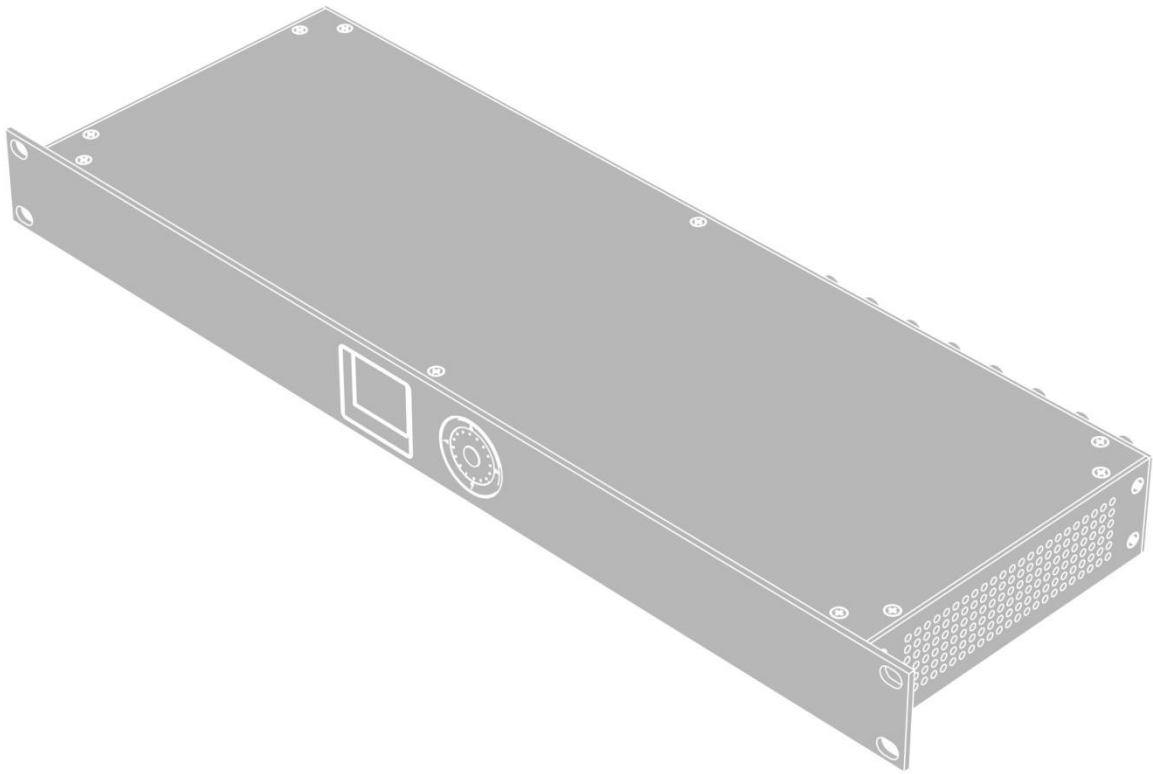




Product Manual
PlexSIS™
Rev 0.3



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1 SAFETY WARNINGS

1.1 LASER CLASSIFICATION

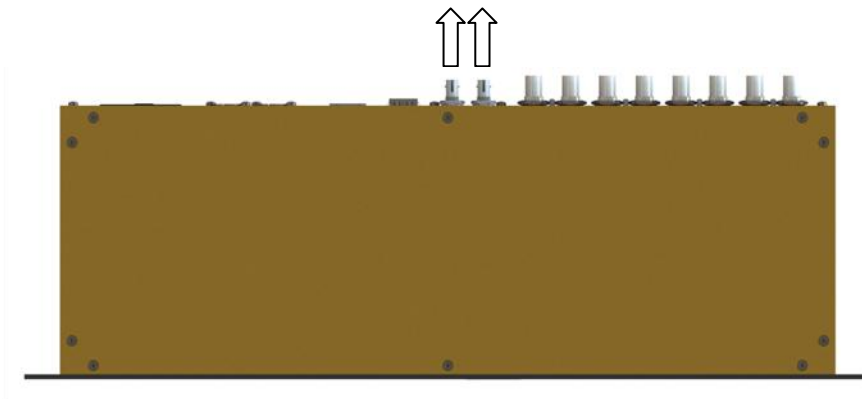


This device is a Class 1 laser product as per IEC 60825.



Never look directly into an optical port or optical fibre.
Optical ports should never be left unterminated - Always make sure either a dust cap or optical fibre is connected.

1.2 LASER EMISSION



1.3 MAINS

This equipment is designed to operate on 100-240VAC 50/60Hz

Replace fuses with identical type and rating only (T 1A L 250V)



Do not remove covers as hazardous voltages may be accessible when they are removed.



WARNING – This appliance must be earthed when powered from AC

1.4 VENTILATION



Allow sufficient space around the unit to help prevent excessive heat, which could lead to early failure of some electronic components. Airflow should not be impeded by covering the ventilation openings.

2 WEEE AND ROHS

SIS LIVE is committed to meeting all requirements of the European Union's WEEE (Waste Electrical and Electronic Equipment) Directive (2002/96/EC) and RoHS (Restriction on the use of Certain Hazardous Substances in Electrical and Electronic Equipment) Directive (2011/65/EU).



This symbol on the product or on its packaging indicates that the product must not be disposed of with normal household waste. Instead, it is your responsibility to dispose of your waste equipment by arranging to return it to a designated collection point for the recycling of waste electrical and electronic equipment. By separating and recycling your waste equipment at the time of disposal you will help to conserve natural resources and ensure that the equipment is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste for recycling, please contact your local authority, or where you purchased your product.

3 INTRODUCTION

The PlexSIS fibre system transports up to 16 SD, HD or 3G SDI signals over a single optical fibre. All ports are fully reclocked, with system performance levels displayed on the front panel and fully configurable alarm systems.

3.1 GENERAL DESCRIPTION

PlexSIS provides transport of 8 SDI (HD, 3G and SD) signals over a single optical fibre, and up to 16 when linking two systems, PlexSIS is available in two configurations (8 channels on one direction or 4 in both directions), with each of these available in the high or low wavelength band. All SDI ports are fully reclocked, meaning that jitter caused by long coaxial runs will not affect the maximum optical run length and vice versa.

The front panel OLED screen displays optical power, SDI signal presence, temperature and system voltages, and alarms can be set up to trigger an audible tone or relay contact closure, giving peace of mind when it comes to detecting and resolving distance, grounding and interference issues.

The system has been extensively used in the field by SIS LIVE at some of the largest outside broadcasts in history to ensure that its effectiveness and reliability are unparalleled.

3.2 PART NUMBERS

P/N	Description	Band	SDI Inputs	SDI Output
046-61	PlexSIS 8:1 OE	LOW (1310nm)	8	-
046-62	PlexSIS 1:8 OE	LOW (1310nm)	-	8
046-63	PlexSIS 8:1 SCL	HIGH (1550nm)	8	-
046-64	PlexSIS 1:8 SCL	HIGH (1550nm)	-	8
046-65	PlexSIS 4/4:1 OE	LOW (1310nm)	4	4
046-66	PlexSIS 1:4/4 OE	LOW (1310nm)	4	4
046-67	PlexSIS 4/4:1 SCL	HIGH (1550nm)	4	4
046-68	PlexSIS 1:4/4 SCL	HIGH (1550nm)	4	4

3.3 KEY FEATURES

- Compact 1U chassis
- Two configurations available - 8 SDI over 1 fibre, 4 SDI in each direction over 1 fibre
- Automatic cable equalisation
- Multi-rate reclocking with automatic rate detection
- Both AC and DC power inputs provides flexibility and power redundancy
- Supports SD, HD and 3G SDI
- Wide DC input range 9-36V
- Local monitoring of SDI signal presence, optical signal strength etc on full colour front panel display
- Configurable audible and relay contact closure alarms
- Optical expansion port - two systems can be combined to provide transport of 16 SDI signals over a single optical fibre
- Both systems available in upper or lower optical bands
- Lower band avoids water peak wavelength to give maximum optical reach over conventional fibre (ITU-T G.625 A&B)

4 FRONT AND REAR VIEWS

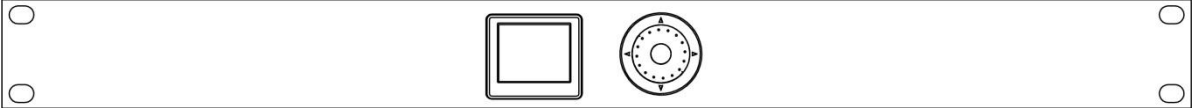


Figure 1

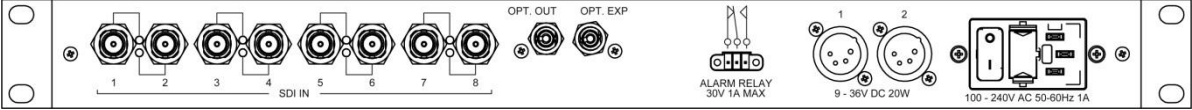


Figure 2

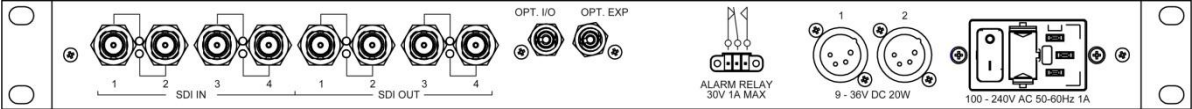


Figure 3

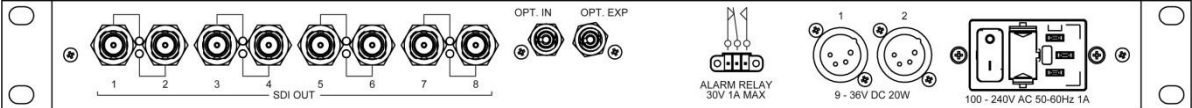


Figure 4

5 PIN-OUTS

DC IN (XLR-4)	
Pin	Function
1	GND
2	-
3	-
4	+9 to +36V

Alarm Relay	
Pin	Function
1	Normally Closed
2	Common
3	Normally Open

6 BLOCK DIAGRAMS

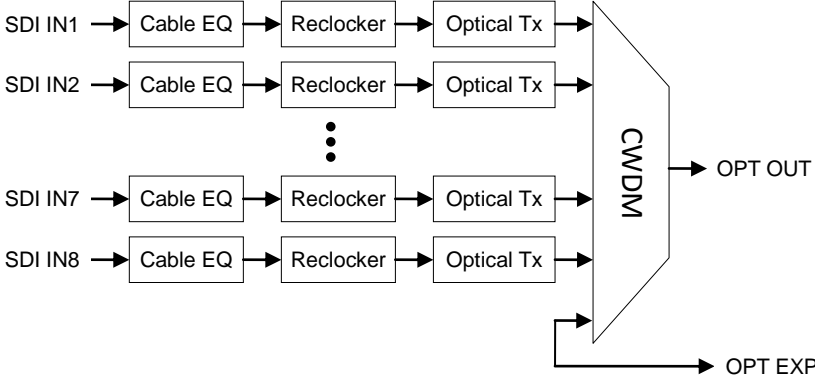


Figure 5: PlexSIS 8:1

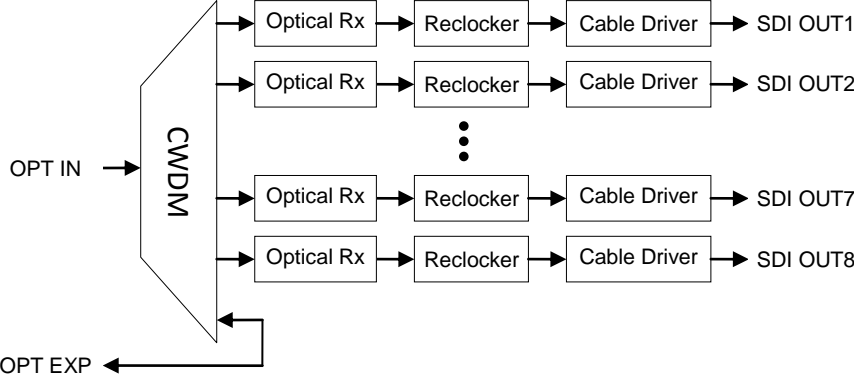


Figure 6: PlexSIS 1:8

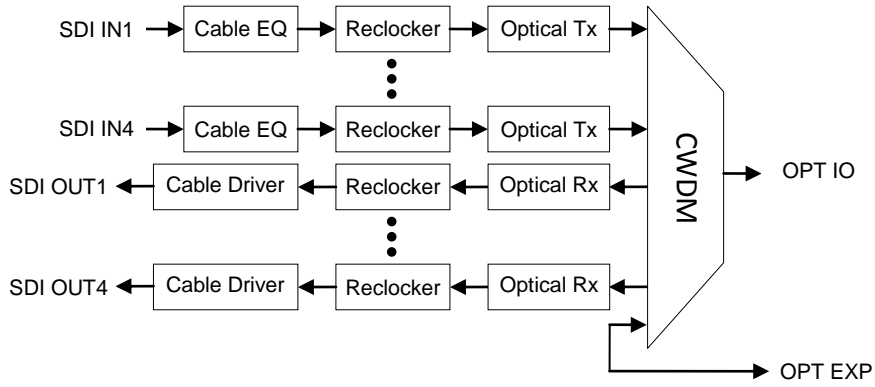


Figure 7: PlexSIS 4/4:1

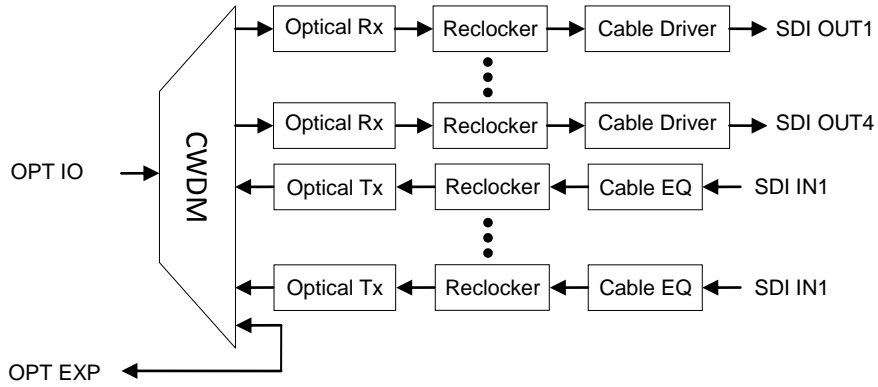


Figure 8: PlexSIS 1:4/4

7 INSTALLATION AND OPERATION

7.1 RACK MOUNTING

Each PlexSIS unit is housed in a 19" rack-mountable 1U enclosure.

Four screws are required to mount each PlexSIS unit.



Ensure that the cage nuts are correctly located in the rack and the screws are tightened sufficiently.

It is recommended that cup washers are used to prevent damage to the front of the unit.

Secure the units in the rack before attaching any cables

7.2 POWER

One AC input and two DC inputs are provided. Multiple inputs can be used simultaneously to provide redundancy.

Two four pin XLR connectors are provided for DC power. Any power supply must be able to provide 20W.

AC power via switched, fused IEC on rear,



Replace fuse with identical type and rating only

7.3 FIBRE

There are two ST optical connectors on the rear of the unit. One of which is the main in/out signal and the other is for expansion.

Ensure optical connectors are always clean as even the smallest amount of dirt can significantly reduce the maximum fibre length.



Never look directly into an optical port or optical fibre.

Optical ports should never be left unterminated - Always make sure either a dust cap or optical fibre is connected.

7.4 SDI

There are 8 BNCs on the rear of each unit. LEDs adjacent to each BNC show signal presence.

7.5 USER INTERFACE

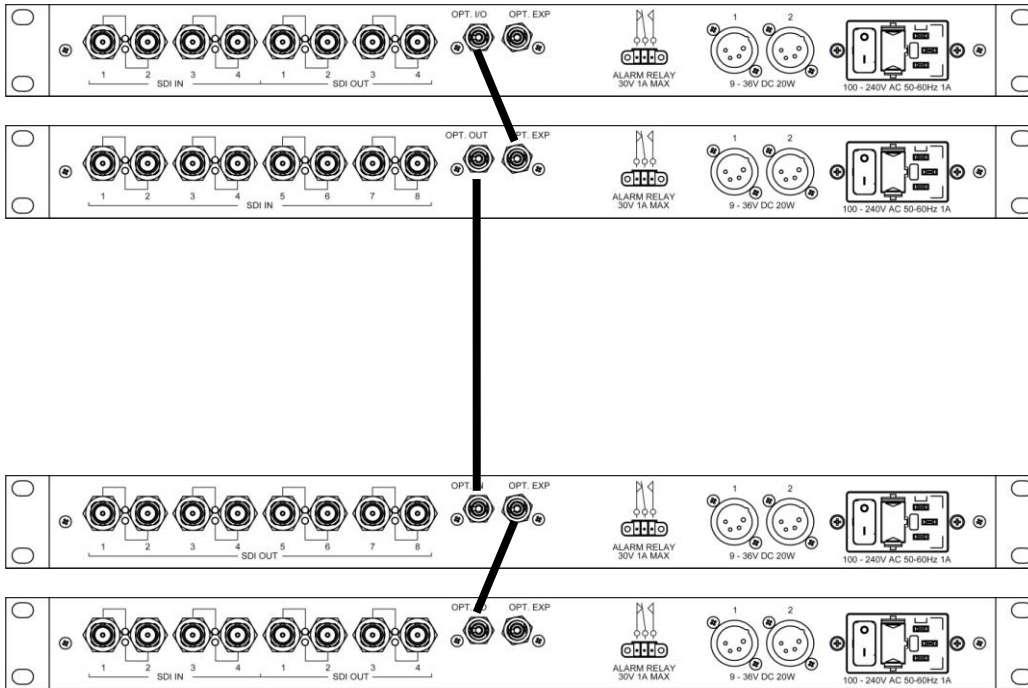
Diagnostic information is available to view on the front screen. Rotating the selection wheel changes the current page of information. The left and right buttons change channel.

8 CWDM CHANNELS

Course Wavelength Division Multiplexing (CWDM) technology is used within PlexSIS to allow multiple SDI signals to share the same optical fibre. The following wavelengths are used:

Channel			Model	
8:1/1:8	4/4:1	1:4/4	OE / LOW (1310)	SCL / HIGH (1550)
1	1 OUT	1 IN	1451nm	1611nm
2	2 OUT	2 IN	1431nm	1591nm
3	3 OUT	3 IN	1371nm	1571nm
4	4 OUT	4 IN	1351nm	1551nm
5	1 IN	1 OUT	1331nm	1531nm
6	2 IN	2 OUT	1311nm	1511nm
7	3 IN	3 OUT	1291nm	1491nm
8	4 IN	4 OUT	1271nm	1471nm

9 OPTICAL EXPANSION PORT



The optical expansion port enables two systems (of different wavelength band) to be linked together to provide transport of 16 SDI signals over a signal fibre. Any two systems of different wavelength can be combined, irrespective of the data direction. This powerful feature allows multiple configurations to be created to suit particular applications. For example, two 8:1 systems could be combined to provide either 16 SDI channels in one direction, or 8 SDI channels in both directions. An 8:1 and a 4/4:1 system could be linked to provide 12 SDI in one direction and 4 in the other.

10 FIBRE LENGTH

The maximum achievable fibre length depends on many different factors – the type of fibre, number of connections, wavelength used, number of splices, data rate etc.

Typical output power is around +2dBm, however this may vary from approximately 0 to +3dBm. The actual value for each wavelength can be viewed on the front panel display. Typical receiver sensitivity is around -22dB, again this may vary between approximately -20dB and -23dB. This gives a worst case link budget of approximately -20dB meaning that the total optical loss between the pair of units may be up to this value and the system should still function.

Approximating total loss:

$$(0.5\text{dB} \times \# \text{ connectors}) + (0.3\text{dB} \times \# \text{ splices}) + (\text{total fibre length} \times \text{fibre attenuation})$$

For example; assuming a link budget of 20dB, 0.5dB/km fibre loss and two connections, the system could support an absolute maximum of approximately 38km of fibre.

11 TROUBLESHOOTING

Problem	Probable Cause	Corrective Action
No response, unit dead	Unit not receiving power	Check DC supply, Check AC supply, switch and fuse
Unit not receiving SDI	No SDI signal present, Coax length too long	Check SDI source, ensure coax is not too long
Signal on fibre, but SDI not recognised	Bad fibre link, too much optical loss	Check for bad connections, clean connectors, minimise number of connectors in the link
No Optical signal received	Bad fibre link, too much optical loss, wrong band	Check for bad connections, clean connectors, minimise number of connectors in the link, check both units in pair are the same wavelength

12 SYSTEM EXAMPLE

13 SPECIFICATION

13.1 ELECTRICAL

SDI Data rates: 270Mbps, 1.485Gbps, 2.97Gbps

SDI Return Loss: >15dB to 1.485GHz, >10dB 1.485GHz-2.97GHz

SDI Signal Level: 800mVp-p ±10%

Typical cable length equalisation (Belden 1694A):

450m @ 270 Mbps

200m @ 1.485 Gbps

150m @ 2.970 Gbps

Input Voltage: 9v – 36VDC, 100-240VAC 50/60Hz

Power Consumption: 20W

13.2 OPTICAL

Spectral Grid: ITU-T G.694.2

Channel Spacing: 20nm

Wavelengths:

Lower Band (O,E): 1271nm ,1291nm,1311nm,1331nm,1351nm,
1371nm,1431nm,1451nm

Upper Band (S,C,L): 1471nm,1491nm,1511nm,1531nm,1551nm,
1571nm,1591nm,1611nm

Output Power: +2dBm typical

Receiver Sensitivity: -22dBm typical

Receiver Overload: +2dBm typical

Optical Source: DFB laser

Optical Detector: PIN Junction Photodiode

13.3 MECHANICAL

Dimensions: L 483mm x D 155mm x H 44mm

Weight: 1.7kg

Connectors:

SDI - 75Ω BNC (IEC 60169-8 amendment 2)

Optical - ST (IEC 61754-2)

DC Power Inlet - 4 Pin XLR

AC power Inlet - C14 (IEC 60320)

Alarm Relay - 3way detachable locking screw terminal

14 DOCUMENT HISTORY

Version	Date	Change Description	Status	Author	Approved
0.1	19/12/2012	New Document	Draft	S.Mansuri	N/A
0.2	01/08/2013	Reformatted	Draft	S.Mansuri	N/A
0.3	20/01/2014		Draft	S.Mansuri	N/A