

SECTION II
INSTALLATION AND OPERATION

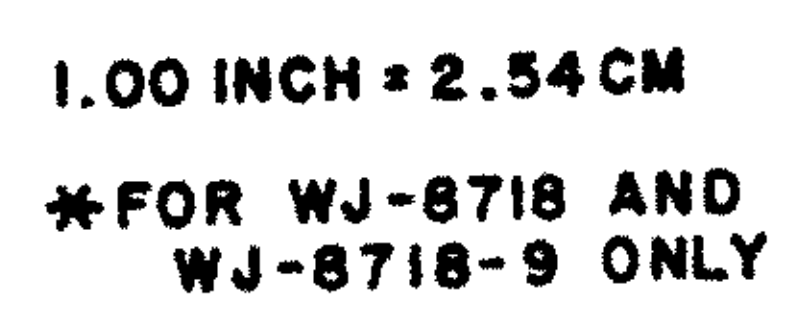


Figure 2-1. WJ-8718 Series Receiver, Critical Dimensions

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, try to 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 PREPARATION FOR RESHIPMENT AND STORAGE

If the receiver must be prepared for reshipment, the packaging 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: -30°C to 85°C

2.3 INSTALLATION

Rack mounting equipment, manufactured by Watkins-Johnson Company, is designed for assembly in 19 inch racks in accordance with MIL-STD-189 or E.I.A. Standard No. RS-310. It is recommended that chassis slides be added to the racks for ease of assembly, access to the unit, and to provide adequate support for general installations. Mobile installation of the equipment should be evaluated on an individual basis.

Watkins-Johnson equipment is designed for operational temperatures between 0°C and 50°C (32°F - 122°F). Equipment installation should provide for free-flowing air circulation around and through ventilated units. Multiple stacking, in particular close adjacent stacking of electronic equipment in a standard console, can produce an appreciable increase in operating temperature for all equipment contained within the console. Forced-air ventilation may be necessary to maintain proper air circulation and temperature for efficient operation of the equipment.

Access to the rear panel should be allowed so that input and output connections can be conveniently made or changed if desired. Figures 2-2 through 2-7 are photographs of the front and rear panels depicting connector locations for the WJ-8718, 8718A and 8718-9 receivers. A description of the functions and input/output parameters of each connector follows.

2.3.1 VOLTAGE SELECTOR/FUSE BLOCK AND LINE CORD RECEPTACLE (FL1J1)

This assembly should be inspected before installing the receiver in a new location. With the line cord unplugged, the clear plastic window can be slid over the three male power receptacle prongs. This exposes the line fuse and a hinged, plastic FUSE PULL lever.

Swinging of the FUSE PULL lever to the left ejects the fuse from the holder and frees a line-voltage-select PC wafer found at the bottom of the assembly. Looking down on the PC wafer at a slight angle on the left side shows the selected line voltage for the receiver, either 100, 120, 220, or 240 Vac. If the voltage shown does not match the available line voltage, remove the PC wafer and reinstall it so that the closest line voltage is visible with the PC wafer in position; the PC wafer should be set in the voltage position closest to the line voltage used. Then install the fuse suitable for the line voltage: 1 A, slow-blow for 100 Vac and 120 Vac, or 1/2 A, slow-blow for 220 Vac and 240 Vac. Install the other fuse in the alternate fuseholder.

Slide the clear plastic window back over the fuse and PC wafer portion of the assembly holder and insert the line cord in the receptacle.

2.3.2 RF INPUT (A2J1)

This BNC connector is the RF signal input for the receiver. Nominal input impedance is 50 Ω . The input is protected against signals exceeding +15 dBm (1.25 V rms) and static build-up.

2.3.3 ALTERNATE FUSEHOLDER (XF2)

This fuseholder provides convenient storage of the fuse for the line voltage not in use. There is no electrical connection to the fuseholder.

2.3.4 IF OUTPUT (J12)

This BNC connector supplies a 455 kHz IF output. The level will be 20 mV, minimum, into 50 Ω in AGC mode, for RF input signals greater than 3 μ V.

2.3.5 TERMINAL BOARD (TB1)

Two audio outputs are available on this board. They will be described separately.

- LINE AUDIO. These three terminals provide a floating, 600 Ω , center tapped audio output. This output will drive a 600 Ω load

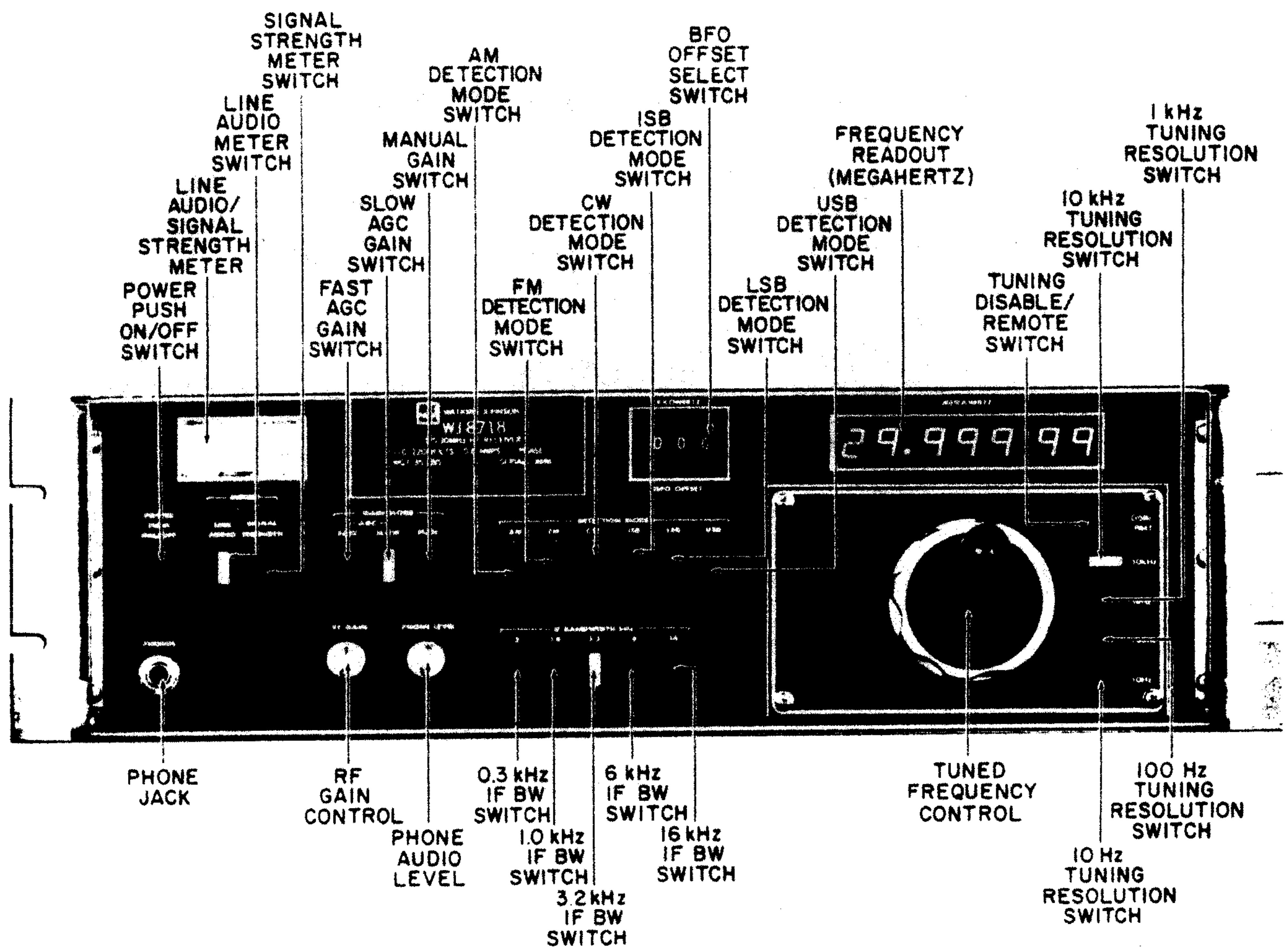


Figure 2-2. WJ-8718 Series HF Receiver, Front Panel View

FIGURE 2-3

WJ-8718 SERIES HF RECEIVER

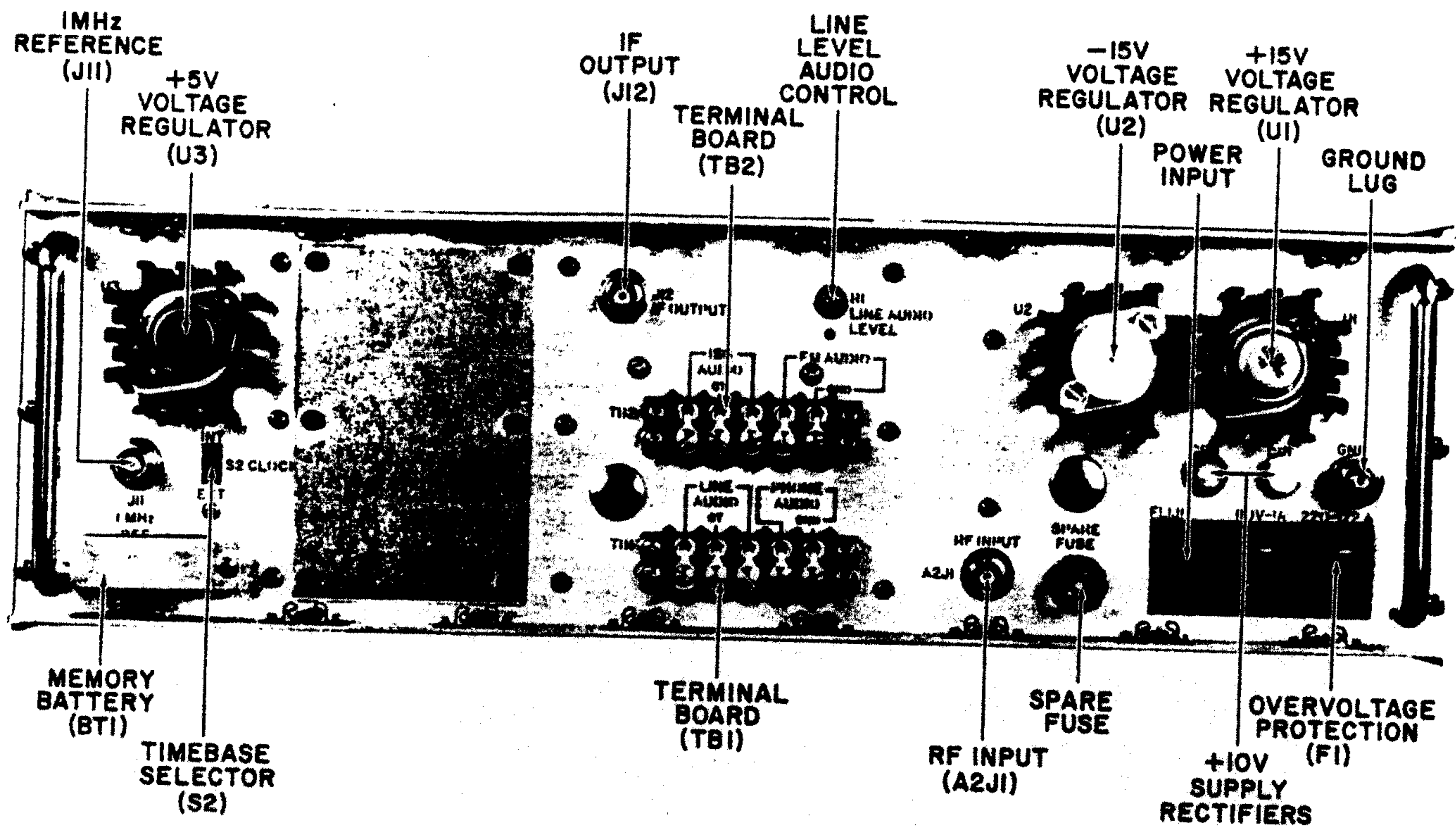


Figure 2-3. WJ-8718 Series Receiver, Rear Panel View

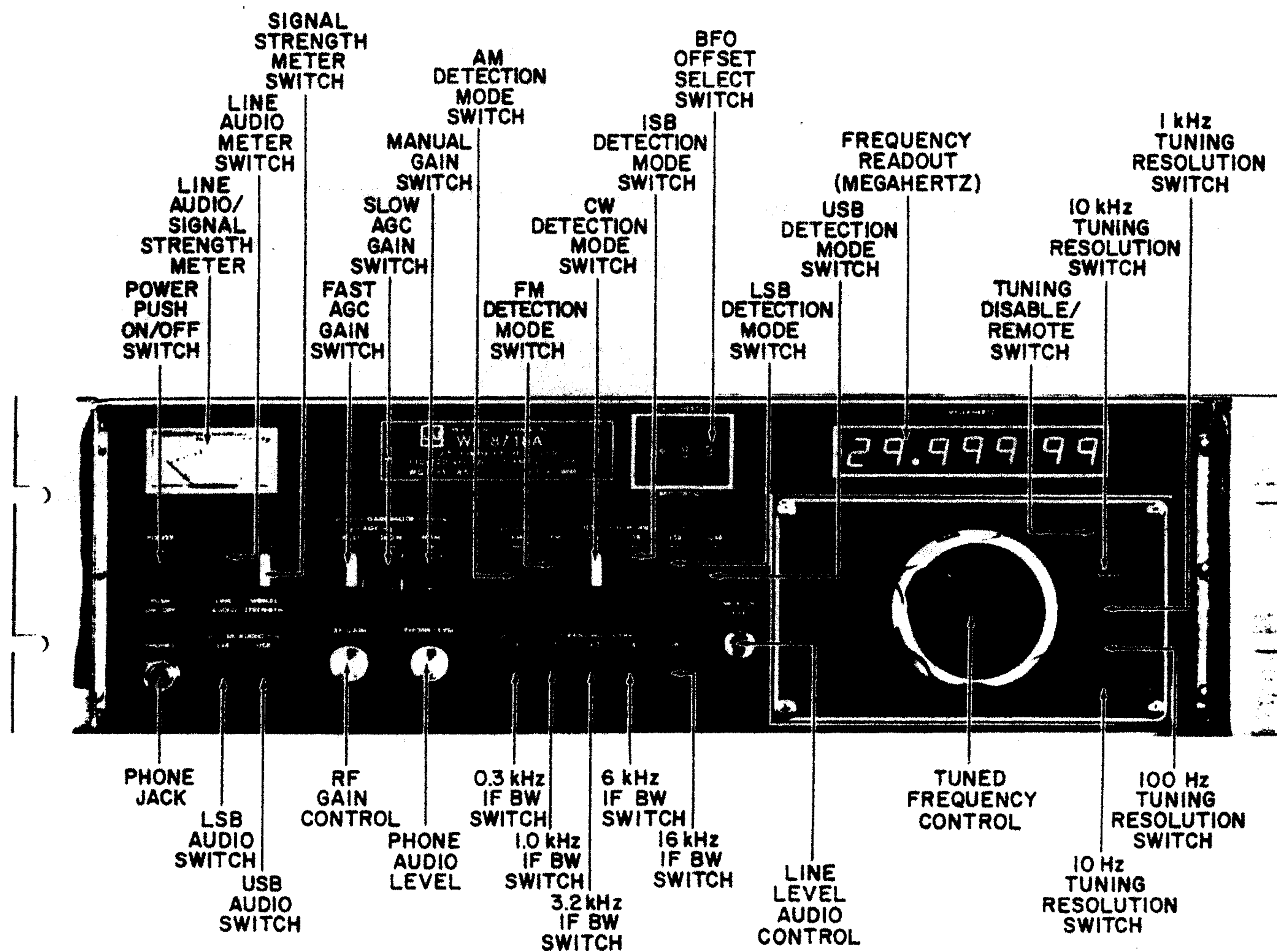


Figure 2-4. WJ-8718A HF Receiver, Front Panel View

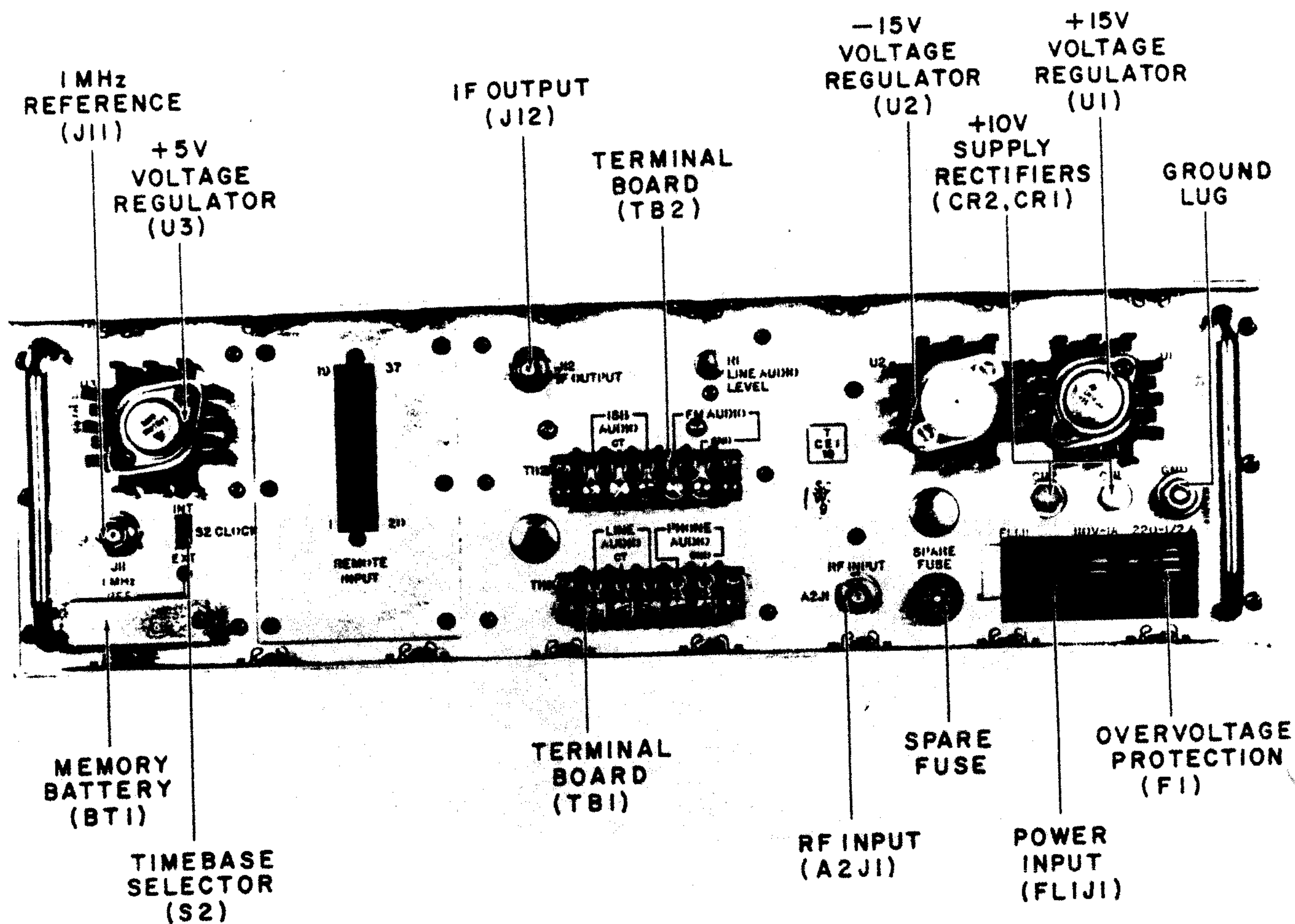


Figure 2-5. WJ-8718A HF Receiver, Rear Panel View

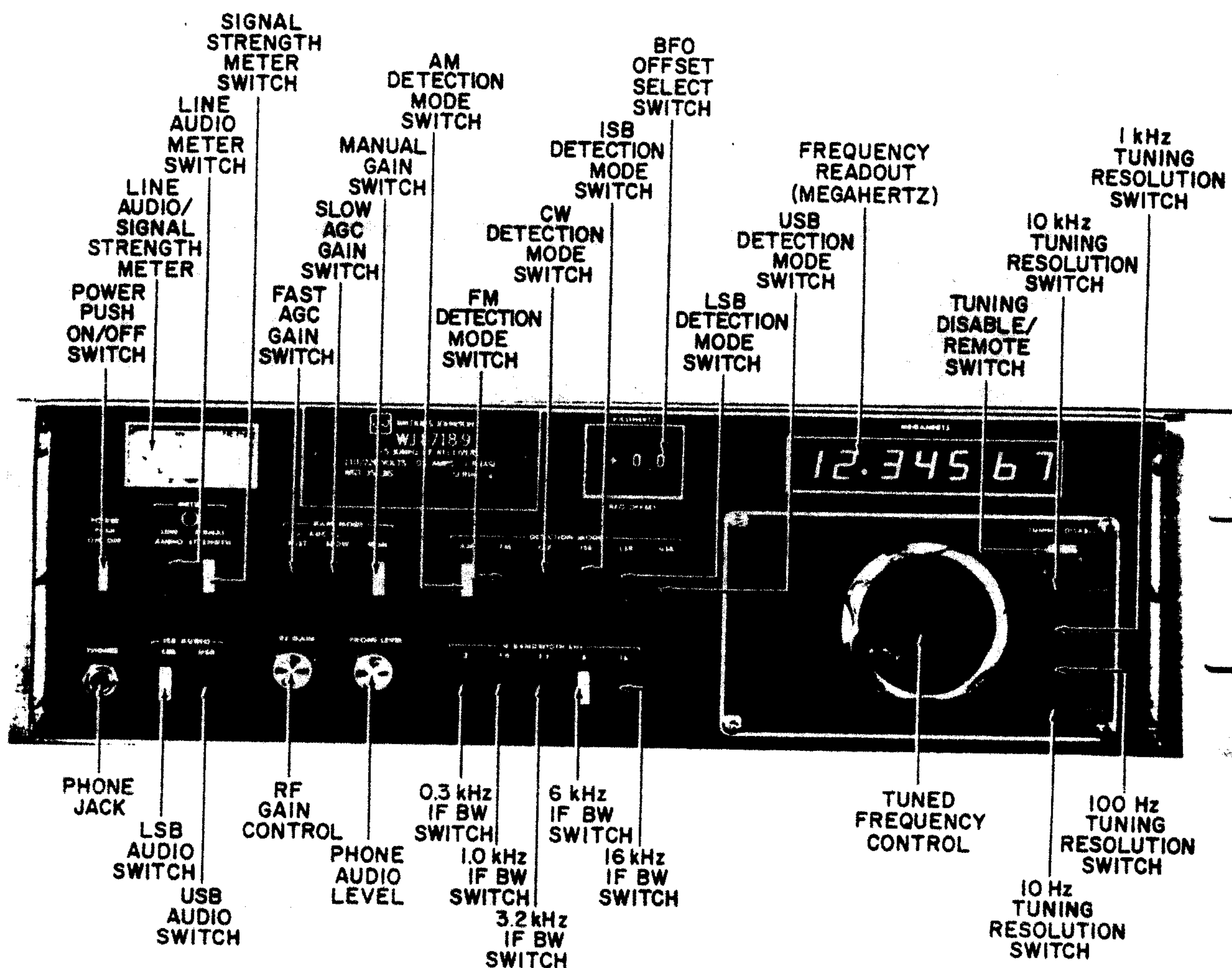


Figure 2-6. WJ-8718-9 HF Receiver, Front Panel View

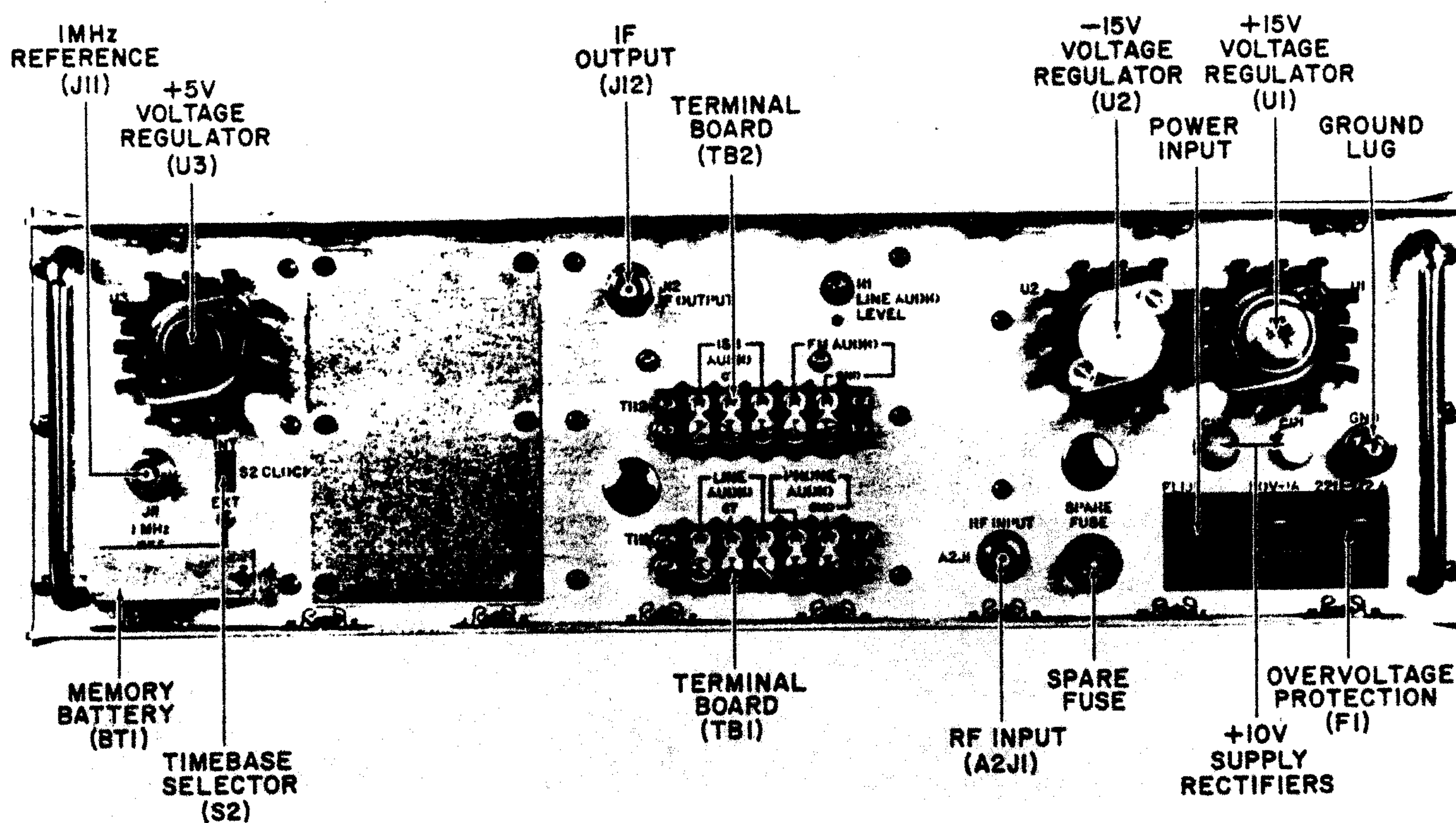


Figure 2-7. WJ-8718-9 HF Receiver, Rear Panel View

from zero (0) W to a minimum 1 W (0 V to 24.5 V rms). Actual level is determined by the setting of the LINE AUDIO LEVEL potentiometer R1. This line level is monitored by the front panel meter when the LINE AUDIO METER switch is engaged.

- PHONE AUDIO. This single ended output is parallel with the front panel PHONES jack and will drive a 600 Ω load. The front panel PHONE LEVEL potentiometer controls the output level to a maximum of 7.8 Vrms.

2.3.6 TERMINAL BOARD (TB2)

These outputs will be described separately.

- ISB AUDIO. Three of the terminals on this board provide a floating, center tapped, balanced output for driving a 600 Ω load. When in the ISB mode, only the LSB signal is available from this output. No other signal is available from these terminals. Audio level may be set to a maximum of 100 mW (7.75 V rms) using a potentiometer on printed circuit card A4A8. The USB signal for the ISB mode appears at the LINE AUDIO terminals of TB1.
- FM AUDIO. This is the audio output voltage from the FM/CW/SSB detector, A4A9. Measure with a high impedance voltmeter.

2.3.7 CLOCK SWITCH (S2)

Setting this switch to the INT position selects the internal time base for the receiver and provides the internal 1 MHz reference output at J11. Setting this switch to the EXT position deactivates the internal reference so that an external signal may be applied to J11.

2.3.8 1 MHz REF (J11)

When the CLOCK switch is in the INT position, this BNC connector provides a 1 MHz, 100 mV rms output into 50 Ω . When the switch is set in the EXT position, a 1 MHz reference signal of at least 50 mV rms into 50 Ω must be applied to J11 to provide a time base for the receiver.

2.3.9 PHONES JACK (J13)

This output is intended to drive a 600 Ω , or greater, stereo headphone set. When operating in the ISB mode, both USB and LSB information are monitored separately in the WJ-8718A/8718-9 receivers, and simultaneously in the WJ-8718.

2.3.10 REMOTE INPUT (A6A1J1)

This 37-pin input connector feeds remote control signals to the Manual Tuning Up/Down Counter, A6A1. Remote tuning is enabled by manually pressing the TUNING DISABLE pushbutton, or internally by connecting a jumper wire in Manual Tuning Up/Down Counter A6A1, as described in Note 4 of **Figure 6-19**. Frequency tuning and IF bandwidth can be remotely selected in AM, FM, or CW modes. Other modes automatically determine IF bandwidth. Identification of the Remote Input lines is shown in **Table 2-1**.

2.4 OPERATION

All front panel controls and indicators are described here. The pushbuttons have a mechanical interlock arrangement so that only one button of any group may be in at a time. Partial depression of a button in the out position releases any button previously depressed. A depressed button will be indicated by a brightly colored display behind the clear front surface. If no button has been depressed in any functional grouping, that particular mode will be inactive. For an explanation of front panel features, refer to the following paragraphs.

2.4.1 PUSH ON/OFF POWER (S1)

Press this button in to energize the receiver. During initial installation, be sure the line-voltage-select PC wafer on the rear panel matches the available line voltage before energizing the receiver. Refer to **paragraph 2.3.1** for the voltage selection procedure.

2.4.2 METER (M1)

The meter contains two scales of which one is a signal strength scale with a relative scale range of 0 to 110. This signal strength scale contains a MAN SET mark on the scale to indicate proper signal strength in the MAN gain mode. The other scale on the meter indicates the audio level of the LINE AUDIO output in dB above 1 mW, referenced to 600 Ω .

2.4.3 METER SWITCHES

These switches determine what function the meter will indicate with:

- LINE AUDIO. This position monitors the level of the rear panel LINE AUDIO output terminals. The meter scale indicates levels from 0 to 2 W (+33 dBm). Normal indication is 1 W.
- SIGNAL STRENGTH. This position provides a logarithmic indication of signal strength in AGC Mode, and a linear indication in MAN Mode. The meter indicates relative signal strength from 0 to 110. Normal indication would be at or near the MAN SET mark.

Table 2-1. Remote Input Lines Identification

Up/Down Counter Board A6A1		Remote Input A6A1J1	
E20		Pin- 9	3.2 kHz
E12		Pin- 5	0.3 kHz
E32		Pin-15	1.0 kHz
E24		Pin-11	6.0 kHz
E28		Pin-13	16 kHz
E16		Pin-33	BW enable
E39	2^0	Pin-37	10^1
E29		Pin-32	
E30		Pin-14	
E38	2^3	Pin-18	
E37	2^0	Pin-36	10^2
E34		Pin-16	
E33		Pin-34	
E35	2^3	Pin-35	
E26	2^0	Pin-12	10^3
E13		Pin-24	
E14		Pin- 6	
E25	2^3	Pin-30	
E22	2^0	Pin-10	10^4
E18		Pin- 8	
E17		Pin-26	
E21	2^3	Pin-28	
E10	2^0	Pin- 4	10^5
E08		Pin- 3	
E04		Pin- 1	
E09	2^3	Pin-22	
E06	2^0	Pin- 2	10^6
E11		Pin-23	
E15		Pin-25	
E5	2^3	Pin-20	
E36	2^0	Pin-17	10^7
E40	2^1	Pin-19	
E7		Pin-21	} Load
E19		Pin-27	
E23		Pin-29	} Ground
E27		Pin-31	

2.4.4 GAIN MODE

These switches establish the receiver gain mode.

- FAST AGC. The 15 ms response time provided is useful for AM and FM signals. SLOW AGC gives a 15 ms attack time and 2 sec decay time suitable for CW, ISB, and SSB signals.
- MAN GAIN. This mode activates the RF GAIN control which was inoperative in AGC modes. If the AM detector is overloaded in the MAN gain mode, switching to the SLOW AGC mode results in a recovery time several times longer than expected for the SLOW AGC mode.

2.4.5 RF GAIN CONTROL

When in the MAN gain mode, rotating the RF GAIN control clockwise approximates a logarithmic increase in receiver gain. With the METER switches in the Signal Strength mode, this control should be set for an indication at the MAN SET mark on the meter.

2.4.6 DETECTION MODE

One of the following six detection switches must be depressed to establish a detection mode. If the AM, FM, or CW switch is selected, an IF BANDWIDTH kHz switch also must be selected. Selection of optional ISB, USB, or LSB switches automatically activates other bandwidth filters related to these modes of operation.

- AM MODE. The Line Audio, Phone Audio, and front panel PHONES audio are taken from the AM detector in this mode.
- FM MODE. The Line Audio, Phone Audio, LINE AUDIO, PHONE AUDIO, and front panel PHONES audio are taken from the FM detector in this mode. A dc-coupled monitor voltage from the detector appears at the FM AUDIO terminals of TB2 for test purposes.
- CW MODE. Selection of this mode enables the BFO and the BFO OFFSET switch. The Line Audio, Phone Audio, and front panel PHONES audio are taken from the CW/SSB product detector in this mode.
- USB MODE. Selection of this mode overrides the front panel IF bandwidth switches and activates the independent IF filter for upper sideband reception. Audio is available at the front panel PHONES jack, and at the Audio Line terminals and Phone Audio terminals of TB1 on the rear panel. The BFO is enabled but fixed in frequency at 455 kHz. The frequency readout indicates the corresponding suppressed carrier frequency.

- **LSB MODE.** Except for the sideband selected, this mode is functionally identical to the USB mode.
- **ISB MODE.** Selection of this detection mode automatically activates separate IF filters independent of the front panel IF bandwidth selection. Both upper and lower sidebands are separately and simultaneously demodulated.

On the rear panel, lower sideband information will be available at the ISB Audio terminals of TB2. Upper sideband information will be available at the Line Audio terminals of TB1.

2.4.7 **IF BANDWIDTH (kHz)**

One of the following IF bandwidth switches must be selected during AM, FM, or CW detection modes; in the three SSB detection modes the IF bandwidth switches are inoperative. Available bandwidths are: 0.3 kHz, 1.0 kHz, 3.2 kHz, 6 kHz, and 16 kHz.

2.4.8 **BFO OFFSET**

These thumbwheel switches are activated only in the CW detection mode. The BFO offset is ± 8.9 kHz (from 455 kHz) in steps of 100 Hz. The BFO signal is injected after the IF bandwidth filters, ensuring that pitch is independent of the IF bandwidth. Switching to "0" of the "+, 0, -" section of the switch automatically tunes the BFO to 455 kHz, regardless of the setting of the numerical sections.

2.4.9 **TUNED FREQUENCY READOUT**

This seven-digit readout displays the tuned frequency of the receiver. Each digit is a seven-segment LED with intensity controlled by a single potentiometer located inside the receiver. The least-significant digit, at the far right, indicates 10's of Hz. Tuned frequency is displayed for both local and remote control of the receiver.

2.4.10 **TUNING KNOB**

Rotating the knob clockwise increases tuned frequency; counterclockwise rotation decreases tuned frequency. Continuing to tune past the end of the range causes the receiver to step to the opposite end of the band and to continue tuning in the same increasing or decreasing frequency direction. The receiver tunes from 00.00000 MHz to 29.99999 MHz, useable above 5 kHz.

2.4.11 TUNING RESOLUTION (A7)

- **TUNING DISABLE.** Engaging this button locks the receiver to the frequency currently being displayed. Any other tuning-related button engaged will be released and the tuning knob disabled. Also, by engaging this button, the receiver may be tuned remotely, if this option is installed. Depressing any tuning button slightly releases all buttons and also disables tuning.
- **10 kHz BUTTON.** With this button engaged, only the four most-significant digits of the readout can be varied by the tuning knob. The 1 kHz, 100 Hz, and 10 Hz digits will be locked to the frequency indicated when the 10 kHz button was engaged.
- **1 kHz BUTTON.** With this button engaged, the five most-significant digits of the readout can be varied by the tuning knob. The two least-significant digits will be locked to a fixed frequency.
- **100 Hz BUTTON.** With this button engaged, only the 10 Hz digit is locked to frequency. All others are available for tuning.
- **10 Hz BUTTON.** With this button engaged, all digits are available for tuning.

2.4.12 LINE AUDIO LEVEL (R1) (WJ-8718A only)

This potentiometer adjusts the level of audio signals on the LINE AUDIO terminals of TB1. The front panel meter monitors this output when the related LINE AUDIO switch is engaged. Rotating this control fully clockwise provides a 1 W audio output (24.5 V rms/-+30 dBm) into 600 Ω .

2.4.13 PHONE LEVEL CONTROL

Rotating the front panel PHONE LEVEL control clockwise increases the output of both Phone Audio terminals at TB2 and the stereo PHONES jack on the front panel.

2.4.14 ISB AUDIO SWITCH (WJ-8718A/8718-9 only)

With the USB Switch depressed, USB audio is fed to both earphones. With the LSB Switch depressed, LSB audio is fed to the earphones. With neither switch depressed, USB audio is fed to one earphone and LSB audio is fed to the other earphone.