

**Dynamic Fiber Conversion System
100Tx-2Fx & 100Tx-2Tx User Manual**

DFCS 100Tx-2Fx Dual Fiber Modules			
Connector Type	Distances	ST	SC
MM	5km	LMC3044C	LMC3047C
SM	30km	LMC3045C	LMC3048C
SM	60km	LMC3046C	LMC3049C
DFCS 100Tx-2Tx Dual Fiber Modules			
Connector Type	Distances	RJ-45	
UTP	100m	LMC3043C	

CUSTOMER SUPPORT INFORMATION
 Order toll-free in the U.S.: Call 877-877-BBOX (outside U.S. call 724-746-5500)
 FREE technical support 24 hours a day, 7 days a week. Call 724-746-5500 or fax 724-746-0746
 Mailing address: Black Box Corporation, 1000 Park Drive, Lawrence, PA 15055-1018
 Web site: www.blackbox.com
 E-mail: info@blackbox.com

Description:

The DFCS Redundant Fast Ethernet manageable media converters are members of the modular DFCS product family. The following models are described:

- 100Tx-2Fx: 100Base-Tx UTP to dual 100Base-Fx dual fiber
- 100Tx-2Tx: 100Base-Tx UTP to dual 100Base-Tx UTP

The DFCS Redundant Fast Ethernet modules are intended for use in networks that require fiber or copper link redundancy. During normal operations Port A is the active primary and Port B is the backup secondary. When loss of link on Port A is detected, the module automatically switches to transmitting on Port B. With a switch over time of less than 100 microseconds, these modules provide the rapid response time required for ultra critical applications. Note: After the link is switched, there will be a 5 second delay before that link can be reestablished.

Application Examples:

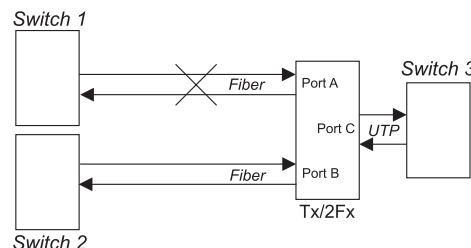


Fig 1: Redundant Switch Example

In this example, redundant Switches 1 and 2 are connected to Switch 3 via a 100Tx-2Fx converter. If power fails in Switch 1, or if there is a loss of link in the fiber cable, the 100Tx-2Fx converter switches to transmitting on port B and routes data flow to Switch 2.

LED Indicators:

LED	Color	Description
Power:	Yellow	On--Power
Port A Link:	Green	On--Link / Blink--activity Steady Blink--Standby mode
Port B Link:	Green	On--Link / Blink--activity Steady Blink--Standby mode
Port C Link:	Green	On--Link / Blink--activity
Port A Select:	Green	On--Active port / Blink--remote side broken
Port B Select:	Green	On--Active port / Blink--remote side broken
UTP Auto:	Green	On--Auto-Negotiation enabled
UTP FDx:	Green	On--Full-Duplex detected

Mounting and Cable Attachment:

DFCS modules are hot-swappable and can be installed into any chassis in the DFCS family.

- Carefully slide the DFCS module into the installation slot, aligning the module with the installation guides. NOTE: Ensure that module is firmly seated against the backplane.
- Secure the module by securing the panel fastener screw (attached to module) to chassis front.
- Attach the UTP port of Port C via a category 5 cable to a 100Base-Tx Ethernet device.
- DFCS Redundant Fast Ethernet Modules should be deployed in pairs with Port A linked to Port A and Port B linked to Port B between the two modules. If using DFCS Redundant Fast Ethernet Modules with redundant Fx or Fx SF ports, attach Port A fiber ports and Port B fiber ports of the two modules via an appropriate multimode or single-mode fiber cable. The DFCS transmit (Tx) must attach to the receive side on other device; the receive (Rx) must attach to the transmit. If using DFCS Redundant Fast Ethernet Modules with redundant Tx ports, attach the UTP ports of the two modules' Port A via a category 5 cable and UTP ports of the two modules' Port B via a category 5 cable.

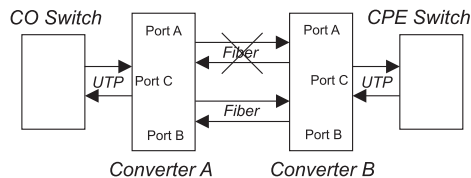


Fig 2: Redundant Fiber to Customer

In this example, data flow from a core switch at the Central Office is converted from UTP to redundant fiber, and converted back to UTP, where it is connected to an edge switch at the Customer Premises. If there is a loss of link in fiber Port A, the 100Tx-2Fx converter switches to transmitting on fiber Port B, without a service disruption to the mission-critical customer.

Link Modes:

In order to accommodate different user needs, the Redundant DFCSs support four different linking modes. It is recommended keeping the Redundant DFCSs in the factory default Link Segment (LS) setting.

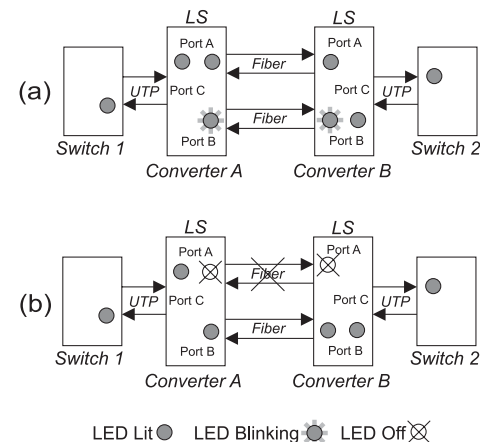


Fig 3: Link Segment Mode

In "Link Segment" (LS), sometimes referred to as the "Normal" mode, a port transmits a "Link" signal independently of any received "Link" at any other port. For example, the UTP transmits a "Link" regardless of the fiber receiving a "Link" [Fig 2(a) & (b)]. Figure 2(a) shows the state when all links are functioning correctly. Port A LEDs indicate link and activity, while the Port B LEDs blink at one Hertz to indicate they are not active, but are in "Standby". Figure 2(b) shows that when the fiber link to Port A is broken, Port B becomes active.

TRADEMARKS

All applied-for and registered trademarks are the property of their respective owners.

FEDERAL COMMUNICATIONS COMMISSION AND CANADIAN DEPARTMENT OF COMMUNICATIONS RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to be cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.

In "Link Propagate" (LP), sometimes referred to as "Link Loss Carry Forward", a port transmits a "Link" signal only when receiving a "Link" at its other port. For example, the UTP transmits a "Link" only when receiving a "Link" at the fiber port (Not Shown).

In "Remote Fault Detection" (RFD), the UTP port transmits a "Link" signal only when receiving a "Link" at the fiber port. The fiber port transmits a "Link" only when receiving "Link" signals both at the fiber port and the UTP port. As a result, fiber faults (no "Link" received at the fiber) are looped-back and can be reported to the network's core (Not Shown).

In "Symmetrical Fault Detection" (SFD), the UTP port transmits a "Link" signal only when receiving a "Link" at the fiber port. The fiber port transmits a "Link" only when receiving "Link" signal both at the fiber port and the UTP port. As a result, fiber faults (no "Link" received at the fiber) are looped back and can be reported to the network core. In addition, connecting two back-to-back converters which are both set to SFD facilitates dual-loop-back where fiber faults are reported to both ends of the network (Not Shown).

Board Mounted Dip-Switch Settings:

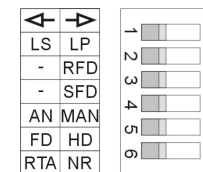


Fig 4: Board Mounted Dip-Switches

"LS/LP" Link Segment/Propagate Dip-Switch:

This dip-switch controls Link Propagation (LP, sometimes referred to as LLC--Link Loss Carry Forward) or Link Segment (LS). In the "ON" position, LP mode is enabled. When in the "OFF" position (factory default), LS mode is enabled.

NORMAS OFICIALES MEXICANAS (NOM)

ELECTRICAL SAFETY STATEMENT

- Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
- Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
- Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
- Todas las instrucciones de operación y uso deben ser seguidas.
- El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
- El aparato eléctrico debe ser usado únicamente con carritos o pedales que sean recomendados por el fabricante.
- El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
- Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá de lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
- El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquear la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
- El equipo eléctrico debe ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
- El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
- Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
- Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
- El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
- En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
- El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

Note that for "LS" mode, "LP", "RFD" and "SFD", dip-switches must be in the Left position (factory setting).

Note that setting more than one of the mode switches ("LP", "RFD" or "SFD") to the Right position on the same module is an illegal mode that will result in unpredictable behavior.

"RFD" Remote Fault Detection:

When in the "RFD" position, the Remote Fault Detection (RFD) mode is enabled.

Connecting two converters with both set to RFD mode is illegal and will cause a "deadly embrace" lockup.

"SFD" Symmetrical Fault Detection:

When in the "SFD" position, the Symmetrical Fault Detection (SFD) mode is enabled. Note that for the DFCS Redundant Fast Ethernet modules when loss of "Link" occurs between two modules, both redundant connections must have a loss of incoming "Link" signal in order for this to occur.

"AN/MAN" UTP Auto/Manual Switch:

Setting this dip-switch to "Auto" (factory setting) enables the UTP Port C to determine the mode automatically. This feature allows connections with devices that do not auto-negotiate properly.

"FD/HD" UTP Full/Half Duplex Switch:

When the "Auto/Manual" dip-switch is in "Manual" position, the "UTP Full/Half Duplex" dip-switch determines the duplex operation mode for the UTP port. When set to "Full Duplex" (factory setting), the UTP port will operate in full duplex. When set to "Half Duplex" the UTP port will operate in half duplex. Adjust the half/full-duplex switch to match the connecting device and check for link status.

"RTA/NR" Return to Port A Switch:

When the "Return to Port A" switch is in "RTA" position (factory default), link reestablishment on Port A will immediately return

- Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
- Servicio por personal calificado deberá ser provisto cuando:
 - El cable de poder o el contacto ha sido dañado; u
 - Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - El aparato ha sido expuesto a la lluvia; o
 - El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - El aparato ha sido tirado o su cubierta ha sido dañada.

data transmission to Port A. When the switch is set to "NR", Port B will continue to be used for transmitting data even after link has been reestablished on Port A.

Note that modules connected together must be set to the same mode for correct operation.

"RJ45 Cross-Over" Switch (not shown):

When connecting the UTP to a hub or switch, set switch to "Straight-Through" (factory setting). When connecting to a workstation, set to "Cross-Over."

Mounting and Cable Attachment:

DFCS modules are hot-swappable and can be installed into any chassis in the DFCS family.

- Carefully slide the DFCS module into the installation slot, aligning the module with the installation guides. NOTE: Ensure that module is firmly seated against the backplane.
- Secure the module by securing the panel fastener screw (attached to module) to chassis front.
- Attach the UTP port of Port C via a category 5 cable to a 100Base-Tx Ethernet device.
- DFCS Redundant Fast Ethernet Modules should be deployed in pairs with Port A linked to Port A and Port B linked to Port B between the two modules. If using DFCS Redundant Fast Ethernet Modules with redundant Fx or Fx SF ports, attach Port A fiber ports and Port B fiber ports of the two modules via an appropriate multimode or single-mode fiber cable. The DFCS transmit (Tx) must attach to the receive side on other device; the receive (Rx) must attach to the transmit. If using DFCS Redundant Fast Ethernet Modules with redundant Tx ports, attach the UTP ports of the two modules' Port A via a category 5 cable and UTP ports of the two modules' Port B via a category 5 cable.

LED Indicators:

LED	Color	Description
Power:	Yellow	On--Power
Port A Link:	Green	On--Link / Blink--activity Steady Blink--Standby mode
Port B Link:	Green	On--Link / Blink--activity Steady Blink--Standby mode
Port C Link:	Green	On--Link / Blink--activity
Port A Select:	Green	On--Active port / Blink--remote side broken
Port B Select:	Green	On--Active port / Blink--remote side broken
UTP Auto:	Green	On--Auto-Negotiation enabled
UTP FDX:	Green	On--Full-Duplex detected

SPECIFICATIONS		
Model	100Tx-2Fx	100Tx-2Tx
Protocols	100Base-Fx, 100Base-Tx	100Base-Tx
Copper Connectors	RJ-45	RJ-45
Fiber Connectors	SC, ST	-
Controls	UTP X-over, LS/LP, RFD, SFD, UTP Auto/Man, FD/HD	UTP X-over, LS/LP, RFD, SFD, UTP Auto/Man, FD/HD
LED Displays	Pwr, FO link, UTP link, SEL, Auto, FD/HD, RTA	Pwr, UTP link, SEL, Auto, FD/HD, RTA
Dimensions	W:0.85" x D:4.5" x H:2.8"	W:0.85" x D:4.5" x H:2.8"
Weight	8 oz.	8 oz.
Compliance	UL, CE, FCC Class A	UL, CE, FCC Class A
Temperature -Operating -Storage	0 to 50 C -40 to 80 C	0 to 50 C -40 to 80 C
Altitude	0-10,000 ft	0-10,000 ft
MTBF (hrs)	1,175,000	1,235,000

TRADEMARKS

All applied-for and registered trademarks are the property of their respective owners.

FEDERAL COMMUNICATIONS COMMISSION AND CANADIAN DEPARTMENT OF COMMUNICATIONS RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to be cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.

NORMAS OFICIALES MEXICANAS (NOM)

ELECTRICAL SAFETY STATEMENT

- Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
- Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
- Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
- Todas las instrucciones de operación y uso deben ser seguidas.
- El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
- El aparato eléctrico debe ser usado únicamente con carritos o pedales que sean recomendados por el fabricante.
- El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
- Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá de lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
- El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
- El equipo eléctrico debe ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
- El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
- Precación debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
- Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
- El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
- En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
- El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.



**Dynamic Fiber Conversion System
100Tx-2Fx & 100Tx-2Tx User Manual**

DFCS 100Tx-2Fx Dual Fiber Modules			
Connector Type	Distances	ST	SC
MM	5km	LMC3044C	LMC3047C
SM	30km	LMC3045C	LMC3048C
SM	60km	LMC3046C	LMC3049C
DFCS 100Tx-2Tx Dual Fiber Modules			
Connector Type	Distances	RJ-45	
UTP	100m	LMC3043C	

Description:

The DFCS Redundant Fast Ethernet manageable media converters are members of the modular DFCS product family. The following models are described:

- 100Tx-2Fx: 100Base-Tx UTP to dual 100Base-Fx dual fiber
- 100Tx-2Tx: 100Base-Tx UTP to dual 100Base-Tx UTP

The DFCS Redundant Fast Ethernet modules are intended for use in networks that require fiber or copper link redundancy. During normal operations Port A is the active primary and Port B is the backup secondary. When loss of link on Port A is detected, the module automatically switches to transmitting on Port B. With a switch over time of less than 100 microseconds, these modules provide the rapid response time required for ultra critical applications. Note: After the link is switched, there will be a 5 second delay before that link can be reestablished.

Application Examples:

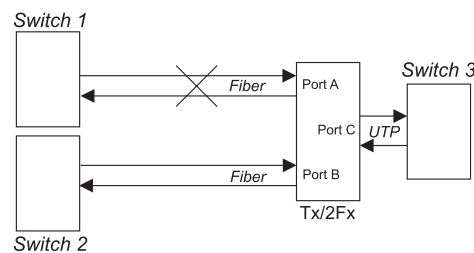


Fig 1: Redundant Switch Example

In this example, redundant Switches 1 and 2 are connected to Switch 3 via a 100Tx-2Tx converter. If power fails in Switch 1, or if there is a loss of link in the fiber cable, the 100Tx-2Tx converter switches to transmitting on port B and routes data flow to Switch 2.

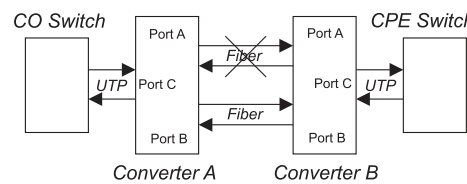


Fig 2: Redundant Fiber to Customer

In this example, data flow from a core switch at the Central Office is converted from UTP to redundant fiber, and converted back to UTP, where it is connected to an edge switch at the Customer Premises. If there is a loss of link in fiber Port A, the 100Tx-2Fx converter switches to transmitting on fiber Port B, without a service disruption to the mission-critical customer.

Link Modes:

In order to accommodate different user needs, the Redundant DFCSs support four different linking modes. It is recommended keeping the Redundant DFCSs in the factory default Link Segment (LS) setting.

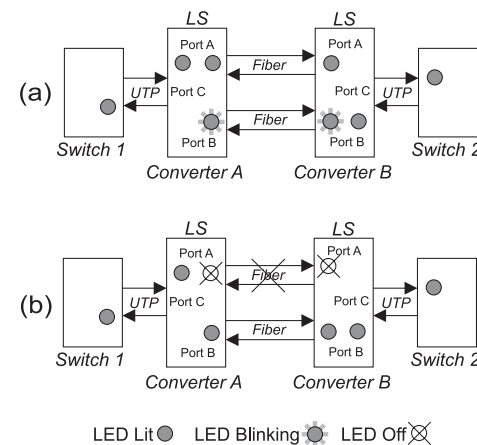


Fig 3: Link Segment Mode

In "Link Segment" (LS), sometimes referred to as the "Normal" mode, a port transmits a "Link" signal independently of any received "Link" at any other port. For example, the UTP transmits a "Link" regardless of the fiber receiving a "Link" [Fig 2(a) & (b)]. Figure 2(a) shows the state when all links are functioning correctly. Port A LEDs indicate link and activity, while the Port B LEDs blink at one Hertz to indicate they are not active, but are in "Standby". Figure 2(b) shows that when the fiber link to Port A is broken, Port B becomes active.

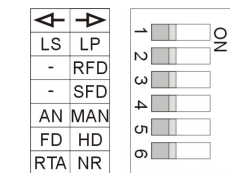


Fig 4: Board Mounted Dip-Switches

"LS/LP" Link Segment/Propagate Dip-Switch:

This dip-switch controls Link Propagation (LP, sometimes referred to as LLC-Link Loss Carry Forward) or Link Segment (LS). In the "ON" position, LP mode is enabled. When in the "OFF" position (factory default), LS mode is enabled.

- Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
- Servicio por personal calificado deberá ser provisto cuando:
 - El cable de poder o el contacto ha sido dañado; u
 - Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - El aparato ha sido expuesto a la lluvia; o
 - El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - El aparato ha sido tirado o su cubierta ha sido dañada.

CUSTOMER SUPPORT INFORMATION
Order toll-free in the U.S.: Call 877-877-BBOX (outside U.S. call 724-746-5500)
FREE technical support 24 hours a day, 7 days a week; Call 724-746-5500 or fax 724-746-0746
Mailing address: Black Box Corporation, 1000 Park Drive, Lawrence, PA 15055-1018
Web site: www.blackbox.com
E-mail: info@blackbox.com