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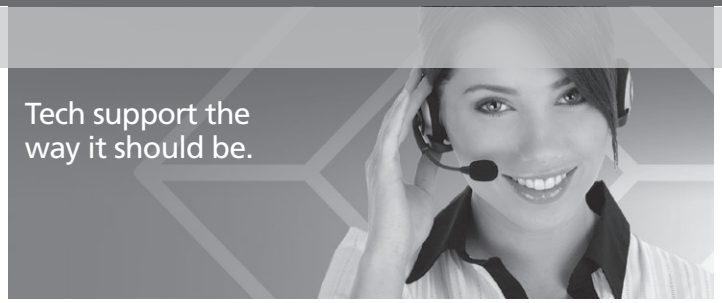

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July 2018
LMC11002A-R2
LMC11012A-R2
LMC11022A-R2

DFCS XG Standalone

Works as a 10G copper-to-fiber converter, fiber mode converter, WDM transponder, or fiber repeater.

Supports Pluggable 10 Gigabit Transceivers
- XFP to XFP
- SFP+ to XFP
- SFP+ to SFP+

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FEDERAL COMMUNICATIONS COMMISSION AND INDUSTRY CANADA 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 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 Industry Canada.

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 Industrie Canada.

Normas Oficiales Mexicanas (NOM) Electrical Safety Statement INSTRUCCIONES DE SEGURIDAD

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.

3) VERIFY OPERATION

Once the module has been installed and configured per steps 1 and 2, verify the module is operational by viewing the LED indicators.

NOTE: THE XG P1 AND P2 LINK LEDS (LK) WILL TURN ON (GREEN) WHEN BOTH TRANSCEIVERS ARE INSTALLED AND PROPERLY CABLED TO THE CONNECTED EQUIPMENT. THIS IS AN INDICATION THAT THE OPTICAL (LIGHT) CONNECTION IS GOOD, BUT NOT NECESSARILY AN INDICATION THAT THERE IS DATA BEING TRANSMITTED OR RECEIVED.

THE USER WILL RECEIVE CONFIRMATION OF DATA FLOW BY CHECKING TO SEE IF THE LINK LED IS ILLUMINATED ON THE CONNECTED EQUIPMENT.

Legend	OFF State	Color	ON/Blinking State
Pwr	Off – No power	Green	Green – Power On
P1 Lk	Off – No Transceiver detected or no fiber link	Green	Green Solid – Fiber link Green Blinking (1/2Hz) – When SFD is enabled, receiving remote fiber fault signal from link partner
P1 Stat	Off – Transceiver does not support digital diagnostic or no transceiver installed	Green	Green Solid – Transceiver supports digital diagnostic and no DDMI Alarm Detected
		Amber	Amber Solid – Transceiver supports digital diagnostic and DDMI alarm detected
P1 LB	Off – Port loopback mode not enabled or configured	Green	Green Solid – Port set to Loopback mode and port in loopback
		Amber	Amber Solid – Port set to loopback mode, but XFP does not support loopback
P2 Lk	Off – No Transceiver detected or no fiber link	Green	Green Solid – Fiber link Green Blinking (1/2Hz) – When SFD is enabled, port has been disabled due to link fault detected on Port 1
P2 Stat	Off – Transceiver does not support digital diagnostic or no transceiver installed	Green	Green Solid – Transceiver supports digital diagnostic and no DDMI Alarm Detected
		Amber	Amber Solid – Transceiver supports digital diagnostic and DDMI alarm detected
P2 LB	Off – Port loopback mode not enabled or configured	Green	Green Solid – Port set to Loopback mode and port in loopback
		Amber	Amber Solid – Port set to loopback mode, but XFP does not support loopback
P1 Lk, P1 Stat, P2 Lk, P2 Stat	-	Amber	Simultaneous Amber Blinking (1Hz) – Ports disabled due to unsupported power level of the installed XFP transceiver. Module drawing more current than allowed

Figure 5: LED Indicators

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 pedestales 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 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 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.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros 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. Precaución 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 aparato ha sido tirado o su cubierta ha sido dañada.

2) INSTALL STANDALONE MODULE AND CONNECT CABLES

a. The XG is available in tabletop and wall-mount models. For wall-mounting, attach the XG to a wall, backboard or other flat surface. For tabletop installations, place the unit on a flat level surface. Attach the rubber feet to the bottom of the XG to prevent the unit from sliding. Make sure the unit is placed in a safe, dry and secure location.

b. To power the unit using the AC/DC adapter, connect the AC/DC adapter to an AC outlet. Then connect the barrel plug at the end of the wire on the AC/DC adapter to the 2.5mm DC barrel connector (center-positive) on the unit. Confirm that the unit has powered up properly by checking the power status LED located on the front of the unit.

   To power the unit using a DC power source, prepare a power cable using a two conductor insulated wire (not supplied) with a 14 AWG gauge minimum. Cut the power cable to the length required. Strip approximately 3/8 of an inch of insulation from the power cable wires. Connect the power cables to the unit by fastening the stripped ends to the DC power connector.

   Connect the power wires to the DC power source. The Power LED should indicate the presence of power.

   WARNING: Note the wire colors used in making the positive and negative connections. Use the same color assignment for the connection at the DC power source.

   NOTE: If mounting with a safety ground attachment, use the safety ground screw at the rear of the unit.

c. Insert the appropriate SFP/SFP+ or XFP transceiver into the corresponding port receptacle on the XG.

   NOTE: The release latch of the transceiver must be in the closed position before insertion.

d. When using copper CX4 XFP, connect the cable between the converter and external device using the recommended copper CX4 cable.

e. Connect an appropriate multimode or single-mode fiber cable to the fiber transceiver ports on the XG. It is important to ensure that the transmit (Tx) is attached to the receive side of the device at the other end and the receive (Rx) is attached to the transmit side.

NOTE: FOR LMC11022A-R2 AND LMC11002A-R2 BOTH TRANSCEIVERS MUST BE INSTALLED FOR THE XG TO PROPERLY FUNCTION. WHEN ONLY ONE TRANSCEIVER IS INSTALLED AND THERE IS NO TRANSCEIVER INSTALLED IN THE OTHER PORT, THE TRANSMITTER OF THE INSTALLED TRANSCEIVER IS DISABLED.

SW1	SW2	SW3	SW4	Function
DOWN	DOWN	DOWN	DOWN	Link Segment (default)
UP	DOWN	DOWN	DOWN	Asymmetrical Link Propagate P1 to P2
DOWN	UP	DOWN	DOWN	Asymmetrical Link Propagate P2 to P1
UP	UP	DOWN	DOWN	Dual Asymmetrical Link Propagate
DOWN	DOWN	UP	DOWN	Remote Fault Detect for P1 and P2
UP	DOWN	UP	DOWN	RFD + Asymmetrical LP P1 to P2
DOWN	UP	UP	DOWN	RFD + Asymmetrical LP P2 to P1
UP	UP	UP	DOWN	RFD + Dual Asymmetrical LP
DOWN	DOWN	DOWN	UP	Symmetrical Fault Detect (SFD)*
UP	UP	UP	UP	Self Diagnostic Circuit Test

Figure 4: DIP-switch BANK 2 Link Mode and Self Test Configurations

* Symmetrical Fault Detect (SFD) requires bookend configuration of two *DFCS* XG converters connected via Port 1.

SELF DIAGNOSTIC CIRCUIT TEST (SFP+ models only)

When two XG (R2) converters are connected via Port 1 (Port 1 to Port 1), a self diagnostic circuit test is supported. To initiate a self diagnostic circuit test, only one XG must be configured.

The XG initiating the circuit test (all DIP-switches to UP) will generate and send a test pattern out Port 1 to the other XG. The receiving XG will detect a good test pattern and return the test pattern back to the initiating XG.

A successful test will produce a green blinking (5Hz) P1 LB LED on the initiating XG and a green blinking (1Hz) P1 LB LED on the receiving XG. If the initiating XG does not receive a valid response, the P1 LB LED will be blinking amber (5Hz). When the self diagnostic circuit test is initiated, the traffic received on Port 2 of both XG converters will be discarded.

If loopback has been initiated, self diagnostic circuit test DIP-switch will be ignored. If self diagnostic circuit test has been initiated, loopback DIP-switches will be ignored.

NOTE: The self-diagnostic circuit test on the XG R1 are not compatible with the self-diagnostic circuit test on the XG R2.

TRADEMARKS USED IN THIS MANUAL

This User Manual describes the functions of the DFCS XG *Rev R2.*

Product Overview

The *DFCS* XG is a protocol-transparent fiber media converter with two pluggable transceiver ports supporting data rates from 6G to 11.32G. The *DFCS* XG can be used as a fiber mode converter, a WDM transponder or a fiber repeater supporting the three Rs (regeneration, retiming and reshaping). The XG auto-detects the speed of the installed transceiver.

The *DFCS* XG can be used in Telecom or Enterprise applications where 10 Gigabit media conversion and fiber extension is required. The product supports 100% traffic throughput and has no packet size restrictions.

The *DFCS* SFP+/SFP+ XG supports two (2) Power Level 1 transceivers. The SFP+/XFP XG supports one Power Level 1 or 2 XFP transceiver and one Power Level 1 SFP+ transceiver. The XFP/XFP XG supports one or two Power Level 2 XFP transceivers.

CAUTION: The SFP+/SFP+ XG does not support Power Level 2 SFP+ transceivers. The SFP+/XFP or XFP/XFP XG does not support Power Level 3 or 4 XFP transceivers.

The transceiver Power Levels are defined in the following table:

SFP+	XFP	Power Requirements
Power Level 1		Up to 1.0 watts
Power Level 2		Up to 1.5 watts
	Power Level 1	Up to 1.5 watts
	Power Level 2	1.5 to 2.5 watts
	Power Level 3	2.5 to 3.5 watts
	Power Level 4	3.3 to 5.5 watts

Figure 1: Transceiver Power Levels

Black Box XFP transceivers conform to the following table:

Black Box Model No.	Description	Power Level
LXP-10G-MMLC	10GBASE-SR, 850nm Multimode, 300m, LC	1
LXP-10G-SMLC10	10GBASE-LR, 1310nm Single-mode, 10km, LC	2
LXP-10G-CX4	10GBASE-CX4, 15m	2

Figure 2: Black Box Transceiver Descriptions

Installation Procedure

1) Configure DIP-switches

2) Install Standalone Module and Connect Cables

3) Verify Operation

1) CONFIGURE DIP-SWITCHES

DIP-SWITCH BANK 1

The location of DIP-switch Bank 1 is on the front of the module between the two ports.

The function of DIP-switch Bank 1 is outlined in Figure 3.

Switch	DOWN (Default)	UP
SW1	Normal	P1 Loopback Enabled
SW2	Normal	P2 Loopback Enabled
SW3	Reserved	Reserved
SW4	Reserved	Reserved

Figure 3: DIP-switch BANK 1 Definitions

The XG supports port loopback. The SFP+/SFP+ XG supports loopback on each individual port or simultaneous loopback on Port 1 and Port 2. The SFP+/XFP and the XFP/XFP XG supports loopback on each individual port and does not support simultaneous loopback.

In all cases, both transceivers must be installed in the XG for the loopback feature to operate.

SW1 - P1 LOOPBACK “P1-LB”

When this DIP-switch is in the DOWN position (factory default), Port 1 (P1) loopback is disabled. When this DIP-switch is in the UP “P1-LP” position, loopback is enabled on P1. When enabled, all data received on P1 is transmitted out P1 and all data received on Port 2 (P2) is dropped. No data is transmitted on P2 when loopback is enabled on P1.

NOTE: For XFP models, the loopback feature is dependent on the capability of the installed XFP. XFPs with XFI-side Loopback feature are required.

SW2 - P2 LOOPBACK “P2-LB”

When this DIP-switch is in the DOWN position (factory default), P2 loopback is disabled. When this DIP-switch is in the UP “P2-LP” position, loopback is enabled on P2. When enabled, all data received on P2 is transmitted out P2 and all data received on P1 is dropped. No data is transmitted on P1 when loopback is enabled on P2.

NOTE: For XFP models, the loopback feature is dependent on the capability of the installed XFP. XFPs with XFI-side Loopback feature are required.

SW3, SW4 - Reserved

These switches are reserved and must be in the LEFT/DOWN default position.

DIP-SWITCH BANK 2

SW1,SW2, SW3 and SW4 - LINK MODES and CIRCUIT TEST

LINK MODES

These four DIP-switches configure the different link modes available on the XG. It is recommended to have link modes set to Link Segment (default setting - all DOWN) during the initial installation. After the circuit has been tested and operational, configure the module for the desired mode. Refer to Figure 4 for configuration options.