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IMPROVE YOUR SOLFAN
FOR
BETTER RESULTS ON 10GHz

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MAY 1988.

OVERCOMING THE "SOLFAN SYNDROME".
[subtitle : "Where are they now?"] by G4VEE & G4ELM.

It can be estimated that about 1 in every 30 British amateurs possesses a SOLFAN 10 GHz unit because over 1,000 of them have been sold via the Microwave Society and other sources. Presumably the vast majority are now lying in junk boxes because it is all too easy to observe that less than 1 in every 1,000 amateurs are actively using them!

This state of affairs appears to be an indication of the outcome of, that now well recognised and unfortunate condition, the SOLFAN Syndrome which has been prevalent amongst recent newcomers to the microwave scene. The stages of development of this syndrome seem to be :-

a) the victim becomes afflicted by an interest in amateur microwaves and, rather than going for a steady development of his frequency capability, decides to make a bold step into the unknown - all in the best interests of "self training of the licensee" of course - and heads for the wide open spaces of 10 GHz,

b) possibly at the recommendation of another amateur, the victim visits a Rally, Convention etc. where he buys a SOLFAN unit as a quick, cheap and easy route toward getting on 10 GHz,

c) some suffering is encountered while the victim actually builds himself a 10 GHz wideband FM system, buying, and putting a soldering iron to, components and indulging in metal bashing! - this is, itself, an ancient and little known affliction, which is, sadly, a condition affecting few these days.
Alas, most of the new recruits fail at this stage and consign the unit to the pile of "projects to be completed - one day!" but just a few endure and manage to obtain the necessary ancillary items - tripod, compass etc. to make a workable station.

d) surviving sufferers attempt a few frustrating, but interesting, local tests with a like-minded enthusiast which usually result in encouraging signs that the condition may be endurable after all,

e) a feverish stage of the affliction next overwhelms the victim who, although by now in a weakened state, can usually bring himself to work a few short paths from a local vantage point during a 10 GHz Cumulative Contest or other therapeutic session. Attempts to work longer paths almost invariably fail causing a puzzled and confused mental state to descend on the victim who may well suffer a relapse into 2 metre FM or some other low condition.

f) treatment of the condition in this advanced stage is now only available by ministrations of large amounts of time or money or by seeking out advice from long-term addicts (invariably to be found huddling together for mutual comfort at microwave round tables and the like) who invariably encourage the newcomer to ".. re-build to improve your system capability" or exhort them to . ".. take your medicine like a man and go narrowband!"
The majority of newcomers baulk at the severity of either of these treatments or at the prospect of expending as much on a set of commercial "modules" as they might on a 2 metre "black box".

g) the few remaining newcomers persevere for a while but eventually, and almost inevitably, they give up and take their enthusiasm elsewhere.

We are not sure if the salutary tale above is a figment of the imagination or an accurate history but what we can say is that it is what is believed to have happened to a whole "generation" of microwave newcomers, over the past 5 years or so, by typical enthusiasts who attend southern Round Table meetings.

What positive information, advice and help can be offered to those who have lapsed, or are lapsing, into this state?

What route can they take to make progress?

The collected thoughts of several amateurs who are existing users of SOLFAN units (in one form or another) are given below against the various aspects and opportunities for improvements:-

0. First Identify Your SOLFAN!

There are several types of SOLFAN module available on the amateur market and several different assemblies are made up from them.
They can simply be recognised by the presence of the SOLFAN name in raised letters on the main casting, albeit with some confusing numbering.

The complete range known to be available is :-

The SOLFAN 1 Gunn Oscillator (9161-1076),
The SOLFAN 2 Gunn Oscillator (9161-1076),
The SOLFAN Mixer Unit (no individual name or number),
The SOLFAN Horn Antennae - RP-70 - lower gain, fan-beam,
- RP-40 - higher gain.

The performance and adaptability of these modules varies slightly with type and each is discussed below.
The use of a standard, square flange size by SOLFAN means that many other modules from other manufacturers will fit and couple directly.
The use of some examples of these is covered below.

1. I.F. Output Decoupling of the Mixer Module.

The mixer diode I.F. output is taken off via a choke/insulator arrangement which extends through a substantial bush in the casting.
This size and capacitance may be a quite deliberate part of the original design of the unit for its role as a doppler module in movement detection, i.e. using an I.F. of zero Hertz, and is, presumably, intended to decouple any "unwanted" radio frequencies from the output!

The choke has a built-in capacitance of several 10's of picoFarads, for this purpose, which tends to make the original form of the mixer output unsuitable for use at high I.F.'s. It is not a good idea, therefore, to attempt to use an unmodified SOLFAN unit with a 100 MHz, or higher, I.F. and some degradation may be noticeable when used at 30 MHz or, even, 10.7 MHz.

The choke would be difficult to modify and will, probably, have to be accepted as it is but any additional, external decoupling (which is often found to have been fitted) can be removed to reduce the loss at I.F. When removing any such components, great care will be needed to avoid damaging the mixer diode (a Schottky device) by static discharge. The usual precautions with handling, earthing soldering irons etc. must be observed and it may well be better to temporarily remove the diode altogether during the process.

2. Use of the Gunn Oscillator for A.T.V. etc.

The SOLFAN Gunn Oscillator module has an even more substantial choke feed arrangement for the diode. Indeed it is so substantial as to warrant the nick-name of "the carburettor float" because of its shape, colour and large size!

This component has been measured as having a capacitance to earth (the casting) of some 90 pF and also effectively reduces the range of modulating frequencies which may be applied to the Gunn diode. This may restrict the use of the SOLFAN in such applications as 10 GHz A.T.V. in much the same way as that of the mixer described above. However, there have been articles for this very application in the B.A.T.C. "CQ-TV" magazine and successful operation as a complete transceiver is perfectly possible.

Once again, there is little known that can be done with this choke/capacitor component in the way of direct modifications.

3. Mechanical Tuning Arrangements.

The main brass tuning screw provided as standard is a masterpiece of careful design - but design for the intended doppler use of the SOLFAN and over the intended frequency range i.e. between about 10.500 & 10.700 GHz.

The screw is very carefully shaped to give smooth mechanical tuning with both a conical end and a cylindrical main section. Between the cylindrical part and the threaded portion is a reduced diameter section which acts as a form of choke and, with increasing penetration of the screw into the waveguide, this choke section comes into play actively preventing the unit tuning too low in frequency i.e. into the amateur band!

It is possible to replace this screw (which has some sort of American thread) with a piece of ordinary 5 mm brass studding obtainable under part number 522-881 from RS etc. A suitable lock-nut is also required.

The studding is a tight fit (desirable!) and, even with a flush-cut end, provides smooth and continuous tuning over a much increased bandwidth - often well below 10.000 GHz. It has been noticed that the power output obtained with this studding cut straight across is often well above that obtained with the standard screw.

[It is also possible to use 2 B.A. brass studding in this position providing the hole is re-tapped to suit.]

Alternative methods of achieving similar results have also been tried whereby the existing tuning screw is replaced by brass studding (for pre-set tuning) and an additional P.T.F.E. or Nylon screw is inserted via an extra hole, over-drilled and re-tapped for the purpose, into the cavity via the boss area which is already present (see figure 1).

This modification usually provides a reduced operational tuning range (within the setting of the pre-set screw) but does give slower, and much more precise tuning with greater stability across that range. The tuning adjustments should always be set in such a way as to minimise the amount of P.T.F.E. rod/studding which protrudes into the cavity.

The modifications recommended include the use of a form of slow-motion drive to allow precision tuning and repeatable calibration of the output frequency. This can most conveniently take the form of a micrometer adjustment or a modified 10-turn potentiometer dial arrangement as shown in figure 2.

4. Setting On Frequency.

A major area of difficulty for any newcomer to microwaves is the lack of readily available test gear. This situation can only be fully overcome by acquiring wavemeters, power meters etc. for oneself as time or money permits. In the initial stages, therefore, it is extremely unlikely that any newly constructed equipment will be on frequency or that the newcomer will have the means to accurately set it on frequency.

Assuming that either of the two improvements covered in 3. above are adopted, the mechanical tuning arrangement can then be prepared to be calibrated.

Regardless of whether the equipment is required to operate on 10.100 or 10.400 GHz, all that is needed to assist the newcomer in obtaining contacts is a short session with access to a calibrated wavemeter and, ideally, with some form of power indicating device. The chosen sub-band can then be accurately set and the power output of the transmitter optimised. A typical test set-up is shown in figure 3.

The pre-setting of the frequency/power output of the equipment can save hours of frustration in the field and should also avoid the situation where two newcomers can work each other using their new equipments but cannot work anyone else because they are on a common, but out of band, frequency! (yes, I did that! - G4ELM).

Suitable opportunities to obtain this access to such test equipment can be found at most Microwave Round Table Meetings or, virtually on demand (well, polite request!), by contacting almost any established, active 10 GHz operator via a meeting or the Microwave Directory published by the Microwave Newsletter.

5. Increased Power Output - 1.

A crude method to improve the power output of the SOLFAN Gunn unit on transmit (~~and, possibly, to make a marginal improvement on receive for the through line mixer~~) is to increase the size of the IRIS (aperture) through which the microwave energy is coupled from the resonant Gunn cavity.

Cautious enlarging of the diameter of this aperture will produce more power in the transmit mode and increased mixer current in the receive mode but it will also reduce the stability of the oscillator and increase its susceptibility to "pulling off frequency" by objects placed close-in to the antenna e.g. usually the operator!

Under no circumstances is it recommended that the power be increased to the point where the mixer diode current exceeds 1 mA.

The SOLFAN oscillator unit is constructed in die-cast aluminium/zinc (?) alloy and the iris is in an integral plate which is set back from the flange surface. To perform this modification would require the temporary separation of the oscillator from the mixer unit and it would be vitally important not to leave any swarf inside the cavity afterwards.

As with any such work on these modules, it cannot be stressed too strongly that great care must be taken even to prevent mechanical shocks to the assembly which could damage the diodes even while in their mounts.

This method of increasing power output cannot be recommended since it does not result in any significant increase in system performance and stands a very good chance of leaving the newcomer with an irretrievably ruined SOLFAN unit. An awareness of the method, however, is of educational value to beginners and leads on to more advanced options.

6. Increased Power Output - 2.

A more sophisticated way to slightly increase the output power of the oscillator is to remove part of the conductive, microwave absorbent foam which is fitted to the back plate/mounting plate at the closed end of the resonant cavity (see figure 4).

The precise purpose of this piece of foam is not clear to the authors but it is recognised that it does perform a role in both the stabilisation of the oscillator frequency and in the smoothing of the mechanical tuning characteristic while appearing to reduce the output power only slightly by direct absorption.

A thin slice of this material may be removed, with a very sharp blade, from the surface of the foam which is exposed inside the cavity. However, it is not recommended that all of the foam be removed.
Once again this method is provided more for educational value than as a recommendation since it has not been fully tested by the authors.

7. Increased Power Output - 3.

The output power obtained from the Gunn oscillator should be maximised by appropriate setting of the supply voltage (see experimental results obtained in tables A & B), the tuning screw(s) and the matching screw(s).

It is here that the SOLFAN 1 and SOLFAN 2 oscillator modules differ since the model 2 has an extra thread tapped into the edge of the waveguide, outside the cavity and very near to the iris. This, and the main matching screw which adjusts directly across the iris plate aperture, should be vary carefully adjusted to optimise power output without compromising receiver performance.

The use of higher power Gunn diodes in place of that fitted as standard is worth trying since they are now more readily available on the amateur market and some are now capable of producing far higher power than the old "surplus" diodes (CXY11-series?) which are in common amateur use.
However, the power output of a representative sample of SOLFAN units has been measured and all exceed 10 milliWatts comfortably with 20 milliWatts being by no means uncommon. With this in mind, it is only considered worthwhile to change to a higher power diode if a device capable of, say, 100 milliWatts is available at a reasonable price.

The experimentally minded might wish to consider instead the possibilities of two alternative uses of the SOLFAN Gunn unit in an entirely altered fashion.

It is possible to run the Gunn oscillator in a "Reversed" mode as shown in figure 5 and to obtain greater power output.

It is also possible to both reverse the SOLFAN Gunn cavity and to add a separate cavity to the "new" rear of the oscillator, beyond the iris (see figure 6). The shorting-block tuning of this second cavity will allow the Gunn's oscillation frequency to become locked to the resonant frequency of the second cavity providing the unlocked oscillation frequency is within the "capture" range of the second cavity.
This will impart a greater stability to the Gunn oscillation frequency than if it were allowed to "free run".

8. Increased Power Output - 4.

The final, and more radical, method of obtaining more power is to exchange the SOLFAN Gunn unit for an alternative oscillator from another manufacturer or even one you have made yourself!

This tends to imply a change to a separate Transmit and Receive system which is a recommendation made in more detail in 12 below.

Proprietary Gunn oscillator modules are available on the amateur market from a variety of sources, e.g. Phillips/Mullard, and one example is the CL8633 unit. Such modules may be used in a SOLFAN system to replace the original oscillator unit or to supplement the oscillator/mixer assembly (used as a receiver) to form a separate transmitter.

The ready adaptability of all these modules, by the experimentally inclined, is illustrated by figures 7 & 8 which show both how to obtain an improved tuning facility and how to obtain a co-axial output from such a cavity design for use in more advanced wideband systems.

9. Improving the Antenna.

The small, die-cast horn assembly fitted to the SOLFAN unit as standard is, again, specifically designed with the original use of the unit in mind. Certain of the adjusting/matching screws provided are fitted specifically to allow optimisation of the unit in circumstances where very strong received signal levels are experienced at the horn, caused by reflection from nearby objects, and where the transmitted signal may undergo destructive interference, beam twisting or what have you.

As already mentioned, there appear to be two alternative forms of horn antenna (see figure 9). The use of the RP-40 or RP-70 horns for initial trials or short-range contacts is perfectly acceptable providing the gain and beamwidth limitations are realised. However, it is recommended that the small horn antenna should be removed and replaced by a larger horn or dish antenna of considerably higher gain at the earliest opportunity.

A suitable starting point is shown in figure 10 where a form of horn can be fabricated from ordinary double-sided p.c.b. material and where, using data from the the reference given, gains up to about 25 dB are realisable. Alternatively, a higher gain horn antenna may be fabricated from an old oil-can (the 1 gallon, 5 litre types) as described in the Microwave Newsletter Collection etc.

The benefit to overall system performance will be substantial since the increased gain of the antenna contributes on both transmit and receive paths. Even the ubiquitous Practical Wireless dish with the "Penny feed" will provide a dramatic improvement. This is, probably, the single greatest improvement that can be made to such a simple equipment.

Note :- In case anyone should think the little horn antenna is wasted, a beginner would be wise to save it for (potential) use as a more sophisticated dish feed arrangement (the RP-40) at some future stage in the development of his 10 GHz system or for use in a mini-beacon, wavemeter etc. (the RP-40 or 70).

10. Improving the Weak Signal Performance - 1.

The relatively poor noise performance provided by a system which has no "front-end" amplification and only a diode mixer direct to I.F. will be further degraded if used with a "noisy" I.F. amplifier following the mixer.

The use of a comparatively low noise amplification system, with an adequate level of gain, immediately following the mixer will give the best performance achievable with this arrangement. It is recommended that one of the tuned or wideband pre-amplifiers shown in the VHF/UHF Manual (Microwaves chapter) be tried where there is any doubt about the performance of the I.F. system in use e.g. with a "junk box" I.F. strip.
Any such pre-amplifier should always be mounted directly onto the mixer module with the minimum lead length and, where possible, the whole assembly should be inside a screening box to prevent any direct pick-up at I.F.

The use of a completely wideband I.F. to detector arrangement cannot be recommended so some form of selective filtering should be provided at a suitable, post-mixer stage.

11. Improving the Weak Signal Performance - 2.

A minor piece of additional construction, and the loan of a few items of basic test equipment, will provide the noise generator/test system shown in figure 11.
This is primarily intended to assist with receiver alignment and maximisation of sensitivity but can also be used to accurately adjust matching screws for optimum performance, to choose the best mixer diode from a selection available, to adjust the amount of local oscillator injection into the mixer for best sensitivity, to choose the better of alternative forms of mixer arrangement and the best I.F. amplifier sub-system and all with just a little "on the bench" experimentation!

Who knows, a little experimentation in this area and you could not only achieve a useful system but even become an expert!

12. System Improvement by Gradual Replacement of Modules.

The newcomer to microwaves will, hopefully, develop his skills and interest in this aspect of the hobby as experience is gained.
It is reasonable, therefore, to suggest that he also develops his 10 GHz system by applying the experience gained and by a steady process of up-grading, enhancing and, yes, even replacing parts of his system as the opportunity allows.

The SOLFAN assembly lends itself well to making a gradual start on this process since it is constructed from three modules (oscillator, mixer & antenna) which use the standard square flange fixing arrangements throughout and are, thus, easily separated.

Little can be found to fault the design or application of the Gunn oscillator yet it soon becomes obvious with growing experience that the inclusion in an amateur wideband system of a second unit will allow the use of independent transmit and receive frequencies with separate tuning arrangements. QSO's with other stations having a variety of fixed or tunable I.F.'s are then made much easier.

The mixer performance is good, within its design limitations, but falls short of what is required by the more advanced microwave operator who might prefer to use a high (circa 100 MHz) I.F. with, say, a low noise pre-amplifier mounted directly on the mixer output pin and a tunable V.H.F., F.M. receiver as the main I.F. to audio detection sub-system.

The system will show considerable benefit from this module being replaced by a purpose designed mixer e.g. the G3WDG/G3RPE design given in RadCom June 1978, the Newsletter Collection etc. Alternatively, commercial units available on the amateur market include the AEI module shown in figure 12 which may be used in place of the SOLFAN unit. Worthwhile receiver performance optimisation can then be carried out using noise sources, beacons or weak signal sources as the skills of the operator develop to such "advanced" levels.

The small horn antenna has already been covered as a candidate for selective replacement and it must surely be in the experimentation with larger horns, various forms of parabolic dish antennae and different feed arrangements that much of the next stage of enjoyment will come for the developing microwave enthusiast.

Summary.

The main recommendations to those ex-beginners who are now suffering from the SOLFAN Syndrome must be to :-

1. Optimise the performance of each individual module of the system rather than accept a compromise for the sake of simplicity,

2. Develop your system into a separate Transmit/Receive arrangement using a waveguide switch, two antennae, circulator or 3 dB coupler method as shown in figure 14,

3. Use a Gunn oscillator module (the SOLFAN unit is perfectly adequate for the job) as a Transmitter on a fixed frequency (10.100 or 10.400 GHz, as required) and optimise it's output power as described in 7 above. Use a fixed output regulator/modulator similar to that shown in figure 15 or 16 and set the output voltage to 9.7 V (or whatever value best suits your Gunn diode as indicated by measurements like tables A & B),

4. Use a second Gunn oscillator module together with a mixer unit to make a receiver mechanically tunable over the whole band 10.000 - 10.500 GHz and electrically tunable (slightly variable Gunn supply voltage) over a small range (+/- 5 MHz as a form of RIT?). Make the Gunn supply transmit/receive switchable.

Be sure to use a low-noise pre-amplifier and I.F. system. It is debatable whether a fixed or a tunable I.F. is preferable. The use of a readily available tunable type (i.e. a V.H.F., F.M. broadcast receiver) for even greater search capability, or a carefully optimised fixed frequency one is a matter of personal choice and circumstances. Either way the choice should be for as high a frequency as possible (usually 30 MHz or 100-108 MHz),

5. Fit a high gain horn or dish antenna on a suitable mount,

6. Procure or arrange the remainder of your system e.g. your tripod or mast, a decent, liquid-damped compass, brush-up on your mapwork and the use of bearings, and plan your talk-back station (2 metres) and then

GO OUT AND USE 10 GHz!

TABLE A

Equipment used :- H.P. Microwave Power Meter 430C,
H.P. 20 dB Attenuator 8491A,
AVO Model 8 Multimeter,
3 inch round to square flange waveguide,
WG16 to "N" type transition,
Variable voltage supply.

CAUTION! Gunn diodes are negative resistance devices and can draw high (and, possibly, damaging) currents if operated at low voltages in the range 0 to about 4 Volts.

Test 1 - SOLFAN Gunn Oscillator with Mixer, unmodified and on original frequency.

i) As purchased :-

Gunn Supply Voltage	Power Output
4	0.3 mW
5	2.0 mW
6	3.8 mW
7	5.8 mW
8	7.4 mW
9	8.6 mW
10	9.3 mW

ii) After adjusting matching screw for maximum o/p at 7 Volts :-

4	Not tested
5	2.8 mW
6	6.2 mW
7	8.7 mW
8	10.0 mW
9	10.5 mW
10	11.0 mW

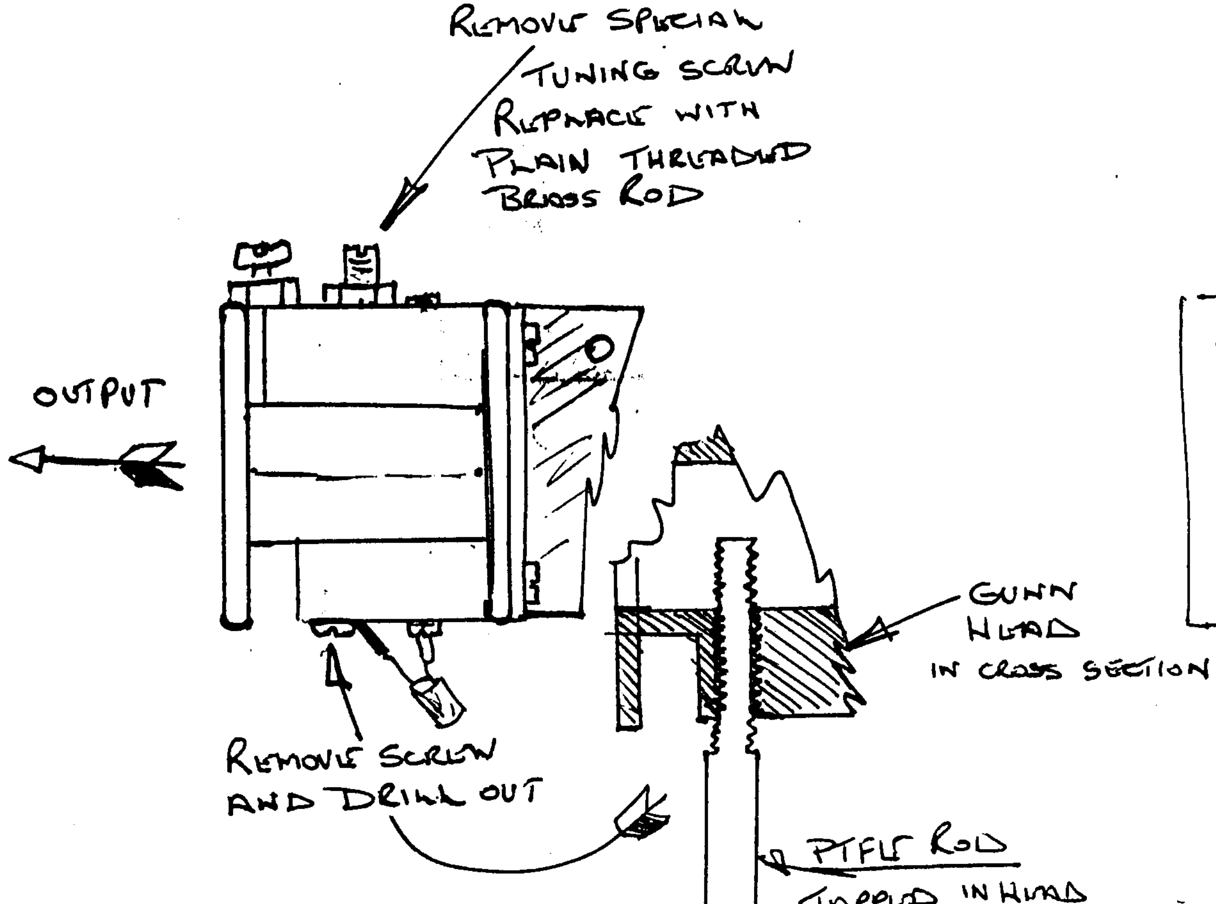
N.B. 20 dB attenuator (HP 8491A) fitted at 10 mW and above.

TABLE B

Test 2 - After modification with a 1 inch length of 2 B.A. brass studding as the tuning screw and setting onto 10.100 GHz and re-optimising the matching screw.

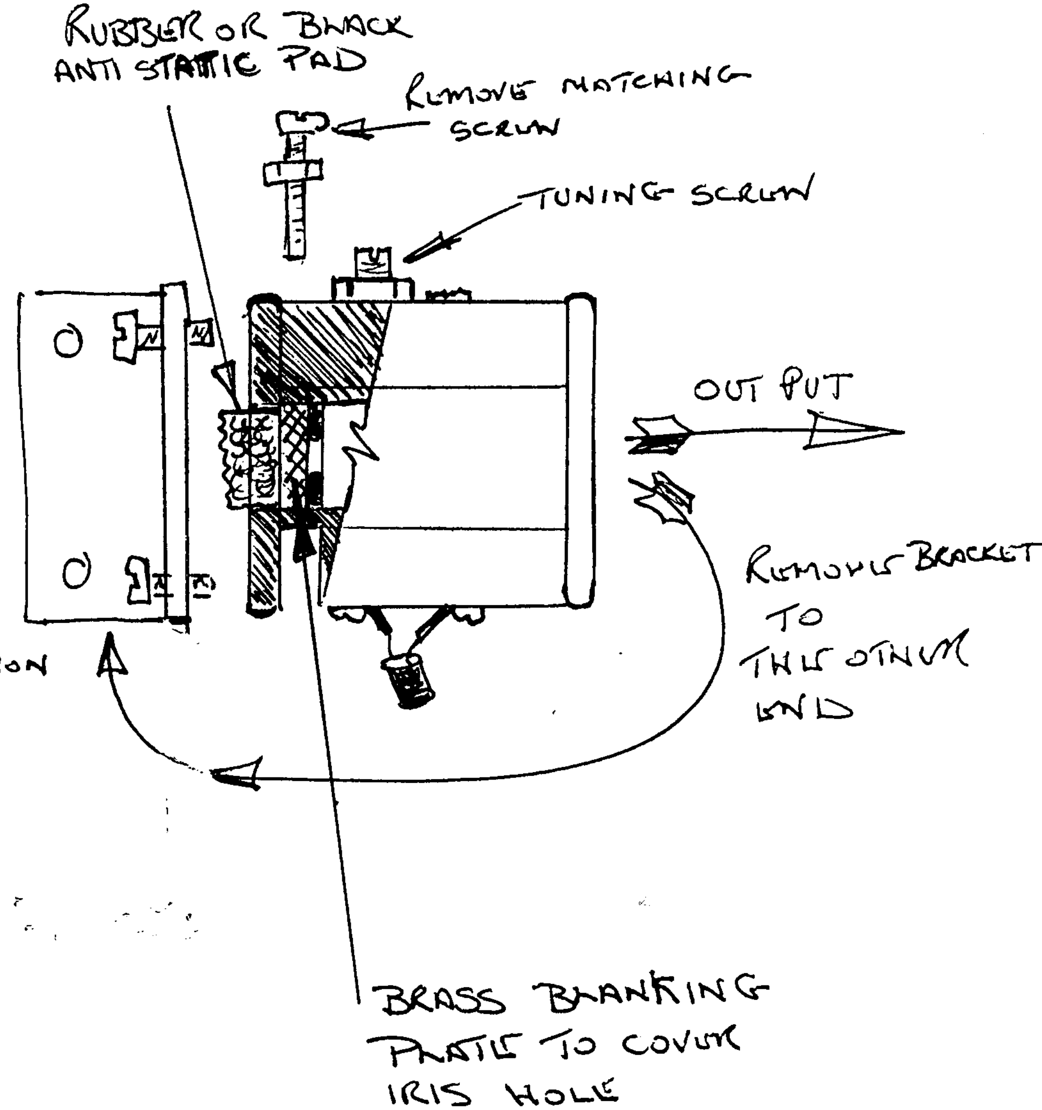
Gunn Supply Voltage	Power Output
5	6.0 mW
6	10.0 mW
7	14.5 mW
8	18.0 mW
9	20.0 mW
10	21.0 mW
11	21.0 mW

Output at 7.5 Volts was noted at 16 mW and Peter notes that Farnell (for example) sell CXY11A10.5 Gunn diodes (8 milliWatt) for 7.80 and CXY11C10.5 (20 milliWatts) for 10.20 and wonders if it is the "C" version which is fitted in the SOLFANs?



FITTING PTFE TUNING ROD

FIG 1



MAKING HIGHER PWR GUNN HEAD BY CHANGING OUT PUT END

FIG 5

SIMPLE TUNING INDICATOR

G4LEE

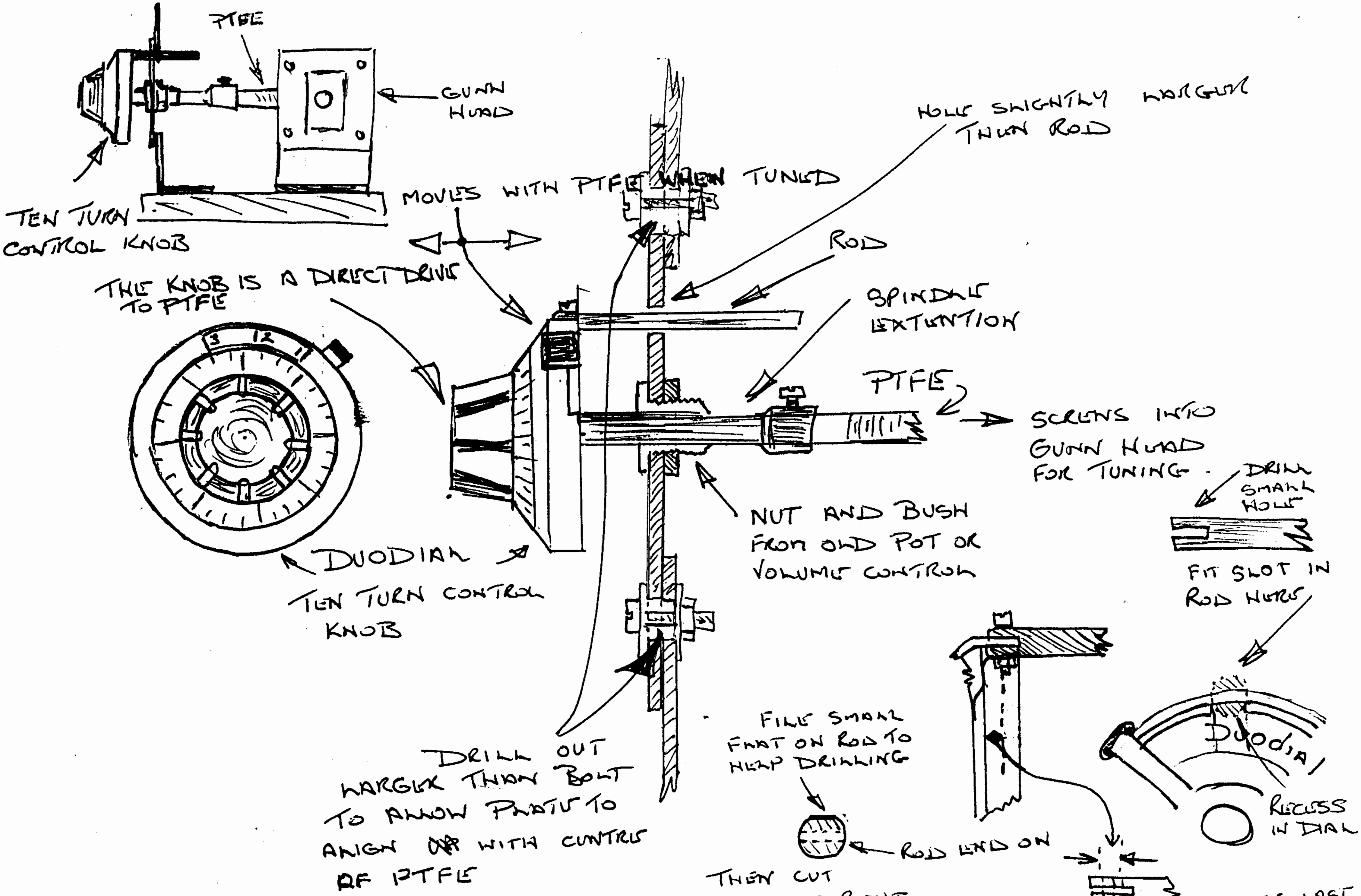
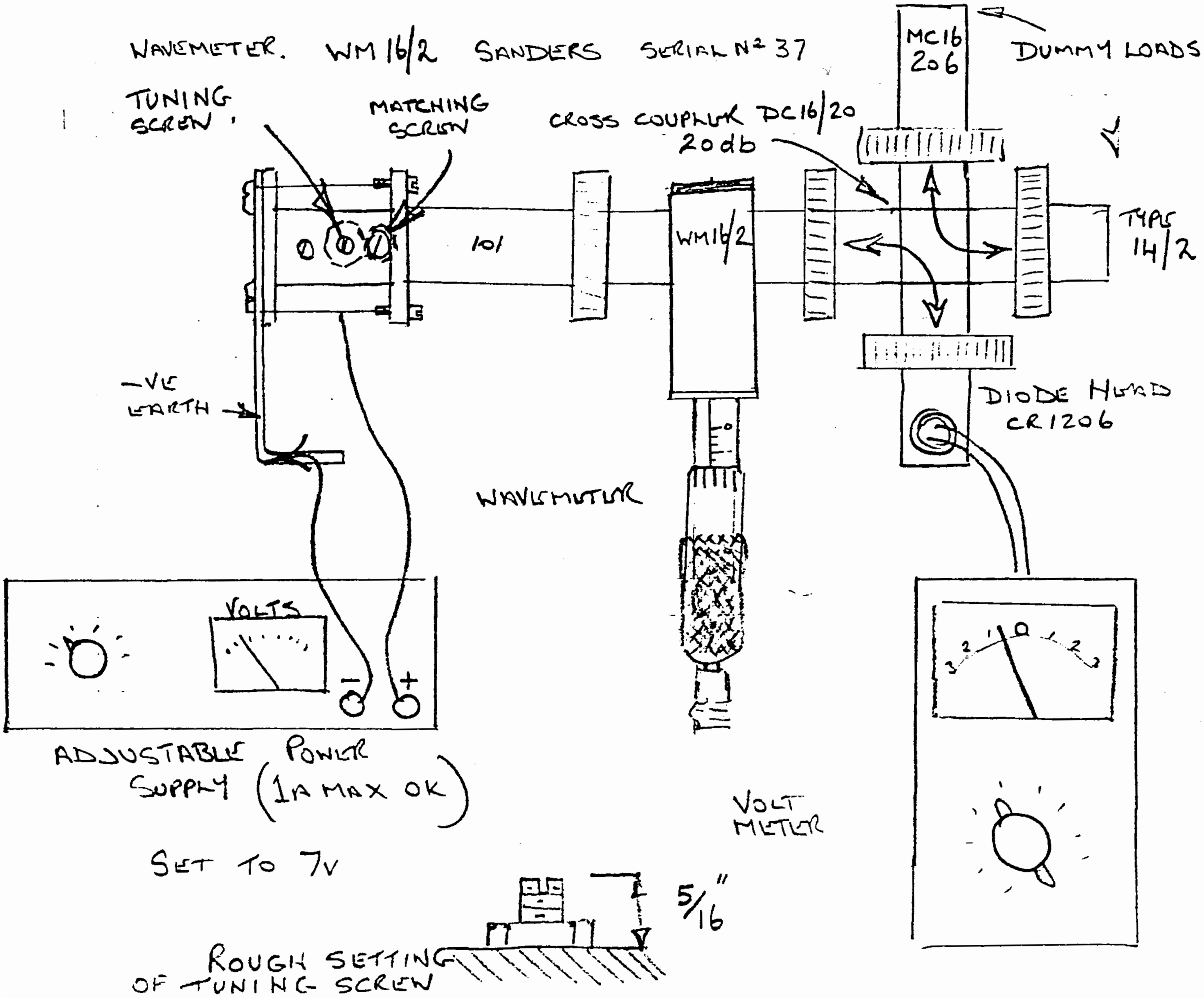


FIG 2

TO SET FREQ

HP D.C. MICRO VOLT-AMMETER + DIODE DETECTOR HEAD (CR1206 J1204 650261)

WAVEMETER. WM 16/2 SANDERS SERIAL No 37



ROD:- 2BA 1" LONG SLOT CUT AT ONE END **BRASS**

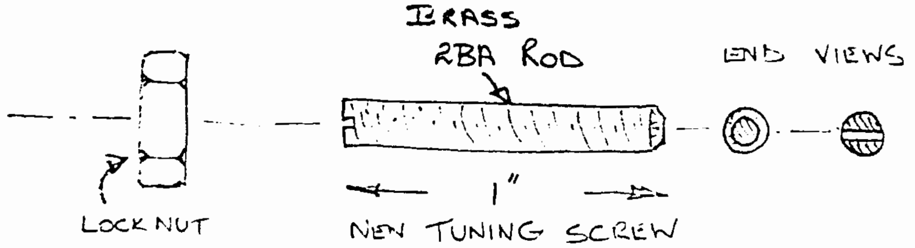


FIG 3

SOLFAN GUNN HEAD

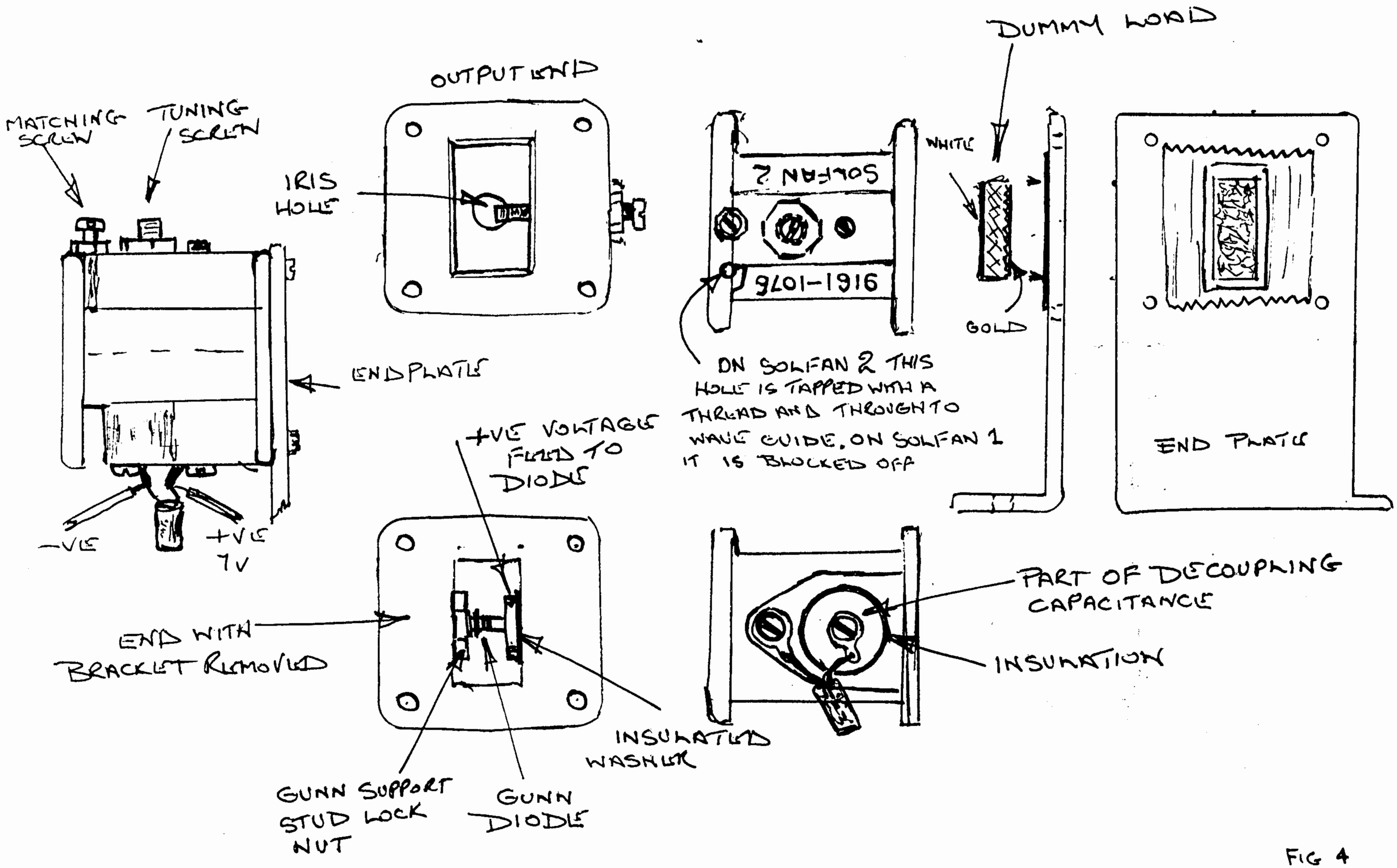
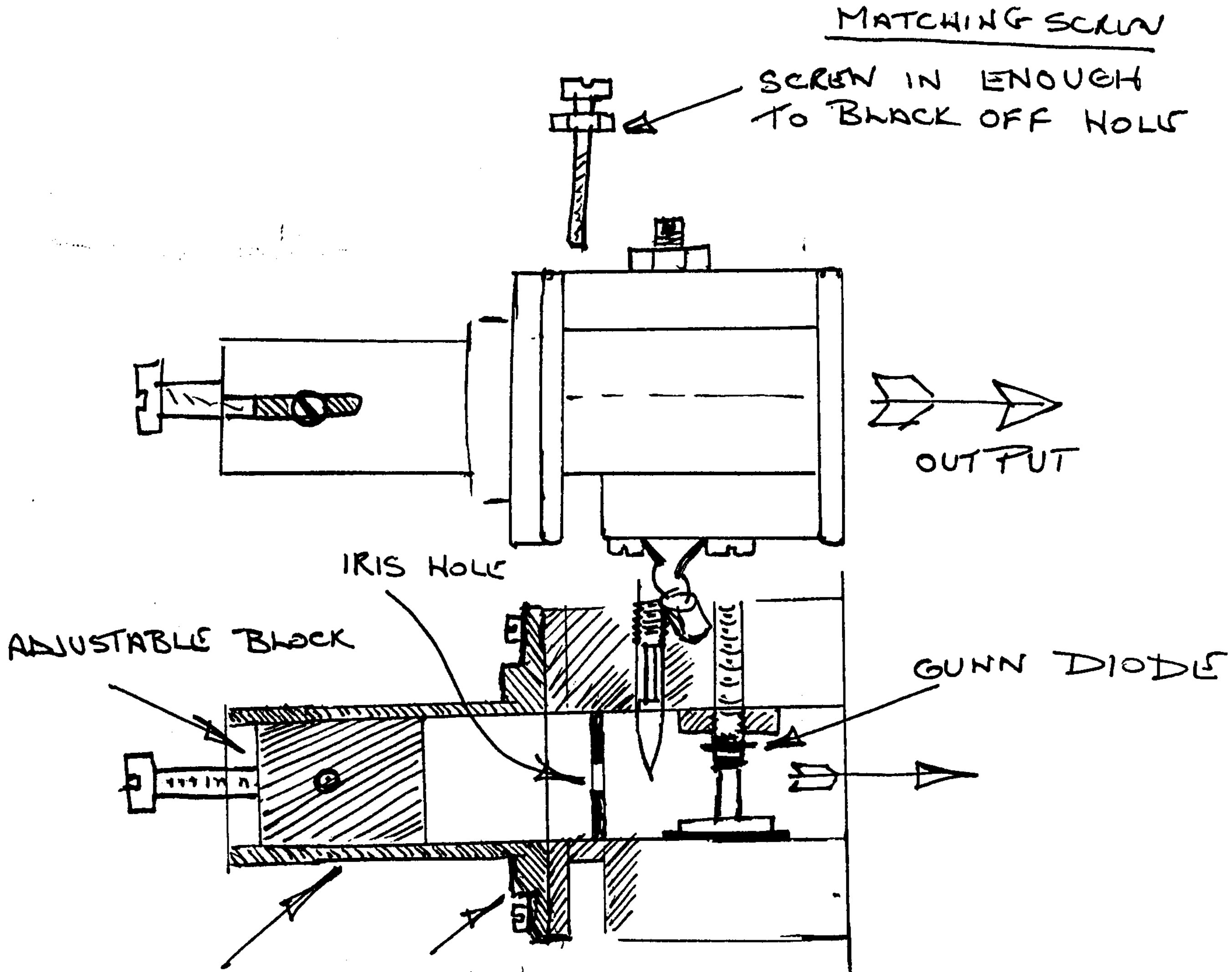


FIG 4

64YEE

CAVITY LOCKED GUNN



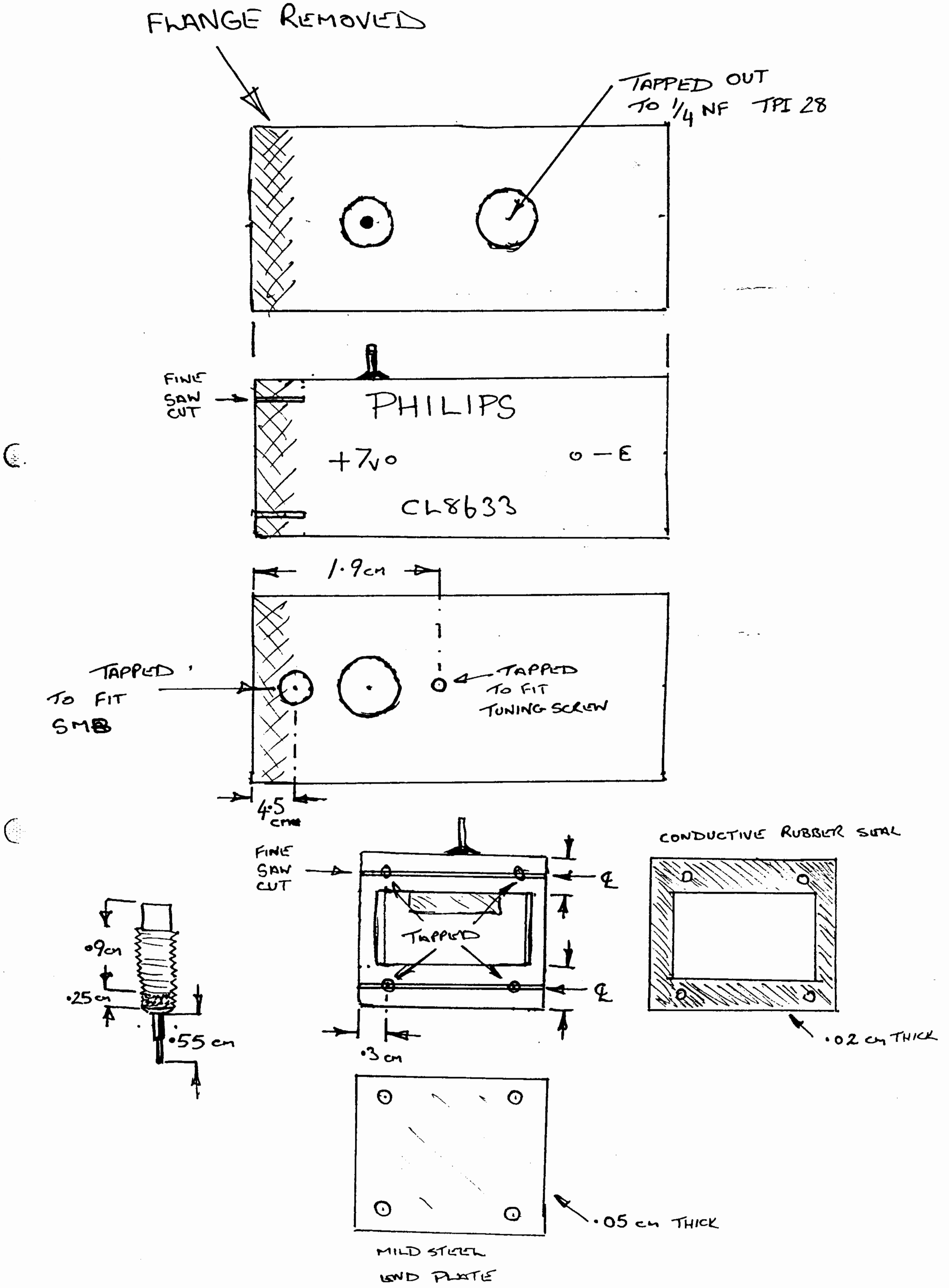
SET FREQ ON TUNING STUD.

ADJUST CAVITY BLOCK TILL DIP IN POWER IS NOTICED ON POWER METER (MIXER + METER DIODE)

FIXED FREQ
CAVITY LOCKED GUNN HEAD.
USING SOLFAN WITH BACK PLATE REMOVED

FIG 6

64455



FLANGE REMOVED
TAPPED OUT TO 1/4 NF TPI 28
FINE SAW CUT
PHILIPS
+7V0
O – E
CL8633
1·9cm
TAPPED TO FIT SMB
TAPPED TO FIT TUNING SCREW
4·5 cm
FINE SAW CUT
TAPPED
·9cm
·25cm
·55 cm
·3 cm
CONDUCTIVE RUBBER SEAL
·02 cm THICK
·05 cm THICK
MILD STEEL END PLATE

FIG 7

G4YGS

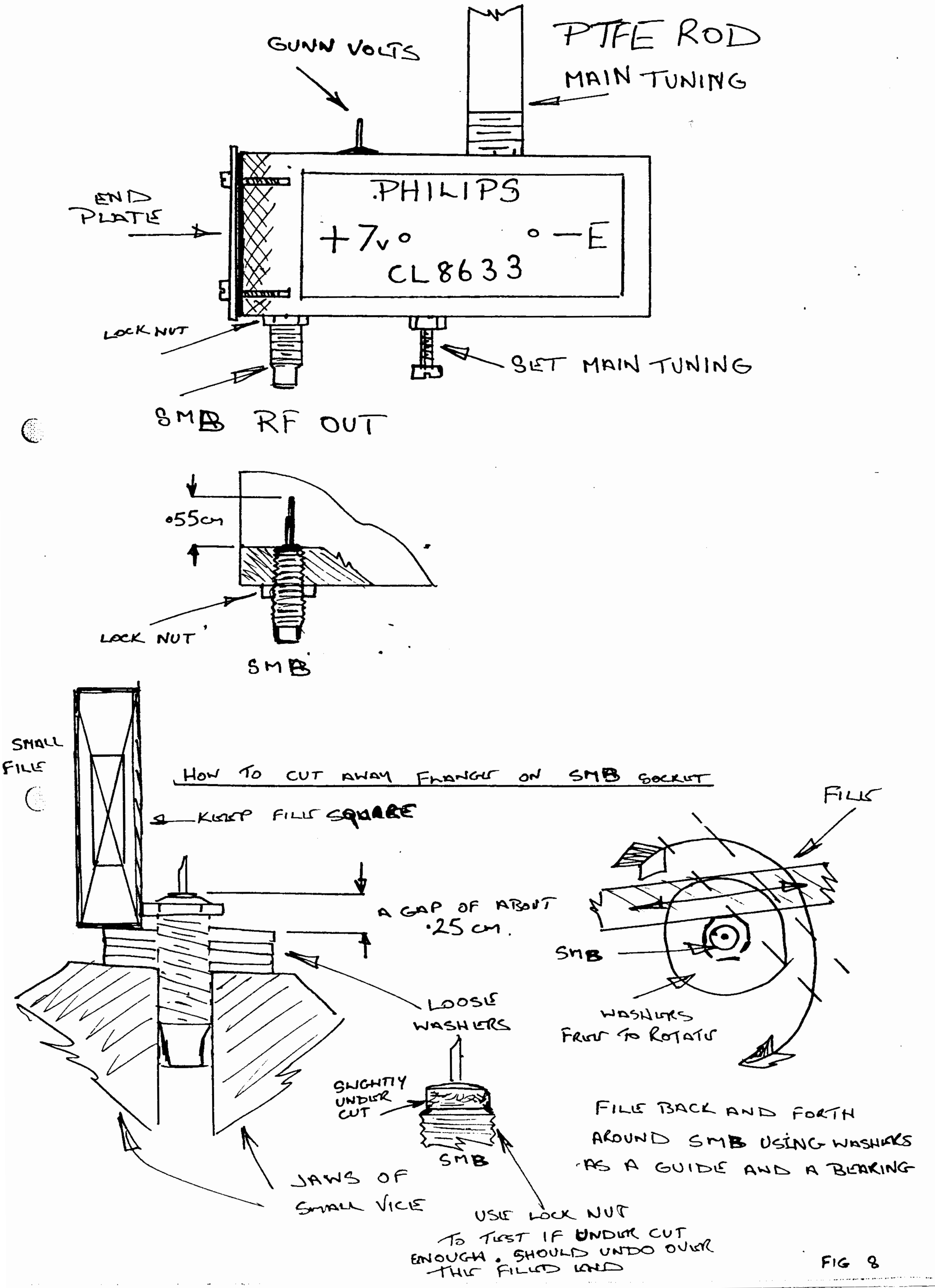
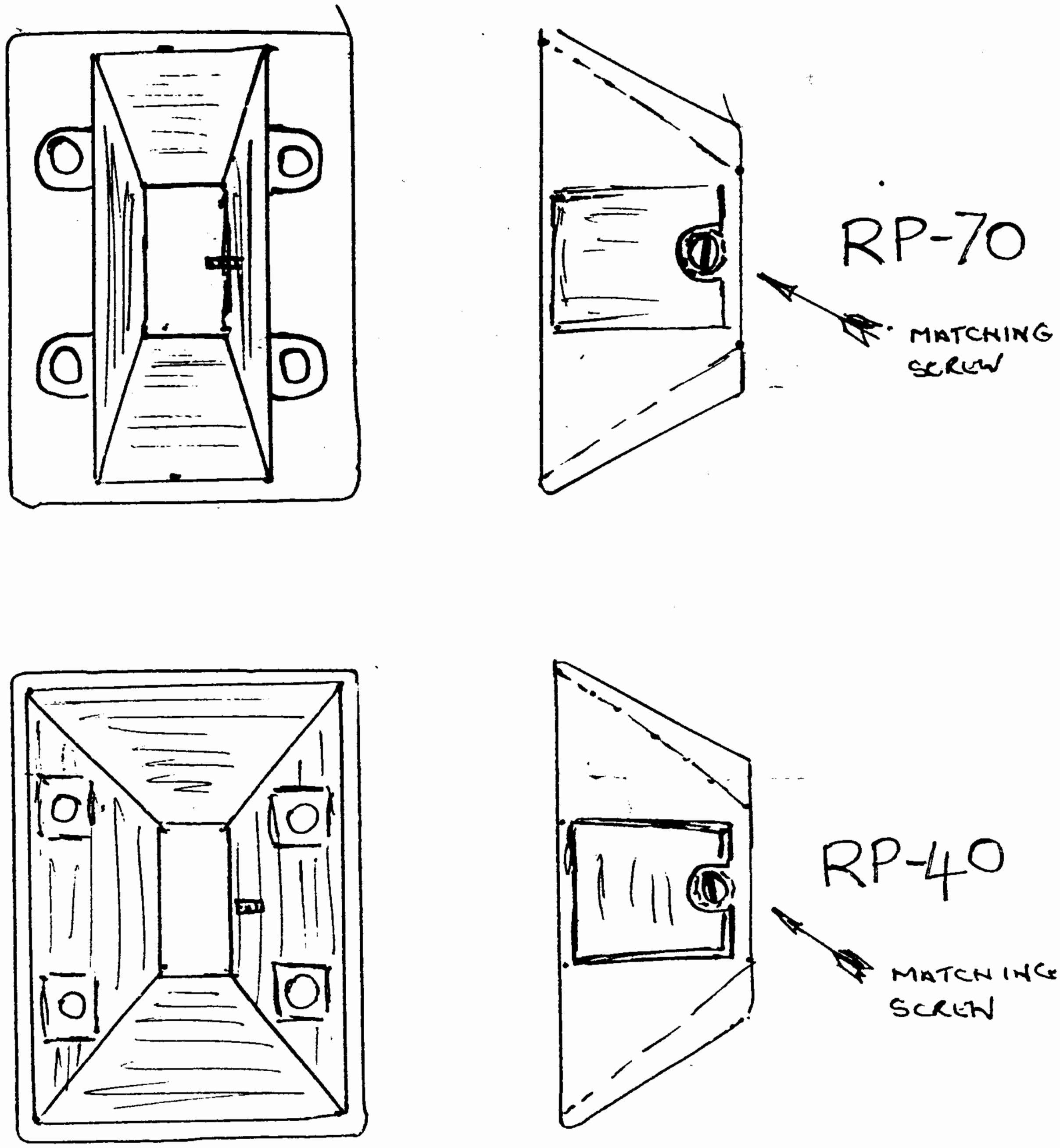

PTFE ROD
MAIN TUNING
GUNN VOLTS
END PLATE
PHILIPS
+7v
E
CL8633
LOCK NUT
SET MAIN TUNING
SMB RF OUT
·55cm
LOCK NUT
SMB
SMALL FILE
HOW TO CUT AWAY FLANGE ON SMB SOCKET
KEEP FILE SQUARE
A GAP OF ABOUT ·25 cm.
LOOSE WASHERS
JAWS OF SMALL VICE
SLIGHTLY UNDER CUT
SMB
USE LOCK NUT TO TEST IF UNDER CUT ENOUGH. SHOULD UNDO OVER THE FILED LAND
FILE
SMB
WASHERS FREE TO ROTATE
FILE BACK AND FORTH AROUND SMB USING WASHERS AS A GUIDE AND A BEARING

FIG 8

SOLFAN HORNS

NOT TO SCALE G4YEE

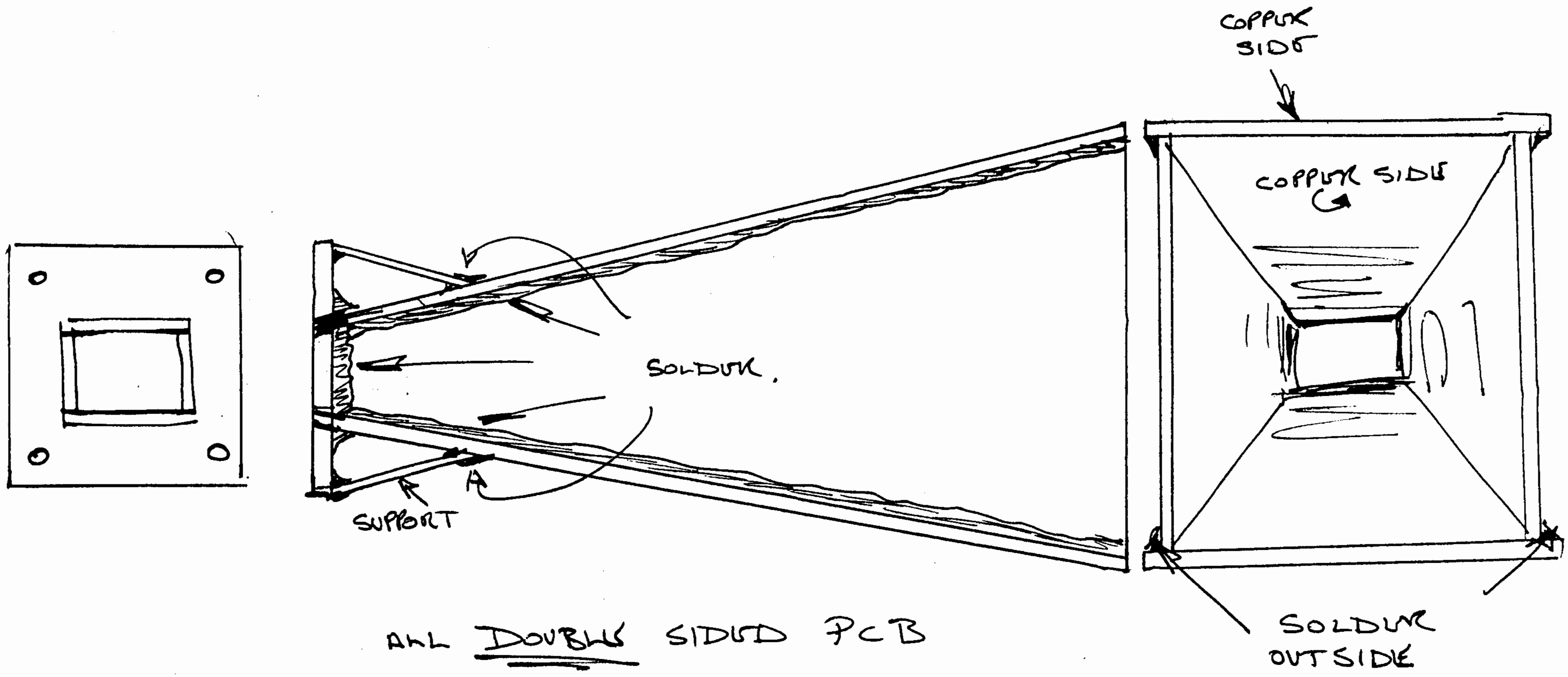


TWO TYPES OF LOW GAIN HORNS FITTED TO THE SOLFAN MICRO WAVE HEAD.

RP-70 IS LOWER GAIN THAN RP-40.

FIG 9

METHOD OF CONSTRUCTING HORN OUT OF PCB
SEE VHF/UHF MANUAL 4 EDITION 9.82–9.83



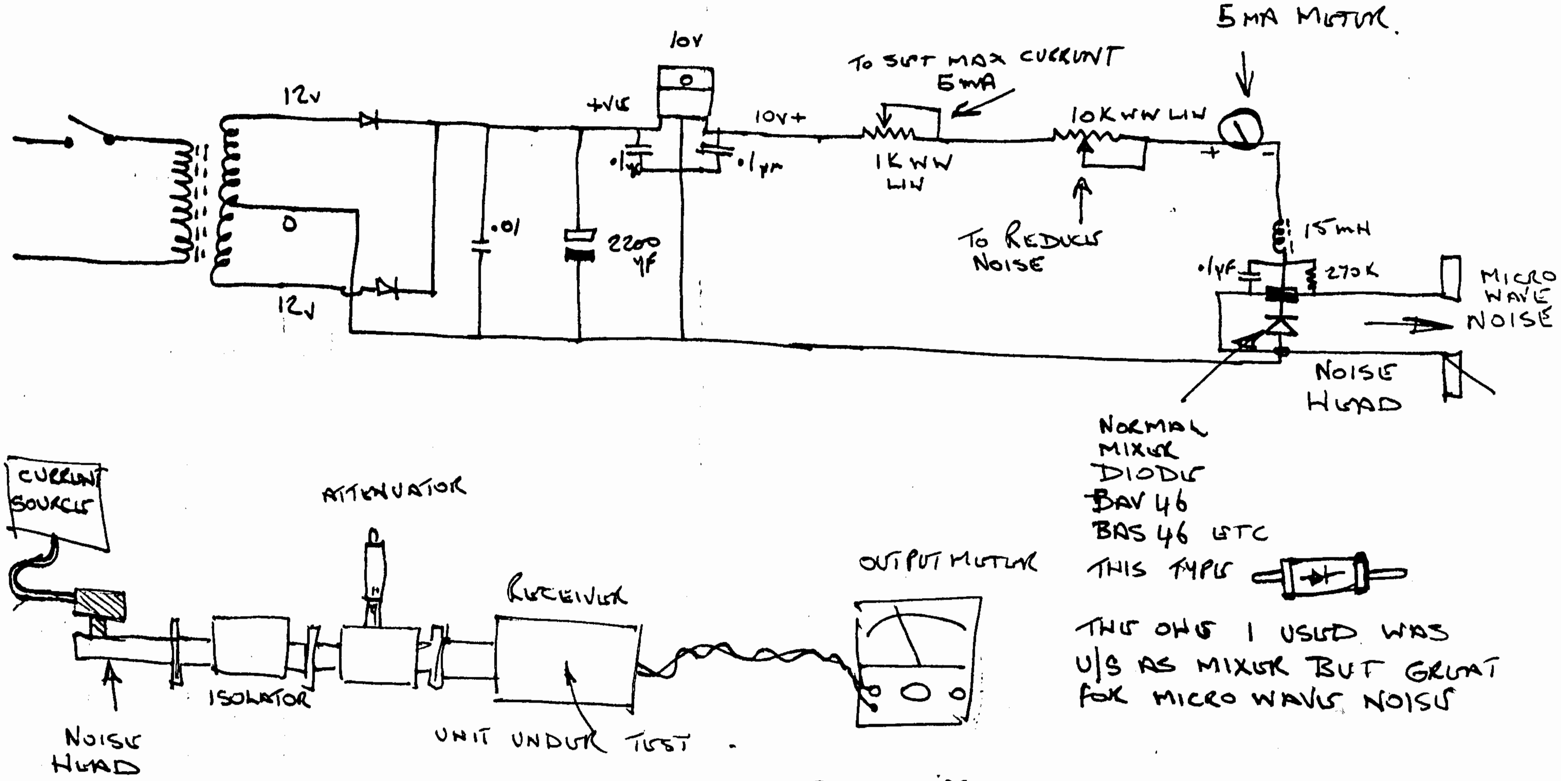
ALL DOUBLE SIDED PCB

ASPECT RATIO NOT WORK OUT
OUT OF TIME
Pete

FIG 10

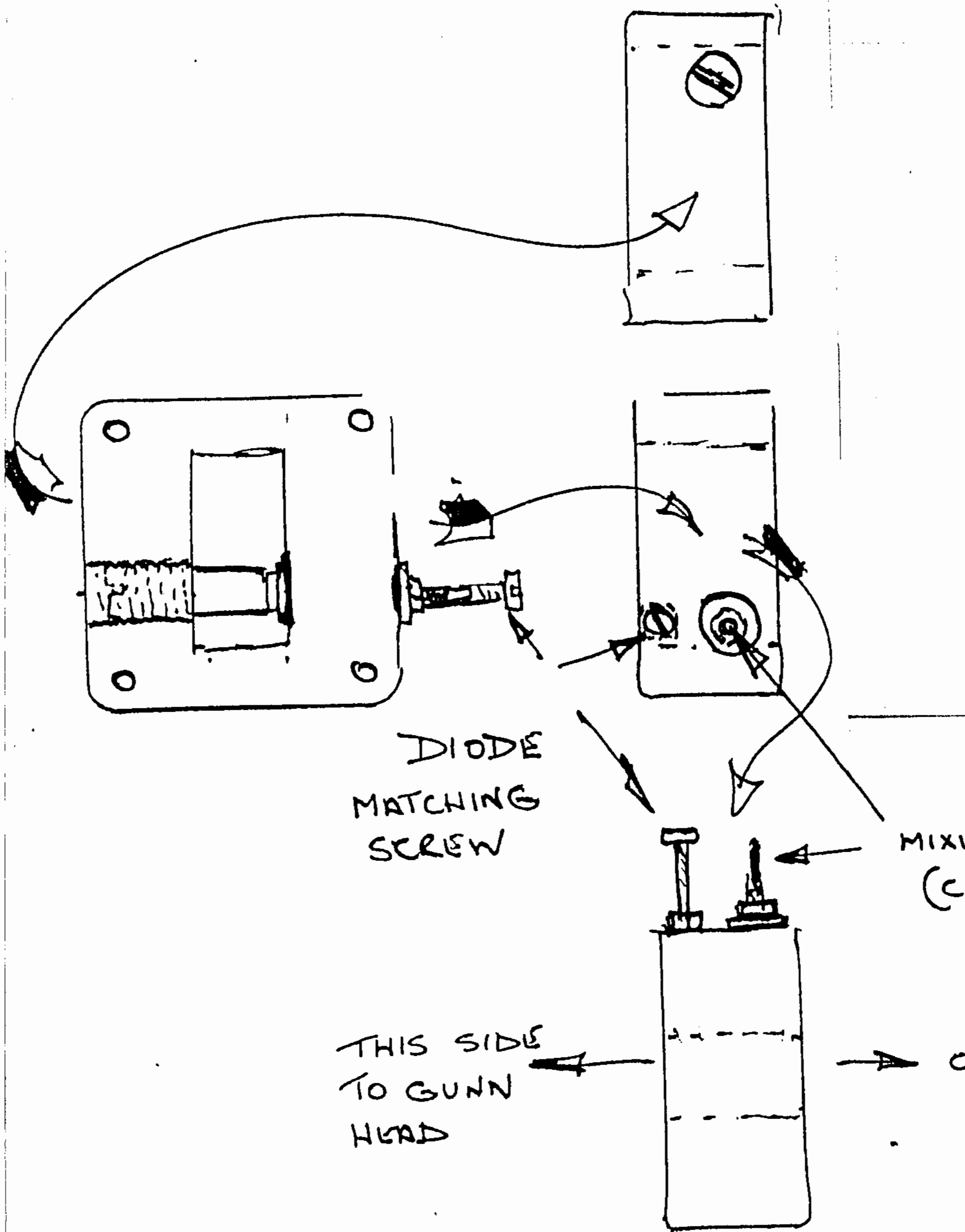
MICRO WAVE WIDE BAND NOISE GENERATOR

G4MEE



I HAVE USED THIS TEST SET UP TO :- ADJUST MATCHING SCREW, MAX NOISE ; CHOOSE BEST MIXER DIODE, MAX NOISE ; AMOUNT OF LOCAL OSCILLATOR INJECTION INTO MIXER DIODE ; BEST SIGNAL TO NOISE RATIO ; TESTS ON IF PRE AMPS ; A OF DIFFERENT MIXER CONFIGURATION

FIG 11



AEI DOPPLER ADD ON

MIXER MODULE

G4YLE

FIG 12

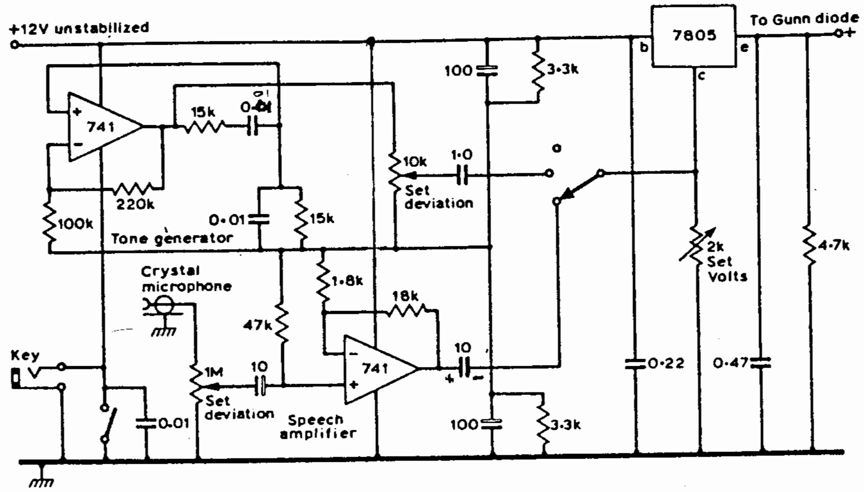
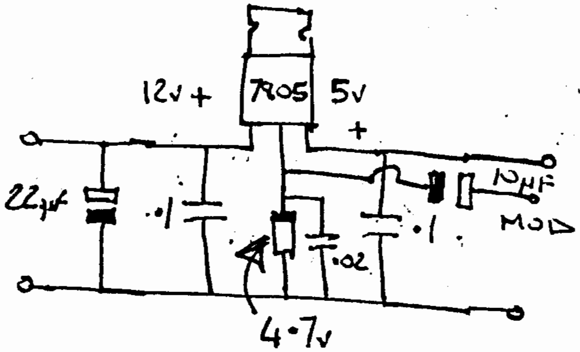


FIG 16

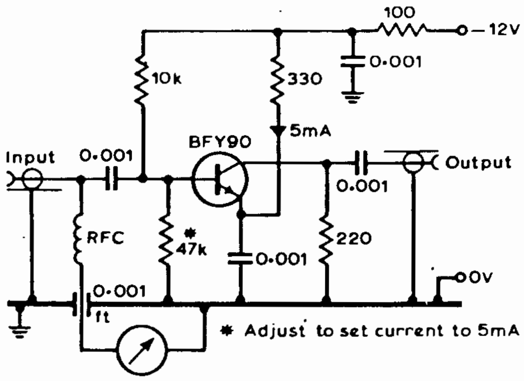
~~Fig 4~~. A modulated psu which is due to G8AGN/G8CZO

FIXED REG/MOD

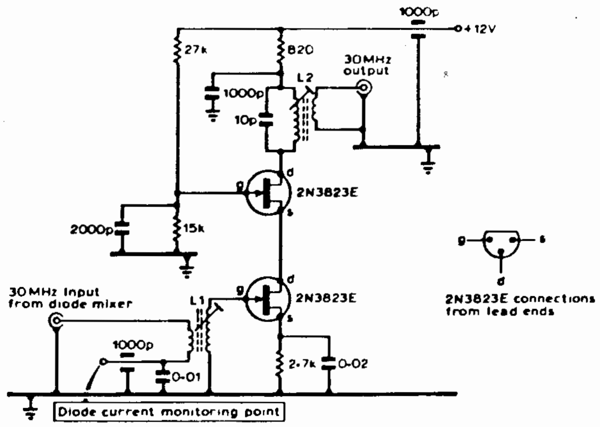
FIG 1.5



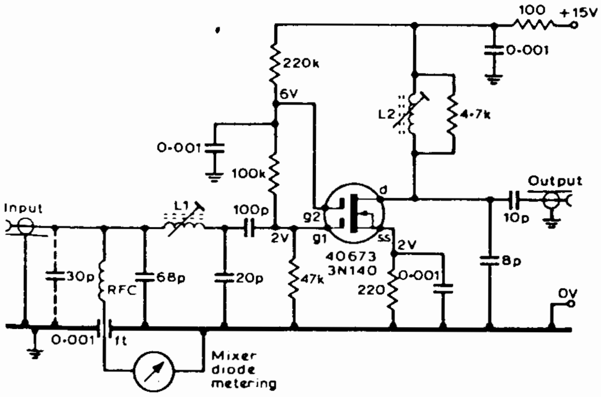
9·7v SEE FIGURES ON HEAD OUTPUT



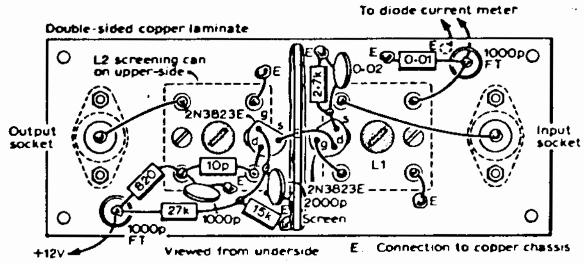
~~Fig 8.77~~. An untuned preamplifier for use at 30 to 200MHz



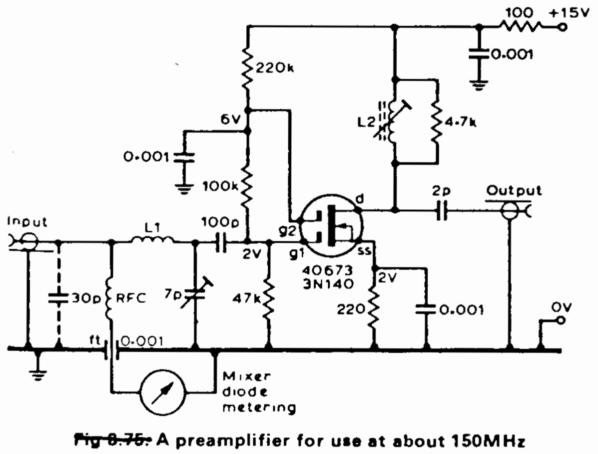
~~Fig 8.78~~. Circuit diagram of 30MHz preamplifier. All decoupling capacitors are disc ceramics. The diode current monitoring point should be strapped to earth if this facility is not required, otherwise a suitable meter should be connected between it and earth. Coil details: L1 and L2 are 20 turns of 28swg, close wound with a 5-turn link winding over the earthy end; the former is a 0·3in Aladdin with ferrite core and screened by a 1⅛in by ⅞in by ⅞in aluminium can



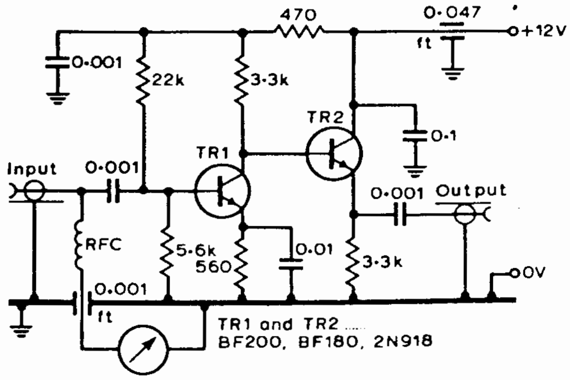
~~Fig 8.74~~. A preamplifier for use at 30MHz



~~Fig 8.79~~. Layout of the preamplifier



~~Fig 8.75~~ A preamplifier for use at about 150MHz



~~Fig 8.76~~. An untuned preamplifier for use at 10 to 150MHz. Its gain is about 25dB. The RFC should have an inductance ranging from 100μH at the lowest frequency to 3μH at the highest

FIG 13