

INSTRUCTION SUPPLEMENT
FOR
WJ-8718A AND WJ-8718A/MFP
1-Hz READOUT OPTION

(TENTATIVE MANUAL)

This document and the subject matter disclosed herein are proprietary items to which Watkins-Johnson Company retains the exclusive right of dissemination, reproduction, manufacture and sale.

This document is provided to the individual or using organization for their use alone in the direct support of the associated equipment unless permission for further disclosure is expressly granted in writing.

WATKINS-JOHNSON COMPANY
700 QUINCE ORCHARD ROAD
GAITHERSBURG MARYLAND 20878

WARNING

This equipment employs dangerous voltages which may be fatal if contacted. Exercise extreme caution in working with this equipment with any of the protective covers removed.

NOTICE

This is not the original Instruction Manual for the 1-Hz Option for the WJ-8718A Receiver Series, it is only an attempt to write one from scratch.

It is based upon visual inspection and visual circuit tracing on existing and unmodified WJ-8718A and WJ-8718A/MFP receivers including this rare option.

The author is Paolo Viappiani of La Spezia, Italy (pviappiani@tin.it), a radio collector whose only purpose is to share technical information. It is a no-profit work and consequently in no way this manual may be sold and/or made object of commercial transactions.

The work is still in progress, so any contribution and suggestion is very welcome. The author also apologizes for eventual ad unwanted mistakes, misprints or omissions of which he cannot be held as responsible.

La Spezia, Italy, June 2017

Revisions:

- Version 1.0 – June 2017

FIELD MODIFICATIONS INSTRUCTIONS
FOR INSTALLING THE 1-Hz OPTION IN
THE WJ-8718A OR IN THE WJ-8718A/MFP HF RECEIVER

The following tools are necessary to perform the modification steps:

Phillips screwdriver;
Soldering gun and solder.

Perform the following steps to install the 1-Hz Option in the WJ-8718A or in the WJ-8718A/MFP receiver:

1. Remove power from the unit.
2. Remove top and bottom covers from the unit.

3. For the WJ-8718A:

Remove the six screws mounting the manual front panel to the unit.
Disconnect all cable assemblies from the old manual front panel except A10P1. Disconnect A10P1 from the Front Panel Interconnect board A6A2.
Remove the manual front panel from the unit.

For the WJ-8718A/MFP:

Remove the six screws mounting the stock MFP front panel to the unit.
Disconnect all cable assemblies from the old MFP front panel (MFP-P12 from MFP-P14, MFP-P13 from MFP-P15, MFP-P1 [16-pin] from J2, MFP-P2 [14-pin] from J1). Disconnect also the MFP-P6 plug from the J1 socket on the Front Panel Encoder card A1- 796056-X, unplug that board from the Front Panel Interconnect small motherboard (MFP-A1, 794310-X) and set it apart temporarily.

Remove the old MFP front panel from the unit.

4. Place the unit with the bottom side facing up.

NOTES

- The 1-Hz Option is normally Factory-installed together with the 10-Hz BFO Option, although this is not mandatory. It is recommended to have at hand and to read carefully also the 10-Hz Option Manual anyway.

- For the WJ-8718A/MFP: before starting the 1-Hz Option installation, please check and ascertain that all the Field Modifications considered in the "WJ-8718A/MFP INSTRUCTION MANUAL REVISION A CHANGE 1"- February 1991 have been already performed as described.

- This manual can also be used for installing the 1-Hz Option on WJ-8716 and WJ-8716/MFP receivers.

5. Find A6 I/O MB (Type number 791580) location by referring to Figure 5-8 of the WJ-8718A HF Receiver Instruction Manual.

For receivers with Manual Tuning Module only (WJ-8718A etc.):

- a. Install A6JW5 by wire wrapping one end of a wire to A6X9, pin 42 and the other end to A6X8, pin 42.
- b. Install A6JW6 by wire wrapping one end of a wire to A6X9, pin 44 and the other end to A6X8, pin 44.
- c. Install A6JW7 by wire wrapping one end of a wire to A6X9, pin 46 and the other end to A6X8, pin 46.
- d. Install A6JW8 by wire wrapping one end of a wire to A6X9, pin 48 and the other end to A6X8, pin 48.

For receivers already having a MFP front panel (WJ-8718A/MFP, etc.):

- a. Install A6JW5 by wire wrapping one end of a wire to A6X9, pin 42 and the other end to A6X8, pin 7.
- b. Install A6JW6 by wire wrapping one end of a wire to A6X9, pin 44 and the other end to A6X8, pin 12.
- c. Install A6JW7 by wire wrapping one end of a wire to A6X9, pin 46 and the other end to A6X8, pin 14.
- d. Install A6JW8 by wire wrapping one end of a wire to A6X9, pin 48 and the other end to A6X8, pin 54.

For all receivers:

- e. Carefully remove the coaxial bridge (W6) that connects J7 to J9 (both placed on the aluminium chassis sides) unscrewing its P10 and P9 connectors. Set the bridge apart for possible future use.
 - f. Install the following coaxial leads:
1Hz-W1 (from J7 to A6X9, pins 5 [signal] and 6 [ground shield]);
1Hz-W2 (from J9 to A6X9, pins 3 [signal] and 4 [ground shield]).
6. Place the unit with the top side facing up..
 7. Carefully insert the 796022 (1-Hz Option) card into the X9 socket of the A6 I/O mainboard (with the card rear facing the A6 I/O MB right edge).

NOTES

- Figures 1a, 1b and 2 (on this Manual) show the bottom side of the A6 I/O mainboard (on a WJ-8718A and on a WJ-8718A/MFP respectively) with all the above-mentioned modifications already performed, while in Figure 3 is shown the bottom side of a NOS A6 I/O mainboard that had been already Factory set up for installation of the 1-Hz Option.

- Instead of using wire-wrapping technique, all the required wire connections can be installed by using PTFE-insulated stranded wires and standard strip-line female connectors that have to be inserted into the proper socket pins. In this case, two four-pole female connectors are required for the WJ-8718A, a four-pole and three two-pole female connectors are required for the WJ-8718A/MFP (as shown in Figure 4).

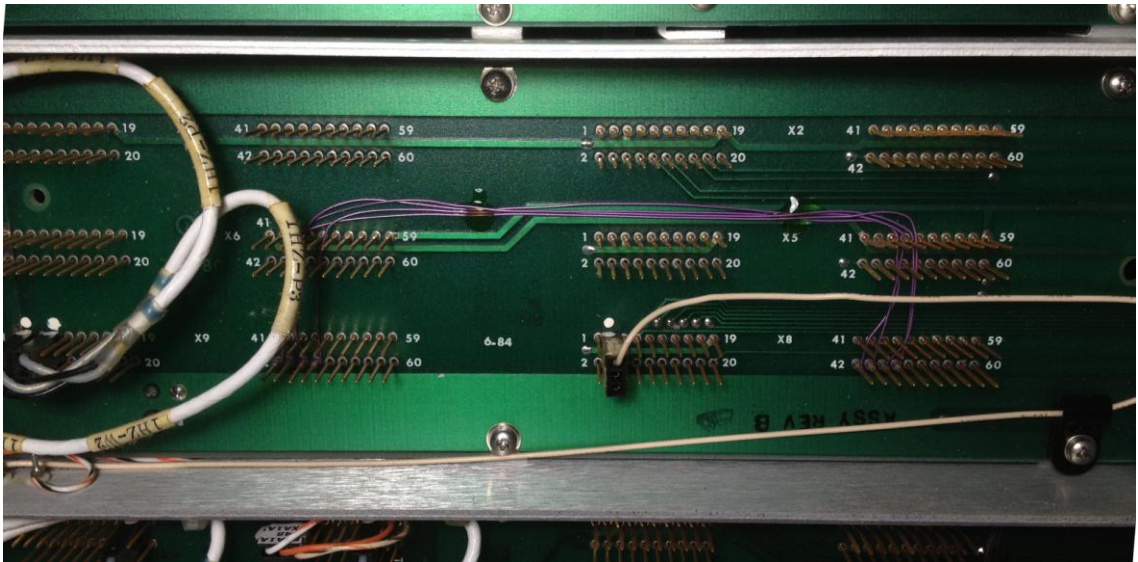


Figure 1a: A6 I/O mainboard of a WJ-8718A 1-Hz resolution receiver (bottom side).

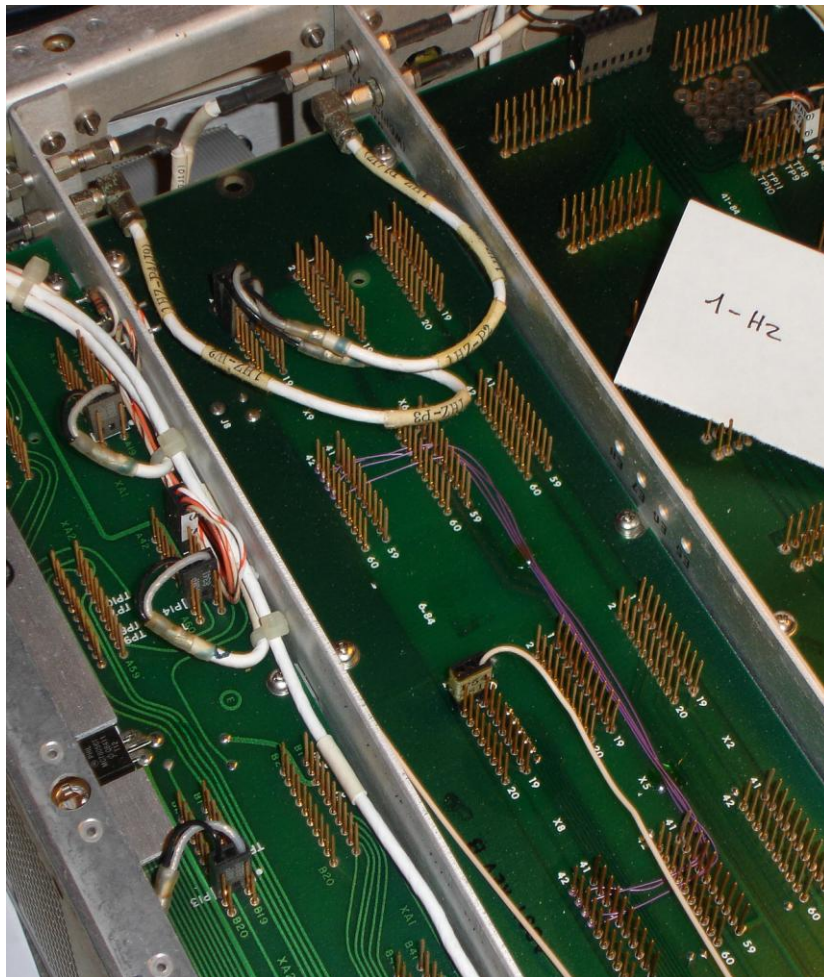


Figure 1b: Further details of the same WJ-8718A receiver (A6 I/O MB, bottom side).

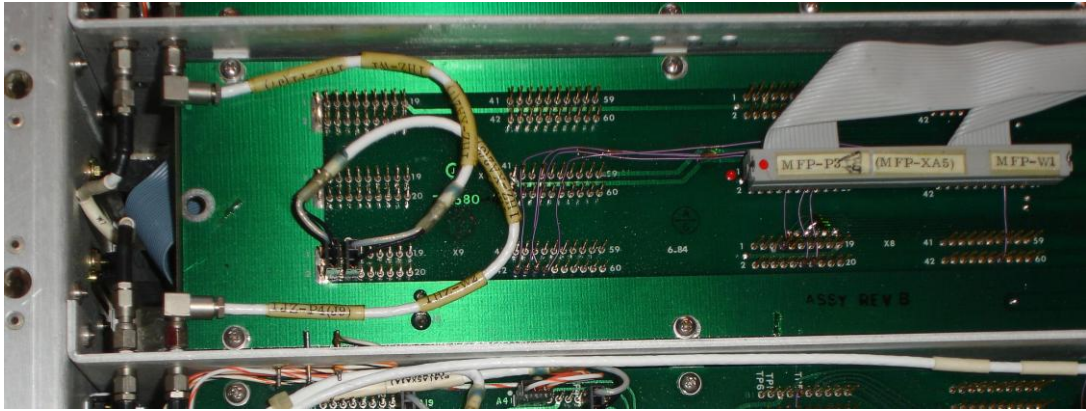


Figure 2: A6 I/O mainboard of a WJ-8718A/MFP 1-Hz resolution receiver (bottom side).

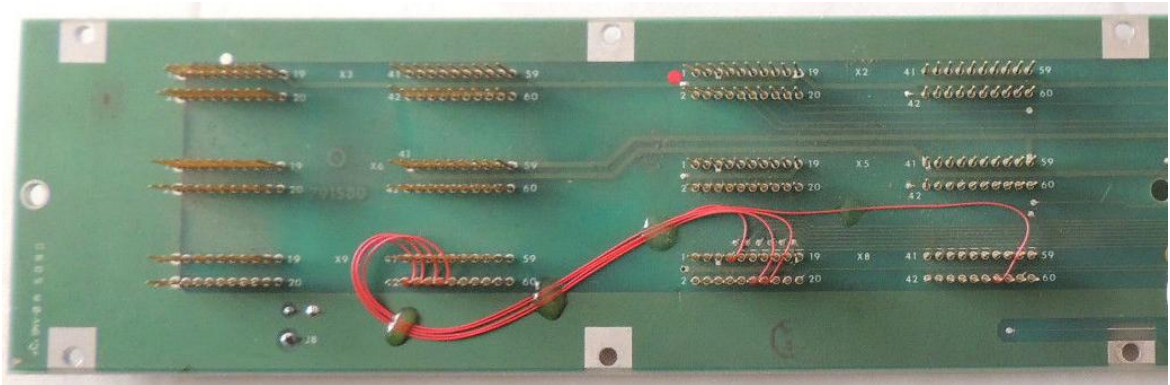
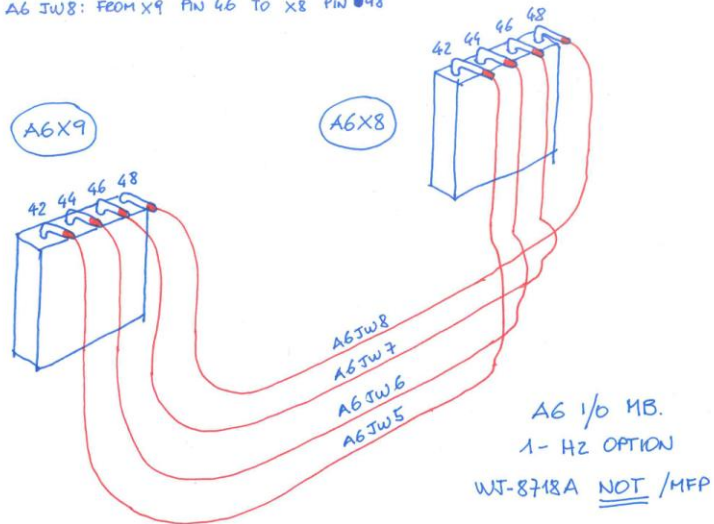


Figure 3: Factory-installed wire-wrap wiring for the 1-Hz Option in a WJ-8718A/MFP radio (A6 I/O mainboard partial view, bottom side).

A6 Jw5: FROM X9 PIN 42 TO X8 PIN 42
 A6 Jw6: FROM X9 PIN 44 TO X8 PIN 44
 A6 Jw7: FROM X9 PIN 46 TO X8 PIN 46
 A6 Jw8: FROM X9 PIN 46 TO X8 PIN 48



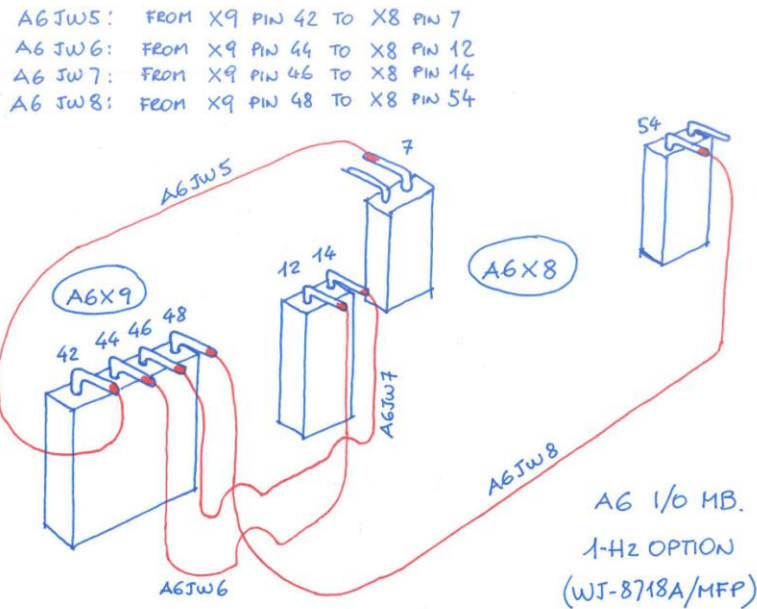


Figure 4: Alternative wiring on the A6 I/O MB for the 1-Hz option in a WJ-8718A and in a WJ-8718A/MFP. Some strip-line female connectors and stranded wires are used.

8. Final steps:

For receivers with Manual Tuning Module only (WJ-8718A etc.):

- Locate the A6A1 Manual Tuning Up-Down Counter card (791575-X) on the A6 I/O mainboard, sockets XA1 (X7 and X8); unplug and remove it, replacing with the 796014 type (see Figures 4a-4b).
- Place the new manual front panel (with an 8-digit frequency display and also with a 4-section BFO thumbwheel switch eventually) in the front of the receiver, taking care not to break the power switch shaft.
- Reconnect to the proper front panel sockets all the plugs that had been disconnected: the ones coming from J4 (A7P1 to manual tuning board), J2 (A8P1 to display), and J3 (A9P1 to BFO thumbwheel switch) on the new A6A1 board (796014).
Reconnect also the A10P1 plug to J1 (on the A6A2 Front Panel Interconnect 791828-X card).

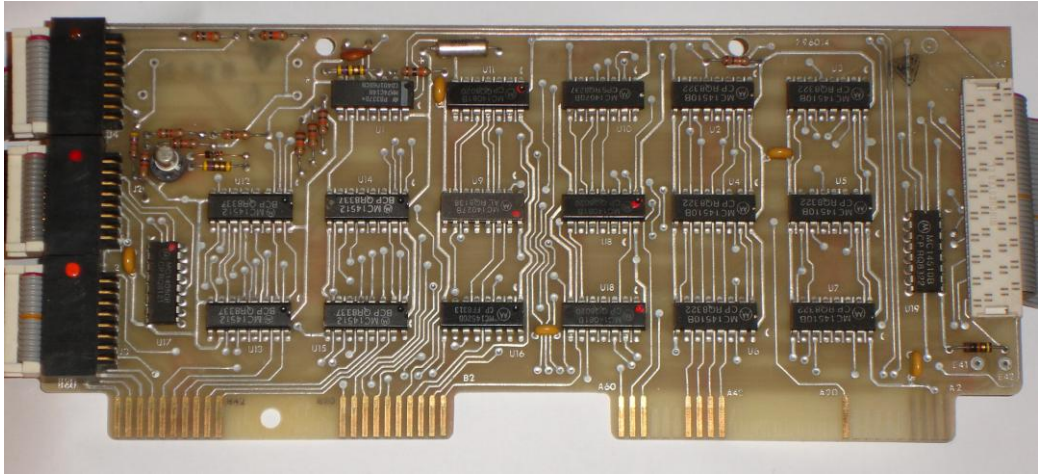


Figure 4a: A 796014 card that replaces the stock 791575-X board (front view).

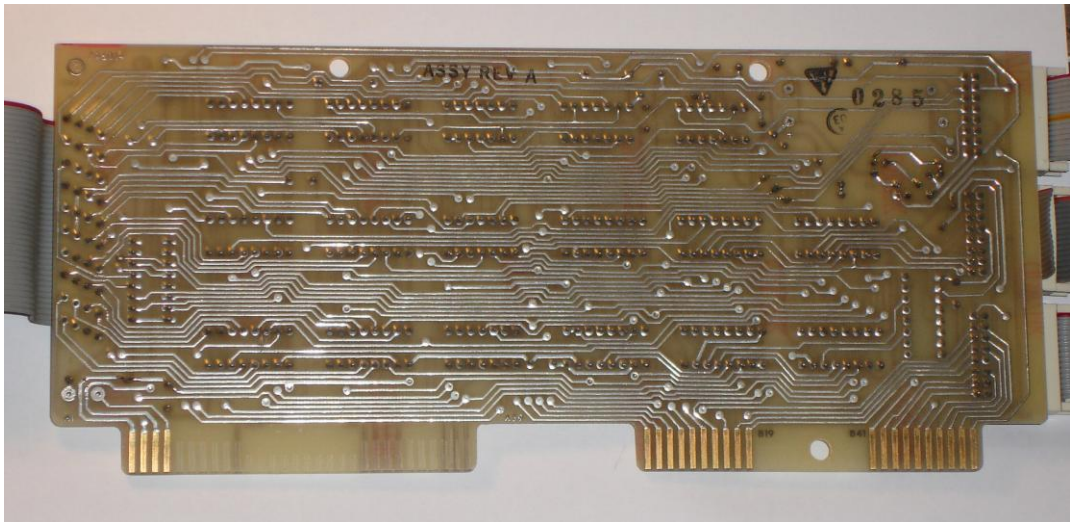
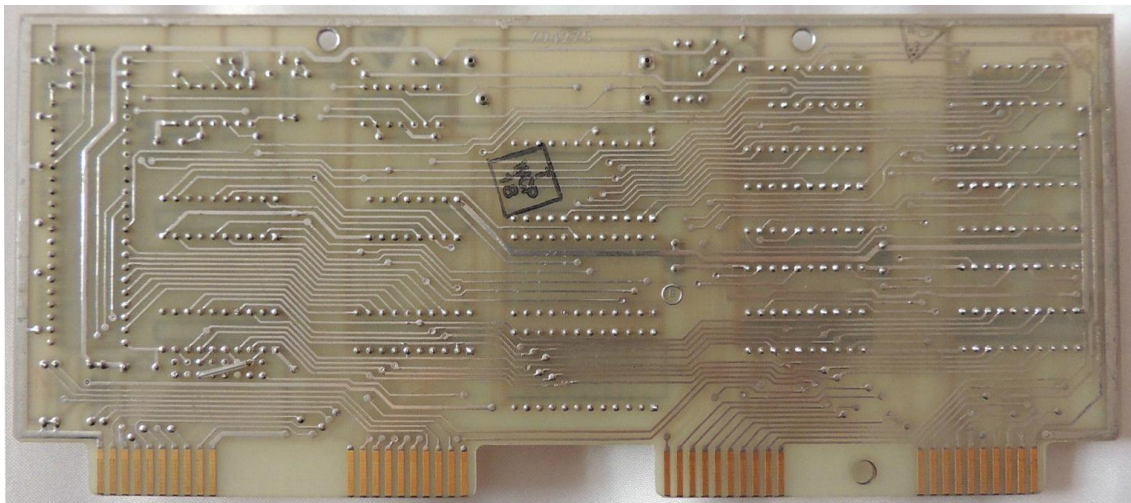
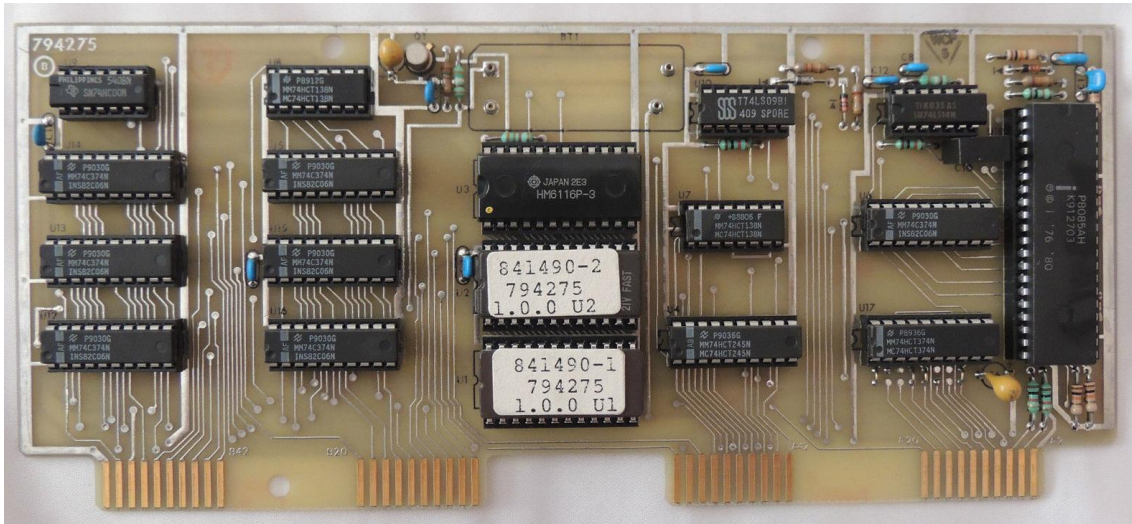


Figure 4b: Rear view of a 796014 card.

For receivers already having an MFP front panel (WJ-8718A/MFP, etc.):

- a. Locate the MFP-A4 Synthesizer Interface/Memory card (794275-X) on the A6 I/O mainboard, sockets XA1 (X7 and X8); unplug and remove it, replacing with the new one that is also provided with U17 IC and two proper EPROMS (U1 and U2) containing the software for the 1-Hz Option too (see Figures 5 and 6 for some more card details).
- b. Place the new MFP front panel (with an 8-digit frequency display) in the front of the receiver, taking care not to damage the power switch shaft.
- c. Reconnect to the proper front panel sockets all the cable assemblies that had been disconnected, using a reverse process: MFP-P12 to MFP-P14, MFP-P13 to MFP-P15, MFP-P1 (16-pin) to J2, MFP-P2 (14-pin) to J1. Reconnect also the Line Audio cable coming from the A4 IF motherboard to the Line Audio potentiometer on the front panel. Re-insert the Front Panel Encoder card A1-796056-X into the Front Panel Interconnect small motherboard (MFP-A1, 794310-X).



Figures 5(a-b): A 794275-X MFP-A4 card suitable for the 1-Hz Option: notice the presence of U17 (normally missing) and of two EPROMs (U1 and U2) that include the 1-Hz software (front and rear views).

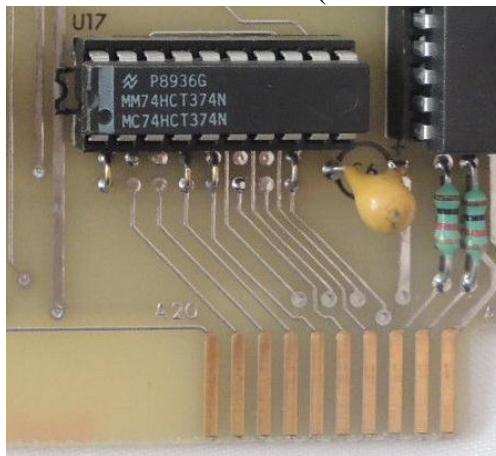


Figure 5c: Details of U17 connections (wire bridges in the front of the MFP-A4 card)

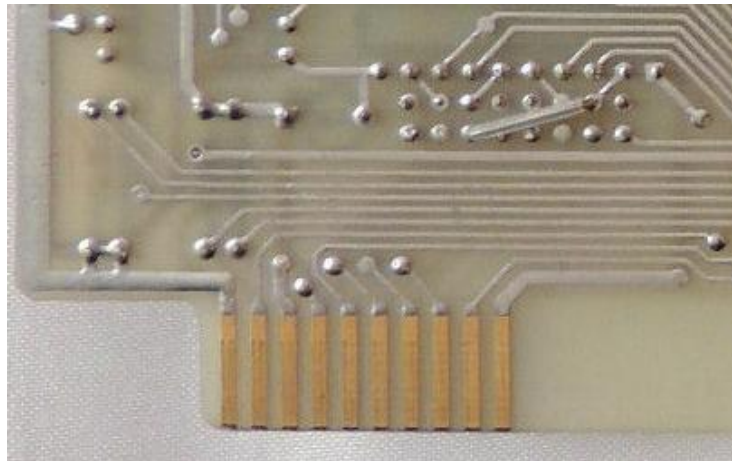


Figure 5d: Details of U17 connections (wire bridge in the rear of the MFP-A4 card)

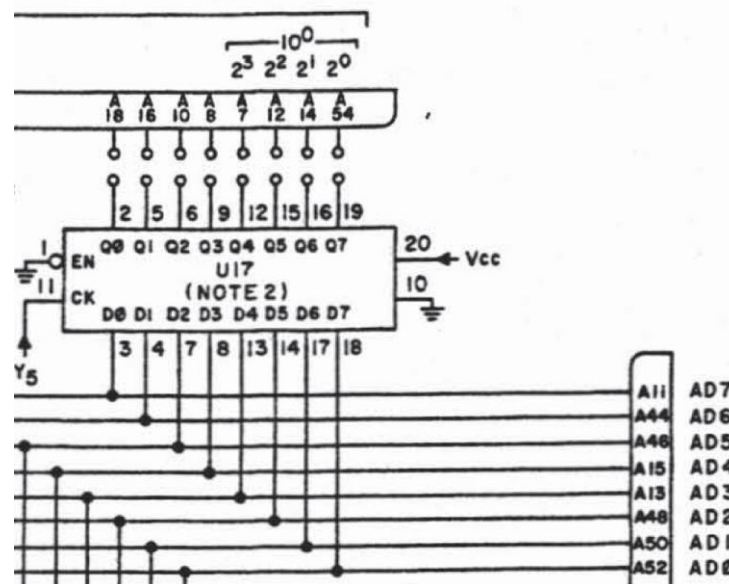


Figure 6: Schematic detail of the PCB bridges near U17

For all receivers:

- d. Install the new front panel using the same six screws removed in step (3) above;
- e. Replace the top and bottom covers using the same screws removed in step (2) above.
- f. Apply power to the receiver and check it for proper operation.

NOTES

- Figures 7 (a and b) show the front and the rear sides of a 796022 1-Hz Option card (that has to be inserted into the A6X9 socket on the A6 I/o mainboard after having performed all the above listed modifications). This enables the 1-Hz tuning and readout resolution.

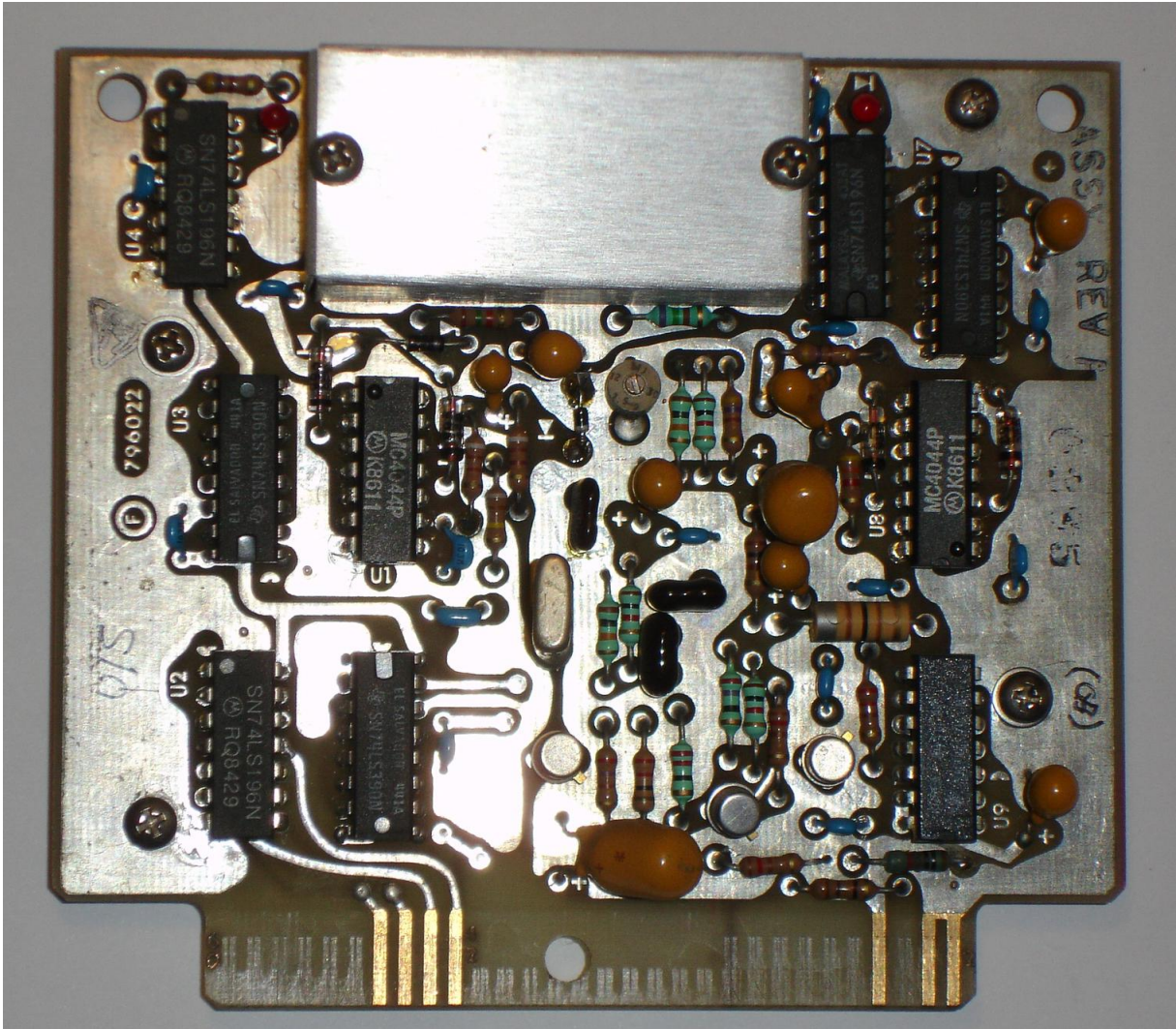


Figure 7a: The 796022 1-Hz Option card for the WJ-8718 Series of receivers (front side).

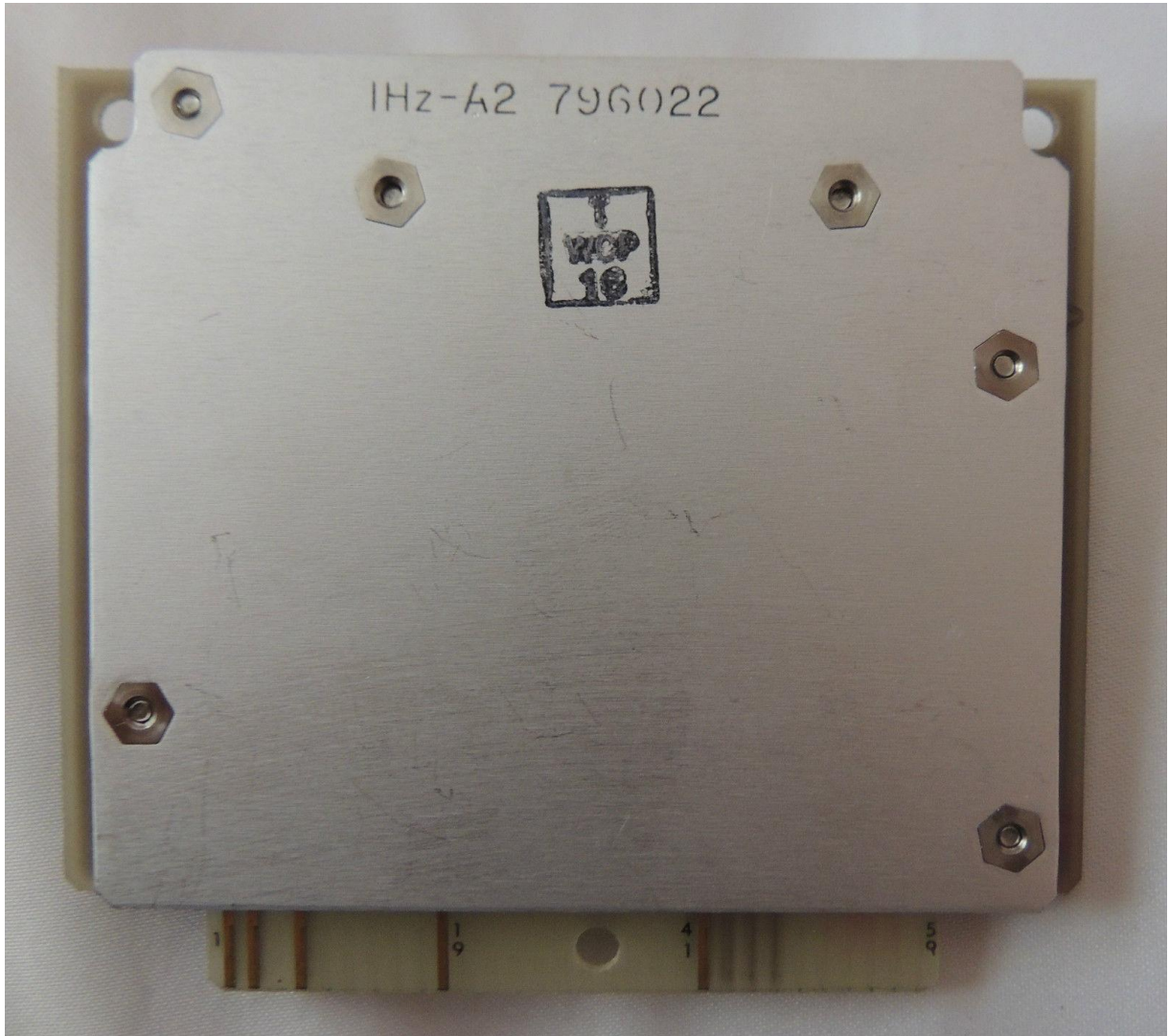


Figure 7b: The rear (shielded) side of the same 796022 1-Hz Option card.

WJ-8718A & WJ-8718A/MFP 1-Hz OPTION

PRINCIPLES OF OPERATION AND CIRCUIT DESCRIPTION

In stock receivers (10-Hz tuning resolution) the coaxial cable bridge named W6 and placed on the bottom side of the receiver - towards the rear of the unit and in correspondence of the A6 I/O mainboard - leads the 11.155,000 MHz signal coming from the third L.O. to the third mixer (U1 on the A4A2 card) in order it is mixed with the 10.7 MHz 2nd IF signal and produces a 3rd IF of 455 kHz. The 3rd L.O. output signal is applied to J9 (P8 on W6) and the 3rd mixer input corresponds to J7 (P10 on W6).

Installing the 1-Hz Option implies that the coaxial bridge W6 is removed and that the 3rd L.O. signal is applied to pin 3 of the X9 socket that corresponds to the new 796022 1-Hz Option card instead (1Hz-W2 cable starting at P4/J9). Then a signal coming from pin 5 of the same X9 socket (1-Hz card) is applied to the 3rd mixer input (1Hz-W1 cable coming to P1/J7).

So it is evident that the 796022 1-Hz Option card produces 1-Hz shifts (from -9 Hz to + 9 Hz) in the 11.155 MHz signal that comes to the 3rd mixer, so that the tuning resolution becomes 1 Hz. Obviously the 1-Hz shifts depend from the tuning encoder (and from the numeric keyboard in the /MFP receivers) and are also sensed by the tuning display.