3G HD SD ASI openGear

IRT-6630-DTR

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

IRT ELECTRONICS

User Manual

Revision History:

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

IRT-6630-DTR

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.

GENERAL DESCRIPTION

BLOCK DIAGRAM IRT-6630-DTR SIGNAL PATH
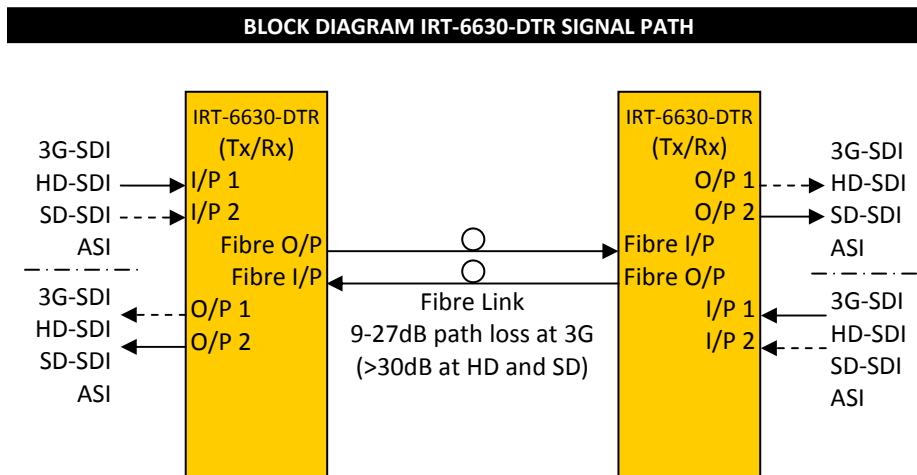
The IRT-6630-DTR is a transmit/receive (transceiver) module designed principally for use as a serial data fibre optic transmission link for 3G-SDI, HD-SDI or SD-SDI applications conforming to SMPTE standards 424M, 292M and 259M-C using 9/125 µm single mode fibre. This enables the use of space saving 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 section 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 section 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-DTR can be used as an independent transmitter and receiver at the same time allowing bi-directional operation over two single mode fibres. Being independent from each other, the transmit and receive signals can be of mixed signal types.

Optionally a 1310/1550nm WDM[2,3] optical combiner can be fitted to allow for combined use on a single fibre.

The IRT-6630-DTR is 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.**
- **Single or bi-directional operation possible with independent transmit and receive functions on the one card.**
- **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.**
- **Optional on-board WDM[2,3] optical combiner for use on a single common fibre.**
- **DashBoard™ software monitoring and control.**

NOTE: 1   27dB path loss at 3G. Typically >30dB at HD and SD. Fitted with APD detector.
2   With WDM option fitted for combined use on a single fibre, optical path loss is reduced by approximately 2dB.
3   With WDM option fitted, when operating as a pair, one IRT-6630-DTR must be fitted with a 1310nm laser and the other a 1550nm laser.

TECHNICAL SPECIFICATIONS

Transmitter:

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	1 x BNC (OUT 1) on rear panel, link selectable Tx input monitor, or nil if set as a second Rx output.

Receiver:

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, or 1 x BNC if OUT 1 has been link selected as an input monitor.

Optical:

Optical output	0 dBm +4.5/-0 dB CWDM DFB laser.
Optical input	APD detector, -9 to -27 dBm input level at 3G-SDI, typically < -30 dBm at HD/SD-SDI.
Available wavelengths	1310nm or 1550nm. Other wavelengths available upon request.
Optical path loss[4, 5]	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	2 x LC/PC (standard) on rear – direct connection to main card, 1 Tx and 1 Rx; 1 x SC/PC (standard) with WDM option fitted.

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-DTR**	IRT-6630-DTR, programmed with DashBoard™ control.
	WDM order codes	IRT-6630-DTR/1310/WDM & IRT-6630-DTR/1550/WDM.

	NOTE:	**4**	Typical values based using DFB laser. Optical attenuator supplied for when optical path loss is less than 9dB for APD detector.
		5	With WDM option fitted for combined use on a single fibre, optical path loss is reduced by approximately 2dB.
		6	With WDM module fitted, when operating as a pair, one IRT-6630-DTR must be fitted with a 1310nm laser and the other a 1550nm laser.

CONFIGURATION

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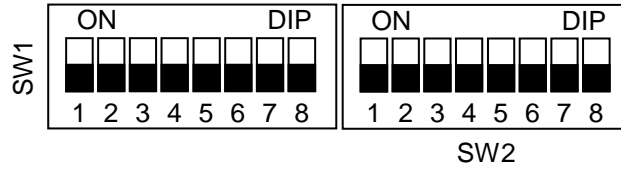
	DIP Switch	
Tx Input Rate	**SW1-1**	**SW1-2**
3G/HD/SD (Auto detect)	OFF	OFF
SD only	ON	OFF
HD and SD only	OFF	ON
Bypass Reclocker	ON	ON

	DIP Switch	
Rx Output Rate	**SW1-3**	**SW1-4**
3G/HD/SD (Auto detect)	OFF	OFF
SD only	ON	OFF
HD and SD only	OFF	ON
Bypass Reclocker	ON	ON

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 OFF   OUT 1 acts as the Rx output (both OUT 1 and OUT 2 are Rx outputs).

ON   OUT 1 acts as the Tx monitor port (only OUT 2 is the Rx output).

SW2-1 to SW2-8   Not Used.

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:

The default setting of the IRT-6630-DTR 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 does 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, SIP switch SW1-7 must be in the OFF position, else all configuration settings are made via DashBoard™ or SNMP software control.

The transmitter and receiver sections of the IRT-6630-DTR act independently from each other in that the signal rates are both independently set.

The serial digital signal connections are made to the BNC connectors on the rear panel. IN 1 is the primary input to the transmitter section of the IRT-6630-DTR. 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 IN 2 is ignored.

With DIP switch SW1-8 OFF, the OUT 1 BNC connector acts as an optical receiver section output. OUT 2 is always an output of the optical receiver section.

With DIP switch SW1-8 ON, the OUT 1 BNC connector acts as a monitor port for the transmitter section. It will monitor either the IN 1 or IN 2 input depending on which input is actually feeding the optical transmitter.

Fibre Optic Connection:

Optical connections are made to the panel adapter mounted on a bracket at the rear of the module. Care must be taken to provide a clean surface on the optical connectors and in inserting the plug on the external fibre to prevent damage to the alignment ferrule of the panel adapter. Type of fibre used must be single mode type.
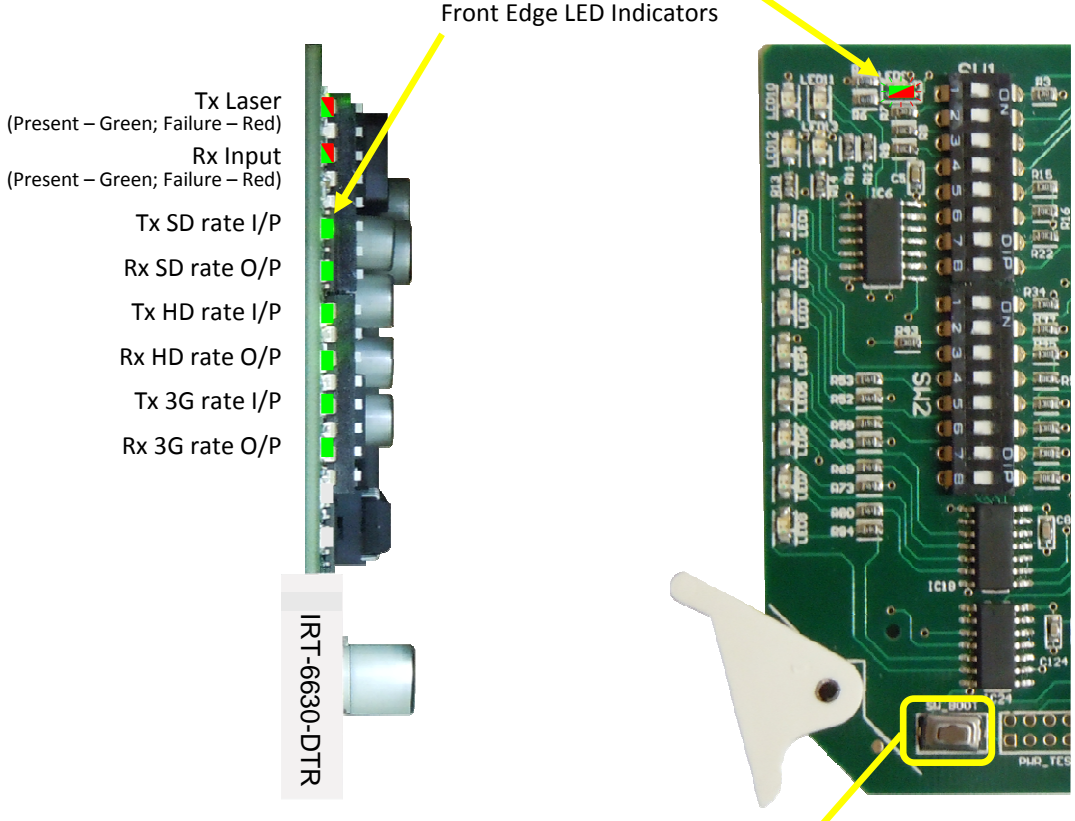
The standard configuration for the IRT-6630-DTR has separate LC/PC optical connectors for the transmitter and receiver sections. The transmitter optical output connector is the upper half of the optical connector, whilst the receiver optical input connector is the lower half.

If the IRT-6630-DTR is fitted with the optional 1300/1550nm wave division multiplexer (WDM), only one common optical SC/PC connector is provided with both transmit and receive functions occurring on a single fibre. When operating the IRT-6630-DTR as a pair with the WDM option fitted, one unit must be fitted with a 1310nm (or 1260-1360nm) optical transceiver and the other with a 1550nm (or 1520-1600nm) optical transceiver.

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 receiver part of the transceiver. For the standard IRT-6630-DTR with no WDM option fitted, an external optical attenuator is supplied as standard with the unit. For IRT-6630-DTR's fitted with a WDM device, only the 1550nm version comes equipped with an external optical attenuator as it shares the same fibre together with the 1310nm version.

Front Edge LED and Switch Locations

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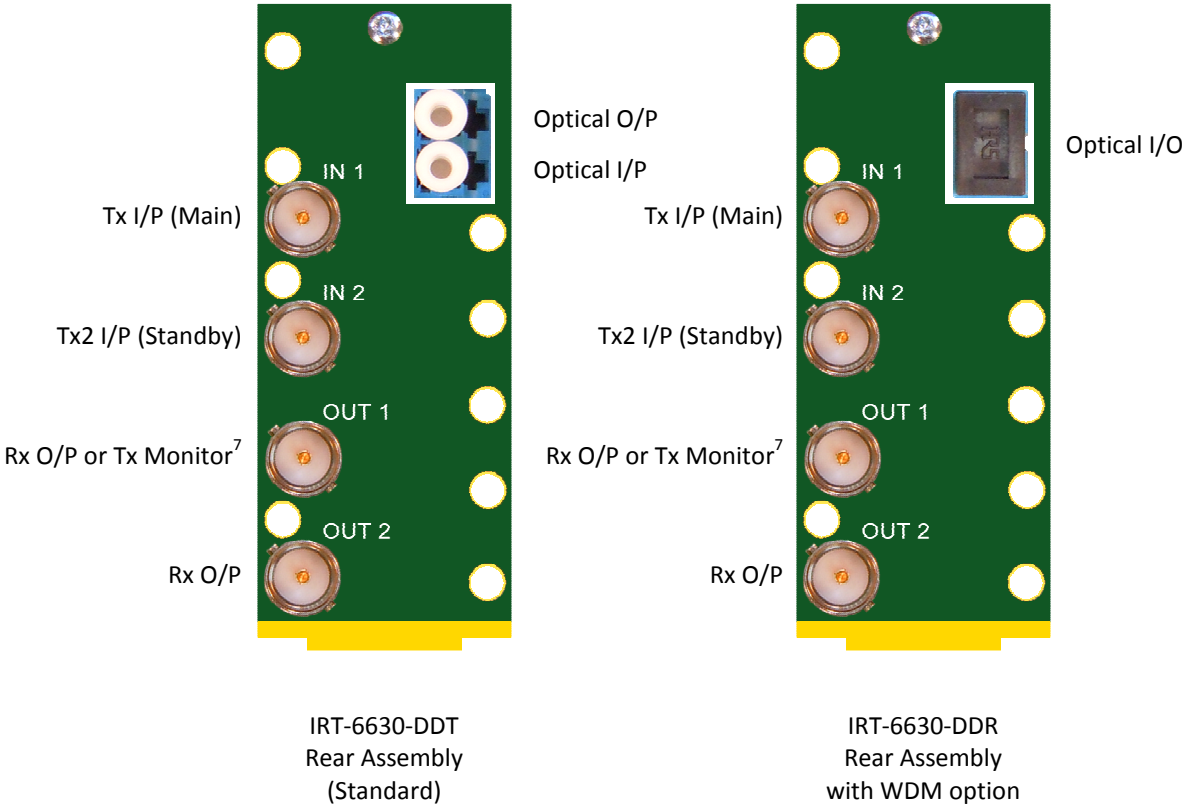RED - No communication with Network card / No Network card.

Front Edge LED Indicators

Tx Laser
(Present – Green; Failure – Red)

Rx Input
(Present – Green; Failure – Red)

Tx SD rate I/P

Rx SD rate O/P

Tx HD rate I/P

Rx HD rate O/P

Tx 3G rate I/P

Rx 3G rate O/P

IRT-6630-DTR

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.

Rear Assembly Layouts

The OUT 1 BNC connector of the IRT-6630-DTR is used either as a receiver (Rx) output or a transmitter (Tx) monitoring port - dependent upon the SW1-8 DIP switch setting as described in the *Configuration* section of this manual.

Optical O/P
Optical I/P

IN 1
Tx I/P (Main)

IN 2
Tx2 I/P (Standby)

OUT 1
Rx O/P or Tx Monitor[7]

OUT 2
Rx O/P

IRT-6630-DDT
Rear Assembly
(Standard)

Optical I/O

IN 1
Tx I/P (Main)

IN 2
Tx2 I/P (Standby)

OUT 1
Rx O/P or Tx Monitor[7]

OUT 2
Rx O/P

IRT-6630-DDR
Rear Assembly
with WDM option

NOTE: 7 Beware that when in DashBoard™ or SNMP modes it is possible for an operator to easily switch between states for monitoring what is both being transmitted and received, therefore OUT 2 should be used as the dedicated receiver output when the module has been set up for DashBoard™/SNMP control (DIP switch SW1-7 = ON).

OPERATION

The IRT-6630-DTR is primarily designed for use as an optical transmitter and receiver unit built into the one card, though it can be operated independently as an optical transmitter or optical receiver only device. The IRT-6630-DTR is fully operable with previous IRT single channel 3G, HD or SD fibre links.

A dual LC/PC style of connector on the rear of the card provides separate optical transmit and optical receive fibre connections with the upper half of the connector being the optical transmitter output and the lower half being the optical receiver input.

Optionally a 1300/1550nm wave division multiplexer (WDM) can be fitted to the IRT-6630-DTR to allow simultaneous transmit and receive functions on the one fibre. Only one SC/PC optical connector is supplied as standard when fitted with the WDM option. When fitted with the WDM option, due to the 1300/1550nm split of the WDM device, and being used as a pair, one IRT-6630-DTR must be fitted with a 1310nm (or 1260-1360nm) transceiver and the other with a 1550nm (or 1520-1600nm) transceiver.

The default setting of the IRT-6630-DTR is 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 does not require any adjustments prior to use. However, either DIP switch or DashBoard™ or SNMP settings 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) on the rear assembly of the IRT-6630-DTR fibre optic transceiver. Front edge LEDs indicates the presence and data rate of a valid input signal.

A second 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 transmitter section automatically switches back to the IN 1 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 detector circuitry of the receiver section, which is used in signal presence 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.

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 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. 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-DTR receiver section is the same signal that was originally inputted to the opposite fibre transmitter. Front edge 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.
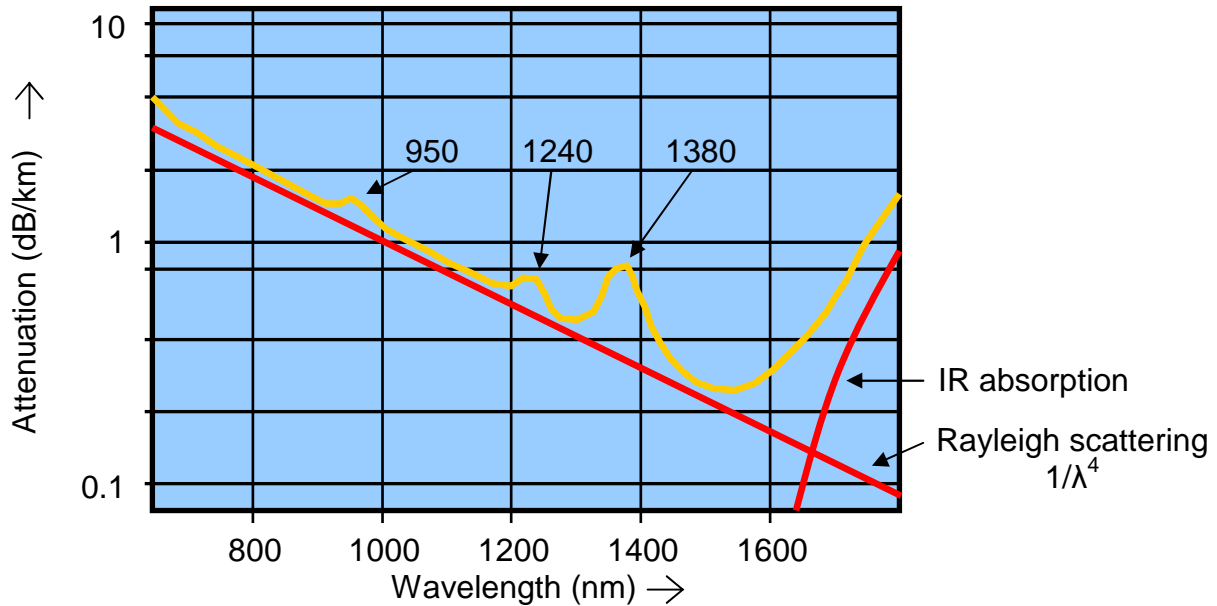
Figure 1: Attenuation versus wavelength.
Attenuation in the fibre is due to Absorption and Scattering.

Front Edge LED Indicators:

If the Tx or Rx input signal rate does not match the set rate, or the secondary input rate is not the same as the primary input rate, even though its rate is compatible with the set rate, the corresponding LED will flash.

In this example the IRT-6630-DTR transmitter section 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), even though its rate (SD) is within the Tx set rate, will flash as its rate is different to the primary input's rate. On loss of primary input the secondary will still take control and stop flashing as its rate is still within the set Tx rate.

If both primary and secondary inputs were HD-SDI and 3G-SDI signals, for example, and the Tx data rate was set for SD only operation, then both the HD and 3G LEDs will alternatively flash.

Laser failure on the IRT-6630-DTR is indicated by a red illuminated LASER LED at the top of the board. In the above 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-DTR 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-DTR
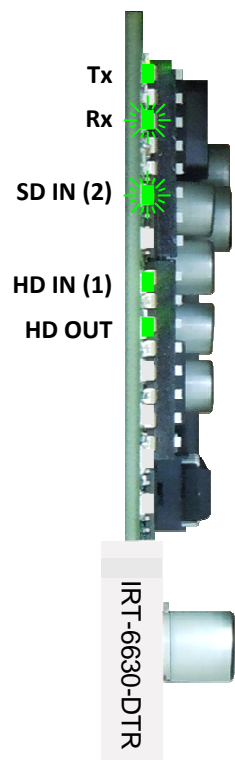
DashBoard™ SOFTWARE CONTROL

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-DTR DashBoard™ Screenshots:

Basic Tree View:
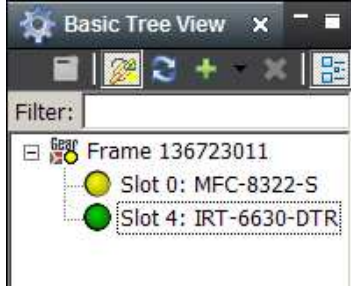
On the left the basic tree view shows the frame. With the tree structure expanded a list of cards within the frame is shown. In this example, slot position 4 is highlighted. All sections and tabs to the right of the basic tree view now relate to the card in slot position 4, in this case the IRT-6630-DTR transceiver. The name of the switcher, in this case IRT-6630-DTR, can be set under the Configuration TAB setting.

Product TAB:

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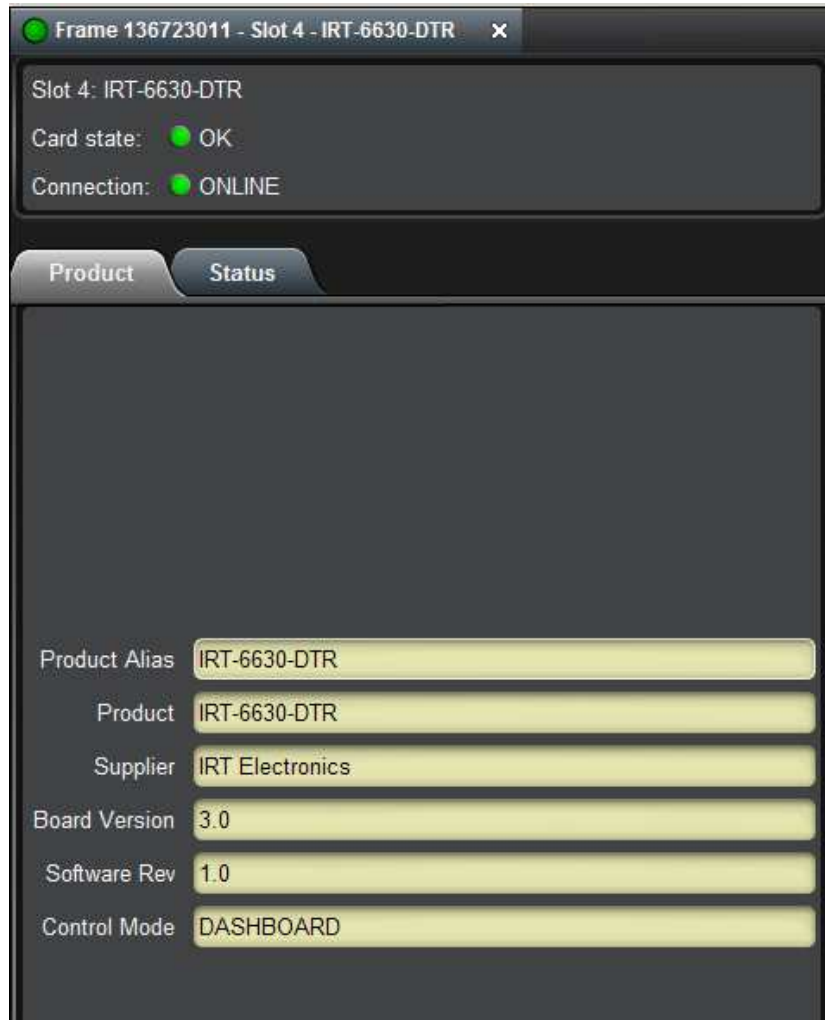
Status TAB:

Status TAB shows the Optical Status & Optical Component of both the transmitter's laser (Optical 1) and the receiver's detector (Optical 2).

The signal status of both the transmitter and receiver are also shown. The Alias (name) of the transmitter inputs (Channel Tx & Channel Tx2) and the receiver output (Channel Rx) are set under the Configuration TAB. The Channel Status indicates if a signal is present as well as the type of signal.

Config TAB:

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

If DIP switch SW1-7 has been set for DashBoard™ control, parameters such as the transmitter and receiver data rates can be set as well as Auto Change Over mode to automatically switch to input 2 on loss of input 1, and whether the OUT 1 output acts as a monitor port for the transmitter or a second receiver output.

Beware that because when in DashBoard™ mode it is possible for the operator to easily switch between states for monitoring the OUT 1 BNC port of what is both being transmitted and received, OUT 2 should be used as the dedicated receiver output.

Under DashBoard™ control it is also possible to lock the control mode to DashBoard™ control. Even if the board is subsequently switch to operate in the PCB mode, these settings will not have any effect until the control mode has been release from the LockToDashBoard mode.

When in the PCB mode of operation, the Config TAB control functions are disabled, with the exception of the Alias and Trap settings. All configuration parameters are then as per the DIP switch settings.

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-DTR 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 this card.

IRT-6630-DTR 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-DTR 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-DTR 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: Optical input to the receiver's detector is below its minimum threshold or has failed.
  (3) urgent-1-2-OpticalFail: Both transmitter laser has failed and optical input to the receiver's detector is below its minimum threshold or has failed.
  (4) nonUrg-ValidSignalAbsent: Either no valid signal is present on the input to the transmitter or received by the receiver.
  (5) urgent-1-OpticalFail-nonUrg-ValidSignalAbsent: Transmitter laser has failed and no valid signal has been received by the receiver.
  (6) urgent-2-OpticalFail-nonUrg-ValidSignalAbsent: Optical input to the receiver's detector is below its minimum threshold, or has failed, and no valid signal is present on the input to the transmitter.
  (7) urgent-1-2-OpticalFail-nonUrg-ValidSignalAbsent: Both transmitter laser has failed and optical input to the receiver's detector is below its minimum threshold or has failed and no valid signal is present on the input to the transmitter.
  (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: Laser has failed 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.
  (10) urgent-2-OpticalFail-nonUrg-OpticalLow: Not applicable to the IRT-6630-DTR.
  (11) urgent-1-2-OpticalFail: Optical input to the receiver's detector is below its minimum threshold or has failed. Duplicate entry for table structure only.

(12) nonUrg-ValidSignalAbsent-OpticalLow: Either no valid signal is present on the input to the transmitter or 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: Transmitter laser has failed and 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.

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

(15) *urgent-1-2-OpticalFail-nonUrg-ValidSignalAbsent: Both transmitter laser has failed and optical input to the receiver's detector is below its minimum threshold or has failed and no valid signal is present on the input to the transmitter. Duplicate entry for table structure only.*

irt663xDxxSettingsTable: A table containing configuration settings for all IRT-6630-DTR 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 OUT 1:
  (0) receiverInput: OUT 1 port outputs the received signal.
  (1) transmitterOutput: OUT 1 port outputs the transmitted signal.
  (2) *transmitterOutput: Not applicable to IRT-6630-DTR. Defaults back to receiverInput (0).*
  (3) *cableInputs: Not applicable to IRT-6630-DTR. Defaults back to transmitterOutput (1).*

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-DTR.*

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

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

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

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

optical2Component — Detector type information about the receiver section:
  (1) nm1470Laser: Not applicable to the IRT-6630-DTR.
  (2) nm1490Laser: Not applicable to the IRT-6630-DTR.
  (3) nm1510Laser: Not applicable to the IRT-6630-DTR.
  (4) nm1530Laser: Not applicable to the IRT-6630-DTR.
  (5) nm1550Laser: Not applicable to the IRT-6630-DTR.
  (6) nm1570Laser: Not applicable to the IRT-6630-DTR.
  (7) nm1590Laser: Not applicable to the IRT-6630-DTR.
  (8) nm1610Laser: Not applicable to the IRT-6630-DTR.
  (9) nm1310Laser: Not applicable to the IRT-6630-DTR.
  (10) unknown: Not applicable to the IRT-6630-DTR.
  (11) pinDetector: IRT-6630-DTR fitted with a PIN receiver.
  (12) apdDetector: IRT-6630-DTR fitted with an APD receiver.
  (13) na: Not applicable to the IRT-6630-DTR.

optical2Status — An indication of the status of the receiver input:
  GOOD
  LOW
  FAIL

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

channel1Present — *Not applicable to the IRT-6630-DTR.*

channel2Present — *Not applicable to the IRT-6630-DTR.*

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 — An indication of the status of the signal received by the receiver:
  sdi3G PRESENT
  sdiHD PRESENT
  sdiSD/ASI PRESENT
  UNKNOWN PRESENT
  NOT PRESENT

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-DTR.*

channel2Enable — *Not applicable to the IRT-6630-DTR.*

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-DTR.*

channelRxEnable — An indication and control of the receiver channel:
(1) disabled: Disable the receiver output. Writing either a 2, 3, 4 or 5 will enable the output.
(2) enabledActive: Receiver output is enabled and active.
(3) enabledMuted: Receiver output is enabled and muted due to either rate not matching the set rate or no signal is present in the received optical signal.
(4) *enabledChangedOver: Not applicable to the IRT-6630-DTR.*
(5) *na: Not applicable to the IRT-6630-DTR.*

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-DTR.*
(5) *na: Not applicable to the IRT-6630-DTR.*

channelAliasTable: A table containing information about the channel aliases.

channel1Alias — *Not applicable to the IRT-6630-DTR.*

channel2Alias — *Not applicable to the IRT-6630-DTR.*

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

channelRxAlias — Set and read the Alias (name) for the received signal.

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-DTR.*

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

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

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-DTR.*

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

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-DTR. Writing 5 will default to sdi3G-HD-SD-ASI setting.

channelRxDataRateSet - 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-DTR. Writing 5 will default to sdi3G-HD-SD-ASI setting.

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-DTR.
    (2) sdiHD-SD-ASI-only: Not applicable to the IRT-6630-DTR.
    (3) sdiSD-ASI-only: Not applicable to the IRT-6630-DTR.
    (4) bypassed: Not applicable to the IRT-6630-DTR.
    (5) na: Not applicable. The IRT-6630-DTR always reports this field.

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