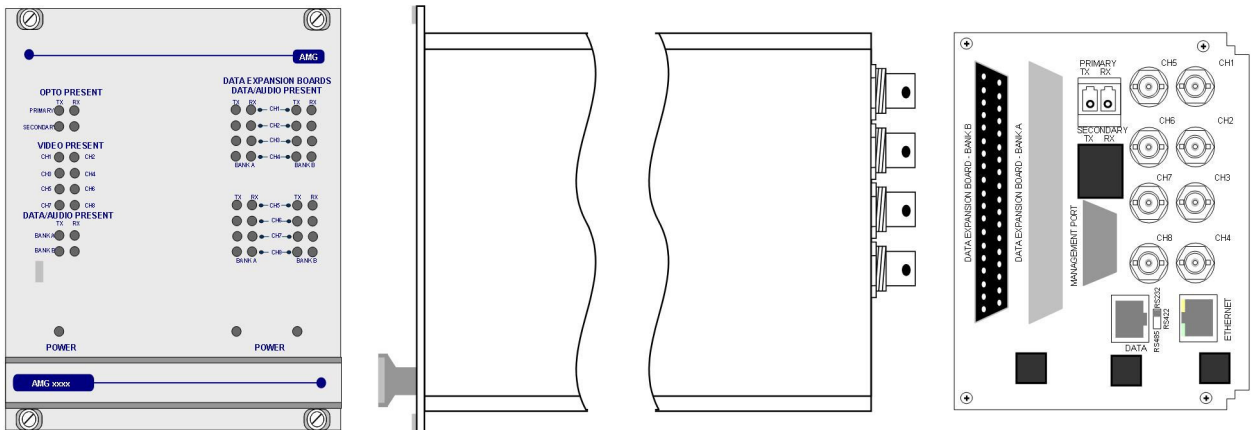


AMG4787BER-SF Instruction Manual

8 Channel Video Transmit Unit with 9 Bi-directional Data and Audio Channels plus Ethernet for a Singlemode Single Fibre Link



The **AMG4787BER-SF** is a rackmount eight channel video transmit unit designed to transmit 8 video signals and transmit and receive up to 9 data or audio signals plus full duplex 100BaseT Ethernet connectivity over one Singlemode fibre. 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 B.

The **AMG4787BER-SF** is designed to plug into an AMG2009 or AMG2015 subrack, which in turn fits into a 19" rack system.

The **AMG4787BER-SF** is designed to operate with **AMG4788BER-SF** or rackmount equivalent **AMG4788BERN-SF** eight channel video receive unit in a point to point configuration.

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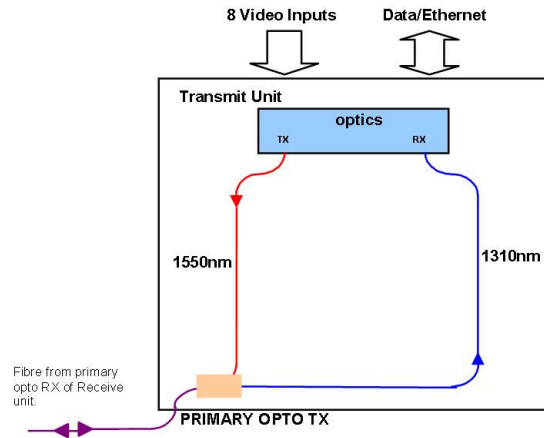
Introduction

Unit Functional Schematic

The **AMG4787BER-SF** transmits up to 8 video and 9 data signals to the **AMG4788BEN-SF**.

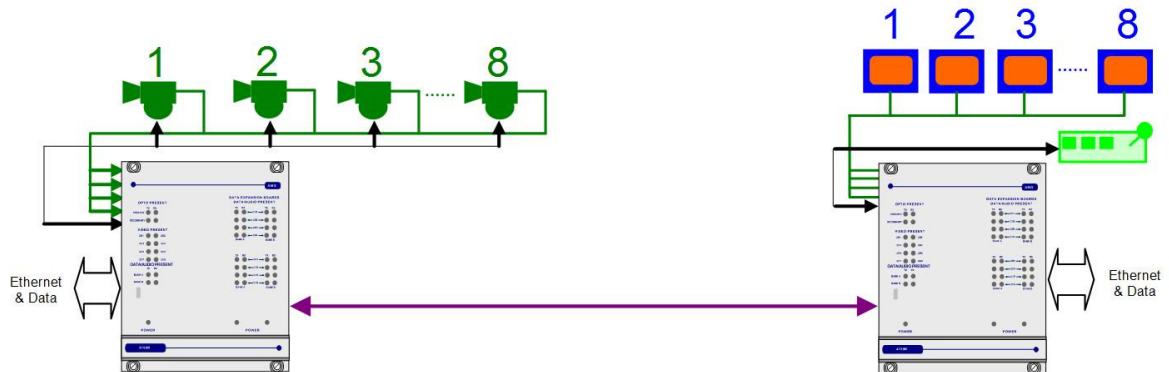
It also receives 9 data signal transmitted from the **AMG4788BEN-SF**.

Ethernet connectivity is also provided between the two units.



Optical Connection

The **AMG4787BER-SF** is connected as illustrated below when used with an **AMG4788BERN-SF** 8-channel receive unit acting as a point to point system.



Connections

Video Input Connections

No. of channels8
Connector75 ohm BNC Socket.
Input Impedance75 ohm terminated.
Input Level1 volt p-p nominal
Frequency Response.....10Hz to 7MHz.

Optical Connections

PRIMARY OPTO OUT

ConnectorLC/PC
Optical FibreOne fibre - Singlemode

Primary Optical Launch Power-5dBm
Wavelength.....1310nm

Primary Optical Sensitivity-22dBm
Wavelength.....1310nm

Power Connection

Power supplyfrom plug in connection on the AMG2009 / AMG2015 subrack
Power consumption10 Watts max.

Ethernet Connection

Ethernet Data ConnectorRJ45
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 Channels9 channels

DATA CHANNEL A

Data Channel A1 channel
Data Connector.....RJ45

Channel A Interface On Board Data Interface – RS232, RS422 or RS485. Selected by slide switch below RJ45 connector.

 RS232 – switch position - high (closest to BNC connections)

 RS422 – switch position – middle

 RS485 – switch position – low (furthest from BNC connections)

DATA BANK B

Data/Audio Channels – BANK ANot Used

Data/Audio Channels – BANK B8 channels

Connector37-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 **AMG4787BE-SF** and rackmount equivalent **AMG4787BER-SF** 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 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.

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.

Bank B Data

Data Bank B channels are operational when fitted with appropriate daughter boards.

Data Interface Daughter Board Options

The data interface daughter board options are as follows:

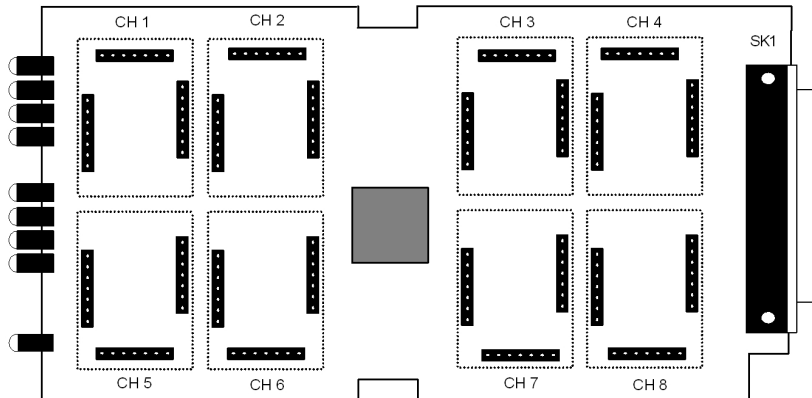
| Option Code 'x' | Part No. | Description |
|-----------------|----------|---|
| 0 | X12542 | 4 Wire Audio Interface Daughter Board |
| 1 | X04057 | RS422/485 Data Interface Daughter Board |
| 2 | X04049 | RS232 Data Interface Daughter Board |
| 3 | X04058 | 20mA Current Loop Data Interface Daughter 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:



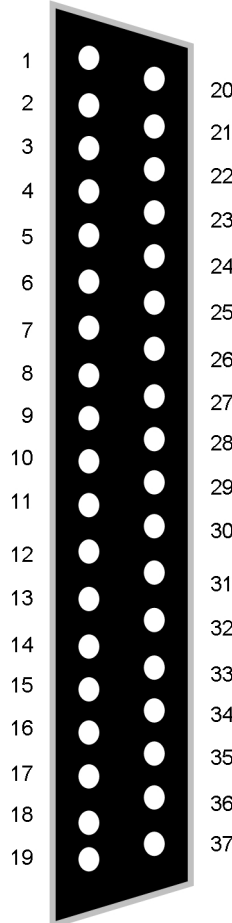
Data and Audio Daughter Board Fitting Instruction

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 + (A) | B |
| | 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.

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 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.

Front Panel Indicators

Power LED

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

Video Input LED's

| | | | |
|---------------------------|-------|---|---|
| Video Present CH1-8 | Green | - | video signal present on input BNC |
| | R/G | - | channel present but no video on I/P BNC |

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.

Physical Information

Dimensions

Height 3U Plug-in
Width 21HP
Depth 170mm excluding connectors
Weight 1200grams

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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