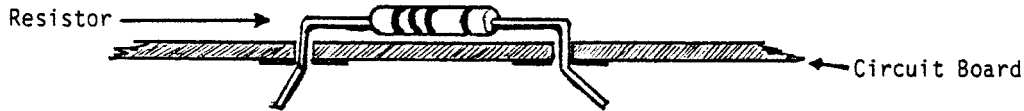


Tools required:- Small tipped soldering iron, about 30 Watts. Small side cutters, long nosed pliers, and a small screwdriver for adjusting the output level when the module is finished.

Make sure you have all the correct parts and tools before you start. It is advisable to read all the paper-work through at least once BEFORE you plug in the soldering iron.

Start by fitting the resistors. Refer to the parts list and select R1. Fit this into the holes marked for it on the circuit board, bending the leads as shown:-



Turn the board upside down and solder R1 to the printed circuit track. To solder properly, you should hold the hot iron so that it is in contact with both the lead and the track so that they heat up for a second or so, then keeping the iron in place, touch the solder onto the joint so that it runs freely over the lead and the circuit track, wait a couple of seconds for the solder to flow and remove the iron. The iron should have been in contact with the work piece for about 4 seconds in all. Do not use more solder than is necessary to form a good joint - the joint should not look like a large blob of solder! Now cut off the leads as close to the joint as possible.

Next fit R2, R3 etc until you have fitted all the resistors, including RV1. Now fit the capacitors, keep the leads short and make sure you get the electrolytic devices the right way round - see the note on the parts list.

Fit the semiconductors next, making sure that you put them in the correct way round. DO NOT OVERHEAT THESE DEVICES.

Thread a ferrite bead onto an offcut lead (choose a long one) and fit this to the board as LK1. You can use a drop of clear adhesive to stop it rattling if you wish. Use a couple more offcut leads to make LK2 and LK3 (no beads on these ones). You can cut LK2 if you find you need more gain when you come to test the module. Do not fit LK3 if you are going to use a high impedance mic. Most rigs come with low impedance mics these days, so normally LK3 should be fitted. Refer to your rigs' handbook for microphone details.

Your AP3 should now be finished, and it is a good idea to check that there are no splashes of solder or whiskers of wire shorting out any of the tracks. Double check that all electrolytic capacitors and all the semiconductors are fitted the right way round. Inspect all the solder joints and resolder any that do not look bright and good. We find that virtually all faults on our kits are due to poor soldering, component failures are very rare. When you are sure the module is put together correctly, it can be installed in a METAL, screened box. A plastic case is not suitable.

Wire up the AP3 as shown in the diagram, check the mic connections in your rigs' handbook. The pins of the mic socket are wired differently from one rig to another. You will need to look up the pinning information for your particular radio.

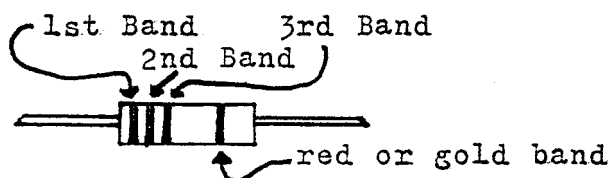
USING YOUR AP3

The AP3 will automatically adjust to the volume of your voice and the distance you are speaking from the mic. If the AP3 does not pick up your voice from as far away as you would wish, simply cut link LK3. This increases the pre-amp gain by a factor of ten times. Set the clipping level switch to the minimum amount necessary for your contact. Whilst maximum clipping will undoubtedly help your signal get through when conditions are difficult, it does not improve the audio quality on local or strong signal QSOs. With good signal strengths, just a small amount of clipping is all that is needed.

You will find the automatic level adjustment very useful for late night DXing, the AP3 will ensure full modulation even when you talk quietly to avoid waking the rest of the household! It is also excellent for multi-operator contest stations - the mod level remains correct no matter who's at the mic!

A speech processor can't work miracles, but your AP3 will help your signal get through that vital bit better when conditions are difficult.

RESISTORS					✓	✓
Part No.	Value	Colour Code			Fitted	Checked
		1st band	2nd band	3rd band		
R1	1k2	Brown	Red	Red		
R2	100k	Brown	Black	Yellow		
R3	22k	Red	Red	Orange		
R4	470R	Yellow	Violet	Brown		
R5	100R	Brown	Black	Brown		
R6	100k	Brown	Black	Yellow		
R7	470R	Yellow	Violet	Brown		
R8	22k	Red	Red	Orange		
R9	100k	Brown	Black	Yellow		
R10	1M5	Brown	Green	Green		
R11	22k	Red	Red	Orange		
R12	33k	Orange	Orange	Orange		
R13	22k	Red	Red	Orange		
R14	10k	Brown	Black	Orange		
R15	22k	Red	Red	Orange		
R16	10k	Brown	Black	Orange		
R17	100k	Brown	Black	Yellow		
R18	47k	Yellow	Violet	Orange		
R19	150R	Brown	Green	Brown		
R20	150R	"	"	"		
R21	47k	Yellow	Violet	Orange		
R22	10k	Brown	Black	Orange		
R23	1K2	Brown	Red	Red		
R24	10k	Brown	Black	Orange		
R25	1k2	Brown	Red	Red		
R26	56k	Green	Blue	Orange		
R27	330R	Orange	Orange	Brown		
R28	470R	Yellow	Violet	Brown		
R29	47k	Yellow	Violet	Orange		
R30	4k7	Yellow	Violet	Red		
R31	22k	Red	Red	Orange		
R32	470R	Yellow	Violet	Brown		
R33	56k	Green	Blue	Orange		
R34	56k	"	"	"		



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RV1

RV1 is a preset variable resistor with two slots on top for adjustment - use a small screwdriver to set this up as per the instruction sheet when you have finished construction of your AP3.

CAPACITORS		Description of component marking	Fitted ✓	Checked ✓
Part No.	Value			
C1	100pF	marked 101		
C2	.1uF	" 104K		
C3	100pF	" 101		
C4	22uF	marked 22uF 25v SEE NOTE		
C5	1uF	" 1uF 50v " "		
C6	4n7	marked 472K		
C7	1uF	marked 1uF 50v SEE NOTE		
C8	22uF	" 22uF 25v " "		
C9	22uF	" " " " "		
C10	1uF	" 1uF 50v " "		
C11	1uF	marked 1uF 50v SEE NOTE		
C12	.1uF	marked 104K		
C13	.1uF	" "		
C14	.1uF	" "		
C15	.1uF	" "		
C16	1nF	marked 102		
C17	1nF	" 102		
C18	1nF	" 102		
C19	10nF	marked 103K		
C20	220pF	" 221		

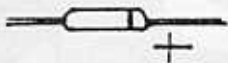
NOTE - Warning C4, C5, C7, C8, C9, C10, & C11 are electrolytic capacitors and MUST be installed the correct way round. The positive lead must go to the hole marked with a plus sign, and the negative lead to the hole with a negative sign. On the parts supplied the negative lead is marked with a "-" sign.

SEMICONDUCTORS

-MAKE SURE THESE ARE FITTED THE RIGHT WAY ROUND.

D1 & D2

D1 is a BZY88 and has its type number marked on it.
 D2 is a 1N4148 and is coloured orange/black. The black band marks the end that goes to the "+" sign on the circuit board. Sometimes we supply 1N4148s with multi-coloured bands - the largest band indicates the "+" end.



Tr1, Tr2 @ Tr3

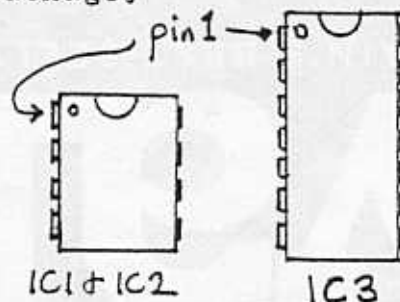


Tr1 is a BC237 and has its type number marked on it.
 Tr2 & Tr3 are BC307 and have their types marked on them.

INTEGRATED CIRCUITS (CHIPS)

IC1, IC2, IC3. IC1 is a TL071 which has 8 pins. IC2 is an SL6270 VOGAD chip -also with 8 pins. IC3 is a 14 legged device type 3046, this has five transistors in the single package.

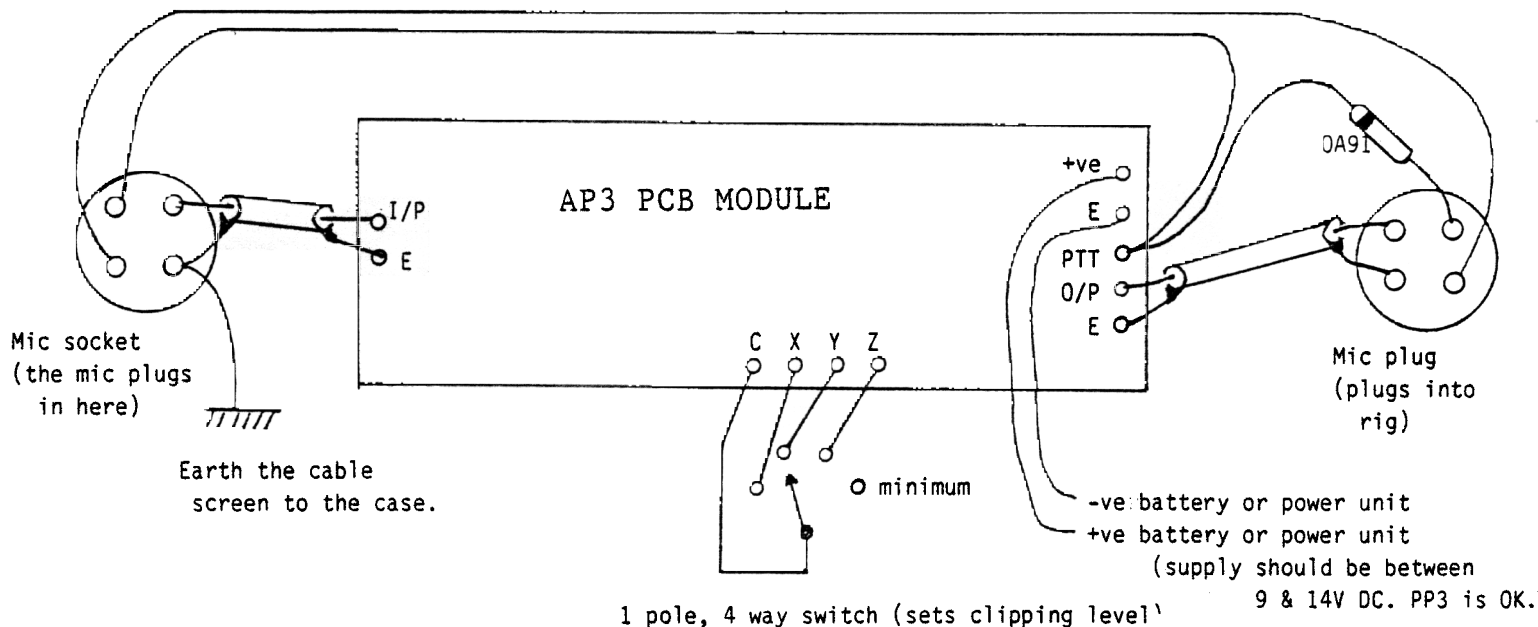
Double Check that all the semiconductors are installed the correct way round.



Ferrite Beads

Thread one on to an offset capacitor lead to make LKL.
 Other Links do not require beads on them.





NOTE - Mic socket connections vary from rig to rig - check your handbook for the correct connections for your set.

Spare ferrite beads are provided to thread on the wires on the back of the mic socket on the AP3s' case to help keep RF out. Keep the output lead to the rig as short as possible and use screened cable for this lead (the cable is not shown in the above diagram, for clarity the connections are shown wired direct to the plug).

An OA91 diode is provided for wiring into the PTT circuit, if this is not fitted, then the AP3 will probably switch on when you turn off the rig and will drain the battery overnight (if you are using a battery that is). If you are using a mains operated power supply then there is no need to add the OA91.

Some CB rigs will not transmit properly with a diode in the PTT line in this case you will have to omit the diode, making a direct connection to the plug instead, and fit an on/off switch in the battery lead. There should be no problem with PTT switching on most Amateur Radio equipment.

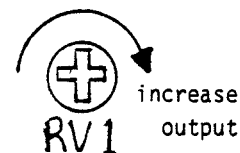
Please note that the AP3 PTT connection must be earthed for the module to operate, this will normally happen when you push the button on the mic, but bear this in mind when bench testing the module without a mic. The PTT switching circuit of the AP3 must not be connected to any rig using more than 24V in its PTT circuit, or drawing more than 40mA through the OA91 diode - this should not be a problem with most modern equipment.

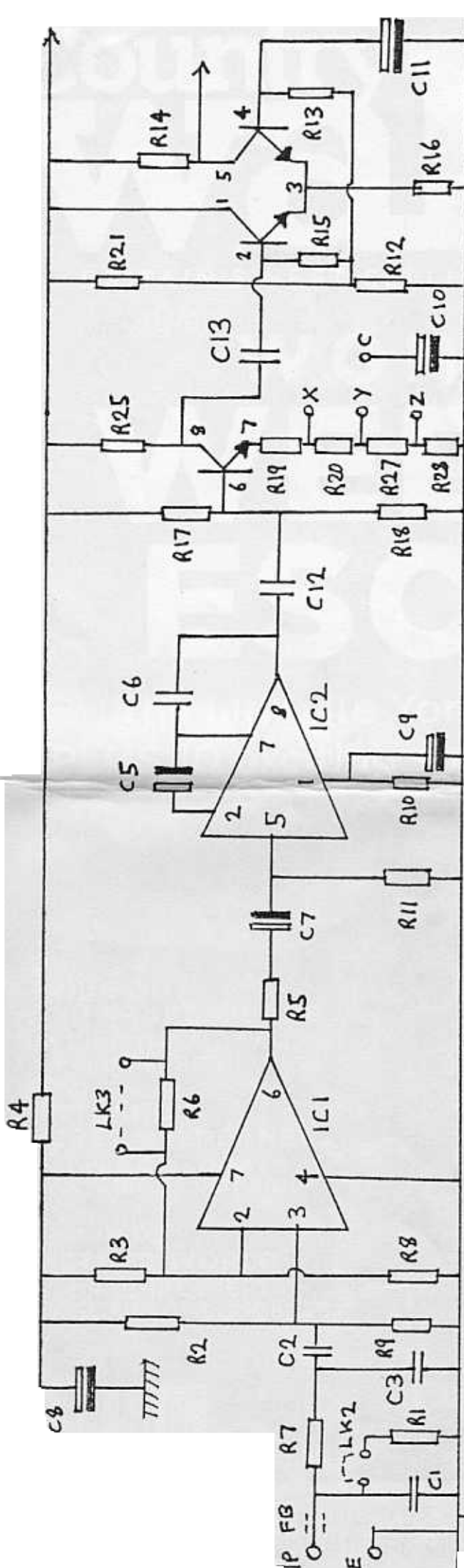
MAKE SURE YOU CONNECT THE BATTERY OR POWER SUPPLY THE RIGHT WAY ROUND.

Adjustment of RV1

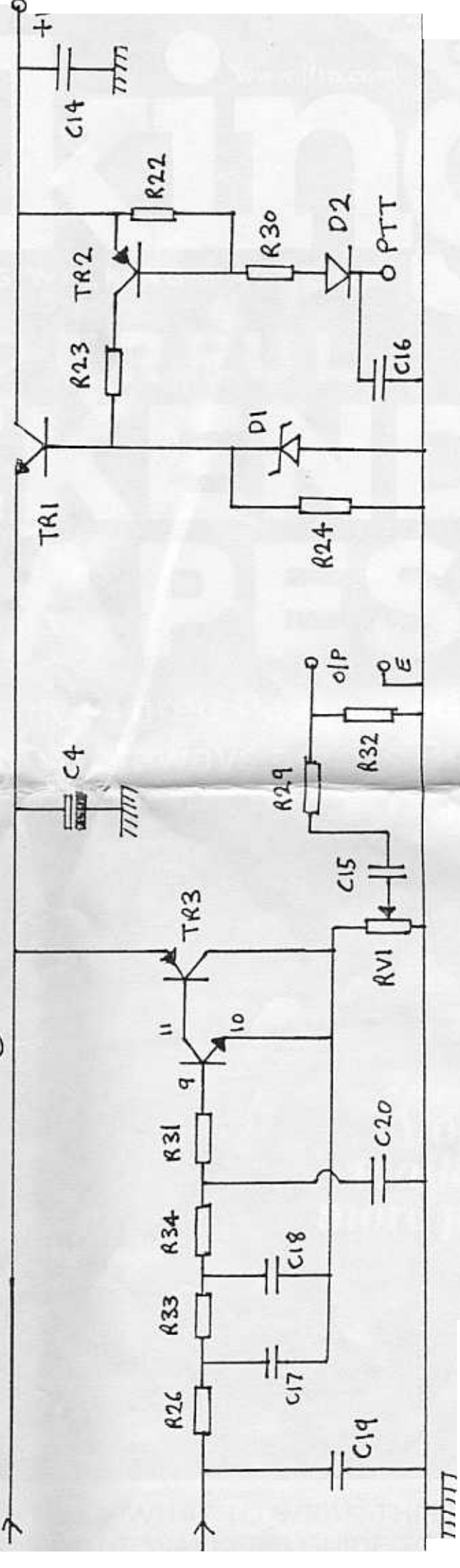
Set the clipping switch to minimum while doing this adjustment. RV1 sets the output level of the AP3 to suit your rig. On SSB equipment, it is best to set the rigs' mic gain control to its normal position and set RV1 so that the rigs' ALC circuit is just starting to operate, then back RV1 off a fraction. If your set has no ALC metering, simply whistle in the mic and turn up RV1 till the output power of the rig is just a fraction less than you get whistling into the mic without the AP3 in circuit. By setting the peak level a fraction under maximum, the output of your rig will be a lot "cleaner", whilst the AP3 will boost the average power substantially giving increased readability. With AM and FM sets it is best to set RV1 to mid position, and then get a reliable friend to give you a report over the air. Adjust RV1 accordingly. If the AP3 does not give enough output to drive your particular radio, then it can be easily increased by reducing the value of R29 to 10k, and if this is still not enough, increasing R32 to 4k7 as well.

We hope you will be pleased with the results of using your new AP3 - good DX!





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HOWES AP3

CIRCUIT DIAGRAM

DATA 7/4/8