IRT-6630-DDT & IRT-6630-DDR

3G/HD/SD-SDI / ASI Fibre Optic Link

IRT ELECTRONICS

User Manual

Revision History:

Revision	Date	By	Change Description	Applicable to:
00	29/07/2014	AL	Original Issue.	Firmware ≥ Revision 1.0

Table of Contents:

This instruction book applies to units fitted with firmware ≥ Revision 1.0.

WARNING

Operation of electronic equipment involves the use of voltages and currents that may be dangerous to human life. Note that under certain conditions dangerous potentials may exist in some circuits when power controls are in the **OFF** position. Maintenance personnel should observe all safety regulations.

Do not make any adjustments inside equipment with power **ON** unless proper precautions are observed. All internal adjustments should only be made by suitably qualified personnel. All operational adjustments are available externally without the need for removing covers or use of extender cards.

Optical Safety

The light emitted from the LASER diode used in this system is invisible and may be harmful to the human eye. Avoid looking directly into the fibre optic cable or connectors or into the collimated beam along their axis when the device is in operation. Operating the LASER diode outside of its maximum ratings may cause device failure or a safety hazard.

DANGER

Invisible LASER radiation-
Avoid direct exposure to beam

Peak power	2 mW
Wavelength	1270–1610nm

Class 1 LASER Product

openGear® INTRODUCTION

Developed by Ross Video, openGear® is a standard where various manufacturers can design their equipment to fit a common frame allowing the end user to mix and match the various openGear® cards available in the market place together in one frame. This allows a single frame to be used instead of multiple different vendor's frames that each would otherwise be using their own proprietary standard.

A simple to use monitoring and control software called DashBoard™ is a free program downloadable from the openGear® website (www.opengear.tv) that allows the user to remotely monitor and control an openGear® type card fitted within an openGear® frame that meets the openGear® standard for DashBoard™ control. A link is also supplied via the IRT Electronics website (www.irtelectronics.com) under the openGear® navigation section.

IRT Electronics' openGear® cards are designed to meet the openGear® standard for mounting within the openGear® OG3-FR frame and its earlier version DFR-8300 frame, and is fully compliant with DashBoard™ control.

The openGear® frame manual, DashBoard™ control software and information regarding the frame's power supplies, controller card and frame accessories are available for download at the openGear® website.
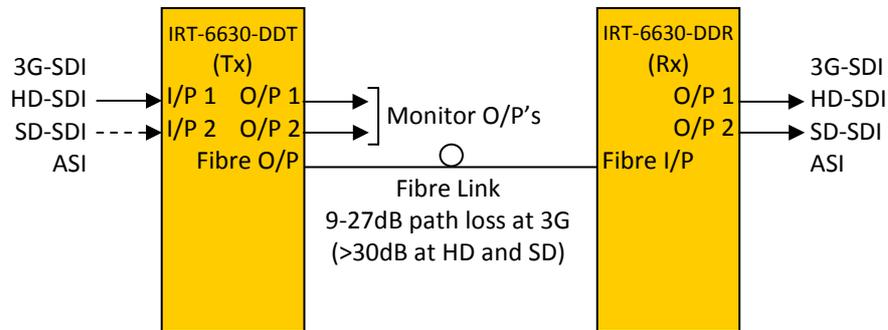
The term openGear® is a registered trade mark of Ross Video Limited.

DashBoard software Control™ is a trade mark of Ross Video Limited.

IRT-6630-DDT & IRT-6630-DDR

GENERAL DESCRIPTION

BLOCK DIAGRAM IRT-6630-DDT & IRT-6630-DDR SIGNAL PATH

The IRT-6630-DDT and IRT-6630-DDR are transmit and receive modules designed principally for use as a serial data fibre optic transmission link for 3G-SDI, HD-SDI or SD-SDI applications conforming to SMPTE standards 424M, 292M and 259M-C using 9/125 µm single mode fibre. This enables the use of space saving fibre optic cable for reliable transmission of digital video signals over lengths greater than can be achieved with coaxial cable.

In addition, the link may be used for ASI transport streams for use with MPEG compressed video streams or other 270 Mb/s type data.

The transmitter features automatic input cable equalisation. A "keep link alive" signal is available to maintain optical link operation when no electrical input is present.

Two inputs are provided with automatic changeover to input 2 on loss of input 1 for input signal redundancy.

The receiver uses an APD detector with signal conditioning and reclocking circuits. The data rate is automatically set to match the 3G-SDI, HD-SDI or SD-SDI/ASI rates dependent on the actual input data rate to the transmitter.

The IRT-6630-DDT and IRT-6630-DDR are designed to fit the openGear® standard 2RU frames which allow a mixture of cards from various manufacturers to be mounted within the same frame.

The DashBoard™ control software is available as a free download.

Standard features:

- **Transports 3G-SDI, HD-SDI, SD-SDI or ASI signal rates.**
- **Path lengths up to 30 dB[1] optical path loss using 9/125µm single mode fibre.**
- **Automatic changeover switching of input for signal redundancy on Tx.**
- **DashBoard™ software monitoring and control.**

NOTE: **1** 27dB path loss at 3G. Typically >30dB at HD and SD. Fitted with APD detector.

IRT-6630-DDT & IRT-6630-DDR

TECHNICAL SPECIFICATIONS

IRT-6630-DDT:

Input serial data signal	2.97 Gb/s (3G-SDI) to SMPTE 424M; 1.485 Gb/s (HD-SDI) to SMPTE 292M; 270 Mb/s (SD-SDI) to SMPTE 259M-C and DVB-ASI.
Input impedance	75 Ω.
Input return loss	> 15 dB 5 MHz to 1.5 GHz; > 10 dB 1.5 GHz to 2.97 GHz.
Automatic cable compensation	> 100 m at 2.97 Gb/s (3G-SDI) with Belden 1694A (typ. 110m); > 100 m at 1.485 Gb/s (HD-SDI) with Belden 1694A (typ. 160m); > 250 m at 270 Mb/s (SD-SDI/ASI) with Belden 8281 (typ. >300m).
Input connector	2 x BNC on rear panel, with I/P 1 taking priority & I/P 2 automatically switching in on loss of I/P 1.
Output connector	2 x BNC on rear panel, monitor outputs.

IRT-6630-DDR:

Number of outputs	2 data reclocked, AC coupled.
Output level	800 mV ± 10%.
Output impedance	75 Ω.
Output return loss	> 15 dB 5 MHz to 1.5 GHz; > 10 dB 1.5 GHz to 2.97 GHz.
Output rise and fall time	< 135 ps at 2.97 Gb/s and 1.485 Gb/s; > 0.4 ns and < 1.5 ns at 270 Mb/s.
Intrinsic jitter	< 0.3 UI at 2.97 Gb/s reclocked; < 0.2 UI at 1.485 Gb/s reclocked; < 0.1 UI at 270 Mb/s reclocked.
Output connector	2 x BNC on rear assembly.

Optical:

IRT-6630-DDT optical output	0 dBm +4.5/-0 dB CWDM DFB laser.
IRT-6630-DDR optical input	APD detector, -9 to -27 dBm input level at 3G-SDI, typically < -30 dBm at HD/SD-SDI.
Available wavelengths	CWDM DFB laser - 1270nm, 1290nm, 1310nm (standard), 1330nm, 1350nm, 1410nm, 1430nm, 1450nm, 1470nm, 1490nm, 1510nm, 1530nm, 1550nm, 1570nm, 1590nm & 1610nm.
Optical path loss[2]	9 to 27 dB at 3G-SDI, typically >30 dB at HD/SD-SDI, APD detector. (Optical path loss = Laser O/P power – Detector I/P power)
Optical fibre	Designed for use with 9/125 µm single mode fibre.
Optical connector	1 x SC/PC (standard) on rear – direct connection to main card.

Power Requirements:

Voltage	+ 12 Vdc.
Power consumption	< 5 VA.

Other:

Temperature range	0 - 50° C ambient.
Mechanical	Suitable for mounting in an openGear® 2RU rack chassis.
Dimensions (openGear® standard)	33.6 mm x 2U x 325 mm.
Supplied accessories	Rear connector assembly.

|		
Ordering	**IRT-6630-DDT**	IRT-6630-DDT, fitted with standard 1310nm laser, programmed with DashBoard™ control.
	IRT-6630-DDT/xxxx	IRT-6630-DDT, fitted with CWDM DFB laser other than 1310nm where xxxx = wavelength required. For example, IRT-6630-DDT/1550 is an IRT-6630-DDT fitted with a 1550nm laser.
	IRT-6630-DDR	IRT-6630-DDR, fitted with APD detector, programmed with DashBoard™ control.
	NOTE: 2	Typical values based using DFB laser. Optical attenuator supplied for IRT-6630-DDR when optical path loss is less 9dB for APD detector.

DIP Switch settings:
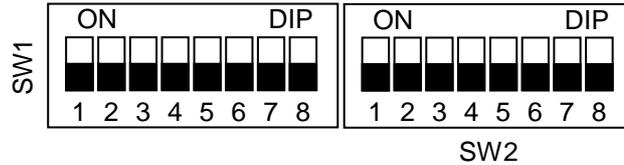
IRT-6630-DDT:

Tx Input Rate	DIP Switch	
	SW1-1	**SW1-2**
3G/HD/SD (Auto detect)	OFF	OFF
SD only	ON	OFF
HD and SD only	OFF	ON
Bypass Reclocker	ON	ON

SW1-3 OFF BNC outputs (OUT 1 and OUT 2) monitor the signal (IN1 or IN2) being fed to the optical output.

ON BNC outputs (OUT 1 and OUT 2) monitor the signal inputs (IN1 and IN2). OUT 1 = IN 1 and OUT 2 = IN 2.

SW1-4 Not used.

SW1-5 OFF Enable Laser - laser is always enabled: 'keep link alive' signal when no input signal is present.

ON Auto Laser – laser is enabled only when an input signal is present.

SW1-6 OFF Enable automatic input changeover on loss of primary input (IN 1) to Tx. (IN 1 takes priority over IN 2).

ON Disable automatic input changeover.

SW1-7 OFF DIP switch control.

ON DashBoard™ control.

SW1-8 Not used.

SW2-1 to SW2-8 Not Used.

IRT-6630-DDR:

Rx Output Rate	DIP Switch	
	SW1-1	**SW1-2**
3G/HD/SD (Auto detect)	OFF	OFF
SD only	ON	OFF
HD and SD only	OFF	ON
Bypass Reclocker	ON	ON

SW1-3 Not used.

SW1-4 Not used.

SW1-5 Not used.

SW1-6 Not used.

SW1-7 OFF DIP switch control.

ON DashBoard™ control.

SW1-8 Not used.

SW2-1 to SW2-8 Not Used.

INSTALLATION

Pre-installation:

Handling:

This equipment may contain or be connected to static sensitive devices and proper static free handling precautions should be observed.

Where individual circuit cards are stored, they should be placed in antistatic bags. Proper antistatic procedures should be followed when inserting or removing cards from these bags.

Installation in openGear® frame:

See details in separate manual downloadable from the openGear® website (www.opengear.tv).

Signal Connections:

IRT-6630-DDT:

The default setting of the IRT-6630-DDT is to automatically operate at either **2.97 Gb/s 3G-SDI**, **1.485 Gb/s HD-SDI** or **270 Mb/s SD-SDI / ASI** signals and do not require any adjustment prior to use, with the exception of DIP switch options described in the *Configuration* section of this manual that also allow SD only, HD/SD only or reclocker bypass modes of operation. Note that in order for DIP switch settings to have any effect, DIP switch SW1-7 must be in the OFF position, else all configuration settings are made via DashBoard™ or SNMP software control.

The serial digital signal connections are made to the BNC connectors on the rear panel. IN 1 is the primary input to the IRT-6630-DDT. With DIP switch SW1-6 OFF, IN 2 becomes the secondary input and will switch in automatically on loss of a valid input to IN1. Upon restoration of a valid signal to the IN 1 port, the optical transmitter automatically restores back to the signal on the IN 1 port. With SW1-6 ON, automatic changeover is disabled and although IN 2 is still monitored it is essentially ignored as far as the laser output is concerned.

With DIP switch SW1-3 OFF, the OUT 1 and OUT 2 BNC connectors act as monitor ports for the transmitter output. It will monitor either the IN 1 or IN 2 input depending on which input is actually feeding the optical laser.

With DIP switch SW1-3 ON, the OUT 1 and OUT 2 BNC connectors act as respective monitor ports for both the IN 1 and IN 2 inputs. OUT 1 monitors the IN 1 port and OUT 2 monitors the IN 2 port.

IRT-6630-DDR:

The default setting of the IRT-6630-DDR is to automatically operate at either **2.97 Gb/s 3G-SDI**, **1.485 Gb/s HD-SDI** or **270 Mb/s SD-SDI / ASI** signals and do not require any adjustment prior to use, with the exception of DIP switch options described in the *Configuration* section of this manual that also allow SD only, HD/SD only or reclocker bypass modes of operation. Note that in order for DIP switch settings to have any effect, DIP switch SW1-7 must be in the OFF position, else all configuration settings are made via DashBoard™ or SNMP software control.

The serial digital signal connections are made to the BNC connectors on the rear panel. Two identical signal outputs, OUT 1 and OUT 2, are provided. BNC connectors IN 1 and IN 2 are not used.
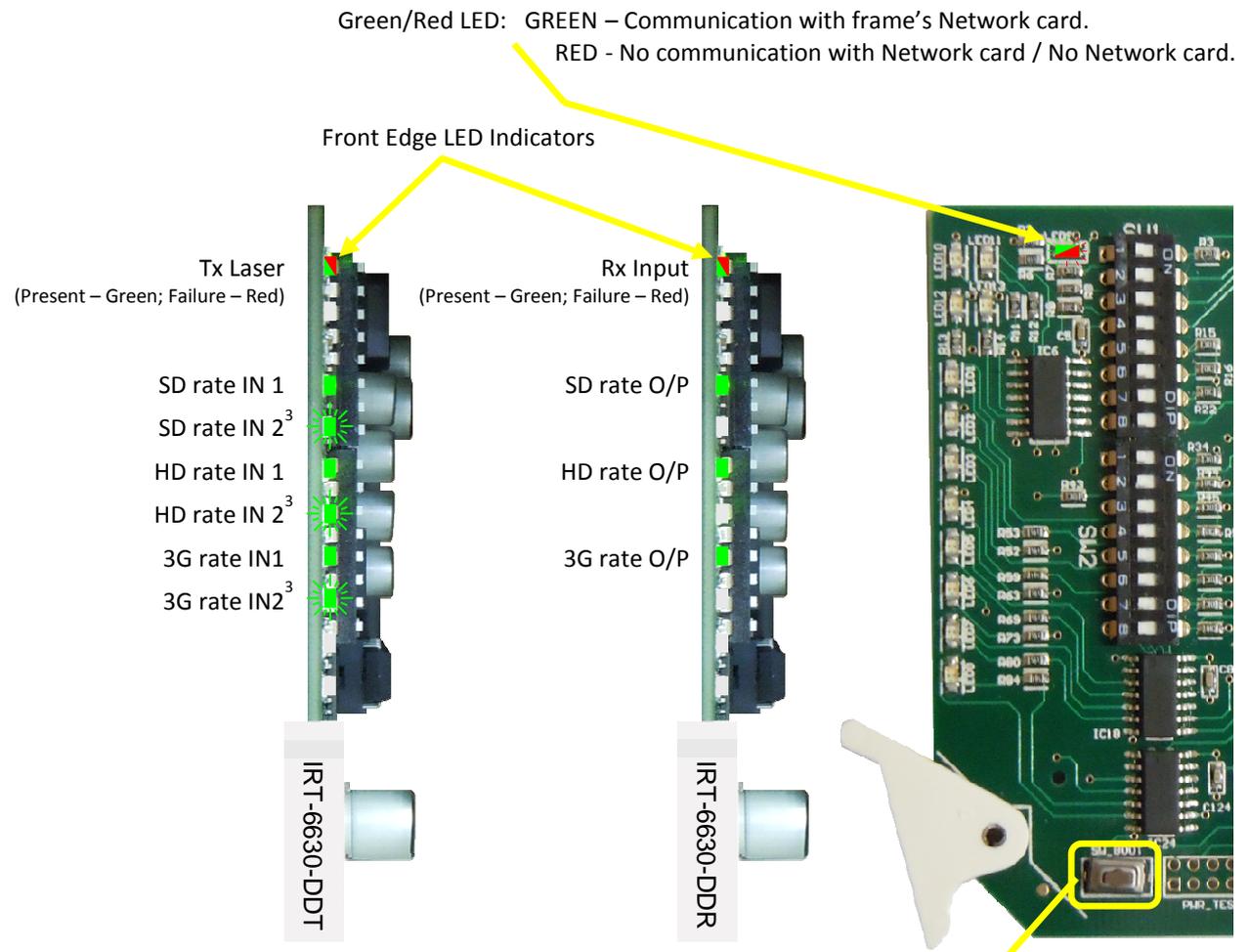
Fibre Optic Connection:

The standard optical connectors of the IRT-6630-DDT & IRT-6630-DDR are SC/PC type and are attached directly to the main module PCB, NOT the rear connector assembly.

When installing the optical fibre sufficient slack should be allowed for the module to be withdrawn with the optical fibre attached until the connector is clear of the frame and can be disconnected. If this is not done, the module will not be able to be removed without first disconnecting the optical fibre at the rear. Attempting to remove the module without first disconnecting the fibre may result in damage to the fibre and / or the module.

Note that for path lengths ≤ 9 dB for APD detectors, or ≤ 3 dB for PIN detectors, an optical attenuator must be used to avoid over driving the IRT-6630-DDR detector.

Front Edge LED and Switch Locations

Green/Red LED: GREEN – Communication with frame's Network card.
RED - No communication with Network card / No Network card.

Front Edge LED Indicators

Tx Laser
(Present – Green; Failure – Red)

Rx Input
(Present – Green; Failure – Red)

SD rate IN 1

SD rate IN 2[3]

HD rate IN 1

HD rate IN 2[3]

3G rate IN1

3G rate IN2[3]

SD rate O/P

HD rate O/P

3G rate O/P

IRT-6630-DDT

IRT-6630-DDR

SW_boot switch: Default Reset Switch.

User set names and switch position are stored within memory so that in the event of a loss of power this information is restored on resumption of power.

If the default Reset Switch is pressed whilst powering or inserting the card, the card will default to factory preset settings.

NOTE: 3   Secondary input, IN 2, rate LED will flash, if present, whilst a valid primary input, IN 1, is present. If channel has been disabled via DashBoard™ or SNMP, both primary and secondary input rate LEDs will flash.

Rear Assembly Layouts

The IRT-6630-DDT and IRT-6630-DDR share the same type of rear assembly. Consequently the IN 1 and IN 2 BNC connectors on the IRT-6630-DDR are not used.

The OUT 1 and OUT 2 BNC connectors of the IRT-6630-DDT are used for signal monitoring, whether monitoring the input signals IN 1 and IN 2 or the signal that is being transmitted via the optical output is dependent upon the SW1-3 DIP switch setting as described in the *Configuration* section of this manual.

IRT-6630-DDT
Rear Assembly
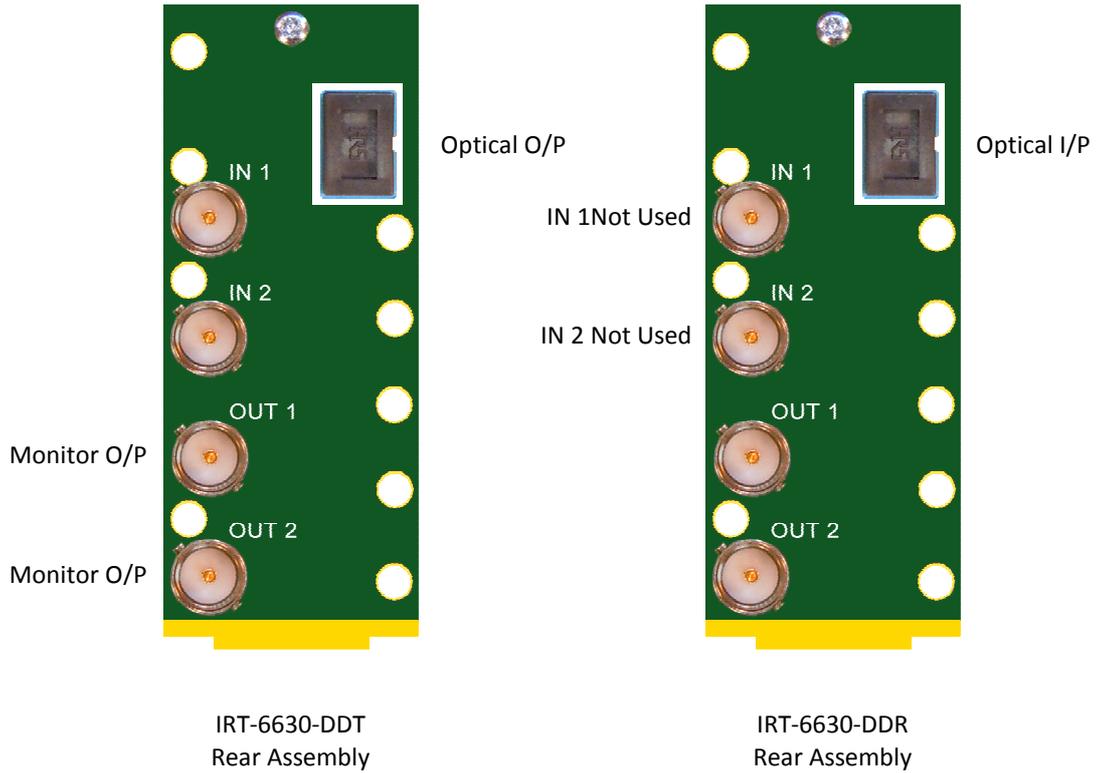
IRT-6630-DDR
Rear Assembly

OPERATION

The IRT-6630-DDT and IRT-6630-DDR is a single channel 3G/HD/SD-SDI/ASI optical link.

A single SC/PC style of connector (standard) on the rear of the card provides the optical transmit and optical receive fibre connection on the IRT-6630-DDT and IRT-6630-DDR respectively.

The default settings of both the IRT-6630-DDT and IRT-6630-DDR are automatically set to operate at either **2.97 Gb/s 3G-SDI**, **1.485 Gb/s HD-SDI** or **270 Mb/s SD-SDI** (or **ASI**) and do not require any adjustments prior to use. However, either DIP switch or DashBoard™ settings also allow the unit to be set for SD only, SD/HD only or reclocker bypass modes.

A 2.97 Gb/s 3G-SDI signal, 1.485 Gb/s HD-SDI signal or a 270 Mb/s type of signal, such as ASI or SDI, is connected to a 75 Ω BNC connector (IN 1) of the rear assembly of the IRT-6630-DDT fibre optic transmitter. Front panel LEDs indicates the presence and data rate of a valid input signal.

A secondary input (IN 2) can be automatically switched to the optical output (if enabled) on loss of a valid input signal to IN 1. On resumption of a valid signal to IN 1 the optical transmitter automatically switches back to the IN 1 input. The secondary input rate LED will flash to indicate its presence and rate. Even if the automatic change-over function is disabled, rendering the secondary input redundant, the secondary input rate LED will still indicate the presence of a secondary input.

If the laser is set for permanent operation, on loss of an input signal, a 54MHz oscillator is switched into the optical output so that the optical receiver still recognizes the optical link as being valid. This 54MHz signal does not affect the signal reclocking detect circuitry of the receiver section, which is used in signal presence/alarm indication on detection or absence of a valid 3G, HD or SD signal.

Single mode optical cable is directly connected to the module at the rear of the unit. Likewise the fibre connection at the far end of the fibre optic cable is directly connected to the rear of the receiver.

The system will operate with an optical path loss from 9dB to a maximum of 27dB (for 3G-SDI signals. Typically >30dB for HD/SD-SDI signals) when the IRT-6630-DDR is fitted with an APD detector, and from 3dB to a maximum of 18dB when fitted with a PIN detector. A flashing green LED indicator on the front edge indicates when the optical path loss is approaching, or has exceeded, the maximum allowed. On loss of input the optical LED illuminates red.

On the IRT-6630-DDT, a green LED indicator on the front edge indicates presence of a laser, and turns red on failure of the laser.

For path lengths <9dB optical loss when using an APD detector, or <3dB optical loss when using a PIN detector, an optical attenuator is required. The length of fibre that this corresponds to depends on the fibre loss characteristics at the relevant wavelength of the laser module chosen. For example, if the fibre loss characteristic of the chosen fibre is 0.2dB per kilometre at 1550 nm, say, then the maximum distance that can be run is 135 km (27dB/0.2dBkm), although connector losses, such as through patch lead connectors etc., should also be taken into consideration when calculating maximum distances. Actual attenuation versus wavelength characteristics depends upon optic fibre manufacturer's own specifications. Also a few dB headroom is recommended to allow for the effects of laser aging over time.

The output of the IRT-6630-DDR receiver is the same signal that was originally inputted to the opposite IRT-6630-DDT transmitter. Front panel green LEDs indicate the presence of a valid locked 3G-SDI, HD-SDI, or an SD-SDI type of output signal.

In the reclocker bypass mode, rates other than the 3G/HD/SD-SDI rates can be sent and received. If the data rate does not match that of 3G-SDI, HD-SDI or SD-SDI all front edge signal data rate LED's will flash to indicate that an unknown data rate has been detected.
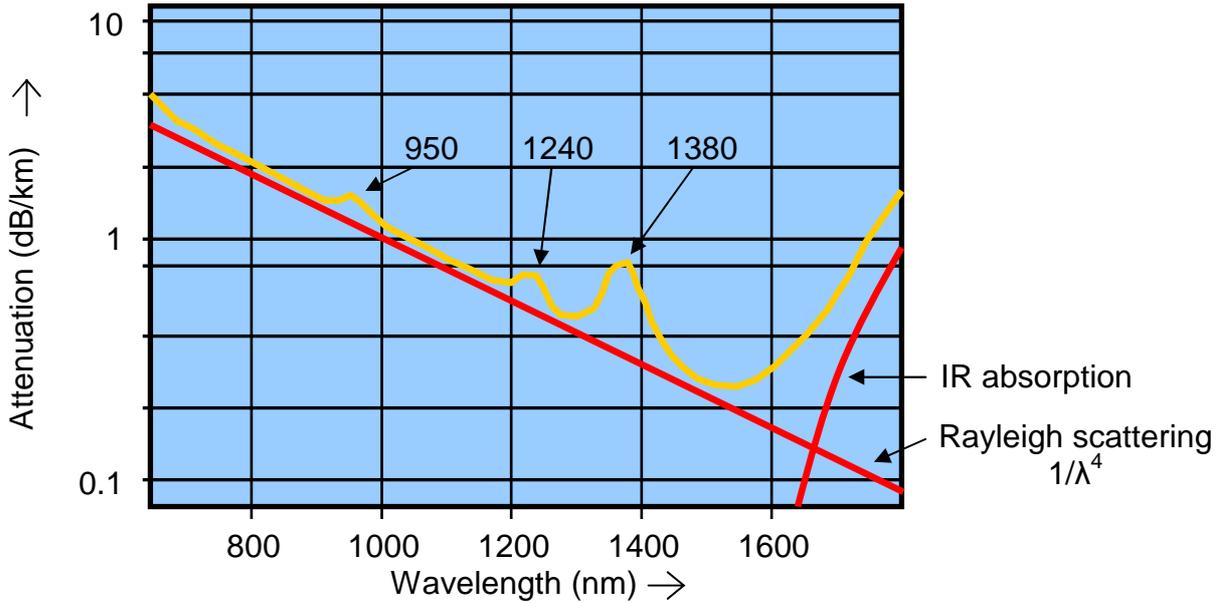
Figure 1: Attenuation versus wavelength.
Attenuation in the fibre is due to Absorption and Scattering.

Front Edge LED Indicators:

If the Transmitter (Tx) or Receiver (Rx) signal rate does not match the set rate, the corresponding LED will flash. If a secondary signal is inputted to the transmitter, its data rate LED will also flash regardless of whether it matches the set rate or not.

In this example the IRT-6630-DDT transmitter has been set for either HD/SD only or 3G/HD/SD operation. The primary input (IN 1) is being fed with an HD source. The secondary input (IN 2) will flash indicating a secondary input is present, in this case an HD signal. On loss of primary input the secondary will take control and stop flashing if its rate is within the set Tx rate.

If both primary and secondary inputs were HD-SDI signals, for example, and the Tx data rate was set for SD only operation, then both the primary (IN 1) and secondary (IN 2) HD LEDs will flash.

Laser failure on the IRT-6630-DDT is indicated by a red illuminated LASER LED. In this example there is no laser failure as indicated by the green illuminated LASER LED.

Optical present, optical low, and optical input failure, on the IRT-6630-DDR is indicated by a bi-colour illuminated OPTICAL LED. In this example the OPTICAL LED is flashing and is illuminated green, but so is the received HD signal LED illuminated green. This indicates that an HD signal is being received even though the OPTICAL alarm LED is illuminated and flashing, thus the OPTICAL alarm LED is indicating that the optical signal level is low, or approaching the minimum signal strength allowed before signal failure takes place, whence the receiver output will be muted. Note however that it is still possible for the optical signal strength to be low and still allow an errored data signal to be received before signal muting takes place. The optical low trigger point can vary between the plug-in receivers, so if operating at signal paths close to the recommended maximum specified threshold, signal analysis should be performed to check the accuracy of the received signal if the OPTICAL LED is flashing green.
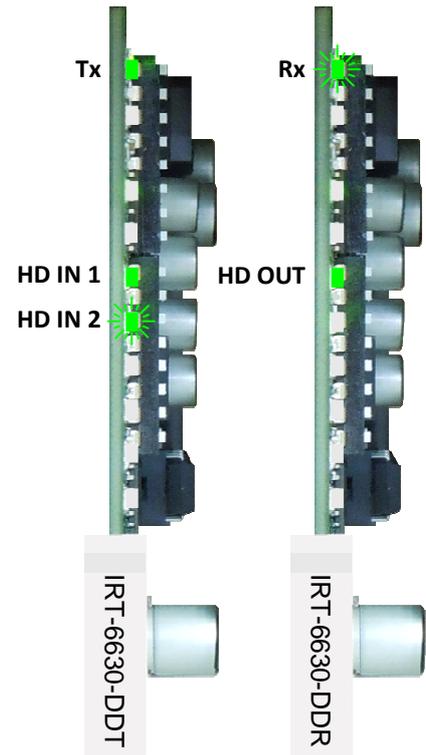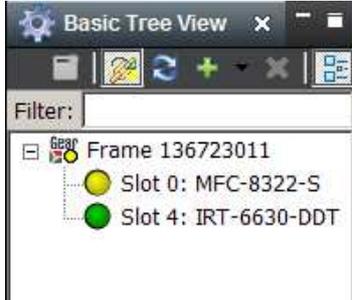
IRT-6630-DDT & IRT-6630-DDR

DashBoard™ SOFTWARE CONTROL

The DashBoard™ Control and Monitoring System is a free application designed for remote control and monitoring of the openGear® platform. This is a free application downloadable from the openGear® website (www.opengear.tv). As such, configuration of the DashBoard™ program will not be described here. The DashBoard™ manual is also downloadable from the openGear® website.
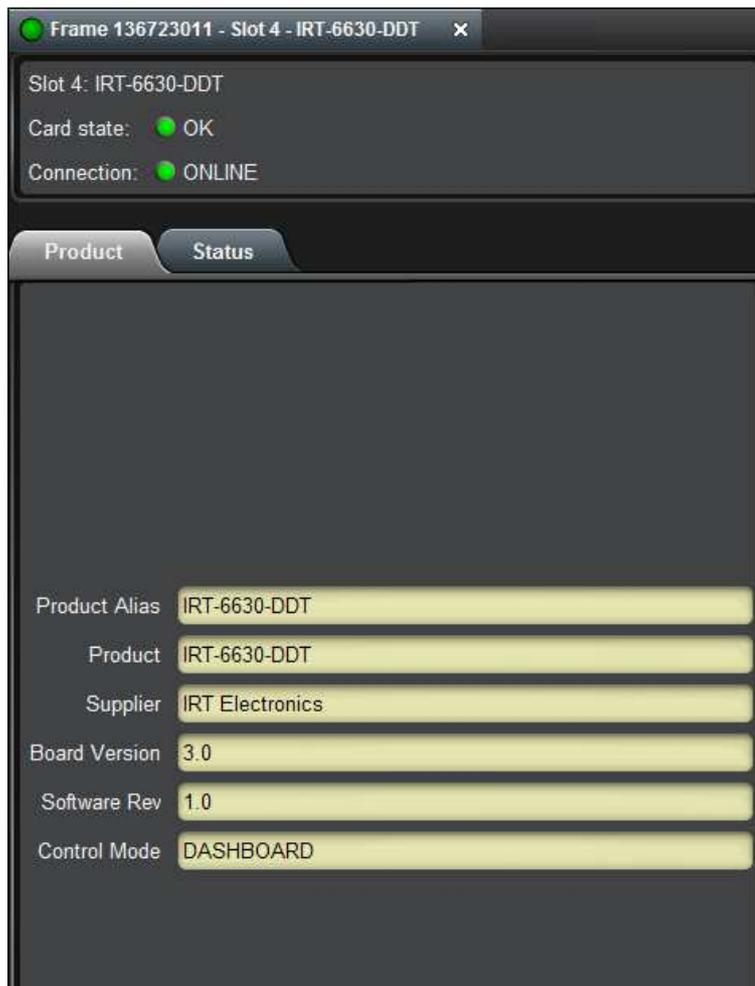
IRT-6630-DDT DashBoard™ Screenshots:

Basic Tree View:

On the left the basic tree view shows the frame. With the tree structure expanded a list of cards within the frame is shown. In this example, slot position 4 is IRT-6630-DDT. When selected, all sections and tabs to the right of the basic tree view now relate to the card in slot position 4. The name of the card, in this case IRT-6630-DDT, can be set under its Configuration TAB setting.

Product TAB:

Self explanatory. Note that the Product Alias field can be set under the Configuration TAB setting.

Status TAB:

Status TAB shows the set input names corresponding to each input channel number, these being set under the Configuration TAB in the second half of the DashBoard™ frame (see next screenshot).

The input signal status and optical status is also shown. In this example, Channel Tx, which corresponds to the primary input IN 1, and Channel Tx2, which corresponds to the secondary input IN 2, both have a 270 Mb/s rated type of signal present, such as either SD-SDI or ASI; and the laser fitted to the IRT-6630-DDT has a 1310nm wavelength and its optical status is good. No I/O alarms are present and the card is plugged into the correct rear assembly.

Config TAB:

Under the Configuration TAB parameters such as Product Alias (name) and channel names (Channel Tx and Channel Tx2) can be user set. Click computer mouse into the field to change and type new name.

If set for DashBoard™ control, as indicated by the Control Mode setting, parameters such as Auto Change Over, Laser Keep Alive signal, data Rate Setting and Channel Enable can be set.

Trap enable & disable functions can be set regardless of Control Mode state.
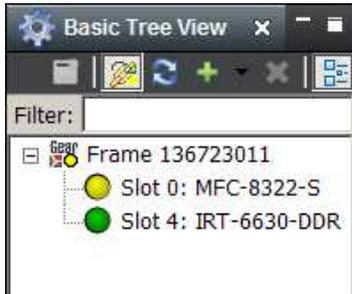
IRT-6630-DDR DashBoard™ Screenshots:

Basic Tree View:

On the left the basic tree view shows the frame. With the tree structure expanded a list of cards within the frame is shown. In this example, slot position 4 is IRT-6630-DDR. When selected, all sections and tabs to the right of the basic tree view now relate to the card in slot position 4. The name of the card, in this case IRT-6630-DDR, can be set under its Configuration TAB setting.

Product TAB:

Self explanatory. Note that the Product Alias field can be set under the Configuration TAB setting.
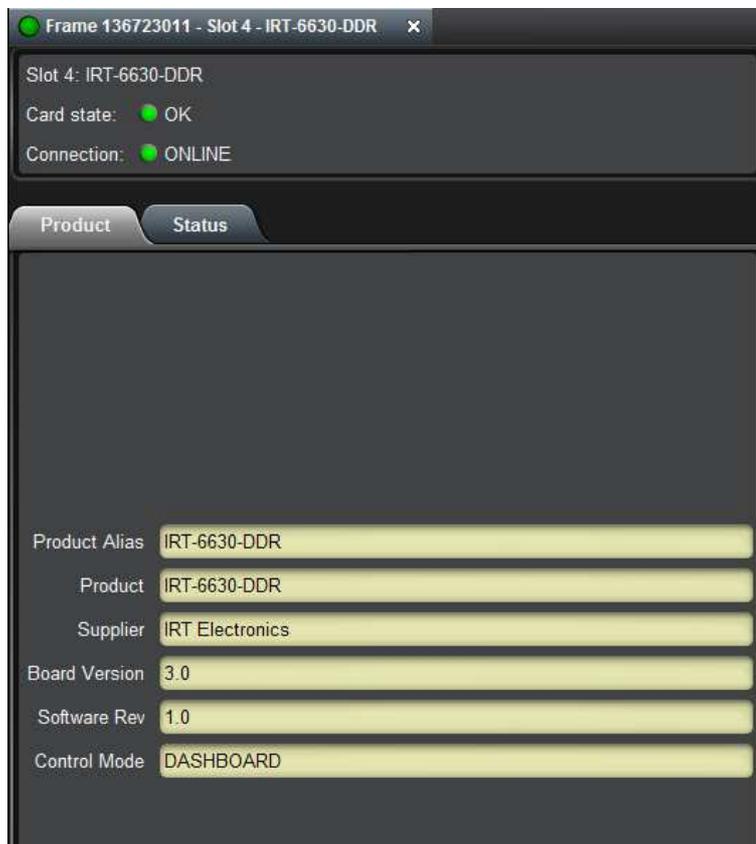
Status TAB:

Status TAB shows the set input names corresponding to the received channel, this being set under the Configuration TAB in the second half of the DashBoard™ frame (see next screenshot).

The received channel signal status and optical status is also shown. In this example, Channel 1, which corresponds to the received signal, has a 270 Mb/s rated type of signal present, such as either SD-SDI or ASI; and the receiver fitted to the IRT-6630-DDR is an APD type and its optical status is good. No I/O alarms are present and the card is plugged into the correct rear assembly.

Config TAB:

Under the Configuration TAB parameters such as Product Alias (name) and channel name (Channel) can be user set. Click computer mouse into the field to change and type new name.

If set for DashBoard™ control, as indicated by the Control Mode setting, parameters such as Data Rate Setting and Channel Enable can be set.

Trap enable & disable functions can be set regardless of Control Mode state.
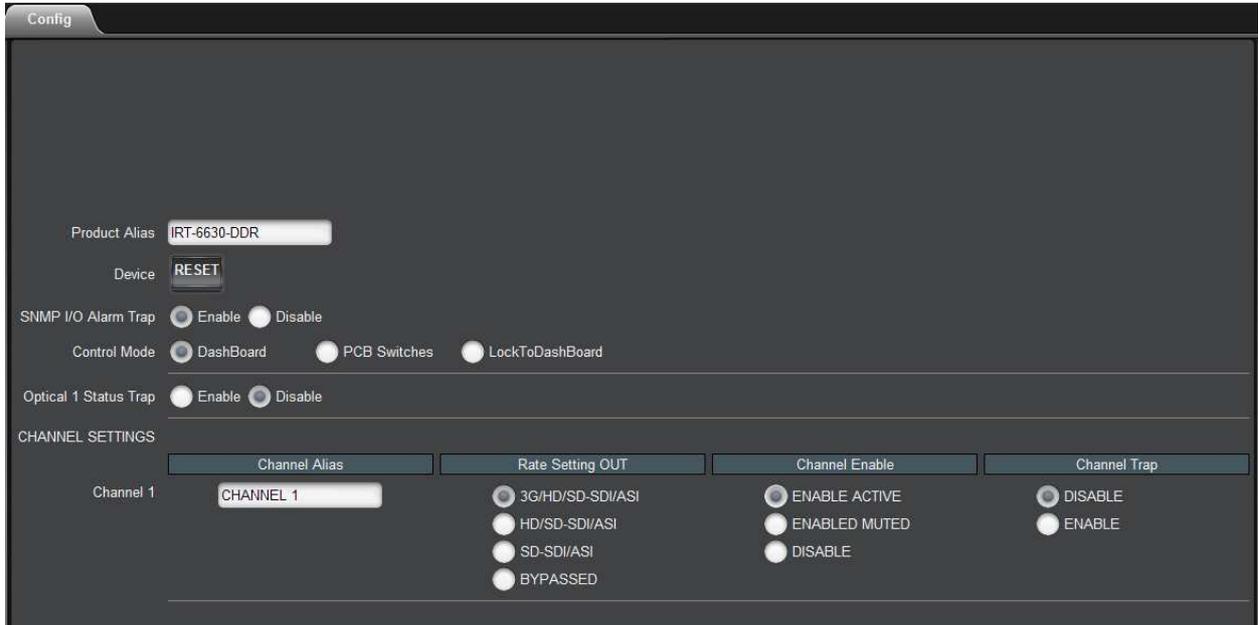
SNMP SOFTWARE CONTROL

Control via SNMP is possible via a third party Network Management System (NMS) provided the openGear® frame is fitted with a relevant Network Management card. In the case of the OG3-FR frame the MFC-8322-NS network management card is required for SNMP control. In the case of either the DFR-8310 or DFR-8321 frames either the MFC-8310-NS or MFC-8320-NS cards are required for SNMP control. Relevant frame MIBs and card MIB required to interface to NMS software - see IRT Electronics website (www.irtelectronics.com) for MIB download.

The MIB file for the IRT-6630-DDT and IRT-6630-DDR is a common MIB file for the family of IRT-6630 fibre links and is named IRT-663x-Dxx. Not all parameters in the MIB file relate to these cards.

IRT-6630-DDT SNMP Functions:

The following SNMP functions are capable of being controlled and monitored by an NMS:

irt663xDxxProductTable: A table containing product info for all IRT-6630-DDT cards at this node.

productAlias	- An indication and control of the Alias (Name) of this card.
boardRev	- An indication of the hardware (board) revision of this card.
softwareRev	- An indication of the software revision of this card.

irt663xDxxStatusTable: A table containing alarm status for all IRT-6630-DDT cards at this node.

rearassembly - An indication whether the card is inserted into the correct rear assembly or not:
    (1) match: Card is inserted into correct rear assembly.
    (2) mismatch: Card is inserted into incorrect rear assembly.

ioAlarm - An indication of the alarm status of this card:
    (0) noAlarm: No alarms present.
    (1) urgent-1-OpticalFail: Transmitter laser has failed.
    (2) urgent-2-OpticalFail: Not applicable to the IRT-6630-DDT.
    (3) urgent-1-2-OpticalFail: Not applicable to the IRT-6630-DDT.
    (4) nonUrg-ValidSignalAbsent: No valid signal is present on the primary input (IN 1).
    (5) urgent-1-OpticalFail-nonUrg-ValidSignalAbsent: Not applicable to the IRT-6630-DDT.
    (6) urgent-2-OpticalFail-nonUrg-ValidSignalAbsent: Not applicable to the IRT-6630-DDT.
    (7) urgent-1-2-OpticalFail-nonUrg-ValidSignalAbsent: Not applicable to the IRT-6630-DDT.
    (8) non-Urg-OpticalLow: Not applicable to the IRT-6630-DDT.
    (9) urgent-1-OpticalFail-nonUrg-OpticalLow: Not applicable to the IRT-6630-DDT.
    (10) urgent-2-OpticalFail-nonUrg-OpticalLow: Not applicable to the IRT-6630-DDT.
    (11) urgent-1-2-OpticalFail: Not applicable to the IRT-6630-DDT.
    (12) nonUrg-ValidSignalAbsent-OpticalLow: Not applicable to the IRT-6630-DDT.
    (13) urgent-1-OpticalFail-nonUrg-validSignalAbsent-opticalLow: Not applicable to the IRT-6630-DDT.
    (14) urgent-2-OpticalFail-nonUrg-validSignalAbsent-opticalLow: Not applicable to the IRT-6630-DDT.
    (15) urgent-1-2-OpticalFail-nonUrg-ValidSignalAbsent: Not applicable to the IRT-6630-DDT.

irt663xDxxSettingsTable: A table containing configuration settings for all IRT-6630-DDT cards at this node.

controlMode - An indication of the control settings made as per the PCB DIP switch setting:
    (0) dashboardSNMP: Card settings can be controlled via DashBoard™ or SNMP.
    (1) pcbSwitches: Card settings as per DIP switch settings only.
    (2) lockedtoDashboardSNMP: Lock module to DashBoard™ or SNMP control – overrides SW1-7 position. Note that SW1-7 must be initially ON to be able to set to Lock to SNMP mode. To release send either a (0) or (1).

ioAlarmTrapEnable - An indication and control of Trap enable/disable function of input/output alarms:
    (0) ioAlarmTrapDisable: Disable input/output alarm Traps.
    (1) ioAlarmTrapEnable: Enable input/output alarm Traps.

reset - Unit reset control:
- (0) normal: when queried reset control returns a 'normal' state.
- (1) reset: system reset causes a reset of the card.

autoChangeOver - Enable or Disable Automatic Changeover to switch Tx optical output from primary (IN 1) to secondary (IN 2) input on loss of valid primary input (if secondary input is both present and valid):
- (1) disable: Automatic Changeover mode disabled.
- (2) enable: Automatic Changeover mode enabled.

monitorPort - Sets the signal source for BNC outputs, OUT 1 & OUT 2:
- *(0) receiverInput: Not applicable to IRT-6630-DDT.Defaults back to transmitterOutput (2).*
- *(1) transmitterOutput: Not applicable to IRT-6630-DDT. Defaults back to cableInputs (3).*
- (2) transmitterOutput: Both OUT 1 and OUT 2 monitor the signal that is being transmitted by the laser.
- (3) cableInputs: OUT 1 monitors the signal on IN 1. OUT 2 monitors the signal that is on IN 2.

keepAliveTx1 - A substitution of a 54 MHz signal in place of no input signal to keep the optical link active at the receiver end:
- (1) enable: Keep Alive signal enabled.
- (2) disable: Keep Alive signal disabled.

keepAliveTx2 *- Not applicable to the IRT-6630-DDT.*

optical1TrapEnable - An indication and control of Trap enable/disable function of the transmitter laser state:
- (0) disable: Disable laser Trap alarms.
- (1) enable: Enable laser Trap alarms.

optical2TrapEnable *- Not applicable to the IRT-6630-DDT.*

opticalSettingsTable: A table containing information about the optical components fitted to the card.

optical1Component - Wavelength information about the transmitter section:
- (1) nm1470Laser: IRT-6630-DDT fitted with a 1470nm wavelength laser.
- (2) nm1490Laser: IRT-6630-DDT fitted with a 1490nm wavelength laser.
- (3) nm1510Laser: IRT-6630-DDT fitted with a 1510nm wavelength laser.
- (4) nm1530Laser: IRT-6630-DDT fitted with a 1530nm wavelength laser.
- (5) nm1550Laser: IRT-6630-DDT fitted with a 1550nm wavelength laser.
- (6) nm1570Laser: IRT-6630-DDT fitted with a 1570nm wavelength laser.
- (7) nm1590Laser: IRT-6630-DDT fitted with a 1590nm wavelength laser.
- (8) nm1610Laser: IRT-6630-DDT fitted with a 1610nm wavelength laser.
- (9) nm1310Laser: IRT-6630-DDT fitted with a 1310nm wavelength laser.
- (10) unknown: IRT-6630-DDT fitted with a wavelength laser not matching any of the above.
- *(11) pinDetector: Not applicable to the IRT-6630-DDT.*
- *(12) apdDetector: Not applicable to the IRT-6630-DDT.*
- *(13) na: Not applicable to the IRT-6630-DDT.*

optical1Status - An indication of the status of the transmitter output:
- GOOD
- FAIL.

optical2Component *- Not applicable to the IRT-6630-DDT.*

optical2Status *- Not applicable to the IRT-6630-DDT.*

inputPresentTable: A table containing information about the input status and settings.

channel1Present *- Not applicable to the IRT-6630-DDT.*

channel2Present *- Not applicable to the IRT-6630-DDT.*

channelTxPresent - An indication of the status of the signal connected to the IN 1 input:
    sdi3G PRESENT
    sdiHD PRESENT
    sdiSD/ASI PRESENT
    UNKNOWN PRESENT
    NOT PRESENT

channelRxPresent *- Not applicable to the IRT-6630-DDT.*

channelTx2Present - An indication of the status of the signal connected to the IN 2 input:
    sdi3G PRESENT
    sdiHD PRESENT
    sdiSD/ASI PRESENT
    UNKNOWN PRESENT
    NOT PRESENT

channelEnableTable: A table containing information about the channel state settings.

channel1Enable *- Not applicable to the IRT-6630-DDT.*

channel2Enable *- Not applicable to the IRT-6630-DDT.*

channelTxEnable - An indication and control of the transmitter IN 1 channel:
(1) disabled: Disable the transmitter. Neither IN 1 nor IN 2 will be sent. Writing either a 2, 3, 4 or 5 will enable the channel.
(2) enabledActive: IN 1 input is enabled and active.
(3) enabledMuted: IN 1 input is active and muted due to either rate not matching the set rate or no signal is present at the IN 1 port.
(4) enabledChangedOver: IN 1 input is active but transmitter has switched to IN 2 input due to either IN 1 rate not matching the set rate or no signal is present at the IN 1 port.
(5) na: Not applicable to the IRT-6630-DDT.

channelRxEnable *- Not applicable to the IRT-6630-DDT.*

channelTx2Enable - An indication of the transmitter IN 2 channel:
(1) disabled: Input IN 2 is disabled as per the auto change-over setting also being disabled.
(2) enabledActive: IN 2 input is enabled and active. An auto change-over operation has taken place.
(3) enabledMuted: IN 2 input is active and muted due to the auto change-over being enabled but IN 1 still has control of the transmitter.
(4) enabledChangedOver: Not applicable for the IRT-6630-DDT.
(5) na: Not applicable to the IRT-6630-DDT.

channelAliasTable: A table containing information about the channel aliases.

channel1Alias *- Not applicable to the IRT-6630-DDT.*

channel2Alias *- Not applicable to the IRT-6630-DDT.*

channelTxAlias - Set and read the Alias (name) for the transmitter signal IN 1.

channelRxAlias *- Not applicable to the IRT-6630-DDT.*

channelTx2Alias - Set and read the Alias (name) for the secondary transmitter signal IN 2.

channelTrapTable: A table containing information about the channel Traps.

channel1TrapEnable	*- Not applicable to the IRT-6630-DDT.*

channel1TrapEnable   *- Not applicable to the IRT-6630-DDT.*

channel2TrapEnable   *- Not applicable to the IRT-6630-DDT.*

channelTxTrapEnable   - Set and read the Trap enable state for the transmitter signal IN 1:
        (0) disabled: Disable IN 1 Trap alarms.
        (1) enabled: Enable IN 1 Trap alarms.

channelRxTrapEnable   *- Not applicable to the IRT-6630-DDT.*

channelTx2TrapEnable   - Set and read the Trap enable state for the secondary transmitter signal IN 2:
        (0) disabled: Disable IN 1 Trap alarms.
        (1) enabled: Enable IN 1 Trap alarms.

chanDataRateTable: A table containing information about the channel data rates.

channel1DataRateSet   *- Not applicable to the IRT-6630-DDT.*

channel2DataRateSet   *- Not applicable to the IRT-6630-DDT.*

channelTxDataRateSet   - Set and read the data rate setting for the transmitter signal IN 1:
        (1) sdi3G-HD-SD-ASI: Reclocker set for 3G/HD/SD-SDI/ASI rates.
        (2) sdiHD-SD-ASI-only: Reclocker set for HD/SD-SDI/ASI rates only. 3G-SDI blocked.
        (3) sdiSD-ASI-only: Reclocker set for SD-SDI/ASI rate only. 3G-SDI & HD-SDI blocked.
        (4) bypassed: Reclocker bypassed. All rates, including non-standard rates, will pass.
        (5) na: Not applicable to the IRT-6630-DDT. Writing 5 will default to sdi3G-HD-SD-ASI setting.

channelRxDataRateSet   *- Not applicable to the IRT-6630-DDT.*

channelTx2DataRateSet   - Data rate setting for the secondary transmitter signal IN 2 = IN 1 channelTxDataRateSet setting:
        (1) sdi3G-HD-SD-ASI: Not applicable to the IRT-6630-DDT.
        (2) sdiHD-SD-ASI-only: Not applicable to the IRT-6630-DDT.
        (3) sdiSD-ASI-only: Not applicable to the IRT-6630-DDT.
        (4) bypassed: Not applicable to the IRT-6630-DDT.
        (5) na: Not applicable. The IRT-6630-DDT always reports this field.

IRT-6630-DDR SNMP Functions:

The following SNMP functions are capable of being controlled and monitored by an NMS:

irt663xDxxProductTable: A table containing product info for all IRT-6630-DDR cards at this node.

    productAlias   - An indication and control of the Alias (Name) of this card.

    boardRev   - An indication of the hardware (board) revision of this card.

    softwareRev   - An indication of the software revision of this card.

irt663xDxxStatusTable: A table containing alarm status for all IRT-6630-DDR cards at this node.

    rearassembly   - An indication whether the card is inserted into the correct rear assembly or not:

                                  (1) match: Card is inserted into correct rear assembly.
                                  (2) mismatch: Card is inserted into incorrect rear assembly.

    ioAlarm   - An indication of the alarm status of this card:

    (0) noAlarm: No alarms present.

    (1) urgent-1-OpticalFail: Optical input to the receiver's detector is below its minimum threshold or has failed.

    (2) urgent-2-OpticalFail: Not applicable to the IRT-6630-DDR.

    (3) urgent-1-2-OpticalFail: Not applicable to the IRT-6630-DDR.

    (4) nonUrg-ValidSignalAbsent: No valid signal has been received by the receiver.

    (5) urgent-1-OpticalFail-nonUrg-ValidSignalAbsent: Not applicable to the IRT-6630-DDR.

    (6) urgent-2-OpticalFail-nonUrg-ValidSignalAbsent: Not applicable to the IRT-6630-DDR.

    (7) urgent-1-2-OpticalFail-nonUrg-ValidSignalAbsent: Not applicable to the IRT-6630-DDR.

    (8) non-Urg-OpticalLow: Optical detector of receiver is reporting that the optical input signal is approaching its minimum, or has exceeded its, allowable signal strength. **NOTE:** Detectors can vary in their reporting of optical low state. It is recommended to confirm that the received signal is error free if an Optical Low alarm has been raised.

    (9) urgent-1-OpticalFail-nonUrg-OpticalLow: Not applicable to the IRT-6630-DDR.

    (10) urgent-2-OpticalFail-nonUrg-OpticalLow: Not applicable to the IRT-6630-DDR.

    (11) urgent-1-2-OpticalFail: Not applicable to the IRT-6630-DDR.

    (12) nonUrg-ValidSignalAbsent-OpticalLow: No valid signal has been received by the receiver and optical detector of receiver is reporting that the optical input signal is approaching its minimum, or has exceeded its, allowable signal strength. **NOTE:** Detectors can vary in their reporting of optical low state. It is recommended to confirm that the received signal is error free if an Optical Low alarm has been raised.

    (13) urgent-1-OpticalFail-nonUrg-validSignalAbsent-opticalLow: Not applicable to the IRT-6630-DDR.

    (14) urgent-2-OpticalFail-nonUrg-validSignalAbsent-opticalLow: Not applicable to the IRT-6630-DDR.

    (15) urgent-1-2-OpticalFail-nonUrg-ValidSignalAbsent: Not applicable to the IRT-6630-DDR.

irt663xDxxSettingsTable: A table containing configuration settings for all IRT-6630-DDR cards at this node.

controlMode - An indication of the control settings made as per the PCB DIP switch setting:
- (0) dashboardSNMP: Card settings can be controlled via DashBoard™ or SNMP.
- (1) pcbSwitches: Card settings as per DIP switch settings only.
- (2) lockedtoDashboardSNMP: Lock module to DashBoard™ or SNMP control – overrides SW1-7 position. Note that SW1-7 must be initially ON to be able to set to Lock to SNMP mode. To release send either a (0) or (1).

ioAlarmTrapEnable - An indication and control of Trap enable/disable function of input/output alarms:
- (0) ioAlarmTrapDisable: Disable input/output alarm Traps.
- (1) ioAlarmTrapEnable: Enable input/output alarm Traps.

reset - Unit reset control:
- (0) normal: when queried reset control returns a 'normal' state.
- (1) reset: system reset causes a reset of the card.

autoChangeOver - *Not applicable to the IRT-6630-DDR.*

monitorPort - *Not applicable to the IRT-6630-DDR.*

keepAliveTx1 - *Not applicable to the IRT-6630-DDR.*

keepAliveTx2 - *Not applicable to the IRT-6630-DDR.*

optical1TrapEnable - An indication and control of Trap enable/disable function of the optical receiver state:
- (0) disable: Disable laser Trap alarms.
- (1) enable: Enable laser Trap alarms.

optical2TrapEnable - *Not applicable to the IRT-6630-DDR.*

opticalSettingsTable: A table containing information about the optical components fitted to the card.

optical1Component - Detector type of the receiver:
- *(1) nm1470Laser: Not applicable to the IRT-6630-DDR.*
- *(2) nm1490Laser: Not applicable to the IRT-6630-DDR.*
- *(3) nm1510Laser: Not applicable to the IRT-6630-DDR.*
- *(4) nm1530Laser: Not applicable to the IRT-6630-DDR.*
- *(5) nm1550Laser: Not applicable to the IRT-6630-DDR.*
- *(6) nm1570Laser: Not applicable to the IRT-6630-DDR.*
- *(7) nm1590Laser: Not applicable to the IRT-6630-DDR.*
- *(8) nm1610Laser: Not applicable to the IRT-6630-DDR.*
- *(9) nm1310Laser: Not applicable to the IRT-6630-DDR.*
- *(10) unknown: Not applicable to the IRT-6630-DDR.*
- (11) pinDetector: IRT-6630-DDR fitted with a PIN detector.
- (12) apdDetector: IRT-6630-DDR fitted with an APD detector.
- *(13) na: Not applicable to the IRT-6630-DDR.*

optical1Status - An indication of the status of the receiver optical input:
- GOOD
- LOW
- FAIL.

optical2Component - *Not applicable to the IRT-6630-DDR.*

optical2Status - *Not applicable to the IRT-6630-DDR.*

inputPresentTable: A table containing information about the received signal status.

channel1Present	- An indication of the status of the signal received:

          sdi3G PRESENT
          sdiHD PRESENT
          sdiSD/ASI PRESENT
          UNKNOWN PRESENT
          NOT PRESENT

channel2Present   - *Not applicable to the IRT-6630-DDR.*

channelTxPresent   - *Not applicable to the IRT-6630-DDR.*

channelRxPresent   - *Not applicable to the IRT-6630-DDR.*

channelTx2Present   - *Not applicable to the IRT-6630-DDR.*

channelEnableTable: A table containing information about the channel state settings.

channel1Enable   - An indication and control of the receiver output:

    (1) disabled: Disable the output signal. Writing either a 2, 3, 4 or 5 will enable the channel.
    (2) enabledActive: Output is enabled and active.
    (3) enabledMuted: Not applicable to the IRT-6630-DDR.
    (4) enabledChangedOver: Not applicable to the IRT-6630-DDR.
    (5) na: Not applicable to the IRT-6630-DDR.

channel2Enable   - *Not applicable to the IRT-6630-DDR.*

channelTxEnable   - *Not applicable to the IRT-6630-DDR.*

channelRxEnable   - *Not applicable to the IRT-6630-DDR.*

channelTx2Enable   - *Not applicable to the IRT-6630-DDR.*

channelAliasTable: A table containing information about the channel aliases.

channel1Alias   - Set and read the Alias (name) for the output signal.

channel2Alias   - *Not applicable to the IRT-6630-DDR.*

channelTxAlias   - *Not applicable to the IRT-6630-DDR.*

channelRxAlias   - *Not applicable to the IRT-6630-DDR.*

channelTx2Alias   - *Not applicable to the IRT-6630-DDR.*

channelTrapTable: A table containing information about the channel Traps.

channel1TrapEnable - Set and read the Trap enable state for the received signal:
(0) disabled: Disable received channel Trap alarms.
(1) enabled: Enable received channel Trap alarms.

channel2TrapEnable - *Not applicable to the IRT-6630-DDR.*

channelTxTrapEnable - *Not applicable to the IRT-6630-DDR.*

channelRxTrapEnable - *Not applicable to the IRT-6630-DDR.*

channelTx2TrapEnable - *Not applicable to the IRT-6630-DDR.*

chanDataRateTable: A table containing information about the channel data rates.

channel1DataRateSet - Set and read the data rate setting for the received signal:
(1) sdi3G-HD-SD-ASI: Reclocker set for 3G/HD/SD-SDI/ASI rates.
(2) sdiHD-SD-ASI-only: Reclocker set for HD/SD-SDI/ASI rates only. 3G-SDI blocked.
(3) sdiSD-ASI-only: Reclocker set for SD-SDI/ASI rate only. 3G-SDI & HD-SDI blocked.
(4) bypassed: Reclocker bypassed. All rates, including non-standard rates, will pass.
(5) *na: Not applicable to the IRT-6630-DDR. Writing 5 will default to sdi3G-HD-SD-ASI setting.*

channel2DataRateSet - *Not applicable to the IRT-6630-DDR.*

channelTxDataRateSet - *Not applicable to the IRT-6630-DDR.*

channelRxDataRateSet - *Not applicable to the IRT-6630-DDR.*

channelTx2DataRateSet - *Not applicable to the IRT-6630-DDR.*

MAINTENANCE & STORAGE

Maintenance:
No regular maintenance is required.

Care however should be taken to ensure that all connectors are kept clean and free from contamination of any kind. This is especially important in fibre optic equipment where cleanliness of optical connections is critical to performance.

Storage:
If the equipment is not to be used for an extended period, it is recommended the whole unit be placed in a sealed plastic bag to prevent dust contamination. In areas of high humidity a suitably sized bag of silica gel should be included to deter corrosion.

Where individual circuit cards are stored, they should be placed in antistatic bags. Proper antistatic procedures should be followed when inserting or removing cards from these bags.

WARRANTY & SERVICE

Equipment is covered by a limited warranty period of three years from date of first delivery unless contrary conditions apply under a particular contract of supply. For situations when "**No Fault Found"** for repairs, a minimum charge of 1 hour's labour, at IRT's current labour charge rate, will apply, whether the equipment is within the warranty period or not.

Equipment warranty is limited to faults attributable to defects in original design or manufacture. Warranty on components shall be extended by IRT only to the extent obtainable from the component supplier.

Equipment return:
Before arranging service, ensure that the fault is in the unit to be serviced and not in associated equipment. If possible, confirm this by substitution.

Before returning equipment contact should be made with IRT or your local agent to determine whether the equipment can be serviced in the field or should be returned for repair.

The equipment should be properly packed for return observing antistatic procedures.

The following information should accompany the unit to be returned:

1. A fault report should be included indicating the nature of the fault
2. The operating conditions under which the fault initially occurred.
3. Any additional information, which may be of assistance in fault location and remedy.
4. A contact name and telephone and fax numbers.
5. Details of payment method for items not covered by warranty.
6. Full return address.
7. For situations when "No **Fault Found"** for repairs, a minimum charge of 1 hour's labour will apply, whether the equipment is within the warranty period or not. Contact IRT for current hourly rate.

Please note that all freight charges are the responsibility of the customer.

The equipment should be returned **to the agent who originally supplied the equipment** or, where this is not possible, to IRT directly. Details of IRT's direct address can be found at IRT Electronics' website.

Web address: www.irtelectronics.com

Email: sales@irtelectronics.com