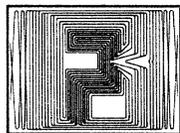


DIGICOM 100

SSB AM TRANSCEIVER



Owners Manual



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DIGICOM 100 OWNERS MANUAL

I. GENERAL

The DIGICOM 100 is a 23 channel AM/SSB Class D Citizens Band two-way radio. Features include:

- All solid state plug-in modular construction for fast, easy servicing.
- Digitally synthesized frequency control for excellent stability and tracking.
- Unequaled receiver spurious, intermodulation, and cross modulation performance.
- Internal transmitter ALC to automatically adjust varying microphone input levels for optimum power output on SSB and maximum modulation percentage on AM.
- True double sideband AM modulation.
- Unique two control channel selection.
- Full sized, communications-type speaker.
- Noise blanker, pre-emphasis type.

The DIGICOM 100 represents the most state of the art design available for the Class D Citizens Radio Service. It will provide the ultimate capability in CB communications while conforming all current Federal Communications Commission regulations. Any user attempt to internally adjust or modify the transmitter of this unit is not only strictly forbidden by Federal law, but will also decrease its communication effectiveness. All transmitter adjustments must be made by a qualified technician with a valid second class or higher radio telephone license.

BEFORE OPERATING THIS UNIT YOU MUST:

- A. Obtain a Class D license and call sign from the FCC. An application (FCC form 505 is available from any FCC office or directly from the FCC, Washington, D.C.).
- B. Read Part 95 of the FCC Rules and Regulations. This is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.

Since the DIGICOM 100 is radically different in concept and design from other transceivers the user may be familiar with, some time will be required to fully appreciate its operational and performance features. It is a very functional unit with a minimum of frills or "flashy" gadgets. All design emphasis has been on simplicity of operation and absolute ultimate radio performance. This is a very carefully engineered radio which represents a significant investment by its purchaser. You should be careful that any accessory added does not detract from the potentially excellent performance of the DIGICOM 100. Should any question arise concerning the possible harm of any accessory, contact the factory.

II. INSTALLATION

A. ANTENNA

In order to realize optimum communication performance, a good antenna is essential. It must be properly matched to the 50 OHM output impedance of the DIGICOM. An antenna VSWR of less than 2:1 on all channels is absolutely necessary. Consult your dealer for antenna installation assistance.

B. MOBILE MOUNTING

Two mounting brackets are provided, front and rear. All brackets should be attached to the unit with the $\frac{1}{4}$ " x 20 x $\frac{3}{4}$ " bolts and $\frac{1}{4}$ " spacers provided. The front bracket should be firmly attached to the vehicle as the main radio support. The rear bracket should be attached in such a way as to provide a rigid, vibration free radio mount.

This rear bracket could attach to either the transmission tunnel or firewall in a vehicle mounting. Place the microphone clip provided in a convenient place that does not interfere with vehicle operation when the microphone is in place.

C. ELECTRICAL CONNECTIONS

Use number twelve or larger wire to connect the unit directly to the vehicle 12 volt battery. For positive ground operation, internal modification is required to insure proper fuse operation, consult your dealer for assistance. Do not attempt the modification yourself. For normal negative ground installation; connect the lead with the fuse to the positive battery terminal, connect the plain lead to the negative terminal.

III. IGNITION NOISE SUPPRESSION

Radio performance will be improved greatly by effective ignition noise suppression. Recommended steps are:

- A. Be sure spark plugs, distributor cap, rotor, and ignition wiring are clean and in first rate operating condition. Replace any worn or suspect parts.
- B. Install resistance type spark plugs and ignition wire if not already present in the vehicle.
- C. If alternator whine (a high pitch tone which changes pitch with engine speed) is heard, install an alternator line filter. Consult your dealer.
- D. Install a heavy metal strap or braid between the vehicle hood and firewall by the hood hinges to insure good grounding that will electrically shield the engine compartment from the CB Radio antenna.
- E. Be sure that the radio is connected directly to the vehicle battery and that the battery is in good condition, fully charged.

IV. RADIO OPERATION AND CONTROLS

- A. ON/OFF SWITCH - Turns on power to unit. Lights behind the channel knobs should come on. Located at lower right corner of front panel.
- B. TRANSMIT SWITCH - Located on the side of the microphone. The red light in the lower left hand corner comes on indicating the transmitter is operative. On channels 24 through 99 the transmitter will not operate and the red light will not come on. Transmission on these channels is illegal under present Class D FCC Regulations. Never transmit on any channel when another station is using that channel.
- C. CHANNEL SWITCHES - Two large knobs with clear numbered plastic skirts at the left side of the radio. Each knob sets a digit of the desired channel number. For example, channel 13 would be a 1 on the left knob and a 3 on the right knob.

Note that channel 00 is the same operating frequency as channel 1 (01). Also note that the transmitter is inoperative for channels 24 to 99.

- D. MODE SWITCH - Located at lower center of panel, just below the meter. Selects mode of both transmit and receive operation. The unit must be operated in same mode as the other station being communicated with. If the other station is on AM and the DIGICOM is in the SSB mode (LSB or USB), a background whistle will be heard on receive. If the other station is SSB and the DIGICOM is in AM or the wrong SSB mode, the other station will be unintelligible. When possible, the SSB mode (either LSB or USB) gives better range and less crowding of the CB channels (two simultaneous SSB communications are possible on one channel, one on LSB and one on USB). However, not all stations on the air have SSB capability at the present time.

- E. **CLARIFIER** - Adjusts tone and intelligibility of received signals in the USB and LSB mode. Peaks receive signal strength in the AM mode. The clarifier should normally be set at half rotation point (pointer on knob straight up). The clarifier does not operate on transmit as this is undesirable for clear SSB two way communications and is illegal under present and any anticipated future FCC regulations.
- F. **SQUELCH** - Suppresses unwanted background noise and weaker signals when the radio is being used to monitor a channel. Increasing clockwise rotation causes increasing suppression of stronger signals. To properly adjust, turn fully counterclockwise (maximum receiver sensitivity) and then turn slowly clockwise until just the point where noise is first quieted. Any further clockwise rotation beyond this point will cause unnecessary loss of receiver sensitivity and thereby many weaker signals may not be heard.
- G. **VOLUME** - Adjusts loudness of speaker audio output.
- H. **NB ON-OFF SWITCH** - When in the on position, the noise blanker is activated, causing suppression of ignition noise, static, and other undesirable background noise during receive operation.
- I. **PA /CB SWITCH** - Should be in CB position for normal radio operation. When in the PA position, the DIGICOM will receive normally, however when the transmit switch is pushed, the unit will not transmit and the microphone voice input is connected to the speaker, creating a public address capability.
- J. **METER** - Indicates relative power output on transmit and relative signal strength on receive.
- K. **MICROPHONE INPUT JACK** - Located on left front side of radio. Note that microphone plug has a tab which must be rotated to line up with the jack before the two will come completely together. Also be sure to engage the plug lock ring after connection.

- L. EXT SPKR JACK - Located on bottom on unit, next to speaker grill. May be used for either an external speaker or public address system. Use 4-8 ohm speaker. **IMPORTANT!** Be sure center conductor of speaker plug is connected to ungrounded side of the voice coil. Audio amplifier will be damaged if above precaution is not taken.

PROPOSED CHANNELS AND FREQUENCIES

MHz	channel	MHz	channel
26.965	1	27.155	16
26.975	2	27.165	17
26.985	3	27.175	18
27.005	4	27.185	19
27.015	5	27.205	20
27.025	6	27.215	21
27.035	7	27.225	22
27.055	8	27.255	23
27.065	9	27.235	24
27.075	10	27.245	25
27.085	11	27.265	26
27.105	12	27.275	27
27.115	13	27.285	28
27.125	14	27.295	29
27.135	15	27.305	30

MHz	channel	MHz	channel
27.310	60	27.410	80
27.315	61	27.415	81
27.320	62	27.420	82
27.325	63	27.425	83
27.330	64	27.430	84
27.335	65	27.435	85
27.340	66	27.440	86
27.345	67	27.445	87
27.350	68	27.450	88
27.355	69	27.455	89
27.360	70	27.460	90
27.365	71	27.465	91
27.370	72	27.470	92
27.375	73	27.475	93
27.380	74	27.480	94
27.385	75	27.485	95
27.390	76	27.490	96
27.395	77	27.495	97
27.400	78	27.500	98
27.405	79	27.505	99

TRANSMITTER TUNING PROCEDURES

I. SYNTHESIZER BOARD (7H001)

A. Complete Alignment Procedure

1. PRELIMINARY SET UP

- a. EQUIPMENT REQUIRED - VOM, high input impedance frequency counter, 13.6 VDC power supply, plastic hex tuning tool, 50 ohm RF dummy load
- b. Connect radio to DC supply
- c. Remove PL 1 from R/T board
- d. NB switch - off
- e. PA/CB switch - CB
- f. MODE switch - LSB
- g. CLARIFIER control - $\frac{1}{2}$ rotation (pointer straight up)
- h. Channel switches - channel 01
- i. Connect 50 ohm load to radio output
- j. Set L3 slug at top of coil (away from board)

- k. Connect counter to TP3
2. Key radio (no RF output should be present as PL1 was removed from R/T board). Adjust C45 with plastic blade tuning tool for 12.800000 MHz at TP3. Set all frequencies within ± 10 Hz. Unkey radio.
3. Set mode switch to USB. Key radio and adjust C55 with plastic blade tool for 12.803000 MHz at TP3. Unkey radio.
4. Connect VOM to TP1. Check that channel switches are on 01. Adjust L3 for 2.0VDC at TP1. Turn channel switches to channel 99 and check that the DC voltage at TP1 does not exceed 7.5VDC. If it does, adjust L3 for a 7.5VDC reading.
5. Connect freq counter to TP2. Check that mode switch is still in USB position. Adjust C80 with blade tool for 10.697000 MHz at TP2.
6. Turn mode switch to LSB. Adjust C56 with blade tool for 10.700000 MHz at TP2.
7. Function checks
 - a. Verify that the radio will not Key (red transmit light does not come on) for channels 24 through 99.
 - b. Verify that the injection frequencies are correct to the R/T unit. Connect the counter to PL1. Note that the AM injection freq is the same as LSB

CHANNEL	OPERATING FREQ (MHZ)	USB INJECTION FREQ (MHZ)	LSB INJECTION FREQ (MHZ)
1	26.965	16.268	16.265
2	26.975	16.278	16.275
3	26.985	16.288	16.285
4	27.005	16.308	16.305
5	27.015	16.318	16.315
6	27.025	16.328	16.325
7	27.035	16.338	16.335
8	27.055	16.358	16.355
9	27.065	16.368	16.365
10	27.075	16.378	16.375
11	27.085	16.388	16.385
12	27.105	16.408	16.405
13	27.115	16.418	16.415
14	27.125	16.428	16.425
15	27.135	16.438	16.435
16	27.155	16.458	16.455
17	27.165	16.468	16.465
18	27.175	16.478	16.475
19	27.185	16.488	16.485
20	27.205	16.508	16.505
21	27.215	16.518	16.515
22	27.225	16.528	16.525
23	27.255	16.558	16.555

8. Reconnect PL1 to R/T board.

II. R/T board

A. TRANSMITTER ALIGNMENT

1. PRELIMINARY SET UP

- a. Equipment required - 13.6VDC power supply, 50 ohm RF dummy load and wattmeter, 100 MHz oscilloscope with high impedance probe (Tektronix 465 or equivalent), 1KC audio generator, DC 0-3 amp meter, plastic hex tuning tool.
- b. Connect radio to DC supply with ammeter in DC line.
- c. Connect wattmeter and dummy load to radio output connector
- d. Set R 167 at $\frac{1}{2}$ rotation
- e. Set R251 fully counter-clockwise (CCW). Note that all references to trimpot settings are facing thumb wheel of pot.
- f. Set R150 at $\frac{1}{2}$ rotation
- g. Set R273 fully CW
- h. Set R280 fully CCW
- i. Set R80 (on synthesizer board) fully CCW
- j. Set slugs of L22, L23, L12, L11, and L24 at top of coil (away from board).
- k. Be sure synthesizer board has been aligned (see section I of tuning procedure).

1. front panel settings
 1. Mode switch - USB
 2. Channel switches - 12
 3. CB PA switch - CB

- m . remove microphone connection

2. Set audio generator to 1 V PP at 1KHz and connect to MIC AUDIO wire at mic jack on control board

3. Key radio by connecting MIC PTT wire to MIC GND wire at mic jack on control board. Note that red PTT light on front panel comes on

4. Connect scope to TP4 and set R251 for .5 v P - P audio at TP4

5. Connect scope to TP5 and peak L22 and L23 for maximum 16.405 MHz voltage at TP5

6. Set R273 at ½ rotation

7. Connect scope to TP6 and carefully peak L12, L11, and L24 for maximum 27.105 MHz voltage at TP6

8. Turn mode switch to AM and adjust R80 (on synthesizer board) for a 90 percent modulated 1 KC waveform at TP6

9. Turn R273 fully CW again

10. Note DC ammeter reading on radio supply line and then slowly turn R 280 CW until current rises about 20 ma (just a slight needle twitch upward). Do not turn R 280 any farther.

11. Making sure mode switch is still in AM position, set RF output to 3.5w by turning R273 slowly CCW.
12. Check RF output on channels 1 and 23 for balance. If they are unequal, tweak L11 slightly for balance.
13. Set radio back on channel 12
14. Remove audio generator connection and PTT clip leader. Set mode switch to USB position and reconnect microphone. Push microphone transmit button and adjust R 167 for 2 to 3 watts RF output while saying the word “four” into the microphone in a normal level voice. Note that as R 167 is turned CCW modulated output increases until a limit point is reached beyond which the RF output does not increase. This indicates the transmit ALC is operating properly.

DIGICOM 100
RECEIVER ALIGNMENT PROCEDURE

PRELIMINARY SETUP

1. Equipment Required - Stable signal generator with AM modulation capability, oscilloscope, hex tuning tool.
2. Set R150, R160, R278 and R130 at $\frac{1}{2}$ rotation (pointer straight up).
3. Connect the signal generator to rear panel antenna connectors. It is good practice to remove the microphone connection to the radio to prevent accidental radio transmit into the signal generator causing potential damage to the signal generator.

ALIGNMENT PROCEDURE

1. Adjust R278 for S-3 reading on the front panel S-meter with the RF generator input level turned fully OFF.
2. With the radio on channel 12 and LSB, adjust signal generator frequency for a 1KC radio audio output tone and the generator level for a S-9 meter reading. Be sure the generator is set for CW output (no AM modulation).
3. Peak L13, L14, L16, L21 and L17 on the S-meter. Decrease the signal generator output during tuning to maintain a S-9 meter reading. This peaks the entire receiver RF signal path.

4. With the squelch open, set 1v p-p audio at TP-8 by adjusting R160. This sets the IF AGC.
5. Turn signal level up to 10 UV and set R278 for a S-9 meter reading. This calibrates the S-meter.
6. Turn signal level up to 1000 uv and set R150 for 1V DC at TP9. This sets the RF AGC.
7. With a 1000 uv signal (still on channel 12), now set the generator on 90 percent 1KC AM modulation. Adjust R130 for a 1v p-p audio waveform at TP8. This balances the AM with the SSB audio output level.