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Gerrards Cross, Bucks.
For the British Amateur Television Club.

"CQ TV" NO. 2

Editors Note:

GREETINGS, oms,

Seasonal and otherwise - and thanks for the mail (and contributions). Its good to see that so much Good Work is being done, and I hope that this no. 2 issue will encourage everyone. It should be a bit larger and a good deal more interesting than the last, thanks to your contributions and comments.

News from the GPO is neither good nor bad. The RSGB are trying to arrange a meeting with the powers that be, but to date have only received a "no" from PMG level. However, it appears that this may be due to a lack of information on the PMG's part. In any event, not one reason for the refusal was given, and, in fact, it is difficult to think of any in view of the frequency and type of transmission we have in mind. I think we are almost certain to get the permission in time, if we cause enough bother.....

To more immediate points, however. Please keep that mail rolling in, anything and everything you have, enquiries requests, sales and wants, etc. Don't expect individual replies, though, except in certain cases, as it is VASTLY easier for me to reply via the Mag. or Circular Letter!

The typing of this edition may not be up to my usual immaculate standard, as I am doing it at odd times on an assortment of W.D typewriters - this Editorial is being done in the Guardroom of 1 T.R, Catterick Camp (on duty, not inside...). And so, dear scroungers and BATCs, let me finish by apologising for the letters I almost certainly owe you, and wish you all a very Happy Christmas, with bags of 5527s in your stockings, and a Prosperous New Year - with plenty of TV and no QRM. here

And typewriters that dont jump lines / , and there.....

See you in the next edition, oms,

73s

Mike B. G3CVO

THIS MONTH'S SHORT NOTES.....

Someone did not get a copy of the first edition of the Mag., as I sent 24 copies to 25 people. If you were the odd man out, and would like a copy, please contact me and I will send on the spare copy. I have a few spare copies, but at 6d per time I cannot be too liberal!

Thanks very much for the stamps, all.

Remember to keep to the bands 420 - 432 mcs (Channel A), and 438 - 460 mcs (Channel C) for TV, and leave Ch. B to the Sound wallahs.

SALES AND WANTS SECTION:

FOR SALE: 10" RCI 3/4 CRT, brand new complete with new mask. Heater - Cathode short, but tube is OK otherwise Htr. OK, no guarantee; offers to G2DHS, 50 Regent St. Stotfold, Beds.

WANTED: 1" - 3" Blue CRT for IFT. G3CVO, Cheyne Cottage, Dukes Wood Drive, Gerrards Cross, Bucks.

WANTED: Transformers from the 1D- 6 - A/APN - 4. P.Parkin Abinger Arms, Abinger Hammer, Surrey.

Will anyone interested in Hi - Fi and/or Tape recording please contact Fred Wood or Bob Styring. (Addresses elsewhere).

Say, we have an article on 420 mc RF equipment please?

2ND. OPS' CORNER

Did you hear about the YL who saw a cardboard block electrolytic, and enquired why we did not take it out of its box?

Most of the articles in this mag. are pretty technical. Is there a demand for some introductory notes? Are YOU clear just what that term means? Write and let us have your views.

Has anyone used an ex - RAF G45 Camera gun in an IFT? If so, could we have the gen, ons?

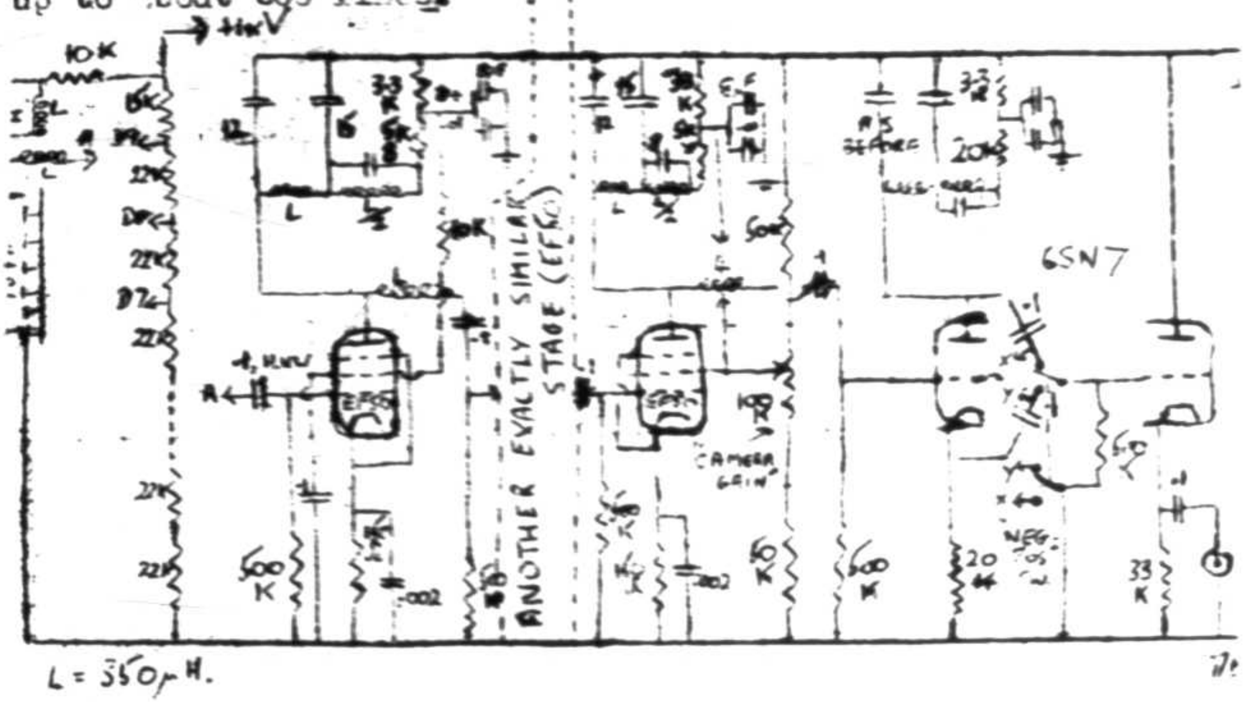
And I apologise for my absence at the Darlington Hamfest - I was put on guard at very short notice. Sorry...

XTALS I can get a limited no. of crystals reground to your choice of frequency, @ 3/6 a time, inc. post. Anyone interested contact G3CVO.

A PHOTO-CELL PREAMPLIFIER FOR THE 5527

by A.E.SALE.

[This circuit was originally designed for EF55s, and had a response flat to 20 mcs. Mr. Sale gives below values for EF50s, with a response to 4.5 mcs, a figure suitable for up to about 500 lines.]



About 10 volts are available at the o/p co-ax socket. The PM EHT must be FW rectified, and the amp. HT must also be very pure. If insufficient control is given by the Camera gain con take another screen to the potentiometer. The Neg./Pos. pha reversing switch is a ceramic one to be safe. Details of a suitable power pack using a 350-0-350 transformer for both HT will be given, after tests, in the next issue. Note that the shunt correction coils are pies taken from an old Radar delay line, halved where necessary.

IN THE NEXT EDITION: Articles on Non-interlace Pulse generators,
A simple monitor unit,
420 mc aerials, etc, etc.

P. Parkin's "TV Notes"

A Survey Of Current Literature:

FROM RADIOLYMPIA: Mullard's have a new valve out, the ME4000, which has a 25 volt filament. The valve is a special EF37, and when used with a Photo-cell a grid leak of up to 1000 Megohms can be used. Just think of it - a swing of 1000 volts for a change of PEC current of 1 micro amp! (What about the HF response, Peter M.B).

Pye's will let you have their colour TV rig for about £35,000, always assuming you can stand the noise of the motors.

Are you having trouble with your references? Have you lost that data? Your troubles will be over, or almost, if you live in the London area. The magic lies in the Patent Office Library in High Holborn. This Ham's paradise contains nearly all the British, American and other Electronic mags, way back to the dim ages of cats whiskers and whirling discs (shades of Pye!). The Library is free, but is for reference only.

A useful article on TV cameras is in a book called "Electronics", by Dr. J.D.McGee of EMI, (edit. by Bernard Lovell). The article is on page 135, and contains packets of refs. that can be looked up at Holborn.

Mullard's new Projection TV unit will sell retail for about £20, and the tube, a 2½" job, for about £8. They hoped to sell it retail at the show. The No. is the MW6-2.

A useful Surplus bit is the K19B PEC unit, which has a 930 in it, besides a Rotary Gen., etc.

By the way, have you seen the monthly Philips (Eindhoven) Review?

Did you know you can get a 'white' trace from a green one by using an orange or red filter?

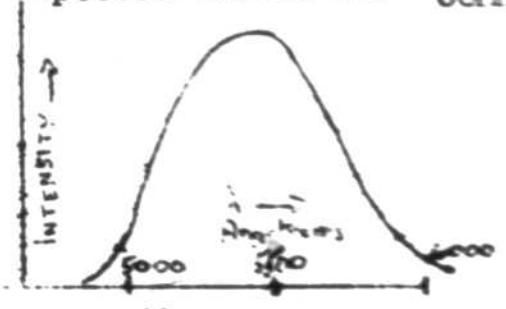
73s, PeP.

EMISSION SPECTRA OF C.R.T. SCREENS by P.Parkin.

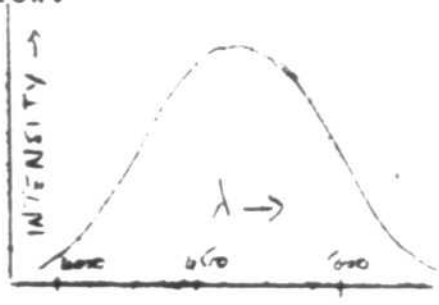
A study of the constants of CRT screens is obviously a necessity if any work is being done on Intermediate film transmitters. The decay time of the persistence is the chief controlling factor in the max. definition attainable in the system. A table of common screen materials and their characteristics is given below.

Material	Colour	Decay Time	Uses
ZnO	Green	1 microsec.	TV film scanners
ZnS act. Cu	..	Up to hours.	
Zn_2SiO_4 Mn	..	10 milliseconds.	CROs, VCR97 etc.
ZnS Ag	Blue	A few secs.	Radar.
$CaWo_4$	...	3 microsecs.	

Most ex WD green tubes have the 10 millisec. afterglo Spectra curves for common tubes follow.

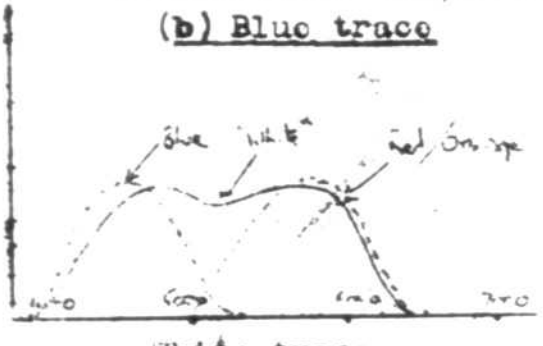


(a) Green trace



(b) Blue trace

(c) "White" trace TV rx tubes contain a mixture of compounds, some giving a blue-green and some an orange-red, the result being approx. white.



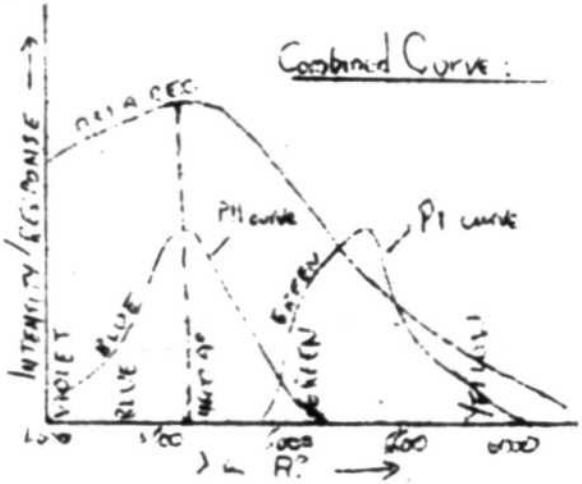
White trace

For max. Photo cell output, it is obviously desirable that the response of the photo cell should be a max. at that colour at which the screen trace has a max. intensity. As can be seen from the next curves, a 931a should work best

with Blue trace tubes, such as the surplus U.S tubes on the market. Its max. response is at 4600 Angstroms, the same as the blue trace. The green trace lies off the 931A cell curve.

Since it is the duration of the afterglow that is so important, any method of shortening it in practice or effect, will help a good deal.

Use of Ultra-Violet filters may help. RCA say that their P1 green phosphor is down by 95% at 4850: A.U. so that in the U.V region the intensity of the screen is presumably nearly zero. It is not known what things are like with British tubes, nor with Blue tubes. RCA make a P15 phosphor for TV use - with a 1.5 microsec. afterglow in the visual region, and a 0.06 microsec time in the U.V region! The trace has two peaks, one at 5000 and one at 3950 Angstroms.



G.E.C have no data on the matter.

Acknowledgements to "Electronic Engineering", Aug. 1949.
"Wireless World" CRT data.
Messrs. Mazda, R.C.A, and G.E.C.

NEW MEMBERS:

and new QTH's.....

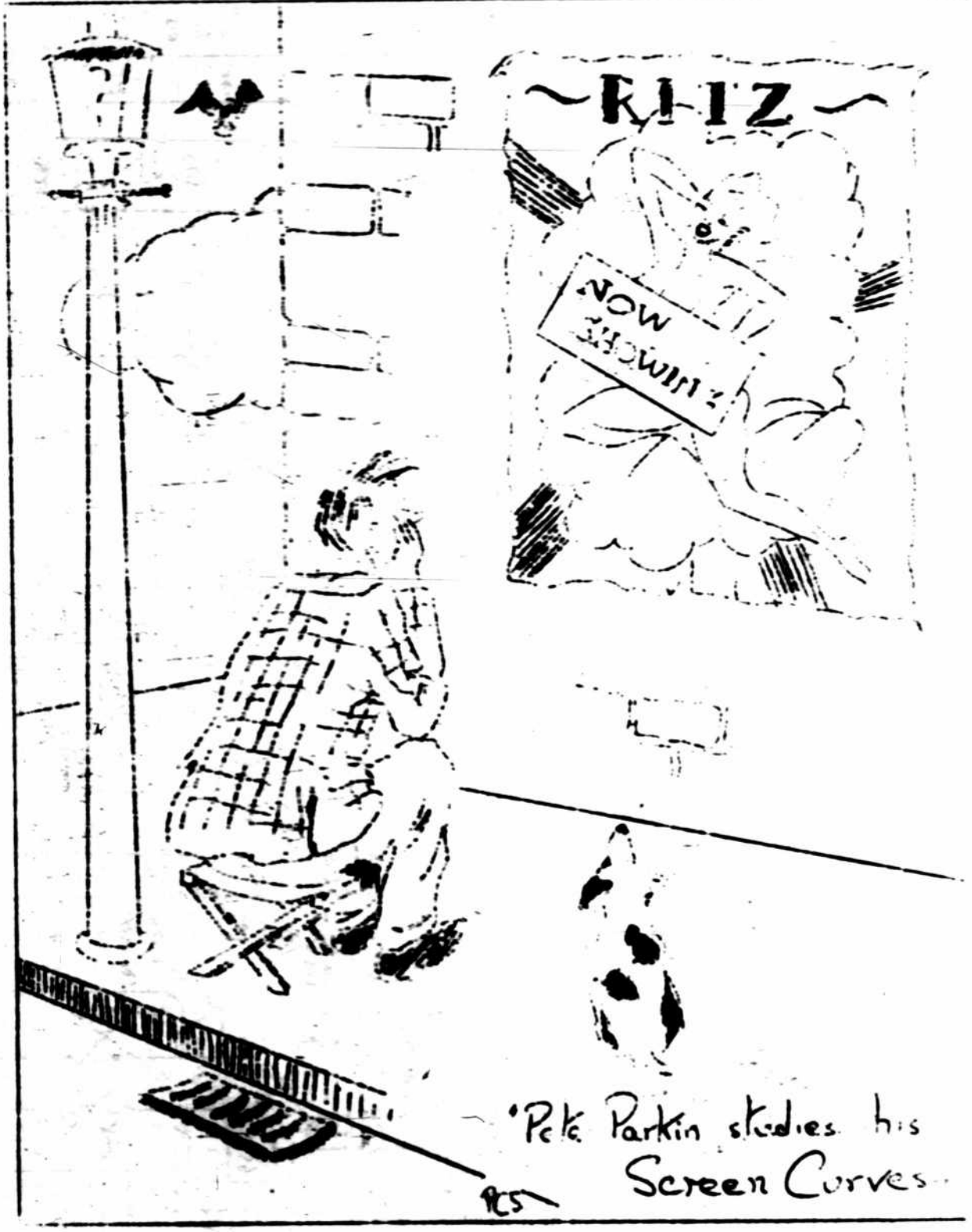
BOB STYRING, 82 South Grove Rd., Sheffield.

G.I.WILSON, G3BHH. 2 Springwell Ave., North End, Durham City.

S.F.HANKAFORD, "Boochwood", Croston Rd., Lostock Hall, Preston, Lancs.

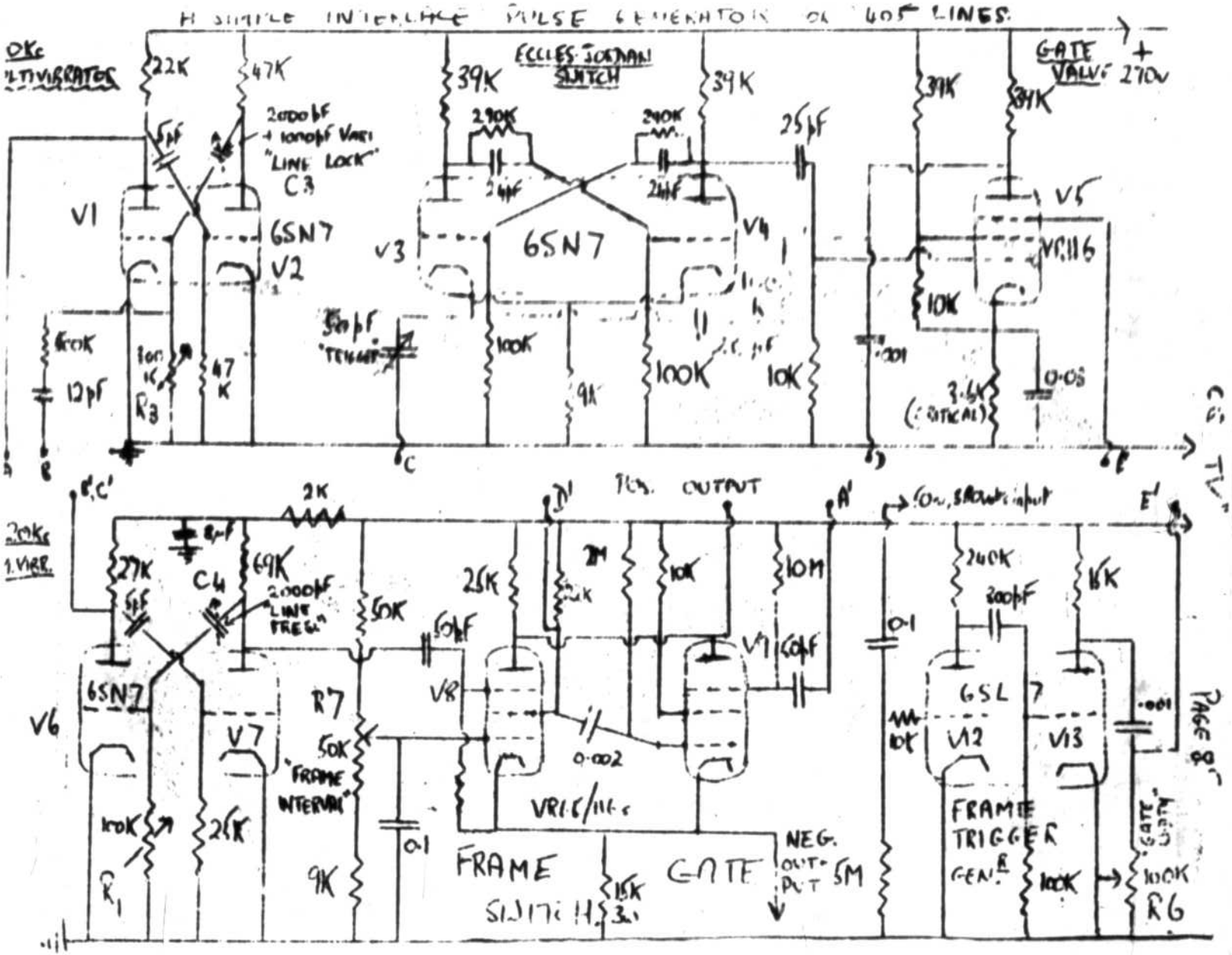
DAVE BISHOP, 14 East Wyld Rd., Weymouth Dorset.

F.ROSE, G3BLV, 18 North Bridge St., Sunderland, Co. Durham.



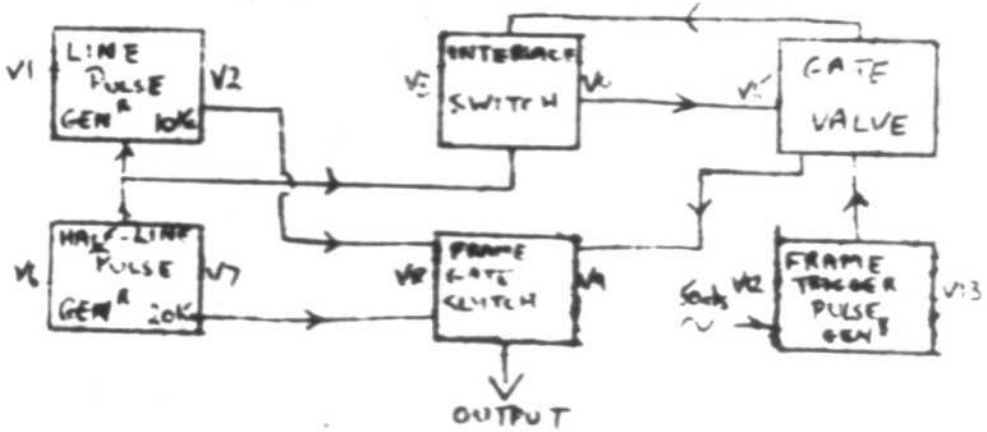
'Pete Parkin studies his Screen Curves.

PCS


H SIMPLE INTERLACE PULSE GENERATOR OF 405 LINES.
OSC & TIVIBRATOR
22K
47K
2000pF + 100pF VARI "LINE LOCK" C3
5pF
V1
6SN7
V2
ECCLES JORDAN SWITCH
39K
290K
240K
2pF
25pF
V3
6SN7
V4
GATE VALVE
+270v
V5
VR116
10K
.001
3.6K (CRITICAL)
0.05
50pF "TRIGGER"
100K
9K
100K
10K
12pF
R3
47K
C
TO TIME BASE
B'C'
2K
TRIG. OUTPUT
D'
A'
E'
20K 1 VIBR.
27K
C4
2000pF "LINE FREQ"
69K
50K
25K
2M
10K
10M
50pF
VR
V6
6SN7
V7
R7
50K "FRAME INTERVAL"
0.002
VR116/117
0.1
9K
R1
100K
25K
FRAME SWITCH
15K
GATE
NEG. OUTPUT 5M
0.1
240K
200pF
16K
6SL7
V12
V13
FRAME TRIGGER GEN.R
100K
.001
"GATE" OUTPUT
100K
R6
PAGE 90

SIMPLE CIRCUITS' DEPT: An Interlace Generator For 405 Lines

By A.E.Sale and G.F.Pember.



The block diagram of the pulser is given above, and t circuit on Page Eight. V8-V7 is a 20 kc multivibrator, locki V1 V2 on 10 kcs. The output from V8 also triggers the Eccles Jordan Flip Flop, V3-V4. This is an electronic switch, either valve conducting as the other is cut off, the mode being rev-ersed when a trigger pulse arrives.

Square waves from the anode of V3 are differentiated and applied to the grid of the Gate Valve, V5. This valve is so biassed, by returning its cathode to HT, that it will only conduct when positive pulses arrive on both control and suppr-essor grids simultaneously.

350 volts of AC mains on the grid of V12 gives a square pulse at its anode. This is differentiated and amplified, and appears across R8 as a sharp positive pulse every 1/50 sec. Th width of this pulse is adjusted by R8 to be about one complet line in time, or width. Due to the gate action, one of the dif-ferentiated Half Line pulses will appear at the anode of V5 ev 1/50th sec, and this pulse is fed back to the grid of V4. Bot grids of V5 have gone positive, so that its anode has gone Ne-gative. This means that, due to the DC coupling in the circu the anode of V3, and so the grid of V4, have gone Positive, b the grid of V4 is already Negative, and the two pulses cancel No Half Line pulse therefore reaches the screen of V8 in this onse, but the Flip Flop has now changed over due to the trigg action, and a pulse will be passed the next time, i.e half a line later. Every alternate pulse at the anode of V5 is, in fa delayed by half a line. These pulses trigger the Frame Gate

-SORRY FOR THE THIN PAPER, AND THE PAGE MIX-UP! A.E.S.

Interlace Generator. Contd.

witch, V8-V9. The grid of V9 is returned to HT, andthe valve asses a high current, developing a large bias voltage across he common cathode resistor. This cuts off V8, and so only ine pulses pass to the output. When a negative trigger pulse rrives from V5, the grid of V9 is carried negative by the harging of C2. V9 cuts off, removing the bias from V8, and etting half line pulses through to the output socket. Providec he loading is light, the output, negative going, may be taken rom the common cathode. Positive output from the anodes may e inverted in a 3SN7, the other half being uded as a Cath. Fol wer.

Alignment is done on the CRO. Check that both Multivibrato rs working, and then look for pulses on the grids of V5. A 50 ycle pos. pulse on the suppressor, and pos. and neg. blips on he control grid should be obtained. The H/Vs are now unpluggec nd the CRO is put on the common anode of V8-V9. R7 is turned ight down, so that the 50 cps trigger pulse appears.R7 is now urned up until V8,V9 trigger without oscillating, and the H/Vs re replaced. The CRO waveform should fill up with Neg. Half ine pulses inside the 50 cps pulse, and Pos. Line pulses out side.The signal can now be checked on a receiver, if the o/p s of the correct polarity. Inject the signal before the Sync. Separator for Neg. pulses, and adjust C3 and R3 until the pic- ure locks on line.The CRO is adjusted to give one line pulse on the screen. C4 and R1 are now altered until two faint Pos. pulses appear on the screen and lock in. The entire generator s now operating satisfactorily, and the output may be mixed with Frame pulses in the usual manner.

WHAT THE OTHER BLOKE IS DOING.....Contd.

TONY SALE, and BILL NORTH, Lane End, Bucks. Tony has finished his Pulse generator, IFC, 420mc RX, monitors, RX, but is having mixer trouble in the Video Amp. He has received some "pictures", but owing to this trouble they are as yet a little crude. Bill is still working on his APN/204. I think they both deserve some praisefor the progress made. What say, men? Well done, chaps.

The Editor wishes to thank the many. cartoonists of ITR who have helped out so notably.

NEXT EDITION —— AROUND JANUARY 10th, 1950.

GETTING ON 420 MC/S.

(From a lecture by Mr. W.J.Meayes to the Catterick A.R.C.)

70 cms should give more or less the same range o working as 2 metres, on ground wave, the probability of duct-ing being less, however, on the higher frequency. Since high gain aerials can easily be constucted - $\lambda/2$ is about a foot - QRP working is convenient, and 10 watts input will be ample for most purposes. Remember, 10 watts into a 35 dB antenna gives an equivalent output of over 30 kW.

Few tubes will operate satisfactorily at 420 mcs, but the 955, 6J6 and various disc seal and coplanar types will all function fairly well. RF stages will not give much gain, but are very useful for preventing local osc. radiation. They are noisy, and give little gain, but may be used in push pull as an un-neutralised RFA.

On the transmitting side, the 832 will give 8 w of RF if doubling or trebling, but if driven direct can give 10 watts or so. The 5012 will take 70 watts in at 420 mcs with no trouble, if the drive is up (5w), and so should easily take the 25w mark when trebling from an SCA522. These tubes are currently available at very reasonable prices.

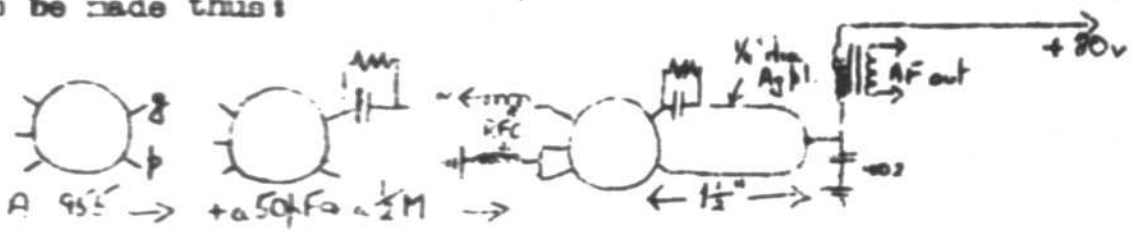
Constructionally, the use of Silver plated Copper or highly polished Aluminium is very necessary at this freq. - the RF is only flowing in the surface of the metal, and any oxide layers, etc, will cause trouble. RF wiring should also be of Ag plated Cu when possible. Tuned ccts. can be loops of Ag/Cu wire, parallel (resonant lines, or concentric tubes - remember they will be shorter than $\lambda/4$ depending on the tube capacities. RF chokes may be $\lambda/4$ sections of co-ax, or 5 turns ¼ in. dia. of 22 SWG Ag/Cu (broader band). Decoupling C's of 90 pF, and coupling C's of 10 pF will do the job nicely.

Converters should be built with a high I.F, 45 mc being low, but satisfactory in view of Our Plans For TV. Xtal mixers of the 1N21 type are good, but avoid the 1N34 series. Alternatively, some gain can be obtained by using valve mixers the 6J6 being less noisy than the 955. L.Os may be on 100 mcs or as preferred. CW is not used on this band at the moment, due to the difficulty of preventing frequency drift.

Details of a suitable converter will appear in a future edition of the magazine. (over)

"Getting On 420 mc/s" - Contd.

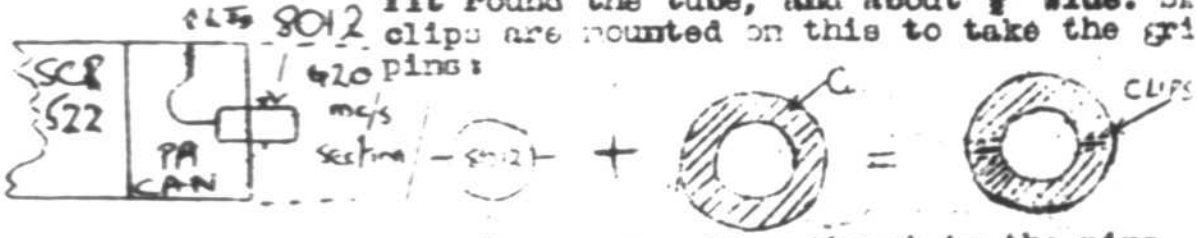
A simple super-regen. rx for experimental purpos can be made thus:



Put RFCs in Htr and Htr-Cath. leads. A hairpin loop will do as an aerial coupling loop.

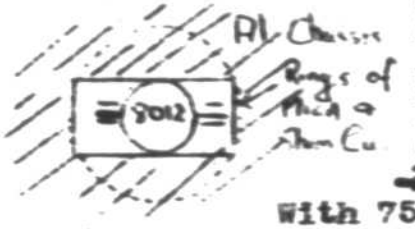
An easily built Tx can be made up from an SCR522 using an 8012 driven at 420 mcs to give the full 25w input. The PA coil of the 522 is replaced by a single hairpin loop, and the aerial coupling link is removed. A slot about 2½ ins. long, and wide enough to be a close fit round the 8012, is cut in the side of the PA case. The grid is earthed as follows:

A thin Copper ring is made to be a close fit round the tube, and about ½" wide. Spr clips are mounted on this to take the gri pins:



On no account solder direct to the pins.

A mica ring of equal size is made by cutting up a Valor oil stove front (cut under water for ease) and splitting it as thin as possible. The mica is sandwiched in between the Cu shim and the chassis and aligned thus:



The grid lead can be taken via an RFC to the bias supply, the actual grid being at RF earth potential. The Htr. and Cathode leads are looped through the ex-PA case as shown above, and are taken to their supplies via RF chokes.

With 750 volts on the anode, some 110 volts of bias will be required, with some three watts of drive.

No modulation systems are shown. Remember CW work is not normal on this band due to the frequency drift in both receiver and transmitter. (Ed. edit.: "420 mc Aerials"

"WHAT THE OTHER CHAP IS DOING....."

S.F.HANNAFORD, Preston. Has been using a 3" Orange tube for camera use, and has managed 130 line definition over a closed circuit. The raster was focussed on the gate of a modified 16mm sound projector, which had contacts on the driving spindle to sync the time bases to the 24 fps of the intermittent. Has a TV Rx on Sutton Coldfield, and is yet another GPO type. Interested in wire recorders too! You will have to give the gear a dusting, om, and be ready to push a signal into 3ETI, about 28 miles, I think.

DON BRADFORD, Denham, Bucks. Has been busy getting his ticket and is now G3GBO. Nice work, oc, now you can really get weaving on the VHF equipt.

R.F.HILLS, Harrow Weald. Is in the RAF most of the time, but has the use of a workshop on odd days. Has the painters in at home, but is installing various aerials prior to building a TV Rx.

"MAC" MACWHIRTER, Gt. Neols, Ches. Paid a visit to F9MH whilst in Paris on holiday, working some real DX there - another F about half a mile away, on 20! Mac is only home at weekends for the time being, as he is at Manchester Univ. Suggests a TV sked on 40. Has a cct. of a Preamp, 100 cs to 20 mcs, and hopes to get a 5527 by a swap with a W. Is making modifications to his Puber, but has wrecked his 931A! Maybe for Christmas.....?

IAN COX, Gerrards Cross, Bucks. Another RAF type, is chiefly concerned with Rx and test equipt. Is thinking of building another TV Rx.

BOB STYRING, Sheffield! Bob had just been demobbed from the Signals, and so has not yet had much time to get going. Is buying a tape recorder. How many more of you?

FRED WOOD, Bexley Heath, Kent. Fred is a bit cluttered up wi Hi Fi recording equipt, and as a result has put his I.F.C aside for the time being. Finds Evening classes and Finance rather large problems!

SANDY WEMYSS, Peterefield, Hants. Sandy is OHMS with the Signals, but is doing a lot of work on 420 and 435 mc Has no plans for ATV at the moment, but is very keen o the RF side of things.

FRED ROSE, Sunderland. Fred has just finished a TV Rx for S.C. (about 180 miles away) which is an FB piece of construction. He suffers from the fact that out of 28 hams in and around Sunderland, there is not one even Two metres, never mind 420 mcs. What about it, Fred?

TONY GILBEY, Chelmsford. Is building a TV Rx, and keeping an eye on matters VHF. Having fun with Time Bases.

MIKE BARLOW G3CVO has now completed his Cell Preamplifier, and is now getting down to building an interlace generator. Is converting an SB502 to 420 mcs, and hopes to be radiating a Sound test signal soon after Christmas.

DAVE BISHOP, Weymouth. Dave is another in the Signals, and is also concentrating on the RF side. He has under construction receivers for Two and 70 cms. He is also trying out aerial arrays for The Band.

IVAN HOWARD, G2DUS, Stotfold, Beds. Has put his Ike cameras on one side for a bit. Is hoping to get a couple of Mullard Optidal Projection Units for monitor and viewing screens. Ivan will be on Fone on all bands soon - and he is making a Tape recorder head!...

PETE PARKIN, Abinger, Surrey, is now OHMS for his 18 months with the RAF. As a last fling he has finished his Pulse generator, and details will appear in the next edition. Still no sign of his 6527, but Pete is hoping To while away the time, Pete has also tried a 30 line disc tx, using a 931 and a 2AP1 for Rx. He managed to get it up to 100 lines at one stage. He has a pretty good selection of CRTs to experiment with.