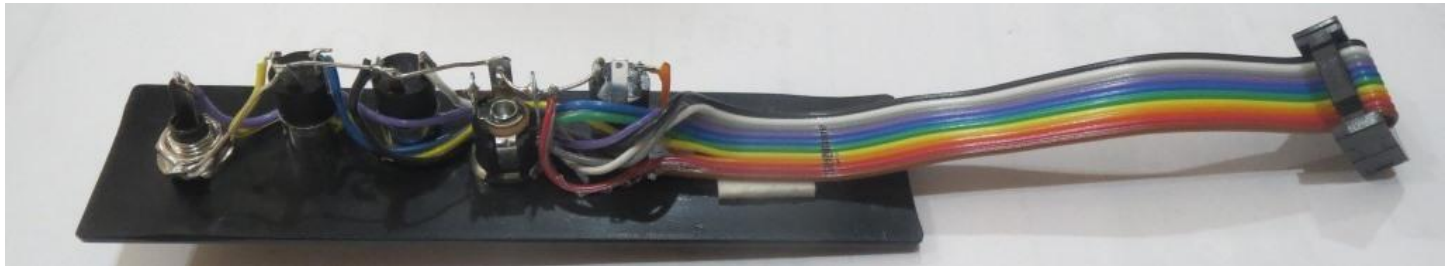


MUK REAR PANEL ASSEMBLY

Rev B. 13 August 2017

ASSEMBLY INSTRUCTIONS



The Midnight Ultimate Keyer (MUK) consists of two functional assemblies:

- **Rear Panel** containing the interface and power connectors.
- **Front Panel** containing the basic keyer electronics, the four-character 7-segment display, all manual controls, and the miniature speaker.

The rear panel assembly is used to supply power to the front panel during testing so it should be assembled before assembling the front panel. The front panel assembly instructions are covered elsewhere.

This document provides step-by-step instructions for assembling the MUK rear panel assembly. The rear panel assembly is made by drilling holes in the standard rear panel included with the MUK enclosure, mounting four connectors in it, and wiring a ribbon cable assembly to the connectors.

A bill of materials (BOM) and a MUK schematic are included for reference at the end of this document.

Revision History

- | | |
|------------|---|
| 2017-05-10 | Initial release |
| 2017-08-13 | Added instructions for optional J3 and updated pictures to include rainbow colored cable. |

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OPTIONAL AUDIO OUT JACK

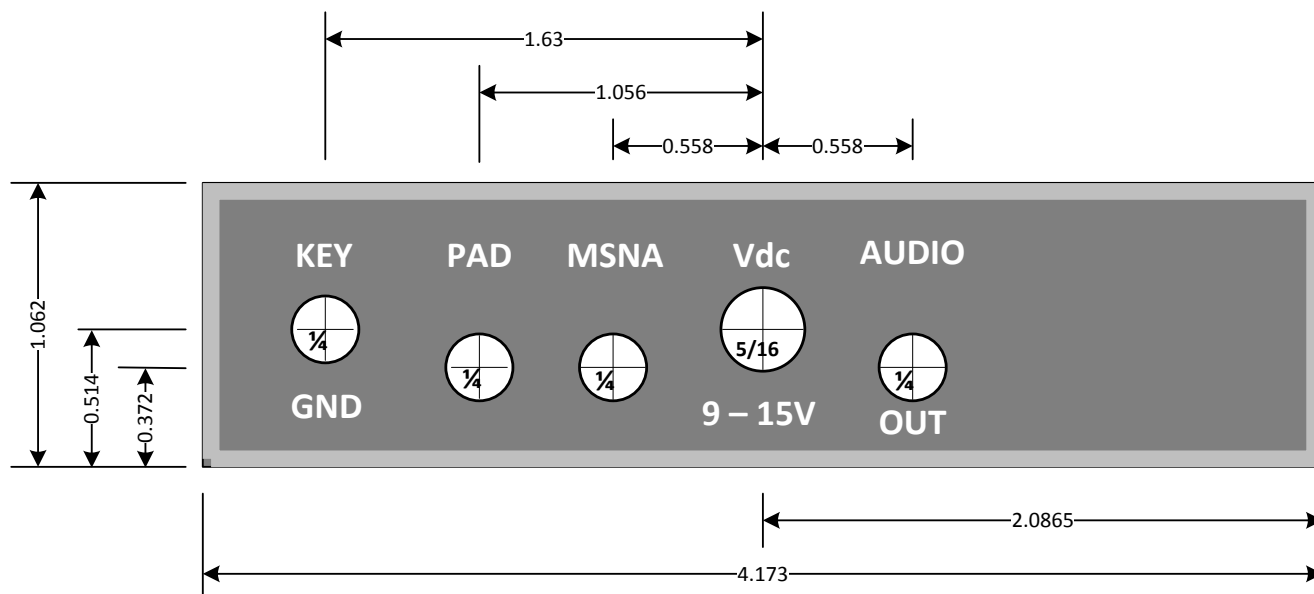
In most cases, the MUK will be used with a transceiver that generates a side tone when transmitting and the MUK speaker will be turned off. All audio will be generated by the transceiver. When using a rig that doesn't generate a side tone, you can install an optional AUDIO OUT jack and use the MUK's side tone (ST) without needing to use the MUK's speaker. The ST line (pin 3 in the rear panel cable connector) provides the side tone as a 0-3V square wave at the frequency set for the speaker side tone. Only transmitted (keyed) data is included in ST, operator alerts and warnings are not included. You will need to combine (mix) ST with your transceiver audio output and provide whatever volume control you desire.

You may also plug headphones into the AUDIO OUT jack to use in practice mode. (Those around you will probably appreciate that.) You may want to add some attenuation or even a volume control. The raw ST signal tends to be quite loud when fed directly to a set of headphones.

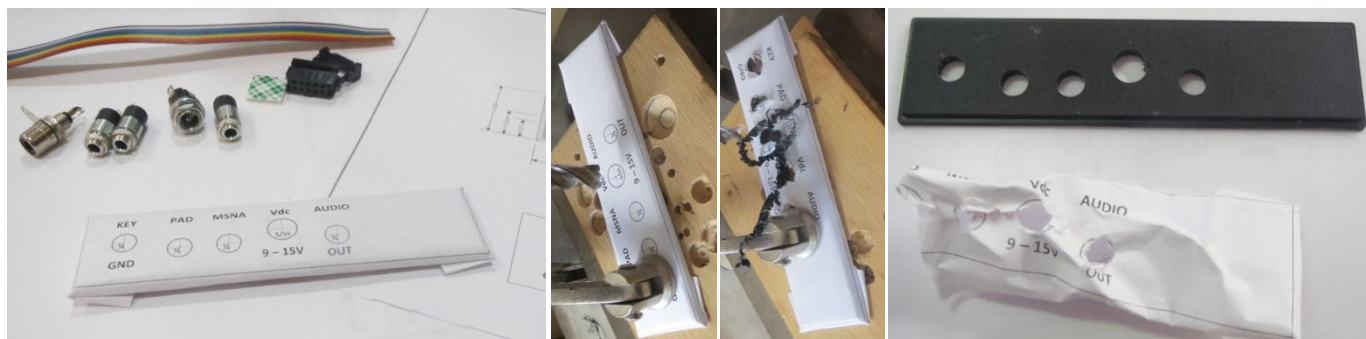
Note that the rear panel drawings and pictures in this document include the optional AUDIO OUT jack. If it is not required, don't drill the hole.

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1. DRILL THE REAR PANEL



Cut out or copy and cut out one of the patterns on the last page of this document. Leave about 1/2 inch of paper beyond the edges. Fold the pattern along the edges and center the pattern on the **outside face** of the rear panel. (The outside face has a raised surface with a rabbet milled along all four edges.) Keeping the pattern centered on the rear panel, fold the ends around the rear panel and tape them to it. Center punch the four holes at the centers of the crosses. Drill the 5/16" hole first then drill the 1/4" holes. Drill through the paper, carefully lining the drill bit center with the indent made with the center punch. If available, use brad-point drill bits to minimize the chance of drill-bit wander. After all four holes have been drilled, remove the remains of the pattern and the tape.



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2. INSTALL THE CONNECTORS (BOM items 1, 2, and 3)

Install the connectors with the power jack (BOM item 1) in the 5/16" hole in the center of the panel. Mount the RCA jack (BOM item 3) in the 1/4" hole at the end of the panel. Orient the RCA jack's ground tab as shown in the following picture and bend it up away from the panel. Install the remaining connectors (BOM item 2) in the remaining 1/4" holes. Orient all connectors roughly as shown here and tighten the retaining nuts.

CAUTION

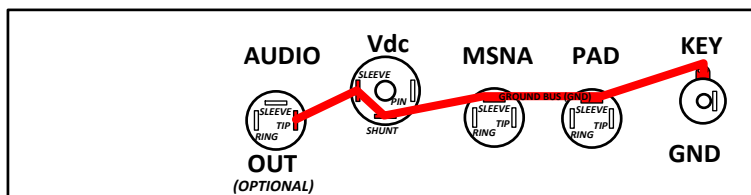
Take care not to over-tighten the retaining nuts to avoid damage to the jack bodies. Tighten only to the point where it is difficult to rotate the jack by hand. When soldering wires to the terminals avoid touching the soldering iron to the plastic jack bodies as this can cause permanent damage to the jack.



It is not really necessary to orient the jacks on the rear panel as shown here, however, this is the orientation used for all illustrations and drawings in this document. Orienting them as shown should make it easier to follow the assembly directions.

3. GROUND BUS

Since the panel is plastic and non-conductive, you must run a ground bus between the ground pins on all four connectors. Solder a length of bare hookup wire between the ground pins as shown below.

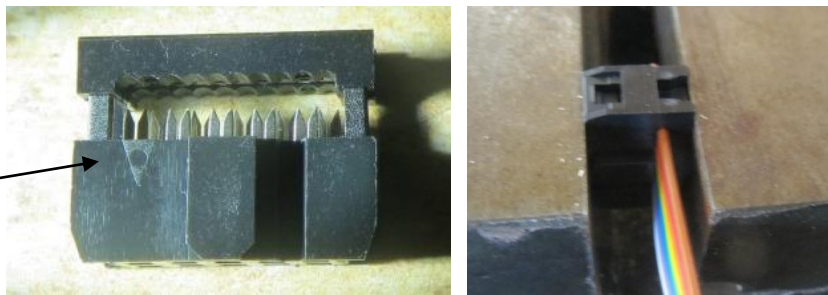


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4. INTERFACE CABLE ASSEMBLY (BOM items 4 and 5)

Locate pin one on the IDCs ribbon cable connector (pin 1 is normally marked with a triangle molded in the housing). Insert the ribbon cable in the housing with the number one conductor over pin 1 of the connector. Squeeze the connector in a vice to push the top piece down on the cable and force it into the IDC pins. Fold the cable over the top of the connector and press the strain-relief clip down over the cable until the two ends snap into the holes at ends of the connector housing.

PIN ONE
INDICATOR



5. ATTACH INTERFACE CABLE TO REAR PANEL

Mark the cable 2-1/2 inches from the connector. Remove the backing and attach the piece of foam mounting tape (BOM item 6) to the rear panel about 1/2 inch from the end of the panel, centered vertically. Peel the cover from the tape and attach the cable assembly so that the 2-1/2 inch mark lines up with the right edge of the mounting tape. Press the tape firmly and hold for about 30 seconds.



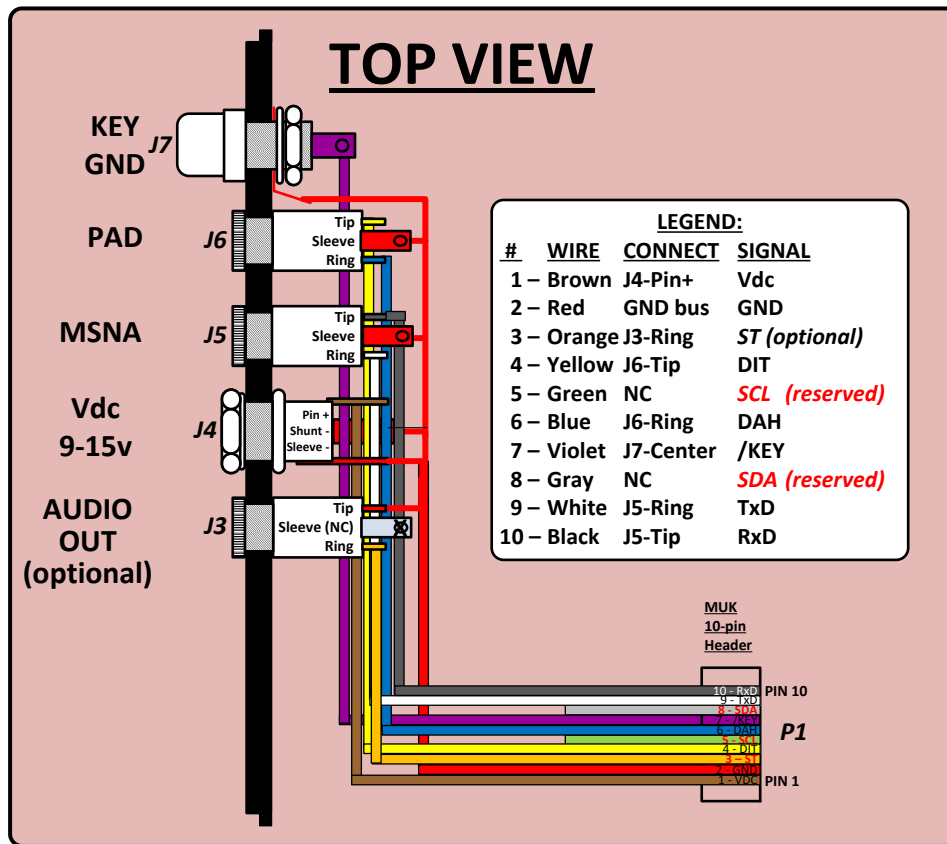
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6. CONNECT CABLE TO REAR PANEL JACKS

Starting with wire number one, solder each wire according to the following diagram and wire list. As you progress, use a side cutter to separate the end of each conductor from its neighbor and unzip it to the left edge of the mounting tape (see photo below). The cable wires are stranded and are 28 gauge. The fine wires tend to "wonder" while they are threaded through holes in the solder tabs on the jacks. To avoid the problem, I recommend you tin each wire end after it is cut to length and the end stripped. I also recommend that you weave each wire between the jack bodies to keep them neat and provide some strain relief.



Route each wire to its designated pin and cut it to length, strip about 1/8" of insulation off the end, tin the wire, and solder it to the pin on the jack. Solder wire number two to the ground bus. Cut the two or three unused wires about even with the DC power jack.



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BOM 2. MIDNIGHT ULTIMATE KEYER -REAR PANEL ASSEMBLY

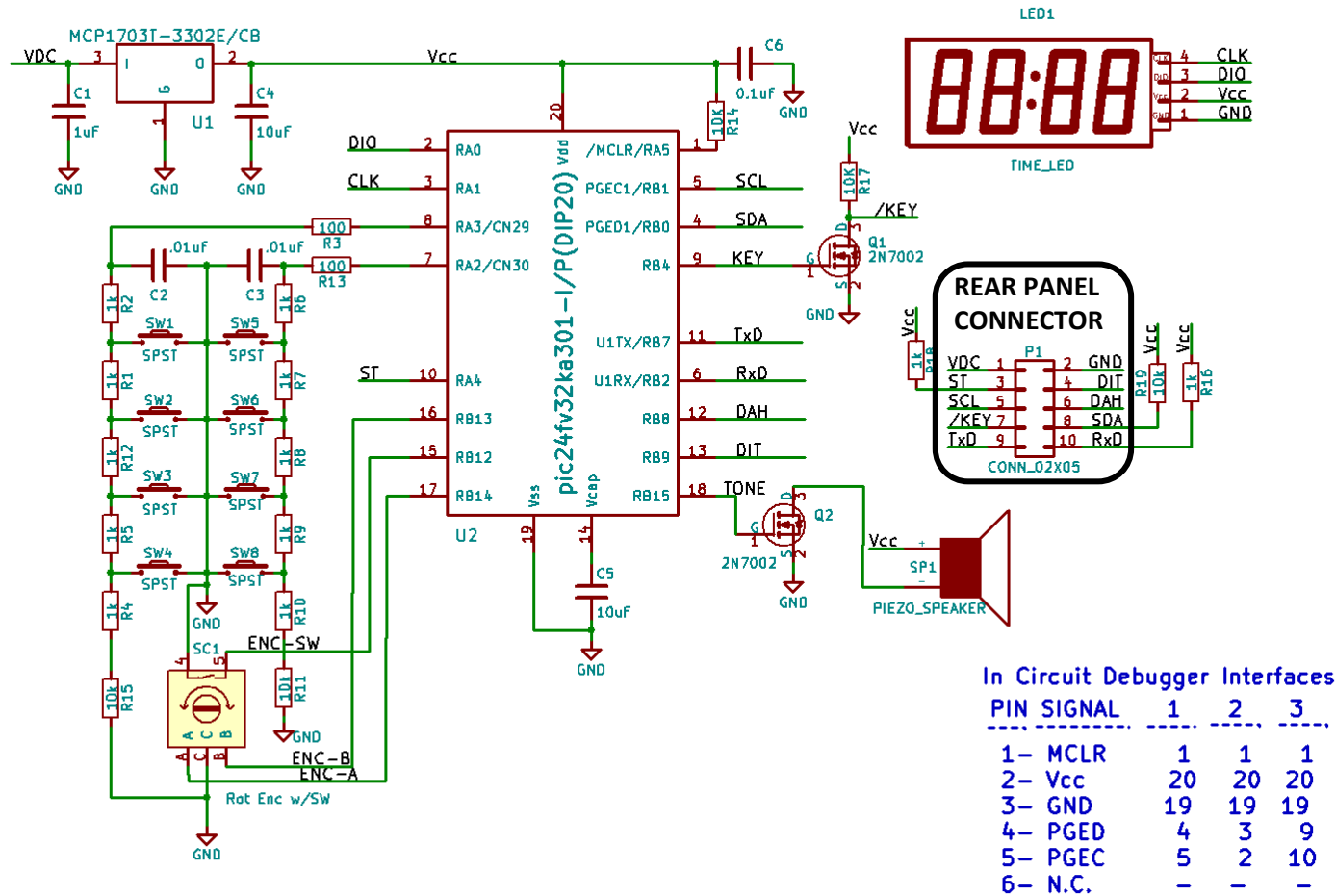
Order	Reference	Qty	Value	Supplier	Part Number	Footprint
		1	Rear Panel (part of enclosure)			1.062"x 4.173"(W)
1	J4	1	2.1mm coaxial DC power jack	Mouser	502-PC722A	5/16" panel mount
2	J3, J5, J6	2	3.5mm stereo audio jack	DigiKey	486-3419-ND	1/4" panel mount
3	J7	1	RCA Jack, Panel Mount	Mouser	490-RCJ-031	1/4" panel mount
4	P1	1	IDC 2.54mm, header 2x5, F	Mouser	710-61201023021	
5		1	10-conductor ribbon cable	Mouser	517-3302/10FT	8"
6		1	Foam Mounting Tape	Walmart	111-SML	1/2" x 1/2"

NOTE: 1. The part suppliers and numbers listed here may differ from the parts in your kit due to parts availability at the time your MUK is kitted.
2. J6 is optional, see text.



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MUK SCHEMATIC (V3Rd)



MUK REAR PANEL ASSEMBLY

REAR PANEL DRILL PATTERN

