Vaux Electronics, Inc.

KP-1 Keypad System

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Record for Future Reference:

Model Number:

Serial Number:

Date Purchased:

Place of Purchase:

Attach your sales receipt to this manual. Rev. 1.0

This equipment may generate and use radio frequency energy which may interfere with residential radio and television reception if not properly installed and used in accordance with instructions contained in this manual. Reasonable protection against such interference is ensured, although there is no guarantee this will not occur in a given installation. If interference is suspected, and verified by powering this equipment on and off, try to correct the interference by one or more of the following measures: re-orient the radio/television receiver's antenna; relocate the television or radio equipment with respect to the Vaux Receiver; plug the equipment into separate electrical outlets. The Vaux System complies with all limits for Part 95 of the Federal Communications Commission (FCC) Rules and Regulations.

SAVE THESE INSTRUCTIONS

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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.

- Do not expose the system to extreme temperatures.

- Do not locate AC-powered equipment near water, for example, near a bathtub, shower or pool. Immersion in water could cause an electrical shock.

- The components should be mounted only as directed in the instruction manual. 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.

- Never install or modify wiring during a lightning storm.

- Do not attempt to disassemble the enclosures. There are no customer serviceable components inside.

IMPORTANT NOTICE

NEVER MIX LOW-VOLTAGE AND HIGH-VOLTAGE ELECTRICAL WIRING TOGETHER IN THE SAME JUNCTION BOX.

While it may seem aesthetically-pleasing to group the A/V control buttons in the same wall plate as the room light switch, such a practice is dangerous, and probably not allowed under your local electrical code. Install your keypad in its own junction box.

INTRODUCTION

Thank you for selecting the Vaux Keypad System. It has 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 Vaux Keypad System.

The Vaux Keypad System is designed to operate a Vaux Controller, such as an Aris MediaMation System, or Altrix Control 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.

Depending on your application (e.g. new-construction or retrofit), and the Vaux Controller model you will be using (e.g. Aris 700 or Aris 710), you may choose either the *Wired* Keypad (KP-MAIN), or the *Wireless* (KP-MAIN-RF) keypad, or possibly both. This manual covers both wired and wireless keypad models.

Wired Keypads (KP-MAIN):

KP-MAIN operates with Vaux Controllers that support keypad input, such as the Aris 720i, Aris 710, and Altrix 3400 Controllers.

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.

Wireless/RF Keypads (KP-MAIN-RF):

KP-MAIN-RF operates with Vaux Controllers that support radio frequency (RF) input, such as the Aris 720i, Aris 700, Altrix 3000, Altrix 3400, and MARC+ Controllers.

As with any radio control system, the operating range is limited; this means that the KP-MAIN-RF Keypad can function only a certain distance away from the Vaux Controller/Receiver. Under typical conditions, the keypad will operate throughout an average home (approximately 120 feet) with the standard receiver antenna. For greater range, receiver antenna options are available; consult Appendix 1: RF Range and Antenna Options.

PARTS CHECKLIST

Wired Keypads (KP-MAIN)

When unpacking your KP-MAIN Keypad, make sure that you have the following parts:

KP-MAIN contents:

- KP-MAIN dual-gang keypad (includes labeled keys)
- (2) white trim bezels with mounting screws
- 6P4C modular plug (connects UTP cable to keypad)
- 6P4C modular patch cable — white, straight-through (connects modular wallplate to MUX-x Hub)

You will also need:

- A Vaux Controller System capable of keypad control
- Two-Pair UTP cabling (Level-1, Cat-3, Cat-5...)
- For each keypad, a junction box (J-Box) having the correct number of gangs, and a depth of at least 2 inches
- A J-Box and modular jack (6P4C) wallplate for the central (media-room) keypad jacks (typically a single or dual-gang is needed, depending on the number of keypad jacks)

- 6P4C modular wall plate for media-room keypad jacks

  (e.g. dual-jack, six-jack...)

- MUX-x Hub (MUX-4 four-port or MUX-8 eight-port)

  (includes power adaptor and Vaux Data cable)

- A modular crimp tool for 6P4C plugs

Optional components you may need:

- KP-Exp Expansion Keypads (includes white trim bezel and mounting screws — keycaps not included)
- Optional Keycaps (standard, blank, custom)
- Keypad Configuration Software, to re-define keys
- Additional KP-MAIN Keypads for other rooms
- Replacement 6P4C modular plugs

  (to correct crimping mistakes)

Wireless/RF Keypads (KP-MAIN-RF)

When unpacking your KP-MAIN-RF Keypad, make sure that you have the following parts:

KP-MAIN-RF contents:

- KP-MAIN-RF dual-gang keypad (includes labeled keys)
- (2) white trim bezels with mounting screws

You will also need:

- A Vaux Controller System capable of RF control.
- For each keypad, a junction box (J-Box) having the correct number of gangs, and a depth of at least 2 inches

  (for retrofit installation, select post-drywall work boxes)
- Either:

  a) RF Keypad Connecting Plate (includes power adaptor)

  (wallplate has power and programming jacks)

  b) 12 VDC power adaptor only (special cases)
- For above Keypad Connecting Plate, a single-gang J-Box

(for retrofit installation, select a post-drywall work box)

- A modular crimp tool for 6P4C plugs

Optional components you may need:

- KP-Exp Expansion Keypads (includes white trim bezel and mounting screws — keycaps not included)
- Optional Keycaps (standard, blank, custom).
- Keypad Configuration Software, to re-define keys;

  requires MUX-x Hub (MUX-4 or MUX-8) while programming, to interface PC to keypad.
- Additional KP-MAIN-RF Keypads for other rooms.
- Replacement 6P4C modular plugs

  (to correct crimping mistakes)

OVERVIEW OF THE KEYPAD SYSTEM

The Vaux Keypad System can be configured in the standard configuration or set up in a custom configuration with pop-off keycaps and using the Vaux Keypad Configuration Software.

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, X-10 commands, or MACROs.

The Vaux Keypad System is designed to operate a Vaux Controller, such as an Aris MediaMation System, or Altrix Control 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.

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.

Depending on your application (e.g. new-construction or retrofit), and the Vaux Controller model you will be using (e.g. Aris 700 or Aris 710), you may choose either the *Wired* Keypad (KP-MAIN), or the *Wireless* (KP-MAIN-RF) keypad, or possibly both.

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

Wired Keypads (KP-MAIN):

KP-MAIN operates with Vaux Controllers that support keypad input, such as the Aris 720i, Aris 710, and Altrix 3400 Controllers.

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.

Wireless/RF Keypads (KP-MAIN-RF):

KP-MAIN-RF operates with Vaux Controllers that support radio frequency (RF) input, such as the Aris 720i, Aris 700, Altrix 3000, Altrix 3400, and the MARC+ Controllers.

As with any radio control system, the operating range is limited; this means that the KP-MAIN-RF Keypad can function only a certain distance away from the Vaux Controller/Receiver. Under typical conditions, the keypad will operate throughout an average home (approximately 120 feet) with the standard receiver antenna. For greater range, receiver antenna options are available; consult Appendix 1: RF Range and Antenna Options.

IMPORTANT NOTICE

KEEP THE KEYPAD IN ITS ANTI-STATIC BAG UNTIL INSTALLATION TIME. TREAT IT AS YOU WOULD A COMPUTER BOARD — IT IS SENSITIVE TO STATIC UNTIL INSTALLED.

NOTE: For both the wired and wireless versions, the keypad's memory contents (i.e. the map-table) is stored in non-volatile memory (EEPROM) — there is no battery back-up required.

HARDWARE INSTALLATION

Wired Keypads (KP-MAIN)

Each of the 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.

1 — Preparation: Plan the layout of the keypad(s): You have already selected a wired keypad, so now you need to decide on the number of gangs needed in each room, in order to provide the desired degree of control. For most rooms, you will probably find that the two-gang Main keypad unit is just-right, perhaps with a redefined key or two. Adding a third gang gives you a lot of flexibility for extra control. You may add additional gangs for numeric digits, etc. If you ever have an application that uses all seven gangs, we would love to know what you are doing with all those buttons. At this point, you need to at least define the number of gangs, so the correct junction boxes may be installed. See a later section on Expansion Gangs.

2 — Rough-In: Install keypad junction box(es): For each keypad location, select the keypad position in the wall. Generally, a position is chosen to the right of, or above, the room's light switch(es). Mount a junction box (J-Box) having the correct number of gangs, and a depth of at least 2 inches.

NOTE: for a retrofit installation, select an "existing-work box;" these are designed to self-support in an opening in existing drywall.

IMPORTANT NOTICE

NEVER MIX LOW-VOLTAGE AND HIGH-VOLTAGE ELECTRICAL WIRING TOGETHER IN THE SAME JUNCTION BOX.

While it may seem aesthetically-pleasing to group the A/V control buttons in the same wall plate as the room light switch, such a practice is dangerous, and probably not allowed under your local electrical code. Install your keypad in its own junction box.

3 — Rough-In: Install central hub junction box(es): At the media center, the keypad cables will be terminated in modular wall jacks. Select one or more single, dual, or six-jack 6P4C modular jack plates to install in the media wall, and install the appropriate junction box(es). Each keypad cable will terminate in its own jack.

NOTE: for a retrofit installation, select an "existing-work box."

4 — Rough-In: Install wiring: Run a two-pair CAT-3 UTP (unshielded-twisted-pair) cable from each keypad J-Box to the media wall central hub J-Box. Label each cable at the media wall with the keypad's room name (e.g. Master Bed).

The wiring from the keypads to the Hub uses standard 2-pair CAT-3 UTP wire, terminated with 6P4C modular connectors (RJ-11-like telephone-type connectors). Cable runs of up to 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 cable may, of course, also be used. CAT-

5 generally comes in a 4-pair flavor, which leaves a couple of pairs for, perhaps, an IR repeater, IR blaster, intercom, etc. (provided, of course, that the small amount of inter-pair coupling does not affect performance of either system).

Shielded twisted-pair (STP) two-pair cable may be used if desired (or already in place); when using shielded wire, ground the shield(s) to a chassis ground at the media center, and leave the shield(s) unconnected at the keypad.

Either CAT-5 or STP cable would be a good choice for running through a very noisy electrical environment. — the keypad is already very noise-immune, due to a differential (balanced) data transmission scheme, but for some noisy-environment installations, it might be prudent to use quieter cable.

NOTE: Shielded two-conductor cabling, used for some IR repeater installations, cannot be used for wiring Vaux keypads, since a fourth conductor is required. However, shielded multi-conductor cabling having three or more interior wires may work — contact factory for compatibility with previously-installed wiring you may wish to use with a Vaux wired keypad.

5 — Trim-Out: Install Media-Room Wallplate(s): At the media center, terminate each keypad cable to a 6P4C modular wallplate jack. Wallplate 6P4C jacks are generally marked with the typical Red/Grn/Yel/Blk color-code, however, the cable you used may have the banded color-code convention (e.g. CAT-5), or perhaps some completely different wire color-code (e.g. multi-conductor shielded cable). Vaux always provides both the Red/Grn/Yel/Blk and the banded color-code conventions — make a note in the table below if you are defining your own color-code convention for a non-standard cable you installed.

6P4C Keypad Wall Jack (Hub Connection)

Pin	Std. Color	Alt. Color	Other Color
1	Blk	Wht/Orn	_____
2	Red	Blu/Wht	_____
3	Grn	Wht/Blu	_____
4	Yel	Orn/Wht	_____

NOTE: Jack is shown from front view.
Alt Colors: (banded color-code) e.g. Blu/Wht indicates blue band on a white background.

Label each keypad connector on the media-room wallplate with the keypad's room name (e.g. Master Bed).

6 — Trim-Out: Install Keypad Connector(s): Terminate each keypad cable to a 6P4C modular plug at the keypad J-Box. Your cable will either have the Red-Grn-Yel-Blk color code, the banded color code, or you own convention. Orient the four wires in your left hand, then cut all four wires for a clean right-angle end, slip on the 6P4C modular plug (contacts

facing towards you), and use a modular crimp tool to squeeze the plug onto the cable.

You cannot damage the keypad or hub if you power-up the system with the wires crimped in the wrong order — although you will need a new plug to replace the one you will have to cut off.

Modular crimp-on plugs are typically designed for 24 or 26 gauge solid wire (some are designed for stranded wire), and generally work well for 22 gauge as well. If you cannot crimp a plug onto your cable, you may wish to use a self-piercing plug design, which allows you to slip the wires into the plug housing, and screw the connector halves together to finish the connection (this type of plug may require additional clearance in the J-Box).

Crimp Modular Plug to Cable at Keypad J-Box

Pin	Signal	Std. Color	Alt. Color	Other Color
1	Ground	Blk	Wht/Orn	_____
2	Data +	Red	Blu/Wht	_____
3	Data -	Grn	Wht/Blu	_____
4	+12 VDC	Yel	Orn/Wht	_____

NOTE: Plug is shown contacts-up.

Alt Colors: (banded color-code) e.g. Blu/Wht indicates blue band on a white background.

7 — Trim-Out: Install the MUX-x Hub: Locate the MUX-x hub behind media-room equipment, near the keypad cable termination wallplate. Connect the white (straight-through) modular cable(s), provided with the keypads, into a hub port, and into a keypad connector on the media-room wallplate — the four (or eight) keypad ports on the hub are identical.

NOTE: the white modular patch cables are a straight-through design; this can be verified by holding the plugs side-by-

side, and noting that the wire colors are the same from left to right. If you substitute a reversed cable (e.g. many telephone cables, or Vaux black patch cables), the keypad will not work — you will notice this in the next step, since the keypad test light will not turn on.

Connect the Vaux Data Cable (2.5 mm phone plugs) between the Hub and the Vaux Controller. Multiple hubs may be daisy-chained together also, by connecting the Dat ports.

Plug the hub's power adaptor into an unswitched AC outlet, and into the hub's power jack. This applies power to all keypad cables, and allows cable testing as keypads are connected (in the next step).

8 — Trim-Out: Install the keypad(s): Connect the keypad cable's modular plug into the keypad's rear connector — if all four wires are connected properly, the green light on the rear of the keypad should be on (NOTE: the hub, and hence the keypads, should be powered in step 7, above).

The green light is only on if all four lines are properly connected. If the keypad's rear light is off, wires are swapped or broken somewhere: check your keypad connector and hub wallplate connections.

Once you have the green light on, the keypad may be installed in the J-Box (if Vaux Controller is installed at this point, you may wish to test the keypad completely before proceeding to final installation).

Position the keypad in the J-Box, slip a trim bezel over a gang of buttons, and install supplied screws (but do not tighten). Repeat for all keypad gangs. After all gangs are in place, straighten and tighten the leftmost gang (the main gang), and tentatively straighten and tighten the next gang to the right. Slip the Decora wall plate over the keypad to check gang alignment, and adjust as necessary. Repeat for additional right-most gangs.

IMPORTANT NOTICE

- **DO NOT OVER-TIGHTEN MOUNTING SCREWS — DOING SO MAY DAMAGE THE KEYPAD.**
- **KEEP THE KEYPAD IN ITS ANTI-STATIC BAG UNTIL INSTALLATION TIME. TREAT IT AS YOU WOULD A COMPUTER BOARD — IT IS SENSITIVE TO STATIC UNTIL INSTALLED.**

9 — Optional Programming: Customize the keypad(s): If you are planning to customize the keypad layout, a good time to do so is before installing the keypad (although you may also program it after installation, from the Hub location). See the later section on Custom Keypad Configuration.

HARDWARE INSTALLATION

Wireless/RF Keypads (KP-MAIN-RF)

The Wireless KP-MAIN-RF keypad is wired to a nearby Vaux RF-Keypad Connection Plate for powering and programming. 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.

IMPORTANT NOTICE

BEFORE INSTALLING THE KP-MAIN-RF KEYPAD VERIFY THAT THERE IS ADEQUATE RADIO FREQUENCY RANGE. FOR MORE INFORMATION SEE APPENDIX 1: RF RANGE AND ANTENNA OPTIONS.

1 — Preparation: Plan the layout of the keypad(s): You have already selected a wireless keypad, so now you need to decide on the number of gangs needed in each room, in order to provide the desired degree of control. For most rooms, you will probably find that the two-gang Main keypad unit is perfect, perhaps with a redefined key or two. Adding a third gang gives you a lot of flexibility for extra control. You may add additional gangs for numeric digits, etc. If you ever have an application that uses all seven gangs, we would love to know what you are doing with all those buttons. At this point, you need to at least define the number of gangs, so the correct junction boxes may be installed. See a later section on Expansion Gangs.

2 — Rough-In: Install keypad junction box(es): For each keypad location, select the keypad position in the wall. Generally, a position is chosen to the right of, or above, the room's light switch(es). Mount a junction box (J-Box) having the correct number of gangs, and a depth of at least 2 inches.

IMPORTANT NOTICE

NEVER MIX LOW-VOLTAGE AND HIGH-VOLTAGE ELECTRICAL WIRING TOGETHER IN THE SAME JUNCTION BOX.

While it may seem aesthetically-pleasing to group the A/V control buttons in the same wall plate as the room light switch, such a practice is dangerous, and probably not allowed under your local electrical code. Install your keypad in its own junction box.

NOTE: for a retrofit installation, select an "existing-work box;" these are designed to self-support in an opening in existing drywall.

IMPORTANT NOTICE

THIS WIRELESS KEYPAD WILL NOT WORK IF INSTALLED IN A METAL JUNCTION BOX — ONLY USE A PLASTIC JUNCTION BOX.

3 — Rough-In: Install power/programming Connection Plate junction box: The RF Keypad is powered from an AC adaptor located elsewhere in the room, or elsewhere in the house. Select a nearby AC outlet for plugging the adaptor into — adjacent to this outlet, you will install a single-gang junction box for mounting the keypad Connection Plate. You will want to select a location that is unobtrusive (e.g. behind a bed or dresser), yet accessible enough to connect to the programming jack, if necessary. Since this is likely a retrofit installation, you will need to fish the cable from the keypad to the Connection Plate; you should consider the implications of this wire routing when selecting a location for the Connection Plate. The power/programming cable may be up to 1000 feet long, allowing you to place the Connection Plate

virtually anywhere you desire (of course, if you are able to run wire around the house, you probably would have selected the wired version of the keypad).

NOTE: for a retrofit installation, select an "existing-work box."

If you do not need to program the keypad after installation (or don't mind removing it to do so), you may opt to simply splice the power adaptor directly to a 2-conductor wire which runs to the keypad to provide power. We recommend installing using a Connection Plate, but, for example, you may have an installation that already has a 2-conductor wire installed.

4 — Rough-In: Install wiring: Run a two-pair UTP (unshielded-twisted-pair) CAT-3 cable from the Keypad J-Box to the Connection Plate J-Box. Cable runs of up to 1000' are supported using standard 22-, 24-, or 26-gauge wire. Generic, Level-1, telephone wire may be used; CAT-3 or CAT-5 cable may also be used. Since this is generally a short run, almost any four-conductor cable will do, but 2-pair CAT-3 is recommended.

5 — Trim-Out: Install Connection Plate: At the Connection Plate J-Box, terminate the keypad cable to the 6P4C modular jack in the Connection Plate. The 6P4C jack is marked with the standard Red-Grn-Yel-Blk color-code, however, the cable you used may have the banded color-code convention (e.g. CAT-5), or perhaps some completely different wire color-code (e.g. multi-conductor cable). Vaux always provides both the Red-Grn-Yel-Blk and the banded color-code conventions — make a note in the table below if you are defining your own color-code convention for a non-standard cable you installed.

6P4C Keypad Wall Jack (Connection Plate)

Pin	Std. Color	Alt. Color	Other Color
1	Blk	Wht/Orn	_____
2	Red	Blu/Wht	_____
3	Grn	Wht/Blu	_____
4	Yel	Orn/Wht	_____

NOTE: Jack is shown from front view.
Alt Colors: (banded color-code) e.g. Blu/Wht indicates blue band on a white background.

6 — Trim-Out: Install Keypad Connector: Terminate the keypad cable to a 6P4C modular plug at the keypad J-Box. Your cable will either have the Red-Grn-Yel-Blk color code, the banded color code, or you own convention. Orient the four wires in your left hand, then cut all four wires for a clean right-angle end, slip on the 6P4C modular plug (contacts facing towards you), and use a modular crimp tool to squeeze the plug onto the cable.

You cannot damage the keypad if you power-up the system with the wires crimped in the wrong order — although you will need a new plug to replace the one you will have to cut off.

Modular crimp-on plugs are typically designed for 24 or 26 gauge solid wire (some are designed for stranded wire), and generally work well for 22 gauge as well. If you cannot crimp a plug onto your cable, you may wish to use a self-piercing plug design, which allows you to slip the wires into the plug housing, and screw the connector halves together to finish the connection (this type of plug may require additional clearance in the J-Box).

Crimp Modular Plug to Cable at Keypad J-Box

Pin	Signal	Std. Color	Alt. Color	Other Color
1	Ground	Blk	Wht/Orn	_____
2	Data +	Red	Blu/Wht	_____
3	Data -	Grn	Wht/Blu	_____
4	+12 VDC	Yel	Orn/Wht	_____

NOTE: Plug is shown contacts-up.
Alt Colors: (banded color-code) e.g. Blu/Wht indicates blue band on a white background.

7 — Trim-Out: Install the Power Adaptor: Plug the AC power adaptor into an unswitched AC outlet, and into the Connection Plate's power jack. This applies power to the keypad cable, and allows cable testing when the keypads is connected (in the next step). To properly test the data pair, you must also plug a powered MUX-x hub into the programming port.

8 — Trim-Out: Install the keypad: Connect the keypad cable's modular plug to the keypad's rear connector — if all four wires are connected properly, the green light on the rear of the keypad should be on (NOTE: the hub must be connected to test for proper data line connections).

If the keypad's rear light is off, wires are swapped or broken somewhere: check your keypad cable connector and Connection Plate wiring.

Once you have the green light on, the keypad may be installed in the J-Box (if Vaux Controller is installed at this point, you may wish to test the keypad completely before proceeding to final installation).

Position the keypad in the J-Box, slip a trim bezel over a gang of buttons, and install supplied screws (but do not tighten). Repeat for all keypad gangs. After all gangs are in place, straighten and tighten the leftmost gang (the main gang), and tentatively straighten and tighten the next gang to the right. Slip the Decora wall plate over the keypad to check gang alignment, and adjust as necessary. Repeat for additional right-most gangs.

IMPORTANT NOTICE

- **DO NOT OVER-TIGHTEN MOUNTING SCREWS — DOING SO MAY DAMAGE THE KEYPAD.**

- **KEEP THE KEYPAD IN ITS ANTI-STATIC BAG UNTIL INSTALLATION TIME. TREAT IT AS YOU WOULD A COMPUTER BOARD — IT IS SENSITIVE TO STATIC UNTIL INSTALLED.**

9 — Optional Programming: Customize the keypad(s): If you are planning to customize the keypad layout, a good time to do so is before installing the keypad (although you may also program it after installation, from the Hub location). See the later section on Custom Keypad Configuration.

EXPANSION GANGS

The Vaux Keypad System is flexible and expandable; you may simply install the standard 2-gang keypad (KP-MAIN-xx), or you may add additional gangs with the KP-EXP expansion gang — up to a 7-gang maximum configuration.

The first expansion gang connects to the KP-MAIN-xx keypad via a supplied ribbon cable. The next expansion gang, connects to the previous expansion gang via a ribbon cable, and so on, in daisy-chain fashion.

The first few expansion gang buttons are pre-defined (by the factory-setting keypad configuration) to useful functions, although you will likely wish to customize the buttons using the Keypad Configuration Software.

KEYPAD CUSTOM CONFIGURATION

The Vaux Keypads allow you to customize the button definitions to suit each installation. Physically, this lets you add gangs as necessary, and replace keycaps with different legends or icons. Once you decide to change a key's definition, and change its keycap, you then need to redefine the key logically — that is, you change the command that is sent when the key is pressed. The keys are re-programmed using the Vaux Keypad Configuration Software.

Off-the-shelf configuration of the keypad uses the "factory-setting" configuration. Associated with each key is a "map-table" entry, which may be changed. The keypad map table has an entry for each of the 56 total keys available on a full 7-gang keypad. A key's map entry tells the keypad what to send when the button is pressed. For example, a "Selection-Up" button will access the infrared (IR) Select-Up (channel-up) codes for the current source device, and will repeat when held down. A button programmed to play Macro-2 will start the Macro sequence in the Controller. Buttons may be used to invoke X-10® commands to turn lights on/off, raise/lower projection screens, etc.

A key's map-table entry contains four items: the "Map-Type," which defines the type of action the button will perform, a "Device" code, a "Function" code, and a "Zone" code, all of which have different allowable values depending on the Map-Type chosen for the button. The Zone will normally be set to "Default" — the keypad's default zone is programmed separately, and defines which room the keypad is located in. The currently-defined Map-Types are:

•**A/V Source-Selection key:** The Device code may be 01 to 08, the Function code is forced to Source-Select, and the Zone code is normally set to Default (or may be hard-coded).

This mapping is used for each of the eight illuminated left-most gang buttons. These keys are the master keys used to turn on the zone, select the chosen source, and enable the keypad to control the source. This is the same as pressing a corresponding key on a Vaux RC-8 remote control (e.g. Tuner, CD, Laser...). Pressing the key when illuminated is the same as pressing Off. When pressed, the keypad sends the appropriate command, turns on the light in the key, and enables the A/V keys on the keypad. The keypad mapping for these eight keys is not normally changed, although you may wish to replace the keycaps (e.g. replace Cab/Sat with DSS).

The intelligence for performing the actual Source-Selection operation resides in the Vaux Controller, and is implemented differently, based on the Controller's capabilities. For example, with an Aris Controller, a "Laser" selection command can power up the laserdisc if needed, power-up a zone amplifier if needed, route the laserdisc to the zone (specified by the keypad or remote) at predetermined volume/bass/treble levels, and then invoke a laserdisc-specific Macro sequence which can do things like put the laserdisc in play and start the popcorn. For a MARC+ Controller, a "Laser" selection command simply plays the IR code to change the A/V receiver to Lasedisc input.

- **Normal A/V key:** The Device code is forced to Current, the Function code selects the action (Volume, Play...), and the Zone code is normally set to Default (or may be hard-coded).

  The Normal A/V key is the primary workhorse, and is used for all non-illuminated (function) keys in the keypad's factory-setting map-table. When the keypad is inactive (no source lights on), these keys are disabled.

- **Special A/V key:** The Device code may be 01 to 08, the Function code selects the action (Volume, Play...), and the Zone code is normally set to Default (or may be hard-coded).

  The Special A/V key is always active (unlike the Normal A/V key); it may be used for misc. IR commands which are not tied to a source currently playing in the zone (e.g. drapery openers).

•**X-10 key:** The Device code is forced to X10, the Function code selects the action (On, Off, Dim, Brighten), and the Zone code is normally set to the X-10 module address (e.g. D5).

The X-10 key is always active, and allows control of light/appliance/contact-closure devices. There is no toggle function, thus a specific light requires separate On and Off buttons. The Dim and Bright buttons will act on the X-10 unit last turned on or off by the keypad (the Zone code is not used for these). Rather than being directly accessed, X-10 commands are often grouped into a MACRO sequence to create a "scene" (see below).

•**MACRO key:** The Device code is forced to Macro-Playback, the Function code selects Macro 1 to 10, and the Zone code is normally set to Default (or may be hard-coded).

The MACRO key is always active, and invokes a playback of a general-purpose MACRO sequence in the Controller (e.g. set dinner lighting). The Zone is not currently used by the Macros in the Controller.

•**MACRO key with Source-Device Enable:** The Device code may be 01 to 08, the Function code selects Macro 1 to 10, and the Zone code is normally set to Default (or may be hard-coded).

This MACRO key is always active, and not only invokes a playback of a general-purpose MACRO sequence in the Controller, but also locally enables a Source-Device in the Keypad, and turns on the appropriate keypad source light. This allows the keypad to mimic A/V routing commands embedded in a Macro. For example, a "Bath" button could invoke a Macro which routes the CD to the Master suite, Plays a selection, and adjusts lighting levels. Since the keypad can be forced to CD mode, track selects and Source-Off are available.

•**Disabled key:** Button is, as the name implies, disabled. Useful if you wish to leave a blank button or two for future use.

To re-configure a keypad (either wired or wireless) you must first load the Vaux Keypad Configuration Software on your Windows® PC, and select an unused serial port. The MUX-x hub is used to program the keypads, and has an RS-232

serial port for connecting to your PC — this is a DB9-F connector, so select an appropriate cable or adaptor. Vaux carries a DB9-F to DB9-M cable for PC connection. The hub contains the interface to allow upload/download of the memory contents of a keypad connected to one of the hub ports.

NOTE: only one keypad may be connected to the hub when using the Configuration program. The four (or eight) keypad ports on the hub are identical. In operation, each keypad's Zone code identifies the keypad uniquely, but during programming, all keypads are addressed identically — if more than one keypad is connected, their data streams will collide, resulting in bizzarro programming. The hub is used for programming both the Wired and Wireless/RF keypads.

NOTE: the keypad must be connected to the hub using a straight-through modular patch cable, such as the white modular patch cable supplied with the wired keypad. Straight-through wiring can be verified by holding the plugs side-by-side, and noting that the wire colors are the same from left to right. If you substitute a reversed cable (e.g. many telephone cables, or Vaux black patch cables), the keypad will not respond.

When you have connected the PC to the MUX-x hub, and connected a single keypad to one of the hub ports, you may start the Keypad Configuration program. The program will ask you to select a serial port (the default is COM-2), and will then attempt to upload the keypad's memory contents (i.e. the map-table). If the program is unable to talk to a keypad, it will ask you if you wish to run the program anyway (just to have a peek at it).

Once the program has loaded the keypad's map table into its edit buffer, you may select a key to edit, load factory settings, etc. The Map-Table entries are easy to edit: select a key, select the Map-Type form the list box, and then select Device, Function, and Zone (do not leave any blank). The list box entries change to reflect the selected Map-Type, keeping the editing more-or-less self-explanatory.

There are also three special entries in the upper right of the screen: the “Customer ID Code” is a 16-character identifier you may store in the keypad (e.g. “Johnson - MBed”). The “Default-Zone” is needed to identify the keypad’s room (this is the same as the Default-Zone in a Vaux remote control), where the first digit is the zone group (normally 0 except multi-Aris systems), and the second is the actual zone number. Thus, a Default-Zone is typically 01, 02, 03..., with 00 being all zones. Note that the Zone is not used at all by a MARC+ Controller. The “SecID-Code” is only needed by the Wireless/RF keypad, and has a factory setting of 1070, just like a Vaux RF remote control.

When you have finished editing the key mapping, and the three special fields, you may select “Write To Keypad” to, well, write it all out to the keypad.

Disconnect this keypad — it is done. Plug in the next keypad to be programmed, press “Read From Keypad,” and continue.

KEYPAD OPERATION

•Source-Selection key:

1. Press one of the eight lighted buttons on the left-most gang to select the desired A/V source. The button will illuminate when selected. This is the same as pressing a corresponding key on a Vaux RC-8 remote control (e.g. Tuner, CD, Laser...). When pressed, the keypad sends the appropriate command, turns on the light in the key, and enables the A/V keys on the keypad.

   The intelligence for performing the actual Source-Selection operation resides in the Vaux Controller, and is implemented differently, based on the Controller's capabilities. For example, with an Aris Controller, a "Laser" selection command can power up the laserdisc if needed, power-up a zone amplifier if needed, route the laserdisc to the zone (specified by the keypad or remote) at predetermined volume/bass/treble levels, and then invoke a laserdisc-specific Macro sequence which can do things like put the laserdisc in play and start the popcorn. For a MARC+ Controller, a "Laser" selection command simply plays the IR code to change the A/V receiver to Lasedisc input.

2. To select a different source, simply press the desired source button and that button will illuminate.

3. To deselect, press the illuminated button again. In the case of the Aris system, pressing the source buttons will turn off the zone (the same as pressing the Off button on a Vaux remote control).

•Audio/Video key:

Simply press the desired key (e.g. Volume, Play...). These keys are only active when a source has been selected.

•Lights and Appliances (X-10) key:

Press the desired key. These keys are always active, and allow control of light/appliance/contact-closure devices. There is no toggle function, thus a specific light requires separate On and Off buttons. The Dim and Bright buttons will act on the X-10 unit last turned on or off by the keypad (the Zone code is not used for these). Rather than being directly accessed, X-10 commands are often grouped into a MACRO sequence to create a "scene."

•MACRO key:

Press the desired key. The MACRO key is always active, and invokes a playback of a general-purpose MACRO sequence in the Controller (e.g. set dinner lighting). The Zone is not currently used by the Macros in the Controller.

•MACRO key with Source-Device Enable:

This MACRO key is always active, and not only invokes a playback of a general-purpose MACRO sequence in the Controller, but also locally enables a Source-Device in the Keypad, and turns on the appropriate keypad source light. This allows the keypad to mimic A/V routing commands embedded in a Macro. For example, a "Bath" button could invoke a Macro which routes the CD to the Master suite, Plays a selection, and adjusts lighting levels. Since the keypad can be forced to CD mode, track selects and Source-Off are available.

APPENDIX 1 — RF RANGE AND ANTENNA OPTIONS

BEFORE INSTALLING THE KP-MAIN-RF KEYPAD, VERIFY THAT THERE IS ADEQUATE RADIO FREQUENCY RANGE. You may want to use an RC-8-RF remote to test installation range, although the keypad will likely have better range than the RC-8.

Radio system operating range is dependent upon many factors. The Vaux RF keypad sends radio signals throughout the house to be picked up by the Vaux Receiver/Controller. In order to obtain maximum range, the location of the Controller is important. In some cases, installing the Controller (or antenna) on the second floor will provide greater range than a ground floor installation. Reception is also affected by computers, big-screen TVs, fluorescent light ballasts, 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 Vaux Keypad reception, but you can keep in mind that a higher installation site for your Vaux 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 RF keypads 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 RF keypad to invoke a command in your Vaux Controller.

Determining Radio Reception Range

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

1) Place the Vaux Controller/Antenna in the desired install location

2) Connect the Controller's X-10 interface module

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 interference 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 or stucco walls
- Large appliances (refrigerators, washers, dryers...)
- Computers
- big-screen TVs
- fluorescent light ballasts

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 wire 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.

Other Antennas

For large homes, you may wish to remotely-locate the antenna to a central closet, or to the attic. Contact Vaux for other antenna options available for increasing the range of your Vaux Keypad System.

MAINTENANCE

The Vaux Keypad 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 Vaux System. Use the original packaging (or equivalent) for protection, if you must ship the system.

Cleaning

The plastic keycaps have 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 1 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 on page 1 of this manual. The Vaux System Serial Number can be found on the rear of the Keypad.

LIMITED WARRANTY

What does your warranty cover?

- Any defect in material or workmanship.

For how long after the original purchase?

- One year.

What will we do?

- If your Vaux Keypad 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 Vaux Keypad System is returned after 30 days, but within the one year of the date of purchase, we will repair it, or, at our option, replace it at no charge to you. If we repair your Vaux Keypad System , we may use new or reconditioned replacement parts. If we choose to replace your Vaux Keypad 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 one year warranty period, whichever is longer.

How do you make a warranty claim?

- To get warranty service for your Vaux Keypad System, you must

provide proof of purchase.

- Within 30 days of the date it was purchased, return your Vaux Keypad 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 and ship the Vaux Keypad System standard UPS or equivalent to Vaux Electronics. Provide necessary shipping insurance.

- 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 incompatibility with:

    - Non-remote control, wired-remote control, RF-remote control, or ultrasonic-remote control-operated components.

    - Pre-programmed universal remote controls.

    - Products that operate over 100kHz (e.g., Bang & Olufsen, Pioneer ISC).

    - Products that use unique or multi-frequency infrared signals (e.g., RCA XL-100).

- This warranty does not cover defects resulting from accidents, damage while in transit to the Vaux Service Department, alterations, unauthorized repair, 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 Vaux Keypad System or other repair information, including charges. We, at our option, may replace, rather than repair, your Vaux Keypad 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 Vaux Keypad System, or property damage caused by your Vaux Keypad System or its failure to work, or any other incidental or consequential damages.