

# My friend Jim

Les Lawry-Johns

I've known Jim for a good few years now. He's in the trade and often pops in to buy some bits and pieces he needs and hasn't got in stock. Usually my last G8 line output transformer or 9000 tripler – you know, the kinds of things you're going to need during the next minute or so. He's not all that interested in servicing however. His main interest seems to be in building. The upshot is that whenever he gets a set he doesn't like the look of he'll bring it along with a comment like "have a look at this for me old chap, only I've got a floor up and really must fix it before the wife comes home". And off he goes leaving me with a bitch of a job.

## The Thorn 9600

He carted this Ferguson 9600 in and left it with me. The 2.5AT mains fuse had blown in a nasty way so I went straight for the filter capacitor, which was innocent. Next the bridge rectifier, which was short-circuit. So I whistled a happy tune as I replaced it, stuck a new fuse in and switched on. There was the usual pause, then it started up normally. A white line appeared across the screen so I checked the supply to the field timebase and then the output transistors. These were all o.k. It wasn't until I turned to the line/field oscillator subpanel on the right-hand side that I found a BC147 transistor (VT402) open-circuit.

With this replaced we had full scan, quite a nice picture and loud, clear sound. I then remembered something else Jim had said. Apparently the set often worked all right for some ten minutes or so and then tripped out. I left it on for some time and sure enough it suddenly gave a few gulps and went into a strike situation. I noticed that just before it did this the sound went down. So with enormous presence of mind I removed the 500mA fuse (F513) in the supply to the audio panel. The set then came on when asked to and apparently stayed on.

I removed the left-hand side audio panel and checked each transistor separately. They all proclaimed their innocence of course. The output pair were on heatsinks but the driver wasn't, so bearing in mind the loss of volume before the set tripped I reasoned (wrongly of course) that the driver could well be at fault. This is a BD386, which I didn't have in stock. I put in a BD204 instead, confident that it wouldn't give in easily. Quite right, it didn't. The set behaved happily for an hour or so then Jim came in to collect it.

## Jim's Return

Within the hour Jim was back with it. "Tripped after ten minutes" he said. So I removed the audio panel and left the set on without it. After half an hour it tripped. Back went the audio panel and the set played away happily enough for quite some time. Then the sound decreased and off it went into sullen silence. Everything shut down except the supply to the chopper circuit. I checked everything in sight and out of sight. Then I started to think.

The sound went down before the set tripped, and the

fault wasn't in the audio panel. So I removed the 500mA fuse F511 in the feed to the 24V regulator. This upset the field timebase but the set didn't trip. To cut a long story short, it wasn't until I removed the supply to IC2 (MC1358P) on the signals panel that the tripping stopped. When this i.c. was replaced our troubles were over. The intercarrier sound and audio preamplifier chip for heaven's sake. What next? Jim then came to collect the set.

## The GEC-Hitachi

An hour later he was back again. This time however he didn't lug in the Thorn. Oh no! That was just a forgotten incident now. This time he had a GEC set we didn't recognise. It was a C2265 (Hitachi NP81CQ chassis) and it took me some time to realise that what I took to be a chopper transistor was in fact a chopper i.c. (IC901, STR441). So I studied the notes in the manual, hoping to get a clue as to how to start the thing up. They did provide a lead, and when I put the meter on R605/6 in the chopper feedback line the set sprang to life. It frightened the life out of me because the sound had been left turned fully up. I turned it down and switched off. When I switched on again the set remained dead until I prodded around the feedback network – the chopper is a sort of blocking oscillator arrangement. The set then came to life. Until the meter probe slipped. There was a nasty flash and the 2.5AT mains fuse disintegrated. "Oh dear" I said.

Like a fool, I put another fuse in and tried again. FLASH! I checked the strange STR441 and found it short-circuit. So I ordered one and got it (along with some other things) next day. I fitted the three-legged device and bravely switched on. The fault was still there. I checked each item in the feedback network and they all read right. I then took them out to make sure. They were all right, so I put them back again and after that the set performed perfectly. Just another dry-joint? Must have been, but it certainly didn't show.

## Thanks Frank

On the subject of GEC I must pass on a message of thanks from several of my trade friends who have had cause to be grateful to Frank Pretty of the GEC technical advice department. He's been most helpful to all who have phoned asking for advice and have received more than they hoped for. I haven't had the pleasure of talking to Frank yet, but I very nearly did over the C2265.

## The Passing of Ben

You no doubt remember me chattering about our dog and cat (and bird). Well Ben isn't with us any more and we do miss him. Spock seems to complain all day long, loudly. Ben lost the use of his back legs and was unable to digest his food. He passed away peacefully but still seems to be around. Thanks Ben. I do wish that cat would shut up.

# Another Smash Hit

Les Lawry-Johns

After another long and weary day of mending TVs then watching TV in the evening we at last got to bed and dropped off into a deep sleep. We were awakened at one o'clock in the morning by a loud crash. I leapt out of bed and rushed down the stairs shouting at the top of my voice, informing the window smashers that they were born of unmarried parents. Such was the speed of my descent (naked as usual) that the smashers fled before taking a thing. I was hardly in a fit state to run out into the street so, after taking note of which window had been smashed, I ran back upstairs to pull my trousers on (having rung the police). There followed the usual clearing up operation, which was especially hard on Honey Bunch because she'd worked so well and long decorating the windows with Christmas decorations. They'd looked nice, very very nice.

We cleared up the mess and boarded the window (the small one this time), had a cup of tea and returned to bed, laying awake for a long time as we half expected another crash. I was plotting ways of laying a grid inside the windows connected to a 25kV e.h.t. supply. Something less I decided, in case I should hurt myself. Why anyone finds it worthwhile smashing the windows beats me: we always take the expensive bits out every night. They must do it for fun. So the grids will go up. I wonder whether that will stop them? Somehow I doubt it.

## That Evening

We felt a bit depressed the following evening so we went next door to the Coach and Horses for a drink. Sylvia the landlady served us and she and HB chatted for a while about knitting patterns. Then HB went over to the fruit machine and lost some money while dreaming about making some. I sat at the bar and dreamed, waking with a start as I heard myself snoring. Just then Tony walked in. He's an avid reader of this magazine and has been for some years.

"You're slipping Les" he greeted me. I sat up straight and wiped the sleep from my eyes. "no you fool, not off your stool, I mean your articles are getting a bit dreary. You've lost your zest, your get up and go if you know what I mean."

I nodded miserably. "I know what you mean Tony. My get up went down and my go just went – some time ago. Sorry, very sorry."

Tony looked a bit mystified, then tried again. "No Les, we know you're getting on a bit and probably feel a bit jaded. But it used to be fun reading your adventure stories – how you won the Battle of Britain single handed, how you fought the Red Baron in the first war when he said your Camel was sippy, how you passed wind through the Great Wall of China. We never have any of that old tripe now. What's happened?"

"Well the editor didn't think he should print the last one about when we got lost up the Yukon and bumped into Eskimo Nell. He said it was too rude and I think he was right. I mean who wants to read what Dead Eye Dick had in his hand?" Tony gave a cough and turned away as

Sylvia approached with the drinks. Sylvia doesn't like naughty songs and always looks daggers at me when I start to sing the Lobster Song. We all have to be on our best behaviour when Sylv's around. That's why Dave sends her upstairs sometimes, when the boys start telling each others' fortunes.

So we had a couple and called it a day, HB having scooped up all our change and bunged it back into the machine that kept telling her to leave the combinations to it to decide. But she wouldn't listen.

## Next Day

Next day there was a long procession of idiots who each knew exactly what was wrong with their sets and didn't like it when I told them they were wrong. One chap said his fuse had gone. I spent some time proving that it was the line output transformer that was blowing the 800mA fuse in his G8, then he said he didn't want it done anyway. I helped him out with the set and he then turned and said he felt he should give me something for my trouble. So he pulled this orange out of his pocket and handed it to me. I gave it back saying I don't like oranges. Then he pulled this ten penny piece out. I told him to b...r off. Is it any wonder I get dispirited at times?

Look what happened when a chap brought in his ITT CVC9 (20in. version). He complained about the focusing and said he thought it was the tube. I chided him for thinking such a thing. "The smaller 20 and 22in. tubes in these sets last forever." I mean, just everyone knows that the resistors in the focus network change value and that if it isn't the one on the tube base it's one of the 4.7M $\Omega$  ones in series with the focus control. So I checked the 2.2M $\Omega$  resistor on the tube base panel and it was all right. I took off the line output stage cover and checked the two 4.7M $\Omega$  resistors. They were all right. So I changed the focus VDR itself and the decoupling capacitor for good measure. No change. I thought the resistors could be telling lies so I fitted some new ones. All to no avail and the voltage was spot on. I didn't believe the meter – it's played tricks before – so changed the tripler. The focus was as bad as ever and I had to conclude that the tube was indeed at fault.

"I thought you said the tubes last forever . . ."

## A Lecture from Les

Having proved that I know nothing about ITT sets I'll now give you a bit of advice which you probably don't need.

Whenever you get a CVC32 or one of that ilk in for service for whatever reason, always check the small subpanel over the top of the scanning coils. Take it out (unclip it) and turn it over to check the contacts on the print side. You'll be glad you did (well I'm always glad that I do anyway). There's always one contact at least that's about to cause trouble. End of lecture.

## Finale

We have a couple of large blocks of flats opposite the shop and I'm often asked to "pop over" to check a TV set or something. They never know the make or model number so if I do go I have to lug quite a load of stuff with me in order to be reasonably sure of doing the job. By the time I've walked over to the flats, gone up to say the seventh floor, then walked along the corridors I'll prob-

ably be feeling a bit puffed. You repair the set, replacing maybe a fuse and a transistor, then test it and line it up. Then you pack your kit bags as it were and prepare to leave. The lady has a pound note in her hand and is saying

"I must pay you something". You don't want to offend, so you decline the reward and leave. As you go out of the door you hear her call out "if we get any other little jobs I'll give you a shout" . . .

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## Letters

### DISCO-LIGHT EFFECT

Les Lawry-Johns mentioned a disco-light effect in the November issue. I've seen similar effects several times, due to loose shadowmasks in tubes. The mask seems to become partially detached within the c.r.t. and gets too hot. This leads to expansion with loss of purity etc. due to movement of the mask from its correct plane.

A tube with this fault will sometimes give a perfectly good display when the set is switched on from cold, going berserk as the shadowmask heats up. A similar effect can be produced by placing a shadowmask from a scrap tube against the face of a good working c.r.t. and moving it about. By keeping the mask still, the individual triad structure of the phosphor dots can be seen. To date I've seen this fault only in delta-gun tubes.

M.J. McHugh,  
Hednesford, Staffs.

### N1700 TIMER RECORDINGS

It doesn't seem to be too well known that to make an unattended recording of more than two hours on a Philips N1700 VCR all one has to do after setting the timer is to make sure that the time setting switch is not returned to the "lock" position. In any other position the recording will be started by the electronic clock and will continue to the end of the tape, being switched off by the stop foil. May I add that the speed reduction modification given in the April 1983 issue of *Television* works very well.

E.A. Evans,  
Taunton, Somerset.

### THE VIEW MASTER

I found Chas E. Miller's vintage TV article on the View Master (December) very nostalgic – I built one of these sets by way of a return to electronics after radio in the 20s followed by a period at University and then war work. Chas has clearly described one of the later models however – I believe there were several. The first appeared in approximately 1946, just after the war, when both Pye and Ekco had 9in. table model t.r.f. sets that sold for about £45. This first model – the one I built – was rather less sophisticated than the one described by Chas Miller. The e.h.t. (7kV) was obtained from a mains transformer instead of being flyback derived, there was electromagnetic focusing, and a full-wave rectifier was used for the h.t. supply. The set nevertheless gave superb results in the area covered by the Alexandra Palace transmitter.

At this time, and for two-three years, there was no question of being able to obtain a 12in. tube – unless you were friendly with someone "in the know". The 9in. size was the order of the day, without internal aluminising (ion burn was very common) and external Aquadag coating, so that high-voltage capacitors were required to smooth the 50Hz e.h.t. The first commercially available receiver with flyback e.h.t. was the Pye B18T, a 9in. table model released in July 1948. The valve e.h.t. rectifier was

encapsulated with the line output transformer in bitumen.

Finally, *Wireless World* about this time designed and described a real DIY television set. In contrast with the View Master, everything that could be made by the constructor was described, even the scan yoke. There was flyback e.h.t. with a voltage tripler that employed metal rectifiers. It was originally a t.r.f. design, but a superhet version followed – very useful for frequency changing as the Birmingham transmitter had by then come into service.

J.B. Haley, Ph.D., C.Chem., F.R.S.C.,  
Fleet, Hants.

### AIRBORNE TV

In the December issue Roger Bunney mentioned airborne TV experiments carried out during the 1960s. A British book published in 1949, *The Television Guide* by Dr. W. Summer, gave details of American transmissions during the 1940s. The Stratovision project as it was called was undertaken by the Westinghouse Corporation, and the pictures of the aeroplane and the transmitter on board indicate that at least the experiment got off the ground. A map showed that virtually all the States could be covered by fourteen aircraft: a 1kW transmitter at 30,000 feet was said to have a service area radius of 400 miles across, giving the same signal as a 50kW ground-based transmitter.

Incidentally, recent discussion of pre-war television may have given the impression that the Americans used the 525-line standard from the start. This is not so: the pre-war system used 441 lines.

Finally a request. I'm assembling a collection of broadcast test card material and have already acquired more than a dozen different monoscope tubes and as many 35mm slides. I'd be pleased to hear from anyone who has items to dispose of.

Andrew Emmerson,  
71 Falcutt Way,  
Northampton NN2 8PH.

**Editorial note:** The effective starting date for regular TV services in the USA was July 1st, 1941 – with 525 lines. Previous services were allowed by the FCC on an experimental basis only. They used 441 lines, though RCA had used 240 and 343 lines for demonstration purposes in the early 1930s. An excellent and very detailed article on the early days of TV in the USA appeared in the March 1982 issue of *Radio-Electronics*.

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## Book Note

The second edition of the **Antenna Engineering Handbook**, edited by Richard C. Johnson and Henry Jasik, has been published by the McGraw-Hill Book Company at £76. This sumptuous book contains 1,408 pages and deals with just about every type of aerial, with the emphasis on design rather than installation etc. The material is of US origin, which means for example that in the section on TV receiving aerials the use of 300Ω twin feeder is assumed and US channels are specified.

# Nobody Told Me

Les Lawry-Johns

A while ago I commented that no one in this trade ever has the chance to get a big head. No sooner does one overcome an impossible job and start to glow than another presents itself and you're back in the dumps, wondering how you ever had the gall to think you could cope. So often it's a question of a dead set, but where does one start with modern designs?

## Power Supplies

Take the Rank T20 and related chassis for example. They come in and without switching on you check the usual things with an ohmmeter. There's a good chance that you'll score a bulls-eye right away. The  $910\Omega$  resistor (4R16) in the 12V regulator circuit tends to go high in value; the  $1\Omega$  resistor (5R8) in the BU208A's base circuit tends to go open-circuit; and the two EW modulator diodes 5D6/7 tend to fail. The drill is to check these items first. Suppose they are all o.k.? You may plug in and find that there's no 200V output from the chopper power supply circuit. This has happened to me several times recently, so I thought I'd dwell on it for a moment.

There are two fuses on the centre power supply panel. The one nearest to you (7FS1, 1.6A HRC) is on the d.c. side of the mains bridge rectifier. You may well find that it has blown and wonder why. As a first step you check the BU326 chopper transistor 7VT7 and find it short-circuit. "Ah ha" you say as you replace it. If you're daft you then replace the fuse and see it blow just like the first one did. The next step is the tedious business of checking all the other components in the area. Start with the two diodes in the overvoltage crowbar circuit - 7D12 (1N4148) and the 27V zener diode 7D13 (BZX79/C27). One or both will probably be short-circuit. You then scurry around looking for a 27V zener diode - naughty boys settle for 30V if they can't find a 27V diode. The two thyristors 7THY1 (chopper drive) and 7THY2 (crowbar) could have suffered and should be carefully checked together with all the associated diodes. If you're lucky you'll have got the 200V back by now. If the tube's heaters don't light up, go on to check the line timebase.

## The GEC C2110 Series

The GEC C2110 series is another old stager with which we should all be thoroughly familiar. Most troubles arise in the line output stage. The BU108 (use a BU208) line output transistor goes short-circuit, taking the 47V zener diode D51 with it; the  $1M\Omega$  resistors R607/8 on top of the line output transformer cook up; and the  $560k\Omega$  resistor in series with the first anode presets goes high or open-circuit. Once again however the pattern is changing.

We've had several of these sets in recently with excessive e.h.t. due to the h.t. line rising to well over 200V. This will occur if transistor TR701 in the thyristor control circuit isn't conducting sufficiently. The cause is likely to be one of the resistors in its base circuit changing value. The usual culprit is the feedback resistor R706 ( $470k\Omega$ ). It goes high, a replacement bringing the firework display to

a halt. The excessive voltages in the line output stage may have resulted in one of the wirewound resistors on the side of the line output transformer housing springing open after the associated zener diode has gone short-circuit.

## Pinky and Perky

We all get our share of strange customers. I think I get more than my share, but they do give us a laugh now and again.

An elderly couple pulled up outside, in an equally elderly Morris Minor. I heard them arguing away so I went out to see if I could be of help.

"You get in and get one end and I'll pull it out this way."

"No, you get in and I'll lift it from here."

I solved the problem for them and thought the dispute was over. No such luck. It was a 20in. Philips G8. The man was rather small and had a pink tam-o'-shanter on his head. The lady was equally small and wore a black hat with a white feather in it. So he was Pinky and she was Perky and they never stopped chattering (mostly both at once) and arguing.

"The switch doesn't work."

"No it's not the switch because you can hear it click."

"That doesn't mean it's doing its job."

"Shut up and let the man look at it."

So I looked. I could hear the degaussing buzz, so the switch was working. I started at the bottom of the mains dropper, to ensure that the mains a.c. was present here. It was, and was also present at the next tag up. I switched the meter to d.c. and checked the upper section. The set immediately started up - as soon as the meter probe was applied. I thought there was a dry-joint and checked carefully, but there were no obvious ones. Switch off, wait a while, then switch on again. Nothing. Check for h.t. at the upper tags and again the set starts up. I switched off and checked the dropper cold. It was intact. To cut a long story short and to cut out Pinky and Perky's tirade, which continued non-stop, I was called upon to make a decision and despite the fact that I nearly always make the wrong one this time I rose to the occasion.

"Well what's wrong with the bloody thing?" asked Perky.

"My opinion, which in your view may be silly, is that the thyristor has an internal open-circuit which makes when the circuit is disturbed - in this instance by application of the test prod."

Pinky gazed at me for a while. "To me that's a load of old bull."

Perky wasn't going to let him get away with that.

"If you had any sense you'd realize the man knows what he's talking about, which is a damn sight more than you ever do. You just rabbit on and on while saying nothing."

It was time to put my theory to the test. I'd noted that the thyristor wasn't the usual BT106. It was of the BT116 type, though the number couldn't be read. I removed it and transferred the nut, bolt and washer to a new SN4444. With this installed the set came on each time it was asked to. I coughed slightly, straining to hear the thunderous applause that should have been forthcoming. It wasn't.

"Well, will it be all right from now on?" demanded Pinky.

"How the bloody hell should I know?" I snapped, losing my cool at last. "You brought the thing in because it wouldn't switch on and now it does. That's my job

completed. What happens hereafter is up to you."

I put the set back in the Minor and off they went, still nattering away at each other like mad. I reflected on the quiet life that HB and I lead. We are such nice people. If only she wouldn't stir the coffee up so quickly.

### **The Bush BC6004A**

This Rank colour portable was made in West Germany and I wasn't familiar with the circuit at all. As it belonged to the "hire and fire" man at the local builders' yard, and as Don has been helpful to us on occasions, I couldn't say no.

It has full v.h.f. as well as u.h.f. reception facilities, so the tuner is not the run of the mill type. The poor reception with very grainy picture suggested that the tuner could well be at fault, but careful investigation failed to reveal anything amiss. The a.g.c. also seemed to be about

right. The tuner and i.f. sections are of the plug-in type, so I next removed the covers of the i.f. section and carefully checked the input and first stage. This consists of a BF199 transistor (T251) which is followed by a TDA440 i.f. i.c. The voltages around the transistor didn't seem right but a replacement produced no improvement. I repeated the voltage checks and injected signals to see where they went missing. The trouble still seemed to be in the first stage, and as I was probing around a small item caught my eye. It was a tiny 4.7k $\Omega$  resistor with the wire ends doubled up ready for insertion into the printed board – but it had never been fitted. It had just layed there inside the i.f. unit, doing nothing until (I presume) it had got jolted and upset things. A look at the circuit revealed that it was part of the tuner a.g.c. circuit, but as the tuner a.g.c. voltage seemed o.k. I simply removed it. This restored normal operation, but I won't tell you how many hours were spent before the errant resistor was spotted.

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# **Electronic Speech for TVs and VCRs**

**David Botto**

Pete pushed the workshop door open and turned on the main power switch. A babble of electronic voices immediately greeted him.

"Good morning!" "It's 9.17 a.m." "Attention please!" "Danger! Smoke!"

"Quiet" yelled Pete, and the voices stopped as built in sensors in the TV sets and VCRs detected his voice. It was well past the time to start work, so Pete picked up his much-used digital meter – he refused to use the new talking multimeter the Boss had ordered from a rep in a weak moment . . .

No, this is not the start of a futuristic story, merely a pointer to what TV engineers may have to put up with in the not too distant future. Thanks to the recent development of very low priced speech generating i.c.s, TV sets, VCRs and perhaps a whole host of domestic appliances will soon be talking electronically. They'll inform, remind and warn in a natural sounding voice, using inexpensive circuitry built into the equipment.

Before discussing electronic speech synthesis it's useful to know how human speech is produced – being able to talk is something we tend to take for granted, but it's quite a complex business. A column of air is sent up by the lungs, pushed up by a dome-shaped muscle called the diaphragm, the lungs acting as a sort of bellows. This air goes through the windpipe, entering the larynx – the voicebox or Adam's apple – in the middle of the throat. There are two small folds of muscle inside this voicebox – the vocal chords – which open and shut to let air in and out (and also to stop foreign objects getting into the lungs). As air is forced from the lungs the vocal cords vibrate, producing sound, the speed of vibration controlling the tone.

After passing through the larynx the air enters the upper part of the throat, going on into the mouth and nasal passages. Overtones are added, and the roof of the mouth, the teeth, gums, jaw and lips break up and control the sound waves so that the listener hears sounds he can understand.

### **Speech Synthesis**

To synthesize speech calls for an entirely different

approach, but one that takes into account the way in which the human voice works. Integrated circuits can do the job easily, cheaply and reliably by combining the component parts that go to make up speech. The basic unit of speech is the phone, a sound made by one's vocal system. Alter a phone just a little and you get an allophone. Bring together phones and allophones and you've the sounds that enable one word to be distinguished from another: these sounds are called phonemes and are composed of many different frequencies.

There are two basic methods of electronic speech synthesis. The first uses digitally stored words and/or phrases. The second stores phonemes or allophones which are combined to produce words and sentences. This second method enables any word in almost any language to be formed – and is thus ideal for robots with a lot to say! For talking TVs and VCRs however the former, stored words/phrases method is more likely to be used: the number of words is limited by the storage method, but is still considerable.

The cost of electronic speech was until quite recently prohibitive so far as domestic equipment is concerned. Now however several large-scale speech processor i.c.s have become available: they contain extremely complex circuitry yet cost only a few pounds. Some examples will be considered in a moment.

An input code such as a binary number is fed to the synthesizer i.c. which then selects the required word/phrase or stored speech element from an internal or external read-only memory (ROM). It then processes the ROM's output before passing this to an electronic circuit that models the human voice tract. The output is amplified and then fed to a normal loudspeaker. The synthesizer could be controlled by switches for single words/phrases or single parts of speech: in practice control is done by a microprocessor or microcomputer.

### **Synthesizer ICs**

The National Semiconductor MM54104 speech processor i.c. is designed for use with specially designed speech ROMs – type MM52164 – and is housed in a 40-pin pack.

The keyboard is also shown as having a two-way data flow. This is because the keyboard operates in the same way as many remote control handsets and VCRs. If there are say 64 keys, we send out eight addresses and the data comes back along any one of eight lines when a key is pressed.

The cassette port is included so that a cassette recorder

can be used to record data and programs and, on playback, transfer them to the RAM.

Next month we'll look at the operation of the CPU in detail. This will also be helpful in connection with the microcomputer i.c.s used in VCRs etc. It's always much easier to repair something when you understand how it works.

## *Tiny Tim's New Shoes*

*Les Lawry-Johns*

Tiny Tim eventually got the new pair of shoes he needed so much – from Tinker Bell, for Christmas. So on Boxing Day he put on his new pair of shoes and kept them on. That evening he had a few drinks (quite a few) and as the hour grew late he indulged in dancing with a young lady (a member of the family you understand). Whilst demonstrating his amazing dip and reverse he somehow stumbled and fell, bashing his chest on the bar. So Tinker Bell took him home and he managed this feat without falling down. When he got upstairs he did fall down, across the table, hitting his chest in the same place. So Tinker Bell guided him to the bedroom and as he was undressing he sort of stumbled and fell on to the arm of the vicar's chair, again on the same rib.

In the morning he couldn't cough or blow his nose but he did sneeze once and that very nearly killed him. He was very cross and vowed not to wear new shoes any more. It still hurts.

### **The Puzzle**

Despite Tim's injuries he managed to carry on almost without complaint. It was business as usual and he made a muck up of only one or two jobs. Until this fellow came in carrying a 14in. Philips portable that is. Tim thought he recognised it as a KT3 and felt confident he could stick in a new 4.7Ω resistor without too much trouble. So he tried to show off.

"Hang on a moment sir, won't take a second."

His doubts grew as he turned the set around. Why was there a three wire mains lead (no plug)? He removed the rear cover and noted a couple of tracks blown open on the right side lower print, then released the top catches and lowered the panel to get at the lower right side of the power board. On removing this he was stunned to see that it was severely blackened and had several tracks blown open. He looked at the control board next to it and noted that this had also taken a pounding. He looked at the man who'd brought it in and confessed that it wouldn't be a quick job and could well turn out to be expensive.

The man showed no surprise. "That's what I thought you'd say. I don't want to spend much on it. If you like you can keep it for spares."

So Tim was left with this bundle of mystery and resolved to solve it when time permitted.

When he returned to it later he started by repairing the power board, replacing two of the diodes in the mains bridge rectifier, the 4.7Ω surge limiter resistor and the 12V zener diode that had gone short-circuit. He then cleaned off and remade the tracks. The control board needed quite a bit of attention – two transistors, a diode and track repairs. The main board also presented a problem, with tracks blown and two diodes at the top short-circuit. There were lots of other faults to clear up,

all apparently due to the original big bang.

Tiny Tim looked at the green earth lead suspiciously and checked that it did indeed go direct to chassis. Also that the brown and blue leads went direct to the power board, i.e. there was no on/off switch. Rightly or wrongly he concluded that the set had been removed from an entertainment centre which must have featured a central bank of switches and a mains isolating transformer. So Tim removed the green lead altogether before testing the set, which now worked perfectly. He put it on one side, intending to show Tinker Bell how clever he'd been when she returned from a visit to the daughters.

### **Zacharius**

When she did return all thought of the set left his mind. This was because she came in with a large puppy Alsatian on the end of a choke chain. She'd apparently had quite a time trying to control him.

"This is Zack" she explained. "When he grows up he'll guard us and we'll be able to sleep at nights. The trouble is that he's a bit unruly and I sound soppy saying Zack back or back Zack. We'd better change his name."

The outcome was that he came to be known as Zeb. He's quite a handful, being only four months old, with boundless energy and a fear of being left on his own for a second or two. Tim's ribs have taken a battering – the cat doesn't like him either.

### **Sans Switch**

When Tim finally showed Tinker Bell how clever he'd been with the Philips portable he was a bit disappointed with her reaction.

"Why can't you switch it off?"

Tim was annoyed with this lack of appreciation.

"The set incorporates this latest safety factor, so far present only in this one set. There's no flimsy on-off switch. When sets are not in use they should be disconnected from the mains supply completely to ensure that they are safe."

Tinker Bell was not impressed. But the more Tiny Tim thought about it the more convinced he became that he was right. He resolved to write a letter to the editor of *Television* magazine suggesting that no sets made in future should be fitted with an on/off switch. . . .

### **Thorn 1600/1615 Chassis**

Tim is also getting angry with the daft 24kΩ resistor (R5) used in these 20 and 24in. monochrome sets to feed the tuning voltage supply regulator. Surely a resistor connected between a 185V h.t. line and a 30V line should be rated at 2W or more for long-term reliability?

# Driven to Drink

Les Lawry-Johns

A smart grey Honda pulled up outside. A rather flash female jumped out and pranced into the shop, immediately filling it with French perfume or something.

## Mrs Upyew

"Oh darling, will you be a pet and get my box out of the car for me?"

I went and dragged the ITT CVC32 out of the car. I then brought it in and put it on the bench while she prattled away.

"I'm going into town for an hour, so I'll collect it on the way back if it's done by then. I don't mind spending a fiver on it if necessary."

I picked the set off the bench and started to put it back in the car.

"Oh darling, I was only joking. I'll pay whatever it costs of course, but fuses don't cost all that much do they?"

I continued to plonk the set on the back seat.

"Oh you are an old grumpy today aren't you? Please do it for me, I'll be so grateful - you'll see."

So I got it out again and started to prepare the sheet.

"What name is it please, madam?"

"Upyew darling."

So I wrote Up You Darling. She screamed with laughter. "No no you naughty boy, the name is Upyew, the darling was meant for you sweetheart."

To shorten the story a bit she then pranced off to her car which refused to start. So I had to push it after telling her to put it in gear and keep her foot on the clutch until we picked up a bit of speed. Then off she went and I returned to the CVC32.

## The Nightmare

It was tripping. Going hump, hump. So I switched off and disconnected the tripler. I then checked the line output transistor which was short-circuit. With this replaced and the tripler still disconnected I switched on again. The set still tripped and this time there was a whisp of smoke from the lower part where the BSX21 chopper driver transistor lives. The set became silent and I found the BSX21 short-circuit. With this replaced the set remained silent and I had to replace the TDA2640 chopper control i.c. As a precaution, the h.t. feed to the line output stage was disconnected before switching on again. When I did switch on the set didn't trip and some pretty red LEDs lit up to show that the set was happy enough without the load presented by the line output stage.

The items connected to the line output transformer's primary and secondary windings were checked and found to be in order. So a new transformer was fitted and, fool that I am, I reconnected the tripler before switching on. When I did this the set continued to trip and then gave up - the BU126 chopper transistor was short-circuit. With a heavy heart and gloom all round I replaced the transistor and this time disconnected the tripler before switching on again. Everything was just fine, i.e. no tripping and the LEDs glowing merrily. A new tripler was fitted and I now had a picture - with severe EW distortion. The BD238

diode modulator driver transistor was short-circuit. By now I was in a filthy temper but to complete the job I replaced the BD238. This enabled me to adjust the presets and a really good picture was obtained. I wrote out the report and bill.

When Mrs Upyew returned she pranced in as usual.

"Set ready darling? I hope it didn't cause you too much trouble."

I gave her the bill and the smile faded. She paid by cheque and I put the set in the car for her and not a word was said. Fortunately the car started first time and off she sped, a very unhappy woman. So much for her fuse. Oh yes I forgot to tell you, I removed the small panel over the scan coils and found the usual dry-joints there.

## Elephants

A well known component firm has for its trademark a small elephant leading a large one, the latter's trunk holding the tail of the small one. I've often wondered about the origin of this and when Stan Westover called last week I asked him about it.

Apparently the firm's two founders started it by combining their separate firms - South East Electronics and Midland Electronics. Naturally they decided to call the firm South East and Midland Electronics. When they came to register the name they were sternly told that this could not be done as there was already such a firm. So they said they'd just use the initials, SEME. No they were told. SEME stands for South East and Midland Electronics which is already registered. "Oh no it doesn't" they replied, "it stands for Small Elephants and Mammoth Elephants." So now you know . . . I think. And I'd always thought it was to do with See Me.

## Fooled

This one made me blush. A chap I know quite well - he works on the river - brought this small ITT (STC) portable in. It was a VC11 with valves and things like that in it. I had quite a tussle, restoring full width and height, repairing the i.f. stages, etc. The aerial was then connected to the u.h.f. socket and the set switched to 625. I next discovered that it didn't have a u.h.f. tuner. So I switched back to 405, plugged in the v.h.f. aerial and tried to tune in Channel 1 or 9. I spent some time on the tuner before realisation dawned on me that it had all been in vain. The signals weren't there any more.

When he came back to collect the set he told me it had been out of commission for a few weeks. It had gone wrong just before the shut down.

## Confusion

I've been in a state of confusion for some time now. I fear it's getting worse, and anyone who brings anything to me expecting to find efficiency must be living in cloud-cuckoo-land. It took me hours last weekend to prepare a car radio (Radiomobile 80) for positive earth use just because the polarity turn key was missing and it had been wired for negative earth and the AD149 output transistor had gone short-circuit and blown its emitter resistor. You see, Dave collects vintage cars and everything has to be right. Not Dave from the pub, Dave from the garage down the road. He often sends me car radios to fix. Some keep their dial lights on when they are switched off - anything to worry me . . .

obtained. Azimuth and tilt are then adjusted as before.

The thing to remember when adjusting a new head is that the final alignment will match that of the machine on which the tape used was recorded, so be certain of the alignment of the machine whose tape you use for the

purpose.

Finally X adjustment. On some machines this is a conical screw, on others the base plate is mounted via slotted holes. In either case centre the tracking control and adjust for best picture.

## Sid's Secret Weapon

Les Lawry-Johns

Our old friend Sid popped in the other day and left a Ferguson 3787 with us for repair. "No hurry Les, I'll be back on Saturday." Since this gave me four days I agreed to have a go, despite my in-built fears of these Nordmende made colour portables that have given me so many hours of torment in the past. I wish an expert on these horrors would write an article for us outlining the pitfalls to be expected when idiots like me try to fumble around in them in the dark. Can you hear me someone out there? . . . help!

I removed the rear shell, loosened the two wing nuts and lowered the chassis. The blue line output transformer at the bottom right caught my eye. It didn't look right. I decided to switch on however to see what would happen. To my surprise the set started up, but in a half-hearted way. I felt the top of the 4.7Ω surge limiting resistor RA05: it was stone cold. When I'd switched off I found that it was open-circuit. The set had been trying to work via the soft-start circuit, which was why RU05 (680Ω) was hot and bothered. So I fitted a new surge limiter and tried again. The sound came on but the tube's heaters didn't glow: the h.t. was correct but all the line output transformer derived voltages were low.

I looked at the transformer again and realised that the top half of the core was missing. I'd a suitable old transformer with a similar core so I stripped it down: the core fitted nicely and I glued it in position. Everything then seemed to be in order. A BBC-1 picture appeared and looked good. It stayed on until I pressed the second button for BBC-2. The set then immediately shut down.

I switched off and tried again after a few minutes. The set came on for a few seconds then shut down. I removed plug II, the feed to the tuner control unit, and tried again. The set now came on, but without any picture or sound of course. There was plenty of noise however to show that the set was willing. It stayed on like this for an hour. Then I replaced plug II and it immediately shut down. So I removed the tuner control unit and checked just about everything. Finding no faults at all I refitted it and tried once more. The set now came on, but on switch position five – and wouldn't be budged. It seemed as though the SAS590 had taken exception to my probing. After fitting a new one the set came on, on channel 1, and didn't object to changing channels. I felt relieved and left it on for quite some time.

I thought I'd disconnect the aerial and let it play away to itself. The act of disconnecting the aerial resulted in the set shutting down and this made me very angry.

I decided that the set was working in too sensitive a condition and studied the circuit at some length. Perhaps if I adjusted the set-e.h.t. control RZ13? I did so carefully, for 27V at the slider. After doing this the aerial could be removed and channels changed at will. "Why didn't I do that in the first place?" I scolded myself.

The set behaved itself until Sid came to collect it. He

phoned yesterday to say that it works o.k. until the aerial is plugged in, then it shuts down. He'll be bringing it back in as soon as he has a chance. Back to square one . . .

### The Quiet Life

When the Nordmende had departed life settled down for a few days to a more peaceful run of routine jobs. You know the sort of thing:

"You put a new element in my kettle last week and now it's burnt out. Surely these things are guaranteed?"

"Yes madam, if they are automatic. The one you had wasn't, and you did opt for the cheapest one without a cut-out. If you let it boil dry and cook up you can hardly blame the makers, or me."

The Thorn 9000 which had a new SKE diode (the one in series with the Syclops transistor) fitted six months ago and now has a tripler arcing to the frame. "I thought all work was guaranteed for a year."

Not all customers are unreasonable however. Some are quite understanding. Mainly men, but some women are, especially when you tell them you have a stiff leg (the remainder of this passage is censored – editor).

### The Philips CTX-S

We seem to be getting a fair number of Philips sets fitted with the CTX-S chassis in lately. They are nice little sets with only a few common faults. Probably the most common, as with the KT3 etc., is failure of the 4.7Ω surge limiter in the power supply. One came in the other day however with the 300V supply present right up to the collector of the BUX84 chopper transistor.

The chopper drive circuit uses discrete transistors, so fault finding is fairly straightforward. The driver transistor is a BF422, a small 250V npn video type. It had failed. I prefer to fit the more beefy BF337, but it's essential to remember that the base is in the middle with this type, so it must be turned to present the base at one end as marked on the print. Provided this is done and plenty of clearance is left for the body (collector) more reliable operation is assured without the need for a heatsink.

These items, the BUX84 and its drive arrangement, occupy the front right side looking from the rear and are easy to get at as the panel slides out once the rear cover is removed (four screws). Since the lady who'd brought the set in had been told the repair would be difficult and costly she was very happy to have it back in two hours.

### Haunted . . .

What a contrast to the Nordmende that continues to haunt me. I'm sure it's only a simple adjustment but I did set it up according to the manual, honest. When it comes back I'll set it up according to me, so there . . .

# Big Foot

**Les Lawry-Johns**

I thought I was the only one here who put his foot in it at least once a day – often more frequently. Now there are two of us. That puppy Zeb has grown rapidly and is now rather large. He'll get bigger – if he lives that long. Honey Bunch tried to bash in his brains (?) the other day after he'd ripped her prize plants out of the ground and then pulled them to pieces. I tried to act as peacemaker and ten minutes later was ready to kill him myself. He'd chased the cat through the shop and she'd leapt up on to a shelf and knocked off a record player just as the owner called to collect it.

Now that the weather is warmer I get a brief respite because he stays outside on a long lead for at least five minutes during which I can get just a little work done. To be fair though that's all we seem to be getting lately – just a little work, not really enough to pay the bills. Charge more they all shout. No. Not when there's not much work coming in. The time to charge more is when there are plenty of jobs and you can afford to lose a few.

What am I rabbiting on about? Sorry, it's the dog you see, he's having an effect on my nerves. When customers try to talk to me I stare past them with my face twitching and they think I'm going funny. Of course I'm not . . . I'm not . . . I'm not.

## **The CTV14R**

Like the chap who brought in the Fidelity CTV14R. "It didn't cost much to buy so I don't want to spend much on having it repaired. Not more than say fifteen pounds."

So I took it in, hoping for a nice dry-joint. What a hope. The fuses were intact and there was a high voltage at the collector of the BUX84 chopper transistor. There was the same voltage, instead of 120V, at its emitter. It was short-circuit. So I stuck another one in. Switched on and there was a funny tripping noise as the h.t. started to rise and then collapsed. I was afraid that the line output transformer was at fault but didn't want to think about it. I checked the line output transistor carefully and then the diodes fed from secondary windings. One (D34) was short-circuit. Glory be. Now normally I would have checked around to see what had killed it, but I had to put my big foot in it. I put another diode in and of course the result was the same tripping. The reservoir electrolytic has shorted I thought, but although a short was found to be present it wasn't the capacitor's fault. When I isolated pins 2 and 5 of the TDA1170 field timebase i.c. the tripping stopped and a nice bright white line appeared across the screen to show that the set was happy to work without the chip to upset things.

So I looked for a TDA1170. I looked where they should be and then where they shouldn't. Perhaps I couldn't see properly? I looked at my glasses. They were smudged. I wiped the lenses and one broke away from the frame as the screw snapped off. Not my new glasses, my old ones – as you'll recall I can't wear my new ones as I can't see close up with them. I even have to take my old ones off to see really close. I knew I didn't have any screws small

enough so I had to stick a piece of wire through the metal frame and solder both sides as I'd done when the lens at the other side broke away long ago. That's why I got the new ones I can't wear. I still couldn't find any TDA1170s however.

"What's wrong" asked Honey Bunch, who was playing ball with the dog.

"I can't find any TDA1170s love, even though I've cleaned and mended my glasses."

"Perhaps you've used them all."

"If I'd used them they'd be on the order sheet."

So I looked at the order sheet and they were on it. Then back it came in a blinding glimpse of the obvious. The Normende. That's where they went, together with the 630mA fuses. So I whipped a TDA2600 off the shelf and dashed down to swap it with Don and Ray.

"Ah Les" they greeted me. "Glad to see you. You don't happen to have a spare TDA2600 up at your shop do you? We're right out what with all these G11's gobbling them up." So I produced the TDA2600 from my pocket and they were astounded. I modestly looked at the ceiling and then at the teapot.

"What do you want in exchange for it?" asked Don.

"Nothing really, but I'll take a TDA1170 if you like."

So after joining them over a cup of tea (they don't have whisky down there) I nipped off carrying my precious chip which completed the Fidelity repair when fitted. The heatsink is a pest to get off but nowhere near as difficult as the one on the Normende. Perhaps it's my Weller soldering gun that's getting old (tighten up the nuts you fool).

## **Mack and Millie**

These very nice people are old friends of mine and live not too far away in a select area where not very much happens except when their grandchildren visit and all hell breaks loose. Mack had phoned to say that their 26in. G11 had broken down. Their house was on the right as I drove up so I pulled over and ran the nearside wheels on to the path outside their gate and switched off the lights. Now Millie is a local magistrate, and when I went in she was going on about thoughtless motorists parking on the pavements all over the town. After exchanging the usual pleasantries I got on with the set and found a funny fault in the power supply. To save time I nipped out to the car to get my spare panel and was back in a flash.

"My God that was quick" commented Millie.

"Well I've parked on the pavement just outside" I admitted.

"YOU'VE DONE WHAT?"

"See you in court Millie."

## **The Estimate**

A chap had left an ITT CVC20 and a message to the effect that £25 was his limit. After quite some time it transpired that the tripler was faulty and that the line output transformer was overheating with the tripler disconnected. After replacing the BU208 and fitting all new parts (I was curious) a blank raster with just a shadow of a picture was resolved. The sound seemed to be o.k. but the contrast control had no effect. Tests cast doubt upon the TBA560 but replacing this merely produced an overbright raster with no signal (vision) at all. At this point I removed all the new stuff and carefully replaced all the faulty items. I should suffer. He was most upset when given an estimate.

# Strangers in the day

Les Lawry-Johns

I could see that she had a chip on her shoulder the moment she walked in carrying a small Grundig portable (not colour I was glad to note). Despite the fact that I was breaking my heart over a Philips G11 power supply panel she plonked the portable in front of me and let loose.

"I've had this set repaired three times in the past few weeks and now it's gone again. No doubt the same thing."

"No doubt" I growled, "which is why you should take it back to the repairer and beg him or her to have another go instead of lumbering me with the thing."

I could see her change gear, the way they do when they see that a change of tactics is required for them to get their own way.

"I've given Quick Fix every opportunity to do the job properly and they've signally failed. I've been told you're good and not expensive . . ."

"That's right" I couldn't help saying, "I'm good for nothing."

She didn't even smile but went straight on ". . . so I thought I'd bring it along to ask your opinion."

I gave up on the G11. "All right, leave it with me and call back tomorrow. I'll just take the name before you go."

"Miss M. Lott - Mona Lott - from Park Avenue."

I wrote down Miss Moanalot and left it at that.

Off she went and I returned to the G11 power supply. I'd checked every transistor in situ and everything else in sight and was now down to taking out each transistor and rechecking it in isolation. T4086 (BC158) in the excess beam current protection circuit proved to have a reverse leakage of some 3k $\Omega$ , and on fitting a replacement the wanted 150V appeared at the h.t. fuse. It's fortunate that these boards can be checked on the bench with only an a.c. supply fed to plug B - one side to pin 1 or 2, the other to pin 4 or 5.

Having disposed of this minor irritation - several hours of sweat due to my stupidity - I turned to the little Grundig (1230GB) where I proceeded to make the same sort of mistake I'd made with the G11. As the fault appeared to be lack of line drive I made a start by checking the supply to the line driver transistor. It was present though a little high. This was to be expected since the line output stage wasn't working, i.e. there was reduced loading on the 11V rail. This was confirmed by the tube's heater, which was glowing a little too healthily.

I switched off and checked the line driver transistor - base to collector, base to emitter - watching the meter's swing out of the corner of my eye. It seemed to be o.k. so I chased around getting nowhere.

I switched on again and checked the voltages in the line driver stage, noting that the transistor's collector was loaded by only the primary winding of the driver transformer (no feed resistance). Raised eyebrows accompanied the check on the transistor's base voltage. Since its emitter went straight to chassis the base shouldn't be far off chassis potential. The reading was 2V. So I looked at the transistor again. It should have been a BD137. A BC142 looked at me, recently fitted. I whipped it out and found that it was open-circuit base to emitter. The reading I'd got with the transistor in circuit had been base to

collector and then to the emitter via the driver transformer and the tube's heater.

I fitted a BD131 and told the set to make do with that for the time being. It did. The picture was good and the supply line voltage was correct. I must watch the meter more carefully in future. Like you do. The set was left on for a full day, just to be sure.

Mona came to collect it later, paid without a murmur but couldn't help saying "see you soon" as she went. Well she hasn't, so far.

## Another Stranger

Amongst the usual procession of Decca, Thorn, Philips, ITT etc. sets this 14in. Amstrad colour portable turned up. Not a bad little set, of far eastern origin. A quick check revealed that the full h.t. voltage was present but as there was no activity in the line output stage the picture and sound were both missing. Once again I started by making checks in the line driver stage. The set immediately started up and wouldn't stop. So I left it on till the next day.

Once again it refused to start. This time when I checked for voltage at the collector of the line driver transistor there wasn't any. So I checked back to the primary of the driver transformer and found voltage at both ends. The set made a half-hearted attempt to start when the probe touched the transistor end of the winding. Although the joint looked good resoldering it produced instant action with no further hanky-panky. Lucky me. For once.

## Easy Mende

If you remember, quite a time ago I told you of an encounter with Beardy and Non-beardy and how they departed never to return.

Well they did. Carrying of all things a NordMende colour portable of the type that frightens me.

"Get out of here with that thing" I bawled.

"Oh my friend" said Beardy, "let us let bygones be bygones."

"Yes" said Non-beardy, "let the sands show not a ripple."

"Never mind about bygones or the sands, I no mend NordMende."

"It's just a little thing" said Beardy. "It won't take a clever man like you a moment. Very very easy."

"Listen. If I was clever I wouldn't be doing this job."

"Just for old time's sake" said Non-beardy. "It's just a fuse you see."

"All right then" I said very calmly. "We'll just check the fuses."

So I whipped the back off, lowered the panel and checked the fuses. The 630mA fuse in the supply to the field timebase was open-circuit. My mind raced. The chances were that the TDA1170 field timebase chip had shorted or was shorting intermittently. Take a chance. Fit a new fuse and get rid of them.

"You're quite right" I told Non-beardy. "It was just a fuse. It's you who are clever, not I."

"Very good" said Beardy. "How much?"

"Fifty pence" I said, "if I don't see this set again."

"You give guarantee?"

"No I bloody don't. Take the set and sod off."

Do you know, it didn't go off again and each time Beardy walks by he raises his thumb and calls out "very good, very good".

I hate those sets.

# The Vet's Problem

Les Lawry-Johns

Not BO but B&O – one that gave me almost as much heartache as that NordMende. If it had been anyone else's I'd have told him to take it back where he got it from, but he's such a nice chap and we do have a dog, a cat and a bird. That bird is definitely female by the way: she doesn't talk but makes a lot of noise. You can't touch her unless she's having one of her freak outs, when she hunches her shoulders, sticks her neck out and babbles away in some strange alien tongue. You can then stroke her till she comes to. She then straightens up and lashes out with her beak. I think it's part of the mating game but she hasn't got one (so far).

## The Spiders

Which brings me to the next horror story. Upon removing the B and O's rear shell – release bottom catches, lift up and off the top tongues – I caught sight of a long brown envelope stuck to the right side of the chassis. Removing the envelope and opening it I found a folded booklet with the circuit details. Inside the fold were the bodies of two spiders which must have been there a long time: one was complete but only the shell of the other remained, no doubt the male who had provided the female with her last meal.

## The Set

The actual repair (having buried the spiders with due ceremony) turned out to be something of an ordeal, as the fault was intermittent. The set would suddenly trip (partially) after it had been on for quite some time, the picture shrinking and then returning rapidly to normal. It didn't shut off to enable proper tests to be made. The power unit is at bottom centre and was removed so that we could try to make some voltage checks. After a long time it transpired that the voltage at the collector of the chopper transistor remained steady while the base and emitter voltages varied, suggesting an overload. I rather doubted this, feeling that the fault was in the power supply itself.

Cold tests were out of the question as the fault was of such an intermittent nature, so we invoked Dante's Law: go where the heat is. This proved valid and the fault no longer occurred when the chopper driver transistor, BD something or other, was replaced. My fading memory suggests that we fitted a BD203 but I could be wrong. I can't check up on it as the circuit is back inside the set, at the vet's home (sans spiders), and I don't have another copy to jog my memory. I've even forgotten the model number and as no bill was presented I can't look up the copy.

## Who's a Ninny?

Next balls up. Who was it who completely stripped down a Fidelity IS100 audio stack system to get at the cassette head in order to solder one wire on, then put it all together again only to find that removal of two screws from the front cassette cover exposes the head and just

gives room to resolder? I won't tell you who it was but I won't do it again.

## Mack and Millie's G11

You remember me calling at Mack and Millie's house, parking on the pavement and getting a rocket from Millie . . .

"Curb crawlers are creepy Les but pavement parkers are putrid."

"Only two wheels, Millie."

"Half a wheel is enough – MORE THAN ENOUGH!"

Well they don't seem to have much luck with their G11. They phoned to report "a white line across the screen".

So along I went and parked in their driveway. I'd taken with me a spare timebase panel (upper left) and some fuses. I checked the second fuse up on the line output panel. It was intact. I checked the soldering to the base of the TDA2600 field timebase i.c.'s holder, and as this seemed to be o.k. I fitted my spare panel. After this I switched on, confidently expecting to see a full raster. Just a white line. Feeling a bit deflated, I tapped the top centre dynamic convergence correction panel. The line flicked to a full raster then collapsed again. Oh dear, I've brought the wrong panel.

I removed the correction panel and examined it closely for cracks and dry-joints. As there didn't seem to be any I refitted the panel and without clipping it down switched on to see if a bit of probing might help to identify the culprit. There was a good, full picture. It wouldn't collapse until I clipped it down. So I unclipped it and told them I'd be back on the morrow with a replacement but that the set would meanwhile be all right as I'd taken the pressure off the trouble spot.

Next day I returned with the required panel and to save time I ran the car up on the pavement outside. I fitted the panel and prepared to depart. Millie said she had to collect her grandchildren from school and came out with me to get her car from the garage.

"THAT CAN'T BE YOUR CAR STUCK UP ON THE PAVEMENT AFTER ALL I'VE SAID!"

"After all you've shouted Millie. See you in court dear."

## The Repair

Back at the shop it took an ohmmeter to locate the intermittently open-circuited track, very near to connector 15A4. A jumper lead was quickly soldered in place to put paid to any further hanky-panky.

## A Solution

I'm fed up with the way this country's going. Everybody seems to be convinced that unless they put up prices, charges, wages – everything every year – they'll be uneconomic and go under. What we need is a universal catch phrase for use at every check out, written on every invoice and bill. Everybody together then, "LESS TEN PER CENT". Salaries, wages, fares, charges. O.K., some won't do it, some perhaps can't. They'll be the unpopular minority. Leave marked up prices as they are, but subtract ten per cent at the time of payment. "Less ten per cent, less ten per cent" – can't you just hear it? I can hear the objections: importers etc. But it could be done if we really wanted to. All right we don't. But dafter things have happened.

# The Tantrums of Tiny Tim

Les Lawry-Johns

Tiny Tim had seen the set before but couldn't remember much about it.

"It keeps flicking in from the sides, sort of bowing in if you know what I mean, and we've still got those bars that travel up the screen" said Mr. Crankcase.

"Sometimes they travel down" said Mrs. Crankcase, "but we don't mind that – we're used to the bars."

"Don't worry" said Tiny Tim, "I'll sort it out tout suite."

Clearly impressed by Tim's confidence, the Crankcases departed and left him to it.

## The CVC5

The 26in. CVC5 proved to be a nightmare. Bowing in at the sides on a set fitted with a 90° tube and no EW diode modulator circuit . . . Tim plugged the set into the mains supply and pressed the on/off switch. Being a hybrid chassis, the valves lit up and Tim waited. And waited. There was no cover over the line output stage (shades of Ike Hodge) so Tim held his little neon near the PL509. It didn't light up and he noticed that the valve was getting red hot. So he checked the h.t. supply to the PCF802 line oscillator valve. This was present and the PL509 cooled down. Suspecting the polywhat'sname capacitors in the line oscillator stage Tim changed the PCF802 – this was easier than changing the capacitors. There was no further trouble with the line drive and the e.h.t. rustled up. The picture appeared but it kept flicking sideways and doing all sorts of funny things like bowing in quickly then bowing out again.

Tim's diagnosis was immediate. "Up with this I'll put no more" he said, "it's poor earthing like in the Bush TV181 series, tabs not soldered properly." So he ran wires from the top to the bottom of the chassis and soldered them securely at each earth point. This solved the flicking and bowing and left Tim with the hum bar.

## The Hum Bar

Now we all know what to do about this. Change the AD161 series regulator transistor in the l.t. supply and the bridge rectifier for a start. Tim did all this and more, though the curve that accompanied the hum bar should have told him that the l.t. supply wasn't responsible. He turned to the h.t. lines and found that all the electrolytics had been resoldered – not very tidily.

"I'll shunt them one by one" he thought. He switched off and used a 470 $\mu$ F test capacitor with jump leads and crocodile clips. First he clipped it across the h.t. reservoir capacitor – that couldn't be it because the h.t. was well up, but just in case – and switched on. No change. Why had he switched off? Because the spark might have frightened him (and the dog). Actually he hadn't switched off, he'd pulled the plug out – that was easier. Now that the test capacitor was charged it could be applied to the other electrolytics without frightening him and the dog.

While he was playing around the lower electrolytic he accidentally touched the earth tag with the live lead. This should have produced a nasty spark and made him jump.

It didn't and he frowned a little. He touched it to the main frame and jumped for his life at the loud crack. The dog fled and Tinker Bell came in demanding to know what he'd done to him.

"Sod the dog" said Tiny Tim. "What about me? I nearly jumped out of my skin."

"Yes but you know what happens when you discharge those things. The dog doesn't."

So Tinker Bell went out and Tim was left on his own. Why hadn't the capacitor discharged when he'd touched the lower electrolytic's earth tag? Because it wasn't earthed. He connected the voltmeter to the tag and it said 200V. He took his glasses off and peered closely. The earth track was very thin and was open-circuit. Tim soldered another wire in to ensure that the earthing was sound. But he still hadn't cured the hum trouble.

"If it's not the smoothing, what else?" thought Tim, getting a bit edgy now. Heater-cathode leakage in the PCF802? He'd just replaced that. Fit another one. Still no change. That side ripple had a sort of ghost like foldover in the background, like you get when the tuning is out and the a.f.c. is off.

So Tim operated the a.f.c. switch, which is incorporated with the brightness control. The set went off. The switch had already been in and pressing it had allowed it out (a.f.c. off). So he pressed it in and the set came back on. He pressed the volume control switch – the real on/off switch – and nothing happened. Tim jumped up and down in rage. "Where's the bloody cat" he bawled.

"She's in the kitchen and she'll stay there until you've done your job properly" said Tinker Bell. "She's not here for you to kick when you can't think of anything better to do."

"Someone's taken the mains leads off the volume control and connected them to the brightness control" moaned Tim.

"What's wrong with that?" asked Tinker Bell.

"Putting them on the brightness control will put hum on the picture" said Tim.

"In that case" said Tinker Bell "putting them on the volume control will put the hum on the sound, and anyway why don't you take the mains leads off the controls and tape them up so that the set is on all the time, like on that Philips portable you were so proud of – no set should have an on/off switch you said, they're dangerous."

So Tim did what he was told. He took the leads off the a.f.c. switch and connected them together. He replaced the plug and was rewarded with a cloud of smoke from the i.f. strip. The neutral mains lead should have gone to chassis via the switch. He'd taken off the mains live and neutral leads, also the a.f.c. lead that's taken to chassis via the switch. The net result was that mains neutral was finding its way to chassis via the a.f.c. circuit.

Tim bashed his head on the bench and broke his glasses. He replaced the burnt out 470 $\Omega$  resistor and checked inside the a.f.c. can. There was a scorched resistor but the transistor read all right. He decided to put the lot back in and wired the neutral direct to chassis, refitting the brown a.f.c. lead back to chassis where it

belonged. Then he plugged in, gingerly, and waited.

The picture came on and was lovely. Who said he wasn't a good engineer? – apart from Tinker Bell. Mr. Crankcase came back at five o'clock to pick up his set and was told that in accordance with Tiny Tim's new rules the on/off switch was no longer operative.

"We never used it anyway. We always pulled the plug out." Mr. Crankcase took out the CVC5 and came back in with a CVC20. "Run the rule over this will you Tim?"

### The CVC20

Tim peered into the back and was surprised to see the front control panel lying inside the set in pieces. This upset him in view of the trouble he'd had with the previous set. His little mind immediately rang up fifteen quid. He removed the pieces and put them back together. The control panel now fitted nicely and he had a.c. leaving it and making its way across to the chopper. But nothing came from the chopper.

The driver is often the cause of this but turned out to be o.k. Tim then took out the chopper control subpanel and checked this, that and the other. He could find nothing wrong and was by now feeling fed up. So he locked up the shop, put out the lights and went upstairs.

### The Next Day

Tim was up bright and early next day – in a vain bid to stop the dog chewing the morning paper.

"You're not a dog. You're just a pig and barking machine. We'd be better off with a tape recorder that makes barking noises than with you" said Tim.

"Leave the dog alone" bawled Tinker Bell. "What's he done for you to kick up such a fuss?"

"He only chewed up your competition page. The rest is untouched."

"I'll kill the dog when I come down."

Tim hurriedly taped together the pieces of the page then got on with breakfast.

"Before you start eating, nip down to the newsagent and get me an untorn paper" said Tinker Bell, "I must have my entry in the post before nine o'clock."

What a start. But Tim was soon at work on the CVC20. He put the chopper control panel back, switched on and was surprised to hear the e.h.t. rustle up and the sound boom out. "Fancy that" he said. "The control panel couldn't have been making proper contact. What a clever boy I am". He then wrapped it up and moved it to the soak test bay – the other end of the bench.

### Another ITT

Tim was a bit surprised to see this CVC5 come back since it had been collected only a couple of days ago after he'd restored the colour. He'd spent some time checking around the top left corner of the chassis and had eventually moved down to the chroma amplifier transistors T27 and T28 where he'd found that slight pressure applied to T28 (the small round BF128) would restore the colour. Although there didn't appear to be any poor contacts he'd resoldered the base, emitter and collector. After doing that the colour couldn't be lost: the set had behaved itself on test but here it was back again with the same fault.

This time he dived straight for the BF128 transistor. A cold check revealed that it was non-conductive. So he fitted a BF197, leaving the screen unused, and switched

# next month in

# TELEVISION

## ● USING A LOGIC PROBE

Logic circuitry has been used in VCRs from the start for system control purposes. As a result there are many faults that can be dealt with only on a trial-and-error basis or by investigating the logic conditions. Voltage readings provide some clues but the type of scope used for TV servicing will not usually handle fast changing pulse trains. The simplest approach to this problem is to use a logic probe – a device that will become more useful to you the more you get to use and know it, and will of course also help to sort out problems in TV control systems and microcomputers. David Botto outlines the minimum requirements for a probe for servicing purposes and describes its use in typical circuitry.

## ● COMMISSIONING TVRO SYSTEMS

Many dealers and enthusiasts are probably thinking about installations for satellite TV reception, something that can already provide additional channels in the UK from low-power satellites. What's involved technically and what sort of expense is likely to be involved? Geoff Lewis provides a simple guide in question and answer form.

## ● SERVICING HYBRID CTVs

The Decca Bradford and ITT CVC5-9 series chassis have proved to be able to provide fine pictures over a much greater than originally expected life span. Many are still in use and of course fail from time to time, causing confusion to those engineers who know only solid-state circuitry. Sam Simon provides a quick-check guide to dealing with common basic faults.

## ● TRANSISTOR FIELD TIMEBASE CIRCUITS

While the vast majority of valve field timebase circuits employed the same basic configuration a wide variety of circuit techniques, including class A, B and AB operation, have been used in transistor field timebases. Part 2 of this series describes the operation of these circuits.

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on. He was bitterly disappointed to find no colour. A voltage check showed that there was no forward base bias, a cold check revealing a short-circuit from the base to chassis. This was due to a speck of solder between the base and the screen (unused) print: a flick of the screwdriver blade restored normal operation which lasted for hours on end.

### Tim's Terrible Trouble

Tim thought it was time he paid some bills. So he gathered them all together and added them up. The total frightened him out of his life and as he lay dead Tinker Bell came in to find out what the scream had been for. She kicked Tim in the ribs and he stirred and moaned.

"Get up and get something done you fool. How am I going to get a new dress if you just lie there moaning?"

Tim got to his feet and showed Tinker Bell his piece of paper. "Look, this is what we owe. Now look at this one which shows what we've got. It's not enough."

"You ought to be able to afford me a new dress" snapped Tinker Bell. "If you can't earn enough by mucking about with those daft TVs you could always write about them like that clever Mr. Trundle and that Silly Simon. I've been looking at that magazine and I'm sure the editor is a nice man who might pay you if you could bestir yourself and do a bit of writing instead of keep complaining and trying to kick the cat."

"He might, he might" mused Tiny Tim. "If I could learn to type, that is."

# Line Selector Unit

A. B. Bradshaw

Many lower-priced oscilloscopes have good wideband deflection systems but poor triggering facilities. This is particularly a disadvantage if you want to examine the vertical interval test signals transmitted during the field flyback blanking period – these signals are very useful for monitoring the performance of the TV transmission path.

The unit described in this article has been in use for several years to provide improved TV triggering. It's in two sections, the first of which produces trigger pulses for display of the selected line. The second section was originally designed to provide X-scan and bright-up signals for the Hewlett-Packard 1707 oscilloscope, but if required the unit can be used to provide line triggering only. If the unit is also used to provide X-scan and bright-up outputs the only oscilloscope controls that need to be operated are horizontal and vertical position with sweep magnification by ten times. In this mode the oscilloscope's timebase is switched to "external" – see Fig. 1 for typical connections. When the oscilloscope's timebase provides the X scan the unit provides a selectable line trigger pulse at the start of the line required. Fig. 2 shows the complete circuit.

There are three switches which provide the following functions. The rotary switch S1 selects the line to be displayed. The latching push-button fast-scan select switch S2 is for use with the oscilloscope's sweep magnification  $\times 10$  control, enabling the 2T pulse to be displayed over a large percentage of the scan – thus K rating graticules can be used. The non-latching field select push-button switch S3 is used to give a "field slip" so that the alternate field can be selected. This latter arrangement is a simple solution – the alternative logic circuit technique would

mean that the last line of the field would have to be identified (half or full line). The "field slip" method is not elegant but is very cheap!

### Circuit Operation

Positive-going composite video with an amplitude of 1V peak-to-peak is fed to Tr1 which provides a voltage gain of ten. The output is capacitively coupled to the base of Tr2 with d.c. restoration by means of D1. The sync pulses are stripped off at the collector of Tr2 while Tr3 provides a TTL compatible output for the following i.c.s.

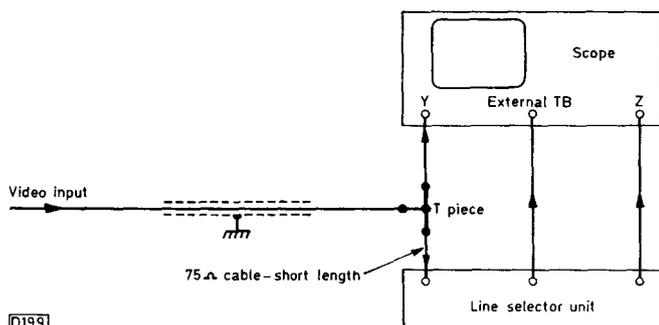
IC1 and one of the gates in IC2 are arranged as a field sync pulse separator, the output being made available at TP2. IC3 is a "start delay" monostable multivibrator which drives IC4. This latter i.c. is used to provide an enable pulse for the following BCD decade counter IC5. Line sync drive for IC5 is provided by IC2b. When enabled, IC5 counts the line sync periods: its outputs are decoded by the BCD-to-decimal decoder IC6.

The decimal decoded outputs from IC6 are brought out to Vero pins on the PCB. These are the basic line trigger pulses used for display selection. IC6's outputs are "loose wired" to a low-capacitance rotary selector switch (S1). Switching the live logic signals in this way is done for cheapness: the method works satisfactorily in practice provided the leads are kept short (2in.).

We now have pulses for each line during the flyback period of interest. The second part of the circuit provides bright-up and X-scan signals. The emitter-follower Tr8 is used to drive the cable bright-up pulse feed to the oscilloscope. The reason for the unusual arrangement in its collector circuit is to provide a measure of protection should the feed from Tr8 become short-circuit.

The selected line trigger pulse is fed to the fast-scan latching switch S2 and to the delay gates IC2c/d. The need for this delay in the fast-scan position will vary depending on the starting rate of the X amplifier in the scope and may require adjustment to the values of C9 and C10 to centre the displayed pulse in the scan.

The selected line pulse is also fed to IC7 and Tr4, via R22/C11 and R23/D6 respectively. Tr4 is used to discharge C13/14. When Tr4 is off, these capacitors charge linearly via the constant-current source Tr5. The resultant voltage ramp is buffered by the cascaded voltage-followers



0199

Fig. 1: Typical scope/line selector unit connections.

# Rocking all the time

Les Lawry-Johns

Things are most certainly not what they used to be. People even talk a different language now and I find it difficult to know what they are on about. Take Mr. Flasher for example. He held up a small Philips TX2 portable.

"Thought I'd let you have a look at this for me, right? Picture valve's gone, right? Don't mind paying you to look at it right? I'd do it myself but haven't got the time, right?"

"No. If it needs a valve, tell me which one and I'll sell it to you. I don't want to look at it because it's white and white gives me spots before my eyes and makes me feel ill, especially this soon after breakfast."

Mr. Flasher was taken aback. "Don't know what you're on about, right? What I'm saying is I'll pay you to put a new picture valve in my set, right?"

"I could put a valve in your set but it would just flop around because there's nowhere to fit one. If you want me to repair the set because you've not the time you'll have to leave it here. It won't involve valves because the set doesn't have any, right?"

So he left it and went out muttering about shopkeepers who had no right to have a shop and the government ought to do something about it.

I took the shell off the little Philips set so that it wouldn't hurt my eyes, plugged it in and switched on. The sound sounded but the screen showed only a line down the centre. So I checked the scan coupling capacitor and it had capacitance, then I checked the tracks to the line output transformer and they were intact. Next I wondered.

I checked the winding on the transformer. It was open-circuit. Oh dear, I certainly didn't have one of these little perishers. With enormous dexterity and wonderful presence of mind I removed the transformer and located the break. It could be soldered and it was. Back it went and the set now showed a picture. But it was upside down. My eyes narrowed as I got Mr. Flasher in my sights. So he'd been flashing around. I looked again at the scan coils. They hadn't been disturbed. I looked at the print. It didn't look as though it had been disturbed. Mr. Flasher was a phantom. So I reversed the field scan coils and the picture was the right way up. I could read the news on BBC-2 in the mirror. Something stirred in my brain. I've never been able to do that before, and people always shake hands with their left hand in the mirror. I looked directly at the screen: the picture was back to front. This made me very angry but everything looked all right when I'd reversed the line scan coil leads. I wrote the bill out with amazing attention to detail.

In fact it was Mrs. Flasher who came to collect the set. "I told Harry there's nothing much wrong with the set, right? I said why don't you do it as you're always pulling the radio to pieces, right? But he said 'I don't know about TVs, they've got valves in them'."

I gave up and ushered her out of the door – the dog wanted to go across the road and chase his ball on the green.

Now you'd think a simple thing like taking the dog across the road to play with his ball would be a simple thing, right? No wrong. In the first place he's still a puppy,

albeit a rather large one. In the second place chasing a ball is to him the most exciting thing on earth. As soon as he catches sight of his lead and the ball he goes berserk. Absolutely mad. I'd like to see Barbara Roadhouse calm him down. A choke chain? He's got one and it's high up but he chokes himself to death because he can't get the ball out of his mind.

We eventually cover the few feet across the road to where he knows the chain is coming off and the struggling reaches fever pitch. Whilst I'm trying to remove the chain he hurls himself this way and that until he finally rips my arm off and runs away with it. I manage to retrieve it and tuck it inside my cardigan and throw the ball with my left arm. When he eventually tires we make our way back to the shop, him panting like a steam engine (you can hear him miles away). With him laying on the floor lapping his water because he's too tired to stand Honey Bunch asks "Why did you let him do that? Come here and I'll stick it back on. You'll have to mix the glue though, I can't stand the smell of that stuff."

So I mixed up the epoxy with my left hand and made it good and strong. H.B. stuck my arm back so that I could work properly, then ran her iron over the joint so that it would harden quickly and I'd be able to get on with the jobs.

Puppets heal very quickly you see.

## The Decca 80

An old friend then arrived with a set I'm not familiar with: I've done a few, but not many. A Decca CT0802 – 80 series chassis. I plugged it in and switched on. Nothing, or at least I couldn't hear anything. The tube base voltages were present, as was the e.h.t., so I came to the conclusion that the l.t. supplies were absent. I looked for the circuit. A very brief reference in the book that did mention it referred me to the 1977-8 book for full details. I'd just lent that one to Tony. No not that Tony, the other one (sorry Tony).

So I swung up the chassis and took the cover from the line output stage. Everything seemed to be in order but I didn't like the look of the soldering on the l.t. output socket. I resoldered the contacts to make them look better, then switched on. The sound roared out and after a short wait the screen lit up. I plugged in the aerial and the picture looked good. So what? The moral is that if you lend someone a manual for a set you're not too familiar with one will promptly come along. Right?

## Looking in the Window

For a long time I've been struck by the fact that nearly every female that walks past the shop turns to smile in at me. Well I can't help being an attractive man. Reliable, sort of, maybe a little staid, sort of . . . I don't know, just fascinating I suppose. After all, those girls can't all be wrong, especially when the sun is shining. Yes that's another thing, they seem to look in more when the sun is shining. It was shining the other morning when I went across the road to post a letter. Coming back I was

surprised to note that I couldn't see inside the shop at all. All I could see was myself . . .

### Fading GEC

It was just an ordinary GEC 2120 or something like that, with the complaint that the picture would fade out for varying periods before returning as good as ever. I had it on test and had left the rear cover on to keep the heat in. After about half an hour the picture faded out, so I whipped the back off to make my definitive tests. These were not required since the picture had returned. So I left the back off. About an hour later the picture faded out and I leapt to the tube base to check the voltages. They were all present and the picture had returned.

I resolved to do nothing the next time. I just looked – at the tube base socket. The tube's heaters faded out. Ah, ha! I checked the heater supply and it was present – and the tube's heaters were glowing normally. So I left the prods connected and lay in wait. The tube's heaters faded but the meter continued to record some 4V a.c. It just had to be pin contact. A thorough clean of the tube's base pins and the socket cleared the trouble, well for a while I suppose.

### More Fading

The next day a similar GEC set appeared. Complaint: picture fades out leaving the sound normal. I resolved to play it cool: meter on the tube base socket to read the applied heater voltage, watch it carefully. After a while the picture faded leaving the heaters glowing merrily. The smile faded and when the meter was switched to the 1kV range we found that all three first anode voltages were missing. There was plenty of voltage at one end of the 560kΩ feed resistor (R506) on the convergence board but little at the other end. A new resistor restored normal, continuous viewing.

### At the Coach

Having had a couple upstairs, perhaps three or four, we decided to go next door to the Coach. Dave's place. Not Dave from the garage, Dave from the pub. We had quite a few while H.B. tried to beat the machine, and of course Dave kept filling my glass so that I was having twice as much as H.B.

Towards the end of the evening I was dully aware that Tony and Jim had come in. They slapped me on the back to make me growl and I did. So they got their drinks and moved over to H.B.

Now H.B. loves to tease Tony because he blushes so easily. So she set out to make him blush and he did. "Got your black tights on tonight?" she asked, "see you haven't got your high heels on."

Tony went along with it all. "Thought I'd give 'em a rest so's not to make all you girls jealous."

Quite unexpectedly a young man standing by broke in. "If he wants to wear black tights and high-heeled shoes why shouldn't he?"

Tony blushed an even deeper red. "They're only joking" he muttered to the young man.

"Maybe they are" said the Y.M., "but what's wrong with you doing it if you want to? I'm fed up with this place and its narrow minds. I'm off."

As he went out Dick came in. H.B. loves teasing him too. Er, I think we'll leave it at that. Whatever next?

# next month in

# TELEVISION

## ● SIGNAL STRENGTH METER

A snowy picture and an awkward customer can present a difficult situation. Is it the set or the signal, and how do you explain matters? This signal strength meter gives an instant guide to the signal level reaching the set and a handy way of proving to the customer that it may be his aerial that requires attention – after all a meter can't lie, can it?! Useful also for aerial alignment. The meter is simple to build and inexpensive – it uses a commercial tuner/i.f. strip so that only the power supply and meter drive circuits have to be constructed. The unit also provides video and audio outputs.

## ● IC FIELD TIMEBASES

Most TV chassis now use an i.c. for the field timebase, but it's not always clear what goes on behind the various pins and what the peripheral components do. Following our articles on valve and transistor field timebases it's time to get up to date with their i.c. successors.

## ● ELECTRON PATTERN PROGRAM

The various computer programs to provide TV test patterns published earlier this year created considerable interest – at last you can get the micro to do something useful! Andrew Heron has written a comprehensive program for the Acorn Electron microcomputer, providing a blank raster in a choice of eight colours, colour bars, split bars, horizontal bars, vertical bars, a crosshatch, dots, a chequerboard and a centre circle.

## ● SERVICING THE NORDMENDE FC25

The NordMende FC25 chassis was used by a number of rental companies in the early seventies. These large-screen sets still have a modern appearance and with a bit of attention can give years of trouble-free service. Pete Sanders provides a comprehensive guide to faults and fault finding.

## ● TEST REPORT

Eugene Trundle has put the Doranuro desoldering iron through an extended bench test.

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# Wag's Wireless

*Les Lawry-Johns*

Wag's a well known local waterside figure and has been for many years. He's been a customer of mine for nearly as long. Last week something that threatened this long-standing relationship occurred. He brought in his son's music centre, a Ferguson Studio 6.

His son lives down in Sussex (I think) and being very busy he didn't have time to bring it in himself. So Wag went off to collect it, leaving behind the speakers since they weren't suspect. There were complaints about the main amplifier, the cassette and the record deck. So I spent a few hours sorting it out, replacing the output transistors, their emitter resistors and a few other odds and ends. Fitting the test speakers proved that the work had been done well, but it was left on test for some time just in case. Some days later Wag called to collect it, settled the bill and departed in his usual high spirits.

## **Wag's Return**

The next day he was back. "It doesn't work Lawry, and that's going to upset my son. Didn't you test it?"

"Yes Wag, I tested it for hours. I'll test it again now." So saying I plugged it in and fitted the test speakers. The radio boomed out loud and clear and Wag's face became worried.

"What's them things?" he said, pointing to my test speakers.

"They're the speakers, Wag. It won't talk without them."

"I haven't got things like that."

"No Wag, you left them in Sussex, so you can't test the machine till everything's connected together again. What did you do?"

"I just plugged it in at home and it didn't work at all, but my record player works without those things."

"That's because they're built into your record player, Wag. This hi-fi has spacially distributed sound from separate stereo speakers, see?"

So Wag went off, feeling a bit foolish – like I do several times a day.

## **I Never Slept a Wink**

A chap carried in a Bush T20. He was followed by an elderly lady who looked a trifle unhappy. He put the set on the bench and retreated. The lady advanced.

"This set was in here three months ago and it went wrong again at teatime yesterday. I couldn't stop worrying all evening and couldn't sleep at all last night. It's not right that it should go wrong so soon after being serviced. I've a good mind to complain to Radio Kent about it."

She was so busy complaining she didn't notice that I'd removed the rear cover and checked one or two points. I quickly replaced the 1Ω resistor (5R8) in the line output transistor's base circuit and refitted the rear cover.

"Well now madam" I said politely, "let's see what's caused you so much sorrow." I plugged it in and switched on. Up came the sound and a few seconds later a good

picture appeared. "Now then, what would you like me to do?"

She stared at it transfixed. "I lay awake all night worrying about it and the moment I get it here it's all right. What's wrong? Will it go again? How do I know it won't go off again tonight? What have you got to say about it?"

"I think it wanted a ride in the car. If it goes again take it for a ride then straight back home again."

"I haven't got a car. My son-in-law brought it down for me because I was so worried. I just couldn't sleep. I've nothing else."

I felt a bit sorry and decided to tell her the truth. "While you were telling me your problems I managed to find out what was wrong and put it right. So you can sleep in peace tonight."

"But how do I know it won't go wrong again? I can't stand another night like last night."

So I took the back off again and examined the scan plug socket which showed some signs of distress. I made that good and checked around the other weak spots on the T20. Everything seemed to be all right so I refitted the back and pronounced everything to be in order.

"I hope it is. Do I owe you anything?"

"I'm afraid so dear. You girls have to pay for my services."

At this point Honey Bunch appeared, towed by Zeb. The old girl screamed.

"Take that dog away. My mother was scratched by an Alsatian once and the scar didn't heal till the dog died."

The old girl called her son-in-law and off they went, vowing not to return to such an unruly place.

## **New Chassis**

I must admit that some of the newer models in the Ferguson and Decca ranges worry me and probably will do for a while – until I get used to their habits. It was the same some years ago when I sold a customer a Philips G6 rather than a G8, because the latter set was new to me and I was afraid of it whereas the G6 had lovely things like valves in it, things I was at home with. Sounds silly, doesn't it? That particular G6 ended up with a tripler in place of the e.h.t. overwinding and valve rectifier. Why? Economy, that's why. The family I'd sold it to fell on hard times and couldn't afford a new transformer. It still gives a good picture. The G8 and G11 are now old friends to me, but I can't say the same about the G9. This one still worries me a bit. As for the Ferguson TX10, who would have thought the line output transistor is actually the chopper when he first opened one up? Once I'd got used to the layout they just had to alter it to confuse me. Only the siting of the focus unit convinced me that I was still dealing with a TX10. I must get out the books and bring myself up to date.

## **GEC 20AX Chassis**

This set really had me going. The tripler had decided to burst out of its confinement: the makers had decided to pass a cableform against the bottom corner of the tripler and this is where the insulation breakdown had occurred. It had been allowed to go on arcing for some time before the owners had switched off, so arcing had also taken place over on the chroma panel. In this chassis the group of chroma panels used in the C2110 series was replaced by a single panel and this had taken the brunt of the arcing.

Having replaced the tripler I switched on to see what damage had been done.

The screen was a lovely bright blue, the brightness control having no effect. I removed the blue connection plug from the top of the board and some red and green showed with chroma only, turning to a blank screen when the colour control was turned down. Considerable time had to be spent checking voltages, i.c.s, transistors etc. before an acceptable picture was eventually obtained. I'd have given my left arm for a replacement panel but no one seemed to have one locally. Working through the panel was agony – and all because a cableform had been tied up close to the tripler's bottom corner.

### **Bookie's Lair**

Do you remember me telling you about my bookie friend who lives in a back-to-front house? You go up the drive, through the garage, ring the bell on the kitchen door, go through the kitchen into the hall then into the lounge where you can look out over the front garden and the swimming pool which is normally empty of water. This room contains many items including a bar and a 26in. Dynatron with the Pye 731 chassis, the rear cover being held by ten thousand screws. A door leads from this lounge to another one that also overlooks the front garden. It contains another 26in. Dynatron, this time with a Philips VCR in the top. So the rear cover is held on by fifteen thousand screws. The chassis is the same (nearly) as the one in the set in the other room. I've looked after these two monsters for many years and of late John's been asking me about fitting up-to-date receivers in the handsome cabinets. I've avoided this exercise on the grounds that I'm no carpenter and might damage the woodwork. Apparently he's made other enquiries and been told that a 26in. Sony would fit in snugly. My reply to this idea was not helpful.

"Bugger you mate. If you have Sony sets fitted let them that fits 'em look after them. Not me. I shall not darken your door again."

So the Pye interiors stay inside the cabinets and the sets still perform.

### **The Hitachi Portable**

What's all this about? Well, John suddenly appeared with a Hitachi colour portable which had the annoying fault of intermittent severe top compression that completely ruined the horse racing (office set). As he brought it into the shop I said I'd have a quick look but wouldn't dwell too long on it as these sets frighten me.

I soon found a small daughter board that held the field output stage and discovered that if this was moved to port the raster remained steady. If it was moved to starboard the compression proceeded apace. I didn't like the look of the items on the board so, being the fool that I am, I fitted a wire and spring to hold the board hard to port. It seemed perfectly all right to me so he took it and paid for my highly technical expertise.

The next day he was back. "In the middle of the 3.30" snarled John.

So out came the offending board (soldered in not plugged) and all the connections on it were carefully resoldered (though none looked suspicious). Refitting the board proved that the operation had been successful and John's office is now at peace. Long may it continue. Still, it could have been a TX10 . . .

# next month in

# TELEVISION

## ● RECENT DECCA-TATUNG CHASSIS

In late 1981 Ray Wilkinson provided a detailed account of the Decca 120/130 series chassis and the reasons for adopting the circuitry it used. Time and the technology don't stand still and the current range of Decca-Tatung chassis differ in many respects while retaining the single, compact PCB approach. Ray Wilkinson brings us up to date on the 140, 145, 150, 160 and 165 series chassis.

## ● SERVICING THE MULLARD/PHILIPS TELETEXT DECODER

Mike Phelan starts a new series, this time on teletext equipped sets. The series will describe the operation of teletext decoders and explain how to go about fault finding. Mike comments that the diagnosis of faults is very easy since the decoder, being a digital device, tends to produce a screen display showing the precise nature of whatever ails it. The teletext version of the Philips G11 chassis is taken as the basic example – many of these sets are now available from disposal warehouses at reasonable prices.

## ● THE N. AMERICAN TV SCENE

Keith Cummins spent several weeks recently in Canada and the USA. We asked him to take a look at the TV scene over there: his report brings out the many differences in the approach to providing TV services in N. America compared to the arrangements we're used to in the UK.

## ● MORE ON THE HYBRIDS

S. Simon with further guidance on quick checks for defective hybrid receivers. This time notes on the Pye 697 and Thorn 1500 chassis.

## ● COMMISSIONING SMATV SYSTEMS

As a follow up to his recent article on TVRO installations Geoff Lewis reports on small master aerial systems.

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