Product Manual

232-Amp+
232-Amp+W

RS-232 Stereo Mixer/Amplifier
Ver 2.3 July 19, 2016

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Overview

232-AMP+

232-Amp+W

The Contemporary Research 232-Amp+ is a compact, programmable mixer/amplifier aimed at integration with flat-panel displays and video projectors. The versatile amp features a stereo line-level display/projector audio input and two mono aux inputs, and outputs stereo sound at 40 watts RMS. The aux inputs mix levels with the stereo input, and can be set to mute or lower other inputs when active, ideal for wireless mics and paging applications. The Class D amplifier is highly energy-efficient, using 90% of DC power for amplification, operating with very little heat, and consuming almost no power at all when quiet.

The 232-AMP+W has integrated flanges for easy surface mounting

Full RS-232 control and status is available, allowing integration with custom control systems. In addition to setting master gain and input levels, the commands can also set aux input threshold, timing, and ducking levels. Installers can adjust performance manually in the field using onboard switches and level potentiometer.

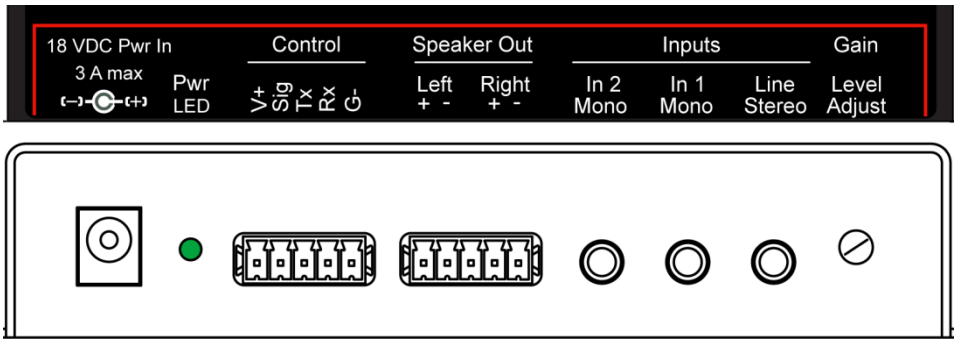
The new V2.2 firmware adds the ability to change gain with the Level pot, set Mono 1 and 2 to a mixer mode with no ducking. As a result, many applications can be set up with only a screwdriver.

- Drives stereo speakers at 16 watts RMS – 32W (16W per channel) @ 8 ohms, 40W (20W per channel) @ 4 ohms
- Mixes one stereo line input with two mono inputs, mono inputs can "duck" other inputs, with programmable ducking on/off, threshold, timing, and mute levels
- Features programmable input levels and volume (volume affects stereo input, mono inputs are fixed)
- Offers field adjustment with onboard DIP switches and level potentiometer
- UL 2043 plenum rated
- 2-way RS-232 control for control systems and wall panels
- Responds to Sharp TV or CR IR remote for Volume Up, Down, and Mute
- Connects speakers and control from captive screw terminals
- Includes 3 A 18 VDC power supply (domestic only), and captive-screw control terminals
- IR-RXC Remote Sensor or compatible IR sensor (carrier can be on or off)

Firmware

- Version 1.7 – Fixes bug where a bump command did not affect Line input volume
- Version 1.5 – Improves ducking performance, Mono 1 and 2 will trigger amp on as well as Line
- Version 1.8 - Adds a Mute On/Off to inputs
- Version 1.9 – Helps to reduce noise in some applications, requires a board modifications in older 232-AMP and AMP+ units.
- Version 2.1 - The V-series commands such as mute only affect the stereo input, not 1 and 2.
- Version 2.2 – Adds more setup options for switches and pot
- Version 2.3 – Adds IR Volume and Mute control

Specifications



Physical

232-Amp+: 5.5" [140mm] wide x 1.1" [28mm] height x 3.5" [86mm] deep
7.7" [196mm] wide with SMA bracket
232-Amp+W: 7.7" [196mm] W x 1.1" [28mm] H x 3.5" [86mm] D
Weight: 8 oz [226g]
Enclosure: All aluminum with durable black powder coat paint
232-Amp+ Mounting: Optional SMA Brackets attach 232-Amp+ to CR tuner or surface, mount alongside CR tuner in RK-1, rack-mount in RK3 rack kit
232-Amp+W Mounting: Integrated flanges for surface mounting
Standards: RoHS compliant and energy-efficiency meets new California standards, UL 2043 plenum rated

Audio

Amplifier Class D, highly energy-efficient, operates with very little heat

Inputs
Stereo: Stereo 3.5 mm jack, unbalanced, 7.5K ohms impedance, 1.4 V RMS max
Programmable input level
Inputs 1 and 2: Two Mono 3.5 mm jack, unbalanced, 7.5K ohms, 1.4 V RMS max
Programmable for input level and ducking gating, timing, and mute levels
Gain Potentiometer: Adjusts volume in normal mode, sets other levels in program mode
DIP switches: Located on bottom of 232-Amp+ interact with Gain for field setup
Operation: Master volume commands affects Input 1 only

Output
Speakers: 5-pin captive-screw terminal for stereo speaker installation, 8 or 4 ohm
Watts @ 18 VDC: 32W RMS (16W per channel) @ 8 ohms
40W RMS (20W per channel) @ 4 ohms
Watts @ 12 VDC: 16W RMS (8W per channel) @ 8 ohms
30W RMS (15W per channel) @ 4 ohms
Gain: Added gain 20 dB (default), programmable to 26, 32, or 36 dB
THD + Noise: 0.25% typical
Response: +/-1 dB, 20 Hz to 20 kHz, 1 watt output
Crosstalk: >65 dB @ 1 kHz, >58 dB @ 20 kHz
Protection: Thermal and short-circuit protected, auto-recovery

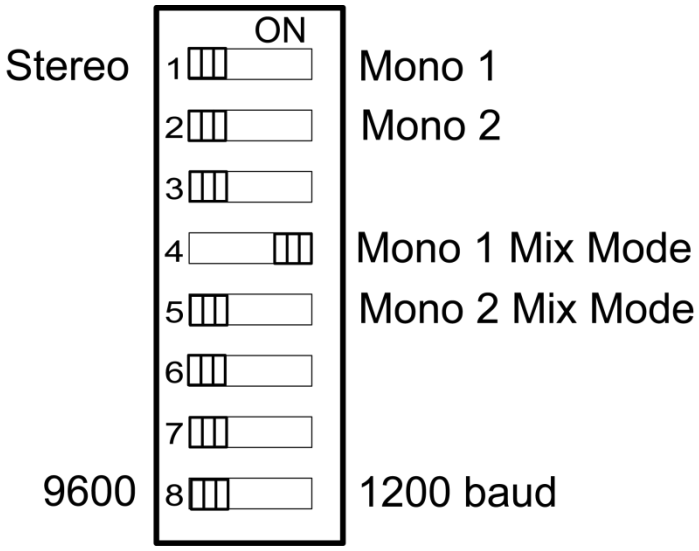
Control
5-pin captive-screw terminal
RS-232: GND, TX and RX, also GND for IR sensor
Signal (Sig): IR Input, Sharp TV or CR IR codes, carrier can be on or off
Power (V+): 12-18 VDC output to IR sensor
DIP switches on bottom of 232-Amp+ interact with Gain for field setup

Power
Power LED: Green LED flashes when DC power is active, slow flash in standby mode
Power In: 5-pin captive-screw terminal
3 A maximum @ 18 VDC, 11.5 to 19 VDC, 18 VDC typical (may be unregulated)

Includes
18 VDC 3 A digital switching power supply (North American shipments only)
Two 5-pin captive screw terminals

Options
SMA Surface Mount for AV Tools
RK-3 Rack Mount Kit for mounting up to 3 AV Tools across in 19" rack, 1 RU
IR-RXC Remote Sensor (can operate at 12-18V, check with others for voltage range)

Field Setup



All the parameters can be programmed via RS-232, but many can be set using the DIP switch on the bottom of the case and the Level potentiometer on the front panel

Amp Settings

- Switches 1 and 2 Off = Stereo level, use Level pot to adjust level
- Switches 1 and 2 On = Amp gain, use Level pot to change
- Switch 1 On, Switch 2 off = Mono 1, use Level pot to adjust level
- Switch 1 Off, Switch 2 On = Mono 2 level, use Level pot to adjust level
- Switch 4 On = Mono 1 Mix mode, no ducking, reverts when switch is off
- Switch 5 On = Mono 2 Mix mode, no ducking reverts when switch is off
- Switch 8 = RS-232 baud rate, Off for 9600, On for 1200
- All Switches On = Reset to factory default

Status LED

The green LED will stay lit when the unit is powered and the output is active. A slow flash on the LED indicates the amplifier is in standby mode (no audio input level, timed out to standby).

Mix/Ducking Operation

Inputs 1 and 2 can serve as mix or ducking inputs. Ducking means that, when audio on one input rises about a trigger level, it will mute the other inputs. The 232-Amp+ allows you to set several parameters for automatic ducking operation for both inputs.

- Volume – This sets the gain level for the input.
- Gate Threshold – Set the input audio level that triggers ducking .
- Gate Hold Time – Sets how long the gate will be held open before checking the Gate level.
- Ducking Level – Sets the volume level for the stereo input during ducking – the other mono input will be muted.

Input 1 always has priority – use this input for audio from a paging system.

Overview

The 232-Amp+ full duplex RS-232 enables a system programmer to control all functions as well as monitor status. All commands are sent as ASCII strings. No delays between characters or commands are required, as data is interrupt driven and buffered.

There are four status strings for the 232-Amp, three for each input channel and one for general Amp status.

One 232-Amp+ may be daisy-chained together with a CR 232-series tuner from a single RS-232 port. The 232-Amp+ is pre-set to Unit 1, and the tuner would be set to Unit 2.

Communications parameters (Front Panel Mode 1) are 300 to 19200 baud, 8 data bits, No parity, and 1 stop bit. Factory default is 9600 baud, Unit#1.

All settings are saved to NVRAM in the 232-Amp.

The tuner will accept non-standard RS-232 control such as voltage that swings from 0 to +5 VDC, commonly found when IR ports are used to send RS-232 commands.

General protocol specifications

Characters in command strings to the 232-Amp+ are common ASCII keyboard characters.

Command strings sent to the 232-Amp+ begin with the ASCII > (greater than symbol) as an 'Attention' character and end with carriage return - ASCII CR, Hex $0D, or keyboard Enter - as an 'End-of-command' character.

Responses from the 232-Amp+ begin with the ASCII < (less than symbol) as an 'Attention' character and end with a carriage return followed by line feed an ASCII LF or Hex $0A as 'End-of-command' characters.

A carriage return is required at the end of each command and is assumed in all examples.

Command String Structure

[Attention] (Unit#) [Command] (Parameters) [Return]

Attention	Single character (>) starts the string
Unit#	The Unit# is expressed as an ASCII 0-9 when used in multiple tuner applications. To address all units, use a Unit # of 0 (Zero) No unit number will default to Unit#1
Command	A two-character command
Parameters	Added attributes to some commands
Return	A carriage return ends the command string, you may use ASCII CR, Hex $0D, or keyboard 'Enter' in programming. For simplicity, the programming examples in the manual will not show the 'CR' – so remember, you'll need to add it in your control code.

Command and Status Response

Commands can be sent back to back at any time without any delay. To allow for rapid, multiple commands, status responses are intentionally delayed by about 125mS, sending the most current status in response to control commands or user actions.

Control Commands

Code	Function	Operation
	Level	You can skip leading zeros on values – so 5 can be 5, 05 or 005
VL=	Stereo input volume	0 (mute) to 63 (full)
VM	Stereo input mute on	Mutes input
VX	Stereo input mute off	Restores volume to previous level
VU	Ramp stereo volume up	Starts volume ramping up
VD	Ramp stereo volume down	Starts volume ramping down
VV	Stop stereo volume ramp	Stops volume ramping
VT	Toggle stereo Volume Mute	Alternates audio mute on and off
VG=	Amplifier Gain	Sets gain level Sent alone returns amp gain status 0=20 dB (default) 1=26 dB 2=32 dB 3=36 dB
Inputs	**Volume Parameter "Bump"**	Send input volume parameter with 255 will bump value to next step. Send parameter with 254 will bump value down one step This allows wall panels that can't send a volume ramp from press and a ramp stop from release to just bump the level up with each button press.
V0=	Stereo Input	Stated with <parameter>,<value> V0 alone will return status for Stereo (xx)=Default setting 1=Volume level 1-63 (40) 2=Max gain level 0-63 (0-63, also acts as mute on/off) 3=Min gain level 0-63 Fixed at 0, variable in future 4=Power On Threshold 0-63 (4) 5=Power On Hold delay 0-99 seconds (99) 0=Always On Ex: '>V0=1,30'
V1=	Mono 1	Stated with <parameter>,<value> V1 alone will return status for Input 1 Input 1 always has priority for ducking (xx)=Default setting 1=Volume level 0-63 (40) 2=Max gain level 0-63 (0-63, also acts as mute on/off) 3=Min gain level 0-63 (Fixed at 0), variable in future 4=Gating threshold level 1-63 (10) 5=Gating hold time 0-50 in 0.1 seconds (15) 00=Ducking off, acts as mixed input 6=Ducking level for the stereo input 0-63 (10) Example: '>V1=1,20 V1=4,03 V1=5,10 V1=6,05'
V2=	Mono 2	Stated with <parameter>,<value> V2 alone will return status for Input 2 (xx)=Default setting 1=Volume level 0-63 (40) 2=Max gain level 0-63 (0-63, also acts as mute on/off) 3=Min gain level 0-63 (Fixed at 0), variable in future 4=Gating threshold level 1-63 (10) 5=Gating hold time 0-50 in 0.1 seconds (15) 00=Ducking off, acts as mixed input 6=Ducking level for the stereo input 0-63 (10)
SV	Amp Status	Returns Amp/Stereo status string

RS-232 Commands

Terminal Communication Commands

EF	Echo Off	Characters received will not be re-transmitted (power up default).
EN	Echo On	Characters received will be re-transmitted. ***Example:*** '>EN' Characters received will be re-transmitted.
ID	Product ID	Returns the product model number and software version.
Z!	Zap	Reconfigures unit for all factory default settings: Unit #1 VG: 0 V0: 40,63,0,4,99,0 V1: 40,63,0,10,15,10 V2: 40,63,0,10,15,10

RS-232 Command Hints and Tips

You can control a 232-Amp+ and a 232-series tuner from a single RS-232 port by daisy-chaining RS-232 between the Amp and Tuner. Set the Tuner to ID 2, the Amp will always be unit 1.

Example: '>1VM2P0' Sets the 232-Amp+ to mute, and the tuner to Off.

The carriage return line feed at the end of each 232-Amp+ response allows for easy monitoring of responses with an ASCII terminal program. You may use ASCII CR, Hex $0D, or keyboard 'Enter' in programming.

You don't have to use the '=' character between the command and parameter – the string works either way.

Gating and Volume

If you want the 232-Amp+ to act as a straight mixer, set Mono 1 and Mono 2 Gate Threshold (4) and Gate Hold (5) to zero (00). Note that both need to be turned off, the 232-Amp+ works best as either a fully gated smart mixer or as a standard mixer, not both.

Usually, gating works well at the default settings, but feel free to adjust the Gate Threshold (4) and Gate Hold (5) to work best with your application.

Try testing the system with the 232-Amp+ set higher than the default 20 dB gain (VG command). There are slight changes in gating performance at the highest levels, but usually 26 dB offers a good blend of volume and performance.

Cloning Amplifiers

If you are installing a number of units in the same facility, you can clone your settings using HyperTerminal, Tera Term, or other Terminal app. Most allow you to send a text file instead of typing all the settings. Type in the series of commands in Notepad or other text editor such as:

>VG=1
>VL=60
>V0=5,00
>V1=1,60
>V21,60 (if you want to skip the '=' sign)

Once you've refined all the settings, just sent the file to the other 232-AMPs in the site. After that, the installer can use a screwdriver and the DIP switches to tweak volume levels for the room.

Typical: [Attention] [Unit#] [data ...data] [cr] [lf]

232-Amp+ status response strings contain ASCII characters similar to those used for the same functions in command strings. An ASCII 'carriage return' and 'line feed' follow each response string. Functions shown as N/A are not applicable; characters will appear in status strings as lower-case x.

Input 0 (Stereo) Status Response String (V0):

Start	Unit	CMD		Volume	Max	Min	On	Hold	Power	
	1			0-63 2 digits	0-63 2 digits	0-63 2 digits	0-63 2 digits	0-99 2 digits	Preset 2 digits	
<	**1**	**V0**	**XXX**	**63**	**63**	**00**	**03**	**20**	**20**	**XXXXXX**

Input 1 Status Response String (V1):

Start	Unit	CMD		Volume	Max	Min	Gate	Hold	Duck	
	1			0-63 2 digits	0-63 2 digits	0-63 2 digits	0-63 2 digits	0-50 2 digits	0-63 2 digits	
<	**1**	**V1**	**XXX**	**63**	**63**	**00**	**10**	**15**	**03**	**XXXXXX**

Input 2 Status Response String (V2):

Start	Unit	CMD		Volume	Max	Min	Gate	Hold	Duck	
	1			0-63 2 digits	0-63 2 digits	0-63 2 digits	0-63 2 digits	0-50 2 digits	0-63 2 digits	
<	**1**	**V2**	**XXX**	**63**	**63**	**00**	**10**	**15**	**03**	**XXXXXX**

Amp Status Response String (SV):

Start	Unit	CMD	Power	Volume	Mute	Stereo
	1		U=On M=Off	0-63 2 digits	U=Off M=On	
<	**1**	**V**	**M**	**63**	**U**	**S**

Amp Gain Response String (VG):

Start	Unit	CMD	Gain	
	1		0-3 1 digit	
<	**1**	**VG**	**1**	**XXXX**

RS-232 Cable Connections

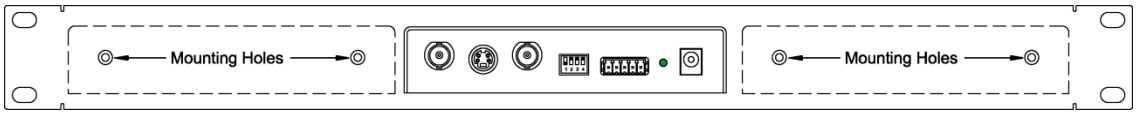
Single 232-Amp+

RS-232 Wiring – Amp

RS-232 Control Port		Captive Screw Terminal
5 GND	GND 5	
2 RXD	TXD 3	
3 TXD	RXD 4	

RS-232 wiring for control or programming should only use pins 2, 3, 5. Cables with all pins wired can lock out front-panel programming and data communication (Pins 4 and 9 are inputs).

Rack Mounting



RK3 AV Tool Rack Kit

Install 232-Amp+ into the center of the RK3 rack mount using included 4-40 ¼" screws

Limited Warranty and Disclaimer

Warranty: Three (3) year limited warranty on all parts and labor for Contemporary Research manufactured products from the day of purchase by authorized dealer. Manufactured products are warranted against defects in materials and workmanship. If Contemporary Research receives notice of such defects during the warranty period, Contemporary Research will repair or replace, at its option, products that prove to be defective.

Exclusions: The above warranty shall not apply to defects resulting from improper or inadequate maintenance by the customer, customers applied software or interfacing, unauthorized modifications or misuse, mishandling, operation outside the normal environmental specifications for the product, use of the incorrect, modified or extended power supply, or improper site operation and maintenance. *Please note Contemporary Research SSV-DX Display Express PC product carries a six month limited warranty.*

Limited Warranty and Disclaimer

Contemporary Research Corporation (CR) warrants this product to be free from defects in material and workmanship under normal use for a period of two years from the date of purchase from CR. Should such a defect occur CR will repair or replace, at their option, the defective product at no cost for parts or labor.

This warranty extends to product purchased directly from CR or an Authorized CR Dealer. Consumers should inquire from selling dealer as to the nature and extent of the dealer's warranty, if any.

All warranty claims must be shipped pre-paid to the factory. Call or fax to obtain a Return Material Authorization (RMA) number.

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