The amplifier can be remotely operated by control and automation systems, such as those manufactured by Crestron and AMX. One RS-232 serial port and one optional Ethernet network port (Telnet protocol, single client) and are provided.

Serial Port

The serial port is a 2-pin Phoenix connector, wired for receive only. The data format of this port is fixed at 115200 baud, 8 data bits, 1 stop bit, no parity, standard RS-232 signaling levels.

Optional Ethernet Network Port

The Ethernet network port is a RJ45 jack, wired as an MDI device. Both 10Base-T and 100Base-TX speeds are supported. The left LED indicates the link speed (off = no link, yellow = 10 Mbps, green = 100 Mbps), and the right LED indicates activity (off = no activity, yellow = half-duplex, green = full-duplex).

RJ45 Pin	Signal
1	TX +
2	TX –
3	RX +
4	not used
5	not used
6	RX –
7	not used
8	not used

The network port supports IPv4. The network port's IP address can be assigned dynamically by a DHCP or BOOTP server, assigned dynamically using 169.254.xxx.yyy link-local addressing (AutoIP / RFC 3927) when there is no DHCP or BOOTP server available (not recommended), or configured statically. Selection of dynamic vs. static IP assignment and configuration of static IP, subnet mask and gateway IP addresses can be done over USB using the PC configuration GUI.

The network port supports connection of a single client and uses the Telnet protocol. The TCP port number is configurable over USB using the PC configuration GUI.

Infrared (IR) Control

The amplifier also allows the master output volume and master output mute controls to be changed using an infrared (IR) remote. The amplifier uses the NEC infrared protocol with an IR wavelength of 950 nm and a carrier frequency of 38 kHz. To allow off-the-shelf remotes to be used, the amplifier responds to several IR remote 32-bit command codes. These command codes correspond to several TVs that use the NEC protocol.

Volume Up (increases master output volume by 0.5 dB):
```
00 FF 70 8F
18 E7 40 BF
1C E3 70 8F
20 DF 40 BF
28 D7 98 67
```

Volume Down (decreases master output volume by 0.5 dB):
```
00 FF F0 0F
18 E7 C0 3F
1C E3 F0 0F
20 DF C0 3F
28 D7 18 E7
```

Mute/Unmute (switches master output mute on and off):
```
00 FF 08 F7
18 E7 90 6F
1C E3 18 E7
20 DF 50 AF
20 DF 90 6F
28 D7 58 A7
```

Master output volume and master output mute changes that occur using an IR remote are reported on the Ethernet Network port as master output volume and master output mute changes.

Program Command / Response Protocol

All commands and responses are composed of 7-bit ASCII characters. Both commands and responses start with an equals sign ('=') and end with an exclamation point ('!'). There are two commands, "get" and "set".

The get command allows the client to inspect the configuration of the amplifier. The format of a get command is:

        =g**ITEM**!

where **ITEM** is the name of the parameter being inspected. The amplifier will send a response that is in the same format as the set command.

The set command allows the client to change the configuration of the amplifier. The format of a set command is:

        =s**ITEM:VALUE**!

where **ITEM** is the name of the parameter being changed and **VALUE** is the new value for the specified parameter.

ITEM specifies the name of one of the amplifier's parameters. A list of the available parameters follows below, under section heading "Parameter Item Names".

VALUE specifies the new value for the specified item. The allowable choices for **VALUE** are indicated in the description of each **ITEM**.

For example, one of the items that can be changed is the master output volume level. This item is called "mvol", and the value is in ½ dB steps. To set the master volume to -6 dB, the command would be:
        =smvol:-12!

To get the current master volume, the command would be:
        =gmvol!
and the amplifier would respond with:
        =smvol:-12!

Characters received by the amplifier that do not occur between the "=" and the "!" are ignored. This allows for clients that send line termination characters, such as CR and LF, at the end of each line.

Parameter Item Names

Version and status information. All items in this section are valid only for a get command.

get main CPU firmware version number: **vercpu**
> The value returned is the juxtaposition of the major and minor version numbers. The lower 3 digits are the minor version number (typically between 0 and 99, but can be 3 digits if the minor version is 100 or above), and the remaining upper digits are the major version number.
> Example responses:
> > `=svercpu:2015!`   version is 2.15
> > `=svercpu:1004!`   version is 1.04
> > `=svercpu:23106!`   version is 23.106

Global controls.

get or set master output volume: **mvol**
> The value indicates the master output volume, in ½ dB steps. The master output volume is an integer between -128 and 0, where -128 indicates muted, -127 indicates -63.5 dB, -126 indicates -63 dB, etc., and 0 indicates 0 dB (maximum volume).
> Example:
> > `=smvol:-9!`   set master output volume to -4.5 dB

set relative master output volume: **mvoldelta**   (valid for set only)
> The value indicates the relative adjustment to be applied to the master output volume, in ½ dB steps. The value can be from -12 (6 dB decrease) to 12 (6 dB increase). The value is added to the current master output volume, and the resulting master output volume is limited to the range of -128 (muted) to 0 (maximum volume). This command is useful when implementing relative volume adjustments, such as "Volume Up" and "Volume Down" (typical of TV-style remote control operation).
> Examples:
> > `=smvoldelta:6!`   increase master output volume by 3.0 dB
> > `=smvoldelta:-4!`   decrease master output volume by 2.0 dB

get or set master output mute: **mmute**
> The value indicates whether the master output mute control is off (not muted) or on (muted), and is an unsigned integer between 0 and 1. Changing the master output mute control does not change the master output volume setting.
> > 0 = master output not muted
> > 1 = master output muted
> Example:
> > `=smmute:1!`   mute master output

toggle master output mute: **mmutetoggle**   (valid for set only)
This command switches the master output mute to the opposite state (e.g., if the master output is muted, it unmutes it; if the master output is not muted, it mutes it). The value for this command is ignored, but must be supplied to comply with the format of the set command. This command is useful when implementing a single "Mute" button, which switches between the muted and unmuted states (typical of TV-style remote control operation).
Example:
```
=smmutetoggle:0!
```
switch master output mute to opposite state