# IC-R70

## COMMUNICATIONS RECEIVER

## INSTRUCTION MANUAL

ICOM

# SECTION 1 SPECIFICATIONS

## GENERAL

Number of Semiconductors:

| | |
|---|---|
| Transistors | 77 |
| FET | 14 |
| IC (Includes CPU) | 43 |
| Diodes | 180 |

Frequency Coverage:

Ham Band 1.8MHz ~ 2.0MHz
3.5MHz ~ 4.1MHz
6.9MHz ~ 7.5MHz
9.9MHz ~ 10.5MHz
13.9MHz ~ 14.5MHz
17.9MHz ~ 18.5MHz
20.9MHz ~ 21.5MHz
24.5MHz ~ 25.1MHz
28.0MHz ~ 30.0MHz

General Coverage
0.1MHz ~ 30.0MHz
(German version: 0.2MHz ~ 26.1MHz)
Thirty 1MHz Segments

Frequency Control:
CPU based 10Hz step Digital PLL synthesizer with dual VFO system

Frequency Readout:
6 digit 100Hz readout.

Frequency Stability:
Less than 250Hz after switch on 1 min to 60 mins, and less than 50Hz after 1 hour. Less than 500Hz in the range of −10°C to +60°C.

Power Supply Requirements:
117V or 235V ±10% 50 ~ 60Hz 30VA
(100V/200V/220V use requires internal modification)

Antenna Impedance:
50 ohms Unbalanced
(Single wire can be used on 0.1 ~ 1.6MHz)

Weight:
7.4kg (10.3 lbs)

Dimensions:
111mm(H) x 286mm(W) x 276mm(D)
(4-3/8 inch x 11-1/4 inch x 10-7/8 inch)

## RECEIVER

Receiving System:
Quadruple Conversion Superheterodyne with continuous Bandwidth Control
($F_3$*: Triple Conversion Superheterodyne)

Receiving Mode:
$A_1$, $A_3J$ (USB, LSB), $F_1$ (Output FSK audio signal), $A_3$, $F_3$*

IF Frequencies:

| | |
|---|---|
| 1st | 70.4515MHz |
| 2nd | 9.0115MHz |
| 3rd | 455KHz |
| 4th | 9.0115MHz (except $F_3$*) |

with continuous Bandwidth Control (except $F_3$*)

2nd IF Center Frequency:

| | |
|---|---|
| SSB ($A_3J$) | 9.0115MHz |
| CW($A_1$) RTTY ($F_1$) | 9.0106MHz |
| AM ($A_3$) FM* ($F_3$) | 9.0100MHz |

Sensitivity (when preamplifier is ON):

SSB, CW, RTTY
Less than 0.15 microvolts (0.1 ~ 1.6MHz : 1 microvolt) for 10dB S+N/N

AM Less than 0.5 microvolts (0.1 ~ 1.6MHz : 3 microvolts)

FM* Less than 0.3 microvolts for 12dB SINAD (1.6 ~ 30MHz)

Selectivity:

| | |
|---|---|
| SSB, CW, RTTY | 2.3KHz at −6dB |
| | (Adjustable to 500Hz min) |
| | 4.2KHz at −60dB |
| CW-N, RTTY-N | 500Hz at −6dB |
| | 1.5KHz at −60dB |
| AM | 6KHz at −6dB |
| | (Adjustable to 2.7KHz min) |
| | 18KHz at −60dB |
| FM* | 15KHz at −6dB |
| | 25KHz at −60dB |

Spurious Response Rejection Ratio:
More than 60dB

Audio Output:
More than 2 Watts

Audio Output Impedance:
8 ohms

*When optional FM unit is installed.

Specifications are approximate and are subject to change without notice or obligation.

## SECTION 2 FEATURES

### GENERAL COVERAGE RECEIVER CAPABILITY

The IC-R70 has capabilities for an all amateur band receiver as well as a general coverage receiver between 100KHz and 30MHz with thirty 1MHz segments. The Up-conversion system using a high side IF and Microcomputer Control System make these capabilities possible.

In addition to these, the low-pass filters and the band-pass filters selected by an electronic signal from the BAND UP/DOWN button, make a no tune-up system.

### DUAL 10Hz STEP DIGITAL VFO

The dual digital VFO consists of the PLL unit, which has a triple looped Phase-Locked-Loop, and the LOGIC unit, used to control the PLL, has the Microcomputer Control System.

Three tuning frequency resolutions of 10Hz, 100Hz and 1KHz steps are selectable with the TUNING RATE SELECT switches. Two separate VFO's can be used independently on any desired band.

### OUTSTANDING RECEIVER PERFORMANCE

The IC-R70 employs a dual conversion superheterodyne system which has the first IF at 70.4515MHz and the second IF at 9.0115MHz.

The RF amplifier circuit is a wide band push-pull amplifier using low-noise and wide dynamic range junction FET's, and the mixer is a high level Double Balanced Mixer developed by ICOM.

These advanced devices and system give higher spurious response rejection ratio, higher sensitivity and wider dynamic range.

### PASS-BAND TUNING

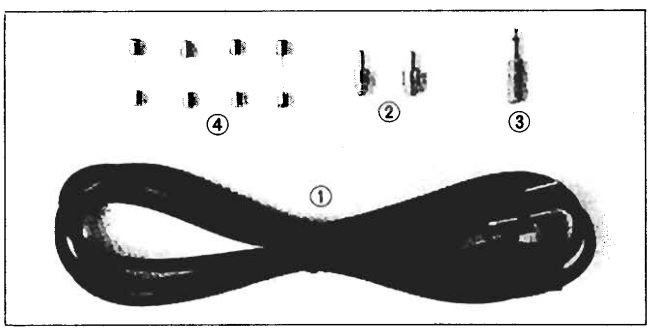
The IC-R70 has a built-in Pass-Band Tuning system developed by ICOM that allows you to continuously adjust the pass band of the IF. By turning the control, you can eliminate interference from a nearby signal, thus providing clear reception.

# SECTION 3 INSTALLATION

## BE SURE TO READ THE FOLLOWING INSTRUCTIONS BEFORE USE.

### 3 - 1 UNPACKING

Carefully remove your receiver from the packing carton and examine it for signs of shipping damage. Should any be apparent, notify the delivering carrier or dealer immediately, stating the full extent of the damage. It is recommended you to keep the shipping cartons. In the event storage, moving, or reshipment becomes necessary they will be handy. Accessory cables, plugs, etc., are packed with the receiver. Make sure you have not overlooked anything.




1. AC Power Cord . . . . . 1
2. Pin Plugs . . . . . 2
3. External Speaker Plug . . . . . 1
4. Spare Fuses . . . . . 4

### 3 - 2 RECOMMENDATIONS FOR INSTALLATION

1. Avoid placing the IC-R70 in direct sunlight, high temperature, dusty or humid places.

2. Be sure that nothing is on and just behind the rear panel to ensure good ventilation. Also avoid places near outlets of heaters, air conditioners, etc.

3. Place the unit so that the controls and switches can easily be handled and the frequency indication and meter can easily be read.

4. Use the Ground Lug!

### 3 - 3 POWER SUPPLY

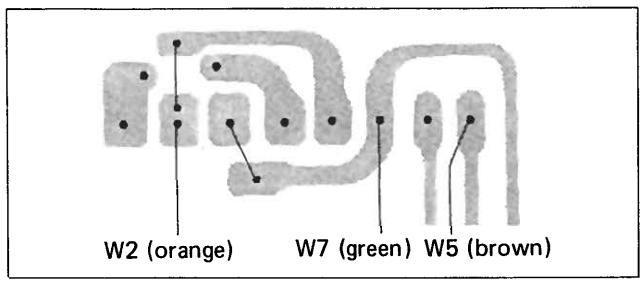
The receiver has a built-in AC power supply. Connect the supplied AC power cord to the AC power socket on the rear panel of the unit, and the opposite side plug of the power cord into any convenient AC power outlet.

When you wish to use the receiver with an AC power supply voltage other than the original one, you must make internal wiring modifications as per the following drawings.

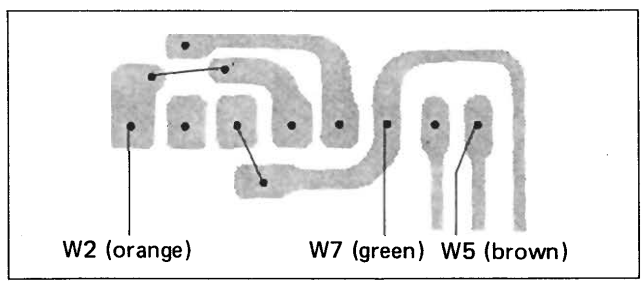
If you are not familiar with soldering or do not understand the drawings, don't attempt to make any modifications, but contact the nearest ICOM service center or authorized dealer.

Pov.

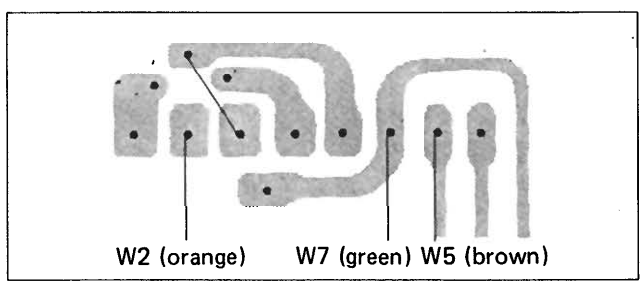
For 100V AC



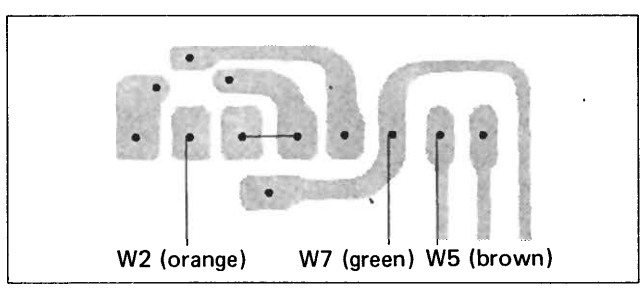

For 117V AC



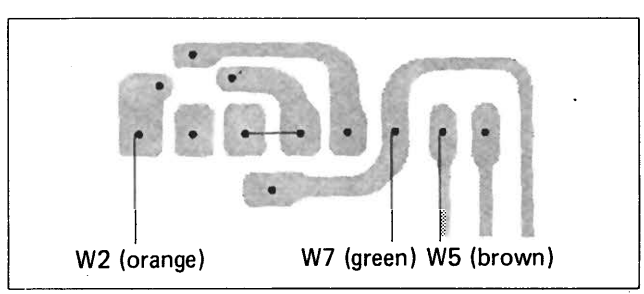

For 200V AC




For 220V AC




For 235V AC




**NOTE:** For DC operation, contact your nearest ICOM service center or authorized ICOM dealer.

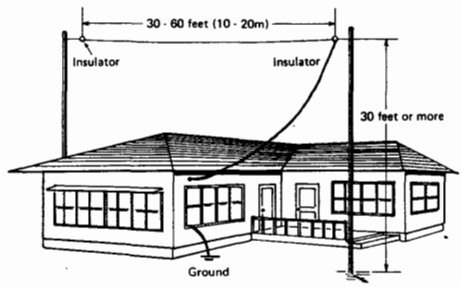
## 3 - 4 ANTENNA

Antennas play a very important role in radio communication. If the antenna is inferior, your receiver cannot give you the best performance. With a good antenna and feeder cable having 50 ohms impedance, you should easily get the desired matching and performance. Carefully install a high performance antenna that suits the frequency band(s) you wish to operate on and place it as high as possible. Be especially careful of the condition of the connectors as loose connections will deteriorate the performance.

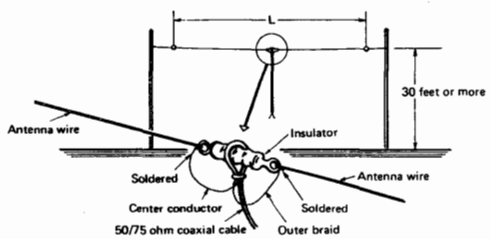
Since the IC-R70 is a general coverage receiver it is recommended that a long-wire general coverage antenna and an antenna coupler be used. To attempt to use the Ham band antenna for general coverage reception could result in mismatching, and attendant poor reception. However, it is good enough for strong broadcasting stations.

**Example of various antennas:**

- Long Wire Antenna

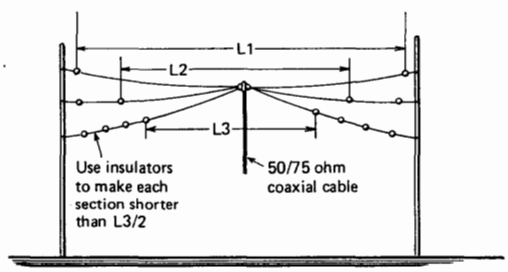



- Dipole Antenna




$$L(m) = \frac{143}{\text{Frequency (MHz)}} \quad \text{or} \quad L(\text{feet}) = \frac{468}{\text{Frequency (MHz)}}$$

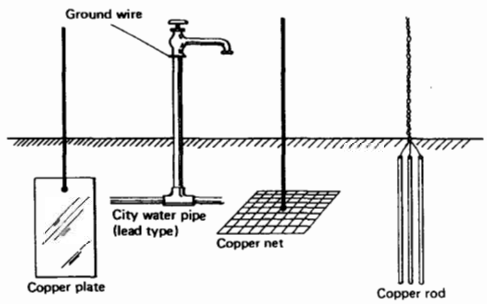
- Multiband Antenna
  L1, L2 and L3 can be calculated by the same formula as for dipole antenna.




## 3 - 5 GROUND

In order to prevent electrical shocks, and other problems, be sure to connect a heavy wire ground, as short as possible, from a good earth point to the ground terminal on the rear panel.

**Example of various ground systems:**




## 3 - 6 EXTERNAL SPEAKER

The IC-R70 contains an internal speaker, and is also designed so that it can drive an external speaker from the external (EXT) speaker jack on the rear panel. Be sure the impedance of the external speaker is 8 ohms, and remember that with the external speaker connected, the internal speaker is disabled.

## 3 - 7 HEADPHONES

Any good headphone set, including stereo type, that have 4-16 ohms impedance can be used. With the plug inserted halfway into the PHONES jack, both the headphone and speaker will operate. This is convenient when others wish to listen in on the station.

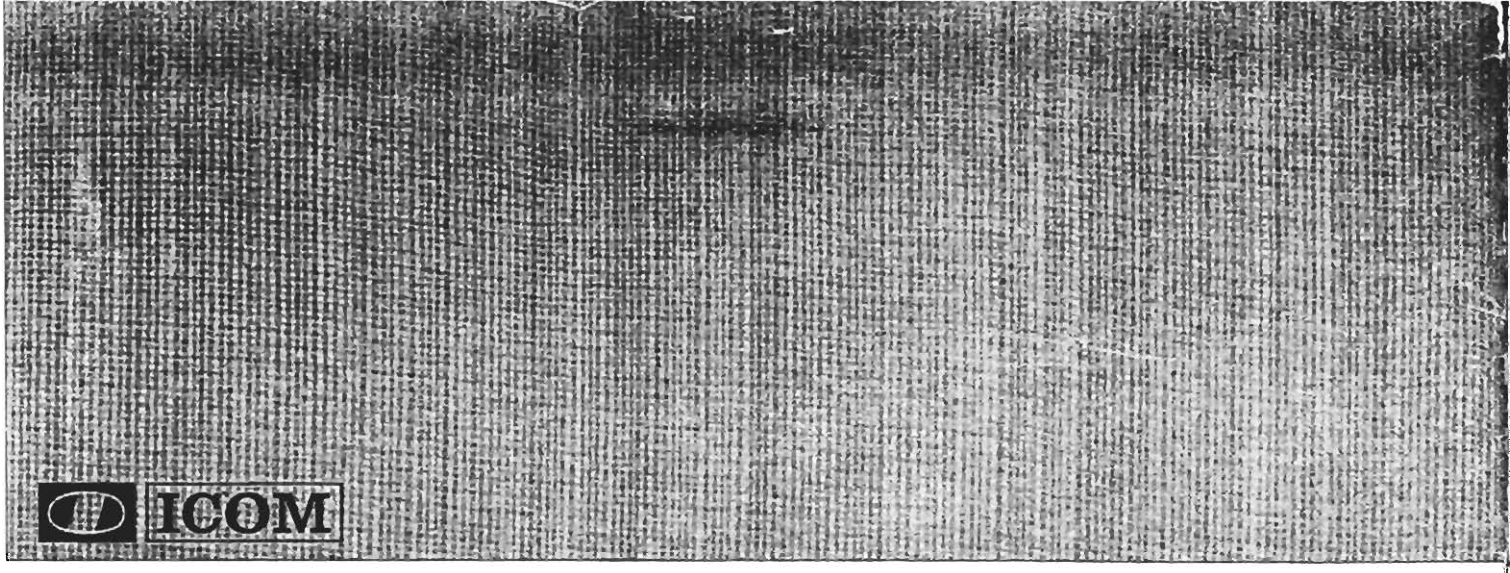
With a stereo headphone set inserted this way, however, the headphone will lose the sound on one side. With the plug inserted completely, only the headphone works.

## 3 - 8 CAUTIONS

As the unit has already been closely adjusted with highly sophisticated measuring instruments, never tamper with the turnable resistors, coils, trimmers, etc.

C-MOS is used in the Logic unit as well as the PLL. C-MOS ICs are very susceptible to excessive static charges and overcurrent and care must be used when handling them. Therefore, avoid touching the Logic unit and the nearby circuitry unless absolutely necessary. When it is necessary to check the circuitry, observe the following points.

Ground all measuring instruments, the soldering iron, and other tools. Do not connect or disconnect the C-MOS IC from its socket, or solder it when the power is on. Do not apply voltage of less than –0.5 or more than +5 Volts to the input terminals of the IC. DO NOT MEASURE WITH AN OHMMETER.

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