

Pocket Size QRP

N2TMS

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What is being Shown

Battery Powered Portable Station

- RockMite 20 meter CW QRPp transceiver/keyer
- 1320 mAH Lithium-Polymer Battery
- End fed half wave antenna
- End fed half-wave antenna tuner
- Battery charger

- “QRP” means “low power”
 - Less than 5 watts by convention
 - QRPp is far less than that!

RockMite Tranceiver

- Single Band, CW (continuous wave, eg: for Morse code)
 - Built for 20 meters (14.060 MHz)
- Crystal controlled – 2 frequencies
 - XTAL Fundamental +/- 800 Hz offset
- About ½ watt output (QRPP)
- Internal micro-controller based keyer
 - allows use of iambic paddle or straight key
- Low current draw (benefit when “off grid”)
 - 21 mA @12v in Rx mode
 - 153 mA @12v in Tx mode (key down)
- Small (pocket) size, mint tin enclosure
- Operates from 9v to 14v DC (many battery options)

3S 1P 1320 mAH Lipo pack

- “Lipo” = Lithium Ion chemistry in polymer (plastic) pouch cells
 - Light weight but sensitive to rough handling
 - Flammable internal materials
- High energy density, (power * time / weight)
- Low self-discharge (stays charged between uses)
- 3S 1P configuration = 3 cells in series, 1 string in parallel
- 1320 mAH indicates product of current * time
 - For example: 1320 mA for 1 hour, or 132 mA for 10 hours
 - About 60 hours Rx or 8 hours Tx time with RockMite!
- Nominal 3.7 volts per cell
 - 3 cells x 3.7v = 11.1 volts nominal
 - More than 9V “transistor” battery, less than car battery
 - 3.0v min to 4.2v max per cell usable voltage range
 - **Must monitor for low voltage and cut off use to prevent damage**

End-Fed Half-Wave (EFHW) Antenna

- “WIT” antenna = “wire in tree”
- Length determined by operating frequency
 - Approximately 1/2 of wavelength (in wire)
- End-Fed is convenient for locating Tx on ground or table
 - Eliminates need to carry feed line (eg: coax)
- Requires antenna tuner to match high impedance feed point to lower impedance Tx output
 - needs a transformer

EFHW Antenna Tuner

- Serves to match impedance of antenna (~ 4000 Ohms) to that of transmitter (50 Ohms)
 - Maximizes power coupling and thus output
 - Reduces “strain” on Tx output stage
- Consists of:
 - tapped autotransformer wound on toroid core
 - Parallel tuning (variable) capacitor
- Requires short counterpoise

Lipo Battery Charger

- Home brew linear circuit version shown
 - Built specifically for this pack size/configuration/chemistry
 - Many more flexible commercial charger options
 - Lipos widely used in RC cars/planes/drones
- Current limited during initial charge
 - Designed for 1*C rate (ie: 1.3 Amps max)
 - Cell voltage increases gradually
- Voltage limited during final charge
 - Designed for 4.3v max
 - Current gradually decreases to maintain max voltage
- Charge completed when cell voltage is at limit and current has tapered to $< .01$ to $.10 * C$ (optimum capacity vs charge time)
- Cells discharged under 3.0v require special handling!!! (Warning)