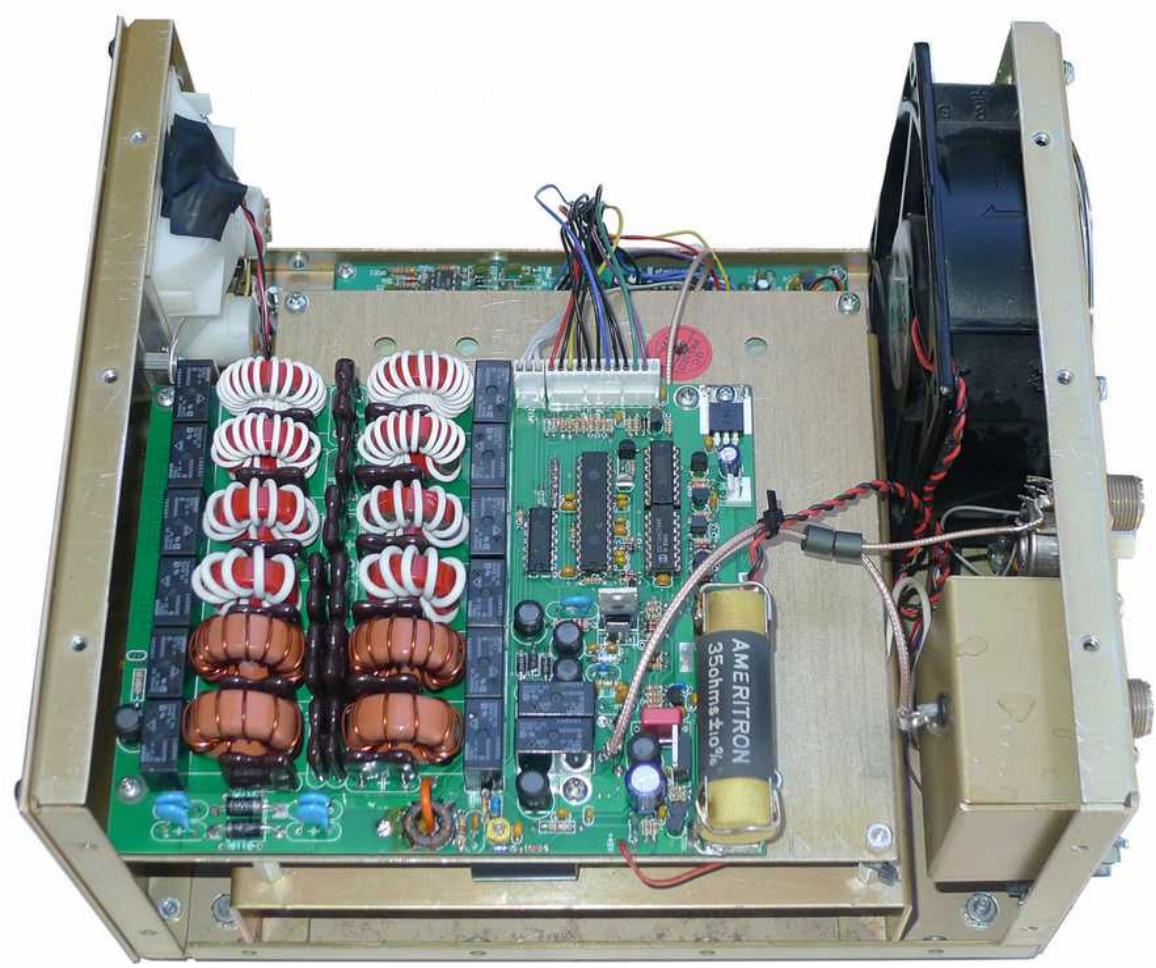
Ameritron ALS-600 Retrofit
ALS-600-LPF
Assembly Manual



FEATURES

- **Automatic band change based on TX frequency.**
- **PIN diode QSK RX/TX switch.**
- **Temperature controlled FAN for quiet operation.**
- **RS-232 serial port for LCD panel, PC control and firmware upgrade.**
- **Automatic fault recovery**

Introduction

ALS-600-LPF kit is a replacement for ALS600FB Output Filter board in Ameritron ALS600 amplifiers. Outputs low pass filter toroid inductors for 160M, 80M, 40M and 20M and all Mica capacitors will be reused. New toroid inductors for 15M and 10M bands are pre-installed on ALS-600-LPF. Optionally, a new FAN and temperature sensor can be installed. Reading the User Manual and using the RS-232 serial port can be a very helpful and powerful tool.

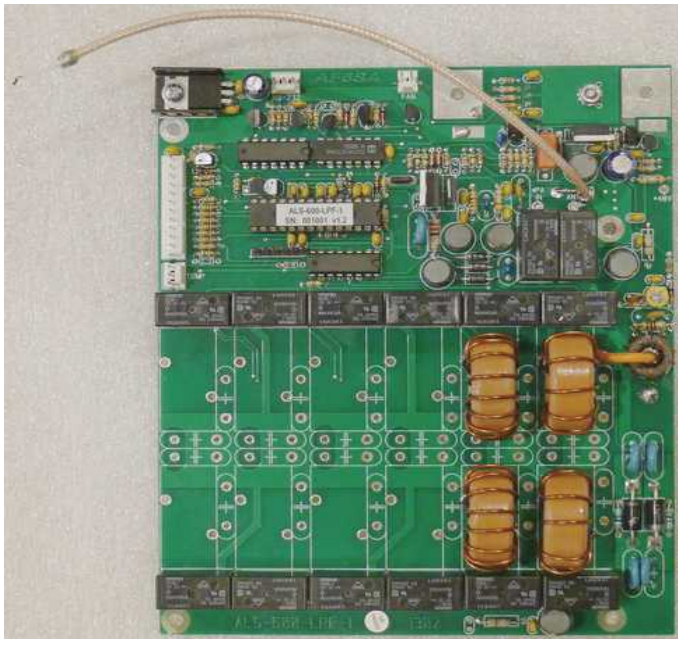
Before starting, measure and take a note about power input, power output and current draw on each band so they can be checked and compared after installing the new board. Cross-needle power indicators calibration will be not affected.

Tools needed

- #1 and #2 Philips screwdriver. To avoid damaging screws, using a power screwdriver is not recommended. Use the screwdriver that best fits the screw.
- Flat screw driver and pliers for removing rotary switch knob.
- Soldering iron 40W to 100W. Do not use acid-core solder.
- Vacuum pump will be helpful when de-soldering capacitors from the old board.
- LOCTITE Repair putty can be found in ACE / HomeDepot / Lowe's
- DMM for making resistance, continuity and voltage measurements.
- Dummy load 50 Ohm rated for 600W.
- Optional RS-232 NULL modem cable for PC connection.

Parts list

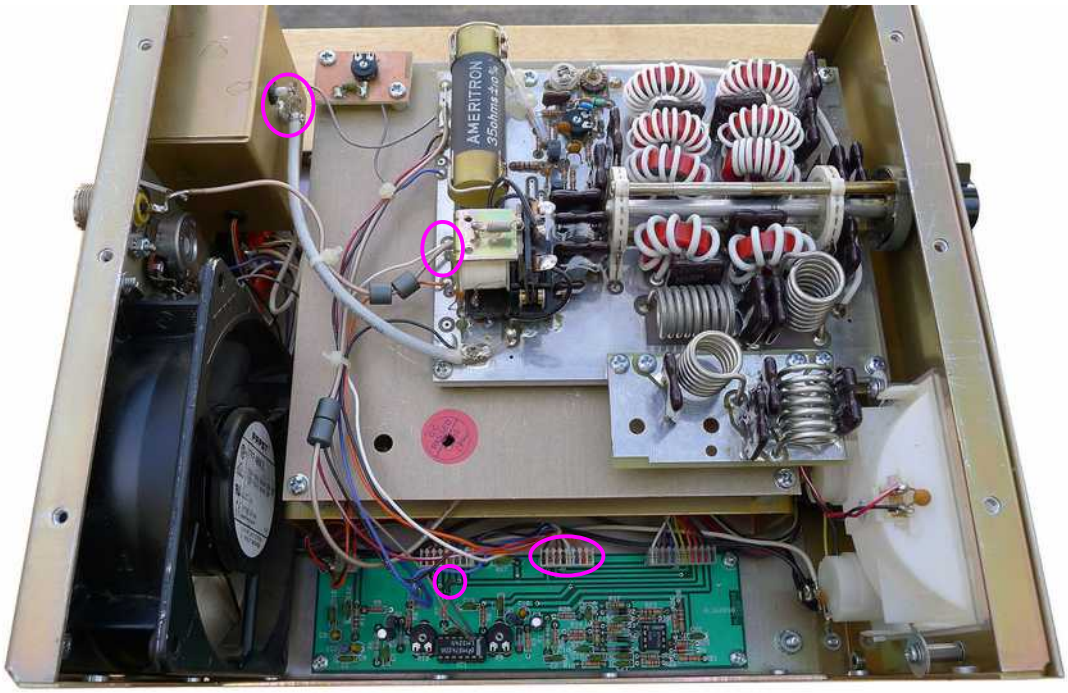
- ✔ 1pcs. ALS-600-LPF P.C.Board
- ✔ 1pcs. Wiring harness
- ✔ 2pcs. Molex connector pins
- ✔ 1pcs. Temperature sensor assembly
- ✔ 1pcs. RS-232 cable assembly
- ✔ 1pcs. Fan assembly (optional)



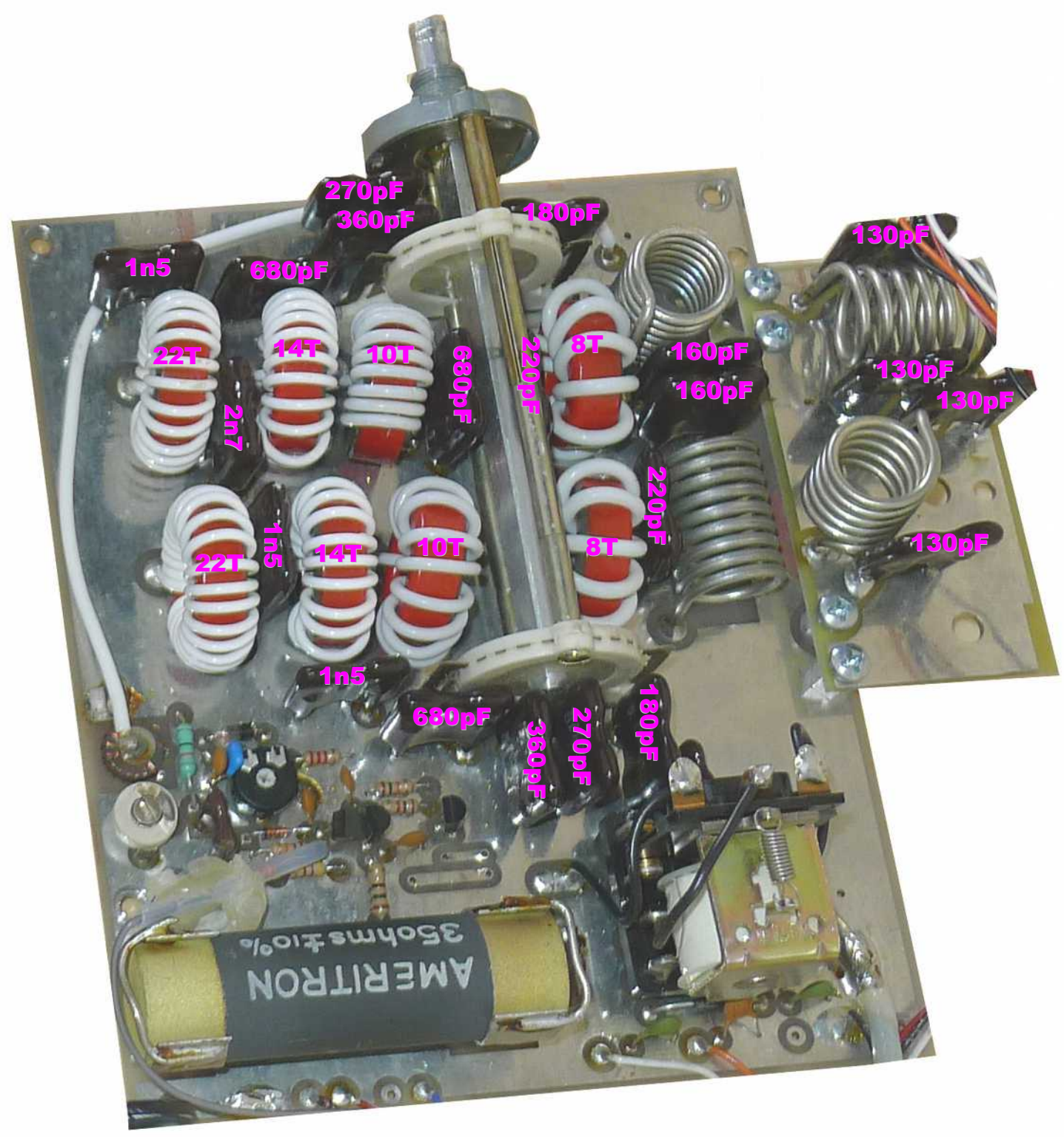
! WARNNING !
Dangerous Voltages Inside!
Disconnect from Main Power and wait at least 1 minute before working inside.
ESD sensitive electronics. Basic ESD protection required.

ALS-600 Disassembly

- Turn off amplifier and disconnect ALS-600PS from main power.
- Disconnect power cable from ALS-600PS.
- Disconnect all cables from ALS-600 back panel.
- Place ALS-600 on your bench and remove the top cover screws.

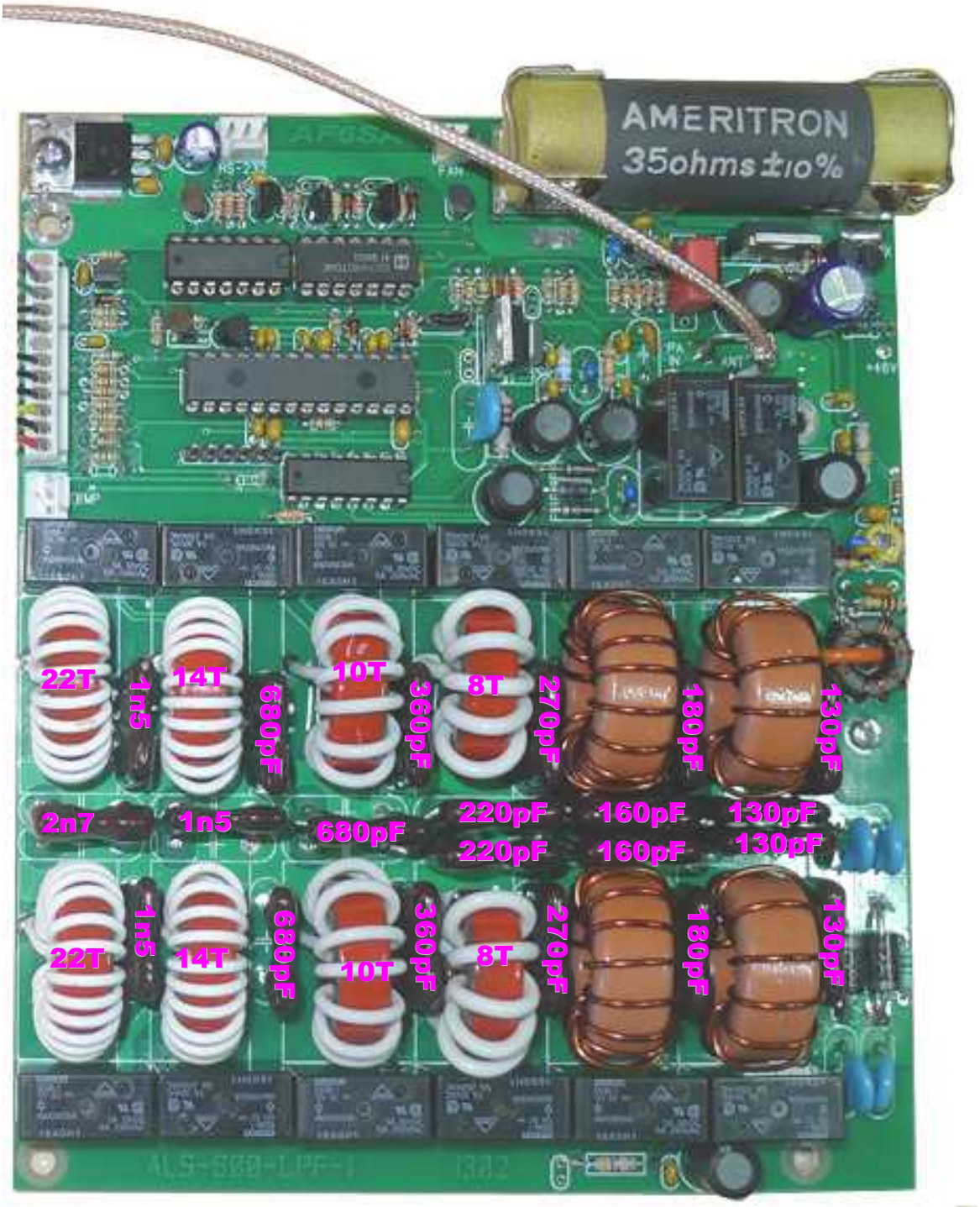


- Disconnect J5 (J105) connector.
- Cut blue wires coming from thermal switch near PC board and connector.
- Cut gray wire from ALC PC board.
- Desolder output (gray) coax cable from SWR detector.
- Desolder RF IN coax from PC board. Keep ferrite cores in place.
- Desolder PA module input coax from PC board. Keep ferrite cores in place.
- Desolder PA module output from filter board – the black and white wires soldered underneath.
- Remove rotary switch knob and nut.
- Remove two screws holding the small PC board whit trimmer.
- Remove screws holding the PC board and keep them.
- Pull the PC board toward back panel and remove it.



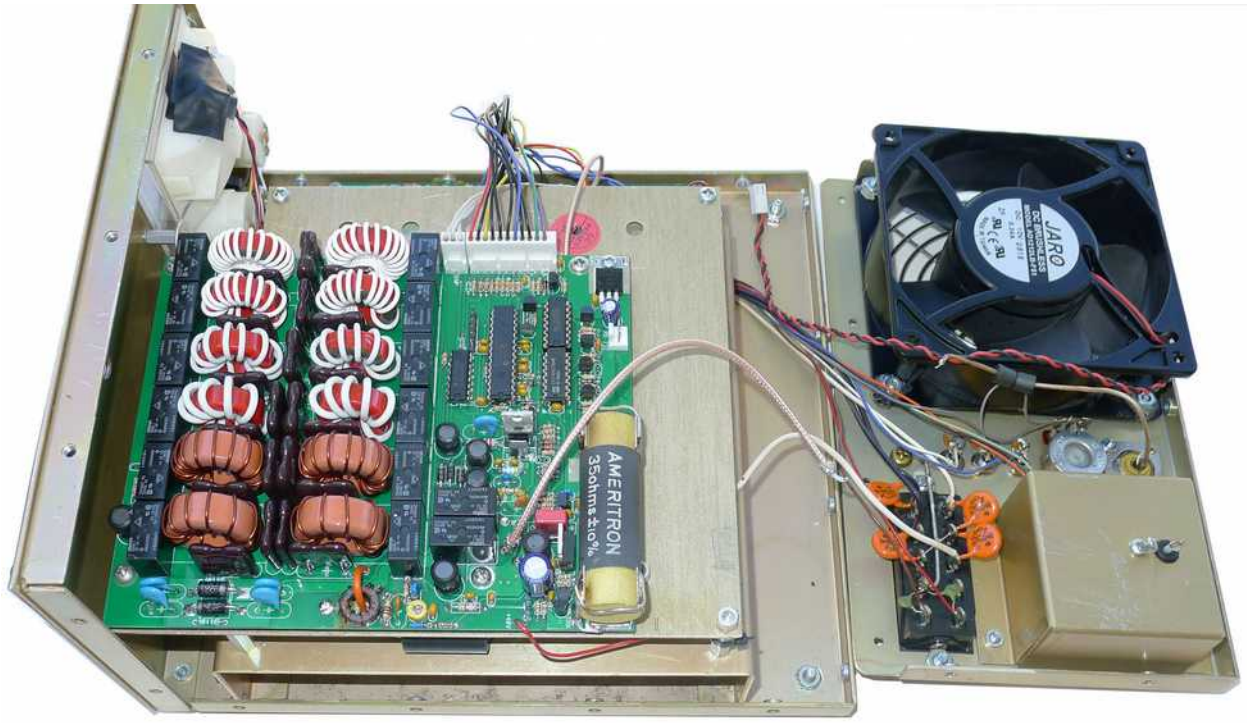
- Desolder toroid inductors from old board. Heat one side first and wiggle it.
- Desolder marked capacitors form old board. Use vacuum pump.
- Remove 35 Ohm attenuator resistor and the keep nuts and bolts.

Low-pass Filters Soldering

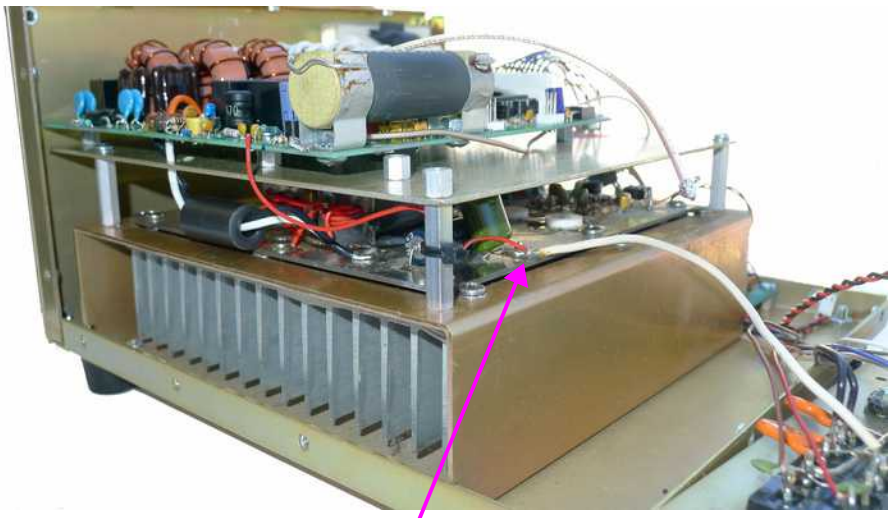


- Solder toroid inductors first as marked.
- Solder capacitors as marked.
- Install 35 Ohm attenuator resistor with original nuts and bolts.

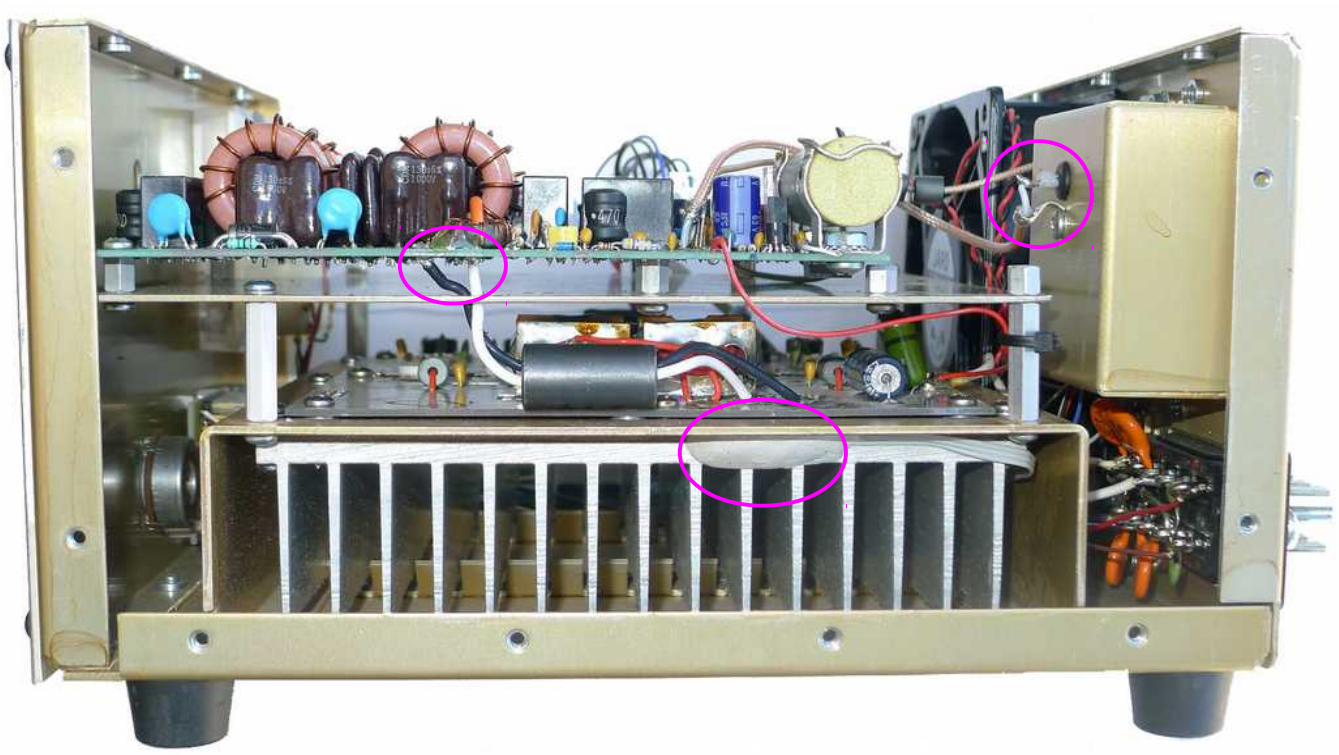
Installing ALS-600-LPF Board



- Remove 4pcs screws that hold the back panel.
- Remove old FAN and cut it wires carefully from ALS600PS connector.
- Install new FAN so it will blow air inwards. Plug it to FAN connector.



- Solder red wire for 48VDC to PA module

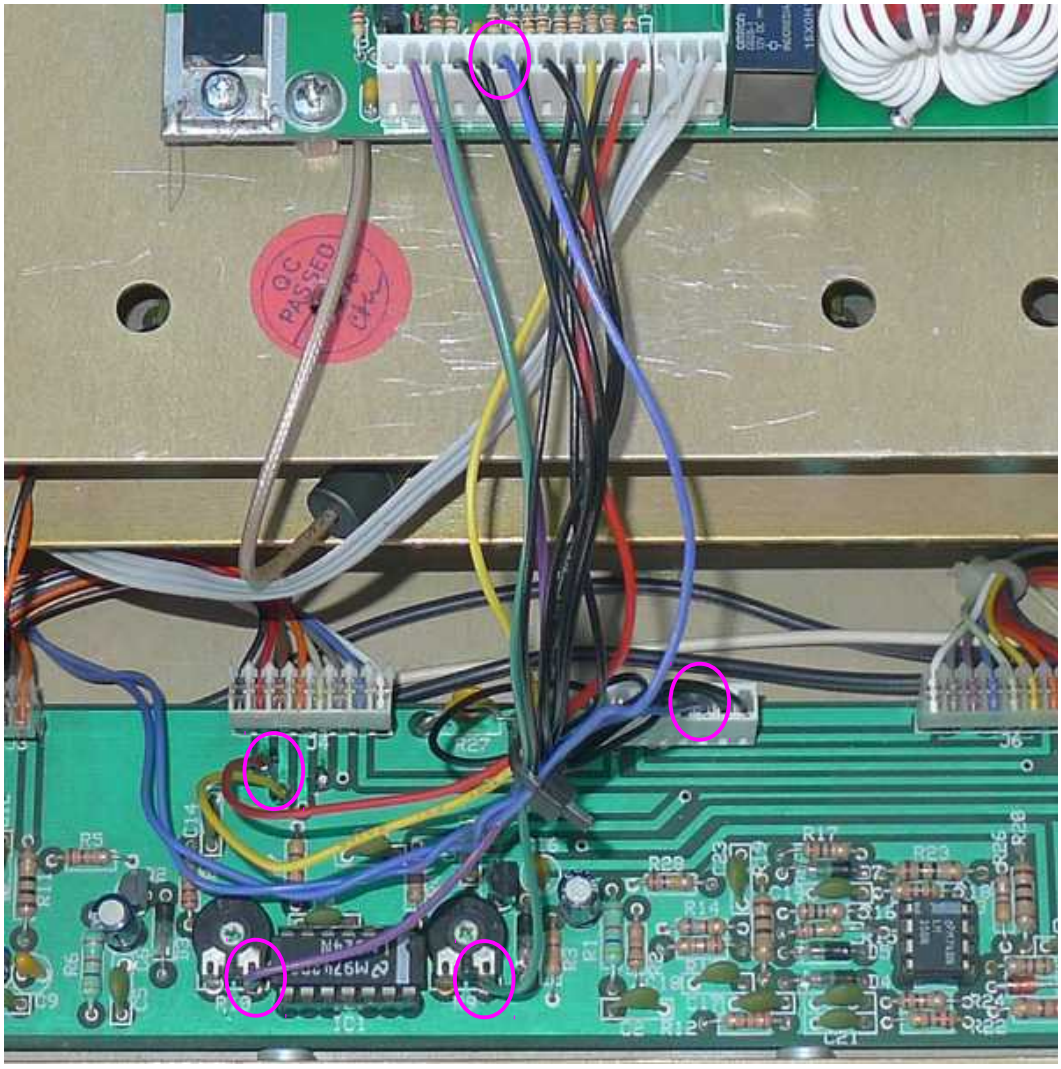


- Solder PA module output to filter board – the black and white wires soldered underneath.
- Mount ASL-600-LPF board using four screws.
- Install temperature sensor to heat-sink with Repair putty and route it cable to the other side then plug it to TEMP connector.
- Solder output coax cable to SWR detector.

- Solder RF IN coax center and shield.

PIN Diodes bias fuse
4.7 – 10 Ohm / 0.25W resistor

- Solder PA module input coax center and shield.



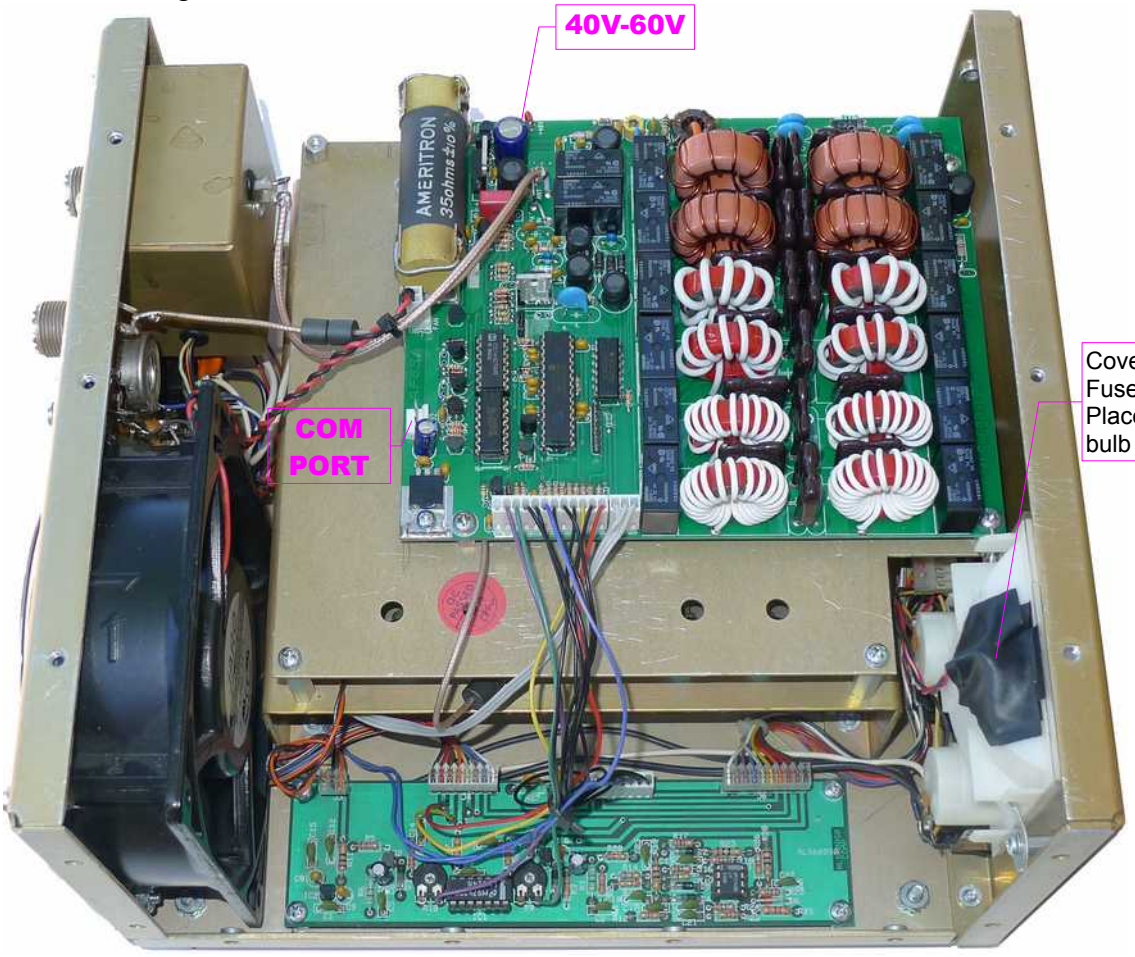
- Crimp provided Molex pins on each blue wire ends and insert them in connectors as shown. Check with Ohm meter for continuity – Thermal switch should be closed.
- Plug new wire harness into J5 (J105) connector.
- Solder the RED, YELLOW, VIOLET and GREEN wires as shown.

Testing ALS-600-LPF

- Check again all connections before powering up the amplifier.
- Check with Ohm meter for short between +48V and Ground.
- Ground ALS-600.
- Connect dummy load or antenna to the amplifiers output.
- Restore connections to transceiver – RF IN coax, PTT and ALC jacks.
- Switch Amplifier to STANDBY. ALC knob in the middle.
- Connect RS-232 cable assembly and using NULL modem cable to PC (optional).
- Check that power switch is OFF, then connect power cable from ALS-600PS.

!!! DANGEROUS VOLTAGES ARE PRESENT WHEN ALS-600PS IS CONNECTED TO MAIN POWER!!!

- Connect ALS-600PS to mains power and turn POWER ON
- Check:
  Indicator light is ON.
  Fan should be working and blowing inside.
  Voltage on red wire should be about 50VDC



- While in STANDBY send 10W CW carrier on 20M and check cross-needle indicators that power is going through the amplifier while bypassed. Relays should “clang” once, switching the low-pass filters. Check band switching on other bands. Proper operation can be confirmed through RS-232 port by using *band* command – see User Manual for more details.
- Stop transmitting. Switch to OPERATE and then send 10W CW carrier. Green LED should be ON and about 50W to 70W output power should be measured. Repeat this for other bands.
- Finally, send about 60W-80W CW carrier to check operation at full power. Adjust ALC knob as needed. CAUTION - Amplifier can overheat without the cover installed.
- Install cover with vents on the right side.

Troubleshooting and Final Adjustment.

When a fault condition occurs, the amplifier is bypassed and LOAD FAULT Led will blink a specific pattern to indicate the fault reason. Amplifier Status and last Fault status can be read thru the RS-232 port. Additionally a line with debugging information and time stamp can be displayed every time Amplifier Status was changed. See User Manual for more details.

- **NoPTT** Carrier is found by measuring frequency between 1.5MHz and 30MHz, but PTT is not active. This can be caused by open Thermal Switch, mounted on the heat sink and wired with blue wires. Check for continuity between two blue wires. Check PTT jack and connection to transceiver.
- **PINBias** Internally generated 300VDC for RX PIN diode reverse bias was missing or too low. This voltage is generated from +50V PA module supply, only when transmitting. Check the 50V / 25A fuse on the back of ALS600PS. Check the 4.7Ohm / 0.25W resistor (see page 7) and replace it with new one.

- **PASWR** Reflected power measured right after the PA module was above the trip point. This can be caused by wrong filter selection – check that frequency readings are correct and the right band was selected with *band* command. Check that newly installed toroid inductors and capacitor are correctly placed and properly soldered.
- **SWR** Output Reflected power measured at RF OUT is above trip point. Check the cross-needle indicator and is SWR reading is below 2:1. Check VIOLET wire for proper connection.
- **OverDrive** Output Forward power measured at RF OUT is above trip point. Check GREEN wire for proper connection. Some transceivers are known to produce short power peak at the beginning of transmission. Check transceiver settings or increase trip point..

Installing this board will not change cross-needle indicators calibration. Adjusting trimmer potentiometers on ALC board will affect only cross-needle indicators like before. Power levels measured and read thru RS-232 port can be calibrated if needed – see user manual for details.