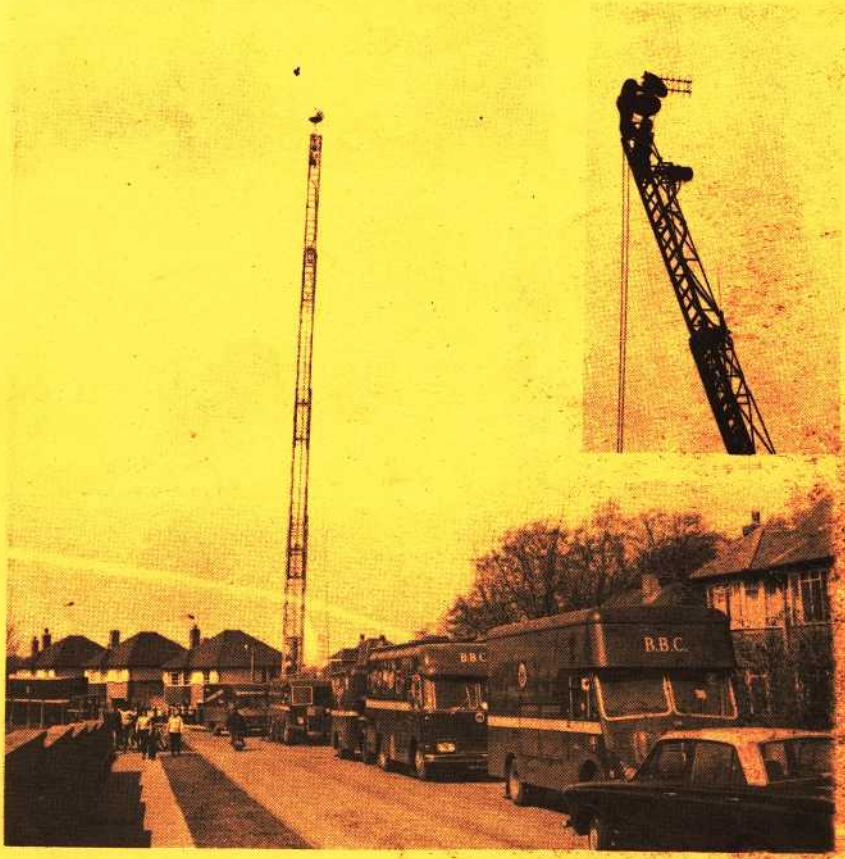


CQ-TV

no 56

The Journal of the British Amateur Television Club

THE BRITISH AMATEUR TELEVISION CLUB
FOUNDED 1949

Editor:- C.F.E. Lacaille,
2, Pasture Road,
Wembley, Middlesex.

ADVERTS.

WANTED. A secondhand 70 cm. Transmitter.
C.N. Roswell, 43, Cheyne Ave., SOUTH WOODFORD,
London, E.18.

WANTED. MW 13-35 Viewfinder Tube also a Heavy Duty Pan and Tilt Head. D. Bridgen, VP8GB/T. (Reply to:- via Hon. Sec.)

For sale:-

Some valve tuners are available from the Hon. Secretary at £2. 2s. 6d. post free. These are U.H.F. tuners and come with full instructions on how to convert to 420Mc/s.

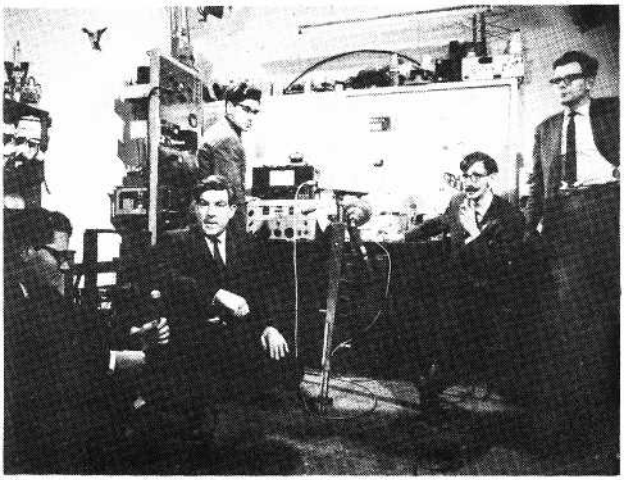
B.B.C. VISITS MIKE BUES.

B.B.C. cameras visited Mike Bues earlier this year. Mr. Rainbow interviewed members and a recording was made of off air pictures from several members in the S.E. and London districts. Those taking part were G3MSN/T, G6OUO/T, G6NDT/T, G6GDR/T, G6RAX/T and G3MCS. The B.B.C. used four $4\frac{1}{2}$ inch I.O. cameras and approximately 2.5 Kilowatts of lighting. Pictures were sent to Television Centre, London, W.12. by microwave link and coaxial cable. Sound was sent by Post Office land line. These were recorded on video tape at the TV Centre. The B.B.C. arrived at 10 a.m. to start rigging and alining equipment. Interviews and off air pictures were recorded between 7 and 8.30 p.m. and the B.B.C. left at about 10 p.m.

PHOTOS:-

The cover shows the B.B.C. vans outside Mike Bues's home. From right to left:- storage van, mobile control room, generator van, microwave links van. The insert shows the microwave transmitter and dish. A B.B.C. engineer is adjusting the 70 cm 8 over 8 aerial. The two cables are used to steady the mast.

This photo shows Mike Bues's shack. From left to right are C. Rainbow (interviewer), J.Ware, L. Woolf, M. Bues and M. Cox.



70 cm. AMATEUR TELEVISION CONTEST

It has been decided, as an experiment, to hold an amateur T.V. contest to run concurrently with the next R.S.G.B. sound contest. It is not intended to make this a regular thing unless there proves to be sufficient interest to warrant it. Your comments will be welcome. The contest will be run in a very similar way to the R.S.G.B. sound contest and the rules are shown below. In order not to interfere with anyone taking part in the sound contest, vision transmissions should take place well away from the 432-434 Mc/s section of the band. A typical operating procedure would be to establish contact in the 432-434 Mc/s section on sound and then change frequency before exchanging vision signals.

RULES.

1. When 18.00 G.M.T. on Saturday November 13th to 18.00 G.M.T. on Sunday November 14th.

2. CONTACTS.

A contact will consist of an exchange of sound signals including a report (i.e. 59.001) and STATION LOCATIONS followed by an exchange of vision signals. The vision signals must be clearly identified at the receiving end. The points claimed for such a contact shall be on the basis of 10 points per mile.

3. ENTRIES.

Entry logs should be tabulated as follows:-

(a) Date/Time G.M.T.
(b) Call sign of station contacted.
(c) My report on his signals and serial number sent.
(d) His report on my signals and serial number received.
(e) Location of station received.
(f) Picture information transmitted. (e.g. test card c, call sign etc.,)
(g) Picture information received.

Entries should also include station location and brief description of equipment used.

To keep the contest as simple as possible, no allowance has been made to accommodate stations who can receive but not transmit vision. This would perhaps be done at some future date. All entries to the Hon. Secretary, please by November 29th, 1965.

A 70 cm OFF AIR PROBE.

By: D. Mann (G60UO).

The unit to be described may be used to set up a television transmitter and to monitor continuously the transmitter output. It provides a video output of 1 volt across 75 ohms which may be fed to a picture monitor and oscilloscope to monitor the off air signal, and also a meter indication of the average transmitter output.

CIRCUIT

The circuit consists of a small probe capacitivly coupled to the inner of the transmitter output coax. This feeds a diode detector which is d.c. coupled to an emitter follower to provide a 75 ohm video output. A mA meter reads the collector current of the emitter follower to give an indication of the transmitter output. Ideally a directional coupler should be used to feed the diode but experiments along these lines have required the use of a lathe to manufacture turned parts. The capacitive coupling used in this circuit works just as well providing the aerial is a reasonable match, i.e. less than about 2 to 1 S.W.R.*

As it stands the probe is designed for use with positive modulation. For negative modulation the diode X1 should be reversed, the transistor changed to a Mullard ASZ 21 or Texas 2G240, and the supply Polarity reversed. The video band width is flat to about 6 Mc/s and it is therefore suitable for use with 405, 525, or 625 line systems.

X1 should be a GEX 66 or similar U.H.F. diode or non linearity may result. The 2N697 is obtainable from most transistor manufacturers and also from Z & I Aero Services Ltd.,

CONSTRUCTION

The probe was constructed in a $5^3/_8$" x $2^3/_8$" x 1" Eddystone die cast box. A short piece of Super Aeraxial cable was used to connect together two Belling Lee coaxial sockets mounted on either end of the box. The inner connectors of the sockets were cut down to 3/16" to enable the connections to the coax to be as short as possible. The length of this coax is almost a quarter wavelength and therefore the mismatch introduced by these connections tends to cancel. The components are mounted on small ceramic stand-off insulators as shewn in FIG. 1. C1 consists of a length of 21 S.W.G. tinned copper wire, one end of which is supported by a ceramic insulator, and the other end is pushed down one of the air holes in the polythene of the super aeraxial cable to a depth of 1/8" and secured with polystyrene cement. The component layout is not critical except that the wires on L1, C1, C2, C3, R1 and X1 should be as short as possible.

SETTING UP

The probe should be connected between the transmitter and aerial, the video output of the probe terminated in 75 ohms and R7 set to maximum resistance before applying the 6V d.c. supply.

With the transmitter switched off adjust R7 until a standing current of 1.5 mA is shown on the meter. The next step is to adjust the probe so that a standing current of 15 mA is shewn on the meter when the transmitter is running at its maximum input power and unmodulated. For transmitters with a maximum d.c. input of less than 50 W. this is done by omitting components R1 and C3 from the circuit and adjusting the depth of the probe wire C1 until the meter reads 15 mA. For transmitters with a maximum power input of more than 50W, R1 should be adjusted in value from 100 ohms to 10K such that the meter reads 15 mA at maximum transmitter power, with the probe wire C1 left at 1/8". For a 150 W. transmitter R1 is typically 220 . When determining the value of R1, the transmitter power should be increased gradually from zero to avoid sending the meter movement round its endstop.

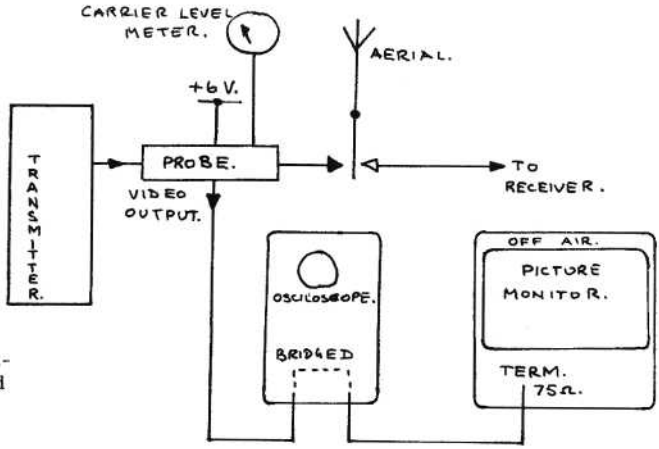


FIG 3.

* (Measurements on a J Beam 8 over 8 show its S.W.R. to be less than 1.2 to 1.)

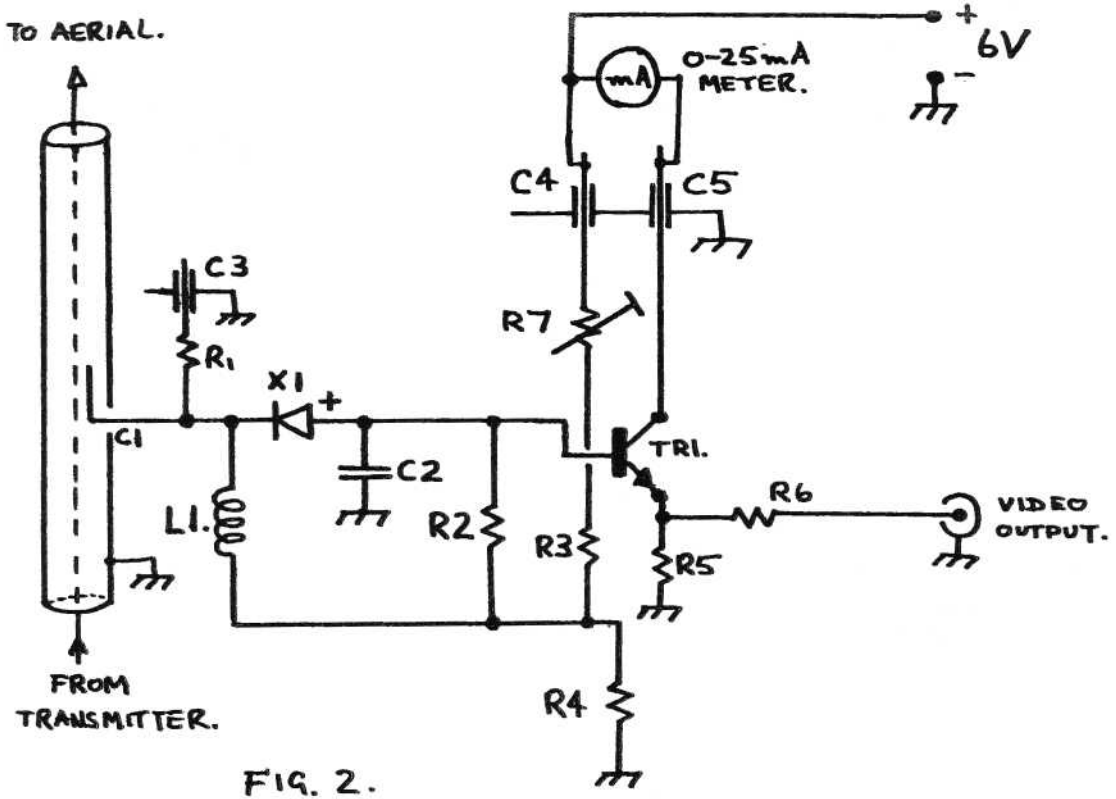


FIG. 2.

COMPONENT LIST.

C1	SEE TEXT	R_1	SEE TEXT
C2	3·3 pF. CERAMIC DISC	R_2	2·2 KΩ ± 20% $\frac{1}{10}$ W
C3	100 pF FEED THROUGH.	R_3	220 Ω " "
C4	1,000 pF " "	R_4	220 Ω " "
C5	1,000 pF " "	R_5	1K Ω " "
X_1	GEX 66.	R_6	56 Ω " "
TRI.	2N697, SEE TEXT.	R_7	500 Ω. pot.

L 1. R.F. CHOKE. 12 TURNS. $\frac{1}{8}$" DIA. 26 S.W.G. ENAMELED COPPER WIRE.

TRANSMITTER ADJUSTMENTS

Fig.3 shows one arrangement for using the probe in conjunction with a transmitter. The normal method of setting up the transmitter is, without any modulation applied, adjust the transmitter so that is it running at its maximum power input. Then adjust the PA anode circuit for maximum reading on the carrier level meter. With a sawtooth or other suitable test waveform applied to the modulator, the PA anode circuit and modulator can now be set for correct picture/syne ratio and optimum liniarity etc., by observing the off air waveform. The probe may, of course, be left in circuit permanently to monitor continuously outgoing transmissions.

NOTE:

(1) If the video output of the probe is not terminated in 75 ohms then the meter reading will be considerably reduced.

(2) The probe is quite suitable for monitoring sound as well as vision.

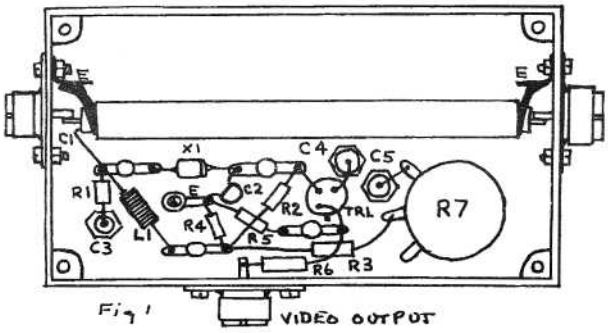


Fig 1

Grant Dixon who is club librarian holds the stock of Mullard Technical Communications. Grant tells us that Vol. 8 No.74 Dec' 64 has an interesting article on a 6 watt transmitter for 480 Mc/s using directly heated valves (types YL 1060 and YL 1130) which reach 70% of maximum output in 0.5 seconds after switch on! Power consumption is 175 volts 170 mA for HT and 1.1 volts and 7.1 amps. for heaters. This might be interesting to some of the R.F. boys if it were modified for 430 Mc/s for use as a portable transmitter with a transistorised camera.

INTERNATIONAL HAM CONVENTION

KNOKKE-ZOUTE, BELGIUM.

17th-19th September, 1965.

Members may be interested to learn of a three day convention which is taking place between the 17th and 19th September at KNOKKE-ZOUTE, Belgium.

The agenda is as follows:-

September 17th.

Reception of those attending.
Visit to Ostend Coastal Station.
Visit to the Radar Landing Approach, Middelkerke Airfield.
Bus tour to beautiful illuminated historic Brugges.
Boat trip on canals to see Brugges

September 18th.

Exhibition of professional R.F. Equipment in actual operation.
Amateur T.V. 432Mc/s demonstration by ON4RT.
Group meetings - U.H.F. - V.H.F. etc.,
Supper - Dance - Tombola.

September 19th.

Technical talks.
V.H.F. one hour direction finding fox hunting.
Local Tour.

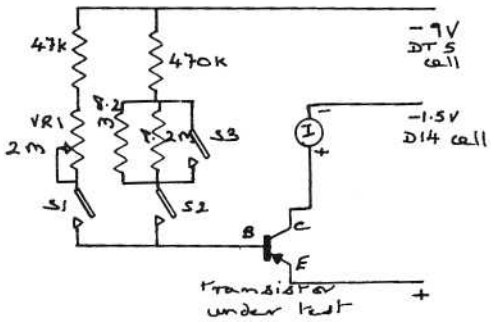
The convention should be highly enjoyable and a chance to meet friends you have worked with over the air. A chance also to visit one of the most exclusive fashionable seaside resorts.

For full details (hotels, transport etc.,)

Write to

L.Vervarcke on 4 LV CM.
Lippenslaam,
284, Knokke 1,
BELGIUM.

TRANSISTOR TESTER.



S3 is a standard toggle switch.
S2 is a spring loaded switch, normally open and S1 is a switch on the pot. VR1 so wired that when VR1 is at maximum resistance, S1 is open.

With S1 and S2 open the meter reads the leakage current I_{ceo} of the transistor.

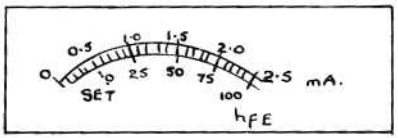
By turning VR1 clockwise, S1 closes and the pot. can be adjusted until I_c is 0.5 mA

With S3 closed, when S2 is pressed an extra base current of $\frac{V1}{470K}$ amp. flows. (This ignores the internal res. of the transistor since it is small compared with the 470K series resistor).

Normally a 9v cell off load is around 9.4 v so the extra base current that flows is $\frac{9.4}{470K}$

$$= 20\mu A$$

If the transistor has a de gain of h_{FE} the increase of collector current will be $20 \times h_{FE}$ μA.
Suppose h_{FE} = 100, then ΔI_c (the increase in collector current) = $100 \times 20 \times 10^{-6}$ A = 2 m.a.
∴ the meter will read 2, + 0.5 (the standing collector current) m.a. = 2.5 m.a.
Correspondingly if h_{fe} = 50, then ΔI_c = 1 m.a. etc.,
∴ the meter scale can be directly calibrated in terms of h_{FE}.



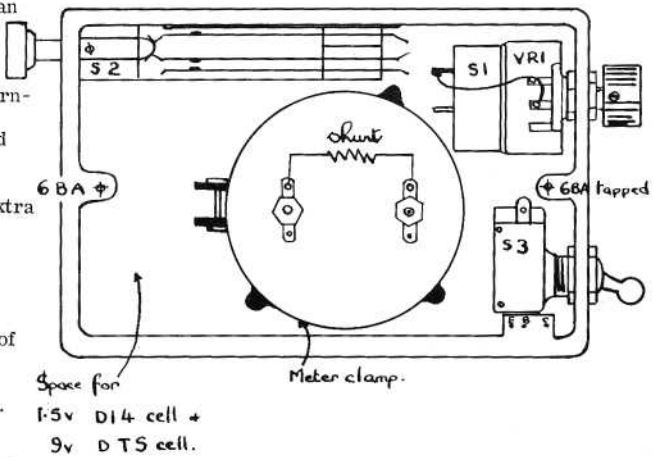
If the transistor has an h_{FE} of above 100 then S3 is opened. The standing collector current remains the same, but now the increase in base current = $\frac{V1 \text{ amp}}{4.6 \times 10^6}$

$$I_B = \frac{9.4}{4.6 \times 10^6} \quad 2\mu A$$

Thus FSD on the meter now represents an h_{FE} of $\frac{2 \times 10^{-3}}{2 \times 10^{-6}} = 10^3$ i.e. 1000.

Thus S3 can be labelled x 10 gain, when in the open position.

The complete tester is built into a plastic case $4\frac{1}{2}$" x 3" x $1\frac{1}{4}$" deep. The meter used had a FSD of 1 mA and was shunted to read 2.5 mA FSD (dia. of meter = 2").



The hole for the 3 pin transistor holder was cut with a hot soldering iron, the socket being subsequently fixed in place with Araldite. The hole for the meter was cut with a tank cutter. S.2 is P.O. type spring loaded, push to make, switch, and was used because it was available. The smaller switch could be used to advantage in this position.

The 1.5 cell was soldered in place, the 9V cell has push fasteners to correct it into cct. The meter was so positioned that it held the cells against the side of the case, the plastic back preventing them from falling out.

Please note the wiring of VR1 and S1 as it is most important that S1 is open when VR1 is at max. resistance.

The functions of the various controls are:-

VR1 and S1 , check I_{ceo} (with S1 open) and set I_c to 0.5 m.A (with VR1 advanced and S1 closed).

S2 , check h_{FE}.

S3 , h_{FE} x 1 on h_{FE} x 10.

No on/off switch is incorporated to disconnect the batteries, since when the transistor is removed the cct is not made.

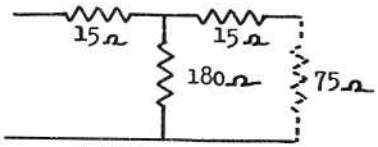
Operation: -

VR1 turned fully anti-clockwise until S1 opens.
S3 opened i.e. in x 10 h_{FE} position.
Transistor inserted in socket taking care that leads do no short.
I_{ceo} can now be read on the meter.
VR1 turned clockwise until I_c = 0.5 mA (marked "set" on meter scale).
S2 pressed, when meter should read h_{FE} x 10, FSD = h_{FE} of 1000. If h_{FE} is less than 100 S3 is closed and procedure repeated, FSD now being h_{FE} of 100.

G. Lewis,
35, Leighton Road,
Hartley Vale,
Plymouth,
Devon.

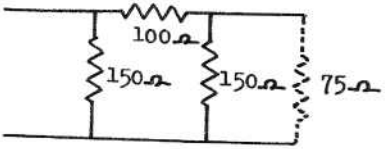
T AND TT ATTENUATORS USING PREFERRED VALUES.

Don Reid has sent us details of some fixed attenuators which use preferred values. They present an input impedance of 75 ohms when terminated with 75 ohms. The input impedance and attenuation quoted are for ideal components. It should be remembered that the accuracy is unlikely to be better than that of the components used. For reasonable precision, resistors of at least 5% accuracy should be used.



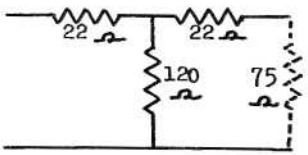
3·52dB

Output volts 2/3input volts

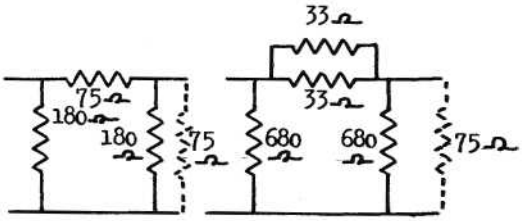


9·54dB

Output volts 1/3input volts



5·22dB



7.47dB. 1·9dB

from the post bag

By D. Mann (G6OUO/T)

Since we last appeared, Don Reid has been back in England on leave, and he is now in Eastern Nigeria with another Television Broadcasting Company. Good luck in your new position Don.

From Darlington, Co. Durham, Laurie Hunton (G3ILD) reports that he, G2BDQ and G3KJX operate on 70 cm. most evenings from 10 p.m. G2BDQ beams south on 434 Mc/s from Newcastle and his vision equipment consists of Derek Aldridges transistor camera and S.P.G. G3KJX beams north on 437 Mc/s from NORTHALERTON in Yorks., and he is building a similar camera with a Murphy pattern generator as S.P.G. Laurie now has a 4 x 150A in his transmitter and an AF186 in front of the receiver. He will be looking for some more D.X. contacts during the Autumn.

Dave Lawton of Bolton, Lancs., is now licenced as G6ABE/T. His transmitter is not yet complete but he has heard G6LEE/T and G6SOG/T on 70 cms. He has almost completed a Vidicon camera and would like to hear from anyone who has a 14" video monitor for sale for about £5.

Chris Jones of Rugby has recently completed a transistor vidicon camera which is working very well.

Peter Johnson (E13AN) of Dublin, has a schedule on 70 cms. with E14Q every Friday morning from 11.00 to 13.30. As his beam heading is north-east, it is possible that his pictures may be received in the Manchester area. His station is 200 ft. A.S.L. and his aerial is 6 over 6 at 55 ft. The transmitter runs 25 w. peak white on 434.7 Mc/s.

Douglas Wilis (G6BBY/T) of Cambridge is now on the air and has had two way vision contacts with G6PGF/T and G3NOX/T. Also of Cambridge, Peter Long is now licenced on G6AAU/T and he is building the Mike Cox transistor S.P.G.

Grant Dixon recently showed his 625 line transistor camera in the education tent of the Three Counties Show at Malvern. He also has a 70 cm T.V. receiver and often tunes the band.

Dave Jones (G3LYF/T) of Totnes, South Devon visited London recently. While he was here he had several vision contacts on 70 cms., using John Tanner's station. This he says has enthused him sufficiently to come on the air from home.

Mike Cox is building a 3 Vidicon colour camera which is well on the way to completion. We look forward to seeing it written up in CQ-TV.

Norman Hampton (G6OUO/T) of N.W. London, has just completed a transistor S.P.G. for 625 lines. His transmitter runs 40 W peak with either positive or negative modulation.

Alan Jenkins of Datchet, Bucks., is now licenced as G6AAL/T. He hopes to be operational soon with the 7 valve Vidicon camera and a 3 W transmitter using an A2521 feeding a 6 over 6 aerial.

John Craig (G3SGR) of Horham on the Sussex coast is building a Receiver to receive vision on 70 cm.

R. Trevitt (G6SSE/T) and John Denning of Tunbridge Wells, Kent, recently gave a talk and demonstration over the air to the West Kent Amateur Radio Society.

Harold Jones (G5ZT) of Plymouth is now fully operational with portable television equipment for 70 cm. He will be out at 1000 ft. A.S.L. at odd times and during the contest.

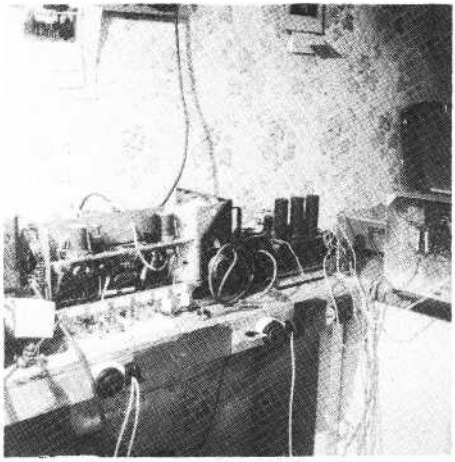
Thats all for now and the best of luck if you are taking part in the 70 cm. vision contest.

David Mann.

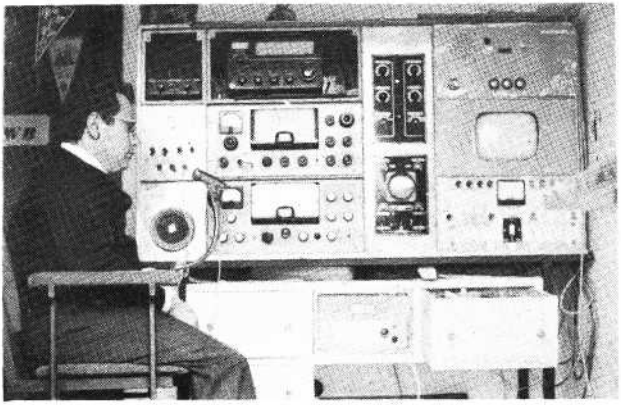
Plastic Badges similar to the lapel badge are now available from the Hon. Secretary at 1/6d. each post free. These are suitable for mounting on equipment and the approximate size is $3\frac{1}{2}$" x 2" measured diagonally.

G3ILD/T received by G6PGF/T at Burwell Cambs., (near Newmarket). Laurie Newton (G3ILD/T) is seen operating his equipment. This picture was received over a transmission path of 180 miles.

Aubrey Black seen here with his slow scan gear.



Michele Troian (ITIWB) operates his radio equipment at Palermo, Sicily.

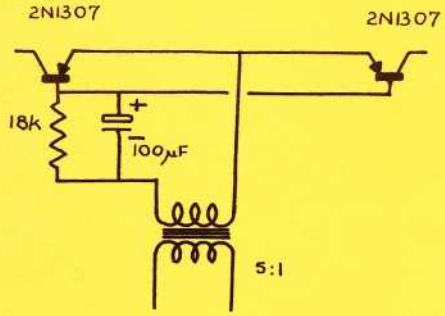


HARLOW TOWN SHOW.

The B.A.T.C. hope to have a demonstration of A.T.V. at the Harlow Town Show in conjunction with the Harlow and District Radio Society on August 28th and 29th, 1965.

Woolworth's now supply plastic "lunch boxes" divided into 18 sections for storage of nuts and bolts, resistors etc.,

4 diode clamp can be replaced by the following:- other transistors should be possible. RC feed might also be possible. This circuit was used in the 'Tiros' weather satellite.



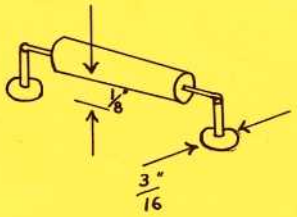
Paper to be given to the Television Society.

On October 29th, four B.A.T.C. members will be presenting a review of the activities of the B.A.T.C. in the last six years. This will be given in the I.T.A. conference hall, 70, Brompton Road, London, S.W.3. at 7 p.m. The meeting is open to all members. It is hoped to publish the review in CQ-TV.

VIDICON HEAD AMPLIFIER.

Several members have built the vidicon head amplifier described by Mr. Cherry and Mr. Hooper in the Proceedings of the I.E.E. (vol. 110, No.2 February 1963). On the whole these attempts have not met with success usually because of instability due to layout problems. Mr. Hooper of the University of Melbourne was kind enough to send us some advice on this.

----- "No difficulties were experienced when the standard method of construction for high-gain, wide-band amplifiers was used. This construction technique employs a single-sided copper-clad board as a basic ground plane. Components are soldered to small pins about $\frac{1}{4}$ inch long which are driven into holes in the insulating board; the copper is cleared within a 3/16 inch diameter circle of each pin hole. This gives a pin-to-ground capacitance of less than 0.5 pF. Components are mounted 1/8 inch clear of the ground plane. In the vidicon amplifier it is wise to keep the signal components (transistors and feedback elements) closely spaced. The overall feedback resistor needs to be synthesized from a number of physical resistors to reduce the effective shunt capacitance C_S down to the design value."



CQ TV