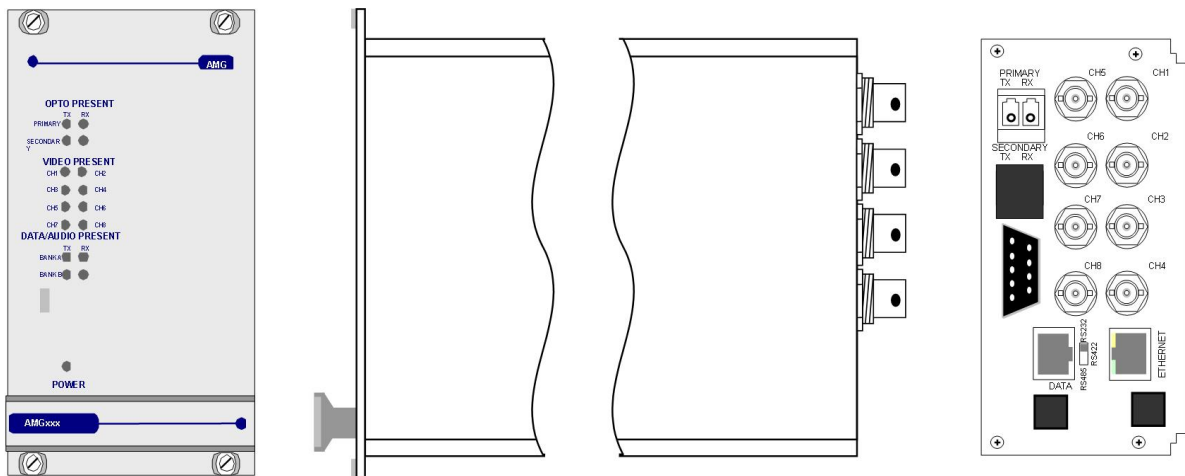


8 Channel Video Receive Unit with Ethernet for a Singlemode Dual Fibre Ring - includes AMG NMS Network Management Interface



The **AMG3784ERN** is a rackmount eight channel video receive unit designed to receive 8 video signals from a singlemode optical fibre ring. It also provides one bi-directional data channel via a low speed data interface, plus full duplex 100BaseT Ethernet connectivity around the ring.

The **AMG3784ERN** is designed to plug into an AMG2009 or AMG2015 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 **AMG3784ERN** is designed to operate with **AMG3713E** or rackmount equivalent **AMG3713ER** single channel video and Ethernet insert units. It may also be used with other combinations of single, dual and four channel video insert units.

An **AMG3784ERN** 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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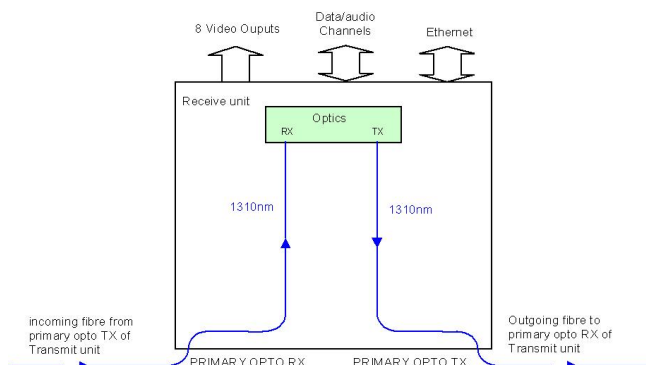
Introduction

Unit Functional Schematic

The **AMG3784ERN** drops off up to 8 video and 1 data signal transmitted from the **AMG3713ER**.

It also transmits 1 data channel to the **AMG3713ER**.

Ethernet connectivity is also provided between the two units.



Video Input Channel Configuration

At the **AMG3713E** or rackmount **AMG3713ER** 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.

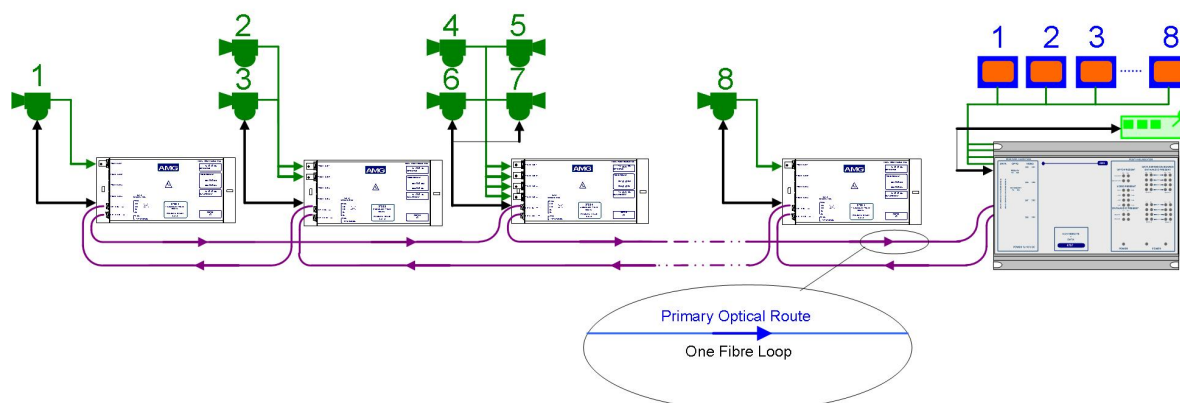
It is normal to set each insert unit to a different channel number. If the same number is used twice, an insert unit connected 'down stream' on the primary optical route will 'over-write' any coincident video channels coming from the previous insert unit and those video signals will be lost.

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.

Optical Connection

The **AMG3784EN** or rackmount **AMG3784ERN** 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.



Connections

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
Optical Fibre Singlemode

PRIMARY OPTO IN

Connector LC/PC
Primary Optical Sensitivity -22dBm
Wavelength 1310nm
Optical Fibre Singlemode

Power Connection

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

Data and Audio Channel Connections

DATA CHANNEL A

Data Channel A 1 channel
Data Connector RJ45
Channel A Interface On Board Data Interface – RS232, RS422 or RS485. Selected by slide switch above the RJ45 connector.

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

DATA CHANNEL B

Data Channel B Not Present

Ethernet Connection

Ethernet Data Connector RJ45
Interface Auto-negotiation up to 100BASE-TX full duplex
Ethernet Data Rate Maximum 50Mbps/s total Ethernet traffic on fibre

Front Panel Indicators

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 transmitting |

Data and Audio Channel Configuration

Data and Audio Channel Configuration

The **AMG3784EN** and rackmount equivalent **AMG3784ERN** sends and receives data to/from Channel A. Channel B is not available. Channel A is a single data interface selectable by the user with the slide switch on the rear panel.

Data Interface Connections Channel A

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

Note: (A) or (B) in brackets in above table refers to RS485 / RS422 data specification, not Channel A, Channel B.

Data Channel A Configuration

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 600mV positive or negative will be detected as a tri-state condition. A level above 600mV 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 120Ω 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 5kΩ. If the third party bias resistors are less the 750Ω 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.

Ethernet Data Configuration

Ethernet Data Configuration

The **AMG3713E** and rackmount equivalent **AMG3713ER** sends and receives Ethernet data.

Ethernet Operation

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 through cable to an external switch port and with a cross over cable when connected directly to a PC or DTE.

Network Management

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 Ω 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

Dimensions

Height.....3U Plug-in
Width.....14HP
Depth170mm 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

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

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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