



INSTALLATION AND OPERATION MANUAL

FDX2HSD(M,S)(1,2)(EA,EB)/M

DUAL HIGH SPEED RS485 (2W) DATA TRANSCEIVER

The ComNet™ FDX2HSD(M,S)(1,2)(EA,EB)/M data transceivers provide point-to-point or drop-and-repeat transmission of two independent simplex or duplex high-speed RS485 (2W) data signals over one optical fiber. The transceivers are transparent to data encoding allowing for broad-range compatibility. Models within this series are available for use with multimode or single mode optical fiber. Plug-and-play design ensures ease of installation requiring no electrical or optical adjustments. The FDX2HSD(M,S)(1,2)(EA,EB)/M has a built-in fiber link test feature that allows for the testing of the fiber.

Bi-color (Red/Green) LED indicators are provided for rapidly ascertaining equipment operating status including the location of fiber breaks. See **Figure 10** on **Page 6** for an explanation of LED indications.

These units are interchangeable between stand-alone or card-cage mount configurations. See **Figure A** on **Page 9** for mounting instructions.

See **Figures 1 – 12** for complete installation details.

FIGURE 1 - FDX2HSD(M,S)2/M TRANSCEIVER / REPEATER

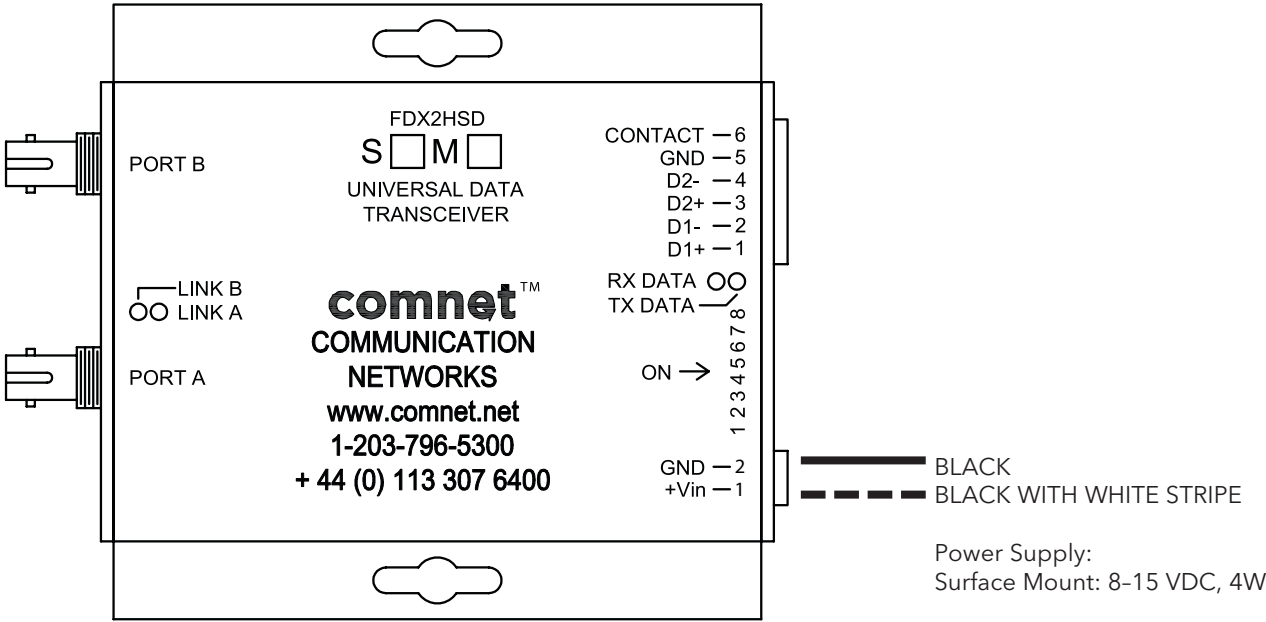


FIGURE 2 - FDX2HSD(M,S)2/M TRANSCEIVER / REPEATER

FRONT PANEL REAR PANEL

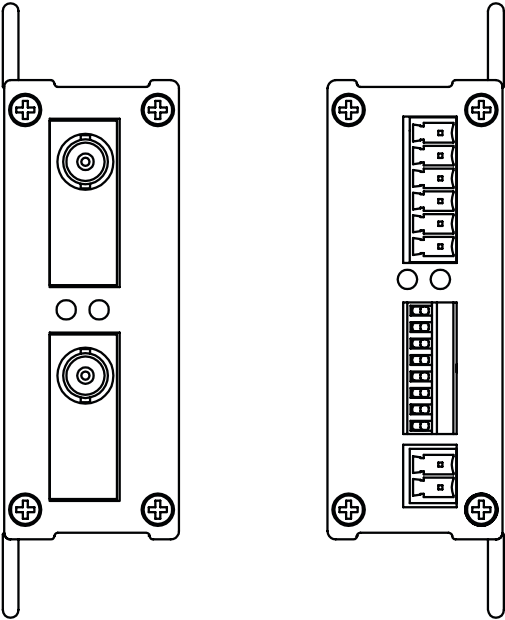


FIGURE 3 - FDX2HSD(M,S)1EA/M TRANSCEIVER (A UNIT)

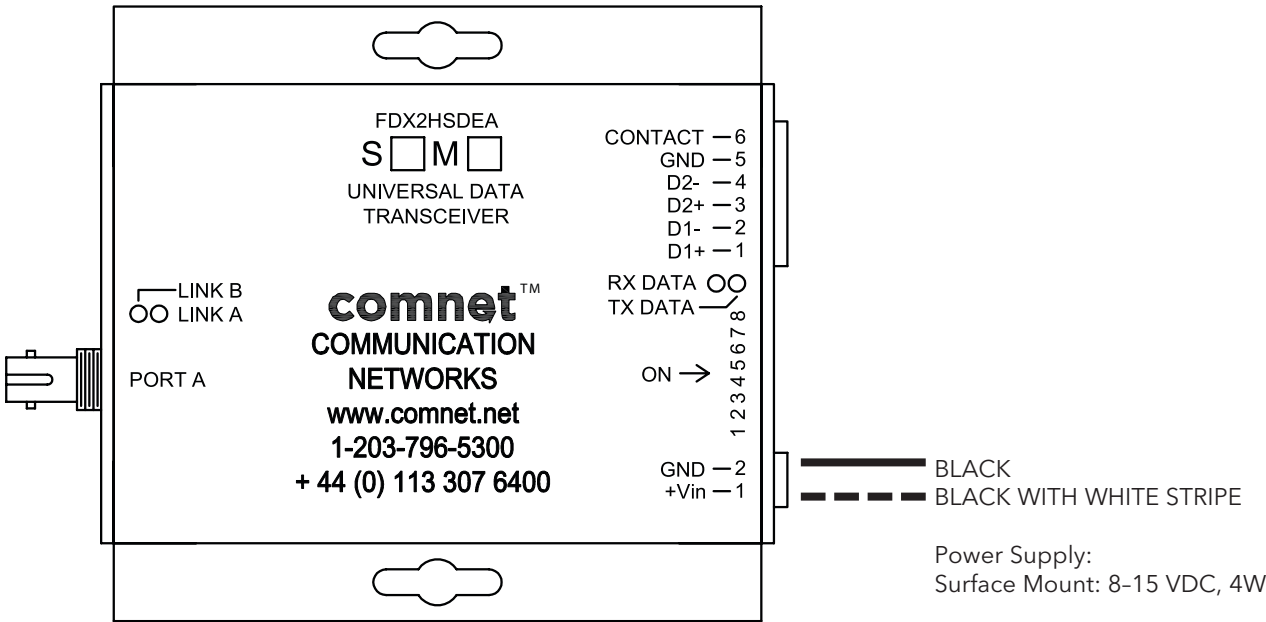


FIGURE 4 - FDX2HSD(M,S)1EA/M TRANSCEIVER (A UNIT)

FRONT PANEL

REAR PANEL

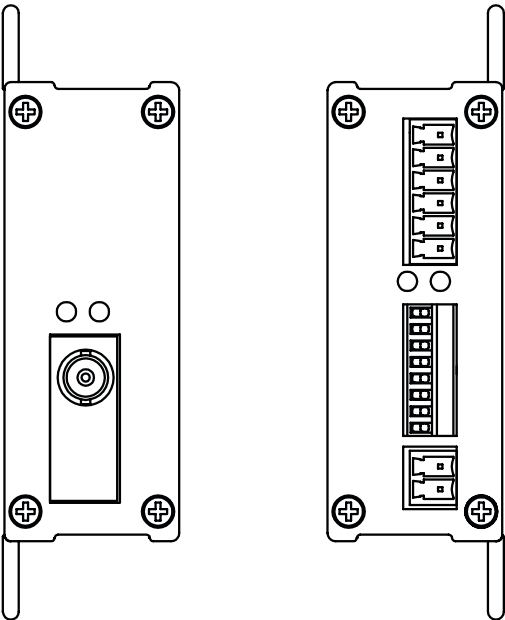


FIGURE 5 - FDX2HSD(M,S)1EB/M TRANSCEIVER (B UNIT)

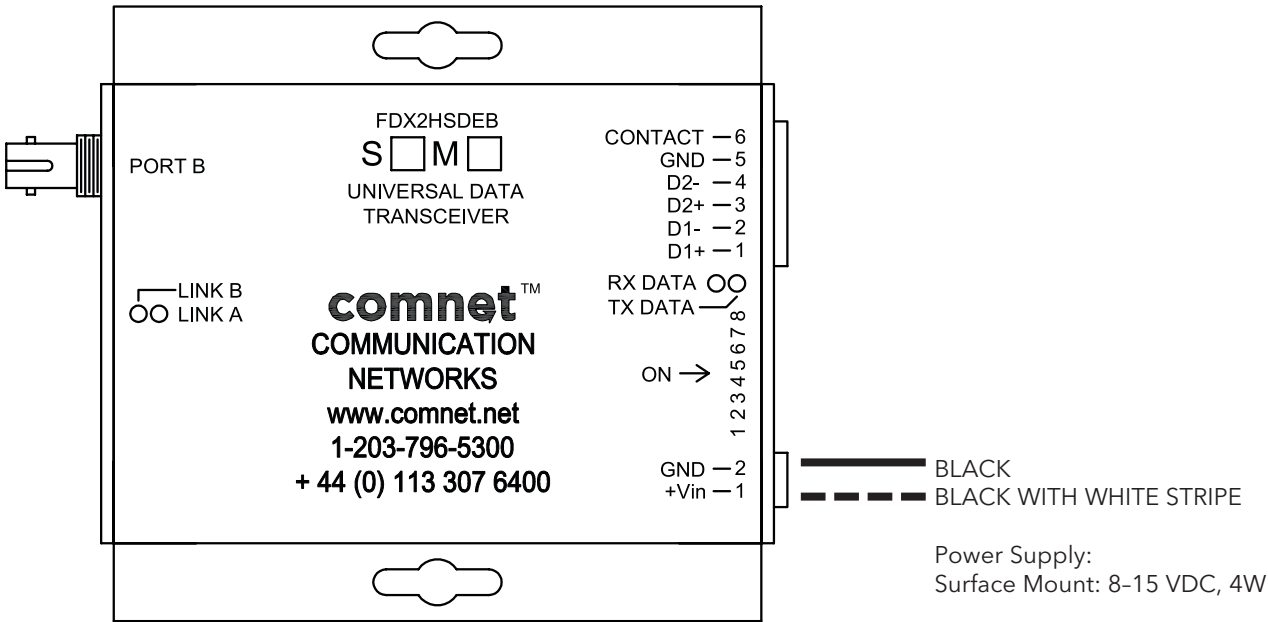


FIGURE 6 - FDX2HSD(M,S)1EB/M TRANSCEIVER (B UNIT)

FRONT PANEL

REAR PANEL

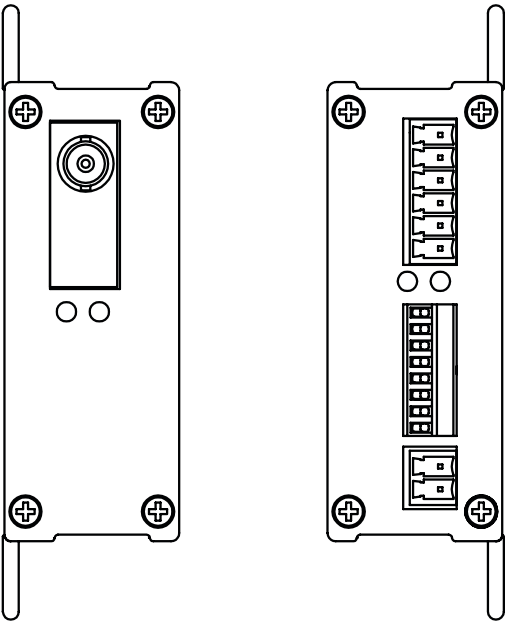
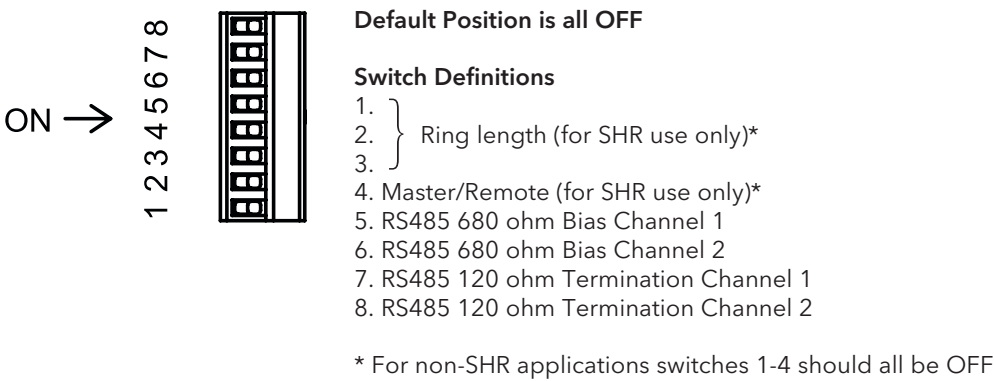


FIGURE 7 - DIP SWITCH POSITIONS



Switches 1 - 3: Ring Length
For high data rate applications in SHR situations, ring length needs to be set to approx total fiber length.

Max Total SHR Ring Length	Switch		
	1	2	3
1km or not SHR	○	○	○
2km	●	○	○
5km	○	●	○
10km	●	●	○
20km	○	○	●
50km	●	○	●
75km	○	●	●
100km	●	●	●

● = ON

○ = OFF

Switch 4: Master / Remote
In SHR applications, one unit in ring shall be set to “Master” - this can be any unit in the ring. This does not affect communications between nodes.

Switches 5 and 6: Bias
When on, applies 680 ohm Pull Up/Pull Down for Bias on RS485 bus.

Switches 7 and 8: Termination
When on, applies 120 ohm termination across RS485 bus.

FIGURE 8 - DATA CONNECTIONS

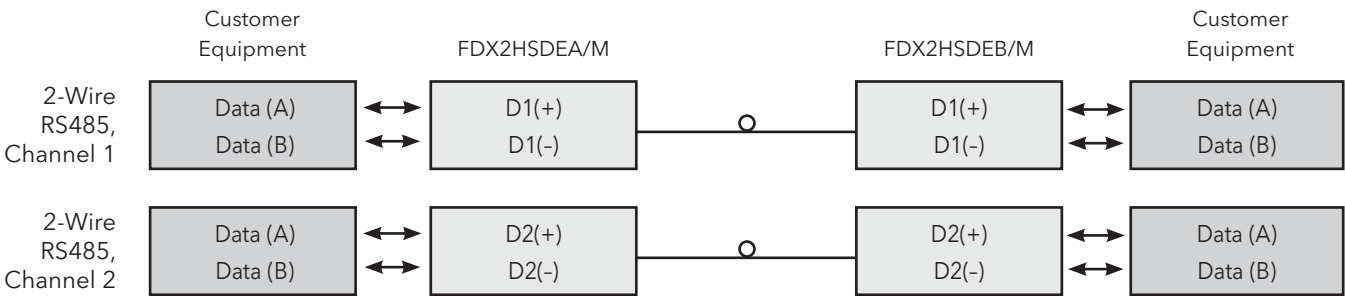


FIGURE 9 - 6-PIN DATA CONNECTOR

CONTACT — 6

GND — 5

D2- — 4

D2+ — 3

D1- — 2

D1+ — 1

CONTACT Fiber alarm output, internal dry contact to GND when optical links are established.

GND: Signal ground reference. Used for alarm output reference and/or data cable shield.

D2+/D2- Electrical data inputs. See **Figure 6** for data connections.

D1+/D1- Electrical data outputs. See **Figure 6** for data connections.

Connector pinout:

1. Data 1+
2. Data 1-
3. Data 2+
4. Data 2-
5. GND
6. Contact out

FIGURE 10 - LED INDICATORS

	OPTICAL LINK A	OPTICAL LINK B	DATA IN	DATA OUT
GREEN	Unit In Sync	Unit In Sync	Data Activity	Data Activity
RED	Unit Not In Sync	Unit Not In Sync	-	-
BLINK	Remote Fault*	Remote Fault*	-	-
OFF	Optic Not Installed	Optic Not Installed	No Data Activity	No Data Activity

* See Figure 11

FIGURE 11 - FAULT CONDITIONS

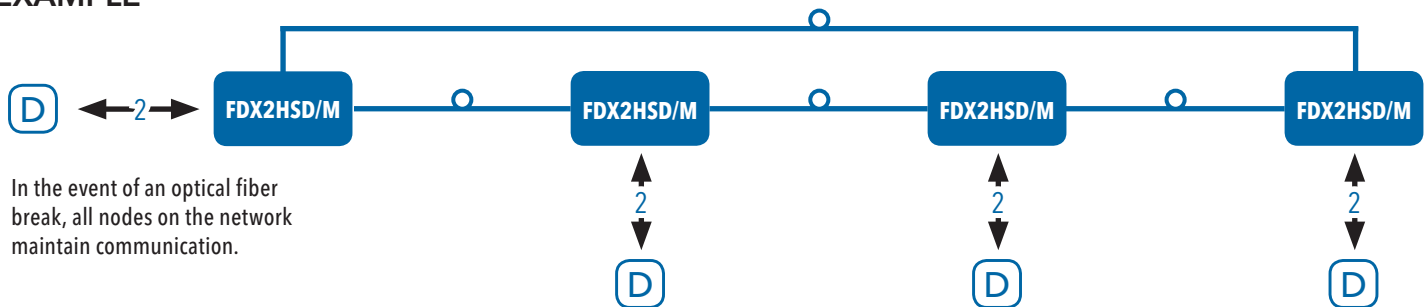
A fault condition is when a FDX2HSD(M,S)/M unit system loses power or optical link. The FDX2HSD(M,S)/M provides three indicators to help identify when and where fault conditions occur in a system:

1. ALARM relay output
2. STATUS LED
3. LINK A and LINK B LEDs

When a fault occurs, the ALARM relay on every FDX2HSD(M,S)/M in the system goes from closed to open. In addition, the STATUS LED on every FDX2HSD(M,S)/M in the system goes from solid green to solid red. The LINK A and LINK B LEDs can then be used to identify the actual location of the fault based on their color and pattern:

Solid Green	Optical link has been established between this optical port and the adjacent FDX2HSD(M,S)/M over fiber. Furthermore, every other unit in the system is also reporting that link has been established. There are no faults in the system.
Solid Red	Optical link over this port has been lost. This could be due to a broken fiber, a bad connection, or loss of power at the adjacent unit.
Blinking Green/Red	Optical link has been established between this optical port and the adjacent FDX2HSD(M,S)/M over fiber. However, a fault condition has been detected somewhere in the system. The LINK LED will be green for a period of time, and then flash red some number of times. The number of red flashes indicates the location of the fault by "hops" around the ring. If the LED flashes red three times, then the location of the fault is three hops away (i.e. three FDX2HSD(M,S)/M units away). For larger systems with faults greater than 9 hops away, the LED will use a combination of long and short red flashes. Each long flash indicates 10 hops. Each short flash indicates 1 hop. For example, a fault 47 hops away would be encoded as 4 long red flashes, followed immediately by 7 short red flashes. The pattern repeats indefinitely until the fault is resolved. NOTE: This feature is disabled when ring length is set to 1km (non-SHR)

EXAMPLE



The diagram above shows how this system will respond to an optical fiber break between unit 2 and unit 3. The ALARM relay on every node will go from closed to an open circuit to indicate an alarm condition. The LINK A and LINK B LEDs on each unit will identify where the fault occurred:

- Unit 1** The LINK A LED will be green for a time, then flash red 1 time. The LINK B LED will be green for a time, then flash red 2 times.
Unit 2 The LINK A LED will be solid red. The LINK B LED will be green for a time, then flash red 3 times.
Unit 3 The LINK A LED will be green for a time, then flash red 3 times. The LINK B LED will be solid red.
Unit 4 The LINK A LED will be green for a time, then flash red 2 times. The LINK B LED will be green for a time, then flash red 1 time.

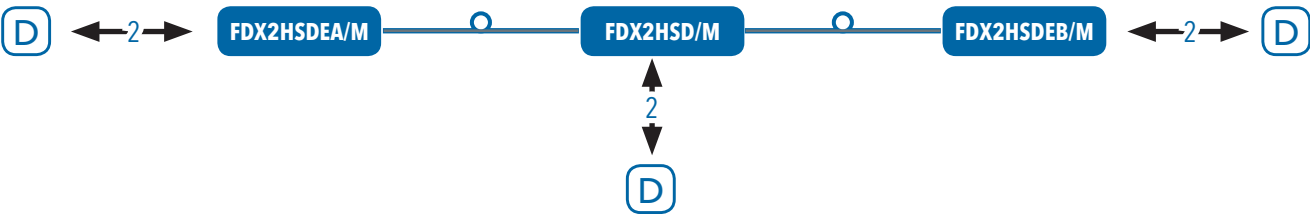
FIGURE 12 - TYPICAL APPLICATIONS

OPTICAL FIBER
RS422 or RS485

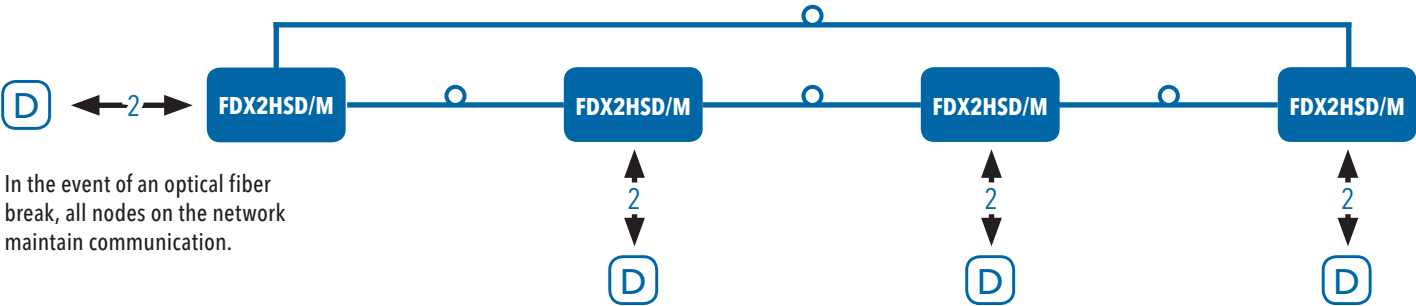
Point to Point



Linear Drop Insert Repeat



Self-Healing Ring



In the event of an optical fiber break, all nodes on the network maintain communication.

MECHANICAL INSTALLATION INSTRUCTIONS

INSTALLATION CONSIDERATIONS

This fiber-optic link is supplied as a Standalone/Rack module. Units should be installed in dry locations protected from extremes of temperature and humidity.

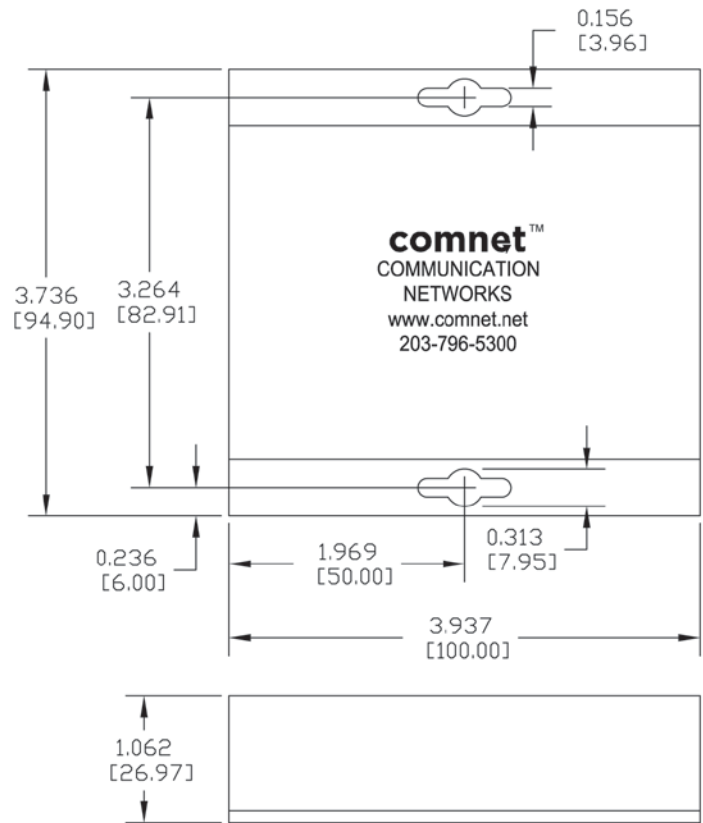
WARNING: Unit is to be used with a Listed Class 2 power supply.

IMPORTANT SAFEGUARDS:

- A) Elevated Operating Ambient** - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T_{ma}) specified by the manufacturer.
- B) Reduced Air Flow** - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

FIGURE A

Dimensions are for a medium sized ComNet™ surface mount module



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