Taken as red

Are cable connections cluttering your life? Roger Gann has seen the future — and it's infra-red.

J ust about everybody is talking about the Universal Serial Bus at the moment but the real unsung hero of advanced PC connectivity remains the humble infra-red port, the number one alternative to ye olde serial ports. To date, more than 60 million laptops, Personal Digital Assistants (PDAs), printers, digital cameras and other devices have been shipped with infra-red ports which, like a domestic TV remote control, use a beam of pulsed invisible infra-red light to transmit and receive data.

Using infra-red beams to carry data is very convenient as it means no more fumbling with cables. But infra-red (IR) isn't just confined to taking the pain out of printing, it can carry any sort of data. Most PDAs such as the Psion Series 5 or Windows CE devices have infra-red ports. As a result, you can exchange documents between PDAs and PCs in much the same way as you can print. You simply point at the other device and press the transmit button.

You can even synchronise your PDA with your PC using infra-red. And, thanks to the latest IrDA 4Mbps Fast Infrared standard, it's also possible to connect to a network using light rather than an expensive, complex docking station or network PC Card. Connecting to a network is as simple as placing your notebook in front of the access point.

Infra-red technology is not the sole preserve of computers. The latest Ericsson and Nokia mobile phones now sport an infra-red port. Thanks to the wonders of IR, phone number and name lists can be zapped into your mobile rather than being tediously punched in, and without worrying about plugs and leads, either. Even better, with a compatible PDA, such as the Ericsson MC12 Windows CE handheld or Psion Series 5, you can connect to the internet using your mobile phone: instead of

using a special cable, you use infra-red to link the two devices. Some payphones in Japan are even equipped with IR ports to simplify data transmission in public.

☞ The IrDA standard

For the same reasons that prevent a TV remote control from controlling any VCR, original PC implementations of IR used proprietary protocols and hence are far from inter-operable. As a result, getting two infra-red devices from different manufacturers to talk to each other was often difficult or impossible. The Infrared Data Association (IrDA) wa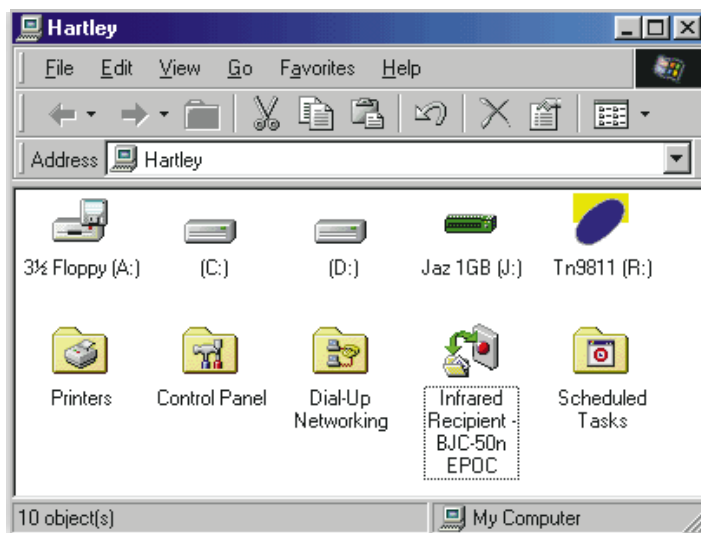s founded in 1993 to devise an industry standard that would offer infra-red compatibility between different brands and types of infra-red devices.

Establishing a wireless data link causes all sorts of headaches compared to a conventional cable connection. Unlike a cable, which is semi-permanently attached, the ends of an IR link may move freely within and out of range which means that the link may be broken in mid-transmission. The IrDA standard defines a communication protocol which provides for the

establishment and maintenance of a link so that error-free communication is possible.

The original IrDA 1.0 standard envisaged the infra-red port as a straight replacement for the standard 16550A RS-232C serial port. This had a maximum speed of 115.2Kbps and so the first IrDA standard mirrored this. It was also called SIR (Serial Infrared). It quickly became apparent that this wasn't fast enough for data transfer and so, in April 1995, v1.1 of the IrDA standard was announced, also known as FIR (Fast Infrared). This permitted transfer speeds as fast as 4Mbps and was backwards compatible with the original, slower standard.
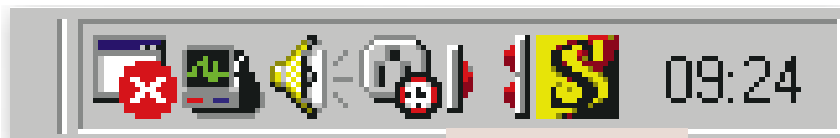
☞ The future of infra-red

Two interesting IR developments are in prospect: IrBus, which is aimed at expanding the use of infra-red among a

whole raft of domestic devices, and Very Fast IR which will boost the speed of IrDA connections as high as 16Mbps.

IrBus is good news for gamers. Based on current Universal Serial Bus technology, it's designed to allow in-room wireless use of mice, keyboards, joysticks, gamepads, remote control

units and PDAs with host devices such as multimedia PCs. It can work with up to eight devices simultaneously communicating with at least two hosts and provides the kind of nippy responsiveness demanded by gaming devices such as joysticks. It's designed to offer room-sized coverage (up to 8m) and its low speed (75Kbps) will mean low battery consumption. For more information, contact www.irbus.org.

Very Fast Infrared (VFIR) is a new 16Mbps IrDA standard proposed for use with PDAs and devices such as digital cameras. With digital picture resolutions reaching a million or more pixels, each picture will take a considerable time to download, even at 4Mbps. VFIR is the solution, it is four times faster and can transmit and receive data at distances of up to 1m and, like the earlier IrDA 1.1 standard, it can also be used in place of a serial port to transfer files or to send to a printer. VFIR could find a home in units such as portable storage devices, mobile phones and handheld scanners.

☛ Infra-red hardware

Of course, to use infra-red you need to have the right hardware. Most, if not all, current notebooks have IrDA ports as standard and the same is also true of most PDAs. But that's the end of the good news. The range of other devices blessed with IR ports is considerably narrower. For example, only a handful of Hewlett-Packard printers (the LaserJets 5 and 6P/MP as well as the portable DeskJet 340), and the new portable BJC-50 Canon printer have them.

We run out of luck completely when we turn to desktop PCs. None are equipped with IrDA ports as standard. However, thanks to IrDA's murky serial-port roots, many PC motherboards do make some sort of provision for an IrDA port. This normally takes the shape of a header connector on the motherboard to which you can attach an inexpensive infra-red transceiver which you'd obtain from the dealer that sold you the motherboard or, at a pinch, somewhere like Maplins. Check your motherboard manual for more details.

Or, you can buy a plug-in adapter such as those sold by Extended Systems www.extendedsystems.com/ products /infra-red/. The JetEye PC (£69 ex VAT) plugs in to your PC's serial port and offers IrDA-compatible data transfer at speeds of 115.2Kbps over a 1m range.

The JetEye Printer (£99 ex VAT) plugs in to a printer's parallel port and as well as permitting infra-red printing it also has a pass-through connector letting you plug in an ordinary printer cable as well. The JetEye Net/Net Plus modules (from £225 ex VAT) allow infra-red-equipped portables to connect to a network at 4Mbps without the hassles of cables and PCMCIA cards.

☛ Windows 9x and IR

The original release of Windows 95 didn't actually ship with any support for infra-red devices, so you have to download the IR drivers from the Microsoft web site at www.microsoft. com/windows/downloads. Version 2 of the IR drivers is available for Windows 95; look for W95IR.EXE, a 434Kb download. This supports IrDA 1.0 and 1.1 — that is, transfer speeds of 115.2Kbps and 4Mbps — and most notebooks will come with Windows 9x IR support already installed.

With this software installed you'll be able to print using IR, but if you wanted to transfer files you'd typically need some additional third-party software such as TranXit, or recent versions of LapLink. It is, however, possible to use Windows 95's Direct Cable Connection to network two PCs, linking them via their IR ports

rather than a cable.

Windows 98 comes with Microsoft Infra-red 3.0, which lets you connect to networks as well as print and transfer data. And, with this version, you no longer need special file transfer software as Windows 98 now comes with Infrared Transfer — downloadable from the microsoft.com website address above — a new application for transferring files via an infra-red connection.

When an infra-red device has been installed, an icon called Infrared Recipient is added to My Computer [Fig 1] and an extra item is added to the Send To menu option which appears when you right-click a file or folder.

To send a file via infra-red involves right-clicking a file and selecting Infrared Recipient from the Send To list. The first time Infrared Transfer is used to send a file or folder, a folder called My Received Files is created and all sent files or folders will be copied to this.
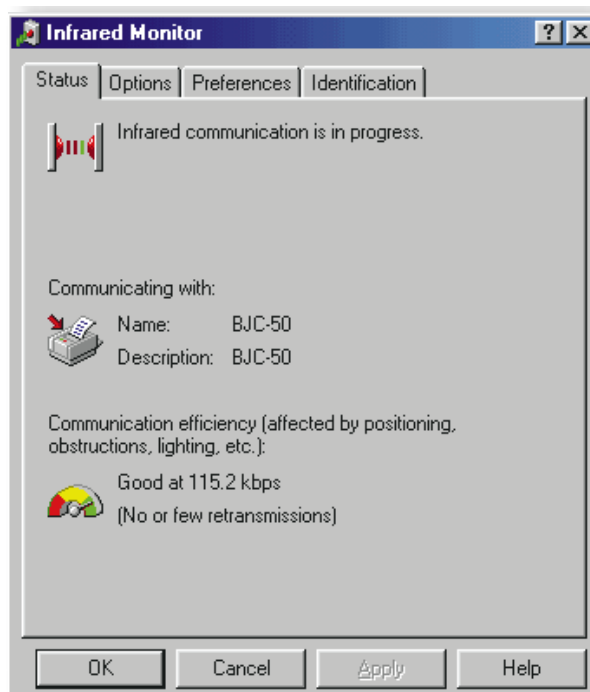
☛ Infra-red in practice

Using infra-red to print really does rival falling off logs in the simplicity stakes. With Windows 9x infra-red support installed, a little IR port icon is displayed in your Taskbar. It flashes away, indicating that Windows 9x is constantly checking for the presence of any IR devices in range [Fig 2]. When one is detected, you get an audible alert and the icon changes to a pair of IR ports. If you click on these, the Infrared Monitor dialog opens up. This tells you the name of the device and, when you're actually sending data, the

Using infra-red to print really does rival falling off logs

Infrared Monitor

Status | Options | Preferences | Identification

Infrared communication is in progress.

Communicating with:
Name: BJC-50
Description: BJC-50

Communication efficiency (affected by positioning, obstructions, lighting, etc.):

Good at 115.2 kbps
(No or few retransmissions)

OK | Cancel | Apply | Help

◄ Fig 3
WHEN YOU'RE SENDING OR RECEIVING DATA VIA IR, THE INFRARED MONITOR REPORTS ON RECEPTION QUALITY/EFFICIENCY

THE KATMAI'S OUT OF THE BAG

The next major processor release from Intel, touted as the replacement for the Pentium II, is finally called the Pentium *III*. Initially a 0.25µm processor — 018µm processors will arrive with the 600MHz versions in the second half of this year — it will sit in a standard Pentium II Slot 1 and feature 70 new multimedia-friendly instructions, formerly called KNI or Katmai New Instructions but now officially labelled 'Streaming SIMD Extensions'. Also featured will be support for a faster graphics bus (AGP 4X) and a new DRAM technology, DirectRAMBus.

The system bus is also to be speeded up to 133MHz, a rate which some BX motherboards offer already, although Intel is readying the forthcoming Camino chipset for this purpose. At first, though, Katmai processors will run at 100MHz.

The server/Slot 2 version (formerly 'Tanner') won't surface until the second quarter of the year. The Coppermine desktop/mobile version will follow later and will probably run at 600MHz although with the present half-speed L2 cache found on current Pentium IIs. The end of this year will see the release of the Cascades CPU, which runs at an estimated 750MHz.

Katmai could spell the end of the K6-2 as the gaming CPU of choice. The new instructions are mainly designed to enhance 3D gaming, but other tasks will benefit as well. For instance, speech recognition, surround sound, AC3, physical modelling and imaging. They offer SIMD (Single Instruction Multiple Data) operations on single precision floating point values, which is one of the most important things for 3D games computing.

This isn't new, AMD's 3DNow! technology incorporates a similar set of instructions. But with Katmai, Intel has taken a different, more sophisticated approach. SIMD-FP introduces eight new 128-bit (4 x 32-bit wide) single precision-packed CPU registers, enabling simultaneous computation of four single precision FP variables. By contrast, the AMD's K6-2 has eight 64-bit (2 x 32-bit) registers.

Also new to Katmai is a new, separate processor state or mode to take advantage of those registers. This is the first new Intel processor mode since the 386 that was introduced more than ten years ago. It will require a patch for Windows 98 but Windows 2000 will support it by default.

The new processor state will enable concurrent use of either SIMD-FP and MMX, or SIMD-FP and IA-FP double-precision floating point code. This is something that is not possible with the existing MMX and 3DNow! architectures which offer the choice of either MMX or FP but not both. Incidentally, the existing MMX instruction set has also been added to.

Katmai has one final performance booster up its sleeve — a new memory streaming architecture. This accelerates the P6 bus, by 'hiding' memory latency effects on CPU performance via a new pre-fetch mechanism. This can improve MPEG- 2 encoding/decoding as well as operating systems, server and workstation applications. Intel predicts performance improvements of five to 20 percent as a result of this new feature.

• A Katmai feature with five tested PCs starts on page 122.
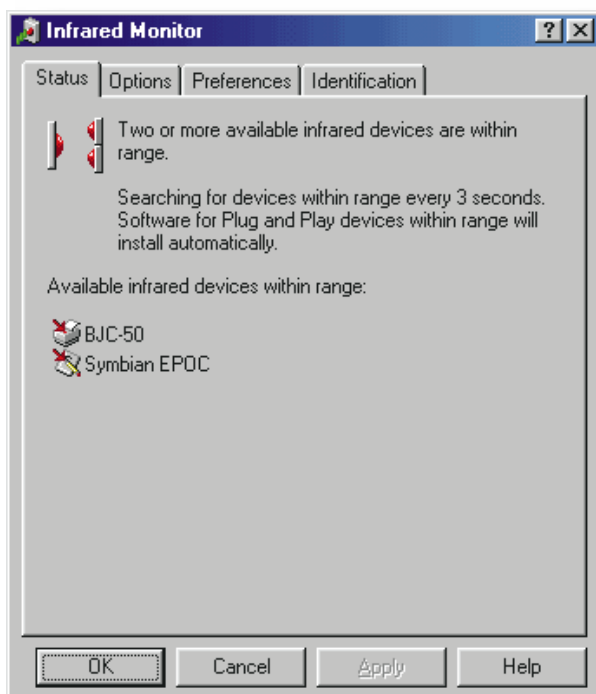
'quality' of the link it has achieved [Fig 3].

Once a printer has come into range [Fig 4] you can print, as though it were attached to your PC by a printer cable, in the normal way. The only thing to watch is that you've configured Windows 9x to connect to the printer via the IR and not the normal printer port. To check this, click Start, Settings, Printers then right-click your printer and select Properties. On the Details tab select the port you want to use from the pull-down list. Normally, this will be LPT3 (Infrared Printing [LPT] port).

It's not all sweetness and light, though. To get a good, reliable IR connection some simple rules must be observed. Forget all you know about TV remote controls; these infra-red devices are very different. The two IR ports have to be pretty close to each other; less than a metre apart but often half this figure, which is often a royal pain. They've also got to be more or less pointing at each other to connect. In short, the IR ports must be virtually touching!

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