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**EXECUTIVE  
MODEL 100C  
OPERATION and MAINTENANCE  
MANUAL**

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**Executive**

INTERNATIONAL CRYSTAL MFG.

TRANSMIT  
SELECTOR

MICROPHONE

SQUELCH

CHANNEL

OPERATE CALIBRATE

VOLUME

TUNE

RECEIVE  
SELECTOR

OFF

## SECTION I

### GENERAL

The INTERNATIONAL EXECUTIVE, Model 100, is a Citizens Band unit which combines sensitive and super selective, dual conversion superhetrodyne receiver, with a highly stable and efficient, crystal controlled transmitter. The complete transmitter, receiver and power supply are housed in an attractive brown and silver colored cabinet to blend favorably in the home, office, car or truck.

The EXECUTIVE Model 100 receiver is the first commercially available citizen band unit to make use of a high-frequency crystal filter to achieve and permanently guarantee receiver selectivity for the life of the equipment. Use of this filter between the first and second mixers greatly reduces adjacent channel interference and offers a very flat response throughout the band-pass of the filter.

The receiver manually tunes all 23 Class "D" Citizens Band channels. In addition, two receiving crystal sockets are provided in the unit for the selection of any two desired channels. The selection of either crystal controlled channel, or manual tuning is accomplished with a three position switch on the front panel. A squelch circuit is built-in to provide receiver quieting during periods when no signal is being received.

The transmitter oscillator uses fundamental crystals operating at one-half the desired operating frequency. The crystals supplied have a frequency tolerance of .005% when used in the EXECUTIVE. A twelve position crystal switch assembly allows the operator to choose anyone of twelve channels at the flick of the switch.

The EXECUTIVE has been designed with flexibility of installation in mind. It may be used in the home or office with power secured from the AC line. It may also be used in a car, boat, plane or other mobile and portable applications, wherever there is 6 or 12 VDC available. It may be used with a base loaded whip antenna, regular whip, long wire, ground plane, beam and other types of antennas. The attractive case design lends itself to use in the home or office without appearing unsightly or out of place.

Though the unit is very versatile, it is not to be expected that either receiving or transmitting results will be the same in every installation. As in all radio communications and particularly in VHF applications, the type of antenna, its location above ground, the noise present in the area and other factors are bound to affect the results obtained.

## SPECIFICATIONS

### Receiver:

Tuning Range (Manual tuning)	26.955 to 27.265 mc, (Class "D" Citizens Band, Channels 1 through 23).
Tuning Range (Selector Pos. 2)	Crystal Controlled - Any Channel, 1 through 23.
Tuning Range (Selector Pos. 3)	Crystal Controlled - Any Channel, 1 through 23.
Sensitivity	Usable to .5 microvolts
Selectivity	50 db down at 10 kc better than 60 db down at 20 kc
Image Rejection	Better than 50 db down
Audio Output	2.5 watts into 4-6 ohms
Speaker Impedance	4-6 ohms
Squelch Range	1 to 50,000 microvolts. On-off differential is approximately 1 microvolt, at 5 microvolt input.
Noise Limiter	Automatic, series-gate

### TRANSMITTER

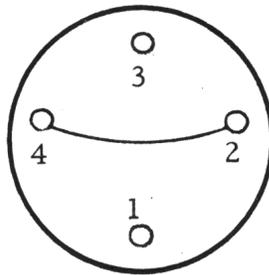
Frequency Stability	$\pm .005\%$ @ $0^{\circ}$ to $125^{\circ}$ F, when used with INTERNATIONAL high stability fundamental crystals.
RF Power Input	5 watts maximum (FCC rules)
Modulation	Capability - 100%
Crystals Required	Transmitter - INTERNATIONAL "T" (T-9 for Channel 9, etc.), high stability, fundamental type, at one- half the desired frequency. Receiver INTERNATIONAL "R" (R-9 for Channel 9, etc.)

Microphone

High impedance crystals, ceramic or high output dynamic type. (Push-to-talk switch required.)

POWER CONSUMPTION

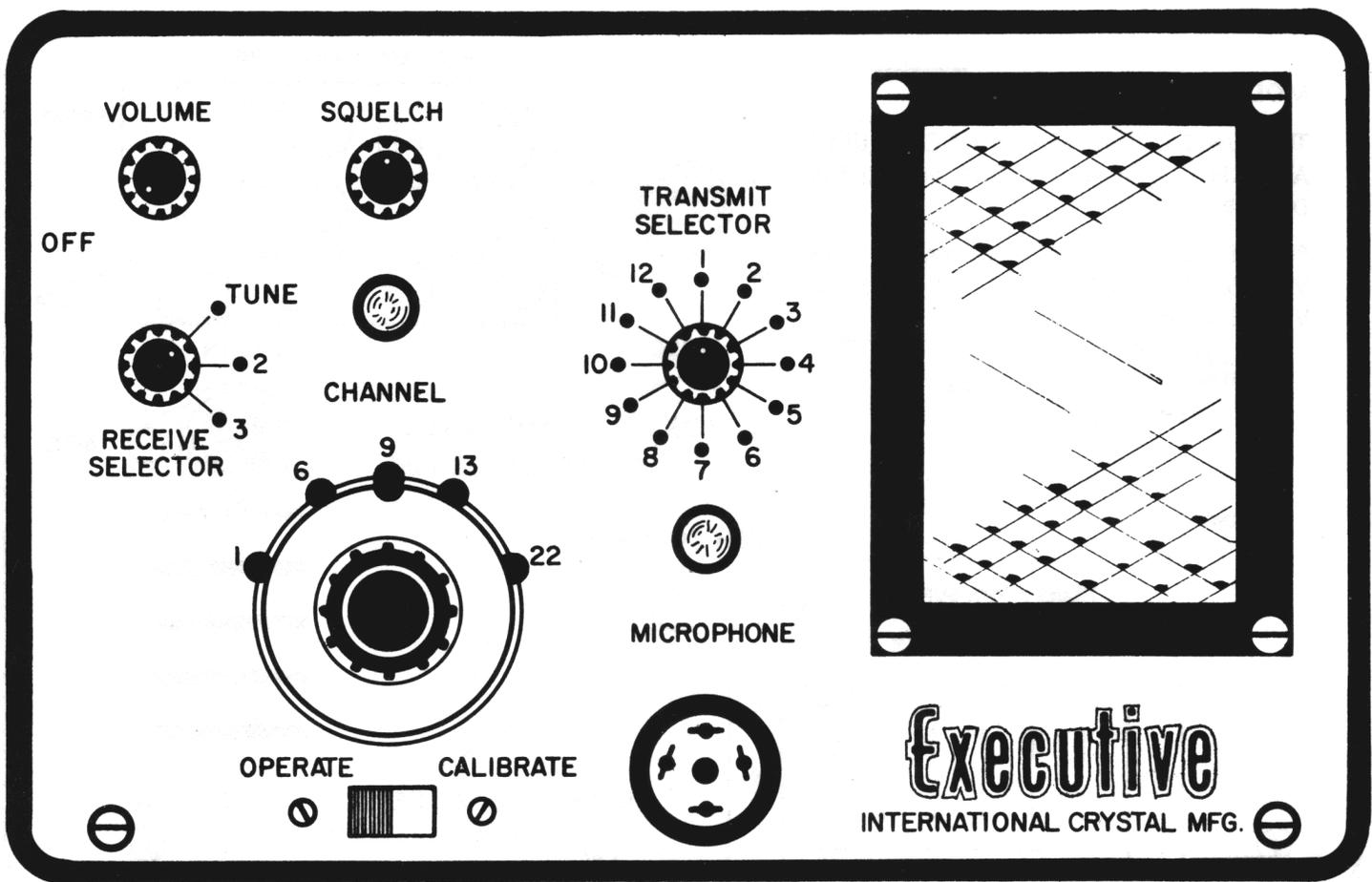
Transmitting	65 watts (approximate)
Receiving	60 watts (approximate)
Weight	12 pounds (approximate)



HI-IMPEDANCE MICROPHONE PLUG WIRING

- Pin 1 - Hot lead of mike
  - Pin 2 - Shield of mike cable
  - Pin 3 - From Switch
  - Pin 4 - Mike switch
- A jumper is placed from pin 2 to pin 4.

NOTE: When pin 4 of the plug is grounded, as it is when the mike switch is closed, the relay in the EXECUTIVE is energized, operating the transmitter section of the unit.



## FRONT PANEL CONTROLS

### VOLUME

On-off switch, volume control. To turn receiver on, turn the knob clockwise. Clockwise rotation of the knob also increases the volume level.

Allow the set to warm up for about one minute before you wish to use it.

### SQUELCH

This control is used to eliminate background noise when no signal is being received. Upon initial warmup, turn this control fully counterclockwise until a click is heard. The switch in the squelch control is **off** in this position. To operate, turn squelch control on and fully clockwise. Then slowly turn the control counterclockwise until the background noise just disappears. Leave the control set at this point. Do not turn the control too far counterclockwise as this will reduce the receiver performance and weak signals will not be heard.

### RECEIVE SELECTOR

Set this control to TUNE unless receiver crystals have been installed in positions #2 and #3, in which case set the switch to the desired crystal position for crystal controlled reception.

### TRANSMIT SELECTOR

A channel 9 crystal has been installed at the factory in switch position #2. Place the switch in this position unless you have had other crystals installed, in which case select the channel on which you desire to transmit.

### CHANNEL (Tuning)

With the RECEIVE SELECTOR set in TUNE position this control tunes the receiver through the range of all 23 channels. The approximate locations of channels 1, 6, 9, 13 and 22 are indicated on the panel. Other channels fall in between these points.

### OPERATE-CALIBRATE (Switch)

During normal operation this switch is left in the OPERATE position. When it is desired to pretune the receiver to a specific Channel (you must have a transmit crystal for this channel installed in the Transmit Selector crystal socket) set the controls as follows:

TRANSMIT SELECTOR to the desired channel.

OPERATE-CALIBRATE switch to Calibrate.

SQUELCH CONTROL full counterclockwise to click **Off**.

RECEIVE SELECTOR to Tune.

Rotate tuning dial until the loudest part of the tone signal is received. Rock the tuning dial back and forth to locate the center of the signal. Leave tuning dial at this point and the receiver is pretuned to transmit channel you have selected.

### MICROPHONE (Receptacle)

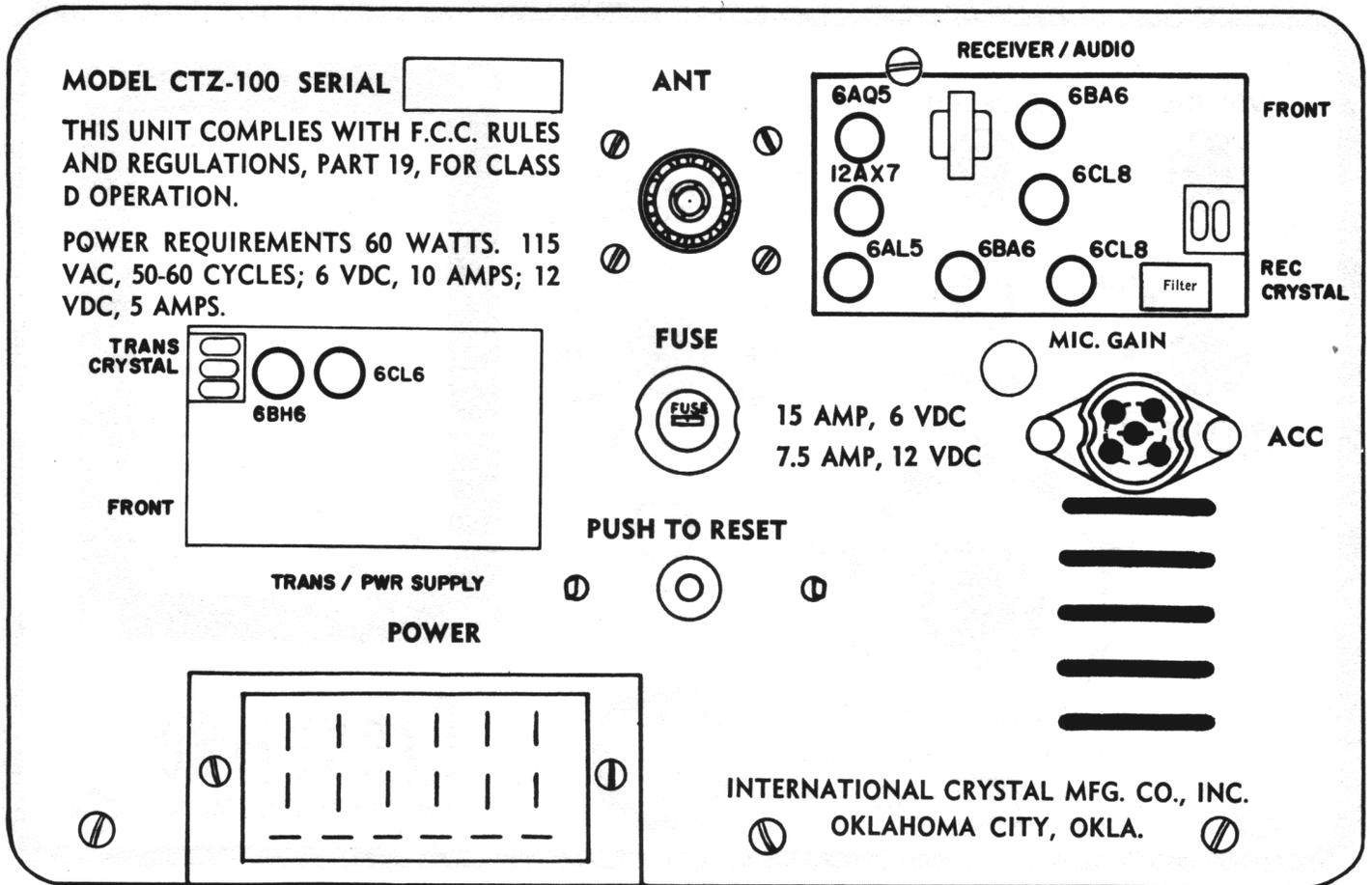
This connector requires a four prong lock-on plug which is furnished with the unit. High impedance crystal or ceramic type microphones may be used with this transceiver.

### RECEIVE (Indicator)

This indicator, located directly below the squelch control, functions as an ON-OFF (plate voltage) indicator for the receiver section of the transceiver. When the transceiver is operating in RECEIVE position, the lamp will glow steadily and go out when the transceiver is placed in TRANSMIT position.

### TRANSMIT (Indicator)

This indicator functions as an audio level monitor. Depress the microphone keying button and speak directly into microphone. The indicator light will flicker intermittently as you speak in a normal voice level. With indicator operating on voice peaks, modulation will be about 95%. When talking too close to microphone the indicator lamp will glow almost constantly. This can result in over-modulation and cause adjacent channel interference. This indicator will flicker when the transceiver is in RECEIVE position also, showing proper operation of the receiver audio section.



## REAR PANEL CONTROLS

### ANT (Antenna Receptacle)

This receptacle is used to connect the transceiver line to the transmit-receive relay, TR-1. The receptacle is a standard low-loss, VHF type designed for 50- to 72-ohm coaxial cable.

### ACC (Accessory Receptacle)

This connector requires a five prong plug which is furnished with the unit. This plug contains a jumper for internal speaker operation and must be in place for the set to function. An external speaker and Signal Strength ("S") Meter may be connected to this set with this connector.

### FUSE

A 15 ampere fuse is installed in the fuseholder and may be changed or replaced, if necessary, by unscrewing the red insert in the center of the holder. If the transceiver is to be operated on 12 volts dc the fuse should be replaced with one having a rating of 7.5 amperes.

### MIC. GAIN (Microphone Level)

This control (yellow knob) adjusts microphone amplifier gain. The level has been factory set for close microphone operation. For base station operation, where the operator desires to talk several inches back from the microphone, this control may be turned clockwise until the red Transmit Indicator lamp flashes on voice peaks.

CAUTION: Excessive gain will cause overmodulation.

### PUSH TO RESET

This is a thermal cut-out. It protects the unit when it is being operated on 115 volts ac. If overload causes it to cut out, it can be reset by pressing in on the plunger and holding it in for about two seconds.

### POWER

An 18-contact plug is used as a power connector. This allows various input voltages to be used without requiring changes within the unit. All necessary connection changes are made on the external plug. Three different power cord assemblies are used, one for each input voltage. CAUTION: The 115 VAC Power Cord for the Executive Model 100 and Model 50 are wired differently. Use only the proper power cord for the Model 100—Part Number 150-174.

## SECTION II

### RECEIVER CIRCUIT DESCRIPTION

The receiver section of this transceiver is a double conversion unit employing the superheterodyne principle of frequency conversion. The first converter is composed of three basic sections; an rf amplifier, mixer, and oscillator which is either tunable or crystal controlled.

A received signal from the antenna is coupled to the control grid of the rf amplifier through a double tuned circuit consisting of coils L1 and L2, their respective shunting capacitors, and coupling capacitor C3. This double tuned circuit aids greatly in the elimination of unwanted signals outside the passband to which it has been tuned. The gain of the rf amplifier is controlled automatically by the receiver's AVC system coupled to the control grid of V1 through a 1 megohm resistor.

After reaching the control grid of V1 (6BA6) the signal is amplified and coupled to the control grid of the mixer, V2A (triode section of 6CL8A). Here the signal is heterodyned with a signal in the 17 mc region coupled from the oscillator, V2B (tetrode section of 6CL8A). A difference frequency signal at 10 mc is selected by coil L4 in the plate circuit of the mixer, V2A and coupled to the grid of the second mixer in the I. F. strip through the 10 mc crystal amplifier-filter assembly.

The oscillator is a conventional Colpitts circuit which may be either crystal controlled or tuned over a limited frequency range when the RECEIVE SELECTOR switch is in TUNE position.

The second section of the receiver consists of a mixer and crystal controlled oscillator, intermediate frequency amplifier, second detector and noise limiter, and a special squelch circuit.

The 10 mc signal received at the grid of the second mixer, V3A, is heterodyned with a 10455 kc signal from the crystal controlled oscillator, V3B. The difference frequency of 455 kc is selected in the plate circuit of V3A and transformer coupled to the control grid of the intermediate frequency amplifier, V4. The gain of this amplifier is also automatically controlled by the AVC system connected to the grid of V4 through the secondary of transformer T1 and 220 K ohm resistor.

The signal is further amplified in V4 and coupled from the plate through transformer T2 to the plate of the detector, V5A, where the audio component is detected. V5A is also used to produce the AVC voltage. The detected signal is coupled to V5B which acts as a series-type noise limiter removing noise pulses which may ride through on the signal. The squelch circuit consisting of a neon lamp, NE-1, silicon diode, CR-1, and associated components is connected so that the audio section of the receiver is cut off and background noise eliminated when no signal is being received. The cut-off level may be varied by use of the squelch control.

The third section of the receiver is a conventional audio amplifier consisting of a twin triode audio voltage amplifier, 12AX7, V6A-V6B followed by a 6AQ5, V7 tetrode power amplifier. When the transceiver is in RECEIVE position only one-half of the 12AX7 is used. The second triode section, V6B, receives the audio signal from the center tap of the volume control. The audio signal is amplified in V6B whose output is RC coupled to the control grid of the power amplifier, V7. The audio signal is further amplified in V7. The plate of V7 is connected to transformer T-3, which performs a dual function. In RECEIVE position this transformer acts as a normal output transformer with its secondary connected to the speaker. In TRANSMIT position, its function is that of a modulation transformer.

CAUTION: Other than adjustment of the receive crystal trimmers, alignment of the EXECUTIVE Model 100 receiver should not be attempted without proper sweep generator and oscilloscope equipment. If receive crystals are added to the EXECUTIVE Model 100 after the unit leaves the factory, the crystal trimmer capacitor connected to the socket where the new crystal is to be installed should be adjusted as follows:

1. RECEIVE SELECTOR set to position where the new crystal is to be installed.
2. SQUELCH CONTROL set fully counterclockwise to click off.
3. VOLUME CONTROL half open.

Both crystal trimmers are adjusted at the factory, consequently will require only minor adjustment to correct the oscillator for reception on the desired crystal controlled channel. Connect the probe of a VTVM to pin 3 on the accessory socket and the meter ground lead to the chassis of the EXECUTIVE Model 100. Set the meter for negative voltage measurement on the 5 volt scale.

Connect the output of a signal generator of known accuracy such as the INTERNATIONAL C-12B Frequency Meter thru the PK-Box to the antenna connector on the EXECUTIVE Model 100. Set the frequency meter to the desired channel and function switch to RF. Depress the PWR switch to On. Using an insulated alignment tool, carefully adjust the crystal trimmer capacitor for maximum AVC voltage as indicated by the VTVM.

## TRANSMITTER CIRCUIT DESCRIPTION

The transmitter is a two-stage unit consisting of a crystal controlled oscillator and neutralized tetrode final amplifier. The crystal oscillator is an electron-coupled Colpitts circuit with the crystal oscillating in the grid cathode circuit. The oscillator uses INTERNATIONAL high stability, fundamental type crystals operating at one-half the desired transmitter output frequency. A twelve position switch, TRANSMIT SELECTOR, is provided to select any one of twelve crystals, which may be installed within the unit. A channel 9 crystal is furnished with the unit and installed in one of the twelve crystal sockets.

The plate circuit of the oscillator is tuned to the second harmonic of the crystal frequency by coil L12. The oscillator output is coupled to the grid of final amplifier, V8, through capacitor C70. The plate circuit of V8 is a shunt-fed, pi matching network. Neutralization is accomplished by capacitor C71, and link coil L12, coupled to the cold end of coil L11.

NOTE: Capacitor C68, which is a small plastic trimmer capacitor should not be adjusted, except by a technician with a commercial F.C.C. license, as this adjustment can effect the frequency of the transmitter.

## POWER SUPPLY CIRCUIT DESCRIPTION

A three-way power supply is used in this transceiver. It operates as a conventional, full-wave rectifier circuit on all voltage inputs followed by a capacitor input RC filter network. On 6 or 12 volt battery operation, a vibrator circuit is used to provide the necessary AC voltage for the primary circuit of the power transformer.

The transceiver is supplied with a power cord for operation from 115 volts AC, 60 cycles. The unit may be operated either from 6 volts or 12 volts DC by use of the proper power cord assembly which may be purchased from your dealer. The power supply is equipped with a thermal circuit breaker for protection on AC operation. For protection on 12 volt DC operation a 7.5 ampere fuse is used with the transceiver. Protection on 6 volt DC operation is provided by a 15 ampere fuse which is supplied with the unit. When 12 volt DC operation is desired the 7.5 ampere fuse must be substituted for the 15 ampere fuse.

CAUTION: Due to wiring changes, the Executive Model 50 115 VAC power cord assembly cannot be used with the Model 100. Use power cord assembly (Part #150-174) with the Model 100 for 115 VAC operation. The 6 VDC power cord assembly (Part #150-118) and 12 VDC power cord assembly (Part #150-119) may be used with both models.

## TRANSMIT-RECEIVE RELAY CIRCUIT DESCRIPTION

By including a transmit-receive relay (TR-1) in this transceiver, the many advantages of "push-to-talk" operation and maximum transfer of energy to and from the antenna are afforded the operator at no extra cost. The circuit consists of a half-wave rectifier which receives its AC voltage from a 12 volt secondary winding on the power transformer. The rectifier is followed by an RC filter network whose output is connected in series with one end of the relay coil. The other end of the relay coil is connected through the microphone socket, to the switch in the microphone. The relay is actuated by depressing the microphone switch button. This completes the 12 volt DC relay circuit to ground and the relay performs the following switching functions:

RECEIVE - In this position the relay is not energized and the antenna is connected to the receiver input, B+ voltages are furnished to the receiver section and one side of the speaker is grounded.

TRANSMIT - The relay is energized and the antenna is switched to the transmitter output circuit, B+ voltages are furnished to the oscillator screen and plate circuits as well as V6A. The speaker voice coil is removed from ground and the cathodes of V6A and V9 are grounded.

## CRYSTAL FILTER

The crystal filter for the Executive Model 100 transceiver is designed primarily to reduce adjacent channel interference. It consist basically of a transistor Hi frequency IF amplifier. The filtering action takes place in a specially designed crystal filter operating between the transistor Hi-IF amplifier and the second converter input.