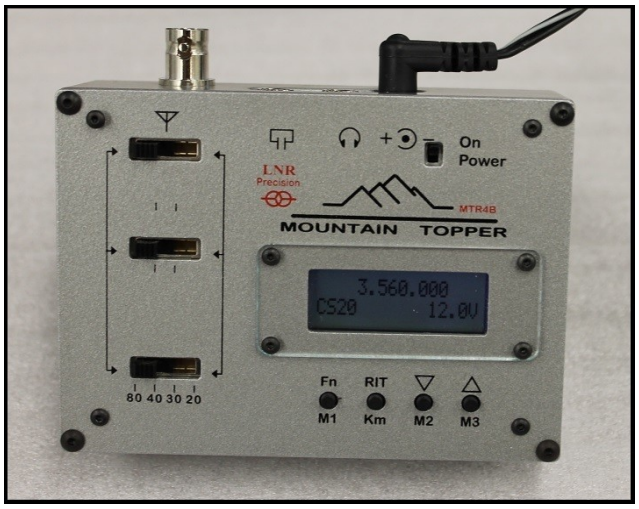
LNR Precision
Mountain Topper ©
MTR-4B and MTR-5B
REV 2.0
User Manual
for use with versions with 16 x 2 display.



Four band MTR 4B shown

Overview:

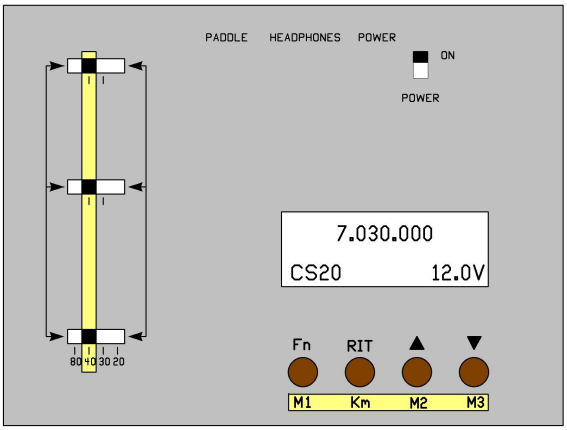
The Mountain Topper Rigs are designed to be a very small, light weight and very battery efficient, multi-band CW rig suitable for field operation. The small size and low weight make these rigs very popular with SOTA operators and backpackers.

Features:

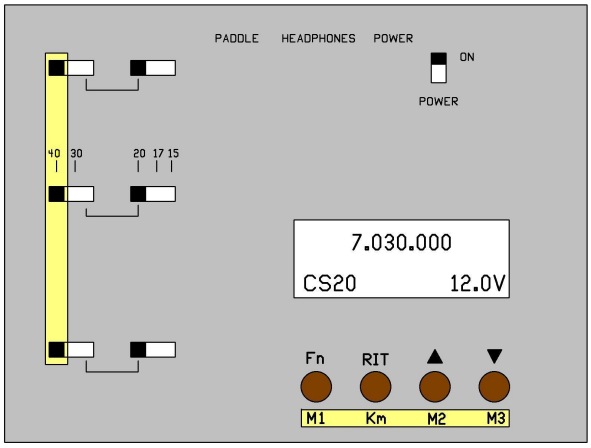
- 4 or 5 band versions (80/40/30/20 or 40/30/20/17/15)
- Wide power supply operation – 6V to 12V
- Low operating current – 30 ma @ 6V, 20 ma @ 12V
- Up to 4.5 Watts out (typical at 12V supply).
- Easy to read 2 line LCD display with back lighting.
- Push button tuning eliminates protruding knobs.
- Iambic B mode keyer, 9 to 31 WPM range in 1 WPM steps.
- Three, 63 character message memories with beacon mode.
- Optional decoding and display of Morse being sent via paddle.
- Optional 24 hour clock display with limited life battery backup.

Operation:

The rig is primarily controlled by four push buttons and the paddle. Bands are selected using a bank of three slide switches. A power ON/OFF slide switch is also included. Operation is identical for both the MTR-4B and MTR-5B. The only difference are the band select switches.



4 band switch locations



5 band switch locations

Band selection:

For proper operation, the three banks of slide switches must all be in the same vertical row for the desired band. This is illustrated by the highlighted column in the above illustrations.

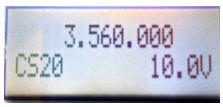
- The top switch tells the processor which band is selected and connects the Rx filter output to the 1st mixer input.
- The middle switch connects the output of the Tx filter to the antenna and the input of the Rx filter.
- The bottom switch connects the output of the PA to the input of the Tx output filter.

The MTR 4B has a single bank of four position switches which select one of the four bands.

The MTR 5B uses a second bank of switches to select one of five bands. The first bank on the left select the 40 and 30 meter bands or the second bank of switches which select 20, 17 or the 15 meter band. If the 20/17/15 band switches are left in the 20M position, the first bank of switches will effectively select 40, 30 and 20 meters.

Note that if the middle and bottom row switches are in the same position, but not lined up the top switch, it is possible to transmit with the wrong Tx low pass filter selected. This condition should be avoided. The best way to ensure the switches are all in the correct position is to move them one position at a time down the column. If the switches are not all in line, no signals will be heard in the receiver.

Display:



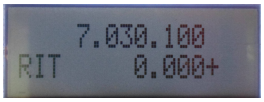
Operating information is displayed on a 2 line, 16 character LCD display. The top line normally displays the operating frequency while the bottom line displays the current keyer code speed, and battery voltage. This information will change depending on which of the various functions become enabled.

Frequency tuning:

The UP arrow (Tune Up) and DOWN arrow (Tune Down) switches change the operating frequency in 50 Hz steps.

- Holding the switch closed for longer then 1 second starts a fast tune mode where the frequency changes in 100 Hz steps at about 10 steps a second.
- If the opposite tuning switch is held closed while in fast tune mode, the step rate will increase to 30 steps/second for real fast tuning.

RIT:

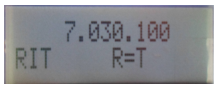


- Enter RIT: HOLD <RIT> closed for 1 second or longer.
- Exit RIT: HOLD <RIT> closed for 1 second or longer.

The plus (+) or minus (-) difference (delta) between the transmit frequency and the current receive frequency is shown below the main frequency readout. The delta frequency is limited to +/- 9.950 kHz.

RIT toggle:

RIT can be toggled on and off to check the transmit frequency for activity.



- TAP <**Fn**> switch to toggle RIT.
- Frequency tuning is locked out when R=T, but you can transmit and use message memories.

Fn (Menu) Functions:

Holding the <Fn> switch closed scrolls through the options at about once a second. Release the switch when the desired function annunciation appears on the display, which will be shown on the lower, left side of the display.

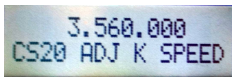
- Morse frequency annunciation (optional)
– - Change Keyer speed
– - Direct Frequency entry (DFE)
– - Keyer Memory entry
– - Tune
– - Set time
– Config - Turn on/off options and store configuration

Morse Frequency Annunciation

This function can be turned on or off in the CONFIG menu. Default is OFF.

- Tap the <**Fn>** switch.
- The current frequency is sounded by the side tone at the current keyer speed.
- Format: 000.0 kHz "T" is used for zero's, "R" indicates decimal point.

Change Keyer speed: [ADJ K SPEED]



- Tap the <**Fn**> switch (or hold closed for 1 second if Morse Freq Annunciation is enabled). The message [ADJ K SPEED] will be displayed to the right of the code speed readout, [**CS**xx], where xx is current code speed.
- Use UP/DOWN arrow switches or DOT/DASH paddle to change speed in 1 WPM steps. Range 9 to 35 WPM.
- Tap the <**Fn**> switch to exit

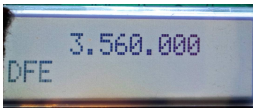
Straight key Mode:

Straight key mode can be enabled in two ways:

1) A mono phone plug in the paddle jack on power up will turn on straight key mode.
2) TAP the RIT switch while in <Adjust Code Speed> mode. This will toggle straight key mode on and off. Straight key mode can not be turned off if a mono plug is in the paddle jack.

- When Straight key mode is active the code speed display will change from [**CS**xx] to [**SK**xx].
- The code speed can be changed using the <**UP/DOWN**> arrow switches.
- **DFE**, **Message Memory entry** and **Tune** modes ***are not*** available when Straight Key mode is active.
- Straight key mode is reset on power up unless a mono plug is in the paddle jack.

Direct Frequency Entry: [DFE]



This mode allows you to jump directly to a new frequency which you enter via the paddle.

Display:



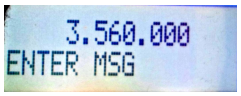
Line 1: current frequency, less the decades which can be changed. [XX.---.-XX] where (-) is a digit to be entered and (X) current frequency digit.
Line 2: EXIT RE LD {Switch function labels}

- Enter four digits, 0 to 9 via Morse, most significant decade first. 100 kHz, 10 kHz, 1 kHz, and finally the 100 Hz digit. If a character is not recognized, a "?" will be annunciated by the side tone.

- Short cut: TAP <**LD**> (UP Arrow) to reset current frequency to the bottom of the band or to load remaining decades as "0". For 80, 30 and 17, the band limit 100 kHz digit needs to be entered.

- TAP <**LD**> (UP Arrow) to load the new frequency.
- TAP <**RE**> (RIT) to re-set entry to zero and start again
- TAP <**EXIT**> (Fn) to exit with no change

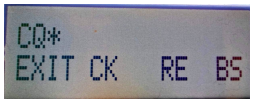
Message entry [**ENTER MSG**]



Line 1 – ENTER MSG (Message)
Line 2 – EXIT CK RE BS {Switch function labels}



Messages can be up to 63 characters long (including word spaces) and there can be three unique messages. Word spaces are automatically inserted after a word space pause of 7 dot lengths. The "ENTER MESSAGE" message on Line 1 will clear once you start to key and the characters you send will be displayed on this line. The display will scroll when the message exceeds 16 characters. A "Back Space" switch can be used to correct errors or eliminate word spaces. Note: you can not delete the first character entered.

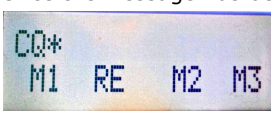


Starting CQ a message.
[*] indicates a word space has been added.
[!] indicates the character was not recognized. Memory pointer not advanced, try again.

Switch functions:

- <**EXIT**> (Fn) TAP to exit at any time before storing a message.
- <**CK**> (RIT) TAP to check (review) the message and hear how it sounds prior to actually storing the message.
- <**RE**> (UP Arrow) TAP to Re-enter (rest) the message entry mode. Only way to clear the first character.
- <**BS**> (Down Arrow) TAP to Back Space one location.

Once the Message has been reviewed after tapping the <CK> switch, Line 2 will change to:[M1 RE M2 M3]

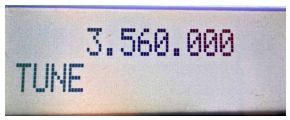


- TAP M1, M2 or M3 to store the message in that memory location.
  - Once tapped, line 2 will change to [**STORING**]. A dot will sound when done and message entry mode will be

returned in case you want to enter another message.
    - When done TAP <**EXIT**> to escape to normal operation.

- TAP <**RE**> (Re-Enter) to escape back to message entry mode without storing.

TUNE [TUNE]

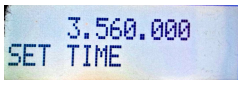


Tune mode allows you to toggle the transmitter on and off so you can fiddle with an antenna tuner with both hands. If you don't need both hands just sending a string of dots would be quicker.

NOTE: If the DC supply exceeds 10 volts the output power is reduced by turning the supply to the PA on and off at about a 1:3 ratio. This helps ensure there is no damage to the PA if excessive SWR is encountered while adjusting the antenna tuner. Since this PWM of the PA supply voltage has no feedback, the output power starts out low and slowly builds up until it stabilizes at about 1/3d of it's steady state output. Therefore, Tune mode can't be used to measure power output with supply voltages above 10 V. Use Straight key mode instead.

- Tap <**DOT**> paddle to toggle on
- TAP <**DASH**> paddle to toggle off
- TAP <**Fn**> switch to exit back to normal operation

SET TIME: [SET TIME]

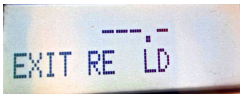


A 24 hour clock can be enabled and displayed on the bottom line of the LCD. This feature can be handy during a contest or while operating in the field.

A coin cell battery can be used to keep the clock running (and preserve the rigs settings) when power is off. However, note that the coin cell battery life is limited and typically will only last 3-4 weeks. In addition, once the battery becomes weak, it can cause the processor to glitch on power up and lock up. Therefore, the battery should be disabled when keeping time is not important by sliding a thin piece of paper or plastic between the cell and the battery clip terminal. The rig is shipped with the battery installed, but disabled. The battery is located under the pushbutton switches inside the case. A #1225 lithium battery is used.

The DFE function is used to enter the time via the paddle. The time is not displayed until the set time function is used. The "display time" flag is reset on power up if battery back up is not used.

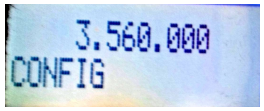
Display:



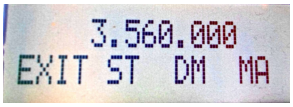
Line 1: ---.-
Line 2: EXIT RE LD

- Enter the current time + 1 minute (24 hr format) using the paddle: hours, then minutes. Leading zero must be entered if the time is before 10:00.
- Tap <**LD**> (DOWN Arrow) to load the time and exit.
- Tap <**RE**> to clear and re-enter the time
- Tap <**EXIT**> to escape with no action taken.

Configuration: [CONFIG]



This function allows you to turn on or off the Morse Frequency annunciation, the display of Morse while transmitting and storing of the current frequency for all the bands and the current keyer speed to be used as the power on frequency and code speed.



- TAP <**EXIT**> (Fn) to escape
- TAP <**ST**> (RIT) to store
- TAP <**DM**> (DOWN arrow) to toggle Display of Morse characters on and off. The side tone will annunciate "ON" or "OFF" to indicate the selected state.
- TAP <**MA**> (UP arrow) to toggle the Morse audio annunciation on and off. The Side tone will annunciate "ON" or "OFF" to indicate the selected state.

Sending a stored message:

- TAP <**RIT**>
- Then TAP <**Fn**> (message 1), <**DWN Arrow**> (message 2) or <**UP Arrow**> (message 3) within ½ second of tapping <**RIT**>

If a message has not been stored in a selected location, nothing will happen.

Pause, terminate and Beacon Mode:

Once started a message can be pause, terminated or set to repeat (beacon mode).

- HOLD <**DASH**> to pause a message. The message will pause at the first word space after the paddle was closed.
- HOLD <**DOT**> to terminate the message. The message will terminate at the first word space after the paddle was closed and normal operation restored once the paddle is released.

Beacon (repeat) mode:

After a message has been started, the message can be set to repeat by **HOLDING** the respective switch for that memory location closed until a word space is detected. For example, if Message 1 was started, hold the <**Fn**> switch closed, if Message 2, <**Down arrow**> and if Message 3, <**Up arrow**>.

Line 2 will now read: [BEACON 3] Where {3} is the repeat delay in seconds.

- During a word space the delay can be set to be up to 9 seconds long using the up and down arrow switches or rotary encoder.
- The message can be paused or terminated while being sent using the DOT or Dash paddles. The message must first be terminated before transmitting will begin again.

Battery voltage accuracy:

The displayed battery voltage accuracy is typically +/- 0.1V, but in some cases can be off by as much as 0.3V, usually on the low side. There is no calibration for the measurement so you might want to check with a voltmeter the actual voltage so you can mentally apply a correctional factor if a more accurate voltage reading is desired.

Power output:

Power output on all bands is typically 2.5 watts +/- 250 mW with a 9V supply voltage.

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