GLENSOUND ELECTRONICS LTD.

Broadcast Equipment Manufacturers

**GDC
6432**

*Glensound
Digital Commentary*

GDC-6432
Glensound Digital Commentary System
Handbook

GLENSOUND ELECTRONICS LIMITED

GDC-6432 HANDBOOK

Table of Contents

List of Diagrams

Overview

The GDC-6432 Glensound Digital Commentary System is a two-part system, consisting of a Commentary Control Unit (dCCU) and a Commentators Unit (dCU). These two parts communicate through a digital link (either coaxial or Ethernet), which transfers 8 channels of bi-directional digital audio.

The dCCU Commentary Control Unit is a 19-inch 1U subrack-mounted unit which can optionally be fitted with a hardware control panel for detailed control of the system by skilled technicians. Alternatively, a software control panel can be accessed through the embedded web server inside the dCCU, allowing the technician to control the system from a remote location.

The dCU Commentators Unit is an easy to use console designed for use by commentators during a broadcast. It provides microphone inputs and headphone outputs, and easy control of Program and Talkback circuits. The exact features available on the dCU depend on the model purchased. Refer to the relevant dCU manual for more details.

The GDC-6432 utilises a proprietary digital mixer, which is capable of simultaneously mixing 64 audio inputs to produce 32 separate audio outputs. The mixer is highly configurable, however the GDC-6432 is supplied with a default configuration that will be suitable for the needs of most users. Re-configuring the mixer is therefore optional. The provided software tool can be used to re-configure the mixer, if this is desired.

The GDC-6432 has 16 channels of CCU audio input and 16 channels of CCU audio output. The inputs and outputs may be either digital or analogue, depending on customer requirements. If digital inputs or outputs are fitted, they will be in the form of eight 2-channel 48kHz 24 bit AES3/EBU.

The system also provides a 2-channel solid-state Ident recorder, optional compression of commentator inputs (with a configurable compressor response), configurable DC Loops, and configurable dCU key actions. Configuration of these features is optional, as the default settings will be suitable for the needs of most users.

This version of the manual is applicable to the following component versions:

dCCU Basestation Firmware:	V1.003
Web Interface:	V1.23
Default Mixer Configuration:	V1.02

Panel Drawings
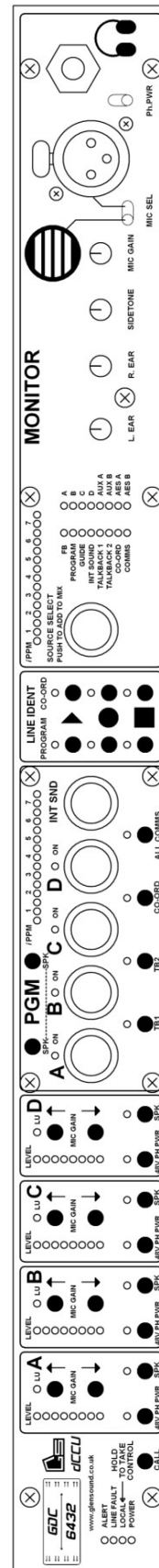
Principle of operation

Digital Link

The Commentary Control Unit (dCCU) and the Commentators Unit (dCU) communicate via a digital link, which carries 8 channels of bi-directional 48kHz 24 bit digital audio, as well as internal control data.

The standard digital link is a 75 ohm coaxial link, which is always available. This link will function with a cable length of up to 400 meters (cable type dependant). Power (48V) is provided from the dCCU to the dCU using a technology similar to Power Over Ethernet (POE). This means that power will only be provided when a compatible dCU is detected, thus protecting any incorrectly connected device.

An Ethernet link may be fitted, which can be used as an alternative to the coaxial link. The data rate is fixed at "100 BASE-T", and a full duplex connection is required. The dCCU is capable of supplying Power Over Ethernet (POE), and the dCU is capable of being powered by POE. Alternatively, the dCU can be locally powered. The link between the dCCU and dCU must exist on its own private LAN, which can be achieved using either a direct connection, or VLAN technology in a managed switch environment.

Copper Ethernet will operate with a cable length of up to 100 meters.

Configurable Digital Mixer

The GDC-6432 utilises a proprietary digital mixer, which is capable of simultaneously mixing 64 audio inputs to produce 32 separate audio outputs. These inputs and outputs include the CCU inputs and outputs on the rear panel of the dCCU, but also include fixed audio paths such as the dCU microphones and headphones. The mixer is highly configurable, however the GDC-6432 is supplied with a default configuration that will be suitable for the needs of most users. Re-configuring the mixer is therefore optional. A software tool can be provided to re-configure the mixer, if this is desired.

When configuring the mixer, any combination of inputs can be mixed together to produce each output. The level of each input to be mixed can be altered using up to four separate *"controls"*. These *controls* represent real-world values, such as a fader level, a switch state, or a DC Loop input. For example, the level of an input mixed into a particular output can be altered by a fader, and muted if a switch is in a particular state, while at the same time, the level of that same input mixed into a different output can be controlled by another fader and another switch.

A diagram demonstrating the operation of the mixer, as well as a block digram showing how the mixer is routed in the dCCU, are provided in the *Diagrams* section of the manual.

CCU Audio Inputs and Outputs

The GDC-6432 has 16 channels of CCU audio input and 16 channels of CCU audio output, arranged in 'D' type connectors on the rear of the basestation. Wiring information is provided for these connectors in the *Further Information* section of the manual. Depending on customer requirements, either analogue or digital inputs will be fitted, and either analogue or digital

outputs will be fitted. If digital inputs or outputs are fitted, they will be in the form of eight 2-channel 48kHz 24 bit AES3/EBU.

In the default mixer configuration, some of these inputs and outputs are used for particular functions, such as Program, International Sound, Talkbacks, etc. A complete listing of the functions defined for these inputs and outputs is given in the *Further Information* section of the manual.

dCCU Control Panels

The GDC-6432 can be controlled by one of two possible control panels. Depending on the exact model of dCCU purchased, a hardware control panel may be fitted to the front of the GDC-6432 basestation. Alternatively, the GDC-6432 can be controlled remotely using a software control panel, which communicates with the basestation via the network interface. If the hardware control panel is fitted then both options are available, but only one of them can be *"in control"* at a time, and the other must *"take control"* before it can be used. Control should not be transferred between the hardware and software control panels while the GDC-6432 is in active use. The following sections describe each type of control panel in detail.

dCCU HARDWARE CONTROL PANEL

The hardware control panel (if fitted) is divided into four main sections:

- **The input gains section** provides control of the input gain and phantom power for each of the dCU commentator channels. A LED meter is provided for each channel to indicate the input level, and a line-up LED indicates when the input is at unity gain.

  This section also houses the SPK keys, which allow the technician to speak to individual commentators. Alternatively, the technician can "call" individual commentators by holding the CALL key (on the left-side of the panel) and pressing the appropriate SPK key. When a commentator presses the "Speak to Tech" key on the dCU, the LED above that commentator's SPK key on the hardware panel will flash, indicating to the technician that the commentator wishes to speak.

- **The mixer section** houses the main faders for each of the commentator channels, as well as the International Sound, and a LED above each fader indicates if that channel is on-air. A 15 LED PPM meter is provided, which displays the main Program mix. When any of the main faders are pressed in, the level of that fader is displayed instead of the Program mix on the PPM meter, and that channel is soloed on the monitor.

  This section also houses the Speak keys for each of the four Talkbacks; TB1, TB2, CO-ORD and ALL COMMS. The ALL COMMS talkback allows the technician to speak to all of the commentators at once. The technician can "call" individual Talkbacks (or all commentators, using the ALL COMMS talkback) by holding the CALL key (on the left-side of the panel) and pressing the appropriate talkback key.

- **The Ident section** provides controls to play, record and stop either of the two Ident channels. To start playing, the play key must be held down for three seconds. To start recording, the record key must be held down for three seconds, during which time the record LED will flash. The recording begins when the record LED turns on permanently, and will end when the record key is released, or when the record time

expires. If the record continues to flash after three seconds, then the recorder is not ready.

- **The monitoring section** allows the technician to select up to 16 different audio feeds to monitor at once. A 15 LED PPM meter displays this monitoring mix. To add or remove a feed from the monitoring mix, the technician uses the knob to select the appropriate feed, then presses the knob in, to toggle its state. In the default mixer configuration, this monitor mix is fed to the left ear of the headphones output on the hardware panel, and its level is adjustable via the L . EAR knob. The right ear is fed from a mix of the Talkback circuits (including ALL COMMS), and its level is adjustable via the R . EAR knob.

  When the technician presses one of the channel or International Sound faders in, that channel will be soloed in the monitor mix. Also, when the technician speaks to one of the commentators or Talkbacks, that Talkback is soloed in the Talkback monitor mix.

  The technician can select between the built-in microphone or an external microphone (either dynamic of phantom powered), and can adjust the gain and sidetone via the MIC GAIN and SIDETONE knobs, respectively.

Expansion Bus

The Expansion Bus is a 15-way 'D' type connector on the rear of the GDC-6432 basestation, which is only fitted if the hardware control panel is fitted. Its purpose is to allow the easy use of multiple dCCU hardware panels at once. When the Expansion Buses of multiple dCCUs are connected together, the headphones output of each unit will be mixed together and shared between all the units. This means that the technician can monitor the mixes and Talkbacks of all units at once, regardless of which unit's headphones output is used. The Expansion Bus also causes monitor soloing to affect all units together.

A termination plug is provided for the Expansion Bus, which must always be fitted on the end of a chain of dCCUs. Details of how to make up Expansion Bus cables and an Expansion Bus termination plug are provided in the *Further Information* section of the manual.

Note that the termination plug <u>MUST</u> always be fitted to the Expansion Bus, even if only one dCCU is in use.

The Expansion Bus also provides a monitor output, to enable the use of an external loudspeaker for the technician's monitor instead of the headphones output on the hardware control panel. Note that this is a balanced mono line level output, so it should only be used with a powered loudspeaker.

Taking control

On the left-side of the hardware control panel there is an LED labelled "Local". This indicates whether the hardware panel is in control or not. If the Local LED is not lit, then the dCCU is under the control of the software control panel. Whilst in this mode, none of the switches or knobs on the hardware panel will be functional. Control can be taken back by holding down the "Call" key for 10 seconds, until the Local LED turns on. Note that when control is transferred between the software and hardware panels, the main commentators faders are reset. Therefore, control should <u>NEVER</u> be transferred between hardware and software panels whilst the GDC-6432 is in active use.

The software control panel is a Java applet that resides on the GDC-6432 embedded web server, and provides the technician with control over the unit via a web browser. The control panel can optionally appear embedded in the web page, or detached as a separate window. Alternatively, the control panel can be downloaded from the web server and used as a stand-alone Java application.

The exact appearance of the software control panel is dependant on the model of dCU Commentators Unit in use. As an example, the software control panel for the dCU3 is shown in Figure 1.
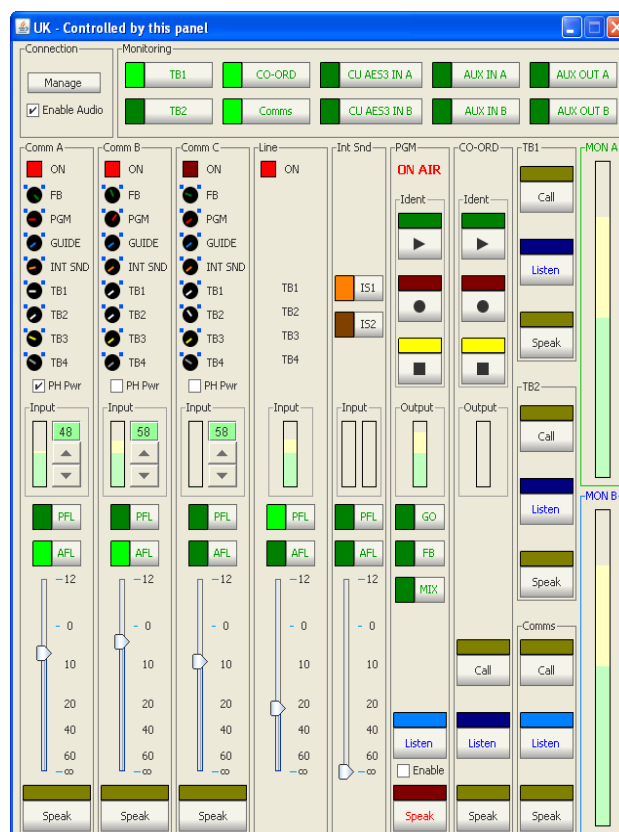
Figure 1: The software control panel for the dCU3

Connecting

The software control panel will attempt to connect to the GDC-6432 as soon as it loads. Only one remote user can be connected at a time, so if another user is already connected, that user will be given the opportunity to reject the connection request, or to release control to it. If the connected user does neither, the requesting user will be given control after a period of time. The user can manually connect or disconnect using the Manage Connection Dialog, accessible via the Manage button. This dialog can also be used to rename the unit.

The user can control multiple GDC-6432 units at the same time by opening multiple web browser tabs, each pointing at a different GDC-6432 unit.

Taking control

The software control panel will automatically take control from the hardware control panel as soon as it connects. Control can be taken manually by clicking on the Connect button in the

Manage Connection Dialog. Note that when control is transferred between the software and hardware panels, the main commentators faders are reset. Therefore, control should <u>NEVER</u> be transferred between hardware and software panels whilst the GDC-6432 is in active use. This does not apply when transferring control between two software control panels. Note that control is <u>not</u> automatically transferred back to the hardware control panel when the software control panel disconnects, so it is safe to close the software control panel while the unit is in active use.

Monitoring

The software control panel has two groups of monitor buttons. Green monitor buttons symbolise the left ear mix, and blue monitor buttons symbolise the right ear mix. Quickly dabbing a monitor button will delatch the other monitors in the same group. Slowly pressing a monitor button will add that monitor to the group's mix. Holding down a monitor button will solo that monitor. If multiple instances of the software control panel are running, they will share the same monitor buses. While the technician is speaking to a particular commentator or Talkback, that Talkback will be soloed.

Audio Over IP

An Audio Over IP feature is provided, as a convenient way of enabling the technician to speak to the commentators and listen to the monitoring. This feature is disabled by default, and can be enabled by ticking the "Enable Audio" checkbox in the top-left of the control panel. Note that in order to ensure maximum quality, the audio is sent uncompressed. For this reason, the Audio Over IP feature is not suitable for use over the open Internet. Alternatively, it may be desirable to route the audio to and from the remote technician by another means. This can be achieved using the CCU audio inputs and outputs, and a custom mixer configuration.

dCU Commentators Unit

The digital link between the dCCU and the dCU carries 8 channels of bi-directional digital audio. The audio channels arriving from the dCU are fed into the mixer in both compressed and uncompressed forms. The response curve of the compressor can optionally be adjusted, using the mixer configuration software.

The actions of the keys on the dCU (such as PROGRAM, TALKBACKs, etc.) can be configured to suit individual requirements using configuration software. Each key can be set as momentary, latching, fixed on, or fixed off. Additionally, each key may be set to suppress or unlatch certain other keys when pressed. A key configuration suitable for most uses is supplied by default, so configuration of the key actions is optional.

The exact features available on the Commentators Unit depend on the model purchased. Refer to the relevant dCU manual for more details.

Ident

The GDC-6432 contains a two-channel solid-state digital Ident recorder/player. Both channels can record and playback independently. The record time is approximately 46 seconds per channel, and the recorder will automatically generate tone to fill up this record time. In the default mixer configuration, the two Ident channels are used for PROGRAM and CO-ORD, and the recording source is the microphone input on the hardware or software control panel (whichever is in control).

DC Loops

The GDC-6432 provides eight general-purpose I/O pins (DC Loops) arranged in a 15-way 'D' type connector on the rear of the basestation. Wiring information is provided in the *Further Information* section of the manual. These DC Loops are configured as "open-collector pull-downs", which means that each DC Loop can be used as either an input or an output. An external pull-up resistor must be fitted on each DC Loop output. Care must be taken to ensure that the voltage on each pin does not exceed 12V, and that the current driven through each pin does not exceed 100mA. Each DC Loop is considered to be "on" when it is pulled-down to 0V, and "off" when it is not pulled-down.

The function of each DC Loop is determined by the mixer configuration. A listing of the functions defined for each DC Loop in the default mixer configuration is given in the *Further Information* section of the manual.

USB Filesystem

The GDC-6432 contains a small (8 MB) filesystem, accessible through the USB connector on the rear of the basestation. This filesystem stores the mixer configuration, the embedded web server interface and the IP configuration settings. At the present time, it is necessary to use this filesystem when uploading mixer configurations, changing the IP configuration, updating the web interface and uploading firmware upgrades released by Glensound. In a future version of firmware, these functions will also be provided remotely through the web interface.

Installation and Setup Procedure

Installation of Basestation Unit

1. The GDC-6432-dCCU unit should be mounted in a 19" rack. It will occupy 1U of rack space. If a 19" rack is not available, the unit can be placed on a flat surface. If mounted in a rack, ensure that the front of the unit is securely fastened to the rack.

2. Ensure that adequate ventilation is provided.

3. Connect the 9-way 'D' type audio input and output ports as required.

4. If required, connect the "48kHz WORD CLOCK" coaxial connector to an appropriate clock source.

5. Connect the 15-way 'D' type "DC LOOP I/O" port as required.

6. If the software control panel (or any other web interface features) are to be used, connect the "ETHERNET CONTROL" connector to an appropriate TCP/IP router.

7. If the coaxial link is to be used, connect a 75 ohm coaxial cable to the coaxial connector labelled "COMMENTATORS BOX" on the rear of the basestation. This cable should be appropriately routed to a GDC-6432-dCU Commentators Unit.

   Alternatively if the Ethernet link is to be used, connect an RJ45 (CAT-5) cable to the RJ45 "ETHERNET" socket inside the "COMMENTATORS BOX" collection line on the rear of the basestation. This cable should be appropriately routed as per the customer's requirements.

8. **<u>IMPORTANT</u> :** If multiple basestation units that include the hardware control panel are installed together, connect the appropriate Expansion Bus cable to the 15-way 'D' type "EXPANSION" port on each basestation, and fit the supplied termination plug to the end of the cable. Alternatively if only one unit that includes the hardware control panel is installed, fit the supplied termination plug directly to the "EXPANSION" port.

9. Connect the basestation unit to a mains power supply.

10. Configure the IP Address of the unit, as detailed below.

Configuration of IP Address

Note that at the present time, it is necessary to use the USB filesystem to perform this function. In a future version of firmware, this function will also be provided remotely through the web interface.

The GDC-6432-dCCU units are supplied with DHCP enabled, however it is necessary to know the IP Address of a unit in order to use its web interface. Manual configuration of the IP Address is therefore recommended.

1. Connect the USB port on the rear of the dCCU basestation to a computer, and open the drive labelled "GDC-6432" in Windows Explorer.

2. Open the file named `IPconfig.txt` in the root directory of the filesystem, using Notepad.

3. This file has a "key=value" structure, and the key names are self-explanatory. The *dhcp_enabled* field is a boolean, and should be set to 1 for enabled or 0 for disabled.

4. Save the file, then cycle the power.

Uploading a New Configuration

Note that at the present time, it is necessary to use the USB filesystem to perform this function. In a future version of firmware, this function will also be provided remotely through the web interface.

1. A valid GDC-6432 configuration consists of a collection of approximately 14 files.

2. Connect the USB port on the rear of the dCCU basestation to a computer , and open the drive labelled "GDC-6432" in Windows Explorer.

3. Navigate to the `\config\01 directory`. Note that in this initial release of the firmware and web interface, only configuration slot 1 is usable.

4. Backup the existing files in the directory if you don't want to loose them.

5. Replace the existing files with the new files.

6. Optionally, edit the file called `name.txt`. Replace the first line with a short description of the new mixer configuration, and the second line with a text string indicating a version number. In a future version of the firmware and web interface, this description and version number will be used to select the desired configuration to be used.

7. Cause the dCCU to reload configuration data by cycling the power, or holding the "CALL" key on the hardware control panel for 10 seconds, or re-connecting the dCCU software control panel.

Further Information

Default Mixer Configuration

CCU AUDIO INPUTS

The following functions are defined for the CCU audio inputs in the default mixer configuration:

AES3 Channel	Mixer Channel	Function
1a	1	---
1b	2	---
2a	3	---
2b	4	---
3a	5	---
3b	6	---
4a	7	---
4b	8	---
5a	9	Program Feedback
5b	10	International Sound 1
6a	11	Guide
6b	12	International Sound 2
7a	13	Talkback 1 Feedback
7b	14	Talkback 2 Feedback
8a	15	CO-ORD Feedback
8b	16	TECH Feedback

CCU AUDIO OUTPUTS

The following functions are defined for the CCU outputs in the default mixer configuration:

AES3 Channel	Mixer Channel	Function
1a	1	dCU Channel 1 Uncompressed (Commentator A on dCU3) Speaking to Program
1b	2	dCU Channel 2 Uncompressed (Commentator B on dCU3) Speaking to Program
2a	3	dCU Channel 3 Uncompressed (Commentator C on dCU3) Speaking to Program
2b	4	dCU Channel 4 Uncompressed (Line Input on dCU3) Speaking to Program
3a	5	dCU Channel 5 Uncompressed (AUX A on dCU3)
3b	6	dCU Channel 6 Uncompressed (AUX B on dCU3)
4a	7	dCU Channel 7 Uncompressed (AES A on dCU3)
4b	8	dCU Channel 8 Uncompressed (AES B on dCU3)
5a	9	Program Go, with International Sound
5b	10	Program Go, without International Sound
6a	11	Program Mix (without Ident)
6b	12	---
7a	13	Talkback 1 Go
7b	14	Talkback 2 Go
8a	15	CO-ORD Go
8b	16	TECH Go

DC LOOPS

The following functions are defined for the DC Loops in the default mixer configuration:

Number	Type	Function
1	Output	dCU Channel 1 – Speak To Program
2	Output	dCU Channel 2 – Speak To Program
3	Output	dCU Channel 3 – Speak To Program
4	Output	dCU Channel 4 – Speak To Program
5	Output	dCU Channel 1 – Speak To CO-ORD
6	Output	dCU Channel 2 – Speak To CO-ORD
7	Output	dCU Channel 3 – Speak To CO-ORD
8	Output	dCU Channel 4 – Speak To CO-ORD

Wiring Information

The dCCU is available in several different I/O configurations. It is important to note that the pin-out is not the same on all configurations.

All Digital I/O with 2 x male, and 2 x female D9 connectors

The digital inputs/outputs are each arranged in two 9-way 'D' type panel-mounted connectors as follows:

Pin	Channel
1	GND
2	1a
3	2a
4	3a
5	4a
6	1b
7	2b
8	3b
9	4b

Pin	Channel
1	GND
2	5a
3	6a
4	7a
5	8a
6	5b
7	6b
8	7b
9	8b

The input panel-mounted connectors are female, while the output panel-mounted connectors are male.

Modular (Hybrid) Analogue or Digital with 4 x male D9, and 4 x female D9 connectors.

The format of the input or output will depend upon the type of module fitted to the dCCU. Each module handles two input and two output channels. Digital modules require two pins to per input or output, analogue channels require four pins.

The following modules are available:

1. Differential AES3.

2. Single ended (coaxial) AES3.

3. Differential AES3 with sample rate converter.

4. Analogue.

GDC-6432 Hybrid IO AES3 Input channels

Cable mounted 9 way D-type male

D9	Signal	XLR
1	GND	
2	AES1+	Pin 2
6	AES1-	Pin 3
3	N/C	
7	N/C	
4	AES2+	Pin 2
8	AES2-	Pin 3
5	N/C	
9	N/C	

GDC-6432 Hybrid IO AES3 Output channels

Cable mounted 9 way D-type female

D9	Signal	XLR
1	GND	
2	AES1+	Pin 2
6	AES1-	Pin 3
3	N/C	
7	N/C	
4	AES3+	Pin 2
8	AES3-	Pin 3
5	N/C	
9	N/C	

GDC-6432 Hybrid IO Analogue Input channels

Cable mounted 9 way D-type male

D9	Signal	XLR
1	GND	
2	An1+	Pin 2
6	An1-	Pin 3
3	An2+	Pin 2
7	An2-	Pin 3
4	An3+	Pin 2
8	An3-	Pin 3
5	An4+	Pin 3
9	An4-	Pin 2

GDC-6432 Hybrid IO Analogue Output channels

Cable mounted 9 way D-type female

D9	Signal	XLR
1	GND	
2	An1+	Pin 2
6	An1-	Pin 3
3	An2+	Pin 2
7	An2-	Pin 3
4	An3+	Pin 2
8	An3-	Pin 3
5	An4+	Pin 3
9	An4-	Pin 2

GDC-6432 Hybrid IO 75 Ohm Coaxial AES3 Input channels

Cable mounted 9 way D-type male

D9	Signal	75 Ohm BNC Socket
1	GND	
2	Coax 1 shield (Connect to pin 1)	Outer
6	Coax 1 inner	Inner
3	N/C	
7	N/C	
4	Coax 2 shield (Connect to pin 1)	Outer
8	Coax 2 inner	Inner
5	N/C	
9	N/C	

GDC-6432 Hybrid IO 75 Ohm Coaxial AES3 Output channels

Cable mounted 9 way D-type female

D9	Signal	75 Ohm BNC Socket
1	GND	
2	Coax 1 shield (Connect to pin 1)	Outer
6	Coax 1 inner	Inner
3	N/C	
7	N/C	
4	Coax 2 shield (Connect to pin 1)	Outer
8	Coax 2 inner	Inner
5	N/C	
9	N/C	

The input panel-mounted connectors are female, while the output panel-mounted connectors are male.

DC LOOPS

Note that the DC Loops panel-mounted connector is female.

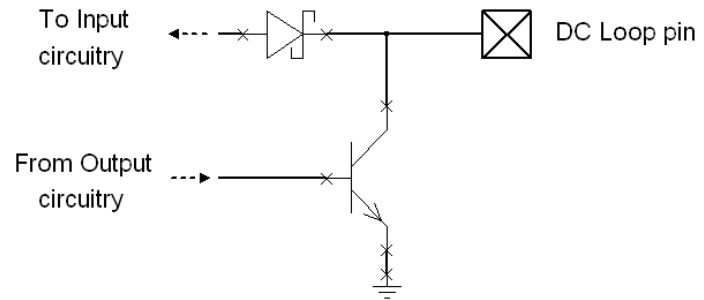| Pin	DC Loop
1	DC Loop 1
2	DC Loop 2
3	DC Loop 3
4	DC Loop 4
5	DC Loop 5
6	DC Loop 6
7	DC Loop 7
8	DC Loop 8
9	GND
10	GND
11	GND
12	GND
13	GND
14	GND
15	GND

Figure 2: Schematic of a DC Loop pin

EXPANSION BUS

The expansion bus is arranged as a 15-way 'D' type female connector, as follows:

Pin	Function
1	Reserved
2	Technician's microphone (PHASE) [1]
3	GND
4	Monitor Bus A (MATE) [1]
5	Monitor Bus B (MATE) [1]
6	External LS (PHASE) [3]
7	GND
8	Data Bus [2]
9	Reserved
10	Technician's Microphone (MATE) [1]
11	Monitor Bus A (PHASE) [1]
12	Monitor Bus B (PHASE) [1]
13	GND
14	External LS (MATE) [3]
15	Data Bus [2]

Notes:

(1) These signals are a current mix bus, therefore care must be taken to ensure they are correctly terminated at all times. See the "Expansion Bus Termination Plug" instructions below.

(2) The data bus pins must be correctly terminated at all times. See the "Expansion Bus Termination Plug" instructions below.

(3) This is a balanced mono line level output, so it should only be used with a powered loudspeaker.
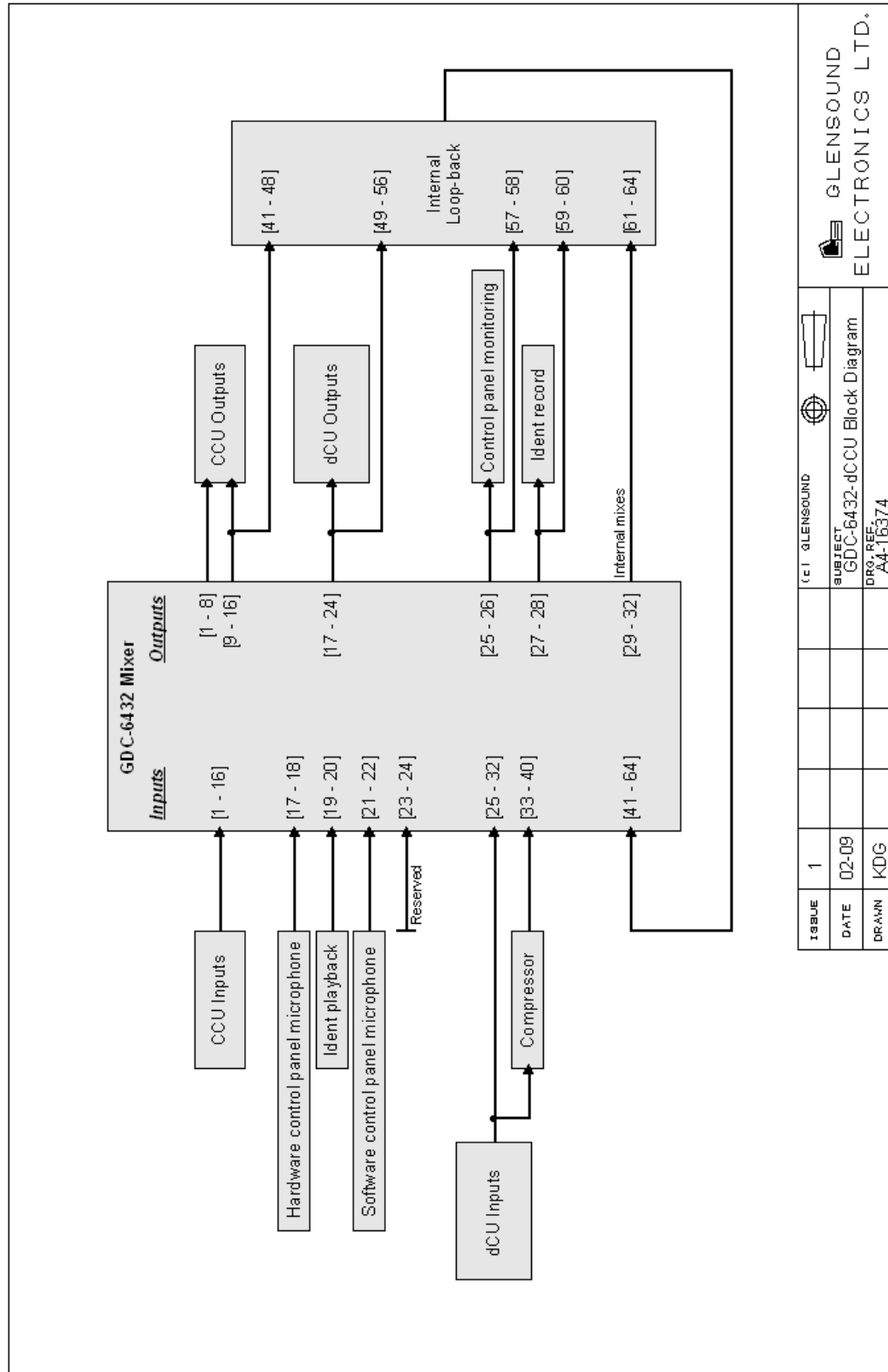
EXPANSION BUS TERMINATION PLUG

A suitable termination plug for the Expansion Bus will be a male connector having the following terminations fitted:

- 600 ohm (2 x 300 ohm in series) resistance between pins 2 and 10
- 600 ohm (2 x 300 ohm in series) resistance between pins 4 and 11
- 600 ohm (2 x 300 ohm in series) resistance between pins 5 and 12
- 110 ohm resistance between pins 8 and 15

EXPANSION BUS CABLE

A suitable Expansion Bus cable will be a 15-way IDC ribbon cable connecting multiple 15-way 'D' type male connectors (each of which will plug into a basestation), and terminated with a 15-way 'D' type female connector, into which the termination plug should be fitted. Note that the Expansion Bus panel-mounted connector is female.

Diagrams

GDC-6432 Block Diagram

GDC-6432 Mixer

GDC-6432 Mixer
64 Inputs : 32 Outputs

Input 64
Input n
Input 2
Input 1

Mixer Inputs

Output n

CONTROL A
CONTROL B
CONTROL C
CONTROL D

Real World Values
Fader levels
Switch states
DC Loops
etc.

Mixer Configuration File

Any combination of inputs can be mixed together to produce each output

			(c) GLENSOUND		
			SUBJECT GDC-6432 Mixer		
			DRG. REF. A4-16372		
ISSUE	1			GLENSOUND	
DATE	02-09			ELECTRONICS LTD.	
DRAWN	KDG				