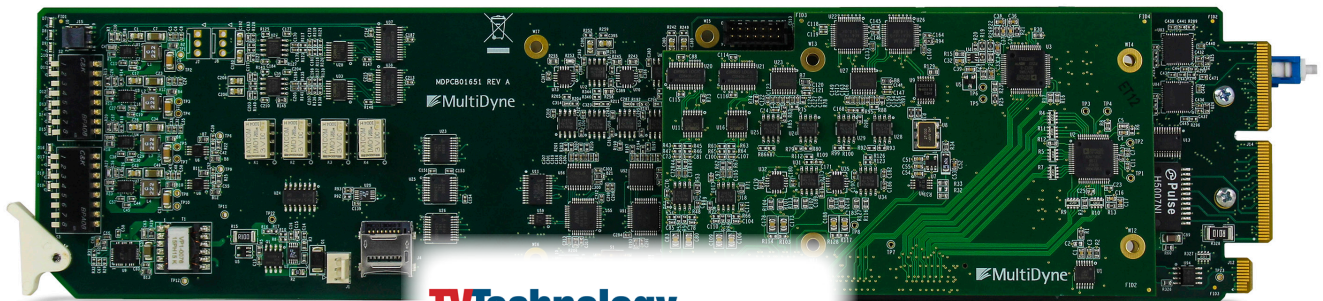


openGear OG3600 Series Fiber Transport Cards User Manual



TVTechnology
PRODUCT
INNOVATION
Awards 2016

 **MultiDyne®**
Fiber Optic Solutions

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FIBER FIRST

Creating Broadcast & Cinema Equipment since 1977

The OG-3600 series of modules for the openGear platform provides flexibility for all fiber transport needs. Signals are transported uncompressed and unprocessed from maximum signal integrity. Included signals are 3G HD-SDI, audio, data, Ethernet, and reference, all compatible with the industry standard openGear platform offering SNMP management via Dashboard software.

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MultiDyne Video & Fiber Optic Systems
10 Newton Place
Hauppauge, NY 11788

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

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Important Safety Instructions

Read these instructions.

Keep these instructions.

Heed all warnings.

Follow all instructions.

Do not use this apparatus near water.

Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.



Warnings indicate danger that requires proper procedures or practices to prevent injury or death to personnel.

CAUTION

Cautions indicate proper procedures or practices to prevent damage to equipment or Property.



Warning – The apparatus shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases, shall be placed on the apparatus.



Warning – Certain parts of this equipment namely the power supply area still present a safety hazard, with the power switch in the OFF position. To avoid electrical shock, disconnect all A/C power cords from the chassis' rear appliance connectors before servicing this area.



Warning – Service barriers within this product are intended to protect the operator and service personnel from hazardous voltages. For continued safety, replace all barriers after any servicing.

This product contains safety critical parts, which if incorrectly replaced may present a risk of fire or electrical shock. Components contained with the product's power supplies and power supply area, are not intended to be customer serviced and should be returned to the factory for repair. To reduce the risk of fire, replacement fuses must be the same time and rating. Only use attachments/accessories specified by the manufacturer.

CAUTION

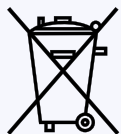
This product is intended to be a component product of an openGear® frame. Refer to openGear® frame Owner's Manual for important safety instructions regarding the proper installation and safe operation of the frame as well as its component products.

CAUTION

If required, make certain Rear I/O Module(s) is installed before installing the OG3600 Series Card into the frame slot. Damage to card and/or Rear I/O Module can occur if module installation is attempted with card already installed in slot.

CAUTION

If card resists fully engaging in rear I/O module mating connector, check for alignment and proper insertion in slot tracks. Damage to card and/or rear I/O module may occur if improper card insertion is attempted.



For product disposal, ensure the following:

- Do not dispose of this product as unsorted municipal waste.
- Collect this product separately.
- Use collection and return systems available to you.



This symbol on the equipment indicates for use at altitudes not exceeding 2000 m.

Laser Safety Information

This unit is classified as a CLASS 1 LASER PRODUCT according to EN60825-1 (EU) and FDA 21CFR 1040.10 (USA). Class 1 laser products are considered safe and do not result in biological hazard if used according to these instructions.



Warning – Use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.



Warning – Never look directly into the end of the optical fiber while either end of the system is operating.



Warning – Always use dust caps on fiber optic connectors when cables are not connected. This will protect the connector from damage and accidental exposure of a human eye to an operating laser.

Series Overview

The OG-3600 series of modules for the openGear platform provides flexibility for all fiber transport needs. Signals are transported uncompressed and unprocessed from maximum signal integrity. Included signals are 3G HD-SDI, audio, data, Ethernet, and reference, all compatible with the industry standard openGear platform offering SNMP management via Dashboard software.

A list of OG3600 series modules is given below. For cards that include SDI video, model # configurations include various 1, 2 and 4 channel count and channel direction options. For cards that include audio, model # configurations include options for 4 and 8 channel versions.

Generic Model Number	Description
OG3601	Four channel SDI, Audio, Data, Timecode, Reference, GPIO, Analog Video and Ethernet fiber transport
OG3602	Four channel SDI, Audio, Data, Timecode, Reference, GPIO and Ethernet fiber transport
OG3603	Four channel SDI, Audio, Data, Timecode, Reference and GPIO fiber transport
OG3604	Audio, Data, Timecode, Reference, GPIO and Ethernet fiber transport
OG3605	Audio, Data, Timecode, Reference and GPIO fiber transport
OG3606	Ethernet-only copper to fiber media converter
OG3607	Four channel SDI-only fiber transport
OG3608	Four channel SDI and Ethernet fiber transport
OG3609	Audio, Data, Timecode, Reference, GPIO and Analog Video fiber transport

SDI Transport

Each OG3600 card is capable of transporting up to 4 channels of SDI video. The number of channels and their direction varies based on the card Model #. SMPTE S259 (SD), S292 (HD), S424 (3G), and ASI/DVB, as well as non-SMPTE digital signals with data rates from 125Mbps to 2.97Gbps, are supported. All SDI outputs are non-inverted and the electrical to optical conversion process is transparent to all embedded audio and data. Optical signals are compliant to SMPTE S397M.

By default, re-clocking is performed at S259, S292, and S424 data rates but can be disabled via a DIP switch at the front of the card or through the DashBoard GUI interface. Signal presence, data rate, and re-clocker lock status for each SDI channel is displayed in the DashBoard GUI interface.

Audio Transport

Each OG3600 card is capable of transporting up to 8 channels of mono audio bi-directionally. The number of channels varies based on the card Model #. Both line-level balanced analog and AES audio formats are supported.

Audio inputs and outputs can be configured, independently, for either analog or AES on a stereo-pair basis using a DIP switch at the front of the card or through the DashBoard GUI interface.

Note that these audio channels are separate from any audio that may already be embedded in the SDI streams. These audio channels are transported separately and not embedded into or de-embedded out of the SDI streams.

Serial Data Transport

Each OG3600 card is capable of transporting up to 3 channels of serial control data bi-directionally. The number of channels varies based on the card Model #. RS232, RS422 and RS485 serial data formats are supported with data rates up to 1Mbps.

The format of each of the data channels can be configured, independently, using a DIP switch at the front of the card or through the DashBoard GUI interface.

Tally/GPIO Transport

Each OG3600 card is capable of transporting up to 4 GPIO signals, 4 GPI's and 4 GPO's. The number of GPIO's varies based on the card Model #. One of the GPIO paths is labeled Tally, for sake of convention, but all the GPIO paths are electrically identical.

GPI inputs are ground-closure sensing inputs (close to ground to activate) with internal pull ups. GPO outputs are normally-open (NO) relay contacts to ground. Open-collector type GPO outputs are optionally supported, please contact MultiDyne for more information.

Timecode Transport

Each OG3600 card is capable of transporting unbalanced timecode in each direction. Timecode transport is available on all card Model number's that support audio.

Reference Transport

Each OG3600 card is capable of transporting an analog video reference signal in each direction. Reference transport is available on all card Model #'s that support audio. Supported formats include SD Black Burst (NTSC, PAL) and HD Tri-Level.

Reference input is taken from the REF1 input on the openGear frame. Only the sync portion of the signal is transported across the fiber link, all video and color information is stripped from the signal.

Ethernet Transport

Each OG3600 card may optionally include a copper to fiber Ethernet media converter. This option varies based on the card Model #. Data rates of 10/100/1000 Mbps are supported.

Note that this Ethernet connection is independent of, and not internally connected to, any Ethernet ports built into the openGear frame itself or on any other openGear cards that may be resident in the frame.

CVBS Transport

Each OG3600 card may optionally include one channel of composite video (CVBS) transport in each direction. This option varies based on the card Model #. NTSC and PAL video are supported.

Note that this CVBS transport is independent of, and separate from, the Reference signal transport that transmits the REF1 signal on the openGear frame to a companion OG3600 card in another openGear frame.

Installing a Rear Module

Before You Begin

Before proceeding with the instructions in this chapter, ensure that your openGear frame is properly installed according to the instructions in the OG3-FR Series User Manual.

Static Discharge

Throughout this chapter, please heed the following cautionary note:



ESD Susceptibility – Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling circuit boards in high static environments such as carpeted areas and when synthetic fiber clothing is worn. Always exercise proper grounding precautions when working on circuit boards and related equipment.

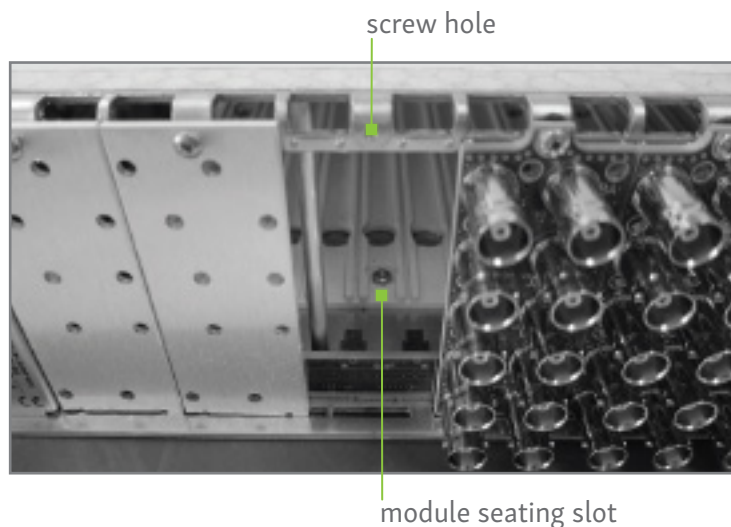
Unpacking

Unpack OG3600 Series Card you received from the shipping container and ensure that all items are included. If any items are missing or damaged, contact your sales representative directly.

To install a Rear Module in your openGear frame

1. Locate the card frame slots on the rear of the frame.
2. Remove the Blank Plate from the slot you have chosen for the OG3600 installation.
3. Install the bottom of the Rear Module in the Module Seating Slot at the base of the frame's back plane.
(below

Rear Module
installation in an
openGear frame



4. Align the top hole of the Rear Module with the screw on the top-edge of the frame back plane.
5. Using a Phillips screwdriver and the supplied screw, fasten the Rear Module to the back plane of the frame.
Do not over tighten.
6. Ensure proper frame cooling and ventilation by having all rear frame slots covered with Rear Modules or Blank Plates.

Installing a Rear Module

Installing the OG3600 Series

This section outlines how to install the OG3600 in an openGear frame. If the OG3600 is to be installed in any compatible frame other than a OG3-FR product, refer to the frame manufacturer's manual for specific instructions.

To install the OG3600 Series in a openGear frame

1. Locate the Rear Module you installed in the procedure “Installing a Rear Module” on page 9
2. Hold the OG3600 by the edges and carefully align the card-edges with the slots in the frame.
3. Fully insert the card into the frame until the rear connection plus is properly seated in the Rear Module.

CAUTION

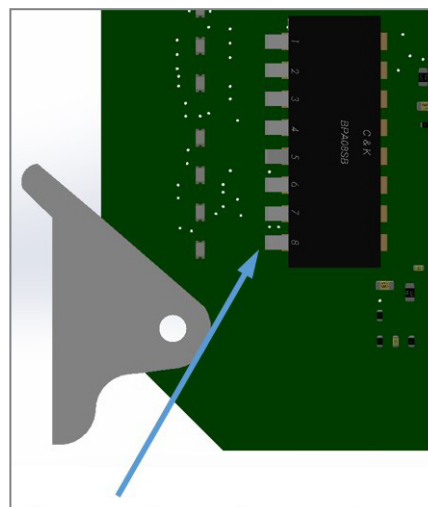
Do not populate Slot 10 in the DFR-8310 series frame with an OG3600 Card. Attempting to populate Slot 10 may damage the OG3600 Card series.

Card Setup

Prior to installation, it must be determined whether to allow changes to the card's configuration to be made from the DashBoard GUI interface. To enable configuration changes from the DashBoard GUI, switch #8 on DIP Switch S3 must be in the DOWN position. This switch is located at the front edge of the card, adjacent to the card ejector lever. Otherwise, Audio, Data, and SDI re-clocker configuration settings can only be made using DIP Switch S2 and the remainder of the switches on DIP Switch S3.

When DashBoard control is enabled, all settings made through the DashBoard GUI interface are stored in non-volatile memory on the card and are restored upon power-up.

When DashBoard control is disabled, all configuration settings made on the DIP switches will be shown on their appropriate window tab in DashBoard.



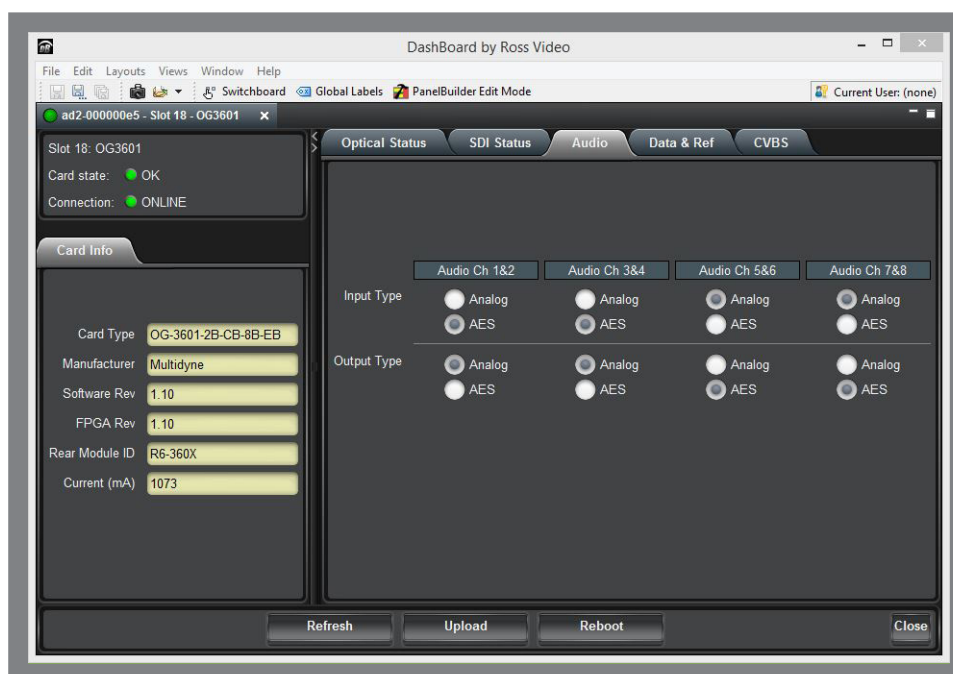
DashBoard Control Enable Switch S-8
Down to enable, up to disable

Audio Configuration

If DashBoard control is disabled, DIP switch S3-8 is in the UP position, configuration of the Audio Input and Output formats is made using DIP switch S2. This DIP switch is located at the front edge of the card. Analog or AES may be selected on a stereo pair basis. The table below outlines the audio configuration settings.

Switch	Function	Description
S2-1	Audio Input 1 & 2 Type Select	OFF(Up) = Analog, ON(Down) = AES
S2-2	Audio Input 3 & 4 Type Select	OFF(Up) = Analog, ON(Down) = AES
S2-3	Audio Input 5 & 6 Type Select	OFF(Up) = Analog, ON(Down) = AES
S2-4	Audio Input 7 & 8 Type Select	OFF(Up) = Analog, ON(Down) = AES
S2-5	Audio Output 1 & 2 Type Select	OFF(Up) = Analog, ON(Down) = AES
S2-6	Audio Output 3 & 4 Type Select	OFF(Up) = Analog, ON(Down) = AES
S2-7	Audio Output 5 & 6 Type Select	OFF(Up) = Analog, ON(Down) = AES
S2-8	Audio Output 7 & 8 Type Select	OFF(Up) = Analog, ON(Down) = AES

If DashBoard control is enabled, selection of the Audio Input and Output formats is made using the Audio Tab in the card's DashBoard menu page. All settings made through the DashBoard GUI interface are stored in non-volatile memory on the card and are restored upon power-up.

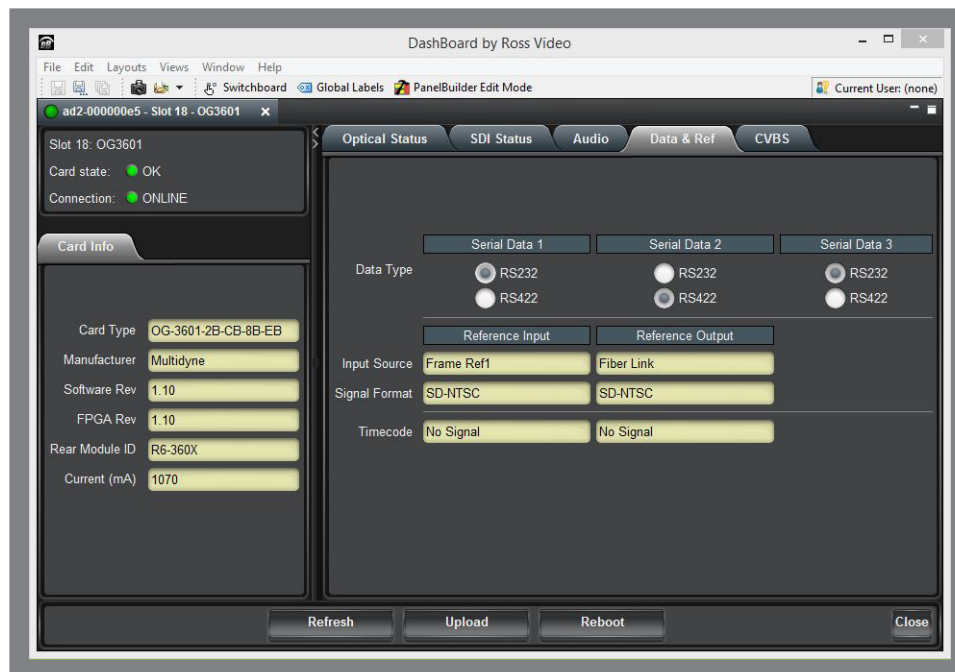


Data Configuration

If DashBoard control is disabled, DIP switch S3-8 is in the UP position, configuration of the Serial Data formats is made using switches 1 through 6 on DIP switch S3. This DIP switch is located at the front edge of the card. The table below outlines the serial data configuration settings.

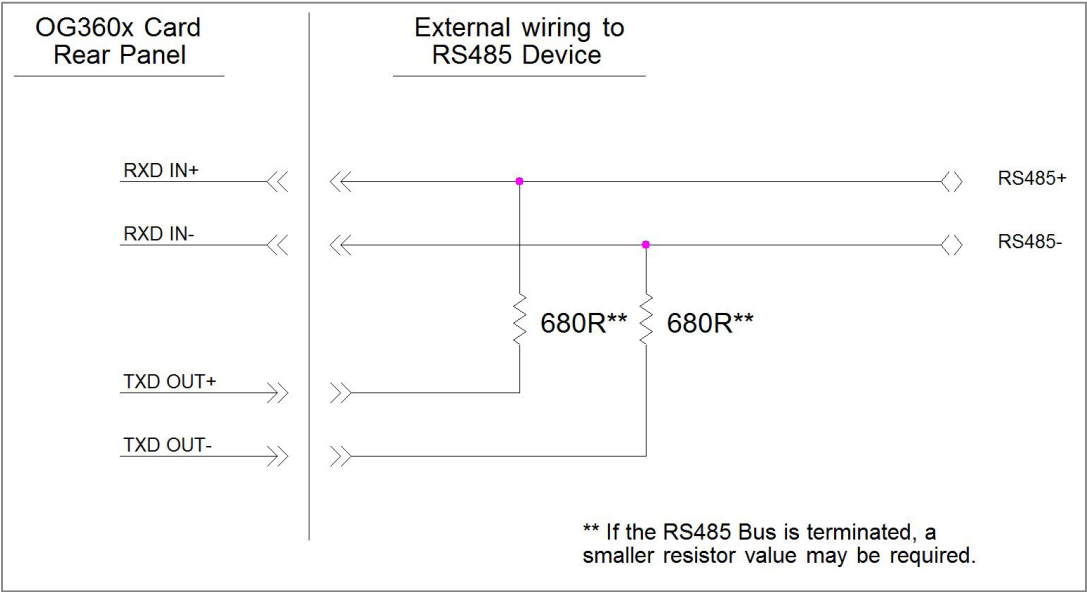
Switch	Function	Description
S3-1	Data 1 Format Select bit0	RS232 = OFF(Up), RS422 = ON(Down)
S3-2	Data 1 Format Select bit1	n/a
S3-3	Data 2 Format Select bit0	RS232 = OFF(Up), RS422 = ON(Down)
S3-4	Data 2 Format Select bit1	n/a
S3-5	Data 3 Format Select bit0	RS232 = OFF(Up), RS422 = ON(Down)
S3-6	Data 3 Format Select bit1	n/a
S3-7	Force SDI Re-clocker Bypass	Sets All SDI Re-clockers to Bypass mode Down = Bypass, Up = Normal.
	Audio Output 7 & 8 Type Select	OFF(Up) = Analog, ON(Down) = AES
S3-8	Dashboard Control Enable	Down = Enable Dashboard Control Up = Disable Dashboard Control,

If DashBoard control is enabled, selection of the Serial Data formats is made using the Data Tab in the card's DashBoard menu page. All settings made through the DashBoard GUI interface are stored in non-volatile memory on the card and are restored upon power-up.



Data Configuration

The OG3600 series cards can be wired externally to support point-to-point 2-wire RS485 serial communications when set to the RS422 format. Please refer to the diagram below for wiring instructions.

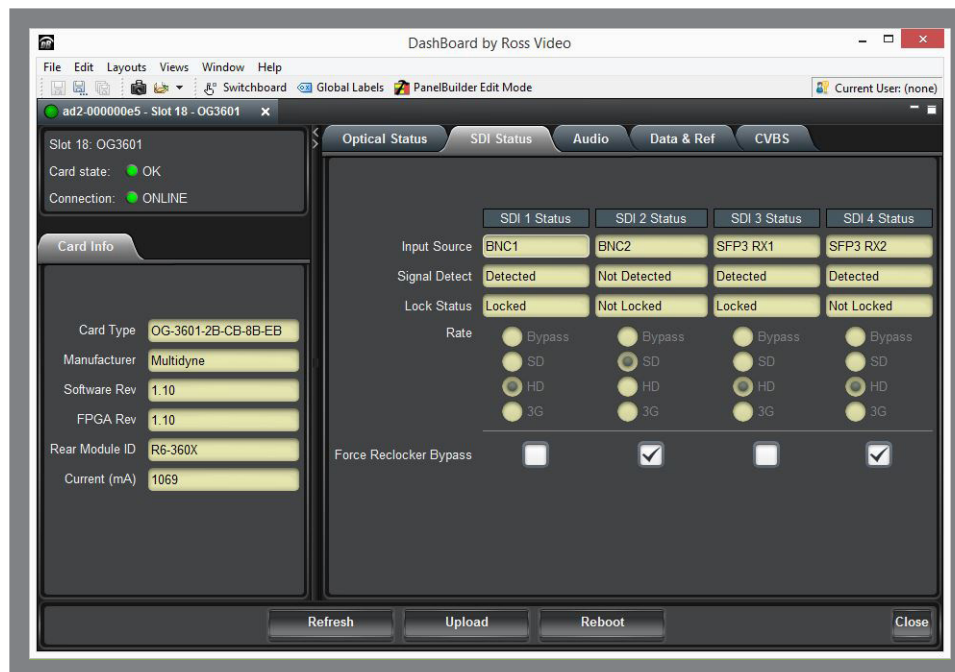


SDI Re-clocker Bypass Configuration

If DashBoard control is disabled, DIP switch S3-8 is in the UP position, bypass configuration of the SDI re-clockers is made using switch # 7 on DIP switch S3. This DIP switch is located at the front edge of the card. Enabling the bypass mode with this DIP switch will place ALL the re-clockers in bypass mode. The table below outlines the SDI re-clocker configuration settings.

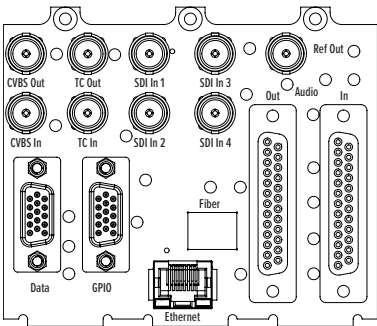
Switch	Function	Description
S3-1	Data 1 Format Select bit0	RS232 = OFF(Up), RS422 = ON(Down)
S3-2	Data 1 Format Select bit1	n/a
S3-3	Data 2 Format Select bit0	RS232 = OFF(Up), RS422 = ON(Down)
S3-4	Data 2 Format Select bit1	n/a
S3-5	Data 3 Format Select bit0	RS232 = OFF(Up), RS422 = ON(Down)
S3-6	Data 3 Format Select bit1	n/a
S3-7	Force SDI Re-clocker Bypass	Sets All SDI Re-clockers to Bypass mode.
	Audio Output 7 & 8 Type Select	OFF(Up) = Analog, ON(Down) = AES Down = Bypass, Up = Normal
S3-8	Dashboard Control Enable	Down = Enable Dashboard Control, Up = Disable Dashboard Control

Bypass configuration of each individual re-clocker can only be set using the DashBoard. When DashBoard control is enabled, configuration of re-clocker bypass is made using the SDI Tab in the card's DashBoard menu page. All settings made through the DashBoard GUI interface are stored in non-volatile memory on the card and are restored upon power-up.

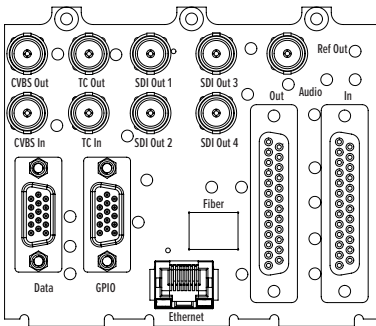


Rear Panel Layouts

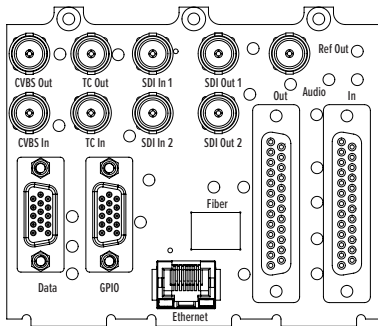
OG3601 Rear Panels



R6-3601-4T

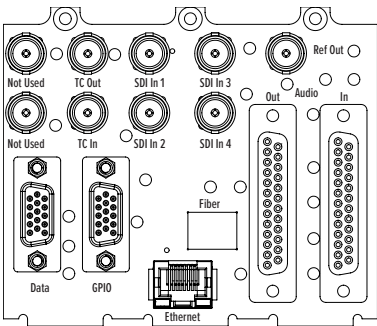


R6-3601-4R

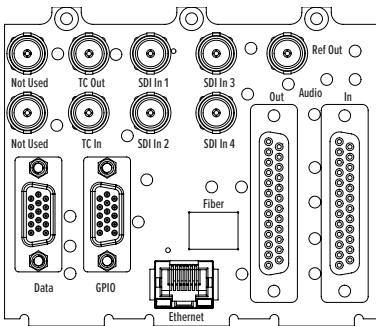


R6-3601-AB

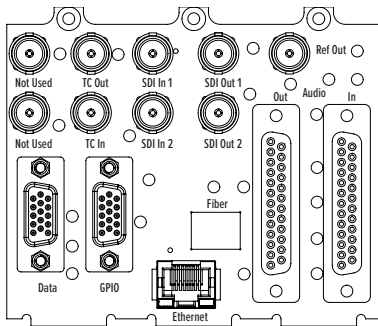
OG3602 Rear Panels



R6-3602-4T

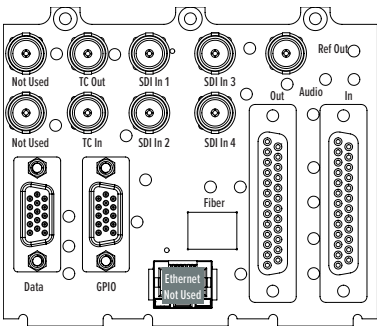


R6-3602-4R

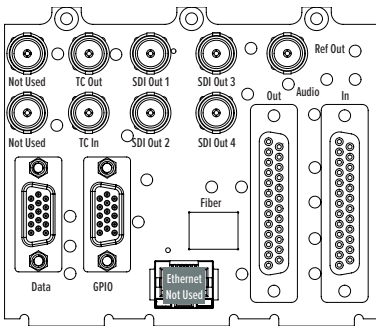


R6-3602-AB

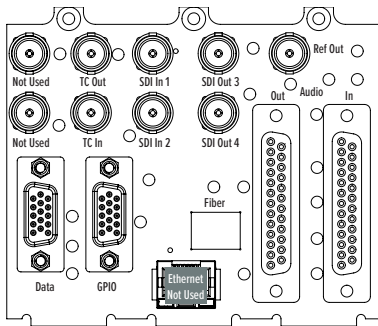
OG3603 Rear Panels



R6-3603-4T



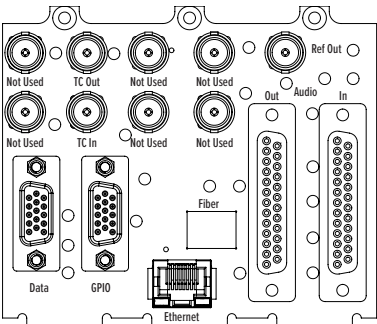
R6-3603-4R



R6-3603-AB

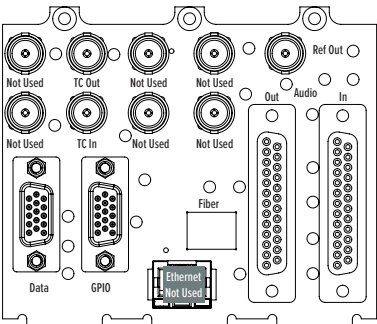
Rear Panel Layouts (continued)

OG3604 Rear Panels



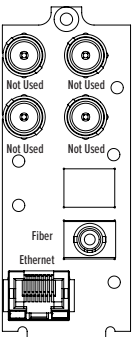
R6-3604-AB

OG3605 Rear Panels



R6-3605-AB

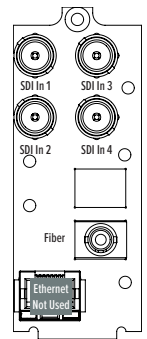
OG3606 Rear Panels



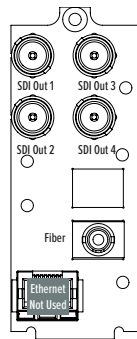
R2-3606-AB

Rear Panel Layouts (continued)

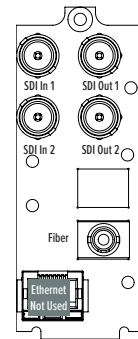
OG3607 Rear Panels



R2-3607-4T

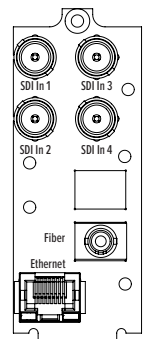


R2-3607-4R

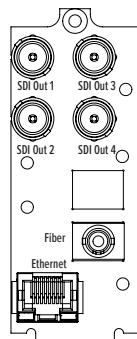


R2-3607-AB

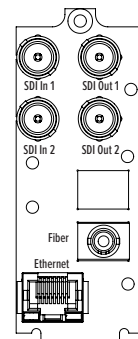
OG3608 Rear Panels



R2-3608-4T

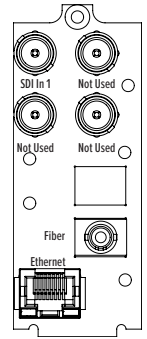


R2-3608-4R

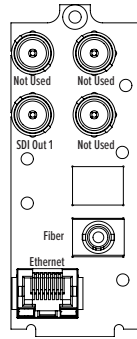


R2-3608-AB

OG3608 Rear Panels



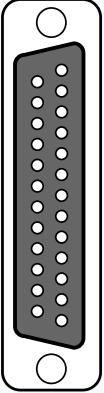
R2-3608-1T



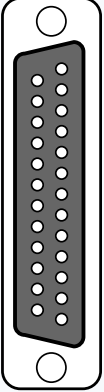
R2-3608-1R

Rear Panel Pinouts

J11 - Audio Input Connector Pinout (Follows Tascam Analog Convention)

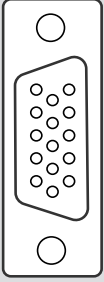
	Number	Analog Pinout	AES Pinout	Number	Analog Pinout	AES Pinout
 DB25-F	1	Ch 8 Input+	N/C	14	Ch 8 Input-	N/C
	2	GND	GND	15	Ch 7 Input+	AES 7/8 Input+
	3	Ch 7 Input-	AES 7/8 Input-	16	GND	GND
	4	Ch 6 Input+	N/C	17	Ch 6 Input-	N/C
	5	GND	GND	18	Ch 5 Input+	AES 5/6 Input+
	6	Ch 5 Input-	AES 5/6 Input-	19	GND	GND
	7	Ch 4 Input+	N/C	20	Ch 4 Input-	N/C
	8	GND	GND	21	Ch 3 Input+	AES 3/4 Input+
	9	Ch 3 Input-	AES 3/4 Input-	22	GND	GND
	10	Ch 2 Input+	N/C	23	Ch 2 Input-	N/C
	11	GND	GND	24	Ch 1 Input+	AES 1/2 Input-
	12	Ch 1 Input-	AES 1/2 Input-	25	GND	GND
	13	N/C	N/C			

J12 - Audio Output Connector Pinout (Follows Tascam Analog Convention)

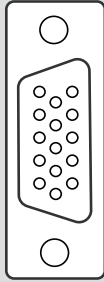
	Number	Analog Pinout	AES Pinout	Number	Analog Pinout	AES Pinout
 DB25-F	1	Ch 8 Output+	N/C	14	Ch 8 Output-	N/C
	2	GND	GND	15	Ch 7 Output+	AES 7/8 Output+
	3	Ch 7 Output-	AES 7/8 Output-	16	GND	GND
	4	Ch 6 Output+	N/C	17	Ch 6 Output-	N/C
	5	GND	GND	18	Ch 5 Output+	AES 5/6 Output+
	6	Ch 5 Output-	AES 5/6 Output-	19	GND	GND
	7	Ch 4 Output+	N/C	20	Ch 4 Output-	N/C
	8	GND	GND	21	Ch 3 Output+	AES 3/4 Output+
	9	Ch 3 Output-	AES 3/4 Output-	22	GND	GND
	10	Ch 2 Output+	N/C	23	Ch 2 Output-	N/C
	11	GND	GND	24	Ch 1 Output+	AES 1/2 Output-
	12	Ch 1 Output-	AES 1/2 Output-	25	GND	GND
	13	N/C	N/C			

Rear Panel Pinouts (continued)

J14 – Serial Data Connector Pinout

	Number	RS422 Pinout	RS232 Pinout	Number	RS422 Pinout	RS232 Pinout
 HDB15-F	1	Data1 RXD In-	Data1 RXD	9	Data3 RXD In+	N/C
	2	Data2 RXD In+	N/C	10	Data3 TXD Out-	Data3 TXD
	3	Data2 TXD Out-	Data2 TXD	11	Data1 TXD Out+	N/C
	4	Data3 RXD In-	Data3 RXD	12	Data2 TXD Out+	N/C
	5	+12VDC Output	N/C	13	Data3 TXD Out+	N/C
	6	Data1 RXD In+	N/C	14	GND	GND
	7	Data1 TXD Out-	Data1 TXD	15	GND	GND
	8	Data2 RXD In-	Data2 RXD			

J15 - GPIO Connector Pinout

	Number	Description	Number	Description
 HDB15-F	1	Tally Output	9	GPI Input 3
	2	GPO Output 1	10	N/C
	3	GPO Output 2	11	GND
	4	GPO Output 3	12	GND
	5	+12VDC Output	13	GND
	6	Tally Input	14	GND
	7	GPI Input 1	15	GND
	8	GPI Input 2		

Technical Specifications

Digital Video

Number of Inputs	2
Number of Outputs	2
Interface	SMPTE ST259, ST292, ST424, DVB-ASI
Data Rate	270Mbps, 1.5Gbps, 3Gbps
Input/Output Level	800mVp-p
Input/Output Impedance	75 Ohms
Return Loss	>15 dB 5 MHz - 1.485 GHz
	>10 dB up to 3 GHz
Jitter	< 0.2UI
Rise/fall times	< 800ps (SD), < 130ps (HD)
Bit-error rate	10e-12

Video, CVBS

Number of Inputs	1
Number of Outputs	1
Type	Analog NTSC, PAL
Impedance	75 Ohms

Video, Genlock

Number of Inputs	1 (REF1 On OpenGear Frame)
Number of Outputs	1
Type	Analog Black Burst (NTSC, PAL), HD Tri-Level
Impedance	75 Ohms

Technical Specifications (continued)

Audio

Number of Input Channels (mono)	8
Number of Output Channels (mono)	8
Type	Balanced. Analog Line-Level or AES3, selectable in groups of 2
Analog Audio:	
Level	+4dBu nominal, +24dBu max.
Input Impedance	> 10k Ohms
Output Impedance	22 ohms
S/N	>90db
Frequency Response	+/-0.1db 20Hz – 20kHz
Distortion	< 0.05%
Digital Audio:	
Sample Rate	Up to 96kHz
Bit Depth	Up to 24 bits

Serial Data

Number of Channels	3
Type	RS232, RS422
Data Rate	DC – 1Mbps

Ethernet

Number of Channels	1
Data Rate	10/100/1000 Base-T

Timecode

Number of Inputs	1
Number of Outputs	1
Inputs	Unbalanced, 15Vp-p max
Outputs	Unbalanced, 3Vp-p

Technical Specifications (continued)

Tally/GPIO

Number of GPI Inputs	3
Number of Tally Inputs	1
Number of GPI Outputs	3
Number of Tally Outputs	1
Inputs	Short to GND or TTL Low to Activate
Outputs	Relay Contact Closure (30V, 2A max)

Optical

Operating Wavelengths	1471-1611nm
Tx Laser Output Power	0dBm (Class 1 Laser)
Receiver Sensitivity	-20dBm
Fiber Compatibility	Single-mode
Optical Connector Types	ST, SC, LG
Distance limit	40km w/Single-mode

Mechanical/Environmental

Dimensions (HxLxW)	3.025H" x 12.75L" x 1 or 3 Standard Density Slots
OpenGear Form Factor	
Environmental	0 to 50°C, 0 to 95% RH, non-condensing.
Power Consumption	12.5 Watts

Limited Warranty

OG3600 Series Fiber Transport Cards is manufactured, warranted and supported by MultiDyne Video and Fiber Optic Systems.

Please review additional warranty terms at **www.multidyne.com** located in terms of sale. A hard copy will be provided promptly and free of charge upon request.

To obtain service or for further information, please contact:

MultiDyne Video and Fiber Optic Systems,
10 Newton Place, Hauppauge, NY 11788

Toll free: (800)-488-8378

Tel: (516)-671-7278

Email: sales@multidyne.com

Website: www.multidyne.com

For further information on warranty terms, please review Sale Terms & Conditions on our web site **www.MultiDyne.com**



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