easyDncXP Version 2.0
April 2004

For Windows 95/98/ME/XP/W2000 and W2003Server

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Introduction

easyDncXP for Windows 95/98/Me/2000 & XP is a new, easy to use file transfer program specifically designed for sending and receiving programs and other data to and from CNC machines in ISO file-transfer mode.

Many such programs are based on DOS technology and even those that do use the Windows Graphical User Interface (GUI) often require a fair bit of keyboard work exposing their underlying DOS based heritage.

easyDncXP is a brand new program based on the Windows 32 bit GUI allowing many functions to be accomplished using the PC mouse. Sending a CNC file to a machine, for example, requires no keyboard work at all; simply use the mouse to navigate to the required file (or files) and click&drag the file(s) onto the relevant machine icon then stand back while easyDncXP queues the files ready for transmission. Just one more mouse click and the data is on its way to the machine.

Saving data FROM the machine couldn't be easier either. Here you open the easyDncXP text editor in receive mode then go to your machine and punch out/send your data which is then displayed instantly inside the easyDncXP text editor where you can view it, save it to disk or make changes and transmit back to the machine.

easyDncXP also runs in DripFeed mode displaying the program being processed with one-click Pause, Stop and Repeat.

All in all, easyDncXP is the ideal solution for those PCs which don't require expensive CAD/CAM functionality but do need simple and extremely low cost ISO file-transfer capability.

Installation

In most cases easyDncXP will be installed from our downloadable setup package available on the internet at www. dncxp. com

Alternatively you may have received your software via email or on a CD possibly from a colleague or a local reseller.

If you download from the internet all the setup files will be compressed into a self extracting zip file called dncxpzip.exe which will normally download onto your Windows desktop or into your Windows Temp folder. Double click the icon and the install/setup files will be extracted to the same location on your computer.

If you received the software on a CD then the install files will usually already be extracted ready for you to begin the installation process.

To begin setup double click the Setup icon and the installation wizard will guide you through the installation process.

Setup may need to reboot your PC in which case you'll probably need to re-run Setup once your PC has restarted.

When the install process is complete you'll find an easyDncXP item in your Windows Start menu.

Use this now to start easyDncXP

We've done as much as we can to make easyDncXP work just like Windows. If you can use Microsoft Windows then you can use easyDncXP.

The first time you run easyDncXP the main screen will look like the picture at the top of the next page.

Before you can send and receive data you need to add at least one machine to the system. Start by double clicking the 'Add Machine' icon.

And just like Microsoft Windows, you can RightClick the new icon to get a menu of options related to the new machine.

In this case of course the first thing to do is to give the machine icon a more sensible name. You rename the machine icon just like renaming any other Windows file or folder.
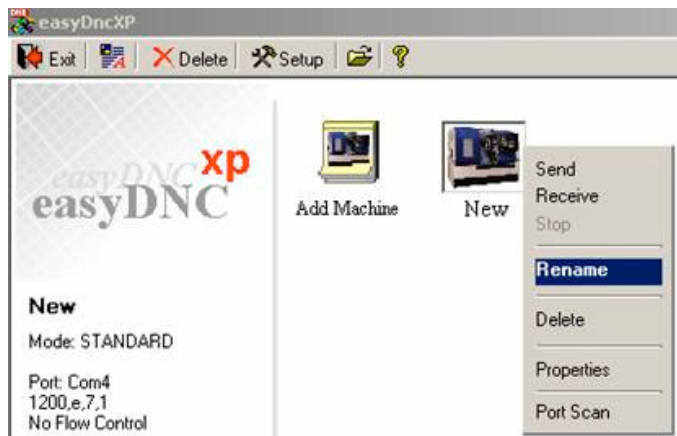
Configuration

Once you've added a new machine you need to configure easyDncXP so that it knows how to communicate with the new machine.

To begin select the machine by clicking its icon. You'll see the border appear around the machine's icon.

You can select "Setup" from the options across the top of the screen or RightClick the machine icon to expose the Machine menu where you can select "Properties".

Whichever menu item you select, the main setup screen, shown on the opposite page, appears.
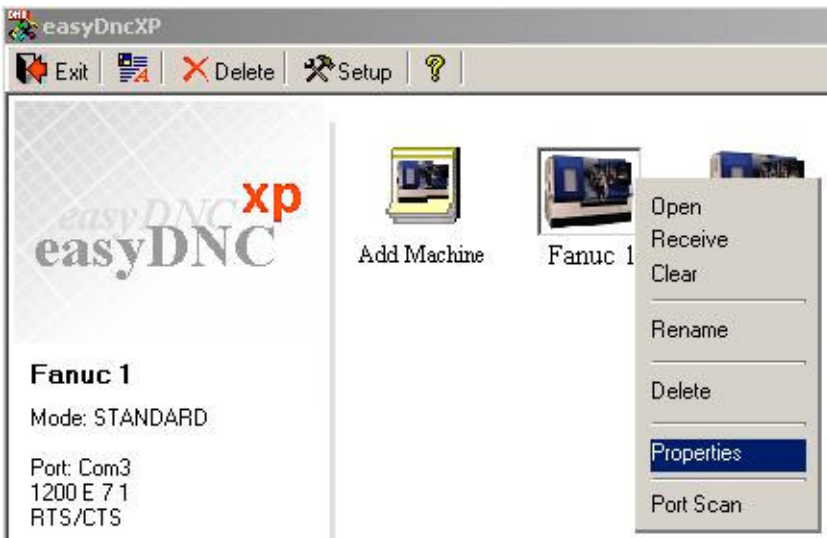
The options in this window need to be adjusted so that they match the communications settings of your CNC.

This window in your version of easyDncXP may have a slightly different layout but in general the options will be the same.

At the top of the window is a 'Help' menu which you can refer to for an explanation of each of the options.
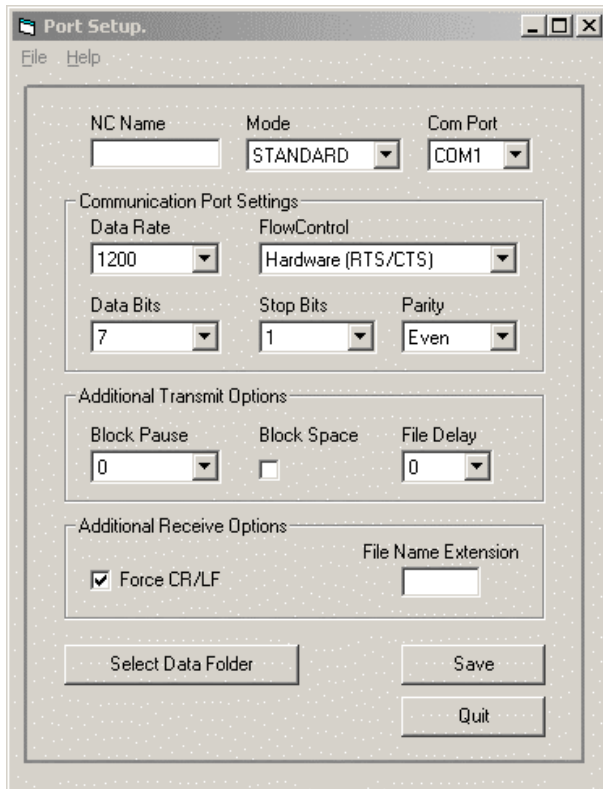
When you're finished click the [Save] button followed by [Quit] to close the setup window and return to the main easyDncXP window.

Send Data to CNC

Before data can be sent to your CNC the data needs to be entered into the transmission queue. In the picture below the Transmission Queue is the small text area in the lower left corner of the window. This example shows a list of four files ready to be sent to the CNC.

How files are entered into the Queue is explained on the following page.

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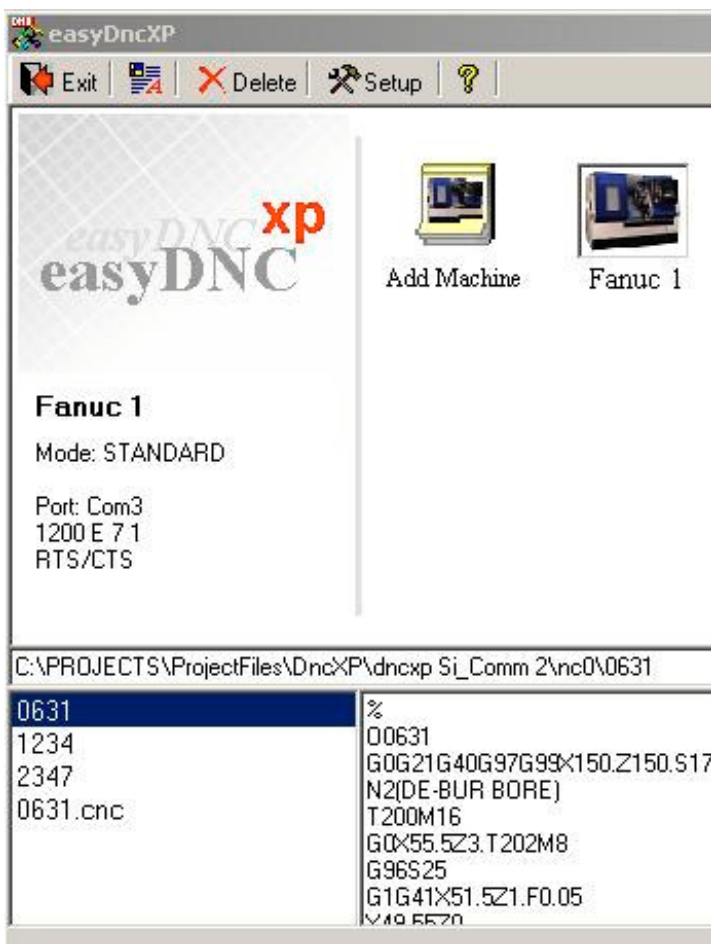
The easiest way to place files into the queue is by Drag & Drop.

To do this you navigate to your file(s) using Windows Explorer or 'MyComputer', click the file (or files) to select and then drag with the mouse and drop the file(s) onto the machine's icon.
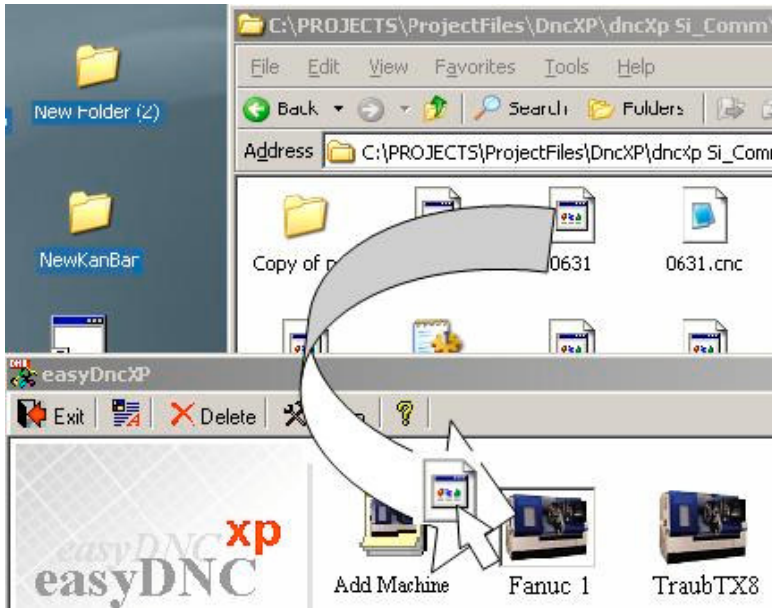
Note:

When you drag and drop files onto the machine icon the actual file is not moved from its original location. This action simply tells easyDncXP what the file is called and where it can be found.

Selecting a file via the Open File dialog

Windows allows you to select files in a number of different ways and different people prefer different methods.

To make using easyDncXP as easy as possible we've also adopted the same methods allowing you to select files by whichever method you prefer.

So, as well as Drag&Drop described on the previous page you can also select files via the Standard Windows file-open dialog.
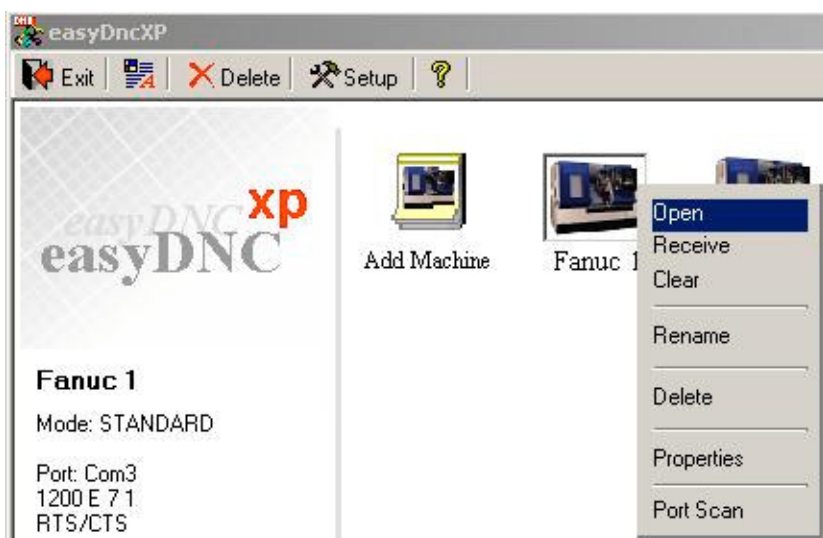
To access the Windows file dialog Right-Click the machine icon to expose the Machine Menu.

When you select 'Open' from the menu the standard Windows file open dialog appears as shown on the following page.

The exact look and feel of the Windows file-open dialog on your computer depends on your version of Windows.

This is the dialog from Windows2003 Server and XP.
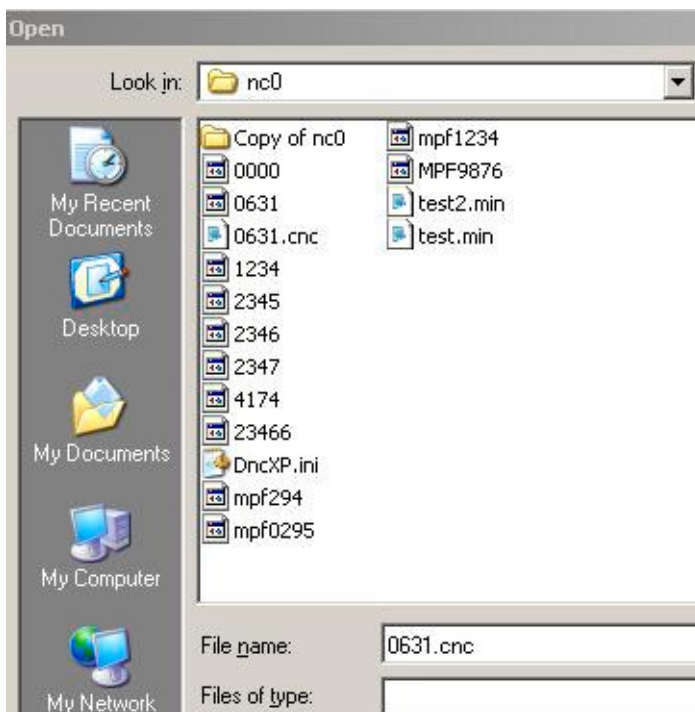
The file-open dialog allows you to navigate to any files anywhere on your computer or local network.
By clicking the file(s) they will be added to the current machine's transmission queue.

Note: The files you select are not moved or altered in any way. This action simply tells easyDncXP what the files are called and where they can be found.

Send Data to CNC

The names of files entered into the transmission queue are shown in the small text area at the bottom left of the main window.

To prepare one of the queued files for transmission select it in the list and its contents appear in the Transmission buffer. (The transmission buffer is the larger text area in the lower right of the window shown below)

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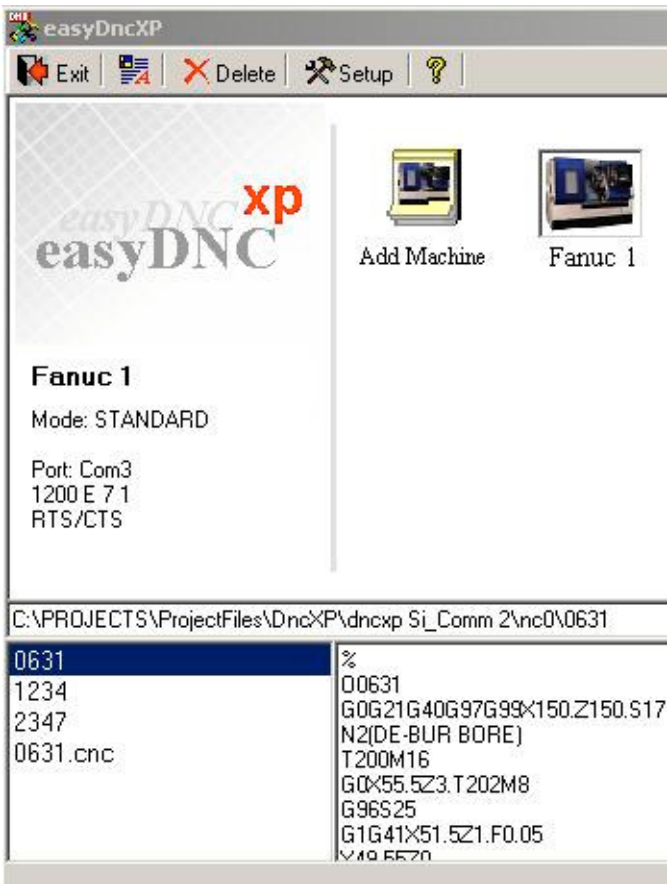
When you're ready to send the data to the CNC you need to place your CNC into 'Read' or 'Data In' mode and then click the easyDncXP [Send] button
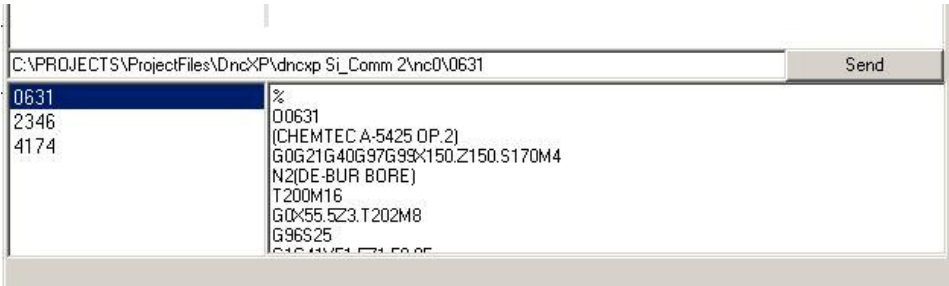
During transfer the data in the buffer scrolls up the window indicating which part of the program is being processed.

Any time during transfer you can click the Stop button to abort or the Pause button to hold temporarily.

The progress indicators and the display of data scrolling up through the window might well be of interest when "Drip Feeding" of large programs giving at a glance an indication of progress.
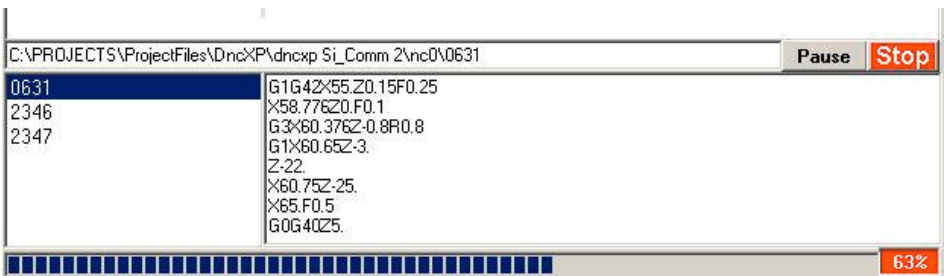
Receive Data from the CNC

To receive data from the CNC you need to set easyDncXP into 'Receive' mode.

First of all select the relevant machine icon and then click "Receive CNC Data" from the top right of the main window or select the 'Receive' option from the Machine Menu. (Right-Click the machine icon and select 'Receive' from the menu)

Whichever method you use the Data Receive window, shown on the opposite page, appears.
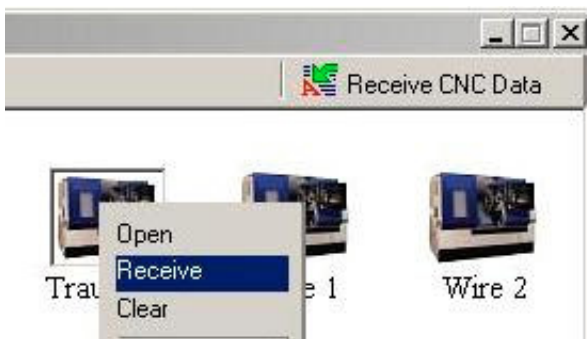
Once the window appears confirm that the coloured bars are scrolling left to right across the bottom of the window showing that easyDncXP is indeed in receive mode and then operate the CNC console to punch/send data from the CNC.

Note: The Data Receive and the built-in text editor share the same window. The actual mode (Receive or Edit) is indicated by the coloured bars that scroll left to right across the bottom of the window when easyDncXP is 'listening' for incoming data.

When data has been received it can be edited by making changes directly into the window, saved to disk via the 'diskette' icon in the top-left of the menu bar   and, if required, copied to the transmit buffer via the 'Send' option in the top right corner of the window.

Note: Copying to the transmit buffer will of course overwrite any data already in the current machine's transmit buffer.

```
15.0 Z2.0
Z-7.0
G01 G42 X13.859 Z-8.392 F0.25
X12.786 Z-9.7 F0.05
X9.668 Z-12.4
G02 X9.4 Z-12.9 I0.866 K-0.5
G01 Z-13.0
G02 X11.4 Z-14.0 I01.0 K0.0
G01 X13.0
G00 G40 X20.0 Z5.0
G40 Z150.0 M05
M01
T11 D11 M8
G95 S200 M3
G00 X14.0 Z2.0
G00 X14.0 Z5.0
G40 X150.0 M05 M09
Z150.0
M30
%
```
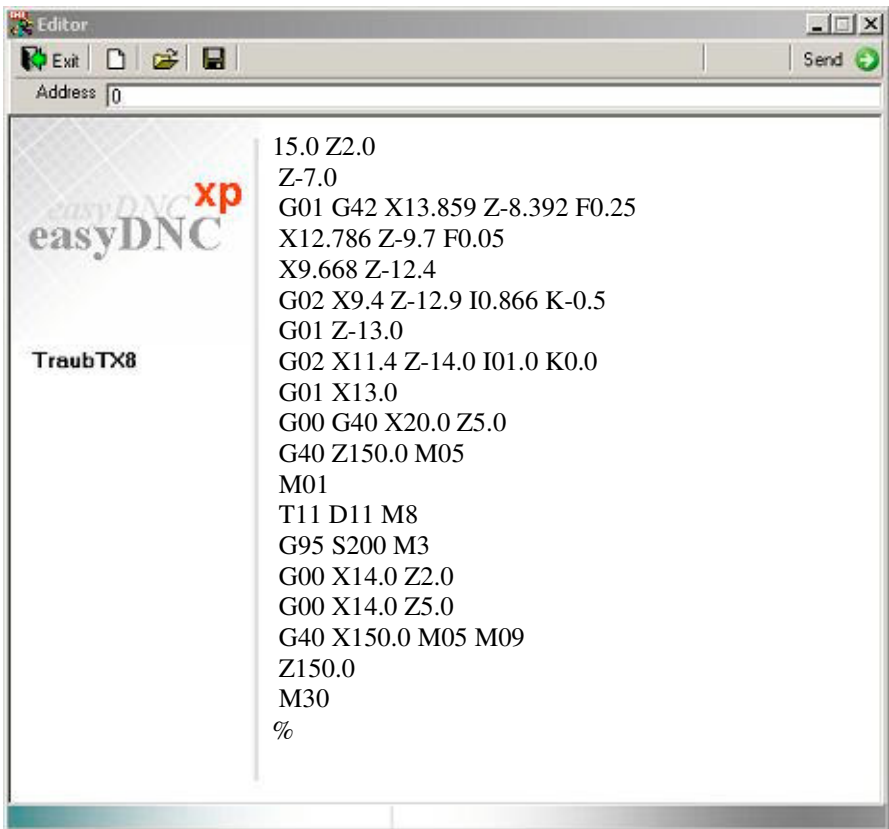
Detect CNC Communications parameters via Auto Port Scan

Port scan can be used to detect the CNC's parameters. Even if the CNC parameters are known it can still be an extremely convenient method of setting up a machine for the first time.

To enter Port Scan mode select that option from the machine menu.

The data input window, shown on the opposite page appears.

You should now use the CNC console to punch/send a program from the CNC which easyDncXP will analyse.

During analysis strange symbols or question marks will appear as easyDncXP scans the data and CNC control codes. In just a few seconds valid CNC data should appear.

When analysis is complete you can accept and save the detected parameters.

If data transfer ends before analysis is complete then simply re-send the data from the machine without restarting the scan process and repeat as often as required.

Usually analysis takes no more than 10 lines or so. So if after a number of attempts the detection is unsuccessful then you'll have no option but to select your CNC communications parameters manually (see page 10).

easyDncXP or easyDNC?

easyDNC has been available in various forms for around 10 years and one might now assume that the new version to which this user guide relates is simply another update to the existing product.

It's true that this new version, easyDncXP, makes better use of the Windows Graphic User Interface (GUI) making it easier to use and giving it a more modern look and feel but it is by no means intended (not yet anyway) as a direct replacement for the older easyDNC.

Having said that, it's likely that many current users of the older easyDNC might well be better served by switching to the newer 'XP' product. (Don't let that 'XP' suffix fool you. easyDncXP works just fine on older Windows95, 98, ME and W2000 PCs too)

To decide which product would serve your requirements allow us to explain in a little detail the difference between the two different products.

easyDNC

easyDNC was produced primarily with the large machine shop in mind. The kind of environment where a number of CNC machines, possibly installed over a large area, would be permanently connected to a single PC.

In such an installation it would be too much to expect a machine operator to run or shout between his CNC device and the distant PC. With this in mind, easyDNC has a number of features which allow CNC files to be transferred in either direction, to and from the CNC, with the CNC machine operator rarely, if ever, requiring access to the PC. In most cases the machine operator can accomplish pretty much everything without leaving his CNC console.

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This page is too short to explain exactly how this is done or what capabilities exist (see other documentation such as the downloadable user guide) but suffice to say that easyDNC is capable of supporting as many machines as you can physically connect to a PC and it'll communicate with all of them simultaneously with almost no degradation in system performance. (The number of actual machines is limited only by the operating system which is 128 on W98 or 256 on NT4)

Because of this 'server' capability the actual Windows GUI of easyDNC is quite small, almost primitive, requiring almost no system resources to talk about and is usually minimised or placed away in the corner of the screen and only viewed occasionally to get status info or access to the log files.

easyDncXP

The reduction in costs of PCs means that many machine shops now base their DNC on a number of 'stand alone' PCs each attached to a single CNC machine. Also an increased number of users rely on portable computers which they carry from one machine to another as and when required. In those configurations the user operates the PC and the CNC at the same time.

Although the older easyDNC works OK in this kind of environment it's not very user friendly especially on portable computers where there's a requirement to switch quickly from one set of CNC communications parameters to another on a single Com port.

We've noticed an increasing number of easyDNC users running with this kind of setup and although more recent versions of easyDNC have improved capability in this area it was with such eXtended Portability in mind that easyDncXP was produced.

easyDncXP has no server features. After all, if the PC is within arm's reach of the CNC why struggle with convoluted CNC/DNC Server capabilities when there's a rich GUI capable of doing pretty much everything with just a few mouse clicks.

To summarize then, if you wish to permanently connect a number of CNCs over a wider area where CNC operator require little or no access to the PC then you should take a look at easyDNC

If on the other hand you're running around with a portable computer or you have your PC within a comfortable distance of your CNC(s) and like the idea of dragging and dropping files via the Windows GUI then you ought to be considering easyDncXP.

The good news though is that you can install them both on the same PC if you want.

Maybe you've got a tight group of machines clustered around a PC at one end of the shop where the users might do a lot of work on the PC such as CAD, Post Processing and Editing files while, at the same time, a fair distance away there's another group of machines where the operators don't need access to the PC. Simply install both products and you're set.

One license, two products. (or, to put it another way, two products for the price of one.)

When is a standard not a standard ?

You don't have to read this section unless you're technically minded, curious or extremely bored so, if you want, you can now skip ahead to page 27.

Whichever of the above categories you're in you might know that the usual response to the above 'riddle' is "When it's RS232".

In fact, contrary to popular belief, RS232 "is" a standard and a fairly rigid one at that. So much so that an engineer, or pretty much anyone capable of wielding a soldering iron, will usually have no problem making up cables to connect almost any make and model of CNC equipment to a computer.

First thing to understand when accepting that RS232 is indeed a standard is its intended purpose. RS232 is a point to point connection intended to carry data from a device at one end point of a connection through to the other end point some distance away. These 'end' devices are referred to, in RS232 jargon, as "Data Terminal Equipment" (abbreviated to DTE.)

If the distance between the two DTE devices is great then other equipment is needed to boost the signal or convert it to some other standard and back again. For example a modem converts the RS232 signal into another format for transmission over public telephone networks.

Such communications equipment is referred to as "Data Communications Equipment" (Abbreviated to DCE.)

So, it's now very clear in that **all** devices using RS232 can be grouped as either **DTE** (Computers and data terminal devices at each end of the link which wish to exchange data) or **DCE** – the communications

equipment such as modems, routers, line boosters etc which make transmission over distance possible.

To Allow a DTE devices to be correctly connected to a DCE device and to each other the RS232 standard describes the pins used in the actual cable connections so that the transmitter at one end of the link connects to the receiver at the other.

The pins carrying the data and other signals at the RS232 port of a DTE are of course a 'one-to-one' fit with a DCE which allows them to be connected together pin for pin. Pin 2 to pin 2, pin 3 to pin 3 etc.

But to connect two DTE's together (IE to connect two computers via a short cable without any intermediary DCE) one must obviously create a 'cross over' so that pin 2 (The transmitter) of one computer connects to pin 3 (The Receiver) of the other.

Notice that we haven't mentioned where your CNC machinery fits into the RS232 puzzle. Well, that's the confusing bit.

Knowing what you now know about DTE and DCE you'd assume that your CNC Control would be a DTE (Data Terminal Equipment). After all, your CNC is on one end of your cable while your computer is on the other.

Unfortunately, not all CNC manufacturers see it that way.

Although many manufacturers do, correctly, configure their RS232 ports as a proper DTE, some others configure their ports like a DCE and that is the one main reason that many users have difficulty getting their CNC equipment to talk to a personal computer.

Whatever the reasoning behind the differences in the RS232 ports on CNC machines, there are still only two basic type of RS232 port on a CNC. Those which function as DTE and those which function as DCE.
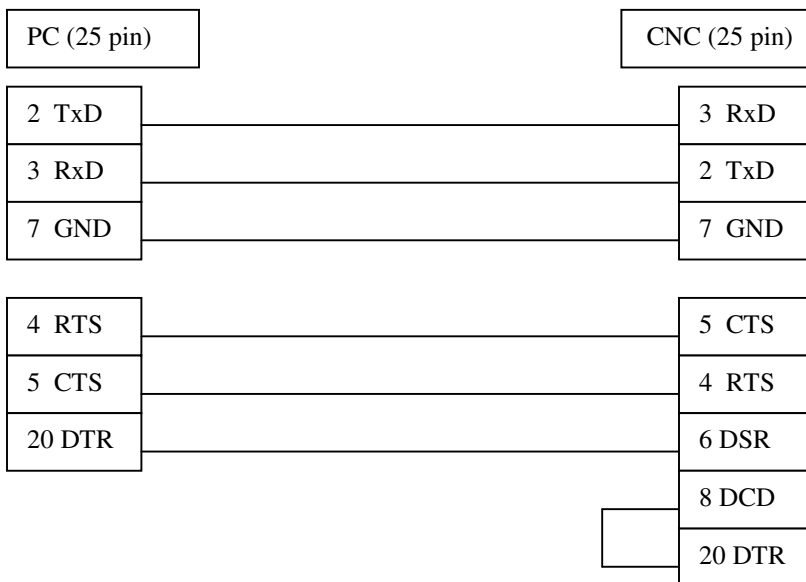
If you skipped here from the previous section then you won't know what the difference is between DTE and DCE or why they exist at all. To be fair you don't really need to know. Just accept that it's two different type of RS232 device and unfortunately a CNC might be either and the only real problem is deciding which one to use.

Another spanner in the works is that older PCs have 25 pin RS232 ports while more recent computers have 9 pin meaning that each type of RS232 port has two possible cables (9 pin or 25 at the computer end of the cable)
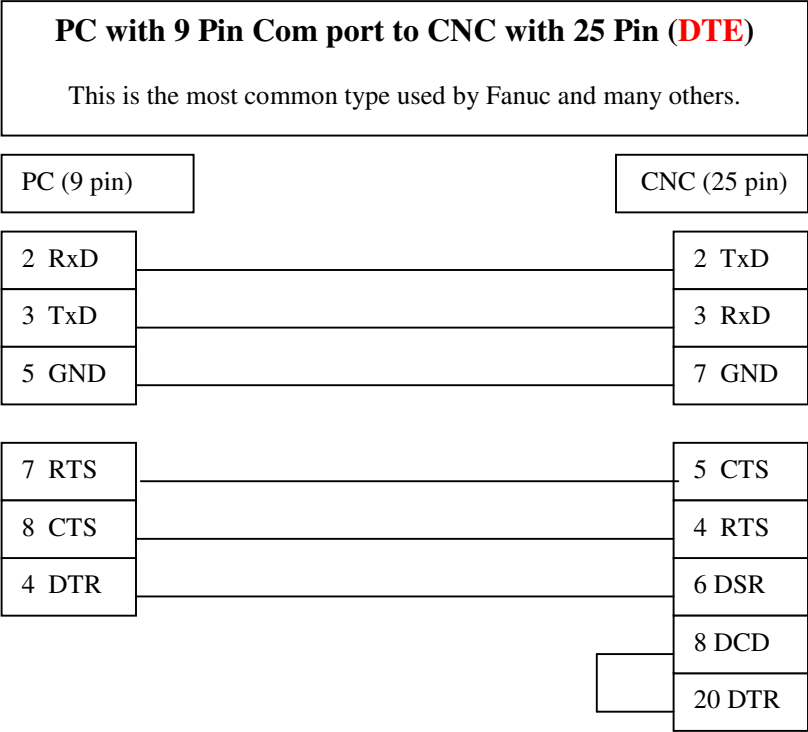
PC with 9 Pin Com port to CNC with 25 Pin (DTE)

This is the most common type used by Fanuc and many others.

PC (9 pin)		CNC (25 pin)
2 RxD	——————	2 TxD
3 TxD	——————	3 RxD
5 GND	——————	7 GND
7 RTS	——————	5 CTS
8 CTS	——————	4 RTS
4 DTR	——————	6 DSR
		8 DCD
		20 DTR

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PC with 25 Pin Com port to CNC with 25 Pin (DTE)

This is the most common type used by Fanuc and many others

PC (25 pin)		CNC (25 pin)

PC		CNC
2 TxD	————	3 RxD
3 RxD	————	2 TxD
7 GND	————	7 GND

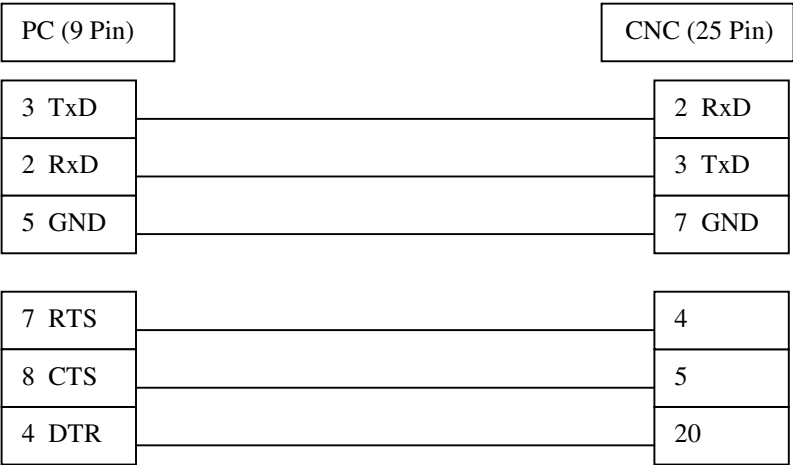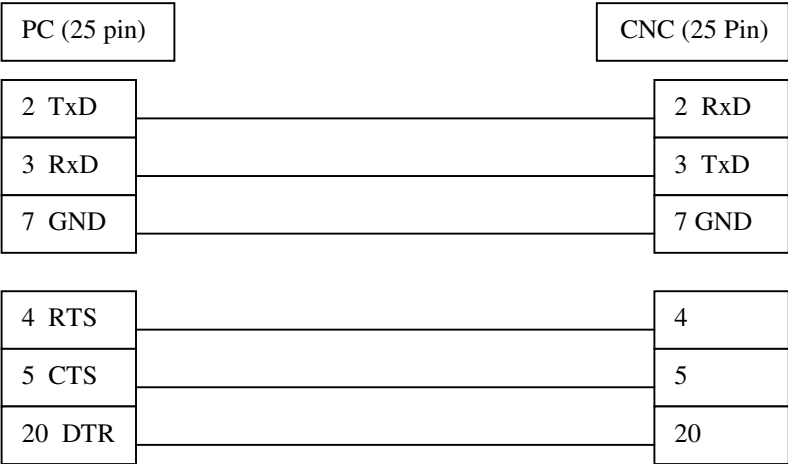| PC		CNC
4 RTS	————	5 CTS
5 CTS	————	4 RTS
20 DTR	————	6 DSR
		8 DCD
		20 DTR

Note:

The diagrams in this section are designed to support full Hardware Flow Control (RTS/CTS) as well as Software Flow Control (XonXoff sometimes referred to by CNC types as DC control codes) So if in doubt make up your cable like this.

If however you're certain that your CNC requires only software flow control then you only need to carry the top three signals (TxD, RxD and GND) but at the CNC end of the cable make two short links. One to connect CNC pins 6, 8 and 20 together and another short link to connect CNC 4 with 5.

PC with 9 Pin Com port to CNC with 25 Pin (DCE)

PC (9 Pin)		CNC (25 Pin)
3 TxD		2 RxD
2 RxD		3 TxD
5 GND		7 GND

7 RTS		4
8 CTS		5
4 DTR		20

PC with 25 Pin Com port to CNC with 25 Pin (DCE)

PC (25 pin)		CNC (25 Pin)
2 TxD		2 RxD
3 RxD		3 TxD
7 GND		7 GND

4 RTS		4
5 CTS		5
20 DTR		20

> **Note:**
>
> These diagrams are intended to support full Hardware-RTS/CTS flow control as well as Software flow control Xon/Xoff (DC Control codes).
>
> If you're certain that your control requires only software flow control then you can make up your cable using only the top 3 connections TxD, RxD and GND although you should still make the local CNC short links 6-20 and 4-5 as described in the previous section.

In deciding which of the two RS232 formats to adhere to (is your CNC wired as a DTE or DCE and therefore whether to use the DTE diagram or the one for DCE) an electrician with a voltmeter might proceed as follows.

With the CNC switched on and ready to communicate with no RS232 cable connected:-

Measure the voltage on pin 20 or pin 6 (using pin 1, 7 or chassis as 0v).

If you observe a definite positive or negative voltage of between 6 to 12 volts on pin 20 while pin 6 is zero or floating then your machine is almost certainly a DTE and you can use the DTE diagrams.

If on the other hand your definite voltage is on pin 6 and nothing on pin 20 then your CNC is almost certainly a DCE and you can use the DCE diagrams.

If the test proves inconclusive then do the same test but measuring voltage on pins 4 or 5 while the machine is prepared for data input. (Again using 1, 7 or chassis as 0v) Result = Volts on pin 4 then wire as DTE. but volts on pin 5 then you should wire as DCE.

<u>Notes</u>