

**Installing
and
Operating**

**The RMK
from Jackson Harbor Press
A keyer chip for the SWL Rock-Mite with pot speed control**

The RMK is a PIC based keyer chip designed to fit into the keyer socket of the Rock-Mite series of transceivers sold by Small Wonder Labs (SWL). The RMK offers a few features not found in the original keyer IC including pot speed control, two 60 character non-volatile memories, beacon mode, iambic keyer mode and more.

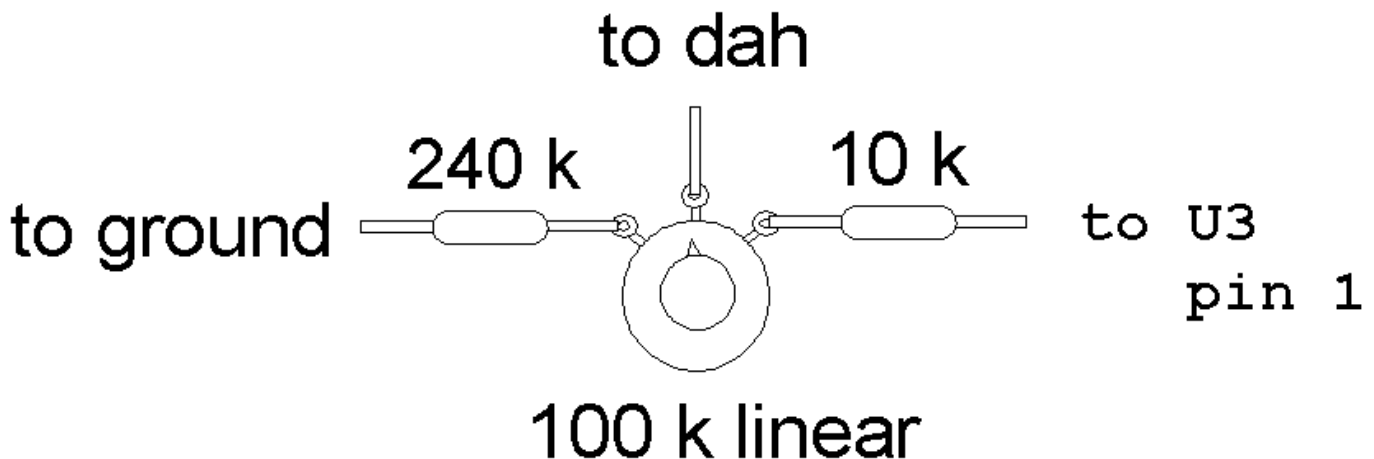
The RMK is a CMOS (Complimentary Metal Oxide Semiconductor) device. This oxide is very thin which means that the RMK should be handled as little as possible to prevent static damage. The installer should use a grounding strap and anti-static mat if available or at the very least, work on a grounded metal surface and be sure to touch ground prior to touching the IC.

Installing the RMK:

Two hardware changes to the Rock Mite are presented for the RMK user. The required resistors are supplied except for the speed pot. Since the Rock-Mite fits into small metal boxes such as the Altoids mint tins, one possible problem is finding a pot that is small enough to fit. Mouser (800 346 6873) sells a 13 mm diameter, 100k linear pot (# 31CX501) that fits nicely into one of these types of tins. The small 4 mm shaft size of the pot requires a special knob - Mouser also has these (# 45KN050).

The first hardware change is mandatory. It adds a 10k pullup resistor (supplied) for pin 4 of the RMK. One end of the 10 k (brown-black-orange-gold) resistor should be soldered to the power connection for the keyer chip (U3, pin 1). The other end of the 10k resistor should be soldered to pin 4 of the keyer chip socket. If this mod isn't done, the keyer chip may enter the beacon menu and "stay there a while".

The second hardware change is optional and adds the pot speed control circuit. The included 240k and 10k resistors should be connected to the pot and then to the ground and power supply of the keyer chip (U3) as shown on the circuit diagram. The wiper of the pot should be connected to the dah input (pin 6) of the Rock-Mite.



Remove the original SWL keyer IC, noting it's orientation in the socket first. Next, form the leads of the RMK to fit in the socket, insert the RMK into the socket with the same orientation as the original keyer IC.

Next, power up the Rock-Mite. A 16 wpm FB should be sent by the keyer at powerup through the sidetone if the keyer is functioning correctly.

Operation: General notes on using the dit, dah and mem switch to control the keyer: The switch on pin 4 of the keyer chip will be referred to as the mem switch. Multiple functions result from multiple switch-press combinations (mem alone, mem+dit, mem+dah, mem+both dit and dah). Also, the switches can be pressed and released (PAR) OR pressed and held for two seconds (PAH). This doubles the number of combinations of the three control switches.

Generally, PAR is used for actions: send the code speed or send a memory. PAH is used for settings: change the code speed (no pot) or record a memory or change the iambic mode.

4 menus are used for setting various options - they are activated by a PAH of the mem switch alone or plus a simulpress of dit or dah or both. The menu selections are made by pressing either the dit or dah switches - you will then normally hear a corresponding dit or dah via the sidetone, the selection will be made and you are then returned back to normal keyer mode. In general, the operator can skip a menu item by a PAR of the mem switch.

Note that the keyer sidetone will be lower in pitch (about 360 Hz) for keyer commands such as the menu prompts, recording a memory or the FB sent at powerup. The normal pitch for routine sending is higher at about 720 Hz.

A function table of the RMK keypress combinations:

keys used	PAR (press and release)	PAH (press and hold)
mem switch	toggle the offset frequency	beacon menu: BE and BA
mem + dit	send speed	paddle set of speed, pot options, main menu
mem + dah	send memory 2	record memory 2: M?
mem + both	send memory 1	record memory 1: T?

Powerup: Immediately after powerup the keyer will send an FB through the sidetone to signal correct operation, EXCEPT if either the dit or dah input was pressed during powerup. Then the RMK will enter a compatibility mode with the original part. The paddle opposite to the one pressed at powerup will act as a straight key. The only function of the mem switch will be to toggle the offset frequency. Note that the switch must be pressed each time the transceiver is powered up to enter compatibility mode - it is NOT stored in EEPROM as the other mode changes are.

Speed Readout: The speed (in WPM) will be played through the sidetone if the mem switch is simulpressed with the dit switch and then both are released. I normally press the mem switch first and hold it, press the dit switch and finally release both.

Speed Control and Menu:

Initially the keyer will powerup at a default speed of 16 WPM in paddle speed set mode. The speed can be adjusted by pressing and holding the mem switch along with the dit switch. Usually I PAH the mem switch and then tap the dit switch. After 2 seconds, the keyer will send an S (for speed set). Press the mem switch to advance to the next menu item without changing the speed. Or, pressing the dit switch will increase the speed by 1 WPM and send a dit. Pressing the dah switch will decrease the speed by 1 WPM and send a dah. You can continuously adjust the speed by holding either switch but note that if you run the keyer “off the scale” at either 4 or 50 WPM, the keyer will “wrap around” to the opposite speed extreme. Exit the speed adjust routine by pressing and releasing the mem switch.

If the pot circuitry is connected AND the P menu is invoked to turn on the pot speed control the speed can be adjusted by turning the pot. Maximum possible speed is 50 WPM, minimum possible speed is 4 WPM. Note that the minimum and maximum speed can be affected by component tolerances on the speed pot and the resistors - see the pot calibration menu item if a 4 WPM minimum speed is required. The pot position is read continuously when the keyer is sending code, just before each dit, dah or space is sent. This allows the operator to adjust the code speed even in the middle of a memory send or record. However, note that no change in the pot will be noticed while the dah paddle switch has been pressed. This can lead to strange speedups or slowdowns if the dah paddle is pressed at the exact moment that the pot is being read - this is unavoidable due to the lack of extra pins on the keyer chip. If these "once in a while" speed changes bother the operator, the paddle speed set should be used instead.

Mem + dit menu (PAR mem to advance to the next menu item)

	Menu item	pressing a dit:	pressing a dah:
S	Speed set from paddle	increases speed by 1 WPM	decreases speed by 1 WPM
P	Pot / paddle speed control	selects pot speed control	selects paddle speed control
C	Calibrate pot speed control	enters the calibration routine	restores default pot calibration
B	Bug / straight key mode	enables bug mode (dah = key)	disables bug mode (default)
A	iambic mode A or B	enables iambic mode A	enables mode B (default)
R	Reverse paddle mode	reverse dit and dah switches	return dit and dah to normal
AU	Autospace on / off	turns on character autospace	turns off autospace (default)

P - Select Pot or Paddle speed control: Allows the keyer to be switched between pot or paddle speed control. The keyer defaults to paddle speed control.

C - Calibrating the Pot speed control: Due to the variation in resistors and pots it is likely that the minimum setting of the pot will result in a minimum speed higher than 4 WPM. This menu item will compensate and store an updated calibration value. Before entering the menu, be sure to turn the pot to the minimum speed. Then press the dit to go into the calibration routine - then one dit will be sent after a short delay and the keyer will exit from the menu. If the pot calibration is run with the pot not set at the minimum, rerun the cal with the pot correctly set. Pressing a Dah will restore the default powerup calibration value.

B - Bug / Straight-key mode: Dits are sent normally but dahs are sent like a straight key.

A - Iambic mode A or B: The A mentioned above signifies the mode A/B select menu item. The iambic mode of the keyer can be set to either mode using this routine. Check the JHP web site for an Acrobat (.pdf) file which explains the difference between the A and B keying modes.

R - Reverse paddle mode: Reverses the dit and dah switches (easier than resoldering a jack). Remember that the pot speed control will be changed to the dit paddle which means that pot speed control changes while the dit is pressed will be ignored until the dit is released.

AU - Autospace on/off: The autospace feature inserts a character space (1 dah in length) automatically if the operator has not pressed a paddle switch 1 dit space after the last dit/dah sent. This feature is always on in the memory record routines (needed for the recording process).

Recording Memory 2: A memory of up to 60 characters long can be recorded. The memory 2 record menu is entered by simulpressing the memory and the dah keys and holding them for 2 seconds. I usually PAH the mem switch and then tap the dah key.

Mem + dah menu (PAR mem to exit)

	Menu item	Pressing a dit:	Pressing a Dah
M?	Record memory	records a dit	records a dah

M? - Record Memory 2: The memory is recorded by sending normally. Note that the keyer output is off during the recording and that the lower command sidetone is used. When complete, PAR the mem switch. The routine will be exited automatically after the 60th character is sent. The memory is saved in flash memory which means that it will still be there even if power is removed. If this menu item is entered by mistake, PAR the mem switch to exit without changing the memory.

Playing Memory 2: Play memory 2 by simulpressing and releasing the memory and the dah keys. I usually PAH the mem switch and then tap the dah switch - the memory starts to play after the mem switch is released. A tap of either the dit or dah switch will stop the message play.

Mem switch menu (PAR mem to advance to the next menu item)

	Menu item	pressing a dit:	pressing a dah:
BE	BEacon mode	starts the beacon going	Exits the menu
BA	Beacon Alternate mode	selects alternate beacon sends of mem 1 and mem 2	selects send of mem 1 only (default)

BE - Beacon Mode: Beacon mode will send the contents of mem 1 continuously. Start the beacon by pressing the dit switch - the beacon starts to play. Exit beacon mode by tapping the dit or dah switch.

BA - Beacon Alternate between mem 1 and mem 2 mode: This routine selects/deselects alternating the beacon play between memory 1 and memory 2.

Mem + both menu (PAR mem to exit)

	Menu item	pressing a dit:	pressing a dah:
T?	Record memory 1	records a dit	records a dah

T? - Record Memory 1: Enter record mode for memory 1 with a PAH of the mem switch and both paddle switches for 2 seconds. Hold the mem switch down, then squeeze both paddle switches simultaneously (they both must be down at the same time), then release the paddle, keep holding the mem switch until after 2 seconds the keyer will send T?. Memory 1 can now be recorded. Start sending your message. when complete, press the mem key. The memory is 60 characters long - recording will terminate automatically after the 60th character. If this menu item is entered accidentally, just PAR the mem switch to exit without recording.

Playing Memory 1: First, hold the mem switch down, next, squeeze both paddle switches (they both must be down at the same time) then release the paddle and finally release the mem switch before 2 seconds elapse. The memory will start to play right after the mem switch release.

Notes:

To perform a full keyer reset (parameters to their default values, memories untouched):

- 1) remove power to the Rock-Mite
- 2) press and hold the mem switch
- 3) powerup the Rock-Mite keeping the switch depressed until the FB is sent.

One unique feature of the RMK is 5 ditdah tune mode. If both paddles are held for at least 5 ditdahs and then released, the keyer will enter tune mode (key down, sidetone on). To exit, tap either the dit or dah. Thanks to Lew Paceley, N5ZE, for inventing this mode.

Thanks to Dave Benson, K1SWL of Small Wonder Labs for the neat design of the Rock Mite - I hope the RMK will make the Rock Mite a little more fun to use.

Please feel free to email with any questions, comments, suggestions or problems with the RMK. Email to: jacksonharbor@att.net

Chuck Olson, WB9KZY

RMK Stocklist

<u>Qty.</u>	<u>Ref.</u>	<u>Part Name</u>	<u>Description</u>
1	U3	12F675	RMK, 8 pin DIP keyer chip - Microchip Technology
1	R2	10 K ohm	Brown-black-orange-gold - 1/4 watt metal film resistor
1	R3	240k ohm	Red-yellow-yellow-gold - 1/4 watt metal film resistor
1	R4	10 K ohm	Brown-black-orange-gold - 1/4 watt metal film resistor

The following items are *NOT* included:

1	R1	100 K ohm	Linear potentiometer speed control
1			knob for potentiometer

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