



Fiber Optic Card Access Hardware User Manual

FOCA-STX

FOCA-SCX

EXPCA

Version 1.0.0

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Overview

This user manual is for Fiber Optic Card Access product series FOCA-STX, FOCA-SCX, and EXPCA. These products allow the user to extend the maximum distance between card readers and access control panels by utilizing a long range fiber optic connection. In addition to much longer distances, the fiber optic cables provide electric isolation and immunity to electrical transients providing safe and secure inter-building connectivity. The FOCA series comes as a kit with both local and remote units, and can easily be expanded using EXPCA modules.

Interface

- D0/D1 – Access control Data line
- LED
- Relays x 4
- EXP – Expansion bus for adding EXPCA port expander modules

Switch Properties

- Up to 16K MAC Address Table supported
- Up to 9216bytes Jumbo Frame supported
- Up to 12Mbits Packet Buffer supported

Power Input

- 8-16VDC @300ma

Temperature

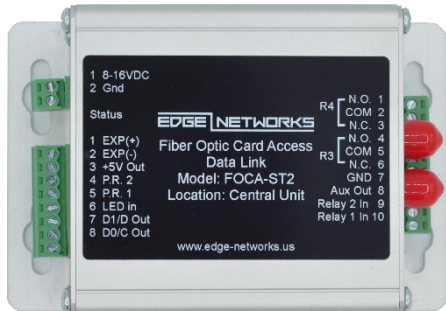
- Operating temperature: -30°C ~ 60°C (-22°F ~ 140°F)
- Storage temperature: -40°C ~ 85°C (-40°F ~ 185°F)

Mechanical Construction

- Aluminum Class IP30 protection
- Wall Mounting

Hardware Description

PRODUCT IMAGES



FOCA-ST2 – Central Unit



FOCA-ST2 – Remote Unit



EXPCA – Central Unit

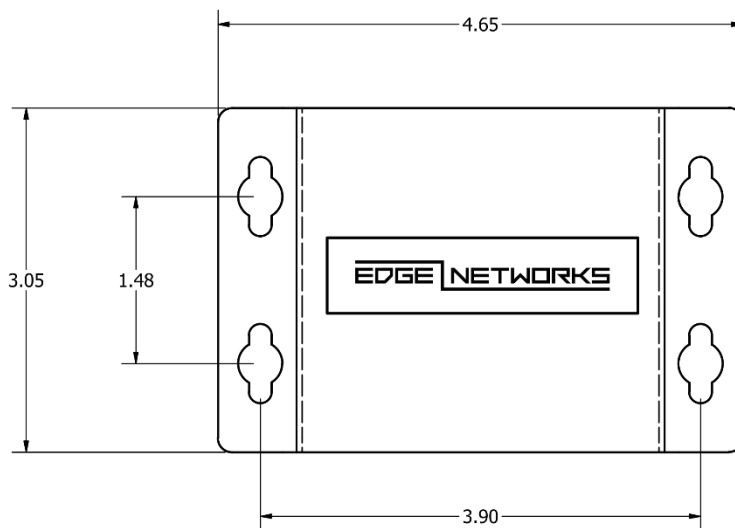


EXPCA – Remote Unit

DIMENSIONS

FOCA modules: 4.65" x 3.05" x 2" (WxLxH)

EXPCA modules: 4.65 x 3.05 x 1" (WxLxH)



PINOUTS

FOCA – Central Unit

Connector	Pin #	Name	Pin Type	Description
Power	1	VDC	Power	DC input 8-16VDC
Power	2	GND	Power	DC Return Connect to Access Control Panel GND
Data	1	EXP+	I/O	Expansion Bus + Connects to EXPCA if used
Data	2	EXP-	I/O	Expansion Bus - Connects to EXPCA if used
Data	3	+5V Out	Power	5V Bias Voltage
Data	4	PR2	Input	Program Resistor 2
Data	5	PR1	Input	Program Resistor 1
Data	6	LED IN	Input	Connect to LED OUT on Access Control Panel
Data	7	D1/D	Output	Data 1 – Connect to Access Control Panel
Data	8	D0/C	Output	Data 0 – Connect to Access Control Panel
Relay	1	R4 N.O.	Output	Relay 4 - Normally Open Output
Relay	2	R4 COM	Output	Relay 4 – Common Output
Relay	3	R4 N.C.	Output	Relay 4 - Normally Closed Output
Relay	4	R3 N.O.	Output	Relay 3 - Normally Open Output
Relay	5	R3 COM	Output	Relay 3 – Common Output
Relay	6	R3 N.C.	Output	Relay 3 - Normally Closed Output
Relay	7	GND	Power	Signal Ground
Relay	8	Aux Out	Output	Auxiliary Output
Relay	9	R2 In	Input	Relay 2 Input
Relay	10	R1 In	Input	Relay 1 Input

FOCA – Remote Unit

Connector	Pin #	Name	Pin Type	Description
Power	1	VDC	Power	DC input 8-16VDC
Power	2	GND	Power	DC Return Connect to Card Reader GND
Data	1	EXP+	I/O	Expansion Bus + Connects to EXPCA if used
Data	2	EXP-	I/O	Expansion Bus - Connects to EXPCA if used
Data	3	+5V Out	Power	5V Bias Voltage
Data	4	R4	Input	Analog Relay 4 input (default)
Data	5	R3	Input	Analog Relay 3 input (default)

Data	6	LED OUT	Output	Connect to LED IN on Card Reader
Data	7	D1/D	Input	Data 1 – Connect to Card Reader
Data	8	D0/C	Input	Data 0 – Connect to Card Reader
Relay	1	R2 N.O.	Output	Relay 2 - Normally Open Output
Relay	2	R2 COM	Output	Relay 2 – Common Output
Relay	3	R2 N.C.	Output	Relay 2 - Normally Closed Output
Relay	4	R1 N.O.	Output	Relay 1 - Normally Open Output
Relay	5	R1 COM	Output	Relay 1 – Common Output
Relay	6	R1 N.C.	Output	Relay 1 - Normally Closed Output
Relay	7	GND	Power	Signal Ground
Relay	8	Aux In	Input	Auxiliary Input
Relay	9	R4D	Input	Digital Relay 4 input
Relay	10	R3D	Input	Digital Relay 3 input

EXPCA – Central Unit

Connector	Pin #	Name	Pin Type	Description
Power	1	VDC	Power	DC input 8-16VDC
Power	2	GND	Power	DC Return Connect to Access Control Panel GND
Data	1	EXP+	I/O	Expansion Bus + Connect to FOCA Central Unit
Data	2	EXP-	I/O	Expansion Bus - Connect to FOCA Central Unit
Data	3	+5V Out	Power	5V Bias Voltage
Data	4	PR2	Input	Program Resistor 2
Data	5	PR1	Input	Program Resistor 1
Data	6	LED IN	Input	Connect to LED OUT on Access Control Panel
Data	7	D1/D	Output	Data 1 – Connect to Access Control Panel
Data	8	D0/C	Output	Data 0 – Connect to Access Control Panel
Relay	1	R4 N.O.	Output	Relay 4 - Normally Open Output
Relay	2	R4 COM	Output	Relay 4 – Common Output
Relay	3	R4 N.C.	Output	Relay 4 - Normally Closed Output
Relay	4	R3 N.O.	Output	Relay 3 - Normally Open Output
Relay	5	R3 COM	Output	Relay 3 – Common Output
Relay	6	R3 N.C.	Output	Relay 3 - Normally Closed Output
Relay	7	232 Out	Output	RS232 connection

Relay	8	232 In	Input	RS232 connection
Relay	9	GND	Power	Signal Ground
Relay	10	Aux Out	Output	Auxiliary Output
Relay	11	R2 In	Input	Relay 2 Input
Relay	12	R1 In	Input	Relay 1 Input

EXPCA – Remote Unit

Connector	Pin #	Name	Pin Type	Description
Power	1	VDC	Power	DC input 8-16VDC
Power	2	GND	Power	DC Return Connect to Card Reader GND
Data	1	EXP+	I/O	Expansion Bus + Connect to FOCA Remote unit
Data	2	EXP-	I/O	Expansion Bus - Connect to FOCA Remote unit
Data	3	+5V Out	Power	5V Bias Voltage
Data	4	R4 in	Input	Relay 4 input
Data	5	R3 in	Input	Relay 3 input
Data	6	LED out	Output	Connect to LED IN on Card Reader
Data	7	D1/D	Input	Data 1 – Connect to Card Reader
Data	8	D0/C	Input	Data 0 – Connect to Card Reader
Relay	1	R2 N.O.	Output	Relay 2 - Normally Open Output
Relay	2	R2 COM	Output	Relay 2 – Common Output
Relay	3	R2 N.C.	Output	Relay 2 - Normally Closed Output
Relay	4	R1 N.O.	Output	Relay 1 - Normally Open Output
Relay	5	R1 COM	Output	Relay 1 – Common Output
Relay	6	R1 N.C.	Output	Relay 1 - Normally Closed Output
Relay	7	232 Out	Output	RS232 Connection
Relay	8	232 In	Input	RS232 Connection
Relay	9	GND	Power	Signal Ground
Relay	10	Aux In	Input	Auxiliary Input
Relay	11	NC		No Connection
Relay	12	NC		No Connection

LED INDICATORS

Status LED

Color	Status	Description
OFF	No Power	Check Power supply connection and voltage 8-16VDC
Flashing Green	Normal	When Central and Remote units are connected and communicating, the Status LED will flash after every polling cycle. The speed will depend on the number of EXPCA modules connected and should be about 1 flash per second with the maximum of 7 EXPCA's connected.
Flashing Green/RED	Communication Failure	Central and Remote units are not communicating. Check fiber optic connections. In 2 fiber modules, make sure Fibers are swapped (TX-RX and RX-TX)
Solid Green	Config Mode	Settings successfully applied. Power cycle unit and return to Run mode (see config section for details)
	Run Mode	EXPCA Comm error. Check power to EXPCA's and connection bus

OPERATING MODES

DIP SWITCHES

To configure the unit, the internal DIP switches must be accessed. To do this, remove the 4 phillips screws on one of the endplates and slide the circuit card assembly out. DIP switches are located on the main board as shown below. By default, all switches are in the OFF state on the Remote units, and all are OFF in the Central units except switch 3 which is ON.

Run Mode

Run mode is used during normal operation of units. In this mode, you can change common settings without having to power cycle the units.

DIP Switch Settings in Run Mode:

DIP Switch	Name	Setting	Description
1	Mode	OFF	RUN Mode
2	Remote Relay (Set on Central unit only)	OFF	Analog Input on Remote unit
		ON	Digital Input on Remote unit
3	Location	OFF	Remote
		ON	Central
4	Supervision Relay	OFF	Disable (default)
		ON	Enable
5	Pullup Resistor	OFF	Disable (default)
		ON	Enable
6,7,8	# of EXPCA's	0 0 0	None (default)
		0 0 1	1 EXPCA Connected on each end
		0 1 0	2 EXPCA's Connected on each end
		0 1 1	3 EXPCA's Connected on each end
		1 0 0	4 EXPCA's Connected on each end
		1 0 1	5 EXPCA's Connected on each end

	1 1 0	6 EXPCA's Connected on each end
	1 1 1	7 EXPCA's Connected on each end

Configuration Mode

In this mode, the link type and interface type can be changed. These changes are recorded on power up. To configure the unit, first power the unit OFF, and set Mode switch ON and the other switches according to the desired type and interface below. Then power ON the unit and wait for GREEN Status LED to indicate the changes have been recorded. Power the unit OFF again and return the Mode switch to RUN mode.

DIP Switch Settings in Config Mode:

DIP Switch	Name	Setting	Description
1	Mode	ON	CONFIG Mode
2	Not Used	OFF	Switch should remain in OFF position
3,4,5	Link Type	0 0 0	No Change
		0 1 0	Fiber Optic
6,7,8	Interface	0 0 0	No Change
		0 0 1	Wiegand
		0 1 0	Wiegand No Filter
		0 1 1	Strobed Rising (MR5)
		1 0 0	Strobed Rising (Dorado 644)
		1 0 1	Strobed Rising (Mag Tek)
		1 1 0	Strobed Falling
		1 1 1	Unsupervised F/2F

Test Mode

Test mode is used for troubleshooting the connection from the panel to the reader. It operates as normal, but the Central unit outputs a test card read every few seconds, and the Remote unit briefly triggers Relay 2 when detecting data. Either unit or both can be placed into Test mode.

DIP Switch Settings in Test Mode:

DIP Switch	Name	Setting	Description
1,2	Mode	ON ON	TEST Mode
3	Location	OFF	Remote
		ON	Central
4	Supervision Relay	OFF	Disable (default)
		ON	Enable
5	Pullup Resistor	OFF	Disable (default)
		ON	Enable
6,7,8	# of EXPCA's	0 0 0	None (default)
		0 0 1	1 EXPCA Connected on each end
		0 1 0	2 EXPCA's Connected on each end
		0 1 1	3 EXPCA's Connected on each end
		1 0 0	4 EXPCA's Connected on each end
		1 0 1	5 EXPCA's Connected on each end
		1 1 0	6 EXPCA's Connected on each end
		1 1 1	7 EXPCA's Connected on each end

Installation

1. Configure the Unit (Optional)

If necessary, configure unit to proper interface. Following the directions in Configuration Mode, set the interface to match the access panel you are using. By default units are set to Weigand so if you are using this format, you can skip this step.

2. Connect Data and LED signals

Connect the Central unit to your access panel, and your Remote unit to your Card Reader as shown.

(add pic of setup)

3. Connect Fiber Optic Cables

Depending on the unit that you have, you may either have ST or SC connectors and either 1 or 2 fibers. If you have a 2 fiber module, it is important to cross the cables so that the TX port on one module connects to the RX port on the opposite module

Add pic

4. Power up and test the units

5. Add additional connections (optional)

Relay support examples

The FOCA modules include two independent bi-directional relays for general purpose use. Most commonly, a forward relay (Central -> Remote) is used for a door strike near the card reader. This can be provided using the dry contact output on the panel if available and wired as shown below, or using the LED signal to drive the Relay input as shown in fig x below.

Additional relays are available as shown.

Program resistors

The FOCA module allows for connectivity to “supervised” contacts that use resistors in series and parallel with the contact to determine if the contact is open, closed, shorted, or cut. Typically 1K resistors are used, but other values are possible.

The FOCA module will compare the resistance at the PROG RES input pins to the normal state of the supervised relay, and trigger on a change. Thus, the configuration is different for a normally closed contact, vs a normally open one. In the example shown below, the standard impedance of the N.C. relay would be 1K, where a N.O. contact would be 2K. Connections would be shown as below. To mimic the impedance of the contacts, resistors must also be added on the relay outputs as shown.

6. Add Expansion Units (optional)

If your system has multiple card readers that need to be extended, they can all be run over the same fiber using EXPCA units. Each EXPCA pair can add one car reader and you can add up to 7 EXPCA units for a total of 8 card readers over one FOCA link.

By default, the FOCA units are configured for 0 EXPCA pairs being used. For proper operation, FOCA modules (both Central and Remote) should be configured for the number of EXPCA's connected as detailed in RUN mode configuration using DIP switches 6,7,8.

Next, each EXPCA needs to be addressed. It is required to address them in order starting with ID #1 and continuing sequentially for each EXPCA pair. This is done by accessing the DIP switches in the EXPCA and setting them as shown below.

Connect EXPCA to the panel and card reader as done with the base FOCA modules

Lastly, the EXPCA's are all daisy chained to the FOCA module using the RS485 Expansion bus labeled EXP+ / EXP-

Notes: EXPCA modules work only in Weigand interface type

Supervision relay (if enabled) will indicate alarm condition if any of the EXPCA's fail to communicate with each other.

LED's are different

Troubleshooting