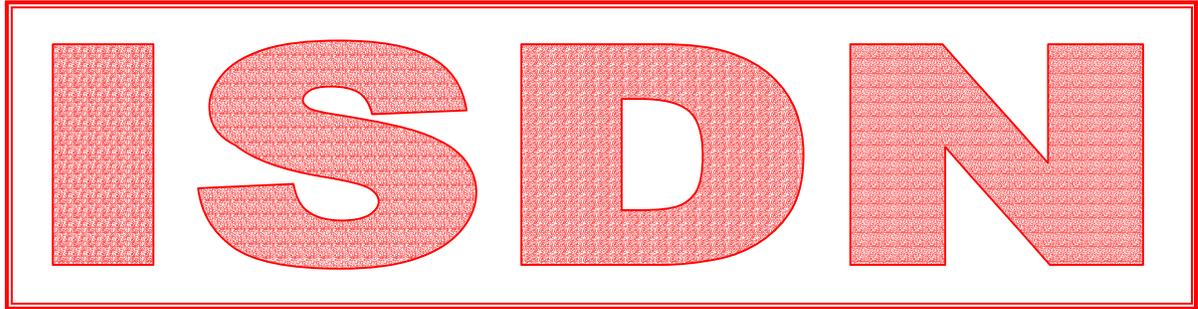


# **GLENSOUND ELECTRONICS LTD**



**GSGC6 & GSGC7**

**ISDN SUBRACK**

**&**

**CONTROLLER**

**PRODUCT DETAILS**

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# **G GLENSOUND ELECTRONICS LTD**

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Date 03/07/97

File AP06-145

Issue 9

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## **GSGC6 & GSGC7**

### **ISDN MIXER & CONTROLLER**

### **PRODUCT DETAILS**

<b><u>GENERAL</u></b>	(Pink Sheets)
Approvals	AP72-02
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# APPROVALS

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## C E

Both the GSGC6 and GSGC7 conform to the requirements of EMC DIRECTIVE 89/336/EEC

Emissions Standards EN 50081-1

Immunity Standards EN 50082-1

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### **BABT APPROVAL REQUIREMENTS FOR THE UNITED KINGDOM**

The GSGC6 incorporates a Dataflex Design ISDN Basic Rate Module which has been approved by the British Approvals Board for Telecommunication (BABT) for connection to the Integrated Services Digital Network (ISDN). The following approval number has been given to this product:

**NS/3010/5/P/603977**

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### **NET 3 APPROVAL**

The GSGC6 is fully approved for use as a digital terminal adapter on any PSTN using a basic rate access interface compatible with CCITT I.420 (NET3).

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### **BRIDGING CTR APPROVAL**

The terminal adaptor used in this unit is the Dataflex IM90C module. This module has bridging CTR approval so that the GSGC6 units are approved for use in any country in the EEC

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# GENERAL INFORMATION

## GSGC6

This unit is a 1U subrack designed to provide ISDN facilities in a studio, it contains a terminal adapter, a mains power supply, some control electronics and space for 1 or 2 codec type cards.

The terminal adapter is a 'Dataflex' IM90 module. This is a twin unit capable of dealing with both B channels of an ISDN 2 circuit at the same time. If the GSGC6 is fitted with 2 codec cards it can be considered as two completely independent units. These are known as PORT 1 and PORT 2. The front panel (See drawing number A2-12822) has LEDs to show the state of port 1 and port 2.

There are three ways of controlling a GSGC6:-

First, it is possible to use the unit with very little extra equipment. The GSGC6 can be set to auto-answer incoming calls. It is also possible to store two numbers, one in port 1 and one in port 2. Either number will be automatically dialled if the corresponding DC loop is made on a rear panel connector

Second, it is possible to remote control it from a computer terminal using the 2 off RS232 connectors fitted on the rear panel. The command language used, is listed later in this book.

Finally we manufacture a dedicated controller type GSGC7 .

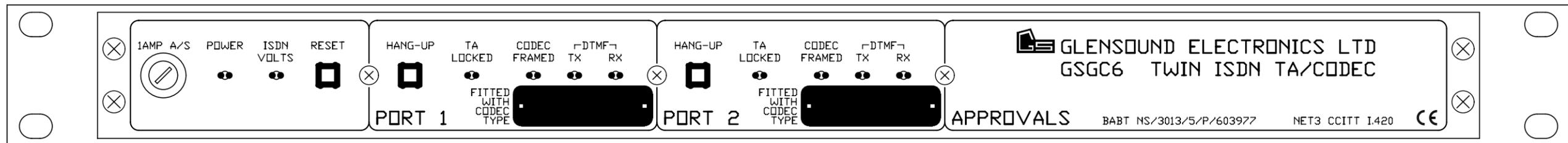
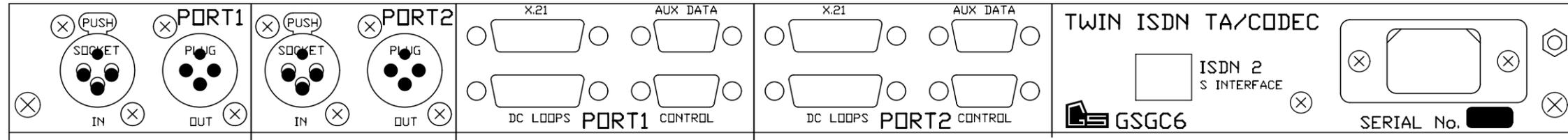
## GSGC7

This unit has been specifically developed to control the GSGC6. Our drawing number A4-12866 shows the general facilities. It would normally be positioned in a studio control room and remote control the GSGC6 which would be located in an apparatus room.

Used to originate and answer calls , it contains a dial, a display, and some LEDs. These LEDs indicate the state of the ISDN line and the Codec

Up to 30 ISDN numbers can be held in non volatile store. These can be given names as well as numbers to help the operator.

If the GSGC6 is fitted with two codecs, it is preferable to have two GSGC7s. These can then be used simultaneously in two different studios producing two totally independent programmes.



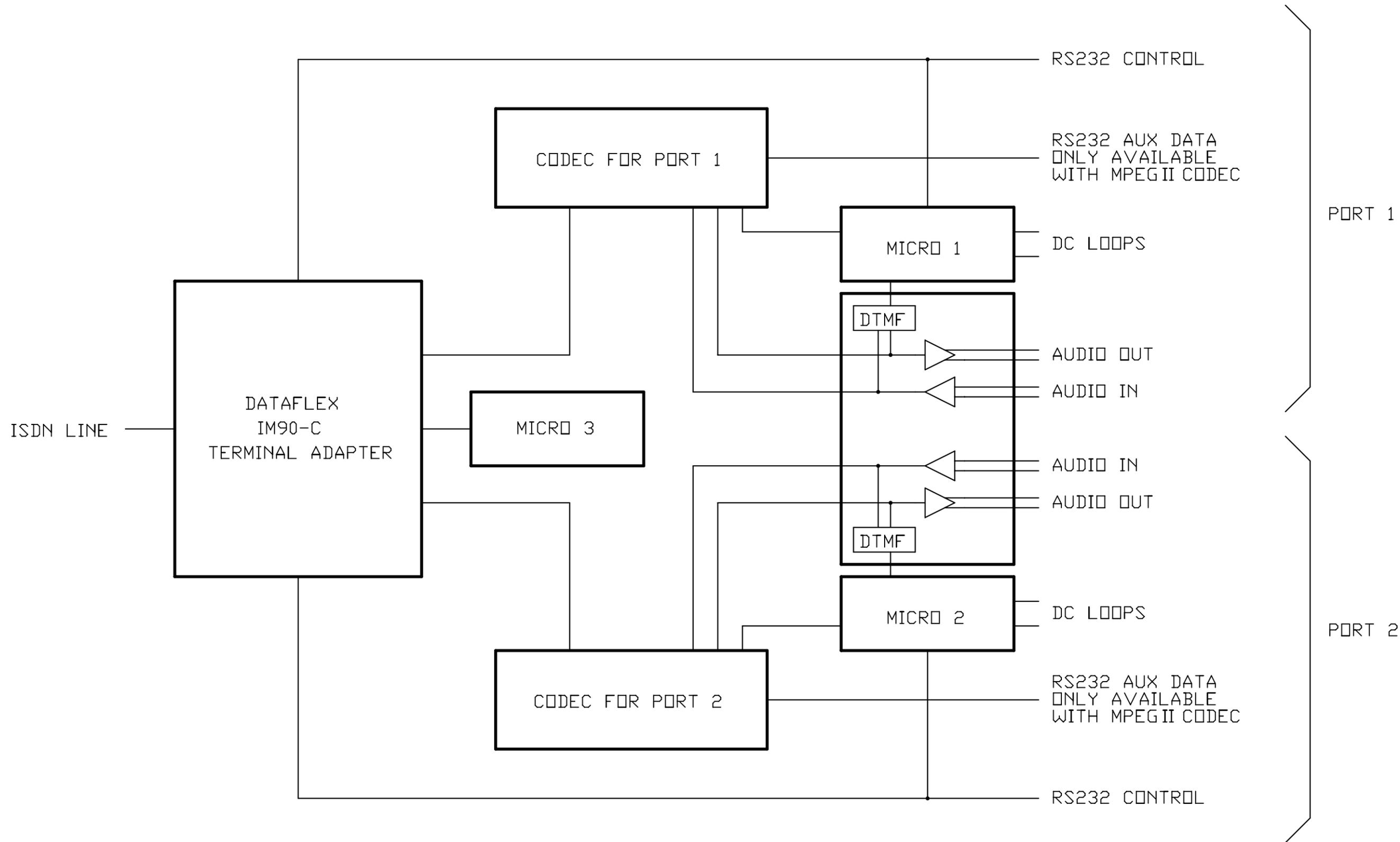

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**GLENSSOUND**  
 ELECTRONICS LTD

GSGC6 TWIN ISDN TA/CODEC  
 FRONT & REAR VIEWS

ISSUE	DATE
1	16-01-95
2	31-01-95
3	09-02-95

DRAWING NUMBER  
**A2-12822**

ORIGINALLY DRAWN USING PROTEL PCB



ISSUE	DATE	DRAWING NUMBER
1	02/02/95	A3-12821
2	04/07/95	
		DRAWN BY
		ORIGINALLY DRAWN USING EASYTRAX

# GSGC6 INSTALLATION

## GENERAL

The GSGC6 is a 1U subrack designed to be fitted in an equipment rack or apparatus room. Although there are some indicators and 3 controls on the front panel, it is not necessary to access these.

## MAINS

An IEC mains connector with a retaining clip is provided on the rear panel. The mains earth is internally connected to the metalwork. A terminal binding post is also provided adjacent to the mains connector to permit additional earth bonding.

## ISDN CONNECTION

Connection to the ISDN2 S bus is via a standard RJ45 socket. A 3 metre lead is provided with the GSGC6. If a longer lead is required or an extension is fitted to the ISDN2 point be very sure to use only cables to the correct specification.

## AUDIO

Audio circuits are balanced zero level on 3pin XLRs. The inputs are fixed sockets and the outputs are fixed plugs. Maximum digital code is sent with a +14dBu signal. The GSGC6 does not contain a limiter so any input greater than +14dBu will be clipped by the digital system. It is worth noting that digitally clipped signals can often upset the codec at the other end of the circuit. This is particularly true for G722 codecs with statistical frame locking. It is therefore good practise to ensure that the levels sent to the GSGC6 do not exceed +14dBu.

## CONTROL

Control of the GSGC6 can be from a computer system or from our dedicated controllers type GSGC7. The control ports are RS232 type ports on a 9 pin D fixed sockets wired to the IBM PC standard. A separate control port is provided for each codec position.

## DC LOOPS

A further 15pin D fixed plug is provided for each port. These provide various loop closures and can be used to operate lamps or other studio equipment. In addition switches can be fitted in the studio to:- 1) send a programmable DTMF tone 2) 'Hang Up' the terminal adapter 3) dial a previously stored ISDN number.

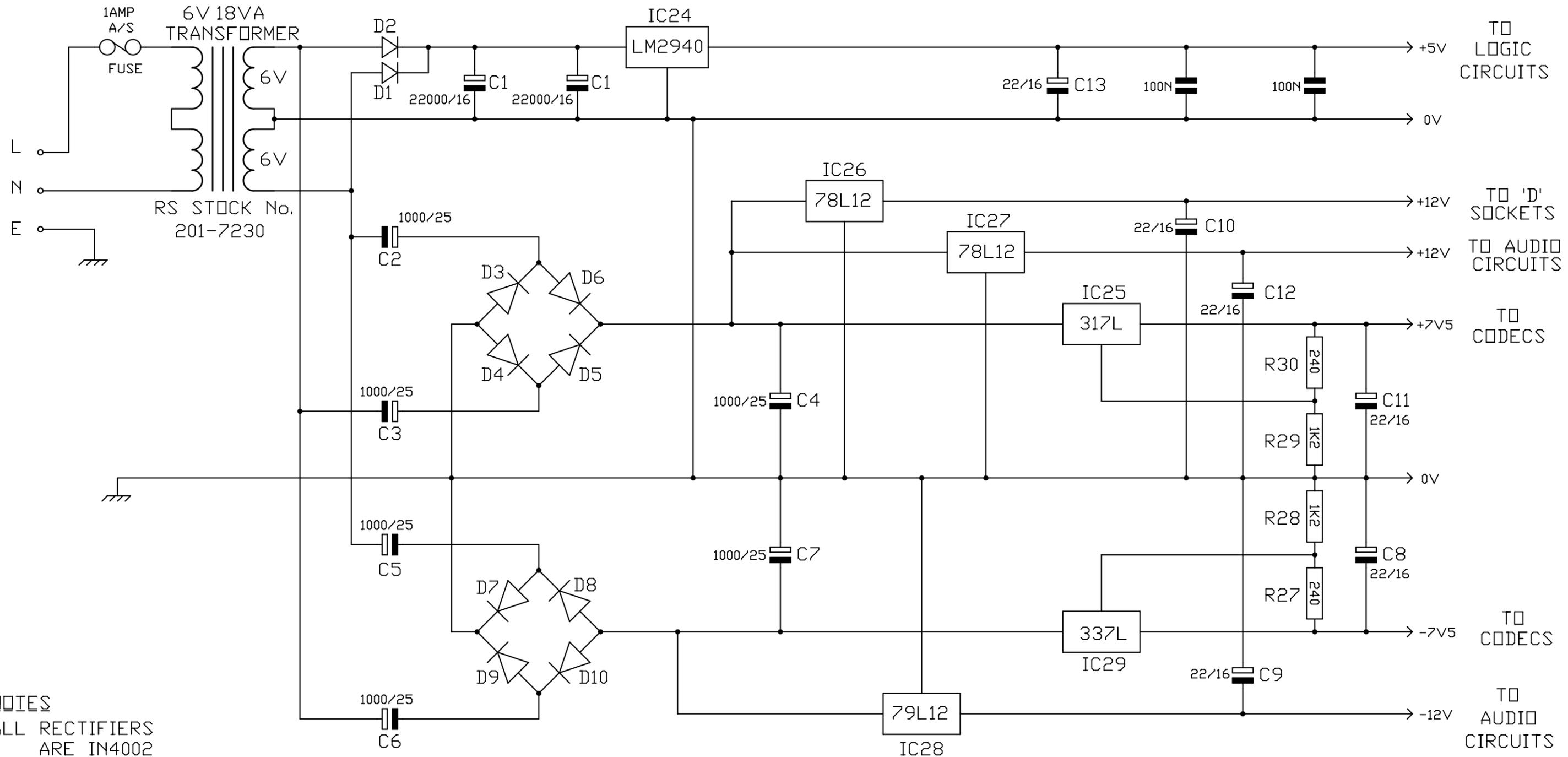
## AUX DATA

When the GSGC6 is fitted with an MPEG Codec an extra 9 pin D fixed socket is fitted. This is the Aux Data connector and provides an RS232 type data path to a similarly equipped codec at the other end of the ISDN circuit. It operates at a fixed 9600 baud and is compatible with some other manufacturers codecs.

## CODECS

The GSGC6 will normally be fitted with the codecs as ordered with the equipment. It is however simple to add or change the codecs. This can be done by removing the top cover of the GSGC6. The codecs are mounted one above the other and are connected to the main PCB via 60pin IDC leads. The lower codec is connected to port 1 and the upper codec is connected to port 2.





NOTES  
ALL RECTIFIERS  
ARE IN4002

ISSUE	DATE	DRAWING NUMBER
1	23/05/95	A3-12823
2	18/06/96	
		DRAWN BY AMD
		ORIGINALLY DRAWN USING EASYTRAX

# GLENSOUND ELECTRONICS LTD

## WIRING INFORMATION FOR GSGC6 1U ISDN TA/CODEC

CONN No	TYPE	FUNCTION	WIRED TO	TYPE	COLOURS
1&3	X3S	<b>Audio Inputs</b> Pin 1 = Ground Pin 2 = In Phase Pin 3 = Mate	Main PCB	GSJ78	
2&4	X3P	<b>Audio Outputs</b> Pin 1 = Ground Pin 2 = In Phase Pin 3 = Mate	Main PCB	GSJ78	
5	D15P	<b>DC Loops Port 1</b> Pin 1 = +12v Aux Power Out Pins 2,9 = I/P LOOP Send DTMF 1 Pins 3,10 = I/P LOOP Hang Up Pins 4,11 = I/P LOOP Dial Stored No. Pins 5,12 = O/P LOOP- DTMF Rcvd Pins 6,13 = O/P LOOP- 2sec Pulse when Framed Pins 7,14 = O/P LOOP- Codec Framed Pins 8,15 = O/P LOOP- TA Locked	Printed Down	GSJ78	
6	D9S	<b>RS232 Control Port 1 (IBM PC Std)</b> Pin 1 = Carrier Detect (o/p) Pin 2 = Receive Data (o/p) Pin 3 = Transmit Data (i/p) Pin 4 = Data Term Ready (i/p) Pin 5 = Ground Pin 6 = Data Set Ready (o/p) Pin 7 = Request to Send (i/p) Pin 8 = Clear to Send (o/p) Pin 9 = Ring Indicator (o/p)	Printed Down	GSJ78	
7	D15P	<b>DC Loops Port 2</b> Pin 1 = +12v Aux Power Out Pins 2,9 = I/P LOOP Send DTMF 1 Pins 3,10 = I/P LOOP Hang Up Pins 4,11 = I/P LOOP Dial Stored No. Pins 5,12 = O/P LOOP- DTMF Rcvd Pins 6,13 = O/P LOOP- 2sec Pulse when Framed Pins 7,14 = O/P LOOP- Codec Framed Pins 8,15 = O/P LOOP- TA Locked	Printed Down	GSJ78	
8	D9S	<b>RS232 Control Port 2 (IBM PC Std)</b> Pin 1 = Carrier Detect (o/p) Pin 2 = Receive Data (o/p) Pin 3 = Transmit Data (i/p) Pin 4 = Data Term Ready (i/p) Pin 5 = Ground Pin 6 = Data Set Ready (o/p) Pin 7 = Request to Send (i/p) Pin 8 = Clear to Send (o/p) Pin 9 = Ring Indicator (o/p)	Printed Down	GSJ78	

NOTES 1) V = VARICON. D = D CONN. X = XLR. P = FIXED PLUG. S = FIXED SOCKET  
2) TW = TWISTED WIRES, TP = TWISTED PAIR, SP = SCREENED PAIR, SS = SINGLE SCREENED WIRE

# GLENSOUND ELECTRONICS LTD

## WIRING INFORMATION FOR GSGC6 1U ISDN TA/CODEC

9.00	D15P	<b>X21 Port 1</b>	<b>NOT FITTED</b>
		Pin 1 = Metalwork Ground	
		Pins 2,9 = Transmit Data	
		Pins 3,10 = Control Element	
		Pins 4,11 = Receive Data	
		Pins 5,12 = Not Used	
		Pins 6,13 = Not Used	
		Pins 7,14 = Byte Timing	
		Pins 8,15 = Signal Ground	
10.00	D9S	<b>RS232 Aux Data Port 1</b>	<b>NOT FITTED</b>
		Pin 1 = Not Used	
		Pin 2 = Rx Data from Decoder	
		Pin 3 = Tx Data to Encoder	
		Pin 4 = Not Used	
		Pin 5 = Ground	
		Pin 6 = Not Used	
		Pin 7 = Not Used	
		Pin 8 = Not Used	
		Pin 9 = Not Used	
11.00	D15P	<b>X21 Port 2</b>	<b>NOT FITTED</b>
		Pin 1 = Metalwork Ground	
		Pins 2,9 = Transmit Data	
		Pins 3,10 = Control Element	
		Pins 4,11 = Receive Data	
		Pins 5,12 = Not Used	
		Pins 6,13 = Not Used	
		Pins 7,14 = Byte Timing	
		Pins 8,15 = Signal Ground	
12.00	D9S	<b>RS232 Aux Data Port 2</b>	<b>NOT FITTED</b>
		Pin 1 = Not Used	
		Pin 2 = Rx Data from Decoder	
		Pin 3 = Tx Data to Encoder	
		Pin 4 = Not Used	
		Pin 5 = Ground	
		Pin 6 = Not Used	
		Pin 7 = Not Used	
		Pin 8 = Not Used	
		Pin 9 = Not Used	
13.00	RJ45S	<b>ISDN Connector to S Bus</b>	<b>Integral with IM90 Module</b>
		Pin 3 = TX-T	
		Pin 4 = RX-R	
		Pin 5 = RX-T	
		Pin 6 = TX-R	

NOTES 1) V = VARICON. D = D CONN. X = XLR. P = FIXED PLUG. S = FIXED SOCKET  
2) TW = TWISTED WIRES, TP = TWISTED PAIR, SP = SCREENED PAIR, SS = SINGLE SCREENED WIRE

# GSGC6 Command Language

## The AT Command Set

A Hayes type AT command/response interface is used to communicate with the GSGC6 internal Terminal adapter. Data sent to the TA are treated as commands and data received from the TA are treated as responses (eg result codes).

All command lines must begin with the characters AT and must be entered in a single case. Multiple commands may be strung together up to a maximum length of 38 characters, including the AT prefix. Command strings may contain spaces to enhance readability except in the AT prefix.

Most commands that take a numeric parameter will default to 0 if the parameter is not supplied on the command line. An example would be: `ATS0=1&W` - which will switch auto-answer on, and then store this set-up as user default 0. Note that the Z (reset) command should only be used in at the end of a command string, as this command will reset the TA and cause it to lose the remainder of the command line entered.

If the TA receives an AT command that is valid in structure, but not in the list below, the Adaptor will generally return an 'OK' to be compatible with existing Terminal Adaptor/application software implementations. Otherwise an 'ERROR' response will be returned.

## The AD Command Set

A Glensound AD command/response interface is used to communicate with the GSGC6 internal Codec & DTMF system. Data sent to the GSGC6 are treated as commands and data received from the GSGC6 are treated as responses (eg result codes).

All command lines must begin with the characters AD and must be entered as single commands.

## AT / AD Command Set

### AT

### Attention

This is the prefix for all AT commands. Typing AT by itself (followed by a carriage return) will result in the "OK" message being displayed and no other action being performed. It is good practice to use this command to check that your terminal software is communicating correctly. You should always receive the "OK" message.

All of the AT commands that follow are documented in their full format, i.e. the AT prefix has been included for clarity.

### ATA

### Answer

This command causes the Terminal Adaptor to answer an incoming call. The Terminal Adaptor will attempt to connect with a remote calling Terminal Adaptor if present. When connected, a connect message will be displayed. If a connection is not achieved then the "NO CARRIER" message will be returned.

### ATD

### Dial

ATD causes the Terminal Adaptor to dial a number according to the dial string supplied.

- 0-9 These are the digits to be dialled.
- L Last number re-dial. The Terminal Adaptor will re-dial the last number entered (stored in S102). The L must be the first character after the D and any subsequent characters will be ignored.
- S Dials the number stored in the directory. See the AT&Z command for details of how to store a telephone number into the Terminal Adaptor's directory.
- # Added after the main number, this dials a given sub-address of that main number.

### ATE

### Echo Control

Default: 1

The ATE command is used to control the echoing of commands to the DTE when the Terminal Adaptor is in command mode.

- ATE0 Command echo disabled
- ATE1 Command echo enabled

**ATH****Hang Up**

This command can be used to "hang up" the Terminal Adaptor.

**ATI****Identify**

Parameters: 3,4

Returns information about the Terminal Adaptor.

**ATQ****Quiet (Message Control)**

Default: 0

Switches result messages on or off.

ATQ0 Result messages will be displayed.

ATQ1 Result messages will not be displayed.

**ATS****Set or Read S Registers**

Parameters: r=n,r?

ATS is used to set or read the Terminal Adaptor's registers. Setting a register requires two parameters, r, which is the register to set and n, which is the value to set the register to. A register may be read by naming register and following it by a question mark.

Example 1: ATS0? will display the contents of register 0.

Example 2: ATS0= 1 will set register 0-1.

**ATV****Result Code Form**

Default: 1

Controls the format of result messages from the Terminal Adaptor.

ATV0 Result codes displayed in numeric format

ATV1 Result codes displayed in word format.

**AT&V****Display Terminal Adaptor Configuration**

Parameters: 0-2

This command will display the current configuration of the Terminal Adaptor.

**AT&W****Save TA Configuration in NV-RAM**

This command will save the current configuration of the Terminal Adaptor.

**AT&Z****Store Telephone Number**

Parameters: x=nnnnnnnnnn

This command is used to store a telephone number into the Terminal Adaptor's directory. The entry can be up to 20 characters long. The x parameter indicates into which entry the number is to be stored and at present must be 0. The nnnnnnnnnn parameter is the telephone number to store. See the ATDS=n command for details of how to dial a stored number.

Example: AT&Z0=0815436417. This will store the number 0815436417 into number store 0.

**ATZ****Reset**

ATZ will reset the Terminal Adaptor to user defaults.

**AD****Additional**

This is the prefix for all AD commands. Typing AD by itself (followed by a carriage return) will result in the "OK" message being displayed and no other action being performed. It is good practice to use this command to check that your terminal software is communicating correctly. You should always receive the "OK" message.

**ADB****Baud Rate**

Default: 5

ADB1	600bps
ADB2	1200bps
ADB3	2400bps
ADB4	4800bps
ADB5	9600bps
ADB6	19200bps

**ADC****Codec**

Parameters: 0-255

This command controls the encoding mode used by the codec as table:-

**If the data rate is set to follow the received data rate :-**

ENCODE ALGORITHM	SAMPLE FREQUENCY	PARAMETER
Follow Decode Algorithm	Follow decode sample Freq.	0
	16KHz	4
	24KHz	8
	32KHz	12
	48KHz	16
Send G722	16KHz Fixed	1
Send MPEG	Follow decode sample Freq.	2
	16KHz	6
	24KHz	10
	32KHz	14
	48KHz	18
Send APTX	16KHz Fixed	3

**To set the data rate to 56KBits/Sec ADD 32 to the parameters in the table**

In this mode it will revert to 64KBits/Sec if it receives 64KBits/Sec

**To force the data rate to 64KBits/Sec ADD 64 to the parameters in the table**

**ADD****Dial DTMF**

Parameters: 0-9,A-D,\*,#

ADD causes the DTMF system to dial a single number according to the dial string supplied.

0-9,A-D,\*,# This is the digit to be dialled.

**ADP** **Parity**

Default: 0

- ADP0 8 data bits no parity
- ADP1 7 data bits odd parity
- ADP2 7 data bits even parity

**ADW** **Save Configuration in NV-RAM**

This command will save the current configuration of the additional commands.

**ADR** **DTMF Detector**

Parameters: 0-9, A-D, \*, #

ADRn determines what DTMF code operates the external DC Loop closure  
ADR without any parameter causes the loop to close with any valid DTMF tone.

**ADS** **Send DTMF by closing external loop**

Parameters: 0-9, A-D, \*, #

ADSn determines what DTMF code is sent when the external loop is closed

**ADT** **Time Duration for sending DTMF**

Parameters: 0 - 255

ADTn sets the period of time that DTMF is sent when the external loop is closed  
n is measured in 100ths of a second. That is if n = 100, time = 1 second

**AD?** **Information about call**

This comand returns information about the call

It first returns	THE DECODER SAMPLE FREQU
Followed by	THE DECODER CODEC TYPE
Followed by	THE DATA RATE
Followed by the following information:-	
If the call is established it returns	CONNECT
If the call is not established it returns	NO CARRIER
If the codec is not yet locked it returns	SEARCH
When the codec is locked it returns	FRAMED

## RESULT CODES

When a command is issued, the GSGC6 responds with a result code (either OK or ERROR) to indicate whether it understands and can act on the instructions. Result Codes also report the progress of a connection.

Word	Meaning
OK	Command executed
CONNECT	
CONNECT B1	Connect
CONNECT B2	Connect
RING	Ring signal detected
NO CARRIER	Carrier lost or never detected
ERROR	Invalid command entered
BUSY	No available channel
DTMF 'n'	DTMF received
FRAMED	Codec frame found
SEARCH	Codec searching for frame
NVRAM ERROR	Error in reading or writing to Non-Volatile memory
UNKNOWN	Codec Mode not known
G722	Codec Mode = G722
MPEG	Codec Mode = MPEG
APTX	Codec Mode = APTX
0k	Sample frequency not known
16k	Sample Frequency = 16KHz
24k	Sample Frequency = 24KHz
32k	Sample Frequency = 32KHz
48k	Sample Frequency = 48KHz
56k	Data Rate = 56KBits/Sec
64k	Data Rate = 64KBits/Sec

## S REGISTERS

The S registers are used to store various operating characteristics of the Terminal Adaptor. The following registers can be modified if necessary. To modify the contents of the S registers, use the ATSn=m command where n is the register number and m is the new decimal value. To view the contents of an S register, use the ATSn? command where n is the S register number.

### S0

### Answer On Ring Number

Default: 0  
Range: 0-255

Register S0 is set to the number of rings that the Terminal Adaptor should wait before answering. Setting this register to 0 will disable the auto answer function.

**S1** **Ring Count**  
 Default: 0  
 Range: 0-255

Register S1 contains a count of the number of times that the phone has rung. This register is reset after a call has cleared.

**S2** **Escape Code Character**  
 Default: 43  
 Range: 0-127

**S21** **Asynchronous Parity**  
 Default: 0  
 Range: 0-4

S21 = 0 No parity  
 S22 = 1 Space parity not compatible with AD commands  
 S23 = 2 Odd parity  
 S24 = 3 Even parity  
 S24 = 4 Mark parity not compatible with AD commands

**S23** **Asynchronous Data Rate**  
 Default: 5  
 Range: 1-6

S23 = 1 600bps  
 S23 = 2 1200bps  
 S23 = 3 2400bps  
 S23 = 4 4800bps  
 S23 = 5 9600bps  
 S23 = 6 19200bps

**S24** **Asynchronous Data Bits**  
 Default: 0  
 Range: 0-1

S24 = 0 8 data bits  
 S24 = 1 7 data bits

**S27** **Synchronous Data Rate**  
 Default: 10  
 Range: 9-10

S27 = 9 5600bps  
 S27 = 10 64000bps

Sets the bearer capability for the call. Must be set before ATD.

## **SPECIAL EXTENDED S REGISTERS**

These registers can be used to access the advanced features that the ISDN service provides. These are the identities of local terminal and also information contained in both incoming and outgoing messages to the network.

### **S100** **Terminal primary address**

Default: None  
Range: up to 20 digits

When a number is configured into this register, any number presented in an incoming call with a Called Party Number information element present will be checked against this number. This can be used for Multiple Subscriber Numbering of Direct Dialling In. If this register is empty or there is no information presented by the network the incoming call will be accepted and pass on to the next check.

### **S101** **Terminal sub-address**

Default: None  
Range: Up to 4 AI5 characters

When a string is configured into this register, any string presented in an incoming call with a Called Party Sub-address information element present will be checked against this string. This will be used for filtering the call on sub-addressing. If this register is empty or there is no information presented by the network the incoming call will be accepted.

### **S102** **Outgoing called party number**

This will always contain the outgoing called number that was or is to be sent to the network. It can be configured using the AT`S102=xxx` command or will automatically be set on an AT`D xxx` command. Once set an AT`DL` command will re-send this number.

### **S103** **Outgoing called party sub-address**

This will always contain the outgoing called sub-address that was or is to be sent to the network. It can be configured using the AT`S103=xxx` command or will automatically be set on an AT`D xxx#yyy` command. Once set the outgoing call will always include this information unless an AT`S103=` or AT`D xxx#` or AT`Z` command is sent.

**S104****Incoming called party number**

This will contain the Number of the called party for the last call received. This will only be so if the network passed the information across with the incoming call. This will be present when multiple subscriber numbering (MSN) is being used.

**S105****Incoming called party sub-address**

This will contain the Sub-address of the called party for the last call received. This will only be so if the network passed the information across with the incoming call. This will be present if sub-addressing is being used.

**S106****Incoming calling party number**

This will contain the Number of the calling party (CLI) for the last call received. This will only be so if the network passed the information across with the incoming call. In order for this to occur both ends of the call must have CLI enabled.

**S107****Incoming calling party sub-address**

This will contain the Sub-address of the calling party for the last call received. This will only be so if the network passed the information across with the incoming call.

**Note:** at present this is not possible with the BT ISDN2 service.

**S116****Incoming display**

This register contains the display string that was received from the network with the last incoming message. This includes call progress and error information intended for display by the terminal.

**S120****Call termination cause**

This register will contain the cause value as presented by or to the national network when a call is cleared.

Common Causes:

- 3 - no route to destination
- 16 - normal call clearing
- 17 - user busy
- 18 - no user responding
- 19 - no answer from user
- 21 - call rejected
- 22 - number changed
- 27 - destination out of order
- 28 - invalid number format
- 29 - facility rejected
- 34 - no circuit/channel available
- 38 - network out of order
- 41 - temporary failure
- 47 - resources unavailable
- 42 - switching equipment congestion
- 49 - quality of service unavailable
- 50 - requested facility not subscribed
- 57 - bearer capability not authorised
- 58 - bearer capability not available
- 63 - service or option not available
- 65 - bearer capability not implemented
- 66 - channel type not implemented
- 69 - requested facility not implemented
- 79 - service or option not implemented
- 88 - incompatible destination
- 111 - protocol error, unspecified

**S121****Primary B channel outgoing**

Default: 0  
Range: 0-2

This allows the user to select a specific channel for all outgoing calls.

Parameters: 0 -Any channel  
1 -B1 channel only  
2 - B2 channel only

This allows the user to select the channel or channels for which an incoming call will be presented. This will be the first element of an incoming call that will be checked . If the check fails the call will be ignored otherwise the call will be passed to the next filtering section. This is primarily of use when the ISDN connection has two directory numbers assigned, one to each channel. Then two or more pieces of equipment can share the network and answer only the calls specifically addressed to it.

Parameters: 0 - Any channel  
1 - B1 channel only  
2 - B2 channel only

**GSGC6 1U TA/CODEC SPECIFICATION****AUDIO INPUTS**

Input Impedance	> 15kohms electronically balanced
Line Up Level	'0' dBu
Normal Prog Peaks	'+8' dBu
Clip Point	'+13' dBu
Connectors	3 pin XLR fixed socket

**AUDIO OUTPUTS**

Output Impedance	45-55 ohms electronically balanced and floating
Line Up Level	'0' dBu
Connectors	3 pin XLR fixed plugs

**POWER**

Mains	210-250 volt AC Mains (105-125v by reconnecting the mains transformer)
Consumption	Less than 18VA
Insulation	Made to BS415 Class 2
Earthing	Mains earth is connected directly to the metalwork An M4 earthing bolt is fitted to the rear panel
Connector	IEC fixed plug with retaining clip

**ISDN CIRCUIT**

Connector	RJ45
Line	Uses 1 or 2 (64Kbit/sec) B channels depending if 1 or 2 Codecs are fitted Channel bonding is not implemented.
Standards	This equipment operates correctly with ISDN2 circuits which meet any one of the following specifications:- ETSI Euro ISDN (Net 3)                      BTNR 191                      I 420

**CODECS**

Any 2 of 4 Different codecs can be fitted in this subrack. These are:-

- |    |                      |  |
|----|----------------------|--|
| 1) | G722                 | Locking by Statistical Analyses  |
| 2) | APT X100             |  |
| 3) | DUAL ( G722 & APTX ) | This automatically uses G722 or APTX algorithms depending on the codec fitted at the other end of the ISDN circuit   |
| 4) | ISO/MPEG layer 2     | This codec can operate using MPEG at 16, 24, 32 or 48 KHz sample frequency or G722 at 16KHz sample frequency. It can be programmed from a terminal or our GSGC7 to control it's mode of operation. For details see our GSGC7 instructions. |

**CODEC DATA RATE**

All 4 Codecs operate at 64KBit/Sec data rate. Codecs 1 and 4 will operate successfully as the 64KBit/Sec end of a programme that was originated at 56KBit/Sec

**CODEC LINE UP**

All codecs are aligned to send maximum digital code with +14dBu input

**AUXILIARY DATA**

When Codec 4 is fitted, an auxiliary RS232 data path becomes available to other suitably equipped codecs.

Connector	9 pin D fixed socket to IBM PC standard
Baud Rate	Fixed at 9600
Compatibility	This data path is compatible with some other manufacturers codecs

# INSTALLATION INFORMATION

## GENERAL

This unit is designed to control our GSGC6 ISDN 1U subracks. It consists of a small plastic case with an LCD display and keypad. In addition 4 other switches and 2 LEDs are provided.

It is usual to have one GSGC7 controller for each codec fitted in the GSGC6 subrack, then the circuits can be used entirely independently.

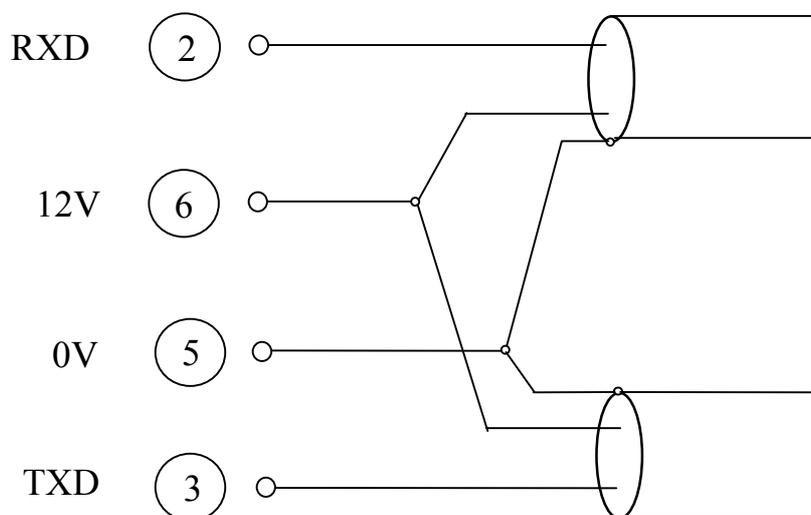
## INSTALLATION

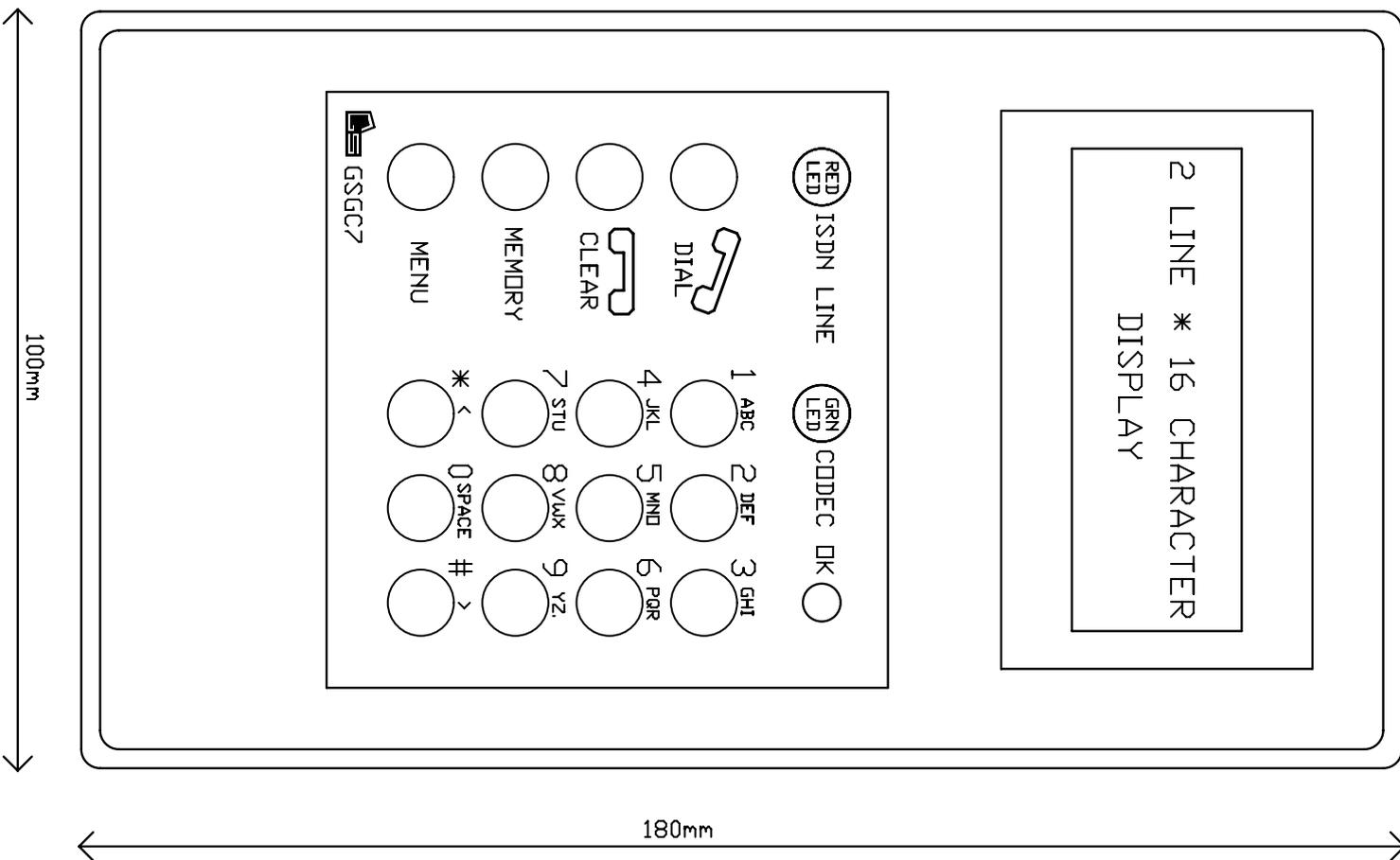
It is necessary to connect this unit to our GSGC6 subrack. Connectors are 9 pin Ds. The GSGC6 has fixed sockets and the GSGC7 has a fixed plug.

The wiring schedule is as follows:-

GSGC6 D9 fixed Socket	Function	GSGC7 D9 Fixed Plug
Pin 2	RXD	Pin 2
Pin 3	TXD	Pin 3
Pin 5	0V	Pin 5
Pin 6	12 Volt Supply	Pin 6

We recommend using a 2 pair cable with individual screens connected:-





ISSUE	DATE
1	27/03/95

DRAWING NUMBER
A4-12866
ORIGINALLY DRAWN USING EASYTRAX

# **GSGC7 OPERATING INSTRUCTIONS**

## **GENERAL**

This unit has a standard keypad and 4 additional buttons. It also has a 2 line by 16 character LCD display. The display is used to prompt the user and to show various actions.

## **KEYPAD**

Each of the 0 to 9 keys has 3 or 2 letters of the alphabet printed next to them. In some uses of these keys it is possible to use them to enter a particular letter. This is done with a single press to produce the number, 2 quick presses to produce the first letter of the group, 3 quick presses to produce the 2nd letter of the group or 4 quick presses to produce the third. A further press reverts to the number.

If you make an error while entering a number or a letter the 'CLEAR' key can be used to erase the last digit.

## **MAKING CALLS DIRECTLY**

It is only necessary to enter the required number, which will be displayed, and when complete press the 'DIAL' key. If the call is successful the red 'ISDN LINE' LED will illuminate and if you have called a number with a matching codec, after a few seconds the 'CODEC OK' LED will illuminate. If, for any reason the call is not successful, the display will show the reason for failure. A list of possible responses is shown later.

## **MAKING SWITCH56 CALLS (Only available with our G722 or MPEG/G722 Codecs)**

Normally directly dialled numbers will be dialled as ISDN64 calls. If the system returns a non compatible message to the equipment, the number will be immediately redialed as a switch56 call. If however you wish to force the equipment to make a switch56 call it is only necessary to hold the 'DIAL' button for a few moments when the display will change to SWITCH56. Then release the 'DIAL' button while this message is displayed. If you continue to hold the 'DIAL' button you will notice that the display alternates between ISDN64 and SWITCH56

## **TO CLEAR THE CALL**

To clear the call it is necessary to press and hold the 'CLEAR' button for about 2 seconds.

## **TO REDIAL THE LAST NUMBER**

To redial the last number used it is only necessary to press the 'DIAL' button.

## **TO DIAL A NUMBER THAT HAS PREVIOUSLY BEEN STORED**

Press the 'MEMORY' button.

You may directly enter the memory number (1-30) or use the '<' and '>' buttons to scroll through the memories. The display will show the name in the memory if it has been stored or else the number itself.

When the correct memory has been found, press the 'DIAL' button to make the call.

### **TO ANSWER AN INCOMING CALL**

It is possible (see engineering set-ups) to set this equipment to automatically answer an incoming call. If this has been done no action is required by the operator.

If set for manual answer simply press the 'DIAL' button to answer the call.

### **CALLING NUMBER IDENTIFICATION (CLI)**

If your ISDN circuit has CLI enabled on it, the display will indicate the calling party. This is done normally by displaying the incoming calling number, however this number is automatically compared with names in the memory and if a match is found, and a name has been given to that number, then the name will be displayed instead of the number.

If a name or number is displayed, pressing the 'DIAL' button will call that number. This makes it very easy to call back. It is possible to clear this number by pressing the 'CLEAR' key.

### **TO STORE NUMBERS IN MEMORY**

It is possible to store up to 30 frequently used numbers in the non volatile memory. Each number can have associated with it an alphanumeric description or name. Each number can also have stored with it note of whether it should dial as an ISDN64 call or as a SWITCH56. Each number can also have stored with it the codec encode mode required along with the sample rate required.

Press 'MEMORY' and use the < and > keys to locate the store you wish to use. It is also possible to directly enter the number (1-30) of the memory you wish to use. Now press 'MENU'. After informing you to press the 'Grey' (MENU) key to proceed, the display will show you the stored name (if any). At this stage it is possible to edit or add the name which may contain up to 16 characters. After editing press the 'Grey' key.

The display will now show the stored number, which may contain up to 20 figures followed by a # sign if subaddressing is used and a further 4 alphanumeric keys. Edit this number and press the 'Grey' key to proceed.

The display will now show if the number is required as ISDN64 or as SWITCH56. This again can be edited before pressing the 'Grey' key to proceed.

The display will now show the codec encode mode. This has four options which can be scrolled using the '< >' keys. The options are Follow Decode, G722, MPEG, APTX

After pressing the 'Grey' key the display will show the encode sample rate. This has five options which can also be scrolled. The options are Follow Decode, 16, 24, 32, 48 KHz

The above procedure can be repeated for the other 29 stores.

## **TO MODIFY SET-UP DURING A CALL**

These facilities are codec dependent. Not all options are meaningful with all codecs. If an unavailable selection is made, the equipment will try to revert to an available mode.

When a call has been successfully connected and the RED LED is on, it is possible to force the codec parameters. It is possible to change the encode algorithm, the sample rate and the data rate. This is simply done by pressing the 'Grey' key 1,2 or 3 times. If pressed once the encode algorithm can be changed. If pressed twice the sample rate can be changed and if pressed three times the data rate can be changed. In each case you are only given a few seconds to make a change before the option is aborted. The '<' and '>' keys are used to scroll through the options. The option in view when the system 'times out' is the selected option. Available options are:-

ENCODE ALGORITHM Follow Decoder, G722, MPEG or APTX

SAMPLE RATE Follow Decoder, 16, 24, 32 or 48 KHz

DATA RATE Automatic, 56 or 64 KBits/Sec

## **ENGINEERING SET UPS**

The GSGC7 can be used to programme the set ups in the GSGC6 1U subrack.

In general the 'Grey' (MENU) key is used to proceed to the next stage.

First press the 'Grey' key. At this stage anybody can set the viewing angle of the display. When a suitable viewing angle has been set enter it by pressing the 'Grey' key. This viewing angle is not yet stored for future use but will remain fixed until the equipment is switched off.

After setting the viewing angle you will be asked for a password before any engineering set ups can be altered. After entering the correct password you will be led through the available set ups. These are as follows:-

AUTO ANSWER2-9 Specifies number of rings to answer by.

0 = Manual Answer

OUTGOING B CHANNELCan be B1, B2 or either

INCOMING B CHANNELCan be B1, B2 or either

MULTIPLE SUB NO. This should be all digits including the area code

SUB ADDRESSUp to 4 alphanumeric characters

NEW EXT SWITCH NUMBERThis is the ISDN number that will be automatically dialled when the DC loop is closed

on the rear panel of the GSGC6

ENCODE MODEForces the Encoder mode

SAMPLE RATEForces the Encoder sample rate

DATA RATEMake call at 56/64 KBits/Sec data rate

DTMF DURATIONSpecified in hundredths of a second duration of each DTMF digit.

DTMF DC-LOOPSpecifies DTMF code sent when DC loop made on rear panel of GSGC6

DTMF DETECTSets the DTMF code required to close the relay loop on the rear panel of the GSGC6 and to

operate the GSGC7 sounder and lamps

if enabled

DTMF KEY PADEnables the GSGC7 key pad to send the DTMF code corresponding to the key pressed.

DTMF LAMPMakes the ISDN lamp flash on valid DTMF

DTMF SOUNDERMakes the sounder operate on valid DTMF

ISDN SOUNDERMakes the sounder operate with incoming call

After the above parameters have been set they must be stored in the NVR (Non Volatile Ram). This is achieved by pressing the 'Green' key when asked. If the 'Red' key is pressed the above set-ups are aborted. This action of pressing the 'Green' key also stores the view angle that was entered before the password.

The set up is independent for each port on the GSGC6. If 2 codecs are fitted to the GSGC6 it is essential to repeat the set up using the second port.

It is possible to reset the microprocessor in the GSGC7. A reset switch has been fitted adjacent to the 15pin D connector. This can be accessed by sliding off the plastic cover marked 'OPEN' on the rear of the unit.

## SYSTEM ERROR RESPONSES

Unsuccessful calls will normally give one of the following responses in the display. In addition the error number is also displayed.

DISPLAY MESSAGE	REASON FOR FAILURE	ERROR NUMBERS
USER BUSY	User Engaged	17
NETWORK BUSY	Network Engaged	42
NO ANSWER	Called Number does not answer	18,19
INVALID NUMBER	Number not recognised	28
OUT OF ORDER	Network or Destination out of order	27,38,41
INCOMPATIBLE	Called Number not suitable for DATA	88
PROTOCOL ERROR	Protocol Error	111
CLEARED	Any other cause	ALL OTHERS

## LIST OF ERROR NUMBERS PRESENTED BY THE TERMINAL ADAPTER

0S Bus not responding 47Resources unavailable  
1Unallocated number 49Quality of service unavailable  
2No Route to specified network 50Requested facility not subscribed  
3No route to destination 57Bearer capability not authorised  
4Channel unacceptable (BT only) 58Bearer capability not available  
6Channel unacceptable 63Service or option not available  
7Call awarded and being delivered 65Bearer capability not implemented  
in an established channel 66Channel type not implemented  
16Normal call clearing 69Requested facility not implemented  
17User busy 70Only restricted digital information  
18No user responding bearer capability is available  
19No answer from user 79Service or option not implemented 21Call rejected 88Incompatible  
destination  
22Number changed 111Protocol error, unspecified  
26Non-selected user clearing  
27Destination out of order  
28Invalid number format  
29Facility rejected  
30Response to Status Inquiry  
31Normal, unspecified  
34No circuit/channel available  
38Network out of order  
41Temporary failure  
42Switching equipment congestion  
43Access information discarded  
44Requested circuit/channel not  
available