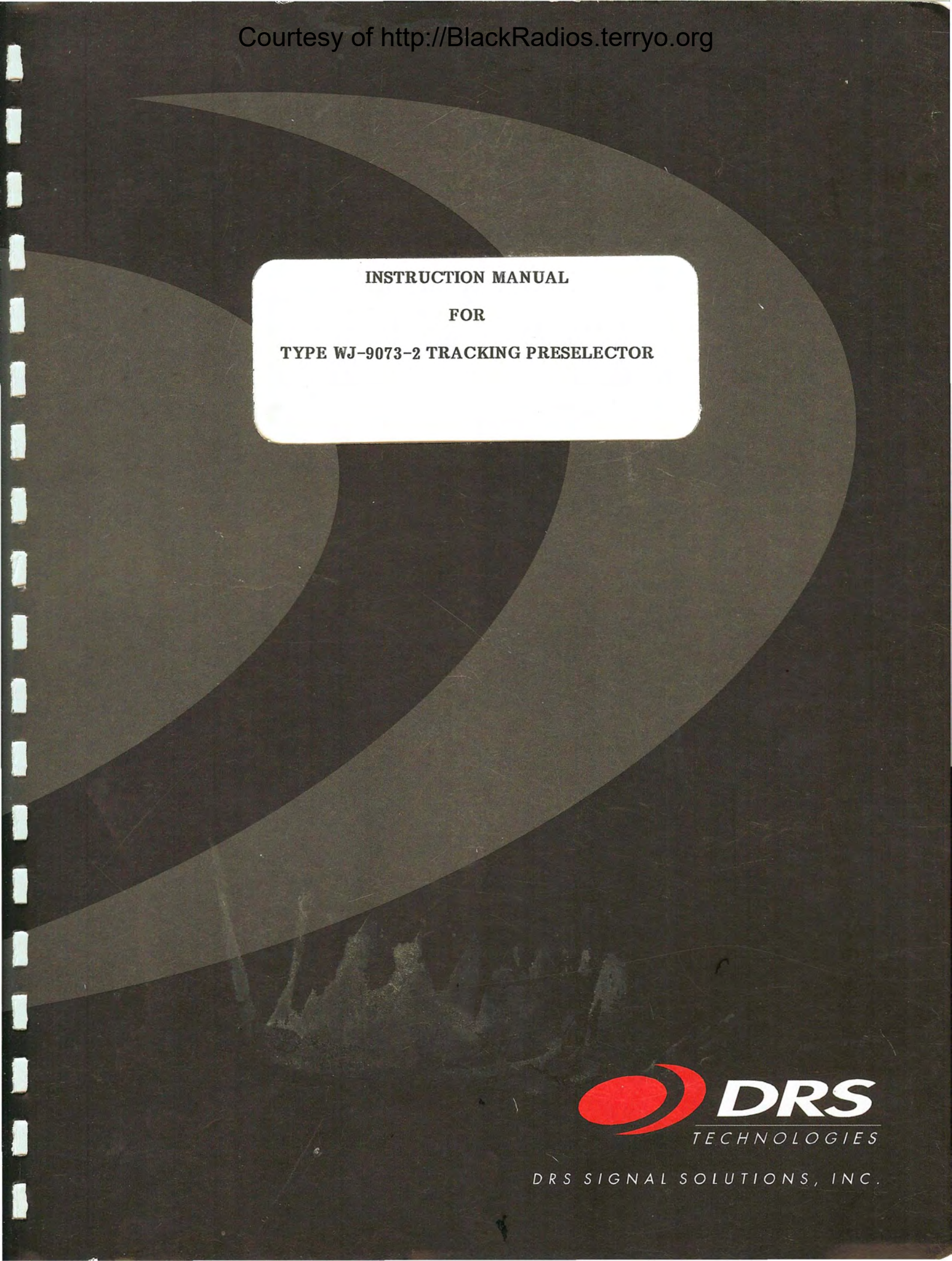
INSTRUCTION MANUAL

FOR

TYPE WJ-9073-2 TRACKING PRESELECTOR



DRS TECHNOLOGIES

DRS SIGNAL SOLUTIONS, INC.

INSTRUCTION MANUAL

FOR

TYPE WJ-9073-2 TRACKING PRESELECTOR

Watkins-Johnson Company
700 Quince Orchard Road
Gaithersburg, Maryland 20878

6/83

WARNING

This equipment employs voltages which are dangerous and may be fatal if contacted. Extreme caution should be exercised in working with the equipment with any of the protective covers removed.

TABLE OF CONTENTS

SECTION I

GENERAL DESCRIPTION

SECTION II

INSTALLATION AND OPERATION

SECTION III

REPLACEMENT PARTS LIST

SECTION IV

SCHEMATIC DIAGRAMS

TABLE OF CONTENTS (Cont'd)

LIST OF TABLES

LIST OF ILLUSTRATION

SECTION I

GENERAL DESCRIPTION

SECTION I

GENERAL DESCRIPTION

1.1 ELECTRICAL CHARACTERISTICS

The WJ-9073-2 Tracking Preselector is intended for use with WJ-8617B and WJ-8618B Receivers to provide additional rejection of undesired signals that could cause intermodulation distortion within the receiver. It covers a 20 to 1100 MHz frequency range in five frequency bands and continuously tunes with the receiver to maintain a center frequency equal to the tuned frequency of the receiver. The 20 to 500 MHz frequency range is covered in four bands of 20 to 48 MHz, 48 to 120 MHz, 120 to 245 MHz, and 245 to 500 MHz. Each band is comprised of a 2-pole varactor tuned filter that maintains a 3 dB bandwidth of 10 ±3% of the receiver's tuned frequency. The 500 to 1100 MHz frequency range is covered in one band consisting of a single 2-pole varactor tuned filter. This filter maintains a 3 dB bandwidth of 15 ±3% of the receiver tuned frequency.

Two antenna inputs are provided to permit flexible antenna configurations. A single antenna, connected at the ANTENNA 1 input, can be used to cover the entire 20 to 1100 MHz range, or the frequency range can be covered using two antennas. Using two antennas, the lower frequency antenna connects to the ANTENNA 1 input and the higher frequency antenna connects to the ANTENNA 2 input. Antenna switching occurs automatically as the receiver tunes past a predetermined point, as preset at the ANTENNA 1 - ANTENNA 2 SWITCHOVER FREQUENCY thumbwheel switches on the front panel. The ANTENNA 1 - ANTENNA 2 SWITCHOVER FREQUENCY control permits the switching frequency to be preset at any point between 20 and 990 MHz and is set in 10 MHz and 100 MHz increments. As the receiver tunes past the preset, switching automatically occurs.

An amplifier with a variable output level, contained in the WJ-9073-2 Tracking Preselector, provides up to 19 dB of gain to compensate for cable loss when the antenna and receiver are separated by a considerable length of RF cable. It can be set for a flat gain across the 20 to 1100 MHz frequency range, or the gain at 20 MHz and at 500 or 1100 MHz can be set individually to provide a gain slope that matches the attenuation verses frequency characteristics of the RF cable used.

Control of preselector tracking, band switching, antenna switching, and gain is provided by an internal microprocessor. It receives tuning data from the receiver and uses this data to select the proper preselector band and tunes the bandpass filter center frequency to the receiver tuned frequency. The receiver data is also utilized to select the appropriate antenna input and set the output gain, as determined by the preselector front panel controls.

1.2 MECHANICAL CHARACTERISTICS

The WJ-9073-2 Tracking Preselector mounts in a standard 19-inch equipment rack. It occupies 1.75 inches of vertical rack space and extends 19 inches into the rack. The main chassis, top cover and internal compartments are constructed of aluminum. A black bezel, etched with control markings is mounted to the front panel. All operating controls and indicators mount to, or extend through the front panel. The POWER ON/OFF switch, POWER ON indicator, GAIN switch, and SWITCHOVER FREQUENCY control mount to the front panel

and are wired to the appropriate subassemblies within the unit. Two GAIN controls mount on a printed circuit board within the unit and extend through the front panel. The ANT 1 and ANT 2 inputs are N-type connectors mounted to a subassembly within the unit and extend through cutouts in the rear panel. An N-type OUTPUT connector and SERIAL DATA INPUT BNC connector mount to the rear panel.

This unit has been designed to operate at ambient temperatures ranging from -30° C to +50° C (-22° F to +122° F). Internal heaters, which activate at temperatures below +5° C, provide chassis heating to maintain the chassis temperature between +5° C and +15° C. A temperature sensitive switch, which opens at +75° C, functions as a high temperature safety and removes power from the circuitry should the chassis temperature exceed this limit. A second temperature sensitive switch functions as a low temperature sensing device. This switch, which is opened at temperatures below 0° C, prevents the preselector from being activated until the heaters increase the chassis temperature above this level. Within the 0° C to +75° C range of the high and low temperature sensing switches, a thermostat controls the heater operation to maintain an internal temperature of from +5° C to +15° C.

Ease of maintenance is provided by the modular design concept. Most components are mounted on printed circuit boards and secured to the deck of the main chassis. The Voltage Tuned Amplifier/Filter circuitry is mounted on a printed circuit board within an RFI shielded module and is secured to the main chassis deck. All power supply components and heater control circuitry are mounted in a separate compartment within the unit for shielding purposes.

1.3 EQUIPMENT SUPPLIED

The equipment supplied consists of the WJ-9073-2 Tracking Preselector, detachable line cord and an interface subassembly to mate with a WJ-8617B or WJ-8618B receiver. In its standard configuration, using a coaxial data interface cable, the Type 796261-5 Async Interface is supplied. Optionally, the Type 796261-6 Async Interface is available where a fiber optic interface cable is to be used.

1.4 EQUIPMENT REQUIRED BUT NOT SUPPLIED

The WJ-9073-2 Tracking Preselector is not capable of independent operation. It is designed for use with a WJ-8617B or WJ-8618B Receiver and requires this receiver to obtain control signals. It can also be driven by a separate controlling device capable of sending the serial control data in the proper format as described in paragraph 2.2.14 of the Installation Instructions.

Table 1-1. WJ-9073-2 Tracking Preselector Specifications

Antenna Input	2, N-Type
Input Impedance	50 ohms
Preselector Output	1, N-Type
Frequency Range	20-1100 MHz
Preselector Bands:	
Band 1	20 - 48 MHz
Band 2	48 - 120 MHz
Band 3	120 - 245 MHz
Band 4	245 - 500 MHz
Preselector 3 dB Bandwidth:	
20 - 500 MHz	7% minimum to 13% maximum of tuned frequency
500 - 1100 MHz	12% minimum to 18% maximum of tuned frequency
Tracking Accuracy	Within 2% of the receiver tuned frequency
Selectivity Factor	4.5:1 maximum at 20 - 1100 MHz (3 dB to 23 dB shape factor)
Bandpass Ripple	2 dB maximum
Input VSWR	2.5:1 maximum, measured at fo ±2%
Output VSWR	2:1 maximum
Noise Figure	7 dB, 20 - 500 MHz 8 dB, 500 - 1100 MHz
System Noise Figure (with WJ-861X Receiver and 3 dB Presenector Gain)	20 - 500 MHz, 10 dB maximum 500 - 1100 MHz, 11 dB maximum
3rd Order Intercept Point (In Band)	+5 dBm maximum
Control Input	Serial data link with WJ-861X receiver (Coax or Fiber-Optic)
Preselector-Receiver Separation	400 feet maximum - for data link
Flat Gain (20 - 1100 MHz)	1 dB to 19 dB (±1 dB), selectable in 2 dB steps

Table 1-1. WJ-9073-2 Tracking Preselector Specifications (Cont'd)

Power Requirement	120/220 Vac, 50-400 Hz 20 watts nominal (180 watts with heaters, below 0°C)
Temperature Range	-30° C to +50° C operating
Dimensions.....	19 inch rack mount, 19 inch depth, and 1.75 inch height
Weight	20 pounds, approximate

SECTION II

INSTALLATION AND OPERATION

SECTION II

INSTALLATION AND OPERATION

2.1 UNPACKING AND INSPECTION

Examine the shipping carton for damage before the equipment is unpacked. If the carton exterior appears to be damaged, try to have the carrier's agent present when unpacking the equipment. If this is not possible, and damage to the equipment is evident after it is unpacked, retain all packing material and shipping containers for the carrier's inspection. Also, verify that the equipment is complete as listed on the packing slip. Contact the Watkins-Johnson Company or your Watkins-Johnson representative with details of any discrepancies or shortages.

2.2 INSTALLATION

The WJ-9073-2 Tracking Preselector is intended for installation at an antenna site, to provide band-limited RF signals to receivers located up to 400 feet from the site. The unit mounts in a standard 19 inch equipment rack, occupying 1.75 inches of vertical rack space, and extends 19.00 inches into the rack. Critical dimensions are illustrated in the WJ-9073-2 Tracking Preselector Outline Drawing, **Figure 2-1.** Front panel mounting should not be relied upon for support of the unit in the rack. The use of equipment slides, mounted to the side panels, or support trays is recommended to provide adequate support for the unit.

The WJ-9073-2 System Interconnection Drawing, **Figure 2-2;** the WJ-9073-2 Rear Panel Illustration, **Figure 2-3;** and the Table of Connectors, **Table 2-1** are provided as a guide for connecting the unit into the receiving system. Refer to paragraph 2.3, OPERATION, for details pertaining to the setting of the preselector controls to satisfy the requirements of the installation. Paragraph 2.4, RECEIVER MODIFICATION, provides the procedure required to modify a standard WJ-8617B or WJ-8618B Receiver to function as a controller for the preselector.

NOTE

Before power is applied to the preselector, verify that the selected line voltage of the unit matches the available line voltage at the installation site. Refer to paragraph 2.2.1.1.

2.2.1 CONNECTOR SIGNALS

2.2.1.1 **Power Input Filter Assembly (FL1J1)** - This multi-functioned assembly accepts AC power into the unit and provides the appropriate fusing. The p.c. wafer directly below the fuse provides a means of selecting either 115 Vac or 220 Vac to match the unit with the available line voltage.

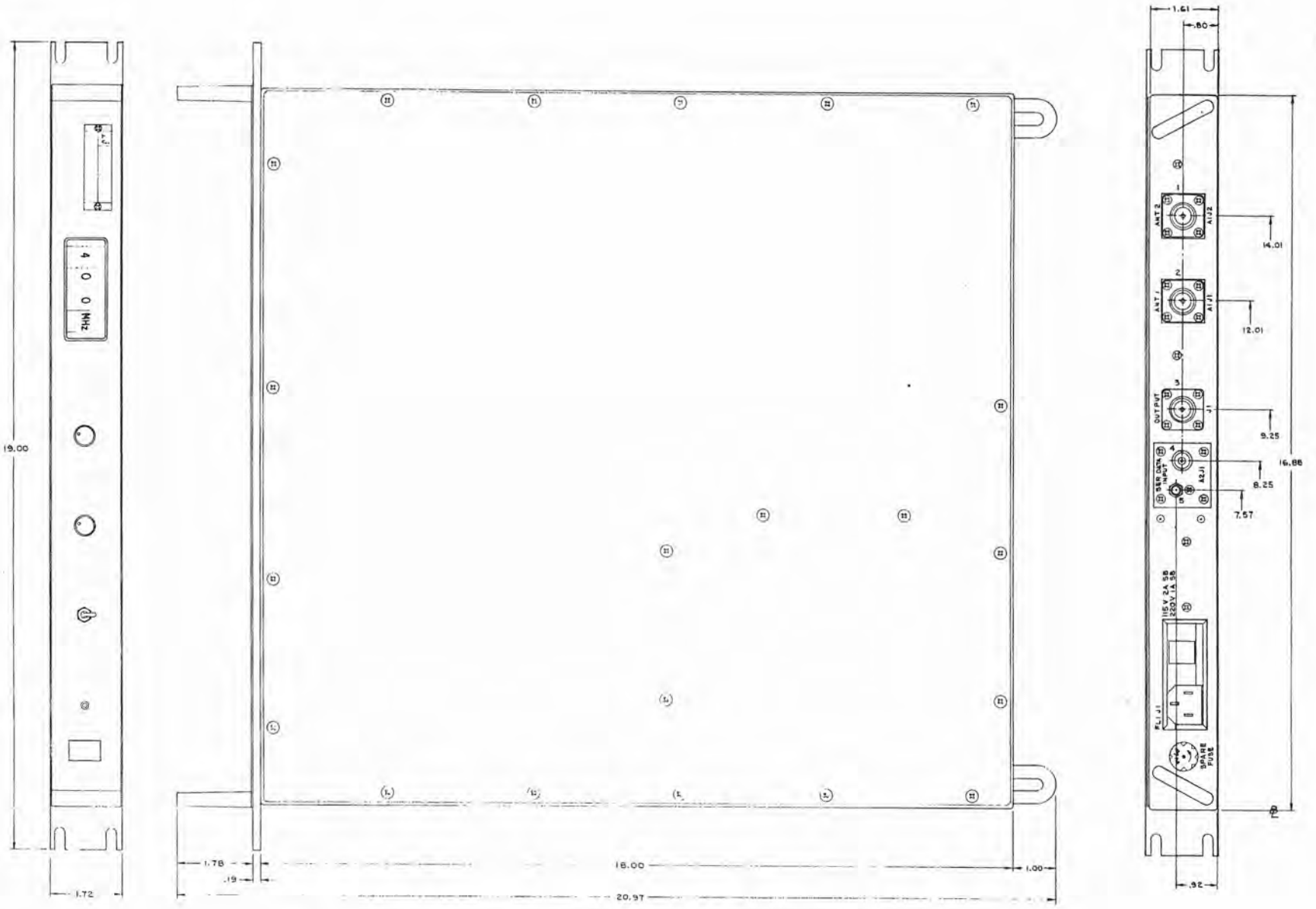


Figure 2-1. WJ-9073-2 Tracking Preselector Outline Drawing

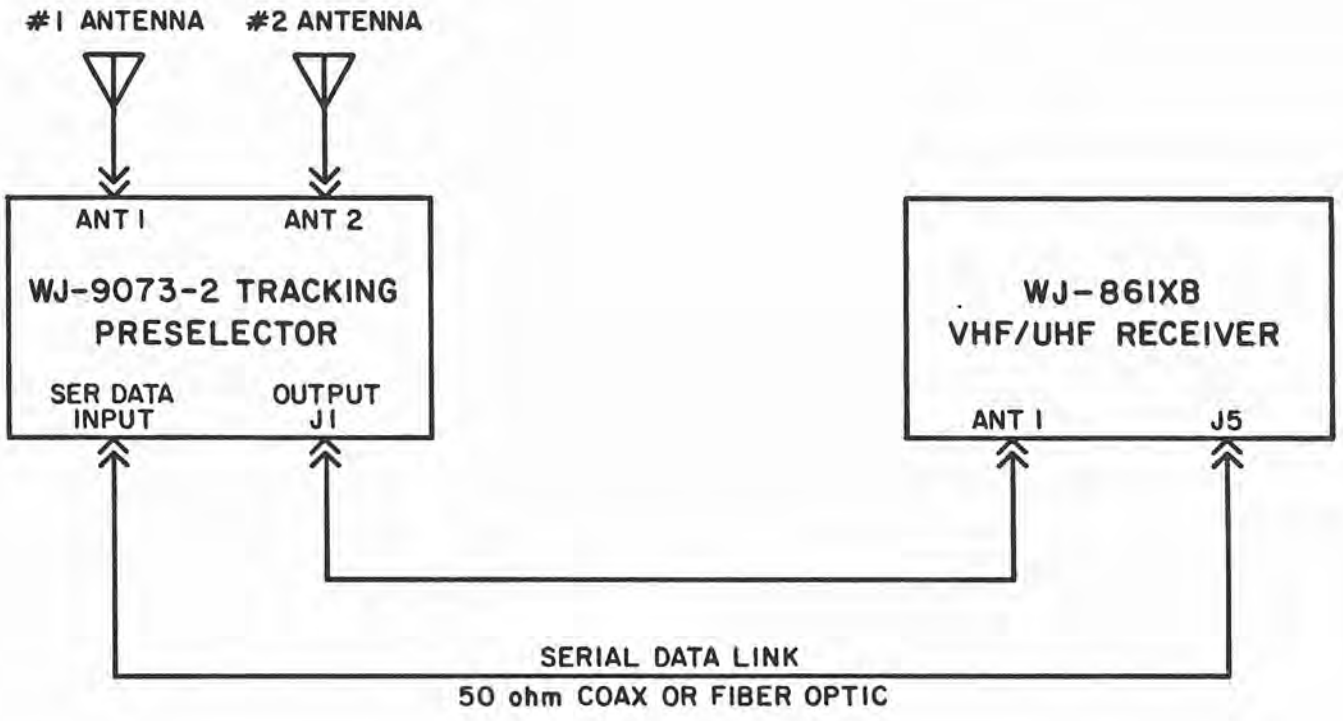


Figure 2-2. WJ-9073-2 System Interconnection Drawing.

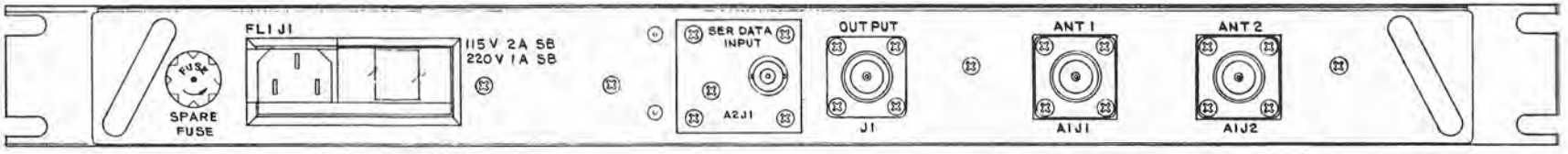


Figure 2-3. WJ-9073-2 Tracking Preselector, Rear Panel Illustration.

Table 2-1. Table of Connectors

A1J1	ANT 1	(Type N) #1 Antenna RF Input
A1J2	ANT 2	(Type N) #2 Antenna RF Input
A2J1	SER DATA INPUT	(BNC) Serial Data Input (Standard) (Fiber Optic) Serial Data Input (Optional)
J1	OUTPUT	(Type N) RF Output
FL1J1	POWER	Power Input (115 Vac/220 Vac)

The line voltage p.c. wafer should always be inspected before installing the unit at a new location. With the power cord removed, slide the clear plastic window over the male power receptacle prongs. This exposes the line fuse and the voltage selector p.c. wafer. Looking down at a slight angle, the selected line voltage can be read off of the wafer. To change the voltage selection, swing the fuse lever to the left to eject the fuse, then remove the p.c. wafer by pulling straight out. Orient the wafer so that the correct line voltage can be read from the rear of the unit and reinsert the wafer. Install the correct fuse for the selected line voltage (2 amp slow-blow for 115 Vac; 1 amp slow-blow for 220 Vac). Install the unused fuse into the SPARE FUSE holder.

2.2.1.2 **ANT 1 (A1J1)** - The ANT 1 Type N connector accepts an input from the #1 antenna. Its nominal input impedance is 50 ohms and the frequency range is 20 to 1100 MHz. The frequency range at which this input is active is determined by the ANTENNA 1 - ANTENNA 2 SWITCHOVER FREQUENCY control.

2.2.1.3 **ANT 2 (A1J2)** - The ANT 2 Type N connector accepts an input from the #2 antenna. Its nominal input impedance is 50 ohms and the frequency range is 20 to 1100 MHz. The frequency range at which this input is active is determined by the ANTENNA 1 - ANTENNA 2 SWITCHOVER FREQUENCY control.

2.2.14 **SER DATA INPUT (A2J1)** - The serial data input connector accepts a serial string of data to control the tuning of the preselector. In the standard configuration, BNC connector J1 accepts the serial data from a coaxial control line. When preselector is equipped with the optional Fiber Optic Interface, the serial data is accepted via fiber optic receiver U2. Tuning data provided to the unit is configured in three bytes, as illustrated in **Figure 2-4**. Each byte consists of a start bit, eight data bits, one parity bit (odd), and a stop bit. Byte one is comprised of a start character (Hexidecimal D) and the BCD value of the 100 kHz digit of the tuned frequency. The second byte contains the 1 MHz and 10 MHz frequency digits. The third byte the 100 MHz tuning digit and a 1 GHz frequency bit followed by three bit locations for address data. In its present configuration, the three bit address is not set and is ignored by the control section.

2.2.1.5 **OUTPUT (J5)** - The OUTPUT Type N connector provides a 50 ohm output to the receiver. This output is a frequency band, centered about the tuned frequency of the controlling receiver. The 3 dB bandwidth of the output frequency spectrum is limited to 10 ±3% of the receiver tuned frequency in the 20 to 500 MHz frequency range. In the 500 to 1100 MHz frequency range, the frequency spectrum is band-limited to 15 ±3% of the receiver

frequency. The output level is from 1 to 19 dB greater than the level of the signal provided at the antenna input, as determined by the gain setting on the preselector front panel.

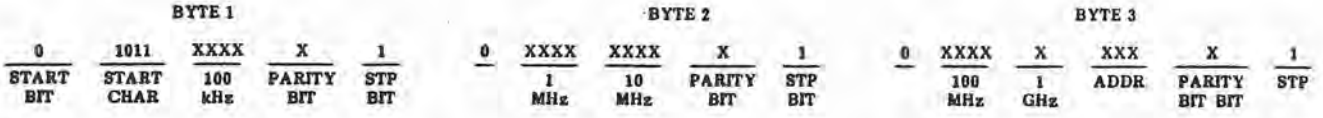


Figure 2-4. Serial Data Input Data Configuration.

2.3 OPERATION

Except for the Power ON/OFF pushbutton, all front panel controls require setting only when the unit is initially installed at the receiver site, or when change in the characteristics of the installation occur. Once the controls are set to meet the requirements of the system, and the unit is powered on, the control section of the preselector maintains full control. The serial data input, from the controlling receiver, and the front panel control settings provid the control section with data to perform all filter tuning, band switching, antenna selection, and gain setting.

Table 2-2 provides a list of controls and indicators associated with the operation of the WJ-9073-2 Tracking Preselector. The locations of these controls are illustrated in the WJ-9073-2 Tracking Preselector Front Panel Illustration, **Figure 2-5.**

2.3.1 CONTROLS AND INDICATORS

2.3.1.1 **Push ON/OFF Power** - This pushbutton applies power to the unit. When pushed, the button will remain partially depressed, indicating that the switch is energized. Depressing the button a second time will cause the button to return to its fully extended off position.

2.3.1.2 **Power On** - The POWER ON indicator illuminates when the Power On pushbutton is energized, and the internal DC power is on. DC power will not come on when the unit temperature is below 0°C.

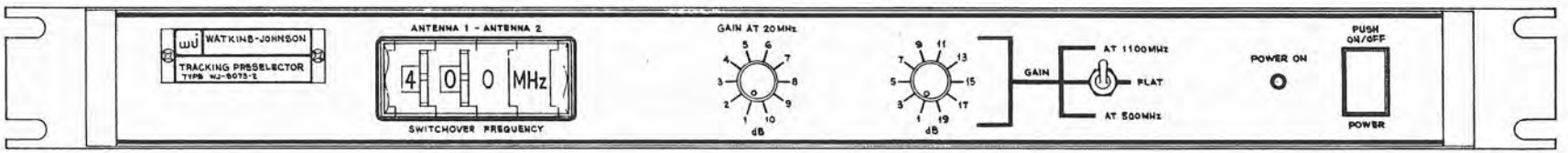


Figure 2-5. WJ-9073-2 Tracking Preselector, Front Panel Illustration.

Table 2-2. Table of Controls and Indicators

Push ON/OFF Power	Applies power to the unit.
POWER ON	Illuminates when unit DC power is on.
GAIN at 1100 MHz/FLAT/AT 500 MHz (Switch)	Three position toggle switch that determines the function of the GAIN AT 1100 MHz/FLAT/AT 500 MHz rotary control.
GAIN AT 1100 MHz/FLAT/AT 500 MHz (Rotary Control)	Controls the gain of the preselector at 1100 MHz, at 500 MHz or accross the 20 to 1100 MHz frequency range.
GAIN AT 20 MHz	Controls the gain of the preselector at 20 MHz. Inactive when the GAIN AT 1100 MHz/FLAT/AT 500 MHz toggle switch is in the FLAT position.
ANTENNA 1 - ANTENNA 2 SWITCHOVER FREQUENCY	Determines the frequency at which the input to the preselector switches between Antenna 1 and Antenna 2.

2.3.1.3 **Gain AT 1100 MHz/FLAT/AT 500 MHz (Switch)** - This three position switch determines the function of the GAIN AT 1100/FLAT/AT 500 MHz rotary control and also determines the gain mode of the preselector. In the FLAT position, the preselector provides the same gain across the entire 20 to 1100 MHz tuning range. The gain is determined by the GAIN AT 1100 MHz/FLAT/AT 500 MHz control. In the at 1100 MHz position, the control section of the preselector reads the setting of the GAIN AT 20 MHz and GAIN AT 1100 MHz/FLAT/AT 500 MHz controls and calculates a gain slope ranging from the setting at 20 MHz to the setting at 1100 MHz. When tuned to any frequency between 20 and 1100 MHz, the preselector gain is determined by the calculated gain slope. In the AT 500 MHz position, the GAIN AT 1100 MHz/FLAT/AT 500 MHz control sets the preselector gain at 500 MHz. The control section calculates a gain slope between 20 and 500 MHz using the setting of the two gain controls.

2.3.1.4 **GAIN AT 1100 MHz/FLAT/AT 500 MHz (Control)** - This ten position control has a range of from 1 to 19 dB, selectable in 2 dB increments. It sets the gain of the preselector across its 20 to 1100 MHz frequency range when the GAIN AT 1100 MHz/FLAT/AT 500 MHz switch is in the FLAT position. In the AT 1100 MHz and AT 500 MHz positions, it provides the gain setting at 500 MHz, or 1100 MHz used by the control section to calculate the gain slope of the preselector.

2.3.1.5 **GAIN AT 20 MHz** - This ten position control has a range of from 1 to 10 dB, selectable in 1 dB increments. It is active when the GAIN AT 1100 MHz/FLAT/AT 500 MHz switch is in the AT 1100 MHz or AT 500 MHz positions. This control provides the gain setting at 20 MHz to the control section of the preselector, used to calculate the 20 to 500 MHz or 20 to 1100 MHz gain slopes.

2.3.1.6 **Antenna 1 - Antenna 2 Switchover Frequency** - This control is comprised of two thumbwheel switches which determine the frequency at which the input to the preselector switches between the Antenna 1 and Antenna 2 inputs. The range of this control is from 0 to 990 MHz, selectable in 10 MHz and 100 MHz increments. Setting this control to less than 20 MHz causes the Antenna 1 input to be active at all times. A setting of 20 MHz causes the Antenna 2 input to always be active. At any other setting, the input switches in accordance with the switch setting.

2.3.2 INITIAL SET-UP

2.3.2.1 **Baud Rate** - The baud rate selection is an internal DIP switch setting within the WJ-9073-2 Tracking Preselector. It is used to match the data rate of the preselector with that of the controlling receiver. When interfacing with a WJ-861XB receiver, the baud rate setting of the preselector should coincide with the settings of the interface within the receiver. The actual baud rate of the data is four times greater than the switch setting of the preselector and WJ-861XB receiver, thus, if a controller other than a WJ-861X is used, the baud rate must be set to four times that of the preselector. Refer to **Table 2-3** as a guide for setting DIP Switch A3S1 to select the appropriate baud rate. In order to facilitate WJ-861XB Receiver scanning, the baud rate must be set to the maximum setting. A Baud rate of 19.2K for proper scan operation.

2.3.2.2 **Antenna Switchover Frequency** - The ANTENNA 1 - ANTENNA 2 SWITCHOVER FREQUENCY control is set to accommodate the antenna arrangement used with the WJ-9073-2 Tracking Preselector. When two antennas of different frequency ranges are used, the lower frequency antenna is connected to the ANTENNA 1 INPUT and the ANTENNA 2 INPUT accepts the higher frequency antenna. The ANTENNA 1 - ANTENNA 2 SWITCHOVER FREQUENCY control is then set to the frequency at which the input switchover is to occur. The thumbwheel switches on the front panel should be set to a frequency where the frequency ranges of the two antennas overlap, allowing for continuous coverage of the frequency spectrum. If a single antenna is used, the control is set to maintain one antenna input active throughout the entire tuning range. Setting the switchover frequency below 20 MHz causes the ANTENNA 1 input to be active at all times. Setting the control at exactly 20 MHz causes the ANTENNA 2 input to be active throughout the entire 20 to 1100 MHz frequency range.

Table 2-3. Baud Rate Selection (In Preselector)

A3S1 Switch Position 7	6	5	4	3	2	1	Baud Setting	Actual Baud Rate
1	0	0	0	0	0	0	300	1.2K
0	1	0	0	0	0	0	600	2.4K
0	0	1	0	0	0	0	1200	4.8K
0	0	0	1	0	0	0	2400	9.6K
0	0	0	0	1	0	0	4800	19.2K
0	0	0	0	0	1	0	9600	38.4K
0	0	0	0	0	0	1*	19200	76.8K

1 = Closed Switch
0 = Opened Switch

*Required baud rate setting when used with WJ-861XB Receivers

2.3.2.3 **Preselector Gain Setting** - The preselector gain controls are set to accomodate the gain requirements of the receiver installation. Gain can be set to introduce a flat gain response across the entire 20 to 1100 MHz frequency range, or it can be set to provide a gain slope that increases logarithmically from 20 MHz to 500 MHz, or 1100 MHz. For installations using long lengths of RF cable, it is often desirable to use one of the slope gain modes (AT 1100 MHz or AT 500 MHz) to compensate for frequency dependent cable losses. Review the characteristics of the cable used to determine the total loss that will be experienced for the length of cable. Select the gain settings that most closely match the calculated losses. **Figure 2-6** illustrates typical frequency vs. loss characteristics of various types of RF cable. Selection of the various gain modes is performed as follows:

Flat Gain: Setting the preselector for a flat gain response provides equal gain from 20 to 1100 MHz. The three position AT 1100 MHz/FLAT/AT 500 MHz switch is set to the FLAT position and the 1 to 19 dB gain control is used to select the desired gain. This gain mode allows the preselector gain to be set between 1 and 19 dB and the gain is selectable in 2 dB steps. In the FLAT mode, the GAIN AT 20 MHz control has no affect on the preselector operation.

20 to 500 MHz Gain Slope: The 20 to 500 MHz gain slope mode is used to select a gain slope that increases the preselector gain with an increase in frequency to overcome cable losses. The anticipated cable loss should be determined at 20 MHz and 500 MHz, as previously described. Set the three position AT 1100 MHz/FLAT/AT 500 MHz switch to the AT 500 MHz position. Rotate the 1 to 10 dB GAIN AT 20 MHz and the 1 to 19 dB GAIN AT 500 MHz controls to match the cable losses calculated for 20 MHz and 500 MHz, respectively. The control section of the preselector will calculate the gain slope using these two gain values and set the proper gain at the preselector, in accordance with the receiver tuned frequency.

20 to 1100 MHz Gain Slope: The 20 to 1100 MHz gain slope mode functions in the same manner as the 20 to 500 MHz gain slope, except that the cable losses and gain slope are calculated for a 20 to 1100 MHz tuning range. Set the AT 1100 MHz/FLAT/AT 500 MHz switch to the AT 1100 MHz position. Set the 1 to 10 dB GAIN AT 20 MHz and the 1 to 19 dB GAIN AT 1100 MHz controls to match the cable loss calculated at 20 MHz and 1100 MHz, respectively. The control section of the preselector will calculate a 20 to 1100 MHz gain slope and select the appropriate gain for the tuned frequency of the receiver.

NOTE

When setting the preselector gain, care must be taken to avoid exposing the receiver input to signal levels that exceed the maximum input level of the receiver.

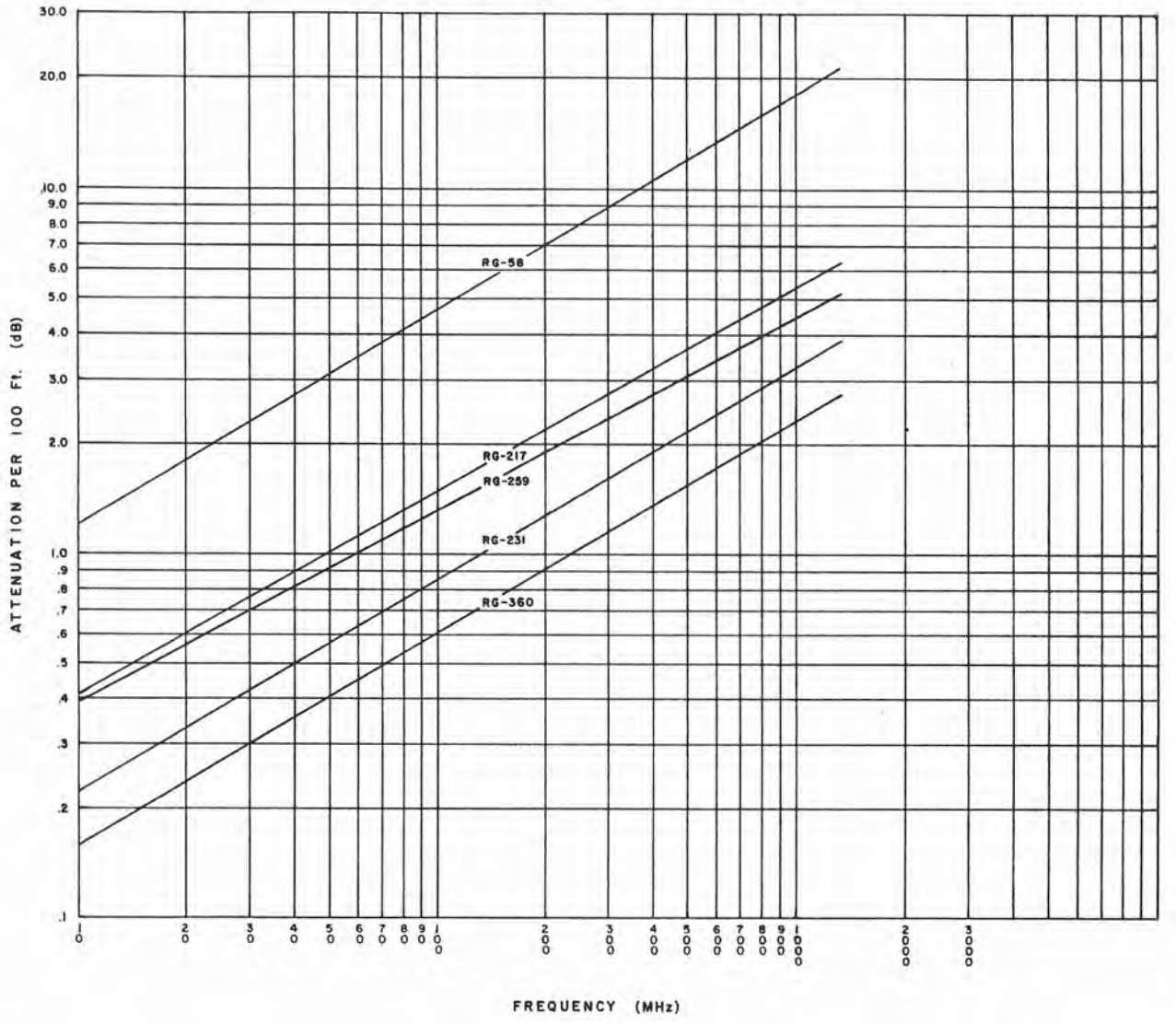


Figure 2-6. Frequency Vs Loss Characteristics of Typical RF Cables.

2.4 RECEIVER MODIFICATION

2.4.1 WJ-8617B RECEIVER WITH COAXIAL INTERFACE

This procedure describes the WJ-8617B Receiver modifications required to provide a coaxial interface between the receiver and a WJ-9073-2 Tracking Preselector. Once modified, the RLOG, ASO and DFC options are no longer supported by the receiver. All other options and receiver functions are unaffected. Proceed as follows:

1. Remove the top and bottom covers of the receiver.

2. From the underside of the receiver, make the below listed wire-wrap connections to the listed connector pins on the Digital I/O Motherboard (A5). Use #30 wire to make these connections. Connect as follows:

From	To
Option Slot 5, Pin 47	A5A1, Pin B27
Option Slot 5, Pin 4	Option Slot 4, Pin 4
Option Slot 5, Pin 6	Option Slot 4, Pin 6
Option Slot 5, Pin 49	Option Slot 5, Pin 17

3. Locate connector P63, connected at J6B on the underside of the Digital I/O Motherboard (A5). Remove the wire from pin 4 of P63 (SCAN OUT) and tie back the wire to the W29 wire harness.

4. At the receiver rear panel, remove OPT OUTPUT connector (J5). Remove any wires connected to J5 and tieback to the harness.

5. Connect the 280502-1 Coax Cable Assembly to the 180157-1 Option Connector Plate, supplied with the modification kit. Route the cable through the J5 opening on the rear panel and attach the Option Connector Plate in place of J5 on the rear panel. Attach the 31-006 Connector cap chain to the rear panel, using the connector plate screw nearest to the BNC connector.

6. Locate the Type 796261-5 Async Interface Assembly, supplied with the modification parts. Set DIP switch S2 on the board for a baud rate equal to that of the preselector (19.2K baud).

7. Connect the 280502-1 Coax Cable Assembly at J2 of the Async Interface Assembly and insert the board into Option Slot 5 of the Digital I/O Motherboard (A5).

8. Remove the Microprocessor (A5A3) from the Digital I/O Motherboard (A5). Remove the EPROMs installed at the U4, location of the subassembly.

9. Locate the replacement EPROM from the modification parts and install the EPROM into the U4 socket, as follows:

   * EPROM number will be 3.0.6 or greater, reflecting the latest software version available for the receiver.

10. Reinstall the A5A3 subassembly into its slot on the Digital I/O Motherboard and replace the receiver top and bottom covers.

2.4.2 WJ-8617B RECEIVER WITH FIBER OPTIC INTERFACE

This procedure describes the WJ-8617B Receiver modifications required to provide a fiber optic interface between the receiver and a WJ-9073-2 Tracking Preselector. Once modified, the RLOG, ASO and DFC options are no longer supported by the receiver. All other options and receiver functions are unaffected.

1. Remove the top and bottom covers of the receiver.

2. From the underside of the receiver, make the below listed wire-wrap connections at the listed connector pins on the Digital I/O Motherboard (A5). Use #30 wire to make these connections. Connect as follows:

From	To
Option Slot 5, Pin 47	A5A1, Pin B27
Option Slot 5, Pin 4	Option Slot 4, Pin 4
Option Slot 5, Pin 6	Option Slot 4, Pin 6
Option Slot 5, Pin 49	Option Slot 5, Pin 17

3. Locate connector P63, connected at J6B on the underside of the Digital I/O Motherboard (A5). Remove the wire from pin 4 of P63 (SCAN OUT) and tie back the wire to the W29 wire harness.

4. At the receiver rear panel, remove connector J5 (OPT OUTPUT). Remove any wires connected to J5 and tie back to the harness.

5. Connect the 280503-1 Optic Cable Assembly to the 180157-2 Connector Mounting Plate, supplied with the modification kit. Route the cable through the J5 opening on the rear panel and attach the Connector Mounting Plate in place of J5 on the rear panel.

6. Insert the 180180-1 Optic Transmitter into the socket on the Connector Mounting Plate.

7. Locate the Type 796261-6 Async Interface Assembly, supplied with the modification parts. Set DIP switch S2 on the board for a baud rate to that of the preselector.

8. Connect the 280503-1 Optic Cable Assembly at J2 of the Async Interface Assembly and insert the board into Option Slot 5 of the Digital I/O Motherboard (A5).

9. Remove the Microprocessor (A5A3) from the Digital I/O Motherboard (A5). Remove the EPROMs installed at the U3, U4, U5 and U6 locations of the subassembly.

10. Locate the replacement EPROMs from the modification parts and install the EPROMs into th U3 through U6 sockets, as follows:

EPROM * Designation	Location
EOB X.X.X	U3
E8B X.X.X	U4
FOB X.X.X	U5
F8B X.X.X	U6

* EPROM number will be 2.1.4 or greater, reflecting the latest software version available for the receiver.

11. Reinstall the A5A3 subassembly into its slot on the Digital I/O Motherboard and replace the receiver top and bottom covers.

2.4.3 WJ-8618B RECEIVER (SER # 1 through 206) WITH COAXIAL INTERFACE

This procedure describes the WJ-8618B Receiver modifications required to provide a coaxial interface between the receiver and a WJ-9073-2 Tracking Preselector. It is directed toward receivers with serial numbers ranging from 1 through 206. Once modified, the DAV and NRT options are no longer supported by the receiver. All other options and receiver functions are unaffected. Proceed as follows:

1. Remove the top and bottom covers of the receiver.

2. From the underside of the receiver, remove any wires connected at Option Slot 6, pins 4, 6, 47 and 49.

3. Make the below listed wire-wrap connections at the listed connector pins on the underside of the Digital I/O Motherboard (A5). Use #30 wire to make these connections. Connect as follows:

From	To
Option Slot 6, Pin 47	A5A1, Pin B27
Option Slot 6, Pin 4	Option Slot 4, Pin 4
Option Slot 6, Pin 6	Option Slot 4, Pin 6
Option Slot 6, Pin 49	Option Slot 6, Pin 17

4. Locate the 280488-1 Connector Mounting Plate and the 280502-1 Coax Cable Assembly from the supplied modification parts. Connect the coax connector of the cable to the "D" hole on the connector plate.

5. Remove the 448 connector plate from the receiver rear panel and disconnect to 488 cable from the plate.

6. Connect the 488 connector to the 280488-1 Connector Mounting Plate and install the mounting plate to the receiver rear panel. Be sure to install the 280447-1 Connector Gasket between the mounting plate and the receiver rear panel. Attach the 31-006 Connector cap chain to the rear panel using the connector plate screw nearest to the BNC connector.

7. Locate the Type 796261-5 Async Interface Assembly, supplied with the modification parts. Set DIP switch S2 on the board for a baud rate equal to that of the preselector.

8. Connect the 280502-1 Coax Cable Assembly at J2 of the Async Interface Assembly and insert the board into Option Slot 6 of the Digital I/O Motherboard.

9. Remove the Microprocessor (A5A3) from the Digital I/O Motherboard (A5). Remove the EPROMs installed at the U3, U4, U5 and U6 locations of the subassembly.

10. Locate the replacement EPROMs from the modification parts and install the EPROMs into the U3 through U6 locations, as follows:

EPROM Designation	Location
EOB 1.7.9	U3
E8B 1.7.9	U4
FOB 1.7.9	U5
F8B 1.7.9	U6

11. Reinstall the A5A3 subassembly into its slot on the Digital I/O Motherboard and replace the receiver top and bottom covers.

12. Install the HP10834A Connector Extender to the 488 connector on the receiver rear panel.

2.4.4 WJ-8618B RECEIVER (SER # 1 Through 206) WITH FIBER OPTIC INTERFACE

This procedure describes the WJ-8618B Receiver modifications required to provide a fiber optic interface between the receiver and a WJ-9073-2 Tracking Preselector. It is directed toward receivers with serial numbers ranging from 1 through 206. Once modified, the DAV and NRT options are no longer supported by the receiver. All other options and receiver functions are unaffected. Proceed as follows:

1. Remove the top and bottom covers from the receiver.

2. From the underside of the receiver, remove any wires connected at Option Slot 6, pins 4, 6, 47 and 49.

3. Make the below listed wire-wrap connections at the listed connector pins on the underside of the Digital I/O Motherboard (A5). Use #30 wire to make these connections. Connect as follows:

From	To
Option Slot 6, Pin 47	A5A1, Pin B27
Option Slot 6, Pin 4	Option Slot 4, Pin 4
Option Slot 6, Pin 6	Option Slot 4, Pin 6
Option Slot 6, Pin 49	Option Slot 6, Pin 17

4. Locate the 280526-1 Connector Mounting Plate and the 280525 Coax Cable Assembly from the supplied modification parts. Connect the Optic Cable at the "D" hole on the connector plate.

5. Remove the 448 connector plate from the receiver rear panel and disconnect to 488 cable from the plate.

6. Connect the 488 connector to the 280526-1 Connector Mounting Plate and install the mounting plate to the receiver rear panel. Be sure to install the 280447-1 Connector Gasket between the mounting plate and the receiver rear panel.

7. Locate the Type 796261-6 Async Interface Assembly, supplied with the modification parts. Set DIP switch S2 on the board for a baud rate equal to that of the preselector.

8. Connect the 280525-1 Optic Cable Assembly at J2 of the Async Interface Assembly and insert the board into Option Slot 6 of the Digital I/O Motherboard.

9. Insert the 180180-1 Optic transmitter into the socket on the Connector Mounting Plate on the receiver rear panel.

10. Remove the Microprocessor (A5A3) from the Digital I/O Motherboard (A5). Remove the EPROMs installed at the U3, U4, U5 and U6 locations of the subassembly.

11. Locate the replacement EPROMs from the modification parts and install the EPROMs into the U3 through U6 locations, as follows:

EPROM Designation	Location
EOB 1.7.9	U3
E8B 1.7.9	U4
FOB 1.7.9	U5
F8B 1.7.9	U6

12. Reinstall the A5A3 subassembly into its slot on the Digital I/O Motherboard and replace the receiver top and bottom covers.

13. Install the HP10834A Connector Extender to the 488 connector on the receiver rear panel.

2.4.5 WJ-8618B RECEIVER (SER # 207 and Above) WITH COAXIAL INTERFACE

This procedure describes the WJ-8618B Receiver modifications required to provide a coaxial interface between the receiver and a WJ-9073-2 Tracking Preselector. It is directed toward receivers with serial numbers ranging from 207 and above. Once modified, the RLOG, ASO and DFC options are no longer supported by the receiver. All other options and receiver functions are unaffected. Proceed as follows:

1. Remove the top and bottom covers from the receiver.

2. From the underside of the receiver, make the below listed wire-wrap connections to the listed connector pins on the Digital I/O Motherboard (A5). Use #30 wire to make these connections. Connect as follows:

From	To
Option Slot 5, Pin 47	A5A1, Pin B27
Option Slot 5, Pin 4	Option Slot 4, Pin 4
Option Slot 5, Pin 6	Option Slot 4, Pin 6
Option Slot 5, Pin 49	Option Slot 5, Pin 17

3. Locate connector P63, connected at J6B on the underside of the Digital I/O Motherboard (A5). Remove the wire from pin 4 of P63 (Scan Out) and tie back the wire to the W29 wire harness.

4. Remove the wires connected to rear panel connector J5 and tie these wires back to the wire harness. Remove J5 from the receiver rear panel.

5. Connect the Type 280502-1 Coax Cable Assembly to the 180157-1 Option Connector Plate, supplied with the modification kit. Route the cable through the J5 opening on the rear panel and attach the Option Connector Plate in place of J5 on the rear panel. Attach the 31-006 Connector cap chain to the rear panel, using the connector plate screw nearest to the BNC connector.

6. Locate the Type 796261-5 Async Interface Assembly, supplied with the modification parts. Set DIP switch S2 on the board for a baud rate equal to that of the preselector.

7. Connect the 280502-1 Coax Cable Assembly at J2 of the Async Interface Assembly and insert the board into Option Slot 5 of the Digital I/O Motherboard (A5).

8. Remove the Microprocessor (A5A3) from the Digital I/O Motherboard (A5). Remove the EPROMs installed at the U3, U4, U5 and U6 locations of the subassembly.

9. Locate the replacement EPROMs from the modification parts and install the EPROMs into the U3 through U6 sockets, as follows:

EPROM * Designation	Location
EOB X.X.X	U3
E8B X.X.X	U4
FOB X.X.X	U5
F8B X.X.X	U6

* EPROM number will be 2.1.4 or greater, reflecting the latest software version available for the receiver.

10. Reinstall the A5A3 subassembly into its slot on the Digital I/O Motherboard and replace the receiver top and bottom covers.

2.4.6 WJ-8618B RECEIVER (SER # 207 and above) WITH FIBER OPTIC INTERFACE

This procedure describes the WJ-8618B Receiver modifications required to provide a fiber optic interface between the receiver and a WJ-9073-2 Tracking Preselector. It is directed toward receivers with serial numbers ranging from 207 and above. Once modified, the RLOG, ASO and DFC options are no longer supported by the receiver. All other options and receiver functions are unaffected. Proceed as follows:

1. Remove the top and bottom covers from the receiver.

2. From the underside of the receiver, make the below listed wire-wrap connections to the listed connector pins on the Digital I/O

Motherboard (A5). Use #30 wire to make these connections. Connect as follows:

From	To
Option Slot 5, Pin 47	A5A1, Pin B27
Option Slot 5, Pin 4	Option Slot 4, Pin 4
Option Slot 5, Pin 6	Option Slot 4, Pin 6
Option Slot 5, Pin 49	Option Slot 5, Pin 17

3. Locate connector P63, connected at J6B on the underside of the Digital I/O Motherboard (A5). Remove the wire from pin 4 of P63 (Scan Out) and tie back the wire to the W29 wire harness.

4. At the receiver rear panel, remove connector J5. Remove the wires connected to J5 and tie back to the wire harness.

5. Connect the 280503-1 Optic Cable Assembly to the 180157-2 Connector Mounting Plate, supplied with the modification kit. Route the cable through the J5 opening on the rear panel and attach the Connector Mounting Plate in place of J5 on the rear panel.

6. Insert the 180180-1 Optic Transmitter into the socket on the Connector Mounting Plate.

7. Locate the Type 796261-6 Async Interface Assembly, supplied with the modification parts. Set DIP switch S2 on the board for a baud rate equal to that of the preselector.

8. Connect the 280503-1 Optic Cable Assembly at J2 of the Async Interface Assembly and insert the board into Option Slot 5 of the Digital I/O Motherboard.

9. Remove the Microprocessor (A5A3) from the Digital I/O Motherboard (A5). Remove the EPROMs installed at the U3, U4, U5 and U6 locations of the subassembly.

10. Locate the replacement EPROMs from the modification parts and install the EPROMs into the U3 through U6 sockets, as follows:

EPROM * Designation	Location
EOB X.X.X	U3
E8B X.X.X	U4
FOB X.X.X	U5
F8B X.X.X	U6

* EPROM number will be 2.1.4 or greater, reflecting the latest software version available for the receiver.

11. Reinstall the A5A3 subassembly into its slot on the Digital I/O Motherboard and replace the receiver top and bottom covers.

SECTION III

REPLACEMENT PARTS LIST

SECTION III

REPLACEMENT PARTS LIST

3.1 UNIT NUMBERING METHOD

The unit numbering method of assigning reference designations (electrical symbol numbers) has been used to identify assemblies, subassemblies (and modules) and parts. An example of the unit numbering method 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)

As shown on the main chassis schematic, components which are an integral part of the main chassis have no subassembly designation.

3.2 REFERENCE DESIGNATION PREFIX

Partial reference designations have been used on the equipment and on the illustrations in this manual. The partial reference designations consist of the class letter(s) and identifying item number. The complete reference designations may be obtained by placing the proper prefix before the partial reference designations. Reference Designation Prefixes are provided on drawings and illustrations in parentheses within the figure titles.

3.3 LIST OF MANUFACTURERS

Mfr. Code	Name and Address
01295	Texas Instruments Semiconductor-Components Div. 13500 North General Expressway Dallas, TX 75231
02114	Ferroxcube Corp. P.O. Box 359 Mt. Marion Road Saugerties, NY 12477
02735	RCA Corporation Solid State Division Route 202
04713	Motorola, Incorporated Semiconductor Products Div. 5005 East McDowell Road Phoenix, AZ 80058
05397	Union Carbide Corporation Materials Systems Divisions 11901 Madison Avenue Cleveland, OH 44101
05820	Wakefield Engineering Inc. 60 Audubon Road Wakefield, MA 01880

Mfr. Code	Name and Address
09021	Airco Electronics Bolivar Road, P.O. Box 547 Bradford, PA 16701
14482	Watkins-Johnson Company 3333 Hillview Avenue Palo Alto, CA 94304
14604	Elmwood Sensors Inc. 1655 Elmwood Avenue Cranston, RI 02907
14632	Watkins-Johnson Company 700 Quince Orchard Road Gaithersburg, MD 20878
16179	Omni-Spectra, Inc. 24600 Hallwood Court Farmington, MI 48024
16428	Belden Corporation P.O. Box 1101 Richmond, IN 47374
20484	Read Plastics Inc. 12331 Wilkins Avenue Rockville, MD 20852
22526	Berg Electronics Inc. Route #83 New Cumberland, PA 17070
24355	Analog Devices Inc. Route #1 INDL PK/P.O. Box 280 Norwood, MA 02062
24539	Avantek Inc. 3175 Bowers Avenue Santa Clara, CA 95051
26805	American Microwave Ind. Inc. Waltham, MA 02154
27014	National Semi-Conductor Corp. 2950 San Ysidro Way Santa Clara, CA 95051
28480	Hewlett-Packard Co. Corporation Headquarters 1501 Page Mill Road Palo Alto, CA 94304
29990	American Technical Ceramics Division of Phase Industries 1 Norden Lane Huntington Station, NY 11746
31433	Union Carbide Corp. P.O. Box 5928 Greenville, SC 29606
33095	Spectrum Control, Inc. 152 E. Main Street Fairview, PA 16415
34649	Intel Corp. 3585 SW 198th Street Aloha, OR 97005
50101	GHZ Devices, Inc. Kennedy Drive North Chelmsford, MA 01863
52673	KSW Electronics Corp. S. Bedford Street Burlington, MA 01803
55027	Q-Bit Corp. 311 Pacific Avenue Palm Bay, FL 32905
56289	Sprague Electric Co. Marshall Street North Adams, MA 01247
70903	Belden Corporation 415 South Kilpatrick Chicago, IL 60644

Mfr. Code	Name and Address
71279	Cambridge Thermionic Corp. 445 Concord Avenue Cambridge, MA 02138
71400	Bussman Manufacturing Division of McGraw-Edison Co. 2536 W. University Street St. Louis, MO 63107
72982	Erie Tech. Products, Inc. 644 West 12th Street Erie, PA 16512
73138	Beckman Instr., Inc. Helipot Division 2500 Harbor Blvd. Fullerton, CA 92634
75378	CTS Knights Inc. 400 Reimann Avenue Sandwich, IL 60548
75915	Littelfuse, Inc. 800 E. Northwest Highway Des Plaines, IL 60016
80058	Joint Electronic Type Designation System
80131	Electronic Industries Assoc. 2001 Eye Street, N.W. Washington, D.C. 20006
81073	Grayhill Incorporated 561 Hillgrove Avenue LaGrange, IL 60525
81349	Military Specifications
91418	Radio Materials Company 4242 West Bryn Mawr Avenue Chicago, IL 60646
91506	Augat, Inc. P.O. Box 779 Attleboro, MA02703
91637	Dale Electronics Inc. Box 609 Columbus, NE 68601
92825	Whitso, Inc. 9330 W. Byron Schiller Park, IL. 60176
95121	Quality Components, Inc. P.O. Box 113 St. Mary's, PA 15857
95146	Alco Electronics Products Inc. Lawrence, MA 01842
96733	San Fernando, Electric Mfg.Co. 1501 First Street San Fernando, Ca. 91341
98291	Sealectro Corporation 225 Hoyt Mamaroneck, NY 10544
99800	American Precision Industries Delevan Electronics Division 270 Quaker Road East Aurora, NY 14052

3.4 PARTS LIST

The parts list which follows contains all electrical parts used in the equipment and certain mechanical parts which are subject to unusual wear or damage. When ordering replacement parts from the Watkins-Johnson Company, specify the type and serial number of the equipment and the reference designation and description of each part ordered. The list of manufacturers provided in paragraph 3.3 and the manufacturer's part number for components are included as a guide to the user of the equipment in the field. These parts may not necessarily agree with the parts installed in the equipment; however, the parts specified in this list will provide satisfactory operation of the equipment. Replacement parts may be obtained from any manufacturer as long as the physical and electrical parameters of the part selected agree with the original indicated part. In the case of components 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 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 lists and schematic diagrams of this manual. However, the semiconductors designated in the manual may be substituted in every case with satisfactory results.

3.5 **TYPE WJ-9073-2, Tracking Preselector, Main Chassis**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
A1	20-1100 MHz Voltage Tuned Filter/Amplifier	1	796235-1	14632	
A2	Serial Data Interface	1	280445	14632	
A3	Control Processor	1	796294-1	14632	
A4	Heater Control	1	796292-1	14632	
C1	Capacitor, Ceramic, Feed-thru: .05µF, 300V	3	54-785-005-503P	33095	
C2	Same as C1				
C3	Same as C1				
C4	Not Used				
C5	Capacitor, Feed-thur: .01µF, 20%, 600 V	4	F1A6103K	96733	
C6	Same as C5				
C7	Same as C5				
C8	Same as C5				
C9	Capacitor, Electrolytic, Tantalum: 47µF, 20%, 20 V	3	196D476X0020PE4	56289	
C10	Same as C9				
C11	Same as C9				
E1	Terminal, Insulated	3	7A1A1	92825	
E2	Same as E1				
E3	Same as E1				
E4	Terminal	1	160-2381-01-05-00	71279	
F1	Fuse: 2 Amp, 3AG, Slow-Blow	1	MDL1	71400	
FL1	Power Line Filter	1	280473-1	14632	
HR1	Blanket Heater: 42 watt, 115 Vac	4	113000-372	85932	
J1	Connector, Jack: Type N	1	UG1095A/U	80058	
L1	Coil, Toroidal	3	20681-129	14632	
L2	Same as L1				
L3	Same as L1				
P1	Part of W1				
P2	Part of W1				
P3	Connector, Plug	1	521-1	16179	
P4	Connector, Plug: SMC	2	UG1465/U	80058	
P5	Same as P4				
P6	Connector, Plug: 18 pin, DIP	1	1P16-2	91506	
PS1	Power Supply	1	VST25-3700-01-1000L		
R1	Resistor, Fixed, Wire-wound: 5 kΩ, 1%, 5 W	2	RH-5-5K	91637	
R2	Same as R1				
S1	Switch	1	SC018542	14632	
S2	Switch/Thermostat	1	3100-45-962	14604	
S3	Switch/Thermostat	1	3100-43-586	14604	
S4	Switch Assembly	1	280524-1	14632	
S5	Switch, Toggle: DPDT	1	MTA-206P	95146	
S6	Switch/Thermostat	1	3100-43-587	14604	

Main Chassis

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
W1	Cable, Power	1	17-250	16428	
W2	Cable Assembly	1	280516-1	14632	
W3	Cable Assembly	1	280517-1	14632	
XF1	Fuseholder	1	342004	75915	

3.5.1 **Type 796235-1, 20-1100 MHz Voltage Tuned Filter/Amplifier** REF DESIG PREFIX **A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
A1	Voltage Tuned Filter	1	380369-1	14632	
A2	Amplifier/Attenuator	1	380370-1	14632	
C1	Capacitor, Ceramic, Feed-thru: .05µF, GMV, 300 V	11	54-785-002-503P	33095	
C2 Thru C11	Same as C1				
E1	Terminal	1	160-1724-02-01	71279	
J1	Connector, Jack: Type N	2	3052-0000-10	26805	
J2	Same as J1				
J3	Connector, Jack: SMA	1	244-2	16179	
P1	Connector, Plug, Multipin	1	1P16-2	91506	

3.5.1.1 **Part 380369-1, Voltage Tuned Filter** REF DESIG PREFIX **A1A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
C1	Capacitor, Ceramic, Chip: 5100 pF, 20%, 50 V	3	ATC700B512MP50X	29990	
C2	Same as C1				
C3	Capacitor, Ceramic, Chip: 470 pF, 10%, 100 V	26	C1210E471K1GAH	31433	
C4	Same as C3				
C5	Capacitor, Ceramic, Disc: 1000 pF, GMV, 500 V	8	B-GP1000PFP	91418	
C6	Same as C5				
C7	Same as C5				
C8	Capacitor, Ceramic, Chip: 4700, 10%, 50 V	4	C1210C472K5XAH	31433	
C9	Same as C3				
C10	Same as C8				
C11 Thru C17	Same as C3				
C18 Thru C22	Same as C5				
C23	Same as C3				
C24	Same as C3				
C25	Same as C8				
C26	Same as C3				
C27	Same as C8				
C28	Same as C3				
C29	Same as C3				
C30	Same as C3				
C31	Capacitor, Composition, Tubular: 2.2pF, 10%, 500 V	1	QC2.2PFK	95121	
C32	Same as C1				
C33 Thru C38	Same as C3				
C39	Capacitor, Composition, Tubular: .68 pF, 10%, 500 V	1	QC0.68PFK	95121	
C40 Thru C44	Same as C3				
C45	Same as C1				
C46	Capacitor, Composition, Tubular: 1.0 pF, 10%, 500 V	1	QC1.0PFK	95121	
C47	Capacitor, Composition, Tubular: .82 pF, 10%, 500 V	1	QC0.82PFK	95121	
CR1	Diode	12	5082-3039	28480	
CR2	Same as CR1				
CR3	Diode	12	GC4371-15	50101	
CR4	Same as CR3				
CR5	Same as CR1				
CR6 Thru CR10	Same as CR3				

REF DESIG PREFIX **A1A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
CR11 Thru CR14	Same as CR1				
CR15	Diode	44	KV3901	52673	
CR16 Thru CR58	Same as CR15				
CR59	Diode	40	U11-3102	52673	
CR60 Thru CR98	Same as CR59				
CR99 Thru CR102	Same as CR1				
CR103 Thru CR107	Same as CR3				
CR108	Same as CR				
E1	Terminal	30	140-1941-02-01	71279	
E2 Thru E30	Same as E1				
E31	Terminal	2	160-2034-02-01	71279	
E32	Same as E31				
FB1	Ferrite Bead	45	56-590-65-4A	02114	
FB2 Thru FB45	Same as FB1				
L1	Inductor	14	170134-1	14632	
L2 Thru L8	Same as L1				
L9	Coil, Modified: 0.121 µH	2	180186-1	14632	
L10	Coil	2	280519-1	14632	
L11	Same as L10				
L12	Same as L9				
L13	Coil, Modified: 0.274 µH	2	180186-2	14632	
L14	Coil	2	280520-1	14632	
L15	Same as L14				
L16	Same as L13				
L17	Coil	2	180188-1	14632	
L18	Coil	1	180189-1	14632	
L19	Coil	1	180189-2	14632	
L20	Same as L17				
L21	Coil	2	180187-1	14632	
L22	Coil	1	180190-1	14632	

REF DESIG PREFIX **A1A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
L23	Coil	1	180190-2	14632	
L24	Same as L21				
L25 Thru L30	Same as L1				
L31	Inductor	2	180185-1	14632	
L32	Same as L31				
R1	Resistor, Fixed, Film: 560Ω, 5%, 1/8 W	12	CF 1/8-560 ohms/J	09021	
R2	Same as R1				
R3	Resistor, Fixed, Film: 560Ω, 5%, 1/4 W	1	CF 1/4-560 ohms/J	09021	
R4	Same as R1				
R5	Resistor, Fixed, Film: 47 kΩ, 5%, 1/8 W	8	CF 1/8-47K/J	09021	
R6	Not Used				
R7	Same as R5				
R8	Not Used				
R9	Same as R5				
R10	Resistor, Fixed, Film: 120Ω, 5%, 1/8 W	5	CF 1/8-120 ohms/J	09021	
R11	Same as R1				
R12	Same as R1				
R13	Same as R5				
R14	Same as R5				
R15	Same as R5				
R16	Same as R10				
R17	Same as R1				
R18	Same as R1				
R19	Resistor, Fixed, Film: 15KΩ, 5%, 1/8 W	12	CF 1/8-15K/J	09021	
R20 Thru R24	Same as R19				
R25	Same as R10				
R26	Same as R1				
R27	Same as R1				
R28	Resistor, Fixed, Film: 2.2KΩ, 5%, 1/8 W	4	CF 1/8-2.2K/J	09021	
R29	Same as R28				
R30	Same as R5				
R31	Same as R5				
R32	Same as R28				
R33	Same as R28				
R34	Same as R10				
R35	Same as R1				
R36 Thru R41	Same as R19				

REF DESIG PREFIX **A1A1**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
R42	Same as R10				
R43	Same as R1				
R44	Same as R1				
R45	Resistor, Fixed, Film: 1.0KΩ, 5%, 1/4 W	1	CF 1/4-1K/J	09021	

3.5.1.2 Part 380370-1, Amplifier/Attenuator REF DESIG PREFIX **A1A2**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
C1	Capacitor, Ceramic, Chip: .056µF, GMV, 50 V	3	C2225C563P5XAH	05397	
C2	Same as C1				
C3	Same as C1				
C4	Capacitor, Electrolytic, Tantalum: 4.7µF, 20%, 35 V	1	196D475X0035JE3	56289	
C5	Capacitor, Ceramic, Disc: .47µF, 20%, 50 V	2	34452-1	14632	
C6	Same as C5				
C7	Capacitor, Electrolytic, Tantalum: 47µF, 20%, 20 V	1	196D476X0020PE4	56289	
E1	Terminal	3	140-1941-02-01	71279	
E2	Same as E1				
E3	Same as E1				
L1	Coil, Fixed: 100µH, 10%	3	553-3635-25	71279	
L2	Same as L1				
L3	Same as L1				
R1	Resistor, Fixed, Film: 47Ω, 5%, 1/4 W	1	CF 1/4-47 ohms/J	09021	
RA1	Heatsink	1	213-CB	05820	
U1	Amplifier	1	QBH-147	55027	
U2	Amplifier	1	A19-1	14482	
U3	Attenuator	1	UTF-025	24539	

3.5.2 **Type 280445-1, Serial Data Interface** REF DESIG PREFIX **A2**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
C1	Capacitor, Ceramic, Disc: 0.1μF, 20%, 100 V	2	8131M100-651-104M	72982	
C2	Same as C1				
E1	Terminal	5	140-1941-02-01	71279	
E2 Thru E5	Same as E1				
J1	Not Used				
J2	Connector, Receptacle	1	50-053-0000	98291	
R1	Resistor, Fixed, Film: 1KΩ, 5%, 1/8 W	1	CF 1/8-1.0K/J	09021	
R2	Resistor, Fixed, Composition: 51Ω, 5%, 1/8 W	1	RCR05G510JS	81349	
U1	Integrated Circuit	1	SN75122N	01295	
U2	Fiber Optic Receiver	1	HFBR-2201	28480	

3.5.3 **Type 280455-2, Serial Data Interface** REF DESIG PREFIX **A2**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
C1	Capacitor, Ceramic, Disc: 0.1μF, 20%, 100 V	2	8131M100-651-104M	72982	
C2	Same as C1				
E1	Terminal	5	140-1941-02-01	71279	
E2 Thru E5	Same as E1				
J1	Connector, Receptacle	1	UG-1094/U	80058	
J2	Connector, Receptacle	1	50-053-0000	98291	
R1	Resistor, Fixed, Film: 1KΩ, 5%, 1/8 W	1	CF 1/8-1.0K/J	09021	
R2	Resistor, Fixed, Composition: 51Ω, 5%, 1/8 W	1	RCR05G510JS	81349	
U1	Integrated Circuit	1	SN75122N	01295	

3.5.4 **Type 796294-1, Control Processor** REF DESIG PREFIX **A3**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
C1	Capacitor, Electrolytic, Tantalum: 4.7µF, 20%, 35 V	1	196D475X0035JE3	56289	
C2	Capacitor, Electrolytic, Tantalum: 100µF, 20%, 20 V	3	196D107X0020TE4	56289	
C3	Same as C2				
C4	Same as C2				
C5	Capacitor, Electrolytic, Tantalum: 47µF, 20%, 35 V	2	196D476X0035TE4	56289	
C6	Capacitor, Ceramic, Disc: 0.1µF, 20%, 100 V	24	8131M100-651-104M	72982	
C7	Same as C6				
C8	Same as C6				
C9	Same as C6				
C10	Capacitor, Ceramic, Disc: 0.47µF, 20%, 100V	1	8131M100-651-474M	72982	
C11	Capacitor, Electrolytic, Tantalum: 22µF, 20%, 10 V	1	196D226X0010JE3	56289	
C12 Thru C19	Same as C6				
C20	Same as C5				
C21 Thru C32	Same as C6				
C33	Capacitor, Mica, Dipped: 220 pF, 2%, 500 V	4	CM04FD221G03	81349	
C34	Same as C33				
C35	Same as C33				
C36	Same as C33				
CR1	Diode	1	1N462A	80131	
CR2	Diode	7	1N752A	80131	
CR3 Thru CR8	Same as CR2				
CR9	Diode	2	1N270	80131	
CR10	Same as CR9				
DS1	LED	1	HLMP-1301	28480	
J1	Socket	2	516AG10D	91506	
J2	Connector, Receptacle	2	50-053-0000	98291	
J3	Same as J2				
J4	Same as J1				
L1	Coil, Fixed: 6.8µH, 5%	1	1537-32	99800	
R1	Resistor, Fixed, Film: 4.7KΩ, 5%, 1/4 W	4	CF 1/4-4.7K/J	09021	
R2	Resistor, Fixed, Composition: 51KΩ, 5%, 1/4 W	1	RCR07G513JS	81349	
R3	Same as R1				
R4	Same as R1				
R5	Same as R1				
R6	Resistor, Fixed, Film: 130Ω, 5%, 1/4 W	1	CF1/4 - 130 ohms/J	09021	
R7	Resistor, Fixed, Film: 15KΩ, 1%, 1/10 W	1	RN55C1502F	81349	
R8	Resistor, Fixed, Film: 10KΩ, 1%, 1/10 W	2	RN55C1002F	81349	

REF DESIG PREFIX **A3**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
R9	Resistor, Fixed, Film: 30.1KΩ, 1%, 1/4 W	1	RN60D3012F	81349	
R10	Resistor, Fixed, Film: 2.7KΩ, 5%, 1/4 W	7	CF 1/4 2.7K/J	09021	
R11	Resistor, Fixed, Film: 27KΩ, 5%, 1/4 W	7	CF 1/4 27K/J	09021	
R12	Resistor, Fixed, Film: 3.9KΩ, 5%, 1/4 W	14	CF 1/4 3.9K/J	09021	
R13	Same as R12				
R14	Resistor, Fixed, Film: 10kΩ, 5%, 1/4 W	14	CF 1/4 10K/J	09021	
R15	Same as R14				
R16	Resistor, Fixed, Film: 22Ω, 5%, 1/4 W	14	CF 1/4 22 ohms/J	09021	
R17	Same as R16				
R18	Same as R10				
R19	Same as R11				
R20	Same as R12				
R21	Same as R12				
R22	Same as R14				
R23	Same as R14				
R24	Same as R16				
R25	Same as R16				
R26	Same as R10				
R27	Same as R11				
R28	Same as R12				
R29	Same as R12				
R30	Same as R14				
R31	Same as R14				
R32	Same as R16				
R33	Same as R16				
R34	Same as R10				
R35	Same as C11				
R36	Same as R12				
R37	Same as R12				
R38	Same as R14				
R39	Same as R14				
R40	Same as R16				
R41	Same as R16				
R42	Same as R10				
R43	Same as R11				
R44	Same as R12				
R45	Same as R12				
R46	Same as R14				
R47	Same as R14				
R48	Same as R16				

REF DESIG PREFIX **A3**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
R49	Same as R16				
R50	Same as R10				
R51	Same as R11				
R52	Same as R12				
R53	Same as R12				
R54	Same as R14				
R55	Same as R14				
R56	Same as R16				
R57	Same as R16				
R58	Same as R10				
R59	Same as R11				
R60	Same as R12				
R61	Same as R12				
R62	Same as R14				
R63	Same as R14				
R64	Same as R16				
R65	Same as R16				
R66	Same as R8				
R67	Resistor, Fixed, Composition: 47KΩ, 5%, 1/4 W	4	RCR07G473JS	81349	
R68	Same as R67				
R69	Same as R67				
R70	Same as R67				
S1	Switch	1	76SB07S	81073	
S2	Switch	1	76SB04S	81073	
S3	Switch	2	71ADF36-01-1AJN	81073	
S4	Same as S3				
U1	Integrated Circuit	1	P8085AH	34640	
U2	Integrated Circuit	1	MC68B50P	04713	
U3	Integrated Circuit	1	SN74LS393N	01295	
U4	Integrated Circuit	2	SN74LS373N	01295	
U5	EPROM	1	P2732A	14632	
U6	EPROM	1	P2764	14632	
U7	Integrated Circuit	1	P8156H	34649	
U8	Integrated Circuit	2	SN74LS147	01295	
U9	Same as U8				
U10	Resistor, Network: 4.7KΩ, 2%, 1.5 W	2	898-1R4.7K	73138	
U11	Same as U10				
U12	Integrated Circuit	1	SN74LS139N	01295	
U13	Integrated Circuit	1	SN74LS138N	01295	
U14	Integrated Circuit	1	SN74LS00N	01295	
U15	Integrated Circuit	1	505		

REF DESIG PREFIX **A3**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
U16	Integrated Circuit	1	AD2700LD	24355	
U17	Integrated Circuit	2	DAC1230LCD	27014	
U18	Integrated Circuit	4	LF356BN	27014	
U19	Same as U18				
U20	Integrated Circuit	2	LH0002CN	27014	
U21	Same as U17				
U22	Same as U18				
U23	Same as U18				
U24	Same as U20				
U25	Same as U4				
U26	Integrated Circuit	7	MPQ6002	04713	
U27 Thru U32	Same as U26				
VR1	Voltage Regulator	1	MC79L05ACG	04713	
U27 Thru U32	Same as U26				
VR1	Voltage Regulator	1	MC79L05ACG	04713	
XU1	Socket	2	540AG10D	91506	
XU2	Socket	3	524-AG10D	91506	
XU3	Not Used				
XU4	Not Used				
XU5	Same as XU2				
XU6	Socket	1	528AG10D	91506	
XU7	Same as XU1				
XU8 Thru XU14	Not Used				
XU15	Same as XU2				
Y1	Crystal, Quartz: 4.91520 MHz	1	MP042	75378	

3.5.5 **Type 796292-1, Heater Control** REF DESIG PREFIX **A4**

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
C1	Capacitor, Ceramic, Disc: 0.1µF, 20%, 100 V	1	8131M100-651-104M	72982	
C2	Capacitor, Electrolytic, Tantalum: 100µF, 20%, 20 V	1	196D107X0020TE4	56289	
E1	Terminal	5	140-1941-02-01	71279	
E2 Thru E5	Same as E1				
Q1	Triac	1	T2806M	02735	
R1	Resistor, Fixed, Composition: 5.1KΩ, 5%, 1/2 W	1	RCR20G512JS	81349	
R2	Resistor, Fixed, Composition: 10KΩ, 5%, 1/2 W	1	RCR20G103JS	81349	
U1	Integrated Circuit	1	CA3058	02735	

SECTION IV

SCHEMATIC DIAGRAMS

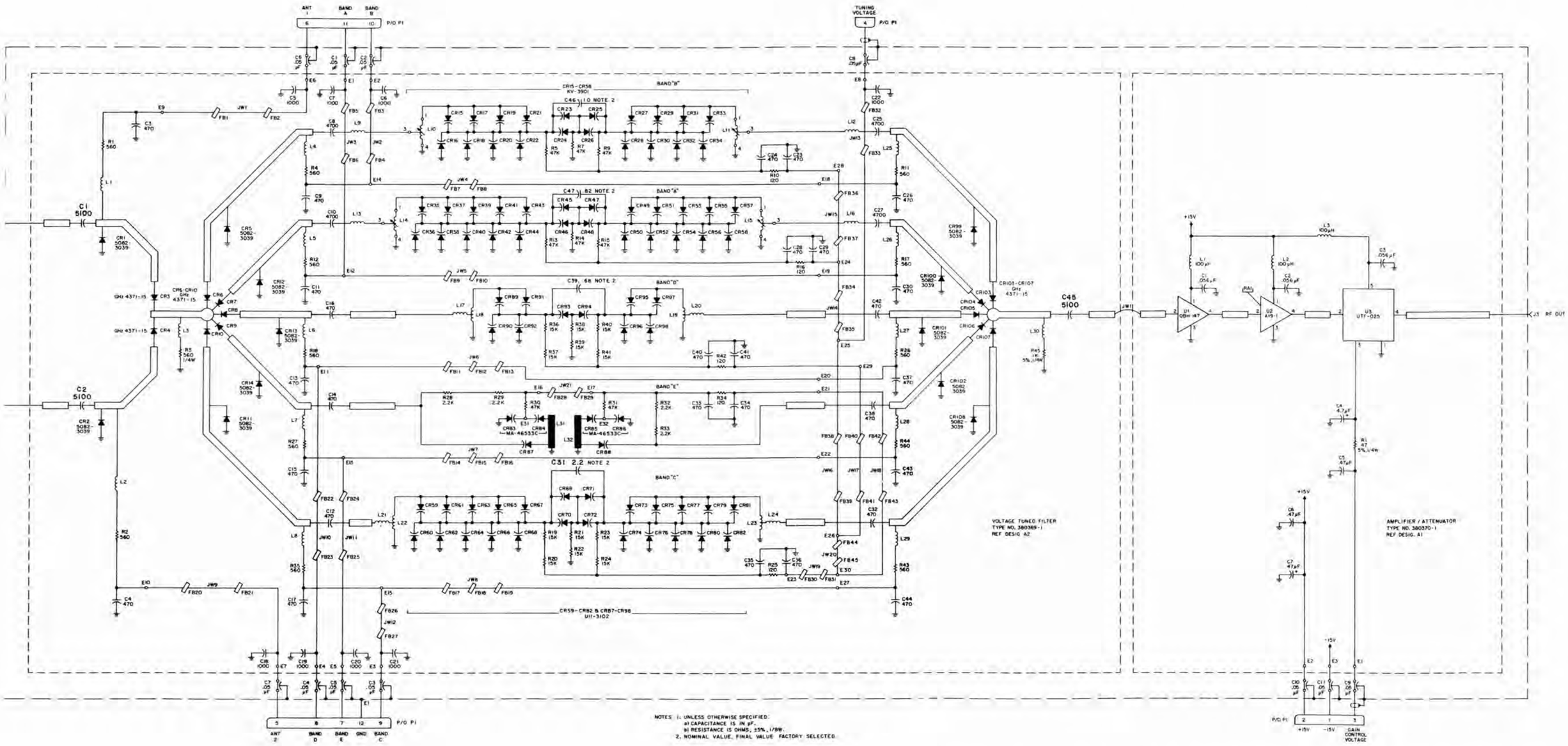
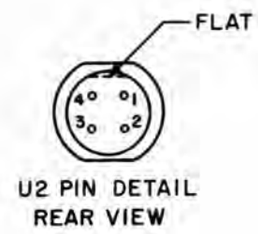


Figure 4-1. Type 796235-1, 20-1100 MHz Voltage Tuned Filter/Amplifier, (A1) Schematic Diagram 680052

NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±5%, 1/4W.
   b) CAPACITANCE IS IN µF
2. THE DIFFERENCE BETWEEN TYPES IS SHOWN IN TABLE I.
   280455-1 IS FIBER OPTICS INTERFACE
   280455-2 IS COAX CABLE INTERFACE.

TABLE I

TYPE NO.	J1	JW1	U2
280455-1	N/U	E1 TO E2	USED
280455-2	USED	E2 TO E3	N/U



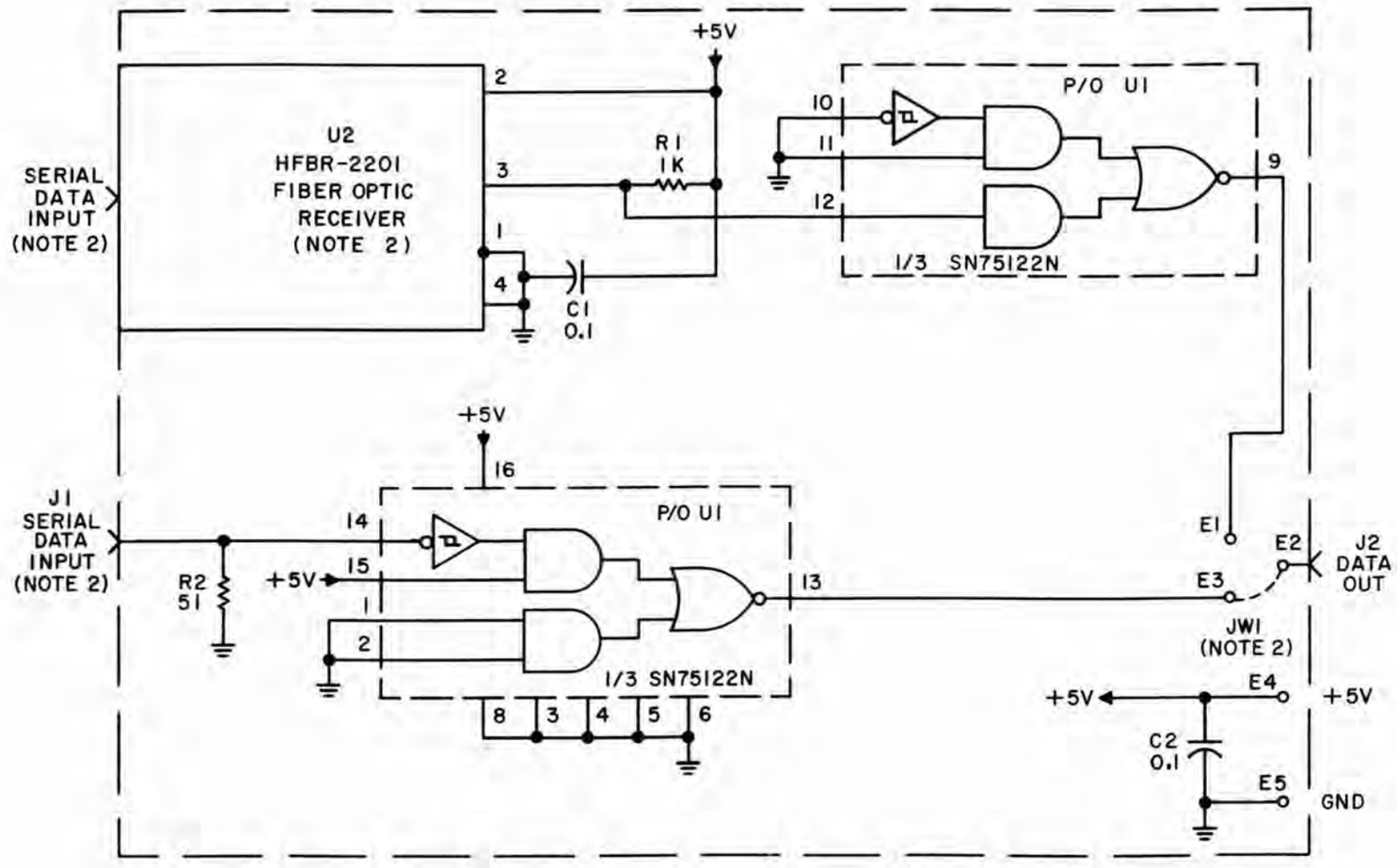


Figure 4-2. Type 280455-1, - 2, Serial Data Interface, (A2) Schematic Diagram 380440

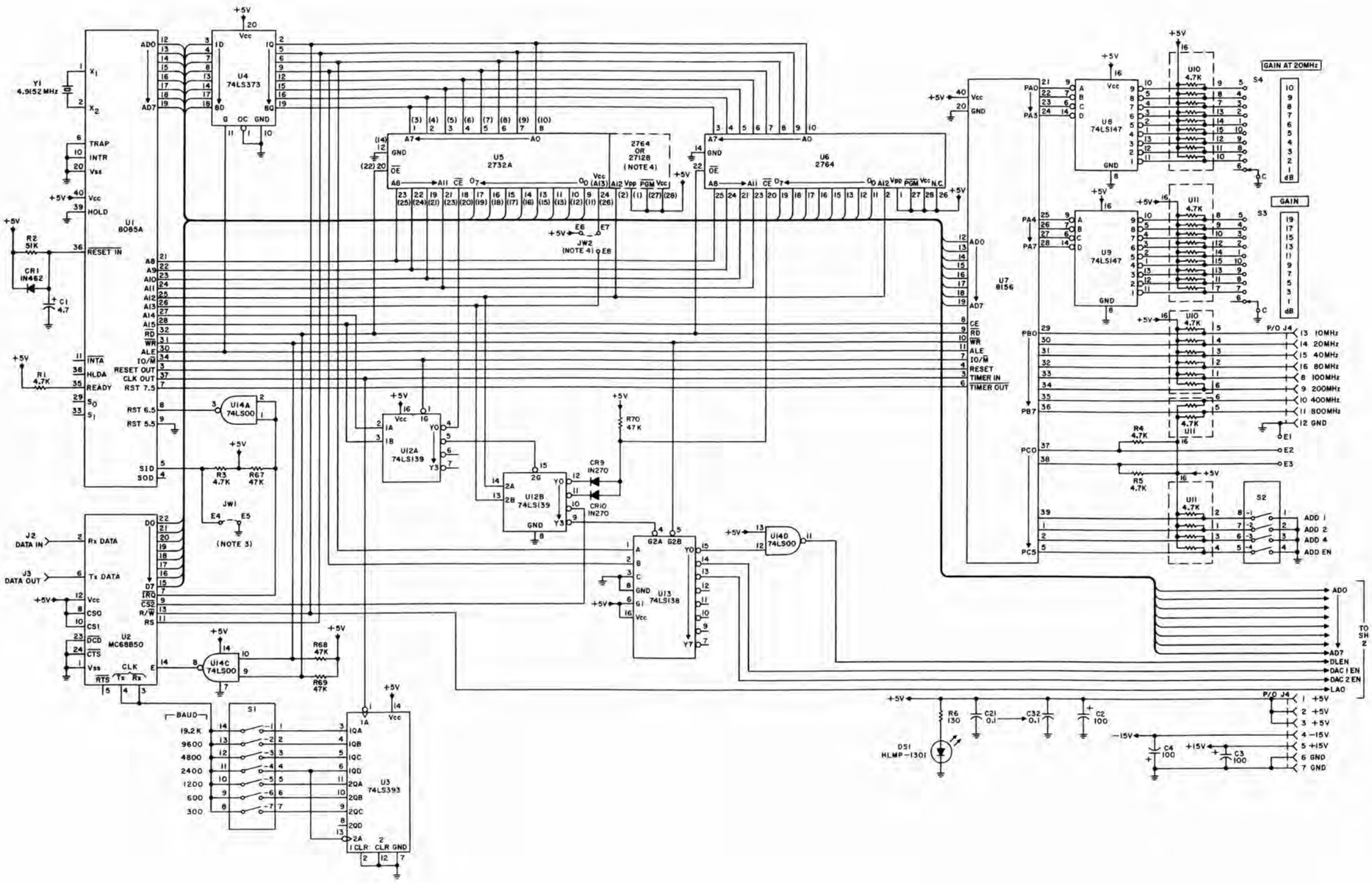


Figure 4-3. Type 796294-1, Control Processor, (A3)
Sheet 1 of 2
Schematic Diagram 580202

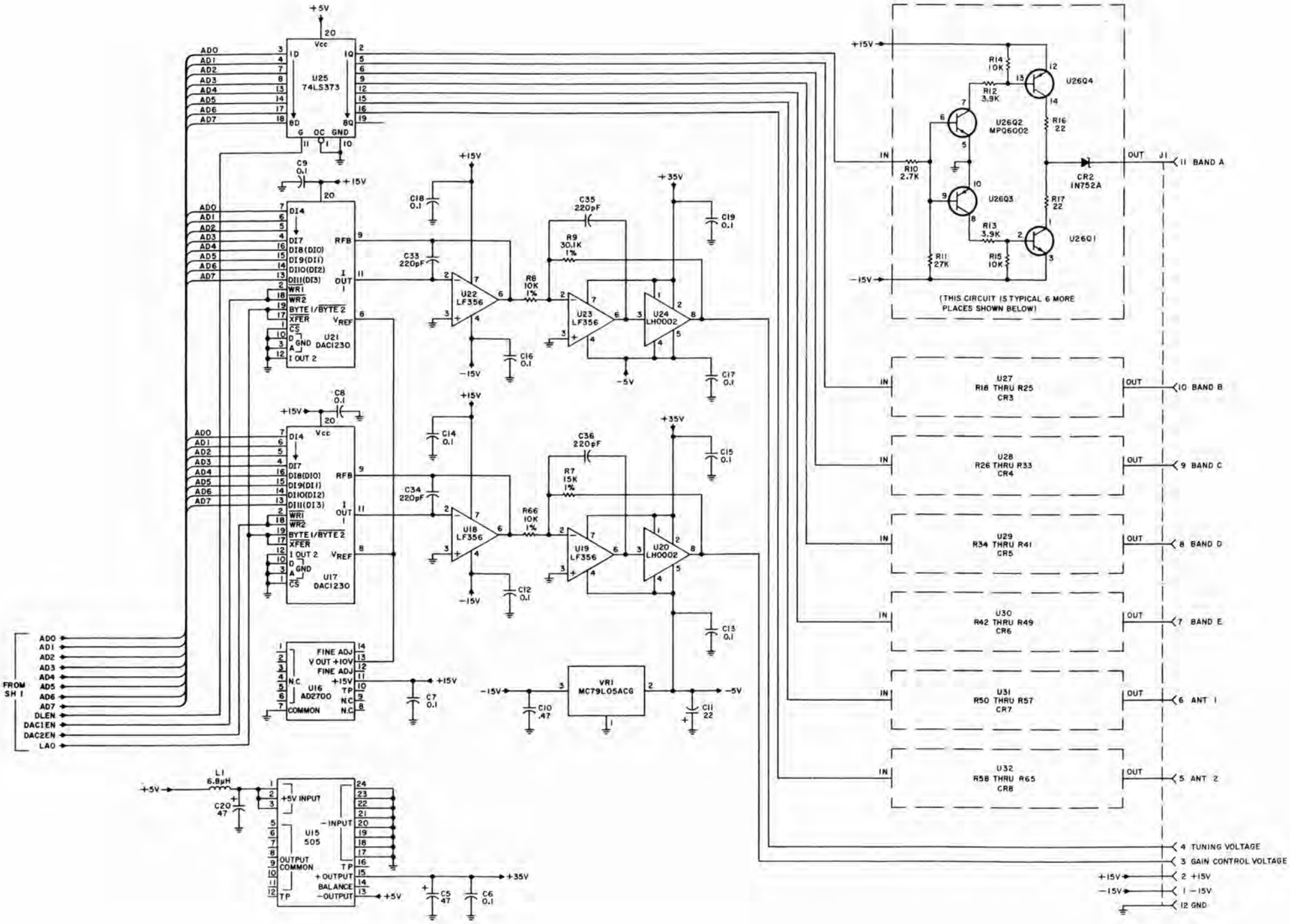
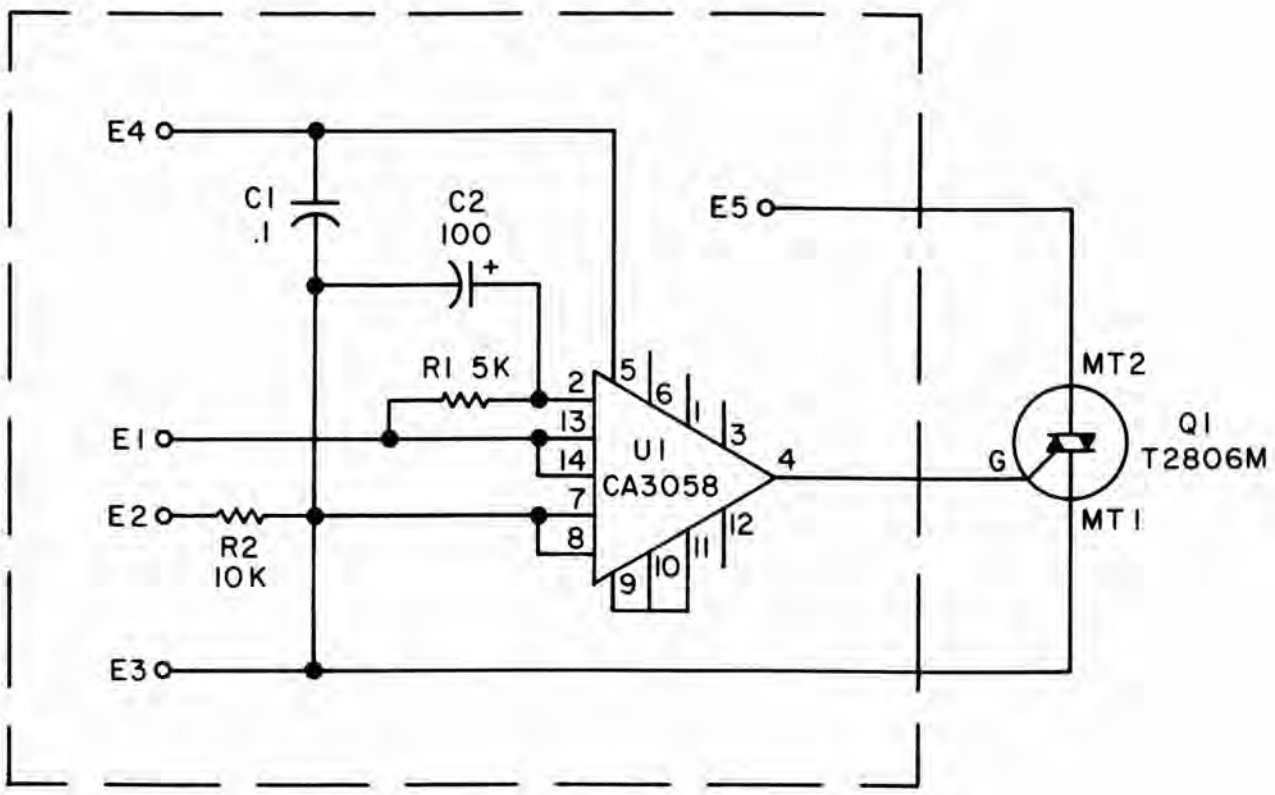


Figure 4-3. Type 796294-1, Control Processor, (A3)
Sheet 2 of 2
Schematic Diagram 580202



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS ±5%, 1/2W.
   b) CAPACITANCE IS IN μF.

Figure 4-4. Type 796292-1, Heater Control, (A4) Schematic Diagram 280474

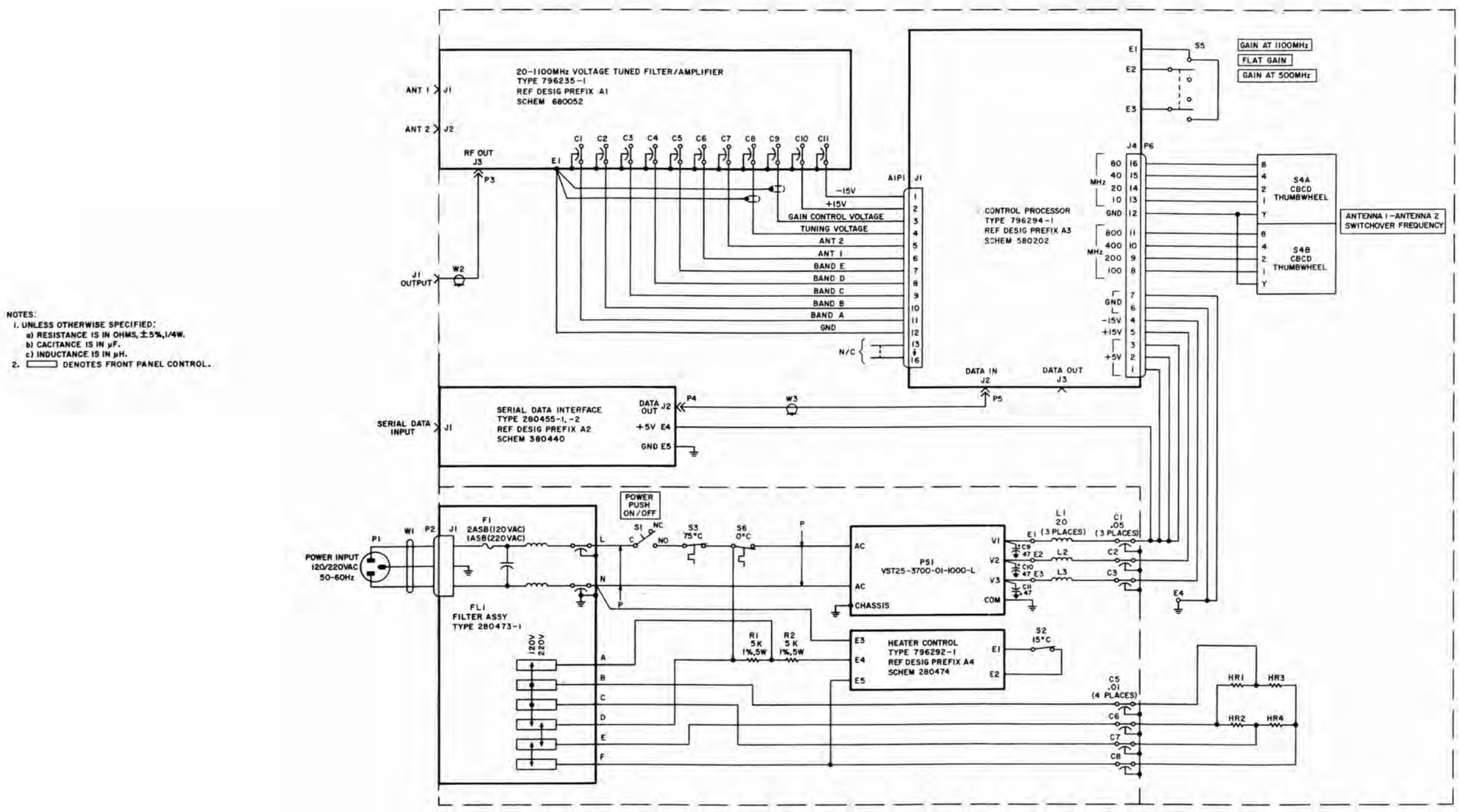


Figure 4-5. Type WJ-9073-2, 20-1100 MHz Tracking Preselector, Main Chassis Schematic Diagram 580193

DRS
TECHNOLOGIES

DRS SIGNAL SOLUTIONS, INC.