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**EQCO-FastECoax7501 Ethernet
Over Coax Converter/Range
Extender
User's Guide**

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Object of Declaration: EQCO-FastECoax7501 Ethernet Over Coax Converter/Range Extender

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Manufacturer: Microchip Technology Inc.
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USA

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Signed for and on behalf of Microchip Technology Inc. at Chandler, Arizona, USA


Derek Carlson
VP Development Tools

12-Sep-14
Date



EQCO-FASTECOAX7501 ETHERNET OVER COAX CONVERTER/RANGE EXTENDER USER'S GUIDE

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Preface

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INTRODUCTION

This chapter contains general information that will be useful to know before using the EQCO-FastECoax7501. Items discussed in this chapter include:

- Document Layout
- Recommended Reading
- Recommended Reading
- The Microchip Web Site
- Development Systems Customer Change Notification Service
- Customer Support
- Document Revision History

DOCUMENT LAYOUT

This document includes the following chapters:

- **Chapter 1. “Introduction”** provides a brief overview of the EQCO-FastE-Coax7501, highlighting its features and uses.
- **Appendix A. “Specifications”** provides technical and performance specifications for the EQCO-FastECoax7501.

RECOMMENDED READING

The following document is recommended as a supplemental reference resource.

EQCO875SC.3 Data Sheet (DS60001314)

Consult this document for detailed information on Power Over Coax transmission. Reference information found in this data sheet includes:

- Device pinout and packaging details
- Device electrical specifications
- List of features included on the device

This document is available for download from the Microchip website (www.microchip.com).

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Technical support is available through the web site at: <http://support.microchip.com>

DOCUMENT REVISION HISTORY

Revision A (February 2015)

- Initial release of this document.

NOTES:

Chapter 1. Introduction

1.1 INTRODUCTION

The EQCO-FastECoax7501 transports Ethernet over 75Ω coaxial cables. The link consists of a pair of converters connected together via coax and terminated at each end with an RJ45 socket. Together, the converters create a virtual UTP cable that is indistinguishable from any other UTP cable link. Power for the internal electronics can be supplied using either the Power over Ethernet (PoE) standard or via a separate AC adapter.

The EQCO-FastECoax7501 consists of two parts:

- EQCO-FastECoax7501H (Head-End)
- EQCO-FastECoax7501C (Camera-Side)

FIGURE 1-1: EQCO-FASTECOAX7501 HEAD-END AND CAMERA-SIDE ADAPTERS

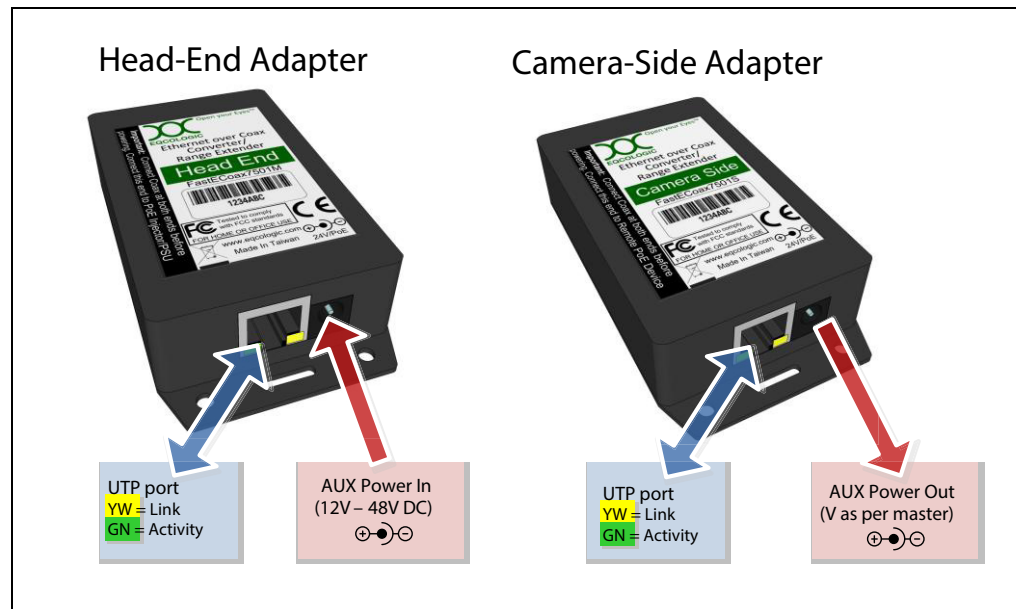


TABLE 1-1: RJ45 LED DESCRIPTION

	Description	LED On	LED Off	LED Flash
RJ45 Green	UTP Port Speed	100 Mbps	10 Mbps	
RJ45 Yellow	UTP Port Link	Link OK	Link Fail	Link OK & Activity

1.2 REQUIRED ITEMS (NOT SUPPLIED) TO COMPLETE THE SYSTEM

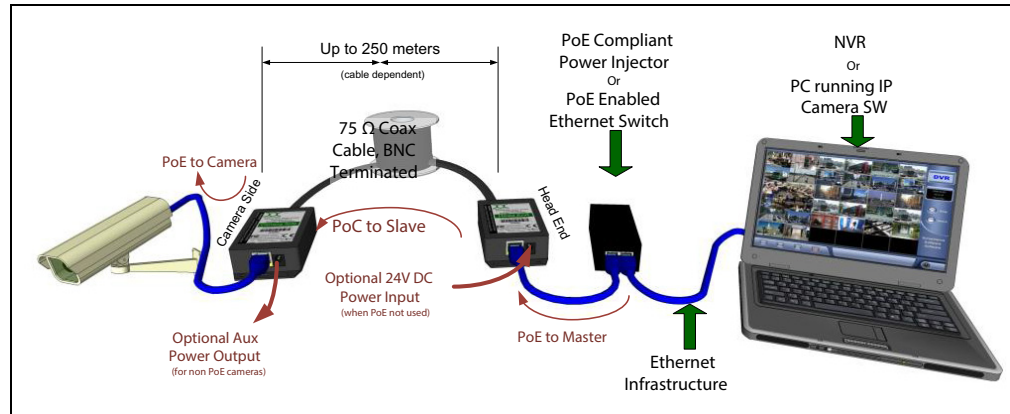
- 75Ω coaxial cable with True 75Ω BNC connectors on each end (maximum length based on cable type – see [Table A-2:“Performance Specifications”](#))
- PoE-compliant PoE power injector, PoE-compliant Ethernet switch or 12V-48V DC adapter

Note: Center pin is positive

- IP Camera or IP source (with or without PoE)
- DVR or PC (with PoE if an injector is not used)
- Two CAT5/6 (UTP) patch cables (< 3m) with RJ45 connector

1.3 SETUP

FIGURE 1-2: TYPICAL APPLICATION



1.3.1 Installation Instructions

1. Connect Head-End and Camera-Side converters to ends of BNC-terminated Coax cable, placing Head-End at the end where power is to be supplied.
2. Connect CAT5/6 patch cable to each converter.
3. Connect Camera-Side converter patch cable to IP camera/ DVR/ Switch/ PC.
4. Connect Head-End converter patch cable to PoE injector, PoE enabled Ethernet switch or local Ethernet infrastructure.
5. In non-PoE systems, connect DC adapter to Head-End auxiliary power input.

Note: The EQCO-FastECoax7501H and EQCO-FastECoax7501C converters must have 75Ω (+/- 3Ω) impedance. The characteristic impedance of the coaxial cable and connectors must all be 75Ω. Only use BNC connectors clearly marked as “True 75Ω”. [Figure 1-3](#) shows the difference between a 50Ω vs a 75Ω connector.

FIGURE 1-3: 50Ω COAX VS 75Ω COAX



1.4 POWER OPTIONS

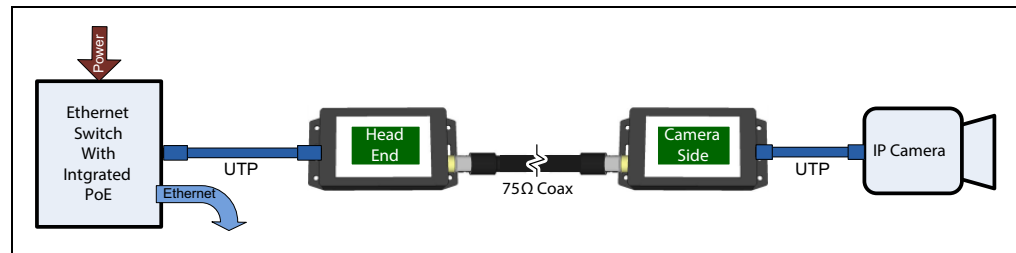
There are a number of ways to power the converters:

- The Head-End converter can be powered via PoE or via DC adapter. PoE has precedence over auxiliary DC input when both are available.
- The Camera-Side converter must be powered by the Head-End over the coax cable.
- An IP camera can be powered via PoE (via UTP from the Camera-Side), via the auxiliary power out of the Camera-Side or using its own power adapter.

Note: Do not connect the Camera-Side to a PoE power injector or to a power adapter (the Camera-Side power connector is output only).

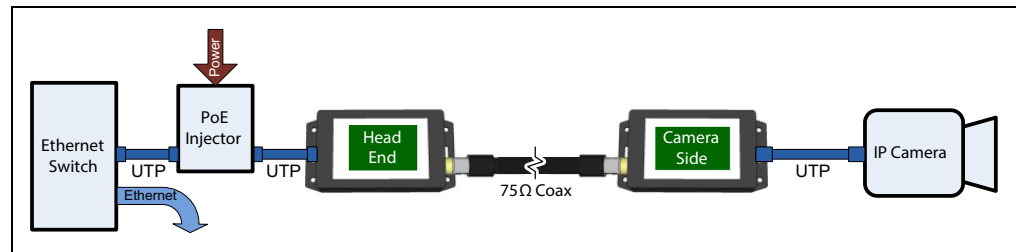
Three example power options are illustrated below.

EXAMPLE 1-1: ETHERNET SWITCH WITH EMBEDDED POE



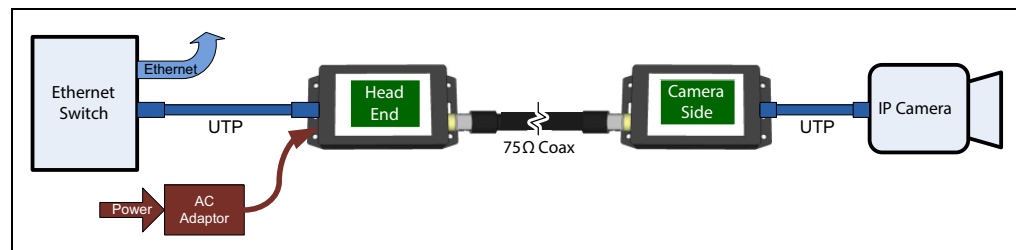
Note: The converters are powered via PoE. PoE-compatible cameras will automatically be powered by the Camera-Side via UTP. A non-PoE IP camera must use its own power adapter.

EXAMPLE 1-2: USING A STAND-ALONE POE INJECTOR



Note: The converters are powered via PoE. PoE-compatible cameras will automatically be powered by the Camera Side via UTP. A non-PoE IP camera must use its own power adapter.

EXAMPLE 1-3: USING A POWER ADAPTER



Note: The converters are powered via the power adapter. The IP camera can optionally be powered from the Camera-Side auxiliary power connector, which is at the same voltage as the power adapter (minus any voltage loss in the coax cable – see [Table A-2: "Performance Specifications"](#)).

1.5 TROUBLESHOOTING

When the EQCO-FastECoax7501 converters are paired, they create a virtual UTP cable. The LEDs on the converters will only light if the complete link is established from the Ethernet device at one end of the cable to the Ethernet device at the other end. Once the whole link is established, the Yellow LED will light and then flash to show Ethernet traffic.

Link establishment is also transparent. If a device at one end of the cable is only capable of operating at 10 Mbps, the devices at each end of the link will negotiate the link to be 10 Mbps. In this case, the green LED will remain off, showing a connection at 10 Mbps. The same happens for full/half duplex.

The EQCO-FastECoax7501 supports Auto-MDI/MDI-X meaning that both straight and twisted patch cables will work. Only use short patch cables, less than three meters in length. The characteristic impedances of the coaxial cables and the BNC connectors must all match. The EQCO-FastECoax7501H and EQCO-FastECoax7501C converters require 75Ω (+/- 3Ω) impedance. Most problems are caused by using poor-quality BNC connectors that are not designed to be 75Ω. Always make sure that the BNC connectors are marked "True 75Ω".

TABLE 1-2: COMMON SYMPTOMS AND PROBABLE CAUSES

Symptom	Probable Cause
Converters will not connect	Ensure coax is 75Ω impedance
Converters will not connect	Ensure BNC connector is 75Ω impedance
Specified range not achieved	Ensure coax is 75Ω impedance
Specified range not achieved	Ensure BNC connector is 75Ω impedance
Slave converter is not powered	See Section 1.4 "Power Options" and Section 1.5 "Troubleshooting"
Master converter is not powered	Check PoE power supplied by injector or switch



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Appendix A. Specifications

This appendix provides the following figures:

- [Table A-1: “Technical Specifications”](#)
- [Table A-2: “Performance Specifications”](#)

TABLE A-1: TECHNICAL SPECIFICATIONS

Coax Interface	
Connectors	BNC True 75Ω
Cable Impedance	75Ω ± 3Ω
Connector/Coax Return-Loss	Return-Loss > 25 dB @ 1 MHz-200 MHz
Data Throughput	100 Mbps full-duplex for all cable lengths
Ethernet Interface	
Connector	Plug connector
Link Speed	10/100BASE-TX
Power Supply Input (Head-End only)	
Aux Power In	12V-48V @ 1.5W
Power Supply Output (Camera-Side only)	
Aux Power Out	VIN @ Head-End 1V Coax DC Drop (varies with cable type/length)
DC Supply Current	Maximum 800 mA
Environmental	
Operating Temperature	0°C to 50°C
Relative Humidity	Up to 85% non-condensing
Storage Temperature	-20°C to +70°C

TABLE A-2: PERFORMANCE SPECIFICATIONS

Performance by Coax Type	Max Coax Length for Error Free Operation	Camera Power Available	
		48V DC Adapter	24V DC Adapter
RG6 Sample 1 (5.5 dB/100m) (Belden 1694A)	180m/580 ft	18W	11W
RG6 Sample 2 (5.5 dB/100m) (Carol Brand)	180m/580 ft	13W	1.8W
5C-HFBT Sample (4.7 dB/100m) (Amphenol)	210m/680 ft	18W	11W
RG59 Sample (8 dB/100m)	125m/400 ft	19W	13W
3C-2V Sample 1 (10 dB/100m) (Hangzhou Linan Tongda Cable Co., Ltd.)	100m/325 ft	19W	13W
3C-2V Sample 2 (8 dB/100m) (Hangzhou Huadi Cable Co, Ltd.)	125m/400 ft	19W	14W
RG11 Sample (3.3 dB/100m) (CommCCope F1160BVV)	250m/800 ft	18W	8.7W

NOTES:



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