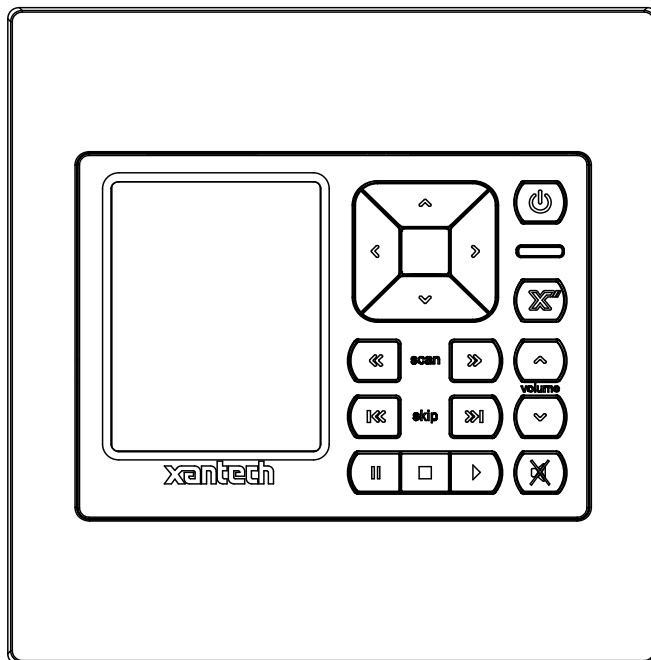# xantech®

INSTALLATION INSTRUCTIONS

MRKP2
Keypad controller
North American Standard

Safety Information

Read Information — All the safety and operating information should be read before the appliance is operated.

Follow Information — All operating and use information should be followed.

Retain Information — The safety and operating information should be retained for future reference.

Heed Warnings — All warnings on the appliance and in the operating instructions should be heeded.

Wall Mounting — Mounting of this appliance should be done only by an authorized installer.

Non-Use Periods — Appliances that are left unattended and unused for long periods of time should be de-energized.

Water — Do not use the apparatus near water.

Cleaning — Unplug the controller unit (MX88/MRC88m/MRAUDIO8x8m) from the power outlet before cleaning the MRKP2. Use only a dry cloth to clean the apparatus.

Object and Liquid Entry — Never insert objects of any kind through the openings of these appliances, as they may touch dangerous voltage points or short-circuit parts that could result in a fire or electric shock. Care should be taken so that objects do not fall and liquids are not spilled into the appliance through openings in the enclosure.

Servicing — Do not attempt to service these appliances yourself, as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

Damage Requiring Service — These appliances should be serviced by qualified service personnel when:
- A power supply connection or a plug has been damaged or
- If liquid has been spilled into the appliance or objects have fallen into the appliance or
- The appliance has been exposed to water or moisture or
- The appliance does not appear to operate normally or exhibits a marked change in performance or
- The appliance has been dropped or the enclosure damaged.

Replacement Parts — When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or that have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards. The Master Control Unit battery should be replaced only after turning the power off and only by an authorized installer.

Safety Check — Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the unit is in proper operating condition.

Lightning Storms — Unplug the controller unit (MX88/MRC88m/MRAUDIO8x8m) during lightning storms or when unused for long periods of time.

Attachments and Accessories — Use only attachments/accessories specified by the manufacturer.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAUTION: Changes or modifications not expressly approved by Xantech could void the user's authority to operate the equipment

Caring For the MRKP2
Clean only with a dry soft cloth.
It is important to properly care for your MRKP2 Keypad. Follow these guidelines to ensure your device is preserved and protected.
- Do not expose the MRKP2 to rain, liquids or moisture for an extended period of time.
- Do not expose the MRKP2 to temperature extremes.

Operating Temperatures & Environments
Operating Temperature: 32-104°F (0-40°C)
Humidity: 0-90%

Precautions

- Always exercise care when operating the MRKP2 Keypad.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- In the unlikely event that smoke, abnormal noise, or strange odor is present, immediately power the MRKP2 off. Please report the problem to your dealer immediately.

Never attempt to disassemble the MRKP2. You will lose any product warranty on the unit.

1. Introduction

The Xantech MRKP2 is a full-featured zone controller specifically designed for multi-room systems based on the MX88 series, MRC88m, or MRAUDIO8x8m multi-room controllers. It has been designed to take advantage of all major features and capabilities of the MX88. The MRKP2 features hard buttons for source selection, volume control, mute, and power. It is also capable of controlling all connected sources via hard buttons, its super-bright TFT LCD touch-screen, or its built-in IR receiver.

The Xantech MX88 System sets a new standard in whole-house audio/video distribution, audio amplification, and control/automation. The MX88 System consists of the MX88 controller/amplifier, keypads or touch-panels to control each zone, and wireless or wired web-enabled devices such as the Apple® iPad® for controlling all zones and the entire system. When combined with IR, RS232, or IP controlled (IP on select models only) meta-data-rich audio/video sources and home automation components, the MX88 becomes a very capable and self-contained system for controlling virtually everything within a household.

MRKP2 Features

- Fits in recommended North American standard two gang electrical back boxes.
- 2.4" touch-screen 16-bit Color TFT LCD display
- Displays multiple lines of meta-data and menu navigation lists
- Full-featured keypad with navigation and select hard buttons.
- Selectable keypad backlight color
- Includes a screwless wall plate
- Quick Plug and Play Installation – No PC Software Programming Required.
- Hot Swappable – no need to shut down and reset system when upon connection of keypad
- Supports Xantech *QuickConfig*
- Built-In interference resistant (CFL, LCD, Plasma) IR receiver for system and source control
- Built-in connecting blocks for use with optional Xantech external IR receiver and IR emitters.

MRKP2 Accessories

- KCK2 color change kit – converts MRKP2 to black, almond, or ivory
- MREM handheld remote
- MRC44CB1 connecting block with 782ERGPS High Current AC adaptor – for connecting multiple MRKP2s within a system – see sections 2 and 3 of this manual for further details

Definitions

Zone

A Zone is defined as an area of the house that has separate source selection capabilities from all other areas of the house. Typically, a zone is comprised of a single room, but it is possible for a zone to spread across multiple rooms (kitchen/dining room, master bedroom/master bath) or for multiple zones to be contained in one room (game room/bar area or multiple zones in the yard).

Source

A Source is any audio (or audio/video) device that is connected to the MX88 source input. Any Source can be heard or viewed in any zone in the system.

2. System Design Overview/Applications

Important Notes

A recommended electrical back box is always required for installation of this product (see specifications).

The MRKP2 is specifically designed to work with the MX88 series, MRC88m, and MRAUDIO8x8m *(Firmware ver. 3.16 at the time of writing this manual – always check the Xantech web site www.xantech.com to make sure that you are running the latest available firmware version).* It is NOT designed to work with MRC88, MRAUDIO8x8, MRC44, MRAUDIO4x4, or BXAUDIO4x4.

For the sake of simplicity, we regularly make singular references to MX88 throughout this manual. Please note that these statements apply equally to MRC88m and MRAUDIO8x8m as well.

The MRKP2 boasts full source control capability and a super bright TFT LCD touch-screen and its current draw is therefore slightly higher than lesser featured keypads such as the MRKP1/1E. As a result, in installations where long CAT5 cable runs (see specifications section) are required and/or more than one keypad is used per zone, MRC44CB1 connecting blocks and 782ERGPS High Current AC Adaptors may be required to be installed before the first keypad for that zone.

The MRKP2/MRKP2E and MRKP1/1E use a newer, faster keypad communications protocol than the old MRC88KP keypad, and therefore the MRC88KP keypads cannot be used in the same zone together with MRKP2/2E or MRKP1/1E. The MRKP2/2E and MRKP1/1E can however be used together in the same zone.

Planning

Before installing the MRKP2, it is essential to have a detailed and accurate system design. The first step to a good design is to map the system. It is advisable to mark up a copy of the house floor plan with speaker, keypad and equipment locations, etc. Make sure that all locations are decided upon before pre-wiring so that all necessary wiring and installation hardware is in place. It is essential that ALL system components are accounted for prior to the pre-wire stage. After establishing design goals, make a detailed list of all components. Include source equipment, keypad, expansion hubs, local source wall plates, IR emitters, etc. Always fully test all actual components to be installed before taking them to the jobsite. This will help streamline and expedite any troubleshooting on site in case it becomes necessary.

Pre-Construction

In a pre-construction installation, walls and ceilings are open with no drywall installed. This is desirable and allows the installer greater access than in retro-fit applications. Before actually running any wire or cable, take the time to look around each room or area of the house and plan your wire paths for maximum efficiency. Look for routes through uncluttered parts of the stud wall or ceiling that allow you to group all low-voltage (video, speaker wires, CAT-5, telephone, etc.) wires wherever possible. It is a good practice to label both ends of all cables and to protect wires by tying a plastic bag over the ends.
Note: Do not run low-voltage wires closer than 12" from high-voltage wires. If necessary, cross low-voltage wires at a 90º angle to prevent interference.

Retro-Fit Wiring/ Post Construction

Retro-fit installations are more difficult to complete than pre-construction because walls and ceilings are intact. Typically wires must be fished into position through walls, floors and ceilings. Holes must be cut; speakers mounted directly in the ceiling or walls with no electrical back- brackets and keypads and local source wall plates must be mounted in existing drywall.

Pre-Wiring

Wiring between MX88 and MRKP2E
The MX88 and all associated components are wired using CAT-5, CAT-5e, CAT-6, or CAT-7 cable terminated to the T568A or T568B Wiring Standard (Figure 2.1). Please note that all references made throughout this manual to CAT-5 apply to CAT-5e, CAT-6, and CAT-7 as well. When pre-wiring the system, run lengths of CAT-5 from the pre-determined MRC88m location to each Keypad or Touch Panel location. The CAT-5 cable routes all Power, Control, Communication, and IR information needed for full system operation. **Important:** While there are two wiring standards, it is very important to be consistent to one configuration throughout the entire system. Otherwise, the system will not operate.

Speaker Wiring from MX88 to each zone
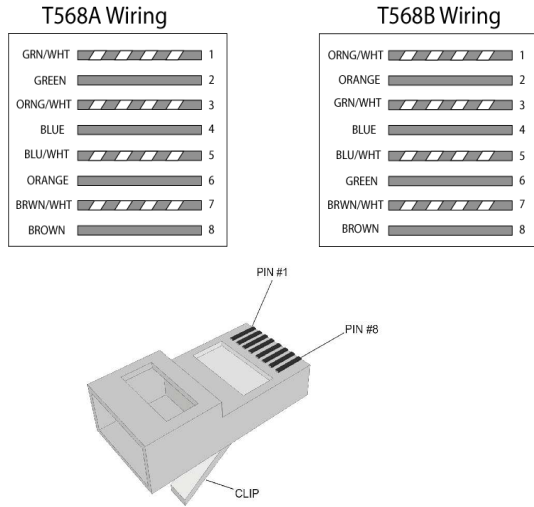Speaker wiring will need to be separately routed from the MX88 to each zone.

T568A Wiring

GRN/WHT	1
GREEN	2
ORNG/WHT	3
BLUE	4
BLU/WHT	5
ORANGE	6
BRWN/WHT	7
BROWN	8

T568B Wiring

ORNG/WHT	1
ORANGE	2
GRN/WHT	3
BLUE	4
BLU/WHT	5
GREEN	6
BRWN/WHT	7
BROWN	8

PIN #1
PIN #8
CLIP

Figure 2.1: T568A and T568B Wiring Standard

RJ45 Connector at Controller/Amplifier

Wire Color	Pin #	Signal
white/orange	1	485 +
orange	2	485 -
white/green	3	12V RET
blue	4	IR RET
white/blue	5	IR
green	6	+12V
white/brown	7	Attn. 485
brown	8	IR Loop Back

Cat 5 Cable

RJ45 Connector at Keypad

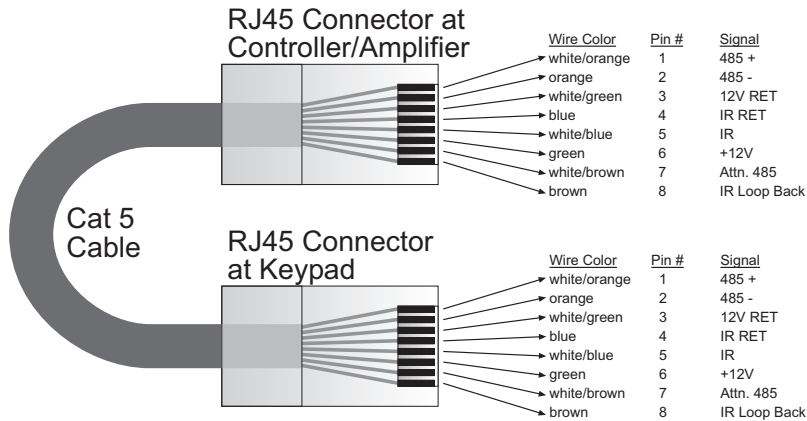| Wire Color	Pin #	Signal
white/orange	1	485 +
orange	2	485 -
white/green	3	12V RET
blue	4	IR RET
white/blue	5	IR
green	6	+12V
white/brown	7	Attn. 485
brown	8	IR Loop Back

Figure 2.2: MX88 – MRKP2 Pin-out diagram for Cat-5 cable
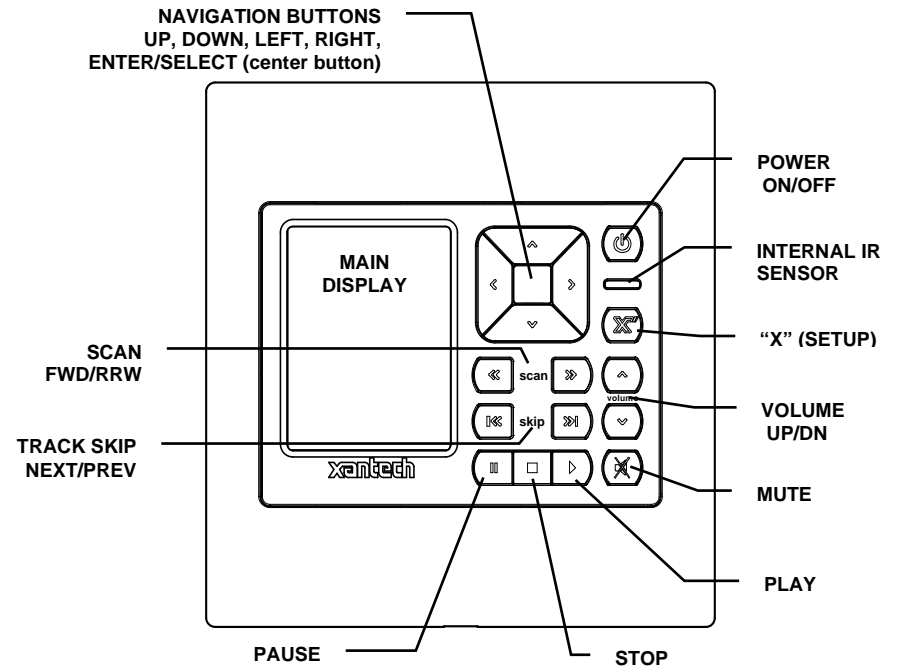(T568B configuration)

MRKP2 – FRONT PANEL

Figure 2.3: MRKP2 Keypad layout and Main display

Notes:

- Tone Control functions of the MRKP2 can be entered by pressing the Next arrow once inside a source control page. Please note that each of the three controls can be returned to their center position by tapping the center of each bar.

- Unlike older keypads, and due to the unique and streamlined functional set-up of the MRKP2E's buttons, "press-and-hold" tier 2 functions are not supported. However, Tier 2 button IDs and the macros underneath them are available through Universal Dragon.

MRKP2 – REAR CONNECTORS

TERMINATION
JUMPER
JP1

SENSOR
ENABLE
JP3

JP1
TERMINATION

+12V
GND
STATUS
IR IN

EXTERNAL
IR SENSOR
CONNECTING
BLOCK

TO MRC88m/MX88
CONTROLLER PORT

TO EXPANSION
KEYPAD

CONNECT TO
CONTROLLER
PORT ON
OTHER KEYPAD
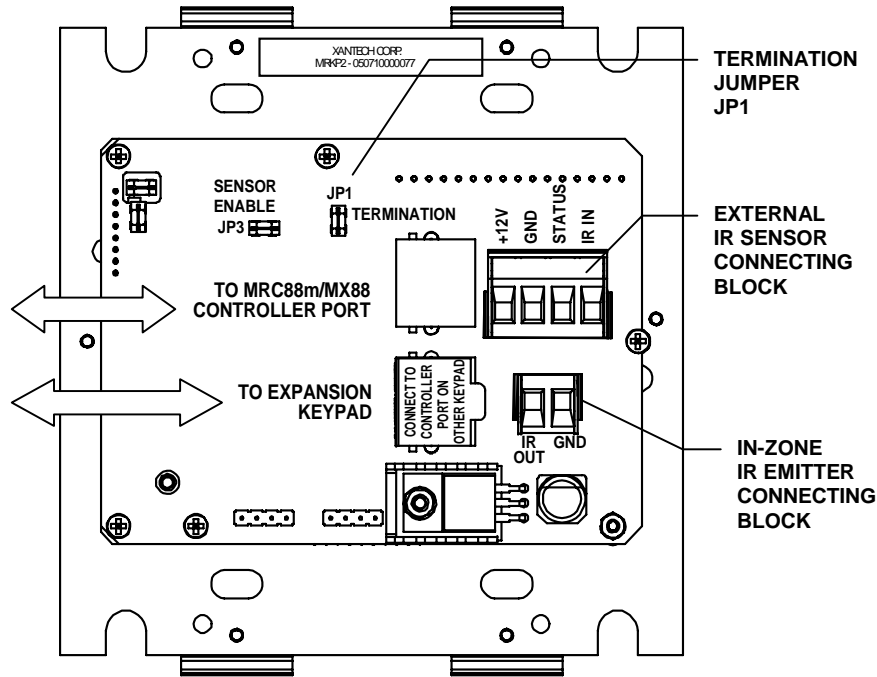
IR GND
OUT

IN-ZONE
IR EMITTER
CONNECTING
BLOCK

Figure 2.4: Rear connector board of MRKP2 Keypad

Note: The IR Out feature on this keypad comes disabled from the factory and if needed, it should be enabled using the Xantech Universal Dragon programming software.

Installation

The MRKP2 is designed to mount in a standard two gang electrical back-box (see Specifications sections for details). Typical mounting height is 56-60 inches (1.53 meters) from the floor to the bottom of the frame. This provides optimum "eye-level" viewing for the largest number of people.

Route the CAT-5 cable from the MX88 into the back of the electrical back-box, terminate it with an RJ-45 connector after it is passed through the electrical back-box. Connect it to the appropriate RJ-45 connector on the rear of the MRKP2 ("CONTROLLER" for connecting to MX88, or "EXPANSION" if connecting to an extension keypad). If using an IR Receiver, strip the ends of three conductors of the IR receiver's cable and insert into the appropriate terminals of the IR Input terminal block shown in Figure 3.1.

Once connections are made, mount the MRKP2 into the electrical back-box using the two provided screws. Mount the Trim Plate Bracket as shown in the Figure 2.5 on next page, and then snap the Screw-less Trim Plate in place.

Note: Do not mount the MRKP2 in the same electrical back- box as high voltage devices such as electrical outlets or switches.

MRKP2

TWO-GANG
ELECTRICAL
BACK-BOX

MOUNTING SCREWS (6-32 x ¾")
Note: Mounting screws are included with most electrical back-boxes.
Extra mounting screws are also included with the MRKP2 product in case
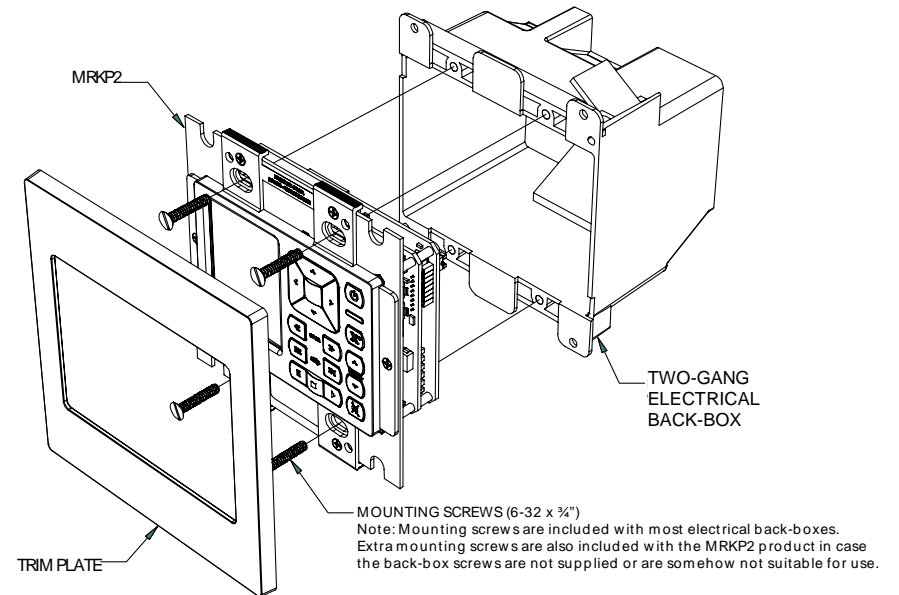the back-box screws are not supplied or are somehow not suitable for use.

TRIM PLATE

Figure 2.5: MRKP2 keypad installation in U.S. standard two gang back-box

3. Connections

MRKP2 to MX88 and Expansion Keypads

Each RJ-45 connector under each PREAMP OUT (1 – 8) is considered a "Zone port". This Zone port interfaces with MRKP2 Keypad through CAT-5 cables. These connectors carry command/control information between the keypad and the MX88. Connect CAT-5 cables terminated to an RJ-45 connector from each Keypad to the corresponding RJ45 connector of the MX88 as shown below. (See Specifications section for maximum length of Cat-5 cables)
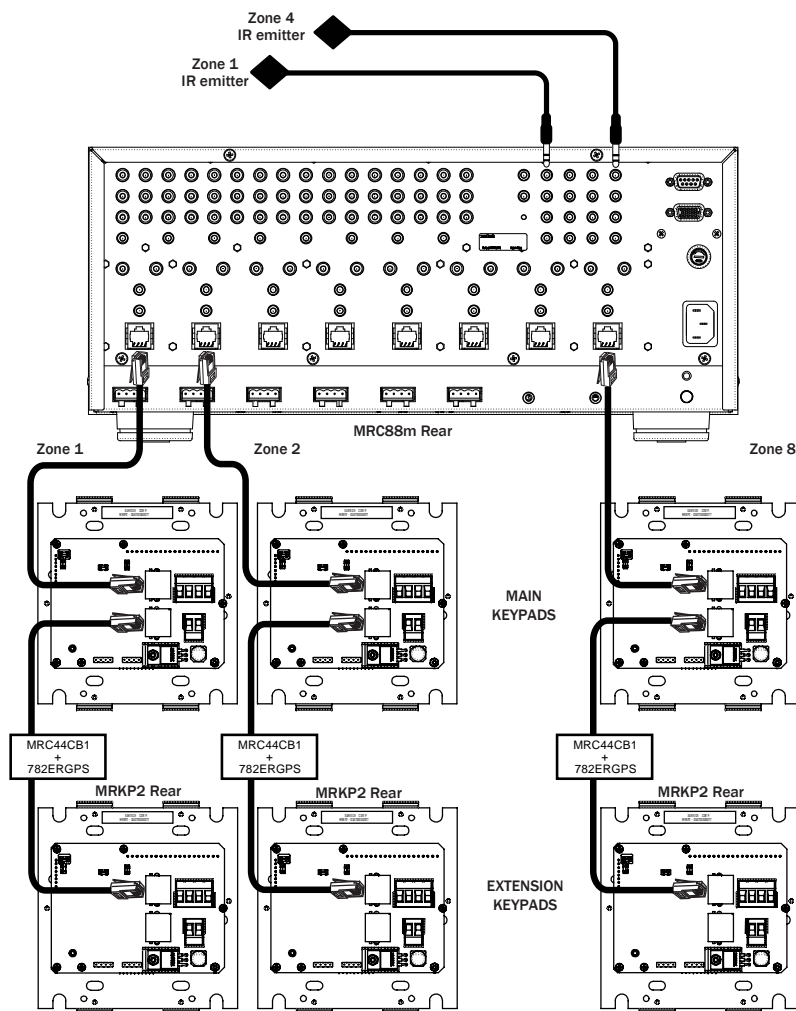
Figure 3.0: MRKP2 to MX88 with expansion keypads

Note:

1. There are four keypads maximum per zone. Remove termination jumper on all keypads except for the last keypad (see location of JP1 on Fig 2.4). Each expansion keypad must each have its own unique address. (see Installer Settings menu on Section 4 of this manual).

2. Long CAT5 cable runs and/or the use of more than one keypad per zone will require the use of MRC44CB1 and 782ERGPS High Current AC adaptors. Please see **Important Notes** on page 6 and the **Specifications** page for more details.

Internal IR Receiver

The internal IR receiver is located beneath the keypad's face plate between the **POWER** and **"X"** buttons (see Figure 2.3). The internal IR receiver receives IR commands for the MRKP2 and for the MX88. It will also pass-thru IR remote control commands to audio sources, via an emitter, to each of the sources connected to the MX88. The internal IR receiver is interference friendly. However, some optically noisy environments may require the use of an external IR receiver. (See Figure 3.1 for details on using an external IR receiver)

Compatible Handheld remotes

The MRKP2's can be controlled with a Xantech handheld remote controller, such as a Xantech RC68 or MREM is for accessing control functions of the source such as navigation, menu, and transport controls. Other programmable Xantech remotes such as XTR39 can also be used. The list of RC68 codes is available at www.xantech.com/Controls/KeypadsRemotes/Remotes/MREM, in the Products page, under "MREM Code List".

Note: RC68 commands may not be used with projects created in *QuickConfig*.

External IR Receiver Connections

Use an external Xantech IR Receiver in cases where a hand-held remote needs to be pointed somewhere other than at the MRKP2 or in cases where additional interference requires the use of a different type of IR receiver or IR receiver mounting location. Typical IR Receiver locations are near a TV or other equipment such as a Local Source (DVD Player, A/V Receiver,…etc.). A CAT-5 cable can be used to extend the IR receiver's wire, if necessary. Refer to the bottom of the Specifications section (page 19) for wiring instruction when using CAT-5 cable to extend the IR signal.

By default, the MRKP2 External and Internal IR receivers are both active. Having both active, in some cases, can cause issues with IR signal reflection and/or multiple processing of the same IR command. In such specific cases it is advisable to disable the Internal IR when using an external IR receiver. The internal IR receiver can be disabled by removing jumper clip JP3 as shown below.
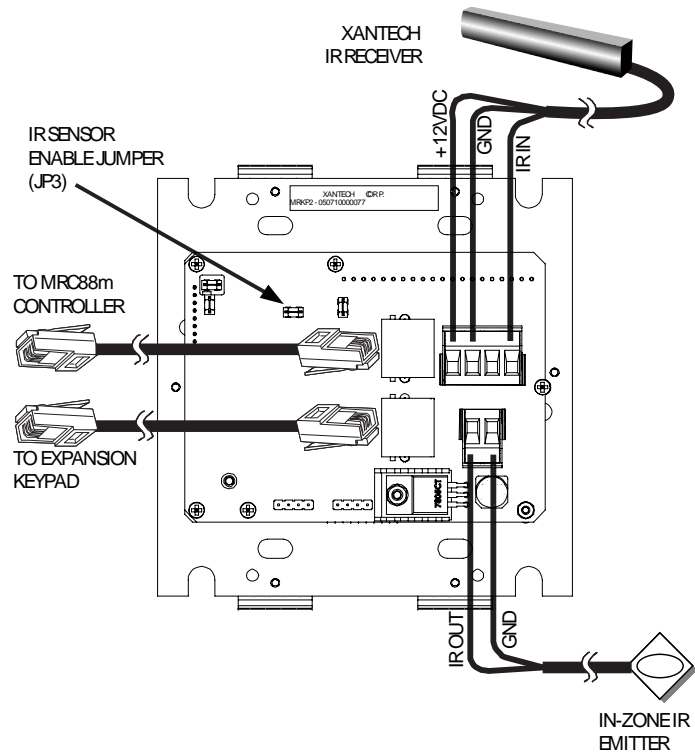
Figure 3.1: MRKP2 to External IR Connections
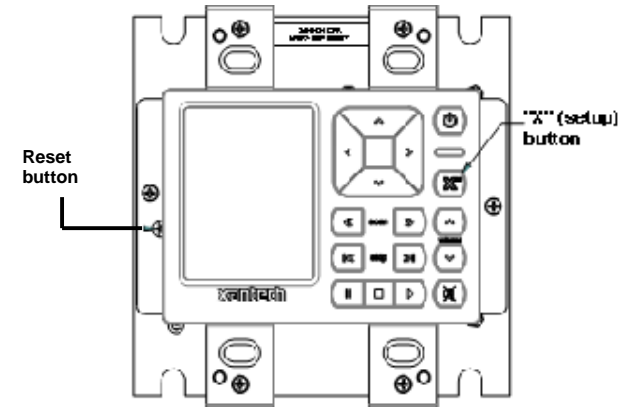
4. MRKP2 Setup

Initial Power-up
Whenever the MX88 or the keypad itself is reset, the MRKP2 will take approximately 1 minute to initialize. During most of this period of time, with the exception of first 5 seconds, the On/Standby LED will be illuminated in green as an indication that boot-up is in progress.
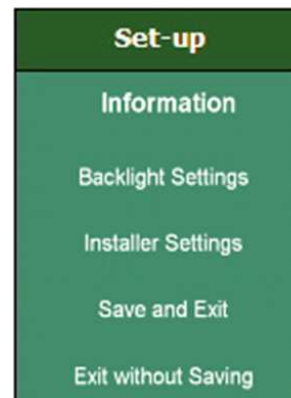
QuickConfig
The Xantech *QuickConfig* feature facilitates the setup of the MX88 system from a keypad without the use of a PC. Please refer to the *QuickConfig* Guide at www.xamtech.com/MX88 for details on setting up *QuickConfig*.

Set-up menu
To access the Main Setup Menu, press and hold down the "**X**" key for at least 5 seconds.

Once the Main Setup Menu is displayed on the touch screen simply touch and release the listed item to access more information or to make adjustments**.**

Information - See Fig. 4.1

Backlight Settings – See Fig. 4.2

Installer Settings – See Fig. 4.3

Save and Exit - Leave the Main Setup Menu and go back to normal display mode and save changes

Exit without Saving - Leave the Main Setup Menu and go back to normal display mode without saving changes

Information

MRKP2

Model Number
Keypad Address
1st Bootloader Ver
2nd Bootloader Ver
OS Version
App Version
Language
Back to Set-up

Fig. 4.1 Information screen

Displays basic information about the unit. Press and release items on the list to display information about the unit and its current settings. No changes/adjustments can be made on this screen.
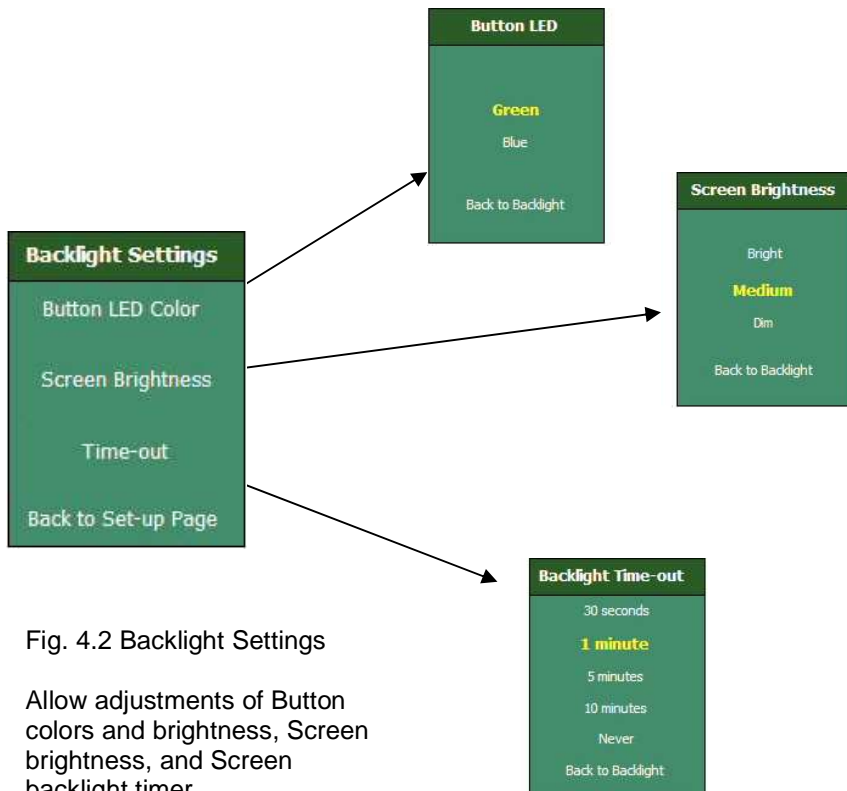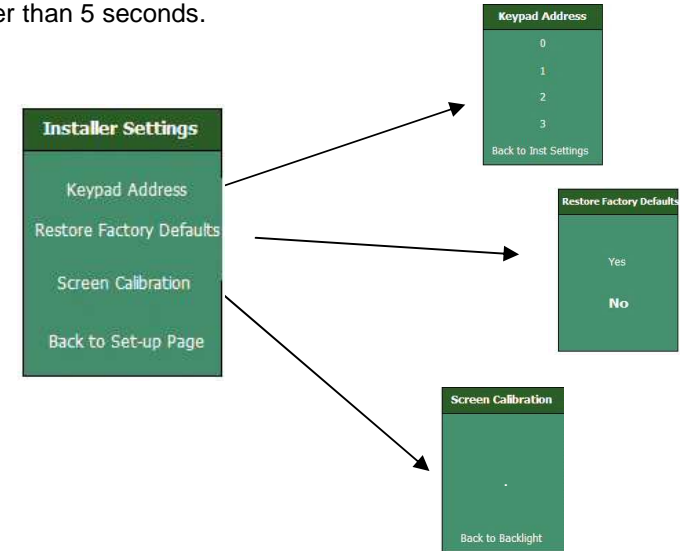
Button LED

Green

Blue

Back to Backlight

Screen Brightness

Bright

Medium

Dim

Back to Backlight

Backlight Settings

Button LED Color

Screen Brightness

Time-out

Back to Set-up Page

Backlight Time-out

30 seconds

1 minute

5 minutes

10 minutes

Never

Back to Backlight

Fig. 4.2 Backlight Settings

Allow adjustments of Button colors and brightness, Screen brightness, and Screen backlight timer.

Fig. 4.3 Installer Settings

This menu facilitates adjustments that may be necessary during system installation, and should be accessed by factory authorized personnel only. To enter the Installer Settings menu, highlight "Installer Settings" by using the "UP" or "DOWN" navigation buttons (see Fig. 2.3 on page 9), press and release the ENTER/SELECT button so that the "Restricted" screen appears, and then press and hold the "ENTER/SELECT" button for longer than 5 seconds.

Installer Settings

Keypad Address

Restore Factory Defaults

Screen Calibration

Back to Set-up Page

Keypad Address

0

1

2

3

Back to Inst Settings

Restore Factory Defaults

Yes

No

Screen Calibration

.

Back to Backlight

Important: While in Installer Settings menu, if "App Upgrade" is accidently selected, the keypad will enter and remain in application update mode, and will display "Please Restart The Keypad". To exit this mode, press the "RESET" button behind the MRKP2 trim panel with a blunt object (see figure on page 15). The keypad will reboot and display "Please Load Application Files". Press the "RESET" button once again. This will conclude the application update process without installing new firmware, and the MRKP2 will return to normal operation. After the keypad returns to normal operation, it is advisable to reset the entire system by turning the MX88 off and back on. Please note that application update is to be performed by factory authorized personnel only, and the procedure to do so is not within the scope of this document.

Other reference documentation

- Universal Dragon MX88 programming Instructions: MRKP2 and 2E: Download from www.xantech.com, under MRKP2 or MRKP2E
- *QuickConfig* Guide: Download from www.xantech.com, under MX88 or MRC88m

5. Troubleshooting

Symptom	Possible Cause	Solution
MRKP2 does not power up or resets itself randomly	1. RJ-45 plug crimped incorrectly; or wiring pin-out of RJ-45 reversed. 2. Break or intermittent connection in CAT-5 between Zone and "Head-End". 3. CAT5 cable length exceeds specification, or more than one keypad is used in a zone.	Verify wiring pin-out and RJ-45 crimp. Correct by re-crimping RJ-45 to CAT-5 cable. Check RJ-45 to RJ-45 connections with cable tester or voltmeter. +12V terminal on back of MRKP2 should read +9V DC or higher with the keypad on. Use MRC44CB1 and 782ERGPS 12V High Current AC Adaptor at keypad side, prior to the first keypad.
The **Next** button on touchscreen or any other virtual button in top right corner of the screen is not operational	**Protect** switch on MX88/MRC88m is left in **Off** position. Protect Off setting is only to be used during the *QuickConfig* setup.	Return the **Protect** switch to **On** position and reset the MX88/MRC88m system
No control of IR sources	1. Wiring: Incorrect wiring between MRKP2 and MRC88m. 2. IR emitter defective at source. 3. IR Enable jumper is set incorrectly	Verify and correct wiring. Replace IR emitter. Make sure IR Sensor Enable jumper is properly configured. (See Section 3 and Figure 3.1)
Intermittent IR source control	IR flooding	Check to see if ambient light is shining on built in IR receiver or in direct line with plasma TV noise. If the IR emitter is flashing when IR is not being sent, IR flooding is likely cause. Disable the built-in IR Receiver. Consider use of an external IR Receiver (see Fig 2.2 and 3.2).

6. Specifications

MRKP2 basic dimensions and cable lengths		
Front panel dimensions	4-1/2" (114mm) wide x 4-5/8" (117mm) high x 1/4" (6mm) deep	
Wall cutout	Depends on electrical back-box used – see below	
Mounting depth	2-1/4" (57mm) for unit and wiring – actual mounting depth will depend on electrical back-box used	
Max length Cat-5 Cable* with 1 keypad per zone	250 feet (75 meters) total per zone* If this distance is exceeded, a MRC44CB1 and 782ERGPS should be placed right before the keypad.	
Max length Cat-5 cable* with 1 keypad and 1, 2, or 3 expansion keypads	Must use MRC44CB1 connecting block and 782ERGPS 12V High Current AC adaptor at and before the first keypad. After the first keypad, each time a cable run exceeds 250 feet (75 meters) total, another MRC44CB1 and 782ERGPS will need to be added before the next keypad.	
Operating Temperature & Humidity	32-104°F (0-40°C) 0-90% Relative Humidity	

Compatible Electrical back-boxes		
North American standard two gang electrical back boxes	Carlon® BH235A, B232A-UPC, B225R-UPC, or BH234R	

* CAT5/5e/6/7 may be used. Cable quality may reduce this maximum length.

Extending external IR receiver connection with 3-wire cable		Extending external IR receiver connection with Cat-5 cable using all 8 conductors
Size (AWG)	Maximum allowable length (feet)	
24	150	Use 4 striped wires for GND
22	300	Use 2 solid wires for IR signal
20	1000	Use 2 solid wires for +12V
18	2000	

Xantech Limited Warranty

Xantech LLC ("Xantech") warrants this product to be free defects in materials and workmanship for a period of two years from the date of documented purchase by the original consumer. Any products returned to Xantech and found to be defective by Xantech within the warranty period will be repaired or replaced, at Xantech's option, at no charge. Xantech will not be responsible for the actual cost of the installation or removal of the product, nor for any incidental or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you. This warranty gives you specific legal rights. You may have additional legal rights that vary from state to state.

Xantech® is a registered trademark of Xantech LLC
Carlon® is a registered trademark of Thomas & Betts Corporation
Apple® and iPad® are registered trademarks of Apple Inc.
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Xantech LLC

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Document #08905262B