

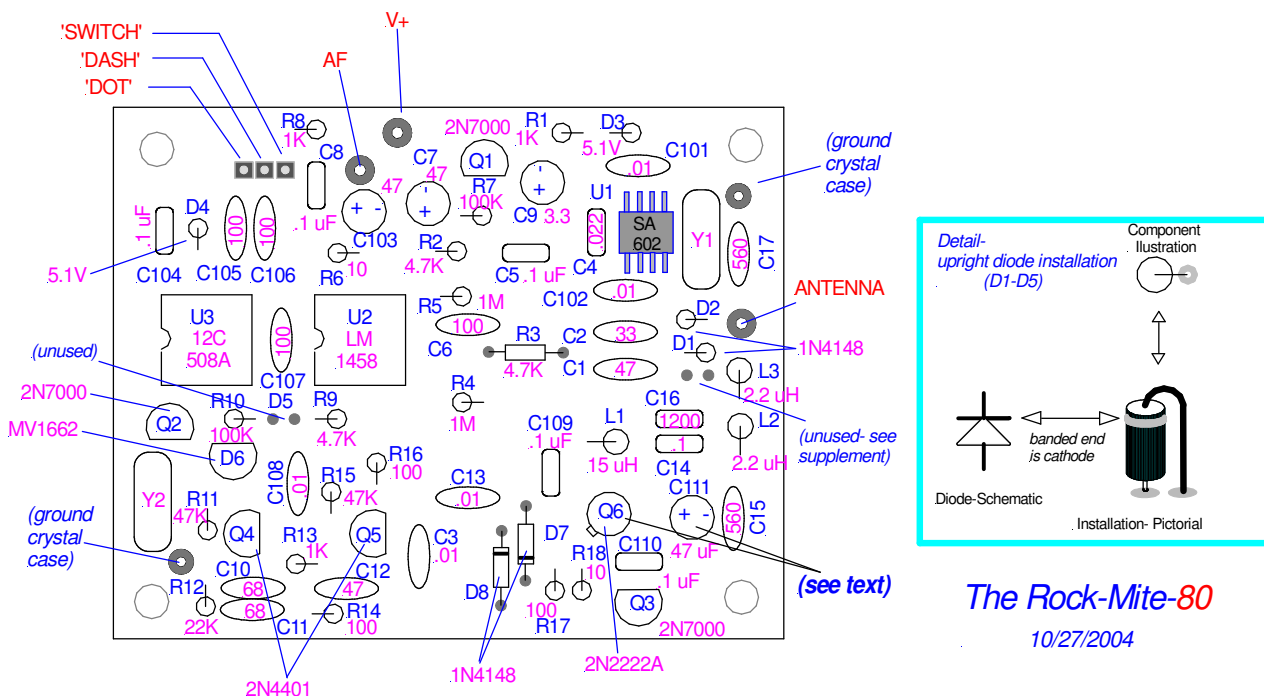
# The '*ROCK-MITE-80*'- a Simple Transceiver

## Parts list

Qty.	Ref. Designator	Component	Description
1	C2	33 pF NPO disk cap	'33' or '33J' ceramic
2	C1,C12	47 pF NPO disk cap	'47' or '47J' ceramic
2	C10,C11	68 pF disk or mono. cap	'68' or '68J'
4	C6,C105-107	100 pF disk or mono. cap	'101' or '101J'
2	C15,C17	560 pF mono. cap	'561' or '561J'
1	C16	1200 pF mono. Cap	'122'- epoxy case
5	C3,C13,C101,102, 108	.01 uF disk cap	'103', ceramic
1	C4	.022 uF monolithic cap	'223', epoxy case
6	C5,C8,C14,C104,109,110	.1 uF monolithic	'104', epoxy case
1	C9	3.3 uF electrolytic cap	
2	C7,C103	47 uF electrolytic cap	
1	C111	47 uF electrolytic cap	low-profile case
4	D1,D2,D7,D8	1N4148 diode	<i>In bag-strip</i>
2	D3,D4	1N5231B diode- 5.1V Zen.	<i>In bag-strip</i>
1	D5	omitted	
1	D6	MVAM109 varicap diode	2 leads- black plastic
1	HS1	TO-18 heat sink, anodized	<i>see text</i>
1	L1	15 uH RF choke	Brown-grn-blk, <i>In bag-strip</i>
2	L2,L3	2.2 uH RF choke	Red-red-gold, <i>In bag-strip</i>
2	R6,R18	10 ohm resistor	Brown-blk-blk-gold
3	R14,R16,R17	100 ohm resistor	Brown-blk-brn-gold
3	R1, R8, R13	1K ohm resistor	Brown-blk-red-gold
3	R2,R3,R9	4.7K ohm resistor	Ylw-violet-red-gold
1	R12	22K resistor	Red-red-org-gold
2	R11,R15	47K resistor	Ylw-violet-org-gold
2	R7,R10	100K resistor	Brown-blk-ylw-gold
2	R4,R5	1 M resistor	Brown-blk-green-gold
3	Q1,Q2,Q3	<b>2N7000 transistor</b>	(TO-92 package)
2	Q4,Q5	2N4401 transistor	(TO-92 package)
1	Q6	2N2222A transistor	Metal can package
1	U1	SA602AD SMT IC	<i>in semiconductor bag</i>
1	U2	MC1458, LM1458 IC	8-pin DIP IC
1	U3	<b>12C508A</b>	8-pin DIP IC, <i>pre-programmed</i>
2	Y1, Y2	3.560 Mhz crystal	<i>/ 20 pF load capacitance</i>
2	--	8-pin IC socket	(on antistatic foam)
1	--	Printed circuit board	'K1SWL 9/02'

Notes: 1) Items in gray shading are in antistatic envelope.  
*Components in bold (above) are static-sensitive.*





## Assembly Sequence:

- **Download and print the following supplement:** <http://smallwonderlabs.com/RMhelps.pdf>
- **U1 Installation:** It's important to install the Surface-mount IC (U1) first- it's more difficult to install when surrounded by other components. Remove U1 from its protective packaging and place it over the pads on the board. The printed labeling on U1 must read 'upright' as shown above. **Do not pre-tin the pads.** The orientation of U1 must match that of the drawing above, i.e., text is 'upright'. 'Tack' down one of the IC corner pins while holding the device down with a fingertip. Move to the opposite side of the IC and solder all pins down. Note: it's easiest to use an excess of solder and remove the excess with solder-wick. (Solder the second group of 4 pins and wick as needed.
- **IC Sockets:** (see the supplement).
- **C111 Installation:** There are 3- 47 uF electrolytic capacitors in this kit. Install the short one at C111.
- **Q6 Installation:** Install the supplied heat sink HS1 on the 2N2222A before installation on the board. Q6 installation should be done late in the assembly to facilitate installation of shorter components nearby. Ensure that the heat sink does not touch the leads of any nearby components.
- **Resistors and diodes:** Most of the resistors and diodes and the RF chokes are mounted 'hairpin'-fashion. Diodes are orientation-critical- be sure to match the banded end of the diode to the wire bend as shown above at upper right, and follow the installation orientation shown on the pictorial above. Resistors are non-critical- their orientations shown above need not be strictly observed.
- **Crystals:** Y1 and Y2 should be stood slightly (0.5 to 1mm) above the printed-circuit board to prevent shorts from case to PC-board traces. Install short lengths of leftover resistor lead from the bottom end of both crystal cases to the nearest ground point. [The crystal cases are tinned and will accept solder readily- use a minimum of heat.] *You'll find it easiest to stand the wire lead up in its mounting hole and solder it first, then cut the wire short, bend it over to the crystal case and solder that end.*

Spare ground pads are provided next to Y1 and Y2. Lay the board down on a flat surface and stand a leftover component lead upright in each hole. Solder on the top side of the board and trim the lead length to 4-5 mm. Bend this 'flying' lead over to the crystal cans and solder to the crystal. Use minimum heat.

- Remaining parts may be installed without regard to sequence. It may be helpful to note the tight clusters of parts and install those first. Install ICs in the sockets as shown above- see the supplement for orientation info.

### ***Rock-Mite operation:***

The Rock-Mite operates on approximately 3579 or 3686 kHz, depending on which version you ordered. The microcontroller provides a 'shift' signal to the Local Oscillator. This signal changes state upon key-down and key-up and provides approximately 600 Hz of frequency shift.

The Rock-Mite contains a built-in Iambic Keyer. Dot and Dash inputs are not firmware-reversible but may be wired to suit the operator's preference.

If either the Dot or Dash inputs is grounded upon power-up, the keyer function is bypassed and the other input accepts a straight-key or external keyer. This is achieved automatically by the use of a 3-conductor jack and 2-conductor (monaural) plug. *Thanks to Steve Weber, KD1JV, for the suggestion.*

#### 'Switch' Input-

- A brief (<250 ms) closure to ground on the 'switch' input reverses the offset to provide a second operating frequency. **Frequency selection:** When you wish to work another station, use this function to select the higher of the two pitches on a received signal. Note that the pitch at the other setting is a measure of how close to zero-beat you are; ideally it would be just a low-frequency 'thump'. If the two selections yield 'high' and 'higher' you probably won't be able to work the other station.
- A longer (>250 ms) closure to ground on the 'switch' input puts the keyer in a speed-adjustment mode. The Rock-Mite outputs a Morse code "S" to acknowledge entry into this mode. Tapping (or holding) the Dot paddle speeds up the keyer; the same operations on the Dash paddle slow it down. The default (power-up) speed is approximately 16 WPM and the upper and lower limits are ~40 WPM/5WPM. If no dot/dash inputs are received over an interval of ~1.5 seconds, the Rock-mite outputs a lower-frequency tone and reverts to normal operation. *The Morse "S" and subsequent tones are not transmitted on the air.*

*Design modifications may be found in the Rock-mite supplement and on-line at the URLs below.*

#### **On-Line Resources:**

Rock-mite images: <http://www.qsl.net/k7qo/rocky1.html>  
Modifications and tips: <http://www.qsl.net/n0rc/rm/>  
Missing Parts : [dave@smallwonderlabs.com](mailto:dave@smallwonderlabs.com)

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