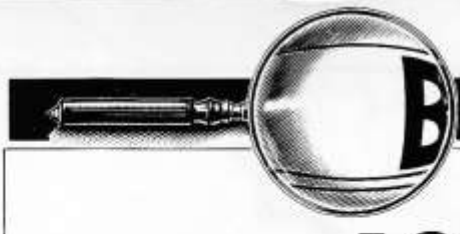


BENCHTEST

ICL OPD

The OPD could be the busy executive's dream come true. It allows several applications to run simultaneously, talks to telephone callers and features Sinclair hardware and microdrives — to name just a few of its impressive capabilities. David Tebbutt takes an exclusive look at the latest concept from ICL.

What does your average busy professional do all day long? I'll tell you. He dives from task to task, taking phone calls, dashing off letters or memos, calling people and generally looking totally disorganised.

In fact, such a person is well in control and is capable of responding rapidly to changing circumstances and altering priorities accordingly. Unfortunately, most computers can't keep up with such a person. They prefer to grab you for an application and hold you there until the job is finished. Integrated programs like Symphony or Framework help considerably and the more recent development of background tasks (calculator, calendar, notebook, and so on) such as Sidekick, Spotlight and QED will bring computers much closer to an executive's needs.

Imagine a computer that lets you run several different applications 'at the same time', takes up less space on your desk than the average personal computer, replaces your telephone for both voice and data calls without interfering with other applications, and chats to your callers when you're out. Interested? I certainly was when ICL's OPD landed on my desk.

The amazing thing about this project is that it's been kept so quiet despite numerous mentions a couple of years ago. Here's a quote from a 1982 Sinclair press release: 'In December 1981, ICL announced that it was to develop with Sinclair Research an ultra low-cost integrated terminal/digital telephone workstation employing Sinclair's flat tube technology and Sinclair Basic. At the time it was christened the "One Per Desk IT Work Station".' The Basic and the name (OPD = One Per Desk) survived, but the flat screen was discarded somewhere along the way. The microdrives used for backing up the memory are a visible reminder of Sinclair's involvement, but the predominant influence is clearly ICL's.

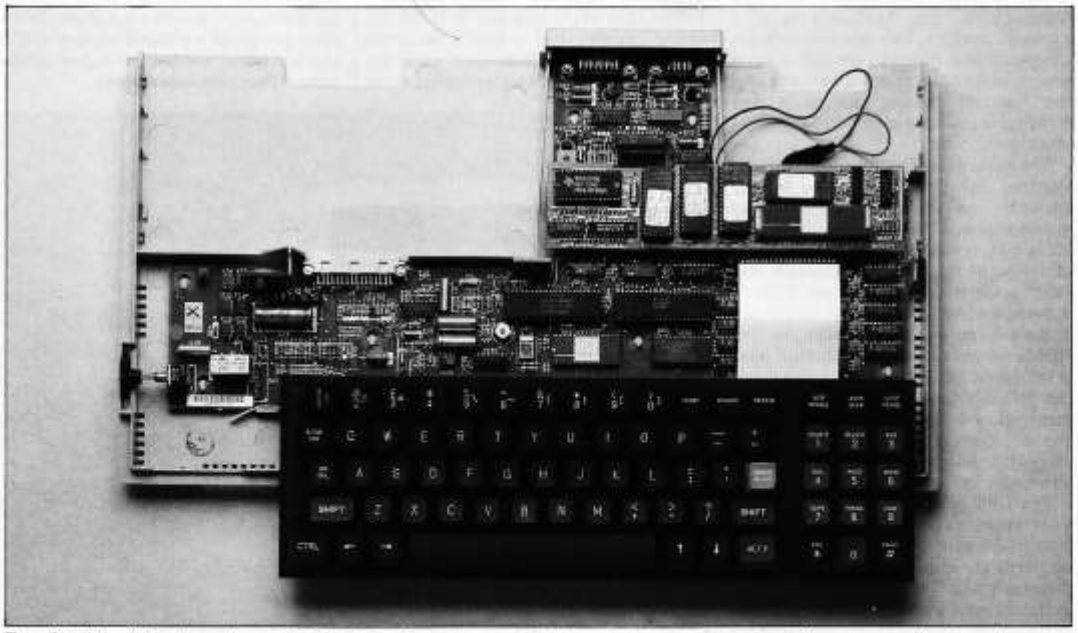
Side view: the monitor is adjustable and fits snugly to the machine

Hardware

The OPD comprises two units — a monitor and a keyboard unit incorporating a pair of microdrives and a telephone handset. To avoid the need for a cooling fan and to allow continuous operation for up to five years, ICL has tucked the power supply away in the back of the monitor unit. A single lead connects the units together, and this carries both power and control signals. A second socket at the back of the keyboard unit allows the attachment of an RS432 printer.

The colour scheme is chocolate and cream with burgundy telephone control keys and a lime green ENTER key. This is a good idea because the ENTER key is quite puny: it's been made the same size as the letter keys to help make room for ICL's special control keys. Six LED windows indicate whether power and the screen are on, which telephone lines are active and which microdrives are in use.

The OPD has no power switch but, in view of its continuous use, has a screen on/off switch to preserve the tube's life. In addition, the screen will blank after



Two Sinclair chips sit on the main PCB with the processor, ROMs and speech synthesiser chip on a smaller board

The standard qwerty keyboard incorporates a pair of microdrives and a telephone handset

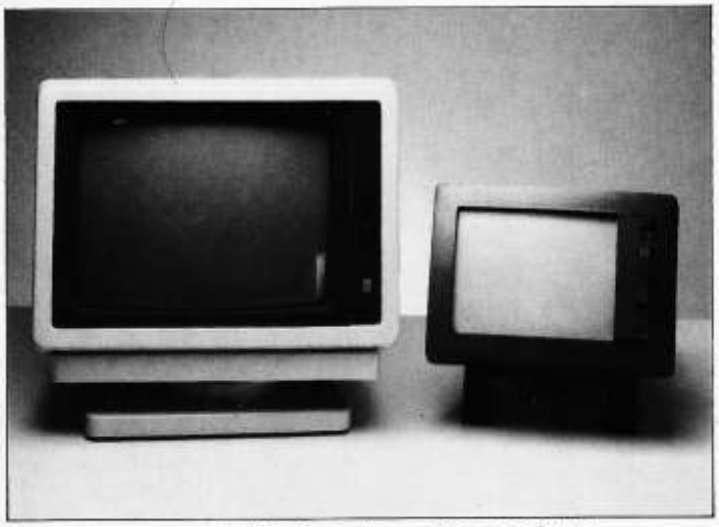
five minutes of inactivity in order to protect the phosphor coating. A loudspeaker permits call monitoring without lifting the handset. The handset must be used if you wish to speak — there's no microphone in the OPD itself.

The keyboard, or control unit, comprises three modules — the main unit, the telephony module and the ROM module. The main unit contains the processor, memory, operating system ROMs, most of the control circuitry, the microdrives, the keyboard and a numeric keypad. The telephony module plugs into the rear left of the main unit, and has two telephone leads and the handset trailing out of it (the handset is a variant of British Telecom's 'Sceptre').

The ROM module slides into the rear right of the OPD and contains two sockets into which you may plug applications software: for example, ICL's own messaging software will be supplied in this form. Optionally, the ROM pack may also contain Psion's Xchange suite of programs which are tucked away inside the pack on five ROMs of its own. When faster one-megabit ROMs are available, the number of ROMs needed for Xchange will be reduced and the ROM pack will allow the addition of up to four additional plug-in applications. Plug-in modules can be 8-, 16- or 32k each.

The OPD is the easiest machine I've ever taken to pieces. The only screw was in the telephony module and I'm not entirely clear what it was doing there anyway. The top of the main unit is held to the base by nine concealed plastic clips; a slot allows you to insert a screwdriver and lever off each clip. It takes seconds and is designed for rapid replacement of damaged or faulty components.

The connections between the upper and lower parts of the assembly are the 14-pin microdrive connecter, the handset switch leads and the loudspeaker leads. The keyboard lies over the front part of an oddly-shaped main PCB (at least, I'm calling it the main one because it's the largest). In fact, the processor, four ICL system software ROMs (32k each) and the TI TMS5220 speech synthesiser are on a separate smaller board 'piggy-backed' onto the first. Two Sinclair-designed chips sit on the main board (sounds like a business machine, doesn't it?) and, of course, the microdrive ULAs are Sinclair's too. The three Sinclair chips and the Motorola 68008 processor are the same as those used in the QL. The main board contains 128k of main memory on 16 chips. An additional 2k of static RAM contains essential system parameter information, and is backed by a lithium battery designed to last at least five years. A further ROM contains the vocabulary for the speech synthesiser. Apart from such things as a volume control and a piezo electric speaker, that just about covers the main ingredients.



Choice of monitors: a 14in Microvitec colour or a 9in monochrome

The upper part of the assembly contains the loudspeaker, the handset on/off switch and the microdrives mounted on their own separate assembly. I must confess that I approached the microdrives with some trepidation, but they worked reliably.

The OPD's keys are well laid out and of normal pitch. The keytops are dished and have a slightly bumpy surface which makes them pleasant to touch. The technology underlying the keyboard is not a million miles from its much-hated rubber membrane relative: each key rests on a rubberised plastic 'bubble'. The bubble is securely trapped by a plastic surround attached to the keyboard PCB. This bubble doubles as a spring and, presumably, as a connecter. The keys automatically repeat after a short pause and a hefty 128k Basic keyboard buffer is provided. This keyboard is designed for low to medium use over the product's lifetime.

The qwerty keyboard is standard but there are a few differences. For example, the numerics on the top row each have three characters inscribed on the key top; the third is accessed by holding down the ALT key while pressing the numeric. INS and DEL are provided on a single key: they open a gap in the current line and delete the character preceding the cursor respectively. If you press CTRL with this key, it deletes characters to the right of the cursor and closes up the gap. TAB and BACK TAB are provided on the same key and are used to move between 'boxes' on data entry screens. The cursor keys are to either side of the space bar, just like the QL.

Now for some new keys: START, RESUME and REVIEW are specific to the OPD. Because the OPD lets you run several tasks at the same time these keys, in conjunction with ICL's firmware, allow you to get out of something (START), get back into whatever you left last if it's still there (RESUME), and find out what tasks are going on at the same time (REVIEW). This last function gives a menu of all active tasks and you can elect to go into any one.

Over on the right is the numeric pad which comprises fifteen keys and works in conjunction with SHIFT and ALT. In this context ALT turns the numeric keys into function keys and, as a reminder of this, has a lower case 'f' inscribed on it. I have always thought that separate function key pads are an irritation, just something else to learn, but ICL's answer is so simple I'm astonished that I've not come across it before.

The numbers are laid out in the same way as a touch-tone telephone: that is, with 123 at the top. Since this computer is so closely linked with the telephone system, ICL has made the right decision. Two keys on either side of the zero contain the Prestel special characters, asterisk and hash; the shift position of these keys contain ESC and PRINT respectively. The first we know, the second performs a screendump to your printer (ICL supplies an OKI printer for use with the OPD).

The remaining keys all have some function connected with the telephone system. Here's the top row: LIST shows your important phone numbers; RECALL has the same effect as RECALL fitted to some telephones; AUTO lets you switch a data call from the handset to the modem; SPKR initiates a 'hands off' call or transfers a call to the loudspeaker; LAST displays the last six numbers dialled and redials your choice; and REDIAL redials the last number dialled. Of the remaining seven, HOLD-S holds a call and transfers you to the other line; SELECT switches your preferred line; END ends a call and starts a new one, or connects you to a call on the other line; DIAL connects/disconnects the numeric pad from the telephone (presumably so you can use it in a program); HOLD holds a call; CAPS (what's that doing *here*?) locks the keyboard in upper case; and TIMING starts timing a call or lets you enter a charge band code.

The screen has a maximum resolution of 256 x 512 pixels, which gives a choice of four colours (or shades of grey) — black, white, green and red. Using a 256 x 256 resolution, the number of colours is doubled to eight and you can make the pixels flash too. In normal use the screen is laid out as 26 lines each of 80 characters (alternatively, each line can contain 40 characters). The top 24 lines form the main display area and the bottom two are referred to as the 'Noticeboard', where the system status messages appear. Since many things may be happening at the same time, these last two lines are essential.

The machine I tested had the standard 9in monochrome monitor (not unlike the one on the Apricot on which I wrote this review), but a 14in Microvitec colour monitor is also available. The OPD monitor has a two-position pair of legs at the front. One position has the monitor lying almost flat on the desk but it's all still visible behind the sloping main unit; the other position raises the monitor so that it may be pulled in close to the main unit where it fits snugly just behind the microdrives. This latter position also tilts the screen backwards and makes it more natural to use. Apart from the screen protection facilities (on/off and auto-blanking after five minutes), the monitor has a slider control for brightness and two LEDs — one to show that the tube is still powered, the other to show that the mains power is still connected.

The telephone module is controlled by a Frequency Shift Key (FSK) modem and can handle 1200/75 baud for Viewdata connections, 1200/1200 half-duplex and 300 baud full duplex. It can also handle two telephone lines at once, and with only one modem and one handset, these will normally be a data line and a speech line. However, it's possible to put one voice call on hold while dealing with another. The board is designed for analogue communication, but a digital board is under development to be ready when digital communication becomes more established. Auto-dialling and auto-answering facilities are also provided.

The speech synthesiser and its associated vocabulary is used to construct messages which can then be broadcast through the telephony module when set in auto-answer voice mode. Auto-answer data mode allows the reception and storage of data without any user intervention.

System software

The QL has an operating system called QDOS which is intimately related to QL Basic. In fact, I think they may even occupy the same ROM on that machine. ICL has written its own operating system software and accordingly has had to prise the Sinclair Basic away from QDOS prior to building it into OPD. This process is ongoing and several features were missing at the time of this review. In particular I felt the need for high resolution graphics, which are oddly missing from this machine.

ICL is aware that a large amount of third party software will be written for the QL, and will therefore be trying to make the two languages as compatible as possible. ICL will also want to make its own operating system resources available to Basic programmers, so I expect the final version of Basic to be completely compatible with QL Basic.

The OPD user will be very taken with the 'operating system' provided with the OPD. To call the ICL software an operating system is rather insulting. ICL calls it the Base Functional Software as it not only controls the essential functions of the machine, but also provides services which the user can invoke in order to access the various applications available. Briefly, the elements of this system are as follows: Kernel, Director, telephone handler, telephone directories, calculator, screen image printing and field editor.

The Kernel is what we normally call an operating system: it manages the nuts and bolts and provides a logical map of the hardware devices. Input, output, memory allocation, device control and interrupt handling are the main tasks of the Kernel and everything is, of course, invisible to the OPD user.

The Director is a higher-level piece of software which comprises two elements — the applications handler and the telephone handler. The Director schedules activities so that they don't trip over each other in their bids for machine resources. Guidelines exist for software authors and, providing they obey the rules, the Director and the Kernel will make sure that no contention problems arise. The Director takes care of those strange keys I mentioned earlier, START, RESUME and REVIEW, and is always in control of what application is where, what resources it's using, and what state it was in

when it was last active.

The telephone handler part of Director keeps track of the calls which have been requested by the various applications, the status of each line and the management of voice and data calls through those lines. Auto-dialling, line switching and connection of the speech synthesiser are handled by this part of the software, as is the reporting of the telephone system status to the Noticeboard at the foot of the screen.

OPD contains two telephone directories — one for computer services and the other for voice calls. The directories can be searched by keyword or part-word, browsed, used to automatically dial a number and saved to microdrive. The user can create and amend directory entries, and load and merge directories from microdrive. All these facilities are directly available to the user from a series of menus.

A simple calculator is provided which handles up to 16 digits (plus decimal point and sign). Calculations are to eight decimal places and the normal +, −, *, /, = and % facilities are provided. In addition, a number of memory commands are included but, frankly, the calculator is nothing to write home about. It's on a par with a credit card calculator, with the additional benefit that you can see the details of earlier calculation scrolling up the screen as if they were on paper.

The screen image printer literally freezes the screen when the button is pressed and dumps the image to the printer, and is obviously useful if you've encountered an interesting Prestel or electronic mail page.

The field editor provides cursor positioning and text editing controls, giving the user a consistent approach to data entry and amendment tasks.

All the foregoing functions are built-in to enable applications programmers to provide a consistent user image in their programs.

For the ordinary user, all the system's facilities and supplied programs are presented through a series of menus. Although you may lose track of yourself from time to time, you can always get back to the main menu by pressing OPD's panic button — the START key. The main menu comprises the following options: Telephone Directory, Telephone Control, Messaging, Applications, Computer Access, Calculator, Basic, and Housekeeping.

The Telephone Directory option conceals a lower menu which allows you to create and amend directory entries, save and load them via microdrives, search for an entry by keyword or part-word, display the current entry, and make automatic calls. You can store two numbers for each person — one data, the other voice. Extension numbers may follow the telephone number for display onscreen while the call is being put through. The only trouble is that when you lift the handset to ask for the extension, it disappears from the screen; you need to use your own short-term memory.

The Telephone Control option allows you to examine the status of your telephone lines (free, ringing, answering, and so on) and the last number called. The fun starts when you want to set the OPD to automatically answer voice calls with its built-in speech synthesiser.

A selection of some two hundred words is offered and to create a message, you simply type it using these words. If a word is unrecognisable to OPD it will highlight the wrong word so that you can change it. Endings such as -s, -ing and -ed may be appended to words and the letters, numbers and dates (1st to 31st) may be included. A sentence like: 'I am sorry, I am out. Please call my secretary on extension "328". Thank you.' is quite feasible. If you're the imaginative sort you could cook up something like: 'I have gone for a we-we. Back soon.' Full stops, spaces and commas provide pauses of varying lengths and the end result sounds rather like a well-educated Dalek. It works, it's fun and you can't be in any doubt that you're being answered by a computer.

You can set a time window for auto-answer and automatically switch to an alternative message outside that window; a repertoire of up to sixteen messages may be stored in the OPD. If you want the phone to ring for 14 seconds before your Dalek answers, then that can be arranged too; this gives people a chance to ring off when they realise you're not there. Other features of Telephone Control allow you to time calls and let OPD work out approximate call charges.

The plug-in ROM capsule covering Messaging wasn't finished at the time of this review. It's a kind of electronic mail facility which lets you create memos, messages or whatever in a 'notebook' on your OPD. You pop it into OPD's electronic 'out tray' where it waits to be transmitted to its destination. Transmissions take place without your intervention and, when you arrive in the morning, you may well find a stack of messages in your electronic 'in tray' which can be transferred to your notebook, printed out or simply destroyed.

The Applications option clearly depends on what you have plugged into your OPD. On the review machine it offered a cartridge menu which told me which programs were available from the microdrive, statistics relating to the microdrive's performance and access to Xchange, Psion's suite of applications programs.

Computer Access lets you maintain a file of computer phone numbers and access details in a similar way to the voice Telephone Directory mentioned earlier. It allows automatic or manual connection using Viewdata or Glass Teletype conventions. Pages of data may be stored for later printing and protocols can be tucked away in its Profile Store. I tried Telecom Gold but was denied access — someone at ICL may have changed the password. The auto-dialling, the connection and the sign on worked perfectly though.

I had more success with Prestel and suffered the usual experience of profound disappointment with what was there. I saved pages and displayed them after I had disconnected, and it pleased me to think that I was cutting down on my phone bills by using the facilities in this way.

Technical specifications

Processor:	68008, 7.5MHz
ROM:	128k integral 208k ROM pack
RAM:	128k dynamic 2k static (lithium battery-backed)
Mass storage:	Two microdrives, minimum 95k each
Keyboard:	73 keys, qwerty plus telephone-style numeric pad
Monitor:	9in monochrome
Size:	Control unit, 95mm × 440mm × 250mm Monitor 250mm × 280mm × 280mm
Weight:	Control unit, 3kg Monitor, 4.75kg
I/O:	Nine-way RS432 serial connecter
Modem:	1200/1200 half-duplex, 75/1200 and 300/300 full duplex
DOS:	Proprietary
Bundled software:	Telephone directories, control, communications, utilities, calculator, Basic
Peripherals:	OKI printer, Microvitec 14in colour monitor
ROM pack:	Psion's Xchange suite (Easel, Archive, Abacus and Quill)

Finally, the Housekeeping option allows you to check the battery charge, set the time and date, save and load important bits of store and mess around with the microdrives. Format, copy, rename, display and delete are among the utilities provided.

Applications software

An option with the OPD is the Psion Xchange suite of programs. This comprises the four most popular applications — spreadsheet, business graphics, word processor and database. Called Abacus, Easel, Quill and Archive respectively, they are similar to the versions offered on the QL and the popular MS-DOS machines. Xchange was reviewed in *PCW*'s October issue and, as is so often the case, I was working with development versions.

Once the programs are fully debugged they offer a perfectly adequate set of facilities, and any minor niggles (especially the need to type Archive commands in full) are overcome by the splendidly low price. Because the Xchange applications are held in ROM and treat RAM as if it were a microdrive, the loading of programs and exchange of information is impressively fast. You can, of course, specify the microdrives for data storage when things do slow down; the trick is to make your telephone calls while the drives are busy. You can get into other activities but, sooner or later, they suspend the microdrive activity.

ICL is looking for other software but, at the time of writing, it either hadn't found what it was looking for or was keeping quiet about its plans. As I mentioned earlier, the company is aiming for compatibility with software offerings destined for the Sinclair QL.

Documentation

The OPD is supplied with the following manuals: *OPD Installation; OPD Handbook; OPD Basic; OPD Messaging;* and *OPD Welcome Package.* I was given draft copies of all except *OPD Messaging.*

The manuals are well laid out and well written, although I did feel the need for a road map from time to time. The problem lies less in the manuals than in the complexity of the subject being tackled. The OPD is a very sophisticated piece of kit and ICL has tried very hard (and very successfully) to hide this from the user. Because the manuals have to cover the subject thoroughly there's a danger of getting bogged down, so my advice is to read as little as possible and use the machine as much as you can. As you run into gaps and apparent inconsistencies, that's the time to study the manuals.

The *Installation* manual is approximately 25 pages which tell you clearly what to do to get your OPD going. Read it — you must. It's a model of clarity and about 50 per cent pictorial.

The *Welcome Package* runs you through a series of 'typical' OPD activities using both a microdrive cartridge and the *Welcome* book. The cartridge is the easiest way to get a feel for the OPD software if you'd like a little theoretical learning before properly using the machine. The accompanying manual is thorough but makes machine operation look a lot more complicated than it actually is.

The *Handbook* tells you everything you're likely to need to know about the OPD, but is a book to be dipped into rather than read straight through. It's clearly written but once or twice I found it guilty of 'forward referencing' — it mentions things before it's explained what they are.

The *Basic* manual is utterly comprehensive and can be used equally well by a novice or an expert.

Prices

The basic OPD costs £1150 including the 9in monitor, and Xchange is a further £150. My guess is that the Messaging software will be cheap, around £25. Discounts will be available for bulk orders, say more than ten units, and all prices exclude VAT. At the time of writing printer and colour monitor prices were still to be fixed.

Conclusion

The ICL OPD is an excellent concept. It grabs a corner of the desk and, with the Xchange software, takes care of most of the professional's data processing and telephone needs. By allowing several tasks to be operational at once, OPD comes very close to matching a user's rather erratic way of working.

The price is simply amazing coming from ICL — I haven't seen anything like this machine at that price level and I suspect that, for a few months at least, ICL will have the field to itself. I do hope that the company introduces a version of OPD which performs simple switchboard operations, rather like the Herald system that's so popular.

The microdrives behaved faultlessly all the time I was using the ICL software but let me down when using Xchange. Exhaustive tests followed and I couldn't avoid the conclusion that the pre-release software contributed to this problem. ICL has modified the electronics and the system software to maximise the realiability of the microdrives and I understand that, even at the time of the review, it still has some further improvements to make.

In view of the fact that ICL's Robb Wilmot would like to see a quarter of a million OPDs shifted next year, it's very much in the company's interests to make the machine as reliable as it can.

No Benchmarks were run on the ICL OPD as the Basic wasn't ready at the time of review. END

In perspective

A single glance at ICL's OPD betrays its pedigree. The Sinclair microdrives peer at you over the top of the keyboard. Inside you'll find three Sinclair-designed chips and the Basic is adapted from Sinclair SuperBasic. Having said all that, the rest of the design is definitely ICL's. The system software has been written by ICL to handle a wide range of tasks concurrently — exactly what the busy professional needs; access to these facilities is through a series of simple menus.

With its built-in voice and data telephony system, ICL has clearly distanced itself from the run-of-the-mill desktop computers. I read somewhere that the few square inches on the top of the executive's desk are the most valuable piece of real estate in the world. The race is on for that space and I think that ICL is in with a very good chance of leading in the first lap. At £1150, or £1300 if you include the Psion packages, this product represents remarkable value. Looking around the market-place I had problems deciding which machines to compare it with; because there's nothing like it my choice is limited. Most people will need two telephones, a modem, a personal computer and a pile of software packages to match the OPD's facilities.

An IBM PC plus RS232 board, modem and integrated package such as 1-2-3 or Symphony would certainly be more than a match for the OPD. But at what cost? The microdrives put a limit on the OPD's data storage, but many users wouldn't notice this. The QL is a much closer match but once again, by the time you've added the extras — two phones, modem, special software and monitor — you're talking about an expensive and untidy system.

Sir Clive Sinclair clearly sees them as machines aimed for two different markets; either that or he's spreading his risk, which is unlikely. I have seen a Macintosh with a phone glued to the side . . . it's desperate, isn't it?

There isn't anything available in our part of the market which compares with the OPD. You're on your own with this one. Go out and cobble together these facilities around any personal computer and I think you'll find that when you price it you'll wonder why you bothered.