



**Extension (slave) Rack Extender Module
Used to connect extension racks to
master rack
Uses optical fibre interconnection
between racks**

Introduction

The 400-BUS-S module provides connectivity to remote extension racks to the rack containing the 400-CPU module and the 400-BUS-M. Upto a maximum of 15 extension racks can be connected to the main rack using 400-BUS-S modules in each extension rack. Extension racks can only contain digital I/O modules and analogue I/O modules no other type of modules may be used in an extension rack. Only the 400-CPU-B and 400-CPU-C support extension racks and so only they can use the 400-BUS-M.
(Please see separate data sheet for more information on the CPU modules).

General Specifications

Storage temperature	-20 to +70 °C
Operating temperature	0 to 55 °C
Humidity	10-90% non condensing
Weight	490g approx
Dimensions	Standard FMT-400 size single width module
Current consumed from rack	TBA mA from rack power supply
Fibre Optic Interconnection	Plastic Optical Fibre interconnection, each module supplied with a 2M cable as standard
Max distance between extension racks	40M between each rack
Compatible 400-CPU modules	400-CPU-B, 400-CPU-C In main rack connected to 400-BUS-S via a 400-BUS-M and optical fibre
Max number of extension racks	15

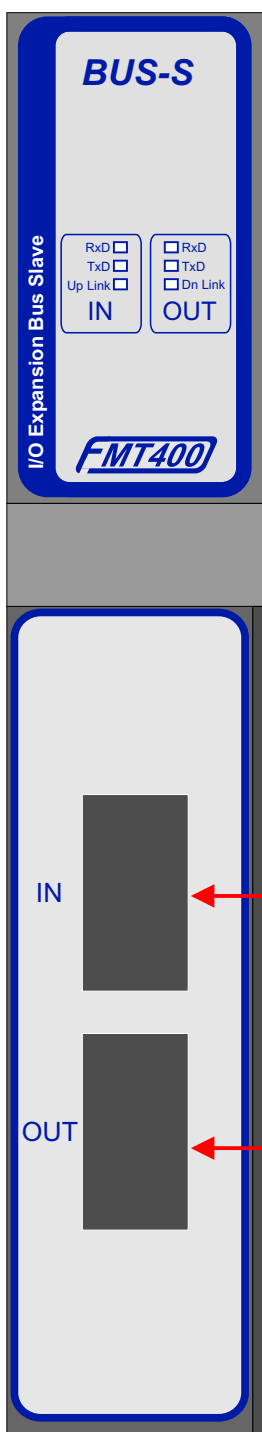




Connection Details

Connections should be made to the 400-BUS-S in the following manner. The optical fibre cable that is supplied is plugged into the 'OUT' connection on the front of the 400-BUS-S. The other end of the cable is then plugged into the 'IN' connector on the front of the next 400-BUS-S module in the next extension rack. If the 400-BUS-S module is in the first extension rack then it's 'IN' connector should be connected to the 'OUT' connector of the 400-BUS-M module.

Note: The standard length cable supplied with the module is 2M long. Other cable lengths are available. Please contact Colter or your supplier if you require a different length cable.



Optical Fibre 'IN' connector. Connect to the 'OUT' connector of the 400-BUS-M or the 'OUT' connector of the previous 400-BUS-S

Optical Fibre 'OUT' connector. Connect to the 'IN' connector of the next 400-BUS-S or leave unconnected if the module is in the last extension rack.

LED Descriptions

Label		Colour	Description
RxD	'IN'	Green	Flashes when I/O data is received from the extension rack or main rack that are before this 400-BUS-S in the 'daisy chain'. At high data rates this LED may appear to be continuously illuminated.
TxD	'IN'	Red	Flashes when I/O data is sent to extension racks or main racks that are before this 400-BUS-S in the 'daisy chain'. At high data rates this LED may appear to be continuously illuminated.
RxD	'OUT'	Green	Flashes when I/O data is received from extension racks that are after this 400-BUS-S in the 'daisy chain'. At high data rates this LED may appear to be continuously illuminated.
TxD	'OUT'	Red	Flashes when I/O data is sent to extension racks or main racks that are after this 400-BUS-S in the 'daisy chain'. At high data rates this LED may appear to be continuously illuminated.
Up Link		Yellow	Illuminates when there is a successful data connection between this 400-BUS-S and further extension racks (further 400-BUS-S's) in the 'daisy chain'.
Dn Link		Yellow	Illuminates when there is a successful data connection between this 400-BUS-S and previous extension racks (previous 400-BUS-S's) in the 'daisy chain'.

Note: Up Link and Dn Link flash alternatively if the optic fibre cable is the wrong way around ie 'OUT' connected to 'OUT'

Usage of the 400-BUS-S module

The main rack is connected to the extension racks by 'daisy chaining' them together. A 400-BUS-M module should be placed in the right most position of the main rack (I/O position 10), the main rack can be either a RACK-400F or a RACK-400H. The 400-BUS-M module is set up using Flex32's rack configuration screen like any other module. After deciding on the number of extension racks to be used (these can be either a RACK-400F or a RACK-400H in any order) the 400-BUS-S module should be placed in each extension rack in the position normally occupied by the 400-CPU module. The extension racks should be linked together using the optical fibre cable supplied. The 400-BUS-M 'OUT' connection should be connected to the first extension rack's 400-BUS-S 'IN' connector, the first extension rack's 400-BUS-S 'OUT' connector should then be connected to the second extension rack's 400-BUS-S module 'IN' connector and so on.

This process should be repeated until all extension racks have been connected together. No termination is necessary at the last rack in the 'daisy chain'

Please see page 4 for a graphical interpretation.

The extension racks are also configured in your Flex32 project in the same way as the main rack.

I/O whether digital or analogue is treated simply as normal I/O from within your user program. The fact that you may be using I/O in an extension rack is transparent to your user code.

IMPORTANT NOTE: The rubber bungs fitted in the optical fibre connectors on the module must always be fitted if the optic fibre cable is not plugged in.





I/O Update Times In Remote Racks

I/O update times for digital and analogue I/O are shown below:

Digital I/O Update Times:

1. For Systems utilising **upto 256 Digital Outputs and 256 digital inputs (Q0-255, I0-255)** the minimum digital output or input update time is **0.1mS to 4mS**. (This will be referred to as system 1 in this datasheet).
2. For Systems utilising **upto 512 Digital Outputs and 512 digital inputs (Q0-511, I0-511)** the minimum digital output or input update time is **0.1mS to 7.5mS**. (This will be referred to as system 2 in this datasheet).
3. For Systems utilising **upto 1024 Digital Outputs and 1024 digital inputs (Q0-1023, I0-1023)** the minimum digital output or input update time is **0.1mS to 14.5mS**. (This will be referred to as system 3 in this datasheet).

IMPORTANT: If the a system setup has an I/O address greater than 255 then this will result in a minimum I/O update time as in system 2.
If a system setup has an I/O address greater than 511 then this will result in a minimum I/O update time as in system 3.

Typical Analogue I/O Update Times:

The typical analogue I/O update time is **76mS**. This is applicable to systems 1, 2 and 3.

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Order Codes

Part Number
400-BUS-S

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