

IP Intercom Hardware Control Panel Installation Guide

ISSUE 1.7

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1. INTRODUCTION

Trilogy's pioneering IP based Intercoms address the demanding needs of today's broadcast and professional media industries namely; expandable structure to cope as requirements change, choice of operator panels to suit application and user, simple installation over short and long distances and absolute reliability. They deliver a unique intercom solution that combines full programme quality audio with integrated IP capability.

Intuitive system operation allied to connectivity for both traditional and IP enabled intercom panels together with support for telephony and intelligent interfacing to analogue and SIP-enabled phone systems and portable devices make the Trilogy range undoubtedly the most flexible system available today.

1.1 PRODUCT RANGE

This manual provides installation information for the 700 series control panel range, compatible with Mercury and Gemini Intercom systems ("the IP intercom range").

Model Number	Description
700-41-xx	8 lever key desktop panel
700-38-00B	10 lever key, 1U panel
700-31-00B	16 lever key, 2U panel
700-47-xx	20 key, desktop touch-screen panel

The panel range, correct at August 2019 is given in the chart below.

The following panel(s) from the ClearCom V-Series Iris range are compatible with Trilogy Mercury hosts. They are not compatible with Trilogy Gemini.

Model Number	Description
VI-PNL-12L-XX	12 lever key display panel
VI-PNL-32L-XX	32 lever key display panel

1.2 RELATED DOCUMENTS

Document	Description
70090628	Control Panel Installation Guide - This Document
70090630	Gemini Quick Start Guide
70090620	Gemini Implementation Guide
70090622	Gateway Configuration Guide (Broadcast)
70090625	Mercury Core Quick Start Guide
70090618	Mercury Core Implementation
70090609	Mercury Core Configuration
ClearCom	V-Series_Iris_Lever_Datasheet
ClearCom	V-Series_Iris_Panels_User_Guide-399G277A

1.3 ADDITIONAL INFORMATION

Please see section 10 for information relating to any updates or variations in panel design.

1.4 CONTROL PANEL FACILITY COMPARISON TABLE

	700-41-xx 8 lever key desktop panel.	700-38-00B 10 lever key panel.	700-31-00B 16 lever key panel.	700-47-xx 20 key desktop touch-screen.	VI-PNL-12L-XX 12 key display panel.	VI-PNL-32L-XX 32 key display panel.
Number of switches	8	10	16	20	12	32
Form factor (D=desktop)	D	1U	2U	D	1U	2U
Display type (1=LCD, 2=LED,	1	2	1	3	4	4
3=Touch-screen, 4=OLED)						
Power Supply (IN=internal, EX=external)	IN	IN	IN	EX	EX	EX
Comprehensive audio inputs and outputs.	+2	\checkmark	+1	\checkmark	\checkmark	\checkmark
Local logic inputs and outputs	+2	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Remote control footswitch	+2	\checkmark	\checkmark	\checkmark	Х	Х
Software re-programmable (upgrade)	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Fitted front panel microphone	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Built in loudspeaker	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Headset connector	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Connection via LAN	Х	\checkmark	Х	\checkmark	Х	Х

Notes:

+1 – Please see panel information in section 5 for audio facilities available from this model.

⁺2 – These facilities are available internally but are not provided externally unless requested at the time of purchase. Please contact Trilogy for more information.

1.5 TECHNICAL SUPPORT

UK & International

Please contact Trilogy at the UK headquarters.

Trilogy Communications Ltd. 2000 Beach Drive Cambridge Research Park Cambridge CB25 9TP United Kingdom Tel: +44 (0) 1223 815 000 Email: <u>support@trilogycomms.com</u> Web: <u>www.trilogycomms.com</u>

Alternatively, please contact your reseller. Contact details may be found at www.trilogycomms.com

1.6 WARRANTY

Conditions of the warranty may vary according to your terms of purchase. Please consult your sales documentation or if in doubt, contact your original supplier or Trilogy at the offices above, quoting the date of purchase and unit serial number.

2. INSTALLATION

2.1 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.

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

2.2 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 within each section). There are no user-accessible fuses on the power supply. The power supplies are crowbar protected against short circuits of the electronics.

Each power supply has its own, dedicated, IEC mains plug. These should be wired according to the instructions provided with a mating mains socket using a 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 the 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.

2.3 GENERAL POINTS

There are now several different generations of Trilogy hardware control panels in service. Those which are part of the current range are listed in the following section.

The following general points should be noted:

- All control panels connect to the matrix using point to point topology. Each panel then utilises a single matrix port.
- For Gemini only, models 700-38-00B and 700-47-xx can be connected to a Gemini matrix over a dedicated or existing IP LAN. An additional IP Panel Interface is required in the Gemini matrix to facilitate this mode.
- Panel firmware may be re-programmed locally using the appropriate hardware adaptor, software utility and connection cable. Contact Trilogy for more information.

3. 700-41-XX SERIES 8 LEVER KEY DESKTOP PANEL

The panel provides 8 programmable lever keys in a compact desktop case.

3.1 700-41-00 CONTROL PANEL REAR VIEW



RJ-45 CONNECTION TO MATRIX

5 PIN XLR SOCKET HEADPHONES

MAINS INPUT (IEC)

3.2 700-41-00 CONTROL PANEL CONNECTIONS

RJ-45 connection to Matrix

RJ-45 Pin	Function	
1	Panel Data out +	Pair 1
2	Panel Data out -	
3	Panel Data In +	Pair 2
6	Panel Data In -	
5	Panel Audio out +	Pair 3
4	Panel Audio out -	
7	Panel Audio in +	Pair 4
8	Panel Audio in -	
n/c	Cable Screen	

Headset - 5 Pin XLR Fixed Socket (Rear panel)

Pin	Function
1	Mic In (Screen)
2	Mic In
3	Headset Ground
4	Headset Out
5	Headset Out

4. 700-38-00B 10 LEVER KEY CONTROL PANEL

The 700-38-00B provides 10 programmable lever keys in a 1U rackmount chassis. The panel may be connected to a matrix port, or for Gemini products only by the use of additional optional hardware and software, connect over IP to a Gemini network.

4.1 700-38-00B SPECIFICATION

Dimensions	485mm wide x 44.5mm high x 120mm deep (approx. excluding mating connectors). 19" x 1U rack mounting		
Mains Input	90 – 250 V ac, 50-60Hz		
Current Consumption	150mA @ 90V, 50mA @ 250V		

4.2 700-38-00B REAR PANEL LAYOUT

$\langle \circ \square \circ \rangle$	EXPANSION	MATRIX	GPIO	ETHERNET

4.3 700-38-00B CONNECTIONS

Matrix – RJ-45 fixed socket on panel

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

Headset - 5 Pin XLR Fixed Socket (front panel)

Pin	Function
1	Mic In (Screen)
2	Mic In
3	Headset Ground
4	Headset Out
5	Headset Out

GPI (Local logic in and out) - D9 Fixed Socket

Pin	Function	Notes
1	Ground	
2	Logic Input 1	
3	Logic Input 2	
4	Logic 2 Out Common	
5	Internal +5V (Out)	Protected with 0.5A thermal fuse & 1N4002 diode.
6	Logic Output 1	
7	Logic 1 Out Common	
8	Logic Output 2	
9	Logic Input +VCC	NB Pin 9 may be driven by external voltage (With dropper
		resistor if greater than 5V), or by internal +5V via pin 5.

Audio I/O – D15 Fixed Socket

Pin	Function	Notes
1	Slave Mic In	Line level, un-balanced
2	+12V Out	Fused internally 500 mA
3	Clean Mic Out +	Line level, balanced, pair with 11 – o/p
		is affected by CUT switch
4	Ext CUT Input	Parallel function to front panel Cut
		Switch. Ground to activate
5	Chassis Ground	
6	LS Out Ground	Paired with pin 13
7	External Input to LS Amp -	Line level, balanced, pair with 14
8	Matrix Audio Input to Panel / parallel output -	Line level, balanced, pair with 15
9	Slave CUT Output Connect to slave panel; pin 4 on this	
		panel type
10	-12V Out	Fused internally 100 mA
11	Clean Mic Out -	Line level, balanced, pair with 3
12	Internal Ground	
13	LS Out +	Paired with pin 6
14	External Input to LS Amp +	Line level, balanced, pair with 7
15	Matrix Audio Input to Panel / parallel output +	Line level, balanced, pair with 8

Ethernet - RJ-45 fixed socket on panel

As an alternative to connecting via the standard matrix port, this panel can connect to a Gemini matrix via an existing or dedicated IP LAN. An additional IP Panel Interface fitted in Gemini can support up to 8 of these panels.

Expansion – RJ-45 fixed socket on panel

This feature is not currently supported. Please contact Trilogy for up to date information.

5. 700-31-00B 16 LEVER KEY CONTROL PANEL

The 700-31-00 panel provides 16 programmable lever keys in a 2U rackmount chassis.

5.1 700-31-00B SPECIFICATION

Dimensions	485mm wide x 88.9mm high x 80mm deep (approx. including PSU and mating connectors). 19" x 2U rack mounting
Mains Input	90 – 250 V ac, 50-60Hz
Current Consumption	150mA @ 90V, 50mA @ 250V

5.2 700-31-00B REAR PANEL LAYOUT



5.3 700-31-00B CONNECTIONS

Matrix - RJ-45 fixed socket on panel

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

Headset - 5 Pin XLR Fixed Socket (front panel)

Pin	Function
1	Mic In (Screen)
2	Mic In
3	Headset Ground
4	Headset Out
5	Headset Out

Foot Switch - D9 Fixed Socket

Pin	Function
1	Foot Switch Input
2	No Connection
3	Chassis Ground
4	Reserved
5	Reserved
6	Ground
7	Reserved
8	Reserved
9	Reserved

GPI (Local logic in and out) - D9 Fixed Socket

Pin	Function	Notes
1	Ground	
2	Logic Input 1	
3	Logic Input 2	
4	Logic 2 Out Common	
5	Internal +5V (Out)	Protected with 0.5A thermal fuse & 1N4002 diode.
6	Logic Output 1	
7	Logic 1 Out Common	
8	Logic Output 2	
9	Logic Input +VCC	NB Pin 9 may be driven by external voltage (With dropper
		resistor if greater than 5V), or by internal +5V via pin 5.

Audio I/O – D15 Fixed Socket

Pin	Function	Notes
1	No connection	
2	+12V Out	Fused internally 500 mA
3	Clean Mic Out +	Line level, balanced, pair with 11 – o/p
		is affected by the CUT switch
4	Ext CUT Input	Parallel function to front panel Cut
		Switch. Ground to activate
5	Chassis Ground	
6	LS Out Ground	Rev 4 hardware only
7	External Input to LS Amp -	Line level, balanced, pair with 14
8	Matrix Audio Input to Panel / parallel output	Line level, balanced, pair with 15
9	No connection	
10	No connection	
11	Clean Mic Out -	Line level, balanced, pair with 3
12	Internal Ground	
13	LS Out +	Rev 4 hardware only
14	External Input to LS Amp +	Line level, balanced, pair with 7
15	Matrix Audio Input to Panel / parallel output +	Line level, balanced, pair with 8

6. 700-47-00 20 BUTTON DESKTOP TOUCH SCREEN CONTROL PANEL

The 700-47-00 provides 20 programmable buttons in a desktop style enclosure. Both the buttons and the associated displays are provided by touch screens. The panel may be connected to a matrix port, or for Gemini only, by the use of additional optional hardware and software, connect over IP to a Gemini network.

6.1 700-47-00 SPECIFICATION

Dimensions	230mm wide x 110mm high x 170mm deep (approximate maximum dimensions).
Mains Input	90 – 250 V ac, 50-60Hz to a separate laptop style power supply. Panel is DC powered.
Current Consumption	150mA @ 90V, 50mA @ 250V

6.2 700-47-00 REAR PANEL LAYOUT



6.3 700-47-00 CONNECTIONS

Matrix – RJ-45 fixed socket on panel

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

Headset - 5 Pin XLR Fixed Socket (front panel)

Pin	Function
1	Mic In (Screen)
2	Mic In
3	Headset Ground
4	Headset Out
5	Headset Out

GPI (Local logic in and out) - D9 Fixed Socket

Pin	Function	Notes
1	Ground	
2	Logic Input 1	
3	Logic Input 2	
4	Logic 2 Out Common	
5	Internal +5V (Out)	Protected with 0.5A thermal fuse & 1N4002 diode.
6	Logic Output 1	
7	Logic 1 Out Common	
8	Logic Output 2	
9	Logic Input +VCC	NB Pin 9 may be driven by external voltage (With dropper
		resistor if greater than 5V), or by internal +5V via pin 5.

Audio I/O – D15 Fixed Socket

Pin	Function	Notes
1	Slave Mic In	Line level, un-balanced
2	+12V Out	Fused internally 500 mA
3	Clean Mic Out +	Line level, balanced, pair with 11 – o/p
		is affected by the CUT switch
4	Ext CUT Input	Parallel function to front panel Cut
		Switch. Ground to activate
5	Chassis Ground	
6	LS Out Ground	Paired with pin 13
7	External Input to LS Amp -	Line level, balanced, pair with 14
8	Matrix Audio Input to Panel / parallel output -	Line level, balanced, pair with 15
9	Slave CUT Output	Connect to slave panel; pin 4 on this
		panel type
10	-12V Out	Fused internally 100 mA
11	Clean Mic Out -	Line level, balanced, pair with 3
12	Internal Ground	
13	LS Out +	Paired with pin 6
14	External Input to LS Amp +	Line level, balanced, pair with 7
15	Matrix Audio Input to Panel / parallel output +	Line level, balanced, pair with 8

Gemini only - Ethernet - RJ-45 fixed socket on panel

As an alternative to connecting via the standard matrix port, this panel can connect to a Gemini matrix via an existing or dedicated IP LAN. An additional IP Panel Interface fitted in Gemini can support up to eight of these panels. See Section 9 on page 21 for more information.

Expansion – RJ-45 fixed socket on panel

This feature is not currently supported. Please contact Trilogy for up to date information.

7. V-SERIES IRIS USER PANELS

The following panel(s) from the ClearCom V-Series Iris range are compatible with Trilogy Mercury hosts. They are not compatible with Trilogy Gemini.

Model Number	Description
VI-PNL-12L-XX	12 lever key display panel
VI-PNL-32L-XX	32 lever key display panel

Suffix "XX" refers to the headset connector. X4 denotes 4-pin XLRM, X5 denotes 5-pin XLRF and X7 denotes 7-pin XLRM.

7.1 SPECIFICATION SUMMARY

Dimensions – 1RU	483 x 44 x 174 mm (WxHxD) – 1RU x 19-inch rackmount
Dimensions – 2RU	483 x 89 x 172 mm (WxHxD) – 2RU x 19-inch rackmount
Mains Power Supply	Voltage: 100/240 VAC +/- 10%
(External)	Frequency: 50 - 60 Hz
	Power: 60W maximum
	Panel is DC powered.

For a complete specification, please see the appropriate Clear-Com datasheet or manual.

7.2 REAR PANEL LAYOUTS



For operation with a Trilogy Mercury matrix, only connectors A, B and C are required. Additional features are provided by connectors D and E.

Item	Description of connector
А	Grounding screw
В	Sleeve locking power connector (12V, 60W). When connecting the sleeve-
	locking power connector, be sure to push until the sleeve locks into the device.
С	Analogue matrix connector (RJ45)

Additional features are provided by connectors D and E.

Item	Description of connector
D	GPI connector (DB25F)
E	Auxiliary audio connector (DB25M)

7.3 CONNECTOR PIN-OUT

7.3.1 Trilogy Matrix to Panel | Connector C

Custom cabling is required. Alternatively, adaptor part number VI-TPNL-RJ45-RJ45-ADPT, available through your normal sales channel, may be fitted at the rear of the panel. This allows normal 1:1 wiring between panel and matrix.

Matrix	Matrix Function	Panel	Panel Function
RJ-45 Pin		RJ-45 pin	
1	Matrix RS422 RX +	1	Panel RS422 TX +
2	Matrix RS422 RX -	2	Panel RS422 TX -
3	Matrix RS422 TX +	7	Panel RS422 RX +
6	Matrix RS422 TX -	8	Panel RS422 RX -
5	Matrix Audio in +	3	Panel Audio out +
4	Matrix Audio in -	6	Panel Audio out -
7	Matrix Audio out +	4	Panel Audio in +
8	Matrix Audio out -	5	Panel Audio in -
			Cable Screen

7.3.2 GPI | Connector D

Pin	Description	Pin	Description
1	Panel Mute relay output Normally	14	Panel Mute output relay Common
	Closed		
2	Panel Mute relay output Normally	15	Panel Aux output relay Normally
	Open		Closed
3	Panel Aux output relay Common	16	Panel Aux output relay Normally Open
4	Not connected	17	Not connected
5	Not connected	18	Not connected
6	Not connected	19	Not connected
7	Not connected	20	5V
8	0V	21	5V
9	0V	22	Opto-isolated input A1
10	Opto-isolated input B1	23	Opto-isolated input A2
11	Opto-isolated input B2	24	Opto-isolated input A3
12	Opto-isolated input B3	25	Not connected
13	Not connected	-	

Pin	Description	Pin	Description
1	Headset 2 MIC +ve	14	Headset 2 MIC -ve
2	Headset 2 Left Ear	15	Headset 2 Left Ear Ground
3	Headset 2 Right Ear	16	Headset 2 Right Ear Ground
4	Headset 2 PTT 1	17	Headset 2 PTT 2
5	0V	18	0V
6	0V	19	0V
7	External Output 2 +ve	20	External Output 2 -ve
8	External Output 1 +ve	21	External Output 1 -ve
9	Not connected	22	Not connected
10	Not connected	23	Not connected
11	External Input 2 +ve	24	External Input 2 -ve
12	External Input 1 +ve	25	External Input 1 -ve
13	0V	-	-

7.3.3 Auxiliary Audio | Connector E

7.4 AUDIO NOTES

- 1. External inputs 1 & 2 are permanently looped to external outputs 1 & 2.
- 2. Also, when in:
 - **Binaural mode** external inputs **1** and **2** are also routed to the headset right ear.
 - Monaural mode the external inputs 1 and 2 are routed to the headset right and left ear.
- 3. For binaural mode operation, adaptor part number VI-TPNL-D25-RJ45-ADPT, available through your normal sales channel, may be fitted at the rear of the panel. This connects panel External Input 1 to the second Mercury RJ45 port.

8. TRILOGY PANEL GPI EXTERNAL CIRCUITRY

Control panels from the Trilogy700-series range provide 2 local GPI inputs and 2 local GPI outputs on a D9 fixed socket. The tables within each control panel section provide pin-out details.

8.1 GPI INPUTS

GPI inputs should be grounded to trigger the logical action. Pin 9 of the connector must be connected to a positive voltage to achieve this. A feed of +5V is provided on pin 5 and the link from pin 5 to pin 9 should be included in the external wiring.

If the input circuitry needs to be isolated from the panel voltage, the link between pins 5 and 9 should not be fitted. An external voltage can now be connected to pin 9 but an additional dropper resistor should be added if this voltage is >5V.

8.2 GPI OUTPUTS

The circuit below gives suggested wiring details for GPI output 1. The maximum current must be limited to 200mA and the maximum external voltage to 200V. Exceeding these limits will damage the panel circuitry.



9. GEMINI ONLY - PANEL NETWORKING

9.1 INTRODUCTION

The panel networking system allows Trilogy Talkback panels to connect to a Gemini matrix using Ethernet 10 Mb/s or 100 Mb/s copper cable connections. To support this, a specific expansion card (IPPI) is fitted to the Gemini host and the panels must be network-capable – specifically, this means they must currently be part of the touch-screen range of panels.

TCP/IP copper cable connectivity has the advantages that customers can use existing networks and network cabling, that the connections can be extended and routed using off-the-shelf products and that many panels can be connected to Gemini via a single cable, reducing cabling requirements. Unlike the non-Ethernet panels, which associate a panel with a Host and Subscriber by a point to point cable, the Host and Subscriber cannot be inferred from the Ethernet cabling and the user of a panel must identify which Host and Subscriber they wish to connect to. Two solutions, one a userfriendly method and the other, a catch-all manual method, are provided.

With a compliant network and the appropriate configuration, the system has been designed so that the user need never enter an IP address, thus simplifying deployment and maintenance.

Note that connection to panels is NOT made via the LAN connection on the back of the Gemini Host matrix; it is made using a dedicated network connector on each expansion board.

9.2 STEP-BY-STEP

- Fit the IP Panel Interface(s) to the correct slot of your Gemini system.
- Decide on an IP addressing policy. The system supports a range of manual (fixed) and automatic (DHCP) arrangements and the approach you adopt will be governed by your local networking infrastructure.
- Set the network characteristics of each IPPI using the Gateway configuration editor.
- Add keys to each control panel using the normal methods explained in the Gateway user Guide.
- Connect panels to the network, configure their IP parameters using the panel menu system and finally select the identity of each panel from those available.

9.3 EXPANSION CARD TYPE 700-26-25 (IPPI)

9.3.1 Overview

One or more expansion card(s), type 700-26-25, can be fitted to each Gemini matrix. Each card has a single RJ45 connector which is the network connection point. The card should be connected from this connector to the appropriate network using CAT 5e/CAT 6 cables. The connection is polarity auto-sensing. The card supports 10 Mb/s and 100 Mb/s connections.

In common with other Gemini expansion cards, each 700-26-25 card supports up to eight panels. More than one expansion card can be fitted, thus allowing additional panel connections. Expansion cards could connect to a cluster of panels each using a discrete private network for each card/cluster, Equally, it is reasonable to connect all expansion cards into the same network, perhaps using a switch located near with/the Gemini Host, as long as each card has a unique IP address. All control messages are sent using TCP. The TCP data transport encoding is proprietary and is not compatible with any recognised protocol. Audio is sent uncompressed using RTP. The decision to use uncompressed audio intentionally favours low latency at the expense of signal bandwidth. One panel typically occupies about 500 kbits of bandwidth.

An expansion card must be configured before it can be correctly deployed. The configuration is made via the Gateway Configuration Editor. It is advisable to make configuration changes before the network connection is applied, in case the default settings clash with the network.

9.3.2 Adding a 700-26-25 IP Panel Interface

Before adding an IP panel interface, shut down the appropriate Gemini matrix. Identify the correct module position and remove any blanking panels which are currently fitted. Before inserting the card, release the black plastic fasteners by pulling outwards. Carefully insert the card, ensuring that it is located correctly on the guides. When the card is in place, push home the two fasteners. You may now reboot the Gemini matrix.

On the host advanced editor, set the expansion board type to EEB or IP Panel interface. If the existing type is set to audio expansion board, you will receive some error messages -- please ignore these and press OK. An additional tab is now displayed on the advanced editor to configure the new expansion boards. A sample is shown below.

EEBs									8
Board #	Name	DHCP	IP Address	Gateway	Subnet Mask	DHCP Server Mode	Jitter Buffer Si:	Jitter Reaction Spe	Sequence Buffer Size
2	Host 1.1 (EEB 2)		0.0.0.0	0.0.0.0	255.255.255.0		5	7	1

The following items can be configured:

Item	Description
Board #	Read-only field to denote the position of the IP panel interface in this
	host.
Name	The default naming format is shown above: this may be manually
	edited for something more appropriate.
DHCP (client)	DHCP Client control. If not checked, the IP address of the card is
	supplied manually. If checked, the IP address will be obtained from
	the network using the DHCP protocol. Note that in the latter case, a
	DHCP server must exist on the network. The expansion card must
	have a valid address before it can be connected to a network.
IP address	The IP address to be used if the card is not operating under DHCP.
	This is also the base address the card will use when acting as a DHCP
	server (see below and 9.3.3).
Gateway, Subnet	Set these to the normal values appropriate for the network. Not used
Mask	when the interface is a DHCP client.
DHCP Server Mode	When checked, the card will act as a DHCP server, as distinct from
	obtaining an address by DHCP (see section 9.3.3).
Jitter buffer size	See Jitter Buffer and Sequence Buffer section 9.5.
Jitter reaction time	
Sequence buffer size	
Password	This is set on a per-Subscriber basis. If set, a panel must be assigned
	with the same password to connect successfully. If not used, the
	password should be set blank.

9.3.3 DHCP Server Mode

As indicated above, the card has a built-in DHCP server which may be deployed for use on a network. The intended primary purpose of this is where a network card is to be connected to a cluster of panels; the panels are connected to a local switch and then the switch is connected to the panel interface. The switch does **not** connect to any other network. In this instance, it may be desirable to enable the DHCP server and allow the panels to obtain IP addresses automatically, as opposed to manually setting up IP addresses on each panel.

Do make sure that only one DHCP server is present on a network segment. The expansion card DHCP server is sufficient to serve a number of panels over a private network but is not recommended to be deployed on a large network with many items connected.

To utilise the DHCP server, check the box named "DHCP server mode" and enter values for the IP address, subnet mask and gateway address (if used). In this case, the card itself will take the IP address set above and client devices requiring an IP address will be allocated an address starting at the base address + 1. Client devices are other IP panel interfaces and any IP enabled control panels which are running in DHCP client mode.

9.4 NETWORK PANEL

9.4.1 Overview

Panels that support connection via a network are the touch-screen range and the 700-38-00B 1U, 10 lever-key panel. These panels have an RJ45 connector which is the network connection point. The panel IP address can be set manually or via DHCP.

Following an IP connection, each panel must be configured to adopt the identity of a particular Subscriber. This is achieved in one of two ways:

- by entering the IP address and Subscriber number of the appropriate expansion card
- by identifying the Gemini host and Subscriber by name

The latter method is preferred but makes use of broadcast UDP messages which may be restricted on some networks.

9.4.2 Configuration

In the following sections, reference is made to configuration menu system of the touch-screen panels. It is assumed the user is familiar with accessing these menus and with their general layout and use.

Three different aspects of the panel configuration need to be considered when connecting to a network:

- Panel type. See section 9.4.3.
- Panel Network setup. See section 9.4.4.
- Network Connect, where the identity of the panel is configured. This is the subscriber identity which the panel will adopt, from those configured with Gateway. See 9.4.7.

9.4.3 Panel Type

The panel type must be set before the unit can be connected to a network. The panel type dictates with which physical connection and message protocol the panel will operate. The type is setup using the Misc. Menu | Page 5. For an Ethernet connection, select either Gemini/Ethernet or Auto Detect. Auto Detect mode will automatically identify and use whichever connection is physically present.

- On touch panels, enter the menu system by pressing and holding the mode button, then turning the REN (rotary encoder).
- On lever key panels, enter the menu system by pressing and holding the Assign key then turning the REN.



Lever Key Panels:

- Select Other, then More
- Select Panel Type and set to Gem/Eth
- Select Back

9.4.4 Panel Network Setup

The Network | Setup menu pages allow the user to view and set local panel settings related to the network, most importantly the panel IP address.

For Touch Panels, Network | Setup | Page 1 provides a summary of the current settings. Note that this page will update in real-time, reacting to any changes in the network; for example, the IP address will update if the panel has been issued with one via DHCP.



Lever Key Panels:

- From home menu, select *Network*
- Select Setup
- Select More
- For each parameter, use *Edit* to make changes
- Step through digits using the REN
- To enter a new digit, press the key 1-9, then choose a new value

Network | Setup | Page 2 permits DHCP to be turned on or off. When turned off, the IP address of the panel must be assigned manually.

SETUP	3 of 8						
Panel Address							
💿 Fixed 🔿 I	ОНСР						
Panel Fixed Address							
192.160.0.10	EDIT						
Click here to enter the fixed IP Address.							
PREV NEXT	BACK						

Click "Next" to show the following menu screen where the panel gateway address and subnet mask are set.

Note: This screen is not applicable when the panel is running in DHCP client mode. In this mode, the panel is handed all IP parameters by a DHCP server.



Subsequent Network Setup pages are concerned with the audio data management. See section 9.5 for more information.

9.4.5 Network Connect Intro

The Network | Connect menu pages allow the user to specify a Host and Subscriber to connect to. Network | Connect | Page 1 provides a summary of the current settings. Note that this page will update in real-time reacting to any changes to the connection. Note that the Error entry will reflect any errors reported by the host, for example, if the password is wrong.

9.4.6 Network Connect – lever key

As before, lever key style panels use a series of menus accessed via the Assign key. The example steps below are for a lever key panel to connect by *Name*.

- From the home menu screen, select Network
- Select Connect
- Connection Method: By Name [choose edit if necessary]
- From Connect, choose more
- Set the Host to the appropriate Gemini which is fitted with the IPPI [if you changed the connection mode, it takes around 30 seconds for a scan of potential Gemini matrices to complete]
- Finally, pick the Subscriber identity from the 8 possible available on your selected Gemini matrix [if your selected Gemini contains more than 1 IPPI, all subscribers will be presented. Only one is shown keep pressing more to see all available]

9.4.7 Network Connect – touch panels

The Network | Connect menu pages allow the user to specify a Host and Subscriber to connect to. Network | Connect | Page 1 provides a summary of the current settings. Note that this page will update in real-time reacting to any changes to the connection. Note that the Error entry will reflect any errors reported by the host, for example, if the password is wrong.

As explained earlier, two connection modes are provided; by name or by IP Address.

The mode is chosen on Page 2 of the Connect menu sequence and examples are shown below. The two connection methods are explained fully in the following pages.

CONNECT 2 of 3	CONNECT 2 of 3	
Host Connection	Host Connection	
💿 By Name 🔿 By IP	🔿 By Name 💿 By IP	
Host	Host	
Host1	192.168.0.5	
Subscriber	Subscriber	
Director	5	
PREV NEXT BACK	PREV NEXT BACK	

Connect By Name

If using the "Connect by IP" method, please skip this section. Network | Connect | Page 3 allows the user to identify the host and subscriber. If the user has selected 'By Name' on the previous page then the host and subscriber will be presented as names.



If the user has selected 'By Name' Host Connection then pressing the Host EDIT button will bring up the page below. After a short pause, the page will be refreshed with all available Hosts. Tick a box on the right-hand side to select a Host. If the number of hosts has changed then pressing the SCAN button will refresh the page with the most recently available Hosts.



If the user has selected 'By Name' Host Connection then pressing the Subscriber EDIT button will bring up the page below. After a short pause, the page will be refreshed with all available Subscribers for the current Host. Tick a box on the right-hand side to select a Subscriber. If the number of Subscribers has changed then pressing the SCAN button will refresh the page with the most recently available Subscribers.



Note that the Subscribers are listed only for the current Host. To see Subscribers from another Host, that Host must be selected first using Host EDIT button on Page 3.

Subscribers that have a password are marked with an asterisk.

Subscribers that are already connected and therefore unavailable for connection to this panel, at this point, are greyed out and cannot be selected.

It is good practice to password protect subscribers to avoid inadvertent panel connections.

Passwords are set on a per-subscriber basis in the Gateway configuration editor. The password entry method is identical for both connection types (by name or by IP address) and is explained fully in the next section.



Connect by IP Address

If using the "connect by name" method, please skip this section.

If the user has selected the 'By IP' Host Connection then pressing the Host EDIT button to change the IP address will bring up a screen to allow the IP address to be edited.



If the user has selected the 'By IP' Host Connection then pressing the Subscriber EDIT button to change the IP address will bring up a screen to allow the Subscriber number to be edited; this will typically be a number from 1 to 32. Note that the subscriber number must be in the range supported by the Host expansion card – for example, if an expansion card was fitted to expansion slot 3 (third slot) in a host, then only Subscriber numbers 17 to 24 are valid.



Subscriber Password

The user may enter a Subscriber Password using the Password EDIT button on Page 3. Note that the password is set in Gateway. If the passwords entered on the panel does not match that entered in Gateway then the panel will not connect as that subscriber; this prevents unintended connection as a given Subscriber.



Use the green shift key to access lowercase letters and numbers.

9.5 JITTER AND SEQUENCE BUFFER

Both the panel and the expansion card have mechanisms to promote reliable audio transmission in the event of an unreliable network. These mechanisms have configurable parameters which are described here. In most instances, satisfactory operation will be achieved by accepting the default values. Please contact trilogy Technical Support for more assistance.

9.5.1 Jitter buffer

The jitter buffer attempts to compensate for audio packets arriving late or early. The audio from the packets is fed into a buffer, the jitter buffer. The buffer fills until it is nominally half fall then audio data is taken out of the buffer and fed to its destination (speaker, Gemini host). In an ideal world, as much audio data enters the buffer as is taken out and thus the buffer always remains half full. In practice this is not the case, not only does network unreliability potentially make the audio packets arrive late or early but the fact that the host runs asynchronously ensures that unless a correction is applied, the buffer will run dry or fill up at some point. Correction is achieved by throwing away or duplicating audio samples to ensure the buffer stays nominally half full. Please note that as the system is asynchronous, this **will** happen regardless; fortunately for speech, this approach is acceptable. The jitter buffer can be configured using two parameters.

Item	Description
Jitter buffer size	This value sets the overall size of the buffer. The size must be set large enough to cope with the normal 'wander' of the audio packets. If it is too low the buffer will fail and entire packets of data will have to be discarded causing noticeable discontinuities in the audio. Setting too high a value does not improve audio quality but does worsen latency; the higher the value, the more lag there will be. A value of '5' is appropriate for unstressed private networks. The buffer size should be set just high enough
Jitter buffer reaction	to ensure there is no failure. This value determines how quickly samples are thrown away or duplicated whenever the buffer is not half full. Too low (quick) and samples may be affected more than they need to be. Too high (slow) and the buffer could fill up leading to dropped packets. A value of '7' is appropriate for unstressed private networks.

9.5.2 Sequence Buffer

Audio packets are transferred using RTP which in turn uses UDP packets. The network may cause the packets to be sent out of sequence. The RTP mechanism can correct for this but to do this the incoming packets must be buffered. Whilst a bigger buffer can cope with more packets out of order it also introduces more latency. Thus the buffer size can be configured to trade sequence correction against latency.

The buffer is configured with one parameter as follows.

Sequence buffer size	This value sets the overall size of the buffer. The size must be set
	large enough for a reasonable worst-case out of sequence event
	but no larger, so that audio latency is kept to a minimum.
	Note that a value of '1' indicates there is no buffer. A value of '1'
	is appropriate for unstressed private networks. The buffer size
	should be set just high enough to ensure there is no failure.

9.6 **TROUBLESHOOTING**

9.6.1 Hints and tips

- Ensure that the network connection is plugged into the correct RJ45; this is the one on the far right when looking at the rear of the control panel.
- Check the lights on the RJ45 connectors are active. Normally, the Orange LED is permanently on to indicate a 100 Mb/s link and the green LED will flash to indicate data activity.
- Ensure that the panel is correctly configured:
 - Check the panel type is set correctly
 - Ensure the panel address is set correctly
 - Ensure the host connection is configured as required
- Check the first page of both the network setup and connect setup menus. Both of these pages contain status information which is dynamically updated.
- Check that the correct password has been entered. The network connect error string will indicate if the password is wrong.

9.6.2 FAQ

Which IP ports does the 'system' use? IP port numbers 50000, 50001 and 50002.

What if more than one panel have the same IP? This will upset the functionality and correct operation is not guaranteed. In common with all networking equipment, all devices must have unique IP addresses. For this reason, enabling DHCP is preferable to setting addresses manually.

Do I have to set MAC addresses? No, all devices have hard coded unique MAC addresses – no programming is required.

What if more than one panel tries to connect to the same Subscriber? The first panel to attempt connection will win; the other panel will not connect. This could potentially lead to the wrong panel hijacking a Subscriber; setting passwords for critical Subscribers may assist in preventing malicious or inadvertent hijacking.

What if the expansion card IP address is changed? If panels are connected using the 'By IP' method then the panels will no longer connect – all panels will have to be reconfigured for the new address. If the panels are connected using the 'By Name' method, then the panels will continue to work without any intervention.

How are multiple expansion boards in one Host supported, assuming the expansion boards are routed into the same network? If the panels connect 'By IP' then the appropriate expansion board IP and Subscriber number must be entered in the Panel. Despite being part of the same Host, different IP addresses must be used depending on the subscriber number. If the panels are connected 'By Name' then there is only one Host name required to identify a Host and the user will be presented with a list of all Subscribers available on all the expansion boards. For example, if two expansion boards are fitted and connected to the same network, the user of the panel can connect to one of up to sixteen Subscribers. The fact that the Subscribers are distributed across multiple expansion boards is hidden from the user.

10. ADDITIONAL INFORMATION

10.1 CONTROL PANEL TALLIES

Panel tallies are used to show an operator which routes to and from their panel are currently active. A route can be active because an operator has chosen to speak or listen to someone else, or because another party has initiated a connection. Keys can be programmed with a variety of modes and the range of tallies reflects this. Tallies are also used to indicate transient states (e.g when local programming is underway) and error conditions (e.g. a route has been requested but is not currently available).

A total of 15 possible panel tally scenarios are identified below, although some of these are currently reserved for possible future use.

- Panels from the Trilogy product range have two independent, fixed colour LEDs.
- IRIS panels have one multicoloured LED plus a secondary graphic LED which appears on the OLED display.

	Trilog Beh		[,] Panel viour	IRIS Panel	Behaviour
	Scenario #	Speak	Listen		Display
		Tally	Tally	LED (Primary)	(Secondary)
TALK- ONLY	1	Solid	Off	Solid	Off
	2	Slow	Off	Slow	Off
	3	Med	Off	Med	Off
	4	Fast	Off	Fast	Off
LISTEN- ONLY	5	Off	Solid	Solid	Off
	6	Off	Slow	Slow	Off
	7	Off	Med	Med	Off
	8	Off	Fast	Fast	Off
TALK & LISTEN	9	Solid	Solid	Solid	Off
	10	Slow	Slow	Slow	Off
	11	Med	Med	Med	Off
	12	Fast	Fast	Fast	Off
	13	Solid	Med	Solid	Med
	14	Solid	Fast	Solid	Fast
	15	Med	Solid	Solid	Med
	16	Fast	Solid	Solid	Fast

The following chart shows the range of tallies for the two panel ranges.

Slow, Medium and Fast refer to the LED flash speeds.

The next table outlines Scenario 1 – 15 in operational terms.

Scenario #	Description
1	The panel is actively speaking to another party. This may have been initiated either by this panel or the other party.
2	Only used with non-touch panels if "On-Air Busy" logic is in place.
3	Reserved for future use.
4	Most commonly occurs when "speak" has been requested but is either inhibited or has failed (e.g. destination Host is offline or speak is inhibited). Also occurs when local panel assignment is underway.
5	The panel is actively listening to another party. This may have been initiated locally or by the other party (i.e. the other party is calling).
6	Only used if "Tally Holdup" logic is configured and triggered.
7	Only used if "Signal Presence" logic is configured and triggered.
8	Most commonly occurs when "listen" has been requested but is either inhibited or has failed (e.g. destination Host is offline or listen route is inhibited or muted). Also occurs when local panel assignment is underway.
9	Scenarios 1 plus 5
10	Scenarios 2 plus 6
11	Scenarios 3 plus 7
12	Scenarios 4 plus 8
13	Scenarios 1 plus 7
14	Scenarios 1 plus 8
15	Scenarios 3 plus 5
16	Scenarios 4 plus 5

10.2 HEADSET GPI INPUT FOR PTT (PRESS TO TALK)

In situations where a headset PTT facility is required, panels may be factory supplied as "GPI-3" status. Please note that this must be requested at time of purchase and is not available retrospectively.

Modified wiring is shown below:

Headset - 5 Pin XLR Fixed Socket

Pin	Function
1	Mic In (Screen)
2	Mic In
3	Headset Ground - common
4	Headset Out
5	GPI Input 1

To activate the GPI input, short pin 5 to pin 3.