



# The Serviceman



## WHAT'S IN A NAME—OR A BRAND?

"Someone's not playing the cards I dealt 'em!" So runs the rather classic quip. Perhaps not surprisingly, it came to mind when I sat down to recount this month's main story.

It began in a perfectly routine fashion with a telephoned complaint from a set owner that the picture on his TV screen was getting less and less clear and he'd decided that it was about time he had someone look at the set. He volunteered, further, "that the picture seemed to have wriggly dots all over it."

From the description, I gathered that the "wiggly dots" would probably be what we would more commonly describe as "snow" or "noise" in the picture — and this is what it turned out to be, when I was at last confronted by the offending receiver.

Perhaps a word of explanation would not be amiss for the rising generation of would-be servicemen:

Most of the spurious signals which produce these disturbances on the screen occur in the circuits and valves in the front end of the receiver itself, and are due to slight irregularities in current flow. With a strong input signal these disturbances are so weak by comparison that they are of little consequence. Providing the set's AGC system is working correctly, so that the gain of the set is suitably reduced to prevent overload, this favourable signal-to-noise ratio will be maintained right through the set to the picture tube. The picture is, therefore displayed to best advantage.

However, when the incoming signal is weak the disturbances in the front end circuits may well approach them in magnitude, resulting in a poor signal-to-noise ratio. To be sure, the AGC system will have sensed the weaker signal and advanced the gain of the set to cope with it, but this will do nothing to improve the signal to noise ratio. All that will happen is that the disturbances will be amplified along with the wanted signal, and eventually appear on the picture tube screen as "wiggly dots." In an ordinary sound-only receiver, the spurious signal is heard as a rushing or swishing sound and the term "noise" is therefore appropriate.

In a television receiver, the same phenomenon produces "wiggly dots" on the screen, mixed up with the wanted image. In some cases, the effect is described as "snow" but, in technical circles, it is more usual to stick to the word "noise." In fact, "noise" is used very widely throughout the electronics industry to describe the spurious energy which a circuit or a piece of equipment superimposes on any kind of wanted electrical signal.

Well, after that "Answer Man" effort, I'd better get back to my original story.

*Taken out of a television tuner, this valve is very clearly branded 6BQ7A, but . . .*



Faced with visual "noise" in a television receiver, the first thing to suspect is the aerial and its connections, for any fault here will interrupt the signal to the receiver, causing the AGC circuit to advance the gain in an effort to compensate — with the result already outlined.

So I slid the set out from the wall, checked to see that both sides of the aerial lead-in were connected — to the right terminals — and that the input was not being shorted out by a stray strand of wire. But everything appeared to be in order in this department, and with the lead-in to where it disappeared through the wall.

So I walked out through the back door and followed its further path along the wall, out over the guttering and up to the aerial. Again, as far as I could see, nothing was wrong but I did note that, helpfully, the aerial was of a type having a folded active element that should show up as a DC short across the ends of the feedline. Accordingly, I disconnected the lead-in from the set and

measured across the two ends with an ohmmeter. It showed very low DC resistance, indicating that the circuit was apparently complete, up one feedwire, through the folded dipole and back down the other feedwire.

Assuming the aerial to be in order, the noise problem looked like having to do with the receiver itself.

Typically, there could be a faulty valve in the tuner or a faulty component, connection or contact. If any of the latter, I might face the decision of having to fiddle with the tuner on the spot, risking waste of time and possible failure, or else taking the tuner out and sending it back to a repair depot. Understandably, servicemen don't like faults in tuners!

As against a possible tuner fault, there was one other "hope" — a fault in the AGC circuit to the IF amplifier. If an open resistor or a leaky bypass capacitor prevents AGC voltage from reaching the IF system, it operates "flat out" and causes a very high AGC voltage to be applied to the tuner. If the tuner AGC is high enough to cut off plate current in the RF amplifier valve, only the merest trace of signal may get through but the IF amplifier will amplify it, along with "noise" from the frequency changer, to produce a "noisy" picture.

But, with the hope that it wouldn't be as complicated as all this, I reached in and pulled out the RF amplifier valve — a 6BQ7A. What there was of the picture disappeared forthwith. Reaching into my kit, I pulled out a spare 6BQ7A, plugged it in and waited for the picture to reappear — I hoped, free of noise.

But in vain. The picture, when it appeared, was even "noisier" than before!

Strange, my spare 6BQ7A must be a dud! With some misgiving, I went out to the truck and brought in a couple more. But neither of these was any better. Yet, when I put back the original 6BQ7A, the picture reappeared in its original, rather noisy form.

What the hec?

Then, suddenly, the bells began to ring. The set was of a type which always used a particular brand of tuner and these tuners NEVER used a 6BQ7A! They always used a 6ES8.

What was I doing then, plugging in 6BQ7A's? And how come that I'd pulled a 6BQ7A out of it?

So, for the first time, I took a good look at the original "6BQ7A." Despite its very clear brand, it was nothing of the kind. Instead of the two slim triode structures inside, it had the more involved and bulky shielding that characterised the 6ES8 that it should have been — and was!

And, sure enough, when I plugged in

## More light on colour television

Strictly incognito, your Serviceman was wandering around the recent IREE convention displays and noted a photographer getting all set to take some pictures off one of the colour television screens. A few minutes later, the program began to roll and the photographer started systematically to snap the best scenes—with the aid of a flashlight!

What a set of pictures would be his reward . . . a whole roll of pictures of a colour set with a blank screen.

Somebody should have told him that a colour television image is not an object—therefore it can't be illuminated by incident light. The image is itself a pattern of light and hitting it with a flash would simply wash it out. What would happen to the picture on the screen of your favourite drive-in if all the cars turned their headlights on to it?

a new 6ES8 the picture came up with exactly the same order of noise as when I had first switched it on.

As it transpired, the noise disappeared the moment I replaced the frequency changer — which was the next step — but I left the place with a shake of the head. As if television receivers haven't enough tricks of their own, without bugging them with wrongly branded valves!

How did it get there in the first place? Because, I imagine, people in the valve factory identify valves by batches and by appearance, rather than by reading every individual type number. And the same would go for the person who plugged the wrongly branded valve into the tuner. It looked right, it worked right and it was right — except for the brand.

But what a mess I'd have got into if I hadn't been quite so familiar with the particular brand of receiver!

As compared with this call, which was very much out of the ordinary, the next call on my list was of the kind that I don't enjoy, any more than any other serviceman.

The complaint, in this case, was that the set had lost its picture altogether, apart from a few white streaks. When I took a look at the screen, I quickly realised that the white streaks were simply highlights from the picture — the only part of it that was visible.

It seemed clear enough that the brightness circuit had developed a fault so that, even turned right up, the brightness control did not raise the picture tube above beam cut-off. In an effort to correct the situation, the owner had turned the contrast to maximum, causing just the peak whites to break through.

A bit of probing around the leads to the picture tube socket confirmed that the grid potential was well below cathode potential, irrespective of the brightness control setting. This much was not hard to verify. The unwelcome thought was that the component responsible, either a resistor or a bypass, was hidden away in the chassis, which was going to take me a half-hour or so to remove and re-install. I did it without much in the way of good grace and my mood wasn't improved when the owner quibbled about the fee, on the grounds that I surely wasn't going to charge all that for one tiny little "resistor thing."

But, if there was a risk of generating hard feelings about owners in general, the temptation was countered by the knowledge of the "swiftly" that a few servicemen have been known to pull in these same circumstances.

Through ignorance or by design, they blame the dim picture on a failing tube and proceed smartly to sell and fit a picture tube brightener. Prompted by the increased heater voltage, the tube produces a more normal picture — for a time! In fact, the receiver still contains the original fault but, by the time it is traced and corrected, the picture tube is on its way to an early demise.

I wonder how such operators can sleep at nights.

By way of a change from television, here's a story which may be of interest to "audio" types.

It actually started with a call to fix a fault in a television set—a call and a fault which, in themselves, would not have warranted any comment. However, with that job done, the owner asked me whether he could pay for a few extra minutes of my time, to have a look at a peculiar fault in his home-made hi-fi system.

I hummed and harred for a few moments, to clear the way for a hasty retreat, should it have proved to be necessary. Home constructors don't always realise that it involves an outlay of real time to become familiar with their circuits, their method of construction and their problem before one can begin to diagnose and "prescribe." And somebody has to pay for this time, if the serviceman is not to work for nothing!

As it transpired, the equipment was not home constructed in the normal sense of the term. My client had bought a crystal cartridge, player, amplifier and loudspeakers separately and assembled them in his own cabinet. And I must say that the sound was excellent, considering his relatively modest outlay.

The one trouble was that the system would not play the extreme outside grooves of a few of his records—and this he proceeded to demonstrate. The pickup could be lowered manually on to the run-in grooves, would appear to "seat" normally and then, just before the music started, the pickup would jump inwards by about 1/8-inch, missing the opening stanzas altogether. On other records, it was perfectly normal.

The natural thing was to suspect some roughness in the vertical bearing, causing the pickup to jump over a high spot. But I certainly couldn't feel any roughness—and why should it happen so positively on particular records, with no hint of trouble on others?

Close examination revealed that the records which were giving trouble were those with a rolled, rather than a flat edge and my first guess was that the stylus was simply sliding downhill. But lowering the pickup gently to where there could be no "hill" didn't overcome the effect. However, in an effort to clarify the situation I undid a couple of screws and propped up one end of the motor board so that the pickup arm had to climb up a definite incline towards the centre of the record. But, alas, on the troublesome records it flipped towards the centre as positively as ever.

In an effort to watch more closely the behaviour of the stylus in the groove, I got down on my haunches, end on to the pickup and had my client hold a torch on the scene while I slowly lowered the pickup into the outer groove.

And, suddenly I spotted the cause. On either side of the stylus, the underside of the cartridge had a slight shoulder, perhaps intended to limit upward thrust of the stylus in the event of the pickup being dropped on to the record. Normally, the shoulders rode just clear of the surface but, on the troublesome discs, the outer shoulder in this case was just fouling the rolled edge. Just as the drag on a stylus tends to pull a pickup towards the centre of a disc, so this unusual friction flipped the pickup violently inwards.

I suggested to the owner that the stylus may have been bending—or have been bent—by excessive playing weight, or that the socket through which it excited the crystal may have been slightly out of position. Yet again, he might be able, very carefully, to file away a little of the offending shoulder.

What he will do about it I'm not sure but my impression, as I took my leave, was that he would probably buy a new cartridge. I gained the impression that he'd been looking for an excuse, anyway, to shout himself a new diamond-tipped ceramic!