



INSTRUCTION MANUAL
HD6000/HD-6000-ONE Series

**SERIAL DIGITAL
FIBER OPTIC TRANSPORT and DISTRIBUTION
SYSTEM FOR SMPTE 259, 292, 424, DVB-ASI and
other protocols**

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

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INTRODUCTION

The HD6000/6000-ONE series of fiber optic transmitters and receivers makes possible the media conversion and combining of up to 6 digital signals onto one fiber (HD6001) using CWDM techniques or onto 6 fibers (HD6000) for transport up to 20km. The units accept and output 75 ohm digital signals with data rates ranging from 125MBPS up to 2970 MBPS. Although designed for SMPTE 424,292, or 259 SDI and DVB-ASI, the HD6000/6001 can be used with other protocols within this range. Each of the 6 channels has a reclocker that is bypassable for non-SMPTE signals, and can support up to 120m of coax cable using its built in equalizer.

It is also possible, upon special order, to have a mixture of transmit and receive channels at each end to support bidirectionality. For example you could have 3 transmit and 3 receive channels at each end, or any other combination.

Applications include transmission links for high definition or digital television studio to transmitter, studio-to-studio, or any other similar long-range situations. It can also combine and optically remap the outputs of other Multidyne products.

FEATURES and OPERATION

The following discussion assumes that we have a standard configuration consisting of 6 transmit channels at one end and 6 receive at the other end.

Each TX channel consists of a cable receiver and a reclocker. The cable receiver can EQ up to 120m of cable at 3 GBPS. In the case of the HD6001, each channel has a CWDM SFP transmitter. In the HD6000, each has a standard 1310 nm SFP transmitter. The reclocking function can be bypassed. The HD6001 also contains a CWDM cassette to combine the 6 CWDM channels onto a single fiber. The HD6000 does not have the cassette as it will use 6 individual fibers.

Each HD6000/6000-ONE RX channel consists of a standard SFP receiver that can accept wavelengths of 1100 to 1600 nm, a bypassable reclocker, and a cable driver. In the case of the HD6001, a CWDM cassette is included to route the single fiber's 6 wavelengths to the SFP optical inputs of the 6 channels. The HD6000 has no cassette and its SFPs receive their inputs directly from 6 individual fibers.

It is possible to order the HD6000/6000-ONE with a mixture of transmit and receive channels at each end to support bidirectionality. For example one end could have 4 TX and 2 RX and the other 4 RX and 2 TX, or any other combination.

TRANSMITTER FRONT AND REAR PANELS

The front and rear panels of the TX are shown below in Fig. 1. The HD6001 rear panel has one BNC input for each channel, labelled **CH1** thru **CH6**, plus a **COMMON** ST/UPC output port for the resulting CWDM optical signal. The HD6000 rear panel differs in that, instead of a single **COMMON** ST/UPC connector, it has 6 ST/UPC output connectors, one for each BNC input, also labelled **CH1** thru **CH6**. Besides a **POWER** LED, which is green when power is applied to the unit, the front panel has 6 **STATUS** LEDS, one for each of the 6 channels. Note that, depending upon the customer requirement, some of these channels can be TXs and some can be RXs as mentioned above. Thus, the BNCs and fiber ports could be either inputs or outputs. Assuming that the channel is a transmit channel, the **STATUS** LED functions for that channel are:

Green whenever there is a carrier detected at the channel's BNC input.

Red if no carrier is detected at the BNC input. This will cause the channel to be muted. But the LED for the corresponding channel at the other end of the link might still be green, as the laser for this channel is still providing light, even if unmodulated.

Blinking Red if the laser has failed for the channel, regardless of input status. This would result in no optical output for that channel onto the fiber. The corresponding LED for this channel at the other end of the link should be red under these conditions, as it will be dark.

Off if the channel is not populated.

Note that the status LEDS do NOT indicate quality or type of signal.

RECEIVER FRONT AND REAR PANELS

The front and rear panels of the RX are shown below in Fig.1. Note that the rear panels are identical to those of the TX except that the directionality of the ports is reversed. Besides a **POWER** LED, which is green when power is applied to the unit, the front panel has 6 **STATUS** LEDS, one for each of the 6 channels. As mentioned above, the channels could be either RXs or TXs. Assuming that the channel is a receive channel, the **STATUS** LEDs for that channel are:

Green whenever channel's optic is illuminated with at least -15 dbm of signal.

Yellow if this optical signal is between -18 and -15 dbm.

Red if this optical signal is less than -18 dbm. This will cause the channel to mute.

Off if the channel is not populated.

Note that the status LEDS do NOT indicate quality or type of signal.

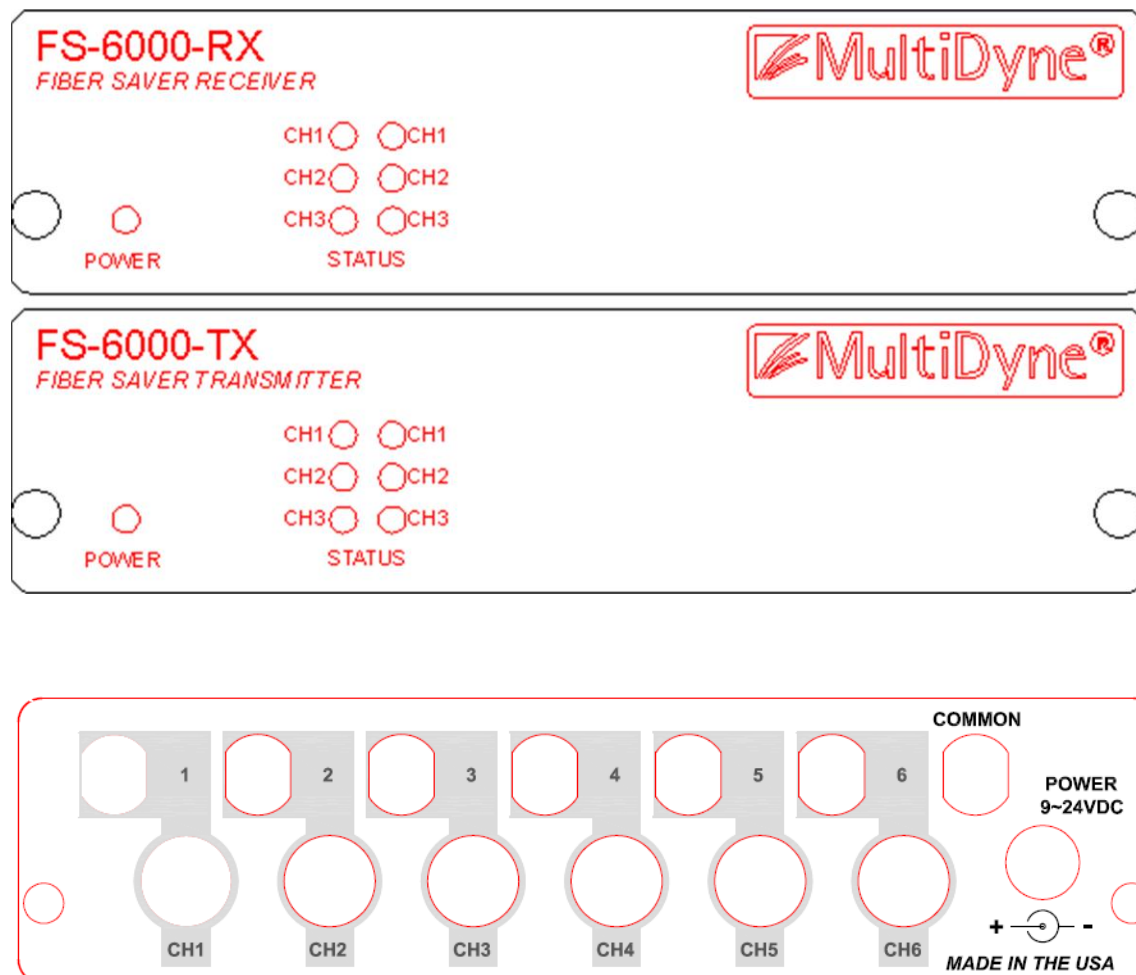


Fig. 1: Front and Rear Panels, FTX and FRX

POWER REQUIREMENTS

The HD6000/6000-ONE operates from 110 or 220 VAC with the included desktop universal input 12V power supply or other source from 9 to 24 VDC and at least 12VA of power. It uses a coaxial type connector (sleeve ground) on the rear panel labelled **POWER**. If desired, the units can be powered from a battery pack or automotive battery instead of the wall unit.

INSTALLATION AND SETUP

The HD6000/6000-ONE is configured at the factory for the signals it will be transporting. Normally no user configuration is required except in cases where non-SMPTE signals are to be transported. Behind the front panel is a row of configuration dip switches. See Table 1 below. The first 6 switches are used to turn reclocking on or off for each channel. Normally you would leave these in the default up position to reclock SMPTE signals. But if use with non-SMPTE signals is anticipated, the reclockers should be turned off by setting the switches down, because otherwise the reclocker may falsely lock to a non-SMPTE signal and corrupt it. This could happen if the signal frequency, or a harmonic thereof, is close to 270, 1485 or 2970 MBPS. The HD6000/6001 will automatically mute a signal if the reclocker is not locked to a SMPTE standard if the reclocker switch for that channel is on. But if reclocking is off, it will be unmuted as long as a signal is present, whether it is locked or not. See Table 2. Switch 7 and Switch 8 are reserved, leave up.

Switch	Function	Setting	
1	Channel 1 reclock	up=reclock	down=bypass reclocker
2	Channel 2 reclock	up=reclock	down=bypass reclocker
3	Channel 3 reclock	up=reclock	down=bypass reclocker
4	Channel 4 reclock	up=reclock	down=bypass reclocker
5	Channel 5 reclock	up=reclock	down=bypass reclocker
6	Channel 6 reclock	up=reclock	down=bypass reclocker
7	Reserved)
8	Reserved		

Table 1: Settings for Configuration Switch in the HD6000/6001-FTX or FRX

Reclocker	Signal	Muted?
bypassed	Any	no
on	SMPTE	no
on	Non-SMPTE	yes
x	No carrier or no illum	yes

Table 2: Automute Functionality

No special sequence must be followed to connect and start up the unit. RG59 or other 75 ohm coaxial cable must be used for the BNC SDI inputs and outputs. Note that the BNC inputs will only accept signals between 125 and 2970 MBPS. The HD6000-ONE-TX and RX should be connected together by SM optical fiber at the **COMMON** ST/UPC connectors on their rear panels. This fiber will contain 6 CWDM signals representing the 6 channels. As such, it cannot go thru an O/E/O switch. The HD6000-TX and RX will require 6 individual fibers to connect their corresponding **CH1** thru **CH6** ST/UPC connectors. The default configuration of the HD6000 is to use single mode fiber. Multimode fiber can be used with the HD6000 only if it is ordered with MM optics. Unlike the HD6000-ONE, the HD6000's fibers only contain one signal and thus only one wavelength so they can be routed thru a switch.

The HD6000/6000-ONE comes standard as stand-alone units. An optional rack-mounting kit is available to mount up to 3 units in a 1 Rack-unit or 1 ¾" by 19" rack space. The part number is –RMT. The HD6000/6000-ONE requires room for adequate ventilation around the units. Do not block the fan vent holes on the top of the case.

APPENDIX: Technical Specifications

General

Power:	9-24V / 12VA
Impedance:	75 ohms
Return Loss, < 1.5 GHz:	> 15 db
Return Loss, < 3.0 GHz:	> 10 db
Max Cable Length, < 3.0 GHz:	> 120 m
Added Jitter:	< 0.06UI
Laser Safety	Class 1
Optical Power	–8 dbm to 0 dbm
Optical Sensitivity	-18 dbm
Operating Temperature	0 to 50 deg C
Data Rates, Optical I/O or BNC Out	19 to 2970 MBPS
Data Rates, BNC Input:	125 to 2970 MBPS

Transmitter (-TX)

Output Wavelengths	6 CWDM or 1310
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Receiver (-RX)

Input Wavelengths	6 CWDM or 1310
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Specifications are subject to change without notice.