



**Control-C Version 2p06**

**Integrated Development Environment - IDE**

**Detailed description**

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# Contents

Overview.....	4
Control-C and System software version control.....	4
Approach.....	4
Feedback.....	4
The Main Screen.....	5
The Menu/Control bar (top).....	5
The Editing/Program Area (middle).....	5
The Status Information Window (bottom).....	5
The Menus.....	7
The File Menu.....	7
Open/New (Ctrl+O).....	7
Save (Ctrl+S).....	7
Save All (Shift+Ctrl+S).....	7
Save As...(Shift+Ctrl+A).....	7
Close.....	7
Close All.....	7
Print Setup.....	7
Print (Ctrl+P).....	8
Exit.....	8
The File Window.....	9
Address field (top).....	9
Breaks On (top).....	9
ListFile On (top).....	9
ImageFile On (top).....	10
The Text Window (middle).....	10
File Status Bar (bottom).....	10
The Edit Menu.....	11
Cut (Ctrl+X).....	11
Copy (Ctrl+C).....	11
Paste (Ctrl+V).....	11
Select All (Ctrl+A).....	11
Find / Repeat - Replace (Ctrl+F).....	11
Find Again (F3).....	11
The Node Menu.....	12
Configure Node (Ctrl+Alt+C).....	12
Select Full Node Address (All Nodes).....	12
Select Group Address High (Gateway nodes only).....	13
Select Group Address Low (Gateway nodes only).....	13
Select CAN Speed (Kbits/s).....	13
Allow gateway to pass broadcast variables (Gateway node only).....	13
Lockout startup calibration of Screen Nodes (Screen nodes Only).....	13
Run Program on Node Power Up (P.O.R) (All nodes).....	13
Save User Program File To Node Store (Ctrl+Alt+t).....	14
Read User Program File From Node Store (Ctrl+Alt+F).....	14
Download User Binary Image (.CCI) To Node (Ctrl+Alt+I).....	14
Backup Binary Image to Node Image Store (Ctrl+Alt+B).....	15
Restore Binary Image from Node Image Store (Ctrl+Alt+R).....	16
Screen Bitmap Manager (Ctrl+Alt+M).....	16
Lock/Unlock Node Programming (Ctrl+Alt+L).....	16
Download System to Node/s (Ctrl+Alt+S).....	17
Factory Configuration (Factory only) (Ctrl+Alt+N).....	17
The Program Menu.....	18
Compile User (F5).....	18
Download (F6).....	18
Run (F7).....	19
Run To Cursor (F8).....	19
Single Step (F9).....	20
Step Over (F10).....	20
Pause (F11).....	20
Reset (F12).....	20
Read Node Status (F2).....	21

Run All (Ctrl+F7).....	21
Pause All (Ctrl+F11).....	21
Reset All (Ctrl+F12).....	21
Fast Stop All Moves (Shift+Ctrl+F12).....	21
Option Menu.....	22
Communications Setup.....	22
Editor Options.....	22
Prompt Options.....	23
Window Menu.....	24
Cascade.....	24
Tile Vertically.....	24
Tile Horizontally.....	24
I/O Window (Ctrl+F2).....	24
Vairables Window (Ctrl+F3).....	25
Next Window (F4).....	25
Apply Syntax Format.....	25
Help Menu.....	26
Resources.....	26
About.....	26

## Overview

This document provides a detailed and technical description of the Integrated Development Environment, (IDE) for Control-C. This is a personal computer based program for use with the E-Node range of network enabled programmable industrial control modules.

Control-C is used to create and develop user programs and perform all other programming and set-up tasks required on the E-Node range.

A free copy of Control-C together with installation instructions can be downloaded from [www.etrol.co.uk](http://www.etrol.co.uk) .

## Control-C and System software version control

Control-C and the E-Node system software are regularly updated with improvements and corrections. Each update has a unique version number in the form XpXX added to the file name, e.g.

ControlC2p02.EXE	The main Control-C program (windows executable file)
Enode2p02.BIN	The E-Node system software (binary file)

► *For correct operation the Control-C executable file and the E-Node system software file must both have the same version number and they must both reside in the same directory.*

## Approach

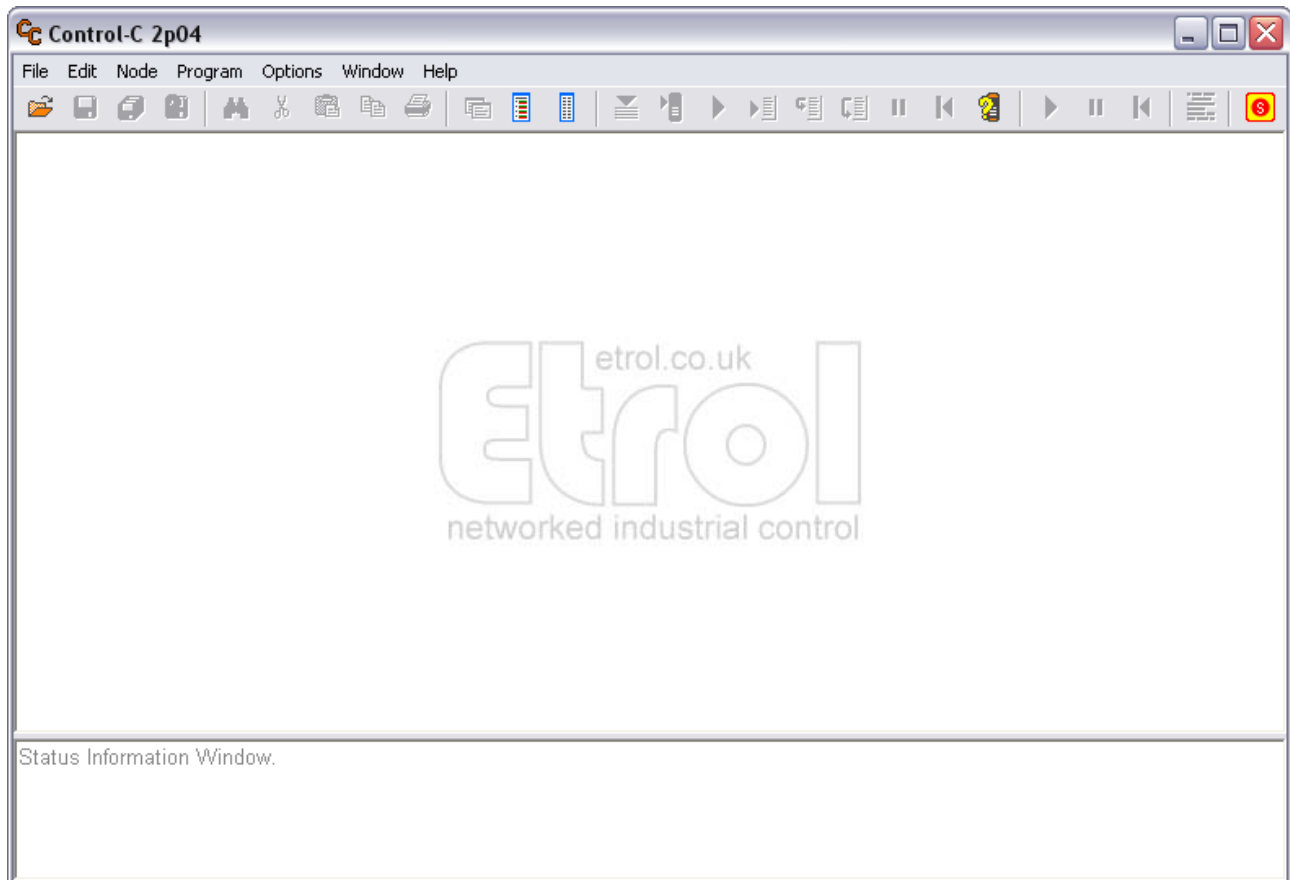
At Etrol Ltd we like to 'Keep It Simple' or 'KIS'. You will find this theme runs through everything we do and is reflected here in this document. If you start Control-C and then read this description you will see that is simply starts at the left hand side of the screen and works to the right hand side detailing all the functions as it goes.

## Feedback

If you find any errors, omissions, or have any suggestions to improve this document please email us at [feedback@etrol.co.uk](mailto:feedback@etrol.co.uk).

# The Main Screen

If you start Control-C the following main screen will appear.



The Control-C IDE Main screen.

The Main screen is split vertically into Three sections.

## The Menu/Control bar (top)

This area holds the familiar windows drop down menu system with the short-cut button control bar just below. The description of the functions found in this area is the main task of this document.

## The Editing/Program Area (middle)

This is where the general purpose windows for user program editing and development are held.

## The Status Information Window (bottom)

This window shows the latest information that has either been requested by you the programmer or that has resulted from some action you have taken. Messages in this window generally take the following form:-

**000 - No Node Errors**  
**000 - The Node Type is SCREEN**  
**000 - The Node is UNLOCKED**  
**000 - The Program is RUNNING**

The first Three digits are the node address associated with the action requested that resulted in the message.

Also communication time outs generate a '-' character in this window. This can occur when waiting for the E-Node to reset/update or when a communications error has occurred.

This window can be resized by the normal click, hold and drag operation on the top border.

# The Menu

The Menu and Button bar's use a scheme of 'greying out' an icon if that facility is not available or not allowed at the time the menu or button is displayed. If you find an item is greyed out when you think it should not be, it is most likely that an operation is currently taking place that locks out that feature for safety or that an option has not been enabled or that a file is not open.

## The File Menu

### **Open/New (Ctrl+O)**

Opens a window from which you can select and open an existing file or type in a new name to create a new file. If the file opened is of the type .CCC Syntax colouring will be applied.

There are Three predefined file type filters:-

Control-C User Program Files (.CCC)  
Control-C List Files (.CCL)  
Control-C User Binary Image File (.CCI)

.CCI and .CCL files are created when a user program is compiled successfully with the options selected.

▶ *All .CCC files have a companion initialisation file with a .INI extension. This file is created automatically by Control-C and should not be modified. Whenever a user program file (.CCC) is moved or distributed its Companion file (.INI) with the same name should accompany it.*

### **Save (Ctrl+S)**

Simply saves the file in the open window.

▶ *If the file in the open window has been saved the icon will be greyed out until the file is modified.*

### **Save All (Shift+Ctrl+S)**

Saves all the open files regardless of their status.

### **Save As...(Shift+Ctrl+A)**

Opens a window to allow saving the open file with a new name.

### **Close**

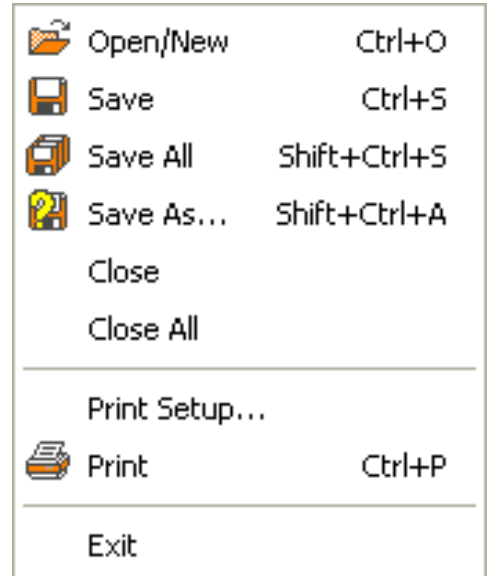
Close the open file. If the file has been modified you will be prompted to ask if you wish to save it first.

### **Close All**

Closes All open files. If the files have been modified you will be prompted to ask if you wish to save them first.

### **Print Setup...**

Opens the print set-up dialogue window.



The File Menu



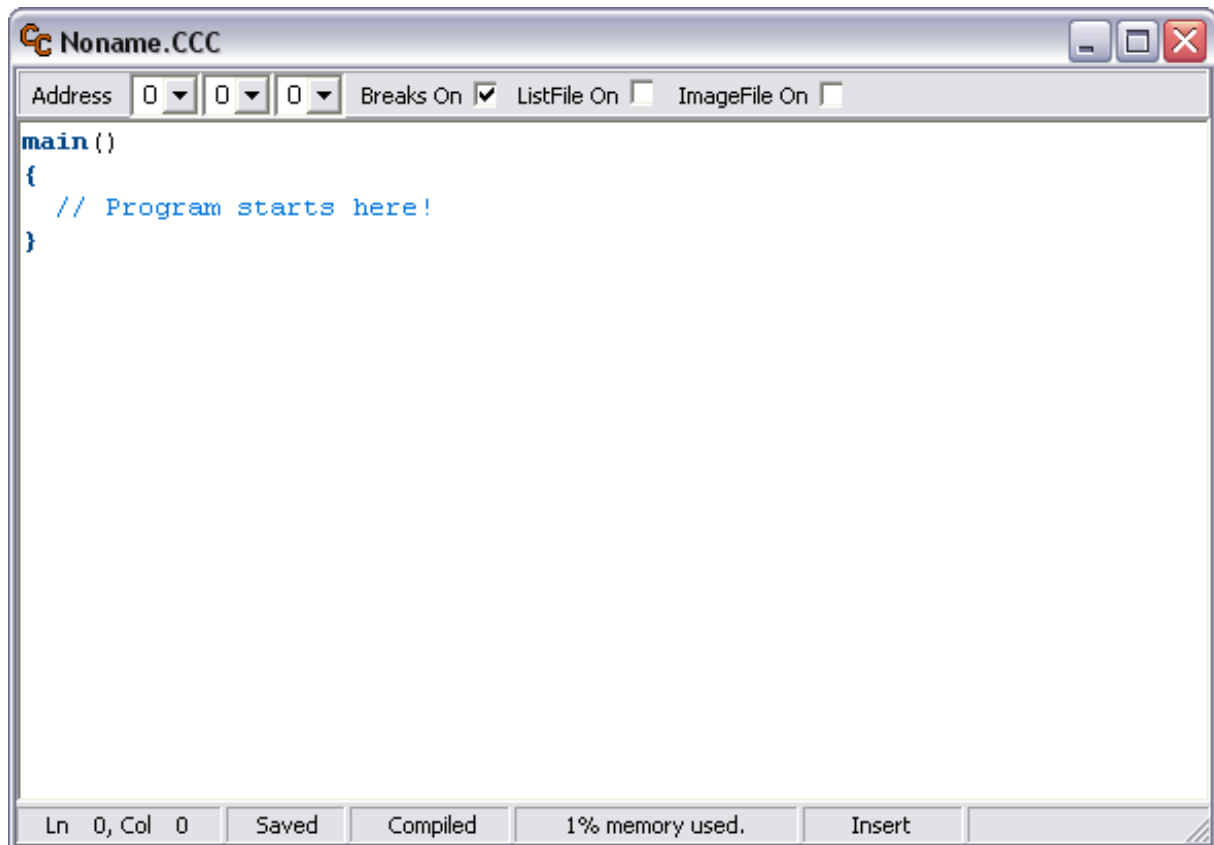
## **Print (Ctrl+P)**

Prints the entire content of the open window to the printer.

## **Exit**

Exits Control-C

## The File Window



An open file window

The File window as show above consists of the following fields.

### **Address field (top)**

*This is a very important field.* These 3 digits select the network address of the node with the following effects:-

1. Unless otherwise specified in the user program this is the default address used when the user program is compiled.
2. This is the address the program will be downloaded to.
3. It is the initial address seeded into the address field for other communications operations chosen when the window is active. e.g. if the address selected is 010 and a 'Read Node Status' request is made the address 010 will appear in the new window address field.

### **Breaks On (top)**

Check this option to compile user programs with break points. This will enable the program to be tested by the means of 'Run to Cursor (F8)', 'Single Step (F9)' and 'Run to Cursor (F10)'. With breaks on the user program runs approximately 5% slower and consumes approximately 10% more memory.

### **ListFile On (top)**

Check this option to force the compiler to create a List file (.CCL) when the user program is successfully compiled. List files can be opened for viewing in a File Window by using the 'Open/New' dialogue with a .CCL file type filter.

A List file shows the break down of the user program into the machine code and memory location used by the Coldfire microprocessor within the E-Node. It is provided as an advanced method of program development and debugging. *The List file is not used or stored on the E-Node.*

## **ImageFile On (top)**

Check this option to force the compiler to create a Binary Image file (.CCI) when the user program is successfully compiled. Binary Image files contain an exact copy of the E-Node memory complete with the compiled user program.

These files are used to update user programs in the field without disclosing the original user program code. The user program is first written and tested at base and then a Binary image file is generated and sent together with the companion .INI file out to site. On site it is downloaded onto the E-Node using the 'Download User Binary Image (.CCI) To Node' option in the 'Node' menu.

## **The Text Window (middle)**

This area contains any text belonging to the opened file. This window is primarily used for creating and editing text and supports all the basic Windows editing commands. In addition if the open file is a user program (.CCC) the following features are enabled:-

1. The syntax is coloured when the file is opened and dynamically as new text is typed in. This helps to prevent errors because all key words are coloured and incorrectly typed entries are easy to spot.
2. When the program is compiled any errors are highlighted and the text cursor is placed at the point the compiler found the error. The compiler also displays the error in the status window and suggests what it was expecting to find.
3. When using break points the line the program is currently stopped on is highlighted. Therefore as the program is stepped through the highlight bar moves through the program indicating the current point of execution.

## **File Status Bar (bottom)**

This field contains current information on the status of the file in the text window.

- Field 1. Line and Column position of the cursor.
- Field 2. The Saved or Modified status of the file.
- Field 3. The Compiled or Not Compiled status of the file (.CCC files only).
- Field 4. The percentage of E-Node memory used after successful compilation (.CCC files only).
- Field 5. Text entry mode, Insert or Overwrite.

## The Edit Menu

### **Cut (Ctrl+X)**

Cuts any selected text to the Windows clipboard.

### **Copy (Ctrl+C)**

Copies any selected text to the Windows clipboard.

### **Paste (Ctrl+V)**

Pastes by inserting any item on the windows clipboard to the current position of the text cursor or if any text is selected it will overwrite the selected text.

### **Select All (Ctrl+A)**

Selects All the text in the current window.

### **Find / Repeat - Replace (Ctrl+F)**

Opens the Find /Repeat - Replace window.

Use this window to find and replace text in the currently open window.

Enter the text to find into the 'Find Text' field or highlight the text to find before open this window and the highlighted text will automatically be entered into the 'Find Text' field. Press 'Find / Repeat' to find and highlight that text in the open file window. Press again to find again.

Enter the text to replace the found text into the 'Replace Text' field. Press 'Replace' to replace any highlighted text. If this field is left empty found text will be erased if the 'Replace' button is pressed.




The 'Next Window' button switches to the next text window if more than one window is open.

Check the 'Match Case' box to only find text that exactly matches the case of the 'Find Text' text.

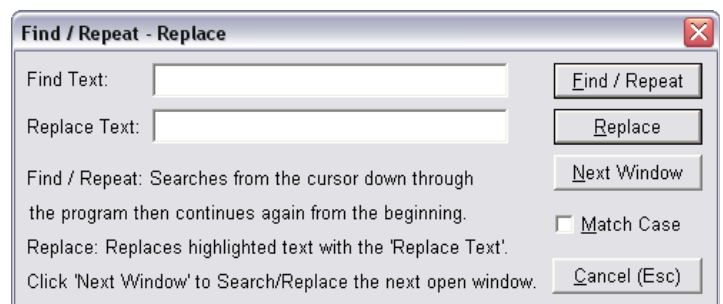
Press 'Cancel' (or the Esc key) to quit this window.

### **Find Again (F3)**

The last text entered into the 'Find Text' field of the 'Find / Repeat - Repeat' window can be searched for again without having that window open by pressing F3 on the keyboard.










	Cut	Ctrl+X
	Copy	Ctrl+C
	Paste	Ctrl+V
Select All		Ctrl+A
	Find / Repeat - Replace	Ctrl+F
Find again		F3

The Edit Menu



## The Node Menu

This menu contains all functions relating to the communications with and setup of nodes.

 Configure Node	Ctrl+Alt+C
 Save User Program File To Node File Store	Ctrl+Alt+T
 Read User Program File From Node File Store	Ctrl+Alt+F
 Download User Binary Image (.CCI) To Node	Ctrl+Alt+I
 Backup Binary Image to Node Image Store	Ctrl+Alt+B
 Restore Binary Image from Node Image Store	Ctrl+Alt+R
 Screen Bitmap manager	Ctrl+Alt+M
 Lock/UnLock Node programming	Ctrl+Alt+L
 Download System to Node	Ctrl+Alt+S
Factory Configuration (Factory only)	Ctrl+Alt+N

The Node Menu



### Configure Node (Ctrl+Alt+C)

Opens the window for configuring E-Nodes.

- ▶ This is a very important window. Before any node can be programmed or used it must first be configured using this window.
- ▶ Please read the information in the window carefully.
- ▶ This window configures all types of E-Nodes. The set-up information required depends on the type of the node being configured
- ▶ The E-Node Programming Adaptor cable must be plugged directly into the E-Port connector of the node to be configured.

### Select Full Node Address (All Nodes)

Use this field to select the permanent network address for the node. Every node on a single network must have a unique address in the range 000 to 999.

- ▶ When the whole system is configured ANY E-Port may be used for normal programming and testing operations.

### **Select Group Address High (Gateway nodes only)**

E-Node networks are made up of groups. All nodes within a group share a common CAN (Control Area Network). To communicate with another group the group must have a 'gateway' node equipped with an Ethernet port. When a gateway node receives a message from its local group CAN network it needs to know if it should pass it on over the Ethernet section of the E-Net network to other groups. To determine this it must have knowledge of the highest and lowest address for its local group. Any message with a destination address outside this range is passed on over the Ethernet section of the E-Net network.

Use this field to select the highest address for a gateway's local group.

### **Select Group Address Low (Gateway nodes only)**

Use this field to select the lowest address for a gateway's local group.

▶ *If the high and low group addresses are set to '000' the gateway facility is disabled.*

### **Select CAN Speed (Kbits/s)**

Groups sharing a single CAN network must all have the same CAN speed setting. The maximum speed in accordance with the standard CAN specification is 1000 Kbits/s, however the design of the E-Node allows a maximum of 2000 Kbits/s. The speed chosen is determined by the physical length of the CAN network. To achieve reliable communications Etrol Ltd make the following recommendations:-

Can Speed (Kbits/s)	Physical network length.
2000	0 to 10 metres
1000	10 to 20 metres
500	20 to 40 metres
250	40 to 80 metres
125	80 to 160 metres

### **Allow gateway to pass broadcast variables (Gateway node only)**

E-Nodes can be programmed to broadcast variable values on a repeated time basis. These values are always received by all nodes in the local group. To share these values with other groups this field must be checked. With careful use of gateway nodes the whole network can be partitioned to allow the use of different broadcast variables in separate sections of the network.

▶ *A maximum of Two Broadcast variables can be used for any one receiving group or groups of nodes. If more than Two are set up overwriting can occur with unforeseen consequences.*

### **Lockout startup calibration of Screen Nodes (Screen nodes Only)**

Screen nodes can be placed in calibration mode when first powered up by the pressing of the touch panel. If the subsequent calibration is not performed correctly this could disrupt normal operation of the Screen. Check this option to prevent prevent the Screen node entering this mode.

### **Run Program on Node Power Up (P.O.R) (All nodes)**

If a node has been programmed with a user program it can be set to automatically run when power is applied. Check this option to enable Power On Run.

Click the 'Program' button to program the node with the values shown in the Configure Node window.

Click the 'Read' button to read the current configuration from the node and overwrite the fields of the Configure Node window.

Click the 'Cancel' button or press the Esc key to exit the Configure Node window.

## Save User Program File To Node Store (Ctrl+Alt+t)

Opens the 'Save File to Node Store' window.

Each node can store One full user program.

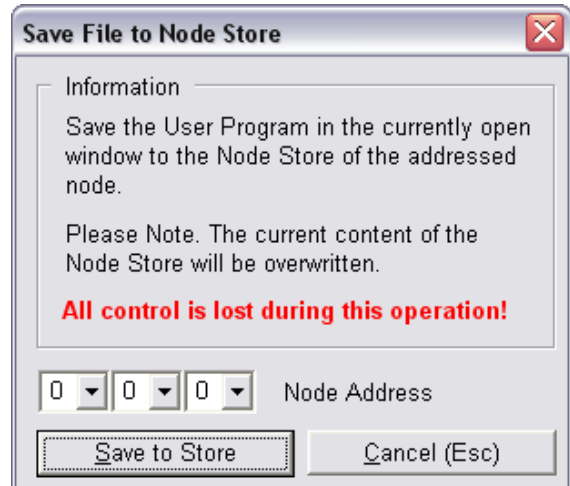
Any node can be used but the main purpose of the store is to hold a copy of the program that it is currently running. This provides a safe backup in the event that the original is lost or modified.

The 'Node Address' shown is where the copy will be stored.

► *The original content of the Node Store will be overwritten.*

Click 'Save to Store' to complete the operation.

Click 'Cancel' or press the Esc key to abort.



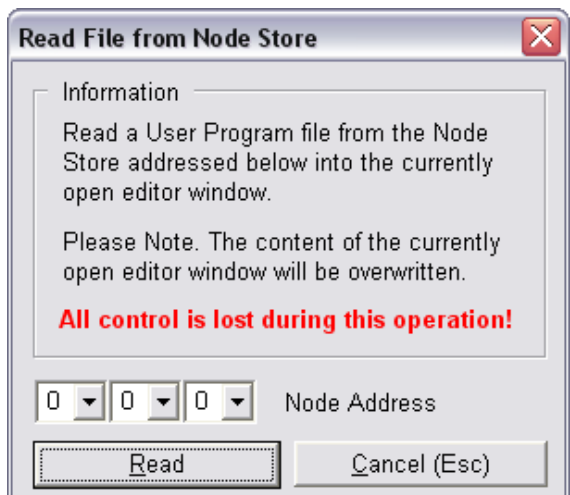
## Read User Program File From Node Store (Ctrl+Alt+F)

Opens the 'Read File From Node Store' window.

To perform a read a file window must first be opened.

Click 'Read' to read a copy of the user program from the node with the given 'Node Address'. The contents of the file window will be overwritten. No other changes are made.

Click 'Cancel' or press the Esc key to abort.



## Download User Binary Image (.CCI) To Node (Ctrl+Alt+I)

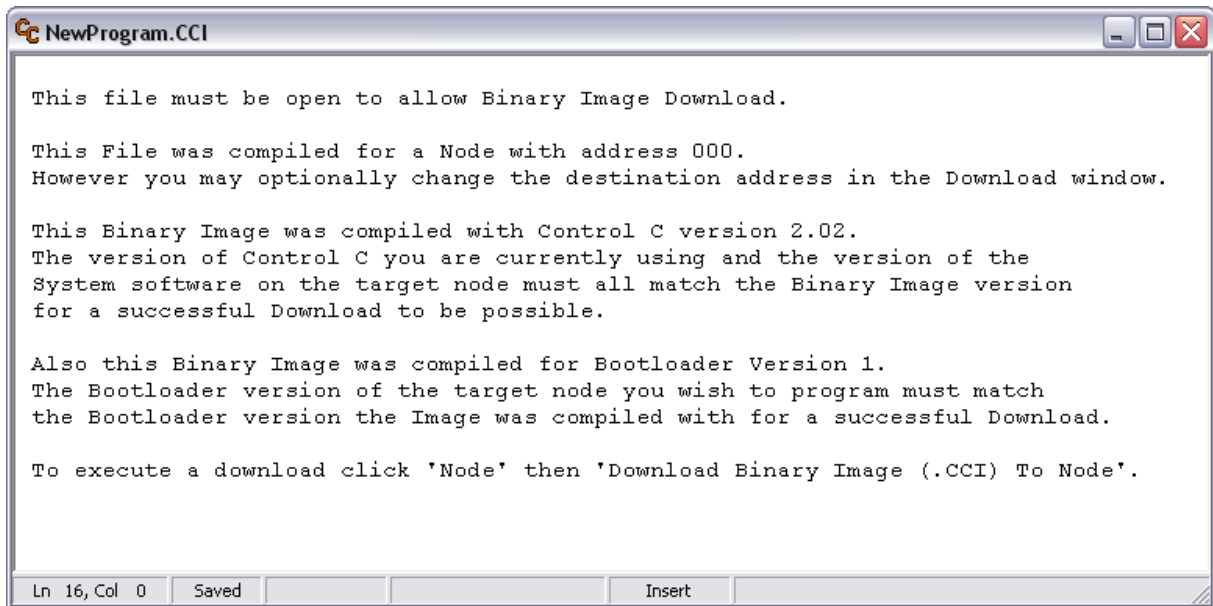
Use this option to program the node without having a copy of the original user program. The original user program must have been successfully compiled with the 'ImageFile On' option checked to enable it to create a file with the '.CCI' extension with the same name as the original.

► *The '.CCI' file together with its companion file '.INI' must be available in the same directory location.*

The 'Download User Binary Image (.CCI) to Node' option will be 'greyed out' until the following is performed.

From the 'File' menu select the 'Open/New' option. Search for the chosen file name using the .CCI filter. Opening the file brings up the following special file window.

Please read the instructions in the window. In particular it is important that the original user program was compiled using the same Control-C and Bootloader versions as those on the target node.



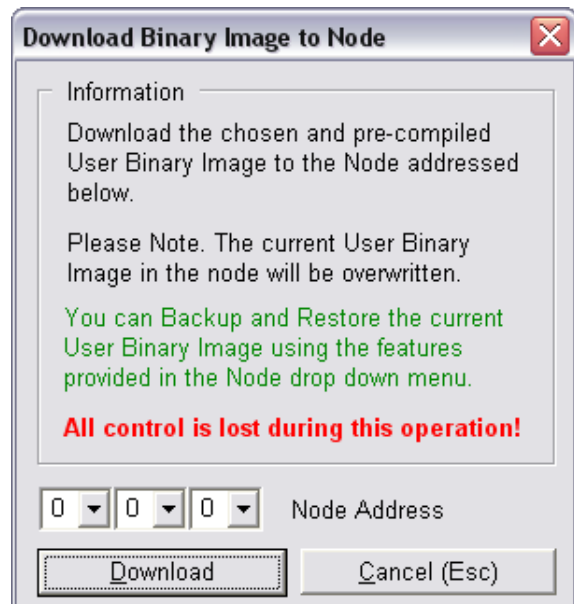
With this window open the 'Download User Binary Image (.CCI) to Node' option becomes active. Click it to open the 'Download Binary Image to Node' window.

In most circumstances the 'Node Address' should match that with which the original user program was compiled. However there may be cases for which this is not required. For example where the same program is installed on many nodes.

► *Before proceeding it is recommended that the current User Binary Image within the node be backed up on the node using the facility provided. If the new image is found to be faulty the old image can then be restored.*

Click 'Download' to complete the operation.

Click 'Cancel' or press the Esc key to abort.



## Backup Binary Image to Node Image Store (Ctrl+Alt+B)

Use this option to backup the current binary image (the machine code version of the user program) from the node's main memory to the Node Image Store. It is recommended this be done before downloading a new Binary Image.

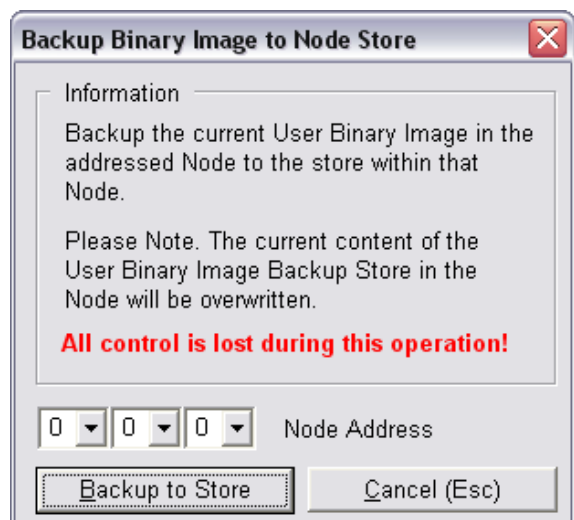
Clicking this option opens the 'Backup Binary Image to Node Store' window.

The Node Store can only hold a single copy of the Binary Image. The current image in the Node Store will be overwritten with this operation.

The given 'Node Address' is where the backup operation will take place.

Click 'Backup to Store' to complete the operation.

Click 'Cancel' or press the Esc key to abort.





## Restore Binary Image from Node Image Store (Ctrl+Alt+R)

Use this option to restore a previously backed up binary image (machine code version of the user program) from the node's image store to the main memory.

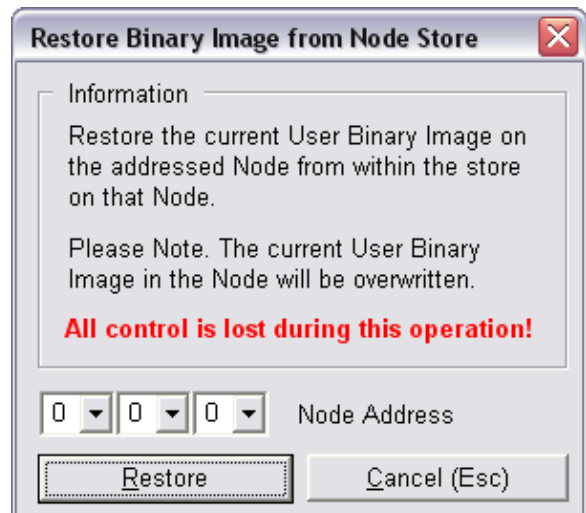
Clicking this option to open the 'Restore Binary Image from Node Store' window.

This operation will overwrite the current Binary Image stored in the node's main memory.

The given 'Node Address' is where the restore operation will take place.

Click 'Restore' to complete the operation.

Click 'Cancel' or press the Esc key to abort.



## Screen Bitmap Manager (Ctrl+Alt+M)

Use this option to manage the storage of Bitmap graphics image files on 'Screen' type nodes.

► *The Bitmap images must be provided in the correct format before they will be accepted for storage on a Screen node. This format is described in detail in a separate document to be found on the Etrol website.*

Clicking this option opens the 'Bitmap manager' window.

The Bitmap manager function centres around the list of file names shown in the middle area. This list is held on the computer and manipulated by adding bitmap files from the computer. Deleting all the bitmaps and reading the bitmaps stored on the addressed node.

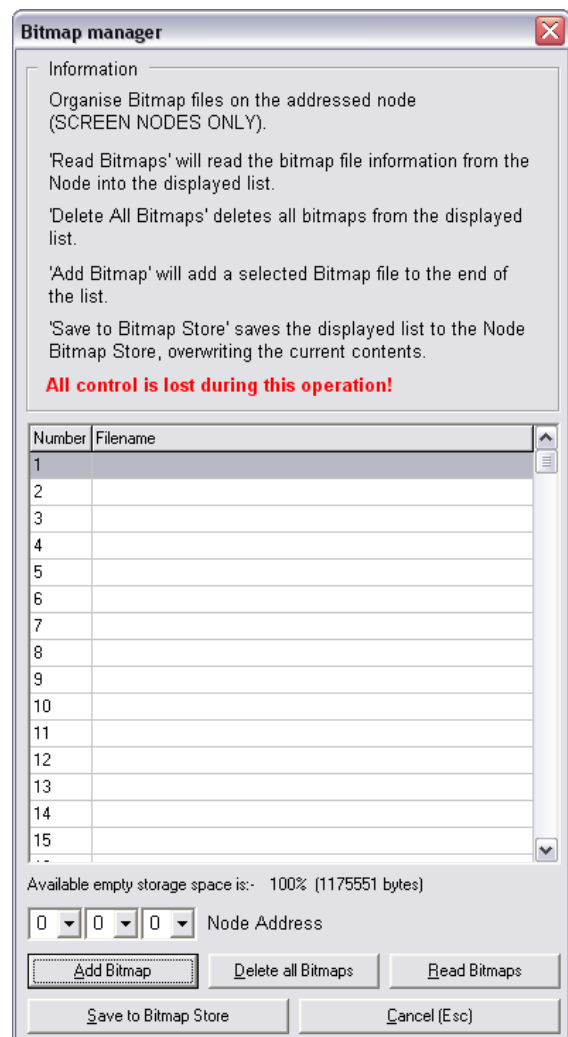
Click 'Add Bitmap' to add a '.bmp' bitmap file to the end of the list,

Click 'Delete all Bitmaps' to clear the list.

Click 'Read Bitmaps' to copy the bitmaps stored on the node at the 'Node Address' into the list. This action overwrites the original list contents.

Click 'Save to Bitmap Store' to save the contents of the list to the bitmap store on the node at the 'Node Address'. This action erases the original contents of the node bitmap store. If the list is empty this will clear the bitmap store.

Click 'Cancel' or press the Esc key to abort.



## Lock/Unlock Node Programming (Ctrl+Alt+L)

Use this option to Lock or Unlock the node for all programming operations.

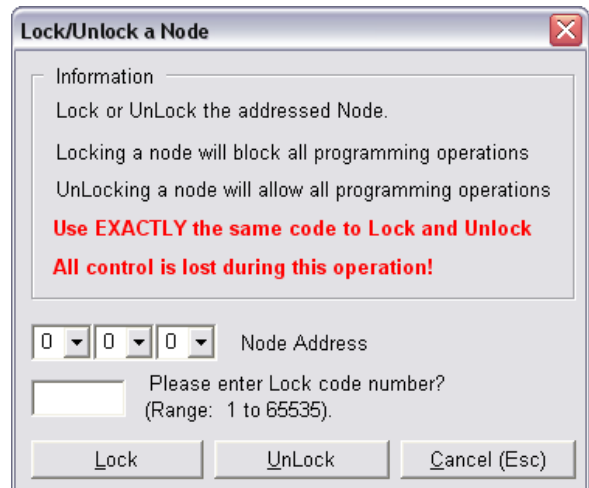
Clicking this option opens the 'Lock/Unlock a Node' window.

To Lock the node at the 'Node Address' enter a number in the range 1 to 65535 and click 'Lock'.

▶ *When a node is locked no programming of the node is permitted.*

To Unlock the node at the 'Node Address' enter exactly the same number used to originally lock the node and click 'UnLock'

Click 'Cancel' or press the Esc key to abort.



## **Download System to Node/s (Ctrl+Alt+S)**

Use this option to download system software to a node/s.

The version of Control-C is always matched with a copy of the E-Node system software with the same version number. The system software must reside in the same directory location as Control-C and its name will take the following form:-

ENodeXpXX.BIN

Where XpXX is the version number, e.g. 2p02.

Updated system software will periodically be made available on the Etrol Website.

The downloading process follows a set procedure please refer to the paragraph 'Download (F6)' for more details.

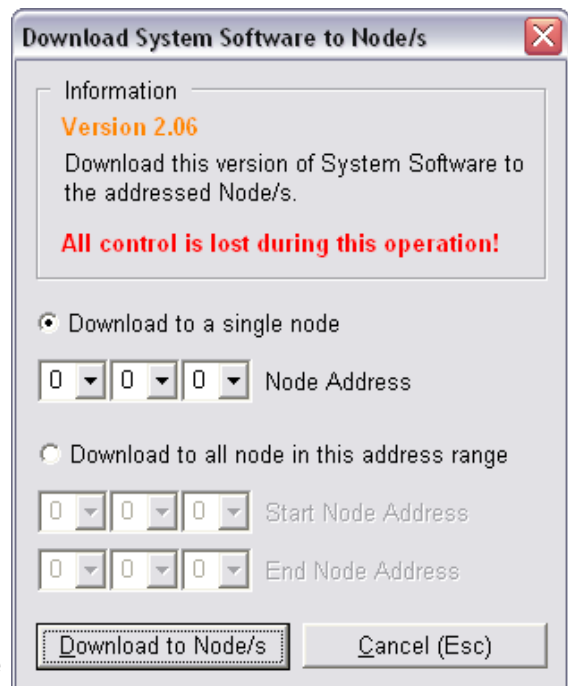
Select the required node address or address range and click 'Download to Node' to execute the procedure.

Click 'Cancel' or press the Esc key to abort.

- ▶ *The version of Control-C and the version of the system software on the node MUST be the same.*
- ▶ *When a compiled user program is downloaded to a node the system software version number on the node is checked. If it is different to the version of Control-C being used a warning window will be displayed.*
- ▶ *Generally system software download can be achieved using any E-Port connection on the network. However if any difficulties are experienced plug directly into the addressed node. Do this for every node in the system.*

## **Factory Configuration (Factory only) (Ctrl+Alt+N)**

This is a password protected option provide for factory use only to configure newly manufactured nodes.



## The Program Menu














Use this menu to compile, download and debug user programs.

Most of this menu will be greyed out until a '.CCC' file window is opened. The commands are duplicated on the button bar and actioned by keyboard function keys for rapid access.

The command are grouped into Two sections.

The topmost orange coloured group operate on the addressed node only (the address in the address field at the top of the file window). When you switch between file windows the address of the node these commands act upon switches as well.

The bottom grey coloured group are 'global' commands operating on ALL nodes on the network simultaneously.

	Compile User	F5
	Download	F6
	Run	F7
	Run To Cursor	F8
	Single Step	F9
	Step Over	F10
	Pause	F11
	Reset	F12
	Read Node Status	F2
<hr/>		
	Run All	Ctrl+F7
	Pause All	Ctrl+F11
	Reset All	Ctrl+F12
	Fast Stop All Moves	Shift+Ctrl+F12

The Program Menu

### **Compile User (F5)**

Use this option to compile the user program in the active file window.

When the user program is compiled a new hidden file is created containing a copy of the user program converted into machine code. This code is directly readable by the microprocessor within the E-Node. If the user program compiles successfully the machine code can be downloaded to the addressed node for testing and subsequent use.

The compiler is a 'Single Pass' type. This means that it starts the compilation process at the top of the file window and performs a single pass down the file until it reaches the end or encounters an error.

The compiler compares the file contents with the Control-C syntax diagram as it makes the single pass. The Control-C syntax diagram describes the correct program layout from the top to the bottom. If the compiler finds a deviation from the syntax diagram its location is highlighted in the file window, the cursor is placed where the error was found and an error is displayed in the status window together with a suggestion regarding what the compiler was expecting.

► *Compilation is a difficult process to perform. The user is free to type anything into the file window and the compiler must interpret this as best it can. When an error is determined the cursor is placed where the compiler thinks the error occurred however in some cases the compiler will have just gone past the real error before stopping and the programmer must look back to locate the error.*

► *Addressing*

► *Many commands in the Control-C language provide the option to define the node address for which the command is destined. If this option is omitted the compiler will default to the address in the address field at the top of the file window.*

### **Download (F6)**

Use this option to download the compiled user program to the addressed node. The main memory of an E-Node is not programmed directly in case there is a communications failure during the download leading to part programmed situation. Instead the program is downloaded into a serial Flash memory first. The E-Node is then restarted and it checks the serial flash for a complete new program. If one is found the main memory of the E-Node is automatically erased and the new program copied over in a fully self contained operation.

Downloading takes place in several distinct stages. At each stage the Eight segment display (ESD) on the front of the standard E-Node shows a particular activity and status information is given in the status window. The stages are:

1. A global reset is issued. All control is lost at this point. ESD shows all segments 'on' for a short time.
2. The required sectors of the serial flash are erased. ESD shows a clockwise light pattern on the lower Four segments. One segment is lit for each sector erased.
3. Serial flash pages are programmed. ESD shows anti-clockwise light pattern on the lower Four segments. One segment is lit for each page programmed.
4. The addressed node is reset to start the auto update process. ESD shows all segments 'on' for a short time.
5. Auto updating takes place. If the serial flash contains a new valid program it is automatically transferred to the main memory. When transferring the ESD shows a clockwise light pattern on the outermost ring of segments. One segment is lit for each page erased and if that same page is also programmed the central segment is lit.

If, for some reason the programming operation failed the last reset will result in an error condition. This will be displayed in the status window if communications are good and on the ESD of the node in question. Depending on the error type one of the following sequence of letters will be displayed on the ESD.

ESD Sequence	Meaning
<b>E - I - b - L</b>	<b>Error, In boot Loader</b>
<b>E - S - C - F</b>	<b>Error, System (program) Checksum Failure</b>
<b>E - U - C - F</b>	<b>Error, User (program) Checksum Failure</b>
<b>E - P - E</b>	<b>Error, Programming Error</b>
<b>E - E - E</b>	<b>Error, Erase Error</b>
<b>E - U - I - b</b>	<b>Error, User (program) Is blank</b>
<b>E - S - I - b</b>	<b>Error, System (program) Is blank</b>
<b>E - F - E</b>	<b>Error, Fram (write) Error</b>

'-' indicates a short blank period on the display.

In extreme cases of poor communication the node may end up with a blank screen and possibly no communications at all. Cycle the power to the node to reset it. It will then display any error messages and communication will resume.

### **Run (F7)**

Use this option to run a user program (already downloaded) on the addressed node. The ESD top segment will be lit to indicate the program is running and the program status will be reported in the status window.

### **Run To Cursor (F8)**

Use this option to run the user program at full speed and stop it on the line of the program where the text cursor is positioned. When a program is compiled with the 'Breaks on' option checked every line of the program is allocated a break point at which the program execution may be halted.

To use this option the following conditions must be met.

1. The file window must be open containing the user program.
2. The user program must have been successfully compiled with the 'Breaks on' option checked and downloaded to the addressed node.
3. The cursor must be placed on the line required.

A program starts at 'main()' and progresses in accordance with the program flow as defined by the programmer. It is normal practice to run the program to a cursor location where it will halt and then re-position the cursor and 'Run to Cursor' again. However if the cursor is positioned before the halted position or in a location that is never reached the programmer may be left forever waiting for the break point to be reached.

Whilst waiting for a break point to be reached the computer is in constant communications with the addressed node and no other operations can be performed in the IDE. The only way to exit this situation is to press the 'Esc' key. The break will be aborted and the program will continue running normally.

- ▶ *If an error occurs whilst waiting for a break point the program enters the error handler and the status window reports the error together with a suggestion for where the error was caused in the user program.*
- ▶ *All queued motion commands issued before the break are completed.*
- ▶ *'Run To Cursor' is greyed out if the program is not compiled and downloaded with the 'Breaks On' option checked.*

### **Single Step (F9)**

Use this option to step through the user program one line at a time. The same conditions apply as detailed in the 'Run To Cursor' description.

When using Single Step the full execution path is followed including entering and stepping through subroutines.

- ▶ *All queued motion commands issued before the break are completed.*
- ▶ *'Single Step' is greyed out if the program is not compiled and downloaded with the 'Breaks On' option checked.*

### **Step Over (F10)**

Use this option to step through the user program in the same manner as 'Single Step' except that subroutines are executed at full speed and the break occurs on the next line.

- ▶ *All queued motion commands issued before the break are completed.*
- ▶ *'Step Over' is greyed out if the program is not compiled and downloaded with the 'Breaks On' option checked.*

### **|| Pause (F11)**

Use this option to immediately pause the user program on the addressed node. To continue program execution from the paused point use 'Run'.

- ▶ *The user program does not need break points for this option.*
- ▶ *Any motion command running at the time the break occurs is completed.*

### **Reset (F12)**

Use this option to immediately reset the program on the addressed node.

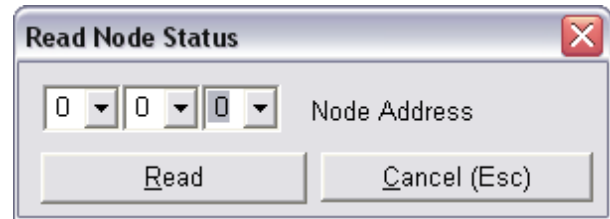


## **Read Node Status (F2)**

Use this option to read the status of a node. It opens the 'Read Node Status' window.

Click 'Read' to read the status of the addressed node and report it in the status window.

Click 'Cancel' or press the 'Esc' key to exit.



## **▶ Run All (Ctrl+F7)**

Use this option to run all user programs across the network immediately. The same conditions detailed in 'Run' apply.

## **|| Pause All (Ctrl+F11)**

Use this option to pause all user programs across the network immediately. The same conditions detailed in 'Pause' apply.

## **◀ Reset All (Ctrl+F12)**

Use this option to reset all user programs across the network immediately. The same conditions detailed in 'Reset' apply.



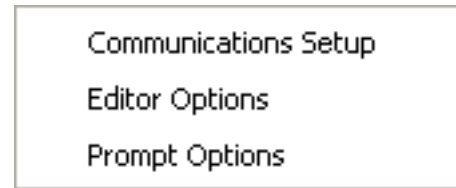
## **Fast Stop All Moves (Shift+Ctrl+F12)**

Use this option at any time to rapidly stop all current moves on a system. It also clears all move queues, pauses all running programs and on AXIS nodes only it floats the outputs (if these outputs are used to enable amplifiers this will disable them).

- ▶ *Stopping the move is achieved by setting the DAC0 output to zero with immediate effect. This is fast but abrupt method and is only used to delivery the fastest possible stop condition.*
- ▶ *This is NOT an emergency stop because it relies on the integrity of communication links.*

## Option Menu

Use this menu to set up general options in the Control-C environment.



The Options Menu

### Communications Setup

Check 'None' for no communications port.

Check 'USB' to use the Universal Serial Bus port for communications with the E-Nodes.

Click 'OK' to perform the set up operation.



► The USB port driver must first be installed before the 'USB' option will work. If it has not been installed a warning window will be displayed. Please refer to [www.etrol.co.uk](http://www.etrol.co.uk) for further information.

### Editor Options

Opens the 'Editor Options' window.

#### Indent options:

Check 'Auto indent' to automatically indent text to the same level as the line above when the 'Enter key' is pressed.

Check 'Auto unindent' to automatically remove Two spaces when the 'Backspace key' is pressed.

#### Syntax Format Selection:

Use this selection to customise the look of the main file editor window.

Click 'Factory Syntax Format' to restore the setting in the selection area to the Factory values.

Click 'Save Syntax Format' to temporarily save a copy of the values in the selection area.

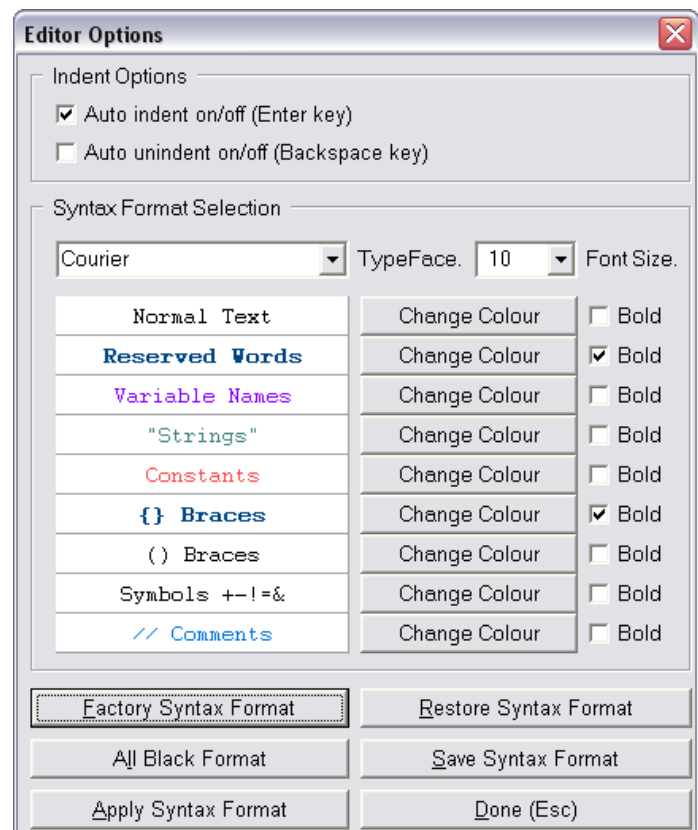
Click 'Restore Syntax Format' to restore the values saved back into the selection area.

Click 'All Black Format' to reset the selection area to an all black format.

Click 'Apply Syntax Format' to save the format for future use and apply the format to the currently open file window.

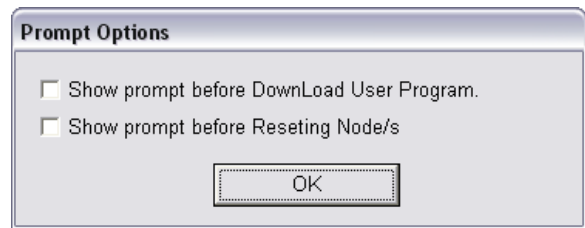
Click 'Cancel' or press the 'Esc' key to exit.

► This option only applies to .CCC file types.



## **Prompt Options**

When downloading user programs and resetting nodes all control is lost on the network. It can be useful to check these option to prompt the programmer before these actions are undertaken to be certain he/she is aware that control will be lost.



In most circumstances experienced programmers will leave these options unchecked.

## Window Menu

### Cascade

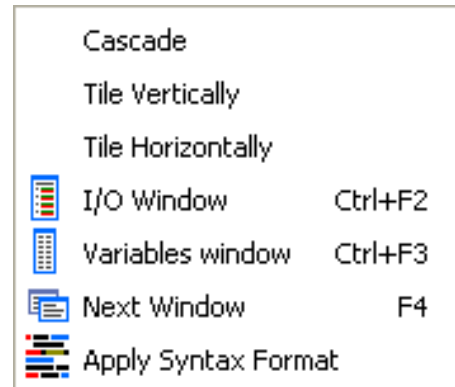
Cascades all open file windows.

### Tile Vertically

Tiles vertically all open file windows.

### Tile Horizontally

Tiles horizontally all open file windows.



The Window Menu

### I/O Window (Ctrl+F2)

Opens the I/O window for viewing the digital Input/Output status of E-Nodes. Updated every 500 milli seconds.





Up to 5 node addresses can be displayed by setting the value in the 'Number of Nodes' drop down box.

Each sub window shows the selectable address of the node, the type of node and the current status of the inputs and outputs. If the node has no I/O they will be greyed out.





Outputs can be toggled by clicking on the icon of the number you wish to toggle.

The I/O icon lights up when in its active state. The active state for PNP I/O is different to NPN.

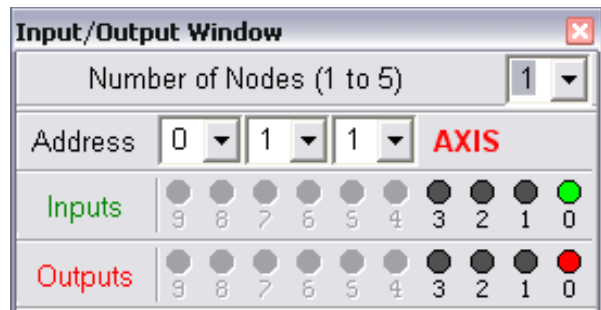
#### NPN

-  Input active = Input is low (0v)
-  Input inactive = Input is floating (weak pull up to 24v)
-  Output active = Output is driven low (0v)
-  Output inactive = Output floating (weak pull up to 24v)

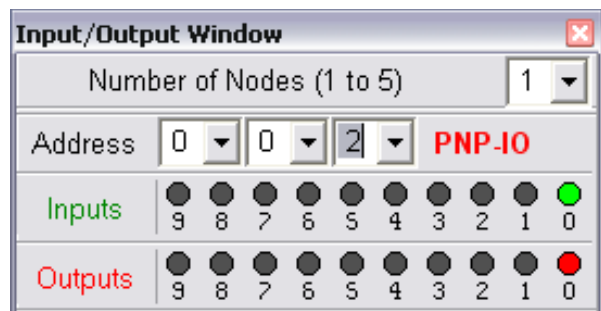
#### PNP

-  Input active = Input is high (24v)
-  Input inactive = Input is floating (weak pull down to 0v)
-  Output active = Output is driven high (24v)
-  Output inactive = Output floating (weak pull down to 0v)

► The I/O status reported is that seen from the inside of the isolation barrier. For these values to properly reflect the status on the outside of the isolation barrier the isolated 24v supply and ground must be applied as detailed by the respective node connection data sheet.



Axis with only 4 I/O



PNP with output 0 active



## Variables Window (Ctrl+F3)

Opens the 'Variables Window' showing the variable values and node type for the addressed node. Updated every 500 milli seconds and if the 'Refresh Variables View' button is clicked.

Variable are either 'Read Only' or modifiable.

To modify a variable value click on it. If the 'Read Only' icon changes to 'Send Value' you may enter a new value and then click 'Send Value'.

User defined variables and named sub-routine return variables (ie the declared sub-routine name) are displayed at the bottom of the list. The User Program must be loaded into a file window and it must be in the compiled state for these variables to be visible. If two or more file windows have programs with the same node address an warning will be shown because the Variables Window will be unable to determine which program file variables to display.

► *Some variables will not accept a decimal term. If one is sent it is simply ignored.*

► *Changing values is not permanent. A reset will always cause the default value to be re-established. If the programmer wishes to override the reset value it must be done by programming the node to do so.*

Name	Value
software_version	2.06
address	0
serial_number	7-11-8-15
node_type	AXIS
group_addr_hi	0
group_addr_lo	0
power_on_run	FALSE
error	0
line_with_error	0
node_with_error	0
status	268436676
activity	IDLE
mode	ABS



## Next Window (F4)

This option switches focus to the next file window if more than One is open.



## Apply Syntax Format

This option applies the current syntax colouring format to the text within the open file window.

► *This option only applies to .CCC file types.*

## Help Menu



### Resources

Opens the 'Help Resources' window.

Shows sources for help.



### About

Opens the 'About' Control-C window.

Shows the version number and release date.

