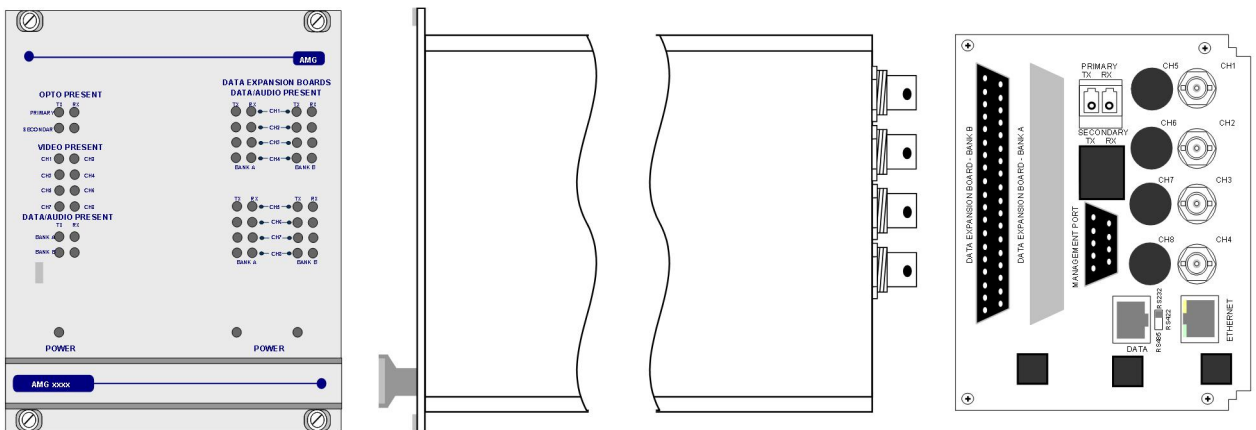


## 4 Channel Video Receive Unit with up to 9 Bi-directional Data and Audio Channels plus Ethernet - includes AMG NMS Network Management Interface



The **AMG4748BERN** is a rackmount four channel video receive unit designed to receive 4 video signals and transmit and receive up to 9 data or audio signals plus full duplex 100BaseT Ethernet connectivity over two singlemode fibres. The 9 data/audio channel interfaces, whether RS232, RS422, RS485, 20mA, TTL, Contact Closure, Lonworks or Audio, are defined at manufacture by the addition of daughter boards fitted onto the Data Expansion Board A.

The **AMG4748BERN** 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 **AMG4748BERN** is designed to operate with **AMG4747BE** or rackmount equivalent **AMG4747BER** four channel video transmit unit in a point to point configuration.

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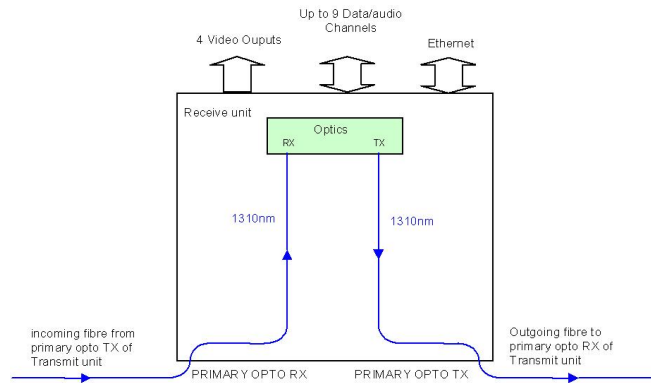
## Introduction

### Unit Functional Schematic

The **AMG4748BERN** drops off up to 4 video and 9 data and audio signals transmitted from the **AMG4747BER**.

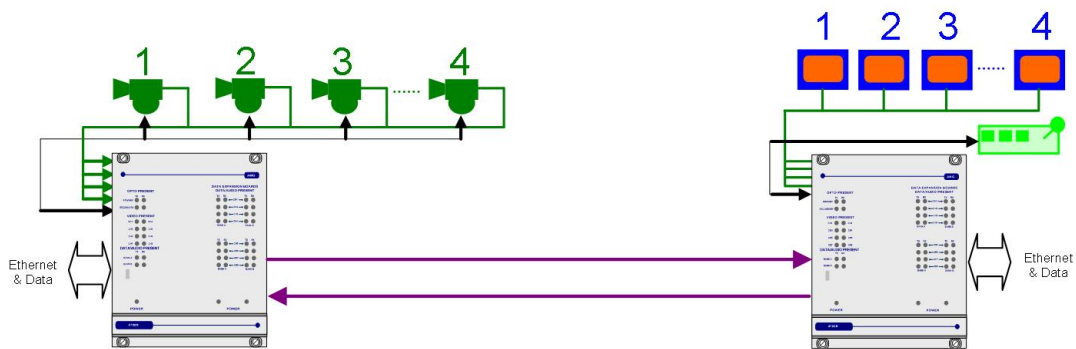
It also transmits up to 9 data and audio channels to the **AMG4747BER**.

Ethernet connectivity is also provided between the two units.



### Optical Connection

The **AMG4748BERN** is connected as illustrated below when used with an **AMG4747BER** 4-channel transmit unit acting as a point to point system.



## Connections

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### Video Output Connections

No. of channels.....	4
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.....	1310nm
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.

### 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

### Data and Audio Channel Connections

Total No. of Data Channels .....	9 channels
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#### 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 RJ45 connector.

RS485 – switch position - high (closest to BNC connections)

RS422 – switch position – middle

RS232 – switch position – low (furthest from BNC connections)

#### DATA BANK B

Data/Audio Channels – BANK A .....	Not Used
Data/Audio Channels – BANK B .....	8 channels
Connector .....	37-way D-Type female connector - shielded.
Connections.....	See appropriate section for connection and configuration details

For the data or audio channels to be present, appropriate data daughter boards must be fitted onto the data expansion board slots.

## Data and Audio Channel Configuration

### Data and Audio Channels

The **AMG4747BE** and rackmount equivalent **AMG4747BER** sends and receives data to/from Channel A and Bank B. Channel A is a single data interface selectable by the user with the slide switch on the rear panel. Bank B carries up to 8 channels of data / audio, the physical interface of which is determined by fitment of AMG data or audio daughter boards onto the B Channel data expansion board slots.

### Data Interface Daughter Board Options

The data interface daughter board options are as follows:

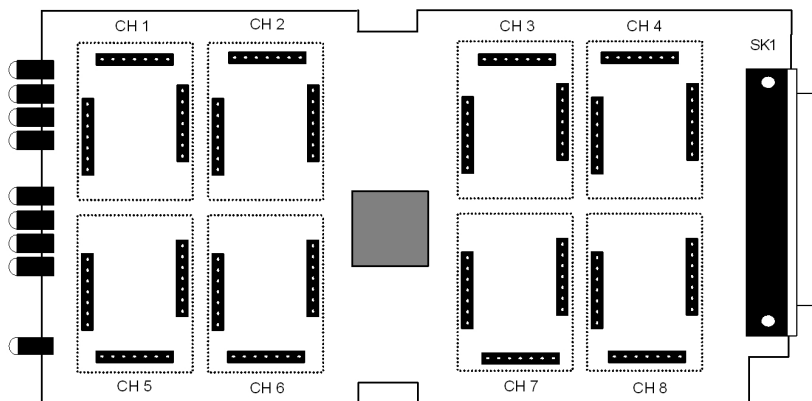
Option Code 'x'	Part No.	Description
0	X12542	4 Wire Audio Interface Daughter Board
1	X04057	RS422/485 Data Interface Daughter Board
2	X04049	RS232 Data Interface Daughter Board
3	X04058	20mA Current Loop Data Interface Daughter Board
4	X12579	TTL Data Interface Daughter Board
5	X12578	Contact Closure Data Interface Daughter Board
6	X13038	FTT10A Echelon Lonworks Data Interface Daughter Board

### Data and Audio Channel Configuration

The data expansion board slots are accessed by removing the AMG unit from its case. A data channel is active when a daughter board is installed in the required data channel slot. Each data interface board enables one bi-directional channel.

### Daughter Board Layout

The channel slots are as follows:



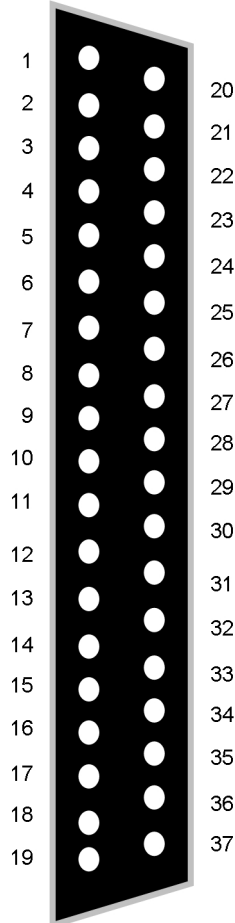
### Data and Audio Daughter Board Fitting Instruction

The data and audio daughter boards pushed on to the pin headers mounted on the data expansion boards. Ensure that the connectors are lined up correctly and not offset before pushing firmly in place. Note that the data and audio channel numbers are associated with each slot. This allocates the pin numbers on the rear panel connector together with the front panel LED indicators.

### Data and Audio Connections Bank B

The BANK B data/audio channels pin connections on the rear panel connectors are as follows:

Pin No.	Description	Bank
1	Audio/Data CH1 IN + (A)	B
2	Audio/Data CH1 IN - (B)	B
3	Audio/Data CH2 IN + (A)	B
4	Audio/Data CH2 IN - (B)	B
5	Audio/Data CH3 IN + (A)	B
6	Audio/Data CH3 IN - (B)	B
7	Audio/Data CH4 IN + (A)	B
8	Audio/Data CH4 IN - (B)	B
9	GND	B
10	GND	B
11	GND	B
12	Audio/Data CH5 IN + (A)	B
13	Audio/Data CH5 IN - (B)	B
14	Audio/Data CH6 IN + (A)	B
15	Audio/Data CH6 IN - (B)	B
16	Audio/Data CH7 IN + (A)	B
17	Audio/Data CH7 IN - (B)	B
18	Audio/Data CH8 IN + (A)	B
19	Audio/Data CH8 IN - (B)	B



Pin No.	Description	Bank
20	Audio/Data CH1 OUT + (A)	B
21	Audio/Data CH1 OUT - (B)	B
22	Audio/Data CH2 OUT + (A)	B
23	Audio/Data CH2 OUT - (B)	B
24	Audio/Data CH3 OUT + (A)	B
25	Audio/Data CH3 OUT - (B)	B
26	Audio/Data CH4 OUT + (A)	B
27	Audio/Data CH4 OUT - (B)	B
28	GND	B
29	GND	B
30	GND	B
31	Audio/Data CH5 OUT + (A)	B
32	Audio/Data CH5 OUT - (B)	B
33	Audio/Data CH6 OUT + (A)	B
34	Audio/Data CH6 OUT - (B)	B
35	Audio/Data CH7 OUT + (A)	B
36	Audio/Data CH7 OUT - (B)	B
37	Audio/Data CH8 OUT - (B)	B

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

See Data or Audio Daughter Board Instruction Sheet for meaning of Audio/Data IN+, Audio/Data IN-, Audio/Data OUT+, and Audio/Data OUT- for each data type.

## 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 CH1-4 .....	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

### Low Speed Data LEDs

#### Channel A

Data Present TX (RS485 or RS422) ...	Green	-	logic zero (+V, -V) present on IN+, IN-
	Red	-	logic one (-V,+V) present on IN+, IN-
	Off	-	tri-state off or no connection on IN+, IN-

Data Present TX (RS232) .....	Green	-	logic zero (+V) present on input IN+
	Red	-	logic transitions present on input IN+
	Off	-	logic one (-V) present on input IN+

This represents the data signals being transmitted on the optical fibre

Data Present RX (RS485 or RS422) ...	Green	-	logic zero (+V,-V) present on OUT+, OUT-
	Red	-	logic one (-V,+V) present on OUT+, OUT-
	Off	-	tri-state off or no connection on OUT+, OUT-

Data Present RX (RS232) .....	Green	-	logic zero (+V) present on OUT+
	Red	-	logic transitions present on OUT+
	Off	-	logic one (-V) present on OUT+

This represents the data signals being received on the optical fibre

#### BANK B (When RS232 data daughter board fitted)

Data Present CH1-8 TX .....	Green	-	logic zero (+V) present on IN+
	Red	-	logic transitions present on IN+
	Off	-	logic one (-V) present on IN+

This represents the data signals being transmitted on the optical fibre

Data Present CH1-8 RX .....	Green	-	logic zero (+V) present on OUT+
	Red	-	logic transitions present on OUT+
	Off	-	logic one (-V) present on OUT+

This represents the data signals being received on the optical fibre



**BANK B** (When RS485 / RS422 data daughter board fitted)

Data Present CH1-8 TX ..... Green - logic zero (+V, -V) present on IN+, IN-  
Red - logic transitions present on IN+, IN-  
Off - logic one (-V, +V) present on IN+, IN-

This represents the data signals being transmitted on the optical fibre

Data Present CH1-8 RX ..... Green - logic zero (+V, -V) present on OUT+, OUT-  
Red - logic transitions present on OUT+, OUT-  
Off - logic one (-V, +V) present on OUT+, OUT-

This represents the data signals being received on the optical fibre

**BANK B** (When audio daughter board fitted)

Audio Present CH1-8 TX ..... Green - audio present > -40dBm  
Red - audio present > 0dBm (overload at +6dBm)  
Off - audio not present or < -40dBm

This represents the audio signals being transmitted on the optical fibre

Audio Present CH1-8 RX ..... Green - audio present > -40dBm  
Red - audio present > 0dBm (overload at +6dBm)  
Off - audio not present or < -40dBm

This represents the audio signals being received from the optical fibre.

***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 both the Transmit unit and the Receive unit.

The Ethernet interface can operate at either 10Mbits/s half duplex, or 100Mbit/s full duplex, and data is transmitted from one port the other port with the minimum of delay or buffering. The maximum bandwidth (at 100Mbit/s full duplex) available for transmission across the fibre link is nominally 50MBit/s.

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**

SMNP Compatibility: SMNP 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 ..... 21HP  
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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