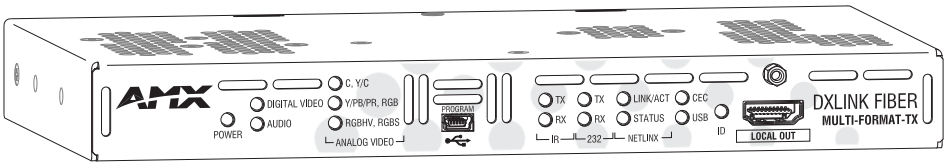
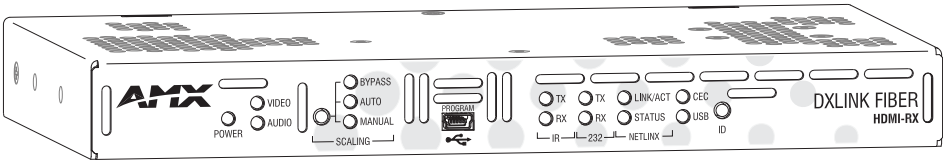
HARDWARE REFERENCE MANUAL

DXLINK™ FIBER TRANSMITTERS AND RECEIVERS

DXF-TX-MMD, DXF-RX-MMD, DXF-TX-SMD, DXF-RX-SMD,
DXF-TX-MMS, DXF-RX-MMS, DXF-TX-SMS, DXF-RX-SMS





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IMPORTANT SAFETY INSTRUCTIONS

1. READ these instructions.
2. KEEP these instructions.
3. HEED all warnings.
4. FOLLOW all instructions.
5. DO NOT use this apparatus near water.
6. CLEAN ONLY with dry cloth.
7. DO NOT block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. DO NOT install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. DO NOT defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wider blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. PROTECT the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. ONLY USE attachments/accessories specified by the manufacturer.

12. USE ONLY with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. UNPLUG this apparatus during lightning storms or when unused for long periods of time.
14. REFER all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. DO NOT expose this apparatus to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the apparatus.
16. To completely disconnect this apparatus from the AC Mains, disconnect the power supply cord plug from the AC receptacle.
17. Where the mains plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.
18. DO NOT overload wall outlets or extension cords beyond their rated capacity as this can cause electric shock or fire.

The exclamation point, within an equilateral triangle, is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electrical shock to persons.

ESD Warning: The icon to the left indicates text regarding potential danger associated with the discharge of static electricity from an outside source (such as human hands) into an integrated circuit, often resulting in damage to the circuit.

WARNING: To reduce the risk of fire or electrical shock, do not expose this apparatus to rain or moisture.

WARNING: No naked flame sources - such as candles - should be placed on the product.

WARNING: Equipment shall be connected to a MAINS socket outlet with a protective earthing connection.

WARNING: To reduce the risk of electric shock, grounding of the center pin of this plug must be maintained.

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LIABILITY NOTICE

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AMX WARRANTY AND RETURN POLICY

The AMX Warranty and Return Policy and related documents can be viewed/downloaded at www.amx.com.

WARNING: This product is intended to be operated ONLY from the voltages listed on the back panel or the recommended, or included, power supply of the product. Operation from other voltages other than those indicated may cause irreversible damage to the product and void the products warranty. The use of AC Plug Adapters is cautioned because it can allow the product to be plugged into voltages in which the product was not designed to operate. If the product is equipped with a detachable power cord, use only the type provided with your product or by your local distributor and/or retailer. If you are unsure of the correct operational voltage, please contact your local distributor and/or retailer.

EU COMPLIANCE INFORMATION:

Eligible to bear the CE mark; Conforms to European Union Low Voltage Directive 2006/95/EC; European Union EMC Directive 2004/108/EC; European Union Restriction of Hazardous Substances Recast (RoHS2) Directive 2011/65/EU; European Union WEEE (recast) Directive 2012/19/EU; European Union Eco-Design Directive 2009/125/EC; European Union Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) Directive 2006/121/EC.

You may obtain a free copy of the Declaration of Conformity by visiting http://www.amx.com/techcenter/certifications.asp.

WEEE NOTICE:

This appliance is labeled in accordance with European Directive 2012/19/EU concerning waste of electrical and electronic equipment (WEEE). This label indicates that this product should not be disposed of with household waste. It should be deposited at an appropriate facility to enable recovery and recycling.

US FCC COMPLIANCE NOTICE – CLASS A

NOTE: *This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.*

US FCC AND CANADA EMC COMPLIANCE INFORMATION:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CANADA ICES INFORMATION

ICES (Interference-Causing Equipment Standard): CAN ICES-3 (A)/NMB-3(A)

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CONTENTS

Overview DXLink Fiber

Applicability Notice

The information in this manual applies to the AMX DXLink Fiber Transmitters and Receivers, Duplex and the DXLink Fiber Transmitters and Receivers, Simplex (see tables below).

DXLink Fiber, Duplex units handle simultaneous, bidirectional or unidirectional data transfer; DXLink Fiber, Simplex units only handle unidirectional data transfer. DXLink Fiber Duplex and Simplex units are available in both multimode and single mode models (which differ only in respect to their transceivers which support different cable lengths). DXLink Fiber, Duplex information applies to both Duplex and Simplex unless specifically noted otherwise.

Throughout this manual, the phrase "DXLink Fiber units" will be used when referring generically to all eight of the DXLink Fiber, Duplex and DXLink Fiber, Simplex product models.

When referring to specific models, the "Model Number" will be used:

- DXF-TX-MMD (multimode duplex)
- DXF-RX-MMD
- DXF-TX-SMD (single mode duplex)
- DXF-RX-SMD
- DXF-TX-MMS (multimode simplex)
- DXF-RX-MMS
- DXF-TX-SMS (single mode simplex)
- DXF-RX-SMS

NOTE: *AMX reserves the right to modify its products and their specifications without notice.*

DXLink Fiber Transmitters and Receivers, Duplex

Part #	Model Name	Model Number, Description
FG1010-362*	DXLink Multi-Format Multimode Fiber Transmitter, Duplex	DXF-TX-MMD, DXLINK MULTI-FORMAT MM FIBER TX, DUPLEX
FG1010-360*	DXLink Multi-Format Single Mode Fiber Transmitter, Duplex	DXF-TX-SMD, DXLINK MULTI-FORMAT SM FIBER TX, DUPLEX
FG1010-562**	DXLink HDMI Multimode Fiber Receiver, Duplex	DXF-RX-MMD, DXLINK HDMI MM FIBER RX, DUPLEX
FG1010-560**	DXLink HDMI Single Mode Fiber Receiver, Duplex	DXF-RX-SMD, DXLINK HDMI SM FIBER RX, DUPLEX

DXLink Fiber Transmitter and Receivers, Simplex

Part #	Model Name	Model Number, Description
FG1010-363*	DXLink Multi-Format Multimode Fiber Transmitter, Simplex	DXF-TX-MMS, DXLINK MULTI-FORMAT MM FIBER TX, SIMPLEX
FG1010-361*	DXLink Multi-Format Single Mode Fiber Transmitter, Simplex	DXF-TX-SMS, DXLINK MULTI-FORMAT SM FIBER TX, SIMPLEX
FG1010-563 **	DXLink HDMI Multimode Fiber Receiver, Simplex	DXF-RX-MMS, DXLINK HDMI MM FIBER RX, SIMPLEX
FG1010-561**	DXLink HDMI Single Mode Fiber Receiver, Simplex	DXF-RX-SMS, DXLINK HDMI SM FIBER RX, SIMPLEX

* On the rear of all Transmitter units, the number will be FG1010-36X, indicating they share a common metal box design.
** On the rear of all Receiver units, the number will be FG1010-56X, indicating they share a common metal box design.

The multimode and single mode fiber optic transceivers allow for in-the-field replacement.

DXLink Fiber Hardware Compatibility

This section applies to TX-to-RX standalone pairs and to DXLink Fiber Input or Output Boards and their corresponding TX or RX units. (Duplex and Simplex boards can be used in the same enclosure.)

Connections are allowed between matching hardware (Duplex to Duplex or Simplex to Simplex) as well as between mixed hardware (Simplex to Duplex or Duplex to Simplex) as long as the constraints of multimode to multimode and single mode to single mode are maintained.

IMPORTANT: *Compatibility between hardware requires matching model types: multimode to multimode and single mode to single mode.*

The next section explains the functionality and limitations inherent in the three Directional Modes used for communication control. An understanding of these modes is necessary, especially if you are not using the default for the specific hardware type (Duplex or Simplex).

DXLink Fiber Directional Modes

DXLink Fiber Directional Modes include Bidirectional Mode, Unidirectional Mode, and Data Link-lost Mode. DXLink Fiber, Duplex hardware has a default setting of Bidirectional Mode, but can be configured for Unidirectional Mode or drop into Data Link-lost Mode (when the return path is removed or not connected). DXLink Fiber, Simplex hardware only uses Unidirectional Mode.

NOTE: *For instructions on setting Duplex TXs and RXs to a particular Directional Mode, see "Duplex Hardware Directional Mode Configuration" on page 42. For instructions on configuring DXLink Fiber, Duplex Input and Output Boards, see the "Hardware Reference Manual – Enova DGX 100 Series Digital Media Switchers" or "Instruction Manual – Enova DGX 8/16/32/64 Digital Media Switchers."*

Bidirectional Mode

When data flows in two directions, the flow is bidirectional. For example, a source device sends audio, video, and communication data to a TX. From the TX, all three signals are sent via fiber to an input board on the switcher. The input board routes the audio and video to an output board, while the integrated Master processes the communication data. The output board sends audio and video (along with any necessary communication data) via its RX to the destination device. If needed, communication data from the destination device can return to the Master for processing via the same path. Bidirectional is the default Directional Mode for DXLink Fiber, Duplex units if both fiber strands are connected. Setting DIP switch #4 to ON enables Unidirectional Mode (see below) and the lack of a return fiber path results in the unit dropping into Data Link-lost Mode (see below).

Unidirectional Mode

When data flows in only one direction, the flow is unidirectional. For example, an audio/video signal travels from a Transmitter to a Receiver and no signals are passed back to the Transmitter. In Unidirectional Mode, the Receiver does not send an optical signal trying to establish a return data path connection. Simplex hardware always operates in this mode and does not require additional setup. Unidirectional Mode is a configurable setting for Duplex hardware which requires setting the DIP switch's #4 Toggle on the bottom of the Transmitter or Receiver.

Data Link-lost Mode

When a system is configured for Bidirectional Mode, but the data return path has been removed or is not connected, the system drops into Data Link-lost Mode. In Data Link-lost Mode, the Transmitter only sends audio and video to the Receiver over a single fiber path, but both units are actively ready for the addition of the return path which will enable Bidirectional Mode. For example, an audio/video signal travels from a Transmitter to a Receiver and no signals are passed back to the Transmitter, but the Receiver's return laser still transmits light and attempts to establish a connection.

CAUTION: *In Data Link-lost Mode, the data return path is disconnected but both of the transceiver lasers are still active. If left uncovered, transceiver lasers may constitute a health hazard. This hazard should be avoided by restoring Bidirectional Mode (see page 42), configuring DXLink Fiber units for Unidirectional Mode (see page 42), or covering exposed lasers.*

IMPORTANT: *When using Duplex hardware in mixed modes (where boards and their units are configured for different Directional Modes) or using both Duplex and Simplex hardware (where the Duplex hardware is in Bidirectional Mode), the hardware must be configured to avoid Data Link-lost Mode (see Caution above).*

Product Notes

Fiber Optic Transceivers

The DXLink Fiber units use SFP+ fiber optic transceivers*. Fiber optic transceivers are self-contained modules that send and receive optical signals over fiber cable. These fiber optic transceivers are either multimode or single mode and must be wired with the corresponding cable type.

* SFP+ = enhanced small form-factor pluggable fiber optic transceiver rated at 10 Gbps transmission data rate.

NOTE: *The types of fiber optic transceivers used in DXLink Fiber units are referred to as "multimode" and "single mode," which indicate the maximum length of the fiber optic cable that can be used. In addition, the Transmitters and Receivers support modes that can be determined during setup to handle the system architecture, accommodate networking needs, and process video signals (see page 20).*

Device Types / Cable Types / Cable Runs

The type of DXLink Fiber device determines the maximum length of cable runs possible. Cable quality is also a determining factor.

DXLink Fiber Devices			
Device Type	**DXLink Fiber, Units**	**Required Cable Type**	**Maximum Distance**
Multimode	• DXF-TX-MMD • DXF-RX-MMD • DXF-TX-MMS • DXF-RX-MMS	OM3 50/125 µm multimode fiber optic	984 ft. (300 m)
Single Mode	• DXF-TX-SMD • DXF-RX-SMD • DXF-TX-SMS • DXF-RX-SMS	9/125 µm single mode fiber optic	6.21 miles (10 km)

All DXLink Fiber units are designed for transmission of an HDMI signal over fiber optic cable.

DXLink Fiber, Duplex multimode and single mode transceivers support bidirectional communication (Bidirectional Mode) or unidirectional communication (Unidirectional and Data Link-lost Mode). DXLink Fiber, Simplex multimode and single mode transceivers only support unidirectional communication.

Bidirectional Mode Communication

Bidirectional communication over DXLink Fiber includes transmission of digital video and audio, native NetLinx control (IR and RS-232), USB keyboard and mouse, and Ethernet (100 Mbps).

Unidirectional Mode and Data Link-lost Mode Communication

Unidirectional and Data Link-lost communication over DXLink Fiber includes transmission of digital video and audio. While native NetLinx control (IR and RS-232) is not supported over fiber, units can provide this support when they are connected to a LAN via their ICS LAN 10/100 connector (see “Unidirectional Mode LAN Configuration” on page 46).

WARNING: DXLink Fiber units use laser transceivers, which are Class 1 Eye Safe per IEC 60825-1/CDRH requirements. While the Class 1 category indicates that the invisible laser used is safe, we recommend avoiding direct eye exposure when using any optical fiber products (see the OSHA directive below).

OSHA Directive

The OSHA Technical Manual (at https://www.osha.gov/dts/osta/otm/otm_iii/otm_iii_6.html) under “VI. Control Measures and Safety Programs” states: “Direct exposure on the eye by a beam of laser light should *always* be avoided with any laser, *no matter how low the power.*”

Transceiver Disposal

IMPORTANT: *If disposal of transceivers is necessary, dispose of them as mandated by your area or country guidelines.*

Multimode SFP+ Fiber Optic Transceiver

Multimode SFP+ fiber optic transceivers are used in the DXLink Fiber units specified in the table at the top of the previous page. Depending on the transceiver model, it will have a latch that is black or a black label on the latch top with white triangles showing data flow direction.

The multimode SFP+ fiber optic transceiver requires multimode fiber optic cable, which allows numerous optical waves to traverse the optic core. Multimode fiber optic cable has a significantly larger optical core (which results in a higher dispersion rate) and results in comparative shorter distance optical runs than the single mode cable.

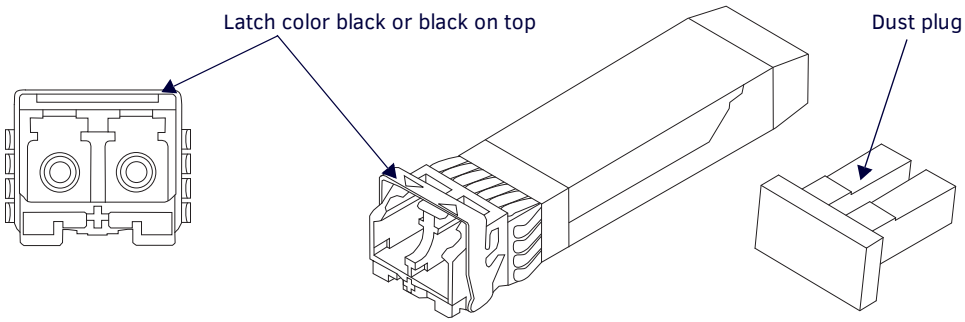


FIG. 1 Multimode SFP+ fiber optic transceiver (model with black label on latch top shown)

Single Mode SFP+ Fiber Optic Transceiver

Single mode SFP+ fiber optic transceivers are used in the DXLink Fiber units specified in the table at the top of the previous page. Depending on the transceiver model, it will have a bright blue latch or a blue label on the latch top with white triangles showing data flow direction.

The single mode SFP+ fiber optic transceiver requires single mode fiber optic cable, which allows a single optical wave to traverse through the optic core. Single mode fiber optic cable has a significantly smaller diameter optical core than multimode fiber optic cable and is generally associated with longer distance transport capabilities.

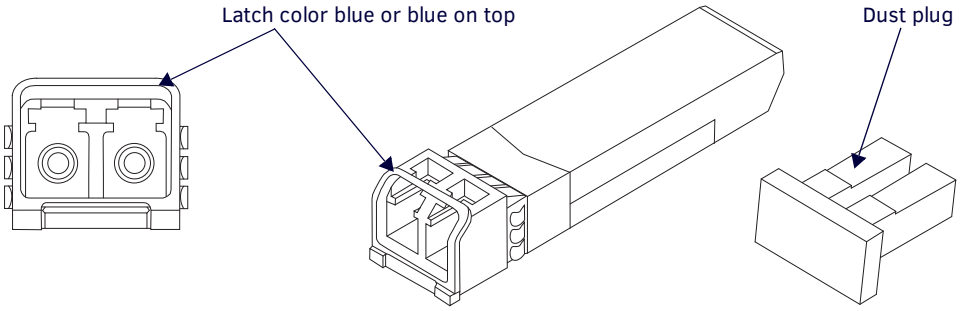


FIG. 2 Single mode SFP+ fiber optic transceiver (model with blue latch shown)

DXLink Fiber Multi-Format Transmitters

The DXLink Fiber Transmitters receive an HDMI signal or analog video signal (composite, Y/C, Y/Pb/Pr, RGB, RGBS, or RGBHV) and an audio signal from a source device. The audio can be either digital audio embedded with the HDMI or analog stereo audio.

Either analog or digital video is transmitted out of the fiber optic transceiver. The active video selection is made using one of two methods:

- Automatic – selects digital video as the priority video input or analog video when digital video is not present. Can be set to treat either the digital or analog video as the priority, which then defaults to the opposite if the primary is not present.
- Active SEND_COMMAND video input selection from a bound NetLinx Central Controller (usually the integrated Central Controller on the Enova DGX).

Both the video and audio are transported over fiber optic cable to either an Enova DGX Digital Media Switcher or directly to a DXLink Fiber, Duplex RX. The unit also has a local HDMI output connector on the front for sending the video signal from the source directly to a local destination device. This local HDMI output connection supports the same input resolutions contained in the first table in “Appendix E - Supported Input Resolutions” (see page 107).

The 232 port (RS-232) on the Transmitters supports bidirectional serial data via the fiber optic cable to/from the 232 port. In addition, the Transmitters have IR ports, which also send data via the fiber optic cable.*

* Configuration of Ethernet, IR, RS-232, and USB for units in Unidirectional or Data Link-lost Mode requires additional information found in “Unidirectional Mode LAN Configuration” on page 46.

DXLink Fiber HDMI Receivers

The DXLink Fiber Receivers feature SmartScale® Technology (integrated EDID output scaling) to ensure an appropriate output resolution, plus they support a Manual (override) option for setting up custom resolutions and a Bypass option (see page 47).

The DXLink Fiber Receivers receive an HDMI signal and an audio signal over fiber optic cable from a DXLink Fiber Output Board on an Enova DGX Switcher or directly from a DXLink Fiber Transmitter. They then send the signal on to the destination. The audio output can be either digital audio embedded with the HDMI signal or analog stereo audio (if the signal originated as a 2 channel audio format).

The 232 ports (RS-232) support bidirectional serial data via the fiber optic cable, which connects the DXLink Fiber TX/RX units with the Enova DGX Switcher or with the DXLink Fiber Transmitter.*

* Configuration of Ethernet, IR, RS-232, and USB for units in Unidirectional or Data Link-lost Mode requires additional information found in “Unidirectional Mode LAN Configuration” on page 46.

NOTE: *If a DVI-D signal is used (via a DVI-to-HDMI cable), the advanced audio support from HDMI will not be available out the Receiver.*

NOTE: *DXLink Fiber units support several different modes which are available for system setup and use. Brief explanations of the modes are provided in the section “Quick Reference Tables for Modes” on page 20 along with page references to detailed information.*

Compatibility with DXLink Fiber Boards

DXLink Fiber TXs and RXs work in conjunction with each other as long as the constraints of multimode to multimode and single mode to single mode are maintained (see "DXLink Fiber Hardware Compatibility" section on page 8).

DXLink Fiber TXs and RXs work in conjunction with the Enova DGX DXLink Fiber Input and Output Boards in the following table as long as the constraints of multimode to multimode and single mode to single mode are maintained. Also note that TX and RX compatibility with Enova DGX DXLink Boards applies when the boards are used in Enova DGX 8/16/32/64 enclosures and in Enova DGX 100 Series enclosures.

DXLink Fiber Boards

Part #	Model Name	Model Number, Description
FG1058-622	Enova DGX DXLink Multimode Fiber Input Board, Duplex	DGX-I-DXF-MMD, ENOVA DGX DXLINK MM FIBER INPUT BOARD, DUPLEX
FG1058-632	Enova DGX DXLink Multimode Fiber Output Board, Duplex	DGX-O-DXF-MMD, ENOVA DGX DXLINK MM FIBER OUTPUT BOARD, DUPLEX
FG1058-620	Enova DGX DXLink Single Mode Fiber Input Board, Duplex	DGX-I-DXF-SMD, ENOVA DGX DXLINK SM FIBER INPUT BOARD, DUPLEX
FG1058-630	Enova DGX DXLink Single Mode Fiber Output Board, Duplex	DGX-O-DXF-SMD, ENOVA DGX DXLINK SM FIBER OUTPUT BOARD, DUPLEX
FG1058-623	Enova DGX DXLink Multimode Fiber Input Board, Simplex	DGX-I-DXF-MMS, ENOVA DGX DXLINK MM FIBER INPUT BOARD, SIMPLEX
FG1058-633	Enova DGX DXLink Multimode Fiber Output Board, Simplex	DGX-O-DXF-MMS, ENOVA DGX DXLINK MM FIBER OUTPUT BOARD, SIMPLEX
FG1058-621	Enova DGX DXLink Single Mode Fiber Input Board, Simplex	DGX-I-DXF-SMS, ENOVA DGX DXLINK SM FIBER INPUT BOARD, SIMPLEX
FG1058-631	Enova DGX DXLink Single Mode Fiber Output Board, Simplex	DGX-O-DXF-SMS, ENOVA DGX DXLINK SM FIBER OUTPUT BOARD, SIMPLEX

Features – DXLink Fiber Transmitters and Receivers

- Optical transport rate of 10 Gbps.
- Incorporates HDMI® technology.
- HDCP 1.4 compatible.
- Supports computer video up to 1920x1200, HDTV up to 1080p, as well as 3D support (3D and Deep Color).
- Supports HDMI passthrough with embedded digital audio and single link DVI (via DVI-to-HDMI cable).
- A local HDMI output connector on the front of the Transmitters for sending the video signal from the source directly to a local destination device.
- DXLink Fiber TX units support analog video: composite, Y/C, Y/Pb/Pr, RGB, RGBS, or RGBHV.
- DXLink Fiber multimode units transport video signals over distances up to 984 feet (300 m).
- DXLink Fiber single mode units transport video signals over distances up to 6.21 miles (10 km).
- Interruption free content when used in conjunction with a switcher; AMX's exclusive InstaGate Pro® Technology allows audio and video to be switched quickly and easily to every connected display without the difficulties typically associated with HDCP.
- AutoDetect on the Transmitters and SmartScale® on the Receivers work to automatically recognize any device's supported resolutions and signal type parameters, allowing switching out source and destination devices without manual setup. Also included is the ability to control detailed timing parameters for customized video output formats. (SmartScale is the ability to configure the scaling output by automatically selecting destination defined resolutions.)
- Supports HDMI embedded digital audio and analog stereo audio.
- Fiber optic cable (for fiber cable specifications, see page 23).
- Field serviceable SFP+ fiber optic transceivers, easier to remove and replace an individual transceiver rather than a TX or RX unit or an Enova DGX DXLink Fiber Board.
- The USB port on the Receivers passes keyboard and mouse USB signals to control a remote computer. The Transmitter's USB port connects to a Host PC and will forward HID keyboard and mouse data received from a Receiver's USB port.*
- The 232 port (RS-232 serial) supports bidirectional transfer of serial data between TX/Enova DGX Switcher/RX (Endpoint Mode) and TX/RX (Standalone Mode).*
- The IR port supports bidirectional transfer of IR data between TX/Enova DGX Switcher/RX (Endpoint Mode) and TX/RX (Standalone Mode).*

* Configuration of Ethernet, IR, RS-232, and USB for units in Unidirectional or Data Link-lost Mode requires additional information found in "Unidirectional Mode LAN Configuration" on page 46.

Features – DXLink Fiber Transmitters and Receivers (continued)

- A desktop power supply (ENERGY STAR® qualified) is provided per DXLink Fiber unit.
- The Transmitters and Receivers are compatible with all V Style, versatile mounting options including rack, surface, and pole.
- Backed by AMX's 3 year warranty (see www.amx.com).
- 24-hour technical support.

NOTE: *Features and specifications described in this document are subject to change without notice.*

Common Applications

DXLink Fiber Transmitters and Receivers, Duplex and Simplex are ideal for any sources and destinations designed into Enova DGX integrated systems that require the distance capabilities and/or inherent security of fiber with bidirectional or unidirectional data transfer. These transmitters and receivers easily handle campus-wide distribution of sources that are shared between classrooms, in secure military applications, medical facilities, casinos, arenas, museums, and large corporate installations. Connect digital or analog video sources to the TXs directly using the HDMI or HD-15 multi-format input connection and easily include audio on the same fiber optic cable by using the stereo or digital audio connection. Directly connect LCDs, plasmas, and projectors to the RXs using the HDMI output connection while delivering room audio via the stereo audio output.

The installation's requirements dictate the system setup, which generally takes one of the following three forms.

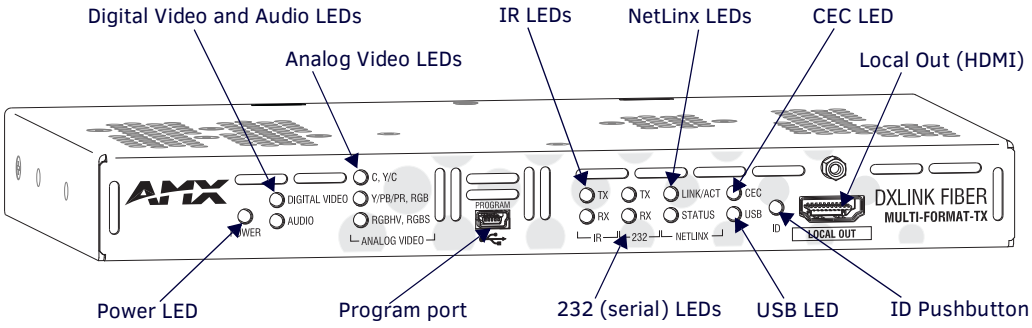
- Endpoint Mode (Switcher) – One or more TX and/or RX are connected to a switcher containing an integrated Master (see page 29).
- Endpoint Mode (Standalone) – A standalone TX/RX pair are connected directly to each other but, in addition, either the TX or RX is connected to a NetLinx Central Controller via a LAN or directly to the Controller (see page 31).
- Extender Mode (Standalone) – A standalone TX/RX pair are connected directly to each other as a simple extender solution (see page 31).

DXLink Fiber Transmitters

DXLink Fiber Transmitters differ in the type of fiber optic transceiver they employ and the Directional Mode they use by default. Duplex Transmitters default to providing simultaneous, bidirectional data transfer or can be configured to provide unidirectional data transfer. Simplex Transmitters are designed to only provide a single direction of data flow and not receive return data flow. The DXF-TX-MMD and DXF-TX-MMS have a multimode transceiver (the latch is black or has a black label), and the DXF-TX-SMD and DXF-TX-SMS have a single mode fiber optic transceiver (the latch is blue or has a blue label).

NOTE: *A DVI-D signal can be used (via a DVI-to-HDMI cable) into the Transmitter.*

DXLink Fiber Transmitters – Front View



DXF-TX-MMD, DXF-TX-SMD, DXF-TX-MMS, and DXF-TX-SMS

FIG. 3 DXLink Fiber Transmitters - front view

Components located on the front of the DXLink Fiber Transmitters, left to right:

- Power LED – Indicates when the unit is powered on.
- Digital Video and Audio LEDs – Indicate the presence of digital video and digital audio signals, including an embedded audio signal on the HDMI path.
- Analog Video LEDs – Indicate the type of analog video present through the unit: composite or Y/C; Y/Pb/Pr or RGB; RGBHV or RGBS.

Components located on the front of the DXLink Fiber Transmitters, left to right (continued)

- Program port – This port (USB mini-B connector) supports DGX Configuration Software* for programming a custom VGA or HDMI EDID.
- IR LEDs – TX and RX LEDs indicate active IR communication.**
- 232 LEDs (RS-232 serial) – TX and RX LEDs indicate active serial communication.**
- NetLinx LEDs – Link/Act LED indicates network communication activity. The Status LED indicates that the LAN connection is active.**
- CEC LED – CEC is not currently supported.
- USB LED – When illuminated, the LED indicates that the USB port is connected and enabled.**
- ID Pushbutton – Places the unit in ID Mode for setting the NetLinx ID (device only) and provides additional functionality, such as placing the unit in Static IP Mode or DHCP Mode (for details, see page 46).
- Local Out (video) – This HDMI connector can be used to send the source signal to a local monitor.

* Does not apply when using DXLink Fiber units in conjunction with Enova DGX 100 Series Switchers, which use the System Configuration interface for programming (see the *Hardware Reference Manual – Enova DGX 100 Series Digital Medial Switchers)*.

** Configuration of Ethernet, IR, RS-232, and USB for units in Unidirectional or Data Link-lost Mode requires additional information found in “Unidirectional Mode LAN Configuration” on page 46.

LEDs – DXLink Fiber Transmitters

DXLink Fiber TXs – Indicator LEDs on the Front		
LED	**Normal Display**	**Indicates**
Power	Green	Power is applied to the unit
Digital Video	Green	A digital video signal is present through the unit
Audio (Digital)	Green	Embedded audio signal is present through the unit
Analog Video	One of the 3 LEDs will be Green	The type of analog video present through the unit: • C (composite) or Y/C (two component) • Y/PB/PR or RGB (three component) • RGBHV (five component) or RGBS (four component)
IR TX*	Red	IR TX active communication
IR RX*	Yellow	IR RX active communication
232 (Serial) TX*	Red	Serial TX active communication
232 (Serial) RX*	Yellow	Serial RX active communication
NetLinx Link/Act*	Green	Active LAN connection to an AMX Network (blinking = #3 Toggle OFF)
NetLinx Status*	Green	LAN connection is active
CEC	OFF	CEC is not currently supported
USB*	Yellow	USB is connected and enabled

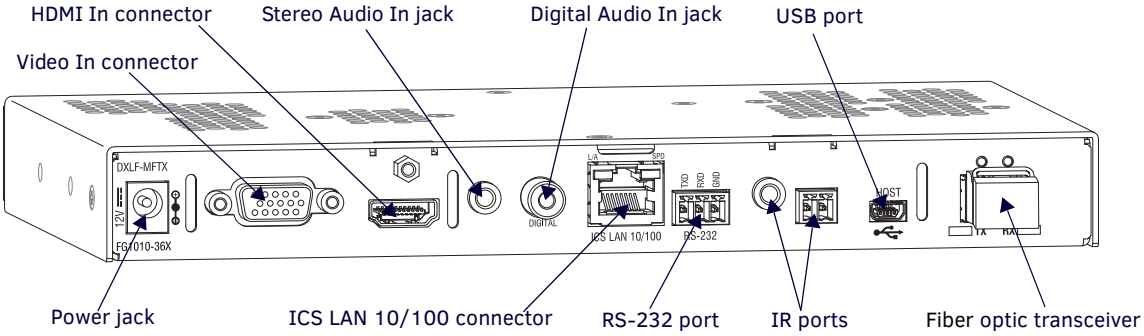
* Configuration of Ethernet, IR, RS-232, and USB for units in Unidirectional or Data Link-lost Mode requires additional information found in “Unidirectional Mode LAN Configuration” on page 46.

NOTE: *For detailed behavior of the NetLinx Link/Act and Status LEDs on the unit’s front, see page 48.*

For detailed behavior of the ICS LAN 10/100 (RJ-45) connector LEDs on the unit’s rear, see page 38.

NOTE: *When an analog video source cable is plugged into the TX, one of the Analog Video LEDs on the front of the TX and the Video LED on the RX (connected directly or via the switcher) turn green to show the type of video that is present through the system.*

DXLink Fiber Transmitters – Rear View



DXF-TX-MMD, DXF-TX-SMD, DXF-TX-MMS, and DXF-TX-SMS

FIG. 4 DXLink Fiber Transmitters - rear view

Components located on the rear of the DXLink Fiber Transmitters, left to right:

- Power Jack

CAUTION: *The provided desktop power supply must be used to power the Transmitter, and it must not be altered in any way.*

The power receptacle is a 2.1 mm DC jack for connecting power. Power comes from the locally connected DC supply of 12 V. The automatically adjusting universal 110/220 IEC power supply is provided. The power supply is ENERGY STAR® qualified to ensure maximum efficiency and savings.

- Video In Connector

The Video In connector on the TX is an HD-15 connector for analog video (composite, Y/C, Y/Pb/Pr, RGB, RGBHV, or RGBS). Pinouts for analog video are on page 105.

NOTE: *When an analog video source cable is plugged into the TX, one of the Analog Video LEDs on the front of the TX and the Video LED on the RX (connected directly or via the switcher) turn green to show the type of video that is present through the system.*

- HDMI In Connector

The HDMI In connector is for digital video and embedded digital audio. When more than one audio signal is present and the default “auto” mode is enabled, HDMI embedded audio takes precedence over S/PDIF and analog audio.

When a NetLinx Central Controller is connected, an audio format SEND_COMMAND is available (the TX must be set for network connectivity via the #3 Toggle) to select the desired audio source (see page 69).

The HDMI connector has a center screw for locking capability. The HDMI connector also supports a DVI-D signal with the use of a DVI-to-HDMI cable.

NOTE: *When a digital video source cable is plugged into the HDMI connector, the Digital Video LED on the front of the TX and the Video LED on the Receiver (connected directly or via the switcher) turn green to show that video is present through the system.*

- Stereo Audio In Jack

The Stereo Audio In jack is a 3.5 mm stereo jack. By default, the stereo audio jack will be third in priority behind the embedded audio on the HDMI input and digital audio on the RCA connector.

When a NetLinx Central Controller is connected, an audio format SEND_COMMAND is available (the TX must be set for network connectivity via the #3 Toggle) to select the desired audio source (see page 69).

- Digital Audio In Jack

The Digital Audio In jack is an RCA jack for an S/PDIF audio signal. When more than one audio signal is present and default “auto” mode is enabled, HDMI embedded audio takes precedence over S/PDIF, which takes precedence over analog audio.

When a NetLinx Central Controller is connected, an audio format SEND_COMMAND can be used (the TX must be set for network connectivity via the #3 Toggle) to select the desired audio source (see page 69).

NOTE: *Configuration of Ethernet, IR, RS-232, and USB for units in Unidirectional Mode or Data Link-lost Mode requires additional information found in “Unidirectional Mode LAN Configuration” on page 46.*

- ICS LAN 10/100 Connector

The Transmitter’s ICS LAN 10/100 (RJ-45) connector provides Ethernet 10/100 connectivity for ingress and egress of network access to the Transmitter (all models). Additionally, when in Bidirectional Mode, that same connection provides Ethernet access via the Transmitter’s fiber port to a downstream Receiver. Special care should be given to enabling the ICS LAN port when connected to an Enova DGX system which is also connected to a network to prevent creating network loops (see “Unidirectional Mode LAN Configuration” on page 46. For pinout and LED information, see page 38).

NOTE: *The #1 Toggle on the DIP switch must be set to ON to enable activity over this port.*

- RS-232 (Serial) Port

The RS-232 serial data interface port is a 3-position screw terminal block. In Bidirectional Mode, the Transmitter’s RS-232 port accepts data from a source device and transfers it via the Transmitter’s fiber port to a downstream Receiver, which in turn transfers the data to the destination device; transfer of data can also be made over the return path. In Unidirectional or Data Link-lost Mode, RS-232 signals cannot be transported via the Transmitter’s fiber port, but must be instead transported via the ICS LAN 10/100 port (see “Unidirectional Mode LAN Configuration” on page 46).

- IR RX Port

The IR RX port is used for IR control (see page 20). This port is a 3.5 mm stereo jack. In addition to being directly connected to a device, this port can be connected as an independent native NetLinx control port from a NetLinx Central Controller.

- IR TX Port

The IR TX port is used for IR control (see page 20). This port is a 2-way mini-Phoenix connector. In addition to being directly connected to a device, this port can be connected as an independent native NetLinx control port from a networked NetLinx Central Controller.

- USB Port

The USB-mini A/B “Host” port on the rear of the TX connects to a PC. The Host port forwards HID keyboard and mouse data received from a directed DXLink Receiver’s USB port (the Receiver can be either Fiber or Twisted Pair). In Bidirectional Mode, the Transmitter receives USB signals via the Transmitter’s fiber port from a connected Receiver. In Unidirectional or Data Link-lost Mode, USB signals cannot be transported via the Transmitter’s fiber port, but must be instead transported via the ICS LAN 10/100 port (see “Unidirectional Mode LAN Configuration” on page 46).

For USB port information, see page 18.

NOTE: *Because the keyboard and mouse capability is unidirectional in nature, functionality requiring return data paths (such as keyboard lights indicating NUM LOCK or CAPS LOCK status on a keyboard) will not function.*

- Fiber Optic Transceiver

The Transmitter's fiber optic transceiver uses either two lasers (in Bidirectional Mode) or one laser (in Unidirectional Mode) to transmit data over fiber optic cable. Transceivers in Bidirectional Mode (Duplex only) transport digital video, embedded audio, Ethernet, and control over fiber optic cable to a DXLink Fiber Input Board or to a DXLink Fiber RX, including digitally transcoded analog video signals. Transceivers in Unidirectional Mode (Simplex default, Duplex configurable) transport digital video and embedded audio to a DXLink Fiber Input Board or to a DXLink Fiber RX, including digitally transcoded analog video signals. All transceivers support HDCP over fiber regardless of Directional Mode. Transceivers with a black latch or black label accept multimode cable; transceivers with a blue latch or blue label accept single mode cable.

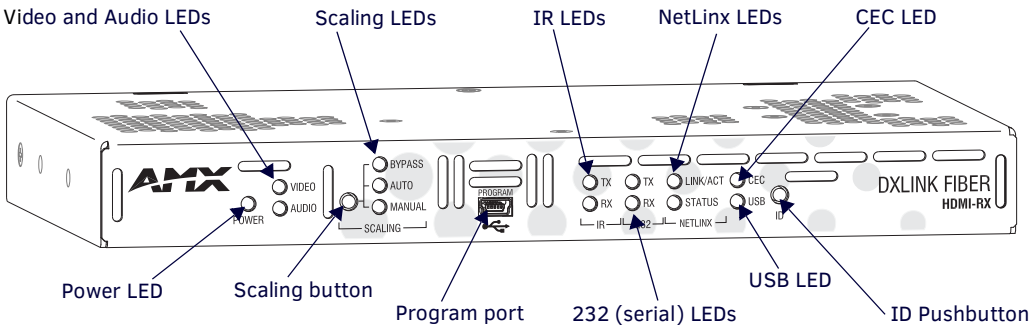
WARNING: DXLink Fiber units use laser transceivers, which are Class 1 Eye Safe per IEC 60825-1/CDRH requirements. While the Class 1 category indicates that the invisible laser used is safe, we recommend avoiding direct eye exposure when using any optical fiber products (see the OSHA directive on page 9).

DXLink Fiber Receivers

DXLink Fiber Receivers differ in the type of fiber optic transceiver they employ and the Directional Mode they use by default. Duplex Receivers default to providing simultaneous, bidirectional data transfer or can be configured to provide unidirectional data transfer. Simplex Receivers are designed to only receive a single direction of data flow and not provide a return data flow. The DXF-RX-MMD and DXF-RX-MMS have a multimode transceiver (the latch is black or has a black label), and the DXF-RX-SMD and DXF-RX-SMS have a single mode transceiver (the latch is blue or has a blue label).

NOTE: *If a DVI-D signal is used (via a DVI-to-HDMI cable), the advanced audio support from HDMI will not be available out the Receiver.*

DXLink Fiber Receivers – Front View



DXF-RX-MMD, DXF-RX-SMD, DXF-RX-MMS, and DXF-RX-SMS

FIG. 5 DXLink Fiber Receivers - front view

Components located on the front of the DXLink Fiber Receivers, left to right:

- Power LED – Indicates when the unit is powered on.
- Video and Audio LEDs – Indicate the presence of video and embedded audio signals through the unit.
- Scaling button and LEDs – Use the Scaling button to select one of the 3 scaling options: Bypass, Auto (default), or Manual. For information on using the Scaling button and options for persisting the Scaling Mode, see page 47.
- Program port – This port will be supported in a future firmware upgrade.
- IR LEDs – TX and RX LEDs indicate active IR communication.*
- 232 (RS-232) LEDs – TX and RX LEDs indicate active serial communication.*
- NetLinx LEDs – Link/Act LED indicates network communication activity. The Status LED indicates that the LAN connection is active.*
- CEC LED – CEC is not currently supported.
- USB LED – When illuminated, the LED indicates the USB port connection has been established.*
- ID Pushbutton – Places the unit in ID Mode for setting the NetLinx ID (device only) and provides additional functionality, such as placing the unit in Static IP Mode or DHCP Mode (for details see page 46).

* Configuration of Ethernet, IR, RS-232, and USB for units in Unidirectional or Data Link-lost Mode requires additional information found in "Unidirectional Mode LAN Configuration" on page 46.

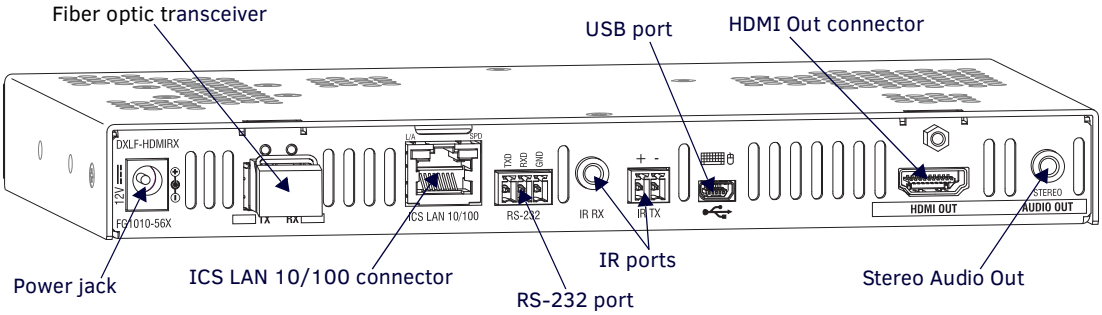
DXLink Fiber Receivers – LEDs

DXLink Fiber RXs – Indicator LEDs		
LED	**Normal Display**	**Indicates**
Power	Green	Power is applied to the Receiver
Video	Green	A video signal is present through the Receiver
Audio	Green	An embedded audio signal is present through the Receiver
Scaling: – Bypass – Auto – Manual	One LED is green; the other two are off	The Receiver is in one of the three modes for scaling • At power up, the Receiver defaults to the Auto scaling option, unless a different scaling option has been persisted* • Pressing the Scaling button cycles the unit through the options: Bypass, Auto, and Manual
IR TX**	Red	IR TX active communication
IR RX**	Yellow	IR RX active communication
232 (Serial) TX**	Red	Serial TX active communication
232 (Serial) RX**	Yellow	Serial RX active communication
NetLinx Link/Act**	Green	Active LAN connection to an AMX Network
NetLinx Status**	Green	LAN connection is active
CEC	OFF	CEC is not currently supported
USB**	Yellow	USB is connected and enabled

* When the output cable is disconnected from the DXLink Fiber RX or if no EDID can be found on the destination device, the last used Scaling Mode LED will be ON. In either case, the DXLink Fiber RX will continue to hold its output resolution to the last known resolution until a sink with a valid EDID is connected. On power up without a valid EDID, the default output resolution presented will be 1280x1024,60Hz until a different EDID is detected.
** Configuration of Ethernet, IR, RS-232, and USB for units in Unidirectional or Data Link-lost Mode requires additional information found in “Unidirectional Mode LAN Configuration” on page 46.

NOTE: *For detailed behavior of the NetLinx Link/Act and Status LEDs on the unit’s front, see page 48. For detailed behavior of the ICS LAN 10/100 (RJ-45) connector’s LEDs on the unit’s rear, see page 38.*

DXLink Fiber Receivers – Rear View



DXF-RX-MMD, DXF-RX-SMD, DXF-RX-MMS, and DXF-RX-SMS

FIG. 6 DXLink Fiber Receivers - rear view

Components located on the rear of the DXLink Fiber Receivers, left to right:

- Power Jack

CAUTION: *The provided desktop power supply must be used to power the DXLink Fiber RX, and it must not be altered in any way.*

The power receptacle is a 2.1 mm DC jack for connecting power. Power comes from the locally connected DC supply of 12 V. An automatically adjusting universal 110/220 IEC power supply is provided. The power supply is ENERGY STAR® qualified to ensure maximum efficiency and savings.

NOTE: *Configuration of Ethernet, IR, RS-232, and USB for units in Unidirectional Mode or Data Link-lost Mode requires additional information found in “Unidirectional Mode LAN Configuration” on page 46.*

- Fiber Optic Transceiver

The Receiver’s fiber optic transceiver uses either two lasers (in Bidirectional Mode) or one laser (in Unidirectional Mode) to transmit data over fiber cable. Transceivers in Bidirectional Mode (Duplex only) transport digital video, embedded audio, Ethernet, and control over fiber optic cable from a DXLink Fiber Output Board or from a DXLink Fiber TX, including digitally transcoded analog video signals. Transceivers in Unidirectional Mode (Simplex default, Duplex configurable) transport digital video and embedded audio from a DXLink Fiber Output Board or a DXLink Fiber TX, including digitally transcoded analog video signals. All transceivers support HDCP over fiber regardless of Directional Mode. Transceivers with a black latch or black label accept multimode cable; transceivers with a blue latch or blue label accept single mode cable.

WARNING: DXLink Fiber units use laser transceivers, which are Class 1 Eye Safe per IEC 60825-1/CDRH requirements. While the Class 1 category indicates that the invisible laser used is safe, we recommend avoiding direct eye exposure when using any optical fiber products (see the OSHA directive on page 9).

- ICS LAN 10/100 Connector

The Receiver's ICS LAN 10/100 (RJ-45) connector provides Ethernet 10/100 connectivity for ingress and egress of network access to the Receiver (all models and modes). Additionally, when part of a switching system in Bidirectional Mode, that same connection provides Ethernet access via the Receiver's fiber port to an upstream Transmitter. Special care should be given to enabling the ICS LAN port when connected to an Enova DGX system which is also connected to a network to prevent creating network loops (see "Unidirectional Mode LAN Configuration" on page 46).

For pinout and LED information, see page 38.

NOTE: *The #1 Toggle on the DIP switch must be set to ON to enable activity over this port.*

- RS-232 Port

The RS-232 (serial data interface) port is a 3-position screw terminal block. In Bidirectional Mode, the Receiver's RS-232 port accepts data (originally from a source device) via a TX or DXLink Fiber Output Board and in turn transfers the data to the destination device; transfer of data can also be made over the return path. In Unidirectional or Data Link-lost Mode, RS-232 signals cannot be transported over the return path via the fiber port, but must be instead transported via the ICS LAN 10/100 port (see "Unidirectional Mode LAN Configuration" on page 46).

- IR RX Port

The IR RX port is used for IR control (see page 20). This port is a 3.5 mm stereo jack. In addition to being directly connected to a device, this port can be connected as an independent native NetLinx control port from a networked NetLinx Central Controller.

- IR TX Port

The IR TX port is used for IR control (see page 20). This port is a 2-way mini-Phoenix connector. In addition to being directly connected to a device, this port can be connected as an independent native NetLinx control port from a networked NetLinx Central Controller.

- USB Port

The USB-mini A/B port on the rear of the Receiver supports keyboard/mouse commands. In Bidirectional Mode, transfer of data is made over the return path to the Transmitter, which supports the USB connection, to the PC (the Transmitter can be either Fiber or can be Twisted Pair when part of a switching system). In Unidirectional or Data Link-lost Mode, transfer of data cannot be transported over the return path via the fiber port, but instead must be transported via the ICS LAN 10/100 port (see "Unidirectional Mode LAN Configuration" on page 46).

- HDMI Out Connector

The HDMI Out connector is for digital video and embedded audio. The HDMI connector has a center screw for locking capability. The HDMI connector also supports a DVI-D signal (via a DVI-to-HDMI cable).

NOTE: *If a DVI-D signal is used (via a DVI-to-HDMI cable), the advanced audio support from HDMI will not be available out the Receiver.*

- Stereo Audio Out Connector

The Stereo Audio Out connector is a 3.5 mm stereo jack. This connector has an analog audio signal available for output whether the embedded audio over the fiber optic cable originated as 2 channel digital or analog stereo. If encoded digital audio (e.g., Dolby or DTS) or multi-channel audio paths (>2 CH L-PCM) are embedded on the HDMI path, then the local analog out will not be available.

Common Features/Functionality

This section covers HDCP compliance, the DIP switches, the USB port, and IR functionality.

HDCP Compliance

If the connected downstream sink is not HDCP compliant, then the HDMI output on the Receiver will not send the signal. This does not affect additional displays the source may be routed to, i.e., HDCP compliant displays will still show content from the source device even when the source device is also routed to non-compliant displays. Non-compliant devices can be easily identified because they display an orange or dark red image to indicate the authentication process failed.

DIP Switches

TIP: *For easiest access to the DIP switch toggles, we recommend setting them before installation.*

IMPORTANT: *When setting the DIP switch toggles, make sure any toggles that need to be ON are flipped toward the AMX sticker.*

A four-toggle DIP switch is on the bottom of the DXLink Fiber Transmitters and Receivers.

- #1 Toggle is used for enabling/disabling the physical ICS LAN 10/100 port (page 33).
- #2 Toggle is used for setting the DXLink Fiber units to either automatically or manually determine the DXLink Mode (page 34).
- #3 Toggle is used for enabling/disabling network connectivity of the DXLink Fiber unit to a connected NetLinx Central Controller (used for IR ports, serial ports, and commands to the DXLink unit); page 34.
- #4 Toggle is used for placing Duplex units in Unidirectional Mode (page 34).

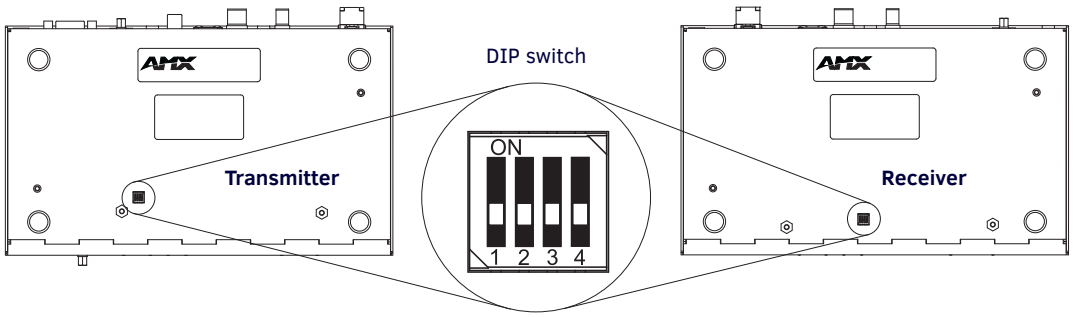


FIG. 7 DIP switch location on DXLink Fiber units

For complete information on setting DIP switches (including settings for common scenarios), see the section starting on page 33.

USB Port (Rear)

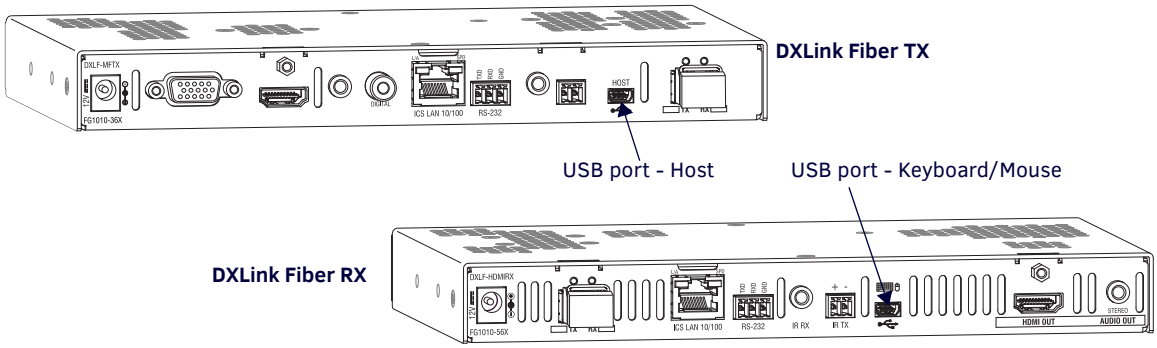


FIG. 8 TX USB port – Host (top); RX USB port – Keyboard/Mouse (bottom)

DXLink Fiber Transmitters USB Port

The USB-mini A/B port labeled "Host" on the rear of the TX connects to a PC (which is the Host). The TX Host port forwards HID (Human Interface Device) keyboard and mouse data received via the switcher or directly from a DXLink Receiver's USB port (the Receiver can be either Fiber or Twisted Pair).

DXLink Fiber Receivers USB Port

The USB-mini A/B port on the rear of the Receiver supports keyboard/mouse commands. The HID keyboard and mouse data is sent via the switcher or directly to the Transmitter (which supports the USB connection) and on to the PC. (The TX can be either Fiber or Twisted Pair.)

This port can be connected using one of the following methods:

- By using a cable with a USB mini-A plug to connect a USB hub (to which a keyboard and mouse can be attached).
- By connecting directly to a keyboard or mouse using the appropriate mini-A plug adapter cable.

NOTE: *Configuration of USB HID in Unidirectional or Data Link-lost Mode requires additional information found in "Unidirectional Mode LAN Configuration" on page 46.*

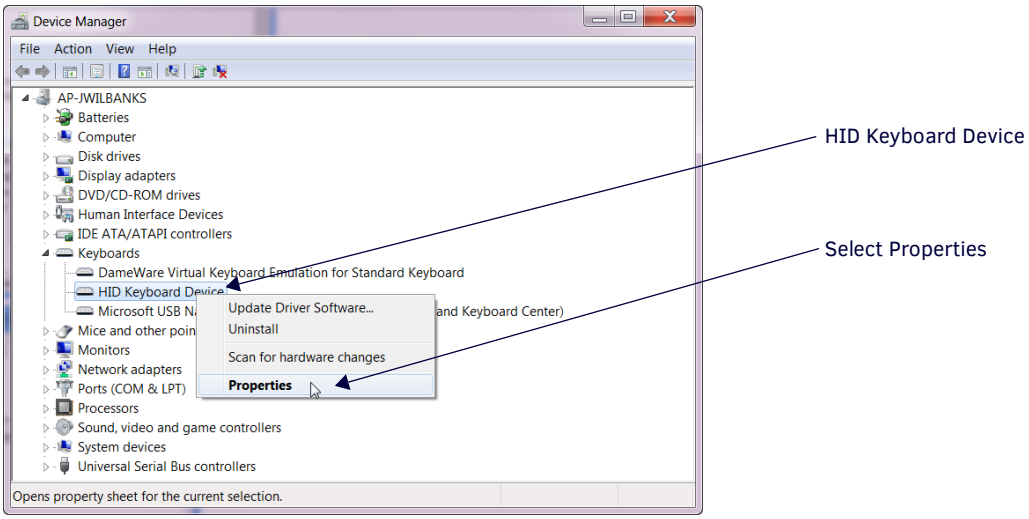
HID Devices and Windows 8

Windows 8 will not wake up from a DXLink connected keyboard or mouse unless the properties for the HID device are set to allow the device to wake the computer. (Note that even a hot plug of the USB cable will not restore connectivity.)

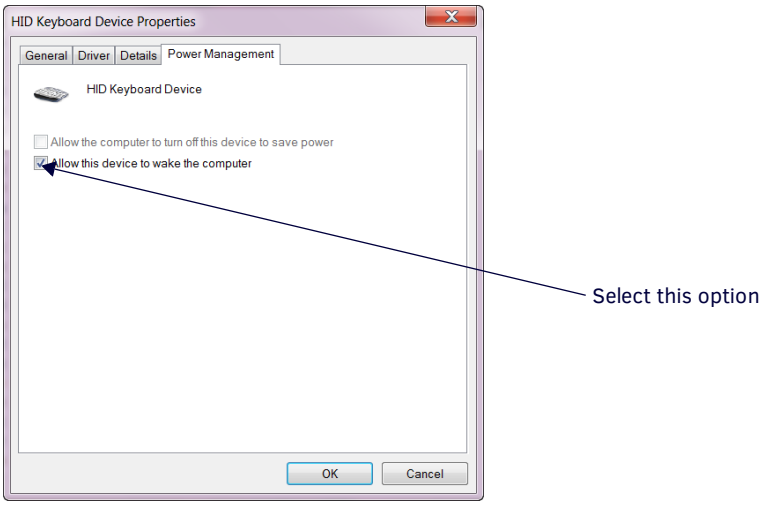
To set Windows 8 to work with DXLink Fiber units and HID devices:

1. On the PC, go to Start > Control Panel > Device Manager and expand "Keyboards."

2. Right-click the HID Keyboard Device and select Properties.
   The HID Keyboard Device Properties dialog box opens.



3. Select the Power Management tab and click “Allow this device to wake the computer.”



4. Click OK.
5. Repeat steps for HID mouse (in the Device Manager dialog box, expand “Mice”).

HID Devices

A list is available of HID devices which have been tested and found to be working well with the latest firmware (see “DXLink - HID Supported Devices” on the DXLink Fiber Receiver’s product page at www.amx.com).

USB LED

The USB LED on the front of a Transmitter or Receiver monitors the USB port on the rear of the unit. The USB LED illuminates (yellow) when a USB device is detected (the port default is “Enable”).

To disable the port on the Transmitter, either disconnect the cable or send the following SEND_COMMAND: `USB_HID_SERVICE-DISABLE`. The Enable/Disable command persists through power cycling. To enable the port, send: `USB_HID_SERVICE-ENABLE`.

The USB ports support a limited number of SEND_COMMANDs; see page 74.

NOTE: *Configuration of USB HID in Unidirectional or Data Link-lost Mode requires additional information found in “Unidirectional Mode LAN Configuration” on page 46.*

IR Control on DXLink Fiber Transmitters and Receivers, Duplex (Optional)

The following two items are required for IR control. In addition, a compatible remote control unit can be used with the system. (The two items listed are not included with the units.)

- IR03 – External IR Receiver Module (FG-IR03). The IR03 can be connected to the IR RX port on the Transmitter or to the IR RX port on the Receiver, allowing IR signals to be received from a compatible IR remote control. The IR03 allows the Transmitter to be placed behind the display device if desired.
- CC-NIRC – NetLinx IR Emitter Cable (FG10-000-11). The CC-NIRC can be connected to the IR TX port on the Transmitter or to the IR TX port on the Receiver. This allows IR signals to be sent to the source device from the Transmitter or to the display device from the Receiver.

NOTE: *Configuration of IR communication in Unidirectional or Data Link-lost Mode requires additional information found in the section "Unidirectional Mode LAN Configuration" on page 46.*

Quick Reference Tables for Modes

The Transmitters and Receivers have modes that can be determined during setup to: (1) handle the system architecture, (2) accommodate networking needs, and (3) process video signals. The Quick Reference Tables are intended to provide users an overview of the many modes available for system setup and use. For complete information on any of the modes listed, see the relevant chapter or chapter section referenced at the end of the specific Description.

Quick Reference Table 1 – Modes for Handling System Architecture

Mode	Description
DXLink Fiber Mode	The DXLink Fiber Mode refers to the type of physical components and how they are connected to make up the system. When DXLink Fiber Transmitters and Receivers are cabled into a system and powered on, they automatically detect the DXLink Mode they are being used in. **Endpoint Mode:** When the system is setup to use Transmitters and/or Receivers with an Enova DGX Digital Media Switcher enclosure, the system is in Endpoint Mode (see example on page 29). **Or** When a TX is connected directly to an RX but, in addition, the TX and/or RX is connected to a NetLinx Central Controller via a LAN or directly connected to the Controller, the system is in Endpoint Mode (see example on page 31). **Extender Mode:** When a TX is connected directly to an RX, the system is in Extender Mode (see example on page 31). For additional information, reference #2 Toggle DIP switch settings for DXLink Mode (see page 34) and DXLink System SEND_COMMANDs (see page 76).
Directional Mode (Bidirectional, Unidirectional, Data Link-lost) **NOTE:** *An additional configuration is a mix of two Directional Modes in a single system. For example, a signal is sent from source to destination through individual runs of Bidirectional Mode and Unidirectional Mode joined by a switcher.*	Directional Mode refers to the flow of signals and communication data within the system. **Bidirectional Mode:** When data flows in two directions, the flow is bidirectional. For example, a signal containing audio and video (with or without control) travels from a TX to an RX in any of the DXLink Fiber Modes (see above) and an RS-232 signal from the RX travels over the fiber return path back to the TX. Bidirectional is the default Directional Mode for DXLink Fiber, Duplex units if both fiber strands are connected (see page 43). **Unidirectional Mode:** When data flows in only one direction, the flow is unidirectional. For example, an audio/video signal travels from a TX to an RX in any of the DXLink Fiber Modes (see above) and no signals are passed back to the TX. In Unidirectional Mode, the RX does not send an optical signal trying to establish a return path connection. Unidirectional is a configurable setting for DXLink Fiber, Duplex and is the only available Directional Mode for DXLink Fiber, Simplex (see page 42). **Data Link-lost Mode:** When a system is configured for Bidirectional Mode, but the data return path has been removed or is not connected, the system is in Data Link-lost Mode. In Data Link-lost Mode, the TX only sends audio and video to the RX over a single fiber path, but both units are actively ready for the addition of the return path which will enable Bidirectional Mode. For example, an audio/video signal travels from a TX to an RX and no signals are passed back to the TX, but the RX's return laser still transmits light and attempts to establish a connection.

Quick Reference Table 2 – Modes for Handling Addressing/Networking	
Mode	**Description**
IP Addressing Mode	IP Addressing Mode refer to network connection settings. By default, all network connection settings are turned OFF. **Static IP Mode:** • This mode configures the network connection to one stable IP address the unit will use continuously. **DHCP Mode:** • This mode configures the network connection to choose a new IP address for each network session. To enable network capability, see the "Network Configuration" chapter on page 50.
ID Mode	ID (Identify) Mode refers to the protocol for enabling a user to establish device addresses. This Mode, accessible through NetLinx Studio, places the entire system on hold while it waits for an event from a NetLinx device in the named system (e.g., pressing the ID Pushbutton on the TX or RX). For further information, see "Assign a Device Address (ID Mode)" on page 53.
Ethernet Mode	Ethernet Mode refers to the LAN configuration settings. **Auto Mode:** • This mode configures the LAN driver to discover its own settings based on the network it is connected to. **Speed/Duplex Mode:** • This mode configures the LAN driver to calculate its speed as either 10 or 100 and to communicate in either half- or full-duplex. Ethernet Mode discovery and configuration information is available through Telnet commands. For further information, see "Establishing a Terminal Connection Via Telnet" on page 85.
Master Connection Mode	Master Connection Mode refers to the modes of communication used for connection to the Master as specified via the `SET CONNECTION` Telnet command. **Auto Mode:** • This mode utilizes TCP communication. It looks for a matching System Number and attempts to come on line with the first Master it sees with that System Number. **TCP URL Mode:** • TCP; the Master is specified via URL. **UDP URL Mode:** • UDP; the Master is specified via URL. **NDP Mode (Default):** • UDP; utilizes the NDP binding process to assign the DXLink Fiber unit (the physical device) to a Master (or Virtual Master) via NetLinx Studio. Once bound, communications are conducted via UDP. For further information, see "Master Connection Modes" on page 98.
Auto-setup Mode	In auto-setup mode, endpoints are automatically discovered by and connected to an Enova DGX 100 Series Switcher using a single IP address. For this mode, *all of the following requirements must be met*. If not, the endpoint will no longer reside in auto-setup mode and must be either bound to the integrated Master or reconfigured to meet the requirements. • Endpoint *must* be connected to a DXLink Input Board in an Enova DGX 100 Series Switcher (or Enova DGX 8/16/32/64 with upgraded 100 Series CPU) • Endpoint *must* be configured for bidirectional communication (Duplex hardware in Bidirectional Mode) • Endpoint *must* have IP mode set to DHCP for setup (self-configures to Static IP on private LAN) • Endpoint *must* have the Master Connection Type set to NDP • Endpoint *must not* be bound to a Master via NDP (traditional binding process) **IMPORTANT:** *If auto-setup is being used, Telnet is the only way to access some of the network settings. Also note that some network settings will disable auto-setup.* For additional information on the auto-setup feature, see the *Hardware Reference Manual – Enova DGX 100 Series Digital Media Switchers*.
IR SEND_COMMAND Mode	Ethernet Mode refers to the LAN configuration settings. **Auto Mode:** • This mode configures the LAN driver to discover its own settings based on the network it is connected to. **Speed/Duplex Mode:** • This mode configures the LAN driver to calculate its speed as either 10 or 100 and to communicate in either half- or full-duplex. Ethernet Mode discovery and configuration information is available through Telnet commands. For further information, see "Establishing a Terminal Connection Via Telnet" on page 85.

Quick Reference Table 3 – Modes for Handling Video and Video Processing	
Mode	**Description**
Scaling Mode	Scaling Mode refers to how the system alters or maintains a source device's resolution as it is passed along to the destination device. The Scaling Mode can be set on the DXLink Fiber RX with the Scaling button (see page 47) or with SEND_COMMANDs (see page 62), or through DGX Configuration Software (in conjunction with Enova DGX 8/16/32/64 Switchers), or through the System Configuration interface (in conjunction with Enova DGX 100 Series Switchers) when scaling is being done via an Enova DXLink Fiber Output Board. **Auto Mode (Default):** • Auto Mode (SmartScale®) allows the destination device to choose the resolution it needs. **Manual Mode:** • Manual Mode allows the user to configure the resolution the video will display through a destination device. **Bypass Mode:** • Bypass Mode allows the video signal to display over the destination device without altering the signal's resolution.

DXLink Fiber Specifications

Applicability

The specifications in this chapter apply to the following DXLink Fiber Transmitters and Receivers:

- FG1010-360 – DXLink Multi-Format SM Fiber TX, Duplex
- FG1010-362 – DXLink Multi-Format MM Fiber TX, Duplex
- FG1010-560 – DXLink HDMI SM Fiber RX, Duplex
- FG1010-562 – DXLink HDMI MM Fiber RX, Duplex
- FG1010-361 – DXLink Multi-Format SM Fiber TX, Simplex
- FG1010-363 – DXLink Multi-Format MM Fiber TX, Simplex
- FG1010-561 – DXLink HDMI SM Fiber RX, Simplex
- FG1010-563 – DXLink HDMI MM Fiber RX, Simplex

Specifications – DXLink Fiber Transmitters and Receivers

General Specifications	
Parameter	**Value**
AC Power	100 to 240 VAC single phase, 50 Hz to 60 Hz 0.8 A max. (100 to 240 VAC)
Included Power Supply Output	2.5 A at 12 V, max 13.5 V
Power Consumption (max.)	Multi-Format TX 20 W, HDMI RX 19 W
Thermal Dissipation (max.)	Multi-Format TX 69 BTU/hr, HDMI RX 65 BTU/hr
Power Connector	2.1 mm DC power jack 
Operational Temperature	32° F to 104° F (0° C to 40° C)
Storage Temperature	-22° F to 158° F (-30° C to 70° C)
Operational Humidity	5 to 85% RH (non-condensing)
Storage Humidity	0 to 90% RH (non-condensing)
Dimensions Depth Width Height	 5.15 in. (13.08 cm) 8.71 in. (22.12 cm) 1.00 in. (2.54 cm)
Weight	Approximately 1.1 lb. (0.5 kg)
Shipping Weight	Approximately 2.2 lb. (1.0 kg)
Mounting Options	Compatible with all V Style versatile mounting options including rack, surface, or pole (for V Style Mounting kits, see www.amx.com)
MTBF	124,232 hours
Safety Certifications	Class 1 Eye Safe per requirements of IEC 60825-1 / CDRH
Transport Layer Throughput	10.3125 Gbps
Fiber Transceiver Type	10G SFP+
Fiber Connector	• LC Duplex conforming to ANSI TIA-EIA 604-10 (FOCIS 10A) • On the DXLink Multimode / Single Mode Simplex Transmitters, only the transmit portion of the SFP+ module is active • On the DXLink Multimode / Single Mode Simplex Receivers, only the receive portion of the SFP+ module is active
Fiber Cable Types and Supported Length	• Single Mode Models, Duplex/Simplex: 9/125 µm, 6.21 miles (10 km) • Multimode Models, Duplex/Simplex: OM3 50/125 µm, 984 ft. (300 m)
Optical Wavelength	• Single Mode Models – 1310 nm • Multimode Models – 850 nm
Single Mode Optical Budget	• 7.4 dB (typical) between DXLink Fiber Transceivers • Optical Modulation Amplitude (OMA): -5.2 dBm (min.) • Optical Modulation Amplitude (OMA) sensitivity: -12.6 dBm (typical)
Single Mode Optical Transceiver Mean Output Power	-8.2 dBm to 0.5 dBm (average power)

General Specifications (continued)	
Multimode Optical Budget	• 6.8 dB (typical) between DXLink Fiber Transceivers • Optical Modulation Amplitude (OMA): -4.3 dBm (min.) • Optical Modulation Amplitude (OMA) sensitivity: -11.1 dBm (typical)
Multimode Optical Transceiver Mean Output Power	-1 dBm (average power)
Noise Level	0 dBA,1m (typical), 45.3 dBA, 1m (max)
Airflow	Convection (openings on top of case, typical); forced air (out of front plate, when fan is active)
Approvals	UL 60950-1, CSA 60950-1, IEC 60950-1, CE EN 60950-1, CE EN 55022 Class A, CE EN 55024, FCC CFR Title 47 Part 15 Subpart B Class A, ICES-003 Class A, RoHS, WEEE
Other AMX Equipment	
AMX Products Compatible with DXLink Fiber Transmitters*	Enova DGX Digital Media Switchers
AMX Products Compatible with DXLink Fiber Receivers*	Enova DGX Digital Media Switchers
Included Accessories	Desktop power supply (ENERGY STAR® qualified): 1 per unit ***CAUTION:*** *Only the provided desktop power supply should be used, and it must not be altered in any way.*
Compatible / Optional Equipment	• CC-NIRC, NetLinx Emitter Cable (FG10-000-11) • IR03, External IR Receiver Module (FG-IR03) • CC-MINIUSB, Mini USB to PC cable adapter (FG5967-20): use with DXLink Fiber RX only – for connecting a keyboard/mouse device • CC-USB, USB programming cable (FG10-5965): use with DXLink Fiber TX only – for connecting to a PC

***** Connectivity between products requires matching transceiver types, MM to MM and SM to SM.

NOTE: *Duplex boards/units support bidirectional control over fiber. Simplex boards/units do not support EDID transfer and control transport (such as Ethernet, USB, IR, and Serial Control) over fiber; although when used as part of a complete Enova DGX solution, control can be provided if a supplemental independent network connection is used. For details, see the "Hardware Reference Manual – Enova DGX 100 Series Digital Media Switchers" or "Instruction Manual - Enova DGX 8/16/32/64 Digital Media Switchers."*

NetLinx and Control Specifications	
ICS LAN / Ethernet Port	• TCP/IP port (ICS LAN 10/100) • RJ-45 connector
Serial Port	• Bidirectional RS-232 • Standard NetLinx baud rate 1200 to 115k • Parity support: Odd/Even/None • 3.5 mm pluggable Phoenix terminal block
IR Control Port	• Port for use with IR03 External IR Receiver (optional accessory FG-IR03) • Port for use with CC-NIRC NetLinx Emitter (optional accessory FG10-000-11)
Advanced Configuration Interface	USB mini-B connector (Program port)
ID Pushbutton	• Toggle between DHCP and static IP addressing • Places system in NetLinx Device ID assignment mode • Reset the factory default settings • Restore the factory firmware image

USB (HID) Keyboard and Mouse Specifications	
USB (HID) TX	• (1) USB mini-A/B connector ("Host") • Connect a DXLink Fiber TX to a PC and emulate keyboard and mouse commands from a DXLink Fiber Receiver or a DXLink Twisted Pair Receiver
USB (HID) RX	• (1) USB mini-A/B connector ("Device") • Connect a keyboard and mouse and send commands to a PC connected to a DXLink Fiber Transmitter or a DXLink Twisted Pair Transmitter

NOTE: *A list of HID devices which have been tested and found to be working well with the latest firmware is available (see the document "DXLink - HID supported Devices" on the DXLink Fiber Receiver's product page on the web).*

HDMI Specifications	
Compatible Formats	HDMI, HDCP, DVI (DVI requires conversion cable)
Signal Type Support	• HDMI • DVI-D (Single Link via a DVI-to-HDMI cable adapter) • DisplayPort++ (input only with HDMI or DVI cable adapter)
Video Data Rate (max.)	4.95 Gbps / 5.568 Gbps^
Video Pixel Clock (max.)	165 MHz / 185.625 MHz^
Progressive Resolution Support	480p up to 1920x1200,60Hz (supported resolutions are listed in the "Supported Input Resolutions" appendix; see page 107)
Interlaced Resolution Support	480i, 576i, 1080i (supported resolutions are listed in the "Supported Input Resolutions" appendix; see page 107)
2K Resolution Support^^^	2048x1024,47Hz; 2048x1080,60Hz; 2048x1152,60Hz; 2048x1536,24Hz
Deep Color Support	24 bit, 30 bit^
Color Space Support	RGB 4:4:4 YCbCr^^ 4:4:4 and 4:2:2
3D Format Support	Yes^^^ (HDMI Primary Formats) • Frame Packing 1080p up to 24 Hz • Frame Packing 720p up to 50/60 Hz • Frame Packing 1080i up to 50/60 Hz • Top-Bottom 1080p up to 24 Hz • Top-Bottom 720p up to 50/60 Hz • Side-by-Side Half 1080i up to 50/60 Hz
Audio Format Support	Dolby TrueHD, Dolby Digital*, DTS-HD Master Audio, DTS*, 2 CH L-PCM, 6 CH L-PCM, 8 CH L-PCM
Audio Resolution	16 bit to 24 bit
Audio Sample Rate	32 kHz, 44.1 kHz, 48 kHz, 96 kHz, 192 kHz
Local Audio Support	TX insertion, RX extraction
HDCP Support	Yes • Supports AMX HDCP InstaGate Pro® Technology • DXLink Fiber products have HDCP key support for up to 16 sinks per output, independent of the source device
CEC support	CEC is not currently supported
Input Signal Type	• HDMI • DVI-D (Single Link with a DVI-to-HDMI cable adapter) • DisplayPort ++ (input only with HDMI or DVI cable adapter)
Local Loopback Output	• HDMI, non-scaling • DVI-D, non-scaling (Single Link with cable adapter)
Local Loopback Output +5 V DDC Pin	55 mA
DDC/EDID Support	• Duplex hardware in Bidirectional Mode only – The HDMI EDID in point-to-point mode is passed up from the sink device. • Duplex hardware in Bidirectional Mode only – When the TX is connected to an Enova DGX Digital Media Switcher, the HDMI and VGA EDIDs are synchronized with the persisted EDIDs on the DXLink Fiber Input Board and are user re-programmable. • Simplex hardware (or Duplex hardware in Unidirectional Mode or dropped into Data Link-lost Mode) – The HDMI EDID is user re-programmable with DGX Configuration Software via the USB Program port on the TX. • For the specific EDID list, see the specifications in the "Enova DGX DXLink Fiber Boards" chapter in the *Instruction Manual – Enova DGX 8/16/32/64 Digital Media Switchers* or in the *Hardware Reference Manual – Enova DGX 100 Series Digital Media Switchers*.

^ Only supported when the DXLink Fiber HDMI RX scaler is in Bypass Mode using CEA-861 formats and the resolution is 1080p60 or less.
^^ Input signal support for YCbCr 4:4:4 and 4:2:2; output color-space is converted to RGB 4:4:4.
^^^ The Scaler on corresponding output board must be set to Bypass Mode.
* Dolby Digital and DTS support up to 48 kHz, 5.1 channels.

NOTE: *Interlaced and progressive video are supported into the Transmitter; progressive is only supported out of the Receiver unless in non-scaling Bypass Mode.*

HDMI Specifications (continued)	
Input Voltage (nominal)	1.0 Vpp differential
Input Re-clocking (CDR)	Yes
Input Equalization	Yes, adaptive
Input Connector	HDMI Type A female
Local Loopback Output Connector	HDMI Type A female
Propagation Delay (typical)	4.8 µs
DXLink Fiber RX	
Output Signal Type	• HDMI • DVI-D (Single Link with cable adapter)
Output Scaling	SmartScale®, Manual Configuration, Bypass
SmartScale® Output Resolution Support	All progressive resolutions between 480p and 1920x1200,60Hz via automatic SmartScale® query of the display's preferred EDID detailed timing definition
Output Nominal Voltage	1.0 Vpp differential
Output Re-clocking	Yes
+5 V DDC Pin Output	55 mA
+5 V USB Output	500 mA
Output Rise Time / Fall Time	425 ps typical (20% to 80%)
Output Connector	HDMI Type A female
Propagation Delay (typical)	26 ms when scaling; 5.2 µs when in Bypass Mode
HDMI Audio Synchronization	Video formats @ 60 Hz frame rate: In Scaling Mode, audio leads video by 12 ms typical (4 ms to 20 ms). In Bypass Mode, audio lags video by 17 ms.

Analog Video Specifications	
Compatible Formats	• RGBHV, RGBS, RGsB • Y/Pb/Pr (HDTV) • Y/C (S-Video), C (Composite)
Progressive Resolution Support	480p up to 1920x1200,60Hz (supported resolutions are shown in the "Supported Input Resolutions" appendix; see page 107)
Interlaced Resolution Support*	480i, 576i, 1080i (supported resolutions are shown in the "Supported Input Resolutions" appendix; see page 107)
Auto-Adjust Input	Supported
RGB Input Signal Level Range	1 Vpp nominal
RGB Input Impedance	75 Ω
HV Sync Input Signal Level Range	2 to 5 Vpp
HV Sync Input Impedance	2.5 pF typical, 10 pF max.
Digital Processing	24 bit, 165 MHz
Y/Pb/Pr Input Signal Level Range	• 1.0 Vpp for Y • 700 mVpp for Pb, Pr
Y/Pb/Pr Input Impedance	75 Ω
Y/C (S-Video) Input Signal Level Range	1.0 Vpp for Y 1.0 Vpp for C
Y/C (S-Video) Input Impedance	75 Ω
C (Composite) Input Signal Level Range	1.0 Vpp
C (Composite) Input Impedance	75 Ω
Input Connector	HD-15 (breakout cable required for non-RGB formats)
Compatible Formats	• RGBHV, RGBS, RGsB • Y/Pb/Pr (HDTV) • Y/C (S-Video), C (Composite)

* Interlaced video is supported into the Transmitter; progressive is only supported out of the Receiver unless in Scaler Bypass Mode.

Local Audio Specifications	
DXLink Fiber TX	
Input Signal Types	• Stereo analog, S/PDIF • Video signal must be present to pass audio
Analog Input Level (max.)	+2.5 dBu, unbalanced
Analog Input Impedance	10k Ω
Analog to Digital Conversion	48 kHz sample rate, 24-bit
S/PDIF Audio Format Support	Dolby Digital*, DTS*, 2 CH L-PCM
S/PDIF Resolution	16 bit to 24 bit
S/PDIF Sample Rate	32 kHz, 44.1 kHz, 48 kHz, 96 kHz
S/PDIF Input Signal Level Range	200 mVpp to 600 mVpp terminated
S/PDIF Input Impedance	75 Ω
Analog to Digital Reference Level	+2.5 dBu = 0 dBfs
Input Connector	• 3.5 mm mini-stereo jack (analog stereo) • RCA jack (S/PDIF)
DXLink Fiber RX	
Output Signal Types	Stereo analog
Analog Output Level (max.)	+2.5 dBu, unbalanced, >= 2k Ω load
Analog Output Frequency Response	<+0 dB to -0.5 dB, 50 Hz to 20 kHz
Analog Audio Output THD+N	<0.04%, 1 kHz, -10 dBu to +2 dBu
Analog Audio Out SNR	>91 dB, 20 Hz to 20 kHz, Vin = +2 dBu
Digital to Analog Reference Level	0 dBfs = +0 dBu
Audio Synchronization	Video formats @ 60 Hz frame rate: In Scaling Mode, audio leads video by 12 ms typical (4 ms to 20 ms). In Bypass Mode, audio lags video by 17 ms.
Output Connector	3.5 mm mini-stereo jack (analog stereo)

* Dolby Digital and DTS support up to 48 kHz, 5.1 channels.

Installation and Setup

Site Recommendations

When placing the DXLink Fiber units in an installation, follow the recommendations and precautions in this section to reduce potential setup and operation hazards.

Environment

- ❑ Choose a clean, dust free, (preferably) air-conditioned location.
- ❑ Avoid areas with direct sunlight, heat sources, or high levels of EMI (Electromagnetic Interference).

DXLink Fiber Transmitter and Receiver Accessibility

Make sure the front of each unit is accessible, so that you can monitor the LED indicators. Leaving adequate clearance at the rear will also allow for easier cabling and service.

Power

The power source's electrical outlet should be installed near the unit, easily accessible, and properly grounded. Power should come from a building branch circuit. To avoid an overload, note the power consumption rating of all the equipment connected to the circuit breaker before applying power.

General Hazard Precautions

These recommendations address potential hazards that are common to all installations.

Elevated Operating Temperature

The maximum rated ambient temperature is 104° F (40° C) for the DXLink Fiber units. All equipment should be installed in an environment compatible with the manufacturer's maximum rated ambient temperature. In a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than the ambient room temperature.

CAUTION: *To protect the equipment from overheating, do not operate in an area that exceeds 104° F (40° C) and follow the clearance recommendation below for adequate airflow.*

Airflow Restriction

The DXLink Fiber units are designed to adequately dissipate the heat they produce under normal operating conditions; however, this design is defeated when high heat producing equipment is placed directly above or below them.

IMPORTANT: *Do not place the unit in a confined space with no airflow; thermal runaway can result and the unit will overheat.*

CAUTION: *To prevent overheating, avoid placing high heat producing equipment directly above or below the units. We recommend allowing plenty of clearance above the vent holes on top of the units. Do not place anything directly on top of the units that would restrict airflow through the vent holes on top.*

Reliable Earthing (Grounding)

Reliable earthing of rack-mounted equipment should be maintained. If not using a direct connection to the branch circuit (e.g., plugging into a power strip), pay particular attention to supply connections.

Unpacking Tips

- ❑ Before fully unpacking the Transmitters and Receivers, *inspect the shipping box(es) for any signs of damage*. If a box is partially crushed or any sides have been broken open, notify the shipping agency immediately and contact your AMX representative (see the warranty at www.amx.com).
- ❑ Once unpacking is complete, closely check the physical condition of the units.
- ❑ Collect all documentation.

NOTE: *Please save the original shipping container and packing materials. AMX is not responsible for damage caused by insufficient packing during return shipment to the factory. Shipping boxes are available; for details, contact your AMX representative.*

Setup Information

IMPORTANT: *The setup information in this manual applies to TXs and RXs in an Enova DGX 8/16/32/64 system or in an Enova DGX 100 Series system with the auto-setup feature disabled. When the auto-setup feature for an Enova DGX 100 Series Switcher is enabled (the default), any TX/RX units are automatically discovered and connected to the switcher using a private network hosted by the integrated Master (for complete information, see the "Hardware Reference Manual – Enova DGX 100 Series Digital Media Switchers.") In an Enova DGX 8/16/32/64 system, each TX/RX unit bound to the system with traditional NetLinx binding (see page 33) acquires its own IP address from the public network (for network configuration, see page 50).*

Setup Requirements

- A PC with NetLinx Studio (v4.0 or later) installed
- An understanding of which DXLink Fiber Mode the system will be used in (below and page 20)
- An understanding of the DIP switch settings (page 33)

IMPORTANT: *We recommend that DXLink Fiber equipment be installed by a technician with knowledge of networks and experience with NetLinx Studio and its Telnet interface. NetLinx experience should include changing device addresses, binding devices, updating firmware, etc.*

The remainder of the "Setup Information" section covers information for system setup, network loop concerns, binding to an integrated Master, DIP switch settings, mounting options, cable requirements and recommendations, and "audio type" precedence.

IMPORTANT: *Compatibility between hardware requires matching model types: multimode to multimode and single mode to single mode.*

The specific installation's requirements dictate the system setup, which generally takes one of the following three forms (each allow for the transport of audio and video signal, but vary in their level of communication functionality):

Endpoint Mode (Switcher)

- One or more DXLink Fiber TXs and/or RXs are connected to an Enova DGX Switcher containing an integrated Master (see page 29). The TXs and RXs can be either multimode or single mode as long as each one's transceiver matches the fiber optic transceivers on the DXLink Fiber Input or Output Board it is attached to.
- Bidirectional Mode (Duplex only) – Ethernet, IR, RS-232, and USB HID (keyboard and mouse data) can be sent over the fiber optic cable.
- Unidirectional Mode* – Ethernet, IR, RS-232, and USB HID (keyboard and mouse data) cannot be sent over the fiber optic cable. This functionality can be provided in Unidirectional Mode by connecting the ICS LAN port to a network (for details, see "Unidirectional Mode LAN Configuration" on page 46).

Endpoint Mode (Standalone)

- A standalone DXLink Fiber TX/RX pair are connected directly to each other (units must match, multimode to multimode and single mode to single mode) but, in addition, either the TX or RX is connected to a NetLinx Central Controller via a LAN or directly to the Controller (see page 31).
- Bidirectional Mode (Duplex only) – Ethernet, IR, RS-232, and USB HID (keyboard and mouse data) can be sent over the fiber optic cable.
- Unidirectional Mode* – Ethernet, IR, RS-232, and USB HID (keyboard and mouse data) cannot be sent over the fiber optic cable.This functionality can be provided in Unidirectional Mode by connecting both the TX and RX ICS LAN port to a network (for details, see "Unidirectional Mode LAN Configuration" on page 46).

Extender Mode (Standalone)

- A standalone DXLink Fiber TX/RX pair are connected directly to each other (units must match, multimode to multimode and single mode to single mode) as a simple extender solution (see page 31).
- Bidirectional Mode – Ethernet, IR, RS-232, and USB (keyboard and mouse data) can be sent over the fiber optic cable.
- Unidirectional Mode – The TX and RX will not have use of Ethernet, IR, RS-232, and USB (keyboard and mouse data) in this system setup option.

* The information in this bullet point applies to Simplex hardware in Unidirectional Mode (only mode available), Duplex hardware that has been configured for Unidirectional Mode (see page 42), and Duplex hardware that has dropped into Data Link-lost Mode (see page 42).

Endpoint Mode (Switcher): Example of Typical System Setup

The primary function of the DXLink Fiber Transmitters and Receivers is to work with compatible DXLink Fiber equipment as an endpoint solution for transmission of HDMI or analog video signals over fiber optic cable (or DVI-D signals via a DVI-to-HDMI cable).

The DXLink Fiber Transmitter receives an HDMI signal and an audio signal from a source device. The audio can be either digital audio embedded with the HDMI signal or analog stereo audio. Both the video and embedded audio are transmitted over fiber optic cable to a fiber optic transceiver on the DXLink Fiber Input Board. The HDMI signal is then routed through any (or all) of the fiber optic transceivers on one or more output boards. The HDMI signal can also be routed through any other types of boards in the system.

When the HDMI signal is routed through a fiber optic transceiver on a DXLink Fiber Output Board to a DXLink Fiber Receiver, the Receiver sends the HDMI signal with embedded audio on to the destination device. The audio can also be output on the Receiver's stereo audio port.

In a system where DXLink Fiber Transmitters and Receivers are used in conjunction with an Enova DGX Switcher,

the cable runs from a Transmitter to a DXLink Fiber Input Board and from a DXLink Fiber Output Board to a Receiver depend on whether the transceivers are single mode or multimode and on the quality of the cable (see cable specifications on page 23).

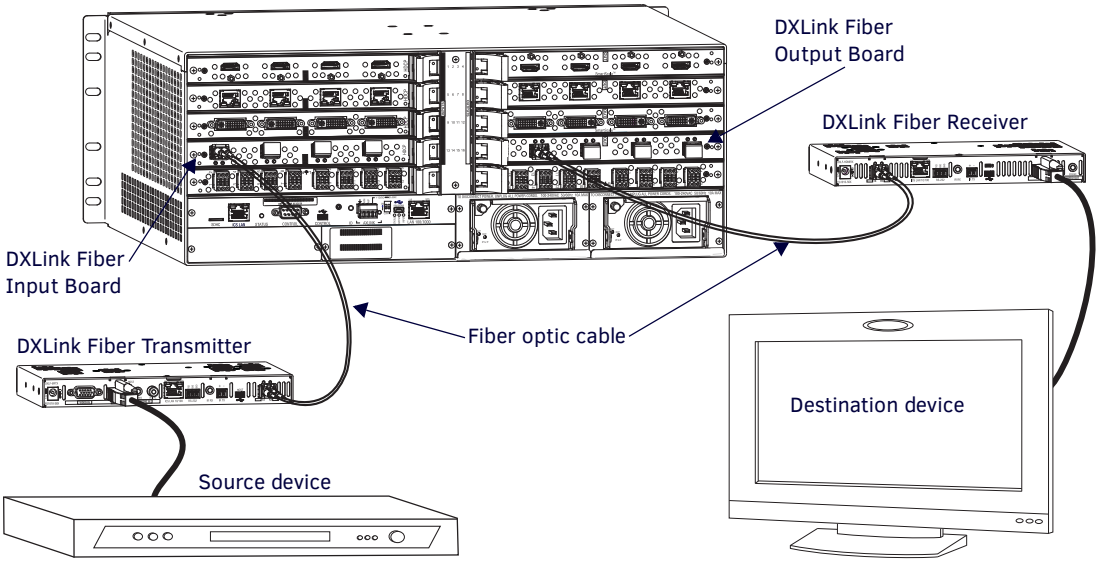


FIG. 9 Endpoint Mode (Switcher) setup with Enova DGX 1600

TIP: *For systems with special requirements – Before installing in the final location, place the equipment close together, so that the destination monitor and a PC for control can be seen simultaneously if adjustments are necessary. Scaling adjustments can be made using SEND_COMMANDs (see page 62).*

For Enova DGX 8/16/32/64 Switcher systems, DGX Configuration Software can also be used to make scaling adjustments via the switcher (see the switcher's manual). For Enova DGX 100 Series Switchers, scaling can also be adjusted via the System Configuration interface (see the switcher's manual).

Custom EDID Settings

If your system has special EDID requirements, see page 118 for information on managing and programming custom EDIDs.

IMPORTANT: *Compatibility between hardware requires matching model types: multimode to multimode and single mode to single mode.*

Options for System Setup with Enova DGX – DXLink Fiber Boards

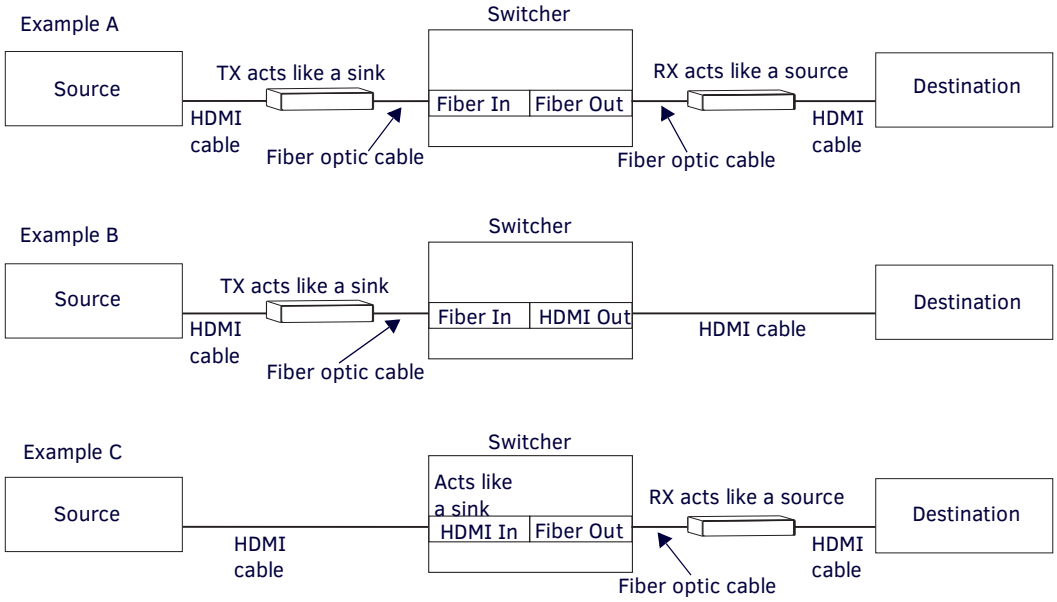
The following table contains options for using DXLink Fiber Transmitters and Receivers in conjunction with DXLink Fiber Input and Output Boards in an Enova DGX Digital Media Switcher. The TX/RX units and input/output boards can be either Simplex or Duplex, as long as the model types match (multimode to multimode and single mode to single mode).

System Setup Options - Enova DGX DXLink Fiber Boards with DXLink Fiber TXs and RXs			
DXLink Fiber TX	**Enova DGX Input Board**	**Enova DGX Output Board**	**DXLink Fiber RX**
Single Mode TX →	DXLink Fiber SM Input Board →	DXLink Fiber SM Output Board →	Single Mode RX
Single Mode TX →	DXLink Fiber SM Input Board →	DXLink Fiber MM Output Board →	Multimode RX
Single Mode TX →	DXLink Fiber SM Input Board →	Any board →	Not applicable
Multimode TX →	DXLink Fiber MM Input Board →	DXLink Fiber MM Output Board →	Multimode RX
Multimode TX →	DXLink Fiber MM Input Board →	DXLink Fiber SM Output Board →	Single Mode RX
Multimode TX →	DXLink Fiber MM Input Board →	Any board →	Not applicable
Not applicable	Any board →	DXLink Fiber SM Output Board →	Single Mode RX
Not applicable	Any board →	DXLink Fiber MM Output Board →	Multimode RX

Functions of DXLink Fiber Transmitters and Receivers

The diagram in FIG. 10 on the next page shows the functions of DXLink Fiber Transmitters and Receivers. The example descriptions contain the device's HDCP key count when used in conjunction with DXLink Fiber Boards in an Enova DGX Digital Media Switcher.

IMPORTANT: *(Applies to Duplex and Simplex) The DXLink Fiber TX and the DXLink Fiber Input Board must have the same type of fiber optic transceiver. The DXLink Fiber Output Board and the DXLink Fiber RX must have the same type of fiber optic transceiver. The multimode and single mode fiber optic transceivers allow for in-the-field replacement and can even be swapped as long as these constraints are followed.*



Example A: When a Receiver acts like a source, its key does not count. Source device sees 1 key (Transmitter).
Example B: When a Transmitter acts like a sink, the source device sees 1 key (Transmitter).
Example C: When a source device is connected directly to a switcher, the source sees 1 key (switcher input).

FIG. 10 The repeater and source functions of DXLink Fiber Transmitters and Receivers

Endpoint Mode (Standalone): Example of Typical System Setup

A standalone DXLink Fiber TX/RX pair are connected directly to each other but, in addition, either the TX or RX is connected to a NetLinx Central Controller via a LAN or directly to the Controller.

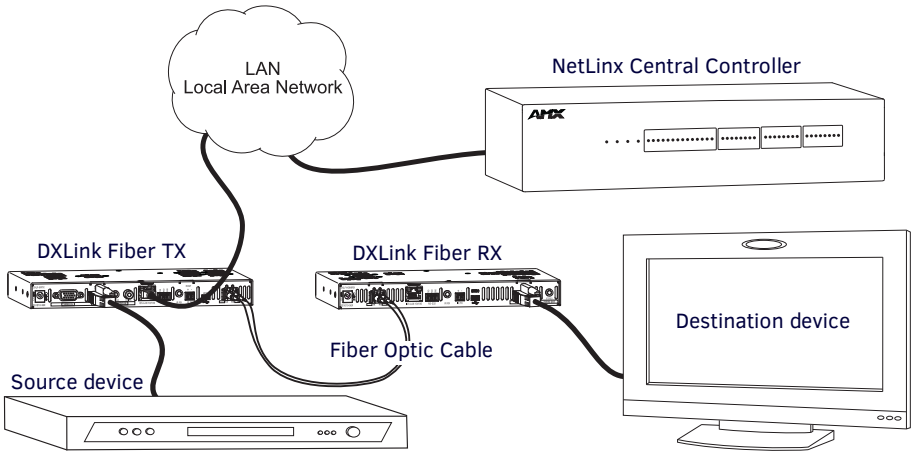


FIG. 11 Endpoint Mode (Standalone) with NetLinx Central Controller

IMPORTANT: *For information on avoiding network loops, see the next page.*

Extender Mode (Standalone): Example of Typical System Setup

A Transmitter and Receiver standalone pair can also work together as an extender solution for transmission of HDMI over fiber cable. The standalone setup supports DVI-D signals with the use of a DVI-to-HDMI cable adapter. A standalone TX/RX pair can also support an analog video source. The length of the cable runs depend on whether the transceivers are single mode or multimode and the quality of the cable (see cable specifications on page 23).

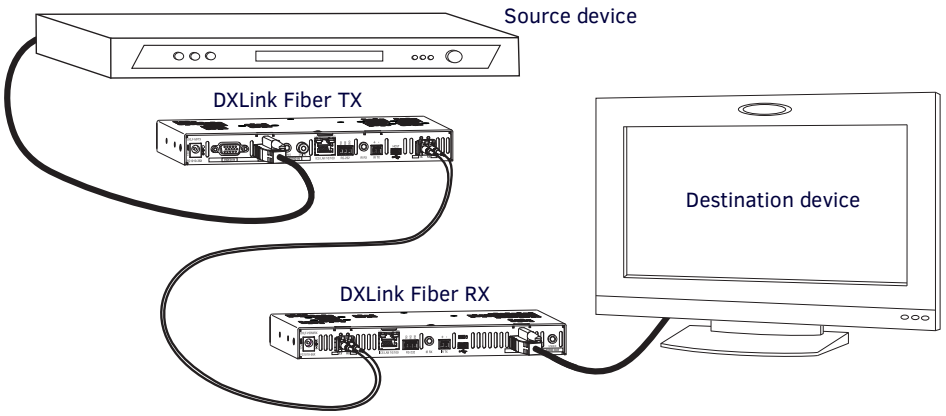


FIG. 12 Extender Mode (Standalone) system

Avoiding Network (Ethernet) Loops

CAUTION: *Be careful not to create a network (Ethernet) loop.*

Only one connection to a LAN is permitted within a switching system with DXLink Fiber support. Network loops must be avoided (see FIG. 13). This applies to systems with DXLink Fiber Boards, Duplex in Bidirectional Mode **and/or** DXLink Twisted Pair Boards.

Avoid Network Loops in Bidirectional Mode

NOTE: *DXLink Fiber units in Unidirectional or Data Link-lost Mode do not send Ethernet traffic over fiber optic cable.*

This list includes guidelines for connecting DXLink Fiber, Duplex units in Bidirectional Mode to a LAN with or without an Enova DGX Digital Media Switcher in the system setup.

- With a TX and RX in Extender Mode, only connect one of the units to a LAN.
- With a TX and RX in Endpoint Mode when both units connect to a switcher, only connect to a LAN via the Switcher.
- Never connect both TX and RX in a single signal run to the same LAN as it causes a network loop.
- Never connect both a switcher and a unit (TX or RX) connected to that switcher to the same LAN.

NOTE: *Best practices for connecting DXLink Fiber TXs and RXs directly to a LAN include setting the units to Unidirectional Mode.*

Example

In the example in FIG. 13, a network loop was created when the Enova DGX 16 was connected to a LAN and one of its DXLink Fiber, Duplex Transmitters in Bidirectional Mode was connected to the same LAN. The Transmitter must be disconnected from the LAN. The same problem would also occur if an enclosure and one (or more) of its DXLink Fiber, Duplex Receivers in Bidirectional Mode were connected to a common LAN. *Remember to avoid network loops.*

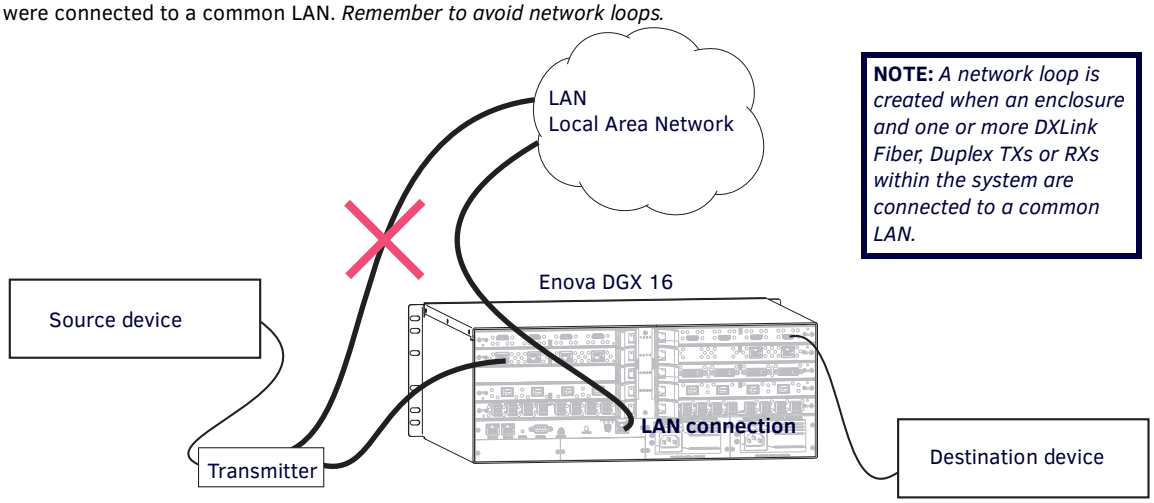


FIG. 13 Avoid network loops with DXLink Fiber, Duplex units in Bidirectional Mode

IMPORTANT: *For Duplex hardware in Bidirectional Mode connected to an Enova Digital Media Switcher, we recommend connecting the switcher to the network for all network connection needs. Network connections via the switcher are faster and more reliable. Never connect both a TX and RX, a TX and switcher, or a switcher and RX to the same network: Avoid network loops.*

CAUTION: *In a source-to-destination signal run that includes hardware in more than one Directional Mode, take precautions against creating network loops with hardware in Bidirectional Mode (see page 43).*

NetLinx Binding of DXLink Fiber Units with an Enova DGX/DVX

NOTE: *If a DXLink module or wallplate has been configured for auto-setup mode and then auto-setup mode has been disabled, the unit may take longer to appear in NetLinx Studio than expected (1-2 minutes).*

DXLink Transmitters and Receivers must have their DIP switch toggles set before they will display as part of an Enova DGX system in NetLinx Studio (v4.0 or later is required). DIP switch information, including settings for common scenarios, is on the next three pages.

In NetLinx Studio, the DXLink TXs and RXs can be bound to the integrated Master by right-clicking on the device and selecting Network Bind/Unbind Device. This is considered the traditional method of binding. If the integrated Master runs on a 100 Series CPU, see the *Hardware Reference Manual – Enova DGX 100 Series Digital Media Switchers* for auto-setup information (which does not require binding).

To bind DXLink units to an Enova DGX integrated Master:

1. Verify the following:
   a. Verify that an Ethernet/RJ-45 cable is connected from the Enova DGX Switcher's integrated Master to the network (i.e., from the switcher's LAN 100/1000 port to a LAN).
   b. Verify that the target Transmitter or Receiver is connected via its DXLink Fiber connector to a DXLink Fiber Input or Output Board (respectively) on the switcher.
   c. Verify that the switcher is powered on.
2. Launch NetLinx Studio and open the OnLine Tree.
3. Bind the target Transmitter or Receiver to the integrated Master:
   a. Select and right-click the TX or RX.
   b. From the context sensitive menu, select Network Bind/Unbind Device (be sure the check box is selected).
   c. Click OK.

DIP Switch Location

TIP: *For easiest access to the DIP switch toggles, we recommend setting them before installation.*

DIP switch toggles for enabling/disabling special Receiver/Transmitter functionality are located on the bottom of the RX and TXs.

IMPORTANT: *When setting the DIP switch toggles, make sure any toggles that need to be ON are flipped toward the AMX sticker.*

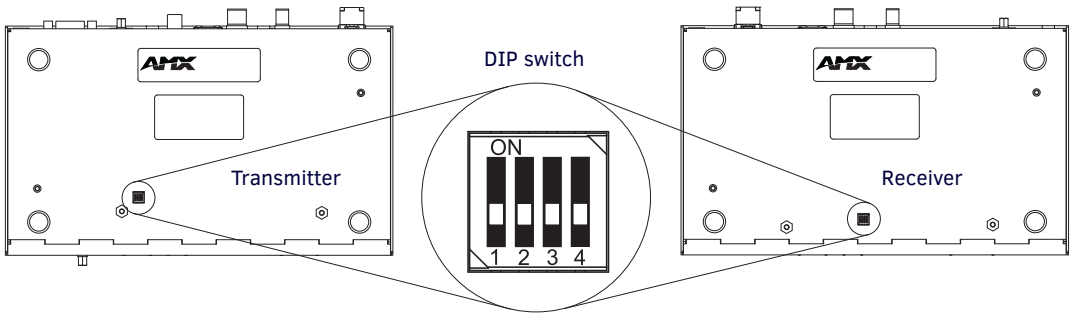


FIG. 14 DIP switch on bottom of Transmitters and Receivers

IMPORTANT: *DIP switch settings on all DXLink Fiber units are read only on reboot. After the settings are read, any adjustment of the toggles will not be implemented and will not affect the system.*

The remaining information on DIP switches in this manual applies when configuring TXs and RXs through traditional NetLinx binding. When the units are used in conjunction with an Enova DGX 100 Series Switcher and they are configured using auto-setup, see the switcher's manual for details on setting the DIP switches.

Setting DIP Switch #1 to Enable/Disable Access to ICS LAN 10/100 Port

The #1 Toggle is used for enabling/disabling network activity over the physical ICS LAN 10/100 port. It does not affect network activity over the DXLink Fiber connection. (For SEND_COMMANDs used to disable/enable ICS LAN functionality, see page 76.)

TIP: *Common setup scenarios and their DIP switch settings are provided in a table on page 35.*

#1 Toggle Settings

- OFF (default) – When the #1 Toggle is set to OFF, network activity over the ICS LAN 10/100 port is disabled.
- ON – When the #1 Toggle is set to ON, network activity over the ICS LAN 10/100 port is enabled.

Toggle #1 Set to ON

When a Transmitter or Receiver is connected to a DXLink Fiber input or output on an Enova DGX Digital Media Switcher, the switcher provides a network connection allowing the Transmitter or Receiver to appear in the OnLine Tree in NetLinx Studio (#3 Toggle *must* be set to ON). For connecting the Transmitter or Receiver to other equipment using the ICS LAN 10/100 port, the #1 Toggle *must* be set to ON.

CAUTION: *Because the DXLink Fiber connection carries network activity passed from the switcher, do not connect the ICS LAN 10/100 port on the Transmitter or Receiver to the same LAN as the switcher because a network loop will result.*
For information on avoiding network loops, see page 32.

Setting DIP Switch #2 to Set the DXLink Mode

#2 Toggle can be set to automatically or manually select the DXLink Mode (to either Extender or Endpoint) for a given Transmitter/Receiver unit. Default state for #2 Toggle OFF is auto selection of DXLink Mode based on connection to another device. When it's ON, the default is Endpoint Mode (used for Master controlled serial/IR data transfer).

TIP: *Common setup scenarios and their DIP switch settings are provided in a table on page 35.*

#2 Toggle Settings

- OFF (default) – When the #2 Toggle is set to OFF, the Transmitter and Receiver will each auto-discover* (not to be confused with auto-setup) what type of DXLink equipment they are connected to and will automatically self-configure to be in one of two DXLink Modes based on the connection:
  - Extender Mode – This mode is automatically selected when a TX and RX are connected directly to each other (a standalone pair). The Transmitter and Receiver act like a simple extender, and serial data and IR data are passed through them.
  - Endpoint Mode – This mode is automatically selected when a unit is connected directly to a DXLink port on a switcher. Serial and IR operations are handled by the host providing control of endpoints. The Master's programming specifies where IR and serial commands are sent (this is handled independently from the routing of the video signals).

* Any time the DXLink connection is re-established or power is cycled on a unit, the auto-discover process will take place, as long as the #2 Toggle remains in the OFF position.

- ON – When the #2 Toggle is set to ON, the auto-discover feature is disabled and the unit can be manually set to either Endpoint Mode (default) or Extender Mode. In Endpoint Mode, when the unit is connected to a switcher or a separate NetLinx Master**, IR and serial operation are only handled via the host.

** When standalone units require IR and/or Serial control by a separate NetLinx Master, then they need to be in Endpoint Mode. Only one must be connected via the ICS LAN 10/100 port to the Master or to a LAN with the Master on it. This requires #1 Toggle to be ON to enable the ICS LAN port. #2 Toggle needs to be ON to place the units in Endpoint Mode (if needed), and #3 Toggle needs to be ON to enable network connectivity.

NOTE: *On either setting, the DXLink Mode may be set via SEND_COMMANDs (see page 76). When #2 Toggle is set to the OFF position, the auto-discover process will overwrite the DXLink Mode setting. However, when the #2 Toggle is set to the ON position, auto-discover is disabled and the mode set by SEND_COMMANDs will persist (i.e., the DXLink Mode setting cannot be overwritten).*

Setting DIP Switch #3 for Network Connectivity

The #3 Toggle is used for enabling/disabling network connectivity of the DXLink Fiber Transmitter or Receiver. If enabled it allows the Transmitter or Receiver to be configured to connect to a NetLinx Central Controller (used for controlling the DXLink Fiber unit and allowing Ethernet traffic).

TIP: *Common setup scenarios and their DIP switch settings are provided in a table on the next page.*

#3 Toggle Settings

- OFF (default) – When the #3 Toggle is set to OFF, the Transmitter or Receiver will not try to connect to the network and will not acquire an IP address.
- ON – When the #3 Toggle is set to ON, the Transmitter or Receiver will attempt to connect to the network via DHCP or static IP, depending on how the unit has been set up (see page 46). The Transmitters and Receivers will not display in NetLinx Studio and will not accept commands or queries unless the #3 Toggle is ON.

NOTE: *After the #3 Toggle is set to ON, a network connection is established, and the NetLinx Studio screen is refreshed, Transmitters and Receivers display in the OnLine Tree as Unbound NDP (Network Detect Proxy) Devices. To facilitate IRL and KIT file transfers, they can be bound to the integrated NetLinx Master in the switcher or to another NetLinx Master. A Virtual NetLinx Master can also be used for file transfers.*

Setting DIP Switch #4

The #4 Toggle is used for placing Duplex units in Unidirectional Mode. If placed in the ON position, Unidirectional Mode is enabled on the DXLink Fiber, Duplex Transmitter or Receiver. Only audio and video will transmit from a TX or be received by an RX; the return optical data path will be turned off and will not try to establish connection. Ethernet, IR, RS-232, and USB HID (keyboard and mouse data) will not be enabled, nor is NetLinx connectivity available. The missing functionality can be provided in Unidirectional Mode by connecting the ICS LAN port to a Network (for details, see "Unidirectional Mode LAN Configuration" on page 46).

After flipping the toggle, the Transmitter or Receiver must have its power cycled to reboot the unit into the mode. Disabling the switch and cycling power will reboot the unit back into Bidirectional Mode.

DXLink Fiber, Simplex Transmitters and Receivers cannot change their Directional Mode: The toggle can be set to ON or OFF.

Scenarios / DIP Switch Settings Table for Bidirectional Mode

IMPORTANT: *In a standalone pair with mixed hardware (one unit Duplex and the other Simplex), we recommend setting the Duplex unit to handle Unidirectional communication (set #4 Toggle to ON). In a switching system with mixed hardware (a mix of Duplex and Simplex boards and units) comprising a complete switching run, the hardware will only support Unidirectional Mode – we recommend configuring all hardware accordingly.*

The table below contains the most common scenarios for setting up DXLink Fiber, Duplex Transmitters and Receivers in Bidirectional Mode as a standalone pair or with other equipment.

Find the scenario in the table that you want to use and then set the DIP switches accordingly. A detailed explanation of functions for each toggle is provided on the previous two pages.

TIP: *Each toggle's ON position is toward the connectors on the rear of the DXLink Fiber units (see page 33).*

Common Scenarios for Bidirectional Mode	DIP Switch Toggle Settings			
TX/RX pair direct connection (Standalone Setup)*	**#1**	**#2**	**#3**	**#4**
AV signals only (plus serial/IR passthrough)	OFF	OFF	OFF	OFF
AV with Ethernet passthrough to networked device** (plus serial/IR passthrough)	ON	OFF	OFF	OFF
AV with NetLinx control of TX/RX unit and serial/IR ports, plus Ethernet passthrough to a networked device^	ON	ON	ON	OFF
TX/RX connected to Enova DGX Switcher (Switcher Setup)	**#1**	**#2**	**#3**	**#4**
AV signals only	OFF	OFF	OFF	OFF
AV with Ethernet passthrough to networked device**	ON	OFF	OFF	OFF
AV with NetLinx control of TX/RX unit and serial/IR ports	OFF	OFF	ON	OFF
AV with NetLinx control of TX/RX unit and serial/IR ports, plus Ethernet passthrough to a networked device^^	ON	OFF	ON	OFF

* Connection requires Duplex hardware with both fibers connected and in Bidirectional Mode (will not work in Unidirectional Mode).
** Connect the ICS LAN 10/100 port on one of the DXLink Fiber units to the network device (e.g., laptop, IP controlled projector, AMX ICSLan EXB Device).
^ Connect the ICS LAN 10/100 port on one of the DXLink Fiber units to the network device (e.g., laptop, IP controlled projector, AMX ICSLan EXB Device) and connect the other unit to the network (the unit with #1 Toggle enabled).
^^ With both units connected to boards in an Enova DGX Digital Media Switcher (provides integrated NetLinx control), connect the ICS LAN 10/100 port on one of the DXLink Fiber units to the network device (e.g., laptop, IP controlled projector, AMX ICSLan EXB Device).

IMPORTANT: *When connecting a Transmitter or a Receiver in a standalone pair setup to a Master (or Virtual Master) for upgrade purposes, #1 and #3 Toggles must be ON. #2 is only required on each module if serial and/or IR control is required from the Master.*

Scenarios / DIP Switch Settings Table for Unidirectional Mode

IMPORTANT: *In a standalone pair with mixed hardware (one unit Duplex and the other Simplex), we recommend setting the Duplex unit to handle Unidirectional communication (set #4 Toggle to ON). In a switching system with mixed hardware (a mix of Duplex and Simplex boards and units) comprising a complete switching run, the hardware will only support Unidirectional Mode – we recommend configuring all hardware accordingly.*

The table below contains the most common scenarios for setting up DXLink Fiber, Duplex Transmitters and Receivers in Unidirectional Mode (also applies to Data Link-lost Mode) and DXLink Fiber, Simplex Transmitters and Receivers as a standalone pair or with other equipment.

Find the scenario in the table that you want to use and then set the DIP switches accordingly. A detailed explanation of functions for each toggle is provided above on the previous two pages.

TIP: *Each toggle's ON position is toward the connectors on the rear of the DXLink Fiber units (see page 33).*

NOTE: *DXLink Fiber, Simplex only - DIP switch #4 Toggle is non-functional. It can be set to ON or OFF.*

Common Scenarios for Unidirectional Mode	DIP Switch Toggle Swttings			
Endpoint Mode – TX/RX pair direct connection (with Switcher on Network)	**#1**	**#2**	**#3**	**#4**
AV signals only	OFF	OFF	OFF	ON*
AV with NetLinx control of TX/RX unit and serial/IR ports**	ON	ON	ON	ON*
TX/RX connected to Enova DGX Switcher (Switcher Setup)	**#1**	**#2**	**#3**	**#4**
AV signals only	OFF	OFF	OFF	ON*
AV with NetLinx control of TX/RX unit and serial/IR ports**	ON	OFF	ON	ON*

* Does not apply for DXLink Fiber, Simplex units: The toggle can be set to ON or OFF.
** Requires ICSLan connection to network.

IMPORTANT: *When connecting a Transmitter or a Receiver in a standalone pair setup to a Master (or Virtual Master) for upgrade purposes, #1 and #3 Toggles must be ON. #2 is only required on each unit if serial and/or IR control is required from the Master.*

Mounting Options for DXLink Fiber Units (Rack Trays and Mounting Brackets)

CAUTION: *To prevent overheating, avoid placing high heat producing equipment directly above or below the units. We recommend allowing plenty of clearance above the vent holes on top of the units. Do not place anything directly on top of the units that would restrict airflow through the vent holes on top.*

The DXLink Fiber Transmitters and Receivers are classified as V Style modules, which have optional V Style mounting hardware. These versatile mounting options include rack trays and mounting brackets for desktops, under desks, on walls, and on poles. For details on V Style Mounting Kit options, see www.amx.com.

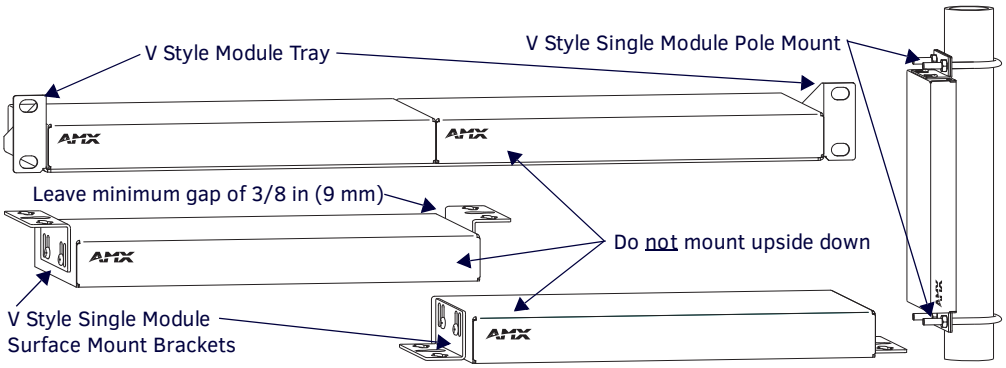


FIG. 15 V Style mounting hardware

IMPORTANT: *When mounting under a surface, the DXLink Fiber unit should be mounted upright and lowered in the slots to provide an airflow gap between the surface and the vent holes. If not using V Style brackets, be sure to leave a gap between the top of the unit and the surface for heat to escape.*

Fiber Optic Cable Requirements

WARNING: DXLink Fiber units use laser transceivers, which are Class 1 Eye Safe per IEC 60825-1/CDRH requirements. While the Class 1 category indicates that the invisible laser used is safe, we recommend avoiding direct eye exposure when using any optical fiber products (see the OSHA directive on page 9).

Fiber Optic Cable Requirements

- Fiber optic cable with LC termination for snap coupling with SFP+ transceivers
- Cable with LC Duplex connectors conforming to ANSI TIA-EIA 604-10 (FOCIS 10A)
- MM duplex units require OM3 50/125 µm multimode fiber optic cable; maximum length 984 feet (300 m)
- SM duplex units require 9/125 µm single mode fiber optic cable; maximum length is 6.21 miles (10 km)

CAUTION: *Do not severely bend or kink the fiber optic cable. Irreversible damage can occur. Refer to the physical limitations (bend radius) specified by the cable manufacturer.*

IMPORTANT: *Be sure to follow the fiber optic cable manufacturer's recommendations.*

TIP: *Multimode transceivers only – If you are unsure that a multimode transceiver is passing a signal, hold the unattached end of the fiber optic cable away from you and take a picture of it with a digital camera (or cell phone camera). The image will show a bright light if signal is being passed (works on some digital cameras).*

Fiber Optic Cable Wiring for Bidirectional Mode – Duplex Only (Default)

When wiring fiber optic cable for bidirectional full system capabilities, a dual set of fiber optic cables is used to wire from a DXLink Fiber Transmitter to a DXLink Fiber Input Board and another dual set of fiber optic cables from a DXLink Fiber Output Board to a DXLink Fiber Receiver (or directly from TX to RX). This wiring provides not only video and audio but Ethernet, IR, serial, and USB functionality as well.

Fiber Optic Cable Wiring for Unidirectional Mode – Simplex (Default) or Duplex (Configurable)

When wiring fiber optic cable for secure unidirectional system capabilities, a single fiber optic cable is used to wire from a DXLink Fiber Transmitter to a DXLink Fiber Input Board and another single fiber optic cable from a DXLink Fiber Output Board to a DXLink Fiber Receiver (or directly from TX to RX). This wiring provides video and audio only.

Fiber Optic Cable Wiring for Data Link-lost Mode – Duplex Only

When a DXLink Fiber Duplex cable run in Bidirectional Mode has one or both of the fiber optic cables on the return path removed, the system automatically drops into Data Link-lost Mode. In Data Link-lost Mode, video and audio continue to flow from source to destination, but network and control no longer transmit over the fiber optic path. Restoring the cable(s) on the return path moves the system back into Bidirectional Mode. Configuring the system for secure Unidirectional Mode communication requires additional actions (see "Duplex Hardware Directional Mode Configuration" on page 42).

Fiber Optic Transceiver LEDs in Duplex and Simplex Hardware

Fiber optic transceiver LEDs have different functionality for each of the data Directional Modes (see “Quick Reference Tables for Modes” on page 20). Duplex hardware is designed for Bidirectional Mode, but can be configured for Unidirectional Mode. Simplex hardware is limited to Unidirectional Mode only. When a Duplex unit in Bidirectional Mode loses its return path, the unit drops into Data Link-lost Mode.

NOTE: *For instructions on setting Duplex hardware to a particular Directional Mode and information about each of the available modes, see “Duplex Hardware Directional Mode Configuration” on page 42.*

NOTE: *Regardless of the Directional Mode Duplex hardware is using, the left LED is yellow and the right LED is green. Simplex LEDs are always blue.*

Transceiver LEDs in Bidirectional Mode* – Duplex Only

The following information applies to the LEDs above the fiber optic transceiver on Duplex TXs, RXs, (and boards) in Bidirectional Mode.

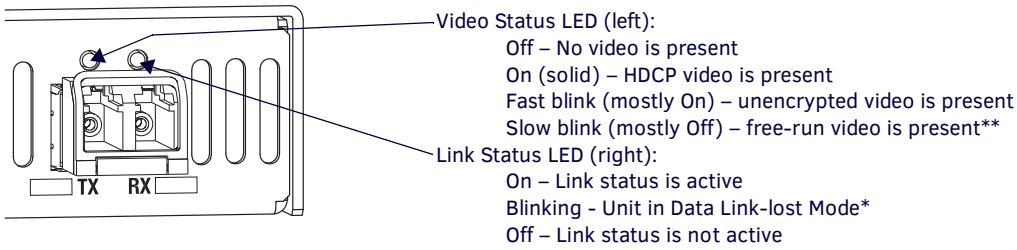


FIG. 16 Fiber optic transceiver LEDs on Duplex hardware

* When a Duplex unit in Bidirectional Mode loses its return data path, the unit drops into Data Link-lost Mode.
** Free run video is a video mode internal to the DXLink system. When free run video is indicated, video is not displayed (nor is black video present) out the endpoint RX. This identifies a good connection with video flow between endpoints.

Transceiver LEDs in Unidirectional Mode – Simplex (Default) or Duplex (Configurable)

The following information applies to the LEDs above the fiber optic transceiver on Simplex or Duplex TXs, RXs, (and boards) in Unidirectional Mode.

NOTE: *Only one transceiver LED will operate in Unidirectional Mode, either the TX (left) or the RX (right). The operational LED illuminates on the side of the transceiver where data enters or leaves the hardware and indicates the individual port where the fiber optic cable should be attached during cabling (see page 39).*

DXLink TX – Data Transport LEDs:
TX is: On (solid) - Available for use; not sending data
Blinking - Sending data
RX is: Off – Transceiver port is not operational

DXLink RX – Data Transport LEDs:
TX is: Off – Transceiver port is not operational
RX is: On (solid) - Available for use; not receiving data
Blinking - Receiving data

FIG. 17 Fiber optic transceiver LEDs shown on TX (left) and RX (right)

Twisted Pair Cable for ICS LAN 10/100 Connection

Cable Pinout

Either T568A or T568B pinout specification for termination of twisted pair cable can be used for ICS LAN 10/100.

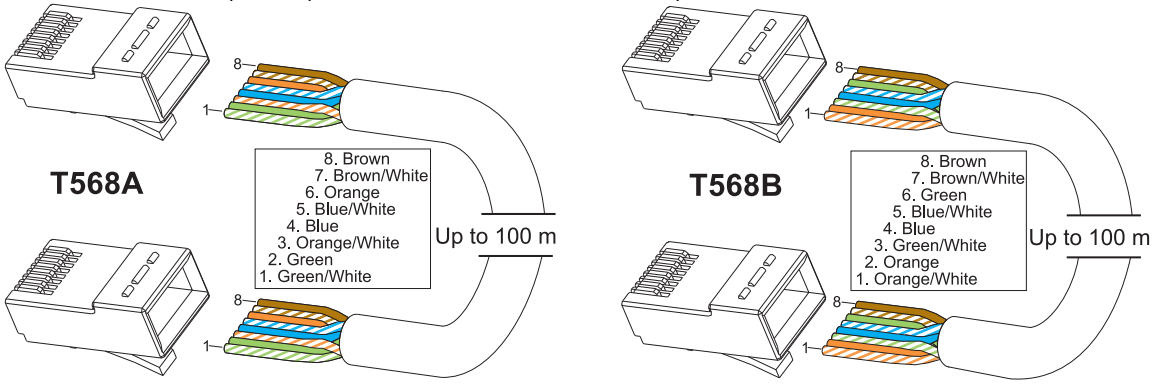


FIG. 18 Twisted pair cable pinouts for Ethernet connectors

ICS LAN 10/100 Connector LEDs

The following information applies to the LEDs on the ICS LAN 10/100 (RJ-45) connector on the units.

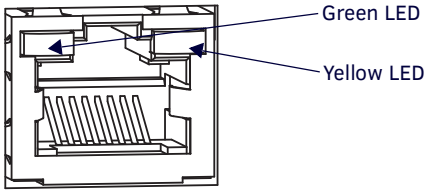


FIG. 19 ICS LAN 10/100 connector LEDs on the DXLink Fiber units

- Link/Activity (L/A) Green LED:
  - On – Link status is active (when the Ethernet cable is connected and terminated correctly)
  - Off – Link status is not active
- Speed Status (SPD) Yellow LED:
  - On – Speed status is 100 Mbps
  - Off – Speed status is 10 Mbps

Audio Type Precedence

The connectors for bringing audio into the system on the Transmitters are as follows:

- HDMI In connector – Embedded audio signal
- Digital Audio In jack – Digital audio signal (S/PDIF)
- Stereo Audio In jack – Analog stereo audio signal

The hierarchy for audio type precedence* is listed in the following table for the Transmitters:

Audio Type Precedence on DXLink Fiber Transmitters	
Incoming Signal	**Audio Type Selected**
HDMI w/ embedded digital audio	HDMI w/ embedded digital audio
S/PDIF digital audio only	S/PDIF digital audio
Stereo audio only	Stereo audio
S/PDIF digital audio and stereo audio	S/PDIF digital audio
HDMI w/ embedded digital audio and S/PDIF digital audio	HDMI w/ embedded digital audio
HDMI w/ embedded digital audio and stereo audio	HDMI w/ embedded digital audio
HDMI w/ embedded digital audio, S/PDIF digital audio, and stereo audio	HDMI w/ embedded digital audio

* Audio precedence as specified in the table above is applicable when the AUDIN_FORMAT_AUTO command is set to ENABLE; this precedence can be overridden by SEND_COMMANDs (see page 69).

The audio selected by the Transmitter is embedded on the HDMI signal (if not already embedded) and sent to the switcher or directly to the RX via the fiber optic cable.

The DXLink Fiber RX will by default take the embedded audio it receives from a Transmitter* and output the following types of audio:

- HDMI Out connector – Embedded digital audio signal
- Stereo Audio Out connector – Analog stereo audio signal

The audio output can be changed using the AUDOUT_FORMAT command (see page 64).

* These exceptions apply: In order for audio to be sent out of the analog stereo audio connector on the DXLink Fiber RX, it must have originated or be embedded in the HDMI signal on the Enova DGX Digital Media Switcher or DXLink Fiber Transmitter as a 2 channel signal (either analog stereo or 2 channel L-PCM). Multi-channel (>2 channel) L-PCM formats will pass incomplete audio (only 2 of the multiple channels will be sent). All other audio formats will be muted at the connector.

DXLink Fiber TX – Attaching Signal, Transport, and Control Cables

IMPORTANT: *Before attaching cables, be sure to set the DIP switch's toggles if necessary (see page 33).*

WARNING: DXLink Fiber units use laser transceivers, which are Class 1 Eye Safe per IEC 60825-1/CDRH requirements. While the Class 1 category indicates that the invisible laser used is safe, we recommend avoiding direct eye exposure when using any optical fiber products (see the OSHA directive on page 9).

Tips for Fiber Optic Connections:

- ❑ Keep dust plugs in transceivers until you are ready to make a connection.
- ❑ Clean fiber optic cable ends before attaching to unit (be sure to follow the cable manufacturer's instructions for inspecting and cleaning the cable ends).
- ❑ Use gentle pressure when connecting fiber optic cables to transceivers (normally an audible click is heard when the connector engages).
- ❑ If unsure the connection is properly seated, gently tug on the connector.
- ❑ If fiber optic cables are removed from the transceivers, reinsert dust plugs.
- ❑ *Multimode transceivers only* – If you are unsure that a multimode transceiver is passing a signal, hold the unattached end of the fiber optic cable **away from you** and take a picture of it with a digital camera (or cell phone camera). The image will show a bright light if the signal is being passed (works on some digital cameras and cell phone cameras).

NOTE: *Power, IR, and RS-232 ports are covered in their own sections.*

IMPORTANT: *Compatibility between hardware requires matching model types: multimode to multimode and single mode to single mode.*

IMPORTANT: *The illustration below shows a Duplex Transmitter wired with dual LC fiber cables. In both Duplex and Simplex hardware: for each LC fiber cable, be sure to verify that the individual wire from the transceiver's TX label on one end of the run connects to the transceiver's RX label on the other end.*

To attach signal, transport, and control cables to the DXLink Fiber TX:

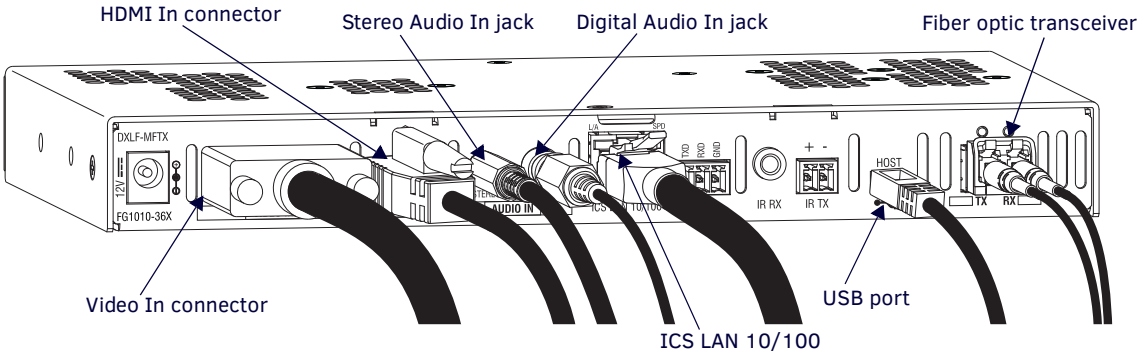


FIG. 20 Attach signal and control cables

1. Video In connector – Attach the HD-15 cable from the source device to the Video In connector (for pinouts for VGA, component, S-Video, and composite, see page 105).
2. HDMI In connector – Attach the HDMI cable from the source device to the HDMI In connector.*
3. When attaching a fiber optic cable:
   a. Clean the end face on the fiber cable following the manufacturer's recommendations.
   b. Fiber optic transceiver – Remove the dust plug (save for further use).
   c. Attach the cable to the fiber optic transceiver** (for transport to the switcher or directly to the RX). Always grasp the fiber connector housing to plug (or unplug) a fiber optic cable (depending on the housing, a click may be heard; if not, lightly tug to be sure the connection is tight).
4. Digital Audio In jack (optional) – Insert the S/PDIF (RCA) plug on the digital audio cable from the digital audio source into the Digital Audio In jack. For audio precedence information, see page 38.

5. Stereo Audio In jack (optional) – Plug in the analog audio cable from the stereo audio source into the Stereo Audio In jack. For audio precedence information, see page 38.

* DVI cable can be used instead (via a DVI-to-HDMI cable adapter).
** When cabling a simplex transceiver, we recommend covering the unused port.

CAUTION: *When you make the connection in Step 6, be careful not to create a network loop (see page 32).*

6. ICS LAN 10/100 connector (optional) – Attach a twisted pair cable from this connector to a LAN. Note that the #1 Toggle on the DIP switch must be set to ON to enable this port.
7. Local Out port (optional) – On the front of the unit, attach an HDMI cable from a local monitor to the Local Out (HDMI) connector.
8. Program port (optional) – On the front of the unit, attach a USB mini-B cable from a PC to the Program port.
9. USB Host port (optional) – Attach USB cable from a PC to the Host USB-mini A/B port. The port's default is "enabled." The USB LED on the front monitors this port. For USB support information, see page 18. For USB SEND_COMMAND information, see page 75.
10. If necessary, set the video and audio formats using SEND_COMMANDs (for NetLinx programming, see page 60).

NOTE: *When digital audio and/or analog stereo audio cables are plugged into the TX, the Audio LEDs on the front of the units turn green to show that audio is present and is being incorporated into the HDMI line and is also available on the DXLink Fiber RX at the Audio Out connector.*

NOTE: *The ID Pushbutton places the unit in ID Mode for setting the NetLinx ID (device only) and provides additional functionality, such as placing the device in Static IP Mode or DHCP Mode. For complete information, see page 46.*

DXLink Fiber TX – Applying Power

CAUTION: *The provided desktop power supply must be used to power the DXLink Fiber TX, and it must not be altered in any way*

To apply power to the DXLink Fiber TX:

1. Plug the cord from the desktop power supply (provided) into the power jack on rear of the unit (2.1 mm DC jack for 12 V local power).
2. Plug the desktop power supply into an AC external power source.
   The Power LED on the front of the unit turns a constant green, which indicates a ready state. Some LEDs turn a constant color while some blink first. For normal LED display, see table below.

DXLink Fiber Transmitters – Indicator LEDs

The LED indicators are listed in the table as they appear on the front of the unit from left to right.

DXLink Fiber TX LEDs	Normal Display	Indicates
Power	Green	Power is applied to the unit
Digital Video	Green	A digital signal is present through the unit
Audio	Green	A digital audio signal is present through the unit
Analog Video	One of the 3 LEDs is Green	Type of analog video present through the unit: • C (composite) or Y/C (2 component) • Y/PB/PR or RGB (3 component) • RGBHV (5 component) or RGBS (4 component)
IR TX	Red	IR TX active communication
IR RX	Yellow	IR RX active communication
232 (Serial) TX	Red	Serial TX active communication
232 (Serial) RX	Yellow	Serial RX active communication
NetLinx Link/Act	Green	Active LAN connection to an AMX Network
NetLinx Status	Green	LAN connection is active

DXLink Fiber Transmitters – LED Troubleshooting

If indicator LEDs for units do not respond with a normal display as stated in table above:

- Check all power connections.
- Check the "Detailed NetLinx (Link/Act and Status) LED Behavior" section on page 48.
- Try the suggestions in the "Troubleshooting" chapter on page 79.

For information on restoring the unit's default settings on power up, see page 54.

DXLink Fiber RX – Attaching Signal, Transport, and Control Cables

IMPORTANT: *Before attaching cables, be sure to set the DIP switch's toggles if necessary (see page 33).*

WARNING: DXLink Fiber units use laser transceivers, which are Class 1 Eye Safe per IEC 60825-1/CDRH requirements. While the Class 1 category indicates that the invisible laser used is safe, we recommend avoiding direct eye exposure when using any optical fiber products (see the OSHA directive on page 9).

Tips for Fiber Optic Connections:

- ❑ Keep dust plugs in transceivers until you are ready to make a connection.
- ❑ Clean fiber optic cable ends before attaching to unit (be sure to follow the cable manufacturer's instructions for inspecting and cleaning the cable ends).
- ❑ Use gentle pressure when connecting fiber optic cables to transceivers (normally an audible click is heard when the connector engages).
- ❑ If unsure the connection is properly seated, gently tug on the connector.
- ❑ If fiber optic cables are removed from the transceivers, reinsert dust plugs.
- ❑ Multimode transceivers only – If you are unsure that a multimode transceiver is passing a signal, hold the unattached end of the fiber optic cable away from you and take a picture of it with a digital camera (or cell phone camera). The image will show a bright light if signal is being passed (works on some digital cameras.)

NOTE: *Power, IR, and RS-232 ports are covered in their own sections.*

IMPORTANT: *Compatibility between hardware requires matching model types: multimode to multimode and single mode to single mode.*

IMPORTANT: *The illustration below shows a Duplex Receiver wired with dual LC fiber cables. In both Duplex and Simplex hardware: for each LC fiber cable, be sure to verify that the individual wire from the transceiver's TX label on one end of the run connects to the transceiver's RX label on the other end.*

To attach signal, transport, and control cables to the DXLink Fiber RX:

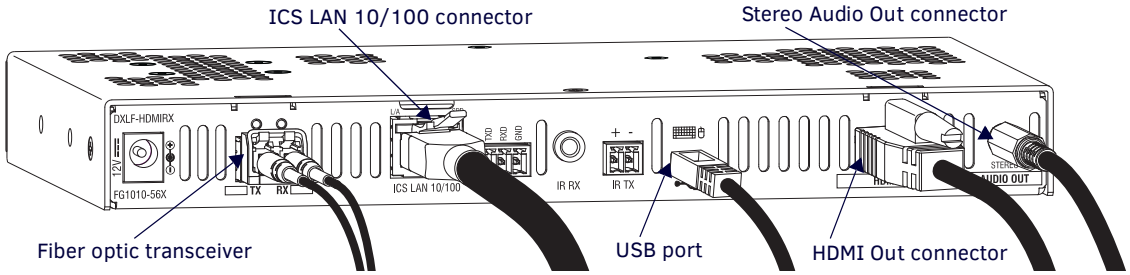


FIG. 21 Attach signal and control cables to DXLink Fiber RX

1. When attaching a fiber optic cable:
   a. Clean the end face on the fiber cable following the manufacturer's recommendations.
   b. Fiber optic transceiver – Remove the dust plug (save for further use).
   c. Attach the cable to the fiber optic transceiver* (for transport from the switcher or directly from the TX). Always grasp the fiber connector housing to plug (or unplug) a fiber optic cable (depending on the housing, a click may be heard; if not, lightly tug to be sure the connection is tight).

   * When cabling a simplex transceiver, we recommend covering the unused port.
2. HDMI Out connector – Attach the HDMI cable that goes to the destination device.**

   ** DVI cable can be used instead (via an HDMI-to-DVI cable adapter).

CAUTION: *When you make the connection in Step 3, be careful not to create a network loop (see page 32).*

3. ICS LAN 10/100 connector (optional) – Attach twisted pair cable from this connector to LAN. Note the #1 Toggle on the DIP switch must be set to ON to enable this port. (For NetLinx programming information, see page 60.)
4. USB port (optional) – This port is for sending keyboard / mouse commands to a PC. You can either connect this port to a hub using a USB mini-A cable and then connect keyboard and mouse to the hub or connect directly to a keyboard or mouse using the appropriate mini-A plug adapter cable. The port's default is "enabled." The USB LED on the front monitors this port. For USB support information, see page 18. For USB SEND_COMMAND information, see page 75.
5. Stereo Audio Out connector (optional) – Plug the audio cable (that goes to the audio destination) into the stereo audio jack. For audio precedence information, see page 38. For information on audio SEND_COMMANDs (including enabling the analog audio format), see page 64.

NOTE: *When digital audio and/or analog stereo audio cables are plugged into the TX, the Audio LEDs on the front of both units turn green to show that audio is present and is being incorporated into the HDMI line and is also available on the DXLink Fiber RX at the Stereo Audio Out connector.*

NOTE: *The ID Pushbutton places the DXLink Fiber RX in ID Mode for setting the NetLinx ID (device only) and provides additional functionality, such as placing the device in Static IP Mode or DHCP Mode. For information, see page 46.*

TIP: *If scaling adjustments are necessary, use SEND_COMMANDs (see page 62). DGX Configuration Software via the output boards on a switcher can also be used for scaling when DXLink Fiber units are used in conjunction with Enova DGX 8/16/32/64 Switchers, and the System Configuration interface can be used when DXLink Fiber units are used in conjunction with Enova DGX 100 Series Switchers.*

DXLink Fiber RX – Applying Power

CAUTION: *The provided desktop power supply must be used to power the DXLink Fiber RX, and it must not be altered in any way.*

To apply power to the DXLink Fiber RX:

1. Plug the cord from the desktop power supply (provided) into the power jack on rear of the DXLink Fiber RX (2.1 mm DC jack for 12 V local power).
2. Plug the desktop power supply into an AC external power source.
   The Power LED on the front of the DXLink Fiber RX illuminates a constant green, which indicates a ready state. Some LEDs turn a turn a constant color while some blink first. For normal LED display, see the table below.

DXLink Fiber Receivers – Indicator LEDs

The LED indicators are listed in the table as they appear on the front of the RX from left to right.

DXLink Fiber RX LEDs	Normal Display	Indicates
Power	Green	Power is applied to the Receiver
Video	Green	A video signal is present through the Receiver
Audio	Green	An embedded audio signal is present through the Receiver
Scaling: – Bypass – Auto – Manual	One LED is green. The other two are off.	Receiver is in one of the three modes for scaling • At power up, the Receiver defaults to Auto Mode, unless a different Scaling Mode has been persisted* • Press the Scaling button to turn on Bypass or Manual
IR TX	Red	IR TX active communication
IR RX	Yellow	IR RX active communication
Serial TX	Red	Serial TX active communication
Serial RX	Yellow	Serial RX active communication
NetLinx Link/Act	Green	Active LAN connection to an AMX Network
NetLinx Status	Green	LAN connection is active

* When the HDMI output cable is disconnected from the DXLink Fiber RX or if no EDID is found on the destination device, the Auto LED is ON. In both cases, the DXLink Fiber RX will revert to a resolution of 1280x1024,60Hz until a different EDID is detected.

DXLink Fiber Receivers – LED Troubleshooting

If the indicator LEDs for the units do not respond with a normal display as stated in the table above:

- ❑ Check all power connections.
- ❑ Check the "Detailed NetLinx (Link/Act and Status) LED Behavior" section on page 48.
- ❑ Try the suggestions in the "Troubleshooting" chapter on page 79.

For information on restoring the unit's default settings on power up, see page 54.

Duplex Hardware Directional Mode Configuration

The following section applies to DXLink Fiber, Duplex Transmitters and Receivers and describes configuration of the units for each of the three Directional Modes (Bidirectional, Unidirectional, and Data Link-lost Modes). Directional Mode refers to the flow of signals and communication data within the system.

Instructions for the configuration of DXLink Fiber, Duplex Input and Output boards are available in the *Hardware Reference Manual – Enova DGX 100 Series Digital Media Switchers* or *Instruction Manual – Enova DGX 8/16/32/64 Digital Media Switchers* at www.amx.com.

NOTE: *A complete list of Modes is available in the "Quick Reference Tables for Modes" section on page 20.*

WARNING: DXLink Fiber units use laser transceivers, which are Class 1 Eye Safe per IEC 60825-1/CDRH requirements. While the Class 1 category indicates that the invisible laser used is safe, we recommend avoiding direct eye exposure when using any optical fiber products (see the OSHA directive on page 9).

CAUTION: *In Data Link-lost Mode, the data return path is disconnected but both of the transceiver lasers are still active. If left uncovered, transceiver lasers may constitute a health hazard. This hazard should be avoided by restoring Bidirectional Mode (see the next page), configuring DXLink Fiber units for Unidirectional Mode (see the next page), or covering exposed lasers.*

Need to Know for Hardware Configuration

- When different pieces of DXLink Fiber, Duplex hardware are in different modes (e.g., a Transmitter in Bidirectional Mode and a Receiver in Unidirectional Mode or a Transmitter in Unidirectional Mode and its corresponding input board in Bidirectional Mode) the entire run drops into Data Link-lost Mode until the hardware is configured for matching modes.
- The only way to configure DXLink Fiber, Duplex Transmitters and Receivers for Unidirectional Mode is to adjust the setting of DIP switch #4 on the bottom of the unit. After setting the DIP switch (ON for Unidirectional Mode and OFF for Bidirectional Mode), power must be cycled to use in the enabled state.
- When Duplex and Simplex hardware are connected, the Duplex hardware will always operate in Data Link-lost Mode until it is set to Unidirectional Mode.

Configuring Duplex Units for Unidirectional Mode

The following directions apply whether the Duplex unit is in Bidirectional Mode (factory default) or in Data Link-lost Mode (see following note).

NOTE: *If the data return path is disconnected while the system is configured for Bidirectional Mode, the system automatically drops into Data Link-lost Mode.*

To configure Duplex units for Unidirectional Mode:

1. Ensure that the unit is not powered. Disconnect power if necessary.
2. Flip DIP switch #4 to the ON position (enables Unidirectional Mode).
3. Apply power to the unit (boots in Unidirectional Mode).

NOTE: *When cabling a Transmitter and Receiver for Unidirectional Mode, we recommend covering any unused ports.*

Configuring Duplex Units for Bidirectional Mode

When starting from Data Link-lost Mode or Unidirectional Mode, the following instructions explain how to restore Duplex hardware configuration to Bidirectional Mode (default).

For units beginning in Data Link-lost Mode, simply restore the fiber optic cables that provide the data return path.

The following directions assume that the Duplex unit is in Unidirectional Mode and both fiber cables are connected.

To restore Duplex units to Bidirectional Mode:

1. Ensure that the unit is not powered. Disconnect power if necessary.
2. Flip DIP switch #4 to the OFF position (enables Bidirectional Mode).
3. Apply power to the unit (boots in Bidirectional Mode).

Serial Data Transfer and IR Flow Control

The illustration in FIG. 22 shows the bidirectional serial data transfer and IR flow control when DXLink Fiber, Duplex units are used in Endpoint Mode with an Enova Digital Media Switcher. The switcher has an integrated NetLinx Central Control Processor which provides native AMX control at each remote location fed by a DXLink Fiber Transmitter and Receiver. Control is sent over fiber optic cable (via the fiber optic transceivers).

Serial data transfer and IR flow control work similarly in directly connected TX/RX pairs (Standalone Mode).

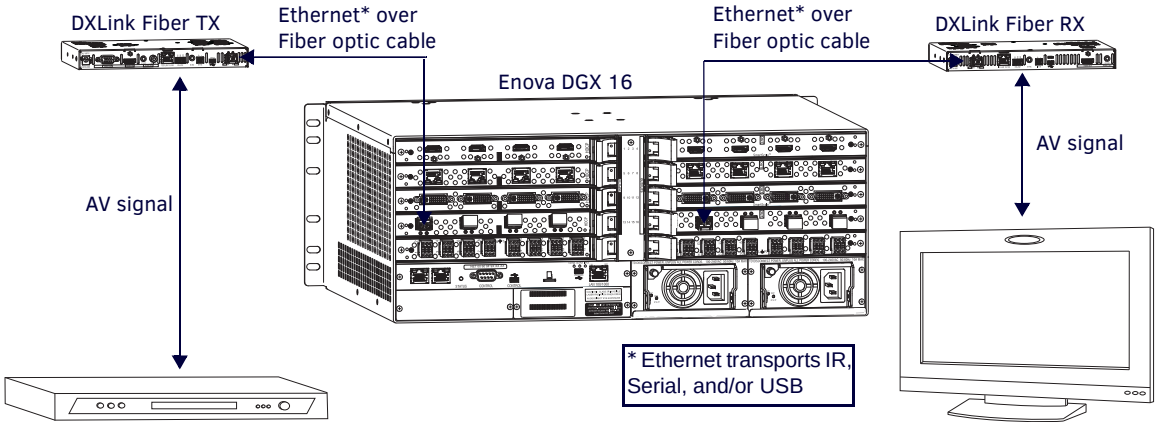


FIG. 22 Serial data transfer and IR flow control with Duplex hardware in Bidirectional Mode

IMPORTANT: *For Duplex hardware in Bidirectional Mode connected to an Enova Digital Media Switcher, we recommend connecting the switcher to the network for all network connection needs. Network connections via the switcher are faster and more reliable. Never connect both a TX and RX, a TX and switcher, or a switcher and RX to the same network: Avoid network loops (see page 32).*

The illustration in FIG. 23 shows a DXLink Fiber Transmitter in Unidirectional Mode* and a DXLink Fiber Receiver in Bidirectional Mode with a setup that allows the units IR, USB, and serial communication via LAN when the system is in Endpoint Mode with an Enova Digital Media Switcher.

* The Transmitter can either be Duplex configured for Unidirectional Mode or Simplex, which can only support Unidirectional Mode. In either case, the fiber cable attached to the Transmitter has no data return path.

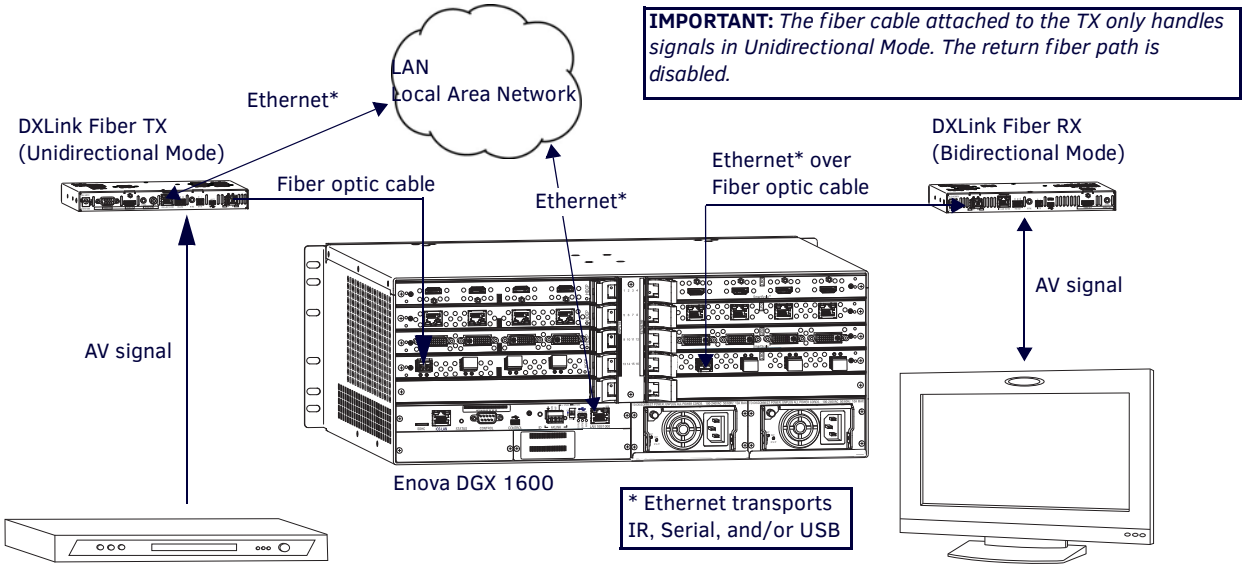


FIG. 23 Serial data transfer and IR flow control with TX in Unidirectional Mode and RX in Bidirectional Mode (Enova DGX 1600 shown)

CAUTION: *In a source-to-destination signal run that includes hardware in more than one Directional Mode, take precautions against creating network loops with hardware in Bidirectional Mode (see page 43).*

The illustration in FIG. 24 shows DXLink Fiber units** in Unidirectional Mode with a setup that allows the units IR, USB, and serial communication via LAN when the system is in Extender Mode. This setup requires that a NetLinx Central Controller be connected to the LAN.

** The Transmitter and Receiver can be either Duplex configured for Unidirectional Mode or Simplex, which can only support Unidirectional Mode. In either case, the fiber cable attached to the Transmitter has no data return path.

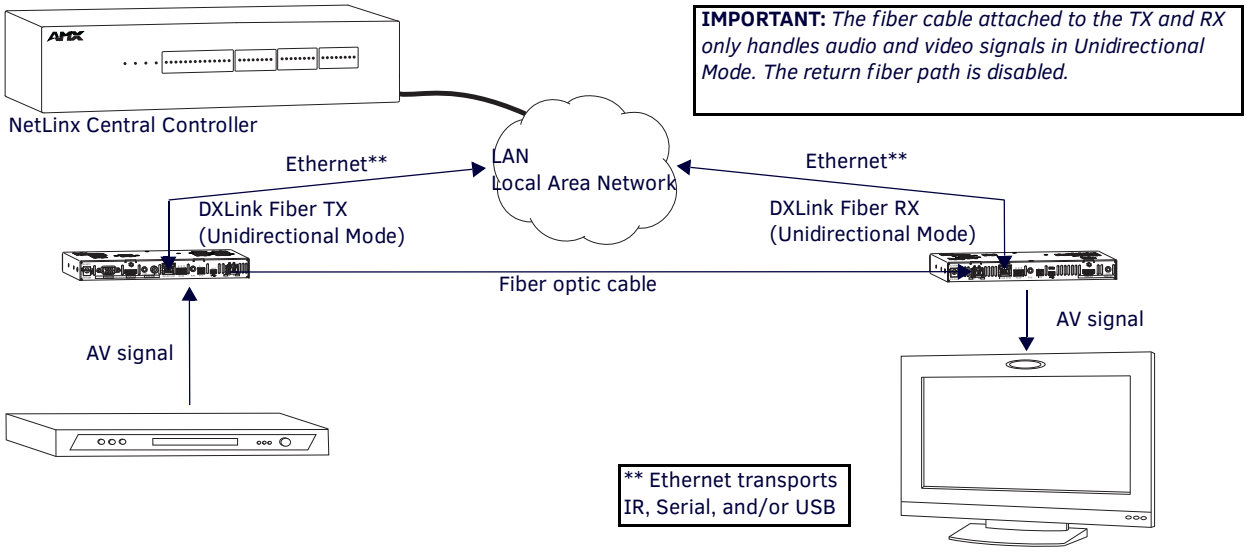


FIG. 24 Serial data transfer and IR flow control with hardware in Unidirectional Mode

Wiring for Serial Data Transfer

The RS-232 (serial) ports are the 3-position screw terminal blocks on the rear of the units to the right of the ICS LAN 10/100 connector. The RS-232 ports can be bound and controlled via an integrated NetLinx Central Controller in an Enova DGX or via another network connected NetLinx Central Controller.

NOTE: *On all DXLink Fiber units, the RS-232 connector pinout is "TX - RX - Ground."*

To wire the RS-232 (serial) connectors on the RX/TX for data transfer:

1. Wire the RS-232 connectors on the units according to the pinout directly above the connector.

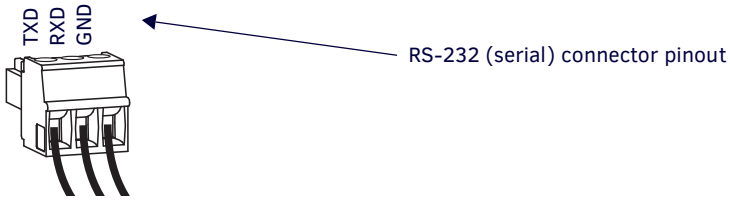


FIG. 25 Wire RS-232 for serial data transfer

2. Use the command RXON to enable this port on the Transmitter and the Receiver. (For complete Serial SEND_COMMAND programming information, see page 73.)

Serial Control – Endpoint Mode and SEND_COMMANDs

With DXLink Fiber TX/RX Duplex units connected to a switcher (in Endpoint Mode), serial operations in Bidirectional Mode are handled by the host providing control of the endpoints. The Master's programming specifies where the serial commands are sent (this is handled independently from the routing of the video signals). For additional information on Endpoint Mode, see page 20. For Serial SEND_COMMANDs, see page 73.

NOTE: *Configuration of serial communication in Unidirectional or Data Link-lost Mode requires additional information found in "Unidirectional Mode LAN Configuration" on page 46.*

Optional: DXLink Fiber TX/RX – IR Control

For additional information on the IR03 and CC-NIRC, which are required for IR control, see page 20. (The IR03 and CC-NIRC are not included with the DXLink Fiber units.) The IR ports can be bound and controlled via the integrated NetLinx Central Controller in the Enova DGX or via another network connected NetLinx Central Controller. A compatible remote control unit can also be used with the system.

IR03 External IR Receiver Module (not included)

FIG. 26 IR Receiver cable (FG-IR03)

To connect an IR Receiver to a TX or to an RX:

1. Connect the jack on the IR03 External IR Receiver Module cable (FG-IR03) to the IR RX port on the unit.
2. Run the cable and attach the IR receiver bud so that it has a clear line-of-sight with the intended remote control device.

CC-NIRC NetLinx IR Emitter Cable (not included)

FIG. 27 IR Emitter cable (FG10-000-11)

To connect an IR Emitter to a TX or to an RX:

1. Connect the Phoenix connector on the CC-NIRC NetLinx IR Emitter cable (FG10-000-11) to the IR TX port on the unit.
2. Run the other end of the IR Emitter cable to the display device and locate the IR window.
3. Attach the IR Emitter bud over the device's IR sensor by removing the cover on the reverse side of the Emitter and sticking the bud directly over the IR window.

IMPORTANT: *When installation of the IR Receiver and IR Emitter is complete, load the appropriate driver (for instructions, see) and program the IR remote according to the product's documentation.*

IR Control – Endpoint Mode and SEND_COMMANDs

In Endpoint Mode (TX/RX units are connected to a switcher), IR operations in Bidirectional Mode are handled by the host providing control of the endpoints. The Master's programming specifies where the IR commands are sent (this is handled independently from the routing of the video signals). For additional information on Endpoint Mode, see page 29; for specific IR SEND_COMMANDs, see page 69.

NOTE: *Configuration of IR communication in Unidirectional or Data Link-lost Mode requires additional information found in "Unidirectional Mode LAN Configuration" on page 46.*

Optional Accessories for USB Transport

CC-USB, USB Programming Cable (FG10-5965)

Order this optional programming cable for connecting to a PC (for use with DXLink Fiber Transmitters only).

CC-MINIUSB, Mini USB to PC Cable Adapter (FG5967-20)

Order this optional cable adapter for connecting a keyboard/mouse device to the DXLink Receiver (for use with DXLink Fiber Receivers only).

ID Pushbutton Functions

The ID Pushbutton is located on the right front of the DXLink Fiber units.

The ID Pushbutton can be used to perform four types of initial configuration settings:

- Toggle between DHCP and static IP addressing
- Assign a device address
- Reset the factory default settings
- Restore the factory firmware image

NOTE: *The functions performed depend on when and for how long the ID Pushbutton is pressed and held. For complete ID Pushbutton information, see page 46.*

NOTE: *ID Pushbutton functions can also be implemented using Telnet commands (see page 85).*

Unidirectional Mode LAN Configuration

The only method for enabling IR, RS-232, or USB in Unidirectional Mode (with either Duplex or Simplex units) requires connecting the system to a LAN since the Ethernet path via fiber (which normally provides network support) is not enabled. Only one fiber is active, and it only passes audio and video. The following procedure applies to DXLink Fiber, Duplex units in Data Link-lost or in Unidirectional Mode and also applies to DXLink Fiber, Simplex units. We recommend reconfiguring Data Link-lost Mode hardware into Unidirectional Mode before starting the procedure below.

To enable IR, USB, and Serial Communication:

1. Recommended – Reconfigure hardware in Data Link-lost Mode for Unidirectional Mode prior to enabling IR, RS-232, USB, and NetLinx access of the device to a connected central control processor (NetLinx Master).
2. Connect each Transmitter and/or Receiver to a LAN with a central controller via the unit's ICS LAN port.
3. Flip DIP switch #1 and DIP switch #3 to the ON position.
4. Cycle power to the unit and allow it a few seconds to reboot.
5. Connect to the unit via NetLinx Studio (v4.0 or later) and use SEND_COMMANDs to communicate with the unit (see page 60).

DXLink Fiber RX Scaling Button and Scaling Modes

The Scaling button is located on the front of the DXLink Fiber Receiver. Pressing the Scaling button cycles the RX through the three Scaling Modes: Bypass, Auto, and Manual.

- Bypass Mode – allows the video signal to display over the destination device without altering the signal's resolution.
- Auto Mode (default) – allows the destination device to automatically scale the signal to its preferred or native resolution (this mode is AMX's SmartScale® Technology in action).
- Manual Mode – allows the user to configure the resolution that the video will display through a destination device.

Selecting a Scaling Mode results in the unit maintaining or altering the source device's resolution as it is passed along to the destination device.

The Scaling Mode can be set on the DXLink Fiber RX with the Scaling button (see instructions below) or with SEND_COMMANDs (see page 62).

When a DXLink Fiber RX is used in conjunction with an Enova DGX 8/16/32/64 Switcher, DGX Configuration Software can be used via the switcher for scaling (see the *Instruction Manual - Enova DGX 8/16/32/64 Digital Media Switchers*).

When a DXLink Fiber RX is used in conjunction with an Enova DGX 100 Series Switcher, the System Configuration interface can be used via the switcher for scaling (see the *Hardware Reference Manual - Enova DGX 100 Series Digital Media Switchers*).

IMPORTANT: *To use SEND_COMMANDs, DXLink Fiber units in Unidirectional or Data Link-lost Mode require a LAN connection to an Enova DGX Digital Media Switcher via the unit's ICS LAN 10/100 port (DIP switch #1 and #3 in the ON position).*

To set the Scaling Mode:

1. Press the Scaling button on the DXLink Fiber RX once or twice until the LED for the desired Scaling Mode illuminates solid green.

Bypass Mode

Bypass Mode allows the video signal to display over the destination device without altering the signal's resolution.

NOTE: *Interlaced and progressive video are supported into the Transmitters; the Receiver only supports progressive out unless it is in the Bypass Mode, which is non-scaling.*

Auto Mode

At power up, the DXLink Fiber RX defaults to Auto Scaling, unless a different Scaling Mode has been persisted. In Auto Mode, the DXLink Fiber RX uses the EDID found on the destination device to automatically determine the best resolution to scale to. If an EDID is not found on the destination device, the DXLink Fiber RX will revert to a default resolution of 1280x1024,60Hz.

Manual Mode

Manual Mode allows the user to configure the resolution that the video will display through a destination device. Manual Mode defaults to 1280x1024,60Hz.

The default resolution can be changed in three ways:

- Use the VIDOUT_RES_REF SEND_COMMAND to set the resolution and refresh rate (for details, see page 62).
- When used as a direct output of an Enova DGX 8/16/32/64 Switcher's DXLink Fiber Output Board, use DGX Configuration Software to set and persist the Manual Scaling resolution for the connector on the output board; the board sends the scaling resolution data to the DXLink Fiber RX.
- When used as a direct output of an Enova DGX 100 Series Switcher's DXLink Fiber Output Board, use the System Configuration interface to set and persist the Manual Scaling resolution for the connector on the output board; the board sends the scaling resolution data to the DXLink Fiber RX.

IMPORTANT: *To use ICSP commands, DXLink Fiber units in Unidirectional or Data Link-lost Mode require a LAN connection to an Enova DGX Digital Media Switcher via the unit's ICS LAN 10/100 port (DIP switch #1 and #3 in the ON position).*

NOTE: *The aspect ratio conversion policy (see page 64) can also be set on DXLink Fiber Output Boards in an Enova DGX 8/16/32/64 Switcher using DGX Configuration Software. The data is persisted on the board and sent to the DXLink Fiber RX.*

Persistence of Scaling Mode

The Scaling Mode has two levels of persistence – the basic level happens automatically and can be considered temporary; the advanced level is the result of sending the PERSISTAV command to the DXLink Fiber Output Board and is permanent (unless the Scaling Mode is changed and the PERSISTAV command is sent again).

Basic Persistence

DXLink Fiber RX – automatically persists the current Scaling Mode locally. The current state of the scaler is always stored in non-volatile memory on the DXLink Fiber RX.

The current state of the scaler on the DXLink Fiber RX can be changed using one of the following methods:

- By sending the VIDOUT_SCALE SEND_COMMAND (page 62).
- By pressing the Scaling button.

In either case – changes to the Scaling Mode on the RX are also sent to the DXLink Output Board and stored in volatile memory.

DXLink Fiber Board – automatically receives the Scaling Mode from an attached RX and stores it in volatile memory. The DXLink Output Board pushes the current Scaling Mode down to the DXLink Fiber RX if any of the following occurs: (1) the RX is power cycled independent of the switcher; (2) the RX is disconnected from the DXLink Output Board and then reconnected; or (3) a different DXLink Fiber RX is connected to the DXLink Output board. The DXLink Output Board's current Scaling Mode then takes precedence and becomes the current Scaling Mode on the DXLink Fiber RX.

Advanced Persistence

A Scaling Mode can be "permanently" persisted to the DXLink Fiber Output Board (in its non-volatile memory) using one of the following methods:

- Using the PERSISTAV SEND_COMMAND (for details, see page 77).
- Using DGX Configuration Software to set and persist the Scaling Mode for the connector on the DXLink Fiber Output Board on the Enova DGX 8/16/32/64 Switcher.

In either case – when the switcher is power cycled, the DXLink Fiber Output Board sends the advanced data for the Scaling Mode (from non-volatile memory) to the DXLink Fiber RX. This will override any locally persisted Scaling Mode on the RX and become the new currently persisted (local) Scaling Mode.

Detailed NetLinx (Link/Act and Status) LED Behavior

The tables below provide detailed descriptions of all blink patterns for the NetLinx Link/Act and Status LEDs on the front of the Transmitter and Receiver units.

NOTE: *The term "light show" refers to the back-and-forth scanning pattern of the LEDs associated with the LEDs on the DXLink Transmitter and Receiver.*

DXLink Fiber TX/RX Operational State as Indicated by LEDs

To determine the operational state (normal boot) of a DXLink Fiber Transmitter or Receiver by its LEDs, check both the Link/Act and Status LED columns.

NOTE: *DXLink units in Unidirectional or Data Link-lost Mode must be connected to a LAN to receive an IP address (see "Unidirectional Mode LAN Configuration" on page 46).*

NetLinx LED Behavior and Operational State		
Link/ACT LED	**Status LED**	**DXLink Fiber TX/RX Operational State**
ON when connected to the switcher (which contains an integrated Master). Blink OFF with data.	Follow Master's instruction for Blink Message if online with Master, otherwise ON.	Normal Online with Master (rest)
OFF	ON	Normal Boot (DHCP found) **NOTE:** *This state continues from the time an IP address is obtained until the device is online with the Master.*
Fast blink, then normal operation.	ON	Normal Boot (DHCP, no server) **NOTE:** *This state continues until a valid IP address is obtained.*
OFF during light show, then normal operation (OFF until connected to Master).	Fast blink (continues only during light show), then ON until first blink from Master.	Normal Boot (Static IP) **NOTE:** *This state continues until the device finishes its light show.*

ID Pushbutton Boot State and LED Behavior

To monitor the ID Pushbutton boot state of a DXLink Fiber Transmitter or Receiver by its LEDs, check both the Link/Act and Status LED columns.

ID Pushbutton Boot and NetLinx LED Behavior		
ID Pushbutton Boot States	**Link/Act LED**	**Status LED**
Boot with ID Pushbutton held down.	Slow blink (1 Hz)	Slow blink (1 Hz)
ID Pushbutton held down long enough for reset to default parameters.	Fast blink until ID Pushbutton is released, then OFF	Fast blink until ID Pushbutton is released, then OFF
ID Pushbutton held down long enough for reset to default firmware image.	Solid ON, transitions to OFF once the unit completes writing to flash and is ready to reboot.	Solid ON, transitions to OFF once the unit completes writing to flash and is ready to reboot.
In Auto ID mode.	Normal	Blink (2 Hz)
ID Pushbutton held down long enough to accept new ID.	2 blinks, then normal	2 blinks, then normal
After boot: ID Pushbutton held down, but not long enough for IP mode change.	Slow blink (1 Hz)	Slow blink (1 Hz)
After boot: ID Pushbutton held down long enough for IP mode change.	Fast blink, then OFF	Fast blink, then OFF

Downloading Firmware State and LED Behavior

To monitor the state of a TX or an RX by its LEDs when downloading firmware, check both the Link/Act and Status LED columns.

NetLinx Behavior when Downloading Firmware		
Downloading Firmware	**Link/Act LED**	**Status LED**
Downloading firmware to flash due to an upgrade via NetLinx Studio.	Fast blink, alternating with Status LED	Fast blink, alternating with Link/Act LED

DXLink Fiber TX – Local Out (HDMI) Port

The Local Out port on the right front of the DXLink Fiber Transmitters can be used to send the source signal to a local monitor.

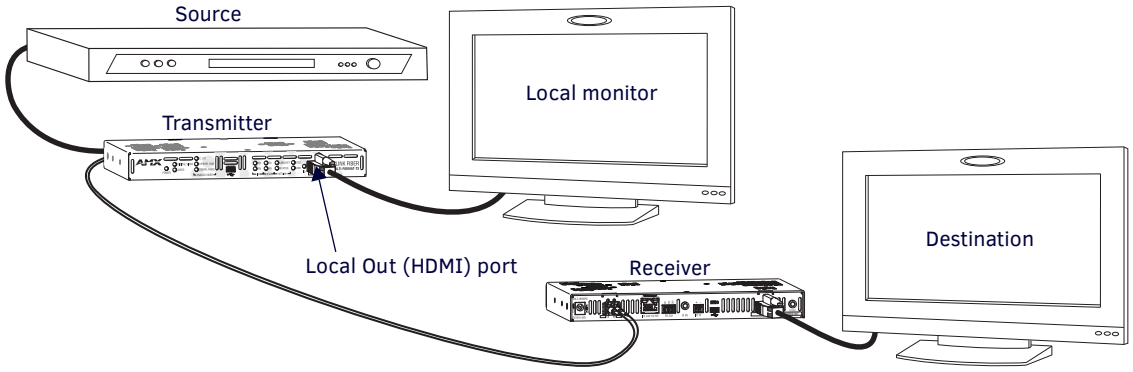


FIG. 28 Local Out port on front of TX sends source signal to local monitor

DXLink Fiber TX/RX in a Multiple-Stage Switching System

When switching systems with DXLink Fiber Technology support (e.g., an Enova DGX 16 Digital Media Switcher) are connected via their fiber optic transceivers, DXLink Fiber Transmitters and Receivers can be used to extend the video and audio transport.

IMPORTANT: *This section does not refer to the linking of enclosures using the RJ-45 port on the left of the CPU board (Enova DGX Digital Media Switchers do not support CPU to CPU linking).*

In an installation with DXLink Fiber equipment in a multiple-stage switching system, the following apply:

- When two switching systems with DXLink Fiber support are connected via their fiber optic transceivers, only video and audio will be passed through the fiber connection.
- When a Duplex Output Board on one switching system determines that it is connected to a Duplex Input Board on another switching system, the hardware will automatically disable all Ethernet and control on that connection port so that only audio and video signals are passed down the fiber optic cable. (On Simplex Boards, Ethernet and control are always disabled.)
- When connecting switching systems via fiber optic transceivers, AMX recommends no more than three switcher throughputs (see the “Example” below).

Example

This example shows how DXLink Fiber Transmitters and Receivers can be used in a system where switchers are connected via their fiber optic transceivers.

The signal path through three switchers could be:

Source device sends signal →**DXLink Fiber Transmitter** →Enova DGX 8, DXLink Fiber Input Board (out a DXLink Fiber Output Board) →Enova DGX 16, DXLink Fiber Input Board (out a DXLink Fiber Output Board) → Enova DGX 32, DXLink Fiber Input Board (out a DXLink Fiber Output Board) →**DXLink Fiber Receiver** →display device outputs an HDMI signal.

Network Configuration

Overview

IMPORTANT: *If the TX/RX units are configured for auto-setup via a connected Enova DGX Switcher with a 100 Series CPU, the information in this chapter will not apply. For network configuration information, see the "Hardware Reference Manual – Enova DGX 100 Series Digital Medial Switchers."*

NOTE: *If a DXLink module or wallplate has been configured for auto-setup mode and then auto-setup mode has been disabled, the unit may take longer to appear in NetLinx Studio than expected (1-2 minutes).*

DXLink Fiber Transmitters and Receivers support two IP Addressing Modes: Static IP and DHCP (with link-local fallback*).

To avoid having a large system consume numerous IP addresses, the Transmitters and Receivers default to disabling the network connection functionality. Therefore, the #3 Toggle *must* be set to ON before the Transmitters or Receivers can establish a network connection (see page 34).

When #3 Toggle is ON, the DXLink Fiber units are automatically placed in DHCP Mode, but they can be configured for either of the IP Addressing Modes via two methods:

- The front-panel ID Pushbutton (page 46)
- Telnet commands (page 85)

* "Link-local fallback" is a method by which an IP host, as a fallback from DHCP, can derive a local network-unique IP address by negotiating with the other IP hosts on the same network. Link-local can also be used in its own right as the primary method of IP address allocation. For details, see "DHCP Mode" below.

Static IP Mode – Default Parameters

Default Parameters for Static IP Mode	
Address	192.168.1.2
Netmask	255.255.255.0
Gateway	192.168.1.1
DNS1	192.168.1.1
DNS2	192.168.1.1
DNS3	192.168.1.1

DHCP Mode

DHCP Mode requires a connection (indirect) to a network with a DHCP server located on it. The Enova DGX Digital Media Switcher (Endpoint Mode) can be connected to a DHCP server device; the DHCP connection is then propagated through the system's DXLink Fiber layer to the DXLink Fiber unit.

IMPORTANT: *DHCP Mode will not function until the #3 Toggle on the DIP switch is set to ON (see page 34). The #3 Toggle must be ON before the device is accessible via SEND_COMMANDs.*

When in DHCP Mode (the default setting), the DXLink Fiber unit will attempt to get a DHCP lease (consisting of an IP address, gateway, and other network parameters). Should the attempt fail, the unit will then configure itself for a link-local address.

- DXLink Fiber units utilize a modified link-local addressing procedure. The first address to be tried is a known address in the link-local space: 169.254.2.2. That address will be probed, and if unclaimed will be used by the DXLink Fiber unit.
- If 169.254.2.2 is already claimed, the DXLink Fiber unit will choose a random address within the 169.254.x.x link-local address space (again probing to ensure that it is unclaimed).

Once the unit is operating with a link-local address, it will periodically re-try DHCP and re-assign the IP address to a valid DHCP grant if successful.

At any time, if the unit determines that its IP address has changed, it will disconnect from the Master (if necessary, depending on the connection state) and then reconnect to the Master.

TCP/IP Address Configuration

DXLink Fiber Transmitters and Receivers support IPV4 network addresses, gateway addresses, DNS server addresses, and network names. They also support NDP (NetLinx Discovery Protocol) capabilities as well as IP discovery via NetLinx Studio.

NOTE: *NDP is a device discovery method used by NetLinx Masters. With NDP Beacon enabled, the Master will transmit NDP Beacons for AMX's proprietary device discovery.*

Telnet IP Configuration Commands

The `SET IP` and `GET IP` Telnet commands listed in the Appendix B tables (which start on page 87) can be sent directly to the DXLink Fiber units via a Telnet terminal session. These commands can be used for initial network configuration of the units.

- The default Telnet port is 23.
- Telnet is enabled by default.
- A value of 0 disables the telnet server.*

For details, see “Appendix B – Telnet (Terminal) Commands” on page 87. The appendix also includes a section on “Master Connection Modes” on page 98.

* If you set the Telnet port to “0” to disable it, you will need to perform a factory reset using the ID Pushbutton to re-enable it (see page 54).

External Master Versions

If the DXLink Fiber TX or RX unit is bound to an external Master, we recommend using the versions listed in the table below, which can be found on the product’s page at www.amx.com.

External Master Versions	
Master	**Minimum Version**
NX x200	v1.3.106
NI-x00/64 NI-x100 NI-x101	v4.1.404
Enova DGX 100 Series (NX Master)	v1.3.106
Enova DGX 8/16/32/64 (NX Master)	v1.3.106
Enova DGX 8/16/32 (NI Master)	v4.2.395
Enova DVX Product Line	v4.8.316
Enova DVX-2100HD (only)	v4.1.406*

* Available from AMX Technical Support at the time of this document version.

Factory Default Parameters

Factory Default Parameters	
Parameter	**Value**
MAC Address	As set in factory
Serial Number	As set in factory
Ethernet Mode	Auto (i.e., speed, duplex, both, auto)
IP Addressing Mode	DHCP
IP Address (for static mode)	192.168.1.2
Netmask (for static mode)	255.255.255.0
Gateway (for static mode)	192.168.1.1
DNS1 (for static mode)	192.168.1.1
DNS2 (for static mode)	192.168.1.1
DNS3 (for static mode)	192.168.1.1
DNS Domain	amx.com
Hostname	Model (e.g., DXF-RX); after factory reset, model with last 7 digits of serial #
Master Connection Mode	NDP - for details, see page 98
Master URL (for TCP and UDP URL modes)	“” (blank)
Master Connection Port Number (for TCP and UDP URL modes)	1319
Friendly-Name	“” (blank) **NOTE:** *If the Friendly Name is non-blank, both Friendly Name and Location are concatenated to make NDPSTRING2, otherwise NDPSTRING2 is generated from the unit’s serial number.*
Location	“” (blank)
Stored MAC Address of Master (used for NDP binding)	00:00:00:00:00:00
ICSP Device Number	0 (0 = receive dynamic device number from Master)
System Number	0
Telnet Port	23 (A value of 0 disables the Telnet server. Telnet is enabled by default.)
SET BAUD	9600, N, 8, 1
CTOF Time	5 (0.5 seconds)
CTON Time	5 (0.5 seconds)
Receivers Only	
VIDOUT_ASPECT_RATIO	STRETCH
VIDOUT_RES_REF	1280x1024,60 (for Manual Mode)
AUDOUT_FORMAT	All
Transmitters Only	
VIDIN_AUTO_SELECT	ENABLE (Digital)
VIDIN_FORMAT	VGA (on Port 8)
VIDIN_PREF_EDID	1920x1080p,60 (EDID default)
VIDIN_EDID	ALL RESOLUTIONS (on both Ports 7 and 8): Unidirectional or Data Link-lost MIRROR OUT 1 (Port 7) / ALL RESOLUTIONS (Port 8): Bidirectional Mode
VIDIN_HDCP	ENABLE
VIDIN_VSHIFT	0
VIDIN_HSHIFT	0
VIDIN_PHASE	0
AUDIN_FORMAT_AUTO	ENABLE
AUDIN_FORMAT	HDMI
VIDIN_AUTO_SELECT	ENABLE (Digital)

DXLink Fiber Units - Device IDs		
Model	**ID (16-bits) Bound***	**ID (16-bits) Unbound***
DXF-TX-SMD	0x0195	0x014B
DXF-RX-SMD	0x0194	0x014B
DXF-TX-MMD	0x0195	0x014B
DXF-RX-MMD	0x0194	0x014B
DXF-TX-SMS	0x01AE	0x014B
DXF-RX-SMS	0x01AD	0x014B
DXF-TX-MMS	0x01AE	0x014B
DXF-RX-MMS	0x01AD	0x014B

Using the ID Pushbutton

The ID Pushbutton is located on the right front of the DXLink Fiber TX/RX units.

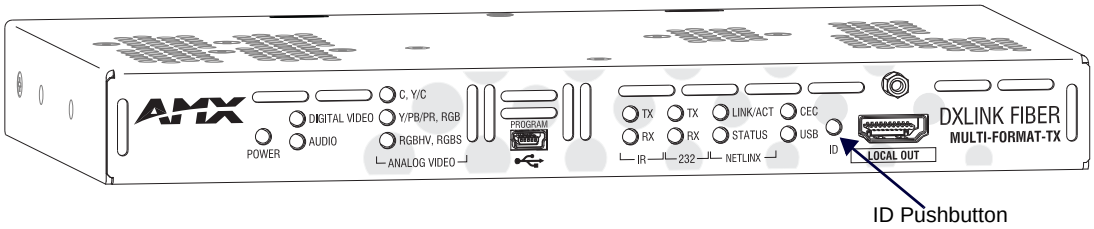


FIG. 29 ID Pushbutton on a DXLink Fiber TX

The ID Pushbutton can be used to perform four types of initial configuration settings:

- Toggle between DHCP and static IP addressing (below)
- Assign a device address (page 53)
- Reset the unit to its factory default settings, which affects the parameters but not the firmware version (page 54)
- Restore the unit to its factory firmware image, which affects both the firmware version and the parameters (page 55)

The functions performed depend on when and for how long the ID Pushbutton is pressed and held. ID Pushbutton functions can also be implemented using Telnet commands (see page 85).

TIP: *To monitor the ID Pushbutton boot state of a unit by its NetLinx LED behavior, see page 55.*

Toggling Between IP Addressing Modes: DHCP and Static IP

DXLink Fiber Transmitters and Receivers support both DHCP and static IP addresses. When the #3 Toggle is ON (see page 34), the units automatically use DHCP with link-local fallback. However, you can use a static IP address which has been set via a Telnet command (SET IP), or you can use the factory default static IP address. The default static IP address can be recalled at any time by resetting the unit to its factory default configuration (see page 54).

The default dynamic (DHCP) address is 169.254.2.2.

The ID Pushbutton can be used to toggle between the DHCP and Static IP Modes.

To toggle between DHCP and Static IP Modes:

1. **Once the TX/RX unit has booted up**, press and hold the ID Pushbutton until the Control/NetLinx LEDs toggle back and forth in unison approximately 10 times.
2. Release when the LED starts to blink faster.
   - When the ID Pushbutton is released, the unit toggles either from static to dynamic (DHCP) IP addressing or vice versa and remains in that mode until the ID Pushbutton is used to set it again or a factory reset is performed.
   - The DXLink Fiber unit automatically reboots to complete the process.

Assign a Device Address (ID Mode)

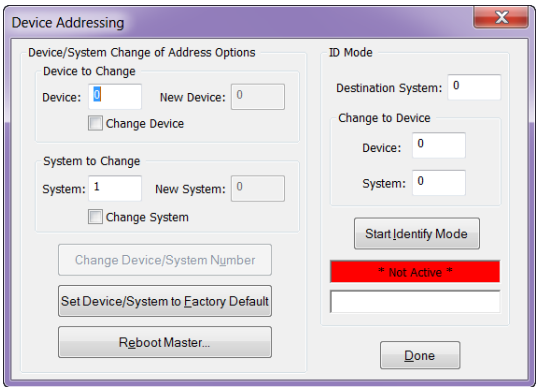
The ID Pushbutton can be used in conjunction with the ID (Identify) Mode feature in NetLinx Studio. A momentary press of the ID Pushbutton assigns a device address to the Transmitter or Receiver (which must be bound to the Master). The device *must* first be placed in ID Mode in NetLinx Studio or the momentary press will be ignored.

NOTE: *The latest version of NetLinx Studio is available to download and install from www.amx.com. Refer to the NetLinx Studio Online Help for instructions on using the application.*

To set the device address on a Transmitter or Receiver:

1. Check to be sure #3 Toggle on the bottom of the Transmitter or Receiver is set to ON.
2. In NetLinx Studio's OnLine Tree, select the Master to which the unit is bound.

3. From the Diagnostic menu, select Device Addressing.
   The Device Addressing dialog box opens.



4. In the ID Mode section, enter the Device and System numbers that you want assigned to the device in the appropriate text boxes.
5. Click Start Identify Mode to place the named system in ID Mode.
   The button changes to "Cancel Identify Mode" (click if you want to cancel ID Mode).
   The text box below the button displays a "Waiting...Press Cancel to Quit" message.

NOTE: *When in ID Mode, the entire system is put on hold while it waits for an event from any NetLinx device in the named system (e.g., pressing the ID Pushbutton on the Receiver). The device that generates the first event is the device that will be "identified."*

Briefly press and release the ID Pushbutton on the Transmitter or Receiver.

The unit will exhibit the following behavior:

- Respond with an ID Mode address response
- Report its old address offline
- Report its new address online

The OnLine Tree will refresh to display the new device address for the Transmitter or Receiver.

NOTE: *NetLinx Studio (v4.0 or later) provides the ability to auto-increment IP Addresses and Hostnames as well as Device and System Numbers. Refer to the NetLinx Studio Online Help for details.*

TIP: *In the following two procedures – if you start a press-and-hold sequence with the ID Pushbutton and then decide not to change the settings, before you release the ID Pushbutton remove power from the unit to abort the procedure.*

Reset the Factory Default Settings

During power up – if the ID Pushbutton is held until the Control/NetLinx LEDs toggle back and forth in unison approximately 10 times, then released when the faster blinking starts, the Transmitter or Receiver will reset to its factory default settings, which affect the parameters but not the firmware version.

Factory Parameters*

- Default static IP address of 192.168.1.2
- Default dynamic (DHCP) address of 169.254.2.2
- Default device number of 0
- NDP mode (page 98)
- Unbound state
- No IRL files

* For a complete list of factory parameters, see the table on page 52.

To reset a Transmitter or Receiver to its factory default settings:

1. Press and hold the ID Pushbutton while plugging in the power connector. Start counting when the NetLinx LEDs begin to flash in unison, not when the power connector is inserted.
   - Once the Transmitter or Receiver has started booting up, both NetLinx LEDs flash in unison at the rate of once per second.
   - After 10 flashes at that rate, the LEDs will blink in unison at a faster rate.

NOTE: *A press-and-hold of the ID Pushbutton at power up will prevent the Transmitter or Receiver from attempting to come online until the ID Pushbutton is released. The Transmitter or Receiver will only attempt to come online if you release the ID Pushbutton prior to the faster blink rate.*

2. At the point that the blink rate increases, release the ID Pushbutton.
   The Transmitter or Receiver will automatically reboot to complete the process.

Restore the Factory Firmware Image and Factory Default Parameters

During power up – if the ID Pushbutton is held until the Control/NetLinx LEDs toggle back and forth in unison approximately 30 times (10 slow, 20 fast) and then released when they go solid, the unit's factory firmware image will be restored. This procedure affects both the firmware version and the parameters.

To restore the Transmitter or Receiver to its factory default firmware image:

1. Press and hold the ID Pushbutton while plugging in the power connector. Start counting when the NetLinx LEDs begin to flash in unison, not when the power connector is inserted.
2. After the LEDs complete the following sequence, release the ID Pushbutton:
   - Once the Transmitter or Receiver has started booting up, all LEDs flash in unison at the rate of once per second.
   - After 10 flashes at that rate, the LEDs will blink in unison at a faster rate.
   - After 10 seconds of flashing at the increased rate, all LEDs go to solid ON.
3. Upon release of the ID Pushbutton, the Transmitter or Receiver executes the following actions:
   - Restores itself to its factory firmware image.
   - Resets to factory default parameters.*
     - Deletes the IRL files stored on the device.
     - Resets to the default static IP address of 192.168.1.2 and default DHCP address of 169.254.2.2.
     - Resets to the default device number of 0 (when bound to a Master, it will receive a dynamic device number from the Master).
     - Resets to NDP mode and being unbound.

* For a complete list of factory parameters, see the table on page 52.

Once all actions in Step 3 are completed, the LEDs all turn off, indicating the Transmitter or Receiver is ready to reboot. The Transmitter or Receiver automatically reboots to complete the process.

TIP: *To monitor the ID Pushbutton boot state of a unit, see the "ID Pushbutton Boot and NetLinx LED Behavior" table below.*

ID Pushbutton Boot State and LED Behavior

To monitor the ID Pushbutton boot state of a DXLink Fiber TX/RX by its LEDs, check both the Link/Act and Status LED columns.

ID Pushbutton Boot and NetLinx LED Behavior

ID Pushbutton Boot States	Link/Act LED	Status LED
Boot with ID Pushbutton held down	Slow blink (1 Hz)	Slow blink (1 Hz)
ID Pushbutton held down long enough for reset to default parameters	Fast blink until ID Pushbutton is released, then OFF	Fast blink until ID Pushbutton is released, then OFF
ID Pushbutton held down long enough for reset to default firmware image	Solid ON, transitions to OFF once the unit completes writing to flash and is ready to reboot.	Solid ON, transitions to OFF once the unit completes writing to flash and is ready to reboot.
In Auto ID mode	Normal	Blink (2 Hz)
ID Pushbutton held down long enough to accept new ID	2 blinks, then normal	2 blinks, then normal
After boot: ID Pushbutton held down, but not long enough for IP mode change	Slow blink (1 Hz)	Slow blink (1 Hz)
After boot: ID Pushbutton held down long enough for IP mode change	Fast blink, then OFF	Fast blink, then OFF

IRL File Transfers

Overview

The NetLinx Studio software application (available for free download from www.amx.com) provides the ability to transfer IR Library files to NetLinx devices such as DXLink Fiber Transmitters and Receivers.

When a Transmitter and/or a Receiver are being used in conjunction with a switcher, the switcher's integrated Master is used for the IRL file transfer. FIG. 30 shows a Transmitter and a Receiver bound to the integrated Master in an Enova DGX 16 in NetLinx Studio's OnLine Tree. Follow the instructions on the top of page 57 to prepare for IRL file transfer and the instructions on page 58 for the actual transfer.

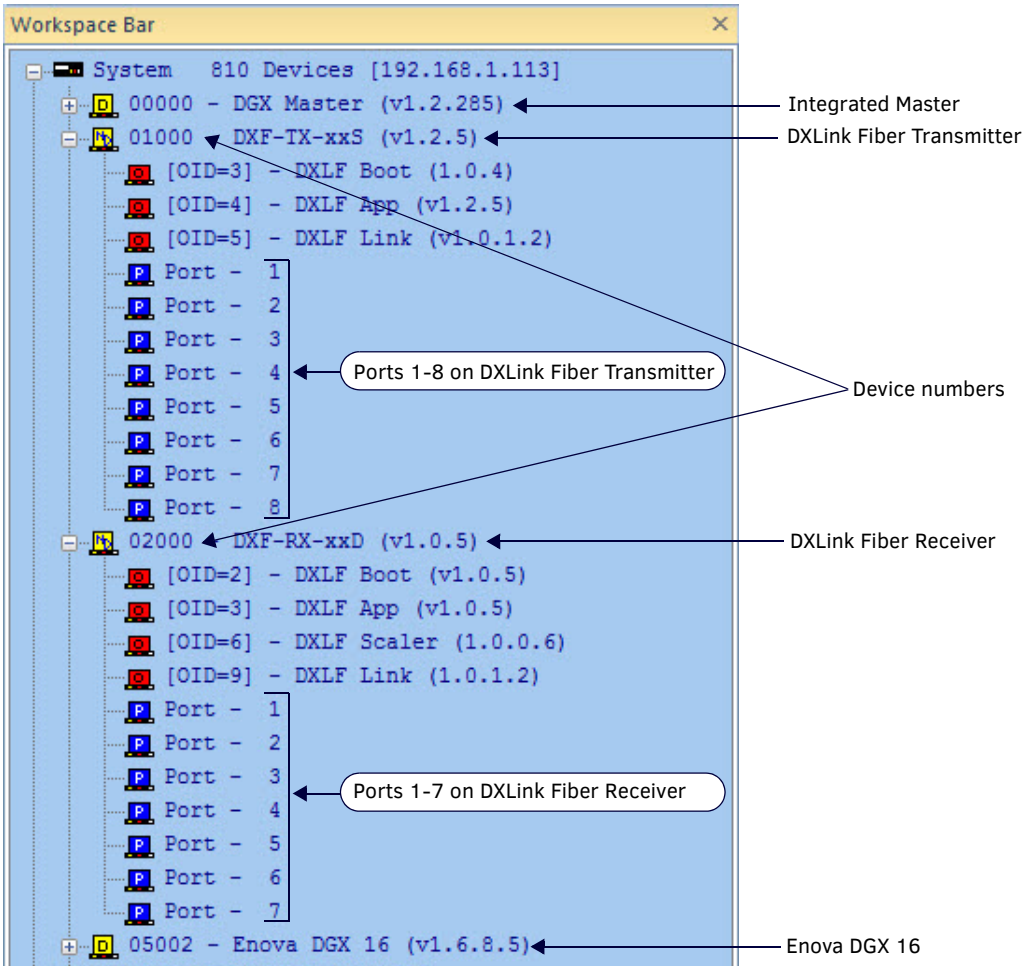


FIG. 30 NetLinx Studio – Integrated Master, Enova DGX 16, DXLink Fiber Transmitter and Receiver

Preparing for IRL File Transfers

To prepare for IRL file transfers:

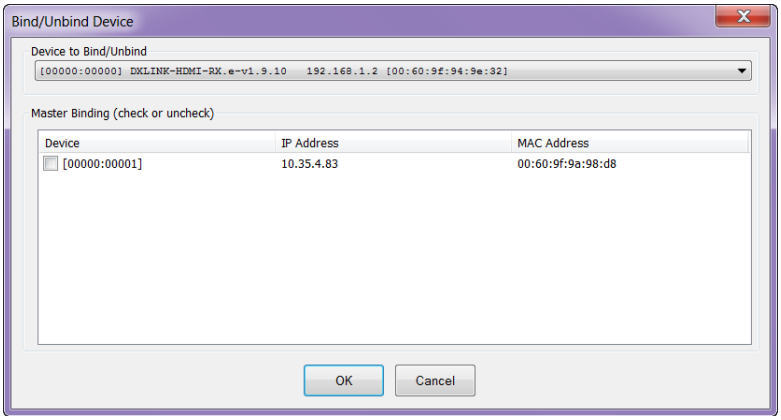
1. Check to be sure #3 Toggle on the bottom of the Transmitter or Receiver is set to ON.
2. Verify that you have the latest version of NetLinx Studio on your PC.

   If the version is not the latest –

   - Use the Web Update option in NetLinx Studio's Help menu to obtain the latest version.

     Or

   Go to www.amx.com and login as a Dealer to download the latest version.
3. Download the applicable IRL file from www.amx.com (Partners / Search Devices) to your PC.
4. Verify the following:
   a. Verify that an Ethernet/RJ-45 cable is connected from the switcher's integrated Master to the network (e.g., from the LAN 100/1000 port on an Enova DGX 32 to a LAN).
   b. Verify that the target Transmitter or Receiver is connected via its fiber optic connection to a DXLink Fiber Input or Output Board (respectively) on the switcher.
   c. Verify that the switcher is powered on.
5. Launch NetLinx Studio and open the OnLine Tree.
6. Bind the target Transmitter or Receiver to the integrated Master:
   - Select and right-click the TX or RX in the Online Tree.
   - From the context sensitive menu, select Network Bind/Unbind Device.
   - Verify that the check box is selected. If not selected, select it now.
   - Click OK.



7. Determine the Device Number assigned to the target Transmitter or Receiver when it was bound. For the Device Number location, see FIG. 30 on the previous page.

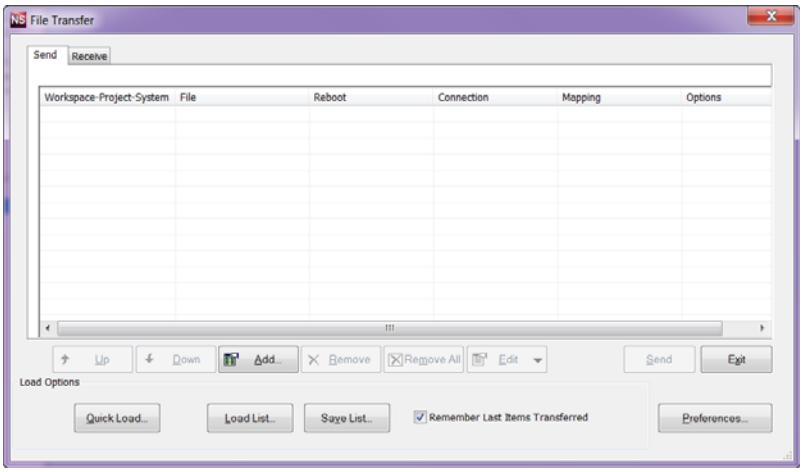
   The Transmitter or Receiver is ready for the IRL file transfer (see the next page).

Transferring IRL Files

The *File Transfer tool* in NetLinx Studio is used to map IRL files to DXLink Fiber Transmitters and Receivers. The instructions below assume that the preparations on the previous page for IRL file transfers have been completed.

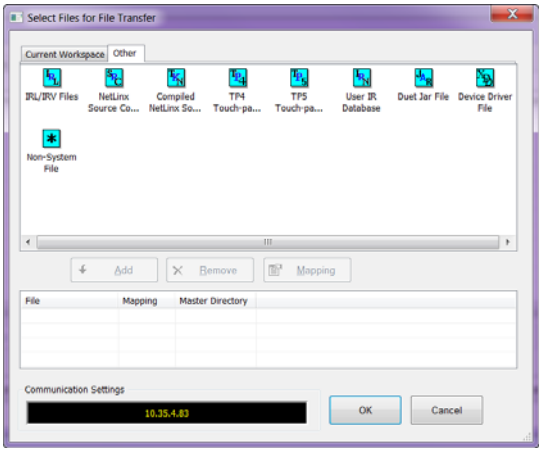
To send an IR Library (*.IRL) file to a Transmitter or Receiver:

1. In NetLinx Studio, select Tools > File Transfer to open the File Transfer dialog box.

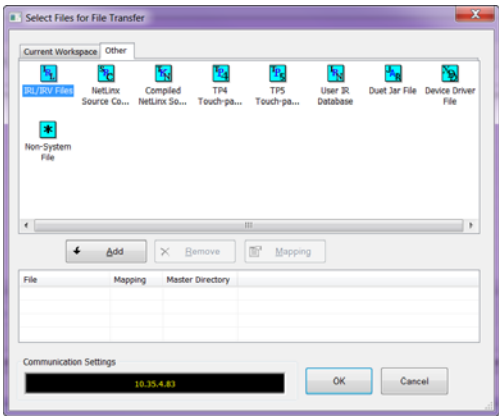


NOTE: *The Preferences button opens a Preferences dialog box that has File Transfer and Firmware File Transfer options you may find useful.*

2. Click Add to open the Select Files for File Transfer dialog box.
3. Open the Other tab (if the file you want to transfer is not included in the open workspace.)
   The Other tab consists of a display of the different types of files that can be transferred to the Master or System devices on the bus.

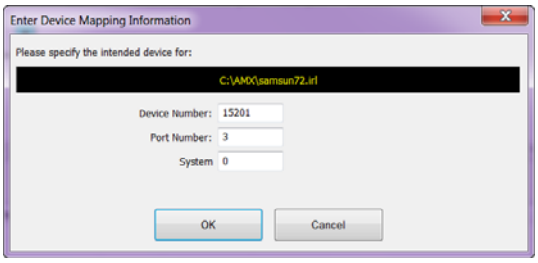


4. Select the type of file (in this case, IRL/IRV Files) that you want to add to the File list for transfer.



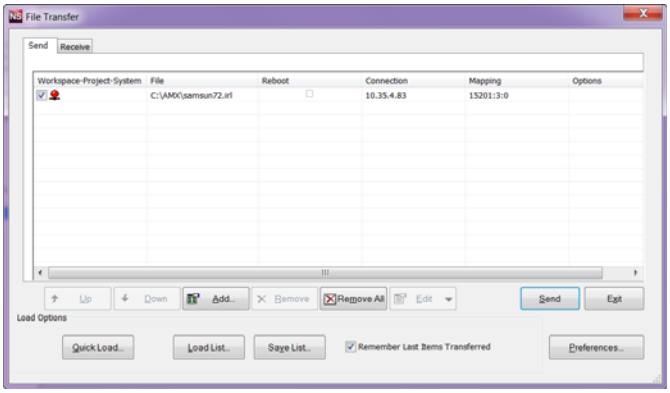
5. Click Add.
   A standard Open dialog box opens with the Files of type selection set to IR Code files (*.IRL/*.IRV).

6. Locate and select the IRL file that you want to add.
7. Click Open.
   The Enter Device Mapping Information dialog box opens.



NOTE: *IRL files must be sent to Port 3 (IR Device Port) on the Transmitter or Receiver.*

8. If the fields are empty – Enter the Device, Port, and System numbers for the selected device.
   If the fields are populated – Verify that the mapping information is correct for the selected device.
   - IRL files are sent to Port 3 (IR Device Port) on the Transmitter or Receiver.
   - Refer to the "Device Numbering" section on page 60 for information on device numbering for the Transmitter or Receiver.
   - If the device's assigned device number has been changed, use the OnLine Tree to determine it.
9. Click OK to return to the Select Files for File Transfer dialog box.
   The selected IRL file and its mapping information are indicated in the File and Mapping lists.
10. Click OK to close the Select Files for File Transfer dialog box and return to the File Transfer dialog box. The IRL file appears in the File queue.



11. Click Send to transfer the file to the Transmitter or Receiver that the file is mapped to.

Additional Documentation

For additional information on using NetLinx Studio, refer to the *WebConsole & Programming Guide – NX-Series Controllers* (available at www.amx.com).

Additional IRL Information

Unlike NetLinx NI-Controllers, ICSLan powered devices (such as the DXLink Fiber Transmitter and Receiver units) are *not* capable of having their IRL files received via the File Transfer dialog box, nor do they support the LOADIRL SEND_COMMAND.

NetLinx Programming – DXLink Fiber TXs/RXs

Overview

IMPORTANT: *Before DXLink Fiber TXs and RXs can receive any NetLinx SEND_COMMANDs, the DIP switch's #3 Toggle must be set to ON or the devices will not be accessible from a NetLinx control system.*

The DXLink Fiber Transmitters and Receivers recognize a select number of SEND_COMMANDs and CHANNELs.

NOTE: *For a list of all supported Telnet commands, see page 85.*

Device Numbering and Ports

Each DXLink Fiber unit has its own Device Number (which is assigned when the unit is bound to a Master) and the following ports.

Transmitters and Receivers

Port 1 – Serial
Port 2 – Not used
Port 3 – IR TX
Port 4 – IR RX
Port 5 – USB
Port 6 – Digital Video/Audio Output
Port 7 – Digital Video/Audio Input
Port 8 – Analog Video Input (Transmitters only)

For an example of port numbering, see the NetLinx Studio illustration in FIG. 31 on the next page.

In NetLinx Studio's OnLine Tree, the DXLink Fiber Transmitters and Receivers each display their ports.

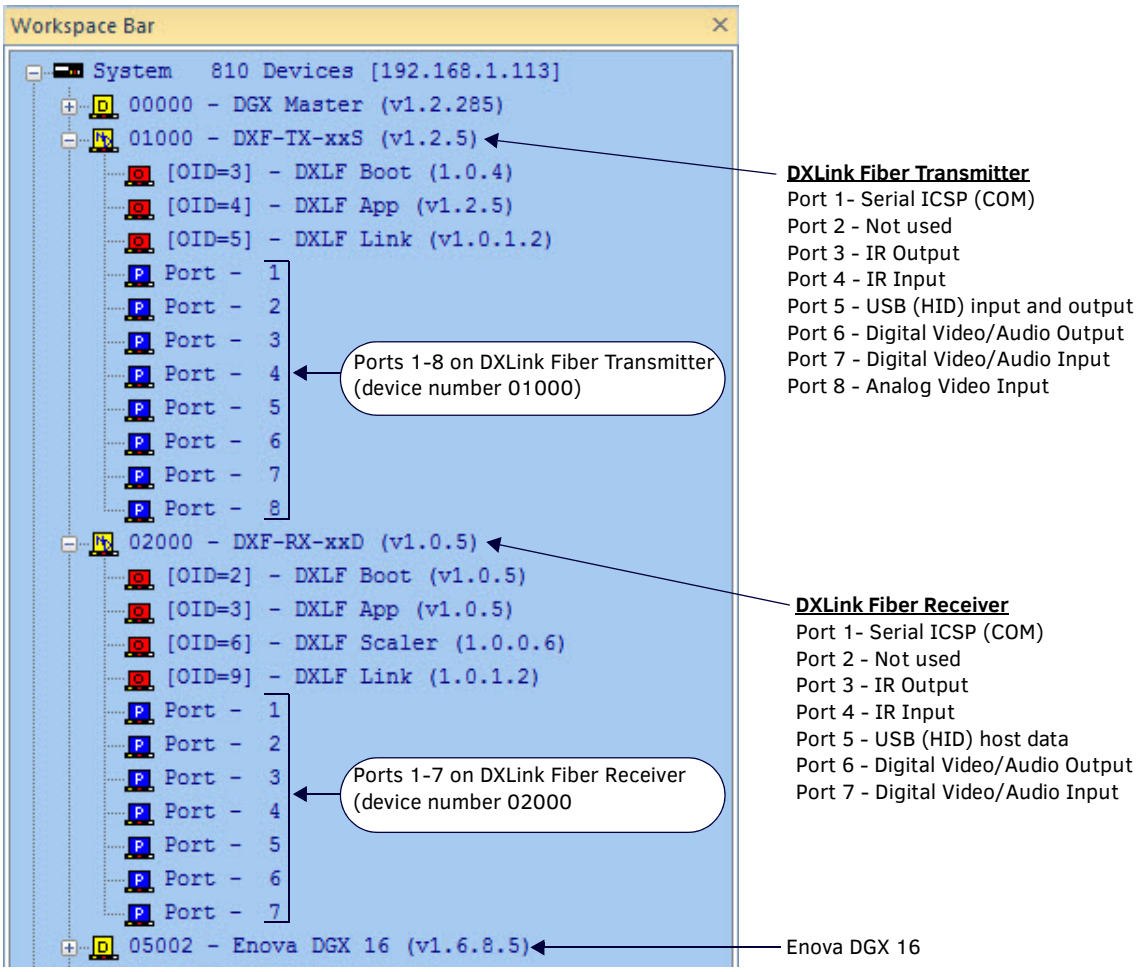


FIG. 31 NetLinx Studio OnLine Tree - Ports 1-8 on DXLink Fiber Transmitter and Ports 1-7 on Receiver

NOTE: *For additional information on using NetLinx Studio, refer to the "WebConsole & Programming Guide – NX-Series Controllers" (available at www.amx.com).*

NOTE: *All command text is based on a Unicode index.*

TIP: *Occasionally new firmware versions affect SEND_COMMANDs. If a command does not produce the expected results, we suggest checking the product's current firmware version against the information in the "Firmware Version" table on page 83.*

CHANNELs

Channel	Function
255	This channel *On* indicates that the DXLink Fiber unit has a valid UTP (twisted pair cable) connection to a switcher with an integrated Master. If the channel is *Off*, the DXLink Fiber unit is incorrectly connected. 1-253 Key presses from selected remote control.

IMPORTANT: *Before DXLink Fiber Transmitters and Receivers can receive any NetLinx SEND_COMMANDs, the DIP switch's #3 Toggle must be set to ON or the devices will not be accessible from a NetLinx control system.*

NOTE: *Since not all devices support both upper and lower case, for best results all commands and parameters should be sent in upper case.*

DXLink Fiber Receiver Video SEND_COMMANDs

DXLink Fiber Receiver Video SEND_COMMANDs are sent to Port 6.

NOTE: *Asynchronous notifications are not available for the Receivers via NetLinx Studio (and Telnet).*

Video SEND_COMMANDs (Receivers)	
Command	**Description**
?VIDOUT_SCALE Requests the current Scaling Mode that the Receiver is set to. The modes are AUTO (SmartScale®), MANUAL, and BYPASS.	Syntax: `SEND_COMMAND <DEV>,"'?VIDOUT_SCALE'"` Example: `SEND_COMMAND dvRX,"'?VIDOUT_SCALE'"` Returns a COMMAND of the form: `VIDOUT_SCALE-<AUTO/MANUAL/BYPASS>`
VIDOUT_SCALE Sets the Scaling Mode on the Receiver to AUTO (SmartScale®), MANUAL, or BYPASS.	Syntax: `SEND_COMMAND <DEV>,"'VIDOUT_SCALE-<scaling mode>'"` Valid responses: scaling mode = AUTO, MANUAL, BYPASS Example: `SEND_COMMAND dvRX,"'VIDOUT_SCALE-MANUAL'"`
?VIDOUT_RES_REF Requests the resolution and refresh rate of the video through the Receiver. **NOTE:** *If the Scaling Mode is set to Bypass, the response will be "BYPASS."*	Syntax: `SEND_COMMAND <DEV>,"'?VIDOUT_RES_REF'"` Valid responses: • horizontal = An integer value representing the horizontal. • vertical = An integer value representing the vertical. May have an additional qualifier such as "p" or "i". • rate = An integer value representing the refresh rate. Example: `SEND_COMMAND dvRX,"'?VIDOUT_RES_REF'"` Returns a COMMAND of the form: `VIDOUT_RES_REF-<horizontal>x<vertical>,<rate>`
VIDOUT_RES_REF Sets the resolution and refresh rate of the video through the Receiver and also sets the Scaling Mode to MANUAL. **IMPORTANT:** *The "valid responses" values used must come from the Resolution Names listed in the table in the "Supported Output Resolutions" appendix on page 110.* **NOTE:** *The default for Manual Mode is 1280x1024,60.*	Syntax: `SEND_COMMAND <DEV>,"'VIDOUT_RES_REF-<horizontal>x<vertical>,<rate>'"` Valid responses: • horizontal = An integer value representing the horizontal. • vertical = An integer value representing the vertical. May have an additional qualifier such as "p" or "i". • rate = An integer value representing the refresh rate. Example: `SEND_COMMAND dvRX,"'VIDOUT_RES_REF-1920x1080p,60'"`

Video SEND_COMMANDs (Receivers)	
?VIDOUT_RES Requests the resolution and refresh rate of the video through the Receiver. **NOTE:** *If the Scaling Mode is set to Bypass, the response will be "BYPASS."*	Syntax: `SEND_COMMAND <DEV>,"'?VIDOUT_RES'"` Valid responses: • horizontal = An integer value representing the horizontal. • vertical = An integer value representing the vertical. May have an additional qualifier such as "p" or "i". • rate = An integer value representing the refresh rate. Example: `SEND_COMMAND dvRX,"'?VIDOUT_RES'"` Returns a COMMAND of the form: `VIDOUT_RES-<horizontal>x<vertical>,<rate>`
?VIDOUT_ASPECT_RATIO Requests the aspect ratio conversion policy of the video through the Receiver. (For explanations of the ratio options, see page 64.)	Syntax: `SEND_COMMAND <DEV>,"'?VIDOUT_ASPECT_RATIO'"` Valid responses: ratio = STRETCH (default after FACTORYAV), MAINTAIN, ZOOM, ANAMORPHIC Example: `SEND_COMMAND dvRX,"'?VIDOUT_ASPECT_RATIO'"` Returns a COMMAND of the form: `VIDOUT_ASPECT_RATIO-<ratio>`
VIDOUT_ASPECT_RATIO Sets the aspect ratio conversion policy of the video through the Receiver to Stretch, Maintain, Zoom, or Anamorphic. (For explanations of the ratio options, see page 64.)	Syntax: `SEND_COMMAND <DEV>,"'VIDOUT_ASPECT_RATIO-<ratio>'"` Valid responses: ratio = STRETCH, MAINTAIN, ZOOM, ANAMORPHIC Example: `SEND_COMMAND dvRX,"'VIDOUT_ASPECT_RATIO-ZOOM'"`
?VIDOUT_TESTPAT Requests the test pattern setting on the Receiver.	Syntax: `SEND_COMMAND <DEV>,"'?VIDOUT_TESTPAT'"` Valid responses: pattern = OFF, COLOR BAR, GRAY RAMP, SMPTE BAR, HILOTRAK, PLUGE, X-HATCH Example: `SEND_COMMAND dvRX,"'?VIDOUT_TESTPAT'"` Returns a COMMAND of the form: `VIDOUT_TESTPAT-<pattern>`
VIDOUT_TESTPAT Sets the test pattern to display. Can be sent in any Scaling Mode.	Syntax: `SEND_COMMAND <DEV>,"'VIDOUT_TESTPAT-<pattern>'"` Valid responses: pattern = OFF, COLOR BAR, GRAY RAMP, SMPTE BAR, HILOTRAK, PLUGE, X-HATCH Example: `SEND_COMMAND dvRX,"'VIDOUT_TESTPAT-COLOR BAR'"`
?VIDOUT_MUTE Requests the setting for the Mute preference applied to the image from the Receiver (Enable or Disable).	Syntax: `SEND_COMMAND <DEV>,"'?VIDOUT_MUTE'"` Example: `SEND_COMMAND dvRX,"'?VIDOUT_MUTE'"` Returns a COMMAND of the form: `VIDOUT_MUTE-<ENABLE|DISABLE>`
VIDOUT_MUTE Sets the Mute preference of the image from the Receiver to Enable (displays a blank screen) or Disable.	Syntax: `SEND_COMMAND <DEV>,"'VIDOUT_MUTE-<ENABLE|DISABLE>'"` Example: `SEND_COMMAND dvRX,"'VIDOUT_MUTE-ENABLE'"`

Aspect Ratio Conversion Policy Options

NOTE: *The commands for setting/verifying the aspect ratio conversion policy are on the previous page.*

Stretch (to fit)

This aspect ratio conversion policy option (default) scales the video to full screen size in both horizontal and vertical directions regardless of the input aspect ratio. No data is cropped. However, the image may be distorted as needed to fill the screen. When Stretch is selected, black bars are not added by the scaler. However, if an image has originated from a source device with either horizontal or vertical black bars (e.g., letter box from a movie), the black bars will be considered as active video and will be included in the stretched video.

Maintain (aspect ratio)

This aspect ratio conversion policy option maintains the incoming video's aspect ratio, but will scale the image until the display fills either horizontal or vertical direction first. If the vertical direction is filled first, then the video will have pillar box black bars on the sides of the display. If the horizontal direction is filled first, then the video will have letter box black bars on the top and bottom of the display.

Zoom

This aspect ratio conversion policy option maintains the input aspect ratio while zooming the image to fill the screen in all directions. Image data may be lost on the top and bottom or to the left and right of the displayed image.

Anamorphic – This aspect ratio conversion policy option is used with anamorphic formatted video sources so that the images appear correctly on the display.

DXLink Fiber Receiver Audio SEND_COMMANDs

DXLink Fiber Receiver Audio SEND_COMMANDs are sent to Port 6.

Audio SEND_COMMANDs (Receivers)	
Command	**Description**
?AUDOUT_MUTE Requests the setting for the Mute preference of the audio from the Receiver (Enable or Disable).	Syntax: `SEND_COMMAND <DEV>,"'?AUDOUT_MUTE'"` Example: `SEND_COMMAND dvRX,"'?AUDOUT_MUTE'"` Returns a COMMAND of the form: `AUDOUT_MUTE-<ENABLE|DISABLE>`
AUDOUT_MUTE Sets the Mute preference of the audio from the Receiver to Enable (no sound) or Disable.	Syntax: `SEND_COMMAND <DEV>,"'AUDOUT_MUTE-<ENABLE|DISABLE>'"` Example: `SEND_COMMAND dvRX,"'AUDOUT_MUTE-ENABLE'"`
?AUDOUT_FORMAT Requests the audio format on the Receiver.	Syntax: `SEND_COMMAND <DEV>,"'?AUDOUT_FORMAT'"` Valid responses: format = HDMI, ANALOG, ALL Example: `SEND_COMMAND dvRX,"'?AUDOUT_FORMAT'"` Returns a COMMAND of the form: `AUDOUT_FORMAT-<format>`
AUDOUT_FORMAT Sets the audio format on the Receiver (default is ALL).	Syntax: `SEND_COMMAND <DEV>,"'AUDOUT_FORMAT-<format>'"` Valid responses: format = HDMI, ANALOG, ALL Example: `SEND_COMMAND dvRX,"'AUDOUT_FORMAT-ANALOG'"`

DXLink Fiber Transmitter Video SEND_COMMANDs

DXLink Fiber Transmitter Video SEND_COMMANDs are sent to Port 7 unless otherwise noted.

NOTE: *Asynchronous notifications are available for the Transmitters via NetLinx Studio (and Telnet).*

NOTE: *All text is based on a Unicode index.*

Video SEND_COMMANDs (Transmitters)	
Command	**Description**
?VIDIN_AUTO_SELECT Requests the setting for the Auto Select mode for the video input signal on the Transmitter (Enable, Analog or Disable).	**IMPORTANT:** *This command must be sent to Port 1.* Syntax: `SEND_COMMAND <DEV>,"'?VIDIN_AUTO_SELECT'"` Example: `SEND_COMMAND dvTX,"'?VIDIN_AUTO_SELECT'"` Returns a COMMAND of the form: `VIDIN_AUTO_SELECT-<ENABLE|DISABLE|ANALOG>`
VIDIN_AUTO_SELECT Enables or disables the Auto Select mode for the video input signal on the Transmitter. • ENABLE – sets the Auto Select mode for digital preference (the factory default is digital). • ANALOG – sets the Auto Select mode to analog preference. • DISABLE – disables Auto Select.	**IMPORTANT:** *This command must be sent to Port 1.* Syntax: `SEND_COMMAND <DEV>,"'VIDIN_AUTO_SELECT-<ENABLE|DISABLE|ANALOG>'"` Valid responses: value = ENABLE | DISABLE | ANALOG Example: `SEND_COMMAND dvTX,"'VIDIN_AUTO_SELECT-ENABLE'"` **NOTE:** *VIDIN_AUTO_SELECT must be set to "DISABLE" for a VIDIN_FORMAT command to take effect.*
?INPUT-VIDEO Requests the video input being used on the Transmitter: either the digital video (Input 7) or the analog video (Input 8). The output is always 6.	**IMPORTANT:** *This command must be sent to Port 1.* Syntax: `SEND_COMMAND <DEV>,"'?INPUT-VIDEO,6'"` Example: `SEND_COMMAND dvTX,"'?INPUT-VIDEO,6'"` Returns a COMMAND of the form: `SWITCH-LVIDEOI8O6` **NOTE:** *If the VIDIN_AUTO_SELECT state is either ENABLE or ANALOG and no content is being passed (nothing is connected to either the digital or analog ports), then the query returns a COMMAND of the form:* `SWITCH-LVIDEOI0O6`
VI<input>O<output> Sets the Transmitter to route either the digital video (Input 7) or the analog video (Input 8) to the output (which is always Output 6).	**IMPORTANT:** *This command must be sent to Port 1.* Syntax: `SEND_COMMAND <DEV>,"'VI<input>O<output>'"` Valid responses: input = 7 for digital video; 8 for analog video output = 6 Example: `SEND_COMMAND dvTX,"'VI8O6'"` **NOTE:** *Setting the route to either digital or analog will also override the VIDIN_AUTO_SELECT setting to DISABLE if not already disabled.*
?VIDIN_STATUS Requests the status of the video input on the Transmitter.	**IMPORTANT:** *Send to Port 7 for digital video and Port 8 for analog video.* Syntax: `SEND_COMMAND <DEV>,"'?VIDIN_STATUS'"` Valid responses: status = NO SIGNAL, UNKNOWN SIGNAL, VALID SIGNAL Example: `SEND_COMMAND dvTX,"'?VIDIN_STATUS'"` Returns a COMMAND of the form: `VIDIN_STATUS-<status>`

Video SEND_COMMANDs (Transmitters)	
?VIDIN_FORMAT Requests the video format on the Transmitter. **NOTE:** *When this query is sent to port 7, the response reflects the format of digital content if there is any digital content. If there is no digital content, it will report UNKNOWN.*	**IMPORTANT:** *Send to Port 7 for digital video and to Port 8 for analog video.* Syntax: `SEND_COMMAND <DEV>,"'?VIDIN_FORMAT'"` Valid responses: format (Port 7) = HDMI, DVI format (Port 8) = COMPONENT, S-VIDEO, COMPOSITE, VGA Example: `SEND_COMMAND dvTX,"'?VIDIN_FORMAT'"` Returns a COMMAND of the form: `VIDIN_FORMAT-<format>`
VIDIN_FORMAT Sets the video format on the Transmitter. **NOTE:** *For RGsB video signals, you must use the VIDIN_FORMAT command and set the "valid responses" format to VGA.*	**IMPORTANT:** *Send to Port 8 for analog video.* Syntax: `SEND_COMMAND <DEV>,"'VIDIN_FORMAT-<format>'"` Valid responses: format = COMPONENT, S-VIDEO, COMPOSITE, VGA Example: `SEND_COMMAND dvTX,"'VIDIN_FORMAT-COMPONENT'"` **NOTE:** *VIDIN_AUTO_SELECT must be set to "DISABLE" for a VIDIN_FORMAT command to take effect.*
?VIDIN_RES_REF Requests the resolution and refresh rate of the video through the Transmitter.	**IMPORTANT:** *Send to Port 7 for digital video and Port 8 for analog video.* Syntax: `SEND_COMMAND <DEV>,"'?VIDIN_RES_REF'"` Valid responses: • horizontal = An integer value representing the horizontal. • vertical = An integer value representing the vertical. May have an additional qualifier such as "i" or "p". • rate = An integer value representing the refresh rate. Example: `SEND_COMMAND dvTX,"'?VIDIN_RES_REF'"` Returns a COMMAND of the form: `VIDIN_RES_REF-<horizontal>x<vertical>,<rate>` **NOTE:** *If no signal is connected to the port being requested, then the response will be `VIDIN_RES_REF-0x0,0`.* **NOTE:** *If analog video is currently routed and the resolution of the digital video (Port 7) is requested, then the response will be `VIDIN_RES_REF-0x0,0` even if digital video is present.*
?VIDIN_PREF_EDID Requests the preferred resolution of the EDID source for the VGA video or HDMI digital input.	**IMPORTANT:** *Send to Port 7 for digital video and Port 8 for analog video.* Syntax: `SEND_COMMAND <DEV>,"'?VIDIN_PREF_EDID'"` Example: `SEND_COMMAND dvTX,"'?VIDIN_PREF_EDID'"` Returns a COMMAND of the form: `VIDIN_PREF_EDID-<resolution,refresh>`
VIDIN_PREF_EDID Sets the preferred resolution of the EDID source for the VGA video or HDMI digital input.	**IMPORTANT:** *Send to Port 7 for digital video and Port 8 for analog video.* Syntax: `SEND_COMMAND <DEV>,"'VIDIN_PREF_EDID -<resolution,refresh>'"` Valid responses: resolution,refresh = <for supported input resolutions and refresh rates, see the tables starting on page 107> Examples: `SEND_COMMAND dvTX,"'VIDIN_PREF_EDID-1920x1080p,60'"`
?VIDIN_EDID Requests which EDID is being presented to the source on the video port addressed by the D:P:S.	**IMPORTANT:** *Send to Port 7 for digital video and Port 8 for analog video.* Syntax: `SEND_COMMAND <DEV>, "'?VIDIN_EDID'"` Example: `SEND_COMMAND VIDEO_INPUT_1,"'?VIDIN_EDID'"` Returns a COMMAND of the form: `VIDIN_EDID-<source>` For the potential sources, see the VIDIN_EDID command.

Video SEND_COMMANDs (Transmitters)	
VIDIN_EDID Sets the EDID to be presented to the source on the video port addressed by the D:P:S. **NOTE:** *For additional information on EDID management and the EDID variables used with this command,* *see page 118.*	**IMPORTANT:** *Send to Port 7 or 8 unless specified otherwise.* Syntax: `SEND_COMMAND <DEV>,"'VIDIN_EDID-<source>'"` Valid responses: source = ALL RESOLUTIONS, USER EDID 1*, USER_EDID_MODIFIED, FULL-SCREEN, WIDE-SCREEN, MIRROR OUT 1**, MIRROR_OUT_LOCAL (Port 7 only) Example: `SEND_COMMAND VIDEO_INPUT_1,"'VIDIN_EDID-ALL RESOLUTIONS'"` * "USER EDID 1" must be written to the TX using DGX Configuration Software (via the USB Program port) or to the DXLink Fiber Input Board. ** The HDMI port mirrors the downstream EDID of the connected DXLink device. When connected to a DXLink Input Board, this EDID will be the same as USER EDID 1.

VIDIN_EDID command – The following table contains EDID behaviors for DXLink Fiber hardware in various setup options.

TX Hardware/Mode	RX Hardware/Mode	Digital Port (7)	Analog Port (8)
Duplex/Bidirectional	Duplex/Bidirectional	MIRROR OUT 1	ALL RESOLUTIONS
Duplex/Unidirectional	Duplex/Bidirectional	ALL RESOLUTIONS	ALL RESOLUTIONS
Duplex/Unidirectional	Duplex/Unidirectional	ALL RESOLUTIONS	ALL RESOLUTIONS
Duplex/Bidirectional	Duplex/Unidirectional	ALL RESOLUTIONS	ALL RESOLUTIONS
Simplex	Simplex	ALL RESOLUTIONS	ALL RESOLUTIONS

NOTE: *MIRROR OUT 1 is the EDID of the sink attached to the RX.*

Video SEND_COMMANDs (Transmitters)	
?VIDIN_HDCP Requests the video HDCP compliance setting of the video input port addressed by the D:P:S.	**IMPORTANT:** *Send to Port 7.* Syntax: `SEND_COMMAND <DEV>,"'?VIDIN_HDCP'"` Example: `SEND_COMMAND VIDEO_INPUT_1,"'?VIDIN_HDCP'"` Returns a COMMAND of the form: `VIDIN_STATUS-<ENABLE|DISABLE>`
VIDIN_HDCP Sets the video HDCP compliance setting of the video input port addressed by the D:P:S. **IMPORTANT:** *For sources (such as DVD and Blu-Ray players) that do not support non-compliant displays, disabling the HDCP compliance is not recommended and may affect DXLink Fiber performance.*	**IMPORTANT:** *Send to Port 7.* **NOTE:** *When VIDIN_HDCP is disabled, the addressed video input will appear to any source as not being HDCP compliant. For PC sources that encrypt all video when connected to an HDCP compliant display, disabling HDCP compliance on the input will cause the PC to send non-encrypted video which can then be routed to non-compliant displays and video conferencing systems.* This command is not applicable to the analog video port. **NOTE:** *After changing this setting, it may be necessary to disconnect and re-connect PC sources.* Syntax: `SEND_COMMAND <DEV>,"'VIDIN_HDCP-<ENABLE|DISABLE>'"` Example: `SEND_COMMAND dvTX,"'VIDIN_HDCP-ENABLE'"` Enables the HDCP Compliance of the video input port (#1 based on D:P:S).
?VIDIN_VSHIFT Requests the vertical shift value of the analog video input port addressed by the D:P:S.	**IMPORTANT:** *Send to Port 8.* Syntax: `SEND_COMMAND <DEV>,"'?VIDIN_VSHIFT'"` Example: `SEND_COMMAND VIDEO_INPUT_8,"'?VIDIN_VSHIFT'"` Returns a COMMAND of the form (the value will be numerical ranging from -7 to 7): `VIDIN_VSHIFT-<value>`

Video SEND_COMMANDs (Transmitters)	
VIDIN_VSHIFT Sets the vertical shift value of the analog video input port addressed by the D:P:S.	**IMPORTANT:** *Send to Port 8.* Syntax: `SEND_COMMAND <DEV>,"'VIDIN_VSHIFT-<value>'"` Valid responses: value = -7. . .7 Example: `SEND_COMMAND dvTX,"'VIDIN_VSHIFT-2'"` Sets the vertical shifting of analog video input port (#1 based on D:P:S) to 2 (shift upward). `SEND_COMMAND "'VIDIN_VSHIFT--3'"` Sets the vertical shifting of analog video input port (#1 based on D:P:S) to -3 (shift downward).
?VIDIN_HSHIFT Requests the horizontal shift value of the analog video input port addressed by the D:P:S.	**IMPORTANT:** *Send to Port 8.* Syntax: `SEND_COMMAND <DEV>,"'?VIDIN_HSHIFT'"` Example: `SEND_COMMAND VIDEO_INPUT_1,"'?VIDIN_HSHIFT'"` Returns a COMMAND of the form (the value will be numerical ranging from -50 to 50): `VIDIN_HSHIFT-<value>`
VIDIN_HSHIFT Sets the horizontal shift value of the analog video input port addressed by the D:P:S.	**IMPORTANT:** *Send to Port 8.* Syntax: `SEND_COMMAND <DEV>,"'VIDIN_HSHIFT-<value>'"` Valid responses: value = -50. . .50 Examples: `SEND_COMMAND "'VIDIN_HSHIFT-2'"` Sets the horizontal shifting of video input port (#1 based on D:P:S) to 2 (shift to right). `SEND_COMMAND "'VIDIN_HSHIFT--3'"` Sets the horizontal shifting of video input port (#1 based on D:P:S) to -3 (shift to left).
?VIDIN_PHASE Requests the input phase of the RGB video input port addressed by the D:P:S.	**IMPORTANT:** *Send to Port 8.* This command is valid only for inputs whose format is set to VGA. Syntax: `SEND_COMMAND <DEV>,"'?VIDIN_PHASE'"` Example: `SEND_COMMAND VIDEO_INPUT_1,"'?VIDIN_PHASE'"` Returns a COMMAND of the form (the value will be numerical ranging from 0 to 31): `VIDIN_PHASE-<value>`
VIDIN_PHASE Sets the input phase of the RGB video input port addressed by the D:P:S.	**IMPORTANT:** *Send to Port 8.* This command is valid only for inputs whose format is set to VGA. Syntax: `SEND_COMMAND <DEV>,"'VIDIN_PHASE-<value>'"` Valid responses: value = 0. . .31 Example: `SEND_COMMAND VIDEO_INPUT_1,"'VIDIN_PHASE-23'"`

DXLink Fiber Transmitter Audio SEND_COMMANDs

DXLink Fiber Transmitter Audio SEND_COMMANDs are sent to Port 7.

Audio SEND_COMMANDs (Transmitters)	
Command	**Description**
?AUDIN_FORMAT_AUTO Requests the setting (Enable or Disable) for automatically detecting the audio source format through the Transmitter.	Syntax: `SEND_COMMAND <DEV>,"'?AUDIN_FORMAT_AUTO'"` Example: `SEND_COMMAND dvTX,"'?AUDIN_FORMAT_AUTO'"` Returns a COMMAND of the form: `AUDIN_FORMAT-AUTO<ENABLE|DISABLE>`
AUDIN_FORMAT_AUTO Sets audio source format to automatically detect the audio through the Transmitter.	Syntax: `SEND_COMMAND <DEV>,"'AUDIN_FORMAT_AUTO-<ENABLE|DISABLE>'"` Example: `SEND_COMMAND dvTX,"'AUDIN_FORMAT_AUTO-ENABLE'"`
?AUDIN_FORMAT Requests the setting for the audio source format.	Syntax: `SEND_COMMAND <DEV>,"'?AUDIN_FORMAT'"` Valid responses: format = HDMI, SPDIF, ANALOG Example: `SEND_COMMAND dvTX,"'?AUDIN_FORMAT'"` Returns a COMMAND of the form: `AUDIN_FORMAT-<format>`
AUDIN_FORMAT Selects the audio input source that will be embedded on the HDMI signal through the Transmitter. **NOTE:** *When the Transmitter is set to route digital video (input 7), you can select from the HDMI, SPDIF, or ANALOG audio inputs. When the Transmitter is set to route analog video (input 8), you can only select the SPDIF or ANALOG audio input (see the VI<input>O<output> command on page 65.*	Syntax: `SEND_COMMAND <DEV>,"'AUDIN_FORMAT-<format>'"` Valid responses: format = HDMI, SPDIF, ANALOG Example: `SEND_COMMAND dvTX,"'AUDIN_FORMAT-ANALOG'"` **IMPORTANT:** *The order of precedence (HDMI embedded audio, S/PDIF, analog) can be overridden with this command; however, you must first send AUDIN_FORMAT_AUTO-DISABLE to disable the auto format function, or the audio format will automatically switch back anytime the order of precedence is violated.*

IR SEND_COMMANDs

On the DXLink Fiber Transmitters and Receivers, IR CHANNELS and SEND_COMMANDs are sent to Port 3 (IR output).

IR CHANNELs

Chennel	Description
1-255	Generate the IR or serial command assigned to that channel.

IR SEND_COMMANDs

IR SEND_COMMANDs (Transmitters and Receivers)	
Command	**Description**
CAROFF Disable the IR carrier signal until a 'CARON' Send Command is received.	Syntax: `SEND_COMMAND <DEV>,"'CAROFF'"` Example: `SEND_COMMAND IR_1,"'CAROFF'"` Stops transmitting IR carrier signals to the IR port.
CARON Enable the IR carrier signals (default).	Syntax: `SEND_COMMAND <DEV>,"'CARON'"` Example: `SEND_COMMAND IR_1,"'CARON'"` Starts transmitting IR carrier signals to the IR port.

IR SEND_COMMANDs (Transmitters and Receivers)	
CH Send IR pulses for the selected channel.	• All channels below 100 are transmitted as two digits. • If the IR code for ENTER (function #21) is loaded, an Enter will follow the number. • If the channel is greater than or equal to (>=) 100, then IR function 127 or 20 (whichever exists) is generated for the one hundred digit. **NOTE:** *Set the Pulse and Wait times with 'CTON' (see page 70) and 'CTOF' (see page 70).* Syntax: `SEND_COMMAND <DEV>,"'CH',<channel number>"` Valid responses: channel number = 0 to 199 channels Example: `SEND_COMMAND IR_1,"'CH',18"` The IR port on the DXLink Fiber TX or RX performs the following: • Transmits IR signals for 1 (IR code 11). • The transmit time is set with the CTON command. • Waits until the time set with the CTOF command elapses. • Transmits IR signals for 8 (IR code 18). • Waits for the time set with the CTOF command elapses. If the IR code for Enter (IR code 21) is programmed, the unit performs the following steps: • Transmits IR signals for Enter (IR code 21). • Waits for the time set with the CTOF command elapses.
CP Halt and clear all active or buffered IR commands, and then send a single IR pulse.	Pulse and Wait times can be set with the 'CTON' and 'CTOF' commands. Syntax: `SEND_COMMAND <DEV>,"'CP',<code>"` Valid responses: code = IR port's channel value 0 to 252 (253 to 255 reserved). Example: `SEND_COMMAND IR_1,"'CP',2"` Clears the active/buffered commands and pulses IR port's channel 2.
CTOF Set the duration of the Off time (no signal) between IR pulses for channel and IR function transmissions. Off time settings are stored in non-volatile memory.	This command sets the delay time between pulses generated by the 'CH' or 'XCH' Send Commands in tenths of seconds. Syntax: `SEND_COMMAND <DEV>,"'CTOF',<time>"` Valid responses: time = 0 to 255. Given in 1/10th of a second increments. Default is 5 (0.5 seconds). Example: `SEND_COMMAND IR_1,"'CTOF',10"` Sets the off time between each IR pulse to 1 second.
CTON Set the total time of IR pulses transmitted and is stored in non-volatile memory.	This command sets the pulse length for each pulse generated by the 'CH' (see page 70) or 'XCH' (see page 71) Send Commands in tenth of a second increments. Syntax: `SEND_COMMAND <DEV>,"'CTON',<time>"` Valid responses: time = 0 to 255. Given in 1/10th of a second increments. Default is 5 (0.5 seconds). Example: `SEND_COMMAND IR_1,"'CTON',20"` Sets the IR pulse duration to 2 seconds.
GET BAUD Get the IR port's current communication parameters.	The port sends the parameters to the device that requested the information. Syntax: `SEND_COMMAND <DEV>,"'GET BAUD'"` Example: `SEND_COMMAND dvRXRS232,"'GET BAUD'"` The port responds with: `Port <port #>,<baud>,<parity>,<data>,<stop>`
GET MODE Poll the IR/Serial port's configuration parameters and report the active mode settings to the device requesting the information. **NOTE:** *Works with Port 3 only.*	Syntax: `GET MODE` The port responds with: `<port #> <mode>,<carrier>,<io link channel>.` Example: `SEND_COMMAND IR_1,"'GET MODE'"` The system could respond with: `PORT 3 IR,CARRIER,IO LINK 0`

IR SEND_COMMANDs (Transmitters and Receivers)	
IROFF Halt and clear all active or buffered IR commands being output on the designated port.	Syntax: `SEND_COMMAND <DEV>,"'IROFF'"` Example: `SEND_COMMAND IR_1,"'IROFF'"` Immediately halts and clears all IR output signals on the IR port.
SET BAUD Use to set the IR communication parameters. **NOTE:** *Before sending the SET BAUD command, you must set the IR port to Data mode (for the SET MODE command, see entry in table on the next page).*	**NOTE:** *This value is not saved in non-volatile memory and is reset to default (9600, N, 8, 1) at power-up.* Syntax: `SEND_COMMAND <DEV>,"'SET BAUD <baud>,<parity>,<data>, <stop>'"` Valid responses: • baud = 9600, 4800, 2400, 1200, 600, 300, 150 • parity = N (none), O (odd), E (even), M (mark), S (space) • data = 7 or 8 data bits • stop = 1 or 2 stop bits **NOTE:** *The only valid 9 bit combination is (baud),N,9,1.* Example: `SEND_COMMAND DEVICE_1,"'SET BAUD 1200,N,8,1'"` Sets the DEVICE_1 port's communication parameters to 1200 baud, no parity, 8 data bits, and 1 stop bit.
XCH Transmit IR codes.	Syntax: `SEND_COMMAND <DEV>,"'XCH <channel>'"` Valid responses: channel = 0 to 999. **NOTE:** *For detailed usage examples, refer to the 'XCHM' command (see below).*
SET MODE Set an IR port to either IR, Serial, or Data mode.	Syntax: `SEND_COMMAND <DEV>,"'SET MODE',<mode>"` Valid responses: mode = • IR (standard IR output with carrier) • SERIAL (IR without carrier and waveform inverted) • DATA (1-way serial/TTL) Example: `SEND_COMMAND IR_1,"'SET MODE IR'"` Sets the IR_1 port to IR mode for IR control.
SP Generate a single IR pulse.	You can use the 'CTON' to set pulse lengths and the 'CTOF' to set time Off between pulses. Syntax: `SEND_COMMAND <DEV>,"'SP',<code>"` Valid responses: code = IR code value 1 to 252 (253 to 255 reserved). Example: `SEND_COMMAND IR_1,"'SP',25"` Pulses IR code 25 on IR port on the RX.

IR SEND_COMMANDs (Transmitters and Receivers)	
XCHM Changes the IR output pattern for the 'XCH' Send Command.	Syntax: `SEND_COMMAND <DEV>,"'XCHM <extended channel mode>'"` Valid responses: extended channel mode = 0 to 4. Example: `SEND_COMMAND IR_1,"'XCHM 3'"` Sets the IR device's extended channel command to mode 3. **Mode 0 Example (default): [x][x]<x><enter>** `SEND_COMMAND IR_1,"'XCH 3'"` Transmits the IR code as 3-enter. `SEND_COMMAND IR_1,"'XCH 34'"` Transmits the IR code as 3-4-enter. `SEND_COMMAND IR_1,"'XCH 343'"` Transmits the IR code as 3-4-3-enter. **Mode 1 Example: <x><x><x><enter>** `SEND_COMMAND IR_1,"'XCH 3'"` Transmits the IR code as 0-0-3-enter. `SEND_COMMAND IR_1,"'XCH 34'"` Transmits the IR code as 0-3-4-enter. `SEND_COMMAND IR_1,"'XCH 343'"` Transmits the IR code as 3-4-3-enter. **Mode 2 Example: <x><x><x>** `SEND_COMMAND IR_1,"'XCH 3'"` Transmits the IR code as 0-0-3. `SEND_COMMAND IR_1,"'XCH 34'"` Transmits the IR code as 0-3-4. `SEND_COMMAND IR_1,"'XCH 343'"` Transmits the IR code as 3-4-3. **Mode 3 Example: [[100][100]....]<x><x>** `SEND_COMMAND IR_1,"'XCH 3'"` Transmits the IR code as 0-3. `SEND_COMMAND IR_1,"'XCH 34'"` Transmits the IR code as 3-4. `SEND_COMMAND IR_1,"'XCH 343'"` Transmits the IR code as 100-100-100-4-3. **Mode 4 Example:** • Mode 4 sends the same sequences as the 'CH' command. • Only use Mode 4 with channels 0 to 199.

Serial SEND_COMMANDs

On the DXLink Fiber units, SERIAL SEND_COMMANDs are sent to Port 1.

Serial SEND_COMMANDs (Transmitters and Receivers)	
Command	**Description**
B9MOFF Set the port's communication parameters for stop and data bits according to the software settings on the RS-232 port.	This command works in conjunction with the 'B9MON' command. • Disables 9-bit in 232 mode. • By default, this returns the Communication settings on the serial port to the last programmed parameters. Syntax: `B9MOFF` Example: `SEND_COMMAND SOMEDEVICE_1,"'B9MOFF'"` Sets the port settings on SOMEDEVICE to match the port's configuration settings.
B9MON Override and set the current communication settings and parameters on the RS-232 serial port to 9 data bits with one stop bit.	This command works in conjunction with the 'B9MOFF' command. • Enables 9-bit in 232 mode. Syntax: `B9MON` Example: `SEND_COMMAND SOMEDEVICE_1,"'B9MON'"` Resets the SOMEDEVICE port's communication parameters to 9 data bits and one stop bit.
CHARD Set the delay time between all transmitted characters to the value specified (in 100 microsecond increments).	Syntax: `SEND_COMMAND <DEV>,"'CHARD-<time>'"` Valid responses: time = 0 to 10000 (1 second) Example: `SEND_COMMAND dvRXRS232,"'CHARD-10'"` Sets a 1-millisecond delay between all transmitted characters.
CHARDM Set the delay time between all transmitted characters to the value specified (in 1 millisecond increments).	Syntax: `SEND_COMMAND <DEV>,"'CHARDM-<time>'"` Valid responses: time = 0 to 1000 (1 second) Example: `SEND_COMMAND dvRXRS232,"'CHARDM-10'"` Sets a 10-millisecond delay between all transmitted characters.
ESCSEQOFF Disables SEND_STRING escape sequences	Disables SEND_STRING escape sequences (see the "SEND_STRING Escape Sequences" section on page 78).
ESCSEQON Enables SEND_STRING escape sequences	Enables SEND_STRING escape sequences (see the "SEND_STRING Escape Sequences" section on page 78).
GET BAUD Get the RS-232 (serial) port's current communication parameters.	The port sends the parameters to the device that requested the information. Syntax: `SEND_COMMAND <DEV>,"'GET BAUD'"` Example: `SEND_COMMAND dvRXRS232,"'GET BAUD'"` The port responds with: `Port <port #>,<baud>,<parity>,<data>,<stop>`
RXCLR Clear all characters in the receive buffer waiting to be sent to the Master.	Syntax: `SEND_COMMAND <DEV>,"'RXCLR'"` Example: `SEND_COMMAND dvRXRS232,"'RXCLR'"` Clears all characters in the receive buffer waiting to be sent to the Master.
RXOFF Disable the transmission of incoming received characters to the Master (default).	Syntax: `SEND_COMMAND <DEV>,"'RXOFF'"` Example: `SEND_COMMAND dvRXRS232,"'RXOFF'"` Disables the transmission of incoming received characters to the Master.

Serial SEND_COMMANDs (Transmitters and Receivers)	
RXON Start transmitting received characters to the Master. Enables sending incoming received characters to the Master.	This command is automatically sent by the Master when a 'CREATE_BUFFER' program instruction is executed. Syntax: `SEND_COMMAND <DEV>,"'RXON'"` Example: `SEND_COMMAND dvRXRS232,"'RXON'"` Sets the RX RS-232 port to transmit received characters to the Master.
TXCLR Stop and clear all characters waiting in the transmit out buffer and stops transmission.	Syntax: `SEND_COMMAND <DEV>,"'TXCLR'"` Example: `SEND_COMMAND dvRXRS232,"'TXCLR'"` Stops and clears all characters waiting in the RX serial port's transmit buffer.
SET BAUD (shown in examples) Or **TSET BAUD** Use either of these commands to set the serial communication parameters. **NOTE:** *The DXLink Fiber Transmitters and Receivers only support RS-232 serial communication.*	**NOTE:** *This value is not saved in non-volatile memory and is reset to default (9600, 8, N, 1) at power-up.* Syntax: `SEND_COMMAND <DEV>,"'SET BAUD <baud>,<parity>,<data>, <stop>'"` Valid responses: • baud = 115200, 76800, 57600, 38400, 19200, 9600, 4800, 2400, 1200, 600, 300, 150. • parity = N (none), O (odd), E (even), M (mark), S (space) • data = 7 or 8 data bits • stop = 1 or 2 stop bits **NOTE:** *The only valid 9 bit combination is (baud),N,9,1.* Example: `SEND_COMMAND DEVICE_1,"'SET BAUD 115200,N,8,1'"` Sets the DEVICE_1 port's communication parameters to 115,200 baud, no parity, 8 data bits, and 1 stop bit.

DXLink Fiber Transmitter USB SEND_COMMANDs

On the DXLink Transmitter, USB SEND_COMMANDs are sent to Port 5.

USB SEND_COMMANDs (Transmitter)	
Command	**Description**
?USB_HID_SERVICE Requests the status for the USB HID passthrough setting (Enable or Disable).	Syntax: `SEND_COMMAND <DEV>,"'?USB_HID_SERVICE'"` Example: `SEND_COMMAND dvTX,"'?USB_HID_SERVICE'"` Returns a COMMAND of the form: `USB_HID_SERVICE-<ENABLE/DISABLE>`
USB_HID_SERVICE Sets the USB HID passthrough to Enable or Disable.	**NOTE:** *When enabled, the USB port addressed by D:P:S is running in auto switching mode.* Syntax: `SEND_COMMAND <DEV>,"'USB_HID_SERVICE-<ENABLE|DISABLE>'"` Example: `SEND_COMMAND dvTX,"'USB_HID_SERVICE-ENABLE'"` **NOTE:** *This command persists through power cycling.*

DXLink Fiber Receiver USB SEND_COMMANDs

On the DXLink Receiver, USB SEND_COMMANDs are sent to Port 5.

USB SEND_COMMANDs (Receiver)	
Command	**Description**
?USB_HID_ROUTE Requests the IP address or hostname of the host device (Transmitter) sending USB keyboard/mouse data to the Receiver.	Syntax: `SEND_COMMAND <DEV>,"'?USB_HID_ROUTE'"` Example: `SEND_COMMAND dvRX,"'?USB_HID_ROUTE'"` Returns a COMMAND of the form: `USB_HID_ROUTE-<IP address or hostname>`
USB_HID_ROUTE Set the IP address or hostname of the host device (Transmitter) that will be sending USB keyboard/mouse data to the Receiver.	**IMPORTANT:** *For hostname usage, check to be sure name resolution service (DNS) is running on the local network (LAN).* **NOTE:** *When a hostname is specified, a maximum of 50 characters can be used.* Syntax: `SEND_COMMAND <DEV>,"'USB_HID_ROUTE-<IP address or hostname>'"` Example: `SEND_COMMAND dvRX,"'USB_HID_ROUTE-192.168.1.5'"` **NOTE:** *To eliminate the connection, specify 0.0.0.0 as the IP address. To redirect to a new host device (Transmitter), send the new IP address or hostname.*

Common DXLink Fiber TX/ RX SEND_COMMANDs

Common NetLinx SEND_COMMANDs for the DXLink Fiber Transmitters and Receivers are provided in the following table. These commands can be sent to any valid port (Port 1 through Port 8); the #3 Toggle *must* be set to ON.

Common NetLinx SEND_COMMANDs (Transmitters and Receivers)	
Command	**Description**
?FWVERSION Requests the firmware version of the Transmitter or Receiver.	Syntax: `SEND_COMMAND <DEV>,"'?FWVERSION'"` Example: `SEND_COMMAND dvRX,"'?FWVERSION'"` Returns a COMMAND of the form: `FWVERSION <version-string>`
LED-DIS **Receivers:** Disable all LEDs to the right of the Program port. **Transmitters:** Disable all LEDs to the right of the Power LED.	Syntax: `LED-DIS` Example: `SEND_COMMAND DEVICE_1,"'LED-DIS'"` **Receivers:** Disables all LEDs to the right of the Program port on DEVICE_1. **Transmitters:** Disables all LEDs to the right of the Power LED on DEVICE_1. **NOTE:** *This parameter does not get stored in non-volatile memory. LEDs are enabled by default at each power-up.*
LED-EN **Receivers:** Enable all LEDs to the right of the Program port. **Transmitters:** Enable all LEDs to the right of the Power LED.	Syntax: `LED-EN` Example: `SEND_COMMAND DEVICE_1,"'LED-EN'"` **Receivers:** Enables all LEDs to the right of the Program port on DEVICE_1. **Transmitters:** Enables all LEDs to the right of the Power LED on DEVICE_1.
REBOOT Reboot the unit.	Syntax: `REBOOT` Example: `SEND_COMMAND DEVICE_1,"'REBOOT'"` Reboots DEVICE_1.
SET_NDX_DESC Set Friendly name and location for NDP.	Syntax: `SET_NDX_DESC-friendly name:location` Max of 25 characters for *friendly name* and max of 25 characters for *location*. If more than 25 characters are sent for either friendly name or location, they will be truncated to a max of 25 characters. Neither the friendly name nor the location should contain a ":" character, as that is used as a delimiter. **NOTE:** *This command requires a reboot to enable new settings.*

DXLink Fiber System SEND_COMMANDs

DXLink Fiber System SEND_COMMANDs can be sent to any valid port (Port 1 through Port 8) on the Transmitters or Receivers.

DXLink Fiber System SEND_COMMANDs (Transmitters and Receivers)	
Command	**Description**
?DXLINK Requests the current mode (Extender or Endpoint) for the TX or RX.	Syntax: `SEND_COMMAND <DEV>,"'?DXLINK'"` Example: `SEND_COMMAND dvRX,"'?DXLINK` Returns a COMMAND of the form: `DXLINK-<DXLINK-EXTENDER/DXLINK-ENDPOINT>`
DXLINK Sets the TX or RX to Extender Mode (for a standalone, direct connection from module to module) or Endpoint Mode (for use in conjunction with a switcher).	Syntax: `SEND_COMMAND <DEV>,"'DXLINK-<EXTENDER|ENDPOINT>'"` Example: `SEND_COMMAND dvRX,"'DXLINK-EXTENDER'"`
?DXLINKIN_LINK_LOST Requests if a Duplex DxLink connection only has one-way communication (receive only).	Syntax: `SEND_COMMAND <DEV>,"'?DXLINKIN_LINK_LOST'"` Example: `SEND_COMMAND dvTX,"'?DXLINKIN_LINK_LOST'"` Returns a COMMAND string of the form: `DXLINKIN_LINK_LOST-<TRUE|FALSE>`
?DXLINKOUT_LINK_LOST Requests if a Duplex DxLink connection only has one-way communication (transmit only).	Syntax: `SEND_COMMAND <DEV>,"'?DXLINKOUT_LINK_LOST'"` Example: `SEND_COMMAND dvTX,"'?DXLINKOUT_LINK_LOST'"` Returns a COMMAND string of the form: `DXLINKOUT_LINK_LOST-<TRUE|FALSE>`
?DXLINKIN_LINK_STATUS Requests if an Endpoint is connected to the DXLink Input Port.	Syntax: `SEND_COMMAND <DEV>,"'?DXLINKIN_LINK_STATUS'"` Example: `SEND_COMMAND dxTX,"'?DXLINKIN_LINK_STATUS'"` Returns a COMMAND string of the form: `DXLINKIN_LINK_STATUS-<DISCONNECTED|CONNECTED>`
?DXLINKOUT_LINK_STATUS Requests if an Endpoint is connected to the DXLink Output Port.	Syntax: `SEND_COMMAND <DEV>,"'?DXLINKOUT_LINK_STATUS'"` Example: `SEND_COMMAND dvRX,"'?DXLINKOUT_LINK_STATUS'"` Returns a COMMAND string of the form: `DXLINKOUT_LINK_STATUS-<DISCONNECTED|CONNECTED>`
?DXLINKIN_QUALITY Requests a value that represents the quality of the signal between a DXLink Input Port and an Endpoint.	Syntax: `SEND_COMMAND <DEV>,"'?DXLINKIN_QUALITY'"` Example: `SEND_COMMAND dvTX,"'?DXLINKIN_QUALITY'"` Returns a COMMAND string of the form: `DXLINKIN_QUALITY--22`
?DXLINKOUT_QUALITY Requests a value that represents the quality of the signal between a DXLink Output Port and an Endpoint.	Syntax: `SEND_COMMAND <DEV>,"'?DXLINKOUT_QUALITY'"` Example: `SEND_COMMAND dvRX,"'?DXLINKOUT_QUALITY'"` Returns a COMMAND string of the form: `DXLINKOUT_QUALITY--22`
?DXLINKIN_QUALITY_ALARM The alarm is triggered when the DXLink cable quality is beyond the threshold where overall performance issues are likely to occur.	Syntax: `SEND_COMMAND <DEV>,"'?DXLINKIN_QUALITY_ALARM'"` Example: `SEND_COMMAND dvTX,"'?DXLINKIN_QUALITY_ALARM'"` Returns a COMMAND string of the form: `DXLINKIN_QUALITY_ALARM-OFF` or `DXLINKIN_QUALITY_ALARM-ON`
?DXLINKOUT_QUALITY_ALARM The alarm is triggered when the DXLink cable quality is beyond the threshold where overall performance issues are likely to occur.	Syntax: `SEND_COMMAND <DEV>,"'?DXLINKOUT_QUALITY_ALARM'"` Example: `SEND_COMMAND dvRX,"'?DXLINKOUT_QUALITY_ALARM'"` Returns a COMMAND string of the form: `DXLINKOUT_QUALITY_ALARM-OFF` or `DXLINKOUT_QUALITY_ALARM-ON`
ICSLAN Sets the ICS LAN connection to Enable or Disable.	Syntax: `SEND_COMMAND <DEV>,"'ICSLAN-ENABLE|DISABLE'"` Example: `SEND_COMMAND dvRX,"'ICSLAN-ENABLE'"`

DXLink Fiber System SEND_COMMANDs (Transmitters and Receivers)	
PERSISTAV **Receivers:** Persists the Scaler Mode, resolution, aspect ratio policy, and audio output type to the DXLink Fiber Output Board. **Transmitters:** Disables the AUDIN_FORMAT_AUTO and persists the current audio format.	Syntax: `SEND_COMMAND <DEV>,"'PERSISTAV'"` Example: `SEND_COMMAND <dvRX>,"'PERSISTAV'"`
FACTORYAV **Receivers:** Clears the persisted settings for the Scaler Mode,* resolution, aspect ratio policy, and audio output type and restores them to their factory defaults. * The "Power-On" Scaler Mode on an Enova DGX DXLink Fiber Output Board will not get reset to default (AUTO), but will remain as whatever was last persisted. **Transmitters:** Clears the persisted setting for the audio and video formats and restores them to their factory defaults. Also restores the preferred EDID to the factory default on both inputs to All RESOLUTIONS.	Syntax: `SEND_COMMAND <DEV>,"'FACTORYAV'"` Example: `SEND_COMMAND <dvTX>,"'FACTORYAV'"` **NOTE:** *A reboot is required after sending the FACTORYAV command.* **NOTE:** *When a Transmitter is connected to a DXLink Fiber Input Board, the input board will override the "ALL RESOLUTIONS" EDID and load the last stored EDID.*

SEND_STRING Escape Sequences

The DXLink Fiber units support several special SEND_STRING escape sequences. If any of the character combinations listed below are found anywhere within a SEND_STRING program instruction, they will be treated as a command and not the literal characters.

Use the ESCSEQON and ESCSEQOFF NetLinx SEND_COMMANDs to control whether these are active or not. The ESCSEQON command must precede the Escape Sequences, otherwise the strings will be processed normally.

These commands are sent to Port 1.

SEND_STRING Escape Sequences

Command	Description
27, 17 Send a break character for a specified duration to a specific device.	Syntax: `27,17,<time>` Valid responses: time = 1 to 255 (measured in 100 microsecond increments) Example: `SEND_STRING RS232_1,"27,17,10"` Sends a break character of 1 millisecond to the RS232_1 device.
27, 18, 0 Clear the ninth data bit by setting it to 0 on all character transmissions.	Used in conjunction with the 'B9MON' command (see page 73). Syntax: `27,18,0` Example: `SEND_STRING RS232_1,"27,18,0"` Sets the RS232_1 device's ninth data bit to 0 on all character transmissions.
27, 18, 1 Set the ninth data bit to 1 for all subsequent characters to be transmitted.	Used in conjunction with the 'B9MON' command (see page 73). Syntax: `27,18,1` Example: `SEND_STRING RS232_1,"27,18,1"` Sets the RS232_1 device's ninth data bit to 1 on all character transmissions.
27, 19 Insert a time delay before transmitting the next character.	Syntax: `27,19,<time>` Valid responses: time = 1 to 255. Measured in 1 millisecond increments. Example: `SEND_STRING RS232_1,"27,19,10"` Inserts a 10 millisecond delay before transmitting characters to the RS232_1 device.

NOTE: *For a listing of all supported Telnet commands, see page 85.*

Troubleshooting

Overview

The troubleshooting suggestions/strategies provided apply to the DXLink Fiber Transmitters and Receivers unless otherwise noted.

Five potential types of issues are covered in this chapter:

- Basic troubleshooting
- Determining HDCP compliance
- Power
- DXLink Fiber
- Network setup

This chapter also provides technical support contact information on page 80.

Basic Troubleshooting

We suggest using the following general list to rule out basic troubleshooting issues.

- ❑ Check the power indicator LEDs on all of the equipment. If any are not illuminated, see the "Power Issues" section below.
- ❑ Check all link and signal connections to make sure everything is physically set up correctly.
- ❑ Isolate source and destination equipment and cable problems by cabling direct without the DXLink Fiber units.
- ❑ If using SEND_COMMANDs – double-check the command and the port number specified and re-send the command (see page 60).
- ❑ If any changes have been made, try resetting the unit to the factory defaults (see page 54).

Additional Resources for Troubleshooting Switching Systems with DXLink Fiber Endpoints

Enova DGX Digital Media Switcher

We suggest checking the troubleshooting information in the *Hardware Reference Manual – Enova DGX 100 Series Digital Media Switchers* or the *Instruction Manual – Enova DGX 8/16/32/64 Digital Media Switchers*.

Determining HDCP Compliance

A dark red or orange screen on an output display is the visual cue from the destination device that it cannot display the HDCP compliant signal from the source device (the authentication process has failed).

Power Issues

Upon power up, the Power indicator LED on the front of the DXLink Fiber units normally illuminates a solid green.

If the Power LEDs on any of the system's equipment are not illuminated:

- ❑ Check the power cords.
- ❑ Check the power connections on the source and destination devices.

DXLink Fiber Troubleshooting

Problem – The signal run exhibits general signal problems, which may be caused by fiber cable quality issues.

Possible Solution – Be sure to check the "Fiber Optic Cable Requirements" section on page 23.

Problem – The signal run exhibits general audio problems, which may because you are trying to pass Dolby, DTS, or high PCM frequency rates and the destination device does not support them.

Possible Solution – Re-programming the EDID may help resolve the problem (see page 118).

Problem – The signal run exhibits general video problems, which may be because you are trying to pass a video format that the destination device does not support.

Possible Solution #1 – Re-programming the EDID may help resolve the problem (see page 118).

Possible Solution #2 – Check the Scaling setting on the RX unit to ensure it is in either Auto or Manual Mode (see page 62).

Problem – You are unsure if a multimode transceiver is passing an optical signal downstream.

Possible Solution – Disconnect the fiber optic cable from the destination unit or board and, holding the cable away from you, take a picture of the end with a digital camera (or cell phone camera). The image will show a bright light if the signal is being passed (works on most digital cameras and cell phone cameras).

Problem – You are unsure that Duplex hardware (in Bidirectional Mode)* is passing data over fiber.

Possible Solution – Verify that the unit's LED activity conforms to expected behavior:

- Yellow LED: fast blink = unencrypted video present
- Yellow LED: slow blink = free-run video present**
- Yellow LED: solid = HDCP video present
- Green LED: solid = full bidirectional link established
- Green LED: off = link not established
- Green LED: blinking = Data Link-lost Mode*** (no Ethernet, RS-232, IR, or USB). If Bidirectional Mode is required, check return fiber path for proper connections and make sure DIP switch Toggle #4 is OFF.

Problem – You are unsure that Simplex hardware* is passing audio and video over fiber.

Possible Solution – Verify that the unit's LED activity conforms to expected behavior:

- Illuminated LED: solid = available for use; not sending audio and video (never present: Ethernet, RS-232, IR, or USB)
- Illuminated LED: blinking = receiving or transmitting audio and video (never present: Ethernet, RS-232, IR, or USB)

* With Simplex hardware or when Duplex hardware is in Unidirectional Mode, only one LED operates, either the TX LED or the RX LED. The operational LED illuminates on the side of the transceiver where data enters or leaves the hardware and indicates the individual port where the fiber optic cable should be attached during cabling.

** Free run video is a video mode internal to the DXLink system. When free run video is indicated, video is not displayed (nor is black video present) out the endpoint RX. This identifies a good connection with video flow between endpoints.

*** When a DXLink Fiber Duplex cable run in Bidirectional Mode has one or both of the fiber optic cables on the return path removed, the system automatically enters Data Link-lost Mode. In Data Link-lost Mode, video and audio continue to flow from source to destination, but network and control no longer transmit over the fiber optic path.

Network Setup Issues

The instructions below can be used for first time setup of DXLink Fiber units on a network with no NetLinx Master (integrated).

NOTE: *Before setting up the network, we recommend plugging all required Ethernet cables into the network before applying power to the DXLink Fiber units.*

To set the IP, connection, and device parameters on a DXLink Fiber unit:

1. Attach the DXLink Fiber unit via its ICS LAN 10/100 port to the network or PC.
2. Power up the DXLink Fiber unit.

   The DXLink Fiber unit will get a DHCP address or default to 169.254.2.2 (or if the unit is in Static IP Mode, the address will be 192.168.1.2).
3. Establish a Telnet connection* to the DXLink Fiber unit and set up the network parameters using the following three commands:
   - `SET IP`
   - `SET CONNECTION`
   - `SET DEVICE`
4. Enter `REBOOT`.
5. Reset the DIP switches to configure the DXLink Fiber unit for the specific type of system setup being used (see the "Common Scenarios" tables on page 35 and page 35).

NOTE: *If you cannot locate the DXLink Fiber unit in the Online Tree, you can reset the factory default by holding the ID button during power up until the LEDs blink in unison and then releasing the ID button. This will revert the DXLink Fiber unit to DHCP mode.*

* For additional information on establishing a Telnet connection and sending Telnet commands, see page 85.

Technical Support

If this manual has not satisfactorily answered your questions regarding the DXLink Fiber Transmitters and Receivers or they are not operating as expected, please contact your AMX representative or technical support. Have the serial numbers for the units and the system's switcher ready. We recommend recording the serial numbers in an easily accessible location.

AMX Contact Information

- 3000 Research Drive, Richardson, TX 75082
- 800.222.0193
- 469.624.8000
- Fax 469.624.7153
- Technical Support 800.932.6993
- www.amx.com

Appendix A – Upgrading the Firmware

Overview

The NetLinx Studio software application (available for free download from www.amx.com) provides the ability to transfer KIT files to NetLinx devices such as DXLink Fiber Transmitters and Receivers. The firmware on the Transmitters and Receiver can be upgraded in the field.

When a Transmitter and/or a Receiver are being used in conjunction with a switcher, the switcher's integrated Master is used for the KIT file transfer. FIG. 32 shows a Transmitter and a Receiver bound to the integrated Master in an Enova DGX 16 in NetLinx Studio's OnLine Tree. Follow the instructions on the top of page 82 to prepare for KIT file transfer and the instructions on page 83 for the actual transfer.

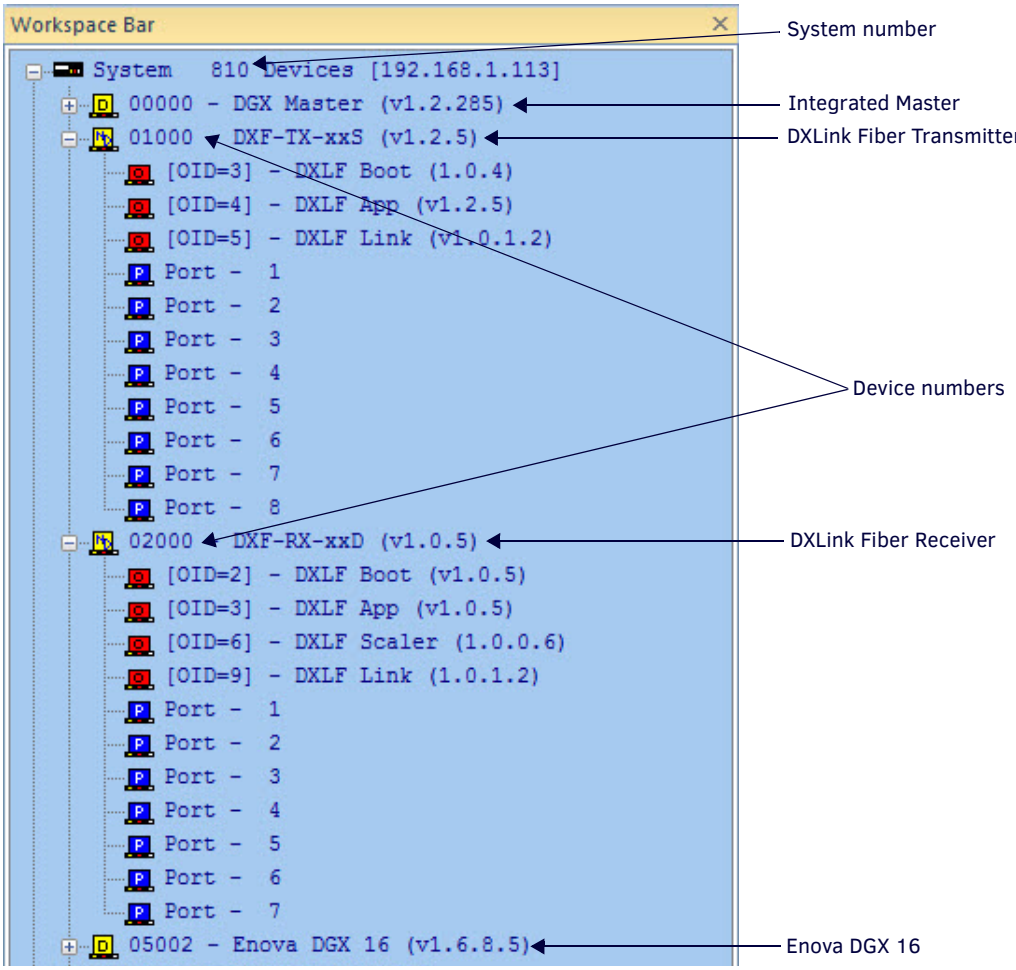


FIG. 32 NetLinx Studio – Integrated Master, Enova DGX 16, and a DXLink Fiber Transmitter and Receiver

Preparing for KIT File Transfers

To prepare for KIT file transfers:

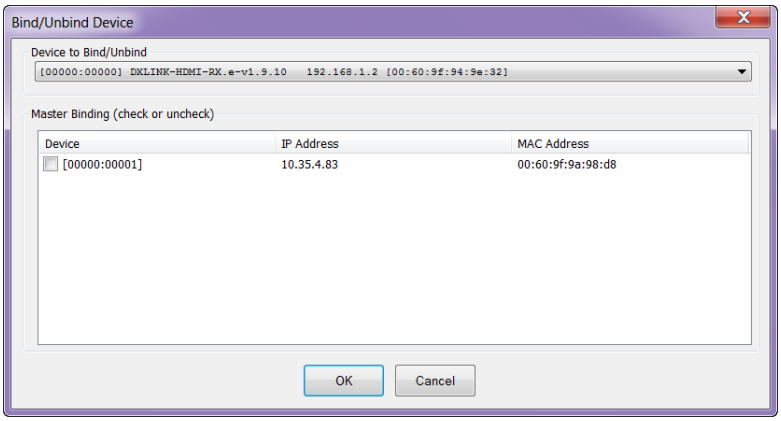
1. Verify that you have the latest version of NetLinx Studio on your PC.

   If the version is not the latest –

   - Use the Web Update option in NetLinx Studio's Help menu to obtain the latest version.

     Or

   - Go to www.amx.com and login as a Dealer to download the latest version.
2. Download the latest Firmware (KIT) file from www.amx.com on the DXLink Fiber Transmitter or Receiver product page to your PC. (Place KIT files on a local drive for speedy throughput.)
3. Verify the following:
   a. Verify that an Ethernet/RJ-45 cable is connected from the switcher's integrated Master to the network (e.g., from the LAN 100/1000 port on an Enova DGX 32 to a LAN).
   b. Verify that the target DXLink Fiber Transmitter or Receiver is connected via its fiber optic transceiver to a DXLink Fiber Input or Output Board (respectively) on the switcher.
   c. Verify that the switcher is powered on.
4. Launch NetLinx Studio and open the OnLine Tree.
5. Bind the target Transmitter or Receiver to the integrated Master: select and right-click the TX or RX; from the context sensitive menu, select Network Bind/Unbind Device (be sure the check box is selected); click OK.



6. Determine the Device Number assigned to the target Transmitter or Receiver when it was bound. For the Device Number location, see FIG. 32 on page 81. The Transmitter or Receiver is ready for the KIT file transfer.

Important Upgrade Information

CAUTION: *Upgrading the firmware is a serious action in that if the upgrade fails, it can leave the system completely non-operational.*

In the Event of Power Loss During an Upgrade

If power loss occurs *before* any firmware information has been transferred – when power is restored, the unit will remain operational using the original firmware.

If power loss occurs *after* some of the firmware information has been transferred *but before* the transfer is complete – when power is restored, the unit will time out and will not operate until a successful upgrade takes place.

CAUTION: *If the application signals a failure, you must immediately reboot the Transmitter or Receiver and attempt to upgrade the firmware again, as the unit is in an unknown state and cannot be guaranteed to be operational.*

Firmware Versions

The following tables contain firmware version information for the DXLink Fiber, Duplex and DXLink Fiber, Simplex units.

DXLink Fiber Firmware Versions			
Applies to	**Version**	**Date**	**Differences**
DXF-TX-MMD DXF-TX-SMD	1.0.3	2/27/14	Baseline
DXF-RX-MMD DXF-RX-SMD	1.0.1	2/27/14	Baseline
DXF-TX-MMD DXF-TX-SMD DXF-TX-MMS DXF-TX-SMS	1.2.10	11/17/14	• Supports standalone (point-to-point) functionality • Supports Simplex units and Unidirectional Mode for Duplex units
DXF-RX-MMD DXF-RX-SMD DXF-RX-MMS DXF-RX-SMS	1.2.1	11/17/14	• Supports standalone (point-to-point) functionality • Supports Simplex units and Unidirectional Mode for Duplex units
DXF-TX-MMD DXF-TX-SMD DXF-TX-MMS DXF-TX-SMS	1.2.x	12/15/15	• Supports compatibility with newer firmware Input and Output Boards in a non-100 Series Enova DGX switcher • Supports compatibility with newer firmware DXLink Fiber Receivers
DXF-RX-MMD DXF-RX-SMD DXF-RX-MMS DXF-RX-SMS	1.2.x	12/15/15	• Supports compatibility with newer firmware Input and Output Boards in a non-100 Series Enova DGX switcher • Supports compatibility with newer firmware DXLink Fiber Transmitters
DXF-TX-MMD DXF-TX-SMD DXF-TX-MMS DXF-TX-SMS	1.4.8	12/15/15	• Supports connection to DXLink Fiber Input Boards running firmware version 1.4.0.10 or later • Supports full Enova DGX 100 Series features
DXF-RX-MMD DXF-RX-SMD DXF-RX-MMS DXF-RX-SMS	1.4.11	12/15/15	• Supports connection to DXLink Fiber Output Boards running firmware version 1.4.0.10 or later • Supports full Enova DGX 100 Series features

NOTE: *For additional details on version differences, see the applicable Readme file.*

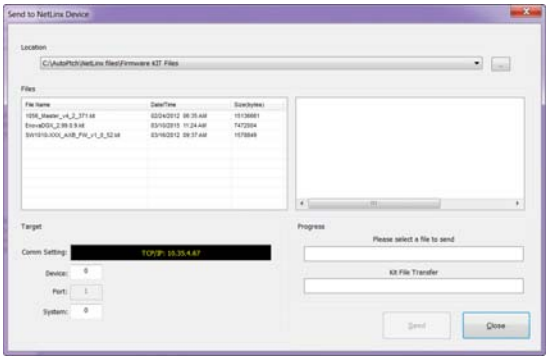
Transferring KIT Files

The system will be non-operational during the upgrade procedure below.

The *Firmware Transfers* tool in NetLinx Studio is used to map KIT files to DXLink Fiber Transmitters and Receivers. The instructions below assume that the preparations on the previous pages have been completed.

To send a KIT file to a DXLink Fiber Transmitter or Receiver:

1. In NetLinx Studio from the Tools menu, select "Firmware Transfers > Send to NetLinx Device" to open the Send to NetLinx Device dialog box.



2. Click Browse (...) to navigate to the target directory. The selected directory path is displayed in the Location text box. KIT files in the target directory display under Files.
3. Select the appropriate KIT file from the list.
4. Enter the Device and System numbers (see FIG. 32 on page 81) for the target unit in the Device and System text boxes.

5. Review the File and Target Device information for accuracy before you send.
6. Click Send to upgrade the firmware on the DXLink Fiber Transmitter or Receiver.

   The Power LED blinks during the process for upgrading the firmware (this is normal).

   The progress of the upgrade displays in the Upload Status field. Status is also indicated in the Status bar at the bottom. The success of the upgrade or any errors that occur will be reported.*

* If an incorrect file has been selected or if the upgrade has failed, the Power LED will briefly illuminate solid green then change to a slow blink. To recover (in either case), reboot the Transmitter or Receiver and browse to select the correct file and then re-send.

7. Close the window when the transfer is complete.
8. When the process is complete, cycle power using the new image on the DXLink Fiber unit (i.e., unplug the desktop power supply from the AC power source and plug it back in).
9. Wait 60 seconds and refresh the System OnLine Tree. Check to be sure the firmware matches the version selected for upgrade.

Reminder

If you set the PC to Static IP Mode for a Virtual NetLinx Master file transfer – when the file transfer is complete, remember to return the setting to "Obtain an IP address automatically" (see page 101).

Appendix B – Telnet (Terminal) Commands

Establishing a Terminal Connection Via Telnet

Telnet terminal communication is accessed remotely via TCP/IP. The DXLink Fiber Transmitter or Receiver must have its own TCP/IP address for a Telnet connection. The connection can be started from the Windows taskbar (see below) or in NetLinx Studio (see the following page).

By default, a username and password are not applied to the Telnet port (Port 23). Therefore, the port does not require login credentials. If you require a username and password for security purposes, directions for setting them are on page 86.

Welcome Banner with and without security enabled (Receiver shown):

- Without Telnet security enabled, a session will begin with a welcome banner similar to the following:

```
Welcome to DXF-RX-xxD v1.0.6 Copyright AMX LLC 2014
>
```

- If Telnet security is enabled, user credentials are required:

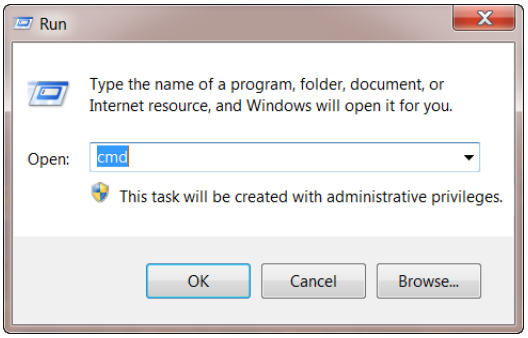
```
Enter username: admin
Enter protected password: ****
Welcome to DXF-RX-xxD v1.0.6 Copyright AMX LLC 2014
>
```

NOTE: *When security is enabled, a user can retry logging in three times before being disconnected (for information on setting a username and password, see page 86).*

IMPORTANT: *If auto-setup mode is being used, Telnet is the only way to access some of the network settings. Also note that some network settings will disable the auto-setup feature (for auto-setup requirements, see the "Quick Reference Table 2 - Modes for Handling Addressing/Networking" on page 21).*

To establish a terminal connection via Telnet at the CMD prompt:

1. From your Windows Taskbar (at far left), select Start > Run to open the Run dialog box.
2. Type cmd in the Open field.



3. Click OK to open an instance of the Windows command interpreter (cmd.exe).
4. At the prompt (>), type telnet followed by a space and the Transmitter or Receiver's IP address. Press Enter.
5. Example:

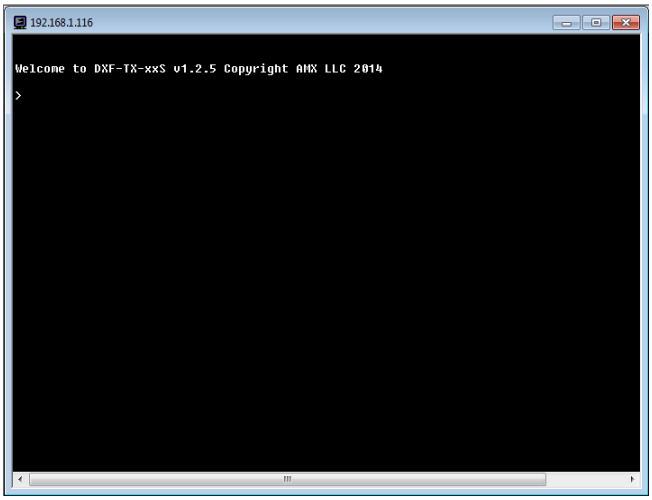
   ```
   >telnet XXX.XXX.XXX.XXX
   ```

   A Telnet session opens for the Transmitter or Receiver and the Welcome Banner appears.*
6. At the prompt, type the Telnet command (see the table starting on page 87) and press Enter.

* If you are using Windows 7 and receive an error message, you may need to enable Telnet by completing the following:
(1) Go to Start / Control Panel / Programs and Features. (2) On the left, select "Turn Windows features on or off."
(3) Select the check-boxes: Telnet Client and Telnet Server. (4) Click OK.

To establish a terminal connection via NetLinx Studio:

1. In the Online Tree, select the DXLink Fiber unit and right-click to access the shortcut menu.
2. Select Launch Telnet Window via NetLinx Studio.
   The Telnet window opens and the Welcome Banner appears (Transmitter shown).



3. At the prompt (>), type the Telnet command and press Enter.

Telnet Username and Password

The following commands are used to set the Telnet username and password for a Telnet connection:

- Set Telnet Username
- Set Telnet Password

By default, both the username and password are blank (empty strings). Performing a factory reset on the device with the ID Pushbutton will return these values to that default. For details, see page 54.

- `Username` – Setting the `Username` will have no effect if the password remains blank (empty string). Defining the username alone will not result in Telnet prompting for a user login.
- `Password` – Setting the `Password` will cause Telnet to prompt for a user login, whether the username has been defined or not. If the username has been defined, this value must be entered. However, since the password can be set independently of the username, it's possible to have a password defined, but the username still at its default (blank, empty string). In this case do not enter anything for the username when prompted. Simply press Enter, which will then present the password prompt. Here, the defined password *must* be entered in order to successfully open the Telnet session.

Additional Notes

- Both the Telnet username and password are case-sensitive.
- Three consecutive, unsuccessful attempts to log in to Telnet will cause the Telnet window to close. Re-launching Telnet will again present the login prompt, with a fresh "batch" of login attempts.
- If a Telnet login fails because of an incorrect username, an "Invalid Password" message will appear (as opposed to an "Invalid Username" message).
- The username and password are saved after reboot or power cycle.
- The username and password are deleted/removed after a factory reset.

Setting a Telnet Username and Password

To set a Telnet username and password for a TX:

IMPORTANT: *DXLink Fiber TX only – To set either the Telnet Username or Password, you must set both of them. If either is left blank (default) the other will not set.*

1. Establish a terminal connection via Telnet (see page 85).
2. Type `Set Telnet Login`, and press Enter.
   a. Required – The program will prompt you to enter a new Telnet username; enter a username and press Enter.
   b. Required – The program will prompt you to enter a new Telnet password; enter a password and press Enter.
   c. Optional – The program will prompt you to enter a login session timeout value (minutes); enter a value and press Enter.
   d. The program will indicate that the new Telnet Login information is being stored.

To set a Telnet username and/or password for an RX:

1. Establish a terminal connection via Telnet (see page 85).
2. Type `Set Telnet Username`, and press Enter.
   a. The program will prompt you to enter a new Telnet username; enter a username and press Enter.

b. The program will indicate that the username is being stored.

3. Type `Set Telnet Password`, and press Enter.
   a. The program will prompt you to enter a password; press Enter twice to clear both the Telnet username and password.
   b. Enter a password and press Enter.
   c. The program will prompt you to re-enter the password; re-enter the password and press Enter.
   d. The program will indicate that the password is being stored.

Telnet Commands

The Telnet commands listed in the table on the following page can be sent directly to the Transmitter or Receiver via a Telnet terminal session.

- The default Telnet port is 23. A value of 0 (zero) disables the Telnet server.*
- Telnet is enabled by default.

* If you set the Telnet port to "0" to disable it, you will need to perform a factory reset using the ID Pushbutton to re-enable it (see page 54).

NOTE: *Enova DGX 100 Series Switchers support Telnet commands and BCS commands over Telnet, while Enova DGX 8/16/32/64 Switchers support BCS tunneling access over TCP/IP. For information, see the applicable manual.*

In the terminal program, type Help or a question mark (?) and press Enter to access the Help Menu and display a list of terminal commands. These commands are included in the table on the following page (commands are listed alphabetically).

NOTE: *If you send a command to a Transmitter and the response is Invalid command, the command may only be valid on a Receiver (or vice versa).*

Telnet Commands

Command	Description
? or Help	Display the commands listed in this table.
ARP	Displays the ARP (Address Resolution Protocol) table. Example: `>arp` `IP Address MAC Address Info` `192.168.43.51 00:1e:4f:a1:82:5d C Resend=0, Age=7529, Expire=7529` `192.168.43.52 00:60:9f:94:94:1f C Resend=0, Age=41854, Expire=41854` `192.168.43.57 00:60:9f:94:ad:8b I-- Resend=0, Age=0, Expire=0` `192.168.43.46 00:0a:cd:1b:6c:1d C Resend=0, Age=932900, Expire=130617`
AUDIO	**NOTE:** *This command applies only to the Receiver.* Shows audio signal status. Example: `>audio` `---------- Audio Output ----------` `Analog Audio ON` `HDMI Audio ON` `Audio Mute OFF` `Audio Input` `N Value` `0x00 0x17 0xFF` `Channel Status Bits` `Audio Type: LPCM` `Dolby TrueHD/DTS Master: No` `Sampling Freq: 44.1kHz` `Channel: 0` `Raw Data:` `0x00 0x00 0x00 0x30 0x73` `Audio InfoFrames` `Channel: 2` `Raw Data:` `0x84 0x00 0x00 0x7C 0x01 0x00 0x00 0x00 0x00` `0x00 0x00 0x00 0x00 0x00`

Telnet Commands	
AVI	**NOTE:** *This command applies only to the Receiver.* Shows AVI InfoFrame status. Example: `>avi` `--------------------------------` `Decoder` `AVI InfoFrame:` `0x82 0x02 0x0D 0x65 0x00 0x08 0x00 0x02 0x00` `0x00 0x00 0x00 0x00 0x00 0x00 0x00` `Packet Type: 0x82` `Version Type: 0x02` `Length: 0x0D` `Checksum: 0x65 (Valid)` `Color Space: RGB` `Colorimetry: No Data` `VIC: 2` `Pixel Repetition: 1x`
CLEAR MASTER USERNAME	Clears the Master username.
CLEAR USB STATS	**NOTE:** *This command applies only to the Transmitter.* Clears the USB statistics.
DATE	Displays the current date.
DEVICE STATUS	Displays device status of a specified device, port, system (<D:P:S>). **NOTE:** *Devices other than the DXLink Fiber device itself will be ignored.* Example: `>device status 32002:1:0` `Device Status` `------------` `Device 32002 AMX LLC, DXF-TX-xxD, v1.2.6 contains 8 Ports` `Port 1 - Channels:255 Levels:8` `MaxStringLen=64 Types=8 bit MaxCommandLen=64 Types=8 bit` `The following input channels are on:None` `The following output channels are on:None` `Level 1=0 Supported data types=UByte,UInt` `Level 2=0 Supported data types=UByte,UInt` `Level 3=0 Supported data types=UByte,UInt` `Level 4=0 Supported data types=UByte,UInt` `Level 5=0 Supported data types=UByte,UInt` `Level 6=0 Supported data types=UByte,UInt` `Level 7=0 Supported data types=UByte,UInt` `Level 8=0 Supported data types=UByte,UInt`
DIPSWITCH	Displays the current value for each of the DIP switch's four toggles. Example: `>dipswitch` `Board Switch Settings:` `DIP# Setting Description` `1 ON: Enable ICS LAN` `2 OFF: Manual DXLink mode` `3 ON: Enable Network` `4 OFF: Force unidirectional mode`
DNS LIST	Displays list of DNS settings. Example: `>dns list` `DNS List` `------------` `Domain suffix: amx.internal` `The following DNS IPs are configured` `Entry 1: 192.168.40.7` `Entry 2: 192.168.40.8`
ECHO	**NOTE:** *This command applies only to the Transmitter.* Toggles echo of local characters on and off. Enter `echo on` or `echo off` or simply re-enter `echo` to toggle between on and off.

Telnet Commands	
ENCODER	**NOTE:** *This command applies only to the Receiver.* Shows video encoder status. Example: `>encoder` `------------------------------` `Video Encoder (ADV7511)` `TMDS On` `Mute Unmuted` `HDCP Screen No`
EXIT	Closes the current Telnet session.
FACTORY APP	**NOTE:** *This command applies only to the Transmitter.* Resets the application to the factory image. **NOTE:** *This command does not reset the factory parameters.*
FACTORYFWIMAGE	Resets unit to factory firmware image and parameters and reboots the DXLink Fiber unit. **NOTE:** *When a Transmitter is connected to a DXLink Fiber Input Board, the input board will override the "ALL RESOLUTIONS" EDID and load the last stored EDID.*
FWIMAGES	Displays firmware version information.
GET CONFIG	Displays the current connection settings. Example: `>get config` `Device number: 8010` `Connection Settings` `------------------------------` `Mode: NDP` `System Number: 3155` `Master IP/URL: 192.168.44.53` `Master Port: 1319` `Username:` `Password:` `IP Settings` `------------------------------` `HostName: DXLF-TX-2075028` `Type: DHCP` `IP Address: 192.168.44.86` `Subnet Mask: 255.255.255.0` `Gateway IP: 192.168.44.2` `MAC Address: 00:0f:3c:00:55:04` `DHCP Server : 192.168.43.2` `Lease Origin : THU 01/09/2031 12:59:02` `Lease Duration : SUN 01/12/2031 12:59:02 (259200 sec)` `Lease Renew (T1): SAT 01/11/2031 00:59:02 (129600 sec)` `Lease Rebind (T2): SUN 01/12/2031 03:59:02 (226800 sec)` `DNS Servers` `------------------------------` `Domain suffix: amx.internal` `Entry 1: 192.168.40.7` `Entry 2: 192.168.40.8` **NOTE:** *The system number and IP addressing information displayed is reflective of actual operating values, not stored parameters.*
GET CONNECTION	Shows the Master connection information. Example: `>get connection` `Connection Settings` `------------------------------` `Mode: UDP URL` `System Number: 1` `Master IP/URL: 192.168.44.53` `Master Port: 1319` `Username:` `Password:`

Telnet Commands	
GET DEVICE	Displays the device number. Example: `>get device` `Device Number` `----------` `Stored Value: 0 (dynamic)` `Active Value: 32005`
GET DNS	Gets the list of DNS entries. Example: `>get dns` `DNS Servers` `----------` `Domain suffix: amx.internal` `Entry 1: 192.168.40.7` `Entry 2: 192.168.40.8` **NOTE:** *When the DXLink Fiber unit is in DHCP Mode, these are active values, NOT the stored values that only apply to Static IP Mode.*
GET ETHERNET MODE	**NOTE:** *This command applies only to the Receiver.* Displays the current LAN configuration setting. Settings are *either* "auto" in which the LAN driver will discover its settings based on the network it is connected to *or* <speed> and <duplex> where speed is either 10 or 100 and duplex is either half or full (10 half, 10 full, 100 half, 100 full). Example: `>GET ETHERNET MODE` `Ethernet mode is auto.` **NOTE:** *See SET ETHERNET MODE on page 93.*
GET FRIENDLY	Displays the device's friendly name (for NDP). Example: `>GET FRIENDLY` <name>
GET IP	Displays the IP configuration of a device. The device displays its D:P:S, Host Name, Type (DHCP or Static), IP Address, Subnet Mask, Gateway IP, and MAC Address. Example: `>GET IP` `HostName DXLF-TX-2075028` `Type DHCP` `IP Address 192.168.44.86` `Subnet Mask 255.255.255.0` `Gateway IP 192.168.44.2` `MAC Address 00:0f:3c:00:55:04` (also displays "Lease" details; see example for the GET CONFIG command)
GET LOCATION	Displays the location parameter for NDP, which is set by using the *SET LOCATION* command (see page 94).
GET PULSE TIME	Displays the current pulse time in milliseconds. Example: `>get pulse time Pulse Time is now: 500`
GET SN	Returns the device's serial number.
GET SYSTEM NUMBER	Displays the stored system number. Example: `>get system number` `System Number` `----------` `Stored Value: 0 (preferred for auto mode)` `Active Value: 1 (connected NDP)`

Telnet Commands	
GET USB	**NOTE:** *This command applies only to the Transmitter.* Displays USB statistics. Example: `>get usb` `USB Statistics :` `Number of USB Connections : 0` `Number of Keyboard Messages : 0` `Number of Mouse Messages : 0` `Number of Table Messages : 0` `Number of Connections : 0` `Number of Disconnects : 1` `Number of Errors : 0`
IP STATUS	Displays the IP status. Example: `>ip status` `NetLinx IP Connections` `Connected to 192.168.43.52, port 1319`
LED [ON|OFF]	Enables/Disables LEDs for identification.
NDP UNBIND	Clears the NDP binding to a Master (requires reboot to take effect).
OFF	Turns off the specified channel.
ON	Turns on the specified channel.
PING [ADDRESS]	Pings an address (IP or URL), to test network connectivity to and confirms the presence of another networked device. The syntax matches the PING application in Windows or Linux. Example: `>ping 192.168.29.209` `192.168.29.209 is alive.`
PULSE	Pulse specified [D:P:S], channel.
REBOOT	Reboots the DXLink Fiber unit. Example: `>REBOOT` `Rebooting...`
RENEW DHCP	Renews / Releases the current DHCP lease for the DXLink Fiber unit. **NOTE:** *Because sending this command can result in the unit acquiring a new DHCP address and the functionality of the endpoints is dependent on the mated IP addresses of the TX (host) and RX (device), the USB connection may need to be reestablished.* Example: `>RENEW DHCP`
RESET FACTORY	Resets the device's stored parameters to factory default state including removal of all security settings, resetting to DHCP. This command will cause an automatic reboot. **NOTE:** *This command does not reset the device to the factory software image.* **NOTE:** *When a Transmitter is connected to a DXLink Fiber Input Board, the input board will override the "ALL RESOLUTIONS" EDID and load the last stored EDID.*

Telnet Commands	
SCALER	**NOTE:** *This command applies only to the Receiver.* Shows video scaler status. Example: `>scaler` `--------------------------------` `Scaler Input` `Width 1920` `Height 1200` `VFreq 60` `VIC 0` `ZoomW 1920` `ZoomH 1200` `Interlace 0` `Scaler Output` `Width 1280` `Height 1024` `VFreq 60` `VIC 0` `ARWidth 1280` `ARHeight 800` `Interlace 0` `scalarMux 1` `aspectRatio 0` `pixelRep 1` `imageFreeze 0` `testPattern 0` `DnSclHeight 800` `DnSclWidth 1280` `UpSclHeight 800` `UpSclWidth 1280` `VClipOffset 0` `ClipHeight 1200` `ClipTopOff 0` `VClipOffset 0` `ClipWidth 1920` `ClipLeftOff 0`
SEND_COMMAND [D:P:S,"'command'"]	Sends the specified SEND_COMMAND (does not work with queries) to the current DXLink Transmitter or Receiver. **NOTE:** *Commands cannot be forwarded to other D:P:S. Asynchronous notifications are available for the Transmitters via Telnet (and NetLinx Studio).* Example: `send_command 6501:1:0,"'VIDIN_AUTO_SELECT-ENABLE'"`
SEND_STRING [D:P:S,"string"]	Sends the specified SEND_STRING to the current DXLink Transmitter or Receiver or connected Master. **NOTE:** *Commands cannot be forwarded to other D:P:S. Asynchronous notifications are available for the Transmitters via Telnet (and NetLinx Studio).* Example: `send_string 32001:1:1,"27,18,0"`
SET CONNECTION	Sets the Master connection settings interactively, allowing the user to specify the mode (for descriptions of various connection modes, see page 98). • If the mode is TCP or UDP, the Master URL and port number can be specified as well. • If Auto is selected, the System number can be specified. • After all data is entered, if the parameters have changed, the DXLink Fiber unit will disconnect from the Master, and begin trying to connect with the new settings. **NOTE:** *These changes do not require a reboot to take effect.*

Telnet Commands	
SET DEVICE	Sets the device number, and stores it in non-volatile memory. Syntax: `SET DEVICE <num>` The valid range of device numbers is 0 to 31999. • If the user enters a number outside that range, then no change will be made and the DXLink Fiber unit will issue an error message. • A Device Number of '0' means that the DXLink Fiber unit will accept the auto-assigned device number from the Master. • If the new device number is different from the old device number, the DXLink Fiber unit will disconnect from the Master, and begin trying to connect with the new settings. **NOTE:** *These changes do not require a reboot to take effect.*
SET DNS	Sets the DNS configuration of the DXLink Fiber unit, only as applied to Static IP Mode (DNS settings in DHCP Mode are received from the DHCP server). Syntax: `SET DNS` This command prompts you to enter a Domain Name, DNS IP #1, DNS IP #2, and DNS IP #3. • Enter Y (yes) to approve/store the information in the Master. • Enter N (no) cancels the operation. **NOTE:** *The device must be rebooted to enable new settings.* Example: `>SET DNS` `-- Enter New Values or just hit Enter to keep current settings --` `Enter Domain Suffix: amx.com` `Enter DNS Entry 1 : 192.168.20.5` `Enter DNS Entry 2 : 12.18.110.8` `Enter DNS Entry 3 : 12.18.110.7` `You have entered: Domain Name: amx.com` `DNS Entry 1: 192.168.20.5` `DNS Entry 2: 12.18.110.8` `DNS Entry 3: 12.18.110.7` `Is this correct? Type Y or N and Enter -> Y` `Settings written. Device must be rebooted to enable new settings`
SET ETHERNET MODE	**NOTE:** *This command applies only to the Receiver.* This command sets the current LAN configuration settings per new mode. Syntax: `SET ETHERNET MODE <m>` Values for *<m> (mode)* are: auto, 100 full, 100 half, 10 full, 10 half **NOTE:** *This command requires a reboot to enable new settings.* Examples: `set ethernet mode auto` `set ethernet mode 100 full` **NOTE:** *See GET ETHERNET MODE on page 90.*
SET FRIENDLY	Set the device's friendly name for NDP to <name>. Syntax: `SET FRIENDLY <name>` • Maximum length = 25 characters. If the name entered exceeds 25 characters, it will be truncated. • The value is stored in non-volatile memory. • If no value specified, an automatic name consisting of AMX, the product name, and serial number will be used. **NOTE:** *This command requires a reboot to enable new settings.*

Telnet Commands	
SET IP	Sets the IP configuration of a specified device. Enter a Host Name, Type (*DHCP* or *Fixed*), IP Address, Subnet Mask, and Gateway IP Address. **IMPORTANT:** *Host Names may only contain ASCII letters "a" through "z" (not case-sensitive), digits "0" through "9", and the hyphen ("-").* **NOTE:** *DHCP implies "DHCP with link-local fallback".* **NOTE:** *For NetLinx Masters, the Host Name can only consist of alphanumeric characters.* • Enter Y (yes) to approve/store the information on the Master. • Enter N (no) to cancel the operation. **NOTE:** *This command requires a reboot to enable new settings.* Example: `>SET IP` `--- Enter New Values or just hit Enter to keep current settings ---` `Enter Host Name: DXLF-TX-2075028` `Enter IP type. Type D for DHCP or S for Static IP and then Enter: DHCP` `You have entered: Host Name DXLF-TX-2075028` `Type DHCP` `Is this correct? Type Y or N and Enter -> y` `Settings written. Device must be rebooted to enable new settings.` **NOTE:** *DXLink Fiber units can also be set to Static IP or DHCP Mode via the front panel ID Pushbutton.*
SET LOCATION	Sets the location parameter for NDP. Syntax: `SET LOCATION <location>` • Maximum length = 25 characters. If the name entered exceeds 25 characters, it will be truncated. **NOTE:** *This command requires a reboot to enable new settings.*
SET MASTER PASSWORD	Sets the password for the Master.
SET MASTER USERNAME	Sets the username for the Master.
SET PULSE TIME	Sets the pulse time. • Value range for pulse time = 10 to 5000 milliseconds.
SET SYSTEM NUMBER	Sets the system number. Syntax: `SET SYSTEM NUMBER <system number>` • The valid range of system numbers is from 0 to 65535.
SET TELNET LOGIN	**NOTE:** *This command applies only to the Transmitter.* Sets the Telnet username and password.
SET TELNET PORT	Sets the device's IP port listened to for Telnet connections. Example: `>SET TELNET PORT` `Current telnet port number = 23` `Enter new telnet port number (Usually 23)(0 = disable Telnet):` Once you enter a value and press the Enter key, you get the following message: `Setting telnet port number to 23` `New telnet port number set, reboot the device for the change to take effect.` **NOTE:** *This command requires a reboot to enable new settings.* **IMPORTANT:** *If you set the Telnet port to "0" to disable it, you will need to perform a factory reset using the ID Pushbutton to re-enable it (see page 54).*
SET TELNET PASSWORD	**NOTE:** *This command applies only to the Receiver.* Sets the username for a secure Telnet session. • Default = blank (no password required) • For details, see page 86
SET TELNET USERNAME	**NOTE:** *This command applies only to the Receiver.* Sets the username for a secure Telnet session. • Default = blank (no username required) • For details, see page 86

Telnet Commands	
SHOW ANALOG STATS	**NOTE:** *This command applies only to the Transmitter.* Displays information about the analog signal. Example: `>show analog stats` `Detected Timing: 1920x1080p , 60.0 Hz` `Format: VGA` `Scan Type: PROGRESSIVE` `Sync Type: SEPARATE` `H Sync Active: YES` `V Sync Active: YES` `H Sync Polarity: POSITIVE` `V Sync Polarity: POSITIVE` `Block Length: 3191` `Field Length: 1757` `Lines/Vsync: 5` `Lines/Field: 1125`
SHOW CONNECTION LOG	Shows the Master Connection log for the device.
SHOW CONNECTION STATS	Shows the connection statistics for the device. Output similar to the following example: `>show connection stats` `Connection Statistics` `Total Last 15 Minutes` `===== ===============` `ICSP Messages: 10039 received 333 received` `10038 transmitted 333 transmitted` `Blink Messages: 5014 received 166 received` `IP Statistics:` `RX packets:29298 errors:0 discarded:0` `TX packets:15286 errors:0 discarded:0`
SHOW DECODER DUMPS	**NOTE:** *This command applies only to the Transmitter.* Displays decoder register information. Example (partial due to length of decoder dump): `>show decoder dumps` `ADV7623 IO Registers (8-bit address 0xb2):` `00 01 02 03 04 05 06 07 : 08 09 0a 0b 0c 0d 0e 0f` `----------------------------------------------------------------` `00 -0a 05 f2 00 62 2c a0 40 : 14 00 90 44 42 1e 0f 1e` `10 -00 00 c9 0d 6a a0 43 5a : 34 00 02 00 00 00 00 20` `20 -ff 00 00 03 00 00 00 00 : 00 00 00 00 00 00 00 00` `30 -88 00 00 00 00 00 00 00 : 00 00 00 00 00 00 00 00` `40 -20 30 14 00 00 00 10 00 : 00 00 00 00 00 00 00 00` `50 -00 00 00 00 00 00 00 00 : 00 00 00 0a 00 00 00 0c` `60 -03 00 00 00 fd 4c 00 00 : 00 f9 44 00 00 00 ff 07`
SHOW DIGITAL STATS	**NOTE:** *This command applies only to the Transmitter.* Displays information about the digital signal. Example: `>show digital stats` `Transmitter Video Signal` `Video mode: HDMI` `Upstream video is not freerun.` `Is not 3D` `1920 x 1200 5994 (Hz*100)` `PClk: 15399 (MHz/10000) HFreq: 7403 (Hz*100), VIC: 0` `HBlank: 48+33+79=160 HTotal: 2080` `VBlank: 6+12+52=35 VTotal: 1235` `Interlaced: False` `Replication Factor: 1` `Deep Color: 8 bits` `Color Space: RGB 444` `Video is not encrypted.`

Telnet Commands	
SHOW DNS	**NOTE:** *This command applies only to the Transmitter.* Shows the DNS settings. Example: `>show dns` `DNS Servers` `----------` `Domain suffix: amx.internal` `Entry 1: 192.168.40.7` `Entry 2: 192.168.40.8`
SHOW LOG	Displays the message log. Syntax: `SHOW LOG <start>` • specifies the message number to start displaying `SHOW LOG <all>` **or** `SHOW LOG` • displays all messages
SHOW MASTER CONNECTION URL	Shows Master connection information. Example: `>show master connection url` `Master Connection URL` `----------` `Master IP/URL: 192.168.1.91` `Master Port: 1319`
SHOW NDP INFO	Displays NDP information. Example: `>show ndp info` `Stored Parameters:` `Master Connection Mode : NDP` `MAC Address for bound Master : 00:60:9f:94:94:1f` `Current Parameters:` `Current NDP state is : NdpFound` `Number of announcements : 2` `Current Master IP Address : 192.168.43.52`
SHOW ROUTE	Shows all active network routes the device detects. Example: `>show route` `Active Routes` `----------` `Network Netmask Gateway` `0.0.0.0 0.0.0.0 192.168.43.2` `127.0.0.0 255.0.0.0 127.0.0.1` `192.168.43.0 255.255.255.0 127.0.0.1`
SHOW TCP	Shows the TCP list. Example: `>show tcp Show TCP List` `----------` `The following TCP connections exist(ed):` `1: 192.168.43.57:23 <=> 192.168.43.51:51418 (connected)` `2: Port:24 (listening)` `3: Port:23 (listening)` `4: Port:7 (listening)`
SHOW UDP	Shows the UDP list. Example: `>show udp Show UDP List` `----------` `The following UDP ports are listening:` `1: Port:1319` `2: Port:68 (DHCP client)` `3: Port:7` `4: Port:2222` `5: Port:4998`

Telnet Commands	
SHOW XG STATS	**NOTE:** *This command applies only to the Transmitter.* Displays information about the XG connection. Example (partial due to length of stats): `>show xg stats` `*************** XG Block Information ***************` `I2C 8-bit Address: 0x52` `I2C 7-bit Address: 0x29` `FW Version: 1.0.0.4` `FW ID: 0x20A0` `HW ID: 0x0000` `Interface Version: 0x20` `FPGA Version: 0x13` `Build Date/Time: Feb 22 2014/13:56:06`
TAIL	**NOTE:** *Direct use of this command applies only to the Transmitter. Using the TAIL command for the Receiver requires superuser remote bug access.* Outputs the device log.
TIME	Displays the current time.
VERSION	Displays the version information for the DXLink Fiber device. Example: `>version` `Device: DXF-TX-xxD` `Serial: 1010560012345678` `MAC Addr : 00:60:9f:9a:9d:35` `Hardware : 0.2` `DXLF Boot: v1.0.4` `DXLF App : v1.2.6` `DXLF Link: v1.0.1.2`
VIDEO	**NOTE:** *This command applies only to the Receiver.* Shows video signal status. Example: `>video` `------------------------------` `Input Video Signal` `==================` `Input Video` `-----------` `Video Signal Valid` `FreeRun VSIF Not Set` `Video Type HDMI` `Width 1920` `Height 1200` `Refresh Rate 60Hz` `Scan Type Progressive` `Encrypted Video Disabled` `InfoFrames` `----------` `Aspect Ratio No Data` `Color Space RGB` `Pixel Rep 1x` `VIC 2` `Deep Color 8-bit` `Output Video Signal` `==================` `Output Video` `------------` `ScalarMux Manual` `Width 1280` `Height 1024` `VFreq 60Hz` `VIC 0` `TMDS On`

Telnet Commands	
VSIF	**NOTE:** *This command applies only to the Receiver.* Shows video VSIF information. Example: `>vsif` `--------------------------------` `Decoder` `Vendor Specific InfoFrame:` `0x81 0x01 0x1C 0x47 0xD0 0x00 0x01 0x02 0x01` `0x00 0x01 0x00 0x00 0x03 0x00 0x00 0x00` `0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00` `0x00 0x00 0x00 0x00 0x00 0xBD` `Packet Type: 0x81` `Version Type: 0x01` `Length: 0x1C` `Checksum: 0xBD (Valid)` `Audio Injected: No` `3d Video: No` `Encryption Status: Not Encrypted` `Free Run: Not Set` `Video Stream: HDMI`
XG	**NOTE:** *This command applies only to the Receiver.* Displays information about the XG fiber link status control. Usage: `xg info` Shows XG block information `xg stats` Shows XG block statistics `xg stats on 5000` Enables periodic logging of stats every 5 seconds (view with the 'tail' command) `xg stats off` Disables periodic logging of stats `xg shortstats` Shows XG brief statistics `xg dump` Shows hex dump of XG block registers `xg reset` Resets the XG FPGA `xg reboot-remote` Executes a hard reboot of the Transmitter (only for Duplex RX to TX in Bidirectional Mode directly connected) `xg reboot-local` Executes a hard reboot of the Receiver
XG STATS	**NOTE:** *This command applies only to the Receiver.* Shows the XG block statistics.

Master Connection Modes

The mode of communication used for connection to the Master is specified via the SET CONNECTION Telnet command (see page 92).

The connection mode setting options are AUTO, TCP URL, UDP URL, or NDP (default) as described below.

- **AUTO** – This mode utilizes TCP communication. It looks for a matching System Number and attempts to come online with the first Master it sees with that System Number.
- **TCP URL** – TCP; the Master is specified via URL.
- **UDP URL** – UDP; the Master is specified via URL.
- **NDP – UDP**; this mode utilizes the NDP binding process to assign the DXLink Fiber unit (the physical device) to a Master (or Virtual Master) via NetLinx Studio. Once bound, communications are conducted via UDP.

NOTE: *In URL modes, the Master can use either an IP address or a DNS name.*

Guidelines

UDP mode is recommended for the following types of installations:

- Small-to-medium residential and corporate installations on a single subnet
- Segmented control network installations (control network is a separate switching domain and subnet from other network equipment)
- Installations with the total of NetLinx / ICSNET devices on a single Master exceeding 128

TCP mode is recommended for installations where (a) the switching domain of the network is subject to “bursty” traffic or heavy streaming activity (>20 Mbps consumption by streaming) and where (b) the total number of NetLinx / ICSNET devices on a single Master is less than 128.

TCP vs. UDP

- **TCP** – Protocol has a built-in retry mechanism.
- **UDP** – Protocol does not have a built-in retry mechanism, but consumes fewer resources on the Master. AMX's UDP implementation of NetLinx employs a retry mechanism to provide the reliability of TCP with the resource efficiency of UDP.

URL vs. NDP vs. Auto

Determining which connection method to use for Master Connection Mode is essentially a matter of deciding what information the device should use to identify the correct Master to connect to.

The default mode is NDP; the mode can be changed via the SET CONNECTION Telnet command (see page 92).

- **URL** – The device connects to the Master with the specified URL. The device must be configured with the URL of a specific Master via the SET CONNECTION Telnet command (see page 92).
- **NDP** – The device connects to the Master it's been bound to, which is based on the Master's MAC address. The binding is configured via NetLinx Studio. Once bound, the device must be unbound using either NetLinx Studio or the NDP UNBIND Telnet command before being re-bound to a different Master.
- Alternatively, NDP devices can be bound/unbound via options on the Master's Web Configuration pages (System > Manage NetLinx). For details, refer to the *WebConsole & Programming Guide – NX-Series Controllers* (see section on "System - Manage NetLinx").
- **Auto** – The device connects to the first Master it finds with the specified System Number. The device must be configured with the desired system number via the SET CONNECTION Telnet command (see page 92).
- Use of the Auto method requires that only one Master has any particular system number and is visible to the subnet. If this is the case, then Auto is the simplest choice. However, with Auto, you are not hard-bound to a particular Master. Therefore, if at some point in the future, another Master is configured with the same system number, the result is that the DXLink Fiber unit could show up on that other Master.

Notes on Specific Telnet Clients

Telnet and terminal clients exhibit different behaviors in some situations. This section states some of the known anomalies.

Windows Client Programs

Anomalies occur when using a Windows® client if you are not typing standard ASCII characters (i.e., using the keypad and Alt key to enter decimal codes). Most programs will allow you to enter specific decimal codes by holding Alt and using keypad numbers.

Example

For example, hold Alt, hit the keypad 1, then hit keypad 0, then release Alt. The standard line feed code is entered (decimal 10). Windows will perform an ANSI to OEM conversion on some codes entered this way because of the way Windows handles languages and code pages.

The following codes are known to be altered, but others may be affected depending on the computer's setup.

- Characters 15, 21, 22, and any characters above 127.

This affects both Windows Telnet and terminal emulation programs.

Linux Telnet Client

The Linux Telnet client has three anomalies that are known at this time:

- A null (\00) character is sent after a carriage return.
- If an "Alt 255" is entered, two of the "255" characters are sent (per the Telnet RAFT).
- If the code to return to Command mode is entered (Alt 29 which is CTRL+]), the character is not sent, but the Telnet Command Mode is entered.

Appendix C – Virtual NetLinx Master

Overview Virtual NetLinx Master (Masterless)

A Virtual NetLinx Master can be created using your PC, which allows NetLinx Studio to facilitate direct file transfers to a DXLink Fiber Transmitter or Receiver when a Master is not available.

Four basic procedures must be completed for Virtual Master file transfers:

- Set the PC to a static IP address (below).
- Create a Virtual Master in NetLinx Studio (page 101).
- Prepare the DXLink Fiber Transmitter or Receiver by placing it in Static IP Mode, assigning a device ID, and setting the connection type to TCP (page 102).
- Transfer the files using a Virtual Master TCP/IP connection (for IRL file transfers, see page 56; for Firmware file transfers, see page 81).

Setting PC to Static IP Address

IMPORTANT: *When you change the PC's settings to a static IP address, the address must be in the same subnet as the DXLink Fiber unit (the default static IP address for DXLink Fiber Transmitters and Receivers is 192.168.1.2).*

Important Information for PCs with Multiple Network Access Points

If the PC has more than one point of network access (multiple NIC cards or wireless networking), check to see if one of the connections uses an IP address of 192.168.1.x before proceeding.

To check for multiple networks:

1. Open the PC's Start menu (at the lower left of the desktop on the Taskbar) and select Run.
2. Enter `cmd` and click OK.
3. At the prompt, enter `ipconfig /all` and press the Enter key.
4. Check the IP Addresses under Connection.

If the PC or Laptop is currently using a connection with an IP address of 192.168.1.x, you will need to disconnect the connection.

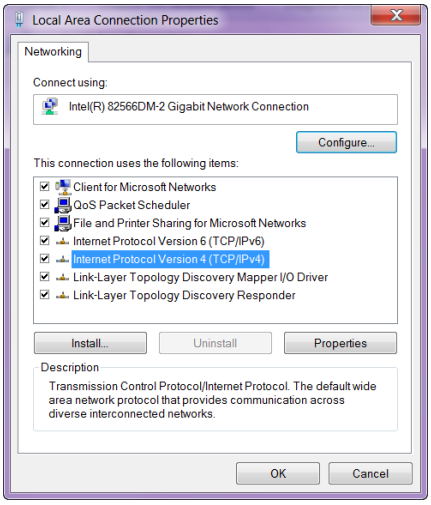
To disconnect a network connection:

1. **Modem:** From the Start menu on the desktop task bar, select Settings \ Network Connections.
   Wireless: From the Start menu on the desktop task bar, select Control Panel \ Network and Internet \ Manage Wireless Networks.
2. Right-click the network connection and select Disable.

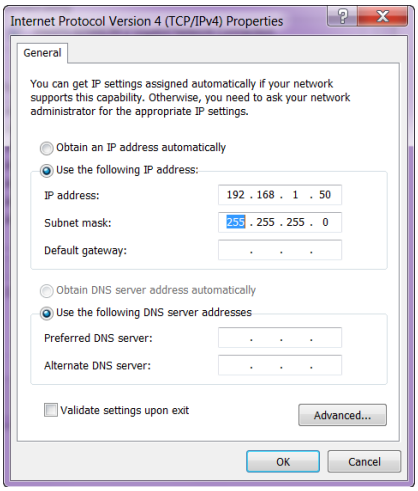
NOTE: *The following procedure was completed on Windows 7 Professional (other versions may vary slightly).*

To set a PC to Static IP Mode:

1. From the Start menu on the desktop taskbar, select Control Panel / Network and Sharing Center.
2. Click "Change adapter settings" (top left).
3. Right-click on Local Area Connection and select Properties.
   The Local Area Connection Properties dialog box opens.



4. From the list of “This connection uses the following items” (see previous page), highlight Internet Protocol Version 4 (TCP/IPv4) and click Properties.
   The Internet Protocol Version 4 (TCP/IPv4) Properties dialog box opens.



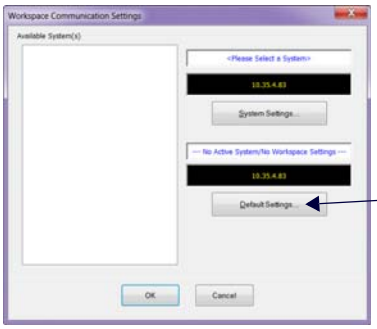
5. Select “Use the following IP address” and enter 192.168.1.50 (or the IP range of the Enova DGX).
6. Press the Tab key on your keyboard to auto-fill the Subnet mask field.
7. Click OK and click Close.

IMPORTANT: *When finished using the PC as a Virtual Master, change the setting in the dialog box shown in Step 4 back to “Obtain an IP address automatically.”*

Creating a Virtual Master

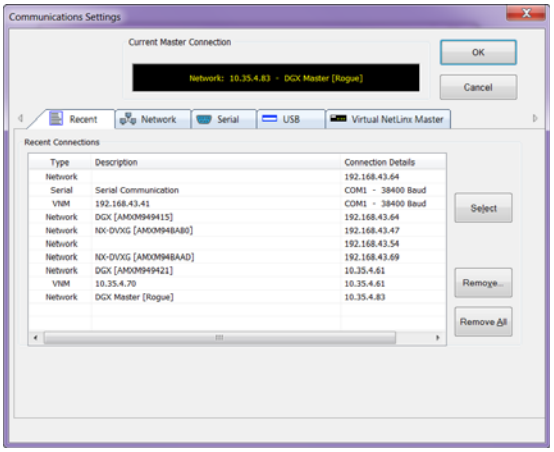
To create a Virtual Master in NetLinx Studio:

1. Open NetLinx Studio.
2. From the Settings menu, select Workspace Communication Settings.

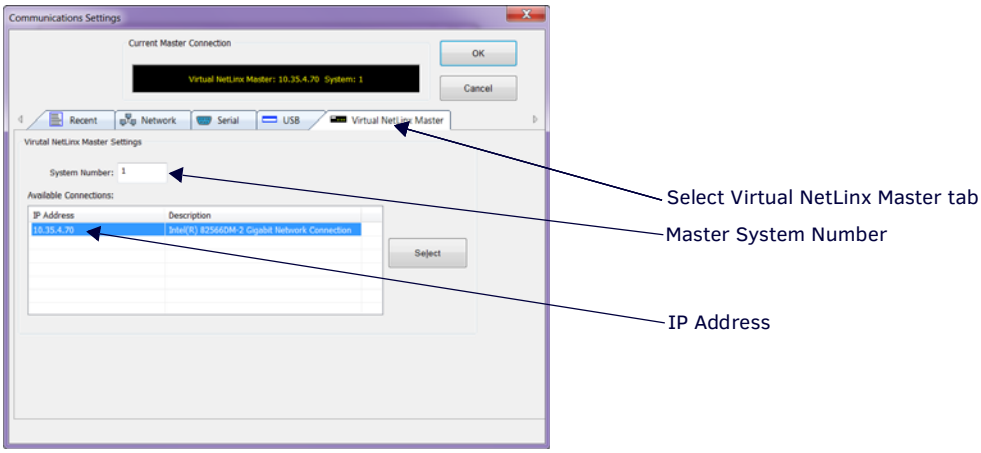


Click to open the Communication Settings dialog box

3. Click the Default Settings button.
   The Communication Settings dialog box opens.



4. Select the Virtual NetLinx Master tab.



5. Under Virtual NetLinx Master Options:
   a. **Optional** – Change the Master System Number (default = 1; range = 1 to 65535).
   b. Select the desired IP Address in the Available Connections list (this will be the static IP address that the PC was set to in the previous instructions).
6. Click Select.
7. Click OK to save the changes and close the dialog box.
   The Virtual Master displays in the NetLinx Studio's OnLine Tree.

IMPORTANT: *When transferring files via a Virtual Master, a direct connection must be made between the DXLink Fiber unit and the PC via the unit's ICS LAN 10/100 port.*

Preparing a TX/RX to Work with a Virtual Master

Preparing the DXLink Fiber Transmitter or Receiver to work with a Virtual Master requires placing the unit in Static IP Mode, assigning it a device ID, and setting the connection type to TCP.

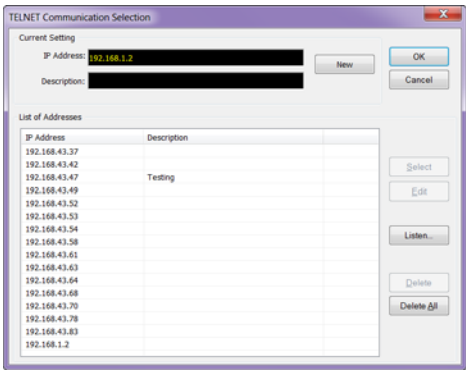
NOTE: *When using the first set of instructions below, only one DXLink Fiber TX/RX can be connected to the Virtual Master at a time because the static IP address is the same for all DXLink Fiber units.*

To place a DXLink Fiber unit in Static IP Mode:

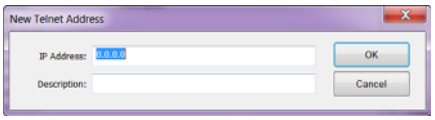
1. Connect the DXLink Fiber unit via its ICS LAN 10/100 port to the PC acting as a Virtual Master.
2. Set the DIP Switch's #1 and #3 Toggles to ON.
3. Apply power to the DXLink Fiber unit.
4. Once the DXLink Fiber unit has booted up (the Power LED on the front of the unit turns a constant green, indicating a ready state), press and hold the ID Pushbutton for at least 10 seconds.
5. The NetLinx LEDs toggle back and forth during this time and then blink faster in unison; release when the faster blink starts.
   - When the ID Pushbutton is released, the DXLink Fiber unit toggles either from static to dynamic (DHCP) IP addressing or vice versa and remains in that mode until the ID Pushbutton is used to set it again.
   - The DXLink Fiber unit automatically reboots to complete the process.

To assign a device ID and set the connection type:

1. From the Tools menu in NetLinx Studio, select Telnet Session.
   The TELNET Communication Selection dialog box opens.



2. Click the New button.
   The New Telnet Address dialog box opens.



3. Enter the default static IP address for the unit: 192.168.1.2 and click OK.
4. Select the new address in the List of Addresses.
5. Click the Select button and click OK.
6. A Telnet session opens.
7. At the prompt (>), type `SET DEVICE <num>` and press Enter.
8. For the <num> value, the valid range of device numbers is 0 to 31999.
9. Setting a device number does not require a reboot to take effect.
10. At the prompt, type `SET CONNECTION` and press Enter.
11. Specify TCP for the connection and the PC's static IP address for the Master.
    The Transmitter or Receiver displays under the Virtual Master and is now ready for file transfers.

NOTE: *The process can be repeated for additional Transmitters and Receivers.*

File transfers via a Virtual Master:

- IRL file transfers – page 56
- Firmware file transfers – page 81

IMPORTANT: *Once you have finished using the Virtual Master – if you disabled a network connection before setting the PC's static IP address, be sure to disable the Virtual Master's network connection and enable the original connection.*

Appendix D – Cable Details and Pinout Info

Overview

The DXLink Fiber Transmitters and Receivers each have an HDMI connector. The Transmitters also have an HDMI output connector on the front for sending the video signal directly from the source to a local destination device. This connection supports the same input resolutions contained in the first table in "Appendix E - Supported Input Resolutions" (see page 107).

IMPORTANT: *System configurations will vary, necessitating different cable requirements for each system. Cables not available through AMX should come from a trusted cable supplier.*

NOTE: *When cabling video through either the HDMI port or HD-15 port, installers should be aware of how cabling will affect audio signals. For information on audio precedence, see "Audio Type Precedence" on page 38.*

HDMI Connector Cable Pinout

HDMI connectors are found on all DXLink Fiber units. These connectors are used to pass HDMI or DVI-D signals (using a DVI-to-HDMI cable) from a source device to a DXLink Fiber Transmitter or from a DXLink Fiber Receiver to a destination device. They are also used to provide an HDMI signal out from the Transmitters to a local destination device. The following table provides cable pinout details for HDMI connections.

HDMI Connector Cable Pinout	
Pin #	**Signal Assignment**
1	TMDS Data 2+
2	TMDS Data 2 Shield
3	TMDS Data 2-
4	TMDS Data 1+
5	TMDS Data 1 Shield
6	TMDS Data 1-
7	TMDS Data 0+
8	TMDS Data 0 Shield
9	TMDS Data 0-
10	TMDS Clock+
11	TMDS Clock Shield
12	TMDS Clock-
13	CEC
14	Utility
15	SCL
16	SDA
17	DDC/CEC Ground
18	+5 V Power (max. 55 mA)
19	Hot Plug Detect

NOTE: *DVI-to-HDMI cables may be required for particular system needs (see page 106).*

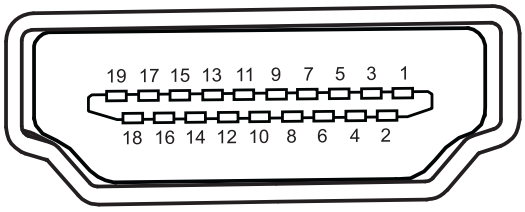


FIG. 33 Pinout table and HDMI receptacle pins on DXLink Fiber unit

HD-15 Connector Cable Pinout

HD-15 connectors are found on the DXLink Fiber Transmitters. These connectors are used to accept a variety of analog video signals from a source device. The following table provides cable pinout details for HD-15 connections for VGA, VGA-RGBS, VGA-RGsB, component, S-Video, and composite.

HD-15 Connector Cable Pinout

Input Pin #	VGA-RGBHV	VGA-RGBS	VGA-RGsB	Component	S-Video	Composite
1	Red	Red	Red	Pr	n/c	n/c
2	Green	Green	Green+Sync	Y	Y	Composite
3	Blue	Blue	Blue	Pb	C	n/c
4	n/c	n/c	n/c	n/c	n/c	n/c
5	GND	GND	GND	n/c	n/c	n/c
6	GND - Red	GND - Red	GND - Red	GND - Pr	n/c	n/c
7	GND - Green	GND - Green	GND - Green	GND - Y	GND - Y	GND - Composite
8	GND - Blue	GND - Blue	GND - Blue	GND - Pb	GND - C	n/c
9	+5 V DDC	+5 V DDC	+5 V DDC	n/c	n/c	n/c
10	GND	GND	GND	n/c	n/c	n/c
11	n/c	n/c	n/c	n/c	n/c	n/c
12	DDC_SDA	DDC_SDA	DDC_SDA	n/c	n/c	n/c
13	H Sync	S	n/c	n/c	n/c	n/c
14	V Sync	n/c	n/c	n/c	n/c	n/c
15	DDC_SCL	DDC_SCL	DDC_SCL	n/c	n/c	n/c

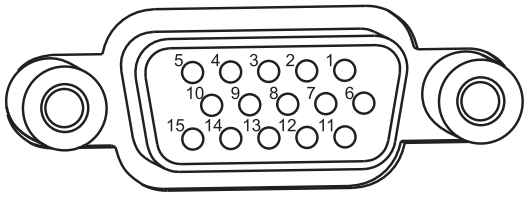


FIG. 34 Pinout table and HD-15 receptacle pins on DXLink Fiber unit

DVI Pinout for DVI-to-HDMI Cable

The pinout in FIG. 35 is for the DVI receptacle for a DVI-to-HDMI cable which can be used with the DXLink Fiber unit when a DVI-D source signal is required.

DVI Cable Connector Pinout	
DVI Input Pin #	**Signal Name**
1	Data 2-
2	Data 2+
3	Gnd
4	n/c
5	n/c
6	DDC-CLK
7	DDC-Data
8	n/c
9	Data 1-
10	Data 1+
11	Gnd
12	n/c
13	n/c
14*	+5 VDC in
15	Gnd
16	Hot-Detect
17	Data 0-
18	Data 0+
19	Gnd
20	n/c
21	n/c
22	Gnd
23	CLK+
24	CLK-

*The +5 VDC on output pin 14 supplies a maximum of 55 mA.

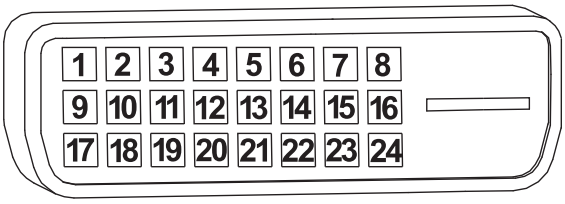


FIG. 35 Pinout table and DVI-D pinout for DVI-D receptacle

Appendix E – Supported Input Resolutions

Available Pixel Display and Refresh Rate

The available pixel display and refresh rates for the input devices connected to the DXLink Fiber Transmitters are listed in this appendix.

The resolutions in the following tables are supported on the DXLink Fiber Transmitters and can be set using a SEND_COMMAND. The horizontal/vertical/refresh information from the Resolution Name (in the first column) can be entered in a SEND_COMMAND (`VIDIN_PREF_EDID`) to specify the preferred resolution for the various video inputs (DVI, HDMI, and VGA) for the Transmitters. For complete command information, see page 60.

DVI, HDMI, and VGA Supported Input Resolutions

DVI, HDMI, and VGA Supported Input Resolutions

Resolution Name	Horizontal Active Pixels	Vertical Active Pixels	Refresh (Hz)	HDMI and DVI Support	VGA Support	Comments	Video Standard
640x400,85	640	400	85	✓	✓		VESA DMT
640x480,60	640	480	60	✓	✓		VESA DMT
640x480,72	640	480	72	✓	✓		VESA DMT
640x480,75	640	480	75	✓	✓		VESA DMT
640x480,85	640	480	85	✓	✓		VESA DMT
720x400,85	720	400	85	✓	✓		VESA DMT
720x480p,60	720	480	60	✓	✓	480p	CEA 861
720x480p,120	720	480	120	✓	✓	480p	CEA 861
720x480p,240	720	480	240	✓	✓	480p	CEA 861
720x576p,50	720	576	50	✓	✓	576p	CEA 861
720x576p,100	720	576	100	✓	✓	576p	CEA 861
720x576p,200	720	576	200	✓	✓	576p	CEA 861
800x600,56	800	600	56	✓	✓		VESA DMT
800x600,60	800	600	60	✓	✓		VESA DMT
800x600,72	800	600	72	✓	✓		VESA DMT
800x600,75	800	600	75	✓	✓		VESA DMT
800x600,85	800	600	85	✓	✓		VESA DMT
848x480,60	848	480	60	✓	✓		VESA DMT
848x480,75	848	480	75	✓	✓		VESA CVT
848x480,85	848	480	85	✓	✓		VESA CVT
1024x640,60	1024	640	60	✓	✓		VESA CVT
1024x768,60	1024	768	60	✓	✓		VESA DMT
1024x768,70	1024	768	70	✓	✓		VESA DMT
1024x768,75	1024	768	75	✓	✓		VESA DMT
1024x768,85	1024	768	85	✓	✓		VESA DMT
1152x864,75	1152	864	75	✓	✓		VESA DMT

DVI, HDMI, and VGA Supported Input Resolutions (continued)							
Resolution Name	**Horizontal Active Pixels**	**Vertical Active Pixels**	**Refresh (Hz)**	**HDMI and DVI Support**	**VGA Support**	**Comments**	**Video Standard**
1280x720,60	1280	720	60	✓	✓		VESA DMT
1280x720p,60	1280	720	60	✓	✓	720p	CEA 861
1280x720p,100	1280	720	100	✓	✓	720p	CEA 861
1280x720p,120	1280	720	120	✓	✓	720p	CEA 861
1280x768,60	1280	768	60	✓	✓		VESA DMT
1280x768,75	1280	768	75	✓	✓		VESA DMT
1280x768,85	1280	768	85	✓	✓		VESA DMT
1280x800,60	1280	800	60	✓	✓		VESA CVT
1280x960,60	1280	960	60	✓	✓		VESA DMT
1280x960,85	1280	960	85	✓	✓		VESA DMT
1280x1024,60	1280	1024	60	✓	✓		VESA DMT
1280x1024,75	1280	1024	75	✓	✓		VESA DMT
1280x1024,85	1280	1024	85	✓	✓		VESA DMT
1360x768,60	1360	768	60	✓	✓		VESA DMT
1400x1050,60	1400	1050	60	✓	✓		VESA DMT
1400x1050,75	1400	1050	75	✓	✓		VESA DMT
1440x900,60	1440	900	60	✓	✓		VESA DMT
1440x900,75	1440	900	75	✓	✓		VESA DMT
1440x900,85	1440	900	85	✓	✓		VESA DMT
1600x1200,60	1600	1200	60	✓	✓		VESA DMT
1680x1050,60	1680	1050	60	✓	✓		VESA CVT
1920x1080i,50	1920	540	50	✓		HDMI & DVI only - 1080i	CEA 861
1920x1080i,60	1920	540	60	✓		HDMI & DVI only - 1080i	CEA 861
1920x1080p,25	1920	1080	25	✓	✓	1080p	CEA 861
1920x1080p,30	1920	1080	30	✓	✓	1080p	CEA 861
1920x1080p,50	1920	1080	50	✓	✓	1080p	CEA 861
1920x1080,60	1920	1080	60		✓	Reduced Blanking	VESA CVT
1920x1080p,60	1920	1080	60	✓	✓	1080p	CEA 861
1920x1200,60	1920	1200	60	✓	✓	Reduced Blanking	VESA CVT

Composite and S-Video Supported Input Resolutions

Composite and S-Video Supported Input Resolutions					
Resolution Name	**Horizontal Active Pixels**	**Vertical Active Pixels**	**Refresh (Hz)**	**Comments**	**Video Standard**
720x480i,60	720	240	60	480i	CEA
720x576i,50	720	288	50	576i	CEA

Component Video Supported Input Resolutions

Component Video Supported Input Resolutions					
Resolution Name	**Horizontal Active Pixels**	**Vertical Active Pixels**	**Refresh (Hz)**	**Comments**	**Video Standard**
720x480i,60	720	240	59.9	480i	CEA 770.2
720x480p,60	720	480	59.9	480p	SMPTE 293M CEA 770.2 ITU-R BT. 1358
720x576i,50	720	288	50	576i	
720x576p,50	720	576	50	576p	ITU-R BT. 1358
1280x720p,60	1280	720	59.9	720p	SMPTE 296M CEA 770.3
1920x1080i,50	1920	540	50	1080i50	SMPTE 274M
1920x1080i,60	1920	540	59.9	1080i	SMPTE 274M CEA 770.3
1920x1080p,50	1920	1080	50	1080p50	SMPTE 274M
1920x1080p,60	1920	1080	59.9	1080p	SMPTE 274M

Appendix F – Supported Output Resolutions

HDMI and DVI Supported Output Resolutions

The resolutions in the following table are supported on the DXLink Fiber RX and can be set using a SEND_COMMAND. The horizontal/vertical/refresh information from the Resolution Name (in the first column) can be entered in a SEND_COMMAND command (VIDOUT_RES_REF) to specify scaling parameters for the DXLink Fiber RX. For complete command information, see page 60.

NOTE: *The resolutions and timings in the table below can only be changed with SEND_COMMANDs.*

HDMI and DVI Supported Output Resolutions

Resolution Name	Horizontal Active Pixels	Vertical Active Pixels	Refresh (Hz)	Comments	Video Standard
640x480,60	640	480	60		VESA DMT
640x480,72	640	480	72		VESA DMT
640x480,75	640	480	75		VESA DMT
800x600,60	800	600	60		VESA DMT
800x600,72	800	600	72		VESA DMT
800x600,75	800	600	75		VESA DMT
1024x768,60	1024	768	60		VESA DMT
1024x768,70	1024	768	70		VESA DMT
1024x768,75	1024	768	75		VESA DMT
1280x720p,60	1280	720	60	720p	CEA 861
1280x768,60	1280	768	60		
1280x800,60	1280	800	60		VESA CVT
1280x1024,60	1280	1024	60		VESA DMT
1360x768,60	1360	768	60		VESA DMT
1440x900,60	1440	900	60		VESA CVT
1400x1050,60	1400	1050	60		VESA CVT
1600x1200,60	1600	1200	60		VESA DMT
1680x1050,60	1680	1050	60		VESA CVT
1920x1080,60	1920	1080	60	1080	VESA CVT
1920x1080p,60	1920	1080	60	1080p	CEA 861
1920x1200,60	1920	1200	60	Reduced Blanking	VESA CVT-R

Digital Video Output Resolution Support

IMPORTANT: *The resolutions and timings in the lists in this section can only be set using DGX Configuration Software via the Enova DGX Switcher when the DXLink Receiver is being used directly from a DXLink Fiber Output Board.*

CEA (RGB Color Space):

640x480p,59Hz
720x480p,59Hz
720(1440)x480i,59Hz
720x480p,60Hz
720x480p,119Hz
720x480p,120Hz
720x480p,239Hz
720x480p,240Hz
720x576p,50Hz
720(1440)x576i,50Hz
720x576p,100Hz
720x576p,200Hz
768x576p,50Hz
960x576p,50Hz
960(1920)x576i,50Hz
1280x720p,23Hz
1280x720p,24Hz
1280x720p,25Hz
1280x720p,29Hz
1280x720p,30Hz
1280x720p,50Hz
1280x720p,59Hz
1280x720p,60Hz
1280x720p,100Hz
1280x720p,119Hz
1280x720p,120Hz
1920x1080p,23Hz
1920x1080p,24Hz
1920x1080i,25Hz
1920x1080p,25Hz
1920x1080i,29Hz
1920x1080p,29Hz
1920x1080i,30Hz
1920x1080p,30Hz
1920x1080p,50Hz
1920x1080p,59Hz
1920x1080p,60Hz

CVR (RGB Color Space):

768x480p,60Hz
800x600p,60Hz
800x600p,120Hz
848x480p,60Hz
960x600p,60Hz
1024x576p,60Hz
1024x640p,60Hz
1024x768p,60Hz
1024x768p,120Hz
1064x600p,60Hz
1152x720p,60Hz
1152x864p,60Hz
1224x768p,60Hz
1280x720p,60Hz
1280x768p,60Hz
1280x768p,120Hz
1280x800p,120Hz
1280x960p,60Hz
1280x1024p,60Hz
1360x768p,60Hz
1360x768p,120Hz
1400x1050p,60Hz
1440x900p,60Hz
1536x960p,60Hz
1600x1000p,60Hz
1600x1200p,60Hz
1680x1050p,60Hz
1704x960p,60Hz
1728x1080p,60Hz
1800x1350p,60Hz
1864x1050p,60Hz
1920x1080p,60Hz
1920x1200p,60Hz

CVT (RGB Color Space):

640x360p,85Hz
640x400p,75Hz
640x400p,85Hz
640x480p,75Hz
640x480p,85Hz
768x480p,60Hz
768x480p,75Hz
768x480p,85Hz
800x600p,50Hz
800x600p,60Hz
800x600p,75Hz
800x600p,85Hz
848x480p,50Hz
848x480p,60Hz
848x480p,75Hz
848x480p,85Hz
960x600p,50Hz
960x600p,60Hz
960x600p,75Hz
960x600p,85Hz
1024x576p,50Hz
1024x576p,60Hz
1024x576p,75Hz
1024x576p,85Hz
1024x640p,50Hz
1024x640p,60Hz
1024x640p,75Hz
1024x640p,85Hz
1024x768p,50Hz
1024x768p,60Hz
1024x768p,75Hz
1024x768p,85Hz
1064x600p,50Hz
1064x600p,60Hz
1064x600p,75Hz
1064x600p,85Hz
1152x720p,50Hz
1152x720p,60Hz
1152x720p,75Hz
1152x720p,85Hz
1152x864p,60Hz
1224x768p,50Hz
1224x768p,60Hz
1224x768p,75Hz
1224x768p,85Hz
1280x720p,50Hz
1280x720p,60Hz
1280x720p,75Hz
1280x720p,85Hz
1280x768p,50Hz
1280x768p,60Hz
1280x768p,75Hz
1280x768p,85Hz
1280x800p,50Hz
1280x800p,75Hz
1280x800p,85Hz
1280x960p,50Hz
1280x960p,60Hz
1280x960p,75Hz
1280x960p,85Hz
1280x1024p,50Hz
1280x1024p,60Hz
1280x1024p,75Hz
1280x1024p,85Hz
1360x768p,50Hz
1360x768p,60Hz
1360x768p,75Hz
1360x768p,85Hz
1400x1050p,50Hz
1400x1050p,60Hz
1400x1050p,75Hz
1440x900p,60Hz
1440x900p,75Hz
1440x900p,85Hz
1536x960p,50Hz
1536x960p,60Hz
1536x960p,75Hz
1600x1000p,50Hz
1600x1000p,60Hz
1600x1200p,50Hz
1600x1200p,60Hz
1680x1050p,50Hz
1680x1050p,60Hz
1704x960p,50Hz
1704x960p,60Hz
1728x1080p,50Hz
728x1080p,60Hz
1864x1050p,50Hz
1864x1050p,60Hz
1920x1080p,50Hz
1920x1200p,50Hz

DMR (RGB Color Space):

1280x800p,60Hz
1366x768p,60Hz
1600x900p,60Hz

DMT (RGB Color Space):

640x350p,85Hz
640x400p,85Hz
640x480p,60Hz
640x480p,72Hz
640x480p,75Hz
640x480p,85Hz
720x400p,85Hz
800x600p,56Hz
800x600p,60Hz
800x600p,72Hz
800x600p,75Hz
800x600p,85Hz
848x480p,60Hz
1024x768i,43Hz
1024x768p,60Hz
1024x768p,70Hz
1024x768p,75Hz
1024x768p,85Hz
1152x864p,70Hz
1152x864p,75Hz
1152x864p,85Hz
1280x800p,60Hz
1280x960p,60Hz,
280x960p,75Hz
1280x960p,85Hz
1280x1024i,43Hz
1280x1024p,60Hz
1280x1024p,75Hz
1280x1024p,85Hz
1360x768p,60Hz
1366x768p,60Hz
1600x1200i,48Hz
1600x1200p,60Hz

Appendix G – Fiber Transceiver Replacement

Applicability Notice

This appendix pertains to replacement of SFP+ fiber optic transceivers for the DXLink Fiber Transmitters and Receivers listed in the tables on page 7.

FIG. 36 SFP+ Fiber Optic Transceiver (blue handle = single mode; black handle = multimode)

The process for removing and replacing transceivers is the same in Enova DGX DXLink Fiber Boards as it is in the DXLink Fiber units and the same for multimode transceivers (black latch) as it is for single mode transceivers (bright blue latch).

Items Required

- ❑ Replacement SFP+ fiber optic transceiver
- ❑ DXLink Fiber unit or DXLink Fiber board
- ❑ ESD wristband and cord with alligator clip
- ❑ ESD shielded bag for storage of removed transceiver

IMPORTANT: *Compatibility between hardware requires matching model types: multimode to multimode and single mode to single mode.*

Important Information for Fiber Transceiver Replacement

WARNING: DXLink Fiber units use laser transceivers, which are Class 1 Eye Safe per IEC 60825-1/CDRH requirements. While the Class 1 category indicates that the invisible laser used is safe, we recommend avoiding direct eye exposure when using any optical fiber products (see the OSHA directive on page 9).

- Replacement transceivers *must* match those replaced: either multimode or single mode.
- Adding or replacing SFP+ transceivers should be done only by personnel trained to handle ESD sensitive parts and assemblies.
- If disposal of transceivers is necessary, dispose of them as mandated by your area or country guidelines.

NOTE: *When fiber optic transceivers are not cabled (e.g., for shipping or storage), replace the dust plugs that originally shipped with the product.*

ESD WARNING: To avoid ESD (Electrostatic Discharge) damage to sensitive components, make sure you are properly grounded before touching any internal DXLink Fiber TX/RX materials. Use an ESD wristband and cord with an alligator clip attached to a good ground source.

Replacing an SFP+ Fiber Optic Transceiver

Tips for Fiber Optic Connections:

- ❑ Keep dust plugs in transceivers until you are ready to make a connection.
- ❑ Clean fiber optic cable ends before attaching to transceivers (be sure to follow the cable manufacturer's instructions for inspecting and cleaning the cable ends).
- ❑ Use gentle pressure when connecting fiber cables to transceivers (normally an audible click is heard when the connector engages).
- ❑ If unsure the connection is properly seated, gently tug on the transceiver.
- ❑ If fiber cables are removed from the transceivers, reinsert dust plugs.
- ❑ Multimode transceivers only – If you are unsure that a multimode transceiver is passing a signal, hold the unattached end of the fiber optic cable away from you and take a picture of it with a digital camera (or cell phone camera). The image will show a bright light if the signal is being passed (works on some digital cameras and cell phone cameras).

In the following procedure, read each step entirely. The steps include helpful tips to avoid damage to DXLink Fiber products.

To remove and replace an SFP+ fiber optic transceiver:

12. Disconnect fiber cables or dust plugs that are attached to the SFP+ fiber optic transceiver.
13. Using the tip of the index finger, swing the transceiver latch out and down.

FIG. 37 Flip transceiver latch out and down (DXLink Fiber Transmitter shown)

14. Use the handle to release and carefully pull the transceiver completely free from its socket.

FIG. 38 Pull transceiver free from transceiver socket

15. Restore the removed transceiver's latch to an upright position and replace the dust plug that originally shipped with the transceiver. Place the transceiver in an ESD shielded bag and set aside.

TIP: *Leave the dust plug in the replacement transceiver for Step 5 to reduce possibility of damaging the transceiver/socket.*

16. With the replacement transceiver's latch in the up (locked) position, gently insert the transceiver straight into the transceiver socket until resistance is felt (an audible click will be heard when it is fully seated).

FIG. 39 Insert transceiver into transceiver socket

17. Verify proper seating by gently pulling on the transceiver with the latch in the locked position.

FIG. 40 Transceiver latch in upright position

18. Remove the dust plug and save for future use.
19. Attach the fiber cable (see “Tips for Fiber Optic Connections” on page 115).
20. Test the signal path.

Appendix H – EDID Management/Programming

DXLink Fiber and EDID

Applicability

This appendix applies to DXLink Fiber units used in conjunction with an Enova DGX 8/16/32/64 Switcher.

IMPORTANT: *If the TX/RX units are configured for auto-setup via a connected Enova DGX 100 Series Switcher or an Enova DGX 8/16/32/64 Switcher with a 100 Series CPU, the information in this chapter will not apply. For information on using the System Configuration interface to handle EDID management/programming concerns, see the "Hardware Reference Manual – Enova DGX 100 Series Digital Medial Switchers."*

EDID Overview

EDID (Extended Display Identification Data) is a data structure established by the Video Electronics Standards Association (VESA) to enable plug-and-play support by enabling easy configuration of a source's graphics subsystem based on the capabilities of the attached display device.

EDID information includes items such as the following:

- Manufacturer's name
- Product type
- Supported video resolutions and refresh rates
- Color space and filter chromaticity
- Detailed timings

When a source is directly connected to a display device, it can use the display device's EDID information to determine an initial compatible video signal to send. With the source's display controls, the user can modify this selection to another compatible signal based on the provided EDID information.

AMX DXLink supported EDIDs

Many EDIDs can be stored on the DXLink Transmitter and the DXLink Fiber Input board for each input – HD-15 (analog) and HDMI (digital).

The AMX DXLink supported EDIDs are classified as follows:

- ALL RESOLUTIONS (default for both analog and digital inputs)
- WIDE-SCREEN
- FULL-SCREEN
- USER EDID 1
- USER_EDID_MODIFIED
- MIRROR OUT 1
- MIRROR_OUT_LOCAL

Any one of these EDIDs can be loaded and activated for their respective input connection by using the command `VIDIN_EDID` (see page 67).

When a TX is directly connected to and RX (Duplex hardware each in Bidirectional Mode), the EDID always defaults to MIRROR OUT 1, which is the EDID of the downstream sink connected to the RX. This is true over a power cycle, a hot plug of either cable, or reboot.

When a TX is connected to a DXLink Fiber Input Board, these EDIDs and the active EDID persist over a power cycle of the Transmitter, the switcher, or both, as well as when the attached Transmitter is replaced with a new Transmitter.

Analog and digital EDIDs function similarly but are managed for each input independently.

IMPORTANT: *For all analog (VGA) EDIDs, to detect a new EDID the source must be power cycled.*

ALL RESOLUTIONS, WIDE-SCREEN, and FULL-SCREEN

These three EDIDs come preprogrammed, loaded for both analog and digital inputs. These EDIDs are fixed and cannot be modified. The ALL RESOLUTIONS EDID will cover most video configurations resulting in high quality video at the displays. The other EDIDs are provided for those special cases that require refinement of the supported resolutions or preferred timings to achieve the best image for each display.

EDID Name	Digital Description	Analog Description
ALL RESOLUTIONS	1080p preferred; Basic Audio (Default, ALL RESOLUTIONS)	1080p preferred (Default VGA EDID, ALL RESOLUTIONS)
FULL-SCREEN	1600x1200 preferred (FULL-SCREEN resolutions); Basic Audio	1600x1200 preferred (FULL-SCREEN resolutions)
WIDE-SCREEN	1080p preferred (WIDE-SCREEN resolutions); Basic Audio	1080p preferred (WIDE-SCREEN resolutions)

USER EDID 1

This EDID is empty until an EDID is programmed/uploaded by using DGX Configuration software. It can be programmed either through the switcher and Input board that the Transmitter is connected to or through the USB Program port on the Transmitter. If the command is sent to load USER EDID 1 prior to any EDID being programmed, then the previously loaded EDID will remain on the input.

EDID Name	Digital Description	Analog Description
USER EDID 1	User supplied custom EDID	User supplied custom EDID

USER_EDID_MODIFIED

This EDID is empty until a preferred timing is set through the SEND_COMMAND: VIDIN_PREF_EDID. For a table listing supported input resolutions that can be made the preferred EDID timing, see page 107. This EDID modifies the current active EDID by replacing the preferred timing with the format desired.

EDID Name	Digital Description	Analog Description
USER_EDID_MODIFIED	EDID containing preferred timing set by SEND_COMMAND 'VIDIN_PREF_EDID-<format>'	EDID containing preferred timing set by SEND_COMMAND 'VIDIN_PREF_EDID-<format>'

MIRROR OUT 1

This EDID mirrors the downstream EDID of the connected DXLink device. When connected to a DXLink Input Board, this EDID will be the same as USER EDID 1.

EDID Name	Digital Description	Analog Description
MIRROR OUT 1	Interpreted as USER EDID 1 when TX is connected to a DXLink Fiber Input Board*	Interpreted as USER EDID 1

* When the Transmitter is connected directly to a Receiver, the EDID from the RX's connected display will be presented to the digital input. This is only supported when both of the units are Duplex hardware operating in full Bidirectional Mode with the return data path established.

MIRROR_OUT_LOCAL

This EDID is the digital EDID from the last sink attached to the local out port. This can only be applied to the HDMI input. This EDID does not persist over a power cycle. If you wish this EDID to persist, you can load it onto the HDMI input using the SEND_COMMAND: VIDIN_EDID-MIRROR_OUT_LOCAL, read it using DGX configuration software from the HDMI input and then writes it back to the HDMI input. The EDID will then be saved as USER EDID 1.

EDID Name	Digital Description	Analog Description
MIRROR_OUT_LOCAL	EDID read from sink connected to LOCAL OUT	NA

NOTE: *A Duplex Transmitter in Bidirectional Mode will use the ALL RESOLUTIONS default EDID until it receives information from the display device (or SEND_COMMAND or DGX Configuration Software) that requires a different EDID. Since a Transmitter in Unidirectional Mode (or connected to a Receiver or Input Board in Unidirectional Mode) has no return data path to receive EDID information from the display device, the EDID will always be the default EDID, ALL RESOLUTIONS, for the Digital input.*

AMX EDID Library

An AMX EDID Library is available at www.amx.com (search for EDID Library). This library provides EDID files that can be used with AMX products. A report is provided for each EDID file, which describes the EDID features in detail, in order to assist you in selecting the most appropriate EDID for your system needs.

- Check the Library to determine if one of the custom EDID files meets your needs. (The custom EDID files are variants of base/standard EDIDs.)
- DGX Configuration Software can be used to reprogram the EDID on the input port with one of the .edid files provided in the EDID library.

DGX Configuration Software Overview

IMPORTANT: *Because signals routed through DXLink Fiber Transmitters normally produce a quality image, you will not need the information in this appendix unless the installation has special EDID requirements for HDMI or VGA.*

IMPORTANT: *DGX Configuration Software can be used either with an individual Transmitter (all Directional Modes) or with a complete switcher run (TXs/RXs and I/O boards) with fiber strands connected on all transceiver ports and the run in Bidirectional Mode. The instructions on this page and the next page address using the software with an individual Transmitter. For instructions on using DGX Configuration with a complete switcher run, see the "Instruction Manual – Enova DGX 8/16/32/64 Digital Media Switchers."*

AMX's DGX Configuration Software has a tabbed view for EDID Programming. This view can be used to re-program the EDID EEPROM chips for the HD-15 and HDMI connectors on the DXLink Fiber Transmitters, allowing for custom configuration of the EDID data that is stored on them.

NOTE: *Scaling and HDCP settings can be applied via SEND_COMMANDs (see the chapter "NetLinx Programming of DXLink Fiber Transmitters and Receivers" on page 60). If a DXLink Fiber Receiver is connected to an Enova DGX DXLink Fiber Output Board, DGX Configuration Software can be used via the Enova DGX for scaling (see the "Instruction Manual – Enova DGX 8/16/32/64 Digital Media Switchers").*

DGX Configuration Software is available at www.amx.com (see the DXLink Fiber Transmitter product pages) and includes a standard Help file with detailed information.

PC System Requirements for DGX Configuration Software v1.0.6

- Windows 7 and Windows XP Professional
- Minimum Hardware: 166 MHz, 128 MB RAM, 36 MB of free disk space*, 800x600 display, serial port, video card with dual outputs (see Caution below)
- Recommended Hardware: 2.0 GHz, 512 MB RAM*

* The installation process requires 36 MB of disk space for the DGX Configuration Software installer. Once installed, the program requires 10 MB of disk space.

CAUTION: *We strongly urge the user not to use video cards with DMS-59 connectors. Video cards with DMS-59 connectors have been shown to fail consistently and, in the worst case, can corrupt an EDID data file. A laptop PC with a VGA or DVI out is a good solution. Cards with 2 DVI connectors, 2 VGA connectors, or 1 DVI and 1 VGA connector are also acceptable.*

Software Installation on PC

IMPORTANT: *Administrator rights are required to install DGX Configuration Software.*

To install DGX Configuration Software:

1. From the DXLink Fiber Transmitter's product page at www.amx.com (under Application Files on the right) double-click, "DGX Configuration Software."
2. Click "I Accept" for the AMX License Agreement, and then select Open to download the file.
3. Optional – Select DGX_Config_SoftwareReadMe_vX_X to read about the software before installation.
4. Click the application file (which is zipped).
5. In the Compressed (zipped) Folders dialog box, click Extract All.
6. Select a destination for the files.
7. When the download is complete, click the application file and follow the directions in the installation wizard.

DXLink Fiber Connection to PC

The following instructions are for setting up an EDID for a DXLink Fiber Transmitter (all Directional Modes) with attached downstream RX. For procedures that address setting up an EDID for a DXLink Fiber board, rather than a Transmitter, see the *Instruction Manual – Enova DGX 8/16/32/64 Digital Media Switchers* at www.amx.com.

To use DGX Configuration Software with a DXLink Fiber Transmitter:

1. Attach one end of a USB mini-B cable to the Program port on the front of the DXLink Fiber Transmitter.
2. Attach the open end of the USB mini-B cable to the PC where the DGX Configuration Software was installed.
3. Apply power to the Transmitter.
4. On the PC, open the DGX Configuration Software.

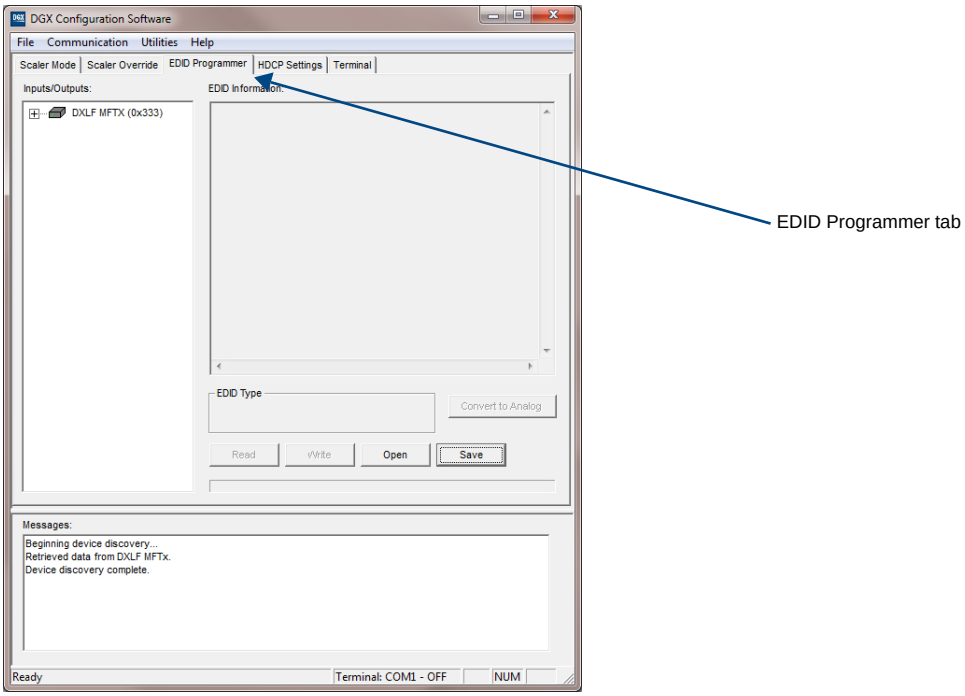
NOTE: *The PC will automatically establish a virtual COM port on the Transmitter.*

5. If changing the communication settings is necessary*:
   a. From the Communication menu (in the DGX Configuration Software), select Serial Port.
   b. Select Change Settings to change the serial port and/or the baud rate for the PC's serial port.

      The baud rate for the PC must match the baud rate for the Transmitter. The recommended (default) baud rate setting for serial communication over USB with DXLink Fiber Transmitters is 115200.
   c. If you changed any of the settings, from the Communication menu select Refresh Device Lists.

* If you are unsure of the USB Serial Port (COM <number>) being used, on the PC go to Start > Control Panel > Device Manager and expand the "Ports" to verify the COM number.

6. Select the EDID Programmer tab in the interface (defaults to the Scaler Mode tab*).



* Scaling and HDCP settings can be applied via SEND_COMMANDs (see page 60).

General Notes for Working with DGX Configuration Software and DXLink Fiber TXs

- When a DXLink Fiber TX is connected to a PC running DGX Configuration Software, the following applies:
- DGX Configuration Software displays the connected Transmitter only.
- File menu – Select Open File to load an .edid file to the program. Select Save to File to save an .edid file containing the currently displayed settings in the EDID Programmer view.
- Communication menu – Use to change the serial communication settings. This menu also includes the option to "Refresh Device Lists," which will refresh the device list in the EDID Programmer tab.
- Utilities menu – This menu does not apply to DXLink Fiber Transmitters.
- Help menu – Select to access the Help file for the program or open a link for the Web Update option (to download updates for the program) or view current version information.
- Messages in the bottom pane of the DGX Configuration Software dialog box report status of operations. Messages can be copied* for technical support purposes.

* Right-click on a message to access a shortcut menu with options to Copy Selected, Copy All, or Clear. When copying multiple messages: either select consecutive items by holding down the Shift key and clicking the first and last item or select nonconsecutive items by holding down the Control key and clicking on each item.

EDID Programmer View

From the EDID Programmer view, EDID EEPROM chips for the HD-15 (VGA) or HDMI connector on the Transmitter can be re-programmed if necessary.

NOTE: *An explanation of EDIDs in available at the beginning of this appendix (page 118).*

DXLink Fiber Equipment and EDID

In cases where the HD-15 (VGA) or HDMI input on a DXLink Fiber Transmitter is used and a resolution incompatibility exists (or if the source device needs a specific resolution or a limited set of resolutions), the DXLink Fiber Transmitters have the ability to update the VGA or HDMI EDID emulation file (by updating the EEPROM chip) which comes preloaded with an AMX VGA or HDMI EDID set.

The AMX VGA EDID set and the AMX HDMI EDID set each consist of a number of common EDID settings (for VGA and HDMI timing details, see page 107). In most cases, the DXLink Fiber Transmitter can be used as is from the factory with no adjustments.

The DGX Configuration Software with EDID programming functionality has been provided for cases where a user defined EDID set is desired (this must be a subset of the supported input resolutions shown in Appendix E; see page 107). The EDID Programmer view can be used for writing user defined VGA or HDMI EDID data to the DXLink Fiber Transmitter's HD-15 or HDMI input.

Reading and Saving EDID Data from a DXLink Fiber Transmitter's Input Connector

When DGX Configuration Software discovers and displays "Inputs" for an DXLink Fiber Transmitter, the input contains two options to allow for reading from either the VGA (HD-15) or HDMI input.

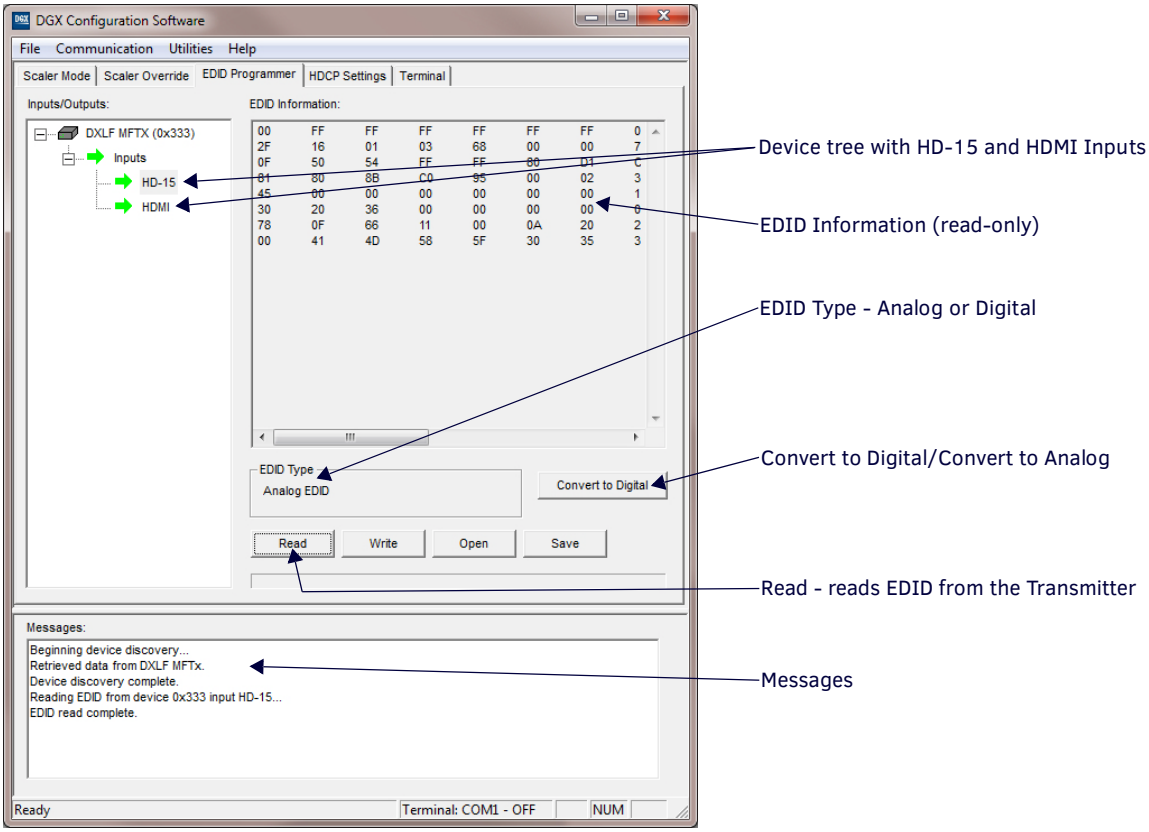
The DGX Configuration Software reads the EDID data from the USER EDID 1 EEPROM location, regardless of the VIDIN_EDID setting.

NOTE: *DXLink Fiber Transmitter or Receiver in Unidirectional Mode – The source device can never access the EDID from the downstream sink (destination device); the source device will always use the default EDID of "All Resolutions" from the Transmitter. DXLink Fiber Transmitter and Receiver in Bidirectional Mode – The TX will store the EDID from the downstream sink on the Digital Input and present the EDID to the source device.*

The EDID data can be read to confirm the correct EDID has been programmed.

To read and save EDID data from a DXLink Fiber Transmitter input:

1. On the PC, open the DGX Configuration Software and select the EDID Programmer tab.
2. Under Inputs/Outputs on the left, expand the device tree, and select either the HD-15 or HDMI Input.



3. Click Read to read the EDID information currently on the selected Input (HD-15 or HDMI).
   The EDID data appears in the EDID read-only field on the right.

TIP: *In the EDID Programmer view, the Save to File option under the File menu can be used to save the EDID information as an .edid file. The saved file can be opened as a text file (from the File menu, select Open File) and edited or opened and written to an input (click the Write button).*

Read Error Message

A Read Error message will appear when attempting to read the EDID after sending a FACTORYAV SEND_COMMAND, which re-initializes the USER EDID 1 EEPROM and resets the VIDIN_EDID setting to ALL RESOLUTIONS (**AMX_HDMI1v3__Standard** for HDMI and **AMX_VGA1v2__Standard** for VGA).

NOTE: *When a Transmitter in Bidirectional Mode is connected to a DXLink Fiber Input Board, the input board will override the "ALL RESOLUTIONS" EDID and load the last stored EDID. A Transmitter in Unidirectional Mode (or Data Link-lost Mode) will maintain the default EDID, ALL RESOLUTIONS.*

Writing EDID Data to a DXLink Fiber Transmitter's Input Connector

This section contains information that applies to DXLink Fiber Transmitters (all Directional Modes) with attached downstream RX. For procedures that address writing EDID data to a DXLink Fiber board, rather than a Transmitter, see the *Instruction Manual – Enova DGX 8/16/32/64 Digital Media Switchers* at www.amx.com.

When DGX Configuration Software discovers and displays "Inputs" for a DXLink Fiber Transmitter, the input contains two options to allow for reading from either an HDMI or a VGA (HD-15) input.

Use the instructions that follow in conjunction with the EDID Programmer view to write user defined EDID information to the HDMI or HD-15 input connector on a DXLink Fiber Transmitter. User defined EDIDs are currently available from technical support. An AMX EDID Library is also available at www.amx.com (search "EDID Library").

To write EDID data to a DXLink Fiber Transmitter input:

1. Download the EDID set (either HDMI or VGA) from the EDID Library* (or an EDID set provided by technical support).
2. On the PC, open the DGX Configuration Software and select the EDID Programmer tab.
3. Under Inputs/Outputs on the left, expand the device tree, and select the HDMI or HD-15 Input.
4. From the File menu, select Open File to select the .edid file that was downloaded in Step 1.
5. Click Write to write the EDID information to the selected Input (either HDMI or HD-15).
6. Analog (VGA) only – The source must be power cycled to detect the new EDID.

* For information on the EDID Library, see page 119.

TIP: *You can confirm that the new EDID data was written to the HD-15 or HDMI input by selecting the input and clicking on the Read button or by using the ?VIDIN_EDID command, which will return: VIDIN_EDID-USER EDID 1.*

IMPORTANT: *You can revert to the factory default EDID for the HDMI or HD-15 input by using the VIDIN_EDID-ALL RESOLUTIONS command (i.e., the EDID file "AMX_HDMI1v3__Standard" for HDMI and "AMX_VGA1v2__Standard" for VGA).*

NOTE: *DXLink Fiber, Duplex Transmitter in Bidirectional Mode only – The EDID of the Receiver-connected sink is mirrored to the HDMI Input of the Transmitter by default. Any changes made to that EDID on the Transmitter (via ICSLan or DGX Configuration Software) will not persist through a change that causes a reprocessing of video (e.g., power cycle, hot plug of the source or sink devices, or hot plug of fiber optic cables), but will cause the EDID on the Transmitter's HDMI input to revert to the EDID of the Receiver-connected sink.*

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Last Revised:
12/15/2015