

Vaux Electronics, Inc.

Altrix Control System

*Whole-House Audio/Video and
Lighting Control System*

*Altrix Controller
3xxx Series
Owner's Manual
Publication M-3000
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1997*

Record for Future Reference:

Model Number:

Serial Number:

Date Purchased:

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Attach your sales receipt to this manual.

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IMPORTANT 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.
- 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.
 - 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 Aris Controller; plug the equipment into separate electrical outlets.

INTRODUCTION

Thank you for selecting the Altrix Control System Model 3000 or 3400. These systems have been designed for the utmost in convenience and reliability. Read this owner's manual carefully to become familiar with the product and how it works. The manual explains in simple steps how to install, use, and care for your Altrix Control System. For model differences, please consult the Altrix Model Comparison Chart on the next page.

Home Theater Automation and Home Control System

The Altrix System allows you to control virtually any audio/video component or X-10®-connected device from any room in your home, even outside.

Power control of infrared audio/video source components, such as your CD and Laserdisc, is handled automatically. The TV monitor will automatically turn on for A/V sources, but not for audio-only sources. AC power control of local and remote equipment may also be automatically switched with the optional Powerline Interface Module, allowing the Altrix system to send X-10 commands on the powerline for control of AC appliances and lighting, and, optionally, for automating source and zone device powering.

Multiple command MACROs allow you to define command sequences for one-button convenience.

Audio Distribution

An Altrix Controller may be configured for Multi-Zone operation, in which an audio receiver is used for each zone in the house. When configured for *Zone-Specific* operation, the Altrix Control System manages a multi-zone audio distribution system which lets you enjoy audio throughout multiple rooms in your home. Listen to and control audio everywhere in your home.

Interactive RF and IR Control

The Altrix System may be operated by hand-held RC-8 remote controls. The remote controls allow selection of A/V source, control of A/V components, control of home lighting, and MACROs for simple one-button system configurations, lighting scenes, etc.

The Vaux RC-8 remote control provides for zoned audio/video source-selection/volume/bass/treble/muting, supports infrared (IR) commands for up to 8 IR-controlled audio/video source components, controls up to 100 X-10®-connected lights and appliances, and provides for MACRO sequences.

There are two versions of the RC-8 Remote Control: RC-8-RF (radio-frequency) and RC-8-IR (infrared). The two remotes behave identically, but the RC-8-IR is only used with Vaux Controllers that support infrared control (e.g. Altrix 3400), while the RC-8-RF is only used with Vaux Controllers that support RF control (e.g. Altrix 3000 or 3400). The RC-8-RF remote is based on radio frequency (RF), allowing transmission of signals through walls, typically up to 125 feet (optional antenna systems may be used for additional range), while the RC-8-IR is a conventional infrared (IR) remote, having a typical line-of-sight range of 15 feet.

For system security when using RF remote controls, each Altrix System has its own identification code that is transferred with every button pressed (similar to garage door opener codes). From a Vaux RF Remote Control, or the Computer port, you can program one of 10,000 possible SecurityID codes.

The Altrix Model 3000 System uses RC-8-RF radio-frequency remote controls, while the Altrix Model 3400 Controller may use either RC-8-RF or RC-8-IR remote controls (or both).

Keypad Control

Your Altrix system may be also be controlled by Vaux wired or wireless keypads. Vaux keypads are programmable and customizable, in configurations from two to seven gangs. Vaux wired keypads may be located up to 1000 feet from the media center, while the wireless keypads have a typical 125 feet range.

The Altrix Model 3000 System may use wireless (RF) keypads, while the Altrix Model 3400 may use either wired or wireless keypads (or both). Keypads may be used in place of, or in addition to, remote controls — in fact, you may want many keypads in some rooms, and remote controls in others.

Computer Control

The Altrix Control System may be completely controlled by an attached computer, or other control system (such as an AMX or Crestron control system) which communicates over a serial RS-232 connection. The host computer has complete control over audio/video source selection, playback of learned IR component codes, MACROs, and control of X-10 lighting and appliance devices. Serial communication uses the public-domain Vaux Protocol standard, which is published in Vaux's Software Developer's Guide.

Altrix Model Comparison Chart

	Altrix 3000	Altrix 3400
IR Learning/Playback (source control)	•	•
Control using Vaux RF Remotes	•	•
Control using Vaux IR Remotes	no	•
Control using IR-Learning Remotes	no	•
Control using Vaux Wired KeyPads	no	•
Control using Vaux RF KeyPads	•	•
Control using RS-232 serial port	•	•
X-10 powerline control support	2-way	2-way

PARTS CHECKLIST

When unpacking your Altrix Control System Model 3000 or Model 3400, make sure that you have the following parts:

- #1: Altrix Model 3000 or 3400 Controller.
- #2: AC Power Adapter (12 VDC, 0.5A).
- #3: Antenna: Base-Loaded Coax antenna w/ 25" wire and F-connector.
- #4: Optional: RC-8-RF radio-frequency remote control(s) (optional for Models 3000 and 3400), and/or RC-8-IR infrared remote control(s) (optional for Model 3400).
- #5: Optional Model X2 (TW523) two-way X-10 Interface Module and cable.
- #6: Optional Model EC-1 (single) or EC-2 (dual) Infrared Emitter cable(s).

Figure 1: Altrix Control System shown with optional RC-8 Remote Control, optional X-10 Interface Module, and optional EC-1 Infrared Emitter Cable.

Optional components you may need:

- One or more RC-8-RF remote controls, if you wish to use the system via interactive RF control.
- Model 3400 only: One or more RC-8-IR remote controls, if you wish to control the system from the front-panel sensor, or wish to use an infrared repeater system from another room.
- Model X2 two-way X-10 Powerline Interface Module and Cable for control of lights and appliances, and to allow other X-10 controllers to control the Altrix system via powerline commands.
- One to Eight EC-1 (single), or EC-2 (dual) Infrared Emitter Cables.
- A serial (RS-232) cable for controlling the system via computer control.
- Coaxial cable (RG-59 or RG-6) and F-F adapter if you wish to relocate the antenna to a central location.
- ANT-3 Folded Dipole Antenna or an APA-1 Antenna Pre-Amp Kit to increase RF reception range.

Altrix Controller Front Panel

1. Power Switch
2. Model 3400 use only: Small dot locates IR control sensor, for affixing external emitter.
3. Power Light
4. Learn Light
5. Infrared Light
6. Macro Light
7. Lights Light
8. Serial Light
9. Error Light
10. Control Light
11. IR Learning Window (used during infrared learning)

Altrix Controller Rear Panel

1. **Antenna Input** (female F-connector) — for connection of the ANT-2 Base-Loaded-Coax Antenna (supplied), either directly to the controller, or via RG-59 or RG-6 coaxial extension cable for a remotely-located antenna. Optionally, other antenna(s), such as the ANT-3 Folded Dipole, or a multi-antenna system may be connected. Used for reception of RF remote control commands.
2. **PLC (Power Line Carrier) Interface** for connecting to an X-10® Interface Module (6P4C modular jack). Uses Model X2 interface (TW523).
3. **Reset Button** (careful — will restore all factory settings, erase all infrared codes, etc.).
4. **VauxNet Expansion Port Connector** (future use).
5. **VauxSerial Interface** (25-pin DB-25F RS-232 connector). DCE (modem-like) port.
6. **3400 only:** **Modulated IR Input** (3.5 mm phone jack; tip=data, sleeve=ground) — Internal IR emitter for connection to IR repeater systems, IR keypads, etc. Fed through a 200-ohm current-limiting resistor.
7. **Future Model:** **VauxNet-485 Expansion Port** for RS-485 network (6P6C modular jack)
8. **3400 only:** **VauxControl Keypad Interface** (Unmodulated IR Input) (2.5 mm phone jack; tip=data).
9. **IR Blaster** — One Infrared Room Blaster Connector (3.5 mm phone jack; tip=data, sleeve=ground) for connecting a room blaster, amplified multiple-emitter connecting block, or a single or dual IR emitter. This is the master IR signal; the green light indicates the presence of infrared signal output. Blaster signal is a positive-going 12V switched signal, fed through a 470-ohm current-limiting resistor.
10. **IR Emitters** — Eight IR Emitter Cable Connectors (3.5 mm phone jacks; tip=data, sleeve=ground) for connecting single or dual infrared emitter cables. These eight connectors are factory-configured for Device-Specific operation (that is, the emitters are active only for the corresponding IR device selected. Identical source components, such as CD changers or satellite tuners, may be individually addressed by placing them in different device pages (IR banks).
RC-8 remote control devices: 1 - Tuner, 2 - CD, 3 - Cab/Sat, 4 - VCR-1, 5 - VCR-2, 6 - Laser, 7 - Tape-1, 8 - Tape-2. The IR Emitter ports may also be configured, via computer command, for "Zone-Specific" operation, in which they are activated based on the remote control's selected zone. Emitter signal is a positive-going 5V switched signal, fed through a 270-ohm current-limiting resistor.
11. **Power Adaptor** (12 VDC, 0.5A) jack (2.1mm connector, center negative).

OVERVIEW OF THE RC-8 REMOTE CONTROL

The Vaux RC-8 Remote Control is the primary device used to control the Altrix System. There are two versions of the RC-8 Remote Control: RC-8-RF (radio-frequency) and RC-8-IR (infrared). The two remotes behave identically, but the RF (IR) remotes are only used with Vaux Controllers that support RF (IR) control. Besides the different transmission techniques used on the RF and IR versions, the only functional difference is that the IR version does not support a Security ID Code, as does the RF version (an infrared control link does not have possible neighboring systems to contend with). One other subtle difference is that the IR transmission is faster, and results in better response time to button presses.

When the batteries are first installed, the remote control will use “factory settings” for the programmable features it stores. Upon battery insertion, the red light flashes twice to indicate that the factory settings have been loaded. The user may at any time change these settings.

The factory settings are:

Current A/V Device: 1 (Tuner)

Default A/V Zone: 1

Default Light Group: 1 (X-10 House Code A)

Default Security ID Code: 1070

Batteries should be changed when the low-battery indication is given, that is the red and green lights flashing simultaneously when a button is pressed. Although you may continue to operate the remote control, operating range will be reduced and remaining battery life is short.

The Remote uses three (3) “AAA” batteries; alkaline preferred.

The remote control has a three-position slide switch which selects the operating mode; Audio/Video, Lights/App, or MACROS.

The **Audio/Video** mode is used to operate infrared-controlled components whose control codes have been learned by the Altrix Controller, select A/V sources, etc.

The **Lights/App** mode is used to operate X-10 connected lights and appliances.

The **MACRO** mode is used to invoke key-sequence MACROS, using the number pad (0 to 9, and Shift-0 to Shift-9), for twenty different 25-step MACROS.

RF and IR Versions of the RC-8

The Vaux RC-8-RF Remote Control uses radio frequency (RF) control, allowing transmission of signals through walls, typically up to 125 feet with the standard receiver antenna. One or more RC-8-RF remotes may be added to either an Altrix 3000 or Altrix 3400 system. The Vaux RC-8-IR Remote Control uses infrared (IR) line-of-sight communications. One or more RC-8-IR remotes may be added to an Altrix 3400 system (e.g. for use with an existing IR repeater system). Infrared control of the 3400 (an *input* mechanism for commanding the 3400) is not to be confused with infrared learning and playback of other device’s IR commands (an *output* mechanism for controlling CD, laser, etc. from the Controllers).

The Mode Switch

The RC-8 has a three-position slide switch which sets the operating mode of the unit. The **Audio/Video** position is used for accessing learned IR control codes, which are divided into eight devices (or banks, or pages). The **Lights/App** position allows control of up to 100 Lights and Appliances around the home, provided that the Controller is equipped with the optional X-10® interface module/cable. The **Macros** position provides direct access of up to 20 multi-step MACRO sequences. Note that depending on the position of the mode switch, certain buttons may not be valid, and will result in a flash of the red Error light on the remote control. For example, in the Macros position, non-numeric buttons are invalid.

The “Device” v.s. “Shift-Device” difference

In the Audio/Video mode, a press of one of the device-selection buttons (e.g. CD) results in a “Source-Change” command being transmitted, as well as a change (internally in the RC-8) which will specify the chosen device in subsequent commands — this is called the RC-8’s “Current Device.” In response to the transmitted Source-Change command, the Altrix Controller will generally perform a sequence of operations to turn the selected source on. By first pressing *Shift*, then a device button (e.g. Shift-CD), there is NO Source-Change command transmitted, just an internal change of the RC-8’s Current Device — this is handy under certain circumstances when you do not want the source-change command transmitted. For example, you may not want to disturb the laserdisc playing in your zone, but you may wish to control a VCR to rewind a tape — Shift-Device provides a way to do this. Note that “Shift-CD” means to first press the Shift button, then the CD button — not both together.

What is stored in the RC-8

The RC-8 only stores four things:

- the “Current-Device” for A/V control, which is changed during operation by pressing a device button, or by pressing a Shift-Device sequence (e.g. Laser or Shift-Laser).
- a “Default Zone,” which is used by Altrix Controllers for controlling the zone you are in (provided the Altrix system is programmed for “zone-specific” operation).
- a default Lighting Group (X-10 House Code).
- a Security ID Code (factory setting = 1070; only applies to the RF version of the RC-8).

What is transmitted by the RC-8

It is sometimes important to know *when* the RC-8 is transmitting, and *what* the command consists of. An example of when you need to be concerned about this is when you are using an RC-8-IR remote to teach Vaux IR commands to a learning keypad, or other learning IR system. Valid (no red-error flash on remote) single-button presses, such as Play, transmit a command. Some button sequences, such as Shift-Device, do not transmit a command at all (although a green-light flash confirms each button press). Some button sequences, such as Shift-Delay-5, or Zone-2-On, only transmit a code on the last button press. The Vaux Controller will provide a flash or other indication when a command has actually been transmitted/received, or, for the RC-8-IR, you can hold the remote a few inches from Controller’s front-panel *IR Learning* sensor (not the *IR Control* sensor), which has an always-active feedback light indicating IR signal.

All Vaux commands consist of three pieces of information: a *Device* number (which indicates IR bank 1 to 8, Lighting device, etc.), a *Zone* number (which is either the Default Zone, or an explicitly-entered temporary zone), and a *Function* Code (which corresponds to the key pressed, etc.). For the RC-8-RF only, there is also a Security ID Code transmitted with every button press.

MACRO sequences are stored in the Controller

Vaux MACRO (key) sequences are accessed by the RC-8, but are stored in, and played back by, the Controller. Note that the Macro play commands just use a single code — if you are teaching an RC-8-IR Macro play command to a learning infrared unit, the user does not need to hold the remote in line-of-sight position for the duration of the Macro playback, as some IR-macro remotes require. This is an important distinction — especially when you have long macros to play (e.g. drop projection screen, delay for 30-seconds, play laser...).

The RC-8 Keypad Buttons

There are several special buttons on the remote control; the SHIFT button, eight Device buttons (Tuner, CD, etc.), the Zone button, the Sec button, and the Learn button. These are used for multi-button commands or system programming tasks. The Zone button allows you to store a “default” zone in the RC-8 Remote Control, and also allows you to access other zones in the house. This default zone is used to uniquely identify different remotes around the house, since the zone information is included in the transmitted commands (this applies to both RC-8-RF and RC-8-IR remotes). For example, if you will be leaving the RC-8 in the master bedroom, you would set the default zone to the master bedroom (perhaps it is zone 3).

Then, when you press buttons on the RC-8, it tells the Altrix Controller that you are “in zone 3.” This zoned operation only applies if your controller is configured for “zone-specific” use — more on this later. The remaining buttons are used in varying ways, depending on the mode switch setting (Audio/Video, Lts/App, or Macros).

The RC-8 Buttons for Learned Infrared Devices and Zone Control

In the Audio/Video mode, there are 30 buttons (excluding the special buttons indicated above) which can access learned infrared codes for the currently-selected device. Each of the eight selectable Devices has a 30-button “keyboard” for a total of 240 infrared control codes. Of these 30 buttons, most are labeled with standard commands (Play...) which will correspond to the IR devices in your system. There are also four general-purpose “function” buttons, F1 – F4, which may be used for less-frequently used infrared commands, for example, PIP, VCR tracking, surround modes, etc.

You may then identify the F1 – F4 functions on the optional rear label for the RC-8 remote control. This keeps the remote uncluttered, yet provides a lot of control by defining the less-used special functions on the rear label. This label also allows you to define a programmed Default Zone, MACROs, radio station presets on the number buttons, etc.

OVERVIEW OF THE KP-1 WIRED/WIRELESS KEYPADS

Vaux KP-1 wired or wireless keypads may be used to control the Altrix System. Multiple keypads may be installed around the house to control the system from convenient locations. Of course, use of keypads does not preclude using other control devices: Controllers capable of keypad, infrared, RF, X-10, and RS-232 control, may use all of these input devices together.

There are two versions of the KP-1 Keypads — depending on your application (e.g. new-construction or retrofit), and the Vaux Controller model you will be using, you may choose either the *Wired* Keypad (KP-MAIN), or the *Wireless* (KP-MAIN-RF) keypad, or possibly both. The two keypads behave identically, but the wired keypads are only used with Vaux Controllers that support wired keypad control (e.g. Altrix 3400), while the wireless versions are used with RF-capable Controllers (e.g. Altrix 3000 or 3400).

Besides the different transmission techniques used on the wired or wireless (RF) keypad versions, another difference is that the wired version does not support a Security ID Code, as does the RF version (a hard-wired control link does not have possible neighboring systems to contend with). One other subtle difference is that the wired transmission is faster, and results in better response time to button presses.

Vaux wired keypads can typically be located up to 1000 feet from the Vaux Controller location (contact the factory for information on wiring for distances beyond 1000 feet). The RF version has a typical 120-foot range, similar to the range of the RC-8-RF remote control. For greater range, receiver antenna options are available; consult the Appendix.

NOTE: Vaux keypads are not designed for (or warranted for) installation or use outside the house.

Each of the wired keypads are home run in a star configuration back to a central location where the Vaux Controller is located (i.e. the media center); the keypads then connect to a MUX-x Connecting Hub, which plugs into the Vaux Controller. The Hub's power adaptor provides power to all keypads.

The wiring from the keypads to the Hub uses standard 2-pair CAT-3 unshielded-twisted-pair (UTP) wire, terminated with 6P4C modular connectors (RJ-11-like telephone-type connectors). Cable runs of 1000' are supported using standard 22-, 24-, or 26-gauge wire. Generic, Level-1, telephone wire may be used, but the tighter twisting (and impedance control) of CAT-3 cable is preferable. CAT-5 UTP cable, or even shielded twisted-pair (STP) cable may also be used. Either CAT-5 or STP cable would be a good choice for running through a very noisy electrical environment.

The keypad system is flexible and expandable — mounting in standard wall junction boxes, the keypads are finished-off using the same conventional Decora® wall plates you choose for the rest of the room. The keypads have eight buttons per gang, and may be designed for two to seven gangs. You may use the standard 2-gang keypad (KP-MAIN-xx), or you may add additional gangs with the KP-EXP single-gang expansion option, up to a maximum seven-gang configuration — that's up to 56 keypad buttons.

The first set of 8 illuminated keys are for source selection; the remaining gangs can be programmed for any combination of A/V control commands (volume, rewind...), X-10 lighting/appliance control commands, or custom MACRO sequences (e.g. *Dinner, Party-Tunes, etc.*).

The Vaux Keypad System ships factory-configured with a standard button layout comprised of a general group of control commands: source selection keys (Tuner, CD, Laserdisc...), Volume up/down, Selection (channel) up/down, Mute, Play, etc. However, the keypads may easily be set up in a custom configuration by replacing the removable keycaps to change legends/icons, and re-defining key functions using the Vaux Keypad Configuration Software.

DESIGNING THE SYSTEM

Infrared Learning Memory Layout

Learned infrared codes are stored in the Controller in one of eight “Device–pages” (or banks). For each of the Devices (CD, Laser...), there are locations for storing the appropriate IR codes for functions such as “Play,” “Pause,” etc. Essentially, there are eight separate “keyboards” which may be programmed with independent IR codes for up to 30 functions, for a total of 240 IR learned codes.

NOTE: INFRARED CODES ARE STORED IN THE ALTRIX CONTROLLER/RECEIVER NOT IN THE REMOTE CONTROLS.

You can learn as many IR buttons as you wish — one or all. If you want to change a button that already has been taught, just learn it again. It will replace the old command with the new infrared command. All of the commands are stored in the Altrix Controller, which has a battery backup — you may unplug it without your codes being lost.

IR Programming Considerations

Learned infrared codes can be associated with all RC–8 keypad buttons except: Shift, Zone, Sec, Learn, and the eight Source–Select (Device) buttons (Tuner, CD...). This leaves 30 IR–programmable buttons per Device page.

For maximum flexibility, the Altrix system has individual volume, mute, and channel buttons, for each of the eight device pages. If you wish to make these buttons common for various devices, simply program the same codes in all locations you wish to be common. For example, if you wish to have a television’s channel/volume/mute buttons common to both the VCR–1 and VCR–2 Devices, just program them in both pages — then connect the TV’s IR emitter to the common blaster port so it will see the commands from both pages. As another example, if you wish to make volume and mute “global” for an audio receiver, program them in all eight pages — again, you need to connect the receiver’s IR emitter to the common blaster port.

The *IR Emitter* connectors, on the rear panel of the Altrix Controller, can be programmed for *device-specific* or *zone-specific* operation. Device–specific operation allows you to use identical source components in your system, for example, identical CD jukeboxes or DSS tuners. Zone–Specific mode allows identical devices, for example A/V Receivers, to be controlled based on the zone you are in. An appendix gives additional information.

Each Source–Device page will be programmed using the keys that make sense for the functions — for tuner section control, you may program AM/FM on A/B, Seek Up/Down on Channel, and perhaps station presets on the number buttons. Volume and Mute will be programmed on the appropriate buttons. Receiver input source selections may be placed on F1–F4, Play, Pause, number digits, or on any other unused buttons (they will be invoked from MACROS). If you wish to “hide” the input–select commands (to prevent accidentally hitting one when you have the Tuner Device page active), you may locate them in an unused device (e.g. Tape–2) which you will not normally have active — you then need to connect the receiver’s IR emitter to the common blaster port in order to share Device pages.

For a multi–zone Altrix Controller, which is configured for “Zone–Specific” IR Output, all receiver codes must reside in the Device–1 (Tuner) page, and all receivers must either be identical, or at least respond to the same IR commands (e.g. different models from the same manufacturer, with identical IR commands).

For functions which have no obvious buttons (such as PIP, surround sound modes, etc.), you can program them on the F1–F4 buttons, and identify their function on the optional rear label for the RC–8 remote control. This keeps the remote uncluttered, yet provides a lot of control by defining the less–used special functions on the rear label. This label also allows you to define a programmed Default Zone, MACROS, radio station presets on the number buttons, etc.

If you have identical source devices, such as two DSS receivers, three CD jukeboxes, or a couple of identical TVs in a wall, they may be individually controlled since the Altrix system is Factory-set for "Device-Specific" IR outputs. The same IR command set will be programmed in multiple device pages, but will independently activate only the respective IR Emitter output port. Note that the emitters must be sealed to prevent IR leakage between the components (otherwise you defeat the device-specific advantage). Note also that an Altrix Controller which is configured for "Zone-specific" IR output cannot support identical source devices, since they are then driven from the common IR Blaster port.

The Source-Selection Process

Pressing a Source-Device button on a Vaux remote control or keypad (e.g.: CD) not only changes the "current device" to CD, but also transmits a "Source-Select" command, informing the Controller that the CD button was pressed. There are a variety of features which can be enabled as part of this Source-Selection process, using a combination of learned IR codes, MACRO sequences, and computer-port programming.

Auto-Source-Power Option

The Auto-Source-Power feature is an integral, and optional, step in the Source-Selection process. Auto-Source-Powering automatically tracks the state of infrared-controlled source devices (CD, Laser...) and powers them up or down as necessary. In a multi-zone system, the system keeps track of all zones and only powers a device up if it is not currently on. Likewise, it only powers a device down when it is not in use by any other zone. You are not required to use this feature, but you may enable auto-source-powering of one or more of the source devices by simply programming a couple of IR power codes.

In operation, Altrix Controllers use the ON and OFF buttons of the remote control in special ways: ON and OFF presses invoke MACROs 19 and 20 (resp.) However, the IR ON/OFF locations are programmable in infrared learn mode, and are used to store these optional device power commands, for Auto-Source-Powering of one or more source-devices.

There are actually sixteen (IR) storage locations associated with the ON and OFF buttons, two for each of the eight Devices (Tuner, CD...) — these locations are only used for the Auto-Source-Power feature, although they can be tested by pressing Shift-ON or Shift-OFF (which also track states). To enable Auto-Source-Powering for a particular Device, you simply program the appropriate ON and OFF locations with the appropriate on/off IR codes for the device. Generally, a single IR "Power" code is provided for an A/V device, so simply program it into both the ON and OFF locations; of course, to handle the occasional device with two individual On/Off codes, program them in the appropriate locations.

The source-devices will then automatically power-up as needed when sources are selected. When you select a different source, or switch the system off, the device will turn off after about five seconds. In a multi-zone system, the source turns off providing no other zone is using the source device.

Power-On-Delay and Power-Off-Delay

This five-second "Power-Off-Delay" is actually programmable via the computer port. Also, there is a computer-programmable "Power-On-Delay," which is normally zero seconds — it may be programmed to add a fixed delay after each IR and X-10 device turns on, to allow the device to stabilize before receiving configuration commands, etc.

Power State Incorrect?

The power states of source devices are managed intelligently by the controller, but the user may manually turn a device on or off and get the system out-of-sync. It is obvious when a device is in the wrong state; it is easily rectified by manually correcting the power state of the device in question. For some devices (e.g. a VCR which will be used for recording when the system is not in use), may be best to not auto-power the device, and either leave it on always, or allow the user to manually power it as necessary.

Auto-Receiver-Power Option

A refinement of the above concept provides an additional feature: Auto-Receiver-Power. This allows one of the devices (Device 1: Tuner) to power an A/V receiver for one of the zones, and intelligently turn the receiver on when the system is in use. Enabling the Receiver powering simply requires programming a couple of IR power codes for Device 1. This option provides global or zoned powering of A/V receivers (or other IR devices). If desired, this feature may be disabled via the computer port, allowing normal Tuner source device powering.

To use this feature, the device's IR power commands must be learned into the Device-1 (Tuner) bank ON and OFF locations, the system configured for device- or zone-specific operation, and the IR emitter for the device(s) connected as follows: In device-specific IR mode, a global "system-active" IR device is connected to the Tuner port (1) or Blaster port. This single IR device is powered up when system is active, and off when inactive -- e.g. a single-zone Altrix system's A/V receiver. In zone-specific IR mode, zoned IR devices (one or more identical devices) are connected to Zone ports 1, 2, 3... (not Blaster port) -- e.g. a multi-zone Altrix system using identical receivers in different zones. Another option, while in zone-specific IR mode, is to program the Tuner device to force global operation -- e.g. a system in zoned-IR mode (perhaps for multi-zone-TV powering), but needing global IR powering for a multi-source input device (e.g. CD/tape unit). In this case, the "Tuner" device powers up when system is active, and off when the system goes inactive -- the IR device must be connected to the Blaster port in this case, since the other IR emitter ports are zoned.

Auto-TV-Power Option

Another refinement of the above concept provides an additional feature: Auto-TV-Power. This allows one of the devices (Device 8: TV/Tape-2) to power a television monitor for one of the zones, and intelligently turn the TV on only for audio/video sources, and off for audio-only sources. Enabling the TV powering simply requires programming a couple of IR power codes for Device 8. This option provides zoned powering of TVs, based on sources defined as Audio-only or A/V (this definition is programmable, via the computer port). This feature may be disabled via the computer port, allowing normal Tape-2 source powering.

To use this feature, the TV's IR power commands must be learned into the Device-8 (TV/Tape-2) bank ON and OFF locations, the system must be configured for zone-specific operation, and the IR emitter for the TV (s) connected as follows: In zone-specific IR mode, zoned IR TVs (one or more identical TVs) are connected to Zone ports 1, 2, 3... (not Blaster port) -- e.g. a multi-zone Aris or Altrix system using one or more identical TVs in different zones. In device-specific IR mode, TV powering is disabled (there is no global source-specific TV powering possible, since different zones may have A/V or Audio-only sources activated) -- in this case, the system provides normal Tape-2 source powering.

A/V-Source Definition for Auto-TV-Powering

If Auto-TV-Powering is enabled, powering of TVs is based on whether sources are defined as Audio-only or Audio/Video. The factory setting A/V-Source definition is:

Tuner:	Audio-only (TV off)
CD:	Audio-only (TV off)
Cab/Sat:	A/V (TV on)
VCR-1:	A/V (TV on)
VCR-2:	A/V (TV on)
Laser:	A/V (TV on)
Tape-1:	Audio-only (TV off)
TV/Tape-2:	A/V (TV on)

System-Active-PLC-Power Option

If you wish to have a global "any-zone-on" indication, you may enable System-Active-PLC-Powering, which sends a unique X-10 command for turning on and off appliance or relay modules. This is a useful method for powering a multi-zone audio power amplifier. Lamp modules may also be used to turn effect lighting on and off. This feature is programmed via the computer port. For more information, consult the Vaux Protocol document.

Example: This example sets the System-Active HC to F (F16 will be used):

VP F0 67 06 00

This option, if enabled, controls a specific X10 device, and provides a master system-is-active control function. The House-Code used for this function may be programmed, via the computer port, to a number (1 to 16) corresponding to the desired House-Code, as follows: 1=A, 2=B, 3=C, ... 16=P, 0=disabled. The factory-setting is 0, which disables this feature. The Unit-Code is forced to 16 for this feature. For example, if the system is programmed to use House-Code L for the X-10 System-Active Power option, then an L16-ON X-10 command is sent when the system first becomes active (a zone turns on from an off state, and all other zones are currently off), and L16-OFF is sent when the system becomes inactive (a zone turns off, and all other zones are currently off).

Auto-PLC-Zone-Power Option

For non-IR-controlled zone devices, such as audio power amplifiers, you may also opt to enable Auto-PLC-Zone-Powering, which sends X-10 commands for turning on and off appliance or relay modules — unique for each zone. The X-10 modules will turn on or off only as necessary, as the zone turns on or off. Lamp modules may also be used to turn zone-specific effect lighting on and off. This feature is programmed via the computer port.

This option, if enabled, sends zone-specific X10 ON/OFF codes. The House-Code used for this function may be programmed, via the VauxSerial port, to a number (1 to 16) corresponding to the desired House-Code, as follows: 1=A, 2=B, 3=C, ... 16=P, 0=disabled. The factory-setting is 0, which disables this feature. The Unit-Code corresponds to the Zone that is turning on or off. For example, if the system is programmed to use House-Code M for the X-10 Zone Power option, then an M3-ON X-10 command is sent when Zone 3 turns on, and M3-OFF is sent when the zone turns off.

Auto-PLC-Source-Power Option

For non-IR-controlled source devices, you may also opt to enable Auto-PLC-Source-Powering, which sends X-10 commands for turning on and off appliance or relay modules — unique for each source. Like the IR powering discussed above, the X-10 modules will turn on or off only as necessary — the power state of the source device is tracked by the controller, across all zones. This feature is programmed via the computer port.

This option, if enabled, sends source-specific X10 ON/OFF codes. The House-Code used for this function may be programmed, via the computer port, to a number (1 to 16) corresponding to the desired House-Code, as follows: 1=A, 2=B, 3=C, ... 16=P, 0=disabled. The factory-setting is 0, which disables this feature. The Unit-Code corresponds to the Source that is turning on or off. For example, if the system is programmed to use House-Code K for the X-10 Source Power option, then a K6-ON X-10 command is sent when Source 6 (Laser) turns on, and K6-OFF is sent when the source turns off. Note: if you will be enabling the "Auto-Receiver-Powering" option, you should not use an X-10 device on source-1 (tuner); if you will be enabling the "Auto-TV-Powering" option, you should not use an X-10 device on source-8 (tv/tape-2).

Source-Select MACRO Programming Considerations

Ten MACROs, 11 to 20, are used by the Altrix and Aris Controllers for customizing routing operations — these MACROs are directly accessed as Shifted-MACRO buttons from the RC-8 Remote Control (e.g.: in MACRO mode, pressing 1 will access MACRO 1; alternatively, pressing Shift, then pressing 1 will access MACRO 11). Learning a MACRO sequence also uses the Shift-MACRO approach (e.g.: in MACRO mode, press Learn, then press/hold/release-0 to initiate MACRO 10 programming; alternatively, press Learn, press Shift, then press/hold/release-0 to initiate MACRO 20 programming). The first eight of these ten MACROs are associated with the Source-Change commands as follows (they begin playback after all source/zone power-up, and routing for the Aris, is complete):

MACRO 11:	Tuner
MACRO 12:	CD
MACRO 13:	Cab/Sat
MACRO 14:	VCR 1
MACRO 15:	VCR 2
MACRO 16:	Laser
MACRO 17:	Tape 1
MACRO 18:	Tape 2
MACRO 19:	ON button (Altrix general-purpose use)
MACRO 20:	OFF button (plays after zone turn off)

You must program at least the A/V receiver's input-selection commands into the Source-Selection Macros, 11 to 18. You will likely also add TV input-selection commands as well — for example, set the TV to S-Video-input for Laser (Macro 16), and set the TV to antenna-input for TV/Tape-2 (Macro 18). This is also a handy place to put a CD or Laser in Play mode.

Some simple audio and A/V receivers do not have individual commands for source selection, but rather have an "Input" or other button which cycles through the inputs. To use a receiver such as this, you must find a known state — for example, determine if the receiver always turns on in "Tuner" mode, or if pressing "FM" overrides the input. You may then define a known sequence of codes for each of the inputs, for example:

Tuner:	"FM"
CD:	"FM" then "Input"
Video-1:	"FM" then "Input" then "Input"
Laser:	"FM" then "Input" then "Input" then "Input"

It's odd, but predictable, and is easily added to a MACRO sequence. Another option is to locate a remote from a pricier model, to find out if your receiver responds to buttons which are not on the supplied remote control (manufacturers often have a master IR command set).

Similar problems may occur with televisions, for accessing a composite or S-video input (e.g. you might need to use: "0" then "3" then "ChanDown" — or, "ChanUp" to get to antenna-in, then "Input" to get to line-in).

X-10 Input (2-way X-10)

Vaux Altrix 3000 and 3400 Controllers support two-way X-10 powerline control (as opposed to the one-way X-10 output-only control found on the Aris 700 and MARC+ systems). In addition to X-10 output for controlling powerline devices, the Controllers also “listen” to the powerline for X-10 commands generated by other systems. The systems are configured with factory defaults, but can be reprogrammed as desired.

A two-way-X-10 Vaux Controller is listening for one specific X-10 House-Code to which it will respond — the *X10-Input-House-Code*. All other House-Codes are ignored by the Controller, although RS-232 messages are sent out the VauxSerial port — for an external control program running on an attached computer system, the Controller provides a full two-way X-10 interface for sending X-10 commands and monitoring powerline traffic.

The factory setting X10-Input-House-Code is “G” and may be changed to be any other House-Code from A to P, or disabled. For the desired House-Code, there are 36 individual commands which may be mapped to an action in the Vaux system: Unit-Code-1-On, 1-Off, 2-On, 2-Off...16-On, 16-Off, All-Lights-On, All-Units-Off, Dim, and Bright codes, each have a map-table entry. The factory settings provide a minimal map table which provides out-of-the-box capability by programming MACROs 1 to 10, as well as demonstrating A/V switching and volume control, using X-10 codes on House-Code G. Note that volume control using X-10 Bright/Dim commands is not particularly fast, but press-and-hold adjustment is supported.

The X-10 Input factory settings are:

X10-Input-House-Code:	G
Unit-1-On (G1-On):	MACRO-1
Unit-2-On (G2-On):	MACRO-2
Unit-3-On (G3-On):	MACRO-3
Unit-4-On (G4-On):	MACRO-4
Unit-5-On (G5-On):	MACRO-5
Unit-1-Off (G1-Off):	MACRO-6
Unit-2-Off (G2-Off):	MACRO-7
Unit-3-Off (G3-Off):	MACRO-8
Unit-4-Off (G4-Off):	MACRO-9
Unit-5-Off (G5-Off):	MACRO-10
All-Lights-On (G):	Source-Select: Tuner to Zone-1
All-Units-Off (G):	Zone-1 Off
Bright (G):	Volume-Up on Zone-1 (Tuner vol for Altrix)
Dim (G):	Volume-Down on Zone-1 (Tuner vol for Altrix)

System Design Examples

Although system programming is covered in more detail in later sections, the following examples will give you an idea of the flexibility possible using an Altrix Control System.

Example 1 — One-Zone Audio System

This example shows a simple one-zone audio system which uses the Altrix Controller to manage all of the components. Device-specific IR outputs (the factory setting) are used to control the audio components via IR Emitter cables. The Altrix System will manage system power — automatically turning on and off sources as needed, and powering the receiver (as necessary) also.

When you press a Source-Select button on the RC-8 (e.g CD), the Altrix controller will turn the receiver on if it is off, turn the CD on if it is off, and invoke a special MACRO, specific to the CD, which you can tailor to the needs of the installation — typically this MACRO will at least select the receiver's CD input source, but you may also wish to automatically play the CD, adjust room lighting, etc. The RC-8 keypad is now controlling the CD (Play, Pause, Stop...). If you press a different Source-Select button (e.g Tape-1, a DAT player), the Altrix controller will turn the DAT player on if it is off, and invoke a special MACRO, specific to the DAT. The RC-8 keypad is now controlling the DAT player. The CD, which is now not being used, will automatically turn off after about five seconds. When you are finished using the system, you will press the OFF button, which will turn off the receiver, and also invoke a "Shut-down" MACRO. You may configure this MACRO adjust lights, or to preset the receiver volume to a desired setting for subsequent turn-on (e.g. turn receiver back on, mute, ramp volume fully down, then ramp up to desired level, then shut receiver off. The ON button turns the receiver on, and invokes a "Turn-on" MACRO which can initialize the entire system to a known state, specific lighting levels, etc. There are also ten general-purpose MACROs which may be used for other system configurations, lighting scenes, etc.

To allow the Altrix Controller to automate the power synchronization, you must program the Receiver (Tuner) and source device ON/OFF codes, as discussed above. Once this has been done, the receiver turn-on/off and the source device turn-on/off is automatic. You must, however, program the receiver input-selection commands in the Source-Device MACROs — you will find these MACROs handy for also projection screens drops, delays, lighting and AC power switching, and even low-voltage switching using X-10 relay modules.

Example 2 — One-Zone Home Theater (audio/video) System

This example shows a one-zone Home Theater system which uses the Altrix Controller. Device-specific IR outputs (the factory setting) are used to control the audio components via IR Emitter cables. The Altrix System will manage system power — automatically turning on and off sources as needed, and powering the A/V receiver (as necessary) also.

The television will also be powered intelligently — turning on as necessary for audio/video sources (DSS, VCRs, Laser), and turning off as necessary for audio-only sources (Tuner, CD).

You may wish to leave some devices powered all the time, or manually power them off when not in use — for example, if the DSS is also connected to a VCR for recording, you may manually power these devices on, only to find that the Altrix auto-powering feature turns one or both devices off when you shut the Altrix system down.

If this system had two identical DSS satellite receivers, the same IR codes would be programmed in each of two Device pages; Sealed IR emitter cables would then provide independent control.

To use the system, just press one Source-Select button — everything powers on as necessary, and the Source-Select Macro will automatically set the correct inputs on the receiver and TV, configure surround-sound modes, adjust lighting, and even start the popcorn. Select a different source, or press Off when you are finished — completely automated Home Theater!

Example 3 — Multi-Zone Audio/Video System

This example shows a multi-zone audio system using the Altrix Controller in “Zone-Specific-IR-Output” mode. The common source equipment is connected to the IR Blaster port via a multi-emitter, connecting block. Each Audio Receiver is driven from a zoned IR Emitter port using a sealed emitter. The common audio sources may simply parallel into all receiver inputs, since loading is not likely to be a problem for a system with a few receivers. The composite video signals, however, must split through a video distribution buffer amplifier, to maintain proper 75-ohm termination.

HARDWARE INSTALLATION

Review the previous section on Designing the System for related information.

The Altrix System is quite flexible, in that it can integrate with a variety of A/V devices and control systems, and may be configured in a variety of ways. Installation of the Altrix System is described below — please note that some installation decisions are related to the configuration and programming of the system, and you might not be able to complete connection of all components until you have considered how everything ties together. For example, connection of the IR Emitter cables to A/V components will depend on the locations you choose to store the learned IR codes.

1 — Controller Location and Power: Place the Altrix Controller near your audio/video components. Avoid placement near large-screen TVs, computers, or fluorescent fixtures — these devices generate RF noise which can reduce range. Turn off the Altrix front panel switch and plug the AC power adaptor's cable into the rear panel **Power** connector on the Altrix Controller. Plug the adaptor into a standard electrical outlet — select an outlet which is not controlled by a wall switch.

2 — Antenna for RF remote control: Plug the antenna into the Altrix Controller **Antenna** port and straighten the antenna wire into a vertical position (for example, hanging behind your equipment cabinet away from cables). Optionally, you may remotely-locate the antenna in a more optimum location (e.g. above the media cabinet, or in a central hall closet), using a section of RG-59 or RG-6 coaxial cable to connect the antenna to the controller.

NOTE: For maximum RF transmission range, position the antenna as high as possible (second story and/or highest shelf), away from metal, cables, computers, brick wall, fireplaces, and mirrors. Consult the appendix for more information on antenna placement and different types of antennas.

3 — Optional Connection of Vaux Wired Keypads: Model 3400 ONLY: If you are installing Vaux wired keypads, plug the Vaux Data cable from the keypad powering hub (KPMUXx) into the VCtrlIn connector.

4 — Optional IR Input from Repeater Systems or IR Keypads: Model 3400 ONLY: If you are connecting an infrared repeater system or infrared keypads to the Altrix system, plug the master IR control signal into the **IR Input** connector on the Altrix Controller. This control signal should be the combined signal from all repeater/keypad locations, not a “zone” output — Vaux IR commands embed the zone code in the infrared command, so there are not separate IR inputs for each zone (more on this later). The data lines must be logically-combined, into a single line, to plug into the 3400 controller. IR combiner boxes are available, or you may solder a switching diode into each data line (cathodes connect together).

The control signal should be positive-going, and does not need to be current-limited since the IR input includes a 200-ohm drop resistor. If the IR control system is designed to drive an emitter (resistor-limited low-level-output), or provides a high-level output (e.g. 5V or 12V signal with no drop resistor), it should plug right in. Note: the 3.5 mm phone jack uses: tip=data, sleeve=ground. Note: the connector ground is not floating (i.e. it is connected to Altrix chassis ground).

Alternatively, you may simply stick an IR emitter over the Altrix Controller’s front panel sensor location, which is marked with a small dot (see the front panel figure). This also isolates the system chassis grounds, which may be necessary if the repeater/keypad system is powered from a distant location and introduces hum in any audio zones.

The IR In jack is for modulated infrared signals; Vaux IR remotes use 40 KHz IR modulation. If you are connecting to a repeater system which strips off the modulation, and only sends the data envelope of the IR commands, plug into the VauxControl (VCtrl In) connector on the 3400 rear panel. This 2.5mm jack (tip=data, sleeve=ground) connects to a buffered input and presents approximately 1K-ohm loading. Connecting to either (or both) rear-panel jack(s) does not disable the front-panel sensor, or the other IR jack.

See the Appendix for more information on IR Inputs and the use of non-Vaux learning IR keypads and remote controls.

5 — Connect IR Emitter Outputs to A/V components: The Altrix Controller learns and plays-back infrared codes for A/V devices, and has two types of IR outputs:

A) The **IR Blaster** port provides a common (always-available) infrared signal for connecting a Xantech®-compatible room blaster, amplified multiple-emitter connecting block, or a single or dual IR emitter. This is the master IR signal; the green light next to the blaster port indicates the presence of infrared signal output. An IR room blaster may be aimed at the rack of A/V equipment, but obstructions can interfere with control signals — alternatively, a multiple-emitter connecting block can be used, which will allow affixing IR emitters directly to the components. By using the common IR signal at the Blaster port, the A/V components may be controlled without regards to where the IR codes are stored, as is necessary when using the IR Emitter ports, described below.

B) The eight **IR Emitter** ports are for the connection of single (Model EC-1) or dual (Model EC-2) IR Emitter Cables. These eight connectors are factory-configured for “Device-Specific” operation — that is, the emitters are active only for the corresponding IR device selected. Identical source components, such as CD changers or satellite tuners, may be individually controlled by placing their infrared codes in different Altrix IR device pages (IR banks). Generally, you will want to set up your system to correspond to the device names labeled on the RC-8 remote control, although you may re-label them if you wish. The IR Emitter ports on the rear panel of the Altrix Controller are labeled 1 to 8; the RC-8 remote control devices map to the emitter ports as follows: port 1: Tuner, port 2: CD, port 3: Cab/Sat, port 4: VCR-1, port 5: VCR-2, port 6: Laser, port 7: Tape-1, and port 8: Tape-2.

The IR emitter cable is comprised of a small casing which houses a small infrared LED (Light-Emitting Diode), and a ten-foot length of cable terminating in a 3.5 mm phone plug. The dual-emitter version has the two LEDs connected in series, and a Y-shaped cable for installation on two A/V components. To install an IR emitter cable, attach the IR emitter case to the audio/video component's infrared (IR) sensor window; the emitter affixes with a small section of peel-off, double-sided, removable adhesive tape. Plug the connector end of the emitter cable into one of the eight *IR Emitter* connectors (3.5 mm phone jacks) on the rear panel of the Altrix Controller.

NOTE: If you are learning two separate components into one IR device bank (e.g. VCR and TV controls combined in the VCR-1 bank), you may use a Dual Emitter cable which has a single 3.5 mm plug and branches to two emitter heads — these components will receive the same IR signals, but they respond only to their own IR codes.

NOTE: If you have two *identical* components (e.g. two CD Changers or two DSS tuners), you can learn their (identical) IR codes into two different IR device banks (e.g. learn the DSS codes in both the VCR-1 and VCR-2 banks); the appropriate emitter outputs will independently control each device (the emitters must be sealed, using a Model EC-BO kit, to prevent IR leakage from one device to the other).

LOCATING AN A/V COMPONENT'S IR SENSOR: If your audio/video component has an infrared (IR) remote control, it will have an IR sensor window, which is typically located on the front panel. It is usually a small dark or red window and may be labeled "IR Sensor." If you cannot locate the IR sensor window, refer to your audio/video equipment owner's manual. If your owner's manual does not indicate the location, you can determine the location by repeatedly covering small areas of your audio/video equipment's front panel with a piece of cardboard and using your remote control. Hold the cardboard close to your component and hold your remote control approximately one foot or more away from (and pointed towards) your component. Remember, infrared signals are invisible beams of light; a solid object in the path of the IR signal will prevent your component from seeing the remote control signals. Once your audio/video equipment is not responding to the commands from your remote control, you know that you have covered — and found — the IR sensor window.

6 — Optional X-10® Interface Module Installation:

PLC (powerline carrier) control of lighting and appliance devices, using X-10 powerline control signaling, is possible when an optional interface module is connected to the Altrix Controller. Altrix Controllers provides X-10 output and also listen to the powerline for specific X-10 commands (which can control the Altrix system). Altrix Controllers use the "two-way" Model X2 interface (TW523). Note: a "one-way" Model X1 interface (PL513) will not work with this system.

- A) Plug one end of the X-10 Interface Cable into the Altrix Controller's *PLC* connector (6P4C modular jack).
- B) Plug the other end of the X-10 Interface Cable into the modular jack on the X-10® Interface Module.
- C) Plug the X-10 Interface Module into a standard electrical outlet, which is not controlled by a wall switch.

NOTE: The 6P4C (6-position, 4-contact) modular patch cable which connects the controller to the interface module, must be wired in a "reversed" pattern. Vaux provides a black patch cable, to differentiate it from the predominantly-gray telephone patch cords. If you need to substitute the cord, you will find that most telephone cords are reverse wired, and will work correctly (some may be incorrectly wired or only have 2 wires — these will not work). You can identify a reversed-wired cord by holding the two modular connectors side-by-side, and noting the color code of the four wires in each: if the wire colors are the opposite from left-to-right on both connectors, the cable is reverse-wired.

7 — Optional RS-232 Computer or Control System Connection:

Connect your computer, using a properly shielded RS-232 "modem" cable, to the 25-pin *Vaux:Serial Port* connector on the rear panel of the Altrix Controller. For maximum reception of RF remote controls, do not install the Altrix Controller immediately next to your computer. For more information on the VauxSerial interface, refer to the appendix.

8 — Connection of A/V Source components: Plug your Audio/Video source components into your A/V Receiver's source inputs using appropriate cabling (generally shielded coaxial patch cables with phono plugs).

9 — Connection of A/V outputs: Connect the A/V Receiver's speaker outputs using appropriate cabling. Connect the video outputs to video monitors or TV line inputs, or, for longer runs, to composite buffer amplifiers or video modulators. For a multi-zone installation, run the speaker wiring and video cables to each zone. For information on audio/video wiring, see the appendix.

10 — Connection of X-10 modules for component Auto-PLC-Powering: If you are programming your system to provide automatic X-10 commands for System-Active, Source, or Zone powering, connect the device's power cable to an X-10 Appliance (not lamp) Module, and leave the device's power switch on. Adjust the module's switches to select the appropriate module address (house/unit-code) which the Altrix system will be controlling. An example installation may use the System-Active (any zone on) X-10 commands to power a multi-zone audio amplifier.

11 — Power-up the system: Turn on the Altrix Controller using the front-panel switch — a string of front-panel lights indicates that the controller is running.

Install batteries in the RC-8-RF and/or RC-8-IR remote controls. Alkaline, Heavy-Duty Carbon, or rechargeable Nicad batteries may be used. Please dispose of used batteries at a recycling center. More information about battery use and disposal may be found in the Safety Information section of this manual. The RC-8 uses three (3) “AAA” batteries to power it. These batteries will last up to 6 months under normal conditions, depending on usage. Be certain to observe polarity markings when installing batteries.

NOTE: When changing the batteries, lay the remote control keyboard-down on a flat surface; protrusions on the case prevent the keys from being pressed. Remove the old batteries and replace with new batteries **WITHIN ONE MINUTE**. This process will ensure that the user-selectable settings are not changed. If you want to restore the factory settings, remove the old batteries, press a key, and let the remote control sit for a minute or so before installing the new batteries — upon battery insertion, the red light will flash twice to indicate that the factory settings have been restored.

PROGRAMMING THE SYSTEM

Review the previous section on Designing the System for related information.

Programming the Default A/V Zone into an RC-8 (Zone-specific mode only)

When controlling your Altrix System with a Vaux RC-8-RF or RC-8-IR Remote Control, each button press sends several pieces of information — one important piece is the Zone Code. There is a *Default-Zone* which you can program into the RC-8 Remote Control — this is only needed if your Controller is set up for “Zone-Specific” operation. For example, you may be programming the master bedroom’s RC-8 to be Zone 04, and the patio’s RC-8 to be Zone 06. Note: for normal “Device-Specific” operation, the Default-Zone does not matter (01 is the RC-8 Factory setting after battery insertion).

To program the Default-A/V-Zone into the RC-8 (this is a global parameter, and may be programmed in any mode switch position):

- A) Press the Learn button
(do not hold down — if held down, system will go into Infrared Learning Mode, not Zone programming).
- B) Press and hold down the Zone button for 2 seconds until the Green light on the remote control is on, then release.
- C) Press two digits (00 through 99), corresponding to the desired default zone
For most installations, you will be entering “01” for zone 1, “02” for zone 2, etc. Note: an Altrix Controller has eight physical zones (IR outputs), 1 to 8; the first digit you enter is a “Zone Group” number used for multi-Controller Aris installations — for an Altrix system, the zone group should be “0”).

Programming the Default Lighting Group (X-10 House Code) into an RC-8

The 1-digit X-10 operation, described later, uses a default Lighting Group (House Code) stored in the remote control. The 1-digit operation is used to reduce the number of keystrokes for the lights/appliances control for up to 9 X-10 modules that are used most frequently and have the same House Code. Additionally, the modules on this House Code may be accessed together with ALL ON/OFF.

The RC-8 Remote Controls initially power-up to a House Code Factory Setting of "A." For initial 1-digit X-10 Operation, a House Code of "A" will automatically be used and you do not have to specify a House Code, if "A" is satisfactory.

If you want to use another House Code (other than "A," for example, "B") you will need to program this new House Code as the "default" House Code. This will store a new House Code which will automatically be used instead of the factory setting "A."

To program the Default-Lighting-Group into the RC-8 (this is a global parameter, and may be programmed in any mode switch position):

- A) Press the Learn button
(do not hold down — if held down, system will go into Infrared Learning Mode, not House Code programming).
- B) Press the Shift button
- C) Press and hold down the Zone button for 2 seconds until the Green light on the remote control is on, then release.
- D) Press one digit (0 through 9), corresponding to the desired default House Code

<u>Vaux Digit Button</u>	<u>X-10® House Code</u>
1	A (Factory Setting)
2	B
3	C
4	D
5	E
6	F
7	G
8	H
9	I
0	J

The optional PLC (X-10) modules, accessed from the remote control, are typically used for lighting and other general uses — the House-Code/Unit-Code for each module (e.g. B4), maps to a Vaux numeric equivalent (e.g. 24). These devices may be controlled directly using a remote control or keypad, or indirectly as part of a Macro sequence.

Since Vaux RC-8 remote controls have a programmed Default-House-Code (A to J), it is handy to define a different House-Code for lighting and other modules in each zone, allowing each remote local independent and All-On/Off control of lighting. Alternately, a Default-House-Code may be chosen for lights throughout the house allowing control of major rooms, and All-On/Off of whole-house lighting. Each RC-8 remote control can also directly address 100 X-10 modules for House-Codes A to J, and Unit-Codes 1 to 10. Vaux Keypads can access all 256 X-10 addresses using pre-defined keys. See the operation section for additional information on X-10 control.

Infrared Learning

Learned infrared codes are stored in the Controller in one of eight “Device–pages” (or banks). For each of the Devices (CD, Laser...), there are locations for storing the appropriate IR codes for functions such as “Play,” “Pause,” etc. Essentially, there are eight separate “keyboards” which may be programmed with independent IR codes for 30 functions, for a total of 240 IR learned codes. Some of these codes are not directly available to the user, such as auto–powering codes, which are sent automatically, as needed.

NOTE: INFRARED CODES ARE STORED IN THE ALTRIX CONTROLLER/RECEIVER NOT IN THE REMOTE CONTROLS.

You can learn as many IR buttons as you wish — one or all. If you want to change a button that already has been taught, just learn it again. It will replace the old command with the new infrared command. All of the commands are stored in the Altrix Controller, which has a battery backup — you may unplug it without your codes being lost.

To learn IR commands from your A/V infrared remote controls to the Altrix Controller:

- A) Move the slide switch on the RC-8 remote control to the Audio/Video mode position
- B) Press and hold down the Learn button for 2 seconds until the Green light on the remote control is on, then release. When the button is released, the yellow *LEARN* light on the Altrix Controller will illuminate.
- C) Select an IR Device page in the RC-8 remote, by pressing Dev, where “Dev” is the device you would like to configure (for example, Tuner, CD, etc.). You have eight separate device pages (or “keyboards”) to program (see Note 1, below).
- D) Press the RC-8 button you want to store an IR command on (e.g. “Stop”). The Altrix *LEARN* light will go out, and the *INFRARED* light will come on (see Note 2, below).
- E) Aim the original IR remote at the IR LEARNING window on the Altrix front panel, and press the appropriate button. Hold your original infrared remote control up to the IR Sensor window on the front of the Altrix Controller (approximately 4 inches away), and press and HOLD DOWN the button on your existing infrared remote control (for example, “Stop”) until the yellow *LEARN* light on the Altrix Controller illuminates, then release.

_____The green *INFRARED* light on the Altrix Controller will flash as the code is being learned, as well as the green “infrared–strength” indicator light inside the *IR LEARNING* window. Generally, the position of the IR remote control which gives the brightest “infrared strength” light will provide the best results.

_____ **IMPORTANT:** You must HOLD DOWN the infrared remote control button, while you are learning the code, until the yellow *LEARN* light on the Altrix Controller illuminates.

If there has been an error while learning, or if you waited over 15 seconds before shining an IR code into the *IR LEARNING* window, the red *ERROR* light on the Controller will flash; go back to step “D.”

F) Repeat steps “D” and “E” until all of the buttons have been learned. You may change the Device setting at any time (step “C”); remember, you have eight separate “keyboards” to program.

G) Exit learning mode by pressing and holding down the RC-8 remote control's **LEARN** button for approximately 2 seconds until the remote control's Green light goes on, and then release the button. When completed, the green *INFRARED* light flashes and the yellow *LEARN* light will go off.

Important: You may exit Learn mode only when the Controller's yellow *LEARN* light is on — if the *LEARN* light is off, and the *INFRARED* is on, the controller is waiting for an infrared signal to learn, and is ignoring any RC-8 commands.

Test the IR codes you just learned — if any codes do not seem to operate properly, you should try learning them again, perhaps holding the IR remote closer-to, or further-from, the IR LEARNING sensor window. Occasionally, the IR sensor can be over (or under) driven and distort the code slightly.

Note 1: The reason for pressing a Device button while in IR Learn mode, is to select an IR “storage-page” by changing the RC-8’s “Current-Device,” which is transmitted with all subsequent button presses. When you press a Device button (e.g. CD) while in IR Learn mode, the transmitted “Source-Change” command is discarded — you will see the red ERROR light on the Altrix Controller flash as you press the Device button (just ignore it).

Note 2: If you press a button which is invalid in IR Learn mode (e.g. a Device button, as mentioned in Note 1), the controller will ignore it; the red ERROR light on the Altrix Controller will flash as you press the invalid button.

IR Learning Note 1: The Altrix Controller’s IR Learning Sensor is reasonably insensitive to IR signal strength, but some remotes might not learn properly when held the typical 2-3 inches from the sensor. Some remotes emit a very strong IR signal, and can overdrive the sensor somewhat — this can result in slightly “fatter” pulses in the learned code, which may operate the device intermittently (or not at all). Conversely, an IR remote with a low signal level can result in “skinny” pulses. If you run into learning problems (and have checked the emitter), try re-learning the code from a different distance.

IR Learning Note 2: The Altrix Controller’s Learning process will analyze the IR code for a “Data Group” and “Repeat Group.” The Data Group is what is played back when a button is pressed, and the Repeat Group (which may or may not be the same as the Data Group) is played continuously as the button is held. Repeating commands (e.g. Volume adjust), may not repeat quite as quickly as the original remote, due to the mechanism used for RF input/IR output. While normally you will hold the IR remote’s button down for the entire learn process, occasionally a single (or multiple) press during learning can improve on a IR code which does not respond to normal learning.

MACRO Programming

Multiple-command MACRO support allows you to define one-button sequences, for example, adjust room lighting, lower the projection screen, power-up the laserdisc, and play. There are twenty 25-step MACROs available using any combination of audio/video IR command, X-10 for light control, even time delays. MACROs are stored in the Controller, which has battery back-up.

There are two groups of MACROs:

- **General MACROs 1 to 10** are accessed directly on the numeric keypad (RC-8 mode switch in MACRO mode). These MACROs have *static zoning*, that is, the zone information stored for each step (when the MACRO was programmed) does not change. These are general-purpose user MACROs.
- **Source-Select MACROs 11 to 20** are accessed as “Shifted” numeric keypad digits (when the RC-8 mode switch is in the MACROs position) — but the more common use of these MACROs is their association to Source-Selection keys when the RC-8 is in the Audio/Video mode. MACROs 11 to 18 are invoked as a result of pressing a Source-Selection button (Tuner, CD...), MACRO 20 plays at the end of a zone-turn-off sequence (upon a press of the OFF key), and MACRO 19 is a general-purpose MACRO which is invoked when the ON button is pressed. You must program at least the A/V receiver’s input-selection commands into the Source-Selection Macros, 11 to 18. You will likely also add TV input-selection commands as well — for example, set the TV to S-Video-input for Laser (Macro 16), and set the TV to antenna-input for TV/Tape-2 (Macro 18). You may also initialize surround-sound modes, etc. This is also a handy place to put a CD or Laser in Play mode.

These MACROs have *dynamic zoning*, that is, the zone information stored for each step is overridden by the zone of the requesting RC-8 remote control. When the Controller is set up for zone-specific IR output, dynamic zoning allows IR commands in the MACRO to be directed to the appropriate zoned IR-Emitter port. For example, if you program MACRO 12 (invoked by the CD button) to select the CD input on the A/V receiver; the code will appear at differing IR output connectors depending on which zone’s RC-8 is used to access it, providing multi-zone operation.

MACROs can also be programmed using the RS-232 Computer Interface (the VauxSerial Port). Additional features are available for MACRO use when programming from the Computer Interface: for example, multiple X-10 modules may be dimmed/brightened together. For more information, please consult the Vaux Protocol Document.

To program a MACRO sequence into the Altrix Controller:

- A) Move the slide switch on the RC-8 remote control to the Macros mode position
- B) Press the Learn button
(do not hold down — if held down, system will go into Infrared Learning Mode, not Macro programming).
- C) Press and hold down the desired Macro button for 2 seconds until the Green light on the remote control is on, then release. The Altrix Controller’s *LEARN* light and *MACRO* lights will illuminate.

For the first ten macros, you will be pressing “1” for Macro 1, “2” for Macro 2, and so on, up to “0” for Macro 10. For the next ten macros, you will be pressing “Shift-1” for Macro 11, “Shift-2” for Macro 12, and so on, up to “Shift-0” for Macro 20. Note that “Shift-2” means to first press the “Shift” button, then the “2” button — not both together.

- D) Enter the MACRO sequence

In the desired operational sequence, slowly press the sequence of buttons, just as you would operate the system normally. All operations, except time delays, will be performed as you are teaching the MACRO sequence — the time delays will be stored, but will not force you to wait while you are in MACRO-program mode. The yellow *LEARN* light on the Altrix Controller flashes off briefly as the button-press is added to

the MACRO's sequence — wait for a step to complete before entering the next step, or the system might miss your next step. You can program up to 25 different audio/video IR, X-10 operations, and/or delay steps in each MACRO location.

Note: you will be changing the mode slide switch position as you navigate through your MACRO sequence, changing to Audio/Video mode to play IR commands, and to Lts/App mode to perform lighting control.

Note: you may enter a time delay step as follows (the mode switch position does not matter): Press Shift-Delay-Digit. That is, press the “Shift” button, then the “Delay” button (shifted-record-button), then a digit button from “1” to “9.” For longer delays, add another delay step, or program the MACRO via the computer port. During MACRO program, the delay step is confirmed by a flash of the *CONTROL* light. The delays available are as follows:

	<u>Vaux Digit Button</u>	<u>Delay (seconds)</u>
1	1	1
2	2	2
3	4	4
4	8	8
5	12	12
6	20	20
7	30	30
8	45	45
9	60	60
0	(not used)	

Continue programming for all steps you wish to include in the MACRO.

Note: The “Source-Change” command (transmitted when you press a Device key, such as “CD”) does not get added to a MACRO sequence if you accidentally press it during MACRO learning.

Note: You may also include IR and X-10 repeats in MACRO steps: Instead of simply pressing a button (e.g. lamp dim), press and hold it until the desired result is achieved, then release. This MACRO step will then include a repeat count which will approximate the length of time you held the button down for.

E) Move the slide switch on the RC-8 remote control back to the Macros mode position

C) Press any digit button to exit macro program mode. The Altrix Controller's *LEARN* light and *MACRO* light will go out.

Test out your MACRO, to determine if you obtained the desired results.

Note: To erase a MACRO, you may enter MACRO program mode for that MACRO, and then exit before saving any steps.

MACRO Tip 1: The macro playback routine adds a small delay after each IR command, but some systems cannot recognize closely-spaced IR codes (e.g. power-up, then input select). If this seems to be happening to a device in your MACRO, try adding a delay step and/or interleaving commands for other devices (or lights) between the commands needing separation. There is also a computer-port-programmable parameter, Power-On-Delay, which may be set to force a fixed delay after device power-on operations (the factory setting is 0-seconds)

MACRO Tip 2: The Altrix Controller has a powerful Auto-Powering options, which track the state of devices. The Controller works with components which have separate On and Off commands, and also handles A/V devices which have a toggling power command. Toggle-Power devices are powered properly unless the user manually powers the device — this synchronization error will require a manual power operation to restore system sync. Generally, this is rarely an inconvenience, but you may have a toggle-power device which you wish to force on, regardless of current power state.

You may use an X-10 Appliance power strip to power this component. In the Source-Selection Macro, first turn the module Off, then On (device now in standby), followed by the component IR power command.

Alternately, enable the Auto-PLC-Source-Power option (via the computer port) in conjunction with the Auto-Powering IR commands — the X-10 module turns on first (followed by a Power-On-Delay, if programmed), and the Auto-Power IR command will then be sent. At turn-off, the IR Power-Off command is sent (not really needed now), followed by the X-10 module turning off. This technique does not need any steps added to the Source-Select Macro.

MACRO Tip 3: Some simple audio and A/V receivers do not have individual commands for source selection, but rather have an "Input" or other button which cycles through the inputs. To use a receiver such as this, you must find a known state — for example, determine if the receiver always turns on in "Tuner" mode, or if pressing "FM" overrides the input. You may then define a known sequence of codes for each of the inputs, for example:

Tuner: "FM"
CD: "FM" then "Input"
Video-1: "FM" then "Input" then "Input"
Laser: "FM" then "Input" then "Input" then "Input"

It's odd, but predictable, and is easily added to a Macro sequence. Another option is to locate a remote from a pricier model, to find out if your receiver responds to buttons which are not on the supplied remote control (manufacturers often have a master IR command set).

Similar problems may occur with televisions, for accessing a composite or S-video input (e.g. you might need to use: "0" then "3" then "ChanDown" — or, "ChanUp" to get to antenna-in, then "Input" to get to line-in).

SYSTEM OPERATION

The RC-8 Remote Control

The Vaux RC-8 Remote Control is the primary device used to control the Altrix System. There are two versions of the RC-8 Remote Control: RC-8-RF (radio-frequency) and RC-8-IR (infrared). The two remotes behave identically, but the RC-8-IR is only used with Vaux Controllers that support infrared control (e.g. Altrix 3400). Besides the different transmission techniques used on the RF and IR versions, the only functional difference is that the IR version does not support a Security ID Code, as does the RF version (an infrared control link does not have possible neighboring systems to contend with). One other subtle difference is that the IR transmission is faster, and results in better response time to button presses.

The RC-8 Factory Settings

When the batteries are first installed, the remote control will use “factory settings” for the programmable features it stores. The user may at any time change these settings.

The factory settings are:

Current A/V Device: 1 (Tuner)
Default A/V Zone: 1
Default Light Group: 1 (X-10 House Code A)
Default Security ID Code: 1070

To restore factory settings, remove the batteries, press a key, and wait about one minute. Upon battery insertion, the red light flashes twice to indicate that the factory settings have been loaded.

RC-8 Low-Battery Indicator and Battery Replacement

Batteries should be changed when the low-battery indication is given, that is the RC-8’s red and green lights flashing simultaneously when a button is pressed. Although you may continue to operate the remote control, operating range will be reduced and remaining battery life is short.

The RC-8 uses three (3) “AAA” batteries to power it; Alkaline, Heavy-Duty Carbon, or rechargeable Nicad batteries may be used. These batteries will last up to 6 months under normal conditions, depending on usage. Be certain to observe polarity markings when installing batteries.

NOTE: When changing the batteries, lay the remote control keyboard-down on a flat surface; protrusions on the case prevent the keys from being pressed. Remove the old batteries and replace with new batteries WITHIN ONE MINUTE. This process will ensure that the user-selectable settings are not changed. If you want to restore the factory settings, remove the old batteries, press a key, and let the remote control sit for a minute or so before installing the new batteries — upon battery insertion, the red light will flash twice to indicate that the factory settings have been restored.

The RC-8 Mode Switch

The RC-8 has a three-position slide switch which sets the operating mode of the unit. The Audio/Video position is used for accessing learned IR control codes, which are divided into eight devices (or banks, or pages). The Lights/App position allows control of up to 100 Lights and Appliances around the home, provided that the Controller is equipped with the optional X-10® interface module/cable. The Macros position provides direct access to up to 20 multi-step MACRO sequences, as implemented by the Controller. Note that depending on the position of the mode switch, certain buttons may not be valid, and will result in a flash of the red Error light on the remote control. For example, in the Macros position, non-numeric buttons are invalid.

The “Device” v.s. “Shift-Device” difference

In the Audio/Video mode, a press of one of the device-selection buttons (e.g. CD) results in a “Source-Change” command being transmitted, as well as a change (internally in the RC-8) which will specify the chosen device in subsequent commands — this is called the RC-8’s “Current Device.” In response to the transmitted Source-Change command, the Altrix Controller will generally perform a sequence of operations to turn the selected source on. By first pressing *Shift*, then a device button (e.g. Shift-CD), there is NO Source-Change command transmitted, just an internal change of the RC-8’s Current Device — this is handy under certain circumstances when you do not want the source-change command transmitted. For example, you may not want to disturb the laserdisc playing in your zone, but you may wish to control a VCR to rewind a tape — Shift-Device provides a way to do this. Note that “Shift-CD” means to first press the Shift button, then the CD button — not both together.

The RC-8 Keypad Buttons

There are several special buttons on the RC-8 remote control; the SHIFT button, eight Device buttons (Tuner, CD, etc.), the Zone button, the Sec button, and the Learn button. These are used for multi-button commands or system programming tasks. The Zone button allows you to store a “default” zone in the RC-8 Remote Control, and also allows you to access other zones in the house. This default zone is used to uniquely identify different remotes around the house, since the zone information is included in the transmitted commands (this applies to both RC-8-RF and RC-8-IR remotes). For example, if you will be leaving the RC-8 in the master bedroom, you would set the default zone to the master bedroom (perhaps it is zone 3). Then, when you press buttons on the RC-8, it tells the Altrix Controller that you are “in zone 3.” More on this later. The remaining buttons are used in varying ways, depending on the mode switch setting (Audio/Video, Lts/App, or Macros).

Audio/Video Operation

Your Altrix Control System will provide simple, one-button control of your Home-Theater or multi-zone A/V system. This automation is performed by use of Auto-Source-Powering, Auto-TV-Powering, and Source-Select Macros, which are used to select the appropriate Receiver/TV inputs, adjust surround-sound modes, etc. If you have a multi-zone system with multiple identical receivers (and, optionally, TVs), the system operates identically from each of the zones.

When you press a Source-Select button on a Vaux remote control or keypad, e.g CD, the Altrix Controller will turn the A/V receiver on if it is off, turn the CD on if it is off, and invoke a special Macro, specific to the CD, which you can tailor to the needs of the installation — typically this Macro will at least select the receiver's CD input source, but you may also wish to automatically play the CD, adjust room lighting, etc. If you are using Auto-TV-Powering, the TV will turn off if it is on. The keypad is now controlling the CD (Play, Pause, Stop...). If you press a different Source-Select button, e.g Laser, the Altrix Controller will turn the Laserdisc player on if it is off, turn the TV on if it is off, and invoke a special Laser Macro, for configuring inputs on the Receiver/TV, etc. The keypad is now controlling the Laserdisc. The CD, which is now not being used in your zone, will automatically turn off after about five seconds (unless another zone is using it). When you are finished using the system, you will press the OFF button, which will turn off the TV, and also invoke a "Shut-down" Macro. You may configure this Macro to adjust lights, or to preset the receiver volume to a desired setting for subsequent turn-on (e.g. turn receiver back on, mute, ramp volume fully down, then ramp up to desired level, then shut receiver off. The ON button invokes a general-purpose Macro which can be used to initialize lighting levels, etc. There are also ten general-purpose Macros which may be used for other system configurations, lighting scenes, etc.

For a multi-zone installation using multiple A/V receivers, the various Vaux remote controls or keypads around your house will have different "Default-Zone" numbers stored in them; this provides direct access to the zone they are in. With the RC-8 remote control, you may also temporarily access another Zone — for example to turn down the kids' music. Or, you may select a *Whole-House* Route to send the same source to all zones in your house. All of this control is available directly from Vaux remote controls or keypads.

The RC-8 Default and Temporary A/V Zone

When controlling your Altrix System with a Vaux RC-8 Remote Control, each button press sends several pieces of information — for a multi-zone Altrix system, one important piece is the Zone Code. There is a *Default-Zone* which you will program into the remote controls. For example, if you will be placing an RC-8 remote in Zone 5 (e.g. master bedroom), you will program Zone 5 into the RC-8; every button press will now tell the Altrix Controller to affect Zone 5. Pressing the Volume Down button will adjust the A/V receiver driving Zone 5. See the Programming section for information on changing the RC-8's default A/V zone.

A "temporary zone access" using an RC-8 remote control uses a two-button prefix to a command button — for example, to turn down the living room volume level (using the master bedroom remote), you will press *Zone, 1*, and then press *Volume Down*. After releasing the Volume Down button, you will again be using the Default Zone (master bedroom) for subsequent commands.

Selecting an A/V Source

When the RC-8 is in the Audio/Video mode, you may select an A/V source, by simply pressing the appropriate "Source-Select" button; a Vaux keypad behaves the same way. As you select a different source device, the keypad buttons reflect the IR control page for the device you have just selected. For example, pressing the "CD" button will select the CD source (in your zone); now, pressing "Play," "Pause," and "Stop" will control the CD component using learned IR commands. Pressing "Laser" will select the Laser instead of the CD; now, pressing "Play," "Pause," and "Stop" will control the Laserdisc. Pressing "Off" will shut your zone off.

Sending an A/V Source to another Zone

A full-blown multi-zone Altrix system setup will have a Vaux remote control or keypad in each zone, configured for the Default-Zone that it resides in. In this case all zones behave identically — using the remote control or keypad in the zone, you will select a source, control it, and turn it off. For less-frequently used zones, you may want to share a remote control among zones. One way to do this is to re-program the remote's Default-Zone each time you change zones. Another way, to share the remote control, takes advantage of the RC-8's "temporary zone" feature.

Zone-x-ON will send the RC-8's "Current-Source" to another zone. As an example, let's say you have pressed CD to select the CD in the zone you are in (i.e. the default zone stored in the remote) — the RC-8's Current-Source is now CD. If you wish to also route the CD to another zone, you press Zone, a digit corresponding to the desired zone, and then press ON (e.g. Zone-4-ON). You may turn off any other zone, regardless of the RC-8's Default-Zone or Current-Source, using Zone-x-OFF.

Zone 0 is used to select whole-house mode (all zones). As an example, you may press Laser to select the laserdisc (in the zone you are in), and then press Zone-0-ON to also send it to the entire house. Likewise, Zone-0-OFF turns off the entire system (all zones).

The above examples required first selecting the source in the zone you are in, in order to change the RC-8's Current-Source before sending a Zone-x-ON command. If you wish to explicitly send a specific source to another zone, without affecting the zone you are in, you use Shift-Device first. By first pressing *Shift*, then a source-device button (e.g. Shift-Laser), there is NO Source-Select command transmitted by the RC-8, just an internal change of the RC-8's Current-Source. Then you may send a Zone-x-ON command to route the source to the zone of your choice. For example, you are in zone 3 (and your RC-8 is set to a Default-Zone of 3), and have pressed CD — the CD is now playing in zone 3. You also wish to send the Tuner to zone 5: press Shift-Tuner, then Zone-5-ON. Zone 3 is undisturbed. Note that the RC-8's Current-Source is now Tuner. You may select a Tuner preset, etc. — you should then press CD to restore control of the CD player in your zone (you could also press Shift-CD, but since the CD is already playing in zone 3, the Source-Select command you send when pressing CD is ignored). Yes, this is a bit confusing at first, but at least you have this option for controlling a little-used zone that does not have its own remote control or keypad.

Shift-Device is also handy under other circumstances when you do not want the Source-Select command transmitted. For example, you may want to control a different IR device (e.g. rewind the VCR while you are watching the Laserdisc) — Shift-Device provides a way to do this.

Infrared Source Device Control

In the RC-8's Audio/Video mode, there are eight selectable Device "keyboards" for infrared control codes. Most buttons are labeled with standard commands (Play...) which will correspond to the IR devices in your system. There are also four general-purpose "function" buttons, F1 – F4, which may be used for less-frequently used infrared commands, for example, PIP, VCR tracking, surround modes, etc. You may identify these F1-F4 buttons (for each of the eight devices) on the RC-8's optional rear-panel label, if you wish.

When the Controller receives the command to play back a previously-learned infrared code, the front-panel *INFRARED* light will flash. The rear-panel IR Blaster light will also flash indicating that an IR code is being sent out the Blaster port. If the Controller receives the command to play back an infrared code which was not previously-learned (an empty IR code location), the front-panel *INFRARED* and *ERROR* lights will flash together.

Lighting and Appliance (X-10®) Control

Controlling your lights and appliances can be performed by using either the 1-digit or 2-digit operation. With the 2-digit X-10 operation, you can control up to 100 lights and appliances explicitly. The 1-digit operation is used to reduce the number of keystrokes for the lights/appliances control for up to 9 X-10 modules that are used most frequently and have the same House Code. 1-digit operation also allows ALL ON/OFF for the House Code Lighting Group.

Note: When the Controller receives an X-10 command, the Altrix *LIGHTS* light will flash.

Lighting Control — 2-Digit Operation

A) Move the slide switch on the RC-8 remote control to the Lts/App mode position

B) Press a digit (0 through 9), corresponding to the desired House Code.

	<u>Vaux Digit button</u>	<u>X-10 House Code</u>
1	A	
2	B	
3	C	
4	D	
5	E	
6	F	
7	G	
8	H	
9	I	
0	J	

C) Press a digit (0 through 9), corresponding to the desired Unit Code.

	<u>Vaux Digit button</u>	<u>X-10 Unit Code</u>
1	1	
2	2	
3	3	
4	4	
5	5	
6	6	
7	7	
8	8	
9	9	
0	10	

D) Press the ON or OFF button to control the X-10 Module.

E) To Dim/Brighten the Module (Lamps only), press Chan down or up button, and hold until the lamp is adjusted to the desired level. Equivalently, you may press Vol down or up buttons.

Example of 2-digit X-10 Operation: either a lamp module or an appliance module set to a house code of “D” and a unit number of “5”, would be addressed by pressing the two-digit code, 4 5. An X-10 module set to a house code of “F” and a unit number of “9,” would be addressed by pressing the two-digit code, 6 9.

Lighting Control — 1-Digit Operation

The 1-digit operation can be used in addition to the 2-digit operation; it is used to reduce the number of keystrokes for the lights/appliances control for up to 9 X-10® modules that are used most frequently and have the same (default) House Code. The Vaux RC-8 remote control is initially programmed with a House Code Factory Setting of “A.” For initial 1-digit X-10 Operation, a House Code of “A” will automatically be used and you do not have to specify a House Code. If you wish to use a different House Code, other than “A,” you must change your Default House Code — See Programming section.

A) Move the slide switch on the RC-8 remote control to the Lts/App mode position

B) Press a digit (0 through 9), corresponding to the desired Unit Code.

<u>Vaux Digit button</u>	<u>X-10 Unit Code</u>
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
0	All Lights On/All Units Off

Note: Zone “0” commands all modules, on the default House Code, to respond to the X-10 “All Lights On” and “All Units Off” commands.

C) Press the ON or OFF button to control the X-10 Module.

D) To Dim/Brighten the Module (Lamps only), press Chan down or up button, and hold until the lamp is adjusted to the desired level. Equivalently, you may press Vol down or up buttons.

Example of 1-digit X-10 Operation: the factory-setting house code is set to “A.” For example, either a lamp module or an appliance module placed in the Living Room may be set to a house code of “A” and a unit number of “1.” An X-10 module placed in the Dining Room may be set to a house code of “A” and a unit number of “2,” etc.

If you have more than nine modules to control, you may use the 2-digit X-10 operation, and/or build MACROs of secondary X-10 sequences.

Lighting Control — Notes on Dimming and Brightening

Only the last module which was accessed (that is, turned on or off) is affected by the Dim/Bright commands; this an X-10® defined operation.

NOTE: “Appliance” modules do not respond to the Dim/Bright commands. The Dim/Bright operation does not apply to the “All Lights” zone; this is an X-10-defined operation.

More on X-10 Dim Levels:

The Dim and Bright commands from the RC-8 remote control, will result in 5 actual X-10 dim/brt steps. This granularity offsets the latency of RF packet transmission with interactive control. There are 32 steps of dim/brt levels available with an X-10 lamp module.

NOTE: a module which is OFF, will assume full brightness upon receipt of a DIM command, and will proceed to dim down from this point. The opposite is not true — a BRIGHT command will not bring an OFF module up gradually (as might be expected).

NOTE: a dimmed module does not assume full brightness upon receipt of an ON command (it stays at the same level — it is already "on"). The OFF command is the only one which puts the module in a definite state.

To help manage module states, you can:

1) Pre-DIM modules to zero brightness by first turning them OFF, and then dimming them down with 32 or more DIM commands for a standby state (e.g. as part of a MACRO). Then, brighten from the standby state when desired, and dim down when finished.

2) Control multiple modules simultaneously *if they all share the same House Code*. By using the Vaux Protocol command for Low-Level X-10 control, you can exercise a greater degree of control. The Low-Level X-10 command lets you select one or more Unit Codes of modules on a specific House Code. This is accomplished by individually "arming" the modules first, and then sending a global command, such as DIM, to all of the armed modules. While this command is not available directly from the RC-8 remote controls, it can be attached to a MACRO key by programming it from the computer interface. For more information on how to use the Low-Level X-10 Command, consult the Vaux Protocol Document.

MACRO Operation

Multiple command MACRO support allows you to define one-button (and two-button) sequences. For example, adjust room lighting, lower the projection screen, power-up the laserdisc, and play.

There are 20 different MACRO buttons available using the number keypad (0-9).

Note: Macro 0 on the remote control keypad corresponds to Macro 10 and 20.

A) Move the slide switch on the RC-8 remote control to the Macros mode position

B) Press a digit (0 to 9), or a shifted digit (Shift-0 to Shift-9) corresponding to the desired Macro.

<u>Vaux Digit button</u>	<u>MACRO</u>	<u>Vaux Digit button</u>	<u>MACRO</u>
1	1	Shift-1	11
2	2	Shift-2	12
3	3	Shift-3	13
4	4	Shift-4	14
5	5	Shift-5	15
6	6	Shift-6	16
7	7	Shift-7	17
8	8	Shift-8	18
9	9	Shift-9	19
0	10	Shift-0	20

The Altrix Controller's *MACRO* light will turn on during MACRO playback. Other lights will respond as they would during interactive operation (e.g. *INFRARED*, *LIGHTS*, *ERROR* lights...). During delay steps, the *CONTROL* light will flash at a 1/2 second rate for the duration of the delay.

APPENDIX 1 — PROGRAMMING TABLES

This table is used to assist in layout of learned infrared (IR) code storage locations. Below the Device headings, enter the actual source-devices used, and complete the table with IR commands learned from those devices.

Client:		Dev-1	Dev-2	Dev-3	Dev-4	Dev-5	Dev-6	Dev-7	Dev-8
RC-8 Key Label	Alternate Uses	(tuner)	(cd)	(cab/sat)	(vcr-1)	(vcr-2)	(laser)	(tape-1)	(tv/tp-2)
On (1)									
Off (1)									
Vol-Up (2)									
Vol-Dn (2)									
Mute (2)									
Chan-Up	Select/Track-Up								
Chan-Dn	Select/Track-Dn								
A/B	Input/Fav								
Play									
Pause	Sleep								
Stop									
Fast Fwd	Track-Up								
Rewind	Track-Dn								
Record	Display								
Disc Skip	Guide/Fm-Am								
Enter/+10	Menu								
1	Disc/Preset-1								
2	Disc/Preset-2								
3	Disc/Preset-3								
4	Disc/Preset-4								
5	Disc/Preset-5								
6	Disc/Preset-6								
7	Disc/Preset-7								
8	Disc/Preset-8								
9	Disc/Preset-9								
0	Disc/Preset-10								
F1/*	Preset-A								
F2/*	Preset-B								
F3/*	Preset-C								
F4/*	Preset-D								

Note 1: On/Off locations, if used, are for Auto-Source-Powering.

Note 2: For Aris only, Vol-Up/Dn and Mute locations normally do not contain IR codes.

This table is used to define connections to infrared (IR) source-devices. Depending on whether the system is configured for Device-Specific (the factory setting), or Zone-Specific IR-output, select the appropriate section of the table, and enter the appropriate source-device(s) connected to each of the IR-Emitter ports.

Client:

Device-Specific Mode, or			Zone-Specific Mode	
IR Port	Active for	Source-Device	Active for	Source-Device
1	Tuner		Zone-1	
2	CD		Zone-2	
3	Cab/Sat		Zone-3	
4	VCR-1		Zone-4	
5	VCR-2		Zone-5	
6	Laser		Zone-6	
7 (1)	Tape-1		Zone-7	
8 (1)	TV/Tape-2		Zone-8	
IR Blaster (2)	(all)		(all)	

Note 1: Altrix has IR ports 7 and 8, Aris does not.

Note 2: Common IR Blaster port typically used for global devices (spanning pages) when in Device-Specific mode, and common A/V source components when in Zone-Specific mode — identify all connected devices.

Installation Notes:

This table is for entry of optional PLC (X-10) powering configuration — enter the House-Code each option is programmed to use, if applicable. The Unit-Code used for the System-Active option is always 16; this allows sharing a House-Code with either the Zone or Source options, which use Unit-Codes 1 to 8.

Client:

PLC (X-10) Powering Options	House-Code Used
System-Active-PLC-Power	
Auto-PLC-Zone-Power	
Auto-PLC-Source-Power	

This table is for entry of optional PLC (X-10) modules used for lighting and other general uses — enter the House-Code/Unit-Code for each module (e.g. B4), the Vaux numeric equivalent (e.g. 24), and a description of the module's use (e.g. media-wall lights). These devices may be controlled directly using a remote control or keypad, or indirectly as part of a Macro sequence. Since Vaux remote controls have a programmed Default-House-Code (A to J), it is handy to define a different House-Code for lighting and other modules in each zone, allowing each remote local independent and All-On/Off control of lighting. Alternately, a Default-House-Code may be chosen for lights throughout the house allowing control of major rooms, and All-On/Off of whole-house lighting. Each RC-8 remote control can also directly address 100 X-10 modules for House-Codes A to J, and Unit-Codes 1 to 10. Vaux Keypads can access all 256 X-10 addresses using pre-defined keys.

Client:

PLC (X-10) Module HC/UC	Vaux Numeric Code	Description/Location/Usage
-------------------------------	-------------------------	----------------------------

This table is for entry of Macro sequence steps. Duplicate this page as necessary to define General-Purpose Macros 1 to 10, Source-Select Macros 11 to 18, and misc Macros 19 and 20. For each Macro you program, enter each step in a Device/Func notation, with an optional comment. For example: Step-1 = Tuner/F1 (surround-on), Step-2 = Lts/23-On (drop screen), Step-3 = Delay/6 (20-sec), Step-4 = Laser/Play.

Client:

Step	Macro:	Desc:	Macro:	Desc:
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				

Macro Notes:

APPENDIX 2 — DEVICE/ZONE-SPECIFIC IR OUTPUTS

The *IR Emitter* connectors (3.5 mm phone jacks), on the rear panel of Altrix Controllers, can be programmed for *device-specific* or *zone-specific* operation. The factory setting of the emitter ports is for *device-specific* operation. The mode in use is configured via a computer port command.

Device-Specific Operation: Device-specific operation allows you to use identical source components in your system, for example, identical CD jukeboxes or DSS tuners. Emitter port 1 corresponds to the Tuner device, 2 corresponds to CD, 3 corresponds to Cab/Sat, 4 corresponds to VCR-1, 5 corresponds to VCR-2, 6 corresponds to Laser, 7 corresponds to Tape-1, and port 8 corresponds to TV/Tape-2.

Example

If you have two identical VCRs, you could use the VCR-1 and VCR-2 device pages for them. When learning IR, you would program the same IR codes in both the VCR-1 and VCR-2 device pages (e.g. Play, FF... are each programmed in two locations). The VCRs are then accessed individually based on selection of the VCR-1 or VCR-2 source-device, since the emitters are activated accordingly.

Zone-Specific Operation: The user-specified Zone information is used to select the desired IR emitter output. All Vaux remote controls and keypads have a *Zone* code which gets transmitted with every button pressed. A default Zone is programmed into the remote or keypad, to identify the room it is controlling.

Example

Using an Altrix Controller, you could design a simple 3-zone audio system by using 3 identical audio receivers and running the speaker wires of each receiver to different areas of the house (up to 8 zones could be implemented with the Altrix by adding a receiver and IR emitter for each zone). The source components' audio (CD, Cassette, DAT, etc...) will connect in parallel to the inputs of all audio receivers.

When learning IR codes for the Altrix System, store the IR commands for the audio receivers (recall that they are identical) in the Tuner device page. Connect the infrared emitters for the receivers to the desired IR Emitter ports on the Controller. Let's say that one audio receiver drives the living room and is connected to IR Emitter port (zone) 1, and another receiver drives the master bedroom and is connected to IR Emitter port (zone) 5. Common equipment (CD...) must connect to the IR Blaster port using a single or dual emitter, or a multi-emitter connecting block, as necessary.

The Vaux Remote Control in each room will have its *default Zone* set to the appropriate zone number for the room — in this case, 01 will be programmed into the remote control for the living room, and 05 for the master bedroom remote. The leading 0 is the Zone-Group which should be 0 for an Altrix system. Now, upon selecting a source for the living room (Zone 01) by pressing a key such as CD, you will be controlling the receiver connected to IR port 1 (for commands such as volume...). The common source device (CD) is controllable independently of the zone, since it is connected to the common IR Blaster port. Other zones are controlled identically, although they are sharing control of the common source equipment.

The Device- or Zone-Specific IR output configuration is programmed via the computer port. A brief description appears below — see the Vaux Protocol document for more information. The factory setting is Device-Specific IR output.

Example: This example sets a Controller to Zone-Specific IR output:

VP FF 7A 06 80

Example: This example sets a Controller to Device-Specific IR output (the factory-setting):

VP FF 3A 06 40

APPENDIX 3 — RF RANGE AND ANTENNA OPTIONS

Radio system operating range is dependent upon many factors. The Vaux remote sends radio signals throughout the house to be picked up by the Altrix Controller. In order to obtain maximum range, the location of the Controller is important. In some cases, installing the Controller on the second floor will provide greater range than a ground floor installation. Reception is also affected by atmospheric conditions, and by metal construction which acts to shield radio signals (for example, aluminum siding, insulation foil backing, and heating ducts). Of course, you can't easily relocate your audio/video components to suit Altrix reception, but you can keep in mind that a higher installation site for your Altrix Controller would be desirable. Also, try to keep the Controller's Antenna Wire in a vertical position and away from other cables and metal cabinets where possible.

Vaux's handheld RF Remote Controls transmit a radio command when a button is pressed; this command is acted on when received by the Vaux Controller. The Controller contains the radio receiver and uses an external antenna to pick up the RF commands (when discussing RF reception, we sometimes refer to the Controller as the *Receiver*). Each button press sends three identical packets of data; the Controller must see two identical packets in order to consider it a valid transmission. Additionally, a security ID code must match (much like setting an ID switch in your garage door opener). Therefore, it is virtually impossible for anything other than your Vaux Remote Control to invoke a command in your Vaux Controller.

Base-Loaded Coax Antenna (Vaux Model ANT-2)

The Base-Loaded Coax Antenna is the standard antenna provided with the Altrix Controller. It consists of a short length of 75-ohm coax, a 25" antenna wire, and a loading coil to tune the wire. This antenna generally plugs directly into the F connector antenna input of the Altrix Controller, and is designed to simply hang down (or to be tacked up) behind the cabinet. It may also be extended from the chassis with a coax cable. The Base-Loaded Coax Antenna (the components marked with * below) is available from Vaux (Model ANT-2).

Radio reception range when using the Base-Loaded Coax Antenna, is:

- Open-field: 250 ft. typical
- In-house (wood-frame construction): 125 ft. typical
- Typically covers up to 5000 sq. ft. homes.

IMPORTANT: With a more efficient antenna, and/or an antenna preamp, you can increase the range to cover larger installations.

Determining Radio Reception Range

Radio reception range may be easily determined in a home as follows:

- 1) Place the Vaux Controller and antenna in the desired installation location
- 2) Connect the Controller's X-10 interface module to allow powerline control
- 3) Plug a nightlight or small lamp into an X-10 lamp module
- 4) Take the lamp/module and the Vaux Remote Control to a far corner of the home, plug in the lamp module, and turn on/off the lamp using the Vaux Remote Control. Repeat the test for all distant areas of the house.

Note that this test presumes that X-10 powerline transmissions are properly reaching all areas of the house. If you find an area of the home where you cannot control the lamp, you must determine if the problem is RF or X-10 related (e.g.: leave the lamp in the trouble spot, but move the Vaux Remote Control to a known good RF control point).

Radio reception range is affected by many factors, some of which you have control over, and some of which you do not. How well RF signals will propagate around the home is primarily determined by how much metal is present. Metal, whether grounded or floating, may shield, reflect, or otherwise affect the propagation of radio signals. The metal most likely to be found in an installation site includes:

- Wiring and cables (AC power, A/V, telephone...)
- Ductwork for heating/cooling systems
- Rebar inside brick walls, fireplaces, etc.
- Aluminum siding
- Foil-backed insulation
- Metal studs (generally only found in office buildings)
- Metal lath or mesh beneath plaster walls
- Large appliances (refrigerators, washers, dryers...)

Maximizing Radio Reception Range

Radio reception range can be optimized by careful placement of the antenna — these general principles apply to all antenna installations for Vaux Controllers:

IMPORTANT: For safety, the antenna and its coax connecting cable (if used) must always be within the confines of the building's lightning protection system. This generally only becomes an issue for an attic antenna installation — proper rooftop lightning arresting systems are necessary. Antennas are not to be installed outdoors.

- The antenna should be as high as is practical. The receiver's antenna should be as far from ground as is reasonable. If the Controller location is in a basement, you may need to relocate the antenna to a more central location using a shielded coaxial extension cable.
- The antenna should be away from metal (e.g.: A/V component cases, cables, ductwork, wiring...). The antenna should be as far from metal as is practical. If the Controller location is surrounded by metal, you may relocate the antenna to a more desirable location using a shielded coaxial extension cable.
- The antenna should be away from any systems which may generate electrical noise (e.g.: computers, projection TVs, fluorescent lights...). "Noisy" devices generate electromagnetic signals which can raise the noise floor of the Vaux Receiver — this degrades the receiver's signal-to-noise ratio, resulting in less reception range. If you suspect that a device may be affecting your range, determine if the range improves when you turn off the device in question, move the Vaux Controller/Antenna, or relocate the antenna using a shielded coaxial extension cable.

A Simple Way to Increase Radio Reception Range

A *lengthened antenna wire*, that is, adding additional wire to the end of the standard Base-Loaded-Coax antenna, will usually result in better range. This *random-length antenna wire* will probably not be resonant at the operating frequency, but this is generally offset by a stronger signal available to the receiver. An improvement will probably not be seen until the antenna is longer than approximately 10 feet. Lengthening the antenna is a simple technique for increasing range — for example, a wire may be run up a wall corner and along the ceiling corner for 10 or 20 feet. Thin bus wire (an uninsulated, silver-color solid wire; e.g.: Radio Shack #278-1341 is 24 gauge tinned solid wire) almost disappears against a wall when stretched tightly. Simply drive small nails or brads into the wall corners where the wire will be run, and then wrap a few turns of the bus wire around each nail head as the wire is stretched into position. Then, strip a small portion of insulation off the end of the wire on the Vaux-supplied Standard Antenna, and then twist the new bus wire with it to complete the installation.

Folded Dipole Antenna (Vaux Model ANT-3)

A Folded Dipole Antenna is quite sensitive, and a version of it is often provided with FM receivers (which is, of course, cut to around 3 feet for the center frequency of the FM band). The Folded Dipole Antenna is constructed using 300-ohm TV twinlead, which is shorted at each end, and which has one of the conductors cut at the center. The antenna's impedance at this point is 300 ohms, and a 300-to-75-ohm TV matching transformer (a 4:1 balun) is connected to provide a 75-ohm impedance for connecting to 75-ohm coax such as RG-59 or RG-6. Additional twinlead may be inserted between the antenna and the matching transformer, but it is generally convenient to simply splice the transformer's 300-ohm pigtail directly to the cut side of the antenna twinlead.

Due to its size, this antenna is best suited to attic installations, where it can be tacked to rafters and positioned centrally over the home. Best results are obtained using a straight antenna, but it can be bent or drooped if necessary (with somewhat lowered performance). The coax should exit the antenna at a 90° angle as much as is practical, and a side or top exit is preferred over a bottom exit to keep the coax out of the desired reception direction (down in the case of an attic installation).

The Folded Dipole Antenna gives excellent reception (e.g.: 600 feet open-field), is inexpensive and easy to construct, and uses standard 75-ohm coax installation (cabling, wallplates, etc.). An assembled Folded Dipole Antenna (the components marked with * below) is available from Vaux (Model ANT-3).

Dual Antennas and Antenna Amplifiers

Two Antennas may be used to cover different areas of a large installation by combining them together using a TV-type splitter/combiner. They are bidirectional, but are usually labeled for splitter use (1 input, 2 outputs); when used as combiners, consider them to have 2 inputs and 1 output. The splitter/combiners that are commonly available are typically rated for 5-900 MHz, 50-500 MHz, 50-900 MHz, etc. (some are not rated at all). The high frequency limit does not matter here, but the low end does. Since the lowest TV channel (Ch2) is in the low 50 MHz range, many devices are not rated below that point. Vaux uses a 27 MHz control band, which requires a combiner rated down below that point — the Vaux Model AACC-3 Dual Antenna Combiner is rated appropriately. Be sure to not use a UHF/VHF band splitter, or a CATV line tap here (they can look the same as a splitter/combiner).

Note that a 2-port combiner will typically have a 3 dB loss on each antenna input, and will provide 20 dB or more of port isolation. The port loss may not affect coverage adversely if you are using good antennas, but if maximum coverage is needed, the Vaux Antenna Preamp (APA-1) may be added between the Combiner and the Controller. The example below shows a typical dual-antenna installation: a Base-Loaded Coax Antenna is used for primary coverage near the Controller, while a Folded Dipole Antenna provides remote coverage for distant areas of the home.

APPENDIX 4 — A/V WIRING CONSIDERATIONS

Speaker Wiring

The speaker wiring you select for distributing zoned audio throughout your home, will depend on the power rating of the amplifier/speaker system and the distance from the amp to the speakers. Low power/short distance runs may use wire as small as 20 or 18 gauge, but 16 gauge or larger is usually a safer bet to minimize losses.

Parallel zip cable or a twisted-pair cable may be chosen for the speaker wiring. Twisting wires will lower noise pickup on high-impedance signals, but on low-impedance signals, such as 2 to 8 ohm speaker lines, noise pickup is not usually an issue; however, twisted-pair wiring may reduce signals from radiating from the speaker wiring and getting into other lines. Of course, the impedance and number of speakers supported is dependent on the power amp chosen for the zone.

Video Distribution

A/V Receivers switch composite-level video signals as well as audio signals. A/V Receivers provide for short-run composite video connections; longer-distance runs may need a composite-level video buffer amplifier, or a video modulator may be used to move the video signal up to a television channel location.

Composite-level Video Signals

The video outputs from source components such as laserdiscs or VCRs are composite-level (or baseband) video signals (generally a yellow phono connector). These video outputs may be connected directly to a video monitor or television having a composite video input. A composite-level video buffer amplifier may be used to drive long cable runs. This baseband video signal resides in approximately a 0 to 6 MHz bandwidth and is interconnected using a 75 ohm coaxial cable.

Video Modulator

A video modulator may be used to move the composite-level video signal up to a television channel location. Typical modulators will place the video on channels 3 or 4, depending on which one is unused by your local TV stations. Most VCRs have this type of modulator built-in — external modulator devices are also available.

External modulators may have mono or stereo audio inputs as well as a composite video input. You may connect the line-level audio outputs to a stereo modulator and allow the television to reproduce the sound. This lower-quality audio may be adequate for some zones; the highest-quality audio will result from a separate audio zone amp and speakers. Stereo audio outputs should not be bridged to drive a mono-input modulator — left and right channels may be resistively or actively mixed to prevent equipment damage if a mono signal is needed.

Some modulators allow composite video to be placed on an unused UHF or cable channel alongside the existing off-air or cable channels on the 75 ohm coaxial cable which feeds the home's TVs — the television tuner is used to select this "in-house" video as if it were another station.

Video Wiring

Composite-level video is low frequency (0-6 MHz), and a 75 ohm coaxial video patch cable may be used to connect directly to video monitors. If prewiring is installed in walls, special 75 ohm composite-video cable, RG-59 coaxial cable, or RG-6 coaxial cable (in order of preference) may be used to connect to the remote monitor. A composite video amplifier may also be used for longer runs.

The American television standard, NTSC, places television channels in specific frequency allocations. For example, the VHF Low band (ch 2-6) is at 54-88 MHz, while the UHF band (ch 14-69) is at 470-806 MHz.

When using a channel 3-4 video modulator, 75 ohm RG-6 or RG-59 coaxial cable may be used to connect to the remote TV. If you are using a modulator for UHF or cable channel slots, use a good-quality, well-shielded RG-6 coaxial cable (RG-59 has more loss at high frequencies).

APPENDIX 5 — ALTRIX MODEL 3400 IR INPUT AND USE OF IR-LEARNING KEYPADS AND REMOTES

Infrared Control of the Altrix Model 3400:

The Altrix Model 3400 Controller may be operated using infrared (IR) control, via the front-panel sensor or via a rear-panel connection from an infrared repeater system or remote IR keypad. The Vaux RC-8-IR Remote Control may be used to control the system, or other IR-learning devices (such as keypads and touchpanels, available from various manufacturers), may be used once they have been taught the RC-8-IR codes. The Vaux wired keypad system may also connect to Vaux Controllers that support IR-input.

Note: infrared control (an input mechanism for commanding these Vaux Controllers) is not to be confused with infrared learning and playback of other device's IR commands (an output mechanism for controlling CD, laser, etc. from Vaux Controllers).

Teaching the RC-8-IR commands to an IR-Learning Keypad or Remote:

You may use the RC-8-IR remote control to program a non-Vaux IR-learning keypad or remote control. Before attempting to program a learning keypad or remote, you should review the chapter entitled "OVERVIEW OF THE RC-8 REMOTE CONTROL" for more information on what is stored in the RC-8, what is transmitted by the RC-8, and an explanation of the RC-8 "Device" v.s. "Shift-Device" difference. When you are using an RC-8-IR remote to teach the Vaux IR commands to a learning keypad, you want to set the RC-8's default zone to correspond to the room the keypad is located in (this zone number will now be included in all IR commands you teach). This zone is necessary for some codes, but not for others. Many of the source control commands (e.g. CD-Play) do not need the Default-Zone which is stored in the RC-8. These codes may be taught without regard to the RC-8's Default-Zone, and if you are programming multiple learning remotes or keypads which allow cloning, you may want to learn the non-zone-specific codes in one learning unit, and clone all others before proceeding with the zone-specific commands (such as Source-Select and Volume).

As you are teaching the RC-8-IR source control commands, you should use Shift-Device when changing a source page, in order to prevent inadvertently learning a Source-Select command. For example, press Shift-CD to change the RC-8-IR to CD mode (without sending the IR CD-Source-Select command), and then learn CD commands such as Play, Pause, etc. To change to the laserdisc page for further programming, press Shift-Laser and then learn the various laserdisc codes. Of course, the original CD and laserdisc codes must be learned by the Vaux Controller — the RC-8 codes you are teaching to your keypad or remote are simply requesting that the Vaux Controller play back the original code.

Once you have learned the source control commands (and optionally cloned your learning units), you need to teach commands which DO require the Default-Zone stored in the RC-8 (such as Source-Select and Volume). A normal press of an RC-8 Source-Device button, such as CD or Laser, sends the Source-Select infrared command to select the source for the zone specified (i.e. the RC-8 Default-Zone). These RC-8 commands must be taught to each learning keypad/remote, using the RC-8 Default-Zone appropriate to the room. The RC-8 OFF button is used to turn off the zone. You will also want to learn the Volume and Mute buttons for the zone.

MACRO sequences are stored in the Controller:

Vaux MACRO sequences are accessed by the RC-8, but are stored in, and played back by, the Controller. Note that the Macro play commands just use a single code — if you are teaching an RC-8-IR Macro play command to a learning infrared unit, the user does not need to hold the remote in line-of-sight position for the duration of the Macro playback, as some IR-macro remotes require. This is an important distinction — especially when you have long macros to play (e.g. drop projection screen, delay for 30-seconds, play laser...).

Connecting to the IR Input on the rear-panel of the Controller:

Since the Zone information is embedded in the commands, it is necessary that the data lines from the keypads or IR repeater are combined (properly) and connected to the Vaux Controller IR-In jack. See Hardware Installation.

APPENDIX 6 — COMPUTER-PROGRAMMABLE FEATURES

Some of the Altrix Controller's programming is only available via the computer (VauxSerial) port. The factory-settings for these features are set to typical values, but your installation may benefit from some fine-tuning of the programmable system parameters. See the Vaux Protocol document for more information.

- **Configure Options for Source-Select Mode:** Pressing a Source-Device button on a Vaux remote control or keypad (e.g.: CD) not only changes the "current device" to CD, but also transmits a "Source-Select" command, informing the Controller that the CD button was pressed. There are a variety of features which can be enabled as part of this Source-Selection process, using a combination of learned IR codes, MACRO sequences, and computer-port programming. The Source-Select mode may be programmed to enable/disable the entire sequence, enable/disable Source-Select Macros (11-18), enable/disable the ON and OFF Macros, enable/disable Auto-Receiver-Powering (a global or zoned IR device), and enable/disable Auto-TV-Powering (for single- or multi-zone use).
- **Define A/V-Sources:** If Auto-TV-Powering is enabled, powering of TVs is based on whether sources are defined as Audio-only or Audio/Video.
- **Enable System-Active-PLC-Powering:** If you wish to have a global "any-zone-on" indication, you may enable System-Active-PLC-Powering, which sends a unique X-10 command for turning on and off appliance or relay modules. This is a useful method for powering a multi-zone audio power amplifier. Lamp modules may also be used to turn effect lighting on and off.
- **Enable Auto-PLC-Zone-Powering:** For non-IR-controlled zone devices, such as audio power amplifiers, you may also opt to enable Auto-PLC-Zone-Powering, which sends X-10 commands for turning on and off appliance or relay modules — unique for each zone. The X-10 modules will turn on or off only as necessary, as the zone turns on or off. Lamp modules may also be used to turn zone-specific effect lighting on and off.
- **Enable Auto-PLC-Source-Powering:** For non-IR-controlled source devices, you may also opt to enable Auto-PLC-Source-Powering, which sends X-10 commands for turning on and off appliance or relay modules — unique for each source. The X-10 modules will turn on or off only as necessary — the power state of the source device is tracked by the controller, across all zones.
- **Program Power-Off-Delay and Power-On-Delay:** The "Power-Off-Delay" is factory-set to turn unused sources off after five seconds. Also, there is a "Power-On-Delay," which is normally zero seconds — it may be programmed to add a fixed delay after each IR and X-10 device turns on, to allow the device to stabilize before receiving configuration commands, etc.
- **Select Zone-Specific or Device-Specific Infrared Output:** The *IR Emitter* connectors, on the rear panel of the Altrix Controller, can be programmed for *device-specific* or *zone-specific* operation. Device-specific operation allows you to use identical source components in your system, for example, identical CD jukeboxes or DSS tuners. Zone-Specific mode allows identical devices, for example TVs, to be controlled based on the zone you are in. An appendix gives additional information.

- **Configuring X-10 Input Options:** Vaux Altrix 3000 and 3400 Controllers support two-way X-10 powerline control (as opposed to the one-way X-10 output-only control found on the Aris 700 and MARC+ systems). In addition to X-10 output for controlling powerline devices, the Controllers also “listen” to the powerline for X-10 commands generated by other systems. A two-way-X-10 Vaux Controller is listening for one specific X-10 House-Code to which it will respond — the *X10-Input-House-Code*. The factory setting X10-Input-House-Code is “G” and may be changed to be any other House-Code from A to P, or disabled. For the desired House-Code, there are 36 individual commands which may be mapped to an action in the Vaux system: Unit-Code-1-On, 1-Off, 2-On, 2-Off...16-On, 16-Off, All-Lights-On, All-Units-Off, Dim, and Bright codes, each have a map-table entry. The factory settings provide a minimal map table which provides out-of-the-box capability by programming MACROs 1 to 10, as well as demonstrating A/V switching and volume control, using X-10 codes on House-Code G.
- **Disabling user programming:** Computer programming may disable remote control programming of infrared learning and macro programming.

APPENDIX 7 — MULTI-CONTROLLER INSTALLATIONS

Need to control more than one system in a house? Have a neighbor with the same system?
You may change the system's SecurityID Code — DO NOT CHANGE UNLESS REQUIRED.

The Security ID (SecID) Code is a unique identifier to the Altrix System, similar in function to that of a garage door opener's code. With each button press (data transmission) the Security ID Code is sent along with the command; the SecID Code stored in the Vaux Remote Control must match the ID Code stored in the Controller in order to have a command accepted. A unique SecID Code prevents interference from a neighbor's system and also allows you to have multiple Vaux Systems in your home. There are 10,000 code combinations possible. To avoid confusion, only power one Controller at a time when setting SecIDs, and label each receiver and remote(s) with the new SecID Code. Before you begin, make sure the Altrix Controller is plugged into a standard electrical outlet and has power. Also, make sure that you are within transmitting distance.

- a. Press and hold down the Sec button on the Vaux remote control for two seconds until the remote's green light is on, then release.
- b. Press 4 buttons corresponding to the 4-digit SecID code desired (0000 through 9999).
- c. For verification, repeat the new 4-digit SecID (0000 through 9999) again.

Once verified, the command to change the SecID code will now be transmitted to the Altrix Controller and the lights on the Controller and remote control will flash indicating acceptance. If an incorrect button is pressed during the second 4-digit code entry, the red Error light on the remote control will flash to indicate that the SecID code was invalid; please start all over again from step a. No command was sent to the Controller — it is still set to the original SecID code. If there is an error during transmission and the Controller did not receive a valid SecID code change, the red Error light on the Controller will flash. If you are too close to the Controller, no light will flash. At this point, the remote control's SecID code has been changed, but not the Controller's SecID. The remote control will need to be changed to match the Controller (start from step a. to restore the previous setting — the command will be ignored by the Controller) or reset to the factory settings (see note below).

NOTE: If for some reason, either the remote control's or the Controller's SecID code changes, but not the other, reset to the factory setting of 1070.

NOTE: When you change the SecID, only Controllers which are initially at the same SecID as the RC-8 will be changed. For example, if an existing (powered) Controller is using a SecID of 1234, and you add a new Altrix System having the factory SecID of 1070, changing the SecID on the new system (e.g. to 9876) will not affect the original (1234) system, since the transmitted command was to *change from a SecID of 1070, to 9876.*

Tip: For a multi-controller installation, where each system must be independent, we recommend that you change the SecIDs of all systems, and do not leave one of them at the factory setting of 1070. This way, if you take too long when replacing remote control batteries (and inadvertently reset the RC-8 to the factory setting SecID of 1070), you can simply re-program the SecID in the RC-8 without affecting any Altrix Controllers in the house — since none of the Controllers are at 1070, they will not be affected by the transmitted *change from a SecID of 1070, to xxxxx* command.

To reset your remote control and controller back to factory settings and clear the memory:

To reset the remote control, removing the batteries, press a button, and wait for about a minute; this resets the Remote Control's Security ID Code to "1070", the Default X-10 House Code to "4", and the Default-Zone to "01". For the Controllers, find the small hole on the rear panel labeled "Reset," and press the recessed pushbutton with a pointed instrument, such as a pen. The front panel the light bar flashes indicating the reset — CAREFUL: this will erase all of the infrared and Macro codes, as well as reset the Security ID Code to "1070".

APPENDIX 8 — VauxSerial RS-232 PORT

RS-232 Connection to the VauxSerial Port

The VauxSerial Port is designed to connect directly to any computer (or asynchronous data terminal) which has a standard RS-232 serial port. An RS-232 Serial Cable is needed to connect the VauxSerial Port to the Computer Serial Port. This cable is not supplied with Vaux controllers. The VauxSerial Port has a DB-25 F (female) connector and is configured as if it were a *modem*. In RS-232 terminology, it is wired as a DCE (i.e. it receives data on pin 2, and transmits data on pin 3 of its DB-25 F connector). If you currently have a cable for connecting your computer to a *modem*, it will likely work with your VauxSerial Port. Vaux also offers optional Serial Cables for IBM PC-compatible and Macintosh computers. You may also choose to wire your own cable — see later sections. Connection of *Hardware Handshaking* lines is recommended, and will be necessary for large amounts of communications traffic (e.g. upload/download of data blocks).

Not all RS-232 Serial Ports are the same, and some may require certain pins to be asserted before the port becomes active. If your cable is not providing Hardware Handshake signals from the VauxSerial port, and your computer's Serial Port is requiring a handshake input (on CTS, DSR, and/or DCD), you will likely need to change your computer's Serial Port configuration to ignore these lines. The Vaux end does not need special treatment — the VauxSerial handshake inputs (from RTS and DTR) may be left unconnected and they will assume an always true state (effectively, it will presume that an infinitely-large receive buffer exists at the computer end of the cable).

The Controller communicates at 9600 baud (bits-per-second) using 8 bits of data, no parity, and one stop bit. The Serial Port on the controlling computer or terminal must be configured according to its manufacturer's instructions. Information transfer between the controlling computer and the Vaux system is in the Vaux Protocol™ format — a Vaux-defined command language. The Vaux Protocol format is comprised of various command and message information streams, as defined in the *Vaux Protocol Specification* document.

VauxSerial PCI Port (RS-232 Interface) (DB-25 F Connector):

Pin	Description	Signal Direction	Vaux Use
1	Frame Ground	—	[not used]
2	TXD (Transmit Data)	Computer → Vaux	Data In
3	RXD (Receive Data)	Computer ← Vaux	Data Out
4	RTS (Request To Send)	Computer → Vaux	Handshake In*
5	CTS (Clear To Send)	Computer ← Vaux	Handshake Out**
6	DSR (Data Set Ready)	Computer ← Vaux	Handshake Out**
7	Signal Ground	—	Signal Ground
8	DCD (Data Carrier Detect)	Computer ← Vaux	Handshake Out**
20	DTR (Data Terminal Ready)	Computer → Vaux	Handshake In*
22	RI (Ring Indicator)	Computer ← Vaux	[not used]

Note: • TXD, RXD, and Signal Ground are mandatory connections.

** At least one of the Vaux Handshake Out signals (CTS, DSR, DCD) should be connected to, and sensed by, your computer, if Hardware Handshaking is used.

* At least one of the Vaux Handshake In signals (RTS, DTR) should be connected to, and driven by, your computer, if Hardware Handshaking is used.

• All lines listed as not used, and other lines not listed, are not connected (to anything) in the VauxSerial interface.

• The shield rim (the "D") is connected to signal ground.

APPENDIX 9 — UPDATING SYSTEM SOFTWARE

Vaux Altrix Controllers may have their system software updated to take advantage of features in newer software releases. Some of the system is hard-coded in firmware, but the bulk of the system's features and operation are controlled by the downloadable portion of the system software. Vaux Authorized Dealers may order a software update disk directly from Vaux; the provided disk is in 3.5", DSHD (or DSDD) IBM format. A computer, terminal emulation program having ASCII transfer capability, and an appropriate serial cable are required to load the system software into the Vaux Controller. Windows machines, some DOS machines, and some Macintosh computers can read the disk file and provide the downloading necessary.

This example uses the "Terminal" emulator provided with Windows 3.1:
(Windows 95 includes a similar application called Hyper-Terminal)

Note: Ensure that you have the correct serial cable available. Also, you must have an unused serial port available on your computer. If you are using a laptop, you may only have one serial port — enable the internal trackball if you have a mouse on your laptop's only available serial port.

1) Start the Terminal application on the Windows PC.

2) From the Settings/Communications menu, select:

Baud:	9600 (note: baud may be set to 1200, 2400, 4800 or 9600)
Data Bits:	8
Stop Bits:	1
Parity:	None
Flow Control:	Xon/Xoff
Connector:	COM2 (or whichever port you are using)

3) Connect the appropriate serial cable between the Computer and the Vaux Controller. Most modem cables will work fine, but not all of them are wired correctly. If your computer requires active handshake input lines to enable the port, the cable must connect these lines or the port will be permanently "waiting."

4) Test the serial connection:

Press 'v' (upper or lower-case), and then press Escape — you should see "VI 81" displayed in your terminal window. The VI 81 message (command aborted) is in response to the ESC character. You now know that you are properly connected to the Vaux Controller.

Note: The 'V' is necessary since the controller will ignore all characters until the first V is found. This is a result of the controller being configured for an auto-answer modem connection, to prevent error messages on normal modem strings such as "RING."

Note: The system's operating baud rate may be set (as of Version 2.5) to 1200, 2400, 4800, or 9600 baud. If you get returned characters in response to sending an Escape character, but the displayed characters are incorrect, it is likely that the baud rate is incorrect — try another. If you do not get any response to sending an Escape character, you do not have a proper connection — check your serial port and cable.

5) Turn OFF the power switch on the Vaux Controller.

Note: Continuing past this point will erase the system software currently in the Controller; a new system must then be downloaded. Ensure that you have the appropriate update disk and that your serial connection is working.

6) While pressing and holding the Controller's rear-panel Reset button, turn ON the power switch; this erases the system software currently in the Controller. The green SERIAL and red ERROR lights on the front panel should both be flashing, indicating that system software is not installed, and that the Controller is awaiting a download.

7) From the Settings/Communications menu, select:

Baud: 9600

Note: The *download* baud rate is unrelated to the *operating* baud rate used by the Controller after a system has been downloaded. The operating baud rate may be changed to accommodate a specific computer or modem interface. For downloading system software, the rate must always be set to 9600 baud.

8) Insert the Vaux system disk into the floppy drive.

9) From the Transfers menu, select "Send Text File..." and find the appropriate system software file to download:

<u>Controller</u>	<u>Filename</u>
Aris Model 700:	A700.HEX
Aris Model 710:	A710.HEX
Aris Model 720i:	A720I.HEX
Altrix Model 3000:	ALT3000.HEX
Altrix Model 3400:	ALT3400.HEX

e.g.: Change to the floppy drive, change the File Name to *.hex, and browse folders if necessary, select the appropriate filename, and click OK.

10) As the file is being transferred, the Controller's SERIAL light will flash. If any errors occur during download (e.g.: incorrect baud rate, or wrong file transferred), the ERROR light will begin to flash again — retry the transfer.

11) When the download is complete (a few minutes later), the Controller will display the "light bar" indication seen at power-up, and is ready for use.

12) Set up the system as usual.

APPENDIX 10 — TROUBLESHOOTING GUIDE

I press a button and nothing happens except:

1.) Nothing — no lights on the remote or the Controller flash.

Dead battery — install new batteries in the remote control.

2.) The red Error light on the remote flashes and no lights on the Controller flash.

You have pressed an invalid button or sequence of buttons.

3.) The green light on the remote flashes, but no lights on the Controller flash.

The remote has sent a valid command, but the Controller has not sensed it; the cause may be one of the following:

- a.) You may be located too close to the Controller (less than 2–3 feet may overload the sensitive RF receiver).
- b.) You may be having interference or other transmission problems; for example, you may be located in an office that has metal studs, or
- c.) You may be located out of range of the Controller, or
- d.) The Controller may not have power.

4.) The green light on the remote flashes and the red Error light on the Controller flashes.

The remote has sent a valid command and the Controller has sensed the command, but the Controller considers it an invalid command. Your problem may be one of the following:

- a.) Your Security Identification Codes in your remote and Controller may not match. Reset the remote to factory settings by removing its batteries for approximately a minute. Reset the Controller to factory settings by pressing the button on the rear of the Controller for a second until the front panel lights flash; this will also clear out the infrared memory in preparation for a new learning session, erase MACROs, and otherwise restore factory settings.

5.) The Controller's red Error light and green Infrared lights flash.

You are requesting an infrared command which has not yet been learned by the Controller. Program the Controller with an infrared code for that device's button.

6.) The Controller's green Infrared light flashes, but still no response by A/V component.

The remote has sent a valid command; the Controller has sensed the command and also has qualified it as a valid command. The Controller is also acting on the command — it is sending signals out the infrared emitter connectors. Your problem may be one of the following:

- a.) You may have the emitter cable placed in the wrong area on your A/V equipment. You can verify that the codes are being emitted by looking on the back of the Altrix Controller and seeing the green diagnostic light (next to the IR Blaster port) flash. Check the Q&A appendix on “How do I locate the A/V equipment's infrared sensor.”
- b.) You may have not programmed the infrared codes into the Controller properly. Try learning the infrared code again, making sure the light inside the Altrix Controller's window is flashing brightly; you may need to hold the infrared remote control closer or further away depending on the strength of the signal.
- c.) You may have a defective emitter cable (or connector). You can verify this with a camcorder if one is available to you. While infrared light is invisible to the eye, you are able to *see* the infrared flashes at the emitter end (it's brightest on the front of the emitter) through the viewfinder of a camcorder. If you have more than one emitter cable, you may be able to isolate the defective one by switching cables. You can sometimes hold the emitter directly in front of the IR learning sensor window — the green feedback LED is always active.

7.) The Controller's red Error light and green Lts/App lights flash.

The Controller has sensed an X-10 command, but the Controller cannot talk to the powerline interface. Your problem may be one of the following:

- a.) You may not have the X-10 Interface Module connected (or its outlet switched off), or
- b.) You may have a defective X-10 Interface Cable.

8.) *The Controller's green Lts/App light flashes*, but still no response by X-10 component.

The remote has sent a valid command; the Controller has sensed the command and also has qualified it as a valid command. The Controller is also acting on the command — it is sending signals out to the X-10® Powerline Interface Module. Your problem may be one of the following:

a.) The X-10 module is not set to the correct House and Unit codes — valid module settings are listed in X-10 Operation section of your Owner's Manual.

b.) You are expecting some action which is not allowed by X-10.

Example 1: the Dim/Bright operation applies only to the last module accessed;

Example 2: the Dim/Bright operation does not apply to the All Lights zone;

Example 3: if you have dimmed a light completely down, you cannot command it ON and expect full brightness (it thinks it is already on at a low level; you must either brighten it, or first turn it OFF, and then ON). These are X-10-defined operations.

c.) Even though the Controller checks for the presence of the X-10 Interface Module, you may still have a defective cable. The Interface Module has a red light which is normally on — if your interface cable is good, this red light should flash off briefly as X-10 signals are being sent to the power line.

d.) You may not be able to send an X-10 command to some outlets in your house — if you can control an X-10 module in the same room as your Altrix System, but the same module does not respond when placed in its final destination, the cause may be:

Example 1: you have placed the module in an outlet which is switched off — turn it on;

Example 2: you have a very large house and the module is located too far from the X-10 Powerline Interface Module

which is sending the commands — there are X-10 signal boosters available from some suppliers;

Example 3: you have discovered that X-10 signals do not always get over to the other *half* of your powerline — if you can access the module when a 220 Volt appliance (such as a dryer or stove) is turned on but not when it's turned off, this is an X-10 subtlety — there are coupler devices available from some suppliers.

If none of the above suggestions help your situation, a Vaux Customer Service Representative will be happy to provide you with technical assistance. Please call (602) 813-8577 between 8:00 am and 4:00 pm MST, Monday through Friday.

MAINTENANCE AND SERVICE

Maintenance

The Altrix Control System is designed to be maintenance-free, but it does contain sensitive electronic parts. Treat it with care to assure best performance.

Avoid Rough Treatment: Avoid dropping the Altrix Controller. If you must ship the system, use the original packaging (or equivalent) for protection.

Cleaning: The hard plastic and aluminum enclosure of the Altrix System has a durable finish that should retain its luster for many years. Clean exposed parts with a soft, slightly damp soft cloth. Never use detergents, excess water, treated cloths, harsh cleaning agents, or sprays.

Service

The Federal Communications Commission (FCC) requires this product be serviced only by the manufacturer or its authorized service agents. For instructions on how to obtain service, refer to the warranty included in this manual or call the Vaux Electronics Service Department at (602) 813-8577.

Attach your sales receipt to this manual for future reference and write down the date this product was purchased on page 2 of this manual. This information will be valuable if service should be required during the warranty period.

According to some State laws, in the event service should be required, you may need both Model and Serial Numbers. Please record your Serial Number(s) on page 2 of this manual. The Altrix Controller Serial Number can be found on the rear panel.

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 the Altrix Controller. Vaux Remote Controls have a one-year limited warranty.

What will we do?

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

How do you make a warranty claim?

- To get warranty service for your Altrix System, you must provide proof of purchase.
- Within 30 days of the date it was purchased, return your Altrix System to your place of purchase for immediate replacement.
- After 30 days of the date it was purchased, call the Vaux Service Department at (602) 813-8577 to obtain a Return Materials Authorization (RMA) Number and ship the Altrix System standard UPS or equivalent to Vaux Electronics, Service Dept. in Chandler, AZ.
- 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, address, phone number and a description of the defect.
- Properly pack your unit, include any cables, etc., which were originally provided with the product. Please use the original carton and packing materials.
- Pay any charges billed to you by the Vaux Service Department for service not covered by the warranty.
- A new or reconditioned 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).
- This warranty does not cover learning incompatibility with remote controls, such as, but not limited to:
 - Non-remote control, wired-remote control, RF-remote control, or ultrasonic-operated components.
 - Pre-programmed universal remote controls (third-party codes are sometimes distorted).
 - Products that operate over 100kHz (for example, Bang & Olufsen).
 - Products that use obscure or multi-frequency infrared signals (for example, RCA XL-100).
- This warranty does not cover defects resulting from accidents, damage while in transit to the Vaux Service Department, alterations, unauthorized repair, tampering, failure to follow instructions, neglect, misuse (including broken antenna), fire, flood, or acts of God.
- Customer instruction. Your Owner's Manual provides information regarding operating instructions.
- Installation and set-up service adjustments.
- Batteries.
- Products which have been modified or incorporated into other products.
- Product purchased or serviced outside the continental USA.

If your product is not covered by our warranty, call the Vaux Service Department at (602) 813-8577 for advice as to whether we will repair your Altrix System or other repair information, including charges. We, at our option, may replace, rather than repair, your Altrix System with a new or reconditioned one of the same or similar design. The repair or replacement 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 time, inconvenience, loss of your Altrix System, or property damage caused by your Altrix System or its failure to work, or any other incidental or consequential damages.