RTXAGC/2

Hands Electronics

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Thank you for purchasing one of our kits. We hope it will give you many hours of service once built. Our aim is to provide satisfaction and service. If you have any problems with the construction or use of the equipment, please ring, or write to us. We will do all we can to help.If you are new to construction we suggest you read carefully the about part identity and soldering contained in the tools and construction section.

Sheldon Hands

Tools and Construction Practice

We recommend the following tools to make your HANDS kit:

15/25w soldering iron
small electrical screwdriver
4 inch Phillips -----"-----
small side cutters
electricians pliers

Below a some notes on construction practice with a heavy emphasis on soldering.

You must use solder with a non-corrosive flux. Acid cored solder MUST NOT be used.A 60/40 solder type will be ideal. The secret of good soldering is to have the correct temperature at the joint. Make sure the tip of the iron is clean, if necessary wipe it on a damp sponge. Do not carry solder on the iron to the joint, by the time you get it there the flux will have burnt or vaporised. Although it seems to contradict the above do lightly tin the iron before making a joint. This will aid the heat transfer and lessen the chance of damage to the pcb track or component.

When you are ready to make the joint apply the solder and the iron at the same time. Do not apply too much solder, a thin gauge helps in this respect. Humps of solder on a joint either means you did not leave the iron on the joint long enough or you used too much solder.

Try to get a medium coating over the track and the component lead. If you use too much heat you may damage the track or the component. We suggest you try some test joints on scrap wire, you will find it inspires confidence! When the board is complete check for solder bridges and dry joints.

All parts in the kit are readily identifiable, but value codes may need some explanation. For wire ended resistors a colour code chart is included at the back of the manual. Most supplies of resistors are coded with 3 bands for the value,i.e. 1st fig, 2nd fig, 3rd multiplier. But we do sometimes receive resistors with a 4 band code this then becomes 1st fig,2nd fig, 3rd fig, 4th multiplier. Capacitor identification for electrolytics is straight forward but ceramic caps may pose a problem. Where n values are used n10 = 100pf and 1n = 1000pf,those with just a 3 digit number use the first 2 numbers as figures and the 3rd indicating the number of zeros, i.e. 102 = 1000pf. For those with a 3 digit number followed by letters treat as 3 digit number type. Check the parts list for possible codes which are shown in square brackets.

CIRCUIT DESCRIPTION

The AGC2 board provides an audio derived agc control system with dual time constants and a 7ele elliptical low pass filter with a 1khz cut off. The agc control voltage is designed to suit MC1350P op amps with a no signal voltage of 5v and S9 voltage of >7v.

Audio from the receiver is feed to IC1b for pre-amplifiation. The output is feed directly to the CW low pass filter via R24 and also to the input of IC1a. IC1a further amplifies the audio oltage which is then rectified by D1. ICd inverts IC1a output which is then rectified by D2 for the oposite half cycle. The resultant dc voltage is buffered by IC1c for output to the receiver agc control line. A capcitor/resistor timing network on the input to IC1c provides a 'Hang' control action. The C part of the network is selectable from either C4 or C5 by applying 12v to the relevant AGC1 or 2 pin. Under some conditions the network can over charge, as the IF amps are almost cut off at 8v a Zener diode ZD1 limits the the control voltage to 9v. For use with the DDS1 a control output id privide via divider R16/17. To avoid MPU damage ZD2 limits the output at 5v

The CW audio filter is a 7ele elliptical design, it is low pass with a cut off of 1khz. R24/25 define the load and source impeadance. The filter is followed by a audio fet mute switch. When used with the Hands RTX-IF2 the audio output to the Af gain control may be paralled with the ssb filter output, the off line filter output is then muted from the AF wide /narrow selector switch.

CONSTRUCTION

- Fit the Berg pin headers and solder to the rack pads. Their posistions are indiated by the oblong outlines.

- Fit and solder the resistors R1-27. Check the appendix for the correct way to fit components. Where you see a ground legend on a resistor this end is soldered to the top foil of the pcb termed GROUNDPLANE. The groundplane acts as a large heat sink so always tin the pcb with solder around the area of the connection first. Cut the ground side resistor lead back to about 3mm before fitting. If the connections are too long and obstruct another pad angle the component to a free area of groundplane.

- Fit and solder the through board links between the ground plane and the track side as listed. The posistions are indicated by a ground ledgend. Use the resistor offcuts for this. -:ADJ C9, C3, C14, C11, AFB, 6 PIN BERG[PIN 4]

- Fit and solder the ceramic capacitors.

- Fit and solder the electrolytic capacitors C2,3,7,8,16,19, making sure that the negative indication stripe is aligned with the board - sign.

- Fit and solder C9,10,11,12,13,14,15. The capacitors 9,11,13 are grounded via the through board links previously installed. **Do not attemp to bend the ground lead on the ground plane**

- Fit and solderC4/5

- Fit and solder diodes D1-4, make sure the cathode band is aligned with band on the board legend.

- Fit and solder TR1,2 the transistor outline should agree with board legend.

- Fit and solder IC1. The cut out on the ic should match the cutout on the board legend, this identifies the pin 1 end. On on the track side this is a square pad.

- Fit and solder RFC1

- Fit and solder TR3. This transistor is static sensitive, do not handle the leads directly .

TEST AND INSTALLATION

Check the board for solder splashes, bridged tracks or ic pins and dry joints. If you suspect a dry joint you may carry out a resistance check with your multimeter between the component lead on one side of the board and the track on the other.

Make a temporary connection from the GND connection to the transceiver gnd line or chassis. Connect the +12v line to the transceiver +12v receive line via a multimeter on its current range. Check that when switched on the current drawen is less than 15 ma.[typ 9ma]

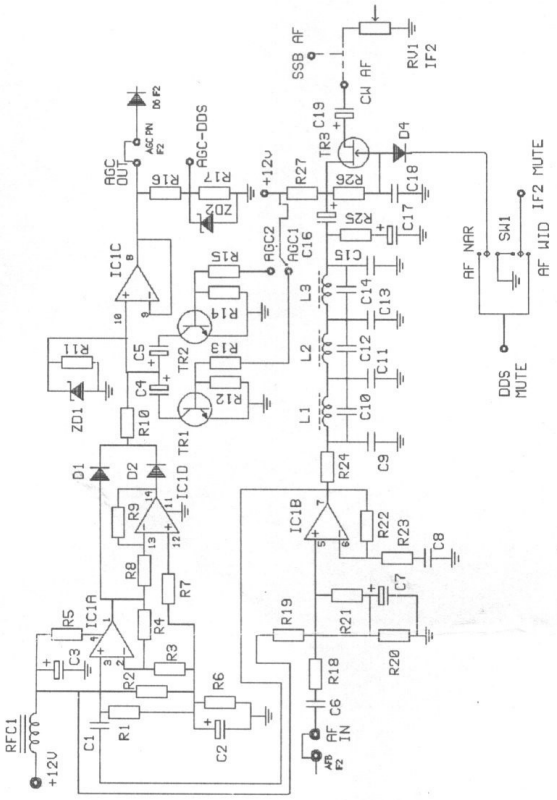
Make another temporary connection, from the detector side of the volume control to the AF input pin. Check with the multimeter that the AGC OUT pin is around 5-6 volts with a weak signal and rises when tuned across a strong signal.

Break the connection to the tranceiver volume control from the detector and rewire it to the agc board AF IN pin connect a lead from the CW OUT pin back to the volume control. With the agc board powered check that filtered audio is ok. Remove the CW OUT connection and reconnect to the SSB OUT pin and recheck the audio. If all the tests are satisfactory the board can now be installed in the transceiver and permantley wired as showen on the connection diagram.

Parts List AGC2

R1,12,14,20,21,23,27	100K
R2,3,4,8,9,18,19,	10K
R5	56R
R6	6K8
R7	4K7
R10	1K
R11,26	1M
R13,15	15K
R16,17	DDS ONLY
R22	620K
R24,25	470R
C1,6,18	100N [104]
C2,3,4,17	22MFD
C5	1MFD
C7	100MFD
C8	10MFD
C9,15	0.39
C10	0.022
C11	0.68
C12	0.1
C13	0.56
C14	0.068
C16,19	2U2
IC1	TL084
TR1,2	BC548A
TR3	2N3819
D1,2	OA47
D3,4	1N4148 [D3 now deleted]
ZD1	9V1
ZD2	5V DDS ONLY
RFC1	1MH 7BS
L1,2,3	100MH 10RB

AGC CIRCUIT DIAGRAM



AGC PCB LAYOUT