CQ — TV

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TELEVISION CLUB.

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The British Amateur Television Club.

CONTENTS

COVER PHOTO

Test Card used by John Wood G3YQC.

THE NEW LICENCE

NEW AMATEUR TELEVISION LICENCE REGULATIONS

EFFECTIVE 1st JANUARY, 1977

The Home Office have announced that with effect from the 1st January 1977 they will no longer be issueing the Amateur /T licence in its present form but that the existing Amateur Sound A & B licences will be superceeded by new ones which will, amongst other things, include botn Amateur Fast Scan Television and Slow Scan Television transmissions.

From the 1st January 1977 the Home Office will issue to all new applicants an "Amateur Licence A" or an "Amateur Licance B" the qualifications required being the same as for the existing "Amateur Sound A or B" licences. Also from the 1st January 1977 holders of existing Amateur Sound A or B licences will have their licences replaced by these new ones as soon as possible after the annual renewal fee has been paid. It has also been stated that although existing licence holders will not necessarily receive their new licence until some time later in 1977 they will be permitted to use the full facilities as set out in the new licence from the date of implementation, 1st January 1977.

An Amateur Television licence holder who does not hold either an Amateur Sound licence A or B will automatically be issued with a new Amateur Licence B.

The issue and renewal fee for the new Amateur licence A and B will be £5.50 so any amateur currently holding more than one amateur licence will save money. The Home Office do not however rule out an increase later if the present inflationary trend continues.

A new clause which has been added, under paragraph 9 Call sign and notification of location, is sub paragraph (5) which states as follows:-

"(5) When sending high definition television signals, the call sign sent for identification purposes must be adjusted to the centre of the video channel".

To elaborate on this the Home Office have said that their engineers have stated that they wish this paragraph to be interpreted as follows:-

a) When transmitting high definition television signals with a double sideband system the sound identification should be made on the vision carrier frequency.
b) When transmitting high definition television signals with a vestigial sideband system then the sound identification should be made on a frequency which is in the centre of the bandwidth being occupied by the vestigial sideband television signal system.

It has also been established that Amateur Television stations may continue the practice of radiating high definition television signals on one band and at the same time accompany them with a sound channel on another band providing that both video and sound transmissions carry the identity of the originating station. The same call sign may be used for both transmissions under these circumstances.

The main purpose behind all these changes is to streamline the licencing system into a new comprehensive Amateur Licence which will replace the old Sound, Mobile and Television separate licences and at the same time make the new licence more flexible. More detailed information

on the new licence can be obtained from the Home Office by obtaining a copy of "How to become a Radio Amateur" but, as the Home Office point out, the job of replacing 22,500 Amateur licences whilst maintaining the issue of new ones is a mammoth task. It would also help if licnece renewals are paid promptly as in future only one reminder will be sent.

In order to help the changeover to the new licences it would be helpful to the Home Office if enquiries could be kept to a minimum and to assist this the British Amateur Television Club, which has been in contact with the Radio Society of Great Britain during the negotiations to introduce the new licences, will try and answer any queries which our members may have on matters relating to the television side of the new licence and enquiries should be sent together with a stamped addressed envelope to The British Amateur Television Club at
64 Showell Lane, Penn, Wolverhampton, West Midlands. WV4 4TT

"How to become a Radio Amateur". Please note that in the current issue of this pamflet Appendix B footnote 10 should be added to the frequency band 3.5 - 3.8 MHz. This was omitted in error.

TV ON THE AIR

By John L. Wood G3YQC

As you all know, from the first of January our G6/T callsigns have disappeared. This must cause great sadness to most TVers especially those who have held their licences for many years and have become household names among TVers. Pity that stations that have electronic callsign generators, piles of QSL cards and test cards which have the call inked in, and what about all those lapel badges? Ah well! I suppose we must bow to the forces of progress. Anyone want to make an offer for a pile of outdated caption cards?

Dave Mann G6OUO/T (sorry! G8ADM) from Whitchurch in Hants, writes about the activity in his area. G8GYS runs about 70 Watts of RF into a 48 element multibeam, Peter transmits PAL colour signals and uses a variety of colour test waveforms and live synthesized colour pictures, a VTR is also used and excellent pictures are received by surrounding stations. G8AER also transmits on 70cm (although not too often) using similar equipment.

G3PYB transmits 625 line monochrome pictures with about 100 Watts and a 48 element array. Peter is constructing a vision modulator for a 23cm transmitter and will be radiating vision on that band soon. (I hope Peter will write an article on his 23cm transmitter).

TV receiving stations in the area include G8FKZ and G8LUF. Everyone mentioned is active on two meters and 70cms with either FM or SSB and can be usually contacted on those bands to arrange TV skeds. Dave himself only receives TV at present, but hopes to be radiating again soon. He has obviously been very busy since, together with G3PYB, he has built and installed the 23cm beacon GB3AND at Andover which is on 1296.87 MHz, reception reports for the beacon would be welcome.

G3LPB says that ATV activity in the Falmouth area is virtually non-existant although John keeps a station in readiness, about the only time the fast scan gear gets an airing is when the local club hold their mobile rally and John arranges a demonstration, so if there is anyone within a reasonable distance of Falmouth who can receive and/or transmit fast scan John would very much like to hear from them.

From north of the border writes Chris Towns GM8BKE (Glasgow). Active stations in that area are GM3SAN, GM3YLD, GM3KXM, GM3SZP and GM8CFW, almost all use the DJ4LB transmitter and some radiate 10 Watts or so with the aid of the DJ3SC linear, standards are 625 line negative modulation. Main activity times are at weekends using tow meters as a talk-back link.

GM8ARV in Edinburgh has also put pictures across to the group. It is interesting to note that the three 70cm repeaters which are planned for central Scotland intend incorporating an automatic shutdown period each day to allow the TV chaps to operate without mutual interference.

The Midlands Video Club of Oldbury in the west Midlands have decided to construct a Club TV station. Plans and equipment are under way and it is hoped to commence operation sometime early this year. Anyone interested in contacting this club should write to G5KS.

Also from the West Midlands comes news that G8BOP of Dudley is now receiving vision and would be pleased to take pictures.

STOP PRESS

A letter from Alan Morris G4ENS (ex G6AGH/T) of Luton in Bedfordshire has just arrived. Alan has submitted a preliminary proposal for an ATV beacon and repeater for operation in the 70cm and 23cm bands respectively. The best way to report on this proposal is to quote from the original text:

Phases of construction

It is intended to construct the repeater in a number of stages and as such a project

is expected to be a long term investigation of various aspects of amateur television.

Phase 1

The construction and operstion of a 70cm television beacon. The vision signal to consist of an electronically generated test card incorporating the beacon callsign. The sound signal would be NBFM of the vision carrier giving the beacon callsign by morse telegraphy.

Phase 2

To construct and operate an amateur television receiver to receive signals transmitted by amateur television stations using the 23cm band. Any signals received on this receiver would then be repeated using the beacon transmitter already in service.

Phase 3

To construct and operate a 23cm television transmitter to relay the signals received by the receiver used in phase 2.

Alan goes on to say that he hopes to complete either phase 1 or 2 before 1979 and the World Amateur Radio Conference. If this can be done it is felt that it will lend considerable weight to the case for amateur television.

Anyone interested in joining a working group or making any constructive suggestions should contact G4ENS at 25 Felstead Way, Luton, Beds.

I'm sure we all wish Alan the very best of success with this project and the B.A.T.C. hope through this column to keep members informed of future developments.

That's it for this time. Please keep the letters coming and send them to TV on the Air, 54 Elkington Road, Yelvertoft, Northampton, NN6 7LU.

Finally, may I take this opportunity to wish allreaders of C Q - T V a very happy and prosperous New Year.

WELSH AMATEUR CONVENTION AND THE GWENT T/V GROUP

September 1976 was the third year for the Welsh Amateur Convention held at Oakdale College, Blackwood. The Gwent T/V Group were there with demonstrations of CCT/V including a colour tv monitor displaying a caption of synthesised coloured letters inside a 'box' (created by a window generator) surrounded by colour bars. This display was provided by Eric GW6ANU/T.

Keith (sw1) and Peter GW4EAI had their camera and monitor on display and Peter also had his Slow-Scan monitor installed with the H.F. station. Peter is a holder of the Home Office permit to transmit Slow-Scan pictures.

Mike GW8MDO had a camera and monitor on display he also brought along his V"R and played back tape recordings of visits we made around some local clubs. Also on tape were video recordings made on the island of Flatholm on August 24th 1976. This was a recording of a memorable event. In the year 1897 the first wireless transmissions over water was carried out by G. Marconi at Lavernock point and was received by Kemp on Flatholm Island. To commemorate this

a sculpture was flown, by helicopter over to the island. The Gwent tv group set up a tv transmitting station with the use of Ray's GW6AJM/T TX and relayed the ceremony back to the mainland. Ray, Mike and Eric stayed overnight on the island to make this possible. Mike made the recordings and his camera was also the video source. On the mainland the Receive Station, about 3 miles away, was Bob GW6AGR/T and the off-air pictures were fed into monitors at the B.P. Chemicals Sports Club at Sully.

The members of Gwent TV Group are small in number but we hope to rectify this by holding meetings open to everyone. We shall be introducing talks and lectures on Amatuer Television both fast and slow scan. There is however, a fair amount of activity within the club members.

CES GW6OAJ/T is presently getting things organised in his newly erected shack and hopes to be back on 70cm very soon.

Bob GW6AGR/T GW8AGI is playing around with a character generator and modifying to suit his own requiremnets and some vision was seen radiating from his shack.

Ray GW6AJM/T GW8GKF, in between underwater tv activities, is building a Solid State portable 6 watt tv transmitter. Bursts of vision are quite frequently seen radiating from this QTH.

Mike GW8MDO, has just completed a Digital Frequency Meter covering the 70 cm band, and is starting to build a video mixer to enable him to use two portable cameras with his VTR.

Peter GW4EAI, is concentrating on Slow Scan. He's the S.S. member of the group, and is working on a Digital Fast to Slow scan converter.

Eric GW6ANU/T GW8LJJ, is going all out for colour. A coder and mixer/FX unit is being built and he has a number generator working. The numbers can be varied in size and move to any position on the screen. etc. An A/B mixer and F/X unit has been previously constructed and will be modified for use with the colour mixer.

Keith (SWL) - We don't exactly know what he's going to do. He has at the moment, a number generator working from pulses derived from his own designed S.P.G. and this can be superimposed onto his camera process amp.

We hope 1977 will be a very active year for the GWENT TV Group.

BUILDING A CAMERA?

May we remind readers that the Arthur Critchley Sync Pulse Generator printed circuit boards can be bought from Club Sales. We now have these, ready drilled, on a fibre glass base and roller tinned for £5 plus 10p postage.

The original design was described in C Q - T Vs 75 and 76, and in 77 and 78 there were further circuits for genlocking etc. A second pcb - the genlock board - is also available at the same price, and the boards are sold with a duplicated data sheet.

Orders should be sent to;
C. Grant Dixon(BATC Club Sales), Kyrles Cross, Peterstow, Ross-on-Wye, HR9 6LD.

A ONE CHIP S.P.G.

David Mann
G8ADM. G6OUO/T.

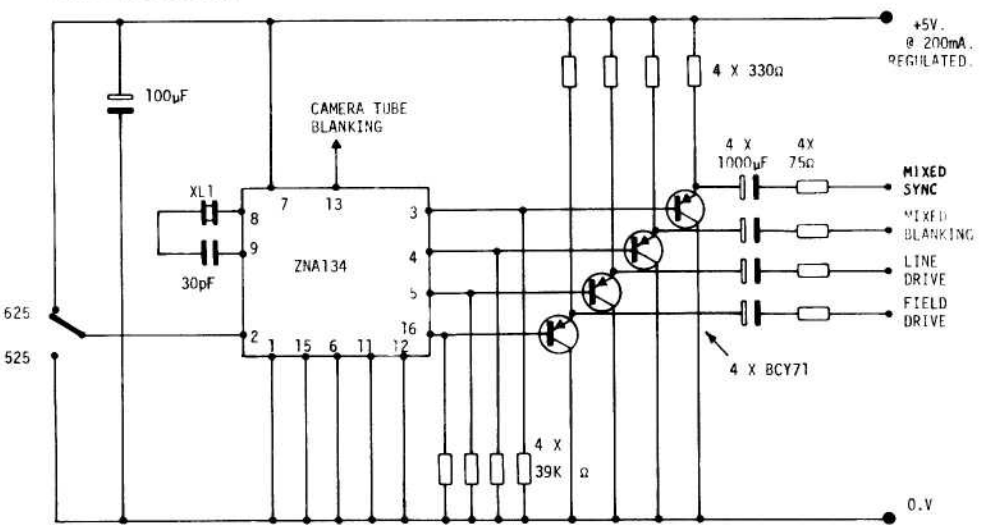
The sync pulse generator to be described must be the simplest, full broadcast, dual standard S.P.G. ever described in CQ TV (and elsewhere). This simplicity is due to the availability of L.S.I. integrated circuits with all the S.P.G. logic within one 16 pin DIL package. Various I.C. manufacturers are making S.P.G. integrated circuits these days, but most of them are for use on the American 525 line system, and those for use on 625 lines are mostly not to broadcast standards.

However, recently Ferranti have introduced the ZN134, a version of their 'uncommitted logic array' which is a mask programmable device, programmed to fulfil the function of a dual standard 525 and 625 line monochrome sync pulse generator. Colour operation is obviously possible if the S.P.G. clock frequency is phase locked to the colour subcarrier oscillator and logic added to produce properly blanked burst gate, and axis switch pulses if required. Colour operation is outside the scope of this article, and readers who are interested in making a colour S.P.G. with this device are recommended to obtain the full Ferranti data sheet for further information.

Apart from containing all the pulse forming S.P.G. logic, the ZN134 also contains an onchip crystal oscillator circuit. This has been designed for use with the 2.5625 MHz quartz crystal together with the series crystal tuning capacitor which for most applications can be fixed at 30pF, or for colour lock or 'genlock' applications this capacitor can be replaced by a varicap diode to allow the S.P.G. to be phase locked to other sources. For 'genlock' use facilities are included in the chip logic for adding to, or subtracting pulses from the clock pulse chain to achieve field lock. A field reset input is also provided for 'crunch' lock applications. The genlock circuitry has not been shown here, and readers wishing to add this are also recommended to refer to the Ferranti data sheet.

The ZN134 is readily available from Ferranti distributors, a list of which is given at the end of this article. It is not a cheap I.C. but when you consider the number of separate I.C's that it is replacing it is quite reasonable at about £15, each. In spite of this price, and without resorting to the parts available from the average junk box it is

A ONE CHIP S.P.G.



XL1 -- Series resonant -- 2·5625 MHz. for 625 lines, 2·583 MHz. for 525 lines.
or 2·573 MHz. compromise for 625 and 525 line use.

possible to make the complete S.P.G. for less than £25.

The S.P.G. circuit is shown below, it is so simple it hardly requires description. The circuit is fed with +5V dc which must be well regulated in order not to damage the ZN134. The I.C. takes about 100mA and therefore gets quite hot. This is the normal operating condition but obviously if the 5V supply goes high, the ZN134 could easily be damaged. The remainder of the circuitry simply consists of emitter follower output stages designed to feed about 2V into 75 ohms. For genuine broadcast use a filter would need to be included between the I.C. and the output stages to restrict the rise and fall times of the pulse edges. For amateur use this is not necessary. The ZN134 also provides a feed of reduced width blanking. This is for camera tube blanking (usually fed to the cathode of a vidicon) when the S.P.G. is used inside a CCTV camera. When used inside a camera the emitter follower output stages would not be required as the pulses would be fed around the camera at high impedance.

Although for precise operation a slightly different crystal is required for use on 525 lines compared to that required for 625 lines, in practice a crystal midway between the two frequencies will be adequate for most purposes. To change the S.P.G. from 625 to 525 lines, a single pole changeover switch as shown on the circuit is all that is required. Bear in mind that the line and field blanking widths are narrower on 525 lines compared to 625, and that the number of equalising and broad pulses is different between the two standards. All these can be seen to change as the standards switch is operated, just like the spec. says it should.

The construction of the unit is relatively simple, it can easily be built on a piece of 'Veroboard' 6 x 6 inches. In order not to damage the ZN134 an I.C. socket is recommended for this device.

List of Ferranti stockists:

Mercia Electronics Limited,
Coronet House, Upper Well Street,
Coventry.

Conway Electronics,
Market Street, Bracknell, Berks.

Edmundsons Electronics Components,
30/50 Ossory Road, London SE1 5AN.

SDS Components,
Gunstone Road, Hilsea Industrial
Est., Portsmouth PO3 5JW.

SEMI Components,
Wellington Road,
London Colney, St. Albans AL2 1E2.

Swift Hardman,
P.O. Box 23, Baillie Street,
Rochdale OL16 1JE.

Wooley Components,
214A Manchester Road,
Broadheath, Altrincham, Cheshire.

The quartz crystal can be obtained from almost any of the companies advertising quartz crystals in the various amateur radio magazines etc.

FIRST PRINCIPLES

by Andrew H. J. Stirt

SCANNING

When I read Eric Edward's article in C Q - T V No 93 again recently I was prompted to put my thoughts on paper too.

Scanning may be RANDOM or NOT RANDOM. If it is NOT RANDOM it must be ORDERED.

Eric described Random Scanning and two types of Ordered Scanning. In the two Ordered Scanning cases, namely 2:1 Interlace and Sequential, the field frequency is divided down from the line frequency, so maintaining a constant frequency and phase relation between them. Whereas in the Random Scanning case the line and field oscillators are separate.

Eric used the 405 line system frequencies in a random scanning system and described it as a $202\frac{1}{2}$ line system at 50 pictures/sec. jumping in and out of 2:1 interlace. However, if we consider the field oscillator staying precisely at 50 Hz and the line oscillator increasing frequency from 10125 Hz then the number of lines per field and the interlace ratio will change. When it has reached 10133 Hz there will be $202\frac{2}{3}$ lines per field, comparable to a 3:1 interlace system of 608 lines at $16\frac{2}{3}$ pictures/sec. The table shows some of the changes more clearly;

Line Frequency	Number of Lines/Field	Interlace Ratio	Number of Lines/Picture	Number of Pictures/Sec
10125	$202\frac{1}{2}$	2:1	405	25
10133	$202\frac{2}{3}$	3:1	608	$16\frac{2}{3}$
10137	$202\frac{3}{4}$	4:1	811	$12\frac{1}{2}$
10150	203	1:1	203	50

In practice of these frequency drifts for Random Scanning may well appear as though the raster were jumping in and out of interlace.

It follows that 2:1 3:1 4:1 etc versions of interlace in Ordered Scanning systems are equally valid, and that the 1:1 interlace case is in fact the Sequential Scanning system. The three main types of scanning are therefore; RANDOM SCANNING
ORDERED SEQUENTIAL SCANNING
ORDERED 2:1 INTERLACE SCANNING

BANDWIDTH

The maximum possible vertical resolution of a tv system is realised when an abrupt change in tonal value from black to white along a vertical line is resolved by two consecutive scanning lines. The upper limit of Bandwidth is, therefore, the frequency produced when the same abrupt change from black to white occurs along a horizontal scanning line. Then the vertical and horizontal resolutions are equal.

Assuming the smallest picture element that can be resolved has a maximum dimension equal to half the distance between two scanning lines, then the equation for Bandwidth is;

$$\text{BANDWIDTH} = \frac{\text{Half the number of elements in an active line}}{\text{The duration of an active line}}$$

$$\text{BANDWIDTH MHz} = \tfrac{1}{2} \times \text{Aspect ratio} \times \frac{\text{Numberof active lines}}{\text{Active line time in uS}}$$

For the 405 line CCIR System A

$$\text{Bandwidth} = \tfrac{1}{2} \times 1\tfrac{1}{3} \times \frac{377}{80.7} = 3.114 \text{ MHz}$$

For the 625 line CCIR System I

$$\text{Bandwidth} = \tfrac{1}{2} \times 1\tfrac{1}{3} \times \frac{575}{51.95} = 7.379 \text{ MHz}$$

However, fine detail in the vertical direction can be completely lost if an abrupt change from black to white occurs on a scanning line, as the output video will contain a mid gray at that point. The subjective effect is an apparent reduction in the vertical resolution. The horizontal resolution may be reduced by the same amount (it has been suggested by as much as 40%). This gives a useful saving in bandwidth.

The ratio of "Bandwidth Used" to "Maximum Theoretical Bandwidth" is called the "Kell Factor".* The 405 line system started before this had been suggested. The various European 625 systems use a Kell Factor of between $\frac{2}{3}$ and $\frac{7}{8}$.

For the 625 line CCIR System I

$$\text{the Kell Factor} = \frac{5.5}{7.379} = 0.745 = \text{approx. } \frac{3}{4}$$

PICTURE - SYNC RATIO

Having arrived at the bandwidth limitation for both video and syncs, what determines the ratio of 0.3 volts of syncs to 0.7 volts of video? Common sense suggests that when the level of noise makes a picture unintelligible to the eye, then the receiver should be losing lock. But that rather depends on the state of the art in receiver sync separator circuit design.

Considering a PAL video signal with a luminence component of 0.7 volts, the limits of the chrominance excursion are + 0.93 volts and - 0.23 volts relative to black level (these are set by fully saturated yellow and blue). Now the logical level for syncs must be - 0.23 volts below black level, then they can be kept within the lower video limit. The ratio 0.23 to 0.7 happens to be 0.25 to 0.75 for a 1.0 volt composite video signal. Having made the luminance 0.75 volts, the limits of chrominance excursion become + 1.0 volts and - 0.25 volts.

It is too late for broadcast transmitters, but an atv transmission may gain a bit of signal to noise ratio, as more transmitter power can be given to the video than before. This applies to both positive and negative modulation. A receiver may need a 4.43 MHz notch filter before the sync separator to prevent chroma at the lower limit of chrominance excursion from upsetting the sync circuits.

* Reference

T.V. Engineering Vol. 1. S.W.Amos & D.C.Birkinshaw.

EDITOR'S NOTE

Comments for publication would be welcomed from members who put Andrew Sturt's ideas into practical use.

In the next issue of C Q - T V we will publish another article on scanning, this time with a very novel aproach.

N O T I C E

The B.A.T.C. has great pleasure in announcing that its new President is Mr. R.C. Hills, Bsc (Eng), C Eng, FIEE, FIERE. Mr. Hills, Chief Engineer (Transmitters) of the Independent Broadcasting Authority, is also a well known amateur G3HRH.

Our former President, Mr. R.S. Roberts, C eng, FIERE, Sen.MIEEE, has completed his four year term of office, and we take this opportunity of thanking him most sincerely for his enthusiasm and interest in the Club.

'SCOPE TRIGGER UNIT

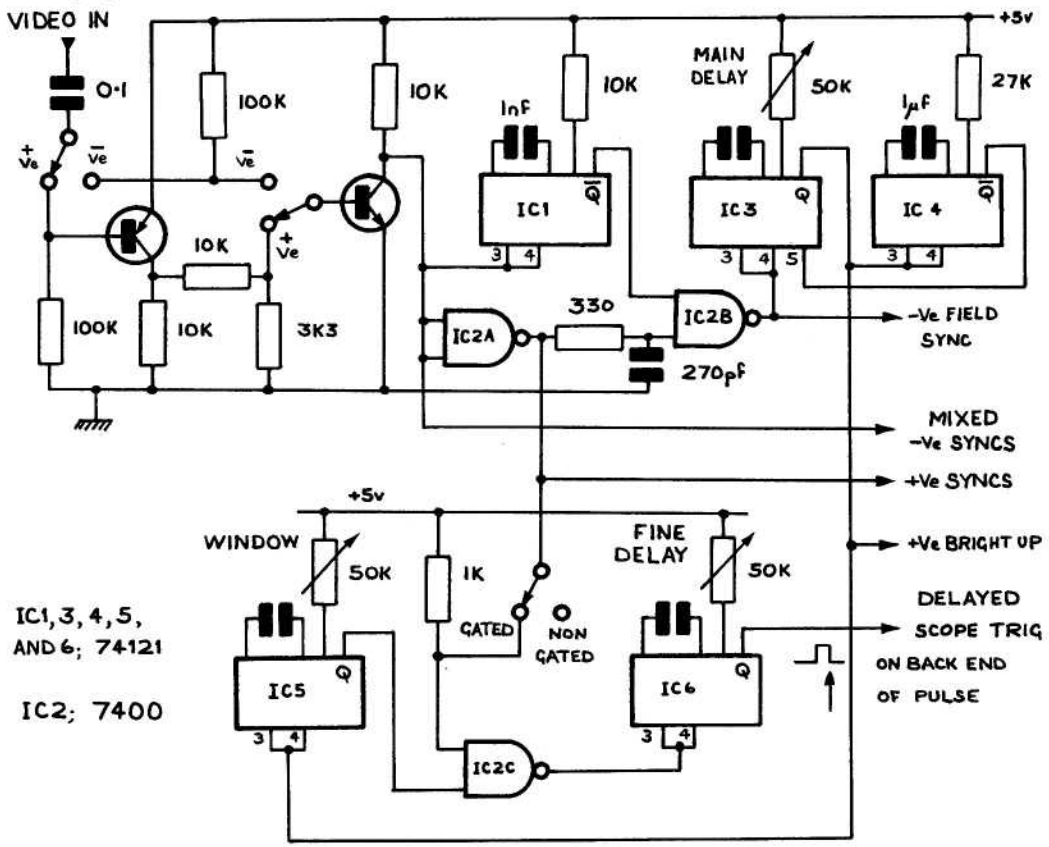
FOR TELEVISION WAVEFORMS.

by J. Hinton

It is often valuable to be able to trigger an oscilloscope at any point in the TV waveform for detailed examination of areas of interest.

Oscilloscopes with a Field Sync separator and 'one shot' gated delayed sweep can provide trigger at the start of a particular line (superimposed upon its nieghbour from the alternate field). If the sweep delay were used ungated, the corresponding lines from alternate fields would be superimposed half a line out of phase unless the oscilloscope posesses special facilities for selecting only odd or only even fields (e.g. Tebtronix 524).

The unit described here was built to give this facility, together with "Multitrig" on the simplest oscilloscope so that the limitation becomes the trace brightness when using it at low duty cycle.



FOR VARIABLE RESISTORS USE 10 TURN HELIPOTS OR 5K IN SERIES FOR FINE ADJ.

The negative mixed syncs from Tr2 fire the field sync monostable IC1 which closes gate IC2b for 7us from the start of sync pulses, so the gate output consists of slightly shortened field pulses with no line pulses. As IC1 has a propogation delay of 70us maximum, it is necessary to delay the direct input to IC2b by a greater amount to avoid 'glitches'.

The separate field pulses start the 'main delay' line selector monostable IC3 which has a delay range in excess of two complete fields. The end of this delay fires the 'window' monostable IC5 which opens gate IC2c allowing line sync pulses arriving during the window into the 'fine delay' monostable IC6. The oscilloscope is set to trigger on the back edge of the pulse from IC6 to give an adjustable trigger point along the selected line. (The timing capacitors are chosen for the ranges required in accordance with the relation t(us) = 0.7 c(uF) x R(ohms)

IC6 disables IC3 from being fired for a time after the end of the main delay pulse to ensure that the timing capacitor recovers fully.

By varying the 'window' duration it is possible to strobe out any particular line in odd or even fields, a pair of adjacent lines in alternate fields, or a band of lines. This 'multitrig' facility is particularly useful with signals where a number of consecutive lines are identical (i.e. Test patterns), by averaging them out and obtaining a brighter display.

The 'window' pulse can be mixed with the video signal being displayed to provide a 'brightup' on the picture for identification of the scope trigger point alternatively.

Ungated delays sweep is provided by switching out the window to start IC6 directly from the back edge of IC3 main delay pulse. Conventional one-shot gating could be achieved by setting a bistable ($\frac{1}{2}$7474) by clocking the D input with the back edge of main delay pulse, and firing IC6 with the negative transition on the Q output of the bistable when unset by line sync applied to the Direct Clear.

This unit was based on single TTL monostables due to availability, but could be simplified by the use of dual monostables. An equivalent design in C.M.O.S. would ease power requirements, as a battery or non-critical D.C. rail could be used.

AN I.T.S. GENERATOR

D.J.Long G3PTU

The unit to be described will produce one line of the waveform shown below on a selected line (usually line 19) after the usual frame sync waveform. If no frame sync waveform is present, no line of test waveform will be produced.

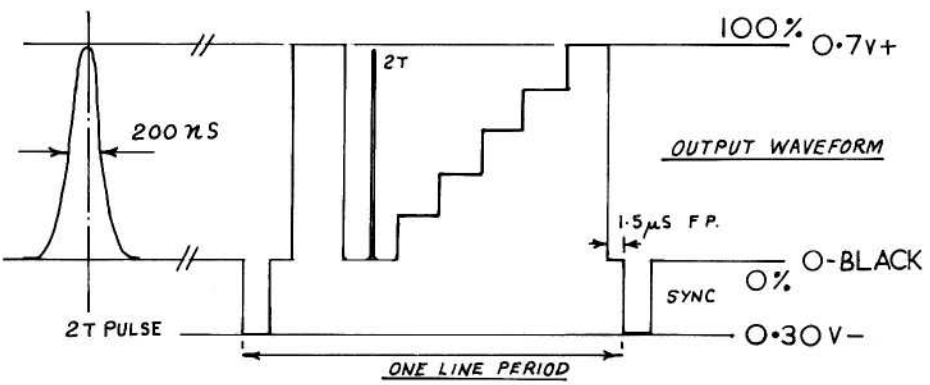
Alternatively, by selecting "full", providing either line or mixed syncs are fed to the unit, the same test waveform will be produced, but on every line, and each line will be sequential i.e. no frame interval. This waveform replaces the input video at the output.

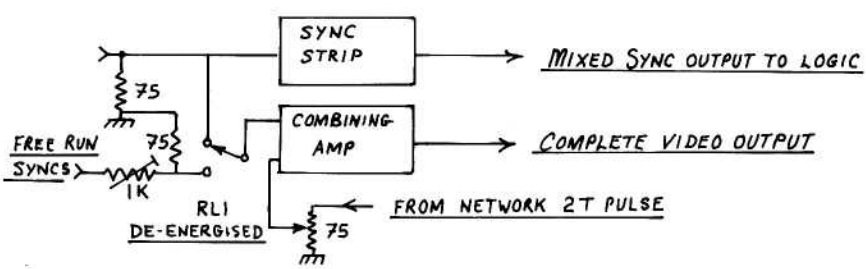
The sync strip and combining parts of the circuit are not shown as it was felt that these would depend on individual practical arrangements. However, in the original a simple addition was used between the I.T.S. and video to combine.

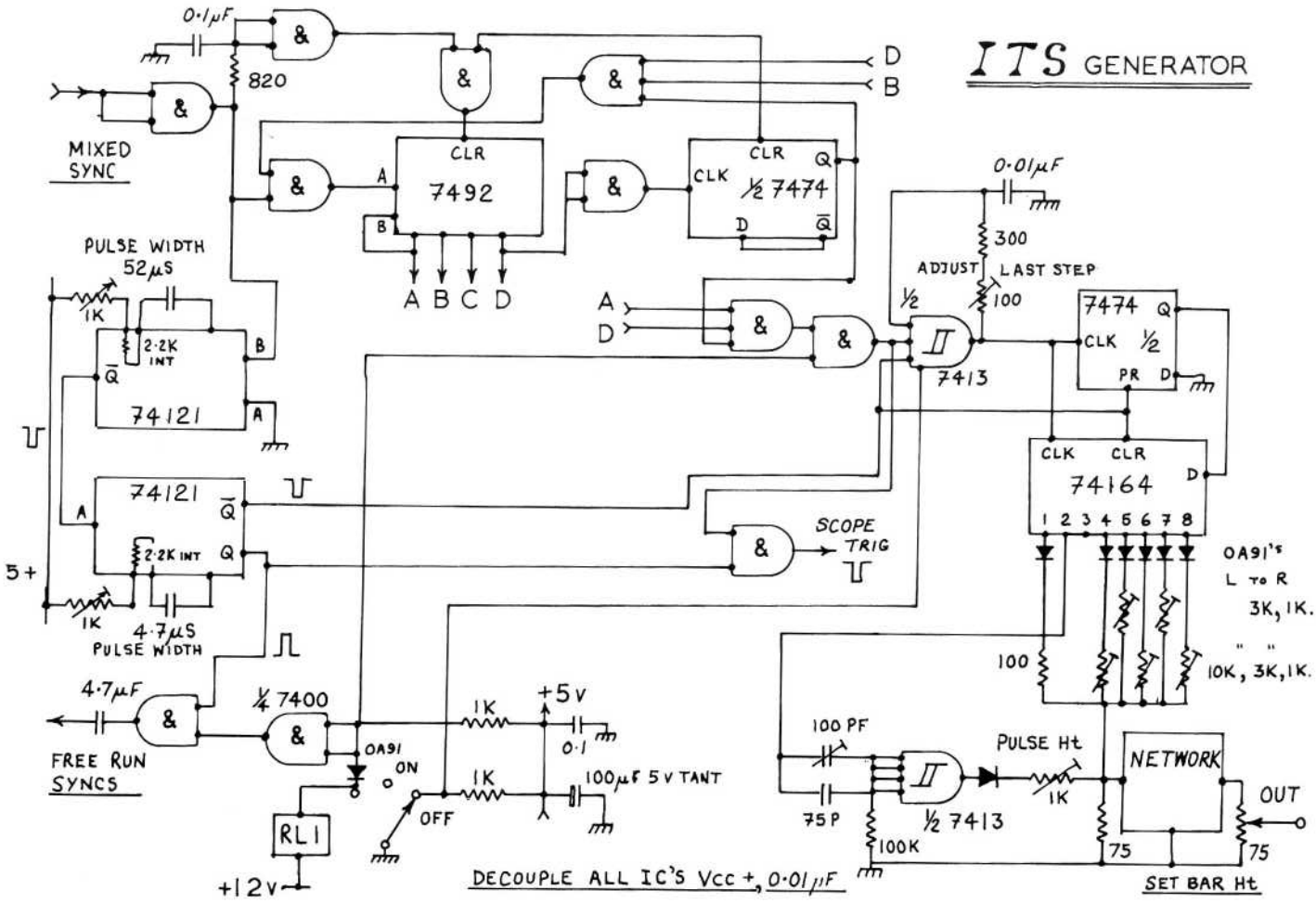
Mixed syncs stripped off the incoming video to avoid delaysare fed conventional way up to an invertor and split three ways;

(a) to produce a pulse to reset the 7492 and 7474 during the broads
(b) to a gate which feeds the clock input of the 7492
(c) to set the 52 uS monostable running

The 7492 and 7474 count up to a maximum of 20 then stop, until it is reset by the next broad pulse. As these counters operate, line 19 is decoded. Although no counting takes place during






ITS GENERATOR
0·1μF
820
MIXED SYNC
CLR
7492
A
B
A B C D
D
B
CLR
CLK
Q
½ 7474
D
0·01μF
300
ADJUST
LAST STEP
100
½
7413
7474
CLK ½
PR
D
PULSE WIDTH
52μS
1K
2·2K INT
74121
74121
2·2K INT
1K
4·7μS
PULSE WIDTH
5+
SCOPE TRIG
CLK
CLR
74164
1 2 3 4 5 6 7 8
OA91's
L to R
3K, 1K.
" "
10K, 3K, 1K.
100
4·7μF
FREE RUN SYNCS
¼ 7400
OA91
ON
OFF
1K
+5V
0·1
100μF 5V TANT
RL1
+12V
100 PF
75P
100K
½ 7413
PULSE Ht
1K
NETWORK
OUT
75
75
SET BAR Ht
DECOUPLE ALL IC'S Vcc +, 0·01μF

the broads, as the equalising pulses are at twice line frequency, the number decoded is the same as if straight lines were counted.

This decoded line is used to allow the 7413 oscillator to run for the duration of the I.T.S. line. The action of the two monostables is to produce a 4.7 uS (i.e. line sync width) pulse every line. The setting of the 52 uS monostable is non critical, providing it is longer than ½ a line and shorter than 1 line. Switching to "full" makes use of this 4.7 uS pulse for line sync and provides an input to the 7413 to make it run on every line. RL1 is operated to switch the video.

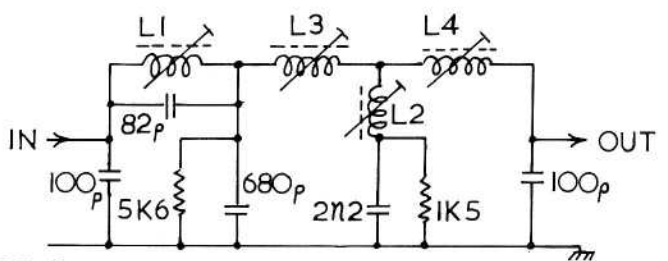
The 4.7 uS pulse is used in both modes to stop the 7413 oscillator, reset the 74164, and preset the 7474 on every line.

The 7413 oscillator clocks the shift register at intervals along the line, the periods being adjusted so that the trailing edge of the last step finishes before 1.5 uS before the sync pulse start. The clocked outputs from the shift register are used to produce the final output waveform, timing errors at this point being very small - and are removed by the filter.

The bar is taken as datum and other outputs are set up in relation to this.

The Network itself was built into a small metal box, the components being preferred value ones and the inductors being tweaked to give best pulse shape and correct HAD. There is quite a loss across the filter and in any case it is not possible to work into 37 ohms with a large output and therefore the output falls short of 0.7 v, and amplification is required. Although the timing is not as per CCIR recommended, this is not a problem unless automatic measuring is contemplated.

NETWORK FOR 625 2T PULSE HAD 200ns



L1. 10T 8mm DIAM CLOSE WOUND
L2 5T . . . . . --ADJUST FOR MAX LOSS @ 5 MHZ
L3 23T . . . . . .
L4 23T . . . . . .

THE NETWORK MUST BE TERMINATED AT EITHER END WITH 75Ω.

The 'scope trigger will provide a means of viewing the I.T.S. waveform on oscilloscopes not equipped with delay facilities, but beware; as the trace will only be triggered on I.T.S. for one line in 317, the brightness will be considerably diminished.

The unit has been in use for some months and has proved to be reliable. The intervening time has been spent tweaking the rest of the station.

MAINLY SCAN COILS

By J. Brown G3LPB

Many constructors along the way make a fine job out of a bit of new gear, only to find in the case of a new monitor, the scan system when connected gives troubles, or even does not work.

This article is to assist them and probably encourage a "given up project" to be resurrected.

I know of NO SOURCE of commercial scan coils for slow scan, if available would cost a lot of money. One reading slow scan articles seemingly thinks that all is well and easy. As yet I have found only one set of coils that worked right away without any mods. with a 5FP7. These are from an old box type COSSOR TV, since then I have found any of the Cossor 930 to 937 series scan coils, plus focus magnets are fine for slow scan and work without any mods. Unfortunately, these have mostly disappeared. Some of the old Phillips types with flared coils work O.K. need correcting.

In the main, the old 70 to 90 degree tube coils work O.K. Admitted they are not snug fit on the neck of the 5FP or 7BP7 CRT. This discrepancy in size and fit is really not a big problem.

Scan coils retrieved from old TV sets usually have four coils. A pair for field or frame, and a pair for line. If the coils system has more, throw it away, not worth all the troubles it incurs.

The windings in some cases are paralleled whilst some are seriesed up. In some coils there are fitted resistors across windings. These are the frame or field coils., whilst the line coils can be recognised by Hi Volt capacitors or extra PVC insulation on leads. However, this in Slow Scan is NOT important. The coils with the highest measured resistance always become the field or frame coils. However, scan coils have to be correctly set up, or what is sometimes known as "Phased" or seriesed up.

This ensures that we get maximum scan for minimum input. Also, we get the correct scan. Some coils have in series with the mA built in thermistor. This looks after any temperature changes due to heat in normal use. However, this seemingly is not required in the Slow Scan monitor as mainly semiconductors are used and the ambient temperature inside the monitor is not in need of correction. Usually a high resistance measurement tells us there is a thermistor in the series with the frame coils.

We need a set of coils with approximately 10 to 40 ohms each set windings. However, they need to be "seriesed up" or phased correctly for a complete scan. In the case of frame coils, incorrect phasing gives us half scan with folded up bottom, in the case of line half width with a white line partway.

The frame coils must be phased such that the complimentary pair driving them during the changeover period with the line travelling downwards travels without flaws, or we may get a broken scan. Fig. 1 shows scan coil breakdown. Some coils have ferrite formers, others are

"dry" type without this. The setup is 4 coils at 90 degrees to each other, top and bottom make the frame or field. The horizontal pair make the line. They are designated a,b,c, and d. Each coil end is numbered for reasons explained later. This assists in this phasing or seriesing correctly.

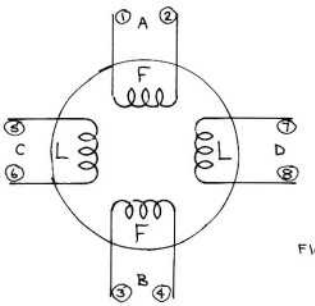


FIGURE 1

The method I use for phasing is really quite simple, and the only way I have had success. Visual indications can lead one astray, i.e. the start and finish of the coils visually one comes adrift.

I use a test card which is really a CRT, with power supplies, i.e. EHT, and DC for brilliant setup, plus two AC supplies. One is for heater, and the other for tests. Putting the coils on the tube neck suitably packed up with paper tubes or cardboard to ensure no movement, push right up hard on the neck. Fit the focus assembly. Earth grid of tube where the video is normally fed in. Connect EHT to final anode and preferably insulate the cap. Switch on. Gradually adjust brilliance till a spot or "blur" is on the screen. Centre this up with the mechanical device usually fitted to focus units. So we get a spot or blurb in approximately the centre.

The test AC winding, connect A1 and 2. Watch the travel of spot and the approximate distance covered, i.e. to say the right 2". Disconnect and reconnect the AC test to the B 3 & 4 side. Again watch. This should be about the same only to the left (say 2"). If we now connect the coils series aided, we should get when correctly phased, a travel of 4" one way. If we do not however, we have to change a winding over, i.e. where they joined and try again. We repeat this with the other coils. Calling one pair of wires frame, the other pair line. We insulate the junction of both wires where they join in series. Always keep the brilliance down to a minimum for viewing. We could use here a small DC voltage, i.e. 4 volts DC instead of the 3V AC required for testing. The DC makes the spot travel in "flips across" and does not "paint" a line visible like the small 3V AC voltage.

What we are after is maximum scan for minimum current in the complimentary pair that drive the coils. If the coils were a good fit on the CRT neck, we could get away with very small transistors, I feel sure. I have in fact, seen a monitor that uses a very small audio output type transistors to drive a 5FP7 (Wonder how you do it Grant. Maybe the coils are wound at home??).

I have used varied setups for coil driving the usual AD161/162, BD135/136, BD139/140, MJE series complimentary pair, D42C5 and D43C5, seemingly any pair works O.K. I did hear of a chappie using Sinclair audio type amp to drive his scan coils feeding sawtooth to the mike input!!

In passing some mention should be made of focus assembly units. These usually comprise two ferrite rings that concentrically get separated. On the back is a lever that shifts the beam in all directions. The tube neck must be absolutely central with any focus assembly or we get corner cutting or even NO RASTER. The same applies to this certering device. If incorrectly set we get cut off, i.e. the pics. with a circular cut off pattern one side, or even round one side and square the other. Good focus is obtained by sliding the assembly along the tube neck manually till a decent focus is obtained. No, the complete answer is to fit between the tube neck and focus assy bore in the magnets cardboard or even plastic. This ensures a decent fit and no chance of being let astray optically. In fact, if one removes both coils and focus gear from the same set, the measurments would be about the same in both cases. The secret is to get raters first then worry about the focus or definition side. REMEMBERING GOOD FOCUS WILL COMPLETELY BURN THE FACE OF THE TUBE SHOULD ONE RUN AT HI BRILLIANCE SETTINGS. So focus is best left till last.

Going back to Fig. 1 and recapping on the phasing
(All figures are examples).

Feeding small AC volts to say "winding a" across "1 and 2" will give us a line in one direction, say left from the centre 2" long. We then connect the small AC volts to "b winding" across "3 and 4" and we get a 2" deflection line. If we now connect "a2" to "b3" this becomes the series connection, and the small AC voltage across "a1" and "b4" if correctly phased we should get a 4" line. If not we have to disconnect the series junction and reconnect say "a1" and "b3" and the AC to "a2" and "b4". This should now be correct. The ends not joined now become the coil connections to the output pair. We repeat this again with the other windings, c and d. The ones with the highest measured resistance become frame or field, the other becomes line. When fitting finally, fit scan coils, apply AC volts about 3v to the frame coils and turn coils till the line is vertical. Connecting to line coils, the line should be horizontal. If this is incorrect, turn the coils till this situation is met. When used in monitors we have a lot more power available than our small AC supply used for these tests. Hence we get a much larger scan. Careful series aiding or phasing will result in good symetrical pictures eventually.

I passing, a couple of snags. One was a thin line appearing on the screen. Eventually a 270 ohm resistor across the winding cured this. Another fault was where the vertical started off O.K. then quote a good friend "hiccuped" off course and continued along O.K. This was due to power troubles and some LF oscillation during the frame scan. A 10,000pf disc from coil junction where it joined the complimentary pair killed this. Some circuits show a 10 ohm wire wound round resistor in the earthy side of the coils. I found this was feedback to the I.C. and had to decouple this resistor by 1uF, stopping take off and weird results.

There is also available, though not seen for a while, electrical focus units comprising a focus coil, plus its associated electronic control. Here the magnet assembly is dispensed with and the coil fitted on the CRT neck in the appropriate position, and the focus adjusted by a panel mounted pot. This I feel personally, is a bit of "old hat", and feel the heat may necessitate continual adjustment (the heat from the heater, as the coil is in close proximity of this.) Finally, do not run and scrounge from your nearest dealer. Tell him your interests. Ask him about any gash ones about, they must be the old box type pre 1955 era. Usually recognised by the mechanical contraptions behind the scan coils. In fact, most tubes of the older variety are O.K. Amongst these old Brimar C series, the Cossor numbered tube series, and the Mazda numbered series, i.e. CRM 92 to CRM 121. If you have doubts, a S.A.E. and I will try to put one on the correct path. Unfortunately, I cannot supply either coils or assist in phasing yours. Too many projects on at the moment.

Assuming we have some sort of scan, troubles again can occur. These take various forms. Short scan, foldover or non linear scan, no scan just a white line in varied forms, varied shapes of scan.

These are too varied to go into much detail over, but starting a spot somewhere on the CRT face indicates that there is NO SCAN TAKING PLACE. This may be due to no output from drivers, no oscillation, and in some cases, NO SIGNAL. One bewildering thing is the forms of obtaining the picture. Quickly we need a signal of sync in the correct frequency etc. to start a driven type of monitor, whilst some always display a raster. Even with no signal there is a raster on the screen. Usually a guide is: if the monitor is fitted with a syncswitch/button or a manual start. The monitor is the sync neede type, i.e. it has to have sync pulses of the correct frequency and duration to even start to display pictures. The other type uses a unijunction oscillator to supply drive to the scan system. This has been decided to be of longer duration than really need be, so that always there being a raster, a picture will be displayed during tuning in, and when the signal of sync is correctly tuned the received sync pulses are shorter than the locally developed ones using hte unijunction or other setup. This allows the monitor to run on the received pulses of sync. Should these be lost a picture will still appear on the screen, "non sunched" as the time base runs on the internally produced sync. Examples of this are noticeable with most commercial gear (NON KITS) are running timebases, so they display a white raster. Whilst kit monitors say the SSMI, MK Products, the RHI monitor all use this "sync needed" to display. Gordon G3LEE G6LEE gave a cct in B.A.T.C. TV some time back for converting monitors to self run, and on receipt of the correct sync pulse received locks on and displays pictures.

Back to snags. Shortage of scan can be I. Low DC volts to the output pair if a negative and positive supply is used these two voltages must be almost equal, or we get a cramped picture, i.e. a 12V line and a negative 10V line (instead of 12V) gives a real weird effect on the picture. Assuming we have good line scan yet poor frame scan, this could also be incorrect setting of gain/size/height controls, or even low volts. Remembering the line is continually to produce 120 lines whilst it takes 7.2 seconds to scan a completeframe. Thinking about it all, it could be explained here the scanning process in a little more detail. As yet, this I have never seen in print. In a "sync needed" monitor, like the MK, SSMI,RHI,W4TB, Phase 2 etc., there is no raster available till the correct sync pulses arrive. Assuming the sync controls are set correctly, when the pulses arrive we get the frame to start the show. In most of the monitors, the spot created by the monitor is resting at the bottom right hand side, maybe off the screen, but my demo monitor is arranged so that this can be shown. On receipt of any pulses the scan operates, i.e. if a line pulse arrives first we get splashes BUT WE MUST HAVE A FRAME PULSE first before anything takes place.

So the spot rests at the bottom right-hand corner. The frame pulse moves it to the top right-hand side. This is due to the duration of the received sync pulse. After this the line pulses take over and produce a line, which is repeated for a complete scan 120 times approximately, the spot zig-zagging across the screen. Due to the persistance of the screen, we have on the screen 120 lines showing till the next frame pulse arrives to take the spot back and it repeats again. As this scan is taking place, the scanning line slowly drops down due to the discharge in the frame time base so we have a spot sweeping to and fro, making up lines superimposed on these lines (stop and go) are the video information. With no video we get on the screen from top to bottom, left to right, the spot that traces the lines 120 in number taking 7.2 secs to do so. This is repeated over and over, and surprising very good definition is obtained. If mistuning takes place during these scan periods we get a white blob, or even black and white blobs. White is usually dessignates carriers or someone that whistles on an adjoining

SSB channel (a ridiculous way to tune up anyway). Signals can fade into the muck and mire yet the monitor will try and in many cases succedd in producing a picture.

So the important things are:

1. Correct tuning
2. Better have a tape recorded and have as a standard.
3. Correct setting up of sync control in the monitor. Once set should never get touched.

Some stations are difficult to tune in. This is oft times due to the sunc etc., not on the similar frequency, i.e. if all syncs are on 1200 Hz and one comes on say 1350 Hz, this will be very hard, if not impossible to tune in. Same with the colours, i.e. White is NOT WHITE, black is black and grey is in between. How the colours come about is another problem. So a LIT raster is white, grey or mid shades, black is dark, but SUPRA BLACK is sync. Venus I think switch the monitor to show signals and one tunes for maximum sync pulses. The rest looks after itself.

Lack of width is usually associated with voltage supplies, but one case where the resistance of the coils was about 15 ohms, I had to insert a series resistor between the coils and earthy side to give the better impendance match(analogue ever tried a 3 ohm speaker on a 15 ohm line? Works but poor).

A useful bit of equipment is a scope, immaterial of its type. The snags can be reasonably easily sorted out. Remebering the sawtooth is needed in the time bases. The output is attack and decay dependant on the line or frame.

Another snag coming to mind. The monitor using I.C. would break through on the received signal superimposed. All sorts of things were tried, till it was discovered the aluminium clamp around the scan coils when earthed killed it stone dead. The line signal was obviously getting back somehow. With I.C. one has to be careful. These are very susceptible to transients created in a unit, even created them themselves. Good decoupling of power lines stops a lot of unnecessary interference.

If one uses an I.C. voltage regulator, remember a small decoupler from the regulated supply to deck. I had troubles with these I.C. regulators going "self oscillating" at low frequency, destroying itself. Expensive things these and the manufacturers will not replace them.

Foldover is usually due to incorrect setting up of controls, i.e. width, size, shape, height, size shape or correction if used. Coils rarely exhibit this fault, as under the terms we use them, cannot very well go faulty, as they have low volts and lowish current through them.

When the frame flips to the start the current will rise quite high. The line current is almost always the same as it is continually running about the same level. A 10 ohm resistor in the earthy side of scan coils assist in any type of measurement voltagewise needed, i.e. one can see if excessive volt change during scanning takes place, breaking the line allows current to be taken start say, at 1 amp setting.

SCAN COIL LOGIC TABLE

Feed AC to where marked AC
Join where in same column

FRAME	AC	a1	a2	a1	a2
	Join	a2	a1	a2	a1
		b3	b3	b4	b4
	AC	b4	b4	b3	b3
LINE	ACc5	c5	c6	d5	d6
	Join	c6	c5	c6	c5
		d7	d7	d8	d8
	AC	d8	d8	d7	d7

Any pair of the above will be correct. As we can get correct with two of the above, the results will be seen. So the first time we get the distance times 2 as explained, we can assume it correct.

Feeding 3V AC to each coil in turn will also test the continuity, as well as give us this distance, i.e. the amount the spot travels with the AC applied to the coil. So when correctly seriesed up we get twice this distance.
In operation we can get varied results:-
The scan can appear
1 Correct 2 Upside down 3 Inside out 4 Upside down and inside out 5 Sideways, plus a multitude of other ways!

The way to overcome this is to select the highest measured resistance coils. Call these frame or field, connect them to the small AC voltage and they should be vertically giving a line. If not, turn the coils on the neck of the CRT carefully until they are in the vertical plane. Now the horizontal or line coils have to come correctly. Connect to the monitor supplies, where the coils are to be fed from. Switch on and watch the screen. The spot should be off the screen now as the DC in the coils magnetically deflect it off. Applying a signal correctly tuned in with filters correctly set, we expect to see something on the screen (CRT face). There should be a raster (at this point forget video or pics), the raster is the important thing at the moment. We carefully watch the direction of appearance of the frame scanning line. It should start at the top and "paint" its way down the screen vertically, taking 7.2 secs. to do so. If it starts at the bottom, we can turn the coils on the tube neck through 180 degrees or reverse the leads to the coils from the output pair. This reverses the direction of flow through the coils. Assuming the line starts at the top and goes to the bottom vertically, have a smoke, you have done well!!

Starting again, now connect the line scan coils. If no connected during the above we get just a bright dot which travels downwards, so it is really ideal to connect both line and frame coils. The line coils deflect the spot across the tube from left to right, and produce 120 lines approx. If wrongly connected they will scan in the opposite direction, so that the pics. are inside out; writing will appear inside out i.e. letters look the wrong direction. Again easily put right be reversing the scan coil connections on the line side.

The main thing is to concentrate on one section at a time. Forget video till the raster

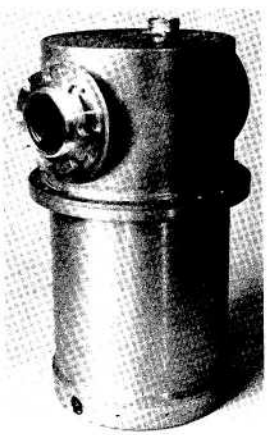
is correct, i.e. scanning from top to bottom framewise, and correct linewise. These wrong connections can easily be recognised. Patterns will not show the line fault up until one has had a fair time on slow scan as with a pattern tapes one without some explanation either verbally or by the written word does not know what to expect. Again, anyone using slow scan will assist or call in on the Sunday net 3725 to 3730 and someone will help.

Slow Scan Television in a Balloon

The University of Tokyo has for the past few years been using slow scan television as a viewfinder for an astronomical telescope carried by a gas-filled balloon. As it is an unmanned system, this viewfinder is an important part of the experiment.

The camera consists basically of a storage type pick-up tube, its attendant electronics, automatic and manual exposure control systems and the output amplifier. The optical system is separate. The specification is as follows:

Active lines per frame	580
Horizontal frequency	325 Hz
Reading period	1.78s
Time between frames	2.09s
Video bandwidth	100 KHz
Pick-up tube	HTV-N337
Dimensions	240mm dia. by 390mm high
Weight	11.3Kg



Camera with 25mm lens.

The image memory tube has a storage electrode with a memory function separate from the image and scanning section. Normal scanning methods are used. Photoelectrons from the photocathode produce an image on the storage mesh electrode behind the image section. An electronic shutter function is built in, with a maximum exposure time of 200uS, to restrict abnormally high voltages which will not form an image.

Automatic exposure time control is operated from a sequence control circuit, where a flip-flop generates a square wave which is applied to the accelerating electrode, thus "opening" the electronic shutter. The emission current from the photocathode charges up an integrator which at a predetermined level stops the flip-flop, "closing" the shutter. A neutral density filter is used to cut down excessive light levels at the lens.

FM modulation of the rf carrier is used, and on the ground the signal is displayed on a slow scan monitor fitted with a motor driven film camera, to record the pictures.

A scan converter has also been developed to allow the pictures to be displayed on a normal monitor or recorded by a VTR. Two memory tubes are used, so that the output video signal is continuous whatever the output of the SSTV camera may be.

SLOW SCAN TELEVISION FROM MARS

A recent article in A5 described how the Viking 6 pictures from Mars were transmitted - or rather retransmitted - on slow scan from the Jet Propulsion Lab. at Pasadena, California in the United States of America.

14.230 was used and the pictures were received by eager SSTVers several days before the news media showed them. This SSTV "first" was the responsibility of N6V, a special station set up for the event, and as can be imagined, considerable interest was shown by the public.

The Artistic Side by J. Brown G3LPB

Following the last C Q - T V article, I have to carry on for just a few words. First, thanks to all who wrote, by now the letters have been answered - and in some cases, samples sent! The comments were varied such as, "very few pay attention to some captions, yet others are excellent. Some of us are not artists and just write on an old postcard". Most were queries where to get certain things.

Some folks use keyboards, as this is the modern (???) way. Some of these are hard to copy, so the keyboards must be in a slightly different key (i.e. different frequency). Anyway, not to start arguments, to work....

1. The magnetic letters referred to are obtained from any good photo store and are marketed by a firm called GRAFOX. These come in sets of white plastic covered metal letters that affix magnetically to a black background plate. Letters, figures and symbols are available in sets of 120.
2. Thin plastic letters in various c lours, (blue, green, red and black), which adhere to almost any surface are also used in photography and sold under the trade name ARROW. For the FSS chaps, these letters will adhere to the c.r.t. face and give very good results either live or recorded.
3. I have also noticed plastic letters with adhesive backs, which could probably be used over and over again. These are dayglo and are marketed under the name GLO NAMES.

The latter two are quite cheap and in fact after use could be thrown away. The magnetic letters are £5 plus a set, but can be used over and over, and can even be washed in detergent to clean them.

So to those who wrote, thanking and enquiring, I say thankyou. Someone said, "We may now see something more than the usual we have seen for a long time".

A. Jaques G3PTD has sent the following notes on the original article, based on his experience of buying dry transfer lettering.

I have been buying these products for lettering my painted equipment panels for some time now, and I find that
(a) Letraset is widely available but is vey difficult to stick to some paint finishes (e.g. brush on hammer finishes) and it seems to age in some way as it lies on the shelf between jobs, so that

after a while it does not seem to work as well.
(b) Letterpress though harder to find is much easier to apply to all painted surfaces. Against this it is also easier to get it on a panel by accident! Also it does not seem to suffer with time like Letraset and is better on glass.
(c)Presletta is a type I have only seen in one shop. I have never been able to get a single letter of this stuff on to paint or glass, though just occasionally part of a letter will stick. At the time of purchase Presletta was only available in black, which does have its uses, but it is amazing how much more often white is required.

Now none of these comments is intended to be derogatory towards these products, which I suspect were never intended for equipment panels anyway. After all, they all work well on paper. It is just that none of them are cheap, so that my experience (and it is only MY experience) could save B.A.T.C. members a little money and quite some frustration.

Though it is true that a letter applied in error can be scratched off, as described by G3LPB, much less risk is presented to the paintwork if the letter is lifted off by rubbing the sticky side of a piece of Sellotape onto it and then peeling off the tape and letter, which will stick to the tape rather than the paint.

EDITORS NOTE This magazine gave up Letraset some time ago due to the aging problem referred to above, and now uses Letterpress. Apart from the problem of very few stockists, this material has proved ideal for the artwork in C Q - T V.

FAX NEWS

Prof. Franco Fanti 14LCF, has produced a booklet containing a description in English and Italian of his fax station. It is available from 14LCF at his own address which is Via A. Dallolio 19, 1-40139 Bologna Italy.

We have just noticed here that the Belgian ATA have appointed a FAX Manager to their committee. His name is John Coppens, his call ON6JC and he can be contacted at ATA's usual address, Oude Brusselsewe -g 119, B - 9219 Gentbrugge, Belgium.

OPTICAL CABLE

Standard Telephones and Cables, who have been manufacturing optical cable for over a year now, have recently opened a complete new factory to produce it in quantity.

The cable, which uses light instead of electicity to conduct information along it, consists of hair-like conductors of silica fibre and the idea was originally a British one, the system being invented by Doctor George Hockham and Doctor Charles Kao.

Cheapness is an advantage of the new cable and research is now going on into the use of lasers for the light source.

Many experimenters are already working on the use of these cables for television, both in single and multicore versions.

TELETEXT

A joint publication by the BBC, IBA and BREMA describes the technical details of the UK Teletext signals transmitted by British tv Stations, and includes a number of recent changes. Enquiries concerning this document which is entitled "Broadcast Teletext Specification" should be addressed to The IBA, Engineering Specification Dept., Crawley Court, Winchester, Hampshire.

The recent changes make the pages of information visually more attractive by the use of double height letters where required,

together with more flexible use of coloured backgrounds. The nominal amplitude of the transmissions has also been reduced from 71% to 66% (of peak white) to help those receivers which are susceptible to inter-carrier buzz.

POSTBAG

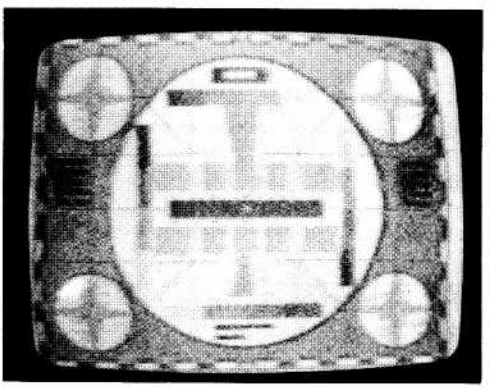
E.W. Mercer whose address is Thaskalki No17 Athens 600, Greece, has built the C Q - T V SPG (using his own pc board layout and a separate IC as the master oscillator) and since it works perfectly, he would like to use it as the basis of an electronic monoscope. He would like to get in touch with any B.A.T.C. members who have any ideas for circuits for generating a castellated border, cross-hatch, circle and multiburst inlay for the circle! Sounds quite a challenge!

Graham Baker ZL1TOF from Auckland, New Zealand writes to say he is thinking about making a colour S.P.G. which doesn't use monostables, as does his present one; meantime he is making 12 inch portable tvs. A current project is a 70cm beacon, in which he doubles from 216 MHz - but can't get it to work using 2N3866s in push pull on 24v. He is in his fifth year of NZCE, and we wish him well in his final exams.

J.E. Brawn of 307 Cromwell Road, Lombardy East, Johannesburg, S.A., has written with an interesting offer to B.A.T.C. members. He has 20 scan and focus coils for 1 inch and ⅔ inch vidicons which he wishes to dispose of as free gifts. He suggests a postage contribution of £3 in cash or goods (such as I.C.s or transistors) and would be willing to hear from anyone interested in an exchange. For customs reasons, any goods will have to be labled "free gifts".

Paul Kaminski GM3PIB would like to hear from someone who built the slow scan tv camera by W7ABW from the Slow Scan Handbook, to compare notes. His address is 5, Tytler St., Forres, Morrayshire, IV36 0EL

Laurie O'Loughlin G8AXC who used to go under the G6AGC/T call, has sent these photos taken by Barrie G8AWN of a transmission over a path of 85 km. Technical details are vestigial sideband, subcarrier audio, CCIR System"I", with
A5 75w input 433.77 MHz
F3 10w input 439.77 MHz
Talkback A3 432.15 MHz



IN THE NEXT C Q - T V

A 70 cm Wideband Pre-Amp.
"Why Lines", a discussion on scanning.
A Simlpe Logitest Unit.

RSGB LECTURE AT THE IEE

This lecture entitled "Image Transmission" took place at Savoy Hill on Tuesday 19th October 1976 before an audience of well over 100 RSGB members and their guests. It was split into two parts, the first by Grant Dixon G6AEC/T on Slow Scan and allied subjects, the second by Mike Bues G6OPB/T on high definition systems.

Grant Dixon with the Slow Scan display

Mike Bues holding a $4\frac{1}{2}$" Image Orthicon.

The Slow Scan system consisted of CCTV vidicon camera running at 625 lines feeding into a scan convertor (as described in B.A.T.C.'s new book "Amateur Television") and an electronic caption generator, with the slow scan output displayed on a home constructed monitor using a 5FP7 tube. As the Faraday room where the lecture was held is very large, another camera was focussed onto the SSTV monitor in order to feed a large projection tv set, so that the audience could see clearly.

For the fast scan demonstration a vidicon camera was fed to a four input A/B mixer, the other inputs being a colour synthesiser, electronic callsign generator and a keyboard caption scanner. The output of the mixer was fed direct to the projection television monitor.

The lecture was very successful and was much enjoyed by the audience. It is hoped to repeat it at the RSGB Convention at Alexandra Palace on the 7th May 1977.

CONTEST RESULTS

1976 INTERNATIONAL ATV CONTEST
11 - 12 Sept

RESULTS (British & German)

SECTION A

1.	DL1LS	3384	19.	DB1SL	600	37.	G6GDR/T	175
2.	DC2FF	3242	20.	DC6VD	567	38.	PA0HKS	158
3.	DJ4LBA	2834	21.	DL9UC	536	39.	G6ALC/T	148
4.	DL9QD	1726	22.	PA0GB	526	40.	G6ALH/T	148
5.	DF2SS	1356	23.	G6AHT/T	495	41.	DL0AK	141
6.	PA0LAM	1316	24.	DB4KKA	472	42.	G6AME/T	114
7.	DK5QI	1292	25.	PA0CMN	425	43.	DC2DR	110
8.	DC6MR	1290	26.	PA0TUJ	412	44.	G6AVF/T	99
9.	DC6VY	1175	27.	PA0BOJ	352	45.	DL8EJ	98
10.	DJ7SX	1124	28.	DK4OU	306	46.	DL7TF	77
11.	DC0NK	1052	29.	G6ANT/T	267	47.	DL0JS	55
12.	DK2DB	986	30.	DB4QM	260	48.	DC9GB	52
13.	DB2YC	900	31.	DF3KC	241	49.	DC2DP	52
14.	PA0GBE	846	32.	DJ0ZL	224	50.	DL2OUA	52
15.	PA0ERW	836	33.	DC6CF	204	51.	DB4ON	38
16.	DK7SN	736	34.	DC6LC	202			
17.	DJ7HJ	658	35.	PA0HMV	186			
18.	PA0JKW	649	36.	DK1AQ	180			

SECTION B

1.	DJ6PI	1698
2.	DB3MH	1698
3.	DC6MY	1698
4.	DJ6TE	615
5.	DC1FM	456

SECTION C

1.	DC0QI	938
2.	DK7GN	374
3.	DK6GI	372
4.	DC9SJ/P	362
5.	DJ4NR/P	55

BEST DX

DC6MR	-	DC6VY	221 km
DL1LS	-	DL9QD	150 km
DK2DB	-	DC2FF	126 km
G6AHT/T	-	G6ANT/P	60 km

CONGRATULATIONS to DL1LS for winning this year's Contest. Please send us details of your QTH and equipment - we would like to see how you did it!

Just to keep the time of year the same, the next Contest will be on September 17th and 18th 1977. Rules will be the same as before.

ATV 70 cm ACTIVITY CONTEST FOR GREAT BRITAIN

January 22nd to 29th 1977.
The same station may be worked each day, but not more than once on each day; i.e. a period of 24 hours must elapse before working a station a second time, to qualify.
One point for each station worked, irrespective of distance; two points for two-way.
BONUS A prize will be awarded for maximum activity. Will all areas try to work new stations by local net, i.e. listen on 2 m, search around, make contact and try a video contact. Ten points bonus for any contact made on 2 m which establishes an atv contact on 70 cm with that station.
Send results to CONTEST ORGANISER whose address is on page 1.

1st ALBATROSS SSTV Contest

September 4/5 1976

F I N A L S C O R E

OM

1) WB5IXK	(214) x / (10x4) + (5x21) /	=	31030
2) W9NTP	(184) x / (10x4) + (5x22) /	=	27600
3) WB5SAJ	(174) x / (10x4) + (5x20) /	=	24360
4) G8PY	(115) x / (10x4) + (5x27) /	=	20125
5) W3LSG	(111) x / (10x4) + (5x20) /	=	15540
6) OH5RM	(72) x / (10x4) + (5x24) /	=	11520
7) G3WW	(62) x / (10x4) + (5x21) /	=	8990
8) I8WAM	(59) x / (10x2) + (5x18) /	=	6.490
9) SM5EEP	(51) x / (10x4) + (5x17) /	=	6.375
10) TA2MM	(50) x / (10x3) + (5x18) /	=	6.000
11) IØPCB	(48) x / (10x3) + (5x18) /	=	5.760
12) DJ2ZG	(71) x / (10x3) + (5x10) /	=	5.680
13) HA5KFZ	(46) x / (10x3) + (5x18) /	=	5.520
14) DL3UH	(32) x / (10x3) + (5x17) /	=	3.680
14) W9HR	(46) x / (10x2) + (5x12) /	=	3.680
15) I1RHB	(29) x / (10x3) + (5x17) /	=	3.335
16) ON5FU	(26) x / (10x3) + (5x19) /	=	3.250
17) OK5ZAS	(25) x / (10x3) + (5x14) /	=	2.500
18) SP3PJ	(24) x / (10x3) + (5x12) /	=	2.160
19) I4CXY	(25) x / (10x3) + (5x9) /	=	1.875
20) I4LRH	(24) x / (10x2) + (5x9) /	=	1.560
21) I1SU	(16) x / (10x3) + (5x12) /	=	1.440
22) DJ6KA	(20) x / (10x2) + (5x10) /	=	1.400
23) I3MIQ	(16) x / (10x2) + (5x10) /	=	1.120
24) JE1WVQ	(8) x / (10x2) + (5x8) /	=	480

S.W.L

1) I1 58509	(34) x / (10x2) + (5x17) /	=	3.570
2) DC3YC	(25) x / (10x1) + (5x10) /	=	1.500
3) ONL 2717	(18) x / (10x2) + (5x10) /	=	1.260
4) I8 64988	(15) x / (10x2) + (5x11) /	=	1.125

5) GM3PIB

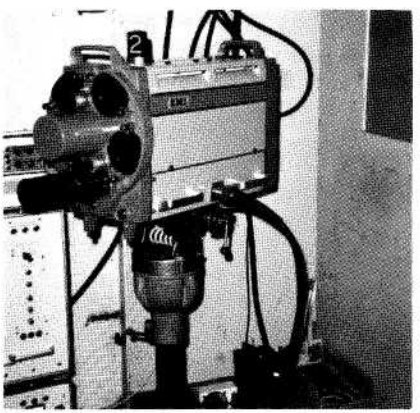
THE B.A.T.C. UK SSTV CONTEST

We regret that due to the holiday period, C Q - T V had to close for press on December 24th, before the last entries for this contest had been received by the Contest Organiser. The results will be printed in the next issue of this magazine, which will be dated May 1977.

EDITOR'S NOTE

The close for press dates for C Q - T V for the rest of 1977 are as below. I would be very grateful if Contributers could send me their material in good time, as this allows the magazine to be prepared slowly, thus reducing the number of mistakes which always creep in when one is rushed.

C Q - T V No 98 closes for press on April 1st
C Q - T V No 99 closes for press on July 1st
C Q - T V No100 closes for press on Sept 30th
C Q - T V No101 closes for press on Dec 30th



An Image Orthicon camera rebuilt by Brian Summers

ADVERTS

Advertisements are inserted in C Q - T V on the understanding that the advertisers comply with the Law and accept responsibility for their wording. They must also undertake to reply to all those who send a stamped addressed envelope.

B.A.T.C. EQUIPMENT REGISTRY exists to help members of the Club who have equipment for disposal, or who want to purchase some specific item. Send a list of your "wants" & "disposals" to the address on page 1. During the six months for which your application is valid, the Registry will attempt to put you in touch with someone who will buy your surplus or sell you your needs.

WANTED

Tube type 2F21 or equivalent for Marconi monoscope.
405 line VTR.
Mark Killingback
2 Danby Close
Eaton Rise
Norwich
NR4 6RH

FOR SALE

SSTV pattern generator printed circuit board, drilled and roller tinned, supplied with data sheets £3.50 post paid.
(This generator provides the three standard frequencies, 2300, 1500 & 1200 Hz; white raster, black raster, chessboard, 4 & 8 step grey scales)
M. E. Dixon
Kyrles Cross
Peterstow
Ross on Wye
Herefordshire
HR9 6LD

FOR SALE

Marconi Mk 3 camera channel, complete and working. Anyone interested please phone Brian Summers on Gainsborough 2802 or 3940

EXCHANGE

Three RCA Vidicons unused 1" type, will exchange for anything interesting. Would like back numbers of C Q - T V.
J. Brown
1 Silverdale Road
Falmouth
Cornwall
TR11 4HW

Club Sales Price List

			Price	Post & Packing
Camera tubes ½" 9777 E.M.I. Ebitron			£28.00	nil
1" P849	English Electric	Amateur Grade	£11.55	nil
9677	E.M.I.	Amateur Grade	£11.00	nil
9728	E.M.I.	Amateur Grade	£11.00	nil
⅔" 9831	E.M.I.	Amateur Grade	£11.00	nil
4½" Image Orthicons E.M.I. 9565			£10.00	for two buyer collects
Coils 1" B.A.T.C. coils			£11.50	48p
⅔" E.M.I. coils			£11.50	48p
Paxolin vidicon sockets			.20p	8p
C mount for lens			.50p	10p
Lapel Badges			40p	8p
Adhesive Badges			.15p	8p
Paper and envelopes (50 sheets)			£ 1.30	
Reporting Charts			. 6p	8p
EEV Camera Chart			£ 1.65	30p
B.A.T.C. Test card			.50p	10p
Film strips of past CQ-TVs			£1.20	10p
Windscreen Stickers			. 6p	8p
CQ-TV SPG printed circuit boards ready drilled			£ 3.00	10p
CQ-TV SPG genlock pc boards ready drilled			£ 3.00	10p

Rapidly increasing postal charges have compelled us to quote the above post and packing charges. Will oversead members please ask for a quotation before sending cash. Obviously for small items such as lapel badges, adhesive emblems, windscreen stickers etc. one can send several items for the same price as one - please try and estimate the right amount. Our thanks go to those members who estimate on the high side and suggest that any balance can be put to club funds.

Please send orders to C.G. Dixon(B.A.T.C. Club Sales)
"Kyrles Cross"
Peterstow,
Ross-on-Wye, Herefordshire.

CLUB PUBLICATIONS

This is a separate department of the Club, do not send orders for publication to Club Sales, send orders to B.A.T.C. Publications
64 Showell Lane
Penn
Wolverhampton
Staffordshire.

Slow Scan Television by B. J. Arnold G3RHI published by B.A.T.C. 2nd edition. 35p + 8p p&p

A Guide to Amateur Television published by B.A.T.C. Price(post-paid) £1.25 to members and £1.75 to non-members. Overseas postage rates on request.

C Q - T V back issues are post free in U.K. Currently available Nos 66-71 & 73-92 25p each, current, (93 onwards) 50p.

Any article which has appeared in C Q - T V can be supplied in photo copy form at 5p per sheet. (One sheet will reproduce any two facing pages of the magazine.) A list of all the main articles which have appeared in C Q - T V giving details of how many sheets are required to reproduce it is also available on request. Please send a 9" x ⅓" s.a.e. when using this service.

PLEASE NOTE THIS LIST CANCELS ALL OTHERS

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