Homebuilding an external keypad for the WJ-8617/8618 Receivers
Some notes and advices on a week-end project

by Paolo Viappiani
Via Magenta 32
54033 Carrara, Italy
pviappiani@tin.it

Homebuilding an external keypad for the Watkins-Johnson 8617/8618 receivers is an easy task that can be performed in a couple of days and that greatly enhances the versatility of these radios.
In order to help all those who are interested in this particular subject and as an example, here I will show the various steps I recently took for building some units and also the right way for connecting the keypads both to the A and to the B (and S-1) receivers of the Series.
The first steps consist in downloading the schematic of the optional keyboard circuit [1] and in searching for all the required parts, mainly a proper 16-key keyboard, a 74C923 IC, a socket for the same and three capacitors (4.7 uF Tantalum, 1.0 uF Poly, 0.1 Ceramic).
I found on the Internet several suitable products and I also purchased some cheap keyboards from China. They exist in various versions and colors (i.e. with black or white keys), but normally their keys are not in the required position (in the upper row are placed the "1", "2" and "3" keys, see Figure 1 below).

Figure 1

Exchanging the keys and putting them in the proper places is easy enough, first you have to part the rear PCB from its front plastic shell using a small blade cutter for removing some hot-placed rivets (see Figure 2). After having exchanged the keys, the parts can be re-attached to each other with some epoxy glue.

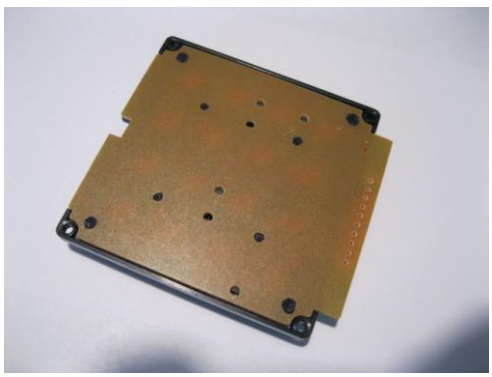


Figure 2

I did just as well and the final result is shown in Figure 3 (White-Key type).

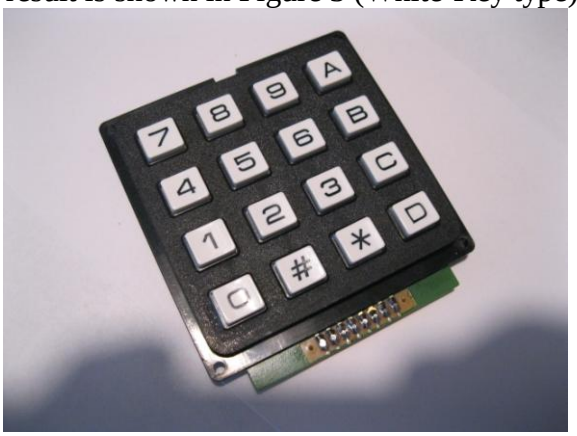


Figure 3

In Figure 4 (below) is shown the schematic diagram of the keyboard assembly.

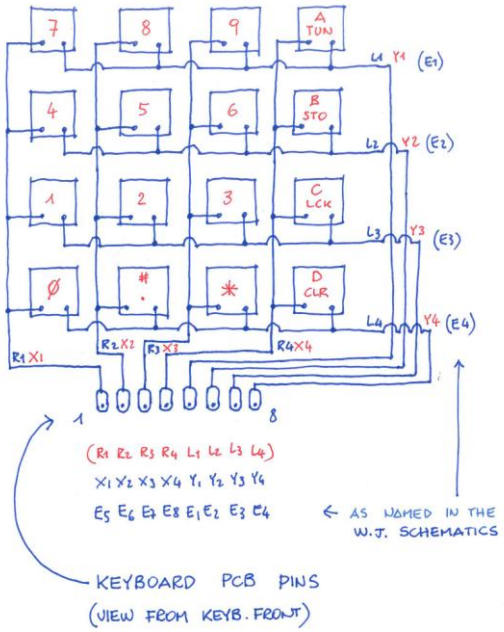


Figure 4

Afterwards I soldered a right-angle 8-pin female spade connector to the keyboard PCB and then I fastened the assembly to a plastic box (after having cut a convenient window and having drilled proper holes on its front). I used a cheap German-manufactured 120x70x20 mm. black box I found on the Internet, see Figure 5.

The associated keyboard circuits has been placed on a perforated fiberglass board whose structure is shown in Figure 6 (component side and opposite side); a silver-plated solid wire was used for all the point-to-point connections as shown in Figures 7 and 8.

The fiberglass board was then joint to the keyboard PCB using a proper right-angle 8-pin male spade connector and it was securely fastened to the plastic box by two screws and hex spacers that had been previously epoxy glued to the box itself, see Figures 9 and 10.

In the rail side of the fiberglass board was also placed a multi-pin socket for the 10-pole flat cable that has to be connected to the receiver front panel. There is also a cable clamp in the vicinity of a small slot

(cut by a file in the upper side of the keyboard box); the clamp has been built utilizing two plastic pieces with screws and hex spacers epoxy-glued to the front shell of the box.
The flat cable passes also through a piece of thin insulated tubing for protection (Figure 11).

Figure 5

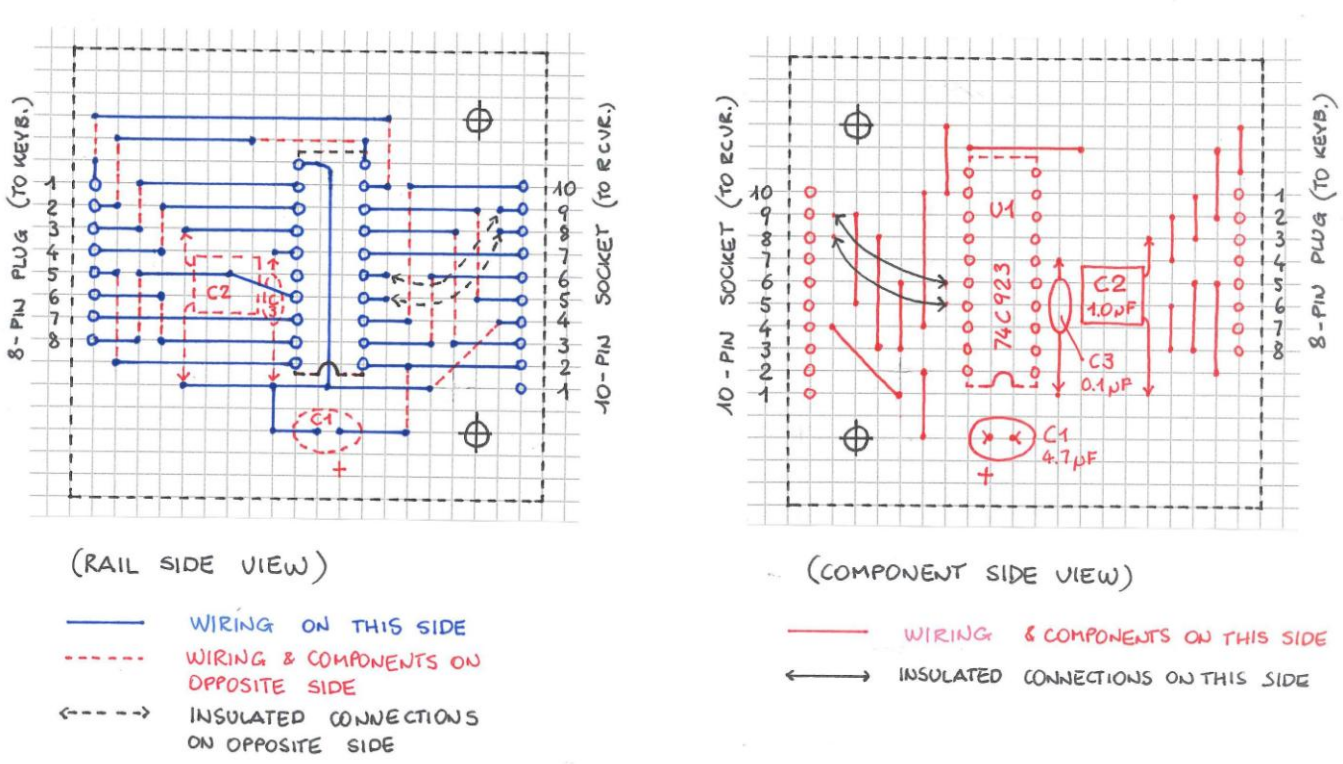


Figure 6

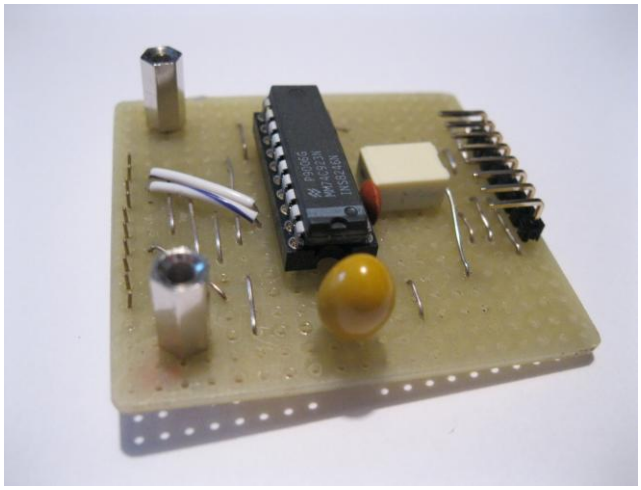


Figure 7

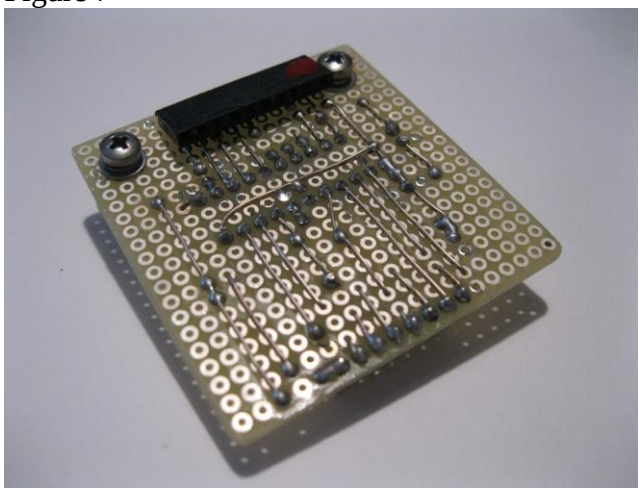


Figure 8

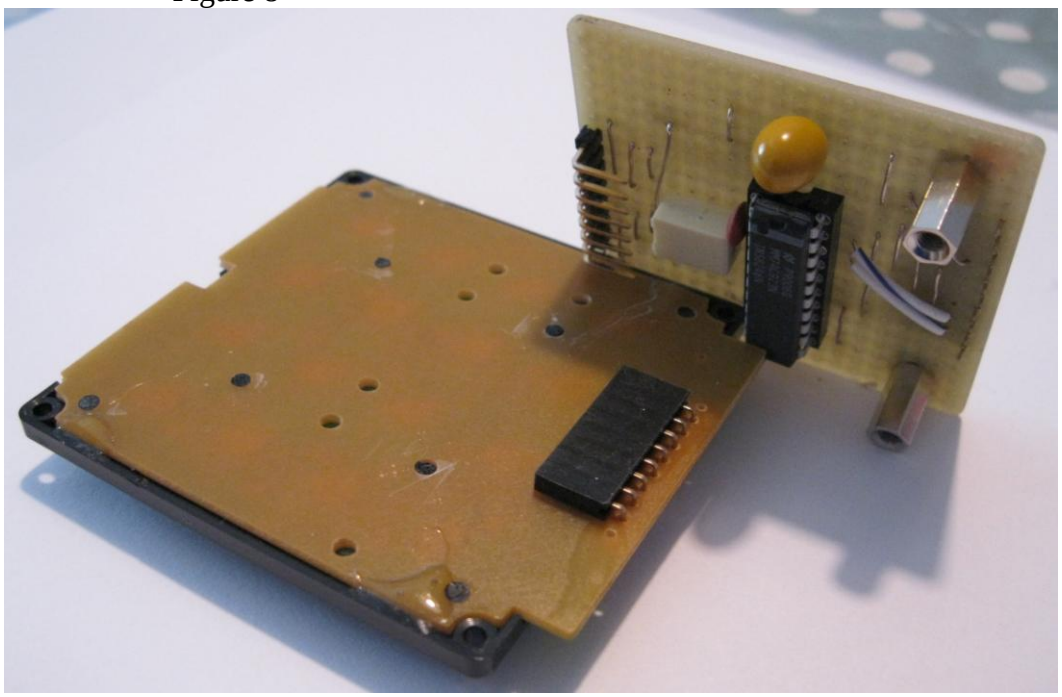


Figure 9

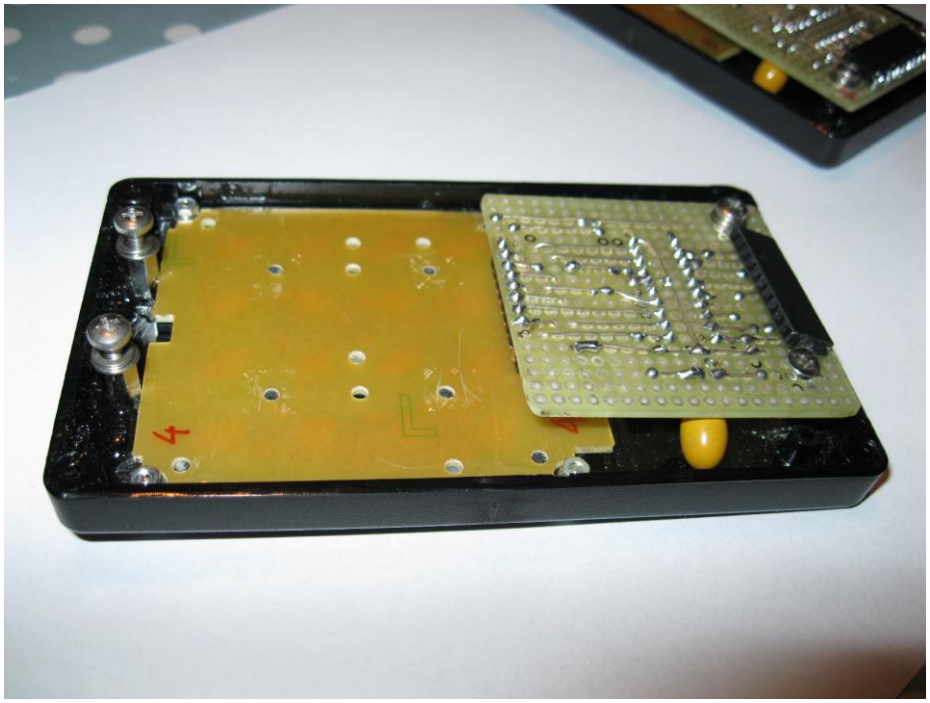


Figure 10

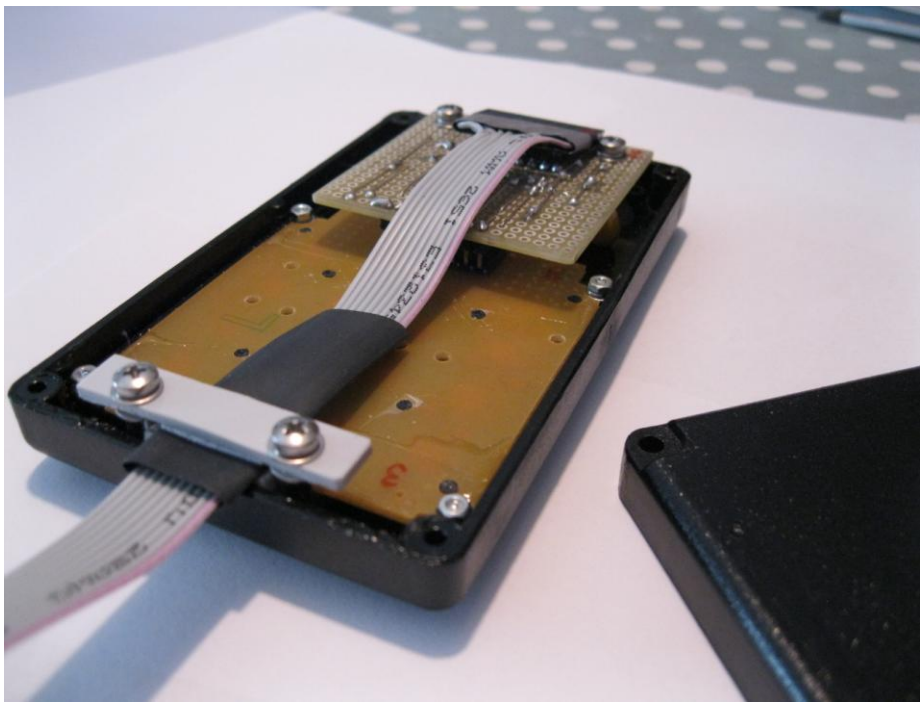


Figure 11

In Figure 12 (below) are shown two flat cables during the assembly process: they have been terminated at one end with a 10-pin spade plug.

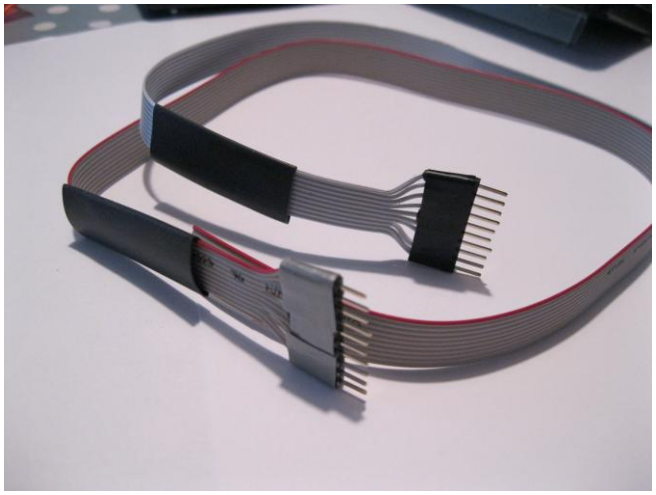


Figure 12

A plastic clamp for paper sheets, conveniently shortened and perforated (Figures 13 and 14 below), has been screwed to the back cover of the keyboard box. It perfectly fits the W-J rack handles and allows the keyboard to be easily supported by the right receiver handle (and to be quickly removed from it).

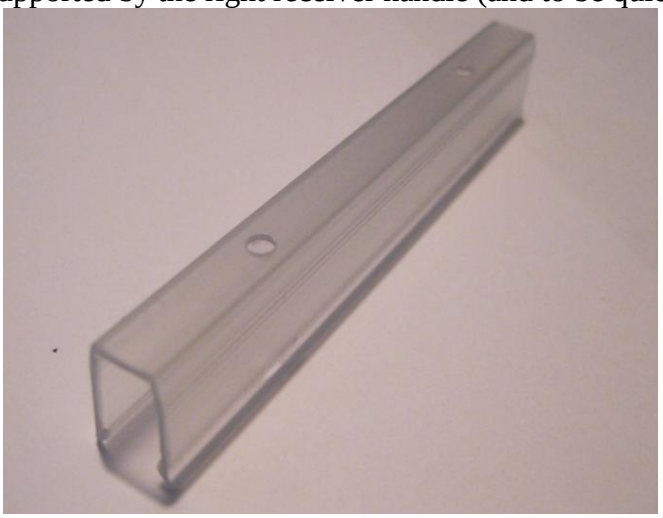


Figure 13

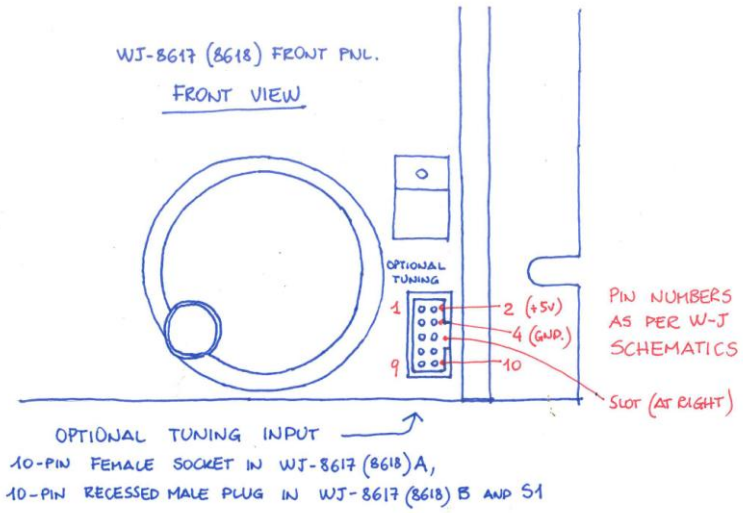
Figure 14

Figure 15 shows two of the keyboard assemblies I built (one with black keys and the other one with white keys). As for the symbols, please notice that the key "#" stands for "." and the keys "A", "B", "C" and "D" stand for "TUNE", "STORE", "LOCK" and "CLEAR" respectively. For sure it is advisable to place new small labels on the keys directly or a comprehensive label below the keyboard for clarity.

Figure 15

Important notices on the 10-pin DIL connector at the end of the flat cable (receiver side)

This connector has to be inserted into the recessed 10-pin plug "OPTIONAL TUNING" that is placed at right of the WJ-8617/8618 ("B" or "S-1" versions) tuning knob (see Figure 16) and for proper working of the keypad is mandatory that all the connections are correctly wired.
So it is extremely important to take note that the pin numbering method used by Watkins-Johnson for the "OPTIONAL TUNING" connector is not standard, as the pins "1" and "2" are located at the top of the plug and the pins "9" and "10" are placed at its bottom (as shown in Figure 16), ***while the connector slot sits on its right side***.
This implies that the arrow (usually indicating the pin "1" in the socket, see Figures 16, 17 and 18) has not to be considered and that the flat cable has to be crimped as shown in the above figures instead. Figures 17 and 18 show the right side of the connector, Figure 19 shows its left side (please notice that the red-marked wire is placed at the top of the socket anyway).



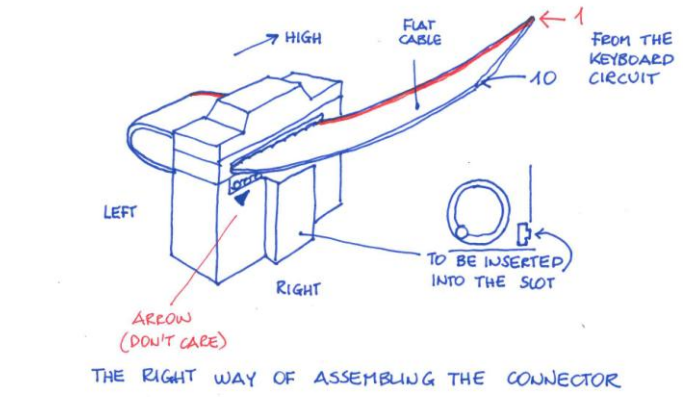


Figure 16

Figure 17

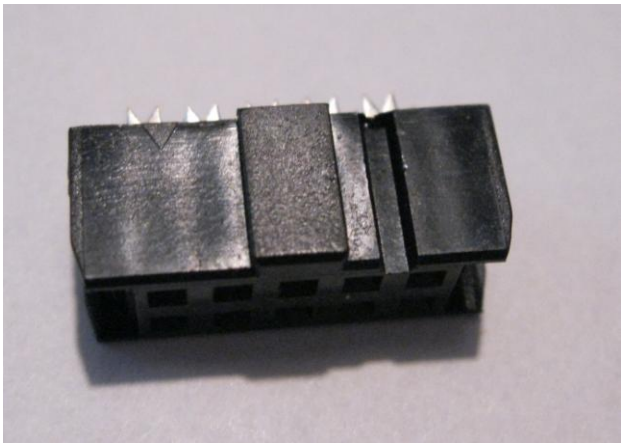


Figure 18

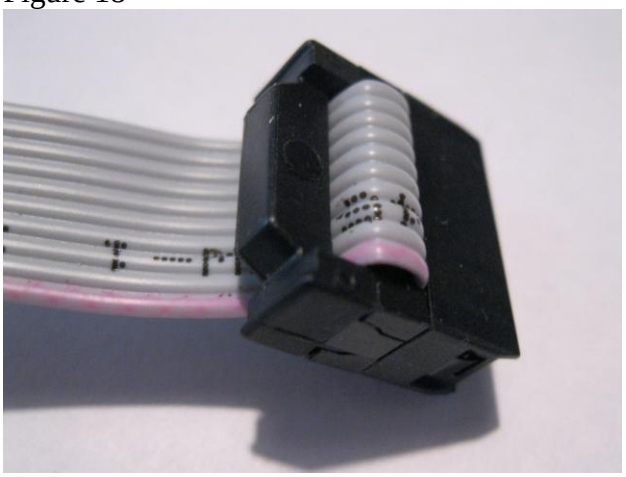


Figure 19

Please also notice that, while in the “B” and “S-1” receiver versions the “OPTIONAL TUNING” connector is a 10-pin recessed male plug, in the WJ-8617/8618 “A” version a recessed 10-pin female socket had been used instead.

Luckily the pin numbering method of both the socket and the plug is the same, so that a keyboard is also suitable for the “A” version of the receivers, provided a convenient 10-pin “male to male” adaptor is used.

Two examples of the required device is shown in Figure 20 (see below).

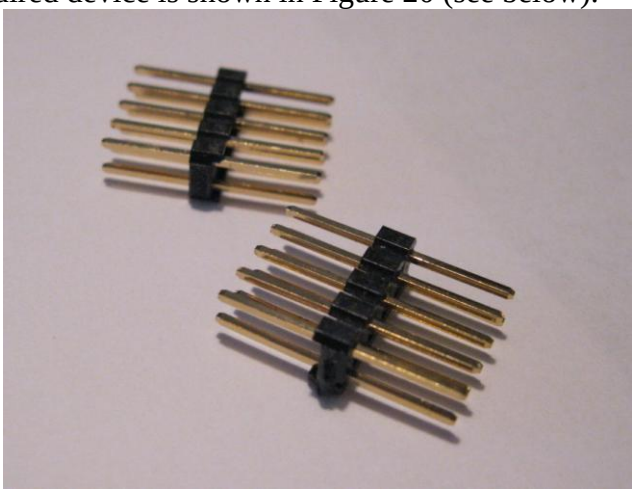


Figure 20

It can be easily assembled starting from a multi-pin DIL connector with long spades; alternatively all the spades can be removed from their plastic support and inserted into the holes of one of the two sockets directly.
The Figures 21 and 22 (below) show the front and the rear sides of a finished keyboard.


Figure 21


Figure 22

I sincerely hope that this paper can be of some help for the largest possible number of WJ-8617/8618 enthusiasts.
Many thanks for your attention and have fun!.

Paolo Viappiani, Italy

References:

[1]: See: http://watkins-johnson.terryo.org/documents/manufacturers/WJ/Technical%20info/WJ%20PKC%20option.jpg