CQ TV

64

THE BRITISH AMATEUR TELEVISION CLUB

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EDITORIAL

There was a time in the early days of amateur radio, when the pundits said wavelengths shorter than 200 metres were useless for practical communication. so they were given to the amateurs.

They, always willing to have a go, soon proved this theory wrong. with two results. One is the present network of worldwide communication; the other, that amateurs were squeezed into narrow congested bands, which would be lost altogether were it not for the endless vigilance of the IARU and the National Societies.

Decades later, when amateur TV became possible, the authorities in Britain issued a handsome slice of what was then the almost unexplored U.H.F. spectrum. Again, we pioneered opening these frequencies for both TV and communication.

But, times have changed; TV, represented by a single Band I station when our licence was first granted, has filled Bands 1 and III and is rapidly occupying Bands IV and V higher in frequency than our 70 cm. band, once the outpost at the top of the spectrum. To this must be added the great expansion of business radio, links, telemetry and other commercial and Government services, all making ever greater demands for space, and looking with envy at our allocation. Indeed, already the segment from 425-427 MHz has been lost.

It is, therefore, high time that we Amateurs took a good look at the use we are making of the band, for we may be certain that the commercial interests will not be slow in suggesting that they could put all or part of it to better use.

Your Committee, working in close co-operation with the RSGB as the National Society has prepared a submission to be used if necessary, making our claims both in terms of technical achievement and band occupation. This has not only been based on the present state of the art. but makes proper allowance for the full development of our hobby into such fields as 625-line transmission and colour.

We should, however, also consider what you, the individual members, can do. Here are some suggestions:

1. If you are able to come on the air with TV, try to do so as often as possible. Also, please keep the secretaries informed of any regular TV skeds and transmissions in your area; such information will be of great value.

2. If you are not yet Rf-minded, why not put up an aerial and fit a converter in front of your TV set? You will be surprised at what you may see, and a few more 'viewers' are a great encouragement to the transmitting stations.

3. Amateur TV, having (up 'till now, at least) plenty of MHz to use, has invariably employed a straightforward double sideband transmission. It would be, however, hard to justify the continuation of this if bandwidth becomes scarce especially when 625 is used. How about some of you Rf wizards designing some simple but effective vestigial sideband filters for 70 cm., and of course an amateur sideband analyser to enable the system to be set up? Who will be first to publish in CQ-TV?

In conclusion. the enthusiasm of British amateurs aided by the enlightened policy of our authorities enabled amateur TV to start first in the UK, and to have developed to a state which is the envy of many of our overseas colleagues. Therefore, let us make a real effort now not only to defend what we have already built up, but to create the network of amateur TV communication which our present chain of stations, aided by the ever-improving state of the technical art, will enable us to produce.

If you only received three CQTV's last year instead of three, you didn't miss one; we just didn't produce it.

There are two reasons for this - the first, of course, is money; and the second is that there is no point in printing a magazine without plenty of interesting articles.

And you can provide the answers to both these problems.

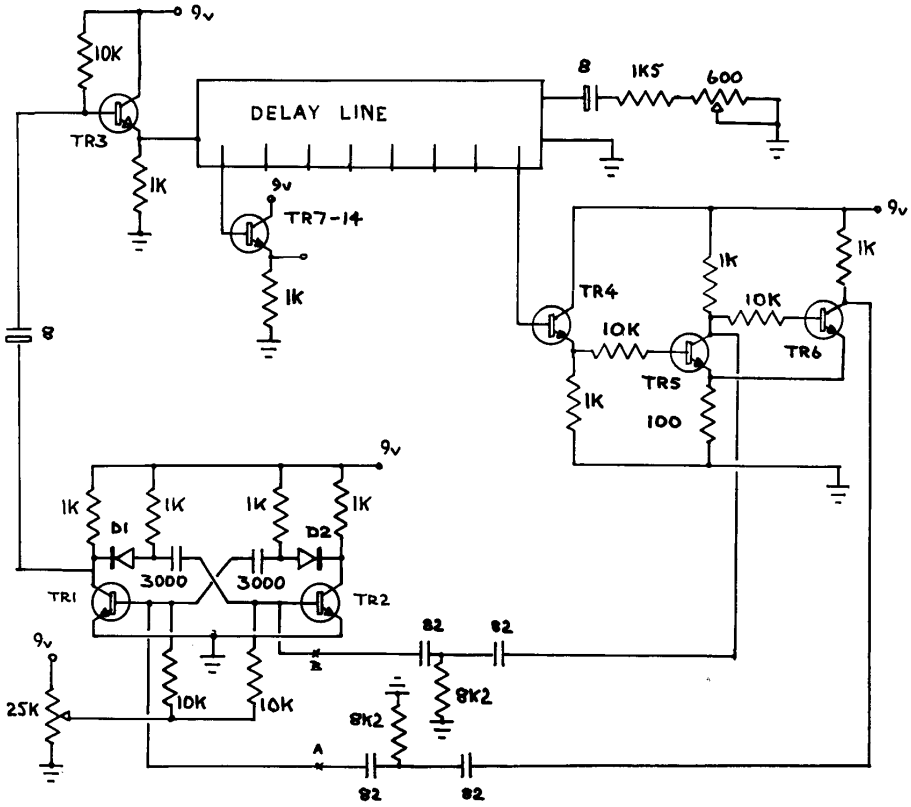
Printing costs have risen so much that we have great difficulty fitting into our budget. We are thinking of increasing the club subscription but, if you have an alternative suggestion, let us know.

The second point is material for the magazine Some members complain that we do not print enough about what the other man is doing. But if you don't let us know what you are up to, we can't print it. How about it?

S. P. G.s
AGAIN

A Master.Oscillator and
Edge Timings Generator
By: Tony Pattinson

It was intended that this circuit would be merely an edge-timing generator for a 625 line interlaced pulse generator which is being built, and that the master-oscillator would be "something else" with vague thoughts of expensive twice-line frequency crystals etc. Whilst playing with the circuit on a double beam scope some interesting phase inversions were noticed, which prompted the development of the oscillator circuit. Whilst not as stable as a crystal, it does two jobs at once. The first "lash-up" drifted about 10 cycles in four hours whilst rolling about the bench.



TR1 and TR2 form an astable multivibrator whose free-running frequency of about 29 Kc/s is set by RV1, D1, D2, R3,R4 ensure good pulse wave forms at TR1 and TR2 collectors.(rise-time about 200 n/s)

The pulses produced at TR1 collector are fed via the delay line into emitter-follower TR3, which is terminated in approximately 2K by RV2 and R5.

Edge timings are obtained from 7 emitter-followers TR7--TR14 which are fed from appropriate points on the delay line. TR5 and TR6 are inverting clippers, each coupled to a differentiating network.

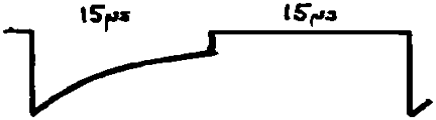
As transistor emitter-followers do not provide a high degree of isolation and because the pulses lose their shape after travelling down the delay line, it is suggested that each emitter-follower be fed into a transistor clipper similar to TR5, which could also form part of the gate circuits.

The operation of the master oscillator is as follows:

Assume a positive trigger at A. This produces a -ve edge at TR1 collector which is transferred via TR3 to the delay line and appears at TR4 emitter 15us later. This is inverted by TR5 producing a positive trigger at B, which turns TR2 on prematurely, and by regenerative action, produces a +ve edge at TR1 collector. This is passed down the delay line and appears 15us later at TR5 base, producing a -ve trigger at B and a positive trigger at A. Thus the cycle repeats itself at a rate determined by the delay network.

No attempt has been made to remove the -ve spikes occurring at A and B as these occur at precisely the right moment to assist the switching by turning off the opposite transistor to that which is being turned on.

The frequency of the astable multivibrator in not critical as long as it is being reliably triggered. The base wave form should be:



The purpose of the astable multivibrator is purely to prevent operation at multiples of 31250 Hz and should not have any noticeable effect on the timings if the circuit is operating correctly. The circuit shown below will produce the name output but has a tendency to "take off" at 3 times the normal operating frequency if shocked by interference pulses in the delay line -indeed it is necessary to put some sort of disturbance into the circuit for it to start in the first place. It would be a good precaution to screen the delay line in any case as such a large amount of wire invites interference.

The transistor used are fairly fast silicon NPNs of unknown origin but something similar to 2N706A or 2N2926 would be satisfactory.

IMPORTANT ANNOUNCEMENTS

The provisional date for the next Convention is in October. Note it down in your diary now, and you won't forget.

Please note that the Club is no longer able to supply vidicon yokes until further notice. Vidicon bases are still available at five shillings, "C" mounts at 8s. 6d., and equipment badges at 1s. Orders for these and for reject vidicons at £10 to the Hon. Secretary.

Gordon Sharpley will be organising a "Northern Convention" in the first half of the year. Further details later.

AMATEUR TELEVISION TRANSMISSION TECHNIQUES

In view of the large number of members who have or are about to embark upon TV transmission, we are printing this reply to an enquiry received from a member. The reply outlines the requirements and some of the problems associated with TV transmission, as well as giving one or two hints and tips derived from the long experience built up by our Chairman.

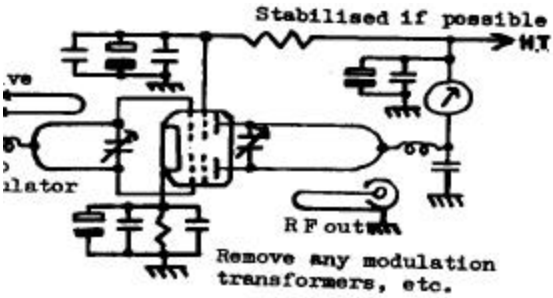
Dear OM,

1. Don't try and use the modulated Rf output of your Grundig camera. If it has a video output use that; if it has not, take the video signal in the camera prior to the modulator stage and feed it out via a cathode or emitter follower to the modulator which I will now describe. The video output should be a composite (i.e. with sync. added) video signal of 1.0 v. peak-peak into 75 ohms. white positive. It should look something like this on your 'scope.

Such a standard video signal is essential before proceeding further.

2. I assume your 2 metre TX works OK on cw (or 'phone). For TV it is necessary that the final is an amplifier not a multiplier. You will only need to drive a PA into class 'B' not class 'C', so put a variable screen voltage on the penultimate stage, or provide some other means to reduce and adjust the drive. Also, for TV work, it is necessary to couple the aerial feed tighter than the optimum adjustment for maximum output on phone. This is necessary to get optimum linearity on the TV waveform. I should, therefore, make the output coupling easily adjustable.

3. You have to remember that a modulated TV PA is a video amplifier an well an an Rf amplifier. For this reason, all the decouplings must be suitable for video (i.e. DC up to. say, 5 MHz) as well an being good at carrier frequency. You will therefore, need , say , 1000 Pf for Rf, plus about 100uF in parallel with a 0.1.uF for video on all points that are decoupled, i.e. Cathode if not directly earthed, screen, and anode feeds. Modulation will take place on grid 1.



4. Now, the grid modulator itself. This can vary considerably in complexity, so we will start with a simple one. But it can easily be made to cater for 'phone as well. Points you should note are:

a) It is suitable for negative modulation i.e. as normally used with 625 lines (CCIR system).

b) The valves are V1, V2, EF91 or any similar small pentode. V3, V4, 6CH6, EL86, EL41, EF55, etc.

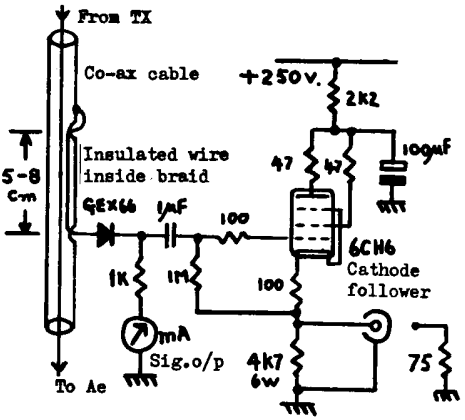
c) You should adjust the value 'R' to give a standing current of about 10 mA in V5 when the correct bias point on the PA has been found by adjustment of 'black level'.

d) The +250 v. line should be stabilised if possible.

e) The capacitors shown dotted in cathodes of V1, V2, V3 can be added about 100 pf to improve fine definition or high frequency response. Adjust by observing demodulated picture.

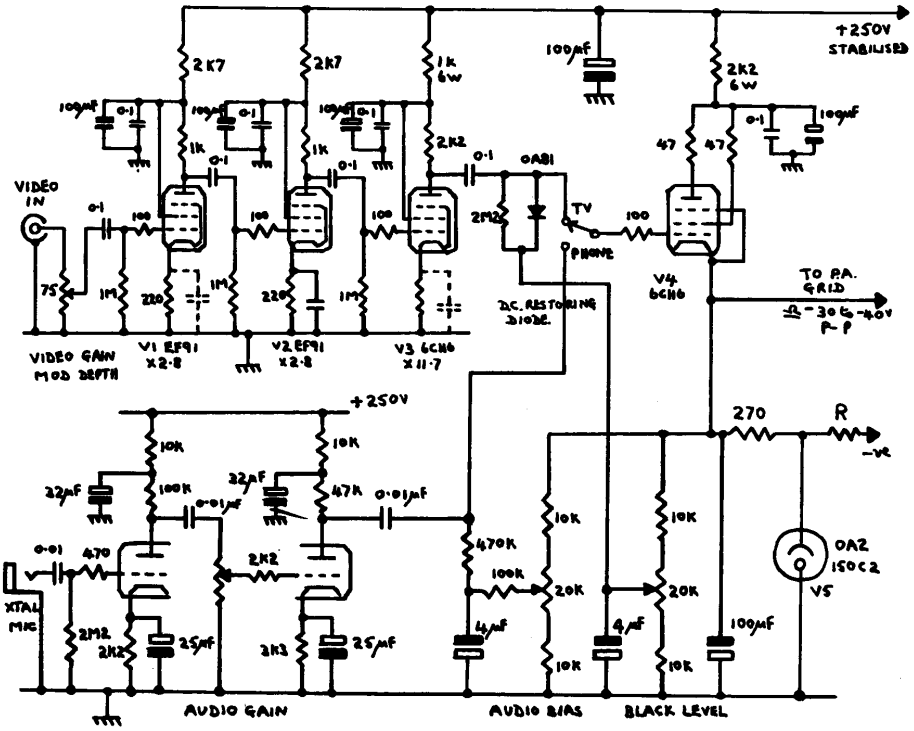
f) The PA will require about -30 to -40 v. DC on its grid and about *30 - 40* v. pp video (or Audio). The DC is set by the black level (or audio bias) control, and the amplitude of the signal by the video and audio gain controls respectively. Note, once set, the bias will remain right for each mode when switching over.

5. Monitoring - a good system of monitoring the outgoing waveform is quite essential. Without it, you could not set up the TX. For this, you require:



The output from this is a video signal of 1.0 v. pp into a 75 ohm termination. It can be displayed on a picture monitor and/or a scope.

Continued on next page



6. Adjustment:

a) 'With modulator on and TX off. Check that you can adjust the PA grid voltage (totally dependent on the modulator since, even with TX drive on, there should be virtually no grid current drawn) between about -10 v. and -60 v.

b) Set to, say, -20 v. on grid of PA. Switch on TX and tune up for max. Rf out. as indicated by probe meter in feeder. Adjust PA tuning and ae. coupling for max.

c) Observe 'scope connected to probe output. There should be no signal. If there is ac hum there, it should be traced. i.e.Hum on TX, HT, etc.

d) Turn up video gain and adjust together video gain, black level, Rf drive. PA tuning, and ae. coupling to give maximum output as seen on scope and maximum Rf indication on probe meter, without exceeding valve rating (or licence). Watch PA Ia. meter for this. You will find with the 'black level' turned too high you will have more Rf but will tend to clip off the tips of the sync pulses. With 'black level' too low you will clip peak white. With too much 'video gain' you may clip both extremities.

e) Set up audio functions in a similar way to give maximum signal balanced about its mean value without undue clipping at either end.

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adverts

FOR SALE:-

Pye 3" IO camera control unit with 9” picture and 3" wfm monitor, needs line o/p trans. Good basis for CCU. As new. £6

Marconi Mk.III picture, wfm monitor, camera control unit with ½ amp 250 v. Marconi PSU. Working only need g Mk.III camera! £15

F & E heavy duty, i.e. full size. pan. tilt head, tripod. Has wedge fitting for your Mk.III, Mk.VII, or what have you! £4

14" high grade picture monitor Marconi BD819. Real ton-up monitor, focus mod. clamps.etc. £6

Load of parts for Mk.III 3" image orth. camera. Scan chassis, EHT genr., head amp., yoke. etc. £8

Pye VDA and PSU 4-o/p into 75 £3

Would prefer buyers to collect, or could come to some arrangement if not too far away.

Please write to:-

G.L. Sharpley, 51 Ambleside Road, Flixton, Urmston. Lancs.

FOR SALE:

G6LYF/T has some R.F. Video and Audio equipment for sale. A list is available in return for a s.a.e. to: Erchwon, Vicarage Road, Stoke Gabriel, Totnes, S. Devon.

Does anybody want two large, heavy 35 mm. Telecine Units? If so, please contact either of the Hon. Secretaries.

Dave Mann. G6OUO/T recently had a contact with G3MPS, Dave Pack, in Bridgewater, Somerset. Dave Pack is now licenced G6ADC/T and transmits on 432.37 MHz. He has constructed the Mike Cox S.P.G. for 405 lines, the transistor modulator and off air probe, all from CQ-TV. He uses 4CX250B P.A. His camera is a vidicon and has separate C.C.U. This is made from a combination of various circuits. Dave Pack's local stations are GW6OAJ/T, GW8AUY and GW8ASA, and G4LW, all of which can receive his pictures, and most of them are building equipment to transmit TV as well.

He is often S9++ in Wembley, London, so a TV contact should be possible some time when conditions are favourable.

G8AEN and G3NNW now have slow scan TV licences.

Helpful Hint

Zener diodes are subjected to considerable temperature variations in use, and thus the best performance is obtained from a zener with a low temperature coefficient. The lowest values of this are generally found in zeners in the range 6.4 to 6.8 volts.

AMATEUR TV

IN BRISTOL

The best sort of publicity which the club can get is an "over the air" demonstration of amateur TV to as big a gathering of the public as possible, and Les Huntley G6ACY/T, together with Cyril Chivers. are two more stalwarts to do this successfully.

A radio show at Trowbridge Town Hall last November was the opportunity, when G6ACY/T transmitted from his home on a Wednesday evening to an enthusiastic audience - in spite of competition from colour TV and the fact that the station was not really complete, and the original intention to transmit sound as well could not be realised.

The after-effects of the display were some very complimentary write-ups in the local press and an appearance on broadcast TV. The Bristol Evening Post put a photo of Les Huntley in the shack, together with a headline and article, on their front page, and the Wiltshire Times printed photos and articles in three consecutive issues. But, best of all,,BBC TV's "Points West" sent cameras and reporter John Newman to interview Les in the shack and so the BATC message must have got across to a tremendous number of people.

G6ACY/T has been building his equipment for some time now, most of his test transmissions being to Cyril Chivers who lives nearby. Pictures have, however, been received in Bridgewater. The aerial is rotatable and pictures ooze from a self-designed and built flying spot scanner and a N.E.V. vidicon camera; the latter can be used for slide or cine film display as well as producing live pictures. A converted domestic receiver is used as a monitor.

Full marks to you both for your efforts.

postbag

Peter Hayes - GM6RAO/T - of 24 Manor Place, Cults, Aberdeen is in need of some projection TV gear (tubes, yokes and optics) and would like to hear from readers with any for disposal.

His current equipment includes an S.P.G., which produces pulses on 405, 525, 625 and 1215 lines! The latter is for high definition work which Peter is using for astronomy.

A. Ciric of 20 Uplands Avenue, Werrington, Stoke on Trent, Staffordshire, possesses a P811 4½ inch image orthicon tube which he wishes to dispose of. Any offers to him.

Mike Barlow writes to tell about activity in Canada. Bill Still, having finished with EXPO. 67, was busy deciding whether to move to the Bahamas or the far north! Mike. who has been recently elected a Fellow of the SMPTE - congratulations! suggests that some BATC members might try to develop a system for multiplexing sound and vision on the same cable. How about it, someone?

Capt. J.A. Cusdin from Eastbourne wrote to us about our note in the last issue about using 2k2 etc., agreeing but making another suggestion. That is, to lose the f in pf and uf. Well, we'll try that, too, to see that you think of it.

Ian Hamill G6ACT/T of Barking Essex 70cm Tx. QQVO3-20 triper into QQVO6-40 P.A. feeding 64 element stack, Rx 2 AF139 pre-amps into modified UHF tuner into Baird T.V. an a monitor. Camera under construction using B.A.T.C. bits and sep. mesh-vidicon. The Tx is as R.S.G.B. handbook except P.A. lines had to be shortened to 5½"!! But works very well.

RSGB

EXHIBITION

The BATC was well represented at this year's R.S.G.B. International Radio Engineering and Communications Exhibition at the Royal Horticultural Society's New Hall. The main attraction was off air BBC-2 colour pictures shown on home-built equipment. This equipment consisted of a colour monitor which could be fed from an external decoder, or from a homebuilt colour bar generator on the stand. The video distribution was rather unusual, as the colour monitor was fed with seperate syncs, luminance and colour difference signals instead of the normal R.G.B. method. The colour bar generator contained its own matrixing unit to obtain colour difference signals. Having a separate feed of luminance meant that monochrome monitors could be fed with the luminance component of the colour signals. They were also fed with pictures from the transistorised camera on the top of the stand. This high-quality camera was mounted on a remote control pan and tilt head which was controlled from a panel on the front of the stand. This unit, which was made by Bob Tebbutt, enabled the camera to pan, tilt and zoom remotely, and was very popular with the visitors to the stands, who were allowed to operate it for themselves. The 10:1 zoom lens on the camera enabled it to cover the whole length of the exhibition hall.

The camera was also used to produce captions, and simple "colour synthesizing" was obtained by switching off different guns on the colour monitor.

Synchronising pulses were provided for the stand from a sync pulse generator by Bob Tebbutt, which also included various test patterns such as Colour Bars and grill. A switching unit network was also included in this unit, which enabled signals to be switched to the colour monitor or to any of the four monochrome monitors, as required.

Also on the stand was a 70 cm. receiver to demonstrate amateur transmissions to the public. Pictures were transmitted from Alan Bird, G6AAQ/T, at Wembley.

We were pleased to see many BATC members at the exhibition, and we would like to thank those who manned the stand during the week; in particular Alan Bird. Bob Tebbutt, David Cottrell and Joe Kasser. Our thanks also to those who gave up an hour or two of their time to help on the stand during their visit to the show. These included Martin Bressant, Don Reid, Malcolm Sparrow, Dave Mann, John Tanners, and many others.

This exhibition should be considered a big success for the BATC, and much interest was shown by visitors. Fortunately, all of the equipment lasted the week, with the occurence of only a few minor faults.

ANOTHER U.K. RECORD

These photographs show what can be achieved during an opening on 70cms.

The photograph was taken by G6OUO/T at Wembley Park Middlesex at 3p.m. on the llth November last of a transmission by G6ILD/T of Heighlington, Co. Durham (just north of Darlington).

At an atmospheric pressure of 1030 millibars the temperature was freezing and the distance covered was 216 miles.

The unusual thing about this contact was that it took place in the afternoon; normally conditions only peak up in the late evening.

This is probably a UK record for amateur T.V. reception.

On the 23rd November at about 10p.m. Mike Bues G6OPB/T transmitted vision to G3ILD who lives 6 miles north of Darlington in County Durham. The path between them was capable of a two way vision QSO although it was only used from G6OPB/T to G3ILT This picture shows the G60PB/T caption as received at G3ILD

FOR SALE

5" C.R.T. DISPLAY UNITS. - Complete with 5CP1, EHT supply, 'Y' amplifiers. 'X' amplifier but no time base. In a cabinet.

14" C.R.T. DISPLAY UNITS - Complete with 14" rectangular C.R.T., magnetic deflection EHT generator, 'Y' amplifier, 'X' amplifier. but no time base. Ideal for conversion to a video monitor.

STABILISED POWER SUPPLIES - 240 VAC input, outputs 180-220v at 100 mA DC, Various L.T. outputs.

U.H.F. SWEEP GENERATORS - 470-890 Mc/s 50mV output. Stabilised power supply, twin levelling amplifiers, synchronous motor/variable capacitance sweep. 'Wrap around' modern perforated type cabinet, motor cost £15 when new.

WIDE BAND L.F.AMPLIFIERS. 25-40 Mc/s ± 1.0 dB 26dB gain. A.F. amplifier/ cathode follower output. No power supply. NEW T.V. CRT's - 19", 21", 23", 17".

Vidicon camera chain complete with PSU, vidicon lens and camera cable. 405 lines. £12 ono

Two EMI type I 405 line monitors in working order, good tubes £10 each.

Complete SPG 405 line, transistorised, with Xtal and ring counter dividers. Not set up, PC construction, no cabinet. £5 ono

Unused set of BATC vidicon deflection coils, tube base and target shield £4.10.0d ono.

Two sets of 4 industrial castors mounted on frames suitable for camera dolly.£1 per set

Masses of components, transistors, valves, diodes, relays, cabinets, wobbulators, SPSU's transformers.

4x150's 2C39's 15/- each 12/6 pp.

Please contact Trevor Wiltshire, G8AKA at 12, Leslie Road, Winton, Bournemouth.

FOR SALE

EMI Type 8 Vidicon Camera £8.

27" Colour T.V. Monitor (requires attention) £50

Dave Mann G6QUO/T 67, West Hill, Wembley Park, Middlesex.

One of our founder members, Mike Barlow has been elected to Follow of the Society of Motion Pictures and Television Engineers. This was announced at the 102nd Technical Conference at Chicago.

Congratulations Mike.

PYE TVT Limited of Cambridge, leading manufacturers of television and sound broadcasting, and closed circuit tv equipment invite keen engineers to join their team working on the development, test and installation of a wide range of products, including:

* VHF and UHF television transmitters and translators from 1W to 50 kW

* Vision and sound studio equipment of all types

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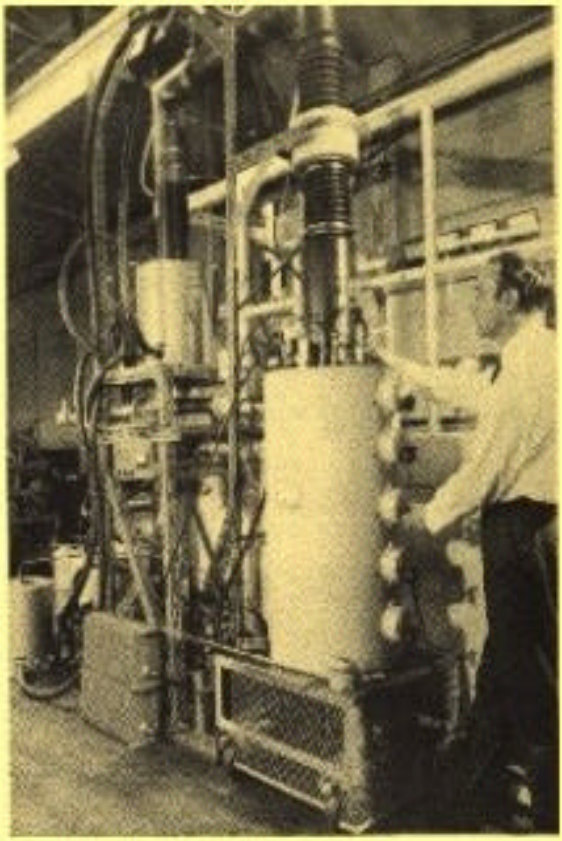

The PYE laboratories and factories are in Cambridge, a go-ahead city of immense life and variety, where many activities organised by the university are open to the public.

Furthermore, Cambridge is the centre of an enthusiastic amateur tv net.

Interested? Then write for an appointment to visit and see for yourself.

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