



MCE-Coax Converter User Manual



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Regulatory information	  N4131

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Contact information

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Chapter 1

Introduction



The GE Security MCE-Coax is a high-performance Ethernet-over-VDSL2 product that converts data between twisted pair (UTP) and coaxial wiring.

Package Contents

Check the contents of your package for following parts:

- Ethernet over VDSL2 Converter – Coaxial x1
- User's Manual x1

If any of these items are missing or damaged, please contact your dealer immediately.

Introduction

GE Security'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 coaxial cables without the need for rewiring.

The MCE-Coax Ethernet over VDSL2 converters have a switching architecture with one RJ-45 10/100Mbps Ethernet port and one asymmetric Ethernet over VDSL port. The VDSL port uses a BNC connector. The MCE-Coax can be set to **CO** mode or **CPE** mode via a DIP switch. When the MCE-Coax-CO is used to connect to the other MCE-Coax-CPE as a standalone pair, you can get up to a 100/65Mbps asymmetric data rate within 200m and up to 70/10Mbps asymmetric data rate at 1.6km. This capability is ideal for use as an Ethernet extender for your existing Ethernet network.

GE Security's VDSL2 Converter solution provides a much cheaper replacement and smoother migration for existing Long Reach Ethernet (LRE) networks.

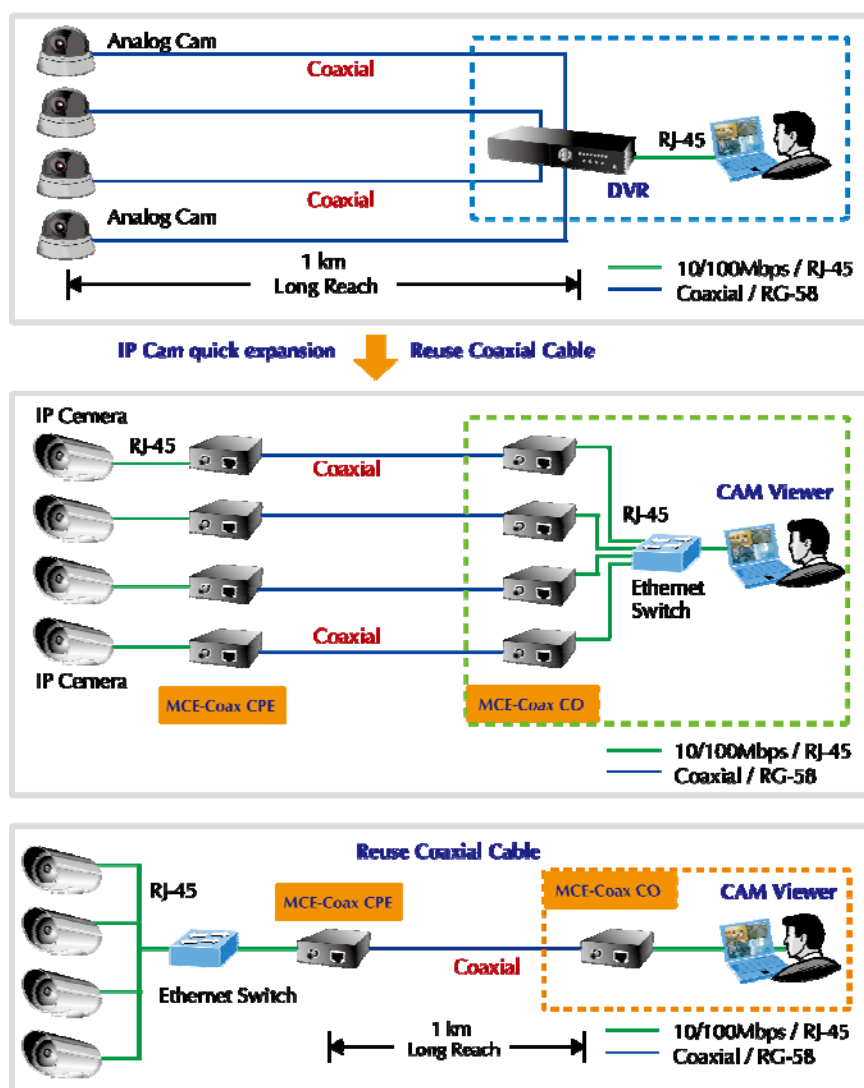
The cable specifications of the connection are listed as following:

- 10Base-T, Category 3, 4 or 5 UTP
- 100Base-TX, Category 5, 5e, 6 UTP
- Ethernet over VDSL, Coaxial cable

Figure 1 shows a typical application for the Ethernet over VDSL converter.

NOTE: Slave device (CPE) must connect to Master device (CO) through the telephone wire. Slave cannot connect to Slave and Master cannot connect to Master. To define the MCE-Coax to CO or CPE, please refer to the Mode DIP Switch section for more detail.

Figure 1: Typical application



MCE-Coax Features

The MCE0Coax Converter has the following key features:

- Cost-effective VDSL2 CO/CPE bridge solution
- One box design, CO/CPE selectable via DIP Switch
- 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
- VDSL2 stand-alone transceiver for simple bridge modem application
- Minimal installation time (Simply as Plug-and-Play)
- Selectable target data rate and target SNR margin
- Support extensive LED indicators for network diagnostics
- Compact in size, easy installation

Product Specifications

Hardware Specification		
Ports	10/100Base-TX	1 RJ-45, Auto-negotiation and Auto-MDI/MDI-X
	VDSL	1 BNC, female connector
DIP Switch		4 position DIP switch
Functionality		CO / CPE mode select Selectable Fast and Interleaved mode Selectable target Data Rate Selectable target SNR mode
Encoding		VDSL-DMT - ITU-T G.993.1 VDSL

		- ITU-T G.997.1 - ITU-T G.993.2 VDSL2 (Profile 12a Support), Annex A
LED Indicators		One Power 3 for RJ-11/VDSL2 WAN : <ul style="list-style-type: none"> • Green, LNK/ACT • Green, CO mode • Green, CPE mode 2 for RJ-45 10/100Base-TX port <ul style="list-style-type: none"> • Green, LNK/ACT. • Green, Speed
Cabling	Ethernet	10Base-T: 2-pair UTP Cat.3, 4, 5 up to 100m (328ft) 100Base-TX: 2-pair UTP Cat.5, 5e up to 100m (328ft)
	VDSL	50 ohm, RG58A/U, RG58C/U, RG58/U or equivalent 75 ohm, RG59 or equivalent
Performance* (Down Stream / Up Stream)		200m -> 100/65Mbps 400m -> 100/65Mbps 600m -> 100/58Mbps 800m -> 100/52Mbps 1000m -> 100/42Mbps 1600m-> 70/10Mbps
Power Requirement		5V DC 2A
Operating Temperature		0-50°C
Storage Temperature		-25-70°C
Operating Humidity		10% to 90%, relative humidity, non-condensing
Storage Humidity		10% to 90%, relative humidity, non-condensing
Standard Conformance		
Regulation Compliance		FCC Part 15 Class A, CE

Standards Compliance	IEEE 802.3 10Base-T
	IEEE 802.3u 100Base-TX
	IEEE 802.3x Flow Control
	ITU-T
	G.993.1 (VDSL)
	G.997.1
	G.993.2 VDSL2 (Profile 12a Support), Annex A

*The actual data rate will vary on the quality of the coaxial cable and environment factors.

Physical Specifications

Dimensions (W × D × H): 3.82 × 2.76 × 1.02 in. (97 × 70 × 26 mm)

Weight: 0.44 lbs / 200 g

Environmental Specifications

Operating:

Temperature: 0°C - 50°C

Relative Humidity: 5% - 90% (non-condensing)

Storage:

Temperature: -20°C - 70°C

Relative Humidity: 5% - 90% (non-condensing)

Electrical Specifications

Power Requirement: 5V, 2A

Power Consumption: 5.60Watts/19 BTU (maximum)

Chapter 2

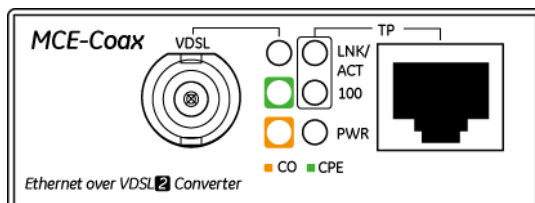
Hardware Overview

MCE-Coax provides 1 BNC connector and supports 75-ohm cable with a distance of up to 1.6km. It has 1 RJ-45 port for two different running speeds - 10Mbps, 100Mbps, in the same converter and automatically distinguishes the speed of incoming connection. This section describes the hardware features of these Converters. For easier control of the converter, familiarize yourself with its display indicators, and ports. Front panel illustrations in this chapter display the unit LED indicators. Before connecting any network device to the converter, read this chapter carefully.

Front Panel

The MCE-Coax front panel provides a simple interface monitoring the converter.

Figure 2: MCE-Coax front panel



LED Indicators

The diagnostic LEDs on the front panel provide the operating status of individual ports and the whole system.

System

LED	Color	Function
PWR	Green	Lit: Power ON Off: Power OFF

VDSL

LED	Color	Function
LNK/ACT	Green	Lit: 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
		Off: Indicates that the port is link down
CO	Green	Lit: Indicates the VDSL Bridge is running at CO mode
CPE	Green	Lit: Indicates the VDSL Bridge is running at CPE mode

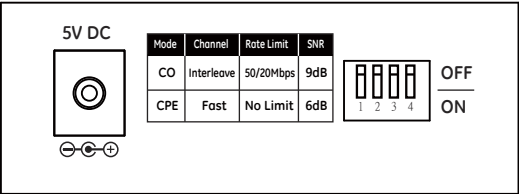
10/100Base-TX Port

LED	Color	Function
LNK/ACT	Green	Lit: 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
100	Green	Lit: Indicates that the port is operating at 100Mbps.
		Off: Indicates that the port is link down or 10Mbps.

The Back Panel

The back panel of the MCE-Coax is shown below.

Figure 3: MCE-Coax back panel



MODE DIP Switch

The MCE-Coax has 4 selective transmission modes. By switching between the transmission modes, you can obtain the best transmission mode to suit your phone line quality or distance of connectivity. The following is the summary table of transmission settings, bandwidth and distance extensibility without noise and cross talk.

	DIP-1	DIP-2	DIP-3	DIP-4
	Mode	Channel	Rate Limit	SNR
OFF	CO	Interleave	50/20 Mbps	9dB
ON(default)	CPE	Fast	No Limit	6dB

CO / CPE

- CO (Central Office)** - the Master device mode, usually the CO device will be located at the data center of ISP or enterprise to link to the backbone.

- **CPE (customer premises equipment)** - the Slave device mode, usually the CPE device will be located at a branch office, home or remote side as a long reach data receiver. The CPE can be connected to the PC, IP Camera or Wireless Access Point and various network devices.

Fast and Interleave mode: (For CO Mode only)

- Fast mode guarantees a minimum end to end latency of less than 1 ms.
- Interleaved mode provides impulse noises protection for any impulse noise with a duration less than 250 us. Interleaved mode has a maximum end to end latency of 10m sec.

Rate Limit: (For CO Mode only)

User has the ability to select fixed data rate. When a Rate Limit is selected, the system will lock the data rate at 50Mbps/20Mbps whenever the calculated SNR margin is higher than 9 dB. This gives the best system stability.

Target SNR (Signal Noise Ratio) Margin: (For CO Mode only)

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

Power Information

Remove power from the converter before making any transmission mode adjustments.

MCE-Coax requires 5V DC power input.

NOTE: The device is a power-required device, which means that it will not work until it is powered. If your networks are active all the time, please consider using UPS (Uninterrupted Power Supply) for your device. It will prevent network data loss or network downtime.

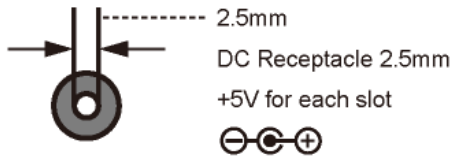
In some areas, installing a surge suppression device may also help to protect your converter from being damaged by unregulated surge or current to the converter or the power adapter.

Power Jack

The power jack of the MCE-Coax is with a 2.5mm central post and requires +5VDC power input. The MCE-Coax **DOES NOT** come bundled with an AC-DC adapter.

The DC receptacle is 2.5mm wide, which conforms to and matches the VDSL2 Converter 2.5mm DC jack's central post.

Figure 4: The power jack



DC receptacle is 2.5mm wide that conforms to and matches the VDSL2 Converter 2.5mm DC jack's central post. Do not install any improper unit, model of the VDSL2 Converter

NOTE: This product is intended to be supplied by a UL Listed Direct Plug-In Power Unit marked "Class 2" or "LPS" and output rated 5 VDC, 2 Amp minimum.

Chapter 3

Installation

Installing Ethernet with the VDSL2 Converter

The Converter does not require any software configuration. Users can immediately use any feature of this product simply by attaching the cables and plugging the power in. There are certain key limitations on the Ethernet over VDSL2 converter. Please check the following items:

- This device is used for Point-to-Point connection only (Master device to Slave device).
- 1 BNC connector and supports 75 ohm cable. Depending on the quality of coaxial cable, the maximum distance of one VDSL segment is 1.6km with 5C coaxial cable.
- The maximum distance will change with the quality of coaxial cables.

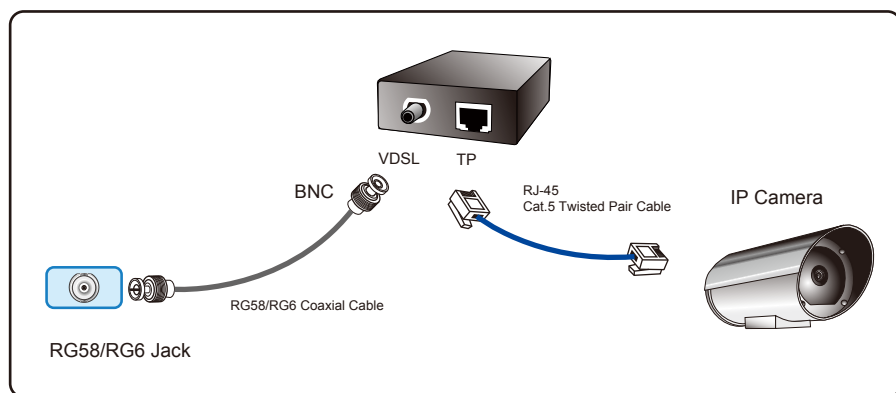
Connecting MCE-Coax

Connecting to a Standalone IP device

The following procedures will help you setup the MCE-Coax to a standalone PC.

1. Set the MCE-Coax to be in CO or CPE mode with the DIP switch at the rear panel.
2. Power on the MCE-Coax by connecting a power source (not supplied with unit).
3. The Power LED will illuminate.
4. Connect the coaxial cable from another VDSL device to VDSL BNC port of the MCE-Coax.
5. The **LNK LED will change from blinking to illuminate.**
6. Connect the Ethernet port to another Ethernet device via regular Cat. 5/5e UTP cable.

Figure 5: Connecting Standalone IP device

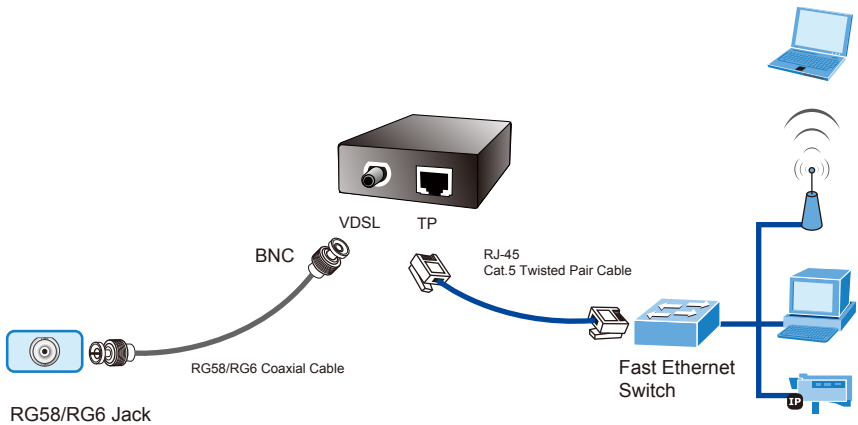


Connecting Multiple PCs to an Ethernet LAN

The following procedures will help you setup the MCE-Coax to an Ethernet LAN.

1. Set the MCE-Coax to be in CO or CPE mode with the DIP switch at the rear panel.
2. Power on the MCE-Coax by connecting a power source (not supplied with unit).
3. The Power LED will illuminate.
4. Connect a VDSL line/coaxial cable from another VDSL device to the VDSL BNC port of the MCE-Coax.
5. The LNK LED will illuminate.
6. Connect the Ethernet port to an Ethernet Switch (or Broadband Router) via regular Cat. 5/5e cable.

Figure 6: Connecting Multiple PCs to an Ethernet LAN



NOTE: Please refer to your Ethernet device's User Manual for the device's set up information.

Chapter 4

Troubleshooting and FAQs

Troubleshooting

SYMPTOM:

The VDSL LNK LED is not lit after the wire is connected to the VDSL port.

CHECKPOINT:

1. Verify the length of the coaxial cable connected. The cable length between two MCE-Coaxs should not exceed 1.6km. Also try to adjust the DIP switch of MCE-Coax to another SNR mode.
2. Please note one MCE-Coax must be in CO mode and the other MCE-Coax must be in CPE mode for communication to work.

SYMPTOM:

The TP LNK/ACT LED does not lite after the cable is connected to the port.

CHECKPOINT:

1. Verify you are using the Cat.5 or better cable with an RJ-45 connector to connect to the port.
2. If your device (like LAN card) supports Auto-Negotiation, please try to manually set at a fixed speed for your device to solve this problem.
3. The converter and the connected device's power is not on.
4. Make sure that all the cabling is firmly seated in its connectors in the switch and in the associated device to which the port's cable is attached.
5. The connecting cable is correctly working and is the correct type.
6. The connecting device, including any network adapter, is functional.

FAQs

Q1: What voltage does the MCE-Coax use?

A1: 5VDC, 2A

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 is the best distance for MCE-Coax?

A3: In order to guarantee stability and a better network, we suggest that the distance of 1.6 kilometer is the maximum distance for the MCE-Coax.

Q4: What is the best data rate for the MCE-Coax?

A4: The data rate of the MCE-Coax is up to 65Mbps/100Mbps (upstream / downstream) in 200 meters.

Q7: What is SNR and what's its effect?

A7: 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 the better the line quality, but lower performance.