ICOM M710 MMI for PC-ALE with ICOM Tuner CONTROL and BYPASS, plus ICOM AT-130 Tuner Upgrade

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REV 2
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REV 2 Changes
Added statement to turn S1 OFF in the AT-130 mod steps
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PURPOSE

1) **Upgrade a ICOM AT-130 Antenna Tuner to a AT-140**

   - Enable Tuner Bypass feature for adding auto-tune and bypass control with PC-ALE and ICOM M710 Marine Radio using the attached MMI files.

2) **Custom MMI for ICOM M710 Marine Radio and ICOM AT-130/140/AH-3 Tuners**

   - Enables Tuner Bypass in receive/scan mode with ICOM AT-140, AH-3 and modified AT-130 Antenna Tuners
   - Enables Auto-Tune functions on transmit frequencies
   - Sets radio parameters
   - Tested with PC-ALE on ICOM M710 Marine Radio
   - Tested with Modified AT-130 (Upgraded to AT-140)
   - Likely will also work with other ICOM Marine Radios such as M710RT, M801, ICF7000 with proper addressing (Address 1) and ICOM AT-140/AH-3 Tuners

UPGRADING ICOM AT-130 ANTENNA TUNER TO AT-140 (Enable Tuner Bypass)

The procedure involves clearing memory and adding a jumper.
Upon Re-booting the Tuner will have the Tuner Bypass feature as the AT-140 and AH-3.

- Open the case (nuts are not captive, be careful)
- Look in the area by the CPU shield box and white connector J8, find jumper J5 next to J8 (see picture)
- Remove J5 to clear the memory while you do the following, it will get replaced later
- Carefully remove the metal cover shield from the CPU area (sharp edges! carefully pry it up)

- Look for jumper W152 in place by the CPU (May look like a white resistor)
- Next to W152 is a spot for W153, add a jumper wire (see picture)
- Tack the jumper wire on top of the board from resistor pack to W152, saves taking the board out of the case
- Replace the metal CPU cover
- Replace J5
- Turn S1 OFF (Switch is next to the control cable input)
- Replace outer plastic cover
- Power up....You now have a AT-140 Tuner with Bypass Feature

CUSTOM MMI FILES and SETUP to allow ICOM M710 to control and bypass ICOM AT-130/140/AH-3 Tuner

(Assuming you have a working PC-ALE M710 system, additional changes shown only)

The attached MMI .MAC files for the ICOM M710 Marine Radio need to go into your PCALE/MMI-RADIO/ directory.
These will allow an ICOM M710 (and likely other ICOM Marine Radios stated above) when addressed properly (Address 1), to place the tuner in Bypass during ALE receive/scan operations and auto-tune to each transmit frequency as needed for sounding and contacts.

Other settings need to be made as well on the radio and within PC-ALE, as follows...

MAKE THESE SETTINGS CHANGES ON THE ICOM M710 RADIO

- Hold [FUNC] and [1] and power up the M710 (this will enter setup menu)
- Use [GROUP] and [CHANNEL} controls to select "AH-3" Tuner, Auto-Tune "ON", Remote ID "01", Remote Interface "D-SUB"

Note: The ICOM PIN remote interface did not work fully for me, but the D-SUB interface works fine.
Connected to a Keyspan USA-19HS USB to Serial Converter.
Data and ground to radio connected only.
Pinout show at end of document.

MAKE THESE CHANGES IN PC-ALE

- Place all the .MAC files in the PCALE/MMI-RADIO/ folder
- In PC-ALE Configuration Menu / MIL-STD-188-141 OPTIONS / Radio Type Select "MMI-RADIO"
- In PC-ALE Configuration Menu / MIL-STD-188-141 OPTIONS / Radio Port Select "4800" Baud, "1" Stop Bit, "8" Data Bits, "N" Parity, "01" Radio Address, "uncheck" Split, Click "OK"

- In PC-ALE Configuration Menu / MIL-STD-188-141 OPTIONS / Parameters Set Tune Words to "4", Click "OK"
- In PC-ALE Configuration Menu / MIL-STD-188-141 OPTIONS / Enable/Disable Options Select "Use CAT for PTT" and set the PTT Comm Port Number same as CAT, Click "OK"
- Power UP the Radio and Restart PC-ALE
- If this is the initial test, or if it sat more than a week unpowered, train the tuner as stated below in ABOUT THE AT-130 TUNER
- Don’t correct the spelling of the MMI_RADIO_PRECONFIUGRATION.MAC file, that's a bug, PC-ALE is looking for this mis-spelled filename

ICOM M710 MMI INTERFACE FUNCTIONALITY

INITIALIZAION

Power UP radio BEFORE starting PC-ALE
Upon PC-ALE Startup with the new MMI it will do the following:

- Place the Radio into REMOTE Mode (REMOTE will appear on Radio Display)
- Set USB mode (see USB next to frequency)
- Set AGC OFF (see AGC with an X thru it)
- Set Noise Blanker OFF (see no NB indication)
- Set Squelch OFF (see no Squelch indication)
- Set TX level 3 HIGH POWER
- Set RF Gain to 9 MAX
- Bypass the TUNER

MANUAL SCAN START

Upon manually starting SCAN it will do the following (makes sure its set correctly if manual changes were made):

- Set USB mode
- Set AGC OFF
- Set Noise Blanker OFF
- Set Squelch OFF
- Set RF Gain to 9 MAX
- Bypass the TUNER
- Start Scanning

SOUNDING AND DATA

Upon stopping on a channel to SOUND or send DATA it will do the following:

- Drop out of Bypass
- Start Tuning
- Delay before transmit - to settle (you can adjust this, more later)
- PTT - Transmit as needed
- When done transmitting it releases PTT and Bypasses the TUNER for receive/scan operation
- Continues Scanning if it was SOUNDING

NOTES ON OPERATION

Manual Radio Commands

- [FUNC] then [TUNE] puts tuner into bypass
- [TUNE] will release bypass and force a antenna tune sequence, even if in REMOTE mode (eg: training)
- [FUNC] then [RESET] escapes Remote mode. Radio will re-enter REMOTE mode when PC-ALE talks to it
- CAT PTT Mutes the MIC, Manual MIC-PTT works (Mic Un-Muted) in REMOTE mode as long as it's not commanded CAT PTT
- Manual MIC-PTT will start a TUNE sequence if needed
- Default ICOM remote control port is 4800 N81, M710 default address 1

ABOUT THE AT-130 TUNER, MEMORY and TRAINING

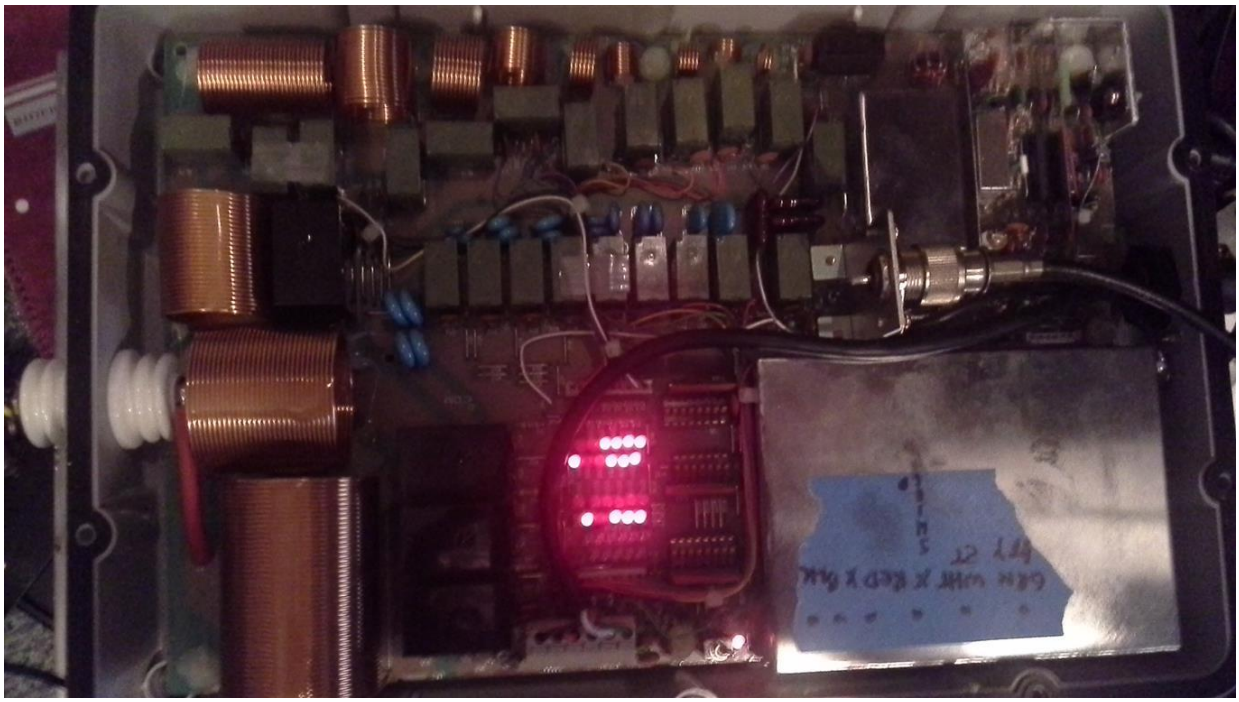
- User Guide says the settings memory capacitor is good for about a week
- If it sits un-powered for longer than that you should re-train it before running PC-ALE
- Re-Train especially if you changed the "Tune Words" in PC-ALE Configuration (init setting 4) and DELAY in the transmit file to speed things up. MMI_RADIO_MIC_PTT_ON.MAC (init settings 1000 and 500)
- Default settings of "Tune Words" = 4 and the DELAY settings of 1000 and 500 are long enough to allow initial tuning to train up automatically, however...
- I suggest manually training the tuner by stepping through EVERY channel (using >) in PC-ALE and pressing [TUNE]on the radio
- Keep a reflected power meter in line so you can see if things go bonkers
- Once trained you can adjust "Tune Words" and DELAY in MMI_RADIO_MIC_PTT_ON.MAC to speed things up significantly
- The M710 tunes in reduced power mode (measured 30W during tune)

D-SUB REMOTE CONTROL INTERFACE - DB-9 Connector

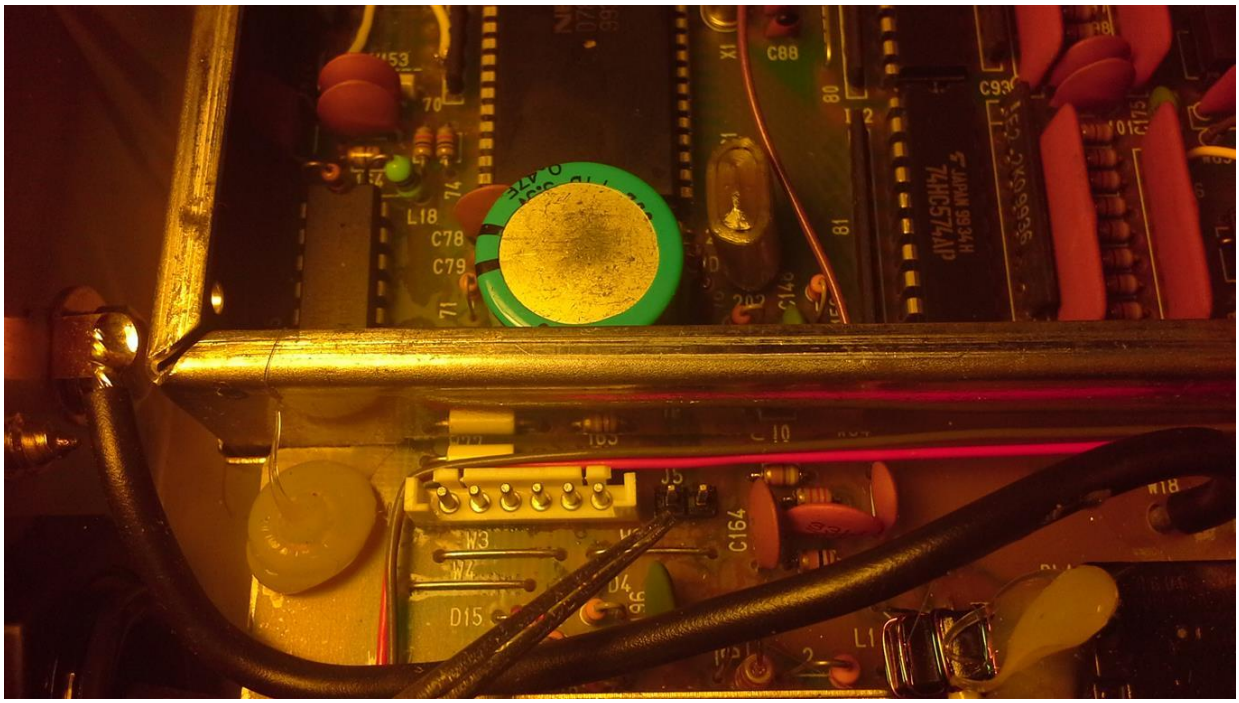
- Radio Pin 5 (NMEA+ Data Input)------TO------Computer DB-9 Serial Port Pin 3
- Radio Pin 6 (NMEA- Input GND)-------TO------Computer DB-9 Serial Port Pin 5
- There is Audio in and out and Data out available here also
- Radio Pin 1 MOD+ Input Impedance 600 Ohms, Approx 100 mV RMS
- Radio Pin 2 MOD- Gnd for MOD Input
- Radio Pin 3 AF+ Detector output Impedance 600 Ohms, 0.25 to 2.5V RMS
- Radio Pin 4 AF- Gnd for Detector output
- Radio Pin 7 NMEA+ Data output
- Radio Pin 8 NMEA- Data output Gnd
- Radio Pin 9 Digital Equipment Gnd

DISCLAIMERS (and all that)

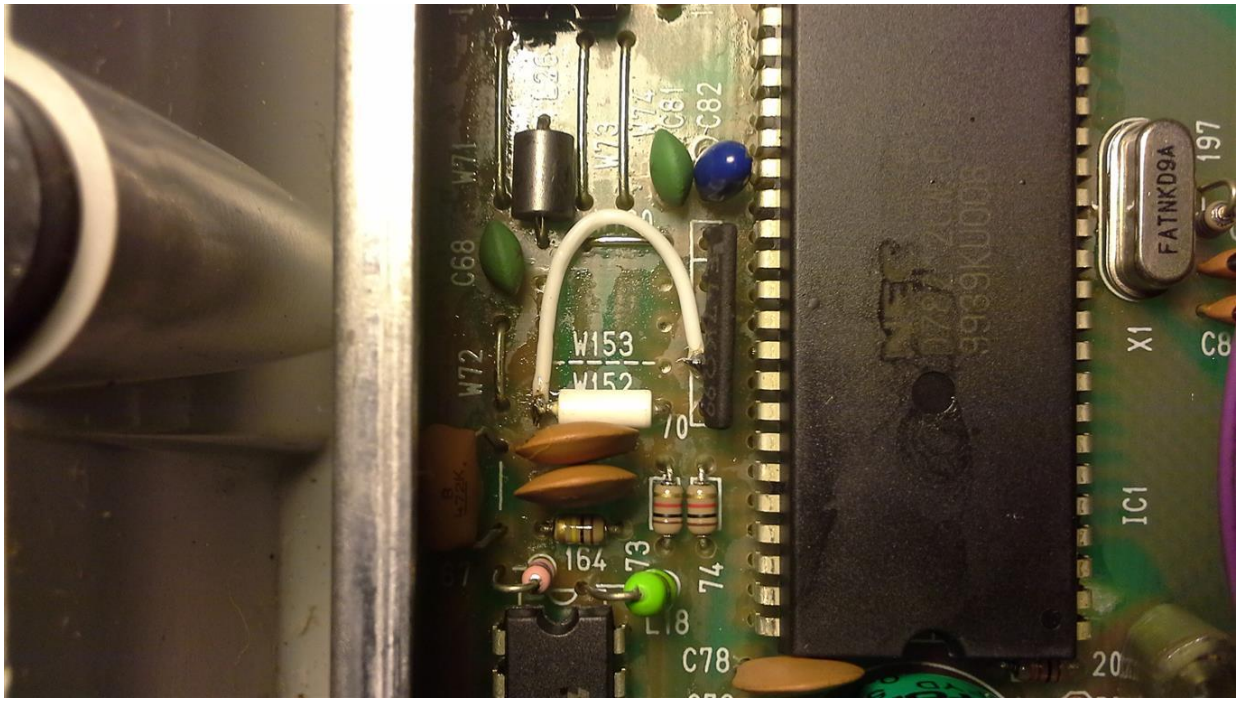
Use this information at your own risk. Warranties will be voided, fingers may get cut or burned, the smoke may be let out of the radio, tuner or computer. You know the drill. Be Careful. Your mileage may vary.



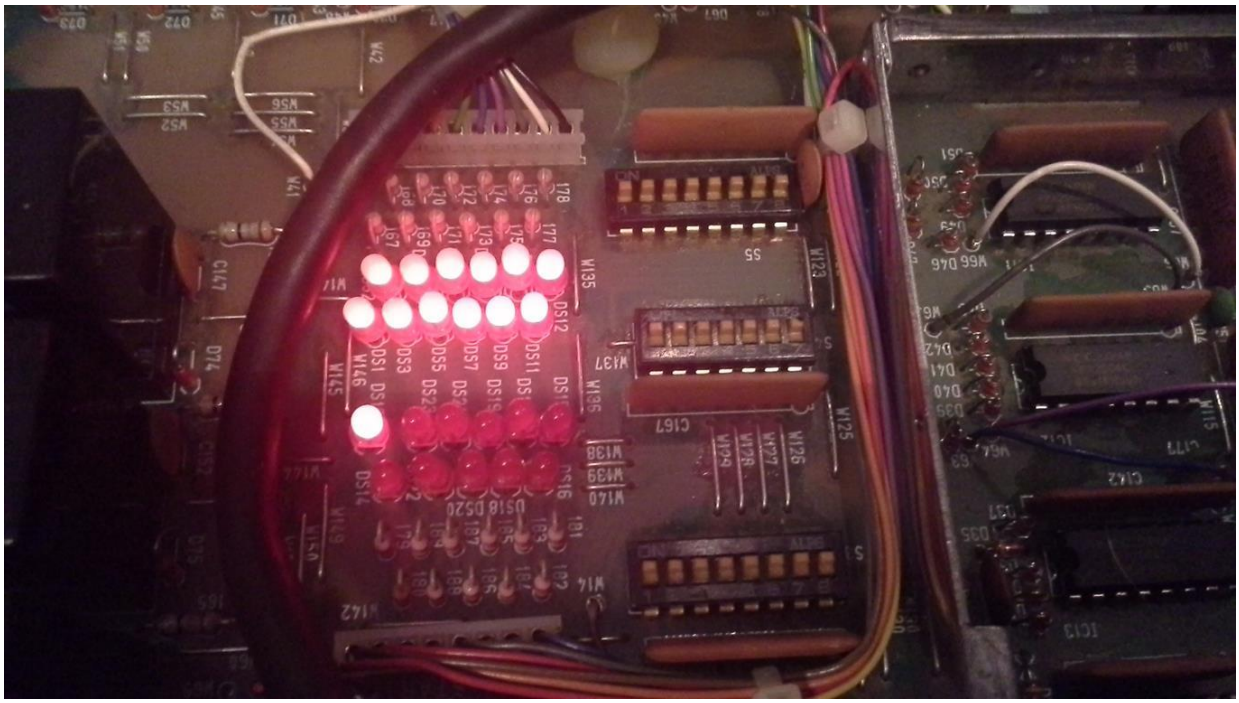
ICOM AT-130 Overview – Remove Silver Cover Bottom Right, S1 is next to Bottom Left Edge of Cover



ICOM AT-130 - Location of J5



ICOM AT-130 – W153 Jumper Installation



ICOM AT-130 – Internal Status LED's in Bypass Condition