Servicing Notes on the Amstrad CPC464

Christopher Holland

Following last year's series of articles on microcomputers, which used the Amstrad CPC464 to illustrate the techniques involved, the following servicing notes should be of interest: they are based on eighteen months' experience of this computer and its accompanying monitors, the colour CTM640 and the green screen GT64.

First, the good news for all TV technicians is the fact that the great majority of problems encountered with these units relate to the monitors and tape decks, which should be familiar territory. Microcomputer faults as such are relatively rare and tend to show up early in the warranty period. The fault-finding principles here are similar to those required with modern microcomputer-controlled VCRs, although the relationship between the symptoms displayed on the monitor's screen and the actual fault is not always obvious. The i.c.s used in the computer are very reliable, which is just as well since most of them are soldered directly into the double-sided print: a useful rule of thumb is that the i.c.s that normally give trouble are the ones the designer has decided to fit in i.c. holders.

Computer Faults

The most common computer fault is that at switch on the monitor's screen is either blank or full of garbage. The cause is usually failure of the ULA chip IC116 (20RA043) or the microprocessor chip IC111 (Z80A). If possible, substitution is the simplest check as both are pluggable. If this fails to effect a cure, try the following steps:

(1) Check the 5V supply and earth lines to the major chips, particularly the ULA, the Z80A and the ROM i.c. (IC103, TMM-23256P-1950). In the event of an intermittent 5V supply, check the socket for the supply lead from the monitor.

(2) Check the clock pulses – a frequency counter is needed for this. Note that the 16MHz crystal X101 rarely gives trouble, also that the wire link soldered across the body of the crystal is a convenient earth connection point for probes etc. (the ULA's heatsink is not earthed). Check for the 16MHz clock pulses at pin 8 of the ULA: if absent suspect the ZN7400 clock oscillator IC125. The Z80A is clocked by a 4MHz pulse at pin 6: if missing check transistor Q103 (ZTX312L – shown as TR3 on the PCB) and confirm that 4MHz pulses are leaving the ULA at pin 39.

(3) Check the reset pulse. This is fed to pin 26 of the Z80A, pin 35 of the PIO chip (IC107) and pin 37 of the ULA. Failure of these reset pulses is normally due to IC110 (74LS132).

Other problems experienced with the computer include the following.

If any of the keyboard buttons fail to respond or do so intermittently, suspect dust or dirt on the keyboard contact PCB: this is a fairly robust panel and is not prone to broken tracks.

The complaint "crashing out", or in layman's terms a program that stops at some point while it's running, accompanied by failure of the computer to respond to any instructions, is invariably caused by the ULA i.c.

Liquid spillage normally seems to occur via the printer and disc ports. While the most common liquid spilt into VCRs seems to be beer, home computer users seem to be coffee drinkers. I'm not sure what conclusions we can draw from this! While I've seen a few VCRs effectively written off by beer, the CPC464's PCB seems to be fairly tolerant of coffee and cleaning the areas affected should provide a cure.

The Cassette Deck

As previously mentioned, problems with the computer section of the CPC464 are fairly rare: much more common are faults with the tape deck causing programs not to load or to load partially or intermittently. This shows up on the monitor as "read error A" or "read error B" messages. The first steps to take are to clean the tape deck heads and to confirm that the problem is not due to poor quality tapes – watch out for distinctly second-hand looking C90 tapes that have provided years of audio use before being acquired for the computer.

Once the heads have been cleaned, check the head alignment by attempting to load a good quality prerecorded software tape – the "welcome tape" that comes with each CPC464 is suitable as it comprises eleven blocks of data. If "read error" messages appear as soon as loading commences, realign the head while monitoring the data being loaded at pin 7 of IC302 on the cassette recorder PCB.

Should the tape load perhaps seven or eight blocks of data before a "read error" occurs, or even intermittently load the whole program, suspect a faulty cassette motor. These can develop wow and flutter after a period of use – in some bad cases this can be heard from the internal loudspeaker and be seen on a scope.

"Read error A" is usually caused by a faulty motor while "read error B" is due to incorrect head alignment. This should be taken as a guide however, not as a hard and fast rule. Failure to load anything usually means that the heads are way out of alignment. Note that the heads themselves don't usually give trouble.

Monitors

Finally the area where TV technicians will feel most at home, the CTM640 colour monitor and the GT64 green screen monitor. The circuitry used is straightforward but the following notes may be of help.

With a dead colour monitor the usual culprit is the switch-mode power supply chip IC501 (SKT7308). If this should fail be sure to check all the following components unless you want to see the replacement i.c. disintegrate at switch on: resistors R501 (5·6Ω, 5W), R502 (1Ω, 3W), R511 (10Ω, 0·25W), R521 (1Ω, 0·25W) and zener diodes D507 (RD3·6FB1) and D510 (SR2M). With a dead set whose power supply is functioning normally, check zener diode D402 (RD11EB2) in the protection circuit if there's no line timebase activity.

The only other problem likely to be encountered is one of the primary colours missing. In this event check the

relevant output transistor on the tube base panel.

The only thing to watch out for on the green screen monitor is the complaint "goes into lines after a few hours". In this case check the adjustment of the line hold control L703. We've had to reset this on a number of monitors after they've been in service for about a year. The easiest method of doing this is to centralise the picture with L703 after programming in a border of a different shade of green to the rest of the screen. Lack of line and field sync, as well as video problems, is often due to the lead that connects the keyboard to the monitor – these leads can have a hard life.