



Lattis Matrix Switcher

1600 and 800 Series Owner's Manual

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Introduction

Thank you for selecting a Vaux Lattis Matrix Switcher. These systems have been designed for the utmost in performance and reliability. There are currently four models in the Lattis Matrix Switcher family:

LE-800A	8-source by 8-zone, audio-only	LE-800AV	8-source by 8-zone, audio/video
LE-1600A	16-source by 16-zone, audio-only	LE-1600V	16-source by 16-zone, video-only

The LE-800A, LE-800AV, and LE-1600A systems provides high-fidelity stereo line-level switching, zoned volume/bass/treble/muting, programmable min/max/mute/initial-volumes, and other customizable features. The systems may be controlled using infrared remote controls, keypads, and/or RS-232 serial control from a computer or other control system (e.g. AMX, Crestron...). The source inputs are driven from any line-level source, while the volume-controlled zone outputs connect to power amplifiers for each stereo zone. In the case of the LE-800AV and LE-1600V, the video switching is line-level composite video, for NTSC or PAL systems.

Matrix Switching and Zone Expansion

The Lattis Matrix Switcher is a multi-source/multi-zone audio (or audio/video) distribution and control system. A Lattis system allows multiple audio (or audio/video) sources to be routed to multiple zones (one or more rooms). Each zone of the system has independent control over source-selection, volume/bass/treble levels, muting, etc.

Multiple Lattis Matrix Switchers may be combined to expand the number of zones. For example, three 16x16 Lattis LE-1600A switchers may be use to provide a 16-source by 48-zone system. The units are simply programmed to respond to different “Base-Zones,” (1, 17, and 33) allowing contiguous zone numbers from 1 to 48. A Vaux system may expand this way to a total of 255 zones. The audio sources may simply use “Y-cables” to split to two or three Lattis inputs, or a “Distribution-Amp” (DA) may be used to buffer each source for driving multiple Lattis Matrix Switchers. For video sources (when using a Lattis LE-800AV or LE-1600V), a DA is not needed since each source has a buffered output which is used to connect to the video input of the next switcher. With video signals, a Y-cable cannot be used since it is mandatory to maintain proper 75-ohm video line impedance. You may also mix and match Lattis switchers to provide different features. For example, an 8x8 audio-only LE-800A may be combined with an 8x8 audio/video LE-800AV, providing eight sources by sixteen zones (eight of these zones have video).

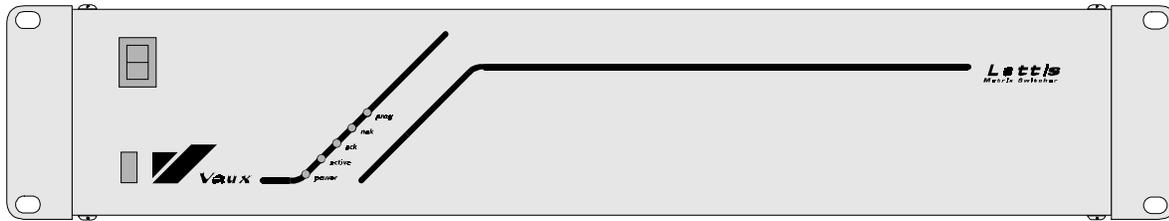
IR and RF Remote Control and Keypad Operation

Lattis Matrix Switchers may be operated by hand-held Vaux RC-16-IR infrared (IR) remote controls. When used with an optional RC-RFX1 receiver, the Lattis models may also be operated using a radio-frequency (RF) remote, the RC-16-RF. The remote controls allow selection of A/V source, adjustment of each zone’s Volume/Bass/Treble levels, as well as system setup and programming functions. The Vaux RC-16 remote control is easily programmed to control one specific numbered zone – the remote’s zone number may easily be changed to move the remote to a different room. IR control from multiple rooms will require a wired or wireless IR-Repeater system, which uses IR sensors in each room. The Vaux RC-16-IR remote may also be used to teach the Vaux control codes (for one zone) to a third-party hand-held “learning” remote. Vaux programmable keypad systems may also be used to control Lattis switchers. Additionally, third-party IR-learning keypads may also be employed, using a Vaux RC-16-IR remote to teach the Lattis commands to the keypad.

Computer Control Systems

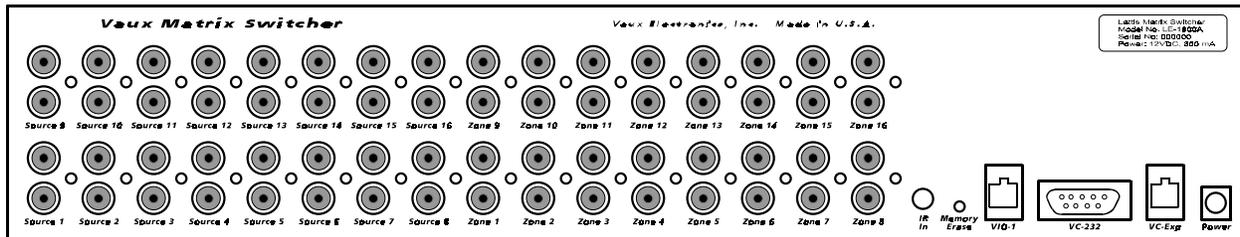
The Lattis Matrix Switcher may be completely controlled by an attached computer, or other control system (such as AMX or Crestron) which communicates over a serial, RS-232 connection. The host computer has complete control over A/V zone switching, volume/bass/treble levels for each zone, etc. The Lattis system sends messages to the control system confirming actions for not only RS-232 commands, but also for RF-, IR-, or keypad-generated commands, closing the loop on the whole system. The control system may optionally poll periodically for system status, or may simply ignore messages for a basic command-only interface. Serial communication uses the VauxProtocol standard, presented later in this manual.

Lattis Matrix Switcher Front Panel



- Power Switch
- Infrared Control Sensor (below switch, left of logo)
- Power light
- Active light (one or more zones on)
- Ack light (acknowledge)
- Nak light (negative acknowledge)
- Prog light (programming)

Lattis Matrix Switcher (LE-1600A) Rear Panel



- A/V Source Inputs (phono jacks) — 8/16 inputs for line-level stereo audio (& composite video on 800AV/1600V).
- A/V Zone Outputs (phono jacks) — 8/16 outputs for line-level stereo audio (& composite video on 800AV/1600V).
- The audio outputs are volume/bass/treble/mute controlled within the Lattis Matrix Switcher and connect to zone power amplifiers (sized appropriately for each zone).
- IR-In jack (3.5mm phone) for connection of IR-Repeater system, or other modulated IR input.
- VC-Exp connector (6P6C) Expansion port for 232 daisy-chaining and keypad hub connection.
- Memory-Erase button. Careful — will restore all factory settings, erase IR codes, etc.
- VIO-1 connector (6P6C) Future use.
- VC-232 connector (9-pin DB-9-F) RS-232 serial control port.
- Power connector (2.1mm connector, auto-polarity) For 12 VDC, 800mA adapter.

Parts Checklist

When unpacking your Lattis system, ensure that you have received the following:

- Lattis Matrix Switcher (LE-800A, LE-800AV, LE-1600A, LE-1600V)
- AC Adapter – 12 VDC, 800 mA
- Owner's Manual

Other components you may need:

- Vaux RC-16-IR infrared remote control(s)
- Vaux RC-16-RF radio-frequency remote control(s) (RC-RFX1 receiver option required)
- Infrared repeater system
- Keypad control system
- Source components, zone power amplifiers, speakers
- Audio/Video connecting cables
- RS-232 connecting cable

Installation

The Lattis Matrix Switcher is quite flexible, in that it can integrate with a variety of A/V devices and control systems, and may be configured a variety of ways. Installation of the Lattis System is described below:

1. **System Power:** Place the Lattis Matrix Switcher near your audio/video components. Turn off the Lattis front panel switch and plug the AC power adapter's cable into the rear panel Power connector on the Lattis Matrix Switcher. Plug the adapter into a standard electrical outlet — select an outlet which is not controlled by a wall switch.
2. **Optional Connection of Vaux Wired Keypads:** If you are installing Vaux wired keypads, plug the Vaux Data cable from the keypad connecting hub into the specified connector.
3. **Optional IR Input from Repeater Systems, Keypads, or other modulated IR input source:** Connect to the rear-panel IR-In jack, or affix an IR emitter over the front-panel sensor.
4. **Optional RS-232 Computer or Control System Connection:** Connect your computer or control system, using a properly wired RS-232 cable, to the 9-pin VC-232 connector on the rear panel of Lattis Matrix Switcher System. For more information on the VC-232 interface, refer to a later manual section.
5. **Connection of A/V Source components:** Plug your Audio/Video source components into the Lattis Source inputs using appropriate cabling.

Note: Lattis Video Switchers (LE-800AV and LE-1600V) use a dual-port connector for source inputs. The video input signal connects to the black phono jack on the Source side – the yellow phono jack above this connector provides a 75-ohm buffered output for looping the source to other destinations (such as a second switcher).

6. **Connection of A/V Zone amplifiers:** Connect the Lattis Zone audio outputs to power amplifiers appropriate for each zone. For video-capable switchers, connect the video outputs to video monitors, or, for longer runs, to composite buffer amplifiers or video modulators. Run the speaker wiring and video cables to each zone. NOTE: Do not use level-sensing audio amp powering options — low volumes may turn the amp off.

Note: Lattis Video Switchers (LE-800AV and LE-1600V) use a dual-port connector zone outputs. Each Zone output has two independent 75-ohm buffered output ports, allowing connection of two video cables to different destinations.

7. **Power-up the system:** Turn on the Lattis Matrix Switcher using the front-panel switch — a string of front-panel lights indicates that the Switcher is running.
10. **Install Two (2) “AA” batteries in the RC-16 remote control(s) (alkaline preferred).**

RC-16 Remote Control

- The RC-16 Remote Control has four lighted "Mode" keys, which select one of four operating modes. Pressing a mode button will flash the light twice and change the "Current-Mode." When non-mode buttons are pressed on the remote, the appropriate mode light flashes to confirm the button press, as well as the Current-Mode in use. The remote acts as four totally-different remotes in each of these modes.
- A/V is the normal mode for turning a zone on or off, selecting sources, and adjusting volume in a zone. The remote's "Current-A/V-Zone" may be changed to correspond to the room in which the remote is located (up to 90 zones and 8 clusters may be controlled). You may select 8 or 16 sources for the zone, depending on your system.
- Note that some RC-16 buttons are not used with Vaux Lattis switchers -- for Vaux Aris systems, you may also use the RC-16 to control source equipment using learned IR codes (play, pause, channel, digits...).
- *Macro* mode is not used with Lattis switchers (Aris-only).
- *Lights* mode is not used with Lattis switchers (Aris-only).
- *Aux* mode is for future use.
- Some other buttons will always switch the remote to a/v mode (regardless of the mode it was set to previously): zone, on/off, volume, mute, shift, prog, and source-select (tuner, cd...).
- During operation or programming, pressing an incorrect button will result in an "Error" flash -- this is a flash of all four of the lighted mode buttons on the remote (a/v, macro, lights, & aux).
- The RC-16 Remote Control uses two "AA" alkaline batteries. Battery life is typically one year, but will depend on how frequently the remote is used. When the remote's operating range seems shorter, or operation seems intermittent or erratic, the batteries likely need to be changed. Batteries contain nasty stuff which gets released in landfills -- to keep our groundwater clean, please dispose of used batteries at a recycling center.
- When inserting batteries, all four mode lights flash, indicating that the stored parameters have been restored to Factory-Settings:

Current-A/V-Source	01 (tuner)
Current-A/V-Zone	01
Current-Lighting-Device	11 (X-10 address A1)
Current-Aux-Device	01

Programming the System

Setting each Zone's Initial Volume Level (and maximum level)

When you have the system running, you will likely wish to tailor each room's initial volume level (the level to which it first turns on). You can also set the maximum volume of the amplifier at this point.

Note: The earlier RC-8-IR remote control may also be used to set this adjustment.

- Set the RC-16 remote control so you are controlling the desired zone (01 to 90).
Press the **Zone** button, followed by two-digits corresponding to the desired zone.
eg: *Zone-0-1* will select zone 01, and *Zone-1-2* will select zone 12.
This zone is saved in the remote until you change it again.
- Turn down power amp's level control for this zone to about 25%
- Select a nominal-level source such as a CD or Tuner.
- Using the RC-16 remote control, turn the zone's volume up to maximum.
- Adjust the power amp's level control to the loudest level you wish the zone to reach.
- Using the RC-16 remote, turn the volume down to the desired initial (turn-on) level.
- Press **Shift-FFwd** on the RC-16 (Shift followed by the FFwd key).
- Repeat for other zones.

Remote Control Setup Commands (shift-pause-x):

Note: The earlier RC-8-IR remote control may also be used to set this adjustment.

* shift-pause-1	Zone-Initial-Volume-To-Current	zone 1-90, also ack/nak flash
* shift-pause-2	Zone-Mute-Volume-To-Current	zone 1-90, also ack/nak flash
* shift-pause-3	Zone-Min-Volume-To-Current	zone 1-90, also ack/nak flash
* shift-pause-4	Zone-Max-Volume-To-Current	zone 1-90, also ack/nak flash
* shift-pause-5	Zone-Previous-Volume-Flag-Off	zone 1-90, also ack/nak flash
* shift-pause-6	Zone-Previous-Volume-Flag-On	zone 1-90, also ack/nak flash
* shift-pause-7	Zone-Current-Volume-To-0dB	zone 1-90, also S50 mssg and ack/nak flash
shift-pause-8	Zone-Restore-Factory-Settings	zone 1-90, also ack/nak flash
shift-pause-9	Restore-All-Factory-Settings	light-bar, also sends S190 mssg

(* zone must be on and unmuted to change)

Examples (first set RC-16 to desired zone, then select a source):

- 1) to configure a zone's maximum volume level (power amp has gain adjust):
 - turn power amplifier's gain down (to perhaps 30 %)
 - adjust volume, using remote control, to maximum
 - adjust power amplifier's gain to loudest acceptable volume level
- 2) to configure a zone's maximum volume level (power amp has no gain adjust):
 - adjust volume, using remote control, to desired level
 - press shift-pause-4 to store this volume as the Maximum-Level
- 3) to configure a zone for a fixed initial (turn-on) volume level:
 - press shift-pause-5 to turn Previous-Volume-Flag off
 - adjust volume to desired level
 - press shift-pause-1 to store this volume as the Initial-Level
- 4) to configure a zone for passthrough volume level (fixed 0 dB):
 - press shift-pause-5 to turn Previous-Volume-Flag off
 - press shift-pause-7 to set volume to 0 dB
 - press shift-pause-1 to store this volume as the Initial-Level
- 5) to configure a zone for using Previous-Volume as initial level:
 - press shift-pause-6 to turn Previous-Volume-Flag on
- 6) to configure a zone for a desired mute level:
 - adjust volume to desired level
 - press shift-pause-2 to store this volume as the Mute-Level
- 7) to configure a zone for a desired minimum volume level:
 - adjust volume to desired level
 - press shift-pause-3 to store this volume as the Minimum-Level
- 8) to restore a zone's programmable parameters to factory settings:
 - press shift-pause-8, and reset a zone's initial/mute/min/max/tapers...
- 9) to restore all switcher programmable parameters to factory settings (careful!):
 - press shift-pause-9, and reset all zones, base-zone, erase ir-codes...

Audio/Video Operation

For all operations below, change the RC-16 remote control to the desired zone, if needed. The remote also needs to be in a/v mode for the following operations: press the RC-16's a/v mode button to change to a/v mode (the button will flash twice). Note: the remote is automatically placed in a/v mode when you press certain buttons.

Setting the RC-16's Current-A/V-Zone:

- For all operations below, set the RC-16 remote so you are controlling the desired zone (01 to 90). Press the **Zone** button, followed by two-digits corresponding to the desired zone -- eg: *Zone-0-1* will select zone 01, and *Zone-1-2* will select zone 12. This zone is saved until you change it again.
- You may also control a *Cluster* (a group of multiple zones that is programmed into the Lattis system), by selecting zones 91 to 98, for Clusters 1 to 8. Only certain functions are available during Cluster operation.
- You may also choose zone 00, which is a special *All-Zones* code. Only certain functions are available during All-Zones operation.
- Note: the remote is automatically placed in a/v mode when you press the zone button.

Selecting a Source:

- Press an RC-16 Source button (*Tuner, CD...*)
Note: This will automatically place the remote in A/V mode.
- The Lattis **Ack** light will flash. The source is routed to the zone at the programmed Initial-Volume-Level for the zone (or, the Previous-Volume, if the zone is so configured). If the zone is currently on, the new source will be at the current volume level.
- The Lattis **Active** light will be on when any zone is in use.
- If the Lattis's **Nak** light flashes, the requested zone is not valid for this Lattis unit. (eg: selecting zone 09 when only 01 to 08 are valid in an 8x8 switcher).
- If you have a 16-source LE-1600A or LE-1600V, you access the upper sources by pressing the *Shift* button, followed by a source button:

button	selects	button	selects
tuner	source 1	shift-tuner	source 9
cd	source 2	shift-cd	source 10
dss	source 3	shift-dss	source 11
vcr1	source 4	shift-vcr1	source 12
vcr2	source 5	shift-vcr2	source 13
dvd	source 6	shift-dvd	source 14
tape	source 7	shift-tape	source 15
aux	source 8	shift-aux	source 16

Turning the Zone Off:

- Press the RC-16's **On/Off** button -- the Lattis **Ack** light flashes, and the zone turns off (note: pressing the **On/Off** button again turns the zone on with the previous source).
- If the Lattis **Nak** light flashes, the requested zone is not valid for this Lattis unit.

Adjusting Zone Volume and Muting:

- Press the RC-16's *Volume-Up/Down* buttons, and release at desired volume level.
Note: This will automatically place the remote in A/V mode.
- Press the RC-16's *Mute* button -- the zone volume lowers to the programmed Mute-Volume-Level for the zone. Pressing Mute again will restore original volume.
- The Lattis *Ack* light flashes during volume adjust or mute. If the Lattis *Nak* light flashes, the requested zone is not valid for this Lattis unit, or the zone is not currently on.

Adjusting Zone Bass/Treble:

- Press the RC-16 *Shift* button, and then press a *Channel-Up/Down* button to adjust Bass, or a *Volume-Up/Down* button to adjust Treble. Each Shift-button-press adjusts up or down one step (can not press-and-hold for Bass/Treble adjustment)
- The Lattis *Ack* light flashes as the level is adjusted. If the Lattis *Nak* light flashes, the requested zone is not valid for this Lattis unit, or the zone is not currently on.
- You may restore *Flat* Bass/Treble (both to 0-dB) by pressing *Shift-Rew* on the RC-16.

VauxProtocol Commands & Messages (RS-232)

Connection of a computer or control system to the VC-232 serial port allows you to fully control the system using a selection of *Commands*, and to obtain immediate feedback on system status by listening to *Messages*. This Command/Message language is called VauxProtocol.

VauxProtocol *Commands* begin with an asterisk (*), followed by two letters, then one or more comma-delimited decimal number parameters, and finally a carriage-return and/or line-feed char (CR/LF). The numbers are ascii-encoded-decimal number strings which may range from 0 to 255. The decimal numbers may be one, two, or three digits total, and may include leading zeroes, or not, as desired (ie: 001, 01, and 1, are all equivalent). A comma must be used to delimit fields, and the command requires a CR, LF, or CR/LF as termination delimiter -- indicated by <cr>. Spaces may be removed, or inserted if desired (they are ignored).

Note: the following commands are all identical:

```
*CW,035,007 <cr>
or:   * C W, 035 , 007 <cr>   (extra spaces are ignored)
or:   *CW,35,7 <cr>         (leading zeros also optional)
```

Similarly, VauxProtocol *Messages* begin with an exclamation (!), followed by one letter, and then one or more comma-delimited decimal number parameters, and a terminating CR/LF.

The CR/LF characters are the only non-printable ascii characters used in VauxProtocol (CR = 0D hex = 13 decimal; LF = 0A hex = 10 decimal)).

Coding Tip: You will likely only need to implement a handful of commands/messages in a typical application! The simplest application will simply send a subset of the commands, and ignore any received Status Messages.

Coding Tip: Status messages are sent in response to RS-232, remote-control, or keypad control – by parsing the messages independently of the command programming, and updating internal variables in your program, you will “close-the-loop” on the whole system. You may then send commands blindly, and allow you message-handler to update your variables/displays. If you wish to ensure that your command resulted in an action, you may monitor internal variables after sending your command (instead of waiting for the actual message), and implement timeout/retry/alert code as desired for your application. This is a more generalized technique than simply sending a command and then waiting to parse a general command-acknowledge message.

Control-Command & Status-Message Summary:

- For zones 1 to 255, Status-Messages are sent in response to Control-Commands.
- Many commands return the same status message – simplifying message parsing programming.
- For zone 0 (all zones), no messages returned (multiple switchers would be responding together).
- Note that volume/bass/treble/mute commands will only affect zones that are not off, even if the requested zone is 0.
- A muted zone will be unmuted if 1) certain route commands (*CW,10/11/12/13/15/17/19) are received, or 2) certain volume commands (*CW,24/25/35/36) are received.

<u>Control-Cmd Description</u>	<u>Command</u>	<u>Status-Message</u>
Route-Audio/Video ssa/ssv (Zone-0 OK)	*CW,10,zon,ssa,ssv <cr>	!S,10,zon,ssa,ssv <cr> then !S,50,zon,sta,vvl,vvr <cr>
Route-Audio ssa (Zone-0 OK)	*CW,11,zon,ssa <cr>	!S,11,zon,ssa <cr> then !S,50,zon,sta,vvl,vvr <cr>
Route-Video ssv (Zone-0 OK)	*CW,12,zon,ssv <cr>	!S,12,zon,ssv <cr>
Route-A/V-Src src (Zone-0 OK)	*CW,13,zon,src <cr>	!S,10,zon,ssa,ssv <cr> then !S,50,zon,sta,vvl,vvr <cr>
Route-Muted ssa (Zone-0 OK)	*CW,14,zon,ssa <cr>	!S,11,zon,ssa <cr> then !S,50,zon,sta,vvl,vvr <cr>
Route-At-Volume ssa (Zone-0 OK)	*CW,15,zon,ssa,vvl,vvr <cr>	!S,11,zon,ssa <cr> then !S,50,zon,sta,vvl,vvr <cr>
Route-At-Vol-Muted ssa (Zone-0 OK)	*CW,16,zon,ssa,vvl,vvr <cr>	!S,11,zon,ssa <cr> then !S,50,zon,sta,vvl,vvr <cr>
Route-Cluster ssa/ssv (Zone-0 OK)	*CW,17,clu,ssa,ssv <cr>	!S,10,zon,ssa,ssv <cr> then !S,50,zon,sta,vvl,vvr <cr>
Route-Cluster-Muted ssa/ssv (Z-0 OK)	*CW,18,clu,ssa,ssv <cr>	!S,10,zon,ssa,ssv <cr> then !S,50,zon,sta,vvl,vvr <cr>
Route-Cluster-Src src (Zone-0 OK)	*CW,19,clu,src <cr>	!S,10,zon,ssa,ssv <cr> then !S,50,zon,sta,vvl,vvr <cr>

Routing Notes:

Routing audio using standard route commands (*CW,10/11/13,zon...):

- 1) Routing a source when zone is currently off:
 - Routes and sets zone volume to:
 - a) Normal (factory setting) route volume uses programmed "Zone-Initial-Volume."
 - b) Optionally, may configure route volume to be "Previous" volume.
(this was level when zone was last turned off)
(the implementation actually updates Zone-Initial-Volume at every zone turn-off).
- 2) Routing a source when zone is currently on (skipped if source is the same):
 - Routes at current zone volume.
- 3) Routing a source when zone is currently muted:
 - Routes and unmutes to previous volume (level when zone was muted).

Routing audio using Route-Audio-Muted command (*CW,14,zon,ssa):

- 1) Routing a source when zone is currently off:
 - Routes and places zone in muted state, and sets unmute volume to:
 - a) Normal (factory setting) unmute level uses programmed "Zone-Initial-Volume."
 - b) Optionally, may configure unmute level to be "Previous" volume.
(this was level when zone was last turned off)
(the implementation actually updates Zone-Initial-Volume at every zone turn-off, then this route-muted command loads unmute levels from initial).
- 2) Routing a source when zone is currently on (skipped if source is the same):
 - Routes at current zone volume.
NOTE: DOES NOT MUTE IF ZONE IS ON
- 3) Routing a source when zone is currently muted:
 - Routes and leaves zone in muted state.
 - Unmute level will be previous volume (level when zone was muted).

Routing audio using Route-Audio-At-Volume command (*CW,15,zon,ssa,vvl,vvr):

- 1) Routing a source when zone is currently off:
 - Routes and sets zone volume to specified volume level.
- 2) Routing a source when zone is currently on:
 - Routes at specified volume level (if source is the same, just updates volume).
- 3) Routing a source when zone is currently muted:
 - Routes and unmutes to specified volume level.

Routing audio using Route-Audio-At-Vol-Muted command (*CW,16,zon,ssa,vvl,vvr):

- 1) Routing a source when zone is currently off:
 - Routes and places zone in muted state.
 - Unmute level will be specified volume level.
- 2) Routing a source when zone is currently on:
 - Routes at specified volume level (if source is the same, just updates volume).
NOTE: DOES NOT MUTE IF ZONE IS ON
- 3) Routing a source when zone is currently muted:
 - Routes and leaves zone in muted state.
 - Unmute level will be specified volume level.

<u>Control-Cmd Description</u>	<u>Command</u>	<u>Status-Message</u>
Absolute-L/R-Vols vvl/vvr (Zone-0 OK)	*CW,20,zon,vvl,vvr <cr>	IS,50,zon,sta,vvl,vvr <cr>
Absolute-Left-Volume vvl	*CW,21,zon,vvl <cr>	IS,21,zon,vvl <cr>
Absolute-Right-Volume vvr	*CW,22,zon,vvr <cr>	IS,22,zon,vvr <cr>
Absolute-Volume vol (Zone-0 OK)	*CW,23,zon,vol <cr>	IS,50,zon,sta,vvl,vvr <cr>
Volume-Up (2-dB/step) (Zone-0 OK)	*CW,24,zon <cr>	IS,50,zon,sta,vvl,vvr <cr>
Volume-Dn (2-dB/step) (Zone-0 OK)	*CW,25,zon <cr>	IS,50,zon,sta,vvl,vvr <cr>
Left-Volume-Up (2-dB/step)	*CW,26,zon <cr>	IS,21,zon,vvl <cr>
Left-Volume-Dn (2-dB/step)	*CW,27,zon <cr>	IS,21,zon,vvl <cr>
Right-Volume-Up (2-dB/step)	*CW,28,zon <cr>	IS,22,zon,vvr <cr>
Right-Volume-Dn (2-dB/step)	*CW,29,zon <cr>	IS,22,zon,vvr <cr>
Balance-to-Left (L-up/R-dn)	*CW,30,zon <cr>	IS,20,zon,vvl,vvr <cr>
Balance-to-Right (R-up/L-dn)	*CW,31,zon <cr>	IS,20,zon,vvl,vvr <cr>
Start-Ramping-Volume-Up	*CW,35,zon <cr>	IS,50,zon,sta,vvl,vvr <cr> (/step)
Start-Ramping-Volume-Down	*CW,36,zon <cr>	IS,50,zon,sta,vvl,vvr <cr>(/step)
Stop-Ramping-Volume	*CW,37,zon <cr>	(none)
NOTE: volume ramps at 2-dB/120-msec until stopped, or Min/Max-Vol reached!		
Absolute-Bass/Treble levels bas/trb	*CW,40,zon,bas,trb <cr>	IS,40,zon,bas,trb <cr>
Flat-Bass/Treble (0-dB) (Zone-0 OK)	*CW,41,zon <cr>	IS,40,zon,bas,trb <cr>
Bass-Up (3-dB/step)	*CW,42,zon <cr>	IS,40,zon,bas,trb <cr>
Bass-Down (3-dB/step)	*CW,43,zon <cr>	IS,40,zon,bas,trb <cr>
Treble-Up (3-dB/step)	*CW,44,zon <cr>	IS,40,zon,bas,trb <cr>
Treble-Down (3-dB/step)	*CW,45,zon <cr>	IS,40,zon,bas,trb <cr>
Audio-Mute-Toggle	*CW,50,zon <cr>	IS,50,zon,sta,vvl,vvr <cr>
Audio-Mute-On (Zone-0 OK)	*CW,51,zon <cr>	IS,50,zon,sta,vvl,vvr <cr>
Audio-Mute-Off (Zone-0 OK)	*CW,52,zon <cr>	IS,50,zon,sta,vvl,vvr <cr>
Send IR Command (Aris-only)	*CW,100,isd,ifc,0,0,0 <cr>	IS,100,isd,ifc,0,0,0,xst <cr>
Send X10 Command (Aris-only)	*CW,120,xhc,xuc,xfc,rpt,0 <cr>	IS,120,xhc,xuc,xfc,rpt,0,xst <cr>
Play a Macro (Aris-only)	*CW,150,mac,0,0,0,0 <cr>	IS,150,mac,0,0,0,0,xst <cr>

Configuration-Command and System-Control Command Summary:

Coding Tip: In many applications, the factory settings are just right. You may want to adjust zone parameters manually using an RC-8 or RC-16 remote control – see the notes below.

<i>Config-Write-Cmd Description</i>	<i>Command</i>	<i>Factory setting</i>
Write-Switcher-Class-and-Base-Zone	*PW,1,swc,0,0,bzn <cr>	swc = 90, bzn = 1
Write-Zone-Minimum-Volume-Level	*PW,10,zon,vll <cr>	0 (-80 dB)
Write-Zone-Maximum-Volume-Level	*PW,11,zon,vhh <cr>	35 (+6 dB)
Write-Zone-Initial-Left-Vol-Level	*PW,12,zon,vil <cr>	22 (-20 dB)
Write-Zone-Initial-Right-Vol-Level	*PW,13,zon,vir <cr>	22 (-20 dB)
Write-Zone-Mute-Volume-Level	*PW,14,zon,vmm <cr>	0 (-80 dB)
Write-Zone-Bass-Level	*PW,15,zon,bas <cr>	4 (0 dB)
Write-Zone-Treble-Level	*PW,16,zon,trb <cr>	4 (0 dB)
Write-Zone-Audio-Mode	*PW,17,zon,mod <cr>	1 (stereo)
Write-Zone-Taper-Up-Delay	*PW,18,zon,tud <cr>	20 (ms/2-dB-step)
Write-Zone-Taper-Down-Delay	*PW,19,zon,tdd <cr>	5 (ms/2-dB-step)
Write-Zone-Parameter-Config-Table	*PW,30,zon,vll,vhh,vil,vir,vmm,bas,trb,mod,tud,tdd <cr>	
Write-Zone-Config-Flag	*PW,20,zon,flg,fst <cr>	fst = 0 (off-state)
Write-Cluster-Table (8-zone-switcher)	*PW,21,clu,z01,z02...z08 <cr>	zxx = 0 (exclude zone)
(16-zone-switcher)	*PW,21,clu,z01,z02...z16 <cr>	zxx = 0 (exclude zone)
Write-Source-Trim-Level	*PW,22,ssa,stl <cr>	stl = 0 (0 dB)

<i>Config-Read-Cmd Description</i>	<i>Command</i>	<i>Config-Message</i>
Read-Switcher-Class-and-Base-Zone	*PR,1 <cr>	!C,1,swc,0,0,bzn <cr>
Read-Zone-Minimum-Volume-Level	*PR,10,zon <cr>	!C,10,zon,vll <cr>
Read-Zone-Maximum-Volume-Level	*PR,11,zon <cr>	!C,11,zon,vhh <cr>
Read-Zone-Initial-Left-Vol-Level	*PR,12,zon <cr>	!C,12,zon,vil <cr>
Read-Zone-Initial-Right-Vol-Level	*PR,13,zon <cr>	!C,13,zon,vir <cr>
Read-Zone-Mute-Volume-Level	*PR,14,zon <cr>	!C,14,zon,vmm <cr>
Read-Zone-Bass-Level	*PR,15,zon <cr>	!C,15,zon,bas <cr>
Read-Zone-Treble-Level	*PR,16,zon <cr>	!C,16,zon,trb <cr>
Read-Zone-Audio-Mode	*PR,17,zon <cr>	!C,17,zon,mod <cr>
Read-Zone-Taper-Up-Delay	*PR,18,zon <cr>	!C,18,zon,tud <cr>
Read-Zone-Taper-Down-Delay	*PR,19,zon <cr>	!C,19,zon,tdd <cr>
Read-Zone-Parameter-Config-Table	*PR,30,zon <cr>	!C,30,zon,vll,vhh,vil,vir,vmm,bas,trb,mod,tud,tdd <cr>
Read -Zone-Config-Flag	*PR,20,zon,flg <cr>	!C,20,zon,flg,fst <cr>
Read -Cluster-Table (8-zone-switcher)	*PR,21,clu <cr>	!C,21,clu,z01,z02...z08 <cr>
(16-zone-switcher)	*PR,21,clu <cr>	!C,21,clu,z01,z02...z16 <cr>
Read -Source-Trim-Level	*PR,22,ssa <cr>	!C,22,ssa,stl <cr>

<i>System-Control-Cmd Description</i>	<i>Command</i>	<i>Note</i>
Zone-Restore-Factory-Settings	*PW,31,zon <cr>	
Write-Zone-Volume-Settings (zone must be on and unmuted to set these)	*PW,40,zon,cvs <cr>	
cvs = 1	Set Zone-Initial-Volume-To-Current	
cvs = 2	Set Zone-Mute-Volume-To-Current	
cvs = 3	Set Zone-Min-Volume-To-Current	
cvs = 4	Set Zone-Max-Volume-To-Current	
Restore-Factory-Settings	*PW,254,0,0,1 <cr>	The front-panel light-bar will flash, followed by the Factory-Settings Restored message (IS,190,4,0)
Force-System-Reset	*PW,255,0,0,1 <cr>	After approximately two seconds, the front-panel light-bar will flash, followed by the System-Boot message (IS,0,bzn,ccf,ccm,swc,0,svh,svl)

Request-Command & Status-Message Summary:

Status-Message are sent in response to preceding Control-Commands, but system status may also be determined at any time (by polling) using these optional Request-Commands (zon=0 not allowed).

Coding Tip: You probably do not need to use these commands, in most applications!

<i>Request-Command Description</i>	<i>Command</i>	<i>Status-Message</i>
Get-System-Information	*CR,0,0 <cr>	!S,0,bzn,ccf,ccm,swc,0,svh,svl <cr>
Get-Zone-Status	*CR,1,zon <cr>	!S,1,zon,sta,stv,ssa,ssv,vvl,vvr,bas,trb <cr>
Get-Audio/Video-Sources ssa/ssv	*CR,10,zon <cr>	!S,10,zon,ssa,ssv <cr>
Get-Audio-Source ssa	*CR,11,zon <cr>	!S,11,zon,ssa <cr>
Get-Video-Source ssv	*CR,12,zon <cr>	!S,12,zon,ssv <cr>
Get-Left/Right-Volumes vvl/vvr	*CR,20,zon <cr>	!S,20,zon,vvl,vvr <cr>
Get-Left-Volume vvl	*CR,21,zon <cr>	!S,21,zon,vvl <cr>
Get-Right-Volume vvr	*CR,22,zon <cr>	!S,22,zon,vvr <cr>
Get-Bass/Treble bas/trb	*CR,40,zon <cr>	!S,40,zon,bas,trb <cr>
Get-Audio-Mute-State	*CR,50,zon <cr>	!S,50,zon,sta,vvl,vvr <cr>
Get-Acknowledge	*CR,199,0 <cr>	!S,199,1 <cr>

Remote-Control Equivalent Commands and Messages:

Pressing buttons on Vaux remote controls or keypads initiates actions equivalent to the following VauxProtocol Commands. Since these actions result in the same Messages being sent (as they would for the equivalent Command), the control system must only parse one set of Messages. This means that the control system is always up-to-date on zone-routes, volume-levels, and other system parameters, reegardless of whether they were initiated by a VauxProtocol command, or by a remote/keypad button press.

<u>Remote-Control Button-Press</u>	<u>Equivalent Command</u>	<u>Status-Message</u>
Source-Select (tuner...) or Zone-Off	*CW,13,zon,src <cr>	!S,10,zon,ssa,ssv <cr> then !S,50,zon,sta,vvl,vvr <cr>
Cluster-Source-Select (tuner...) or Off NOTE: clu 1 to 8 = remote zone 91 to 98	*CW,19,clu,src <cr>	!S,10,zon,ssa,ssv <cr> then !S,50,zon,sta,vvl,vvr <cr>
Volume-Up/Down/Release NOTE: volume ramps at 2-dB/120-msec until button released, or Min/Max-Vol reached!	*CW,35/36/37,zon <cr>	!S,20,zon,vvl,vvr <cr> (per step)
Flat (bass/treble to 0-dB)	*CW,41,zon <cr>	!S,40,zon,bas,trb <cr>
Bass-Up/Down	*CW,42/43,zon <cr>	!S,40,zon,bas,trb <cr>
Treble-Up/Down	*CW,44/45,zon <cr>	!S,40,zon,bas,trb <cr>
Mute (toggle)	*CW,50,zon <cr>	!S,50,zon,sta,vvl,vvr <cr>
IR Command (Aris-only)	*CW,100,isd,ifc,0,rpt,0 <cr>	!S,100,isd,ifc,0,rpt,0,xst <cr>
X10 Command (Aris-only)	*CW,120,xhc,xuc,xfc,rpt,0 <cr>	!S,120,xhc,xuc,xfc,rpt,0,xst <cr>
Macro (Aris-only)	*CW,150,mac,0, <cr>	!S,150,mac,0,xst <cr>

Command/Message Parameter Notes (A/V Routing and Control):

zon is zone	0 to 255 (0=all) (or 1 to 255, depending on command) (no !S mssg returned for zon=0 cmds)
src is audio/video source	0 to 8 (0=off) (or 0 to 16, depending on controller)
ssa is audio source	0 to 8 (0=off) (or 0 to 16, depending on controller)
ssv is video source	0 to 8 (0=off) (or 0 to 16, depending on controller)
vol is volume (left and right)	0 to 35 (2-dB/increment, except for 0)
vv1 is left volume level	0 to 35 (2-dB/increment, except for 0)
vv2 is right volume level	0 to 35 (2-dB/increment, except for 0)
	35 +6 dB (max volume level)
	34 +4 dB
	33 +2 dB
	32 0 dB (passthrough volume level)
	31 -2 dB
	30 -4 dB
	...
	3 -58 dB
	2 -60 dB
	1 -62 dB
	0 -80 dB (min volume level)
bas is bass level	0 to 8 (3-dB/increment)
trb is treble level	0 to 8 (3-dB/increment)
	8 +12 dB (max bass/treble level)
	7 +9 dB
	6 +6 dB
	5 +3 dB
	4 0 dB (flat bass/treble level)
	3 -3 dB
	2 -6 dB
	1 -9 dB
	0 -12 dB (min bass/treble level)
sta is audio-state code	0=off, 1=on, 2=on/muted-audio
stv is video-state code	0=off, 1=on

NOTE: Independent Audio Left and Right Volume Commands:

Source is always the same for L&R channels, but these commands allow you to provide independent volume for two mono rooms, if the zone is programmed for mono operation.

If the zone is programmed for stereo operation, you may use these left and right commands to balance the zone, or you may use the balance commands.

The left and right volumes may be different -- the volume up/down commands operate on both channels, relative to the volume of each.

Command/Message Parameter Notes (Switcher Configuration):

NOTE: Only connect to one switcher when programming swc/bzn (ie: disconnect RS-232 daisy-chain). The swc parameter is set to 91 (Separate-A/V-Switchers) when both an LE-1600A and LE-1600V are used together, on the same Base-Zone. Both switchers are then configured for swc=91. In this mode, the audio switcher handles all messages for both switchers (routes, etc), while the video switcher acts as a silent slave.

swc is Switcher-Class	90 = Normal, 91 = Separate-A/V-Switchers
bzn is Base-Zone	1 to 248 for 8-zone switcher (1 to 240 for 16-zone ctrl) (typical bzn: 1, 9, 17...)
mod is Zone-Audio-Mode	0=mono, 1=stereo
tud is Taper-Up-Delay	1 to 30 (ms/2-dB-step)
tdd is Taper-Down-Delay	1 to 30 (ms/2-dB-step)
clu is cluster number	1 to 8
zxx is include/exclude parameter for zones 1 to 8 (or 1 to 16)	1 = include zone in cluster, 0 = exclude
fst is flag state (1 or 0)	
flg is flag:	
flg = 1	When fst = 1, use zone's "Previous-Volume" as Initial, else stored level
ssa is source (1 to 8, or 1 to 16)	
stl is source-trim level (attenuate a loud source)	
0	0 dB
1	-2 dB
2	-4 dB
3	-6 dB
4	-8 dB
5	-10 dB
6	-12 dB
7	-14 dB
8	-16 dB
9	-18 dB
10	-20 dB
vll is Minimum-Volume-Level	0 to 35 (2-dB/increment, except for 0)
vhh is Maximum-Volume-Level	0 to 35 (2-dB/increment, except for 0)
vmm is Mute-Volume-Level	0 to 35 (2-dB/increment, except for 0)
vil is Initial-Left-Volume-Level	0 to 35 (2-dB/increment, except for 0)
vir is Initial-Right-Volume-Level	0 to 35 (2-dB/increment, except for 0)

NOTE: Min-vol has priority over mute-vol and init-vol, and is the absolute min volume zone will reach. If min-vol incorrectly set above max-vol, then min-vol will be presumed to be zero.

NOTE: Max-vol has priority over all other settings, and is the absolute max volume zone will reach.

NOTE: Min-Vol and Max-Vol should be set before setting Initial-Volumes. If init-vol incorrectly set above max-vol, then init-vol will be presumed to be max-vol. If init-vol incorrectly set below min-vol, then init-vol will be presumed to be min-vol.

NOTE: Min-Vol and Max-Vol should be set before setting Mute-Volume.

Mute always acts upon both L&R channels, even though L&R volume levels may differ; balance is preserved when zone is unmuted.

Mute-vol is a ceiling, not an absolute level. If mute-vol set above min-vol, zone volume levels may go below mute-vol level. When muting, volumes above mute-vol will lower to mute-vol level, but volumes below mute-vol will not change. If mute-vol incorrectly set above max-vol, then mute-vol will be presumed to be max-vol. If mute-vol incorrectly set below min-vol, then mute-vol will be presumed to be min-vol.

Command/Message Parameter Notes (Aris-only IR, X-10, and Macros):

isd is IR-Source-Device-Bank (1 to 16)

ifc is IR-Function-code (1 to 36, except 20, 24, 25, 27, and 28 are removed for legacy reasons)

xst is Exit-Status for IR (1=performed, 20=empty, 21=invalid-dev/func, 22=bin-error, 23=data-error)

xhc is X-10-House-Code (1=A, 2-B...16=P)

xuc is X-10-Unit-Code (1 to 16)

xfc is X-10-Function-Code (0=off, 1=on, 2=dim, 3=bright)

rpt is number of repeats (must be 0 for on/off commands, must be 1 to 32 for dim/brt commands)

xst is Exit-Status for X10 (0=not-performed, 1=performed)

mac is Macro-Number

Command/Message Parameter Notes (System-Information Message):

The SysInfo message is sent at system boot, or in response to a *CR,0,0 Request-Command.

!S,0,bzn,ccf,ccm,swc,0,svh,svl <cr>

where:

bzn is Base-Zone for this switcher (eg: 1, 9, 17,...)

ccf/ccm is System-Family/Model

10/1 is Lattis LE800A

10/2 is Lattis LE800AV

10/3 is Lattis LE1600A

10/4 is Lattis LE1600V

20/1 is Aris AR510A

20/2 is Aris AR520A

20/3 is Aris AR508A

20/4 is Aris AR508AV

20/6 is Aris AR516A

swc is Switcher-Class (90=Normal, 91=Separate-A/V-Switchers)

svh/svl is Software-Version-High/Low (0 to 99 each)

(eg: 4/10 is version 04.10)

Note: In a system with daisy-chained multiple switchers, a message is returned from each switcher, in succession.

To keep multi-switcher responses from overlapping, the SysInfo message (which is about 34 ms max) is delayed 50 ms per 8 additional zones added to each switcher's base-zone:

<u>Switcher Base-Zone</u>	<u>Delay</u>	<u>Message</u>
1 (factory setting)	0 ms	!S,0,1,...
9	50 ms	!S,0,9,...
17	100 ms	!S,0,17,...
25	150 ms	!S,0,25,...
33	200 ms	!S,0,33,...
(etc)		

Command/Message Parameter Notes (Miscellaneous Messages):

Sensor-State-Change messages !S,180,sen,sst,0,0 <cr>

sen=1: VIN-1 input on VIO-1 jack !S,180,1,sst,0,0 <cr>

Diagnostic messages !S,190,dgc,0 <cr>

dgc=0: Watchdog-Reset occurred !S,190,0,0 <cr>

dgc=2: Brownout Detection/Recovery !S,190,2,0 <cr>

dgc=3: Base-Zone write cmd error !S,190,3,0 <cr>

dgc=4: Factory-Settings-Restored !S,190,4,0 <cr>

VC-232 Serial Port (EIA/RS-232)

The VC-232 Port is designed to connect directly to any computer or control system which has a standard RS-232 serial port. For the record, instead of RS-232 (RS stands for Recommended Standard), the proper term is actually EIA-232 or EIA/TIA-232 (for the standards bodies concerned). However, the EIA/TIA designation never really caught on, and virtually everyone retains the RS-232 terminology.

A cable (not supplied) is needed to connect the VC-232 Port to the control system or computer serial port. The VC-232 Port is a DB-9 F (female) connector – the connector pinout is defined below. Typically, only three wires are needed: TX, RX, and Ground. Depending on the setup of your control system serial port, you may need to connect other signals before the port becomes active. If your serial port expects handshake inputs (on CTS, DSR, and/or DCD), you may be able to either change your port configuration to ignore these signals, or you may provide the appropriate signals from the Vaux VC-232 connector. The Vaux end does not need special treatment — the VC-232 handshake input pins (RTS and DTR) are not used. Pin-9 on the VC-232 port is a Vaux-Private signal, used with the RS-232 daisy-chain cable for multi-switcher installations. Pin-9 should normally not be connected to anything, although a PC serial cable may temporarily be connected, since this signal is the normally-unused Ring-Indicator input to the PC, and will not affect either system.

Vaux systems communicate at 9600 baud (bits-per-second) using 8 bits of data, no parity, and one stop bit.

The serial port on the controlling computer must be configured according to its manufacturer's instructions. Information transfer between the controlling computer and the Vaux system is in the VauxProtocol format — a Vaux-defined command language comprised of various commands and messages.

VC-232 Port (RS-232 Interface) (DB-9 F Connector):

Pin	Description	Signal Direction	Vaux Use
1	DCD (Data Carrier Detect)	Computer <— Vaux	“Active” level output *
2	RXD (Receive Data)	Computer <— Vaux	Data Out
3	TXD (Transmit Data)	Computer —> Vaux	Data In
4	DTR (Data Terminal Ready)	Computer —> Vaux	[not used]
5	Signal Ground	—	Signal Ground
6	DSR (Data Set Ready)	Computer <— Vaux	“Active” level output *
7	RTS (Request To Send)	Computer —> Vaux	[not used]
8	CTS (Clear To Send)	Computer <— Vaux	“Active” level output *
9	IRU (private Vaux signal)	DO NOT CONNECT	(special) **

- Typical Connections: TXD, RXD, and Signal Ground.
- Minimal Connections: TXD, and Signal Ground (commands only)
- * One or more of CTS/DSR/DCD may need to be connected to your serial port, if expected.
- ** Pin 9 should not be connected to a computer serial port, as it is sometimes used for the Ring Indicator (RI) input – the Vaux IRU (unmod IR) signal should be left open for proper system operation.
- Pins listed as not used, are not connected (to anything) in the Vaux system.
- The DB-9 shield rim (the “D”) is connected to signal ground.

Maintenance and Service

Vaux systems are designed to be maintenance-free, but do contain sensitive electronic parts. Avoid rough treatment to assure best performance. If you must ship the system, use the original packaging (or equivalent) for protection. The enclosures may be cleaned with a soft, slightly-damp soft cloth. Never use detergents, excess water, treated cloths, harsh cleaning agents, or sprays.

This product is to be serviced only by the manufacturer or its authorized service agents. For instructions on how to obtain service, call the Vaux Electronics Service Department. Attach your sales receipt to this manual for future reference, should service be required during the warranty period. Also, record your Serial Number(s) on the cover of this manual. Serial Numbers can be found on rear-panel labels.

For more information on product service, see the Limited Warranty section.

Limited Warranty

What does your warranty cover?

Any defect in material or workmanship.

For how long after the original purchase?

Three-year limited warranty on Lattis Matrix Switchers. One-year limited warranty on Vaux Remote Controls.

What will we do?

If your Vaux product is defective and returned within 30 days of the date it was purchased, we will replace it at no charge to you. If your Vaux product is returned after 30 days, but within the warranty repair period, we will repair it, or, at our option, replace it at no charge to you. If we repair your Vaux product, we may use new or reconditioned replacement parts. If we choose to replace your Vaux product, we may replace it with a new or reconditioned unit of the same or similar design. The repaired or replacement unit will be warranted for either (a) 90 days or (b) the remainder of the original warranty period, whichever is longer.

How do you make a warranty claim?

To get warranty service for your Vaux product, you must provide proof of purchase. The "Purchase Date" is the date shown on your invoice. Within 30 days of the Purchase Date, return your Vaux product to your place of purchase for immediate replacement. After 30 days of the date it was purchased, call the Vaux Service Department to obtain a Return Materials Authorization (RMA) Number and ship the Vaux product standard UPS or equivalent to the Vaux Electronics Service Dept. Provide necessary additional shipping insurance. Most shipping companies' basic insurance coverage is only \$100.00. Include in the package a copy of the sales receipt or other evidence of date of original purchase. Also print your name, shipping address (no PO boxes), phone number and a description of the defect. Write the RMA number on the shipping label or prominently on the outside of the box. Properly pack your unit, include any cables, etc., which were originally provided with the product. Please use the original carton and packing materials, or equivalent. Pay any charges billed to you by the Vaux Service Department for service not covered by the warranty. Your repaired unit will be shipped to you prepaid freight.

What does your warranty not cover?

This warranty does not cover any upgrades of system hardware or software to revisions later than that which shipped with the system when originally purchased. If this Vaux product includes infrared learning, this warranty does not cover incompatibility with third-party remote controls, such as, but not limited to: wired-remote controls, RF remote controls, ultrasonic remote controls, pre-programmed universal remote controls (third-party codes are sometimes distorted), products that operate over 100kHz, products that use obscure or multi-frequency infrared signals. This warranty does not cover defects resulting from accidents, damage while in transit to the Vaux Service Department, alterations, products which have been modified or incorporated into other products, unauthorized repair, tampering, failure to follow instructions, neglect, misuse, fire, flood, lightning damage, meteorite bombardment, regional or global warfare, or acts of God. This warranty does not cover customer instruction, installation and set-up, or batteries.

If your product is not covered by our warranty, call the Vaux Service Department for advice as to how we may repair your Vaux product, and other repair information, including charges. At our option, we may replace, rather than repair, your Vaux product with a new or reconditioned one of the same or similar design. The repaired or replacement product will be warranted for 90 days. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Limitations

Implied warranties, including those of fitness for a particular purpose and merchantability (an unwritten warranty that the product is fit for ordinary use), are limited to one year from date of purchase. We will not pay for loss of use (eg: during warranty repair), inconvenience, loss or theft of your Vaux product, or property damage caused by your Vaux product or its failure to work, or any other incidental or consequential damages.

Safety Information

- As with any product, basic safety precautions should be observed during handling and use of this system.
- Before using your system, please follow and adhere to all warnings, safety and operating instructions located on the product and in this owner's manual. Retain this manual for future reference.
- All warnings on the system components and in the instruction manual should be adhered to
- Do not expose the system to extreme temperatures, such as found near a hot radiator or stove.
- Do not locate AC-powered equipment near water, for example, near a bathtub, shower or pool. Immersion of the system in water could cause an electrical shock. Keep hands out of toasters.
- The components should be mounted only as directed in the instruction manual. Provide proper ventilation for any components which generate heat. Do not situate a component such that its ventilation openings are blocked or impeded. Components are to be situated away from heat sources such as amplifiers, heat registers, and stoves.
- Components are to be connected to a power supply only of the type described in the instruction manual, or as marked on the component. Polarities must be observed as necessary. Any grounding or polarization means of the component should not be defeated. Power cords should be routed such as to provide protection against pinching, abrasion, excess flexing, etc.
- Do not place lighted candles, cigarettes, cigars, etc. on the system.
- Never install or modify wiring during a lightning storm.
- Care should be taken so that objects do not fall onto, or liquids do not spill into, the system.
- Do not attempt to disassemble the enclosures. There are no customer serviceable components inside.
- If this system operates on batteries, adhere to the following precautions:
- Any battery may leak electrolyte if mixed with a different battery type, if inserted incorrectly, or if all batteries are not replaced at the same time.
- Any battery may leak electrolyte or explode if disposed of in fire or an attempt is made to charge a battery not intended to be recharged.
- Discard leaky batteries immediately. Leaking batteries can cause skin burns or other personal injury., and can damage electronic components.
- Always dispose of batteries properly — please recycle when possible. Do not eat.
- Remove batteries from your system if it will not be used for an extended period of time.

This equipment generates and uses radio frequency energy which may interfere with residential radio and television reception if not properly installed and used in accordance with instructions contained in this manual. Reasonable protection against such interference is ensured, although there is no guarantee this will not occur in a given installation. If interference is suspected, and verified by powering this equipment on and off, try to correct the interference by one or more of the following measures: re-orient the radio/television receiver's antenna; relocate the television or radio equipment with respect to the Vaux equipment; plug the equipment into separate electrical outlets.