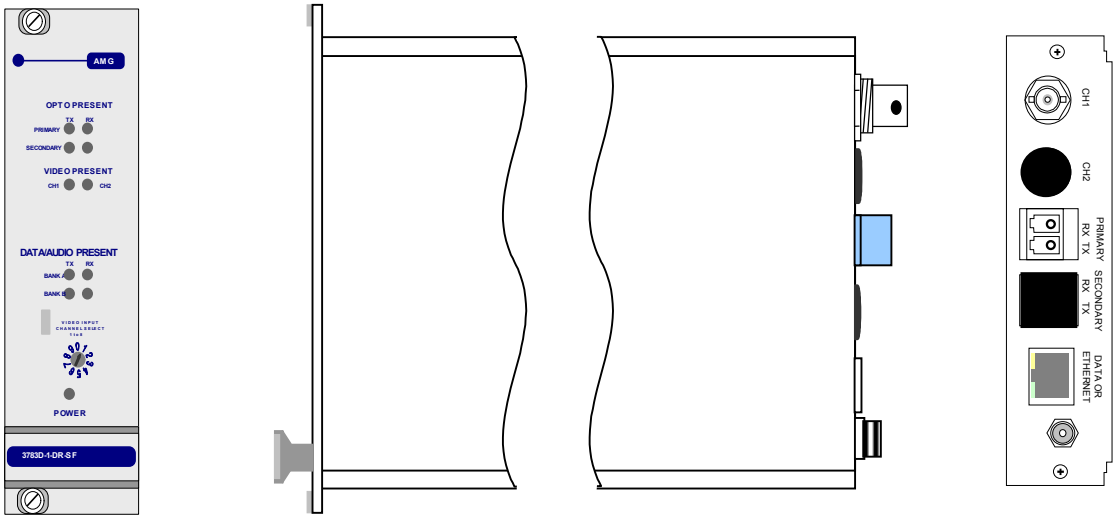
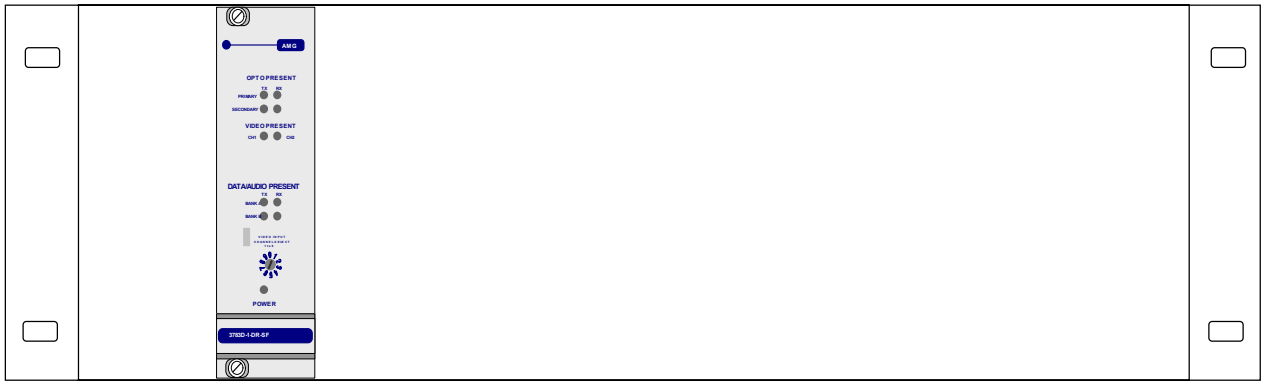
AMG3783D-1-DR-SF
Instruction Manual

Single Channel Video Insert Unit with Bi-directional Data on a Dual Redundant single fibre ring



AMG3783D-1-DR-SF is a single channel video insert unit designed to transmit a video signal on to a single dual redundant optical fibre ring. It also provides bi-directional data channels via a low speed data interface. The **AMG3783D-1-DR-SF** unit is supplied mounted in a basic 3U subrack as shown below. It is designed to be powered from an AMG2002 power supply and is ordered as a separate item. However this will be mounted to the subrack.

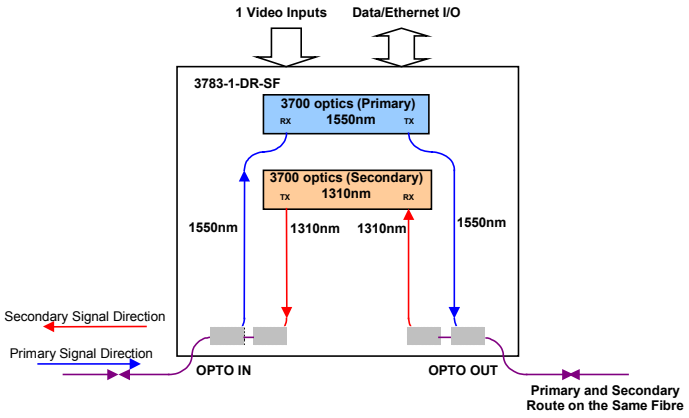


The **AMG3783D-1-DR-SF** is designed to operate with the **AMG3784RN-DR-SF** eight channel video and data receiver. Each receiver will 'drop off' up to eight video channels which are being transmitted around the single fibre ring from up to eight single channel insert units.

Introduction

Unit Functional Schematic

The **AMG3783D-1 DR-SF** transmits and receives optical signals from both a primary and secondary optical channels. These optical channels are transmitted on the same optical fibre indifferent directions, operating at different wavelengths. The primary channel operates on 1550nm and the secondary channel on 1310nm.



The **AMG3783D-1-DR-SF** receives and drops off data signals transmitted from an **AMG3784RN-DR-SF** receiver. It then inserts video and data signals onto the outgoing optical signal. The video signal is inserted on 1 of 8 channels available on the optical signal. The insert channel number is set by the channel selector switch on the front of the unit. If the video channel number is set to a channel that already has a video signal on it, this unit will over-write this in-coming video signal.

In normal operation where connection of both the previous unit and the subsequent unit are OK, the video and data signals are transmitted on the primary output and the data received from the primary input. The secondary optical input is independent and is regenerated on the secondary output.

If the primary input signal is not present, the unit will shut down the secondary output to inform the previous unit that the signal route is not OK. The previous unit will then send out the video and data signals on its secondary output in the opposite direction. This signal will be repeated around the ring to get back to this **AMG3783D-1-DR-SF** on the secondary route. As the primary input is not present on this unit, the data signal will now be taken from the secondary optical input. Thus maintaining integrity of the data transmission.

If the secondary input signal is not present, the unit will assume that the route to the next unit is not OK and send out the video and data signal on the secondary optical output. This video and data will be transmitted to the next unit around the ring in the opposite direction on the secondary route.

Connections

Video Input Connection

Connector .....75 ohm BNC Socket.
Input Impedance.....75 ohm terminated.
Input Level .....1 volt p-p nominal
Frequency Response .....10Hz to 5.75MHz min.
See below for **video input channel configuration**

Optical Connections

PRIMARY OPTO OUT
Connector .....LC/PC
Primary Optical Launch Power.....-6dBm
Wavelength.....1550nm

Secondary Optical Sensitivity.....-21dBm
Wavelength.....1310nm

PRIMARY OPTO IN
Connector .....LC/PC
Primary Optical Sensitivity.....-21dBm
Wavelength.....1550nm

Secondary Optical Launch Power .....-6dBm

Wavelength..... 1310nm

Power Connection

Connector ..... 2.1mm screw lock long power jack – centre positive (Switchcraft Pt. No. S761K, AMG Pt. No. G16125-00)

Power requirement ..... 12 volt to 16 volt DC @ 500mA max.

Data Connections

Data Connector RJ45

No of Channels..... 2 (See below for low speed data operation)

Channel A Interface:..... On Board Data Interface – RS232, RS422 or RS485. Selected by slide switch above RJ45 connector.

RS485 – switch position - high (closest to BNC connections)
RS422 – switch position – middle
RS232 – switch position – low (furthest from BNC connections)

Channel B Interface..... Defined by data/audio interface daughter board fitted into Slot 1 on main board.

RJ45 low speed data/audio interface connections

RJ45 Pin No.	**Channel A**			**Channel B**	**Cat 5/6 cable colour (T568B Colour Code)**
	RS485 (switch high)	**RS422** (switch mid)	**RS232** (switch low)	**Data Daughter Board**	
1		IN +	GND		White/orange
2		IN -	IN		Orange
3				OUT +	White/green
4				IN -	Blue
5				IN +	White/blue
6				OUT -	Green
7	IN/OUT +	OUT +	N/A		White/brown
8	IN/OUT -	OUT -	OUT		Brown

When operating as RS485 the data bus will require terminating if a pre-bias is used by the attached equipment see below.

Indicators

Power	Green	–	unit powered
	Off	–	no power applied to unit
Primary Opto Sync TX	Green	-	optical channel transmitting
	Off	-	optical channel not transmitting
Primary Opto Sync RX	Green	-	optical channel receiving and synchronised
	Red/Green	-	optical channel receiving and not synchronised
	Off	-	optical channel not receiving
Secondary Opto Sync TX	Green	-	optical channel transmitting
	Off	-	optical channel not transmitting
Secondary Opto Sync RX	Green	-	optical channel receiving
	Red/Green	-	optical channel receiving and not synchronised
	Off	-	optical channel not receiving
Video Present	Green	–	video signal present on video CH1 input BNC
	Off	–	no video present on video CH1 input BNC

Data LED's
BANK A

Data Present TX (RS485 or RS422)	Green	–	logic one present on the data input
	Red	–	logic zero present on the data input
	Off	–	tri-state off or no connection on the data input
Data Present TX (RS232)	Green	–	logic one present on the data input
	Red	–	logic transitions present on the data input
	Off	–	logic zero present on the data input

This represents the data signals being transmitted on the optical fibre

Data Present RX (RS485 or RS422)	Green	–	logic one present on the data output
	Red	–	logic zero present on the data output
	Off	–	tri-state off or no connection on the data output
Data Present RX (RS232)	Green	–	logic one present on the data output
	Red	–	logic transitions present on the data output
	Off	–	logic zero present on the data output

This represents the data signals being received on the optical fibre

BANK B (when data daughter board fitted – any type)

Data Present TX	Green	–	logic one present on the data input
	Red	–	logic transitions present on the data input
	Off	–	logic zero present on the data input

This represents the data signals being transmitted on the optical fibre

Data Present RX	Green	–	logic one present on the data output
	Red	–	logic transitions present on the data output
	Off	–	logic zero present on the data output

This represents the data signals being received on the optical fibre

BANK B (when audio daughter board fitted)

Audio Present TX	Green	–	audio level present > -40dBm
	Red	–	audio level present > 0dBm (note overload level +6dBm)
	Off	–	audio level not present or < -40dBm

This represents the audio signals being transmitted on the optical fibre

Audio Present TX	Green	–	audio level present > -40dBm
	Red	–	audio level present > 0dBm (note overload level +6dBm)
	Off	–	audio level not present or < -40dBm

This represents the audio signals being received on the optical fibre

NOTE: FRONT PANEL DATA LEDS DO NOT OPERATE WHEN X16003 ETHERNET INTERFACE FITTED.

Physical Information

Dimensions

Height 3U
Width..... 7 HP
Depth ..... 182mm excluding connectors, normally allow a further 75mm for BNC connection
Weight..... 1050grams including power supply and reduced subrack frame

Mounting Details

The unit is designed to mounted in a 19” rack

Video input channel configuration

The video present on the video input can be inserted on one of eight video channels transmitted on the optical fibre. The input channel number is set by rotary switch on the front panel of the unit.

It is normal to set each AMG3700 insert unit to a different channel number. If a number is used twice the second unit connected ‘down stream’ on the primary optical route will ‘over-write’ the first unit and the video signal will be lost.

Setting switch to position 0 selects channel 1 and setting switch to position 9 selects channel 8.

Low Speed Data Operation

In order for the 3700 unit to transmit and receive low speed signals, the X16004 low speed data interface should be fitted to all units in the ring. Unless specified at order all units will be factory shipped with this interface fitted. This interface allows for 2 low speed data interfaces, Channel A and Channel B. Both channels transmit and receive data between a 3700 transmit or insert unit and a 3700 receiver unit. Data does not operate between 3700 transmit or insert units.

Data Channel A

Channel A is always present and allows for a RS232, RS422 (full duplex, four wire) or RS485 (half duplex, two wire) interface depending on the position of the switch located above the RJ45 connector. The switch signifies the presence of the X16004 Low Speed Data/Audio Interface Board. If there are LED's present on the RJ45 connector then an X16003 Ethernet Interface Board is fitted.

The data input for both the RS485 and the RS422 modes detects a tri-state input condition by monitoring the differential voltage level across the input. A differential level below 120mV positive or negative will be detected as a tri-state condition. A level above 120mV positive or negative will be detected as a logic 1 or logic zero respectively. **It is important therefore to terminate the RS485 bus or the RS422 input bus using 120ohms if a pre-bias is present on the RS485 or RS422 bus.** A large number of third party equipment manufacturers apply a pre-bias on their RS485 bus. This pre-bias is applied by pulling one arm of the RS485 bus high (+5 volts) and the other arm low (0 volts) using high value resistors within the third party equipment. In order to ensure that the AMG equipment detects a tri-state condition, then these resistors should have a value above 5kohm. If the third party bias resistors are less the 5kohm the bus can be double or triple terminated as required to ensure that a tri-state level is detected.

Note: - the Data Channel A is shipped from the factory set up for RS485 operation unless otherwise requested.

If multiple insert units are connected in a ring, the type of 3700 receiver unit will determine whether the individual Channel A data channels are kept separate on multiple ports or combined onto one port at the receiver.

A 3784xx type receiver which does not have the data expansion cards fitted will combine all the individual data transmit signals from each insert unit onto the Channel B data output on the RJ45 connector on the receiver, so long as an appropriate data interface daughter board is fitted. The receiver will logically 'OR' the signals together to produce the single output. Any data transmitted from the receiver on Channel B of the RJ45 will transmit to all Channel B data outputs on the RJ45 at the insert or transmit units connected in the ring, so long as appropriate data interface daughter boards are fitted. If Audio daughter boards are fitted the Audio signal will only broadcast simplex from the receiver to the transmitters. The Audio signal will not go from the transmitters to the 3784xx receiver.

A 3788xx type receiver which has the 'B' Channel data expansion card fitted will keep each Channel B data associated with each insert unit separate. The data channel number will be the determined by the video channel number selected by the video channel selection switch at the insert unit. In this mode of operation only RS232 or RS422 operation is available at a video insert unit. (See 3788xx instruction sheet for selection of data channel and fitting of the appropriate data interface cards on to the data expansion board). Note with the 3788xx type receiver audio channels will operate bi-directionally and independently.

Data Channel B

Channel B interface is only present at a unit if a data interface daughter board is fitted on the main board within the 3700 unit. This data interface daughter board can be any one of the following:

Option Code	Part No.	Description
1	X04057	RS422/485 Data Interface Daughter Board
2	X04049	RS232 Data Interface Daughter Board

3	X04058	20mA Current Loop Data Interface Daughter Board
4	X04059	TTL Data Interface Daughter Board
5	X12578	Contact Closure Data Interface Daughter Board
6	X13038	FTT10A Echelon Lonworks Data Interface Daughter Board
7	X14542	4 Wire Audio Interface Daughter Board

If multiple insert units are connected in a ring, as with Channel A, the type of 3700 receiver unit will determine whether the individual Channel B data channels are kept separate on multiple ports or combined onto one port at the receiver.

Note: - the Data Channel B only operates when a data daughter board is fitted. These should be ordered with the unit.

Safety

The 3700 series of products uses a Class 1 laser system in accordance with EN 60825-2:2000 and as such the optical power emitted from the optical connector is regarded as eye safe under all operating conditions.

However it is always advisable to follow good practice when working with optical fibre systems. This includes:

- Do not stare with unprotected eyes or with any unapproved collimating device at fibre ends or connector faces, or point them at other people.
- Use only approved filtered or attenuating viewing aids

For other safety issues and advice on good practice associated with the optical fibres systems see EN 60825-2:2000 or your local safety officer.

Maintenance and Repair

There are no user serviceable parts within the AMG3700 products.
In case of problem or failure contact your local support centre or AMG Systems Ltd, Technical Support Department on tel. +44 (0) 1767 600777.

See unit data sheet for full specification.