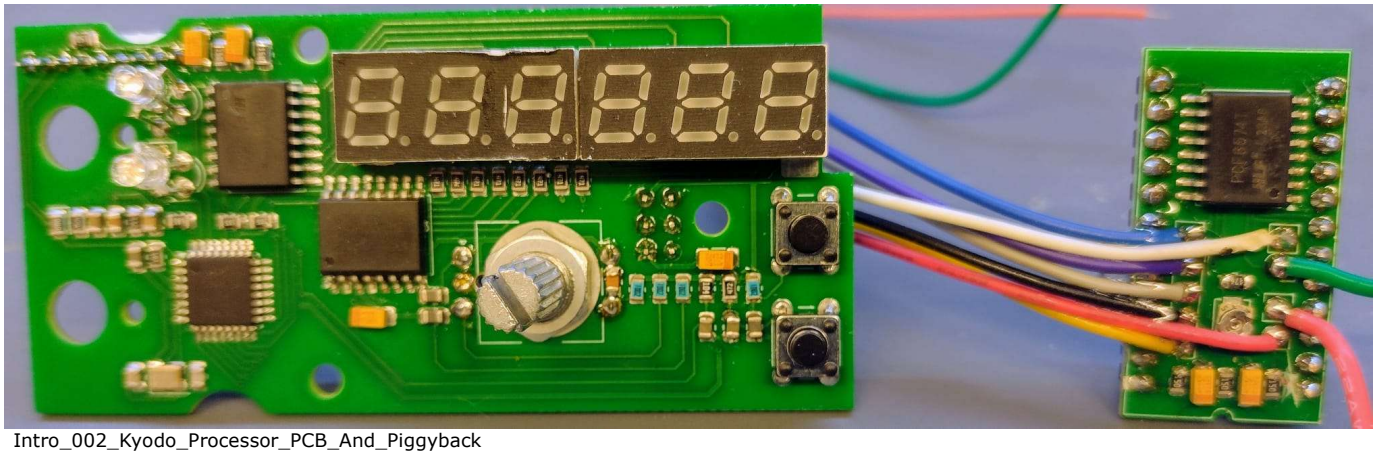
Conversion instructions Kyodo kg-105 version

Intro_001_Kyodo

0. Introductie



Intro_002_Kyodo_Processor_PCB_And_Piggyback

This is the conversion manual for the Kyodo KG-105 series. Two PCBs were developed for this purpose:
- Processor PCB
- Piggyback PCB.

The processor PCB has the exact same dimensions as the PCB with the channel selector in the transceiver. The positions of the potentiometers for volume and squeezing are carried over from the original PCB. The pushbuttons have been given new and applicable functions in this design.

After minimal modification to the PLL PCB, the piggyback is placed in the designated IC socket in the location of the frequency EPROM. This piggyback takes over the entire function of the EPROM under program control. The pre-programmed software for the ATMEGA328p offers the following functions for the following transceivers:
- kyodo 50 MHz model
- kyodo 70 MHz model
- kyodo 150 MHz model
- kyodo 220 MHz model and
- kyodo 460 MHz model.

With adjustable grid frequency of 12 kHz, 25 kHz and 50 kHz.

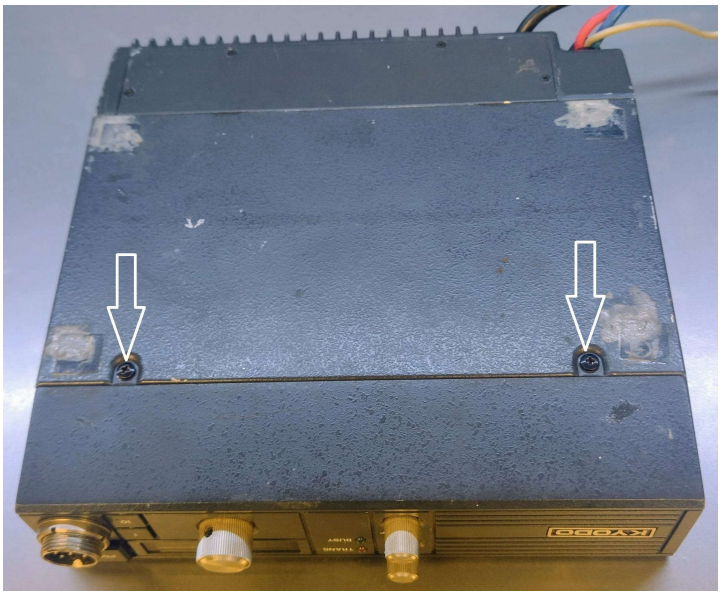
Fixed repeater offset:
- -600 kHz for the 2 meter model
- +1600 kHz and – 7600 kHz for the 70 cm model.

The repeater function is automatically disabled if transmitting outside the HAM-band. Adjustable CTCSS of 67 Hz, 71,9 Hz, 77,0 Hz, 82,5 Hz, 88,5 Hz, 94,8 Hz. 100 Hz, 103,5 Hz, 110.9 Hz, 114,8 Hz, 118,8 Hz 123 Hz, 131,8 Hz, 173,8 Hz and NoCTCSS. During repeater use you can "listen on the repeater input."

During the design of the conversion kit, we strived to minimize interference with the existing electronics to preserve the transceiver's charm as much as possible. The conversion instructions have been kept as simple as possible. Hence, they are presented in the form of a "comic strip." Before you begin converting the Kyodo, please read the entire manual carefully. This way, you'll know where to pay extra attention and where the tricky parts lie. I wish you much enjoyment with the conversion and many connections with this full-featured transceiver.

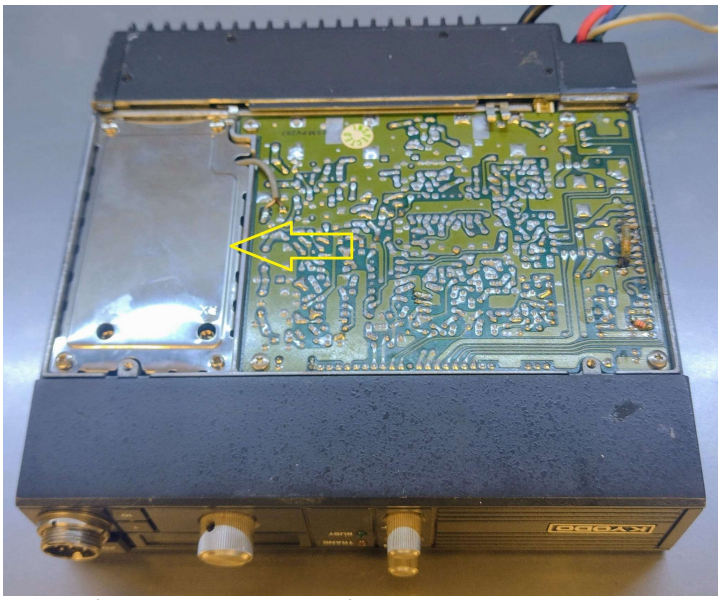
Martin Brus, PE1NZI

1. Remove both cover plates from the Kyodo



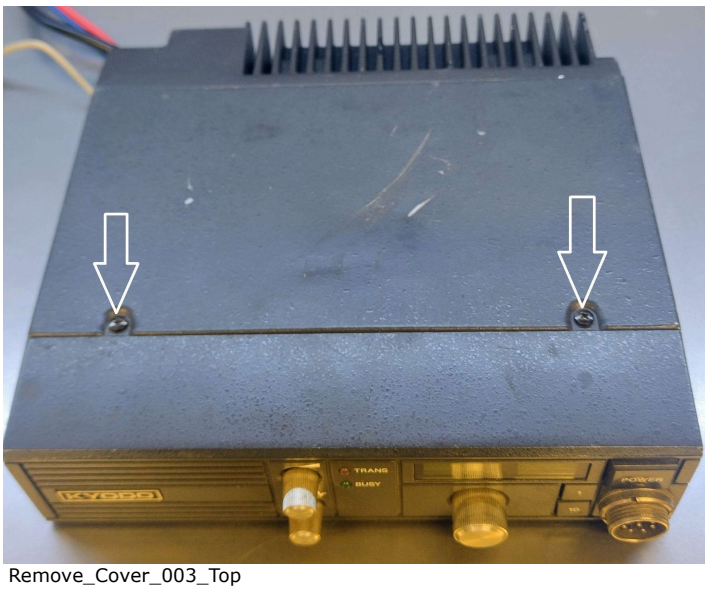
Remove_Cover_001_Bottom

Unscrew the two screws on the bottom of the chassis and remove the cover plate.



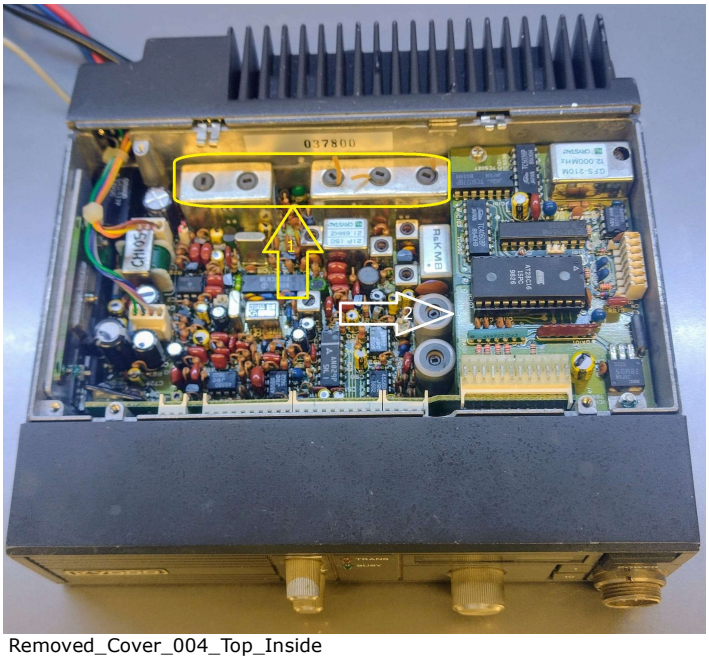
Removed_Cover_002_Bottom_Inside

The canned part with the oscillators is clearly visible.



Remove_Cover_003_Top

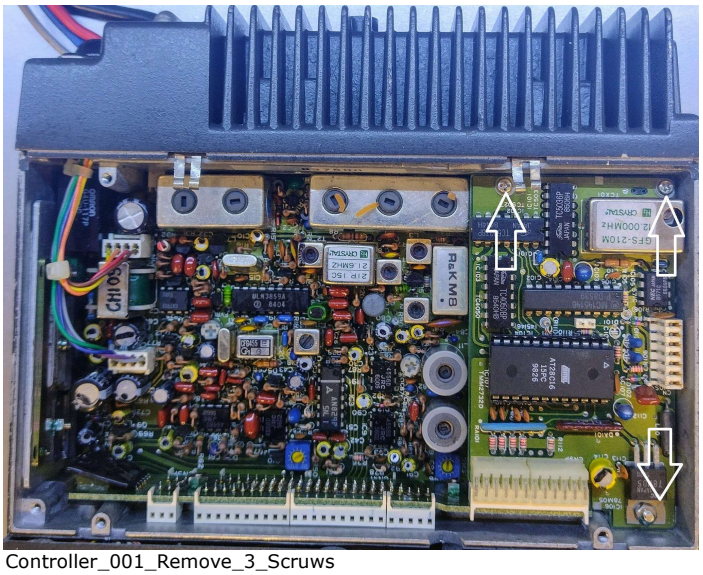
Unscrew the two screws at the top of the chassis and remove the cover plate.



Removed_Cover_004_Top_Inside

The receiving circuits (1) and the PLL print (2) are clearly visible.

2. Expanding the PLL print

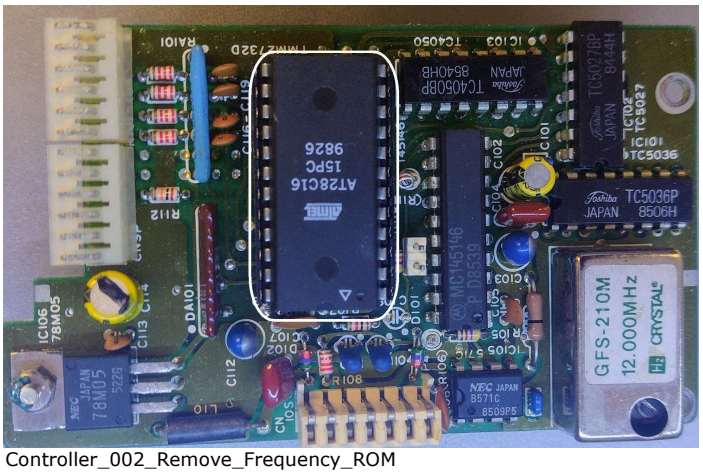


Controller_001_Remove_3_Scruws

Remove the three indicated screws from the PLL board.

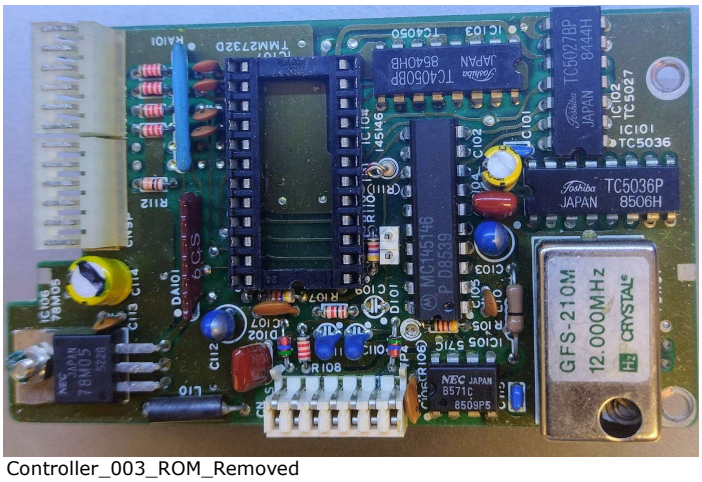
Note:
Depending on the PLL board version, the bottom screw may not be present (as shown in this image).

Carefully lift the PLL board out of the chassis.



Controller_002_Remove_Frequency_ROM

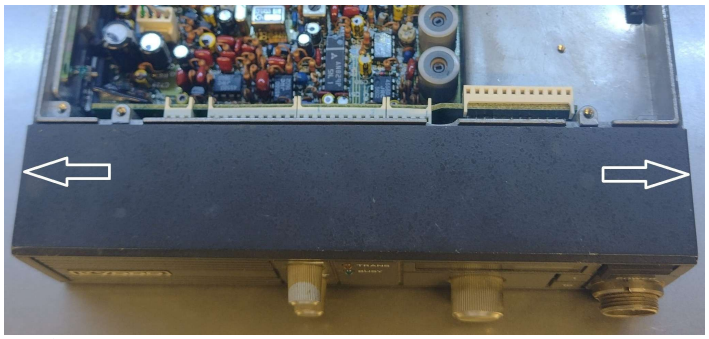
Remove the indicated ROM from the IC socket.



Controller_003_ROM_Removed

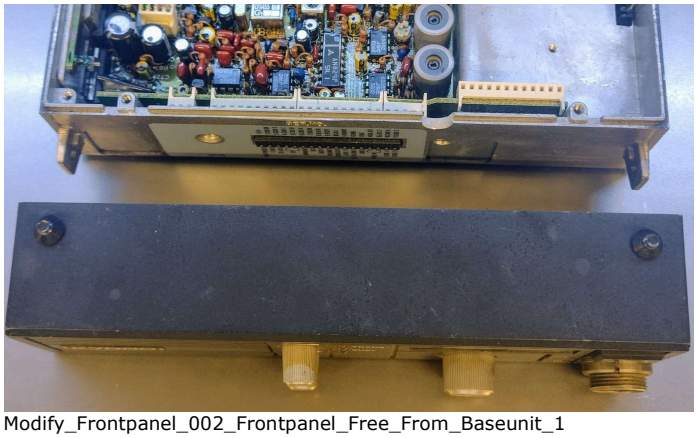
Set the PLL print aside.

3. Removing the front



Modify_Frontpanel_001_Remove_Side_Scuws_1

Unscrew the two screws on the side of the front.



Modify_Frontpanel_002_Frontpanel_Free_From_Baseunit_1

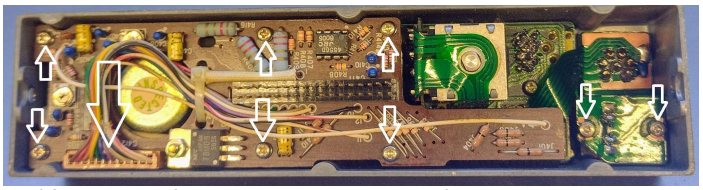
The front is easily removable from the chassis.

Modify_Frontpanel_003_Remove_Knops_Microphonering_Powerbutton

<u>Tip:</u>
Use WD-40 if the screws on the buttons and the mounting ring of the microphone chassis are very tight.

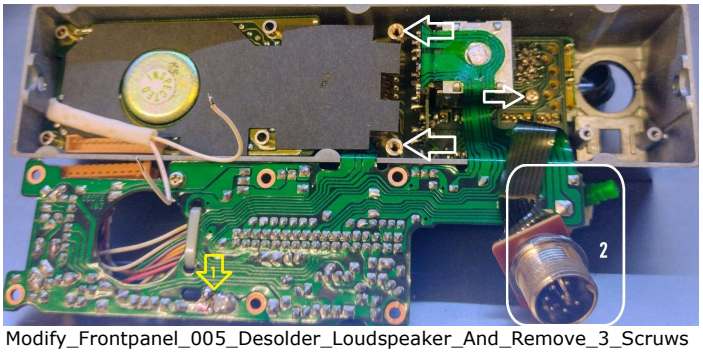
Remove the buttons, the mounting ring of the microphone chassis, and the on/off switch cover.

4. Removing the PCBs from the front



Modify_Frontpanel_004_Remove_Connect_And_Scruws

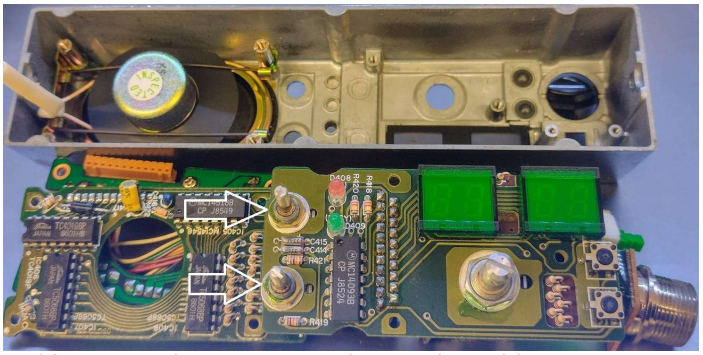
Disconnect the connector from the center PCB.
Remove all indicated screws.



Modify_Frontpanel_005_Desolder_Loudspeaker_And_Remove_3_Scruws

Mark one speaker wire and its corresponding solder pad. This will maintain the correct phase for the speaker. Desolder the speaker wires.
Carefully lift the exposed PCB, the microphone chassis, and the on/off switch from the front panel. Be careful with the flexiboard.

Remove the indicated standoffs and screws. Remove the black paper. Remove the PCBs from the front panel.



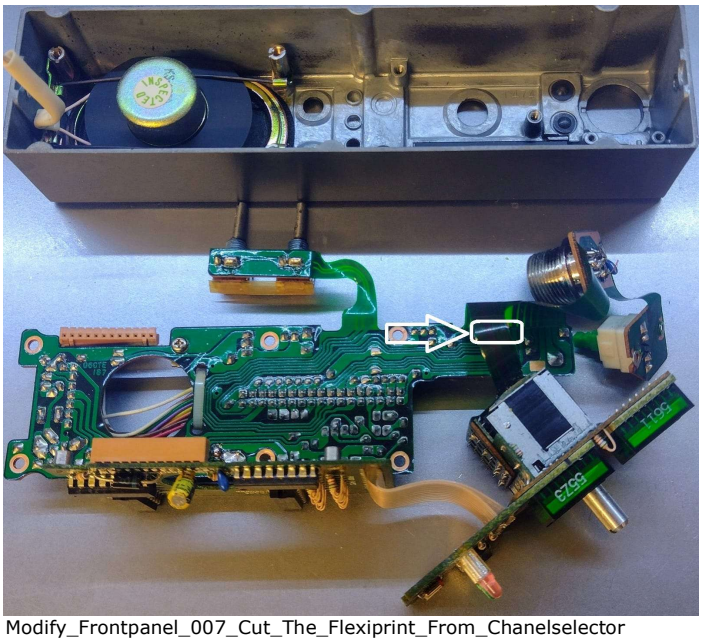
Modify_Frontpanel_006_Remove_Volume_And_Squelch_Potmeters

Tip:
WD40 may also be necessary here.

Loosen the two nuts from the potentiometer.

Note:
The potentiometers are not connected to a flexiboard. This can tear very easily.

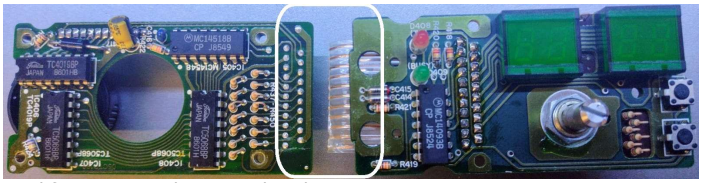
Carefully remove the potentiometers from the circuit board.



Modify_Frontpanel_007_Cut_The_Flexiprint_From_Chanelselector

Set the potentiometers aside. Make sure the flexiboard isn't kinked.

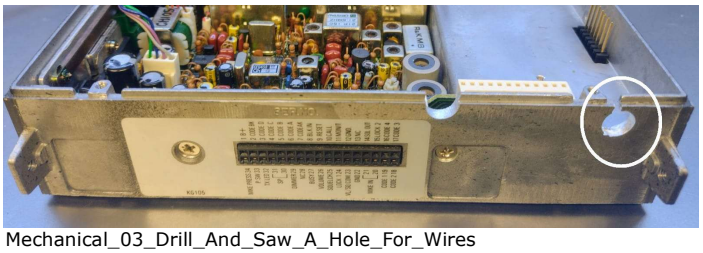
Cut the flexiboard loose from the channel selector.



Modify_Frontpanel_008_Split_The_2_PCBs

As shown, disconnect the channel selector PCB from the controller PCB.

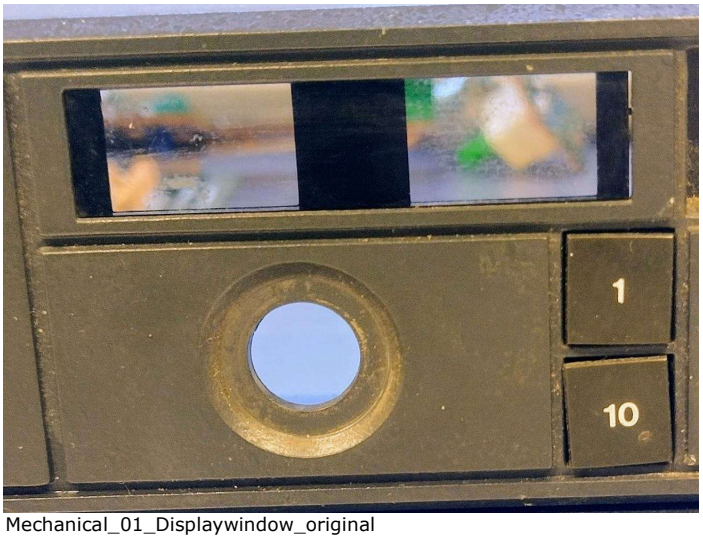
5. Drill a hole for the piggyback wiring and clear the display window of paint



Mechanical_03_Drill_And_Saw_A_Hole_For_Wires

Drill a hole approximately 6 mm wide as shown in the image. Drill right next to the tap for the lid and not too far below the edge.

Then make a saw cut wide enough to allow the piggyback wire to pass through.



Mechanical_01_Displaywindow_original

With light pressure, the display screen can be removed from the front. It's secured with relatively soft adhesive.

Remove any adhesive residue from the inside of the front and the plexiglass window.

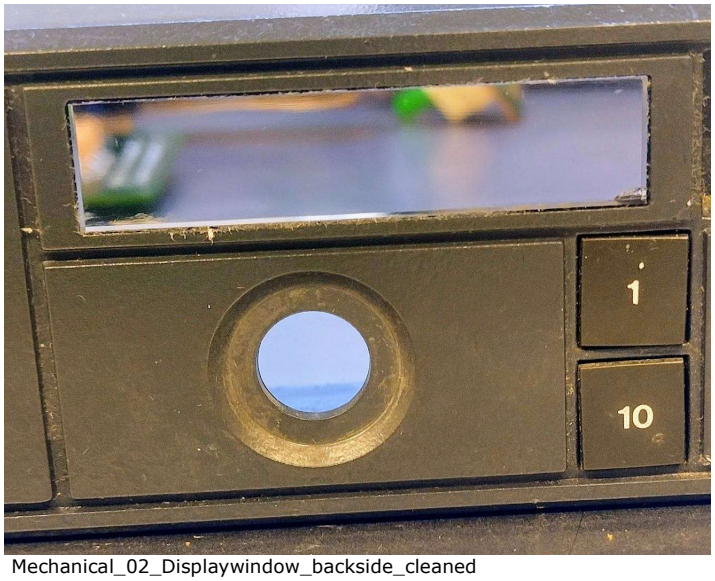
Mechanical_04_Sand_The_Displaywindow

The painted print on the window is easily removed with fine-grained waterproof sandpaper, such as P3000 sandpaper.

Once the print is removed, the window will be slightly dull.

Mechanical_05_Polish_The_Displaywindow

After sanding away the paint, the window can be made clear again with a polishing agent.



Mechanical_02_Displaywindow_backside_cleaned

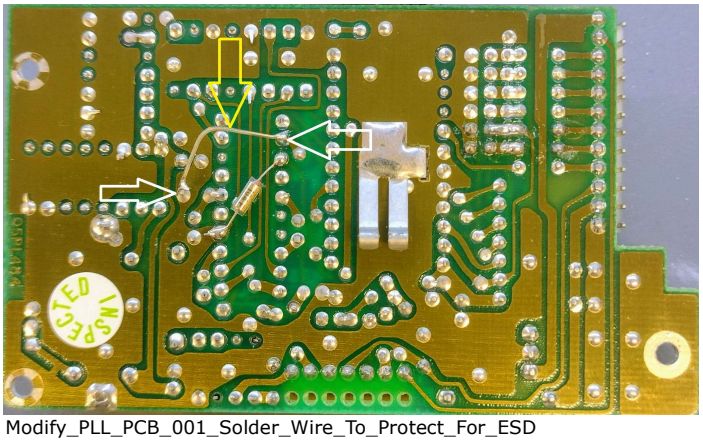
Caution:
DO NOT use 10-second glue. This will severely damage the plastic.

Then glue the window back into the front.

Clean the inside of the window as thoroughly as possible. You won't be able to access it after installing the new electronics.

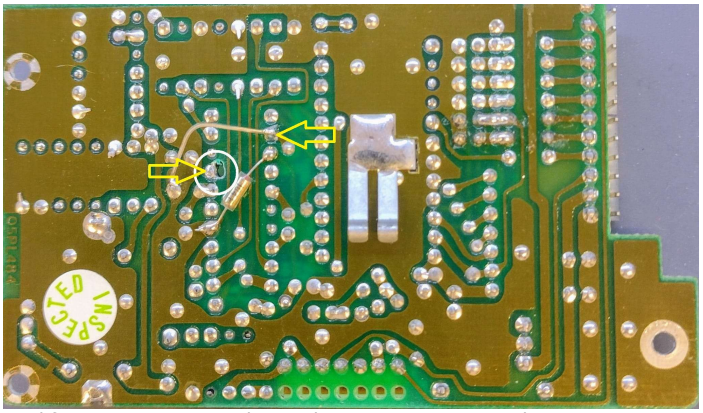
There's still plenty to do to allow the glue to cure properly.

6. PLL print adjustments



Modify_PLL_PCB_001_Solder_Wire_To_Protect_For_ESD

The PLL IC is somewhat sensitive to ESD (Electrostatic Discharge). To prevent damage from this, a wire is soldered to ground between the indicated points.

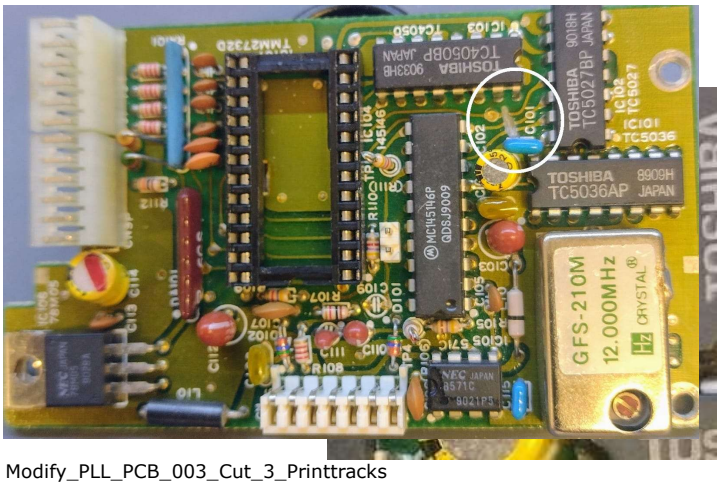


Modify_PLL_PCB_002_Dril_A_Hole_To_Cut_A_Printtrack

A printed circuit board trace runs on the component side from pin 7 to pin 12. To modify the PLL board, the trace is cut through.

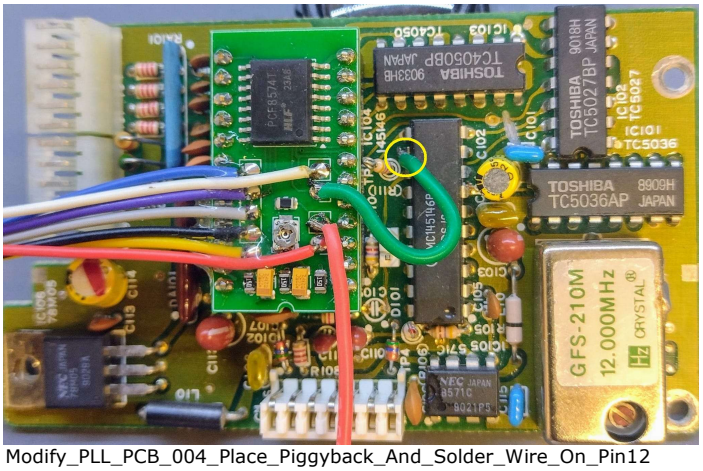
Use a PCB drill to drill a hole as shown in the image. Drill just wide enough to penetrate the board. If necessary, carefully use the PCB drill as a cutter.

Measure at the indicated points whether the printed circuit board trace is interrupted. This will be a few Mohms.



Modify_PLL_PCB_003_Cut_3_Printtracks

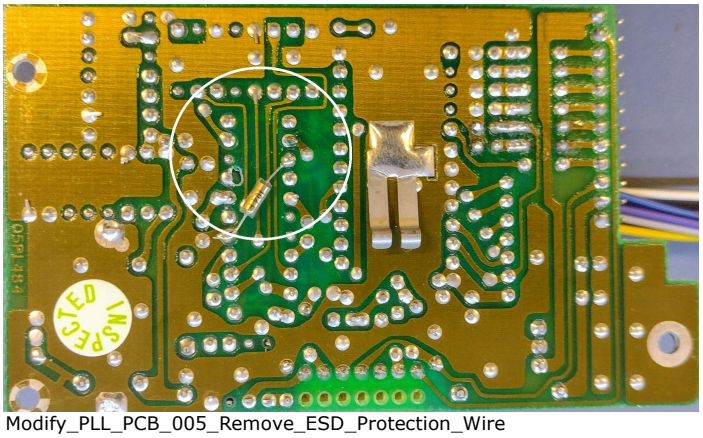
Mill or cut the 3 indicated print tracks with a print drill.



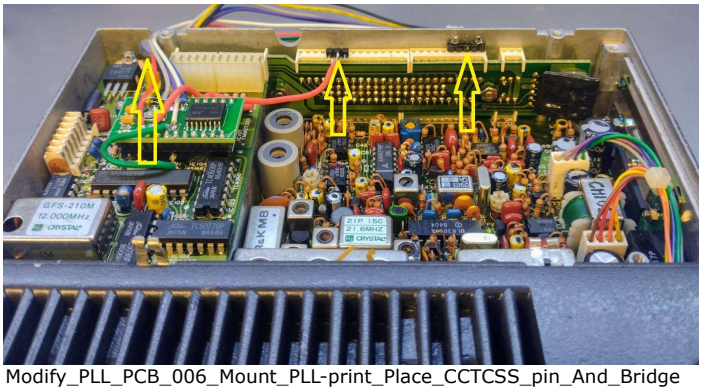
Modify_PLL_PCB_004_Place_Piggyback_And_Solder_Wire_On_Pin12

Place the piggyback on the IC socket where the frequency ROM was previously located. Push the piggyback into the IC socket at the short edges. Do not press too hard on the IC itself.

Solder the short wire to pin 12 of the PLL IC..


Modify_PLL_PCB_005_Remove_ESD_Protection_Wire

Finally, remove the ESD protection wire from the bottom of the PCB.

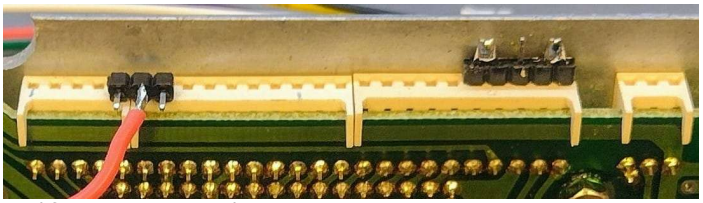

Modify_PLL_PCB_006_Mount_PLL-print_Place_CCTCSS_pin_And_Bridge

Place the PLL board back in the chassis and screw it back in place.

Feed the piggyback wiring through the hole you made earlier in the chassis.

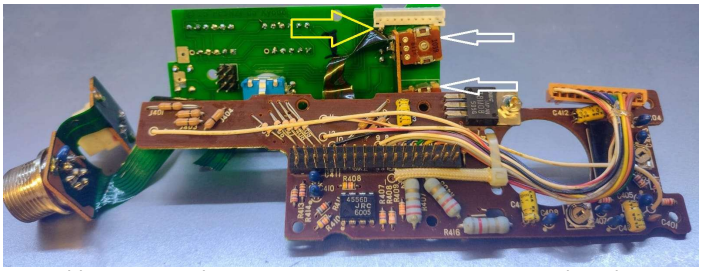
Connect the long wire with a PCB pin to the 6th hole in the expansion socket.

Place the jumpers in the expansion socket as shown..


Modify_PLL_PCB_007_CloseUp_Connect_Pins

For clarity, a close-up of connections on the expansion bus.

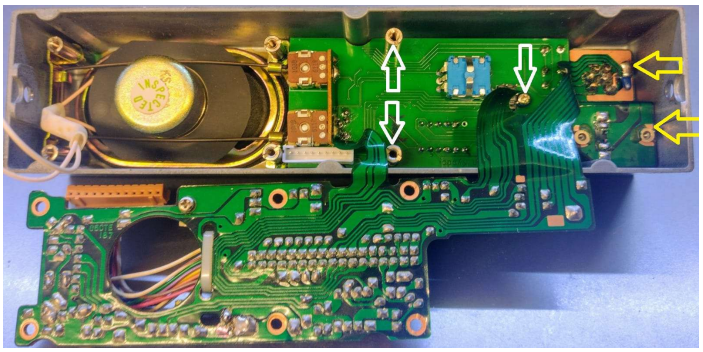
7. Mounting processor PCB



Assemble_Frontpanel_001_Mount_Potmeters_To_Processorboard

Note:
Make sure the flexiboard runs along the white connector before attaching the potentiometers. The flexiboard can easily become damaged at this point.

Mount the potentiometer on the processor PCB as shown. The PCB has a recess for the potentiometer's tabs. Make sure the tabs fit into the recess.



Assemble_Frontpanel_002_Processorboard_In_Frontpanel

Place the processor PCB in the front panel. Secure the PCB with the standoffs and the small screw.

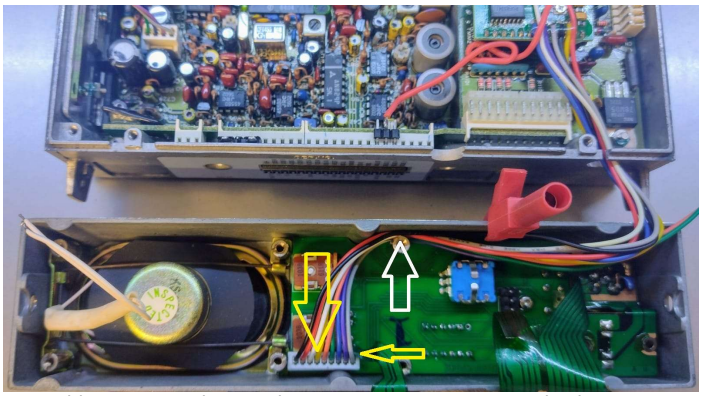
Replace the microphone chassis and the on/off switch.

Assemble_Frontpanel_004_Check_LEDs_Potmeters_And_Buttons

Check that the Tx and Rx LEDs are in the correct position on the front panel.

Check whether buttons 1 and 10 make a distinct click when pressed.

If there isn't a distinct click, place a plastic washer under the PCB near the small screw.

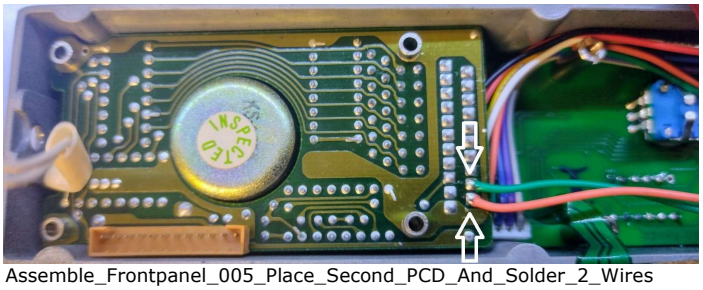


Assemble_Frontpanel_003_Place_Connector_From_Piggyback

Install the piggyback connector. Be careful not to damage the flexiboard for the potentiometers.

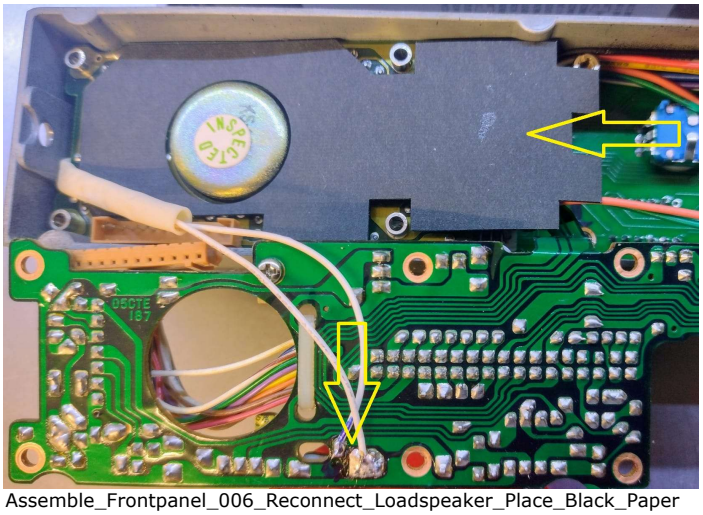
As shown, route the piggyback wiring along the tensioning bushing. For neatness, note the order of the wires coming out of the connector. Two wires remain that do not go to the piggyback. These are for the intermediate board.

Secure the wires with a clamp. They will remain in place when the intermediate board is installed.


Assemble_Frontpanel_005_Place_Second_PCD_And_Solder_2_Wires

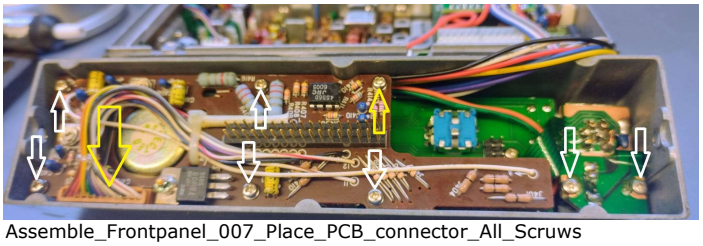
Replace the intermediate board. Solder the two remaining wires to the intermediate board as shown.

These are the wires for the Tx and Rx LEDs.


Assemble_Frontpanel_006_Reconnect_Loadspeaker_Place_Black_Paper

Solder the speaker wires. Note the marked wire and the marked solder pad.

Replace the black paper.


Assemble_Frontpanel_007_Place_PCB_connector_All_Scruws

Replace the PCB. Be careful not to pinch the necessary wires between the PCB and the speaker.
Replace all the indicated screws in the front.

Insert the connector.

Assemble_Frontpanel_008_Mount_Microphoneplug_And_Powerbutton

Attach the microphone chassis and snap the on/off switch cover back on.
Secure the front panel to the chassis with the screws.

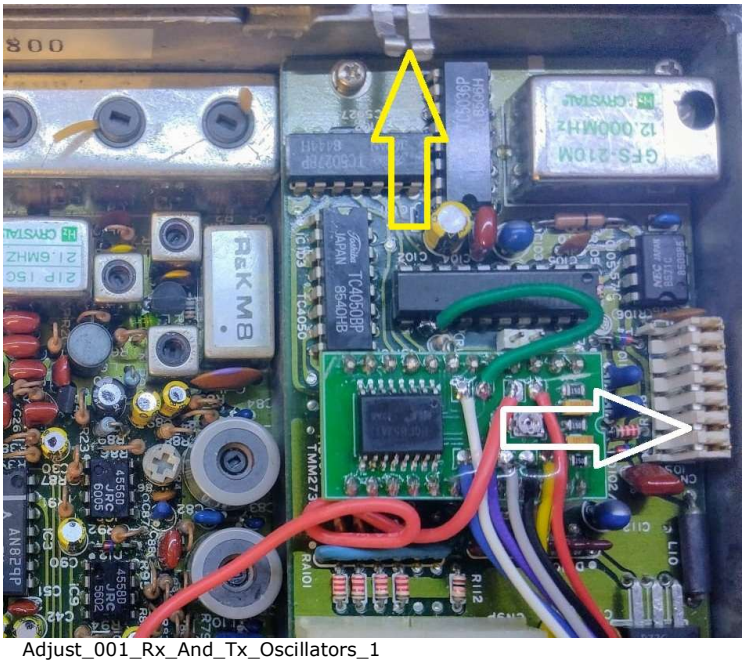
Install the knobs. Make sure the frequency knob has enough space for the pushbutton for the grid setting. Connect the microphone.

Connect the Kyodo to a power supply.

8. Adjusting the Rx and Tx oscillators, the receive filters and the CTCSS

Connect a dummy load to the antenna output.

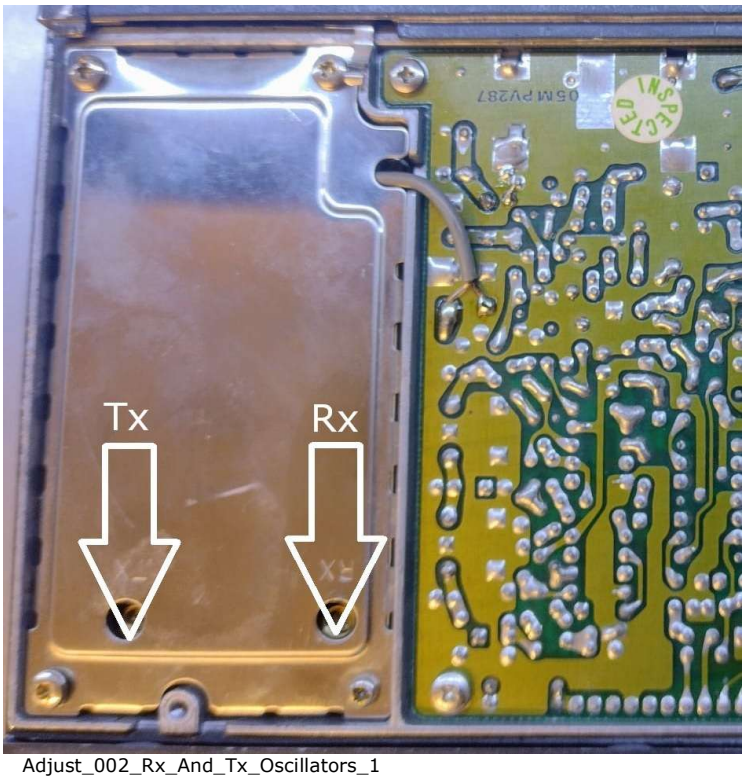
Set the Kyodo on the center frequency of the band in simplex mode. (Rx and Tx same frequency).



Adjust_001_Rx_And_Tx_Oscillators_1

Connect a high-impedance analog voltmeter or oscilloscope to the indicated points.

GND is the yellow arrow, and the white arrow is the PLL voltage.



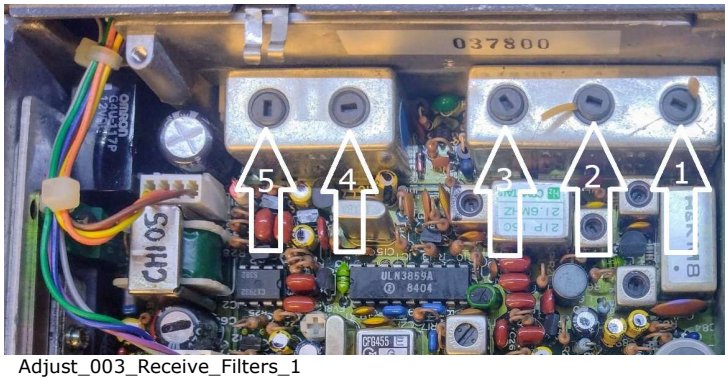
Adjust_002_Rx_And_Tx_Oscillators_1

Set the frequency to 145 MHz, which is the center of the band.

Adjust the Rx and Tx PLL voltages to +/- 3 V.

Be sure to press the PTT to adjust the Tx voltage.

Then check the PLL voltage between the frequencies of 144 MHz and 146 MHz to ensure there is sufficient control voltage between 1 V (144 MHz) and 5 V (146 MHz).

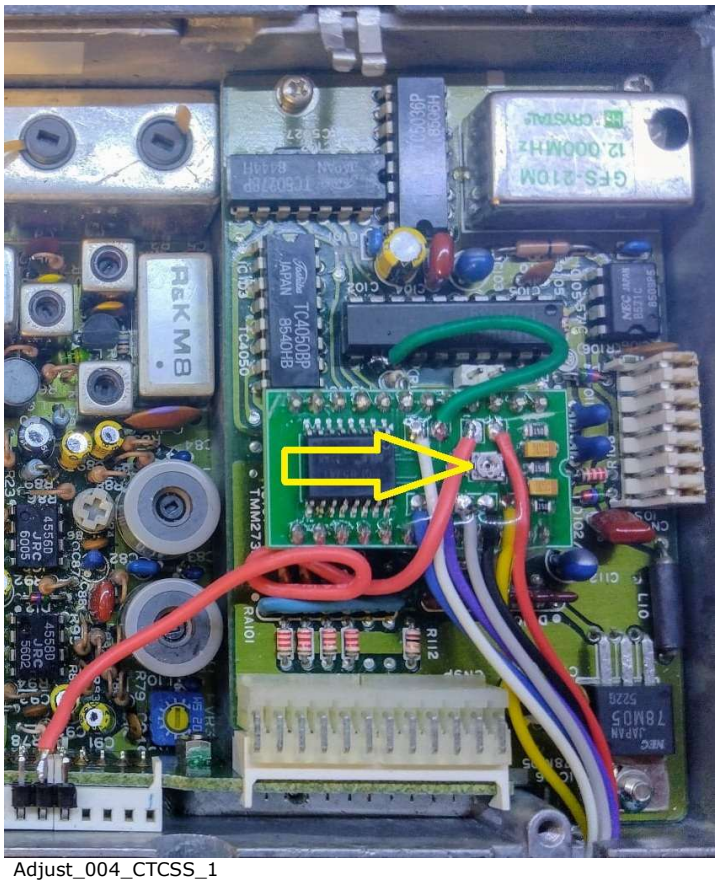


Adjust_003_Receive_Filters_1

Set the receiver to 145 MHz. The Kyodo does not offer the option of measuring signal strength.

Use a variable signal source and adjust the input circuits in the order 1, 2, 3, 4, and 5 for minimal noise.

Do this until the circuits peak at minimal noise.



Adjust_004_CTCSS_1

Set the transmitter to repeater mode and set the CTCSS for this repeater.

Adjust the appropriate potentiometer so that the repeater just opens on the CTCSS signal..

9. Finally, the use of the functions

1. Set frequency = turn the knob.

2. Set grid = Press the frequency knob. You can return to the repeater by pressing PTT or the bottom right pushbutton.

3. Set CTCSS = press [1]. You can return to the repeater by pressing PTT or the bottom right pushbutton. You are then immediately in repeater mode. This is indicated by the blue TX and RX LEDs and the frequency in the display.

4. In repeater mode (blue LEDs), press the top left pushbutton = listen to the repeater input.

5. Press [10] to switch between repeater mode and simplex mode.

====> That’s All Fooks, many QSO’s <====