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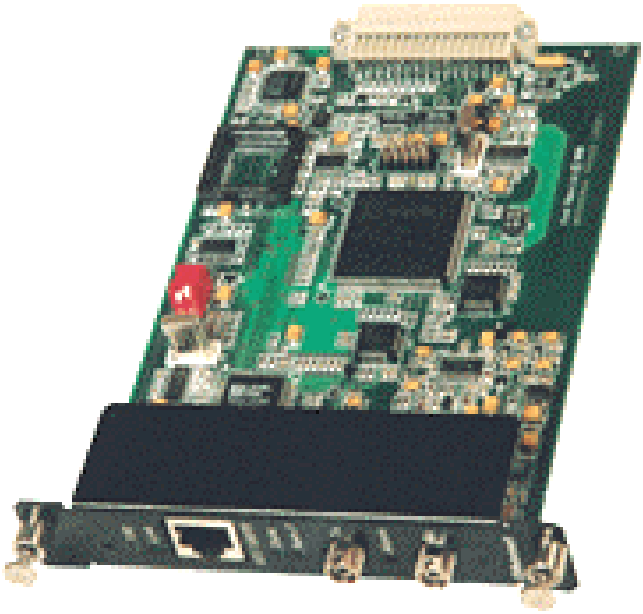
NETWORK SERVICES

FEBRUARY 2001
LCL533A
LCL534A
LCL535A
LCL536A

CityLIGHT® 10/100 Ethernet Transceiver Card



CUSTOMER SUPPORT INFORMATION

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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 J 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 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

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.

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 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 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.

CERTIFICATION NOTICE FOR EQUIPMENT USED IN CANADA

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications-network protective, operation, and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single-line individual service may be extended by means of a certified connector assembly (extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility—in this case, your supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION:

> Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The LOAD NUMBER (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices, subject only to the requirement that the total of the load numbers of all the devices does not exceed 100.

CONTENTS

Chapter **Page**

CONTENTS 6
1. SPECIFICATIONS 7
2. PRODUCT OVERVIEW 9
2.1 Auto-negotiation 9
2.2 Data Rate 12
2.3 Frame Size 12
2.4 Drive Distance 12
2.5 External Attenuator 12
2.6 Ergonomics 13
2.7 Power Supply 13
2.8 Link Loss Forwarding 13
2.9 Management 14
2.9.1 Temperature 14
2.9.2 Laser Bias Current 15
2.9.3 Link Activity 15
2.9.4 Remote Fault 15
2.9.5 Copper and Fiber Port Status 15
2.9.6 Other Managed Features 16
2.10 Shipping Contents 16
3. INSTALLATION 17
3.1 Tools Required 17
3.2 Before You Start 17
3.3 General Set-Up 17
4. DIAGNOSTIC LEDs 21
5. SWITCH POSITIONS 23
APPENDIX A - TROUBLESHOOTING 26
APPENDIX B - GLOSSARY OF TERMS 29

Figures

Figure 1 - CityLIGHT 10/100 Ethernet Transceiver 9
Figure 2 - Typical Application 11
Figure 3 - Switch Positions 23

1. SPECIFICATIONS

DATA RATE		10 OR 100 Mbps
OPTICAL POWER BUDGET		18 dB STANDARD POWER
		25 dB HIGH POWER
TYPICAL LAUNCH		-11.5 dBm STANDARD POWER
		-1.5 dBm HIGH POWER
MIN LAUNCH POWER		-13 dBm STANDARD POWER
		-3 dBm HIGH POWER
MIN RECEIVE POWER		-28 dBm
LINK LENGTHS		
OPTICAL	9/125 μm FIBER	UP TO 50 km; 31.3 MILES (25 dB)
		UP TO 35 km; 22.5 MILES (18 dB)
ELECTRICAL	TYPE 3 (CAT 5 UTP) RJ 45 (24 AWG)	UP TO 100 M
CONNECTOR PINOUTS RJ 45		
TX+		1
TX-		2
RX+		3
RX-		6
CONNECTORS		
OPTICAL		SC/ST (ORDER TIME OPTIONS)
ELECTRICAL		SHIELDED RJ 45

CITYLIGHT 10/100 ETHERNET TRANSCEIVER CARD

ENVIRONMENTAL	
TEMPERATURE	OPERATING: 32 TO 104°F (0 TO 40°C);
	STORAGE: 14 TO 158°F (-10 TO +70°C)
HUMIDITY	MAX 95% (NON-CONDENSING)
STANDARDS SUPPORTED	IEEE 802.3 AND IEEE 802.3U
WEIGHT	0.15 kg; 0.33 lb.
ELECTRICAL INFORMATION	
MAX. CURRENT	LESS THAN 1.5A @ 5V
POWER CONSUMPTION	LESS THAN 7.5W
COMPLIANCE	UL1950
	CUL1950
	CE 73/23/EEC
	CE 89/336/EEC
CARD VARIANTS	
LCL533A	10/100 ETHERNET, RJ 45 TO SM SC, 35KM
LCL534A	10/100 ETHERNET, RJ 45 TO SM SC, 50KM
LCL535A	10/100 ETHERNET, RJ 45 TO SM ST, 35KM
LCL536A	10/100 ETHERNET, RJ 45 TO SM ST, 50KM

2. PRODUCT OVERVIEW

The CityLIGHT 10/100 Ethernet Transceiver is part of the CityLIGHT system and is designed to provide both 10BASE-T and 100BASE-TX LAN interfaces.

It retransmits data between the connected devices over distances of up to 35 km on single-mode fiber using standard optics or up to 50 km using high-power optics.

The CityLIGHT 10/100 Ethernet Transceiver reduces received jitter which ensures error-free operation when connected to any IEEE 802.3 device.

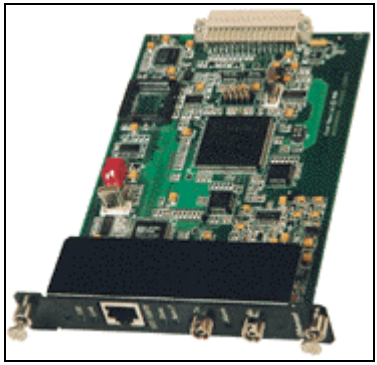

Figure 1 - CityLIGHT 10/100 Ethernet Transceiver

2.1 Auto-negotiation

The CityLIGHT 10/100 Ethernet Transceiver supports auto-negotiation on the copper/user port. When enabled the port will advertise its capabilities to the attached port and negotiate to the highest common mode.

Modes are 100BASE-TX FDX

100BASE-TX HDX

10BASE-T FDX

10BASE-T HDX

NOTE: The CityLIGHT 10/100 is a transceiver. The devices attached to the CityLIGHT 10/100 Ethernet Transceiver at either end MUST have the same highest common capability and operate in the same mode and speed, e.g. all elements of the link must be operating at say 10 Mbps Full-Duplex or all at 100 Mbps Full-Duplex. It is not possible to mix Half- and Full-Duplex operation or 10 Mbps and 100 Mbps operation on the same link.

NOTE: The CityLIGHT 10/100 Ethernet Transceiver will advertise all these capabilities and operates transparently in Half- or Full-Duplex mode. However care must be taken when the local port operates in Half-Duplex mode as distance is limited by the Half-Duplex Ethernet protocol. In Full-Duplex Mode the Ethernet Protocol does not limit distance.

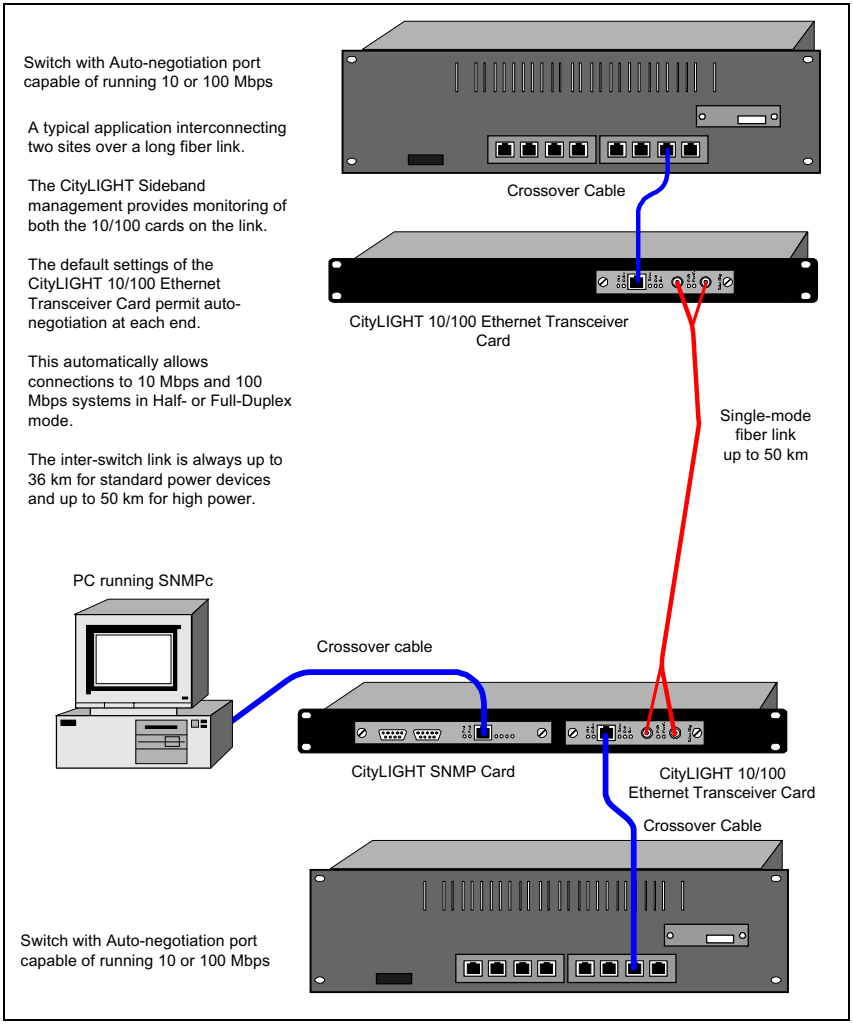

Figure 2 - Typical Application

The example above shows the simplest CityLIGHT configuration. The CityLIGHT 10/100 Ethernet Transceiver can be used in any of the CityLIGHT chassis including the 3U Chassis which can manage up to 32 devices from 1 SNMP agent.

Auto-negotiation is enabled by setting switch 2 to ON; see Section 5, Switch Positions. Setting switch 2 OFF allows the data rate to be controlled by the speed select switch (Switch 1); see Section 5, Switch Positions.

2.2 Data Rate

The CityLIGHT Fiber Extender Modules can operate at either 10 or 100 Mbps. Switch 1 controls the speed whenever auto-negotiation is not enabled; see Section 5, Switch Positions:

ON – 100 Mbps.

OFF – 10 Mbps.

The CityLIGHT 10/100 Ethernet Transceiver works transparently with either full- or half-duplex ports attached, though users should be aware distance is limited by the Ethernet protocol in half-duplex environments.

2.3 Frame Size

The CityLIGHT 10/100 Ethernet Transceiver transparently supports all frame sizes including longer frames used for VLAN tagging. This includes transmission of 802.1q VLAN tagged frames as well as ISL 1548 byte length frames.

2.4 Drive Distance

The CityLIGHT 10/100 Ethernet Transceiver allows a user to connect LAN interfaces over extended distances. Each copper port has a maximum drive distance of 100 m on UTP cables. Every CityLIGHT 10/100 Ethernet Transceiver fiber link can be up to 35 km using standard optics or 50 km using high-power optics. Two launch-power options are available; a standard-power unit typically launching at -10 dBm and a high-power unit at -3 dBm. All units receive to a minimum light level of -28 dBm. See Specifications for more details.

2.5 External Attenuator

All high-power or long haul CityLIGHT cards have been designed for long distance transmission and provide a minimum optical budget ranging between 20dB and 25dB. This provides transmission distances between 40km and 50km based on an average fiber attenuation of 0.5dB/km.

When these products are used for short distance applications, the received power may exceed the saturation limit of the receiver and external attenuation will be necessary to prevent optical overload and the inevitable data errors.

For these applications, an external 10dB attenuator is available to ensure that the optical receive power falls within the operating limits of the receiver.

The fixed value 10dB attenuator, LCL505A, is of a doped-fiber design which eliminates the troublesome reflections which an air-gap attenuator may introduce. These reflections can upset the operation of lasers, particularly those used in high data rate systems.

The 10dB attenuator may be deployed anywhere in the single-mode fiber link but it is recommended that it be deployed at the receive end (rather than the transmit end) of any particular point-to-point link.

The attenuator has a female connector at one end and a male connector at the other end. The connector style should be specified at the time of ordering.

2.6 Ergonomics

The CityLIGHT 10/100 Ethernet Transceiver is able to be installed in any of the CityLIGHT chassis including the 1U Chassis and 2-Card Chassis as well as the 3U Chassis.

2.7 Power Supply

The CityLIGHT 10/100 Ethernet Transceiver receives all its power from the PSUs mounted in the CityLIGHT Chassis. All chassis can support AC and 48V DC PSUs in single and redundant forms. (See the CityLIGHT 1U or 3U Chassis or CityLIGHT 2-Card Chassis as applicable for details).

2.8 Link Loss Forwarding

To allow fiber link failures to be passed to the copper interface, a link loss forwarding feature is provided.

This is enabled by setting switch 4 to ON, and is disabled when switch 4 is OFF; see Section 5, Switch Positions.

When enabled failures on the fiber link are passed to the copper port; they can be seen by the device attached to the copper port as a link failure. Consequently the fiber link must be good before the copper link is established.

When disabled, each of the fiber and copper links are established independently.

2.9 Management

The CityLIGHT 10/100 Ethernet Transceiver is managed via the CityLIGHT SNMP Module which supports both In-Band and Out-of-Band management of the unit.

Once installed in a chassis with an SNMP card or connected via the fiber to a card in an SNMP-managed chassis, the SNMP agent automatically detects the card and displays the following information.

NOTE: This information is the same for the local and remote cards and is available via the terminal interface as well as the SNMP MIB.

i) Card Type

ii) Card Speed

iii) Fiber Port Link Status

iv) Copper Port Link Status

v) Temperature

vi) Fan Status

vii) Laser Bias Current

viii) PSU Voltage

ix) Redundant PSU State

x) Serial Number

xi) Firmware Version Number

xii) Location (entered by the user, see SNMP card manual for details)

The CityLIGHT SNMP Module provides trap alarms for the following parameters of the CityLIGHT Fiber Extender Module.

2.9.1 Temperature

This is the temperature of the CityLIGHT Fiber Extender Module. A trap alarm is generated if the temperature is not within the required range.

2.9.2 Laser Bias Current

The laser bias current gives an indication of the drive current required to maintain the correct output power of the laser on the CityLIGHT Fiber Extender Module. The value of the laser bias is used to generate a trap if a threshold value is exceeded. This indicates that the laser is approaching its end of life and the card should be replaced during a suitable maintenance window.

2.9.3 Link Activity

This gives an indication of data activity on the copper connection of the CityLIGHT Fiber Extender Module. Its state is either active (carrying LAN data) or inactive (not carrying LAN data).

2.9.4 Remote Fault

The local 10/100 Ethernet Transceiver indicates that a fault has occurred on the remote Fiber Extender Module. The copper and fiber port status can be used to determine the exact problem.

2.9.5 Copper and Fiber Port Status

These give an indication of the state of both the copper and fiber connections to the CityLIGHT Fiber Extender Module.

The fiber port may indicate:

i. Inserted (the CityLIGHT 10/100 Ethernet Transceiver is correctly attached).

ii. Rx Alarm (the CityLIGHT 10/100 Ethernet Transceiver is not receiving light from the far end device. A fault lies in the far end device or the receive fiber path).

iii. CheckTx (the port is inactive. The CityLIGHT 10/100 Ethernet Transceiver in the CityLIGHT managed chassis has been recognized on the receive fiber but a fault lies in the path between this CityLIGHT 10/100 Ethernet Transceiver and the remote unit's receiver).

The copper port may indicate:

iv. Active (this CityLIGHT 10/100 Ethernet Transceiver is receiving link pulses on the copper interface and is therefore correctly attached and all other ports, both local and remote, are good).

v. Link UP (this CityLIGHT 10/100 Ethernet Transceiver is receiving link pulses on the copper interface but the copper port at the far end is reporting a fault).

vi. Link DOWN (this CityLIGHT 10/100 Ethernet Transceiver is not receiving link pulses on the copper interface and is therefore not correctly attached).

2.9.6 Other Managed Features

The CityLIGHT SNMP Module also monitors the PSUs and cooling fans of both the CityLIGHT 1U or 3U Chassis and CityLIGHT 2-Card Chassis. Refer to the user manual supplied with the CityLIGHT SNMP Module for more details.

2.10 Shipping Contents

The shipping carton contains:

This manual (1)

CityLIGHT 10/100 Ethernet Transceiver(1)

Ethernet crossover cable (1)

3. INSTALLATION

NOTE: The CityLIGHT 10/100 Ethernet Transceiver is hot-swappable; the power to the CityLIGHT 1U or 3U Chassis and the CityLIGHT 2-Card Chassis does not need to be turned off during installation or removal.

3.1 Tools Required

To install the CityLIGHT Fiber Extender Module, the following items are required:

Flat-bladed Screwdriver

Fiber Cleaning Kit

Fiber Patch Cords

Electrical Patch Cables

Loss Set (Power Meter and 1300 nm Light Source)

3.2 Before You Start

Make sure that both CityLIGHT chassis (local and remote) are correctly installed.

Make sure you have the following information before you start:

Cable Type: 100Ω Category 5 RJ 45.

Fiber Connection: Check that the connections on the units, the patch cords used, and the site requirement are compatible.

As the CityLIGHT 10/100 Ethernet Transceiver is a long-distance product, installation is greatly simplified with a technician at each end of the link. This allows link tests to be completed in the minimum of time.

3.3 General Set-Up

1) Set switch 1 to the required operating speed; OFF for 10 Mbps or ON for 100 Mbps operation on both CityLIGHT Fiber Extender Modules.

2) Configure the attached switches to fixed-rate full-duplex for the required speed. If the attached switches/ports only support "auto" mode, the CityLIGHT 10/100 Ethernet Transceiver can auto-negotiate with these ports to allow full-duplex operation. Setting switch 2 ON enables auto-negotiation. With switch 2 set to ON, switch 1 has no effect.

NOTE: Auto-negotiation does not take place across the fiber link. The local user/copper ports negotiate independently. Consequently the ports at both ends of the link must support the same highest common mode. i.e. one end must not negotiate a 100 Mbps link if the far end can only negotiate a 10 Mbps link.

3) If an SNMP card is present in either of the chassis on the link, both Local/Remote switches should be set to Remote i.e. both cards must have switch 3 ON (this is the default setting).

NOTE: If no SNMP card is present in either of the chassis, one card MUST be set to Local and the other to Remote, (setting the card to Local allows the link connection to operate correctly; when present, the SNMP card controls this automatically). **With no SNMP card in either chassis, one card must have switch 3 set to OFF (Local) and the other far-end device set to ON (Remote).**

4) If link loss forwarding is required, set switch 4 to ON. (In this mode failures on the fiber link cause the copper (user) link to be dropped).

   If the state of the fiber link is not to affect the copper link then switch 4 must be set to OFF. In this mode each of the fiber and copper links establish themselves independently. This is the default setting.

5) Position the first CityLIGHT 10/100 Ethernet Transceiver at the required slot in the CityLIGHT management chassis.

6) Push the CityLIGHT 10/100 Ethernet Transceiver along the card guides into the slot until it engages with the connector inside the CityLIGHT chassis. Repeat at the remote location.

7) Tighten the two captive screws on the front panels of both CityLIGHT 10/100 Ethernet Transceivers to secure them in position.

8) Make sure on both CityLIGHT 10/100 Ethernet Transceivers that the 100 LED illuminates to indicate that power is available and that it is the correct color, (yellow for 10 Mbps or green for 100 Mbps). Also note that the Alarm LED illuminates.

9) Using the loss set, and ideally a technician at the CityLIGHT remote chassis, check that the link budget is less than 18 dB for the standard-power unit or 25 dB for the high-power unit.

10) Ensure connector ends are clean. Connect the fiber cables to the Rx and Tx connectors at both ends of the link. Make sure that the local transmit is connected to the far end receive and vice versa.

11) Make sure the Alarm LED is extinguished. If the Alarm LED on the CityLIGHT 10/100 Ethernet Transceiver in the CityLIGHT managed chassis remains illuminated, check that the receive power is greater than -28 dBm. If it is less than -28 dBm, check the launch power of the CityLIGHT 10/100 Ethernet Transceiver in the CityLIGHT remote chassis and check the fiber connections are correctly made Tx to Rx.

12) If the Alarm LED on the CityLIGHT 10/100 Ethernet Transceiver in the remote chassis remains illuminated, check that the receive power is greater than -28 dBm. If it is less than -28 dBm, check the launch power of the CityLIGHT 10/100 Ethernet Transceiver in the CityLIGHT managed chassis.

13) At both CityLIGHT Fiber Extender Modules insert the copper interface in the RJ 45 10T/100TX port. To connect to a DCE, use a straight-through cable; to connect to a DTE, use the crossover cable supplied. Make sure the Link LED illuminates.

14) Once the link is correctly made, check the following:

    i) The 100 LED is illuminated and is the correct color at both ends of the link.

    ii) The Link LED is illuminated.

    iii) The Rem F LED is extinguished.

    iv) The Alarm LED is extinguished.

    v) The Data LED flashes (if the link is active).

    If any of the LEDs is not correctly illuminated/extinguished, see Appendix A – Troubleshooting for possible causes.

NOTE: During commissioning most faults are associated with bad/wrong cabling, incorrect patching, loss of power, or excessive power budget.

The hardware installation is now complete. To enable management, refer to the Management Serial Interface section of the CityLIGHT SNMP Module user manual.

4. DIAGNOSTIC LEDs

LED	COLOR	CONDITION
100	GREEN/YELLOW	THIS INDICATES THAT POWER IS SUPPLIED TO THE DEVICE AND ADDITIONALLY THE OPERATING DATA RATE; YELLOW FOR 10 Mbps OR GREEN FOR 100 Mbps. WHEN AUTO-NEGOTIATION IS ENABLED, CHECK THAT THE LEDS AT BOTH ENDS OF THE LINK INDICATE THAT THE CARDS ARE OPERATING AT THE SAME SPEED. IF THIS LED IS NOT LIT, CHECK THAT POWER IS CORRECTLY SUPPLIED TO THE CHASSIS AND THAT THE CARD IS FULLY INSERTED INTO THE CHASSIS.
LINK	GREEN	THIS INDICATES THAT THE INTEGRITY OF THE COPPER LINK IS GOOD. IF THIS LED IS NOT LIT, IT MAY BE BECAUSE THE COPPER LINK IS NOT INSERTED. THE CORRECT CABLE TYPE IS NOT BEING USED. THE SUPPLIED CROSSOVER IS REQUIRED TO CONNECT TO A DTE (STATION/SWITCH TYPE DEVICE). LINK LOSS FORWARDING IS ENABLED AND THE FIBER LINK IS INACTIVE. (CHECK THE STATE OF THE ALARM LED).
DATA	GREEN	THIS INDICATES THAT RECEIVE ACTIVITY IS PRESENT ON THE COPPER PORT. THE SIGNAL THAT DRIVES THE LED IS STRETCHED TO MAKE SURE THAT A SINGLE ACTIVITY EVENT IS SEEN. IF THE ACTIVITY IS CONTINUOUS, THE LED APPEARS PERMANENTLY ILLUMINATED.

ALARM	RED	THIS INDICATES THERE IS A LOSS OF RECEIVE POWER ON THE FIBER PORT, I.E. THE RECEIVE POWER HAS DROPPED BELOW -28 dBm. CHECK THAT THE FIBERS ARE CORRECTLY INSERTED TX TO RX AND VICE VERSA. CHECK THAT THE LINK LOSS IS LESS THAN 18 dB FOR STANDARD-POWER OPTICS AND LESS THAN 25 dB FOR HIGH-POWER OPTICS.
REMF	RED	THIS INDICATES THERE IS A FAULT IN THE TRANSMIT FIBER PATH FROM THIS CITYLIGHT CARD TO THE REMOTE RECEIVE CITYLIGHT CARD. THE RECEIVE PATH FIBER IS INTACT. CHECK THE FIBER LINK FROM THIS CARD'S TRANSMITTER TO THE FAR-END CARD'S RECEIVER.

5. SWITCH POSITIONS

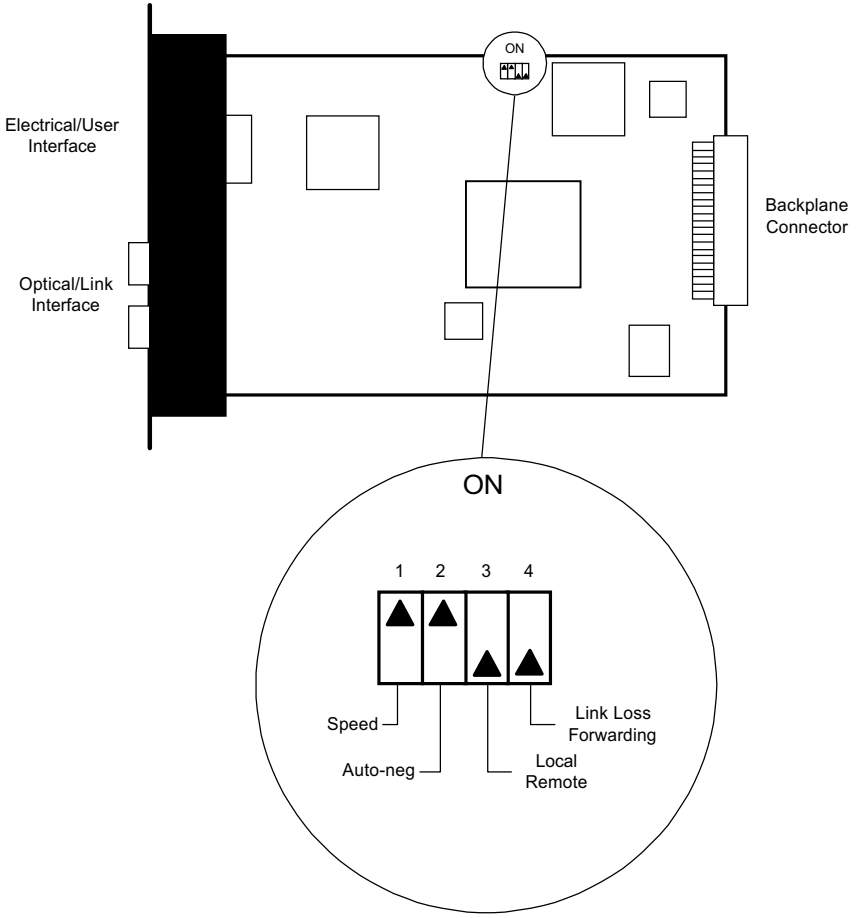

Figure 3 - Switch Positions

SWITCH	POSITION	FUNCTION
1, SPEED		CONTROLS THE SPEED OF THE CARD WHEN AUTO-NEGOTIATION IS NOT SET.
	ON	100 Mbps OPERATION
	OFF	10 Mbps OPERATION
2, AUTO-NEGOTIATION		USED TO CONTROL THE COPPER PORT OPERATING MODE. EITHER AS FIXED SPEED AND MODE OR AUTO-NEGOTIATED MODE. SWITCH 1 CONTROLS THE SPEED WHEN AUTO-NEGOTIATION IS DISABLED. NB. AUTO-NEGOTIATION TAKES PLACE AT THE LOCAL CARD COPPER PORT. THE FAR-END CARD MUST NEGOTIATE THE SAME OPERATING MODE AND SPEED AS THE LOCAL CARD, E.G. IF THIS CARD AUTO-NEGOTIATES 100 Mbps FDX, THE CARD AT THE REMOTE SITE MUST AUTO-NEGOTIATE 100 Mbps FDX. THIS WILL BE CONTROLLED BY THE PORT TYPE THE CITYLIGHT FIBER EXTENDER MODULES CONNECT TO. IF THERE IS ANY DOUBT, CONFIGURE ALL PORTS MANUALLY USING FIXED CONFIGURATION.
	ON	AUTO-NEGOTIATION AT THE LOCAL COPPER PORT IS ENABLED.
	OFF	AUTO-NEGOTIATION IS DISABLED, (THE SPEED IS SET BY SWITCH 1).

3, LOCAL/REMOTE		USED WHEN NO SNMP CARD IS PRESENT. ONE CARD MUST BE SET TO LOCAL, THE OTHER TO REMOTE. WHEN AN SNMP CARD IS PRESENT, SET BOTH CARDS TO REMOTE. THIS IS THE DEFAULT SETTING.
	OFF	LOCAL (ONE END OF THE LINK).
	ON	REMOTE (OTHER END OF A LINK).
4, LINK LOSS FORWARDING		CONTROLS WHETHER OR NOT FAILURES ON THE FIBER LINK CAUSE THE USER (COPPER) PORT TO BE DISABLED. THIS IS USEFUL FOR INDICATING THE FIBER FAILURE TO THE ATTACHED DEVICE. WHEN THIS FEATURE IS DISABLED (SWITCH OFF), THE COPPER AND FIBER PORTS ESTABLISH THEIR LINKS INDEPENDENTLY.
	ON	ENABLED.
	OFF	DISABLED.

APPENDIX A - TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSES
THE 100 LED DOES NOT ILLUMINATE.	THE CITYLIGHT 10/100 ETHERNET TRANSCEIVER IS NOT RECEIVING POWER. CHECK THE PSUS IN THE ASSOCIATED CITYLIGHT 1U OR 3U CHASSIS OR CITYLIGHT 2-CARD CHASSIS ARE CORRECTLY INSTALLED. CHECK THE EXTERNAL POWER SUPPLY CONNECTION TO THE PSUS IS CORRECT. MAKE SURE THE SWITCH CONTROLLING THE OPERATING SPEED IS CORRECTLY SELECTED TO 10 OR 100 Mbps. IF AUTO-NEGOTIATION IS ENABLED, CHECK THAT THE CARDS AT BOTH ENDS OF THE LINK ARE OPERATING AT THE SAME SPEED. WITH AUTO-NEGOTIATION ENABLED THE COPPER LINKS NEGOTIATE INDEPENDENTLY; CONSEQUENTLY THE DEVICES ATTACHED TO THE CITYLIGHT FIBER EXTENDER MODULES MUST HAVE THE SAME HIGHEST OPERATING MODE. IF IN DOUBT, CONFIGURE ALL DEVICES TO HAVE A FIXED OPERATING MODE. (TYPICALLY 100 Mbps FDX).
THE LINK LED DOES NOT ILLUMINATE.	THE CITYLIGHT 10/100 ETHERNET TRANSCEIVER CANNOT DETECT THE CONNECTED DEVICE. CHECK THE CONNECTED DEVICE IS TURNED ON. CABLE INCORRECTLY INSTALLED. CHECK THAT THE CABLE IS CORRECTLY INSERTED IN THE RJ 45 CONNECTOR. INCORRECT CABLE. CHECK THAT THE CORRECT CABLE TYPE IS BEING USED. USE THE SUPPLIED CROSSOVER CABLE FOR CONNECTION TO A DTE TYPE DEVICE. USE A STRAIGHT-THROUGH CABLE FOR CONNECTION TO A DCE TYPE DEVICE. LINK LOSS FORWARDING IS ENABLED (SWITCH 4 IS ON) AND THE FIBER LINK IS NOT ESTABLISHED. CHECK THAT THE REMOTE FAULT AND RX ALARM LEDS ARE NOT LIT. ONCE THE FIBER LINK IS GOOD, THE LOCAL COPPER LINK WILL INSERT. CONTINUED OVERLEAF.

PROBLEM	POSSIBLE CAUSES
THE LINK LED DOES NOT ILLUMINATE.	NOTE IF LINK LOSS FORWARDING IS DISABLED THEN EACH OF THE COPPER AND FIBER LINKS OPERATE INDEPENDENTLY.
THE REMF LED IS ILLUMINATED.	THE CITYLIGHT 10/100 ETHERNET TRANSCEIVER CAN SEE THE FAR-END DEVICE. THE FAR-END DEVICE CANNOT SEE THIS 10/100 ETHERNET TRANSCEIVER. A FAULT LIES IN OR BETWEEN THE TRANSMITTER OF THIS CARD AND THE REMOTE CARD RECEIVER. CHECK THAT THE RECEIVE POWER AT THE REMOTE DEVICE IS GREATER THAN -28 dBm.
THE ALARM LED IS ILLUMINATED.	THE FIBER LINK IS NOT WORKING. CHECK THE RECEIVE CONNECTORS AND MAKE SURE POWER IS CORRECTLY SUPPLIED TO ALL DEVICES. THE RECEIVE POWER LIGHT LEVEL SHOULD BE GREATER THAN -28 dBm. IF THE RECEIVE POWER IS LESS THAN -28 dBm AT THE CITYLIGHT 1U OR 3U CHASSIS, CHECK THE LAUNCH POWER OF THE CITYLIGHT 10/100 ETHERNET TRANSCEIVER IN THE REMOTE CHASSIS IS GREATER THAN -10 dBm FOR THE STANDARD-POWER UNIT AND -3 dBm FOR THE HIGH-POWER UNIT. IF THE RECEIVE POWER IS LESS THAN -28 dBm, CHECK THE LAUNCH POWER OF THE CITYLIGHT 10/100 ETHERNET TRANSCEIVER IN THE CITYLIGHT 1U OR 3U CHASSIS AS ABOVE. CHECK THAT THE LINK LOSS IS LESS THAN 18 dB FOR THE STANDARD-POWER UNIT OR 25 dB FOR THE HIGH-POWER UNIT.
THE DATA ACTIVITY LED DOES NOT ILLUMINATE.	CHECK THE CONNECTED DEVICES ARE TURNED ON. CHECK THAT THE ATTACHED NETWORK DEVICES ARE ACTIVE AND ARE CARRYING DATA. CONTINUED OVERLEAF…

PROBLEM	POSSIBLE CAUSES
THE DATA ACTIVITY LED DOES NOT ILLUMINATE.	MAKE SURE BOTH THE CITYLIGHT 10/100 ETHERNET TRANSCEIVERS IN THE CITYLIGHT 1U OR 3U CHASSIS AND THE CITYLIGHT 2-CARD CHASSIS ARE SET TO THE SAME OPERATING SPEED. THIS IS PARTICULARLY IMPORTANT IF AUTO-NEGOTIATION IS ENABLED, AS EACH OF THE COPPER LINKS NEGOTIATE THEIR OPERATING SPEEDS INDEPENDENTLY AND THEREFORE MUST BE CONNECTED TO DEVICES THAT "TRADE UP" TO THE SAME SPEED. NOTE: THE ACTIVITY LED WILL ONLY ILLUMINATE WHEN DATA IS BEING TRANSMITTED OVER THE LINK.

If, after going through the troubleshooting section, you fail to resolve your problem and require more help, please contact Black Box Technical Support at 724-746-5500 with the following information:

1. Unit type.
2. Unit serial number.
3. Environment lay-out. Include hubs, bridges and routers (with model numbers), estimated cable lengths (between equipment), and type of cable used.
4. A description of the problem you are experiencing.
5. List of tests performed.

APPENDIX B - GLOSSARY OF TERMS

CATEGORY 5	HIGH-SPECIFICATION CABLE FOR USE WITH DATA RATES UP TO 100 Mbps OVER 100 M DEFINED BY EIA/TIA 568.
DCE	DATA COMMUNICATING EQUIPMENT. IN SERIAL (RS-232) COMMUNICATION THIS IS THE DEVICE THAT CONNECTS TO A DTE (E.G. A MODEM).
DTE	DATA TERMINATING EQUIPMENT. IN SERIAL (RS-232) COMMUNICATION THIS IS THE DEVICE WHICH IS EITHER THE SOURCE OR SINK FOR DATA ON THE LINK (E.G. A TERMINAL OR COMPUTER).
ETHERNET	A LAN DEFINED BY THE IEEE 802.3 COMMITTEE CAPABLE OF OPERATING AT 10 Mbps, 100 Mbps OR 1000 Mbps DATA RATES.
LAN	LOCAL AREA NETWORK.
LED	LIGHT-EMITTING DIODE.
PSU	POWER-SUPPLY UNIT.
RJ 45	EIGHT-PIN MODULAR JACK CONNECTOR.
SNMP	SIMPLE NETWORK MANAGEMENT PROTOCOL.
UTP	UNSHIELDED TWISTED PAIR (CABLE TYPE).

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