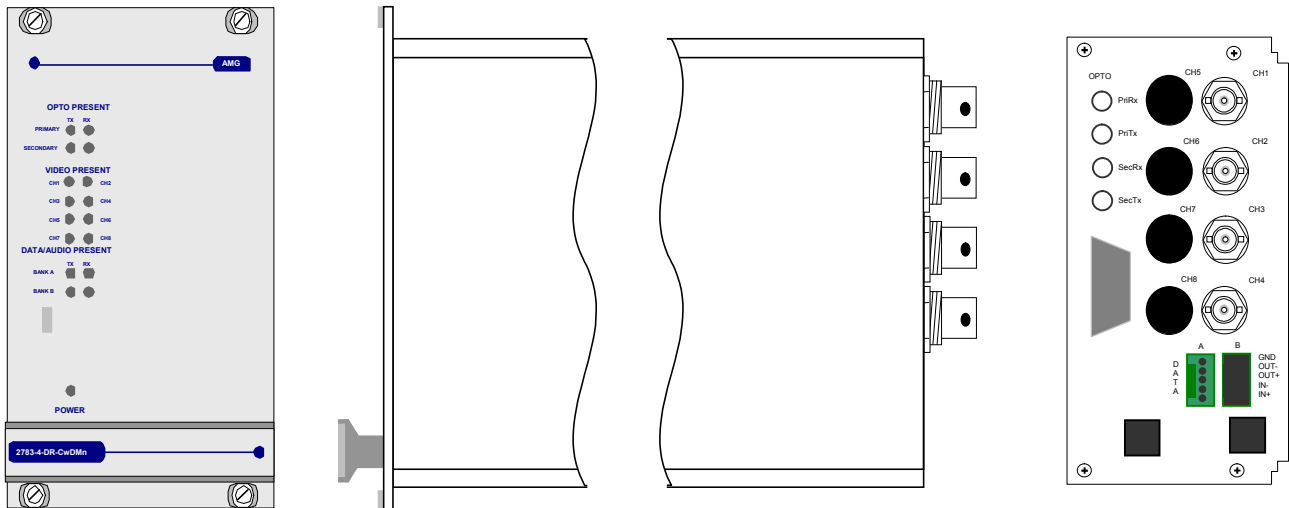


## Four Channel Video Insert Unit with Bi-directional Data Dual Redundant on a dual fibre ring



The **AMG2783AR-4-DR-CWDMn** is a four channel video insert unit designed to transmit a video signal onto a dual fibre, dual redundant optical ring operating at CWDM wavelength 'n'. It also provides an RS-485/RS-422 or RS-232 bi-directional data channel. The **AMG2783AR-4-DR-CWDMn** is designed to plug into an **AMG2009** or an **AMG2015** sub-rack which in turn fits into a 19" rack system.

The **AMG2783AR-4-DR-CWDMn** is designed to operate with an **AMG2784(A)R-DR-CWDMn** eight channel video and data receiver. Each receiver will 'drop off' up to eight video channels which are being transmitted around the fibre ring on the corresponding CWDM wavelength. Up to 8 wavelengths can be transmitted on the same fibre giving a capacity of 64 video channels on the fibre.

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## Introduction

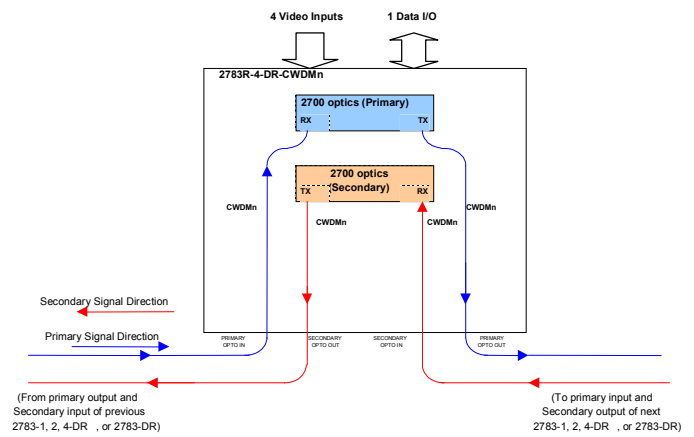
### Unit Functional Schematic

The **AMG2783AR-4-DR-CWDMn** receives a CWDM wavelength 'n' optical signal from both a primary and secondary fibre input. It inserts up to 4 video signals and data onto the optical fibre and receives a data channel signal transmitted from **AMG2784(A)R-DR-CWDMn** receiver.

In normal operation the data signal is taken from the primary input and the video and 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 data signal on its secondary output. This signal will be repeated around the ring to get back to this **AMG2783AR-4-DR-CWDMn** 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 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 video and data signal on the secondary optical output. This return video and data signal will be transmitted to the next unit around the ring in the opposite direction on the secondary route.



### Video Input Channel Configuration

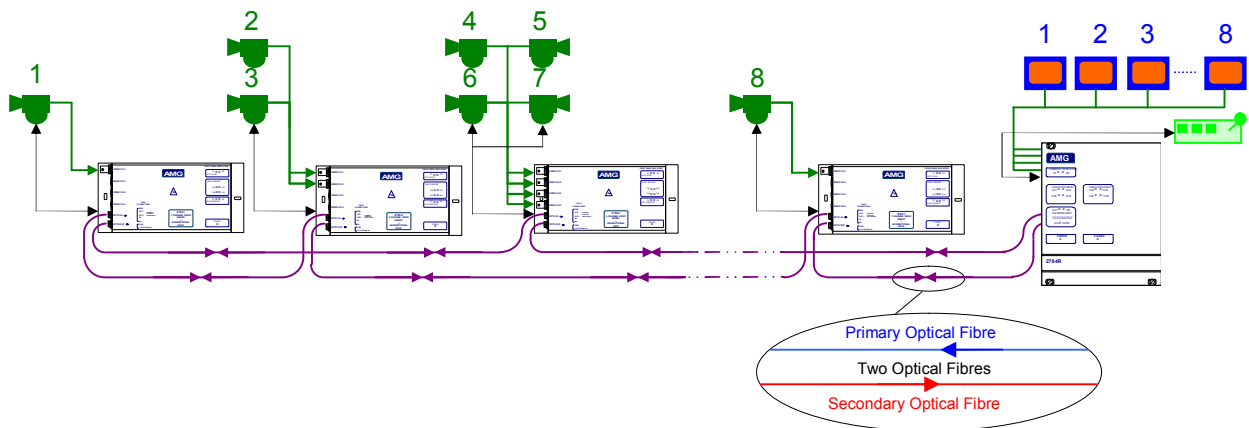
At the **AMG2783AR-n-DR-CWDMn** insert unit, video signals present at the BNC inputs can be inserted on one to eight video channels transmitted on the optical fibre. The first video channel number of each insert unit is set by the rotary switch on the front panel of the unit.

The switch channel numbers 1 to 8, correspond to video channels 1-8. Unused switch channel numbers 0 & 9 duplicate video channel selections 1 & 8 respectively. i.e. setting switch to position 0 or 1 selects video channel 1 and setting switch to position 8 or 9 selects channel 8.

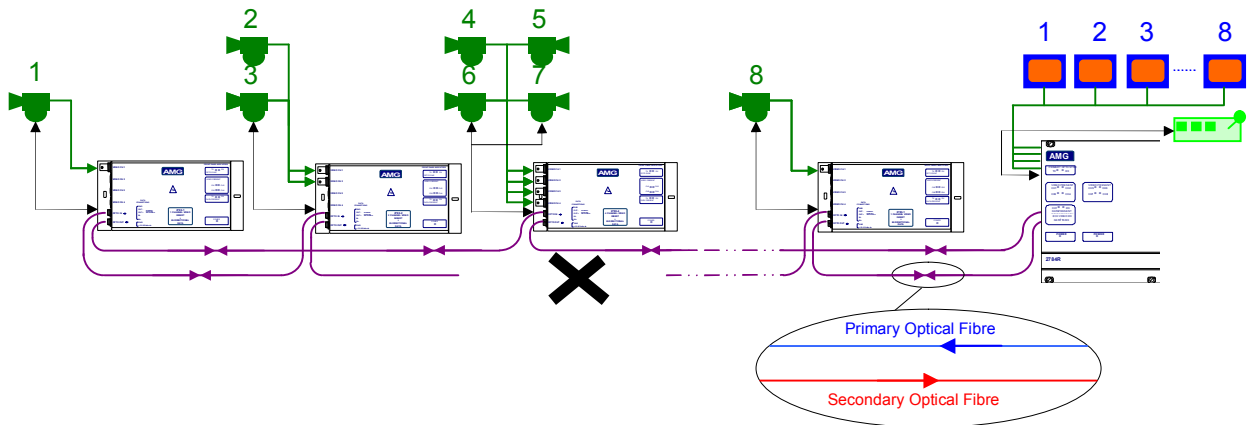
### Optical System Connection

The **AMG2783AR-n-DR-CWDMn** units are designed to be connected in a ring. Up to 2 **AMG2783AR-4-DR-CWDMn** dual channel units of the same wavelength can be connected on the same ring. Alternatively the **AMG2783AR-4-DR-CWDMn** can be combined with **AMG2783-1-DR-CWDMn** and **AMG2783-2-DR-CWDMn**, single and dual channel insert units respectively or their rackmount equivalents, to make up the eight video channels on the same wavelength on the fibre.

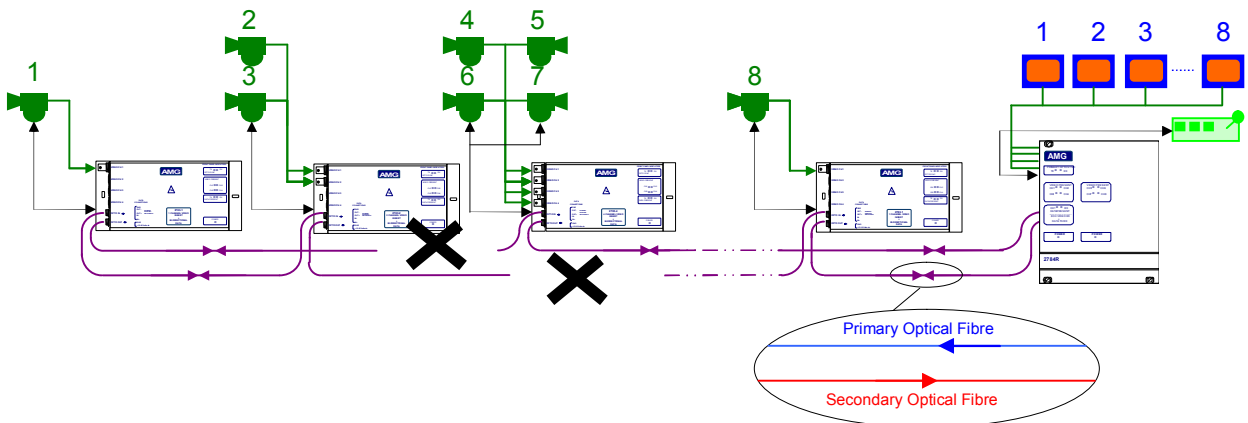
The schematic below illustrates a system combining **AMG2783-1-DR-CWDMn**, **AMG2783-2-DR-CWDMn** and **AMG2783-4-DR-CWDMn** units. As each unit regenerates the optical signal, the optical dynamic range between each optically connected node is 22dB.



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 will 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 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.  
No of channels .....4

See below for **video input channel configuration**

### Optical Connections

#### PRIMARY OPTO OUT

Connector .....FC/PC  
Primary Channel Launch Power .....-3dBm

#### PRIMARY OPTO IN

Connector .....FC/PC  
Primary Channel Sensitivity .....-25dBm

#### SECONDARY OPTO OUT

Connector .....FC/PC  
Secondary Channel Launch Power .....-3dBm

#### SECONDARY OPTO IN

Secondary Channel Sensitivity .....-25dBm

Operating Wavelength ..... n = 1 1510nm  
n = 2 1530nm  
n = 3 1550nm  
n = 4 1570nm  
n = 5 1470nm  
n = 6 1490nm  
n = 7 1590nm  
n = 8 1610nm

### Power Connection

Power supply .....from plug in connection on the AMG2000-AMG2105 Sub-rack  
Power consumption .....15 Watts max.

### Data Connections

Number of Channels .....One - associated with the first selected video channel.

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

Protocol .....**RS-232**  
SW1 switch position any.  
SW2 1, 2, 3, 4 all DOWN.

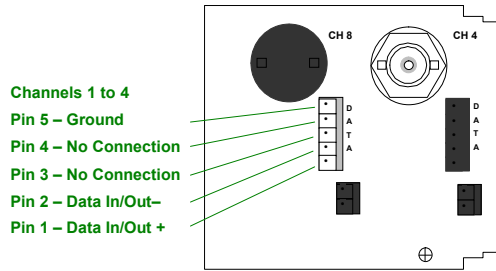
**RS-485** 2-wire  
SW1 switch position "LEFT"  
SW2 1, 3, 4 all UP. 2-UP if 120R termination required.

**RS-422** 4-wire Bus'ed or point to point  
SW1 switch position "RIGHT"  
SW2 1-UP, 3-DOWN, 4-DOWN, 2-UP if 120R termination required,

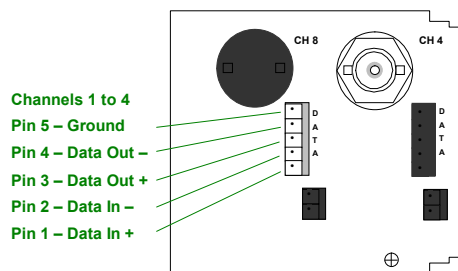
**NOTE: The unit is shipped from the factory as RS-485 unless otherwise requested.**

## Data Connections

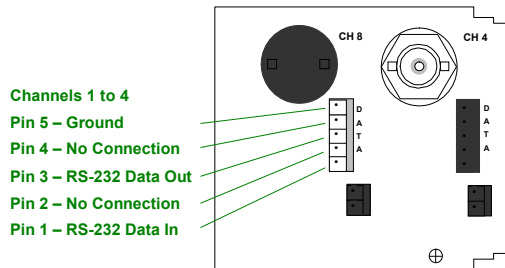
Connections RS-485 2-wire.....See schematic



Connections RS-422 4-wire.....See schematic



Connections RS-232 .....See schematic



See below for Configuration of the data channel and description of tristate operation

## Configuration of the Data Channel

SW1 and SW2 determine the protocol of the data channel. This can be RS-232, RS-485 or RS-422. (See below for **removal from the case** and access to SW1 and SW2)

**Mode 1 RS-485 two wire half duplex transmission.**

**Mode 2 RS-422 four wire full duplex transmission.**

In this mode the RS-422 output will transmit a tristate condition as well as logic high and logic low for systems which require bus-ing of the RS-422 four-wire connection.

MODE	Configuration Details	SW2 position 1	SW2 position 2	SW2 position 3	SW2 position 4	SW1 position
1	RS-485 2 wire BUS systems	UP	UP*	UP	UP	LEFT
2	RS-422 4 wire Point-to-Point - and RS-422 BUS system	UP	UP*	DOWN	DOWN	RIGHT

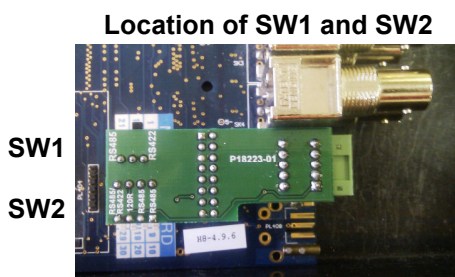
The data input for both the RS-485 and the RS-422 modes detects a tri-state input condition by monitoring the differential voltage level across the input. A differential level below 500mV positive or negative will be detected as a tristate condition. A level above 500mV positive or negative will be detected as a logic 1 or logic zero respectively.

**\*It is important therefore to terminate the RS-485 bus or the RS-422 input bus using 120Ω if a pre-bias is present on the RS-485 or RS-422 bus.** A large number of third party equipment manufacturers apply a pre-bias on their RS-485 bus. This pre-bias is applied by pulling one arm of the RS-485 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 1kΩ.

**Mode 3 RS-232 full duplex transmission.**

MODE	Configuration Details	SW2 position 1	SW2 position 2	SW2 position 3	SW2 position 4	SW1 position
3	RS-232 Point to Point	DOWN	DOWN	DOWN	DOWN	ANY

**Note: - the data channel is set to Mode 1: RS-485 operation with 120Ω ON, at the factory unless otherwise requested.**



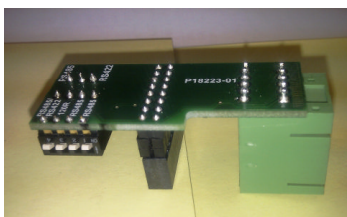
**SW1: RS-485 Mode**



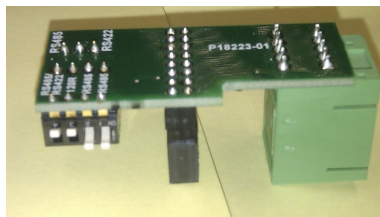
**SW1: RS-422 Mode**



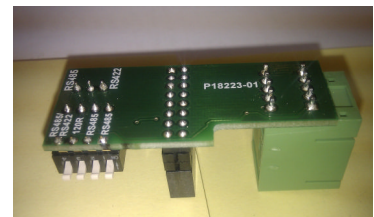
**SW2: RS-485 Mode**



**SW2: RS-422 Mode**



**SW2: RS-232 Mode**



**Indicators**

Power.....	Green Off	- unit powered - no power applied to unit
Primary Opto Sync TX.....	Green Off	- Primary optical channel transmitting - Primary optical channel not transmitting
Primary Opto Sync RX .....	Green Off	- Primary optical channel receiving - Primary optical channel not receiving
Secondary Opto Sync TX.....	Green Off	- Secondary optical channel transmitting - Secondary optical channel not transmitting
Secondary Opto Sync RX.....	Green Off	- Secondary optical channel receiving - Secondary optical channel not receiving
Video Present CH1-2.....	Green Off	- video signal present on video CH1 input BNC - no video present on video CH1 input BNC
Data Present TX .....	Green Red Off	- logic one present on the corresponding data input - logic zero present on the corresponding data input - tri-state present on the corresponding 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 corresponding data output - tri-state present on the corresponding data output
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This represents the data signals being received on the optical fibre

## **Physical Information**

### **Dimensions**

Height .....3U Plug-in  
Width..... 14HP  
Depth ..... 170mm excluding connectors  
Weight.....800grams

### **Mounting Details**

The unit is designed to be mounted within an AMG2000, 2005, 2009 or 2015 sub-rack on standard card guides.

The AMG2000 series sub-rack is fitted with a 50 watt power supply

The AMG2005, 2009, 2015 series sub-racks are fitted with a 100 watt power supply

## **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 stamps) when handling the PCB.

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 out of 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.

## **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.