ALINCO

VHF/UHF FM TWIN BAND MOBILE TRANSCEIVER

DR·590T/E

INSTRUCTION MANUAL

ALINCO ELECTRONICS INC.

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INTRODUCTION ▊▊▊▊▊▊▊▊▊ ▎▍▎▍▎▍

Congratulation, now you are the owner of one of our many "ALINCO" products.

Your DR-590T/E has been manufactured and tested very carefully at the factory and will give you satisfactory operation for many years.

ACCESSORIES ▊▊▊▊

Carefully unpack your transceiver and you will find the included with the transceiver.

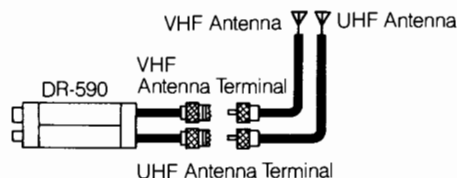## ■ Accessories supplied as standard

— Hand Microphone (Condenser type)

    a. 16 bulton DTMF Microphone (DR-590T)

    b. Hand Microphone (DR-590E)

— Mobile Mounting Bracket

— Mounting Hardware

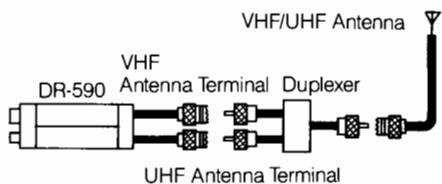— D.C. Power Cable

INSTALLATION ▊▊▊ ▎▍▎▍▎▍

How to install mobile antenna:

Connect the antenna for VHF to the VHF antenna terminal and that for UHF to the UHF antenna.

When using the antenna for dual band (antenna for VHF/UHF), a duplexer (an equipment for sharing antenna) is needed.

Use a coaxial cable of 50 ohms. It is necessary to install the base of antenna to the body for the mobile antenna. Securely install it.

SPECIFICATIONS ▊▊▊▊▊▊▊ ▎▍▎▍▎▍

■ General

Frequency coverage:	• DR-590T (U.S. Version)
	144.000-147.995 MHz (TX),
	137.000-173.995 MHz (RX),
	440.000-449.995 MHz (TX),
	410.000-469.995 MHz (RX)
	• DR-590E (Europe Version)
	144.000-145.9875 MHz (TX & RX)
	430.000-439.9875 MHz (TX & RX)
Frequency Resolution:	5, 10, 12.5, 15, 20, and 25 kHz steps
Antenna Impedance:	50 Ohms unbalanced
Power Supply Requirement:	13.8 Volts D.C.
Current Drain at 13.8 V:	Receiving
	Squelched: does not exceed 800 mA
	Transmitting

	VHF	High:	45 W approx. 9.5 A
		Middle:	10 W approx. 4.5 A
		Low:	5 W approx. 3.5 A
	UHF	High:	35 W approx. 15 A
		Middle:	8 W approx. 5 A
		Low:	4 W approx. 4 A

Dimension:	150 mm(W) × 50 mm(H) × 178 mm(D) (5⁹/₁₀″ × 2″ × 7″)
Weight:	Approx. 1.5 kgs. (3.3 lbs.)

■ Transmitter

Output Power:	VHF	High:	45 W
		Middle:	10 W
		Low:	5 W
	UHF	High:	35 W
		Middle:	8 W
		Low:	4 W

|	
Emission Mode:	F3 (FM)
Modulation System:	Variable Reactance F.M.
Max. Frequency Deviation:	±5 kHz
Spurious Emission:	−60 dB or under below carrier
Microphone:	Electret Condenser Microphone
Operating Mode:	Simplex
Duplex:	5 kHz and 12.5 kHz steps between 0 and 10.995 MHz from receive frequency
DTMF Encoder:	Built-in (DR-590T only)

■ Receiver

Receiving System:	Superheterodyne, Dual Conversion
Modulation Acceptance:	F3 (FM)
Intermediate Frequency:	1st 21.6 MHz and 455 kHz at VHF
	1st 30.825 MHz and 455 kHz at UHF
Sensitivity:	12 dB SINAD −16 dBμ
Selectivity:	±6 kHz or under at −6 dB
	±12 kHz or under at −60 dB
Audio Power Output:	Approx. 2.5 W
Speaker Impedance:	8 Ohms

CONTROLS AND FUNCTIONS

■ FRONT PANEL

CIRFOLK VHF/UHF FM TWIN BAND **DR-590**
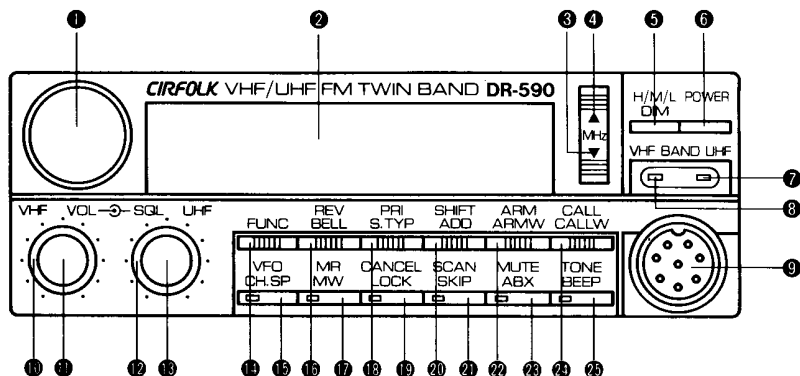
❶ MAIN TUNING DIAL
The main tuning dial knob may be rotated in either direction to select transmit/receive frequencies, memory channels, frequency steps, subaudible tones and transmit frequency offsets.

❷ LCD PANEL
Highly visible under all lighting conditions the LCD panel displays functional information during transceiver operation. Refer to Section.

❸ MHz DOWN KEY
Frequency of selected band is decreased one MHz with each touch of this key. When the key is pressed and held the frequency decreases rapidly in one MHz increments. This key is also used to change memory channels and transmit offset frequencies downward in one MHz steps.

❹ MHz UP KEY
Used the same way as the MHz DOWN key except frequency increases.

❺ H/M/L (DIM) KEY
Pressing this key selects desired transmitter output power. Power level is indicated by MID and LOW symbols on the LCD panel. When neither MID nor LOW appears on the LCD panel the power level is HIGH. LOW power is 5 watts at VHF/4 watts at UHF. MID power is 10 watts at VHF/8 watts at UHF. HIGH power (blank indicator) is 45 watts at VHF and 35 watts at UHF. Used in combination with the Function key (DIM) increases or decreases the LCD panel illumination intensity.

❻ POWER SWITCH
Main power ON/OFF switch. Push in to turn ON. Push again to turn OFF.

❼ UHF BAND SWITCH
Pressing this key once selects UHF as the main (transmitting) band.
The ● U symbol will appear on the UHF band side of the LCD display.

❽ VHF BAND SWITCH
Pressing this key once selects VHF as the main (transmitting) band.
The V symbol will appear on the VHF side of the LCD display.

❾ MICROPHONE CONNECTOR
Connect the supplied microphone to this connector.

❿ VHF SQUELCH CONTROL
Adjusts VHF squelch. Turn fully counterclockwise then rotate clockwise until background noise just disappears.

⓫ VHF VOLUME CONTROL
Adjusts VHF audio level. Rotate clockwise to increase volume.

⓬ UHF SQUELCH CONTROL
Operates the same as the VHF squelch control.

⓭ UHF VOLUME CONTROL
Operates the same as the VHF volume control.

⓮ FUNC (Function) KEY
Controls access to secondary functions printed in GREEN on the control keys. FUNC is displayed on LCD panel when selected. All secondary functions are shown in (parentheses).

⓯ VFO (CH.SP) KEY
Selects either the VFO or channel spacing (CH.SP) in 5, 10, 12.5, 15, 20 or 25 kHz increments.

⓰ REV (BELL) KEY
Used during duplex operation REV reverses the main band transmitting and receiving frequencies. This feature is useful for listening on the input frequency or to invert a repeater frequency pair. (BELL) activates a tone whenever squelch is opened alerting the operator to a signal on the main band receiving frequency even with the audio volume all the way down.

⓱ MR (MW) KEY
MR, Memory Recall, is used to access the DR-590T/E MEMORY mode. (MW), Memory Write, stores selected frequencies and functions in memory.

⓲ PRI (S.TYP) KEY
PRI selects the Priority mode allowing one important channel to be scanned periodically during the various scanning modes. (S.TYP) is used to select the desired Scan Type such as stop at busy channel and resume, stop at open channel and resume, stop at busy channel and time resume or stop at open channel and time resume.

⓳ CANCEL (LOCK) KEY
CANCEL voids a mistaken entry and returns the unit to previously set frequency and functions. LOCK disables function and control keys.

⓴ SHIFT (ADD) KEY
SHIFT selects up/down repeater input frequency shift or simplex. ADD, Additional, is used in the scan mode.

㉑ SCAN (SKIP) KEY
SCAN starts or stops scan mode. SKIP is used to skip selected memory channels during Memory Scan.

㉒ ARM (ARMW) KEY
Automatic Repeater Memory (Automatic Repeater Memory Write): This function is used to memorize a repeater frequency.

㉓ MUTE (ABX) KEY
Either band may be muted with MUTE. Automatic Band Exchange (ABX) exchanges the main, transmitting, band between VHF and UHF.
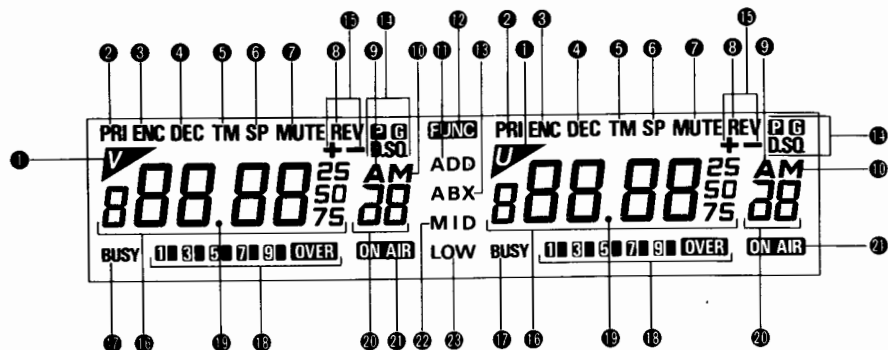
㉔ CALL (CALLW) KEY
CALL function is used to operate desired very important frequency in a second.
(DR-590E: TONE BURST BUTTON)

㉕ TONE (BEEP) KEY
Subaudible TONE is used to activate repeaters requiring a coded access tone. BEEP enables or disables tones indicating that a key has been pressed or an automatic function had occurred.

■ LCD DISPLAY

❶ MAIN BAND
Indicates MAIN (transmitting) BAND.

❷ PRI
PRIORITY function ON.

❸ ENC
ENCODED tone frequency ON, will be transmitted with carrier.

❹ DEC
Tone DECODER ON.

❺ TM
TIME Scan function ON. Scan resumes after 5 seconds even if signal is still present.

❻ SP
Open Channel scan ON. Scan stops and remains at open channel.

❼ MUTE
Silences audio on selected band.

❽ REV
REVERSE function selected.

❾ A
AUTOMATIC REPEATER MEMORY function active.

❿ M
MEMORY mode selected.

⓫ ADD
ADDITIONAL programmed scan active.

⓬ FUNC
Function is ON. Secondary GREEN function keys may be activated.

⓭ ABX
AUTOMATIC BAND EXCHANGE function enabled.

⓮ DSQ
DTMF SQUELCH function ON.

⓯ + −
Indicate up or down transmitter offset.

⓰ FREQUENCY
Displays selected transmit/receive frequencies, channel step and subaudible encoded tone frequencies.

⓱ BUSY
Squelch open, signal being received.

⓲ S/RF METER
Indicates relative received SIGNAL strength or transmitter RF output level.

⓳ DECIMAL POINT
Indicates: MHz for transmit/receive and offset frequencies.
kHz for channel step.
Hz for encoder tone frequency.
Flashes in Memory mode, disappears at memory skip channel number.

⓴ MEMORY CHANNEL
Indicates selected Memory Channel.
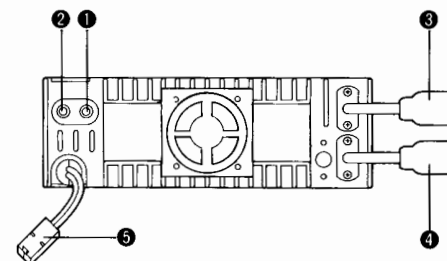
㉑ ON AIR
Transmitting.

㉒ MID
Middle transmitter output power level selected; 10W/VHF and 8W/UHF.

㉓ LOW
Low transmitter output power selected; 5W/VHF and 4W/UHF.

■ REAR PANEL

❶ VHF 8 ohm speaker jack.

❷ UHF 8 ohm speaker jack.

❸ VHF 50 ohm antenna connector, marked VHF on connector barrel.

❹ UHF 50 ohm antenna connector, marked UHF on connector barrel.

❺ 13.8V D.C. power input connector. Connect supplied D.C. power cable to this connector. CAUTION: Be sure voltage polarity is correct before connecting power cable. Supplied power cable is polarity-coded, RED is positive, BLACK is negative.

■ MICROPHONE
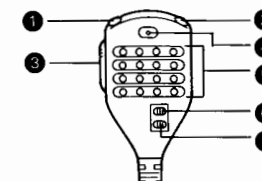
❶ & ❷ UP/DOWN Switches
Used to step VFO and subaudible tone frequencies or Memory Channel up or down. Frequencies will change continuously when switch is pressed and held.

❸ PTT Switch
Unit transmits when Push To Talk switch is pressed.

❹ MIC
Speak into Microphone from approximately 5" distance.

❺ 16 Tone DTMF Pad (DR-590E: Option)
Each numerical or letter key activates one DTMF encoded tone. Press in desired order. Microphone emits a low level verification tone to indicate successful key activation.

DTMF (Dual Tone Multi Frequency) Chart				
Low Tone (Hz) \ High Tone (Hz)	1209	1336	1477	1633
697	1	2	3	A
770	4	5	6	B
852	7	8	9	C
941	✳	0	#	D

⑥ LOCK
Disables all microphone functions except PTT.

⑦ REMOTE/DTMF (DR-590E: Option)
REMOTE permits remote input of 16 functions to main unit.
DTMF selects DTMF key pad.

RECEIVE

■ Initial Control Settings
1. Connect 13.8V D.C. power supply and antennas. Ensure antennas are connected to proper band connectors. Set switches and controls as indicated below:

POWER: OFF
POWER of switchable D.C. power supply: OFF
VOLUME CONTROLS: Fully counterclockwise
SQUELCH CONTROLS: Fully counterclockwise

Initial factory-delivered settings or reset modes for Frequency, Memory Channel and other functions:

	VHF	UHF
VFO frequency:	145.000 MHz	445.000 MHz (DR-590E: 435.000 MHz)
Memory Channel:	1	15
Channel Step:	5 kHz (DR-590E: 12.5 kHz)	5 kHz (DR-590E: 12.5 kHz)
Shift:	0	0
Offset Frequency:	0.6 MHz	5 MHz (DR-590E: 7.6 MHz)
Tone Encoder:	None	None
Tone Frequency:	88.5 Hz	88.5 Hz
DTMF Squelch:	None	None
Memory Frequency:	145.000 MHz (No. 1 — No. 14)	445.000 MHz (No. 1 — No. 14) (DR-590E: 435.000 MHz)
Scan Type:	Carrier stop & resume	Carrier stop & resume
ARM Base:		
ARM:		
DSQ Code:	111 (No. 0 — No. 4)	111 (No. 0 — No. 4)
Autodialer:	None	None

2. Turn on the power supply then press radio POWER switch. Display will indicate frequencies and V.
3. Adjust VOLUME controls on each band until a signal or noise is heard.
4. Rotate main tuning dial to select an open frequency on each band then rotate Squelch controls on each band until noise just disappears.
5. Select desired MAIN BAND (V or U) by pressing desired end of **VHF BAND UHF** switch just above microphone jack on front panel. Then select desired frequency using main tuning dial. Select frequency on other band in same fashion.
6. Turning off DR-590T/E: turn off transceiver POWER switch before turning off power supply or vehicle engine.

■ Frequency Selection
Select either the VHF band or the UHF band as the MAIN (transmitting) BAND by pressing once the appropriate end of the **VHF BAND UHF** switch on the front panel.

If VHF is selected the V symbol will appear to the left of the VHF frequency display and most of the command and control functions will be active on this band. If UHF is selected the U symbol will appear to the left of the UHF frequency display and most of the command and control function will be active on this band.

The desired MAIN BAND operating frequency may be selected by rotating the main tuning dial in either direction or by using the UP/DOWN switches on the microphone.

■ FREQUENCY STEP Selection
The Frequency Step function allows the operator to select the desired Channel Spacing increment in steps of 5, 10, 12.5, 15, 20 and 25 kHz.
1. Press VFO key to select VFO mode.
2. Press FUNC key then press the CH.SP key. The current channel spacing will appear in place of the MAIN BAND frequency.
3. Desired Channel Spacing increment may be selected by rotating the main tuning knob either direction or with the UP/DOWN microphone switches.

$$\rightarrow 5K \rightarrow 10K \rightarrow 12.5K \rightarrow 15K \rightarrow 20K \rightarrow 25K \rightarrow$$

■ Example:
If 5 kHz channel spacing is selected the frequency will step from 144.000 to 144.005 to 144.010 to 144.015 and so on. If 10 kHz is used the frequency will step from 144.000 to 144.010 to 144.020 to 144.030... etc.
4. After setting the frequency step return to normal operation by pressing any key except the CANCEL key or the POWER switch.

■ CONFIRMATION TONES
Musical tones will sound whenever control keys are pressed if the BEEP function is active. Tones will not sound when the main tuning dial, volume and squelch controls, main power switch or microphone UP/DOWN switches are activated. To defeat confirmation tones press FUNC key then press the BEEP key. To restore tones press FUNC and BEEP again.

TRANSMIT

■ Cautions
Ensure that antennas are attached to the correct antenna terminal, i.e. VHF antenna to VHF antenna terminal and UHF antenna to UHF antenna terminal. Check markings on antenna terminal barrel. Always use an antenna with low standing wave ratio (SWR). Improper antenna termination may cause damage to transmitter final amplifier.

The 590T/E has two bands both of which are always visible on the LCD display. The VHF band is on the left and the UHF band is on the right.
1. Before transmitting select the desired MAIN (transmitting) band with the **VHF BAND UHF** selector switch on the front panel.
2. Check to see if frequency is occupied before transmitting.
3. Select appropriate transmitter output power level by cycling H/M/L key on front panel until minimum power for the intended transmission is indicated on the LCD panel.
4. Press PTT switch and speak into microphone. ON AIR indicator will illuminate while transmitting.
5. Release PTT switch, ON AIR light goes out and unit returns to receive.

■ Tone Frequency Selection
1. Press TONE key. The MAIN BAND frequency will be replaced by a TONE frequency and ENC will appear on the LCD display panel.
2. Select desired TONE frequency by rotating main tuning dial or by using microphone UP/DOWN switches in REMOTE mode.
3. Return normal frequency to display by pressing any control key except TONE, MR or CANCEL.
4. The encoded TONE frequency will be transmitted with the carrier.

■ Transceiver Mode
DR-590T/E has 4 modes; VFO mode, MEMORY mode, CALL mode and ARM mode. (DR-590E: 3 modes)

1. VFO mode
Press the VFO key. The transceiver will be in VFO mode.
This mode is used to change frequency and select desired channel step, offset frequency (up to 10.995 MHz by 5 kHz), tone frequency (38 kinds in Hz.) and etc.

2. MEMORY mode
Press the MR key. Memorized frequency and Memory Channel number will display on the LCD. There is 28 Memory Channel in total for VHF and UHF.
To change Memory Channel number press the MHz △ or ▽ switches. And also 1L, 1U on VHF 2L, 2U on UHF will be displayed on the LCD,

which are used to scan edges in Memory contents.

When these numbers appear on the LCD any keys will not accept.

To change VFO mode, CALL mode or ARM mode select Memory Channel number 1 — 28.

3. CALL mode (DR-590T only)

Press the CALL key. The transceiver will be in CALL mode.

To cancel CALL mode press the CALL key again.

To store desired frequency, offset, tone frequency in the CALL channel.

Select a VFO mode or Memory mode and press the FUNC key and then press the CALLW key.

4. ARM mode

1. Select VFO mode. Select a frequency, Offset, Shift direction and Tone frequency according to a repeater.
2. Press the F key, and select "A" rotating the main dial and then press the MR/MW key.
3. The initial setting is completed. The LCD display will return to the VFO mode. (ARM is limited to recording within the initial MHz frequency.)
   Initial frequency (A1) EX. 145.000 to max. 145.995
4. Press the microphone PTT switch. If the transceiver receives the signal from the repeater, the frequency will be memorized in Channel A1.
5. The last set frequency will be memorized in Channel A1 and the second last will be memorized in Channel A2.
6. If you want to memorize a repeater output frequency manually, after the above No. 1 procedure, press the F key and press the ARMW key.

■ SCAN

The DR-590T/E offers 4 scanning options: Band scan in the VFO mode, Programmable Band scan in the VFO mode, Memory Channel scan in the Memory mode and ARM scan in the ARM mode. Four scanning options are available:

1. Busy channel stop and restart: stops at busy channel and restarts 2 seconds after carrier drops.
2. Open channel stop and restart: stops at open channel and restarts 2 seconds after a carrier appears.

3. Busy channel stop and time restart: stops on busy channel and restarts 5 seconds later.
4. Open channel stop and time restart: stops on open channel and restarts 5 seconds later.

To select a scan type press the FUNC key then press the S.TYP key. The type of scan selected, SP, TIM or TIM SP, will be displayed above the frequency on the MAIN BAND LCD display. Press the FUNC and S.TYP keys each time a different scan type is selected.

Both bands may be scanned simultaneously. Simply program the desired band scan edges and scan type first in one band then the other. In ABX mode scan will stop on whichever band becomes active making it the MAIN BAND.

A. BAND SCAN

In this mode all MAIN BAND VFO channels are scanned by pressing the SCAN key. Frequency decimal point will flash to indicate scanning in progress. In the BAND SCAN mode no scan type symbol is displayed on the LCD panel. The scanning direction may be reversed by rotating the main tuning dial in the direction opposite to the scan. Pressing the appropriate UP or DOWN microphone switch, in REMOTE mode, also reverses the scan direction.

B. PROGRAMMABLE BAND SCAN

This mode scans a range of VFO frequencies between user selected Lower (L) and Upper (U) band scan edges. In the Simple Programmable (SP) mode band scan edges are stored in frequency limits 1L and 1U in the VHF (1) band, 2L and 2U in the UHF (2) band.

Storing lower and upper VHF band scan edges

1. Select VFO mode.
2. Select desired Lower frequency.
3. Press the FUNC key. FUNC and a channel number will be displayed on the LCD panel.
4. Rotate the main tuning dial until 1L appears.
5. Press MW key. Lower band edge frequency is now stored in 1L.
6. Select VFO mode again.
7. Select desired Upper frequency.
8. Repeat steps 3 through 5, this time selecting desired Upper (1U) band scan edge. Upper band edge frequency is now stored in 1U.

9. Press SCAN key. Scan will begin on frequencies between 1L and 1U.
10. Press SCAN key again to stop scan. Scan may also be stopped by touching PTT switch. Restart by pressing SCAN key again.
11. Scanning direction, up or down, may be reversed as described under BAND SCAN above.
12. UHF Upper and Lower band scan edges are stored in the same manner between band edges 2L and 2U.

To scan this programmed band when DR-590T/E is in another mode simply select VFO mode then select any frequency within the band between 1L and 1U. Press SCAN key to start scan.

C. MEMORY SCAN

In the Memory Scan mode memorized frequencies in either band may be scanned. Bands may be scanned individually or both bands may be scanned simultaneously.

Storing desired frequencies to Memory:

1. Select VFO mode for the desired band, VHF or UHF.
2. Select frequency, offset and tone, if any, to be memorized.
3. Press the FUNC key. A channel number will appear to the right of the Main Band LCD display.
4. Rotate Main Tuning Dial to select desired channel number.
5. Press the MW key. The desired frequency is now stored in the selected channel. Frequencies are stored in the other band in the same manner.

To start scan press the MR key then the Scan key. Main Band decimal point will flash indicating scan function is active. To stop scan press the SCAN key or the microphone PTT switch. To scan both bands at the same time select the other band and start scan in the same fashion.

Only those memory channels into which a frequency has been programmed will be scanned. If only one channel contains a memorized frequency then that channel will be continuously displayed. If two or more channels have been memory programmed those channels will be scanned and displayed.

Memory channel skip

This mode permits unwanted Memory Channel skip during Memory Scan.

1. Press MR key to select Memory Recall mode.
2. Rotate the Main Tuning Dial to select channel to skip.
3. Press the FUNC key then the SKIP key. The LCD display decimal point will disappear and the selected Memory Channel will be skipped during Memory Scan.
4. To cancel Memory Channel Skip press the FUNC key then the Skip key. The skip function is cancelled and the channel is restored to scan.

D. ARM Scan

To select ARM mode, press the ARM key. Press the SCAN key. The radio will start to scan A1 through A10. Scan will stop at open channel and resume after a signal presents.

■ PRIORITY FUNCTION

This function allows a one second scan of the user-selected priority frequency and a five second scan of the other frequencies in the VFO Priority, Memory Priority and Call Priority modes.

A. VFO Priority

Desired priority frequency stored in Memory Channel 1 will be scanned for one second in every six in the VFO mode.

1. Store desired frequency in Memory Channel 1.
2. Select VFO mode and a VFO frequency.
3. Press the PRI key. PRI indicator will appear on the LCD display and VFO Priority scan will begin. Memory channel frequency will be scanned for one second. VFO frequency will be scanned for five seconds. If the microphone PTT switch is pressed to talk while scan is on the VFO frequency scan will restart when PTT is released. If PTT switch is pressed while scan is on the Memory channel scanning is cancelled.
4. Press PRI key to cancel VFO Priority scan. DR-590T/E will return to the VFO frequency.

B. MEMORY Priority

This is the reverse of the VFO Priority mode. The VFO frequency will be scanned one second in every six seconds in Memory mode.

1. Select VFO and a VFO frequency.
2. Press MR to select Memory mode then select memory channel containing the desired memorized frequency to be scanned.
3. Press the PRI key. PRI indicator will appear on the LCD display and Memory Priority scan will begin. VFO frequency will be scanned for one second, memory channel frequency will be scanned for five seconds. If the microphone PTT switch is pressed to talk while scan is on Memory channel scan will restart when PTT switch is released. If PTT switch is pressed while scan is on the VFO frequency scanning is cancelled.
4. Press PRI key to cancel Memory Priority scan. DR-590T/E will return to the memory channel.

C. CALL Priority (DR-590T only)

VFO frequency is scanned for one second in every six seconds in the CALL priority mode.

1. Select VFO and a VFO frequency.
2. Select CALL mode by pressing the CALL key.
3. Press the PRI key. PRI indicator will appear on the LCD display and CALL priority scanning will commence. VFO frequency will be scanned one second, the CALL mode will be scanned for five seconds. If PTT switch is pressed while scanning the CALL mode scan will restart when PTT switch is released. If PTT switch is pressed while scanning the VFO frequency CALL priority scanning will be cancelled. Cancel CALL priority scanning mode by pressing PRI key. DR-590T/E will return to the CALL mode.
4. To store a frequency in the CALL channel:
   A. Select VFO mode and desired frequency.
   B. Press the FUNC key then the CALLW key.

■ TONE SQUELCH (Option)

The Tone Squelch function is initiated by the distant calling station. Tone Squelch allows the DR-590T/E to remain quiet until it receives the proper Tone Squelch frequency, a desirable feature on busy or noisy channels. (Optional Tone Squelch Unit EJ-7U is required)

1. Press the TONE key. ENC (encoder) indicator will

appear on the LCD display panel.
2. Select the desired Tone frequency and press the TONE key again. The DEC (decoder) indicator will appear on the LCD display panel. The DR-590T/E will now remain quiet until it receives the encoded Tone Squelch.
3. Press TONE key to cancel Tone Squelch function. The ENC and DEC indicators on the LCD display panel will disappear.
4. To return to Tone Squelch press the CANCEL key within five seconds. ENC and DEC will reappear and the TONE SQUELCH function is restored.

■ REPEATER OPERATION

Amateur radio repeaters utilize separate transmitter and receiver sections. The transmitter frequency may be offset either above or below the receiver frequency according to repeater coordination conventions.
Note: Repeater offsets are sometimes referred to as "splits".

To select repeater offset frequency and direction:

1. Select VFO mode, select desired repeater output frequency and press the SHIFT key. Each time the SHIFT key is pressed the offset indicator will step cycle through the various offset options one at a time.
2. The current offset (usually 0.60) and the minus sign (−) will appear first on the LCD display panel indicating a minus offset of 0.60 MHz (600 kHz). In this position the desired offset frequency may be selected by rotating the main tuning dial in either direction. The DR-590T/E accepts offsets from 0.00 to 10.0 MHz in 5 kHz or 12.5 kHz steps.
3. Press the microphone PTT switch to store the selected offset, the minus (−) shift and return to the selected repeater frequency.
4. Pressing the SHIFT key again will show the VFO frequency and the plus (+) offset indicator on the LCD display panel. Press the microphone PTT switch to store the frequency and the plus (+) offset.
5. Pressing the SHIFT key again will show the VFO frequency but neither the minus (−) nor the plus (+) offset direction indicator. In this mode the transmitter is not offset from the receiver frequency indicating the simplex mode. The transmitter will transmit on the frequency to which the receiver (VFO) is set.

■ REVERSE (REV)

In some areas there may be repeaters operating on repeater frequency pairs the exact reverse of another repeater in the area. That is, the input of one repeater is the output frequency of the other and vice versa. The input and output frequencies of these repeaters are identical but reversed. To avoid the inconvenience of reprogramming every time both repeaters are in range the REV key allows instant reversal of the input and output frequencies and the offset direction. The REV function is also useful to check the repeater input and to determine if another station is within simplex range.

To activate the REV function:

1. Press the REV key. The repeater input frequency and the opposite SHIFT indicator will appear on the LCD display panel.
2. Press the REV key again to cancel the REV function.

■ AUTOPATCH OPERATION (DR-590E: Option)

Many repeaters offer a telephone link known as an autopatch allowing use of the DR-590T/E in much the same manner as a mobile or cellular telephone. The DTMF (Dual Tone Multi Frequency) key pad on the supplied microphone is used to activate an autopatch and other repeater user functions. The repeater control operators or regular repeater users can advise how these functions are used.

■ Autodialer (DR-590E: Option)

This function is used to transmit a memorized DTMF code, such as a telephone number, up to 18 digits. The DR-590T/E has four autodialer memory channels in each band. It also has one memory channel in each band for receiving DTMF codes.

■ To Program The Autodialer: (DR-590E: Option)

1. Select desired band, select VFO mode then enter code C13 on the microphone DTMF pad. A channel number and flashing minus (−) sign will appear.
2. Select desired channel number using the MHz UP/DOWN switch on the main unit front panel. The C08/C09 DTMF pad codes cannot be used

to change channel numbers while autodialer is being programmed. Each time the MHz UP/DOWN switch is pressed the channel number will change upward from one to five and the flashing minus (−) sign will be present. When channel 5 appears it will display a flashing letter "d". Channels one through four are transmit autodialer memory channels. Channel 5 is the DTMF monitor channel.
3. Enter desired telephone number and any required codes such as A, B, C, D, ✳ or # up to 18 digits. To store the number press the FUNC key or the microphone PTT switch.
4. To cancel a stored telephone number enter C13 on the DTMF pad, select the appropriate autodialer channel number then press the FUNC key followed by the skip key.

■ Transmitting The Stored Autodialer Number: (DR-590E: Option)

1. Select the VFO mode then select the transmitting frequency.
2. Enter DTMF pad code C13 and select the desired autodialer channel.
3. Select VFO Mode.
4. Enter DTMF pad code C15. The stored autodialer number will be transmitted on the selected frequency.

■ DTMF Monitor (DR-590E: Option)

A received DTMF code may be memorized in Autodialer channel 5. This memory can store up to ten digits. To confirm a received DTMF code has been stored in Channel 5 enter the C13 code on the DTMF pad. Press the MHz UP/DOWN switch on the main unit to access Channel 5. If a DTMF code has been received it will be displayed on the LCD display panel.

■ REMOTE CONTROL (DR-590E: Option)

The DR-590T/E offers remote control either from the supplied microphone DTMF pad or by a transceiver with DTMF capability.

Remote Control From The Microphone:
All remote control functions are controlled by entering three commands on the DTMF pad using the following control command chart:

Code	Corresponding function key	Remote Function
C00	CANCEL	Cancel function
C01	VFO	Select VFO mode
C02	MR	Select Memory mode
C03	CALL	Select CALL mode
C04	ARM	Select ARM mode
C05	VHF	Select VHF main band
C06	UHF	Select UHF main band
C07	H/M/L	Select power output
C08	MHz (up) ↑	Up one MHz
C09	MHz (on) ↓	Down one MHz
C10	—	Set DSQ code
C11	—	Select DSQ code
C12	—	Select DSQ mode
C13	—	Set Autodialer
C14	—	Select Autodialer
C15	—	Transmit Autodialer

■ To Use The Microphone Remote Control DTMF Function: (DR-590E: Option)

1. Select the REMOTE position on the microphone REMOTE/DTMF switch.
2. Enter the desired three digit code on the DTMF pad. The selected function is now completed.

If DR-590T/E is in the Memory mode memory channel will change up one memory, each time C08 is entered and down one memory, each time C09 is entered. In the VFO mode desired frequency may be entered directly from the DTMF pad. Press any DTMF key to cancel an incomplete entry. DSQ and Autodialer functions are explained in later Sections.

■ Remote Control By A Transceiver With DTMF capability: (Option)

DR-590T/E can be controlled on above functions (C00-C15) by another transceiver with DTMF capability. (DTMF unit (EJ-8U) must be built-in)
1) On VFO or memory mode, press C12. DSQ flashes.
2) Press F or P.T.T. button.
3) Press F + MHz △ keys. DSQ flashes again.
4) Select one of above functions and push the 3 digits (C00-C15).
5) To input the frequency, push A + 6 digits or

A + 5 digits (12.5 kHz step.) ex: A144500
Note: To cancel the remote control function, press F + MHz ▽ keys.

ADDITIONAL FUNCTIONS AND OPERATIONS

■ Simultaneous Receiving And Full Duplex Operation

Among the many useful features of the DR-590T/E are the ability to receive on both bands at the same time and also to operate in the full duplex mode similar to a telephone where both parties can speak and listen simultaneously on two different channels.

Simultaneous Receive On Both Bands:
1. Simply select the desired receiving frequencies on each band. Ensure that the MUTE function is not active on either band.

Full Duplex Operation:
1. Select VFO and set desired frequency on each band. Either band may be used to transmit. The selected Main Band will be the transmitting band. The sub-band will be the receiving band. In this mode you speak on the Main Band and listen on the sub-band. Avoid repeater frequencies. Restrict full duplex operation to establish simplex frequencies only.

■ ABX (Automatic Band Exchange)

This function automatically selects whichever band is active, hearing a signal, as the Main Band. For example, if VHF has been selected as the Main Band the ABX function will switch automatically to the UHF band if it becomes active and VHF is not receiving a signal. UHF will remain the Main Band as long as it hears a signal then will switch back to the VHF band whether or not it is active. Likewise, if UHF is the Main Band ABX automatically switches to VHF if it becomes active while UHF is quiet.

To Select The ABX Function:
1. Select VFO and set desired frequency on each band.
2. Press the FUNC key then the ABX key. The ABX indicator will appear on the LCD display panel and the ABX function becomes active.
3. If the microphone PTT switch is pressed while ABX has switched to the sub band the ABX func-

tion is cancelled and the sub-band becomes the Main Band.
4. If a Priority function is active on the sub-band it will be inactive when ABX switches to the Main Band. Priority will resume when ABX returns to the sub-band.

■ MUTE

The MUTE function permits temporary silencing of either band.

To Mute Either Band:
1. Press the MUTE key repeatedly until the MUTE symbol on the LCD display panel appears over the band to be silenced.
2. To cancel MUTE press the MUTE key until the MUTE symbol disappears.

■ LOCK

This function prevents unintended function changes by locking out all functions except the main POWER switch and the microphone PTT switch.

To Activate The LOCK Function:
1. Press the FUNC key then the LOCK key.
2. To cancel LOCK press the FUNC and LOCK keys again.

■ DIM (Dimmer)

The DIM function allows selection of two different LCD display panel brightness levels.

To Change LCD Brightness Level:
1. Press the FUNC key then the DIM key. Repeated pressing of these keys will raise and lower the brightness level.

■ CANCEL

Some mistaken operations may be corrected with the CANCEL function.
1. When frequency is changed by mistake press the CANCEL key within five seconds and the previous frequency will reappear on the LCD display.
2. If Memory Scan is started by mistake press the CANCEL key within five seconds. The former frequency will reappear on the LCD display panel.

■ DSQ (DTMF Squelch)

The DSQ is an abbreviated name of DTMF squelch and has the pager and code squelch functions. The DSQ requires the optional DTMF unit (EJ-8U) and a

microphone remote control (EMS-3) with DTMF supplied for US version.

A. DESCRIPTION OF DSQ

The DSQ is divided into the pager and code squelch. The pager is divided into the 3 groups. The LCD display as shown below:

0→0、1→1、2→2、3→3、4→4、5→5、
6→6、7→7、8→8、9→9、A→A、B→b、
C→C、D→d、*→H、#→U

Classification of code

The DSQ has three codes, namely the group code, self-station code, and remote station code. A pager consists of the combination of these three codes. Only the group code is used by the code squelch. Each code consists of three digits. The group code is the code of a group which one belongs to.
The self-station code is the code of its own. The remote station code is the self-station code of a partner whom one is communicating or one wishes to communicate.

Code squelch

The code squelch allows the squelch to be opened when the received three-digit code agrees with its own group code. The same code is transmitted on transmission. This machine has three group codes. Comparison of agreement is performed to all three group codes. If either one of them agrees, the code is automatically selected.

Group paging

The type of group paging consists of the group code (3 digits), "*", and self station (3 digits) (a total of 7 digits). When group paging is performed, stations with the same group code can communicate each other. This machine has three group codes, making comparison of the received code and three codes for agreement. If either one of them agrees, the code is selected.

Private paging (individual paging)

The type of private paging consists of 7 digits, namely the remote station code (3 digits), "*", and self-station code (3 digits). When private paging is made, the squelch of the station with the same self-station code as the remote station code which has been sent is opened for enabling communication to be made.
In this machine, the squelch is opened when the received remote station code agrees with the self-

station code owned by the self station. Also, the received self-station code is rewritten as the remote station code of self station.

Private paging within group

The type of private paging within a group consists of 6 digits, namely the group code (3 digits), upper one digit of remote station code, " ∗ ", and upper one digit of self-station code.

When private paging within group is performed, the squelch of a station having the same upper one digit as that of the received remote station code as the self-station code is opened, thus enabling communication to be made.

In this machine, the group code enables automatic selection to be made. Being based on the received self-station code, the remote station code is rewritten by producing three digits, namely the self-station code which receives the code (1 digit), " ∗ ", and " ∗ ".

Automatic selection of DSQ mode

Whichever paging may be selected for the pager, the received type is used to judge the type of paging and to select the paging mode.

B. HOW TO SET DSQ CODE

The DSQ code consists of a total of 5 codes, namely 3 group codes, 1 self-station code, and 1 remote station code. The details of remote station code may change depending on communication.

Paging of code setting mode

Set the VFO mode and then enter the "C10" from a microphone remote control. The frequency display of main band blinks. Enter the NO. of code to be entered.

    Self-station code: 0
    Group code: 1-3
    Remote-station code: 4

The code NO. and the uppermost one digit of code at that time appear. Also, the remote station has the codes independently for VHF and UHF. Set them as needed.

Code input

Enter the codes to be input in order. They are transmitted from the uppermost digit on transmission.

Rotate the main dial counterclockwise for correcting halfway during input. Every time you reach the next detent position, you can go back to the previous code.
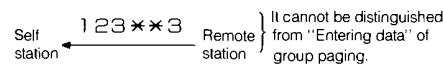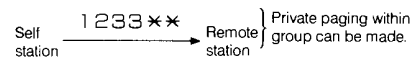
Blinking indicates the location of current entry. Rotate the main dial clockwise if you do not wish to change the code where LED is blinking. Every time you reach the next detent position, you can go to the next code.

When you complete entering up to three digits, you can go back to the VFO mode. When completing halfway during entry, press any key on the main unit. Then, you will go back to the VFO mode.
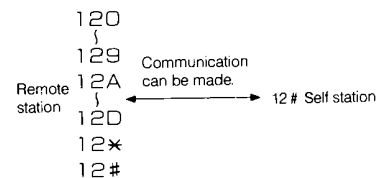
Cautions on code entry

On pager, the " ∗ " mark is used as a delimiter between codes. Thus, if you specify the " ∗ " mark at the uppermost position of self-station code, you cannot perform private paging within group.

Example: Group code: 123, self-station code: ∗00, There is a private paging within group when the self-station code of remote station is equal to 345.

```
Self          1 2 3 3 ∗ ∗    Remote   } Private paging within
station    ───────────────►  station  } group can be made.

Self          1 2 3 ∗ ∗ 3    Remote   } It cannot be distinguished
station    ◄───────────────  station  } from "Entering data" of
                                       } group paging.
```

The " # " is used as a wildcard. The wildcard allows the code to be judged to be in agreement unconditionally for that position. By using a wildcard, it becomes possible to perform the same operation as having a plurality of self-station codes or four or more group codes.

Example: When 12# is specified to the group code in the code squelch:

```
          1 2 0
           )
          1 2 9   Communication
Remote    1 2 A   can be made.
station    )      ◄──────────────► 12 # Self station
          1 2 D
          1 2 ∗
          1 2 #
```

The wildcard temporarily changes the details on paging from the remote station.

When transmitting immediately after setting, the "12 #" is transmitted and only the station with the group code "12 #" opens the squelch. The same is true immediately after modifying the group code to "12 #". Although the wildcard as the remote station code can be set, it may be rewritten depending on the DSQ mode so that the function is not activated.

C. SELECTION OF DSQ MODE

The DSQ mode consists of the code squelch, group paging, private paging, and private paging within group. Three of them are automatically selected when paging is made.

Paging of selection mode

When the "C12" is entered from the ten-key pad of a microphone remote control in VFO or memory read, the "DSQ" of DSQ display blinks.

How to select

When you press the MHz [△] and [▽] keys, the DSQ display changes. Select a desired mode (the commands of a remote controller "C08" and "C09" are also possible).

    DSQ: Code squelch
    PDSQ: Private paging
    GDSQ: Group paging
    PGDSQ: Private paging within group
    Lighting off: No DSQ setting

When the selection of DSQ mode is completed, press the [FUNC] key or PTT switch. Set the DSQ mode and return to the previous mode. Select the "C07" code by the remote controller to return to the previous mode.

Cautions on selecting DSQ mode

Codes which can be used differ depending on the DSQ mode to be used. The group code and the remote station code are used in the code squelch group paging and private paging, respectively. When the DSQ mode is modified, the mode may be changed so that a usable code may be selected.

No DSQ mode can be selected in the ARM and call modes.

D. SELECTION OF DSQ CODE

The selection of DSQ code is limited by the DSQ mode. In the case of private paging, there is only

one remote station so that the remote station is selected automatically. In other cases, since the group code is required, it needs to be selected from three group codes.

Paging of selection mode

When you enter the "C11" using a ten-key pad of a microphone remote control in either the VFO or memory mode, the code NO. selected at that time and the details appear at the frequency display position.

How to select

Press the MHz [△] and [▽] keys in the selection mode to allow the code to be changed. Select a desired code (the "C08" and "C09" of a remote controller commands are also possible).
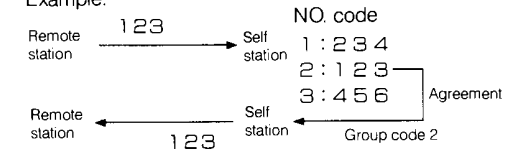
Cautions on selecting DSQ code

When the DSQ has been set, codes to be selected are limited.

When the group code is not needed, it is automatically selected. Select a group code when needed. You can select codes independently for VHF and UHF.

E. OPERATION OF CODE SQUELCH

The code squelch is used to open the squelch when performing communication using a three-digit code and a group code is used. The code squelch allows whether the received code agrees with the group code of self station to be judged. If they agree, the code is selected and the succeeding communication is made.

Example:

```
Remote        1 2 3      Self        NO. code
station    ───────────►  station     1 : 2 3 4
                                      2 : 1 2 3 ─┐
                                      3 : 4 5 6   │ Agreement
Remote                   Self                    ┘
station    ◄───────────  station
              1 2 3                  Group code 2
```
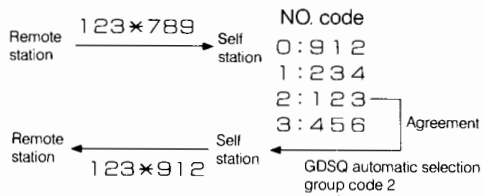
When paging from the self station, select the code previously. When you use it along with the bell function, alarm and display will inform it on paging.

F. OPERATION OF PAGER

When either of three pagings of pager is set, the DSQ mode is selected in the paged code type.

Example: When private paging is set:

Remote station 123✳789 → Self station

NO. code
0:912
1:234
2:123 ─┐
3:456 ─┘ Agreement

Remote station ← Self station
123✳912   GDSQ automatic selection group code 2

Select the code and mode when performing paging from the self station. When you use it along with the bell function, alarm and display inform it on paging.
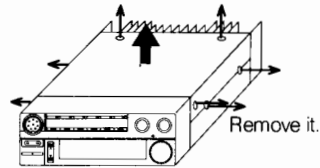
OPTION

■ OPTION
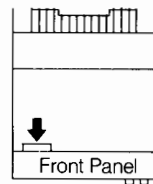
Tone Squelch Unit (EJ-7U)

This unit is necessary to operate the tone squelch unit. Two circuits for VHF and UHF are incorporated into one unit. Thus, it is possible to specify and operate independently for VHF and UHF.

How to install:

① Remove the screws at the lower side of main unit and at both sides and then the cover at the lower side.

Remove it.

② Confirm that there are two connectors at the lower left corner with the control panel toward yourself.

Front Panel

③ Install the tone squelch unit to the lower side of the connector.

The side with ICs should face upward (the opposite side of the printed-circuit board of main unit). After completing installation, press the stopper around the connector and then fix it.

Parts should face upward.
Connector for EJ-7U   Press it.
Connector for EJ-8U
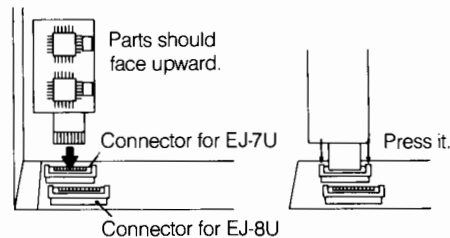
④ Attach a sponge tape to the rear of printed-circuit board. Remove the seal and then fix it to the main unit.

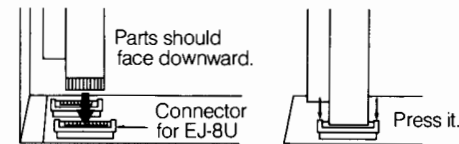⑤ Put the case on it and then fix it with screws.

DTMF Unit (EJ-8U)

This unit is needed for the DSQ function, auto dialer, and external remote controller.

Also, a separate remote microphone (EMS-3) is needed for setting and selecting these.

How to install:

① Confirm the location of connectors at the lower side of main unit as in 4-1. ② How to install tone squelch unit.

② Install the DTMF unit to the upper side of connector.

The side with ICs of DTMF unit should face the lower side (the side of printed-circuit of main unit). After installation, press the stopper around the connector and then fix it.

Parts should face downward.
Connector for EJ-8U   Press it.

③ Attach a sponge tape on ICs. Remove the seal and then fix it to the tone squelch unit EJ-7U. If the tone squelch unit EJ-7U is not fitted, fix it to the main unit.

④ Put the case and then fix it with screws.