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# INSTRUCTION MANUAL

# FOR

# WJ-8626A-4 HF RECEIVER

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12/85

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**WARNING**

This equipment employs dangerous voltages which may be fatal if contacted. Exercise extreme caution in working with this equipment with any of the protective covers removed.

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# SECTION I

# GENERAL DESCRIPTION

## 1.1 ELECTRICAL CHARACTERISTICS

The WJ-8626A-4 (**Figure 1-1**) is a fully synthesized, microprocessor-controlled HF receiver that operates in the frequency range of 5 kHz to 30 MHz, tunable to 0 Hz. The receiver is compatible with the WJ-9040 Receiving System Family, functioning both as a receiver and a receiver controller (option MH). The receiver shares the WJ-9040 System characteristics of low power consumption, modular construction and high performance. The WJ-8626A-4 operates in both a local and remote control mode. Variable tuning resolution to 10 Hz is provided by phase lock loop frequency synthesizers stabilized by a 50 MHz reference frequency normally provided by a module in the WJ-9040 equipment frame (FRM150 or SRM105). For stand-alone applications, a dedicated power supply module (option MPS) provides the reference signal.

The WJ-8626A-4 can demodulate AM, FM, CW, USB and LSB signals. Two-tone FSK Demodulation is also available (option FSK). Five selectable IF bandwidths are available from 200 Hz to 16 kHz. SSB detection is achieved with a 2.85 kHz BW filter in conjunction with offset local oscillators. This filter also acts as one of the five selectable IF bandwidths for AM, FM, or CW detection. In cases where optimum carrier rejection performance is critical, separate USB and LSB filters can be installed leaving three remaining choices for other IF bandwidths.

The receiver's front panel includes both a general purpose keypad for direct entry of all parameters, and a tuning knob for sweep tuning of frequency, COS threshold and BFO offset. Front panel versatility is enhanced with dedicated control of detection mode, IF bandwidth, gain mode, RF and audio gain. Additional dual purpose keys facilitate control of the WJ-8626A-4's memory in both the stand alone and Master Receiver (option) applications with a minimum of operator training.

The microprocessor-controlled liquid crystal display (LCD) provides 48-character alphanumeric and graphic display of operating status. In the normal mode, all receiver parameters are indicated, including an easy-to-read bar graph comparison of the relative signal strength versus the squelch threshold. A tuning indicator with 13 discreet positions provides an aid for accurate centering of signals.

The versatile display also permits special setup modes such as Scan Set, where easy, comprehensive screens provide all pertinent information regarding step channel scanning (standard feature) or optional f1/f2 sector scanning (option SCAN).

Operator training time is minimized with the front panel ability to display error conditions using clear, concise phrases. Interactive prompting and corrective procedures written on the display greatly enhance the user's confidence in the receiver.

The standard memory configuration of the WJ-8626A-4 provides up to 56 kilobytes of ROM and 4.25 kilobytes of RAM with battery backup for all memory channels. The basic receiver uses approximately 2/3 of this capacity, supporting additional software for special applications. For expanded data collection requirements, 8 kilobytes of RAM may be substituted for ROM in the unit's memory.

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The WJ-8626A-4 is capable of remote talk-listen communication when installed in a properly configured WJ-9040 equipment frame, or as a stand-alone unit with an I/O option. An external controller (i.e., terminal or computer) can interrogate the receiver's status at any time. When the receiver is in Remote mode, either from a front panel key entry or a remote command, the controller can send new status to the WJ-8626A-4. The controlling device also has the ability to store and recall any of the 99 memory channels, and perform scan functions.

When used as a Master Receiver Controller (option MH), the receiver generates a high-speed WJ-9040 System I/O data stream. Connecting this 50-ohm link to a properly configured equipment frame achieves direct control of all the 1/4 rack (HF or VHF/UHF) receivers in that frame.

Maintenance operations are straightforward due to clean mechanical packaging and placement of nearly all components on plug-in circuit boards. These circuit boards mount on mother boards with most pins accessible from the bottom of the receiver. Removing the top cover exposes the assemblies, which may be unplugged from their sockets or freed from the main chassis by quick disconnect plugs.

## 1.2 MECHANICAL CHARACTERISTICS

The receiver normally is mounted in a 19-inch WJ-9040 System equipment frame (EFR 100) and occupies one half the width of the frame. The main chassis, front, rear, top and internal compartment panels are constructed of aluminum. The side panels are cast aluminum, the front is a 0.19 inch thick aluminum plate and the rear panel, main deck and internal partitions are stamped aluminum. All operating controls and indicators are on the front panel, while all input and output lines are routed through the rear panel (except for the phone jack).

The front panel is overlaid with a black bezel etched with control markings. The keypads are mounted on a printed circuit board and extend through cutouts in the front panel. The alphanumeric display is mounted on a circuit card positioned behind a cutout in the front, over which a polarized filter is installed. The phones jack, RF gain and Audio gain controls are also mounted on the front panel.

The rear panel mounts all input and output connectors. A 25-pin D series connector interfaces the required control I/O, DC supply voltages and Polled I/O signals between the receiver and the EFR100 Equipment Frame. Five SMA coaxial connectors interface the RF input, 50 MHz reference input, signal monitor, selected video, and IF outputs. A nine-pin SRE series connector interfaces the auxiliary output signals.

Removing eight screws allows the top cover to be lifted from the receiver exposing four main compartments. The input filter, optional preselector (option PRE) and input converter are each in brass enclosures. The four synthesizers are mounted in a partitioned compartment, while the IF assemblies and the digital control circuits are each in separate compartments for mechanical support and shielding.

Removing the bottom cover via eight screws exposes two additional printed circuit assemblies and allows access to the three motherboards. Most of the interconnections are made with push-on multipin plugs.

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## 1.3 OPERATIONAL OVERVIEW

The following paragraphs describe the WJ-9040 operational environment in terms of its interaction with the WJ-8626A-4 HF Receiver. Included are definitions of the hardware interface between the receiver and the WJ-9040 System and an overview of the data interchanges that occur.

### 1.3.1 BASIC SYSTEM ORGANIZATION

The WJ-8626A-4 HF Receiver is part of the WJ-9040 Receiving System Family and will typically be operated in a WJ-9040 System environment. The receiver is designed to plug into the WJ-9040 EFR100 Equipment Frame. This frame defines the interface point between the receiver and the WJ-9040 System. The receiver receives all DC power, control instructions and commands via a 26-pin D type connector that mates with a counterpart on the equipment frame. The WJ-9040 System is designed to communicate with the receiver from two primary sources: from a WJ-9040 System Receiver Controller or from an external control device via RS-232/IEEE-488 Interface. Both sources interface with the receiver through the IOM108 I/O and Interface Module on the equipment frame. Actual communication with the receiver is via a 54-bit serial data stream connecting the IOM108 and the receiver. In addition, an FRM150 Frequency Reference Module or SRM105 Site Lockable Reference Module, supply a 50 MHz signal to the receiver synthesizers. **Figure 1-1** is a simplified block diagram showing the relationship between the major elements in the WJ-9040 System.

### 1.3.2 EQUIPMENT REQUIRED BUT NOT SUPPLIED

The following items are a minimum complement necessary to obtain use of the receiver if it is to be configured as a component in a WJ-9040 receiving system.

- Up to Five WJ-9926A-XXXX IF Filter Assemblies
- EFR100 Equipment Frame
- EPS Series Power Supply
- FRM150 Frequency Reference Module or SRM105 Site Lockable Reference Module
- IOM108 Interface Module with DIO232 or DIO488 Interface (necessary only for interface with external controller)
- Antenna, 50 ohms
- Audio Monitoring Equipment:

  a. Speaker panel
  b. Headphones
  c. Tape recorder

For stand-alone use, a dedicated power supply and frequency reference unit are available.

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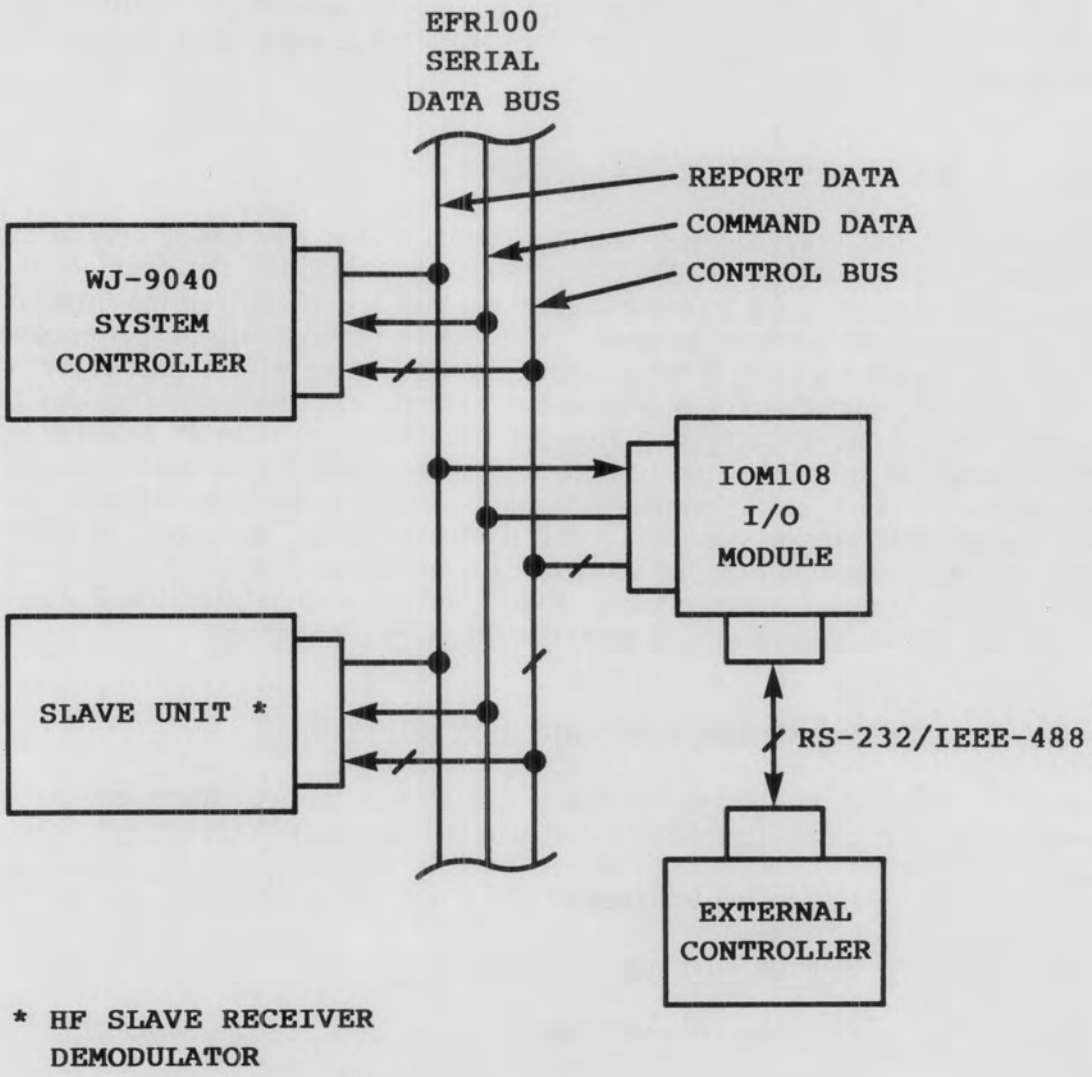


**Figure 1-2. WJ-9040 System Configuration**

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### 1.3.3 OPTIONAL EQUIPMENT

The following optional equipment is available for use with the WJ-8626A-4 HF Receiver. For additional information concerning these options and others, contact the Watkins-Johnson Company, Gaithersburg, Maryland, or your Watkins-Johnson representative.

- Sub-Octave Preselector — WJ-8626A-4/PRE
- Wideband Signal Monitor Output (100 kHz BW), (standard output is 17 kHz wide) — WJ-8626A-4/SMO
- Master/Handoff — WJ-8626A-4/MH
- FSK Demodulator — WJ-8624A-4/FSK
- Stand Alone Power Supply — WJ-8626A-4/MPS
- F1/F2 Sector Scan — WJ-8626A-4/SCAN

## 1.4 EQUIPMENT SPECIFICATIONS

See **Table 1-1** for WJ-8626A-4 HF Receiver specifications and **Table 1-2** for IF bandwidth options and sensitivity levels.

**Table 1-1. WJ-8626A-4 HF Receiver Specifications**

| | |
|---|---|
| Tuned Frequency | 5.0 kHz to 30.00000 MHz |
| Tuning Resolution | 10 Hz |
| Synthesizer Tuning Speed | 15 ms, typical |
| Antenna Conducted Local Oscillator Radiation | -87 dBm, maximum |
| Antenna Input Protection | The antenna input will withstand the effects of RF power to +27 dBm and static build-up. The protection circuit automatically resets. |
| Input Impedance | 50 ohms, unbalanced, nominal |
| IF Bandwidths (3 dB) | Standard: 2.85 kHz; Optional: any four of the following: 0.2, 0.5, 1, 2, 3, 4, 6, 8, 12 or 16 kHz; USB, LSB |
| Detection Modes | Standard: FM, AM, CW, LSB and USB |
| Gain Control Modes | Manual, AGC |
| AGC and Manual Range | 90 dB, minimum |
| AGC Threshold | 3.0 microvolt, typical |
| AGC Attack Time | 15 ms, maximum |
| AGC Release Time | FAST = 100 ms, maximum; SLOW = 2-4 Sec., nominal |
| Synthesized BFO | ±8.0 kHz in 100 Hz steps |
| IF Rejection | Greater than 90 dB |
| Image Rejection | Greater than 90 dB |

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**Table 1-1. WJ-8626A-4 HF Receiver Specifications** (Continued)

| | |
|---|---|
| Sensitivity | See IF Options and Sensitivity Table |
| IF Output | 455 kHz, 20 mV into 50Ω, minimum, at 3 microvolt input level, IF BW limited |
| Signal Monitor Output | 455 kHz, center frequency, 17 kHz bandwidth, 50Ω, output impedance |
| Third Order Input Intercept Point | +20 dBm, minimum for signals separated by 30 kHz minimum. |
| Video Amplifier Response | Within 3 dB from 20 Hz to 1/2 IF Bandwidth |
| Video Output Level | 350 mV rms into 75 ohms |
| Video Distortion | Less than 5% total Harmonic Distortion in AGC or Manual Gain Modes |
| Phones Output | 10 mW minimum into 600 Ω phones |
| Signal Strength Output | Shaped DC AM Detector output, 0 to +10 Vdc |
| Squelch/COR | Adjustable threshold from noise level to 80 dB above noise. COR holds a nominal 4 seconds after carrier disappears. |
| Digital Control | 72 Bit Serial Word (WJ-9040 System compatible) |
| Environmental Conditions: | |
| Temperature, Operating | 0° to +50°C |
| Size | 5.2 inches (132 mm) high, 8.0 inches (203 mm) wide and 14.38 inches (365 mm) deep |
| Weight | Approximately 17 lbs (7.7 kg) |
| Power Consumption | Approximately 15 watts (From +8.2, ±18.3, +29 VDC) |

**Table 1-2. IF Bandwidth Options and Sensitivity Levels**

| | 3 dB IF Bandwidth | IF Shape Factor (Typical) 50 dB:3 dB | RF Input Level Microvolts | dBm |
|---|---|---|---|---|
| WJ-9926A/200 | 200 Hz | 10:1 | 0.50 | -113 |
| WJ-9926A/500 | 500 Hz | 7:1 | 0.64 | -111 |
| WJ-9926A/1K | 1 kHz | 5:1 | 0.80 | -109 |
| WJ-9926A/2K | 2 kHz | 3:1 | 1.0 | -107 |
| WJ-9926A/3K | 3 kHz | 3:1 | 1.4 | -104 |
| WJ-9926A/4K | 4 kHz | 3:1 | 1.6 | -103 |
| WJ-9926A/6K | 6 kHz | 3:1 | 2.0 | -101 |
| WJ-9926A/8K | 8 kHz | 3:1 | 2.2 | -100 |
| WJ-9926A/12K | 12 kHz | 3:1 | 2.9 | -98 |
| WJ-9926A/16K | 16 kHz | 2:1 | 3.2 | -97 |
| WJ-9926A/USB | 2.85 kHz | 1.8:1 | 0.7 | -110 |
| WJ-9926A/LSB | 2.85 kHz | 1.8:1 | 0.7 | -110 |
| WJ-9926A/SSB (uses offset L.O.) | 2.85 kHz | 1.8:1 | 0.7 | -110 |

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**Table 1-2. IF Bandwidth Options and Sensitivity Levels** (Continued)

NOTE: Over the frequency range of 0.2 to 30 MHz, the RF input levels and IF Bandwidths specified above will:

1. Produce a minimum AM (S+N)/N ratio of 10 dB at the audio output for 50% AM modulation at a 400% Hz rate, (1 kHz and wider IF Bandwidths).
2. Produce a minimum CW (S+N)/N ratio of 16 dB at the audio output.
3. Produce a minimum FM (S+N)/N ratio of 17 dB at the audio output (10 kHz and wider IF Bandwidth).
4. Produce a minimum USB/LSB (S+N)/N ratio of 10 dB at the audio output (SSB Filters only).

Over the frequency range of 5 kHz to 200 kHz, the following applies:

CW Sensitivity (1 kHz IF Bandwidth)

| | |
|---|---|
| 200 kHz - 30 MHz ..... | A 0.8 microvolt signal will produce at least a 16 dB (S+N)/N ratio at the audio output. |
| 50 kHz - 200 kHz ..... | A 1.8 microvolt signal will produce at least a 16 dB (S+N)/N ratio at the audio output. |
| 15 kHz - 50 kHz ..... | A 7.1 microvolt signal will produce at least a 16 dB (S+N)/N ratio at the audio output. |
| 5 kHz - 15 kHz ..... | A 128 microvolt signal will produce at least a 16 dB (S+N)/N ratio at the audio output. |

When the optional switched sub-octave preselector option is installed, receiver sensitivity is decreased by 2 dB, maximum.

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# SECTION II

# INSTALLATION AND OPERATION

## 2.1 UNPACKING AND INSPECTION

Examine the shipping carton for damage prior to unpacking the equipment. If the carton appears to be damaged, have the carrier's agent present when the equipment is unpacked. If this is not possible, retain all packaging material and shipping containers for the carrier's inspection to verify damage to the equipment after unpacking. Also verify that the equipment shipped corresponds to the packing slip. Contact the Watkins-Johnson Company, CEI Division, or your Watkins-Johnson representative for any discrepancies or shortages.

The unit was thoroughly inspected and factory adjusted for optimum performance prior to shipment. It is, therefore, ready for use upon receipt. After uncrating and checking contents against the packing slip, visually inspect all exterior surfaces for dents and scratches. If external damage is visible, remove the dust covers and inspect the internal components for apparent damage. Then check the internal cables for loose connections, and plug-in items such as printed wiring boards, which may have been loosened from their receptacles.

## 2.2 REPACKING

If the equipment must be prepared for reshipment, the packing methods should follow the pattern established in the original shipment. If retained, the original materials can be reused to a large extent or at least provide guidance for the repackaging effort. Conditions during storage and shipment should be limited as follows:

Maximum humidity: 95% (no condensation)
Temperature Range: -40°C to 85°C

## 2.3 INSTALLATION PROCEDURES

The WJ-8626A-4 HF Receiver is designed to mount in the EFR100 Equipment Frame. Specific installation procedures for the EFR100 are covered in the WJ-9040 EFR100 Operator's Manual. However, the following general guidelines should be observed when using the receiver in the WJ-9040 Operational Environment:

1. Operating temperature range should be from 0°C to +50°C.
2. Free air circulation should be allowed between equipment frames. Multiple stacking significantly increases ambient temperatures.
3. Use only stable, properly grounded AC power for the WJ-9040 equipment.
4. Secure the receiver in the frame by rotating the four front panel locking screws clockwise until tight.

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### 2.3.1 INPUT/OUTPUT CONNECTORS

The receiver's input/output connectors are shown in **Figure 2-1.** These connectors are physically mounted on the receiver rear panel. The 25-pin D type connector (J1) mates with a counterpart in the EFR100 Equipment Frame to provide DC power and control signals to the receiver and status indication outputs. Five SMA female connectors provide signal input and output connections. BNC connector (J3) provides the optional WJ-9040 Serial I/O output for connection to other frames. A nine-pin SRE female connector (J4) provides auxiliary outputs from the demodulator. These connectors are described individually in the following paragraphs.

#### 2.3.1.1 Power, Command/Control J1

This 25-pin D type connector mates with the stand-alone power supply (option MPS) or any one of connectors J1-J8 on the EFR100 to supply DC voltage and I/O command and control signals to the receiver. Status conditions, including signal strength, squelch status, tuning voltage and synthesizer lock, are polled by the IOM108 via this connector.

#### 2.3.1.2 50 MHz Reference Input J2

This SMA connector must be connected to either J1, J2, J3, or J4 on the FRM150 or other highly stable 50 MHz signal (50 ohm, 0 dBm), to provide a reference for the receiver's synthesizers.

#### 2.3.1.3 Optional WJ-9040 Serial I/O Connector J3

When equipped with the Master/Handoff Option (option MH), this 50-ohm BNC connector supplies the high speed I/O data stream for the Master Receiver Controller mode. It may be connected to A1A3J1 on any IOM108 for control of all quarter-rack receivers in that frame.

#### 2.3.1.4 Auxiliary Output J6

This nine-pin SRE female connector provides outputs from the receiver's Demodulator Section. These outputs are for connection to user-selected interface devices. The pin assignments are as follows:

| | | |
|---|---|---|
| A | - | Ground |
| B | - | FM Audio Output (5 kohm impedence) |
| C | - | AM Audio Output (5 kohm impedence) |
| D | - | Signal Strength Output (analog 0 to +10 Vdc 10 mA) |
| E | - | Carrier Operated Relay (open collector, 30 mA sink to ground, +24 Vdc max) |
| F | - | Carrier Operated Squelch (0 or + 5 Vdc CMOS driver) |
| H | - | CW/SSB Output (5 kohm impedence) |
| J | - | Squelched Audio Output (600 ohm impedence) |
| K | - | FSK Output (option) |

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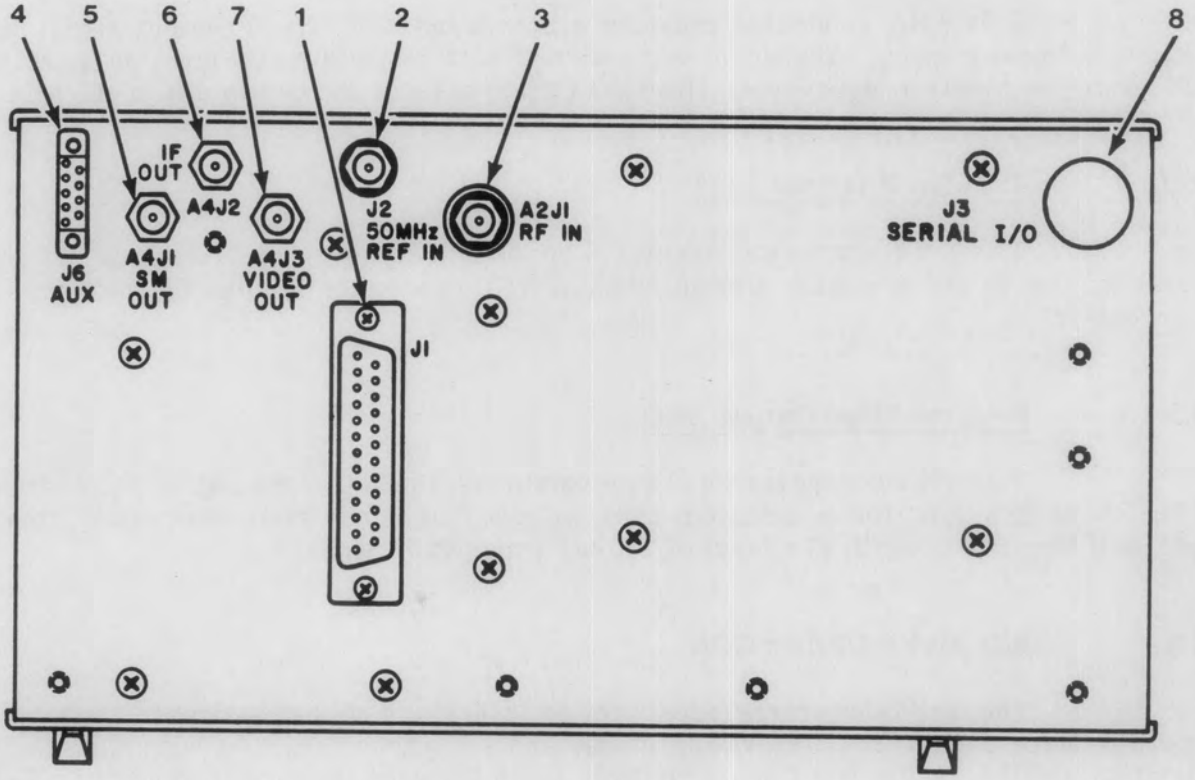


1. Power, Command/Control J1
2. 50 MHz Reference Input J2
3. RF Input A2J1
4. Auxiliary Output J6
5. SM Output A4J1
6. 455 kHz IF Output A4J2
7. Selected Video Output A4J3
8. Serial I/O Connector J3

**Figure 2-1. Receiver Input/Output Connectors**

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#### 2.3.1.5 RF Input A2J1

This SMA connector is the RF signal input for the receiver. Nominal input impedance is 50 ohms. The input is protected against RF power levels up to +27 dBm (500 milliwatts) and static buildup.

#### 2.3.1.6 SM Output A4J1

This SMA connector provides a broadband 455 kHz IF output signal suitable for driving a signal monitor. The signal occupies a 17 kHz bandwidth at a level of approximately 25 dB above the receiver input level. The SMO Option extends the bandwidth to 100 kHz.

#### 2.3.1.7 455 kHz IF Output A4J2

This SMA connector supplies a bandwidth limited 455 kHz IF output signal. The level will be 20 mV minimum into 50 ohms in AGC mode, for RF input signals greater than 3 microvolts.

#### 2.3.1.8 Selected Video Output A4J3

This SMA connector supplies a bandwidth limited video output signal from the AM, FM, CW or SSB detector as selected. The AC coupled signal has a bandwidth from 20 Hz to one-half the IF bandwidth at a level of 350 mV rms into 75 ohms.

## 2.4 RECEIVER OPERATION

The following paragraphs are an operator's guide designed to familiarize the operator with the different operating modes and sequences available with the receiver. The function and use of the front panel controls and indicators are explained and detailed receiver operating instructions are provided.

### 2.4.1 INTRODUCTION

The WJ-8626A-4 HF Receiver incorporates the following operational features:

- Local receiver control through momentary contact keypad switches and a tuning knob on the front panel.
- Ninety-nine discretely addressed and one implicitly addressed memory channels. The channels are utilized to store front panel data. They may be accessed individually or scanned.
- A memory scan mode in which the receiver scans a selected group of channels.
- An F1/F2 frequency sector scan mode in which the receiver scans an operator programmed frequency sector (optional).

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- Remote control capability through the IOM108 interface or stand-alone I/O interface.
- Software flexibility allowing implementation of customer enhancements.

## 2.4.2 CONTROLS AND INDICATORS

The purpose and function of the front panel controls, keypad switches and displays are explained in the following paragraphs.

### 2.4.2.1 Front Panel Controls

Refer to **Figure 2-2** for the location of each of the following front panel controls.

#### 2.4.2.1.1 BACKLIGHT ON Switch

When lifted to the ON position, this switch energizes the illuminated backlight in the LCD display. This backlight enhances display readability when a low ambient light level is present. The intensity of the backlight illumination is adjustable inside the unit. See **paragraph 4.6.7.**

#### 2.4.2.1.2 DISPLAY ADJUST Potentiometer

This potentiometer adjusts the vertical viewing angle of the LCD display characters. The characters are invisible at maximum CCW and the display is totally illuminated at maximum CW. The operator may adjust this control for optimum display contrast.

#### 2.4.2.1.3 RF GAIN Control

When in the MAN gain mode, rotating this potentiometer clockwise approximates a logarithmic increase in receiver gain. The RF Gain control is inoperative when any AGC mode is selected.

#### 2.4.2.1.4 AUDIO GAIN Potentiometer

Rotating the Audio Gain potentiometer clockwise increases the output of the phone audio signal from the front panel PHONES jack.

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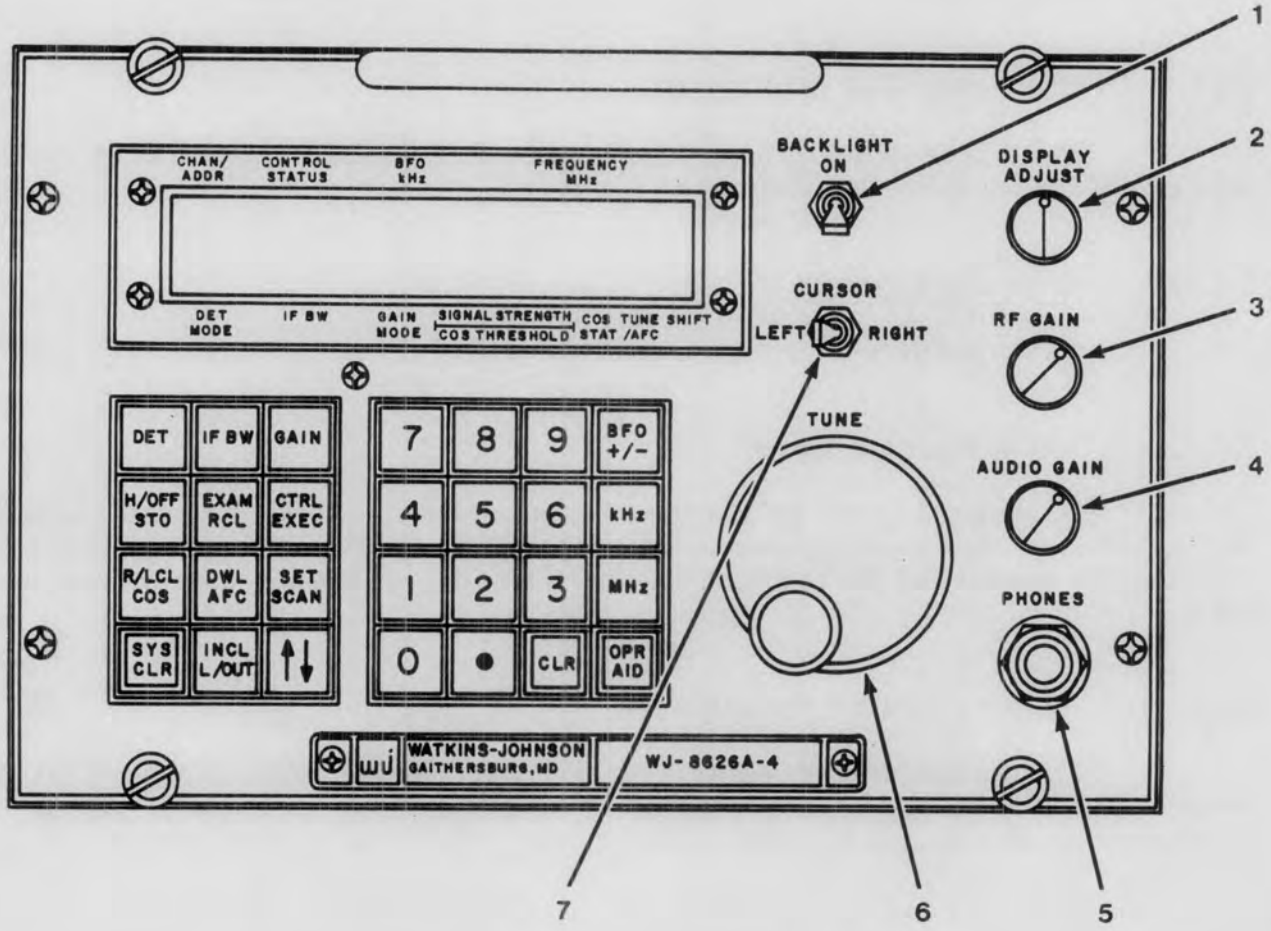


1. BACKLIGHT ON Switch
2. DISPLAY ADJUST
3. RF GAIN
4. AUDIO GAIN
5. PHONES Jack
6. Tuning Knob
7. Cursor Control Switch

**Figure 2-2. Receiver Front Panel Controls**

Courtesy of http://BlackRadios.terryo.org



2.4.2.1.5 **PHONES Jack**

This output is intended to drive a 600 ohm or greater headphone set. An output level of 10 milliwatts, minimum, into 600 ohms is available when the AUDIO GAIN control is at maximum clockwise.

2.4.2.1.6 **TUNE Knob**

This knob is used to manually set the receiver's tuned frequency, BFO frequency or COS (Carrier Operated Squelch) threshold. When used for frequency setting, the knob is rotated clockwise to numerically increase the receiver's tuned frequency or BFO frequency. When used for COS threshold setting, the knob is rotated clockwise to numerically increase the receiver's squelch threshold (0 minimum, 63 maximum, software controlled).

2.4.2.1.7 **Cursor Control Switch**

This switch is used to position the LCD display cursor (underscore) to permit the TUNE knob to control tuned frequency, BFO frequency or COS threshold. The switch is toggled either left or right to move the cursor to the desired position. When the cursor is in the proper position, the TUNE knob may be rotated to adjust the desired parameter. The cursor can also be moved to the far right edge of the screen where the TUNE knob is disabled, indicated by a left-pointing arrow adjacent to the frequency display.

2.4.2.2 **Front Panel Keypad Switches**

Refer to **Figure 2-3** for the location of each of the following front panel keypad switches.

2.4.2.2.1 **BFO +/- Switch**

In CW mode, this switch is used for direct entry of BFO offset frequencies. Numeric data in kHz (**paragraph 2.4.2.2.6**) is entered followed by the BFO +/- switch as a termination command. If no data is entered, the switch will toggle the offset from "+" (above the tuned signal) to "-" (below the signal).

2.4.2.2.2 **kHz Switch**

This switch is used for direct entry of receiver tuned frequency. Numeric data is entered followed by the kHz switch as a termination command.

2.4.2.2.3 **MHz Switch**

This switch is used for direct entry of receiver tuned frequency. Numeric data is entered followed by the MHz switch as a termination command.

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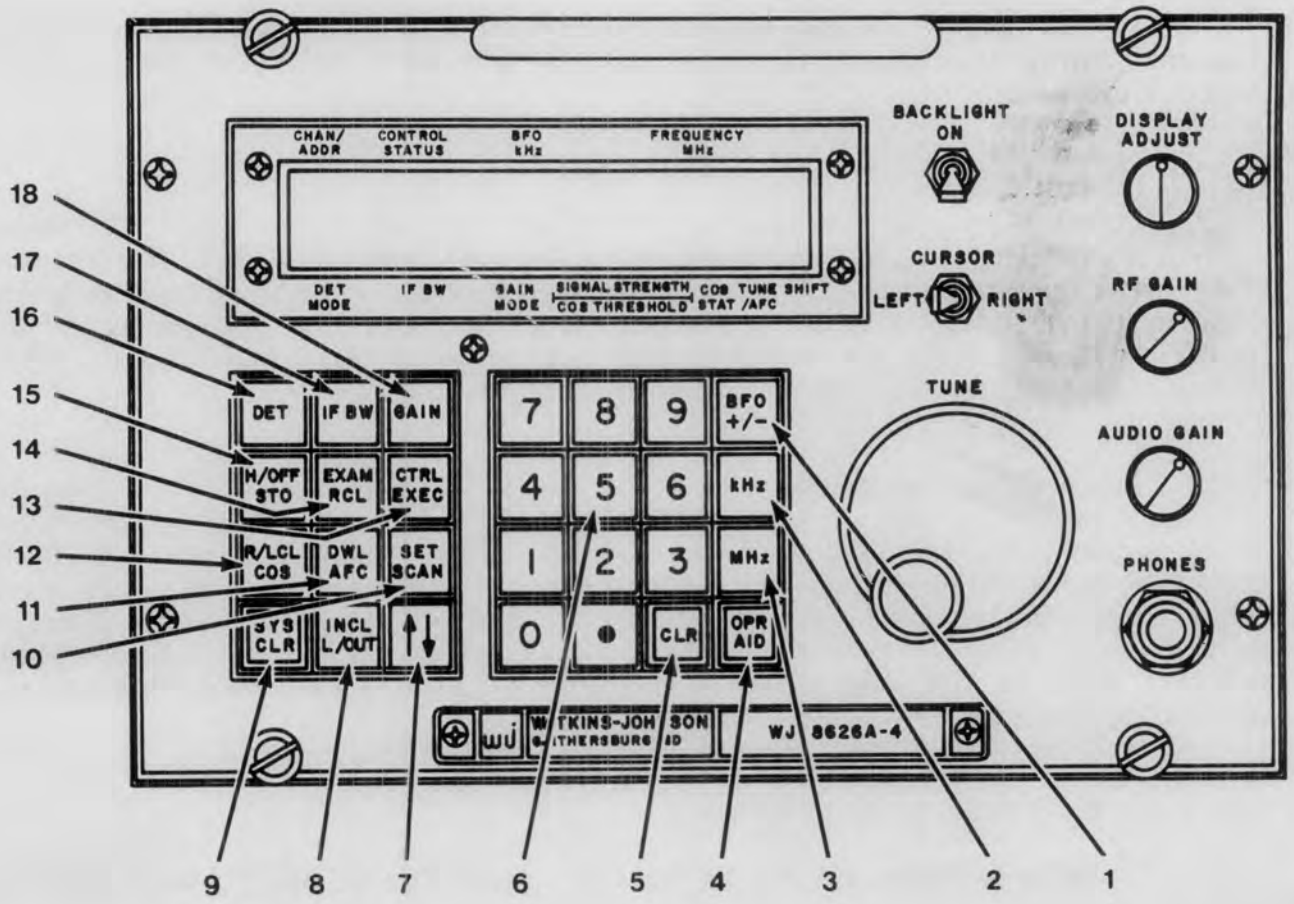



1. BFO +/- (BFO Offset Entry Switch)
2. kHz Tuned Frequency Entry
3. MHz Tuned Frequency Entry
4. OPR AID (Operator Aid Switch)
5. CLR (Numeric Entry CLEAR Switch)
6. Numeric Entry Switches 0-9
7. (Lower/Upper Case Selection)
8. INCL L/OUT (Include/Lock Out Memory Channels), (SCAN function)
9. SYS CLEAR (System Clear)
10. SET SCAN (SCAN/SCAN SET select)
11. DWL (Dwell select), (SCAN function)
12. L/LCL COS (COS Threshold Set/ Remote and Local Select)
13. EXEC (Execute Select)
14. RCL (Recall Select)
15. STO (Store Select)
16. DET (Detection Mode Select)
17. IF BW (IF Bandwidth Select)
18. GAIN (Gain Mode Select)

**Figure 2-3. Front Panel Keypad Switches**

Courtesy of http://BlackRadios.terryo.org



#### 2.4.2.2.4 OPR AID Switch

This switch accesses software designed to aid the operator in understanding the sequences and functions available with the receiver.

#### 2.4.2.2.5 CLR Switch

This switch, when pressed after a numeric data entry, CLEARS the display of the numeric data and returns the display to normal status. The entered numeric data is not processed by the receiver. This switch will also clear any error message and restore the previous display.

#### 2.4.2.2.6 Numeric Switches 0-9

These switches are used for direct entry of numeric data required for tuned frequency, BFO offset, COS threshold, memory channel access, dwell time, etc.

#### 2.4.2.2.7 Up/Down Arrow Switch

This switch is the upper case/lower case access switch. Some of the keypad switches are dual function, as indicated on the face of the switches. The upper case arrow is used to access the upper functions on these switches, and the lower case arrow is used to access the lower functions. The switch toggles the arrow shown in the lower right corner of the LCD.

#### 2.4.2.2.8 SYS CLR Switch

This switch access the SYSTEM CLEAR routine which allows the operator to empty all memory channel locations and reinitialize the receiver. The IOM108 units connected via the frame or WJ-9040 Serial I/O can also be cleared by following the prompts.

#### 2.4.2.2.9 INCL/L-OUT Switch

This is a dual function switch. The upper case INCL function is used as a termination command to INCLUDE a memory channel or string of channels in a scan. The lower case L/OUT function is a termination command to LOCK OUT a memory channel or string of channels from a scan.

#### 2.4.2.2.10 SET/SCAN Switch

This is a dual function switch. The upper case SET function is the SCAN SET mode which allows the operator to review and modify parameters associated with SCANNING. Pressing SET again terminates this mode. The lower case SCAN function is the SCAN mode which performs a scan of selected memory channels. Pressing the SCAN key again terminates the scan.

Courtesy of http://BlackRadios.terryo.org



2.4.2.2.11 **DWL Switch**

This switch is the DWELL mode which allows the operator to program the various dwell times associated with scan functions, or examine the current dwell time values.

2.4.2.2.12 **R/LCL COS Switch**

This is a dual function switch. The upper case R/LCL function toggles the receiver between the REMOTE and LOCAL modes of operation. The lower case COS (carrier operated squelch) function is used as a termination command for direct entry of COS threshold data, or to examine the numeric value of COS threshold.

2.4.2.2.13 **EXEC Switch**

This switch is a termination command for the EXECUTE mode. The function is used to directly control the status of the receiver section of the WJ-8626A-4 from channel 0 or any of the 99 stored memory channels.

2.4.2.2.14 **RCL Switch**

This switch is a termination command which changes the CONTROL STATUS to RCLm (RECALL MEMORY). The contents of one of the stored memory channels is displayed without changing the receiver status.

2.4.2.2.15 **STO Switch**

This switch is a termination command which will STORE all of the currently displayed parameters into the designated memory channel.

2.4.2.2.16 **DET Switch**

This switch is used to select one of the available detection modes. The switch is repeatedly pressed until the desired detection mode is displayed.

2.4.2.2.17 **IF BW Switch**

This switch is used to select one of the available IF bandwidths. The switch is repeatedly pressed until the desired bandwidth is displayed.

2.4.2.2.18 **GAIN Switch**

This switch is used to select one of the available gain modes. The switch is repeatedly pressed until the desired gain mode is displayed.

Courtesy of http://BlackRadios.terryo.org



### 2.4.2.3 Front Panel Display

Refer to **Figure 2-4** to locate the display areas described in the following paragraphs.

#### 2.4.2.3.1 DET MODE Display

This area displays the selected detection mode for the receiver.

#### 2.4.2.3.2 CHAN/ADDR Display

This area displays the channel number of the memory channel being accessed by the receiver.

#### 2.4.2.3.3 IF BW Display

This area displays the selected IF bandwidth for the receiver.

#### 2.4.2.3.4 CONTROL STATUS Display

This area displays which one of the control modes the front panel is currently executing.

#### 2.4.2.3.5 GAIN MODE Display

This area displays the gain mode the receiver is currently operating under. The three gain modes are: FST, SLO, and MAN.

#### 2.4.2.3.6 BFO (kHz) Display

If the receiver is in CW mode, this area displays the BFO offset frequency in kHz currently selected.

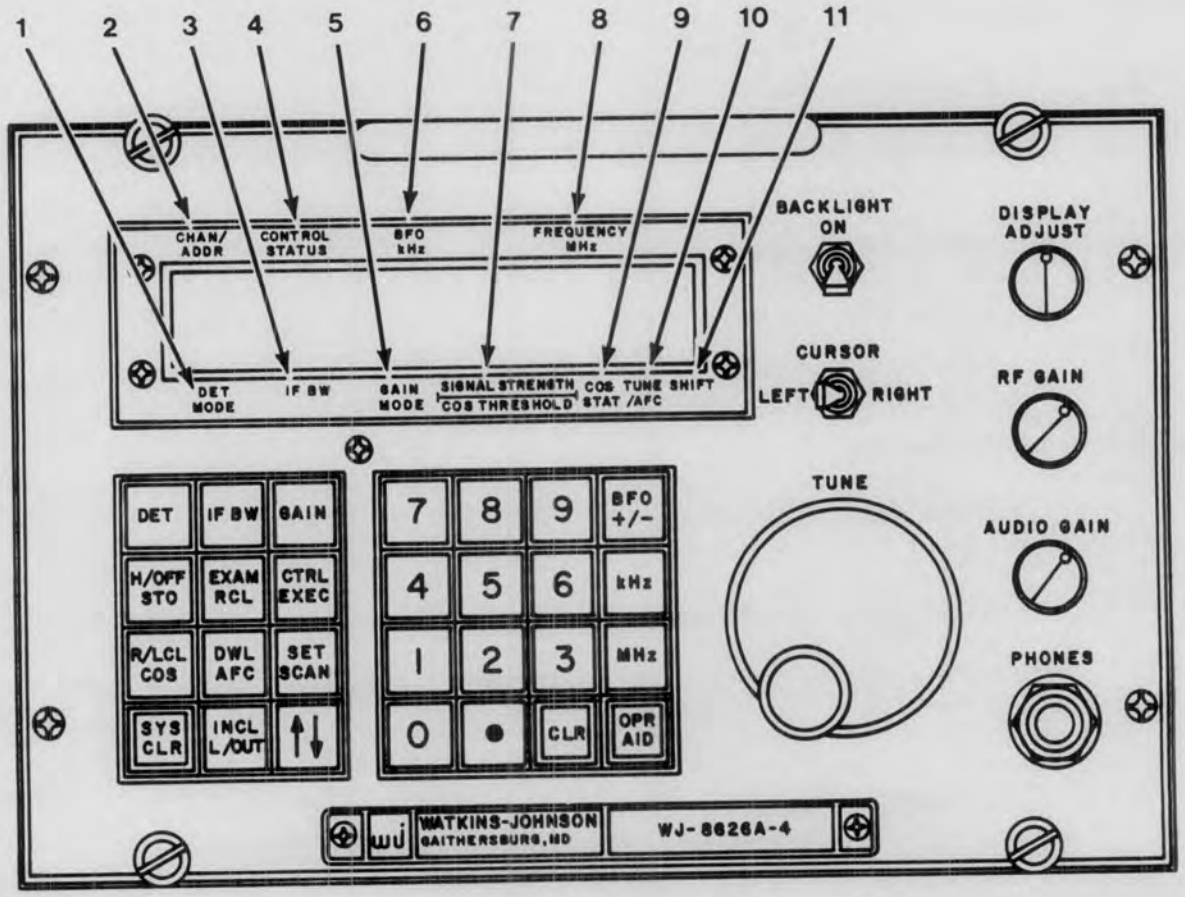
#### 2.4.2.3.7 SIGNAL STRENGTH/COS THRESHOLD Display

This is a dual purpose display area. It gives a graphic comparison of relative signal strength vs. COS (carrier operated squelch) threshold. The upper bar shows signal strength. The length of the bar increases from left to right as signal strength increases. The lower bar shows COS threshold. The length of the bar corresponds to the magnitude of COS threshold entered. A COS of 0 is shown as no bar length (bar completely collapsed at the left). A COS of 63 is shown by maximum bar length. The COS threshold is exceeded when the signal strength bar exceeds the length of the COS bar.

The numeric value of the COS threshold will appear in place of the bars when the COS key is pressed with no previous data entry.

Courtesy of http://BlackRadios.terryo.org






1. DET MODE (Detection Mode)
2. CHAN/ADDR (Channel/Address)
3. IF BW (IF Bandwidth)
4. CONTROL STATUS
5. GAIN MODE
6. BFO Offset
7. SIGNAL STRENGTH/COS THRESHOLD
8. FREQUENCY (MHz), (Receiver Tuned Frequency)
9. COS STAT (COS Status)
10. TUNE/AFC (AFC Tuning Indicator)
11. SHIFT (upper/lower case functions)

**Figure 2-4. LCD Parameter Display Locations**

Courtesy of http://BlackRadios.terryo.org



#### 2.4.2.3.8 FREQUENCY (MHz) Display

If no numeric data is entered, this area shows the tuned frequency of the receiver in MHz. When numeric keys are pressed, the frequency information is erased and the data is entered calculator style in the frequency area. Data entry is identified by the flashing arrow symbol in the upper right corner of the display.

#### 2.4.2.3.9 COS STAT Display

This area displays a star (*) when the received signal strength exceeds the COS (carrier operated squelch) threshold.

#### 2.4.2.3.10 TUNE/AFC Display

This area serves as a visual tuning indicator for the receiver. When the receiver is exactly tuned on a signal, the tuning indicator is displayed as a vertical bar. Mistuning of the receiver is displayed as a right or left deflection of the tuning indicator. On receivers equipped with AFC, this indicator is replaced by the letter "A" when AFC is selected. The correct tuning is then handled by the digital AFC circuitry.

#### 2.4.2.3.11 SHIFT Display

This area displays an upward pointing arrow when upper case key functions with white lettering have been selected, and displays a downward pointing arrow when lower case key functions with black lettering have been selected. Single-color labels positioned in the center of the 'key' buttons are active in either upper or lower case.

### 2.4.3 OPERATING PROCEDURES

The following paragraphs are a detailed description of the techniques required to correctly operate the receiver. The operating procedures are provided in five separate units: Initializing, Local Mode, Remote Mode, Memory Functions and Scanning. The operator should first become familiar with the functions of the controls and indicators (**paragraph 2.4.2**) before proceeding.

The mode currently in use by the receiver is indicated in the CONTROL STATUS area of the display (**paragraph 2.4.2.3.4**). The CONTROL STATUS indications are briefly explained as follows:

a. EXEC

The EXEC (EXECute) mode directly controls the status of the receiver section of the WJ-8626A-4. All keys are enabled. Any activated key which alters receiver parameters causes this information to be immediately transferred to the receiver.

Courtesy of http://BlackRadios.terryo.org



b. RCLm

The RCLm (Recall memory) mode displays the contents of the selected memory channel 1 to 99 without causing a change to the receiver section. Any change made to a parameter during RCLm mode changes only the LCD, and is not immediately restored in memory. The display status changes to MODm (MODified memory), prompting the operator to use the STO key (**paragraph 2.4.2.2.15**) if the changes are desired.

c. SCANNING

The SCAN key is used to activate the SCAN MODE. In this mode, SCANNING is displayed in the control status area and the selected channels are successively executed by the receiver and tested for a signal presence above the selected COS threshold. When a signal is found above threshold, the complete status of that channel is displayed and the dwell time begins.

d. RMT

In the RMT (Remote) mode, all receiver operations are under the control of an external device. All front panel keys (except R/LCL) are locked out. Pressing the R/LCL switch changes the Control Status to EXEC.

### 2.4.3.1 Initializing the Receiver

Whenever power is applied to the WJ-8626A-4, an initialization sequence is performed. Depending upon the hardware and software options installed, and the associated WJ-9040 System components connected to the WJ-8626A-4, some initialization steps may or may not be executed. In all cases, the following tests and commands are performed.

1. The I/O interface is initialized and enabled for communication with an external controller.

2. The main 4 kilobytes of RAM used by the microprocessor are write/-read tested. Any error found is displayed.

3. All IF Bandwidth modules are identified for display and SSB offset purposes. The presence of certain receiver options is also checked.

4. The previous tuning status (frequency, detection mode, etc., retained in battery-backed memory) is sent to the receiver.

5. The previous front panel CONTROL STATUS, also retained by the battery, is enabled. The receiver's operating mode is now either RMT or EXEC, and the initialization is finished.

The configuration of the Master/Handoff Subsystem (option) also takes place on power-up. Refer to **paragraph 2.4.3.6.3.**

Courtesy of http://BlackRadios.terryo.org



### 2.4.3.2 Local Mode Operation (EXEC)

The following paragraphs describe the basic local mode operating procedures for the receiver. Local mode procedures permit the operator to set the receiver's tuned frequency, BFO offset, detection mode, IF bandwidth, gain mode and COS (Carrier Operated Squelch) threshold level. Direct control over the local receiver using these procedures can only be achieved when the receiver is in the EXEC (EXECUTE) CONTROL STATUS mode with lower case key functions selected. To ensure this condition, each of the following procedure examples is first preceded by three keypad entries:

[0] lower case arrow [EXEC]

If the receiver is already in this mode (hereafter called EXEC mode), these three keypad entries may be ignored. The local mode procedures are also used in the RECALL mode, as will be explained in **paragraph 2.4.3.3.**

#### 2.4.3.2.1 Detection Mode

When depressed, if no numeric entries are present, the DET keypad will step the receiver through the available Detection Modes. In the EXEC mode, the current receiver Detection Mode will be changed to agree with the Mode being displayed. The available Detection Modes are AM, FM, CW, USB and LSB. If a numeric entry precedes the DET keypad, the error message "Not expecting # before DET" will appear and will remain as long as the DET keypad is depressed. **Example 1** illustrates the method of selecting Detection Mode.

- Det Mode Selection - Procedure

  1. IF the Control Status is not "EXEC", press the lower case, 0 and EXEC keypads.

  2. Repeatedly press the DET keypad until desired DET mode is displayed.

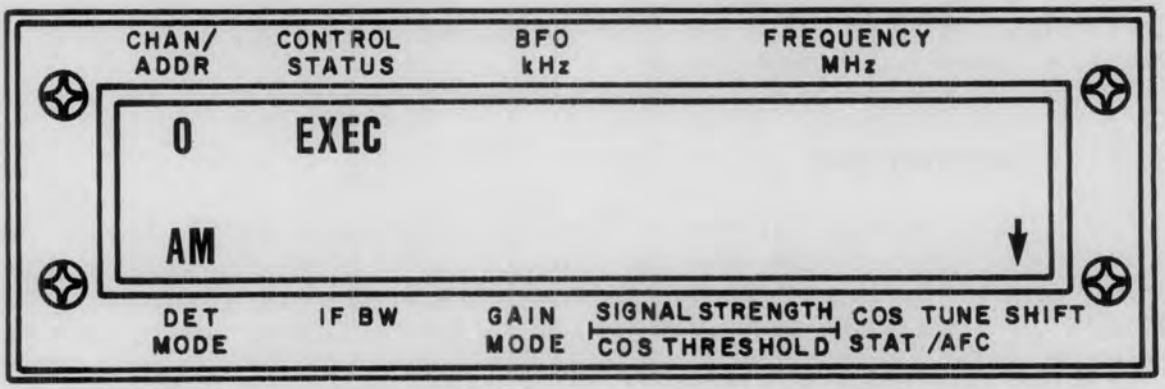
Courtesy of http://BlackRadios.terryo.org



Example 1. Select AM Detection Mode

↓ [0] [EXEC] ..... (1) This places the receiver in EXEC mode as required for local operation.

[DET] ..... (2) Repeatedly depress the DET keypad until AM is displayed as shown below.




2.4.3.2.2 **IF Bandwidth**

When depressed, if no numeric entries are present, the IF BW keypad will step through the IF bandwidths installed in the unit. In the EXEC mode, the current receiver Bandwidth will be changed to agree with the Bandwidth being displayed. The available Bandwidths are listed in **Table 1-2.** If a numeric entry precedes the IF BW keypad, the error message "Not expecting # before IF BW" will appear and will remain as long as the IF BW key is depressed. **Example 2** illustrates the method of selecting IF Bandwidth.

- IF Bandwidth Selection - Procedure

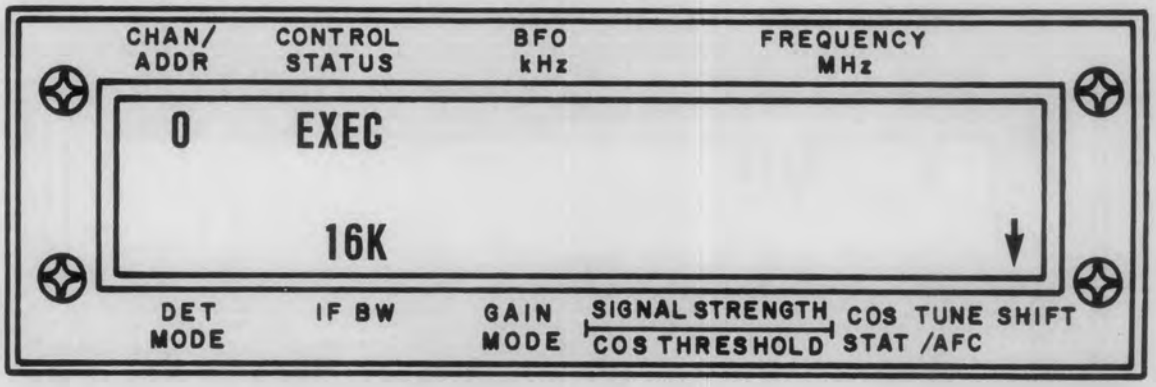
  1. If the Control Status is not EXEC, press the lower case, 0 and EXEC keypads.

  2. Repeatedly press the IF BW keypad until the desired BW is displayed.

Courtesy of http://BlackRadios.terryo.org


Example 2. Select 16 kHz Bandwidth

| | | |
|---|---|---|
| ↓ 0 EXEC ..... | (1) | This places the receiver in EXEC mode as required for local operation. |
| IF BW ..... | (2) | Repeatedly depress the IF BW keypad until 16 is displayed as shown below. |




2.4.3.2.3 **Gain Mode**

When depressed, if no numeric entries are present, the GAIN keypad will step through the available Gain Modes. In the EXEC mode, the current receiver Gain Mode will be changed to agree with the mode being displayed. The available Gain Modes are FST, SLO and MAN. If a numeric entry precedes the GAIN keypad, the error message "Not expecting # before GAIN" will appear and will remain as long as the GAIN keypad is depressed. **Example 3** illustrates the method of selecting Gain Mode.

- Gain Mode Selection - Procedure

  1. If the Control Status is not EXEC, press the lower, 0 and EXEC keypads.

  2. Repeatedly press GAIN until the desired Gain Mode is displayed on the LCD display.

  3. When the MAN (Manual) Gain Mode is selected, the front panel RF Gain Control is activated. Rotating the control counter-clockwise reduces the receiver gain, and clockwise rotation increases the gain.

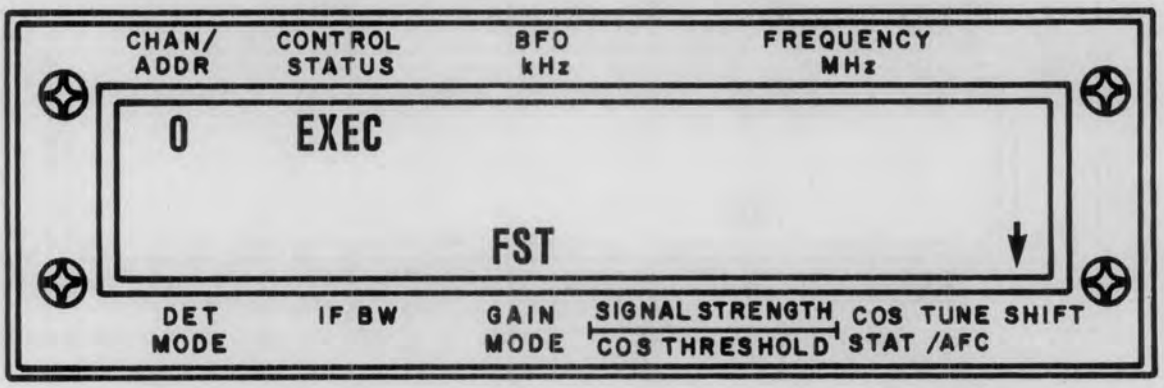
Courtesy of http://BlackRadios.terryo.org



Example 3. Select FST Gain Mode

↓ [0] [EXEC] ..... (1) This places the receiver in EXEC mode as required for local operation.

[GAIN] ..... (2) Repeatedly depress the GAIN keypad until FST is displayed as shown below.




2.4.3.2.4 **COS (Carrier Operated Squelch) Threshold**

When preceded by a numeric entry, depression of the COS keypad will result in the processing of the numeric entry as a COS threshold level. If in the EXEC mode, the current receiver COS level will be changed to agree with the level entered. When depressed, when no numeric entries are present, the COS keypad will cause the LCD display to show the numeric value of the threshold level. This display will remain as long as the COS keypad is depressed. The range of COS levels are from 0 to 63. **Examples 4** and **5** illustrate the use of the COS keypad.

- COS Threshold Entry - Procedure

  1. If the Control Status is not EXEC, press the lower, 0 and EXEC keypads.
  2. Enter desired 1 or 2 digit COS threshold.
  3. Terminate by depressing COS keypad.

Courtesy of http://BlackRadios.terryo.org



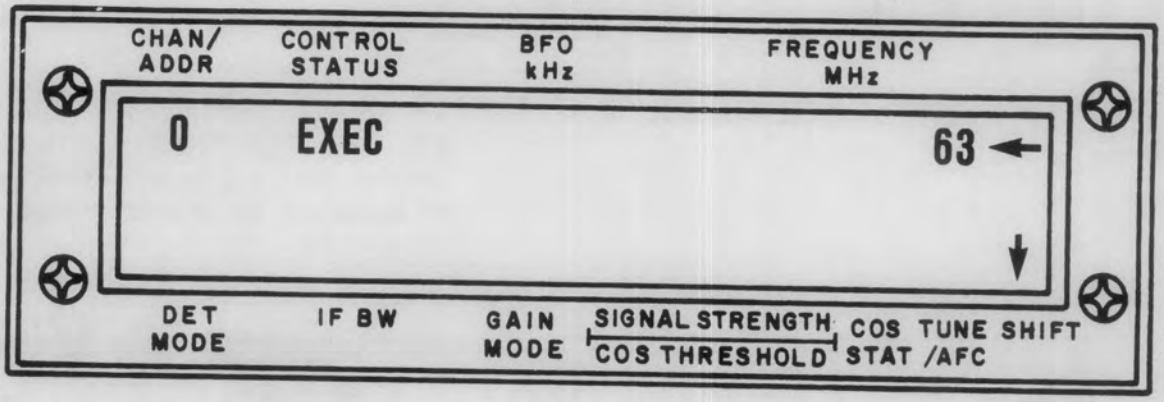
Example 4. Set COS Threshold Level to 63

↓ [0] [EXEC] .....

(1) This places the receiver in EXEC mode as required for local operation.

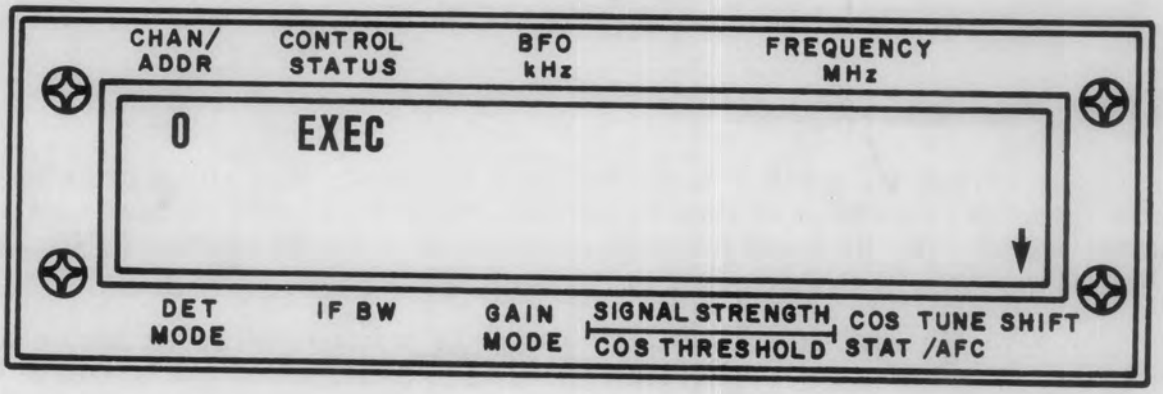
[6] [3] .....

(2) Desired threshold data entry: "63" is displayed in FREQUENCY (MHz) area of display as shown below.




[COS] .....

(3) Termination command: FREQUENCY (MHz) returns to normal, COS threshold bar shows maximum deflection to right as shown below.



Courtesy of http://BlackRadios.terryo.org



- COS Threshold Level Check - Procedure

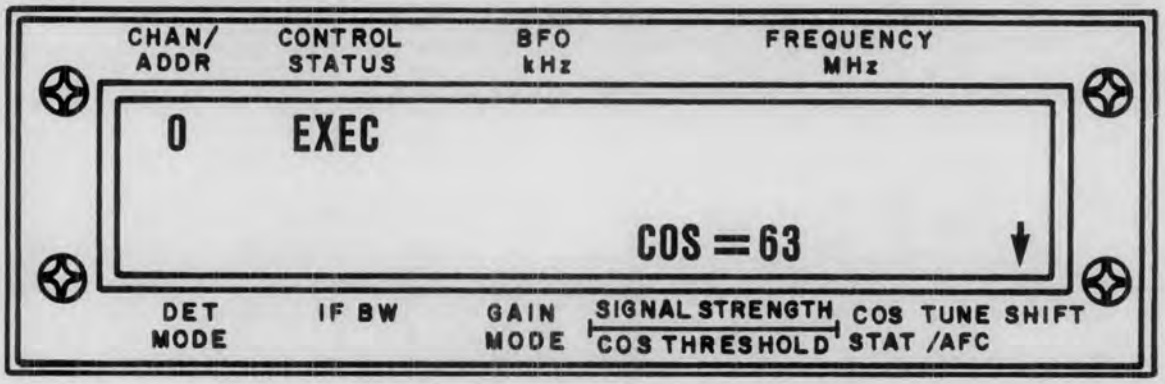
  1. If the Control Status is not EXEC, press the lower, 0 and EXEC keypads.

  2. Press the COS keypad and hold to display the data.

Example 5. Check the Current COS Threshold Level.

↓ [0] [EXEC] ..... (1) This places the receiver in EXEC mode as required for local operation.

[COS] ..... (2) Termination command: the SIG STR and COS THRS bar displays are removed and current COS level is displayed as analog number as shown below.




2.4.3.2.5 **RF Tuned Frequency**

Setting the receiver tuned frequency is accomplished either by utilization of the TUNE knob and CURSOR or by directly entering the desired tuned frequency via the general purpose keypad. The RF tuned frequency is displayed in the FREQUENCY (MHz) area of the LCD display.

When the TUNE knob is used to tune the receiver, tuning the knob clockwise will increase the tuned frequency while counterclockwise will decrease it. Selection of tuning step size is accomplished by toggling the CURSOR switch to position the display CURSOR (or Underscore) under the desired digit in the FREQUENCY (MHz) area of the display. Digits to the right of the selected digit will not be altered by the TUNE knob. The selected digit and all digits to the left of the selected digit will be incremented or decremented by the TUNE knob in decade ripple counting fashion.

Courtesy of http://BlackRadios.terryo.org



The frequency can also be set by entering the desired frequency, in kHz or MHz, on the general purpose keypad. When preceded by a numeric entry, depression of either the kHz or MHz keypads will result in the processing of the numeric entry as an RF tuned frequency. If in the EXEC mode, the current receiver tuned frequency will be changed to agree with the frequency entered. When depressed, when no numeric entries are present, the error message "Expecting # before kHz" or "Expecting # before MHz" will appear, and will remain as long as the kHz or MHz keypad is depressed. The range of available tuned frequencies is 00.00000 to 30.00000 MHz or 0000000 to 30000.00 kHz. **Examples 6** and **7** illustrate the use of the kHz and MHz keypads.

- RF Tuned Frequency Entry - Procedure

  1. If the Control Status is not EXEC, press the lower, 0 and EXEC keypads.

  2. Enter the desired numerical frequency data.

  3. Terminate by pressing MHz or kHz keypad.

### 2.4.3.2.6 BFO Offset Frequency

When the receiver is in CW detection mode, setting the receiver BFO Offset Frequency is accomplished either by utilization of the CURSOR and TUNE knob or by directly entering the desired offset frequency via the general purpose keypad. The BFO offset is displayed in the BFO (kHz) area of the LCD display.

When the TUNE knob is used to set the receiver's BFO offset, turning the knob clockwise will numerically increase the offset while counterclockwise will decrease. The TUNE knob is enabled for BFO offset by first selecting the CW mode, then toggling the CURSOR switch to position the display cursor (Underscore) under the 0.1 kHz BFO digit. Rotating the TUNE knob will change the BFO offset from +8.0 to -8.0 kHz in 0.1 kHz steps.

Courtesy of http://BlackRadios.terryo.org



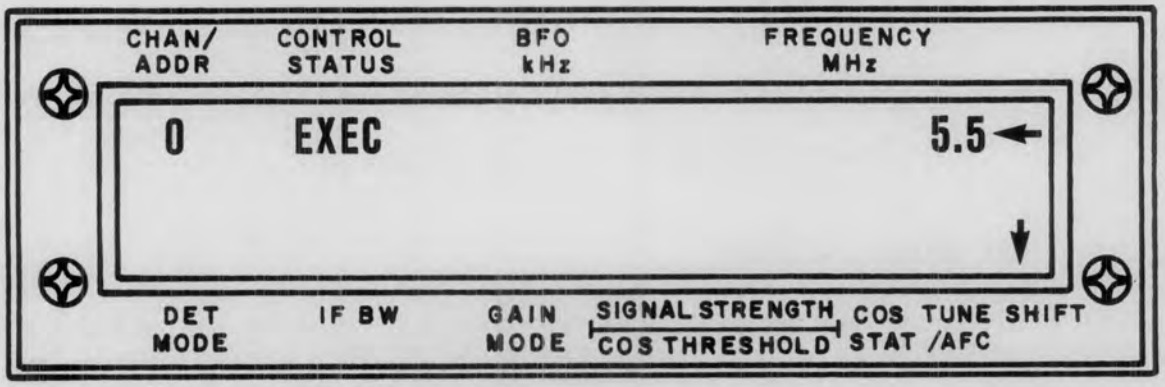
Example 6. Tune the Receiver to 5.5 MHz

↓ [0] [EXEC] .....

(1) This places the receiver in EXEC mode as required for local operation.

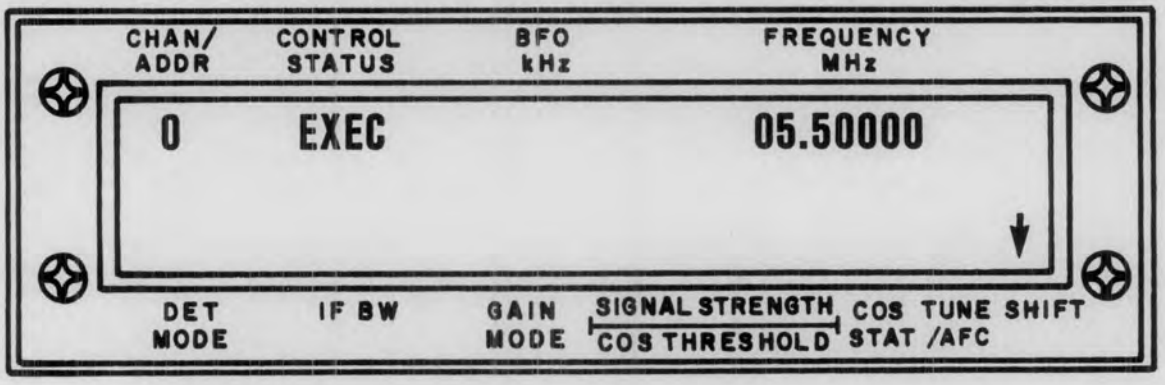
[5] [•] [5] .....

(2) Desired tuned frequency data entry. 5.5 is displayed in FREQUENCY (MHz) area as shown below.




[MHz] .....

(3) Termination command: new tuned frequency is displayed as shown below.



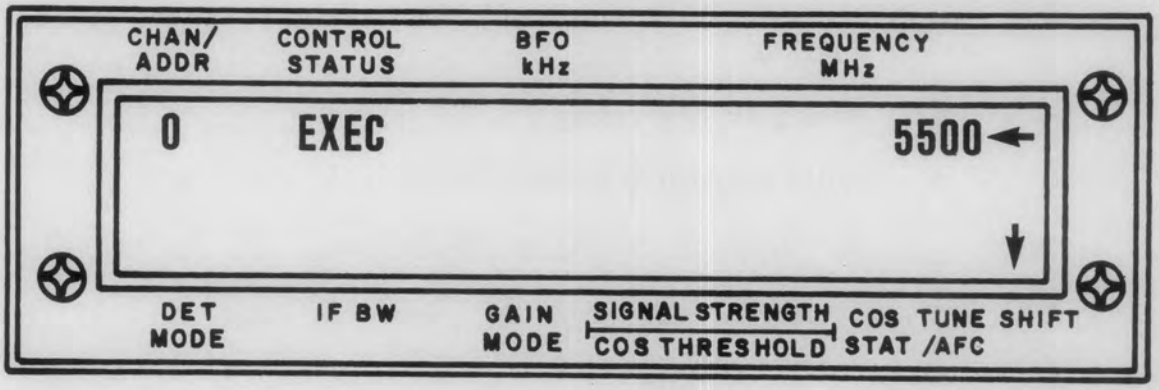
Courtesy of http://BlackRadios.terryo.org



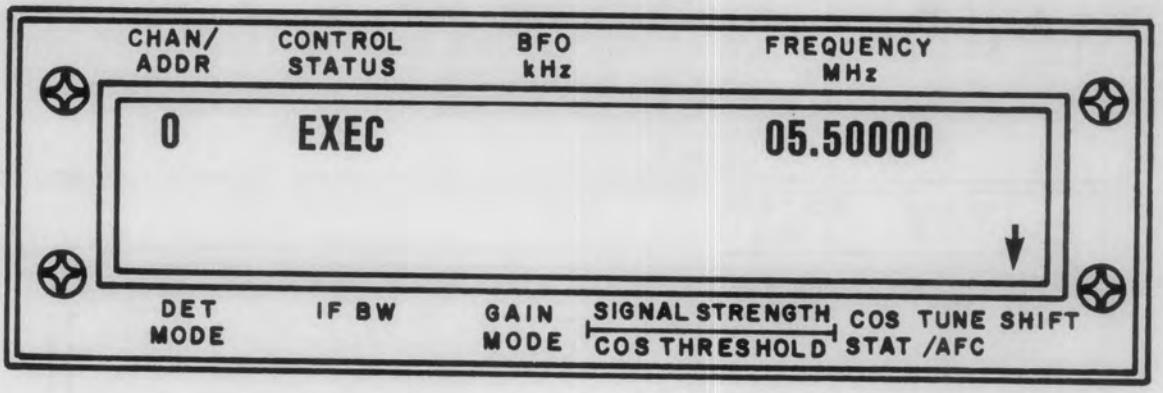
Example 7. Tune the Receiver to 5.5 MHz (Alternate Method)

↓ [0] [EXEC] ..... (1) This places the receiver in EXEC mode as required for local operation.

[5] [5] [0] [0] ..... (2) Desired tuned frequency data entry. 5500 is displayed in FREQUENCY (MHz) area as shown below.




[kHz] ..... (3) Termination command: new tuned frequency is displayed as shown below.



Courtesy of http://BlackRadios.terryo.org



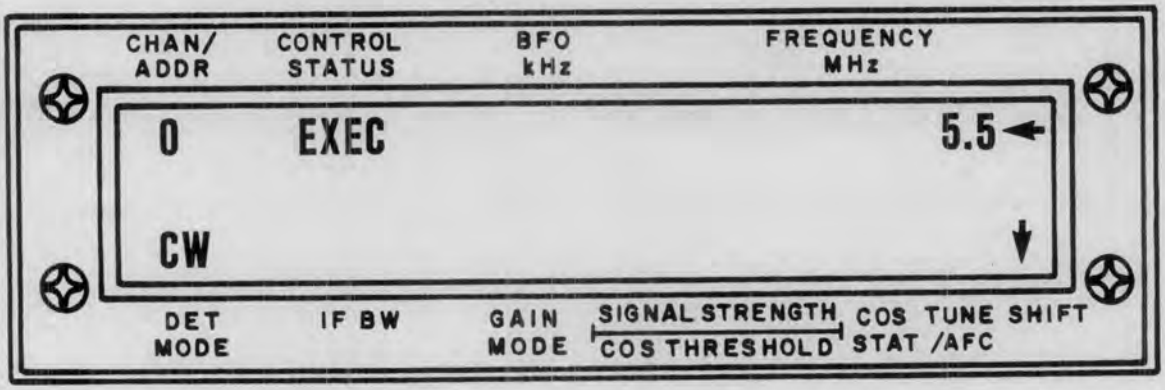
The BFO offset can also be set by entering the desired offset in kHz on the general purpose keypad. If the BFO +/- key is depressed while the receiver is not in CW detection mode, the error message "BFO Det Mode is not CW" will be displayed and will remain as long as the BFO +/- key is depressed. During CW mode, when preceded by a numeric entry, depression of the BFO keypad will result in the processing of the numeric data as a BFO offset. If in the EXEC mode, the current receiver BFO offset will be changed to agree with the offset entered. When depressed, when no numeric entries are present, the polarity sign of the displayed offset is changed. The range of available offsets are 0.0 to 8.0 kHz. **Example 8** illustrates the use at the BFO keypad.

- BFO Offset Frequency Entry - Procedure

  1. If the Control Status is not EXEC, press the lower, 0 and EXEC keypads.
  2. Select CW mode using the DET keypad.
  3. Enter the desired numerical offset data.
  4. Terminate by pressing the BFO keypad.
  5. If offset polarity is incorrect, press BFO again.

Example 8. Set BFO Offset to +5.5 kHz

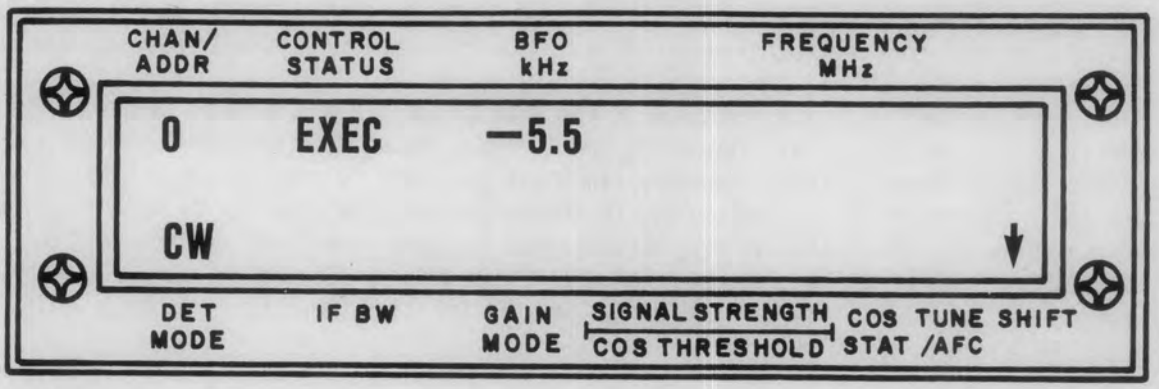
| | |
|---|---|
| ↓ [0] [EXEC] ..... | (1) This places the receiver in EXEC mode as required for local operation. |
| [DET] ..... | (2) The DET keypad is repeatedly depressed until CW is displayed. |
| [5] [•] [5] ..... | (3) Desired BFO offset data entry. 5.5 is displayed in FREQUENCY (MHz) area and CW is displayed in DET MODE area as shown below. |



Courtesy of http://BlackRadios.terryo.org



BFO +/- ..... (4) Termination command: new BFO offset is displayed as shown below.




BFO +/- ..... (5) The BFO keypad is pressed again to change the offset polarity from "-" to "+".

2.4.3.3 **Memory Functions (RCLm)**

The following paragraphs describe the basic memory storage and recall procedures for the receiver. The memory functions permit the operator to store receiver front panel parameters in a memory channel, and then recall and execute receiver parameters from a memory channel. Memory functions also permit the operator to program the receiver to scan a selected group of memory channels.

There are 100 available memory channels (99 discrete and one implicitly addressed) for storage of receiver parameter data. Each memory channel is used to store the following receiver parameters: RF tuned frequency, BFO offset, detection mode, IF bandwidth, gain mode and COS threshold. Dwell time is a separate parameter that is used in conjunction with scanning.

Courtesy of http://BlackRadios.terryo.org



Some memory functions are lower case, some are upper case. To ensure the correct case is selected, each procedure example given is first preceded by a lower case or upper case entry as required for that example. If the receiver is already in the correct state, the lower/upper case entry may be ignored.

#### 2.4.3.3.1 Memory Channel 0

Memory channels in the range 1 through 99 have the ability to maintain setup parameters without affecting the receiver status. Memory Channel 0, however, always contains the current active receiver status regardless of the front panel Channel/Address number.

As shown in **paragraph 2.4.3.2**, the EXEC (EXECUTE) Control Status with a channel address of 0 will be the most commonly used mode during local operation. By ensuring this condition, stored data in other memory channels will not be accidentally altered. Also, any change to the receiver (i.e., frequency, IF bandwidth) during this mode will automatically be stored in channel 0. The STO key may not be used to place new data into channel 0. If the STO key is used without entering data beforehand, the message "Expecting data entry before STO" will appear. If the STO key is used as a termination command after a data entry of 0, the message "STO range: 1-99" will be displayed.

If the RCL key is used as a terminator for a data entry of 0, the result is the same as for the EXEC key sequence, and the Control Status becomes 0 EXEC.

#### 2.4.3.3.2 Numbered Memory Storage (STO)

Each memory channel from 1 to 99 is utilized to store one set of receiver parameters. Storable parameters are RF tuned frequency, detection mode, gain mode, IF bandwidth, BFO offset and threshold level. Entry of these parameters was explained in **paragraph 2.4.3.2.**

When preceded by a numeric entry from 1 to 99, depression of the STO keypad will result in the processing of the numeric entry as a memory channel. All currently displayed receiver parameters will be stored in the designated memory channel. The front panel responds with the complete status still displayed, a Control Status of "Stored" and the designated memory channel in the CHAN/ADDR display area. Note that this Control Status is displayed only until the next keystroke.

- Numbered Memory Storage - Procedure

  1. Enter the desired 1 or 2 digit memory channel digits.
  2. Terminate by depressing STO keypad.

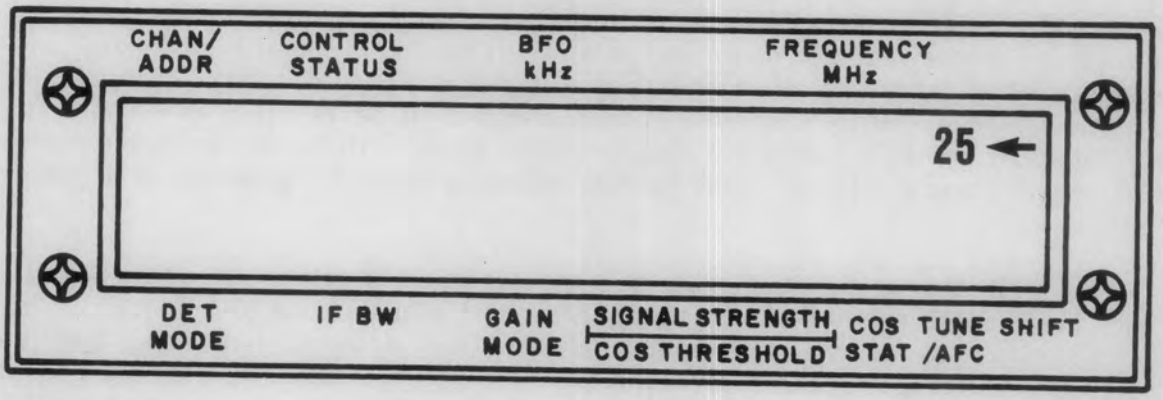
Courtesy of http://BlackRadios.terryo.org



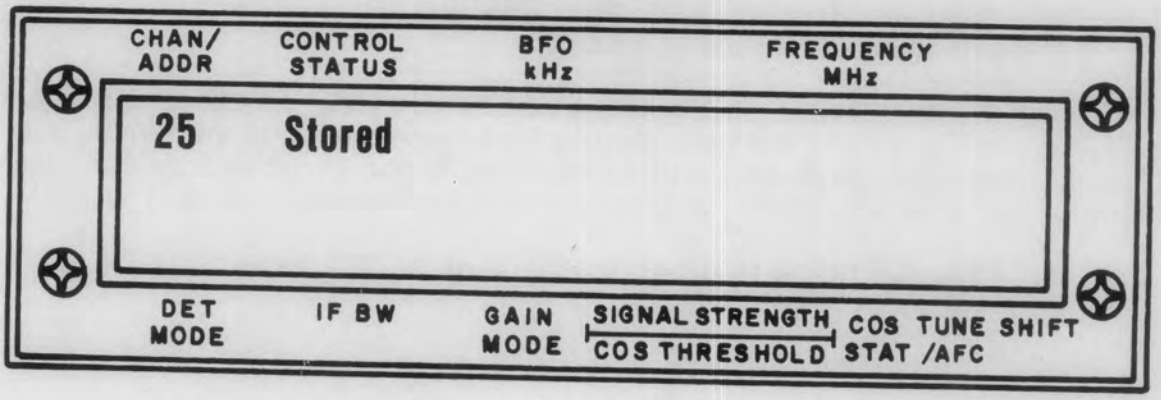
Example 9. Store Receiver Parameters In Channel 25

↓ [0] [EXEC] ..... (1) This places the receiver in EXEC mode as required for local operation.

[2] [5] ..... (2) Desired numbered channel data entry, "25" is displayed in FREQUENCY (MHz) area of display as shown below.




[STO] ..... (3) Termination command: FREQUENCY (MHz) returns to normal, "25" is displayed in CHAN/ADR window, STORED is displayed in CONTROL STATUS window as shown below.



Courtesy of http://BlackRadios.terryo.org



### 2.4.3.3.3 Single Keystroke Memory Storage (STO)

If the Control Status is MODm (Modified Memory, **paragraph 2.4.3.3.4**) the currently displayed CHAN/ADDR may be used to automatically re-store the new setup into that memory channel. This is accomplished by pressing the STO key as a terminator with no data entered. The front panel responds by displaying the complete status of that channel and changing the Control Status back to RCLm (Recall Memory, **paragraph 2.4.3.3.4**).

### 2.4.3.3.4 Numbered Memory Recall (RCL)

When preceded by a numeric entry from 1 to 99, depression of the RCL keypad will result in the processing of the numeric entry as a memory channel. The contents of the designated memory channel will be displayed and the Control Status becomes RCLm (Recall Memory). Current receiver operating parameters are maintained in channel 0 and will not be changed. When depressed, when no numeric entries are present, the RCL keypad will cause the contents of the currently displayed channel number to be recalled and displayed. Repeated depressions of the RCL keypad, without numeric entry, will cause successive memory channels to be recalled and displayed. This feature allows a rapid examination of a group of memory channels.

If any of the displayed memory set-up parameters are changed while in RCLm mode, the changes are not automatically re-stored into the memory channel. The CONTROL STATUS display area changes to MODm (Modified Memory) indicating that the currently displayed receiver parameters do not match the parameters stored in the designed memory channel. This avoids accidental changes to a memory channel. Depressing the STO keypad will store the changed parameters in the designated memory channel.

If the modified parameters are not to be stored, depressing the RCL key with no data entered will discard the changes. The Control Status returns to RCLm (Recall Memory) with the original contents of the memory channel displayed.

If, during a Control Status of MODm, a new front panel mode is desired (i.e., 0 EXEC, **paragraph 2.4.3.2**), the operator is prompted to save the new data in the memory channel. The display reads:

"Store new data in _____? Use CURSOR: NO ? YES",
with the channel number indicated.

If the CURSOR switch is pressed to the left, the changed parameters for the channel are discarded and the next Control mode is entered. If the switch is moved to the right, the new setup parameters will be re-stored in the designated memory channel and the Control Status returns to RCLm, with the new memory channel contents displayed.

**Examples 10** and **11** illustrate the use of the RCL keypad.

Courtesy of http://BlackRadios.terryo.org



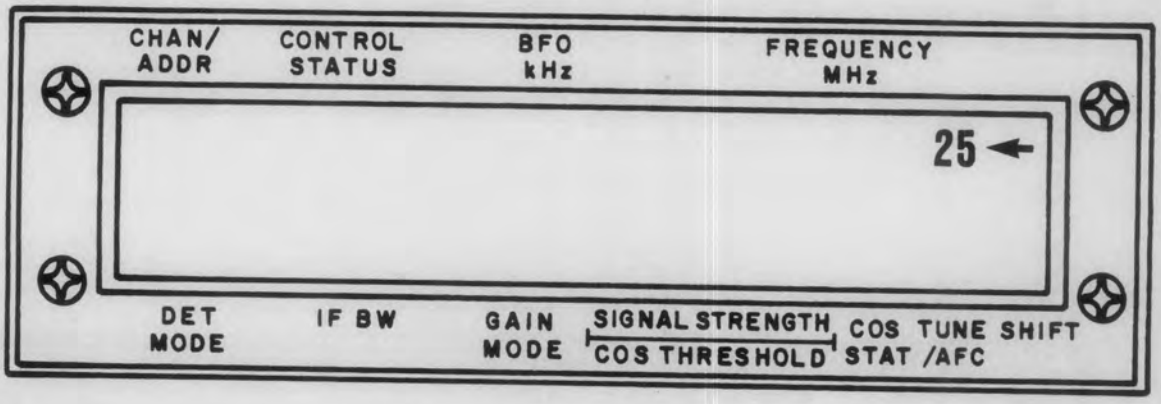
- Numbered Memory Recall - Procedure

1. Enter the desired 1 or 2 digit memory channel digits.
2. Terminate by depressing the RCL keypad.

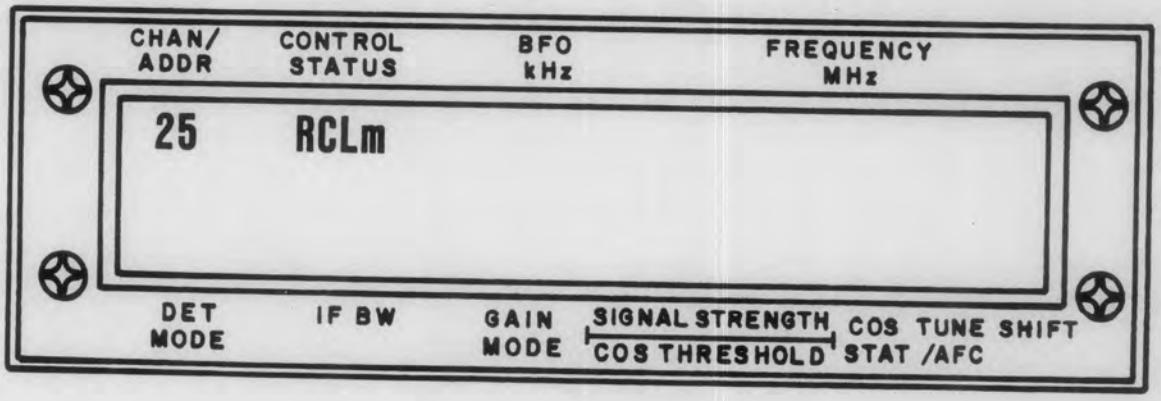
Example 10. Recall Receiver Parameters In Channel 25

↓ [0] [EXEC] ..... (1) This places the receiver in EXEC mode as required for local operation.

[2] [5] ..... (2) Desired numbered channel data entry, "25" is displayed in FREQUENCY (MHz) area of display as shown below.




[RCL] ..... (3) Termination command: FREQUENCY (MHz) returns to normal, "25" is displayed in CHAN/ADR window, RCLm is displayed in CONTROL STATUS window, contents of channel are displayed as shown below.



Courtesy of http://BlackRadios.terryo.org



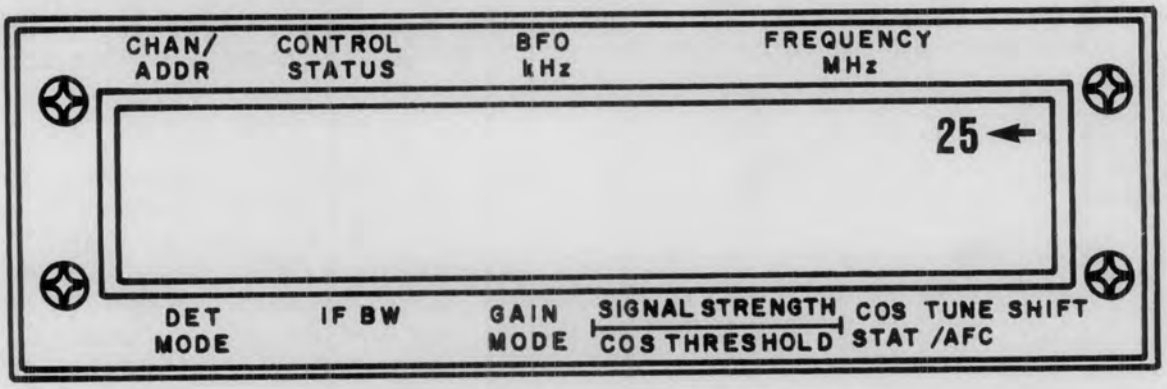
- Numbered Memory Updating - Procedure

  1. Enter the desired 1 or 2 digit memory channel digits.
  2. Terminate by depressing the RCL keypad.
  3. Update desired individual receiver parameters (**paragraph 2.4.3.2**).
  4. Terminate by depressing the STO keypad.

Example 11. Change IF Bandwidth Stored In Channel 25 From 16 kHz to 6 kHz

↓ [0] [EXEC] ..... (1) This places the receiver in EXEC mode as required for local operation.

[2] [5] ..... (2) Desired numbered channel data entry, "25" is displayed in FREQUENCY (MHz) area of display as shown below.

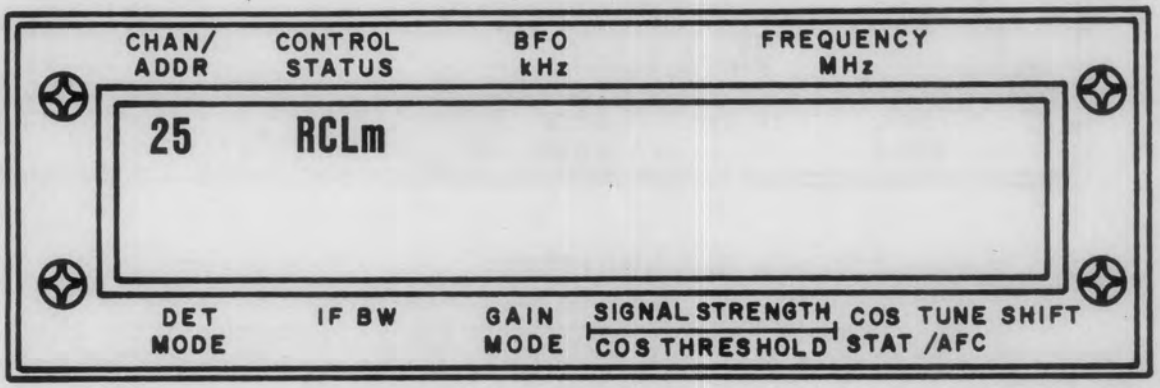


Courtesy of http://BlackRadios.terryo.org

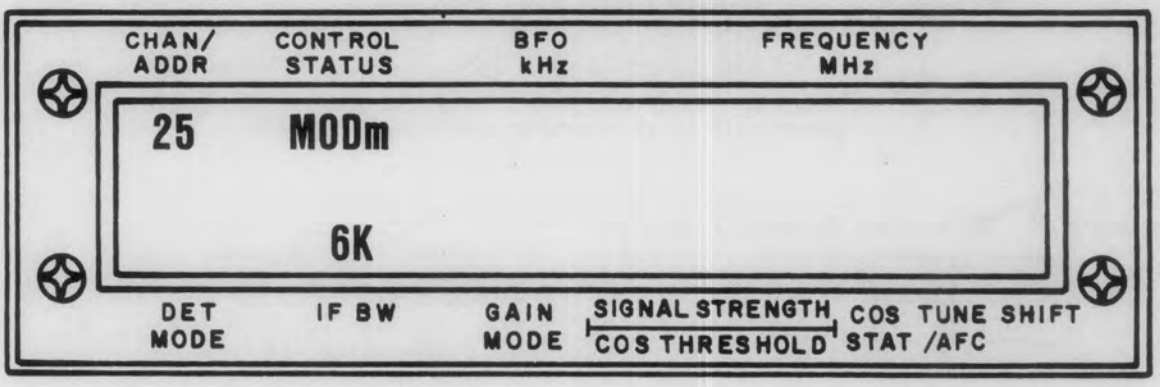


Example 11: Change IF Bandwidth Stored In Channel 25 From 16 kHz to 6 kHz (Continued)

RCL ..... (3) Termination command: FREQUENCY (MHz) returns to normal, "25" is displayed in CHAN/ADR window, RCLm is displayed in CONTROL STATUS window, contents of channel are displayed as shown below.



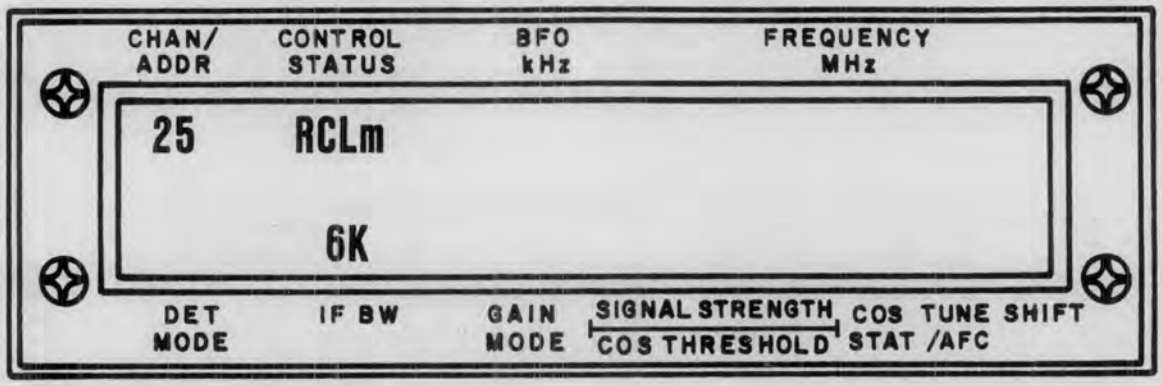

IF BW ..... (4) Depress IF BW keypad repeatedly until 6 kHz is displayed; MODm is displayed in CONTROL STATUS window, other receiver parameter displays remain unchanged as shown below.



Courtesy of http://BlackRadios.terryo.org



STO ..... (5) Termination command: RCLm is displayed in CONTROL STATUS window as shown below. Displayed status is shown in CHAN 25.




2.4.3.3.5 **Numbered Memory Execution (EXEC)**

When preceded by numeric entry from 1 to 99, depression of the EXEC keypad will result in the processing of the numeric entry as a memory channel. The contents of the designated memory channel will be displayed and current receiver operating parameters will be changed to the parameters in the designated memory channel. When depressed during the Control Status RCLm (Recall memory) when no numeric entries are present, the EXEC keypad will cause the contents of the currently displayed memory channel number to be executed. If the Control Status is EXEC with a CHAN/ADDR display of 1-99, repeated depressions of the EXEC keypad, without numeric entry, will cause successive memory channels to be executed. This allows rapid manual scanning of a group of memory channels. If any of the displayed receiver parameters are changed following execution of a numbered memory channel, the actual receiver tuning status is changed and the contents of that channel are updated to agree with the newly displayed receiver parameters. **Example 12** illustrates the use of the EXEC keypad.

- Numbered Memory Execution - Procedure

  1. Enter the desired 1 or 2 digit memory channel digits.
  2. Terminate by depressing the EXEC keypad.

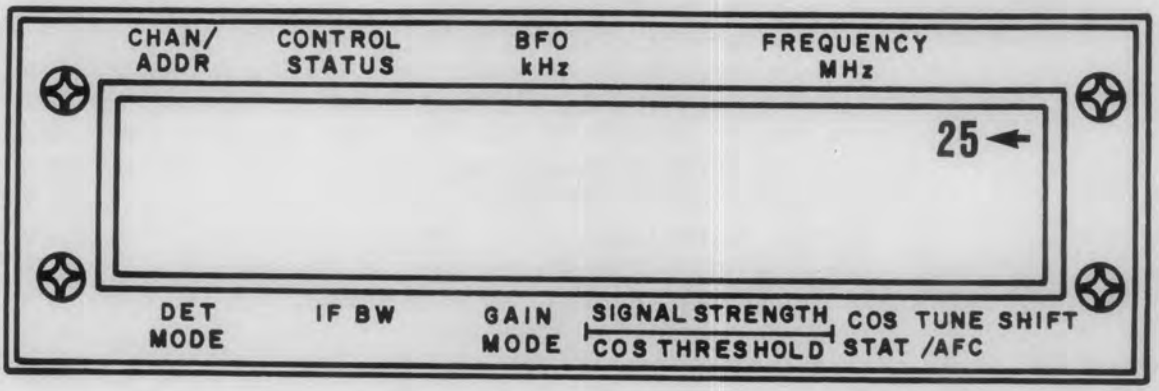
Example 12. Numbered Memory Execution

↓ 0 EXEC ..... (1) This places the receiver in EXEC mode as required for local operation.

Courtesy of http://BlackRadios.terryo.org



[2] [5] ..... (2) Desired numbered channel data entry "25" is displayed in FREQUENCY (MHz) area of display as shown below.




[EXEC] ..... (3) Termination command: "25" is displayed in CHAN/ADR window, receiver operands are changed.

2.4.3.4 **Scanning**

2.4.3.4.1 **Numbered Memory Scanning**

The receiver's memory scan capability will sequentially scan an operator selected group of memory channels. During scan operation, the stored parameters of each memory channel are automatically recalled and transferred to the receiver. As each channel is recalled, the received signal strength is compared to an operator selected threshold level stored in that channel (**paragraph 2.4.3.2.4**). When a channel is located where signal strength equals or exceeds the threshold level, the scanning operation will stop for an operator selected dwell time, and then restart automatically. The following is a summary of the functions of the various keypads associated with memory scanning.

SCAN: When depressed, after storing a desired group of memory channels (any or all of 1 through 99), the SCAN keypad will start or end the CHANNEL SCAN mode.

L/OUT: When depressed, following numeric entry of 1 to 99, the L/OUT keypad will delete the designated memory channel from the CHANNEL SCAN list. When depressed, following numeric entry of two digits separated by a decimal point, the L/OUT keypad will delete all channels between the two digits from the CHANNEL SCAN list.

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INCL: When depressed, following numeric entry of 1 to 99, the INCL keypad will add the designated memory channel to the CHANNEL SCAN list. When depressed, following numeric of two digits separated by a decimal point, the INCL keypad will add all channels between the two digits to the CHANNEL SCAN list.

DWL: When depressed, following numeric entry, the DWL keypad will process the numeric entry as a DWELL TIME for the CHANNEL SCAN mode. Two dwell time entries are possible. The first is the time in seconds the receiver will remain on a hit channel after exceeding COS threshold. This is useful for automatically continuing the SCAN when a signal remains active for a long period. Entry range is 0-9, where 9 is infinite. The second is the time in seconds the receiver will remain on a hit channel after the signal drops below threshold. Entry range is 1-9, where 9 is infinite. When the DWL key is depressed with no data entered, the present dwell times are displayed as long as the key is held.

SET: When depressed, the SET keypad displays the total number of channels in the SCAN list. The two dwell times are also displayed. Individual channel numbers are displayed in the screen area labeled "LIST:" This list can be scrolled by the cursor control switch.

### 2.4.3.4.2 RF Gain Control During Scan Mode

The software program which scans the WJ-8626A-4 is optimized for use in AGC mode. Each memory channel contains an operator-entered COS (Carrier Operated Squelch) threshold. When stepping through the included channels, this threshold level is used to convert the receiver to a preset manual gain level which will cause only those signals above the threshold to be detected. Thus, in AGC mode, the COS threshold is used to adjust the sensitivity of the scan for that channel.

If an included channel has been stored in memory with the MAN (Manual) Gain selected, the digital manual gain word is not stored. Instead, the RF Gain Control on the front panel of the WJ-8626A-4 is tested. Each time a channel is found in manual mode, the potentiometer position is read and sent to the receiver as the RF Gain Setting. In manual gain mode, therefore, the COS threshold and the RF Gain Control will affect the sensitivity of the scan. Note that this applies only to the front panel scan mode. Under remote control the digital manual gain word is stored in each memory channel (refer to **examples 13** through **17**).

- Dwell Time Entry - Procedure

1. Enter desired dwell time on keypad.
2. Terminate by depressing the DWL keypad.

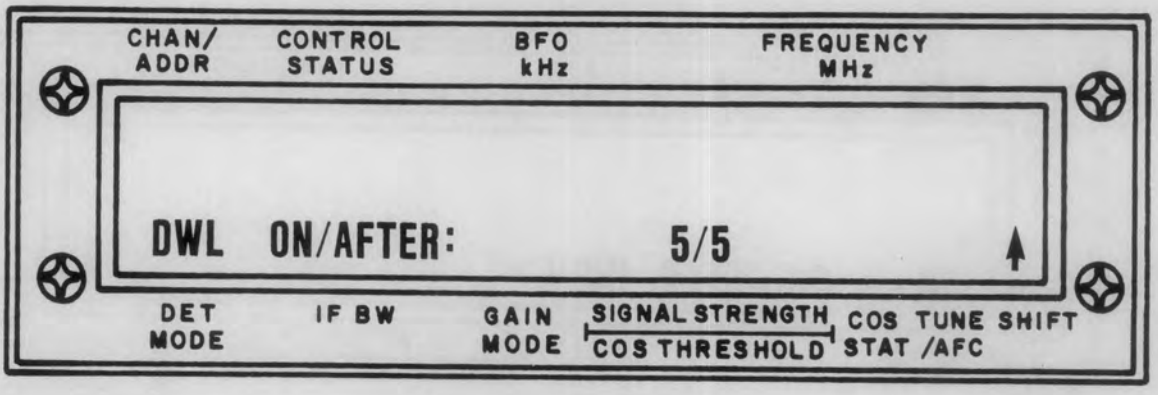
Courtesy of http://BlackRadios.terryo.org



Example 13. Enter ON HIT and AFTER Dwell Times of 5 Seconds Each

5 • 5 ..... (1) Desired numeric entry: ON HIT and AFTER times separated by decimal point, "5.5" is displayed on the FREQUENCY (MHz) area.

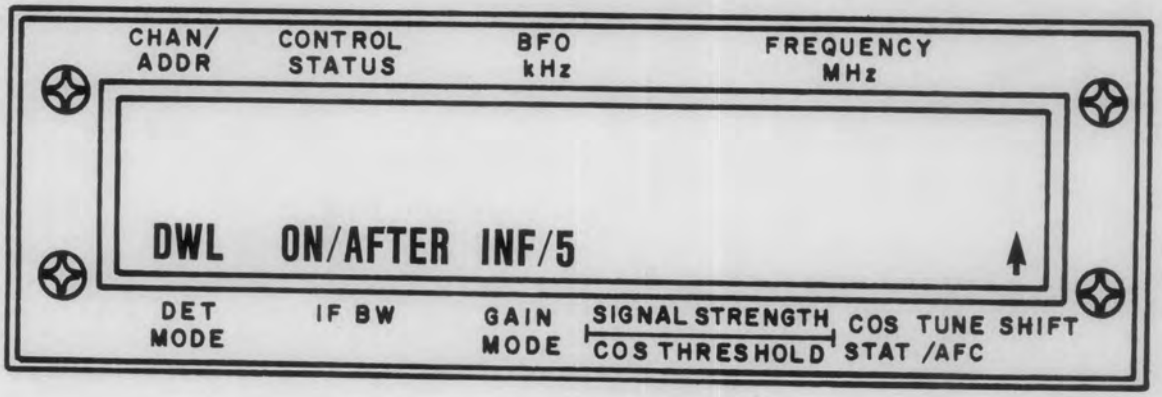
↑ DWL DET ..... (2) Termination command: FREQUENCY (MHz) area returns to normal, DWELL times displayed as shown below.




Example 14. Enter ON HIT Dwell Time of Infinite

9 ..... (1) Desired numeric entry: "9" is displayed in FREQUENCY (MHz) area.

↑ DWL ..... (2) Termination command: FREQUENCY (MHz) area returns to normal, DWELL times are displayed as shown below.

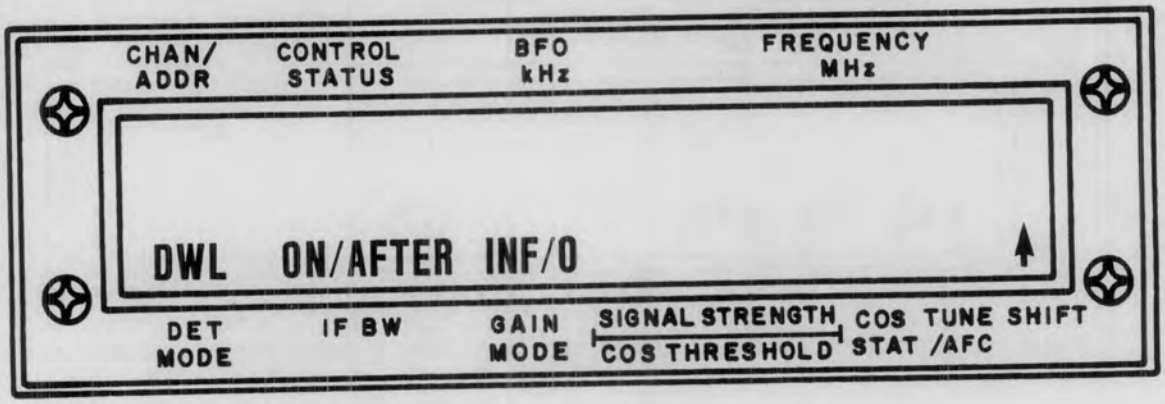


Courtesy of http://BlackRadios.terryo.org



Example 15: Enter AFTER Dwell Time of 0 Seconds

| | | |
|---|---|---|
| [•] [0] ..... | (1) | Desired numeric entry: AFTER time is preceded by a decimal point, ".5" is displayed in FREQUENCY (MHz) area. |
| ↑ [DWL] ..... | (2) | Termination command: FREQUENCY (MHz) area returns to normal, DWELL times are displayed as shown below. |




- Single Channel Lockout - Procedure

  1. Enter the desired 1 or 2 digit memory channel digits.
  2. Terminate by depressing the lower and L/OUT keypads.

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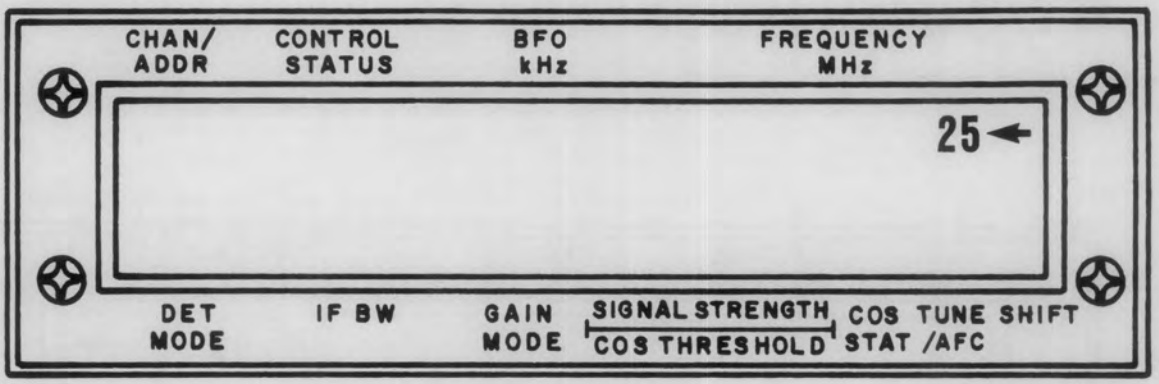
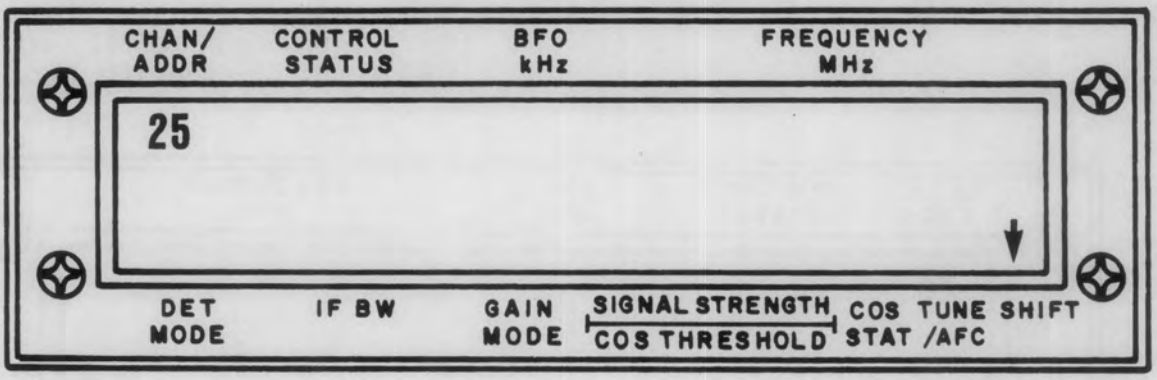
Example 16: Lockout Memory Channel 25

2 5 ..... (1) Desired numeric entry: AFTER time is preceded by a decimal point, "25" is displayed in FREQUENCY (MHz) area as shown below.




↓ L/OUT ..... (2) Termination command: FREQUENCY (MHz) returns to normal. If channel 25 was being displayed, the "i" (included) symbol is erased from the CHAN/ADDR area.



Courtesy of http://BlackRadios.terryo.org



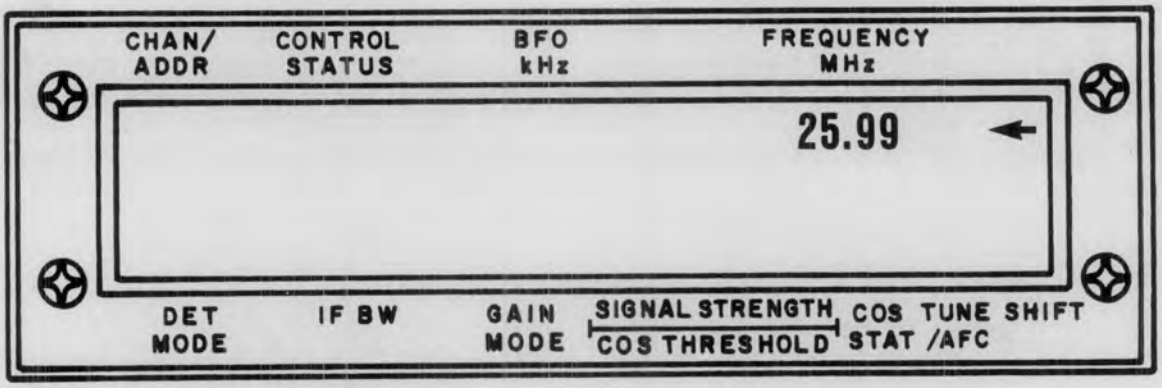
- Channel Group Lock Out - Procedure

  1. Enter first and last memory channel digits of the group separated by a decimal point.

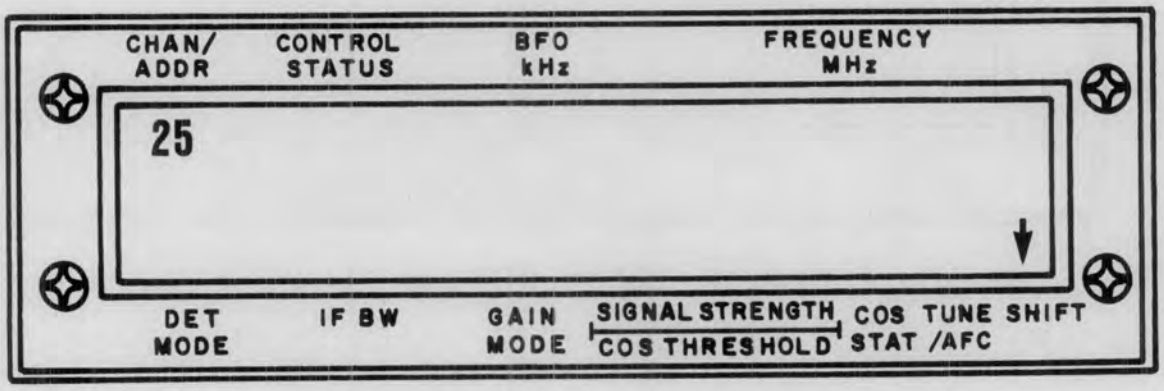
  2. Terminate by depresssing the lower and L/OUT keypads.

Example 16. Lockout Memory Channel 25 (Continued)

2 5 • 9 9 .... (1) Desired numbered channel data entry, "25.99" is displayed in FREQUENCY (MHz) area as shown below.




↓ L/OUT ..... (2) Termination command: FREQUENCY (MHz) returns to normal. If any string channel was displayed, the "i" (included) symbol next to CHAN/ADDR number is erased.



Courtesy of http://BlackRadios.terryo.org

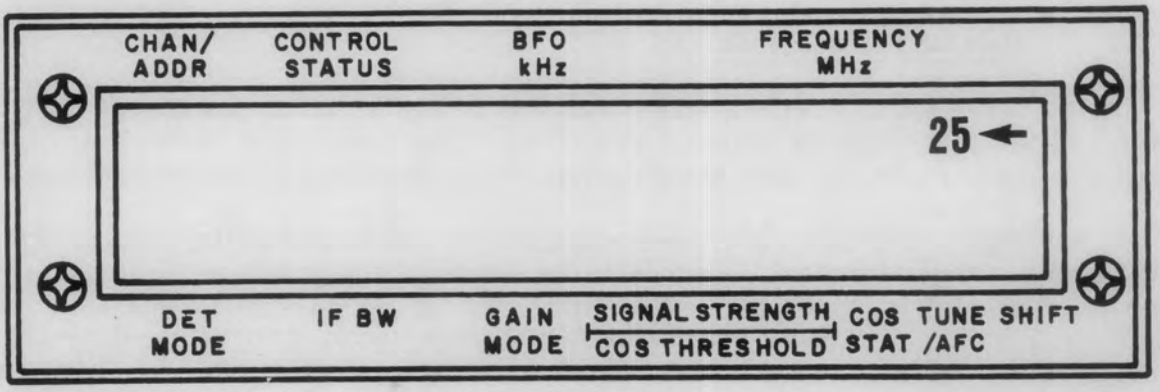


- Add Memory Channel to Scan List - Procedure

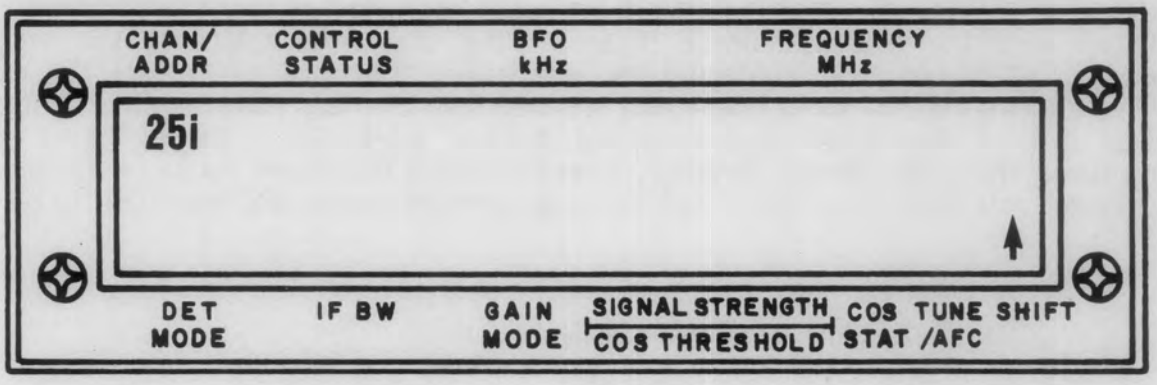
1. Enter the desired 1 or 2 digit memory channel digits.
2. Terminate by depressing the upper and INCL keypads.

Example 17. Add Channel 25 to Channel Scan List

[2] [5] ..... (1) Desired numbered channel data entry, "25" is displayed in FREQUENCY (MHz) area as shown below.




↑ [INCL] ..... (2) Termination command: FREQUENCY (MHz) returns to normal as shown below. If channel indicated is "25" an "i" appears after channel indicating it has been "included" into scan list.



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2.4.3.4.3 **Scan Calibration**

The WJ-8626A-4 is aligned at the factory for optimum performance. Due to variations in gain circuitry between units, caused by normal component tolerances, occasional false channels or missed channels may occur in the Scan Mode. To compensate for these variations a table of gain settings specific to each receiver is stored in battery-backed memory. Unusual power surges or mishandling of the memory circuit boards may corrupt the table of gain values. If this occurs, the following message appears each time the Scan Mode is started:

"Warning: Scan Cal Req'd Using Standard Tables"

In this condition, the Scan will operate with a default table of gain values stored in permanent memory with the threshold of each channel subject to an error of approximately 10 to 15 dB. Refer to **paragraph 4.6.13** for the scan calibration procedure.

2.4.3.5 **Remote Control Mode**

When the LOCAL/REMOTE switch is in the REMOTE position, the demodulator is configured for control by an external controller. The front panel controls are disabled and selection of gain, detection mode and IF bandwidth is performed by the external controller.

**Figure 2-5** shows a typical configuration for implementing remote control by an ASCII type computer terminal. As shown, the minimum equipment configuration consists of a computer terminal equipped for either IEEE-488 or RS-232 communication, an EFR100 Equipment Frame, an IOM108 I/O and Interface Module equipped for either IEEE-488 or RS-232 communication and a WJ-8626A-4 HF Receiver. Using "English like" ASCII commands, the controller communicates directly with the IOM108 which decodes the commands and communicates with the receiver via the command/report data lines on rear panel at connector J1. Additionally, the receiver reports to the controller via the polled I/O lines on rear panel at connector J1 through the IOM108. **Table 2-1** lists the specific commands which may be sent to the receiver from the controller via the IOM108. Detailed information for implementing remote control via RS-232 or IEEE-488 may be found in the WJ-9040 Receiving System Operator's Manual.

2.4.3.6 **Master/Handoff Option Operation**

This section describes the front panel operation of the WJ-8626A-4 HF Receiver equipped with the Master/Handoff Option. The master/handoff software increases the flexibility of the receiver controller by permitting it to directly control 1 or more slave receivers located in the local frame and in other frames. Any slave receiver in the WJ-9040 Family can be monitored and controlled by the WJ-8626A-4 Master Receiver/Receiver Controller. The direct handoff function, however, where the active status of the master unit is downloaded to a slave receiver, is possible only between compatible types (HF to HF or VHF to VHF).

2.4.3.6.1 **Master/Handoff Hardware Configuration**

The minimally configured master/handoff system is structured around the EFR100 Equipment Frame. The EFR100 is designed to accept the various plug-in modules in the WJ-9040 Family. These modules are available in three sizes: one-eighth, one-quarter and

Courtesy of http://BlackRadios.terryo.org



rack width. The EFR100 has eight internal connectors which mate with counterparts on the rear panel of each plug-in module. Insertion of a module causes its mating EFR100 connector to become active via recognition software in the IOM108. To successfully implement the Master/Handoff Option, the following hardware items, as a minimum, must be present in the EFR100:

1. One WJ-8626A-4 Receiver/Controller with Option MH
2. WJ-8626A-1 Slave Receivers (one or more)
3. One IOM108 I/O and Interface Module
4. One EPS100 Power Supply
5. One FRM150 Frequency Reference Module

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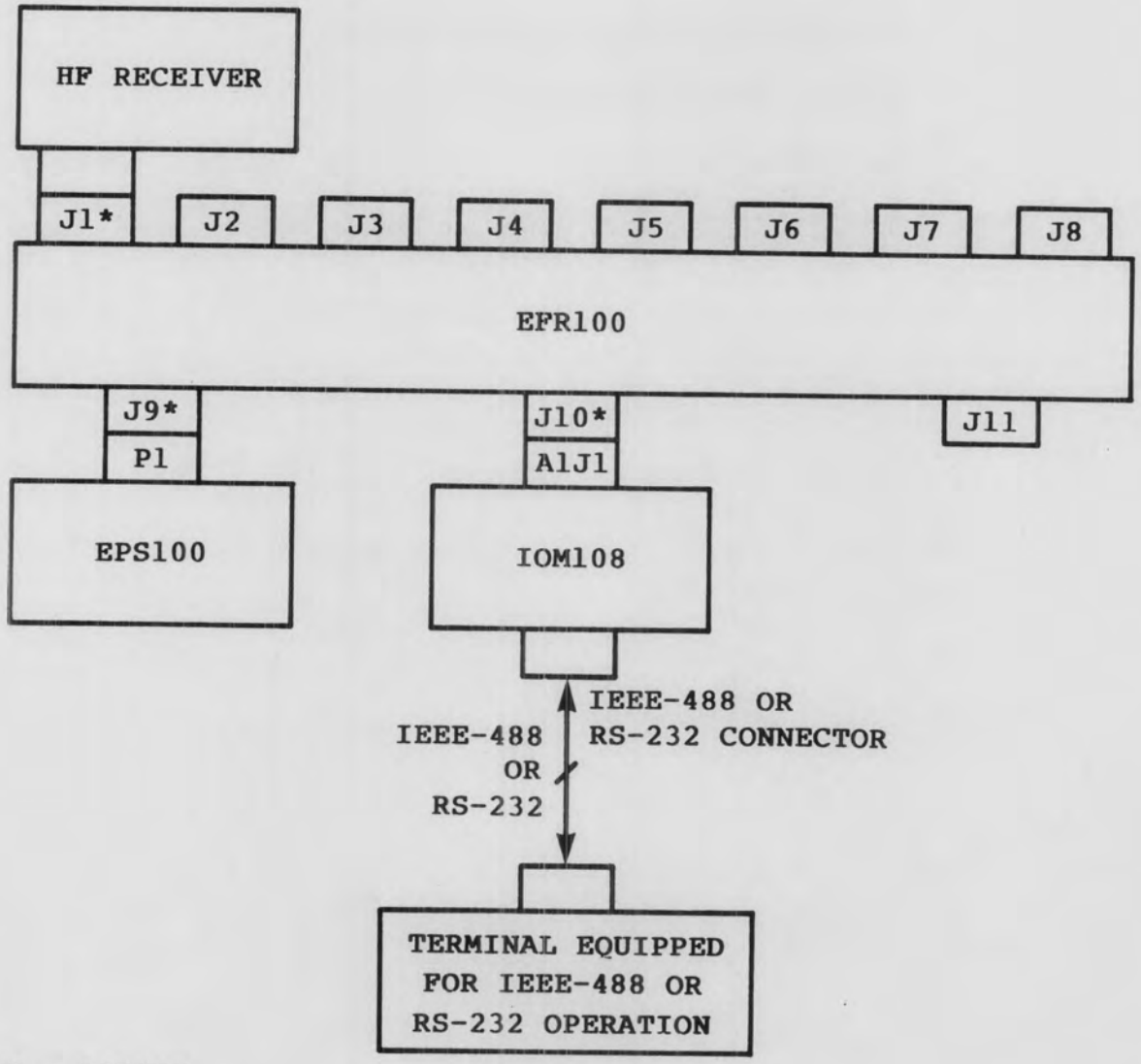


**Figure 2-5. Remote Control Hardware Configuration**

Courtesy of http://BlackRadios.terryo.org



**Table 2-1. Operation Through the IEEE-488 or RS-232 Interface (WJ-9040 System Configuration)**

| COMMAND | OPERATION | EXPLANATION | EXAMPLE |
|---|---|---|---|
| AGC | Turns on AGC | Automatic gain control is turned on. | AGC |
| AGC/ | Turns off AGC | Manual gain control is selected. | AGC/ |
| AGC? | Asks for the AGC | Returns a response of FAST, SLOW or OFF | AGC? |
| AGCF | Sets AGC to FAST | Automatic gain control is switched to FAST. | AGCF |
| AGCS | Sets AGC to SLOW | Automatic gain control is switched to slow. | AGCS |
| AM | Selects AM | Sets receiver in AM detection mode | AM |
| BFO (+/-)f | Sets the BFO frequency | Sets BFO to frequency f kHz | BFO-3.2 |
| BFO? | Asks for BFO frequency | Returns the BFO frequency in kHz | BFO? |
| BW n | Sets the bandwidth | Sets the bandwidth to number n, $1 \leq n \leq 5$ | BW2 |
| The number "n" is not a bandwidth, it is a number that represents which bandwidth slot the receiver looks at. The actual bandwidth that is selected is determined by the specific bandwidth card in that slot. | | | |
| BW? | Asks what BW# has been selected | Returns the number of the BW selected | BW? |
| BWC? | Asks what the BW is | Returns with the BW in kHz | BWC? |

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**Table 2-1. Operation Through the IEEE-488 or RS-232 Interface (WJ-9040 System Configuration)** (Continued)

| COMMAND | OPERATION | EXPLANATION | EXAMPLE |
|---|---|---|---|
| BD n | Sets the baud rate # | Sets the baud rate to number, $1 \leq n \leq 8$. | BD 2 |
| This command is valid only with WJ-8626A-4 receivers which have the FSK option installed. The number "n" is associated with an actual baud rate. The corresponding rates can be found in the FSK Option Manual. | | | |
| BD? | Asks what baud rate was selected | Returns with the number and actual rate | BD? |
| CLR | Resets a unit | The addressed module's status is reset to zeros. | CLR |
| COS n | Sets COS level | Sets Carrier Operated Squelch to a level o n, $0 \leq n \leq 63$. | COS 7 |
| COS? | Asks for level of COS | Returns the COS level | COS? |
| CST? | Asks for the state of COS | Returns a response of ON if signal is $\geq$COS and OFF otherwise. | CST? |
| CW | Selects CW detection mode | Puts receiver in CW detection mode | CW |
| DET? | Asks for the detection mode | Returns the selected detection mode | DET? |
| DWL n,m | Sets sector and channel dwell times in IOM108 | IOM Sector dwell is set to n. IOM Channel dwell is set to m, $0 \leq n, m \leq 9$. | DWL 2,3 |
| DWL* n,m | Sets WJ-8626A-4 dwell times | Sets on-hit time to n and off-hit time to m for a WJ-8626A internal scan, $0 \leq n, m \leq 9$. | DWL* 4,2 |
| DWL? | Asks for the IOM dwell times | Returns IOM sector and channel scan dwell times | DWL? |

Courtesy of http://BlackRadios.terryo.org



**Table 2-1. Operation Through the IEEE-488 or RS-232 Interface (WJ-9040 System Configuration)** (Continued)

| COMMAND | OPERATION | EXPLANATION | EXAMPLE |
|---|---|---|---|
| EXAM n | Asks for I.D. in EFR100 slot | Returns a description of module in slot n, where $1 \leq n \leq 8$ | EXAM 3 |
| FASTSS | Sets SS to fast mode | Sets a WJ-8626A-1 or WJ-8626A-4 into a fast SS mode. | FASTSS |
| FM | Sets FM detection | Puts the receiver in FM detection mode | FM |
| FRQ f | Sets the tuned frequency | Receiver is tuned to frequency f MHz | FRQ 21.876 |
| FRQ? | Asks for the tuned frequency | Returns the tuned frequency of receiver | FRQ? |
| FSK(+/-) | Sets FSK detection mode | Puts WJ-8626A-4 with FSK option into FSK mode | FSK |
| INL n,m-p | Include IOM memory channels | Sets memory channels (1-99) so they will be included in the IOM channel scan. | INL 4-7,9 |
| INL* n-m | Includes WJ-8626A-4 channels | Tells the WJ-8626A-4 to include the memory channels in its scan | INL* 3-10 |
| LCK n,m-p | Locks out IOM memory channels | Locks out memory channels from an IOM108 channel scan | LCK 1-4,99 |
| LCK* n-m | Locks out WJ-8626A-4 channels | Locks out WJ-8626A-4 memory channels from its scan | LCK* 5-88 |
| LCL | Sets unit to local | Puts the unit into local front panel operation | LCL |
| LSB | Sets LSB detection mode | Sets receiver in the LSB detection mode | LSB |

Courtesy of http://BlackRadios.terryo.org



**Table 2-1. Operation Through the IEEE-488 or RS-232 Interface (WJ-9040 System Configuration)** (Continued)

| COMMAND | OPERATION | EXPLANATION | EXAMPLE |
|---|---|---|---|
| MAN n | Stops specified IOM scan | n=0 stops IOM channel scan, $1 \leq n \leq 8$ stops IOM sector n scan (not in operation) | MANO |
| MAN* | Stops a WJ-8626A-4 scan | Tells WJ-8626A-4 to stop its internal scan | MAN* |
| NORMSS | Sets SS to normal mode | Puts WJ-8626A-1,-4 into Signal Strength mode | MORMSS |
| RCL n | Recalls specified IOM memory channel | Recalls and executes specified channel status to the receiver it was assigned to, $1 \leq n \leq 99$ | RCL 54 |
| RCL* n | Recalls WJ-8626A-4 memory channel | Recalls and executes WJ-8626A-4 memory channel, $1 \leq n \leq 99$ | RCL* 75 |
| RFG n | Sets RF Gain | Sets the level of RF gain, $0 \leq n \leq 63$ | RFG 28 |
| RFG? | Asks for the RF gain level | Returns the RF gain level from 0 to 63 | RFG? |
| SCN | Starts IOM channel scan | Begins IOM channel scan at the first channel included | SCN |
| SCN* | Starts WJ-8626A-4 channel scan | Begins WJ-8626A-4 internal channel scan | SCN* |
| SLOT n | Addresses the slot in EFR100 | Addresses specified EFR100 slot so that subsequent commands will be executed on that unit, $1 \leq n \leq 8$ | SLOT 1 |
| RMT | Sets unit into remote | Puts a unit into remote mode | RMT |

Courtesy of http://BlackRadios.terryo.org



**Table 2-1. Operation Through the IEEE-488 or RS-232 Interface (WJ-9040 System Configuration)** (Continued)

| COMMAND | OPERATION | EXPLANATION | EXAMPLE |
|---|---|---|---|
| RMT? | Asks the remote status | Returns either remote or local | RMT? |
| SS? | Asks for signal strength | Returns the signal strength in a range from 0 to 99 | SS? |
| STO n | Allocates an IOM memory channel | Puts the present status of the addressed receiver in the IOM memory channel n, $1 \leq n \leq 99$ | STO 91 |
| STO*n | Allocates a WJ-8626A-4 memory channel | Puts the present status of WJ-8626A-4 in its internal memory channel n | STO* 5 |
| SH n | Sets the shift for FSK option | Puts WJ-8626A-4 into shift n for the FSK mode option, $1 \leq n \leq 8$ | SH 3 |
| SH? | Asks for the shift selection | Returns with shift number and actual deviation | SH? |
| USB | Sets USB detection mode | Sets receiver in USB detection mode | USB |
| VIEW n | Report IOM memory channel n | Returns with complete status of IOM memory channel n | VIEW 43 |
| VIEW* n | Report WJ-8626A-4 memory channel n | Returns with complete status of WJ-8626A-4 memory channel n | VIEW* 21 |

Courtesy of http://BlackRadios.terryo.org



The Receiver/Controller can control slave receivers in more than one frame. The additional frames are connected via the WJ-9040 high speed data link. **Figures 2-6** and **2-7** depict simplified hardware interconnection requirements for implementing single frame and multi-frame master/handoff subsystems.

### 2.4.3.6.2 Handoff Addressing Assignments

Address assignments for handoff receivers are performed by the controller on power-up and are verified every 10 seconds. **Figure 2-8** shows one example of address assignments for a two-frame handoff subsystem consisting of a controller and three handoff receivers. The handoff address assignments will be used by the operator in performing master/handoff operation sequences (**paragraph 2.4.3.6.4**).

**NOTE**

The WJ-9040 System is comprised of customer-selectable receiver modules and ancillary devices. The arrangement of modules within equipment frames is a matter of choice. For the purpose of this manual, the receivers are located as shown in **Figure 2-7** and **Figure 2-8**. The terms slave receiver and handoff receiver will be used interchangeably regardless of their handoff compatibility with the master receiver (**paragraph 2.4.3.6**).

### 2.4.3.6.3 Initialization on Power-Up

When power is applied to the WJ-8626A-4, the battery backed memory will attempt to restore the previous operating mode. If the previous mode was a remote control function such as RMT or RMT scan, the WJ-8626A-4 will initialize itself only and assume the status RMT, waiting for instructions from the external controller.

If the power-down mode was any other than a remote control function, the WJ-8626A-4 will attempt to configure the Master/Handoff Subsystem. The handoff receivers in the subsystem are identified and addresses are assigned by the master receiver. No action is required by the operator to perform this function on power-up. When initialization is finished, the control status of the WJ-8626A-4 will be EXEC, the main local operating mode. If any subsystem configuration errors occurred, a message will remain on the display (**paragraph 2.4.3.6.5**).

### 2.4.3.6.4 Subsystem Check

Prior to actually placing a handoff subsystem into operational service, it is recommended that a subsystem check be performed. This insures that all I/O functions are operational and informs the operator of the handoff address assignments. Additionally, the

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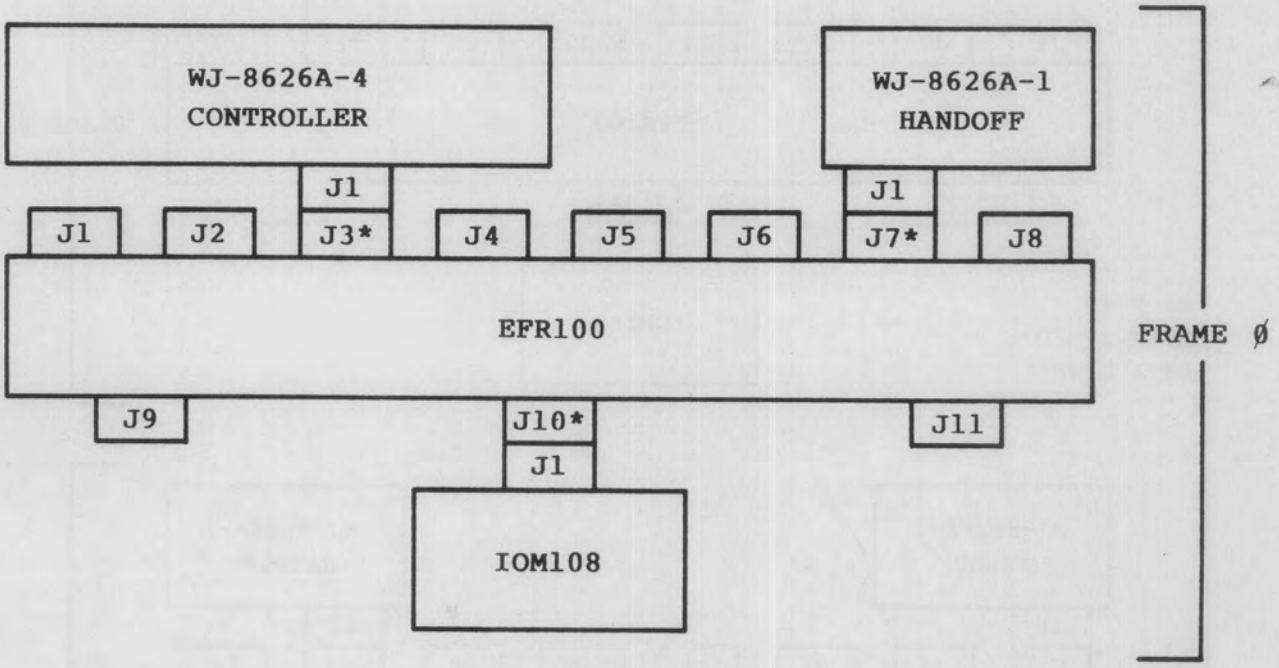
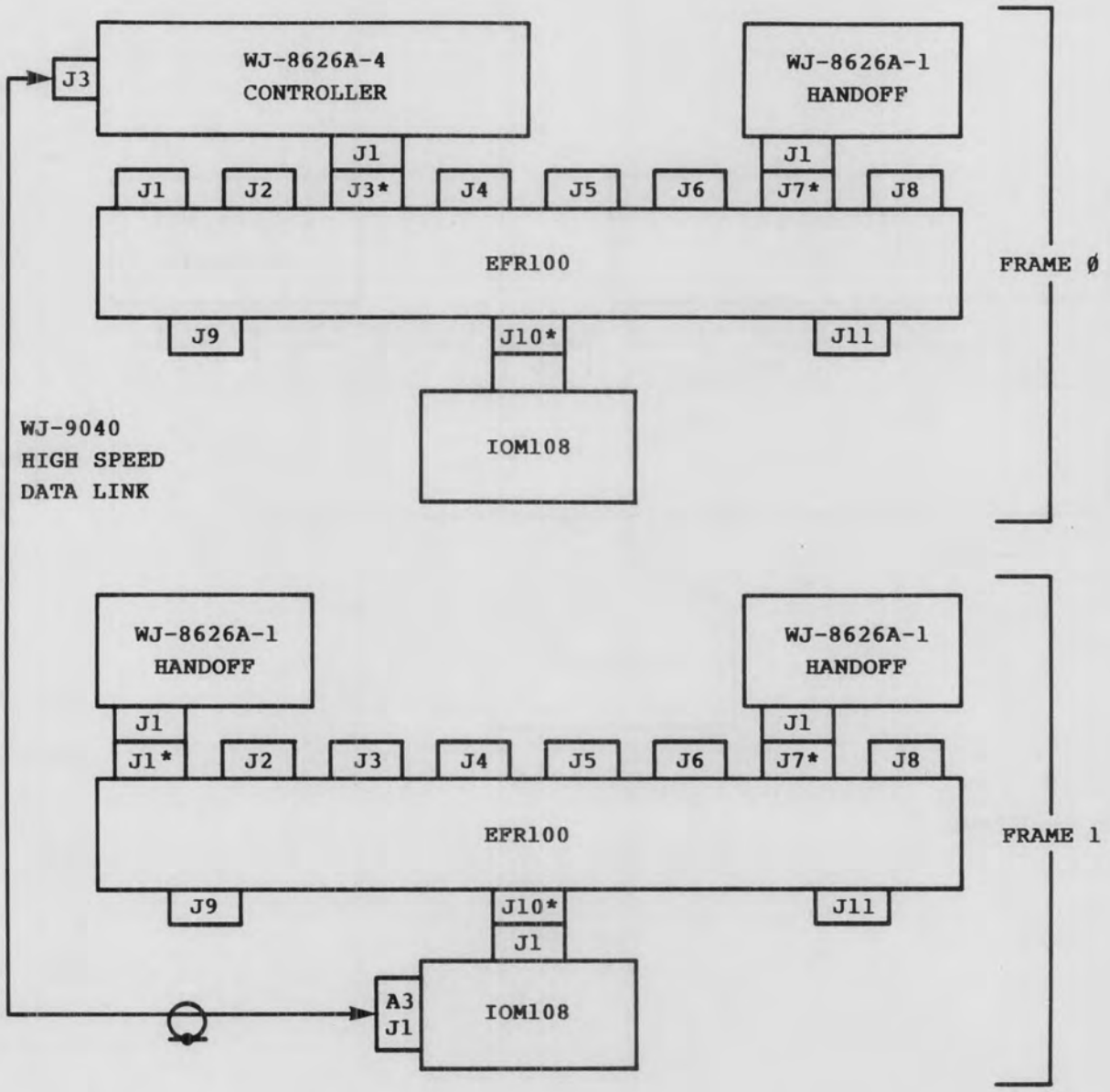



* = ACTIVE

**Figure 2-6. Single Frame Hardware Configuration**

Courtesy of http://BlackRadios.terryo.org






* = ACTIVE

**Figure 2-7. Multi-Frame Hardware Configuration**

Courtesy of http://BlackRadios.terryo.org



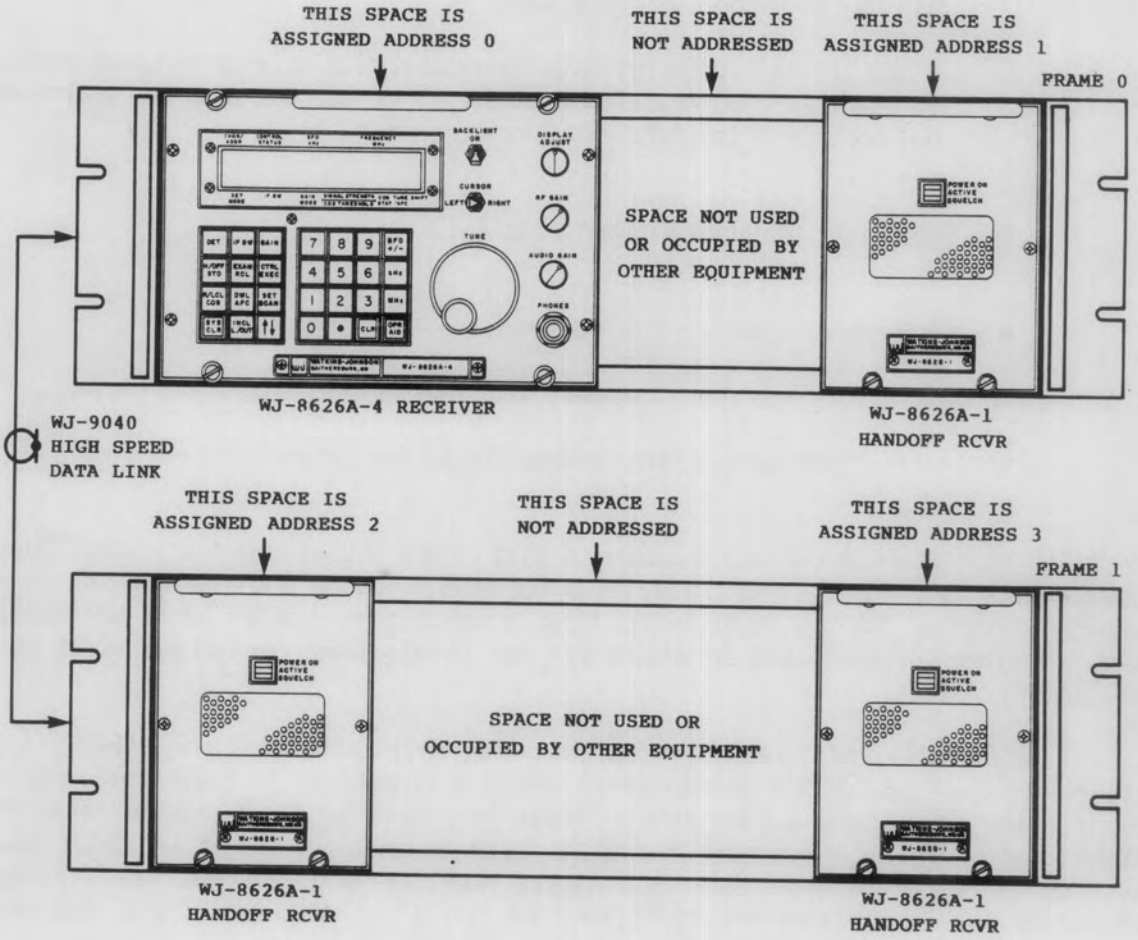



**Figure 2-8. System Initialization Handoff Receiver Addressing**

Courtesy of http://BlackRadios.terryo.org



operator must use the subsystem check to reconfigure the handoff assignments. This would be necessary for one of the following reasons:

1. If the controller was turned off while in RMT (Remote) mode, it will come on in Remote mode without assigning handoff addresses.

2. If the EFR100 connected by the WJ-9040 serial link was not connected or turned on during power up, the controller will not assign handoff addresses to that frame.

3. If the frame configuration is changed during operation (i.e. a receiver was removed or replaced with frame power on), the controller will not reperform handoff address assignments.

The Subsystem Check is performed as follows:

- Subsystem Check - Procedure

  1. Depress the upper case function keypad then the 0 keypad.

  2. Terminate by depressing the EXAM keypad.

The WJ-8626A-4 now executes a part of the initialization routine. The IOM108 in the local equipment frame identifies all units in the frame and reports this to the master receiver. Likewise, the WJ-9040 Serial Link is used to report all units accessable in other frames. If either of these I/O functions are not successfully completed, error messages will appear on the LCD.

Some WJ-9040 Receiving Systems may have more than one WJ-8626A-4 receiver, or other units equipped with a front panel. While it is possible to have more than one master receiver in the subsystem, and for both of these to access the same handoff receivers, it is not possible to place a master receiver in a slave mode to another master receiver. If, during the subsystem check, more than one front-panel receiver is identified, the message, "Please Note.....1/2 Rack rcvrs are not configured as slaves" is displayed for a few seconds as a reminder to the operator.

After all I/O functions are completed and any messages have been cleared, the LCD displays the Frame 0 status as shown in **Figure 2-9.** Frame 1 status may be checked by stepping the cursor to the right. The LCD displays Frame 1 status as shown in **Figure 2-10.** Note the correlation between the LCD display areas and the hardware configuration shown in **Figure 2-7.** Additional frames, if connected, may be checked by stepping the cursor switch to the right.

To exit the subsystem check, press the CLR keypad to return to the previous display mode, or press the EXAM keypad for additional information about specific handoff receivers within the subsystem (see **paragraph 2.4.3.4.5** EXAM key).

Courtesy of http://BlackRadios.terryo.org



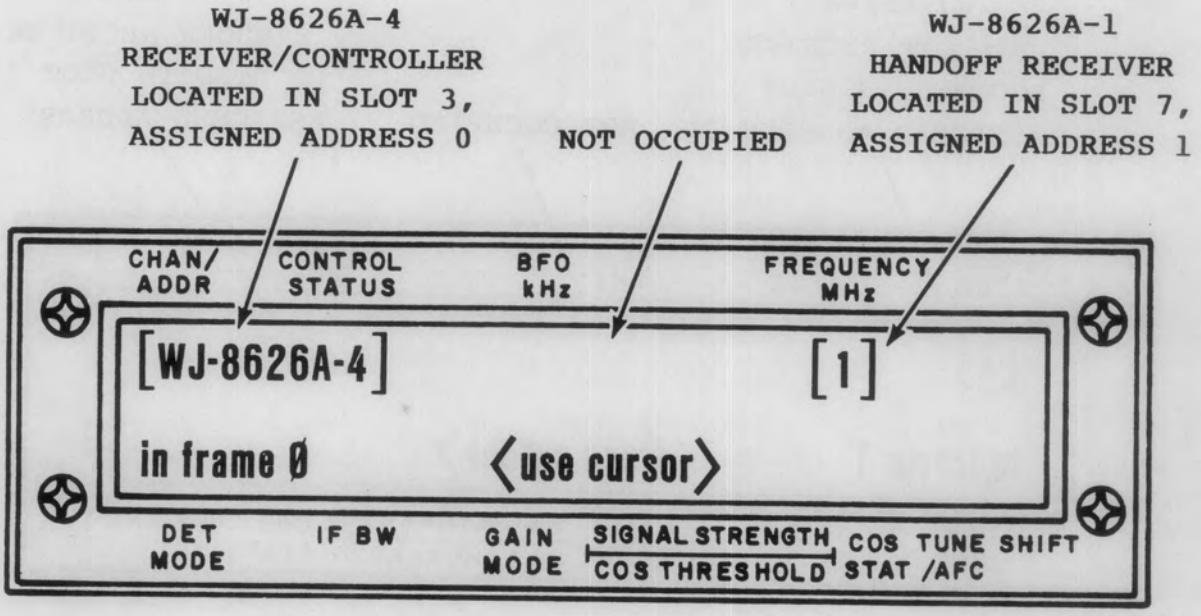



**Figure 2-9. Subsystem Check, Frame 0 Status Display**

Courtesy of http://BlackRadios.terryo.org



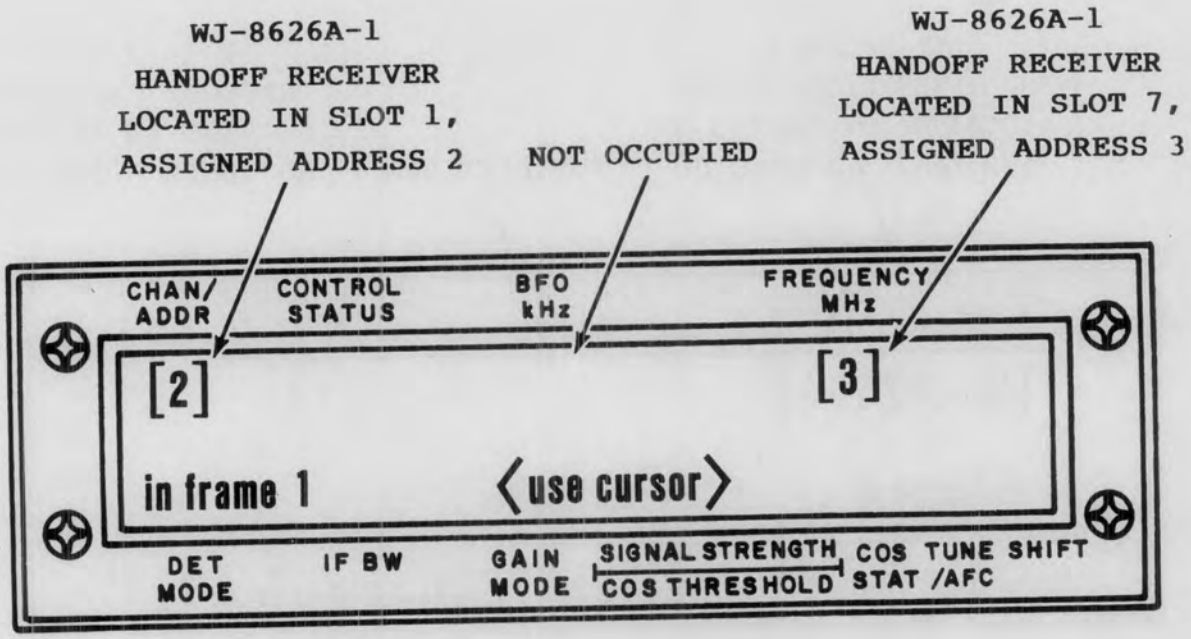



**Figure 2-10. Subsystem Check, Frame 1 Status Display**

Courtesy of http://BlackRadios.terryo.org



### 2.4.3.6.5 Master/Handoff Configuration Errors

1. If the IOM108 in the local EFR100 Equipment Frame fails to respond to the WJ-8626A-4 during the Master/Handoff configuration, an error condition has occurred. If the particular WJ-9040 system does not contain an IOM108 in the equipment frame, the master receiver would also intepret this as an error. In response to any such fault in the local frame on power-up, the LCD on the front panel will display the message, "Error on Power-up Enter [11] [OPR AID ]". The WJ-8626A-4 then continues configuration via the WJ-9040 Serial Link.

2. If the IOM108 connected to the WJ-8626A-4 via the WJ-9040 Serial Link fails to respond during the Master/Handoff configuration, the same message will be displayed, "Error on Power-up Enter [11] [OPR AID ]".

3. If both the local IOM108 and the external IOM108 fail to respond to the initialization commands, the same error message is displayed on the LCD.

4. Error Messages:

   A. "Error on power-up. Enter [11] [OPR AID] " This message is displayed if either the local or external IOM108 failed to respond to the Master/Handoff configuration commands issued by the WJ-8626A-4 on power-up or subsystem check. If more information about the error condition is desired, the keystroke described in the message may be entered and a second message (explained below) will be displayed. If the second message is not desired, the next stroke of any key button will erase the message and the previous front panel status will be displayed. The keystroke 11 OPR AID may be entered later, if desired, with the appropriate secondary message displayed.

   B. "No Equip. Frame response; Possible hardware fault" This message is displayed following the keystroke [11][OPR AID] if the local IOM108 in the equipment frame with the master receiver failed to respond during configuration.

   C. "No Serial I/O response; Power? Coax? Hdwr? Busy?" This message is displayed following the keystroke [11][OPR AID] if the external IOM108 connected via the WJ-9040 Serial Link failed to respond during configuration. Causes for this error include no power applied to the external frame, disconnected or faulty coaxial cable, or the IOM108 is busy servicing another I/O such as IEEE-4888.

   D. "No Equip. Frame response; No Serial I/O response" This message is displayed following the keystroke [11][OPR AID] if both the local and external IOM108s fail to respond to the Master Receiver during configuration.

Courtesy of http://BlackRadios.terryo.org



### 2.4.3.6.6 Master/Handoff Operating Procedures

The following paragraphs provide a detailed description of the techniques required to correctly operate the receiver in the master/handoff modes. The information provided is only applicable to properly configured subsystems as described in **paragraph 2.4.3.6.1.** The three basic master/handoff operations are:

EXAM, CTRL and HANDOFF.

### 2.4.3.6.7 Handoff Receiver Monitoring (EXAM)

The use of the EXAM keypad permits the receiver/controller to continuously monitor the status of any handoff receiver configured in its subsystem. The EXAM mode is a monitor mode only and all keys which cause the handoff receiver status to change are locked out from the receiver/controller front panel.

When preceeded by a numeric entry not greater than the highest handoff address, depression of the EXAM keypad will result in the processing of the numeric entry as a handoff receiver address. The subsystem address, tuning range and frame location of the addressed receiver is displayed. Depressing the EXAM keypad a second time causes the handoff receiver's active status to be displayed, and the signal strength, COS status and center tuning are continuously updated on the master receiver's front panel.

When depressed, when no numeric entries are present, the EXAM keypad monitors each successive handoff receiver. After the last receiver, address 1 is selected and the cycle may be repeated.

To exit the EXAM mode, the CTRL keypad may be used to directly enter the CTRL mode (**paragraph 2.4.3.4.6**) or the entry of 0, EXEC or 0, CRRL will return the controller to EXEC mode, activating the local master receiver. **Example 18** illustrates the use of the EXAM keypad.

- Handoff Receiver Monitoring - Procedure

  1. Press the upper keypad.
  2. Enter the desired 1 or 2 digit handoff receiver address.
  3. Terminate by depressing the EXAM keypad.
  4. Depress EXAM a second time to display handoff status.

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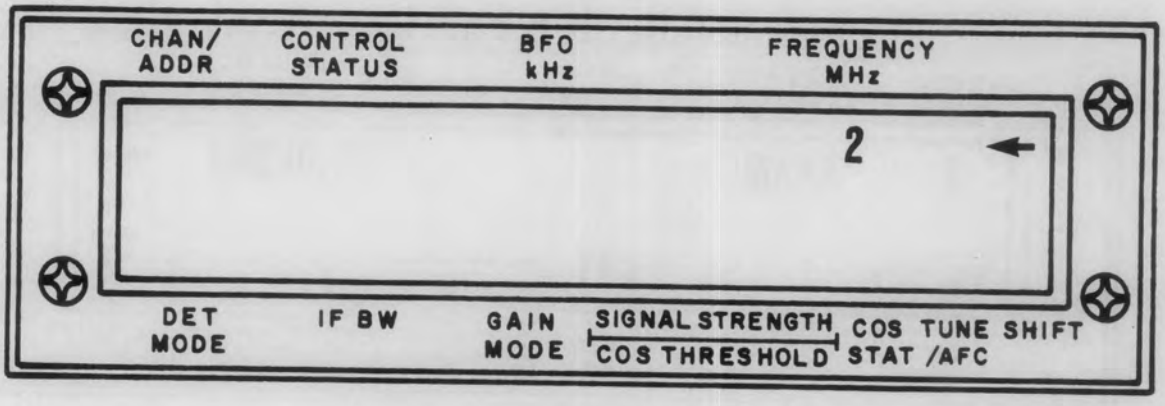
Example 18. Monitor the Status of Handoff Receiver #2.

↑ ..... (1) Sets the controller to respond to uppercase functions.

[2] ..... (2) Desired handoff address data entry, "2" is displayed in FREQUENCY (MHz) window as shown below.



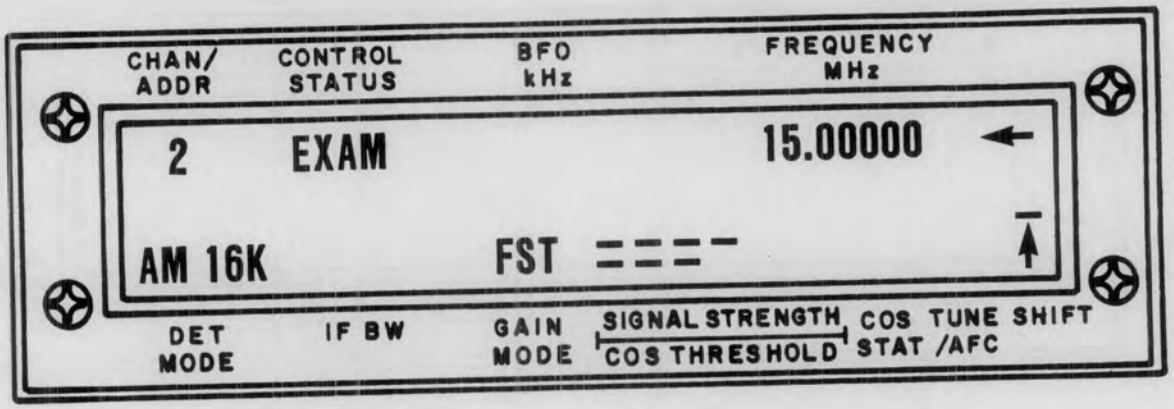

[EXAM] ..... (3) Termination command: FREQUENCY (MHz) returns to normal, "2" is displayed in CHAN/ADDR window. Handoff receiver address, tuning range and frame location are displayed as shown below.

Courtesy of http://BlackRadios.terryo.org



Example 18. Monitor the Status of Handoff Receiver #2 (Continued)

EXAM ..... (4) Second termination command, addressed handoff receiver's status is displayed as shown below.



Courtesy of http://BlackRadios.terryo.org



### 2.4.3.6.8 Handoff Receiver Status Modification (CTRL)

The use of the CTRL keypad permits the receiver/controller to modify the status of any handoff receiver configured in its subsystem. The CTRL mode is both a status modification and a status monitoring mode. Handoff receiver parameters (signal strength, COS status and center tuning) are continuously sampled and updated. CTRL is similar to EXAM except that the status change keys are enabled on the receiver/controller front panel.

When preceeded by a numeric entry not greater than the highest handoff address, depression of the CTRL keypad will result in the processing of the numeric entry as a handoff receiver address. The status of the addressed receiver is displayed and all receiver parameter keys are enabled. Addressed receiver parameters may be changed using procedures given in **paragraph 2.4.3.2**, but without entering the 0 EXEC keystroke.

When depressed, when no numeric entries are present, the CTRL keypad accesses each successive handoff receiver. After the last receiver, address 1 is selected and the cycle may be repeated.

To exit the CTRL mode, the EXAM keypad may be used to directly enter the EXAM mode (**paragraph 2.4.3.4.5**) or the entry of 0, EXEC or 0, CTRL will return the controller to EXEC mode enabling the local master receiver. **Example 19** illustrates the use of the CTRL keypad.

- Handoff Receiver Status Modification - Procedure

  1. Press the upper keypad.
  2. Enter the desired 1 or 2 digit handoff receiver address.
  3. Terminate by depressing the CTRL keypad.
  4. Enter new handoff receiver parameters, as desired, directly through the controller keypad.

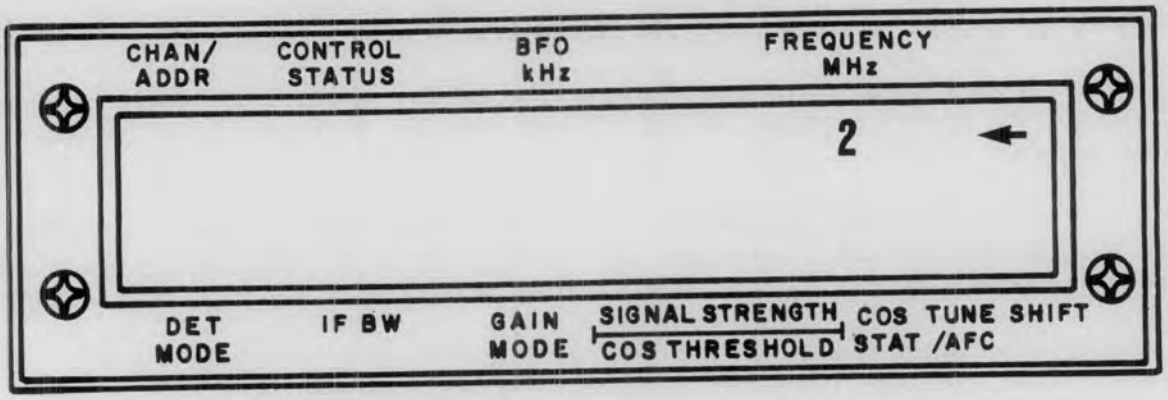
Courtesy of http://BlackRadios.terryo.org



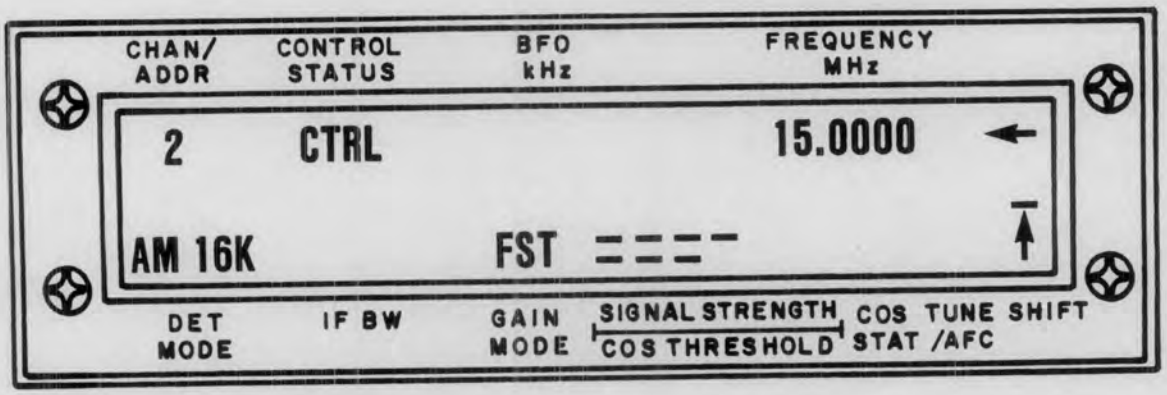
Example 19. Modify Status of Handoff Receiver #2

↑ ..... (1) Sets the controller to respond to uppercase functions.

[2] ..... (2) Desired handoff address data entry, "2" is displayed in FREQUENCY (MHz) window as shown below.




[CTRL] ..... (3) Termination command: receiver parameter keys are enabled, addressed receiver status is displayed as shown below.




[RECEIVER PARAMETER KEYS] ... (4) Parameter changes are entered as desired, addressed receiver status changes as parameters are entered, controller display immediately updates to new parameters.

Courtesy of http://BlackRadios.terryo.org



### 2.4.3.6.9 Front Panel Status Transfer (H/OFF)

The use of the H/OFF key permits the receiver/controller to perform a transfer of its front panel status to any similar handoff receiver configured in its subsystem. The use of H/OFF is subject to the following conditions:

1. The H/OFF keypad must not be used with receivers of different types (e.g. HF/VHF). Attempting to do so will result in an error.
2. Handoff data transfer transmits only the IFBW slot number of the controller. The actual BW installed in the handoff receiver may be different.
3. If an unavailable IFBW slot number is requested in the handoff receiver, it will default to BW number 1.
4. IF the controller has options which cannot be transferred, an appropriate message will be displayed.

When preceeded by a numeric entry not greater than the highest handoff address, depression of the H/OFF keypad will result in the processing of the numeric entry as a handoff receiver address. The handoff receiver's status is changed to agree with the parameters currently displayed on the controller front panel. The controller then acknowledges a correctly executed H/OFF by displaying the handoff address, subsystem location, IFBW slot number and actual handoff receiver bandwidth.

The handoff acknowledgement display is terminated by depressing any keypad.

Depressing EXAM or CTRL immediately after H/OFF will cause the controller to enter the EXAM or CTRL mode for the designated handoff receiver. See **paragraphs 2.4.3.6.7** and **2.4.3.6.8** for information concerning the use of these two keypads. Any key other than EXAM or CTRL will restore the Control Status to the previous mode (EXEC, RCLm). **Example 20** illustrates the use of the H/OFF keypad.

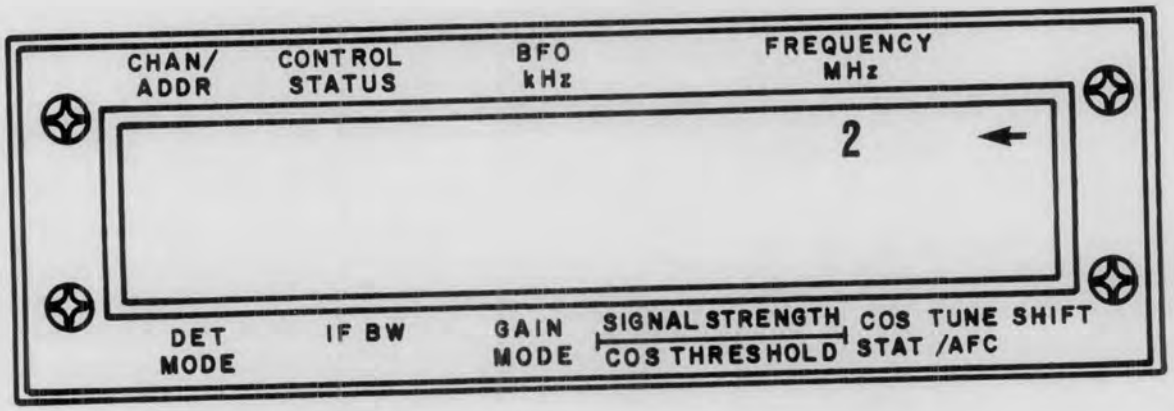
- Front Panel Status Transfer - Procedure
  1. Press the upper keypad.
  2. Enter the desired handoff receiver address.
  3. Terminate by depresssing the H/OFF keypad.

Courtesy of http://BlackRadios.terryo.org



Example 20. Transfer Controller Parameters to Handoff Receiver #2

| | | |
|---|---|---|
| ↑ | ..... | (1) Sets the controller to respond to uppercase functions. |
| 2 | ..... | (2) Desired handoff address data entry, "2" is displayed in FREQUENCY (MHz) window as shown below. |




| | | |
|---|---|---|
| H/OFF | ..... | (3) Termination command: handoff receiver status is changed to agree with controller. Handoff receiver address, subsystem location, IFBW slot number and actual bandwidth is displayed as shown below. |

Courtesy of http://BlackRadios.terryo.org



# SECTION III

# CIRCUIT DESCRIPTION

## 3.1 INTRODUCTION

This section describes the theory of operation of the receiver. A receiver simplified block diagram is provided to show overall functional partitioning of the receiver. Functional block diagrams are provided for each of the receiver's major sections to show functional signal flow through the receiver. The functional descriptions are followed by individual circuit-level descriptions of each receiver module.

## 3.2 GENERAL DESCRIPTION

**Figure 3-1** is a simplified block diagram of the receiver. The receiver functions have been grouped into the following five sections:

1. RF/IF Conversion Section
2. IF/Demodulator Section
3. Synthesizer Section
4. Digital Control Section
5. Power Supply Section

A general discussion of each of these sections follows.

### 3.2.1 RF/IF CONVERSION SECTION

A general description of the RF/IF Conversion Section functions and signal interfaces is provided in the following paragraphs.

#### 3.2.1.1 RF/IF Conversion Section Functions

The RF/IF Conversion Section performs the following functions:

a. Preselection (Option PRE) - The incoming 0.005-30 MHz spectrum is divided into 10 separate bands. Each band, when selected, passes that portion of the RF spectrum, while undesired portions in the incoming spectrum are suppressed.

b. Frequency Translation - The selected portion of the incoming RF spectrum is translated to the 10.7 MHz 2nd IF by a double conversion process with a 1st IF center frequency of 42.905 MHz.

Courtesy of http://BlackRadios.terryo.org



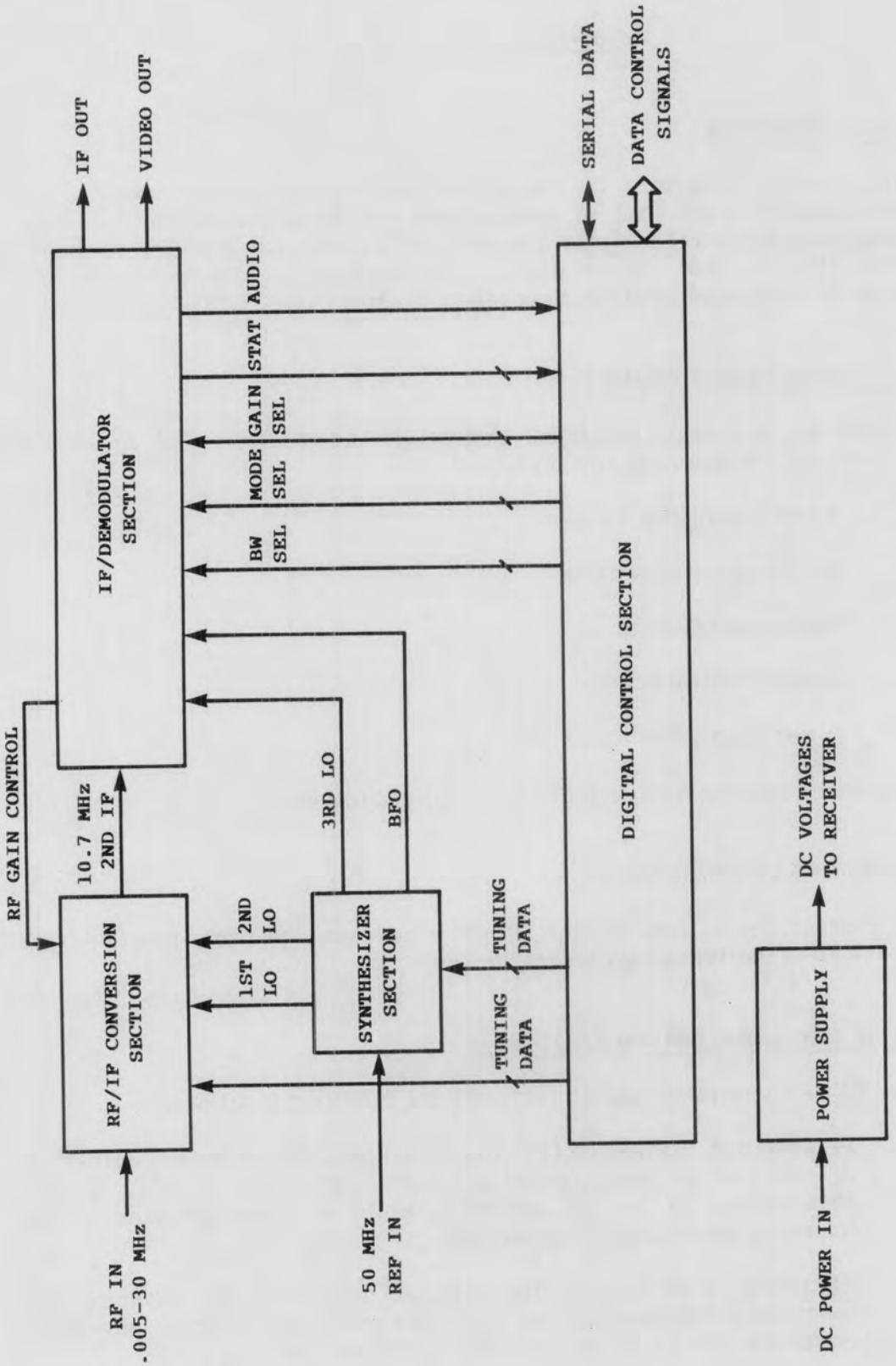



**Figure 3-1. Simplified Overall Block Diagram**

Courtesy of http://BlackRadios.terryo.org



c. Bandlimiting - The bandwidth of the 10.7 MHz 2nd IF output is limited to 17 kHz (100 kHz with option SMO) and is characterized by low in-band ripple and group delay.

d. Gain Control - Under high input signal conditions, the overall gain of the RF/IF Conversion Section is reduced to prevent overloading or saturation of succeeding receiver sections.

3.2.1.2 **Input/Output Signal Interfaces**

The following input/output signals interface with the RF/IF Conversion Section:

a. RF Input - Rear panel A2J1 feeds broadband 0.005-30 MHz RF signals from an antenna or similar source into the receiver at a 50 ohm impedance. This input is protected against RF levels exceeding +15 dBm.

b. Tuning Data - The receiver Digital Control Section sends a 4-bit, BCD encoded, data word to select each of the 10 preselector bands. (Applicable only with option PRE).

c. 1st LO - The Synthesizer Section sends the 1st LO signal, 42.91-72.90 MHz, to operate the 1st mixer.

d. 2n LO - The Synthesizer Section sends the 2nd LO signal, 32.21000-32.20001 MHz, to operate the 2nd mixer.

e. 2nd IF Output - The 10.7 MHz 2nd IF output is provided as an input to the IF/Demodulaor Section. This output is 50 ohms at 17 kHz bandwidth (100 kHz with option SMO) and is nominally 15 dB above the RF input signal level.

3.2.2 **IF/DEMODULATOR SECTION**

A general description of the IF/Demodulator Section functions and signal interfaces is provided in the following paragraphs.

3.2.2.1 **IF/Demodulator Section Functions**

The IF/Demodulator Section performs the following functions:

a. Frequency Translation - The 10.7 MHz 2nd IF input signal is translated to the 455 kHz 3rd IF by a single conversion process.

b. Bandlimiting - The 3rd IF signal is routed through one of five selectable IF filters. Available bandwidths range from 200 Hz to 16 kHz.

Courtesy of http://BlackRadios.terryo.org



c. IF Amplification - A two stage, high gain, 3rd IF amplifier provides the major portion of overall receiver gain.

d. Gain Control - An AGC detector provides primary gain control to the 3rd IF amplifier under normal signal conditions, and secondary gain control to the RF/IF Conversion Section under high signal conditions.

e. Signal Demodulation - Three signal demodulators provide demodulated AM, FM and CW/SSB video outputs.

3.2.2.2 **Input/Output Signal Interfaces**

The following input/output signals interface with the IF/Demodulation Section:

a. 2nd IF Input - The RF/IF Conversion Section sends the 10.7 MHz 2nd IF input signal. Signal bandwidth is 17 kHz (28 kHz with option SM) and input impedance is 50 ohms.

b. 3rd LO - The Synthesizer Section sends the 3rd LO signal, 11.155 MHz, to operate the 3rd Mixer.

c. SM - A medium level 3rd IF signal at approximately 15 dB above the RF input level. The bandwidth is 17 kHz, or 100 kHz with option SMO.

d. BFO - The Synthesizer sends the BFO signal, 447-463 kHz, to operate the CW/SSB detector.

e. BW Select - The Digital Control Section sends a 5-bit data word to select each of the five 3rd IF filters.

f. Mode Select - The Digital Control Section sends a 3-bit data word to select AM, FM or CW/SSB modes. When any SSB mode is selected, an appropriate SSB 3rd IF filter is selected via the BW select data word.

g. Gain Select - The Digital Control Section sends a 2-bit data word to select SLOW, FST or MAN gain modes. In MAN mode, the Digital Control Section also sends a MAN GAIN voltage to directly control the gain of the 3rd IF Amplifier.

h. IF Out - A high level, 3rd IF signal is provided as a rear panel receiver output. This output is 50 ohms, bandwidth limited by the 3rd IF filter, and is nominally 67 dB above the 2nd IF input signal.

i. Video Output - A demodulated AM, FM or CW/SSB signal is provided as a rear panel receiver output. This output is 75 ohms, 1/2 the 3rd IF filter bandwidth, and is nominally 1 Vpp or greater.

j. RF Gain Control - This DC voltage is supplied to the RF/IF Conversion section. The level is nominally 0 vdc under normal signal conditions, increasing to -4 Vdc under maximum signal conditions.

Courtesy of http://BlackRadios.terryo.org



k. Status - These DC outputs are sent to the Digital Control Section and represent the status of COS, Signal Strength, AFC, and the IF bandwidth identification voltage.

l. Audio - This low level audio is sent to the Digital Control for distribution to the front panel and rear panel I/O connector.

### 3.2.3 SYNTHESIZER SECTION

A general description of the Synthesizer Section functions and signal interfaces is provided in the following paragraphs.

#### 3.2.3.1 Synthesizer Section Functions

The Synthesizer Section performs the following functions:

a. LO Signal Generation - The Synthesizer Section translates digital tuning data into the 1st, 2nd, 3rd and BFO signals required for operation of the mixers in the RF/IF Conversion and IF/Demodulation Sections.

b. External Reference Locking - Internal phase locked loops lock the accuracy of the four LO signals to an external frequency reference source.

#### 3.2.3.2 Input/Output Signal Interfaces

The following input/output signals interface with the Synthesizer Section:

a. 50 MHz Ref. In - Rear panel J2 provides the input for a high stability 50 MHz reference signal. This signal is a sine wave into 50 ohms at 0 dBm nominal level and determines the effective tuning accuracy of the receiver.

b. Tuning Data - The Digital Control Section sends 9 BCD encoded tuning data words to program the output frequencies of the 1st, 2nd, 3rd and BFO synthesizers.

c. 1st LO - The 1st LO output is provided as an input to the RF/IF Conversion Section. Frequency range is 42.91-72.90 MHz and level is +20 dBm nominal into 50 ohms.

d. 2nd LO - The 2nd LO output is provided as an input to the RF/IF Conversion Section. Frequency range is 32.21000-32.20001 MHz and level is 0 dBm nominal into 50 ohms.

Courtesy of http://BlackRadios.terryo.org



e. 3rd LO - The 3rd LO output is provided as an input to the IF/Demodulation Section. Frequency is fixed at 11.155 MHz and level is -6 dBm nominal into 50 ohms.

f. BFO - The BFO signal output is provided as an input to the IF/Demodulation Section. Frequency range is 447-463 kHz and level is 40 mVrms (high impedance).

### 3.2.4 DIGITAL CONTROL SECTION

A general description of the Digital Control Section functions and signal interfaces is provided in the following paragraphs.

#### 3.2.4.1 Digital Control Section Functions

The Digital Control Section performs the following functions:

a. Receiver Control - The Digital Control Section generates the digital control words necessary to operate the RF/IF, IF/Demodulation and Synthesizer Sections.

b. Front Panel Interface - Operator selected parameter inputs are interfaced from the front panel to the digital circuitry to generate receiver digital control words, store data in memory locations, or perform special functions. Receiver status is also input and displayed on the Liquid Crystal Display for monitoring purposes.

c. External Controller Interface - External controller commands are interfaced to the digital circuitry to generate receiver digital control words. The Digital Control Section also sends receiver status words to the external controller. This would typically be an IOM108 connected through the backplane of an EFR100 Equipment Frame.

#### 3.2.4.2 Input/Output Signal Interfaces

The Digital Control Section is divided into two major parts. The first, hereafter called the Digital Interface, manages the signal lines to and from the synthesizer, demodulator, and the other part of the Digital Control Section. This second part, called the I/O Control, is responsible for all front panel communication and all external controller communication. They are described separately below.

##### 3.2.4.2.1 Digital Interface Input/Output

a. Tuning Data - A 4-bit preselector bandswitch word is sent to the RF/IF Conversion Section (applicable only with option PRE) and a 34-bit synthesizer tuning data word is sent to the Synthesizer Section.

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b. IF/Demodulator Select Data - A 5-bit BW select word, a 3-bit Detection Mode select word and a 2-bit Gain select word are sent to the IF/Demodulator Section.

c. Status - DC voltages representing the status of COS, Signal Strength, AFC and selected IF bandwidth are sent from the IF/Demodulator Section to the I/O Control Section.

d. Audio - Low level audio is sent from the IF/Demodulator Section to the I/O Control Section for distribution to the front panel and rear panel I/O connector.

e. Status Input - A 72-bit serial data stream containing the codes for all receiver parameters is received from the I/O Control Section. A clock, strobe, and enable line control the flow of data.

f. I.D. Output - A 16-bit serial data stream is sent to the I/O Control Section containing the IFBW identification, and any option IDs if present.

3.2.4.2.2 **I/O Control Input/Output Interfaces**

a. Front Panel Input - All keypad switches, the tunewheel, and adjustments on the front panel are received.

b. Front Panel Output - The audio is sent to the phones jack. The microprocessor data bus is connected to the Display module to send the characters to be displayed. The LCD backlight voltage is sent to illuminate the display.

c. Receiver Status Out - The 72-bit serial data stream, clock, strobe and enable signals are generated and sent to the Digital Interface Section (**paragraph 3.2.4.2.1**).

d. Receiver Report Input - The 16-bit serial data word to identify IFBW and options, is received from the Digital Interface Section.

e. Status Input - The signal strength, COS status, AFC voltage, synthesizer lock and audio are received from the Digital Interface Section.

f. Status Output - The COS status, COR switch driver, signal strength, AFC voltage, service request and polled audio signals are sent to the rear panel connectors.

g. External Controller Input - Serial data, clock, strobe, and enable lines are received from rear panel connector J1. These would typically be generated by an IOM108 to send commands.

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h. External Controller Output - A serial data stream is sent to the rear panel connector J1 in response to certain external controller inputs. This output data may contain identification codes, status, or requests for service.

### 3.2.5 POWER SUPPLY SECTION

The Power Supply Section receives DC input voltages from either a bolt-on power supply unit or from the EFR100 Equipment Frame and converts these voltages to DC levels required by the receiver circuits. There are two voltage regulator assemblies in the WJ-8626A-4. Module A1 regulates for the receiver section as shown below.

a. Input: +29 V, +18 V, -18 V, +8V

b. Output: +29 V, +15 V, -15 V, +5V

Module A9A1 regulates for the I/O Control in the Digital Section as shown below.

a. Input: +18V, -18V, +8V

b. Output: +12V, -12V, +5V

## 3.3 RECEIVER FUNCTIONAL DESCRIPTION

### 3.3.1 RF/IF CONVERSION SECTION

**Figure 3-2** is a block diagram of the RF/IF Conversion Section. As shown in **Figure 3-2**, the RF/IF Conversion Section consists of three major modules: Input Filter, A2; Preselector, A7 (option PRE); Input Converter, A3.

#### 3.3.1.1 Input Filter, A2

RF signals from receiver rear panel A2J1 drive the input of the Input Filter, A2. A2 is a 15-pole lowpass filter with a 50 ohm characteristic impedance and a 3 dB nominal loss. The RF input signals are bandlimited to 0.005 to 30 Mhz by A2 and are applied to the Preselector, A7. If option PRE is not installed, the signal is routed to Input Converter, A3.

#### 3.3.1.2 Preselector, A7 (Optional)

Bandlimited RF input signals from the Input Filter, A2, drive the input of the optional Preselector, A7. The receiver tuning range of 0.005-30 MHz is divided into ten frequency bands by digitally selectable sub-octave bandpass filters. The filters are selected by a 4-bit BCD encoded data word from the Digital Control. **Table 3-1** shows the relationship between the frequency bands and the Preselector tuning data word. RF input signals passing through the Preselector are attenuated by approximately 2 dB and drive the input to the Input Converter, A3. Refer to the WJ-8626A-4/PRE Instruction Manual for further information.

Courtesy of http://BlackRadios.terryo.org



FIGURE 3-2

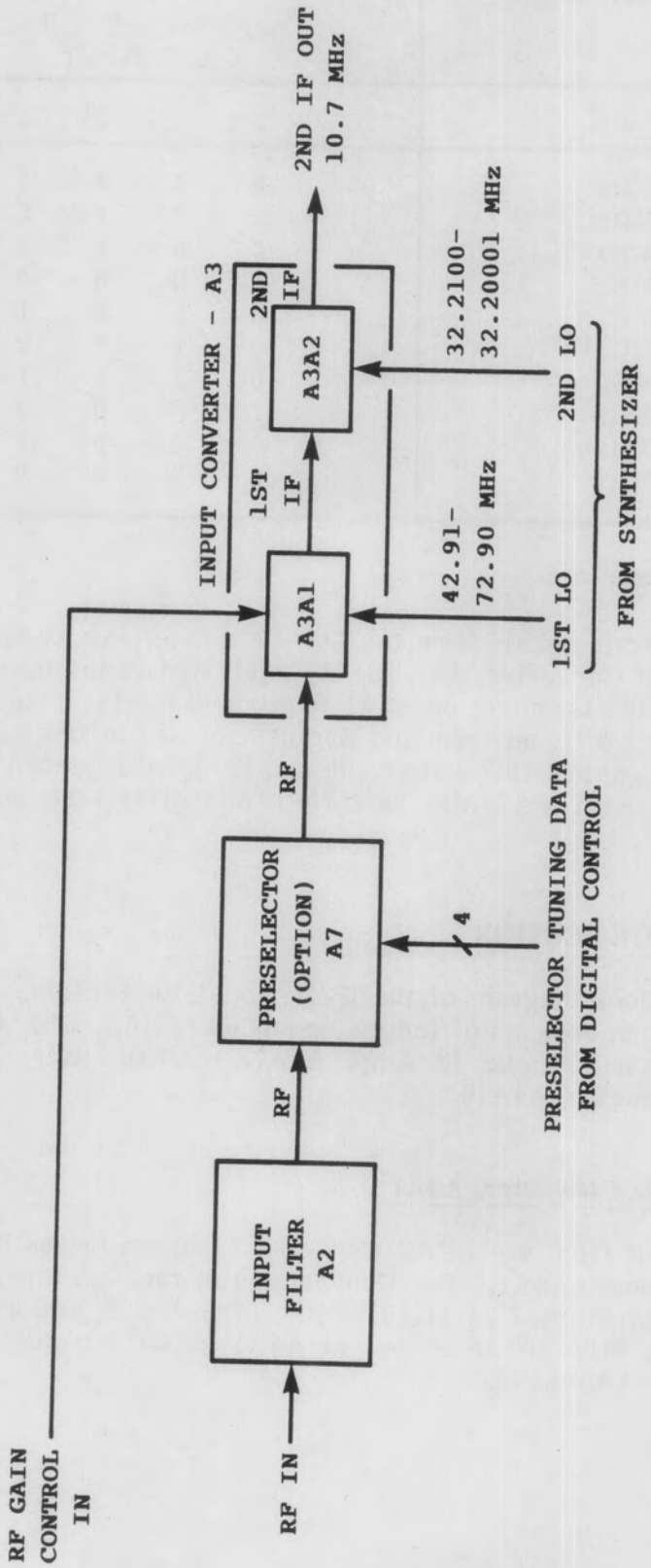


Figure 3-2. RF/IF Conversion Block Diagram

Courtesy of http://BlackRadios.terryo.org



**Table 3-1. Preselector Tuning Data (Optional)**

| TUNED FREQUENCY | PRESELECTOR CODE INPUT | | | |
|---|---|---|---|---|
| | $2^3$ | $2^2$ | $2^1$ | $2^0$ |
| 0.005 - 0.74 MHz | 0 | 0 | 0 | 1 |
| 0.75 - 1.09 MHz | 0 | 0 | 1 | 0 |
| 1.10 - 1.69 MHz | 0 | 0 | 1 | 1 |
| 1.70 - 2.59 MHz | 0 | 0 | 0 | 0 |
| 2.60 - 3.89 MHz | 0 | 1 | 0 | 1 |
| 3.90 - 5.99 MHz | 0 | 1 | 1 | 0 |
| 6.00 - 8.99 MHz | 0 | 1 | 1 | 1 |
| 9.00 - 12.99 MHz | 1 | 0 | 0 | 0 |
| 13.00 - 19.99 MHz | 1 | 0 | 0 | 1 |
| 20.00 - 30.00 MHz | 0 | 0 | 0 | 0 |

3.3.1.3 **Input Converter, A3**

Bandlimited RF input signals from the Low Pass filter, A2, or optional Preselector, A7, drive the input of the Input Converter, A3. The RF input signals and the 1st LO signal from the Synthesizer are mixed by the 1st mixer on A3A1 to produce the 1st IF signal of 42.905 MHz. The 1st IF signal and the 2nd LO signal from the Synthesizer are mixed by the 2nd mixer on A3A2 to produce the 2nd IF signal of 10.7 MHz. The 2nd IF signal is passed through a bandpass filter centered at 10.7 MHz with a 17 kHz bandwidth and drives the 2nd IF input of the IF/Demodulator Section.

3.3.2 **IF/DEMODULATOR SECTION**

**Figure 3-3** is a block diagram of the IF/Demodulator Section. As shown in **Figure 3-2**, the IF/Demodulator Section consists of ten major modules: 10.7 MHz/455 kHz Converter, A4A1; IF Filters, A4A2-A4A6; 455 kHz IF Amp. A4A7; WB/NB Filter, A4A8; AM/FM/SSB Demod., A4A9; AGC/Video/Squelch, A4A10.

3.3.2.1 **10.7 MHz/455 kHz Converter, A4A1**

The 2nd IF output from the RF/IF Conversion Section drives the 50 ohm input of the 10.7 MHz/455 kHz Converter, A4A1. The Converter also receives the 3rd LO signal from the Synthesizer Section which is fixed at 11.155 MHz. The 2nd IF and 3rd LO are mixed to produce the 3rd IF, 455 kHz. The 3rd IF output of A4A1 is buffered and drives the parallel connected inputs of IF Filters A4A2-A4A6.

Courtesy of http://BlackRadios.terryo.org



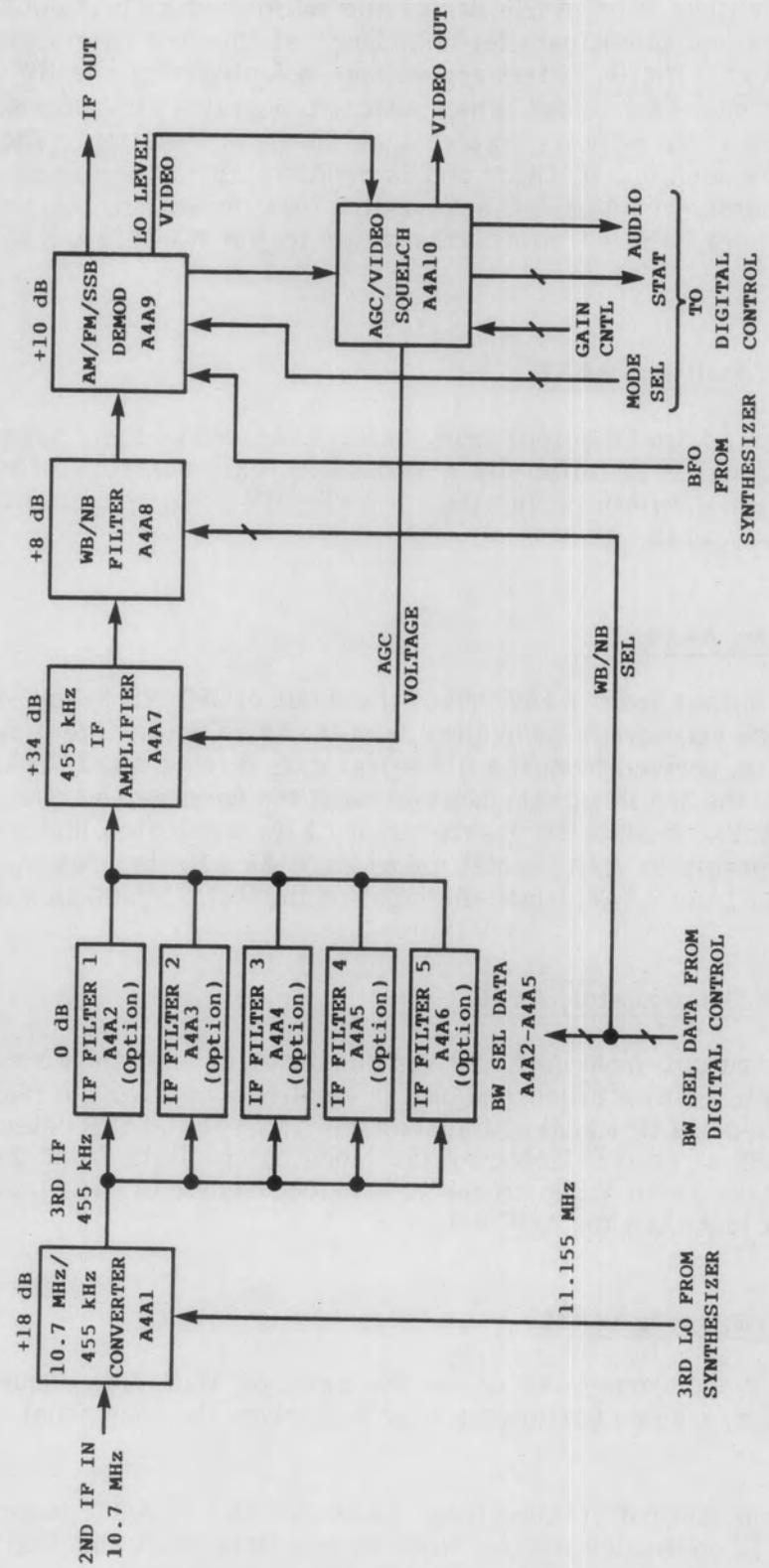


**Figure 3-3. IF/Demodulator Block Diagram**

Courtesy of http://BlackRadios.terryo.org



### 3.3.2.2 IF Filters 1-5, A4A2-A4A6 (Specific Filters Customer Selected)

The 3rd IF output from A4A1 drives the paralleled high impedance inputs of IF Filters A4A2-A4A6. The equivalent parallel impedance of the five filters presents a 200 ohm load to the output of A4A1. The IF Filters are voltage selectable by the BW select data from the Digital Control Section. Each filter, when selected, operates at approximately unity gain. When not selected, each filter exhibits greater than 60 dB of isolation. The 455 kHz 3rd IF signal passes through the selected IF filter and is bandlimited to the bandwidth of the filter. The bandlimited 3rd IF output of A4A2-A4A6 drives the high impedance input of the 455 kHz IF Amplifier, A4A7. For more detailed information refer to the WJ-9926A-XXXX IF Filter Sets Instruction Manual.

### 3.3.2.3 455 kHz IF Amplifier, A4A7

The bandlimited 3rd IF output from A4A2-A4A6 drives the input of the 455 kHz IF amplifier, A4A7. The signal is amplified by a two stage, gain controlled (for AGC purposes) amplifier with an overall bandwidth of 30 kHz. The amplified 3rd IF output from A4A6 drives the input of WB/NB Filter, A4A8.

### 3.3.2.4 WB/NB Filter, A4A8

The 3rd IF output from A4A7 drives the input of WB/NB Filter, A4A8. The signal is applied to both the wide and narrow-band circuits of A4A8. Circuit selection is accomplished by the WB/NB Select data, derived from the BW Select data driving A4A2-A4A6. If an IF BW of 2 kHz or less is selected, the 3rd IF signal passes through the narrow-band circuit in A4A8 which provides a 4 kHz bandwidth. If an IFBW greater than 2 kHz is selected, the 3rd IF signal passes through the wideband circuit in A4A8 which provides a 28 kHz bandwidth. The amplified, bandlimited 3rd IF output from A4A8 drives the input of the AM/FM/SSB Demodulator, A4A9.

### 3.3.2.5 AM/FM/SSB Demodulator, A4A9

The 3rd IF output from A4A8 drives the input of the AM/FM/SSB Demodulator, A4A9. The signal is amplified by a broadband buffer amplifier to drive the rear panel IF output jack, A4J2. The amplified 3rd IF signal also drives the AM, FM and SSB detector circuits. The detected AM, FM and SSB video is selected by the Mode Select Data from the Digital Control Section and is sent as Low Level Video to the AGC/Video/Squelch, A4A10. The AM detector also provides a DC level to A4A10 for AGC control.

### 3.3.2.6 AGC/Video/Squelch, A4A10

Low Level Video from A4A9 drives the input of AGC/Video/Squelch, A4A10. The video signal is amplified by a video buffer amplifier and drives the rear panel video output jack, A4J3.

The DC gain control voltage form A4A9 drives the AGC processing circuitry in A4A10. This circuitry is controlled by the Mode Select data from the Digital Control. The output of the AGC processing circuitry is an AGC voltage to A4A7, an RF AGC voltage to A3 and Signal Strength Voltage to the Digital Control Section.

Courtesy of http://BlackRadios.terryo.org



### 3.3.3 SYNTHESIZER SECTION

**Figure 3-4** is a block diagram of the Synthesizer Section. As shown in **Figure 3-4**, the Synthesizer Section consists of four major modules: Reference Divider, A5A1; 1st LO Synthesizer, A5A2; 2nd LO Synthesizer, A5A3; 3rd LO/BFO Synthesizer, A5A4.

#### 3.3.3.1 Reference Divider, A5A1

The Reference Divider, A5A1, is the heart of the Synthesizer Section. A stable 50 MHz Reference input from rear panel jack J2 is run through a series of digital dividers to generate the various time base signals required by the four synthesizers. The Reference Divider outputs are: 20 kHz (1st LO); 2 MHz, 8 kHz (2nd LO); 50 kHz, 5 kHz (3rd LO); 1 kHz (BFO).

#### 3.3.3.2 1st LO Synthesizer, A5A2

The 1st LO Synthesizer produces the 1st LO signal required by the Input Converter, A3. A 20 kHz time base signal is supplied by the Reference Divider to lock the phase lock loop circuits of A5A2. Tuning of the 1st LO is provided by the 1st LO tuning data from the Digital Control. This data consists of four BCD encoded data words representing the 10 MHz, 1 MHz, 100 kHz and 10 kHz receiver tuned frequency digits. When the receiver is set to 00.00XXX MHz, the 1st LO output is 42.91 MHz. When the receiver is set to 30.00XXX MHz, the 1st LO output is 72.91 MHz.

#### 3.3.3.3 2nd LO Synthesizer, A5A3

The 2nd LO Synthesizer produces the 2nd LO signal required by the Input Converter, A3. The 2 MHz and 8 kHz time base signals are supplied by the Reference Divider to lock the phase lock loop circuits of A5A3. Tuning of the 2nd LO is provided by the 2nd LO tuning data from the Digital Control. This data consists of three BCD encoded data words representing the 1 kHz, 100 Hz and 10 Hz receiver tuned frequency digits. When the receiver is set to XX.XX000 MHz, the 2nd LO output is 32.21000 MHz. When the receiver is set to XX.XX999 MHz, the 2nd LO output is 32.20001 MHz.

#### 3.3.3.4 3rd LO/BFO Synthesizer, A5A4

The 3rd LO/BFO Synthesizer produces the 3rd LO signal required by the IF/-Demodulator Section and also produces the BFO signal required by the IF/Demodulator Section. The 3rd LO consists of a fixed crystal oscillator at 11.155 MHz and phase lock loop circuits. The 50 kHz and 5 kHz time based signals are provided by the Reference Divider to precisely lock the 3rd LO output at 11.155000 MHz.

A 1 kHz time base signal is supplied by the Reference Divider to lock the BFO phase lock loop circuits. Tuning of the BFO is provided by the BFO tuning data from the Digital Control. This data consists of two BCD encoded data words representing BFO Offset Frequency in kHz. When an offset of -8.0 kHz is requested, the BFO output is 447.0 kHz. When an offset of 0.0 kHz is requested, the BFO output is 455.0 kHz. When an offset of +8.0 is requested, the BFO output is 463.0 kHz.

Courtesy of http://BlackRadios.terryo.org



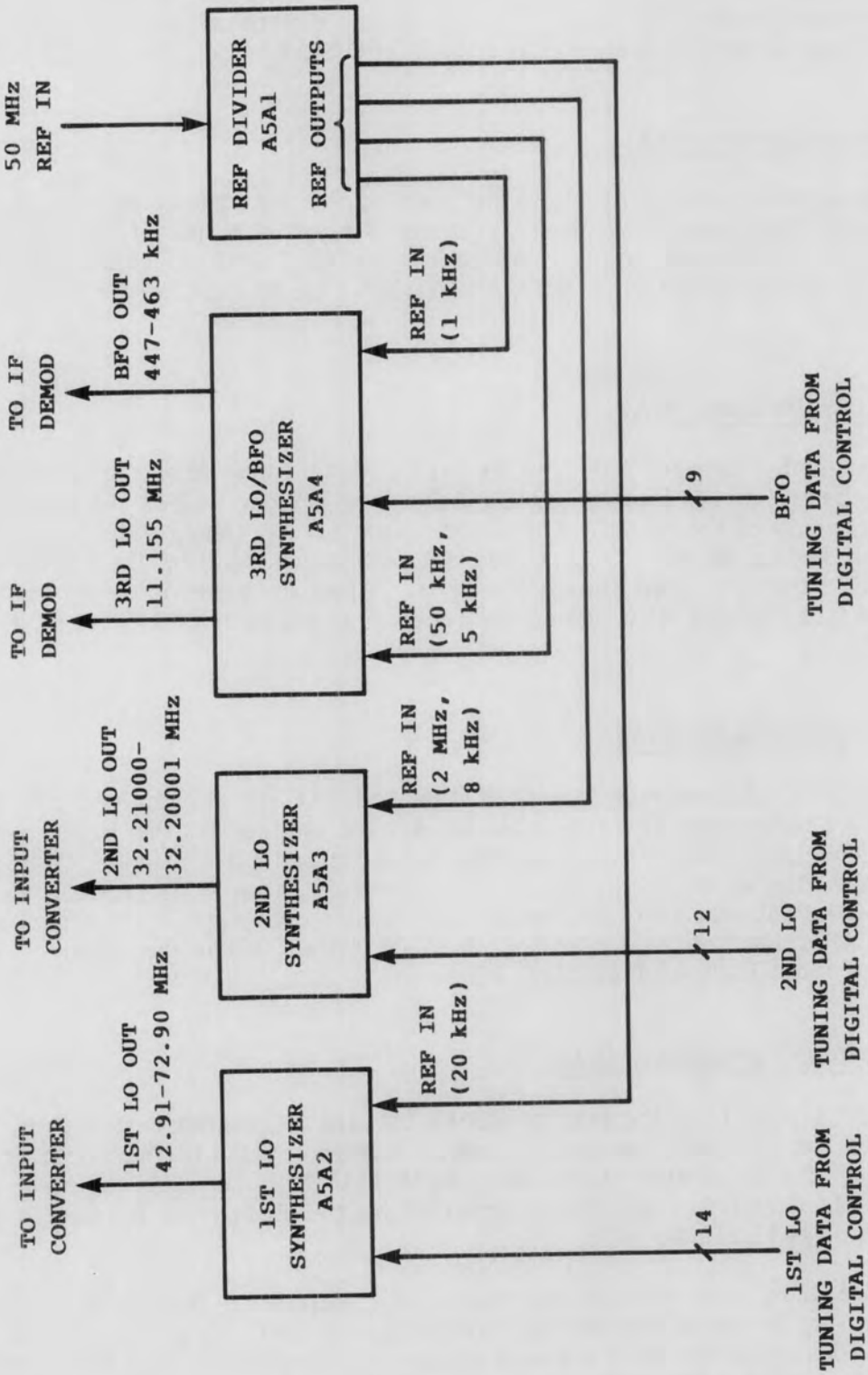


**Figure 3-4. Synthesizer Block Diagram**

Courtesy of http://BlackRadios.terryo.org



### 3.3.4 DIGITAL CONTROL SECTION

**Figure 3-5** is a block diagram of the Digital Control Section. As shown in **Figure 3-5**, the Digital Control Section consists of seven major modules: Digital Interface, A6; Receiver Interface, A9A5; CPU, A9A3; Front Panel Interface, A9A6; LCD Display, DS1; Keyboard, A8; Tuning Encoder, U1.

#### 3.3.4.1 Digital Interface, A6

The Digital Interface consists of a serial to parallel converter, a parallel to serial converter, status reporting logic and timing/control circuitry. It functions as the major interface point between the receiver analog section and the rest of the digital control circuitry.

Receiver parameter data is transmitted from the Receiver Interface, A9A5, as a 72-bit serial data stream. This 72-bit word completely defines all receiver operating parameters. **Table 3-2** shows the configuration of this word. As shown, the 72-bit stream is organized into nine 8-bit words. The transfer of the serial data stream into the Digital Interface is coordinated by data transfer timing/control signals. These signals consist of four lines: data, clock, strobe and enable. All 72 bits of the data stream are run into a serial to parallel converter. When all 72 bits have been transferred, the strobe signal latches the data to the converter outputs. This data is presented to the receiver analog section as tuning and select data.

Signal from the receiver section are presented to the Digital Interface as an 8-bit parallel word. Five of these bits represent actual bandwidth filters selected and are routed through a parallel to serial converter. The output of this converter is sent to the Receiver Interface as the serial Receiver Identification Data. This will be used to form part of the receiver configurator (**paragraph 3.3.4.2**). The remaining three bits represent COS, AFC and SIG STR status. These are routed directly to the Receiver Interface, A9A5, in parallel format.

Low level demodulated audio from the receiver analog section is also routed directly through the Digital Interface to the Receiver Interface.

#### 3.3.4.2 Receiver Interface, A9A5

The Receiver Interface consists of a serial to parallel converter, a parallel to serial converter, status reporting logic and timing/control circuitry. It is tied directly to a common 8-bit CPU data/address bus which coordinates A9A2, A9A3, A9A5 and A9A6. The Receiver Interface functions as the major interface point between the Front Panel, External Controller (if connected) and the Digital Interface.

The Receiver Interface communicates directly with the Digital Interface via two serial data streams: Receiver Data and Receiver Identification Report. On power up, the Status Report provides the controller section with IF BW codes, and is thereafter not used. Operator selected parameters are inputted to the Receiver Interface via the CPU data/address bus. This is an 8-bit bus (AD0-AD7). Receiver parameters are transmitted in nine separate bytes (total of 72 bites per **Table 3-2**). These bytes are sequentially strobed through the parallel to serial converter by the CPU control bus (ALE, RD, WR, IO/M). The output of the converter is a 72 bit serial data stream and is sent to the Digital Interface as the Receiver Data line.

Courtesy of http://BlackRadios.terryo.org



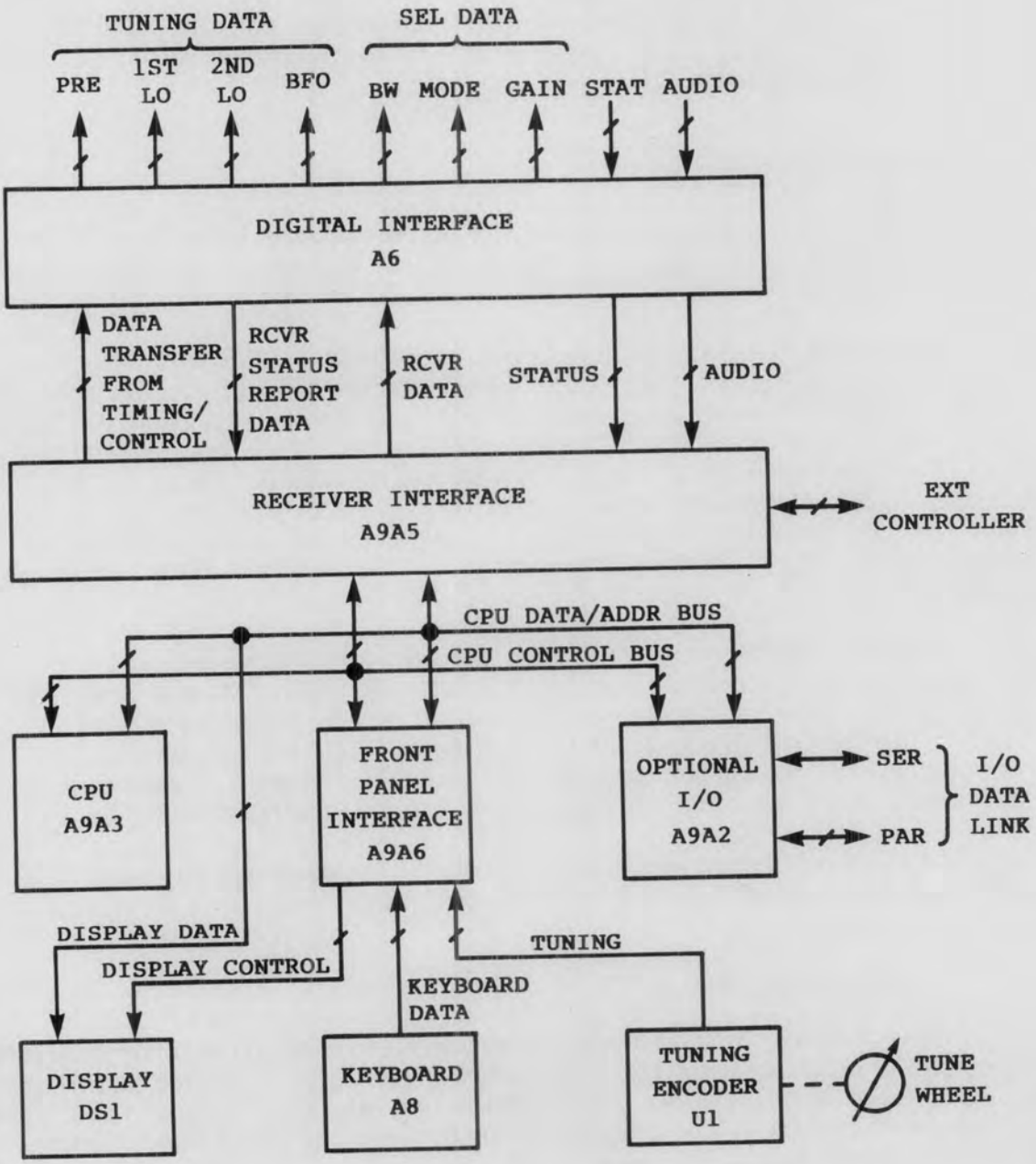


**Figure 3-5. Digital Control Block Diagram**

Courtesy of http://BlackRadios.terryo.org



**Table 3-2. 72-Bit Receiver Parameter Data Word**

| | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| BYTE 1: SIGN | (10 HZ BFO OPTION ) | | | | ((SIGN) | * | * | * ) |
| BYTE 2: OFFSET | ( 1 kHz BFO DIGIT ) | | | | ( 100 Hz BFO DIGIT ) | | | |
| BYTE 3: FREQ 1 | (100 Hz FREQ DIGIT ) | | | | ( 10 Hz FREQ DIGIT ) | | | |
| BYTE 4: FREQ 2 | ( 10 kHz FREQ DIGIT ) | | | | ( 1 kHz FREQ DIGIT ) | | | |
| BYTE 5: FREQ 3 | ( 1 MHz FREQ DIGIT ) | | | | ( 100 kHz FREQ DIGIT) | | | |
| BYTE 6: FREQ 4 | * | * | * | * | * | * | * | (10 MHz FREQ) |
| BYTE 7: COS | (AFC) | (FAST) | ( COS THRESHOLD LEVEL ) | | | | | |
| BYTE 8: GAIN | ( AGC) | | ( MANUAL GAIN CONTROL LEVEL ) | | | | | |
| BYTE 9: BW/DET | ( IF BW CODE ) | | | * | * | (DET MODE CODE) | | |

*Indicates bits not used.

When operated by an External Controller (typically an IOM108) the Receiver Interface connects to the External Controller using the same serial-to-parallel and parallel-to-serial techniques. As shown in **Figure 3-6**, these lines consist of EF CMD/CONT DATA IN, EF REPORT DATA OUT and timing/control lines (CLOCK, STROBE, ENABLE).

The CMD/CONT DATA IN line is a serial data line. The External Controller uses this line to transfer receiver parameter data and communication commands to the Receiver Interface. Data on this line is routed through a serial to parallel converter and then is transferred to the CPU, A9A3, via the CPU data/address bus. If the data is parameter data, the CPU uses the data to generate nine 8-bit parameter commands. These are routed back through the Receiver Interface parallel to serial converter and to the Digital Interface as a 72 bit serial data stream, RCVR DATA. If the data is a communication command, the CPU processes it accordingly and reports back to the External Controller through the Receiver Interface parallel to serial converter via the REPORT DATA OUT LINE.

The REPORT DATA OUT LINE is also used to report a unique serial data word called the configurator. This is a word generated by software that defines the receiver type, tuning range, bandwidth and options present.

The TIMING/CONTROL lines are generated by the external controller and are used to coordinate the transfer of CMD/CONT and REPORT DATA between the Receiver Interface and the External Controller.

Courtesy of http://BlackRadios.terryo.org



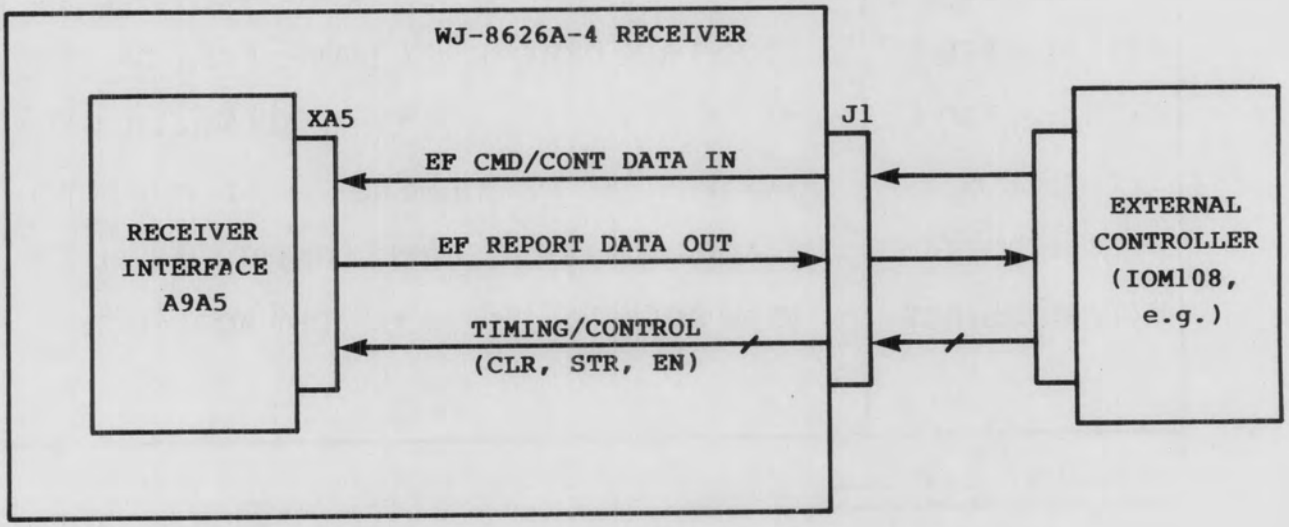


**Figure 3-6. External Controller Interface**

Courtesy of http://BlackRadios.terryo.org



### 3.3.4.3 CPU, A9A3

The CPU is the main controlling element in the Digital Control Section. It consists of a microprocessor controller, RAM for temporary storage of data and commands, ROM which contains system operating software and I/O timing to coordinate data movement. The CPU is tied to the Receiver Interface, Front Panel Interface and Optional I/O via an 8-bit data bus and a control/timing bus.

In local mode, operator input parameters are transferred from the Front Panel Interface to the CPU. The CPU processes these inputs and generates the 72-bit receiver parameter data word which is sent to the Receiver Interface and then to the Digital Interface.

In External Control mode, the receiver parameter data from the External Controller is transferred from the Receiver Interface to the CPU. The CPU processes this data and generates the 72-bit receiver parameter data which is sent to the Receiver Interface and then to the Digital Interface. Additionally, the CPU system software is designed to recognize and process special commands sent from the External Controller.

### 3.3.4.4 Front Panel Interface, A9A6

The Front Panel Interface is the main interconnection between the front panel switches and indicators and the CPU. In normal operation, the Front Panel Interface routine scans the status of the Keyboard and Tuning Encoder and also updates the Front Panel Display.

The Front Panel Keyboard is organized as a row/column matrix. Four row and eight column lines are sent to the keyboard encoder on the Front Panel Interface. The row and column data is encoded into an 8-bit word and sent to the CPU. This informs the CPU of which keypad switches have been depressed.

The tuning encoder outputs two lines which represent direction and speed of turning of the tune wheel. These two lines are selectively strobed through data buffers on the Front Panel Interface and placed on the CPU data bus. This informs the CPU of changes in the tune wheel.

The CPU contains a record of current front panel status. This status is periodically read to the LCD for display purposes. The display data is transferred directly to the LCD from the CPU data/address bus. The transfer of display data is coordinated by the Display Control bus from the Front Panel Interface.

## 3.3.5 POWER SUPPLY SECTION

**Figure 3-7** is a block diagram of the Power Supply Section. As shown in **Figure 3-7**, the Power Supply Section consists of one major module, Voltage Regulator A1, and a secondary module which provides separately regulated power for the Digital Control Section.

### 3.3.5.1 Voltage Regulator Module, A1

The Voltage Regulator module A1 consists of three fixed voltage regulator modules. The +18 V input to A1 is dropped to a fixed regulated output of +15 V. The -18 V

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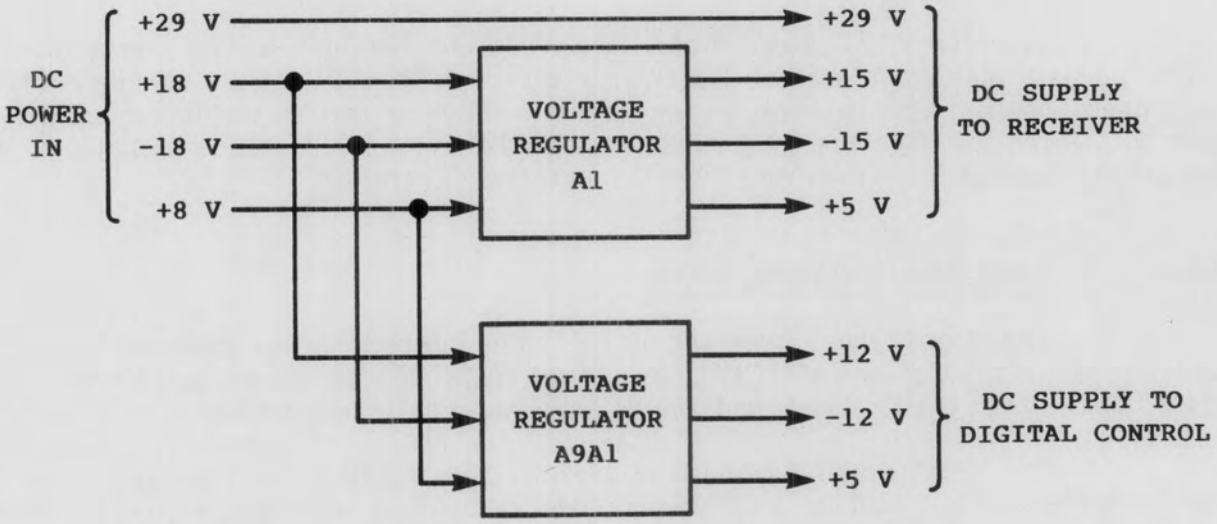


**Figure 3-7. Power Supply Block Diagram**

Courtesy of http://BlackRadios.terryo.org


input to A1 is dropped to a fixed regulated output of -15 V. The +8 V input to A1 is dropped to a fixed regulated output of +5 V. These three DC voltages, along with the +29 V unregulated voltage from the external power supply, are distributed to the receiver circuits.

### 3.3.5.2 Voltage Regulator Module, A9A1

Voltage Regulator Module, A9A1, is very similar to module A1 except the outputs are +12 V, -12 V, and +5 V. They are used by the digital circuitry and the front panel adjustments and indicators.

Courtesy of http://BlackRadios.terryo.org



# SECTION IV

# MAINTENANCE

## 4.1 GENERAL

This section contains maintenance procedures for the WJ-8626A-4 HF Receiver. Included are preventive maintenance procedures, performance verification tests, trouble-shooting and fault isolation procedures and alignment procedures.

## 4.2 MODULE ACCESS

The receiver is a highly compact unit consisting of small printed circuit assemblies, interconnecting cabling and chassis mounted components. Physical access to all receiver assemblies is obtained by removing the top cover. Access to the front panel components is obtained by removing the front panel which is secured to the receiver side panels.

## 4.3 PREVENTIVE MAINTENANCE

Preventive maintenance consists of visual inspection, cleaning and lubrication. These procedures described in this paragraph are designed to improve the receiver's reliability by preventing breakdowns and uncovering potential malfunctions before they impair the function of the receiver. **Table 4-1** is a recommended schedule for performing preventive maintenance procedures.

**Table 4-1. Preventive Maintenance Schedule**

| PROCEDURE | INTERVAL | COMMENTS |
|---|---|---|
| Cleaning | 60 days | Interval variable depending on the operating environment. |
| Inspection for Damage | 60 days | Interval variable depending operating environment and equipment use. |
| Performance Tests | 180 days | Interval variable depending on operating environment and equipment use. |
| Adjustment/Alignment | --- | Adjustment/Alignment keyed to results of Performance Tests. |

Courtesy of http://BlackRadios.terryo.org



### 4.3.1 VISUAL INSPECTION

Many potential or existing faults can be detected by making a visual inspection of the unit. For this reason, a complete visual inspection should be made on a routine basis and whenever the receiver is inoperative. At a minimum, the following items should be visually inspected.

1. Inspect the equipment covers and front panel for condition of finish and panel markings.
2. Inspect for dents, punctures, or warped areas.
3. Inspect quarter-turn fasteners and receptacles.
4. Inspect the external surfaces for loose or missing screws or washers.
5. Inspect the receptacles for conditions of pins, contacts, and mountings.
6. Inspect the internal components for signs of deterioration, discoloration, or charring. Check for melted insulation and damaged, cracked, or broken components.
7. Inspect the printed circuit boards for damaged tracks, loose connections, corrosion, or other signs of deterioration.
8. Inspect the PC connectors, interface connectors, and chassis wiring for excessive wear, looseness, misalignment, corrosion, or other signs of deterioration.

### 4.3.2 CLEANING

Cleaning should be performed to remove accumulated dust, grease, and other contamination, and to ensure trouble-free operation.

**CAUTION**

Avoid the use of chemical cleaning agents containing benzene, toluene, zylene, acetone, or similar solvents. These chemicals may damage the plastics used in this receiver.

1. Exterior - Dust the cabinet with a soft cloth. Dust the front panel controls with a small soft-bristled paint brush. Dirt clinging to the cabinet may be removed with a clean, lint-free cloth dampened with a mild detergent and water solution. Avoid using abrasive cleaners. They will scratch the front panel.

Courtesy of http://BlackRadios.terryo.org



2. Interior - Dust in the interior of the unit should be removed before it builds up enough to cause arcing and short circuits during periods of high humidity. Dust is best removed by dry, low-pressure air. Dirt clinging to surfaces may be removed with a soft-bristled paint brush or a clean, lint-free cloth dampened with a mild detergent and water solution. Use a cotton tipped applicator for cleaning in narrow spaces and on the circuit boards.

## 4.4 RECEIVER PERFORMANCE TESTS

### 4.4.1 GENERAL

The Performance Tests outlined in this paragraph define the Minimum Performance Standards which ensure adequate receiver functioning in all detection modes, gain modes and IF bandwidths. The tests should be used for initial receiver inspection, for preventive maintenance checks, for troubleshooting or to verify receiver performance after repairs have been made.

### 4.4.2 MINIMUM PERFORMANCE STANDARDS

**Table 4-2** summarizes the parameters tested by the Performance Tests. To be acceptable for use, the receiver should meet or exceed all minimum performance standards listed.

**Table 4-2. Receiver Minimum Performance Standards**

| PARAMETER TO BE TESTED | PERFORMANCE STANDARD |
|---|---|
| Front Panel Control Status | All local mode functions operational as defined in **paragraph 2.4.3.2.** |
| IF Gain, Input to IF Out | 82 dB +/- 2 dB |
| Video Output in AM Mode | 350 mV minimum into 75 ohms with -97 dBm input and 50% modution at 400 hz |
| Video Output in FM Mode | 350 mV minimum into 75 ohms with -97 dBm input and 4.8 kHz deviation at 400 hz |
| Video Output in CW Mode | 350 mV minimum into 75 ohms with -97 dBm input unmodulated and receiver offset -400 hz |
| AGC Range | Control range -97 dBm to -7 dBm with less than 6 dB output change |
| Manual Gain Control Range | Greater than 90 dB |
| Frequency Tuning Accuracy | +/- 100 hz at 29.99999 MHz |

Courtesy of http://BlackRadios.terryo.org



### 4.4.3 TEST EQUIPMENT REQUIRED

**Table 4-3** lists the test equipment required for performance testing of the receiver. Equivalent types of equipment may be used.

**Table 4-3. Test Equipment Required**

| INSTRUMENT TYPE | REQUIRED CHARACTERISTICS | RECOMMENDED INSTRUMENT |
|---|---|---|
| Signal Generator | AM, FM, CW, RF output, | HP-8640B from -130 dBm to 0 dBm |
| Oscilloscope | DC to 50 MHz | HP-180C |
| RF Voltmeter | 1 mV to 3.0V; -50 dBm | Boonton 92B to +20 dBm |
| Digital Counter | 0 to 500 MHz | HP-5303A |
| AC Voltmeter | 1 mV to 300V, full scale | HP-400E |
| DVM | DC ranges; 1% or better | Fluke 8100A |
| Terminator, 75 ohm | 75 ohms, 1/2 watt | 75 ohm 1/2 watt resistor soldered to BNC male connector. |
| Headphones | Mono, 600 Ω impedance | Telex 820-4 |

### 4.4.4 PROCEDURE GUIDELINES

1. Read each test procedure thoroughly before attempting to perform the test.
2. Hook up the proper test equipment as indicated in the Test Setup figure for each test.
3. Set the test equipment and receiver controls as directed for each test.
4. Allow a minimum of 30 minutes warm-up time for test equipment prior to performing any of the tests.
5. Unless otherwise specified, acceptable tolerances are +/-3 dB for signal levels and +/-20% for AC and DC supply voltages.

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6. The tests should be performed in the order given. If a malfunction is noted, refer to **paragraph 4.5** for troubleshooting information.

### 4.4.5 POWER-UP TEST

1. Connect the receiver to a DC power source such as the EPS100 Power Supply in the EFR100 Equipment Frame.
2. Energize the DC power source.
3. Rotate the front panel display adjust control from maximum counter-clockwise to maximum clockwise. The LCD display should change from totally invisible to almost completely dark (total illumination).
4. Set the display adjust control for a comfortable viewing intensity with all display characters clearly illuminated.
5. Turn the Backlight Switch to the on position. Verify the illumination of the LCD module.
6. Deenergize the DC power source.

### 4.4.6 KEYBOARD/DISPLAY FUNCTION TEST

1. Connect the receiver to an appropriate DC power source.
2. Energize the DC power source.
3. Verify that the initialization routine is correctly executed as explained in **paragraph 2.4.3.1.**
4. Repeatedly depress the upper/lower keypad and observe the shift arrow on the LCD display toggle between upper and lower. Set the arrow for lower functions.
5. Depress the 0 and EXEC keypads. The display should indicate 0 in the CHAN/ADDR window and EXEC in the CONTROL STATUS window.
6. Verify the local mode entry procedures in **paragraphs 2.4.3.2.1** through **2.4.3.2.6.**
7. Deenergize the DC power source.

### 4.4.7 IF GAIN TEST

1. Connect the receiver as shown in **Figure 4-1.**
2. Energize the DC power source.

Courtesy of http://BlackRadios.terryo.org



**NOTE**

These two sources may be provided by placing the receiver in an EFR100 Equipment Frame containing an EPS100 Power Supply and FRM150 Frequency Reference Module.

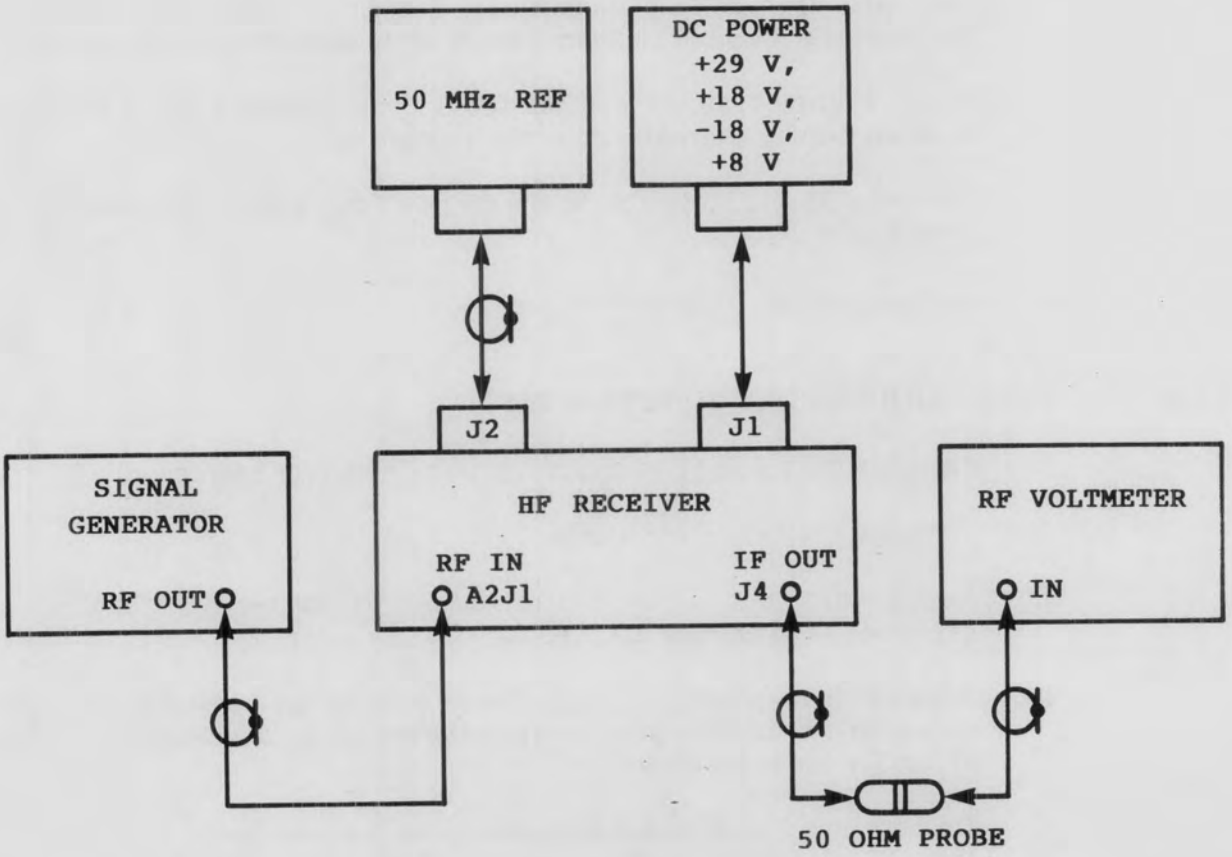


**Figure 4-1. IF Gain Test Equipment Setup**

Courtesy of http://BlackRadios.terryo.org



3. Using the receiver front panel controls and keypad, set the receiver to the following parameters:

   a. Detection Mode - AM

   b. Bandwidth - 16 kHz

   c. Gain Mode - Manual

   d. RF Gain - Maximum clockwise

   e. Tuned Frequency - 15.00500 MHz

4. Set the signal generator output frequency to 15.00500 MHz unmodulated and output level to -97 dBM.

5. Set the RF voltmeter to the -10 dBm range. The meter should indicate -15 dBm +/-2 dB.

6. Use the IF BW keypad to step the receiver through all available bandwidths. The level for each bandwidth should be -15 dBm +/-2 dB.

7. If sideband filters are installed, use the DET keypad to select USB and LSB modes. The RF voltmeter level should be -15 dBm +/-2 dB for USB and LSB.

**NOTE**

If asymmetrical sideband filters have been installed, it will be necessary to increase the generator frequency +1 kHz in USB and decrease the generator frequency -1 kHz in LSB. Output level should be -15 dBm +/-2 dB.

8. Return the receiver to the settings listed in step 3.

9. Tune the signal generator and the receiver to 500 kHz, 1.0 MHz, 1.5 MHz, 2.0 MHz, 3.0 MHz, 5.0 MHz, 7.0 MHz, 11.0 MHz and 25.0 MHz in succession. At each frequency the RF voltmeter should read within 2 dB of the level obtained in step 5 above.

10. Deenergize the DC power source.

Courtesy of http://BlackRadios.terryo.org



## 4.4.8 DETECTION MODE TEST

1. Connect the receiver as shown in **Figure 4-2.**
2. Energize the DC power source.
3. Using the receiver front panel controls and keypad, set the receiver to the following parameters:
   a. Detection Mode - AM
   b. Bandwidth - 1 kHz
   c. Gain Mode - Manual
   d. RF Gain - Maximum clockwise
   e. Tuned Frequency - 15.00500 MHz
4. Set the signal generator output frequency to 15.00500 MHz and output level to -97 dBm. Set the Generator for 50% AM modulation at 400 Hz.
5. Set the oscilloscope to the 0.5 V/CM range. The oscilloscope should display a 400 Hz sine wave at a level of 1 Vpp or greater.
6. Turn off the generator modulation.
7. Use the receiver DET keypad to step the receiver to the CW mode. Enter a BFO offset of -0.4 kHz.
8. The oscilloscope should display a 400 Hz sine wave at a level of 1 Vpp or greater.
9. Set the generator for 4.8 kHz FM deviation at 400 Hz.
10. Use the receiver DET keypad to step the receiver to the FM mode. Use the IF BW keypad to step the receiver to 16 kHz BW.
11. The oscilloscope should display a 400 Hz sine wave at a level of 1 Vpp or greater.
12. Deenergize the DC power source.

Courtesy of http://BlackRadios.terryo.org



**NOTE**

These two sources may be provided by placing the receiver in an EFR100 Equipment Frame containing an EPS100 Power Supply and FRM150 Frequency Reference Module.

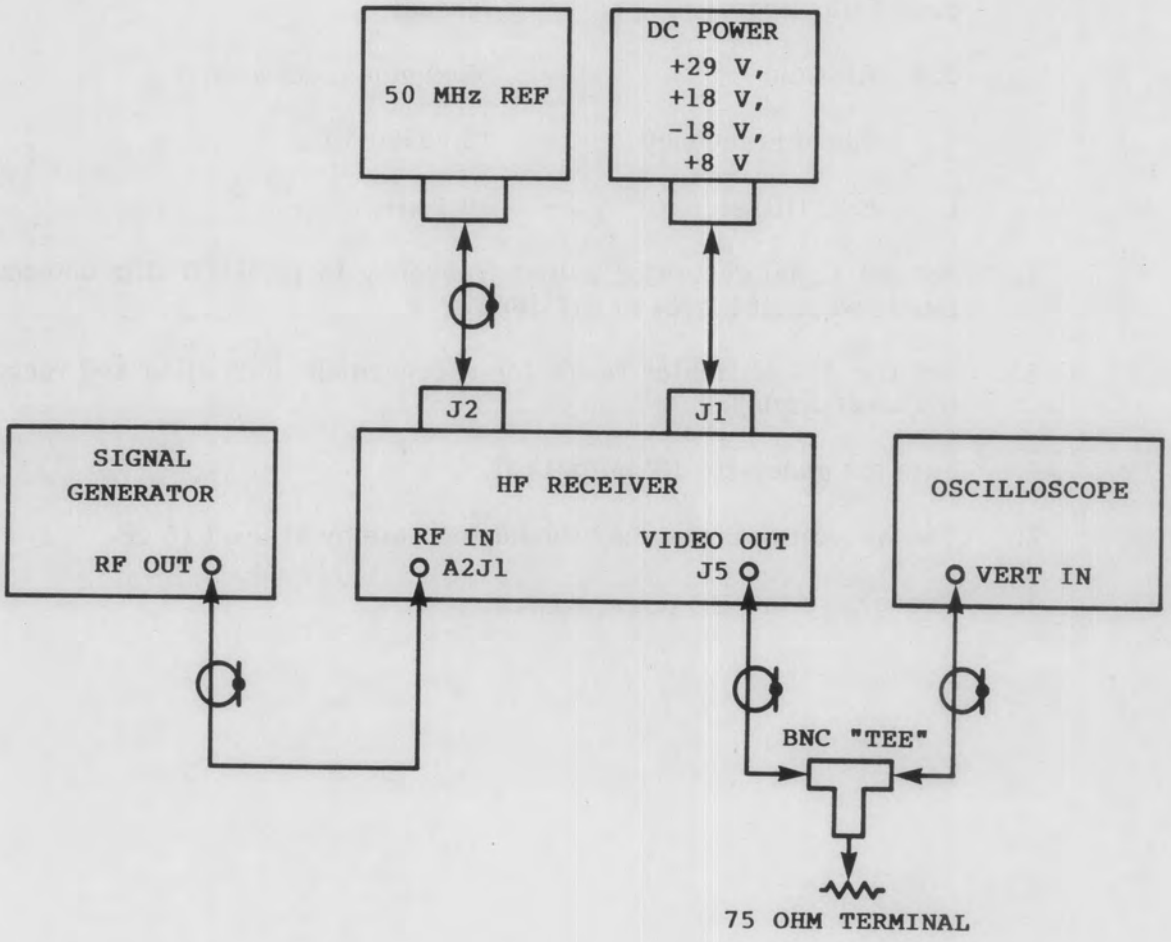


**Figure 4-2. Detection Mode Test Equipment Setup**

Courtesy of http://BlackRadios.terryo.org



### 4.4.9 SIGNAL-TO-NOISE RATIO (SNR) TEST

1. Connect the receiver as shown in **Figure 4-3.**
2. Energize the DC power source.
3. Using the receiver front panel controls and keypad, set the receiver to the following parameters:
   a. Detection Mode - CW
   b. Bandwidth - 16 kHz
   c. Gain Mode - Manual
   d. RF Gain - Maximum clockwise
   e. Tuned Frequency - 15.00500 MHz
   f. BFO Offset - -0.4 kHz
4. Set the signal generator output frequency to 15.00500 MHz unmodulated and output level to -97 dBm.
5. Set the AC voltmeter range for a convenient indication and record the level displayed.
6. Turn the generator RF output off.
7. The AC voltmeter reading should decrease by at least 16 dB.
8. Deenergize the DC power source.

Courtesy of http://BlackRadios.terryo.org



**NOTE**

These two sources may be provided by placing the receiver in an EFR100 Equipment Frame containing an EPS100 Power Supply and FRM150 Frequency Reference Module.

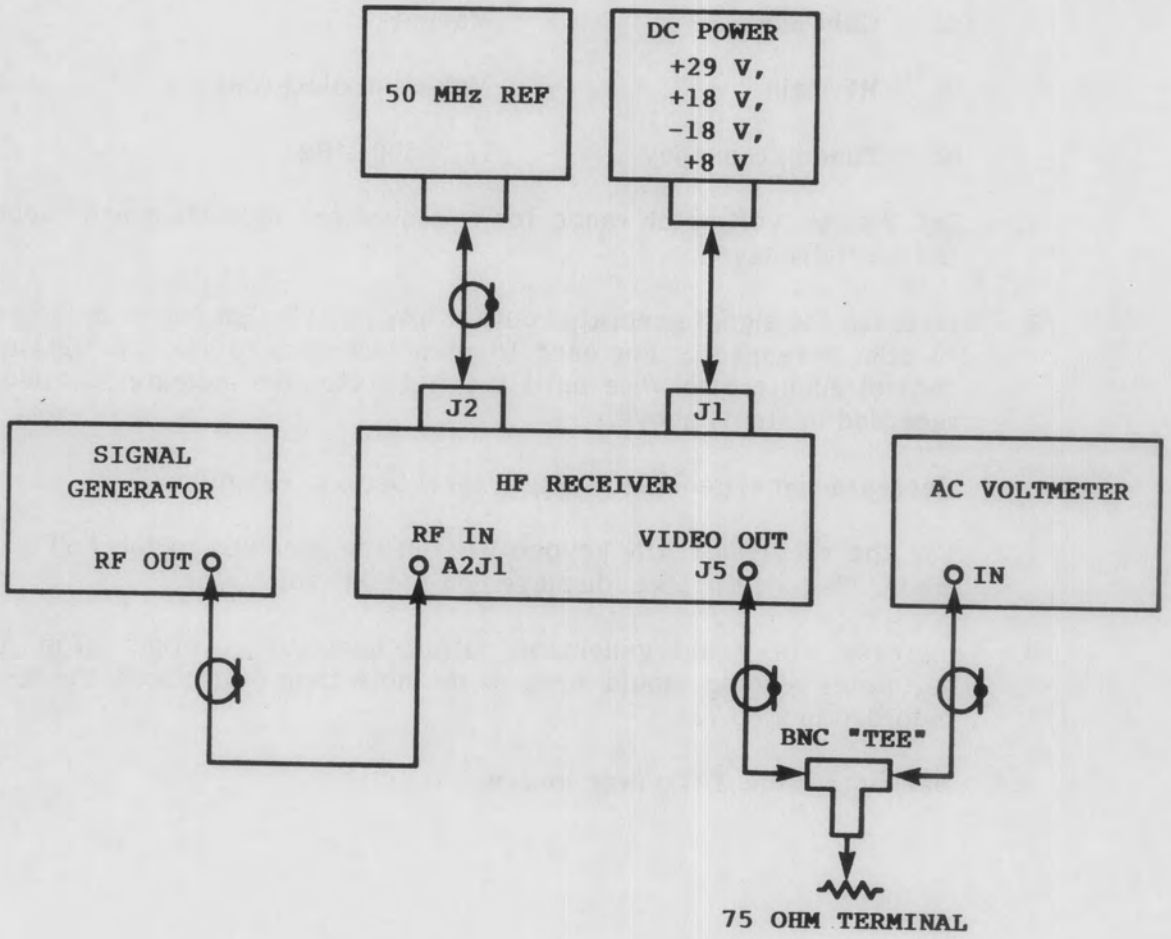


**Figure 4-3. SNR Test Equipment Setup**

Courtesy of http://BlackRadios.terryo.org



## 4.4.10 GAIN CONTROL TEST

1. Connect the receiver as shown in **Figure 4-4.**
2. Energize the DC power source.
3. Using the receiver front panel controls and keypad, set the receiver to the following parameters:
   a. Detection Mode - AM
   b. Bandwidth - 1 kHz
   c. Gain Mode - Manual
   d. RF Gain - Maximum clockwise
   e. Tuned Frequency - 15.00500 MHz
4. Set the AC voltmeter range for a convenient indication and record the level displayed.
5. Increase the signal generator output level in 10 dBm increments until +3 dBm is reached. For each 10 dBm increase, rotate the RF Gain control counterclockwise until the AC voltmeter indicates the level recorded in step 4 above.
6. Decrease signal generator output level back to -97 dBm.
7. Use the receiver GAIN keypad to step the receiver to the FST gain mode. Record the level displayed on the AC voltmeter.
8. Increase the signal generator output level to -7 dBm. The AC voltmeter reading should increase no more than 6 dB above the level recorded in step 7.
9. Deenergize the DC power source.

Courtesy of http://BlackRadios.terryo.org



**NOTE**

These two sources may be provided by placing the receiver in an EFR100 Equipment Frame containing an EPS100 Power Supply and FRM150 Frequency Reference Module.

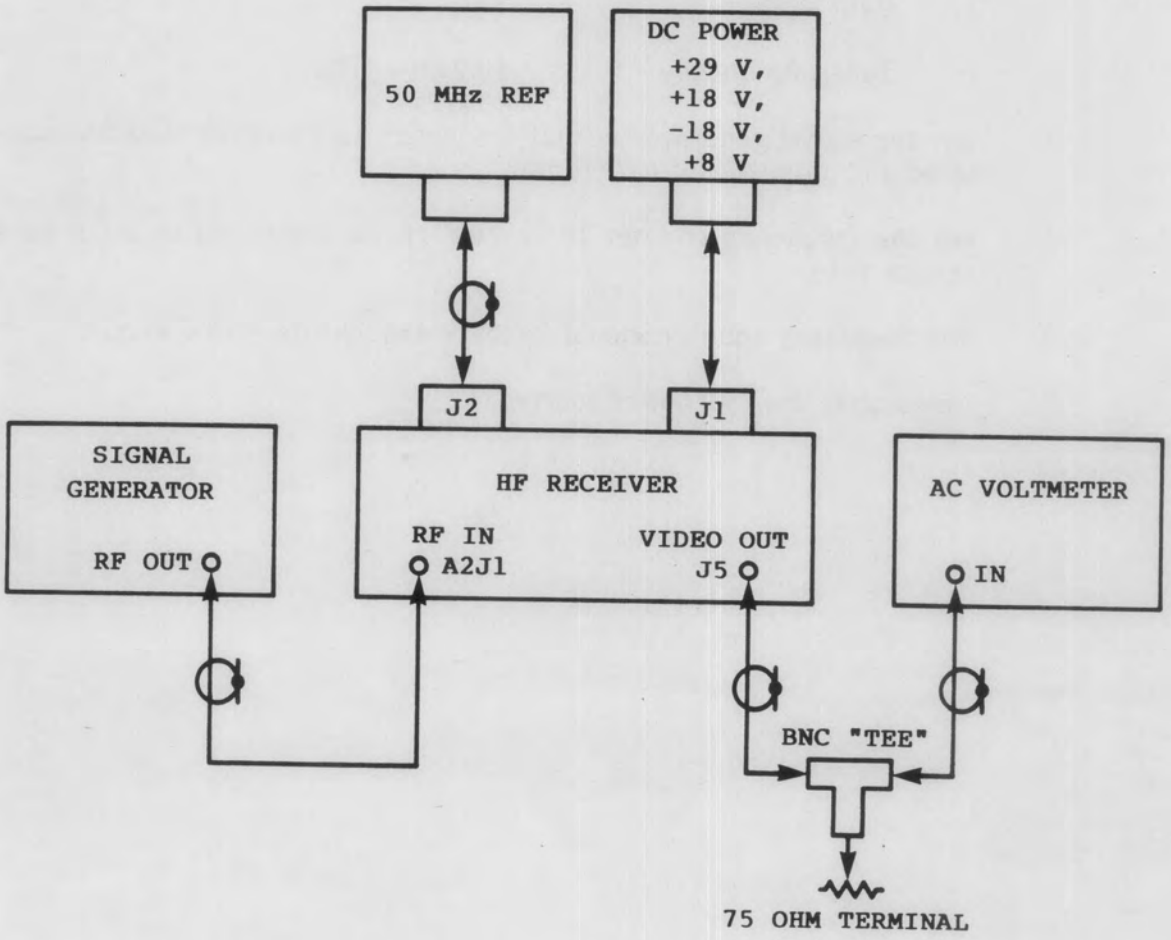


**Figure 4-4. Gain Control Test Equipment Setup**

Courtesy of http://BlackRadios.terryo.org



## 4.4.11 FREQUENCY TUNING ACCURACY TEST

1. Connect the receiver as shown in **Figure 4-5.**
2. Energize the DC power source.
3. Using the receiver front panel controls and keypad, set the receiver to the following parameters:
   a. Detection Mode - AM
   b. Bandwidth - 1 kHz
   c. Gain Mode - FST
   d. Tuned Frequency - 29.99990 MHz
4. Set the signal generator output frequency to 29.99990 MHz unmodulated and output level to -60 dBm.
5. Set the frequency counter to provide 10 Hz resolution at a 1 second sample rate.
6. The frequency counter should indicate 455.00 kHz +/-0.1 kHz.
7. Deenergize the DC power source.

Courtesy of http://BlackRadios.terryo.org



**NOTE**

These two sources may be provided by placing the receiver in an EFR100 Equipment Frame containing an EPS100 Power Supply and FRM150 Frequency Reference Module.

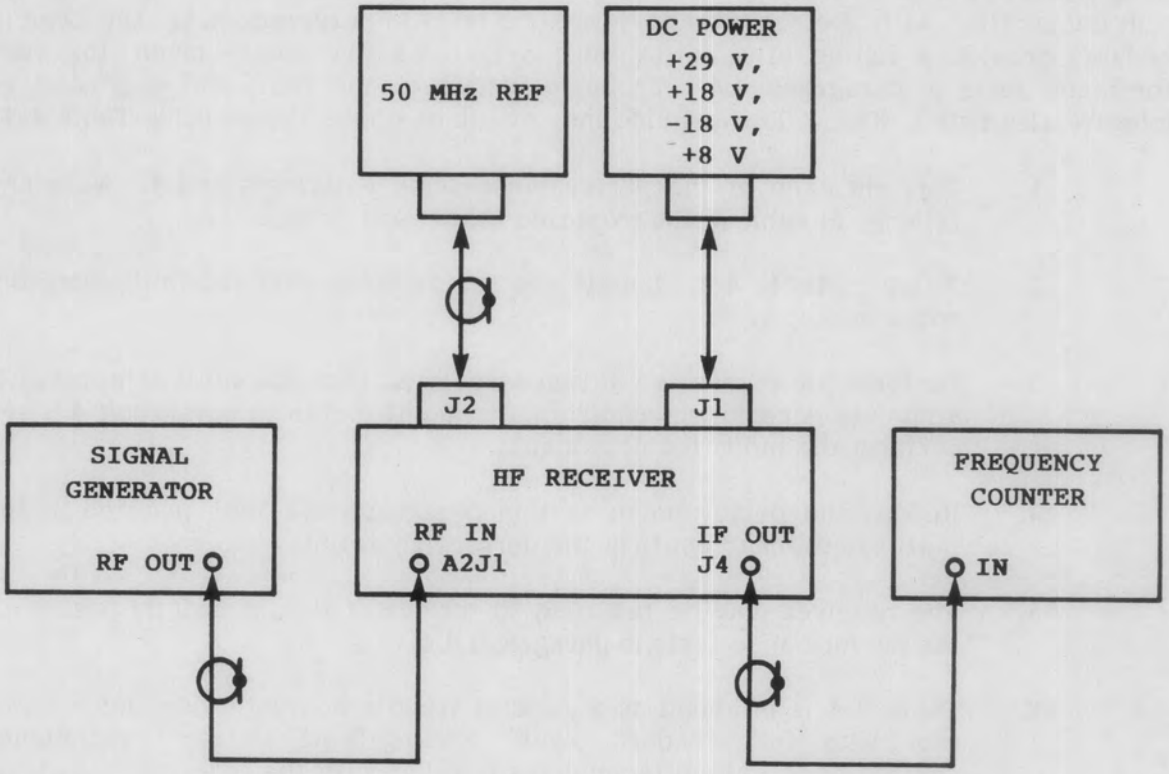


**Figure 4-5. Frequency Tuning Accuracy Test Equipment Setup**

Courtesy of http://BlackRadios.terryo.org



## 4.5 RECEIVER TROUBLESHOOTING PROCEDURES

### 4.5.1 GENERAL

Information is provided in this paragraph to troubleshoot the receiver to a defective replaceable assembly or PC board. The receiver will normally require troubleshooting as a result of failure to pass any of the performance tests in **paragraph 4.4**, or as a result of operator-observed malfunctions during normal receiver operation.

### 4.5.2 TROUBLESHOOTING GUIDELINES

**Table 4-4**, WJ-8626A-4 HF Receiver Troubleshooting Chart, is provided as an aid in locating defective assemblies and PC boards within the receiver. The chart is designed to be used in conjunction with the receiver performance tests in **paragraph 4.4.** The troubleshooting procedures provide a listing of specific fault symptoms that could occur for each of the performance tests in **paragraph 4.4.** Probable causes of the fault and suggested corrective actions are also listed. The following guidelines should be applied when using **Table 4-4.**

1. Perform each of the performance tests in **paragraph 4.4.** Note any failures to achieve the expected test result or results.

2. Refer to **Table 4-4.** Locate the performance test and fault symptom noted in step 1.

3. Perform the corrective action associated with the fault symptom. If a module is replaced requiring alignment, refer to **paragraph 4.6** and perform the indicated alignment.

4. Repeat the performance test in **paragraph 4.4** that resulted in the fault symptom to confirm the corrective action.

5. The receiver may be returned to service if it successfully passes all the performance tests in **paragraph 4.4.**

6. **Table 4-4** is intended as a general troubleshooting guide and is not a substitute for standard signal tracing/fault isolation techniques performed by skilled technicians familiar with the receiver circuitry.

Courtesy of http://BlackRadios.terryo.org



**Table 4-4. WJ-8626A-4 HF Receiver Troubleshooting Chart**

| PERFORMANCE TEST | FAULT SYMPTOM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|---|
| POWER-UP TEST | No display brightness | No display exciting voltage | Check A9J5-17 for 90 VAC. If OK, replace DS1. If bad, replace A9U1. |
| | | Power supply voltages low | Check voltage regulator outputs: A1E1: +5V<br>A1E2: +15V<br>A1E3: -15V<br>If bad, replace A1.<br>If OK, replace A9A6. |
| | Display/Adjust control does not work. | Defective control | Check voltage at A9J5-9. Should vary from -2 to +1V. If OK, replace A9A1. If bad, replace R3. |
| KEYBOARD/ DISPLAY FUNCTION | Initialization does not execute | Digital control section is dead. | Replace A9A3. If still OK, check AD0-AD7 and CLOCK lines for activity. If dead, selectively remove digital modules until lines become active.<br>If still bad, replace A9A5 and A9A6 and reinitialize. |
| | Cannot implement keypay control functions | Defective keyboard interface circuit | Check keyboard row (R1-R4) and column (C1-C7) inputs on A9J3. If OK, replace A9A6. If bad, replace A8. |
| IF GAIN TEST | IF output dead on all BWs | Defective AGC | Replace A4A10 |
| | | Defective Input Converter | Check A3 for 15 dB gain. If bad, replace A3. |
| | | LO signals defective | Check LO signals: 1st: 57.91 MHz at +20 dBm at A3P2. |

Courtesy of http://BlackRadios.terryo.org



**Table 4-4. WJ-8626A-4 HF Receiver Troubleshooting Chart** (Continued)

| PERFORMANCE TEST | FAULT SYMPTOM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|---|
| IF GAIN TEST (Continued) | | | 2nd: 32.20500 MHz at 0 dBm at A3P3.<br><br>3rd: 11.155 MHz at -6 dBM at A4E2.<br>If any LO is bad, first replace affected LO module. If still bad, replace A6, then A9A5. |
| | | Defective IF modules | Check or replace A4A1, A4A7, A4A8, A4A9. |
| | IF output dead on 1 or more BWs | Defective IF filter module(s) | Check BW select, pin 11, on affected module (A4A2-A4A6). Should be +15V when selected. If OK, replace module associated with defective BW. If bad, replace A6, then A9A5. |
| | | Defective WB/NB filter module | Check select inputs, pins 5 and 7, on A4A8. Should be +15V when selected. If OK, replace A4A8. If bad, replace A6, then A9A5. |
| | Receiver gain is not constant from 500 kHz to 25 MHz. | Defective preselector | Replace preselector. If bad, replace A6, then A9A5. |
| DETECTION MODE TEST | No video output in any mode | Defective video output amplifier | Replace A4A10, then A4A9 |
| | No AM video | Defective AM det | Check AM select at A4A9-B2 for +15V. If OK, replace A4A9. If bad, replace A6, then A9A5. |

Courtesy of http://BlackRadios.terryo.org



**Table 4-4. WJ-8626A-4 HF Receiver Troubleshooting Chart** (Continued)

| PERFORMANCE TEST | FAULT SYMPTOM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|---|
| DETECTION MODE TEST (Continued) | No FM video | Defective FM detector | Check FM select at A4A9-A1 for +15 V. If OK, replace A4A9. If bad, replace A6, then A9A5. |
| | No CW video | Defective CW detector | Check CW select at A4A9-A7 for +15 V. If bad, replace A6, then A9A5. If OK, check BFO signal at A4A9-A12. Should be 455.000 kHz at 40 mV. If bad, replace A5A4, then A6, then A9A5. If BFO signal is OK, then replace A4A9. |
| | No SSB video | | Replace A6, then A9A5. |
| SNR TEST | Signal-to-noise ratio is less than 16 dB | Low receiver gain | Perform IF Gain Alignment, **paragraph 4.6.3.** |
| | | Low 1st LO signal | Check 1st LO signal at A3P2. Should be +20 dBm. If bad, replace A5A2. |
| | | Low input converter gain | Check RF GC voltage at chassis terminal E4 for 0 Vdc. If OK, replace A3. If bad, replace A4A10. |
| | | | Perform Input Converter Alignment, **paragraph 4.6.2.** |
| GAIN CONTROL TEST | Output level variation is more than 6 dB in FST | Defective AGC amplifier | Check IF GC voltage at A4A10-A2. Should be greater than -4 Vdc at max. signal. If bad, replace A4A10. If OK, replace A4A7. |

Courtesy of http://BlackRadios.terryo.org



**Table 4-4. WJ-8626A-4 HF Receiver Troubleshooting Chart** (Continued)

| PERFORMANCE TEST | FAULT SYMPTOM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|---|
| GAIN CONTROL TEST (Continued) | Manual gain range is not 100 dB | Defective AGC amplifier | Check MAN GAIN IN. at A4A10-A4. Should be +0.75 V with RF GAIN at max CW. If OK, replace A4A10. If bad, replace A6, then A9A5, then A9A6. |
| FREQUENCY TUNING ACCURACY TEST | Tuning error more than +/-100 Hz at 29.99990 MHz | Time Base | Verify accuracy of 50 MHz Reference. |
| | | 3rd LO unlocked | Check 3rd LO signal at A4E2. Replace A5A4. |
| | | 1st or 2nd LO tuning error | Replace A5A2 and A5A3. If still bad, replace A6, then A9A5. |

Courtesy of http://BlackRadios.terryo.org



## 4.6 RECEIVER ALIGNMENT PROCEDURES

### 4.6.1 GENERAL

The following alignment procedures should only be performed when indicated by the results of Performance Testing (**paragraph 4.4**) or Troubleshooting (**paragraph 4.5**). Prior to performing any alignment, be sure to allow 30 minutes for test equipment warm-up.

### 4.6.2 INPUT CONVERTER ADJUSTMENT

1. Connect the receiver as shown in **Figure 4-2.**
2. Loosen the screws holding the input converter module to the chassis. Pull the module out.
3. Energize the DC power source.
4. Using the receiver front panel controls and keypad, set the receiver to the following parameters:
   a. Detection Mode - AM
   b. Bandwidth - 16 kHz
   c. Gain Mode - Manual
   d. RF Gain - Maximum clockwise
   e. Tuned Frequency - 15.00500 MHz
5. Set the signal generator output frequency to 15.00500 MHz unmodulated and output level to -97 dBm.
6. Set the RF voltmeter to the -10 dBm range. The voltmeter should indicate approximately -15 dBm.
7. Adjust A3A2C1 and A3A2C14 for maximum RF voltmeter indication.
8. Deenergize the DC power source.
9. Install the input converter in the chassis.

Courtesy of http://BlackRadios.terryo.org



**NOTE**

These two sources may be provided by placing the receiver in an EFR100 Equipment Frame containing an EPS100 Power Supply and FRM150 Frequency Reference Module.

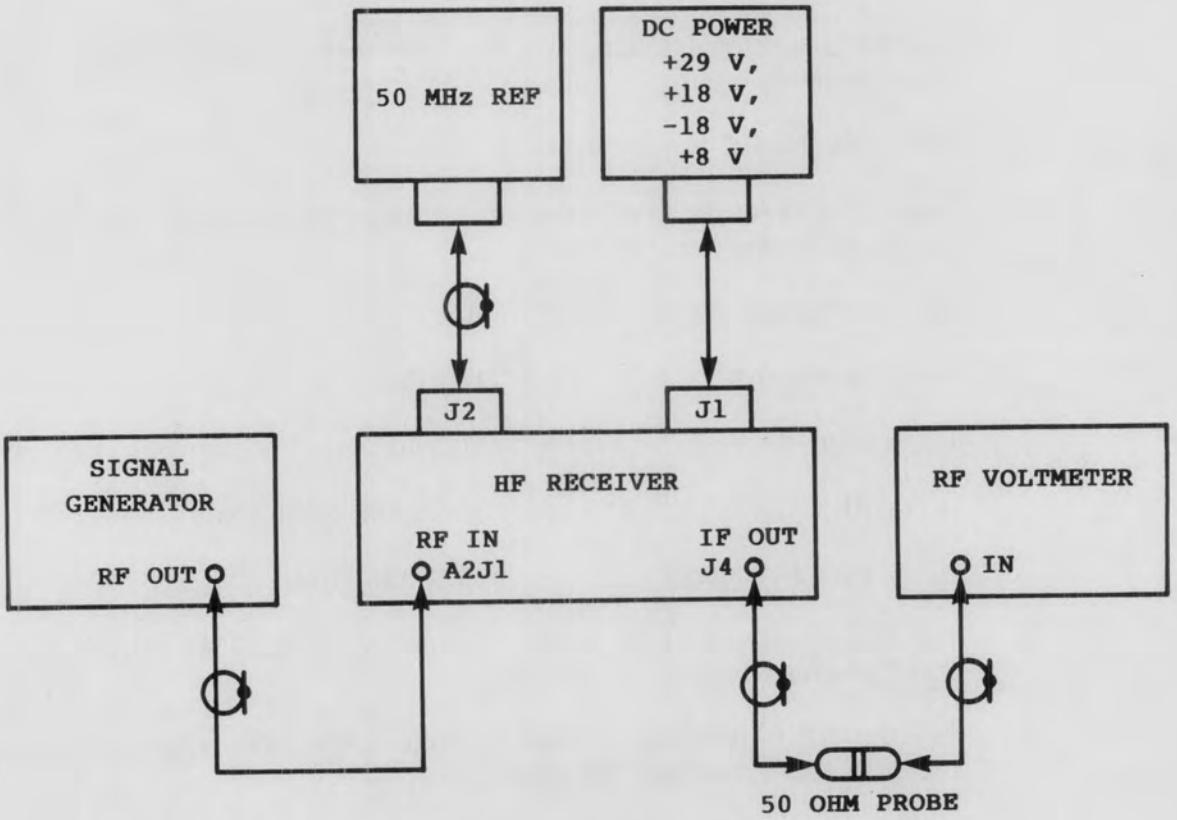


**Figure 4-6. Input Converter Adjustment Equipment Setup**

Courtesy of http://BlackRadios.terryo.org



### 4.6.3 IF GAIN ADJUSTMENT

1. Connect the receiver as shown in **Figure 4-7.**
2. Set A4A7-R16 at approximately mid-range.
3. Energize the DC power source.
4. Using the receiver front panel controls and keypad, set the receiver to the following parameters:
   a. Detection Mode - AM
   b. Bandwidth - BW #1
   c. Gain Mode - Manual
   d. RF Gain - Maximum clockwise
   e. Tuned Frequency - 15.00500 MHz
5. Set the signal generator output frequency to 15.00500 MHz unmodulated and output level to -97 dBm.
6. Set the RF voltmeter to the -10 dBm range.
7. Adjust A4A2-R12 for a voltmeter reading of -15 dBm.
8. Using the IF BW keypad, step the receiver to IF BW #2. Adjust A4A3-R12 for a voltmeter reading of -15 dBM.
9. Using the IF BW keypad, step the receiver to IF BW #3. Adjust A4A4-R12 for a voltmeter reading of -15 dBm.
10. Using the IF BW keypad, step the receiver to IF BW #4. Adjust A4A5-R12 for a voltmeter reading of -15 dBm.
11. Using the IF BW keypad, step the receiver to IF BW #5. Adjust A4A6-R12 for a voltmeter reading of -15 dBm.
12. If the correct output reading is not achieved using A4A2-A4A6. Adjust A4A7-R16 as required and repeat steps 7 through 11.

**NOTE**

If discrete sideband filters are installed in slots 4 and 5, the USB and LSB modes must be selected to adjust their gain, and the generator frequency must be increased +1 kHz in USB mode and decreased -1 kHz in LSB mode.

Courtesy of http://BlackRadios.terryo.org



**NOTE**

These two sources may be provided by placing the receiver in an EFR100 Equipment Frame containing an EPS100 Power Supply and FRM150 Frequency Reference Module.

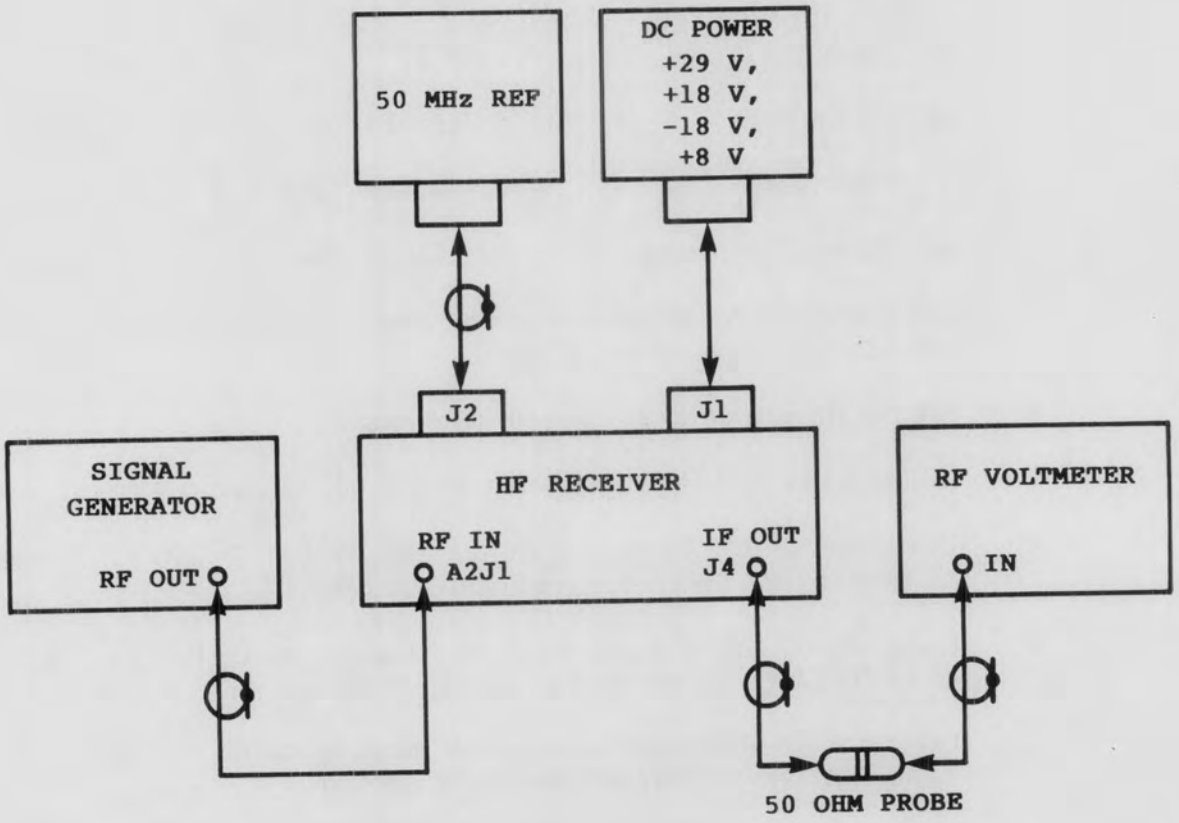


**Figure 4-7. IF Gain Adjustment Equipment Setup**

Courtesy of http://BlackRadios.terryo.org



13. If adjustments were made, step through each IF BW again to verify correct output levels.

14. If adjustments were made, perform Scan Calibration procedure outlined in **paragraph 4.6.13.**

15. Deenergize the DC power source.

### 4.6.4 FM DISCRIMINATOR ADJUSTMENT

1. Connect the receiver as shown in **Figure 4-8.**

2. Place module A4A9 on an extender card.

3. Set A4A9R51 approximately mid-range.

4. Energize the DC power source.

5. Using the receiver front panel controls and keypad, set the receiver to the following parameters:

   a. Detection Mode - FM

   b. Bandwidth - BW #1

   c. Gain Mode - AGC

   d. Tuned Frequency - 15.00500 MHz

6. Set the signal generator output frequency to 15.00500 MHz unmodulated and output level to -60 dBm.

7. Set the digital voltmeter to the 2 Vdc range.

8. Adjust A4A9L4 for approximately 0 Vdc on the voltmeter.

9. Use A4A9R51 to fine adjust the discriminator output to 0 +/- 0.05 Vdc on the voltmeter.

10. Deenergize the DC power source.

Courtesy of http://BlackRadios.terryo.org



**NOTE**

These two sources may be provided by placing the receiver in an EFR100 Equipment Frame containing an EPS100 Power Supply and FRM150 Frequency Reference Module.

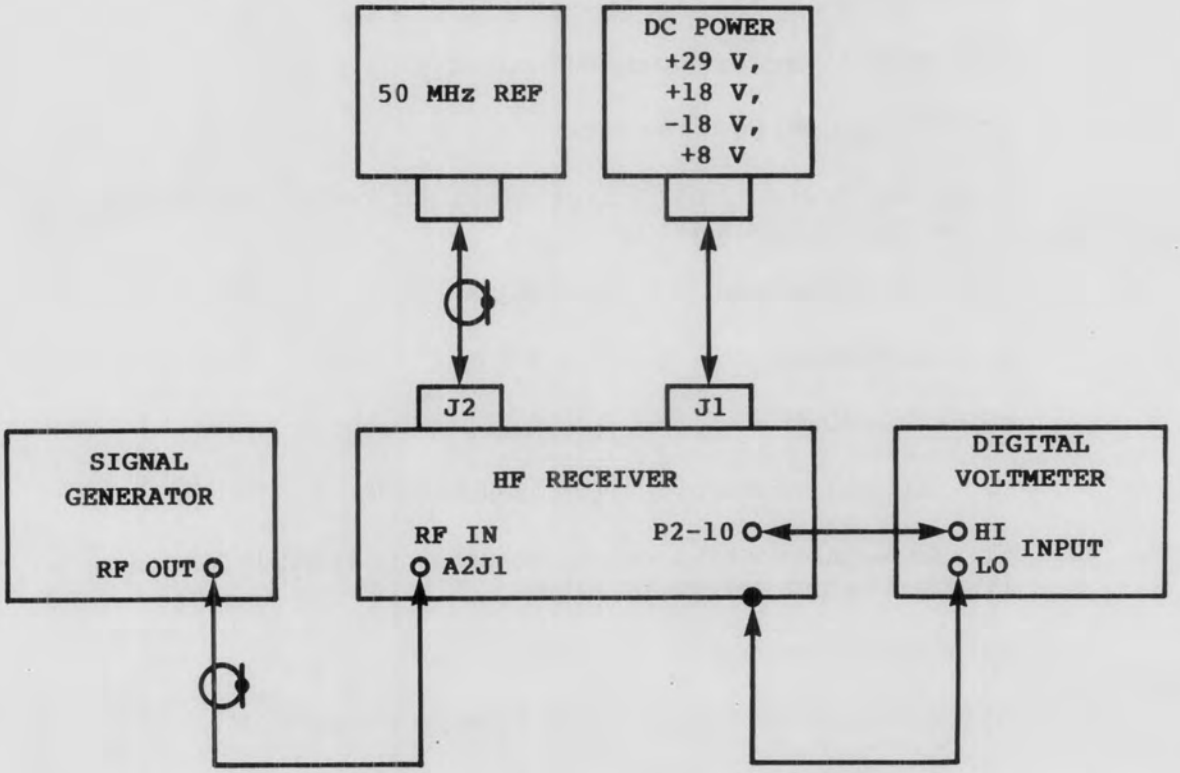


**Figure 4-8. FM Discriminator Adjustment Equipment Setup**

Courtesy of http://BlackRadios.terryo.org



### 4.6.5 SIGNAL STRENGTH FULL SCALE OUTPUT ADJUSTMENT

1. Connect receiver as shown in **Figure 4-9.**
2. Place module A4A10 on an extender card.
3. Energize the DC power source.
4. Using the receiver front panel controls and keypad, set the receiver to the following parameters:
   a. Detection Mode - AM
   b. Bandwidth - BW #1
   c. Gain Mode - AGC
   d. Tuned Frequency - 15.00500 MHz
5. Set the signal generator output frequency to 15.00500 MHz unmodulated and ouput level to -7 dBm.
6. Set the digital voltmeter to the 20 Vdc scale.
7. Adjust A4A10R34 for 9.5 Vdc on the voltmeter.
8. If adjustments were made, perform the Scan Calibration procedure outlined in **paragraph 4.6.13.**
9. Deenergize the DC power source.

### 4.6.6 D/A CONVERTER OUTPUT ADJUSTMENT

1. Connect the receiver to a DC power source such as the EPS100 mounted in the EFR100 Equipment Frame.
2. Energize the DC power source.
3. Using the receiver front panel controls and keypad, set the receiver to the following parameters:
   a. Detection Mode - AM
   b. Gain Mode - MAN
   c. COS level - 63
   d. RF GAIN - Max. CW

Courtesy of http://BlackRadios.terryo.org



**NOTE**

These two sources may be provided by placing the receiver in an EFR100 Equipment Frame containing an EPS100 Power Supply and FRM150 Frequency Reference Module.

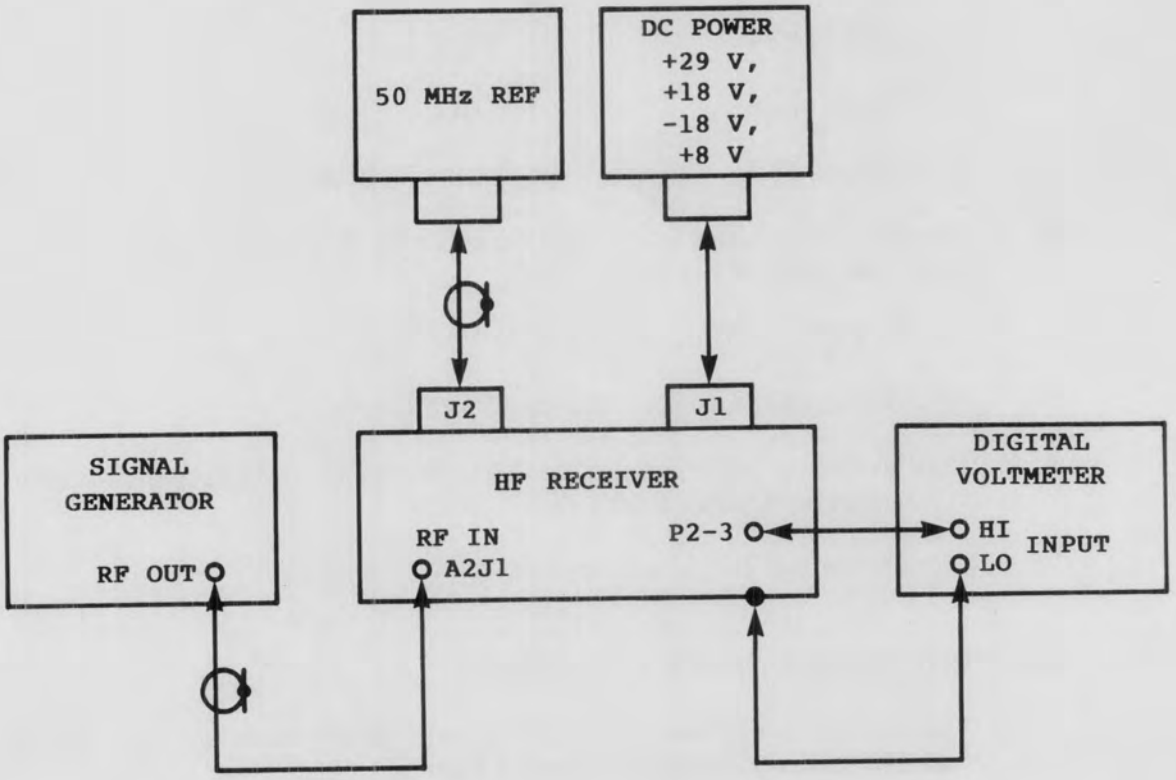


**Figure 4-9. Signal Strength Full Scale Output Adjustment Equipment Setup**

Courtesy of http://BlackRadios.terryo.org



4. Connect the ground or low lead of the digital voltmeter to the receiver chassis.

5. Connect the high lead of the digital voltmeter to A6J3-9. Adjust A6R28 for +5.0 Vdc on the voltmeter.

6. Connect the high lead of the digital voltmeter to A6J3-5. Adjust A6R25 for 0.750 Vdc on the voltmenter.

7. If adjustments were made, perform the Scan Calibration procedure outlined in **paragraph 4.6.13.**

8. Deenergize the DC power source.

### 4.6.7 DISPLAY BACKLIGHT ADJUSTMENT

1. Connect the receiver to a power source such as the EPS100 mounted in the EFR100 Equipment Frame.

2. Energize the DC power source. Turn the BACKLIGHT switch on.

3. While observing the front panel display, adjust A9A1R3 for the minimum backlight brightness necessary to achieve adequate visibility.

**NOTE**

The electro-luminescent backlight lamp has a half-life related to use and intensity. The brightness adjustment is intended to compensate for this over the life of the unit, and should be considered when making this adjustment.

4. Deenergize the DC power source.

### 4.6.8 A/D CONVERTER REFERENCE ADJUSTMENT

1. Connect the receiver to a power source such as the EPS100 mounted in the EFR100 Equipment Frame.

Courtesy of http://BlackRadios.terryo.org



2. Place module A9A6 on an extender card.

3. Energize the DC power source.

4. Set the receiver for MAN mode and RF GAIN at max. CW.

5. Enter the following keystrokes via the front panel keypad:


6. Observe that the display indicates:

   MAINTENANCE TEST 1

   MGC A/D OUTPUT = XXX

7. Adjust A9A6R14 until the display indicates 250.

8. Deenergize the DC power source.

### 4.6.9 1ST LO SYNTHESIZER ALIGNMENT

The only alignment points for the 1st LO are in the 1st LO VCO which is a very sensitive circuit; care must be taken to ensure proper operation.

1. Place the 1st LO on an extender card.

2. Remove the VCO front plate.

3. Connect a Digital Voltmeter to pin A5A2A2C1.

4. Refer to **Table 4-5.** Beginning at Band 0, adjust the indicated components until the voltage at pin A1E1 stays within limits as the receiver is tuner through Band 0.

5. Repeat for Bands 2 through 7. As suggested in **Table 4-5,** the inductors align more than one band and a compromise between bands may be necessary.

6. Deenergize the DC power source.

7. Disconnect the digital voltmeter. Replace the VCO front plate and place the 1st LO back in the receiver.

Courtesy of http://BlackRadios.terryo.org



**Table 4-5. VCO Alignment Procedures**

| VCO Band | Band Freq. Limits | Voltage at Pin A2C1 (Typical) | A2A1 Alignment Component |
|---|---|---|---|
| 0 | 0 - 3.99 MHz | < 8.0 to < -5.0 Vdc | C3 |
| 1 | 4 - 7.99 MHz | < 8.0 to < -5.0 Vdc | L2 |
| 2 | 8 - 11.99 MHz | < 8.0 to < -5.0 Vdc | L3 |
| 3 | 12 - 15.99 MHz | < 8.0 to < -5.0 Vdc | L2 & L3 |
| 4 | 16 - 19.99 MHz | < 8.0 to < -5.0 Vdc | L4 |
| 5 | 20 - 23.99 MHz | < 8.0 to < -5.0 Vdc | L2 & L4 |
| 6 | 24 - 27.99 MHz | < 8.0 to < -5.0 Vdc | L3 & L4 |
| 7 | 28 - 30 MHz | < 8.0 to < -5.0 Vdc | L2, L3 & L4 |

### 4.6.10 2ND LO SYNTHESIZER ALIGNMENT

The 2nd LO Synthesizer Alignment consists of a 32 MHz Loop Alignment, a Programmable Loop Alignment and an Output Loop Alignment. Perform the procedure in the given sequence.

1. Preliminary Setup

   a. Mount the 2nd LO Synthesizer on an extender board.
   b. Energize the DC power source and allow 30 minutes for warm-up.

2. 32 MHz Loop Alignment

   a. Connect a digital voltmeter to Test Point E1.
   b. Adjust C19 until a voltmeter reading of 7.5 Vdc is observed with the alignment tool withdrawn from the VCO shield.

3. Programmable Loop Alignment

   a. Connect a digital voltmeter to Test Point E2.
   b. Tune the receiver to 15.00999 MHz.
   c. Adjust C61 until a voltmeter reading of -8.0 Vdc is observed with the alignment tool withdrawn from the VCO shield.

4. Output Loop Alignment

   a. Connect a digital voltmeter to Test Point E3.
   b. Tune receiver to 15.00499 MHz.
   c. Adjust C44 until a voltmeter reading of 7.5 Vdc is observed with the alignment tool withdrawn from the VCO shield.
   d. Using a frequency counter, verify that a frequency of 32.205010 MHz +/-3 Hz is present at J1.

Courtesy of http://BlackRadios.terryo.org



### 4.6.11 3RD LO SYNTHESIZER ALIGNMENT

1. Mount the 3rd LO/BFO Synthesizer on an extender board.
2. Connect a digital voltmeter to Test Point E3.
3. Adjust C30 for a voltmenter reading of +2.5 Vdc.

### 4.6.12 BFO SYNTHESIZER ALIGNMENT

1. Mount the 3rd LO/BFO Synthesizer on an extender board.
2. Connect a digital voltmeter to Test Point E2.
3. Using the front panel keypad, select CW mode and enter a BFO offset of 0 kHz.
4. Adjust C8 for a voltmeter reading of +7.5 Vdc.

### 4.6.13 SCAN CALIBRATION

1. Connect the equipment as shown in **Figure 4-10.**

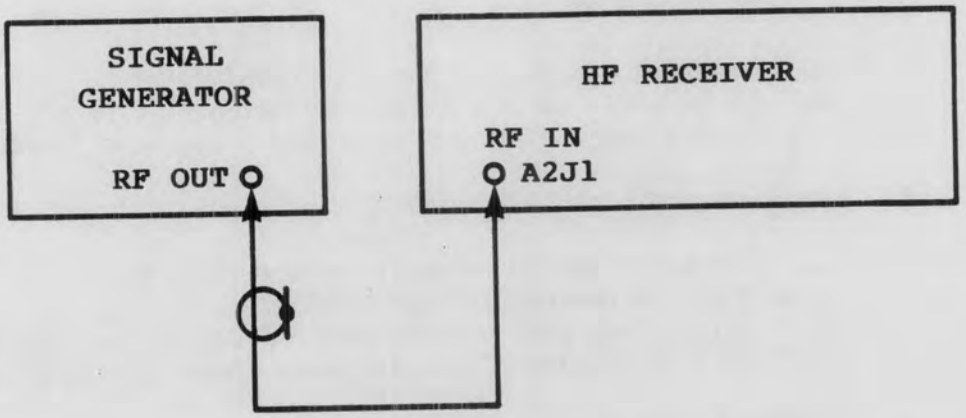


**Figure 4-10. Scan Calibration Equipment Setup**

Courtesy of http://BlackRadios.terryo.org



2. Set the signal generator to:

   a. TUNED FREQUENCY - 10.000 MHz

   b. MODULATION - OFF

   c. OUTPUT LEVEL - 0 dBm

3. Energize the DC power source, allowing sufficient warm-up time.

4. Enter the following keystrokes via the front panel keypad:


   The display will respond with:

   "Scan Calibration Req'd Use cursor NO <?> YES"

5. Use the cursor switch to either exit or proceed. If answered YES, the display indicates:

   "RCVR must be aligned...Answer NO if not ready"

   This display remains for approximately 5 seconds, followed by:

   "10.0 MHz 0 dBm CW in RF? Use cursor NO<?>YES"

6. Use the cursor switch to either exit or proceed. If answered YES, the display indicates:

   "please wait 10 minutes"

   The WJ-8626A-4 now automatically beings to store the correct gain values in a table for the Scan function. Error messages will appear if the set-up or alignment is incorrect. Do not disturb the receiver or generator during this time.

7. After completing the first half of the table, the display will indicate:

   "RF in = -50 dBm READY? Use cursor NO<?>YES"

8. Reduce the generator level to - 50 dBm.

9. Use the cursor switch to exit or proceed.

Courtesy of http://BlackRadios.terryo.org



10. If answered YES, the display will indicate:

    "please wait 10 minutes"

    The WJ-8626A-4 now completes the second half of the gain table.

11. If the procedure is successful, the message "Scan Calibration complete" will appear. Use the CLR key to continue.

If the set-up or receiver alignment was not correct, the calibration routine is aborted and an error message appears. The default gain table is then used during Scan mode, and the message "WARNING: Scan Cal Req'd Using Standard Tables" appears each time the scan mode is entered. Realign the IF section, Video, Signal Strength, and Digital-to-Analog sections. Then repeat this procedure.

Courtesy of http://BlackRadios.terryo.org



# SECTION V

# REPLACEMENT PARTS LIST

## 5.1 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.

## 5.2 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.

## 5.3 LIST OF MANUFACTURERS

| Mfr. Code | Name and Address |
|---|---|
| 00779 | AMP, Incorporated<br>P.O. Box 3608<br>Harrisburg, PA 17105 |
| 01121 | Allen-Bradley Company<br>1201 South 2nd Street<br>Milwaukee, WI 53204 |
| 01295 | Texas Instruments, Inc.<br>Semiconductor-Components Div.<br>15300 North Central Expressway<br>Dallas, TX 75231 |
| 02114 | Ferroxcube Corporation<br>P.O. Box 359<br>Mt. Marion Road<br>Saugerties, NY 12477 |
| 02735 | RCA Corporation<br>Solid State Division<br>Route 202<br>Somerville, NJ 08876 |
| 04013 | Taurus Corporation<br>1 Academy Hill<br>Lambertville, NJ 08530 |
| 04213 | Caddell-Burns Mfg. Co., Inc.<br>40 E. Second Street<br>Mineola, NY 11501 |
| 04713 | Motorola Incorporated<br>Semiconductor Products Div.<br>5005 East McDowell Road<br>Phoenix, AZ 85008 |

Courtesy of http://BlackRadios.terryo.org



| Mfr. Code | Name and Address |
|---|---|
| 06776 | Robinson-Nugent, Inc.<br>800 E. 8th Street<br>Albany, IN 47150 |
| 07263 | Fairchild Camera & Instr. Corp.<br>Semiconductor Division<br>464 Ellis Street<br>Mountain View, CA 94040 |
| 09021 | Airco Inc.<br>Airco Electronics<br>Bradford, PA 17055 |
| 13103 | Thermalloy Company<br>2021 W. Valley View Lane<br>Dallas, TX 75234 |
| 14632 | Watkins-Johnson Company<br>700 Quince Orchard Road<br>Gaithersburg, MD 20878 |
| 15542 | Mini-Circuits Laboratories<br>Division of Scientific<br>Components Corp.<br>2625 E. 14th Street<br>Brooklyn, NY 11235 |
| 15912 | Thomas and Betts/Ansley Corp.<br>Subdivision of Thomas-Betts Corp.<br>4371 Valley Blvd.<br>Los Angeles, CA 90031 |
| 17856 | Siliconix, Inc.<br>2201 Laurelwood Road<br>Santa Clara, CA 95050 |
| 18324 | Signetics Corporation<br>811 East Arques Avenue<br>Sunnyvale, CA 94086 |
| 19505 | Applied Eng. Products, Co.<br>Division of Samarious, Inc.<br>300 Seymour Avenue<br>Derby, CT 06418 |
| 22526 | Du Pont EI De Nemours and Co.<br>Inc.<br>Photo Products Dept.<br>Berg Electronics Div.<br>Route 83<br>New Cumberland, PA 17070 |
| 24355 | Analog Devices, Inc.<br>Route 1 Industrial Park<br>P.O. Box 280<br>Norwood, MA 02062 |
| 27014 | National Semi-Conductor Corp.<br>2950 San Ysidro Way<br>Santa Clara, CA 95051 |
| 27735 | IF-Dyne Electronics<br>449 Howard Avenue<br>Bridgeport, CT 06605 |
| 27956 | Relcom<br>3333 Hillview Avenue<br>Palo Alto, CA 94304 |
| 28480 | Hewlett-Packard Company<br>Corporate Headquarters<br>1501 Page Mill Road<br>Palo Alto, CA 94304 |
| 32293 | Intersil Inc.<br>10600 Ridge View Court<br>Cupertino, CA 95014 |
| 33095 | Spectrum Control, Inc.<br>152 E. Main Street<br>Fairview, PA 16415 |
| 49956 | Raytheon Co.<br>141 Spring Street<br>Lexington, MA 02173 |
| 50157 | Midwest Components, Inc.<br>1981 Port City Blvd.<br>P.O. Box 787<br>Muskegon, MI 49443 |

Courtesy of http://BlackRadios.terryo.org



| Mfr. Code | Name and Address |
|---|---|
| 51406 | Morata Erie North America, Inc.<br>1148 Franklin Road, SE<br>Marietta, GA 30067 |
| 51642 | Centre Engineering, Inc.<br>2820 E. College Avenue<br>State College, PA 16801 |
| 52648 | Plessey Trading Corp.<br>Plessey Optoelectronics and Microwave<br>1641 Kaiser Avenue<br>Irvine, CA 92714 |
| 52673 | KSW Electronics Corp.<br>Burlington, MA 01803 |
| 55322 | Samtec, Inc.<br>810 Progress Blvd.<br>P.O. Box 1147<br>New Albany, IN 47150 |
| 56289 | Sprague Electric Company<br>Marshall Street<br>North Adams, MA 01247 |
| 70903 | Belden Corp.<br>Subdivision of Cooper Industries, Inc.<br>2000 S. Batavia Avenue<br>Geneva, IL 60134 |
| 71279 | Cambridge Thermionic Corp.<br>445 Concord Avenue<br>Cambridge, MA 02138 |
| 71468 | ITT Canon Electric<br>Div. of ITT Corp.<br>10550 Talbert Avenue<br>P.O. Box 8040<br>Fountain Valley, CA 92708 |
| 72136 | Electro Motive Mfg. Co., Inc.<br>South Park & John Streets<br>Willimantic, CT 06226 |
| 73138 | Beckman Instruments, Inc.<br>Helipot Division<br>2500 Harbor Boulevard<br>Fullterton, CA 92634 |
| 75378 | CTS Knights, Inc.<br>400 Reimann Avenue<br>Sandwich, IL 60548 |
| 76055 | Mallory Controls Co.<br>Division of Emhart Industries, Inc.<br>State Road 28W<br>P.O. Box 327<br>Frankfort, IN 46041 |
| 80058 | Joint Electronic Type Designation System |
| 80103 | Lambda Electronics Corp.<br>Div. of Veeco Instr., Inc.<br>51 Broad Hollow Road<br>Melville, NY 11746 |
| 80131 | Electronic Industries Assoc.<br>2001 Eye Street, N.W.<br>Washington, DC 20006 |
| 81312 | Winchester, Electronics<br>Division of Litton Ind.<br>Oakville, CT 06779 |
| 81349 | Military Specifications |
| 81350 | Joint Army-Navy Specifications |
| 82389 | Switchcraft, Incorporated<br>5555 North Elston Avenue<br>Chicago, IL 60630 |

Courtesy of http://BlackRadios.terryo.org



| Mfr. Code | Name and Address |
|---|---|
| 91293 | Johanson Manufacturing Co.<br>P.O. Box 329<br>Boonton, NJ 07005 |
| 91418 | Radio Materials Company<br>4242 West Bryn Mawr Avenue<br>Chicago, IL 60646 |
| 92825 | Whitso Incorporated<br>93330 Bryon Street<br>Schiller Park, IL 60176 |
| 93332 | Sylvania Electric Products, Inc.<br>Semiconductor Products Div.<br>100 Sylvan Road<br>Woburn, MA 01801 |
| 95121 | Quality Components, Inc.<br>P.O. Box 113<br>St. Mary's, PA 15857 |
| 95146 | Alco Electronic Products, Inc.<br>P.O. Box 1348<br>North Andover, MA 01842 |
| 99800 | American Precision Industries<br>Delevan Electronics Division<br>270 Quaker Road<br>East Aurora, NY 14052 |

## 5.4 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 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 5.3** 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 semi-conductors become available, it is the policy of Watkins-Johnson to incorporate them in proprietary products. For this reason some transistors, diodes, and integrated circuits installed in the equipment may not agree with those specified in the parts list and schematic diagrams of this manual. However, the semi-conductors designated in the manual may be substituted in every case with satisfactory results.

Courtesy of http://BlackRadios.terryo.org



5.5 **TYPE WJ-8626A-4 HF RECEIVER, MAIN CHASSIS**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| A1 | Voltage Regulator Motherboard | 1 | 271153-1 | 14632 | |
| A2 | Input Filter | 1 | 794343-1 | 14632 | |
| A3 | Input Converter | 1 | 794349-1 | 14632 | |
| A4 | IF Demodulator Motherboard | 1 | 794429-1 | 14632 | |
| A5 | Synthesizer Motherboard | 1 | 794414-1 | 14632 | |
| A6 | Digital Interface | 1 | 794434-1 | 14632 | |
| A7 | Customer Selected Option (Preselector) | | | | |
| A8 | Keyboard Assembly | 1 | 371037-2 | 14632 | |
| A9 | Controller Motherboard | 1 | 794431-1 | 14632 | |
| C1 Thru C4 | Capacitor, Ceramic, Feedthru: 0.05 µF, GMV, 300 V | 4 | 54-785-005-503P | 33095 | |
| C5 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 1 | 34475-1 | 14632 | |
| DS1 | Display, LCD | 1 | LM23B2C24CTW | 16339 | |
| E1 | Terminal, Lug | 1 | 505-169 | 79963 | |
| E2 | Terminal, Lug | 1 | 505-120 | 79963 | |
| E3 | Terminal, Standoff | 2 | 4D4A1 | 92825 | |
| E4 | Same as E3 | | | | |
| J1 | Connector, Receptacle | 1 | DBR-25P | 71468 | |
| J2 | Connector, Jack, SMA | 1 | 9230-7553-005 | 19505 | |
| J3 | Not Used | | | | |
| J4 | Not Used | | | | |
| J5 | Connector, Phone Jack | 1 | C11 | 82389 | |
| J6 | Connector, Receptacle | 1 | SRE9SJ | 81312 | |
| MP1 | Handle | 1 | 10221-B-0632-4A | 06540 | |
| MP2 Thru MP4 | Control Knob/Round | 3 | 50-2WD-1G | 94144 | |
| MP5 | Control Knob | 1 | 18664-2 | 14632 | |
| MP6 | Snap, Button | 1 | 653 | 83330 | |
| P1 | Connector, Plug | 2 | 65043-028 | 22526 | |
| P2 | Connector, Plug | 1 | 65039-034 | 22526 | |
| P3 | Connector, Plug | 1 | 65039-033 | 22526 | |
| P4 | Same as P1 | | | | |
| P5 | Connector, Plug | 6 | 66900-014 | 22526 | |
| P6 Thru P10 | Same as P5 | | | | |
| P11 | Connector, Plug | 1 | 66900-020 | 22526 | |
| P12 | Connector, Plug, Receptacle | 1 | JF3S1PACD | 81312 | |
| P13* | Connector, Plug | 1 | SRE9SJT4 | 81312 | |
| | *Prewired in unit for WJ-8626A-4/PRE (Option). | | | | |

Courtesy of http://BlackRadios.terryo.org




**Figure 5-1. WJ-8626A-4 HF Receiver, Front Panel, Location of Components**

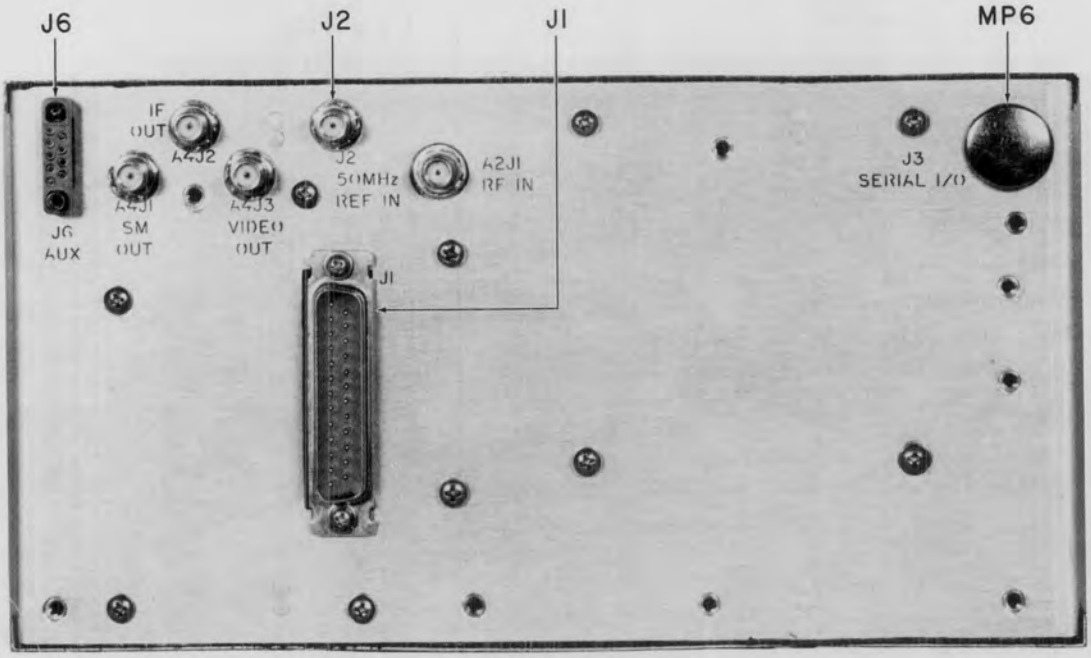


**Figure 5-2. WJ-8626A-4 HF Receiver, Rear Panel, Location of Components**

Courtesy of http://BlackRadios.terryo.org



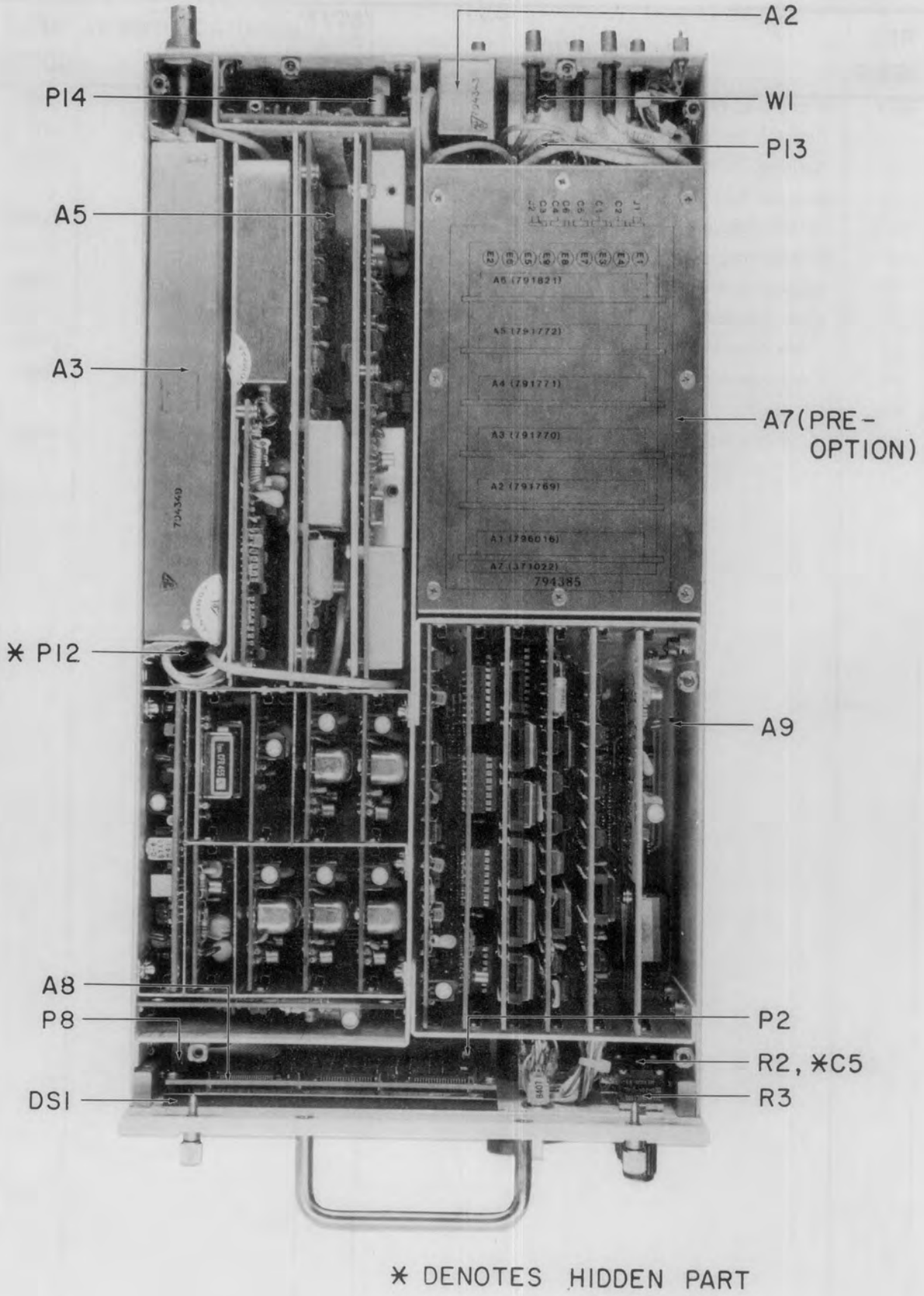


**Figure 5-3. WJ-8626A-4 HF Receiver, Top View, Location of Components**

Courtesy of http://BlackRadios.terryo.org



MAIN CHASSIS

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| P14 | Connector, Plug | 1 | 2105-7521-005 | 19505 | |
| R1 | Resistor, Variable, Composition: 50 kΩ, 10%, 1 W | 2 | 70A3N056L503A | 01121 | |
| R2 | Resistor, Variable, Composition: 10 kΩ, 10%, 1 W | 2 | 70A3N056L103U | 01121 | |
| R3 | Same as R2 | | | | |
| S1 | Switch, Toggle | 1 | MTF-126D | 95146 | |
| S2 | Switch, Toggle | 1 | MTF-126G | 95146 | |
| U1 | Encoder Assembly | 1 | SP-16 | USDIG | |
| W1 | Cable Assembly | 1 | 17300-342-1 | 14632 | |
| W2 | Cable Assembly | 1 | 271332 | 14632 | |
| W3 | Cable Assembly | 1 | 271333 | 14632 | |
| W4 | Not Used | | | | |
| W5 | Cable Assembly | 1 | 271331 | 14632 | |

Courtesy of http://BlackRadios.terryo.org



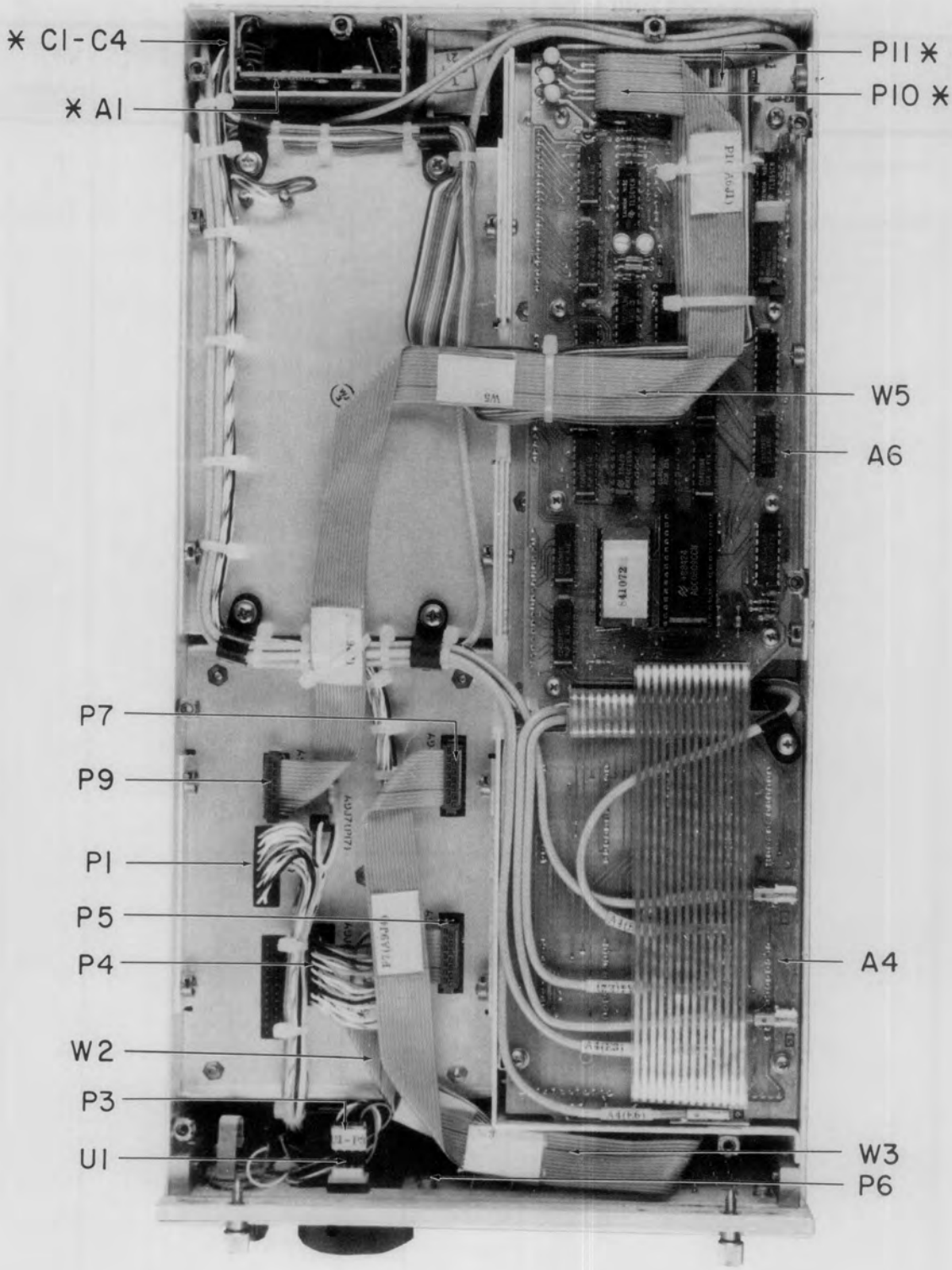


**Figure 5-4. WJ-8626A-4 HF Receiver, Bottom View, Location of Components**

Courtesy of http://BlackRadios.terryo.org



5.5.1 **TYPE 271153-1 VOLTAGE REGULATOR MOTHERBOARD** REF DESIG PREFIX **A1**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| E1 Thru E7 | Terminal, Forked | 7 | 140-1941-02-01 | 71279 | |
| J1 | Terminal, Strip | 1 | 65500-112 | 22526 | |

Courtesy of http://BlackRadios.terryo.org



5.5.1.1 **Type 764009-1 Voltage Regulator Assembly** REF DESIG PREFIX **A1A1**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 Thru C6 | Capacitor, Electrolytic, Tantalum: 1 µF, 20%, 35 V | 6 | 196D105X0035HE3 | 56289 | |
| P1 | Connector, Plug | 1 | 65001-010 | 22526 | |
| RA1 | Heat Sink, Low Profile | 1 | 6073B | 13103 | |
| U1 | Voltage Regulator | 1 | 7805UC | 07263 | |
| U2 | Voltage Regulator | 1 | MC7815CT | 04713 | |
| U3 | Voltage Regulator | 1 | 7915UC | 07263 | |

Courtesy of http://BlackRadios.terryo.org



5.5.2 **TYPE 794343-1 INPUT FILTER** REF DESIG PREFIX **A2**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| A1 | 30 MHz Low Pass Filter | 1 | 271137-1 | 14632 | |
| C1 | Capacitor, Ceramic, Disc: 47 µF, 5%, 100 V | 1 | 811-100-COGO-470J | 59660 | |
| E1 | Connector, Bulkhead | 1 | 8144-7521-005 | 19505 | |
| J1 | Connector, Receptacle, SMA | 1 | 9412-7113-000 | 19505 | |
| L1 | Coil, Toroidal | 1 | 20681-208 | 14632 | |
| P1 | Connector, Jack, SMB | 1 | 2002-7571-005 | 19505 | |
| W1 | Cable Assembly | 1 | 271146-1 | 14632 | |

Courtesy of http://BlackRadios.terryo.org



5.5.2.1 **Type 271137-1 30 MHz Low Pass Input Filter Assembly** REF DESIG PREFIX **A2A1**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 | Capacitor, Ceramic Disc: 0.47 µF, 20%, 50 V | 2 | 34452-1 | 14632 | |
| C2 | Capacitor, Mica, Dipped: 120 pF, 2%, 500 V | 1 | CM05FD121G03 | 81349 | 72136 |
| C3 | Capacitor, Mica, Dipped: 10 pF, 0.5 pF, 500 V | 1 | CM05CD100D03 | 81349 | 72136 |
| C4 | Capacitor, Mica, Dipped: 180 pF, 2%, 500 V | 1 | CM05FD181G03 | 81349 | 72136 |
| C5 | Capacitor, Mica, Dipped: 33 pF, 2%, 500 V | 1 | CM05ED330G03 | 81349 | 72136 |
| C6 | Capacitor, Mica, Dipped: 150 pF, 2%, 500 V | 3 | CM05FD151G03 | 81349 | 72136 |
| C7 | Capacitor, Mica, Dipped: 39 pF, 2%, 500 V | 1 | CM05FD390G03 | 81349 | 72136 |
| C8 | Same as C6 | | | | |
| C9 | Capacitor, Mica, Dipped: 18 pF, 5%, 500 V | 1 | CM05CD180J03 | 81349 | 72136 |
| C10 | Same as C6 | | | | |
| C11 | Same as C1 | | | | |
| C12 | Not Used | | | | |
| CR1 | Diode | | IN4449 | 80131 | |
| CR2 | Same as CR1 | | | | |
| L1 Thru L4 | Coil, Variable | 4 | 558-7107-08 | 71279 | |
| L5 | Coil, Variable | 1 | 558-7107-07 | 71279 | |
| R1 | Resistor, Fixed, Film: 10 kΩ, 5%, 1/4 W | 1 | CF1/4-10K/J | 09021 | |
| R2 | Resistor, Fixed, Film: 12Ω, 5%, 1/8 W | 1 | CF1/8-12 OHMS/J | 09021 | |
| R3 | Resistor, Fixed, Film: 470Ω, 5%, 1/8 W | 2 | CF1/8-470 OHMS/J | 09021 | |
| R4 | Same as R3 | | | | |
| VR1 | Diode, Zener | 2 | IN753A | 80131 | |
| VR2 | Same as VR1 | | | | |

Courtesy of http://BlackRadios.terryo.org



5.5.3 **TYPE 794349-1 INPUT CONVERTER** REF DESIG PREFIX **A3**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| A1 | 1st Mixer, 1st IF | 1 | 370938-1 | 14632 | |
| A2 | 2nd Mixer, 2nd IF | 1 | 370947-1 | 14632 | |
| C1 Thru C4 | Capacitor, Ceramic, Feedthru: 1000 µF, 500 V | 4 | 54-794-009-102W | 33095 | |
| C5 | Capacitor, Ceramic, Disc: 2200 µF, 5%, 100 V | 1 | 8131-100-COGO-222J | 59660 | |
| C6 | Capacitor, Ceramic, Disc: 68 µF, 5%, 100 V | 1 | 8121-100-COGO-680J | | |
| E1 | Terminal, Turret | 1 | 160-2034-01-01 | 71279 | |
| J1 Thru J4 | Connector, Receptacle, SMB | 4 | 2012-7511-000 | 19505 | |
| J5 | Connector, Receptacle, Plug | 1 | JF38ISACD | 81312 | |
| R1 | Resistor, Fixed, Film: 8.2Ω, 5%, 1/8 W | 1 | CF1/8-8.2 OHMS/J | 09021 | |
| R2 | Resistor, Fixed, Film: 560Ω, 5%, 1/8 W | 1 | CF1/8-560 OHMS/J | 09021 | |

Courtesy of http://BlackRadios.terryo.org



5.5.3.1 **Type 370938-1 1st Mixer/1st IF Assembly** REF DESIG PREFIX **A3A1**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 | Capacitor, Ceramic, Disc: 0.01 µF, 20%, 50 V | 1 | 34453-1 | 14632 | |
| E1 Thru E5 | Terminal, Forked | 5 | 140-1941-02-01 | 71279 | |
| FL1 | Filter | 1 | 92123 | 14632 | |
| L1 | Coil, Fixed: 10 µH, 10% | 1 | 1537-36 | 99800 | |
| L2 | Coil, Fixed: 0.15 µH, 20% | 1 | 1537-00 | 99800 | |
| R1 | Resistor, Fixed, Film: 560Ω, 5%, 1/8 W | 1 | CF1/8-560 OHMS/J | 09021 | |
| U1 | Mixer, Balanced | 1 | M9D | 27956 | |
| U2 | Amplifier | 1 | A58 | 27956 | |

Courtesy of http://BlackRadios.terryo.org



5.5.3.2 **Type 370947-1 2nd Mixer/2nd IF Assembly** REF DESIG PREFIX **A3A2**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 | Capacitor, Variable, Ceramic: 9-35 pF, 350 V | 1 | 538-011D9-35 | 59660 | |
| C2 | Capacitor, Variable, Ceramic: 2.5-11 pF, 350 V | 1 | 538-011B25-11 | 59660 | |
| C3 | Capacitor, Ceramic, Disc: 1000 pF | 2 | B-GP1000PFP | 91418 | |
| C4 | Capacitor, Ceramic, Disc: 4.7 pF, 0.25 pF, 100 V | 1 | 8101-100-COHO-47 | 59660 | |
| C5 | Same as C3 | | | | |
| C6 Thru C11 | Capacitor, Ceramic, Disc: 0.01 µF, 20%, 50 V | 6 | 34453-1 | 14632 | |
| C12 | Capacitor, Ceramic, Disc: 0.47 µF, 20%, 50 V | 1 | 34452-1 | 14632 | |
| C13 | Capacitor, Electrolytic, Tantalum: 4.7 µF, 20%, 35 V | 1 | 196D475X0035JE3 | 56289 | |
| C14 | Capacitor, Mica, Dipped: 91 pF, 2%, 500 V | 2 | CM05FD910G03 | 81349 | |
| C15 | Same as C14 | | | | |
| C16 | Capacitor, Mica, Dipped: 39 pF, 2%, 500 V | 1 | CM05ED390G03 | 81349 | |
| C17 | Capacitor, Ceramic, Disc: 470 pF, 20%, 1000 V | 2 | BHD470-20PCT | 91418 | |
| C18 | Same as C17 | | | | |
| C19 | Capacitor, Mica, Dipped: 47 pF, 2%, 500 V | 1 | CM05ED470G03 | 81349 | |
| CR1 | Diode | 1 | IN4446 | 80131 | |
| CR2 | Diode | 1 | 5082-3039 | 28480 | |
| FB1 Thru FB3 | Ferrite Bead | 3 | 56-590-65-4A | 02114 | |
| FL1 | Filter | 1 | 92124 | 14632 | |
| L1 Thru L3 | Coil, Fixed: 10 µH, 10% | 4 | 1537-36 | 99800 | |
| L4 | Coil, Fixed, Mold: 1.8 µH, 10% | 1 | 1537-18 | 99800 | |
| L5 | Coil, Fixed: 0.33 µH, 10% | 1 | 1537-04 | 99800 | |
| L6 | Coil, Fixed: 0.15 µH, 20% | 1 | 1537-00 | 99800 | |
| L7 | Coil, Fixed, Mold: .22 µH, 10% | 2 | 1537-02 | 99800 | |
| L8 | Coil, Fixed, Mold: .47 µH, 10% | 1 | 1537-06 | | |
| L9 | Same as L7 | | | | |
| L10 | Coil, Fixed: 0.56 µH, 15% | 1 | 202-11 | 99848 | |
| L11 | Same as L1 | | | | |
| Q1 | Transistor | 1 | 2N2222A | 80131 | |
| Q2 | Transistor | 1 | CP643 | 12498 | |
| Q3 Thru Q5 | Transistor | 3 | 2N5109 | 80131 | |
| RA1 | Heatsink | 1 | 260-2T18 | 05820 | |
| R1 | Resistor, Fixed, Film: 2.2 kΩ, 5%, 1/4 W | 1 | CF1/4-2.2K/J | 09021 | |
| R2 | Resistor, Fixed, Film: 82Ω, 5%, 1/4 W | 1 | CF1/4-82 OHMS/J | 09021 | |
| R3 | Resistor, Fixed, Film: 10Ω, 5%, 1/4 W | 4 | CF1/4-10 OHMS/J | 09021 | |
| R4 | Resistor, Fixed, Film: 1.8 kΩ, 5%, 1/4 W | 1 | CF1/4-1.8K/J | 09021 | |
| R5 | Resistor, Fixed, Film: 220Ω, 5%, 1/4 W | 1 | CF1/4-220 OHMS/J | 09021 | |

Courtesy of http://BlackRadios.terryo.org



REF DESIG PREFIX **A3A2**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| R6 | Resistor, Fixed, Film: 3.3 kΩ, 5%, 1/4 W | 1 | CF1/4-3.3K/J | 09021 | |
| R7 | Resistor, Fixed, Film: 2.2 kΩ, 5%, 1/4 W | 1 | CF1/4-2.2K/J | 09021 | |
| R8 | Resistor, Fixed, Film: 1 kΩ, 5%, 1/4 W | 2 | CF1/4-1K/J | 09021 | |
| R9 | Resistor, Fixed, Film: 200Ω, 5%, 1/4 W | 2 | CF1/4-200 OHMS/J | 09021 | |
| R10 | Same as R3 | | | | |
| R11 | Resistor, Fixed, Film: 47Ω, 5%, 1/4 W | 1 | CF1/4-47 OHMS/J | 09021 | |
| R12 | Resistor, Fixed, Film: 4.7Ω, 5%, 1/4 W | 1 | CF1/4-4.7 OHMS/J | 09021 | |
| R13 | Resistor, Fixed, Film: 68Ω, 5%, 1/4 W | 1 | CF1/4-68 OHMS/J | 09021 | |
| R14 | Resistor, Fixed, Film: 390Ω, 5%, 1/4 W | 1 | CF1/4-390 OHMS/J | 09021 | |
| R15 | Resistor, Fixed, Film: 330Ω, 5%, 1/4 W | 2 | CF1/4-330 OHMS/J | 09021 | |
| R16 | Resistor, Fixed, Film: 15Ω, 5%, 1/4 W | 1 | CF1/4-15 OHMS/J | 09021 | |
| R17 | Resistor, Fixed, Film: 2.0 kΩ, 5%, 1/4 W | 1 | CF1/4-2.0K/J | 09021 | |
| R18 | Same as R8 | | | | |
| R19 | Same as R15 | | | | |
| R20 | Same as R3 | | | | |
| R21 | Resistor, Fixed, Film: 12Ω, 5%, 1/4 W | 1 | CF1/4-12 OHMS/J | 09021 | |
| R22 | Same as R9 | | | | |
| R23 | Resistor, Fixed, Film: 6.8Ω, 5%, 1/4 W | 1 | CF1/4-6.8 OHMS/J | 09021 | |
| R24 | Same as R3 | | | | |
| T1 | Transformer | 1 | 22295-53 | 14632 | |
| T2 | Transformer | 1 | 22295-54 | 14632 | |
| T3 | Transformer | 1 | 22295-55 | 14632 | |
| T3 | Transformer | 1 | 22295-55 | 14632 | |
| U1 | Mixer, Balanced | 1 | M9A | 27956 | |

Courtesy of http://BlackRadios.terryo.org



5.5.4 **TYPE 794429-1 IF DEMODULATOR MOTHERBOARD** REF DESIG PREFIX **A4**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| A1 | 10.7 MHz/455 kHz Converter | 1 | 370815-1 | 14632 | |
| A2 Thru A6 | Customer Selected Option (IF Filter Sets) | | | | |
| A7 | 455 kHz IF Amplifier | 1 | 370817-1 | 14632 | |
| A8 | Wideband/Narrow Band Filter | 1 | 370816-1 | 14632 | |
| A9 | AM/FM/SSB Demodulator | 1 | 794435-1 | 14632 | |
| A10 | AGC/Video/Squelch Assembly | 1 | 794436-1 | 14632 | |
| C1 Thru C3 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 3 | 34475-1 | 14632 | |
| E1 Thru E6 | Terminator, Coax | 6 | D-607-10 | 06090 | |
| J1 | Connector, Receptacle | 1 | 65610-206 | 22526 | |
| J1 Thru J3 | Connector, Jack | 3 | 9230-7553-005 | 19505 | |
| P1 | Connector, Jack | 1 | 2002-7571-006 | 19505 | |
| P2 | Connector, Plug | 2 | 2105-7521-005 | 19505 | |
| P3 | Same as P2 | | | | |
| XA1 Thru XA8 | Terminal Strip, 12 Pin | 12 | 65500-112 | 22526 | |
| XA9A | Same as XA1 | | | | |
| XA9B | Same as XA1 | | | | |
| XA10A | Same as XA1 | | | | |
| XA10B | Same as XA1 | | | | |

Courtesy of http://BlackRadios.terryo.org



5.5.4.1 **Type 370815-1 10.7 MHz/455 kHz Converter** REF DESIG PREFIX **A4A1**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 | Capacitor, Ceramic, Disc: 0.01 µF, 20%, 50 V | 5 | 34453-1 | 14632 | |
| C2 | Same as C1 | | | | |
| C3 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 5 | 34475-1 | 14632 | |
| C4 | Capacitor, Mica, Dipped: 270 µF, 2%, 500 V | 1 | CM05FD271G03 | 81349 | |
| C5 | Capacitor, Mica, Dipped: 68 µF, 2%, 500 V | 1 | CM05ED680G03 | 81349 | |
| C6 Thru C8 | Same as C1 | | | | |
| C9 | Same as C3 | | | | |
| C10 | Capacitor, Ceramic, Disc: 0.47 µF, 20%, 50 V | 1 | 34452-1 | 14632 | |
| C11 | Same as C3 | | | | |
| C12 | Capacitor, Mica, Dipped: 150 µF, 2%, 500 V | 1 | CM05FD151G03 | 81349 | |
| C13 | Capacitor, Mica, Dipped: 100 µF, 2%, 500 V | 1 | CM05FD101G03 | 81349 | |
| C14 | Capacitor, Mica, Dipped: 51 µF, 2%, 500 V | 1 | CM05ED510G03 | 81349 | |
| C15 | Same as C3 | | | | |
| C16 | Same as C3 | | | | |
| C17 | Capacitor, Variable, Ceramic: 9-35 µF, 350 V | 1 | 538-01109-35 | 72982 | |
| C18 | Capacitor, Mica, Dipped: 12 µF, 5%, 500 V | 1 | CM05CD120J03 | 81349 | |
| L1 | Coil, Fixed: 3.3 µH, 10% | 1 | 1537-24 | 99800 | |
| L2 Thru L4 | Coil, Fixed: 1.2 mH, 10% | 3 | 553-3635-38 | 71279 | |
| P1 | Connector, Plug | 1 | 65001-010 | 22526 | |
| Q1 | Transistor | 1 | 2N2857 | 80131 | |
| Q2 | Transistor | 1 | 841001-1 | 14632 | |
| Q3 | Transistor | 1 | 2N2222A | 80131 | |
| R1 | Resistor, Fixed, Film: 51Ω, 5%, 1/4 W | 1 | CF1/4-51 OHMS/J | 09021 | |
| R2 | Resistor, Fixed, Film: 16 kΩ, 5%, 1/4 W | 1 | CF1/4-16K/J | 09021 | |
| R3 | Resistor, Fixed, Film: 10Ω, 5%, 1/4 W | 2 | CF1/4-10 OHMS/J | 09021 | |
| R4 | Resistor, Fixed, Film: 4.7 kΩ, 5%, 1/4 W | 1 | CF1/4-4.7K/J | 09021 | |
| R5 | Resistor, Fixed, Film: 470Ω, 5%, 1/4 W | 1 | CF1/4-470 OHMS/J | 09021 | |
| R6 | Resistor, Fixed, Film: 27Ω, 5%, 1/4 W | 1 | CF1/4-27 OHMS/J | 09021 | |
| R7 | Resistor, Fixed, Film: 220Ω, 5%, 1/4 W | 2 | CF1/4-220 OHMS/J | 09021 | |
| R8 | Resistor, Fixed, Film: 180Ω, 5%, 1/4 W | 1 | CF1/4-180 OHMS/J | 09021 | |
| R9 | Resistor, Fixed, Film: 240Ω, 5%, 1/4 W | 1 | CF1/4-240 OHMS/J | 09021 | |
| R10 | Resistor, Fixed, Film: 150 kΩ, 5%, 1/4 W | 1 | CF1/4-18K/J | 09021 | |
| R11 | Resistor, Fixed, Film: 18 kΩ, 5%, 1/4 W | 1 | CF1/4-18K/J | 09021 | |
| R12 | Resistor, Fixed, Film: 100 kΩ, 5%, 1/4 W | 1 | CF1/4-100K/J | 09021 | |
| R13 | Resistor, Fixed, Film: 620Ω, 5%, 1/4 W | 1 | CF1/4-620 OHMS/J | 09021 | |
| R14 | Resistor, Fixed, Film: 5.1 kΩ, 5%, 1/4 W | 1 | CF1/4-5.1 OHMS/J | 09021 | |
| R15 | Same as R3 | | | | |
| R16 | Same as R7 | | | | |
| R17 | Resistor, Fixed, Film: 47Ω, 5%, 1/4 W | 1 | CF1/4-47 OHMS/J | 09021 | |

Courtesy of http://BlackRadios.terryo.org



REF DESIG PREFIX **A4A1**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| R18 | Resistor, Fixed, Film: 100Ω, 5%, 1/4 W | 1 | CF1/4-100 OHMS/J | 09021 | |
| R19 | Resistor, Fixed, Film: 9.1 kΩ, 5%, 1/4 W | 1 | CF1/4-9.1K/J | 09021 | |
| R20 | Resistor, Fixed, Film: 13 kΩ, 5%, 1/4 W | 1 | CF1/4-13K/J | 09021 | |
| R21 | Resistor, Fixed, Film: 2.0 kΩ, 5%, 1/4 W | 1 | CF1/4-2K/J | 09021 | |
| T1 | Transformer | 1 | T4-1 | 15542 | |
| T2 | Transformer | 1 | T16-1 | 15542 | |
| Y1 | Holder, Crystal/Quartz | 1 | CR64U 11.155MHZ | 80058 | |

Courtesy of http://BlackRadios.terryo.org



5.5.4.2 **Type 370817-1 455 kHz IF Amplifier** REF DESIG PREFIX **A4A7**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 | Capacitor, Ceramic, Disc: 0.01 µF, 20%, 50 V | 4 | 34453-1 | 14632 | |
| C2 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 6 | 34475-1 | 14632 | |
| C3 | Same as C1 | | | | |
| C4 | Same as C2 | | | | |
| C5 | Same as C2 | | | | |
| C6 | Same as C1 | | | | |
| C7 | Same as C1 | | | | |
| C8 Thru C10 | Same as C2 | | | | |
| CR1 | Diode | 1 | IN462A | 80131 | |
| L1 | Coil, Fixed: 3.3 MH, 10% | 2 | 553-3635-43 | 71279 | |
| L2 | Same as L1 | | | | |
| P1 | Connector, Plug | 1 | 65001-010 | 22526 | |
| Q1 | Transistor | 2 | 841001-1 | 14632 | |
| Q2 | Same as Q1 | | | | |
| RT1 | Resistor, Thermistor | 2 | 3D102 | 50157 | |
| RT2 | Same as RT1 | | | | |
| R1 | Resistor, Fixed, Film: 120 kΩ, 5%, 1/4 W | 1 | CF1/4-120K/J | 09021 | |
| R2 | Resistor, Fixed, Film: 10 kΩ, 5%, 1/4 W | 1 | CF1/4-10K/J | 09021 | |
| R3 | Resistor, Fixed, Film: 150 kΩ, 5%, 1/4 W | 2 | CF1/4-150K/J | 09021 | |
| R4 | Resistor, Fixed, Film: 4.7 kΩ, 5%, 1/4 W | 2 | CF1/4-4.7K/J | 09021 | |
| R5 | Resistor, Fixed, Film: 22 kΩ, 5%, 1/4 W | 2 | CF1/4-22K/J | 09021 | |
| R6 | Resistor, Fixed, Film: 330Ω, 5%, 1/4 W | 2 | CF1/4-330 OHMS/J | 09021 | |
| R7 | Resistor, Fixed, Film: 270Ω, 5%, 1/4 W | 2 | CF1/4-270 OHMS/J | 09021 | |
| R8 | Resistor, Fixed, Film: 100Ω, 5%, 1/4 W | 1 | CF1/4-100 OHMS/J | 09021 | |
| R9 | Resistor, Fixed, Film: 56Ω, 5%, 1/4 W | 1 | CF1/4-56K/J | 09021 | |
| R10 | Same as R4 | | | | |
| R11 | Same as R3 | | | | |
| R12 | Resistor, Fixed, Film: 47Ω, 5%, 1/4 W | 1 | CF1/4-47 OHMS | 09021 | |
| R13 | Same as R5 | | | | |
| R14 | Same as R6 | | | | |
| R15 | Same as R7 | | | | |
| R16 | Resistor, Trim, Film: 1 kΩ, 10%, 1/2 W | 1 | 61PAR1K | 73138 | |
| R17 | Resistor, Fixed, Film: 220Ω, 5%, 1/4 W | 1 | CF1/4-220 OHMS/J | 09021 | |

Courtesy of http://BlackRadios.terryo.org



5.5.4.3 **Type 370816-1 Wideband/Narrowband Filter** REF DESIG PREFIX **A4A8**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 | Capacitor, Ceramic, Disc: 0.01 µF, 20%, 50 V | 2 | 34453-1 | 14632 | |
| C2 | Same as C1 | | | | |
| C3 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 12 | 34475-1 | 14632 | |
| C4 Thru C14 | Same as C3 | | | | |
| FL1 | Filter, Ceramic | 1 | CFS-455I | 51406 | |
| FL2 | Filter, Ceramic | 1 | CFR-455A | 51406 | |
| P1 | Connector, Plug | 1 | 65001-010 | 22526 | |
| Q1 | Transistor | 4 | 2N2222A | 80131 | |
| Q2 Thru Q4 | Same as Q1 | | | | |
| R1 | Resistor, Fixed, Film: 22 kΩ, 5%, 1/4 W | 4 | CF1/4-22K/J | 09021 | |
| R2 | Resistor, Fixed, Film: 6.8 kΩ, 5%, 1/4 W | 4 | CF1/4-6.8K/J | 09021 | |
| R3 | Same as R1 | | | | |
| R4 | Same as R2 | | | | |
| R5 | Resistor, Fixed, Film: 1.0 kΩ, 5%, 1/4 W | 3 | CF1/4-1K/J | 09021 | |
| R6 | Same as R5 | | | | |
| R7 | Resistor, Fixed, Film: 2.0 kΩ, 5%, 1/4 W | 1 | CF1/4-2K/J | 09021 | |
| R8 | Resistor, Fixed, Film: 1.1 kΩ, 5%, 1/4 W | 1 | CF1/4-1.1K/J | 09021 | |
| R9* Thru R12 | Resistor, Fixed, Film: 220Ω, 5%, 1/4 W | 1 | CF1/4-220 OHMS/J | 09021 | |
| R13 | Resistor, Fixed, Film: 3.3 kΩ, 5%, 1/4 W | 1 | CF1/4-3.3K/J | 09021 | |
| R14 | Resistor, Fixed, Film: 1.3 kΩ, 5%, 1/4 W | 1 | CF1/4-1.3K/J | 09021 | |
| R15 | Same as R1 | | | | |
| R16 | Same as R2 | | | | |
| R17 | Same as R1 | | | | |
| R18 | Same as R2 | | | | |
| R19 | Resistor, Fixed, Film: 100Ω, 5%, 1/4 W | 1 | CF1/4-100 OHMS/J | 09021 | |
| R20 | Same as R5 | | | | |
| R21 | Resistor, Fixed, Film: 47Ω, 5%, 1/4 W | 2 | CF1/4-47 OHMS/J | 09021 | |
| R22 | Same as R19 | | | | |
| R23 | Same as R21 | | | | |
| | *Nominal Value, Final Value Factory Selected | | | | |

Courtesy of http://BlackRadios.terryo.org



5.5.4.4 **Type 794435-1 AM/FM/SSB Demod Assembly** REF DESIG PREFIX **A4A9**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 Thru C4 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 24 | 34475-1 | 14632 | |
| C5 | Capacitor, Mica, Dipped: 10 µF, .5%, 500 V | 1 | CM04CD100D03 | 81349 | |
| C6 Thru C8 | Same as C1 | | | | |
| C9 | Capacitor, Mica, Dipped: 100 µF, 2%, 500 V | 1 | CM05FD101603 | 81349 | |
| C10 | Capacitor, Ceramic, Disc: 0.47 µF, 20%, 50 V | 4 | 34452-1 | 14632 | |
| C11 | Capacitor, Ceramic, Disc: 0.022 µF, 10%, 100 V | 1 | CK06BX223K | 81349 | |
| C12 | Same as C10 | | | | |
| C13 | Capacitor, Ceramic, Disc: 300 µF, 10%, 200 V | 1 | CK05BX331K | 81349 | |
| C14 | Capacitor, Electrolytic, Tantalum: 18 µF, 10%, 20 V | 4 | 196D186X9020KE3 | 56289 | |
| C15 | Same as C14 | | | | |
| C16 | Not Used | | | | |
| C17 Thru C28 | Same as C1 | | | | |
| C29 | Same as C14 | | | | |
| C30 | Capacitor, Electrolytic, Tantalum: 4.7 µF, 20%, 35 V | 1 | 196D475X0035JE3 | 56289 | |
| C31 | Capacitor, Ceramic, Disc: 2200 µF, 10%, 200 V | 2 | CK06BX222K | 81349 | |
| C32 | Capacitor, Mica, Dipped: 15 µF, 5%, 500 V | 1 | CM04CD150J03 | 81349 | |
| C33 Thru C35 | Same as C1 | | | | |
| C36 | Same as C31 | | | | |
| C37 | Same as C1 | | | | |
| C38 | Same as C14 | | | | |
| C39 | Capacitor, Mica, Dipped: 24 µF, 5%, 500 V | 1 | CM04ED240J03 | 81349 | |
| C40 | Capacitor, Ceramic, Tubular: 15 µF, 5%, 500 V | 1 | 301-000U2J0-150J | 59660 | |
| C41 | Capacitor, Mica, Dipped | 1 | DM15-511G | 72136 | |
| C42 | Same as C1 | | | | |
| C43 | Capacitor, Ceramic, Disc: 3300 µF, 10%, 200 V | 1 | CK06BX332K | 81349 | |
| C44 | Capacitor, Mica, Dipped: 36 µF, 2%, 500 V | 1 | CM04ED360G03 | 81349 | |
| C45 Thru C47 | Capacitor, Ceramic, Disc: 2.2 µF, 10%, 50 V | 3 | 8141-050-651-225M | 59660 | |
| C48 | Same as C10 | | | | |
| C49 | Same as C10 | | | | |
| L1 Thru L3 | Coil, Fixed | 3 | 553-3635-47 | 71279 | |
| L4 | Coil, Variable | 1 | 6740-41 | 04213 | |
| P1 | Connector, Plug | 2 | 65001-010 | 22526 | |
| P2 | Same as P1 | | | | |
| Q1 | Transistor | 4 | 2N2222A | 80131 | |

Courtesy of http://BlackRadios.terryo.org



REF DESIG PREFIX **A4A9**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| Q2 | Transistor | 1 | 2N3251 | 80131 | |
| Q3 Thru Q5 | Same as Q1 | | | | |
| R1 | Resistor, Fixed, Film: 27 kΩ, 5%, 1/8 W | 2 | CF1/8-27K/J | 09021 | |
| R2 | Resistor, Fixed, Film: 3.3 kΩ, 5%, 1/8 W | 1 | CF1/8-3.3K/J | 09021 | |
| R3 Thru R5 | Resistor, Fixed, Film: 330Ω, 5%, 1/8W | 5 | CF1/8-330 OHMS/J | 09021 | |
| R6 | Resistor, Fixed, Film: 220Ω, 5%, 1/8 W | 1 | CF1/8-220 OHMS/J | 09021 | |
| R7 | Resistor, Fixed, Film: 270Ω, 5%, 1/8 W | 1 | CF1/8-270 OHMS/J | 09021 | |
| R8 | Resistor, Fixed, Film: 4.7 kΩ, 5%, 1/8 W | 2 | CF1/8-4.7K/J | 09021 | |
| R9 | Resistor, Fixed, Film: 100Ω, 5%, 1/8 W | 7 | CF1/8-100 OHMS/J | 09021 | |
| R10 | Resistor, Fixed, Film: 33 kΩ, 5%, 1/8 W | 1 | CF1/8-33K/J | 09021 | |
| R11 | Resistor, Fixed, Film: 47Ω, 5%, 1/8 W | 4 | CF1/8-47K/J | 09021 | |
| R12 | Same as R9 | | | | |
| R13 | Resistor, Fixed, Film: 47Ω, 5%, 1/8 W | 1 | CF1/8-47 OHMS/J | 09021 | |
| R14 | Resistor, Fixed, Film: 15 kΩ, 5%, 1/8 W | 1 | CF1/8-15K/J | 09021 | |
| R15 | Same as R3 | | | | |
| R16 | Resistor, Fixed, Film: 10 kΩ, 5%, 1/8 W | 2 | CF1/8-10K/J | 09021 | |
| R17 | Same as R11 | | | | |
| R18 | Same as R11 | | | | |
| R19 | Same as R9 | | | | |
| R20 | Same as R9 | | | | |
| R21 | Not Used | | | | |
| R22 | Resistor, Fixed, Film: 130 kΩ, 5%, 1/8 W | 2 | CF1/8-130K/J | 09021 | |
| R23 | Resistor, Fixed, Film: 100 kΩ, 5%, 1/8 W | 2 | CF1/8-100K/J | 09021 | |
| R24 | Not Used | | | | |
| R25 | Resistor, Fixed, Film: 470Ω, 5%, 1/8 W | 2 | CF1/8-470 OHMS/J | 09021 | |
| R26 | Same as R1 | | | | |
| R27 | Same as R8 | | | | |
| R28 | Same as R25 | | | | |
| R29 | Same as R23 | | | | |
| R30 | Same as R11 | | | | |
| R31 | Same as R22 | | | | |
| R32 | Resistor, Fixed, Film: 5.1 kΩ, 5%, 1/8 W | 2 | CF1/8-5.1K/J | 09021 | |
| R33 | Same as R9 | | | | |
| R34 | Resistor, Fixed, Film: 3 kΩ, 5%, 1/8 W | 2 | CF1/8-3K/J | 09021 | |
| R35 | Same as R9 | | | | |
| R36 | Resistor, Fixed, Film: 3.9 kΩ, 5%, 1/8 W | 3 | CF1/8-3.9K/J | 09021 | |
| R37 | Resistor, Fixed, Film: 150Ω, 5%, 1/8 W | 1 | CF1/8-150 OHMS/J | 09021 | |
| R38 | Same as R16 | | | | |
| R39 | Same as R36 | | | | |

Courtesy of http://BlackRadios.terryo.org



REF DESIG PREFIX **A4A9**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| R40 | Same as R36 | | | | |
| R41 | Resistor, Fixed, Film: 5.6 kΩ, 5%, 1/8 W | 1 | CF1/8-5.6K/J | 09021 | |
| R42 | Resistor, Fixed, Film: 470 kΩ, 5%, 1/8 W | 2 | CF1/8-470K/J | 09021 | |
| R43 | Same as R34 | | | | |
| R44 | Same as R42 | | | | |
| R45 | Same as R9 | | | | |
| R46 | Same as R32 | | | | |
| R47 | Resistor, Fixed, Film: 14.7 kΩ, 1%, 1/10 W | 1 | RN55C1472F | 81349 | |
| R48 | Resistor, Fixed, Film: 178 kΩ, 1%, 1/10 W | 3 | RN55C1783F | 81349 | |
| R49 | Resistor, Fixed, Film: 10 kΩ, 1%, 1/10 W | 1 | RN55C1002F | 81349 | |
| R50 | Same as R48 | | | | |
| R51 | Resistor, Trim, Film: 5 kΩ, 10%, 1/2 W | 1 | 62PAR5K | 73138 | |
| R52 | Resistor, Fixed, Film: 51.1 kΩ, 1%, 1/10 W | 2 | RN55C5112F | 81349 | |
| R53 | Same as R48 | | | | |
| R54 | Same as R52 | | | | |
| R55 | Resistor, Fixed, Film: 82.5 kΩ, 1%, 1/10 W | 2 | RN55C8252F | 81349 | |
| R56 | Same as R55 | | | | |
| R57 | Resistor, Fixed, Film: 10Ω, 5%, 1/4 W | 2 | CF1/4-10 OHMS/J | 09021 | |
| R58 | Same as R57 | | | | |
| R59 | Same as R3 | | | | |
| T1 | Transformer | 1 | T16-1 | 15542 | |
| U1 | Integrated Circuit | 1 | TL064CN | 01295 | |
| U2 | Integrated Circuit | 1 | DG212CJ | 17856 | |
| U3 | Integrated Circuit | 1 | MC1596L | 04713 | |
| U4 | Integrated Circuit | 1 | MC1357P | 04713 | |
| VR1 | Diode | 1 | IN753A | 80131 | |

Courtesy of http://BlackRadios.terryo.org



5.5.4.5 **Type 794436-1 AGC/VIDEO/SQUELCH ASSEMBLY** REF DESIG PREFIX **A4A10**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 | Capacitor, Ceramic, Disc: 47 µF, 20%, 50 V | 2 | 34452-1 | 14632 | |
| C2 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 5 | 34475-1 | 14632 | |
| C3 | Capacitor, Electrolytic, Tantalum: 47 µF, 10%, 20 V | 1 | CS13BE476K | 81349 | |
| C4 | Capacitor, Electrolytic, Tantalum: 2.2 µF, 20%, 35 V | 1 | 196D225X0035JE3 | 56289 | |
| C5 | Capacitor, Electrolytic, Tantalum: 18 µF, 10%, 20 V | 4 | 196D186X9020KE3 | 56289 | |
| C6 | Same as C5 | | | | |
| C7 | Capacitor, Ceramic, Disc: 1 µF, 20%, 50 V | 1 | 8131-050-651-105M | 59660 | |
| C8 | Capacitor, Ceramic, Disc: 150 pF, 10%, 200 V | 2 | CK05BX151K | 81349 | |
| C9 | Same as C1 | | | | |
| C10 Thru C12 | Same as C2 | | | | |
| C13 | Same as C8 | | | | |
| C14 | Same as C5 | | | | |
| C15 | Same as C5 | | | | |
| C16 | Same as C2 | | | | |
| CR1 | Diode | 10 | IN4449 | 80131 | |
| CR2 Thru CR10 | Same as CR1 | | | | |
| E1 | Terminal Forked | 2 | 140-1941-02-01 | 71279 | |
| E2 | Same as E1 | | | | |
| P1 | Connector, Plug | 2 | 65001-010 | 22526 | |
| P2 | Same as P1 | | | | |
| Q1 | Transistor | 7 | 2N2222A | 80131 | |
| Q2 Thru Q7 | Same as Q1 | | | | |
| R1 | Resistor, Fixed, Film: 100Ω, 5%, 1/4 W | 7 | CF1/4-100 OHMS/J | 09021 | |
| R2 | Resistor, Fixed, Film: 47Ω, 5%, 1/4 W | 1 | CF1/4-47 OHMS/J | 09021 | |
| R3 | Resistor, Fixed, Film: 100 kΩ, 5%, 1/4 W | 6 | CF1/4-100K/J | 09021 | |
| R4 | Resistor, Fixed, Film: 2.2 kΩ, 5%, 1/4 W | 2 | CF1/4-2.2K/J | 09021 | |
| R5 | Resistor, Fixed, Film: 1.2 kΩ, 5%, 1/4 W | 2 | CF1/4-1.2K/J | 09021 | |
| R6 | Resistor, Fixed, Film: 15 kΩ, 5%, 1/4 W | 4 | CF1/4-15K/J | 09021 | |
| R7 | Resistor, Fixed, Film: 33 kΩ, 5%, 1/4 W | 4 | CF1/4-33K/J | 09021 | |
| R8 | Same as R3 | | | | |
| R9 | Resistor, Fixed, Film: 82 kΩ, 5%, 1/4 W | 1 | CF1/4-82K/J | 09021 | |
| R10 | Same as R3 | | | | |
| R11 | Resistor, Fixed, Film: 75 kΩ, 5%, 1/4 W | 2 | CF1/4-75K/J | 09021 | |
| R12 | Same as R1 | | | | |
| R13 | Resistor, Fixed, Film: 1.0M, 5%, 1/4 W | 1 | CF1/4-1M/J | 09021 | |
| R14 | Resistor, Fixed, Film: 4.7 kΩ, 5%, 1/4 W | 4 | CF1/4-4.7K/J | 09021 | |
| R15 | Same as R4 | | | | |
| R16 | Resistor, Fixed, Film: 22 kΩ, 5%, 1/4 W | 2 | CF1/4-22K/J | 09021 | |

Courtesy of http://BlackRadios.terryo.org



REF DESIG PREFIX **A4A10**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| R17 | Resistor, Fixed, Film: 1.5 kΩ, 5%, 1/4 W | 1 | CF1/4-1.5K/J | 09021 | |
| R18 | Resistor, Fixed, Film: 2.7 kΩ, 5%, 1/4 W | 2 | CF1/4-2.7K/J | 09021 | |
| R19 | Resistor, Fixed, Film: 27 kΩ, 5%, 1/4 W | 3 | CF1/4-27K/J | 09021 | |
| R20 | Resistor, Fixed, Film: 1.8 kΩ, 5%, 1/4 W | 1 | CF1/4-1.8K/J | 09021 | |
| R21 | Same as R6 | | | | |
| R22 | Resistor, Fixed, Film: 68 kΩ, 5%, 1/4 W | 1 | CF1/4-68K/J | 09021 | |
| R23 | Resistor, Fixed, Film: 470Ω, 5%, 1/4 W | 1 | CF1/4-470 OHMS/J | 09021 | |
| R24 | Same as R1 | | | | |
| R25 | Resistor, Fixed, Film: 100 kΩ, 1%, 1/10 W | 2 | RN55C1003F | 81349 | |
| R26 | Resistor, Fixed, Film: 47 kΩ, 5%, 1/4 W | 5 | CF1/4-47K/J | 09021 | |
| R27 | Same as R7 | | | | |
| R28 | Same as R3 | | | | |
| R29 | Not Used | | | | |
| R30 | Same as R16 | | | | |
| R31 | Resistor, Fixed, Film: 680 kΩ, 5%, 1/4 W | 1 | CF1/4-680K/J | 09021 | |
| R32 | Resistor, Fixed, Film: 2.74 kΩ, 1%, 1/10 W | 1 | RN55C2741F | 81349 | |
| R33 | Same as R7 | | | | |
| R34 | Resistor, Trim, Film: 20 kΩ, 10%, 1/2 W | 1 | 62PAR20K | 73138 | |
| R35 | Same as R18 | | | | |
| R36 | Same as R19 | | | | |
| R37 | Same as R19 | | | | |
| R38 | Resistor, Fixed, Film: 6.8M, 5%, 1/4 W | 1 | CF1/4-6.8M/J | 09021 | |
| R39 | Same as R6 | | | | |
| R40 | Same as R3 | | | | |
| R41 | Same as R11 | | | | |
| R42 | Resistor, Fixed, Film: 10M, 5%, 1/4 W | 2 | CF1/4-10M/J | 09021 | |
| R43 | Same as R6 | | | | |
| R44 | Same as R42 | | | | |
| R45 | Same as R5 | | | | |
| R46 | Same as R1 | | | | |
| R47 | Same as R3 | | | | |
| R48 | Same as R26 | | | | |
| R49 | Same as R1 | | | | |
| R50 | Same as R7 | | | | |
| R51 | Resistor, Fixed, Film: 39K, 5%, 1/4 W | 1 | CF1/4-39K/J | 09021 | |
| R52 | Resistor, Fixed, Film: 68Ω, 5%, 1/4 W | 1 | CF1/4-68 OHMS/J | 09021 | |
| R53 | Same as R1 | | | | |
| R54 | Same as R1 | | | | |
| R55 | Same as R25 | | | | |
| R56 | Same as R26 | | | | |
| R57 | Same as R14 | | | | |
| R58 | Same as R26 | | | | |

Courtesy of http://BlackRadios.terryo.org



REF DESIG PREFIX **A4A10**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| R58 | Same as R26 | | | | |
| R59 | Same as R14 | | | | |
| R60 | Same as R26 | | | | |
| R61 | Same as R14 | | | | |
| U1 | Integrated Circuit | 2 | TL064CN | 01295 | |
| U2 | Integrated Circuit | 1 | SA741CN | 18324 | |
| U3 | Same as U1 | | | | |
| U4 | Integrated Circuit | 1 | CD4053AE | 02735 | |
| U5 | Integrated Circuit | 1 | MM74HC02N | 27014 | |

Courtesy of http://BlackRadios.terryo.org



5.5.5 **TYPE 794414-1 SYNTHESIZER MOTHERBOARD** REF DESIG PREFIX **A5**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 | Capacitor, Electrolytic, Tantalum: 220 µF, 20%, 10 V | 1 | 196D227X0010TE4 | 56289 | |
| C2 | Capacitor, Electrolytic, Tantalum: 100 µF, 20%, 20 V | 2 | 196D107X0020TE4 | 56289 | |
| C3 | Same as C2 | | | | |
| C4 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 1 | 34475-1 | 14632 | |
| J1 | Connector, Receptacle | 1 | SS-120-G-2 | 55322 | |
| J2 | Connector, Receptacle | 2 | SS-116-G-2 | 55322 | |
| J3 | Same as J2 | | | | |
| J4 | Connector, Receptacle | 2 | 2010-1511-000 | 19505 | |
| J5 | Same as J4 | | | | |
| L1 | Coil, Fixed | 2 | 1537-48 (4455-2J) | 99800 | |
| L2 | Ferrite Choke | 1 | VK200-10-3B | 02114 | |
| L3 | Same as L1 | | | | |
| XA1 | Terminal Strip | 1 | 65500-112 | 22526 | |
| XA2 | Terminal Strip | 1 | 65500-126 | 22526 | |
| XA3A | Terminal Strip | 4 | 65500-120 | 22526 | |
| XA3B | Same as XA3A | | | | |
| XA4A | Same as XA3A | | | | |
| XA4B | Same as XA3A | | | | |

Courtesy of http://BlackRadios.terryo.org



5.5.5.1 **Type 794345-1 Reference Divider Assembly** REF DESIG PREFIX **A5A1**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 | Capacitor, Ceramic, Disc: 0.01 µF, 20%, 50 V | 2 | 34453-1 | 14632 | |
| C2 | Same as C1 | | | | |
| C3 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 8 | 34475-1 | 14632 | |
| C4 | Same as C3 | | | | |
| C5 | Same as C3 | | | | |
| C6 | Capacitor, Mica, Dipped: 30 µF, 2%, 500 V | 1 | CM05ED300G03 | 81349 | |
| C7 Thru C11 | Same as C3 | | | | |
| C12 | Capacitor, Mica, Dipped: 10 µF, 1/2%, 500 V | 2 | CM05CD100D03 | 81349 | |
| C13 | Capacitor, Electrolytic, Tantalum: 220 µF, 20%, 10 V | 1 | 196D227X0010TE4 | 56289 | |
| C14 | Same as C12 | | | | |
| CR1 | Diode | 1 | 5082-2800 | 28480 | |
| J1 | Connector, Receptacle | 1 | 2009-1511-000 | 19505 | |
| J2 | Jack, Tip | 1 | TJ206GN | 49956 | |
| P1 | Connector, Plug | 1 | G5001-010 | 22526 | |
| Q1 | Transistor | 1 | 2N3478 | 80131 | |
| Q2 | Transistor | 1 | 2N706 | 80131 | |
| R1 | Resistor, Fixed, Film: 51Ω, 5%, 1/4 W | 1 | CF1/4-51 OHMS/J | 09021 | |
| R2 | Resistor, Fixed, Film: 3.6 kΩ, 5%, 1/4 W | 1 | CF1/4-3.6K/J | 09021 | |
| R3 | Resistor, Fixed, Film: 1.0 kΩ, 5%, 1/4 W | 4 | CF1/4-1K/J | 09021 | |
| R4 | Resistor, Fixed, Film: 390Ω, 5%, 1/4 W | 2 | CF1/4-390 OHMS/J | 09021 | |
| R5 | Resistor, Fixed, Film: 10Ω, 5%, 1/4 W | 1 | CF1/4-10 OHMS/J | 09021 | |
| R6 | Same as R3 | | | | |
| R7 | Same as R3 | | | | |
| R8 | Resistor, Fixed, Film: 10 kΩ, 5%, 1/4 W | 4 | CF1/4-10K/J | 09021 | |
| R9 | Same as R8 | | | | |
| R10 | Same as R4 | | | | |
| R11 | Same as R3 | | | | |
| R12 | Same as R8 | | | | |
| R13 | Same as R8 | | | | |
| R14 | Resistor, Fixed, Film: 2.7Ω, 5%, 1/4 W | 1 | CF1/4-2.7 OHMS/J | 09021 | |
| U1 | Integrated Circuit | 1 | SN74S196N | 01295 | |
| U2 | Integrated Circuit | 1 | SN74LS196N | 01295 | |
| U3 | Integrated Circuit | 1 | MC14569BCP | 04713 | |
| U4 Thru U6 | Integrated Circuit | 3 | MC14518BCP | 04713 | |

Courtesy of http://BlackRadios.terryo.org



5.5.5.2 **Type 794425-1 1st LO Synthesizer Assembly**

REF DESIG PREFIX **A5A2**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| A1 | Phase Lock Loop Assembly | 1 | 794417-1 | 14632 | |
| A2 | VCO Assembly | 1 | 796132-1 | 14632 | |
| L1 | Coil, Fixed, Air | 1 | 22292-152 | 14632 | |

Courtesy of http://BlackRadios.terryo.org



5.5.5.3 **Type 794415-1 2nd LO Synthesizer Assembly** REF DESIG PREFIX **A5A3**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 | Capacitor, Ceramic, Disc: 0.1 µF, 10%, 50 V | 14 | 8121-050-X7RO-104K | 59660 | |
| C2 | Capacitor, Ceramic, Disc: 0.47 µF, 10%, 50 V | 12 | 8131-050-X7RO-474K | 59660 | |
| C3 | Same as C2 | | | | |
| C4 | Same as C2 | | | | |
| C5 | Same as C1 | | | | |
| C6 | Capacitor, Ceramic, Disc: 2200 pF, 10%, 50 V | 14 | 8121-050-X7RO-222K | 59660 | |
| C7 Thru C12 | Same as C6 | | | | |
| C13 | Capacitor, Ceramic, Disc: 120 pF, 5%, 50 V | 2 | 8121-050-COGO-121J | 59660 | |
| C14 | Capacitor, Ceramic, Disc: 27 pF, 5%, 50 V | 1 | 8111-050-COGO-270J | 59660 | |
| C15 | Same as C6 | | | | |
| C16 | Same as C2 | | | | |
| C17 | Same as C6 | | | | |
| C18 | Capacitor, Ceramic, Disc: 6.8 pF, 50 V | 2 | 8101-050-COHO-689C | 59660 | |
| C19 | Capacitor, Variable, Air: 1.0-10 pF, 250 V | 3 | 8052 | 91293 | |
| C20 | Capacitor, Ceramic, Disc: 2.2 pF, 50 V | 4 | 8101-050-COJO-229B | 59660 | |
| C21 | Capacitor, Ceramic, Disc: 39 pF, 5%, 50 V | 2 | 8111-050-COGO-390J | 59660 | |
| C22 | Capacitor, Ceramic, Disc: 200 pF, 5%, 50 V | 3 | 8121-050-COGO-201J | 59660 | |
| C23 | Capacitor, Ceramic, Disc: 1100 pF, 5%, 50 V | 2 | 8121-050-COGO-112J | 59660 | |
| C24 | Same as C23 | | | | |
| C25 | Same as C1 | | | | |
| C26 | Not Used | | | | |
| C27 | Same as C1 | | | | |
| C28 | Capacitor, Electrolytic, Tantalum: 100 µF, 10%, 10 VDC | 2 | 196D107X0010PE4 | 56289 | |
| C29 | Capacitor, Electrolytic, Tantalum: 220 µF, 20%, 10 V | 1 | 196D227X0010TE4 | 56289 | |
| C30 | Same as C2 | | | | |
| C31 | Capacitor, Ceramic, Disc: 0.01 µF, 10%, 50 V | 1 | 8121-050-X7RO-103K | 59660 | |
| C32 | Same as C2 | | | | |
| C33 | Same as C18 | | | | |
| C34 | Same as C6 | | | | |
| C35 | Same as C2 | | | | |
| C36 | Same as C6 | | | | |
| C37 | Same as C20 | | | | |
| C38 | Same as C6 | | | | |
| C39 | Capacitor, Ceramic, Disc: 43 pF, 5%, 50 V | 1 | 8111-050-COGO-430J | 59660 | |
| C40 | Same as C22 | | | | |
| C41 | Capacitor, Ceramic, Disc: 24 pF, 5%, 50 V | 1 | 8111-050-COGO-240J | 59660 | |
| C42 | Same as C6 | | | | |
| C43 | Same as C13 | | | | |
| C44 | Same as C19 | | | | |

Courtesy of http://BlackRadios.terryo.org



REF DESIG PREFIX **A5A3**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C45 | Same as C20 | | | | |
| C46 | Same as C6 | | | | |
| C47 | Same as C21 | | | | |
| C48 | Same as C22 | | | | |
| C49 | Same as C1 | | | | |
| C50 | Capacitor, Ceramic, Disc: 0.1 µF, 10%, 100 V | 2 | CK06BX104K | 81349 | |
| C51 | Same as C2 | | | | |
| C52 | Same as C2 | | | | |
| C53 | Same as C50 | | | | |
| C54 | Same as C2 | | | | |
| C55 | Capacitor, Ceramic, Disc: 330 pF, 10%, 100V | 10 | 8101-100-X7RO-331K | 59660 | |
| C56 | Same as C2 | | | | |
| C57 | Same as C55 | | | | |
| C58 | Same as C20 | | | | |
| C59 | Capacitor, Composition, Tubular: .51 pF, 10%, 500 V | 1 | QCO.51PFK | 95121 | |
| C60 | Same as C55 | | | | |
| C61 | Same as C19 | | | | |
| C62 | Capacitor, Ceramic, Disc: 15 pF, 5%, 50 V | 1 | 8101-050-COGO-150J | 59660 | |
| C63 | Same as C2 | | | | |
| C64 | Same as C55 | | | | |
| C65 | Same as C1 | | | | |
| C66 | Same as C55 | | | | |
| C67 | Same as C55 | | | | |
| C68 | Same as C55 | | | | |
| C69 | Same as C55 | | | | |
| C70 Thru C72 | Same as C1 | | | | |
| C73 | Same as C55 | | | | |
| C74 | Same as C55 | | | | |
| C75 Thru C79 | Same as C1 | | | | |
| C80 | Same as C28 | | | | |
| C81 | Capacitor, Electrolytic, Tantalum: 4.7 µF, 20%, 35 V | 3 | 196D475X0035SJE3 | 56289 | |
| C82 | Capacitor, Electrolytic, Tantalum: 22 µF, 20%, 10 V | 1 | 196D226X0010JE3 | 56289 | |
| C83 | Same as C81 | | | | |
| C84 | Capacitor, Electrolytic, Tantalum: 1 µF, 20%, 35 V | 1 | 196D105X0035HE3 | 56289 | |
| C85 | Same as C81 | | | | |
| C86 | Capacitor, Ceramic, Disc: 0.01 µF, 20%, 50 V | 2 | 34453-1 | 14632 | |
| C87 | Same as C86 | | | | |
| CR1 | Diode | 2 | KV3901 | 52673 | |
| CR2 | Not Used | | | | |

Courtesy of http://BlackRadios.terryo.org



REF DESIG PREFIX **A5A3**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| CR3 | Same as CR1 | | | | |
| CR4 | Diode | 1 | U11-3102 | 52673 | |
| CR5 | Diode | 8 | 5082-2800 | 28480 | |
| CR6 Thru CR12 | Same as CR5 | | | | |
| JW1 | Wire, Electric, Bus | A/R | 8021 22AWG | 70903 | |
| L1 | Coil, Fixed, Mold | 5 | 1025-48 | 99800 | |
| L2 | Coil, Fixed | 2 | 1537-08 | 99800 | |
| L3 | Coil, Fixed | 1 | 553-3635-25 | 71279 | |
| L4 | Same as L1 | | | | |
| L5 | Coil, Fixed | 3 | 1025-16 | 99800 | |
| L6 | Coil, Fixed, Mold | 1 | 1025-38 | 99800 | |
| L7 | Not Used | | | | |
| L8 | Same as L2 | | | | |
| L9 | Same as L1 | | | | |
| L10 | Same as L5 | | | | |
| L11 | Same as L1 | | | | |
| L12 | Same as L1 | | | | |
| L13 | Same as L5 | | | | |
| L14 | Not Used | | | | |
| L15 | Coil | 1 | 21210-37 | 14632 | |
| L16 | Coil, Fixed, Mold | 1 | 1025-20 | 99800 | |
| P1 | Connector, Plug | 2 | 65001-026 | 22526 | |
| P2 | Same as P1 | | | | |
| P3 | Connector, Jack | 1 | 2002-7571-005 | 19505 | |
| Q1 | Transistor | 3 | U310 | 17856 | |
| Q2 | Transistor | 4 | 2N2857 | 80131 | |
| Q3 | Same as Q2 | | | | |
| Q4 | Not Used | | | | |
| Q5 | Same as Q2 | | | | |
| Q6 | Same as Q1 | | | | |
| Q7 | Same as Q2 | | | | |
| Q8 | Same as Q1 | | | | |
| R1 | Resistor, Fixed, Film: 3.3 kΩ, 5%, 1/8 W | 6 | CF1/8-3.3K/J | 09021 | |
| R2 | Resistor, Fixed, Film: 27 kΩ, 5%, 1/8 W | 1 | CF1/8-27K/J | 09021 | |
| R3 | Resistor, Fixed, Film: 3 kΩ, 5%, 1/8 W | 1 | CF1/8-3K/J | 09021 | |
| R4 | Resistor, Fixed, Film: 15 kΩ, 5%, 1/8 W | 2 | CF1/8-15K/J | 09021 | |
| R5 | Resistor, Fixed, Film: 2.2 kΩ, 5%, 1/8 W | 9 | CF1/8-2.2K/J | 09021 | |
| R6 | Resistor, Fixed, Film: 100Ω, 5%, 1/8 W | 4 | CF1/8-100 OHMS/J | 09021 | |
| R7 | Resistor, Fixed, Film: 8.2 kΩ, 5%, 1/8 W | 1 | CF1/8-8.2K/J | 09021 | |

Courtesy of http://BlackRadios.terryo.org



REF DESIG PREFIX **A5A3**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| R8 | Resistor, Fixed, Film: 39 kΩ, 5%, 1/8 W | 3 | CF1/8-39K/J | 09021 | |
| R9 | Resistor, Fixed, Film: 1.0 kΩ, 5%, 1/8 W | 3 | CF1/8-1.0K/J | 09021 | |
| R10 | Resistor, Fixed, Film: 300Ω, 5%, 1/8 W | 2 | CF1/8-300 OHMS/J | 09021 | |
| R11 | Resistor, Fixed, Film: 22 kΩ, 5%, 1/8 W | 5 | CF1/8-22K/J | 09021 | |
| R12 | Resistor, Fixed, Film: 13 kΩ, 5%, 1/8 W | 1 | CF1/8-13K/J | 09021 | |
| R13 | Resistor, Fixed, Film: 4.3 kΩ, 5%, 1/8 W | 3 | CF1/8-4.3K/J | 09021 | |
| R14 | Resistor, Fixed, Film: 22Ω, 5%, 1/8 W | 3 | CF1/8-22 OHMS/J | 09021 | |
| R15 | Resistor, Fixed, Film: 910Ω, 5%, 1/8 W | 1 | CF1/8-910 OHMS/J | 09021 | |
| R16 | Resistor, Fixed, Film: 240Ω, 5%, 1/8 W | 1 | CF1/8-240 OHMS/J | 09021 | |
| R17 | Resistor, Fixed, Film: 30Ω, 5%, 1/8 W | 2 | CF1/8-30 OHMS/J | 09021 | |
| R18 | Resistor, Fixed, Film: 27Ω, 5%, 1/8 W | 1 | CF1/8-27 OHMS/J | 09021 | |
| R19 | Same as R17 | | | | |
| R20 | Resistor, Fixed, Composition: 51Ω, 5%, 1/8 W | 1 | RCR05G510JC | 81349 | |
| R21 | Resistor, Fixed, Film: 68 kΩ, 5%, 1/8 W | 2 | CF1/8-68K/J | 09021 | |
| R22 | Resistor, Fixed, Film: 10 kΩ, 5%, 1/8 W | 1 | CF1/8-10K/J | 09021 | |
| R23 | Resistor, Fixed, Film: 4.7Ω, 5%, 1/8 W | 1 | CF1/8-4.7 OHMS/J | 09021 | |
| R24 | Resistor, Fixed, Film: 1.2 kΩ, 5%, 1/8 W | 2 | CF1/8-1.2K/J | 09021 | |
| R25 | Resistor, Fixed, Film: 10Ω, 5%, 1/8 W | 1 | CF1/8-10 OHMS/J | 09021 | |
| R26 | Resistor, Fixed, Film: 330Ω, 5%, 1/8 W | 1 | CF1/8-330 OHMS/J | 09021 | |
| R27 | Same as R24 | | | | |
| R28 | Resistor, Fixed, Film: 820Ω, 5%, 1/8 W | 2 | CF1/8-820 OHMS/J | 09021 | |
| R29 | Same as R6 | | | | |
| R30 | Same as R1 | | | | |
| R31 | Same as R1 | | | | |
| R32 | Same as R11 | | | | |
| R33 | Same as R13 | | | | |
| R34 | Resistor, Fixed, Film: 15 kΩ, 5%, 1/8 W | 3 | CF1/8-16K/J | 09021 | |
| R35 | Same as R5 | | | | |
| R36 | Same as R11 | | | | |
| R37 | Same as R34 | | | | |
| R38 | Resistor, Fixed, Film: 2.7 kΩ, 5%, 1/8 W | 1 | CF1/8-2.7K/J | 09021 | |
| R39 | Same as R14 | | | | |
| R40 | Resistor, Fixed, Composition: 470Ω, 5%, 1/8 W | 1 | RCR05G471JS | 81349 | |
| R41 | Same as R10 | | | | |
| R42 | Same as R34 | | | | |
| R43 | Same as R1 | | | | |
| R44 | Same as R14 | | | | |
| R45 | Same as R28 | | | | |
| R46 | Same as R5 | | | | |
| R47 | Same as R5 | | | | |
| R48 | Same as R6 | | | | |
| R49 | Same as R11 | | | | |

Courtesy of http://BlackRadios.terryo.org



REF DESIG PREFIX **A5A3**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| R50 | Same as R13 | | | | |
| R51 | Same as R8 | | | | |
| R52 | Same as R5 | | | | |
| R53 | Same as R6 | | | | |
| R54 | Resistor, Fixed, Film: 47 kΩ, 5%, 1/8 W | 2 | CF1/8-47K/J | 09021 | |
| R55 | Resistor, Fixed, Film: 220Ω, 5%, 1/8 W | 1 | CF1/8-220 OHMS/J | 09021 | |
| R56 | Same as R11 | | | | |
| R57 | Resistor, Fixed, Film: 47Ω, 5%, 1/8 W | 2 | CF1/8-47 OHMS/J | 09021 | |
| R58 | Same as R57 | | | | |
| R59 | Same as R9 | | | | |
| R60 | Same as R8 | | | | |
| R61 | Same as R5 | | | | |
| R62 | Same as R1 | | | | |
| R63 | Same as R9 | | | | |
| R64 | Same as R21 | | | | |
| R65 | Resistor, Fixed, Film: 1.5 kΩ, 5%, 1/8 W | 2 | CF1/8-1.5K/J | 09021 | |
| R66 | Same as R5 | | | | |
| R67 | Resistor, Fixed, Film: 3.6 kΩ, 5%, 1/8 W | 2 | CF1/8-3.6K/J | 09021 | |
| R68 | Same as R65 | | | | |
| R69 | Same as R67 | | | | |
| R70 | Resistor, Fixed, Film: 500Ω, 5%, 1/8 W | 1 | CF1/8-560 OHMS/J | 09021 | |
| R71 | Same as R1 | | | | |
| R72 | Same as R5 | | | | |
| R73 | Same as R5 | | | | |
| R74 | Resistor, Fixed, Film: 10Ω, 5%, 1/8 W | 1 | CF1/8-10 OHMS/J | 09021 | |
| R75 | Resistor, Fixed, Film: 100 kΩ, 5%, 1/8 W | 5 | CF1/8-100K/J | 09021 | |
| R76 Thru R79 | Same as R75 | | | | |
| R80 | Same as R54 | | | | |
| R81 | Same as R4 | | | | |
| U1 | Integrated Circuit | 1 | 11C44DC | 07263 | |
| U2 | Integrated Circuit | 2 | MC1458N | 18324 | |
| U3 | Integrated Circuit | 1 | SP8659B | 52648 | |
| U4 | Integrated Circuit | 2 | MM74C932N | 27014 | |
| U5 | Integrated Circuit | 1 | SA741CN | 18324 | |
| U6 | Integrated Circuit | 1 | SP8657B | 52648 | |
| U7 | Integrated Circuit | 1 | SN74L | 01295 | |
| U8 | Integrated Circuit | 1 | CD4013BE | 02735 | |
| U9 | Integrated Circuit | 1 | SP8690B | 52648 | |
| U10 | Integrated Circuit | 2 | SN74ALS168N | 01295 | |
| U11 | Same as U10 | | | | |

Courtesy of http://BlackRadios.terryo.org



REF DESIG PREFIX **A5A3**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| U12 Thru U14 | Integrated Circuit | 3 | SN74LS169N | 01295 | |
| U15 | Mixer, Balanced | 1 | M6D | 27956 | |
| U16 | Same as U4 | | | | |
| U17 | Not Used | | | | |
| U18 | Same as U2 | | | | |

Courtesy of http://BlackRadios.terryo.org



5.5.5.4 **Type 794416-1 3rd LO Synthesizer Assembly** REF DESIG PREFIX **A5A4**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 14 | 34475-1 | 14632 | |
| C2 | Capacitor, Electrolytic, Tantalum: 18 µF, 10%, 20 V | 4 | 196D186X9020KE3 | 56289 | |
| C3 | Capacitor, Ceramic, Disc: .01 µF, 20%, 50 V | 11 | 34453-1 | 14632 | |
| C4 | Same as C2 | | | | |
| C5 | Same as C1 | | | | |
| C6 | Same as C2 | | | | |
| C7 | Same as C1 | | | | |
| C8 | Capacitor, Variable, Ceramic: 2.5-11 pF, 350 V | 1 | 538-011B2.5-11 | 59660 | |
| C9 | Capacitor, Mica, Dipped: 82 pF, 2%, 500 V | 1 | CM05ED820G03 | 81349 | |
| C10 | Capacitor, Mica, Dipped: 680 pF, 2%, 300 V | 2 | DM15-681G | 72136 | |
| C11 | Same as C10 | | | | |
| C12 | Capacitor, Ceramic, Disc: 0.47 µF, 20%, 50 V | 2 | 34452-1 | 14632 | |
| C13 | Capacitor, Mica, Dipped: 150 pF, 2%, 500 V | 1 | CM05FD151G03 | 81349 | |
| C14 | Same as C3 | | | | |
| C15 | Same as C1 | | | | |
| C16 | Not Used | | | | |
| C17 | Same as C1 | | | | |
| C18 | Same as C2 | | | | |
| C19 | Capacitor, Polyester, Foil: 6800 pF, 2%, 100 V | 1 | PE51.0068-100-2 | 27735 | |
| C20 | Capacitor, Polyester, Foil: 0.015 µF, 2%, 100 V | 1 | PE51.015-100-2 | 27735 | |
| C21 Thru C26 | Same as C1 | | | | |
| C27 | Capacitor, Electrolytic, Tantalum: 150 µF, 10%, 15 V | 1 | CS13BD157K | 81349 | |
| C28 | Capacitor, Electrolytic, Tantalum: 10 µF, 10%, 20 V | 1 | CS13BE106K | 81349 | |
| C29 | Same as C3 | | | | |
| C30 | Capacitor, Variable, Air: 1.0-10 pF, 250 V | 1 | 8052 | 91293 | |
| C31 | Capacitor, Mica, Dipped: 18 pF, 5%, 500 V | 1 | CM04CD180J03 | 81349 | |
| C32 | Capacitor, Mica, Dipped: 220 pF, 2%, 500 V | 1 | CM04FD221G03 | 81349 | |
| C33 | Capacitor, Mica, Dipped: 470 pF, 2%, 500 V | 1 | DM15-471G | 72136 | |
| C34 | Same as C3 | | | | |
| C35 | Same as C12 | | | | |
| C36 | Capacitor, Ceramic, Disc: 1000 pF, 500 V | 1 | B-GP1000PFP | 91418 | |
| C37 | Same as C3 | | | | |
| C38 | Capacitor, Mica, Dipped: 43 pF, 2%, 500 V | 1 | CM05ED430G03 | 81349 | |
| C39 | Capacitor, Mica, Dipped: 240 pF, 2%, 500 V | 1 | CM05FD241G03 | 81349 | |
| C40 | Same as C3 | | | | |
| C41 | Same as C3 | | | | |
| C42 Thru C44 | Same as C1 | | | | |
| C45 Thru C48 | Same as C3 | | | | |

Courtesy of http://BlackRadios.terryo.org



REF DESIG PREFIX **A5A4**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C49 | Capacitor, Ceramic, Disc: 68 pF, 5%, 100 V | 1 | 8121-100-COGO-680J | 59660 | |
| CR1 | Diode, Varicap | 2 | KV3901 | 52693 | |
| CR2 | Same as CR1 | | | | |
| CR3 Thru CR5 | Diode | 4 | IN4446 | 80131 | |
| CR6 | Diode | 1 | U11-3102 | 52673 | |
| CR7 | Same as CR3 | | | | |
| FB1 | Ferrite, Bead | 2 | 56-590-65-4A | 02114 | |
| FB2 | Same as FB1 | | | | |
| L1 | Coil, Fixed | 1 | 1537-40 | 99800 | |
| L2 | Coil, Fixed | 1 | 1537-44 | 99800 | |
| L3 | Coil, Fixed, Mold | 1 | 1025-54 | 99800 | |
| L4 | Coil, Fixed | 2 | 1025-70 | 99800 | |
| L5 | Same as L4 | | | | |
| L6 | Coil, Fixed, Mold | 1 | 1025-36 | 99800 | |
| P1 | Connector, Plug | 2 | 65001-026 | 22526 | |
| P2 | Same as P1 | | | | |
| Q1 | Transistor | 1 | U310 | 17856 | |
| Q2 | Transistor | 1 | 2N2222A | 80131 | |
| Q3 | Not Used | | | | |
| Q4 | Transistor | 2 | 2N706 | 80131 | |
| Q5 | Same as Q4 | | | | |
| R1 | Resistor, Fixed, Film: 33 kΩ, 5%, 1/4 W | 4 | CF1/4-33K/J | 09021 | |
| R2 | Same as R1 | | | | |
| R3 | Resistor, Fixed, Film: 300 kΩ, 5%, 1/4 W | 1 | CF1/4-300K/J | 09021 | |
| R4 | Resistor, Fixed, Film: 62 kΩ, 5%, 1/4 W | 1 | CF1/4-62K/J | 09021 | |
| R5 | Resistor, Fixed, Film: 330 kΩ, 5%, 1/4 W | 1 | CF1/4-330K/J | 09021 | |
| R6 | Resistor, Fixed, Film: 22 kΩ, 5%, 1/4 W | 2 | CF1/4-22K/J | 09021 | |
| R7 | Same as R1 | | | | |
| R8 | Resistor, Fixed, Film: 100 kΩ, 5%, 1/4 W | 1 | CF1/4-100K/J | 09021 | |
| R9 | Resistor, Fixed, Film: 47Ω, 5%, 1/4 W | 1 | CF1/4-47 OHMS | 09021 | |
| R10 | Resistor, Fixed, Film: 330Ω, 5%, 1/4 W | 1 | CF1/4-330 OHMS/J | 09021 | |
| R11 | Resistor, Fixed, Film: 6.8 kΩ, 5%, 1/4 W | 1 | CF1/4-6.8K/J | 09021 | |
| R12 | Resistor, Fixed, Film: 1.0 kΩ, 5%, 1/4 W | 3 | CF1/4-1K/J | 09021 | |
| R13 | Same as R12 | | | | |
| R14 | Not Used | | | | |
| R15 | Not Used | | | | |
| R16 | Resistor, Fixed, Film: 10 kΩ, 5%, 1/4 W | 3 | CF1/4-10K/J | 09021 | |
| R17 | Same as R16 | | | | |
| R18 | Resistor, Fixed, Film: 3.3 kΩ, 5%, 1/4 W | 1 | CF1/4-3.3K/J | 09021 | |
| R19 | Resistor, Fixed, Film: 270Ω, 5%, 1/4 W | 1 | CF1/4-270 OHMS/J | 09021 | |

Courtesy of http://BlackRadios.terryo.org



REF DESIG PREFIX **A5A4**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| R20 | Not Used | | | | |
| R21 | Same as R1 | | | | |
| R22 | Resistor, Fixed, Film: 8.2 kΩ, 5%, 1/4 W | 2 | CF1/4-8.2K/J | 09021 | |
| R23 | Resistor, Fixed, Film: 12 kΩ, 5%, 1/4 W | 1 | CF1/4-12K/J | 09021 | |
| R24 | Same as R6 | | | | |
| R25 | Same as R22 | | | | |
| R26 | Same as R16 | | | | |
| R27 | Resistor, Fixed, Film: 22Ω, 5%, 1/4 W | 1 | CF1/4-220 OHMS/J | 09021 | |
| R28 | Resistor, Fixed, Film: 470Ω, 5%, 1/4 W | 4 | CF1/4-470 OHMS/J | 09021 | |
| R29 | Resistor, Fixed, Composition: 5.1 kΩ, 5%, 1/4 W | 1 | RCR07G512JS | 81349 | |
| R30 | Resistor, Fixed, Film: 2.7 kΩ, 5%, 1/4 W | 2 | CF1/4-2.7K/J | 09021 | |
| R31 | Same as R30 | | | | |
| R32 | Resistor, Fixed, Film: 220Ω, 5%, 1/4 W | 1 | CF1/4-220 OHMS/J | 09021 | |
| R33 | Same as R28 | | | | |
| R34 | Same as R12 | | | | |
| R35 | Same as R28 | | | | |
| R36 | Same as R28 | | | | |
| R37 | Resistor, Fixed, Film: 47 kΩ, 5%, 1/8 W | 1 | CF1/8-47K/J | 09021 | |
| U1 | Integrated Circuit | 2 | MM74C932N | 27014 | |
| U2 | Integrated Circuit | 1 | SA741CN | 18324 | |
| U3 | Integrated Circuit | 1 | CD4013BE | 02735 | |
| U4 | Integrated Circuit | 1 | CD4082BE | 02735 | |
| U5 | Integrated Circuit | 2 | CD4002BE | 02735 | |
| U6 | Integrated Circuit | 1 | CD4030BE | 02735 | |
| U7 Thru U10 | Integrated Circuit | 4 | MC14510BCP | 04713 | |
| U11 | Same as U5 | | | | |
| U12 | Integrated Circuit | 1 | SN74LS169N | 01295 | |
| U13 | Integrated Circuit | 1 | SN74LS290N | 01295 | |
| U14 | Integrated Circuit | 1 | MM74HC74N | 27014 | |
| U15 | Same as U1 | | | | |
| U16 | Integrated Circuit | 1 | MM74HCOON | 27014 | |
| Y1 | Crystal Quartz Holder | 1 | CR64U11.155MHZ | 80058 | |

Courtesy of http://BlackRadios.terryo.org



5.5.6 **TYPE 794434-1 DIGITAL INTERFACE ASSEMBLY** REF DESIG PREFIX **A6**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 Thru C3 | Capacitor, Electrolytic, Tantalum: 4.7 µF, 20%, 35 V | 3 | 196D475X0035JE4 | 56289 | |
| C4 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 11 | 34475-1 | 14632 | |
| C5 | Not Used | | | | |
| C6 | Capacitor, Ceramic, Disc: 0.01 µF, 20%, 50 V | 2 | 34453-1 | 14632 | |
| C7 | Same as C4 | | | | |
| C8 | Same as C6 | | | | |
| C9 | Capacitor, Ceramic, Disc: 68 pF, 10%, 200 V | 1 | CK05BX680K | 81349 | |
| C10 | Same as C4 | | | | |
| C11 | Capacitor, Ceramic, Disc: 330 pF, 10%, 50 V | 1 | 8101-050-X7RO-331K | 59660 | |
| C12 | Same as C4 | | | | |
| C13 | Capacitor, Ceramic, Disc: 2.2 µF, 10%, 50 V | 1 | 8141-050-651-225M | 59660 | |
| C14 | Same as C4 | | | | |
| C15 | Capacitor, Ceramic, Disc: 0.47 µF, 20%, 50 V | 1 | 34452-1 | 14632 | |
| C16 Thru C21 | Same as C4 | | | | |
| CR1 Thru CR3 | Diode | 3 | 5082-2800 | | |
| E1 Thru E9 | Terminal Strip | 3 | 65500-103 | 22526 | |
| JW1 Thru JW3 | Connector, Plug | 3 | 65474-001 | 22526 | |
| J1 | Connector, Receptacle | 1 | 65624-214 | 22526 | |
| J2 | Socket, Strip | 1 | 742-20 | 15912 | |
| J3 | Connector, Receptacle | 1 | 742-14T | 15912 | |
| J4 | Connector, Receptacle | 1 | 65624-220 | 22526 | |
| P1 | Terminal, Strip | 1 | TS-120-G-AA | 55322 | |
| P2 | Terminal, Strip | 2 | TS-116-G-AA | 55322 | |
| P3 | Same as P2 | | | | |
| Q1 | Transistor | 1 | 2N2907/JAN | 81350 | |
| R1 | Resistor, Fixed, Film: 2.7Ω, 5%, 1/4 W | 2 | CF1/4-2.7 OHMS/J | 09021 | |
| R2 | Same as R1 | | | | |
| R3 | Resistor, Fixed, Film: 560Ω, 5%, 1/8 W | 2 | CF1/8-560 OHMS/J | 09021 | |
| R4 | Resistor, Fixed, Film: 3.0 kΩ, 5%, 1/8 W | 2 | CF1/8-3.0K/J | 09021 | |
| R5 | Same as R4 | | | | |
| R6 | Resistor, Fixed, Film: 6.8 kΩ, 5%, 1/8 W | 1 | CF1/8-6.8K/J | 09021 | |
| R7 | Resistor, Fixed, Film: 220 kΩ, 5%, 1/8 W | 2 | CF1/8-220K/J | 09021 | |
| R8 | Resistor, Fixed, Film: 100 kΩ, 5%, 1/8 W | 3 | CF1/8-100K/J | 09021 | |
| R9 | Resistor, Fixed, Film: 120 kΩ, 5%, 1/8 W | 1 | CF1/8-120K/J | 09021 | |
| R10 | Resistor, Fixed, Film: 33 kΩ, 5%, 1/8 W | 1 | CF1/8-33K/J | 09021 | |

Courtesy of http://BlackRadios.terryo.org



REF DESIG PREFIX **A6**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| R11 | Same as R3 | | | | |
| R12 | Resistor, Fixed, Film: 47Ω, 5%, 1/8 W | 2 | CF1/8-47 OHMS/J | 09021 | |
| R13 | Resistor, Fixed, Film: 470 kΩ, 5%, 1/8 W | 1 | CF1/8-470K/J | 09021 | |
| R14 | Resistor, Fixed, Film: 4.7 kΩ, 5%, 1/8 W | 8 | CF1/8-4.7K/J | 09021 | |
| R15 | Same as R14 | | | | |
| R16 | Same as R12 | | | | |
| R17 | Same as R14 | | | | |
| R18 | Same as R14 | | | | |
| R19 | Same as R8 | | | | |
| R20 | Resistor, Fixed, Film: 75 kΩ, 5%, 1/8 W | 1 | CF1/8-75K/J | 09021 | |
| R21 | Resistor, Fixed, Film: 10 kΩ, 5%, 1/8 W | 2 | CF1/8-10K/J | 09021 | |
| R22 | Same as R8 | | | | |
| R23 | Same as R21 | | | | |
| R24 | Resistor, Fixed, Film: 100 kΩ, 1%, 1/10 W | 1 | RN55C1003F | 81349 | |
| R25 | Resistor, Trim, Film: 200 kΩ, 10%, 1/2 W | 1 | 62PR200K | 73138 | |
| R26 | Same as R14 | | | | |
| R27 | Resistor, Fixed, Film: 10 kΩ, 1%, 1/10 W | 1 | RN55C1002F | 81349 | |
| R28 | Resistor, Trim, Film: 50 kΩ, 10%, 1/2 W | 1 | 62PR50K | 73138 | |
| R29 | Same as R14 | | | | |
| R30 | Resistor, Fixed, Film: 750 kΩ, 5%, 1/8 W | 1 | CF1/8-750K/J | 09021 | |
| R31 | Resistor, Fixed, Film: 22 kΩ, 5%, 1/8 W | 1 | CF1/8-22K/J | 09021 | |
| R32 | Same as R7 | | | | |
| R33 | Same as R14 | | | | |
| R34 | Same as R14 | | | | |
| U1 | Integrated Circuit | 2 | TLC64CN | 01295 | |
| U2 | Integrated Circuit | 1 | MM74C14N | 27014 | |
| U3 | Integrated Circuit | 1 | MM74HC08N | 27014 | |
| U4 | Integrated Circuit | 2 | CD4028AE | 02735 | |
| U5 | Integrated Circuit | 1 | MC14528BCP | 04713 | |
| U6 | Integrated Circuit | 1 | DG212CJ | 17856 | |
| U7 | Integrated Circuit | 2 | MM74C165N | 27014 | |
| U8 | Integrated Circuit | 9 | CD4094RE | 02735 | |
| U9 | Same as U4 | | | | |
| U10 | Integrated Circuit | 1 | ADC0809CCN | 27014 | |
| U11 | Integrated Circuit | 1 | MM74C244N | 27014 | |
| U12 | Integrated Circuit | 2 | AD7523JN | 24355 | |
| U13 | Same as U8 | | | | |
| U14 | Integrated Circuit | 1 | CD4025AE | 02735 | |
| U15 | Same as U1 | | | | |
| U16 | Same as U12 | | | | |
| U17 | Same as U8 | | | | |
| U18 | Same as U7 | | | | |

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REF DESIG PREFIX **A6**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| U19 | Integrated Circuit | 1 | 841072 | 14632 | |
| U20 Thru U25 | Same as U8 | | | | |

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5.5.7 **TYPE 371037-1 KEYBOARD ASSEMBLY** REF DESIGN PREFIX **A8**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| J1 | Connector, Receptacle | 1 | 65610-114 | 22526 | |
| S1 | Switch, Pushbutton ("DET MODE") | 1 | 370985-36 | 14632 | |
| S2 | Switch, Pushbutton ("IF BW") | 1 | 370985-33 | 14632 | |
| S3 | Switch, Pushbutton ("GAIN MODE") | 1 | 370985-37 | 14632 | |
| S4 | Switch, Pushbutton ("STO") | 1 | 370985-39 | 14632 | |
| S5 | Switch, Pushbutton ("RCL") | 1 | 370985-40 | 14632 | |
| S6 | Switch, Pushbutton ("EXEC") | 1 | 370985-41 | 14632 | |
| S7 | Switch, Pushbutton ("COS LVL") | 1 | 370985-38 | 14632 | |
| S8 | Switch, Pushbutton ("DWL") | 1 | 370985-44 | 14632 | |
| S9 | Switch, Pushbutton ("SCAN SET") | 1 | 370985-34 | 14632 | |
| S10 | Switch, Pushbutton ("INCL") | 1 | 370985-42 | 14632 | |
| S11 | Switch, Pushbutton ("LOCKOUT") | 1 | 370985-43 | 14632 | |
| S12 | Switch, Pushbutton ("SCAN") | 1 | 370985-35 | 14632 | |
| S13 | Switch, Pushbutton ("7") | 1 | 370985-23 | 14632 | |
| S14 | Switch, Pushbutton ("8") | 1 | 370985-24 | 14632 | |
| S15 | Switch, Pushbutton ("9") | 1 | 370985-25 | 14632 | |
| S16 | Switch, Pushbutton (BFO +/-") | 1 | 370985-32 | 14632 | |
| S17 | Switch, Pushbutton ("4") | 1 | 370985-20 | 14632 | |
| S18 | Switch, Pushbutton ("5") | 1 | 370985-21 | 14632 | |
| S19 | Switch, Pushbutton ("6") | 1 | 370985-22 | 14632 | |
| S20 | Switch, Pushbutton ("KHZ") | 1 | 370985-31 | 14632 | |
| S21 | Switch, Pushbutton ("1") | 1 | 370985-17 | 14632 | |
| S22 | Switch, Pushbutton ("2") | 1 | 370985-18 | 14632 | |
| S23 | Switch, Pushbutton ("3") | 1 | 370985-19 | 14632 | |
| S24 | Switch, Pushbutton ("MHZ") | 1 | 370985-30 | 14632 | |
| S25 | Switch, Pushbutton ("0") | 1 | 370985-26 | 14632 | |
| S26 | Switch, Pushbutton (" ") | 1 | 370985-27 | 14632 | |
| S27 | Switch, Pushbutton ("CLR") | 1 | 370985-28 | 14632 | |
| S28 | Switch, Pushbutton ("REM/LCL") | 1 | 370985-29 | 14632 | |

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5.5.8 **TYPE 794431-1 CONTROLLER MOTHERBOARD** REF DESIG PREFIX **A9**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| A1 | Voltage Regulator Module | 1 | 794432-1 | 14632 | |
| A2 | Customer Selected Option (Serial I/O) | -- | 794437-1 | 14632 | |
| A3 | CPU | 1 | 794290-1 | 14632 | |
| A4 | Extended Memory | 1 | 794288-1 | 14632 | |
| A5 | Receiver/EF Interface | 1 | 794221-1 | 14632 | |
| A6 | Front Panel Interface | 1 | 794433-1 | 14632 | |
| C1 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 7 | 34475-1 | 14632 | |
| C2 Thru C7 | Same as C1 | | | | |
| J1 | Connector, Receptacle | 2 | 65610-218 | 22526 | |
| J2 | Connector, Receptacle | 3 | 65610-214 | 22526 | |
| J3 | Same as J2 | | | | |
| J4 | Same as J2 | | | | |
| J5 | Same as J1 | | | | |
| J6 | Connector, Receptacle | 1 | 65610-224 | 22526 | |
| J7 | Terminal Strip | 1 | 65500-202 | 22526 | |
| U1 | Integrated Circuit | 1 | PC1502-05VDC | 62483 | |
| XA1 | Connector, Receptacle | 1 | 65610-240 | 22526 | |
| XA2 | Terminal Strip | 10 | 65500-220 | 22526 | |
| XA3 | Same as XA2 | | | | |
| XA4 | Same as XA2 | | | | |
| XA5 | Same as XA2 | | | | |
| XA6 | Same as XA2 | | | | |

Courtesy of http://BlackRadios.terryo.org



5.5.8.1 **Type 794432-1 Voltage Regulator Module** REF DESIG PREFIX **A9A1**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 | Capacitor, Ceramic, Disc: 0.47 µF, 20%, 50 V | 3 | 34452-1 | 14632 | |
| C2 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 2 | 34475-1 | 14632 | |
| C3 | Same as C1 | | | | |
| C4 | Capacitor, Electrolytic, Tantalum: 1 µF, 20%, 35 V | 5 | 196D105X0035HE3 | 56289 | |
| C5 | Same as C1 | | | | |
| C6 | Same as C2 | | | | |
| C7 | Same as C4 | | | | |
| C8 | Capacitor, Electrolytic, Tantalum: 220 µF, 20%, 10 V | 1 | 196D227X0010TE4 | 56289 | |
| C9 | Capacitor, Electrolytic, Tantalum: 100 µF, 20%, 20 V | 1 | 196D107X0020TE4 | 56289 | |
| C10 | Same as C4 | | | | |
| C11 | Capacitor, Mica, Dipped: 820 pF, 5%, 300 V | 1 | DM15-821J | 72136 | |
| C12 | Same as C4 | | | | |
| C13 | Same as C4 | | | | |
| C14 | Capacitor, Ceramic, Disc: 2.2 µF, 10%, 50 V | 1 | 8141-050-651-225M | 59660 | |
| CR1 | Diode | 6 | IN4003 | 80131 | 93332 |
| CR2 Thru CR6 | Same as CR1 | | | | |
| CR7 | Diode | 2 | IN5819 | 80131 | |
| CR8 | Same as CR7 | | | | |
| P1 | Connector, Plug | 1 | 65000-066 | 22526 | |
| Q1 | Transistor | 1 | 2N2222A | 80131 | |
| R1 | Resistor, Fixed, Film: 10 kΩ, 5%, 1/4 W | 1 | CF1/4-10K/J | 09021 | |
| R2 | Resistor, Fixed, Film: 22 kΩ, 5%, 1/4 W | 3 | CF1/4-22K/J | 09021 | |
| R3 | Resistor, Variable, Film: 50 kΩ, 10%, 1/2 W | 1 | 62PAR50K | 73138 | |
| R4 | Resistor, Fixed, Film: 68k, 5%, 1/4 W | 2 | CF1/4-68 OHMS/J | 09021 | |
| R5 | Same as R4 | | | | |
| R6 | Same as R2 | | | | |
| R7 | Same as R2 | | | | |
| U1 | Integrated Circuit | 1 | TLO62CP | 01295 | |
| U2 | Voltage Regulator | 1 | LM78L12CZ | 27014 | |
| U3 | Voltage Regulator | 1 | LM320LZ-12 | 27014 | |
| U4 | Voltage Regulator | 1 | LM340T-5.0 | 27014 | |

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5.5.8.2 **Type 794437-1 Serial I/O**

REF DESIG PREFIX **A9A2**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 4 | 34475-1 | 14532 | |
| C2 | Same as C1 | | | | |
| C3 | Capacitor, Ceramic, Disc: 0.47 µF, 20%, 50 V | 1 | 34452-1 | 14632 | |
| C4 | Same as C1 | | | | |
| C5 | Same as C1 | | | | |
| C6 | Capacitor, Electrolytic, Tantalum: 0.47 µF, 20%, 35 V | 1 | 196D475X0035JE3 | 56289 | |
| CR1 | Diode | 1 | IN4449 | 80131 | |
| CR2 | Diode | 1 | IN746A | 80131 | |
| JW1 | Not Used | | | | |
| P1 | Connector, Plug | 1 | 65001-066 | 22526 | |
| R1 | Resistor, Fixed, Film: 39Ω, 5%, 1/8 W | 1 | CF1/8-39 OHMS/J | 09021 | |
| R2 | Resistor, Fixed, Film: 56Ω, 5%, 1/8 W | 1 | CF1/8-56 OHMS/J | 09021 | |
| R3 | Resistor, Fixed, Film: 2.2 MΩ, 5%, 1/8 W | 1 | CF1/8-2.2M/J | 81349 | |
| R4 | Resistor, Fixed, Film: 10 kΩ, 1%, 1/10 W | 2 | RN55C1002F | 81349 | |
| R5 | Resistor, Fixed, Film: 47 kΩ, 5%, 1/8 W | 1 | CF1/8-47K/J | 09021 | |
| R6 | Resistor, Fixed, Film: 100 kΩ, 1%, 1/10 W | 1 | RN55C1003F | 81349 | |
| R7 | Same as R4 | | | | |
| U1 | Integrated Circuit | 1 | CA3140E | 02735 | |
| U2 | Integrated Circuit | 1 | LM393N | 27014 | |
| U3 | Integrated Circuit | 1 | MM74HC04N | 27014 | |
| U4 | Integrated Circuit | 1 | IM6402A | 32293 | |
| U5 | Integrated Circuit | 1 | CF4011AE | 02735 | |
| U6 | Integrated Circuit | 1 | MM74C374N | 27014 | |
| U7 | Integrated Circuit | 1 | MM74HC138N | 27014 | |
| U8 | Integrated Circuit | 1 | MD74SC373AC | 27014 | |
| U9 | Integrated Circuit | 1 | MM74HC08N | 27014 | |
| U10 | Integrated Circuit | 1 | MM74C244N | 27014 | |
| U11 | Integrated Circuit | 1 | MM74HC32N | 27014 | |

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5.5.8.3 **Type 794290-1 CPU** REF DESIG PREFIX **A9A3**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 | Capacitor, Mica, Dipped: 20 pF, 5%, 500 V | 2 | CM05ED200J03 | 81349 | 72136 |
| C2 | Same as C1 | | | | |
| C3 | Capacitor, Ceramic, Disc: 0.47 µF, 20%, 50 V | 2 | 34452-1 | 14632 | |
| C4 | Same as C3 | | | | |
| C5 | Capacitor, Ceramic, Disc: 0.01 µF, 20%, 50 V | 3 | 34453-1 | 14632 | |
| C6 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 1 | 34475-1 | 14632 | |
| C7 | Same as C5 | | | | |
| C8 | Capacitor, Electrolytic, Tantalum: 47 µF, 10%, 10 V | 1 | 109D476X9010C2 | 56289 | |
| C9 | Same as C5 | | | | |
| C10 | Capacitor, Electrolytic, Tantalum: 4.7 µF, 20%, 35 V | 1 | 196D475X0035JE3 | 56289 | |
| C11 | Capacitor, Electrolytic, Tantalum: 200 µF, 20%, 15 V | 1 | MTP207M015PIC | 76055 | |
| CR1 | Diode | 2 | IN4449 | 80131 | |
| CR2 | Same as CR1 | | | | |
| JW1 | Terminal Strip | 1 | 65500-103 | 22526 | |
| P1 | Connector, Plug | 1 | 65001-066 | 22526 | |
| R1 | Resistor, Fixed, Film: 2.2 MΩ, 5%, 1/8 W | 2 | CF1/8-2.2M/J | 09021 | |
| R2 | Same as R1 | | | | |
| R3 | Resistor, Fixed, Composition: 120 kΩ, 5%, 1/8 W | 1 | RCR05G124JS | 81349 | 01121 |
| R4 | Resistor, Fixed, Film: 68 kΩ, 5%, 1/8 W | 1 | CF1/8-68K/J | 09021 | |
| R5 | Resistor, Fixed Composition: 100 kΩ, 5%, 1/8 W | 6 | RCR05G104JS | 81349 | 01121 |
| R6 | Resistor, Fixed, Film: 200 kΩ, 5%, 1/8 W | 1 | CF1/8-200K/J | 09021 | |
| R7 Thru R11 | Same as R5 | | | | |
| R12 | Resistor, Fixed Film: 10 kΩ, 5%, 1/8 W | 1 | CF1/8-10K/J | 09021 | |
| RN1 | Resistor Network | 1 | 765-1-R10K | 73138 | |
| U1 | Integrated Circuit | 1 | MM74PC04N | 27014 | |
| U2 | Integrated Circuit | 2 | MM74C244N | 27014 | |
| U3 | Same as U2 | | | | |
| U4 | Integrated Circuit | 1 | NSC800N | 27014 | |
| U5 | Integrated Circuit | 1 | MM7HHC373N | 27014 | |
| U6 | Integrated Circuit | 1 | MM82PC08J | 27014 | |
| U7 | Integrated Circuit | 2 | MM74PC138N | 27014 | |
| U8 | Integrated Circuit | 1 | HM6116-4 | 62786 | |
| U9 | Same as U7 | | | | |
| U10 | Integrated Circuit | 1 | MM74PC08N | 27014 | |
| U11 | Integrated Circuit | 2 | NMC27C32Q-45 | 27014 | |
| U12 | Integrated Circuit | 2 | X2212P | 60395 | |
| U13 | Same as U12 | | | | |

Courtesy of http://BlackRadios.terryo.org



REF DESIG PREFIX **A9A3**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| U14 | Same as U11 | | | | |
| Y1 | Crystal Quartz Holder | 1 | MP042 | 75378 | |

Courtesy of http://BlackRadios.terryo.org



5.5.8.4 **Type 794288-1 Extended Memory** REF DESIG PREFIX **A9A4**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| BT1 | Battery | 1 | 2736 | 20681 | |
| C1 | Capacitor, Electrolytic, Tantalum: 4.7 µF, 20%, 35 V | 1 | 196D475X0035JE3 | 56289 | |
| C2 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 1 | 34475-1 | 14632 | |
| C3 | Capacitor, Micro-Q, Dipped: 0.03 µF, 100% ± 25%, 25 V | 1 | UQ-24.03 | 31745 | |
| C4 Thru C9 | Capacitor, Micro-Q, Dipped: 0.03 µF, 100% ± 25% | 6 | UQ-28.03 | 31745 | |
| C10 | Capacitor, Micro-Q, Dipped: 0.03 µF, 100% ± 25% | 1 | Q-20.03 | 31745 | |
| C11 | Capacitor, Micro-Q, Dipped: 0.03 µF, 100% ± 25% | 1 | UQ-16.03 | 31745 | |
| CR1 | Diode | 2 | 5082-2800 | 28480 | |
| CR2 | Same as CR1 | | | | |
| P1 | Connector, Plug | 1 | 65001-066 | 22526 | |
| R1 | Resistor, Fixed, Film: 2.0M, 5%, 1/8 W | 1 | CF1/8-2M/J | 09021 | |
| U1 Thru U6 | Integrated Circuit | 6 | MBM27C64-30 | 61271 | |
| U7 | Integrated Circuit | 1 | TC5517APL | 02735 | |
| U8 | Integrated Circuit | 1 | MM74HC138N | 27014 | |
| U9 | Integrated Circuit | 1 | MM74HC373N | 27014 | |
| U10 | Integrated Circuit | 1 | MM74HCOON | 27014 | |
| XU1 Thru XU6 | Socket, Integrated Circuit | 6 | ICN-286-S5-T | 06776 | |
| XU7 | Socket, Integrated Circuit | 1 | ICN-246-S5-T | 06776 | |
| XU8 | Socket, Integrated Circuit | 1 | ICN-163-S3-T | 06776 | |
| XU9 | Socket, Integrated Circuit | 1 | ICN-203-S3-T | 06776 | |

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5.5.8.5 **Type 794421-1 Receiver/IF Interface Assembly** REF DESIG PREFIX **A9A5**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 Thru C5 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 5 | 34475-1 | 14632 | |
| P1 | Connector, Plug | 1 | 65001-066 | 22526 | |
| Q1 | Transistor | 1 | 2N2222A | 80131 | |
| R1 | Resistor, Fixed, Film: 100 kΩ, 5%, 1/8 W | 2 | CF1/8-100K/J | 09021 | |
| R2 | Same as R1 | | | | |
| R3 | Resistor, Fixed, Film: 100Ω, 5%, 1/4 W | 1 | CF1/4-100 OHMS/J | 09021 | |
| R4 | Resistor, Fixed, Film: 1.0 kΩ, 5%, 1/8 W | 1 | CF1/8-1.0K/J | 09021 | |
| U1 | Integrated Circuit | 2 | MM74HC74N | 27014 | |
| U2 | Integrated Circuit | 1 | MM74C161N | 27014 | |
| U3 | Integrated Circuit | 1 | CD4094BE | 02735 | |
| U4 | Integrated Circuit | 1 | MM74C157N | 27014 | |
| U5 | Same as U1 | | | | |
| U6 | Integrated Circuit | 1 | MM74C374N | 27014 | |
| U7 | Integrated Circuit | 1 | MM74C373N | 27014 | |
| U8 | Integrated Circuit | 1 | MM74HC138N | 27014 | |
| U9 | Integrated Circuit | 1 | MM74HC08N | 27014 | |
| U10 | Integrated Circuit | 1 | MM74C240N | 27014 | |
| U11 | Integrated Circuit | 2 | MM74C165N | 27014 | |
| U12 | Same as U11 | | | | |
| U13 | Integrated Circuit | 1 | DG212CJ | 17856 | |
| U14 | Integrated Circuit | 1 | TL062CP | 01295 | |
| U15 | Integrated Circuit | 1 | MC14503BCP | 04713 | |

Courtesy of http://BlackRadios.terryo.org



5.5.8.6 **Type 794433-1 Front Panel Interface Assembly** REF DESIG PREFIX **A9A6**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| C1 Thru C3 | Capacitor, Ceramic, Disc: 0.1 µF, 20%, 50 V | 2 | 5082-2800 | 28480 | |
| C4 | Capacitors, Ceramic, Disc: 100 pF, 5%, 100 V | 1 | 8121-100-COGO-101J | 59660 | |
| C5 | Same as C1 | | | | |
| C6 | Same as C1 | | | | |
| C7 Thru C10 | Capacitor, Electrolytic, Tantalum: 4.7 µF, 20%, 35 V | 5 | 196D475X0035JE3 | 56289 | |
| C11 | Same as C1 | | | | |
| C12 | Same as C1 | | | | |
| C13 | Same as C7 | | | | |
| C14 | Capacitor, Ceramic, Disc: 0.01 pF, 20%, 50 V | 3 | 34453-1 | 14632 | |
| C15 | Same as C1 | | | | |
| C16 | Same as C14 | | | | |
| C17 | Same as C14 | | | | |
| C18 | Same as C1 | | | | |
| C19 | Capacitor, Electrolytic, Tantalum: 1 µF, 20%, 35 V | 2 | 196D105X0035HE3 | 56289 | |
| C20 | Same as C1 | | | | |
| C21 | Same as C19 | | | | |
| C22 | Same as C1 | | | | |
| CR1 | Diode | 2 | 5082-2800 | 28480 | |
| CR2 | Same as CR1 | | | | |
| P1 | Connector, Plug | 1 | 65001-066 | 22526 | |
| R1 | Resistor, Fixed, Film: 12 kΩ, 5%, 1/8 W | 6 | CF118-12K/J | 09021 | |
| R2 | Same as R1 | | | | |
| R3 | Resistor, Fixed, Film: 9.09 kΩ,1%, 1/10 W | 1 | RN55C9091F | 81349 | |
| R4 | Resistor, Fixed, Film: 28.7 kΩ, 1%, 1/10 W | 1 | RN55C2872F | 81349 | |
| R5 | Resistor, Fixed, Film: 15 kΩ, 1%, 1/10 W | 2 | RN55C1502F | 81349 | |
| R6 | Resistor, Fixed, Film: 1.0 kΩ, 5%, 1/8 W | 2 | CF1/8-1.0K/J | 09021 | |
| R7 | Resistor, Fixed, Film: 7.5 kΩ, 5%, 1/8 W | 2 | CF1/8-7.5K/J | 90921 | |
| R8 | Same as R5 | | | | |
| R9 | Resistor, Fixed, Film: 120 kΩ, 5%, 1/4 W | 1 | CF1/4-120K/J | 09021 | |
| R10 | Same as R1 | | | | |
| R11 | Same as R1 | | | | |
| R12 | Resistor, Fixed, Film: 40.2 kΩ, 1%, 1/10 W | 1 | RN55C4022F | 81349 | |
| R13 | Resistor, Fixed, Film: 8.66 kΩ, 1%, 1/10 W | 1 | RN55C8661F | 81349 | |
| R14 | Resistor, Fixed, Film: 5 kΩ, 10%, 1/2 W | 1 | 62PAR5K | 73138 | |
| R15 | Same as R6 | | | | |
| R16 | Same as R1 | | | | |
| R17 | Same as R1 | | | | |
| R18 | Resistor, Fixed, Film: 27 kΩ, 5%, 1/8 W | 5 | CF1/8-27K/J | 09021 | |

Courtesy of http://BlackRadios.terryo.org



REF DESIGN PREFIX **A9A6**

| REF DESIG | DESCRIPTION | QTY PER ASSY | MANUFACTURER'S PART NO. | MFR. CODE | RECM VENDOR |
|---|---|---|---|---|---|
| R19 Thru R22 | Same as R18 | | | | |
| R23 | Same as R7 | | | | |
| U1 | Integrated Circuit | 1 | TL064CN | 01295 | |
| U2 | Integrated Circuit | 1 | CD4051BE | 02735 | |
| U3 | Integrated Circuit | 1 | TLC62CP | 01295 | |
| U4 | Integrated Circuit | 1 | AD7574JN | 24355 | |
| U5 | Integrated Circuit | 1 | MM74C374N | 27014 | |
| U6 | Integrated Circuit | 1 | MM74C373N | 27014 | |
| U7 | Integrated Circuit | 1 | MM74HC00N | 27014 | |
| U8 | Integrated Circuit | 1 | MM74HC138N | 27014 | |
| U9 | Integrated Circuit | 1 | MM74C244N | 27014 | |
| U10 | Integrated Circuit | 2 | MM74C922N | 27014 | |
| U11 | Same as U10 | | | | |
| U12 | Integrated Circuit | 1 | MM74C74N | 27014 | |
| U13 | Integrated Circuit | 1 | MM74C14N | 27014 | |
| U14 | Integrated Circuit | 1 | CD4020BE | 02735 | |
| VR1 | Diode, Zener | 1 | IN751A | 80131 | |

Courtesy of http://BlackRadios.terryo.org

# SECTION VI

# SCHEMATIC DIAGRAMS

Courtesy of http://BlackRadios.terryo.org



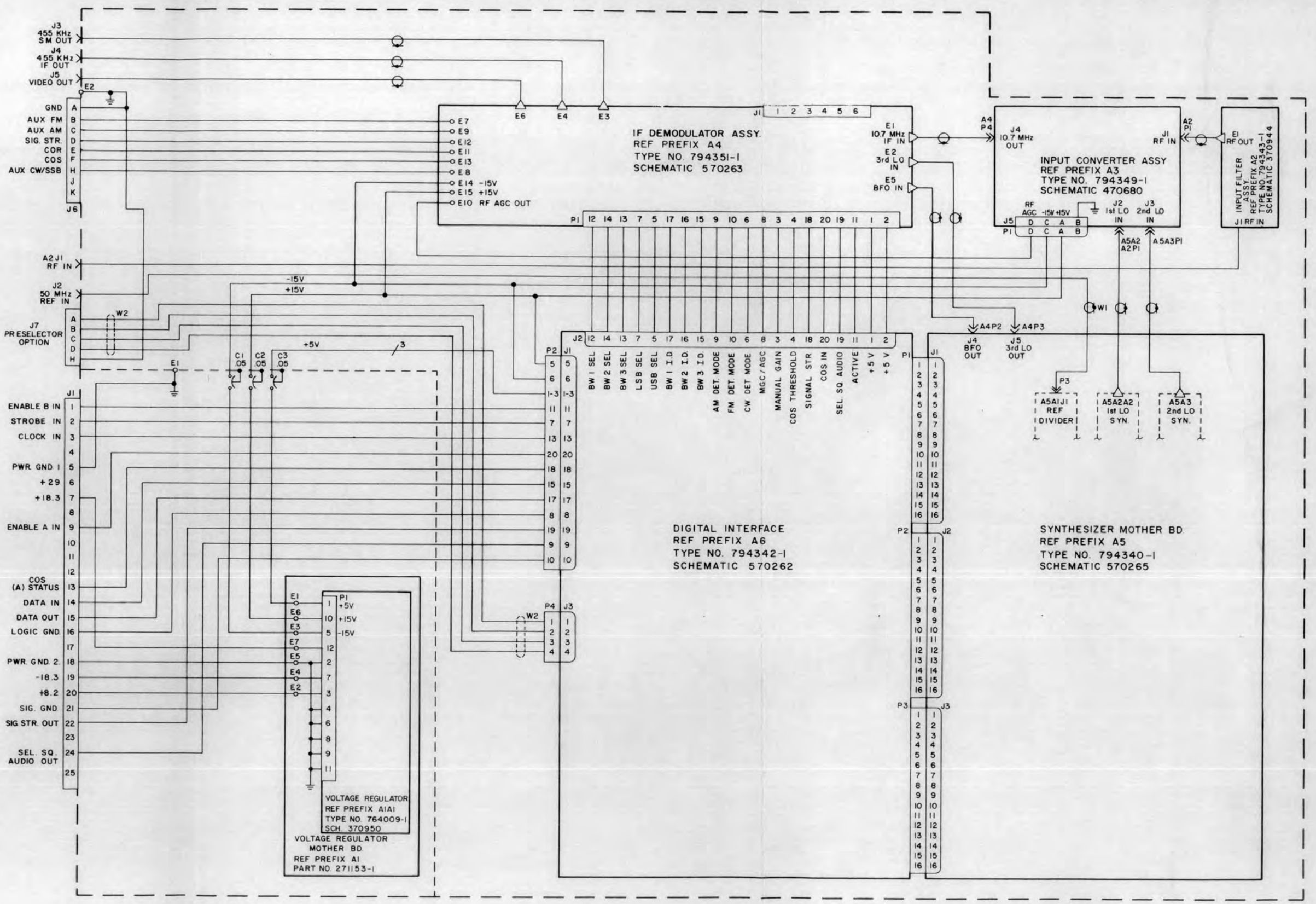
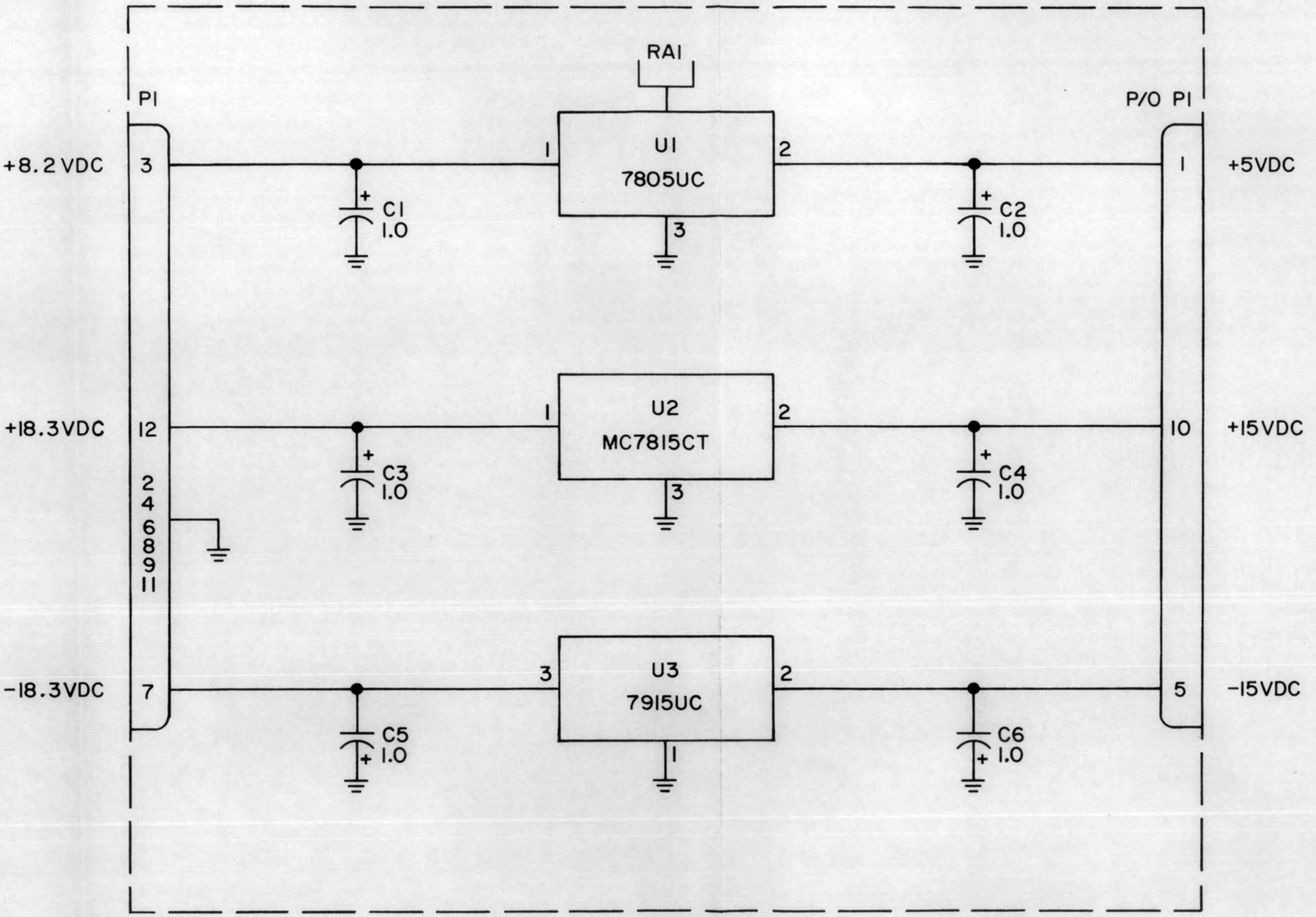



Figure 6-1. Type 271153-1 Voltage Regulator Motherboard (A1), Schematic Diagram 570266

Courtesy of http://BlackRadios.terryo.org



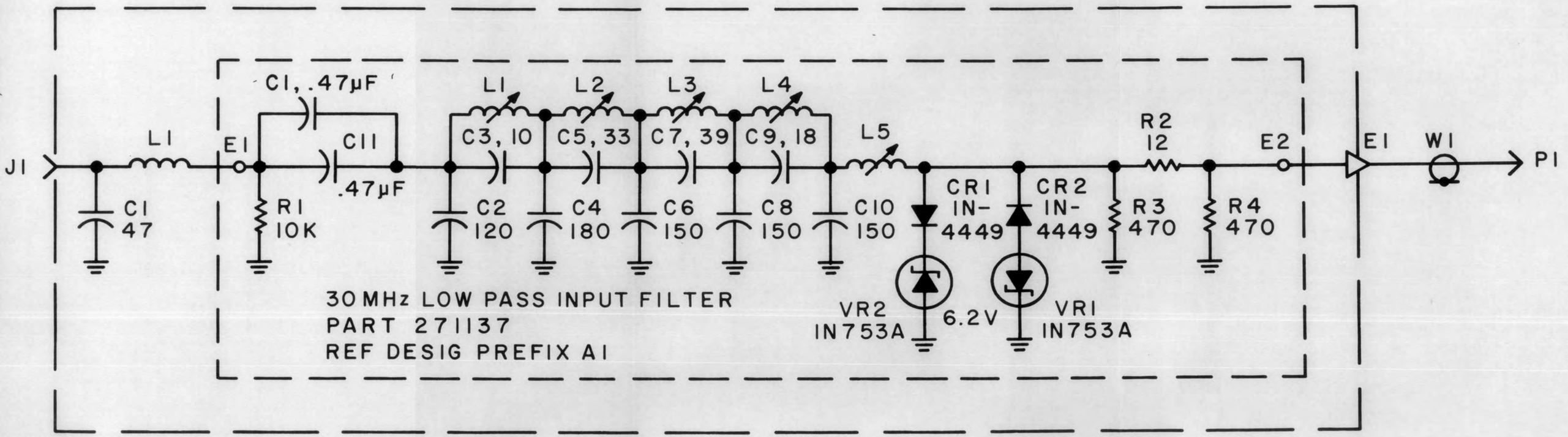



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) CAPACITANCE IS IN uF.

Figure 6-2. Type 764009-1 Voltage Regulator (A1A1), Schematic Diagram 370950

Courtesy of http://BlackRadios.terryo.org






NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±5%, 1/4W.
   b) CAPACITANCE IS IN pF.
   c) INDUCTANCE IS IN µH; L1-L4 ARE .351 TO .429, L5 IS .297 TO .363.

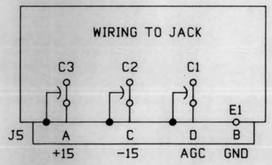
Figure 6-3. Type 794343-1 Input Filter (A2), Schematic Diagram 370944

Courtesy of http://BlackRadios.terryo.org



NOTES:

1. UNLESS OTHERWISE SPECIFIED
   a) RESISTANCE IS IN OHMS, ±5%, 1/4W
   b) CAPACITANCE IS IN pF
2. NOMINAL VALUE, FINAL VALUE FACTORY SELECTED.



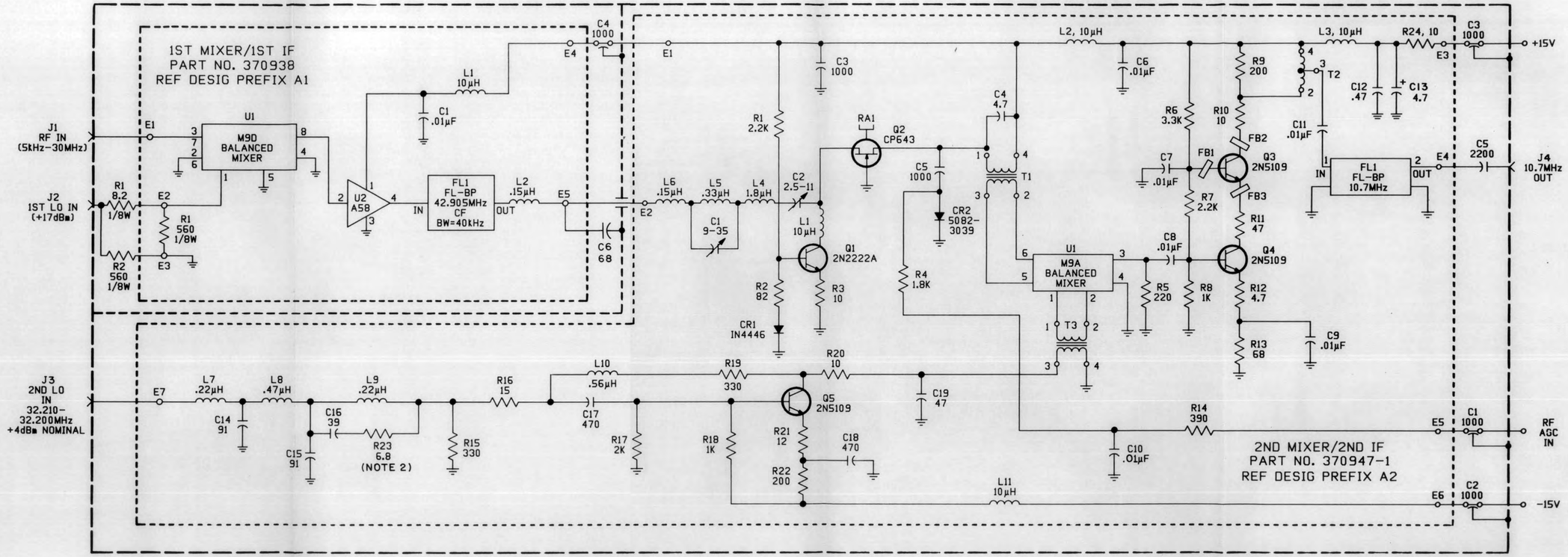




Figure 6-4. Type 794349-1 Input Converter (A3), Schematic Diagram 470680

Courtesy of http://BlackRadios.terryo.org



NOTE:
1. DIFFERENCE BETWEEN TYPES IS AT P1, P2 AND P3 PLUG ASSEMBLIES.

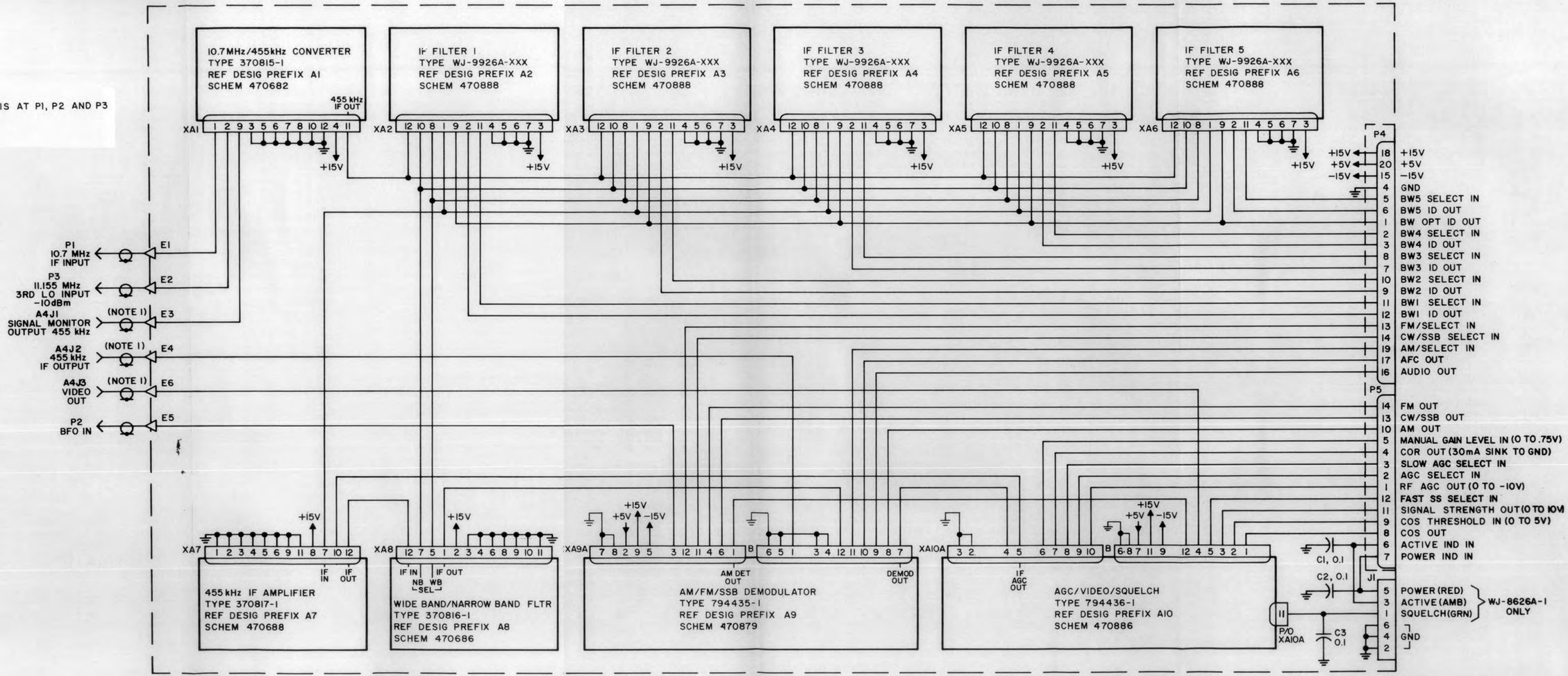



Figure 6-5. Type 794429-1 IF Demodulator Motherboard (A4), Schematic Diagram 470885

Courtesy of http://BlackRadios.terryo.org



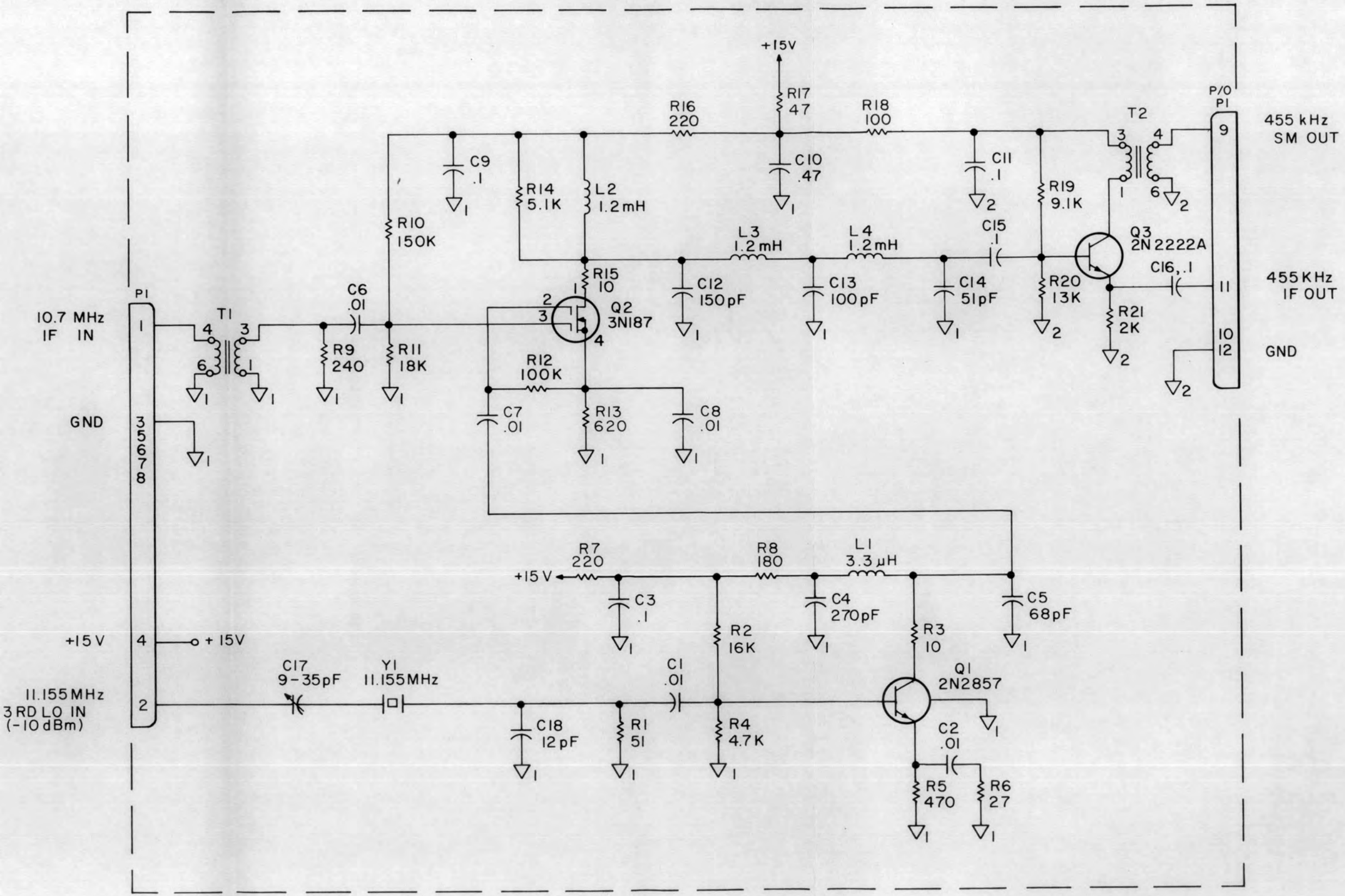


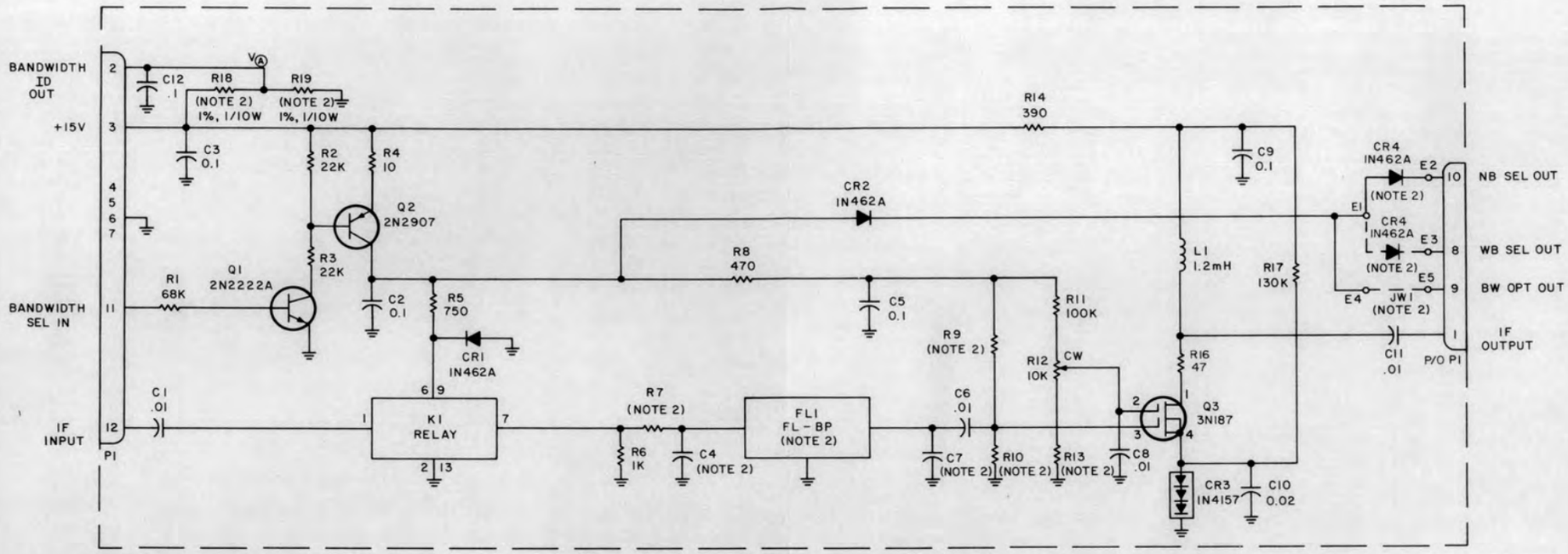

Figure 6-6. Type 370815-1 10.7 MHz/455 kHz Converter (A4A1), Schematic Diagram 470682

Courtesy of http://BlackRadios.terryo.org



NOTES:

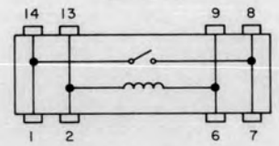
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±5%, 1/4 W.
   b) CAPACITANCE IS IN µF.
2. DIFFERENCE BETWEEN TYPES IS SHOWN IN TABULATION.
3. DETAIL LEAD ARRANGEMENT FOR K1 IS SHOWN IN DETAIL A.
4. CW ON R12 INDICATES CLOCKWISE ROTATION OF ACTUATOR.




TABULATION

| TYPE | V(A) | PW NO. | BANDWIDTH | FL1 | CR4 | R7 | R9 | R10 | R13 | R18 | R19 | C4 | C7 | JW1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WJ-9926A-LSB-1 | 3.6V | 794430-1 | 3kHz LSB | 92062-18 | E1-E3 | 1.2K | 22K | 2.2K | 9.1K | 100K | 31.6K | 27pF | 27pF | |
| WJ-9926A-USB-1 | 3.9V | 794430-2 | 3kHz USB | 92062-19 | E1-E3 | 1.2K | 22K | 2.2K | 9.1K | 95.3K | 33.2K | 27pF | 27pF | |
| WJ-9926A-LSB-2 | 4.2V | 794430-3 | 2.1k LSB | 92062-20 | E1-E3 | 1.8K | 30K | 3.0K | 9.1K | 95.3K | 37.4K | 360pF | 360pF | |
| WJ-9926A-USB-2 | 4.5V | 794430-4 | 2.1k USB | 92062-21 | E1-E3 | 1.8K | 30K | 3.0K | 9.1K | 90.9K | 39.2K | 360pF | 360pF | |
| WJ-9926A-200 | 0V | 794430-5 | 200Hz | 92062-1 | E1-E2 | 4.7K | 56K | 5.6K | 10K | N/U | JW2 | 51pF | 51pF | |
| WJ-9926A-500 | .75K | 794430-7 | 500Hz | 92062-2 | E1-E2 | 4.7K | 56K | 5.6K | 12K | 143K | 7.5K | 51pF | 51pF | |
| WJ-9926A-1K | 1.0 | 794430-8 | 1kHz | 92062-3 | E1-E2 | 4.7K | 56K | 5.6K | 12K | 140K | 10K | 51pF | 51pF | |
| WJ-9926A-2K | 1.4V | 794430-9 | 2.1 kHz | 92062-4 | E1-E2 | 4.7K | 56K | 5.6K | 12K | 133K | 13.7K | 51pF | 51pF | |
| WJ-9926A-3K | 1.7V | 794430-10 | 3kHz | 92062-5 | E1-E3 | 4.7K | 56K | 5.6K | 12K | 133K | 17.4K | 51pF | 51pF | |
| WJ-9926A-4K | 2.0V | 794430-11 | 4kHz | 92062-6 | E1-E3 | 4.7K | 56K | 5.6K | 12K | 130K | 20K | 51pF | 51pF | |
| WJ-9926A-6K | 2.4V | 794430-12 | 6kHz | 92062-7 | E1-E3 | 4.7K | 56K | 5.6K | 12K | 127K | 23.7K | 51pF | 51pF | |
| WJ-9926A-8K | 2.7V | 794430-13 | 8kHz | 92062-8 | E1-E3 | 4.7K | 56K | 5.6K | 12K | 127K | 27.4K | 51pF | 51pF | |
| WJ-9926A-12K | 3.0V | 794430-14 | 12kHz | 92062-9 | E1-E3 | 4.7K | 56K | 5.6K | 12K | 115K | 28.7K | 51pF | 51pF | |
| WJ-9926A-16K | 3.3V | 794430-15 | 16kHz | 92062-10 | E1-E3 | 4.7K | 56K | 5.6K | 12K | 115K | 32.4K | 51pF | 51pF | |
| WJ-9926A-3KS | 5.0 | 794430-16 | 2.85kHz | 92062-16 | E1-E3 | 4.7K | 56K | 5.6K | 12K | 100K | 49.9K | 51pF | 51pF | |
| WJ-9926A-300 | .47 | 794430-6 | 300Hz | | E1-E2 | 4.7K | 56K | 5.6K | 10K | 147K | 4.75K | 51pF | 51pF | |
| WJ-9926A-3.2K | 0.0 | 794430-17 | 3.2kHz | 92314 | E1-E3 | 4.7K | 56K | 5.6K | 12K | N/U | JW2 | 51pF | 51pF | X |
| WJ-9926A-2.2K | .47 | 794430-18 | 2.2kHz | 92062-17 | E1-E3 | 4.7K | 56K | 5.6K | 12K | 147K | 4.75K | 130pF | 130pF | X |

DETAIL A

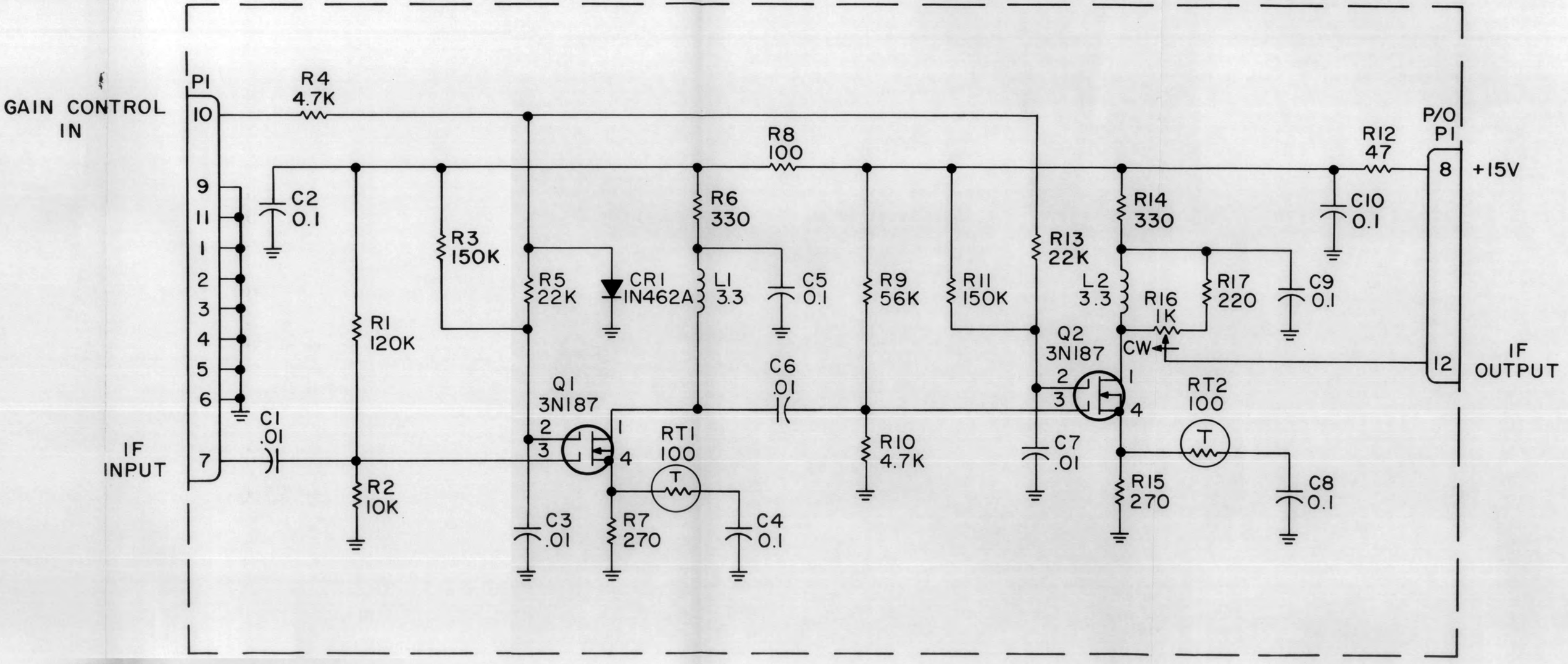



TOP VIEW

Figure 6-7. Type WJ-9926A-XXXX IF FILTER (A4A2-A4A6), Schematic Diagram 470888

Courtesy of http://BlackRadios.terryo.org





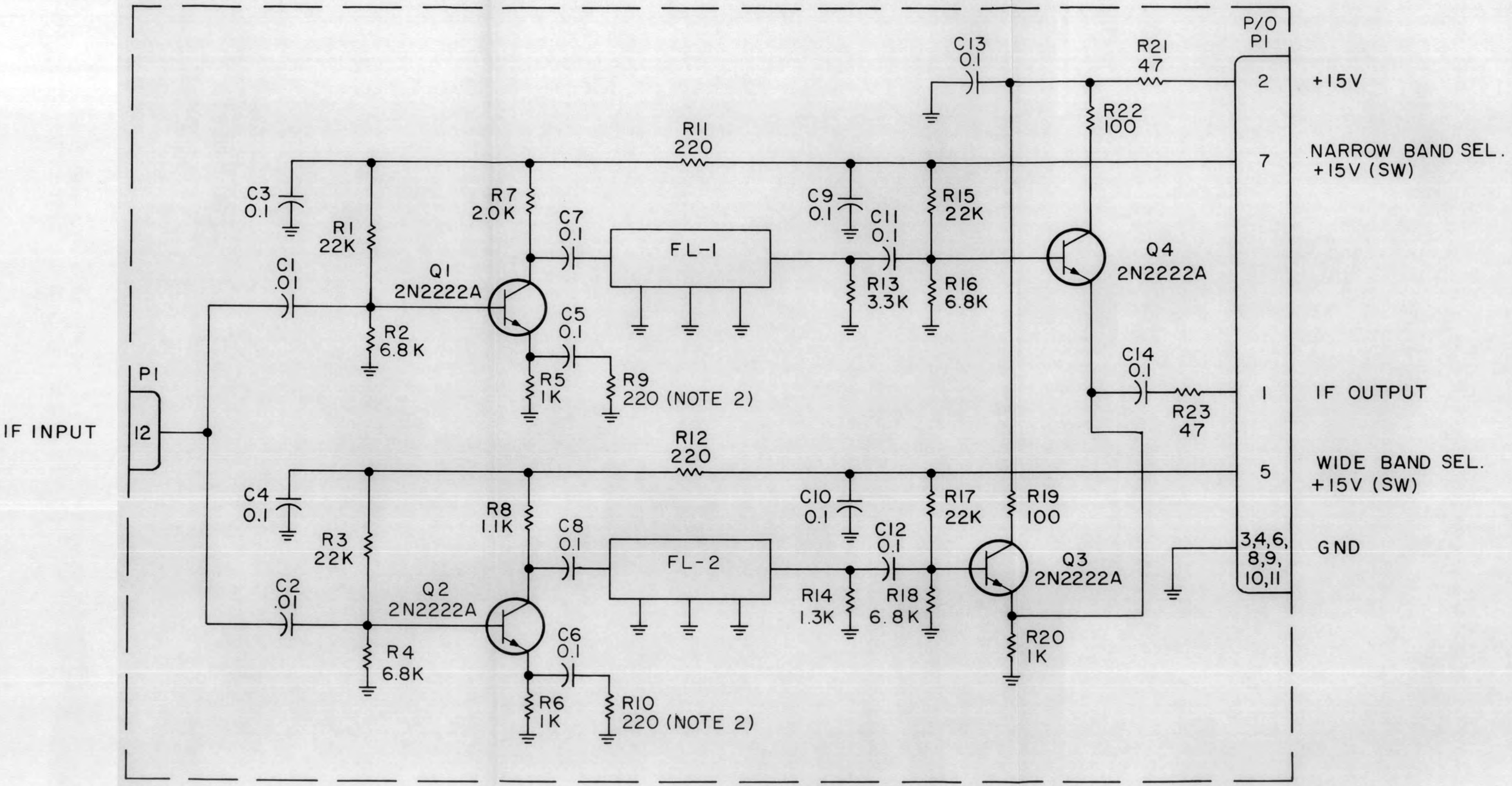

NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   a.) RESISTANCE IS IN OHMS, ±5%, 1/4W.
   b.) CAPACITANCE IS IN μF.
   c.) INDUCTANCE IS IN mH.
2. CW ON R16 INDICATES CLOCKWISE ROTATION.

Figure 6-8. Type 370817-1 455 kHz IF Amplifier (A4A7), Schematic Diagram 470688

Courtesy of http://BlackRadios.terryo.org



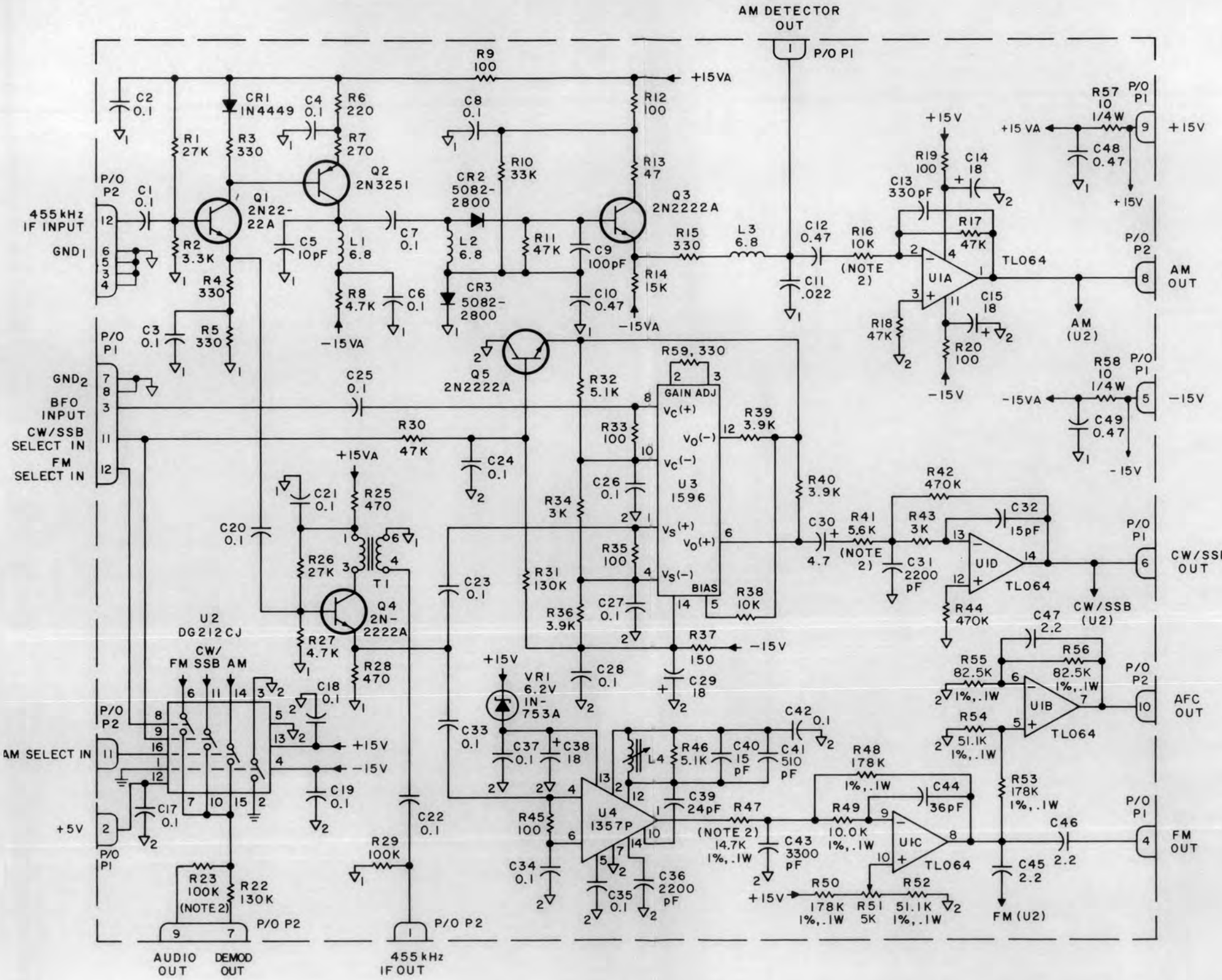



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a.) RESISTANCE IS IN OHMS, ±5%, 1/4W.
   b.) CAPACITANCE IS IN μF.
2. NOMINAL VALUE FINAL VALUE FACTORY SELECTED.

Figure 6-9. Type 370816-1 Wideband/Narrowband Filter (A4A8), Schematic Diagram 470686

Courtesy of http://BlackRadios.terryo.org






NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±5%, 1/8W.
   b) CAPACITANCE IS IN µF.
   c) INDUCTANCE IS IN mH.
2. NOMINAL VALUE; FINAL VALUE FACTORY SELECTED.

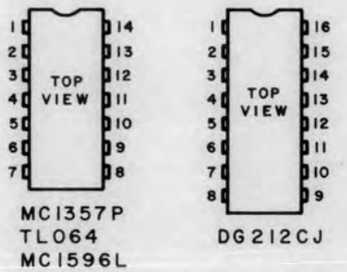
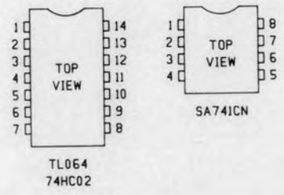



Figure 6-10. Type 794435-1 AM/FM/SSB Demodulator (A4A9), Schematic Diagram 470879

Courtesy of http://BlackRadios.terryo.org



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±5%,1/4W.
   b) CAPACITANCE IS IN µF.
2. NOMINAL VALUE, FINAL VALUE FACTORY SELECTED.



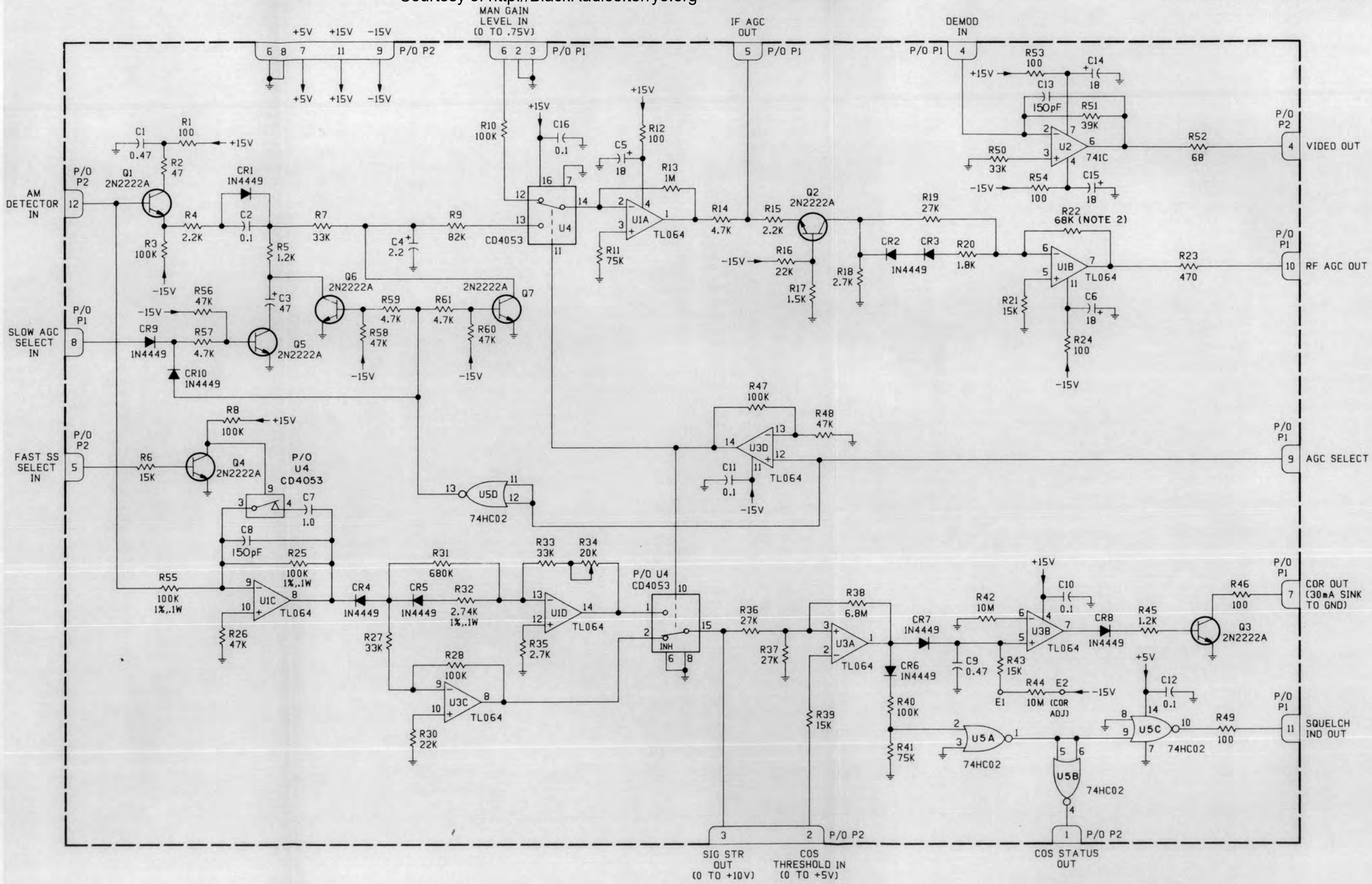
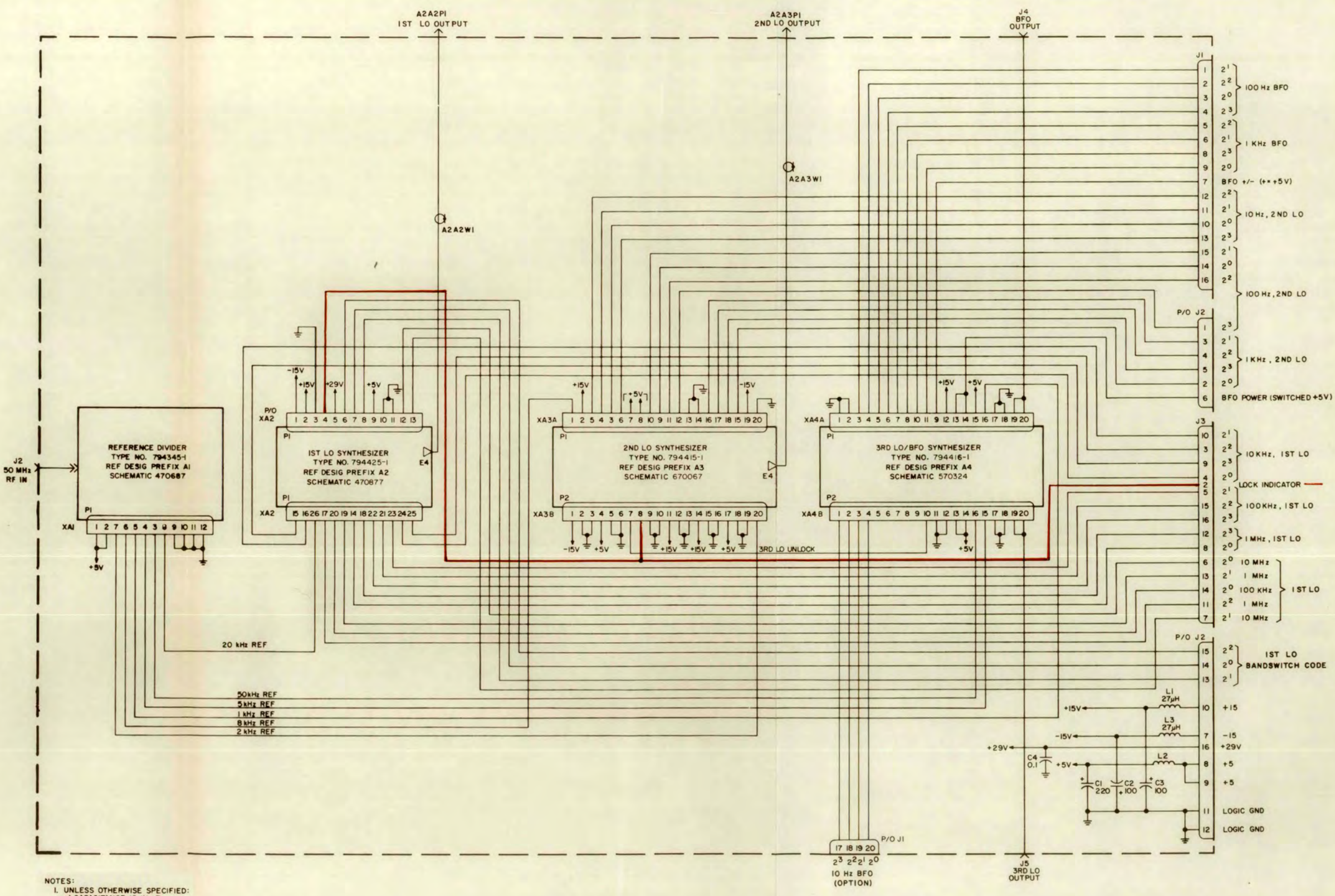




Figure 6-11. Type 794436-1 AGC/VIDEO/SQUELCH (A4A10), Schematic Diagram 470886

Courtesy of http://BlackRadios.terryo.org

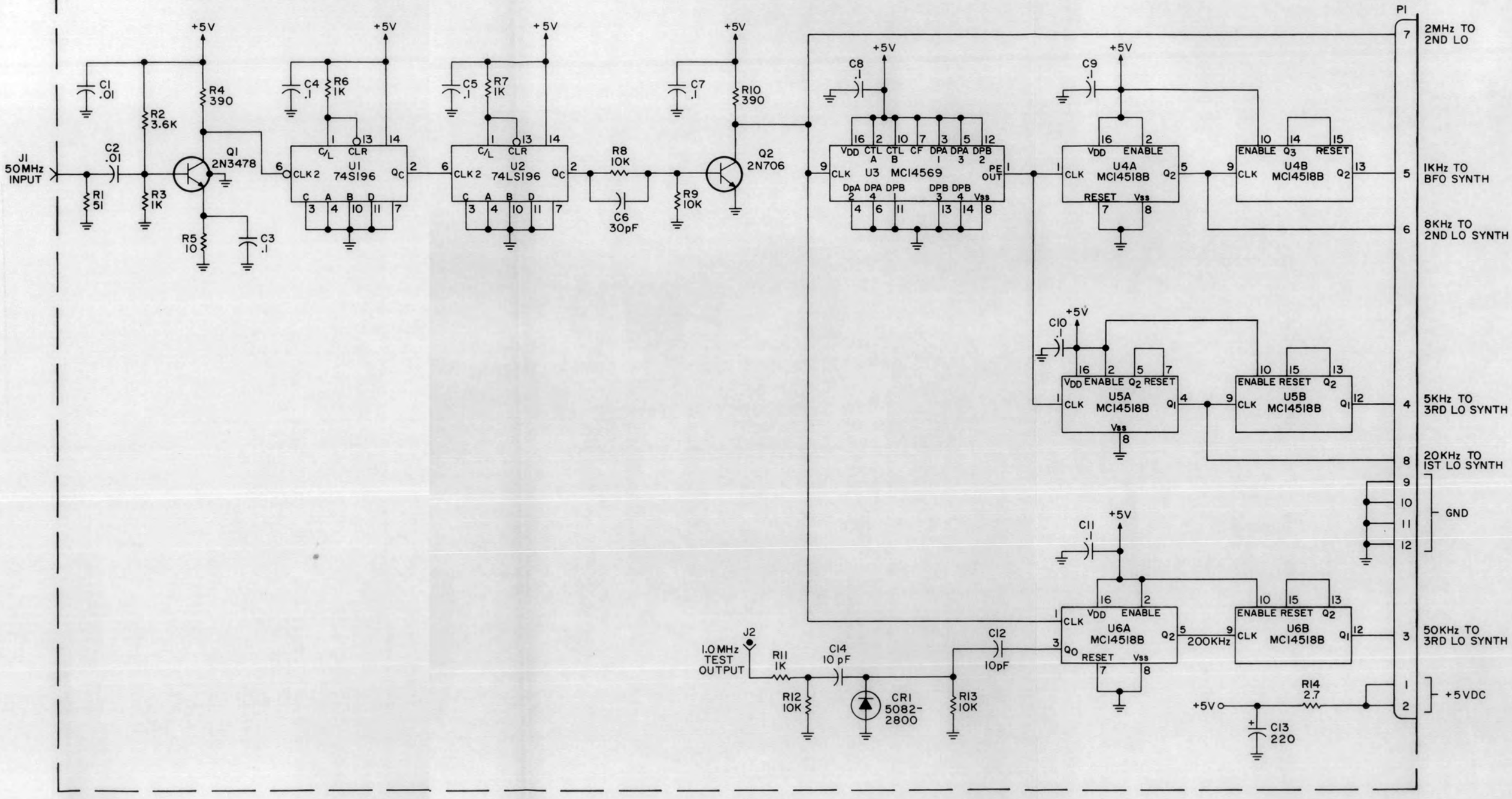



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) CAPACITANCE IS IN µF.

Figure 6-12. Type 794414-1 Synthesizer Motherboard (A5), Schematic Diagram 570325

Courtesy of http://BlackRadios.terryo.org






NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±5%, 1/4W.
   b) CAPACITANCE IS IN uF.

Figure 6-13. Type 794345-1 Reference Divider (A5A1), Schematic Diagram 470687

Courtesy of http://BlackRadios.terryo.org



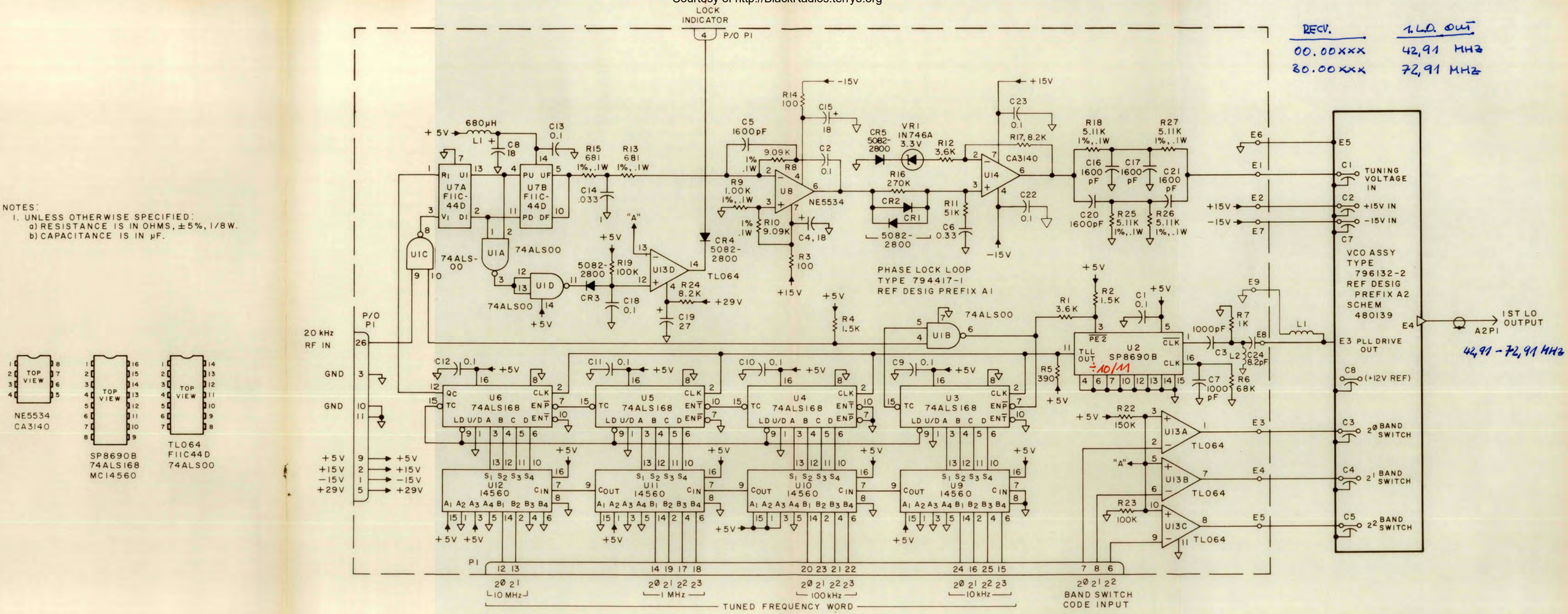



Figure 6-14. Type 794425-1 1st LO Synthesizer (A5A2), Schematic Diagram 470877

Courtesy of http://BlackRadios.terryo.org



| RECV. | 2.LO OUT | |
|---|---|---|
| XX.XX000 | 32.21000 | MHz |
| XX.XX999 | 32.20001 | MHz |

LOCKED

U2B(7) 14V
U1BB(7) 14V
U16 (1) 5V
U4 (1) 5V
U4 (6) TTL BKHE

TP1 'E1' 7,5V
TP2 "E2 -8.0 (15.00999)
TP3 "E3 7,5V (15.00499)

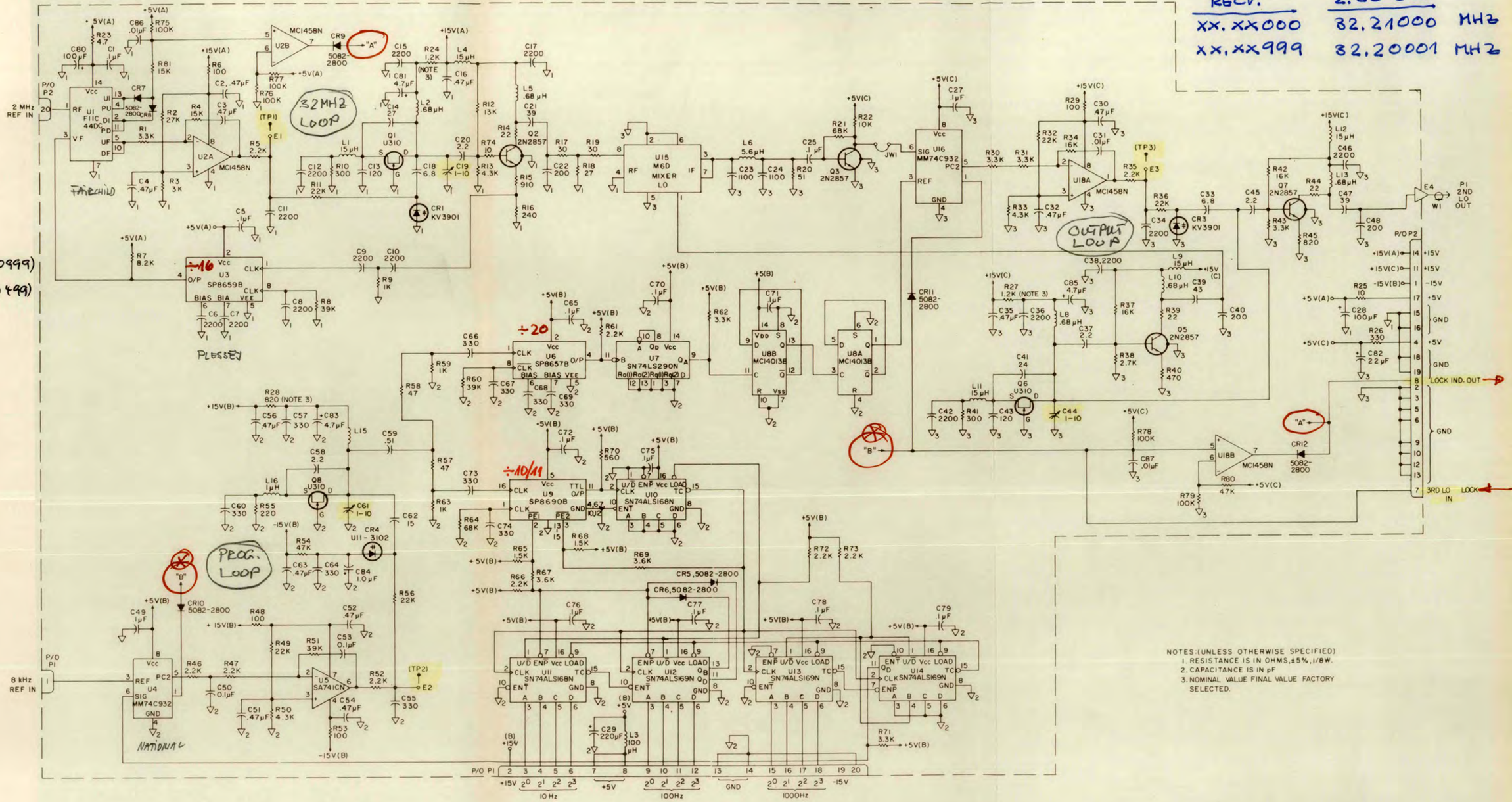
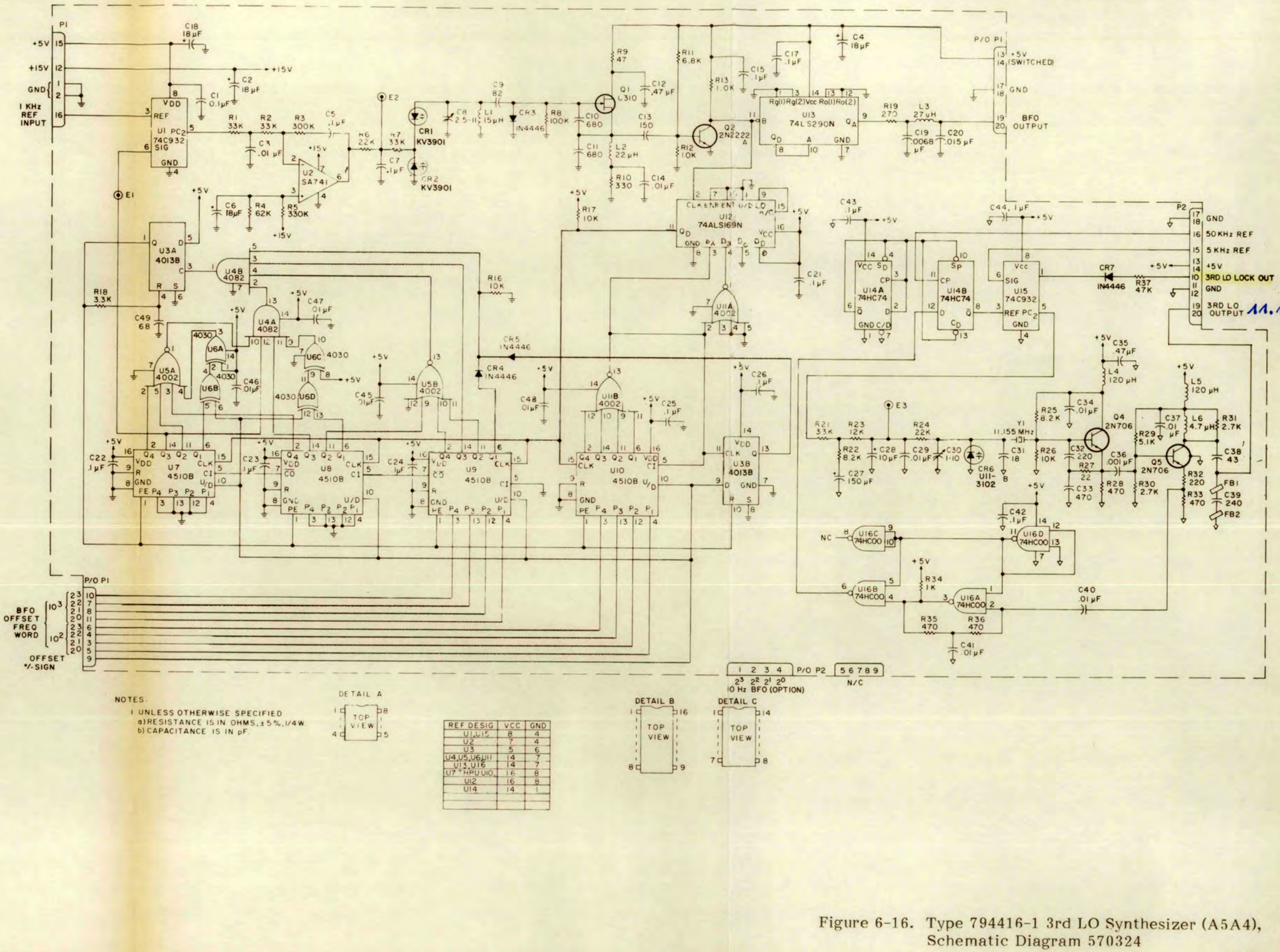



Figure 6-15. Type 794415-1 2nd LO Synthesizer (A5A3), Schematic Diagram 670067

Courtesy of http://BlackRadios.terryo.org






NOTES:

1. UNLESS OTHERWISE SPECIFIED
   a) RESISTANCE IS IN OHMS, ±5%, 1/4W.
   b) CAPACITANCE IS IN pF.

DETAIL A




| REF DESIG | VCC | GND |
|---|---|---|
| U1, U15 | 8 | 4 |
| U2 | 7 | 4 |
| U3 | 5 | 6 |
| U4, U5, U6, U11 | 14 | 7 |
| U13, U16 | 14 | 7 |
| U7 THRU U10, | 16 | 8 |
| U12 | 16 | 8 |
| U14 | 14 | 1 |

DETAIL B




DETAIL C




Figure 6-16. Type 794416-1 3rd LO Synthesizer (A5A4), Schematic Diagram 570324

Courtesy of http://BlackRadios.terryo.org



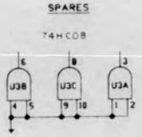
NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   a. RESISTANCE IS IN OHMS, ±5%, 1/8W
   b. CAPACITANCE IS IN µF
2. SEE TABULATION

| TABULATION | |
|---|---|
| U19 SCD NO. | USED ON |
| 841072 | WJ-8626A-1, WJ-8626A-4 |

SPARES

74HC08




| HIGHEST REF DESIG USED | REF DESIG NOT USED |
|---|---|
| C21 | C5 |
| CR3 | |
| J4 | |
| P2 | |
| Q1 | |
| R32 | |
| U25 | |

TL064


Figure 6-17. Type 794434-1 Digital Interface (A6), Schematic Diagram 470897

Courtesy of http://BlackRadios.terryo.org



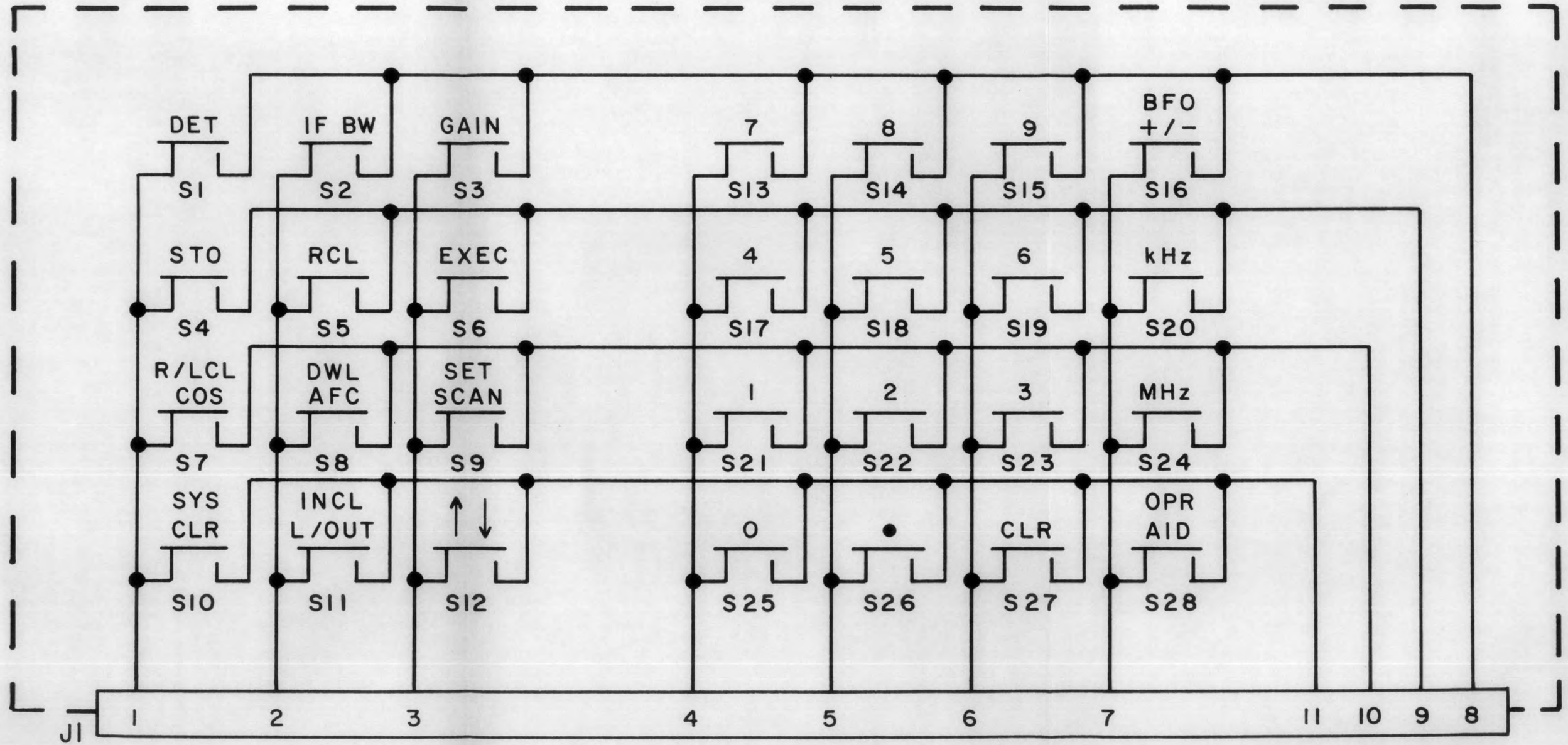



Figure 6-18. Type 371037-1 Keyboard Assembly (A8), Schematic Diagram 371045

Courtesy of http://BlackRadios.terryo.org



| | TITLE | TYPE | SCHEM |
|---|---|---|---|
| XA1 | VOLTAGE REGULATOR MODULE | 794432-1 | 470889 |
| XA2 | I/O OPTION | 794437-1 | |
| XA3 | CPU | 794290-1 | 570213 |
| XA4 | EXTENDED MEMORY | 794288-1 | 470799 |
| XA5 | RECEIVER/EF INTERFACE | 794421-1 | 470894 |
| XA6 | FRONT PANEL INTERFACE | 794433-1 | 470895 |

NOTES:
UNLESS OTHERWISE SPECIFIED
CAPACITANCE IS IN μF

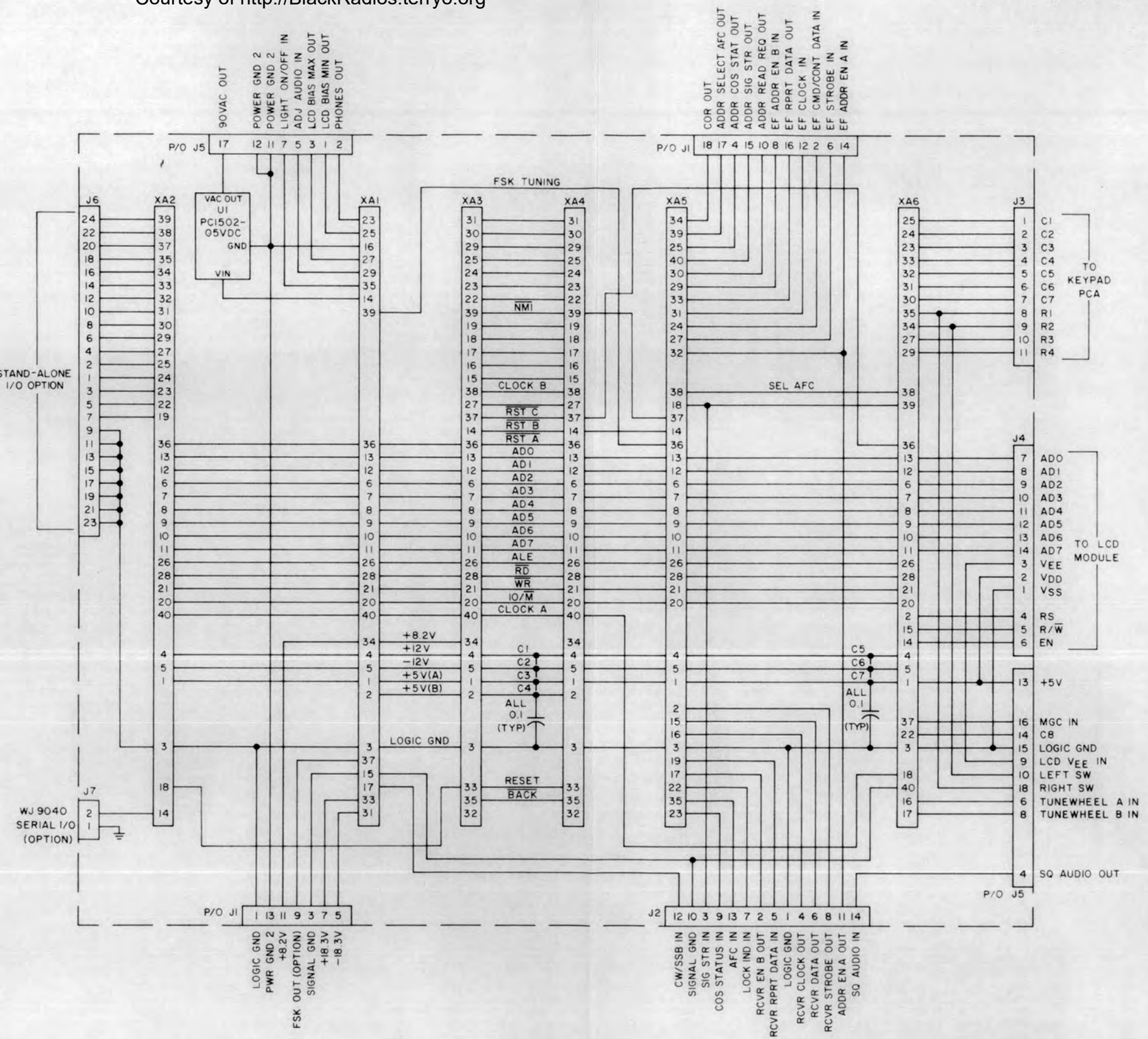



Figure 6-19. Type 794431-1 Controller Motherboard (A9), Schematic Diagram 470890

Courtesy of http://BlackRadios.terryo.org



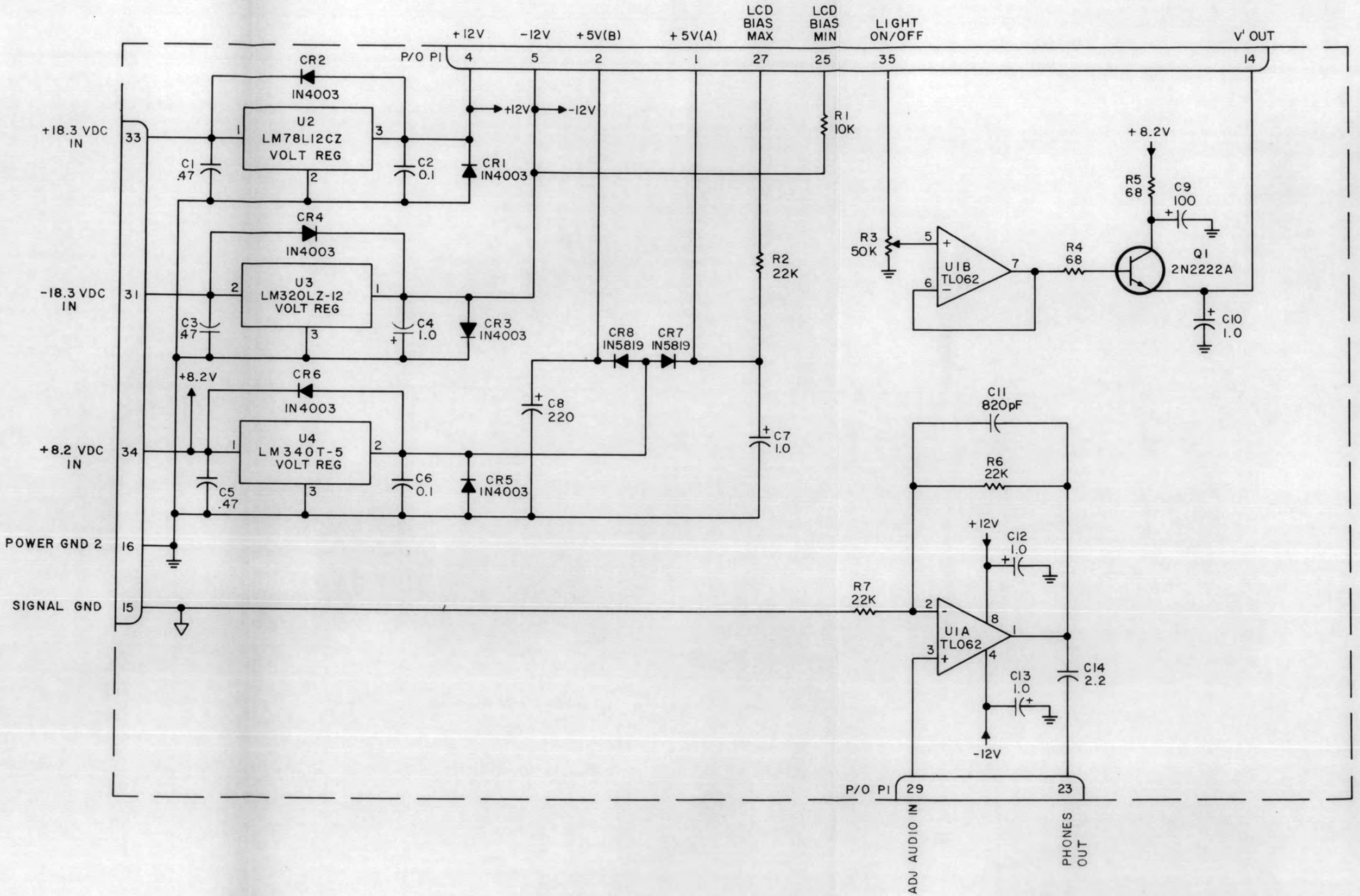



Figure 6-20. Type 794432-1 Voltage Regulator (A9A1), Schematic Diagram 470889

Courtesy of http://BlackRadios.terryo.org



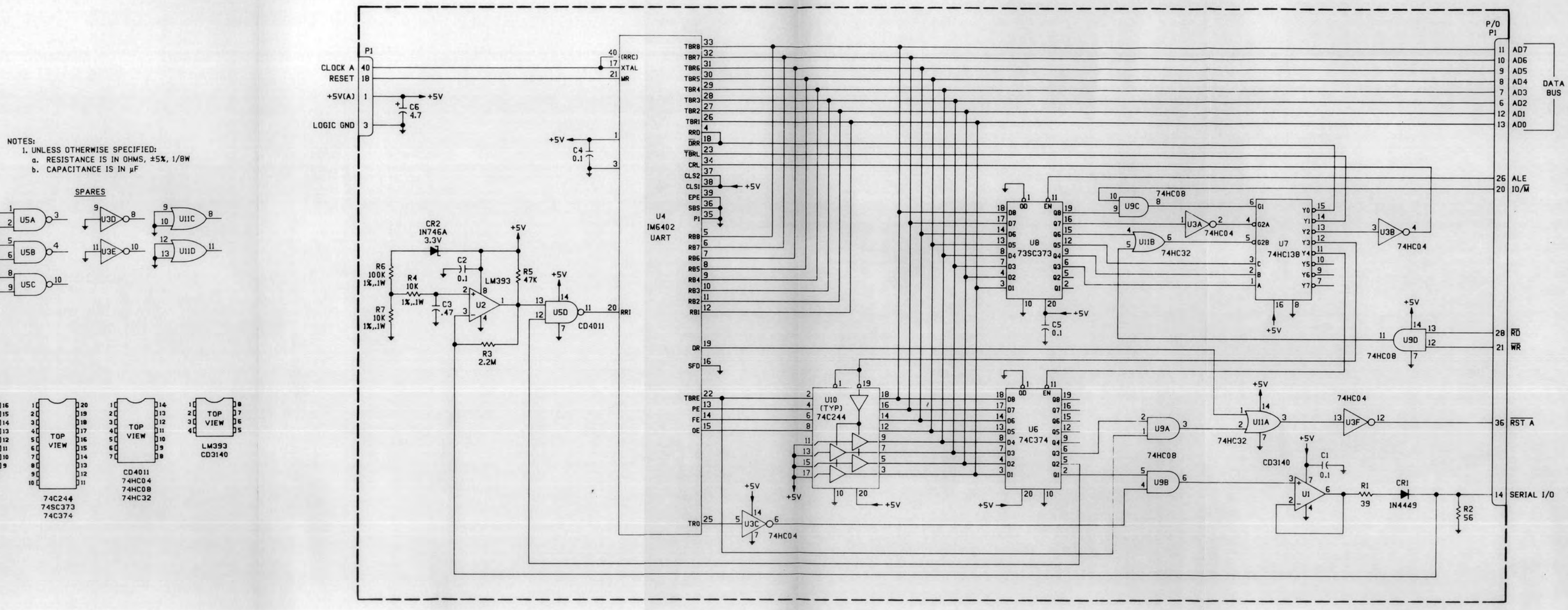
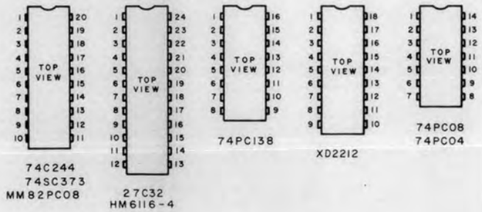



Figure 6-21. Type 794437-1 Serial I/O (A9A2), Schematic Diagram 470969

Courtesy of http://BlackRadios.terryo.org



NOTES:
UNLESS OTHERWISE SPECIFIED:
a) RESISTANCE IS IN OHMS, ±5%, 1/8W.
b) CAPACITANCE IS IN µF.



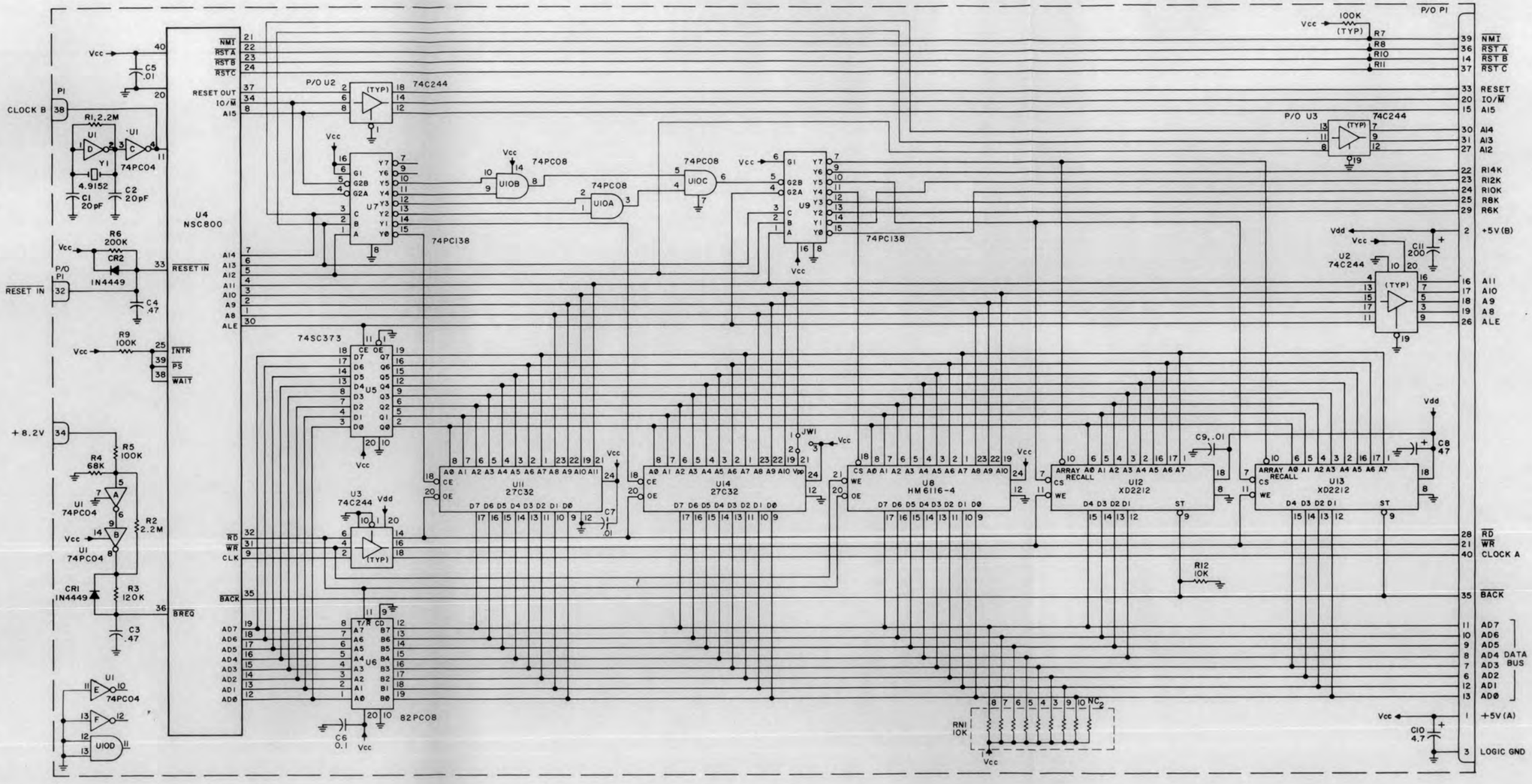



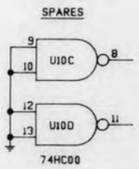

Figure 6-22. Type 794290-1 CPU (A9A3), Schematic Diagram 570213

Courtesy of http://BlackRadios.terryo.org



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) CAPACITANCE IS IN μF.

SPARES



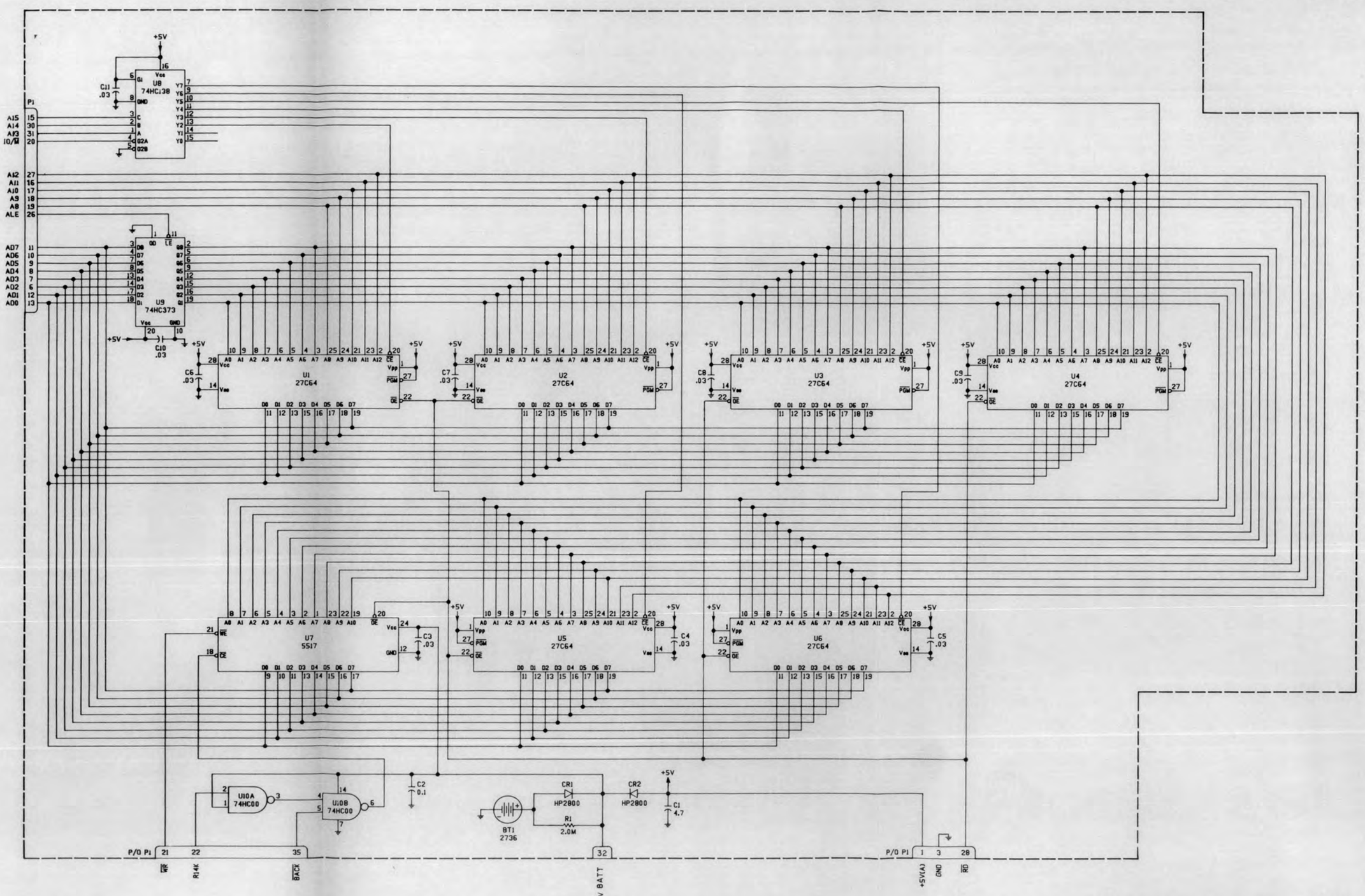




Figure 6-23. Type 794288-1 Extended Memory (A9A4), Schematic Diagram 470799

Courtesy of http://BlackRadios.terryo.org



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS,±5%,1/8W.
   b) CAPACITANCE IS IN µF.

SPARES

Figure 6-24. Type 794421-1 Receiver/EF Interface (A9A5), Schematic Diagram 470894

Courtesy of http://BlackRadios.terryo.org



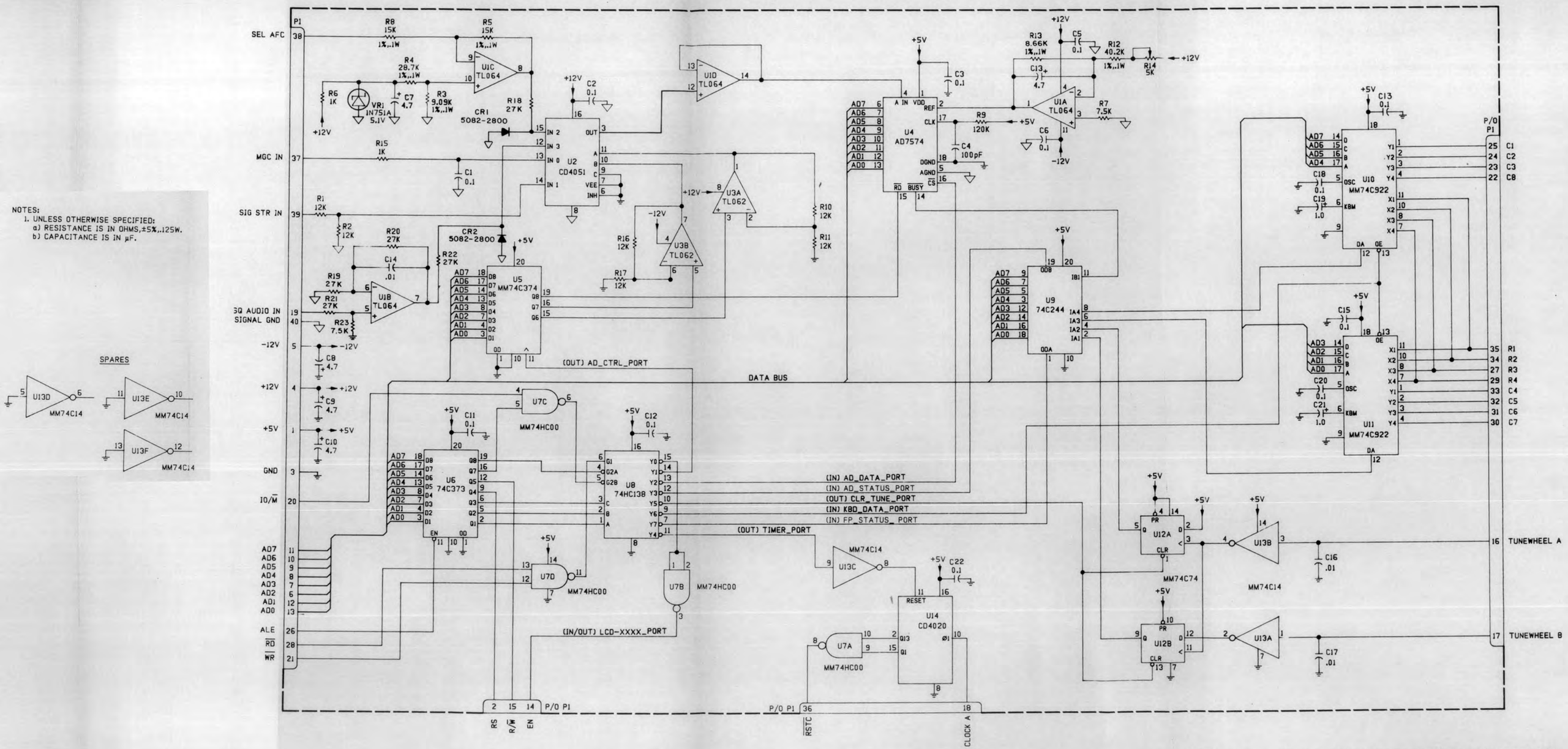



Figure 6-25. Type 794433-1 Front Panel Interface (A9A6), Schematic Diagram 470895

Courtesy of http://BlackRadios.terryo.org



NOTE
1. PI3 IS PREWIRED IN UNIT FOR 8626-4/PRE (OPTION).

| HIGHEST REF DESIG USED | | REF DESIG NOT USED |
|---|---|---|
| A9 | S2 | A7 |
| C5 | U1 | J3 |
| DS1 | W5 | J4 |
| E4 | | W4 |
| J6 | | |
| P14 | | |
| R3 | | |

Figure 6-26. Type WJ-8626A-4 HF Receiver Main Chassis, Schematic Diagram 470896

Courtesy of http://BlackRadios.terryo.org

| WJ MAT'INB-JOHNSON COMPANY | PSCN NO. 14632 | ENGINEERING DEVIATION/WAIVER | DEV./WAIVER NO. D5654 | REV. - |
|---|---|---|---|---|

| UNIT | TYPE OR PART NO. AND TITLE | REF. DESIG | SHEET NO. |
|---|---|---|---|
| WJ8626A-4 S/N 47 AND 49 | 794444-X EXTENDED CPU | A9A3 | 1 OF 3 |

| ☐ DEVIATION ☒ WAIVER | PECN REQD? ☐ YES ☒ NO | ECN REQ'D? ☐ YES * ☐ NO | PECN/ECN NO. [redacted] |
|---|---|---|---|

REASON:
CORRECT CUSTOMER COMPLAINT OF DISPLAY BLANKING ON POWER-UP.

EFFECTIVITY

PLANNER: [illegible] PROJECT ENGR: J Howard 6-1-94

| LOCATION | SERIAL/JOB NO. | LOT | QTY | REWORK YES | REWORK A/R | REWORK NO | REWORK N/A | REWORK QTY | REWORK INIT |
|---|---|---|---|---|---|---|---|---|---|
| REPAIR AND RETURN | SN 47 AND 49 ONLY | | 2 | ✓ | | | | | |
| SHPNG/FNSH GOODS | | | | | | | | | |
| FINAL TEST/PAT | | | | | | | | | |
| ALIGNMENT TEST | | | | | | | | | |
| LOADING | | | | | | | | | |
| MODULE TEST | | | | | | | | | |
| ASSEMBLY | | | | | | | | | |
| KITTING | | | | | | | | | |
| FAB SHOP | | | | | | | | | |
| VENDOR P.O. NO. | | | | | | | | | |

DESCRIPTION OF DEVIATION/WAIVER:
COMPONENT SIDE - BD REV C

CHNG R5, FROM: C/N S410283 P/N CF1/4-2.2M/J, (2.2M) 1/4W
TO: C/N S360331 P/N CF1/4-47K/J, (47K) 1/4W

CHNG R9, FROM: C/N S370317 P/N CF1/8-10K/J, (10K) 1/8W
TO: C/N S370313 P/N CF1/8-6.8K/J, (6.8K) 1/8W

CHNG R12, FROM: C/N S410282 P/N CF1/8-2.2K/J, (2.2K) 1/8W
TO: C/N S370231 P/N CF1/8-2.7OHMS/J, (2.7Ω) 1/8W

CHNG R15, FROM: C/N S370317 P/N CF1/8-10K/J, (10K) 1/8W
TO: C/N S370269 P/N CF1/8-100OHMS/J (100Ω) 1/8W

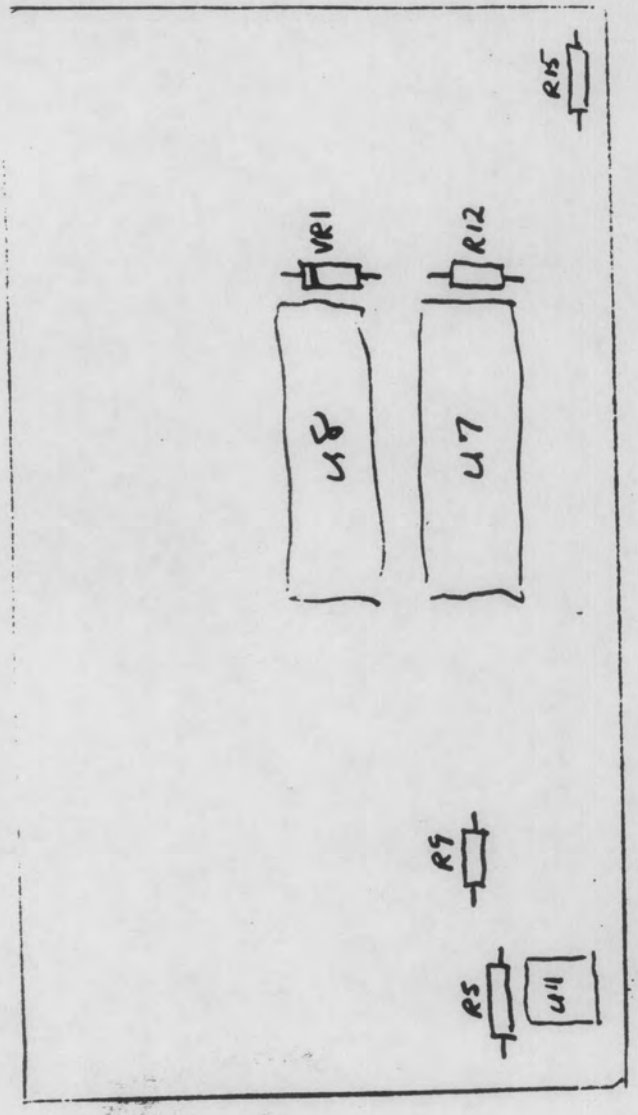
CHNG VR1, FROM: C/N S190102 P/N 1N746A (3.3V)
TO: C/N S190104 P/N 1N749A (4.3V)

| ORIGINATOR / DATE | PROJECT ENGR. / DATE | MECHANICAL ENGR. / DATE | PLANNER / DATE |
|---|---|---|---|
| JACK HOWARD 5/26/94 | J Howard 5/26/94 | [illegible] 5/26/94 | [illegible] 5/27/94 |
| **MFR / DATE** | **Q.A. / DATE** | **TEST ENGR. / OTHER / DATE** | **OTHER / DATE** |
| [illegible] 6/2/94 | [illegible] 6/2/94 | [illegible] 6/3/94 | |

FORM NO. CET-00001

Courtesy of http://BlackRadios.terryo.org

| WJ WATKINS-JOHNSON COMPANY | FSCM NO. 14632 | ENGINEERING DEVIATION/WAIVER | DEV./WAIVER NO. D5654 | REV. - |
|---|---|---|---|---|
| | | | SHEET NO. 2 OF 3 | |




| | From | To |
|---|---|---|
| R5 | 2.2M | 47K |
| R9 | 10K | 6.8K |
| R12 | 2.2K | 2.7Ω |
| R15 | 10K | 100Ω |
| VR1 | 1N746A | 1N949A |