



INSTRUCTION MANUAL
HD3000 Gen2 Series

**SERIAL DIGITAL VIDEO
FIBER OPTIC TRANSPORT and DISTRIBUTION
SYSTEM FOR HDTV and SDTV**

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This product was designed and manufactured in the
UNITED STATES of AMERICA

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INTRODUCTION

These 3G/HD/SDI/ASI -to- optical fiber converters facilitate the automatic conversion and transport of SDI, HD-SDI, DVB/ASI and 3GBPS SDI signals over distances up to 10 km using readily available fiber-optic cable. Consisting of 6 new modules, the new HD-3000-II family provides customers with a choice of LC, ST, FC or SC connectors, depending on the converter model selected. MultiDyne's HD-3000-II converters are compliant with all SMPTE specifications and are housed in a rugged enclosure that stands up to daily production, both in the studio and in the field. The HD-3000-II line offers the flexibility to convert HDSDI signals to optical fiber and output them as single or dual HDSDI feeds. Dual-channel models allow the conversion of two channels, making them ideal for 3D, dual-link HDSDI, or two completely independent HDSDI channels. SD, HD, and 3G signals can be intermixed in any combination. Also, the HD-3000-II converters offer electrical isolation that eliminates ground loop problems. They also include automatic cable EQ up to 120m for 3G and 350m for SD. HD-3000-II Models include:

- **HD-3000-2TX**: Dual channel HDSDI to Fiber converter
- **HD-3000-2RX**: Dual channel Fiber to HDSDI converter
- **HD-3000-1TX**: Single channel HDSDI to Fiber converter with looping HDSDI output
- **HD-3000-1RX**: Single channel Fiber to HDSDI converter with dual HDSDI outputs
- **HD-3000-TRX**: HDSDI/Fiber transceiver
- **HD-3000-DR**: Single channel HDSDI optical in, Single channel HDSDI optical out with two BNC HDSDI outputs, for drop and repeat application.

FEATURES and OPERATION

Please consult the appropriate section below and block diagram in Appendix A according to what model(s) you have.

TRANSMITTER, HD3000-xTX

The transmitter models, designated by model numbers **HD3000-1TX** or **HD3000-2TX** include 1 or 2 reclocked fiber **OUT** optical connectors, and 1 or 2 serial digital video **IN** 75 Ohm BNC connectors, depending on number of channels. Only digital carriers of 125 Mbps and above should be applied to the BNC input(s). The **-1TX** also includes a 75 Ohm **LOOP OUT** BNC loop-through connector. It is an active re-clocked version of the signal at the BNC SDI input that can be used to feed other SDI gear or as a cable repeater. Due to lack of rear panel space, the **-2TX** does not have any loop thru outputs.

The transmitter front panels include **SD**, **HD** and **3G** Rate LEDs for 270, 1485, or 2970 MBPS, and a **STATUS** LED for Carrier Detect. The Rate LEDs indicate which of the 3 possible SMPTE rates the reclocker PLL has locked to. In the transmitters, the **STATUS** LED glows green when a signal is present at the BNC input. It is red otherwise. Note that this LED is not an indication of signal integrity. The **-2TX** front panel will have 2 identical groups of Rate and **STATUS** LEDs, one for each channel.

RECEIVER, HD3000-xRX

The receiver models, designated by model number **HD3000-1RX** or **HD3000-2RX**, include 1 or 2 fiber **IN** optical connectors, depending on number of channels, and two reclocked serial digital video **OUT** 75-Ohm BNC connectors. On the **-1RX**, the 2 BNC outputs are a DA splitter, but on the **-2RX**, there is just a single BNC output for each channel due to lack of rear panel space.

The receiver front panels include Rate LEDs with the same functionality as on the transmitter, and a **STATUS** LED for optical signal level. In the receivers, the **STATUS** LED glows green if the optical input signal is above 18dbm, yellow if between 15 and 18dbm, and red if below 15dbm. Note that this LED is not an indicator of signal integrity. The **-2RX** front panel will have 2 groups of Rate and **STATUS** LEDs, one for each channel.

TRANSCEIVER, HD3000-TRX

The transceiver model, designated by model number **HD3000-TRX**, is essentially a **-1TX** and a **-1RX** in the same enclosure, but without loopthru or DA connectors. It includes 1 fiber **IN** and 1 reclocked fiber **OUT** optical connector, one reclocked serial digital video **OUT** 75-Ohm BNC connector and one serial digital video **IN** 75 Ohm BNC connector. As on the transmitter, only signals above 125 MBPS should be applied to the BNC input.

The **-TRX** front panel includes 2 groups of Rate and **STATUS** LEDs, one for the transmit section and one for the receive section. Each includes Rate LEDs with the same functionality as on the other models. The receive section has an Optical Signal Strength **STATUS** LED, and the transmit section has a Carrier Detect **STATUS** LED, each with the same functionality as described for the other models.

DROP AND REPEAT, HD3000-DR

The repeater model, designated by model number **HD3000-DR**, is essentially a **-1RX** with an additional reclocked, regenerated optical loop thru output for repeating the optical signal onward to other devices. It includes 1 fiber **IN** and 1 fiber **OUT** optical connectors, and two reclocked serial digital video **OUT** 75-Ohm BNC connectors. As on the **-1RX**, the 2 BNC outputs are a DA splitter.

The front panel of the **-DR** is functionally identical to that of the **-1RX**.

None of the models have a power LED because the **STATUS** LED(s) will be lit whenever power is applied.

POWER REQUIREMENTS

The HD3000 Series operates from 115 or 230 VAC with a wall-mount power supply or 9 to 24 VDC @ $\geq 1A$ using a coaxial type connector (sleeve ground) on the rear panel labeled **POWER 9~24VDC**. If desired, the units could be powered from a 12V battery.

INSTALLATION

The installation and start up of the HD3000 Series do not have special requirements. No special sequence must be followed to connect and start up the units. RG59 or other 75 Ohm Coax cable must be used for the BNC inputs and outputs and single mode fiber with the selected proper connectors must be used for the fiber link. Optionally, multimode fiber can be used with a shift patch on the transmitter, or if the units are ordered with MM optics, though significantly reduced range performance is expected for this scenario. The HD3000 Series come standard as stand-alone units. An optional rack-mounting kit is available to mount up to 6 units in a 1 Rack-unit or 1 $\frac{3}{4}$ " by 19" rack space. The part number is **-RM6**.

SETTINGS FOR NON-SDI SIGNALS

The HD3000 series comes configured to satisfy the needs of most users.

This includes automatic reclocking and auto mute for SMPTE 3G, HD and SD signals and support for DVB/ASI.

The factory setting is to auto mute the link when there is not a valid SMPTE signal present, and to attempt to reclock any signals that are close to the standard SMPTE rates of 270, 1485 or 2970 MBPS. However, it is possible to pass other non SMPTE rates and digital signals by setting dip switches located inside the units to the non-default values.

These settings are controlled by SW1. The settings are as follows:

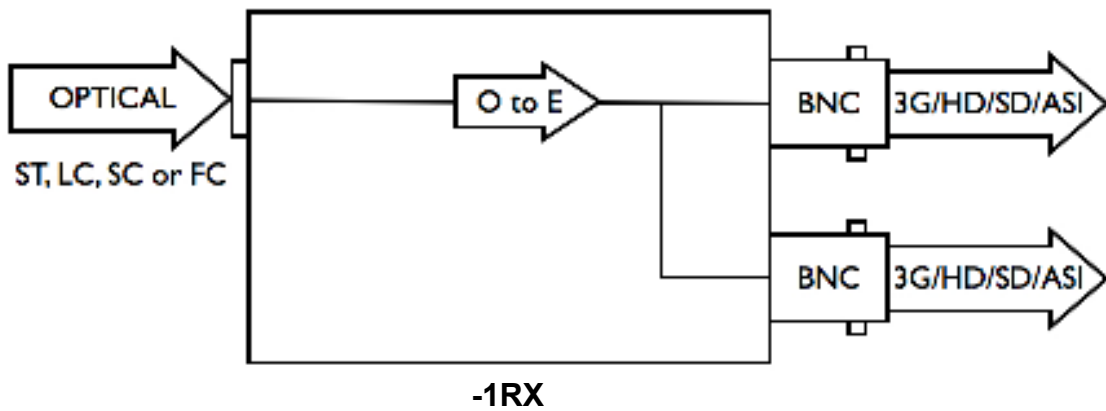
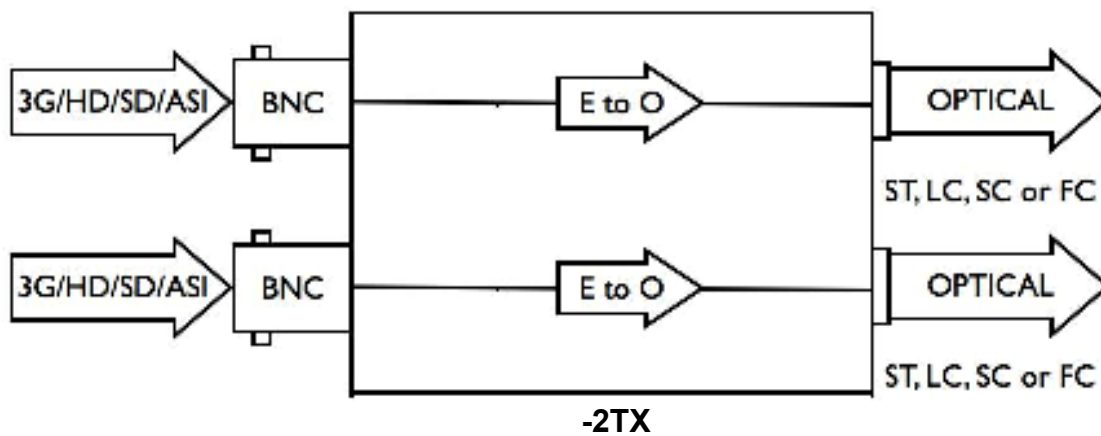
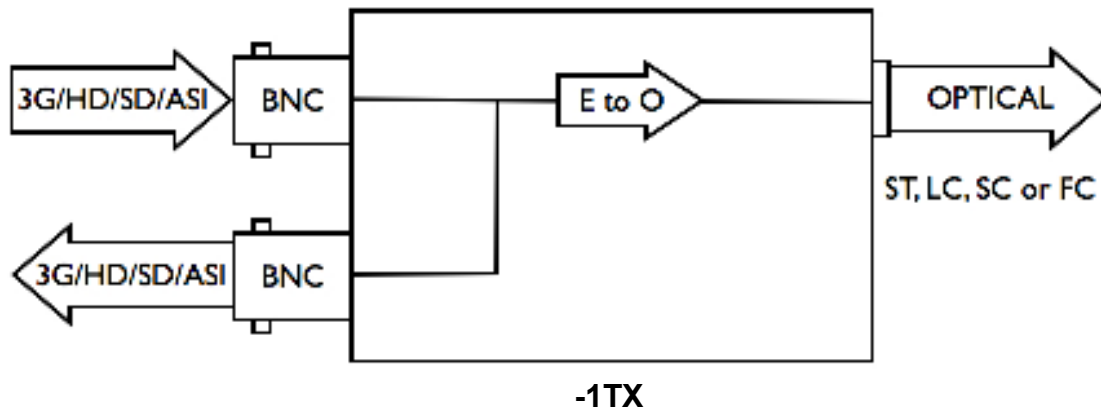
Sw 1	Function	Setting (Default values in Bold)	
1	Reclock Ch 1	Off = reclock	On = bypass
2	Reclock Ch 2	Off = reclock	On = bypass
3	Automute Ch 1	Off = never mute	On = automute
4	Automute Ch 2	Off = never mute	On = automute

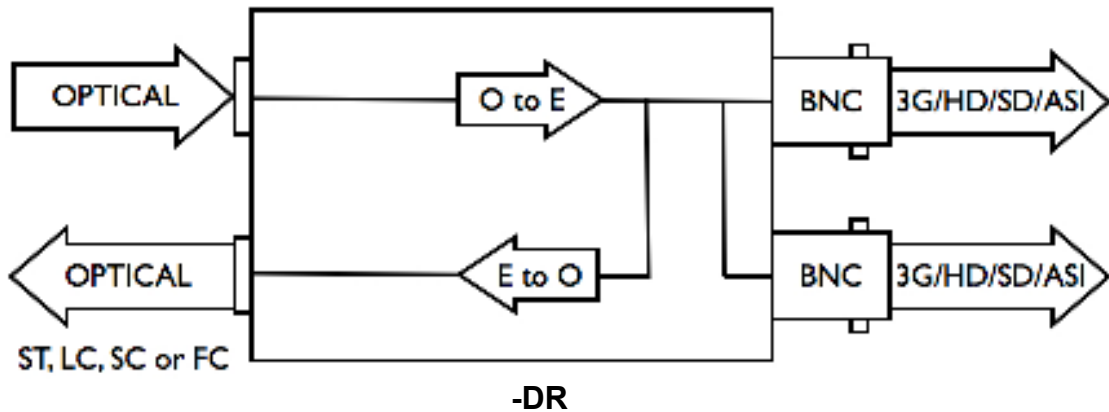
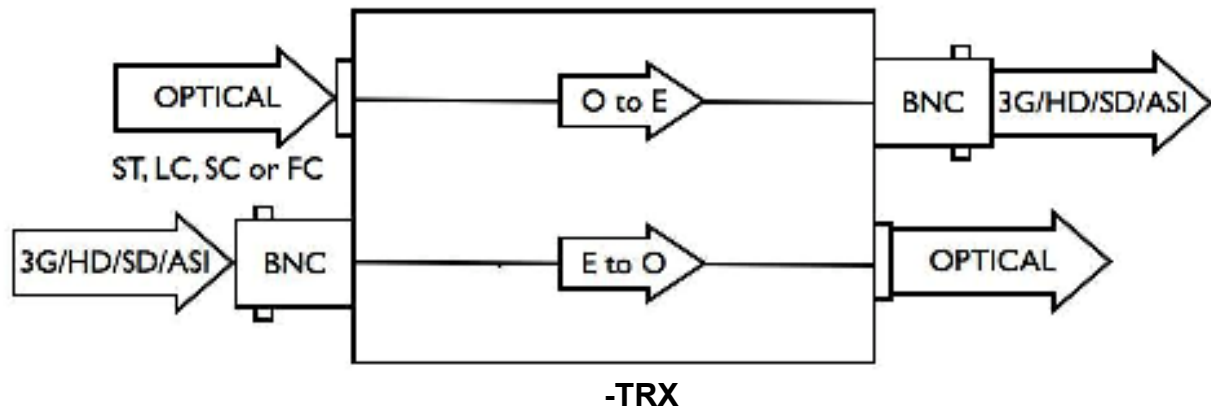
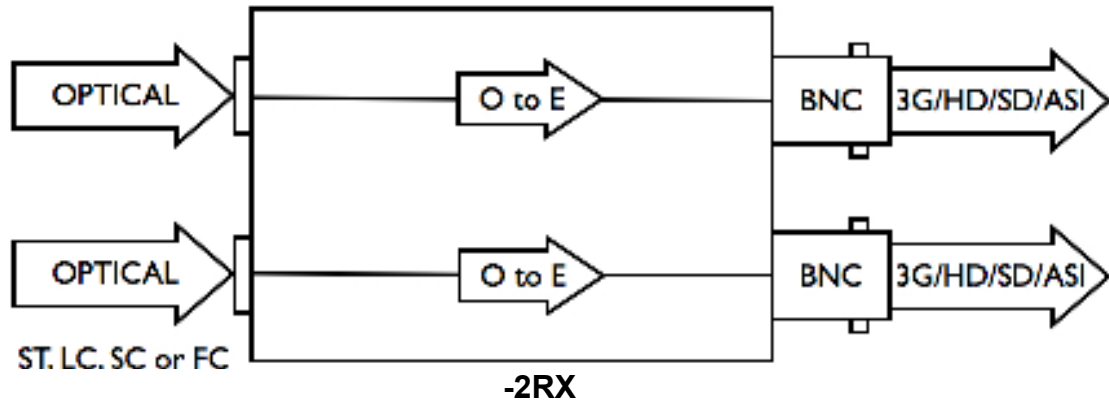
In the **-1TX**, use settings for Ch 1. The Ch 2 settings are ignored. In the **-1RX** or **-DR**, use settings for Ch 2. The Ch 1 settings are ignored. In the **-TRX**, Ch 1 refers to the TX section and Ch 2 to the RX section. To access the switches, remove the 2 screws on the rear panel. Slide the pcb out.

MAINTENANCE

There are no user serviceable parts or internal adjustments other than the switch selections described above. As always, it is recommended that all optical fiber connections be checked periodically for cleanliness and integrity. For repair and service, please call the factory.

APPENDIX A. Block Diagrams





APPENDIX B. Technical Specifications

Video

Bit Rates:	125 to 2970 MBPS
# of Ins/outs:	1 or 2 BNC(model dependent)
Impedance	75 Ohms
Level	800mV (peak to peak)
Standard:	SMPTE 425M, 297M, 292M, 259M-C & DVB-ASI
Bit Error Rate (@-22dBm)	10 ⁻¹¹
Return Loss:	>15 dB at 5 MHz - 1.485 GHz, >10 dB at 1.5 GHz to 3 GHz
Jitter(wideband)	< 0.3 UI
Rise/Fall times	<120psecs

Optical

Wavelengths	TX: 1310nm or CWDM RX: 1100~1600nm
Optical Connector	ST, SC or LC
Optical Source	FP laser or CWDM DFB
Optical Detector	PIN Diode
TX Output	-7 Standard (0 DFB)
RX Sensitivity	-22 dBm
Link Margin	15 to 22 dB (up to 40km)
Fiber Type	Multimode or Singlemode, Singlemode recommended

Environmental/ Electrical

Power:	9-24 VDC
Consumption	<5 Watts
Temperature:	0 to +70C
Humidity	0-95% RH non-condensing
Dimensions	2.75 x 1.125 x 5 inches
Weight	7 oz.
Display:	LEDs for Power, Rate, Carrier Detect, Optical Signal Level

Cable Length Equalized (w/Belden 1694A)

3 GBPS:	>120m
1.485 GBPS:	>150m
143-360 MBPS:	>350m

Specifications are subject to change without notice.