

Servicing the Philips CD104 CD Player

Mike Leach

The Philips CD104 compact disc player has been around in various guises since the mid-eighties. Atmstead for example used the basic machine in some mini systems while Mission put it in a smarter looking box. In addition to machines that come into the workshop with specific faults, some can come in because they have been part-exchanged for a more recent model and require certain checks and adjustments to ensure reliable operation before being resold. The purpose of the following notes is to provide guidance on basic servicing and some of the fault conditions likely to be encountered.

Layout

One excellent feature of these machines is the general design and layout. There are various PCBs that are all separate and plugable. This can help when there's an awkward fault since it's easy to interchange boards with those in a working machine. As I've said on previous occasions, we're all allowed to cheat occasionally. In this connection it's particularly helpful that each board does a specific job, e.g. power supply, decoder, servo, tray control, laser preamplifier etc. In contrast most modern machines have just about everything mounted on a single PCB which has several surface-mounted chips interconnected by very fine print. Thus if you have limited experience of CD players the CD104 is an ideal machine to practice on - provided you get up on the Philips single-beam laser and tracking system that's used instead of the usual Japanese three-beam laser with sled drive.

Fig. 1 shows a basic block diagram of the CD104. It illustrates the way in which the various functions are split up between the boards. It's worth noting at this point that the focus and radial motors are both incorporated within the laser assembly.

The first thing you see when you remove the top cover is the servo board. It can be hinged up after removal of the two front case screws to give easy access to the decoder board beneath. To gain access to the component side of the decoder board and the laser preamplifier board the bottom cover has to be removed. The tray control PCB is mounted alongside the servo board at the top of the machine while the control/display board is on the front panel. Fig. 2 shows the PCB layout.

You can run the machine on its side when fault finding. I don't recommend this however as it's all too easy to press the open/close button by mistake and jam the disc in the carriage mechanism. If it happens to be a Philips test disc you say goodbye to E35 straight away.

Circuitry and Abbreviations

Before delving into particular sections of the machine it's worthwhile familiarising yourself with the terms and abbreviations that Philips use. This helps you to understand what's going on between the various chips, particularly those in the decoder section. These terms may seem to be of little consequence at the moment if you don't have a circuit diagram to hand: if you do have a circuit take a quick look at it and pick out some of the terms listed below.

Basically each chip has a particular function and name.

For example the decoder PCB has on it a demodulator (DEMOD) chip, an error-correction (ERCO) chip, an interpolator (intercalament, interpolation and mating - CIM) chip, a filter (FIL) chip and two digital-to-analogue converter (DAC) chips. Each chip has to "speak" to others, and in most cases each data line has its own abbreviation. Thus the data line from the demodulator to the error correction chip is called the DADIE signal line - it stands for Data from Demodulator to Error correction chip. Some of the main data lines relevant to routine fault finding are listed below. You may find this list of help when you take a look at the circuit diagram for the first time. Since it's difficult to print inversion bars, where relevant we'll precede the abbreviation with a slash (/).

ACLOCK = clock from DEMOD to ERCO chip.
CLEC = clock from ERCO to CIM chip.
CLOCK = clock output from the CIM chip (system clock).
DADIE = data from the DEMOD to the ERCO chip.
DEEMPH = de-emphasis.
DLCE = data (left) from the CIM to the FIL chip.
DRCE = data (right) from the CIM to the FIL chip.
FSDE = frame sync from the DEMOD to the ERCO chip.
FSRC = frame sync from the ERCO to the CIM chip.
HF = h.f. input to the DEMOD chip (eye pattern).
HFD = h.f. detector for demodulator.
MCES = motor control from the ERCO to the SERVO chip (turntable motor).
MULTI = mute signal.
UNEC = unreliable data flag from the ERCO to the CIM chip.

These lines are generally easy to find on the various panels - in most cases you can go to one pin of a particular chip.

The Laser Unit

The laser unit used in these players is pretty reliable. Some years back when I was at Servscope we had to replace some of them but on the whole not many. In recent times they've proved to be very good, unlike the laser type used in the CD100/100 series machines. Tolerances may change with age however, and the laser supply should be checked in every machine that comes into the workshop. It's possibly a good idea to adjust the laser supply only when you are sure that it's wrong or been gut at by a hunkie. If the machine is not spinning the disc for example or has some other fault, try to explore all other possibilities first or you could end up with two faults instead of one. I usually check the laser supply once the machine's basically working.

The official, accurate way of checking/adjusting the laser supply, laid down in the Philips service manual, is as follows: Insert the Philips test disc no. 5, part no. 4822 397 3896 (the disc without defects). Connect a d.c. voltmeter across R3308 on the servo PCB or between the emitter of transistor 6239 and the earth line. Play track one and adjust R3196 for a voltage reading of $575\text{mV} \pm 75\text{mV}$.

That's fine if you have a Philips test disc. But many workshops don't. So we need to find a reasonably accurate

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Kathleen Armour



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