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IFS MC250-4T/1CXT
User Manual

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Manufacturer UTC Fire & Security Americas Corporation, Inc.
2955 Red Hill Avenue, Costa Mesa, CA
92626-5923, USA

EU Authorized EU manufacturing representative:
UTC Fire & Security B.V.
Kelvinstraat 7, 6003 DH Weert, Netherlands

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Certification CE N4131

FCC compliance **Class A:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canada This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

ACMA compliance **Notice!** This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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Contents

Overview 1
Package Contents 1
Ethernet over VDSL2 Bridge Description 1
Key Features 3

Hardware Overview 4

LED Indicators 5
System 5
VDSL/BNC 5
10/100Base-TX Port 5
Mode DIP Switch 5
The Top Panel 7

Installation 8
Installing the MC250-4T/1CXT 8
MC250-4T/1CXT Application Connection 9
Wiring the Power Inputs 9
Wiring the Fault Alarm Contact 10
Mounting Installation 11

Troubleshooting 15
FAQs 16

Specifications 18

Contacting Technical Support 19

Overview

Package Contents

Before installing the IFS MC250-4T/1CXT Industrial Ethernet Converter, verify that package contains the following parts:

- IFS MC250-4T/1CXT x1
- DIN Rail Kit x1
- Wall Mount Kit x1
- User's Manual x1

If any of the items in the package are damaged or missing, please contact your distributor or IFS sales rep. If possible, retain the original carton and packaging material in case of need to return the product for repair/replacement.

Ethernet over VDSL2 Bridge Description

IFS's state-of-the-art Ethernet-over-VDSL2 products are based on two core networking technologies: Ethernet and VDSL2 (**Very-high-data-rate Digital Subscriber Line 2**). This technology offers the absolute fastest possible data transmission speeds over existing copper telephone lines or coaxial cables without the need for rewiring.

The IFS MC250-4T/1CXT Industrial Ethernet Converter has a switching architecture with 4 RJ-45 10/100Mbps Ethernet ports and one asymmetric or symmetric Ethernet over VDSL port (Asymmetric means upstream and downstream rate are not the same and Symmetric means upstream and downstream rate are similar) – the VDSL port can be RJ-11or BNC Connector.

The MC250-4T/1CXT can be set to Master or Slave mode via a DIP switch. The MC250-4T/1CXT coax symmetric data rate performance will be 95/99Mbps for at 200m, and 19/13Mbps at

2400m. The MC250-4T/1CXT (BNC) coax performance is up to 100/65Mbps for asymmetric data rate within 200m and 31/4Mbps for asymmetric data rate at 2.4km.

The IFS MC250-4T/1CXT Industrial Ethernet Converter is engineered in a slim metal enclosure that conforms to IP30 standards for deployment in demanding industrial environments.

The IFS MC250-4T/1CXT provides a lower cost replacement and smooth migration for existing Long Reach Ethernet (LRE) networks.

The cable specifications of the connection are listed as following:

- 10Base-T, Category 3, 4 or 5 UTP
- 100Base-TX, Category 5, 5e or 6 UTP
- Ethernet over VDSL2, Twisted-pair Telephone Wires
- Ethernet over VDSL2 Coaxial Cable

Note: Slave devices (CPE) must connect to the Master device (CO) through the telephone wire or coaxial cable. To define the MC250-4T/1CXT as a Master or Slave, please refer to the Mode DIP Switch section for more detail.

Key Features

The MC250-4T/1CXT provides the following key features:

- Cost-effective VDSL2 Master / Slave bridge solution
- -40º to 75º Degree C operating temperature
- Redundant Power Design: 12~48V DC, redundant power with polarity reverse protect function
- IP-30 metal case
- One box design, Master / Slave selectable via DIP Switch
- Defines Asymmetric (Band Plan 998) and Symmetric band plans for the transmission of Upstream and Downstream signals
- Complies with IEEE 802.3, IEEE 802.3u and IEEE 802.3x standards
- DMT (Discrete Multi-Tone) line coding
- Half Duplex Back Pressure and IEEE 802.3x Full Duplex Pause Frame Flow Control
- Support up to 1536 bytes packet size, 802.1Q VLAN tag transparent
- Integrated address look-up engine, support 2K absolute MAC addresses
- VDSL2 Stand-Alone transceiver for simple bridge modem application
- Selectable Target Band Plan and Target SNR Margin
- LED indicators for network diagnostics
- DIN Rail and Wall Mount Design

Hardware Overview

The MC250-4T/1CXT provides 4 10/100 Mbps RJ-45, 1 RJ-11 and 1 BNC port for network line connection. The 4 RJ-45 ports will distinguish the speed of incoming connection automatically.

This section describes the hardware features of the MC250-4T/1CXT. For easier control of the MC250-4T/1CXT, it's recommended to get familiar with the LED indicators and port characteristics. Front panel illustrations in this chapter display the units LED indicators. Before connecting any network device to the MC250-4T/1CXT, read this chapter carefully.

Figure 1: Front Panel

LED Indicators

System

LED	Color	Function	
P1	**Green**	**Light**	Indicates that the power is active.
P2	**Green**	**Light**	indicates power 2 is active.
FAULT	**Green**	**Light**	indicates that either power 1 or power 2 does not have power.

VDSL/BNC

LED	Color	Function	
ACT	**Green**	**Light**	Indicates that the VDSL link is established.
		Blink	Indicates that the VDSL link is actively sending or receiving data over that port.
Sync	**Green**	**Light**	Indicates that the VDSL link is established.
		Fast Blink	Indicates that the VDSL link is at training status (about 10 seconds).
		Slow Blink	Indicates that the VDSL link is at idle status.
Master	**Green**	**Light**	Indicates that the VDSL Bridge is running in **Master** mode.
Slave	**Green**	**Light**	Indicates that the VDSL Bridge is running in **Slave** mode.

10/100Base-TX Port

LED	Color	Function	
LNK/ ACT	**Green**	**Light**	Indicates that the port is link up.
		Blink	Indicates that the Converter is actively sending or receiving data over that port.
		Off	Indicates that the port is **link down.**

Mode DIP Switch

The MC250-4T/1CXT provides 4 selective transmission modes. By switching the transmission modes, you can obtain a best transmission mode to suit the phone line quality or

distance of connectivity. The following is a summary table of transmission settings, bandwidth and distance extensibility tested for AWG 24 (0.5mm) twisted-pair without noise and cross talk.

	DIP-1	DIP-2	DIP-3	DIP-4
	Mode	**Channel**	**Band Plan**	**SNR**
OFF	Master	Interleave	Symm	9dB
ON (default)	**Slave**	**Fast**	**Asymm**	**6dB**

Master / Slave

- Master (Central Office) – in Master device mode, usually the Master device will be located at the data center of the ISP or enterprise to link to the backbone. For IP video applications, the Master (CO) setting should be used at the IP camera for maximum bandwidth availability over distance.
- Slave (Customer Premises Equipment) – the Slave device mode, usually the Slave device will be located at branch office, home or remote side as the long reach data receiver. The Slave also can be connected to the network devices such as a PC, VoIP, Wireless Access Point, etc.

When the MC250-4T/1CXT is operating in Slave mode, the DIP switch 2, 3, and 4 are disabled.

Fast and Interleave mode

- Fast mode guarantees a minimum end to end latency of less than 1 ms.

- Interleaved mode provides impulse noises protection with a duration of less than 250 μs. Interleaved mode has a maximum end to end latency of 10m sec.

Band Plan

- User can switch the Band Plan to either Symmetric or Asymmetric based on the application. Symmetric band plan provides better upstream performance while Asymmetric band plan provides a better downstream performance.

Target SNR (Signal Noise Ratio) Margin

- When fixed SNR margin is selected, the system will maintain the SNR margin at 9 dB across all usable loop length.

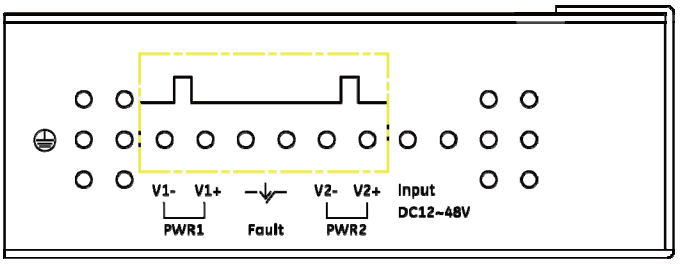
Note: The default for the DIP switch settings is "ON" for all four switches, that sets the media converter to CPE mode. For selecting "CO" mode, please adjust the DIP 1 switch to "OFF".

Please power off the MC250-4T/1CXT before making any transmission mode adjustments.

The Top Panel

The top panel of the MC250-4T/1CXT consists of a terminal block connector with two DC power inputs. Figure 2 shows the top panel of the MC250-4T/1CXT.

Figure 2: Top Panel



Installation

Installing the MC250-4T/1CXT

The MC250-4T/1CXT does not require any software configuration. Users can immediately use any feature of this product simply by attaching the cables and power plug. There is some key limitation on the MC250-4T/1CXT. Please check the following items:

MC250-4T/1CXT: The device is used for Point-to-Point connection only (Master device to Slave device) and is equipped with one RJ-11 and one BNC connectors for VDSL2 port for network link connection.

Phone wire: Depending on the quality of the telephone line being used, the maximum distance of one VDSL segment is 1.6km (5249ft) with AWG 24 telephone wires.

Coaxial: Depending on the quality of the coaxial cable being used, the maximum distance of one VDSL segment is 3.0km (9842ft) with 50 or 75 ohm coaxial cable.

The distance achieved will vary according to the quality of telephone wires and coaxial cables.

MC250-4T/1CXT Application Connection

Two sets of the MC250-4T/1CXTs could be used to link two local Area networks that are located in different locations. Through a normal telephone line or coaxial cable, 100/55Mbps (RJ-11) or 100/65Mbps (BNC) asymmetric backbone, can be setup with one media converter in Master (CO) mode and the other in Slave (CPE) mode.

Figure 3: MC250-4T/1CXT VDSL2 (RJ-11) connection

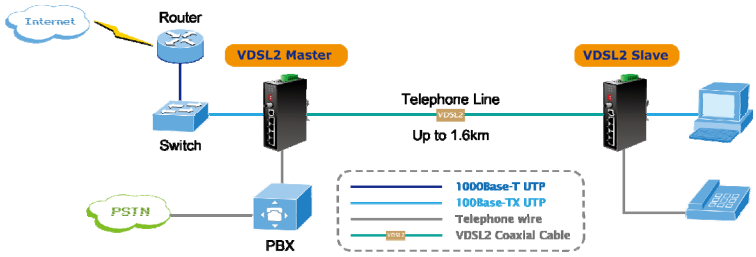
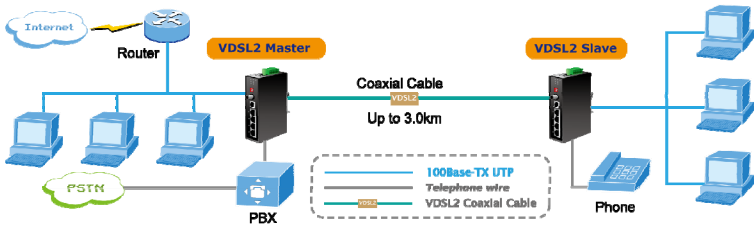


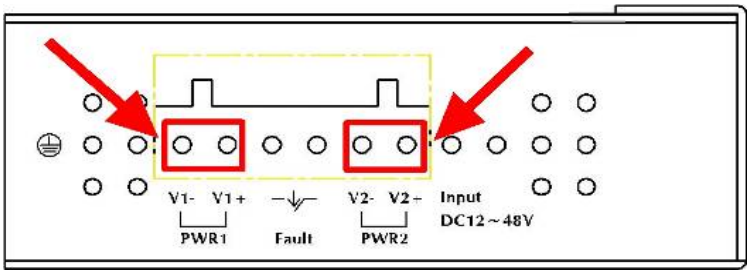
Figure 4: MC250-4T/1CXT VDSL2 (BNC) connection



Wiring the Power Inputs

The 6-contact terminal block connector on the top panel of the MC250-4T/1CXT is used for two DC redundant powers inputs. Please follow the steps below to insert the power wires.

1. Insert positive / negative DC power wires into the contacts 1 and 2 for POWER 1, or 5 and 6 for POWER 2.



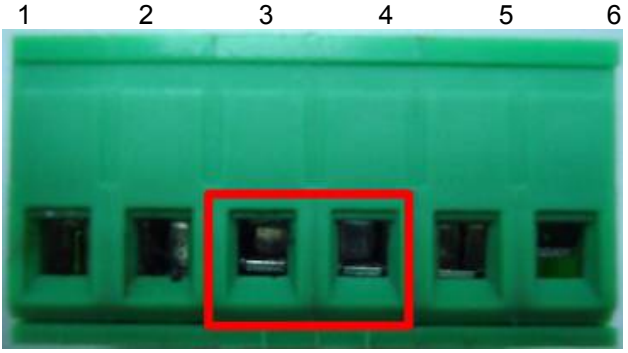
V1- V1+ V2- V2+

2. Tighten the wire-clamp screws to prevent the wires from disconnecting.

1	2	3	4	5	6
Power 1		Fault		Power 2	
-	+			-	+

Wiring the Fault Alarm Contact

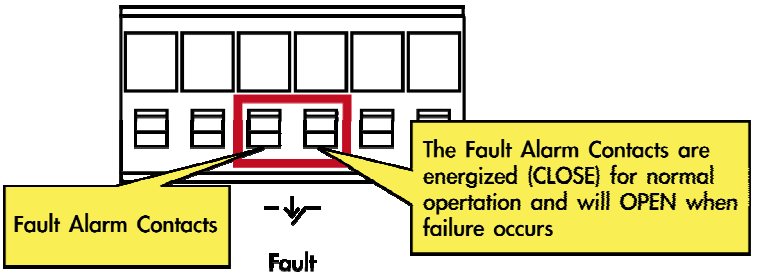
The fault alarm contacts are in the middle of the terminal block connector as the picture shows below. Inserting the wires, the MC250-4T/1CXT will detect the fault status of the power failure and then forms an open circuit. The following illustration shows an application example for wiring the fault alarm contacts.



Insert the wires into the fault alarm contacts

Note: The wire gauge for the terminal block should be in the range between 12 ~ 24 AWG.

The alarm relay circuit accepts up to 30V, max. 3A currents.



Mounting Installation

This section describes how to mount the MC250-4T/1CXT and make connections to it. Please read the following sections and perform the procedures in the order presented.

Note: In the installation steps below, this Manual uses the GE-DSGH-8 (IFS 8 Port Industrial Gigabit Switch) as an example. However, the steps for any IFS Industrial Switch & Industrial Media Converter are similar.

Mounting to a DIN-Rail

The DIN-Rail kit comes assembled on the MC250-4T/1CXT out of the box. Please refer to following figures to hang the MC250-4T/1CXT on a DIN-Rail.

1. Lightly press the bottom of the DIN-Rail connector mount into the track.

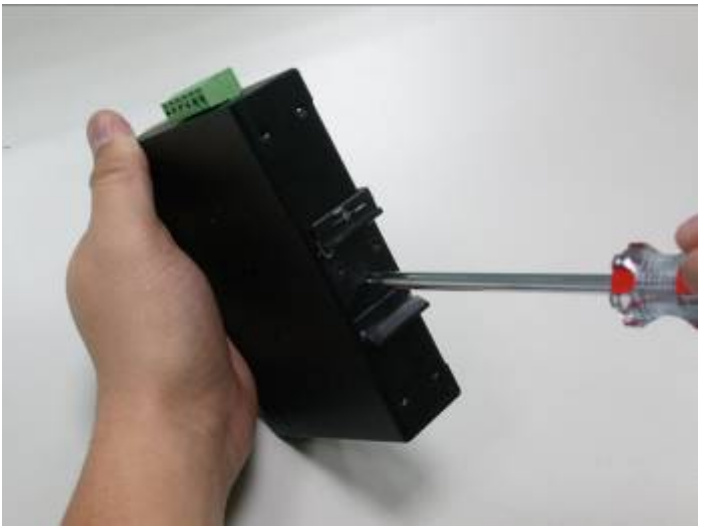
2. Check that the DIN-Rail connector mount is tightly mounted on the track.
3. Please refer to following procedures to remove the MC250-4T/1CXT from the track.

4. Lightly press the bottom of DIN-Rail connector mount to remove it from the track.

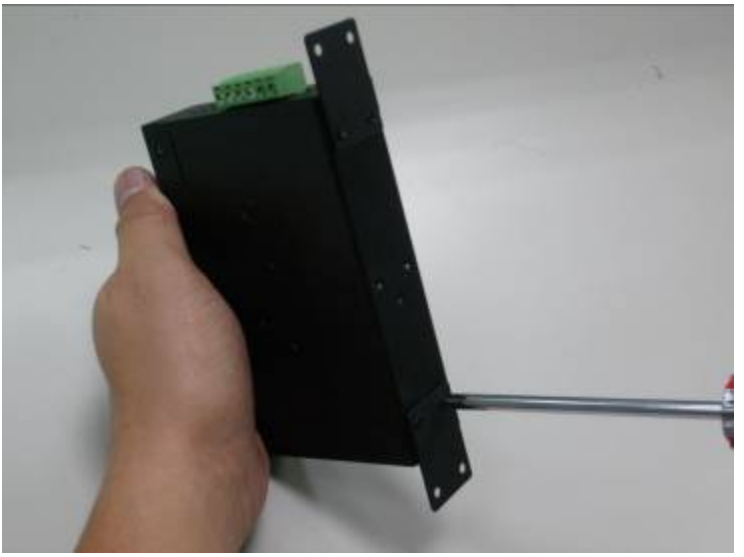
Mounting to a Wall

To install the MC250-4T/1CXT on the wall, please follows the instructions described below.

1. Loosen the screws to remove the DIN Rail from the Media Converter.



2. Place the wall mount plate on the rear panel of the MC250-4T/1CXT.



3. Assemble the wall mount plate on the MC250-4T/1CXT.
4. Use the hook holes at the corners of the wall mount plate to hang the MC250-4T/1CXT on the wall.

Troubleshooting

SYMPTOM:

VDSL LNK LED does not light after wire is connected to the VDSL port.

CHECKPOINT:

- Verify that the length of the wire connected between two MC250-4T/1CXT is not more than 2.4km. Please also try to adjust the DIP switch of MC250-4T/1CXT to other SNR mode.
- Please note you must use one MC250-4T/1CXT with Master mode and the other MC250-4T/1CXT with Slave mode.

SYMPTOM:

TP LED does not illuminate after the cable is connected to the port.

CHECKPOINT:

- Verify that you are using the Cat.5, 5e or 6 cables with RJ-45 connector to connect to the port.
- If your device (i.e. LAN card) supports Auto-Negotiation, try to set it to a fixed speed manually.
- Make sure that both converter and the connected devices are turned on.
- Make sure that all cables are properly plugged in to the correct ports.
- Make sure that the cable is not bad.
- Make sure that the power adapters are functional for each device.

FAQs

Q1: What is the voltage and current rating to power MC250-4T/1CXT media converter?

A1: 12 ~ 48V DC

Q2: What is VDSL2?

A2: VDSL2 (Very High-Bit-Rate Digital Subscriber Line 2), G.993.2 is the newest and most advanced standard of xDSL broadband wire line communications.

Designed to support the wide deployment of Triple Play services such as voice, data, high definition television (HDTV) and interactive gaming, VDSL2 enable operators and carrier to gradually, flexibly, and cost efficiently upgrade exiting xDSL-infrastructure.

Q3: What distances can be achieved between MC250-4T/1CXT media converters?

A3: Under ideal conditions and use of quality cable maximum distances of 1.4 km for telephone wire (POTS) or 2.4km for coax cable can be achieved.

Q4: What is the maximum date rate for MC250-4T/1CXT?

A4: Under ideal conditions and use of quality cable maximum distances: 200 meters, 99Mbps/63Mbps (downstream/upstream) for telephone cable or 100Mbps/65Mbps (downstream/upstream) for coax cable.

Q5: What is SNR and what's the effect?

A5: In analog and digital communications, Signal-to-Noise Ratio, often written SNR, is a measure of signal strength

relative to background noise. The ratio is usually measured in decibels (dB).

In digital communications, the SNR will probably cause a reduction in data speed because of frequent errors that require the source (transmitting) computer or terminal to resend some packets of data. SNR measures the quality of a transmission channel over a network channel. The greater the ratio, the easier it is to identify and subsequently isolate and eliminate the source of noise.

Generally speaking, the higher SNR value gets better line quality, but lower performance.

Q6: What is band plan and what's the effect?

A6: VDSL2 defines multiple band plans and configuration modes (profiles) to allow asymmetric and symmetric services in the same binder (by designated frequency bands) for the transmission of upstream and downstream signals. User has the ability to select fixed band plan. Symmetric band plan provides better downstream performance while Asymmetric band plan provides better upstream performance.

Specifications

Ethernet	Description
Data Rate	10/100Bast-TX with Auto-negotiate and Auto-MDI/MDI-X
Connectors	4-RJ-45
Cable	10 Base-T (Cat 3, 4, 5) / 100Base-TX T (Cat 5, 5e, 6) - 328ft (100m)

VDSL2

VDSL2 Transmission Mode	CO/CPE Mode; Channel; Rate Limit; SNR
VDSL-DMT Encoding	ITU-T G.993.1 VDSL; ITU-T G.997.1; ITU-T G.993.2 VDSL2 (Profile 17a support)
Telephone cable	24AWG or better
Phone Line connector	1-RJ-11 female
Coaxial Cable	50 or 75 ohm coax
Coax Connector	1-BNC female

VDSL2 Distance > Data Rate	Down Stream / Up Stream			
	Asymmetric		Symmetric	
Distance	Twisted-Pr	Coax	Twisted-Pr	Coax
656 ft. (200m)	99/63 Mbps	99/65 Mbps	91/99 Mbps	95/99 Mbps
1,312 ft. (400m)	91/48 Mbps	99/64 Mbps	74/79 Mbps	92/97 Mbps
1,969 ft. (600m)	71/32 Mbps	97/59 Mbps	54/51 Mbps	81/82 Mbps
2,525 ft. (800m)	53/18 Mbps	94/51 Mbps	38/34 Mbps	71/70 Mbps
3,281 ft. (1000m)	38/8 Mbps	84/45 Mbps	27/21 Mbps	60/57 Mbps
3,937 ft. (1200m)	33/5 Mbps	73/37 Mbps	24/15 Mbps	50/44 Mbps
4,593 ft. (1400m)	28/2 Mbps	62/28 Mbps	21/10 Mbps	42/33 Mbps
5,249 ft. (1600m)	--	54/20 Mbps	--	37/27 Mbps
5,906 ft. (1800m)	--	48/13 Mbps	--	29/22 Mbps
6,562 ft. (2000m)	--	38/9 Mbps	--	23/21 Mbps
7,218 ft. (2200m)	--	35/6 Mbps	--	19/17 Mbps
7,874 ft. (2400m)	--	31/4 Mbps	--	19/13 Mbps

LED Indicators

Power	P1: On - Green; P2: On - Green; FAULT: Green
10/100 Base-TX Port	LNK/ACT; 100Mbps - Green
VDSL2 Port	LNK/ACT; CO Mode; CPE Mode; Sync. (Green)

Electrical and Mechanical

Power	12VDC ~ 48VDC
Enclosure	IP-30 Rated Metal
Dimensions (H x W x D)	5.3 x 3.5 x 1.26 in. (135 x 87.8 x 32 mm)
Weight	0.3 lbs. / 83g

Environmental

Operating Temperature	-40ºC ~ +75ºC
Storage Temperature	-40ºC ~ +85ºC
Relative Humidity	0%–90% (non-condensing)

Contacting Technical Support

Contact technical support if you encounter any difficulties during this installation. Please make sure you have the requested diagnostic or log files ready before you contact us by phone or go to www.interlogix.com/customer-support.

Technical Support

Europe, Middle East and Africa	
W	Select *Contact Us* at www.utcfssecurityproducts.eu
North America	
T	+1 855.286.8889
E	techsupport@interlogix.com
Australia	
E	techsupport@interlogix.au