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A CLEAR-COM COMPANY

Intercom
Messenger

Implementation Guide

ISSUE 1.3

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Issue	Date	Reason for Change	Approved
0.9	27 October 2016	Enhanced section 3.2 GPI; new logo	
1.0	5 December 2016	Updated screenshots	
1.1	14 January 2017	Correct table P12	
1.2	11 March 2017	Updated logo, title page, header, footer	
1.3	06 April 2017	Minor errors corrected	

CONTENTS

1. INTRODUCTION

Messenger fulfils the need for a cost effective intercom solution without the installation, operational and future expansion constraints of more traditional 2 and 4 wire systems. From the factory configured Base System, Messenger can evolve to suit the emerging communication needs of the organisation.

At the heart of a Messenger system, the central matrix combines best of breed intercom functionality and expansion possibilities with the reduced cost of an entry level product. It offers full software programmability, choice of operator panels and other devices but has built-in IP capability.

Flexibility is the key to managing future requirements, and Messenger's architecture allows you to develop the system as and when you wish, whether it is for a simple studio or OB, or a more complex multi-site intercom operation.

A single Messenger matrix can be expanded at any time to 16 or 24 panel / 4 wire ports and up to 4 channels of analogue telephone interfacing. For larger requirements, multiple Messenger matrices can be interconnected via the optional IP gateway over any standard network, utilising Trilogy's proven IP based communications technology. This enables systems to be connected over multiple sites or to other current or legacy Trilogy systems including Gemini, Commander or Orator.

1.1 RELATED DOCUMENTS

Document	Description	Document	Description
70090622	Gateway Configuration Guide	70090628	Control Panel Installation Guide
70090620	Gemini Implementation Guide	*70090626*	*Messenger Implementation Guide - This Document*
70090630	Gemini Quick Start Guide	70090627	Messenger Quick Start Guide

1.2 SYSTEM IMPLEMENTATION

This manual provides installation information for the Messenger system. Cabling and pin-out information is included for all of the Trilogy manufactured items plus some commonly used third party equipment. Other information relating to the hardware configuration will be useful if the system is upgraded or expanded in the future.

- **Section 2** covers the matrix assembly and installation, to the point where the matrix may be powered
- **Section 3** covers all of the cabling necessary to complete the installation.
- **Section 4** covers the Talkback Controller Application (TBC), which manages all audio and IP routes.
- **Section 5** provides information on installing other equipment (e.g. telephones, radio talkback).
- **Section 6** gives the system specification for matrix hardware, control panels and the configuration computer.

For further assistance please contact Trilogy Communications Technical Support Department at the address given at the front of this document. You may also contact us via the Broadcast Division website at www.trilogycomms.com or directly by e-mail at:broadcastsupport@trilogycomms.com.

1.3 OPTIONS AVAILABLE AND MODULE TYPE NUMBERS

Please contact our Sales Department for a complete listing of the current module types.
Each Messenger matrix unit is available with 1, 2, 3 or 4 option boards, providing 8, 16 or 24 ports plus an optional FXO telephony board. The second (redundant spare) power supply and the additional DSP are also available as options, either with the initial purchase or later.

Order Code	Description
700-20-02	Redundant Power Supply Module
700-11-01	Audio expansion board, 8 channel
700-12-01	GPI Board, 16 GPI in plus 16 GPI out
700-15-03	Telephone Interface Board, 4 channel FXO
700-13-03	24 channel DSP Module

The optional Configuration software application, Gateway, may be purchased at any time. Two versions are offered, as shown below.

Order Code	Description
700-65-00	Gateway for a single Messenger matrix
700-65-01	Gateway for multiple network connected matrices

Gateway is a modular application and additional features of the Messenger platform are unlocked when appropriate extra key-codes are entered via Gateway.

Order Code	Description
700-65-20	Gateway upgrade keycode to allow live changes
700-65-21	Gateway upgrade keycode to allow SIP connectivity
700-65-10	Gateway upgrade keycode, from version 700-65-00 to 700-65-01

Due to the nature of talkback systems, any given installation may have some custom items. Trilogy Communications prides itself on its ability to tailor standard components to meet specific requirements and is willing to discuss any other customisation as required.

2. INSTALLATION

2.1 INTRODUCTION

Follow the sequence below, step by step, to install the Messenger matrix.

- Unpack the matrix.
- Set the Messenger IP address.
- Fit the matrix frame into the equipment bay.
- Apply power to the system and check basic operation.
- Connect control panels and check operation with the supplied configuration.

2.2 UNPACKING

Carefully unpack the equipment from its transit material and check each item for signs of damage.

Check the contents of the boxes against our despatch note and your original order to ensure that you have received the correct parts.

In the event that the unit has been damaged or does not match your order, immediately contact your supplier or Trilogy Communications at the address given at the front of this guide.

2.3 RACK MOUNTING

The matrix is 19" rack mounted, and occupies 2U. The depth of each chassis (excluding mating connectors) is 375 mm. Control Panels are standard 19" rack mounting units; most panels are 2U although a series of 1U panel are available along with freestanding desktop panels.

Suitable care should be taken with cooling and ventilation within the equipment bay. The air inlet is on the right side of the chassis, towards the rear, as viewed from behind. Exhaust is on the left side, close to the front. Take care not to obscure the vents. Refer to the image below or contact Trilogy Communications for further details.

VIEW FROM ABOVE

FRONT OF RACK

Messenger

EXHAUST

INLET

REAR OF RACK
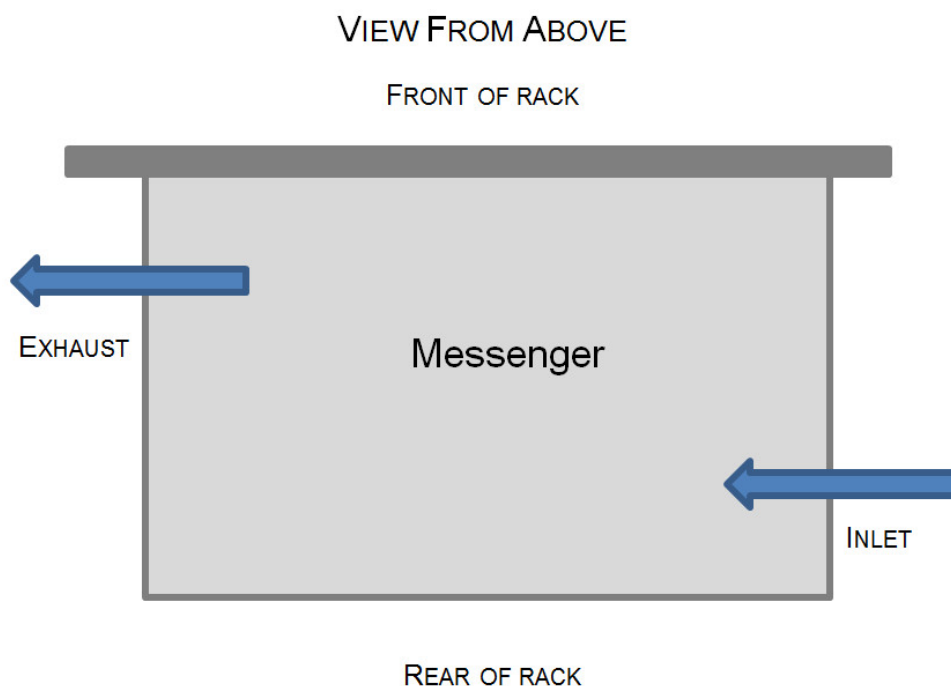
2.4 EARTHING REQUIREMENTS

Each chassis is provided with a single 4mm-earthing stud on the rear panel. Incoming mains earth from the IEC connector is internally bonded to both the chassis and technical 0V to meet safety requirements and performance specifications. The stud allows the addition of an earth strap in rack installations.

2.5 MAINS CONNECTION AND SAFETY

Important
Power Supply Cord Used as Disconnect Means

CAUTION: THE POWER SUPPLY CORD IS USED AS THE MAIN DISCONNECT DEVICE. ENSURE THAT THE SOCKET-OUTLET IS LOCATED / INSTALLED NEAR THE EQUIPMENT AND IS EASILY ACCESSIBLE.

ATTENTION: LE CORDON D'ALIMENTATION EST UTILISÉ COMME INTERRUPTEUR GÉNÉRAL. LA PRISE DE COURANT DOIT ÊTRE SITUÉE OU INSTALLÉE À PROXIMITÉ DE L'ÉQUIPMENT ET ÊTRE FACILE D'ACCÉS.

The power supplies within the unit are a switched mode design and will cope automatically with a wide input voltage range (see specification, section 6). There are no user accessible fuses on the power supply. The power supplies are crowbar protected against short circuits of the matrix electronics.

The standard Messenger is fitted with a single mains power supply unit (PSU), with an option to fit a second PSU. Each power supply has its own, dedicated, IEC mains plug on the rear of the chassis. These should be wired according to the instructions provided with a mating mains socket using suitable cable. See above for earthing requirements.

Mains cable conductors are to be three-core (two-wire with ground), wire gauge 18 AWG (cross sectional area 0.75mm²) Jacket to be type SJT.

Covers are only to be removed by trained personnel. Shock hazard exists with covers removed; therefore disconnect mains supply before removal. Interconnection between circuit boards and panels are all safety extra low voltage (SELV) as defined by IEC/EN/CSA/UL 60950-1-200X. The equipment signal connections must only be connected to SELV circuits to prevent hazards from improper connection.

2.6 STARTING THE SYSTEM

Messenger is designed to operate as a standalone matrix, without any connection to a local IP network. If you have purchased the optional Gateway configuration software, we would recommend that this is installed on a separate PC or laptop, and Messenger should then be connected over IP to facilitate configuration updates.

To allow Messenger to join your network, or to carry out configuration updates supplied by Trilogy Technical Support, there are three possible approaches:

- Connect a local keyboard, mouse and monitor to Messenger
- Connect Messenger to a shared keyboard, mouse and monitor using an existing KVM switch
- Temporarily connect a keyboard, mouse and monitor as suggested above. Then assign appropriate static IP addresses and connect Messenger to your local network. You can then carry out any administration and monitoring tasks from another PC on your network using Windows Remote Desktop Protocol (RDP).

The first approach is often the simplest for an initial setup.

2.7 INITIAL WINDOWS SETUP OF MESSENGER

When Messenger runs for the first time, Windows will take you through a series of steps to create a new account. The account that you create will be your backup account, so the choice of username and password is your own, but please record these carefully in case they are needed in the future.

The primary account is pre-installed and once the initial sequence has completed, please log-in to Windows using the following credentials: *trilogy | trilogy*

From the "start" menu, go to Control Panel and change the IP address to a fixed IP which is suitable for your application. You can choose to connect to your company network, or simply to create your own network using an unmanaged Ethernet switch. Whatever you choose, take a note of the network settings and be consistent when using them later. At this point, you should allocate a second IP address to be used for VoIP traffic. Make a note of this – you will need it later.

2.7.1 Database and database supervisor

The database running on Messenger is managed by a Windows service named "Trilogy Database Supervisor". This service is loaded automatically every time Messenger boots up, and it then runs in the background.

A small graphical application is also provided as part of the installation. This allows you to monitor the current status of the database and to perform routine maintenance and troubleshooting. It will launch automatically at start up. When it is run, a small additional icon will be displayed in the Windows system tray adjacent to the clock. On double clicking the icon, the database supervisor will be displayed

As stated previously, once configuration is complete and no further changes are required, a single Messenger can operate stand-alone. Since the Messenger software is designed to run as a service, under a Windows System account, you do not normally need to log in to Windows and the keyboard and monitor may be removed.
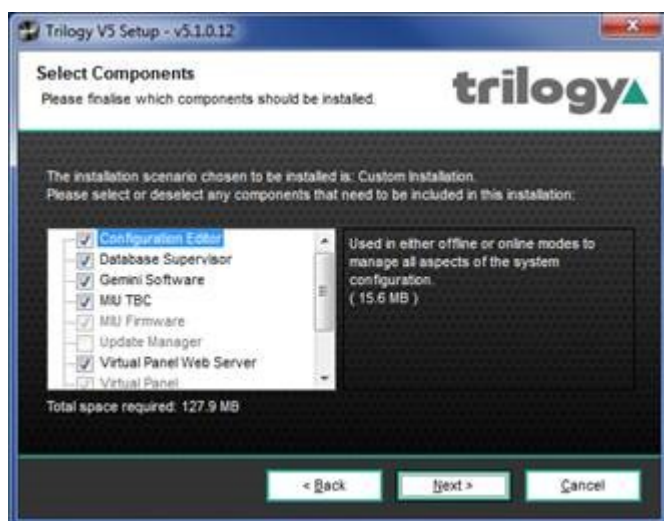
2.8 GATEWAY CONFIGURATION SOFTWARE

Messenger is designed to run as a standalone intercom matrix, and all essential software is pre-installed. Configuration is carried out using Gateway, the Configuration Editor application which is shared with the Trilogy IP intercom product range. Gateway can be closed down when not required.

We would recommend that Gateway is installed on a separate PC or laptop, and a specification is provided at the end of this manual.

2.8.1 Installing Gateway on your PC

The software is normally provided on a CD which will auto-run when loaded into the optical drive on your PC. For security reasons, your PC may not allow discs to auto-run; in this case, use Windows Explorer to browse to the "Software" folder of the CD and double click the file "TrilogyV5Setup.exe".

When the installation application appears, we suggest that you accept the default options on most of the screens.

The Gateway Configuration Editor connects to a database, but for an installation which only consists of Messenger, the database will be pre-installed on one Messenger matrix. In this case, you should only install the Configuration Editor component as shown below.
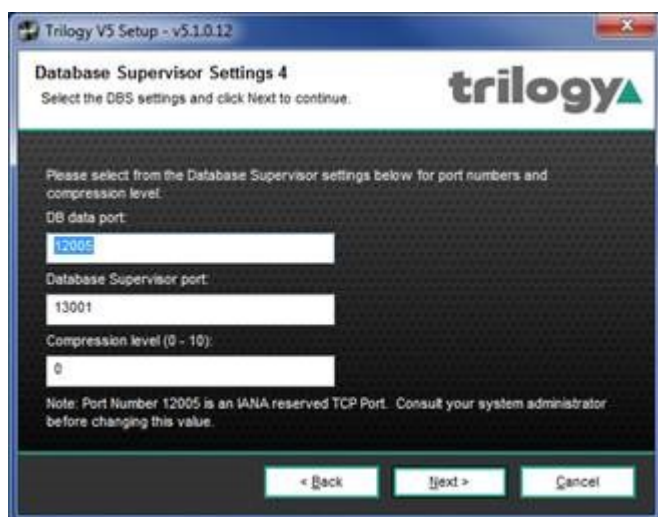
On the screen which requests the address of the database, select "Use fixed IP" and enter the Windows IP address of the Messenger which is hosting the database.

On all other screens, we suggest that you accept the default values offered. There is no need to restart your PC once the installation is complete.

2.8.2 Software Features

When first run, Gateway will prompt you for a feature unlock code. The code is supplied with your original purchase CD and you should keep this safe for any future re-installation. Additional paid for features may be unlocked by entering a new code.
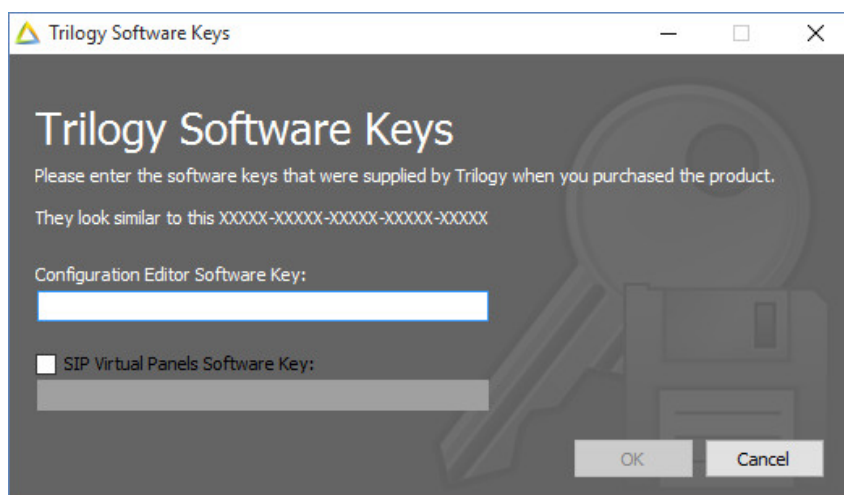
2.8.3 Firewall

Following installation of the software as described above it will be necessary to open a number of ports on the computer firewall. It is beyond the scope of this document to describe in detail how to do this due to the range of operating systems, use of Windows or third-party firewall applications, and the differing permissions which may be granted to Windows users or administrators.

The most common scenario is the Windows firewall and this requires the following rules to be added for inbound ports:

- TCP 12005
- TCP 12006
- TCP 13001

Please contact your IT Administrator or Trilogy Technical Support for further assistance.

2.8.4 Using Gateway

The default log-in credentials are: *Admin | trilogy*

For further information please refer to the Gateway Configuration Guide, Document 70090622, supplied on CD.

3. CONNECTING TO MESSENGER

3.1 CONNECTING TO MESSENGER

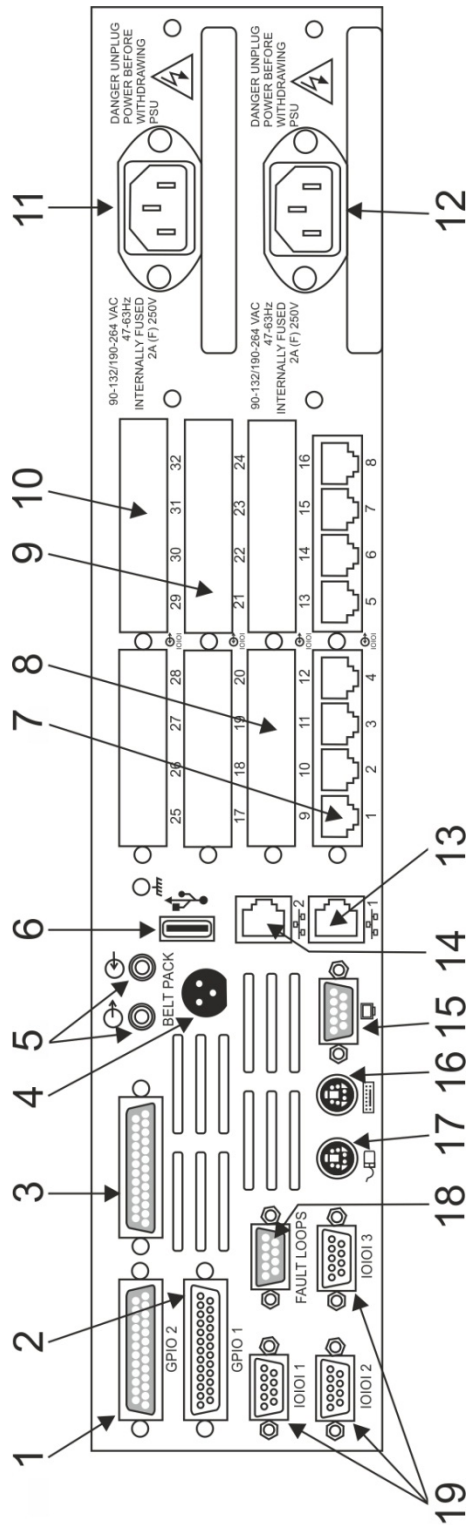Following are the minimum connections required for initial operation:

- Matrix ports (panels and 4 wires). See 3.2.1 below.
- IP Network link to a suitable PC, running the Gateway editor software.
- Mains (one or two connectors)

**MESSENGER:
REAR PANEL**

Item	Description	Connector on chassis
1	GPI Output 1 – 2 (†1)	D25 socket
2	GPI Input 1 – 2 (†1)	D25 plug
3	Camera Mix	D25 socket
4	Aux Power	Hirose 3 pin socket
5	PC audio (†2)	3.5mm jack
6	USB	USB
7	Port 1 - 8	RJ45 x 8
8	Port 9 - 16	RJ45 x 8
9	Port 17 - 24	RJ45 x 8
10	Port 25 - 32	RJ45 x 8
11	Power Supply 1	IEC
12	Power Supply 2	IEC
13	LAN	RJ45
14	Aux LAN (not used)	RJ45
15	Monitor VGA	D
16	Keyboard	PS2
17	Mouse	PS2
18	Fault Loop	D9 socket.
19	COM Port 1,2,3	D9 plug (x3)

Notes:

†1 – Messenger is normally equipped with 2 GPI inputs plus 2 GPI outputs. An optional GPI Expansion board may be factory fitted to increase this to 16 inputs plus 16 outputs.

†2 – the audio from the internal motherboard is not used in most intercom systems.

3.2 CONNECTION DETAIL

3.2.1 Matrix Ports

Port 1 is the bottom left connector, port 8 is at the bottom right; port 25 is the top left and port 32 the top right, as viewed from the rear of Messenger.

Connector type: Chassis mounted RJ45.

RJ-45 Pin	Function		Cable
1	Matrix Data in +	Panel Data out	Pair 1
2	Matrix Data in -		
3	Matrix Data out +	Panel Data in	Pair 2
6	Matrix Data out -		
5	Matrix Audio in +	Panel Audio out	Pair 3
4	Matrix Audio in -		
7	Matrix Audio out +	Panel Audio in	Pair 4
8	Matrix Audio out -		
shell	Cable Screen		

3.2.2 Auxiliary Power Output

Auxiliary power, suitable for Trilogy wired Beltpacks, is provided on the rear of each Messenger. Internal fuses are self-resetting.

Connector type: Chassis mounted 3 pin Hirose socket.

Pin	Function
1	+12 VDC, ±0.5 V, fuse protected at 450 mA.
2	Ground
3	-12 VDC, ±0.5 V, fuse protected at 200 mA.
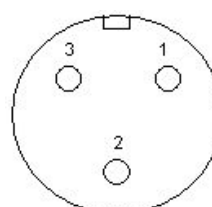
3.2.3 Camera Mix Connector

This connector provides a mixing pad for up to 6 inputs from cameras, plus a 6 output audio distribution amplifier to supply talkback to a group of cameras.

The corresponding system port is the last port of the uppermost (highest numbered) fitted AEB.

- Example 1: a Messenger fitted with just two AEBs will have the Camera Mix port located at # 16.
- Example 2: a Messenger fitted with three AEB plus a single FXO will place the Camera Mix at # 24.

To use the camera mix facility, the port must be configured in software as a 4 wire circuit. Connect signals to *either* the camera mix D type connector, *or* the corresponding RJ45 matrix port, but not both.

Connector type: Chassis mounted D25 socket.

Pin	Function		Pin	Function
1	Screen/Chassis			
2	From Cam 1 audio +	….paired with…….	14	From Cam 1 audio -
3	From Cam 2 audio +	….paired with…….	15	From Cam 2 audio -
4	From Cam 3 audio +	….paired with…….	16	From Cam 3 audio -
5	From Cam 4 audio +	….paired with…….	17	From Cam 4 audio -
6	From Cam 5 audio +	….paired with…….	18	From Cam 5 audio -
7	From Cam 6 audio +	….paired with…….	19	From Cam 6 audio -
8	To Cam 1 audio +	….paired with…….	20	To Cam 1 audio -
9	To Cam 2 audio +	….paired with…….	21	To Cam 2 audio -
10	To Cam 3 audio +	….paired with…….	22	To Cam 3 audio -
11	To Cam 4 audio +	….paired with…….	23	To Cam 4 audio -
12	To Cam 5 audio +	….paired with…….	24	To Cam 5 audio -
13	To Cam 6 audio +	….paired with…….	25	To Cam 6 audio -

3.2.4 Fault Loop

A single general purpose fault loop indicates that a fault condition exists. The possible states are given in the table below.

Fault Condition	State
All OK	Short circuit (closed)
Fan Fail	Alternating open / closed
PSU 1 Present but failed	Open circuit
PSU 2 Present but failed	Open circuit

Connector type: Chassis mounted D9 socket.

Pin	Function
1	Chassis Ground
2	General fail -
6	General fail +
3,4,5,7,8,9	No connection

### 3.2.5 General Purpose Interface (GPI) Inputs, default configuration

By default, Messenger supports two GPI inputs plus two GPI outputs. An optional GPI board providing 16 GPI inputs plus 16 GPI outputs may be factory fitted at time of purchase. Please refer to section 3.3 for details.

Connector type: Chassis mounted D25 plug.

Pin	Function
6	Input 1
13	Supply out (+5V)
19	Input 2
23	Reference voltage in (+5V max) († Note1).
25	Input Common
All other pins	No connection

†Note 1. Pin 23 **must** be connected to a reference voltage. A suitable voltage is provided on pin 13, which should then be linked to pin 23. Alternatively, an external reference voltage may be connected to pin 23, taking note of the +5V maximum.

GPI Input Wiring using
Messenger provided reference
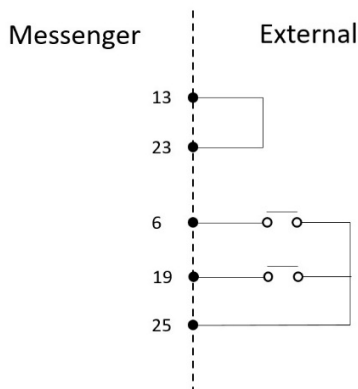
GPI Input Wiring using
external reference
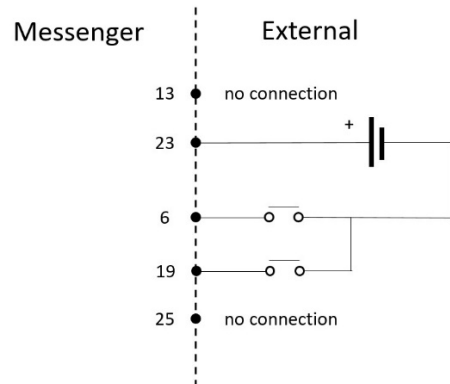
Inputs are activated by a closure to ground shown above as a push button. In the scenario on the right, and in practice, activation may be achieved by connecting a "grounding" voltage to pin 6 or 19. For activation to occur, this voltage must be <1.0V.

Input Specification:

Input Activation	<1.0V with respect to unit 0V.
Absolute Maximum Voltage	+5V.

3.2.6 General Purpose Interface (GPI) Outputs default configuration

Connector type: Chassis mounted D25 socket.

Pin	Function
6	Output 1+
7	Output 2+
18	Output 1-
19	Output 2-
All other pins	No connection

Output Wiring
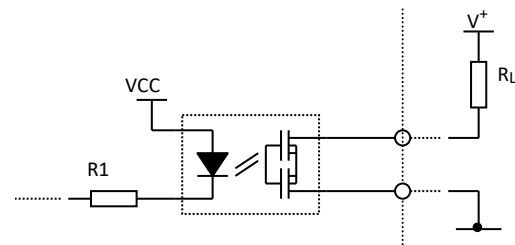
Output Specification:

Absolute Maximum Load Voltage	+40V
Absolute Maximum Load Current	160mA

Please see 3.3 for the wiring arrangement of the optional 700-12-01 GPI expansion module.

3.3 700-12-01 |16 CHANNEL GPI INPUT AND GPI OUTPUT OPTION

This factory fitted option replaces the default 2 input, 2 output configuration shown in 3.2.5 and 0. The inputs are factory configured to operate as opto-isolated circuits while the outputs provide a mix of Darlington and opto-isolated circuits. They may be re-configured to operate as TTL type circuits: please contact Trilogy Technical Support for information.

3.3.1 16 channel General Purpose Interface (GPI) Inputs

Inputs are numbered 0 to 15 and are opto-isolator type. Appropriate "V+" pins must be connected to +5 V or an external supply (+5 to +12 V DC). An opto input is "made" by connecting the pin to 0V.

Connector type: D25 chassis plug

| Pin	Input	Pin	Input
1	0	14	1
2	2	15	3
3	4	16	5
4	6	17	7
5	Common 0 V	18	V+ (0-7)
6	6	19	9
7	10	20	11
8	12	21	13
9	14	22	15
10	Common 0 V	23	V+ (8-15)
11	Common 0 V	24	Common 0 V
12	+5 V Out	25	Common 0 V
13	+5 V Out		

3.3.2 16 channel General Purpose Interface (GPI) Outputs

Outputs are numbered 0 to 15: 0 to 7 are Darlington outputs which are returned to a separate 0V (pin 5).
Outputs 8 to 15 are opto outputs and are fully floating, rated 40V, 160mA.

Connector type: D25 chassis socket

Pin	Output		Pin	Output
1	Darlington 0		14	Darlington 1
2	Darlington 2		15	Darlington 3
3	Darlington 4		16	Darlington 5
4	Darlington 6		17	Darlington 7
5	Darlington 0 V			
6	OP 8 +ve	....paired with.......	18	OP 8 -ve
7	OP 9 +ve	....paired with.......	19	OP 9 -ve
8	OP 10 +ve	....paired with.......	20	OP 10 -ve
9	OP 11 +ve	....paired with.......	21	OP 11 -ve
10	OP 12 +ve	....paired with.......	22	OP 12 -ve
11	OP 13 +ve	....paired with.......	23	OP 13 -ve
12	OP 14 +ve	....paired with.......	24	OP 14 -ve
13	OP 15 +ve	....paired with.......	25	OP 15 -ve

GPI Output Wiring
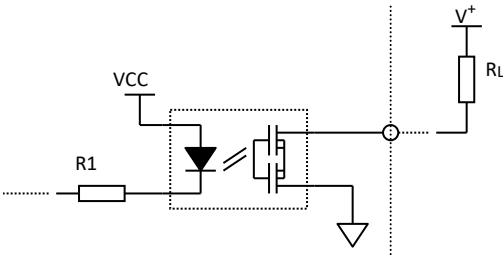
Output 1-8 (Common Ground)   Output 9-16 (Floating)
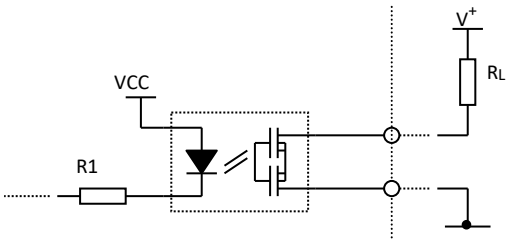
3.4 700-15-03 | 4 CHANNEL FXO ANALOGUE TELEPHONE INTERFACE OPTION

FXO denotes Foreign EXchange Office, meaning that connection should be made to external circuits as opposed to handsets or subscriber devices.

The optional module provides:
- 4 x RJ12 analogue telephone ports to be connected to PTT circuits either directly or via a suitable in-house phone system
- 4 x RJ12 bypass ports which (in the event of a power failure) connect to the adjacent port to enable emergency dial-out capability
- Software Selectable Loop Start or Ground Start Signalling
- Software Selectable Telephony Termination (CTR21, 600Ω, 900Ω, Japan)

Connector type RJ12

Pin	Function/Pin Name
1	NC
2	NC
3	Ring (Switched on phone connector)
4	Tip (Switched on phone connector)
5	NC
6	NC

All pins labeled "NC" are not connected internally. Your country or equipment supplier may use a different pin-out arrangement, so please check carefully if you are unable to establish calls.

4. TALKBACK CONTROLLER APPLICATION (TBC)

The TBC application manages all of the audio routes in real-time for the Messenger and for other Trilogy intercom matrices connected over IP. The application is made up of two parts:
- A Windows service which starts automatically when the system boots.
- A graphical component (GUI) which allows status monitoring of the TBC. This is a Windows executable (exe) which starts when a user is logged on to Windows. This is controlled by a shortcut in the "Startup" menu folder.

The TBC GUI is not required for intercom operation and the system will continue to operate if the GUI is closed. Intercom functionality is lost if the Windows service is stopped.

4.1 TBC ICON

When the TBC GUI is first started, it runs minimised and visible as an icon in the system tray, adjacent to the clock in the lower right portion of the screen. The icon will appear in one of three colours, dependent on the current state.

Colour	Description
Red	The configuration is loaded but the application cannot communicate with the hardware.
Yellow	The VoIP audio card is unable to communicate with network.
Green	The application is operating correctly.

The red and yellow states are a normal part of the boot up sequence and may be displayed for up to one minute while the hardware and software initialise and the configuration is loaded. To display the TBC GUI on screen, double click the icon. If Messenger is not operating correctly, please see the TBC troubleshooting tips in section 4.3.

4.2 TBC GUI

4.2.1 TBC Status tab

During normal operation, the TBC GUI displays all green indicators, as shown below.
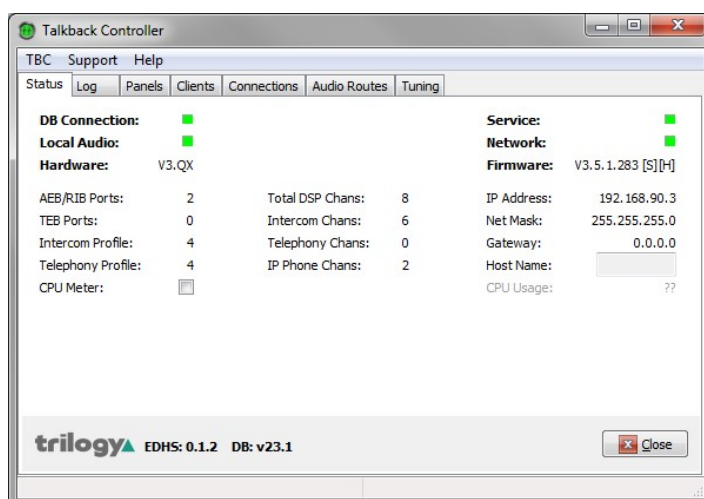
A full explanation of the information on this tab is provided in section 4.4.1.

4.2.2 TBC Log tab

The log screen displays a sequence of messages as the system initialises. During normal operation, no further messages will appear, unless additional logging has been enabled. This is not normally required. A typical log screen is shown below.
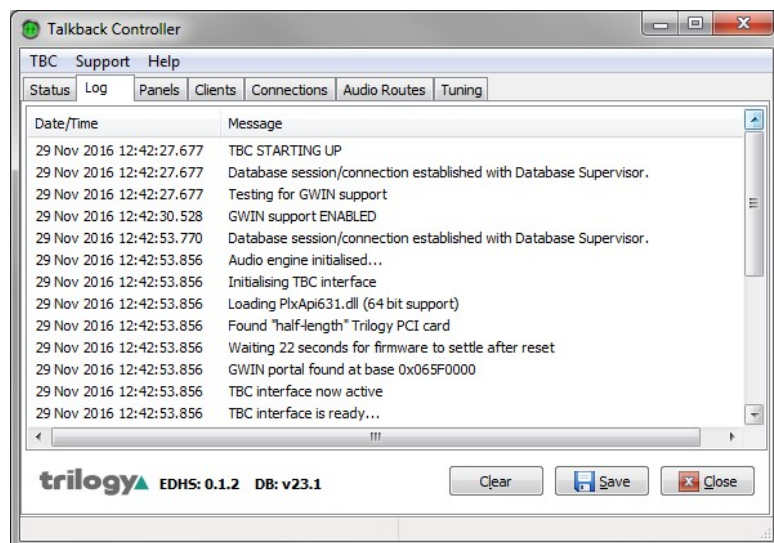
4.2.3 TBC – Additional tabs

These provide information about:

- *Card List* shows the option cards fitted in Messenger
- *Panels* connected to the system
- Additional software *Clients* connected. This will normally be blank
- External *Connections* over IP audio. This will remain blank unless Messenger is linked over IP to other Trilogy intercom matrices
- Local *Audio Routes* made across the Messenger matrix in real time
- The *Tuning* tab is not used.

4.2.4 TBC – TBC Menu

The options available on this menu are set correctly for a single, standalone Messenger intercom. If Messenger is part of a larger, IP based Trilogy system, two settings may alter:
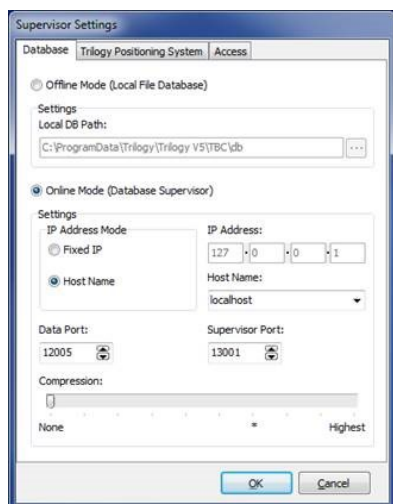
This sets the address of the database. A single Messenger is configured to run its own database application (see section xx). For a larger system, it is preferable to use a central database application running on a PC or server. In this case, the value will change.

Note the use of the terms "*127.0.0.1" or "localhost*" to denote the server location. This is "IT shorthand" for "this machine" and is also known as the loopback address. The address entered in this field always relates to Windows, not the VoIP audio card.
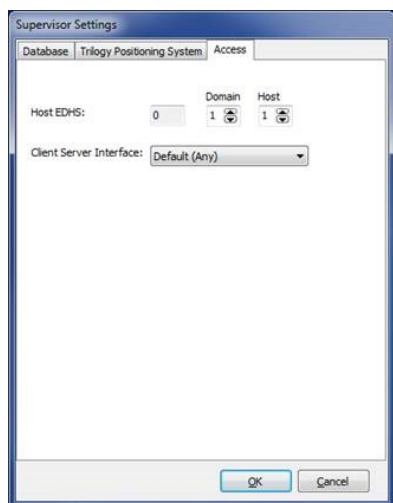
The Host address (or EDH value) of a single Messenger is 0.1.1. As part of a larger overall system, this value may change.

4.3 TBC TROUBLESHOOTING

Problems with the TBC are indicated by the status icon remaining red or yellow in the period beyond initialisation and boot up. Most commonly, this will occur if a mismatch occurs between different areas of the hardware and software. If possible, examine the TBC log for more information. Review any changes which may have been made recently to the system, especially to IP settings. If you have the Gateway configuration editor, check and compare IP addresses as set under Windows networking and within your configuration file. If you do not have Gateway, configuration management is provided by the Database Supervisor application. This provides a limited ability to adjust IP settings within a factory supplied configuration. The default values for a system delivered from Trilogy are given below.

	Windows	VoIP audio card
IP Address	192.168.200.200	192.168.200.201
Subnet Mask	255.255.255.0	255.255.255.0
Default Gateway	[not set]	[not set]
Host (EDH) address	0.1.1	

4.4 TBC FIELD DEFINITIONS

4.4.1 TBC Status tab

Display Item	Description
Hardware Version	The hardware version.
Firmware Version	The firmware version.
Local Audio	An indicator to show the status of the local audio access ports and Digital Signal Processing (DSP) channels. Green = operating correctly; Red = not working correctly. If the indicator remains Red for more than one minute after the TBC starts, this normally indicates that the system configuration does not contain valid information for the Messenger (hardware does not match configuration).
AEB/RIB Ports	The physical number of Audio Expansion Board (AEB) ports.
TEB Ports	The number of Telephone Expansion Board (TEB) ports detected.
Intercom Profile	The coding profile used for intercom. Specified using the Configuration Editor.
Telephony Profile	The coding profile used for telephony. Specified using the Configuration Editor.
Total DSP Chan's	The total number of DSP channels available on the installed hardware.
Intercom Chan's	The number of DSP channels allocated to intercom.
Telephony Chan's	The number of DSP channels allocated to telephony (TEB).
IP Phone Chan's	The number of DSP channels allocated to IP.
Network	An indicator to show the status of the network. Green = connected; Red = not connected. This may also indicate a mismatch between IP addresses specified in the configuration and those set in Windows.
IP Address	The IP address of the internal VoIP audio card.
Net Mask	The subnet mask used by the audio card.
Gateway	The IP address of the gateway used by the audio card.
CPU Meter	Select this check box to enable the CPU Usage field.
CPU Usage	Shows the CPU usage (when enabled).

5. OTHER EQUIPMENT

5.1 BELTPACKS

Beltpacks may be connected to the matrix on ports configured as 4-wire. They require an external DC voltage supply, either single or dual rail, depending on the model. A 3 pin Hirose socket is provided on the rear of each matrix with ± 15V protected by an internal self-resetting fuse. See section 3.2.2 for connector details.

The table below show the different belt box types.

Type	No. of input channels (from matrix)	Fixed Connector type (to matrix)	Mating Connector type required (to matrix)	Supply voltage required (note 3)	Headset connector (socket)
410-50-12	1	XLR6 Male	XLR6 Female	+8.5V to +15V (note 3)	XLR5 Female
410-50-13	2	Hirose 12 Way Plug RM15TRD-12P	Hirose 12 Way Socket RM15TPD-12S	±8.5V to ± 15V (note 3)	XLR5 Female

Notes:
1. All beltpacks have one output channel (i.e. return to the matrix).
2. The beltpack press-to-talk (PTT) switch is normally momentary action. The -12 and -13 types may be ordered with a latching talk switch, using part codes 410-50-12-L & 410-50-13-L.
3. The beltpack will operate reliably on a wide range of supply voltages. Current consumption is approximately 30mA per beltpack. If powered from the matrix, knowledge of the resistivity of installed cable (Ω / 100 m) allows a simple calculation of likely voltage drop.

The following tables give individual connector pin-outs for each model.

410-50-12 Single Channel Beltpack Connection to Matrix	
XLR6 - Pin	Function
1,2 (+,-) pair	Audio output from box to matrix
3,4 (+,-) pair	Audio input to box from matrix
5	0V
6	+8.5V to +15V (see note 3 above)

410-50-13 Two Channel Beltpack Connection to Matrix	
Hirose 12 way - Pin	Function
1	Chassis
2,3 (+,-) pair	Audio 1 input to box (PTB)
4,5 (+,-) pair	Audio 2 input to box (Prog Snd)
6,7 (+,-) pair	Audio output from box to matrix
8	+8.5V to +15V (see note 3 above)
9	-8.5V to -15V (see note 3 above)
10	0V
11,12	n/c

All models Headset Connector (XLR5 Socket)	
Pin	Function
1	Mic in (screen)
2	Mic in (signal)
3	Headset Ground
4	Headset Out
5	Headset Out

5.2 RT EQUIPMENT

Radio Talkback equipment may be supplied by Trilogy as part of a complete system. It is not manufactured by Trilogy and will be supplied with the original equipment manuals.

The usual configuration consists of one or more base stations and a number of portable transceivers. The base stations are connected to the matrix using normal 4 wire audio ports according to the pin-out information in 3.2.1.

6. SPECIFICATION

Environmental	Power	Nominal 100-264 V AC. 47-63 Hz
		125 VA fully equipped
		Internal Fuse - 2A (F) 250 V
		IEC mains connector with retainer
	Dimensions (WxDxH)	483 mm (19") x 370 mm (14.5") x 88.9 mm (3.5")
	Weight	6 kg fully loaded (13.5lbs)
	Operating Temp	0 - 50ºC
	Humidity	0-90% Relative Humidity Non Condensing
	Shock	800g/1mS
	Vibration	5.0g (22 - 500Hz)
Connectors	USB - Front	USB 2, supports 1 unit load (100 mA)
	USB - Rear	USB 2, supports 5 unit loads (500 mA)
	PS2	2 (keyboard and mouse for setup only)
	SVGA	1 rear (for setup only)
	Ethernet- Normal Mode	1 x RJ45 - combined voice and data traffic via internal switch
	Auxiliary Audio	Mic in, Headphone out via 3.5mm jack (front)
		Aux In, Aux Out via 3.5mm jack (rear)
Audio	Frequency response (3dB points)	<25 Hz and >6600 Hz (16 kHz sampling)
	Distortion	<0.05% when routed locally
	Noise	< -60dB un-weighted
	Number of ports	8 per card. Max of 3 option cards plus 1 Telephone Interface Board
Audio Input	Type	Balanced audio on RJ45
	Input impedance	> 10kΩ
	Nominal input level	0dBu
	Maximum input level	+20dBu
	Input level adjustment	Via software from -9dB to +12dB in steps of 1.5dB
	Common mode rejection ratio	>70dB
	Absolute maximum input voltage	Common Mode ±15 V / Differential ±28 V
Audio Output	Type	Electronically balanced on RJ45 connector
	Output impedance	<20Ω
	Nominal output level	0 dBu
	Maximum output level	+20 dBu
	Output level adjustment	Via software from -34.5 dB to +12 dB in steps of 1.5 dB.
		Mute option
Panel Data	Type	RS422 balanced data, directly coupled
	Data Rate	230.4 kbaud, 8 data bits, 2 stop bits, 1 start bit, no parity
	Protocol	Proprietary
	Recommended cable type	CAT5e UTP
	Maximum cable length	300 m