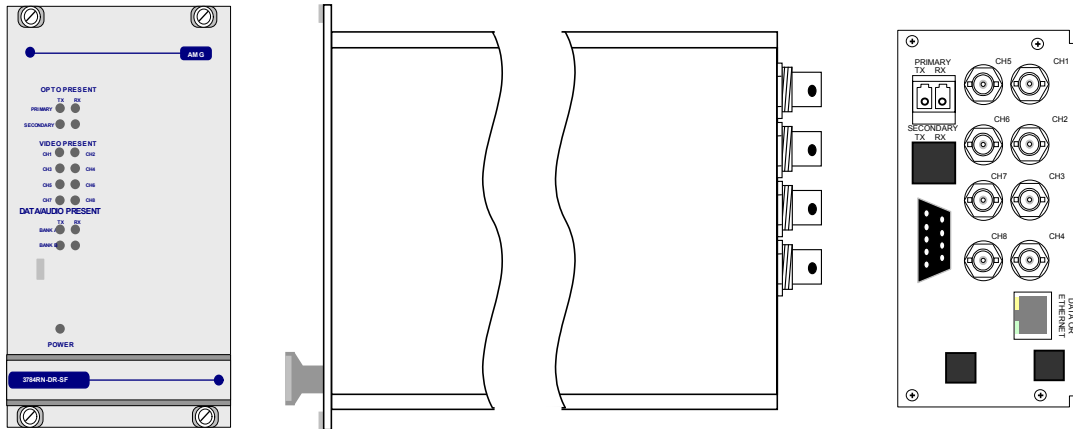




# AMG3784RN-DR-SF Instruction Manual

***Eight Channel Video Receive Unit with Bi-directional Data with Dual Redundant Operation on a single fibre ring - includes AMG NMS Network Management Interface***



The **AMG3784RN-DR-SF** is a rackmount eight channel video receive unit designed to ‘drop off’ eight video signals from a single fibre optical fibre ring. It also provides bi-directional data channels via a low speed data interface. The **AMG3784RN-DR-SF** is designed to plug into an **AMG2000** or an **AMG2005** subrack which in turn fits into a 19” rack system. It also includes an AMG Network Management Interface to allow management of the system using the AMG SNMP enabled management software.

The **AMG3784RN-DR-SF** is designed to operate with **AMG3783-1-DR-SF**, **AMG3783-2-DR-SF**, **AMG3783-4-DR-SF** and **AMG3783-DR-SF**, single channel, dual channel, 4 channel and 8 channel video insert units respectively or their rackmount equivalents. Each receiver will ‘drop off’ up to eight video channels which are being transmitted around the single fibre ring.

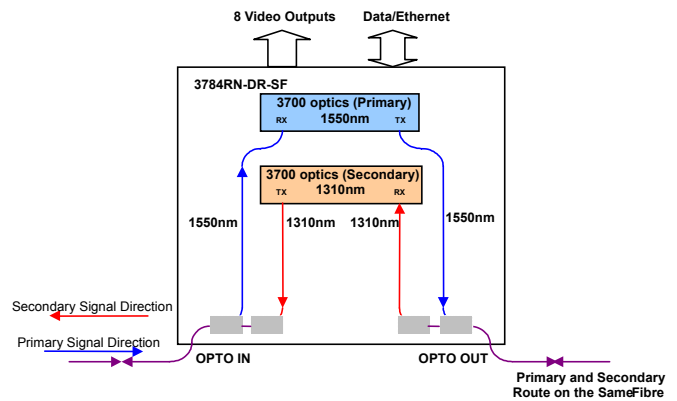
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## Introduction

### Unit Functional Schematic

The **AMG3784RN-DR-SF** receives optical signals from both a primary and secondary optical channels. These optical channels are transmitted on the same optical fibre in different directions, operating at different wavelengths. The primary channel operates on 1550nm and the secondary channel on 1310nm.

It drops off up to 8 video signals and the data signals transmitted from **AMG3783-n-DR-SF** insert units. It also transmits the data signals back to the insert units.



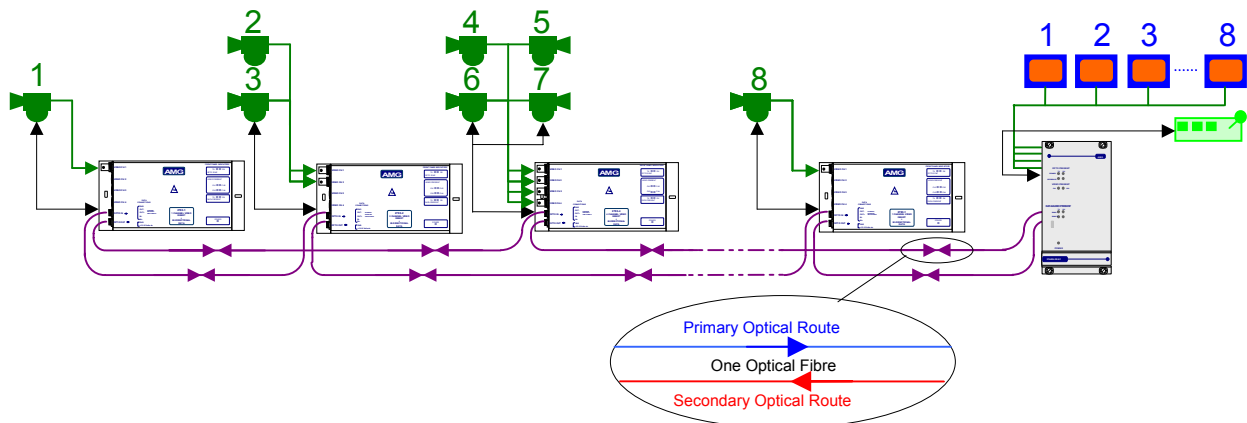
In normal operation, where connection of both the previous unit and the subsequent unit are OK, the video and data signal is taken from the primary input and the data transmitted out on the primary output. The secondary optical input is independent and is regenerated on the secondary output.

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 signal on its secondary output in the opposite direction. This signal will be repeated around the ring to get back to this **AMG3784RN-DR-SF** on the secondary route. As the primary input is not present on this unit, the video and data signal will now be taken from the secondary optical input. This action automatically maintains the integrity of the video and data transmission in the event of a fibre failure.

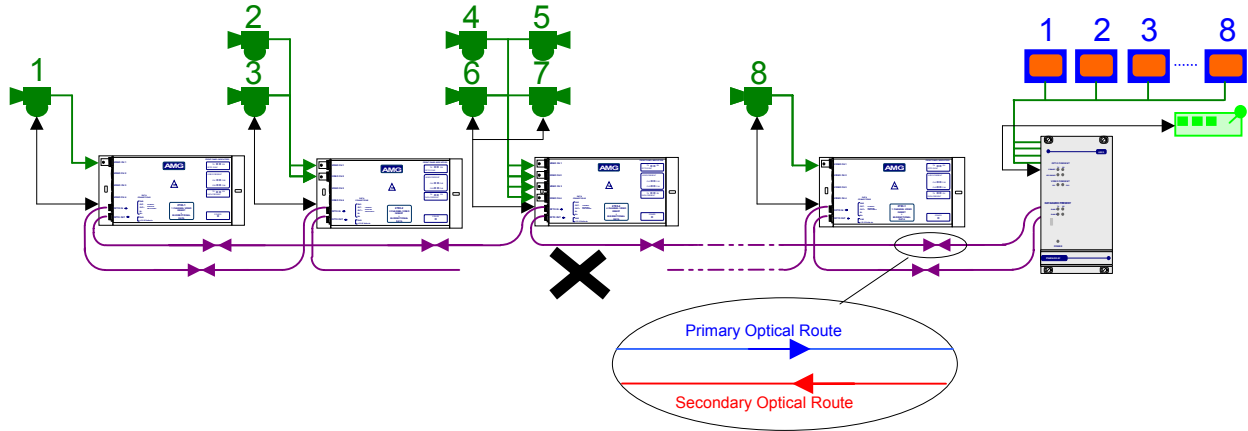
If the secondary input signal is not present, the unit will assume that the route to the next unit is not OK and send out the return data signal on the secondary optical output. This return data will be transmitted to the next unit around the ring in the opposite direction on the secondary route.

### Optical System Connection

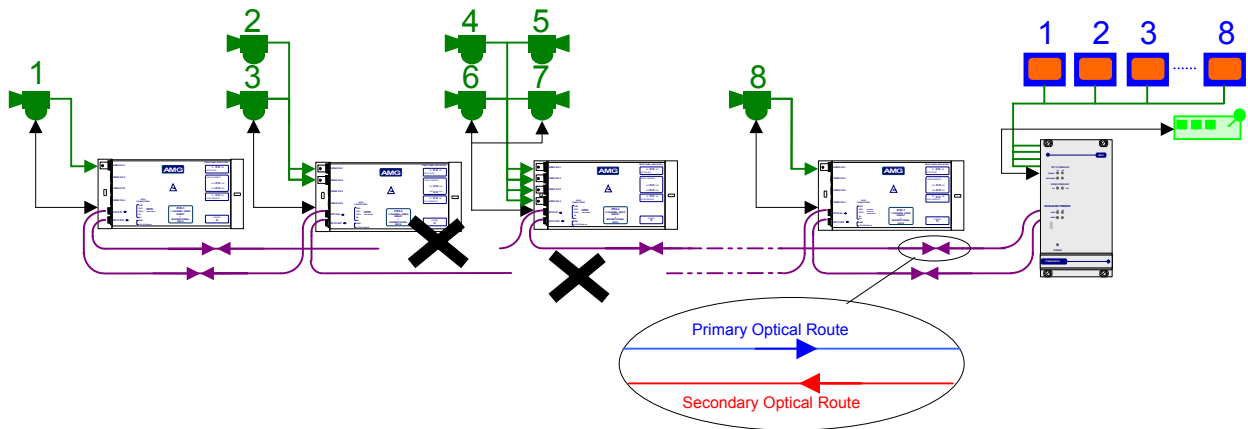
The **AMG3784RN-DR-SF** units are designed to be connected in a ring or point to point system. In a ring system **AMG3783-1-DR-SF**, **AMG3783-2-DR-SF** and **AMG3783-4-DR-SF**, single, dual and four channel insert units respectively can be combined to make up an 8 channel video transmission system as illustrated below. As each unit regenerates the optical signal, the optical dynamic range between each optically connected node is 15dB.



If a fibre link is broken, operation of the ring continues by making use of the secondary optical fibre route as below:



If multiple breaks occur, operation is maintained with all the units still physically connected to the receiver. For the scenario shown below camera signals and control would now be lost from cameras 1,2 and 3 as there is now no physical connection between the transceivers and the receiver. However operation of cameras 4,5,6,7 and 8 remains fully functional.



Note that where necessary repeaters can be added at nodes to increase the average distance between nodes.

# Connections

## Video Output Connections

Connector ..... 75 ohm BNC Socket.  
Output Impedance ..... 75 ohm terminated.  
Output Level ..... 1 volt p-p nominal  
Frequency Response ..... 10Hz to 5.75MHz min.  
No of channels ..... 8

## 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

Power supply ..... from plug in connection on the 2000 or 2005 subrack  
Power consumption ..... 8 Watts 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 with RS485 or with a tri-state RS422 signal 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 output BNC
	Red/Green	- channel present but no video present output BNC

**Data LED's (only operate when a X16004 low speed data interface board is fitted)**

**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

***Physical Information***

**Dimensions**

Height .....	3U Plug-in
Width.....	14HP
Depth .....	170mm excluding connectors
Weight.....	1000grams

**Mounting Details**

The unit is designed to be mounted within an **AMG2005** Subrack on standard card guides. Note the AMG2005 Subrack is supplied with guide rails every 14HP. In order to fit this unit in the subrack it may be necessary to move some card guides by pulling gently on the card guides.

## Low Speed Data Operation

In order for the unit to transmit and receive low speed data or audio signals, the X16004 low speed data interface should be fitted. This interface allows for 2 low speed data interfaces, Channel A and Channel B. Both channels transmit and receive data between the 3700 transmit and a 3700 receiver 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.**

### 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 4600 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

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

## The Management Interface

The AMG3700 Management Interface is fitted within AMG3782RN, AMG3784RN and AMG3788RN receivers and is signified by a 'N' in the part number

Each management interface, thus each receiver, has a ID number with is identified below the management port. This ID number is used by the AMG Network Management System (NMS) to identify the unit.

The physical interface is a 9 way female D-type connector.

### Management Port Pinout

Pin Number	RS232 Connection	RS485 Connection
1	-	Data B (-)
2	RD (data out of port)	Data A (+)
3	TD (data into port)	-
4	Connect to DTR held -ve or short to ground	-
5	SG (signal ground)	SG (signal Ground)
6	Alarm Output	Alarm Output
7	Alarm Output	Alarm Output
8	Alarm reset (Gnd)	Alarm reset (Gnd)
9	Alarm reset	Alarm reset

For multiple Management Ports it is recommended that the RS485 interface is used with each RS485 pair connected in parallel. In this case a RS485 to RS232 converter is required in order to connect to a normal PC Comm Port.

The time delay between receiving a data request and sending out a response from the port is 625us. Therefore any RS232 or RS485 converter should have a 'turn around' time or 'transmit dwell' time equal to or less than 625us.

A suitable converter is the **Dataforth DCP485-S**  
(Available in the UK Farnell, Pt. No 300-9348)

#### On **DCP485-S**

RS485 Switch Settings:

1-UP, 2-DOWN, 3-DOWN, 4-UP, 5-DOWN, 6-DOWN, 7-DOWN, 8-UP

RS232 Switch Settings

1-DOWN, 2-UP, 3-DOWN, 4-UP

DCE/DTE set to DCE.

Connections to management port.

DCP485-S	Management Port
1	N/C
2	1
3	2
4	1
5	2



NOTE: on the DCP485-S pin 5 and pin 3 are connected together and pin4 and pin 2 connected together.

### **Alarm Output and Reset Operation**

The alarm output and reset is designed to indicate a change of state of the fibre loop or spur attached to the receiver. The Alarm output is a volts free contact relay output (rating: 0.5amp at 125VAC or 1amp at 24VDC). It normally open, which means that when not powered the contacts will be open circuit. On power up the contacts will close and will remain closed for up to 5 seconds. During this time the receiver will monitor and record the state of the 3700 units connected to the receiver. The contacts will then remain closed until there is a change from this recorded state. A change of state would be:

1. addition or loss of video at any insert node
2. addition or loss of primary optical input at any node
3. addition or loss of secondary optical input at any node
4. power up or down of any node
5. loss of power at the receiver

Following a change of state the contacts will remain open, regardless of whether the alarm condition reverts back to its previous state, until the a reset signal is presented to the alarm input connections. The alarm reset input is biased at 5volt via 1000ohm resistor. To reset the alarm, the alarm reset is required to be pulled to ground, either by a volts free contact or an open collector output. The alarm output will be held in a closed state whilst the alarm reset is connected to ground.

On release of the alarm reset, the alarm output will remain in a closed state until the next change of state to the 3700 system connected to the receiver. The alarm output may not register a change of state which happens within 5 seconds of release of the alarm reset.

### **Safety**

The 3700 series of products uses a Class 1 laser system in accordance with EN 60825-2:2000.

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.