

modification was to add 100k Ω resistors in series with the A, B, and C inputs to the MC14493 LED display decoder chip, i.e. between pins 8, 9 and 10 of IC3 and connections D3/4/5.

All this suggests that the SL471 consumes more current than the SL470. In the Ferguson TX9 and TX10 chassis the use of different receiver chips enables the SL470 to be replaced with the SL471 without modification.

Our main reason for writing is to help people who've

built the project and find that they have to replace the SL470 with an SL471 due to failure of the device.

*K. Stanley and R. Wateridge,
Stanley Television, Portsmouth.*

Editorial comment: Our thanks for this helpful suggestion. We would not recommend constructors to build this project today since difficulties are likely to be experienced in obtaining line output stage components.

In the Workhouse

Les Lawry-Johns

Yes we're back in the workhouse again – after a very lean period that extended from before spring until well into the autumn, a period when we fretted and wondered whether the trade would ever come back. The theories we pondered were many and varied, e.g. more reliable sets, too many spare sets and so on. Whatever the real reason, the wheel seems to have turned and the sets are now coming in thick and fast. Mainly G11s and T20s, with the odd ITT and GEC set for good measure. I'm glad of this since I don't like those odd sets with strange sounding names that were born half a world away, and I don't take in videos or computers either. They're too complicated for me. Fault tracing with a logic probe? Ugh! "How does he live?" I can hear you say. I suppose the answer is that we don't have a staff to pay, we don't want expensive holidays and we're always here when wanted. In the workhouse so to speak.

Tony's Ordeal

It seems that not only us men read this magazine. Apparently lots of women do as well. I know Keith Cummins' wife does, but then she was a local lass before she met him – him and that Casablanca image he projects. It would appear that Tony's wife also reads this Macho Magazine and when she read that bit in the November issue about Tony wearing black tights etc. she wasn't very pleased. What can I say? It was all by way of a joke dear, honest. The fact that Tony has been threatening to throw bricks through our windows late at night has nothing to do with this apology, nothing at all. It wasn't Tony who wore the tights. It was Jim (now I'm for it).

The Pye 725

Do you remember me telling you about the struggle I had with a friend's Dynatron fitted with the Pye 731 series chassis? If you recall, the trouble was to do with changing the BU208 line output transistor. Following the nightmare of removing the vertical panel I found that the screws holding the BU208 refused to budge. Son-in-law Duggie came upon the scene and offered to help using his car repair kit. The BU208 then came out all right but the panel was well nigh destroyed and took hours to repair. When I say how much I welcome a well known name on a set that comes in for repair I do have to admit to being dubious when one of these Pyes comes along.

One that I'd sold several years ago came in the other day. The centre 800mA h.t. fuse had failed but a meter check didn't record a short. Now this usually means that

the 0.1 μ F (1.25kV) first anode supply reservoir capacitor inside the top of the line output stage screening has shorted, but it hadn't. So a new fuse was fitted. It blew and another check was made. This time there was a short-circuit, and it just had to be the BU208. I tried to slacken the screws without removing the panel but had to accept defeat. So the nightmare started. It eventually came out and the BU208 was replaced. Now it's one thing to remove these panels, another to put them back complete with all the plugs etc. I know there's an easy way. It just doesn't seem to work for me and reading instructions is an art I've never mastered. I always forget what I've read as soon as I've read it you see. No, the 725/731 series isn't one of my favourites – not when there are line output stage troubles.

Droopy Draws

I suppose the G11 is one of my pets. These sets don't seem to give much trouble when they come in – and they do come in, thick and fast. EW troubles are normally due to dry-joints or the fact that the BY223 has caused the BD238 to fail. One that was a little different came in recently. No dry-joints could be found so we swung the line scan panel round and there it was: old droopy draws. The EW loading coil hung down in shame. It was like looking at myself. We always keep a few of these in stock, so in no time the new and more substantial coil was fitted and the raster sides were nice and straight again. It did look sad though, drooping down like that.

Such a Nice Girl

A car stopped outside and I could see that the driver was a young and very pretty girl with long blonde hair. So I resolved that I would do my best for her. She got out and I could see that there were two young kids and a baby in the car. Someone else had been doing his best already. She yanked a 22in. T20 out of the back of the car and casually brought it into the shop. Strong too I thought. She put it on the bench and without further ado told me about it.

"Fucking thing's gone again" she declared.

I didn't know what to say, me with my delicate upbringing.

"Where's it gone?" I gasped.

"It ain't gone nowhere you nit" she snapped. "I mean it's gone wrong again and I'm bleedin' fed up with it."

"When did I last do it?" I asked.

"Ain't bin here before. Those Snappy Service idiots had it – three times."

So I ventured a look and found that the BU208 was short-circuit. "Call back in half an hour and I'll tell you more about it" I whispered.

"Hope it's going to be done properly."

"So do I."

And away she went, roaring off down the road and

leaving me to fit a new transistor and test the set.

It had a funny way of coming on, remaining faint with curled edges for quite some time. This suggested to me that the power supply module was at fault, with probably one of the small 47 μ F capacitors suspect. So I fitted a replacement power panel and everything came on nicely and behaved itself.

She came to collect it. "Do you think the bloody thing will be all right now?"

"I hope so, but I've only fitted a power board and line output transistor so I can't speak for the rest of it. It's yours dear, not mine."

She said something nasty, paid up and went.

She was back next day and the air was blue. I yelled for help and Zeb came bounding in. He took one look and bounded out again. Some guard dog. H.B. popped her head around the corner and popped it back again. I was alone and felt lonely. I got the set in - she didn't carry it this time - and found that the 1.6A fuse on the power panel had blown. Fortunately I'd fitted a pair of 47 μ F capacitors (7C4/5) on the original board and this was now in full working order. It was replaced in a flash.

"Just a little thing. I'm sorry you've been bothered" I apologised.

"I suppose you want another small fortune?"

"Oh no madam, it's on the house. Our pleasure, so pleased to see you . . ."

"Bollocks" she snapped as she departed, I hope never to return.

The Network Colour Portable

After all those G11s and T20s and the experience just recounted an old friend popped in with a set I'd not seen before. It was a Network NW1414 14in. colour portable. I took the rear shell off, peeped inside and was depressed to see a chassis that lowered just like a NordMende, with a thyristor line output stage etc. Dead was the complaint and I just happened to spot a wirewound resistor sprung open at the top centre. R607, 1.2k Ω , 5.5W. The set started up when I touched the resistor together so I soldered it back. The set then worked perfectly and I left it on for some time, noticing that the resistor remained quite cold. I concluded therefore that it was a start-up resistor that had been suddenly asked to do a bit more than usual and wondered why. Having run it for some time I returned it to its owner.

He brought it back next day and I said I'd keep it for a week just to make sure. Once more the resistor was open and the set functioned perfectly when the contact was restored. It then continued to function every day for a week and has now gone back. I wonder what it was - and hope I don't have to find out.

(Editor's note: The set is one of the Grundig Networks, GCS100 chassis. See page 608 of the September 1984 issue for information on R607 going open-circuit.)

Zeb

I mentioned Zeb's cowardice when confronted with the young lady of the blue language. He's not really like that. It's just that he doesn't like high pitched noises - and she was certainly high pitched. Fireworks have the same effect. Otherwise he seems to know no fear. He's a very good guard dog and kicks up merry hell when anyone comes near the door and we're not around. That means a lot to us. Just thought I'd put the record straight. Now, about that cat . . .

next month in

TELEVISION

● VCR DEVELOPMENTS

Major developments in VCR technology, including long-play operation and hi-fi sound recorded using helical tracks, have been introduced on up-market machines released during the last year. Steve Beeching explains the techniques used, with specific reference to the JVC HRD725, a full-specification machine with all the "trick" features and a vision noise reduction system.

● AMSTRAD CPC464 SERVICING NOTES

Practical fault-finding guidance on the Amstrad CPC464 microcomputer and its associated monitors, based on eighteen months' experience of the machine.

● DECCA-TATUNG 160 SERIES

Ray Wilkinson brings us right up to date with the current 160/165 series chassis. The 160 is noteworthy for the design simplification achieved. Interesting points of detail include the absence of a luminance delay line and line drive that keeps the line output transistor out of saturation.

● QUICK CHECKS - PHILIPS CTVs

S. Simon continues his series with quick check procedures for the G8, G9 and KT3 chassis, covering the common fault conditions (very few with the reliable KT3).

● TEST REPORT: THE PORTASOL IRON

What's this - a gas-operated soldering iron! While not suited to general bench use there are many applications where it's a boon. Eugene Trundle found the performance very good, with an adjustable capability of 10-60W.

● VIDEO SCRAMBLING TECHNIQUES

Video signal scrambling has come into wider use with the increase in the number of cable and satellite TV services in Europe. Andy Emmerson reviews the basic techniques employed.

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field engineers and cablepersons.

The review iron was lent to me by SEME Ltd., Units 2E and 2F, Saxby Road Industrial Estate, Melton

Mowbray, Leics. LE13 1BS (0664 65 392). The Portasol is also available from Anglia Components and Phab Electronics.

And There's Another Funny Thing

Les Lawry-Johns

What strange things some sets can do. When Miss Converge brought in her Pye T194 portable (Philips TX chassis) I thought it would be another quick job. So she stood there while I fumbled about. She said it was the on/off switch and I wanted to show her that it wasn't. The supply was reaching the series regulator transistor but its output was only about 2V. So I checked the control circuit and everything seemed to be o.k. I took the tube base off to check for shorts or heavy loading but found nothing.

"Try the switch again" said Miss Converge.

"It won't make any difference" I growled.

Just to show her I switched the set on again and the sound burst out loud and clear. The only thing that was different was the disconnected tube base. I put this back on and the heater glowed merrily, followed by a raster. She smirked.

"It's not the switch" I insisted.

"All right then, try it again."

So I switched off, waited a while and switched on again. Nothing happened. I removed the tube base and the sound burst out. Put the tube base back on again and a picture appeared.

"If you fit a switch it'll be all right."

"Yes dear, if I fit a switch to turn the tube's heater off until the set has started up it'll be all right."

"Well do that then."

I was in no mood to argue, so I fitted a single-pole switch on the back cover and wired it in series with the tube's heater. I realised I was doing something wrong, but if that's the way she wanted it at least this would save me having to think. We could now switch the set on with the rear switch off, then close the rear switch and the tube would light up and everything was fine. I made sure she understood the procedure - keep the rear switch in the off position until the sound comes through.

After she'd departed, feeling satisfied that she'd been right all along, I was left to wonder what part of the control circuit had been at fault. I'd checked everything (I thought). Have you had a funny feeling like that? You probably found out what it was, like I should have done.

To Sweat or Not to Sweat

It's not often that a G11 makes me sweat, but one did the other day. The chap said he didn't want to spend more than twenty quid on it and I told him I didn't think that would be necessary.

I checked the h.t. line for a start. There was a short that disappeared when I removed the BU208A's plug, from the top. So I removed the line output transistor subpanel, fitted a new one and also a 1A fuse in the h.t. fuseholder (the one in there was 2.5A). Both the 3.15A mains fuses were intact.

With the new panel fitted I switched on. There was a flash from the 3.15A mains fuses and I found that two of the bridge rectifier diodes were dead short. I wondered

about this but fitted two BY127s and new fuses and tried again. There was a brief rush of sound and a spark from the tube base, then nothing. The glow switch on the power panel glowed and some smoke came from a resistor. The 1A fuse had failed and the new BU208A was short-circuit. Oh yes, I'd also taken out the green 470µF h.t. reservoir electrolytic and fitted a nice blue one.

The price was beginning to escalate so I thought I'd better check the tube. It was cracked. I took my blue 470µF electrolytic out and wrapped the whole thing up.

"Sorry sir, it'll be a lot more than twenty quid I fear."

Sam Boy

Sam is a local character who is slipped the odd pound by everyone who receives his "Morning Guv" greeting. This enables him to live comfortably without the need to work - except to clean the occasional car or something. He reminds me of a song we used to sing during the last war.

"Sam boy was a lazy goon
who never would work in the afternoon,
too tired was he, too tired was he.
Into the woods he used to go
just to get his head down low
under a tree.
When along came a bee
making this noise
bzz, bzz, bzz, bzz.
Go away you bumble bee
I ain't no rose, no silly little flower,
get off my (censored) nose, away from here.
If you want a bit of
you can
but you'll get no here.

A silly song maybe, but an evocative one. It brings back memories of the pubs in Gib (Main Street) and Alex (Beer Street) . . .

Prodnose: I don't see the point of all this and suspect you're merely trying to be vulgar. Your editor has been consulted and you are asked to stick to TV matters.

Myself: I'm sorry. I'll try to do just that.

Nobody Told Me

So where do all the turkey eggs go? The question occurs to me at this time of year and no one's ever been able to shed any light on the matter. Until the other day - in the pub this Sunday lunchtime.

"I asked him why you can't buy turkey eggs. The farmer said they only lay fertile ones which are hatched. The rest of the time they just gobble."

Well I never. Not like chickens after all. I also heard it said that farmers don't know how long pigs would live if they were allowed to. Then they turned to me and asked how long a TV set lives? I had to say that after ten years it's anybody's guess.

You won't believe me

Les Lawry-Johns

Last month I commented on the fact that TV sets can do some strange things. Here's another case, this time involving a Thorn TX9 chassis.

The TX9

A chap brought the set in and put it on the bench. I was busily engaged on a portable but he asked me to do a quick job, at the same time looking anxiously at the clock. So I put the portable to one side and whipped the back off the TX9. The 1.6A mains fuse had shattered and a light shone on the board revealed that the bridge rectifier diodes were in a sorry condition. I removed them and the red cover and wired the replacement diodes underneath for a quick test. After fitting a new fuse I switched the set on. The e.h.t. rustled up, a picture appeared and a look of profound relief showed on the chap's face. The picture then suddenly disappeared and a bright blank screen took its place. Very bright, as you get on certain GEC sets (PIL/20AX chassis) when the $82k\Omega$ resistor in the RGB output stage clamp circuit goes open-circuit. Before I could take any action the 1.6A fuse failed again, with a pop. This time a check on the bridge rectifier diodes revealed that they were innocent, and no shorts could be recorded. I fitted another fuse and tried again. The picture came on and seemed fine. Suddenly the blank screen appeared and while I was making some quick checks in the RGB output stages the fuse once more failed. Since the screen appeared blank white I reasoned that something was affecting all three RGB output stages, but why this should have blown the fuse puzzled me.

The chap became very agitated and said that if it was going to take any longer he'd rather return the set "to her". I didn't argue as I could see that he was upset, so I removed the bridge diodes to allow the red cover to be refitted and he took the set away.

Upon reflection, the strange thing was that the full h.t. was present at the collectors of the RGB output transistors, which are d.c. coupled to the tube's cathodes. I'd have thought that some 190V here would have blanked the tube instead of being accompanied by a bright, blank raster. The only conclusion I can come to is that C209 (0.1 μ F), which decouples the bias applied to the tube's grids, must have been going short-circuit intermittently. It's taken to the 190V line instead of to chassis to provide hum cancellation. But why should this have blown the fuse? I wish he hadn't been in such a hurry.

The Philips G6

You may recall the Philips G6 I mentioned a couple of months back – the one I sold many years ago when I could have sold my first G8. Well Mr. Furnace has since died but the set still carries on under the guidance of Mrs. Furnace. She phoned recently to say that the colour was now very slow to appear, so I went along to investigate. I was amazed at the clarity of the picture, though there was no colour. So I changed the EF183 and EF184 valves in turn. This made no difference, and the voltages all seemed about right. I then tried a cautious turn on the

core of the reference oscillator's coil. "Colour" cried Mrs. Furnace. "Bingo" I replied.

So there it still is, working and giving a perfect picture – with a tripler in place of the previous e.h.t. overwinding etc. Supplied in 1970. How about that?!

Infra Red

Ray brought in this Fidelity handset and was moaning because it wouldn't work. I had a radio set on the bench at the time so I switched it to long wave, tuned it to 200 metres and directed the handset at it. Nothing. I replaced the battery (Alkaline MN1604) and again pointed it at the radio. There was a series of clicks as the buttons were pressed.

"Well I'm blown" said Ray. "Is that all it was? It's three years since I bought that set from you and I never thought about it having a battery in it". I nipped upstairs and tried it on our CTV14S and it worked perfectly, as the radio set had said it would.

Thanks Denis

I'd like to thank those of you who offered me help with the Network colour portable whose start-up resistor would intermittently spring open. Special thanks are due to Network's service manager Denis Mott. I took down all you said Denis – about directing heat at the suspect components – and will follow this advice when the set comes back, as you all say it will.

Bounce, bounce, bounce

I was quite annoyed with a well known store that expressed doubt about taking my cheque (business account). Having identified myself, they accepted the cheque and overcharged me sixty three pounds. I got that put right and went away mumbling about their strange way of doing business.

Later that same day a nice man came into the shop and said he wanted a portable set for his daughter. He selected a nice black and white Pye and said he'd collect it later but would pay for it now. He presented me with a cheque for sixty nine pounds, on his business account, and wrote his address on the back. H.B. gift wrapped it and it looked splendid there waiting to be collected. He came back next day and expressed delight with H.B.'s efforts. He left in high spirits and we were pleased.

Next week we were not so pleased. The cheque had been returned as his account had been cancelled. I wrote a note to him at the address he'd given. This came back from the Post Office marked "gone away". Oh well, a small price for experience – it could have been a lot more.

Problems with Scotch

As I write this the festive season (Christmas through to the New Year) is at its peak. Here's a little story about a friend who's also a reader. He was at this party and had had a few beers. The host brought him a scotch (neat) which he was not used to drinking. So he topped up his

glass from a nearby water jug. "Um, not bad" he thought. There was a repeat performance and after that he began to feel funny but quite happy. Before he passed out like a light he was vaguely aware of a young lady emptying her glass into the water. "Wassat?" he enquired. "Vodka" she replied, "I've been doing it all evening - can't stand the stuff but you can't very well say so".

Next day he was decidedly out of salts. Daft you may say, but it can happen - especially if you're basically a beer man.

While on the subject of Scotch, an apology. Some time ago I did a job which was a bit of a swine for Mr. Webb. He gave me a china bottle in the shape of a ship's bell. Now I drink a lot of that brand of whisky and I said the contents were nice but not that brand. A few days ago I was presented with an ordinary shaped bottle of the same brand, with a black label marked twelve years old. It was identical to the scotch in the china bottle. Sorry Mr. Webb, I'm so used to the cheaper stuff. I feel ashamed of myself . . .

Developments in VCRs

Part 2

The first long-play VHS machines were introduced in 1983. For long-play operation the tape is run at half speed (11.7mm/sec). This has several implications. First the track width is reduced by half, from 49 to 25 microns: as this reduces the signal-to-noise figure new noise reduction techniques have been adopted. Secondly for stable playback in the long-play search modes special "jump" circuits have been designed. Further luminance signal correction is used to reduce h.f. noise.

LP Track Characteristics

The characteristics of the LP track are determined by the slower tape speed and the extra set of LP video heads fitted to the dead drum. In some early models the LP heads were mounted at an angle of 70° with respect to the standard-play heads, though in later models the two sets of heads are mounted on single assemblies as described in Part 1 last month.

With standard-play VHS operation the tracks are laid down side-by-side with a 1.5 TV line offset between the start of each track to ensure that lines with the same colour phase lie next to each other on adjacent tracks and that the line sync pulses on adjacent tracks line up. It's not possible to achieve this symmetry in the LP mode, due to the effects of tape speed and track angle. Fig. 1 shows the difference between the SP and LP tracks: you can see that with the LP tracks shown at (b) the 0.75 line offset (half the 1.5 line SP offset) results in the adjacent line patterns being displaced. The adjacent colour phasing is also displaced: whereas lines 2 and 316 in the SP mode carry the same PAL phasing the correlation between lines 2 and 316 is shifted by 0.75 of a line in the LP mode.

The standard colour crosstalk system used in VHS machines will cope with colour crosstalk in the LP mode but extra measures are required to eliminate the increased luminance crosstalk.

Picture Search

The main problems occur during picture search however, when due to the increased linear tape speed a video head will cross over a number (usually around five) of its own video tracks as it traverses the width of the tape. In the SP mode the line sync pulses replayed by a video head as it crosses the tracks it recorded occur in regular order - with drum speed correction - at 64µsec intervals. Picture search at the same speed will with LP tracks produce line sync pulses that are by no means at 64µsec intervals: without correction the result will be considerable picture skew (sideways pulling).

Steve Beeching, T. Eng.

A section of recorded tape is shown in Fig. 2: the upper edge of the tape is to the right and the lower edge to the left (the slanting recorded tracks are shown horizontally to make things clearer). A ch. 1 head is shown scanning across the tracks in the forward picture search mode. The burst phase is 135° on lines shown as clear blocks and 225° on lines with diagonal-line shading. In this example the head crosses over four of its own recorded tracks.

The top line of the timing part of the diagram, line (1), shows the original signal - it's a reconstruction of the replayed lines and colour phases as the head crosses over its own ch. 1 recorded tracks, i.e. tracks 1, 2, 3 and 4. You

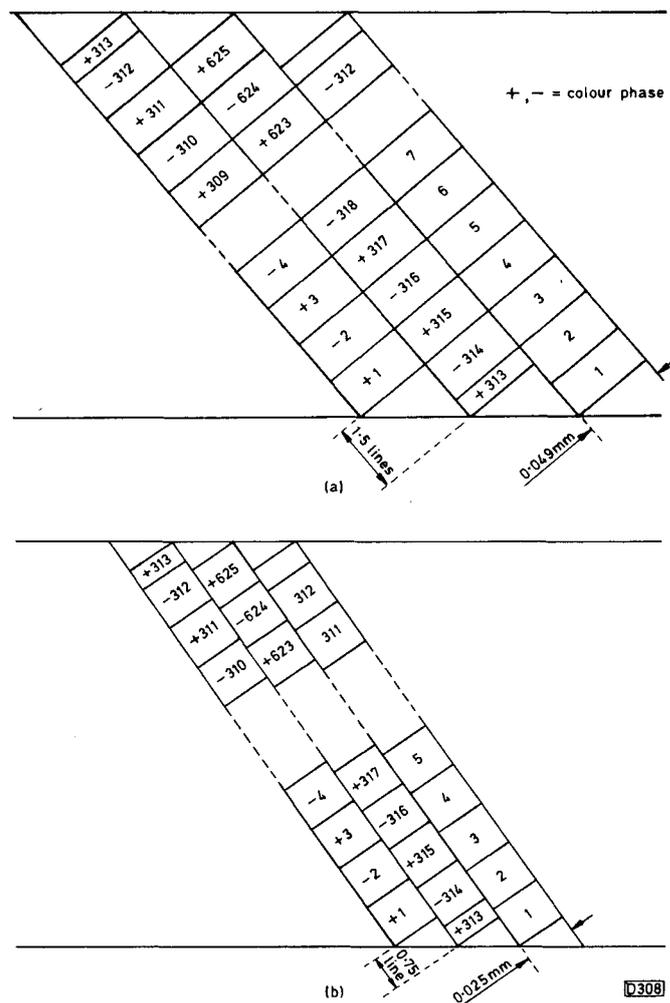


Fig. 1: SP (a) and LP (b) track characteristics.

Horror Stories

Les Lawry-Johns

This lady brought in a Fidelity CTV14S colour portable. "It's hissing" she said, "it doesn't belong to me - it's my neighbour's."

I removed the rear cover and plugged the set in. The line output transformer started to hiss and sparks came from it. "Leave it with me" I said, "I'll dry it out and see whether that stops the problem. Call back later this afternoon."

The Arc Over

So I dried it out with a hairdryer and sprayed it with Plastic Seal. Switching on, I was quite pleased to hear that there was no hissing. I plugged in an aerial and a good picture appeared. A nasty arc over then suddenly occurred around the line output transformer and the field collapsed to a line across the screen. I assumed that the spark had damaged the field output chip and was surprised to find that this was a TDA3561 - it was the later version of the CTV14S. I looked through my chips and couldn't find one. No one I phoned seemed to have one either. So I phoned SEME and got one the next day. I fitted it in the portable and was most annoyed with myself when it didn't clear the problem. Oh yes, in the meantime I'd fitted a new line output transformer which I had in stock. I now had a hissless set but there was still no field scan.

I must confess that I didn't have the complete circuit for this fairly recent set, so I was in some doubt. I phoned Fidelity and received some good advice. "If the voltage at the scan coil plug is less than 13V, change the TDA2578A sync/timebase oscillator chip." Again I couldn't find one and again no one locally seemed to have such a thing. Feeling a bit sheepish I phoned SEME again and they didn't shout at me. I got the chip the next day and fitted it. Glory be, a nice blank raster.

I plugged in the aerial and the sound was loud and clear but the blank raster remained blank, with the brightness and contrast controls having no effect. In fact the only way to control the raster was by means of the first anode preset, which is part of the line output transformer. I started to panic. The brightness and contrast controls worked on the TDA3562A decoder i.c., which has twenty eight pins, so I checked everything else.

All this would have been avoided if I'd replaced the line output transformer in the first place instead of trying to rescue the old one. Mrs. Clearwater wasn't going to be too pleased with her bill. When the set had come in it had showed a good picture and I had told the lady who'd brought it in that I'd phone the set's owner when I'd got it sorted out. I'd better get permission to proceed. So I did this first. Now to proceed . . .

The signals went into the TDA3562A but didn't come out. The voltages were present but the output voltages were high. So I looked for a replacement chip which I knew I didn't have. Now don't get me wrong. We keep lots of chips in stock - all those I think we'll need. I just didn't think we would need these so soon and we wouldn't have done if I'd only fitted a replacement transformer in

the first place instead of drying the old one.

I felt terrible when I phoned SEME again, but luckily this time a different girl took the order. All those girls must be nice - efficient too. In no time she told me that the chip was in stock, then proceeded to tell me where I lived. Something to do with the computer, Stan said. And I've always hated those things. Live and learn.

Anyway the next day the chip arrived and was fitted after a bit of a struggle. At last I was able to phone Mrs. Clearwater to tell her that the set was ready. "Funny" she said, "all it did here was to hiss, and you've had all that trouble". This may seem a trifle to you but it was a nightmare to me, feeling guilty all the time because I'd taken the wrong action in the first place. I'll know next time.

It Ticks

Eddie brought in his Thorn 9800. "There's not much wrong Les, it just ticks." I scowled at him. "When these sets tick you're in trouble, and so's the bloke who has to sort it out."

"Never mind Les, just have a look."

So when I had a chance I looked. It just stood there ticking. I brought my 25V power supply into action and fed 25V to the mauve lead on plug 4 on the decoder panel - these sets tick when the internal 25V supply is missing. Sound burst out but there was no sign of life in the line timebase - no e.h.t. I checked the line output transistor (VT851) and it said it was all right. I removed the screws and turned the line output panel up. The base-emitter readings didn't seem right, so I removed the plug from the right side panel and checked again. R858 (8.2Ω), which is in series with VT851's base, was open-circuit. I didn't have an 8.2Ω resistor so I put in two 4.7Ω resistors (KT3 type) in series. The set then worked beautifully, displaying a nice picture, but channel six was on instead of channel one. I touched selector one: the set hesitated then reverted to six. I touched all the other selectors and it still came back to six. I cleaned the front and this made no difference. So I removed the internal screws that hold the selector unit and pulled this out, away from the plug pins. I sprayed the front panel inside and the result, when the unit was refitted, was that position three was displayed and couldn't be shifted. I put the set to one side as I was fast losing patience.

I polished off a G11 and a Pye 725, then returned to the 9800. I pulled out the selector panel, leaving the front unit still secured to the front moulding by three screws. With these off it could be removed from the front and stripped down. The plastic strip needed a thorough clean and after doing this I refitted the unit to the cabinet, pushed the selector unit back on and put the screws back. It now came on with channel one displayed (fancy that): 3, 4 etc. could be selected but not channel 2.

My spirits were beginning to get low after all this. I replaced neon two and that didn't make any difference, so I checked the voltages and found that two differed quite a bit. My eyes strayed downwards and immediately caught sight of a red lead snipped off the panel that held the ML237 chip: the two ends were visible and were quickly soldered together. Channel two could now be selected and the job was done - except for an odd dry-jointy noise on the sound. Disconnecting the audio plug from the top of the signals panel stopped the noise so I concluded that the output stage, which is on the power supply panel, was in order. I spent some time replacing suspect items, includ-

ing the MC1358PQ intercarrier sound chip and associated components. The noise had then gone, but came back after a while. I eventually had to admit that the trouble could be in the audio output stage so I replaced the output transistor, using an MJE340 turned round: the trouble stopped and the sound remained clear.

What an ordeal! I know it doesn't sound much, but it

damages my confidence – which has always been sadly lacking – and I feel a bit let down when I'm tackling jobs that won't go right. When the thing is eventually done I feel a lot better, but I still have this feeling that it shouldn't have taken so long.

Eddie got a ticking off when he came to collect his 9800.

Vintage TV: US Sets of the 50s

Chas E. Miller

Since American design tends to reflect the "big is beautiful" school of thought (cars, buildings, etc.) one might think that their TV sets have all been on large and opulent lines. In fact the range of sets on offer around 1950 extended from some genuine monsters to sets that were much smaller than anything to be found in the UK at that time. But whatever the picture and cabinet size, there were certain design features common to all US sets – dictated by the different conditions in the States.

From the start American TV had been organised on commercial rather than public service lines. This meant that in large centres of population viewers could receive programmes from several different stations while in more remote, rural areas viewers required very sensitive receivers if they were to get acceptable pictures (the situation mirrored that of the early thirties, when powerful, selective radio sets were developed to provide reception of the proliferating number of radio stations on air).

Thus from the start all US sets had to be capable of receiving twelve channels (2 - 13, ch. A1 never being used for scheduled TV transmissions). This made the use of superhet tuning essential (in the UK the BBC's monopoly in the early days made it possible for many setmakers to opt for t.r.f. designs). To provide sufficient gain and selectivity, the tuner units and i.f. strips employed large numbers of valves compared to the designs with which UK servicemen were familiar.

The sets had to work from mains voltages between 110V and 120V – no problem with an a.c. supply since a mains transformer could be used, but liable to cause problems if the designer opted for the a.c./d.c. type of power supply. Those unfortunates who had d.c. supplies were likely to remain only would-be viewers since most sets eschewing a mains transformer tended to use a voltage-doubling circuit that would not, of course, work on anything other than an a.c. supply.

Pilot Table TV

We'll take a look at a couple of sets that illustrate opposite extremes of US TV receiver design of the period. First a small-screen set. The Pilot Model TV37 was a small table model fitted with a tiny three-inch c.r.t. with electrostatic deflection. It used a total of twenty valves, many of them double-triodes, and was suitable for use with 105-125V, 60Hz supplies.

The tuner unit employed three 12AT7 double triodes. Three triodes were used for low-band (55-25-87MHz) operation and the other three for high-band (175-25-215-75MHz) operation. Tuning across the bands was continuous, by means of ganged capacitors, the front band selection and tuning knobs being concentric. Each r.f. amplifier triode was used in the earthed-grid mode, with the input to its cathode via broadband transformer cou-

pling. Similarly the other two double-triodes were split between the two bands, as local oscillators and mixers. This arrangement enabled a commendably simple band switching system to be used: only the aerial input circuit and the h.t. supplies to the two local oscillators were switched.

The tuner was followed by a four-valve i.f. amplifier using 6AU6 r.f. pentodes. These were similar to but not as sensitive as the EF91 found in many contemporary UK sets. The vision detector used the only solid-state device in the set, a 1N34 diode. The following video amplifier stage employed a 6BA6 pentode, a valve more commonly employed as an i.f. amplifier in radio sets – it had a vari-mu characteristic. Its output was a.c. coupled to the tube's cathode, with the brightness control setting the d.c. level here. Intercarrier sound was a feature of many US sets from the start. In this one the intercarrier sound signal was tapped from the video amplifier's anode and fed to a single 6AU6 i.f. pentode. This was followed by a 6AL5 in a ratio detector circuit and a 35B5 as the output beam tetrode. Negative feedback was provided by returning the output valve's cathode to chassis via the secondary winding on the output transformer. The video output valve also provided the input signal for the sync separator pentode, a 6AU6 which was operated under unusual conditions – upside down in effect!

The technique used in this set to get round the low mains voltage was to obtain both negative and positive h.t. rails from the mains supply. The sync separator valve was operated from the negative rail: its anode load resistor and screen grid were taken to chassis while its cathode bias network was connected to the negative h.t. line.

The two timebases were basically similar, each using two 12SN7GT double triodes. Both oscillators consisted of cathode-coupled multivibrators, but while the field oscillator was operated from the positive h.t. rail, with the cathodes returned to chassis, the line oscillator was operated in the upside down mode, like the sync separator, its anode load resistors being returned to chassis. The two output 12SN7GTs were used as push-pull amplifiers to drive the deflection plates, and to get an adequate voltage swing both stages were connected between the negative (-120V) and positive (112V) lines. Even this wasn't quite enough for the field output stage, where the anode load resistor of one of the triodes was connected to a potential divider network across the e.h.t. supply. Fig. 1 shows the line output stage – the likes of which we've not seen before in this long-running series! A d.c. supply was connected across the deflection plates to provide centring (the same technique was used with the field deflection plates).

The negative supply was useful for several other reasons. It provided the supply for the contrast control,

within a single DBS channel designed for a 625-line signal. DATV is basically a bandwidth compression technique: the role of the digital component of the transmitted signal is to provide the receiver with control information to enable it to reconstruct the picture without significant degradation compared to the original. One example of the use of the DATV digital component is to carry information about which parts of the picture are moving and which parts are stationary – several bandwidth reduction techniques rely upon this information being made available to the receiver. Another example is to carry data to help reconstruct a sequentially scanned picture which, to save transmission bandwidth, has been converted from

sequential to interlaced scanning.

Early results of experiments at the BBC's Kingswood Warren Research Department indicate that the DATV technique can provide HDTV quality even where the signal bandwidth has been reduced by a factor between two and four. DATV can also be used to improve the performance of 625-line systems with associated digital capacity such as the MAC/packet family of transmission standards. The BBC's deputy director of engineering Charles Sandbank sees DATV as "a powerful technique to squeeze HDTV signals through the bottleneck of transmission channels using the sort of technology that will be in our homes in the 1990s".

Hush My Mouth

Les Lawry-Johns

If you remember, a couple of months ago I bragged about Mrs. Furnace's set: a Philips G6 which I'd sold to them some sixteen years ago. I mentioned how good the picture was. Well, she phoned the other day to say that the picture had gone into lines. So I packed my bag with care, taking with me in particular a PCF802 and a PFL200, the latter in case it was rolling too. In these sets you see the luminance output valve is a PFL200, the second pentode section being the sync separator.

We arrived at the house and switched the set on. When it had warmed up, the picture was in lines and I could see that it was also rolling over. So I decided to fit the new PFL200. As I did so I noticed that a small nearby resistor looked the worse for wear. It was one of the sync separator's anode load resistors, R2121 (68k Ω – it's a single-standard G6). Just to be sure I measured it and found that in fact it wasn't too far out. To be safe I replaced it, then tried the set again. This time the picture looked fine: I left Mrs. Furnace with her praise ringing in my ears. "Don't retire yet Les."

Next Day

Next day she was on the phone again. "The picture's all white with no picture but the sound sounds fine." I didn't doubt what had happened. The glass of the PFL200 had cracked when I'd put it in. It's happened before to ham-fisted idiots like me. So off I went again, this time with three PFL200s just in case.

The valve hadn't cracked, but I noticed a resistor laying in the bottom of the rear edge. It was the luminance output pentode's screen grid feed resistor R2111. My lightning sharp (what?) mind immediately pointed out that an open-circuit screen grid feed resistor would have caused the valve's anode voltage to rise, not fall, thus blacking out the screen. But I checked the resistor's value, which was correct at 2.7k Ω . So I refitted it and to be on the safe side checked the resistance to chassis (in case the decoupling capacitor was short-circuit, which it wasn't) and fitted another PFL200. The picture was now as poor as it could be. There was plenty of colour but no luminance. I decided to try the previous PFL200. There was a puff of smoke from R2111 and it fell off its tags again, this time damaged beyond salvation. I kicked myself hard, then fitted a new PFL200 and a new resistor.

We were now back to the lack of luminance.

I looked askance at the BC148 black-level clamp transistor in the luminance PFL200's control grid circuit: if the previous valve had gone short-circuit between its screen and control grids the transistor would have been dealt a mortal blow. I looked twice at the chassis and decided to remove the panel (three screws at the top). This done it was a simple matter to replace the BC148 – except that I didn't have one with me. I did however find a BC147, and decided to fit that. It worked fine and once more we had a lovely picture. I tottered out into the snow and managed to find my way to the nearest off-licence – I never drink at work but make up for it in the evening.

Mrs. Furnace phoned later that night, after I'd downed a few whiskeys, to say that her picture was rolling. "If you look at the back of the set you'll see that a knob sticks out at the lower rear centre. Turn it slightly, looking at the picture through a mirror: get the picture to roll down, then turn the control so that the picture rolls up and clicks into lock. O.K.?" I presume that when I refitted the rear cover the last time I'd moved the control slightly without realising it. She hasn't phoned back, so it's either all right or she's called in a more able engineer who's not thinking about retiring.

A Handy Tip

Here's a handy tip that's been passed on to me. Apparently lots of 20in. Philips sets fitted with the KT3 chassis are suffering from loss of blue and green to leave a predominantly red picture. The cause is loss of emission in the blue and green guns – the heaters are slightly underrun and the cathodes become contaminated. The tip is to short out the heater chokes on the tube base. Put a link across one of the two chokes and note the difference after a day or two. If there's no improvement, put a link across the other choke as well and leave the set working in this way for a day or so. When full emission has been restored, remove the links to leave the set in the original condition (chokes in circuit). I haven't tried this yet myself but we've a couple of KT3s that could do with it.

Reggie's Mum

Reg Butcher is in fact our butcher. He's an important person since he supplies Zeb with his weekly bones as well as our meat. When H.B. called into his shop last Friday Reg told her that his mother was in dire straights with her TV set. Would Uncle Les put in an urgent call?

So Les paid her a visit. She opened the door and I said "I've called about the TV". She told me my visit wasn't necessary as it had been fixed. I was a bit taken aback

because I knew they wouldn't call in anyone else and Reg always paid the bill. I told her that Reg had asked me to call.

"My Reg? Oh, you must mean the TV. I thought you were the telephone man. Come in." I went in and switched on the Thorn 8800. There was no green. She was talking away ten to the dozen about her ailments and the weather and what not whilst I tried to listen and answer, at the same time checking the voltages around the three top transistors. The voltage at the collector of the green output transistor was a lot higher than the voltages at the collectors of the other two output transistors. "What's wrong? Something gone has it? I suppose you'll have to order it and I'll have to wait as usual." I didn't answer as I was searching in my bag for a BF337. I found one, fitted it and the picture was then green. So I set the controls and wrapped the job up. "Oh you've done it then. I suppose they give you all those things in case you need them."

"No dear I have to buy them in case you need them."

"What happens if no one needs them?"

"I just have to keep them till they are needed."

"Oh, well. Never mind. Give my love to my Reg."

So off I went to present him with my bill.

"Thanks Uncle Les."

A Smashing Time

Later that day I called to a customer who said the set was too big to bring in. It turned out to be a Ferguson set fitted with the TX10 chassis – a 26in. model that lived quietly in a corner of the room, under a shelf on which were displayed many china articles which I presumed to be Ming or something.

I pulled the set out and removed the rear cover. The fuse under the right side red cover had failed so I looked suspiciously at the focus control. "There was a spark and then the set went off altogether." That confirmed my suspicion. I replaced the fuse and rummaged in my bag for a focus unit (the long type with improved insulation). I found one and took it out of the box. "Oh" said the lady of the house, "look at the pretty elephants on that box." So I had to tell them what Stan had told me months ago, about Small Elephants and Mammoth Elephants. I could see they didn't believe me and I don't blame them.

As I was fitting the unit my shoulder caught against the shelf. There was a resounding crash as the china descended into the fireplace. I managed to catch one lovely plate in its plastic holder and handed it over to the lady. As I did so the plate toppled out and joined the others in pieces in the fireplace. "Oh, I'm so sorry" I mumbled, expecting to be attacked at any moment. "Don't worry" was the surprising reply, "they were only raffle prizes." Well I never. Most other people would have done their nuts, raffle or not. I fixed the focus unit and refitted the red cover. When I switched on a good picture appeared. We watched it for a few minutes to make sure, then I took my leave.

Smoke and Moans

A chap was waiting when I got back to the shop. He was tapping his foot and moaning his head off. "You repaired this set for me a few months ago, now it's smoking."

"It's not good for it you know."

"It's not good for me either" he groaned. "Paying out all this money. I paid you ten pounds for this set only six months ago."

"No you didn't. You paid me ten pounds for an e.h.t. unit to save replacing the line output transformer which would have cost a lot more." The set was a Ferguson Model 3840 (1690 chassis) which has an e.h.t. rectifier buried inside the transformer. We fix an external, shrouded diode in series with the e.h.t. lead and this restores normal working. It was the lead from the transformer to the diode that was smoking, running a bit too close to the heatsink. I unsoldered it and slipped a used solder mop cover over it. This held it away from the heatsink. Soldered it up again and the job was done, i.e. no more smoke.

"There you are sir. You can stop moaning now. Good afternoon. May you have many more male children and don't let them smoke." As I rolled myself a cigarette.

Second-hand VCRs

Derek Snelling

In the November 1983 issue of *Television* I wrote an article on checking over second-hand VCRs. Since then some of the more modern machines have started to appear on the second-hand market. While everything said in the previous article still holds, certain extra points need to be borne in mind. So here's a short up-date on what to look for.

In the previous article the problem of pulsing with the Ferguson 3V22 was mentioned – the picture or colour moving from side to side when playing back a recording of a stationary picture. The most common cause of this at the moment is a worn pinch roller.

When checking in the picture search mode the presence of extra wide noise bars may be the first indication of head wear. The problem can also be caused by the fast forward/rewind idler slipping – this results in varying tension, particularly in reverse search. It applies of course only to machines fitted with this type of idler.

With the newer machines it's best to find out as much as possible about the model before you go to inspect it – in particular what it's supposed to be able to do and how many motors it has. For example, is the pause supposed to have a noise bar or not? Is the timer a one event or several type? Knowing the number of motors can have a bearing on such problems as poor rewind: if this is done by the same motor used for fast forward then a clean or a new idler is probably all that's required, but if each turntable is directly driven by its own motor the problem could well be due to a faulty motor.

Another point concerning motors. In some machines a noisy capstan motor is a precursor to wow on sound. If the machine you're checking seems noisy in the playback mode, press pause: if the noise goes away it's coming from the capstan motor; if it remains the lower cylinder could be worn.

Finally, most of the more recent machines have remote control. Don't forget to check its operation. Faulty wired remote control systems are usually easy to repair but beware of the type with multipin plugs. If the machine has an infra-red remote control system try to arm yourself with a set of batteries to counter any claim that "it's all right – just needs some new batteries".

Armed with the above notes and the previous article you should be able to avoid most of the pitfalls of buying a second-hand VCR.

Other things and other places

Les Lawry-Johns

There's more to life than TV sets, though there are times when this is none too obvious. Anyway, I thought you wouldn't mind if for a change I told you about some other things and places.

The Coat

One of these things is my overcoat. It was made to measure in 1938 by M. Burton and cost 37/6d. For those of you who want that in present day money it comes to one pound thirty seven and a half pence (I think). That coat is as good as new and still fits. It's double breasted and waisted. I've worn it twice during the last thirty years, which all goes to show how many funerals I've attended. Not quite true that, because an overcoat isn't needed in summer. Jealousy will get you nowhere. Oh yes, black melton.

The Journey

Next places. A couple of weeks ago the phone rang during the evening. HB answered it. She sounded a bit excited and I heard her say "We'll come up and get it". Since her daughter Colleen was with us at the time she didn't say anything more about the conversation. After Colleen had left I was told all about it. Colleen had always wanted a small Dachshund and we'd sent out signals a month or two back in the hope of getting one for her birthday. One of the signals had now been answered: there were three puppies ready to leave their mother and we could have our pick. All we had to do was to hang up the Closed sign and pop up to Dersingham. Lovely, but where's that?

I consulted my AA New Book of the Road. It's just up from Kings Lynn, near the Wash. My eye wandered down the A10 to Ely, thence to Cambridge and Theydon Bois to pick up the M25 to Dartford Tunnel. Not far. Any idiot could do it with a full tank of petrol.

On the following Tuesday the tank was full, the oil was checked and we were ready to go. Colleen arrived at nine thirty and we were off. First to the Dartford Tunnel which is practically on our doorstep. I missed it. We circled round and after a slight detour through Bexley we got there. Never mind, we were on our way in my safe and strong hands. Straight up the M25 towards Theydon Bois, steer to the right and up the M11 and on our way to Cambridge. On and on like the brave six hundred my Grandad used to sing about. Harlow came and went, then Bishop's Stortford. Flashing along the motorway while other cars flashed past as though we were standing still.

Undeterred we fought our way up past Cambridge and on to Ely, my eyes like diamonds behind my new specs (first time wearing them for two years), though I must admit they were getting tired. King's Lynn loomed up and we went round a roundabout and took the A149 past Castle Rising on the left and finally hit Dersingham. By now the Ouse was ousing all over the place and had been

for some time: waterways to the right of us, waterways to the left. On we went, past the fish and chip shop, slowly now, looking for the flags. At last we found them and turned into our destination. A man was waiting at the gate. He'd been waiting for a long time.

HB jumped out and greeted him profusely. I was amazed. Then Colleen did the same. I got out and we shook hands like gentlemen.

"This is my Uncle Roy" said HB.

"Well I'm buggered" said I.

"This is my husband."

"Well I'm buggered" said Roy.

HB hadn't even said we were going to relatives.

Into the house where Roy's wife greeted us warmly. Colleen looked at the large box on the floor from which some whimpering issued. "Goodness, aren't they beautiful!" she cried. One had a black patch on its back. She leaned over and picked him up, then realisation dawned. "He's yours" we told her.

We had lunch and gossiped. I finished off my whisky and started on some wine. They'd a lovely garden where the birds were well catered for. While we were admiring its features we saw a bag containing a marrow and some beans being passed over the wall on a rope. Roy took the bag in and came out with a bottle of home-made wine. It was tied to the rope and pulled over the wall. Nary a word was said.

"Does that happen often?" I queried.

"Several times a week - the wife makes good wine."

"So I'd noticed."

By now it was almost two and I was beginning to wonder how long it would take to get back. So with Dacksy in a box and plenty of food for him we took our leave and departed, heading for King's Lynn. Somehow I took the wrong road and we went through miles and miles of country. There wasn't much sun but what there was I kept to the right of me so I knew we were going south. Eventually we arrived at Ely. HB glanced at the petrol gauge. "We're half empty."

I'd also been looking at it. "We're half full" I said.

We were well on the way to Cambridge now, but instead of bypassing it I found myself in the town centre. So many bikes, I've never seen so many. We went round the market square just for fun and headed out of town, eventually finding the M11. Down we hurtled while cars flashed by in the outer lane. The petrol gauge by now read very low. It suddenly occurred to me that there are no filling stations on these motorways. I didn't want to go off and get lost again; I also knew that an empty reading meant that there were still two gallons on board. But at the speed we were going they wouldn't last very long. So I gritted what teeth I had and slowed down. We crept along the M25 and under the Dartford Tunnel. Then along the A3 till we were able to fill up just three miles from home. We were glad to be back. Dacksy had slept all the way and even Douggie (Colleen's husband) likes him.

So much for the trip and its confusions. I don't know how ET manages it: from one end of England to the other about twice a week. But I'm not that bad at navigation. JAR gets lost trying to find his way from one side of London to the other (almost) on a good day with the light behind him . . .

Oven Problem (Microwave)

You remember HB's sister Dot - her with the brown eyes? Well Dot has a microwave oven with two bulbs in it.

Return of the French Lady

Les Lawry-Johns

You may recall the French lady whose ex-husband taught Scottish rig workers how to swim (she said). She has another set now and it's giving trouble. A Pye 731 which also gave me trouble, mainly because I didn't want to carry it from her flat, round the square and out to the car.

The Pye 731

First there was intermittent sound which I thought was due to a dry-joint. It turned out to be a poor plug/socket connection. After getting this right the sound still wasn't clear – it sounded as if the speaker was rubbing. So I said I'd be back with another speaker as soon as I could. Shortly after I was back with a nice new speaker with a free floating cone and proceeded to fit it. She was nattering away and I vaguely heard something about the picture going off. With the speaker fitted the sound was fine and the picture showed no sign of going off. I tapped around but it wouldn't do anything wrong. So I left it at that.

Next day she phoned again and read out a long list of the times when the picture had gone off, apparently for very short periods and with no regular pattern. So I sallied forth again and this time managed to make the picture go off by applying pressure to the TBA990 chip on the decoder panel. I immediately resoldered every joint in the vicinity. After this I couldn't make it go off so I departed, thinking that that was the last of the matter. It wasn't. I had to return several times subsequently, replacing in turn the line output transformer, the BU208 line output transistor, the tripler and for good measure the 0.1 μ F first anode supply reservoir capacitor C563 (1.25kV). It was a nightmare and every time the phone rings I dread hearing that voice "allo, allo, this is ze French woman talking". And talking, and talking.

Mother-in-law's Set

A young fellow brought in this ITT hybrid colour set (CVC8 chassis) and said it belonged to his mother-in-law. I'd no idea whom he was talking about. The repair took some time as the boost capacitor had gone short-circuit (as usual) but had this time taken the PY500A boost diode and 56 Ω h.t. feed resistor with it. I did all that was necessary and wrote out the bill, charging fifteen pounds. A fortnight later all hell broke loose.

A voice which I vaguely recognised phoned to say that the TV set I'd "thoroughly overhauled" was giving trouble after being moved round the room. So I got the car out and nipped over to see what I could do. I was appalled when she opened the door. I knew her all right, and knew the language to expect. Talk about that young girl with the long blonde hair, she was a saint in comparison. Leaving aside the language, the woman was demanding to know why a set that had been "overhauled" so recently should give trouble so soon. She waved the bill in my face.

"Look at this, fifteen **** quid. You should be ashamed of yourself."

"If I'd known it was your set I wouldn't have touched it in the first place" I bawled back.

Anyway, she insisted that I saw the set working. The

picture was wavy and the colour was in bars. I thought that moving the set had disturbed a poor earth connection. It transpired however that the AD161 l.t. regulator transistor (left side) was leaky. I had one with me and it was in before you could say knife. The picture was now perfect.

"I wonder how long that will last. You people certainly know how to rob us poor ****s."

"Well this poor **** is going off now, having performed a miracle in front of your eyes. I don't intend to repeat the performance. Goodbye."

I got to the car while she stood at the garden gate waving the bill in the air and bawling about wanting her money back.

Beardy's Brother

I thought I'd seen the last of beardy and hope I have. His brother came in however, struggling with a 26in. TX10. The back cover was held on by Sellotape and I felt sorry for myself.

"This television you see, there's very little wrong with it. Just a little something that stops it working properly. I'll leave it with you and call back later when you've fixed it for me."

I switched it on and the tube's heaters glowed. Oh well, that's a start. He'd left the remote control unit and although I pressed the brightness button no raster appeared. The first anode voltage was low at about 200V. I smelt a rat – someone had been messing about. I turned up the first anode control until the voltage measured 400V. The raster was now present but with an aerial plugged in there was no picture. I checked the tuning but nothing could be resolved. The tuner was suspect but a new one had recently been fitted. So I turned my attention to the i.f. module. Fitting a replacement made no difference. Back with the original and out with the tuner, using a yard of desoldering braid because whoever had fitted it had been over generous with the solder. I fitted a new 1043 and got a picture that was very grainy. A.G.C. I thought, so I adjusted the small preset on the i.f. panel and it made no difference at all.

I thought the new tuner might be faulty and like a fool fitted another. Again no difference. The aerial socket may be? I connected a new one to the tuner, just hung it on so to speak. The picture was best with only the inner connected, the braiding left off. This confused me so I fitted another aerial socket which did the same thing. I left it for a moment to serve a customer who wanted to know why he was getting severe interference in the shape of another picture floating around on top of the one he wanted.

"Continental interference" we advised him. "Leave it alone and it'll go away."

When I got back to the TX10 I'd forgotten what conclusion I'd reached, and came to the conclusion I'd not reached one. I then injected signals into the i.f. module and found that the output was weak. So I refitted the new one. This restored normal reception and I wrote out a bill for a very reasonable (I thought) £20. I was prepared for a performance and I got one.

"Both these things faulty? One I can understand but not two. Are you sure?"

"Yes I am sure and it took me long enough to work it out. In any case I've only charged you for one."

"Twenty pounds is a lot of money. Can you make it fifteen?"

"I'll make it nothing" I snapped, tearing off the Sellotape that held the rear cover. "I'll put back your tuner and your i.f. unit and you can take it elsewhere."

"Oh no, no. I was only joking. Here's your twenty pounds. I never argue about money."

I refitted the Sellotape and off went beardy's brother, nattering away in a language I didn't understand.

Fidelity Portables

The 14in. Fidelity portables (ZX2000 chassis) are now using up line output transformers at a rate of knots. If you handle them you must keep a couple of transformers in stock, complete with the small subpanel that enables the newer type to be fitted to the older type of panel. A leaflet explains the steps to be taken – remove the focus unit and first anode control etc.

One came in the other day with the complaint that though it chattered away in various tongues it didn't show a picture. I didn't at first associate this with the line output transformer as the fuse usually fails when the transformer is defective. In this case it hadn't because the 10Ω, 2W h.t. smoothing resistor, in the feed to the line output stage, had gone instead. This left the chopper working and the supply to the TDA3190 sound i.c. intact.

Mrs Steadfast's New Set

Mrs Steadfast has bought a new Fidelity from us. She complained because it didn't have a carrying handle and I complained because of the tuning arrangement. It has three buttons at the rear: up the scale, down the scale and store. It would have been easier if these had been at the front or on the side. It's easy once you've had a bit of practice however. Her old set, a 26in. Swedish monster, had to be carried out through the door, along a corridor and into the back room. I did it alone, though there was a male who didn't lend a hand present. I'll remember that Harold: the set was very heavy, and me in my condition. But I didn't complain. I never do.

Whatever Next?

I had a shock the other morning. I got up fairly early to let the dog out and was pottering around in the kitchen when I heard a knock on the shop door. There was a large van outside, with Sheepless Nights on the side. The man at the door asked whether it would be all right to bring the bed in.

"I haven't ordered a bed" I said.

"I did" came Honey Bunch's voice from the toilet.

So in came this great big bed, which she assembled later in the day, and out went my nice comfortable favourite.

As we sat there that evening H.B. asked why I was knocking back the whisky (Cutty Sark this time).

"So I can face getting into that high, firm monster in there" I growled.

"We'd had that old one for twenty years. It had a dip in your side and was all misshapen."

So we went to bed and had a good night's sleep, much to my surprise. New bed – what next?

next month in

TELEVISION

● INSTALLING TVRO TERMINALS

Part 1 of a new series by Harold Peters on the principles and practice of satellite TV reception. Next month's instalment deals with basic installation – dish mounts and siting and tuning in the receiver.

● THE ELECTRIC MOTOR

The large numbers of VCRs nowadays being handled by service departments have brought with them a need to know something about electric motors. Mike Phelan's new series explains their operation and, since they can be expensive items, provides hints on ways of repairing them. The many different types of electric motor will be described.

● TIMEBASE SYNCHRONISATION

J. LeJeune deals with sync circuits, from the simple one-transistor sync separator stage to the complex arrangements used in modern sync processing i.c.s. Flywheel line sync will be explained, also the generation and use of sandcastle pulses.

● RGB INTERFACING CIRCUIT

Brian Webb presents a simple circuit that can be used to interface a microcomputer with RGB plus sync outputs to an older set with a delta-gun tube. An inexpensive way of obtaining an RGB monitor.

● SCAN YOKES FOR COLOUR TUBES

In Part 3 of his series on colour tube technology Eugene Trundle takes a look at the scan yoke and the ways in which yoke design has evolved to meet the needs of modern self-converging and pinfree tube systems.

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Thanks Denis

Les Lawry-Johns

Some months back (January) I mentioned a Network colour portable – Model NW1414, fitted with the Grundig GSC100 chassis. The original fault was that the fusible resistor R607 in the start-up circuit would go open-circuit for no apparent reason. Resoldering it restored normal operation, and despite my suspicions nothing showed up during a prolonged soak test. Network's service manager Denis Mott subsequently got in touch and provided some tips. He drew my attention to his article in the September 1984 issue of *Television* and said that the set would come back to me. Well it did, after some months though.

This time I followed Denis's suggestions and also checked a number of other things. No fault could be found. I eventually resoldered R607 and everything was lovely for a day and a half. Then it pinged again and we started replacing components en bloc. The result of this was that the set refused to come on at all when R607 was resoldered. My language was deplorable and Zeb went away and hung his head. Spock jumped up on to the highest shelf in the shop. Honey Bunch was out so she didn't have to hear it. Suddenly I stopped swearing. This is what we'd wanted in the first place, a fault that was there all the time. Unless I'd put it there when replacing various resistors and transistors. Supposing one had been defective? But I'd tested them all before fitting, as I always do. So I put this thought out of my mind and started a general check.

The line output thyristor, which had checked all right during previous tests, was now open-circuit between its gate and cathode. It should read about 30Ω one way and about 200Ω the other, with no reading between the anode and the other two electrodes when disconnected. Now it showed no reading at all. It was speedily replaced: the set worked for the rest of the day and the week that followed.

The Blind Comes Up

A chap staggered in carrying a 26in. Ferguson set fitted with the TX10 chassis. He explained that after about an hour's use a blind came up from the bottom, leaving just a few inches of picture at the top with the rest of the screen blacked out. I'd never heard of this one before.

I let the set run for some time, not really expecting anything to happen as the shop is a lot cooler than the customer's home. Then I removed the back cover and brought the hairdryer into action. I directed hot air at the field output transistors and the surrounding components. When I lingered on the TDA1044 chip the bottom of the screen blacked out and the blind rose until only the top few inches of picture remained. I grabbed the freezer but with the heat off the blind came down again and a normal picture was displayed. Again I heated the chip and again the blind rose, only this time I was ready with the freezer and the blind came down as soon as the chip was cooled. I didn't have a TDA1044 in stock so I looked under it to see what the ventilation was like. As there wasn't any near the chip I drilled a hole to let in some air. I explained to the chap what I'd done and mentioned that the TDA1044

would be here when the blind came up again – if it does come up again.

The Bush BC6004

Shortly after our second encounter with the Network set a Bush BC6004 colour portable came in. Another German chassis, this time manufactured by Saba. The customer's complaint was that it would be fine for an hour then shut off! It's the set with the small enclosed unit at the top right containing the line output transistor (BU208), line driver transformer etc. I changed the BU208 and the set worked fine for the best part of an hour. Then it shut down again.

I tapped the BU208 with the handle of a screwdriver, more out of frustration than anything else. The set then started up and shut down after an hour. This time I moved the line output stage housing cautiously and the set started up again. So I took the housing out of its socket, having removed the two screws, and carefully resoldered all the input joints – though none looked suspicious. I then touched up any other joints that looked the slightest bit shaky and refitted the unit. It played away for the rest of the day and as far as I know it's still playing away quite happily. I wish I was.

GEC C1404H Series

These 14 and 16in. portables are made by ITT in W. Germany, using the CVC1110/CVC1112 series chassis. They suffer from a common fault: a bright white screen, suggesting that the tube's cathodes have lost their bias. The RGB output transistors with their 12kΩ collector load resistors are mounted on the tube base panel. No voltage will be found on these resistors. The source of the 150V supply is the line output transformer: the series-connected rectifier diodes D504 and D505 are on the right side of the main panel. There's a small surge-limiter resistor in the feed from the transformer, R514 (1.5Ω). It looks very small and is intended to be, acting as it does as a fuse. It doesn't burn out for nothing. The cause could be leakage in the diodes or in the associated 10μF reservoir capacitor C506 or the 1μF smoothing capacitor C1002 on the tube base panel. Occasionally one of the three RGB output transistors may be at fault, but this doesn't happen very often. Then of course it may be the tube . . .

This and That

The editor must be taken to task for a couple of mistakes that got into my column in the June issue. First about my overcoat. I said it cost 37/6d made to measure, also that this works at one pound eighty seven and a half pence. In print it said one pound thirty seven and a half pence. I also said that we filled up with petrol on the A2 just a little way from home. This came out as the A3, which is a long way from home. Oh well, I suppose we can't all be perfect . . .

It amazes me what Honey Bunch gets given to her. Boxes of chocolates by the dozen (we don't eat chocolates but Zeb does, so does her aunt). Last Sunday lunchtime we were in Dave's for a drink and H.B. happened to mention that she hadn't had duck's eggs for years. Next day one was brought in. I haven't had (given to me) a bottle of whisky since Christmas, and I'm not likely to till next Christmas. It won't be long now however. This year has simply rocketed by.

June's Daughter

Les Lawry-Johns

You may recall me telling you a while back about a frustrating call on June, when her dog Piddler pinned me to the floor and was about to tear my throat out just before he recognised me. Well, her daughter got a relative to bring her set down to me and carry it in for her. It was a large 26in. ITT set fitted with the CVC5 chassis. Yes, an oldie – but in good condition. The report was that the picture went off but the sound stayed on.

I switched it on and when it had warmed up my neon glowed when brought near the PL509 line output valve. So the line output stage was active, but there was no sign of a raster – or sound for that matter. I tested this and that and when I checked the voltages in the sound i.f. stages dance music blared out.

"There you are" said June's daughter.

"That's radio music" I growled.

The same music came through when I was checking the final vision i.f. transistor and this suggested to me that the fault was in this stage. Now most of you know how difficult a fault in this section can be. I switched off and cold checked the BF123 transistor (T17). I couldn't get any readings from base to emitter or base to collector but I wasn't sure where I was in the confined space. So I reasoned (?) with myself. If the BF123 was open-circuit, I could hold a BF197 across its contacts as a check. Switch on again and allow the set to warm up. Sort out a BF197 and hold it in position, base to base etc. True TV sound burst out and a picture appeared on the screen.

"There it is" screamed June's daughter.

This scared me (women's voices do) and I withdrew the BF197. The sound and vision continued and I gave a sickly smile.

"Aren't you clever?" said June's daughter.

"Aren't I?" I agreed, wondering what the hell had happened. Tap the vision i.f. stage and move it about a bit. The vision and sound continued whatever I did. Pull the aerial out and switch off.

"We'll put the back on and pretend it's finished. Then we'll switch it on again to surprise it. That's what we'll do." And that's what we did. The picture was now grainy and horrible though the sound was o.k.

"Bloody tuner's up the creek" I bawled. "It wasn't a minute ago." So off came the back cover and I moved the tuner about a bit. A lovely picture came on then went all grainy again.

I removed the covers and laid the tuner on its side. Resoldering the r.f. amplifier transistor's base and emitter connections did the trick. After that it wouldn't go grainy again. We put the rear cover back and tried again. It was still all right. So they took it away, after I had warned them that the sound and vision could fail again at any time as I didn't trust it. The set hasn't been back so I suppose it's still all right. But what brought the BF123 to life – if indeed it was faulty? Perhaps it's me that's faulty? I can imagine E.T. chuckling away down there in Sussex. "Yes, it's you who's faulty Les!" Well I know I'm silly but the inspector of taxes had my books last year and couldn't fault them: there's not many can say that! And I did check the soldered edge connectors, so there.

You'd think the way I natter on that I don't have any real troubles. No so. Take the Thorn 9000 that came in the other day for example. I put a new tripler in it last week and this week it came back with the report that it was "no go – probably the switch". It wasn't the switch of course and there was plenty of h.t. at the collector of the R2540 Syclops transistor. I moved over to the line driver transistor and found that there was only 12V or so at its collector instead of around 150V. The same voltage readings were obtained at its base and emitter. Like a fool I dallied around the subpanel for a while, finding wrong voltages all over the place, also aware that I'd had this trouble before and had solved the matter in minutes. At last I listened to the voice in my head. It kept saying "thick film unit".

I got one off the shelf and fitted it, telling myself that it wasn't going to help matters. When I switched on again the e.h.t. rustled up. I knew it was going to be the thick film unit all along of course. It's just that I like to give myself a bit of exercise every now and again.

The Family Dawe

I've mentioned the brothers Jack and Owen Dawe before. I've just discovered that there's another. Ray. I couldn't believe it. All I can say is that their parents must certainly have had a sense of humour.

Ray said he had a set that didn't like odd numbers. We asked him what it was. It turned out to be a Ferguson set fitted with the TX10 chassis, and it wouldn't select channel one – or three or five etc. "You've a duff chip" I told him, hoping I was right.

He brought the set in and sure enough a new SAA5012 remote control receiver/decoder chip restored normal channel selection. Peace was thus restored in Ray's household. He'd altered the selectors so that 2 gave BBC-1, 4 gave BBC-2, 6 gave ITV etc. but his wife had said that interfering with the set would bring bad luck. She was right.

After we'd replaced the chip and reselected the programmes the set worked for one day then gave up. He brought it back and we investigated. I lowered the rear, i.f. panel and the set behaved itself, showing a nice picture and producing nice sound. I raised the panel and it lapsed into sullen silence. Feeling a bit annoyed I lowered the panel again and everything was all right. Inspection showed that the cable loom was subject to pressure from the i.f. panel when it was raised and that the insulation had punctured. Only a slight movement was required to put the cableform out of risk. I seem to remember having had this one before, but such is the state of my deplorable memory that I can't recall when it was. The set now functioned correctly however and Ray had to face his wife . . . "I told you so" she said.

This and That

Stan from SEME had popped in to take an order. He also wanted to know if I'd seen Ray Ling the Chinese fence. Daft, isn't he? Shortly after he'd gone a nice couple popped in to say hallo. They were from Blackpool and being in the area had decided to run Les to ground – they're regular readers. Thanks for calling, Chris and Jill. Hope to see you again sometime. Also hope you weren't too disappointed. I did get that set done. Can't remember which one it was, but I was in a bit of a dither over it for a while.

Dogs can Fly

Les Lawry-Johns

They say that pigs can't fly. Well dogs can, and Zeb did last Saturday night. We were in the lounge above the shop and I was nodding off as usual, having had one or two. Now over the shop front we've an awning to keep the sun off the windows in the summer. There was a sudden commotion outside and Honey Bunch raised a window to see what it was all about. Two chaps on the other side of the road were shouting and shaking their fists at the world. They saw H.B. and shook their fists at her. Zeb was watching and didn't approve of this. In a flash he leapt out of the window, on to the awning and in one more mighty leap he was across the road, confronting the lads with bared teeth. They didn't hang around after that and the next job was to get Zeb back. He came in and bounded upstairs with tail wagging to prove that his incredible flight hadn't hurt him. The two fellows weren't the only ones to get badly shaken. H.B. and I were as well at the thought of what could have happened.

First Ordeal

The reason I'd been nodding off was partly because the whole day had been horrible. It started first thing in the morning when a Ferguson TX10 was brought in. I started on it right away, removing the rear cover and checking the supply to the right side fuse. Nothing. So I checked the plug fuse and the continuity to the on/off switch then to the right side fuse. Everything was in order. I then realised that I hadn't plugged in the bench supply.

When power was applied to the TX10 the sound came through loud and clear but the LED on the tube base panel didn't light up. There was e.h.t. so I concluded that the trouble was on the tube's base panel or the supplies to it. The voltages were present however and the tube's cathodes were high. The LED had failed. I looked for one but couldn't find any. My ordering had gone wrong. Stan from SEME was at fault for not reminding me. I won't forget to have a go at him. But what to do? We want a voltage drop of about 3V. I stuck in a 75Ω resistor and got this, but there was still no raster. I checked the transistors on the panel and came to the conclusion that one of the BF460s was leaky. Once again I couldn't find one, so in desperation I fitted a BD410. This worked and I got a nice picture – for ten minutes. Off it went and I pondered. The BD didn't have the slope, so it had to be a BF like me. I fitted a BF338 with a heatsink. Good enough for the G8, good enough for the TX10. It worked all day and was collected at five o'clock.

The ITT CVC32

The next horror was an ITT CVC32 with no field scan below the centre line and only about three inches of picture above it. I dived for the field output transistors and found one with funny readings. After changing it I expected to have a full field scan. It remained as before, with nothing below the centre line. I tried a new field timebase subpanel but this made no difference. I checked all the electrolytics associated with the output stage, then

carefully checked the subpanel above the scan coils. They were without fault. Further checks of just about everything relevant still produced no result. The scan coils were the only thing left. They measured all right but I still suspected them. The set is still here, standing around doing nothing because the customer won't accept the estimate for fitting a new set of scan coils. I'm waiting to find a yoke somewhere.

The GEC C2110

My next failure concerned a C2110 series GEC set. The complaint was that the set would work perfectly for hours, then suddenly roll and following this produce a bright blank raster. It didn't do this for me. The picture rolled and pulled for a short period before going bright cyan, i.e. red remained normal but the tube's green and blue cathode voltages both fell. Investigation showed that the 12V line was missing as the spring-loaded resistor on the right-hand side had pinged open. As soon as this was soldered back the picture returned to normal for another few hours. I changed the field scan panel, also the audio panel in case it was loading the 12V supply. No luck. The screen became bright for a few seconds before the resistor pinged open again. I looked for a video panel but couldn't find one. In fact I'd had this set for some days as the owner was away. He came and collected it on the Saturday, showing no surprise that the cause of the fault hadn't been located. I suggested he took it to Geoff in Moon Lane. He did but wouldn't accept the estimate Geoff gave him. Where it went after that I don't know – unless he uses it for only a couple of hours at a time.

Pye Portable

Our next case was a Pye colour portable fitted with the Philips CTX chassis. The mains fuse had shattered and there were open-circuit tracks to and from the bridge rectifier. This had gone short-circuit and the 4.7Ω surge limiter resistor had gone open-circuit. I fitted a KBL08 bridge, a new fuse and a 4.7Ω resistor and wired across the open-circuit tracks. The set then came on but was tripping. Investigation revealed a short-circuit diode in the line output stage. Question: why did the diode fail with the minor explosion the customer reported? Any ideas? I kept the set on test for a day or two as a precaution.

Barry's Sanyo

Barry, a friend of mine in the CID, asked me to have a quick look at his 26in. Sanyo colour set. Now sets from the far east frighten me so I don't normally take them in and I don't keep spares for them. I said I'd have a look however and I did. Not so far eastern as it turned out, probably made in Sanyo's Spanish plant. The fuse was shattered and the BUY69 chopper transistor was short-circuit. The switch-off thyristor was open-circuit – it's the discrete component version of the Siemens self-oscillating chopper circuit. I put in a BU326 transistor and a BT116 thyristor. With a new fuse installed I confidently switched on. Nothing. The BU326 wasn't being switched on. Everything was in order in the start-up circuit so, not having experience of these sets, I carefully put the shorted BUY69 and the thyristor back, refitted the blown fuse and suggested to Barry that he took the set to a cleverer chap than I, such as Geoff up Moon Lane.

"Ha!" said Barry, "I'm going to tell that magazine you

write for you're not the clever fellow you tell them you are!"

"Don't worry – they know it already!"

The Last Ordeal

I thought that the misery must be over. It wasn't. A couple I know quite well brought in a 20in. Fidelity set.

"It's gone dead. Someone's had a look at it but said they couldn't get the chip." Apparently it belonged to their son.

I whipped the back off and was confronted with an early ZX2000 chassis. Tapping the line output transformer I commented that "this is the weak link in these sets". I connected the meter to its feed resistor and got a short-circuit reading. "Instant diagnosis" I smirked.

I gave them an estimate and they popped off to consult their son, promising to phone within the hour. I thought I'd make sure and removed the transformer – no easy matter. It was shorted so I took a 3000 series transformer off the shelf and fitted the little base panel so that it would fit the 2000 chassis. I fitted it nicely and removed the focus

and first anode controls from the tube's base panel, wiring the leads from the transformer directly to the base panel as the controls are on the transformer (in case you didn't know).

I fitted the e.h.t. cap and switched on, expecting to hear the rustle of e.h.t. All I heard was the h.t. humping unhappily. I looked closely at the panel and found that the 10 Ω h.t. smoothing resistor had been removed. I'd made the test from the 4.7 Ω resistor between the 10 Ω one and the transformer. Clever me. So I fitted a 10 Ω resistor and switched on again. Hump, hump.

I then checked more carefully and found that the previous repairer, not suspecting the transformer, had had a good go at the h.t. supply and that the circuit now didn't agree with the circuit diagram at all. At this point I lost patience. I removed the new transformer, refitted the old one and the controls and wrapped it all up just as I'd found it. When they phoned I told them it had been messed about with and that I hadn't the patience to sort it out. Sorry readers, very sorry – but it was late and I wanted my bath and a drink. I had both and then had to put up with a flying dog. What a life.

Letters

TVRO DISH INSTALLATION

The advice on using the sun to find due south, given in Part 1 of your satellite TV installation feature, seems to me to require some qualification. It takes no account of the so-called "equation of time", which gives the difference between the time read by a sun dial and clock time. The order of the difference can be seen from the mean between the sunrise and sunset times published in many daily newspapers. With a maximum value of about 18 minutes in November, the changes are of the same magnitude as those shown in Table 2 for different locations in the British Isles.

*L.G. Whitehead, C.Eng.,
Theydon Boise, Essex.*

Harold Peters comments: I have seen obscure references to this but decided to keep things simple. My readings certainly work out in practice here in East Anglia. Perhaps other readers would like to comment on this?

Mention should also be made of "sun outrages", which occur in late autumn and early spring when the sun follows the orbital plane, heating up a LNB with more s.h.f. than it can handle. The result is a noisy picture – also the possibility of a blown LNB. Even replacing a LNB can be a hazard at such times, due to the sun being focused on one via the dish.

RESISTOR PROBLEMS

Gordon Haigh's article on resistor troubles prompts me to make the following comments on the subject.

The convergence potentiometers used in some sets (the GEC C2110 series for example) have a tendency to burn out, particularly when an attempt is made to adjust them. The two line tilt controls in the C2110, P501 and P502, are used as simple variable resistors. These two controls are very often set so that less than half the track is in circuit, the power dissipation being confined to that section of the track – hence the tendency to burn out. Reliability can be

improved either by using lower potentiometer values or by connecting a suitable value resistor in parallel with the original control. Where both ends of the track are in circuit, try a slightly lower value potentiometer with series resistors at either end to maintain the correct circuit resistance. These modifications will restrict the range of adjustment but the reliability will be improved.

A similar situation often occurs with the height control in a valve field timebase, particularly where the value of the control is 2M Ω or thereabouts. This can be replaced with one of a lower value – after checking the values of any series resistors and also the valve.

Finally a digression. My Feathertouch ITT CVC9 has recently been changing channels intermittently. I was just about to collect some tools when I noticed a fly walking about on the touch pads – perhaps it thought the red lights were strawberry jam or something! I've subsequently observed the same thing happen on a number of occasions. The only cure is to hang a small book over the front edge to cover the channel selector. This is worth bearing in mind if a customer complains of intermittent channel changing, particularly during the summer months.

*S. Pearson,
Chipping Norton, Oxon.*

UNUSUAL HUM PROBLEM

The problem with a Rank set fitted with the A823 chassis was a 50Hz hum bar. Closer inspection revealed that it was a slowly moving, sharply defined band of modulation on the field scan.

Theory number one was that the thyristor power supply was the cause. A new choke and electrolytics failed to fix it however. I admitted defeat and substituted an old faithful Thorn 3500 – only to get identical symptoms! We eventually discovered that the fault was present only when a newly acquired Philips G8 in a room twelve yards away was switched on.

Theory number two was interference via the mains supply, but examination of the mains filter capacitors and even trying a second G8 failed to cure the trouble.

Theory number three was that a magnetic field generated by the house mains wiring deflected the beam. This

The Barefoot Contessa

Les Lawry-Johns

Not long since H.B. decided that our Alsatian Zeb was lonely. She enquired around and located a suitable friend for him in the Medway towns – a three-year-old German Shephard who had had puppies and had been seen to . . . One of her puppies lives a few doors from us and was on heat. It had been sitting on her owner's lap, which by a chain of events led to some problems. Her owner offered to accompany H.B. to pick up our new dog you see. As H.B. was driving, the new dog ("Duchess") sat on the lady's lap during the return journey. The arrival home was spectacular. As Duchess trotted in through the door Zeb caught what he thought was her smell and went mad. There was a monumental struggle, with TV sets toppling over everywhere and me losing my temper over this unseemly mess.

Zeb's sense of smell is more acute than I thought, but it didn't take long for him to realise that his attentions were unwanted. We very nearly have peace now but their boisterous playing seems to continue nearly all day long and completely upsets my dubious ability to think straight. Being of German descent I felt that the new arrival must be a Contessa rather than a Duchess – so Tessa she is. The few customers who came nowadays tend to get a shock when confronted by two such large hounds, but at least their sets are assured of protection.

The Hitachi

A friend of mine lumbered in carrying what appeared to be a 22in. colour set. I saw the name Hitachi and started to make excuses.

"It's my mother-in-law's, Les. Just have a look and see if you can get rid of all that green."

I guessed that the tube was at fault but thought I'd make sure. He left it and in due course I took the back off, expecting to find an ordinary in-line gun tube that needed reactivating. The more I looked at it however the more confused I became. There was a single first anode supply, which is normal. It read correctly. I looked for the red cathode and found two pins marked RK on the left-hand side, two marked GK at the bottom and two marked BK on the right. The voltages on all these pins read the same, so the tube seemed to be at fault – there was brilliant green with very little red or blue.

Not realising what I was up against I looked for a common heater to connect the reactivator to. I checked the GK pins with the set switched off and got the reading I expected. I then looked for a grid pin and found two earthed. So I hooked up to this earth and to the pin marked RK and applied the heater voltage to the GK pins. There was a funny noise and the heater lit brightly. Heater, not heaters. I disconnected the reactivator and tried the set again. The picture came on immediately but was in magenta (red and blue) with no sign of green. Mind you, it looked a lot better than that green picture, but it dawned on me that I'd damaged the green emission. I studied the base more carefully and realised that each gun had its own heater supply, hence two pins marked RK etc. The cathodes are in fact the heaters and I remembered reading in the magazine some years ago about this unusual Hitachi tube. Why hadn't I remem-

bered earlier? It would have needed a new tube anyway . . .

Another One

Shortly after this episode a nice couple came in and said they wanted help with their TV set which they couldn't bring in. I enquired about the make and the nature of the trouble. An Expert they said, the fault being that the top of the picture came down and went back up every few minutes shortly after switching on, the display eventually settling down. Memories of my friend's GEC-Hitachi set came back to me. Remember the elastic band that wasn't successful? I'd eventually had to take out the thick-film field output module and resolder all the contacts. In this way we gained the upper hand. I guessed that the Expert was actually an Hitachi and promised to nip over and solve the problem the following morning – only hoping that I was right.

I went, I was right, and I did it. What a clever boy! Incidentally these sets have the transit screws in the back cover in the same way as the TX9 etc. This makes removal of the cover a bit of a puzzle when you're used to dealing with sets that have been serviced before and don't have the screws fitted.

Sad Tales

Another 26in. ITT colour set fitted with the CVC5 chassis caused me a nightmare the other day. The complaint was intermittent or no colour. I had to call at the house which was well out of town, so I resolved to do it there rather than bring it back to the shop. The colour came on at first. It then went into bars and faded out, leaving a pleasant monochrome picture. I tried another channel. The colour was again present but then vanished as before. Maybe the colour reference oscillator preset R311 was out of adjustment? I tried a new setting, but no luck. I tuned in the channel and the colour briefly appeared. In a nutshell I checked every likely item on the decoder panel. Nothing seemed to be at fault and all the voltages were as expected, changing only when the colour faded. I overrode the colour killer and faint bands remained despite adjustment of R311. I shunted the crystal and adjusted the relevant cores. Nothing doing.

Eventually I took it back to the shop, having struggled through the house and down the garden with this heavy set. Back at the shop I again tried to hold the colour and found that it faded before it reached the decoder. I checked the i.f. panel but this seemed to be in order and correctly aligned. Time was slipping by and so was my patience. I suspected the channel selector unit which can cause signal problems but decided to return the set to the owner with the recommendation that he took it to one of the brighter boys in the neighbourhood. I ran away feeling very ashamed of myself.

Back at the ranch H.B. told me that an acquaintance, an ex-TV engineer, had taken his own life. He'd lost his wife some months earlier and had been very depressed ever since. This completely deflated me and I've yet to recover. I know it happens, but even so . . .

(HA11703), part of which forms an a.g.c. stage. The input at pin 12 was correct but the output at pin 11 showed up all the distortions – the sync amplitude varied with picture content, in fact even the overall signal amplitude varied with picture content. So much for the a.g.c.!

From pin 11 the signal path splits. One path is the E-E one to IC3. The other returns to IC2 where after further processing, including a.g.c. circuit drive, the signal becomes the record f.m. for the video heads. This path incorporates a filter to remove the colour subcarrier

information. Just before it re-enters IC2 at pin 16 the luminance only signal is d.c. clamped by X5 (2SC2647C), which is driven by composite sync pulses from the sync separator in IC3. Because of the fault the waveforms were wrong all around this circuit, but the trusty meter showed that the d.c. conditions were correct everywhere except at X5 whose base, collector and emitter were all at the same voltage. An out-of-circuit check confirmed that this transistor was leaky – a BC184L in its place restored normal working.

R.R.

Tiny Tim's Nightmare

Les Lawry-Johns

Tim felt very sad as he sat at his desk, swinging his little feet under his stool – as he had done some two years ago, hoping for a new pair of shoes. He had got some shoes then. Now it was a different matter. The half yearly clutter of bills demanded his attention: hundreds of pounds that would put him back in the red again, and he had only just got out from under the last lot, at a cost.

Why didn't these people realise who they were demanding money from? He fought his one man battle against inflation with extreme dedication. He didn't charge a lot for his services, much the same as he had done years ago. Then he had been rich and could dine out several times a week and drink the best wine. Now he couldn't afford to go out at all, not even once a week at Sunday lunchtime. He and Tinker Bell used to pop into the pub for an hour or two on Sunday and spend his whole week's wages. Now his wages buy a couple of bottles that have to last the whole week while he and Tinker Bell watch TV – and occasionally a film on the video to ensure that when they pass it or them on to Tim's brother he won't get a heart attack. Tim's brother has a very bad heart, much worse than Tim's, and the sight of all those young girls panting away might upset him. Tim didn't think they panted because of the fellow who was standing nearby. More at the thought of the money they'd be paid to pant. And why do they keep kissing their fingers? They must love themselves a lot more than they love the fellow who just stands around. I wonder what he gets paid for? Tim wondered whether anyone would pay him to stand around while . . .

The Collection

Just then a lorry pulled up outside. It had a load of junk in the back and Tim guessed who it was. Tim the Tinker had come to collect his small portable. He came in and Tim handed it to him.

"What was wrong with it then?"

"I've written it all down on the bill sir."

"I can't read."

Tim's mind (our Tim) raced. If he couldn't read, the bill could be upped a bit. Instead of eight pounds fifty he could charge fifty quid.

"Ten pounds" he said.

"It says eight pounds fifty down here."

"Just testing your reading, just testing you see."

"I can read money, don't you worry about that" said Tim the Tinker.

So he paid his eight pounds fifty and walked out. Tim heard him say to the other chap in the lorry "tried to con

me, the twisting old B . . .". Tim felt ashamed of himself. What a nasty fellow he was.

Visit from Keith and Alex

Keith and Alex had come up from Portsmouth mainly to bring me a set of scan coils – you remember the CVC32 (October)? I was so grateful, though I didn't actually need them. I'd already got over the trouble by replacing the scan coupling electrolytic which I'd previously shunted as an inadequate test. As the faulty one was leaky it had to be taken out and a new one put in. Silly me.

Keith gazed around and Alex gazed around the other way.

"Just as we imagined it would be. Beyond belief."

"Sorry, very sorry" I apologised.

"No, we didn't mean it's old fashioned or anything like that. It's just that it all fits into place. The awning outside where Zeb jumped out and earned undying fame, and the inside with all the bits and pieces. It's nice really."

Keith was the one who wrote that first letter (June) about the lack of test cards.

"You'll have to get up earlier" I suggested.

Alex was admiring our till. "Right out of Coronation Street" he commented.

"It's easy to fiddle" I said, "and I like it."

A chap came in for a universal tripler and Keith showed me where to find it on the shelf. The chap wanted to know how to fit it in an ITT CVC32. I explained how to connect the leads, joining the diode and earth leads together and soldering them to one side of the focus control. The chap went out with the diagram I'd drawn for him and Keith commented that it wouldn't last long with the leads joined. I wondered why he said that. I always join them. Am I doing something wrong? When I say always, I mean in the ITT and similar sets.

Anyway they departed in high spirits and I wonder if I'll see them again. All the best. Keep the flag flying and all that sort of thing!

The Siemens Set

A 26in. Siemens set came in the other day and I couldn't make head or tail of it. A new line output transistor was required and the chopper circuit had been tampered with. The line output transistor is a BU600S, which I didn't recognise at all. I tried a BU208A but this didn't work and the open-circuit tracks to the chopper unsettled me. I suggested to the chap that he took it up to Geoff. He did, and Geoff had to suffer too.

Next day Geoff phoned to tell me not to send any more lunatics up to him. He also told me that the correct replacement would have been a BU208D. I keep these in stock and kicked myself for not having tried one.

The joke is that another set of exactly the same type came in an hour later and I was able to oblige my friend

by fitting a BU208D in a couple of minutes, with complete success – the resultant picture was superb. Nice sets these, though the chopper circuit does frighten me a bit. I should read the magazine more thoroughly.

The Cummin of Keith

As I was busily shovelling up what the dogs do in the garden (concrete) I heard Tessa barking her loud, deep bark in the shop. Zeb doesn't seem to bark so much now that the bossy female has taken control. I went in with the shovel of you know what and found a man standing in the shop.

"Won't be a second" I said, "I'll just bung this lot down the toilet then I'll be with you."

"Don't worry Les, you look as though you've a lot on your hands".

I knew that voice, and the Casablanca image. It was Keith Cummins himself.

After I'd disposed of the er stuff we had a chat about this and that and whilst he drank the coffee H.B. had made him (sugar, no milk) he told me about the job he was engaged on. Some sort of secret service matter, which is why he told me all about it. Thanks for calling Keith.

Whatever Happened to Tiny Tim?

Sorry I've been rabbiting on about myself as usual. Actually Tim was put to the test this last Saturday afternoon. He was standing behind the counter talking to young Phil, who pops in on Saturdays to pick up a few tips and dodges. A smart young couple came in and asked Tim if he would mind looking at their set. Tim said he didn't mind looking, went outside to their car and did just that. It was a Grundig set of the 5010 variety. A big 26in. monster. Phil came out to help, and they all struggled in with it.

"There's sound but no picture, and some things have burnt up in the bottom."

Armed with this information, Tim removed the rear cover and swung down the chassis. He noted two burnt out resistors at the bottom right. They appeared to be connected to the tripler. Tim's ice cool brain began to function, under the gaze of the young lady whose amused smile showed that she didn't think Tim knew what he was doing. Tim held his neon near the line output transformer and it lit weakly. He switched off, removed the feed to the tripler, and switched on again. This time the neon lit brightly. Tim announced his opinion.

"The tripler has failed and has burnt out the resistors in the beam limiter circuit."

The circuit was folded up inside the set. Tim removed it and gave it to Phil to check on the resistors. He then went over to the shelf and selected a universal tripler.

"Do you want me to fit this and replace the resistors?" he asked.

The girl still smiled. "Do you think that will do it?"

"Yes dear, with a bit of luck, and provided the transformer hasn't been damaged" said Tim as he fought off the urge to smack her bottom.

"O.K. then" they agreed. Tim fitted the tripler carefully and wired it up. In the meantime Phil had found the resistors and Tim fitted these as well. He switched on and a lovely picture appeared on the screen. The girl's smile faded and Tim was glad.

"Pay up and take the thing away" he said crossly.

They did and Tim and Phil drank their coffee, relieved that the Grundig hadn't wanted more doing to it.

next month in

TELEVISION

● SERVICING THE SONY KV1800UB

Though this was one of the first Sony colour sets to be released in the UK large numbers were sold and many remain in use – still giving good results. Unusual features include a decoder that deals with the PAL signal though not in the conventional way. David Botto provides a detailed report on faults and servicing.

● TV BEHIND THE CURTAIN

This time Keith Cummins' wanderings have taken him behind the Iron Curtain. A report on the different TV conditions in the USSR, including strange aerials and hybrid colour sets with SECAM decoders.

● CRT HEATER VOLTAGE CHECKER

The practice of deriving the c.r.t.'s heater supply from the line output transformer makes it difficult to check the voltage. Yet there are few more important voltages in a TV set since the heater supply has a profound effect on tube life. J. LeJeune's novel checker is simple, easy to use and fairly immune to misuse. It employs a lamp, a preset resistor, a silicon solar cell and a 50µA meter. It will enable you to ensure that the c.r.t. heater conditions are correct – a check that's particularly useful after fitting a regunned tube.

● BRUSHLESS DC MOTORS

The direct-drive, brushless motor has become the most popular type for video use. In the concluding instalment of his series on electric motors Mike Phelan describes this type of motor, the basic drive circuitry and some common fault conditions.

● MORE ON ACTIVE DEFLECTORS

Roger Bunney provides practical guidance on the choice of aerials and amplifiers for use in active deflector systems.

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