

Fast Ethernet Fiber-to-Fiber Converters



Illustrated: Standard and Single-Fiber, Bi-directional Fiber Converter Family

Canary's Fast Ethernet Fiber-to-Fiber converters deliver economical long-range fast data transmission linking low-cost multi-mode ports with single-mode Fiber optic segments. They are ideal for connecting user desktops with low-cost work-group switches and servers—or for long distance, switch-to-switch links. Canary's Fiber-to-Fiber converters are used to economically distribute Fast Ethernet to users throughout the network. Canary converters were the first in the industry to speed up Spanning Tree link recovery by employing Link Fault Signaling (LFS) technology that forwards lost link awareness to each connected host.

Installed success ... proven in the field.

**CFC-91XX
& CFC-92XX**

**Standard Multi-mode
to Single-mode series**

**CFC-21XX
& CFC-22XX**

**Standard Multi-mode
to Multi-mode series**

CFC-9721A/B

**Multi-mode to
Single-Fiber,
Bi-Directional
Single-Mode**

CFC-9791A/B

**Single-mode to
Single-Fiber,
Bi-Directional
Single-Mode**

CFC-21WXX

**Multi-mode to Single-
mode at ITU specified
CWDM wavelengths**

**Economic distribution
of Fast Ethernet
to users throughout
the network.**



Product Specifications

Power Supply:

- External switching
- 100/240 VAC, 1.2/0.6 Amp
- 50/60 Hz

Environment:

- Operating Temp.: 0 to 50°C
- Storage Temp.: -10 to 70°C
- Relative Humidity:
5% to 95% non-condensing

Mechanical:

- Height: 1.00" (2.54 cm)
- Length: 5.75" (14.61 cm)
- Width: 2.85" (7.24 cm)
- Ship Weight: 2.0 lb (0.9 Kg)
- Single Unit: 0.4 lb (0.2 Kg)

Regulatory:

- Designed in compliance with CE, UL, CSA & TUV standards
- IEEE 802.3 μ ; 100BASE-FX
- Class 1 lasers conform to US 21CFR11, EN 60825-1, UL 1950 and IEC-825

Warranty:

- Five (5) Years, parts and labor

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Fast Ethernet Fiber-to-Fiber Converters

The pages that follow provide ordering information for Canary's Fast Ethernet Fiber-to-Fiber Converters products:

- **Standard Multi-mode to Single-mode series**
CFC-91XX & CFC-92XX
- **Standard Multi-mode to Multi-mode series**
CFC-21XX & CFC-22XX
- **Multi-mode to Single-Fiber, Bi-Directional Single-Mode**
CFC-9721A and CFC-9721B
- **Single-mode to Single-Fiber, Bi-Directional Single-Mode**
CFC-9791A and CFC-9791B
- **Multi-mode to Single-mode at ITU specified CWDM wavelengths**
CFC-21WXX



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Standard Fast Ethernet Fiber-to-Fiber Converters

CFC-91XX & CFC-92XX – Standard Multi-mode to Single-mode series: 100BASE-FX/FX

CFC-21XX & CFC-22XX – Standard Multi-mode to Multi-mode series: 100BASE-FX/FX

CFC models support data rates from 10 Mbps through 155 Mbps (OC-3). Outside of their designed data range, some models have successfully demonstrated ≤ 1 Mbps data transmission in field applications. Contact Canary for more information.

Standard CFC converters with multi-mode ports provide transmission distances of 2000 meters over 62.5/125 μm fiber; while standard converter models with single-mode ports provide transmission distances ranging from 30 to 80 kilometers over 9.0 μm single-mode fiber.



Illustrated: Fiber-to-Fiber converter with standard connectors

- Simple plug and go installation
- Auto-sensing 100/240 VAC power supply
- Optional: UK, Continental European power
- Automatic Link Fault Signaling (LFS) Forwards lost link signals to each connected host
- Diagnostic LEDs
- Additional models include: Long-range single-mode, Single-Fiber Bi-Directional single-mode and versions launching ITU specified CWDM transmitter wavelengths

Ordering Information

Model Numbers	Media Types	Optical Specifications								
		Min. Tx PWR	Max. Tx PWR	Rx Sensitivity	Min. PWR Budget	Max.PWR Budget	Max. Input PWR	Connector Type	Wavelengths (μm)	Transmit Distance
<i>Standard multi-mode fiber port connectors are designated by (21 or 22) e.g. (CFC-XX21) or (CFC-XX22) and have common power and sensitivity specifications. Special 10/100 Mbps / 850 μm multi-mode fiber port connectors are designated by (-72-) e.g. (CFC-XX72) and transmit 2 Km @ 10 Mb or 700 m @ 100 Mb.</i>										
CFC-2121 *	MM / MM	-20.0 dBm	-14.0 dBm	-31.0 dBm	11.0 dB	17.0 dB	-8.0 dBm	SC/SC	1310 μm	2 Km Each
CFC-2222 *	MM / MM	-20.0 dBm	-14.0 dBm	-31.0 dBm	11.0 dB	17.0 dB	-8.0 dBm	ST/ST	1310 μm	2 Km Each
CFC-XX72 10Mb *	XX / MM	-15.2 dBm	-15.2dBm	-34.4 dBm	19.2 dB	19.2 dB	NA	/ST	850 μm	2 Km/ 10Mb
CFC-XX72 100Mb*	XX / MM	/	/	/	11.7 dB	17.7 dB	NA	/ST	850 μm	700m/100Mb
CFC-XX71 100Mb**	XX / MM	-12.0 dBm	-4.0 dBm	-27.0 dBm	15.0 dB	23.0 dB	3.0 dBm	/SC	850 μm	2 Km/100Mb
<i>Specifications above in blue are for multi-mode, fiber connectors. Specifications below for single-mode, fiber connectors.</i>										
CFC-9191 *	SM / SM	-15.0 dBm	-8.0 dBm	-34.0 dBm	19.0 dB	26.0 dB	-7.0 dBm	SC/SC	1310 μm	30 Km Each
CFC-9172 100 Mb	MM / SM	-15.0 dBm	-8.0 dBm	-34.0 dBm	19.0 dB	26.0 dB	-7.0 dBm	SC/ST	1310 μm	700m / 30 Km
CFC-9272 100 Mb	MM / SM	-15.0 dBm	-8.0 dBm	-34.0 dBm	19.0 dB	26.0 dB	-7.0 dBm	ST/ST	1310 μm	700m / 30 Km
CFC-9121	MM / SM	-15.0 dBm	-8.0 dBm	-34.0 dBm	19.0 dB	26.0 dB	-7.0 dBm	SC/SC	1310 μm	2 Km / 30 Km
CFC-9122	MM / SM	-15.0 dBm	-8.0 dBm	-34.0 dBm	19.0 dB	26.0 dB	-7.0 dBm	SC/ST	1310 μm	2 Km / 30 Km
CFC-9221	MM / SM	-15.0 dBm	-8.0 dBm	-34.0 dBm	19.0 dB	26.0 dB	-7.0 dBm	ST/SC	1310 μm	2 Km / 30 Km
CFC-9222	MM / SM	-15.0 dBm	-8.0 dBm	-34.0 dBm	19.0 dB	26.0 dB	-7.0 dBm	ST/ST	1310 μm	2 Km / 30 Km
CFC-9121L	MM / SM	-5.0 dBm	0.0 dBm	-35.0 dBm	30.0 dB	35.0 dB	0.0 dBm	SC/SC	1310 μm	2 Km / 50 Km
CFC-9122L	MM / SM	-5.0 dBm	0.0 dBm	-35.0 dBm	30.0 dB	35.0 dB	0.0 dBm	SC/ST	1310 μm	2 Km / 50 Km
CFC-9121XL	MM / SM	-5.0 dBm	0.0 dBm	-35.0 dBm	30.0 dB	35.0 dB	0.0 dBm	SC/SC	1550 μm	2 Km / 80 Km
CFC-9121E85	MM / SM	-5.0 dBm	0.0 dBm	-35.0 dBm	30.0 dB	35.0 dB	0.0 dBm	SC/SC	1550 μm	2 Km / 80 Km
CFC-9122XL	MM / SM	-5.0 dBm	0.0 dBm	-35.0 dBm	30.0 dB	35.0 dB	0.0 dBm	SC/ST	1550 μm	2 Km / 80 Km
CFC-9122E85	MM / SM	-5.0 dBm	0.0 dBm	-35.0 dBm	30.0 dB	35.0 dB	0.0 dBm	SC/ST	1550 μm	2 Km / 80 Km

* Reference optical specifications for standard multi-mode or single-mode fiber port connectors. Other table specifications for alternate (second) fiber port connector.

** This CFC-XX71 version supports data rates of 10 & 100 Mbps through OC-3, uses an SC-type fiber connector and has more powerful 850 μm optics that supports two-Kilometer transmissions

NOTE: Most versions of CFC-XXXX standalone converters are available as card modules for Canary's CCM-1600 and CCN-2000 / CCN-0400 Chassis models. Please refer to the CCM-1600 and CCN-2000 / CCN-0400 Data Sheets for more information.

More versions of the CFC- Fiber-to-Fiber converters may be found on the Canary web site as they become available.



Fast Ethernet Fiber to Single-Fiber Bi-Directional Converters

CFC-972XA and CFC-972XB – Multi-mode to Single-Fiber, Bi-Directional Single-Mode

CFC-979XA and CFC-979XB – Single-mode to Single-Fiber, Bi-Directional Single-Mode

Canary's multi-mode to Single-Fiber, Bi-Directional single-mode converters deliver Fast data originating at low-cost multi-mode ports throughout the enterprise via a single strand of



Illustrated: Fast Ethernet Fiber to Single Fiber, Bi-Directional converter

single-mode fiber cable. CFC-972XA/B converters are designed to free-up fiber capacity by using dual wavelengths transmitted bi-directionally over a single strand of a duplex fiber pair. They are ideal for data intensive backbones in the enterprise or across the campus where extra fiber capacity is lacking but additional access is needed for redundancy, to add channels, or for alternate protocols.

Canary's Single-Fiber, Bi-Directional converters are functionally identical to standard units with the exception that units designated with an A transmit at 1550 nm and receive on 1310 nm, while B

- Simple plug and go installation
- Auto-sensing 100/240 VAC power supply
- Optional: UK, Continental European power
- Automatic Link Fault Signaling (LFS) Forwards lost link awareness to each connected host
- Diagnostic LEDs

units transmit at 1310 nm and receive on 1550 nm. Single-Fiber converters must be connected as complementary A & B pairs. (A and B units must be ordered in pairs because every A unit must be connected to a B unit.) Similarly, standalone A & B units can be connected to complementary A & B modules used in the CCN-2000/0400 or CCM-1600 Chassis families. Canary Single-Fiber converters are available with 20 kilometer, 40 kilometer or 60 kilometer transmission ranges.

Ordering Information

Model Numbers	Media Types	Optical Specifications						Connector Type	Wavelengths (nm)	Transmit Distance
		Min. Tx PWR	Max. Tx PWR	Rx Sensitivity	Min. PWR Budget	Max. PWR Budget	Max. Input PWR			
CFC-2121 **	MM / MM	-20.0 dBm	-14.0 dBm	-31.0 dBm	11.0 dB	17.0 dB	-8.0 dBm	SC/SC	1310 nm	2 Km Each
<i>Specifications above in blue are for multi-mode, fiber connectors. Specifications below for single-mode, fiber connectors.</i>										
CFC-9191 **	SM / SM	-15.0 dBm	-8.0 dBm	-34.0 dBm	19.0 dB	26.0 dB	-7.0 dBm	SC/SC	1310 nm	30 Km Each
CFC-9721A	MM / SM	-14.0 dBm	-8.0 dBm	-33.0 dBm	19.0 dB	25.0 dB	-3.0 dBm	SC/SC	1550/1310 nm	20 Km
CFC-9721B	MM / SM	-14.0 dBm	-8.0 dBm	-33.0 dBm	19.0 dB	25.0 dB	-3.0 dBm	SC/SC	1310/1550 nm	20 Km
CFC-9721E4A	MM / SM	-8.0 dBm	-3.0 dBm	-33.0 dBm	25.0 dB	30.0 dB	-3.0 dBm	SC/SC	1550/1310 nm	40 Km
CFC-9721E4B	MM / SM	-8.0 dBm	-3.0 dBm	-33.0 dBm	25.0 dB	30.0 dB	-3.0 dBm	SC/SC	1310/1550 nm	40 Km
CFC-9721E6A	MM / SM	-5.0 dBm	0.0 dBm	-33.0 dBm	28.0 dB	33.0 dB	-3.0 dBm	SC/SC	1310/1550 nm	60 Km
CFC-9721E6B	MM / SM	-5.0 dBm	0.0 dBm	-33.0 dBm	28.0 dB	33.0 dB	-3.0 dBm	SC/SC	1310/1550 nm	60 Km
CFC-9791A	SM / SM	-14.0 dBm	-8.0 dBm	-33.0 dBm	19.0 dB	25.0 dB	-3.0 dBm	SC/SC	1550/1310 nm	20 Km
CFC-9791B	SM / SM	-14.0 dBm	-8.0 dBm	-33.0 dBm	19.0 dB	25.0 dB	-3.0 dBm	SC/SC	1310/1550 nm	20 Km
CFC-9791E4A	SM / SM	-8.0 dBm	-3.0 dBm	-33.0 dBm	25.0 dB	30.0 dB	-3.0 dBm	SC/SC	1550/1310 nm	40 Km
CFC-9791E4B	SM / SM	-8.0 dBm	-3.0 dBm	-33.0 dBm	25.0 dB	30.0 dB	-3.0 dBm	SC/SC	1310/1550 nm	40 Km
CFC-9791E6A	SM / SM	-5.0 dBm	0.0 dBm	-33.0 dBm	28.0 dB	33.0 dB	-3.0 dBm	SC/SC	1310/1550 nm	60 Km
CFC-9791E6B	SM / SM	-5.0 dBm	0.0 dBm	-33.0 dBm	28.0 dB	33.0 dB	-3.0 dBm	SC/SC	1310/1550 nm	60 Km

** Reference optical specifications for standard multi-mode or single-mode fiber port connectors. Other table specifications for alternate (second) fiber port connector.

* NOTE: CFC-972XA/B, CFC-972XE4A/B, CFC-972XE6A/B standalone converters are available as card modules for Canary's CCN-2000 / CCN-0400 and CCM-1600 chassis models. Please refer to the CCM-1600 and CCN-2000 / CCN-0400 Data Sheets for more information.

More versions of the CFC-972XA/B series may be found on the Canary web site as they become available.



Fast Ethernet Fiber-to-Fiber CWDM Converters

CFC-21W-XX – Multi-mode to Single-mode with ITU-specified CWDM wavelengths

CFC-91W-XX – Single-mode to Single-mode with ITU-specified CWDM wavelengths

Canary's CFC-XXW-XX series of Fast Ethernet, Coarse Wavelength Division Multiplexing (CWDM) converters provide an economical way to launch multiple Fast Ethernet channels through CWDM Multiplexers for transport and access to high capacity CWDM-based networks.

Coarse Wavelength Division Multiplexing reduces network congestion with a minimum infrastructure investment. Using discrete wavelengths (one per channel), multiple data channels can be transported in parallel over a single-mode fiber cable.

Canary CWDM converters are designed to meet industry needs for an economical way to access CWDM point-to-point campus and metro-ring networks. They are used with Main Distribution Frame (central office) Multiplexer / De-multiplexers and with remote-site, Optical Add/Drop Multiplexers (OADMs), to insert and/or recover, optical traffic from single-mode fiber segments. Specific models provide transmission on one of eight discrete λ s, each an ITU specified, CWDM wavelength. Standard versions support Kilometer transmission distances.

- Simple plug and go installation
- Auto-sensing 100/240 VAC power supply
- Optional: UK, Continental European power
- Automatic Link Fault Signaling (LFS) Forwards lost link signals to each connected host
- Diagnostic LEDs

CWDM converters are functionally identical to standard units with the exception that units at opposite ends of a fiber link must be models with identical wavelengths in order to maintain a common channel link e.g. if one device is operating at 1470 nm, the second must transmit and receive on the same CWDM wavelength. Similarly, a standalone 1470 nm unit can be connected to a CCM-1600 or CCN-2000 / CCN-0400 chassis module with the same wavelength.

Ordering Information

Model Numbers	Media Types	Min. Tx PWR	Max. Tx PWR	Rx Sensitivity	Min. PWR Budget	Max.PWR Budget	Max. Input PWR	Connector Type	Wavelengths (nm)	Transmit Distance
<i>Standard multi-mode fiber port connectors are designated by (21 or 22) and have common power & sensitivity specifications: PWR: -20/ -14 dBm; Sensitivity: -31 dBm</i>										
<i>Standard single-mode fiber port connectors are designated by (-91-) and have common power & sensitivity specifications: PWR: -15/ -8 dBm; Sensitivity: -34 dBm</i>										
CFC-2121 **	MM / MM	-20.0 dBm	-14.0 dBm	-31.0 dBm	11.0 dB	17.0 dB	-8.0 dBm	SC/SC	1310 nm	2 Km Each
<i>Specifications above in blue are for multi-mode, fiber connectors. Specifications below for single-mode, fiber connectors.</i>										
CFC-9191 **	SM / SM	-15.0 dBm	-8.0 dBm	-34.0 dBm	19.0 dB	26.0 dB	-7.0 dBm	SC/SC	1310 nm	30 Km Each
CFC-21W-XX	MM / SM	-5.0 dBm	0.0 dBm	-34.0 dBm	29.0 dB	34.0 dB	-3.0 dBm	SC/SC	CWDM	2Km / 80 Km
CFC-21W-XXE9	MM / SM	-3.0 dBm	2.0 dBm	-34.0 dBm	31.0 dB	36.0 dB	-3.0 dBm	SC/SC	CWDM	2Km / 100Km
CFC-91W-XX	SM / SM	-5.0 dBm	0.0 dBm	-34.0 dBm	29.0 dB	34.0 dB	-3.0 dBm	SC/SC	CWDM	30Km / 80Km
CFC-91W-XXE9	SM / SM	-3.0 dBm	2.0 dBm	-34.0 dBm	31.0 dB	36.0 dB	-3.0 dBm	SC/SC	CWDM	30Km/100Km
** Reference optical specifications for standard multi-mode or single-mode fiber port connectors. Other table specifications for alternate (second) fiber port connector.										
NOTE 1: W-XX designates one of eight CWDM optical transmission wavelengths (λ) e.g. CFC-91W-47=1470nm or CFC-91W-61=1610nm transmission. Please refer to other CWDM (Coarse Wavelength Division Multiplexing) Data Sheets for additional information.										
NOTE 2: Canary CWDM standalone converters are available as card modules for the CCM-1600 and SNMP manageable CCN-2000 / CCN-0400 Chassis models. Please refer to the CCM-1600 and CCN-2000 / CCN-0400 Data Sheets for more information.										
Please refer to the Standalone / Rackable CWDM data pages for information on Passive Optical Multiplexer / De-Multiplexers and OADMs.										
There are eighteen CWDM wavelengths (λs) specified. Eight standard wavelengths plus four O-band λs are usable over most standard single-mode fiber.										
Canary offers products for the standard eight wavelengths plus four O-band λs: 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610 nm + 1290, 1310, 1330, 1350 nm										
More versions of the CFC-21W-XX or CFC-91W-XX series may be found on the Canary web site as they become available.										

