



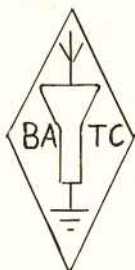
cq-tv

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## Editorial

This edition sees the end of another year, and it is time to remind members that

### ALL SUBSCRIPTIONS MUST BE RENEWED.

As usual, we cannot send you a second reminder, but the enclosed leaflet may help to jog the memory.

Edition 31 brings with it our 500th member; although our present membership is only about 300, the figures do reflect the healthy state of the art, particularly in this country. In the circumstances it is surprising to find almost no interest in ATV in some other countries, notably the USA, Germany and France, where one might have expected to find enthusiastic groups at work.

As described in this edition, the Convention was a great success, and it is to be hoped that all who were able to attend have gone away suitably stimulated. Arrangements for next year's exhibitions and shows are already in hand with some groups, but we do not expect to hold another BATIC Convention unless some other venue for members to meet is not forthcoming.

Finally, your attention is drawn to the column at the right.

With many thanks from myself, family, and BATIC "staff" for the good wishes and Seasons Greetings, (which we all heartily return), may I wish you all the best of luck for 1957.

*J. Balow*

### OUR FRONT COVER

Britain's first amateur Outside Broadcast Unit! The cameraman has to focus and aim the camera, and also keep the aerial pointing to the receiver aerial, without falling off as the taxi moves along. Some of the smaller signs on the vehicle include "For First Class Passengers Only" (rear door); "Remains Live Even When Switched Off" (bonnet); "Accident Black Spot" (mudguard), and of course "Please Do Not Use the Lavatory whilst Stationary"! The radiator cap is an old soda siphon top. The camera is a staticon built by G8FY (Cambridge) and the cab belongs to the "Matilda Resurrection Group". It cost £5 originally.

Picture received in the exhibition hall from the OB Unit outside. Interference bars are noticeable at the bottom of the picture. Owing to tall buildings a range of not more than 600 yards was attempted, although in open country good pictures have been received over 3 miles with the existing V-beams.

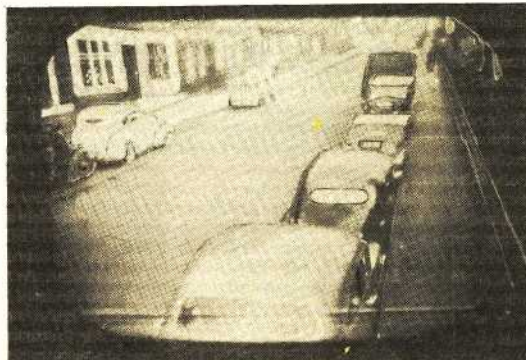
For personal reasons, it is likely that G3CVO will have to give up the post of Editor of CQ-TV next Christmas. He has no intention of severing contacts with the BATIC, and expects to be able to contribute at least four pages of text to each edition. As the Club is peculiarly dependent, by its very nature, on the production of a magazine, however simple, it is vital that someone else should come forward now to help with the next few editions and then to take over completely.

This is not an easy point to decide, so a short description of the work involved may help. An average edition takes about 14 evenings to assemble, assuming the present members can continue to produce the circuit and other drawings. The editor needs a typewriter, a long transparent rule, and a sense of humour. All other necessities will be supplied by G3CVO.

Onto a ready marked drawing board is placed a piece of card approximately  $\frac{4}{3}$  the size of a double CQ-TV page. The margins are pencilled in, and then the text, typed onto white paper (supplied), plus drawings and photos, etc, are cut out and stuck down with Cow gum (supplied). The titles are stencilled or borrowed from a suitable magazine, the page numbers added, and the whole lot despatched to our printers. The latter are in Chelmsford, but there is no reason why a local printer should not do the job if he has a Rotaprint machine. There is actually no need to be close to the printer, as after a while there are very few enquiries raised.

Whilst the printing is being done (about 3 weeks), the editor is responsible for addressing the envelopes, some 250 or so (card index supplied). This will take four people approx. 45 minutes. When the magazines arrive, they must be inserted in their envelopes, with receipts where required, bundled into groups of 25, and taken to the post.

The work involved is much reduced if a group of members is available to help with the drawing, addressing and folding. If no-one suitably placed comes forward, we have the alternatives of hiring some secretarial assistance (expensive, and still requires proof-reading), or we shall have to go back to a duplicated magazine, with its inefficient circuit reproductions and much less space. In either case we still need an editor. As a matter of fact, there is not so much drudgery involved; seeing your own words appear in print is a great encouragement, and the right man will definitely enjoy doing the job. If you would like to take over, please write to G3CVO.





The 1956 Convention broke all records. The attendance of 141 was twice that of 1955 - and the turnover was £65, or nearly 10/- per person. Visitors came from Tasmania, the Netherlands, the Channel Isles, and from Northumberland and Cumberland amongst the further English counties. For the first time there were professional exhibits by Pye, Solartron, Telequipment, Iliffe, Norman Price, STC, Mullard and Messrs Proops, the well-known "surplus" firm.

The Bonnington Hotel is in Southampton Row, between the end of the old Kingsway tram tunnel and Russell Square - known to most for its RSCG Exhibition associations. The Temple Room was at the rear of the hotel, below ground level. Visitors arrived at the Reception desk, manned (womanned?) by Angela and Sonia..... (Margaret Barlow could not attend this year). Here were back copies of CQ-TV, booklets, filmstrips, lapel badges, QSL cards, entry forms, raffle tickets and so forth. A large blackboard entitled "I am here" invited the visitor to add a



Jim Bramhill (t/cine) and Jim Chalwin (who did the display work) examine some of the gear on Messrs. Proops stand. P. Harrison (Sheffield) is at the right. Left of the TV Society exhibit is GSCVO's new CRO.

chalk mark representing his home address, so that by reference to the Visitors Book, he could find the name and address of his nearest fellow enthusiast.

On the right of the entrance was the Quiet Room. Displays of books (Iliffe, Norman Price) and valve data sheets (STC, Mullard) shared space with photos of other TV groups' activities, and a static display of Grant Dixon's colour gear. A 35mm filmstrip projector showed the Back Copy Microfilm (Nos 1-20) of CQ-TV, and a tape recorder played extracts from

the Club Lecture Tapes. An enormous box of surplus components was a "Lucky Dip", at 6d per handful, with a paper bag thrown in gratis.

Inside the main hall, the High Wycombe group had a very fine display complete with fluorescent lighting, background photos, and so on. All of their very well made equipment was on view, although it is not yet in a working state. Solartrons displayed one of their oscilloscopes on the next stand, and then Mike Cox, quoting his operating frequency as 0-3Mc/s, was at the next. He displayed his rack, flying spot scanner, two monitors, vision mixer "telesign" unit and his Simple Monoscope ("for a simple mon"). Unfortunately the equipment did not enjoy its day out in London, and was behaving very poorly; it worked perfectly immediately on switching on back at Chelmsford again, as one might expect. (Sodd's Law). Telequipment Ltd showed their very neat 405 line pattern and RF generator, feeding a domestic TV set and also one of their very fine oscilloscopes. The Birmingham group were unable to bring any gear at the last minute, but their representatives made up for this in enthusiasm. PAOAR displayed photos of the Dutch ATV groups in the corner, and G3CVO had his rack at the end.

The right-hand corner of the room was made into a small studio for the big image iconoscope (G2WV) and image orthicon (G3KOK) cameras and their control gear, plus a display table of the raffle prizes. These included an 813, 7 CRTs assorted, a large number of valves, UHF video and steam, and sundry other items, including a unit containing 2 5FF7s kindly donated by Messrs Proops. The big cameras were handicapped by only having one good monitor between them, as G3KOKs became Exhibition conscious! Pye Ltd had a very neat station camera with remote pan and tilt mechanism, which was most useful for sniping at unsuspecting BATCs. In the corner G3KKD's 70cm converter was relaying the pictures transmitted by the Outside Broadcast unit in the street, using a Pye 14" receiver as monitor. Ivan Howard G2DUS produced his usual very comprehensive exhibit of station camera, telecine unit, monoscope and so on. This was the cause of much discussion and appreciative comment amongst those present, the pictures being, as usual, excellent.

In the middle of the room, G2DUS's 24 element 70cm array made a good centre-piece. G3AST had units of his FSS on display, and there was a good show of converters and RF equipment, including a 4X150A PA and a 3cm TV link, by P. Burrage, using the 723A/B. Messrs. Proops had a table of equipment specially chosen for its ATV interest, and the Television Society showed units of G3CTS/T, the station being installed at Norwood Technical College.

With due respect to the exhibitors, however, pride of place must go to the O.B Unit outside in the street. As the photos show, a really ancient London taxi, with suitable inscriptions upon it, carried a station camera and a V aerial on the roof, a petrol generator on the luggage grid, and the CCU and transmitter inside the passenger space. This remarkable vehicle travelled down from Cambridge in the morning, and was a centre of attraction in Queen Square, as will be imagined. The pictures

transmitted were excellent, and when an equally old taxi appeared being towed by a breakdown truck, the OB unit hotly (and noisily) pursued it nine times round the square. No cameramen were lost, although the constant buffeting from viewfinder hood in front and aerial mast at the rear must have given them some real headaches! Words cannot do justice to this very fine effort produced by members of the Cambridge group, but we should say that the taxi itself was at least as much a technical success as the vision gear!

After the lunch break, a short AGM was held. The Committee resigned, offered themselves for re-election, and were duly re-elected in true amateur fashion, Tom Douglas G3BA being proposed in his absence as Midlands member in place of Frank Rawle, who has had to retire. The Vice-President, Mr Townsend, and the Chairman both congratulated the Club on the past year's efforts, and expressed the hope that we should now turn to something more original, something that could not be done better by the professionals. After the Treasurer's report (verdict: solvent), tape recordings of absent members Paozi, Tony Sale, Mrs. G3CVO and Master G3CVO were played, and the meeting declared adjourned.

At 4 p.m. a film show was given by John Adams, in spite of his feeling extremely ill, and having been up until 1 a.m. the previous night with G3CVO remaking the sound accompaniment to one of the films. We saw "The Magic Window" by Phillips, "OB Vans" by Marconis, and then the now-20-minutes-long "BATC Newsreel", complete with sound and even advertisements ("She's lovely - she's gorgeous - she uses - Resin Cored Solder!"). This was a great success, which was some recompense for the effort put into making it by various members. The raffle followed, as many as possible being given something, and then the remaining contents of the 6d-dip box were auctioned - raising much more than they would have done at 6d per dip! At 6 pm some of the exhibitors had to leave, and by 8 pm the Convention was over, having been voted a great success by all. Don Reid, the organiser, received a special cheer at the AGM, and adds his thanks to all who helped. Your Editor would also like to apologise to those members whom he had not time to talk with. It does look as if our next Convention, whenever it is, will have to be a two-day affair - Conventions are getting popular.

G3AST



View of some of G3AST's equipment, behind which can just be seen part of P. Burrage's 4XL50A PA on the RF equipment stand. The netting at the left is the back of G2DUS's 24 element array. Holding the hankie (?) is G4RO (St. Albans) talking with G3AST. In the background (with beard) is the Hon. Treasurer G3EKE.

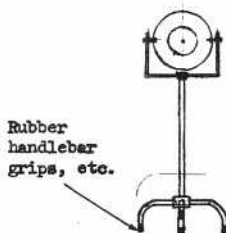
A woollen scarf in squares of red, beige etc made by "Sammy" Ltd was found after the show, and may be reclaimed from G3CVO.

Bill Stapleton has copied the sound newsreel tape made at the Convention, and one copy is en route to Paozi and the other to Jack Mason in New Zealand. We should like to have the 1955 Newsreel returned please. If you wish to borrow either tape, please write to G3CVO.



NOISY PICTURES HERE TONIGHT, OM!

Jeremy Royle sends in a note for those wanting to make cheap studio light stands. The scheme is



At G2WJ internally silvered bulbs are used, more expensive than normal but much more efficient.

Transistors tend to be a mystery to the average amateur, perhaps because of the amount of mathematics apparently required to understand their operation. It should be remembered that a similar state of affairs existed with the first valves - they were expensive, not fully understood, and regarded with awe. Fortunately, just as with valves, it is not essential to understand all about transistors in order to be able to use them in circuits. One or two practical points should be borne in mind; everyone knows that transistors require much lower HT voltages and currents than valves, and no LT at all. They tend to be much more efficient than valves, and more linear.

Transistors will do most things that valves will, but there are still many cases where valves are better. The nomenclature is in just as bad a state as valves, each manufacturer having his own code. Mullards at least keep in step with their valves - all transistors are O (zero heater volts) O (triode) and two numbers. There are two broad classifications of transistors, "point contact" (in general low power but useful at HF) and "junction" (more powerful but often poor at HF). For various reasons the point contact type is almost extinct. The junction types come in p-n-p, n-p-n and symmetrical types amongst others, none of which need concern us except to notice that the polarity of the HT voltage required changes between types.

From the amateur TV point of view, one of the biggest snags is that many of the present junction types have a cut-off frequency in the 2 or 3 Mc/s range. In other words they will not work above this frequency and are in consequence useless for many video applications eg video amplifiers. Naturally a great deal of work is being done to improve this, and in a few years no doubt suitable types will emerge. The actual cut-off frequency depends on the type of connection of the transistor.

Wired in the grounded collector mode, it acts in a similar manner to a cathode follower. With suitable peaking the response can be maintained out to 4 or 5 Mc/s. Feeding into 75 ohms, the gain is about 0.75, but the driving impedance must be low (2 to 5K).

Unlike the cathode follower, this circuit does not have a very high input impedance, and it does not give isolation of the output from the input. On the contrary, it is possible to go either way through a grounded collector circuit, but the gains are not equal in both directions, being much less from "back" to "front".

At the moment, transistors appear to be most useful in pulse circuits. The point transistor has a useful negative resistance characteristic so that it can be used as an oscillator. Figure 2 shows the MC stage of a transistorised sync generator, together with one of the divider stages, designed by C.H. Banthorpe. Counts of from 2 to 7 per stage can be obtained with great reliability, and the 12V HT is very suitable for mobile work. Triggering can be as

shown from base to base, or from the 1K collector load to the next base; AFC feedback can go to the bottom of the 2.5K variable, or as preferred.

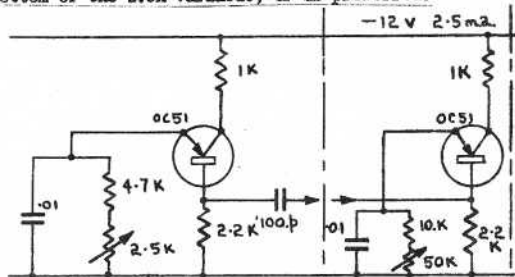


Fig.2: Transistor counter chain

Note that the above circuit will only operate with POINT transistors. Junction transistors have no negative resistance characteristics, and so we can regard them as simple triodes; blocking oscillators and multivibrators can be made, the latter being smaller physically owing to the finite size of the BO transformer. Figure 3 shows a typical multivibrator

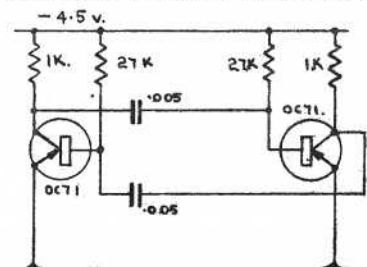


Fig.3: Transistor multivibrator

circuit; in appearance it is very similar to a valve circuit, and the formulae for pulse width and frequency are much the same. As usual, such a multivibrator gives out a pulse of amplitude almost that of the applied HT voltage, and can be used for Line and Field Sync and Blanking generators, master oscillators, counters, etc. Using transistors and crystal diodes only, it is possible to make a very compact and economical sync generator, and we shall be very pleased to print any transistor circuits that members may develop.

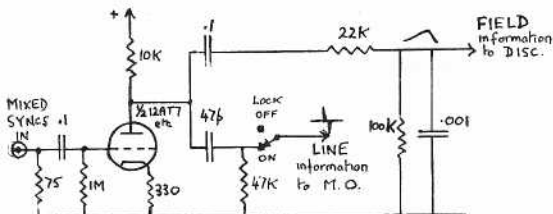
Members may like to be reminded that Mullards issue a very useful introductory booklet entitled "Transistors for the Experimenter"

#### This month's BATC Wrinkle:

You can use a triode amplifier from a 75 ohm line without fear of Miller capacity ruining your frequency response.

It is becoming increasingly apparent that with the extension of amateur TV activities, the Club should consider the introduction of a new standard to enable any BATC sync generator to be locked to any other. Occasions when this facility is extremely useful are when two or more self-contained camera chains are running, as at an exhibition, or when both ends of an RF link wish to lock themselves to the BBC or ITA syncs. (As has been stressed many times, the latter process enables much weaker signals to be resolved than when synchronising depends on the use of the received - and noisy - sync pulses radiated by the amateur transmitter. 525/625 line BATCs should remember that flywheel sync circuits are rare in the UK, and so noise on the syncs has a drastic effect on the average domestic TV receiver).

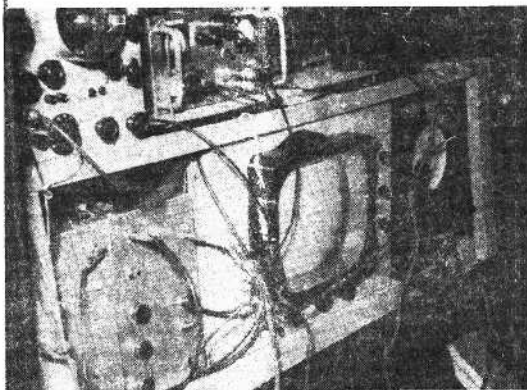
The problem is to unlock the local sync generator from the mains, and to lock it instead to both line and field information from the remote source. If this is not done, then the effect will be of slow and variable line and field slip. Feeding remote field syncs (usually integrated) into the discriminator in place of the mains sine wave usually employed will lock the field effectively but the lines can still wander. Switching the discriminator to compare local and remote line syncs locks the lines, but the fields may be mis-phased; the fields will not wander because the counter chain locks them to the line frequency. To correct the phasing, the counter ratio must be varied until the two fields, local and remote, slip into phase. This easily done by shorting out one of the counters with a push-button - but there are 405 chances of releasing it at the correct moment!



For amateur use, the easiest method is to unlock the local generator from the mains, displaying the local and remote field pulses together on the CRO, or displaying a local picture with remote syncs, or vice versa. Now the master oscillator frequency control is varied until the two pulses or pictures are in phase; this is easily seen on the picture if the brilliance is increased until the flyback lines are visible. Now switch in some differentiated line information into the master oscillator to sync it, and the job is done, the two generators being "genlocked". If remote field pulses are also available, the discriminator can be fed with these to avoid the phasing troubles mentioned above.

The proposed standard then is that: "All BATC sync generators shall be fitted with a Belling-Lee socket for accepting either Line Sync only or Mixed Sync information from a remote source (at standard level), together with such circuitry as will enable the sync generator to be genlocked to the remote source."

A suggested circuit is shown below; the field sync section can be omitted if it is preferred to work from Line Syncs only.



MATILDA AGAIN!

The control gear installed in the passenger compartment of the taxi: top left, monitor CRO; centre top GSKKD's cw/mcw/fone/tv tx (6J6 PA); picture monitor and camera control and talkback at the bottom, also voltmeter for the P-E set.

Further to the remarks about video tape recording, it has been suggested that we could do this easily by using 30 line 25 picture standards. Using the formula on P18 of Television Engineering Vol 2 that  $f = \frac{aL}{2T}$  approximately

where  $f$  is the video bandwidth,  $a$  the aspect ratio  $L$  the number of lines and  $T$  the duration of one line, we find that for 30 line standards  $f$  is about 15 kc/s, which is well within the capabilities of the average tape recorder at 15 ins/sec. Although it would be nice to use the other track for the sound accompaniment, this would mean modifying the tape recorder, and it might be better for the time being to have a separate tape for that. G3CVO will be delighted to receive any such tapes, so those members with flying spot scanners and the like - screw down the line frequency control, and have a go. We already know the Williamson makes a fair video amplifier at 200 lines.... Incidentally, 30db is considered to be a reasonable signal/noise ratio for video work; the Ampex video tape recorder does that on a 2" tape @ 15 ins/sec, obtaining 4Mc/s bandwidth and so giving 320 line definition on the 525 line system.

Reference for slow speed high definition scanning: Ennes: "Slow Sweep TV for Closed Circuit use", Electronics November 56. Circuits, etc.



By Brian Partridge G3KOK/T.

This little converter is easy to make and easy to get going. It gives a very good account of itself when compared with the "G3GDR Sub-standard" converter. It consists of an oscillator in the 390Mc/s region link coupled to a trough line mixer employing a silicon crystal diode. Either straight or cascode head IF amplifiers can be used, depending on the signal-to-noise ratio required; for short ranges, say up to 5 miles from the transmitter, the simple IF stage should suffice, but beyond that a cascode will show an improvement. The IF chosen may be any BBC or ITA channel, or slightly better results will be obtained if the converter can feed directly into the TV set IF chain, assuming the latter to work on the standard 35Mc/s or so. Lower IFs may cause trouble.

The chassis consists of a sq tangular box 'A' containing a U-shaped trough 'B', so forming three equal troughs. These are for the mixer, IF and oscillator respectively. Thin sheet brass is ideal for the construction - 22awg or thinner is ample - but copper, aluminium or tin may be used. The inside surfaces of the troughs should be well polished; silver plating would increase the efficiency a little but is not essential. The outer box should be cut out and drilled to the drawing overleaf, and then bent up. The corners should be soldered or brazed for added strength and electrical efficiency. The trough is similarly drilled and bent, and attached to the main box by fixing in the socket for whatever IF valve is to be used. For a straight Band 1 IF stage a B7G holder to take an EP91 or 6AK5, or a B9A for an EP80 or EOC84, EOC81 or 6BQ7A cascode stage. Note that the wiring is shown for a 6AK5.

Eddystone miniature tuning condensers are specified, cut down to size, but the cheaper Philips concentric or Mullard ceramic can be used, in which case alternative fixings must be arranged. Before attaching the lines to the condensers, fit the coaxial link across the top of the chassis and solder it to the two loops inside the troughs. Do not depart from the sizes of line shown or the tuning may be a long way out. In particular take care that all connections to the lines have as little inductance as possible, or the tapping points will be wrong. This applies particularly to the connection from the mixer line to the tuning condenser, which should be of  $\frac{1}{4}$ " copper foil; the tail of the input plug for the aerial connection could well be thickened by soldering a  $\frac{1}{4}$ " o.d. collar round it to reduce its inductance.

The IF stage can now be assembled and wired. The crystal is held against the mixer line by the spring of its connection to the coil. This connection is best made by using an octal topcap connector. Under no circumstances attempt to solder directly onto the crystal. The connector also carries a piece of copper or brass foil about 1" square, insulated by a thin mica sheet if necessary, which is held close to the trough wall to act as a decoupling condenser. A 2.2pF ceramic condenser can equally well be soldered from crystal holder to earth.

The oscillator section is straightforward; either a 12AT7 or a 6J6 can be used, the latter being shown in the drawings. Put in the feedthrough capacitors first, then the heater and cathode chokes and the grid leak. Then fix in the plate lines. Connect the

HT and heater lines OUTSIDE the chassis, and the unit is ready to test.

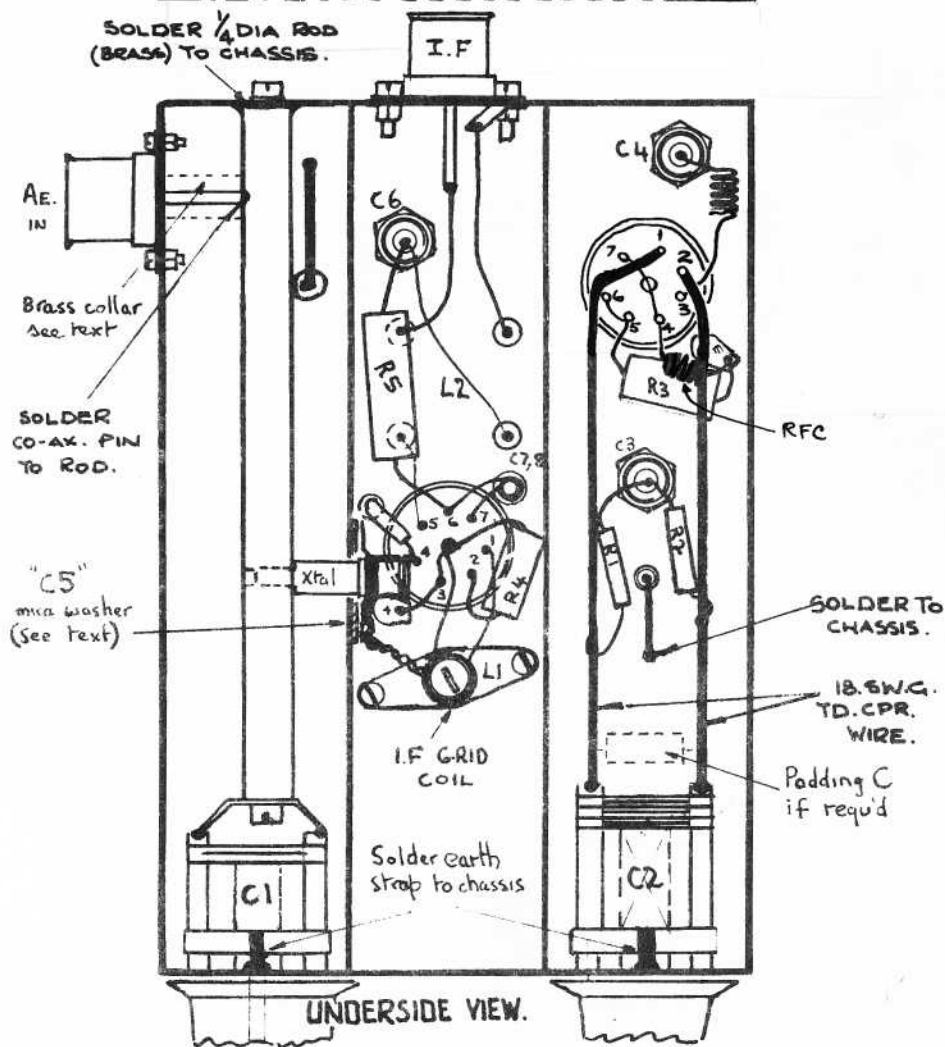
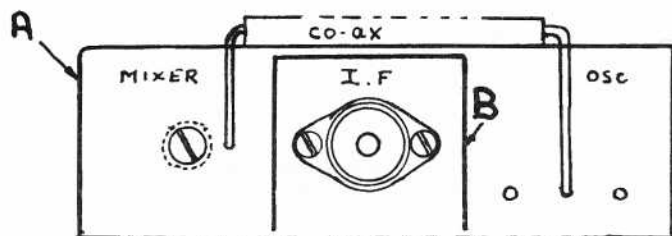
#### Testing the converter

The testing procedure is the same for all converters. First of all, set the IF stage correctly. This can be done with a signal generator, the converter feeding into a receiver of some sort, either TV or sound, or a simple diode detector and microammeter can be used. As most readers will not possess such a signal generator, however, almost as good results can be obtained by clipping a short aerial onto the crystal, and using the IF stage as a pre-amplifier on the local Band 1 signal. There should be a very definite increase in signal, as seen on the screen, with as little extra noise as possible, and the bandwidth should not be constricted - this may not be easily seen without a signal generator or 70cm TV source. If it is, some damping resistance may be needed across the anode coil of the IF stage. There should be no tendency to oscillate. Note that a 6AK5 should not have more than 180V appearing at its anode pin.

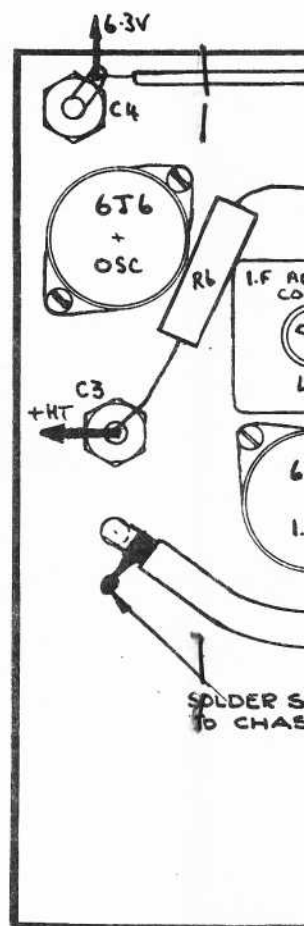
Next the oscillator is put on the right frequency. First check for any oscillation at all by inserting a milliammeter in the oscillator HT feed, and then shorting the grid leak. If the current goes up, then the circuit was oscillating. No difficulty has been found with this layout. To measure the frequency, either use the frequency meter given on P10 of "An

Introduction to Amateur TV Transmission", or any other absorption wavemeter, or make up some Lecher lines. These may consist of two bare wires spaced about 1" apart and stretched on a wooden board. At one end a loop is formed by joining the two ends, and this is held about  $\frac{1}{2}$ " away from the oscillator lines. A shorting bar is now run along the lines, and at certain points the HT current reading will vary. These points are half a wavelength apart, i.e. 30 cms spacing would correspond to a frequency of 500 Mc/s, so the oscillator needs more capacity across the lines. The Lecher lines should be as loosely coupled as possible, and the average of several points should be taken.

Now the injection to the mixer is set to the right point. The bottom end of the IF grid coil is detached from earth and taken via a 1mA fsd meter to chassis. With the oscillator at its correct frequency some crystal current should be registered. With the mixer tuning at mid-scale, adjust the injection by bending the coupling loops nearer or further from the oscillator and mixer lines until about 200µA is indicated. This should not vary by much as the oscillator and mixer tuning is varied, unless the mixer is tuned near to the oscillator frequency. Now the aerial can be attached - the tap is for a 75 ohm input or less - and the unit should work right away. Tune the oscillator until a signal is found (as shown the tuning range is about 40Mc/s; this may be reduced by removing more plates from the tuning condensers and adding fixed C instead) and then peak the signal with the mixer tuning. The oscillator tuning will be extremely sharp, the mixer pretty flat. Provided the dimensions given overleaf are strictly adhered to, there should be no difficulty in finding a signal IF one is there and IF the aerial and feeder are bringing it in!



70 cms CON

MAT'L 22.SWG (.0SCALE FULL SIZE

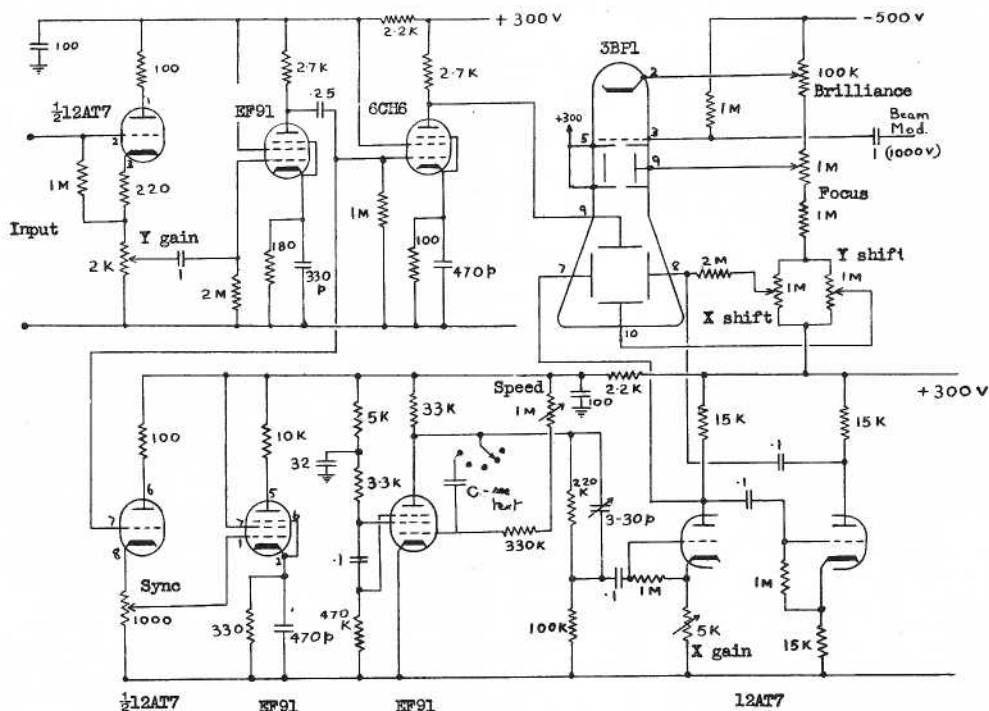
TOP





# A SIMPLE TEST OSCILLOSCOPE

By Brian Partridge G3KOK/T.



Every amateur TV station must have some form of oscilloscope to monitor the various pulses and wave-forms. This unit is designed to mount in the same rack as the pulse generator and camera control unit at G3KOK/T. It uses a 3BP1 CRT, and occupies a 4" by 15" panel. All the usual facilities are incorporated, but no time or amplitude measurement is included, as this is not normally required in such an instrument.

Up to 40 volts p-p signal can be accepted; an external 10:1 attenuator is easily added, consisting of a 10M resistor shunted by a 1pF condenser in series with the normal input terminal. The amplifier after the Y-gain control has a gain of about 150, giving ample deflection on the CRT. Cathode peaking is used to give a response about 3 db down at 3.5Mc/s.

Sync is taken off the first amplifier anode; no selection of sync phase is included but this is not important in practice. Sync is injected into the screen of the Miller timebase. Coarse timebase speed is selected by a switch selecting "C" (on the circuit diagram) from the range 15p, 30p, 100p, 300p, .001, .003, .01, .03, .1 and .25mfd. A push-pull amplifier follows, fed from a potential divider that enables HF boost to be applied to improve linearity at the

higher trace speeds. An X gain control is included so that the trace may be expanded about 3 screen diameters for close examination of line and field pulses.

The "Beam Mod" input is useful for checking mains lock; 50 cycles is injected and the local pulse is displayed. A black mark is impressed on the beam by the modulation which will be stationary when the two are in synchronism. Other timing pulses can be fed in from a signal generator, or the sync generator itself, when required, but these need to be of some 10V amplitude if they are to be easily seen. An additional front panel socket provides roughly 1 volt p-p calibration sine wave from the junction of an 18K and 1K resistor fed from the heater supply, one side of which is earthed.

Power supplies are straightforward. Actually at G3KOK/T the +300V is obtained from the unregulated (but smoothed) supply feeding the main 250V stabiliser. The negative supply can be obtained from any 2:1 transformer running from the mains - an old AF transformer can be used as the current drain is very small, but the supply should be well smoothed.

**REINDER:** do NOT earth one side of your valve filaments at the valve. Run twisted lead right back

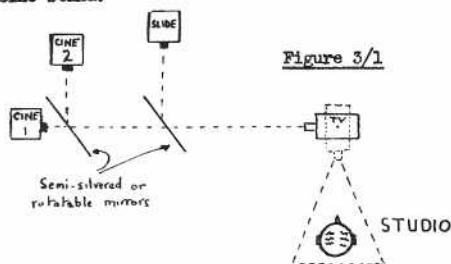
to the filament transformer, and when the installation is complete, earth the heater line at one point only, found by experiment for least hum injection.

8mm film	4.80mm x 3.51mm
9.5mm film	8.5mm x 6.5mm
16mm film	10.41mm x 7.47mm

Table 3.1: Standard Camera Gate Apertures

### 3.3 Using a Studio Camera for Telecine Scanning

Basically, television camera and cine projector are pointed at each other, although some form of optical diplexing may be used where more than one projector is needed. Figure 3/1 shows a typical arrangement for two cine projectors and a slide scanner or title-card holder. It is possible to arrange the camera to pivot to cover the television studio alongside without removing it from the telecine stand.



Vibration is one of the greatest enemies of good telecine results, and this is especially so when camera and projector are on separate chassis. The best scheme is to mount both on as heavy a base as can be managed. A satisfactory structure can be made from Dexion or angle iron, but for permanent use this should be screwed down to a solid bench, or the floor.

The focal length of the lens will depend on the size of film and size of camera tube surface. Only one lens is required. In the case of the station or vidicon tube, where the camera surface is the same area as a full 16mm film frame, a 1:1 enlargement is required, so the lens will be exactly half-way between camera and film gate. A 3" or 4" lens is a reasonable size in this case. Before finally fixing down the camera and projector, check that the film picture just fills the camera target when the film is correctly focussed. If more than one size of film is to be handled, arrangements must be made for moving the lens suitably. A little experimentation is called for here. If for some reason the optical path must be long, necessitating the use of long focal-length lenses, a much better scheme is to use an intermediate field lens of large diameter; this will enable the optical path to be lengthened without changing the focal length of the main lens, but it must be remembered that the surfaces of the field lens are in focus and must therefore be clean and unscratched.

A variac or variable resistor must be used in series with the projector lamp, or neutral density filters, or an iris diaphragm, put in the light path so that the camera tube is not damaged. Do not forget

to check that with no film in the projector the light falling on the camera is still within the safety region. Dropping the projector lamp voltage will upset the balance of colour films, but it will also lengthen the life of the lamp.

Iconoscopes of the 5527 pattern, and also vidicons, will give reasonable pictures when run asynchronously. The latter tubes, run at a high light level, are entirely free from the slight lag noticeable in low light levels, and are capable of fully professional results in telecine applications.

### 3.4 Flying Spot Scanning Systems

Fundamentally the arrangement is identical with that used for slide scanning, the differences being in the transparency transport system. If a film taken at 24 pps is projected at 25 pps, the faster speed is not noticeable except perhaps on the soundtrack. If therefore a single line is displayed on the scanning CRT, and the film is moved past continuously at 25pps each film frame will be scanned in 1/25th of a second, i.e. normal TV standards (405/625 line systems). Unfortunately, in order to obtain a reasonable output from the photocell, the CRT must be run at full brilliance, and this will burn a line onto the screen in time. Furthermore, the effects of CRT screen persistence are increased enormously, and so the scheme is of academic interest only. Notice that in this case the frame blanking period is determined by the spacing of the pictures on the film - a few milliseconds only.

If a complete raster is put up, and a normal cine projector is used, a reasonable picture can be obtained even without synchronisation of film speed and field scan rate, but results are much improved if the two are locked together in some way. Each film picture is scanned twice by the raster before it moves; as the projector shutter and mechanism is usually arranged to black out the picture once or twice whilst it is stationary as well as when it is moving, some modification to the projector shutter may be necessary. Furthermore the "pull-down" time of the projector will normally be much longer than the field blanking period, so that some lines at the top of the picture will be wasted. If this can be tolerated, and a projector is available, then this is probably the simplest way of scanning cine films. Thus a Kodascope 16mm projector driven by a synchronous motor, with its lamp replaced by a 951A photocell, and using an MW22-14 9" domestic TV tube for scanning gives excellent results.

If a projector is not available, then the film must be run continuously. This has the advantage of reducing the size of driving motor required, and small synchronous motors, surplus magclips or even shaded-pole motors as used in tape recorders can be used. If the film picture moves, then so must the scanning raster, and so it is arranged that alternate rasters are displaced by the height of one film frame. Each film frame is then scanned twice, once from each position of the raster, which is what is required. The registration problem, particularly with interlaced scanning, is formidable when viewed in the light of uncertain film shrinkage, EFT and scan variation, and so on. For good results automatic compensating devices are required, and these are rather beyond the scope of the amateur. For further information, the reader is referred to the Journal Soc. Motion Pic. & Television Engngs. for April 1954, where details of the Motorola Jump-Scan system will be found.



An alternative means of arresting the film motion without the use of an intermittent mechanism is used in the ordinary film editor. The film is wrapped around a glass polygon, and is projected onto a small screen. As the film is pulled through, the polygon rotates, giving a continuous lap dissolve from one picture to the next, so that the projected picture remains stationary. The important point from the amateur view is that this occurs at any film speed from zero upwards, so dispensing with all synchronising problems once and for all. Spare polygons can be obtained at a price from the makers of such editors, or they can be machined from perspex sheet. The usual editor-type polygon has only 6 or 8 faces, giving some flicker. Any even number of faces can be used, and Figure 3/2 shows details of a 24 sided polygon for 16mm scanning. Polygons for other gauges can be scaled down.

### 3.5 A Rotating Polygon Film Scanner

A piece of unscratched perspex at least  $\frac{1}{8}$ " thick is required; this is turned down to 2.28" diam, and then fixed in a dividing head so that  $\frac{7}{16}$ " of the thickness can be machined. Using a very sharp cutter revolving at a very high speed (1500 rpm plus), and with a very fine feed, 24 faces are milled as shown. With these precautions a polished surface will result, although a very slight touch of Bluebell or similar polish may improve the finish. On no account attempt to polish to any extent by hand, or the optical performance will be seriously affected.

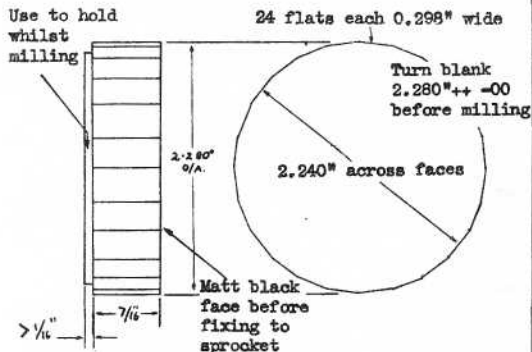


Figure 5/2: Details of 16mm perspex polygon

The polygon must be driven at the same rate as the film; this can be accomplished by suitable gearing to a sprocket, or the sprocket shown in Figure 3/3 can be made up. This starts as a brass disc  $\frac{1}{16}$ " thick or more, 2  $\frac{3}{8}$ " in diameter, which is mounted onto a suitable spindle. This is mounted in a dividing head, and end-milled to the profile shown. Note that if the film has shrunk, it will ride up on the sprocket teeth, but will remain in synchronism. There is no need for the film to be in actual contact with the faces of the polygon.

The sides of the polygon are now painted matt black after suitable roughening, and the sprocket is fixed on with Durofix. Be sure to get disc and

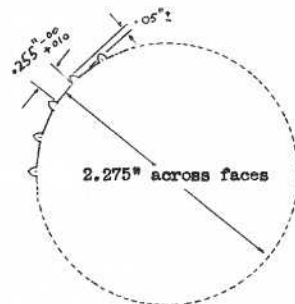
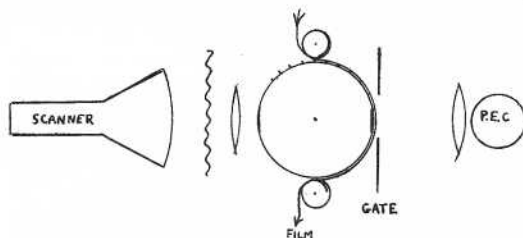


Figure 3/3: Machining details for 16mm sprocket

sprocket concentric.

The complete scanner is shown in Figure 3/4. It will be noted that the film is wrapped around the polygon on the opposite side to the scanner tube. Since the polygon is 2.24" across faces, the main lens cannot be nearer than about 2.35" to the film. A  $2\frac{1}{2}$ " or 3" lens is therefore the shortest that can be used. With a 5" scanner tube, and a  $\frac{1}{4}$ " x 3" raster, the magnification required for a 16mm film frame is  $\frac{1}{10}$ th. For a 3" lens, therefore, the lens must be 5.3" from the film (subject to adjustment due to the refractive index of the perspex), and 33" from the scanner tube face. With an 8" x 6" raster, the CRT face must be 63" from the lens. Allowing room for the film spools, etc, it will be seen that the length of the film scanner becomes excessive. (Naturally for 9.5mm and 8mm film, everything is scaled down). A



Note that the film gate must be three frames high although only two adjacent frames at any one time contribute to the picture.

Figure 3/4: Optical path in the polygon scanner

suggested way of overcoming this is shown in Figure 3/5. Two separate 24" x 15" racks or boxes are used, the upper one containing a 5" scanner tube (mounted horizontally), 5" monitor, timebases, scan reversing switches, etc. The lower unit carries the polygon, film drive and spools, photocell and amplifier. By suitable additional lenses, it should be possible to use the top case on its own as a slide scanner, the lower unit only being required for telecine.

AROUND THE CLUBS

HIGH WYCOMBE have completed their new shack, and Club night - Monday - always sees a full house. With most of the camera chain now complete, the group has demonstrated its equipment to the local cine Society, and it is hoped that the latter will film some of the group's activities.

Hon. Sec: K.Cooper, Hayreed, Gallows Lane, Sands, Nr. High Wycombe, Bucks.

CHELMSFORD have partially rebuilt the studio, but as the latter is a Batley garage, the cold weather has reduced activity except at weekends. Monthly meetings continue, in spite of Col. Nasser; G3KOK/T gave a talk on Nov. 8th on his Image Orthicon camera, which has given perfectly good pictures on a pitch dark night by the light of an ailing cycle lamp at 30 yards! The Club sked at 11 am on 1975 kos on Sundays continues to flourish. Future meetings: January 10 "Pulse Generators" (G2WJ); Feb 14th: "UHF Scatter TV Transmission" (D.Lyon) March 14th "3cm Amateur TV Microwave Link" (F.Burridge). April: "Transistor Pulse Circuitry". Hon Sec. D.Reid 4 Bishop Rd, Chelmsford.

ROMFORD AND DISTRICT GROUP

Regular meetings are now held on the third Wed. in each month at 58, Burlington Gdns, Chadwell Heath. Plans are in hand for an extensive exhibit at the 1975 Dagenham Town Fair. Lectures: Jan 16: "Flying Spot Scanning" (M.Cox); Feb 20 "Thermionic and Transistor Pulse Circuits" (M.Barlow); March 20 "A Home-made CPS Camera" (D.Wheeler). Chairman D.Wheeler G5AEJ, Hon. Sec Martin Lilley, 25 Netherpark Drive, Romford tel 2115.

SOUTH LONDON GROUP

A club room is available above G3EKE's house, and regular meetings are held on the first Friday in each month for lectures, films, etc. A visit to GSOTS/T is in hand; the group numbers G3LCM/T amongst its members. Visitors and other BATCs are welcome; the group intends to build a complete studio. Hon Sec Alwyn Stockley G3EKE 4 Norbury Court Rd, London SW16.

WOLVERHAMPTON GROUP

Owing to petrol rationing, the group is having difficulty in attending Birmingham group meetings, and is therefore considering holding its own. Anyone interested is invited to contact Malcolm Sparrow, G5KJ/T, Orchard Hill, Showell Lane, Penn, Wolverhampton.

BIRMINGHAM GROUP

Good progress has been made with the groups new camera. Recent meetings have featured a transmission of films from G3KBA/T to the clubroom, and a demonstration of the AP815 TX/RX, which is being modified for TV use by several of the group. Meetings are held monthly at the White Swan Inn, Edmund St, Birmingham usually on the second Thursday of the month. Hon. Sec E.Whetton G3DJJ 38 Maxholm Rd, Streetly, Sutton Coldfield. 160m ATV net Sundays 1100 hrs.

GRONINGEN (NETHERLANDS) GROUP

The new image iconoscope camera is coming on slowly, as both PA0BE and PA0ZI have been busy with other things. The camera is intended for colour work and it is hoped to make the first PA0-DL TV contact with it. Hon. Sec Dr. Hendrik de Waard PA0ZX Van Houtenlaan 116, Groningen.

No news from Cambridge, N.London, Wellington (NZ), Capetown (SA) Amsterdam etc. What about it, Hon Secs? Could we please have your proposed lectures etc for publication well in advance.

THE G8SK-TYPE GJ6 70CM TRANSMITTER

Several members have found difficulty in making the G8SK type all-GJ6 70cm transmitter shown in CQ-TV 29. G8FX (Oxford) has kindly sent in some comments in answer to the common plea of "no drive at 210 Mc/s":

"I have always been lucky with Squier oscillators, and the only thing to watch is the activity of the crystal. If the oscillator does not give enough drive, try another crystal or carefully wash the crystal in carbon tetrachloride or soapy water. An awful lot of time can be wasted trying to get drive when it is the crystal at fault. If a 24Mc/s receiver is not available, the oscillator may be checked for crystal control by inserting a millimeter in the HT feed to the valve. When the coil is tuned, oscillation is denoted by a dip in current, and if crystal controlled placing the hand near or on the coil will not affect the current. If the oscillator is running free, the current will increase or fluctuate as the hand is brought near. An absorption wavemeter or grid dip oscillator is useful for checking frequencies."

Two misprints will have been obvious to anyone making the unit: the heater RFC on V3 should be in the non-earthly line; the right-hand anode of V3 should be joined to the top end of L5. If an ECL80 is not available, a 6UB8/ECF82 may do, but a 6J6 or 12AT7 will not; plenty of drive in the early stages is required to drive the later triodes.

Video modulation is easily accomplished by replacing the two 33K grid leaks on the PA by RFCs, and feeding the junction of the two RFCs via a low value feedthrough capacitor (or short length of co-ax) from the cathode of a cathode follower. The output swing required is about 30 volts p-p of 50:50 picture to sync, and the peak white output volts should be about -30V. A suitable circuit is shown in "An Introduction to Amateur TV Transmission" P16. Or a series valve can be placed in series with the HT feed (instead of the AF transformer) if a higher HT rail is available, in which case a larger video swing will be required from the modulator.

We shall be pleased to print comments from other members who have tried this design.

MICROFILM copies of CQ-TV Nos. 21-50 (one page per 35mm frame) are now available price 12/6 incl. post from C.G.Dixon, 25 Wye St, Ross on Wye. The quality of reproduction is better than for nos 1-20, and each film contains an extra test card frame, and an index. COPIES of C.G.Gouriet's book on Colour Television can be obtained at 8/6d less 20% for BATC members from the Television Society, 184 Shaftesbury Avenue, London WC2. The Club tape on "Telecine" is being re-recorded. The DAGENHAM TOWN SHOW this year is on July 15-14th. Assistance from BATCs will be welcomed by G5AEJ. 40ft tower, plus 84 ele beam for 70cms and 12 ele for 2m, complete with rotatable head, selsyn indicators etc FOR SALE from G2DUS, Sunnyside, Wallington, Near Baldock, Herts.

Certain Chelmsford lectures are being recorded, and may be borrowed from G3CVO. These will be erased if not required. Note that they are recorded meetings and NOT lecture tapes. Available: "Station t/dms" G2DUS "CROs for ATV" G3CVO. Any lecture will be recorded by request.

Let us have your suggestions with your subscription, on the form provided. This issue also contains an index.

# WHAT THE OTHER CHAP IS DOING

By Paunamulaikuikauki Kahamukeahahaai.

PAOZX has been getting at Harry Grimbergen PAOLQ at Leiden to try for the first cross-channel TV QSO. He reinforced his pleas with a tape recording played at the Convention, and G3CVO and G2WJ also dropped the odd hint. Well, Harry has come up trumps: in two months he has built a complete 405 line station in addition to his 625 line gear. The sync generator uses 20 tubes, all surplus, and counts 5-9-9 with blocking oscillators. The count holds in for HT variations of +15%. The 12" picture monitor is now switchable 405-625 lines, although the line whistle at 10kc/s is unnering! The receiver IF is switchable pos-neg output. Harry is now making a two-standard PSS for slides, and a 70cm tx using a 2022 PA at 100W peak white; a 32 ele beam should give him an erp of about 2kW. The whole gear should be ready for the summer VIF season, G2WJ and others please note. The path length is about 180 miles to G2WJ/T.

Ivan Howard G2DUS/T (Baldock) has won the Grand-field trophy for his /T activities. He expects to be moving back to Stotfold next year, a slightly inferior VIF site, but he should be able to exchange pictures with G3AST (Luton) and G3KKD as before. The colour converter (field sequ. for NTSC) is almost complete, and Ivan is to build a CPS FS colour camera this year. George Planner G3KBA/T (Birmingham) has received his station camera tube. He has been regularly transmitting telecine pictures with an average range of 5 to 10 miles radius, in spite of very heavy screening. The transmitter uses a QVVO3/20 driven by a QVVO3/10 tripler from 2m, modulated on the plate and screen. Output is about 8 watts fed to 4 folded dipoles with a wire netting reflector. Most of the tests have been with G3LWJ, G3JFZ and G3EJO, with Ernie Foulds and Geoff Hill using RT34/APSL3 units with success (details pae). Malcolm Sparrow G3KQJ/T (Wolverhampton) now has a test card C monoscope, and also an APSL3 receiver. He hopes to start radiating soon. The Cambridge group took Matilda (see front cover) up to Birmingham before Christmas, but we have not had a full report.

Doug Wheeler G3AKJ is rebuilding the CPS camera for use at the Dagenham town show this year. A plan has been drawn up of equipment required; RF distribution is one of the first. Martin Lilley (Romford) is making an PSS for the occasion, but the group is to borrow a camera, etc from the Chelmsford group.

Grant Dixon is giving two lectures on amateur Colour TV to the Slade Radio Club and to the Cheltenham Club. He is experimenting with means of generating 33 1/3 cps AC to drive the disc motors directly, and would be glad of suggestions. He says that Ian Macwhirter G3EIT is temporarily with the Hazeltine Corp studying colour TV. A visit to the BBC Colour Studio has been laid on for the BATC Colour group, and will be in January, during programme hours. He reports that the surplus altimeter units with a "magnetic sounder" cover 420Mc/s nicely and can be used as a wobulator without modification. If two units are coupled, one swept at 50c/s and the other kept fixed, a video sweep generator can be made. Has anyone tried this? Grant's new house should be complete by next summer - 250 ft a.s.l and a much bigger shack!

Jeremy Royle G2WJ/T has a Test Card C monoscope in action and has added a Decca projection TV set to the monitors available at Dunmow. They have been watching the monoscope trans-missions from G3CIS/T at Norwood, which are from 7.30 to 9 p.m on Mon, Wed and Fri beamed NW over London. As far as is known, G2WJ is the only person to have received the signals!

At Chelmsford, Roy Martyr has come back from the ITA, and hopes to continue with pulser and converters. Jack Terry ran his 5 807s into grid current before he could get 350mA at 200V out of his power supply, so is changing to a couple of 12ELs. He has also made a 15 minute slide scanner from an APQ9 jammer unit, using G3KOK's 9" monitor as a scanner and Mike Cox's monitor for its true purpose. The latter has retired temporarily to London, and Jack Terry is trying one or two modifications to the equipment. Peter Allcott G3KWD has rewired the studio for sound and vision; peak programme metering is now available on all 6 sound lines, including FM converter and test 2kc/s source. Brian Partridge G3KOK/T has built a new miniature camera pre-amp on a paxolin board to replace the existing one in the image orth camera which has been giving trouble. An MW6-2 viewfinder is to be fitted, and then Brian intends to build yet another sync generator. G3CVO has built a new modulator for the transmitter, as the existing one (using DC restorers and not clamps) is only satisfactory on an impeccable input waveform, which is difficult to obtain from BBC receivers or via the 30 yards of cable to the studio, which has a different earth.

Capt. J. Spafford G4RB is now fully recovered and expects to be putting Gillingham on the ATV map. George Slack G5KG (Danbury, Essex) is on the highest hill in Essex. Using a 4 ele Yagi only and 30ft of ordinary 1/2" co-ax he has received pictures from both G3CVO/T (4 miles) and G2WJ/T (16 miles). A 32 element array, some good feeder and a new converter are on the way. As the signal strength of the ITA and BBC is so great with him, his TV set had lost all its 45Mc/s gain without his noticing it; this proved a snag when ATV pictures were tuned in as there was then insufficient gain at IF. Bruno Puglia W3ETP is a TV cameraman at WNHQ-TV in New Haven. His amateur TV gear consists of a surplus iconoscope and TV transmitter. He also runs 400 watts on 2m, and is equipped for SSB on 20-15-10m.

John Easden (High Wycombe) is building a master vision and sound control unit, complete with tape and gram facilities. Syd Collins and John Keen have built a new power supply in a T1154 rack; B. North, R. Bowler and Ken Smythes are working on the group's timer and shaper chassis, including a special waveform tapping device for monitoring. B. Hopgood has finished the studio sound equipment; Rex Lakeman has finished the station camera wiring in between running the publicity side of things and maintaining the catalogue library. Ken Cooper has wound the coils for the camera, and finished the case.



ARE YOU IN FOR A CALL FROM MR. BARLOW?



## NEW MEMBERS

Opl. R.Smalley is in the RAF at Horsham St Faith, Norwich - but he is also G3JLQ/T, and his home is in Lancashire, where he has a 3FF7 scanner running, a sync generator built, and an AFS13 to hand for conversion to a 70cm receiver. He will be the first /T station on the air North of Birmingham unless some of you other lads get a move on! Doug Wheeler G3AKJ now has a dialling system by which he can dial any combination of sound or vision to any part of the house.

Harry Grimbergen PA0LQ paid a visit to the Convention, and then stayed for a couple of nights at Chelmsford where he was able to both visit G2WJ/T and see pictures from that station over the air. He said that considering we were not using flywheel sync on G3CVO's 9" receiver, the pictures were very creditable and comparable in signal/noise ratio to those he gets on 2m over a worse path from PA0SW in the Hague. Harry uses 64 "steam" tubes in his 625 line OCIR sync gen, which produces 30 different test patterns. He has started quite an active group in Leiden, but they are to build receivers first. A.P.Harding is with a Forces Broadcasting Unit in Tripoli, and wants to build 16mm telecine equipment on a 525 line standard. Charlie Newton G2FKZ has the vision transmitter in pieces; G3GDR/T has G2WJ's old sync generator to play with; G3KWD will get G3KOK's when the latter rebuilds.

Fred Pilkington G3IAG/MM is on board the M/S "Pinemore", and was in the Med. at last count. He sends 73s to G3KKD at Ely, and hopes to contact him again when on leave. Bill Stapleton has lashed out and built a new workshop; illness prevented his attending the Convention, but he has, as usual, kindly duped the tape Newreel. Bill's application for a /T ticket has the Dept. of Posts and Telegraphs rather baffled. The transmitter crystals are certified - even though they are to be used in an overtone oscillator. Bill is getting rid of his interlaced sync generator as he thinks that it is too complicated for amateur use, and not at all necessary except for high quality closed circuit work. He is building TV tape gear for slow speed scanning, and intends to try 100 lines per field, two fields per sec, displayed on a P7 CRT with sound and vision on adjacent tracks of  $\frac{1}{4}$ " tape at 15 ips. Bill hopes to be the first BATC member to produce a video tape letter, and would like to exchange video tapes with anyone else interested. Dublin members are invited to contact Bill with a view to holding regular meetings. In Belfast Robert Torrens G13FWF/T is also making a new shack. He finds 5" trolley wheels by Slingsby very good for heavy dollies, etc.

Dave Hooper G3ICU (NW6) has the station mounted in a case on a ball-bearing runner; f2 lens. 3 EF80s act as video amp, channel 2 RF osc and o/p stage, and a small control box contains OCU and power pack. Sequential scanning will be used at first. Ron Smith G3JGV has his cross generator working, and is trying an AFS13 unit for 70cms. A 9" monitor is to hand. A whole new batch of members has turned up at PETERBORO (Northants). B.N.Love has two 9" monitors, 931A and video amplifier, 5FF7, a 19" rack and enough components for a regulated power supply. He is in touch with 4 other Peterborough members/enthusiasts. Ron Bassett (Southampton) has cleared up the snags on the station camera, and it is now working quite well. He showed it at a local exhibition, and managed to sign on G3QW. He also sees John Paul (Iymington) quite a bit, and they hope to produce some more items, particularly a slide scanner, in the future. Arthur Critchley at Lytham St Annes, Lancs, has a station, and built 2

P.G.Allott G3KWD 117 Baddow Rd, Chelmsford, Essex.  
F.H.Brown 346 Eastern Avenue East, Romford.  
D.N.Clackson 211 Breck Rd, Wallasey, Cheshire.  
P.J.Collins The Limes, Shepreth, Cambs.  
H.A.Cox c/o Garrison Engineer RMAS, Camberley, Sy.  
Capt. J.A.Cusdin Hillcrest Nurseries, Polegate, Sx.  
B.Darby 17 West St, Blackheath, Birmingham.  
D.L.Davies G8QW 17 Calmore Gdns, Totton, Southampton.  
D.G.Knoch G3KLZ 86 Heaton Pk Drive, Heaton, Bradford.  
K.J.Field 23 High St, Olney, Bucks.  
James Foye ZS5JF 19 Powell Rd, Stamford Hill, Durban.  
J.Harris Karachi Bungalow, 23 Madeira Rd, Streatham SW16.

P.C.Harris 190 Banister House, Homerton High St London E9.

W.Hipwell 20 Trinity College, Dublin, Eire.  
J.F.van Hoogstraten Eves Cottage, Danbury, Essex.  
Marcos Huller Humahuaca 3951 60-A Buenos Aires.  
John A. Jull 32 Haig Rd, Cambridge.  
L.V.Major 36 Cranham Rd Wythenshawe Manchester.  
G.Moeijes PA0GME Nieuwsteeg 16, Hoorn (NH), Netherlands.  
N.F.Newland 164A London Rd, Wokingham, Berks.  
Bill North North's Garage, Lane End, Bucks.  
Bruno Puglia WLETF Box 373, West Haven, Connecticut.  
D.Rintoul 37 Vicarage Rd, Chelmsford, Essex.  
H.Seagood G6SG 34 Chigwell Pk Drive, Chigwell, Essex.  
4125491 Opl. Smalley G3JLQ/T, Radio Servicing Flight, RAF Horsham St Faith, Norwich.

J.E.Smith G3JZF 53 Woolmore Rd, Erdington, B'ham.  
K.G.R.Smithyves c/o High Wycombe BATC Group.  
C.J.Stone 90 Horsham Ave, Kinson, Bournemouth.  
J.W.Tanner "Brooklands", London Rd, Chelmsford.  
J.B.Terry Theydon Cottage, 64 Birches Lane, Kenilworth, Warks.  
Zdenek Tomek Berliner Chaussee 36, Magdeburg-Bru Germany.

PATRON MEMBER: Messrs. Proops Ltd, 52 Tottenham Ct. Rd, London W1. (520).

## Changes of Address:

Chief Officer D.Bradford VQ4EV, PO Box 420, Nairobi, Kenya; Capt. J.Spafford G4RB 37 Arden St, Gillingham Kent.

stabilised power supplies with 12ELs @ 5/- each! N.F.Newland (Wokingham) is stocking up on useful bits and wants to contact local members.

Nigel Nathan was in South Africa recently and brings news of activities there. Sam Liff at Jo'burg has been off ATV for a while but is now active with a 5527 camera, and is rebuilding the RF gear. A licence is needed for closed circuit work there (!) but no fee is charged. Tony Bannister is another with a 5527, and the camera is beautifully made. J.F.van Hoogstraten is now at Marconis, Chelmsford, and is busy comparing UK and SA results. J.Foye ZS5JF (Durban) now has 931As 5FF7s and all the necessary, plus back copies of CQ-TV on microfilm - "a gem of wisdom and learning!"

Ted Mitchell G3GZW (Basildon) has a monoscope, and is trying out various stabiliser circuits. Two EL81s are used as series valves, with two EF80s in the amplifier. Ted hopes to have a complete closed circuit system in operation by the summer.

And that's all for this time; apologies for not getting it all done by Christmas, and don't expect 16 page editions every time. It's only a hobby with me too you know! P.S Don't forget your subscription to G3EKE 4 Norbury Court Rd, London SW16.



# L A W R E N C E      E L E C T R O N I C S

(L.C.MANSFIELD G3LCM/T).

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DL92	-	7/6	EL90	-	7/-	3V4	-	7/6	12AX7	-	9/-
DL94	-	7/6	EY51	-	11/6	2C34	-	3/6	12H6	-	2/6
DK96	-	9/-	EZ35	-	8/-	2X2	-	4/-	12J5	-	5/-
DET19	-	1/6	GZ32	-	8/6	5U4	-	8/-	12J7	-	7/6
EA50	-	1/-	H63	-	7/6	5Z4	-	8/6	12K7	-	7/6
EB34	-	2/6	KT33C	-	8/6	6AG5	-	6/6	12Q7	-	8/6
EB91	-	6/-	KT44	-	7/6	6AK5	-	6/6	12SC7	-	7/6
EBC33	-	8/6	KT66	-	12/6	6AL5	-	6/6	12SG7	-	7/6
EBC41	-	9/6	PL81	-	10/6	6AM6	-	6/6	12SQ7	-	7/6
EBF80	-	9/-	PL82	-	10/6	6AQ5	-	7/-	12SJ7	-	7/6
ECC33	-	7/6	PY81	-	8/6	6AT6	-	8/-	12SK7	-	7/6
ECC35	-	7/6	PY82	-	8/6	6AU6	-	7/-	35L6	-	9/-
ECC81	-	9/-	PCF80	-	10/-	6BE6	-	8/-	85A2	-	10/-
ECC84	-	11/6	PCF82	-	11/-	6BA6	-	8/6	90C1	-	10/-
ECH35	-	8/6	PCC81	-	10/-	6BF6	-	8/6	807	-	7/6
ECH81	-	9/-	PCC84	-	11/6	6BR7	-	8/6	832	-	40/-
ECH42	-	10/-	Pen46	-	8/6	6BW6	-	8/6	931	-	50/-
ECF82	-	11/-	RK34	-	3/6	6B8	-	7/6	931A	-	50/-
ECL80	-	9/-	RL37	-	6/-	6C4	-	6/-	954	-	5/-
EC52	-	5/-	SP41	-	4/-	6G6	-	5/-	955	-	5/-
EC90	-	6/-	SP61	-	4/-	6H6	-	2/6	5763	-	10/-
EF36	-	6/-	U50	-	8/-	6J5	-	5/-	7193	-	2/6
EF37A	-	12/6	U52	-	8/-	6J6	-	7/-	8012	-	6/-
EF39	-	6/-	UBC41	-	10/-	6K7	-	5/6	9003	-	5/-.
EF41	-	10/-	UF41	-	10/-	6K8	-	9/6	<u>C.R.TUBES</u>		
EF50	-	5/-	UL41	-	10/-	6L6	-	10/-	VCR511(12)		
EF54	-	7/6	UY41	-	8/-	6N7	-	7/6	50/- +15/-C&P		
EF55	-	9/-	VP23	-	5/-	6Q7	-	8/6	VCR138 (3½")		
EF80	-	8/6	HL23DD	-	6/-	6R7	-	7/6	15/- +5/-C&P.		
EF85	-	10/6	VR116	-	6/-	6SH7	-	7/6			
EF91	-	6/6	VR150/30	-	7/6	6SL7	-	6/6			
EF92	-	5/6	VU111	-	2/-	6SN7	-	7/6			
EF95	-	6/6	X65	-	10/6	6V6	-	7/6			
EK32	-	8/6	OZ4A	-	6/6	6X4	-	7/6			
EK90	-	8/-	1R5	-	7/6	6X5	-	7/6			

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