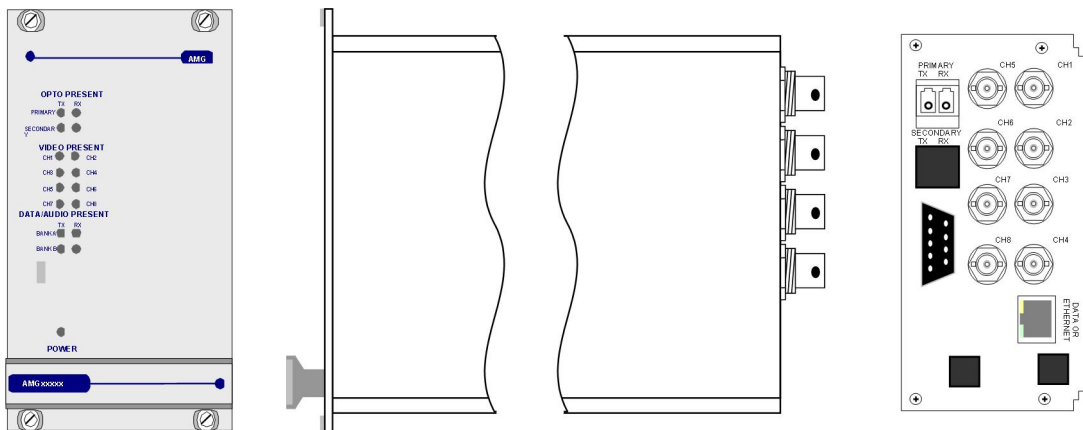


## 8 Channel Video Receive Unit with Ethernet for a Dual Redundant Single Fibre Ring - includes AMG NMS Network Management Interface



The **AMG3782ERN-DR-SF** is a rackmount eight channel video receive unit designed to receive 8 video signals from a singlemode optical fibre ring with Dual Redundant operation. It also provides full duplex 100BaseT Ethernet connectivity around the ring.

The **AMG3782ERN-DR-SF** is designed to plug into an AMG2005 subrack, which in turn fits into a 19" rack system. It also includes an AMG Management Interface to allow management of the system using the AMG SNMP enabled Management software.

The **AMG3782ERN-DR-SF** is designed to operate with **AMG3741E-DR-SF** or rackmount equivalent **AMG3741EG-DR-SF** four channel video and Ethernet insert units. It may also be used with other combinations of single, dual and four channel video insert units.

An **AMG3782ERN-DR-SF** receive unit will 'drop off' up to eight video channels which are being transmitted around the fibre ring from up to eight single channel insert units, or from an equivalent combination of multi-channel insert units.

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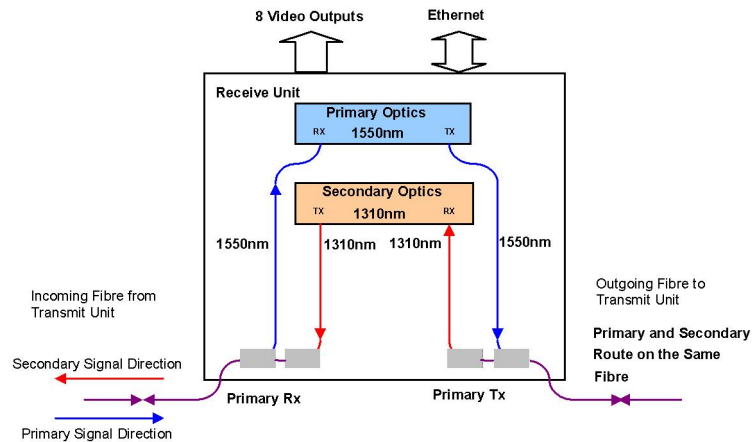
## Introduction

### Unit Functional Schematic

The **AMG3782ERN-DR-SF** transmits and receives the optical signals from both a primary and secondary optical channel.

These optical channels are transmitted on the same optical fibre in opposite directions, operating at different wavelengths.

The primary channel operates on 1550nm and the secondary channel on 1310nm.



The **AMG3741EG-DR-SF** receives and drops off Ethernet signals transmitted from an **AMG3782ERN-DR-SF** receiver. It then inserts video and Ethernet signals onto the outgoing optical signal.

As each unit regenerates the optical signal, the optical dynamic range between each optically connected node is 17dB.

### Video Input Channel Configuration

At the **AMG3741E-DR-SF** or rackmount **AMG3741EG-DR-SF** 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.

It is normal to set each insert unit to a different channel number. If the same number is used twice, an insert unit connected 'down stream' on the primary optical route will 'over-write' any coincident video channels coming from the previous insert unit and those video signals will be lost.

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.

### Dual Redundant Operation

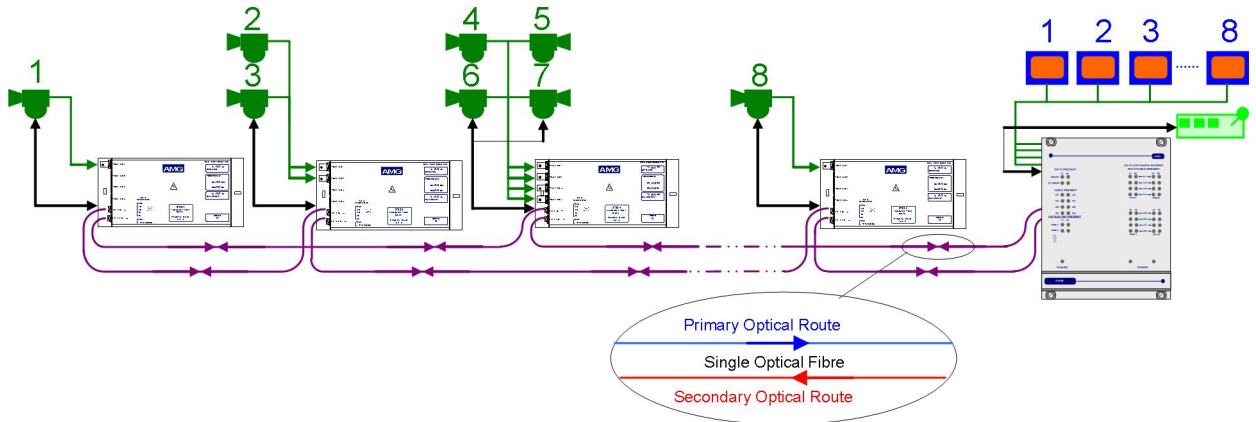
In normal operation where optical connection to both the previous unit and subsequent insert units is OK, video and data signals are transmitted on the primary output and data is received from the primary input. The secondary optical input is independent and is regenerated on the secondary output.

If the primary input signal is not present, a 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 unit 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.

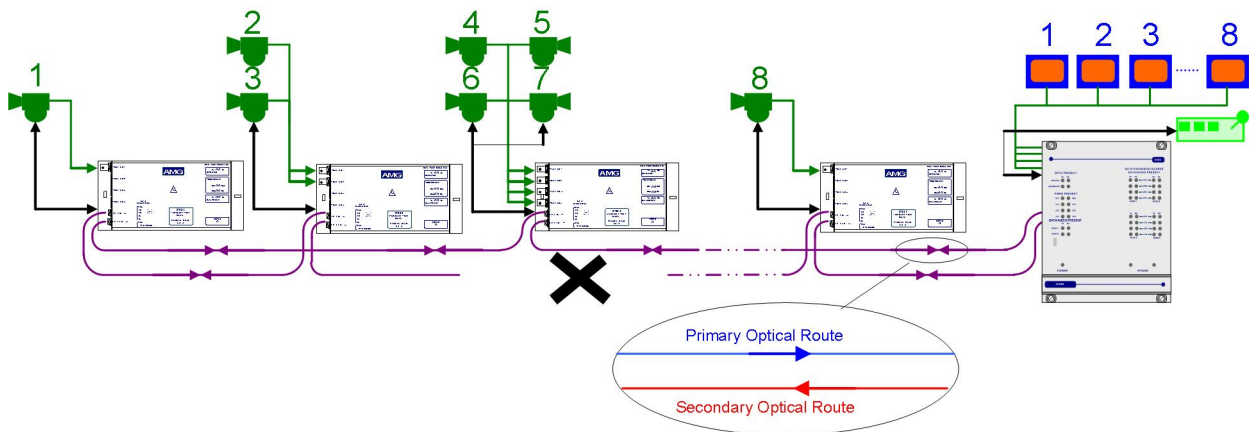
If the secondary input signal is not present, an insert unit will assume that the route to the next unit is not OK and send out the video and data signal on the secondary optical output. This video and data will be transmitted to the next unit around the ring in the opposite direction on the secondary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

## Optical Connections

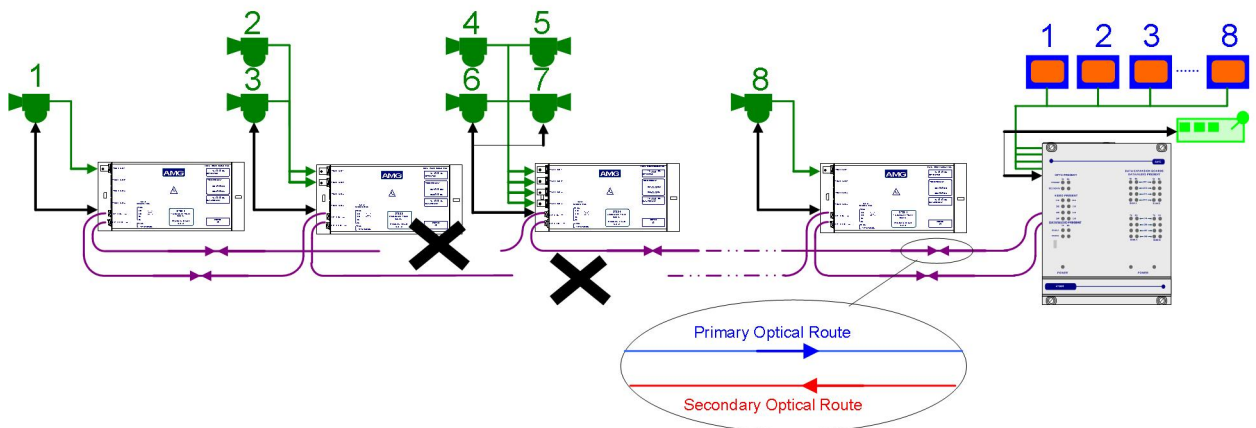
The **AMG3782EN-DR-SF** or rackmount **AMG3782ERN-DR-SF** is designed to be connected in a ring or point to point system. In a ring system, single, dual and four channel insert units respectively can be combined to make up an 8 channel video transmission system as illustrated below.



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.



## **Connections**

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### **Video Output Connections**

No. of channels .....8  
Connectors .....75 ohm BNC Socket.  
Output Impedance .....75 ohm terminated.  
Output Level .....1 Volt p-p nominal  
Frequency Response.....10Hz to 7MHz.

### **Optical Connections**

#### **PRIMARY OPTO OUT**

Connector .....LC/PC  
Primary Optical Launch Power .....-5dBm  
Wavelength .....1550nm  
Secondary Optical Sensitivity .....-22dBm  
Wavelength .....1310nm

#### **PRIMARY OPTO IN**

Connector .....LC/PC  
Primary Optical Sensitivity .....-22dBm  
Wavelength .....1550nm  
Secondary Optical Launch Power .....-5dBm  
Wavelength .....1310nm

### **Power Connection**

Power supply .....from plug in connection on the AMG2009 / AMG2015 subrack  
Power consumption .....10 Watts max.

### **Ethernet Connection**

Ethernet Data Connector .....RJ45  
Interface .....Auto-negotiation up to 100BASE-TX full duplex  
Ethernet Data Rate .....Maximum 100Mb/s total Ethernet traffic on fibre

## Front Panel Indicators

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### Power LED

|             |       |   |                          |
|-------------|-------|---|--------------------------|
| Power ..... | Green | - | unit powered             |
|             | Off   | - | no power applied to unit |

### Video Output LED's

|                           |       |   |   |
|---------------------------|-------|---|---|
| Video Present CH1-8 ..... | Green | - | video signal present on output BNC      |
|                           | Org   | - | channel present but no video on O/P BNC |
|                           | Off   | - | no video channel present                |

### Fibre Optic LED's

|                              |       |   |   |
|------------------------------|-------|---|---|
| Primary Opto Sync TX.....    | Green | - | optical channel transmitting            |
|                              | Off   | - | optical channel not transmitting        |
| Primary Opto Sync RX .....   | Green | - | optical channel receiving               |
|                              | Org   | - | optical channel receiving but not sync. |
|                              | 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               |
|                              | Org   | - | optical channel receiving but not sync. |
|                              | Off   | - | optical channel not receiving           |

## Ethernet Data Configuration

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### Ethernet Data Configuration

The **AMG3741E-DR-SF** and rackmount equivalent **AMG3741EG-DR-SF** sends and receives Ethernet data.

### Ethernet Data Connections

| RJ45 Pin No. | Cat 5/6 Cable Colour Code T568B |
|--------------|---------------------------------|
| 1            | White/orange                    |
| 2            | Orange                          |
| 3            | White/green                     |
| 4            | Blue                            |
| 5            | White/blue                      |
| 6            | Green                           |
| 7            | White/brown                     |
| 8            | Brown                           |

## Ethernet Operation

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In order for the AMG system to transmit Ethernet signals, an onboard RJ45 Ethernet interface or X16003 Ethernet interface adaptor should be fitted to all units in the ring.

The Ethernet interface can operate at either 10Mbit/s half duplex, or 100Mbit/s full duplex. When all the Ethernet interfaces around the ring are operating at 100Mbit/s full duplex the system behaves as a multi-port repeater. Data transmitted on any one port is transmitted out on all other ports with the minimum of delay or buffering. The nominal bandwidth available for Ethernet transmission within the ring is 100Mbit/s when Ethernet only, or 50Mbit/s when the low speed data option is also used. If one node is transmitting, the entire bandwidth is available for this traffic. If multiple nodes transmit simultaneously on the ring, then the bandwidth is shared between each node as required. With similar traffic at each node the sharing would be nominally equal.

Although the limit for the number of video channels which can be transmitted around the ring is eight, up to 64 nodes can be attached for distributing Ethernet signals with the bandwidth sharing implemented. The units use Flow Control (Pause Frames) to limit the access to the ring to share the bandwidth and to ensure that no data is lost. When an Ethernet port is operating at 10Mbit/s half duplex, this port will now only receive data from a receive unit rather than all ports as when operating at 100Mbit/s full duplex.

The 100BaseT port does not implement MDI/MDIX; it should be connected with a straight though cable to an external switch port and with a cross over cable when connected directly to a PC or DTE.



## **Network Management**

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Network Management of the system is provided by the AMG Management Interface which allows Management using the AMG SNMP enabled Management software.

### **NMS Operation**

Requires Network Management "N" option in each Rx (Receive) or Tx (Transmit) unit.  
Recommended for Dual Redundant Options to give knowledge of failure  
Rx collects information regarding all attached Tx units

### **Interface**

- 9 Way D-type management port on each Rx or Tx
- RS-232 or RS-485 on Management Port
- Multiple Rx/Tx units use RS-485 and effectively parallel all the RS-485 ports together
- Connect to PC RS-232 Port via RS-485/RS-232 convertor

### **Proprietary GUI**

- Loss of unit
- Loss of Optical Input
- Loss of Video Input

### **SNMP**

SNMP Compatibility: SNMP Version 1  
AMG3700 Device do NOT act as SNMP Agents

PC running AMG NMS software is the only 'true' SNMP Agent

- Provides Proxy access to all AMG devices
- SNMP Community String used to differentiate between AMG devices

### **Network Alarm Port**

Alarm Output: Normally Closed

Opens when loss of :

- Video at any insert node
- Primary optical input at any node
- Secondary optical input at any node
- Any node through a power down
- Power at the receiver

Closed by: Reset

### **The Management Interface**

The Management Interface is fitted to AMG receivers / transmitters and is signified by a 'N' in the part number

Each management interface, thus each receiver or transmitter, has an 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. It supports either RS-232 or RS-485.

#### Management Port Pin-out:

| Pin Number | RS-232 Connection                            | RS-485 Connection  |
|------------|--|--------------------|
| 1          | -  | Data B (+)         |
| 2          | RD (data out of port)                        | Data A (-)         |
| 3          | TD (data into port)                          | -                  |
| 4          | Connect to DTR held -ve or shorted 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 RS-485 interface is used with each RS-485 pair connected in parallel. In this case an RS-485 to RS-232 / USB converter is required in order to connect to a standard PC Comms. Port.

The time delay between receiving a data request and sending out a response from the port is 625µs. Therefore any RS-485 converter should have a 'turn around' time or 'transmit dwell' time equal to or less than 625µs.

#### Recommended RS-485 Converter's are:

RS-485 to RS-232

Dataforth DCP485-S: Available in the UK from <http://uk.farnell.com/> Order No. 300-9348

#### Settings on the DCP485-S:

- RS-485 Switch Settings: 1-UP, 2-DOWN, 3-DOWN, 4-UP, 5-DOWN, 6-DOWN, 7-DOWN, 8-UP
- RS-232 Switch Settings: 1-DOWN, 2-UP, 3-DOWN, 4-UP
- DCE/DTE set to DCE.

RS-485 to USB

B&B 485USBTB-2W: Available in Europe from <http://www.bb-europe.com/> Order No. 485USBTB-2W

#### Connections to management port:

| Management Port | DCP485-S | 485USBTB-2W |
|-----------------|----------|-------------|
| 1               | 2 or 4   | B+          |
| 2               | 3 or 5   | A-          |
| 5               | GND      | GND         |

#### NOTES:

On the DCP485-S, pins 3 and 5 are connected together and pins 2 and 4 are connected together. On the 485USBTB-2W, there are 2 pairs of terminals both labeled A-, B+, either pair may be used.

### ***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: 0.5A at 125VAC or 1A 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 AMG transmit 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:

- Addition or loss of video at any insert node
- Addition or loss of primary optical input at any node
- Addition or loss of secondary optical input at any node
- Power up or down of any node
- 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 5V via a 1k $\Omega$  resistor. To reset the alarm, the alarm reset is required to be pulled to ground, either by a volt-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 AMG transmit unit 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.

## Physical Information

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### Dimensions

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

### Mounting Details

The unit is designed to be mounted within an AMG2009 or AMG2015 Subrack on standard card guides.

### Removal / replacement from / to the Case

Note: - The AMG unit 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.

To remove units from the case to access the data expansion boards and the daughter boards, remove the 2 or 4 fixing screws on the rear panel and slide the PCB's out of the case. Ensure that the fibres do not snag or get trapped.

To replace the PCB's into the case, slide the PCB's gently into the case aligning the boards with the appropriate slots. Ensure that the fibre do not snag or get trapped.

## Safety

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AMG Optical Fibre Products use Class 1 laser systems 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 optical fibre systems, please see EN 60825-2:2000 or your local safety officer.

## Maintenance and Repair

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There are no user serviceable parts within AMG products. See unit data sheet for full specification.

In case of problem or failure, please call your local support centre or contact: **AMG Systems Ltd.** at 3 The Omega Centre, Stratton Business Park, Biggleswade, Beds., SG18 8QB, UK.

|                   |                            |
|-------------------|----------------------------|
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