Quad 77CD
compact disc player

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The Quad 77 integrated amplifier was launched last autumn at the Live '94 show in London. I reviewed it in February this year (page 142) and in the same issue provided a lengthy discourse on the 77 system's elaborate remote control system ("Quad's new bus", page 125), which at the time had not quite reached its final form; complex logic software, such as this contains, always takes a while to 'settle'. For the past few weeks I have had the opportunity to use the amplifier once again, this time in conjunction with the remote control unit and the keenly-awaited 77 CD player. Next on the agenda, and due to be released soon, is the 77 RDS-equipped FM/AM tuner.

A brief recap on the philosophy behind the 77 system will be of help to those not yet familiar with Quad's progress since the 66 series. The 77 is a fundamental rethink of what is actually required of a hi-fi system, a rethink not so much in terms of technical performance – although there are certainly aspects which are both novel and innovative – as in the way units connect together and in the logic circuits that have been devised to control them. Quad wanted to produce a flexible system which could grow according to the user's needs and could readily accommodate future technological developments, whatever they may be. To this end it has developed what it calls Quadlink, a 'data bus' interconnection arrangement unique to the 77 series which carries balanced analogue and digital signals, system protocol and command signals and a 30 volts AC supply that enables almost any number of 77 units to be connected together with just one mains lead going back to the wall socket. Optional but fundamentally central to the system is the 77 infra-red remote control handset. This is unusual in that it not only issues commands as with any normal RC handset but also receives and processes information broadcast back to it from whichever 77 unit has elected itself 'bus master'. It automatically configures itself at power-on to reflect the *status quo* of the entire system, at which point access to all adjustable parameters of every unit is available via its simple array of ten push-buttons and single rotary knob. Load a CD and the 77 remote itself knows how many tracks there are, how much playing time is left and so on, details which are shown on its integral liquid crystal display (LCD). In addition to the standard input, level and balance control functions of the integrated amplifier, it can also be used to set up different input sensitivities for the two external source and tape inputs. And so on ...

The joy of the 77 system is its essential simplicity. With just the multi-pin connector of the Quadlink bus used to connect each unit in daisy-chain fashion, the only 'external' cables are a single one for the mains, an aerial feeder and the usual pair going to the loudspeakers. Via Quadlink the 77 integrated amplifier can cater for an unlimited number of 77 units but it has in addition two conventional line-level inputs and a single tape loop in case the user needs to connect non-77 units such as an existing CD player or a cassette recorder.

For all its clean, uncluttered logic, the 77 remote handset does require a little patience to master; faced with it 'cold' I think most people would be a little daunted at first, but after a few minutes of experiment with the clever arrangement of on-screen menu pages and context-dependent buttons it becomes almost second nature.

77CD

The new CD player, like the 77 integrated amplifier and the the 67 CD player before it, is the work of Quad's gifted young electronics engineer Jan Ertner. There are two versions. One is conventionally powered from the AC mains and has an IEC mains input socket with adjacent on/off rocker switch plus a pair of phono output sockets in addition to the Quadlink socket pair and thus can function either as a stand-alone player for use in any hi-fi system or as part of the 77 system. The other, less expensive model which I have been looking at, has only a pair of the 15-pin Quadlink sockets on its rear panel and is powered from the bus, so is dedicated to the 77 system. In all other respects the two versions are identical (except of course that the latter has a 30V transformer primary rather than 240V).

For the player mechanism Quad has once again turned to Philips, this time to the recent CDM 12·4 unit which was developed in the first place for CD-ROM applications. With its linear-movement shuttle this offers much quicker track access times than the previous swing-arm Philips types and because of its designation for use in CD-ROM players is said to have a higher tolerance to disc errors – a greater tracking ability, not that the earlier Philips transports were anything less than highly capable in this respect. Philips used to provide the control logic board as an integral part of its CD transport packages but with this new unit it leaves this to the OEM purchaser.

Quad has developed two main printed circuit boards for this player. One, mounted beneath the transport, carries the servo electronics for the shuttle, the laser interface and digital decoder, the microprocessor for the entire player and the Quadlink circuitry. The other board is devoted to the ➔

Specification

D/A conversion	18-bit, 64-times oversampling, delta-sigma converter
Frequency response	20Hz–20kHz ±0·1dB
Phase linearity	<±0·5°, 20Hz–20kHz
Signal-to-noise ratio	>100dB, 20Hz–20kHz
Crosstalk	<100dB at 1kHz
Total harmonic distortion	<0·003% at 1kHz
Wow and flutter	below measurement levels
Audio output	2V rms max. Minimum load impedance 10k ohms
Power consumption	approx 14W
Dimensions	(W × H × D) 321 × 60 × 300mm
Weight	approx 3·5kg
Manufacturer	Quad Electroacoustics Limited, 30 St Peter's Road, Huntingdon, Cambridgeshire PE18 7DB. Telephone 01480 52561
UK retail price	£595 'bus' powered version, £850 mains powered version

elaborate power supply (there are two secondary windings on the transformer, feeding two separate power supply circuits) and to the digital-to-analogue circuitry: an 18-bit, 64-times oversampling delta-sigma circuit based around Crystal Semiconductor's CS4328 integrated circuit which was used so successfully in the CD67. An auxiliary small board behind the fascia supports four control push-buttons and a six-character, seven-segment red LED array, plus associated driver and control logic.

Quad 77 integrated amplifier and system remote control unit

The 77CD is built into the same die-cast housing as the amplifier. This forms the top, sides and front, with the rear panel and base formed of sheet steel. The entire 'works' are fitted upside down, as it were, on supports formed in the casting. The fascia itself is a blue-grey plastics panel into which are let the CD loading tray, the four control buttons and the display window. The buttons have built-in LED indicators which show red when they are in command or green when the remote handset has control. The only functions available from the fascia buttons themselves are Standby, which puts the system in or out of its sleep mode (it is normally left powered but dormant, like a VCR), Next/Previous track (a two-function rocker-action button), Play/Stop and Disc which opens or closes the tray.

More advanced functions are available from the 77 system handset and I will cover them in a moment. A simple remote control is supplied with the mains powered version of the player. This gives access to the usual fast forward and reverse searching functions and has a numeric keypad for direct track access. It allows a sequence of up to 50 tracks to be programmed in any order and also provides for the playing of tracks in random order.

When controlling the 77CD player, the 77 handset offers ten menu 'pages' accessed in a logical sequence from what might be called the root level screen. Pressing its Standby button brings the system to life and displays the root level screen. This will automatically show which 77 components the system comprises and their names (the name of a 77 device can be edited so that one could, for example, have two 77 CD players, appropriately labelled, in different rooms and call up either from the handset). Pressing "77CD" (the default name for the CD player) takes you to its opening menu. Six of the handset's ten buttons are context sensitive and assume the function of the display label adjacent to them. At this level, for example, one can choose Open to load a disc, Play or Track up/down. Choosing Open displays another menu which then offers Close, Play or Up (goes back to the root level menu). With a disc in the player and Play instigated the rotary knob assumes its normal function of controlling the 77 amplifier's volume. Pause and Search now become options, the latter temporarily changing the function of the rotary knob so that it 'nudges' the player forwards or backwards in time in roughly ten-second increments. With the disc stopped an Expand option becomes available which accesses menus to facilitate programming of tracks, Random play, Repeat play or the Editing function already described. I shan't go into all these options in any more detail here because it would make for tiresome and probably confusing reading. It is all much easier to see than to describe.

Performance

Once one has become accustomed the logic routines, the 77 is both straightforward and a pleasure to use. One has, though, to take a few things into account. Because the handset interrogates the system only infrequently (to conserve battery charge) it can take several seconds before its track number and time displays appear, and at first this can be disconcerting. Also, as there isn't a numeric pad on the system handset or the player, access to any given track is only possible by pressing the Track up or down button(s) an appropriate number of times, but again because the handset display takes a while to catch up one has to look across at the player to be sure that the required track has been selected. It's more of a minor irritation than a problem – after all any kind of active display on a handset is a luxury. Track access time itself is good at about one second. My only real complaint applies also to the CD67 and that is that the display shows track time remaining only. This seems to me odd if for no other reason than when identifying a particular moment on a disc – as one might well want to do in choosing a passage to play to friends, for example, or in finding a reference point that a magazine or radio reviewer has identified in making comparisons – it is universal to specify the elapsed time and tedious, not to say infuriating, to have to calculate the equivalent remaining time. Perhaps a future update to the software could address this limitation. Personally I also like to be able to switch off a player's time display altogether, since under most conditions I find the 'counting' a distraction. No provision is made for accessing index points but as so few disc manufacturers have made use of them that is of no real practical consequence; it's just that where facilities are concerned we all tend to want what others have!

Sonically the 77CD is as much of a delight as the CD67. Excellent focus and a really stable, solid image are characteristics, together with an open, clear-sounding tonal balance which is devoid of any of the 'edge' that some parties too readily associate with digital media. I have been listening to the player in conjunction with Quad ESL-63 loudspeakers via either the 77 integrated amplifier – which has been so highly and widely regarded – or my own regular amplification components (taking the line-level signal from the 77 amplifier's tape output sockets) and am perfectly convinced of its high performance. Complex scores are unravelled with ease, dynamic, punchy music retains its rhythmic drive and the subtle sonic signature of a hall's ambience in a good recording is readily perceived.

This product has been rather longer in reaching the marketplace than was envisaged at the time of the amplifier's release and since then there have been a number of changes to the remote control operating software. In its typically considerate way Quad is offering a free update to early editions of the amplifier for those now purchasing the system remote. With all three units up and running one certainly has the essentials of a fine sounding, powerful, remarkably compact, technologically advanced and substantially future-proof system which will surely be enhanced again with the imminent arrival of the matching tuner G