

cq-tv

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For our large number of overseas members, the good news this month is that

VIDICONS ARE NOW AVAILABLE TO ANY MEMBER ANYWHERE with the exception of Iron Curtain countries. The tubes are rejected for minor blemishes, and will cost £25 (\$70) plus postage and insurance charges. Send us the £25, and we will send a bill for the extra. Write to G3CVO with your orders, and we will deal with them as quickly as possible. These tubes are identical to the RCA 6198, but no bases or coils are available. As we anticipate a fair demand for the Club coil data, we are printing some notes in this issue, and would ask that anyone with vidicon circuits, etc send them in at once for publication. Please note that monoscopes are available under the old scheme to UK members ONLY. UK members writing in for tubes will be dealt with under the old scheme (Cathodeon) unless we are requested to the contrary.

The experiment of sending Club lecture tapes overseas was only partly successful; in 15 months only three people apparently heard them, and none of them notified Grant Dixon as to the whereabouts of the tapes. In fact, we hope many more did get to hear the tapes, and we will be glad to continue the service IF you will play the game too. Copies have been made of the two tapes sent out "Getting Started" and "Flying Spot Scanning", and these may be borrowed from Eddie Collins, 1003 East Blount St, Pensacola, Fla, USA; C.A. Rouse 10 Troonville Ave, Auckland NZ. Italian translations are available from Giacomo Vargiu, Via Brofferio, Asti, Italy. Let Grant Dixon know if you would like to borrow the tapes - but note his new address at Kyrle's Cross, Peterstow, Ross-on-Wye, Herefordshire, Our apologies for the delay in getting out the last two tapes - "Pulse Generation" (oversize tape!) and "Telecine" stuck with one of the contributors. Chelmsford group recorded lectures are at present being circulated to the Ross-on-Wye, Yeovil and South London groups, and we would like to extend this facility. Send recordings (of any sort) to Grant Dixon, and he will pass them round. But PLEASE don't keep the tapes so long

Another point for our overseas members: in view of G30V0's forthcoming move, address mail that will arrive after October 1st to G3EKE at 4 Norbury Ct Rd, London SW16. He will be writing the Other Blokeisms column too, so send him all your news and circuits.

Summer is the time for groups and individual members to go out and see what others are doing, and we hope as many as possible of you will find your way to Great Baddow before the autumn. With shows at Dagenham (July 13-14) Birmingham (Scouts Jamboree)



Vidicon picture and waveform monitor built by Jim Russell of Bournemouth. The sync generator is built into the bottom; only the miniature camera is external to the unit.

and Southampton (August), you have plenty of chances to see the gear in action and discuss it with the makers, whilst Don Reid and Jeremy Royle are already thinking about another BATC Convention in 1958. Good luck, all - and lest break a few of the TV DX records this year.

AROUND THE CLUBS

SOUTHWEST ESSEX is now the name of the old Dagenham and Romford group. Yeetings - third Wednesday of the month. Recent lectures: Video Amplifiers (Don Reid), APQ2 Jammer Unit (G3KWD), Effects Amplifier (G3CVO) and the BATC Newsreel. Much more gear is now to hand, and average attendance at meetings is about 18. Work is concentrated on the Dagenham Show JULY 13-14 w/e. BIRMINGHAM are concentrating on the Jamboree in August. The camera is now running, but is not yet up to George Flanner's standards. Regular transmissions take place from G3DFL/T and G3KBA/T. SOUTH LONDON GROUP meets on the first Friday in each month at 4 Norbury Ct Rd, SW16, where a large wellequipped Clubroom is available. Recent meetings have included G3CVO showing his PG and Effects Amp, and G3AKJ with his 5527 camera. The group's own 5527 unit is on the way, PG, FSS and 9" monitor ready. G3EKE/T will take care of the RF side when A PA bottle arrives. A Monoscope is also being built. CHELMSFORD have their meetings on the second Thurs in each month at G3CVO's. The Club studio is now dismantled to make room for a car. Recent meetings have included "APQ2 Conversion" (G3KWD), Roy Martyr's Super Sync Generator, G2WJ's TCC Monoscope camera, and G3CVO's effects amplifier. The group is supplying two cameras to the Dagenham Fair. HIGH WYCOMBE meet every Monday at Ken Cooper's, tea on the brew and visitors welcomed. The staticon camera is nearly ready. Recent visitor was G3CVO at Easter, who demonstrated the BATC Sync Generator. Mike Chaney at Amersham also pops in, and Jack Terry has kindly lent his CRO to the group. Two car loads of HW group recently paid a visit to the Chelmsford group, seeing G3CVO, John Tanner, Roy Martyr, G2WJ and G3KOK, acquiring some useful ideas and tubes en route. Regrettably they had to leave just before the colour dem at G5KOK's!

THE APQ2 RADAR JAMMER

This unit is undoubtedly one of the most useful buys on the surplus market. Messrs. Proops for instance have these units for about £5.

The RF section consists of two 388A triodes in a push-pull parallel line oscillator, covering the range 250 to 550 Mc/s, with a power output of some 20W at the lower frequency and 5W at the higher. All controls are continuously variable over this range, but the back lines are clipped onto the valves for use above about 430Mc/s. The heater transformer fitted is a 400 cycle job. and can be replaced by a 50 cycle one supplying 4V at about 6 amps. The filaments were originally fed from two separate windings of 2V, but the unit appears to be quite satisfactory and hum-free with the valves in series. HT in the region 300 to 550 max volts is used, the valves being rated at 50W max dissipation. The aerial coupler fitted has two ranges of tuning, and the unit is designed for 50 ohm co-ax cutput from a standard S0239 socket. A crystal probe is fitted, which takes a standard silicon cartridge diode; a 500µA meter should be used, and a typical reading is 175µA for 350V HT. The 28V blower motor is marked "D.C", but if the field coils and arma--ture are rewired in series, will run off the mains via a 2µF paper capacitor. Try grid modulation, or there is plenty of room for an anode (series) modula--tor and pre-amp to be fitted; miniature 807s are probably the best bet here, and will fit easily under the output coupler. An external 500µA meter is used in conjunction with the metering switch, for measuring Ik in the two valves, crystal current, etc. If the valves are in series, the metering will need to be changed. There is no apparent microphony from the blower, nor hum, when the RF is picked up on a simple dipole and crystal plus headphones. The frequency can be checked with a simple absorption wavemeter such as that described in "An Introduction to Amateur Television", and the following readings were obtained at 436Mc/s on one unit: Anode 127.5 Grid 241.5 Coupling 4.6 (front end), Stub tuning 2.2. The frequency stability appears to be good. Remember that the valves are bright emitters!

The Video section is identical to that in the APQ9 radar jammer, and consists of a 931A photocell. two 6AC7s and a 6ACF, and two 807 modulators. For use as a slide scanner, remove the cover over the 931A, and remove the lamp found inside. Rotate the base of the 931A so that the cell points in a more useful direction. Strip out all the components, plus the 807 valve bases and chokes, and the block capacitors. Take out temporarily the screens between stages, and rewire the amplifier as a simple RC video amplifier (the circuit in "An Introduction to Amateur TV Transmission" is suitable). Fill in the first 807 base hole with a plate carrying an octal valveholder for the phase-splitter and cathode follower. The second hole can be filled in to carry the PEC volts potentiometer. In the end plate mount the new gain control, power inlet, and output video socket. The ON/OFF control can be used for phase reversing. With the screens refitted, the amplifier will be found quite stable with an unregulated HT supply

of 200 to 300 volts. The negative supply to the PEC should be 150 to 350V, giving a total of about 500V across the cell. Point the cell at the domestic TV set, and view the video output on a CRO, or another TV set. In the latter case some extra amplification may be needed. For synchronis--ation, feed the same programme to both TV sets, but disconnect the monitor CRT video drive from the set, and feed from the APQ video unit instead. Beware of live chassis in AC/DC sets.

It is unlikely that the video strip will be run alongside the transmitter in its original case, so that there is plenty of room for a modulator ete in the carrying frame. The case itself makes a useful camera or power pack case. -G5KWD

WHY LINES?

No member of the BATC has yet reported experiments with spiral scanning, so the following notes are given in case they should appeal to someone who is about to build a flying spot scanner using a 5FP7 and 951A.

The original 5FF7 deflector coils look as if they could easily be adapted to this application as the line and field coils appear identical. For spiral scanning a sine wave is applied to one pair of coils, and the same sine wave, shifted 90° in phase, to the other. This produces a circular trace on the tube, and the spiral is obtained by amplitude modulating the sine wave oscillator with a sawtooth. If the sinewave is at 10kc/s and the sawtooth at 50c/s, the spot will trace out 200 turns of spiral, giving 400 line defi--nition. The lOKc/s and 50c/s must be locked by the usual counter chain, and also the sawtooth must be applied so as to dim the intensity of the spot as it approaches the centre of the tube, where it has a low linear velocity. On the credit side, there is only one flyback line to be suppressed, and the circular pictures make better use of lenses and CRTs.

As there is only one sync pulse per picture, the receiver 10Kc/s and 50c/s oscillators must also be locked by a counter chain, but much better use is made of the time available for transmission, and RF carriers can be modulated 100% with picture detail, if both tx and rx are locked to the mains.

For initial experiments, the same oscillator can feed both scanner and monitor. The sinewave should be of very pure waveform to **obtain** a true circle; this can be checked by drawing a circle on a piece of perspex, and placing it in front of the CRT. C.G.D

MODIFICATION

to the G3KOK/T 70cm CONVERTER in "CQ-TV" Number 31. On production models of this converter, trouble has been experienced from the mixer line tuning to too low a frequency. As shown it has a maximum frequency of about 450.0 Mc/s. To increase this, either make the centre line of 5/16" diam instead of 1/4", or replace Cl by two 1/2" diam discs, one attached to the line and one to a screw adjustment through the end of the trough, or pad or rebuild the mixer trough to be 7/8" square and not 1".

Please pass your copy of CQ-TV around any of your friends who might be interested in joining the Club.

Continued from CQ-TV No. 23

In all cases, the information given applies to Cathodeon Staticons types C931A and B and later types, to the RCA 6198 and 6326, and to English Electric P810 and P813, and is obviously applicable to any other equivalent tubes.

Most amateurs will not be able to afford to buy the correct scanning and focus assemblies, whilst the ridiculously nom-standard base is impossible to buy outside the trade. Details for these will now be given, which will act at least as a guide for anyone to follow, although the detailed construction will depend on the facilities and capabilities of the constructor.



Figure 6/7: Standard Outline of Vidicon/Staticon

Figure 6/7 shows the dimensions of the tube; it should be noted that the side pip on the Cathodeon tubes appears in many cases to be much bigger than those on other tubes, although the clearance shown is adequate. Figure 6/8 shows the assembled yoke, whilst Figure 6/9 shows the dimensions of the inner former upon which the deflection colls are wound.



This is a fit inside the focus coil former, and has its connections brought out to a flange at the end remote from the target plate. The former is made from l_{4}^{m} o.d paxolin tube, which is turned down to be



Figure 6/9: Deflection coil Former

1 1/16" i.d. Alternatively, paper can be wrapped round a 1 1/16" diam core, and well shellaced or stuck with suitable cement to make it really rigid. Upon this former can be wrapped the screening coil, if requir--ed (there is some doubt as to whether screening is necessary in amateur gear). A $\frac{1}{2}$ " wide strip of 2 thou copper foil is wound in one layer over the former, the flange end being taken to an earthing tag, and the other end left floating. Great care must be taken to prevent the turns from touching each other.

Over the screening, a couple of layers of paper are wound and shellaced, and the former is now ready to receive the scan coils. These are shown in Fig.6/10 and 6/11. After winding, the coils can be formed round a core 1 3/32" diam for the line coils, and 1 3/8" o.d for the field coils. The line coils are placed on the yoke former as diametrically opposite as possible, and cemented in position. The field coils are best attached to a thin paper former, which is then slipped over the line coils. This enables the field coils to be rotated slightly to give a truly rectangular scan, after which they can be secured permanently to the former. The flange, fitted with tags (conveniently made by forcing 16swg tinned copper wire through 17swg holes) is cemented in position, and the coils wired to the tags as shown.

(Right) Deflection coil after bending.



Deflection coil before bending. See Table 6.1 for details.



Q



CQ-TV

Dim	Line Coils	Field Coils	Alignment Coils			
A	2 3/16"	2"	1 1/4" 3/4"			
в	1 7/8"	2 5/16"	3/4"			
(Tole	erance on above: not critical).	<u>+</u> 1/16"; align	ment coil dim ⁸			
C	0.110"	0.06"	9/32"			
P	15/16"	29/32"	3/8"			
ō	1 1/4"	11/16"	7/8*			
(Tole	erance on P & Q: not critical).	+1/32" - 0"; a				
R	0.55" approx	0.69" appro	x 13/4"			
ohms/	coil 1.6	82	70			
mH/co:	11 0.62	17	22			
Total	L.					
	s 1.35mH	41	44			
	coil 105	620	1000			
SWG	26	38	34			
	exbond T will be		siest to work).			

Winding details

<u>Idne:</u> Wind 26 turns, tie with thread; repeat twice (total 78); wind to 105 turns, finish off and tie. Bind sides with Sellotape and bend to shape. <u>Field</u>: Wind 150 turns, insert pegs into first holes, or tie; repeat for 160, then 150t, then finish off to 620 turns. If Lewmexbond, pass 6.5V or heat to 150°C to bond wire, or tie. Form to shape.

Alignment: Not critical - wind on jig as preferred.

TABLE 6.1: COIL WINDING DATA



Figure 6/12: Assembly of Focus Coil Former

The focus coil assembly is made up of several parts as shown in Fig 6/12. The end flange A is either surned down from a 3" disc of 1" thick paxolin, or it can be made up from thinner pieces stuck together. It has two "steps" turned out of it, to take the three phosphor-bronze contacts XYZ; these serve the additional purpose of centering the tube in the coils. The three contacts are wired together. The flange should be fairly strong, as it supports the weight of the complete yoke. The coil former is made in the same way as the deflection coil former; before assembling the flanges and former, check that the deflection coil assembly will fit inside, and that the tube pip will go through the slot provided for it. The focus coil has to provide a field of 40 gauss, and one suitable winding is 6500 turns of 34 swg enamelled wire, which will require some 40mA of DC. A final wrap of paper or tape will finish the coil neatly. A winding of iron wire will reduce the

Page Five

focus current required, but this is not easily obtained. Permanent magnet focus by four rod magnets parallel to the tube can be used if they can be obtained. The tube is very susceptible to external magnetic fields, and should be kept well away from such things as viewfinder focussing magnets, motors and the like.



BIGNAL PLATE



The tube socket presents some difficulties. No doubt many members will dismantle an old valveholder and just push the connectors one at a time on to the pins, possibly keeping the leads apart with a parolin disc suitably drilled. For those who wish to make a proper

Figure 6/13:

Details of Tube Socket

SHORT INDEX PIN

holder, a piece of tufnol or paxolin about 1" o.d and 11/32" thick is required. See Fig 6/13. The centre hole is 5/8" diam, clearance for the stem of the tube. 9 holes at 40° intervals are drilled on a 0.60"pod. For the particular sockets used, taken from a Clix B8A valveholder FC81815/1, 8 of the holes are counter--bored 1/8" diam for a depth of 5/16". The tool shown is ground from an old hacksaw blade, and punched through the remaining 1/32" of material. The sockets are then inserted and twisted in the same way as in the original valveholder.

The tube is held in the yoke by gentle pressure from the front, ensuring good contact with the three target connectors, and is supported at the back by a simple Jubilee clip, suitably padded, around the glass neck. In professional circles, the actual tube socket is not supported, but acts merely to keep the connections separated. No doubt there is a good reason for this, for at first sight it would seem better to clamp the socket rather than the glass.

The alignment coils serve to ensure that the scanning beam meets the target at 90°. They may not be required, or can be replaced by bar magnets. When the alignment is correct, adjustment of the electric focus electrode (G3) of the vidicon will not shift the position of the picture. One, two or four coils can be used, wound to fit into the end cheeks of the focus coil former. With one or a pair of coils, their position and current is varied to adjust the align--ment; if four coils, disposed in pairs like deflect--ion coils, are used, then only the currents need be varied. The coils shown draw about 40mA max, and can conveniently be wired in series with the focus coil. They may be shunted by 250 ohm wirewound potentiomet--ers to vary the current. Alternatively, another set of field coils could be wound, shaped to fit the available space, and a much higher current passed through; this current might well be the centering current passing through the scan coils.

USEFUL CIRCUITS



Our little problem last edition about a simple way to produce an accurate 1 wolt p-p calibration signal has produced some good ideas. Grant Dixon suggests the use of a double diode clipper, and a



ite suitable circuit is
set shown in Fig. 1. Mains,
line or field sawtooth
 is fed in, and a corres swords at the output.
 The potentiometer is
 adjusted to give exactly
 l volt out, or to a close
 approximation the right
 result is obtained if the
 DC on the pot. slider is
 set to 10 volts.

Naturally this circuit depends on a stable HT supply. The only circuit that will still give a 1 wolt output in the face of mains, LT and HT variation is that sent in by Harry Grimbergen PAOLO. This uses



a neon, firing both ways from an AC input. The stabilised output is then tapped suitably. Indicator neons can be used, the usual QSI50/15 and similar types of neon stabilisers not being too satisfactory as they are not intended to strike in reverse, and consequently the output

voltage varies from tube to tube. The output waveform is not a square wave, but is sufficiently so for most purposes. Any more ideas?

FRONT COVER PICTURE

Brian Partridge G3KOK/T with some of his gear at the 1955 BATC Convention. At the left are the 4 channel sound and vision mixers in front of a 9" monitor; the IH rack carries 405 line sync gen, VSB mixer, test waveform unit, waveform monitor (see CQ-TW 51), talkback unit and camera control unit. The other rack supplies 250V regulated to all units. The image orthicon camera at the right contains timebases, head amplifier, etc. The camera control unit behind the camera is part of G2WJ's equipment on the next stand. This equipment, and much more, will be operating at the Dagenham Show, Sat-Sum July 13-14. Will you be there too? At the left is George Flanner's scan failure protection circuit for the staticon camera. Pulses obtained from the scan coils (BATC type) are amplified and rectified; the resulting DC closes the two relays which apply operating volts to the staticon screen grid. If either scan fails, the screen goes to earth via 100K. George did try using just one relay, but found it a bit tricky to adjust, especially whilst experimenting with raster size.



Above is a very effective sync separator which can be used in any application where a 1 volt comp signal is available. At GSGVO it is tied across the output of a 45Mc/s Fye strip, and gives immaculate BBC syncs for genlocking, etc. VI, a 12AT7, is used as an amplifier cathode follower, VZ as a pentode sync separator. A 1 volt output is obtained across a 75 ohm termination even when the input drops to to less than 0.1 volt, and the rise times are well below .3 microsec. The valve types are not critical, an EF91, GAUG or similar being used at V2.



"PULSE GENERATION" We regret that this tape has only just been completed. Apologies for the delay - please write C.G.Dixon for loan.

<u>OLDIE</u> George Wynn ran this 1849 ike camera in Canada about 5 years ago. He now runs a mobile vidicon rig in the car, and is at present in Metz with the RCAF.

When you have a photo of your gear published in a magazine of newspaper, FLEASE try and borrow the block so that we can print CQ-TV covers from them. The blocks are usually destroyed quite quickly, so be prepared. Or ask for 400 CQ-TV size covers.... May we have YOUR vidicon circuits, please? URGENTLY.

RF Equipment (Contd from CQ-TV No.29)

9.12 A 30 watt 70cm Television Transmitter

Figure 9/9 shows the circuit of a typical crystal controlled drive unit, intended to produce enough signal at 145Mc/s to drive a tripler to 70cms. In building such a unit, a compromise is necessary between obtaining sufficient drive for following stages, and running the early stages at such a high level that spurious signals are radiated, causing TVI and the like. In this case, although a 9Mc/s crystal is used (B7G based type), no patterning is produced on Channel 1, 45Mc/s, and it is quite possible to re-radiate Channel 1 without trouble.



Page Seven



Coil data:

15 turns 30swg enam on 5/16 Aladdin former; LT L2 14 turns 30swg enam on 5/16 Aladdin former; 6 turns 18swg 3/8 i.d, tapped at 1/2 turn; L3 7 turns 18swg 3/8 i.d tap 3 from grid end; L4 7 turns 18swg 3/8 i.d, c.tap. L5 L3.4.5 are spaced one wire diam. RFCs 20 turns 30swg enam 1/4" former.

A 9Mc/s crystal was used because it was available. but this means that an overtone oscillator cannot be used due to the multiplication ratio required (432 + 9 = 48), a x3 multiplication being reserved for a p-p tripler. With 8 or 12 Mc/s crystals, it is more usual to use overtone circuits, which usually produce an output at 3 times the crystal frequency approximately, so avoiding harmonics of the basic crystal frequency. The usual care should be taken in choosing a frequency and circuit to avoid TVI. The actual circuits that can be used are legion; Figure 9/10 shows one which cannot damage even modern low-level crystals. Circuits such as the popular Squier may overload modern crystals, which are often rated at 5mW maximum, and should be used only with bigger crystals such as the FT245 series.

In Figure 9/9, V1 is a straightforward CO stage doubling to 18Mc/s in its anode circuit. The screen and anode voltages are kept low to discourage TVI. V2 doubles twice to 72Mc/s; note that there is no stage on 45Mc/s. V3 doubles to 144Mc/s, its grid being tapped up the plate coil of V2B so as to reduce the capacity loading on that circuit. V3 anode is pi-coupled into the grid of V4, which acts as a buffer amplifier at 144Mc/s. (It will be appreciated that this unit makes a useful 2m transmitter). The

3-30p Philips trimmer in series with the grid of V4 acts with the input capacity of V4 as a capacity potentiometer, so that an accurate match between V4 grid and V3 anode is possible. This method of feed gives slightly more drive than the usual method of having the tuning capacitor to ground. V4 screen is tied down by a simple disc condenser: if instability is encountered, a series tuned circuit to ground can be used instead (6t x 1" i.d 22swg and 3-30p will be found to be about right). With a screen right across the valveholder, no trouble was found in the prototype. The output is taken via a link coil to the tripler

Although the photograph is not too clear, the construction of the unit may be seen. The multiplier chain runs from left to right at the front of the chassis, the valves being in a straight line. A

screen was found to be necessary between Ll and L2 to prevent instability. L2,3,4 are mutually at right angles. The heaters are decoupled at the pins of V3 and V4, and all meter wiring is is run in thin screened lead. The meter resist--ors are chosen to give a reasonable deflection in use; a 400 ohm 500µA FSD meter was used in the original, and typical readings were: V1 0.4; V2A 1.5; V2B 1.6; V3 2.0; V4 0.5. alternative overtone oscillator



A VIDEO EFFECTS AMPLIFIER

By M.Barlow, G3CVO.



much to the interest and amusement of your transmiss--ions. Basically it is a device for chopping out part of the picture from one camera and inserting in its place the picture from another camera. If carried to the extreme, a "wipe" results, whilst with the addition of some further circuitry, "inlay" and "overlay" effects can be produced. In addition a simple phase reverser can be used to produce negative pictures - or to correct troubles due to wrong polarities somewhere. As with all BATC vision mixing equipment, the unit is designed to handle noncomposite video, that is, suppressed but not truly blanked. Post mixing blanking is required to suppress switching transients which otherwise upset the synchronisation.

There are innumerable ways of proceeding, and the circuit given is intended only as a guide. No doubt many improvements will occur to the reader, and some suggestions are included at the end.





The basic scheme is shown in block form in Fig.1. The two video inputs, marked 1 and 2, are fed into a video changeover switch operated by the trigger circuits. A common phase-splitter and cathode follower output stage completes the video side. The switch is operated by combinations of DC level changes and suitable AC waveforms, primarily derived from Line and Field Syncs. Further details will become time constant, and the 100K resistors are chosen to clear from the circuit description.

V4 and V5 are short suppressor base pentodes, type 6F33 or 6AS6. The video signals are applied to the suppressors. No terminating 75 ohm resistor is shown because at G3CVO the inputs are bridged across two of the four inputs to the main vision mixer. The screens and control grids are arranged as a Scmitt trigger, V5 normally conducting unless V4 control grid is raised above the potential of V5 control grid. Only one valve at a time conducts, allowing its video signal to be fed from the common anode load to the phase splitter. Cathode bias for the suppressor signals is obtained across the 220 ohm resistor; crystal diode DC restorers might be an improvement in place of the suppressor grid leaks. V6A is a simple phase splitter; it has a low input capacity which helps to make up for the large anode load on the 6F33s. V6B is a cathode follower designed to produce 1 wolt in a 75 ohm termination at the far end of a cable.

The Schmitt trigger connection was originally used so that the manual and automatic wipe controls would directly operate the changeover, but this was unsatisfactory as the change in potential near the changeover point affected the current in the conducting valve and so added to the vision signal at the output. To get round this, another Schmitt trigger V3 was added, whose output can be one of two absolute levels only. The 100K pedestal control is used to balance the two video outputs and so allow for valve ageing, etc.

Only four switch positions are shown, but by applying some ingenuity and thought, almost any effect can be produced. With no input from V1 or V2, V3A control grid is governed entirely by the manual control 250K, or alternatively from the "operate" switch. This is loaded with 8mfds to give a reasonable give equal wipe times in each direction, etc. With

CQ-TV

no input from Vl or V2, this switch will merely change from input 1 to 2 with a slight delay, and the unit can be used as a two channel vision mixer. Vl and V2 are simple integrators producing line and field sawteeth. If, say, line sawtooth is added to the DC fed to V3, then by setting the manual control the changeover will occur at any desired point in the line, and the resulting picture is as in Fig. 5a.



Figure 3: Some of the effects produced by the unit.

On auto, the vertical division moves across the picture producing a horizontal wipe. Using the field sawtooth from VI, a horizontal division is obtained, or a vertical wipe. Adding field and line sawteeth outs out ideally a rectangle from the bottom righthand corner as in Fig 3c, but in practice this becomes rounded and rather contemporary in shape as in Fig 3d. The aspect ratio of this "lozenge" can be varied by altering the amplitude of one of the sawteeth. An external input can be used for a variety of effects such as "Venetian Blind" (sinewaves or bars at a multiple of field frequency) and inlay and overlay, where the input signal consists of the output from some camera clipped above or below some reference level.

The unit is built on a 4" by 15" panel mounted above the vision mixer panel at G5CVO. Only the controls project at the front, and a 12 way connector joins the unit to the input sockets which are mounted on the frame of the mixer console. Video, and line and field syncs, are looped through in the usual way.

Hints for further improvements:

Applying last months BATC Wrinkle, the 6F33s could well be replaced by 12AT7s, connected as cathode coupled pairs. The video would go in on one grid, and the switching waveform from both anodes of V3 to the other. This would mean that all six valves would be similar, and the increased gm of the 12AT7. would allow the 10K common video load to be reduced. A fairly large peaking coil would extend the bandwidth too. If 6F35s are used, the video could well be applied to the control grids (higher gm), with the anodes of V3 connected suitably to the suppressors. There is a white bar produced at the chageover which can be reduced to about 1% of the line width by choice of capacitors across the Schmitt coupling resistors, but this bar is of large enough amplitude in the Positive Output condition to cause DC restoration in following amplifiers, so depressing the pictures into the black region. The net result is that the contrast of the pictures suffers as the wipe occurs. A peak white limiter, possibly on V6A grid combined with some load and bias switching, would be an advantage. In the negative output condition no such trouble occurs. It should be possible to switch V2A to act as an amplifier of external signals. G3EKE suggests making V3 a flip-flop of adjustable duration to produce the switching. In any case the RH grids of V3 and V5 can be used to add more waveforms, and there seems no limt to what can be done. However, oddly enough, a simple diagonal wipe has so far defeated us, but makes a grand

subject for argument as to What Combination of Line and Field Sawteeth should produce it!

Finally the author would like to thank PAOZX and Mike Powell for helpful suggestions over the past few years. The unit will be in action at Dagenham - possibly doing the Daz window test with one half of the picture negative and one positive!

AN OUTPUT COUPLER

One of the most difficult operations at NF is to abstract the hard-won NF from the PA tank circuit and to push it into the feeder. It is possible to lose easily 90% of the output by inefficient coupling; this will show up as a weak signal, and entirely the wrong modulation characteristic for the PA brought about by incorrect loading. Series tuned loops, pi-coupled loops and the like can be used, but a very successful device is that used by G2WJ/T. The coupler consists of

a shorted quarter wave line tuned by a small capacitor, with the output co-ax tapped up the line. An almost unlimited number of variations can be made, but the design shown has proved very satisfactory. 4" side U channel, brass, is used, although 1" tube would do. The "cold" end is spaced about "above the "cold" part of the PA plate lines, i.e where the





MT chokes are connected. With the coupler parallel to the lines, tune the PA for resonance, tune the coupler to resonance, and then move the coupler closer or further from the lines until maximum HT current is indicated - retuning if necessary. It may be found that slight overcoupling gives the best results with TV modulation.



Mike Bailey operates G2WJ's photicon camera at the 1956 ATV Convention in London.

WHAT THE OTHER CHAP IS DOING

As usual, most of the news of progress comes from the various groups. Whether there are two or twenty-two of you, do please get in touch and share the work - its more fun, more instructive, and you get there quicker....

Bill Still W2GVR/VE2 of Montreal writes that he has been in the TV business since 1938, and is now permanently in Montreal, where he has been pushing ATV for two and a half years. Already on the air, besides himself, are VE2AFM, AKT; LS and VE3RM are experimenting, and by the autumn VE2JF, ADR, AES, JL, APD and OM Karas should be putting out pictures. Others building gear include VE2AKK, AWP, KB, MB, AUV APU, SC and ZP, whilst WIVSA is hoping to relay the pictures of WCAX-TV from Mt. Mansfield, Vt some 65 miles away. The VEs are using more or less a 525 line version of our 405 line system, with the addition of a front porch on the field sync period (Why, oms?). Sound is radiated on a 4.5Mc sub carrier, FM. They reckon on a 3Mcs video band. To add to this sterling work, Bill has recently duplicated his complete circuitry for the conversion of an IFF unit: this uses a pair of 826s as a p-p oscillator on 145Mc/s driving an 832A tripler and a pair of 9910 or 9903 tubes in the PA, and has been copied by several stations. Sound and vision modulators are also given; Bill doesnt state a price for the data, but no doubt can supply if you write him at 4367 Papineau, Montreal. Well done, om, and good luck to Still Pictures !!

Charlie Coorsh VE2AFM sent in a colour print of his gear. Unfortunately we cannot reproduce a colour print even in B&W, so we hope for a monochrome print for next time. The gear looks fine, and Charlie is active with AM FM Mobile and ATV. Cliff Sunderland VE2CB is visiting the UK now, and hopes to look up a few /Ts.

Peter Burrage (Suffolk) has had a spell of bad health, which has prevented him from completing the 13cm microwave link. He is now collaborating with Roy Martyr (Chelmsford) in building a 3cm link for the Dagenham show, using 723A/B klystrons and FM. 45Mc/s Pye strips will be used initially, but wider bandwidth IF strips will be required later for good TV results. Roy has put the Super Sync Generator and its 400mA regulated power supply in a 6' x 19" enclosed cabinet; a clamp pulse generator is next on the list, together with FSS and vidicon camera. Ted Pegram G3INY/T is working on the CV67 klystron link for 13cms, using AM by grid mod. The G8SK transmitter is now working fairly well, and Ted has built a wonderful version of the 70cms converter in "I.A.T.V" booklet. A lattice mast for further RF experiments is being built.

Ken Cooper (High Wycombe) has made a lens turret assembly from an old cake tin lid, whilst the staticom focus coil is wound on a shellaced "Bronco" toilet roll former! Syd Collins and Colin Draper are making a 1" angle iron frame for the monitor (don't get it magnetised, oms) whilst John Easden is making an audio mixer panel. Brian Hopgood is building a monitor amplifier. Rex Lakeman has finished the camera and now awaits the staticon and valves: S.O.S the group is stuck for 3 6GB6s (same as EF91 but g2 and

g3 reversed). Any help would be much appreciated by the H.W. group.

Yeovil (Somerset) and District Amateur Television Club meet every Wednesday at Alan Stacey's. That is GSAST, now in temporary accommodation whilst his new house (superb VHF site) is built, Alan and G4OZ at Sherborne, some 6m away. Alan has a 50C4 FSS tube by Mazda, and gets 3Mos easily from the video amp using EF91s with 4.7K loads. A 5FP7 in the same setup gave distinctly noisy results. A 5527 is to hand, which the boys will probably use for film scanning, and with John's equipment as well the group has a good nucleus of ideas and gear to keep them going. Visitors and tapes always welcomed.



JANKO VASILIC of BELGRADE with some of his gear.

PAOZX has been extremely busy, and unable to do much with TV; the 80m sked for German and Dutch speaking BATCs has had to slide. Harry Grimbergen PAOLQ (Leiden) continues the excellent work: a new FSS using a 5WP15 scanner at 20kV, and a 48 element 70cm array made from copper tube. A short spell in hospital will set Harry back a week or two for his trans-North Sea tests. W8MRH is at Pontiac, in Michigan. He runs an AX9903 PA on 430Mcs to a 24 ele beam; the camera uses a 6326 vidicon, built on a 5" by 7" by 2" chassis. 525 line type of sync is used, but non-interlace (ie 262/525 lines). The 6326 is designed for film work at high light levels, and we should be interested to hear of results. Kric Lawley (RAF Locking) manages to find time to do a few small ATV units, and hopes to be in Birmingham at the time of the Scouts Jamboree. Simon Freeman is now G3LOR/T at Dedham, Nr Colchester, and has had some unsuccess--ful tries at persuading overtone oscillators to work. With a supply of new crystals, and an old SCR522 of G3CVO's, Simon hopes to get some real drive into his QQV06/40s. He is 6m from Eddie Barrall G2BCB at Colchester, but the latter has very little spare time at present.

Mike Barlow G3CVO has had a major rebuild, taking the gear out of the rack and putting it into mobile cases 24"x15"x6½". One of these contains the sync generator, pattern generator, RF distribution, power supply and camera control; another contains 70cm tr, sound tr, waveform monitor, and modulators; the third

CQ-TV

contains a Test Card C monoscope camera and power supply - TCC selected for the benefit of Montreal been overprinted with the call letters of Barlow's Broadcasting Co. The master control console has been completed, with four sound channels, four vision mixing and two vision effects inputs, and talkback and cue control. Because of the cables involved, some non-BATC standard 8 way plugs carrying mains, HT, LS FS and MS are used between certain of the units, being sure to finish up with a standard Belling-Lee, of course! An EC91 pre-amp to G3VI's design in the last edition has proved to be just as good as the RF105 unit with its disc seal CV53. The vidicon camera proceeds slowly, and is designed to be interchangeable with John Tanner's.

George Flanner G3KBA/T in Birmingham continues to be one of the leading lights up there. His camera is 12"x8"x5", complete with free-running timebases, video amp, regulator tube, and scan failure circuit 11 valves in all. He gets 3Mc/s easily, and is very pleased, but had some trouble at first with nonlinearity of scans, due to mismatching. George tried a cascode pre-amp but found no improvement over a simple pentode, and the present lineup is KF91/6CB6 (triode conn.) EF91, EF91, EF91 CF. Line and field osca are EF91s, with a 5763 Line o/p and EF91 field. The camera itself is made from two standard 12x8x22 chassis back to back, with hinges for easy access. For camera cable, George has used 50ft of ordinary 7 way flex. He finds this quite adequate provided the "live" video and pulse leads are run at about 25 ohms impedance. It is very much lighter and more flexible than proper camera cable, and so there is less chance of pulling the small camera off its tripod. George reminds us that he recorded video on tape two years ago by FM of the bias osc; Bill Stapleton is now trying a carrier system.

John Tanner's vidicon camera chain is almost complete, and should be running at the Dagenham Show. The camera is 8" x 5" x 4", with the CCU etc on a separate rack mounting chassis. Whilst John builds the camera, Mike Chaney (Amersham) is toying with FSS, and John Deveson is working on a 430Mc/s TVTX, using a QQV06/40 PA. All three ahare a shack at Chelmsford, so a complete station should be available by the time G3CVO leaves in November.

J.Shankland GM8FM complains that all the BATCs in his area (Edinburgh) have either lost interest or moved South to the land of the telly. He is very anxiousneat 9" picture monitor, using 1/2" angle dural; like to have a go at ATV himself, so if you are near him please write. Tom Douglas G3BA is now well installed at his new home at Sutton Coldfield, with a very good 70cm site. How about some pictures, Tom? J.A.Cusdin (Polegate, Sx) would like to meet a 931A and a mixer Xtal. He has written several articles for the Radio Constructor. Mike Cox has temporarily returned to Beccles whilst preparing for exams. His "Pathe-Cox" telecine unit is a great improvement on the old one. The 931A fits in the lamphouse with its pre-amp, so cutting out a lot of the motor hash. The scanner CRT is placed a couple of feet in front of the lens, and the results are surprisingly good. Mike has tried a colour wheel between lens and CRT and has had good results. A transistorised pattern generator using surplus transisitors is also on the way. He has scrapped the counter, and is currently obtaining field timing from the T41 thyratron which locks on

NEW MEMBERS

D. Atkinson 6 Holden Rd, Waterloo, Liverpool 22. Buz La Bonte K6KDU-TV Auburn California. viewers who may not know it. It has, at great expense, Guy Eagle WOTTU 536 S. Fifth St, Box 54, Neodesha, Kansas. G.Gilbert 67 Abbey Rd, London SE16. L.Housteau W8IIH 139 Park Ave, Youngstown, Ohio. D.Jones 63 Parkside Ave, Romford, Essex. F.T. Lawrence Slitrig Villa, Hawick, Roxburgh. J.T. Lawrence GW3JGA Perranporth. East Ave. Brynn Newydd, Prestatyn, Flintshire. G.H. Mackenzie-Shapland "Treetops", Lynhurst Ave, Barnstaple, Devon. E.W.Mercer 26B Kirkstone Rd North, Liverpool 21. J.C.Nash W6AZI 604 La Sena, West Covina, California. Ross Neal 453 Montrave Ave, Oshawa, Ontario. Don Oliver VE7AOG 1209 Vancouver Ave, Nanaimo B.C. R.F. Redfern 23 Rawalpindi St, Auckland, N.Z. J.V. Sergeant WOWAJ 1016 Trant St, Bettendorf, Iowa. J.M. Shankland GM8FM 28 Craigmount Crescent, Corsto--phine, Edinburgh 12.

Paul Vago 1315 Bryson, Youngstown, Ohio. D.J. Whitehead Albert Hotel, Madoc St, Llandudno. S.F. Wyndham 32 Rothmans Ave, Chelmsford. (562).

Changes of Address

4160556 J/T Brett, Tech Section, RAF Scarinish, Isle of Tiree. Inner Hebrides, Scotland; F.Brown G3JQP Myrtle Villa, Clifton Rd, Pound Lane, Pitsea, Essex; E.H. Butcher G3CUH 4 Crowsfield Cottages, West Hannin--gfield, Essex; Eric Cornelius VK6EC 157 Wood St. Inglewood, W. Australia; C. G. Dixon Kyrle's Cross, Peterstow, Ross-on-Wye; J.Harte Chapel St, Newcastle West, Co. Limerick, Eire; Ivan Howard G2DUS/T 40 Regent St, Stotfold, Beds (tel 297); J.V.Mercer 73 Timsbury Crescent, Bedhampton, Havant, Hants; J. Plowman G3AST 4 Hewish Farm Cottages, Bradford Abbas, Sherborne, Dorset.

the HT ripple!

Alwyn Stockley has been very busy with exams and house painting, but has started work on the 441.4Mcs vision tx; his 160m gear is working and he hopes to start a regular TV net in S.London. Doug Wheele has been very busy building gear for the Dagenham Show, including a 4 channel vision mixer using suppressor grid switching, but with the push buttons remote from the unit. Frank Brown is designing a vision transmitter, and Martin Lilley has built a 16 ele stack. G3AKJ/T, using a 6J6 transmitter, should also be on the air soon. Peter Waspe has built a very Jack Terry's 14" one, it can be stood any way up. Anyone using MW6-2 projection tubes as monitors? Vidicon coils fit these quite nicely, and waste less power than standard 35mm coils would. Grant Dixon hopes to make a 3-tube "Triniscope" using 3 MW6-2s. G2WJ has aligned his converter for him, and Grant also has an RF105 70cm pre-amp. When he is settled into the new house at Peterstow (a much better VHF site) some RF tests will be laid on. Eric Lawley, RAF Locking, says there is a very active TV group there who want to contact BATCs in the area. They intend to build the lot

Eric Cornelius VK6EC is ordering a new vidicon as the old one is spotty. He reckons that VK6WJ/T (those letters again) is the only other ACTIVE TV man in the whole of Australia. Full details and photo next time. If our next Convention lasts two days, do you prefer Fri-Sat or Sat-Sunday? 7.3M

BRITISH AMATEUR TELEVISION TRANSMITTING STATIONS LICENSED BY JUNE 1957

G2DUS	I.Howard, Stotfold, Beds.
G2WJ	R.Royle, Gt. Canfield, Essex.
GJACK	J.Hogarth, Blyth, Nthmbld.
GJAST	J. Plowman, Yeovil, Som.
G3BAY	G.Addison, Leicester.
G3BLV	F.Rose, Sunderland.
G3CTS	TV Society, SE26.
G3CVO	M.Barlow, Gt. Baddow, Essex.
G3DFL	G.Hill, Birmingham.
GJEKE	A. Stockley, London SW16.
G3FNL	R.Grubb, Upminster.
GISFWF	R. Torrens, Belfast.
G3GDR	L.Dent, Abbots Langley, Herts.
GJJVO	F.Lee, St Albans.
G3KBA	G.Flanner, Birmingham.
G3KFE	G.Ellery, Enfield, Middx.

G3KFH	P.Robinson, Worthing, Sx.
G3KKD	I.Waters, Ely, Cambs.
G3KOK	B. Partridge, Bishops Stortford.
G3KPX	R. Howard, Maidenhead, Berks.
G3KQJ	M. Sparrow, Wolverhampton.
GSKRA	M.Cole, Chelmsford.
GJKYW	R.Watson, London SE2.
GSLOM	L.Mansfield, Coulsdon, Surrey.
GSLDW	W.Ellesmere, Birmingham 16.
GJINY	T. Pegram, Chelmsford.
GSLOS	G. Chatley, Enfield, Middx.
GJLPB	J.Brown, Penryn, Cornwall.
GJLQR	S.Freeman, Dedham, Colchester.
G5ZT	H.Jones, Plymouth.
GJILO	R.Smalley, Carnforth, Ches.
GW3FDZ	D. Whitehead, Llandudno, N. Wales,

This list includes only those who are known to the BATC.

LAWRENCE ELECTRONICS

GUARANTEED

G3LCM/T

VALVES

TELEVI	SIC	N SPECI	ALS.		OTHER 1	ALVES											
EB91	-	6/-	CV6	-	1/-	EF94	-	7/-	P61		5/-	6AG5	-	8/6	8D2	-	4/8
ECC81	-	7/6	DET19		1/6	EF96	-	6/6	RK34	-	3/6	6AK6	-	8/6	9D2	-	4/6
ECC62	-	9/-	DET25		5/-	EK32	-	8/6	RL37	-	5/-	6AJ8	-	9/-	12A6		7/6
10002		9/-	DF91	-	7/6	EK90	-	8/-	SP13C	-	4/6	6AT6	-	8/-	12AH8	-	10/-
ECC84		11/-	DF92	-	7/6	EL32		6/6	SP41	-	5/-	6AU6	-	7/-	1208	-	5/-
ECF82	-	11/-	DL92	-	7/6	EL33	-	15/-	SP61	-	5/-	6BES	-	8/-	12H6	-	2/6
ECL80	-	9/-	DL93	-	7/6	EL41	1	10/-	TTII		4/-	6BA6	-	8/6	12J5	-	5/-
ECC91		7/-	DL95	-	7/6	EL42	-	10/-	UB41	-	10/-	6BC5	-	6/6	1217	-	7/6
EF80	-	8/6	and a second	-	1/-	EL90	-	7/-	UCH42	-	10/-	6BH6	-	7/6	12K7	-	7/6
		0/0	EABCS		9/-	EL91	-	8/6	UF42	-	10/-	6BR7	-	8/6	1288	-	17/6
KF91	-	7/6		-	2/6	EMSO		13/-	UL41	-	10/-	6BS7	-	8/6	1207	-	7/6
EF95		6/6	EBC33		9/-	EN91	-	7/6	UBC41	-	10/-	6BW6	-	8/6	12807		7/6
EL84		10/6	EBC41		10/-	EZ35	-	8/-	UF41	-	10/-	6BX6	-	8/6	125G7	-	5/-
EY51		11/6				EZ40	-	8/-	008	-	20/-	6B8	-	5/-	12SH7	-	5/-
504	-	8/-	EBC91		8/-	EZBO	-	8/6	UL46	_	10/-	604	-	6/-	12537	-	5/-
6AK5	- 444	6/6	EBF80		9/-	EZ90	-	7/6	UY41	-	8/-	6F32	-	5/-	129K7	-	5/-
6AL5	-	6/6	ECC53		7/6	FC130		4/6	VP13C	2	4/6	6 G 6	-	5/-	15D2	-	5/-
6AM6	-	7/6	ECC35		7/6		-	4/6	VRILG	-	6/-	6H6		2/6	3516	-	9/-
6AQ5	-	7/-	ECH35		10/-	HL13C	-		VR150/		7/6	635	-	5/-	3524	-	8/6
6CH6	**	8/6	ECH81		9/-	H63	-	7/6	VUILI	-	2/-	6J7	-	7/6	45	-	6/6
6F33	-	7/6	ECH42		10/-	KT33C		8/6	X65	-	10/-	6K7	-	5/6	58	-	5/-
676	-	7/-	BC52	-	5/-	KT44	-	10/-			6/6	6KB		8/6	76	-	5/-
6SL7	-	6/6	EC54	-	5/-	KTW63	-	7/6	OZ4A	-	7/6	6L6	-	10/-	807	-	7/6
65N7	-	7/6	EC90	-	6/-	PL38	-	20/-	114	-		6N7	-	7/6	954	-	5/-
6X4	-	7/6	EF36	-	6/-	PL81	-	10/6	114	-	7/6	6N8	-	9/-	955	_	5/-
12AT7	-	7/6	EF37A		10/-	PL82	-	10/6	105	-	8/6	6P28	- 2	20/-	7193	2	3/-
12AU7	-	9/-	EF39	-	6/-	PI80	-	9/-	105		7/6	697	-	8/6	9001	2	
12AX7		9/-	EF41	-	10/-	P181	-	8/6	2034	-	3/6	6R7				-	5/-
12BH7	-	8/6	EF42	-	10/-	PI82		8/6	2D21		7/6			8/6	0000		= /
85A2	-	9/-	EF50	-	5/-	PCF80	-	9/6	2X2	-	4/-	6SA7	-	8/-	9003	-	5/-
9001	-	8/-	EF54	-	7/6	PCF82	-	10/-	344	-	7/6	6SH7	-	5/-	U801	-	20/-
829	-	40/-	EF55	-	9/-	PCC81	-	10/-	394	-	7/6	6SJ7	-	7/6			S-0.
832	-	30/-	EF82	-	8/6	PCC84		11/6	4D1	-	4/6	6SK7	-	7/6			
8012		6/6	EF85	-	10/6	PCL82	-	10/-	5Z4	-	8/6	6557	-	5/-			
S. A. S. M. S.		00000	EF92	-	5/6	PEN46	-	8/6	6AC7	-	6/6	678	-	9/-			
			EF93	-	8/6	PZ30	-	15/-	6AB8	-	9/-	676	-	7/6			

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