



Interfaces non Fieldbus equipment to Fieldbus networks
4 Digital Inputs
4 Digital Outputs
4 Comms Ports
Optional Fieldbus Module
Optional 2400 bps Modem
LED Status Display
Real Time Clock

Introduction

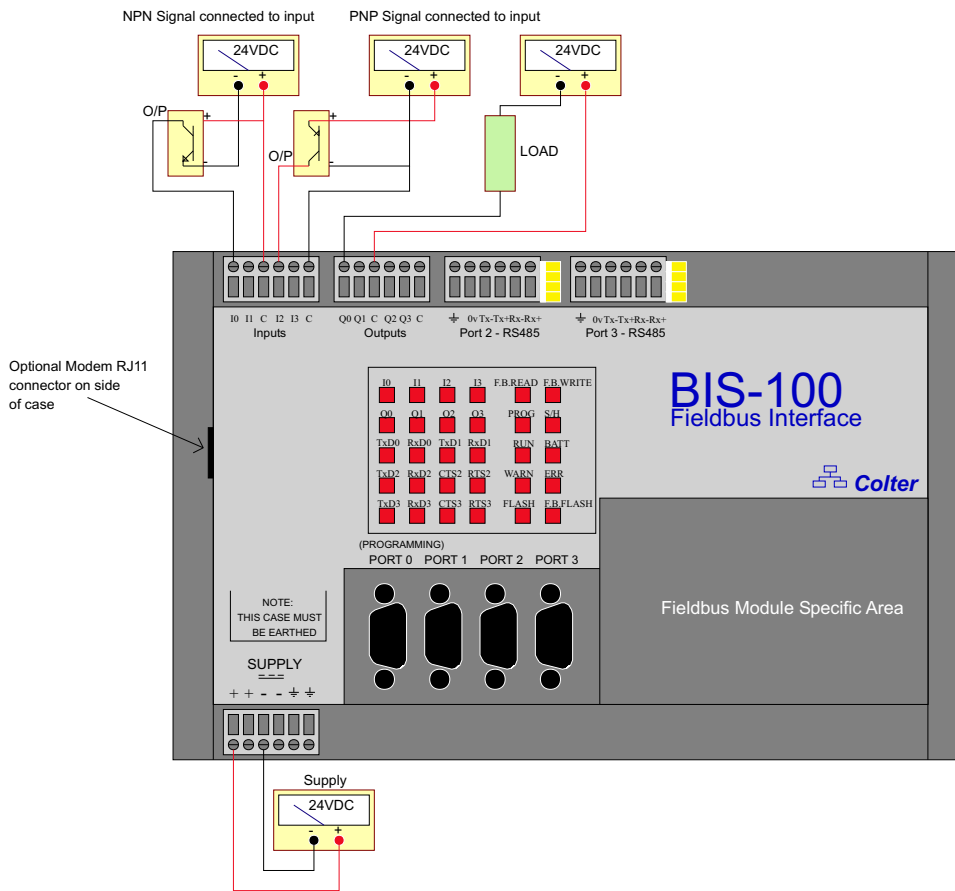
The BIS-100 provides Master and Slave interfaces to different types of Fieldbus. It includes 4 digital inputs and 4 relay switched outputs. Four communication ports (all RS232 compatible, two also support RS485), LEDs display the status of inputs, outputs, communications etc. An additional 2400 bps modem can be fitted. It is part of the FMT range and is programmed using the FLEX32 PC programming software. The typical connections along with the ratings and descriptions are shown in the following tables. For information relating to programming or the internal facilities available see your FLEX32 on-line help.

General Ratings

Storage temperature	-20 to +70 °C
Operating temperature	0 to 50 °C
Humidity	0-90%
Battery life	Typically 5 Years un-powered 10 years powered
Weight	Typically 1600g
Dimensions	273 mm wide 158 mm high 60 mm deep
Screw Terminal Wire gauge	Up to 2.5 mm csa (14 AWG)
Supply currents	Typically 115 mA @ 24VDC Supply without optional Fieldbus module fitted Typically 190 mA to 225 mA @ 24VDC Supply with optional Fieldbus module fitted (supply current is dependant on the type of module fitted)
Output type	4 normally open relay outputs, 2 commons
Output rating	Maximum Load per channel 5A @ 48VDC
Input type	4 opto-isolated digital inputs (24v bipolar), 2 commons
Input rating	Approx. 6 mA @ 24VDC



Connection Details



LED Descriptions

Label	Colour	Description
I0- I3	Red	Indicates status of the digital input. When illuminated the external input is energised.
Q0-Q3	Red	Indicates status of the digital output. When illuminated the output is turned on.
TxD0	Red	Indicates status of the PORT 0 RS232 transmit data output line. When flashing, data is being sent out from the BIS-100.
RxD0	Red	Indicates status of the PORT 0 RS232 receive data line input. When flashing, data is being received by the BIS-100.
TxD1	Red	Indicates status of the PORT 1 RS232 transmit data output line. When flashing, data is being sent out from the BIS-100.
RxD1	Red	Indicates status of the PORT 1 RS232 receive data line input. When flashing, data is being received by the BIS-100.
TxD2	Red	Indicates status of the PORT 2 RS232 / RS485 transmit data output line(s). When flashing, data is being sent out from the BIS-100.
RxD2	Red	Indicates status of the PORT 2 RS232 / RS485 receive data line(s) input. When flashing, data is being received by the BIS-100.
CTS2	Red	Indicates status of the PORT 2 external 'Clear to Send' input. When illuminated the CTS line is high and the BIS-100 will send data out of the RS232 port on PORT 2.
RTS2	Red	Indicates status of the PORT 2 external 'Request To Send' input. When illuminated the RTS output is high and the BIS-100 is ready to receive data into the RS232 port on PORT 2.
TxD3	Red	Indicates status of the PORT 3 RS232 / RS485 transmit data output line(s). When flashing, data is being sent out from the BIS-100.
RxD3	Red	Indicates status of the PORT 3 RS232 / RS485 receive data line(s) input. When flashing, data is being received by the BIS-100.
CTS3	Red	Indicates status of the PORT 3 external 'Clear to Send' input. When illuminated the CTS line is high and the BIS-100 will send data out of the RS232 port on PORT 3.
RTS3	Red	Indicates status of the PORT 3 external 'Request To Send' input. When illuminated the RTS output is high and the BIS-100 is ready to receive data into the RS232 port on PORT 3.



LED Descriptions (continued)

Label	Colour	Description
F.B.READ	Red	Indicates when Fieldbus module is being written to by the BIS-100. When flashing, data is being written to the module by the BIS-100.
F.B.WRITE	Red	Indicate when data is being read from the Fieldbus module into the BIS-100. When flashing data is being read from the module by the BIS-100.
PROG	Red	Indicates that a programing lead is connected to PORT 0.
S/H	Red	This is normally on but will go out in the event of an internal failure of the microprocessor.
RUN	Red	When illuminated the BIS-100 is running the user program stored inside. Flashes quickly after power-up whilst checking the integrity of the application program.
BATT	Red	When on the battery requires replacement. Note IF7 also reflects this state.
WARN	Red	When on a warning has been detected by the BIS-100 firmware. Use the Alarm option within the monitor window in FLEX32 to find out which warning has occurred.
ERR	Red	When on an error has been detected by the BIS-100 firmware. Use the Alarm option within the monitor window in FLEX32 to find out which error has occurred.
FLASH	Red	Indicates that the system is writing the downloaded program to the internal FLASH memory. Do not turn the BIS-100 off while this is illuminated.
F.B. FLASH	Red	When illuminated this indicates that the Fieldbus flash switch has been switched to Re-prog (switch is under the Fieldbus module cover). This is done when the firmware of the Fieldbus module is to be upgraded via PORT 3 of the BIS-100. Do not turn the BIS-100 off while upgrading

Terminal Descriptions

Label	Description	Nominal Rating	Maximum Rating (not continuous)	Notes
I0 - I3	Inputs 0 to 3	24V (+/-20%) where <5V = OFF >18V = ON	48V < 1 Second	The input current at 24V is typically 6 mA Blocks of 2 inputs can be connected in different polarities to different power supplies.
C	Common for block of 2 inputs Earth Stud			Can be connected to either 0v or 24v. See the 'connection details' diagram. If no connection, BIS-100 will RUN However to meet the EMC regulations, this terminal must be connected to a clean earth.
- +	FMT supply common FMT supply	8 - 40V	48v	This supplies all the internal needs of the FMT
Q0-Q3	Outputs 0 to 3	5 A @ 48v		Blocks of 2 outputs can be connected to different power supplies.
C	Common for block of 2 inputs	Either 0V or up to 48V		This supply feeds the block of digital outputs and is isolated from all other supplies.
Rx+ Rx- Tx+ Tx- 0v (earth)	Port 2 RS485 connections			Receive data + Receive data - Transmit data + Transmit data - 0v connection Earth for Screen
Rx+ Rx- Tx+ Tx- 0v (earth)	Port 3 RS485 connections			Receive data + Receive data - Transmit data + Transmit data - 0v connection Earth for Screen



RS232 Communications Ports

The BIS-100 has four communication ports. All four ports have a 9 way D-type connector for connection to RS232 devices. Ports 2 and 3 also have RS485 connections via two part terminals. Pin assignments for the 9 way connectors are as below:

Pin No	Port 0	I/O	Port 1	I/O	Port 2	I/O	Port 3	I/O
1	Protective Earth	-	Protective Earth	-	Protective Earth	-	Protective Earth	-
2	Receive Data	I	Receive Data	I	Receive Data	I	Receive Data	I
3	Transmit Data	O	Transmit Data	O	Transmit Data	O	Transmit Data	O
4	N/C	-	N/C	-	Request to send	O	Request to send	O
5	N/C	-	N/C	-	Clear To Send	I	Clear To Send	I
6	Programming	I	N/C	-	N/C	-	N/C	-
7	Common	-	Common	-	Common	-	Common	-
8	N/C	-	N/C	-	N/C	-	N/C	-
9	N/C	-	N/C	-	N/C	-	N/C	-

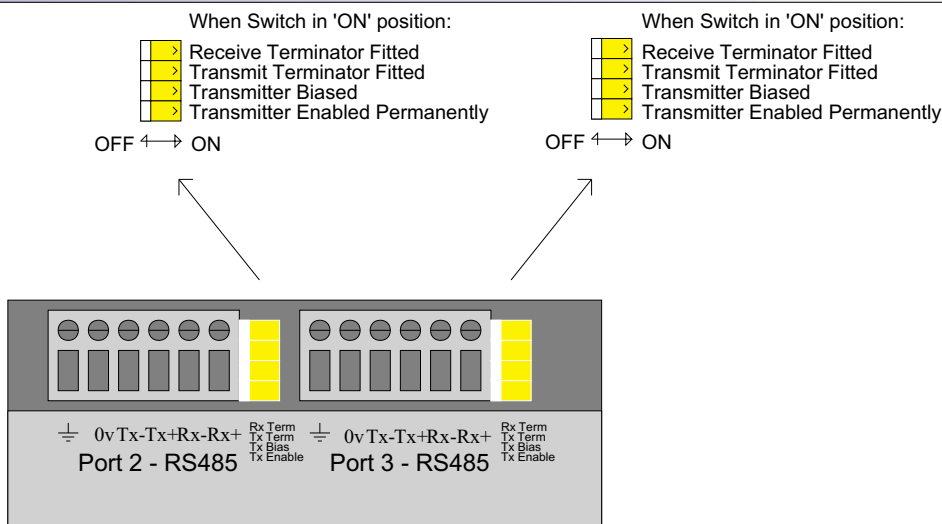
RS485 Communications Ports

RS485 is available on ports 2 and 3 of the BIS-100. The following points relating to RS485 should be noted;

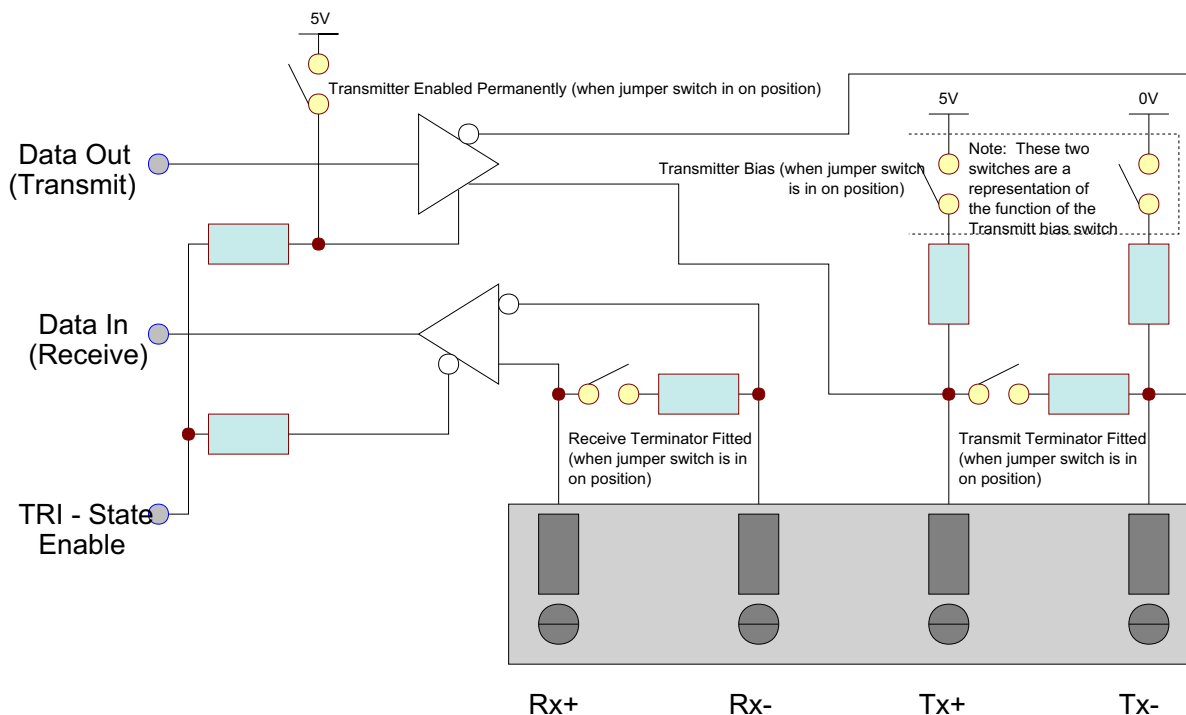
- RS485 allows up to 32 units to be connected together in a multidrop.
- The maximum cable length is 1200 metres.
- Stub lengths from a junction box to a BIS-100 should be no more than 500 mm.
- Use screened cable with twisted pairs.
- The screens should be continuous throughout the cable run and connected to a good earth at one end only.

A number of jumper switches allow users to configure terminating resistors and enable options for the transmitters and receivers of both ports.

The diagram below shows the position and function of each of the eight jumper switches.



RS485 Jumper Selection



Link	Link Fitted	Link Removed	Comments
Transmitter Enable	Transmitter Permanently enabled	Transmitter only enabled when the port is sending out data	Fit this link if the transmitter is only connected to one or more receivers. Do not fit the link if the transmitter is connected to other transmitters in a multidrop.
Transmitter Bias	Transmitter biased	Transmitter Tri State	Fit this link if you need to bias the transmitter lines to 5v and 0V (TxD+ and TxD- respectively)(via 620 resistors). This is useful in electrically noisy environments. Note: A maximum of two transmitters on any one multidrop network should have these links fitted.
Transmit Terminator	120 resistor fitted between Tx+ and Tx-	No resistor fitted	Fit terminating resistors to the devices at each end of the cable run only. If required
Receive Terminator	120 resistor fitted between Rx+ and Rx-	No resistor fitted	Fit terminating resistors to the devices at each end of the cable run only. If required

Changing the Battery

The internal battery can be replaced as follows.

- Disconnect the BIS-100 from all external connections and remove from panel.
- Undo 3 screws from each end of the case and remove the bottom cover.
- The battery can now be seen in it's holder on the smaller PCB (which is mounted on the main PCB) and replaced with one of the same type. If in doubt new batteries are available from your supplier.

NOTE: Depending on the state of charge of the old battery you have up to one minute to swap the batteries before volatile information (such as date/time and preserved facilities) is lost.



Fieldbus Modules (optional fitment)

The BIS-100 comes with the option of a Fieldbus module fitted. This will enable you to interface non Fieldbus equipment to a Fieldbus via the RS232 / RS485 ports and the Fieldbus module fitted to the BIS-100.

The modules can be retrospectively fitted by the user to enable different modules to be fitted should the need arise to connect to a different type of Fieldbus.

At present the Fieldbus types supported (each type requires a different module) are:

- * Profibus-DP (slave)
- * Profibus-DP (master)
- * DeviceNet
- * ControlNet
- * Canopen
- * Ethernet
- * Interbus-S
- * Modbus+

Profibus-DP (slave)

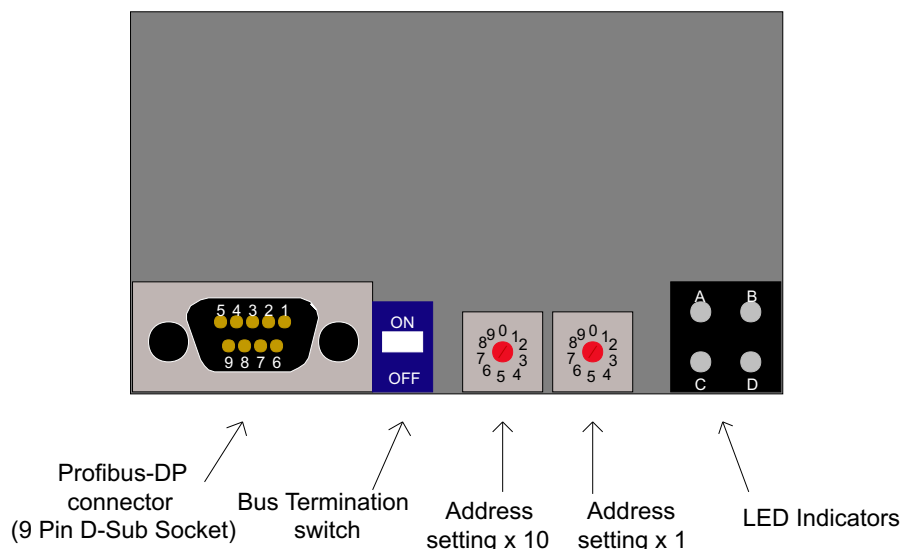
Overview:

The transmission media for the fieldbus is a shielded copper cable consisting of a twisted pair. The baudrate for the bus is between 9.6kbaud to the maximum of 12Mbaud. The Profibus-DP network can consist of 126 nodes and the total amount of data for Profibus-DP are 244 Bytes out per module and 244 Bytes in per module.

The maximum distance is 200m at 1.5 Mbit/s

Note: Node No. 126 is only used for commissioning purposes and should not be used to exchange user data.

Hardware connections etc.





Profibus-DP connector (9 Pin D-sub connector) pinout:

Pin	Name	Function
Housing	Shield	Connected to Protective Earth
1	Not Connected	-
2	Not Connected	-
3	B-Line	Positive RxD/TxD according to RS 485 specification
4	RTS	Request To Send *
5	GND BUS	Isolated GND from RS 485 side *
6	+5V BUS	Isolated +5V from RS 485 side *
7	Not Connected	-
8	A-Line	Negative RxD/TxD according to RS 485 specification
9	Not Connected	-

* +5V BUS and GND BUS are used for bus termination. Some devices such as optical transceivers (RS485 to fibre optics) may require an external power supply from these pins. RTS is used in some equipment to determine the direction of transmission. In normal applications only A-Line, B_line and Shield are used.

Termination Switch:

The end nodes in a Profibus-DP network have to be terminated to avoid reflections on the bus line. The termination switch is used to accomplish this.

Termination switch ON: Bus termination enabled.
If the module is the first or last module, the bus termination has to be set on, or an external termination connector has to be used.

Termination switch OFF: Bus Termination disabled

Note: If an external termination connector is used then the switch must be set in the OFF position.

Address Switches (used to set node address):

The node address of the module is set using the two rotary switches on the module, this enables the node address to be set to a number in the range 1 to 99 in decimal format. Looking at the module, the leftmost switch is used for the ten setting and the rightmost switch is used for the units.

For Example:

$$\text{Address} = (\text{Left Switch Setting} \times 10) + (\text{Right Switch Setting} \times 1).$$

Note: Please be aware that the node address can not be changed during operation.

LED Indicators:

The module is equipped with four indicator LEDs. The function of these is as follows:

LED	Colour	Function	Description
A	N/A	Not Used	-
B	Green	On-line	Indicates that the module is On-Line on the Fieldbus. green - Module is on line and data exchange is possible. Turned OFF - Module not On - Line
C	Red	Fieldbus Diagnostics	Flashing red 1 Hz - Error in configuration: In and/or OUT length set during initialisation of the module is not equal to the Length set during configuration of the network. Flashing red 2hz - Error in User Parameter data: The Length/contents of the User Parameter data set during initialisation of the module is not equal to the length/contents set During configuration of the network. Flashing red 4Hz - Error in initialisation of the Profibus communication ASIC.
D	Red	Off-line	Turned Off - No diagnostics present Indicates that the module is Off-Line on the fieldbus. Red - Module is off line and no data exchange is possible. Turned Off - Module is not Off - Line

Profibus-DP (master)

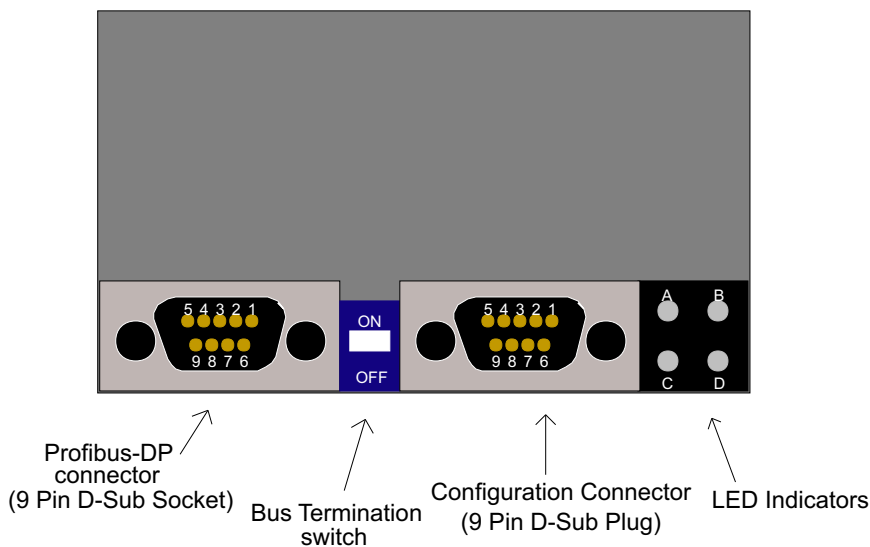
Overview:

The Profibus Master module operates as a master to a fieldbus network. The modules will support at least 8192 I/O points (4096 Inputs and 4096 Outputs) of process data and also have a structure for telegram services. On bus systems limited to a smaller amount of data or limited telegram function then the module will be limited to the same extent. The Profibus-DP module is configured using the PC based configurator program (available separately).

Technical Specifications

- * All baud rates from 9.6 kbit/s up to 12 Mbit/s supported.
- * Up to 124 Stations.
- * Maximum 512 bytes out of process data.
- * Maximum 512 bytes in of process data.

Hardware connections etc.



Profibus-DP connector (9 Pin D-sub connector) pinout:

Pin	Name	Function
1	Shield	Connected to Protective Earth
2	Not Connected	-
3	B-Line	-Positive RxD/TxD according to RS 485 specification
4	RTS	Request To Send
5	GND BUS	IGND
6	+5V BUS	+5V
7	Not Connected	-
8	A-Line	Negative RxD/Txd according to RS 485 specification
9	Not Connected	-

Termination Switch:

The end nodes in a Profibus-DP network have to be terminated to avoid reflections on the bus line. The termination switch is used to accomplish this.

Termination switch ON: Bus termination enabled.
If the module is the first or last module, the bus termination has to be set on, or an external termination connector has to be used.

Termination switch OFF: Bus Termination disabled
Note: If an external termination connector is used then the switch must be set in the OFF position.



Configuration Connector:

The configuration lead supplied with the PC compatible configuration program (order code KONF-PDP) is plugged into this connector. The other end of the lead is plugged into a suitable free 9 pin RS232 port (or 25 pin using a 9 to 25 way convertor) on the PC.

LED Indicators:

The module is equipped with four indicator LEDs. The function of these is as follows:

LED	Colour	Function	Description
A	Red	Error	When OFF - No errors detected. When ON - Error on communication line.
B	Green	Ready	When ON - Module OK 'Device Error' = 0. Flashing green 1Hz - No valid firmware stored in module's flash. Flashing green 4Hz - Hardware or system error. Or module firmware / configuration database download in progress.
C	Green	Token	When OFF - Hardware error. When ON - Profibus Master module owns Token.
D	Green	Run	Flashing green 4Hz - ready for communication. Acyclic flashing green - configuration error or fatal error*. When ON - Communication running.

*The acyclic flashing pattern repeats every 10 seconds.

Ethernet (Modbus / TCP)

Overview:

The Ethernet module implements Modbus/TCP over an Ethernet network and can be set up in several different ways by using the 'Fieldbus' page within Flex32. There are two main options within the 'Fieldbus' page, these being 'Normal' and 'Comms'.

'Normal': If this option is selected then the Ethernet module will work in the same fashion as the other Fieldbus modules that are available. You should set:

- The start number of registers to read in from the Fieldbus (note that this is the start number of registers within the BIS-100 that will contain the contents of the registers been read in from the Fieldbus).
- The number of registers to read in from the Fieldbus.
- The start number of registers to write out to the Fieldbus (note that this is the start number of registers within the BIS-100 that will be written out to the Fieldbus).
- The number of registers within the BIS-100 that will be written out to the Fieldbus.
- The update interval (this is the time between reads and writes to the Fieldbus by the BIS-100).

Modbus/TCP: In 'Normal' mode the module allows the BIS-100 to work as a Modbus / TCP server according to the Modbus / TCP specification 1.0. It is possible to use up to eight Modbus / TCP connections simultaneously.

The module supports all the Modbus commands according to class 0 and class 1 and some of the commands in class 2.



The Modbus commands supported by the module in 'Normal' mode are:

<u>Function Code</u>	<u>Function Name</u>	<u>Class</u>
1	Read coils	1
2	Read input discretes	1
3	Read multiple registers	0
4	Read input registers	1
5	Write coil	1
6	Write single register	1
7	Read exception status	1
15	Force multiple coils	2
16	Write multiple registers	0
22	Mask write register	2
23	Read / Write registers	2

For more information regarding the Modbus / TCP specification, visit the website: www.modicon.com/openmbus/.

Notes:

1. The input registers of the Ethernet module are from address 0 to 1023 (decimal), here any 'input data' that is sent to the Ethernet module is contained (e.g. write single register, write coil).
2. The output registers of the Ethernet module are from address 1024 to 2047 (decimal), here any 'output data' that is sent from the Ethernet module is contained (e.g. read coils, read multiple registers).

In notes 1 and 2 above the registers referred to are registers within the Ethernet module, NOT within the BIS-100.

Example 1: If you set the 'Start of registers to read in from Fieldbus to R100 and the number of registers to read in from Fieldbus to 100 then this will store data in registers R100 to R200 in the BIS-100 this corresponds to registers 0 to 99 within the Fieldbus module.

Example 2: If you set the 'Start of registers to write out to Fieldbus to R200 and the 'Number of registers to write out to Fieldbus' to 150 then data will be written from registers R200 to R350 within the BIS-100 to registers 1024 to 1174 within the Fieldbus module.

'Comms': If this option is selected then you have the options to implement various communication protocols over a TCP/IP Ethernet network. The options presently available are: 'Modbus RTU Slave' and 'Modbus (Flag map I/O)'.

'Modbus RTU Slave': This option implements a Modbus RTU slave over a TCP/IP Ethernet network. Standard Modbus RTU slave commands are directly implemented e.g. sending the command to force coil 1 on will result in output Q1 in the BIS-100 being switched on, sending the command to write a register will result in that register being written to within the BIS-100. You should set:

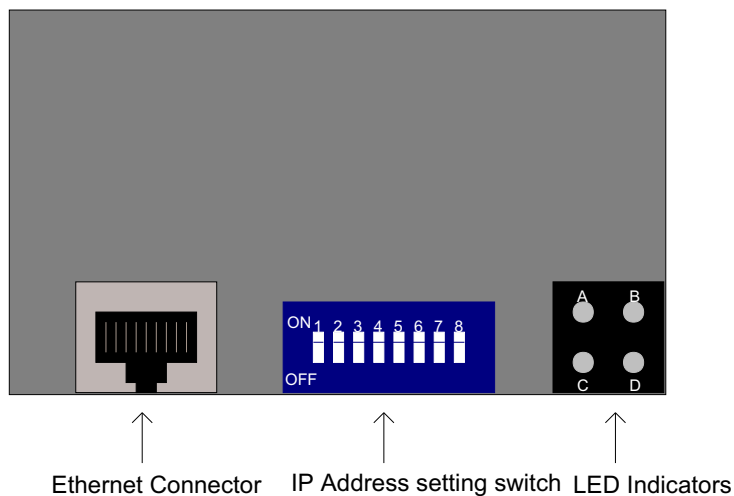
- The Modbus station number.

'Modbus (Flag Map I/O)': This option is the same as the Modbus RTU Slave above, but the physical I/O is mapped in flags within the BIS-100. You can have upto 1024 flags mapped as inputs and 1024 flags mapped as outputs. This is of use if, for example, you are interfacing a PLC with a large I/O count, via the BIS-100, to the Ethernet network. The BIS-100 can read and write I/O on the PLC via Modbus RTU on one of it's comms ports and the PLC's I/O is effectively mapped as virtual I/O within the BIS-100's flags. You should set:

- The Modbus station number.
- The starting point of the flags to be used as 'virtual' inputs.
- The starting point of the flags to be used as 'virtual' outputs.



Hardware connections etc.



Connection Cable:

The cable that should be used is normal CAT5 twisted pair Ethernet cable with RJ45 connector.

Configuration:

To configure the module for intranet use, use the DIP switch to configure the IP address.

The settings below are used:

IP address: 192.168.0.X
 Subnet mask: 255.255.255.0
 Gateway address: 0.0.0.0

The last byte 'X' in the IP address is set between 1 - 255 using the address setting DIP switch on the module. The MSB is switch number 1 (the left most switch).

Example: If switches 8,6 and 3 were set to the 'ON' position then the byte 'X' would be set to a value of 37. The IP address for the module will therefore be: 192.168.0.37.

Note: The last byte 'X' should not be set to 0.

LED Indicators:

The module is equipped with four indicator LEDs. The function of these is as follows:

LED	Colour	Function	Description
A	Green	Link	When ON - Module connected to an Ethernet.
B	Green/ Red	Status	Flashing green 1Hz - Indicates that used IP address has not been set by the value on the DIP switches.
			Flashing red 1Hz - The Ethernet MAC address is not correct. The module will not be able to initialise.
			Flashing red 2hz - The module failed to load Ethernet configuration from its flash RAM.
C	Green	Activity	Steady green - No activity.
			Flashes from green to off - The LED flashes from green to off when a packet of data is received or transmitted.
D	Green	Connections	Indicates the number of Modbus / TCP connections that are established to the module. The number of flashes indicates the number of connections. The LED turns off for a short period then repeats the number of flashes.



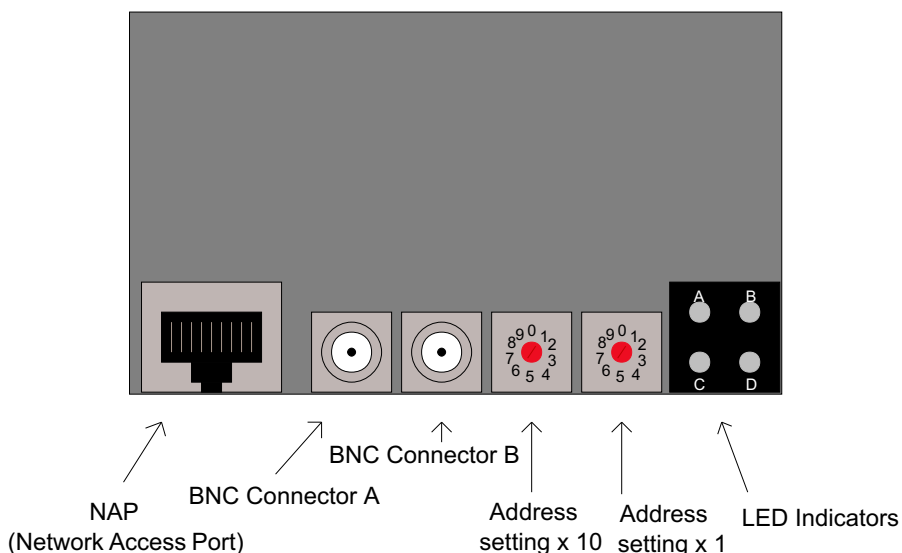
ControlNet

Overview:

The media for the fieldbus is a RG-6 quad shielded cable with support for media redundancy. Flexibility in topology options (bus, tree, star) to meet various application needs. ControlNet's high-speed (5 Mbits/s) control and data capabilities significantly enhance both time - critical I/O performance and messaging data, including upload/download of programming, configuration data and peer-to-peer messaging.

The module is classified as a ControlNet adapter, i.e. it can not originate connections on it's own but a scanner node can open a connection towards it. The size of the connection can be up to 450 bytes in either direction.

Hardware connections etc.



Network Access Port (NAP):

The Network Access Port (NAP) is available for temporary connection of various configuration tools e.g. APC card. The minimum Network Update Time (NUT) of the module is 5ms

BNC connectors A and B:

The module has two BNC connectors for connection to ControlNet. If redundant operation is desired, both connectors are used, otherwise connector A or connector B is used.

Address Switches (used to set MacID (node address)):

The MacID (node address) of the module is set using the two rotary switches on the module, this enables the node address to be set to a number in the range 1 to 99 in decimal format. Looking at the module, the leftmost switch is used for the ten setting and the rightmost switch is used for the integers.

For Example:

$Address = (Left\ Switch\ Setting \times 10) + (Right\ Switch\ Setting \times 1).$

LED Indicators:

The module is equipped with four indicator LEDs. The function of these is as follows:



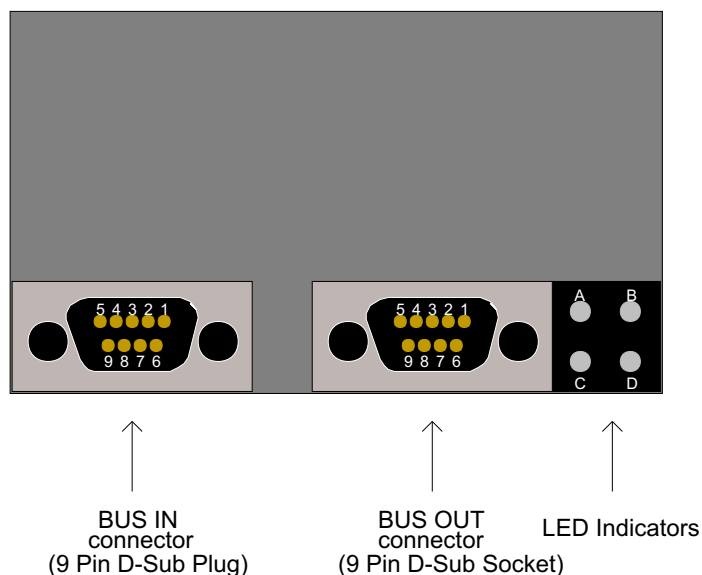
LED	Colour	Function	Description
A	Red/ Green	Module Status	Flashing green - Module is waiting for initialisation. Steady green - Module is initialised. Flashing red - Minor fault, MacID has been changed after initialisation etc. Steady red - Major fault, module must be restarted.
B&D	Red/ Green	Channel LED's	B is Channel A LED D is Channel B LED LED B&D steady off - module is not initialised. LED B&D steady red - Faulty unit must be restarted or repaired LED B&D alternating red/green - Selftest of bus controller LED B&D flashing red/off - Incorrect node configuration, duplicate MacID etc. LED B or D steady off - relevant channel disabled, depending on network configuration LED B or D steady green - Normal operation of channel LED B or D flashing green/off - Temporary errors (node will self correct) or node is not configured to go online LED B or D flashing red/off - media fault or no other nodes on the network
C	Green	Module Owned	LED B or D flashing red/green - Incorrect network configuration LED steady green - a connection is opened against the module LED off - no connection opened

Interbus-S

Overview:

The media for the Fieldbus is a shielded copper cable consisting of three twisted pairs. Two of these pairs are used for the bus connection and in the last pair there is only one cable used. This cable is used for the ground connection of the bus. The baudrate for the bus is 500kbit/s and the total amount of data for Interbus is 4096 I/O points. The module is a slave node and can be read and written to, from an Interbus master. The module will not initiate communication to other nodes, it will only respond to incoming commands.

Interbus has two ways of exchanging data. One through fast cyclic I/O data, called process data and one through a somewhat slower protocol called PCP. The module can support up to 10 words on the bus, out of which none, one, two or four words can be selected to be the PCP-channel needed if this protocol is desired. The PCP version supported by the module is version 2.0.



BUS-IN (9 Pin D-sub plug) pinout:

Pin	Name	Function
1	DO1	Positive Data Out
6	/DO1	Negative Data Out
2	DI1	Positive Data In
7	/DI1	Negative Data In
3	GND	Ground
HOUSING	PE	Protective Earth

BUS-OUT (9 Pin D-sub socket) pinout:

Pin	Name	Function
1	DO2	Positive Data Out
6	/DO2	Negative Data Out
2	DI2	Positive Data In
7	/DI2	Negative Data In
3,5	GND	Ground
9	RBST	Bus Terminator
HOUSING	PE	Protective Earth

Note: Always connect RBST to GND if it is not the last module on the bus. If the RBST is not connected to GND on the output connector, the module will terminate the outgoing bus.

LED Indicators:

The module is equipped with four indicator LEDs. The function of these is as follows:

LED	Colour	Function	Description
A	Red	Remote Bus Disable	LED lights red when outgoing bus is switched off
B	Green	Transmitt/Receive	LED lights green when PCP communication is carried out over the Interbus
C	Green	Bus Active	LED lights green when monitoring layer 2
D	Green	Cable Check	LED lights green if the cable connection is good and the Interbus master is not reset

DeviceNet

DeviceNet is used for industrial automation, normally for the control of valves, sensors and I/O units, and other automation equipment. The DeviceNet link is based on a broadcast - oriented, communications protocol, the Controller Area Network (CAN).

The transmission media for the DeviceNet fieldbus is a shielded copper cable comprising of one twisted pair and two cables for external power supply. The baud rate can be changed between 125k, 250k and 500kbit/s.

The DeviceNet module is implemented according to the ODVA (Open DeviceNet Vendor Association) specification for a communication adapter (profile no 12), it acts as a 'group two only server' on the DeviceNet network.

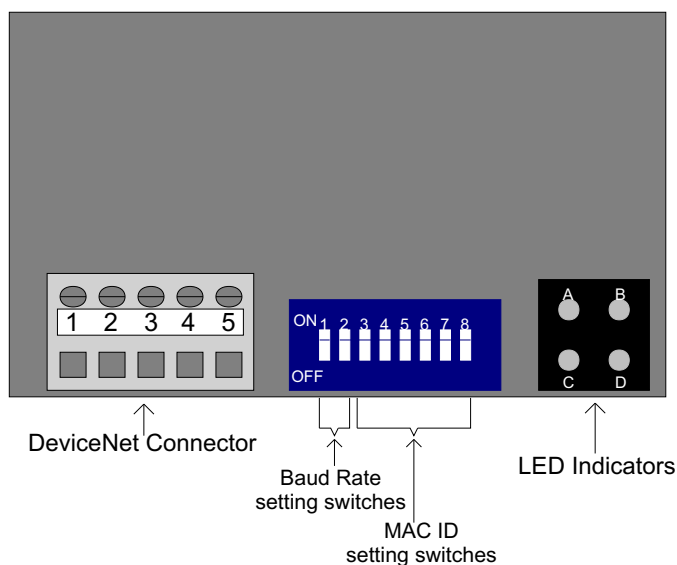
Connections supported:

- 1 Explicit
- 1 Polled I/O
- 1 Bit - Strobed I/O
- 1 Change of state / cyclic I/O.

Baud rate and Mac ID can be set by the Dip switch.



Hardware connections etc.



DeviceNet Connector Pin Descriptions:

Pin	Description
1	V-
2	CAN_L
3	SHIELD
4	CAN_H
5	V+

DIP Switch settings:

The DIP switch is used to set the baud rate and also the MAC ID as described below:

BAUD RATE: There are three different baud rates for DeviceNet, these are 125k, 250k and 500kbit/s. Choose the required baud rate using the DIP switches 1 and 2 as required. Make the setting before turning the BIS-100 on.

Baud rate bit/sec	DIP 1-2
125k	00
250k	01
500k	10
Reserved	11

MAC ID: The node address (Mac ID) is set using the DIP switches 3 to 8, DIP switch 3 is the most significant bit and DIP switch 8 is the least significant bit. Make the setting before turning the BIS-100 on.

Address	DIP 3-8
0	000000
1	000001
2	000010
3	000011
....
62	111110
63	111111

LED Indicators:

The module is equipped with four indicator LEDs. Two of the LEDs are reserved and currently perform no function.

LED	Colour	Function	Description
A	N/A	Reserved	Reserved - currently performs no function.
B	Green/Red	Network Status	LED - steady off: Not powered / not on line. LED - steady green: Link OK on line, connected. LED - steady red: Critical Link failure. LED - flashing green: On line not connected. LED - flashing red: Connection time out.
C	N/A	Reserved	Reserved - currently performs no function.
D	Green/Red	Module Status	LED - steady off: No power on module (BIS-100 probably off) LED - steady red: Unrecoverable fault LED - steady green: Device operational LED - flashing red: Minor fault



Configuration:

In the DeviceNet network each node has a MAC ID (the node's address in the network). The MAC ID is a number between 0 and 63. Each node's MAC ID must be unique in the network because it is used to address the node.

It is also possible to configure the baud rate. All nodes in the network must be set to the same baud rate.

Termination:

Termination of the fieldbus requires a terminating resistor at each end of the fieldbus. These resistors should have a value of 121

Optional Modem

The BIS-100 can also additionally be fitted with a 2400bps BABT compliant modem to enable you to connect the BIS-100 to the telephone network. The modem fits inside the BIS-100 with a standard RJ11 connection accessible on the side of the BIS-100 case.

The modem occupies communication port 1 and it is therefore recommended that port 1 RS232 port is not used if the modem is fitted.

EMC Compliance

The BIS-100 is fully tested and CE marked in accordance with the following standards:

- | | | | |
|--------------------------|--------------------|------|--|
| <input type="checkbox"/> | BS EN55022 class A | 1995 | Emissions standard for ITE industrial applications. |
| <input type="checkbox"/> | BS EN50082-2 | 1995 | Generic immunity standard for industrial applications. |
| <input type="checkbox"/> | BS EN61000-4-2 | 1995 | ESD requirements. |
| <input type="checkbox"/> | BS EN61000-4-3 | 1997 | Radiated susceptibility. |
| <input type="checkbox"/> | BS EN61000-4-4 | 1995 | Electrical Fast Transient Burst requirement. |
| <input type="checkbox"/> | BS EN61000-4-5 | 1995 | Surges requirements. |
| <input type="checkbox"/> | BS EN61000-4-6 | 1996 | Conducted susceptibility. |
| <input type="checkbox"/> | BS EN61000-4-11 | 1994 | Voltage Dips and Interruptions. |
| <input type="checkbox"/> | ENV5024 | 1996 | RF EM field Keyed carrier. |

following the provisions of EU EMC Directive (s) 89/336/EEC and 92/31/EEC.

Installation

The BIS-100 is mounted by four M5 keyhole slots on centres of 254.2 mm by 90 mm. It is recommended that a minimum gap of 60 mm be provided from the outside of the BIS-100 case to any trunking around it. It is also recommended that high voltage and high current cables be routed elsewhere in the panel to avoid running next to the BIS-100.

Note: Ensure screw terminals are fully un-screwed before inserting wire and tightening the screw. The reason for this is if the screw is screwed up and then the wire is inserted then the wire will go underneath the saddle clamp of the terminal which may not be initially obvious but will be an unreliable connection. To test for a secure connection, tug the wire and check that it can not be removed after tightening up the terminal screw.



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Order Codes

<u>Description</u>	<u>Part Number</u>
BIS-100, programmable interface unit with socket ready to accept your chosen Fieldbus module.	BIS-100
Profibus-DP slave, plug-in kit.	BIS-100P
Profibus-DP plug-in kit (also requires configuration software).	BIS-100MP
Profibus-DP master configuration software.	KONF-PDP
DeviceNet plug-in kit.	BIS-100D
ControlNet plug in kit.	BIS-100C
Canopen plug in kit.	BIS-100CO
Ethernet plug-in kit.	BIS-100E
Interbus-S plug-in kit.	BIS-100I
Modbus+ plug-in kit.	BIS-100M+
Factory fitted 2400 baud data modem.	BIS-100-TEL

COLTER GROUP COLTER PRODUCTS LIMITED

UNIT 7, ZONE C
CHELMSFORD ROAD INDUSTRIAL ESTATE
DUNMOW
ESSEX
CM6 1HD

Telephone: + 44 (0) 1371 876887
Fax: + 44 (0) 1371 875638

E-Mail: sales@coltergroup.co.uk
Web Site: www.coltergroup.co.uk

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