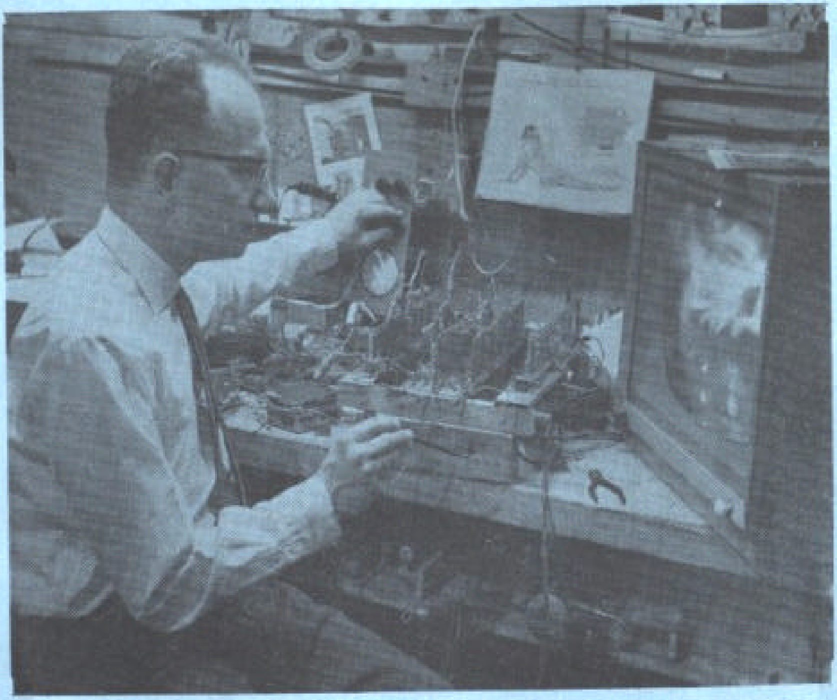


C Q
T V 41

CQ-TV, Journal of the British Amateur Television Club.

Published quarterly
for the B.A.T.C. at
20, Hughenden Road,
Bristol 8.

Editor: J.E.Tanner,G3NDT/T
.

CLUB OFFICERS
Chairman: C.G.Dixon, Kyrle's Cross, Peterstow, Ross-on-Wye.
Hon. Secretary:D.S.Reid, 149 Ongar Road,
Brentwood, Essex.
Hon. Treasurer: L.A.F.Stockley, G3EKE,
101 Hollingwood lane, Bradford, Yorks.
Editor, CQ-TV. J.E.Tanner, G3NDT/T,
20. Hughenden Road, Clifton, Bristol 8.

Editorial

This edition of CQ-TV marks the tenth anniversary of the magazine. The first edition was published in November 1949 and consisted of several duplicated sheets stapled together. Since then the club has expanded and the circulation of CQ-TV has increased from under 20 copies to around the 600 mark. It is hoped that sometime next year CQ-TV will take on a 'new look' and appear as a printed publication. The number of editions per year is limited by the amount of material available for publication, so it you could find time to write a description of some item of equipment, then each edition could be enlarged or an extra edition published.

At the Radio Hobbies Exhibition this year the first of a series of technical publications is available. This one concerns the basic ideas of slow scan television and will be followed shortly by one dealing with circuitry in a more detailed manner. In due course a complete series of these publications will be available to enable club members to obtain information on different subjects without having to refer to back copies of CQ-TV.

The Slow scan exhibit at the Radio Hobbies Exhibition this year caused the development work on the system outlined in the last edition to be held up. This means that some of the circuits are still not ready for publication. Those shown in this edition and all those under development will be included in a separate BATC publication which will give complete details, including circuit values and constructional information. The circuits still to come will also be published in CQ-TV in order to complete the original article.

COVER PHOTOGRAPH this edition shows one of our founder members, Professor Hendrik de Waard, helping on the development of the timer unit described in this edition. This was during his recent visit to Mike Barlow in Canada.

Photo: M.B.

A TIMER UNIT FOR THE B.A.T.C. PULSE GENERATOR.

By MICHAEL BARLOW

The last item of the BATC Sync Generator to be described in the Timer Unit. It has been left till last as it is really a refinement that is not essential to early TV experiments.

The purpose of the unit is to supply timing pulses to the sync generator (henceforward called the "shaper" unit). The shaper then merely generates the correct sequence of pulses of the correct widths.

The timer unit controls the absolute number of lines in the picture, and thus whether or not the picture is interlaced. The timing pulses can be locked to the mains to prevent hum bars showing on the pictures, or it can free run, or it may be “genlocked” to another sync source, as explained in CQ-TV 31 p6.

The outputs of the timing unit are pulses at twice line frequency and at field frequency i.e.
31250 c/s and 50 c/s for 625 lines,
31500 c/s and 60 c/s for 525 lines,
20250 c/s and 50 c/s for 405 lines.
The range of the counters is such that other numbers of lines can easily be set up for experimental purposes. The description that follows is based on the 525 line version.

Description of the Circuit

Figure 1 shows a block diagran of the unit, which uses 6 valves. One is the master oscillator at 31500 c/s, which in followed by four dividers counting down to 60 c/s. This 60 c/s is compared with 60c/s from the mains in a discriminator, and the resulting error signal is fed to an amplifier which controls the MO frequency. The remaining triode serves to amplify incoming genlock sync signals, and to separate them into line and field components. It also amplifies and clips the internal 60c/s pulses. The system switch changes the feed to the Field Blanking generator in the shaper unit from the clipped 60c/s counter output to the external 60c/s pulses. At the same time the input to the control amplifier is changed from the discriminator output to the external line pulses, and the clipper becomes an amplifier for the external pulses.

For 525 lines the counters are set to count down by 5,7,5 and 3; for 625 lines 5,5,5, and 5, and for 405 lines 3,9,5 and 3.

Figure 2 shows the circuit diagram. An usual with BATC circuits, values are not critical and standard parts are used wherever possible. Possible economies in valves and components have been sacrificed in order to make the unit easily serviced and set up with a minimum of test gear.

V1 is a cathode coupled oscillator. V1B in normally conducting because of the DO voltage at its grid. The common cathode is therefore at about the same potential. It the grid of V1A reaches this potential, V1A will conduct and V1B will be shut off. The charge and discharge of the capacitor at V1A grid determines the oscillation frequency, and this is controlled partly by the MO FREQ variable resistor and partly by the voltage dropped In the 100K plate load of V6A This circuit was chosen for its economy of components, ease of external frequency control, and because its output comes from a free anode - reducing unwanted back coupling from the counters.

V2, V3, V4 and V5 are basically similar step counters with minor changes to produce the correct frequencies. Each valve is a Schmitt trigger that will fire whenever the left-hand grid potential exceeds the common cathode potential. Each step counter consists of a coupling capacitor, return resistor, series diode and storage capacitor. See Fig 3. The valve acts as a discharging or resetting device. As each pulse arrives the diode opens like a non-return valve and the pulse contributes to the charge on, and hence the potential of, the storage capacitor.

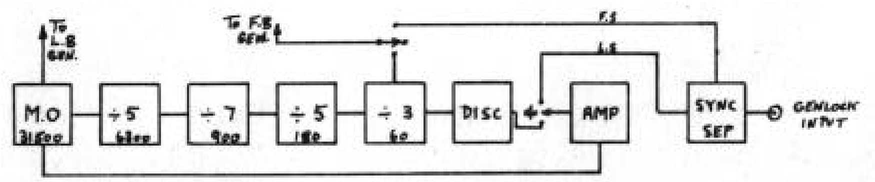


Figure 1: Block diagram.

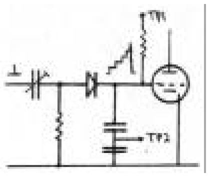
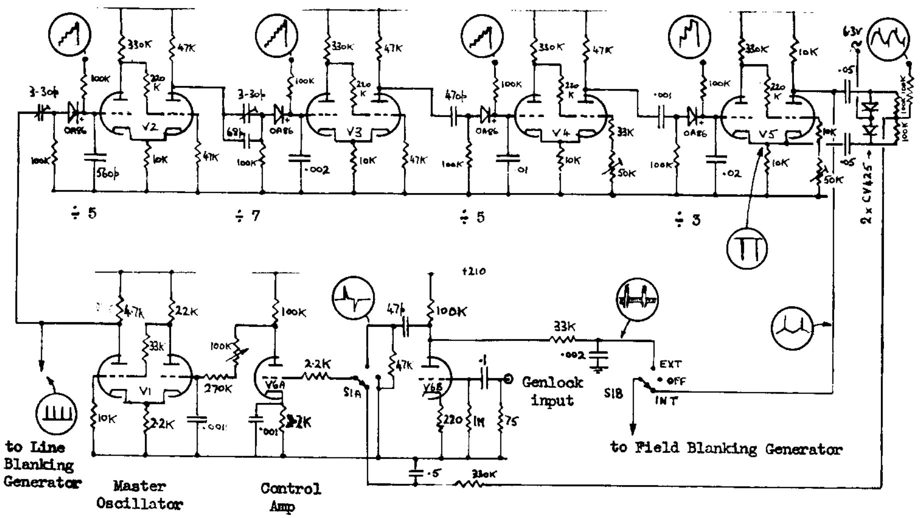


Fig.3: Typical step counter showing alternative test points (see text)



This voltage therefore increases in steps until the grid potential exceeds the cathode potential, when grid current flows and discharges the capacitor. Since the incoming pulses are of constant width, frequency and amplitude, there is no need to DC restore them before applying them to the series diode and this saves one diode per step counter. A simple resistor to ground is sufficient. The series diode must have a high back resistance to prevent the charge on the capacitor leaking away between pulses. An 0A86 or 1N480 or 1N54 is good enough.

On the first two counters, the actual count is set by a trimmer capacitor across the coupling capacitor. Reducing the capacity reduces the charge added to the storage capacitor and hence increases the count. Philips 3-30p concentric trimmers were used in the original. 100K isolating resistors on the grid connection allow a scope to be connected to monitor the count. Another method is to use a series capacitor about ten times as large as the storage capacitor, as shown in Fig 3, but this adds four rather bulky components to to the unit.

The size of coupling capacitor required for the lower frequency counts makes a trimmer adjustment impractical. In the last two stages the count is varied by adjusting the RH grid potential with a miniature variable resistor. This method can, of course, be used equally well for the first two counters.

V5 circuit is slightly modified to give both positive and negative pulses to feed the discriminator. The anode pulse, being at 60 c/s, is used an the INT trigger for the FB generator in the shaper.

The discriminator diodes are not at all critical but should at least be the same types. The other side of the bridge in fed with 6.3V AC from the unearthed heater line, which gives about 18v p-p sinewave. It the pulses from V5 and the sinewaves are not in phase, the discriminator output is DC (plus ripple) whose polarity and amplitude depend on the phase difference. This DC is applied to the control amplifier V6A when the switch is at INT, and hence varies the MO frequency to remove the error. There is a large 60 cycle ripple on the DC of course, and this has to be to be filtered out by the smoothing circuit, 330k and 0.5mfd. These components must have a long enough time constant to remove the ripple, but otherwise may be as large or small as desired. Their actual values will determine how “spongy” is the lock, i.e. how long it takes the system to come back into phase after a disturbance.

V6B amplifies the external 1 volt mixed sync input to about the 30 volt level. The anode feeds a differentiating network to extract the line pulse edges, and an integrator to obtain the field pulses. When S1A is at EXT, the line pulse edges are fed to V6A grid, and hence to the MO. The cathode of V6A is bypassed to maintain a rough edge to the pulses. The spikes that do eventually arrive at the MO FREQ pot are sufficient to lock the MO to the second harmonic of the pulse frequency, ie 31500 c/s. S1B meantime feeds the integrated field pulses out to the FB generator. In the OFF position V6A grid is grounded, breaking the feedback loop. S1B in this position can be grounded, left free, or taken to 60 c/s as preferred. If desired a further switch section could be used to cut the HT to the counters on EXT.

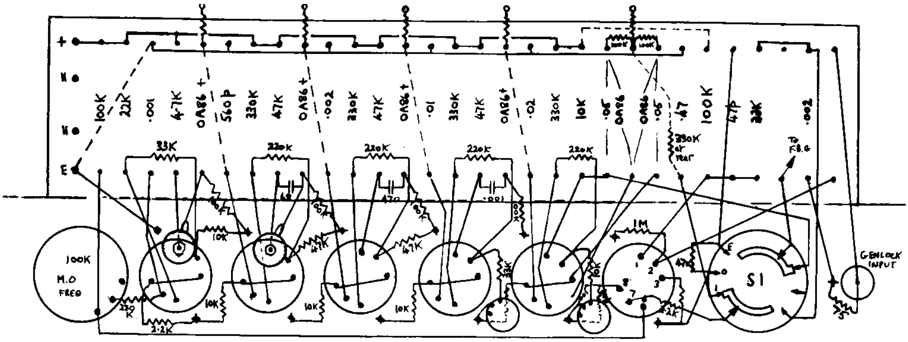


Figure 4.

The HT consumption is about 25mA at 200 to 250v. Whilst the unit is tolerant of HT voltage variations it might be better to supply it from a stabilized supply. A regulated supply in not needed. All resistors are half watt, and no components are critical. 12AT7 12AU7 or 12AX7s can be used interchangeably with very slight adjustments to the counts.

Construction

The unit is built on a 15” x 2” panel to match the BATC Sync Generator given in CQ-TV 32, where further mechanical details are given. The counter adjustments are all pre-set from the rear. The l00K test resistors project above the tagboard. The 1ayout is not at all critical, but there are a 1arge number of components to accommodate. The layout shown in Fig 4 gives good access to all parts.

Setting Up the Timer

Switch S1 to OFF, breaking the feedback loop. With the master oscillator frequency control at mid position, check for pulses at the 4.7K anode load. If these are missing check that V6A is passing current. Now transfer the scope to the first counter test point, and adjust the trimmer until a count of 5 is obtained; count the "risers" rather than the steps. With the scope at high speed check that the steps are level and do not have excessive tilt. In case of trouble suspect the diodes or some leakage path. The trimmer of the next counter is next set to a count of 7 (these are 525 line figures). With the scope at low speed 7 rows of dots will appear, and these may be easier to count by eye than the actual steps obtained with the scope at high speed. The last two counters are set to counts of 5 and three respectively by adjustment of the variable resistors. If any count is outside its range of adjustment, reset the MO frequency and start again. When all the counters are at their right setting, look at the discriminator test point with the scope time base set to display at least two mains cycles; sync the scope to the mains. The counted down pulses will be running through the sine waves, and the MO frequency control must now be adjusted to bring these pulses into synchronism. Check that the counters are still at the right count. The first time this is done my take a little juggling but ones done the counters should never need further adjustment.

The counter chain is now dividing by 525 (or 405 or 625 as set) and the control amplifier should be checked A high impedance voltmeter on V6A plate should show a change of at least 20 volts as the counted-down pulses slip through the sine waves. The switch S1 is now put to INT, and the pulses should lock in firmly. There will be a little “bounce” depending on the smoothing circuit time constant, but in a second or so the whole chain should be locked. Now adjust each counter in turn so that its adjustment is at the middle of its travel for that particular count. 405 and 625 line counters may need slight alterations to the adjustable components to bring them to the correct counts. Where possible avoid the use of ceramic capacitors in critical timing circuits, since these may drift. Use silvered mica or similar.

Feed into the GENLOCK INPUT 1v p-p mixed sync (negative going) from an external sync generator or TV set take-off. Check for differentiated line sync spikes at S1A-E and for integrated field pulses at S1B-E The Field Blanking timing output should change from these integrated pulses to the final counter output as S1 is operated. The master oscillator should lock in on the harmonic of the line pulses without any adjustment. The 2:1 relationship can be used to set up the MO to the right frequency if any trouble is experienced with the initial setting up.

References:

A Diode Pump Integrator. Earnshaw, E.E 28 26 1956.

TV Engineering Vol. iv. Amos and Birkinshaw, Iliffe.

CQ-TV 2,3,8,9,12,13,18,21,29,30,

Pulse and Digital Circuits, Millman and Taub McG-H.

NEGATIVE FEEDBACK AMPLIFIERS

Amplifiers using negative feedback can achieve low distortion, good .frequency response and gain stability unobtainable in any other way. It is therefore a little surprising that so many BATC members seem to be nervous of negative feedback, NFB for short. Let's creep up on it quietly, then. The basic idea of negative feedback is that if an amplifier stage distorts in the sense, say, of having too much gain at one particular frequency, more of that frequency appears at the output, more of it is fed back to the input, but in the negative sense, where it reduces the input signal at that frequency and tends to correct the error ; in other words, it tends to flatten out unevenness in the frequency response.

The gain of an amplifier is of course reduced by feedback, but this is not necessarily a disadvantage (mere gain is easy to come by - it is securing the necessary bandwidth, linearity and low noise that is troublesome). If an amplifier has gain A, reduced by application of NFB to A', A and A' are related by the formula A' = A /(1+pA) where a fraction 1/p of the output is fed back to the input. The output impedance of the amplifier is at the same time changed from Z without feedback to Z/(1+pA) with feedback. This much can be found in most of the textbooks (where I found it !). If the gain A of the amplifier without feedback is large, then A' = 1/p approximately - so the gain of such an amplifier may be determined merely by inspection of the component values in the feedback chain, and is independent of the stage gain.

Applying this to John Tanner's vidicon head amplifier (back cover of CQ-TV 36) : the 2nd, 3rd and 4th Z77s have together a gain of 100, since the feedback, obtained from the cathode of the last Z77, is potted down in the ratio

p =100/(100 + 10,000) =1/100 approx. Hence the gain = 1/p = l00.

Now for a few practical considerations - to extend L.F. response, a capacitor of the order of luF may be included in the feedback chain. A typical circuit is shown in Fig.1, in which feedback is applied from an output cathode follower to the cathode of an earlier stage ; in this case, the gain 1/P will be (R 1 + R 2)/R 2 at mid-frequencies; at low frequencies, the impedance of C will be large, there will be less feedback , and the gain of the amplifier will be maintained down to lower frequencies. Some control over L.F. response is therefore available by choice of the correct values of C1 and R2.

C1 can conveniently be a cathode-decoupling type electrolytic, since the working voltage is generally low, and a little leakage doesn't matter very much but make sure it's the right way round !

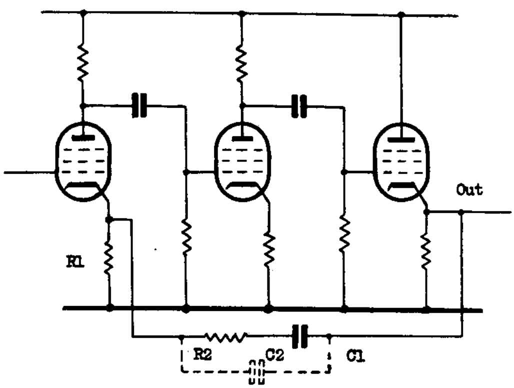


Fig.1.

H.F. response can also be controlled by judicious use of NFB ; a small capacitor of the order of a few pF across R2 will apply more feedback at high than at mid-frequencies, tending to cause the frequency response to fall at high frequencies. If as more usually happens, a lift at H.F. is required, the feedback may be shorted to earth at H.F. by a small capacitor, best done by splitting R 2 in two, and putting a small C to earth from the mid-point, as in Fig. 2. Splitting R2 so that C2 is 1/3 of the way along may give better results.

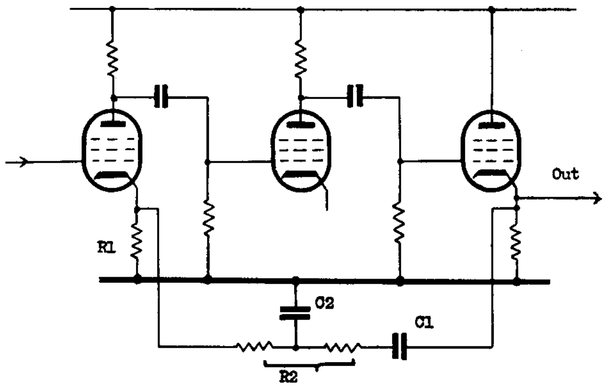


Fig. 2.

For those members without a sweep generator (!), the best way to set up a frequency response is to look at the edges of a pulse. Pass, say, BBC syncs through the amplifier and look at the output on a decent scope ; trim the amplifier for best rise and fall times and sharp corners to the line pulses, consistent with lack of overshoot and ringing. But be sure to look at the pulses first of all with the scope alone, and make sure you are not overpeaking the amplifier to correct for poor response in the scope.

A few words of warning now : NFB amplifiers have a bad name for their tendency to oscillate outside the pass band. This is deserved, alas, but can be prevented. NFB amplifiers will oscillate (and how!) if the phase shift that accompanies falling H.F. or L.F. response approaches 180° for any frequency for which the gain of the amplifier as a whole exceeds one, for then the feedback becomes positive. Practically, this can be avoided by not attempting to apply feedback over more than three stages at a time (the "ring of three" scheme consists of two gain stages and a cathode follower), and limiting the feedback to about 30dB at maximum. If this does not provide enough gain, cascade two or more of these discrete amplifiers. Bear in mind too, that it is just not possible to get, say, a 20 dB improvement in H.F. response from an amplifier that has a gain of only 18 dB without feedback. However, higher values of anode load can safely be used when feedback is applied. so the gain of the amplifier without feedback (the "internal gain") can be increased, and more feedback applied, so that the gain of the amplifier with NFB remains the same.

Finally, a word on fault finding in feedback amplifiers. This is very simple when you know the trick : put a signal into the amplifier and follow it through and round through the feedback loop back to the input. At some point, the distortion in the signal due to the fault will be reversed, since the feedback will be applied "all out" to correct it. For example, a coupling capacitor which has gone down in value will cause excessive L.F. tilt (Fig.3) on a low frequency (50 or 60 c/s) square wave passed through the unit. After the capacitor, the signal will be as in Fig.3, with positive tilt ;

before it, full feedback will be applied and the tilt will be negative as in Fig,4. This enables the faulty component to be identified quickly. Similarly a valve in the amplifier operated under wrong conditions so as to clip a sinewave will have peaks clipped at its anode, but greatly stretched at its grid (Fig.5).

Ling Electronics of Dallas, ask $2495 for their complete 50 watt Tv station plus vidicon camera.

There are 75 licensed TV amateurs in the UK out of 8000 licensed. amateur transmitters. In the US, ??.

The Vice-President Mr F.H.Townsend MIEE, is now with Westinghouse Camera Tube division at Elmira, NY.

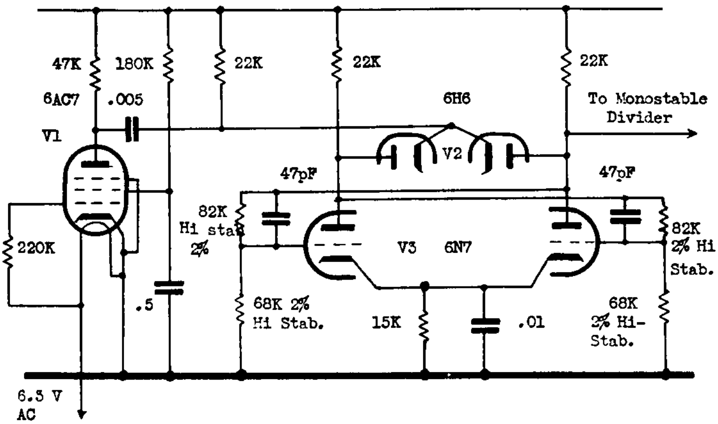
All 525 line members should have received the 525 line newsletters from Mike Barlow. Let him know if you have missed them.

Power Supply References.

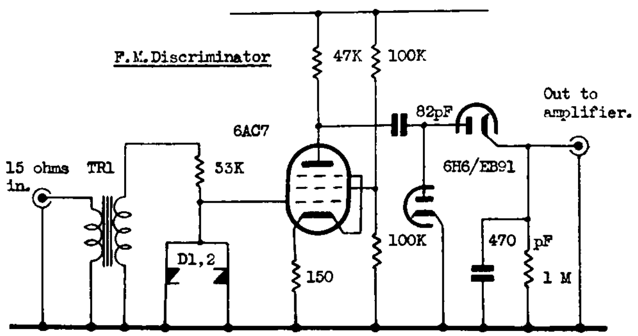
A list of 10 refs: Electronic Eng. March 56 p131.
Cathode Follower Power Supply. E.E Dec 56. By Perry.
Screen resister compensator. JIEE 94 I 447.
Regulated Power Supplies. E.E April 1959.
DC Controlled Phase-Splitter. EE Aug 1958.
Reg. HV supply with Mgntc Amps. Electronics July 17 59.
Reg PSU with transistor control. Mullard Tech Comm. 3/21 Feb 1957
Power Supply Design. Electronics 16:62 Jan 1957

SLOW SCAN TELEVISION.

Two of the slow scan television circuits developed by G3AST. The second one is arranged so that any communications receiver, or tape recorder with a 15 ohm output may be fed directly into the unit. The output goes direct to the D.C. amplifier feeding the display tube.



Start of divider chain for Slow Scan pulse generator.
V1. 50 (60) c/s squaring stage. V2,3. Eccles-Jordan Flip Flop.



TR1. Any old cheap output transformer. (Not much iron required)
D1,2. Two ZS10A's were used in the original, but these are only used as a two diode clipper and a 6H6, or two CV448 crystals may be tried.

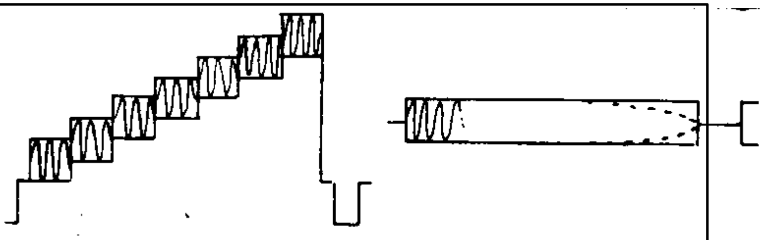
Photograph off the screen of a picture received on tape, recorded at 3¾ inches per second by Cop Macdonald WA2BCW .
Permission has been received by Cop to carry out some tests of direct transmission in the 10 metre amateur band.
This picture has 120 lines, and is repeated once every six seconds. The exposure for this photograph was made over 31 repeats of the frame scan and gives a good indication of the high degree of stability of the system.

Photo: G3AST

WHAT ARE THEY TALKING ABOUT? By M.Barlow.

Members who study the professional press and who read the technical ads for good ideas may have wondered at one or two expressions used which do not seem to crop up in amateur work. There may be a feeling that some detail is being missed by which amateur results could be made better.

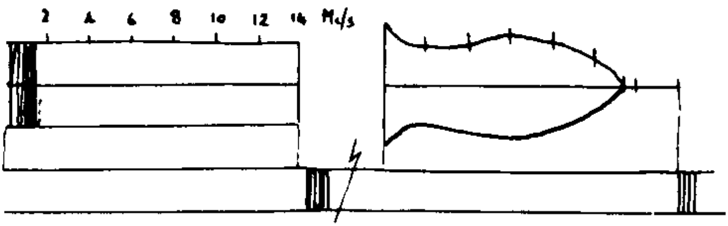
One of the most common expressions is "Differential Linearity". The concept of linearity is familiar to all BATCs; if the input to output curve of some item say a video amplifier is not straight, then blacks and whites may be amplified by different amounts, and the precise amounts may depend on the picture content. This is one reason why we use DC restorers or clamps if the valves are handling signals of amplitude equal to say half the valve grid base. At least under these conditions the distortion introduced in the picture remains fairly constant. Obviously the non-linearity will get worse if the input signal is increased, and the "differential linearity" is a measure of the difference of gain of the unit at high and low levels, say black and white. This is also called "differential gain" for obvious reasons. It can be noticed on a sawtooth, but is most easily measured by using a stairstep test waveform, each step carrying a burst of RF at some suitable video frequency (often the colour subcarrier). The output waveform is put through a high-pass filter which removes the stairstep but leaves the RF. The variations in the RF envelope are a measure of the differential gain of the unit.



Differential Gain Test: Input, left; output, right.
The dotted line indicates a practical result.

Another phrase used is "Differential Phase". This is the variation in phase shift with amplitude and is only important with equipment designed to handle NTSC type colour signals. Here a change of phase corresponds to a change of colour, so that if there is differential phase present, a bright blue say will not be the same blue as a dim blue.

Finally, what are the current test signals used professionally to decide the video performance? First there is the video sweep-plus-syncs to obtain a reasonably flat frequency response free of humps, dips, or fast roll-offs which would cause ringing. Then there is the "window" test, which consists of a white square on a black background. This will show up LF streaking and overshoots on edges. Finally the unit is tested for differential gain and, it required, phase. For amateur work the frequency response can usually only be estimated by looking at a test card resolution wedge. A black or white cross pattern will do instead of the window provided the bars are wide; and a sawtooth will show up bad non-linearity. If more detailed figures are required then extensive testgear costing several hundred pounds will be needed, but it is surprising what you can do by just looking carefully at your own testcards!



Video Sweep plus Syncs: Usually at field frequency, the input has a steadily increasing frequency superimposed, plus frequency markers. The output shows the response of the circuit. The syncs are necessary to maintain correct bias and clamping conditions.

WHAT THE OTHER CHAP IS DOING

The Bill Still scanner (CQ-TV 35) is proving popular : R. Monteil FUM reports good results from it, after having modified it for 819 line operation. Alan Sherman (Brentwood) is also building a scanner to this design.

The studio/workshop in Brentwood is beginning to take shape ; the converted bowling alley now has a concrete floor, and concrete supports for the timbers of the walls. One almost working, and several non-working, TV sets are now available as monitors, and when power is laid on, there should be plenty of activity.

Bill Horton, W2QQX, of New York, has built the "one minute modulator" and the 6J6 420 Mc/s transmitter from CQ-TV circuits, and at the time of writing, had transmitted a picture from his scanner over 1 ft. distance.

D. Goodyear sends news of the St.Albans & District Radio & TV Soc staticon camera ; the definition is 2 Mc/S but there are plans to improve it soon.

G. Mackenzie-Shapland (Devon) has built a FSS consisting of 931A, EF80 head amp and EF91 cathode follower, feeding a 3 stage video amplifier. The picture is rather noisy at 3 Mc/s bandwidth, but gives nice results with 2 Mc/s bandwidth.

It was encouraging to hear from A. Cook (W. Australia) again ; by the time these notes are published, his vidicon camera should be in action. He is so interested in tape recording of TV, and would be glad to hear from anyone with similar interests. Another member from W. Australia, Warren Jacobs VK6WJ is working on his second vidicon camera. His pulse generator uses 30 valves to give a standard 625 line waveform ; the main improvement in camera circuitry is in the use of cathode coupled scan coils eliminating the need for matching transformers.

Jack Terry is now in Nigeria, and finds that his professional work doesn't leave any time for amateur TV at present.

M.W. Heffernan, ZC4MH, is leaving Cyprus, and also going to Nigeria to assist in setting up the TV service there.

K.C. Whittaker has been on leave from Ghana, and is taking back components for his vidicon camera when he returns.

Slow scan TV has attracted the interest of several members : Pluff Plowman G3AST, (Yeovil), and the Butcher brothers G3KPJ and G3CUH (Chelmsford) are among the active enthusiasts.

Jack Schmermund W8VSY (Ohio) has 70 cm receivers, and hopes he may pick up the nearest amateur TV transmitter in Columbus, 80 miles away. He is also busy on a transmitter.

The Cambridge group are without Matilda but the group camera is still in good order and created interest at the recent London Short Wave Rally, despite the lack of monitors.

Arthur Critchley has almost completed a staticon camera, with a neat and accessible layout.

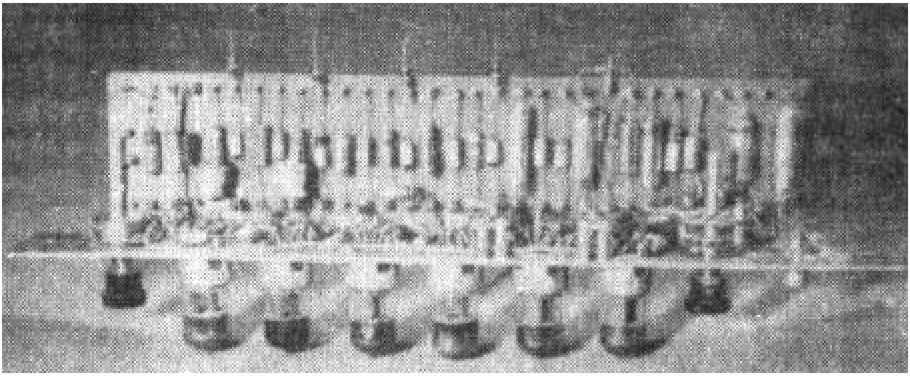
John Cronk, G3MEO, was another member who displayed pictures from his vidicon camera at the Rally.

The S.W. Essex met at D.W.Wheele's house for their AGM, and the winter programme of activities was discussed.

John Tanner in Bristol has temporarily shelved the Vidicon equipment to make space and time for slow scan equipment.

Grant Dixon has almost completed a slow scan monitor, and hopes to receive tapes from other slow scan enthusiasts. His new tape recorder has cleared the worries about irregular tape speed.

Dave Young (Welwyn Garden City) is busy collecting parts for his Vidicon camera, Dave spent an interesting day with the Cambridge Group recently.



The counter chassis for the B.A.T.C. sync generator. Note the test point resistors sticking up at the back. The Genlock input is at the right hand end. See article on Page Two. Photo M.B.

New Members.

B.B.Ajayi, 24 Belgrave Rd., London S.E.25
D.W.Aldridge, 1 Fowberry Crescent, Fenham Newcastle on Tyne, 4.
L.B.D'Alton, University College, Science Bldg, Upper Merrion St., Dublin.
M.J.Boei, Saenredamstraat 50R, Haarlem, Holland.
M.Coyne, Main Street, Castlerea, County Roscommon, Eire.
J.J.Davis, GW3CVY Llanina Mansion, New Quay, Cardigan, West Wales.
L.Duncan, 3 Lindsay's Wynd, Oakley, By Dunfermline
D.Egbert, Ingalls, Kansas , U.S.A.
J.Ennis, 66 Irish St., Dungannon, Co.Tyrone, N.I.
J.Finch, 198, Bellegreen Lane, Higher Ince, Wigan, Lancs
H.Grierson 5 West St., Glasgow C.5
K.L.Hall 28 Field Terrace Rd., Newmarket, Suffolk
W.F.Hayward, Christian Malford, Chippenham, Wilts.
K.R.Hill, 17 King's Ave., Hounslow, Middx.
S.R.Handyside, 43 Slindon Ave., Peacehaven. Sussex
S.J.Harris, Chimneys Tall, Ruskin Avenue, Moordown, Bournemouth, Hants.
G.Hudson, 110 Carholme Rd., Lincoln
R.H.Erwin 100 Longford St., Ayresome, Middlesboro' Yorks
C.M.S.Jones, 280 Allenby Rd., Southall, Middx.
I.A.Jackson 32 Lindhurst Rd., Rugby, Warcs.
B.Johnson W2WVC 12 Belmont St., Buffalo, N.Y. USA.
D.H.Joyce, 85 Hanney Rd., Steventon, Berks.
R.Lamy W2PBU 110 Woodward Ave., Kenmore, N.Y. USA.
P.S.La'Pierre 38 Dartmouth Park Rd, London N.W.5.
J.R.Lukats, 4 Vereker Rd London, W.14.
M.J.Moosbrugger, Augsburg 15, Thelott Str. 21, Germany.
H.Muir, 41 Turnberry Rd., Partik Hill, Glasgow, W.1
H.D.Neil, 7 Dalston Rd., Workington, Cumberland
P.Petrick, W3WFL, 7 Willow Ave, Baltimore 6. Maryland USA.
S.Pollitt. 43 Bolton Rd., Chorley, Lancs
C.Rann VK3AAK, 2, Georgiana St., Sandringham Melbourne, Victoria, Australia.
J.E.Rising, The Pantiles, Mill Rd., Stock, Nr Ingatestone, Essex.
R.G.Scammel, 28 Huntspill. Rd., Highbridge, Somerset
J.Schmermund, 401 N.Main St., West Miltonk, Ohio, U. S. A.
A.J.Short 37 Weylands Drive, Hunts Cross, L'pool
G.C.Smith, VK2TW/T, 20 Collins St., Cammeray Sydney, Australia.
N.E.Thornewait, 9 Thirlmere St., Currock, Carlisle Cumberland
J.G.Thomas 95, Gwyddon Rd., Abercarn, Monmouth
M.S.Tooms, 15 Abbotts Rd. Southall, Middx.
A. R.Watson, Somerby View, Bigby Barnetby, Lincs.
D.Withington, 4349 Broadview Rd., W.Richfield, Ohio, U.S.A.

CHANGE OF ADDRESS.

F.Constable. Greenways, Foxley Drive, Bishop's Stortford, Herts.
J.A.Cusdin, 58 Gilda Crescent, Polegate, Sussex.
R.Griffin, High View, Beech Avenue, Ext., Sandiacre Notts.
W.Still, VE2AZT, 6204 Chabot Street, Rosemount, Montreal, Canada.
P.A.Waspe, 62 Birdwood Rd., Cambridge.

USEFUL REFERENCES By M.Barlow

Transistorised TV Camera; Electronics Jan 16 1959.
Carrier Transmission for CCTV; Electronics June 12 1959, by Schimpf.
Transistors in TV receivers; J.TV Soc Vol 8 No.ll.
A New Test Transparency ; J.Royle at al, BBC Eng monograph No 21 1959.
TV flying spot scanner; Baracket, Electronics, July54.
TV Station monitor, Thomas and Stein. Same issue.
Continuous Film Scanner for Monochrome and colour by Traub and Fisher, Electronics Aug 1954.
Wideband Data Transmitter, Electronics Sep 1953.
Design of Phantastron delay Ccts, Electronics on Apr. 48.
The Cathode Repeater. Marconi Rev. 2nd quarter 1950.
A Neon Timer. Electronics Aug 29 1958.
A Triode FM Discriminator. Electronics Eng April 54
Time Base Oscillator, Banthorpe. Same issue.
Video Amplifier using PCL84. Mullard Tech Review July 1958 and correction in later Issue.
Stable BFO; Radio Electronics March 59 p148.
Transistorized TV Vert Deflection, Palmer and Schiess Trans IRE BTR4/3 June 58.
Transistorized TV Receiver. BTR3/2 Oct. 1957.
Transistorised Horiz. system. BTR4/3 June 58.
Transistor circuitry used in new TV Sync Gen, BTR4/4 September 1958.
Narrow Band Image Transmission System, Macdonald. QST Aug-Sept 1958 Vol 42 Nos 8 & 9.
Diode Modulator, Weitbricht. CQ April 1952.
Bifilar T-Trap. E and R.E July 1958.
Amplifier IF Compensation. E&R.E March 58.
Operation of 6866 Storage Display tube, RCA Rev, Sep 1957.
Pulse Cross modification of Tv receivers 0'Kelley, Electronics 31:54;5 Feb 28 1958.
Starved Transistors raise DC Input Resistance. Electronics Jan 30 1959.
Twin-T Oscillator. EE April 1956 p178.
Electronic Switches for TV. Spooner , EE May 1956.
Electrostatic Pulse Generator. ES March 56.
Transistor RC oscs. EE Aug 56.
Single valve FM osc, Johnson. WW 121 168 1949.

NEWS FLASH

FIRST TRANSATLANTIC AMATEUR TELEVISION TRANSMISSION

On Sunday, 22nd November 1959, at approximately 3 p.m., a direct slow scan television transmission was received by "Pluff" Plowman G3AST on 29.5 Mc/s.

The transmission was recorded on magnetic tape, and a drastically edited version played back over "Pluff"s monitor.

The picture quality was poor, but the tuning wedge was recognised and WA2BCW's call letters resolved.

one way effort constitutes an all-time ATV first, and marks a milestone in the development of amateur television activity.

- - - - - - - - - - - - -

THE FIFTH

AMATEUR TELEVISION CONVENTION

will be held at

THE CONWAY HALL

LONDON, W.C.l.

on

SATURDAY, 10thSEPTEMBER, 1960.

Further details will be announced later BOOK THIS DATE!!