MIDLAND INTERNATIONAL®

# SSB/AM 2-Way Transceiver

# CITIZENS BAND SOLID STATE




# MODEL 79-900

# OWNER'S GUIDE

# FEDERAL COMMUNICATIONS COMMISSION REQUIREMENTS

Your new Midland 79-900 is a combination receiver-transmitter designed and built for licensed Class D operation on any of the 40 frequencies designated for citizens band use by the Federal Communications Commission. You are required to read and understand Part 95 of the F.C.C. rules and regulations prior to operation of this unit.

You are also required to complete F.C.C. form 505 and submit it to the F.C.C. GETTYSBURG, PA. 17326 to receive your license to operate this unit. F.C.C. regulations will be violated if you transmit with this unit without complying with procedures explained on F.C.C. temporary license from 555-B.

You may use Form 555-B as a temporary permit while your regular Form 505 application is being processed by the F.C.C.

Both forms and a copy of Part 95 of the Commissions Rules are packed, with the transceiver for your use and convenience.

NOTE: The technical information and diagrams provided in this manual are supplied for the use of a qualified holder of a first or second class radiotelephone license in servicing this transceiver. It is the users responsibility to see that this unit is operating at all times in accordance with the F.C.C. Citizens Radio Service regulations.

If you install or service your own transceiver do not attempt to make any transmitter tuning adjustment. Transmitter adjustments are prohibited by the F.C.C. unless you hold a first or second class radiotelephone license or are in the presence of a person holding such a license. A Citizens Band or Amateur license is not sufficient.

MIDLAND INTERNATIONAL CORPORATION HEREBY CERTIFIES THAT THIS UNIT HAS BEEN DESIGNED, MANUFACTURED, TYPE ACCEPTED AND CERTIFIED IN ACCORDANCE WITH PARTS 95 AND 15, SUB-PART C OF THE CURRENT F.C.C. RULES AND REGULATIONS AS OF THE DATE OF MANUFACTURE.

# OWNER'S GUIDE

Your 79-900 is a versatile, professional quality transceiver and we suggest that you read this Owner's Guide carefully before operation so that you may receive full benefit from its many features.

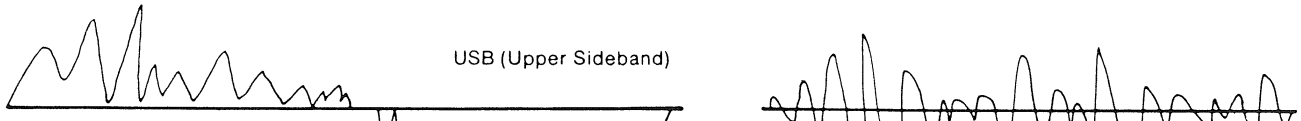
## SINGLE SIDEBAND:

SSB (Single Sideband) is relatively new in Citizens Band Communications but has been highly effective in commercial amateur and military usage for many years. It is a superior means of wireless communications allowing transmissions of greater distances with a minimum amount of interference and noise.

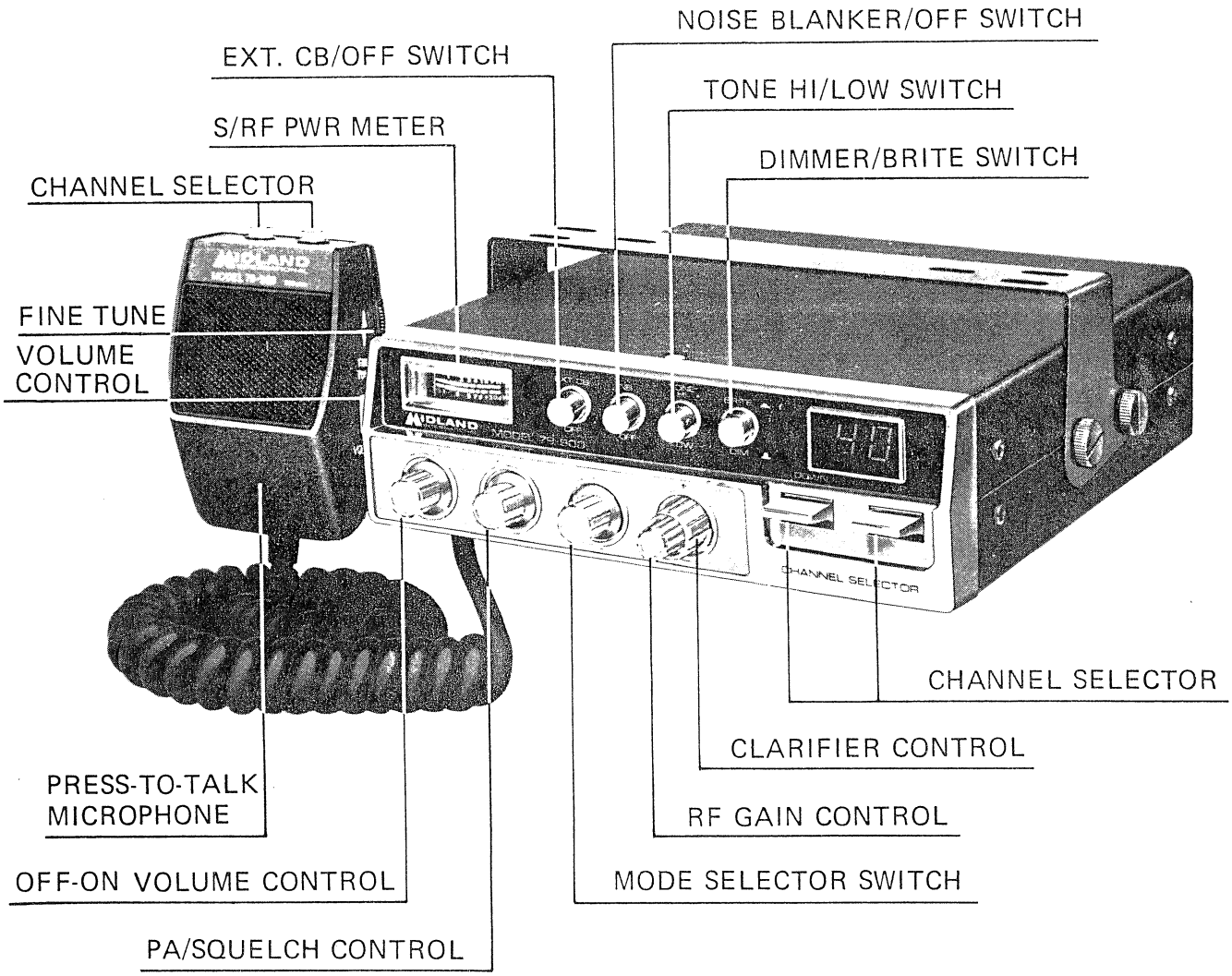
There are two types of single sideband transmissions, USB (Upper Sideband) and LSB (Lower Sideband). These might be described as half signals and due to the narrow bandwidth required, will travel over greater distances at lower power than ordinary AM signals. Figure 1 below illustrates USB and LSB signals and the reference carrier line.

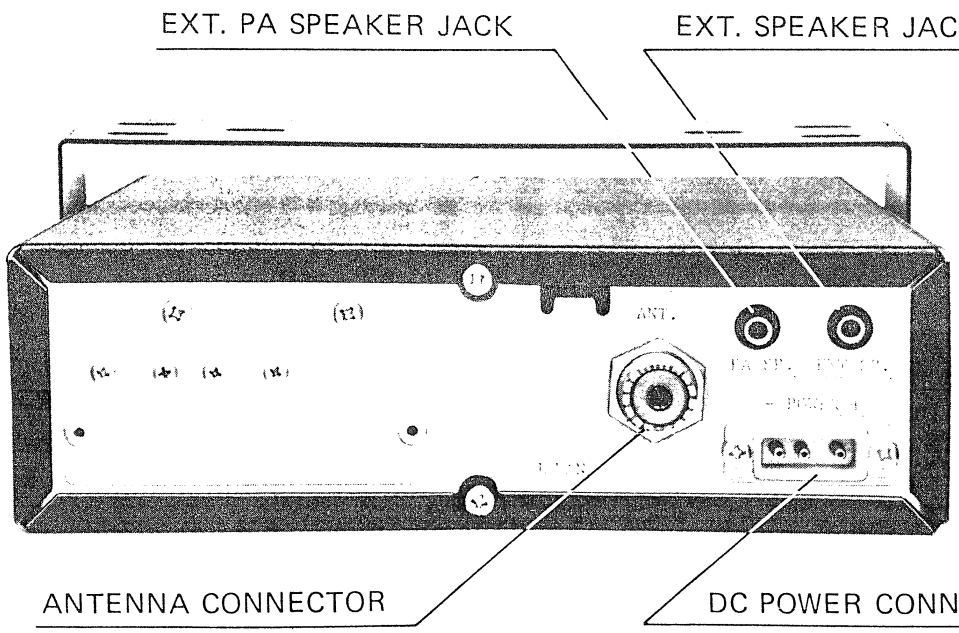
In the actual transmission of either USB or LSB, the carrier is removed. All of the modulation for a transmission is concentrated in either the Upper or Lower Sideband. In the receiver the carrier is reconstructed and the intelligence or modulated voice is then detected, amplified and converted into an audible sound heard at the speaker.

AM (Amplitude Modulation) has been the standard method of Citizens Band reception and transmission for many years and most of the existing transceivers being used today are AM. Technically, Amplitude Modulation is Double Sideband (DSB). In this method of operation, a carrier is transmitted which is modulated or interrupted by voice on both positive and negative sides as represented by Figure 2.



# OPERATION OF CONTROLS



## SELECTING CHANNELS:

Model 79-900 is equipped with electronic channel selection. Key type selectors are provided on the control panel of the unit and buttons are provided on the top of the push-to-talk microphone. Channel selection can be made from either of these locations.

By depressing the selector key or button marked "UP", the numerical channel indication (L.E.D. Display) moves forward as follows: I.E. 1 2 3 4 5 6...40. Pressing the "DOWN" key or button reverses the channel selection process i.e. 40 39 38 37...3 2 1. The speed of the selection process is controlled by the amount of time the up or down key or button is depressed. Rapid, progressive channel switching is achieved by continuous depressing of the control key or button. Single channel movement is done by temporarily pressing, then releasing, the channel selector key or button.

## VOLUME CONTROL AND OFF-ON SWITCH:

The volume control varies the sound output of the loudspeaker. It also functions as an "OFF-ON" switch. Clockwise rotation increases volume.

## PA/SQUELCH CONTROL:

Squelch quiets the receiver when signals are not being received and allows Quiet standby operation. Its function is only in the receive mode and does not affect the receiver volume when signals are being received. To adjust when no signals are present, rotate the squelch control clockwise until the receiver is quieted. Incoming signals will automatically release the Squelch. Careful adjustment is necessary since a setting too far to the right will not allow weaker signals to release the squelch.

To use your unit as a P.A. amplifier, place this switch in the "PA" position (turn counter-clockwise fully until click sound can be heard) and press the PRESS-TO-TALK button on the microphone. When the knob is in the "PA" position, it will not act as a Squelch control.

## MODE SELECTOR SWITCH:

This switch selects AM, USB or LSB mode of operation. Unless the station with which communication is desired is equipped with SSB, the AM mode is normally used. The mode selector switch changes the mode of operation of both transmitter and receiver simultaneously.

## RF GAIN CONTROL:

Adjust as required to optimize signal. This control is functional in both AM and SSB modes and is used primarily to optimize reception in strong signal areas. Gain is reduced by counterclockwise rotation of the control.

## SSB CLARIFIER CONTROLS:

For convenience in mobile operation, your 79-900 has both a "CLARIFIER" control on the front of the radio and a "FINE TUNE" control on the microphone. These controls allow slight variation of receive frequency above and below the actual channel frequency. To use, set the "FINE TUNE" to the middle of its range and adjust the "CLARIFIER" for the best reception. After setting-up in this manner, the "FINE TUNE" on the microphone may be adjusted as you go to keep reception clear, without reaching to the radio itself each time adjustment is necessary.

## EXT. CB/OFF SWITCH:

This switch enables you to monitor CB calls through a P.A. speaker connected to the "PA" jack on the back panel. For example, when you leave your car and you are expecting a call on your radio, simply set the "EXT. CB/OFF" switch in the "EXT. CB" position. This channels incoming signals through the P.A. speaker and cuts off the built-in speaker (or speaker connected to the "EXT. SPEAKER" jack). It is possible for you to transmit while the unit is in the "EXT. CB" mode although the unit's built-in speaker will not be operational until the "EXT. CB/OFF" switch is moved to the "OFF" position.

NOISE BLANKER/OFF SWITCH:

The NB(Noise Blanker) is a circuit designed to reduce impulse noises such as ignition noise from vehicles, etc., without significantly affecting the basic sensitivity of the receiver. To operate, simply set the switch to the "ON" position.

TONE HI/LOW SWITCH:

This switch is designed to adjust TONE either HI or LOW to your listening preference.

DIMMER/BRITE SWITCH:

This controls the illumination strength of the L.E.D. channel indicator.

DC POWER CONNECTOR:

This will be used for connection of DC power cord supplied with the unit.

EXT. PA SPEAKER JACK:

This will be used for connection of PA or monitor speaker(4 or 8 ohms). See "PA/SQUELCH CONTROL" and "EXT. CB/OFF SWITCH" in this manual. This jack accepts a standard(3.5 mm $\phi$) 2 circuit phone plug.

EXT. SPEAKER JACK:

This will be used for an external speaker(4 or 8 ohms) connection. This jack accepts a standard(3.5 mm $\phi$) 2 circuit phone plug. When the plug is inserted into the jack, the built-in speaker is automatically disconnected.

ANTENNA CONNECTOR:

This will be used for antenna connection and matches PL-259 standard type.

S/RF PWR METER:

When receiving, this gives the relative strength of incoming signals and when transmitting, RF power output's.

PRESS-TO-TALK-MICROPHONE:

The receiver and transmitter are controlled by the press-to-talk switch on the microphone. Press in this and the transmitter is activated. Release this switch to receive. When transmitting, hold the microphone 3 to 4 inches from your mouth and speak clearly and in a normal voice.

## MOBILE INSTALLATIONS

A location in the car or truck should be chosen carefully for convenience of operation and non-interference with normal driving functions. Mounting may be under the dash or instrument panel or any place a secure installation can be made.

### GROUND INFORMATION:

NOTE:

This transceiver may be installed and used in any 12 volt DC negative or positive ground system vehicle.

Most newer U.S. and foreign made cars and small trucks use a negative ground system while some older cars and some newer large trucks may use a positive ground system.

A negative ground system is generally identified by the (-) battery terminal being connected to the vehicle motor block, but if you cannot determine the polarity system of your vehicle, it is suggested that you consult your vehicle dealer for definite information.

### NEGATIVE GROUND SYSTEM:

In the case of a negative ground system connect the red DC power cord from the transceiver to the positive or (+) battery terminal or other convenient point and connect the black power lead to the chassis or vehicle frame or (-) battery terminal.

### POSITIVE GROUND SYSTEM

In the case of a positive ground system, connect the black DC power cord from the transceiver to the negative or (-) battery terminal or other convenient point and connect the red power lead to the chassis or vehicle frame or (+) battery terminal.

With regard to the connection of the power cords, it may be possible or desirable to connect the (red lead for negative ground system) or (black lead for positive ground system) to the ignition switch accessory terminal so that the transceiver is automatically turned off when the ignition switch (key) is turned off.

Alternately, the power lead may be connected to an available terminal on the fuse block or even to a point in the wiring harness. Care must be taken however to guard against a short circuit condition so when in doubt, please contact your vehicle dealer for specific information for your vehicle.

### IGNITION INTERFERENCE:

Engine ignition interference should not be a problem and vehicles equipped with standard broadcast radios will have enough suppression to eliminate ignition interference. If interference is present, any skilled auto radio repairman should be able to eliminate it for you.

## ANTENNA INSTALLATIONS

### BASE STATION:

When 79-900 is used as a base station, any Citizens Band beam, dipole, ground plane or vertical antenna may be used. A ground plane type will provided greater coverage and, since it is essentially non-directional, it is ideal in base station to mobile operation. From base station to base station, or point to point operation, a directional beam will give greater distance even under adverse condition. The range of the transceiver depends basically on the height of the antenna and, whenever possible, select the highest location within F.C.C. limits. Generally a minimum of lead-in cable should be used due to line losses. However, a desirable antenna location may justify the loss in longer cable runs.

### MOBILE ANTENNAS:

A vertical whip antenna is best suited for mobile use. A non-directional antenna should be used for best results in any case. The base loaded whip antenna will normally provide effective communication. For greater range and more reliable operation, a full quarterwave-whip should be used.

Either of these antennas use the metal car body as a ground plane and the shield of the base lead as well as the metal case of the transceiver should be grounded. A standard antenna connector (type SO 239) is provided on the transceiver for easy connection to a standard PL-259 cable termination.

### COMPATIBILITY:

The 79-900 is designed to be completely compatible with all current modes of Class D operation, including single sideband, (upper or lower), or conventional AM and is equipped with separate modulation circuitry to provide high level AM (Amplitude Modulated) transmissions and True SSB (Single Sideband) transmissions. The Receiver section is also capable of receiving AM and SSB. The mode of operation for both receiver and transmitter sections is automatically selected by the mode selector switch.

# SPECIFICATIONS

## GENERAL:

| | | |
|---|---|---|
| Channels | : | 40 channels |
| Frequency Range | : | 26.965 MHz – 27.405 MHz |
| Semiconductors | : | 42 Transistors, 3 FET, 62 Diodes, 7 IC, 1 LED. |
| Microphone | : | 600 ohms Dynamic Type<br>with up/down type channel selector switch, remote volume control and fine tuning |
| Speaker | : | 8 ohms 3 watts |
| Antenna Connector | : | M Type |
| Meter | : | Indicate received signal strength and relative transmit power output. |
| Size | : | 185mm(W) x 230mm(D) x 58mm(H) |
| Weight | : | 2.4 kg (5.3 lbs) |
| Jacks & Connector | : | EXT SP 3.5$\phi$, PA 3.5$\phi$, MIKE 6P(DIN), DC Power 3P |
| Controls | : | Up/Down Channel Selector Switch on front panel and remote microphone.<br>Volume Control with Power ON/OFF switch on front panel.<br>Remote Volume Control on the microphone.<br>Fine Tuning Control on the microphone.<br>Model Selector (AM-USB-LSB).<br>Squelch Control with PA Switch.<br>RF Gain Control and Clarifier.<br>Noise Blanker Switch.<br>Tone(HI-LOW) Switch.<br>Dimmer(BRITE/DIM) Switch |
| Illumination | : | Channel Number Indication (LED) |
| Accessories | : | DC Power Cable(Fuse built-in), Remote Control Microphone, Microphone Hanger, Fuse 4A, Mounting Bracket, Screws. |

| **TRANSMITTER:** | | UNITS | NOMINAL |
|---|---|---|---|
| 1. Frequency Tolerance at 25°C (5 Minutes after switch on) | AM | % | ±0.0005 |
| | SSB | % | ±0.0005 |
| 2. Carrier Power at No Modulation | AM | W | 3.8 |
| 3. PEP Power, Two Tone, SSB (input 10 mV) | | W PEP | 11.5 |
| 4. Spurious & Harmonic Emission | AM | dB | -65 |
| | SSB | dB | -65 |
| 5. Carrier Suppression | SSB | dB | -55 |
| 6. Battery Drain at No Modulation | AM | mA | 1800 |
| | SSB | mA | 700 |
| 7. Battery Drain | | | |
| AM : 80% Mod. | | mA | 1800 |
| SSB: 10 watts PEP, Two tone | | mA | 1800 |
| 8. Microphone Sensitivity | | | |
| AM : For 50% Mod. | | mV | 1.0 |
| SSB: For 4 watts PEP | | mV | 1.0 |
| 9. AMC Range | | | |
| AM : 50 — 100 % Mod. | | dB | 36 |
| SSB: 9 — 12.0 W PEP | | dB | 36 |

| **RECEIVER:** (ANL & Noise Blanker Switch OFF) | | | |
|---|---|---|---|
| 1. Max. Sensitivity | AM | μV | 0.5 |
| | SSB | μV | 0.25 |
| 2. Sensitivity for 10 dB S/N | AM | μV | 0.75 |
| | SSB | μV | 0.5 |
| 3. AGC Figure of Merit 50 mV for 10 dB Change in Audio output | AM | dB | 75 |
| | SSB | dB | 75 |
| 4. Overall Audio Fidelity at 6 dB Down | | | |
| Upper Frequency | AM | Hz | 2100 |
| | SSB | Hz | 3000 |
| Lower Frequency | AM | Hz | 300 |
| | SSB | Hz | 300 |
| 5. Cross Modulation, EIA Standard | AM | dB | 66 |
| 6. Adjacent Channel Rejection (10 KHz) | AM | dB | 60 |
| 7. Maximum Audio Output Power (at 4 ohm load) | AM | W | 4 |
| | SSB | W | 4 |
| 8. Audio Output Power at 10% THD (at 4 ohm load) | AM | W | 3 |
| | SSB | W | 3 |
| 9. RF Gain Control Range at Max. Sensitivity Level | AM | dB | 30 |
| | SSB | dB | 30 |
| 10. Hum & Noise Ratio at Input 1 mV | AM | dB | 40 |
| 11. Squelch Sensitivity at Threshold | AM | μV | 0.5 |
| | SSB | μV | 0.25 |
| 12. Squelch Sensitivity at Tight | AM | μV | 500 |
| | SSB | μV | 500 |

| | | UNITS | NOMINAL |
|---|---|---|---|
| 13. S. Meter Sensitivity at "S-9" (No Modulation AM) | AM | μV | 160 |
| | SSB | μV | 160 |
| 14. Image Rejection Ratio | AM | dB | 60 |
| | SSB | dB | 60 |
| 15. IF Rejection Ratio | AM | dB | 83 |
| | SSB | dB | 83 |
| 16. Oscillator Dropout Voltage | AM | V | 9 |
| | SSB | V | 9 |
| 17. Battery Drain at No Signal | AM | mA | 270 |
| | SSB | mA | 270 |
| 18. Clarifier Range | AM | KHz | ±1.25 |
| | SSB | KHz | ±1.25 |
| 19. Fine Tuning Range | AM | Hz | ±300 |
| | SSB | Hz | ±300 |

**PUBLIC ADDRESS**

| | | | |
|---|---|---|---|
| 1. Output Power at 10% distortion (at 4 ohm load) | | W | 3 |

* F.C.C. Type Acceptance specifications for Part 2, 15 and 95.

* Frequency Tolerance and specification: ±0.005% from -30° C to +50° C

## FREQUENCY-CHANNEL NUMBER CHARTS

| Frequency | Channel |
|---|---|
| 26.965 MHz | 1 |
| 26.975 MHz | 2 |
| 26.985 MHz | 3 |
| 27.005 MHz | 4 |
| 27.015 MHz | 5 |
| 27.025 MHz | 6 |
| 27.035 MHz | 7 |
| 27.055 MHz | 8 |
| 27.065 MHz | 9 |
| 27.075 MHz | 10 |
| 27.085 MHz | 11 |
| 27.105 MHz | 12 |
| 27.115 MHz | 13 |
| 27.125 MHz | 14 |

| Frequency | Channel |
|---|---|
| 27.135 MHz | 15 |
| 27.155 MHz | 16 |
| 27.165 MHz | 17 |
| 27.175 MHz | 18 |
| 27.185 MHz | 19 |
| 27.205 MHz | 20 |
| 27.215 MHz | 21 |
| 27.225 MHz | 22 |
| 27.255 MHz | 23 |
| 27.235 MHz | 24 |
| 27.245 MHz | 25 |
| 27.265 MHz | 26 |
| 27.275 MHz | 27 |
| 27.285 MHz | 28 |

| Frequency | Channel |
|---|---|
| 27.295 MHz | 29 |
| 27.305 MHz | 30 |
| 27.315 MHz | 31 |
| 27.325 MHz | 32 |
| 27.335 MHz | 33 |
| 27.345 MHz | 34 |
| 27.355 MHz | 35 |
| 27.365 MHz | 36 |
| 27.375 MHz | 37 |
| 27.385 MHz | 38 |
| 27.395 MHz | 39 |
| 27.405 MHz | 40 |

# BLOCK DIAGRAM

