Implementation Guide

ISSUE 0.9
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Comments or correspondence concerning this manual should be addressed to the Publications Manager at the address given at the front of this User Guide.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Date</th>
<th>Reason for Change</th>
<th>Approved</th>
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<tbody>
<tr>
<td>0.6</td>
<td>26 July 2013</td>
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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

<table>
<thead>
<tr>
<th>Document</th>
<th>Description</th>
<th>Document</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>70090622</td>
<td>Gateway Configuration Guide</td>
<td>70090628</td>
<td>Control Panel Installation Guide</td>
</tr>
<tr>
<td>70090620</td>
<td>Gemini Implementation Guide</td>
<td>70090626</td>
<td>Messenger Implementation Guide - This Document</td>
</tr>
<tr>
<td>70090630</td>
<td>Gemini Quick Start Guide</td>
<td>70090627</td>
<td>Messenger Quick Start Guide</td>
</tr>
</tbody>
</table>

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 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](http://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.

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>700-20-02</td>
<td>Redundant Power Supply Module</td>
</tr>
<tr>
<td>700-11-01</td>
<td>Audio expansion board, 8 channel</td>
</tr>
<tr>
<td>700-12-01</td>
<td>GPI Board, 16 GPI in plus 16 GPI out</td>
</tr>
<tr>
<td>700-15-03</td>
<td>Telephone Interface Board, 4 channel FXO</td>
</tr>
<tr>
<td>700-13-03</td>
<td>24 channel DSP Module</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>700-65-00</td>
<td>Gateway for a single Messenger matrix</td>
</tr>
<tr>
<td>700-65-01</td>
<td>Gateway for multiple network connected matrices</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>700-65-20</td>
<td>Gateway upgrade keycode to allow live changes</td>
</tr>
<tr>
<td>700-65-21</td>
<td>Gateway upgrade keycode to allow SIP connectivity</td>
</tr>
<tr>
<td>700-65-10</td>
<td>Gateway upgrade keycode, from version 700-65-00 to 700-65-01</td>
</tr>
</tbody>
</table>

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.

![Diagram showing the view from above and below of a rack-mounted Messenger unit, with arrows indicating exhaust and inlet]

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’ACCÈS.

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

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.**

<table>
<thead>
<tr>
<th>RJ-45 Pin</th>
<th>Function</th>
<th>Cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Matrix Data in +</td>
<td>Panel Data out</td>
</tr>
<tr>
<td>2</td>
<td>Matrix Data in -</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Matrix Data out +</td>
<td>Panel Data in</td>
</tr>
<tr>
<td>6</td>
<td>Matrix Data out -</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Matrix Audio in +</td>
<td>Panel Audio out</td>
</tr>
<tr>
<td>4</td>
<td>Matrix Audio in -</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Matrix Audio out +</td>
<td>Panel Audio in</td>
</tr>
<tr>
<td>8</td>
<td>Matrix Audio out -</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Cable Screen</td>
<td></td>
</tr>
</tbody>
</table>
3.2.2 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 always port 8.

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.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Screen/Chassis</td>
<td>14</td>
<td>From Cam 1 audio -</td>
</tr>
<tr>
<td>2</td>
<td>From Cam 1 audio +</td>
<td>15</td>
<td>From Cam 2 audio -</td>
</tr>
<tr>
<td>3</td>
<td>From Cam 2 audio +</td>
<td>16</td>
<td>From Cam 3 audio -</td>
</tr>
<tr>
<td>4</td>
<td>From Cam 3 audio +</td>
<td>17</td>
<td>From Cam 4 audio -</td>
</tr>
<tr>
<td>5</td>
<td>From Cam 4 audio +</td>
<td>18</td>
<td>From Cam 5 audio -</td>
</tr>
<tr>
<td>6</td>
<td>From Cam 5 audio +</td>
<td>19</td>
<td>From Cam 6 audio -</td>
</tr>
<tr>
<td>7</td>
<td>From Cam 6 audio +</td>
<td>20</td>
<td>To Cam 1 audio -</td>
</tr>
<tr>
<td>8</td>
<td>To Cam 1 audio +</td>
<td>21</td>
<td>To Cam 2 audio -</td>
</tr>
<tr>
<td>9</td>
<td>To Cam 2 audio +</td>
<td>22</td>
<td>To Cam 3 audio -</td>
</tr>
<tr>
<td>10</td>
<td>To Cam 3 audio +</td>
<td>23</td>
<td>To Cam 4 audio -</td>
</tr>
<tr>
<td>11</td>
<td>To Cam 4 audio +</td>
<td>24</td>
<td>To Cam 5 audio -</td>
</tr>
<tr>
<td>12</td>
<td>To Cam 5 audio +</td>
<td>25</td>
<td>To Cam 6 audio -</td>
</tr>
<tr>
<td>13</td>
<td>To Cam 6 audio +</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.2.3 Fault Loop

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

<table>
<thead>
<tr>
<th>Fault Condition</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>All OK</td>
<td>Short circuit (closed)</td>
</tr>
<tr>
<td>Fan Fail</td>
<td>Alternating open / closed</td>
</tr>
<tr>
<td>PSU 1 Present but failed</td>
<td>Open circuit</td>
</tr>
<tr>
<td>PSU 2 Present but failed</td>
<td>Open circuit</td>
</tr>
</tbody>
</table>

Connector type: Chassis mounted D9 socket.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chassis Ground</td>
</tr>
<tr>
<td>2</td>
<td>General fail -</td>
</tr>
<tr>
<td>6</td>
<td>General fail +</td>
</tr>
<tr>
<td>3,4,5,7,8,9</td>
<td>No connection</td>
</tr>
</tbody>
</table>
3.2.4 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.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Input 1</td>
</tr>
<tr>
<td>13</td>
<td>Supply out (+5V)</td>
</tr>
<tr>
<td>19</td>
<td>Input 2</td>
</tr>
<tr>
<td>23</td>
<td>Reference voltage in (+5V max) († Note1).</td>
</tr>
<tr>
<td>25</td>
<td>Input Common</td>
</tr>
<tr>
<td>All other pins</td>
<td>No connection</td>
</tr>
</tbody>
</table>

†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.

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.
3.2.5 General Purpose Interface (GPI) Outputs

Connector type: Chassis mounted D25 socket.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Output 1+</td>
</tr>
<tr>
<td>7</td>
<td>Output 2+</td>
</tr>
<tr>
<td>18</td>
<td>Output 1-</td>
</tr>
<tr>
<td>19</td>
<td>Output 2-</td>
</tr>
<tr>
<td>All other pins</td>
<td>No connection</td>
</tr>
</tbody>
</table>

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 GPI expansion module.

3.2.6 Auxiliary Power

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.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+12 VDC, ±0.5 V, fuse protected at 450 mA.</td>
</tr>
<tr>
<td>2</td>
<td>Ground</td>
</tr>
<tr>
<td>3</td>
<td>-12 VDC, ±0.5 V, fuse protected at 200 mA.</td>
</tr>
</tbody>
</table>
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 3.2.4 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

<table>
<thead>
<tr>
<th>Pin</th>
<th>Input</th>
<th>Pin</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>16</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>Common 0 V</td>
<td>18</td>
<td>V+ (0-7)</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>19</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
<td>20</td>
<td>11</td>
</tr>
<tr>
<td>8</td>
<td>12</td>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td>9</td>
<td>14</td>
<td>22</td>
<td>15</td>
</tr>
<tr>
<td>10</td>
<td>Common 0 V</td>
<td>23</td>
<td>V+ (8-15)</td>
</tr>
<tr>
<td>11</td>
<td>Common 0 V</td>
<td>24</td>
<td>Common 0 V</td>
</tr>
<tr>
<td>12</td>
<td>+5 V Out</td>
<td>25</td>
<td>Common 0 V</td>
</tr>
<tr>
<td>13</td>
<td>+5 V Out</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Pin</th>
<th>Output</th>
<th>Pin</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Darlington 0</td>
<td>14</td>
<td>Darlington 1</td>
</tr>
<tr>
<td>2</td>
<td>Darlington 2</td>
<td>15</td>
<td>Darlington 3</td>
</tr>
<tr>
<td>3</td>
<td>Darlington 4</td>
<td>16</td>
<td>Darlington 5</td>
</tr>
<tr>
<td>4</td>
<td>Darlington 6</td>
<td>17</td>
<td>Darlington 7</td>
</tr>
<tr>
<td>5</td>
<td>Darlington 0 V</td>
<td>18</td>
<td>OP 8 -ve</td>
</tr>
<tr>
<td>6</td>
<td>OP 8 +ve</td>
<td>19</td>
<td>OP 9 -ve</td>
</tr>
<tr>
<td>7</td>
<td>OP 9 +ve</td>
<td>20</td>
<td>OP 10 -ve</td>
</tr>
<tr>
<td>8</td>
<td>OP 10 +ve</td>
<td>21</td>
<td>OP 11 -ve</td>
</tr>
<tr>
<td>9</td>
<td>OP 11 +ve</td>
<td>22</td>
<td>OP 12 -ve</td>
</tr>
<tr>
<td>10</td>
<td>OP 12 +ve</td>
<td>23</td>
<td>OP 13 -ve</td>
</tr>
<tr>
<td>11</td>
<td>OP 13 +ve</td>
<td>24</td>
<td>OP 14 -ve</td>
</tr>
<tr>
<td>12</td>
<td>OP 14 +ve</td>
<td>25</td>
<td>OP 15 -ve</td>
</tr>
<tr>
<td>13</td>
<td>OP 15 +ve</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function/Pin Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NC</td>
</tr>
<tr>
<td>2</td>
<td>NC</td>
</tr>
<tr>
<td>3</td>
<td>Ring (Switched on phone connector)</td>
</tr>
<tr>
<td>4</td>
<td>Tip (Switched on phone connector)</td>
</tr>
<tr>
<td>5</td>
<td>NC</td>
</tr>
<tr>
<td>6</td>
<td>NC</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Colour</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>The configuration is loaded but the application cannot communicate with the hardware.</td>
</tr>
<tr>
<td>Yellow</td>
<td>The VoIP audio card is unable to communicate with network.</td>
</tr>
<tr>
<td>Green</td>
<td>The application is operating correctly.</td>
</tr>
</tbody>
</table>

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.

![TBC Log Screen](image)

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.

<table>
<thead>
<tr>
<th></th>
<th>Windows</th>
<th>VoIP audio card</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Address</td>
<td>192.168.200.200</td>
<td>192.168.200.201</td>
</tr>
<tr>
<td>Subnet Mask</td>
<td>255.255.255.0</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>Default Gateway</td>
<td>[not set]</td>
<td>[not set]</td>
</tr>
<tr>
<td>Host (EDH) address</td>
<td>0.1.1</td>
<td></td>
</tr>
</tbody>
</table>
### 4.4 TBC Field Definitions

#### 4.4.1 TBC Status tab

<table>
<thead>
<tr>
<th>Display Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Version</td>
<td>The hardware version.</td>
</tr>
<tr>
<td>Firmware Version</td>
<td>The firmware version.</td>
</tr>
</tbody>
</table>
| 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 3.2.6 for connector details.

The table below show the different belt box types.

<table>
<thead>
<tr>
<th>Type</th>
<th>No. of input channels (from matrix)</th>
<th>Fixed Connector type (to matrix)</th>
<th>Mating Connector type required (to matrix)</th>
<th>Supply voltage required (note 3)</th>
<th>Headset connector (socket)</th>
</tr>
</thead>
<tbody>
<tr>
<td>410-50-12</td>
<td>1</td>
<td>XLR6 Male</td>
<td>XLR6 Female</td>
<td>+8.5V to +15V (note 3)</td>
<td>XLR5 Female</td>
</tr>
<tr>
<td>410-50-13</td>
<td>2</td>
<td>Hirose 12 Way Plug RM15TRD-12P</td>
<td>Hirose 12 Way Socket RM1STPD-12S</td>
<td>±8.5V to ±15V (note 3)</td>
<td>XLR5 Female</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>XLR6 - Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2 (+,-)</td>
<td>Audio output from box to matrix</td>
</tr>
<tr>
<td>3,4 (+,-)</td>
<td>Audio input to box from matrix</td>
</tr>
<tr>
<td>5</td>
<td>0V</td>
</tr>
<tr>
<td>6</td>
<td>+8.5V to +15V (see note 3 above)</td>
</tr>
</tbody>
</table>

### 410-50-13 Two Channel Beltpack Connection to Matrix

<table>
<thead>
<tr>
<th>Hirose 12 way - Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chassis</td>
</tr>
<tr>
<td>2,3 (+,-)</td>
<td>Audio 1 input to box (PTB)</td>
</tr>
<tr>
<td>4,5 (+,-)</td>
<td>Audio 2 input to box (Prog Snd)</td>
</tr>
<tr>
<td>6,7 (+,-)</td>
<td>Audio output from box to matrix</td>
</tr>
<tr>
<td>8</td>
<td>+8.5V to +15V (see note 3 above)</td>
</tr>
<tr>
<td>9</td>
<td>-8.5V to -15V (see note 3 above)</td>
</tr>
<tr>
<td>10</td>
<td>0V</td>
</tr>
<tr>
<td>11,12</td>
<td>n/c</td>
</tr>
</tbody>
</table>

### All models Headset Connector (XLR5 Socket)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mic in (screen)</td>
</tr>
<tr>
<td>2</td>
<td>Mic in (signal)</td>
</tr>
<tr>
<td>3</td>
<td>Headset Ground</td>
</tr>
<tr>
<td>4</td>
<td>Headset Out</td>
</tr>
<tr>
<td>5</td>
<td>Headset Out</td>
</tr>
</tbody>
</table>

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

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