

**INSTRUCTION
MANUAL
FR-101**

YAESU MUSEN CO., LTD.

TOKYO JAPAN

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FR-101

COMMUNICATIONS RECEIVER



GENERAL DESCRIPTION

The model FR-101 is a solid-state communications receiver designed to provide extreme flexibility that even the most demanding amateur desires with provisions for all mode reception on twenty one 500 KHz amateur and major shortwave broadcast bands from 160 through 2 meters. The versatile FR-101 receiver is capable of transceive or independent receive and transmit function with the matching FL-101 transmitter or FT-101E/277E transceiver.

New, solid-state technology, with features such as a double-balanced mixer, offer unparalleled performance and rejection of cross-modulation and intermodulation interference. All circuits are composed of standard, computer type, plug-in modules, for reliable operation and service simplicity. A linear tuning, temperature compensated VFO with 1 KHz frequency readability is

incorporated. A 100 KHz/25 KHz crystal calibrator is built-in. The FR-101 also includes fast attack/slow release AGC for SSB or AM and fast release for CW. If desired, the AGC can be completely disabled. A built-in noise blanker with adjustable threshold control provides excellent elimination of most impulse type noise.

In addition to external VFO operation, a crystal oscillator is built-in for crystal-control operation of 4 channels of fixed frequency reception. The FR-101 includes a self-contained AC power supply - adjustable from 100/110/117/200/220/234 volt AC when the primary power transformer winding is appropriately wired.

The SP-101PB/277PB phone-patch and external speaker combination is a useful accessory for amateur operation.

SPECIFICATIONS

Frequency Range:

160m	1.8 ~ 2.0 MHz	
80	3.5 ~ 4.0	
60	4.5 ~ 5.0*	
40	7.0 ~ 7.5	
31	9.5 ~ 10.0*	
25	11.5 ~ 12.0*	
20	14.0 ~ 14.5	
19	15.0 ~ 15.5*	
16	17.5 ~ 18.0*	
15	21.0 ~ 21.5	
13	21.5 ~ 22.0*	
11	25.5 ~ 26.0*	
CB	27.0 ~ 27.5*	
10A	28.0 ~ 28.5	
10B	28.5 ~ 29.0	
10C	29.0 ~ 29.5*	
10D	29.5 ~ 29.9*	
VHF 6m	50.0 ~ 52.0*	52.0 ~ 54.0*
VHF 2m	144 ~ 146*	146 ~ 148*
☆1	4.0 ~ 4.5**	
☆2	5.0 ~ 5.2**	
☆3	7.5 ~ 9.0**	
☆4	22.0 ~ 27.0**	

Type of Emission:

USB, LSB, CW, AM, FM* or RTTY

Frequency Stability:

Within 100 Hz during any 30 minute period after warm-up. Not more than 100 Hz with 10% line voltage variation.

Calibration Accuracy:

1 KHz maximum after 100 KHz calibration.

Backlash:

Not more than 50 Hz.

Antenna Impedance:

50 ohm unbalanced nominal.

Power Requirement:

100/110/117/200/220/234 volt AC 50/60 Hz or 13.5 volt DC nominal.

Sensitivity:

SSB and CW...0.3 μ V for 10 dB Noise plus Signal to Noise Ratio on 14 MHz.

AM.....1 μ V on 14 MHz.

FM12 dB SINAD

Selectivity:

CW·N*0.6 KHz/6 dB, 1.5 KHz/60 dB

CW, SSB, RTTY, AM·N

.....2.4 KHz/6 dB, 4 KHz/60 dB

AM·W*.....6 KHz/6 dB, 12 KHz/50 dB

FM*.....20 KHz/6 dB, 45 KHz/50 dB

Harmonic & Other Spurious Response:

Image Rejection Better than 60 dB.

Internal Spurious Signal ... Below 1 μ V equivalent to antenna input.

Automatic Gain Control:

AGC threshold nominal 1 μ V.

Selectable AGC time constant, fast or slow.

Fast attack time 3 milli-second and slow attack time 4 milli-second. Fast release time 0.5 second and slow release time 2 seconds.

Audio Noise Level:

Not less than 40 dB below 1 watt.

Audio Output:

2 watts at 4 ohm impedance.

Audio Distortion:

Less than 10% at 2 watts output.

Dimensions:

340(W) x 153(H) x 285(D) mm.

Weight:

9 Kg.

*Options for FR-101 Standard Type Receiver.

**Options for FR-101 Standard and Deluxe Type Receives.

SEMICONDUCTORS

Silicon TR:

18 x 2SC372Y, 1 x 2SC710D, 6 x 2SC735Y

FET:

8 x 2SK19GR, 3 x 3SK35, 1 x 3SK40M

IC:

1 x AN214, 1 x TA7061AP, 2 x CA3053,

1 x MC1496G, 1 x MFC6034A

Diode:

2 x 1S2236, 1 x 1S2689, 5 x WZ090, 1 x WZ0109,

1 x 1S993, 6 x 1S1555, 14 x 1S1007,

4 x 1S188FM, 4 x V06B, 2 x TLR104

INSTALLATION

GENERAL

Carefully remove the FR-101 receiver from the carton and examine it for any physical damage. Should any be apparent, notify the carrier immediately, stating the damage in detail. Save the carton and packing materials for future use.

LOCATION

In general, the location of the FR-101 is not critical, however it is recommended that excessively warm locations be avoided. The FR-101 should be placed in a location that has adequate space to permit free air circulation through the cabinet opening.

POWER REQUIREMENT

Two prewired plugs are furnished with the unit for AC or DC voltage operation. The FR-101 is supplied with a multi-voltage power transformer and can be operated in many areas of the world where voltages may differ from your local supply voltage. Therefore, before connecting the AC cord to the power outlet, be sure that the voltage marked on the rear of the receiver agrees with the local AC supply voltage.

CAUTION

PERMANENT DAMAGE WILL RESULT IF IMPROPER AC SUPPLY VOLTAGE IS APPLIED TO THE RECEIVER.

The FR-101 will operate satisfactorily from 12 volt, negative ground battery source by connecting the DC power cord to the rear panel receptacle. The receiver requires an average of 0.5 amp. When making connections to the battery, be certain that the RED lead is connected to the positive (+) and the BLACK lead to the negative (-) terminals of the battery. Reversed connection could permanently damage the receiver circuitry.

ANTENNA AND GROUND

The FR-101 is designed for use with a resonant antenna at the operating frequency and having an impedance of 50 to 75 ohms. This requirement is easily met by using a center-fed dipole antenna resonated to the receiving frequency and fed with coaxial cable. For amateur band operation, any commercially designed antenna system with an impedance of 50 to 75 ohms may be used.

If a tuned, open-wire transmission line or a long wire antenna is used, a suitable antenna tuner must be used between the receiver and antenna. For more detailed description on antennas, please refer to "The ARRL Antenna Hand Book" or "The Radio Amateur Hand Book".

It is recommended to use the transmitting antenna when the FR-101 is used with a transmitter or a transceiver. Antenna change-over is accomplished by an antenna relay provided in our transmitter or transceiver.

The FR-101 should be connected to a good ground. The ground lead should be connected to the terminal marked GND located on the rear panel of the receiver.

SPEAKER

A 4 ohm speaker should be connected to the jack on the rear of the chassis marked SP. One lead of the speaker output is grounded to the chassis so that the one lead of the speaker should be connected as illustrated in Figure 1. Our accessory speaker model SP-101B/277B or SP-101PB/277PB provides the correct impedance match and matches in appearance with the FR-101.

HEADPHONE (4 to 8 ohm impedance)

A headphone jack is provided on the front panel for the use of a high sensitivity headphone. When a low sensitivity headphone is used, the 100 ohm resistor, R11, should be shorted for adequate volume. (Ref. to Fig. 2)

MUTE

The MUTE jack on the rear of the chassis is wired so that the receiver will operate only when the inner-conductor of this jack is shorted to ground. When the FR-101 is operated separately, and external muting is not desired, the RCA plug with shorted inner and outer conductors should be inserted into the MUTE jack. The inner-conductor should, therefore, be connected to a relay contact in the transmitter, or the transceiver, which is normally open in transmit and grounded in receive. It is recommended that a shielded wire be used for the interconnection between the transmitter or transceiver.

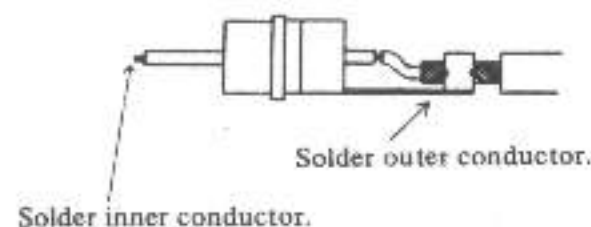


Fig. 1



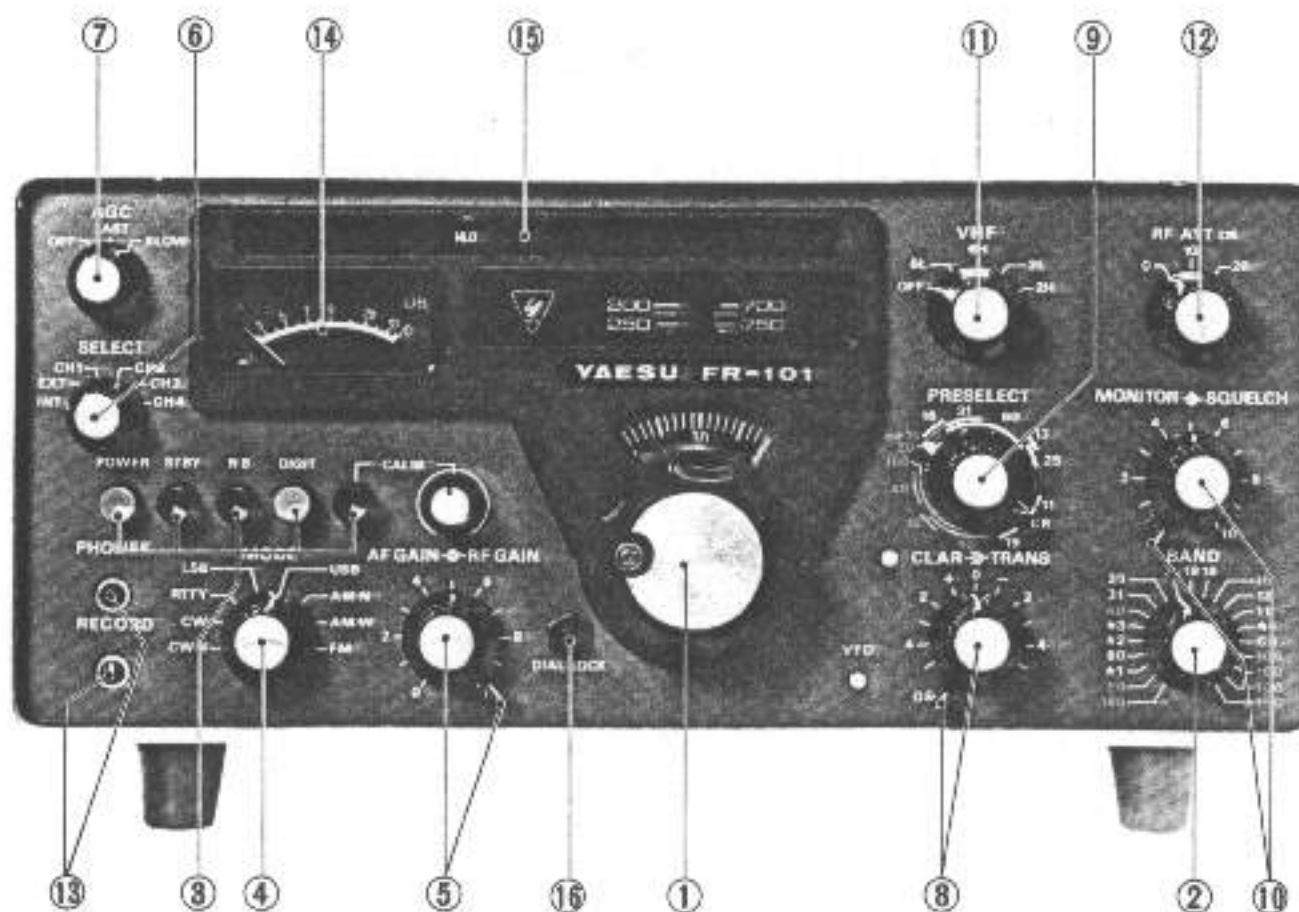
Fig. 2

CONTROLS AND SWITCHES

The FR-101 has been specifically designed for ease of operation and versatility. All controls have been properly adjusted at the factory. Several panel controls and switches are unusual in operation, and improper adjustment may result in poor receiver performance. The

function of various controls and switches is described in the following section. Be certain that you understand thoroughly the individual function of each before operating the receiver.

FRONT PANEL



(1) MAIN TUNING

The MAIN TUNING knob determines the frequency which you are receiving.

(2) BAND

The BAND switch is a twenty one position switch. The tunable frequency range of each band is listed in the specifications on page 2.

(3) FUNCTION SWITCH

The FUNCTION switch consists of five push button switches: POWER, STBY, NB, DIGIT and CALIB.

POWER: When this switch is in the depressed position, the power transformer primary is connected to the power line for AC operation. A separate DC cable is provided for connection to a battery for DC operation.

STBY: With this switch in the depressed position, the receiver is muted.

NB: With this switch in the depressed position, the Noise Blanker is activated.

DIGIT: This switch is used on the digital readout receiver to turn off the last digit if the flicker is annoying.

CALIB: With this switch in the depressed position, the 100 KHz/25 KHz calibrator is switched on.

A control is used for the calibration of the digital model only.

(4) MODE

The MODE switch is an eight position switch which determines the appropriate detector and the filter in use. In the AM position, a diode detector is incorporated and the carrier oscillator is switched off. In the CW, RTTY, and SSB (USB & LSB) positions, a ring demodulator is used as a detector with the appropriate carrier oscillator turned on. In the FM position, an (optional) FM detector unit is switched in. The appropriate filter is also automatically selected by the MODE switch.

(5) AF-RF GAIN

The AF and RF GAIN control is a concentric double-shaft potentiometer. The inner knob controls the audio output level of the receiver and the outer lever knob controls the RF and IF gain of the receiver.

(6) SELECT

This switch provides the selection of an external VFO or one of four crystal-controlled oscillator positions. Normal operation of the FR-101 requires that the switch be placed in the "INT" (Internal) position. When the switch is in the "INT" position, a red lamp marked VFO is lighted.

(7) AGC

This switch selects the AGC time constant. In the SLOW position, the AGC time constant is 0.75 second and in the FAST position, it is approximately 0.025 second. In the OFF position, AGC voltage is not generated. The SLOW position is normally used with SSB and CW, and the FAST position is normally used for break-in CW and RTTY. The OFF position may be used on CW under difficult reception conditions in conjunction with the RF Gain control

(8) CLAR-TRANS

These controls use a concentric double-shaft potentiometer. The CLAR (Clarifier) control - the inner knob - provides a means of varying the receiver frequency a few KHz to either side of the transmitting frequency when the FR-101 is used as a companion receiver to the FL-101 or FT-101E/277E. Thus it is possible to set the pitch of the voice you are receiving to the most readable point without affecting your transmitting frequency. The CLAR control may be switched off and the receiver locked to the transmitting frequency by setting the CLAR control to the OFF position. Normally, you will want to keep the clarifier in the OFF position until the initial contact is made. The CLAR control may then be used to zero-in and correct any drift on the received signal. With the clarifier ON position, a red lamp is lighted.

The TRANS (Transceiver) control is used to coincide the receiving frequency with transmitting frequency when the FR-101 is used in conjunction with the FL-101 or

FT-101E/277E. Slowly advance the MONITOR knob of the FR-101 to monitor the transmitted signal, then adjust the TRANS control for the most natural voice quality while transmitting.

(9) PRESELECTOR

The PRESELECTOR control permeability-tunes the antenna and RF coils in the receiver front-end. The scale on this control is calibrated with the wave length markings showing the correct setting for various bands. This control has two pointers - red and white. The red pointer corresponds to red band markings and the white pointer to white band markings.

(10) MONITOR-SQUELCH

The MONITOR control is used to monitor the transmitted signal when the FR-101 is used in transceive with the FL-101 transmitter or FT-101E/277E transceiver. The SQUELCH control adjusts the receiver squelch threshold sensitivity in the FM reception mode (when the optional FM detector unit is installed).

(11) VHF

The VHF switch selects the (optional) 6 meter and 2 meter VHF convertors. In normal reception, this switch should be set to the HF position.

(12) RF ATT

The RF ATT (RF Attenuator) switch attenuates the incoming signal to prevent over-loading of the front-end when an extremely strong signal is present.

(13) PHONE-RECORD

PHONE and RECORD jacks are provided for private listening and recording when desired. The attenuator resistor, R11, is connected to the PHONE jack in order to use high sensitivity stereo headphones.

(14) S-METER

The S-METER indicates the relative signal strength of a received signal. It is calibrated in S-Units from S-1 to S-9 and in DB over S-9.

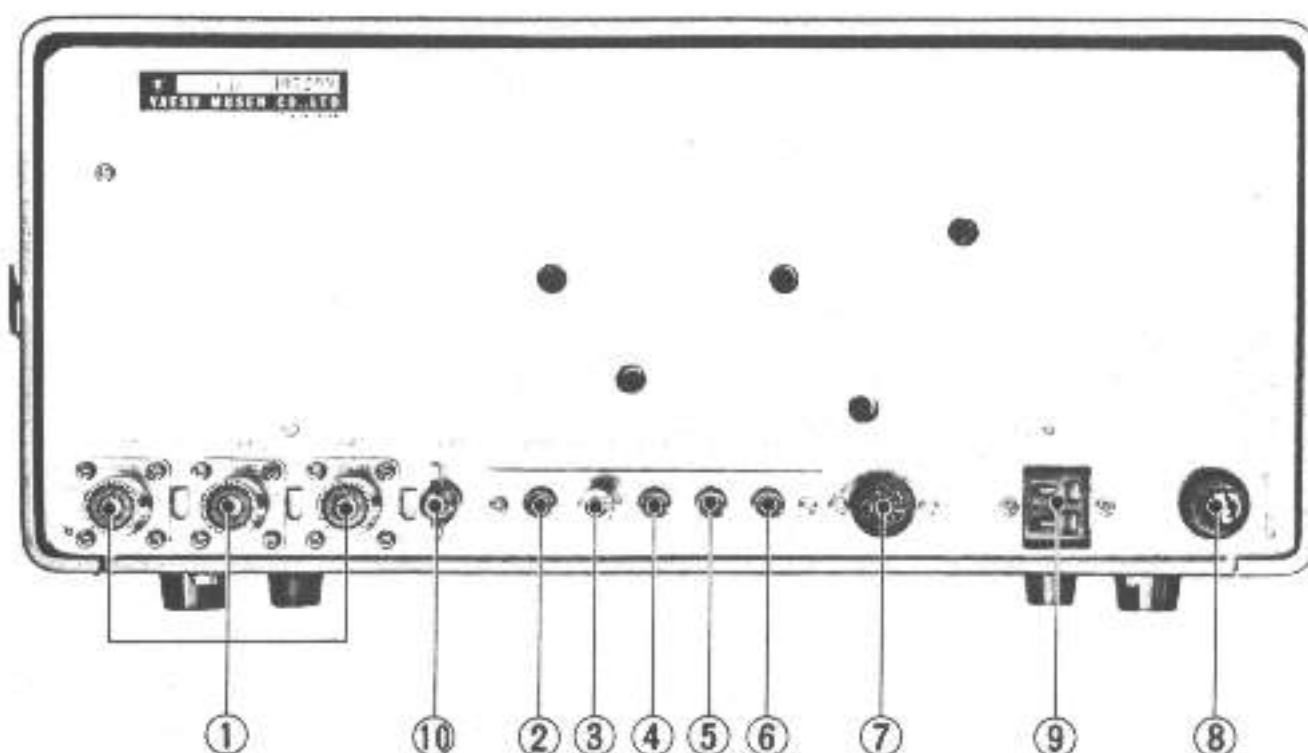
(15) BAND INDICATOR

The BAND INDICATOR automatically indicates the band in use when the BAND switch is set to the desired band.

(16) DIAL LOCK

The DIAL LOCK locks the dial for the dial calibration.

REAR PANEL CONNECTIONS



(1) ANTENNA CONNECTOR

Three coaxial connectors are provided for separate use on HF, 6 meter and 2 meter bands. The input impedance is approximately 50 ohms and an antenna having an impedance between 50 to 75 ohms should be used.

(2) AUX JACK

An AUXILIARY jack is provided for optional use and this jack is not wired internally.

(3) MUTE JACK

The MUTE jack is for externally muting the receiver. Shorting the center conductor to ground places the receiver in the receive mode and the FR-101 mutes when the center conductor is open from ground.

(4) TONE JACK

The TONE jack is for input of an external sidetone signal in CW operation.

(5) SP JACK

The SP jack is for a connection of 4 ohm speaker, such as our SP-101B/277B.

(6) A. TRIP

The receiver audio signal is brought out from the A. TRIP (Anti-Trip) jack for use in energizing the VOX circuit of a transmitter used with the FR-101, such as our FL-101 or FT-101E/277E.

(7) VFO

This socket is used for coupling the VFO signal of FR-101 to the FL-101 or FT-101E/277E, so that transceive operation may be obtained.

(8) FUSE

A 1 amp. fuse is used to protect the FR-101. For 220 volt operation, a 0.5 amp. fuse should be used.

(9) POWER

The POWER socket accepts AC or DC voltages. AC and DC cables are provided.

(10) GND

This is for a GROUND connection.

OPERATION

The receiving procedure of the FR-101 is not complicated, however care should be exercised when tuning to insure optimum performance of the equipment. The following paragraphs describe the procedures for the operation of the receiver.

INITIAL CHECK

Before connecting the FR-101 to a power source, carefully examine for any visible damage. Check that all modules and crystals are firmly in their sockets and that controls and switches are operating normally. Be sure that the voltage specification marked on the rear panel matches the supply voltage.

FREQUENCY SELECTION

The main tuning dial has two scales for proper frequency readout and is marked in 50 KHz increments to provide a coarse setting within a given band. The white scale is for 0 to 500 KHz and a green scale is for 500 KHz to 1 MHz. The sub-dial in window is marked in 1 KHz increments and provides accurate settings of the received frequency.

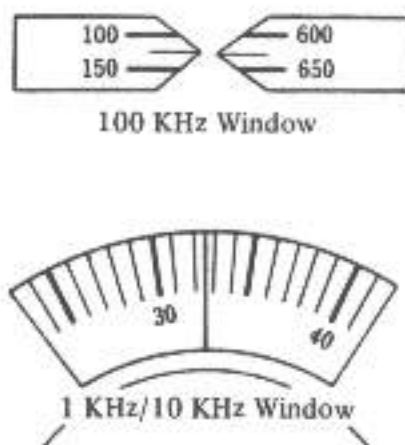


Fig. 3

The lower frequency limit of the main tuning dial is automatically illuminated in the top window of the dial escutcheon by setting the BAND switch. For example, when the BAND switch is set to 25 meter band, the top window shows 11.5 MHz as starting frequency. Therefore, the green scale is used for the frequency readout. The setting shown in the example, Figure 3, would then be 11,632.5 KHz, when the BAND switch is set to 25 meter band. When the BAND switch is set to 20 meter band, then the starting frequency is now 14.0 MHz. Therefore, the above setting would then be 14,132.5 KHz. The amateur bands are marked in red on the BAND switch. For VHF reception (with the optional convertors), the 10 meter bands are used as a variable IF stage. Refer to the Table 1 for the correct frequency readout.

BAND	HF (MHz)	6L (MHz)	6H (MHz)	2L (MHz)	2H (MHz)
10A	28.0	50.0	52.0	144.0	146.0
	28.5	50.5	52.5	144.5	146.5
10B	28.5	50.5	52.5	144.5	146.5
	29.0	51.0	53.0	145.0	147.0
10C	29.0	51.0	53.0	145.0	147.0
	29.5	51.5	53.5	145.5	147.5
10D	29.5	51.5	53.5	145.5	147.5
	30.0	52.0	54.0	146.0	148.0

Table 1

PRELIMINARY CONTROL SETTING

For all modes of operation, set the controls as follows:

POWER	OFF (push out position)
AGC	SLOW (push out position)
SELECT	INT
STBY	OFF (push out position)
NB	OFF (push out position)
DIGIT	OFF (push out position)
CALIB	OFF (push out position)
MODE	Desired mode
AF GAIN	Comfortable listening level
RF GAIN	Fully clockwise
VHF	HF
RF ATT	0
MONITOR	Fully counter-clockwise
SQUELCH	Fully counter-clockwise
CLAR	OFF
TRANS	Fully counter-clockwise
BAND	Desired band
PRESELECT	Set the band mark and peak for maximum S-meter reading.

Push in the POWER switch and tune the main tuning dial for the desired signal and peak the PRESELECTOR for a maximum S-meter reading. The bandwidth of the receiver is automatically selected by the setting of the MODE switch as listed in Table 2.

If impulse type noise is experienced, push in the NB (Noise Blanker) switch. The noise blanker is an IF device which turns off the signal pass during a noise pulse. It is equally effective on all modes except the FM mode, however it will be noticed that the noise blanker works when the noise is greater than the desired signal. Due to the effect of the AGC in holding the audio output constant the noise may not appear to decrease, but a signal down in the noise will come up. It should be noted that the noise blanker functions best on noise pulses which are very short in duration and which are separated widely in time such as automobile ignition noise. For continuous noise, such as power line static,

the noise blanker will be less effective since the blanker circuit has difficulty in distinguishing the noise from the desired signal.

For VHF reception, set the VHF switch to the desired band, either 6 or 2 meters. Set the BAND switch to the 10 meter band and peak the PRESELECTOR for maximum S-meter reading. The frequency relation is listed in Table 1. When the (optional) FM unit is installed, advance the SQUELCH control slowly until the back-ground noise disappears with no signal input.

MODE	BANDWIDTH	
	CW·N *	0.6 kHz/6 dB
CW RTTY** LSB USB AM·N	2.4 kHz/6 dB	4.0 kHz/60 dB
AM·W *	6 kHz/6 dB	12 kHz/50 dB
FM *	20 kHz/6 dB	45 kHz/50 dB

*With optional filter for FR-101 Standard type receiver

**With optional filter for FR-101 Standard and Deluxe type receivers.

Table 2

DIAL CALIBRATION

The calibration of the main tuning dial may vary slightly from band to band due to the tolerance limits of the heterodyne crystals. Therefore, a dial calibration knob is provided on the front panel. To set the calibration on a given band and desired mode, proceed as follows:

1. Set the BAND switch and the PRESELECTOR to the desired band.
2. Set the CLAR switch to OFF position.
3. Push the CALIB switch in. A switch is located on the top of AF unit inside the cabinet that selects either the 25 KHz or 100 KHz calibrate signals. When the switch is set in the direction of front panel, a calibrate signal may be heard at 25 KHz intervals.
4. Set the 100 KHz dial in the window to the nearest 100 KHz or 25 KHz reading, then zero beat the main tuning dial against marker signal while pressing the DIAL LOCK. For AM or FM, the beat tone can not be heard. Therefore, the calibration should be made for maximum S-meter reading. Since the AM and FM filters have a wide bandwidth, the calibration should be made at the center of the passband as illustrated in Figure 4.

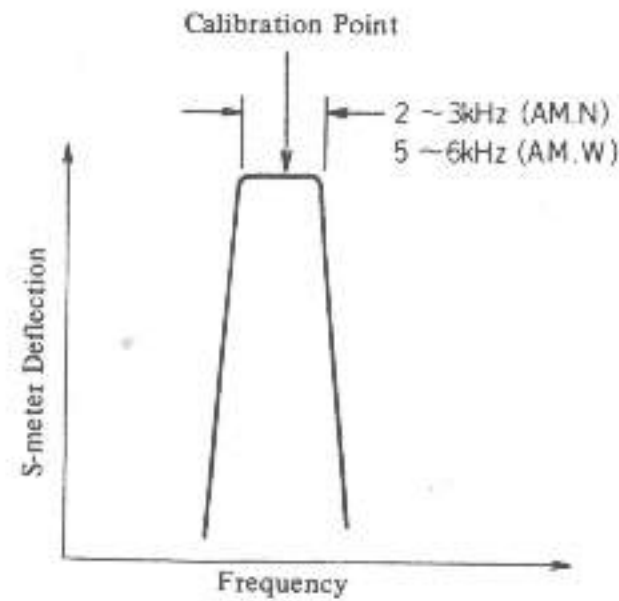


Fig. 4

CRYSTAL-CONTROLLED SPOT RECEPTION

The FR-101 provides for spot frequency reception with a crystal-controlled oscillator utilized in the place of the main tuning VFO. The crystal holders accept standard HC-25/U type crystals. All crystal frequencies must fall between 8,700 to 9,200 KHz. A trimmer capacitor has been connected to each crystal for precise frequency adjustment and its adjustment range is approximately 1 KHz. The correct crystal frequency for any desired operating frequency within the band set by the BAND switch, may be determined as follows:

$$F \text{ crystal} = f_1 - F_x$$

Where f_1 is taken from Table 3; F_x is the last 3 figures of operating frequency from which Mega-Hertz order is disregarded. When the last 3 figures are between 500 to 999 KHz, 500 KHz is subtracted from this value.

- Example 1—Find the crystal frequency for 7099 KHz in LSB mode.

From the Table 3, f_1 is 9201.5 KHz.

Therefore, F crystal is $9201.5 - 99 = 9102.5$ KHz.

- Example 2—Find 11.750 MHz AM reception.

From the Table 3, f_1 is 9200 KHz.

Therefore, F crystal is $9200 - (750 - 500) = 8950$ KHz.

MODE	f_1 (KHz)
AM, FM	9200.0
LSB	9201.5
USB	9198.5
CW	9199.3

Table 3

AUXILIARY BAND RECEPTION

In addition to the amateur and major shortwave broadcast bands, the FR-101 may be programmed to receive four 500 KHz-wide ranges covered in Table 4.

The crystals can be ordered direct from your dealer. When ordering, be sure to specify that the crystals you desire are for auxiliary band use in the FR-101.

The PRESELECTOR tuning range is given in Figure 5. On ☆1, ☆2 and ☆4 position, the FR-101 will work properly by only inserting the crystals, however on ☆3 position, TC22 must be adjusted as follows:

1. Insert the crystal in ☆3 socket.
2. Set the BAND switch to ☆3 position.
3. Push the CALIB switch on and tune the FR-101 to

the calibrator signal.

4. Peak the PRESELECTOR.
5. Adjust TC22 for maximum S-meter reading.

Insert the crystal of the correct frequency given in the Table 4 to the corresponding crystal socket located on the right side of the chassis. The crystal socket accepts standard HC-25/U type crystals. In order to receive the desired band, the BAND switch must be set to the number corresponding to the crystal socket in which the auxiliary crystal in use is installed.

A fundamental frequency is used when the crystal frequency is lower than 28 MHz and the second harmonic when higher than 28 MHz. It should be noted that the bands covered in Table 4 work only when the appropriate auxiliary bands are used as listed in the Table.

AUX	FREQ (MHz)	LOCAL OSC		RF AMP		MIX T103
		XTAL (MHz)	TRIMMER	T101	T102	
☆1	4.0~4.5	10.02	TC25 + C38	T107 + C4	T108 + C7	T109 + C20
☆2	5.0~5.2	11.02	TC24 + C37	T107 + TC1 + C9	T108 + TC2 + C11	T109 + TC11 + C22
☆3	7.5~8.0	13.52	TC22 + 50P	TC3 + C12	TC4 + C14	TC11 + C23
	8.0~8.5	14.02	"	"	"	"
	8.5~9.0	14.52	"	"	"	"
☆4	22.0~22.5	28.02	C44	TC9	TC10	TC15
	22.5~23.0	28.52	"	"	"	"
	23.0~23.5	29.02	"	"	"	"
	23.5~24.0	29.52	"	"	"	"
	24.0~24.5	30.02	"	"	"	"
	24.5~25.0	30.52	"	"	"	"
	25.0~25.5	31.02	"	"	"	"
	26.0~26.5	32.02	"	"	"	"
	26.5~27.0	32.52	"	"	"	"
27.5~28.0	33.52	"	"	"	"	

Table 4 AUX BAND

The band not covered by Table 4 may be programmed by using the band which is already assigned to another band. The relations between the desired new band and existing band are listed in Table 5.

○ Example—Desired Band: 10.5 - 11.0 MHz

From the Table 5, the local crystal frequency is 16.52 MHz.

Insert this crystal into the crystal socket assigned to the 31 meter band as shown in the remarks column of Table 5. Adjust TC21 as described in $\star 3$ band adjustment. Set the BAND switch to the 31 meter band position and peak the PRESELECTOR around the scale given in Figure 5.

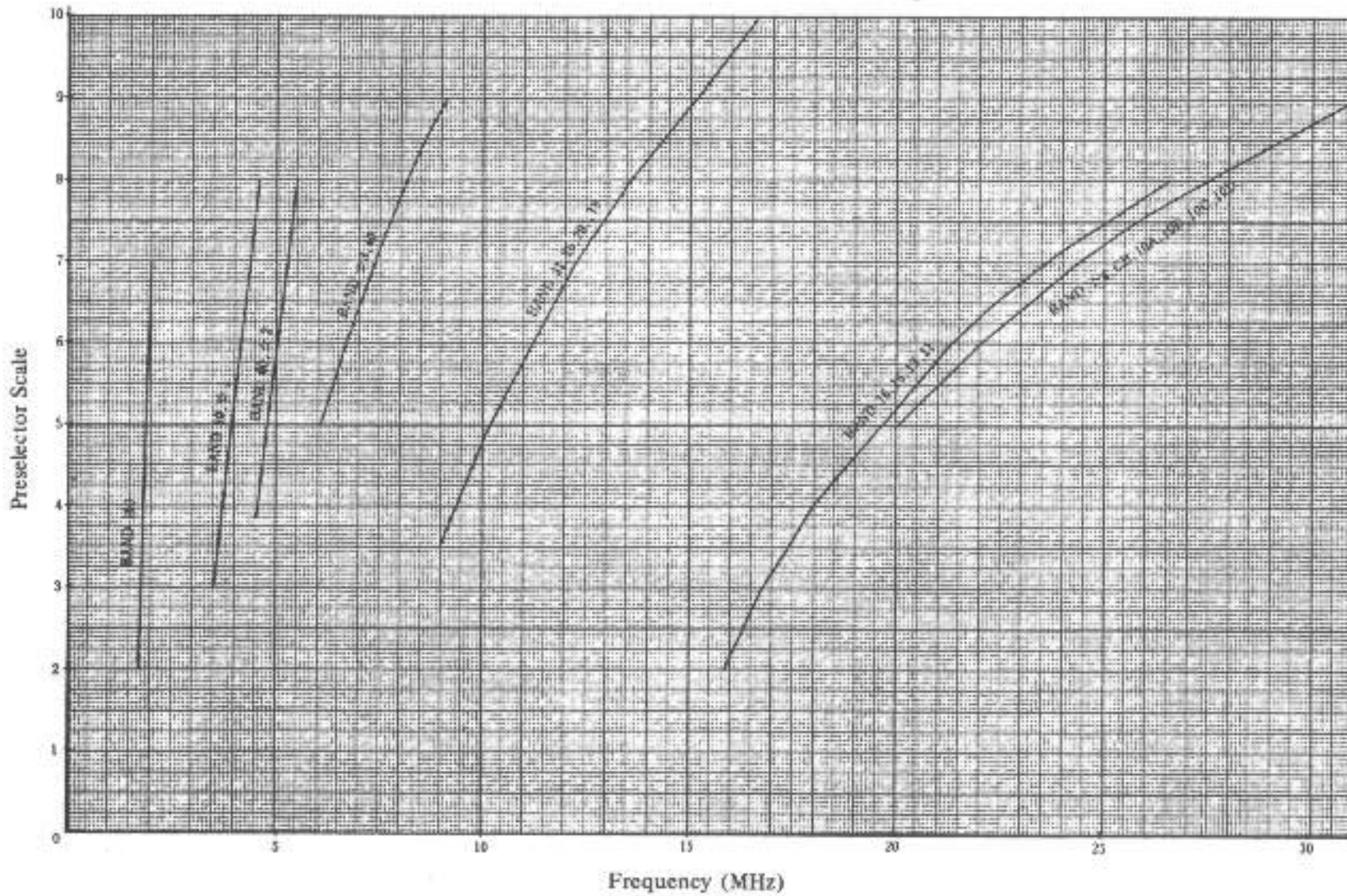


Fig. 5

FREQ	XTAL (MHz)	BAND	RMKS	FREQ	XTAL (MHz)	BAND	RMKS	
1.8~2.0	7.52	160		16.0~16.5	22.02		Use 16m band.	
2.0~2.5			Not covered.	16.5~17.0	22.52			
2.5~3.0				17.0~17.5	23.02			
3.0~3.5				17.5~18.0	23.52	16		
3.5~4.0	9.52	80		18.0~18.5	24.02			
4.0~4.5	10.02		AUX 1	18.5~19.0	24.52			Adjust TC18.
4.5~5.0	10.52	60		19.0~19.5	25.02			
5.0~5.5	11.02		AUX 2	19.5~20.0	25.52			
5.5~6.0			Not covered.	20.0~20.5	26.02			
6.0~6.5				20.5~21.0	26.52			
6.5~7.0				21.0~21.5	27.02	15		
7.0~7.5	13.02	40		21.5~22.0	27.52	13		
7.5~8.0	13.52		AUX 3	22.0~22.5	28.02		AUX 4	
8.0~8.5	14.02			22.5~23.0	28.52			
8.5~9.0	14.52			23.0~23.5	29.02			
9.0~9.5	15.02		Use 31m band.	23.5~24.0	29.52			
9.5~10.0	15.52	31		24.0~24.5	30.02			
10.0~10.5	16.02		Adjust TC21.	24.5~25.0	30.52			
10.5~11.0	16.52			25.0~25.5	31.02			
11.0~11.5	17.02		Use 25m band.	25.5~26.0	31.52	11		
11.5~12.0	17.52	25		26.0~26.5	32.02			
12.0~12.5	18.02			Adjust TC20.	26.5~27.0	32.52		
12.5~13.0	18.52				27.0~27.5	33.02		CB
13.0~13.5	19.02		Use 20m or 19m band.	27.5~28.0	33.52			
13.5~14.0	19.52			28.0~28.5	34.02	10A		
14.0~14.5	20.02	20		28.5~29.0	34.52	10B		
14.5~15.0	20.52			Adjust TC19 or TC27.	29.0~29.5	35.02		10C
15.0~15.5	21.02	19			29.5~30.0	35.52		10D
15.5~16.0	21.52							

Table 5

TRANSCEIVE OPERATION

The FR-101 has the feature of transceive operation when it is used with our FL-101 transmitter or FT-101E/277E transceiver.

(1) FR-101-FL-101 COMBINATION

Before connecting the equipment, the interconnection cables should be prepared as illustrated in Figure 9. Install the FL-101 side by side with the FR-101 and connect them, as illustrated in Figure 6, with the cables prepared.

The switches and controls may be used as described in the preceding pages, however some of them are used particularly in transceive operation as follows:

SELECT: This switch selects the VFO (main tuning) of both transmitter and receiver as shown in Table 6. The red lamp will light up to indicate the VFO in use.

MONITOR: When the transmitting frequency coincides with the receiving frequency, the transmitted signal may be monitored by advancing this control slowly in a clockwise

direction. When the monitored signal is distorted by overloading, use the RF ATTENUATOR. This control does not work for CW sidetone monitoring, since the CW sidetone must be set to the desired listening level with the controls in the transmitter section.

TRANS:
(Trans-
ceive)

This control is used to coincide the frequency difference between the FR-101 and transmitter due to the tolerance limits of the various crystals. The adjustment of this control is as follows:

Set the CLAR control to OFF position. Advance the MONITOR control until your transmitting voice is heard from the FR-101 while transmitting on the same SSB mode as that of the receiver. Adjust the TRANS control for a natural voice quality. For CW operation, adjust the TRANS control for maximum S-meter reading of the monitor signal with the mode switch in the CW Narrow position, while keying the transmitter. Once the above adjustment has been done, it is not necessary to readjust the control until the band or mode in use is changed.

	SELECT SWITCH		OPERATION
	FR-101	FL-101	
1	INT	INT	Separate operation.
2	EXT	INT	Transmitter VFO controls transmitter and receiver.
3	EXT	EXT	Transmitter VFO controls receiver, and receiver VFO controls transmitter frequency.
4	EXT	TRX	Receiver VFO controls transmitter and receiver. (Transceive operation by FR-101's VFO.)

Table 6

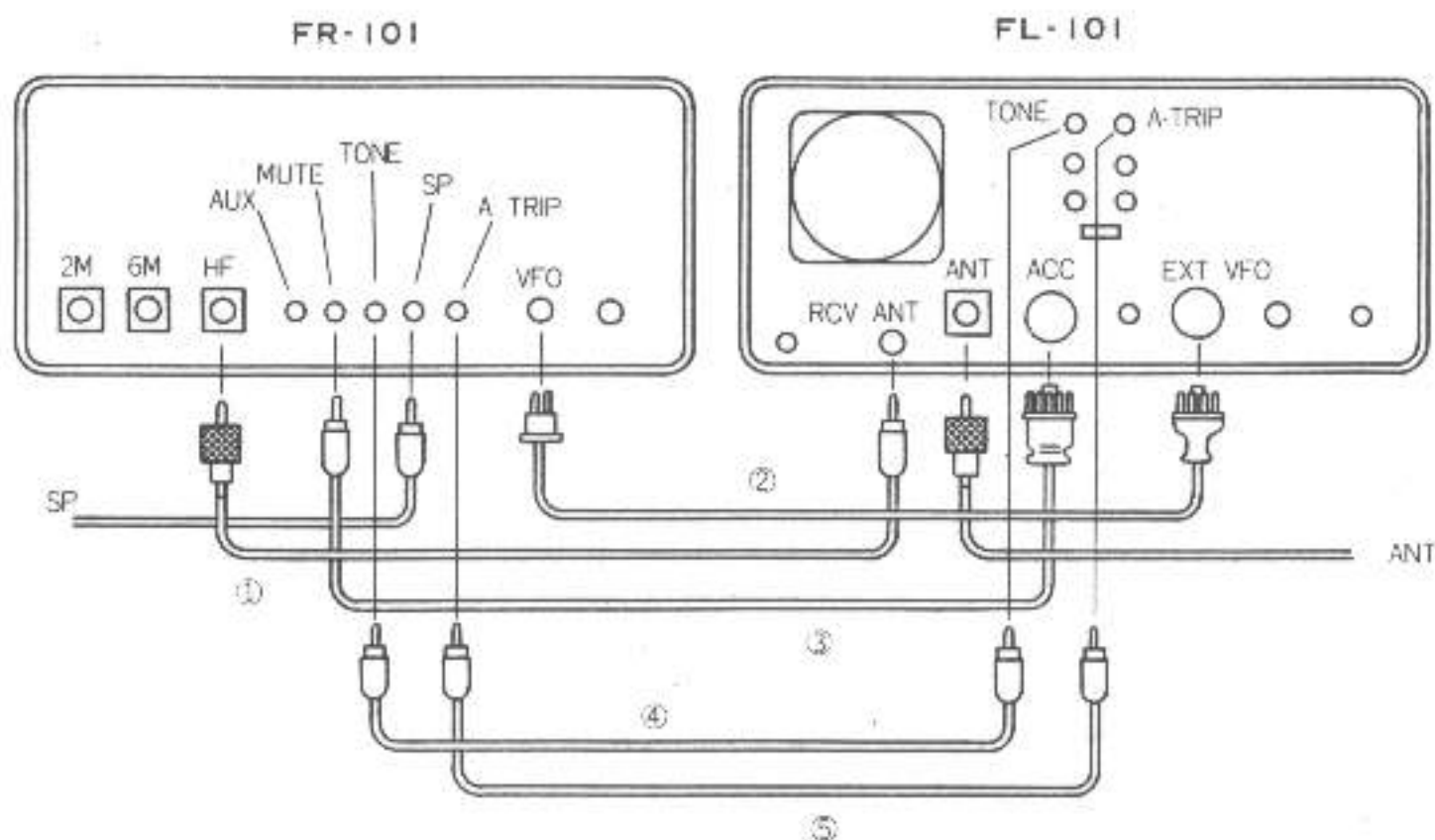


Fig. 6

(2) FR-101-FT-101E/277E COMBINATION

Connect the FR-101 and FT-101E/277E as illustrated in Figure 7. The operation is exactly same as the FR-FL combination except the function of SELECT switch, which is shown in Table 7.

Since the first IF of FR-101 has the characteristics shown in Figure 8, the receiver sensitivity will be decreased by the same amount shown on the Figure 8 when the FR-101 and FT-101E/277E are operated on different frequencies in mode 4 of Table 7.

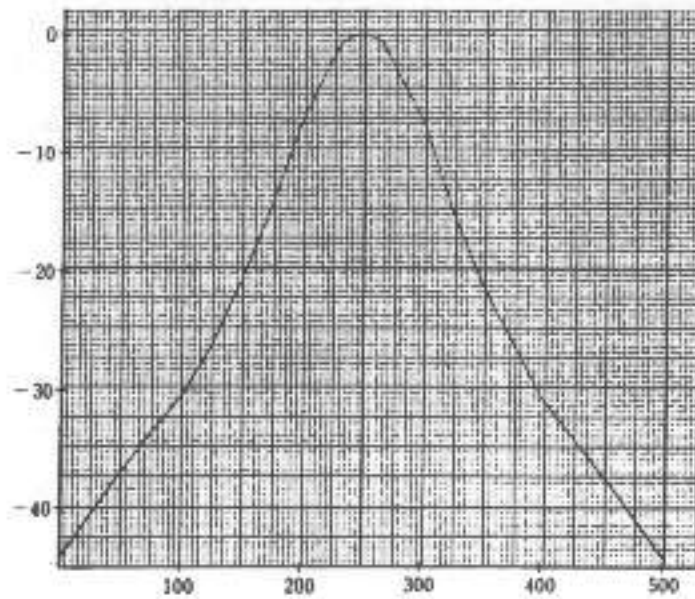


Fig. 8

	SELECT SWITCH		OPERATION
	FR-101	FT-101E/277E	
1	INT	INT	Separate operation. Transceiver VFO controls transceiver, and receiver VFO controls receiver.
2	EXT	INT	Transceiver VFO controls transceiver and receiver. (Transceive operation by FT-101E/277E's VFO)
3	EXT	RXEXT	Transceiver VFO controls transmitting frequency. Receiver VFO controls receiver itself and receiving frequency of transceiver.
4	EXT	TXEXT	Transceiver VFO controls receiving frequency of transceiver and receiver. Receiver VFO controls transmitting frequency of transceiver.
5	EXT	EXT	Receiver VFO controls both transceiver and receiver.

Table 7

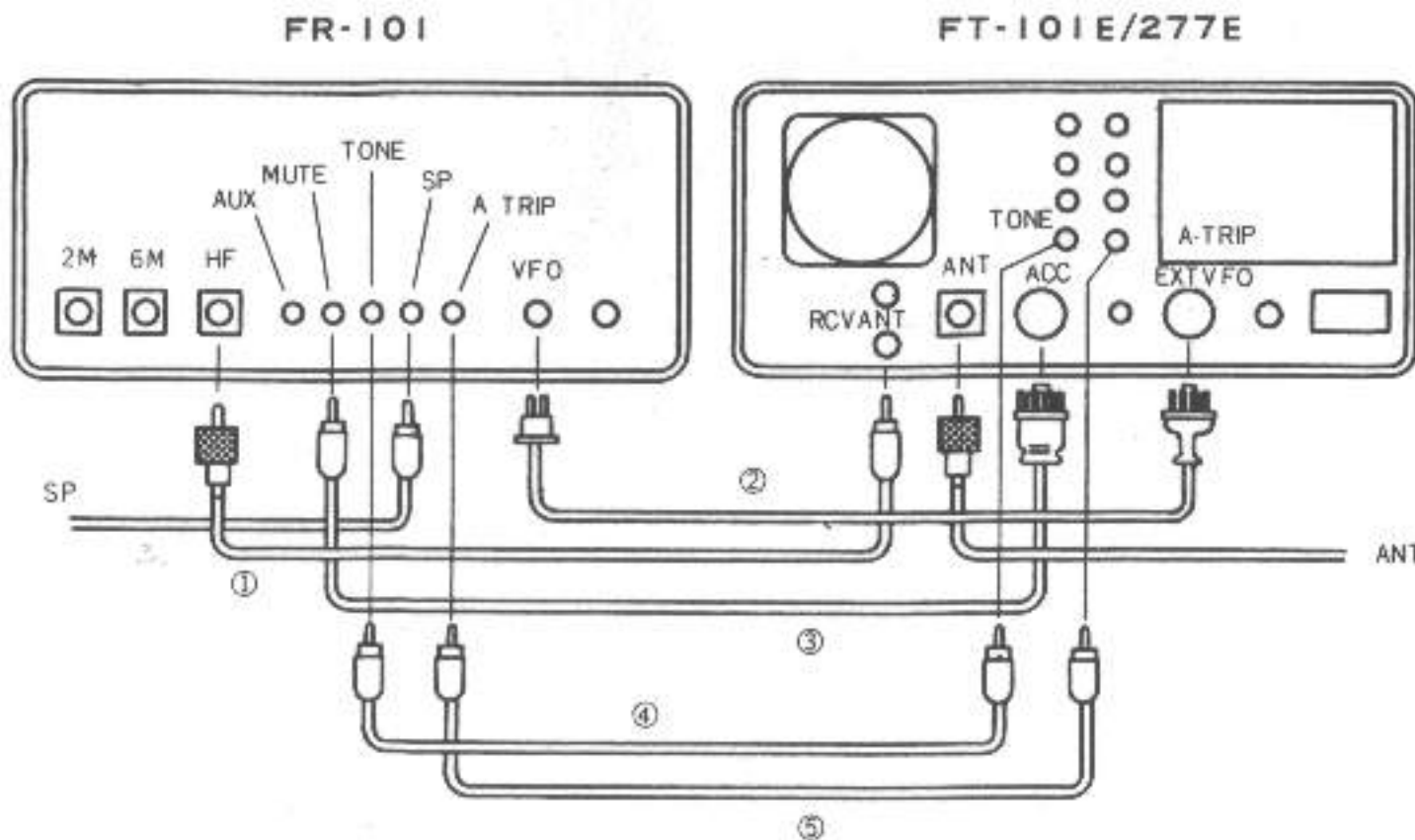


Fig. 7

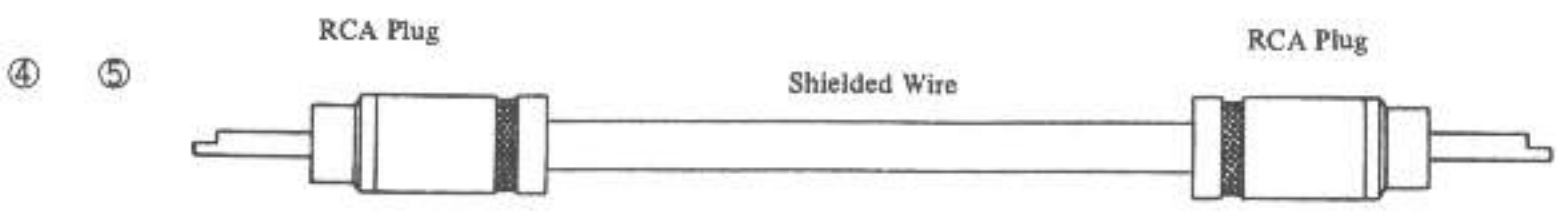
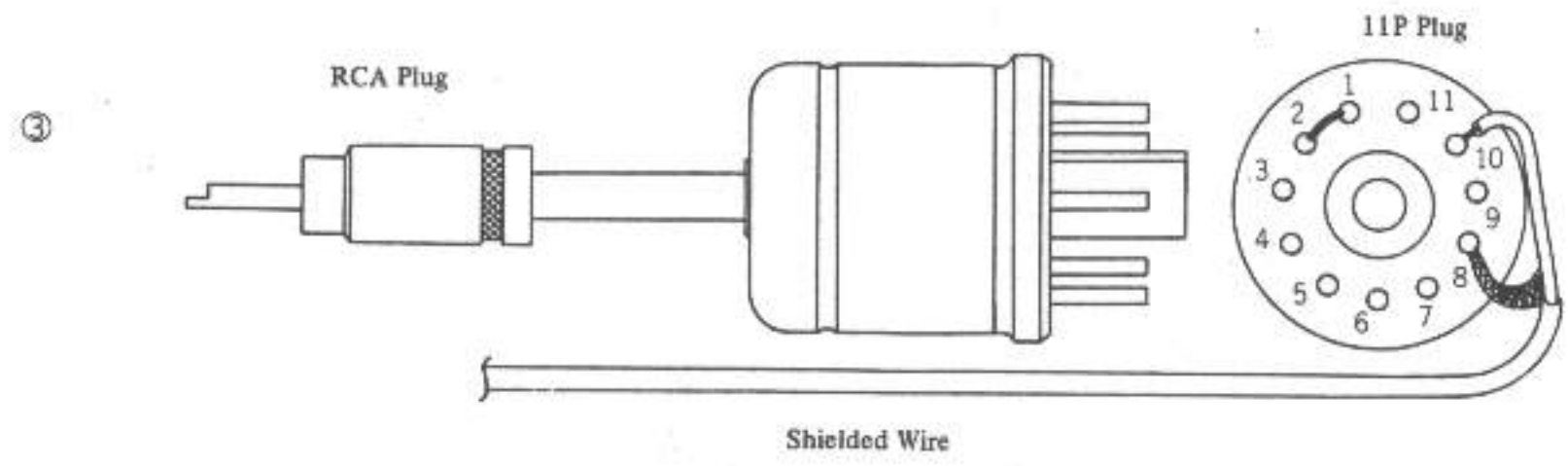
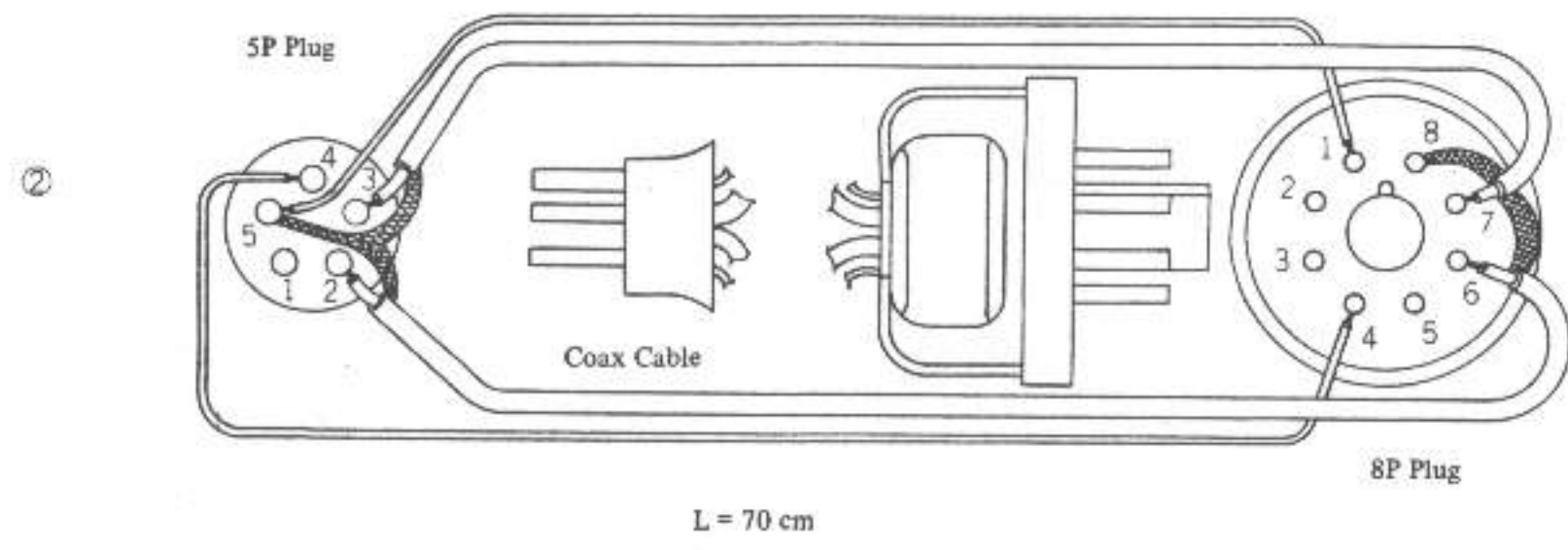
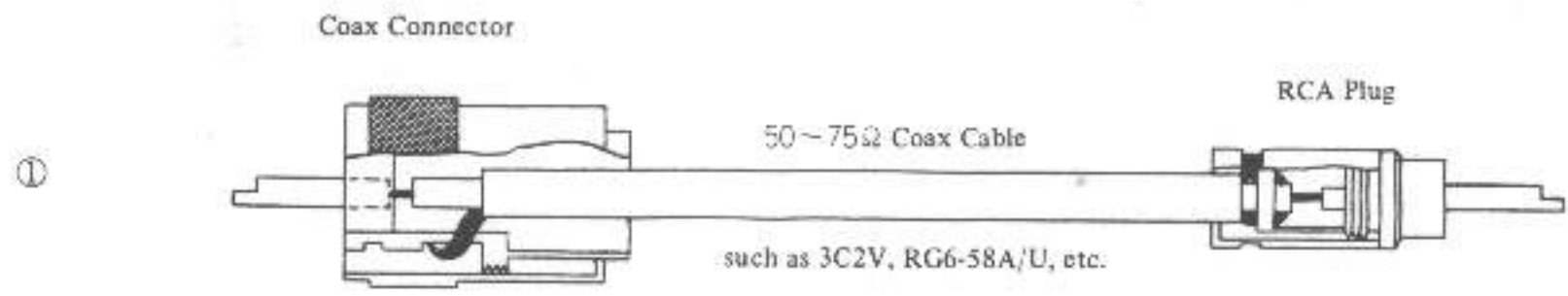


Fig. 9

