



OWNER'S  
MANUAL

**Model**  
**2591**

## CONTENTS

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
I	INTRODUCTION	1-1
	UNPACKING	1-1
	SPECIFICATIONS	1-2
	INSTALLING AND REMOVING THE BATTERY PACK	1-3
	BATTERY NOTES	1-4
II	OPERATING INSTRUCTIONS	
	Rear Panel and Battery Pack	2-1
	Top Panel	2-1
	Front Panel and Keyboard	2-3
	Memories	2-5
	Operating Hints	2-8
	Optional Accessories	2-9
III	BLOCK DIAGRAM & SCHEMATICS (insert)	

TEN-TEC, INC.  
SEVIERVILLE, TN 37862

PT. NO. 74149    PRINTED IN USA.    8-83

## SECTION I

## INTRODUCTION

The Model 2591 Two Meter FM Handheld is a full featured transceiver incorporating the latest in microprocessor technology. Model 2591 provides 10 memories, programmable and memory scan, two transmit power levels and many more features in a compact and lightweight handheld.

## UNPACKING

Carefully remove your Model 2591 from the packing carton and examine it for signs of shipping damage. Should any damage be apparent, notify the delivering carrier or dealer immediately, stating the full extent of the damage. Retain all damaged cartons. Liability for shipping damage rests with the carrier.

It is recommended that you keep the shipping carton and fillers. In the event that storage, moving or reshipment becomes necessary, they come in handy. The following items are packed with the Model 2591. Make sure that you have not overlooked anything.

1. Battery Pack - - - - 1
2. AC Battery Charger - - 1
3. Flexible Antenna - - - 1
4. Belt Clip - - - - - 1
5. Belt Clip Screws - - - 2
6. External Mic Plug - - 1
7. External Speaker Plug - 1
8. Manual and Warranty Card

**IMPORTANT NOTE :**

The Ni-Cad battery pack supplied with your Model 2591 is shipped uncharged from the factory. It should therefore be charged a full 14 hours before use. (See Page 1-4 under Battery Notes)

## SPECIFICATIONS

GENERAL

FREQUENCY COVERAGE: 143.500 to 148.995 MHz.

FREQUENCY TOLERANCE: +/- 1 kHz.

CHANNEL STEPS:

Incremental: 5 kHz.

Programmable Scan: 5, 10, 15, 25, or 30 kHz.

MEMORIES: 10.

NON-STANDARD SPLIT: One (Memory channel #0).

EMISSION TYPE: F3.

VOLTAGE REQUIREMENT: 8.4 VDC (450 mA Ni-Cad battery pack).

ANTENNA: 50 ohms unbalanced, BNC type connector.

DIMENSIONS HWD: 6.67 (169) X 2.6 (66) X 1.6 (41) inches (MM).

WEIGHT: 17.5 ounces (.496kg) with battery pack.

OPERATING TEMPERATURE: 32 to 122 degrees F (0 to 50 degrees C).

MEMORY DRAIN: Less than 75 microamps.

SEMICONDUCTORS : 1 microprocessor, 36 transistors, 5 ICs, 1 FET, 19 diodes.

TRANSMITTER

2.3 W on battery 2/95

0.3 W on battery 2/95

RF OUTPUT POWER: HI 2.5 watts, LO 300 milliwatts.

MODULATION: Variable reactance direct modulation.

FREQUENCY DEVIATION : +/- 5kHz.

TRANSMIT OFFSET: +600 kHz, -600kHz, simplex, memory offset.

SPURIOUS AND HARMONIC OUTPUT: More than 60 dB below carrier.

MICROPHONE: Built-in electret condenser type. Optional Speaker/Microphone available.

CURRENT DRAIN: HI power - less than 750 mA, LO power - less than 375 mA.

RECEIVER

CIRCUIT TYPE: Double conversion superheterodyne.

IF FREQUENCIES: 10.7 MHz, 455 kHz.

SENSITIVITY: Better than .5  $\mu$ V for 20 dB quieting.

Squelch less than .4  $\mu$ V.

SELECTIVITY: More than +/- 7.5 kHz at -6 dB, less than +/- 15 kHz at -60 dB.

SPURIOUS RESPONSE: Better than 50 dB.

AUDIO OUTPUT: 325 mW at 8 ohms.

CURRENT DRAIN: Squelched less than 25 mA, Maximum audio less than 180 mA.

.414  $\mu$ V for  
12dB SINAD  
7/95

INSTALLING AND REMOVING THE BATTERY PACK

Remove the paper cover from the battery. Install the battery pack by sliding the pack onto the transceiver until a click is heard.

To remove the battery pack, grasp the transceiver firmly and slide the battery pack to the left.

The Model 2591 uses a capacitive memory backup system. The following procedures must be followed in order to retain memory and/or power up the microprocessor in the proper sequence.

When installing the battery pack for the first time or if the battery pack has been removed for more than 30 seconds:

1. Make sure the VOLUME on/OFF control is in the OFF position.
2. Remove the paper cover.
3. Slide the battery pack into position.
4. The transceiver is now ready for use.

To install a fresh battery pack and retain memory:

1. Make sure the VOLUME on/OFF control is in the OFF position.
2. Remove the battery pack and install the fresh one within 30 seconds.

## BATTERY NOTES

The battery pack is rated at 8.4 VDC nominal, 450 MAH.

The Model 2591 indicates that the batteries should be recharged when the TX/BATT. LED flashes on and off during transmit. Stop using the transceiver as soon as possible and proceed as follows:

1. Turn the transceiver to the OFF position
2. Connect the supplied AC charger to the battery pack; the LED on the battery pack indicates that the batteries are being charged.
3. Charge the battery pack for 14 to 15 hours, but no more than 15 hours.
4. The transceiver is now ready to use.

If you have an additional battery pack Model 2991, the exhausted battery pack may be recharged separately from the transceiver and the fresh battery pack can be used to power the Model 2591.

The charger jack on the battery pack cannot be used to power the Model 2591 directly.

If the battery pack is allowed to go completely dead the possible results are loss of memory and/or degradation of the Ni-Cad batteries.

For maximum life of your Ni-Cad battery pack, TEN-TEC recommends:

1. DO NOT charge more than 15 hours or less than 14 hours.
2. Use the supplied AC charger. DO NOT substitute another charger.
3. Charge the battery pack only after the TX/BATT. LED indicates a charge is needed.
4. Charge between 35 to 100 degrees F.
5. DO NOT use the battery pack for more than a few minutes after the TX/BATT. LED has started to flash.
6. DO NOT operate the transceiver while charging an attached battery pack with the AC charger.
7. DO NOT short across the exposed battery contacts.

## SECTION II

## REAR PANEL AND BATTERY PACK

BELT CLIP MOUNTING

Attach the belt clip to the back of the transceiver at the belt clip mounting holes using the supplied screws.

IMPORTANT NOTE:

DO NOT use screws longer than the ones supplied. The possible result is damage to the circuit board behind the mounting holes.

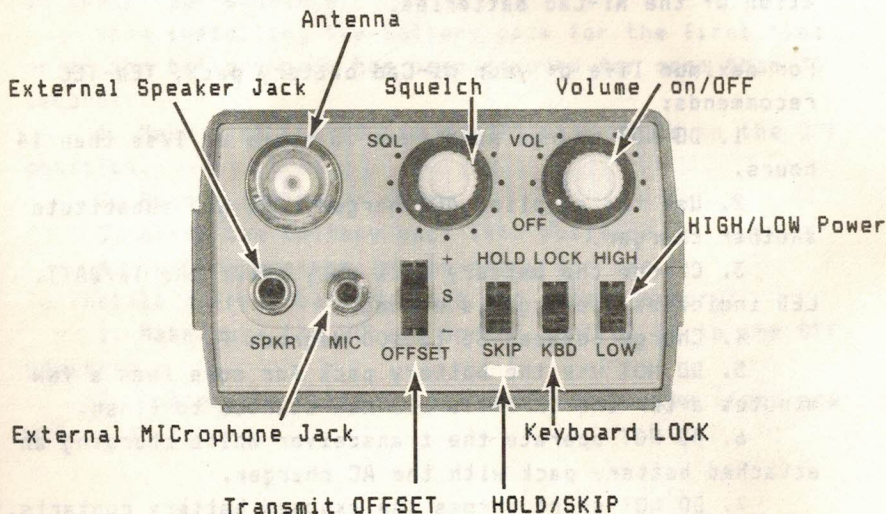
CHARGER JACK

For use with the supplied AC Charger only. DO NOT connect to an external power supply.

CHARGER CONTACTS

The two screws located on the bottom of the battery pack are for use with the optional 5 hour desk charger, Model 2992.

## TOP PANEL

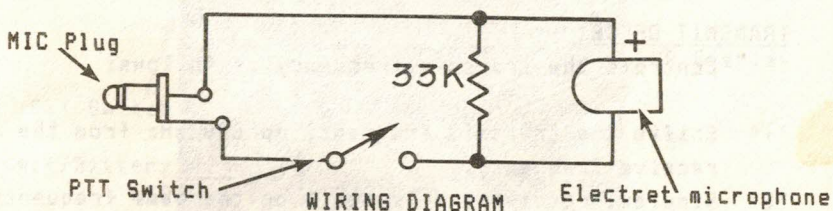


ANTENNA CONNECTOR

A BNC type connector for use with the supplied flexible antenna or any other 50 ohm, 2 meter antenna.

EXTERNAL SPEAKER/MICROPHONE

For use with the optional speaker/mic Model 2700 or any external speaker (8 ohm) and/or external microphone (electret condenser type). Use shielded cable for the external microphone.

SQUELCH CONTROL

This control sets the squelch threshold level. Rotate the control until the receiver becomes silent with no signal present. The squelch must be activated to use the scan functions.

VOLUME ON/OFF CONTROL

This control adjusts the receiver audio level. Rotating this control fully counter-clockwise until it clicks turns off the transceiver.

HI/LO TRANSMIT POWER

Selects RF power output at either HI 2.5 W or LO 300 mW. Use the LO position whenever possible to conserve battery power.

KEYBOARD LOCK

Place in the LOCK position to prevent accidental input to the keyboard.

SKIP/HOLD

Used in the Programmable or Memory Scan Mode. In



the HOLD position, scanning will stop and stay on a busy channel until approximately 2 seconds after the transmission has ended.

In the SKIP position, scanning will stop on a busy channel, wait for approximately 4 seconds and then continue scanning.

#### TRANSMIT OFFSET

Controls the transmit frequency as follows:

- "+" Shifts the transmit frequency up 600 kHz from the receive frequency.
- "S" Simplex, receive and transmit on the same frequency.
- "-" Shifts the transmit frequency down 600 kHz from the receive frequency.

#### FRONT PANEL AND KEYBOARD

##### MICROPHONE

To transmit press the PTT switch and speak into the microphone using your normal voice level. For best results recommended distance is 2 to 3 inches.

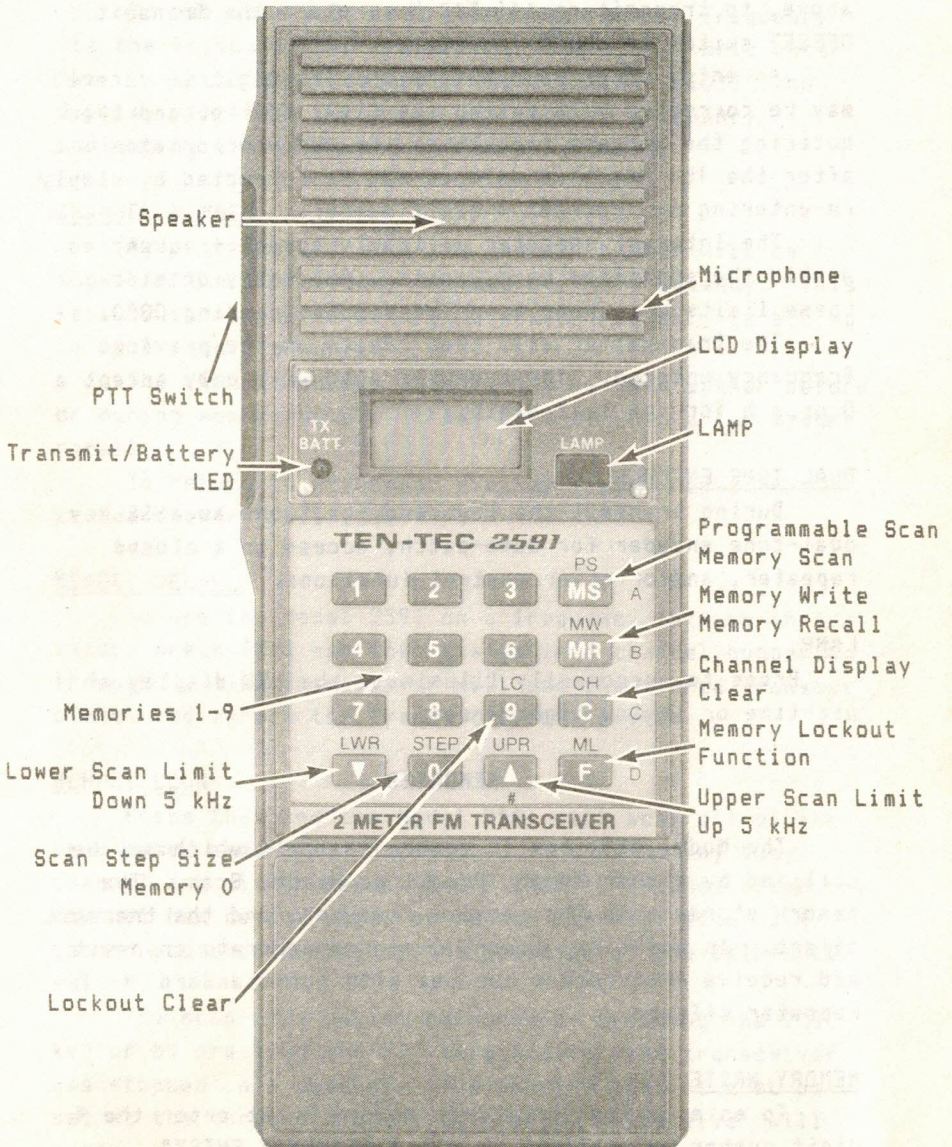
##### TX/BATT. LED

Lights in the transmit mode. Also indicates battery condition during transmit. When the battery voltage drops below 7 volts, the LED will flash on and off during transmit indicating that the batteries need to be recharged.

##### FREQUENCY ENTRY

The receive frequency is entered as a four digit number. For example to receive on 146.940 MHz, enter [6] [9] [4] [0].

The transmit frequency is controlled by the position



Speaker

Microphone

LCD Display

PTT Switch

Transmit/Battery LED

TX BATT

LAMP

LAMP

TEN-TEC 2591

Programmable Scan Memory Scan

1

2

3

MS A

Memory Write

4

5

6

MR B

Memory Recall

7

8

9

LC CH

Channel Display Clear

Memories 1-9

LWR

STEP

UPR

C C

Memory Lockout Function

Lower Scan Limit Down 5 kHz

▼

0

▲

F D

Upper Scan Limit Up 5 kHz

2 METR FM TRANSCEIVER

Scan Step Size Memory 0

Lockout Clear

of the Transmit OFFSET switch. In the example shown above, to transmit on 146.340 MHz, place the Transmit OFFSET switch in the "-" position.

An entry error made before the 4th digit is entered may be corrected by pressing the Clear [C] key and then entering the correct frequency. An entry error made after the 4th digit is entered may be corrected by simply re-entering the correct 4 digit number.

The internal computer will only accept frequencies within the specified band limits. Any entry outside these limits will result in the display reading 0000.

The transceiver will then remain on the previous frequency entered. The computer also will only accept a 0 or a 5 for the last digit.

#### DUAL TONE ENCODER

During transmit the keyboard functions as a 16 key dual-tone encoder for auto-patch, access to a closed repeater, and/or other control functions.

#### LAMP

Press to temporarily illuminate the LCD display at nighttime or in low light areas.

### MEMORIES

The Model 2591 has 10 memory channels which may be utilized by either Memory Recall or Memory Scan. The memory stores both the receive frequency and the transmit offset. In addition, memory 0 stores separate transmit and receive frequencies for use with non-standard repeater offsets.

#### MEMORY WRITE

To enter a frequency into memory first enter the 4 digit number as outlined in the "FREQUENCY ENTRY" section. Select the desired transmit offset using the OFFSET switch, then press [F], [<sup>MR</sup>MR], and then the desired channel number 0 through 9.

### MEMORY 0

To use memory 0 first enter the receive frequency via the keyboard then press [F], [MR]<sup>MW</sup>, [0]. Next enter the transmit frequency and press [F], [MR]<sup>MW</sup>, [0]. The display will then return to the receive frequency indicating that memory 0 is now programmed.

### CHANNEL NUMBER

By pressing [F], [C]<sup>CH</sup> the channel number will be shown in the LCD display instead of the frequency. This feature is useful to determine which frequency is stored in each memory channel.

The channel number display may be used either before or during memory scan. It may also be used after memory recall.

To return to frequency display simply repeat the keyboard entry [F], [C]<sup>CH</sup>.

### MEMORY RECALL

To use the Model 2591 on a frequency that is in memory press [MR] and then the desired channel number 0 through 9. The transceiver will use the stored transmit offset and ignore the Transmit OFFSET switch.

### MEMORY SCAN

Press [MS] and the Model 2591 will scan all of the programmed memories. Scanning will stop on any busy channel and either remain there until 2 seconds after the channel has become clear or resume scanning after a 4 second pause depending on the position of the SKIP/HOLD switch.

The scan mode may be defeated by pressing the [C] key or by pressing the PTT switch after the transceiver has stopped on a channel. The squelch control must be set at the threshold point before the transceiver will scan.

MEMORY LOCKOUT

The Memory Lockout function temporarily bypasses selected channels during Memory Scan. This feature is available on memories 0 through 7 and any number of these channels may be locked out.

To lock out a channel during memory scan, wait until the transceiver has stopped on the channel to be bypassed then press [F], [<sup>ML</sup>F]. Pressing [MS] will then resume memory scan.

A channel may also be locked out by recalling the channel and pressing [F], [<sup>ML</sup>F].

LOCK CLEAR

To return all of the memories to normal operation, press [F], [<sup>LC</sup>9]. All of the memories will now be scanned during memory scan.

To unlock an individual memory channel, recall the desired channel using Memory Recall then press [F], [<sup>ML</sup>F].

MANUAL SCAN

Press [▲] to go up frequency in 5 kHz steps. Press [▼] to go down frequency in 5 kHz steps.

Note: If Manual Scan is used from a memory channel frequency, the memory mode is cancelled and the transmit offset is then determined by the Transmit OFFSET Switch.

PROGRAMMABLE SCAN

By selecting a lower frequency limit, an upper frequency limit, and a step size (5,10,15,25, or 30 kHz) the Model 2591 will start at the lower limit, scan up to the upper limit and then repeat. HOLD/SKIP operates as in the memory scan mode. The upper or lower limits or the step size may be independently changed at any time.

To set the lower limit, enter the desired frequency via the keyboard and press [F], [<sup>LWR</sup>▼].

To set the upper limit enter the desired frequency and press [F], [<sup>UPR</sup>▲].

To set step size press [F], [0]<sup>STEP</sup>. The display will show 5 kHz. Use the [Δ] key to select the desired step size and then press [F] to store this value.

The transceiver may now be placed in programmable scan by pressing [F], [MS]<sup>PS</sup>.

Scan is cancelled by pressing the PTT switch or by pressing [C], [C]. Pressing [C] once during scan will stop the scanning on the present frequency until [MS] is pressed and then scanning will resume from that frequency. Scanning may be resumed after the transceiver has stopped on a channel by pressing [MS].

When scanning in 5 kHz steps the scan may stop 5 kHz below the correct frequency of the received signal. If this happens, press [Δ] and the frequency will move up 5 kHz.

#### OPERATING HINTS

1. If the display shows invalid numbers or will not accept keyboard input (make sure the keyboard lock switch is not in the LOCK position) then either the battery needs recharging or for some reason the microprocessor has "locked up" and needs to be reset.

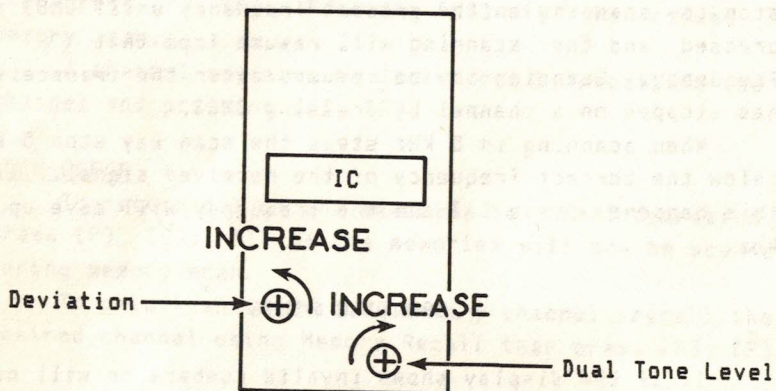
Check battery condition by pressing the PTT switch and observing the TX/BATT. LED.

To reset the processor first try turning the transceiver off and then back on. If the problem remains, refer to the "Removing and Installing the Battery Pack" section, remove the battery pack, wait 2 to 3 minutes and then reinstall the battery pack.

2. If it is desired to clear all of the memories, remove the battery pack as described above.

3. When the transceiver has stopped on a busy channel during scan, the SKIP/HOLD switch is in the SKIP position, and the transceiver is then turned off, the display will remain on for 6 seconds until the microprocessor turns itself off.

The deviation and dual tone levels are adjusted at the factory for  $\pm 5$  kHz. However should adjustment become necessary, the locations of the controls are as shown.



#### OPTIONAL ACCESSORIES

- Model 2201 - Sub-Audible Tone Encoder
- Model 2202 - Case
- Model 2425 - Power Amplifier
- Model 2700 - Speaker/Microphone
- Model 2991 - Extra 450 mA/HR Battery Pack
- Model 2992 - 5 hour Desk Charger
- Model 2993 - 12 VDC adapter pack
- Model 2994 - Extra AC Wall Charger