

QUAD CD67 COMPACT DISC PLAYER



THREE years have passed since I reviewed the first Quad CD player, a review in which quite a few readers sensed more than a touch of disappointment as it revealed little more than a re-housed mid-price Philips machine with a corresponding middle-of-the-road performance. In spite of Quad's gentlemanly protestations that certain tests they performed showed that "no player will ever sound better" the new R & D team, now well established at this revered company, obviously thought differently. The CD67, although considerably more expensive than its Dutch uncle, is in a very different class. Indeed, in certain aspects of sound reproduction, such as tightness of focus and finely graded definition of the faintest detail, I have found nothing to beat it and few to offer serious rivalry.

Judged purely on outward appearance and on the operational features offered, the average person would have considerable difficulty in identifying this new model from its predecessor, but there is one easy giveaway; the ugly extended rear casting required to house the CDM4 mechanism used in the 66 has been replaced by the conventional Quad-style rear panel, carrying just a fused IEC mains connector and three gold-plated phono output sockets for left and right audio and digital—there is no optical output. The choice of mechanism has still remained with Philips but is now the latest CDM9 which they regard as a definitive product, a finalized development of their unique swing-arm design. This version has been appearing in a number of up-market machines and certainly its performance, once in the play mode, seems to be the equal of many more elaborate and expensive designs.

However, its loading characteristics and inability to 'jump to it' when, for example, asked to change track still disappoints. Perhaps this

is more a feature of the associated Philips-based control and signal derivation electronics which every user needs to buy with it, for I see no reason why the beautifully engineered linear motor-driven laser pod and swing-arm should be any slower than most of its oriental rivals. Then too their silky-smooth loading drawers inspire a degree of confidence before a note is heard, which the Philips design fails to equal; and the shallow tapered sides to the disc tray occasionally fail to correct an off-centre disc if one is a little careless in proffering it. These minor gripes aside, once in the playing state there is no audible noise from the mechanism and the stability is such that no reasonable domestic disturbance is likely to upset it.

The remainder of the electronics section, the signal processing, the conversion from a digital stream to a pair of analogue outputs and the operational display are Quad's own and for the major part of this duty they have elected to use a new digital-to-analogue conversion integrated circuit from the Crystal Semiconductor Corporation based in Austin, Texas, USA. The CS4328, as this interesting device is called, is actually two distinct ICs implemented on lattices of different pitch but interconnected and housed together in a standard 28-pin package. Any meaningful description of the mathematical juggling that goes on therein is way beyond the scope of our pages but incorporated are several recently practical (as opposed to purely theoretical) concepts which eliminate many of the areas of questionable performance in existing designs. Examples are: Delta-Sigma modulation, a mathematical transposition which converts the incoming source data into a one-bit stream; a switched capacitor converter charged from a reference voltage but independent of clock timing errors (jitter) so long as the charge

SPECIFICATION

D/A conversion: 18-bit, 64-times oversampling, Delta-Sigma converter
Frequency response: 20Hz–20kHz <+0.1dB
Phase linearity: 20Hz–20kHz <0.5°
Signal-to-noise ratio: 20Hz–20kHz >100dB
Crosstalk: >100dB @ 1kHz
Total harmonic distortion: <0.002% @ 1kHz
Wow & flutter: unmeasurable
Output voltage: 2V max; 300mV normal programme
Minimum load impedance: 10k Ohms
Mains voltage options: 110–120V or 220–240, changed by links on board
Power consumption: 14 Watts, approximately
Dimensions (W x H x D): 321 x 80 x 240mm
Weight: 3.5kg
Manufacturer: Quad Electroacoustics Ltd., Huntingdon, Cambs PE18 7DB
Tel: 0480 52561
UK retail price: £795

reaches the capacitor at some stage of the cycle; the development, on the second analogue chip, of switched capacitor and continuous time filters which together effectively remove unwanted artifacts from the complex switching which has previously taken place whilst possessing adequately low distortion and phase shift.

The Crystal people have made a name for themselves in professional audio circles for their A/D (analogue-to-digital) converters using the Delta-Sigma modulation technique and are well known for medical and industrial applications of specialised chips. However, the development of the CS4328 for domestic use implies comparatively vast quantities and it was no surprise to see the names of Japanese Asahi people added to the list of contributors to a recent AES paper on this remarkable double chip. I was therefore quite prepared for the word Japan on the CS4328 incorporated in my sample CD67. Although this versatile device includes a pair of analogue output stages, Quad have chosen to add a pair of low-noise OP275 output buffers and further filtering, possibly because the CS4328 makes no provision for on-board de-emphasis which can be conveniently incorporated at these buffer inputs. If it appears that I have 'gone on a bit' about this Crystal device, I excuse myself with the certainty that we shall see it in common use in the very near future and Quad are to be congratulated on reversing their previous policy of 'buying in' and taking on the task of incorporating this intricate and obviously highly strung double chip in what is for them their first home grown design.

Like its predecessor, the CD67 can be used as a solo item or as part of a Quad system. It has only two inbuilt controls and the first of these, a half-moon Power On/Off button at lower left can be ignored if the unit is employed with an accompanying 66 control unit. The second takes the form of a rectangular plastic insert alongside the disc drawer which is actually a tilt-touch switch. A slight pressure on its left side causes the drawer to open or shut. Quad have retained a neat double operation here. If a disc is placed in the open drawer and it is then closed with the touch switch the player will assess the disc contents in the usual

manner and await further instructions; if however the drawer is closed manually by giving it a slight starting push the machine will play the first track and follow on without further advice. Alternative instructions can then be given from the remote control tablet associated with the 66 control unit, if one is employed, or alternatively from a hand-held remote control which comes with the 67 and has additional useful facilities such as programming for up to 50 selections or direct access via a numerical keypad. Adjacent is a small liquid crystal display which is confined to just running Track and Time information plus a few minor indications for Pause and Programming.

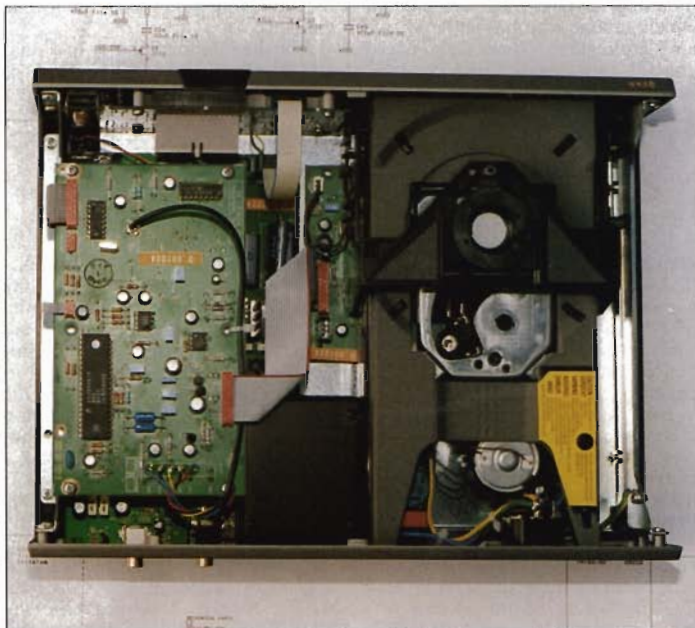
The CD67 must be one of the smallest and certainly the neatest serious players—portables apart—yet produced. At a glance it is difficult to believe that you are looking at one of the world's better examples of the genre. The eventual realisation makes its £800 price tag very modest against the several thousands of pounds which equivalent performing imports demand. Removing the reassuringly stout steel cover immediately impresses even the least technical enquirer; the old Latin tag *multum in parvo* could never be better employed than here. Similarly, a study of the circuit layout is a rare treat for those of us who wallow in such things—rather like musicians who get immense enjoyment from a score (the late professor Jack Westrup once told me that was the only perfect performance!). In typically Quad manner the realisation has not been achieved by wasteful over specification or expensive indulgences included to impress and provide scoring points for so called high-end devotees. You won't find duplicated 100-Watt power transformers provided here for an apparatus that consumes a frugal 14 Watts; instead a small boxed affair alongside the mechanism feeds all—but it does have four independent secondaries, each with its own rectifiers and capacitors and from them are derived seven separate supplies with regulators where it counts: alongside the circuits they nourish. Evidence of thoughtful care is readily perceived and as always with this company's products the standard of workmanship is beyond question. It comes with a decent IEC mains lead, an adequate dou-

ble-ended phono pair and an excellent instruction book.

Someone has to say it, and it might as well be me—for it is as though no one else has noticed that the standard of British products has quietly risen above that of the majority of imports. And I mean overall standards: style, design, ergonomics, use of materials and sheer craftsmanship.

How it performed

Needless to say measurements made on the CD67 showed near perfect results. Each channel produced 1.98 Volts maximum. Frequency response showed a wriggle above 12kHz of a mere 0.1dB—just enough to keep this observer alert! Channel separation was so complete as to be well nigh unmeasurable and, as with in-band noise, was right up against the limits of my test gear. I collected this sample from the factory and they were kind enough to run some graphs with their wildly expensive Audio Precision test set, which uses digital technology to produce magical low level readings of linearity, distortion at different signal levels and the like, so I knew what to expect. Absolute phase was correct and impulse and squarewave traces absolutely 'text-book'. I really couldn't catch this one out; even wideband noise was down to the -90dB level and entirely random.



Of course the proof of the electronic pudding is in the listening and I have come across several players in my time which measured well and then turned in a turgid and uninvolved experience. Not so here. The CD67 certainly is different. I have mentioned its ability to focus: good

recordings have a realisable disposition of the component parts in space, both laterally and in depth, which subtly adds to the realism without ever directly pulling at one's attention as some players do—even to odd ghosts beyond the loudspeakers. The CD67 produces a sta-

ble, solid picture which is what stereo means. If, however, the studio engineer moves a slider, and they do, you find yourself looking up with a "who did that?" feeling. I have found this once before with a one-bit Sony player which for other reasons failed to warrant a review.

Other benefits of the CD67 are better realised in one's voyages of musical discovery and rediscovery along the shelves of CDs, rather than through instantaneous recognition. Little things, like a distantly-shaken tambourine previously unnoticed, yet when you go back to another machine you find, yes, it was there but failed before to register. It is a well known fact that if one gets to grips with a new piece of equipment which has excited one's curiosity there is a tendency to extra concentration which can colour judgement, but inevitably such transient reactions pass with time. This has not happened with the CD67. In many ways its simplistic operational approach puts it out of court for the job I often find myself doing—hopping about comparing passages of different versions of the same work for example—for that my old Sony is unbeatable. But I know now that on the occasions when I can have the luxury of sitting down to enjoy a whole work I should choose the CD67 every time; it would be the natural thing to do.

GEOFFREY HORN.

MARANTZ PM-80SE INTEGRATED AMPLIFIER



AS befits a Japanese company which is owned by Philips and whose origins lie in 1940s America rather than Japan's post-war economic miracle, Marantz is a breed apart from its Oriental peers—a mass producer with genuine audiophile credibility. Not because it competes with today's American high-end manufacturers on price and pretension but rather because it is widely perceived as having a slightly quirky approach to product design and development which doesn't quite square with the mar-

keting-led conservatism typical of its compatriots.

Which other Japanese major, for example, still offers an expensive turntable in its range (the £5,000 TT1000 MkII) and is prepared to promulgate such hi-tech heresy in its catalogue as "LPs can sound every bit as good—and often better—than digitally recorded sources"?

Marantz's reputation for individualism today rests primarily with its highly praised and consistently award-winning CD players, but it actually stretches back to the pre-

SPECIFICATION

Power output rating: 100 Watts Class AB, 20 Watts Class A into 8 Ohms
Total harmonic distortion: 0.006% into 8 Ohms load at half rated output level
Intermodulation distortion: 0.006%
Damping factor: 120
Phono cartridge inputs
Frequency response: RIAA curve to within ± 0.3 dB
Signal-to-noise ratio: 88dB (MM)
Input sensitivity/impedance: 2.5mV/47k Ohms MM; 250 μ V/100 Ohms MC
Line-level inputs
Frequency response: 10Hz–70kHz ± 1 dB
Input sensitivity/impedance: 150mV/33k Ohms
Signal-to-noise ratio: 106dB (CD)
Channel separation: >85dB @ 1kHz
Dimensions (W x H x D): 420 x 146 x 334mm
Weight: 13kg
Manufacturer: Marantz Japan Inc. UK distributor: Marantz Hi-Fi UK Ltd., Kingsbridge House, Bath Road, Longford, Middlesex UB7 0EH. Tel: 0753 680868
UK retail price: £629.90

digital era. Then it was amplifiers and tuners for which the Marantz name was best known and respected, a fondly remembered example being the MA-5 monoblock power amplifiers which, prior to the arrival of dreadnought American designs like the Krells, served as a rare reminder to British enthusiasts of the benefits of Class A operation.

The MA-5 heritage lives on most obviously in the current MA-24, but lower down the range the traditional espousal of Class A is still to be found. In the PM-80, PM-82 and £630 PM-80SE—the subject of this review—the user is given the unusual choice of operating the amplifier either in Class AB mode, which maximises power output potential (110 Watts continuous into 8 Ohms), or in Class A, which drops the rated power considerably

(25 Watts) but offers the potential of superior sound quality. In Class A the transistors in both halves of the push-pull output stage conduct throughout the signal cycle, thereby eliminating the various distortions which can arise in Class AB operation, where one half of the output stage is switched off for part of the time.

No Japanese amplifier, even a Marantz, is complete without a welter of proprietary features codified by arcane initials, and the PM-80SE is no exception. In addition to the Class A option it incorporates CCNE (current conversion noise elimination), LDPS (linear drive power supply) and HR (high resolution) circuits. The SE appended to the amplifier's designation stands for 'special edition' and signifies that its design was fine-tuned in