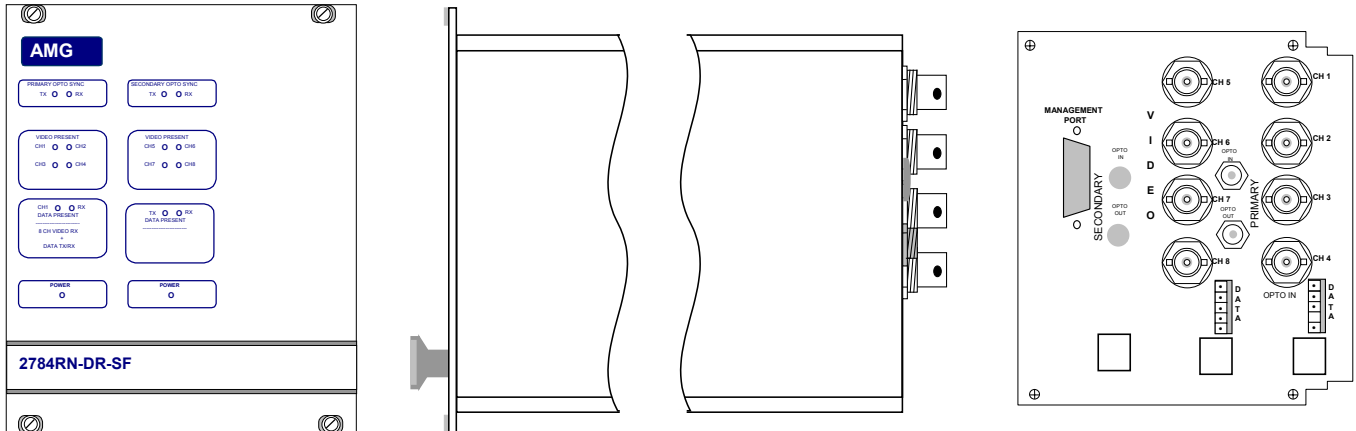




# AMG2784RN-DR-SF Instruction Manual

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



The **AMG2784RN-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 one RS485/RS422/RS232 bi-directional data channel to the video insert outstations, or two RS485/RS422/RS232 bi-directional data channels to an eight channel transmitter. The **AMG2784RN-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 card to allow management of the system using the AMG SNMP enabled management software.

The **AMG2784RN-DR-SF** is designed to operate with **AMG2783-1-DR-SF**, **AMG2783-2-DR-SF**, **AMG2783-4-DR-SF** and **AMG2783-DR-SF**, single channel, dual channel, 4 channel and 8 channel video and bi-directional data 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. When used with an 8-channel transmitter the ring becomes a point to point system.

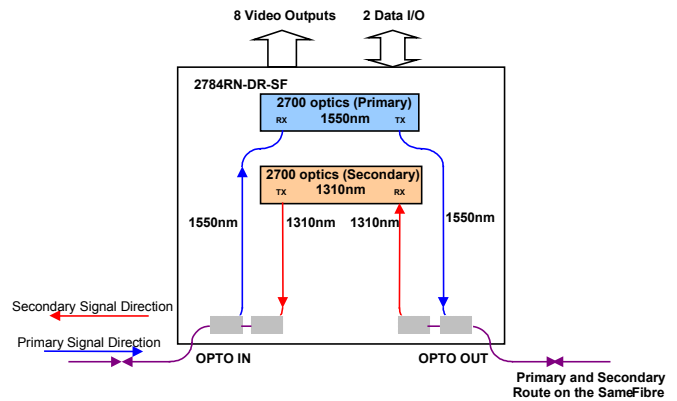
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## Introduction

### Unit Functional Schematic

The **AMG2784R 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 a combined data signal transmitted from **AMG2783-n-DR-SF** insert units and transmits out up to two data channels back to the insert units.



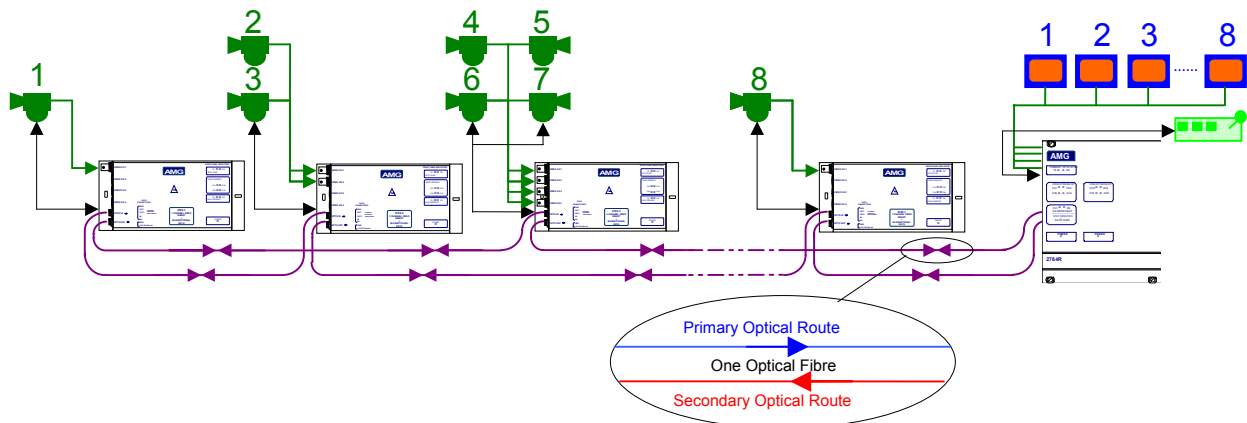
In normal operation where connection of both the previous unit and the subsequent unit are OK, the video and data signal is taken from the primary input and the data transmitted out on the primary output. The secondary optical input is independent and is regenerated on the secondary output.

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 **AMG2784R-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. Thus maintaining integrity of the video and data transmission.

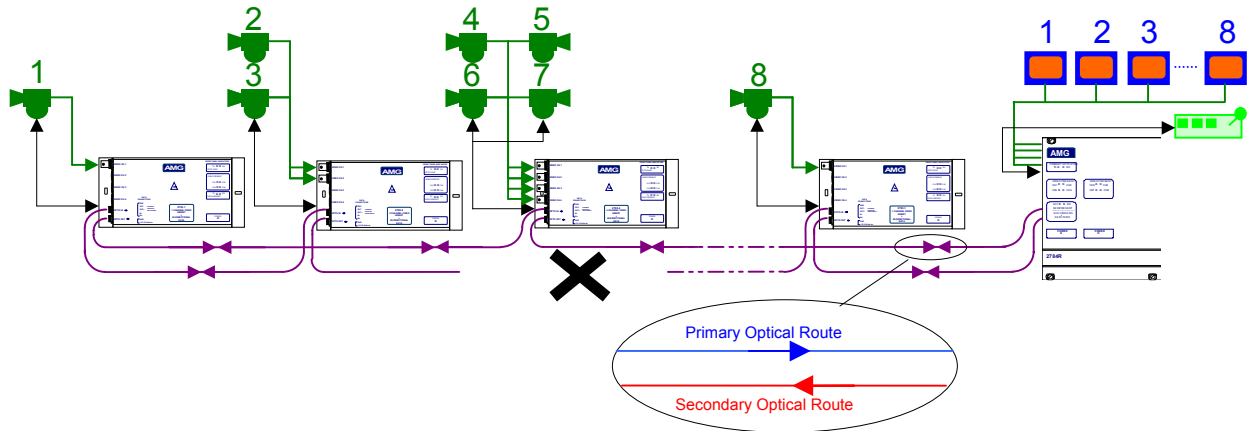
If the secondary input signal is not present, the unit will assume that the route to the next unit is not OK and send out the return data signal on the secondary optical output. This return data will be transmitted to the next unit around the ring in the opposite direction on the secondary route.

### Optical System Connection

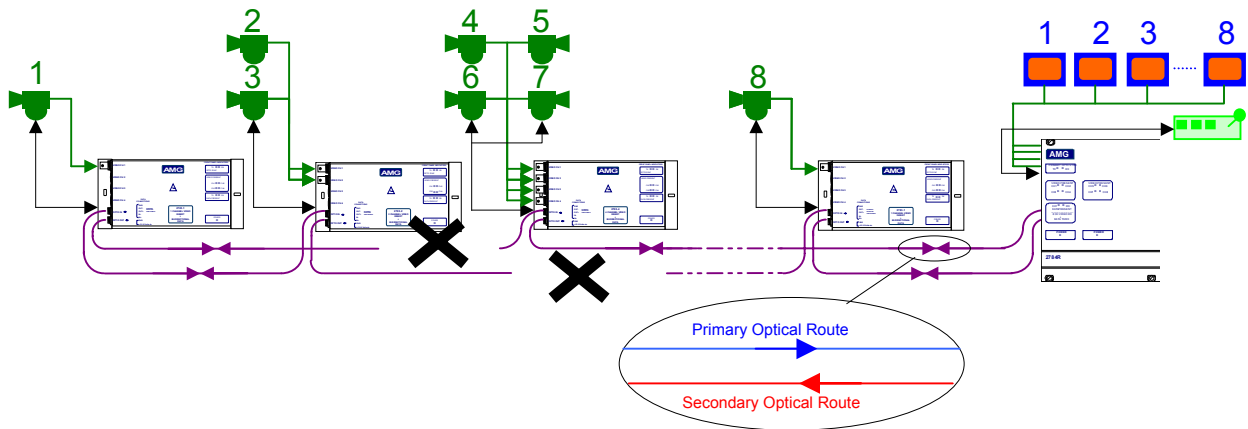
The **AMG2784R-DR-SF** units are designed to be connected in a ring or point to point system. In a ring system **AMG2783-1-DR-SF**, **AMG2783-2-DR-SF** and **AMG2783-4-DR-SF**, single, dual and four channel insert units respectively can be combined to make up an 8 channel video transmission system as 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:

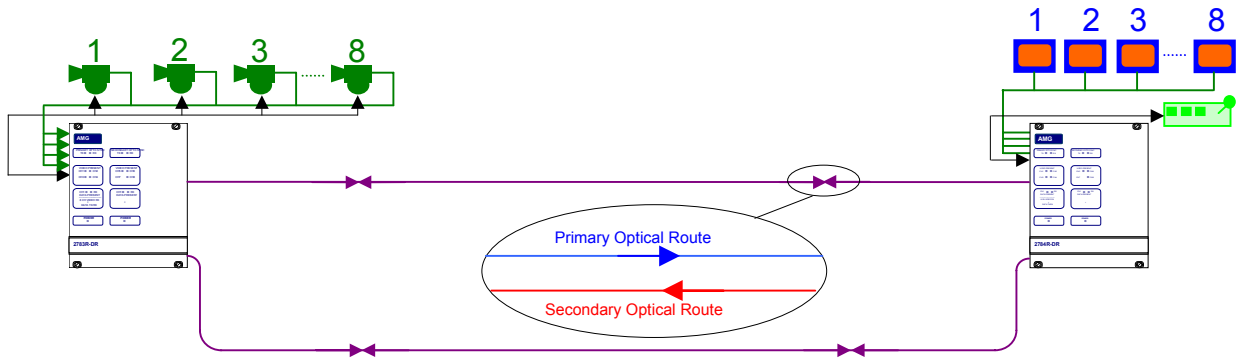


If multiple breaks occur, operation is maintained with all the units still physically connected to the receiver. For the scenario shown below camera signals and control would now be lost from cameras 1, 2 and 3 as there is now no physical connection between the transceivers and the receiver. However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

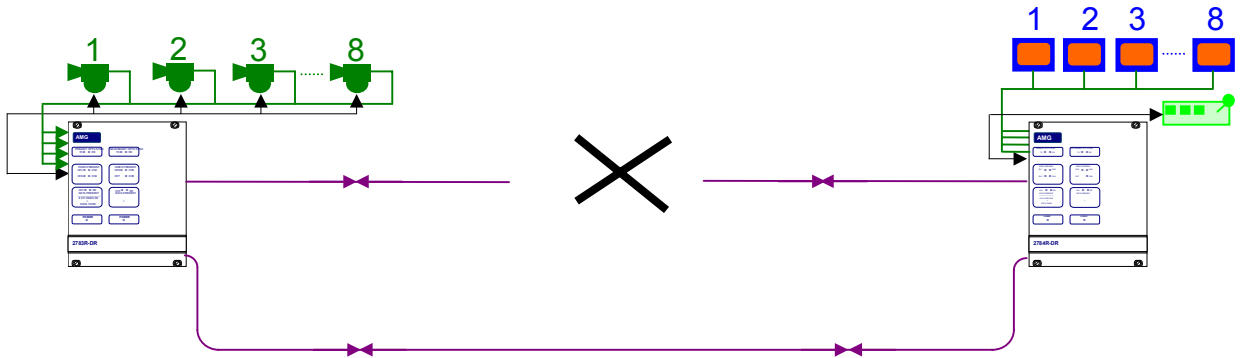


Note that where necessary repeaters can be added at nodes to increase the average distance between nodes.

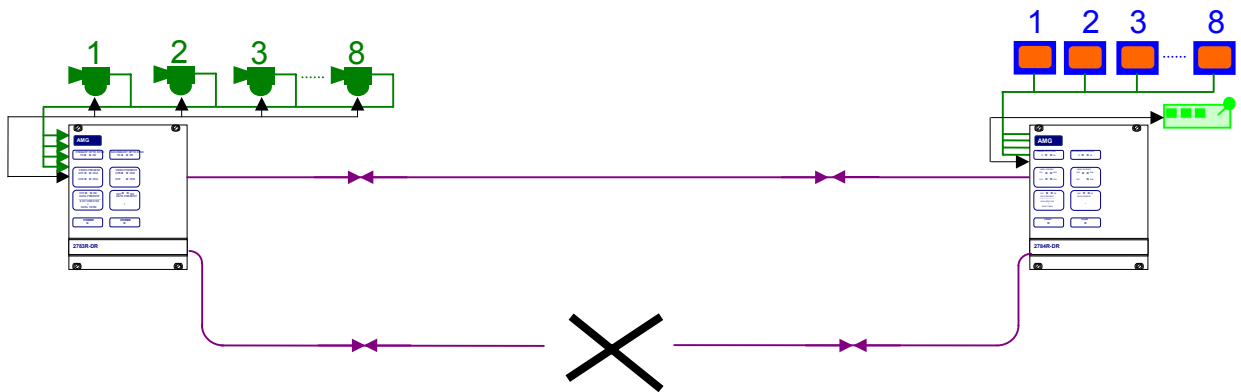
The **AMG2784R-DR-SF** is connected as illustrated below when used with an **AMG2783R-DR-SF 8** channel insert unit.



Again if one of the routes is broken, operation of the system is maintained as shown below:



Or:



## 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 ..... FC/PC  
Primary Optical Launch Power ..... -6dBm  
Wavelength ..... 1550nm

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

#### PRIMARY OPTO IN

Connector ..... FC/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 ..... 20 Watts max.

### Data Connections

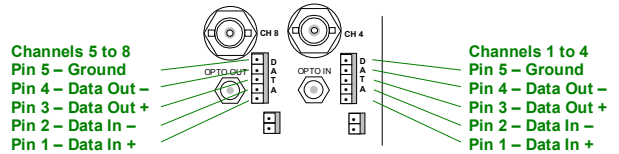
Data Connector ..... 5 way removable spring terminal connector (2.5mm spacing)  
Manufacturers Part No. Phoenix/Combicom FK-MC-0.5/5-ST-2.5  
AMG Part No G15098-00

Data Channels ..... 2 channels, one associated with video channels 1 to 4 and the second associated with video channels 5 to 8. The data into the AMG2784R is broadcast out to the respective insert units. The return data from the insert units is logically OR'ed together to provide two data return signals respectively. When the 2784R is used with a management card, as in a 2784RN, these two data channels are combined and presented on either rear panel connector. See the instruction sheet for the 2700 Management card for how to separate out the data channels in the two banks.

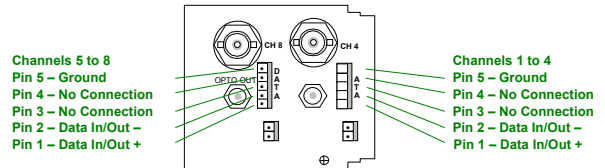
SW1 used to select between RS232 and RS485/422, SW2 is used to select between RS422 and RS485.

**NOTE: The unit is shipped from the factory as RS485 unless otherwise requested.**

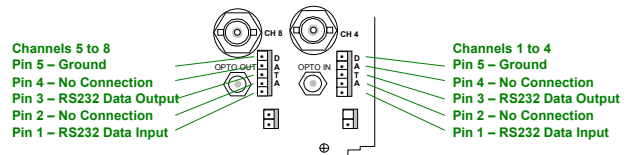
Connections RS422 4 wire ..... See schematic



Connections RS485 4 wire ..... See schematic



Connections RS232..... See schematic



Protocol  
 RS232 SW1 switch position 9 on, switch position 10 on SW2 all off

RS485 2wire SW1 switch position 9 off, switch position 10 off SW2 see below

RS422 4 wire Bus'ed or point to point SW1 switch position 9 off, switch position 10 off SW2 see below

See below for **Configuration of the RS485 / RS422 data channel** and description of tristate operation  
 Each of the two data channels can be set up independently.

**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
	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
	Off	- optical channel not receiving
Video Present CH1.....	Green	– video signal present on video CH1 input BNC
	Off	– no video present on video CH1 input BNC
Video Present CH2.....	Green	– video signal present on video CH2 input BNC
	Off	– no video present on video CH2 input BNC
Video Present CH3.....	Green	– video signal present on video CH3 input BNC
	Off	– no video present on video CH3 input BNC

Video Present CH4.....	Green Off	– video signal present on video CH4 input BNC – no video present on video CH4 input BNC
Video Present CH5.....	Green Off	– video signal present on video CH5 input BNC – no video present on video CH5 input BNC
Video Present CH6.....	Green Off	– video signal present on video CH6 input BNC – no video present on video CH6 input BNC
Video Present CH7.....	Green Off	– video signal present on video CH7 input BNC – no video present on video CH7 input BNC
Video Present CH8.....	Green Off	– video signal present on video CH8 input BNC – no video present on video CH8 input BNC
Data Present TX.....	Green Red Off	– logic one present on the data input – logic zero present on the data input – tri-state off or no connection on the data input
This represents the data signals being transmitted on the optical fibre		
Data Present RX.....	Green Red Off	– logic one present on the corresponding data output – logic zero present on the data output – tri-state off on the data output
This represents the data signals being received on the optical fibre		

## ***Physical Information***

### **Dimensions**

Height .....	3U Plug-in
Width.....	21HP
Depth .....	170mm excluding connectors
Weight.....	1100grams

### **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.

The 2005 series subrack is fitted with a 100 watt power supply. A maximum of 3 units may be fitted into one 2005 series subrack limited by the 70HP rack space.

It is important to take into account air circulation within a subrack. As a minimum a 1U space is recommended below and above each subrack and Fan trays should be used where appropriate.

### ***Configuration of the Data Channels***

SW1 and SW2 determine the protocol of the data channel. This can be either RS232, RS485 or RS422. (See below for **removal from the case** and access to SW1 and SW2)

**Mode 1 – RS485 two wire half duplex transmission.**

**Mode 2 – RS422 four wire full duplex transmission.**

In this mode the RS422 output will transmit a tristate condition as well as a logic high and a logic low for systems which require bus-ing of the RS422 four-wire connection.

MODE	Configuration Details	SW2 position 1	SW2 position 2	SW2 position 3	SW2 position 4	SW1 position 9	SW1 position 10
1	RS-485 2 wire BUS systems	OFF	ON	ON	ON	OFF	OFF
2	RS-422 4 wire Point-to-Point - and RS-422 BUS system	OFF	OFF	OFF	OFF	OFF	OFF

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 500mV positive or negative will be detected as a tristate condition. A level above 500mV 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 AMG2700 equipment detects a tri-state condition, then these resistors should have a value above 1kohm.

### Mode 3 – RS232 full duplex transmission.

MODE	Configuration Details	SW2 position 1	SW2 position 2	SW2 position 3	SW2 position 4	SW1 position 9	SW1 position 10
3	RS-232 Point to Point	OFF	OFF	OFF	OFF	ON	ON

**Note: - the data channel is set at Mode 1 – RS485 operation at the factory unless otherwise requested.**

### SW1 Switch Settings

All SW1 switch settings are set at the factory as follows:  
Channels 1-4 Card

Switch Position	Description	Setting
1	Video channel configuration	OFF
2	Video channel configuration	OFF
3	Video channel configuration	OFF
4	Primary / Secondary Board Setting	ON
5	Dual Redundant / Not dual redundant	OFF
6	Not Used	OFF
7	Not Used	OFF
8	On board data / Separate data card	ON
9	RS232 Select	OFF for RS485/422
10	RS232 Select	OFF for RS485/422



## Channels 5-8 Card

Switch Position	Description	Setting
1	Video channel configuration	OFF
2	Video channel configuration	OFF
3	Video channel configuration	ON
4	Primary / Secondary Board Setting	OFF
5	Dual Redundant / Not dual redundant	OFF
6	Not Used	OFF
7	Not Used	OFF
8	On board data / Separate data card	ON
9	RS232 or RS422/485	OFF for RS485/422
10	RS232 or RS422/485	OFF for RS485/422

### **Removal from the Case**

**Note:** - The 2700 PCB's are static sensitive. Handle with proper care and use normal electrostatic discharge (ESD) procedures. Use properly grounded protection (for example, wrist straps) when handling the PCB. The switch positions can be accessed without pulling out the boards from the case fully. It is recommended that the boards are slid out just sufficient to access the switches (~40mm) in order to reduce the possibility of damage to the optical fibres and electrical circuits.

In order to remove the case (to access SW1 and SW2)

- 1.1. Loosen and remove the four screws on the top and bottom of the unit's rear panel.
- 1.2. Slide the PCB assembly connected to the rear panel back from the case.
- 1.3. Ensure that the optical fibre is not trapped.

SW1 and SW2 can be found on the bottom right hand corner of each board and are labelled, close to the rear panel. The switch position are labelled on the switch, switch position 1 is always the furthest from the edge of the PCB.

When re-inserting the main PCB into the housing take care not to trap the optical fibre or the board interconnection cables.

Fasten the rear panel with the screws.

## The Management Card

The AMG2700 Management card is fitted within AMG2782RN, AMG2784RN and AMG2788RN receivers and is signified by a 'N' in the part number

Each management card, 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 +
2	RD (data out of port)	-
3	TD (data into port)	-
4	-	Data -
5	SG (signal ground)	SG (signals Ground)
6	N/C	N/C
7	N/C	N/C
8	N/C	N/C
9	N/C	N/C

**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	4
4	1
5	4

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

## **Safety**

The 2700 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 AMG2700 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.