WJ-861X RECEIVER

APPENDIX J

WJ-861XB(S1) RECORD LOGGING (RLOG) OPTION

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

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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

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APPENDIX J

RECORD LOGGING (RLOG) OPTION

J.1 GENERAL DESCRIPTION

The Record Logging (RLOG) option provides the WJ-861XB Receiver with the capability of logging signal contacts on an external line printer or on a computer terminal. RLOG allows the generation of a running log of signals encountered. In addition to the frequency of the signal contacted, the receiver operating parameters, selected during the signal contact, are also provided. If the receiver is equipped with the Real-Time Clock (RTC) option, the time of day of signal contact is also provided as an item in the running log. Three modes of logging are available. Logging may consist of:

- Front Panel Log
- Manual Log
- Auto Log

The front panel log provides an indication of the receiver front panel operating parameters. Manual logging allows the receiver to step or to scan through the programmed frequencies stored in memory, to halt, and to log the data when a signal exceeds the set COR level. Auto logging allows the receiver to step or to scan until the receiver encounters a signal greater than COR, to pause momentarily, to log the data, and to resume its selected operation.

Two DIP switches (S1 and S2), located on the RLOG assembly, control the data byte structure (switch S1) and the baud rate (switch S2). For the setting of these switches, refer to **Table J-1** for the setting of switch S1 and refer to **Table J-2** for the setting of switch S2.

These switches should be set prior to inserting the RLOG assembly into the receiver. If these switches are set after the RLOG assembly is installed in the receiver, power must be cycled off and on again before the new switch settings are recognized.

J.2 INSTALLATION

When field installing the RLOG option into the receiver, the following material are required:

Receiver	Description	Part No.	Qty.
WJ-8617B	RLOG Interface	796617-1	1
WJ-8618B	Cable Assembly	380334-1	1
	RLOG Decal	180148-1	1

Table J-1 Switch S1 Data Byte Structure

Switch Position						Selected Structure		
1	2	3	4	5	6	Data Bits	Parity	Stop Bits
0	0	0	X	X	X	8	Even	1
1	0	0	X	X	X	8	Odd	1
0	1	0	X	X	X	8		1
1	1	0	X	X	X	8		2
0	0	1	X	X	X	7	Odd	1
1	0	1	X	X	X	7	Even	1
0	1	1	X	X	X	7	Odd	2
1	1	1	X	X	X	7	Even	2
X	X	X	X	X	*0	Automatic Logging Selected		
X	X	X	X	X	*1	Manual Logging Selected		

NOTES:
1 = CLOSED
0 = OPENED
X = DOESN'T CARE
* Required only with Type 796109-X Microprocessors

Table J-2. Switch S2 Baud Rate Selection

Switch Position							Baud Rate (in Hz)
1	2	3	4	5	6	7	
1	0	0	0	0	0	0	300
0	1	0	0	0	0	0	600
0	0	1	0	0	0	0	1200
0	0	0	1	0	0	0	2400
0	0	0	0	1	0	0	4800
0	0	0	0	0	1	0	9600
0	0	0	0	0	0	1	19200

NOTES:
1 = CLOSED
0 = OPEN

Depending on the WJ-861XB Receiver configuration and options installed, a multipin connector may be used for RLOG or a triaxial connector may be used.

J.2.1 RLOG OPTION INSTALLATION WITH MULTI-CONNECTOR

To install the RLOG option into the WJ-8617B Receiver using the multipin connector (J5), proceed according to the following steps:

1. Turn the receiver power off and remove the receiver top protective cover that is secured by quarter-turn fasteners.

2. Remove option assemblies installed in option slots 3 and 4 of the receiver, if necessary, to allow access to multipin connector J5 located on the rear panel.

3. Refer to **Figure J-1** for the installation of the three pins of the RLOG cable (RLOG-W1) into connector J5. Insert the three pins into the back side of connector J5. Press the pins in straight and apply firm pressure until the pins are properly seated in the connector. Insert the three wires according to the following steps:

   a. Insert the Orange wire into pin 8 of connector J5.
   b. Insert the Brown wire into pin 7 of connector J5.
   c. Insert the Red wire into pin 6 of connector J5.

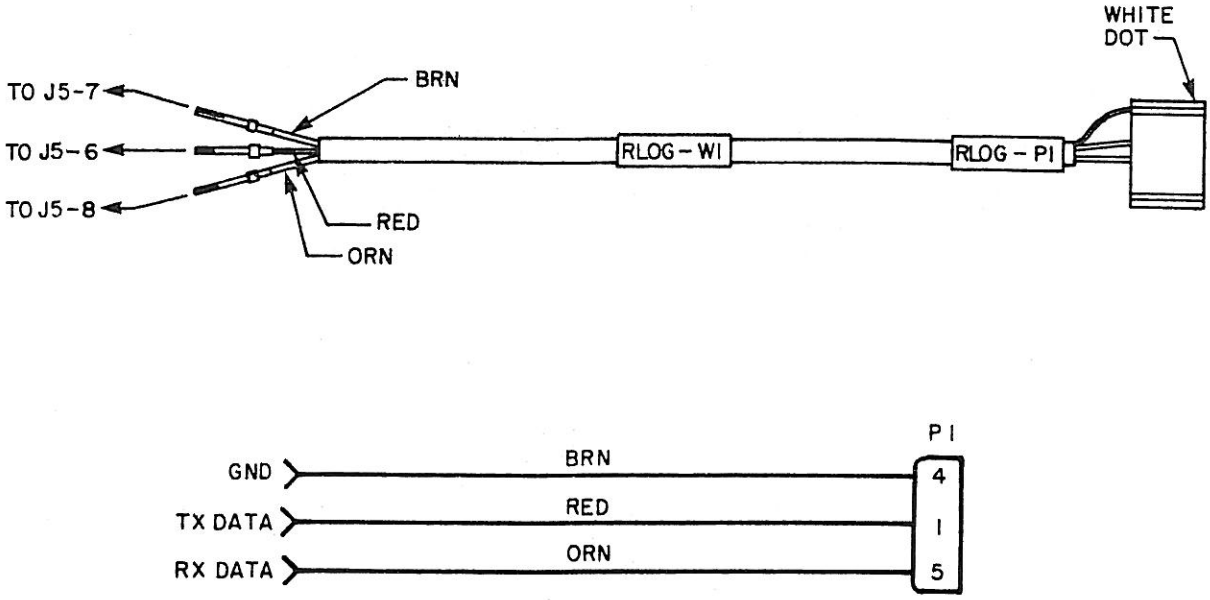

Figure J-1. RLOG Cable Pin Configuration

4. With the pins properly installed into connector J5, connect P1 of the RLOG cable to J1 of the RLOG assembly. Pin 1 of P1 aligns with pin 1 of J1 on the RLOG assembly.

5. Refer to **Table J-1** and **Table J-2** for the setting of the two DIP switches on the RLOG assembly. Set these switches to ensure proper operation of the RLOG, as required by the printer or terminal used.

6. Insert the Type 796619-1 RLOG assembly into Option Slot 5 of the Digital Motherboard (A5) and connect the RLOG cable to J1 of the RLOG assembly. Pin 1 of the RLOG assembly mates with pin 1 of the connector receptacle.

7. Replace EPROM U4 on Microprocessor A5A3 in order to support the addition of the RLOG option.

NOTE

When ordering the RLOG field installation kit the following information should have been supplied to Watkins-Johnson Company to ensure that the proper EPROM was supplied.

- Receiver Type
- Receiver Serial Number
- Software Revision Level (written on the Microprocessor EPROMs U4 or U5)
- Options Installed
- IF Bandwidths Installed

8. Replace and properly secure the top protective cover.

9. If the receiver front panel is not etched with AUTO LOG and MAN LOG above the STO and MAN pushbuttons, place the RLOG decal (part 180148-1) above the STO pushbutton.

J.2.2 INSTALLING THE RLOG OPTION WITH A TWINAXIAL CONNECTOR

To install the RLOG option with a twinaxial connector perform the following steps:

1. Turn the receiver power off and remove the receiver top protective cover that is secured by quarter-turn fasteners.

2. Remove option assemblies installed in option slots 3 and 4 of the receiver, if necessary, to allow access to multipin connector J5 located on the rear panel.

3. On the receiver rear panel, remove the hex retaining nut from the SCAN OUT connector (J5) from the outside of the receiver. Then remove the two Phillips-head screws securing the decal to the rear panel and remove the SCAN OUT decal.

4. Pull the ASO cable inside the receiver main chassis. Secure the ASO cable to the rear panel of the receiver with a tie wrap or other suitable fastener.

5. Insert the RLOG connector J1 through the connector hole in the receiver rear panel.

6. Slide the RLOG decal (part 290374-1) over the connector and secure the decal to the rear panel with the two screws.

7. Connect P1 of the RLOG cable to connector J1 of the Type 796261-3 Asynchronous Interface assembly.

8. Insert the Type 796617-1 RLOG assembly into Option Slot 5 of the Digital Motherboard (A5) and connect the RLOG cable to J1 of the RLOG assembly. Pin 1 of the RLOG assembly mates with pin 1 of the connector receptacle.

9. Replace EPROM U4 on Microprocessor A5A3 in order to support the addition of the RLOG option.

NOTE

When ordering the RLOG field installation kit the following information should have been supplied to Watkins-Johnson Company to ensure that the proper EPROM was supplied.

- Receiver Type
- Receiver Serial Number
- Software Revision Level (written on the Microprocessor EPROMs U4 or U5)
- Options Installed
- IF Bandwidths Installed

10. Replace and properly secure the top protective cover.

J.2.3 RLOG EXTERNAL LOGGING DEVICE INTERFACE

The 861X/RLOG option interfaces with RS-232 compatible line printers or computer terminals. The RLOG option is configured as a data terminal device (DTE) to provide a one way data link from the receiver to the external logging device. **Figure J-2** illustrates a typical interface cable required for connecting the receiver to a line printer. Connect the TX DATA line from the receiver to the RX DATA line of the printer and connect the receiver RX DATA line to the printer TX DATA line. Ground the cable shield at the receiver end and the printer end. A

Type 205204-1 accessory item (AI-6) is available that mates receiver connector J5 with a standard 25-pin D-Type connector. Refer to **Figure J-2** for an illustration of a typical receiver-to-printer interconnection.

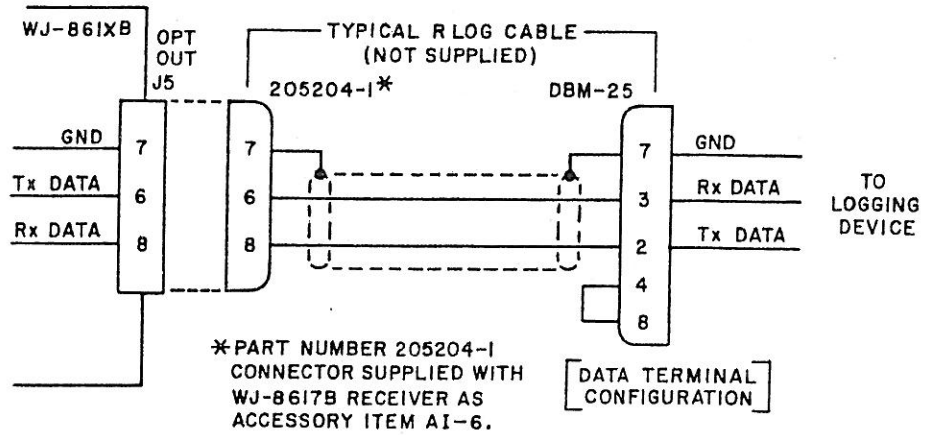

Figure J-2. Typical Receiver/Printer Interconnect Cable

J3. OPERATING PROCEDURES

The following paragraphs describe the various modes of RLOG operation and the steps required to operate the receiver RLOG mode of operation.

NOTE

If the receiver memory is lost, the default RLOG operating mode is AUTO LOG. Clearing the receiver memory (pressing the CLR pushbutton three times) does not change the selected RLOG operating mode.

J.3.1 RLOG DUMP

An RLOG Dump allows the receiver operating parameters to be logged by the external device connected to J5 of the receiver. The following steps are required to initiate an RLOG Dump.

1. Press the FUNCTION key (F ↑) to place the receiver front panel into the upper case operating mode. The LED on the FUNCTION key is illuminated in the upper case mode.

2. Press the MAN pushbutton to dump the receiver operating parameters. These parameters include:

Parameter	Display	Range
Tuned Frequency	FREQ	20.0000-500.0000
Time	TIME	00:00:00-23:59:59
Signal Strength	SS	-127 to 000
IF Bandwidth Selected	BW	1-10
Detection Mode Selected	DET	AM, FM, CW, PL
Antenna Selected	ANT	1 or 2
AGC Status	AGC	ON or OFF
AFC Status	AFC	ON or OFF
COR Setting	COR	00-40
RF IF Gain Level	RFIFGN	000-255
BFO Frequency	BFO	+7.99--7.99
% FM Modulation	FM	000-100
% AM Modulation	AM	000-100
Modulation	MOD	AM, FM, CW, PL, ??

The RLOG Dump feature allows a single dump of the receiver operating parameters. This may be performed even though the receiver is not in the step or scan mode of operation. After an RLOG Dump has been performed, the receiver front panel returns to lower case operation.

J.3.2 MANUAL LOGGING

Manual logging is performed during the step or scan mode. Manual logging allows the receiver to step or to scan through the operator defined memory channels that have been stored in the receiver memory one time and then to halt. Manual logging performs the selected operation (step or scan) only one time. The receiver either steps through the selected frequencies once or scans the selected frequency spectrum once and then halts. If during manual logging a signal is encountered that exceeds the COR level stored in memory, the step or scan is halted, the data is logged, and the receiver remains on the signal until the COR threshold is not exceeded or until the scan or step is resumed by pressing the STEP or SCAN Key.

Select manual logging by performing the following steps:

1. Press the FUNCTION (F↑) key

2. Observe the LEDs above the STO (AUTO LOG) and MAN (MAN LOG) pushbuttons.

3. If neither LED is illuminated, press the STO key to enter the manual logging mode of operation. Pressing the STO key returns the front panel to lower case operation.

4. Verify that the manual logging mode of operation is selected by pressing the FUNCTION key and observing that the LED on the MAN (MAN LOG) key is illuminated.

5. Press the STEP or SCAN key to begin the step or scan operation. For either operation to be performed, parameters must have been previously stored in the memory channels.

If the step operating mode is selected by pressing the STEP key, the following information is logged to the external device before the step operation is initiated:

- **STEP**
- **FREQ**
- **BW**
- **DET**
- **ANT**
- **AGC**
- **AFC**
- **COR**
- **RFIFGN**
- **BFO**

Using this information as a header, each step frequency and operating parameter is listed for the step memory channels. A separate line of data is logged for each step memory channel, using the headers at the top of the columns. Thus, if five memory channels are being stepped through, there would be five rows of data following the step logging header listed above.

If the scan operating mode is selected by pressing the SCAN key, the following information is logged to the external device before the scan operation is initiated:

- **STRT-FRQ**
- **STOP-FRQ**
- **BW**
- **DET**
- **ANT**
- **AGC**
- **AFC**
- **COR**
- **RFIFGN**
- **BFO**

If a signal is encountered in either mode of operation that exceeds the set COR threshold level, the receiver halts and a log is sent to the external device. The following information is sent to the logging device:

- **FREQ**
- **TIME**
- **SS**
- **FM**
- **AM MOD**

The receiver remains locked onto the frequency until either the receiver operation is resumed by manually pressing the STEP or SCAN pushbutton or the signal level drops below the set COR threshold level. Either of these conditions will cause the receiver to resume its mode of operation. If no signal activity is encountered that exceeds the COR set level, the receiver halts at the end of its step or scan operation. Another step or scan is initiated by pressing the STEP or SCAN pushbutton.

J.3.3 AUTO LOGGING

Auto logging allows the receiver to step or scan through the selected frequencies or frequency range in the search for signal activity. If a signal that is greater than the set COR threshold is encountered, the receiver halts its selected operation, logs the data, and resumes its operation. A running log is generated of each signal contact.

Auto logging is selected by performing the following steps:

1. Press the FUNCTION (F ↑) key
2. Observe the LEDs above the STO (AUTO LOG) and MAN (MAN LOG) pushbuttons.
3. If neither LED is illuminated, press the STO key to enter the manual logging mode of operation. Pressing the STO key returns the front panel to lower case operation.
4. Press the FUNCTION key again and verify the LED on the MAN key is illuminated. Press the STO key again to enter the auto logging mode of operation.
5. Verify the auto logging mode of operation is selected by pressing the FUNCTION key and observing that the LED on the MAN (MAN LOG) key and STO (AUTO LOG) keys are illuminated.
6. Press the STEP or SCAN key to begin the step or scan operation. For either operation to be performed, parameters must have been previously stored in the memory channels.

The logging headers used and the data logged are identical as those for the manual logging operation. However, auto logging resumes its selected mode of operation after the signal data has been logged. The step or scan operation will be continuously repeated, only pausing to log encountered signal data.

The setting of the DWELL control knob varies the rate at which the selected scan or step operation is performed.

J.4 CIRCUIT DESCRIPTION

J.4.1 TYPE 796617-1 RLOG INTERFACE

The Type 796617-1 RLOG Interface assembly installs into Option Slot 5 of the Digital Motherboard (A5). Refer to **Figure J-4** for the schematic diagram of the Type 796617-1 RLOG Interface assembly. NOTE 2 on the schematic lists the differences between existing versions of the RLOG Interface.

Control of the RLOG Interface assembly is performed by the receiver Microprocessor (A5A3) using the Address bus lines (A0, A2, and A12) and the data bus lines (D0-D7). The address lines are used to enable different outputs from decoder/demultiplexer U3. Depending on the address bus status, a different output of U3A or U3B is enabled. Enabling the different outputs of these devices allows the associated device to be addressed. When addressed,

the device provides an output to the data bus. Enabling HEX buffer U12 allows the status of data byte structure switch S1 to be applied to the data bus. This allows the Microprocessor and asynchronous communications interface adapter (ACIA) U8, to know the selected data structure.

Enabling U8 allows parallel data on the data bus to be converted to serial form for transmission to an external device. The rate at which data is transferred between the receiver and the external device is controlled by the setting of jumper JP1.

A logging operation performs the following sequence of events. The microprocessor applies a low to connector P1 pin 41, the Enable line (OE*). This applies a low to decoder/demultiplexer U3. U3A and U3B decode address lines A2 and A12. U3A provides a low chip select signal to U8, which allows it to read the data on its data input lines. U3A's low output signal, at pin 5, enables HEX buffer U3 to output its contents. This data constitutes the data byte structure, which is configured by setting S1. The low output from U3 is applied to HEX buffer U12 and to ACIA U8.

After addressing the RLOG assembly, data is applied to the data bus (D0-D7). The logic level of the read/write line (connector P1 pin 14) determines the direction of data on the data bus. When this line is High, the data is read from U8 and when the line is low, data is written to U8. With this line low, data on the data bus is transferred into U8 at the clock rate determined by the frequency of DBE (connector P1 pin 16). U8 converts the parallel data from the data bus into serial form for transmission. Serial data from U8 is applied out pin 6, across jumperwire 1 (JW1) and inverted through line driver U2 to pin 1 (TX DATA) of connector J1. Line driver U2 is used to convert the logic data "1" to an output less than -3 Vdc and converts the logic "0" to an output greater than +3 Vdc for use by the external printer.

The rate at which data is transmitted is determines by the setting of jumper JP1. Jumper JP1 determines the baud rate. Baud rates are selectable from 150 to 19.2K. The output from 4.9152 crystal oscillator Y1 is applied to the oscillator input of CMOS clock generator U1. U1 provides a buffered 4.9152 MHz output frequency. This frequency is applied to the clock input of binary counter U4.

Binary counter U4 divides the input frequency by different rates to allow the different baud rate selections, determined by the setting of DIP switch S2. The input frequency is divided by: 2, 4, 8, 16, 32, 64, 128, and 256 for baud rates between 9600 and 150. U8 divides the clock input frequency at pins 3 and 4 by a factor of 64 to produce the baud rates between 150 and 19.2K. The selected baud rate determines the rate at which data is transmitted to the external device attached to connector J1.

U8 sets the interrupt request line (IRQ) low when the internal transmit data register is empty or when the data carrier detect line is high. By setting the IRQ line low, the microprocessor unit operation is interrupted. The Microprocessor then can poll the interrupts to determine what condition or device set the interrupt. When the transmit data register empty (TDRE) condition occurs, additional data may be applied to U8.

J.5 PARTS LISTS

J.5.1 **TYPE 861XB(S1)/RLOG, LOGGING OPTION** REF DESIG PREFIX **RLOG**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision B				
RLOG-A1	RLOG Interface	1	796617-1	14632	
RLOG-P1	Connector, Receptacle	1	102241-6	00779	
RLOG-W1	Cable Assembly	1	380334-1	14632	
RLOG	RLOG Decal	1	180148-1	14632	

J.5.1.1 **Type 796617-1 RLOG, Interface**

REF DESIG PREFIX RLOG - A1

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
	Revision C1				
C1	Capacitor, Ceramic, Disc: .1 µF, 20%, 50 V	7	34475-1	14632	
C2	Capacitor, Ceramic, Monolithic: 18 pF, 2%, 50 V	2	100-100-NPO-180G	51642	
C3	Same as C2				
C4	Capacitor, Electrolytic, Tantalum: .47 µF, 10%, 35 V	2	CS13BF474K	81349	
C5	Same as C1				
C6	Same as C4				
C7	Capacitor, Ceramic, Monolithic: 100 pF, 2%, 100 V NPO	1	200-100-NPO-101G	51642	
C8	Capacitor, Ceramic, Monolithic: 30 pF, 2%, 100 V NPO	2	150-100-NPO-300G	51642	
C9	Same as C8				
C10	Capacitor, Ceramic, Disc: 1 µF, 20%, 100 V	3	RPE114-Z5U105M100V	72982	
C11	Capacitor, Electrolytic, Tantalum: 220 µF, 20%, 10 V	1	CS13BC227K	81349	
C12 Thru C16	Same as C1				
C17	Capacitor, Ceramic, Disc: .01 µF, 20%, 50 V	6	34453-1	14632	
C18 Thru C22	Same as C17				
C23	Same as C10				
C24	Same as C10				
CR1	Diode	2	1N746A	80131	
CR2	Same as CR1				
J1	Header	1	102203-5	00779	
J2	Connector, Receptacle	1	65610-116	22526	
J3	Connector	1	1010-7511-001	19505	
J4	Header	1	102203-1	00779	
JP1	Connector, Plug	1	ML-100S	51167	
JW1*	Wire, Electrolytic, Buss	AR	8021 22 AWG BUSSWIRE	70903	
JW2*	Same as JW1				
JW3*	Not Used				
R1	Resistor, Fixed, Film: 1.0 kΩ, 5%, 1/8 W	1	CF1/8-1.0K/J	09021	
R2	Resistor, Fixed, Film: 15 kΩ, 1/8 W	2	CF1/8-15K/J	09021	
R3	Same R2				
R4	Resistor, Fixed, Film: 330 Ω, 5%, 1/4 W	1	CF1/4-330 OHMS/J	09021	
R5	Resistor, Fixed, Film: 10 kΩ, 1/8 W	2	CF1/8-10K/J	09021	
R6	Not Used				
R7	Resistor, Fixed, Film: 4.7 kΩ, 5%, 1/8 W	1	CF1/8-4.7K/J	09021	
R8	Resistor, Fixed, Film: 47 kΩ, 5%, 1/8 W	3	CF1/8-47K/J	09021	
R9	Same as R5				

REF DESIG PREFIX **RLOG - A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
R10	Resistor, Fixed, Film: 3.9 kΩ, 5%, 1/8 W	1	CF1/8-3.9K/J	09021	
R11	Resistor, Fixed, Film: 56 kΩ, 5%, 1/8 W	2	CF1/8-56K/J	09021	
R12	Same as R8				
R13	Resistor, Fixed, Film: 68 kΩ, 5%, 1/8 W	1	CF1/8-68K/J	09021	
R14	Resistor, Fixed, Film: 33 kΩ, 5%, 1/8 W	1	CF1/8-33K/J	09021	
R15	Resistor, Fixed, Film: 22 kΩ, 5%, 1/8 W	3	CF1/8-22K/J	09021	
R16	Same as R15				
R17	Resistor, Fixed, Film: 100 kΩ, 5%, 1/8 W	2	CF1/8-100K/J	09021	
R18	Same as R15				
R19	Same as R11				
R20	Same as R8				
R21	Same as R17				
R22	Resistor, Fixed, Film: 100 Ω, 5%, 1/8 W	1	CF1/8-100 OHMS/J	09021	
S1	Switch, Dip	1	76PSB08S	81073	
TP1	Pin, Test Point	8	460-2976-02-0400	71279	
TP2 Thru TP8	Same as TP1				
U1	Integrated Circuit	1	ICM 7209-1-PA	32293	
U2	Integrated Circuit	1	SN75150P	01295	
U3	Integrated Circuit, DCDR	1	MM74HCT139N	27014	
U4	Integrated Circuit, Center	1	MM74HC4040N	27014	
U5	Integrated Circuit, Buffer	1	MM74HCT04N	27014	
U6	Integrated Circuit	1	SN75154N	01295	
U7	Not Used				
U8	Integrated Circuit	1	MC68B50P	04713	
U9	Not Used				
U10	Integrated Circuit	1	MM74HCTOON	27014	
U11	Not Used				
U12	Integrated Circuit, Latch	1	MM74HCT373N	27014	
U13	Resistor, Nework: 47 Ω	1	4310R-101-473	80294	
U14	Integrated Circuit	1	MM80C98N	27014	
U15	Not Used				
U16	Integrated Circuit	1	MC1458N	18324	
Y1	Crystal, Quartz: 4.91520 MHz	1	MP042	75378	
T2	Not Used				

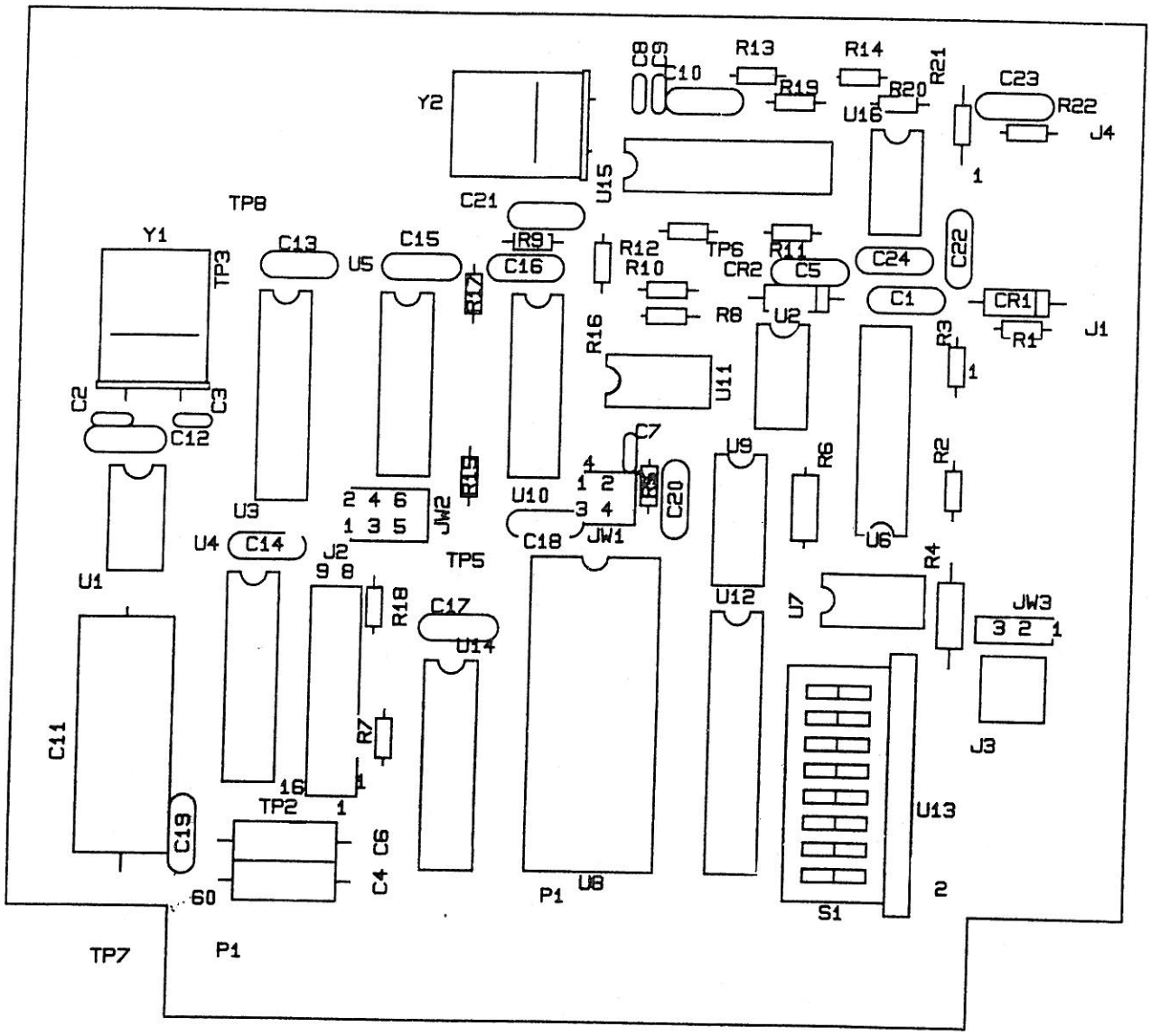

Figure J-3. Type 796617-1 RLOG, Interface (Option J - RLOG), Location of Components