

AMPETRONIC

C-Series Hearing Loop Drivers Protocol Guide

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C-Series Hearing Loop Drivers

Protocol Guide

Introduction

This document describes the implementation of Telnet and SNMP protocols for the C-Series amplifiers which allow remote control and monitoring via third party devices. It should be read in conjunction with the C-Series Handbook.

Telnet Commands

Introduction

This section describes the Telnet command format and the commands that the Driver recognises.

The Telnet interface of the Driver is on port 9760. Therefore, to make a Telnet connection to an amplifier whose IP address is 10.2.0.144 the Telnet command would be 'Telnet 10.2.0.144 9760', or similar depending on your Telnet client's syntax.

Telnet needs to be enabled via the web interface before a connection can be established. By default, Telnet is disabled.

The Telnet interface requires the same authentication as the web interface to access relevant commands. To authenticate at the start of a session send the command `login=username&password`.

Telnet Setting Commands

These commands are typically a string followed by "=" and then the value as specified in the table below.

For example, to set the current to -20dB the command is "`cur=-20`" is sent. The return key is used to end a command and trigger the interpreter to process the command.

Spaces are never used within a command.

Some commands do not require a value, such as "`logout`".

Command	Function	Accepted parameters
<code>login</code>	Authenticates user level to control amplifier	username&password
<code>logout</code>	Logout	None
<code>cur</code>	Sets the current drive level of the Driver	-80 to 0
<code>curo</code>	Sets the current offset. -ve means channel B is quieter than channel A and vice versa. Values beyond +/-10 will disable the respective channel (dual channel drivers only)	-11 to +11
<code>inp1</code>	Set the input 1 gain dB	-80 to 0
<code>lowcf1</code>	Enables or disables the low cut filter for input 1	"en" enables, "dis" disables
<code>inp2</code>	Set the input 2 gain dB	-80 to 0
<code>lowcf2</code>	Enables or disables the low cut filter for input 2	"en" enables, "dis" disables
<code>in2p</code>	Enables or disables the priority option for input 2	"en" enables, "dis" disables
<code>in2d</code>	Sets the ducking level	-80 to 0
<code>inp3</code>	Set the input 3 gain dB (Dante enabled drivers only)	-80 to 0
<code>tfrq</code>	Set the frequency of the test sine wave in Hz	100 to 5000

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Command	Function	Accepted parameters
tsts	Set the test signal used by the amplifier	"Off" "Combi10" "Combi16" "Combi25" "Pink" "Sine"
mlc1	Set the first MLC slope level in dB/Octave	0.0 to 4.0
mlcf	Set the MLC mid frequency in Hz	200 to 5000
mlc2	Set the second MLC slope level in dB/Octave	0.0 to 4.0
mlcq	Use a pre-set MLC response, 0 is custom, 1 is off, 2-17 are fixed slopes in 0.25dB/Octave steps	0 to 17
mlch	Enables or disables the MLC HF Boost when using a fixed slope	"end" enables, "dis" disables
phse	Sets the phase shift on channel B (dual channel drivers only)	"0" = no phase shift "1" = channel B shifted by 90°
phseA	Sets the phase shift on channel A (single channel drivers only)	"0" = no phase shift "1" = channel A shifted by 90°
slp	Sets how long the driver will wait after no audio signal before going into sleep mode	"off", "10", "30", "60"
stnd	Puts the driver into standby mode	"en" enables, "dis" disables
setip	Set the IP address when DHCP is disabled	XXX.XXX.XXX.XXX
setgw	Set the gateway address when DHCP is disabled	XXX.XXX.XXX.XXX
setmask	Set the subnet mask when DHCP is disabled	XXX.XXX.XXX.XXX
setdns1	Set the primary DNS address when DHCP is disabled	XXX.XXX.XXX.XXX
setdns2	Set the secondary DNS address when DHCP is disabled	XXX.XXX.XXX.XXX
dhcp_option61	Enable or disable DHCP option 61 and optionally the client ID (Client ID maximum 12 characters)	"en" enables, "dis" disables "en[&id]" enables and sets client ID "dis[&id]" disables and sets client ID
mail	Set the reporting email address	"mail=email"
erlc	Controls Emails on error conditions	"true" enables, "false" disables
itlc	Sets the interval at which status emails are sent by the driver	"off", "6h", "12h", "24h", "48h", "4d", "1w", "2w", "4w"
dco	Controls status of 12V DC output	"on" DC on "off" DC off "onf" DC on if fault "offf" DC off if fault
snmp	Enables or disables SNMP (Simple Network Management Protocol)	"en" enables, "dis" disables
freset	Reset the unit to factory settings, including user passwords (superadmin only)	None

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Telnet Error Reporting Commands

In the same way as the setting commands, error reporting commands are a string followed by “=” and then the value as specified in the table below.

These commands also work as reading commands, returning the current value of an error reporting setting when the command is followed by “=val”.

For example, the command “**ChAClipEmail=en**” would enable the clipping error reporting over email. Following this with the command “**ChAClipEmail=val**” would return “**Current value=en**”.

Note that where commands in this section reference ChA a matching ChB command is accepted on dual channel drivers, however the error reporting will always be set for both channels simultaneously. As such enabling a reporting protocol for channel A will automatically enable the same option for channel B and vice versa.

Command	Function	Accepted parameters
pwlc	Enable or disable power on reporting over email	“true” enables, “false” disables
PowerOnSnmP	Enable or disable power on reporting over SNMP	“en” enables, “dis” disables, “val” returns current value
ChAClipEmail ChAClipRelay ChAClipSnmP	Enable or disable clipping error reporting over email, DC out/relay or SNMP	“en” enables, “dis” disables, “val” returns current value
ChAClipAttenEmail ChAClipAttenRelay ChAClipAttenSnmP	Enable or disable attenuation error reporting over email, DC out/relay or SNMP	“en” enables, “dis” disables, “val” returns current value
ChAOpenLpEmail ChAOpenLpRelay ChAOpenLpSnmP	Enable or disable open loop error reporting over email, DC out/relay or SNMP	“en” enables, “dis” disables, “val” returns current value
AmpHotDeratedEmail AmpHotDeratedRelay AmpHotDeratedSnmP	Enable or disable amp too hot derated error reporting over email email, DC out/relay or SNMP	“en” enables, “dis” disables, “val” returns current value
AmpHotMutedEmail AmpHotMutedRelay AmpHotMutedSnmP	Enable or disable amp too hot muted error reporting over email email, DC out/relay or SNMP	“en” enables, “dis” disables, “val” returns current value
TransOverDeratedEmail TransOverDeratedRelay TransOverDeratedSnmP	Enable or disable transformer overload derated error reporting over email email, DC out/relay or SNMP	“en” enables, “dis” disables, “val” returns current value
TransOverMutedEmail TransOverMutedRelay TransOverMutedSnmP	Enable or disable transformer overload muted error reporting over email email, DC out/relay or SNMP	“en” enables, “dis” disables, “val” returns current value
TransOverShutdownEmail TransOverShutdownRelay TransOverShutdownSnmP	Enable or disable transformer overload shutdown error reporting over email email, DC out/relay or SNMP	“en” enables, “dis” disables, “val” returns current value

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Telnet Reading Commands

These commands read data back from the Driver. They do not have an equals sign because the commands are to read back data.

Command	Response
mac	MAC address of the unit
ip	IP address in format XXX.XXX.XXX.XXX
dns1	Primary DNS address in format XXX.XXX.XXX.XXX
dns2	Secondary DNS address in format XXX.XXX.XXX.XXX
gw	Gateway address in format XXX.XXX.XXX.XXX
msk	Subnet mask in format XXX.XXX.XXX.XXX
dhcp_option61	Current settings for DHCP option 61 (enabled/disabled state and client ID)
disA	Displayed peak current on channel A (full rated current is 1) (instantaneous value)
disB	Displayed peak current on channel B (full rated current is 1) (instantaneous value) (dual channel drivers only)
comp	Compression level in dB (instantaneous value)
pwri	Input current from the transformer in Amps
lpra	Returns loop A resistance as measured at the last power cycle
lpla	Returns loop A inductance as measured at the last power cycle
lprb	Returns loop B resistance as measured at the last power cycle (dual channel drivers only)
lplb	Returns loop B inductance as measured at the last power cycle (dual channel drivers only)
temp	Returns the heatsink temperature in Celsius
errs	Returns a list of currently active errors
id	Returns driver type

Usage

Please note that the Telnet commands are case sensitive and so the exact strings specified above must be used to control the driver.

In the event of an invalid command and/or value, the Driver will return an error or information about how to use the command.

Example 1: Set the current to -4.3 dB.

cur=-4.3

Example 2: Get the MAC address of the driver.

mac

Example 3: Attempt to set the current to +1.0 dB, which is an invalid value.

cur=1

Illegal value, gain will be off limit

Example 4: Sending a command without the required value.

smmp

Usage: snmp=en|dis

Example 5: Sending a command that is not supported.

output

Not recognised

Simple Network Management Protocol (SNMP)

Introduction

This section describes the Simple Network Management Protocol (SNMP) capabilities of the Driver.

The Driver acts as an SNMP agent. An SNMP manager application is needed in order to communicate with an SNMP agent. When using an SNMP manager it is possible to query specific read-only information from the agent (Driver), and to receive SNMP traps to the manager after a status change or error has occurred on the agent.

At present, only the default information provided by all SNMP-enabled devices is available.

SNMP needs to be enabled via the web interface before communication can take place. By default, SNMP is disabled.

For firmware v1.6.0 and above there are multiple SNMP versions supported.

- **V1 & V2C – V1 Traps.** This matches the implementation used in prior firmware versions. GET and SET can be used over either V1 or V2C, V1 traps are sent.
- **V2C** – GET and SET can be used over V2C only and V2 traps are sent.
- **V3** – GET and SET can be used over V3 only and V2 traps are sent according to the V3 security settings.

V3 is selected by default unless upgrading from a previous firmware version, in which case V1 & V2C is selected to retain existing functionality.

For V1 and V2C the SNMP implementation uses the default community strings of "public" for read and "private" for write. The "public" community string is also used when sending traps.

For V3 additional security options are presented. A single user is available with the following options and defaults.

User Name: 8-32 characters, case sensitive, alphanumeric plus the following special characters: @\$!%*#?-_{}(). Default "ampetronic".

Security Level: noAuthNoPriv, authNoPriv or authPriv (default).

Auth Protocol: MD5, SHA1-96 (default) or SHA2-256.

Auth Password: 8-32 characters, case sensitive, alphanumeric plus the following special characters: @\$!%*#?-_{}(). Default "ampetronic".

Privacy Protocol: DES or AES-128 (default).

Privacy Password: 8-32 characters, case sensitive, alphanumeric plus the following special characters: @\$!%*#?-_{}(). Default "ampetronic".

The SNMP Engine ID is based on the MAC address of the device, with the format of "80 00 BF 2F 80 <MAC Address>". As an example a driver with a MAC address of 30-0a-60-a0-60-06 would have an Engine ID of 80 00 BF 2F 80 30 0A 60 A0 60 06.

Reading Information

The Driver supports selected child OIDs (Object Identifiers) that exist below the ISO OID 1.3.6.1 (the Internet OID). These OIDs are defined in RFC 1213 ('Management Information Base for Network Management of TCP/IP-based internets: MIB-II'). Carrying out an SNMP walk using the SNMP manager application is a convenient way to view all the available OIDs on the device.

The manager must explicitly request OID parameters from the agent in order to receive a response. The following OIDs are given as examples that may be useful for status monitoring:

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OID	Name	Description	Example response
1.3.6.1.2.1.1.3	sysUpTime	The time (in hundredths of a second) since the network management portion of the system was last re-initialised	Timeticks: (16880) 0:02:48.80
1.3.6.1.2.1.2.2.1.6	ifPhysAddress	The interface's address at its protocol sub-layer	30:9:60:a0:c0:3
1.3.6.1.2.1.4.20.1.1	ipAdEntAddr	The IPv4 address to which this entry's addressing information pertains	192.168.0.56

The following OIDs are not currently supported in this firmware:

OID	Name
1.3.6.1.2.1.1.2	sysObjectID
1.3.6.1.2.1.1.4	sysContact
1.3.6.1.2.1.1.6	sysLocation
1.3.6.1.2.1.2.2.1.2	ifDescr
1.3.6.1.2.1.2.2.1.9	ifLastChange
1.3.6.1.2.1.2.2.1.22	ifSpecific

OID 1.3.6.1.2.1.1.5 sysName will default to the driver model.

OID 1.3.6.1.2.1.1.1 sysDescr will default to "Ampetronic Hearing Loop Driver".

While some of the above OIDs will accept a SET command, they will revert to default on restart of the driver.

Status and Error Reporting

Configuration Options

To receive SNMP traps, an SNMP manager needs to register with the agent using the normal process. A list of managers that have requested traps is displayed on the web interface. It is possible to add or delete from this list and a maximum of 16 address can be in the list at any time.

It is possible to configure which status changes and errors will trigger an SNMP trap using the Status Reporting management page on the web interface, or through the Telnet protocol (as detailed above). Certain errors cannot be configured and will always trigger a trap providing that SNMP is enabled and the error has occurred (for example, Heat Sink Too Hot).

If status or error reporting is enabled then an SNMP trap will be sent to the manager as soon as possible after the status change or error has occurred. There might be a short delay in the event that the unit needs to recover from the status change or error (for example, Power On).

Specific Trap Numbers

The trap includes a specific trap number under the OID 1.3.6.1.4.1.48943.0.n which pertains to an error as defined in the table below:

Number	Definition
0	Fatal Firmware Error
1	Channel A Clipping
2	Channel B Clipping
3	Channel A Clipping Attenuation
4	Channel B Clipping Attenuation
5	Channel A Open Loop

6	Channel B Open Loop
9	Amplifier Too Hot - Muted
10	Amplifier Too Hot - Derated
11	Transformer Overload - Muted
12	Transformer Overload - Derated
13	Transformer Overload - Shutdown
14	Heat Sink Too Hot
15	Loop A Overcurrent
16	Loop B Overcurrent
17	Loop A Cross Wired
18	Loop B Cross Wired
19	Loop A Resistance Too Small
20	Loop B Resistance Too Small
21	Power On

See the product manual for further explanation of error states, if relevant.

A custom MIB is available to download which will enable a textual description of the above traps to be reported by the SNMP manager.

For more information regarding network protocols or the C Series talk with our experts on:

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