BLACK BOX®
NETWORK SERVICES

Dynamic Fiber Conversion System
4Tx/L2 User Manual

DFCS 4Tx/L2		
Connector Type	**Distance**	**Model**
RJ-45	100 m	LMC3050C

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* 4Tx/L2 is a 4-port 10/100 Ethernet Switch Module that supports the IEEE 802.3 Ethernet standard and allows connectivity between 10Base-T and 100Base-Tx unshielded twisted pair (UTP) devices on any of its front-plane ports. The 4Tx/L2 fits the DFCS module standard and can be used in any DFCS chassis.

The 4Tx/L2 supports Half-Duplex and Full-Duplex modes and features an automatic cross-over UTP circuitry that facilitates easy attachment to hubs, switches and workstations.

All four front-plane ports operate in an auto-negotiation mode and can auto-sense the proper speed and duplex mode for optimal operation. All four front-plane ports can be set via the network management to any desired speed and duplex mode. Two of the four can also be set manually via dip-switches.

The 4Tx/L2 can be used as a standard compact four-port 10/100 switch. It can also use its two additional 10/100 backplane ports to connect to adjacent modules and accommodate flexible network configurations such as in-band management and multi-module configurations.

The 4Tx/L2 can be used in an unmanaged or managed fashion. When unmanaged, it can be installed in a chassis without a SNMP and Telnet Management Module (MGT). To be managed, a MGT module must be installed in the same chassis

Port Structure

Using a 6-port-switch design, the 4Tx/L2 features four front-plane 10/100 UTP ports and two 10/100 Ethernet backplane ports ("A" and "B") that can connect to adjacent

modules within the same chassis.

The four front-plane 10/100 ports are designated as P1-P4 where P1 is located at the top (closest to the power LED) and P4 is at the bottom (closest to the fastener screw).

When the 4Tx/L2 A and B ports are enabled (using the "BP A EN" or "BP B EN" dip-switches), they connect via the chassis' backplane to the slots to the left and right of the 4Tx/L2 module. When another switch-based module with backplane port connections such as a 10/100T-Fx or a MGT is installed in an adjacent slot, it can be connected via the backplane to the 4Tx/L2 to facilitate a multi-module configuration.

Application Example

In-Band Managed Switch with Fiber Uplink

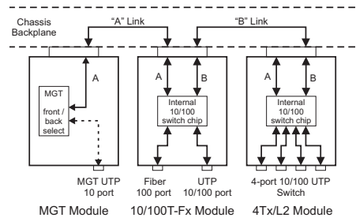

Fig. 1 In-Band Managed Switch with Fiber Uplink

Fig. 1, depicts a chassis with three modules plugged into three of its adjacent backplane slots. The adjacent slots are connected via the backplane using the A and B 10/100 Ethernet links. In this example, a 10/100T-Fx (a 10/100

converter with fiber port) in the center slot connects to the slot on its left using the A link and to the slot on its right using the B link.

In this example, the module on the left is a MGT Module and it connects via its A backplane port to the 10/100T-Fx facilitating "In-Band" management (via the fiber uplink). The module on the right is the 4Tx/L2 4-port switch module and it connects via its B backplane port to the 10/100T-Fx facilitating a 5-port 10/100 Ethernet switch with a fiber uplink configuration. This 3-module configuration provides an effective 5-port 10/100 managed switch with a fiber uplink configuration.

This example shows how the 4Tx/L2 can be used as a managed or unmanaged switch.

Board Mounted Dip-Switch Settings

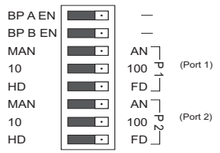

Fig 2. Board Mounted Dip Switches

Backplane Port A "BP A EN" Dip-Switch

When the "BP A EN" dip-switch is in the "right" position (factory setting), the A backplane Port is disabled and the module is disconnected from the A backplane Link. When in the "left" position, the A backplane Port is enabled and connects the 4Tx/L2 to the A backplane Link.

Backplane Port A "BP A EN" Dip-Switch

When the "BP B EN" dip-switch is in the "right" position (factory setting), the B backplane Port is disabled and the module is disconnected from the B backplane Link. When in the "left" position, the B backplane Port is enabled and connects the 4Tx/L2 to the B backplane Link.

Port 1 "AN/MAN" Dip-Switch:

When in "AN" (Auto-Negotiation) "right" position (factory setting), Port 1 (P1) auto-negotiates and matches the 10/100 speed and duplex mode of a mating auto-negotiating UTP port.

When in "MAN" (Manual) "left" position, the port does not auto-negotiate and operates in the mode selected by the P1 "10/100" and "HD/FD" dip-switches.

Port 1 "10/100" Speed Selection Dip-Switch

When the "AN/MAN" dip-switch is in the "MAN" position, the P1 "10/100" dip-switch selects the speed of the P1 port. When in the right "100" position (factory setting), P1 operates at 100 Mbps. When in the left "10" position, P1 operates at 10 Mbps.

Port 1 "HD/FD" Full/Half Duplex Dip-Switch:

When the P1 "AN/MAN" switch is in the "MAN" position, the P1 "HD/FD" switch selects the duplex mode of the P1 port. When in the "FD" (Full Duplex) "right" position (factory setting), P1 operates in full duplex. When in the "HD" (Half Duplex) "left" position, P1 operates in half duplex.

Port 2 "AN/MAN" Dip-Switch:

When in "AN" (Auto-Negotiation) "right" position (factory setting), Port 2 (P2) auto-negotiates and matches the 10/100 speed and duplex mode of a mating auto-negotiating UTP port.

When in "MAN" (Manual) "left" position, the port does not auto-negotiate and operates in the mode selected by the P2 "10/100" and "HD/FD" dip-switches.

Port 2 "10/100" Speed Selection Dip-Switch

When the "AN/MAN" dip-switch is in the "MAN" position, the P2 "10/100" dip-switch selects the speed of the P2 port. When in the right "100" position (factory setting), P2 operates at 100 Mbps. When in the left "10" position, P2 operates at 10 Mbps.

Port 2 "HD/FD" Full/Half Duplex Dip-Switch:

When the P2 "AN/MAN" switch is in the "MAN" position, the P2 "HD/FD" switch selects the duplex mode of the P2 port. When in the "FD" (Full Duplex) "right" position (factory setting), P2 operates in full duplex. When in the "HD" (Half Duplex) "left" position, P2 operates in half duplex.

Note that attaching an auto-negotiating UTP port to a non-auto-negotiating (manual / forced / hard-coded) UTP port may result in an unpredictable port setting with excessive collisions and poor link performance. When operating in manual mode, both mating ports MUST be set manually to the same speed and duplex mode.

"RJ45 Cross-Over" Slide-Switch:

When the P1 "AN/MAN" switch is in the "MAN" position, the "RJ45 Cross-Over" slide-switch controls the "Straight-Through" or "Crossed" wiring of the P1 port. When connecting P1 to a hub or switch, set slide-switch to the "Switch" (factory setting) position. When connecting to a workstation, set to "Workstation".

Software Controlled Switch Settings

When managed, the following 4Tx/L2 switch settings can be controlled:

- A and B Backplane Ports control.
- P1-P4 Auto/Manual Negotiation mode selection
- P1-P4 10/100 speed selection
- P1-P4 Duplex mode selection

The last to configure a mode (software or the physical board mounted dip-switch) controls the mode of operation.

See respective software manuals for details.

LED Indicators

LED	Color	Description
Power:	Yellow	On--Power
Port 1-100 Link:	Green	On--Link / Blink--activity
Port 1-10 Link:	Green	On--Link / Blink--activity
Port 2-100 Link:	Green	On--Link / Blink--activity
Port 2-10 Link:	Green	On--Link / Blink--activity
Port 3-100 Link:	Green	On--Link / Blink--activity
Port 3-10 Link:	Green	On--Link / Blink--activity
Port 4-100 Link:	Green	On--Link / Blink--activity
Port 4-10 Link:	Green	On--Link / Blink--activity

Mounting and Cable Attachment

DFCS modules are hot-swappable and can be installed into any *DFCS* chassis.

1. Using the chassis' module guides for alignment, insert the module into the selected slot and secure using the front panel fastener screw.
2. Using a Category 5 cable attach the UTP P1-P4 ports to mating 10 or 100Base-Tx Ethernet device ports.
3. Set the BP A EN and BP B EN Backplane Port enable dip-switches as needed.
4. Set the AN/MAN Auto-Negotiation, 10/100 speed and HD/FD duplex mode dip-switches as needed.

SPECIFICATIONS	
Model	4Tx/L2
Protocols	10Base-T or 100Base-Tx
Connectors	RJ-45
Controls	UTP X-over (Port 1), Auto/Man, 10/100, FD/HD
LED Displays	Pwr, 10 link (1 per port), 100 link (1 per port)
Dimensions	W:0.85" x D:4.5" x H:2.8"
Weight	8 oz.
Compliance	UL, CE, FCC Class A
Temperature -Operating -Storage	0 to 50 C -40 to 80 C
Altitude	0-10,000 ft
MTBF (hrs)	1,150,000

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 numéirques de las 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

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. 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.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedelstales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. 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 or 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.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u ostros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precación debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.
13. 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.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
    A: El cable de poder o el contacto ha sido dañado; u
    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o
    C: El aparato ha sido expuesto a la lluvia; o
    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
    E: El aparto ha sido tirado o su cubierta ha sido dañada.

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040-L3050-001A 11/03

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Port Structure

Using a 6-port-switch design, the 4Tx/L2 features four front-plane 10/100 UTP ports and two 10/100 Ethernet backplane ports ("A" and "B") that can connect to adjacent

modules within the same chassis.

The four front-plane 10/100 ports are designated as P1-P4 where P1 is located at the top (closest to the power LED) and P4 is at the bottom (closest to the fastener screw).

When the 4Tx/L2 A and B ports are enabled (using the "BP A EN" or "BP B EN" dip-switches), they connect via the chassis' backplane to the slots to the left and right of the 4Tx/L2 module. When another switch-based module with backplane port connections such as a 10/100T-Fx or a MGT is installed in an adjacent slot, it can be connected via the backplane to the 4Tx/L2 to facilitate a multi-module configuration.

Application Example

In-Band Managed Switch with Fiber Uplink

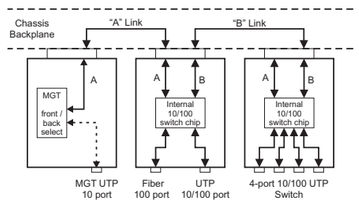

Fig. 1 In-Band Managed Switch with Fiber Uplink

Fig. 1, depicts a chassis with three modules plugged into three of its adjacent backplane slots. The adjacent slots are connected via the backplane using the A and B 10/100 Ethernet links. In this example, a 10/100T-Fx (a 10/100

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Altitude	0-10,000 ft
MTBF (hrs)	1,150,000

converter with fiber port) in the center slot connects to the slot on its left using the A link and to the slot on its right using the B link.

In this example, the module on the left is a MGT Module and it connects via its A backplane port to the 10/100T-Fx facilitating "In-Band" management (via the fiber uplink). The module on the right is the 4Tx/L2 4-port switch module and it connects via its B backplane port to the 10/100T-Fx facilitating a 5-port 10/100 Ethernet switch with a fiber uplink configuration. This 3-module configuration provides an effective 5-port 10/100 managed switch with a fiber uplink configuration.

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Board Mounted Dip-Switch Settings

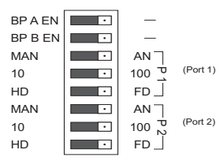

Fig 2. Board Mounted Dip Switches

Backplane Port A "BP A EN" Dip-Switch

When the "BP A EN" dip-switch is in the "right" position (factory setting), the A backplane Port is disabled and the module is disconnected from the A backplane Link. When in the "left" position, the A backplane Port is enabled and connects the 4Tx/L2 to the A backplane Link.

TRADEMARKS

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

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Backplane Port A "BP A EN" Dip-Switch

When the "BP B EN" dip-switch is in the "right" position (factory setting), the B backplane Port is disabled and the module is disconnected from the B backplane Link. When in the "left" position, the B backplane Port is enabled and connects the 4Tx/L2 to the B backplane Link.

Port 1 "AN/MAN" Dip-Switch:

When in "AN" (Auto-Negotiation) "right" position (factory setting), Port 1 (P1) auto-negotiates and matches the 10/100 speed and duplex mode of a mating auto-negotiating UTP port.

When in "MAN" (Manual) "left" position, the port does not auto-negotiate and operates in the mode selected by the P1 "10/100" and "HD/FD" dip-switches.

Port 1 "10/100" Speed Selection Dip-Switch

When the "AN/MAN" dip-switch is in the "MAN" position, the P1 "10/100" dip-switch selects the speed of the P1 port. When in the right "100" position (factory setting), P1 operates at 100 Mbps. When in the left "10" position, P1 operates at 10 Mbps.

Port 1 "HD/FD" Full/Half Duplex Dip-Switch:

When the P1 "AN/MAN" switch is in the "MAN" position, the P1 "HD/FD" switch selects the duplex mode of the P1 port. When in the "FD" (Full Duplex) "right" position (factory setting), P1 operates in full duplex. When in the "HD" (Half Duplex) "left" position, P1 operates in half duplex.

Port 2 "AN/MAN" Dip-Switch:

When in "AN" (Auto-Negotiation) "right" position (factory setting), Port 2 (P2) auto-negotiates and matches the 10/100 speed and duplex mode of a mating auto-negotiating UTP port.

When in "MAN" (Manual) "left" position, the port does not auto-negotiate and operates in the mode selected by the P2 "10/100" and "HD/FD" dip-switches.

Port 2 "10/100" Speed Selection Dip-Switch

When the "AN/MAN" dip-switch is in the "MAN" position, the P2 "10/100" dip-switch selects the speed of the P2 port. When in the right "100" position (factory setting), P2 operates at 100 Mbps. When in the left "10" position, P2 operates at 10 Mbps.

Port 2 "HD/FD" Full/Half Duplex Dip-Switch:

When the P2 "AN/MAN" switch is in the "MAN" position, the P2 "HD/FD" switch selects the duplex mode of the P2 port. When in the "FD" (Full Duplex) "right" position (factory setting), P2 operates in full duplex. When in the "HD" (Half Duplex) "left" position, P2 operates in half duplex.

Note that attaching an auto-negotiating UTP port to a non-auto-negotiating (manual / forced / hard-coded) UTP port may result in an unpredictable port setting with excessive collisions and poor link performance. When operating in manual mode, both mating ports MUST be set manually to the same speed and duplex mode.

"RJ45 Cross-Over" Slide-Switch:

When the P1 "AN/MAN" switch is in the "MAN" position, the "RJ45 Cross-Over" slide-switch controls the "Straight-Through" or "Crossed" wiring of the P1 port. When connecting P1 to a hub or switch, set slide-switch to the "Switch" (factory setting) position. When connecting to a workstation, set to "Workstation".

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DFCS modules are hot-swappable and can be installed into any *DFCS* chassis.

1. Using the chassis' module guides for alignment, insert the module into the selected slot and secure using the front panel fastener screw.
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3. Set the BP A EN and BP B EN Backplane Port enable dip-switches as needed.
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Software Controlled Switch Settings

When managed, the following 4Tx/L2 switch settings can be controlled:

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- P1-P4 10/100 speed selection
- P1-P4 Duplex mode selection

The last to configure a mode (software or the physical board mounted dip-switch) controls the mode of operation.

See respective software manuals for details.

LED Indicators

LED	Color	Description
Power:	Yellow	On--Power
Port 1-100 Link:	Green	On--Link / Blink--activity
Port 1-10 Link:	Green	On--Link / Blink--activity
Port 2-100 Link:	Green	On--Link / Blink--activity
Port 2-10 Link:	Green	On--Link / Blink--activity
Port 3-100 Link:	Green	On--Link / Blink--activity
Port 3-10 Link:	Green	On--Link / Blink--activity
Port 4-100 Link:	Green	On--Link / Blink--activity
Port 4-10 Link:	Green	On--Link / Blink--activity