



Installation Instructions

ControlNet Modular Repeater Medium Distance Fiber Module

Cat. Nos. 1786-RPFM

Use this document as a guide when you install a ControlNet™ repeater fiber module for medium distances. This document contains:

Topic:	Page:
Important User Information	2
EMC Directive	3
Low Voltage Directive	3
Fiber Optic Safety Statements	4
Rockwell Automation Support	4
About the Fiber Module	6
Mount the Fiber Module	7
Remove the Protective Caps	10
Choose Fiber Cable Types	11
Specifications for 1786-RPFM Fiber Optic Cable	12
Estimate Cable Lengths	12
Connect the Fiber Cable	13
Example Topology	14
Status Indicators	15
Related Publications	16
Mounting Dimensions	16
Specifications	17
Hazardous Location Approval	19

This product is associated with a planning and installation guide, publication CNET-IN001A-EN-P, The ControlNet Fiber Media Planning and Installation Guide. To view it, visit www.ab.com/manuals or www.theautomationbookstore.com

Publication 1786-IN011B-EN-P - October 2000

Allen-Bradley 1786-RPFM

About the Fiber Module

Use this module when a medium-distance (distances of 3000m/ 9843ft) fiber link is required between two ControlNet products. This fiber link provides ground isolation between nodes and is less susceptible to noisy environments than traditional copper media.

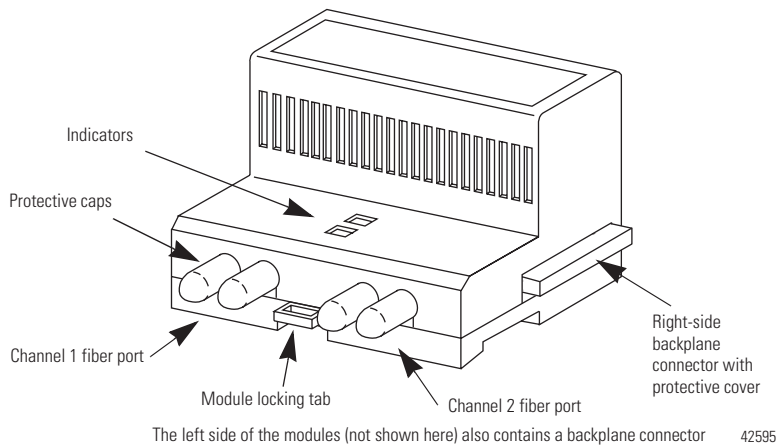
IMPORTANT

The distance that can be supported is dependent on the quality of the fiber, number of splices, and connectors. The total loss of the fiber link must be less than 13.3 dB.

The module provides:

- two fiber channels
- activity LED indicators for each fiber channel

Figure 1 Components of the Module



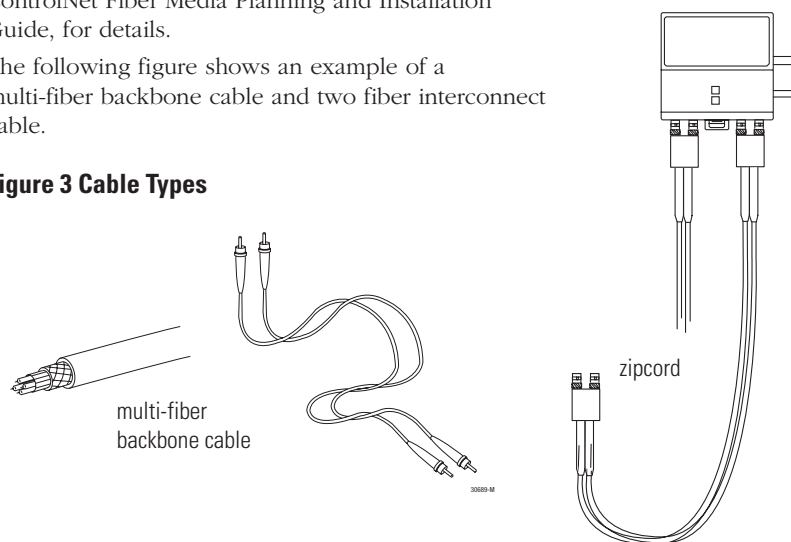
Choose Fiber Cable Types

Multi-fiber cables for backbone use are available with a wide range of fiber counts; between 2 and 216 fibers. Rockwell offers the short distance (< 300 m) fiber cable preterminated “zipcord” as a kit for use with the 1786-RPFS fiber module. You terminate the medium and long distance (> 300 m) cable in the field.

The type of fiber cable you choose to use depends on the network environment. Consult your installation professional to determine the best type of cable to use for your environmental conditions. Refer to Publication CNET-IN001A-EN-P, The ControlNet Fiber Media Planning and Installation Guide, for details.

The following figure shows an example of a multi-fiber backbone cable and two fiber interconnect cable.

Figure 3 Cable Types



What is termination?

Termination is simply the process of attaching a connector to the ends of our fiber cable. This is done in a similar manner as the coax BNC is terminated to the end of a coax cable. We terminate the coax network at the two ends of the network to prevent reflections in the system. This is not required for fiber. We recommend that you cover unused ports with a suitable protector cap to prevent dust and other contaminants from damaging the fiber transceiver ports. The protector cap for fiber is equivalent to the dust cap for a ControlNet Tap drop cable.

However, for a ControlNet drop cable we also provide a 1786-TCAP for unused taps to make them electronically transparent to the network. For the Fiber repeaters we recommend that a simplex jumper be placed between the transmit port and receive port of an unused channel. This is somewhat similar to the 1786-TCAP for the coax. See Figure 2 on page 10.

Specifications for 1786-RPFM Fiber Optic Cable

The quality of the fiber cable determines the distance you can achieve. Consult your local distributor for attenuation specifications prior to purchasing your fiber media components. The table below provides specifications for fiber optic cable:

Item	Description
Fiber Type	62.5/125 μ m
Fiber Termination Type	ST [®] (Plastic or ceramic)
Fiber Operating Wavelength	1300nm
Optical Power Budget	13.3db ¹

¹This includes all loss associated with the fiber link, including: splices, fiber attenuation, bulkhead connectors, and the 1786-RPFM ST terminations.

The medium-distance fiber module (1786-RPFM) is designed for use with 62.5/125 μ m multi-mode optic fiber and plastic or ceramic ST type connectors. The wavelength used is 1300 nm.

Estimate Cable Lengths

The maximum length of a fiber cable section for the 1786-RPFM is dependent on the quality of the fiber, number of splices, and the number of connectors. The total attenuation for a cable section **must** be less than 13.3dB.

Typically cable attenuation for a wavelength of 1300nm is less than 1.5dB/km.

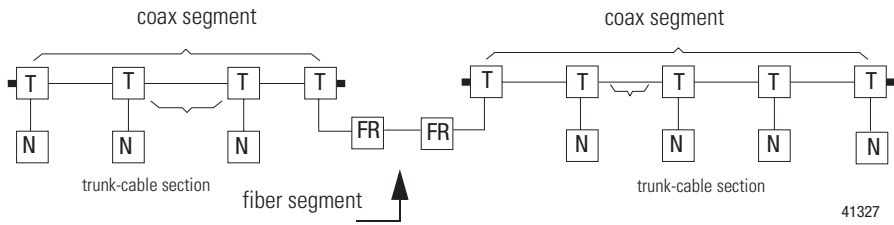
IMPORTANT

Avoid splicing your cable. Connectors can cause considerable attenuation and limit the maximum length of your system. Be certain to check the attenuation of different cable sections after the cable is installed.

Example Topology

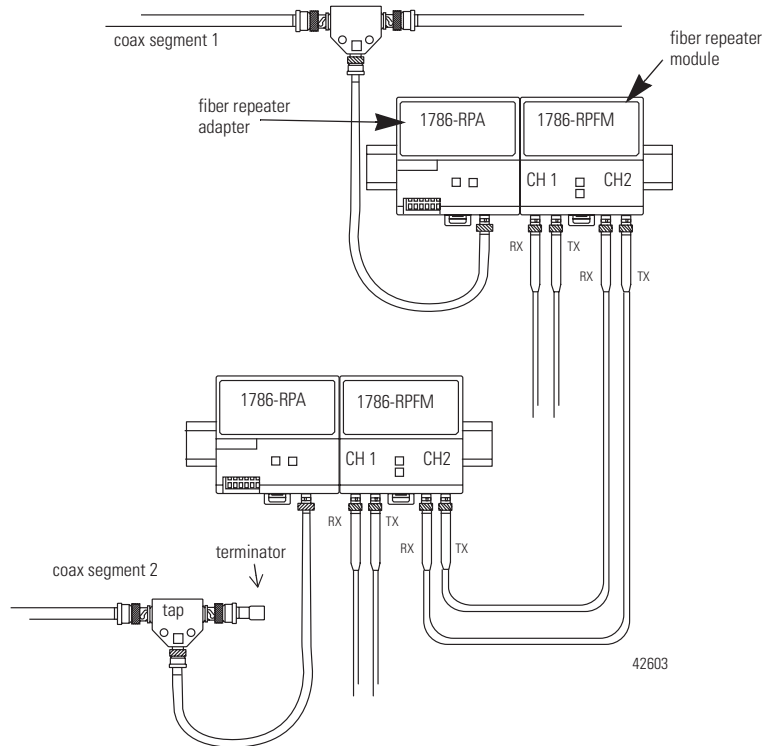
Figure 5 This topology is for example purposes only.

Create a new segment with a fiber repeater.



When you insert a fiber repeater into your media system, you create a new segment or link. The same restrictions on the number of taps and cable length apply to this new segment.

Figure 6 Basic fiber topology



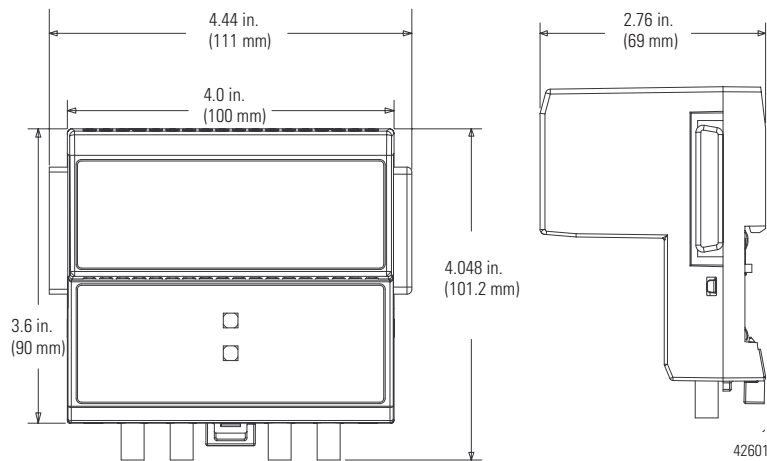
Related Publications

The table below lists publications that you may want to refer to for additional information:

Publication	Publication Number
Industrial Automation Wiring and Grounding Guidelines	1770-4.1
ControlNet Fiber Media Planning and Installation Manual	CNET-IN001A-EN-P
ControlNet Coax Tap Installation Instructions	1786-5.7
ControlNet COAX Media Planning and Installation Manual	CNET-IN002A-EN-P
ControlNet Cable System Component List	AG-2.2






Mounting Dimensions

Figure 8 Mounting Dimensions



Specifications

Specification	Range
Communication Rate	5M bits/s
Operation Voltage	Class 2 operational power is provided from 1786-RPA at 5 V dc ⁽²⁾
Backplane Power Requirements	400 mA maximum
Indicators	Channel 1 Status - Green Channel 2 Status - Green
Environmental Conditions	This product must be mounted within a suitable system enclosure to prevent personal injury resulting from accessibility to live parts. The interior of this enclosure must be accessible only by the use of a tool.
Operating Temperature	0 to 60° C (32 to 125° F)
Storage Temperature	-40 to 85° C (-40 to 185° F)
Pollution	This industrial control equipment is intended to operate in a Pollution Degree 2 environment, in overvoltage category II applications, (as defined in IEC publication 664A) at altitudes up to 2000 meters without derating.
Relative Humidity	5 to 95% non-condensing
Shock	Operating Non-operating
	30 g peak acceleration, 11(± 1)ms pulse width 50 g peak acceleration, 11(± 1)ms pulse width
Vibration	Tested 5 g @ 10-500Hz per IEC 68-2-6

Specification	Range
Fiber Type 62.5/125 micron Fiber TerminationTypeST® Fiber Operating Wavelength Optical Power Budget LED Light Output ²	(plastic or ceramic) 1300 nm 13.3 dB ⁽¹⁾ <5 mW/mm
Agency Certification (when product or package marked)	 Listed Industrial Control Equipment  Certified Process Control Equipment Certified Class 1, Division 2, Groups A, B, C, D  Approved Class 1, Division 2, Groups A, B, C, D  Marked for all applicable directives  Marked for all applicable acts N223

¹This includes all loss associated with the fiber link, including: splices, fiber attenuation, bulkhead connectors, and the ST terminations.

²Power to operate this equipment must be supplied from a source compliant with "Class 2" as defined in the National Electrical Code ANSI/NFPA 70, or the Canadian Electrical Code - Part 1, C22.1.