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Introduction

Thank you for choosing ISDN from Cable & Wireless. This Guide gives you the information you need for using your ISDN connection, and tells you more about what ISDN can do for you.

> ISDN stands for **integrated services digital network**, so called because an ISDN connection can carry voice, data and video, completely interchangeably. The speed and flexibility of ISDN open up the possibility for new applications such as:

- fast access to the Internet
- working from home
- videoconferencing
- sending and receiving documents and files

Because an ISDN connection gives you two 64 kbit/s lines, you can make two calls simultaneously. Or, when you need higher-speed communication — for example, to download a large file from a web site — provided you have suitable equipment you can use both lines together on a single call.

A number for each application

You can choose to have up to eight phone numbers on your ISDN connection (see **Multiple Subscriber Number**, overleaf). This lets you give each device, application or extension its own number. For example, you might want to have separate numbers for your telephone, your fax machine and your computer, so that callers can dial straight through to the device they want.

NUMBERS TO CALL

Ordering new connections or features; making changes	FreeCall	0800	068 4 ⁴	I 01
Information on Cable & Wireless Internet access solutions	FreeCall	0800	092 00	5 36
Problems with your ISDN connection?	FreeCall	0800	068 4'	I 03
Please refer to pages 10 to 11 before reporting a problem				

Making the most of ISDN

Many people initially take ISDN for just one or two applications. But a Cable & Wireless ISDN connection can do much more for you.

> The diagram below shows an example of applications sharing an ISDN connection. The connection has been supplied with **Multiple Subscriber Number (MSN)**, which gives up to six extra phone numbers in addition to the two numbers supplied as standard. Each application has been given its own phone number; for example, to send a fax, callers dial 0171 123 4502 to be connected directly to the fax machine.

> If you do not yet have MSN, and you'd like more information, phone FreeCall **0800 068 41 01** or speak to your Cable & Wireless sales contact.



Know your callers' identity

With **Calling Line Identity Presentation (CLIP)**, the phone number of the person calling you is 'presented' to your equipment. How the CLI is used depends on the equipment, for example:

- A specialised ISDN phone will display the number and may show the caller's name, if you have stored it in the directory. So you can decide how (or if) to answer the call.
- Taking this a stage further, your computer can be set up to display information from a database about the caller; this is an example of computer-telephony integration (CTI).
- If security is important, you can set up your ISDN router or computer to check the caller's CLI before allowing access to data on your system.

Use the resources of the Internet

For access to the Internet and online information, many users find that a modem and ordinary phone line are not fast or reliable enough. Your Cable & Wireless ISDN connection can give you Internet access at 64 kbit/s or 128 kbit/s in both directions, with near-instantaneous call set-up. This lets you take full advantage of the resources of the Web — you can easily view sites with complex graphics and video, and download files within seconds.

Cable & Wireless Internet services Cable & Wireless offers a range of Internet access solutions for businesses and homes, including **CWIC Link**, a package for small business customers. CWIC Link provides you with the connections and equipment to network up to ten PCs, each with Internet access.

For more information about Cable & Wireless Internet access solutions, phone FreeCall **0800 092 06 36** or speak to your Cable & Wireless sales contact.

Maintaining your own web site If you have your own web site, hosted by an Internet Service Provider (ISP) such as Cable & Wireless, you will find that adding new and updated files using File Transfer Protocol (FTP) is much quicker over ISDN.

Connect computers and local area networks (LANs)

ISDN is a cost-effective way of linking your office LANs and extending access to your network resources. You don't need a private circuit that's open at all times; just a router that dials up a connection automatically when there's data to send. And the ISDN lines are available for other calls when they are not being used for exchanging data.

With high-speed access to resources in the office, users have the flexibility to work from home, making better use of their time and escaping the stress of daily commuting.

Send and receive documents and files

Using couriers or the postal service to exchange documents and files can be unreliable, slow and expensive. ISDN speeds up the process while cutting costs.

Smaller files can be attached to email messages, while larger files can be exchanged over an ISDN link using communications software. Alternatively, with a Group 4 fax machine, you can send an A4 page in seconds, with laser printer quality.

Electronic proofing and printing

If your business is producing documents, you can use ISDN for exchanging design proofs and artwork. A document can be converted to Portable Document Format (PDF) using Adobe Acrobat and sent via ISDN to the client, who can view and print an accurate copy using free-issue software.

Acrobat and ISDN are now often used to send camera-ready artwork to bureaux for printing, eliminating whole days from the workflow process and allowing true print-ondemand when documents are needed in a hurry.

Portable Document Format (PDF) and Acrobat are trademarks of Adobe Systems Inc.

Talk face-to-face without travelling

Videoconferencing lets you talk face-to-face with colleagues and associates when you need to, without the stress and wasted time of travelling.

As well as 'group' systems for the meeting room, desktop videoconferencing systems — consisting of a camera and microphone to be used with your PC — are now available. They are cost-effective and easy to run, and let you set up flexible 'virtual workgroups' with colleagues at other locations, working on shared files as you talk. Using multipoint conferencing units, a number of desktop systems can participate simultaneously in a videoconference.

Because the picture on a desktop system is relatively small, and only one or two people are using the equipment at each end, two ISDN channels (128 kbit/s) give you acceptable picture quality and voice/image synchronisation. For group videoconferencing, with a larger picture and more people, you can combine up to three ISDN connections, using an inverse multiplexer. This gives you a total bandwidth of 384 kbit/s.

Other features giving you multiple phone numbers

As well as Multiple Subscriber Number (MSN), Cable & Wireless ISDN has two other optional features for multiple telephone numbers:

- For some specialist data networking applications, you may wish to use sub-addressing as well as, or instead of, MSN.
- If your ISDN lines are connected to a PBX, you can use Direct Dialling In (DDI) to give each extension its own number so that callers can dial directly to the extension they want.

For more information on these features, phone FreeCall **0800 068 41 01** or speak to your Cable & Wireless sales contact.

Getting connected

How to connect your equipment to your ISDN lines.



Programming your equipment

Having connected your equipment, you may need to program it, and the application software you are using. For details of how to do so, please refer to the documentation provided with the equipment or the software, and contact the supplier or manufacturer if necessary.

Because your ISDN connection gives you two lines, you can make calls from one of your numbers to the other(s). This is useful for testing whether you have configured your equipment correctly.

For outgoing calls

Your software documentation will tell you how to program in outgoing numbers — for example, the access number for your Internet service provider — and how to set up your applications.

Note: international data calls. For international ISDN data calls, the dialling prefix is **000** (rather than 00, as used for international voice calls). If you are storing international numbers in a directory, or as part of the settings for an application, remember to use the correct prefix.

For incoming calls

If you are using MSN, you need to program each item of equipment to recognise and respond to its own telephone number. If you have several devices connected via a terminal adapter or router, you need to program it to route calls to them according to the dialled number.

If you are using DDI on a PBX, the PBX needs to be programmed to route calls to extensions. The maintainer of the PBX will normally do this for you.

CLI Presentation on incoming calls If you have an ISDN phone with a directory, you may wish to store details of your regular callers, to be displayed according to the CLI. You may also be able to program your equipment to reject calls from, or only to respond to, certain CLIs.

You need to have requested CLIP when you ordered your ISDN connection, or to order it as an upgrade. For more information, phone FreeCall **0800 068 41 01** or speak to your Cable & Wireless sales contact.

Making calls

Making calls during a mains power failure

Most ISDN equipment needs mains power. If there is a mains power failure, and you do not have backup power, you may not be able to make calls.

The ISDN connection can supply 40 V / 240 mW of power to the equipment from the telephone network. This may be enough to power a single ISDN phone for making voice calls — for example, to Emergency Services — although the phone's features may not all work without mains power.

Some ISDN devices can be 'designated' as emergency phones. Check the documentation supplied with the equipment, and ask the supplier or manufacturer if necessary.

Note: only one device per ISDN connection should be designated as the emergency phone. If you try to designate more than one device, you will not be able to make calls.

Cable & Wireless cannot guarantee that you will be able to make calls during a mains power failure; this depends on the suitability of your equipment.

Calling Line Identity (CLI) on outgoing calls

Normally, whenever you make a call your phone number (CLI) will be sent over the line and may be displayed on the equipment used by the person you call. If you prefer to keep your identity private, you can ask Cable & Wireless to set Calling Line Identity Restriction (CLIR).

In either case, you can override the default setting on a callby-call basis, as follows.

- Without CLIR by default, your CLI is released with each call. To prevent its release on the call you are making:
 - Dial 141 before the telephone number
- With CLIR by default, your CLI is never released. To allow its release
on the call you are making:
 - Dial 1470 before the telephone number

POINTS TO REMEMBER

■ Your ISDN equipment needs electrical power. If you disconnect it from the mains, or turn it off, your callers will hear Number Unobtainable tone when they try to get through to you. This also applies if you have a terminal adapter (TA) or router with a phone or answering machine connected to its analogue ports — the analogue equipment will not function unless there is power to the TA or router.

It's a good idea to have some form of backup power so that communications will not be disrupted by a mains power failure.

- Remember to use the international dialling prefix 000 when you make international data calls. For voice calls, use the 00 prefix as usual.
- If you communicate with anyone in countries where ISDN runs at 56 kbit/s, you should check that your equipment can perform the necessary rate adaptation. This applies, for example, to some destinations in the USA.
- Some ISDN equipment is capable of inverse multiplexing, or BONDING, letting you use both lines together for data calls at 128 kbit/s. If you use both lines this way, remember that they will be busy for incoming calls.



Troubleshooting

The engineer who installed your Cable & Wireless ISDN connection left it tested and ready for use. If you have difficulties setting up a piece of equipment or an application, please refer initially to the documentation supplied with it, and contact the supplier if necessary.

Important: Remember that, to answer calls, each device must be programmed to respond to a phone number on your ISDN connection.

If your ISDN service seems to have developed a fault, please check these points before contacting Cable & Wireless —

1 Does the problem affect all calls?

If not, the problem may be with your equipment. Also, for some ISDN features to work correctly, the equipment at each end of the connection must be compatible. So you may not be able to use all features on all calls. Check the User Guide supplied with your equipment and that at the far end.

2 Check mains power

Make sure that the mains power to your ISDN equipment has not been disconnected or switched off.

3 Check the 'points to remember' on page 9

You may find that you have overlooked one or more points.

4 Check the light on the back of the smartbox





Reporting problems to Cable & Wireless

If you suspect a fault on your ISDN connection, telephone Cable & Wireless on:

FreeCall 0800 068 41 03

When you call, please be ready to give:

- your Cable & Wireless Account Number, which is shown on your monthly Telecoms Bill
- the telephone number of the ISDN connection which is affected
- a description of the problem is it intermittent? has it happened before? does it affect all the calls you make?

When you report the problem, the Cable & Wireless Customer Service Adviser will give you a reference number. Make a note of it — you will need to quote it if you want a progress report or if you call us back to report that the problem has been cleared.

Choosing equipment

A brief overview of ISDN-compatible equipment.

In summary, you can choose between:

- a card which fits inside your computer
- an external terminal adapter (TA) or router
- an ISDN-compatible telephone
- an ISDN-compatible PBX (IS-PBX)

Important: make sure that any equipment you buy fully conforms to the European standard Q.931, also known as ETSI ISDN or Euro ISDN.

You should also be aware that some features offered by ISDN equipment can only be used with the same type of equipment at each end of the connection. Check end-to-end compatibility with the manufacturer before purchase.

ISDN PC cards

ISDN network interface cards for PCs and Apple Macintoshes give direct access to ISDN features and functionality, with high-speed data transfer. An internal card may have direct interfaces for up to four Basic Rate ISDN connections.

Software is available for Internet access, file transfer, videoconferencing, computer-telephony integration (CTI), remote LAN access, etc. Using standard applications programming interfaces (APIs), the software can establish ISDN calls and control ISDN features.

You need one card per computer, unless your computers are networked and the card is installed in the network communications server.

Important: Before opening up a computer yourself to install a card, check that you will not invalidate the guarantee or service contract. If in doubt, contact the supplier for advice.

Terminal adapters (TAs) and routers

Terminal adapters are sometimes called 'ISDN modems', because they look and behave rather like external modems. For connecting a computer to ISDN, a TA plugs into a serial port and is controlled by standard communications software. To overcome the speed limitations of a serial connection, some TAs can now be connected via a parallel port.

Alternatively, you could opt for a **SOHO (small office/home office) router**, with an Ethernet connection to your computer, giving faster data transfer than a serial or parallel connection. Routers are more flexible than TAs or internal cards, as there is no need to configure the attached devices individually, and a number of routers can be centrally configured and managed.

Many TAs and routers have analogue ports for connecting phones and fax machines, letting you continue to use your existing equipment. This means you can replace your existing analogue lines without having to buy new telephones.

The diagram on page 2 shows a TA or router in use.

ISDN telephones

These telephones can be plugged into the ISDN smartbox, or to an extension socket. Most have LCD screens for displaying CLI, and some have programmable directories so that they will show the names of your regular callers. Some can be directly connected to the serial port of a PC for file transfer and Internet access.

ISDN PBXs (IS-PBXs)

With an IS-PBX, you can have several outside lines serving a number of extensions. IS-PBXs support both ISDN and analogue trunks, and analogue phones as well as ISDN devices can be connected to extensions.

Using DDI (see page 5), you can give each extension its own telephone number for incoming calls.

Glossary

A few technical terms you may come across.

Analogue and digital transmission An analogue signal is one that varies continuously with time, within certain limits. On an analogue telephone line, the transmitted signal is a replica of the speech waveform.

For digital transmission, the analogue signal is converted to series of electronic '1's and '0's. This means that much more information can be transmitted on each line, and also allows provision of supplementary features such as MSN.

- B and D channels Channels on an ISDN connection. B channels are telephone lines, carrying voice, data or video at 64 kbit/s.
 D channels carry control signals between your equipment and the local exchange, for call set-up and supplementary features.
- Bandwidth The information-carrying capacity of a connection — effectively the data transfer speed. For ISDN it is measured in kilobits per second (kbit/s) or Megabits per second (Mbit/s).

Basic Rate and Primary Rate Access ISDN connections come in two sizes:

- Basic Rate Access (your current Cable & Wireless ISDN connection) is sometimes called 2 B+D; it gives you two B channels and one 16 kbit/s D channel.
- Primary Rate Access, sometimes called 30 B+D, gives you thirty B channels and one 64 kbit/s D channel.
- Inverse multiplexer A device that lets you combine two or more ISDN B channels for a single call, when you need bandwidth of more than 64 kbit/s. Inverse multiplexing is sometimes referred to as BONDING.
- **POTS** 'Plain old telephone services' standard analogue exchange lines and equipment.
- **Q.931** The European standard for signalling on the ISDN D channel; sometimes called 'Euro-ISDN' or 'ETSI ISDN'.

Extension wiring

To connect equipment with more than 10 metres of cable between it and the smartbox, you need to have extension wiring installed.

Here are a couple of examples of extension wiring configurations.



Finding a suitable supplier

When looking for a company to install and maintain your wiring, you are advised to select one which is registered to TIA-Q, a voluntary approval scheme operated by the Tele-communications Industry Association (TIA).

You may also wish to check whether the company is registered to ISO 9000.

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