



GlenSound

GLENSOUND LTD.

Broadcast Equipment Manufacturers

Issue

6

Copper 29

GlenSound Telephone balance Unit

Handbook



GlenSound

GLENSOUND ELECTRONICS LIMITED

Copper 29 HANDBOOK



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Overview

The Glensound Copper 29 is a high performance Telephone Balance Unit designed to interface to analogue telephone lines. A high performance network echo canceller enables the unit to achieve excellent isolation between send and receive circuits.

Two balanced analogue inputs and two balanced analogue outputs are provided. Additionally AES3 inputs and outputs are provided to allow easy interfacing to digital studio equipment.

Provision has been made for a telephone handset for call set up.

The Copper 29 is available in a single (Copper 29/S) or twin (Copper 29/T) 19-inch 1U sub-rack mounted unit, or in a single desktop style case (Copper 29/SD).

Full remote control may be achieved using either the DC loops or RS232 serial interface.



DECLARATION OF CONFORMITY

Manufacturers

Name: Glen sound Electronics Ltd
Address: 6 Brooks Place, Maidstone, Kent, ME14 1HE

Equipment

Model Number GS Copper 29 TBU
Description Dual Telephone Balance Unit
Year of Manufacture 2010

EMC DIRECTIVE 2004/108/EC

Standards to which conformity is declared

Emissions EN 61000-6-3
Immunity EN 61000-6-1
Low Voltage Directive EN 60065
Telephone Network ETSI ES 203 021

I the undersigned, hereby declare that the equipment specified above conforms to the above Directives and Standards.

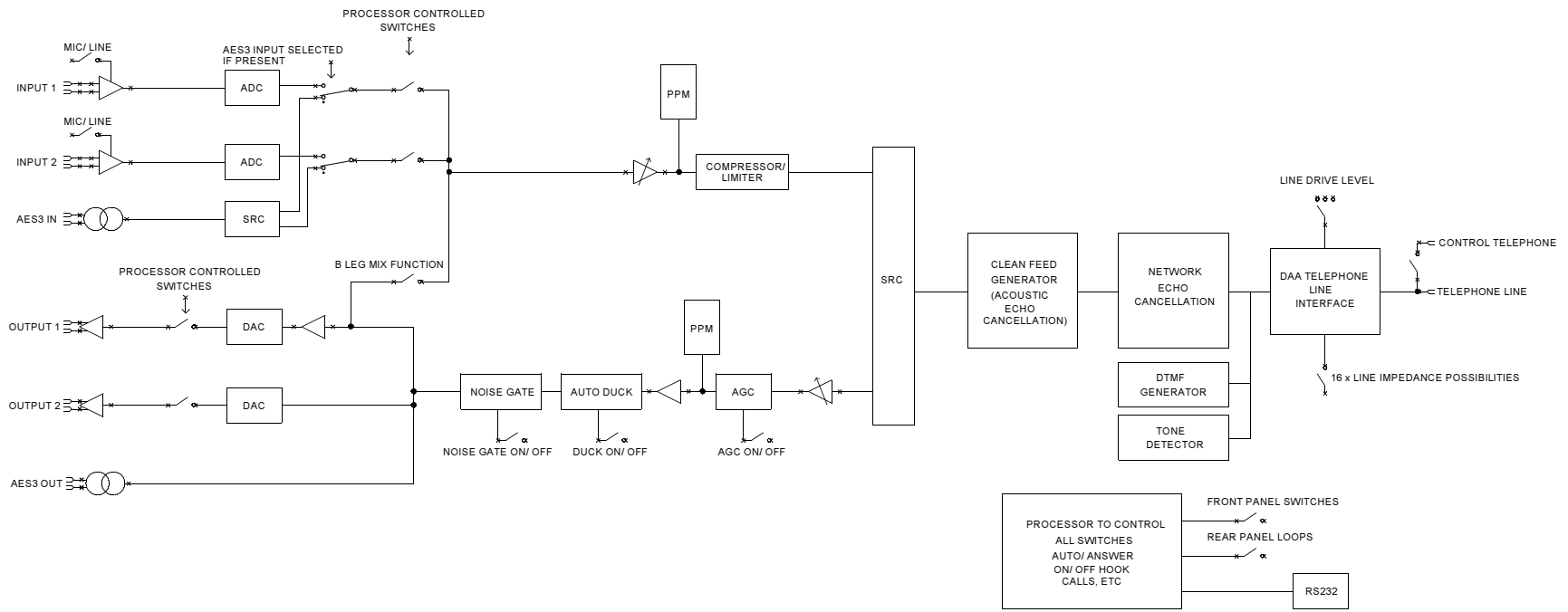
Signed

Full Name Gavin George Davis

Position in Company Managing Director

Date 01/10/2010

Place Maidstone Kent



Block diagram

Description

Telephone Line Interface

A Direct Access Arrangement (DAA) chip-set with world wide approvals provides the interface to the telephone line. Data to/from the DAA is processed by DSP1.

DSP1

DSP1 is the main system processor. It performs the following functions:-

- Network echo cancellation.
- Acoustic echo cancellation.
- DTMF generation.
- Disconnect Tone detection.
- System monitoring and control.
- Serial control interface.

The network echo canceller cancels echo's with a tail length of up to 64mS.

DSP2

DSP2 is a dedicated audio processor running at 48KHz sample rate. It provides the following functions.

- Sample rate conversion to and from the AES inputs & outputs.
- Sample rate conversion to and from DSP1.
- Receive noise gating.
- Ducker.
- Audio switching and routing.
- Receive automatic gain control.
- Send and receive level controls
- Send and receive metering

CPLD

The CPLD provides all system clocks and general interface logic.

Power Supply

The Copper 29 TBU is powered by a high reliability mains input switched mode supply. This produces a bulk 5V supply which is used to generate the +3.3V and +/-12V supplies required by the TBU electronics.

Front Panel

Metering

Two eight LED bar-graph meters provide level metering for the send and receive signals.

Gain control

Two Pre-set level controls allow +/-10dB of gain adjustment for send and receive signals.

On hook / Off hook control

An illuminated push button provides on hook /off hook control. The button is illuminated to indicate off hook status, and flashes to indicate an incoming call (ringing). Press and release to go off hook, press and hold for 2 seconds to go on hook.

Power and status indication

The front panel power LED also indicates fault conditions. Under normal conditions the LED should be on. The LED will turn off momentarily in case of receiver overload, or flash to indicate more serious faults.

LED state	Status
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On	Normal
Momentarily off	Receiver overload. Can be caused by transient noise on the line.
Off, three short flashes, off	Line current fault. Usually caused by the TBU being disconnected from the line
Off, four long flashes, off	DAA chip set fault
Off, five long flashes, off	CPLD or DSP2 communication fault.

DIP configuration switches

A set of 12 DIP switches allow configuration of the TBU. The switch functions are described in the table below.

DIP Switch Settings	
1	Network echo canceller enable.
2	Acoustic echo canceller enable. <i>*See note below</i>
3	Auto answer.
4	Auto answer period. Off 2 rings, On 8 Rings
5	DAA full scale. Off 0dBm (normal), On +6dBm
6	Telephone line line-up level.
7	Tone disconnect.
8	K-Break disconnect.
9	Ducker. <i>*See note below</i>
10	RX AGC.
11	RX noise gate.
12	B leg mix function. When enabled the B leg of the audio output will be a mix of the send and receive signals.

*The acoustic echo canceller may be used to generate a clean feed where the mixing desk cannot generate one. When using a desk without a clean feed the ducker function should not be used.

Country selection switch

A 16 position country selection switch allows the telephone line parameters (AC impedance etc.) to be set to the appropriate Telecom standard.

Switch position	Region / Country
0	UK
1	CTR21
2	TBR21
3	USA
4	Thailand
5	South Korea
6	Japan
7	Brazil
8	Bulgaria
9	South Africa
A	Australia
B	New Zealand
C	Nortel PABX
D	PABX 425Hz 500mS/500mS disconnect
E	France
F	Custom configuration via serial port

Rear Panel

Analogue audio I/O

Two analogue audio inputs are provided. They may be individually switched between microphone and line levels. These inputs do not provide phantom power.

Two analogue line level audio outputs are provided.

Digital audio I/O

AES3 digital inputs and outputs are provided. The output sample rate will follow the input over a range of 32-192KHz. In the absence of any input the output defaults to 48KHz sample rate.

Remote control interface

The Copper 29 TBU may be remotely controlled using the DC loop inputs or the RS232 interface. The DC loop inputs should be shorted to ground to activate the function described in the table below.

Remote control interface 15 way D socket

DB 15 Pin	Direction	Function
1	Output	RS232 Serial TX
2	Input	RS232 Serial RX
3	NC	
4	Output	Open collector Status output. Off = On hook, On = Off hook, On/Off = Ringing
5	Input	On hook switch.
6	Input	Fast hangup option. Open for normal operation, ground to remove 3 second safety delay on hangup.
7	Input	Mute TX B
8	Input	Mute RX B
9	Input/Output	Ground
10	Input/Output	Ground
11	Input/Output	Ground (Optional 5V @ 50mA. Requires V4 PCB)
12	Input	On hook / Off hook. Identical to front panel switch.
13	Input	Reserved
14	Input	Mute TX A
15	Input	Mute RX A

RS232 Serial interface remote control functions.

The serial interface parameters are 57600 baud, 8N1. All commands are case sensitive and must be terminated with a carriage return.

AT commands	Description	Permitted values
ATA	Answer – go off hook	
ATDTnnn.	DTMF Dial the number nnn. Example: ATDT1234<CR>	0-9,*,#,A,B,C,D.
ATH0	Go on hook	None
ATH1	Go off hook	None
The following commands allow direct access to registers in the DSP and should be used with care.		
AGR commands	Description	Permitted values
AGR parameter,value	Set register value	
AGR 200,nnnn	Set disconnect tone coefficient	0x00-0xFFFF
AGR 201,nnnn	Set disconnect tone threshold	0x00-0xFF
AGR 202,nnn	Set disconnect event count	0x00-0xFF
AGR 203,nnn	Set disconnect tone pattern high word	0x00-0xFFFF
AGR 204,nnn	Set disconnect tone pattern low word	0x00-0xFFFF
AGR 205,nnn	Set disconnect tone mask high word	0x00-0xFFFF
AGR 206,nnn	Set disconnect tone mask low word	0x00-0xFFFF
AGR 207,nnn	Reserved	
AGR 208,n	Set acoustic echo canceller state.	1=on, 0=off
AGR 209,n	Set line echo canceller state.	1=on, 0=off
AGR 210,n	Set K-Break disconnect state.	1=on, 0=off
AGR 211,n	Set Tone disconnect state.	1=on, 0=off
AGR 212,n	Set auto answer state.	0=off, 1-15 number of rings
AGR 213,nnn	Set auto answer time-out value.	0-255
AGR 214,n	Set DAA FS.	0=0dBm, 1=+3dBm, 2=+6dBm
AGR 215,nn	set country.	0-15
AGR 216,n	set conference mode	1=on, 0=off
AGR 217,n	mute rx A leg	1=mute, 0=normal
AGR 218,n	mute rx B leg	1=mute, 0=normal
AGR 219,n	mute tx A leg	1=mute, 0=normal
AGR 220,n	mute tx B leg	1=mute, 0=normal
AGR 221,n	Set ducker state.	1=on, 0=off
AGR 222,n	Set agc state.	1=on, 0=off
AGR 223,n	Set noise gate state.	1=on, 0=off
AGR 224,n	Set B leg audio function state.	1=on, 0=off
AGR 100-159,nnn	Set DAA chipset register value.	Values between 0 and 0xFF set new value. >255 or ? read current value
AGW	Write custom configuration to memory.	None.

Serial response and error messages.

Message	
SYSTEM_START_3	DSP1 has rebooted
OFF_HOOK	TBU has gone off hook
ON_HOOK	Front panel switch or DC loop has caused TBU to go on hook
+ON_HOOK	K-BREAK has caused TBU to go on hook
*ON_HOOK	Disconnect tone has caused TBU to go on hook
RING	TBU is ringing
AUTO_ANS	TBU has auto answered a call
E_FR	DAA chip set Framing error
E_LC	Telephone line under or over current fault
E_BF	RS232 Serial buffer full
E_RO	DAA receiver overload
E_IC	An invalid character was sent to the RS232 interface.
E_COM	Communications error with DSP2 or CPLD
POLI	Line Polarity inversion detected
DODI	Line drop out (K-BREAK) detected

Operation

Making a call

Connect the Copper 29 to the telephone line and audio interfaces as required.

Connect a telephone to the 'handset' socket on the rear panel.

Dial the number required using the telephone.

Divert the call to the TBU by pressing the off hook button on the TBU. The telephone will be disconnected and the call will be diverted to the TBU.

Adjust the level controls as required.

When the call has ended, hang up the TBU by pressing the on hook / off hook button for ~2 seconds.

To answer an incoming call press and release the on hook / off hook button.