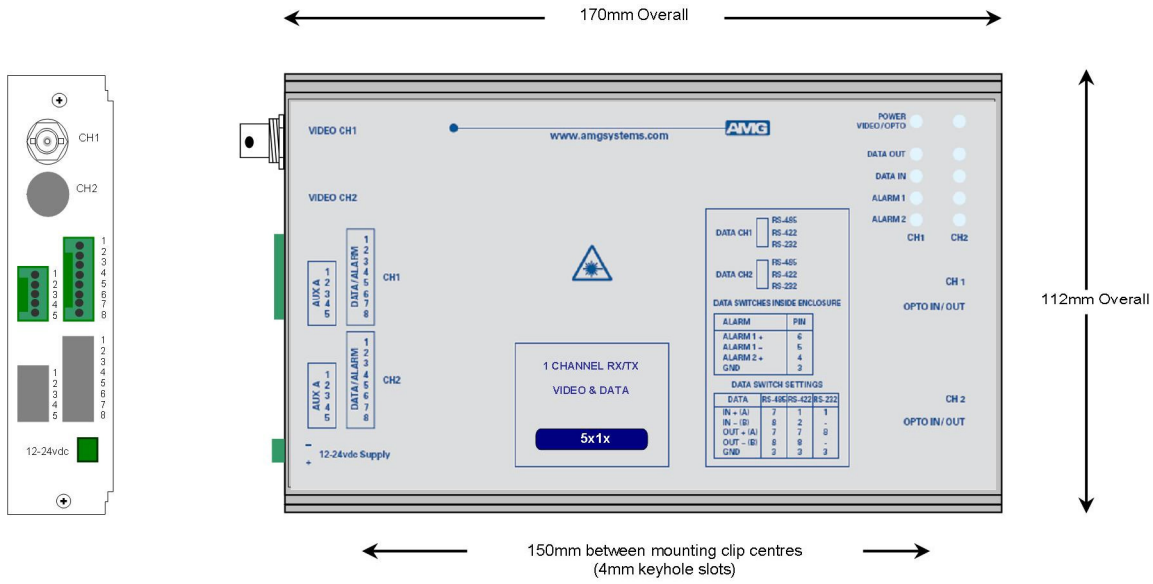
Single Channel Video Receive Unit with two Bi-directional Data Channels and two Uni-directional Alarms for a Multimode Fibre Link



The **AMG5616A1** is a standalone one channel video receive unit designed to receive 1 video signal plus 2 Uni-directional alarms, and transmit & receive 2 data signals over a single Multimode optical fibre.

The **AMG5616A1** is designed to be powered using an **AMG2001** standalone power supply.

The **AMG5616A1** is designed to operate with an **AMG5615A1 / AMG5615A1R** single channel video transmit unit in a point to point configuration. The R suffix in the partno. indicates a rackmount configuration.

An Auxiliary Expansion card is fitted to provide an additional Data channel (Aux. A).

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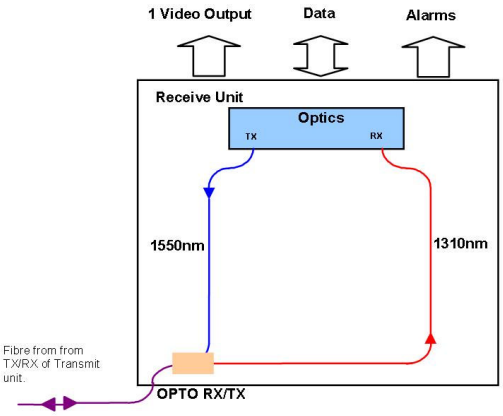
Contents

Introduction

Unit Functional Schematic

The **AMG5616A1** receives 1 video signal plus 2 data and 2 uni-directional alarm signals from an **AMG5615A1** transmit unit.

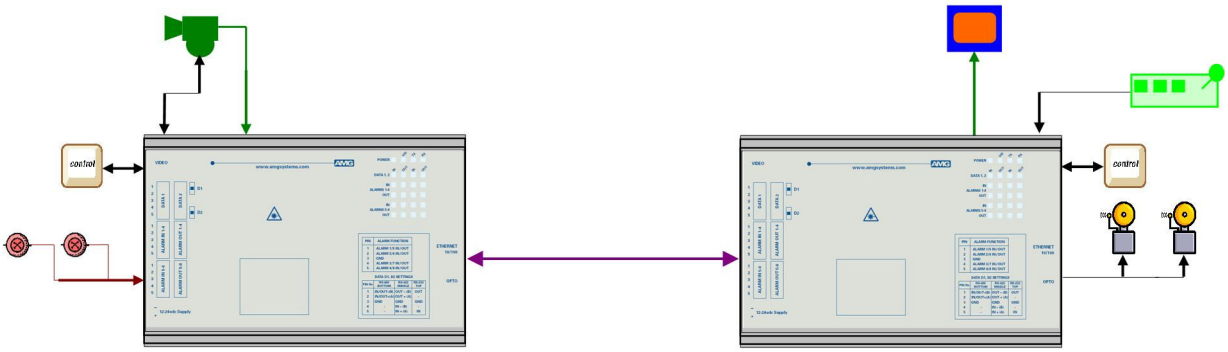
It also transmits 2 data signal to a **AMG5615A1**.



Optical Connection

The **AMG5616A1** connections are illustrated in the following example which shows an **AMG5615A1** transmit unit together with an **AMG5616A1** standalone receive unit configured as a single channel point to point system.

1 Channel Video, Data, Uni-directional Alarms



Connections

Video Output Connections

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

Optical Connections Multimode

No. of Optical Connections.....1 per video channel
Optical Fibre .....Multimode 50/125 or 62.5/125**
Connector .....SC/PC

Minimum Optical Launch Power.....-10dBm
Transmit Wavelength.....1550nm

Minimum Optical Sensitivity.....-30dBm
Receive Wavelength.....1310nm

Minimum Optical Dynamic Range .....20dB.

**Note: the transmission distance is limited by the bandwidth of the Multimode optical fibre. The optical data rate is 155Mbits/s, which may restrict operation to a maximum fibre length of 7km, although in most cases the units will operate successfully over longer fibre lengths. It is advisable however for distances greater than 7km, to have the optical fibre tested.

Power Connection

Connector Type .....Removable 2-pin, 3.81mm, Screw Terminal
Connector Partno.....Phoenix 1803578
Supply Voltage.....+12 to +15 Volts DC
Maximum Power .....2.5 Watts

Data and Alarm Channel Connections

No. of Data Channels .....One switchable RS-232 / RS-422 / RS-485
No. of Data Channels .....One selectable RS-422 / RS-485
No. of Alarms 2

Connectors .....Removable 5-pin, 8-pin, 2.5mm, Spring Terminal
Connector Partnos.....Phoenix 1881354, 1881383

Data Interface 1: .....RS-232, RS-422 or RS-485. Selected by slide switch inside enclosure. *See appropriate section on how to remove the case for access to the data switches

RS-485 – Switch Position - Top
RS-422 – Switch Position - Middle
RS-232 – Switch Position - Bottom

Data Interface 2: .....RS-422 or R-S485. Options Selected by DIL switch inside enclosure. *See separate Datasheet for Additional Data Interface Settings with the data switches

Alarm Outputs Solid-state Relay, maximum 150mA at 125Vac/dc, Ron < 6.5Ω

Front Panel Indicators

Power LED

Power / Video / Opto	Green	-	Video present & opto sync.
	R/G	-	Opto sync. but no video present.
	Red	-	No opto sync.
	Off	-	No power applied to unit.

Low Speed Data LEDs

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

IN corresponds to the data signals being transmitted onto the optical fibre.

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

OUT corresponds to the data signals being received from the optical fibre.

Auxiliary Data LEDs

Data type depends on AMG system: RS-232, RS-422, RS-485, 20mA,TTL, or FTT-10A

Data Present IN	Green	-	Data channel present but not transmitting
	R/G	-	Data channel transmitting
	Off	-	Data channel not present or no connection

IN corresponds to the data signals being transmitted onto the optical fibre.

Data Present OUT	Green	-	Data channel present but not transmitting
	R/G	-	Data channel receiving
	Off	-	Data channel not present or no connection

OUT corresponds to the data signals being received from the optical fibre.

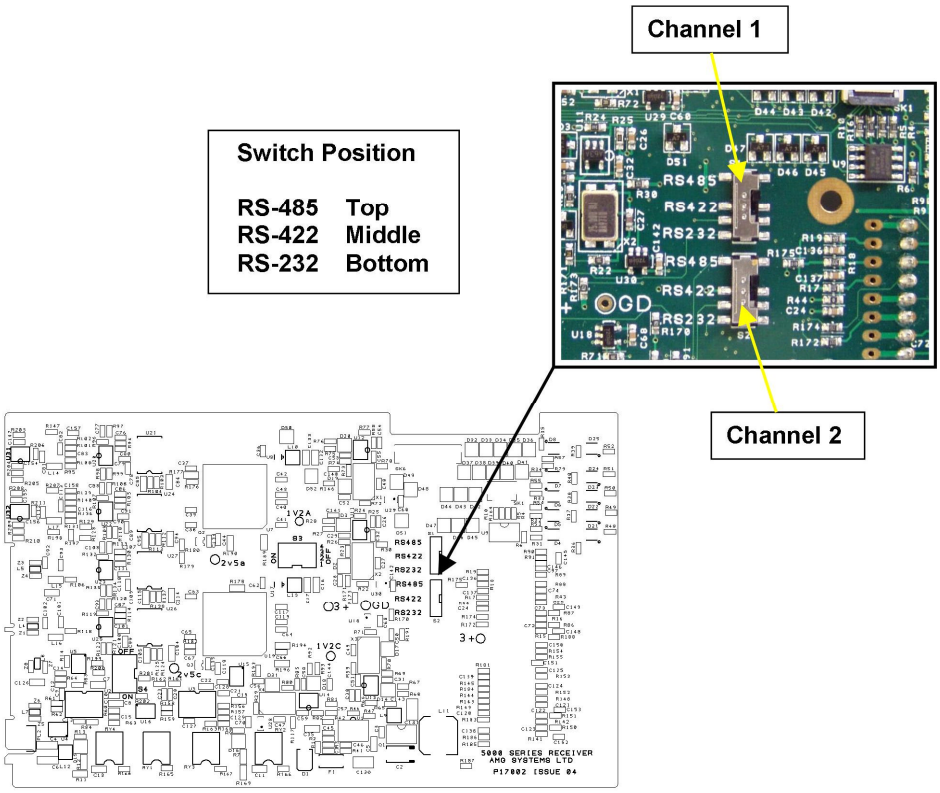
Alarm LEDs

ALARM 1 OUT.....	Green	-	Alarm ON / Contacts closed.
	Off	-	Alarm OFF / Contacts open.
ALARM 2 OUT.....	Green	-	Alarm ON / Contacts closed.
	Off	-	Alarm OFF / Contacts open.

Data and Alarm Channel Configuration

The **AMG5616A1** sends and receives data to/from one **AMG5615A1** or **AMG5615A1R** rackmount equivalent single channel transmit unit. The physical data interface RS-485, RS-422 or RS-232 is selectable by the user with the slide switch mounted on the main PCB inside the enclosure.

2 uni-directional alarms are also provided, each of which can receive an on/off signal from an **AMG5615A1** and are typically used to convey contact closure status. Each alarm output uses a Solid-state relay, with a maximum load current of 150mA at 125Vac/dc and Ron < 6.5Ω.



Data Channel Configuration

Each low speed data channel provides an RS-232, RS-422 (full duplex, four wire) or RS-485 (half duplex, two wire) interface defined by the corresponding mode switch inside the enclosure. Every data channel as shipped from the factory is set up for RS-485 operation unless otherwise requested.

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 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 0 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 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 multiple terminated as required to ensure that a tri-state level is detected.

The system detects a tri-state input condition on the data channel bus when in RS-485 or RS-422 mode.

Data Interface Connections

Connector Pin No.	Data Channel		
	RS-485 [switch top]	RS-422 [switch middle]	RS-232 [switch bottom]
1		IN + (A)	IN
2		IN - (B)	
3	GND	GND	GND
4			
5			
6			
7	IN/OUT + (A)	OUT + (A)	
8	IN/OUT - (B)	OUT - (B)	OUT

Note: (A) or (B) in brackets in the above table refers to RS-485 / RS-422 data specification.

Alarm Channel Configuration

The **AMG5616A1** provides 2 uni-directional alarm outputs.

Each alarm output uses a solid-state relay, maximum current 150mA at 125Vac/dc and Ron < 6.5Ω.

Alarm Output 1 : Provides a pair of normally open, volt-free contacts.
Alarm Output 2 : Provides a normally open, switched contact to Ground (0V / GND).

Alarm Interface Connections

Connector Pin No.	Alarm Interface	
	Alarm 1	Alarm 2
1		
2		
3		ALARM 2 GND
4		ALARM 2 OUT +
5	ALARM 1 OUT -	
6	ALARM 1 OUT +	
7		
8		

Auxiliary RS-422/RS-485 Data Channel Configuration

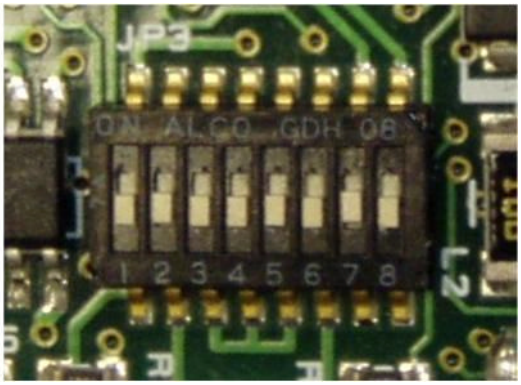
The **AMG5616A1** receive unit sends and receives Echelon FTT-10A data to/from an **AMG5615A1** or rackmount equivalent **AMG5615A1R** transmit unit.

The auxiliary data channel is provided by an X04057 RS-422/RS-485 Daughter Board. It is used when an additional RS-422 or RS-485 data interface is required and provides one bi-directional RS-422 or RS-485 data channel.

The X04057 daughter board is pre-configured at manufacture using the multiway 8-way DIP switch JP3. It is set to RS-485 mode by default. This switch is not usually accessable by the user, and the following instructions are for INFORMATION only.

ON

OFF



The switch functions are as follows: Default (RS-485) settings are shown in the last column.

SW. No.	Function	RS-422	RS-485	DEFAULT
1.	Mode Selection - PCB Identification	Off	On	**On**
2.	390Ω RX- Pre-bias to +5V. Note when off, the pre-bias is set at 10kΩ to +5V.	Off	On	Off
3.	390Ω RX+ Pre-bias to gnd. (note when off pre-bias set at 10kΩ to GND)	Off	On	Off
4.	120Ω RX termination	Off	On	Off
5.	RX+ connected to TX+	Off	On	**On**
6.	RX- connected to TX-	Off	On	**On**
7.	TX data enabled from logic one on the data stream. TX output tri-state after 5µs of a logic zero. See Note 1.	Off	On	**On**
8.	RX data disabled when TX enabled	Off	On	**On**

Note 1: Resistor R7 = 1kΩ for 5µS Tx dwell time. (10kΩ for 50µs)

The switches are used as follows:

SW. No.	4 Wire RS-422 Point to Point	4 Wire RS-422 Bussed	DEFAULT 2 wire RS-485
1.			On
2.			
3.			
4.			
5.			On
6.			On
7.		On	On
8.			On

Additional 120Ω Termination	Additional High Bias
	On
	On
On	

Data Interface Connections

Connecter Pin No	RS-422	RS-485
1	OUT + (A)	IN/OUT + (A)
2	OUT - (B)	IN/OUT - (B)
3	GND	GND
4	IN + (A)	IN/OUT + (A)
5	IN - (B)	IN/OUT - (B)

Physical Information

Dimensions

Height.....112mm
Width.....170mm (excluding connectors)
Depth 35mm
Weight.....750grams

Mounting Details

The AMG unit is supplied with a clip-on mounting bracket which should be attached to a panel or wall using 2 off 4.0mm screws, see diagram on page 1 for dimensions. The unit is clipped into the mounting bracket, and is then held firmly in position.

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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