF Input path, select the appropriate menu item with the left mouse button. For further information on the Preamp, Attenuate, and Normal selections refer to Section III in the WJ-871Y base manual.

G.4.4.4 Selecting the Local/Remote Control Modes

Refer to **Figure G-12**. Located in the upper left comer of the WJ871Y UI (Main) control window just below the Control Menu Button) is a simulated indicator light. Clicking on this icon toggles the receiver thorough three available control modes:

- Local - The simulated light turns black and the word Local appears momentarily to the right of the icon. In this state the receiver is controlled via its front panel. No receiver functions can be controlled via the 871Y/PCSM2 control software except to place the receiver to the remote control mode.

- Remote - The simulated light turns red and the word Remote appears momentarily to the right of the icon. In this state the receiver can be controlled from either the remote computer or from its front panel.

- Locked - The simulated light remains red and the word Locked appears momentarily to the right of the icon. In this state, the receiver front panel is locked out. The receiver can be controlled ONLY from the remote computer.

G.4.4.5 Entering the Tuned Frequency

Refer to **Figure G-12**. The Frequency window, located in the upper center portion of the WJ871Y UI (Main) control window, permits the adjustment and viewing of the receiver's current tuned frequency. The tuned frequency range is from 0.0 Hz to 30.0 MHz, with a 1.0-Hz tuning resolution. Adjustment of the tuned frequency can be accomplished using one of the following methods:

- Using the computer mouse, double-click on the Frequency window and type in the desired frequency with the controller's numeric keypad. Press the **Enter** key when completed.

- Use the computer mouse to place the display cursor next to a digit in the Frequency window, identifying the desired tuning resolution. Once the tuning resolution is selected, click on the up or down arrow buttons to the right of the Frequency window. The displayed digit to the left side of the display cursor will increment or decrement by a value of one as the up or down arrow buttons are selected, respectively.

- Activate the Step Tune function for the receiver and use the frequency display's up/down arrow buttons to increment or decrement the tuned frequency by the selected step tune size. Refer to **paragraph G.4.4.6** for details concerning the Step Tune function.

G.4.4.6 Using the Step Tune Function

Refer to **Figure G-12**. The Step tune function allows the tuned frequency of the receiver to be adjusted according to an operator selected step tune size. The range for the step tune size is from .001 kHz to 30.0 kHz, with a 1.0-Hz resolution. The step tune function is implemented using the step window and the step selection box located directly below the Frequency window. The desired step size can be entered in the following ways:

- Using the computer mouse, double-click on the step window and type in the desired step tune size with the controller's numeric keypad. Press the **Enter** key when completed.

- Use the computer mouse to place the display cursor next to a digit in the step window, identifying the desired adjustment resolution. Once the resolution is selected, click on the up or down arrow buttons to the right of the step window. The displayed digit to the left side of the display cursor will increment or decrement by a value of one as the up or down arrow buttons are selected, respectively.

Once the desired step tune size is entered, enable the step tune function by clicking on the box next to the word 'step' with the mouse cursor. When enabled, an ‘x’ appears in the step box. When the step tune mode is enabled, the up and down arrow buttons of the Frequency window are used to increment or decrement the tuned frequency according to the entered step tune value.

G.4.4.7 Viewing the Received Signal Strength

Refer to **Figure G-12**. The "SigStr" field, located on the left side of the WJ871Y Ul (Main) window, identifies the signal strength in dBm of the RF signal being detected by the receiver. This is an informational field only.

G.4.4.8 Setting the Gain Control Mode

Refer to **Figure G-12**. The AGC field, located in the lower left portion of the WJ871Y UI (Main) window, is used to select the gain control mode of the receiver. Available modes are Automatic Gain Control (AGC) and Manual. In the AGC mode, the receiver automatically adjusts the gain level (depending on the level of the received signal) to provide the optimum signal level for demodulation. Three AGC settings are available including AGC Fast, AGC Medium, and AGC Slow. The AGC Fast mode is a more suitable selection for AM and FM detection modes, while the AGC Medium and AGC Slow modes are suitable for CW, USB, LSB, and ISB detection modes. In the Manual gain mode, the gain level of the receiver is set manually between 0 and 127 dB, in 1.0 dB increments. For further details on the AGC and Manual gain modes, refer to **Section III** of the WJ-871Y base manual.

To select the current gain control mode, click the mouse cursor on the AGC pull-down menu button. This opens the AGC pull-down menu shown in **Figure G-16**. Select the desired gain control mode by placing the mouse cursor on the required AGC mode or the Manual selection and click the left mouse button. The current gain mode is displayed in the AGC field to the left of the pull-down menu button.

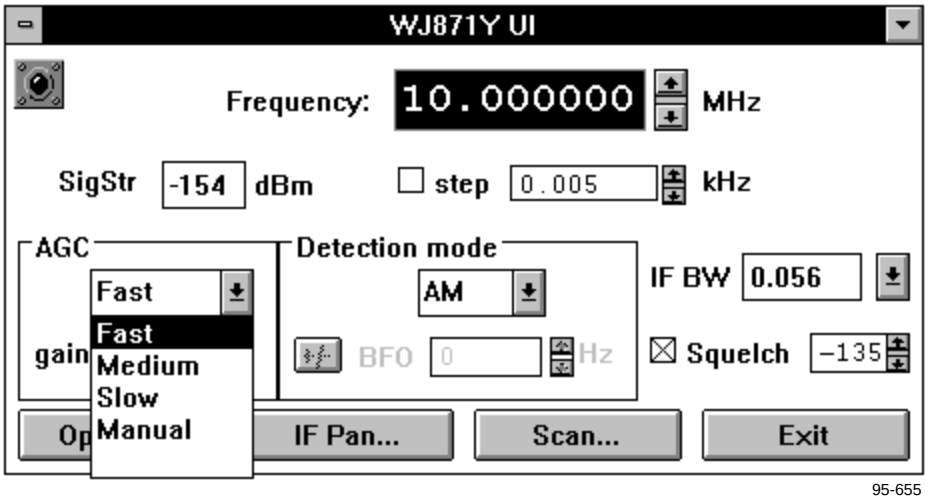


Figure G-16. The AGC Pull-Down Menu

Regardless of the selected gain control mode, the manual gain level is displayed in the lower portion of the AGC field below the AGC pull-down window. The manual window is only active, however, when the Manual gain control mode is selected. To adjust the manual gain value, double-click on the gain window with the mouse and type in the desired level, in dB, with the controller's numeric keypad. Press the Enter key when completed. An alternate method of adjustment is to click the mouse cursor on the up or down arrow buttons of the gain window. Each press of the up or down arrow buttons increments or decrements the gain setting by a value of one, respectively.

G.4.4.9 Selecting the Detection Mode

Refer to **Figure G-12**. The Detection mode field, located in the lower center portion of the WJ871Y UI (Main) window, is used to select the detection mode of the receiver. Available detection modes are AM, Synchronous AM, CW, FM, USB, LSB, and ISB. The current detection mode is displayed in the upper portion of the Detection mode field. While in the CW detection mode, a Beat-Frequency-Oscillator (BFO) is available (refer to **paragraph G.4.4.9.1** for details).

To change the detection mode selection, open the detection mode pull-down menu by clicking on the detection mode pull-down menu button. Once the detection mode pull-down menu is open (refer to **Figure G-17**) select the desired detection mode with the computer's mouse. After the selection is made, the pull-down menu is closed and the detection mode window is updated to show the current selection.

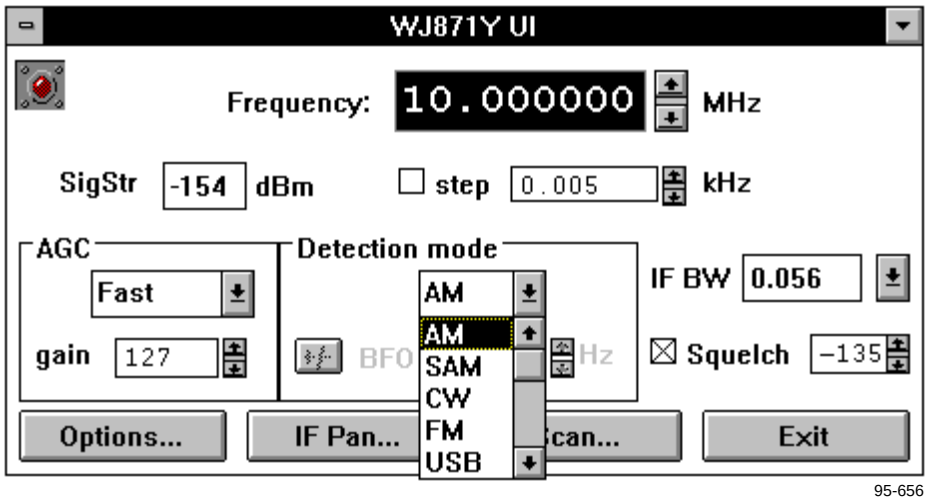


Figure G-17. The Detection Mode Pull-Down Menu

G.4.4.9.1 Adjusting the BFO Frequency

While in the CW detection mode, a BFO is available to aid in the reception of CW signals. The BFO range is +/-8000 Hz, with a 10.0-Hz resolution. The current BFO setting is displayed in the BFO window located in the lower portion of the Detection mode field (refer to **Figure G-12**). To adjust the BFO setting, double-click on the BFO window with the mouse and type in the desired frequency with the controller's numeric keypad. Press the **Enter** key when completed. An alternate method of adjustment is to click the mouse cursor on the up or down arrow buttons of the BFO window.

Each press of the up or down arrow buttons increments or decrements the BFO setting by a value of 10 Hz, respectively. In all detection modes other than CW, the BFO window is disabled.

The "+/-" button, located at the left side of the BFO window, is used to quickly change the polarity of the BFO setting. Each click of the "+/- " button toggles the selected BFO frequency between plus, minus, and 0 Hz. For example, if the current BFO frequency is +1000 Hz, the BFO setting will toggle between - 1000 Hz, 0.0 Hz, and + 1000 Hz with each press of the "+/-" button.

G.4.4.10 Selecting an IF Bandwidth

Refer to **Figure G-12**. The IF BW field, located in the lower right portion of the WJ871Y UI (Main) window, is used to select the receiver's IF bandwidth filter. One of 66 different IF bandwidths, ranging from .056 kHz to 16.0 kHz, are available for selection from the IF BW pull-down menu shown in **Figure G-18**. **Table G-2** lists the available IF bandwidth filter choices.

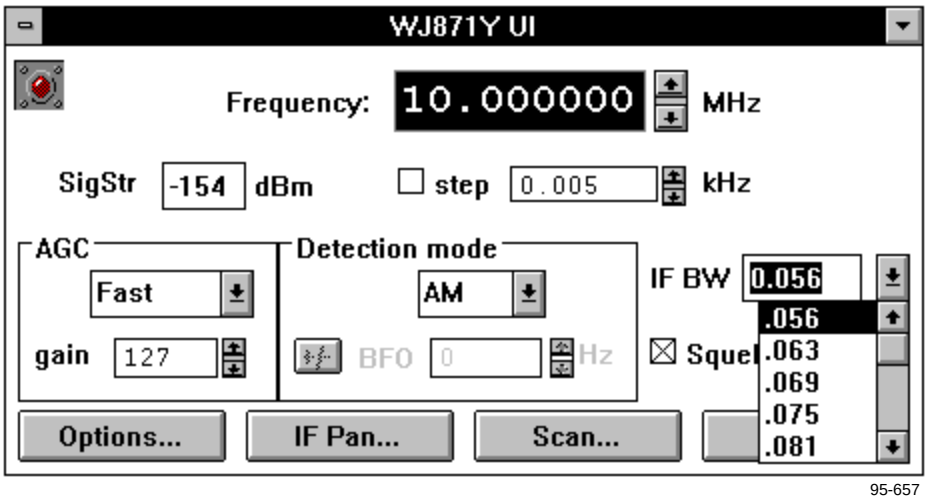


Figure G-18. The IF Bandwidth PuIl-Down Menu

To select an IF bandwidth filter, click the mouse cursor on the pull-down menu button of the IF BW window. A pull-down menu appears showing the available bandwidths (refer to **Figure G-18**). Using the pull-down menu's scroll bar, scroll through the IF bandwidth list and click on the desired bandwidth. The pull-down menu will close and the selected IF bandwidth value appears in the IF BW window.

Table G-2. Available IF Bandwidth Filters

3-dB Bandwidths	Typical Shape Factor (3/60 dB)	3-dB Bandwidths	Typical Shape Factor (3/60 dB)
.056 kHz	1.45:1	1.000 kHz	1.40:1
.063 kHz	1.40:1	1.100 kHz	1.40:1
.069 kHz	1.40:1	1.120 kHz	1.35:1
.075 kHz	1.35:1	1.300 kHz	1.35:1
.081 kHz	1.35:1	1.400 kHz	1.35:1
.088 kHz	1.35:1	1.500 kHz	1.35:1
.094 kHz	1.35:1	1.600 kHz	1.30:1
. 100 kHz	1.30:1	1.800 kHz	1.45:1
.113 kHz	1.45:1	2.000 kHz	1.40:1
.125 kHz	1.40:1	2.200 kHz	1.40:1
.138 kHz	1.40:1	2.400 kHz	1.35:1
.150 kHz	1.35:1	2.600 kHz	1.35:1
.163 kHz	1.35:1	2.800 kHz	1.35:1
.175 kHz	1.35:1	3.000 kHz	1.35:1
.188 kHz	1.35:1	3.200 kHz	1.30:1
.200 kHz	1.30:1	3.600 kHz	1.45:1
.225 kHz	1.45:1	4.000 kHz	1.40:1
.250 kHz	1.40:1	4.400 kHz	1.40:1
.275 kHz	1.40:1	4.800 kHz	1.35:1
.300 kHz	1.35:1	5.200 kHz	1.35:1
.325 kHz	1.35:1	5.600 kHz	1.35:1
.350 kHz	1.35:1	6.000 kHz	1.35:1
.375 kHz	1.35:1	6.400 kHz	1.30:1
.400 kHz	1.30:1	7.200 kHz	1.45:1
.450 kHz	1.45:1	8.000 kHz	1.40:1
.500 kHz	1.40:1	8.800 kHz	1.40:1
.550 kHz	1.40:1	9.600 kHz	1.35:1
.600 kHz	1.35:1	10.400 kHz	1.35:1
.650 kHz	1.35:1	11.200 kHz	1.35:1
.700 kHz	1.35:1	12.000 kHz	1.35:1
.750 kHz	1.35:1	12.800 kHz	1.30:1
.800 kHz	1.30:1	14.400 kHz	1.25:1
.900 kHz	1.45:1	16.000 kHz	1.20:1

G.4.4.11 Setting the Squelch Value

The squelch control function is used to limit unwanted signals or noise below a selected threshold level. If a signal is being received that is not quite strong enough for proper demodulation (i.e., audio is unclear), the squelch level can be adjusted to block it from being applied to the receiver' s audio outputs. The squelch control function is located in the lower right portion of the WJ871Y Ul (Main) control menu (refer to **Figure G-12**). The squelch mode may be enabled by clicking on the box to the left of 'Squelch.' An x will appear in the box indicating that squelch is enabled. To disable squelch, click again on the box and the x will disappear indicating that squelch is off

When squelch is enabled, the available squelch range is from 0 and -135 dBm. The squelch level may be set by using one of the following methods:

- Using the computer mouse, double-click on the Squelch window and type in the desired squelch value in -dBm with the controller's numeric keypad. Press the **Enter** key when completed.

- Click on the up or down arrow buttons on the right side of the Squelch window. Each press of the up or down arrow buttons increases or decreases the squelch setting by a value of 1 dB, respectively.

G.4.4.12 Viewing the IF Pan Display

The IF Pan button, located in the lower left portion of the WJ871Y UI (Main) control window, permits access to the graphic IF Panoramic (IF Pan) display shown in **Figure G-19**.

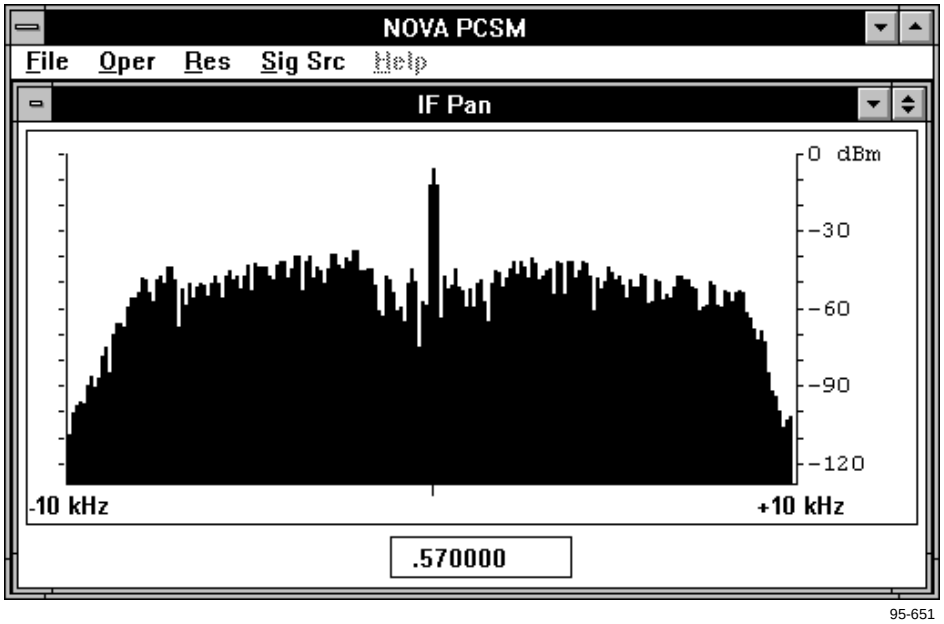


Figure G-19. The IF Pan Display

The current tuned frequency of the receiver is displayed in a box at the bottom center of the IF Pan display. The signal strength of the displayed signal is determined by referencing the display's right vertical axis (0 to -130 dBm). The tuned or center frequency of the IF Pan display can be changed by placing the mouse pointer to the left or the right of the display and clicking the left mouse button. If the pointer is on the left side of the display, the tuned frequency will shift downward with each click. If the pointer is on the right side of the display, clicking the left mouse button will cause the center frequency to shift upward. Placing the mouse pointer on a signal peak and clicking will cause the center frequency to shift to the frequency of that peak.

There are five menu items shown in the menu bar of the IF Pan window. They are:

- **File** - Allows storing an IF Pan display to a file.
- **Oper** - Provides Center display and Freeze display options.
- **Res** - Provides adjustment of the displayed bandwidth for the IF Pan display.
- **Sig Src** - Permits selection of the signal source for the IF Pan display.
- **Help** - Reserved for future enhancement.

The following paragraphs provide details on the menu items available in the IF Pan window.

G.4.4.12.1 **The Oper Menu Item**

Selecting the Oper menu item on the IF Pan display's menu bar opens the Oper pull-down menu. This menu provides two items for the control of the IF Pan display. The two menu items are Peak and Freeze.

Selecting the Peak menu item in the Oper pull-down menu causes the IF Pan display to center on the strongest signal shown in the IF Pan display at the time the Peak menu item was selected.

Selecting the Freeze menu item in the Oper pull-down menu causes the IF Pan display to freeze and not accept new data. This permits the IF Pan display to be analyzed. When the IF Pan display is in the Freeze mode, a check mark will appear to the left side of the Freeze menu item. To return the IF Pan display to normal operations, deselect the Freeze function by selecting the Freeze menu item with the mouse. The check mark next to the Freeze menu item is removed.

G.4.4.12.2 **The Res Menu Item**

Selecting the Res menu item on the IF Pan window menu bar opens the Res pull-down menu. This menu provides eight resolution options ranging from 156 Hz to 20.0 kHz. The selected resolution determines the current display bandwidth for the IF Pan window. **Table G-3** lists the available Res menu item values and the IF Pan window display bandwidths selected with each menu item.

Table G-3. Resolution Value Versus IF Pan Display Bandwidth

Selected Resolution Value	IF Pan Bandwidth (+/-) From Center Frequency)
156 Hz	+/-78 Hz
312 Hz	+/-156 Hz
625 Hz	+/-312 Hz
1.25 kHz	+/-625 Hz
2.50 kHz	+/-1.25 kHz
5.00 kHz	+/-2.50 kHz
10.0 kHz	+/-5.00 kHz
20.0 kHz	+/-10.0 kHz

To change the display resolution, click the computer mouse on the desired resolution menu item. The display will update immediately with the new display resolution.

G.4.4.12.3 The Sig Scr Menu Item

The Sig Scr menu item of the IF Pan window menu bar provides two choices for use as the display's signal source. Available selections of ‘Processed IF’ and ‘Unprocessed IF’ are listed in the Sig Scr pulldown menu. To select the desired input source, use the computer mouse to click on the Sig Scr menu item, opening the Sig Scr pull-down menu. Select the desired signal source, ‘Processed IF’ or ‘Unprocessed IF’ with the mouse.

G.4.4.13 Opening the Scan Control Window

The Scan control window shown in **Figure G-20** is used to place the receiver into the scan mode of operation. The scan mode allows the receiver to automatically tune between defined start and stop frequencies at a predetermined step size. Once a signal is encountered whose signal strength is equal to or above the set threshold level, the scan process is suspended for a specified period of time. Additionally, the scan may be paused manually to continually monitor signals of interest.

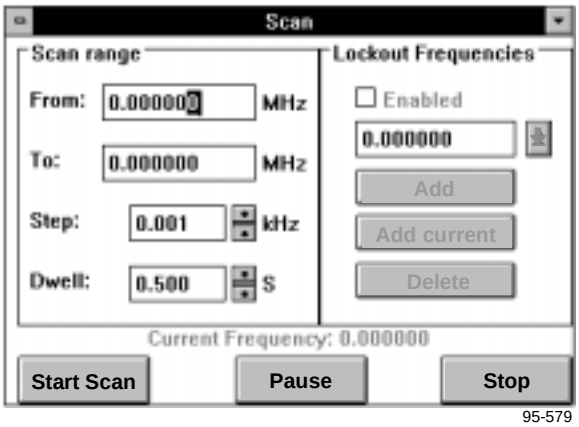


Figure G-20. The Scan Window

There are two methods for opening the Scan window (refer to **Figure G-10**):

1) select the Scan menu item from the Windows pull-down menu of the main NOVA PCSM window (refer to **paragraph G.4.4.1**),

2) select the Scan... button located in the lower center portion of the WJ871Y Ul (Main) control window.

The following paragraphs provide details on setting the scan frequency range, the step size, and the signal dwell timer values. Information is also provided on starting, stopping, pausing, and resuming scan operations.

G.4.4.13.1 Setting the Scan Frequency Range

The Scan range control section appears on the left side of the Scan window (refer to **Figure G-20**). Two entry boxes labeled From and To are used to enter the scan's start and stop frequencies, respectively. Valid scan ranges may be entered between 0.0 Hz and 29.999999 MHz.

To enter a scan start frequency, select the From box with the mouse cursor and type in the desired start frequency with the controller's numeric keypad. Click the left mouse button to enter the selection when completed. Any frequency between 0.0 Hz and 29.999999 MHz is valid provided the start frequency is less then the entered stop frequency.

The scan stop frequency is entered in a similar manner. Select the To box with the mouse cursor and type in the desired stop frequency with the controller's numeric keypad. Click the left mouse button to enter the selection when completed. Any frequency between 0.0 Hz and 29.999999 MHz is valid provided the stop frequency is greater then the entered start frequency.

G.4.4.13.2 Setting the Scan Step Size

The Step box, located in the Scan range field of the Scan control window (refer to **Figure G-20**), is used to set the tuning increment used during the scan sequence. The step size can be set from .001 kHz to 25.0 kHz, with a resolution of .001 kHz. Three methods are available for entering the step size.

- Using the computer mouse, double-click on the Step box and type in the desired step size in kHz with the controller's numeric keypad. Click the left mouse button to enter the selection when completed.

- Click on the up or down arrow buttons adjacent to the Step box to change the displayed step size in .001-kHz increments. Each click of the up arrow or down arrow increments or decrements the step size, respectively.

- Use the computer mouse to place the cursor next to a digit in the Step box, identifying the desired adjustment resolution. Once the resolution is selected, click on the up or down arrow buttons adjacent to the Step box. The displayed digit to the left side of the display cursor will increment or decrement by a value of one as the up or down arrow keys are selected, respectively.

G.4.4.13.3 Setting the Signal Dwell Timer Value

The signal dwell timer is used to determine the amount of time the scan sequence is suspended when a signal is intercepted whose signal strength is equal to or greater than the set threshold level. Valid dwell timer settings are from 0.5 seconds to 20.000 seconds, with a resolution of .001 second. The dwell timer may be set to infinite by entering a value less then 0.5 seconds. Set the dwell timer by performing one of the following procedures (refer to **Figure G-20**):

- Using the computer mouse, double-click on the Dwell box and type in the desired dwell timer value with the controller's numeric keypad in seconds. Clicking the left mouse button enters the selection when completed.

- Click on the up or down arrow buttons adjacent to the Dwell box. Each click of the up or down arrow buttons increments or decrements the dwell timer value by .001 seconds, respectively.

- Use the computer mouse to place the cursor next to a digit in the Dwell box, identifying the desired adjustment resolution. Once the resolution is selected, click on the up or down arrow buttons adjacent to the Dwell box. The displayed digit to the left side of the display cursor win increment or decrement by a value of one as the up or down arrow buttons are selected, respectively.

G.4.4.13.4 **Adding, Deleting, and Enabling Lockout Frequencies**

The Lockout Frequencies display area located on the right side of the Scan control window (refer to **Figure G-20**) is currently inactive. Adding, deleting, and enabling lockout frequencies for a scan operation will be a future enhancement to the 871Y/PCSM2 software control program.

G.4.4.13.5 **Starting, Stopping, and Continuing A Scan**

Refer to **Figure G-20**. Once all scan parameters are entered, click on the Start Scan button located in the lower left portion of the Scan window to start the scan sequence. Once the Start Scan button is selected, its function is changed to the Continue button.

To pause an active scan, click the Pause button located in the lower center portion of the Scan control window (refer to **Figure G-20**). This button suspends the scan sequence at the receiver's currently tuned frequency so that signals of interest may be monitored. To resume the scan sequence at the point from where it was paused, click the Continue button located in the lower left portion of the Scan control window.

To stop an active or paused scan operation, click the Stop button located in the lower right portion of the Scan control window (refer to **Figure G-20**).

G.5 **REPLACEMENT PARTS LIST**

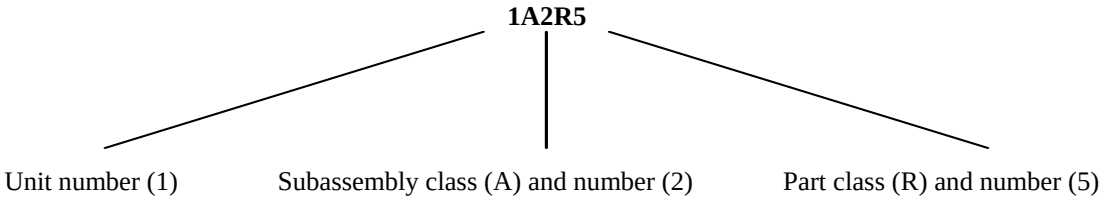
The following paragraphs provide comprehensive information on the parts used in the unit. Included is an overview of the method used to number the parts, a brief definition of the reference designator prefix, a list of applicable manufacturers including addresses, and the physical parts lists.

G.5.1 **PART NUMBERING METHOD**

The numbering method used to identify the parts used in this unit is consistent with most commercial and military numbering standards. Reference designations are assigned to assemblies, subassemblies, modules within a subassembly, and discrete components. These designations allow the user to quickly identify and locate specific parts, regardless of the complexity of the unit. A basic reference designation consists of a letter identifying the class (type) of the item followed by the item number. For example, the first resistor in an assembly is identified as "Rl". Both complete and partial reference designations are found in this manual and throughout the unit.

G.5.1.1 Complete Reference Designations

A complete reference designation is used to identify a basic part along with each applicable unit and subassembly associated with the part. The unit and subassembly reference designations are listed as prefixes to the part's reference designation. For example, the following complete reference designation identifies the fifth resistor (R5) of the second subassembly (A2) in the first unit (1):



G.5.1.2 Partial Reference Designations

A partial reference designation, consisting only of the basic part's reference designator (e.g. R1), is used to identify each basic part in the replacement parts lists and schematic diagrams. The applicable unit and subassembly reference designation prefixes, which are not included in the actual partial reference designation, may be found at the beginning of each replacement parts list. Placing these reference designation prefixes before the basic part's partial reference designation yields the complete reference designation for the basic part.

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

G.5.2 LIST OF MANUFACTURERS

The manufacturers listed below are supply sources used for obtaining certain parts in this option, and are not listed in the base manual. All other manufacturers not listed below can be found in the base manual.

Mfr. Code	Name and Address
86072	Capitol Radio Wholesales, Inc. 45 W. Watkins Mill Road Gaithersburg, MD 20878-4026
OFJN4	Arnet Corporation Digi International, Inc. 6400 Flying Cloud Drive Eden Parrie, MN 55344

G.5.3 PARTS LIST

The following parts lists contain the electrical components used in this unit, along with mechanical parts which may be subject to unusual wear or damage. Refer to the base manual for a comprehensive listing of all parts. When ordering replacement parts from the factory, 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 **paragraph G.5.2**, and the manufacturer's part number, provided in **paragraph G.5.4**, are supplied as a guide to aid the user of the equipment while in the field. The parts listed may not necessarily be identical with the parts installed in the unit. The parts listed in **paragraph G.5.4** 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 is suggested as a convenience to the user.

NOTE

As improvements in semiconductors are made, it is the policy of the factory 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, the semiconductor devices listed in this manual may be substituted with satisfactory results.

G.5.4 871Y/PCSM2 PERSONAL COMPUTER SIGNAL MONITOR OPTION

REF DESIG	DESCRIPTION	OTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
	Revision D				
Al*	PCSM2 Option PC Assembly	1	797201-003	14632	
A2AI**	PCSM2 Option PC Assembly	1	797201-003	14632	
J1	Connector, Plug: 9-position, D-style	1	205204-001	00779	
P1	Connector, Receptacle	1	M80-8881005	14632	
W1	Cable Assembly	1	283254-001	14632	
	Accessory Items				
	I/O Communications Board	1	POR-0002-XX-2321	OFJN4	
	Software, Graphical User Interface	1	841949-1	14632	
	Null Modem Adapter, 9-pin to 25-pin	1	117	86072	
	Null Modem Cable Assembly, 9-pin to 25-pin	2	119-6	86072	
	Spacer, . 187 x .400, 4-40 Stud	5	283051-001	14632	
	Washer, Flat, No. 4	10	MS15795-803	96906	
	Washer, Lock, No. 4	10	MS35338-135	96906	
	Screw, Pan Head, 4-40 x 5/16	5	MS51957-14	96906	
	Screw/Lock Kit	2	205817-1	00779	
	Label, PCSM2	1	283479-001	14632	

* Designated Al for WJ-8712A Series receivers.
** Designated A2A1 for WJ-8711A and HF-1000 Series receivers

NOTES

APPENDIX H

871Y/485 RS-485 INTERFACE OPTION

AND

871Y/MCU MULTI-DROP CONVERTER UNIT OPTION

WJ P/N 181273-001, Revision G

WATKINS-JOHNSON COMPANY
700 QUINCE ORCHARD ROAD
GAITHERSBURG, MARYLAND 20878-1794

June 1999

PROPRIETARY STATEMENT

WARRANTY

Seller warrants for a period of one year from the date of shipment, unless a different period has been agreed upon and incorporated into the Contract, that the products delivered or services rendered will conform to the specifications and be free from defects in workmanship and materials. THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY, FITNESS FOR PURPOSE, OR OTHER WARRANTIES OR GUARANTIES OF ANY KIND OR DESCRIPTION, WHETHER STATUTORY, EXPRESS, OR IMPLIED. If the goods delivered or services performed fail to conform to the warranty stated in this clause, Seller will correct the nonconformity at its expense by such repair, adjustment, modification, or replacement of the goods or services as Seller deems expedient. THE FOREGOING REMEDY OF BUYER FOR ANY FAILURE OF THE GOODS OR SERVICES TO MEET ANY WARRANTY IS EXCLUSIVE. BUYER EXPRESSLY AGREES THAT THE LIABILITY OF SELLER UNDER ANY WARRANTY SHALL NOT INCLUDE DAMAGE TO OUR LOSS OF PROPERTY OTHER THAN THE GOODS COVERED BY THE CONTRACT; LOSS OF PROFITS OR REVENUE; INCREASED COSTS OF ANY KIND; CLAIMS OF CUSTOMERS OF BUYER; OR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES. As to goods or components where the customer has funded the repair, Seller will warrant as limited above, the repaired portion of the unit for three months from the date of reshipment. EQUIPMENT OR PARTS DESCRIBED AS BEING MANUFACTURED BY OTHERS ARE SOLD BY SELLER AS IS and Buyer must look to the respective manufacturer for any and all claims with regard to said equipment or parts.

LIST OF EFFECTIVE PAGES

Page Number	Description	Revision
i	Cover	G
ii	Proprietary Statement	G
iii	List of Effective Pages	G
iv	Intentionally Blank	G
v	Revision Record	G
vi	Intentionally Blank	G
vii thru viii	Table of Contents	G
H-1 thru H-32	Appendix H	G

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APPENDIX H

871Y/485 AND 871Y/MCU OPTIONS

REVISION RECORD

Revision	Description	Date
A	Initial Issue.	2/94
B	Changed Recommendation of RS-232-to-RS-485 Converter.	5/94
C	Corrected errata associated with DIP switch configuration.	5/95
D	Revised **Figure H-1** to show schematic representation of B&B RS-232-to-RS-485 I/O Converter Box hook-up.	12/94
E	Updated for 797214-1 (A2) Upgrade.	3/95
F	Added WJ part number to the title page. Incorporated a List of Effective Pages. Added page numbers to section cover pages and their back pages. Removed "intentionally left blank" pages and replaced with "Notes" pages that are formatted with headers and page numbers.	9/97
G	Incorporated ECO 039697, adding details for the 871Y/MCU option.	6/99

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APPENDIX H

871Y/485 RS-485 INTERFACE OPTION AND 871Y/MCU MULTI-DROP CONVERTER UNIT

H.1 INTRODUCTION

This document describes the 871Y/485 RS-485 Interface Option. Details on the 871Y/MCU Multi-Drop Converter Unit option are also provided herein due to its exclusive use with the 871Y/485 option. The associated configuration setup procedures and remote operation instructions are also provided. These options are used on the WJ-8710A, WJ-8711A, WJ-8712A, and WJ-8712P Digital HF Receivers. When the WJ-871Y/485 RS-485 Interface Option is installed, standard remote operations via the CSMA interface are not available.

H.2 ELECTRICAL CHARACTERISTICS

The 871Y/485 RS-485 Interface Option provides the capability of networking several WJ-871Y receivers over an RS-485 interface. It can be used in multipoint applications, where one central computer that is also equipped with the 871Y/MCU option controls many different devices. Up to 32 units can be interconnected over an RS-485 network in a multi-drop interface setup. A computer with a standard RS-232 interface will also require the 871Y/MCU Multi-Drop Converter unit which also acts as an RS-232 to RS-485 converter. This converter connects in-line with the interface cables and requires +12 Vdc for operation. A 120 Vac to 12 Vdc Power Supply Adaptor is provided with the option for this purpose.

H.3 MECHANICAL CHARACTERISTICS

The 871Y/485 RS-485 Interface Option consists of the Type 797214-007 Digital Assembly and associated software installed on EPROMs.

The 871Y/MCU Mutli-Drop Converter Unit option consists of a B&B Electronics Manufacturing Company (6J757) Model 485COR RS-232 to RS-485 Converter and a Model 485PS 120 Vac/12 Vdc Power Supply Adaptor module.

H.4 OVERALL FUNCTIONAL DESCRIPTION

The 871Y/485 RS-485 Interface Option provides the capability of networking several WJ-871Y receivers over a RS-485 interface when used with the 871Y/MCU Multi-Drop Converter unit. See **Figure H-1** for a typical network diagram of RS-485 equipped receivers. The RS-485 standard defines a balanced interface with tristatable drivers. It can be used in multipoint applications where one central computer controls many different devices. Up to 32 units can be interconnected over an RS-485 network. Transmissions can run long distances at speeds as high as 9600 baud. Distance is a function of cable design. For specific allowable distances, consult the RS-485 Standard.

The RS-485 interface is implemented on pins 18 (TX/RXA) and 25 (TX/RXB) of connector A2J3, located on the receiver's rear panel.

H.5 INSTALLATION

The 871Y/485 RS-485 Interface Option is installed in the receiver at the factory when ordered with the receiver.

The B&B Electronics Manufacturing Company (6J757) Model 485COR RS-232 to RS-485 Converter unit (included with the 871Y/MCU option) attaches to the controlling PC's 25-pin RS-232 control port. The DB-25 pin female connector of this converter is its RS-232 port, intended for connection to the PC. The DB-25 pin male connector is its RS-485 port, intended for connection to the receiver via an interface bus using the appropriate serial interface cable. When installing the converter module, tighten its retaining screws to both the PC and the interface cable to ensure a good connection. See **Figure H-1** for a typical network configuration including the converter module.

The RS-232 to RS-485 Converter unit requires +12 Vdc for operation. The 120 Vac/12 Vdc adaptor is provided with the 871Y/MCU option specifically for this purpose. This adaptor plugs into a standard US 2-prong, 120 Vac outlet. A cable with a 2.5 mm plug on one end is used to attach the adaptor to the Converter unit.

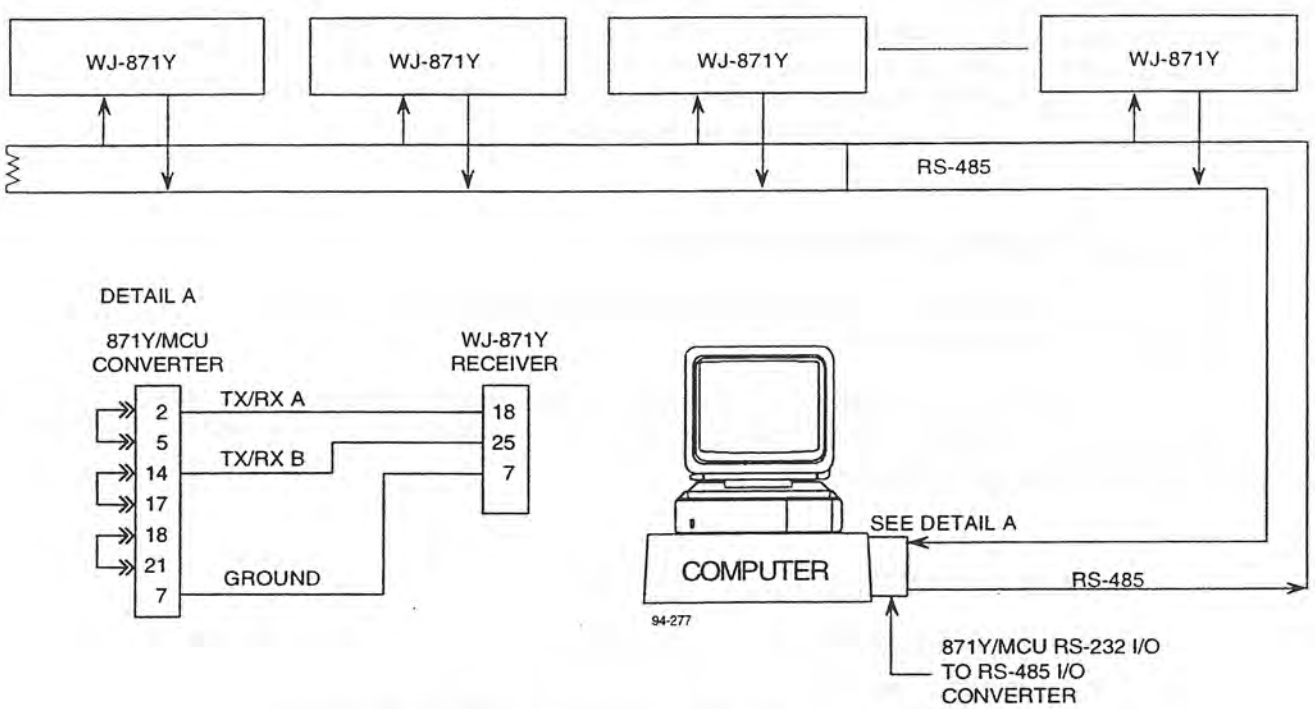

Figure H-1. Typical 871Y/485 Network Configuration

H.6 CONFIGURING THE RECEIVER FOR REMOTE OPERATION

The receiver contains two DIP switches that are used to configure the receiver for remote operation. These switches are mounted on the Digital PC Assembly (A2) and are accessed as noted in **paragraph H.6.1**. The switches are designated A2S1 and A2S2. Each switch contains eight rocker-type switches. The rocker switches are on when they are in the down position and are off when in the up position.

The rocker switches in A2S1 are used to enable either the RS-232C or the RS-485 interface for remote operations, to set the baud rate for the selected interface, and to set the receiver's frame address. Setting switch 4 of A2S1 to off(up) enables the RS-232C interface. Conversely, setting switch 4 to on enables the RS-485 interface.

The positions of switches 1, 2, and 3 of A2S1 are used to set the baud rate for remote operations. Selectable baud rates are 75, 150, 300, 600, 1200, 2400, 4800, and 9600 bps. See **Figure H-2** for the proper positions of switches 1, 2, and 3 of A2S1 to select the desired baud rate.

Switches 5 of A2S1 is used to designate the receiver's frame address. When set to on, the frame address is 25 which is reserved for the WJ-8711A receivers. When reset, the frame address is 24, reserved for the WJ-8710A and WJ-8712A and WJ-8712P receiver.

Switches 1 thru 5 of A2S2 are used to set the receiver's address on the RS-485 Network during RS-485 remote operations. Valid addresses are from 00 to 31. See **Figure H-2** for the proper position of switches 1 thru 5 of A2S2 to select the desired RS-485 network receiver address.

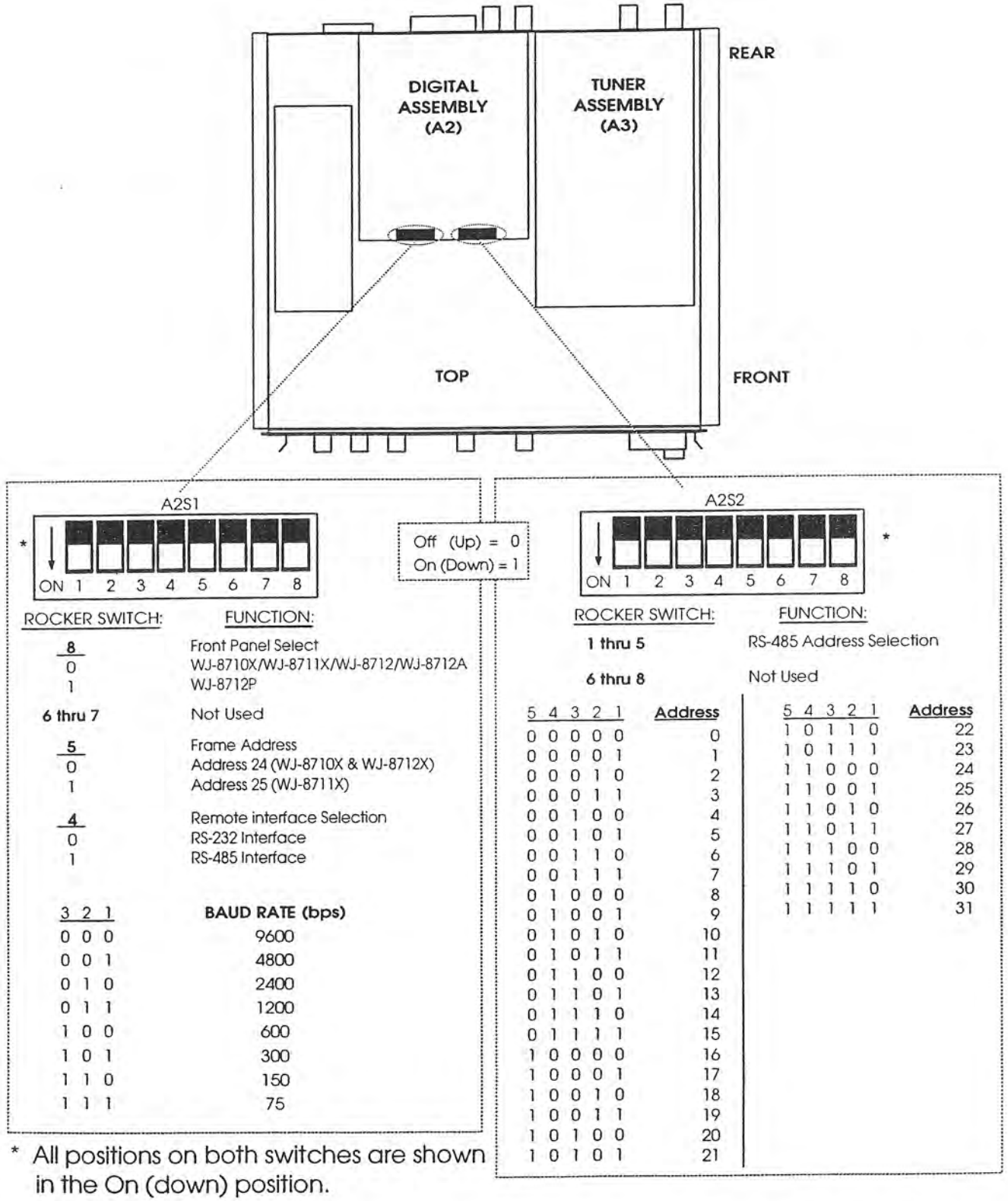

Figure H-2. Locating and Setting Configuration DIP Switches A2S1 and A2S2 (WJ-8711A)

When determining the switch settings to achieve a specific binary value, a switch in the off (up) position corresponds to a binary 0 while a switch in the on (down) position corresponds to a binary 1.

Figure H-3 gives an example of switches A2S1 and A2S2 set to positions to provide particular configurations. In the example, switch A2S1 is set to provide a frame address of 24 (WJ-8710X and WJ-8712X) and to select RS-485 remote operation with a baud rate of 2400 bps. Switch A2S2 is set to a receiver address of 26.

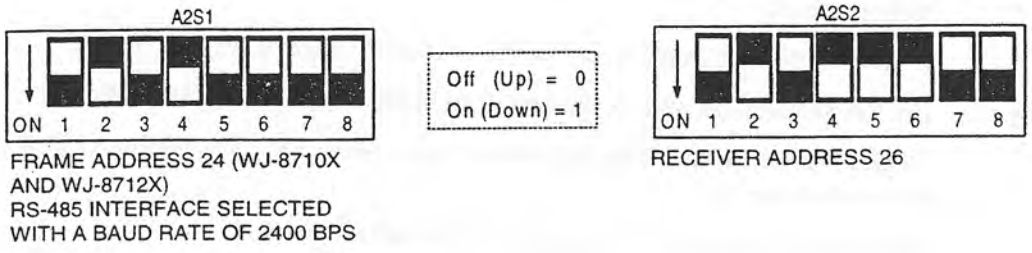

Figure H-3. Examples of Set DIP Switches A2S1 and A2S2

H.6.1 ACCESSING DIP SWITCHES ON THE DIGITAL CONTROL PC ASSEMBLY

H.6.1.1 WJ-8711A Digital HF Receiver

Perform the following procedural steps to gain access to DIP switches A2S1 and A2S2:

a. Turn off the receiver and disconnect the power plug from the rear panel power connector.

b. Remove two pan-head screws from the rear edge of the top panel securing it to the chassis rear apron and two flat-head screws on the forward edge of the top panel.

c. Carefully remove top panel and disconnect the speaker leads.

d. Locate switches S1 and S2 on the A2 assembly (refer to **Figure H-2**).

e. Set the switches for the desired configuration in accordance with **Figure H-2**.

f. Reconnect the speaker leads to the top panel and replace the top panel on the receiver. Secure the top panel with the screws removed in step b.

g. Reconnect power cord to the rear panel power connector.

H.6.1.2 **WJ-8712A and WJ-8712P Digital HF Receiver**

Perform the following procedural steps to gain access to DIP switches A2S1 and A2S2:

a. Turn off the receiver and disconnect the power plug from the rear panel power connector.

b. Remove twelve (12) flat-head screws from the bottom cover and remove the bottom cover.

c. Locate switches S1 and S2 on the A2 assembly (refer to **Figure H-4**).

d. Set the switches S1 and S2 on the A2 assembly (refer to **Figure H-4**).

e. Replace the bottom cover and secure it in place with the twelve (12) screws removed in step b.

f. Reconnect power cord to the rear panel power connector.

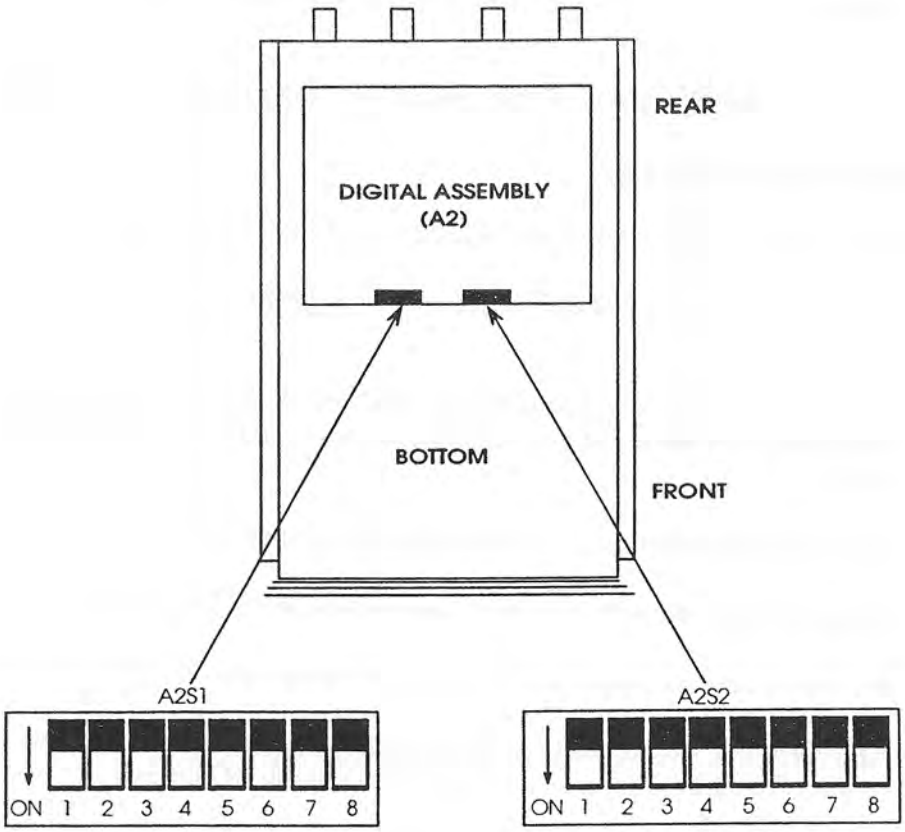

Figure H-4. Location of Switches A2S1 and A2S2 in the WJ-8712A and WJ-8712P

H.6.1.3 **WJ-8710A Digital HF Receiver**

Perform the following procedural steps to gain access to DIP switches A2S1 and A2S2:

a. Turn off the receiver and disconnect the power plug from the front panel PWR 12 Vdc connector.

b. Remove two black pan-head screws from the lower left and right corners of the front panel.

c. Remove four flat-head screws from the rear panel.

d. Slide the main chassis out of the enclosure.

e. Locate switches S1 and S2 and the A2 assembly (refer to **Figure H-5**).

f. Set the switches S1 and S2 on the A2 assembly (refer to **Figure H-5**).

g. Slide the main chassis back into the enclosure and reinstall the two pan-head screws and four flat-head screws that were removed in steps b and c, respectively.

h. Reconnect the power plug to the front panel PWR 12 Vdc connector.

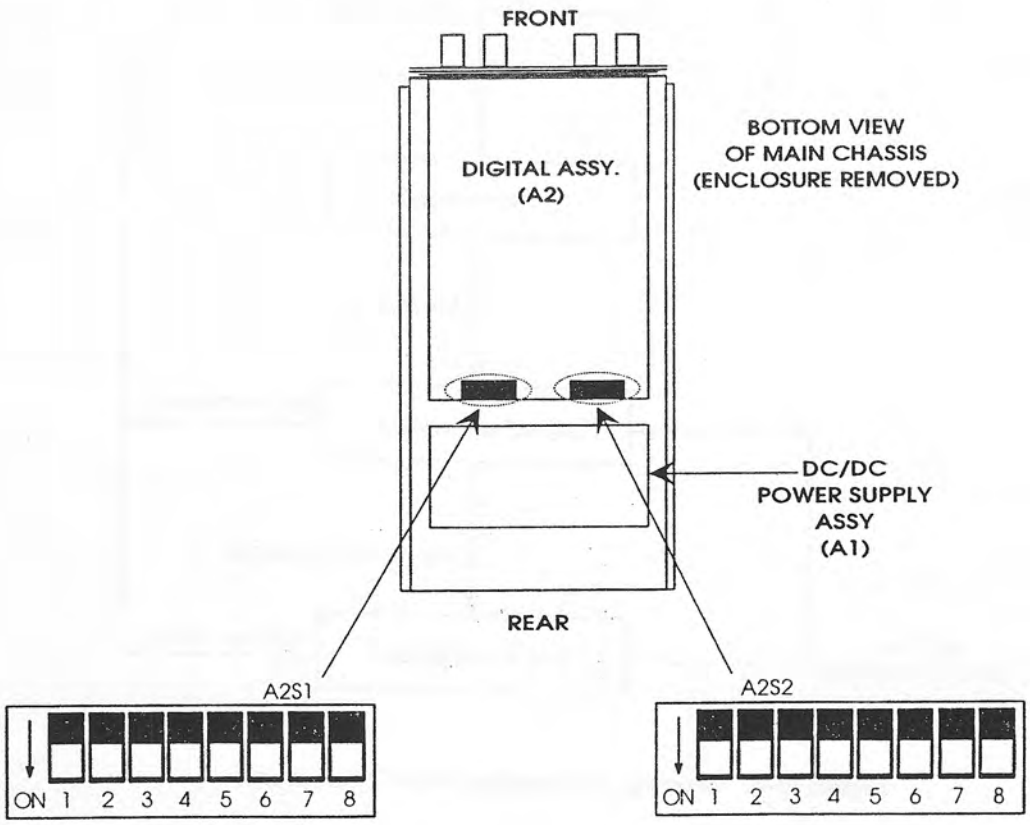

Figure H-5. Location of Switches A2S1 and A2S2 in the WJ-8710A

H.7 REMOTE OPERATION

With the RS-485 Interface Option installed, the WJ-8711A, WJ-8710A, WJ-8712P, or WJ-8712A Digital HF Receiver is controlled remotely by a computer or other controller device equipped with an RS-232C interface connected to the B&B Electronics Model 485COR RS-232 to RS-485 Converter, part of the 871Y/MCU option.

The WJ-8711A can be set for RS-485 remote control by selecting "RS-485" in the remote control entry mode with the front panel SPECIAL FUNCTION key and then selecting the desired receiver address (00-31). Refer to **Section III** of the WJ-8711A Manual for details on using the SPECIAL FUNCTION key. In addition, the WJ-8711A, WJ-8710A, WJ-8712P or WJ-8712A may be set for RS-485 remote operation by setting the DIP switches as described above.

Once the receiver is properly addressed, it continues to accept data until a new frame or receiver address is detected. If no new frame address is issued, the frame address need not be reissued, only the receiver address. **Figure H-6** shows the receiver addressing state transitions.

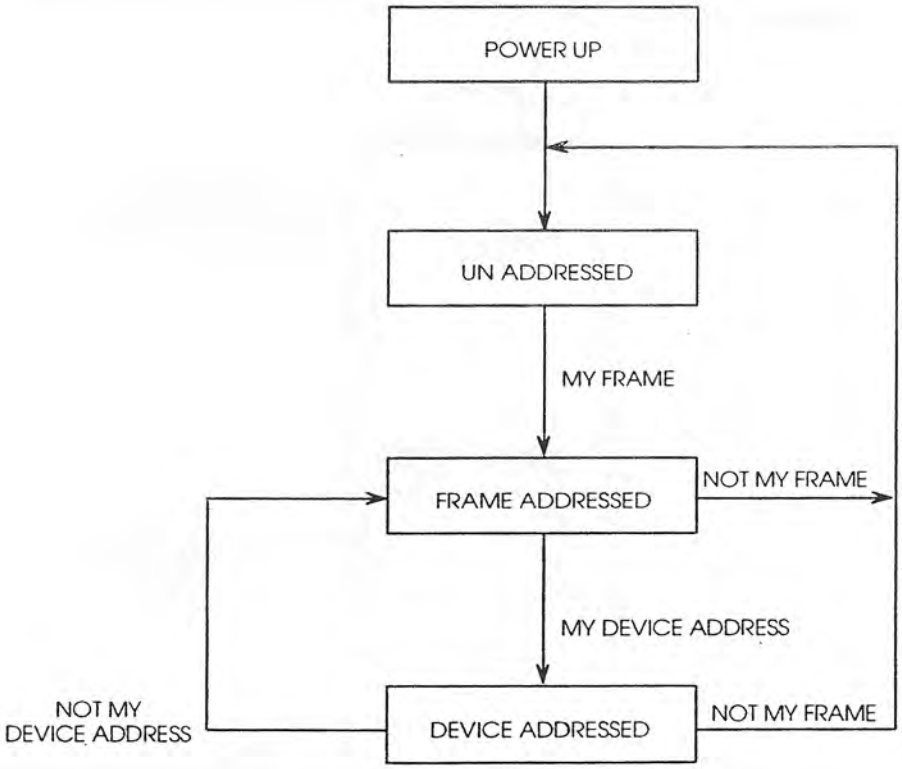

Figure H-6. Receiver Addressing State Transitions

H.7.1 COMMUNICATIONS PROTOCOL

When the LF character is sent to the receiver, it responds to a valid message with an ACK, or to an invalid message with a NAK. An invalid message is indicated on a communications error such as framing, noise, or overrun. The transmission of a NAK indicates that one or more of the bytes received after the last LF had an error. ACK/NAK response is sent only after the receiver has completed processing any previous messages in the input buffer and output any response necessary. **Table H-1** shows the data and command structure for the RS-485. **Table H-2** shows the supported multi-drop communications control commands.

The input buffer is processed on the receipt of a LF character or a CR.LF combination of characters.

Receipt of the DCL (device clear) command causes the receiver to clear both input and output buffers of any data. This command is acted upon as soon as it is received and is not buffered.

Table H-1. RS-485 Data and Command Structure

D0	D1	D2	D3	D4	D5	D6	D7	Command Type
x	x	x	x	x	x	x	0	Data
x	x	x	x	x	0	0	1	Bus Acquisition, Not used in this application
x	x	x	x	x	1	0	1	Not used
x	x	x	x	x	0	1	1	Frame Address
x	x	x	x	x	1	1	1	Receiver Address

Table H-2. Supported Multi-drop Communications Control Commands

HEX	ASCII	RX	TX	Function
06	ACK		x	Acknowledged, data received okay
15	NAK		x	Not Acknowledged, data communications error
0A	LF	x	x	Line Feed, start processing input buffer
0D	CR	x	x	Carriage Return, no action
14	DC4	x		DCL, clear input and output buffers
D9,D8		x		Frame Address group (24, 25)
E0-FF		x		Receiver Address group (00-31)

H.8 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.

H.9 REFERENCE DESIGNATION PREFIX

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).

H.10 LIST OF MANUFACTURERS

The manufacturer listed below is a supply source used for obtaining parts used in the 871Y/MCU option. This manufacturer is not listed in the base manual. All other manufacturers of parts listed in this appendix can be found in the base manual.

Mfr. Code	Name and Address
6J757	B&B Electronics Manufacturing Co. 707 Dayton Road P.O. Box 1040 Ottawa, IL 61350

H.11 PARTS LIST

The following parts lists identify all of the major electrical and mechanical components used in the 871Y/485 RS-485 Interface Option and in the 871Y/MCU Multi-Drop Converter Unit Option. When ordering replacement parts from the Watkins-Johnson Company, specify the unit type, serial number, option configuration, and reference designation and description of the part being ordered. The manufacturer's part number provided in **paragraph H.11.1** and **paragraph H.11.2** are supplied as a guide to aid the user of the equipment while in the field. The parts listed may not necessarily be identical with the parts installed in the unit. The parts listed in **paragraph H.11.1** and **paragraph H.11.2**, if used, will provide 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 cases where components are defined by a military or industrial specification, a vendor who 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 that are installed in the unit may not agree with the parts lists or schematic diagrams contained in this manual. Replacing these components with the devices listed in this manual, however, will produce satisfactory results.

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR

H.11.1 TYPE 871Y/485 RS-485 INTERFACE OPTION

Revision E

A2	Digital Control PC Assembly	1	797214-007	14632	

H.11.1.1 Type 797214-007 Digital Control PC Assembly

REF DESIG PREFIX A2

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
	Revision D				
BT1	Not Used				
XBT1	Not Used				
BT2	Not Used				
XBT2	Not Used				
C1	Capacitor, Ceramic, .01µF, 10%	118	841415-019	14632	
C2	Same as C1				
C3	Same as C1				
C4	Capacitor, Ceramic, .033µF, 10%	17	841415-022	14632	
C5	Same as C4				
C6	Same as C4				
C7	Same as C4				
C8	Same as C4				
C9	Same as C4				
C10	Same as C4				
C11	Same as C1				
C12	Capacitor, Ceramic, .1µF, 10%, >/=50VDC	8	841250-25	14632	
C13	Same as C1				
C14	Capacitor, Ceramic, 75pF, ~~2%	1	841416-046	14632	
C15	Capacitor, Tantalum, 3.3µF, 20%, 16V	10	841293-10	14632	
C16	Same as C12				
C17	Capacitor, Ceramic, 22pF, 5%	3	841415-003	14632	
C18	Same as C1				
C19	Same as C1				
C20	Capacitor, Ceramic, 100pF, 5%	9	841415-007	14632	
C21	Same as C20				
C22	Same as C20				
C23	Same as C20				
C24	Same as C1				
C25	Capacitor, Electrolytic, Aluminum, 470 F, 16V	1	ECE-A1CU471	54473	
C26	Same as C1				
C27	Capacitor, Ceramic, .047µF, 10%	9	841415-023	14632	
C28	Same as C27				
C29	Same as C1				
C30	Same as C4				
C31	Same as C4				
C32	Same as C1				
C33	Same as C4				
C34	Same as C1				
C35	Same as C15				
C36	Same as C1				
C37	Same as C1				
C38	Same as C12				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
					REF DESIG PREFIX **A2**
C39	Same as C1				
C40	Capacitor, Tantalum, 10µF, 20%, 16V	2	841293-16	14632	
C41	Same as C17				
C42	Same as C17				
C43	Same as C12				
C44	Same as C1				
C45	Same as C12				
C46	Same as C40				
C47	Same as C1				
C48	Same as C12				
C49	Capacitor, Ceramic, 470pF, 5%	8	841415-011	14632	
C50	Same as C49				
C51	Same as C49				
C52	Same as C49				
C53	Same as C49				
C54	Same as C1				
C55	Same as C1				
C56	Capacitor, Ceramic, 1000pF, 10%	4	841415-013	14632	
C57	Capacitor, Ceramic, 47pF, 2%	4	841416-041	14632	
C58	Same as C1				
C59	Same as C1				
C60	Same as C1				
C61	Same as C15				
C62	Same as C15				
C63	Same as C15				
C64	Same as C1				
C65	Same as C1				
C66	Same as C1				
C67	Same as C1				
C68	Same as C1				
C69	Same as C1				
C70	Same as C1				
C71	Same as C15				
C72	Same as C56				
C73	Same as C56				
C74	Same as C49				
C75	Same as C27				
C76	Same as C27				
C77	Capacitor, Ceramic, 1500pF, 10%,	3	841415-014	14632	
C78	Same as C27				
C79	Same as C77				
C80	Same as C77				
C81	Capacitor, Ceramic, 820pF, ~~2%	3	841416-071	14632	

REF DESIG PREFIX **A2**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
C82	Same as C49				
C83	Same as C1				
C84	Same as C1				
C85	Same as C1				
C86	Same as C49				
C87	Same as C1				
C88	Same as C1				
C89	Same as C1				
C90	Same as C1				
C91	Same as C1				
C92	Same as C1				
C93	Same as C1				
C94	Same as C1				
C95	Same as C1				
C96	Capacitor, Ceramic, 2200pF, 10%	4	841415-015	14632	
C97	Same as C57				
C98	Same as C1				
C99	Same as C1				
C100	Same as C1				
C101	Same as C27				
C102	Same as C1				
C103	Same as C15				
C104	Same as C15				
C105	Same as C4				
C106	Capacitor, Ceramic, 220pF, 5%	1	841415-009	14632	
C107	Same as C1				
C108	Same as C27				
C109	Same as C1				
C110	Same as C1				
C111	Same as C1				
C112	Same as C15				
C113	Capacitor, Ceramic, 330pF, 5%	1	841415-010	14632	
C114	Same as C27				
C115	Same as C57				
C116	Same as C1				
C117	Same as C1				
C118	Same as C96				
C119	Same as C1				
C120	Same as C1				
C121	Same as C15				
C122	Same as C57				
C123	Same as C4				
C124	Same as C96				

REF DESIG PREFIX **A2**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
C125	Capacitor, Ceramic, 180pF, 2%	1	841416-055	14632	
C126	Capacitor, Ceramic, 470pF, 2%	1	841416-065	14632	
C127	Same as C27				
C128	Capacitor, Ceramic, 68pF, ~~2%	1	841416-045	14632	
C129	Same as C1				
C130	Same as C1				
C131	Not Used				
C132	Same as C1				
C133	Same as C1				
C134	Same as C1				
C135	Not Used				
C136	Same as C1				
C137	Same as C1				
C138	Same as C81				
C139	Same as C1				
C140	Same as C1				
C141	Same as C1				
C142	Not Used				
C143	Same as C1				
C144	Same as C81				
C145	Same as C1				
C146	Same as C1				
C147	Same as C1				
C148	Capacitor, Ceramic, 100pF, 2%	4	841416-049	14632	
C149	Same as C148				
C150	Same as C148				
C151	Same as C148				
C152	Same as C1				
C153	Same as C1				
C154	Same as C1				
C155	Same as C1				
C156	Same as C1				
C157	Same as C1				
C158	Capacitor, Ceramic, 1000pF, 2%	1	841416-073	14632	
C159	Capacitor, Ceramic, 56pF, 2%	1	841416-043	14632	
C160	Same as C1				
C161	Same as C1				
C162	Capacitor, Ceramic, 1200pF, 2%	1	841416-075	14632	
C163	Capacitor, Tantalum, 68µF, 20%, 6.3V	1	841293-24	14632	
C164	Same as C1				
C165	Same as C1				
C166	Same as C1				
C167	Same as C1				

REF DESIG PREFIX A2

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
C168	Same as C1				
C169	Same as C1				
C170	Same as C1				
C171	Same as C56				
C172	Same as C1				
C173	Same as C1				
C174	Same as C1				
C175	Capacitor, Tantalum, 33µF, 20%, 16V	9	841293-22	14632	
C176	Same as C175				
C177	Same as C96				
C178	Same as C1				
C179	Same as C175				
C180	Capacitor, Tantalum, 6.8µF, 20%, 6.3V	2	841293-14	14632	
C181	Same as C180				
C182	Same as C1				
C183	Not Used				
C184	Same as C1				
C185	Same as C12				
C186	Same as C12				
C187	Same as C1				
C188	Same as C1				
C189	Same as C1				
C190	Not Used				
C191	Same as C1				
C192	Same as C4				
C193	Same as C1				
C194	Same as C1				
C195	Same as C1				
C196	Same as C1				
C197	Same as C1				
C198	Not Used				
C199	Not Used				
C200	Same as C1				
C201	Same as C1				
C202	Same as C175				
C203	Same as C175				
C204	Same as C175				
C205	Same as C1				
C206	Same as C20				
C207	Same as C1				
C208	Same as C1				
C209	Same as C1				
C210	Same as C1				

REF DESIG PREFIX A2

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
C211	Same as C1				
C212	Same as C1				
C213	Same as C1				
C214	Same as C20				
C215	Same as C20				
C216	Same as C1				
C217	Same as C20				
C218	Same as C1				
C219	Same as C175				
C220	Same as C175				
C221	Same as C175				
C222	Same as C1				
C223	Same as C20				
C224	Same as C1				
C225	Same as C1				
C226	Same as C1				
C227	Same as C1				
C228	Same as C1				
C229	Same as C4				
C230	Same as C1				
C231	Same as C1				
C232	Not Used				
C233	Same as C4				
C234	Not Used				
C235	Same as C1				
C236	Same as C4				
C237	Same as C4				
C238	Not Used				
C239	Not Used				
CR1	Not Used (SOT-23)				
CR2	Diode/Swpin Dual Swithcing Diode Reverse Volltage	2	MMBD7000LT1	04713	
CR3	Not Used				
CR4	Same as CR2				
CR5	Not Used				
FL1	Filter, 455 kHz Precision Ladder Type	1	CFS-455B	51406	
J1	Connector, Jack, BNC BNC Rt Ang , PCB/Panel MT W/SLDR Mt Posts	1	227677-1	00779	
J2	Phone Jack, 3.5 Dia Mini Phone Jack	1	SJ360	53337	
J3	Connector, 25-Pin, D-Sub, RT Ang, PC MT	1	DB25SQFA	05574	
J4	Connector, 24-Pin Term Strip Gold Flash .100CTRS	4	79223-624	22526	
J5	Connector, Header, 6 Pos Pin Friction Lock .156 CTRS	1	26-48-2066	27264	
J6	Not Used				
J7	Same as J4				

REF DESIG PREFIX **A2**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
J8	Same as J4				
J9	Same as J4				
J10	Not Used				
J11	Connector, PC.BD 3 Pin SHRD HDR	1	3-102202-4	00779	
J12	Not Used				
J13	Not Used				
J14	Connector, Header,10 Pin, Double Row	1	SLW-105-01-G-D	55322	
J15	Not Used				
J16	Not Used				
JW1	Not Used				
L1	Inductor, 10µH, Surface MT	3	RL-1500-10	14778	
L2	Same as L1				
L3	Same as L1				
L4	Inductor, 1.0µH, ~~20%,@7.96MHZ QMIN-25 370MA Ferrite 1210	9	B82422-A1102-M	25088	
L5	Same as L4				
L6	Same as L4				
L7	Same as L4				
L8	Same as L4				
L9	Same as L4				
L10	Same as L4				
L11	Not Used				
L12	Inductor, 2.2µH	1	841444-009	14632	
L13	Inductor, 4.7µH	1	B82422-A1472-M	25088	
L14	Inductor, 150nH	1	841438-029	14632	
L15	Inductor, 68nH	1	841438-021	14632	
L16	Inductor, 2.7µH	1	841444-011	14632	
L17	Not Used				
L18	Inductor, 1000µH	2	NLF453232-102K	7J069	
L19	Same as L18				
L20	Same as L4				
L21	Same as L4				
L22	Not Used				
L23	Not Used				
Q1	Not Used				
Q2	Transistor	3	MMBT2222ALT1	04713	
Q3	Same as Q2				
Q4	Not Used				
Q5	Not Used				
Q6	Transistor	2	2N7002-LT1	17856	
Q7	Same as Q2				
Q8	Transistor	2	MMBT-3906	04713	

REF DESIG PREFIX **A2**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
Q9	Same as Q6				
Q10	Transistor	2	MMBT3904LT1	04713	
Q11	Same as Q8				
Q12	Same as Q10				
R1	Resistor, Fixed, 100kΩ, 5%	110	841414-121	14632	
R2	Resistor, Fixed, 47Ω, 5%	20	841414-041	14632	
R3	Resistor, Fixed, 47kΩ, 5%	7	841414-113	14632	
R4	Same as R3				
R5	Resistor, Fixed, 100Ω, 5%	16	841414-049	14632	
R6	Same as R3				
R7	Resistor, Fixed, 10kΩ, 5%	43	841414-097	14632	
R8	Resistor, Fixed, 4.7kΩ, 5%	7	841414-089	14632	
R9	Resistor, Fixed, 2.2kΩ, 5%	8	841414-081	14632	
R10	Same as R2				
R11	Resistor, Fixed, 820Ω, 5%	1	841414-071	14632	
R12	Resistor, Fixed, 680Ω, 5%	1	841414-069	14632	
R13	Same as R5				
R14	Same as R5				
R15	Not Used				
R16	Not Used				
R17	Not Used				
R18	Resistor, Fixed, 1.0kΩ, 5%	23	841414-073	14632	
R19	Jumper .05 Ω MAX 1A MIN@70C	26	841417	14632	
R20	Same as R19				
R21	Same as R18				
R22	Same as R19				
R23	Not Used				
R24	Same as R18				
R25	Same as R19				
R26	Resistor, Fixed, 1.5kΩ, 5%	5	841414-077	14632	
R27	Same as R19				
R28	Same as R18				
R29	Resistor, Fixed, 2.7Ω, 5%	4	841414-011	14632	
R30	Resistor, Fixed, 22kΩ, 5%	4	841414-105	14632	
R31	Same as R5				
R32	Same as R30				
R33	Same as R5				
R34	Same as R1				
R35	Same as R19				
R36	Resistor, Fixed, 2.7kΩ, 5%	2	841414-083	14632	
R37	Same as R18				
R38	Same as R19				
R39	Same as R7				

REF DESIG PREFIX A2

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
R40	Same as R7				
R41	Same as R18				
R42	Same as R7				
R43	Same as R19				
R44	Not Used				
R45	Same as R18				
R46	Same as R36				
R47	Same as R2				
R48	Same as R1				
R49	Same as R1				
R50	Resistor, Fixed, 470Ω, 5%	10	841414-065	14632	
R51	Not Used				
R52	Resistor, Fixed, 75kΩ, 5%	2	841414-118	14632	
R53	Same as R52				
R54	Same as R1				
R55	Resistor, Fixed, 33kΩ, 5%	5	841414-109	14632	
R56	Resistor, Fixed, 220kΩ, 5%	6	841414-129	14632	
R57	Same as R55				
R58	Same as R56				
R59	Resistor, Fixed, 68kΩ, 5%	4	841414-117	14632	
R60	Same as R18				
R61	Same as R1				
R62	Same as R1				
R63	Same as R50				
R64	Same as R1				
R65	Same as R1				
R66	Same as R1				
R67	Same as R2				
R68	Same as R56				
R69	Same as R56				
R70	Same as R2				
R71	Same as R56				
R72	Same as R56				
R73	Same as R2				
R74	Same as R59				
R75	Same as R18				
R76	Same as R1				
R77	Same as R1				
R78	Same as R9				
R79	Same as R1				
R80	Same as R1				
R81	Same as R18				
R82	Same as R1				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
			REF DESIG PREFIX A2		
R83	Same as R1				
R84	Same as R1				
R85	Not Used				
R86	Same as R1				
R87	Same as R2				
R88	Same as R18				
R89	Same as R9				
R90	Same as R1				
R91	Same as R1				
R92	Same as R1				
R93	Same as R50				
R94	Resistor, Fixed, 18kΩ, 5 %	4	841414-103	14632	
R95	Same as R2				
R96	Same as R94				
R97	Same as R2				
R98	Same as R3				
R99	Same as R3				
R100	Same as R55				
R101	Same as R8				
R102	Same as R1				
R103	Same as R1				
R104	Same as R1				
R105	Not Used				
R106	Same as R9				
R107	Same as R94				
R108	Same as R9				
R109	Same as R94				
R110	Same as R18				
R111	Same as R7				
R112	Resistor, Fixed, 8.2kΩ, 5%	2	841414-095	14632	
R113	Same as R112				
R114	Same as R7				
R115	Same as R1				
R116	Not Used				
R117	Same as R7				
R118	Same as R7				
R119	Same as R7				
R120	Same as R1				
R121	Same as R1				
R122	Same as R1				
R123	Same as R1				
R124	Same as R2				
R125	Same as R1				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR

REF DESIG PREFIX A2

R126	Same as R18				
R127	Same as R59				
R128	Same as R7				
R129	Same as R2				
R130	Same as R1				
R131	Same as R1				
R132	Same as R1				
R133	Resistor, Fixed, 150kΩ, 5%	2	841414-125	14632	
R134	Same as R50				
R135	Same as R7				
R136	Same as R26				
R137	Same as R26				
R138	Same as R30				
R139	Same as R2				
R140	Same as R1				
R141	Same as R1				
R142	Same as R18				
R143	Same as R18				
R144	Same as R1				
R145	Same as R18				
R146	Same as R55				
R147	Resistor, Fixed, 150Ω, 5%	1	841414-053	14632	
R148	Resistor, Fixed, 3.3kΩ, 5%	9	841414-085	14632	
R149	Same as R1				
R150	Same as R1				
R151	Resistor, Fixed, 10Ω, 5%	5	841414-025	14632	
R152	Same as R18				
R153	Same as R18				
R154	Same as R133				
R155	Resistor, Fixed, 4.7Ω, 5%	1	841414-017	14632	
R156	Not Used				
R157	Same as R7				
R158	Same as R7				
R159	Same as R7				
R160	Same as R26				
R161	Same as R26				
R162	Same as R30				
R163	Same as R2				
R164	Same as R3				
R165	Same as R1				
R166	Same as R7				
R167	Same as R7				
R168	Same as R18				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
			REF DESIG PREFIX **A2**		
R169	Resistor, Fixed, 220Ω, 5%	3	841414-057	14632	
R170	Same as R7				
R171	Same as R1				
R172	Same as R151				
R173	Same as R7				
R174	Same as R7				
R175	Not Used				
R176	Same as R29				
R177	Same as R1				
R178	Same as R7				
R179	Same as R1				
R180	Same as R2				
R181	Not Used				
R182	Not Used				
R183	Same as R2				
R184	Same as R29				
R185	Same as R7				
R186	Same as R19				
R187	Same as R2				
R188	Same as R151				
R189	Not Used				
R190	Same as R29				
R191	Same as R19				
R192	Not Used				
R193	Same as R1				
R194	Same as R1				
R195	Same as R7				
R196	Same as R7				
R197	Same as R148				
R198	Same as R148				
R199	Same as R151				
R200	Same as R18				
R201	Same as R19				
R202	Same as R148				
R203	Same as R148				
R204	Not Used				
R205	Same as R19				
R206	Same as R151				
R207	Same as R1				
R208	Same as R1				
R209	Same as R19				
R210	Same as R1				
R211	Same as R19				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR

REF DESIG PREFIX A2

R212	Same as R1				
R213	Not Used				
R214	Same as R19				
R215	Same as R1				
R216	Same as R19				
R217	Resistor, Fixed, 5.6kΩ, 5%	1	841414-091	14632	
R218	Same as R148				
R219	Same as R9				
R220	Same as R5				
R221	Same as R5				
R222	Same as R9				
R223	Same as R7				
R224	Same as R1				
R225	Not Used				
R226	Same as R8				
R227	Same as R3				
R228	Same as R8				
R229	Same as R1				
R230	Same as R1				
R231	Same as R19				
R232	Same as R1				
R233	Same as R1				
R234	Not Used				
R235	Same as R1				
R236	Not Used				
R237	Same as R1				
R238	Not Used				
R239	Same as R1				
R240	Same as R7				
R241	Same as R8				
R242	Same as R8				
R243	Same as R7				
R244	Same as R1				
R245	Same as R7				
R246	Same as R1				
R247	Resistor, Fixed, 1.0 MΩ 5%	4	841414-145	14632	
R248	Same as R2				
R249	Same as R1				
R250	Same as R7				
R251	Same as R7				
R252	Same as R2				
R253	Same as R1				
R254	Same as R1				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR

REF DESIG PREFIX **A2**

R255	Same as R7
R256	Same as R1
R257	Same as R1
R258	Same as R1
R259	Same as R1
R260	Same as R1
R261	Same as R1
R262	Not Used
R263	Not Used
R264	Not Used
R265	Same as R5
R266	Same as R1
R267	Same as R1
R268	Same as R1
R269	Not Used
R270	Same as R7
R271	Same as R19
R272	Same as R1
R273	Same as R7
R274	Same as R7
R275	Same as R1
R276	Same as R1
R277	Same as R1
R278	Same as R7
R279	Not Used
R280	Same as R19
R281	Same as R1
R282	Same as R1
R283	Same as R7
R284	Not Used
R285	Not Used
R286	Same as R247
R287	Not Used
R288	Same as R1
R289	Same as R19
R290	Same as R1
R291	Not Used
R292	Same as R1
R293	Same as R19
R294	Same as R19
R295	Not Used
R296	Same as R19
R297	Same as R55

REF DESIG PREFIX **A2**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
R298	Same as R7				
R299	Not Used				
R300	Not Used				
R301	Same as R19				
R302	Same as R5				
R303	Same as R7				
R304	Same as R1				
R305	Same as R1				
R306	Same as R18				
R307	Same as R59				
R308	Same as R7				
R309	Not Used				
R310	Same as R7				
R311	Same as R7				
R312	Same as R1				
R313	Same as R1				
R314	Same as R5				
R315	Same as R7				
R316	Same as R5				
R317	Same as R1				
R318	Same as R5				
R319	Same as R1				
R320	Same as R50				
R321	Same as R1				
R322	Same as R1				
R323	Same as R18				
R324	Same as R5				
R325	Same as R1				
R326	Same as R1				
R327	Same as R18				
R328	Same as R7				
R329	Same as R1				
R330	Same as R9				
R331	Same as R1				
R332	Same as R1				
R333	Resistor, Fixed, 6.8 kΩ, 5%	2	841414-093	14632	
R334	Same as R8				
R335	Not Used				
R336	Same as R1				
R337	Same as R333				
R338	Same as R148				
R339	Same as R148				
R340	Resistor, Fixed, 68Ω, 5%	2	841414-045	14632	

REF DESIG PREFIX A2

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
R341	Same as R247				
R342	Same as R247				
R343	Same as R2				
R344	Same as R1				
R345	Same as R1				
R346	Same as R1				
R347	Same as R1				
R348	Same as R1				
R349	Same as R1				
R350	Same as R1				
R351	Same as R1				
R352	Same as R1				
R353	Same as R1				
R354	Same as R1				
R355	Same as R1				
R356	Same as R1				
R357	Same as R1				
R358	Same as R1				
R359	Same as R1				
R360	Same as R7				
R361	Same as R340				
R362	Not Used				
R363	Same as R19				
R364	Not Used				
R365	Not Used				
R366	Same as R50				
R367	Same as R5				
R368	Same as R5				
R369	Same as R5				
R370	Same as R50				
R371	Same as R50				
R372	Same as R169				
R373	Same as R50				
R374	Same as R50				
R375	Same as R169				
R376	Same as R19				
R377	Same as R148				
R378	Same as R2				
R379	Not Used				
S1	Switch/Dip SPST Side Actuated Dip	2	ADP-08S	95146	
S2	Same as S1				
T1	Transformer CPLG Audio 600CT/500CT IMP=10%,	2	SPT-130	20462	
T2	Same as T1				

REF DESIG PREFIX A2

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
U1	Integrated Circuit, Microcontroller.Microcontroller Unit 16-BIT Timer 8 Channel 8-BIT	1	MC68GC11A0FN	04713	
XU1	Socket 52-POS PLCC .050CTRS 1.050 X .20HT Polarized Surf	1	213-052-601	26742	
U2	Integrated Circuit,TRI-State Octal D-Type Latch SOL-20 Wide Pkg	1	74HC373SOL20	02735	
U3	Integrated Circuit,Octal TRI-State B!uffer, SOL-20 Wide Pkg	4	74HC244 SOL20	04713	
U4	Integrated Circuit,Quad 2-Input NAND Gate S0-14N	1	74HC00 SO14	02735	
U5	Integrated Circuit, RAM,8K X 8 Nonvolatile Time Keeping RAM 120NS=AT 28-Pin	1	DS1643-120	0B0A9	
XU5	Socket, IC 28 Pin .600 Row Spacing On .100 CTRS Gold Contact	2	O-628-SGT	S5322	
U6	Integrated Circuit, CMOS,Triple Three Input OR Gate SO-14 PLSTC PKG	1	74HC4075 SO14	02735	
U7	Integrated Circuit.TRIPLE 3-Input NOR Gates	1	74HC27 SO14	02735	
U8	Integrated Circuit,3-TO-8 Line Decoder	1	74HC138 SO16	02735	
U9	Integrated Circuit, CMOS,Quad Buffer/Line Driver	2	74HC125 SO14	34371	
U10	Integrated Circuit,Triple 3-Input AND Gate	1	74F11 SO14	04713	
U11	Integrated Circuit,1-OF-8 Decoder/Demultiplexer	1	74F138 SO16	04713	
U12	EPROMProgrammed	1	842032	14632	
XU12	socket, IC 32-PIN LOW PROFILE DIP Socket .600 Row Slpace Gold	1	O-632-SGT	S532	
U13	Integrated Circuit,16-BIT A/D Converter 20-Pin PLSTC DIP	1	DSP56ADC16S	04713	
U14	Same as U3				
U15	Integrated Circuit,Octal D Flip-Flops With Clear SOL-20 Wide Pkg	1	74HC273 SOL20		
U16	Same as U9				
U17	Same as U3				
U18	Not Used				
U19	Same as U3				
U20	Integrated Circuit,Line Driver and Receiver Monolithic 8 Pin PKS	2	SN75155D	01295	
U21	Integrated Circuit, CMOS.Hex Inverters Active Outputs	3	74AC04 SO14	04713	
U22	Amplifier Ultra-High Frequency Op. Amp Gain Bandwidth 1.	1	NE5539D	18324	
U23	Integrated Circuit,Dual D Flip-Flop With Preset and Clear	3	74HC74 SO14	04713	
U24	Integrated Circuit, CMOS,14-Stage Binary Ripple Counter	2	74HC4020 SO16	34371	
U25	Integrated Circuit, CMOS,Parallel-In/Serial-OUT 8-BIT Shift Register SO-1	1	74HC165 SO16	02735	
U26	Integrated Circuit, /INV Hex Inverter	1	74HC04 SO14	04713	
U27	Integrated Circuit,SYN Presettable Binary Counter	2	74AC161 SO16	34371	

REF DESIG PREFIX A2

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
U28	Same as U27				
U29	Same as U23				
U30	Integrated Circuit,Synchronous Binary Counter with Asynchronous Clear SO	1	74HC161 SO16	02735	
U31	Same as U23				
U32	Same as U21				
U33	Integrated Circuit, CMOS,Dual D Flip-Flop With PRESET AND CLEAR	1	74AC74CO14	02735	
U34	Voltage Regulator3 TERM NEG Volt Regulator -5V	1	MC79M05CDT	04713	
U35	Same as U24				
U36	Same as U21				
U37	Integrated Circuit,40 MHZ DSP Microprocessor with PLL 24-BIT 132-PIN PQF	1	DSP56002FC40	04713	
U38	Same as U20				
U39	Integrated Circuit, /SRAMCMOS,32K X 8 20NS Access Time 28PIN SOJ	6	MT5C2568DJ-20	6Y440	
U40	Same as U39				
U41	Same as U39				
U42	Integrated Circuit, /Sensing Undervoltage Sensing Rest Operation W/1V Input	1	MC34064D-5	04713	
U43	Not Used				
U44	Integrated Circuit, Differential Bus Transceiver	2	SN75176AD	01295	
U45	Same as U39				
U46	Same as U39				
U47	Same as U39				
U48	Integrated Circuit, Octal D Flip-Flop with RESET SOL-20 PKG	2	74HCT273 SOL20	02735	
U49	Integrated Circuit, Dual D Flip-Flop with SET and RESET	1	74HCT74 SO14	34371	
U50	Same as U48				
U51	Integrated Circuit, /CONV D/A Monolithic 8-BIT HS Current Output	2	DAC0800LCM	27014	
U52	Amplifier JFET-Input Dual OP AMP	7	MC34002D	04713	
U53	Integrated Circuit, Quad 2-Input AND Gate	1	74HC08 SO14	02735	
U54	Same as U52				
U55	Same as U51				
U56	EPROM Programmed	1	842033	14632	
XU56	Same as XU5				
U57	Same as U44				
U58	Integrated Circuit, Dual 1-OF-4 Decoder/Demultiplexer	1	74F139 SO16	04713	
U59	Integrated Circuit, /CONV D/A 16 Bit Audio D/A Converter	1	AD1851R	24355	
U60	Integrated Circuit, CMOS,Triple 2-Channel Analog Multiplexer/Demultiplexer	3	74HC4053 SO16	02735	

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR

REF DESIG PREFIX **A2**

U61	Same as U52			
U62	Same as U60			
U63	Same as U52			
U64	Same as U52			
U65	Amplifier Single Low Noise OP AMP SO 8 PIN	3	NE5534D	18324
U66	Same as U65			
U67	Integrated Circuit, Dynamic Range Processor Dual VCA 16-Pin DIP	1	SSM-2122P	06665
U68	Same as U60			
U69	Amplifier JFET-Input Operational Amplifier	2	MC34001D	04713
U70	Same as U69			
U71	Same as U52			
U72	Integrated Circuit, /AMP 1.5W Audio Power AMP 14-PIN DIP	1	LM388n-1	27014
U73	Not Used			
U74	Same as U52			
U75	Same as U65			
VR1	Not Used			
XTB1	Connector, Header.13-POS Shrouded PC MT	1	ELFH13210	58982
Y1	Not Used			

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR

H.11.2 TYPE 871Y/MCU MULTI-DROP CONVERTER UNIT OPTION

Revision B

1	Converter Unit, RS-232 to RS-485, 2-Channel	1	485COR	6J757	
2	Adaptor, Power Supply, 120 Vac/12 Vdc, 100 mA	1	485PS	6J757	

APPENDIX I

TYPE WJ-871Y/SEU SPEECH ENHANCEMENT UNIT

WJ P/N 181274-001, Revision D

WATKINS-JOHNSON COMPANY
700 QUINCE ORCHARD ROAD
GAITHERSBURG, MARYLAND 20878-1794

September 1997

WARNING

This equipment utilizes voltages which are potentially dangerous and may be fatal if contacted. Exercise extreme caution when working with the equipment with any protective cover removed.

PROPRIETARY STATEMENT

LIST OF EFFECTIVE PAGES

Page Number	Description	Revision
i	Cover	D
ii	Proprietary Statement	D
iii	List of Effective Pages	D
iv	Intentionally Blank	D
v	Revision Record	D
vi	Intentionally Blank	D
vii thru viii	Table of Contents	D
I-1 thru I-8	Appendix I	C

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WJ-871Y/SEU SPEECH ENHANCEMENT UNIT

REVISION RECORD

Revision	Description	Date
A	Initial issue.	1/95
B	Updated for 797214-1 (A2) Upgrade.	4/95
C	Corrected edratta. Mnemonic for WBN added to **Table I-1**. Information about mutual exclusivity of options also updated.	3/95
D	Added WJ part number to the title page. Incorporated a List of Effective Pages. Added page numbers to section cover pages and their back pages. Removed "intentionally left blank" pages and replaced with "Notes" pages that are formatted with headers and page numbers.	9/97

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APPENDIX I

WJ-871Y/SEU SPEECH ENHANCEMENT UNIT

I.1 GENERAL DESCRIPTION

The WJ-871Y/SEU Speech Enhancement Unit option uses adaptive filtering techniques to provide enhancement of audio signals that are received from signals in the HF frequency band. The option utilizes these filter techniques to accomplish wideband noise reduction and automatic notch filtering of the audio signals. The adaptive filters analyze the correlation, or constancy, of the signal and modify the audio response to attenuate highly correlated steady tone interference or uncorrelated broad band noise. Use of these features permits an operator to attenuate the effects of the interference, providing a more intelligible output. Selection and control of the Adaptive Notch Filter and Wideband Noise Reduction can be performed from the front panel or via the remote interface.

I.2 MECHANICAL DESCRIPTION

The WJ-871Y/SEU Speech Enhancement Unit option may be field installed in units equipped with software versions 4.01.02 or greater, having a Type 797012 Digital Control Assembly (A2) with a dash 3 or greater type number suffix. The option may also be installed in units that have a Type 797214-1 Digital Control Assembly (A2) installed. It functions with any option configuration except for configurations containing the WJ-871Y/PCSM, WJ-871Y/488, WJ-871Y/IFC125, or WJ-871Y/DSO1 options.

When used with the Type 797012 Digital Control Assembly the option consists of the Type 797201-4 Digital Expansion Assembly, five standoffs for mounting the assembly, a DSP EPROM and a Control EPROM containing the control and Digital Signal Processing software for the option. The Control and DSP EPROMs install in place of the existing Control (U12) and DSP (U56) EPROMs, located on the Type 797012 Digital Control Assembly. When used with the Type 797214 Digital Control Assembly the two EPROMS are not required as they are already installed in the Type 797214 Digital Controll Assembly.

The Type 797201-4 Digital Expansion Assembly is a daughterboard that mounts to either of the Digital Control Assemblies using the five mounting standoffs supplied with the option. Electrical interface between the Digital Control Assembly and the Digital Expansion Assembly is through two on-board multipin connectors that plug into the J8 and J9 connectors of the Digital Control Assembly. No additional cabling or hardware configuration is required.

I.3 FIELD INSTALLATION PROCEDURE WHEN USED WITH TYPE 797012 DIGITAL CONTROL ASSEMBLY

Installation of the WJ-871Y/SEU Speech Enhancement Unit consists of upgrading of the Type 797012 Control and DSP software, and installation of the Type 797201-4 Digital Expansion Assembly daughterboard onto the receiver's Digital assembly. All of the necessary installation hardware is included with the option. The installation procedure is detailed in the following steps.

1. Remove the top cover from the receiver to gain access to the receiver's Type 797012 Digital assembly.

2. Remove EPROMs U12 and U56 from their sockets on the Digital Assembly. Refer to **Figure I-1** for the locations of these components on the assembly.

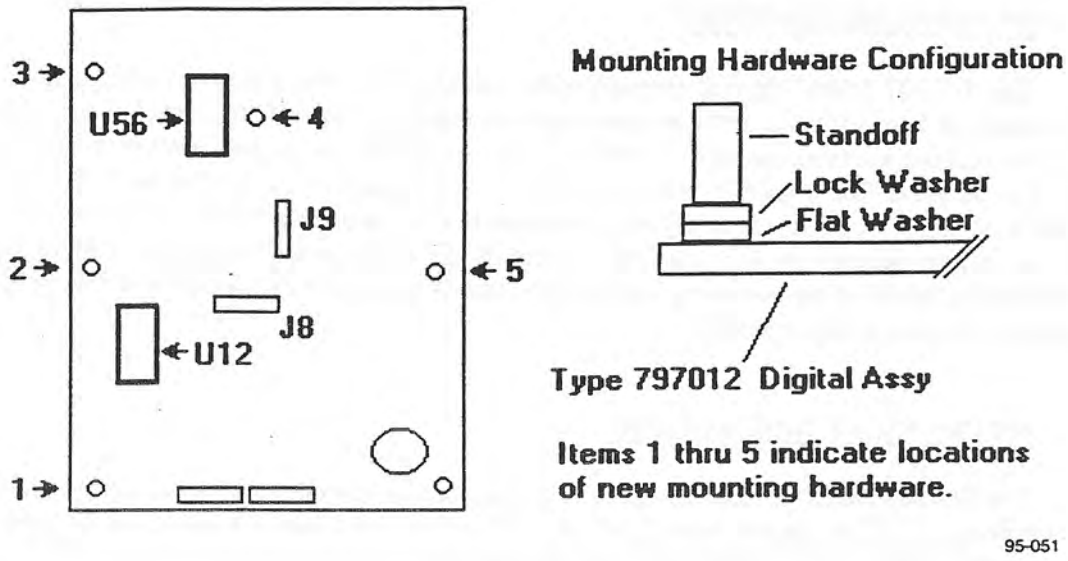

Figure I-1. Type 797012 Installation Component Illustration

3. From the components supplied, locate EPROMs U12 (842032) and U56 (842033) and install these components into their respective EPROM sockets.

4. Remove five of the six mounting screws and their associated washers from the Digital Assembly, identified as items 1 through 5 in **Figure I-1**.

5. At each mounting location install one standoff, one flat washer, and one lock washer. Refer to the Mounting Hardware Configuration in **Figure I-1** for the orientation of these parts.

6. Orient the SEU Digital Expansion Assembly as illustrated in **Figure I-2**, with the component side facing down and J5 pointing toward the rear of the receiver. Carefully connect sockets J1 and J2 with J8 and J9 on the Type 797012 Digital Assembly. Using slight pressure, seat the SEU Digital Expansion Assembly into place.

7. At each of the five mounting holes on the SEU Digital Expansion Assembly, install one mounting screw, one flat washer and one lock washer. Refer to the mounting hardware configuration in **Figure I-2** for the orientation of these parts.

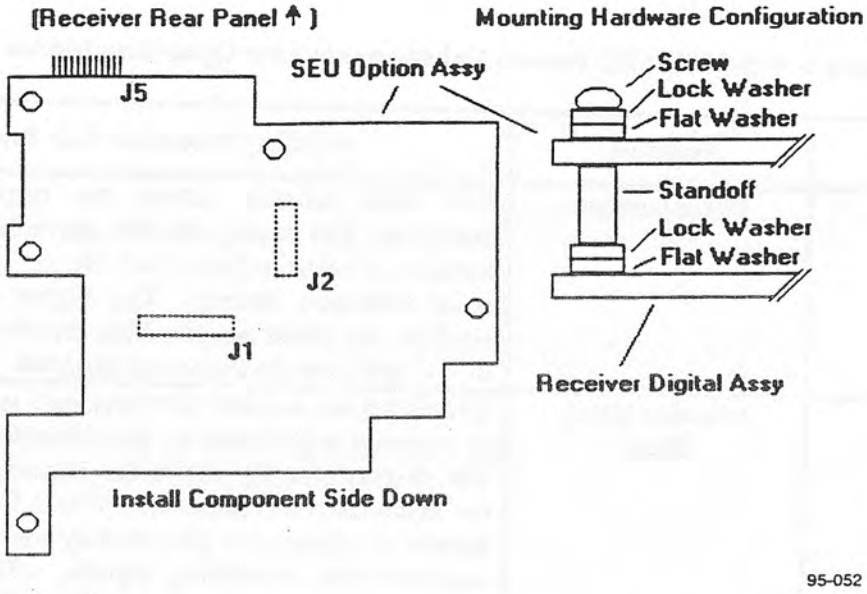

Figure I-2. SEU Digital Expansion Assembly Hardware Illustration

I.4 FIELD INSTALLATION PROCEDURES WHEN USED WITH TYPE 797214 DIGITAL CONTROL ASSEMBLY

The procedures for installtion of the WJ-871Y/SEU option when used with the Type 797214 Digital Control Assembly are identical to the instructions contained in **paragraph I.3** above except that the EPROMS are not required, as the correct EPROMS are already installed in the Type 797214 Digital Control Assembly.

I.5 OPERATION

The WJ-871Y/SEU option provides enhancement to the audio present at all audio outputs of the receiver. It may be activated with AM, FM, SAM, CW, SB, or USB demodulation. It is not recommended for use with CW signals and is inhibited in the ISB detection mode. Activation and control of the speech enhancement features may be performed locally at the front panel, or remotely via the remote interface.

I.5.1 LOCAL OPERATION

Local selection of the features of the WJ-871Y/SEU Speech Enhancement Option are made using the BLANKER key and the Auxiliary Parameter edit knob on the receiver front panel. When the option is installed, the BLANKER key becomes a three-function selection key, permitting control of the Noise Blanker, the Adaptive Notch Filter, and the Wideband Noise Reduction. The Auxiliary Parameter Edit knob sets the magnitude of control over the selected function. The control operation is illustrated in **Table I-1**.

Table I-1. WJ-871Y/SEU Speech Enhancement Unit Operating Modes

Blanker	Function	Auxiliary Parameter Edit Knob
1st Press	Noise Blanker	Edit knob rotation selects the degree of noise reduction. The display directly above the Blanker key displays a number from 1 to 10, or "–", indicating noise reduction setting. The higher the displayed number, the lower the blanking threshold. A setting of "--" indicates the blanker is disabled.
2nd Press	Adaptive Notch Filter	The Edit knob rotation activates and sets the amount of attenuation provided by the Adaptive Notch Filter. The display directly above the Blanker key displays the alpha-numeric characters A0 to A7, indicating the degree of attenuation provided by the notch filter to constant tone interfering signals. The higher the number, the greater the filter effect. A setting of A0 disables the adaptive filter.
3rd Press	Wideband Noise Reduction	The Edit knob activates and sets the magnitude of the effect provided by the Wideband Noise Reduction filter. The display directly above the Blanker key displays the alpha-numeric characters W0 to W3, indicating the degree of noise filtering provided. The higher the number, the greater the filter effect. A setting of W0 disables Wideband Noise Reduction.

The Adaptive Notch Filter and Wideband Noise Reduction can be used separately or simultaneously. Once activated, the function remains active until it is disabled by setting its parameter to 0 (A0/W0), or by cycling the receiver's power off and back on. The amount of filtering that is required is determined by listening to the audio, and adjusting the setting to obtain the best audio response. Use of the Adaptive Notch Filter with CW signals should be avoided as this highly correlated signal will be attenuated along with undesired tones.

I.5.2 REMOTE OPERATION

The commands listed in **Table I-2** are used for activating and setting of the Adaptive Notch Filter and Wideband Noise Reduction. In addition, the OPT? query has been modified to add the Speech Enhancements option to the list of available options.

Table I-2. WJ-871Y/SEU Speech Enhancement Unit Remote Commands

Command	Response	Description
ADN *nrf*		Selects the Adaptive Notch Filter and sets the degree of filtering provided. Range: 0-7, 0=Off
ADN?	ADN *nrl*	Requests the Adaptive Notch Filter setting. Range: 0-7, 0=Off Default: ADN 0, Off Reset: ADN 0, Off Example: ADN 1, Feature enabled with minimum filter effect.
WBN nrl		Selects Wideband Noise Reduction and sets the degree of noise filtering. Range: 0-3, 0=Off
WBN?	WBN *nrl*	Requests the Wideband Noise Reduction Setting. Range: 0-3, 0=Off Default: WBN 0, Off Reset: WBN 0, Off Example: WBN 3, Feature enabled with maximum filter effect.

Table I-2. WJ-871Y/SEU Speech Enhancement Unit Remote Commands (Continued)

Command	Response	Description
*OPT?	*OPT *nrf, nrf*	Requests a list of the options installed in the receiver. Two bytes are returned, with the bit setting reflecting available options. A bit set to logic "1" indicates that the option is installed. Byte 1: Bit 0 - Preselector Bit 1 - Extended IF BWs Bit 2 - Tuned Carrier Bit 3 - Variable Line Audio Bit 4 - Notch Filter Bit 5 - AGC/Detection Mode Match Bit 6 - Zero Digit Tuning Bit 7 - Synchronous AM Byte 2: Bit 0 - AGC Enhancements **Bit 1 - Speech Enhancement** Bit 2-7 - Reserved, set to 0

I.6 OPERATOR TIPS

This section contains a number of operator tips and suggestions that will provide the most effective performance of the WJ-871Y/SEU option. It is suggested that this section be reviewed before using the features of this option.

- When copying CW signals, the Adaptive Notch Filter should not be engaged, as it will attenuate the desired signal along with interfering tones. In this situation, it is recommended that the Passband Tuning and Tunable Notch Filter functions be used to block interfering tones. Refer to the Local Operation section of the receiver manual for details on these functions.

- In situations where multiple interfering tones are present, it is recommended that the Tunable Notch Filter feature be used first to attenuate the strongest interfering signal. The Adaptive Filter should then be activated to attenuate the remaining tones. This will provide better attenuation performance on the remaining tones.

- Due to limitations in the computational capabilities of this option, the effectiveness of the Adaptive Notch Filter and Wideband Noise Reduction is decreased when the features are used simultaneously. To obtain the highest level of performance it is recommended that only one of these features be activated at a time. For example, a signal with multiple interfering tones and static hiss would be best satisfied by selecting a narrower IF bandwidth and then activating the Adaptive Notch Filter. This provides more effective performance than enabling both the Adaptive Notch Filter and Wideband Noise Reduction with a wide IF bandwidth selected.

- Some signals may cause the Speech Enhancement Option performance to fail. This condition results in a sudden muting of the receiver audio. If this condition occurs, the setting of the enabled feature should be decreased until the audio is restored.

I.7 PARTS LIST

The following parts list contains all operational components used in the Speech Enhancement Option, along with mechanical parts and EPROMS that are required for installation.

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
I.7.1	**WJ-871Y/SEU SPEECH ENHANCEMENT OPT**			REF DESIG PREFIX SEU	
	Revision X1				
A1	Digital Expansion Assy/SEU Option	1	797201-4	14632	
A2U12	EPROM, Programmed, Control*	1	842032	14632	
A2U56	EPROM, Programmed, DSP*	1	842033	14632	
	Spacer, .187 x .52, 4-40 Stud	5	283051-2	14632	
	Washer, Flat, No. 4	10	MS15795-803	96906	
	Washer, Lock, No. 4	10	MS35338-135	96906	
	Screw,Machine, 2-56 x 5/16	5	MS51957-4	96906	

*A2U12 and A2U56 are not required when the WJ-871Y-SEU Option is used with the Type 797214 Digital Control Assembly

WJ-871Y/IFC125 12.5 kHz IF OUTPUT OPTION

APPENDIX J

WJ P/N 181275-001, Revision B

WATKINS-JOHNSON COMPANY
700 QUINCE ORCHARD ROAD
GAITHERSBURG, MARYLAND 20878-1794

September 1997

PROPRIETARY STATEMENT

LIST OF EFFECTIVE PAGES

Page Number	Description	Revision
i	Cover	B
ii	Proprietary Statement	B
iii	List of Effective Pages	B
iv	Intentionally Blank	B
v	Revision Record	B
vi	Intentionally Blank	B
vii thru viii	Table of Contents	B
J-1 thru J-22	Appendix J	A
J-23 (J-24 blank)	Schematic	A
J-25 (J-26 blank)	Schematic	A
J-27 (J-28 blank)	Schematic	A
J-29 (J-30 blank)	Schematic	A

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WJ-8711A DIGITAL HF RECEIVER

REVISION RECORD

Revision	Description	Date
A	Initial issue.	12/95
B	Added WJ part number to the title page. Incorporated a List of Effective Pages. Added page numbers to section cover pages and their back pages. Removed "intentionally left blank" pages and replaced with "Notes" pages that are formatted with headers and page numbers.	9/97

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WJ-871Y/IFC125 12.5 kHz IF OPTION

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LIST OF ILLUSTRATIONS

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WJ-871Y/IFC125 12.5 kHz IF OPTION

APPENDIX J

J.1 ELECTRICAL CHARACTERISTICS

The WJ-871Y/IFC125 12.5 kHz IF Option provides a post-filtered IF output on the rear panel of the WJ-871Y receiver at A2J1. The output center frequency is 12.5 kHz with a bandwidth equal to the operator-selected IF Bandwidth. The minimum output level is -20 dBm (20mV) into a 50 ohm load. Note that when the WJ-871Y/IFC125 option is installed, the WJ-871Y/DSO1, /488, /SCU, /SEU, /PCSM, and PCSM2 options are not available.

J.2 INSTALLATION

The WJ-871Y/IFC 12.5 kHz IF Option requires the modification of the Type 797214-X Digital Control PC Assembly (A2). The modified version is a Type 797214-5 Digital Control PC Assembly(A2). The modified A2 assembly contains the following modifications:

- FL1 and C130 are removed.
- R11, C16, C106, C122, and C129 have new values.
- A new DSP EPROM is installed as U56.
- A jumper wire is installed instead of FL1.
- A jumper wire is installed from U32 pin 13 to U32 pin 14.
- The A2 assembly has "797214-5" stamped on the outer housing for identification.

Install the new WJ-871Y/IFC125 12.5 kHz IF Option according to the removal and installation procedures for the A2 assembly outlined in the base manual.

Affix the new label, "IF TAPE" over the "IF OUT" label on the rear panel and add the "12.5K Filter" marking to the nameplate.

J.3 FUNCTIONAL DESCRIPTION

Refer to **Figure J-1**. The Reconstructed Analog section receives the Digitized IF and audio data from the Digital Signal Processing section and converts the signals back to analog form for output. In addition to the serial data, the Digital Signal Processing section provides frame synchronization and serial data clock signals for timing of the data transfer. These timing signals permit the Reconstructed Analog section to demultiplex the signals into separate IF and audio signals. The multiplexed analog IF and audio signals pass to the IF/Audio Demultiplex and Filtering section where the reconstructed IF signal is converted to a 12.5 kHz IF signal and is passed through the IF Baseband Filter to rear panel connector A2J1.

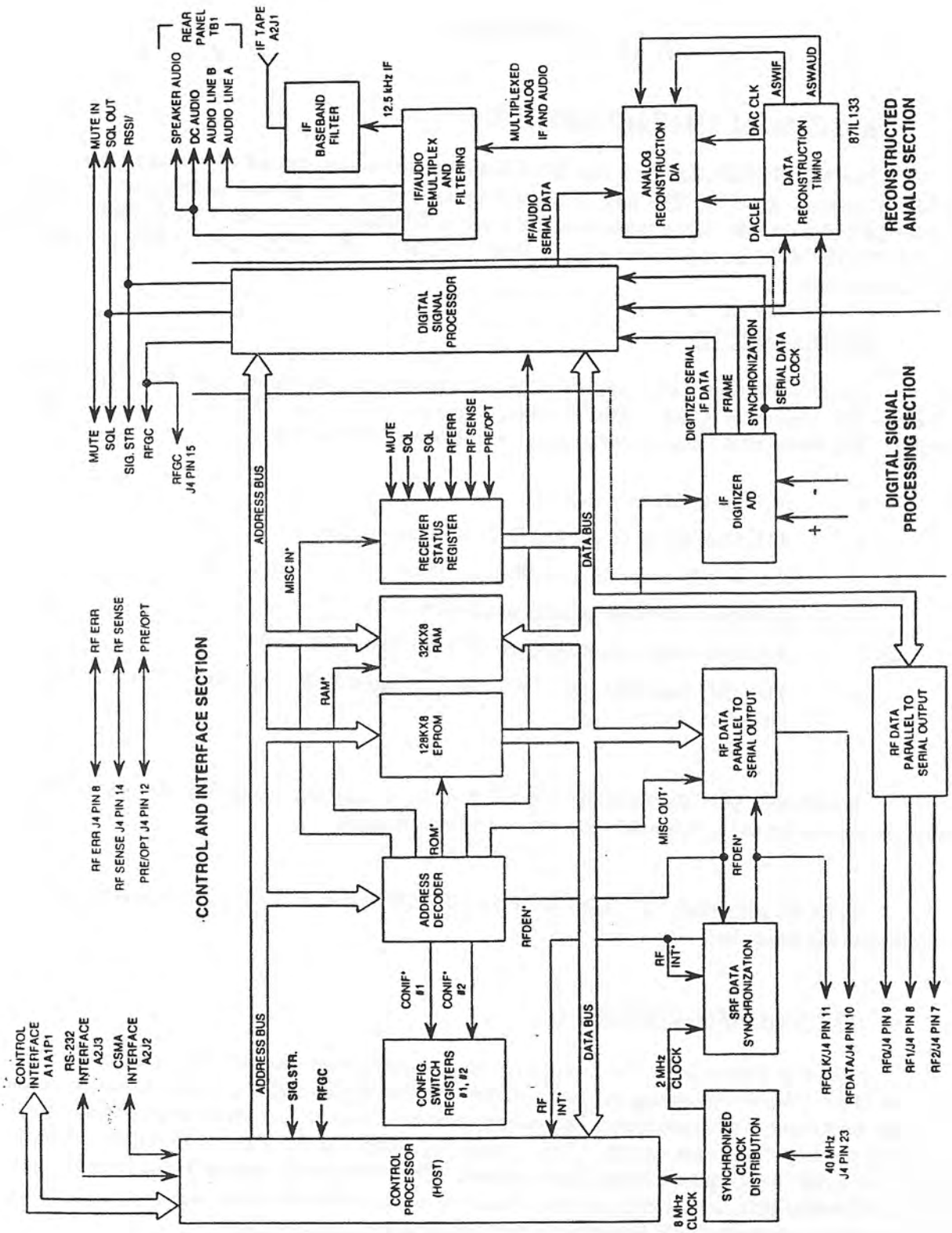


Figure J-1. Type 797214-5 Digital Assembly Functional Block Diagram

J.4 LIST OF MANUFACTURERS

The manufacturers listed below are supply sources used for obtaining certain parts in this option and may not be in the base manual. All other manufacturers not listed below are found in the base manual.

Mfr. Code	Name and Address
05574	Viking Electronics Inc. 21001 Nordhoff St. P.O. Box 2379 Chatsworth, CA 91311-5987
53337	RDI/REED Devices, Inc. 525 Randy Road Carol Stream, IL 60188
1Z447	RCA Corp. Solid State Div. 2872 Woodcock Blvd., Suite 304 Atlanta, GA 30341-4002

J.5 PARTS LIST

The following parts list contains all the electrical components used in the unit, along with mechanical parts that may be subject to unusual wear or damage. When ordering replacement parts from the Watkins-Johnson Company, specify the unit type, the serial number, and the operation configuration. Also include the reference designation and the description of each item ordered. The list of manufacturers, provided in **paragraph J.4**, and the manufacturer's part numbers, provided in **paragraph J.5.1**, are supplied as a guide to aid the user of the equipment while in the field. The parts list may not necessarily be identical with the parts installed in the unit. The parts list in **paragraph J.5.1** will provide for satisfactory operation.

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

NOTE

As improved semiconductors become available, it is the policy of Watkins-Johnson to incorporate them in proprietary products. For this reason some transistors, diodes, and integrated circuits installed in the equipment may not agree with those specified in the parts list and schematic diagrams of this manual. However, the semiconductors designated in the manual substitute in every case with satisfactory results.

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
J.5.1	**TYPE 797214-5 DIGITAL CONTROL PC ASSEMBLY**				**REF DESIG PREFIX A2**
	Revision A				
BT1	Not Used				
XBT1	Not Used				
BT2	Not Used				
XBT2	Not Used				
C1	Capacitor, Ceramic, .01µF, 10%	118	841415-019	14632	
C2	Same as C1				
C3	Same as C1				
C4	Capacitor, Ceramic, .033µF, 10%	17	841415-022	14632	
C5	Same as C4				
C6	Same as C4				
C7	Same as C4				
C8	Same as C4				
C9	Same as C4				
C10	Same as C4				
C11	Same as C1				
C12	Capacitor, Ceramic, .1µF, 10%, >/=50VDC	8	841250-25	14632	
C13	Same as C1				
C14	Capacitor, Ceramic, 75pF, ±2%	1	841416-046	14632	
C15	Capacitor, Tantalum, 3.3µF, 20%, 16V	10	841293-10	14632	
C16	Capacitor, Tantalum, 6.8 pf, 20%, 10V	1	841293-37	14632	
C17	Capacitor, Ceramic, 22pF, 5%	3	841415-003	14632	
C18	Same as C1				
C19	Same as C1				
C20	Capacitor, Ceramic, 100pF, 5%	9	841415-007	14632	
C21	Same as C20				
C22	Same as C20				
C23	Same as C20				
C24	Same as C1				
C25	Capacitor, Electrolytic, Aluminum, 470 F, 16V	1	ECE-A1CU471	54473	
C26	Same as C1				
C27	Capacitor, Ceramic, .047µF, 10%	9	841415-023	14632	
C28	Same as C27				
C29	Same as C1				
C30	Same as C4				
C31	Same as C4				
C32	Same as C1				
C33	Same as C4				
C34	Same as C1				
C35	Same as C15				
C36	Same as C1				
C37	Same as C1				
C38	Same as C12				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
					REF DESIG PREFIX A2
C39	Same as C1				
C40	Capacitor, Tantalum, 10µF, 20%, 16V	2	841293-16	14632	
C41	Same as C17				
C42	Same as C17				
C43	Same as C12				
C44	Same as C1				
C45	Same as C12				
C46	Same as C40				
C47	Same as C1				
C48	Same as C12				
C49	Capacitor, Ceramic, 470pF, 5%	8	841415-011	14632	
C50	Same as C49				
C51	Same as C49				
C52	Same as C49				
C53	Same as C49				
C54	Same as C1				
C55	Same as C1				
C56	Capacitor, Ceramic, 1000pF, 10%	4	841415-013	14632	
C57	Capacitor, Ceramic, 47pF, 2%	4	841416-041	14632	
C58	Same as C1				
C59	Same as C1				
C60	Same as C1				
C61	Same as C15				
C62	Same as C15				
C63	Same as C15				
C64	Same as C1				
C65	Same as C1				
C66	Same as C1				
C67	Same as C1				
C68	Same as C1				
C69	Same as C1				
C70	Same as C1				
C71	Same as C15				
C72	Same as C56				
C73	Same as C56				
C74	Same as C49				
C75	Same as C27				
C76	Same as C27				
C77	Capacitor, Ceramic, 1500pF, 10%,	3	841415-014	14632	
C78	Same as C27				
C79	Same as C77				
C80	Same as C77				
C81	Capacitor, Ceramic, 820pF, ±2%	3	841416-071	14632	

REF DESIG PREFIX A2

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
C82	Same as C49				
C83	Same as C1				
C84	Same as C1				
C85	Same as C1				
C86	Same as C49				
C87	Same as C1				
C88	Same as C1				
C89	Same as C1				
C90	Same as C1				
C91	Same as C1				
C92	Same as C1				
C93	Same as C1				
C94	Same as C1				
C95	Same as C1				
C96	Capacitor, Ceramic, 2200pF, 10%	4	841415-015	14632	
C97	Same as C57				
C98	Same as C1				
C99	Same as C1				
C100	Same as C1				
C101	Same as C27				
C102	Same as C1				
C103	Same as C15				
C104	Same as C15				
C105	Same as C4				
C106	Capacitor, Ceramic, 820pF, ±2%, 50V	1	841416-071	14632	
C107	Same as C1				
C108	Same as C27				
C109	Same as C1				
C110	Same as C1				
C111	Same as C1				
C112	Same as C15				
C113	Capacitor, Ceramic, 330pF, 5%	1	841415-010	14632	
C114	Same as C27				
C115	Same as C57				
C116	Same as C1				
C117	Same as C1				
C118	Same as C96				
C119	Same as C1				
C120	Same as C1				
C121	Same as C15				
C122	Capacitor, Ceramic, 56 pf, ±2%, 50V	1	841416-043	14632	
C123	Same as C4				
C124	Same as C96				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
				REF DESIG PREFIX A2	
C125	Capacitor, Ceramic, 180pF, 2%	1	841416-055	14632	
C126	Capacitor, Ceramic, 470pF, 2%	1	841416-065	14632	
C127	Same as C27				
C128	Capacitor, Ceramic, 68pF, ±2%	1	841416-045	14632	
C129	Jumper, 0.0Ω	1	841417	14632	
C130	Not Used				
C131	Not Used				
C132	Same as C1				
C133	Same as C1				
C134	Same as C1				
C135	Not Used				
C136	Same as C1				
C137	Same as C1				
C138	Same as C81				
C139	Same as C1				
C140	Same as C1				
C141	Same as C1				
C142	Not Used				
C143	Same as C1				
C144	Same as C81				
C145	Same as C1				
C146	Same as C1				
C147	Same as C1				
C148	Capacitor, Ceramic, 100pF, 2%	4	841416-049	14632	
C149	Same as C148				
C150	Same as C148				
C151	Same as C148				
C152	Same as C1				
C153	Same as C1				
C154	Same as C1				
C155	Same as C1				
C156	Same as C1				
C157	Same as C1				
C158	Capacitor, Ceramic, 1000pF, 2%	1	841416-073	14632	
C159	Capacitor, Ceramic, 56pF, 2%	1	841416-043	14632	
C160	Same as C1				
C161	Same as C1				
C162	Capacitor, Ceramic, 1200pF, 2%	1	841416-075	14632	
C163	Capacitor, Tantalum, 68µF, 20%, 6.3V	1	841293-24	14632	
C164	Same as C1				
C165	Same as C1				
C166	Same as C1				
C167	Same as C1				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
	REF DESIG PREFIX A2				
C168	Same as C1				
C169	Same as C1				
C170	Same as C1				
C171	Same as C56				
C172	Same as C1				
C173	Same as C1				
C174	Same as C1				
C175	Capacitor, Tantalum, 33µF, 20%, 16V	9	841293-22	14632	
C176	Same as C175				
C177	Same as C96				
C178	Same as C1				
C179	Same as C175				
C180	Capacitor, Tantalum, 6.8µF, 20%, 6.3V	2	841293-14	14632	
C181	Same as C180				
C182	Same as C1				
C183	Not Used				
C184	Same as C1				
C185	Same as C12				
C186	Same as C12				
C187	Same as C1				
C188	Same as C1				
C189	Same as C1				
C190	Not Used				
C191	Same as C1				
C192	Same as C4				
C193	Same as C1				
C194	Same as C1				
C195	Same as C1				
C196	Same as C1				
C197	Same as C1				
C198	Not Used				
C199	Not Used				
C200	Same as C1				
C201	Same as C1				
C202	Same as C175				
C203	Same as C175				
C204	Same as C175				
C205	Same as C1				
C206	Same as C20				
C207	Same as C1				
C208	Same as C1				
C209	Same as C1				
C210	Same as C1				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
	REF DESIG PREFIX A2				
C211	Same as C1				
C212	Same as C1				
C213	Same as C1				
C214	Same as C20				
C215	Same as C20				
C216	Same as C1				
C217	Same as C20				
C218	Same as C1				
C219	Same as C175				
C220	Same as C175				
C221	Same as C175				
C222	Same as C1				
C223	Same as C20				
C224	Same as C1				
C225	Same as C1				
C226	Same as C1				
C227	Same as C1				
C228	Same as C1				
C229	Same as C4				
C230	Same as C1				
C231	Same as C1				
C232	Not Used				
C233	Same as C4				
C234	Not Used				
C235	Same as C1				
C236	Same as C4				
C237	Same as C4				
C238	Not Used				
C239	Not Used				
CR1	Not Used (SOT-23)				
CR2	Diode/Swpin Dual Swithcing Diode Reverse Volltage	2	MMBD7000LT1	04713	
CR3	Not Used				
CR4	Same as CR2				
CR5	Not Used				
FL1	Not Used				
J1	Connector, Jack, BNC BNC Rt Ang , PCB/Panel MT W/SLDR Mt Posts	1	227677-1	00779	
J2	Phone Jack, 3.5 Dia Mini Phone Jack, RES=3OM	1	SJ360	53337	
J3	Connector, 25-Pin D-Sub RT Ang, PC MT	1	DMRSTR25RA05Cg	05574	
J4	CONN 24-Pin Term Strip Gold Flash .100CTRS	4	79223-624	22526	
J5	Connector, Header,6 Pos Pin Friction Lock .156 CTRS	1	26-48-2066	27264	
J6	Not Used				
J7	Same as J4				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
					REF DESIG PREFIX A2
J8	Same as J4				
J9	Same as J4				
J10	Not Used				
J11	Connector, PC,BD 3 Pin SHRD HDR	1	3-102202-4	00779	
J12	Not Used				
J13	Not Used				
J14	Connector, Header,10 Pin HDR .025SQ X.230 X.10CTR SGLD PLTD	1	TSW105-07-G-D	55322	
J15	Not Used				
J16	Not Used				
JW1	Not Used				
L1	Inductor, 10µH, Surface MT	3	RL-1500-10	14778	
L2	Same as L1				
L3	Same as L1				
L4	Inductor, 1.0µH, ±20%,@7.96MHZ QMIN-25 370MA Ferrite 1210	9	B82422-A1102-M	25088	
L5	Same as L4				
L6	Same as L4				
L7	Same as L4				
L8	Same as L4				
L9	Same as L4				
L10	Same as L4				
L11	Not Used				
L12	Inductor, 2.2µH	1	841444-009	14632	
L13	Inductor, 4.7µH	1	B82422-A1472-M	25088	
L14	Inductor, 150nH	1	841438-029	14632	
L15	Inductor, 68nH	1	841438-021	14632	
L16	Inductor, 2.7µH	1	841444-011	14632	
L17	Not Used				
L18	Inductor, 1000µH	2	NLF453232-102K	7J069	
L19	Same as L18				
L20	Same as L4				
L21	Same as L4				
L22	Not Used				
L23	Not Used				
Q1	Not Used				
Q2	Transistor	3	MMBT2222ALT1	04713	
Q3	Same as Q2				
Q4	Not Used				
Q5	Not Used				
Q6	Transistor	2	2N7002-LT1	17856	
Q7	Same as Q2				
Q8	Transistor	2	MMBT-3906	04713	

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
					REF DESIG PREFIX A2
Q9	Same as Q6				
Q10	Transistor	2	MMBT3904LT1	04713	
Q11	Same as Q8				
Q12	Same as Q10				
R1	Resistor, Fixed, 100kΩ, 5%	110	841414-121	14632	
R2	Resistor, Fixed, 47Ω, 5%	20	841414-041	14632	
R3	Resistor, Fixed, 47kΩ, 5%	7	841414-113	14632	
R4	Same as R3				
R5	Resistor, Fixed, 100Ω, 5%	16	841414-049	14632	
R6	Same as R3				
R7	Resistor, Fixed, 10kΩ, 5%	43	841414-097	14632	
R8	Resistor, Fixed, 4.7kΩ, 5%	7	841414-089	14632	
R9	Resistor, Fixed, 2.2kΩ, 5%	8	841414-081	14632	
R10	Same as R2				
R11	Resistor, Fixed, 15kΩ, 5%, .1 watt	1	841414-101	14632	
R12	Resistor, Fixed, 680Ω, 5%	1	841414-069	14632	
R13	Same as R5				
R14	Same as R5				
R15	Not Used				
R16	Not Used				
R17	Not Used				
R18	Resistor, Fixed, 1.0kΩ, 5%	23	841414-073	14632	
R19	Jumper .05 Ω MAX 1A MIN@70C	26	841417	14632	
R20	Same as R19				
R21	Same as R18				
R22	Same as R19				
R23	Not Used				
R24	Same as R18				
R25	Same as R19				
R26	Resistor, Fixed, 1.5kΩ, 5%	5	841414-077	14632	
R27	Same as R19				
R28	Same as R18				
R29	Resistor, Fixed, 2.7Ω, 5%	4	841414-011	14632	
R30	Resistor, Fixed, 22kΩ, 5%	4	841414-105	14632	
R31	Same as R5				
R32	Same as R30				
R33	Same as R5				
R34	Same as R1				
R35	Same as R19				
R36	Resistor, Fixed, 2.7kΩ, 5%	2	841414-083	14632	
R37	Same as R18				
R38	Same as R19				
R39	Same as R7				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
	REF DESIG PREFIX A2				
R40	Same as R7				
R41	Same as R18				
R42	Same as R7				
R43	Same as R19				
R44	Not Used				
R45	Same as R18				
R46	Same as R36				
R47	Same as R2				
R48	Same as R1				
R49	Same as R1				
R50	Resistor, Fixed, 470Ω, 5%	10	841414-065	14632	
R51	Not Used				
R52	Resistor, Fixed, 75kΩ, 5%	2	841414-118	14632	
R53	Same as R52				
R54	Same as R1				
R55	Resistor, Fixed, 33kΩ, 5%	5	841414-109	14632	
R56	Resistor, Fixed, 220kΩ, 5%	6	841414-129	14632	
R57	Same as R55				
R58	Same as R56				
R59	Resistor, Fixed, 68kΩ, 5%	4	841414-117	14632	
R60	Same as R18				
R61	Same as R1				
R62	Same as R1				
R63	Same as R50				
R64	Same as R1				
R65	Same as R1				
R66	Same as R1				
R67	Same as R2				
R68	Same as R56				
R69	Same as R56				
R70	Same as R2				
R71	Same as R56				
R72	Same as R56				
R73	Same as R2				
R74	Same as R59				
R75	Same as R18				
R76	Same as R1				
R77	Same as R1				
R78	Same as R9				
R79	Same as R1				
R80	Same as R1				
R81	Same as R18				
R82	Same as R1				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR

REF DESIG PREFIX A2

R83	Same as R1				
R84	Same as R1				
R85	Not Used				
R86	Same as R1				
R87	Same as R2				
R88	Same as R18				
R89	Same as R9				
R90	Same as R1				
R91	Same as R1				
R92	Same as R1				
R93	Same as R50				
R94	Resistor, Fixed, 18kΩ, 5 %	4	841414-103	14632	
R95	Same as R2				
R96	Same as R94				
R97	Same as R2				
R98	Same as R3				
R99	Same as R3				
R100	Same as R55				
R101	Same as R8				
R102	Same as R1				
R103	Same as R1				
R104	Same as R1				
R105	Not Used				
R106	Same as R9				
R107	Same as R94				
R108	Same as R9				
R109	Same as R94				
R110	Same as R18				
R111	Same as R7				
R112	Resistor, Fixed, 8.2kΩ, 5%	2	841414-095	14632	
R113	Same as R112				
R114	Same as R7				
R115	Same as R1				
R116	Not Used				
R117	Same as R7				
R118	Same as R7				
R119	Same as R7				
R120	Same as R1				
R121	Same as R1				
R122	Same as R1				
R123	Same as R1				
R124	Same as R2				
R125	Same as R1				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR

REF DESIG PREFIX A2

R126	Same as R18				
R127	Same as R59				
R128	Same as R7				
R129	Same as R2				
R130	Same as R1				
R131	Same as R1				
R132	Same as R1				
R133	Resistor, Fixed, 150kΩ, 5%	2	841414-125	14632	
R134	Same as R50				
R135	Same as R7				
R136	Same as R26				
R137	Same as R26				
R138	Same as R30				
R139	Same as R2				
R140	Same as R1				
R141	Same as R1				
R142	Same as R18				
R143	Same as R18				
R144	Same as R1				
R145	Same as R18				
R146	Same as R55				
R147	Resistor, Fixed, 150Ω, 5%	1	841414-053	14632	
R148	Resistor, Fixed, 3.3kΩ, 5%	9	841414-085	14632	
R149	Same as R1				
R150	Same as R1				
R151	Resistor, Fixed, 10Ω, 5%	5	841414-025	14632	
R152	Same as R18				
R153	Same as R18				
R154	Same as R133				
R155	Resistor, Fixed, 4.7Ω, 5%	1	841414-017	14632	
R156	Not Used				
R157	Same as R7				
R158	Same as R7				
R159	Same as R7				
R160	Same as R26				
R161	Same as R26				
R162	Same as R30				
R163	Same as R2				
R164	Same as R3				
R165	Same as R1				
R166	Same as R7				
R167	Same as R7				
R168	Same as R18				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
					REF DESIG PREFIX A2
R169	Resistor, Fixed, 220Ω, 5%	3	841414-057	14632	
R170	Same as R7				
R171	Same as R1				
R172	Same as R151				
R173	Same as R7				
R174	Same as R7				
R175	Not Used				
R176	Same as R29				
R177	Same as R1				
R178	Same as R7				
R179	Same as R1				
R180	Same as R2				
R181	Not Used				
R182	Not Used				
R183	Same as R2				
R184	Same as R29				
R185	Same as R7				
R186	Same as R19				
R187	Same as R2				
R188	Same as R151				
R189	Not Used				
R190	Same as R29				
R191	Same as R19				
R192	Not Used				
R193	Same as R1				
R194	Same as R1				
R195	Same as R7				
R196	Same as R7				
R197	Same as R148				
R198	Same as R148				
R199	Same as R151				
R200	Same as R18				
R201	Same as R19				
R202	Same as R148				
R203	Same as R148				
R204	Not Used				
R205	Same as R19				
R206	Same as R151				
R207	Same as R1				
R208	Same as R1				
R209	Same as R19				
R210	Same as R1				
R211	Same as R19				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR

REF DESIG PREFIX A2

R212	Same as R1				
R213	Not Used				
R214	Same as R19				
R215	Same as R1				
R216	Same as R19				
R217	Resistor, Fixed, 5.6kΩ, 5%	1	841414-091	14632	
R218	Same as R148				
R219	Same as R9				
R220	Same as R5				
R221	Same as R5				
R222	Same as R9				
R223	Same as R7				
R224	Same as R1				
R225	Not Used				
R226	Same as R8				
R227	Same as R3				
R228	Same as R8				
R229	Same as R1				
R230	Same as R1				
R231	Same as R19				
R232	Same as R1				
R233	Same as R1				
R234	Not Used				
R235	Same as R1				
R236	Not Used				
R237	Same as R1				
R238	Not Used				
R239	Same as R1				
R240	Same as R7				
R241	Same as R8				
R242	Same as R8				
R243	Same as R7				
R244	Same as R1				
R245	Same as R7				
R246	Same as R1				
R247	Resistor, Fixed, 1.0 MΩ 5%	4	841414-145	14632	
R248	Same as R2				
R249	Same as R1				
R250	Same as R7				
R251	Same as R7				
R252	Same as R2				
R253	Same as R1				
R254	Same as R1				

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR

REF DESIG PREFIX A2

R255	Same as R7
R256	Same as R1
R257	Same as R1
R258	Same as R1
R259	Same as R1
R260	Same as R1
R261	Same as R1
R262	Not Used
R263	Not Used
R264	Not Used
R265	Same as R5
R266	Same as R1
R267	Same as R1
R268	Same as R1
R269	Not Used
R270	Same as R7
R271	Same as R19
R272	Same as R1
R273	Same as R7
R274	Same as R7
R275	Same as R1
R276	Same as R1
R277	Same as R1
R278	Same as R7
R279	Not Used
R280	Same as R19
R281	Same as R1
R282	Same as R1
R283	Same as R7
R284	Not Used
R285	Not Used
R286	Same as R247
R287	Not Used
R288	Same as R1
R289	Same as R19
R290	Same as R1
R291	Not Used
R292	Same as R1
R293	Same as R19
R294	Same as R19
R295	Not Used
R296	Same as R19
R297	Same as R55

REF DESIG PREFIX A2

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
R298	Same as R7				
R299	Not Used				
R300	Not Used				
R301	Same as R19				
R302	Same as R5				
R303	Same as R7				
R304	Same as R1				
R305	Same as R1				
R306	Same as R18				
R307	Same as R59				
R308	Same as R7				
R309	Not Used				
R310	Same as R7				
R311	Same as R7				
R312	Same as R1				
R313	Same as R1				
R314	Same as R5				
R315	Same as R7				
R316	Same as R5				
R317	Same as R1				
R318	Same as R5				
R319	Same as R1				
R320	Same as R50				
R321	Same as R1				
R322	Same as R1				
R323	Same as R18				
R324	Same as R5				
R325	Same as R1				
R326	Same as R1				
R327	Same as R18				
R328	Same as R7				
R329	Same as R1				
R330	Same as R9				
R331	Same as R1				
R332	Same as R1				
R333	Resistor, Fixed, 6.8 kΩ, 5%	2	841414-093	14632	
R334	Same as R8				
R335	Not Used				
R336	Same as R1				
R337	Same as R333				
R338	Same as R148				
R339	Same as R148				
R340	Resistor, Fixed, 68Ω, 5%	2	841414-045	14632	

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR

REF DESIG PREFIX A2

R341	Same as R247				
R342	Same as R247				
R343	Same as R2				
R344	Same as R1				
R345	Same as R1				
R346	Same as R1				
R347	Same as R1				
R348	Same as R1				
R349	Same as R1				
R350	Same as R1				
R351	Same as R1				
R352	Same as R1				
R353	Same as R1				
R354	Same as R1				
R355	Same as R1				
R356	Same as R1				
R357	Same as R1				
R358	Same as R1				
R359	Same as R1				
R360	Same as R7				
R361	Same as R340				
R362	Not Used				
R363	Same as R19				
R364	Not Used				
R365	Not Used				
R366	Same as R50				
R367	Same as R5				
R368	Same as R5				
R369	Same as R5				
R370	Same as R50				
R371	Same as R50				
R372	Same as R169				
R373	Same as R50				
R374	Same as R50				
R375	Same as R169				
R376	Same as R19				
R377	Same as R148				
R378	Same as R2				
R379	Not Used				
S1	Switch/Dip SPST Side Actuated Dip	2	ADP-08S	95146	
S2	Same as S1				
T1	Transformer CPLG Audio 600CT/500CT IMP=10%,	2	SPT-130	20462	
T2	Same as T1				

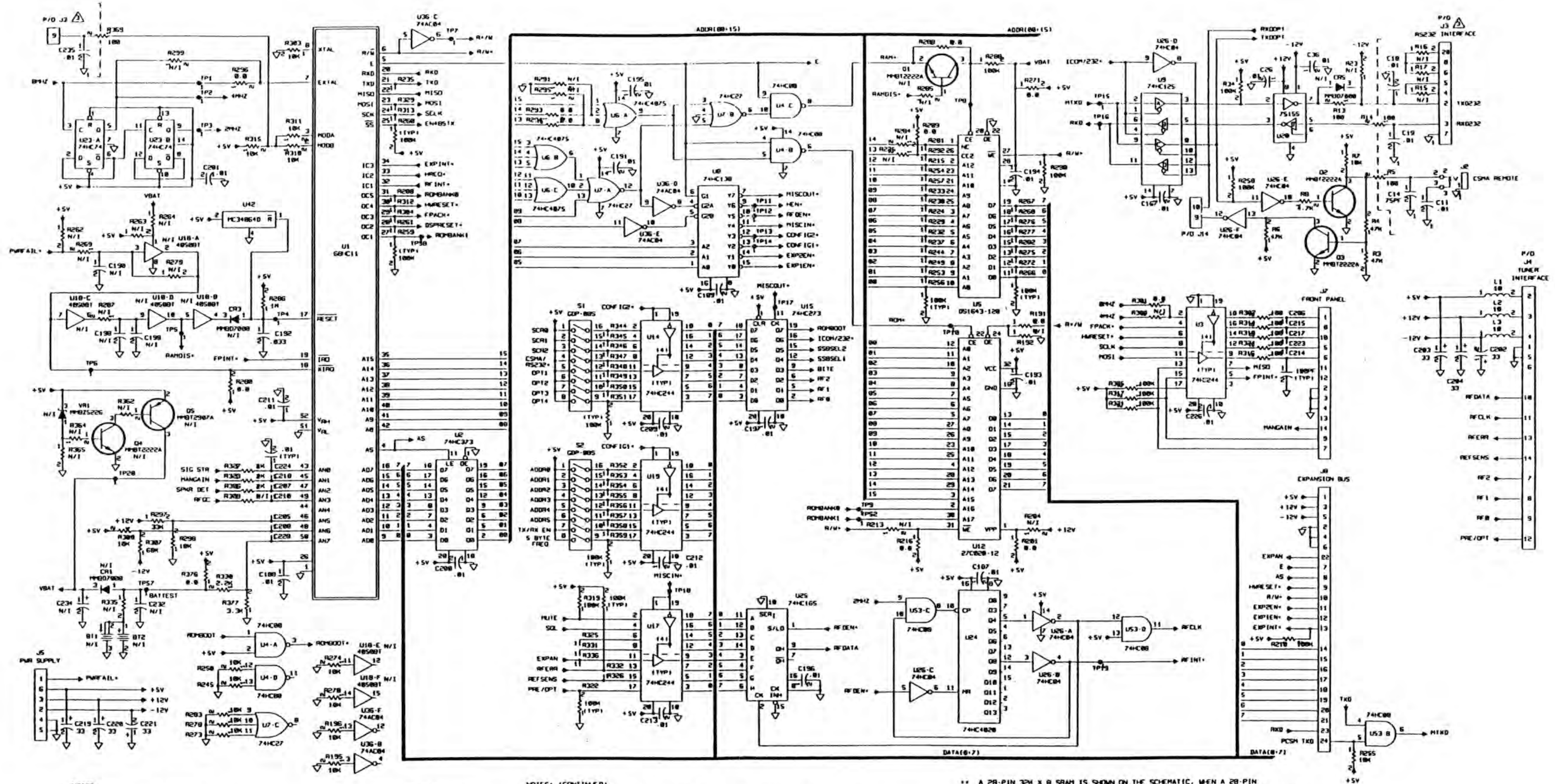
REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
			REF DESIG PREFIX A2		
U1	Integrated Circuit, Microcontroller,Microcontroller Unit 16-BIT Timer 8 Channel 8-BIT	1	MC68GC11A0FN	04713	
XU1	Socket 52-POS PLCC .050CTRS 1.050 X .20HT Polarized Surf	1	213-052-601	26742	
U2	Integrated Circuit,TRI-State Octal D-Type Latch SOL-20 Wide Pkg	1	74HC373SOL20	02735	
U3	Integrated Circuit,Octal TRI-State B!uffer, SOL-20 Wide Pkg	4	74HC244 SOL20	04713	
U4	Integrated Circuit,Quad 2-Input NAND Gate S0-14N	1	74HC00 SO14	02735	
U5	Integrated Circuit, RAM,8K X 8 Nonvolatile Time Keeping RAM 120NS=AT 28-Pin	1	DS1643-120	0B0A9	
XU5	Socket, IC 28 Pin .600 Row Spacing On .100 CTRS Gold Contact	2	O-628-SGT	S5322	
U6	Integrated Circuit, CMOS,Triple Three Input OR Gate SO-14 PLSTC PKG	1	74HC4075 SO14	02735	
U7	Integrated Circuit,TRIPLE 3-Input NOR Gates	1	74HC27 SO14	02735	
U8	Integrated Circuit,3-TO-8 Line Decoder	1	74HC138 SO16	02735	
U9	Integrated Circuit, CMOS,Quad Buffer/Line Driver	2	74HC125 SO14	34371	
U10	Integrated Circuit,Triple 3-Input AND Gate	1	74F11 SO14	04713	
U11	Integrated Circuit,1-OF-8 Decoder/Demultiplexer	1	74F138 SO16	04713	
U12	EPROMProgrammed	1	842032	14632	
XU12	socket, IC 32-PIN LOW PROFILE DIP Socket .600 Row Slpace Gold	1	O-632-SGT	S532	
U13	Integrated Circuit,16-BIT A/D Converter 20-Pin PLSTC DIP	1	DSP56ADC16S	04713	
U14	Same as U3				
U15	Integrated Circuit,Octal D Flip-Flops With Clear SOL-20 Wide Pkg	1	74HC273 SOL20		
U16	Same as U9				
U17	Same as U3				
U18	Not Used				
U19	Same as U3				
U20	Integrated Circuit,Line Driver and Receiver Monolithic 8 Pin PKS	2	SN75155D	01295	
U21	Integrated Circuit, CMOS,Hex Inverters Active Outputs	3	74AC04 SO14	04713	
U22	Amplifier Ultra-High Frequency Op. Amp Gain Bandwidth 1.	1	NE5539D	18324	
U23	Integrated Circuit,Dual D Flip-Flop With Preset and Clear	3	74HC74 SO14	04713	
U24	Integrated Circuit, CMOS,14-Stage Binary Ripple Counter	2	74HC4020 SO16	34371	
U25	Integrated Circuit, CMOS,Parallel-In/Serial-OUT 8-BIT Shift Register SO-1	1	74HC165 SO16	02735	
U26	Integrated Circuit, /INV Hex Inverter	1	74HC04 SO14	04713	
U27	Integrated Circuit,SYN Presettable Binary Counter	2	74AC161 SO16	34371	

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR

REF DESIG PREFIX A2

U28	Same as U27			
U29	Same as U23			
U30	Integrated Circuit,Synchronous Binary Counter with Asynchronous Clear SO	1	74HC161 SO16	02735
U31	Same as U23			
U32	Same as U21			
U33	Integrated Circuit, CMOS,Dual D Flip-Flop With PRESET AND CLEAR	1	74AC74CO14	02735
U34	Voltage Regulator3 TERM NEG Volt Regulator -5V	1	MC79M05CDT	04713
U35	Same as U24			
U36	Same as U21			
U37	Integrated Circuit,40 MHZ DSP Microprocessor with PLL 24-BIT 132-PIN PQF	1	DSP56002FC40	04713
U38	Same as U20			
U39	Integrated Circuit, /SRAMCMOS,32K X 8 20NS Access Time 28PIN SOJ	6	MT5C2568DJ-20	6Y440
U40	Same as U39			
U41	Same as U39			
U42	Integrated Circuit, /Sensing Undervoltage Sensing Rest Operation W/1V Input	1	MC34064D-5	04713
U43	Not Used			
U44	Integrated Circuit, Differential Bus Transceiver	2	SN75176AD	01295
U45	Same as U39			
U46	Same as U39			
U47	Same as U39			
U48	Integrated Circuit, Octal D Flip-Flop with RESET SOL-20 PKG	2	74HCT273 SOL20	02735
U49	Integrated Circuit, Dual D Flip-Flop with SET and RESET	1	74HCT74 SO14	34371
U50	Same as U48			
U51	Integrated Circuit, /CONV D/A Monolithic 8-BIT HS Current Output	2	DAC0800LCM	27014
U52	Amplifier JFET-Input Dual OP AMP	7	MC34002D	04713
U53	Integrated Circuit, Quad 2-Input AND Gate	1	74HC08 SO14	02735
U54	Same as U52			
U55	Same as U51			
U56	EPROM Programmed	1	841678	14632
XU56	Same as XU5			
U57	Same as U44			
U58	Integrated Circuit, Dual 1-OF-4 Decoder/Demultiplexer	1	74F139 SO16	04713
U59	Integrated Circuit, /CONV D/A 16 Bit Audio D/A Converter	1	AD1851R	24355
U60	Integrated Circuit, CMOS,Triple 2-Channel Analog Multiplexer/Demultiplexer	3	74HC4053 SO16	02735

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURERS PART NO.	MFR. CODE	RECM VENDOR
					REF DESIG PREFIX A2
U61	Same as U52				
U62	Same as U60				
U63	Same as U52				
U64	Same as U52				
U65	Amplifier Single Low Noise OP AMP SO 8 PIN	3	NE5534D	18324	
U66	Same as U65				
U67	Integrated Circuit, Dynamic Range Processor Dual VCA 16-Pin DIP	1	SSM-2122P	06665	
U68	Same as U60				
U69	Amplifier JFET-Input Operational Amplifier	2	MC34001D	04713	
U70	Same as U69				
U71	Same as U52				
U72	Integrated Circuit, /AMP 1.5W Audio Power AMP 14-PIN DIP	1	LM388n-1	27014	
U73	Not Used				
U74	Same as U52				
U75	Same as U65				
VR1	Not Used				
XTB1	Connector, Header,13-POS Shrouded PC MT	1	ELFH13210	58982	
Y1	Not Used				



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   - A) RESISTANCE IS IN OHMS, ±5%, 1/10W.
   - B) CAPACITANCE IS IN µF.
   - C) INDUCTANCE IS IN µH.
2. PIN/ADDRESS NUMBERS SHOWN ARE FOR MICRON SEMICONDUCTOR PARTS. ADDRESS NUMBERS MAY DIFFER ON ALTERNATE MFG. PARTS. HOWEVER THEY ARE FUNCTIONALLY EQUIVALENT.

△3 DIFFERENCE BETWEEN TYPES IS LISTED IN TABLE 1.

TABLE 1

TYPE	J3	J2
797214-1	USED	USED
797214-2	N/I	USED
797214-3	USED	N/I
797214-4	△5	
797214-5	△6	

NOTES: (CONTINUED)

4. IT IS POSSIBLE TO USE VARIOUS DENSITY MEMORY CHIPS FOR U39, U48, U41, U45, U46, U47 & U56. THE FOLLOWING TABLE 2 LISTS EACH ASSY DASH NO. (TYPE), IT'S MEMORY CONFIGURATION, AND WHICH 0-OHM RESISTORS MUST BE INSTALLED.

TABLE 2

TYPE	REF DES	DESCRIPTION	PART NO.	R43	R44	R38	R156
797214-1, -2	U56 U45, U46, U47 U39, U48, U41	64K X 8 EPROM 32K X 8 SRAM ** 32K X 8 SRAM ***	27C512 MT5C2568 MT5C2568	0.0	N/I	0.0	N/I

** A 28-PIN 32K X 8 SRAM IS SHOWN ON THE SCHEMATIC. WHEN A 28-PIN 8K X 8 SRAM IS INSTALLED, PIN 26 IS CE2 (VS. A13) AND PIN 1 IS NC (VS. 14).

*** A32-PIN 128K X 8 SRAM IS SHOWN ON THE SCHEMATIC. WHEN A 28-PIN 32K X 8 IS INSTALLED, PINS 1 THRU 28 CORRESPOND TO PINS 3 THRU 30 ON THE 32-PIN CHIP.

△5 -4 SAME AS -1, EXCEPT CONFORMAL COATED.

△6 CUSTOMER SPECIFIC ALTERATIONS MADE. SEE 797214-5 CPL.

Figure J-2. Type 797214-5 Digital Control Assembly (A2) Schematic Diagram 581839 (Sheet 1 of 4) (D)

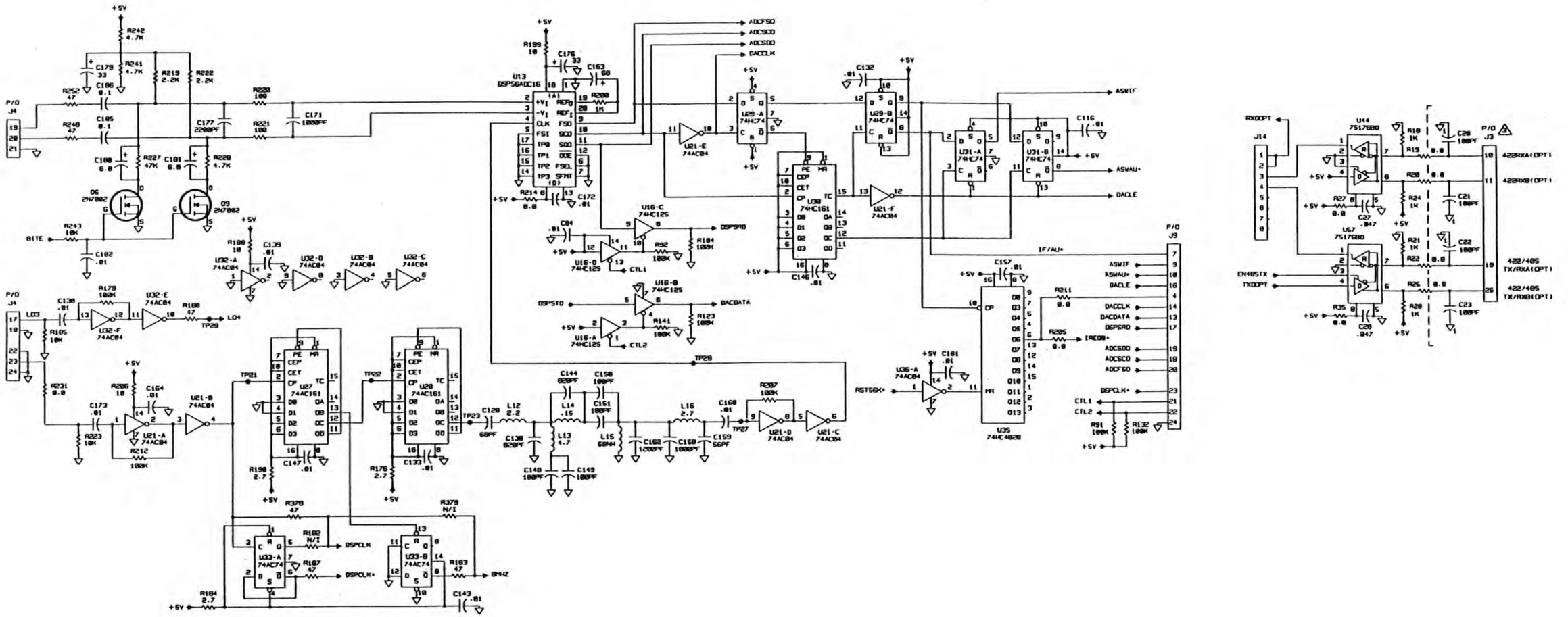


Figure J-2. Type 797214-5 Digital Control Assembly (A2)
Schematic Diagram 581839 (Sheet 2 of 4) (D)

Figure J-2. Type 797214-5 Digital Control Assembly (A2) Schematic Diagram 581839 (Sheet 3 of 4) (D)

Figure J-2. Type 797214-5 Digital Control Assembly (A2)
Schematic Diagram 581839 (Sheet 4 of 4) (D)

APPENDIX K

TYPE WJ-871Y/FSK FREQUENCY SHIFT KEYING OPTION

WJ P/N 181401-001, Revision B

May 1999

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LIST OF EFFECTIVE PAGES

Page Number	Description	Revision
i	Cover	B
ii	Proprietary Statement	B
iii	List of Effective Pages	B
iv	Intentionally Blank	A
v	Revision Record	B
vi	Intentionally Blank	A
vii	Table of Contents	A
K-1 thru K-4	Appendix K	A
K-5 thru K-6	Appendix K	B

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WJ-871Y/FSK FREQUENCY SHIFT KEYING OPTION

APPENDIX K

REVISION RECORD

Revision	Description	Date
A	Initial Release.	1/98
B	Incorporates ECO 039120.	5/99

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WJ-871Y/FSK FREQUENCY SHIFT KEYING OPTION

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APPENDIX K

WJ-871Y/FSK FREQUENCY SHIFT KEYING OPTION

K.1 GENERAL DESCRIPTION

The WJ-871Y/FSK Option adds the FSK Demodulation mode to the standard detection modes available with the WJ-871Y series of HF Receivers. FSK Demodulation mode is selected via the front panel or remote interface in the same manner as the other detection modes. With FSK Demodulation selected, the receiver can demodulate FSK signals from 50 to 1200 baud at frequency shifts of 60, 170, 200, 400, 600, 850, 1000 and 2000 Hz. Each selectable frequency shift is comprised of two shifting frequencies called mark and space. The mark frequency is normally the lower of the two and the space frequency is the higher. The FSK Option allows inversion of mark and space frequencies, if desired, making the mark frequency higher and the space frequency lower.

K.2 MECHANICAL DESCRIPTION

The WJ-871Y/FSK Option is implemented via software and requires no external or internal mechanical modifications. Receivers configured for FSK operation have the standard ROM chips, U56, and U12 replaced with new ROM chip.

K.3 OPERATION

The WJ-871Y/FSK Option provides demodulation of FSK signals received by any of the WJ-871Y series of HF Receivers. Setup and operation of any of the receivers in FSK mode is accomplished via the front panel and follows the structure and format of the other modes of operation. Familiarity with receiver operation is assumed. If necessary, review the local and remote operation sections of the base receiver manual before proceeding.

K.3.1 REAR PANEL DATA OUTPUT

Terminal 9 of TB1 on the receiver's rear panel provides a DC-coupled demodulated audio output from the receiver. In the FSK mode, this terminal provides mark and space data output at approximately +/- 11 Vdc and is compatible with RS-232C type terminal equipment (printers, modems, computer I/O ports, etc).

K.3.2 LOCAL OPERATION

Local operation of the WJ-871Y/FSK Option uses the receiver front panel controls, indicators and displays. Familiarity with the receiver front panel is assumed. The remaining paragraphs describe the following FSK Option front panel functions:

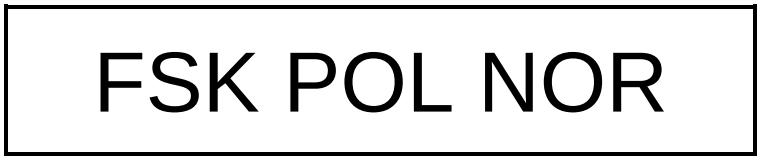
K.3.2.1 SELECTING FSK DETECTION MODE

The DET MODE key is located below the lower display in the Auxiliary Parameter section. Pressing the DET MODE key lights the DET MODE LED, placing the receiver in detection mode entry mode. Each press of the DET MODE key steps through the choices of detection modes: AM, SAM, FM, FSK, CW, LSB, USB, and ISB. To select **FSK MODE**, press the **DET MODE** key repeatedly until **"FSK"** displays in the Detection Mode window as shown below:

The detection mode entry mode can be exited by pressing any other Auxiliary Parameter key, extinguishing the DET MODE key LED.

K.3.2.2 SELECTING FSK NORMAL/INVERTED POLARITY

After selecting the FSK detection mode, press the SPECIAL FUNCTION key (located in the lower center part of the front panel) repeatedly until the upper Auxiliary Parameter display appears as shown below:



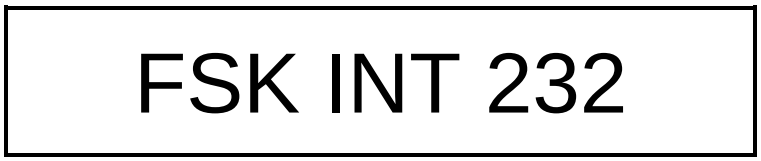
Rotate the Auxiliary Parameter Edit knob (located directly above the SPECIAL FUNCTION key) to switch between FSK Polarity Normal as shown above and FSK Polarity Inverted as shown below.

K.3.2.3 **SELECTING FSK FREQUENCY SHIFT**

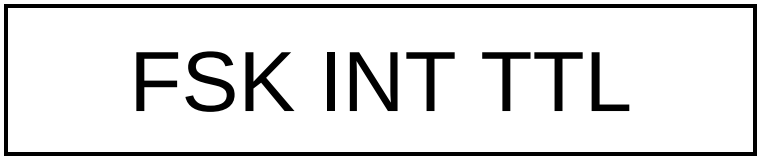
Press the SPECIAL FUNCTION key again and the FSK Frequency Shift Display will appear. As shown below "nnnn" is the frequency shift selected. Rotate the Auxiliary Parameter Edit knob to select either 60, 170, 200, 400, 600, 850, 1000, or 2000 Hz frequency shift.

K.3.2.4 **SELECTING RS-232 OR TTL OUTPUT**

Press the SPECIAL FUNCTION key again and the FSK Interface Display will appear as shown below:



Rotate the Auxiliary Parameter Edit knob to switch between the RS-232 interface as shown above and the TTL interface as shown below. This selects the output logic for FSK control signals output at TB1, terminal 9.



K.3.2.5 **SELECTING FSK BAUD RATE**

Press the SPECIAL FUNCTION key again and the FSK Baud Rate Display will appear. As shown below "nnnn" is the current selected baud rate. Rotate the Auxiliary Parameter Edit knob to select the baud rate. Selectable baud rates are 50, 75, 110, 150, 200, 300, 600, and 1200 baud.

K.3.2.6 **SELECTING THE FSK TUNING MODE**

Press the SPECIAL FUNCTION key again and the FSK Tuning Display will appear as shown below:

Rotate the Auxiliary Parameter Edit knob to switch between FSK Tuning OFF as shown above and FSK Tuning ON as shown below:

With FSK tuning ON, rotate the Tuning Wheel to tune the signal for a maximum indication on the tuning meter to achieve correct center frequency tuning of the FSK signal.

K.3.3 **REMOTE OPERATION**

In remote operation, the list of receiver commands is expanded to include commands, responses and messages necessary to operate the receiver in FSK mode. Familiarity with the receiver operation in remote control mode is assumed.

K.3.3.1 RECEIVER DEVICE MESSAGES

Receiver Device Messages are commands that affect the operational parameters of the receiver. With the FSK Option installed, additional Receiver Device Messages are available to operate the receiver in FSK mode. They are summarized in **Table K-1**.

Table K-1. Receiver Device Messages

Command	Response	Description
BDR nrf		Select the baud rate for FSK demodulation. Range: 0 to 7 Where: 0 - 50 baud 1 - 75 baud 2 - 110 baud 3 - 150 baud 4 - 200 baud 5 - 300 baud 6 - 600 baud 7 - 1200 baud
BDR?	BDR nr1	Request the current baud rate. Default: BDR 0 Example: BDR 4
DET nrf		Set the detection mode. Range: 1 - 8 Where: 1 - AM 2 - FM 3 - CW 4 - USB 5 - LSB 6 - ISB 7 - SAM 8 - FSK
DET?	DET nr1	Request the active detection mode. Reset: DET 1 Default: DET 1 Example: DET 4

Table K-1. Receiver Device Messages (Continued)

Command	Response	Description
FSA nrf		Set the frequency shift in the FSK detection mode. Range: 0 to 7 Where: 0 - 60 1 - 170 2 - 200 3 - 400 4 - 600 5 - 850 6 - 1000 7 - 2000
FSA?	FSA nr1	Request the frequency shift. Default: FSA 0 Example: FSA 4
KIN nrf		Select the FSK polarity output (mark and space). Range: 0, 1 Where: 0 - Normal 1 - Inverted
KIN?	KIN nr1	Request the current FSK polarity output. Default: KIN 0 Example: KIN 1
KOP nrf		Selects the logic level for FSK control output at TB1, terminal 9. Range: 0, 1 Where: 0 - 232 1 - TTL
KOP?	KOP nr1	Request the current FSK control logic setting. Default: KOP 0 Example: KOP 1
TAM nrf		Select the FSK tune on and off. Range: 0, 1 Where: 0 - Off 1 - On
TAM?	TAM nr1	Request the current FSK tuner setting. Default: TAM 0 Example: TAM 1