

**WJ-861X RECEIVER**

**APPENDIX I**

**WJ-861X 60 dB LOG VIDEO OPTION**

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November 1990

**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.

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## APPENDIX I

## 60 dB LOG VIDEO (LOG) OPTION

I.1 GENERAL DESCRIPTION

The 60 dB LOG Video option (LOG) provides a LOG Video output at the receiver rear panel. It supplies a DC voltage of from +0.4 Vdc to approximately +7.7 Vdc that varies with the strength of the received signal. Input signals at the noise floor of the receiver produce a +0.4 Vdc LOG Video output, with the output increasing by approximately .125 Vdc for each 1 dB increase in signal strength. At 60 dB above the receiver noise floor, the LOG Video output produces an output of +7.7 Vdc.

I.2 INSTALLATION PROCEDURE

Installation of the 60 dB LOG Video option is accomplished as illustrated in Figure I-3, using the following procedures:

1. Remove the top and bottom covers from the receiver.
2. From the top of the receiver, remove the standard AM Demodulator/IF Output Amplifier from the A3A16 slot on the RF/IF Motherboard.
3. Install the Type 726004-1 AM Demodulator/IF Output Amplifier (60 dB LOG Video) subassembly into the A3A16 slot.
4. From the under side of the receiver, install plug LOG-P1 of LOG W1 onto the XA16 connector pins of the RF/IF Motherboard (A3). Orient LOG-P1 such that pin 1 of LOG-P1 mates with XA16-pin 20 and pin 3 of LOG-P1 mates with XA16-pin 16.
5. Route LOG-W1 to the rear of the receiver and mount LOG-J1 of this cable to the receiver rear panel at the AUX connector mounting hole.
6. Install the LOG VIDEO OUT decal on the rear panel to identify the LOG-J1 output.
7. Installation of the LOG option may require realignment of the Type 726004-1 AM Demodulator/IF Output Amplifier (60 dB LOG Video) and the AGC Amplifier (A3A8) to provide the proper signal strength display. Refer to paragraphs 4.7.1.7 and 4.7.1.9 in Section IV of the receiver manual for the required alignment procedures.

I.3 OPERATION

The LOG VIDEO output is utilized when the receiver is in the manual gain control mode, with the RF/IF GAIN control set in the fully clockwise position. This will provide a full 60 dB of range at the output. When the receiver is in the AGC gain mode, an accurate output is provided from the receiver noise floor to 40 dB above noise. Signal levels greater than 40 dB above noise cause the AGC action to affect the receiver gain, thus affecting the LOG VIDEO output.

#### I.4 CIRCUIT DESCRIPTION

##### I.4.1 TYPE 726004-1 AM DEMODULATOR/IF OUTPUT AMPLIFIER (60 dB LOG VIDEO)

The reference designation for this subassembly is LOG-A1. Refer to **Figure I-3** for the Type 726004-1 AM Demodulator/IF Output Amplifier (60 dB LOG VIDEO) schematic diagram.

With the exception of the circuitry comprised of U5 through U8, this subassembly functions identically to the Type 724016-1 AM Demodulator described in **paragraph 3.3.2.15** of the receiver manual. The difference between subassemblies is in the LOG IF Amplifier components used to provide 60 dB of Log Video range.

The 21.4 MHz IF signal, provided by the input switching network of the subassembly, is taken from the wiper of potentiometer R5 and is provided via R62 and C60 to the LOG IF Amplifier strip, comprised of U5 through U7. U5 through U7 are all wideband log amplifiers. U5 and U6 each provide approximately 24 dB of gain and U7 provides approximately 13 dB of gain. The three amplifiers are then cascaded to provide an overall range greater than 60 dB. The amplified IF signal, at the output of each of these IF amplifiers, is output at pin 3 of the integrated circuit and directed to the input of the next stage. The output of the final stage (U7) is developed across the output load, C67 and R76. Pin 4 of each integrated circuit provides a dc bias current which varies logarithmically with the output level of its respective amplifier. These bias outputs are summed together by the summing network comprised of R66 through R70, R78 and RT1 and are then provided to U8 for voltage amplification. The summing network components, along with feedback resistors R72 and R73 set the gain of U8. From pin 6 of U8, the LOG IF Output is passed via R74 to connector pin 20 to provide the LOG video output to the required circuits.

#### I.5 PARTS LIST

## I.5.1 TYPE WJ-861XB/LOG

## REF DESIG PREFIX LOG

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision D				
A1	AM Demodulator/IF Output Amplifier (60 dB Log Video)	1	726004-1	14632	
FL1	Filter, Jack, EMI	1	1240-030-0060	72982	
J1	Part of FL1				
W1	Cable Assembly	1	380325-1	14632	
	Decal	1	180111	14632	

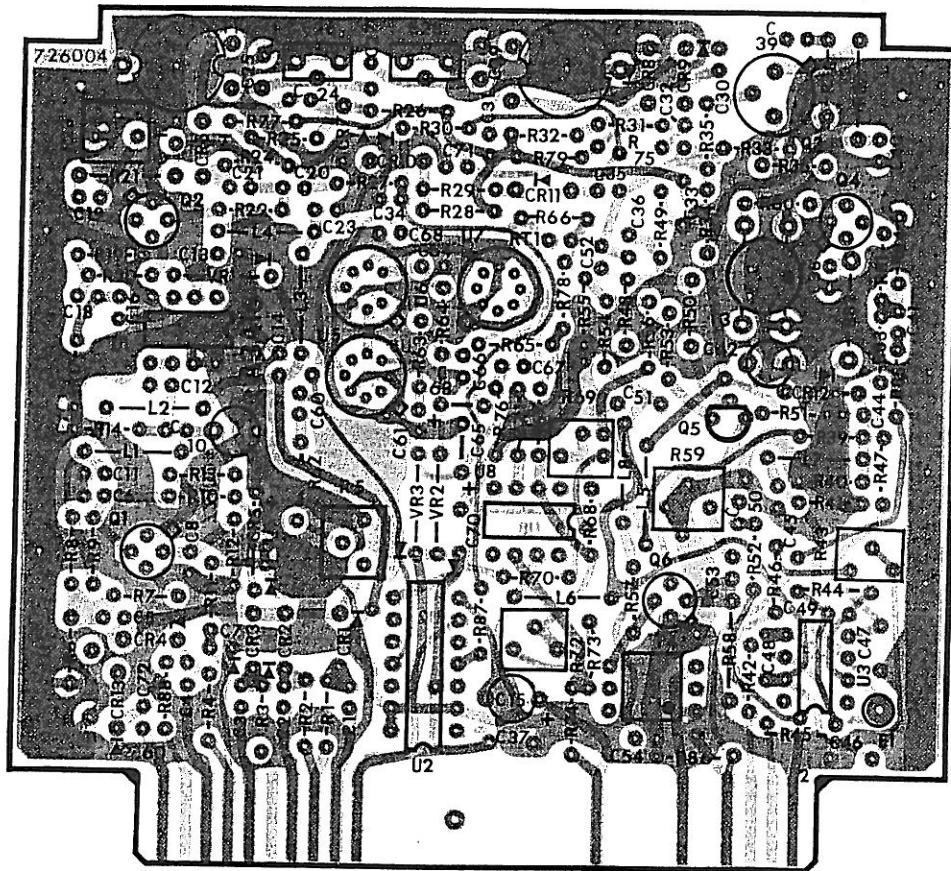


Figure I-1. Type 726004-1 AM Demodulator/IF Output Amplifier (60 dB LOG Video) (Option I - LOG), Location of Components



I.5.1.1 Type 726004-1 AM Demodulator/IF Output Amplifier  
(60 dB LOG Video)

REF DESIG PREFIX LOG-A1

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
C1	Revision F Capacitor, Ceramic, Disc: 4700 pF, 20%, 50 V	41	8121-050-651-472M	59660	
C2 Thru C8	Same as C1				
C9	Capacitor, Variable, Ceramic: 5-25 pF, 100 V, N750	1	518-000A5-25	59660	
C10 Thru C14	Same as C1				
C15	Capacitor, Electrolytic, Tantalum: 2.2 $\mu$ F, 20%, 35 V	1	196D225X0035JE3	56289	
C16 Thru C21	Same as C1				
C22	Not Used				
C23	Same as C1				
C24	Same as C1				
C25	Capacitor, Mica, Dipped: 91 pF, 2%, 500 V	2	CM04FD910G03	81349	
C26	Capacitor, Variable, Ceramic: 5-25 pF, 100 V, NP0	2	518-002A5-25	59660	
C27	Capacitor, Ceramic, Disc: 1.8 pF, $\pm$ 0.1 pF, 100 V	1	8101-100C0K0-189B	59660	
C28	Same as C26				
C29 Thru C31	Same as C1				
C32	Same as C1				
C33	Capacitor, Ceramic, Disc: 0.01 $\mu$ F, 20%, 50 V	2	34453-1	14632	
C34	Same as C1				
C35	Same as C1				
C36	Capacitor, Ceramic, Monolithic: 8.2 pF, $\pm$ .5 pF, 100 V	2	8101-100C0H0-829D	59660	
C37	Capacitor, Ceramic, Disc: 0.47 $\mu$ F, 20%, 50 V	4	34452-1	14632	
C38 Thru C41	Same as C1				
C42	Capacitor, Variable, Ceramic: 1-3 pF, 100 V	1	518-000A1-3	59660	
C43	Not Used				
C44	Capacitor, Ceramic, Disc: 4.7 pF, $\pm$ .25 pF, 100 V	3	8101-100C0H0-479C	59660	
C45	Same as C44				
C46	Same as C37				
C47	Same as C37				
C48	Capacitor, Ceramic, Disc: 0.1 $\mu$ F, 20%, 50 V	1	34475-1	14632	
C49	Same as C44				
C50	Same as C1				
C51	Same as C33				
C52	Same as C36				
C53	Same as C1				
C54	Same as C1				

## REF DESIG PREFIX LOG-A1

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
C55 Thru C59	Not Used				
C60	Same as C1				
C61	Same as C1				
C62	Not Used				
C63	Capacitor, Electrolytic, Tantalum: 22 $\mu$ F, 20%, 10 V	2	196D226X0010FE3	56289	
C64	Same as C1				
C65	Same as C63				
C66	Same as C1				
C67	Same as C1				
C68	Capacitor, Ceramic, Disc: 470 pF, 5%, 100 V	1	8121-100-C0G0-471J	59660	
C69	Not Used				
C70	Same as C37				
C71	Same as C1				
C72	Same as C1				
C73	Capacitor, Ceramic, Monolithic: 2200 pF, $\pm$ 2%, 100 V	1	200-100-NPO-222G	51642	
CR1	Diode	11	5082-3188	28480	
CR2 Thru CR4	Same as CR1				
CR5	Diode	1	1N462A	80131	
CR6 Thru CR11	Same as CR1				
CR12	Diode	1	5082-2800	28480	
CR13	Same as CR1				
L1	Coil, Fixed: 2.2 $\mu$ H, 10%	1	1025-28	99800	
L2	Coil, Fixed: 27 $\mu$ H, 10%	4	1025-54	99800	
L3	Same as L2				
L4	Same as L1				
L5	Same as L2				
L6	Coil, Fixed: 18 $\mu$ H, 10%	1	1025-50	99800	
L7	Coil, Fixed: 39 $\mu$ H, 10%	1	1537-56	99800	
L8	Same as L2				
Q1	Transistor	1	3N211	80131	
Q2	Transistor	3	2N2857	80131	
Q3	Transistor	1	2N5109	80131	
Q4	Same as Q2				
Q5	Transistor	1	2N3904	80131	
Q6	Same as Q2				
R1	Resistor, Fixed, Film: 3.3 k $\Omega$ , 5%, 1/8 W	8	CF1/8-3.3K/J	09021	

## REF DESIG PREFIX LOG-A1

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
R2 Thru R4	Same as R1				
R5	Resistor, Trimmer, Film: 100Ω, 10%, 1/2 W	1	62PAR100	73138	
R6	Resistor, Fixed, Film: 39 kΩ, 5%, 1/8 W	1	CF1/8-39K/J	09021	
R7	Resistor, Fixed, Film: 47Ω, 5%, 1/8 W	3	CF1/8-47 OHMS/J	09021	
R8	Resistor, Fixed, Film: 130 kΩ, 5%, 1/8 W	1	CF1/8-130K/J	09021	
R9	Resistor, Fixed, Film: 100 kΩ, 5%, 1/8 W	5	CF1/8-100K/J	09021	
R10	Resistor, Fixed, Film: 33 kΩ, 5%, 1/8 W	3	CF1/8-33K/J	09021	
R11	Resistor, Fixed, Film: 4.7 kΩ, 5%, 1/8 W	7	CF1/8-4.7K/J	09021	
R12	Resistor, Fixed, Film: 120Ω, 5%, 1/8 W	1	CF1/8-120 OHMS/J	09021	
R13	Resistor, Fixed, Film: 33Ω, 5%, 1/8 W	4	CF1/8-33 OHMS/J	09021	
R14	Resistor, Fixed, Film: 220Ω, 5%, 1/8 W	4	CF1/8-220 OHMS/J	09021	
R15	Not Used				
R16	Not Used				
R17	Resistor, Fixed, Film: 150Ω, 5%, 1/8 W	2	CF1/8-150 OHMS/J	09021	
R18	Not Used				
R19	Resistor, Fixed, Film: 6.8 kΩ, 5%, 1/8 W	4	CF1/8-6.8K/J	09021	
R20	Same as R17				
R21	Resistor, Fixed, Film: 750Ω, 5%, 1/4 W	1	CF1/4-750 OHMS/J	09021	
R22	Resistor, Fixed, Film: 100Ω, 5%, 1/8 W	4	CF1/8-100 OHMS/J	09021	
R23	Resistor, Variable, Film: 200Ω, 10%, 1/2 W	1	62PAR200	73138	
R24	Resistor, Fixed, Film: 2.7 kΩ, 5%, 1/8 W	2	CF1/8-2.7K/J	09021	
R25	Same as R10				
R26	Same as R9				
R27	Same as R1				
R28	Same as R1				
R29*	Resistor, Fixed, Film: 300Ω, 5%, 1/8 W	1	CF1/8-300 OHMS/J	09021	
R30	Same as R1				
R31	Same as R10				
R32	Same as R9				
R33	Same as R11				
R34	Same as R11				
R35	Resistor, Fixed, Film: 330Ω, 5%, 1/8 W	1	CF1/8-330 OHMS/J	09021	
R36	Resistor, Fixed, Film: 22Ω, 5%, 1/8 W	1	CF1/8-22 OHMS/J	09021	
R37	Resistor, Fixed, Film: 180Ω, 5%, 1/4 W	1	CF1/4-180 OHMS/J	09021	
R38	Resistor, Fixed, Film: 39Ω, 5%, 1/8 W	1	CF1/8-39 OHMS/J	09021	
R39	Resistor, Fixed, Film: 200 kΩ, 5%, 1/8 W	1	1/8-200K/J	09021	
R40	Resistor, Fixed, Film: 8.2 kΩ, 5%, 1/8 W	3	CF1/8-8.2K/J	09021	
R41	Same as R40				
R42	Resistor, Fixed, Composition: 470Ω, 5%, 1/8 W	3	RCR05G471JS	81349	

## REF DESIG PREFIX LOG-A1

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
R43	Resistor, Trimmer, Film: 50 k $\Omega$ , 10%, 1/2 W	1	62PR50K	73138	
R44	Resistor, Fixed, Film: 10 k $\Omega$ , 5%, 1/8 W	2	CF1/8-10K/J	09021	
R45	Same as R22				
R46	Resistor, Fixed, Film: 18 k $\Omega$ , 5%, 1/8 W	1	CF1/8-18K/J	09021	
R47	Same as R7				
R48	Same as R44				
R49	Same as R19				
R50	Same as R22				
R51	Same as R42				
R52	Same as R13				
R53	Same as R22				
R54	Same as R19				
R55	Resistor, Fixed, Film: 22 k $\Omega$ , 5%, 1/8 W	1	CF1/8-22K/J	09021	
R56	Same as R19				
R57	Same as R14				
R58	Resistor, Fixed, Film: 1.0 $\Omega$ , 5%, 1/4 W	1	CF1/4-1.0K/J	09021	
R59	Resistor, Trimmer, Film: 500 $\Omega$ , 10%, 1/2 W	1	62PAR500	73138	
R60	Not Used				
R61	Not Used				
R62	Same as R7				
R63	Resistor, Fixed, Film: 10 $\Omega$ , 5%, 1/8 W	3	CF1/8-10 OHMS/J	09021	
R64	Same as R63				
R65	Same as R63				
R66	Same as R14				
R67	Same as R11				
R68	Resistor, Fixed, Film: 910 $\Omega$ , 5%, 1/8 W	1	CF1/8-910 OHMS/J	09021	
R69	Resistor, Trimmer, Film: 5 k $\Omega$ , 10%, 5 W	1	62PAR5K	73138	
R70	Same as R40				
R71	Resistor, Fixed, Film: 2.2 k $\Omega$ , 5%, 1/8 W	1	CF1/8-2.2K/J	09021	
R72	Resistor, Trimmer, Film: 10 k $\Omega$ , 10%, 1/2 W	1	62PAR10K	73138	
R73	Resistor, Fixed, Film: 15 k $\Omega$ , 5%, 1/8 W	1	CF1/8-15K/J	09021	
R74	Same as R13				
R75	Same as R24				
R76	Same as R11				
R77	Same as R9				
R78	Resistor, Fixed, Film: 270 $\Omega$ , 5%, 1/8 W	1	CF1/8-270 OHMS/J	09021	
R79	Same as R9				
R80	Same as R13				
R81	Same as R42				
R82	Resistor, Fixed, Film: 330 $\Omega$ , 5%, 1/4 W	1	CF1/4-330 OHMS/J	09021	
R83	Same as R11				

## REF DESIG PREFIX LOG-A1

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
R84	Same as R11				
R85	Same as R14				
R86	Resistor, Fixed, Film: 56 $\Omega$ , 5%, 1/8 W	1	CF1/8-56 OHMS/J	09021	
R87	Resistor, Fixed, Film: 680 $\Omega$ , 5%, 1/8 W	1	CF1/8-680 OHMS/J	09021	
R88	Same as R1				
RT1	Resistor, Thermal: 1 k $\Omega$	1	2D102	50157	
RT2	Thermistor: 100 k $\Omega$ , $\pm$ 10%	1	4D101	50157	
T1	Transformer	2	390452-1	14632	
T2	Same as T1				
T3	Transformer	1	22295-71	14632	
T4	Transformer	1	T4-1	15542	
U1	Integrated Circuit	2	SL1611C/DP	52648	
U2	Integrated Circuit	1	DG301ACJ	17856	
U3	Integrated Circuit	2	LM318N	27014	
U4	Not Used				
U5	Integrated Circuit	2	SL1523C	52648	
U6	Same as U5				
U7	Integrated Circuit	1	SL1521C	52648	
U8	Same as U3				
VR1	Voltage Regulator: 8.2 V	2	1N756A	80131	
VR2	Voltage Regulator: 4.3 V	2	1N749A	81131	
VR3	Same as VR1				
VR4	Same as VR2				

