Introduction

Flex32 is the software used to program the Colter Products' range of programmable controllers including the FMT-100, FMT-200 and BIS-100.
The main features include:

- Graphical Ladder Programming
- Text based high level language
- Source level debugging
- Syntax highlighting in both programming languages
- Graphic mimic screens
- Facility Useage screen
- Easy Project documentation
- Site License

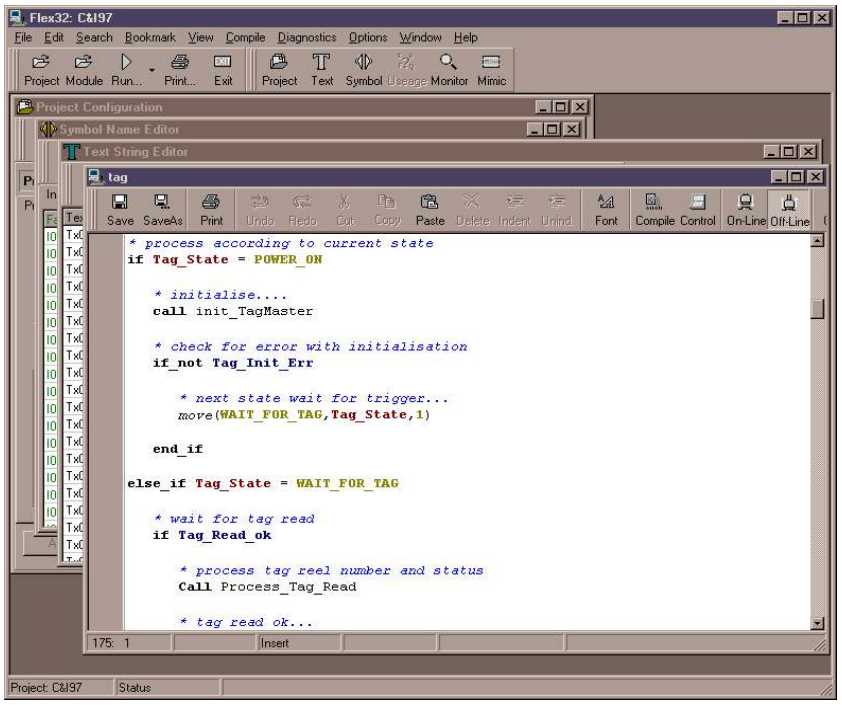
Minimum System requirements:

- Microsoft® Windows™ 95/98/NT.
- SVGA monitor supporting 800 x 600
- 5MB Hard Disk space
- 16MB Ram
- Serial Communications port for connection to controller
- Mouse
- CD-Rom

High Level Instruction Language

The High Level text based instruction language is designed to be a simple high level language easily learned by anyone familiar with 'C', Basic, Pascal or any other programming language.

- The text editor is used to write instruction language programs and features colour syntax highlighting and multiple undo steps.
- For debugging the on-line mode of operation can be selected. Break points can be set and the current state of facilities such as inputs, outputs, registers etc can be displayed.
- Individual modules can be stopped, started, single stepped, or run to breakpoints.



Screen shot from the Text Editor

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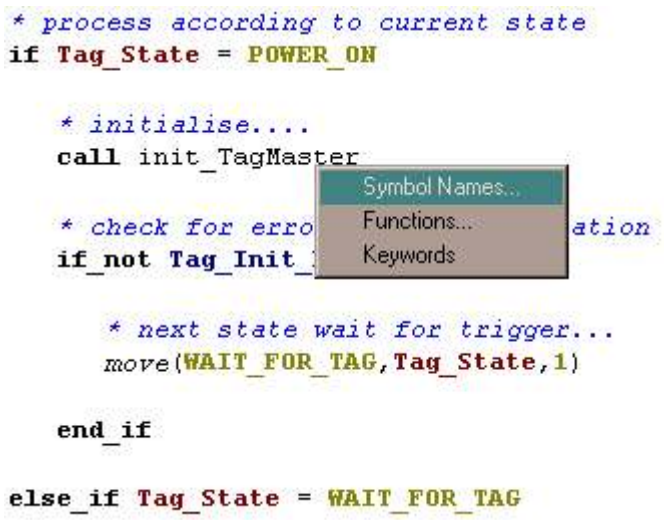
Pop-up menu in instruction editor

When in the instruction editor if the right mouse button is pressed you will be presented with a pop-up menu:



- If 'Symbol Names' is selected then a list of all the symbol names assigned for the project is displayed. Double clicking on an entry will paste that name into the editor at the current cursor location.
- If 'Functions' is selected from the pop-up menu then a list of all the instruction language functions will be displayed. Double clicking on an entry will paste that function into the editor at the current cursor position.
- If 'Keywords' is selected from the pop-up menu then a list of all the instruction language keywords will be displayed. Double clicking on an entry will paste that key word into the editor at the current cursor position.

Total Recall

Total Recall is a new feature in Flex32 it allows you to store your entire project in your FMT / BIS memory when downloading the executable code:

- Provides you with the option to store your entire project in your FMT / BIS memory alongside the controller's executable code. This means that at a later date the project can be uploaded from the FMT / BIS, into a computer with Flex32, even though the project is not stored on the computer.
- Optional password protection of project stored on FMT / BIS to prevent unauthorised uploading of stored project.
- Entire project is stored using Total Recall - project configuration, source code, ladder code, symbol names etc.

Ladder Logic

The Ladder Logic editor enables you to write and debug programs in the familiar style of ladder logic.
The ladder editor enables access to all of the FMT's or BIS-100's advanced maths and communications facilities as well as the simple contacts, coils, flags, counters etc.
The ladder editor features graphical ladder display with colour highlighting of the facility type being used. The On-line mode showing current ladder condition to enable easy debugging.

Ladder functions include:

- Inputs: on, off, edge, fast edge.
- Outputs: on, off.
- Timers: on-delay, off-delay, pulse.
- Counters: count-up, count-down, pre-set, clear.
- Comparators: greater, less-than, equal to.
- 16-Bit and 32-Bit operations:

  Add, Subtract, Multiply, Divide, Square, Square Root.

  And, Or, Exclusive Or. Negate, Logical shift, Rotate.

  Binary to BCD, BCD to Binary.
- Move:

  inputs, outputs, and flags and analogues to/from registers.

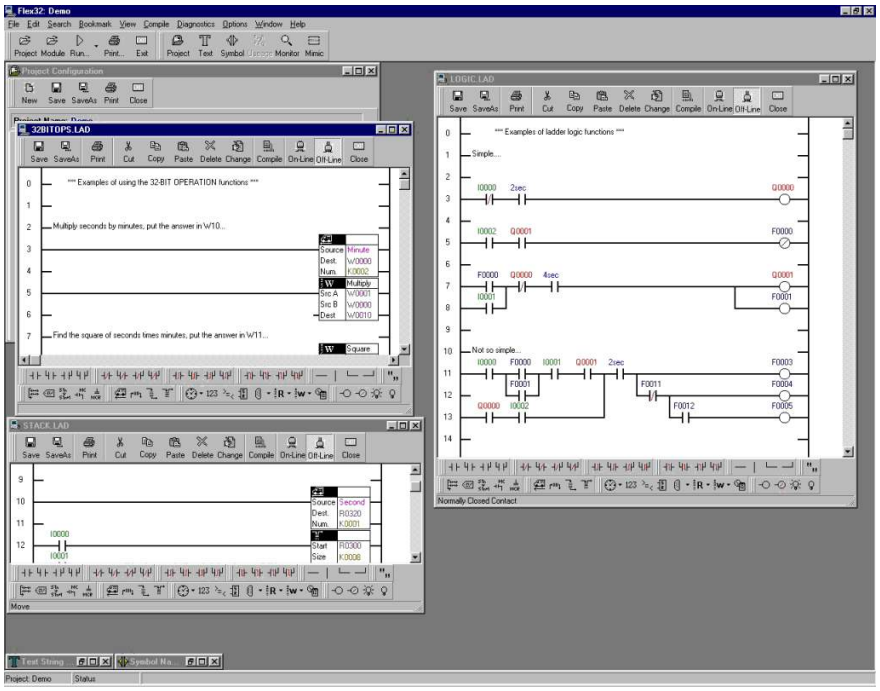
  16-Bit or 32-Bit registers to/from 16-Bit or 32-Bit registers.
- Data Handling with flags and registers:

  Shift Registers, Stacks, and FIFOs.
- Serial Communications:

  Send out Text string.

  Receive number, text, data.

  Compare received text with stored text.



Screen shot from the Ladder Editor

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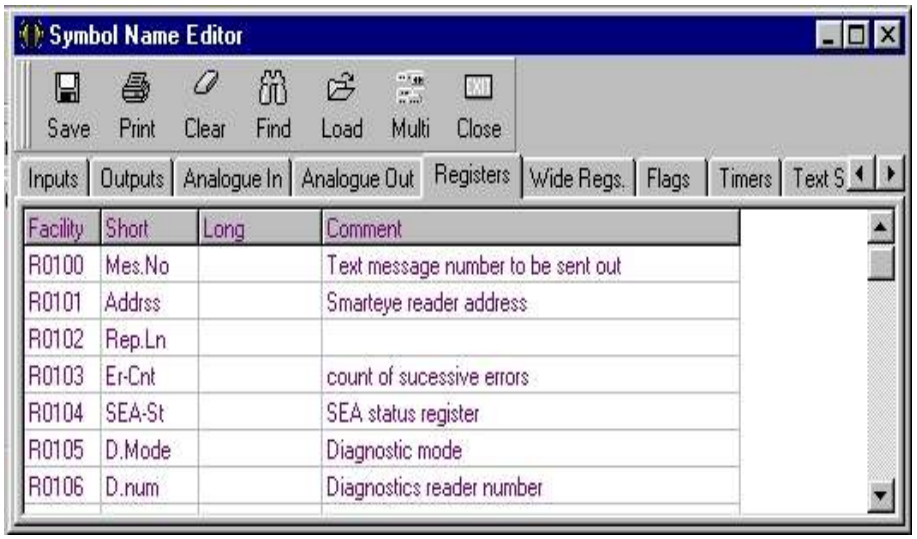
Symbol names for all facilities

Flex32 allows names to be assigned to all facilities such as inputs, outputs, registers, timers etc. A short name of 6 characters is used in the Ladder diagrams while the instruction modules can use the short name or a long name of up to 12 characters.
Symbol names are assigned to facilities using the symbol name editor.

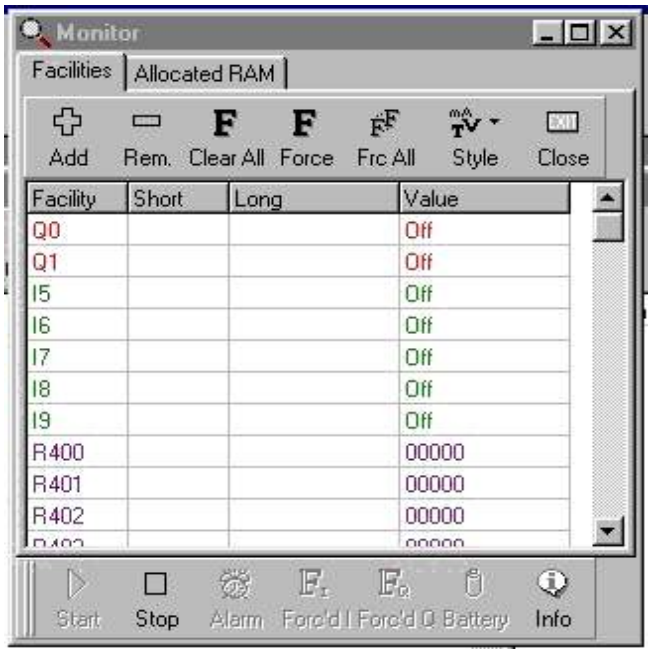


Screen shot from the Symbol Name Editor

Facility Monitor

The facility monitor allows values of facilities to be displayed in decimal number, text, voltage*, current*, or ASCII values.
Facilities can also be set or forced to as part of the debugging process.

* Voltage and current display relates to 10v and 20mA analogue inputs.



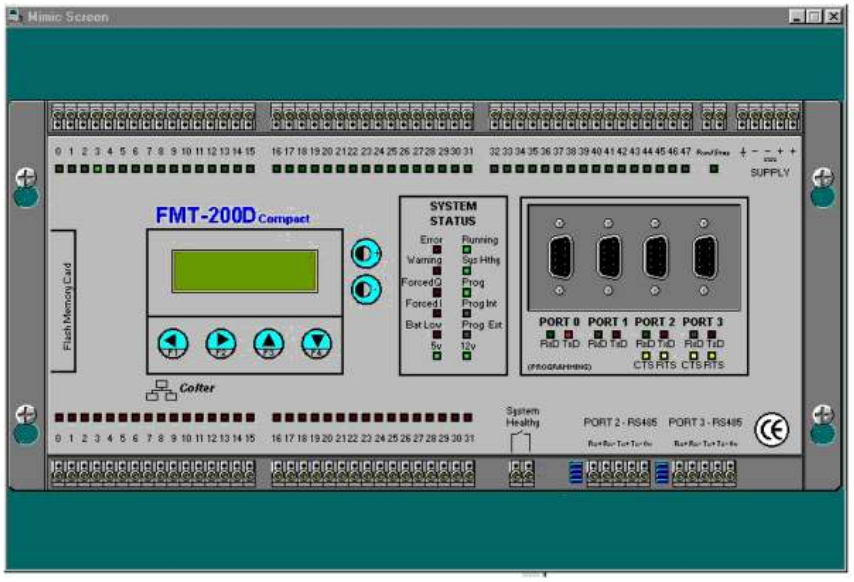
Screen shot from the Facility Monitor window

Mimic Screen

The Mimic Screen shows a live, animated graphic of the current state of the controller you are connected to.

All analogue and digital I/O are displayed as is the built in display of the FMT-200.

Facilities can be set and/or forced from this screen.



Screen shot from the Mimic Screen (FMT-200D shown)

Instruction module execution options

Modules can be executed in several different ways and these are set up in the instruction editor. The different ways of module execution are:

One instruction step per loop (default): In this mode, one 'step' of the instruction module will be carried out during each execution loop. This is the default mode of operation and will be the best option for the vast majority of modules.

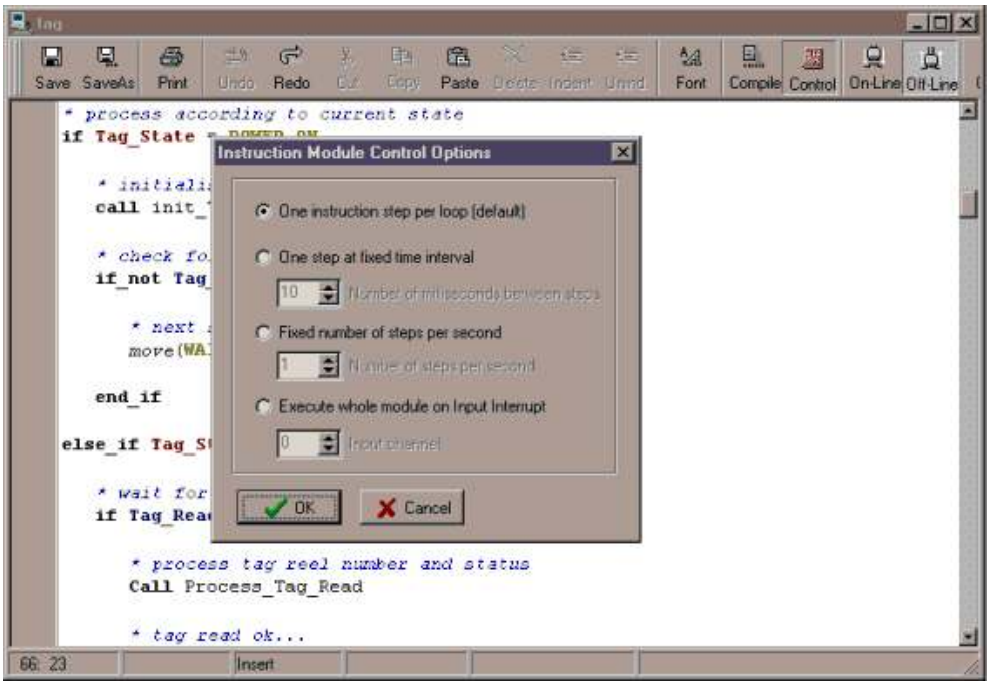
One step at fixed time interval: In this mode you will be prompted to enter the time interval between steps. The time interval can be 10mS to 1second in 10mS intervals. There are several reasons for selecting this option...

- If you have an unimportant section of code that you want to execute slowly without using much processor time. Select only a few steps per second.
- If you have some code that is very important and must be executed frequently then select a high number of steps per second.

Fixed number of steps per second: In this mode you will be prompted to enter the number of steps per second to be executed from this module. The number of steps per second can be between 1 and 100.

Execute module on input interrupt: In this mode the entire module will be executed at the exact moment that the specified input comes on. It should be remembered that executing large sections of code on an input interrupt will reduce the capacity of the FMT to process the other code within the project. You are limited to executing 20 steps of code in one interrupt before the firmware will raise an 'Input Interrupt overrun' error.

Screen shot showing the Instruction Module Control Options box

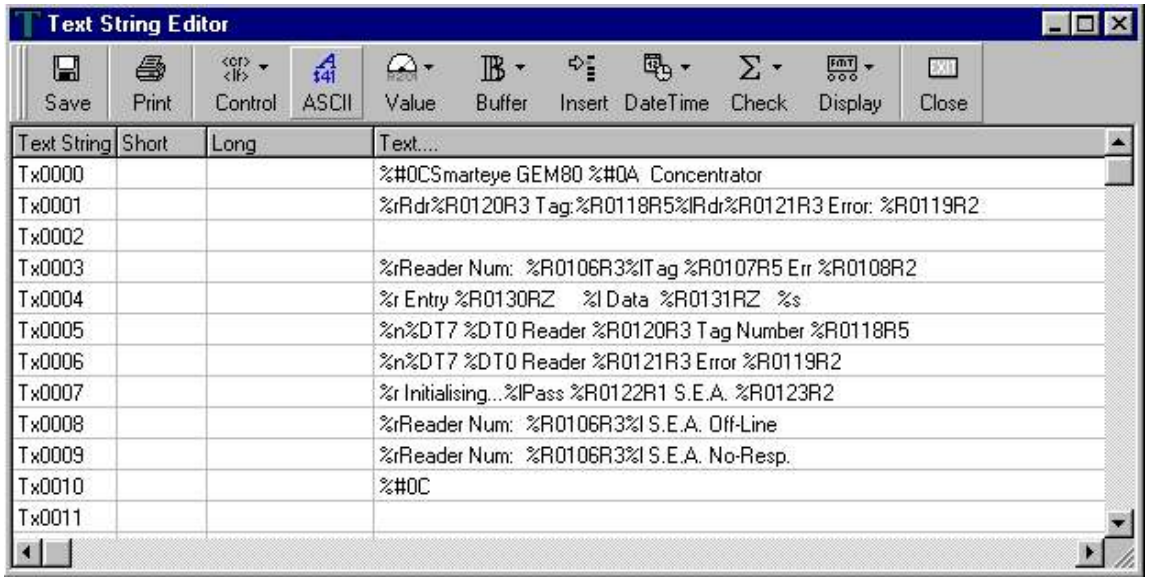


Setting the module execuion: While in the instruction module editor click on the 'Control' button on the instruction editor toolbar. You will then be presented with a box as in the screen shot above from which you can select how your module is executed.

Text String Editor

Text strings to be sent from the ports are set up using the text string editor. The text, data in register etc. to be sent is entered next to the text string number which is to be controlled from the program. The text string is sent out using the 'text' command in your program. The text string can be assigned a symbol name which can be used in your program.

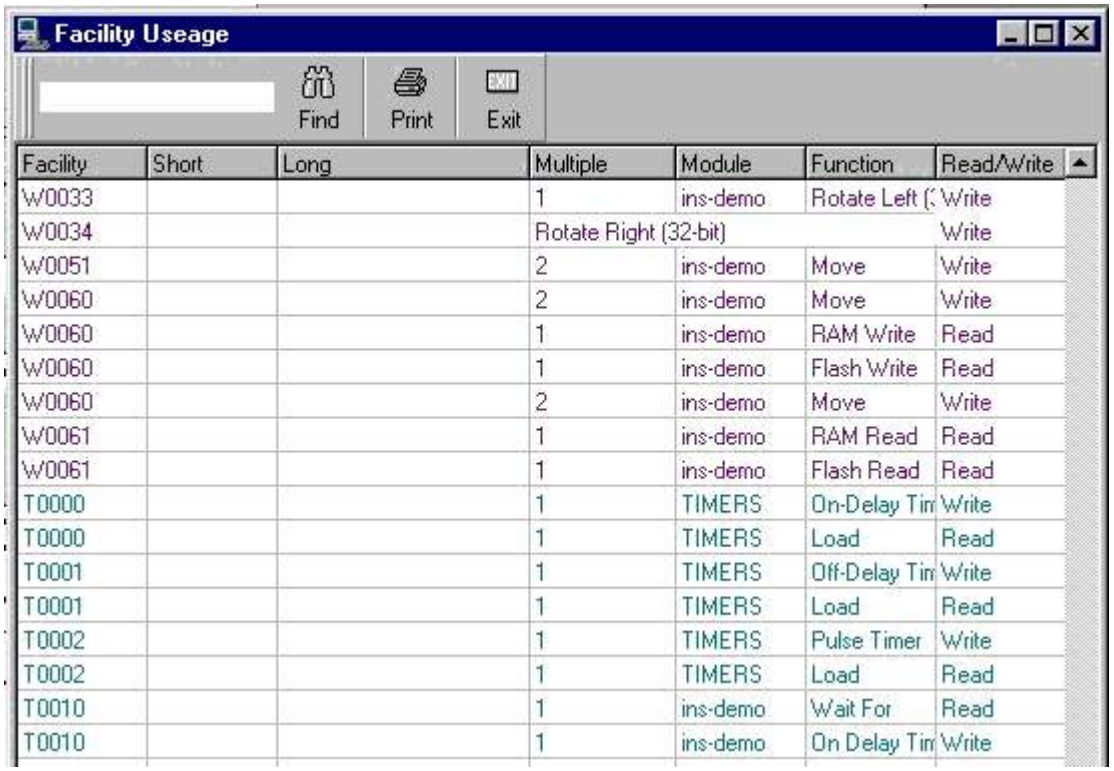
Screen shot from the Text Editor



Facility useage screen

The facility useage screen shows you which facilities of the FMT are being used and in which module they are referenced. This information simplifies the process of keeping track of facilities that have been used and can be printed out for project documentation.
Note that the Facility useage screen is only available once a ‘test compile’ or ‘compile and download’ has been completed.

Screen shot from the Facility useage screen



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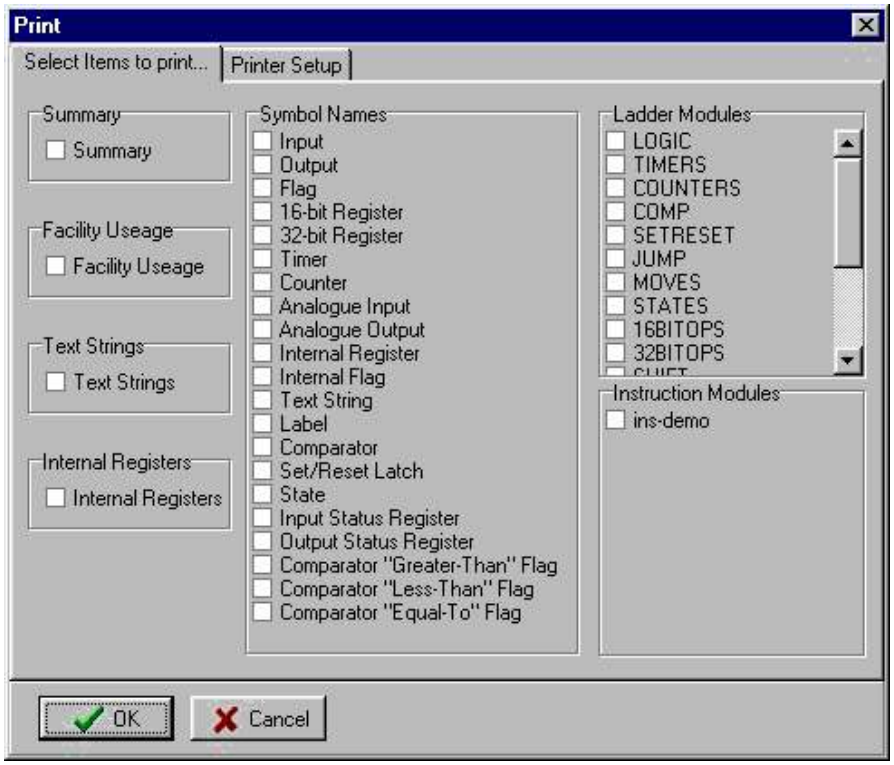
Easy project documentation

Flex32 allows you to easily document you project using it's print center. You can select exactly which parts of the project to print:

- Project Summary
- Ladder Modules
- Instruction Modules
- Symbol Names (selected by facility)
- Facility Useage
- Text Strings

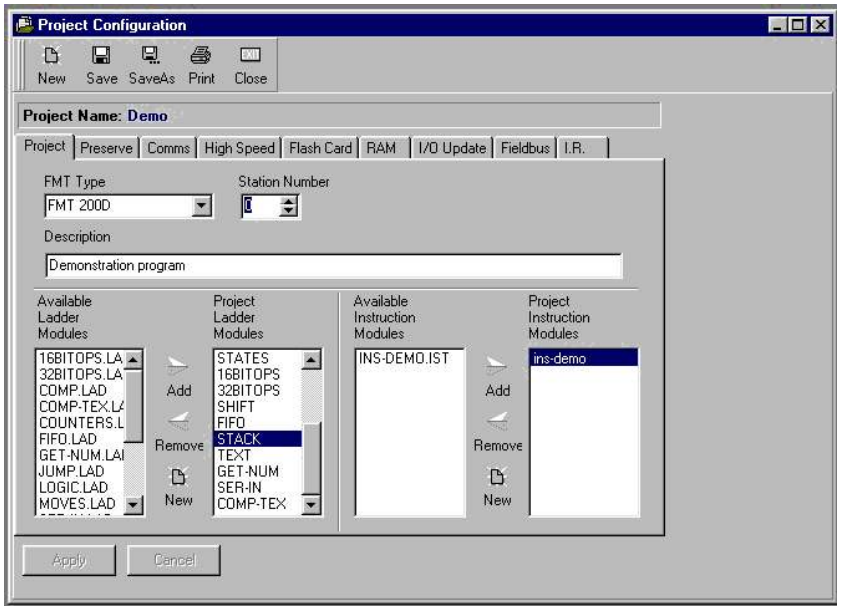


Screen shot from the Print centre

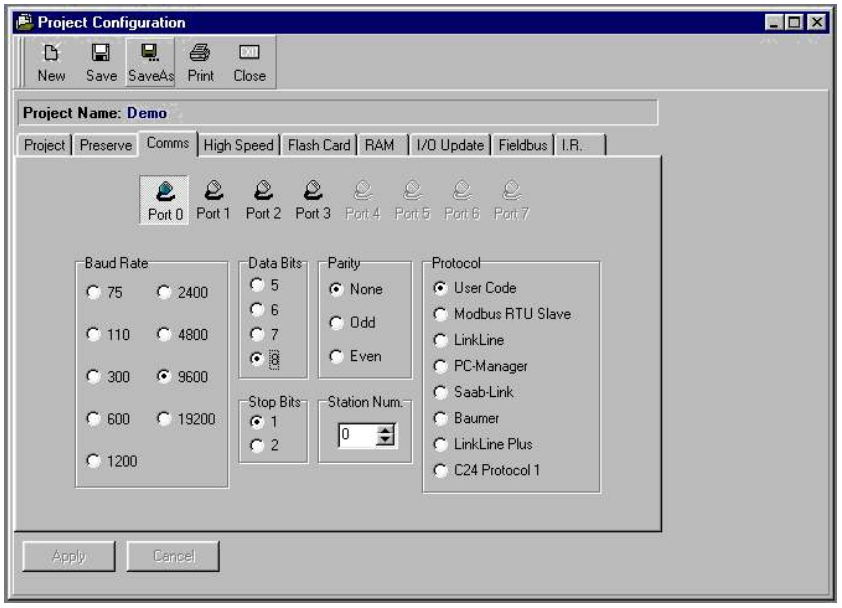
Simple project configuration

Flex32 allows you to configure you project with the greatest of ease. Various configuration options can be set from within the project configurations screen.
These options include:

- Communications ports setup
- High speed inputs setup
- Flash card setup
- I/O update setup
- Fieldbus module setup (BIS-100 only)
- Allocated RAM



Screen shot from the Project configuration screen



Screen shot from the Project configuration screen showing the communcations settings

Allocated RAM: The FMT contains battery backed memory which is used to store your program. If you wish you can use some of this RAM to hold data instead of program code, but obviously the maximum size of your program will be smaller. The amount of RAM to be used is setup in the RAM page of the configuration screen.

I/O Update: In this page you can set the number of digital inputs and outputs used and the time between updates. You can also set the number of analogue inputs and outputs used and the update time. The less inputs and outputs set to be used and the longer the update time then the more instruction per that second will be executed. This can be useful when code within the FMT is required to be executed at great speed. For more information on optimising FMT performance please see the separate data sheet.

Fieldbus setup: (This is only applicable to the BIS-100). In this page of the project configuration screen you can set the start of the block and the number of registers that are read from and written to the Fieldbus that the BIS-100 is connected to. You can also set the update time of these registers. Again the longer the time between updates the more instruction per second that will be executed.

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Order Codes

Part Number
FLEX32

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