Hot Pyes

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TIME after time we've noticed that if you get one awkward one in of one type you're bound to get half a dozen of them in a row. A little while ago we were plagued with Thorn 3500 chassis, one after the other, all awkward, nothing easy. Then came the Philips G8s, one after the other again until we cried out in anguish, enough, enough, let's have an end to it. The other day though it was the turn of the Pye group hybrid models – 691, 693 and 697 chassis, Pyes, Ekcos, Invictas, etc. Normally these sets are no trouble to us at all: one can usually put a couple of items in one coat pocket, a couple of tools in another and carry a soldering iron etc. to the scene of the crime in full knowledge that if the customer has described the symptoms correctly the job will be done in minutes. You know the sort of thing: picture went off, sound still o.k., a smell of burning (or saw smoke) and switched off (or the set went off completely as the fuse failed). The one or two items in this case would be a 100kΩ 1W resistor, an 0·1μF 1kV capacitor and the usual fuses normally in the trouser pockets anyway.

The Stock Troubles

Avid readers will have no trouble in identifying this common fault. The 0·1μF capacitor (C224) decouples the boost line feed to the c.r.t. first anode presets, coming via the 100kΩ resistor (R227). The capacitor shorts, the resistor cooks and the fault then becomes the same as if the 0·47μF boost capacitor has shorted, the difference being given in the description, i.e. smoke or a smell of burning which doesn't occur when the boost capacitor goes short-circuit because the PY500 immediately passes excess current and the fuse fails.

For the benefit of less avid readers, or if the symptoms have not first been properly described, the way to tackle the condition is as follows. Check the fuse. Connect an ohmmeter from the top cap of the PY500 (or PL509) to chassis. If there is a low reading (should be about 1MΩ, give or take a few hundred thousand – let's not be mean about this, say the needle moves on the ×1 scale or more likely swings over to give a definite reading) there is a short on the boost line. There are two likely conditions (lots of others, but two likely). One is that the 0·47μF boost capacitor C218 on the line output transformer assembly has shorted, the other that R227 has become a charred image of its former self due to C224 shorting, the 100kΩ now being more like something under 100Ω (hence the unspecified movement or deflection on the low ohms range). The clue is in the appearance of the 100kΩ resistor. If it's clean and brightly showing its brown-black-yellow bands, suspect it not. Neither suspect C224 of course. Snip one end of C218 (the fat capacitor) and read again.

Ah, you may say. This is all very well, but where do we look for the 100kΩ resistor, to see if it is feeling poorly? Ah, we reply. It all depends. If the right side section is mainly a metal box, look underneath on a tag panel about half way between the PL509 and the PCF802 valve bases, with the 0·1μF capacitor laying along toward the shift controls (early models), or smack in the middle on later models (691). If the right side is occupied by a vertical printed panel (later 697 chassis), note the top centre red box with the fuse inside. Look down the centre about a third of the way down, just above the transformer, and there it is, with C224 leading off to the right. All right?

Unstable Sound

Well now, none of this applied to our row of Pyes, and more's the pity. The first one seemed simple enough to start with. No valves glowing. Early model, metal box on right side. Move it out to check the supply line. O.K. Check PY500 and PL509 heaters. O.K. Move the box unit back but fail to notice that the rubber sleeve has slipped down from the end of the focus unit (the e.h.t. end). Find break in heater circuit on left side colour-difference amplifier panel – crack in track to one of the PCL84 heater pins. Repair track. Valves light up. Lovely picture and sound. Sharp crack as e.h.t. discharges to convergence panel. Picture still o.k. Sound goes funny. Very slow motorboating, low sound clear, loud sound increases the rate of motorboating to make the effect garbled.

This could be due to an open-circuit electrolytic in the power unit or a fault in the audio module, possibly a faulty transistor. Check the easy thing first. Clip a high capacitance electrolytic across the supply to the module. No improvement. Fault must be in module.

Now the module in these earlier models is a Mullard LP1162. The most common complaint is failure of the output transistors. This cooks up the 2.2Ω resistors which are connected between the emitters for bias purposes. Replacement is no joke, as we've mentioned before. Rush down to van and say unkind things to sleeping guard dog who continues sleeping. Rummage in spares box. Two modules. One used, one new. Rush up with both. Fit new one. Similar symptoms as before. What now? Don't know. Check this, that and the other. Remove front control panel again. Remove module again. Fit used one. Lovely clear sound. I hate modules. Make sure e.h.t. cannot discharge again. Carefully mark modules u/s.

No Signals

Carry on to next set not too far away. Ekco with the 697 chassis. Varicap tuner. Raster and noise on screen, just as if aerial is disconnected. Aerial is disconnected. Plug in aerial. No change. Check tuning. Suspect loss of h.t. to the two 9·1kΩ resistors on top of the tuning panel (Fig. 1). H.T. present, and just over 30V at the TAA550 zener. Now what?

Remove tuner panel and check voltages. A.G.C. o.k. at A. +12V at B, nothing at C. This is where the tuning voltage should be. Check again and hold tuner steady. Tuning voltage o.k. at around 10V and lots more noise. Reach round and tune in sound and vision. I.F. unit on one knee, tuner on other, very uncomfortable. Let go of tuner. No tuning voltage, no sound only hiss. Move legs. Sharp point on i.f. panel penetrates trousers. Has to be 200V h.t. Move more quickly and wish I were dog in van. Examine tuner more carefully. Intermittent short to earth from tuner

voltage point C when tuner is moved. Take off cover and find tiny piece of wire which had no right to be there.

This was a bit of a relief actually, because we've had our fair share of trouble with varicap tuners of various types. It's usually a faulty transistor or wires touching (just) the side wall, but we had one where the tuning voltage was lost due to a coil inside the screened compartment intermittently touching the wall of the compartment (lid soldered on).

Intermittent Blue

So having restored normal signals and replaced the tuner and i.f. panel we thought we'd finished. No such luck. "While you're here," said the gaunt Mr. Moneypenny, "perhaps you'll clear a minor thing. The blue keeps going." I like this "minor" business. It implies that it won't take a moment, any fool could do it if he wasn't so busy, and of course it won't be worth charging for.

Anyway, the blue did drop out as we watched the test card, and promptly dropped back in again. We diagnosed a poor contact under the blue PCL84 on the CDA panel. Inverting this, we were surprised to find hardly any sign of deterioration. All was bright and clean. No poor solder, no cracks, nothing. Tapping around above the panel produced blue drop out all around the area however. More gentle disturbance finally seemed to cast suspicion on RV27, the B—Y drive control which is part of the blue preamplifier transistor VT31's load, as the collector voltage of this transistor came and went as the preset was moved one way and then the other. Fitting another preset seemed to clear the condition, but on checking the control later nothing seemed to be wrong with it at all.

Dealing with Weak Line Hold

Back on the bench sat yet another specimen, this time a Dynatron set resplendent with a black front control panel with lots of little chrome knobs, but still a Pye at heart. Again the 697 chassis (glad of this really, because we're still not completely at home with the later solid-state 725 etc. with vertical swing panels). The note read "loses line hold after one hour, also poor brightness and colour." Coward to the last, we tackled the poor colour and brightness first. A new PL802 worked wonders for the brightness and definition. Soldering suspect joints under the panel and improving the earth contacts to the rear edge clips seemed to clear up the colour.

Now for the line hold. Always tricky on these sets, purely because of the vertical right side panel. The PCF802 line

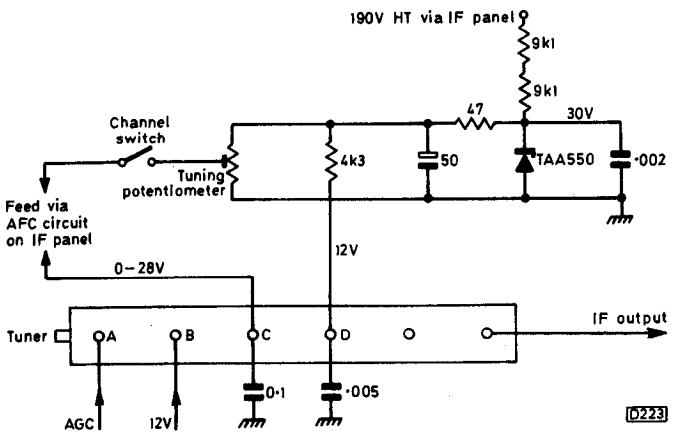

Fig. 1: Varicap tuner supplies, Pye 693/697 chassis. There are six channel selector switches/tuning potentiometers.

oscillator, line hold control etc. are at the bottom and are most inaccessible. So we don't use normal methods of fault tracing on these sets when such line troubles raise their ugly heads.

Remove the side and top edge connectors, partly withdrawing the unit. Remove the cover of the line output transformer and the clip earth connectors. Remove the front PK headed 4BA screw which secures the e.h.t. tripler. Lower the panel. Components can now be seen. First check the 47kΩ flywheel sync circuit flyback pulse integrating resistor R203. If it looks discoloured or reads less than 47kΩ on the meter, change it. If it's much less than 47kΩ, check the discriminator diodes D40 and D41 which can suffer if R203 goes low. Remove one end of R210 (in series with the line hold control) and check its value (100kΩ). If much less than 100kΩ, replace it. Even if it's not at fault now it soon will be and can cause other troubles. Then check the large 16μF electrolytic and the smaller 1μF and 4μF ones. These are C215, C213 and C210 respectively, in the line oscillator circuit. If these checks are inconclusive, change the PCF802 and the feedback capacitor C211 (320pF). This completes the normal checks.

Swing up the panel, refit the tripler screw, line output transformer cover, not forgetting the grommets at either end, and the earthing clips, especially that of the focus unit. Replace the edge connectors and refit the unit. If the convergence is wrong or there's something else not working, recheck the edge connectors. This method of attack has proved its worth over and over again. Indeed, after this the Dynatron dyned very well.

Explosions

We have always had difficulty in identifying which Dawe brother is which. Jack Dawe had bought a 26in. Invicta set from us some four years ago (697 chassis), whilst his twin, Oven, had more recently (about two years) bought a 20in. Thorn set (9000 chassis). We had not heard a word from either by way of trouble, which is not bad when you think of it, although we have had a drink with them from time to time.

Anyway, in walked Mr. Dawe. "Hallo Oven," we greeted him.

"I'm Jack" he corrected me. "Where's the complaints department? That rotten set you sold me's gone wrong. I bought it only four years ago. Frightened the life out of our dog when it went bang. He hasn't been the same since. And there was a flash on the wall at the back, or so the wife says. I wasn't looking at it at the time myself."

"How's the wife Jack?" I enquired. "Shelagh isn't it? Lovely girl! Went bang eh? I wonder why?"

"I'm on my way home now," said Jack. "You coming?"

"Rightho Jack, I'll follow you up just as soon as I've put a new mains dropper in this brand new set that I've just unpacked."

So off we went up the hill. Pity his wife's name wasn't Jill, but we mustn't invent names just for effect, must we?

When we got there the poodle was running round in circles, apparently chasing his tail.

"Been doing that ever since the set went bang" said Jack.

"Probably checking up to see that he's still all there" I suggested helpfully, being an expert on dogs.

Taking the back off the Invicta we were not surprised to find a nasty mess on the top centre of the right side vertical panel. The mains input is taken directly to the 2·5A fuse, with tracks leading to the edge connectors which lead back to the on/off switch. The supply then comes back again to the panel to the rectifiers etc. This means that the supply

fuse and its connections are alive when the set is off, a point well worth bearing in mind.

When there's been a minor explosion, it's difficult to say exactly what the chain of events were. There's some molten copper and a blackened area. The idea is to clean up the panel, accepting the fact that there's been conduction across the panel between the tracks, the cause of the trouble in the first place rather than the failure of a component. First establish which tracks did which job (when they were there) and carefully wire up as neatly as possibly, cutting away any remaining sections of conductive panel. Some confusion is possible, so the original circuitry must be kept clearly in mind.

There's another and very important factor. Some long thin tracks run down from the top edge connectors, near the area likely to have been damaged. Although they may have been intact at the time of the original trouble, subsequent handling of the panel may have extended any fine cracks farther across the paxolin, fracturing these tracks. This can lead for example to field collapse due to the 20V supply to the height control suddenly being lost. Careful examination can save an awful lot of trouble later.

Having patched the patient up nicely, the set was tried out. Picture rather dark at maximum brilliance. Fit new PL802. Plenty of brilliance. Convergence had wandered over the years, but responded to a few minor adjustments. All in all, not bad for four years' service.

Incidentally, the audio module is replaced by an i.c. on some of these 697 chassis, and there's a separate 1N4002 diode to supply the i.c. instead of the supply being derived from the bridge rectifier.

A further note may be necessary. We've outlined what happens when there's a breakdown of the panel insulation itself. This condition should not be confused with the type of blow out that occurs when the mains filter capacitor, wired across the on/off switch, goes short-circuit. This shatters the fuse of course, but can also damage the print beneath, discolouring a small area of the panel. If the panel itself isn't damaged but the tracks are, check the capacitor which will almost certainly be found shorted.

The next job was to seat the poodle in front of the set so that it could see that it wasn't going to go bang again. Being satisfied on this point, it no longer chased its tail or whatever it was. With the poodle straightened out we thought that a quiet five minutes would be in order. It wasn't.

No Raster

A Pye 691 was apparently no longer entertaining its elderly owner. Off we went armed to the teeth, to wrestle with the final electronic cock up of the day. We won't bore you with the old girl: suffice it to say that she didn't stop nattering from the time we entered to the time we exited. The set however was a different matter.

The fuse had failed and there was a short from the top cap of the PY500 to chassis. Oh well we thought (as best we could against the old girl's incessant chatter), back to the old routine.

Turn up the unit to have a look at the resistors. We expected R227 (100kΩ) to be charred – as mentioned earlier. It wasn't. Or rather they weren't. In fact the 100kΩ resistor had been replaced by two 56kΩ resistors in series, and these were obviously in the best of health. Looking around however we found the 100kΩ resistor (R210) to the line hold control burnt out instead. This made the look under the unit worthwhile after all.

Now whilst this could affect the h.t. supply to the line oscillator, it wouldn't explain the boost line short which we foolishly attributed to the 0·47μF boost capacitor on the line output transformer. Having fitted a new 100kΩ resistor to the hold control, we were then stupid enough to remove the side panel of the transformer housing to expose the said capacitor, instead of checking something else first. Needless to say the 0·47μF capacitor proved innocent when disconnected at one end. Then the penny dropped.

Take out the PY500. No short then present. Heater-cathode short in the PY500 you stupid clot. Why didn't you check that first?

Well, if we had we wouldn't have found the duff 100kΩ resistor to the hold control. All right then, make excuses for yourself, after all it is getting late and the old girl is still on about her sister who died three years back.

Right then. New PY500, new fuse, no shorts. Switch on, lovely sound, real nice that sound. Wonder why the valves aren't lighting up? The sound which sounded so nice by the way wasn't really sound, just a nice loud hiss since the aerial was not in. Put the aerial in. No difference.

Wait a minute. Even if the valves were not lighting, that's nothing to do with the sound. It's not a 691! It's got a varicap tuner that needs h.t. dropped to supply the 30V for tuning. Quick check. No h.t. Now the old girl is on about her school days. Wish she'd stop for a moment so that I can think. Turn the power unit round. A.C. supply o.k. at one end of the surge limiter resistor, not at the other end. 5·6Ω wirewound. Fit another. Try again. Sound o.k., news reader now competing with old girl.

Right. Why don't the valves light up? PY500 is getting heater supply and is new. What about the PL509? Open-circuit heater.

Oh dear, where's it all going to end? Fit new PL509. Heaters light. Allow time for set to warm up. Rustle of e.h.t. Can now see news reader. Not bad. Square up all round and wonder what the sequence of events must have been. Switch set off and wait for lady to stop going on about present day school standards. At last we manage to get our bit in and escape. Name on the cheque, Nightingale. Not very clever and logical was it? We do try to be but confusion usually sets in toward the end of the afternoon. Getting old.