2 SPECIFICATIONS

			TM-241A(U.S.A./Canada)	TM-241A/E	TM-441A(U.S.A./Canada)	TM-441A	TM-441E	TM-541A/E
General	Frequency range MHz		144 to 148	144 to 146 [1]	438 to 450	430 to 440	430 to 440	1240 to 1300
	Mode		F3E(FM)					
	Antenna impedance		50Ω					
	Operating temperature		−20°C to +60°C (−4°F to +140°F)					
	Power requirements		13.8V DC ±15% (11.7~15.8V)					
	Ground		Negative					
	Current drain	Transmit mode	Less than 11A		Less than 10A			Less than 6A
		Receiver mode	Less than 0.6A					
	Frequency stability		Less than ±10 ppm					Less than ±3ppm
	Dimensions (W×H×D) (mm) (Projections included)		140×40×160(5-1/2"×1-37/64"×6-19/64") (140×40×172(5-1/2"×1-37/64"×6-25/32")					
	Weight (kg)		1.2(2.65lbs)					
Transmitter	Output power [2]	HI	50W		35W			10W
		MID	Approx 10W		Approx 10W			—
		LOW	Approx. 5W		Approx. 5W			1W
	Modulation		Reactance modulation					
	Spurious radiation		Less than − 60 dB					
	Maximum frequency deviation		±5KHz					
	Audio distortion (at 60% modulation)		Less than 3% (300 to 3000 Hz)					
	Microphone impedance		600Ω					
Receiver	Circuity		Double conversion superheterodyne					
	Intermediate frequency 1st/2nd		30.825MHz/455kHz	10.7MHz/455kHz	30.825MHz / 455kHz			59.7MHz/455kHz
	Sensitivity (12 dB SINAD)		Less than 0.25μV	Less than 0.16 μV				
	Selectivity		−6dB: More than 12 kHz −60dB Less than 24 kHz					
	Squelch sensitivity		Less than 0.1 μV		Less than 0.177 μV			Less than 0.1 μV
	Output (5% distortion)		More than 2 W across 8 Ω loads					
	External speaker impedance		8Ω					

[1] Australia: 144 to 148

[2] Recommended duty cycle: 1 minute Transmit, 3 minutes Reception

Circuits and ratings are subject to change without notice due to advancement in technology.

3 ACCESSORIES

Unpack your new transceiver carefully, and examine it for visible damage If the equipment has been damaged in shipment, notify the transportation company immediately. Save the boxes and packing material for future shipping.
The following accessories should be included in the box with the transceiver.

DTMF Microphone (U.S.A. CANADA only)	T91-0380-X5	1 ea.
or		
Dynamic Microphone (GENERAL market only)	T91-0379-X5	1 ea.
or		
Dynamic Microphone (EUROPE market only)	T91-0382-X5	1 ea.
Microphone Hook (U.S.A. CANADA only)	J20-0319-24	1 ea.
Mobile Mounting Kit		
Bracket	J29-0436-03	1 ea.
Screw set	N99-0331-05	1 ea.
Self tapping Screw (U.S.A. CANADA only) ...	N46-3010-46	2 ea.
Hex wrench	W01-0414-04	1 ea.
Stacking plate (TM-441A/441E/541A/541E)..	J21-4147-14	2 ea.
DC power Cable	E30-2111-05	1 ea.
Fuse (TM-241A/241E: 15A)..	F05-1531-05	1 ea.
(TM-441A/441E: 10A)..	F05-1031-05	1 ea.
(TM-541A/541E: 8A) ...	F05-8021-05	1 ea.
Instruction Manual	B62-0031-XX	1 copy
Warranty Card		1 ea.

(U.S.A., CANADA, EUROPE market s only)

4 INSTALLATION INSTRUCTIONS

4-1 INSTALLATION

Mounting Bracket

When installing the transceiver in a vehicle consider the ease of operation and safety when selecting the location for the mounting bracket.

1. Install the bracket using the supplied flat washers and self tapping screws (4 pcs.each).
2. Attach the transceiver loosely using the 4 SEMS screws.
3. Align the grooves in the bracket with the transceiver's screws (Fig. A) and slide the transceiver to the rear.
4. Adjust the viewing angle in the bracket to the desired position (Fig. B).
5. Hold the transceiver in place and tighten the 4 SEMS screws using the supplied wrench.

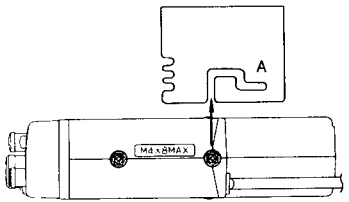


Fig. A

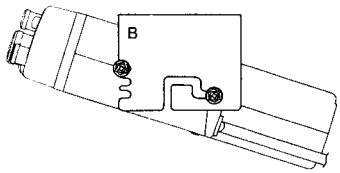
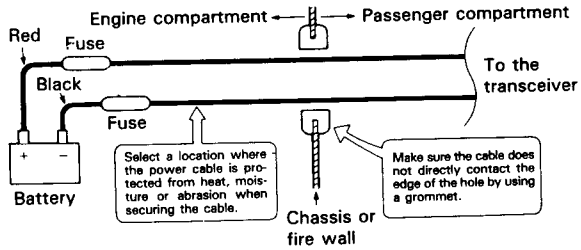


Fig. B

4-2 CONNECTION
4-2-1 Mobile Installations

Cautions :
1. Before installing the power cable, be sure to remove the negative lead from the battery for safety.
2. After installation and wiring, be sure to double check for correct installation before reconnecting the negative lead to the battery terminal.
3. If the fuse opens, be sure to check that each conductor has not been damaged by short circuiting, etc. Then replace with a new fuse of the same rating.
4. After completing the wiring, wrap the fuse holder with heat resistant tape to protect against heat and moisture.
5. Do not remove the fuse even if the power cable is too long.

Make sure the positive (+) and negative (−) lead polarity is correct when connecting to the battery.



■ If the wiring hole in the fire wall or chassis is too small, disassemble the fuse holder to thread the wire through the hole.

A. Battery Connections

Connect the power cable directly to the battery terminals. Using of the cigarette lighter socket will lead to a poor connection, and will result in poor performance. Pay close attention to the polarity of the cables when connecting them to the battery.

B. Ignition Noise

This transceiver has been designed to suppress ignition noise; however, if excessive noise is present, it may be necessary to use suppressor spark plugs (with resistors).

4-2-2 Fixed Station

A regulated DC power supply (13.8 VDC capable of supplying at least 11 amperes) is required. PS-33 is recommended.

1. Never connect the AC power cable to the AC outlet until all other connections have been made.
2. Before connecting and disconnecting the power connector, be sure to turn OFF the POWER switches of both the transceiver and the DC power supply.
3. Observe polarity of the DC power cable. The transceiver operates on 13.8 VDC, negative ground. Battery polarity must be correct. The power cable is color coded :
   Red → + (Positive polarity)
   Black → − (Negative polarity)

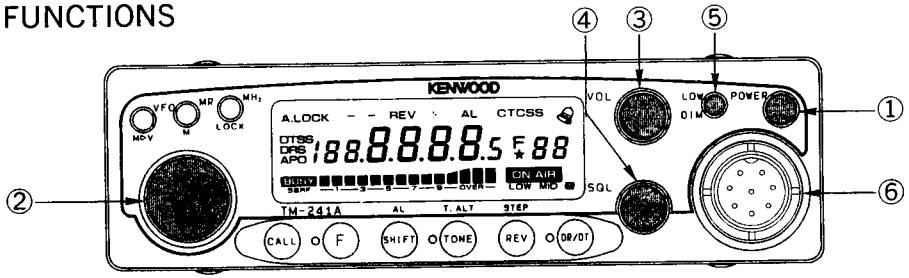
4-2-3 Antenna

The type of antenna that is used will greatly affect the performance of the transceiver. Use a properly adjusted antenna, of good quality, to enable your transceiver to perform at its best. The antenna input impedance is 50 ohms. Use 50-ohm coaxial cable such as RG-8U or 8D-2V for this connection. If the antenna is far from the transceiver the use of low loss coaxial cable, such as RG-8U is recommended. Match the impedance of the coaxial cable and that of the antenna so that the SWR is less than 1.5 to 1. The protection circuit in the transceiver will activate if the SWR is particularly poor (greater than 3 to 1).
High SWR values will cause the transmitter output to drop, and may lead to TVI or BCI reports.

Caution :
We recommend that you install a high quality lightening arrestor in your antenna lines for protection against fire,electric shock,personal injury,or damage to the radio itself.

5 OPERATION

5-1-1 CONTROL FUNCTIONS



① POWER switch
Press to turn the transceiver on or off.
Press the VFO/M▶V or MR/M key and switching the power on will reset the VFO or MEMORY.
The microphone PF key can be programmed when the power is switched on.

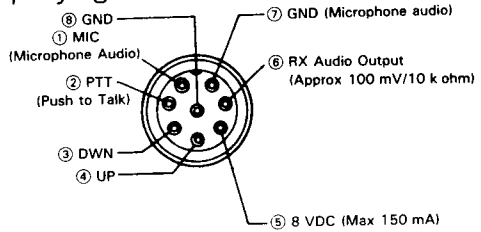
② Tuning control
This control is used to select the desired transmitter/receiver frequency, MHz step, memory channel, frequency step, tone frequency, scan direction, etc.

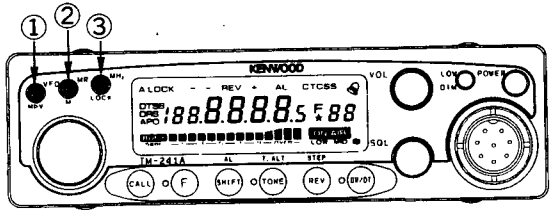
③ VOL control
This control is used to adjust the volume from the internal and external speaker (if used). Clockwise rotation will increase the volume and counterclockwise rotation will decrease the volume.

④ SQL (Squelch) control
This control is used to select the desired squelch threshold level.

⑤ LOW/DIM key
LOW
This function is used to select the transmit output power level (HI, MID(Except TM-541A/E), or LOW).
DIM
This function is used to select the intensity of the front panel display illumination. (See page 48)
Pressing the F key for longer than 1 second and then press the LOW/DIM key while the F indicator is flashing will turn the time-out timer function on and off.

⑥ Microphone connector
Attach the supplied microphone to this connector. The pin out of the connector is shown in the accompanying illustration.





① VFO/M▶V key

This key is used to return to VFO operation after operating in the MR or CALL channel mode. Pressing this key will allow the tuning control and microphone UP/DWN keys to increase or decrease the operating frequency.

Press and hold the key for longer than 1 second to initiate VFO scan. Pressing the key after scan has been initiated will cause scan to stop.

Pressing the key within 10 seconds of pressing the F key will copy the memory channel or call channel data to the VFO. This allows you to change parameters of that channel without actually changing the data that has been stored in memory.

Pressing the F key for longer than 1 second and then pressing the VFO key will cause radio to toggle the hold / resume mode between Time Operated scan and Carrier Operated scan.

If you press and hold the VFO key while you turn on the POWER switch you will reset the microprocessor's VFO memory, without destroying the memory channel or call channel data.

② MR/M key

This key is used to select MR (Memory Recall) mode from the VFO mode. The tuning control can then be used to select the desired Memory channel.

Pressing the key for longer than 1 second will initiate memory channel scanning.

Pressing the key within 10 seconds of pressing the F key will store the displayed data into memory.
In the MR channel mode pressing the F key for longer than 1 second and then pressing the MR key will cause the Memory channel to skip during Memory channel scan mode.

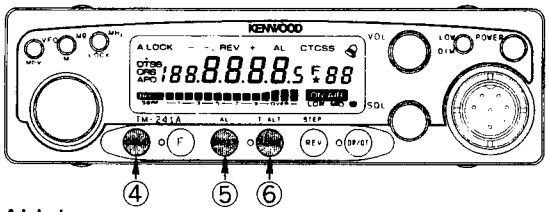
If you hold and press this key while you turn on the POWER switch you will clear all the microprocessor's operator programmed memory section.

③ MHz/LOCK key

This key is used to tell the microprocessor that you wish to increase or decrease the operating frequency in 1 MHz increments.

Pressing this key within 10 seconds of pressing the F key will cause the key lock function to activate, protecting the currently displayed data from accidental erasure.

Pressing the F key for longer than 1 second and then pressing MHz / LOCK key while the F indicator is flashing will turn the AUTOMATIC POWER OFF function on or off.(See page 48)



④ CALL key

Press this key to activate the call channel function.

Press the F key momentarily and then press the CALL key to store the currently displayed data into the CALL channel. The radio will allow you up to 10 seconds to press the CALL key after pressing the F key.

Pressing the F key for longer than 1 second and then pressing the CALL key will store the currently displayed data as the lower limit for the programmable VFO tuning limit function.

To operate the transceiver with the RC-10 press and hold the CALL key on the transceiver and then turn on the POWER switch.

⑤ SHIFT/AL key

SHIFT function

Pressing this key alone to select the desired transmitter offset direction. Pressing the key will cause the radio to shift from one offset direction to the next, i.e. "+" to "−" to simplex where no indicator shows. ("−"to"− −" for European versions)

AL function

Pressing the F key momentarily and then pressing the SHIFT/AL key will cause the radio to activate the Priority Alert function. When this function is active the radio will scan memory channel 1 at approximately a 5 second interval. If there is activity on the frequency a beep will sound from the speaker. Pressing the same key sequence again will cancel the function.

Pressing the F key for longer than 1 second and then pressing the SHIFT/AL key will store the currently displayed data as the upper limit for the programmable VFO tuning limit function.

⑥ TONE/T.ALT key

TONE function

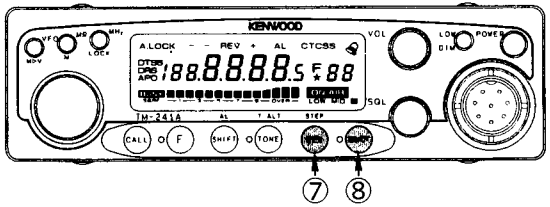
Pressing this key by itself causes the radio to select the desired tone signaling mode. When the "T" indicator is illuminated in the display the transceiver will transmit the selected subaudible tone. When the "CTCSS" indicator is illuminated the transceiver will both transmit the subaudible tone and will also remain squelched until the proper subaudible tone is received.

TONE frequency selection

Pressing the F key for longer than 1 second and then pressing the TONE/T.ALT key will allow you to select the desired tone frequency. To change to a different tone frequency rotate the tuning control or press the UP/DWN switches on the microphone until the desired tone frequency appears in the display. To return to the normal frequency display you can press any front panel key except the power switch.

TONE ALERT function

If you press the F key momentarily and then press the TONE / T.ALT key, T.ALT function will be activated. This function will cause the radio to emit a series of beeps when an incoming signal is received. (See page 47)



⑦ REV/STEP key

This key is used to reverse the transmit / receive frequencies during repeater operation. If you have selected simplex this key will not function!

Pressing the F key momentarily and then the REV/STEP key will allow you to select the desired VFO tuning step and Scan step size. Use the tuning control to select the desired tuning step and then press any front panel key except the POWER switch to return to the normal frequency display.

Pressing the F key for longer than 1 second and then pressing the REV / STEP key will turn the BEEP function Off or ON.

⑧ DR/DT/ALT key(ALT: TM-541A/541E only)

DR/DT function

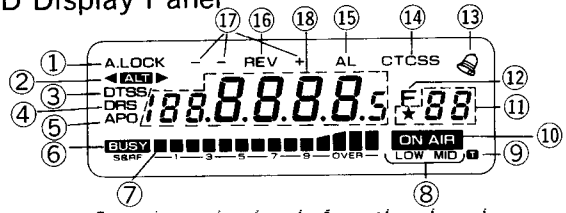
Pressing this key alone to select the DTSS(Dual Tone Squelch System) function or DRS (Digital Recording System) function.

ALT function

Pressing the F key momentarily and then the DR/DT/ALT key will cause the ALT(Automatic Lock Tuning) function of the TM-541A/541E to activate.

Pressing the F key for longer than 1 second and then pressing the DT / DR / ALT key will turn the DRS function ON or OFF.

5-1-2 LCD Display Panel



① **LOCK** / **A.LOCK** — On when the Lock function has been activated. On when the All Lock function has been activated.

② **◀ ALT ▶** — On when the Automatic Lock Tuning function is active. When the ALT system is operating the direction indicator will turn on if the system shifts the receiver frequency.

③ **DTSS** — On when the DTSS function has been activated.

④ **DRS** — On when the Digital Recording System is active.

⑤ **APO** — On when the Automatic Power Off function has been activated.

⑥ **BUSY** — On when the squelch opens.

⑦ — This level meter indicates the relative receiver signal strength or the relative transmitter power output.

⑧ **LOW MID** — Indicates the relative output power setting for transmit. No indicator for high power.

⑨ **T** — On when the Time Out Timer function has been activated.

⑩ **ON AIR** — On during transmit.

⑪ ★ 88
Indicates the active memory channel number. ★ indicates that the channel is locked out.
C is displayed during call channel.
Either P0, P1, P2, P3, or PA is displayed during paging.

⑫ F
On whenever the F key has been depressed. Also shows the last memory channel number that had been selected.

⑬
On when the Tone Alert function is active. The indicator flashes when signal has been received.

⑭ CTCSS
On when the Tone Decode and Encode function has been activated.
On when the Tone Encode function has been activated.

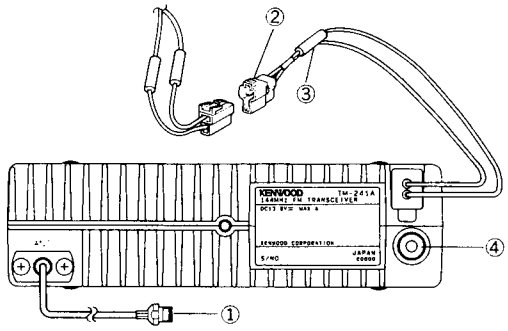
⑮ AL
On when the Priority Alert function has been activated.

⑯ REV
On when the Reverse function has been activated.

⑰ − +
Display the selected transmitter offset direction.
Both − and + light at the same time during split channel operation.

⑱ 888.888
Displays the operating frequency to the nearest kHz digit; or the tone frequency etc.
The indicator flashes when scanning.

5-1-3 Rear Panel



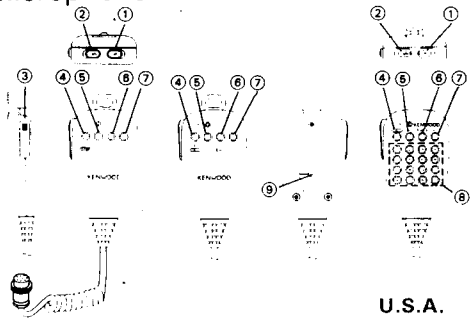
① ANTENNA connector
Attach an antenna with a low SWR and an impedance of 50 ohms.

② 13.8 VDC power input connector
Connect the supplied DC power cable to this connector.
Pay close attention to the polarity. Red is positive and black is negative.

③ Fuse holder
Contains a requaired fuse.
TM-241A: 15A, TM-441A: 10A, TM-541A: 8A
Do not use a larger fuse as damage might result to the transceiver.

④ External speaker jack
This jack is used to connect an external speaker. The speaker should have an impedance of 8 ohms.

5-1-4 Microphone



European version

U.S.A. version

①②UP/DOWN switches
These switches can be used to increase or decrease the VFO frequency, the Memory channel number, and the Tone frequency, etc..

③ PTT (Push to Talk) switch
The transceiver will transmit whenever this switch is depressed. Scan operations may be canceled by pressing this switch without transmitting.

④ CALL key (except European version)
This key functions just like the CALL key on the front of the radio.
1750 key (European version)
The transceiver will transmit with 1750 Hz repeater access tone whenever this switch is depressed.

⑤ VFO key
This key functions just like the VFO key on the front of the radio.

⑥ MR key
This key functions just like the MR key on the front of the radio.

⑦ PF (Programmable Function) key
This key can be programmed to perform any of the following functions:
MHz key (Initial setting from the factory); or SHIFT-key; or TONE key; or REV key;or DR/DT key ; or LOW key.
To program the key use the following procedure:
1. Turn the POWER switch on the transceiver OFF.
2. Press and hold the key on the front panel of the set that corresponds with the function you wish to program the microphone key to perform.
3. Turn on the POWER switch while the key on the front panel is held in.
4. Release the front panel key.

One additional function can be programmed that is not included on the front panel of the transceiver. This is known as the MONITOR function. This will allow you to open squelch to check the band for a clear frequency. This will function even if you are operating in the CTCSS decode mode or DTSS mode or PAGING mode.
MONITOR programming
Press and hold the F key on the front panel as you turn on the POWER switch of the transceiver and then release the F key.

⑧ 16-Tone DTMF keypad (U.S.A. and CANADA version only)
These buttons are used to activate the DTMF encoder.

⑨ LOCK key
This key will deactivate all functions of the microphone except the PTT function and DTMF key pad.