PoleVault Digital Switcher Systems

featuring the PVS 407D Switcher

Includes installation details for the PoleVault (PMK 560), WallVault (WMK 160 and USFM 100), and PlenumVault (PVM 220) Mounting Kits.

ALSO AVAILABLE:
The PoleVault® System
Installation Video.
View it at www.extron.com.

Extron Electronics

INTERFACING, SWITCHING AND CONTROL

Safety Instructions

Safety Instructions • English

> **WARNING:** This symbol, ⚠, when used on the product, is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

> **ATTENTION:** This symbol, ⚠, when used on the product, is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

For information on safety guidelines, regulatory compliances, EMI/EMF compatibility, accessibility, and related topics, see the Extron Safety and Regulatory Compliance Guide, part number 68-290-01, on the Extron website, **www.extron.com.**

Instructions de sécurité • Français

> **AVERTISSEMENT:** Ce pictogramme, ⚠, lorsqu'il est utilisé sur le produit, signale à l'utilisateur la présence à l'intérieur du boîtier du produit d'une tension électrique dangereuse susceptible de provoquer un choc électrique.

> **ATTENTION:** Ce pictogramme, ⚠, lorsqu'il est utilisé sur le produit, signale à l'utilisateur des instructions d'utilisation ou de maintenance importantes qui se trouvent dans la documentation fournie avec le matériel.

Pour en savoir plus sur les règles de sécurité, la conformité à la réglementation, la compatibilité EMI/EMF, l'accessibilité, et autres sujets connexes, lisez les informations de sécurité et de conformité Extron, réf. 68-290-01, sur le site Extron, **www.extron.com**.

Sicherheitsanweisungen • Deutsch

> **WARNUNG:** Dieses Symbol ⚠ auf dem Produkt soll den Benutzer darauf aufmerksam machen, dass im Inneren des Gehäuses dieses Produktes gefährliche Spannungen herrschen, die nicht isoliert sind und die einen elektrischen Schlag verursachen können.

> **VORSICHT: Dieses Symbol ⚠ auf dem Produkt soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.**

Weitere Informationen über die Sicherheitsrichtlinien, Produkthandhabung, EMI/EMF-Kompatibilität, Zugänglichkeit und verwandte Themen finden Sie in den Extron-Richtlinien für Sicherheit und Handhabung (Artikelnummer 68-290-01) auf der Extron-Website, **www.extron.com.**

Instrucciones de seguridad • Español

> **ADVERTENCIA:** Este símbolo, ⚠, cuando se utiliza en el producto, avisa al usuario de la presencia de voltaje peligroso sin aislar dentro del producto, lo que puede representar un riesgo de descarga eléctrica.

> **ATENCIÓN:** Este símbolo, ⚠, cuando se utiliza en el producto, avisa al usuario de la presencia de importantes instrucciones de uso y mantenimiento recogidas en la documentación proporcionada con el equipo.

Para obtener información sobre directrices de seguridad, cumplimiento de normativas, compatibilidad electromagnética, accesibilidad y temas relacionados, consulte la Guía de cumplimiento de normativas y seguridad de Extron, referencia 68-290-01, en el sitio Web de Extron, **www.extron.com.**

Инструкция по технике безопасности • Русский

> **ПРЕДУПРЕЖДЕНИЕ:** Данный символ, ⚠, если указан на продукте, предупреждает пользователя о наличии неизолированного опасного напряжения внутри корпуса продукта, которое может привести к поражению электрическим током.

> **ВНИМАНИЕ:** Данный символ, ⚠, если указан на продукте, предупреждает пользователя о наличии важных инструкций по эксплуатации и обслуживанию в руководстве, прилагаемом к данному оборудованию.

Для получения информации о правилах техники безопасности, соблюдении нормативных требований, электромагнитной совместимости (ЭМП/ЭДС), возможности доступа и других вопросах см. руководство по безопасности и соблюдению нормативных требований Extron на сайте Extron: **www.extron.com,** номер по каталогу - 68-290-01.

Chinese Simplified（简体中文）

> **警告**：⚠产品上的这个标志意在警告用户该产品机壳内有暴露的危险 电压，有触电危险。

> **注意**：⚠ 产品上的这个标志意在提示用户设备随附的用户手册中有重要的操作和维护(维修) 说明。

关于我们产品的安全指南、遵循的规范、EMI/EMF 的兼容性、无障碍使用的特性等相关内容，敬请访问 Extron 网站 **www.extron.com**，参见 Extron 安全规范指南，产品编号 68-290-01。

Chinese Traditional（繁體中文）

> **警告**: ⚠若產品上使用此符號，是為了提醒使用者，產品機殼內存在著可能會導致觸電之風險的未絕緣危險電壓。

> **注意** ⚠ 若產品上使用此符號，是為了提醒使用者，設備隨附的用戶手冊中有重要的操作和維護（維修）說明。

有關安全性指導方針、法規遵守、EMI/EMF 相容性、存取範圍和相關主題的詳細資訊，請瀏覽 Extron 網站: **www.extron.com**，然後參閱《Extron 安全性與法規遵守手冊》，準則編號 68-290-01。

Japanese

> **警告:** この記号 ⚠ が製品上に表示されている場合は、筐体内に絶縁されていない高電圧が流れ、感電の危険があることを示しています。

> **注意:** この記号 ⚠ が製品上に表示されている場合は、本機の取扱説明書に 記載されている重要な操作と保守(整備)の指示についてユーザーの注意を喚起するものです。

安全上のご注意、法規厳守、EMI/EMF適合性、その他の関連項目については、エクストロンのウェブサイト **www.extron.com** より『Extron Safety and Regulatory Compliance Guide』(P/N 68-290-01) をご覧ください。

Korean

> **경고**: 이 기호 ⚠ 가 제품에 사용될 경우, 제품의 인클로저 내에 있는 접지되지 않은 위험한 전류로 인해 사용자가 감전될 위험이 있음을 경고합니다.

> **주의**: 이 기호 ⚠ 가 제품에 사용될 경우, 장비와 함께 제공된 책자에 나와 있는 주요 운영 및 유지보수(정비) 지침을 경고합니다.

안전 가이드라인, 규제 준수, EMI/EMF 호환성, 접근성, 그리고 관련 항목에 대한 자세한 내용은 Extron 웹 사이트(**www.extron.com**)의 Extron 안전 및 규제 준수 안내서, 68-290-01 조항을 참조하십시오.

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. The Class A limits provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference. This interference must be corrected at the expense of the user

> **NOTE:** For more information on safety guidelines, regulatory compliances, EMI/EMF compatibility, accessibility, and related topics, see the "**Extron Safety and Regulatory Compliance Guide**" on the Extron Website.

Conventions Used in this Guide

Notifications

The following notifications are used in this guide:

> **DANGER:**
> - Will result in serious injury or death.
> - Entraînera des blessures graves ou la mort.

> **WARNING:**   Potential risk of severe injury or death.
> **AVERTISSEMENT :** Risque potentiel de blessure grave ou de mort.

> **CAUTION:**   Risk of minor personal injury.
> **ATTENTION :**   Risque de blessure mineure.

> **ATTENTION:**
> - Risk of property damage.
> - Risque de dommages matériels.

> **NOTE:**   A note draws attention to important information.

> **TIP:**   A tip provides a suggestion to make working with the application easier.

Software Commands

Commands are written in the fonts shown here:

```
^AR Merge Scene,,Op1 scene 1,1 ^B 51 ^W^C
[Ø1] R ØØØ4 ØØ3ØØ ØØ4ØØ ØØ8ØØ ØØ6ØØ [Ø2] 35 [17] [Ø3]
```

[Esc] [X1] * [X17] * [X20] * [X23] * [X21] CE ←

> **NOTE:**   For commands and examples of computer or device responses mentioned in this guide, the character "Ø" is used for the number zero and "O" is the capital letter "o."

Computer responses and directory paths not having variables are written in the font shown here:

```
Reply from 2Ø8.132.18Ø.48: bytes=32 times=2ms TTL=32
C:\Program Files\Extron
```

Variables are written in slanted form as shown here:

```
ping xxx.xxx.xxx.xxx –t
SOH R Data STX Command ETB ETX
```

Selectable items, such as menu names, menu options, buttons, tabs, and field names are written in the font shown here:

From the **File** menu, select **New**.

Click the **OK** button.

Specifications Availability

Product specifications are available on the Extron Website, **www.extron.com**.

Extron Glossary of Terms

A glossary of terms is available at **http://www.extron.com/technology/glossary.aspx**

Contents

Introduction

Overview

This guide covers the installation of the Extron PoleVault Digital System, and also the installation methods for each type of WallVault and PlenumVault enclosure.

> **NOTE:** PoleVault, WallVault, and PlenumVault Digital systems use the same digital PVS switcher, input source AV devices, control device, and ceiling speakers. However, the systems have different mounting enclosures, (PMK 560, USFM 100, WMK 160, and PVM 220), depending on the system type. This guide attempts to use a basic PoleVault Digital System setup to cover installing the common system components, and highlights the different enclosure installations separately.

The PoleVault Digital System is used in a drop ceiling room with a wood or concrete structural ceiling. If the location has a concrete or beam style ceiling, alternative ceiling mounts can be obtained separately from Extron.

WallVault Systems are specifically developed for classrooms or lecture rooms with a wall mounted short-throw projector or flat panel display. WallVault Systems utilize either the USFM 100 or WMK 160 enclosures to securely mount and conceal the system switching and audio amplification components on the wall.

PlenumVault Systems are designed for rooms with a suspended ceiling. They utilize the PVM 220 PlenumVault Mounting Kit that securely mounts and conceals system components in the plenum space above the suspended ceiling.

It is assumed that the installer has some knowledge and experience of AV, electrical, or electronic device installation. This guide takes the AV installer through the steps for installation and connection of each of the system component parts.

It may be that the locations for the devices (for example, wallplates, projector, and screen) have been pre-determined. However, some room installation examples are given to help in installations where final location is yet to be determined.

The Digital PoleVault, WallVault, and PlenumVault Systems

The Digital PoleVault, WallVault, and PlenumVault Systems are easy-to-use, network-enabled, all-inclusive packages, making them ideal for single-display classrooms. These Systems use shielded twisted pair cables for transmitting signals and include network connectivity for Web-based asset management, monitoring, and control.

> **NOTES:**
> - The hardware and devices listed on the **inventory pages** have detailed safety information, installation, set-up, and configuration instructions which should be referred to as needed.
> - For operation and setup of the projector, screen, and input devices, refer to the relevant manufacturer manuals supplied with those devices.
> - A PoleVault System Installation video is viewable online at **www.extron.com**. This video is also a step-by-step guide to installing PoleVault System and is useful for first-time installations.

Application Diagram

**Extron
FF 120**
Flat Field
Speakers
- 1 Pair

TCP/IP
Network

**Extron
SPK 18 - 35'**
Cable

Ethernet

**Extron
VLR 102**
VoiceLift
Receiver

**Extron
PCM 340**
Projector Drop
Ceiling Mount
with Adjustable
Pole

**Extron
PMK 560**
PoleVault
Pole Mount Kit

**Extron
PVS 407D**
PoleVault Switcher

**Extron
PVT HDMI RGB**
HDMI, RGB & Audio
Input Wallplate

Presenter
Laptop

HDMI

VGA

**Extron
UPB 125**
Universal Projector
Mounting Bracket

RS-232
to Switcher

RS-232
to Projector

Document
Camera

**Extron
PVT HDMI**
Dual HDMI & Audio
Input Wallplate

HDMI

Ethernet

**Extron
VLM 2000H**
VoiceLift Microphone
with Charging Station

Blu-ray Player

Legend:

**Extron
MLC 104 IP Plus**
MediaLink Controller

Video Audio Control CATx

Figure 1.   PoleVault System Installation and Wiring Overview

Before You Begin — Planning the Installation

Before installation is started, you must consider several major factors to ensure that the installation process is as smooth and trouble free as possible, and so that the final finished project meets the needs of the customers, users, audiences, and installer.

The installation considerations on the following pages, though not comprehensive, should be consulted to help ensure that key installation aspects have been considered.

Americans with Disabilities Act (ADA) Compliance

When planning where to install the Polevault System, you may need to consider factors affecting accessibility of the system such as the height of devices from the floor (for example the MLC controller), distance from obstructions, and how far a user must reach to press any device buttons.

For guidelines, see sections 307 ("Protruding Objects") and 308 ("Reach Ranges") of the 2010 ADA Standards for Accessible Design available at:
http://www.ada.gov/regs2010/2010ADAStandards/2010ADAStandards.pdf.

Room Layout

The Room

The application diagram below shows a typical classroom installation.

Figure 2.   Typical Classroom Installation

Room factors to be considered should include, but are not confined to:

- **Room size, orientation, and layout**:
    - Audience factors (for example number, ADA requirements, seating arrangements)
    - Existing installed furniture (bookcases, racks, cabinets, workbenches, sinks, and so forth)
    - Windows, doors, and support pillar locations in relationship to the proposed screen location

- **Ceiling and wall type** (important in assessing the hardware needed)
  - Ceiling type: dropped, spline, hard lid, and similar.
    Structural type (wood, concrete, trusses), plenum or non-plenum
  - Wall type: drywall, cement, brick.

> **WARNING:** **Structural ceiling failure could cause death serious injury or death**. Check the structural ceiling to ensure that it can handle a load four times the weight of the final setup.
>
> **AVERTISSEMENT : Un défaut dans la structure du plafond pourrait provoquer des blessures graves voire mortelles.** Vérifier la structure du plafond afin de vous assurer qu'il peut supporter une charge quatre fois supérieure au poids de l'installation finale.

- **Lighting:**
  - Type and control (important for projector image viewing)
  - Ambient light from windows
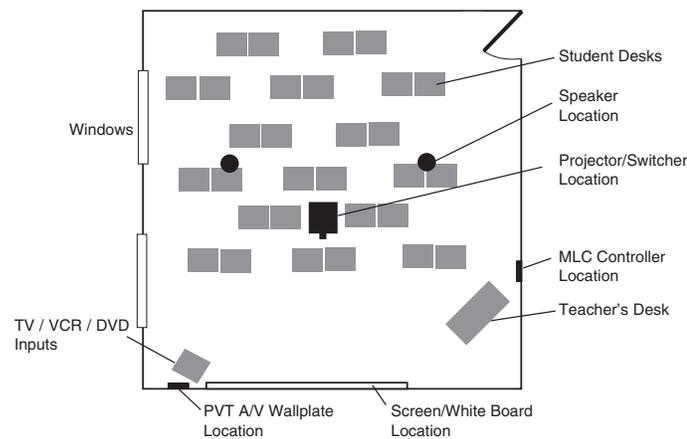
Figure 3.   **Example Classroom Installation**

Location of the Screen and Projector

Factors to consider include:

- Proposed screen location (normally located at the front center of the room)
- The lowered screen does not cover safety devices, such as fire alarm strobes.
- Dimensions and type of screen (maximum image size, motorized or hanging screen)
- Proposed projector location
- Projector aligned with center of the screen and not an obstruction to viewing
- Projector throw distance (maximum and minimum limits to the screen) of the image
- Horizontal offset (horizontal distance from the center of the lens to the center of the projector)
- Vertical offset of the projected image (height relationship between the projector and the screen).
- Projector angle (image projected up, down, or horizontal to screen)
- Power source for the projector: existing and accessible or needing installation
- Projector weight: the Universal Projector Bracket (UPB 125) supports a maximum weight of 15 pounds (6.8 kg).

- Viewing obstructions: pillars, furniture and so forth, window locations for glare reduction, obstructions between projector and screen.
- Overhead clearances (refer to a copy of *ADA Standards for Accessible Design*, *Sections 307 and 308,* for ADA requirements).

Location of MediaLink Controller and Wall Plates

- Forward and side reach (for full details refer to a copy of *ADA Standards for Accessible Design, Sections 307 and 308,* for ADA requirements)*.*
- Location of source devices: Desk, table, or rack mounted, and proximity to proposed transmitter location (wall, podium, or furniture)
- Cabling obstacles: Studs, utility pipes, power supply location (raceway installation needed?)
- Network drop for MediaLink Controller: Wall or floor cabled

Type and Location of the Speakers

- Speaker type based on room ceiling and wall type
- Total number and spacing of speakers Based on ceiling height and room size
- Audience seating and room acoustics: Desired spread and evenness of sound coverage and ambient noise level compensation
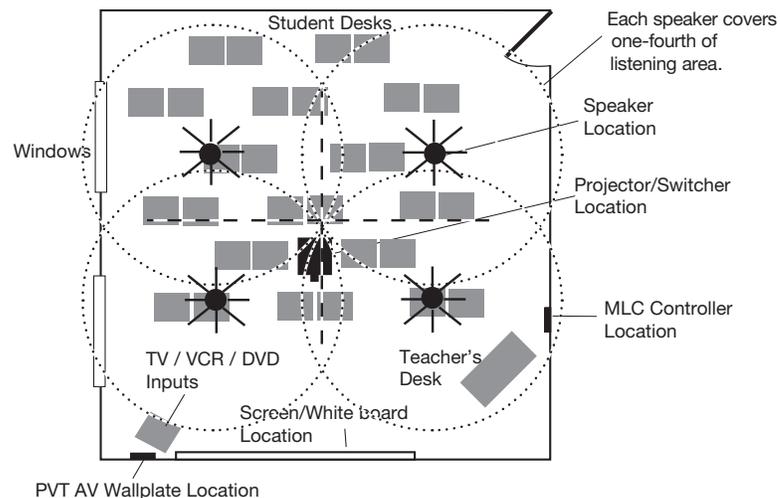
Figure 4. **Example Classroom with Four Speaker Installation**

Inventory — PoleVault Digital System

The PoleVault Digital System (PVS xxx) ships in two boxes. The larger box contains the devices and hardware, individually boxed and labeled. The smaller box contains only the FF 120 speakers.
Carefully check all the received items against the lists on this and the next page.

PoleVault Digital System Devices and Hardware

PoleVault Digital System
42-307-03 or 42-308-03

PCM 340

PCM 340 White
70-656-23
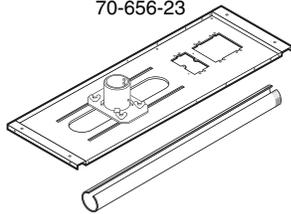
PCM 340
Projector Drop Ceiling Mount

Accesories
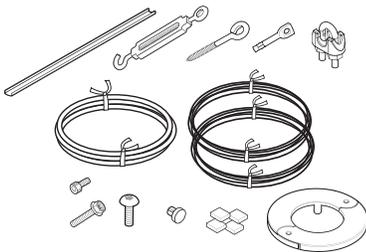
(1) Snap-in trim piece
(4) Turnbuckles
(5) Lag eye bolts
(5) Concrete anchors
(2) Cable clamps, Galv steel
(1) Safety wire (15 ft. 1/8 in. dia)
(2) Tie wire (30 ft., 14 AWG)
(4) T-frame screws
(2) Set screws
(1) Location screw
(11) Hole plugs
(4) Adhesive pads
(1) 25 in. slotted pipe
(1) Escutcheon ring

UPB 125

UPB 125 White
70-902-03
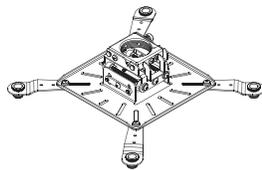
UPB 125
Universal Projector Bracket

Accesories
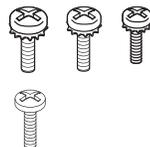
(4) M5 x 10 mm securing screws
(4) M4 x 8 mm screws
(4) M5 x 12 mm screws
(4) M6 x 12 mm screws
(1) M5 x 10 mm lock screw

PMK 560

PMK 560 White
70-1034-03
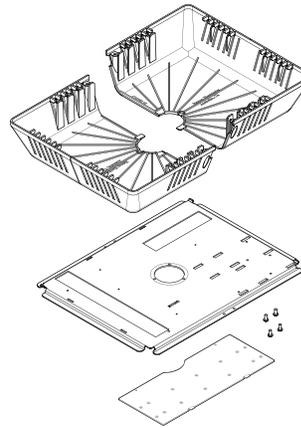
PMK 560
Pole Mount Kit

The PVS 407D may come pre-installed on the PMK 560.

Accesories
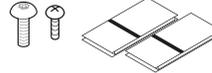
(4) 10-32 cover screws
(3) 4-40 screws
(2) Velcro® pads
(1) Tie wrap

Cables

(1) SPK 18, 35 ft

(1) MLC, PW/RS232/VC, 50 ft

(1) MLC IR Serial, 50 ft

(1) HDMI Micro, 3 ft

XTP DTP 24 cable, 35 ft
(Quantity varies depending on PVS system ordered).

(1) 26-637-50 CAT5e Plenum Patch Cable, 50 ft

Cables may be boxed separately or loose inside larger box.

NOTE Items are not drawn to scale

Kits

- PVS 201D (part number **42-307-03**) includes one PVT SW HDMI D
- PVS 401D (part number **42-308-03**) includes one PVT SW HDMI RGB D and one PVT SW HDMI D.

> **NOTE:** If any items in the PoleVault Digital System boxes are damaged or missing, contact the **Extron Technical Support Hotline** (see rear cover for contact numbers).

PoleVault Digital System Devices and Hardware, cont'd

PoleVault Digital System
42-307-03 or 42-308-03

PVS 407D

This item may come pre-installed on the PMK 560.
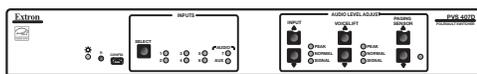
PVS 407D
PoleVault Digital Switcher
60-1466-01
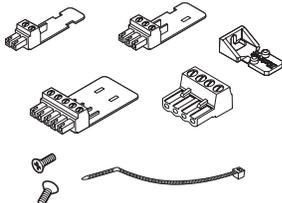
(1) 2-pole connector
(1) 2-pole connector (orange, power)
(3) 3-pole connectors
(2) 5-pole connectors
(1) Audio connector, 4-pole
(2) Securing screws
(7) Tie wraps
(3) HDMI LockIt brackets
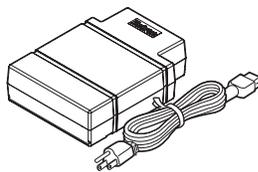
(1) Power supply
(1) Power cord

PVT HDMI RGB
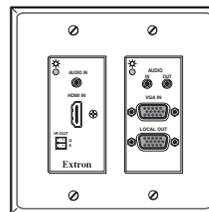
PVT HDMI RGB
White
60-1335-13
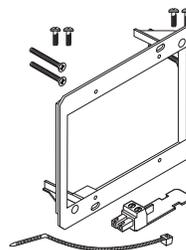
(1) Mud ring
(4) PVT mounting screws
(1) Decora® faceplate
(4) Faceplate screws
(1) 2-pole connector
(1) Tie wrap

or optional
PVT HDMI
60-1270-13

MLC 104 IP Plus
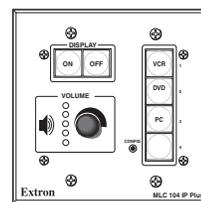
MLC 104 IP Plus
60-818-03
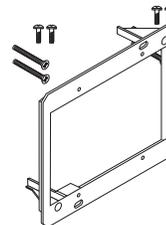
(1) Mud ring
(8) Mounting screws
(4) Faceplate screws
(2) Faceplates -
   (1) White (on unit)
   (1) Black

FF 120
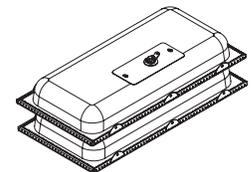
FF 120
42-120-03
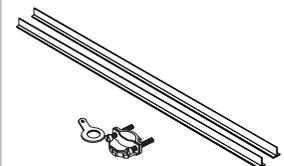
(2) Cable clamps - Anchor ring
(2) T-rails

Inventory — WallVault Systems (USFM 100)
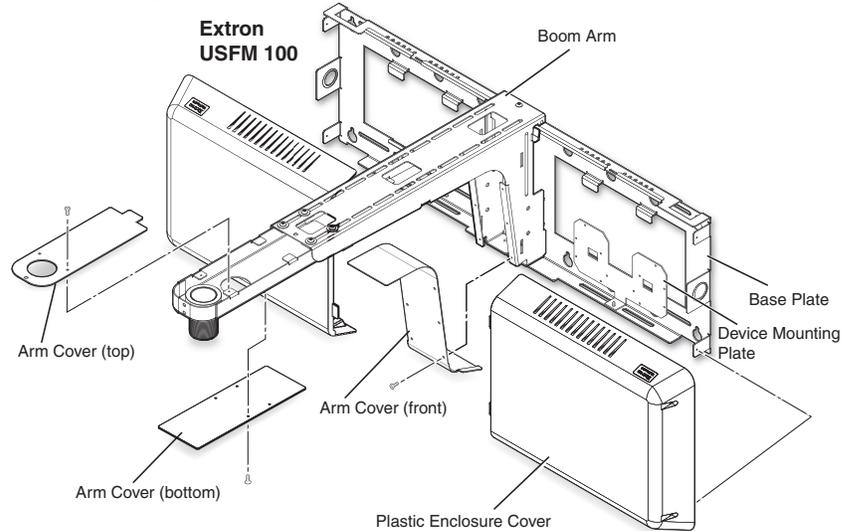
Figure 5. USFM 100 for WVS 201D and WVS 401D WallVault Systems

42-309-03 WVS 201D

Part Number	Description	Quantity
26-621-50	MLC IR Serial cable, 50 ft	1
26-626-50	MLC PW/RS-232 cable, 50 ft	1
26-627-35	Speaker cable, 35 ft	2
26-637-50	CAT5e Plenum Patch cable, 50 ft	1
26-663-06	HDMI Ultra cable, 6 ft	1
26-695-35	XTP DTP 24 cable, 35 ft	1
42-120-03	FF 120 speakers	1 pair
60-818-03	MLC 104 IP Plus	1
60-1335-13	PVT HDMI RGB	1
60-1466-01	PVS 407D	1
70-744-03	USFM 100	1
70-902-03	UPB 125	1

42-310-03 WVS 401D

Part Number	Description	Quantity
26-621-50	MLC IR Serial cable, 50 ft	1
26-626-50	MLC PW/RS-232 cable, 50 ft	1
26-627-35	Speaker cable, 35 ft	2
26-637-50	CAT5e Plenum Patch cable, 50 ft	1
26-663-06	HDMI Ultra cable, 6 ft	1
26-695-35	XTP DTP 24 cable, 35 ft	2
42-120-03	FF 120 speakers	1 pair
60-818-03	MLC 104 IP Plus	1
60-1270-13	PVT HDMI	1
60-1335-13	PVT HDMI RGB	1
60-1466-01	PVS 407D	1
70-744-03	USFM 100	1
70-902-03	UPB 125	1

Inventory — WallVault Systems (WMK 160)
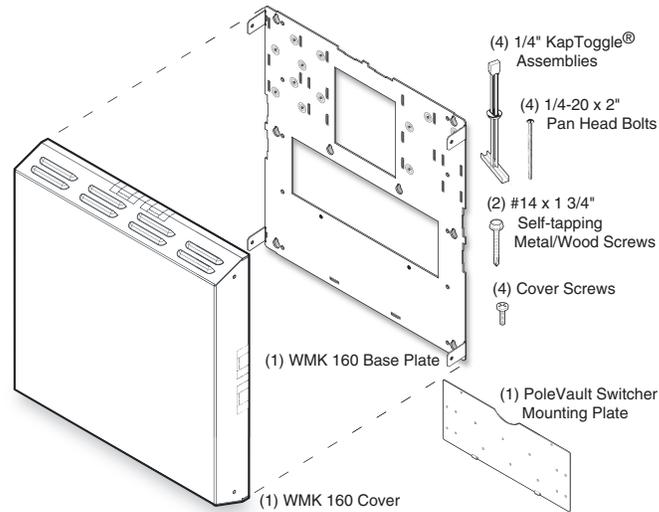
Figure 6. **WMK 160 for WVS 211D and WVS 411D WallVault Systems**

42-311-03 WVS 211D

Part Number	Description	Quantity
26-621-50	MLC IR Serial cable, 50 ft	1
26-626-50	MLC PW/RS-232 cable, 50 ft	1
26-627-35	Speaker cable, 35 ft	2
26-637-50	CAT5e Plenum Patch cable, 50 ft	1
26-692-15	HDMI Plenum M-M cable, 15 ft	1
26-695-35	XTP DTP 24 cable, 35 ft	1
42-120-03	FF 120 speakers	1 pair
60-818-03	MLC 104 IP Plus	1
60-1335-13	PVT HDMI RGB	1
60-1466-01	PVS 407D	1
70-1030-03	WMK 160	1

42-312-03 WVS 411D

Part Number	Description	Quantity
26-621-50	MLC IR Serial cable, 50 ft	1
26-626-50	MLC PW/RS-232 cable, 50 ft	1
26-627-35	Speaker cable, 35 ft	2
26-637-50	CAT5e Plenum Patch cable, 50 ft	1
26-692-15	HDMI Plenum M-M cable, 15 ft	1
26-695-35	XTP DTP 24 cable, 35 ft	2
42-120-03	FF 120 speakers	1 pair
60-818-03	MLC 104 IP Plus	1
60-1270-13	PVT HDMI	1
60-1335-13	PVT HDMI RGB	1
60-1466-01	PVS 407D	1
70-1030-03	WMK 160	1

Inventory — PlenumVault Systems (PVM 220)
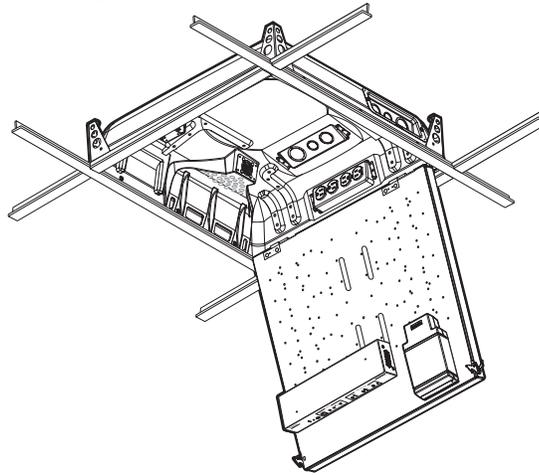
Figure 7. **PVM 220 for PLS 201D, PLS 211D, PLS 401D, and PLVS 411D PlenumVault Systems**

42-320-03 PLS 201D

Part Number	Description	Quantity
26-621-50	MLC IR Serial cable, 50 ft	1
26-626-50	MLC PW/RS-232 cable, 50 ft	1
26-627-35	Speaker cable, 35 ft	1
26-637-50	CAT5e Plenum Patch cable, 50 ft	1
26-692-15	HDMI Plenum M-M cable, 15 ft	1
26-695-35	XTP DTP 24 cable, 35 ft	1
42-120-03	FF 120 speakers	1 pair
60-818-03	MLC 104 IP Plus	1
60-1335-13	PVT HDMI RGB	1
70-656-23	PCM 340	1
70-902-03	UPB 125	1
70-1135-01	KTS, PVM 220/PVS 407D/PS	1

42-321-03 PLS 401D

Part Number	Description	Quantity
26-621-50	MLC IR Serial cable, 50 ft	1
26-626-50	MLC PW/RS-232 cable, 50 ft	1
26-627-35	Speaker cable, 35 ft	1
26-637-50	CAT5e Plenum Patch cable, 50 ft	1
26-692-15	HDMI Plenum M-M cable, 15 ft	1
26-695-35	XTP DTP 24 cable, 35 ft	2
42-120-03	FF 120 speakers	1 pair
60-818-03	MLC 104 IP Plus	1
60-1270-13	PVT HDMI	1
60-1335-13	PVT HDMI RGB	1
70-656-23	PCM 340	1
70-902-03	UPB 125	1
70-1135-01	KTS, PVM 220/PVS 407D/PS	1

42-330-03 PLS 211D

Part Number	Description	Quantity
26-621-50	MLC IR Serial cable, 50 ft	1
26-626-50	MLC PW/RS-232 cable, 50 ft	1
26-627-35	Speaker cable, 35 ft	2
26-637-50	CAT5e Plenum Patch cable, 50 ft	1
26-692-15	HDMI Plenum M-M cable, 15 ft	1
26-695-35	XTP DTP 24 cable, 35 ft	1
42-120-03	FF 120 speakers	1 pair
60-818-03	MLC 104 IP Plus	1
60-1335-13	PVT HDMI RGB	1
70-1135-01	KTS, PVM 220/PVS 407D/PS	1

42-331-03 PLS 411D

Part Number	Description	Quantity
26-621-50	MLC IR Serial cable, 50 ft	1
26-626-50	MLC PW/RS-232 cable, 50 ft	1
26-627-35	Speaker cable, 35 ft	2
26-637-50	CAT5e Plenum Patch cable, 50 ft	1
26-692-15	HDMI Plenum M-M cable, 15 ft	1
26-695-35	XTP DTP 24 cable, 35 ft	2
42-120-03	FF 120 speakers	1 pair
60-818-03	MLC 104 IP Plus	1
60-1270-13	PVT HDMI	1
60-1335-13	PVT HDMI RGB	1
70-1135-01	KTS, PVM 220/PVS 407D/PS	1

Items Not Included

The following items are not included in the systems. However, input and display devices are essential parts of the system, and at any installation they may vary depending on their use. This list suggests various devices that may be used.

- Projector (or display device)
- Screen (and mounting hardware)
- Input devices, such as:
    - Blu-ray
    - Document camera (and cables)
    - PC or Mac computer (with keyboard, mouse, local monitor, VGA cables, RJ-45 network cables, power cords, and, where desired, a P/2 DA2 or other distribution amplifier [DA] for PC signal to local monitor)
- Installation hardware needed (may vary per installation):
    - Bolts for concrete structural ceilings where needed
    - Toggle bolts (used for screen mounting on dry wall)
    - S-hooks for hanging the screen
    - Spare ceiling tiles in case of accidental damage during installation
    - Electrical box, where installation of a box on the PCM 340 is desired
    - Safety wire, lag eye bolts, and strain reliefs for installation and securing ceiling speakers
    - Heat shrink, extension cord

Installation Tools

To aid the professional installer, this checklist gives the tools recommended to complete the installation. Tools should include, but are not confined to:

- Laser level, or two levels (large for screen installation, small for wall plates and projector mounts)
- Tape measure
- Stud finder
- Drill and drill bit set including a unibit to cut through metal studs
- Extension drill bit (3/4 inch min., 4 to 8 foot length, to drill through fire breaks)
- Socket set
- Pipe strap or wrapped pipe wrench
- Pliers and wire strippers
- Standard screwdriver set and Extron Tweeker
- Cable cutters (to cut safety wire)

- Drywall saw and hacksaw blade mounted on handle (for cutting ceiling tiles)
- Flashlight and safety goggles
- Razor knife
- 2 inch hole saw
- Painter's tape (to mark up walls), pencil, and marker pen
- RJ-45 crimpers and RJ-45 connectors
- Voltage tester
- Fish tape, pull string, and electrical tape (for taping fish tape to pull string)
- Zip ties
- Vacuum cleaner
- Heat gun

Optional Items

The optional Extron products suggested below can be added to or substituted for items in the standard Digital PoleVault System. Some of these items may also be suitable for the Digital WallVault or PlenumVault Sytems.

- **Accessories**

  MLC 104 IP Plus DV+ controller (includes DVD/VCR IR control)
  MLC 104 IP Plus L controller (with lectern faceplate)
  MLC 104 IP Plus AAP controller (with AAP opening)
  MLC 226 IP controller
  PPS 25 Priority Page Sensor (w/Cable & Metal Junction Box)
  PPS 35 Priority Page Sensor for PoleVault Digital Systems
  SM 3 (Compact Full-Range Surface Mount Speakers)
  SI 3C LP (Full-Range Ceiling Speakers with 4" Low Profile Back Can)
  Wall mount speakers (for example, SI 26) or extra ceiling speakers
  VLM 1000 VoiceLift Microphone System or VLM 2000 System

- **Installation hardware**

  FCMP (flat ceiling mount)
  ACMP (angled ceiling mount)
  SMB (surface mount boxes for installing the MLC on a podium or desk)
  EWB (external wall boxes to mount devices for a surface raceway system)

Installation - Overview

Overview

The following sections outline the basic steps for installing the PoleVault System. An outline and checklist of the stages (Stages One through Five), listing the relevant steps within each stage, is given on **page 16** and the **rear cover**. A fully detailed description of these steps is given in the five corresponding sections.

Carefully check inventory of PoleVault System packages, input and output devices, any optional accessories, and installation hardware before commencing.

> **NOTES:**
> - Additional installation hardware is needed for this installation, and should be supplied by the installer. See **Items Not Included** on page 12 for a list of items that you may need.
> - Refer to local building standards and codes to verify that the installation will meet all the regulatory requirements.
> - Observe all local and national building and safety codes, UL requirements, and ADA accessibility guidelines.

Similar outline lists of steps for installing **WallVault** (WMK 160 or USFM 100) and **PlenumVault** (PVM 220) Digital Systems can be found on pages 73 through 76.

Outline of Installation Steps for PoleVault Digital Systems

Stage 1 — Install the Screen and Projector.
- ☐ Mark the screen location (page 18).
- ☐ Install projector to verify location (page 18).
- ☐ Verify the image location (page 21).
- ☐ Cut the ceiling tile (page 22).
- ☐ Preliminary safety hardware installation (page 22).
- ☐ Finish projector drop ceiling mount installation (page 23).
- ☐ Secure the projector drop ceiling mount to the ceiling (page 24).
- ☐ Install the electrical box (if required) (page 25).
- ☐ Install the screen (page 25).

Stage 2 — Mount the PVT Wall Plates and the MLC 104 IP Plus.
- ☐ Install the mud rings (page 29).
- ☐ Pull cables (at the input locations) (page 30).
- ☐ Install the wallplates (page 31).
- ☐ Install the MediaLink Controller (page 32).

Stage 3 — Install the FF 120 Speakers.
- ☐ Cut the ceiling tile (page 36).
- ☐ Install the speaker on the drop ceiling (page 36).
- ☐ Terminate the speaker cable for the PVS switcher (page 38).

Stage 4A — Install the PMK 560 and PVS 407D.
- ☐ Install the PMK 560 base plate (page 40).
- ☐ Pull the cables (at the switcher location) (page 41).
- ☐ Finish installing the pole mount kit (page 43)

Stage 5 — Configure the PoleVault Switcher and the System.
- ☐ Configure the switcher — PCS Configuration program (page 61).
- ☐ Configure the system — Global Configurator (page 62).
- ☐ Test the system (page 63).
- ☐ Final installation (page 65).

Optional Accessory Installation
- ☐ Voice Lift System (page 66).
- ☐ Priority Page Sensor PPS 35 (page 67).
- ☐ Priority Page Sensor PPS 25 (page 69).

The pages listed above contain instructions for installing the PoleVault Digital System. Where possible, line drawings and photos from an actual installation are used to clarify some of the steps discussed in the text. Most images have a number corresponding to the step that is being described (for example, **3a**).

> **NOTE:** Similar outline lists of steps for installing WallVault (WMK 160 or USFM 100) and PlenumVault (PVM 220) Digital Systems can be found on pages 72 through 75.

Stage 1:
Installing the Screen
and Projector

Stage 1 Involves installing the three pieces of hardware shown below.

PCM 340 Projector Drop Ceiling Mount ❶

- **Where it goes:** Attaches to a structural ceiling, rests on the suspended ceiling.
- **What it does:** Holds the slotted pipe, PoleVault pole mount kit (PMK 560), and projector.

❶
PCM 340

Pipe Adapter Plate Wing Nuts (4)

T-bar Securing Screws (4)

1-gang and 2-gang Accessory Mounting Points (Power Sockets)

Pipe Adapter

Base Plate

Pipe Adapter Set Screws (2)
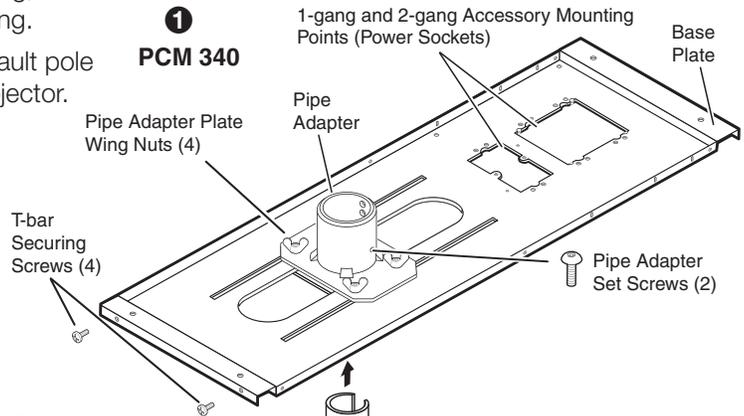
Slotted Pipe ❷

- **Where it goes:** Locks into place in the PCM 340 adapter.
- **What it does:** Holds the PMK 560 pole mount kit, UPB 125 Universal Projector Bracket, and projector.

❷
Slotted Pipe
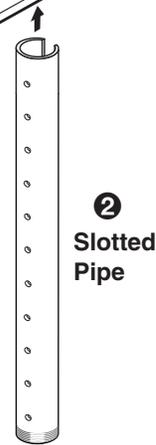
UPB 125 Universal Projector Bracket
(separated into two sections) ❸

- **Where it goes:** Pipe Adapter Block screws onto the base of the slotted pipe, and the Base Plate Assembly attaches to the projector.
- **What it does:** Attaches the projector to the PCM 340. Allows proper projector positioning and orientation.

❸
UPB 125

Pipe Adapter Block (Top Section)

Base Plate Assembly (Bottom Section)
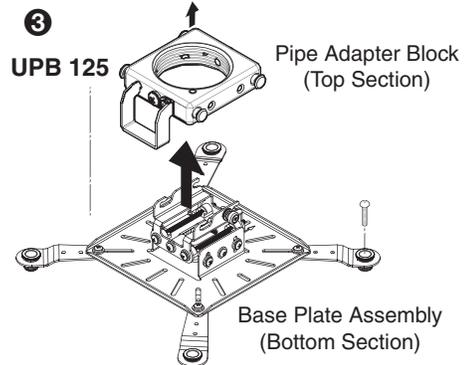
1. Mark Screen Location.

> **TIPS:**
> - When marking the location of screens, devices, or the site for installing transmitters and MediaLink control devices, use painters tape to avoid wall surface damage.
> - When marking the center line of the screen, where possible, keep it aligned with the center of the ceiling tile. This makes the projector installation and alignment easier.

1a Mark the screen location.

a. Mark the center line and the outer edges of the screen.

b. Mark any structural studs, utility pipes, conduits, or fire breaks before drilling the hardware holes. Do not drill the holes yet.

2. Install Projector to Verify Location.

a. Remove the ceiling tiles at the location, and mark the maximum and minimum throw distances on the T-frame. See the projector installation manual for more information.

> **TIP:** For ease of working on the T-frame, remove the adjacent tiles.

b. Place the PCM 340 over the T-frame, between the two marks. Lightly tighten the T-frame securing screws. The T-frame screws can be used on the outside or the inside to secure the PCM to the T-frame.

> **NOTE:** Place the PCM 340 on the T-frame so that the pipe adapter slides left to right in relation to the proposed screen location, rather than towards and away from it. This makes it easier to align and center the image.

Minimum/Maximum Throw Distance Marks

PCM 340

2b Place the PCM 340 on the T-bar.

c. Slide the slotted pipe up into the pipe adapter. Adjust to the desired height and align the location holes and pipe holes. Insert the location screw, lightly tightening it down using a 5/32 inch hex wrench. Insert and lightly tighten down the set screws onto the pipe. Do not overtighten. The pipe is removed and replaced later during installation.

Slotted Pipe

Pipe Adapter

Align pipe holes with location screw holes.

Insert location screw and secure.
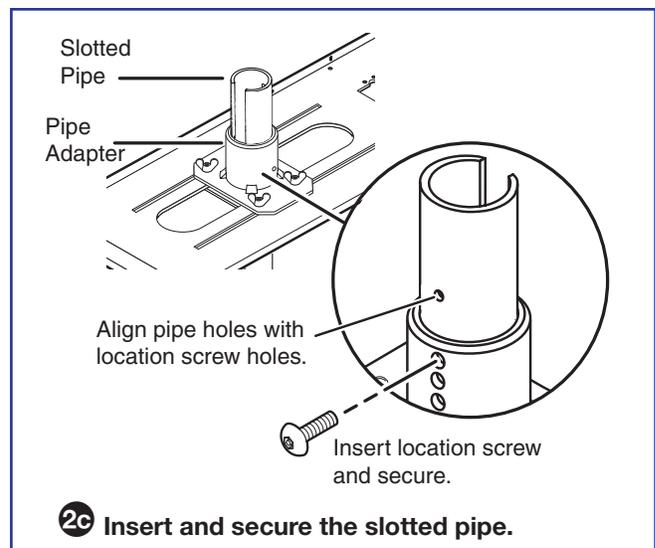
2c Insert and secure the slotted pipe.

d. Separate the two main parts (Pipe Adapter Block **Ⓐ** and Base Plate Assembly **Ⓑ**) of the UPB 125 (see the image at right).

e. Carefully follow the steps below to install the Base Plate Assembly on the projector.

   i. Invert the projector on a protected surface to access the mounting points.

   ii. At the end each of the arm **Ⓒ**, **rotate the barrel** so that it protrudes from the base of the arm about 1/4 inch.

   iii. Select the correct sized projector mounting screws **Ⓓ** that fit the projector mounting point inserts.

   iv. Attach the arms to the projector (see images at right.

   v. Pivot the arms so that they extend towards the center of the projector (see the figure at below right).
   It is critical to provide evenly level arms at each mounting point for the Base Plate Assembly to secure to.

> **ATTENTION:**
> - Do not overlap the arms.
> - Ne pas superposer les pattes de montage.

   vi. With the arrow on the Base Plate Assembly pointing towards the front of the projector, place the Base Plate Assembly on top of the arms and adjust for slot alignment with the holes in the arms.

   vii. Loosely secure each arm to the base plate (see the figure at bottom right).

   viii. As close as possible, balance the weight of the projector evenly across the Base Plate Assembly. Adjust the Plate on the arms as needed.

> **ATTENTION:**
> - Distribute the projector weight evenly.
> - Répartissez le poids du projecteur de façon égale sur les pattes.

Lift the assembly at opposite corners to assess if the configuration is approximately balanced.

Pipe Adapter Block

Ⓐ

Ⓓ Projector Mounting Screw

Arm Locking Screw and Washer

Ⓒ Arm

Barrel

Ⓑ Base Plate Assembly

Loosen the thumbscrew and slide the Pipe Adapter Block **Ⓐ** away from the Base Plate Assembly **Ⓑ**.

2d **Separate the Pipe Adaper Block and the Base Plate Assembly.**

⚠ **ATTENTION:** Center the Arm Barrel on the mounting point.

Insert and tighten down appropriate sized screw.

Mounting Point on the Projector Base

Pivot arms towards center of projector.

Align a screw hole with a slot in Base Plate Assembly. Then place washer, insert screw, and tighten down screw.

ix. **Check for stress on the arms.** To do this loosen the mounting screws (do not remove). If the arm or the barrel lifts, this indicates stress on the arm. Adjust the height of the threaded barrels to reduce or eliminate any torque or stress that might be caused by crossed arms or by projector mounting points with differing heights. It is important to keep the arms level and as close (low) to the projector base as possible.

Check that the projector weight is still as evenly distributed as possible.

Hand tighten all the screws until snug.

> **ATTENTION:**
> - Do not overtighten the mounting screws as this may damage the projector.
> - Ne serrez pas trop les vis de montage au risque d'endommager le projecteur.

f. Attach the Base Plate Assembly to the Pipe Adapter Block as follows:

i. Loosen the two set screws (M5) on the Projector Pipe Block and screw the Block onto the bottom of the pipe (see the figure at right). A minimum of three turns are needed to safely secure the bracket on the pipe.

ii. Swing open (down) the cable harness and thread through any cables exiting from the projector pipe (see images at lower right). Close the cable harness. This keeps the cables out of the way when attaching the Base Plate Assembly to the Pipe Adapter Block.

iii. Carefully lift the projector up to the Projector Pipe Block and, **with the projector facing forward**, slide the Base Plate Assembly onto the Projector Pipe Block (see images at right). Tighten down the thumbscrew.

iv. On the opposite side to the thumb screw, insert and tighten down the additional lock screw (see image at right center, **Ⓐ**.)

INCORRECT — Arm not level	CORRECT — Arm is level
Causes stress on mounting points	No stress on mounting points

Lock Screw Ⓐ

Set Screws (2)

Cable Harness

Front

Thumb Screw

To open cable harness, pull harness out and swing it down.

Projector Mounting Pipe

Route cabling.

Close harness.
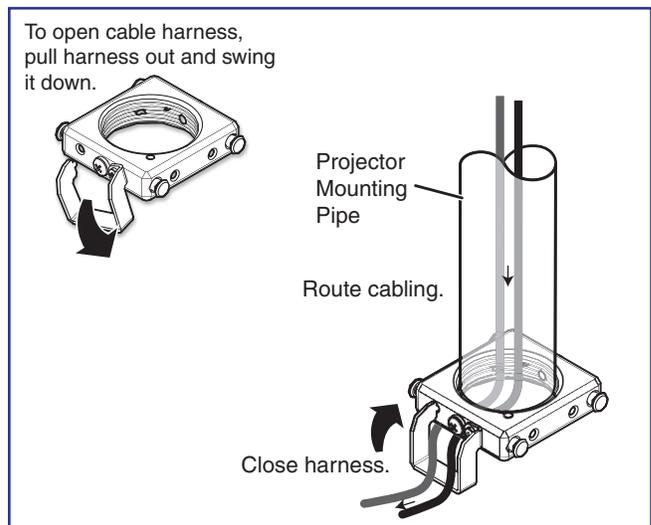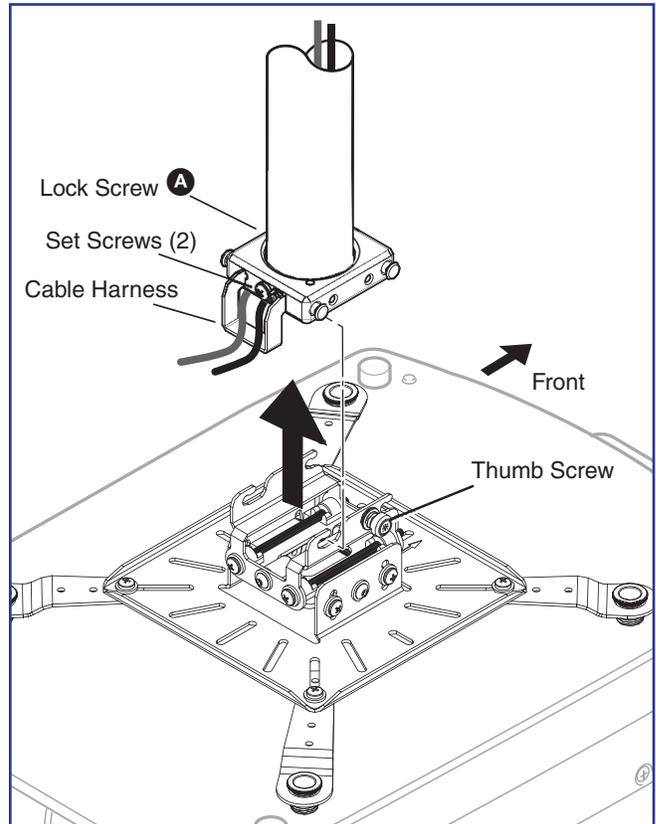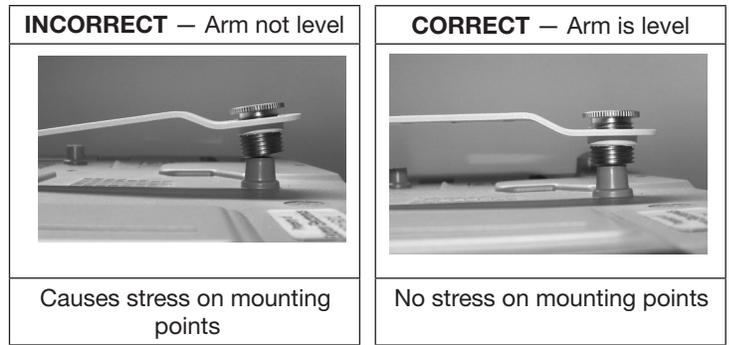
g. Adjust the projector alignment (yaw, pitch and roll) as follows:

  i. Adjust the rotation (yaw)
- Turn the unit on the projector pole to the correct position.
- Secure the position by tightening the two set screws against the pole.

> **ATTENTION:**
> - Do not turn the unit all the way to the end of the pole or the projector may fall.
> - Ne tournez pas l'unité complètement à l'extrêmité du pôle au risque de faire tomber le projecteur.

  ii. Adjust the vertical angle (pitch) and horizontal tilt (roll):
- On the Base Plate Assembly, loosen the vertical angle and horizontal tilt adjustment screws.
- Adjust the vertical angle (pitch) of the projector to the correct alignment. Tighten down the two vertical angle adjustment screws.
- Adjust the horizontal tilt (roll) of the projector to the correct alignment. Tighten down the two horizontal tilt adjustment screws.
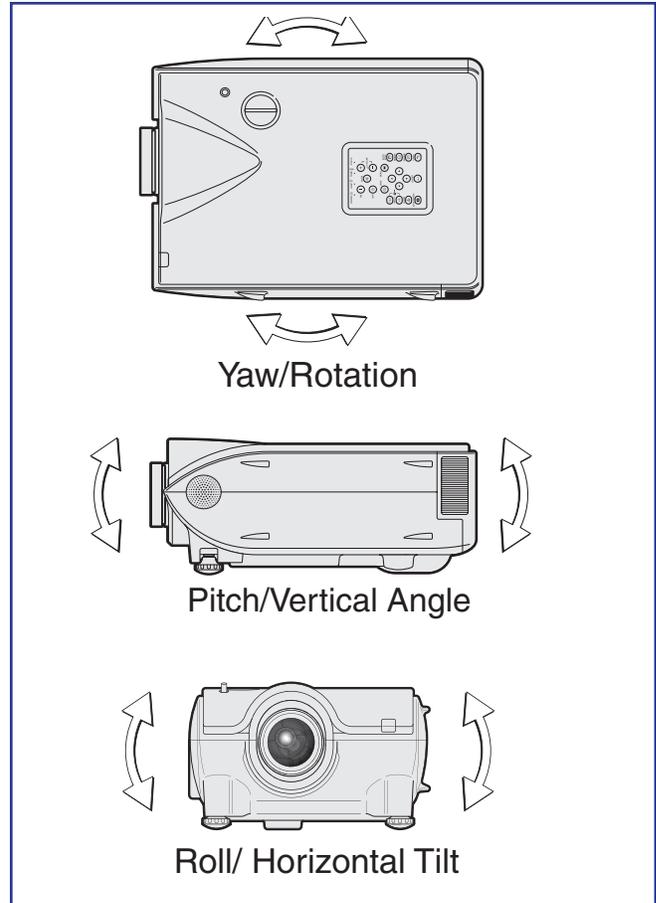
3. Verify the Image Location.

a. Connect a power cable to the projector and turn it on.

b. Verify image size and location by loosening the PCM 340 pipe adapter plate wing nuts, and adjust the plate (left-right) to center the image.

> **TIP:** Remember to include the vertical and horizontal offsets when aligning the projector. See the projector manual for information.

c. When satisfied, tighten down the plate wing nuts.

Yaw/Rotation

Pitch/Vertical Angle

Roll/ Horizontal Tilt

Projector Center Line

Measure the horizontal offset.

Lens Center Line
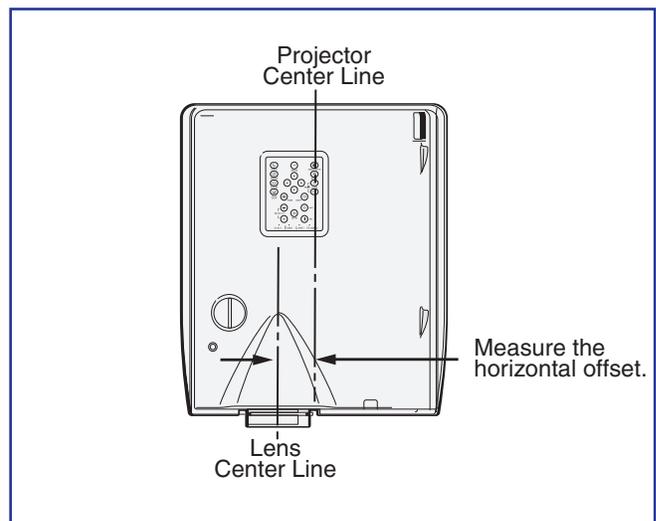
4. Cut the Ceiling Tile.

a. Mark the location of the PCM 340 on the T-frame. This aids putting it back in the correct location when the tile is replaced.

> **TIP:** Mark the screen direction on back of the tile (for example with an arrow or "to front") to help orientation of tile when replacing it after cutting.

b. Measure the distances X and Y (see the figure at right) from the inner vertical section of the front and left T-frame runners to the center of the Pipe Adapter Plate.
Using the X and Y dimensions, mark and cut a hole for the slotted pipe in the ceiling tile.

> **TIP:** Place the tile on a box and mark the center of the hole on the underside of the tile. Use a hole saw bit to start to cut the hole by hand (turning bit counter clockwise) to avoid damaging the tile. When the drill bit is through the tile, turn the tile over and finish cutting from the top side.

X"

Y"

T-bar

Minimum and Maximum Throw Distance Marks

4b Take the measurements with the PCM 340 on the T-frame.

90°   Top Side of Tile

Underside of Tile

> **TIP:** Mark and start cutting the hole on the underside. Finish on the top side.
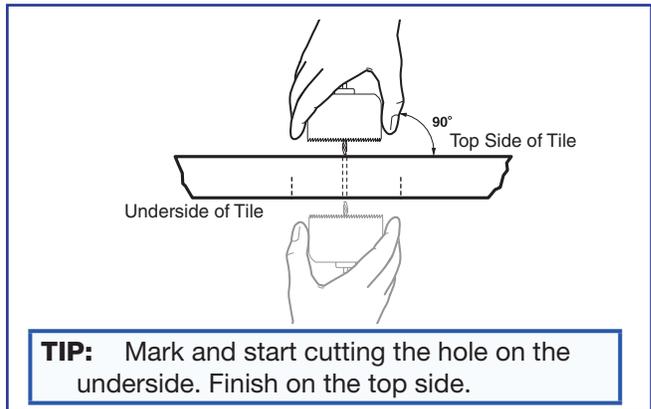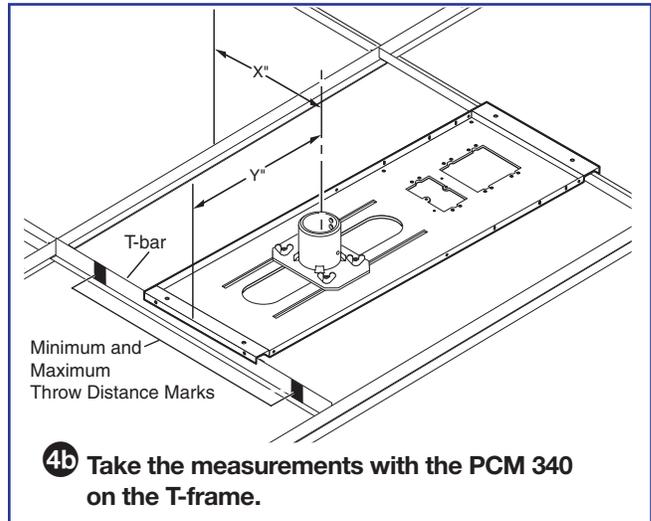
5. Preliminary Safety Hardware Installation.

a. Mark and drill holes in the structural ceiling at 10 degrees out from vertical for each turnbuckle. Drill a fifth hole directly centered above the PCM 340 for the safety cable.

b. Install an appropriate anchor or lag eye bolt for the structural ceiling into each drilled hole.

5a Mark the structural ceiling for lag eye bolt installation.
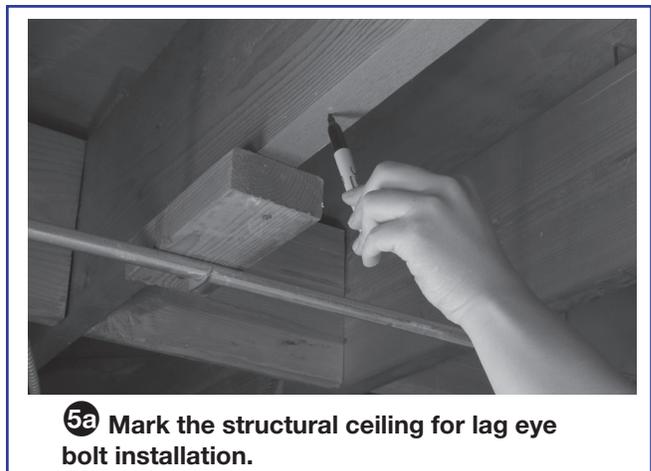
6. Finish Projector Drop Ceiling Mount Installation.

a. Detach the projector bracket and projector from the adapter plate. DO NOT remove the projector bracket from the projector.

b. Unscrew the adapter plate from the mounting pole.

c. Loosen the pipe adapter set screws on the PCM 340 and the pipe location screw and remove the mounting pole, then loosen the T-frame securing screws and remove the PCM 340 from its marked location.

d. Replace the cut ceiling tile, checking the orientation to align the hole with the PCM 340.

e. Replace the PCM 340 over the ceiling tile, slide the slotted pipe up through the tile and into the adapter plate. Realign the location holes with the pipe holes, insert and tighten down the location screw. Tighten the set screws.

f. Tighten the four T-frame securing screws on the PCM 340. The T-frame securing screws can be used on either side of the frame.

6e **Slide the pipe up through the ceiling tile and into the pipe adapter plate. Shown as viewed from below.**
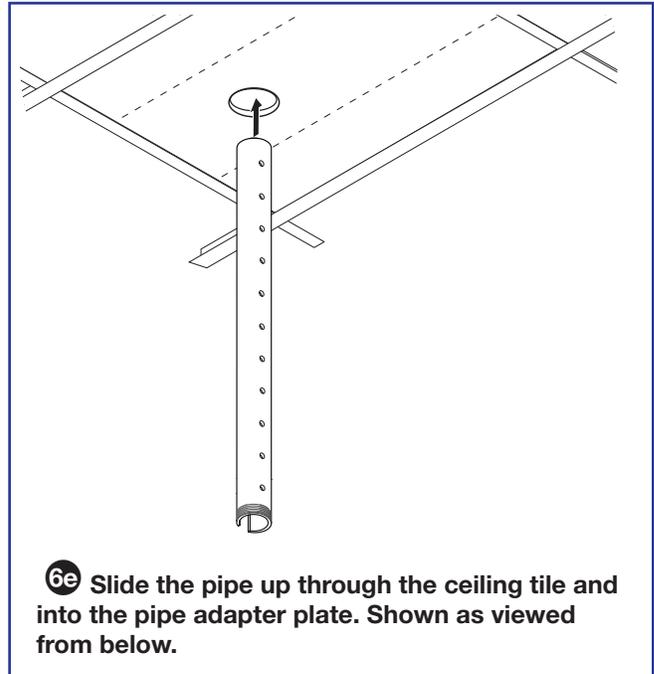
7. Secure the Projector Drop Ceiling Mount to the Ceiling.

a. Attach the four turnbuckles to the base plate, one at each corner.

> **WARNING:** **May result in serious injury.** **DO NOT** rest or lean on the mounting plate or suspended ceiling when attaching turnbuckles, tie wire, or when drilling into the ceiling.
>
> **AVERTISSEMENT : Risque potentiel de blessure grave ou de mort**. Ne vous appuyez pas contre la plaque de montage ou le plafond suspendu en attachant les ridoirs et les serre-câbles, ou en perçant le plafond.

> **NOTE:** For safest installation, insert the turnbuckle from the outside so that it hooks inwards.

b. Cut four equal lengths of the supplied hanging wire, and loop the wire through the anchors or lag eye bolts, and the turnbuckles. Twist the wire around itself at least five times tightly at each end.

c. Hand tighten the turnbuckles and level the plate so it just rests on the T-frame.

> **CAUTIONS:**
> - The four hanging wires should be taut, taking the full weight of the completed installation.
> - **Do not overtighten the turnbuckles** or the T-frame assembly could be lifted, making the suspended ceiling bowed and unsafe.
>
> **ATTENTIONS :**
> - Les quatre câbles suspendus devraient être tendus, de façon à supporter le poids total de l'installation une fois terminée.
> - **Ne serrez pas trop les tendeurs** ou l'ensemble T-cadre pourraient être levées, rendant le plafond suspendu s'inclina et dangereux.

e. Pass the braided safety cable through the fifth and center anchor and attach it to the center holes on either side of the plate. Ensure the cable is of equal length on both sides of the anchor and secure the cable using the cable clamps.

7a Attach the turnbuckles at the corners of the PCM 340.

Secure PCM to T-frame (from either side)

PCM

T-frame

Adjust the turnbuckles to take up any slack in the hanging wire.
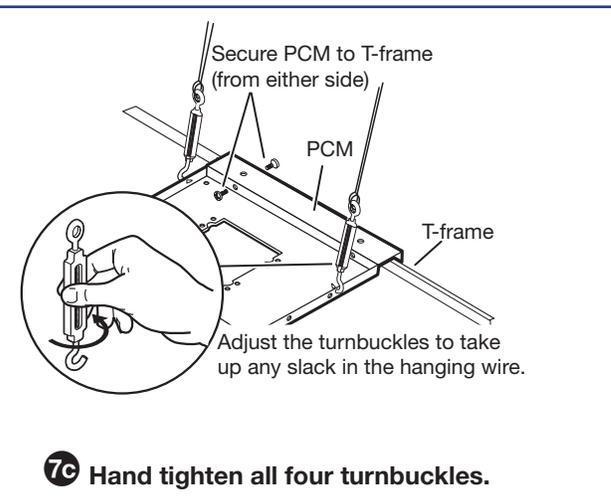
7c Hand tighten all four turnbuckles.

8. Install the Electrical Box (if required).

> **WARNING:** **Improper installation may result in electrical shock or serious injury.**
> All electrical installation should be performed by qualified personnel in accordance with local and national building codes, fire and safety codes, and local and national electrical codes.
>
> **AVERTISSEMENT :** **Une installation non-conforme peut entraîner un choc électrique ou des blessures graves.**
> Toute installation électrique devrait être effectuée par un personnel qualifié, conformément aux codes du bâtiment, aux codes incendie et sécurité, et aux codes électriques locaux et nationaux.

If required, the following method is recommended for integrating a 4S RACO® electrical box (not supplied) on the PCM base plate (for example, a RACO 232, 2 1/8 inch deep, 4x4 inch electrical box and a RACO 778, 1/2 inch raised, 4x4 inch plaster ring or similar).

Install the RACO box on the PCM plate as follows:

a. Attach the box to the plate, using the smallest notches in corners of the cut-out (see figure). Do not tighten the screws fully at this time.

b. On the opposite side of the PCM plate, slide the plaster ring under the screws. The plaster ring anchors the box in place with PCM plate sandwiched between.

c. Fully tighten the screws.

> **WARNING:** **May result in electrical shock or serious injury.** For safety, complete **all wiring** of the electrical boxes and accessories **after** the plate is fully installed and secured.
>
> **AVERTISSEMENT :** **Une installation non-conforme peut entraîner un choc électrique ou des blessures graves.**
> Pour des raisons de sécurité, terminez tout le câblage des boîtiers électriques et des accessoires après que la plaque soit installée et sécurisée.

d. Mark and cut a hole in the ceiling tile for the electrical box opening.

RACO box

Use the smallest notches when attaching the RACO box.

RACO 778 Plaster Ring

Install the RACO box and plaster ring onto the PCM 340.
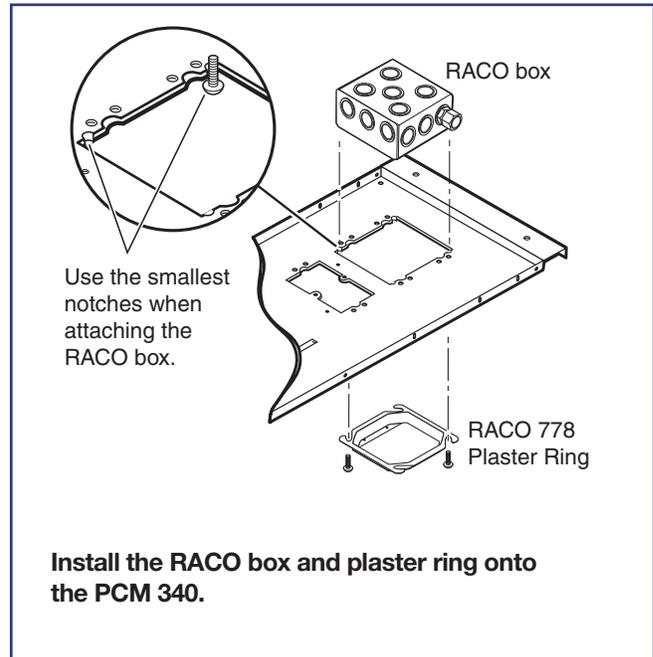
9. Install the Screen.

a. Following the guidelines given by the screen manufacturer, continue to install the screen mounting brackets and then hang the screen.

> **TIP:** Use S-hooks to hang the screen from the brackets. Bend the ends of the S-hooks so the screen does not fall when it is rolled up.

Stage 2:
Mounting the PVT
Wallplate and the
MediaLink Controller

Stage 2 Involves installing and cabling the devices shown below.

> **NOTE:** The installation must conform to national and local electrical codes and UL requirements. See the device user guide for details.

PVT HDMI RGB AV Source Input Wallplate
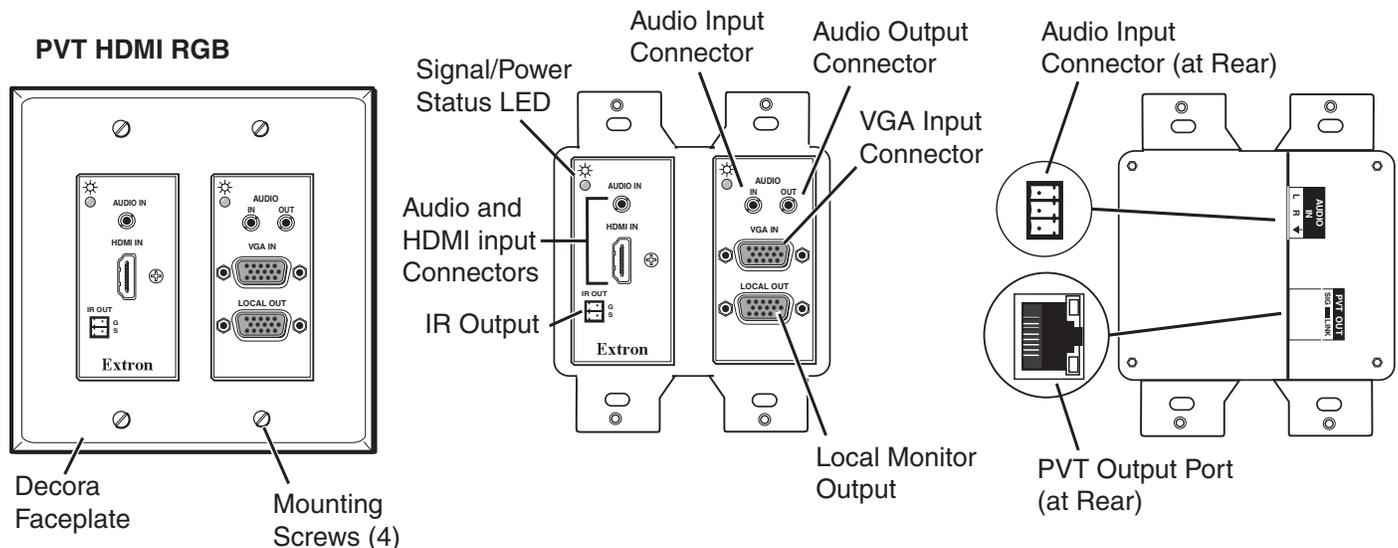
PVT HDMI RGB

Signal/Power Status LED

Audio Input Connector

Audio Output Connector

Audio Input Connector (at Rear)

Audio and HDMI input Connectors

VGA Input Connector

IR Output

Decora Faceplate

Mounting Screws (4)

Local Monitor Output

PVT Output Port (at Rear)

- **Where it goes:** Installs in a wall near input source location.
- **What it does:** Transmits an input source HDMI or RGB video and audio signals to the switcher.

> **NOTES:**
> - The PVT HDMI RGB and the PVT HDMI are compatible with the PVS 407D only.
> - The PVT HDMI RGB and the PVT HDMI are NOT compatible with PVS 405D, or any XTP/DTP products.
> - The PVT HDMI RGB is a 2-gang wallplate.
> - The PoleVault Digital System incorporates EDID Minder. This allows the transmitter to communicate the appropriate EDID information to the source, ensuring correct video output resolution.
> - The EDID settings on the PVT wallplates are set during switcher configuration. See the *PVS 407D PoleVault Digital Switcher User Guide* (available at **www.extron.com**), or the PCS Help file for setup and operating details.

MLS 104 IP Plus MediaLink Controller

Captive screw connectors for:

Display/RS-232/IR
Comm. Link
Digital I/O,
MLS/RS-232
Power

Mounting screws (4)

DISPLAY
ON   OFF
VOLUME
VCR
DVD
PC
CONFIG
1
2
3
4

Extron   MLC 104 IP PLUS

Ethernet port

LAN

PRESS TAB WITH TWEEKER TO REMOVE

Location of MAC address

Right Side

RUN 100

00-05-A6-01-6B-F5

Rear View
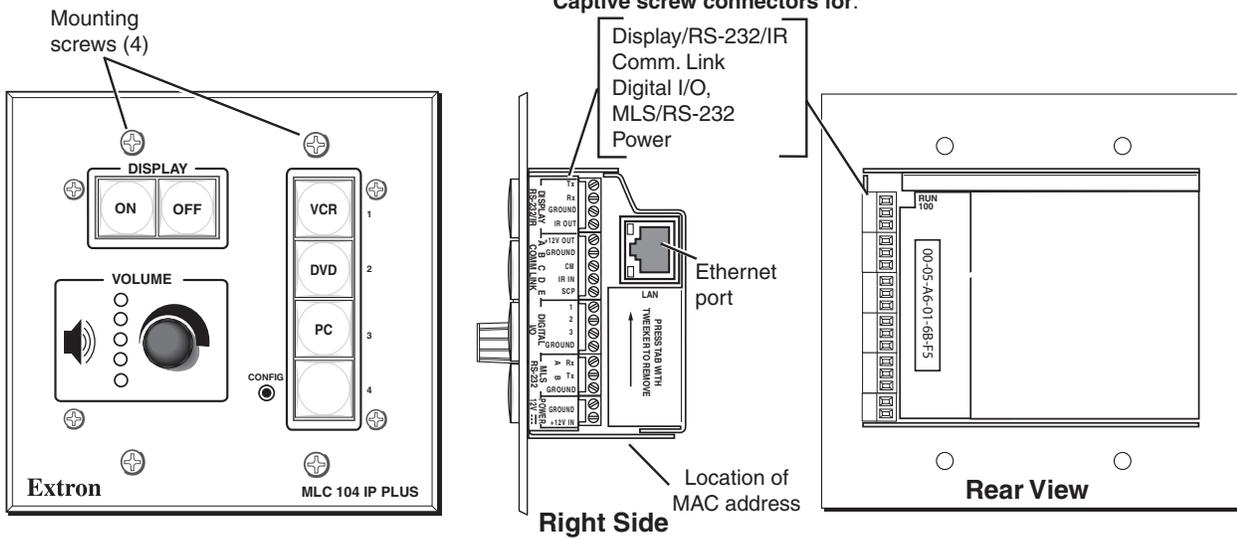
- **Where it goes:** Installs in a wall at a location convenient to users.
- **What it does:** Provides remote control of switcher and projector.

Cabling for the Wallplates and MediaLink Controller

PVT transmitter installation
- Sheilded twisted pair (XTP DTP 24) signal transmission cables (connects PVT input wallplates to PVS 407D switcher)

XTP DTP 24 cable, 35 ft
26-695-35

MLC 104 IP Plus installation

- MLC power and RS-232 control cable (connects the MLC controller to the MLC control port on the PVS 407D switcher)

MLC PW/RS-232, 50 ft
26-626-50

- IR/RS-232 communications cable control cable (connects the MLC controller to the projector via RS-232 or to an IR emitter)

IR Serial Comm, 50 ft
26-621-50

- LAN network cable (not supplied - connects the MLC controller to LAN)

Optional Wallplate
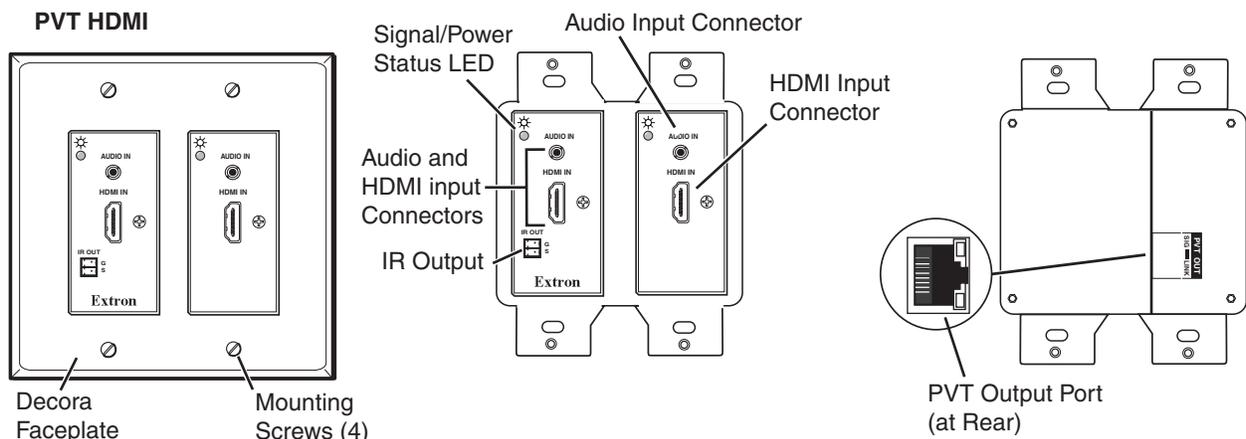
PVT HDMI

Signal/Power Status LED

Audio Input Connector

HDMI Input Connector

AUDIO IN
HDMI IN
IR OUT

Extron

Audio and HDMI input Connectors

IR Output

AUDIO IN
HDMI IN

Extron

PVT Output Port (at Rear)

Decora Faceplate

Mounting Screws (4)

- **Where it goes:** Installs in a wall near input source location.
- **What it does:** Transmits an input source HDMI and audio signals to the switcher.

1. Install the Mud Rings.

NOTE: These devices can be installed using the supplied mud ring or a wall box. If installing a box, allow enough depth for the plate and the cables. The box should be at least 2.5 inches (6.4 cm) deep to accommodate the connectors and cables. If a suitable wall box is already installed, follow **step 2** onwards.

1c Insert the mud ring into the wall.

a. Using an appropriate template or the PVT mounting enclosure as a guide, with a pencil, mark the area of the wall that will be cut out.

> **NOTE:** If installing a metal junction box, check with the manufacturer of the box for specific installation requirements.

b. Use a jigsaw or small hand saw to carefully cut away the material within the marked area.

c. If using a mud ring in a wall with insulation inside, remove at least 6 inches of the insulation in all directions around the cutout.

> **NOTE:** If a wall stud interferes with removing 6 inches of insulation around the cutout, remove the insulation between the cutout and wall stud.

> **CAUTION:** Risk of personal injury. Smooth the edges of the opening to avoid personal injury during installation and avoid damage to the mounting.
>
> **ATTENTION :** Risque de blessure mineure. Lissez les bords de l'ouverture afin d'éviter toute blessure lors de l'installation et d'éviter d'endommager la monture.

d. Insert the mud ring into the opening. The mud ring locking arms should fit easily into the opening. **If needed, use a saw, file, or sandpaper to enlarge the hole.**

e. Rotate the mud ring locking arms and secure with the screws provided.

Repeat steps **a** to **e** for each additional input wallplate that needs to be installed.

f. At the desired location mark the opening for the MLC 104 IP Plus mud ring.

g. Repeat steps **b** to **e**.
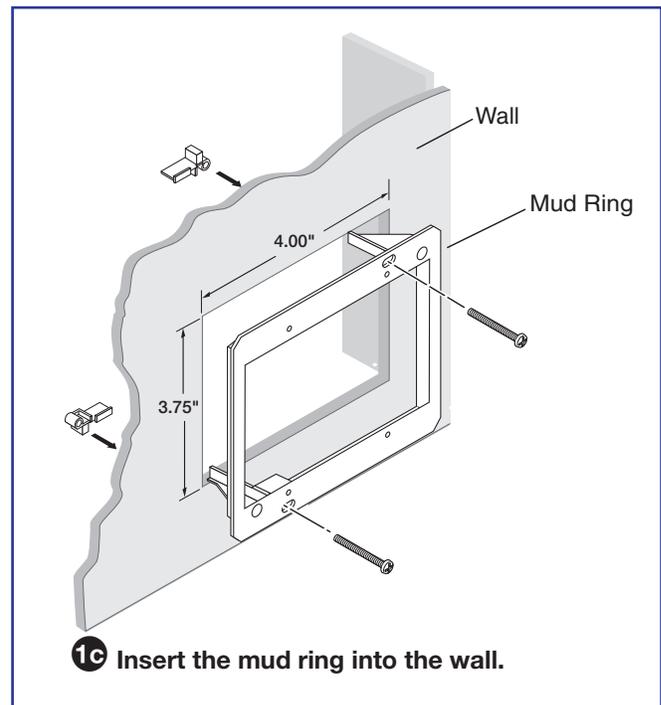
2. Pull the Cables (at the input locations).

The following cables need to be installed:
- XTP DTP 24 cables for signal transmission from the AV wallplates to the PVS 407D

> **NOTES:**
> - Maximum distance from the PVS 407D to the wallplate is 150 feet.
> - XTP DTP 24 cables supplied are terminated to the TIA 568B standard.

- PoleVault switcher communication cable from the MediaLink controller (MLC PW/ RS-232/VC, 50 feet, part number **26-626-50**)
- Projector communication cables from the MediaLink controller (IR Serial Comm, 50 feet, part number **26-621-50**)

a. Drill cable pathways through any obstructions (for example, wall caps, fire-breaks, or horizontal studs).

b. Label the signal cables at both ends with the supplied labels.

c. Pull the cabling through the wall from the ceiling space down to the location of the transmitters and other wall devices, and out through the openings.

> **NOTES:**
> - Take into consideration the bend radius of the cable. Do not bend the cables at 90 degrees.
> - Secure cables with cable clamps to provide suitable stain relief and maintaining the cable bend.

NOTE: Fasten the WHITE section to the cable first, then wrap the clear section around it.

INPUT 1/2

2b Use the supplied labels for clear cable identification during installation.

2c Pull the cables at each location.

3. Install the Wallplates.

a. Connect the cables to the rear of the wallplates.

b. If desired, wire an IR emitter to the wallplate using a two conductor cable. Wire the ground to G and signal lead to S. IR signals are transmitted over the XTP DTP 24 cables.

> **NOTE:** For podcasting or recording applications, use a three conductor audio cable and connect the audio return to the connector marked G (ground wire), R (black wire), and L (red wire). The other end will be connected to the "Line Out" connection on the PVS 407D switcher. This option is available only with PVT HDMI RGB wallplates.

c. Mount the device into the mud ring, using the supplied screws.

d. Attach the supplied Decora® faceplate.

e. Label the Decora plate with the supplied label, using the appropriate input number. This makes inputs easier to identify when configuring the switcher.

f. Repeat steps **a** through **e** for other AV wallplates.
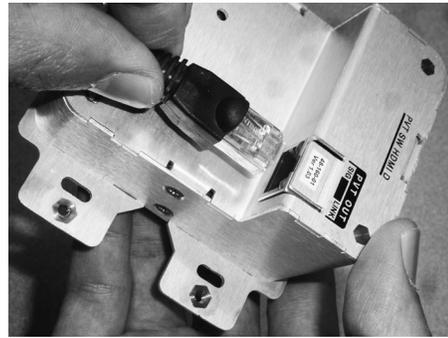
3a Connect the cables to the AV wallplate transmitters at each location.

Wall

Mud Ring

Audio Input Cable

**Extron
PVT HDMI RGB**

XTP DTP 24 Cable from PoleVault® Switcher
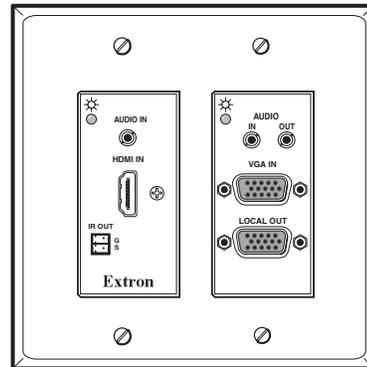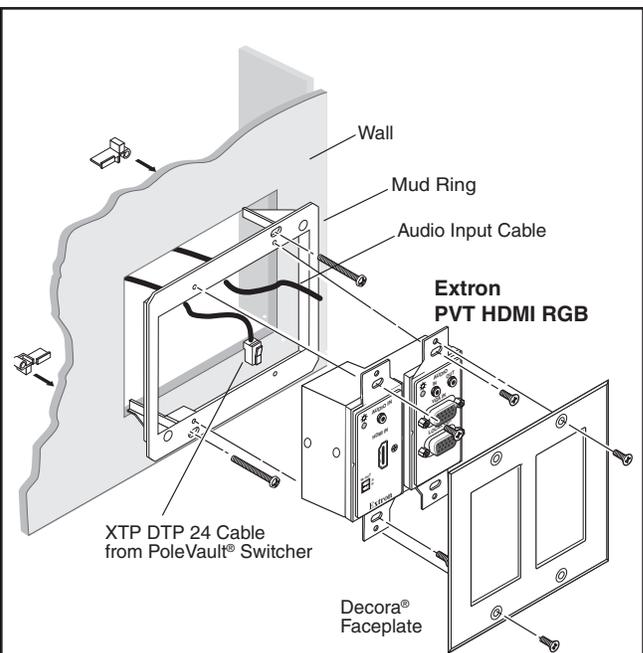
Decora® Faceplate

3c Mount the PVT in the mud ring then **3d** attach the Decora faceplate.

4. Install the MediaLink Controller.

TIP: Before cabling and installing the MLC 104 IP Plus, locate the device MAC address printed on a label on the bottom of the controller. Write down the 12 character alphanumeric address, (for example, 00-05-A6-03-9G-H4) and use when configuring the IP address.
When cabling, the length of exposed wire is critical to avoid transmission problems. Ensure the lengths given here are adhered to when stripping the cables for connection.

NOTE: If a drain wire is used, both ends of the wire must be covered by heat shrink to avoid accidental grounding.

a. Connect the MLC power and RS-232 control cable (part number **26-626-50**) as shown at right. To do this, strip the outer jacket back to the length appropriate to get the red and black leads to the switcher power supply. Trim the white/purple/drain short enough to plug directly in to the switcher, keeping most of the drain covered in the jacket.

Wire Bared 3/16" (5 mm) Max.

Heat Shrink on Outer Jacket to Inner Conductor Transition

Heat Shrink on Drain Wire

7/8" (22 mm)
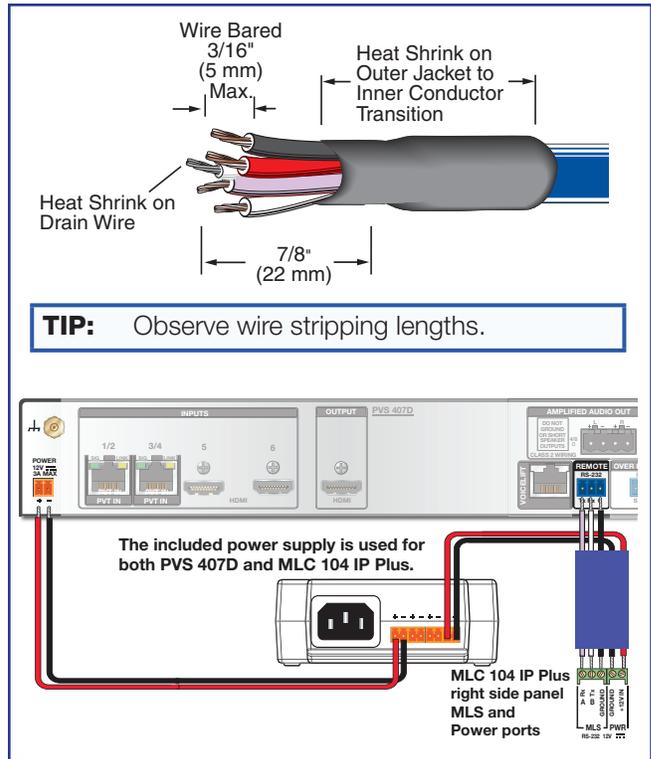
TIP: Observe wire stripping lengths.

The included power supply is used for both PVS 407D and MLC 104 IP Plus.

MLC 104 IP Plus right side panel MLS and Power ports

PVS 407D Remote RS-232 Port

From MLC 104 IP Plus terminal	Wire color	To PVS 407D terminal
A - (Rx on the MLS port)	White	(Tx on the RS-232 port)
B - (Tx on the MLS port)	Violet	(Rx on the RS-232 port)
MLS RS-232 Ground	Drain wire	Ground (G)
Power Ground	Black	To PVS 407D Power Supply
12 V In	Red	To PVS 407D Power Supply

NOTE: You must connect a **ground wire** between the MLC and PVS 407D.

G Ground (Gnd)
B Receive (Rx) Transmit (Tx) **B**
A Transmit (Tx) Receive (Rx) **A**

G Ground
+ +12 VDC input

Connect to the same power supply used by the PVS 407D
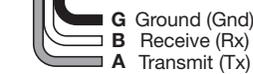
NOTE: If you use cable that has a drain wire, tie the drain wire to ground at both ends.

MLC 104 IP Plus right side panel MLS and Power ports

Ground all devices.
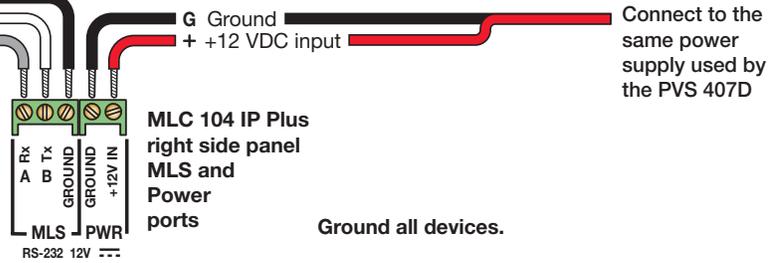
NOTE: The MLC 104 IP Plus is powered from the same power supply the PVS 407D uses.

4a **Connect the MLC 104 IP Plus to the PVS 407D Switcher and Power Supply.**

b. Connect the IR/RS-232 projector communication cable as shown for either RS-232 or IR projector control

> **NOTE:** Some projectors require NULL connection wiring, which inverts the Tx and Rx connections. See the projector guide for details.

IR control for a connected input device such as a Blu-ray player can be made through the PVT wallplate (see the figure at step 4d).

RS-232 connection

Terminal	RS-232 Cable Color	Pin
Tx	White	2
Rx	Violet	3
Ground	Shield	5

IR connection

Terminal	IR/RS-232 Cable Color	IR Cable Color
Ground	Black	Black
IR Signal	Red	White/Black

Connecting RS-232 Cable

Connecting IR Cable

NOTE: Red and black not used.

NOTE: White, violet, and shield not used.

MLC 104 IP Plus

4b **Connect the MLC to the projector with an RS-232 cable or IR emitter cable, as appropriate.**

c. Connect a network cable (CAT 5, 5e, or 6 straight through) from the PVS 407D to the RJ-45 LAN jack on the MLC.
The switcher acts as a 4-port Ethernet switch, when connected to the LAN.

NOTE: Connect to the Ethernet ports as follows:
1. TCP/IP network
2. MLC controller
3-4. Optional network devices

CAT 5, 5e or 6 Cable

PVS 407D

MLC 104 IP Plus Right Side Panel

4c **Connect to the LAN using a CATx cable.**

d. The connections between the MLC 104 IP Plus and the PVS 407D switcher should look like the figure below.

4d Connections made to the MLC 104 IP Plus
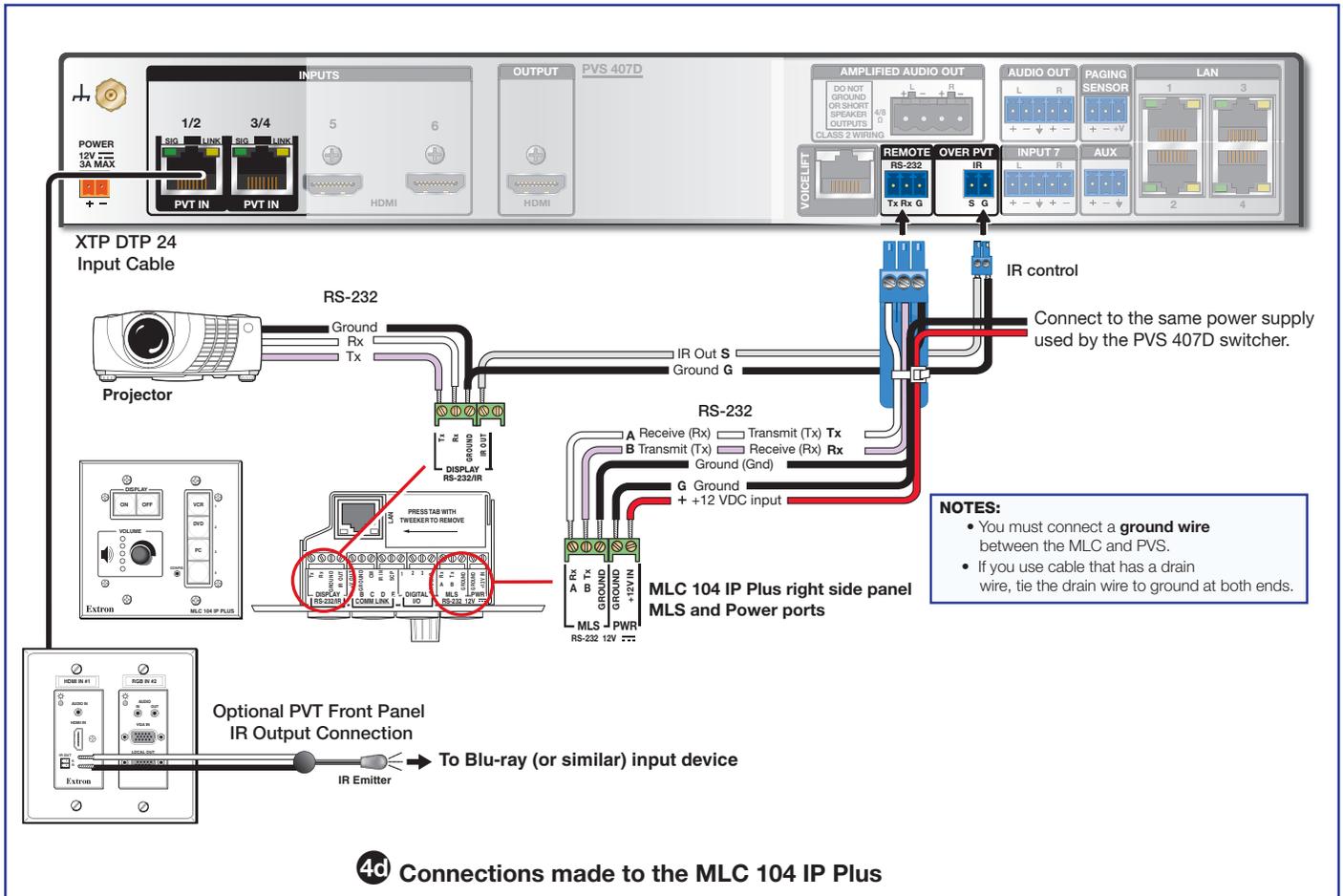
e. Sliding the cables into the opening, secure the MLC 104 IP Plus to the mud ring with the provided machine screws.

4e Secure the MLC 104 IP Plus to the mud ring.
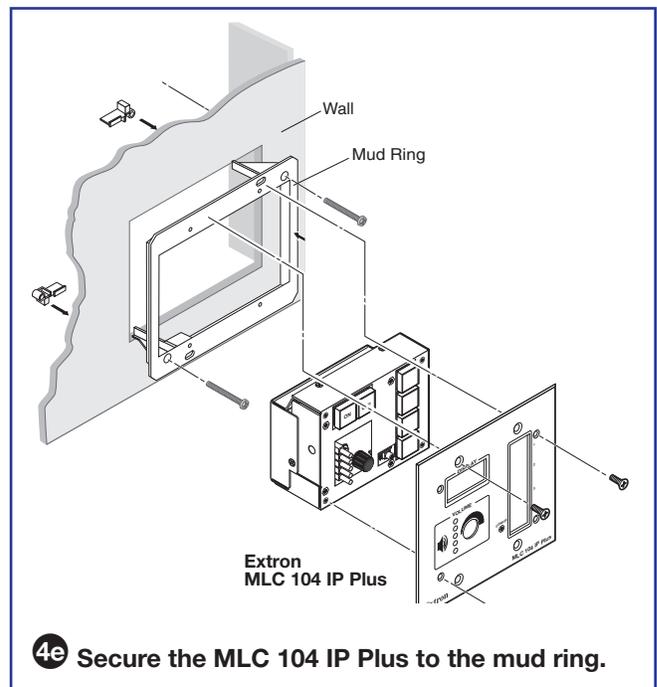
Stage 3:
Installing the FF 120
Ceiling Speakers

Stage 3 Involves installing the devices shown below.

FF 120 Flat Field Ceiling Speakers

FF 120 Speakers (2)

Seismic Tabs
(1 at each end)

Terminal Cover

Cable Clamps (2)

T-rails (2)
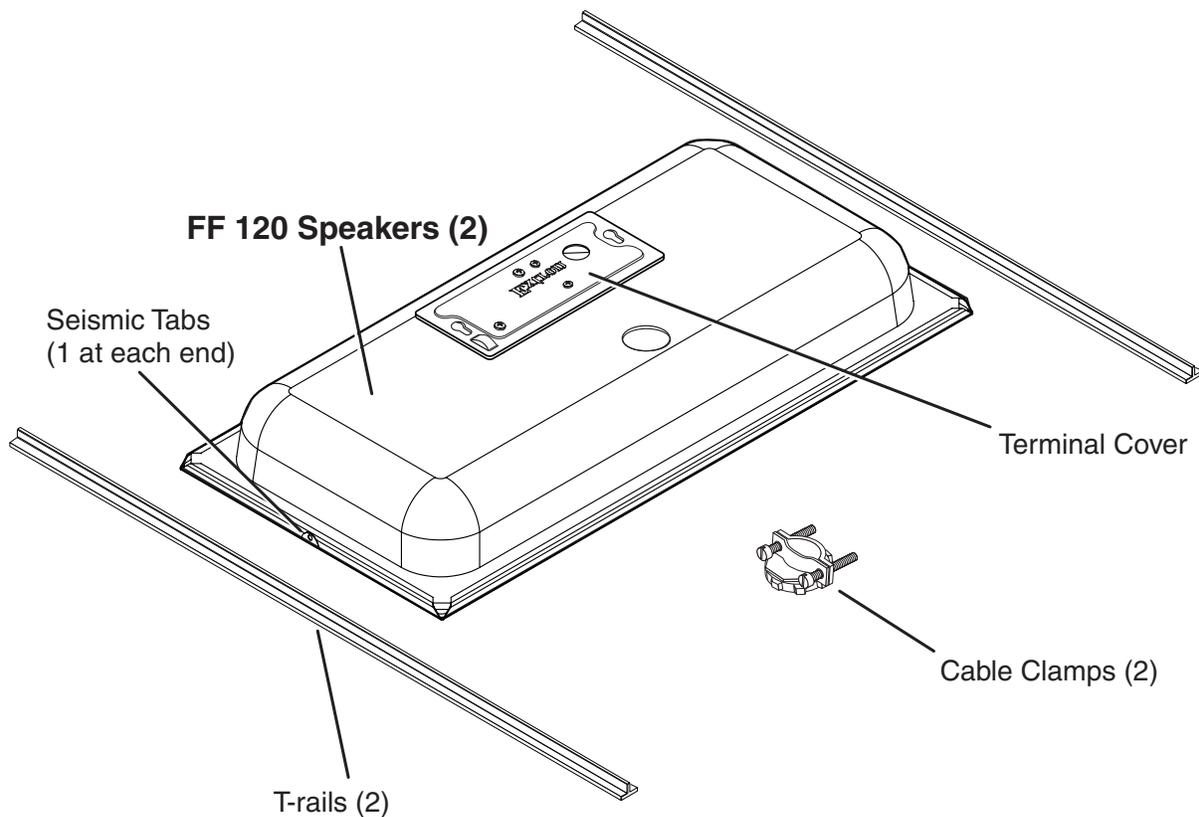
- **Where it goes:** Installs in ceiling tiles at a predetermined location for best acoustics. Connects to the switcher.
- **What it does**: Receives and outputs audio signal from the PVS 407D switcher.

Cabling for the Speakers

Speaker Installation:

- Speaker cable (connects ceiling speakers to the PVS 407D switcher).

SPK 18, 35 ft

NOTE: The installation must conform to national and local electrical codes, and UL requirements.
See the device guide for details.

1. Cut Ceiling Tile for the Speakers.

a. Remove the ceiling tiles where the speakers are to be installed.

> **TIP:** For ease of working on the speaker when it is replaced on the T-frame, re-move adjacent tiles.

b. Mark a line 12 inches from one of the short sides of the tile and cut along the line. Discard the short portion.

> **TIP:** Use a fine hacksaw blade to cut the tile without damaging the face. Place an empty box under the tile for support and to collect the waste.

1b Mark and cut the tile.
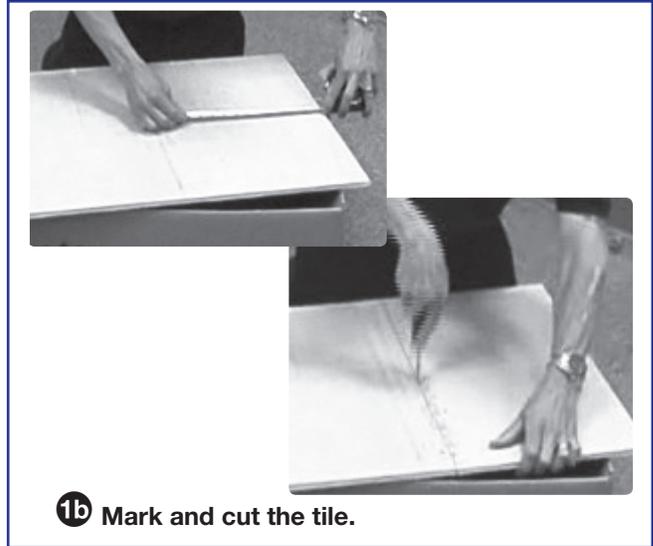
2. Install the Speaker on the Drop Ceiling.

a. At the speaker location, lay one of the supplied T-rails 12 inches from one end of the T-frame. The speaker is placed into the small section.

b. Remove the terminal cover from the rear of a speaker and attach the cable clamp to the cover.

c. Place the speaker onto the T-frame and, passing the speaker cable through the cable clamp on the terminal cover, connect the speaker wires to the speaker terminals:
   • Red wire - positive (+)
   • Black wire - negative (-)

> **ATTENTION:** DO NOT short the speaker wires together as it may damage the speakers.
>
> Ne créez pas de court circuit entre les câbles des enceintes au risque d'endommager les enceintes.

d. Reattach the terminal cover.

2a Place the T-rails on the T-frame.

2b Remove terminal cover and attach clamp.
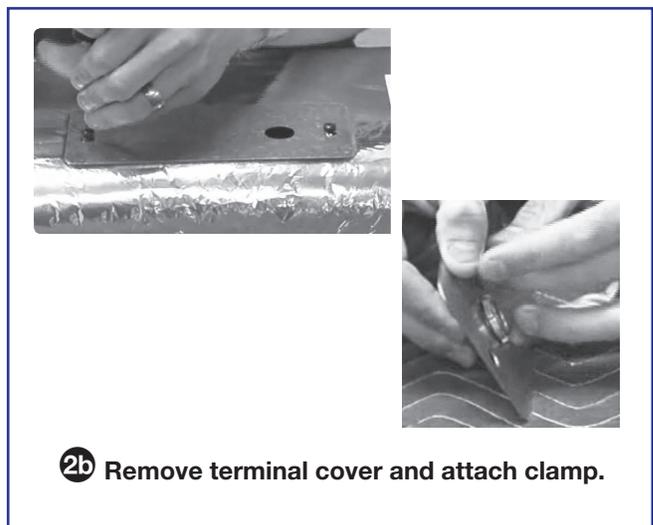
e. Bend the seismic tabs (bendout tabs) over the T-rails.

f. Replace the ceiling tile.

Repeat steps **1** and **2** for each speaker that needs to be installed, connecting the speakers according to the system preferred (for example, in parallel, see page 38).

If you wish to install an optional seismic/safety or secondary support cable at each speaker location do the following:

g. Mark the locations and drill pilot holes, then install lag eye bolts for the seismic safety cables (not included) in the structural ceiling above the speaker location.

h. Pass the seismic cable through the line retainer, down to the seismic bend-out tab and twist the end around the cable five times. Pass the other end up through the lag eye bolt and twist it around the cable five times.
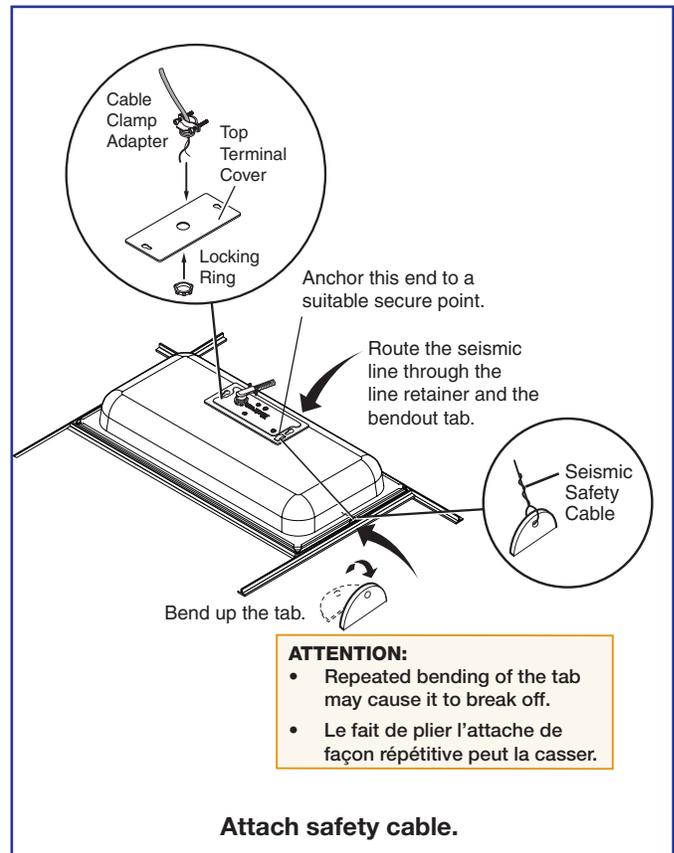
To wire the speaker, see the next page.

Cable Clamp Adapter

Top Terminal Cover

Locking Ring

Anchor this end to a suitable secure point.

Route the seismic line through the line retainer and the bendout tab.

Seismic Safety Cable

Bend up the tab.

ATTENTION:
- **Repeated bending of the tab may cause it to break off.**
- **Le fait de plier l'attache de façon répétitive peut la casser.**

Attach safety cable.

3. Terminate the Speaker Cable for the PVS Switcher.

a. To terminate the cable, strip the end of the cable 0.2 inch (5 mm) and secure the wires into the supplied 4-pole captive screw connector.

> **ATTENTION:** DO NOT short the speaker wires together as it may damage the switcher.
>
> Ne créez pas de court circuit entre les câbles des enceintes au risque d'endommager les enceintes.

> **NOTE:** The correct speaker impedance loading must be observed when setting up a speaker system. See figures below for examples.

AMPLIFIED OUTPUTS

4/8 Ohms

+ L − + R −

PVS Switcher Rear Panel

4-pole Captive Screw Connector (viewed from top)

Audio output to speakers

Speaker Wire color	To PVS 407D terminal (Left and Right)
Red	Positive (+)
Black	Negative (-)

3a Wire the captive screw connector.

Stereo output

AMPLIFIED OUTPUTS

8 Ohms

Stereo L+   Stereo R+

+   +

−   −

+ L   + R −

Stereo L−   Stereo R−

8 Ohm Load

Dual mono output

AMPLIFIED OUTPUTS

8 Ohms

Mono +   Mono +

+   +

−   −

+ L   + R −

Mono −   Mono −

8 Ohm Load

Stereo or dual mono output using parallel speaker wiring

AMPLIFIED OUTPUTS

4/8 Ohms

Mono +
or
Stereo L+

Mono +
or
Stereo R+

Two 8 ohm speakers wired in parallel equal a 4 ohm load.

+
8 ohms
−

+
8 ohms
−

+ L −   + R −

+
8 ohms
−

+
8 ohms
−

Mono −
or
Stereo L-

Mono −
or
Stereo R-

4 Ohm Total Load   **4 Ohm Total Load**

> **NOTE:** By default, the amplifier is set for dual mono output. Use the software or Extron Special Instruction Set (SIS) commands to change the setting to stereo if desired. For full details, see the PVS 407D User Guide, available online at **www.extron.com**.

Stage 4: Installing the Switcher Mounting System and the PVS 407D

Stage 4 Involves installing the switcher mounting system and the PVS 407D Digital Switcher. This stage is divided into four sections based on the system type. Each system mounts the PVS 407D switcher and associated power supply using a specific mounting kit.

A. PoleVault System (using the PMK 560 Pole Mount Kit)

B. WallVault Wall Mount System (using the WMK 160 Wall Mount Kit)

C. WallVault Short Throw System (using the USFM 100 Short Throw Wall Mount Kit)

D. PlenumVault System (using the PVM 220 PlenumVault Mount Kit)

PVS 407D Digital Switcher

Rear View

- Power Supply Connector
- HDMI/RGB Video and Audio Inputs (1-4) *
- *Inputs from PVT HDMI RGB or optional PVT HDMI
- HDMI Inputs (5-6)
- HDMI Output
- VoiceLift Receiver Port
- RS-232 Control Port
- IR Control Input
- Aux Audio Input 7
- Aux Input
- Speaker Output
- Lineout Output
- Paging Sensor Port
- 4-Port 10/100 Ethernet Switch

- **Where it goes**: PVS 407D and power supply install into a mounting enclosure.

- **What it does**: Receives input video and audio signals from AV source input wallplates. Outputs and switches the video and audio signals to a display device (such as a projector or flat screen display) and ceiling speakers.

NOTES:

- The installation must conform to national and local building and electrical codes, and UL requirements. See the device user guide for details.

- The included power supply **MUST NOT** be installed in wall cavities or similar locations.

- Unless installing the PVM 220 (for the PlenumVault System only) the power supply **MUST NOT** be installed above the suspended ceiling.

A. PoleVault System (PMK 560 Pole Mount Kit)

Mounting Plate

Base Plate

To open, remove 4 cover screws and slide the covers away.

PMK Covers (2)
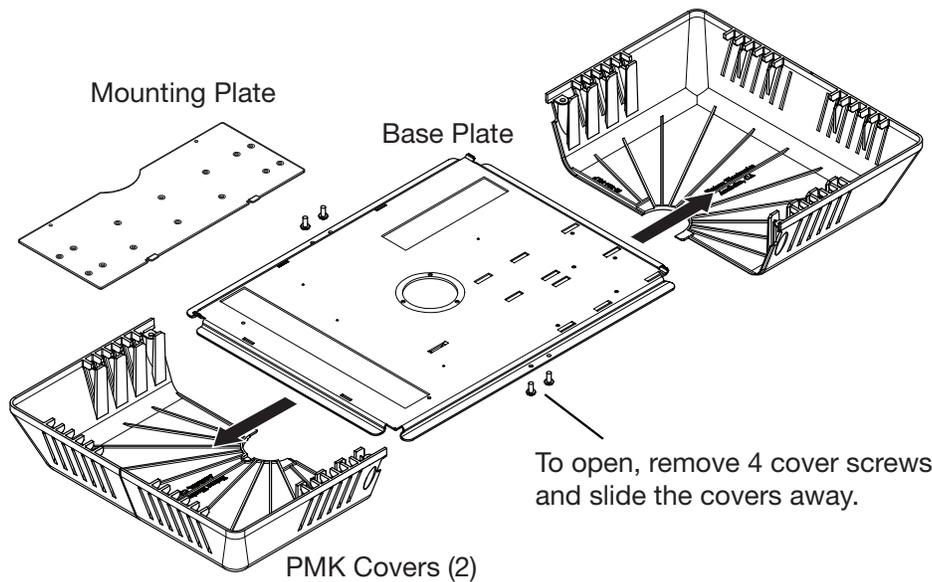
- **Where it goes:** Attaches to slotted pipe, above the projector and close to the drop ceiling.
- **What it does:** Supports and hides the installed PVS 407D switcher and power supply from view.

A1. Install the PMK 560 Base Plate.

a. Remove the four cover screws from the center of the PMK 560 and slide the two halves apart. Remove them from the base plate.

> **NOTE:** If the PoleVault switcher and its power supply are already installed, go directly to step 1d.

b. To mount the PoleVault switcher, place the mounting plate, with the raised tabs upwards, on the top surface of the switcher and pass the two supplied 4-40 x 3/16 inch screws into the top of the switcher (see figure at right). Secure the mounting plate but do not overtighten. Use only the supplied screws to avoid damaging the switcher.

c. Attach the associated power supply to the base plate with the supplied tie wraps by passing them through the appropriate slots and around the power supply. Tighten until snug

d. Loosen the four pipe collar set screws and slide the base plate up the pipe until it is touching the suspended ceiling.

e. Level the base plate and secure it by fully tightening the set screws.

> **NOTE:** At least three set screws must come in contact with the pipe.

1d Attach PMK to the projector pole. **1e** Secure the pipe collar with the four 10-32 set screws.

1f Hook the combined mounting plate and switcher into the base plate and secure with screws.

1b Attach the mounting plate to the top of the PoleVault switcher.

1c Attach Power Supply

Projector Pole

PVS 407D Switcher
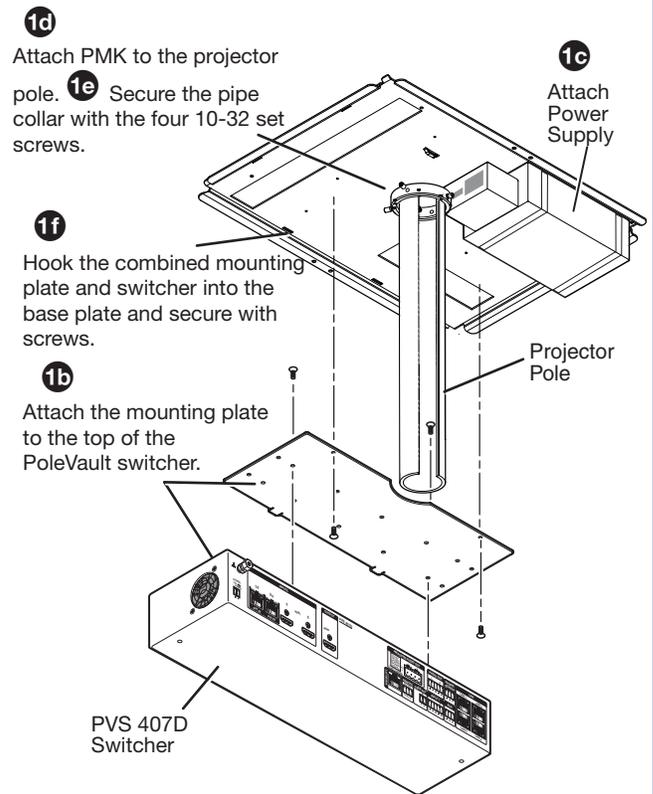
1b Attach the mounting plate to the switcher,

1c fasten the power supply to the base plate,

1d secure the base plate to the projector pole,

1f hook mounting plate tabs into the base plate.

f. Hook the combined plate and switcher into the PMK 560 base plate (see figure on page 40, **1f**). Secure it to the base plate with two screws.

> **ATTENTION:** Use only supplied screws to avoid damaging the switcher.
>
> Utilisez seulement les vis fournies pour ne pas endommager le sélecteur.

A2. Pull the Cables (at the switcher location).

a. Gather all the cables from the speakers, AV wallplates, MLC 104 IP Plus controller, network, and any installed optional devices that have been run to the switcher location. Pull them down through the ceiling hole and the pipe. These cables are:

- MLC power/RS-232 cable
- XTP DTP 24 AV input cables from the wallplates
- Speaker cables
- MLC to projector (IR/RS-232 projector control) cable
- LAN cables
- Any optional device cables (Aux audio input Priority Page Sensor Kit, VoiceLift)

b. Pull the cables out of the pipe slot towards the switcher, ready for connection. Leave the IR/RS-232 projector control cable to hang out of the bottom of the pipe.

c. Connect the HDMI output video signal cables to the switcher and pull the loose ends down the pipe so that they hang out the pipe with the IR/RS-232 projector control cable, to be connected to the projector later.

> **NOTE:** Do not thread any high voltage power cabling, such as power supply or projector power cords, through the projector pipe. This violates National Electrical Code.

Cables to PVS 407D

1 AV wall plate cables, XTP DTP 24

2 MLC 104 IP Plus switcher control cable

3 FF 120 speaker cables

4 LAN cable(s)

5 IR/RS-232 projector control cable (from MLC)

Optional accessory cables from VoiceLift and Page Sensor may also be included.

PVS 407D Switcher

Cable Access Slot

Cables to Projector

2 Control cable

6 HDMI cable

To Projector

Switcher and Projector Cable Overview

A3. Secure the HDMI Cables Using the LockIt Bracket.

The supplied Extron LockIt lacing bracket makes it possible to secure a standard HDMI cable to the PVS 407D switcher.

> **NOTE:** The tie wrap can be tightened using pliers or similar tools.

To securely fasten an HDMI cable to the PVS 407D:

a. Plug the HDMI cable into the rear panel HDMI connector.

b. Loosen the HDMI connection mounting screw from the rear panel enough to allow the LockIt lacing bracket to be placed over it. The screw does not have to be removed.

c. Place the LockIt lacing bracket on the screw and against the HDMI cable connector.

d. Tighten the screw to secure the bracket.

e. Place the included tie wrap around the HDMI connector and the LockIt lacing bracket and tighten as shown in the images at right.

Secure HDMI Cable with LockIt Bracket
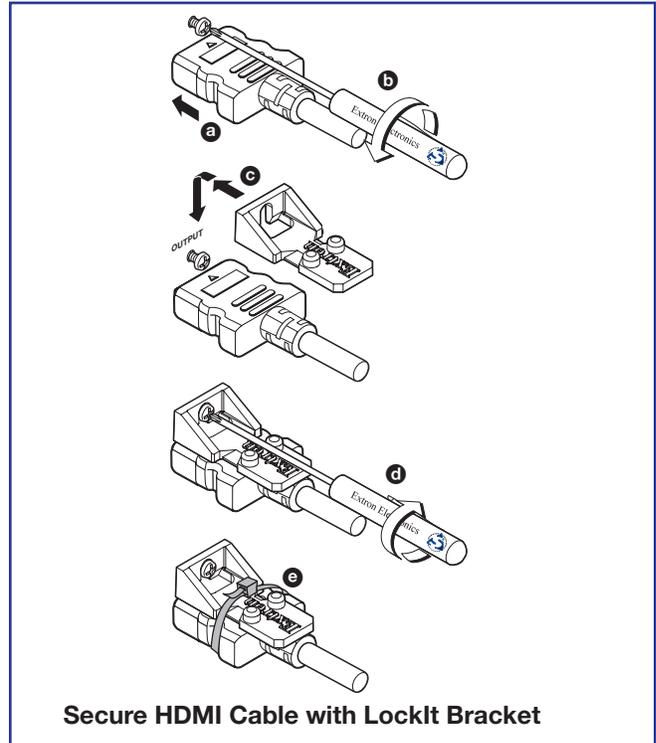
AV Wallplate LED indications.

Each wall plate has front panel LEDs that indicate the power and signal status of the wallplate (see image at right).

Amber LED:
Wallplate is powered, however there is no signal from the input source, or the signal from the input source is present but the input is not selected.

Green LED:
Wallplate is powered, the input is selected *AND* a signal is present from the input source.

Location of PVT LEDs
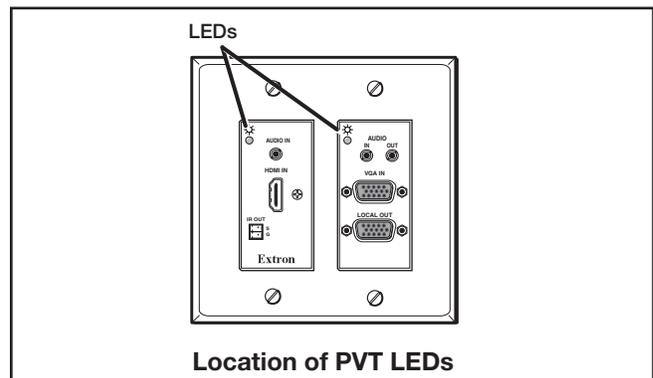
AV Wallplate Inputs

Each digital wallplate has two inputs. Up to two wallplates can be connected to the PoleVault digital switcher.
See image at right for an explanation of input association.

Connect up to two digital wallplates to PVT IN 1/2 and 3/4 using 1 XTP DTP 24 cable with RJ-45 connectors per wallplate.

> **NOTE:** Any digital wallplate connected to PVT IN 1/2 on the switcher is associated with inputs 1 and 2. Input 1 is the left audio and video input, and input 2 is the right audio and video input on the wallplate.
>
> The same is true when connecting to PVT IN 3/4. Input 3 is the left and input 4 is the right input on the wallplate.

PVT HDMI RGB   PVT HDMI

A4. Finish Installing the Mounting Kit.

> **CAUTION:** The PoleVault signal transmission method is specific for a PVS 407D switcher working with PVT wallplates. **DO NOT** connect the PVT input ports to an MTP, XTP, or DTP system, or to a LAN or to a data transmission system.
>
> **ATTENTION :** La méthode de transmission du signal PoleVault est spécifique pour les sélecteurs PVS 407D qui fonctionnent avec les plaques murales PVT numériques. Ne PAS connecter les ports d'entrée à un système MTP, XTP, or DTP, ou à un système Ethernet/LAN ou de transmission de données.

a. Connect the cables as follows to the switcher:

A PVT HDMI RGB input wallplate (XTP DTP 24) cable (inputs 1/2 and 3/4)

B HDMI input cable (inputs 5-6) (optional)

C Audio input 7 cable (optional)

D Aux input cable (optional)

E VoiceLift Receiver cable (optional)

F Paging sensor cable (optional)

G HDMI output cable

H Audio line out cable to an assistive or recording device (optional, see audio warning card for details)

I Audio output to speakers (**see page 38**)

J Control cable from MLC 104 IP Plus

K IR control cable

L LAN 1: TCP/IP network
LAN 2: MLC controller
LAN 3 Optional network device
LAN 4 Optional network device

M Power supply. **Do not apply power yet**

Your completed connections should look like the image below.
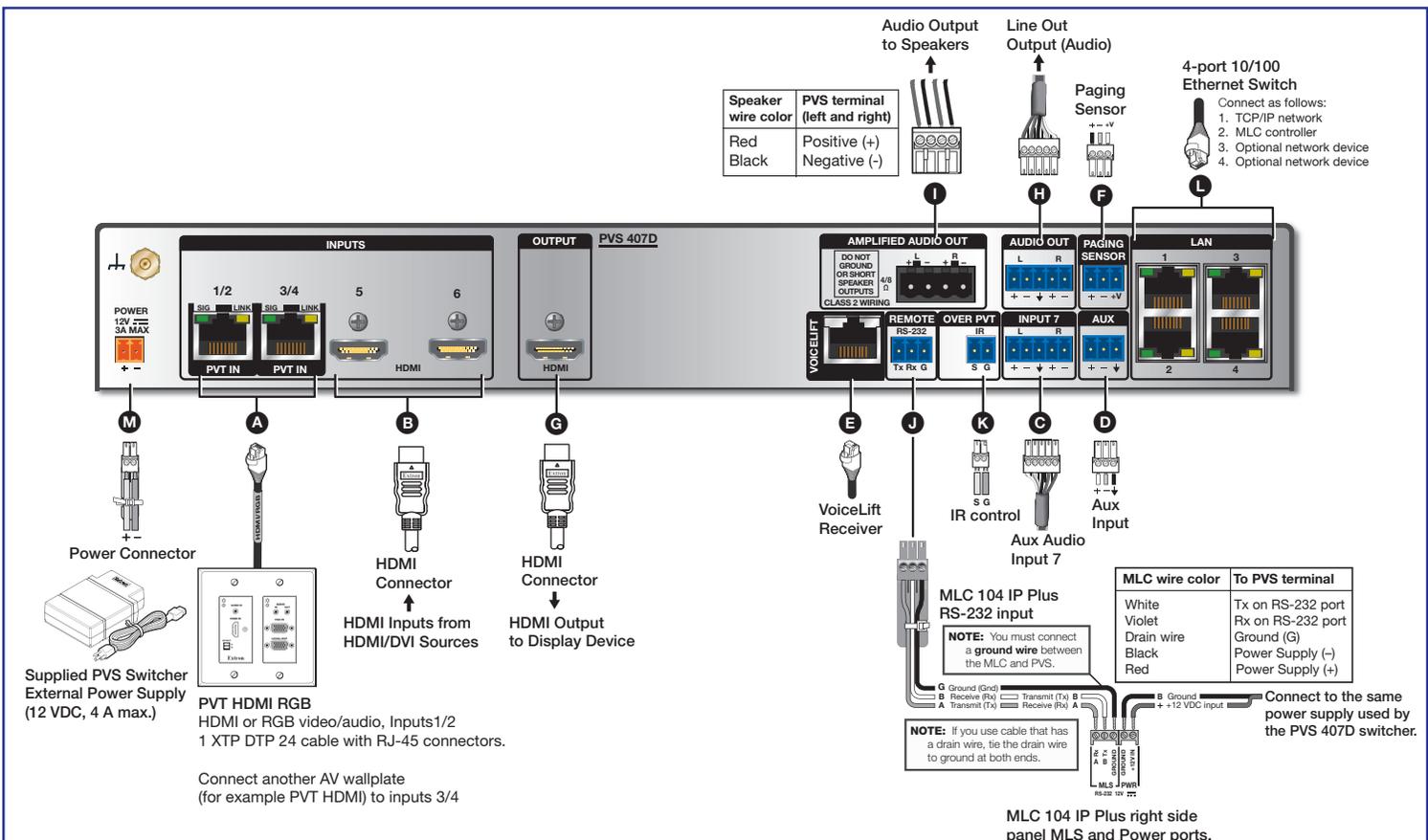
> **NOTE:** The cabling of the PoleVault Switcher is the same regardless of which switcher mounting kit is used.

B. WallVault System (WMK 160 Wall Mount Kit)

(4) 1/4" KapToggle® Assemblies

(4) 1/4-20 x 2" Pan Head Bolts

(2) #14 x 1 3/4" Self-tapping Metal/Wood Screws

(4) Cover Screws

(1) WMK 160 Base Plate

(1) PoleVault Switcher Mounting Plate

(1) WMK 160 Cover
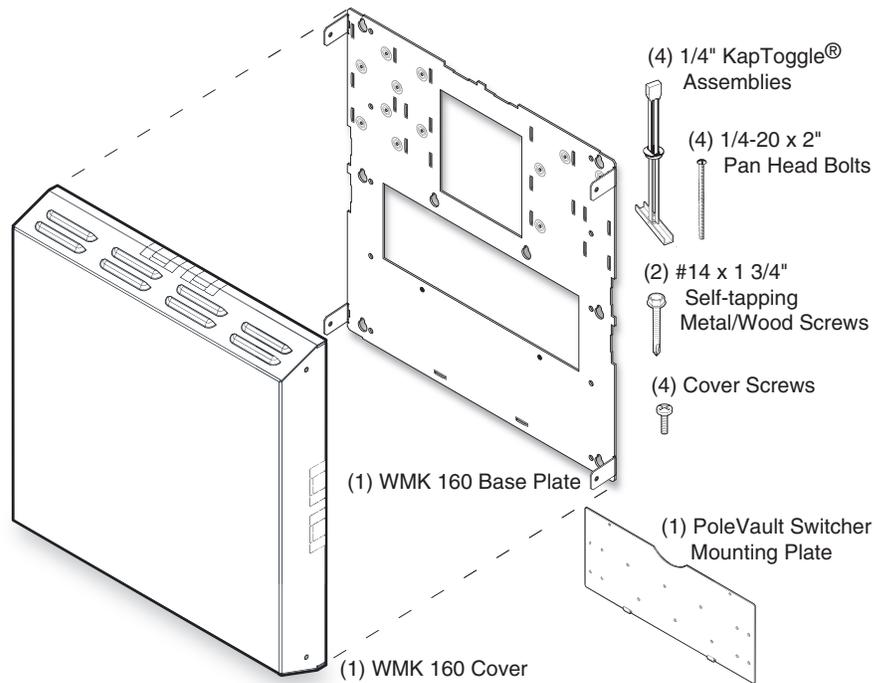
- **Where it goes:** Installs onto a wall close to the projector.
- **What it does:** Supports and hides from view the installed PVS 407D switcher, power supply, and any installed optional accessories.

B1. Install the WMK 160 Base Plate

NOTES:
- For masonry wall use steps a to e.
- For non-masonry walls use steps **f to j**.

a. **To mount the WMK 160 onto masonry walls,** hold the base against the wall, level it, and mark the positions of four slotted mounting holes (indicated by + marks in the figure at right). Set the base plate aside.

b. Using a masonry drill bit, drill 1¾ inch (4.4 cm) deep pilot holes at the marked locations.

c. Screw in ¼ x 1¾ inch masonry screws (not supplied) until a gap of about 3/8 inch (9 mm) remains between the wall and the screw heads.

d. Align the slotted mounting holes of the base plate over the installed screws, then slide the plate down so the screws fit into the slots.

e. Verify level and position and tighten all the screws to secure the plate flush to the wall.

Proceed to step B2 on the next page.

WMK 160 Base Plate

Mounting Holes

Level

Cutout for Electical Outlet

Marker for Pilot Hole

Cutout for Signal Cable Access
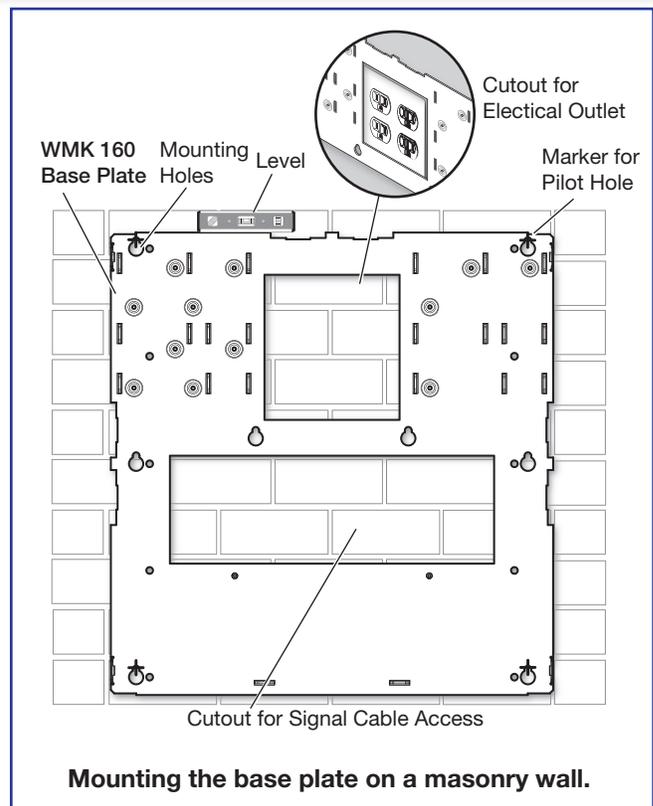
Mounting the base plate on a masonry wall.

f. **To mount the WMK 160 onto non-masonry walls,** at the desired site, locate and mark the wall studs.

> **NOTES:**
> - For ideal installation secure the base plate to at least one wall stud
> - Drywall KapToggles can be used for holes not aligned with studs.
> - Always use the widest spacing of screws and KapToggles.
> - The base plate can be installed over an existing electrical outlet.

g. Hold and level the base plate against the wall and mark the positions of the slotted mounting holes that are on the stud lines (see image at right). Where applicable, mark the mounting holes on the wall for drywall toggles.

h. If the cables are to be run behind the wall to the WMK 160 location, mark the cutout area on the wall for the signal cable access hole and cut out the marked area.

i. Drill 1¾ inch (4.4 cm) deep pilot holes at the hole marks.

j. At the pilot holes, screw in the screws until a gap of about 3/8 inch (9 mm) remains between the wall and the screw heads.

k. Align the slotted mounting holes in the base plate over the installed screws, then slide the plate down so the screw fit into the slots.

l. Verify level and position, and tighten down all the screws to secure the plate flush to the wall.

> **NOTE:** If using toggle assemblies, see figure at right for method.
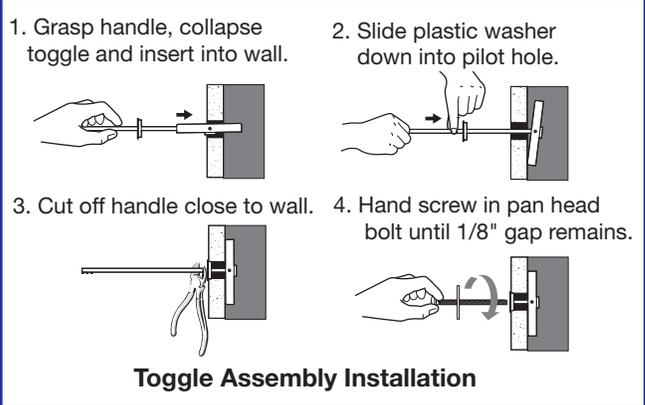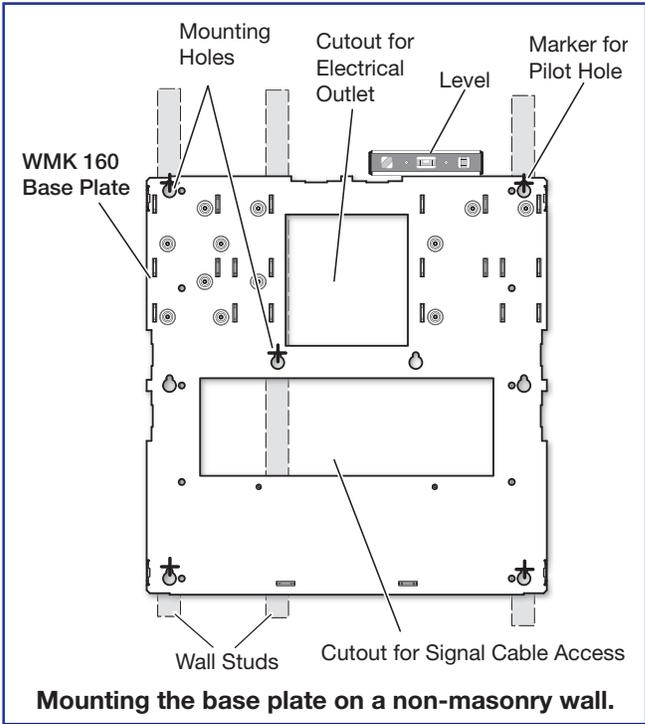
B2. Install the Switcher Onto the Base Plate.

a. Place the switcher (base up) on a flat surface. Place the mounting plate flat on the switcher base with the plate tabs (raised section up) over the edge of the front panel. Align the two mounting holes in the switcher base with the corresponding holes on the mounting plate. Secure the plate to the switcher with the supplied 4-40 x ¼ inch screws.

b. Secure the switcher mounting plate (with switcher attached) to the base plate by sliding the two tabs into the slots at the bottom edge of the base plate. Secure to the standoffs with 4-40 x 3/16 inch screws.

Mounting the base plate on a non-masonry wall.

1. Grasp handle, collapse toggle and insert into wall.
2. Slide plastic washer down into pilot hole.
3. Cut off handle close to wall.
4. Hand screw in pan head bolt until 1/8" gap remains.

Toggle Assembly Installation

(2) 4-40 x 3/16" screws

(2) 4-40 x 1/4" screws

PVS 407D Switcher

Attach switcher to the mounting plate and secure both to the base plate.

c. Secure the power supply to the right of the electrical outlet cutout by threading the supplied tie wraps through the loops on the base plate. Attach it so the cables are easily and safely routed to the electrical outlet and switcher alike.

d. An optional ¼ rack, 3 inch deep accessory device, such as the Extron IPL T S2, can be installed on the WMK 160 base plate. To do so, remove the base plate from the wall and place the device towards the top of the base plate, align the holes on the base plate and the device, and secure with the supplied 4-40 x 3/16 inch screws. Replace the base plate.

B3. Run the Cables to the WMK 160 Location.

Run signal cables from the proposed PVT input wallplates, control device location, and the speakers to the WMK 160 location. Cables can be routed to WMK 160 either behind the walls, or through a surface raceway (for example, Wiremold® V700 or 2400 series).

a. **If running cable behind the walls,** run all the cables from the various locations to the WMK and through the access cutout.

b. **If using a surface raceway**, slide the WMK cover over the base plate, identify and mark the most suitable raceway entrance to the WMK 160.

Run the raceway from the signal source, speaker, and display locations to the marked raceway entrance at the WMK.

Remove the WMK cover, and remove the desired knockout.

Attach the raceway to the wall. Run cables from the sources and outputs through the raceway to the WMK.

B4. Cable the Switcher.

Connect the cables to the switcher as shown on page 43.

> **NOTE:** Take into consideration the bend radius of the input cables, especially the XTP DTP 24 cable. Do not bend the cables at 90 degrees.

B5. Final Installation.

Place the cover onto the WMK 160 base plate and tighten down the screws to secure the cover.
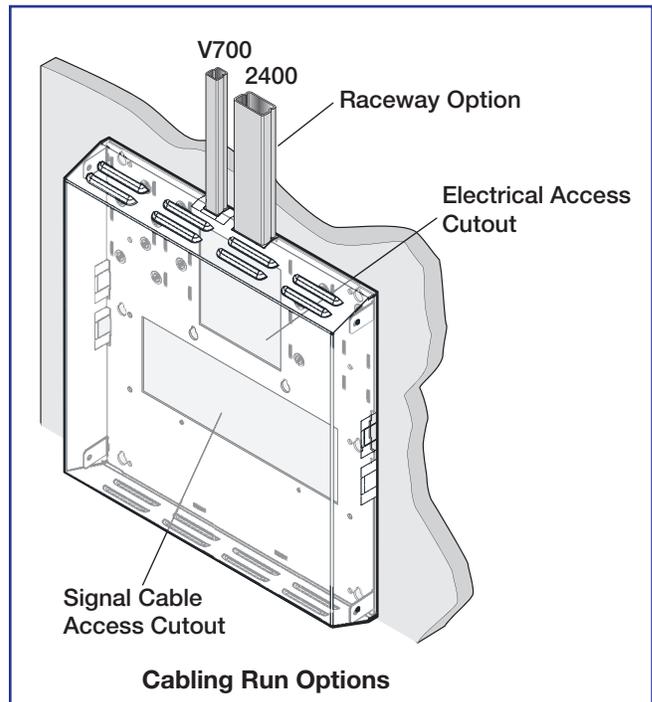
V700
2400
Raceway Option
Electrical Access Cutout
Signal Cable Access Cutout

Cabling Run Options

> **CAUTION:** The WallVault signal transmission method is specific for PVS 407D switcher working with PVT wallplates. **DO NOT** connect the PVT input ports to an MTP, XTP, or DTP system or to a LAN or data transmission system.
>
> **ATTENTION :** La méthode de transmission du signal WallVault est spécifique pour les sélecteurs PVS 407D qui fonctionnent avec les plaques murales PVT numériques. Ne PAS connecter les ports d'entrée à un système MTP, XTP, or DTP ou à un système Ethernet/LAN ou de transmission de données.

C. WallVault System (USFM 100 Short Throw Wall Mount Kit)

Boom Arm

Base Plate

Device Mounting Plate

Arm Cover (top)

Arm Cover (front)

Arm Cover (bottom)

Plastic Enclosure Cover
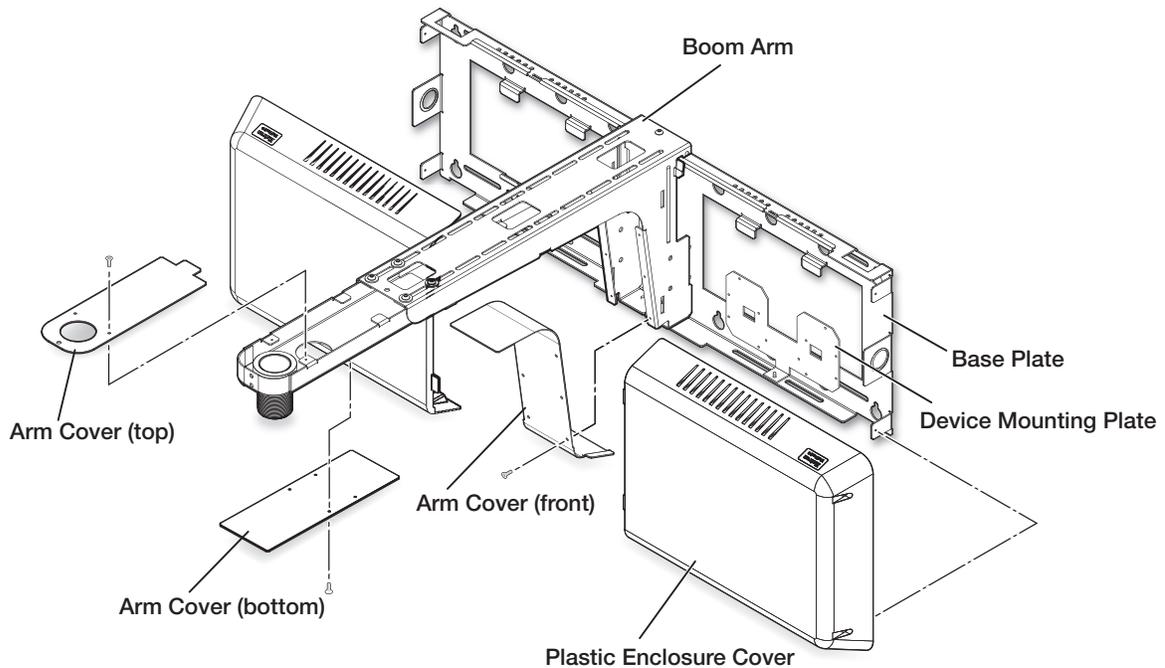
- **Where it goes:** Installs onto a wall close the short throw projector location.
- **What it does:** Supports the short throw projector and hides from view the installed PVS 407D switcher, power supply, and any installed optional accessories.

> **WARNING:** Before commencing installation, the wall structure must be examined to determine if it is suitable for the proper installation and support of this product. If needed, the installer should reinforce the wall. Drywalls should have a minimum thickness of 1/2 inch and a maximum thickness of 5/8 inch. Improper installation of this product could lead to serious injury.
>
> **AVERTISSEMENT :** Avant de commencer l'installation, la structure du mur doit être examinée afin de déterminer si elle est appropriée pour l'installation et la prise en charge correctes de ce produit. Si nécessaire, l'installateur devra renforcer le mur.
> Les murs en plaque de plâtre doivent avoir une épaisseur minimum de 2,54 cm (1/2 inch) et une épaisseur maximum de 12,7 cm (5/8 inch).

> **NOTE:** Before installation, see the user manual for the display device to determine the proper location and placement of the mount. Take into consideration the projector lens offset, screen size, screen aspect, and projected image throw distance. See the USFM 100 specifications (available at **www.extron.com**) for the dimensions of the USFM 100 to aid in this determination.

USFM 100 Base Plate

Cutout for Signal Cable Access

Level

Marker for Pilot Hole

Mounting Holes
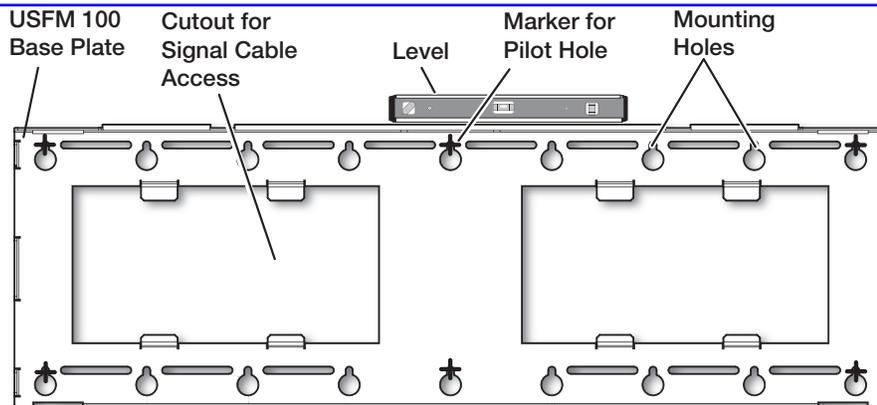
USFM 100 Base Plate.

C1. Install the USFM 100 Base Plate.

> **NOTES:**
> - It is required to attach the base plate to two wall studs, using a minimum of four securing points
> - Drywall KapToggles can be used for holes not aligned with studs.
> - Always use the widest spacing of screws and KapToggles.
> - The base plate can be installed over an existing electrical outlet.

a. **To mount the USFM 100 onto non-masonry walls,** at the desired site, use an edge-to-edge stud finder to locate the center of the wall studs (wood or steel). Mark each stud location. Minimum joist size should be 2 by 4 inches.

b. Hold and level the base plate against the wall. Mark a minimum of four positions (two top, two bottom) using either the mounting slots or the keyholes (slots uppermost) that are on the stud lines. Where applicable, mark the mounting holes on the wall for drywall toggles.

c. If the cables are to be run behind the wall to the USFM 100 location, mark the cutout area on the wall large enough for signal cables.

d. Remove the base plate and set it aside. Cut out the marked area for cable access.

For drywall with wood studs:

i. Drill ¼ inch diameter pilot holes at the marked stud locations.

ii. Align the base plate mounting holes over the pilot holes and lightly secure with 5/16 inch lag screws and washers.

iii. Verify level and position, and fully tighten down all the screws to secure the plate.

For drywall with steel studs:

i. Drill a ½ inch (13 mm) hole through the stud at each of the locations (four recommended).

ii. Insert the supplied toggles through the studs and lightly secure the plate using the four supplied (¼-20 x 2 inch) bolts and washers.

iii. Verify level and position, and fully tighten down all the bolts to secure the plate flush to the wall.

C2. Install the Switcher Onto the Base Plate.

a. Place the mounting plate flat on the switcher base with the two small raised tabs on top, and the small securing tab over the front panel. Align the two mounting holes in the switcher base with the corresponding holes on the mounting plate. Secure the plate to the switcher using the two 4-40 x ¼ inch pan head screws.

Marker for Pilot Hole

Mounting Holes

Cutout for Signal Cable Access

Signal Cables Exiting from Cutout

Cut out a Cable Access Area

1. Grasp handle, collapse toggle and insert into wall.

2. Slide plastic washer down into pilot hole.

3. Cut off handle close to wall.

4. Hand screw in pan head bolt until 1/8" gap remains.

Toggle Assembly Installation
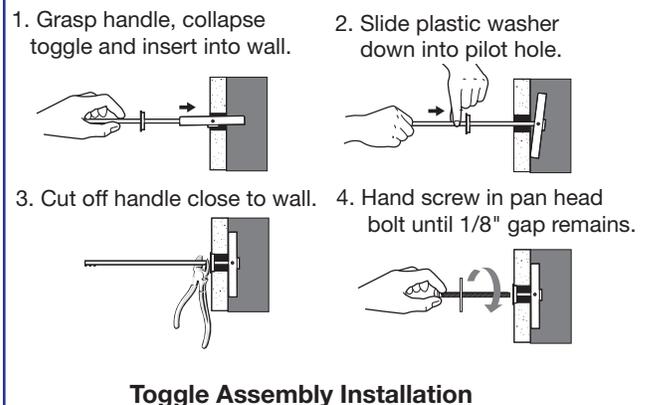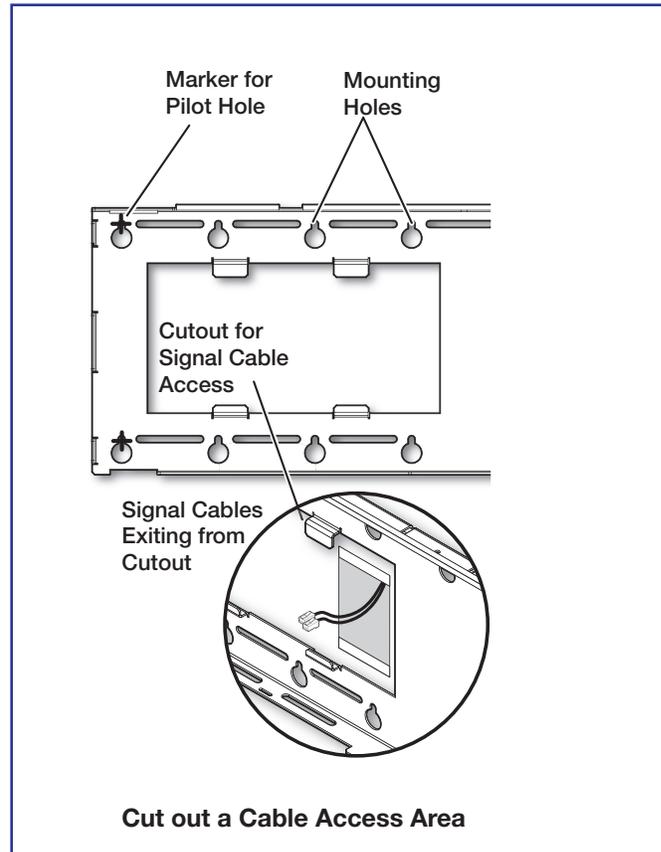
iv. Secure the mounting plate (and switcher) to the base plate by aligning the two small tabs on the back of the mounting plate over the corresponding tabs on the base plate (see figure at right). Slide the mounting plate (and switcher) down into place. Secure it to the base plate by passing a 6-32x¼ inch screw up through the securing tab (see figure at right). Tighten down the screw.

C3. Run the Cables to the USFM 100 Location.

Run signal cables from the PoleVault input wallplates, control device location, and the speakers to the USFM 100 location. Cables can be routed behind the walls, through a surface raceway (such as Wiremold 700 or 2400), or through conduit directly to the USFM 100.

If running cable behind the walls:

Run all the cables from all the locations to the USFM 100 and through the access hole (cut in step C1d).

If using a surface raceway or conduit:
i. Turn over the left or right cover as needed, and from the inside, cut the most suitable marked raceway or conduit knockout for the cable to enter the USFM 100. Remove the knockout.

ii. Run the raceway or conduit from all locations to the marked entrance and attach to the baseplate.

iii. Run the cables through the raceway or conduit to the USFM 100.

USFM 100 Base Plate

(2) 4-40 x 1/4" Screws

Mounting Plate

Securing Tab

PVS 407D Switcher

(1) 6-32 x 1/4" Screw

Mounting the Switcher onto the Base Plate.

2400

Raceway Option

V700

Signal Cable Access Cutout Option

Conduit Option

Options for Running the Cables to the USFM 100
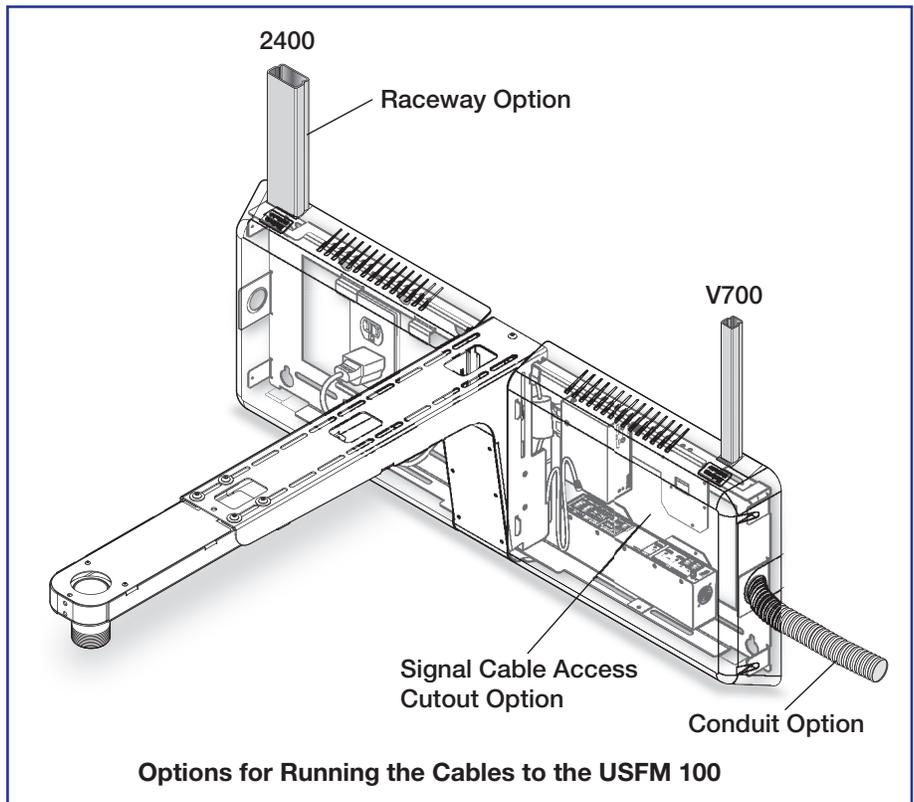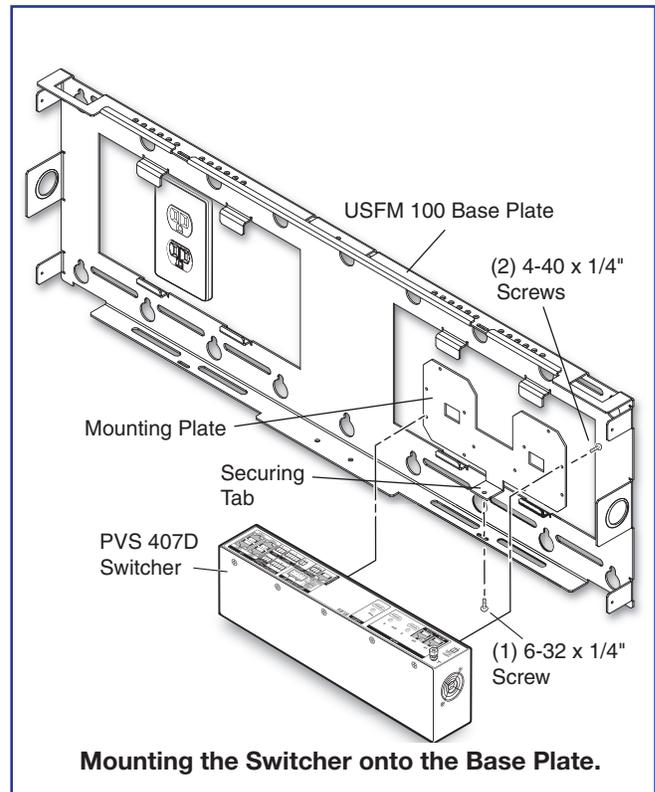
C4. Cable the Switcher.

Connect the cables to the switcher as shown on pages 43.

> **CAUTION:** The WallVault signal transmission method is specific for PVS 407D switcher working with PVT digital wallplates.
> DO NOT connect the PVT input ports to an MTP, XTP, or DTP system, or to a LAN or data transmission system.
>
> **ATTENTION:** La méthode de transmission du signal WallVault est spécifique pour les sélecteurs PVS 407D qui fonctionnent avec les plaques murales PVT numériques. Ne PAS connecter les ports d'entrée PVT à un système MTP, XTP, or DTP system ou à un système Ethernet/LAN ou de transmission de données.

C5. Attach the Boom Arm, Power Supply, and Projector.

a. Hook the boom arm over the top rail on the base plate so that the tab on the arm (see figure below) is against the rail. Secure the arm at the bottom with the two supplied (10-32 x 3/8 inch) pan head screws and washers, and at the top with the single ¼-28 x ¾ inch screw.

Screw

Screws and Washers

Phillips Pan Head Screws

Set Screw
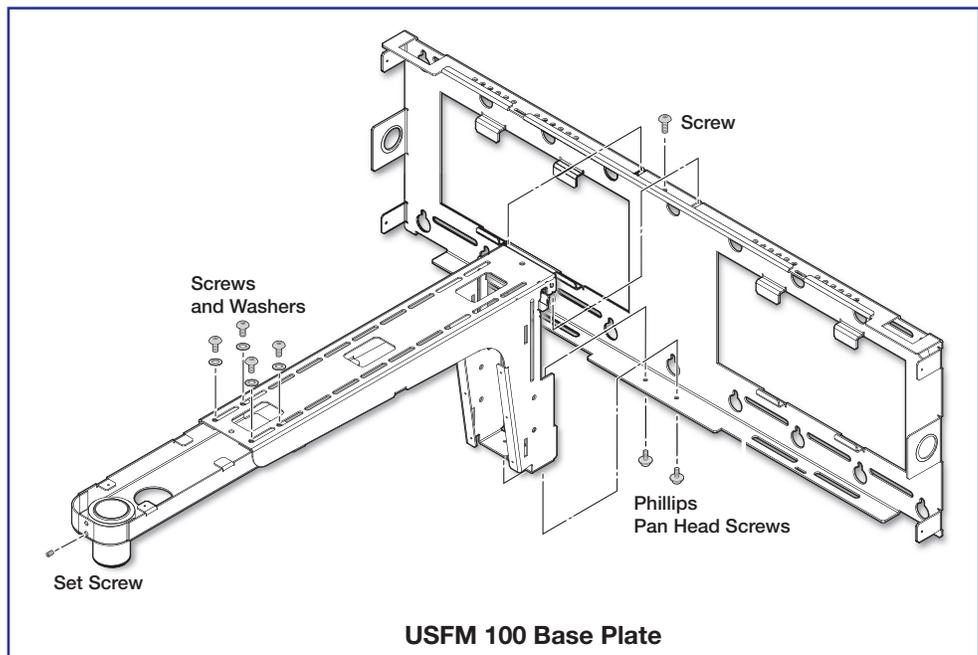
USFM 100 Base Plate

b. If using a PS 1248 power supply, secure the power supply on the extra device mounting plate, then secure plate and supply to the USFM base plate above the switcher. Refer to the *USFM 100 Installation Guide* for more details.

Option for Attaching a PS 1248 Power Supply

In both cases, the cables should then be easily and safely routed to the electrical outlet and to the switcher.

c. Extend the boom arm to the appropriate projector throw distance and secure in the applicable slots with the four supplied (¼-20 x ½ inch) screws and washers.

> **NOTE:** Do not overtighten the screws.

d. Loosen the set screw (located in the lower hole on the boom arm end), and screw the threaded pipe up into the end of the arm. A minimum of three turns is needed to safely secure the pipe in place. Lock it in place by tightening down the set screw.

> **NOTE:** The upper hole on the boom arm end is for attaching an optional seismic support wire.

e. Run the video cables from the switcher to the projector through the boom arm so that they exit down the projector mounting pipe.

> **NOTE:** Provide sufficient cable slack within the boom arm to allow for future arm length adjustment.

f. Referring to the *UPB 125 Setup Guide*, screw the UPB 125 pipe adapter block onto the threaded pipe and attach the projector to the UPB 125 base plate assembly.

g. Attach the projector and base plate assembly onto the UPB 125 pipe adapter block and secure.

h. Connect the output cables from the switcher, any MLC control cables, and the power cable to the projector.

> **CAUTION:** **Electrical shock that may result in injury.** Do not thread the projector power cable through the boom arm or mounting pipe. Threading it through the arm or the pipe violates national electrical regulations.
>
> **ATTENTION :** **Une installation non-conforme peut entraîner un choc électrique ou des blessures graves.** N'enfilez pas le câble d'alimentation du projecteur sur le support flexible ou le tuyau de montage. L'enfiler sur le support ou le tuyau enfreint les réglementations électriques nationales.
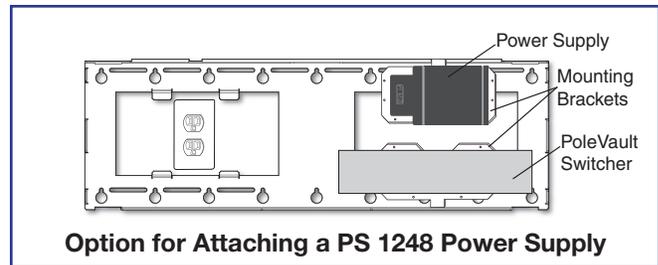
D. PlenumVault System (PVM 220 PlenumVault Mount Kit)

PVM 220 Enclosure

Device Mounting Plate

Door Frame
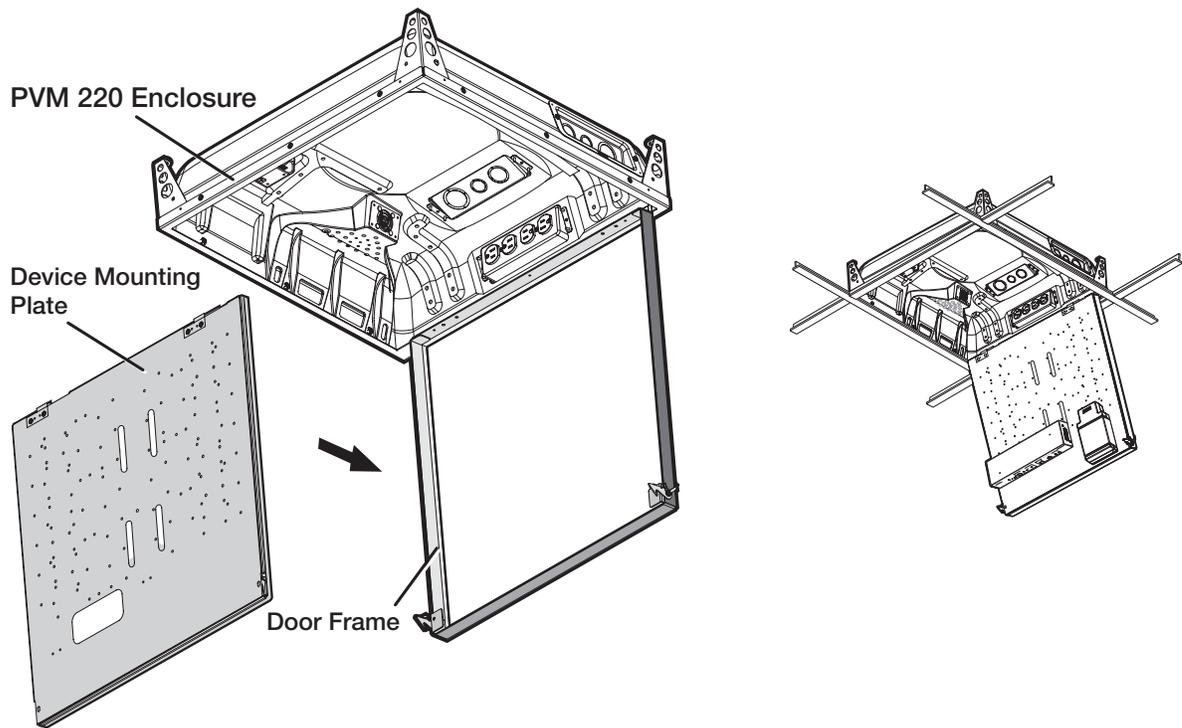
- **Where it goes:** Installs onto a T-grid , within the air-handling space above a suspended ceiling near (within 50 feet) of the projector location.
- **What it does:** Supports and hides from view the installed PVS 407D switcher, power supply, and any installed optional accessories.

The PVM 220 is UL Listed for use in plenum airspaces: meets UL 2043 for heat and smoke release.

Suitable for use in environmental air space in accordance with Section 300-22(C) of the National Electrical Code, and Sections 2-128, 12-010(3) and 12-100 of the Canadian Electrical Code, Part 1, CSA C22.1. The product has been additionally investigated to UL 2043, "Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces."

NOTES:
The following products are approved for use in the UL 2043 rated Extron PVM 220 enclosure as part of the Extron PlenumVault System:
• PVS 305SA IP PoleVault Switcher • PVS 405D PoleVault Switcher • PVS 407D PoleVault Switcher
• CC 100C Network Codec • IPL 250 IP Link Controller • SW2 HDMI Switcher
In addition, any Extron product that has been individually tested and UL 2043 approved can also be used. Contact Extron for a complete list of plenum rated products.
The PoleVault switcher and other AV devices are not supplied with the PVM 220.

IMPORTANT INSTRUCTIONS:
- Installation of this product must be done by a qualified, professional installer.
- Installation of this product (including the wiring of devices) must meet national electrical codes, and local building standards and codes.
- A readily accessible disconnect device shall be incorporated in the building installation wiring.
- Building installation wiring is to be protected by a UL Listed circuit breaker rated 20 A.
- Observe all local and national building and safety codes, UL requirements, and ADA Accessibility Guidelines.
- "Only for use with Extron's UL Listed ITE or Audio/Video equipment." or equivalent.

D1. Remove the Device Mounting Plate from the Access Door.

a. Open the access door and unscrew the two Phillips screws that are located in the bottom corners of the plate (left and right sides), near the door latches and door tether "T."

> **NOTE:** Do not remove any of the screws located below the hinges.

b. Swing the bottom of the plate up to separate it from the door frame, then slide the plate to the right until it becomes free of the hinge pins on the door frame.

Retain the device mounting plate for later use (see step D6).

D2. Remove Ceiling Tile and Install Suspension Cables.

For threaded rod installation see step D3, steps **a-c**, at the top of page 55.

a. At the location where the PVM 220 is to be installed, remove the ceiling tile and mark the T-grid for that tile then remove the adjacent tiles to make working on the grid easier.

b. At an approximate angle of 10 degrees out from each corner of where the PVM 220 will be installed, mark and drill four holes in the structural ceiling for the suspension cable anchors.

c. Screw a lag eye bolt (or an appropriate anchor) into each hole.

d. Thread the looped end of the suspension cable though the bolt eyehole, pass the rest of the cable through the loop and tighten. Allow each cable to hang down.

a. Remove this screw on the right and left sides of the mounting plate.

Door Tether "T"

Bottom of Door (inside right corner view)

b. Swing the mounting plate out from the door frame and slide the plate to the right, off the hinge pins.

Remove the access door.
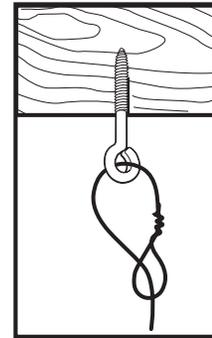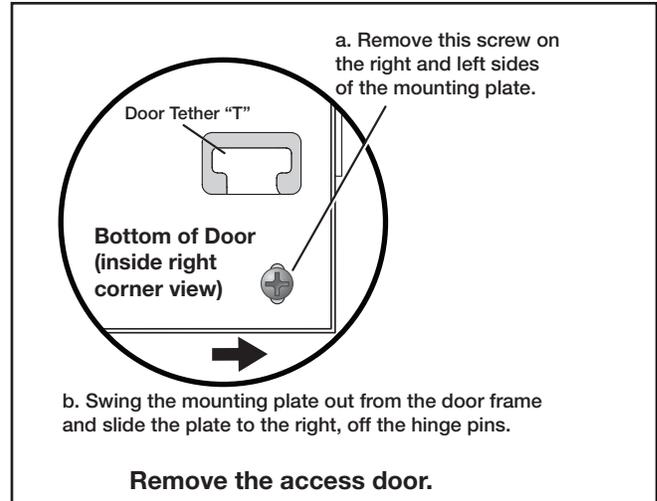
Secure using lag bolts.

D3. Suspend the main PVM 220 enclosure from the ceiling.

a. Lift and place the PVM 220 enclosure carefully onto the T-grid so that it sits squarely on the grid.

b. Holding a cable lock, press the locking pin down (following arrow directions) and pass the loose end of one the cables down through the large hole in the lock.

Continue to push the cable down until about 12-15 inches of cable has exited the lock.

c. Pass the loose end of the cable directly through the corner hole on the PVM 220 enclosure and then back up through the other large hole in the lock.

Pass at least six inches of cable out through the top of the lock.

d. Repeat for each corner.

e. Adjust the cable tension through all locks, making each cable taut without lifting the PVM 220 off the T-grid.

Thread the cable down through the cable lock, through the hole on the frame of the enclosure, and back up through the lock.

Locking Pin

Cable Lock

Pass cable through the cable locks.
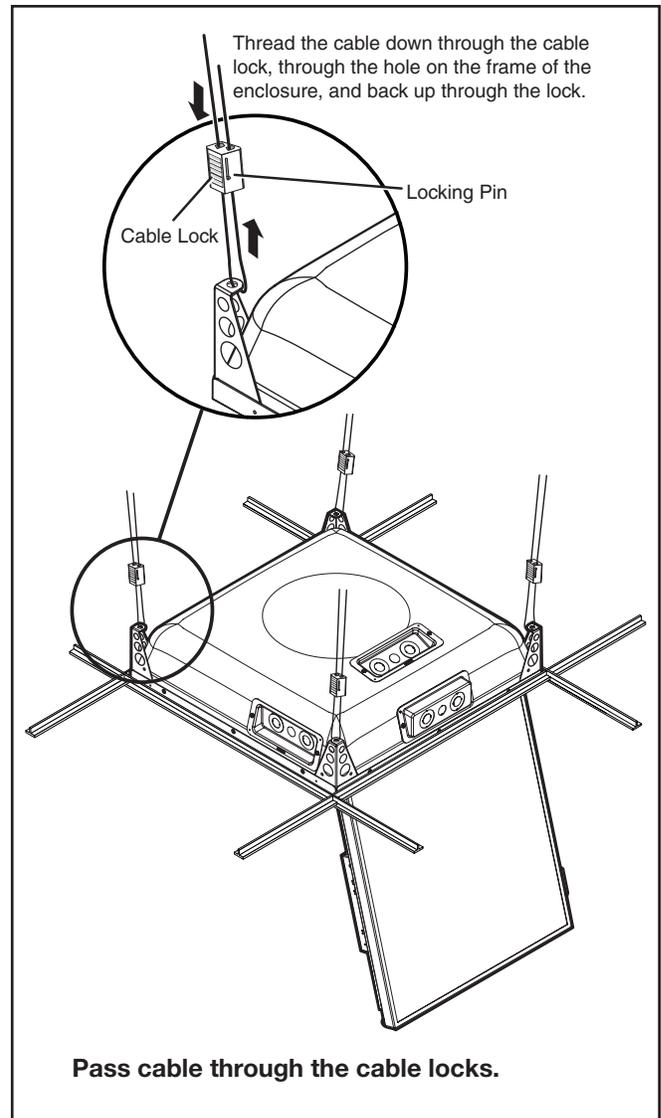
For threaded rod installation:

> **NOTES:**
> - 1/2 inch or 3/8 inch diameter threaded rods are recommended to be used for installing this product.
> - The threaded rod should be properly secured to the ceiling structure. For example, properly fasten a unistrut to the ceiling structure and attach threaded rods using nuts and washers.

Secure the frame to the structural ceiling using threaded rods.

To do this:

a.   Attach four rods to the support structure by using, for example a unistrut, one over each corner of the PVM 220 installation location.

b.   Attach a rod to each corner securing point of the PVM 220 with nuts and washers (see figure at right).

c.   Adjust all the nuts to secure the PVM 220 to the ceiling, keeping it level and without lifting the unit from the T-grid.

D4. Run AC Power Wiring to the AC Module in the PVM 220.

If power is not available close to the installation location, install a junction box or power source at the area.

> **NOTES:**
> - This must be done by a qualified electrician and must meet local and national electrical, building and safety codes and all the regulatory requirements. See the Important Instructions on page 52.
> - Use metal conduit only to run wire to the AC module.
> - Do not run power cable in the same conduit as signal cables.
> - Use 12 AWG gauge solid copper wire only, as required by the installed power receptacles.

Run the power cable through metal conduit and wire it into the PVM 220 power module.

To do this:

a.   Unscrew the two center screws (left and right side) of the power inlet/control panel and remove it from the enclosure (see figure at right).

b.   Unscrew the two screws on the corners and detach the outer cover.

Insert threaded rods through holes on the ends of the mounting plate.

Attach washers and nuts and secure.

Threaded Rod Installation

c Attach a metal conduit to the outer cover.

1/2" Conduit Knockout

b Remove screws and detach the outer cover from power module.

a Remove screws and remove power module from the PVM 220 enclosure.

Cabling the Power Module
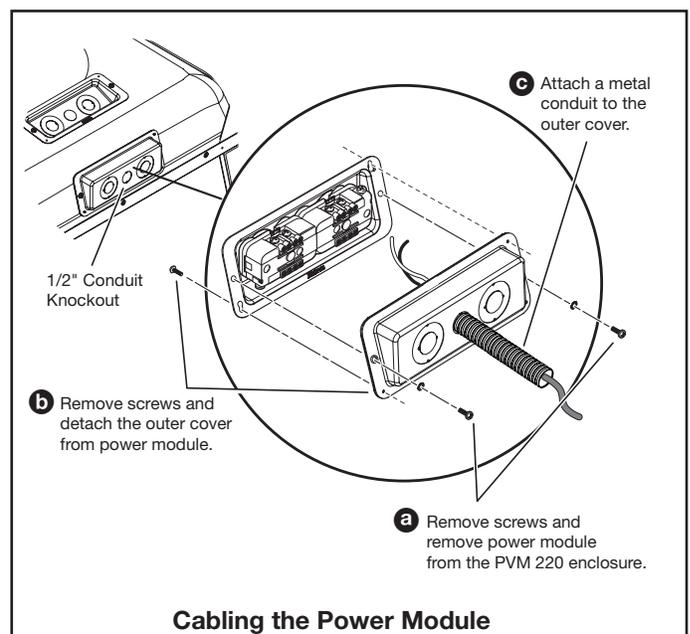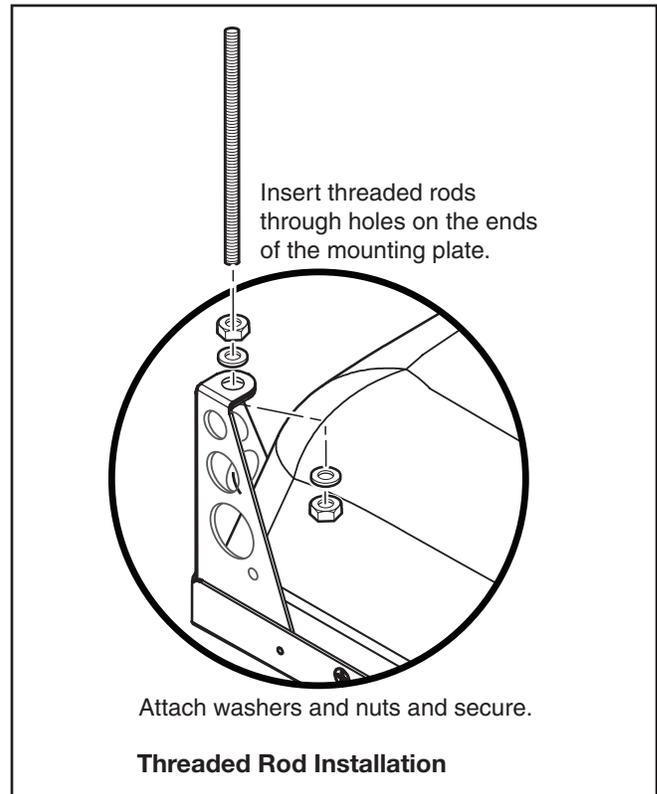
c. Attach the metal conduit to the outer cover.

> **NOTES:**
> - Remove only the knockouts that are to be used for cabling. Leave intact the unused knockouts.
> - The three knockout sizes are 1/2 inch to 3/4 inch, 3/4 to 1 inch, and 1 to 11/4 inch.

d. Run the wires through the conduit and connect to the AC receptacles.

e. Reassemble the power module.

f. Reattach the module to the enclosure.

> **NOTE:** The power module outlets must be used to power installed AV devices only.

D5. Run Signal and Control Cables to the PVM 220.

Run the signal and control cables either into cable clamps or through conduit attached to the PVM 220 enclosure (see figure at right).
To install a cable clamp on the enclosure:

a. Select a suitable sized cable clamp for the quantity and thickness of cable to be fed into the enclosure. See the note in step D4 for knockout sizes.

b. Identify the most suitable cable entry point and remove one or more knockouts as needed.

> **NOTE:** Remove only the knockouts that are to be used for cabling. Leave intact the unused knockouts.

c. Remove the large nut from the back of the cable clamp and insert the clamp into the enclosure knockout from the inside.

d. Place the nut on the clamp and tighten to secure.

e. Pass the cables through the clamp into the enclosure. Leave enough cable slack at the PVM 220 to ensure cable connection to any device is maintained when the access door is open.

f. Tighten down the cable grip until the cables are held firmly.

Avoid damaging or bending cables at too sharp an angle.

c. Push the cable clamp into the knockout from inside the enclosure.

d. Attach the nut from the outside of the enclosure.

Run the signal and control cables into the PVM 220 through the knockouts.
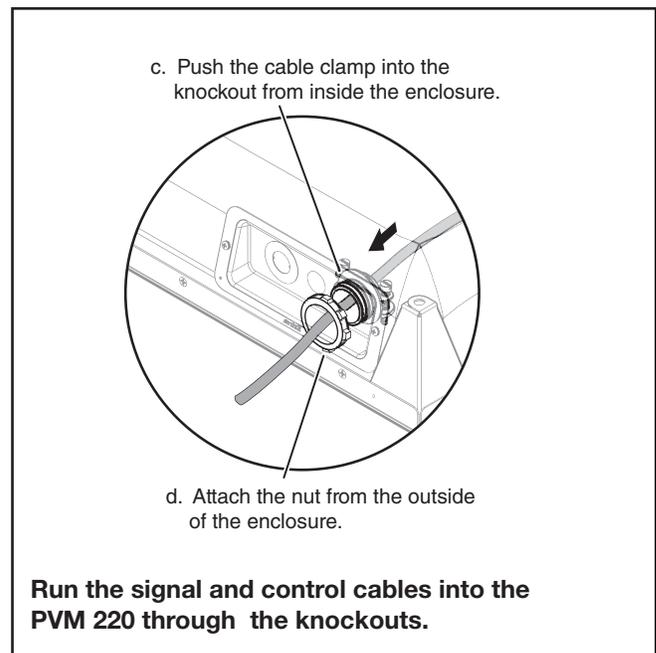
D6. Install Devices onto the Device Mounting plate.

> **NOTE:** The maximum door load is 15 lbs (6.8 kg).

To mount the devices and accessories:

a. If mounting a PoleVault (PVS) switcher, carefully align the switcher with the appropriate holes in the marked location on the device mounting plate (location is indicated by a white device outline and 2 arrows, see figure at right). Non-PVS devices can be mounted anywhere within the enclosure.

> **NOTE:** The PVS switcher must be mounted in the designated area ONLY. This ensures that the switcher is positioned correctly for proper ventilation.

b. Secure the PVS switcher with the supplied #4-40 3/16 inch mounting screws, tightening each one until snug. Do not overtighten.

c. Align the power supply with the appropriate holes in the marked location on the device mounting plate (location is indicated by a white device outline and 3 arrows, see figure at above right). Secure using the supplied screws.

> **NOTE:** Replacement power supplies must be either the equivalent Extron power supply, or a UL Listed NEC Class 2 power supply.
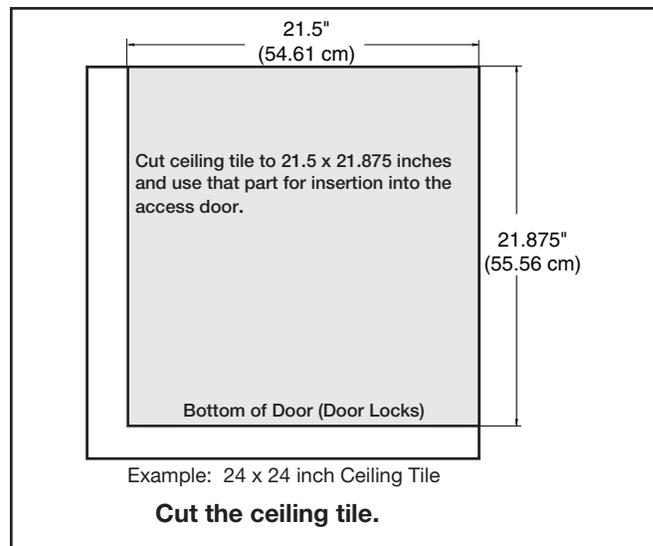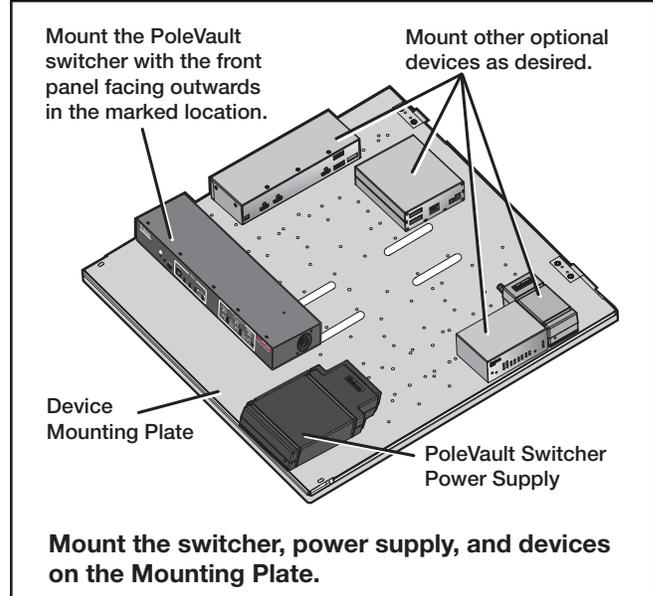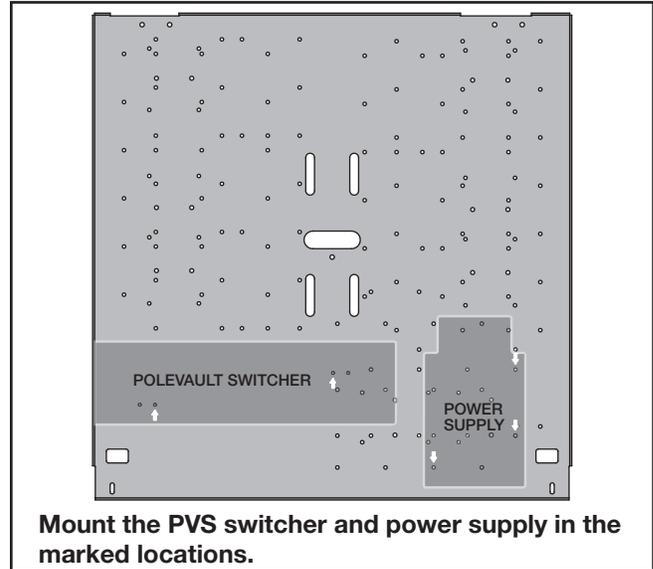
d. Mount any other approved devices following the procedures in the supplied device guide.

D7. Cut and Install the Ceiling Tile in the Access Door.

> **NOTES:**
> - The door can accept a ceiling tile thicknesses of 1/2 - 1 1/4 inches. Check the tile thickness before cutting.
> - If the ceiling tiles have a specific pattern direction, ensure the overall pattern direction is maintained when cutting and fitting the cut tile insert into the access door.

a. Mark the dimensions (21.5 inches by 21.875 inches) for the PVM 220 access door on the installation tile and cut the tile to size.

b. With the access door open, insert the cut ceiling tile into the door frame (see figure on page 58).

POLEVAULT SWITCHER

POWER SUPPLY

Mount the PVS switcher and power supply in the marked locations.

Mount the PoleVault switcher with the front panel facing outwards in the marked location.

Mount other optional devices as desired.

Device Mounting Plate

PoleVault Switcher Power Supply

Mount the switcher, power supply, and devices on the Mounting Plate.

21.5" (54.61 cm)

Cut ceiling tile to 21.5 x 21.875 inches and use that part for insertion into the access door.

21.875" (55.56 cm)

Bottom of Door (Door Locks)

Example: 24 x 24 inch Ceiling Tile

Cut the ceiling tile.

D8. Install the Device Mounting Plate onto the Access Door.

To fit the mounting plate and devices on the access door:

a. Align and slide the device mounting plate onto the two hinge pins located at the top of the door frame.

b. Secure the plate into place with the two mounting plate screws, located at the bottom of the door frame.

D9. Cable the Switcher.

a. Connect the cables to the switcher as shown on pages 43.

> **CAUTION:** The PlenumVault signal transmission method is specific for PVS 407D switcher working with PVT digital wallplates. DO NOT connect the PVT input ports to an MTP, DTP, or XTP system, or to a LAN or data transmission system.
>
> **ATTENTION :** La méthode de transmission du signal PlenumVault est spécifique pour les sélecteurs PVS 407D qui fonctionnent avec les plaques murales PVT numériques. Ne PAS connecter les ports d'entrée PVT à un système MTP, DTP, or XTP, ou à un système Ethernet/LAN ou de transmission de données.
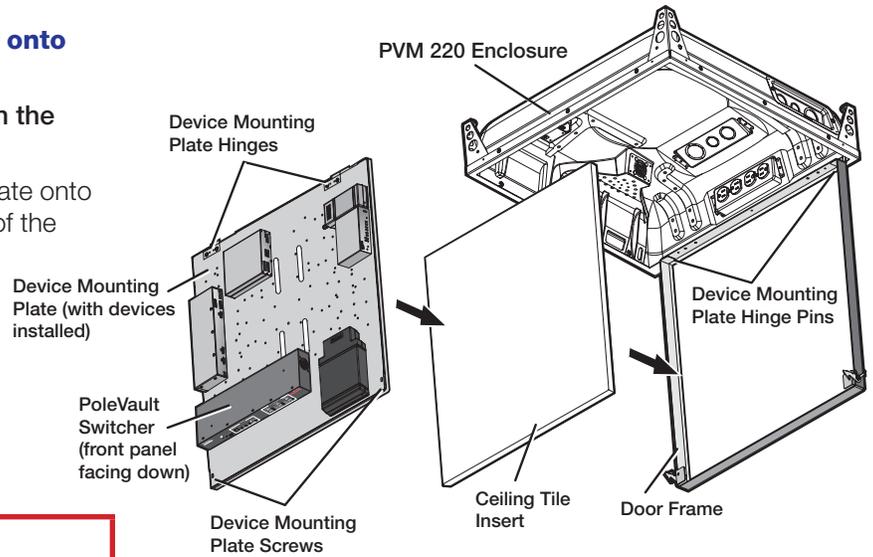
> **NOTE:** For cable connections to optional devices see the device guide or manual.

b. Plug in the fan controller cable to the switcher power supply. The fan comes already pre-wired to the controller in the enclosure.
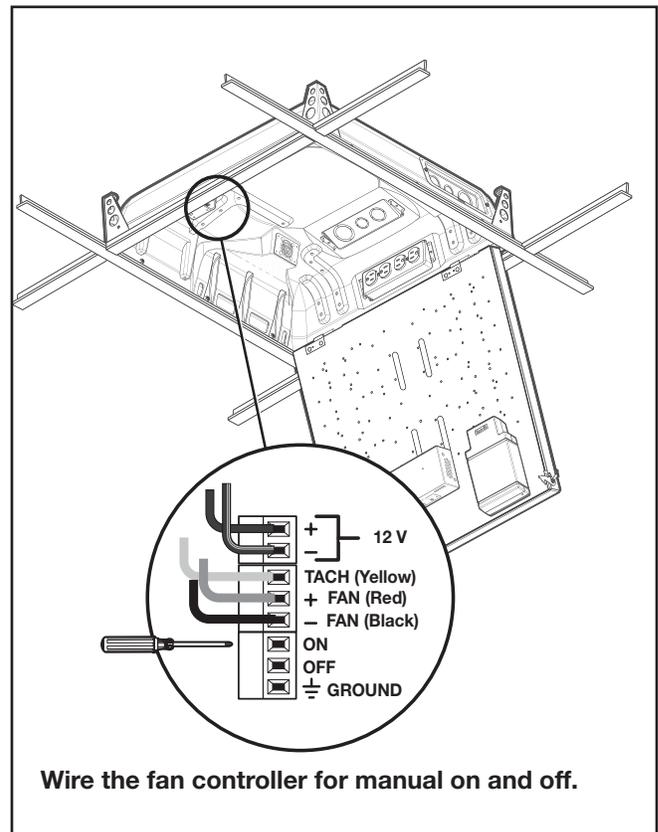
> **NOTE:** The fan is controlled automatically by the internal temperature of the PVM 220. The fan can also be turned on or off manually (see below for wiring). Manually controlling the fan overrides the automatic thermal control mode.

The fan can be wired to a control system for manual On/Off as follows (see figure at right for connectors):

- For manual On, wire a latching relay to the On and Ground connectors on the fan controller.

- For manual Off, wire a latching relay to the Off and Ground connectors on the fan controller.

c. Connect and dress the other device cables as needed, providing enough slack to open and close the access door.

PVM 220 Enclosure

Device Mounting Plate Hinges

Device Mounting Plate (with devices installed)

PoleVault Switcher (front panel facing down)

Device Mounting Plate Screws

Device Mounting Plate Hinge Pins

Ceiling Tile Insert

Door Frame

Install the Mounting Plate onto the Access Door.

+
−
12 V

TACH (Yellow)
+ FAN (Red)
− FAN (Black)
ON
OFF
⏚ GROUND

Wire the fan controller for manual on and off.

D10. Verify and Configure the Setup.

Turn on the power to all the devices. Verify and configure the system.

See the *PVS 407D User Guide* available at **www.extron.com** for full details.

D11. Attach the Door Tether to the Door.

The PVM 220 enclosure has a coiled door tether installed on the right side of the enclosure (when viewed from the front).

After the device mounting plate is installed, the tether should be attached to the door to ensure safety when the door is opened.

To attach the tether to the door:

a.   With the door fully open, locate the door tether attached within the enclosure. The coiled tether has a looped end to be attached to the door.

b.   In the lower corners of the door locate the cutout with a "T" shaped metal tab (see figure at right).

c.   Stretch the tether and close up the door until the loop on the tether can be carefully slid over the "T" tab on the door. Ensure the loop is completely over the "T".

d.   Carefully lower the door to the full extent of the tether to ensure it functions correctly.

Push the tether loop completely over the T tab on the door.

Attach the door tether.
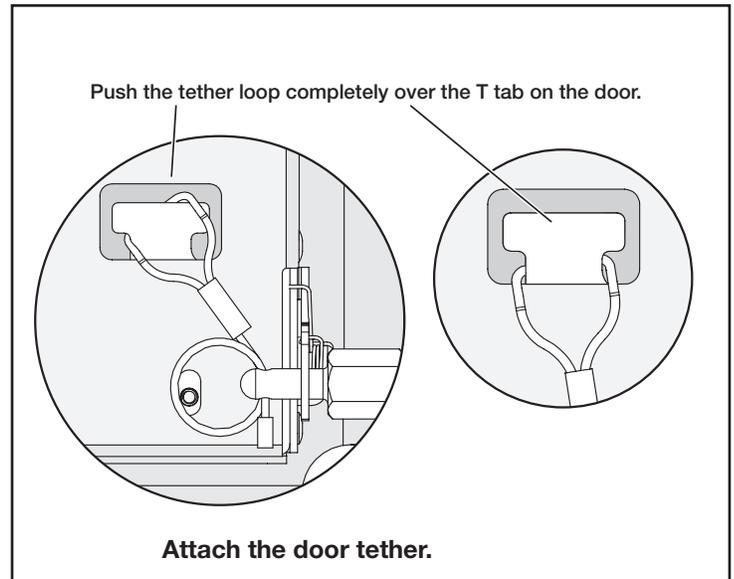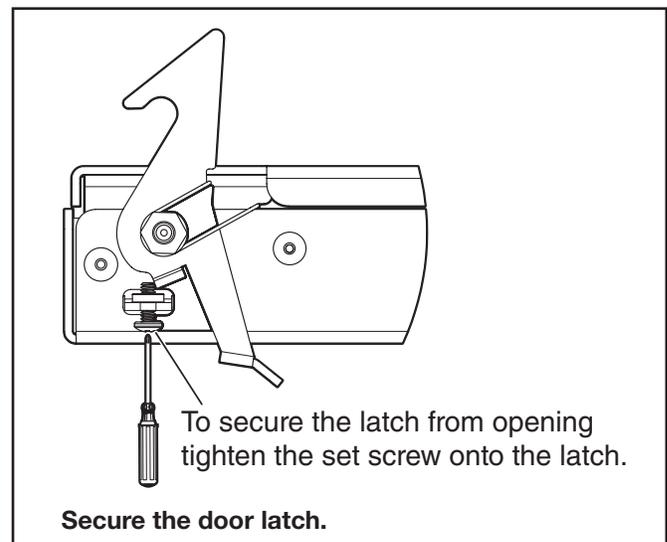
D12. Secure the Door Latches.

Both door latches can be made secure so the door cannot be opened accidentally or inadvertently.

To secure the latches close the door and tighten down the small set screws onto the latch (see the figure at right).

For full safety secure both latches.

To secure the latch from opening tighten the set screw onto the latch.

Secure the door latch.

Stage 5: Configuring the PoleVault Switcher and System

Stage 5 Involves installing the programs below.

Items needed to help complete this stage:

- Laptop (or PC) with a network connection
- Product Configuration Software (PCS) program download from **www.extron.com**
- Global Configurator software download from **www.extron.com**
- *MLC 104 IP Plus User Guide*
- Projector manufacturer guide
- Device driver and driver package (download from **www.extron.com**)

1. Configure the Switcher — PCS Product Configuration Software Program

a. Download and install the latest Extron Product Configuration Software (PCS) program onto the PC that is to be connected to the PVS 407D.

b. Connect the switcher to the PC (via the front panel USB or rear panel TCP/IP port), power devices, check they are connected to the LAN.

**c.** Click on the desktop icon ![icon] to launch PCS.

> **NOTE:** After installation, open the embedded PCS Help file and follow the instructions to access and configure your switcher.

d. From the **Device Discovery** tab scroll to the applicable PVS 407D and click **Connect**.

Alternatively select **New Configuration File** from the drop-down menu, scroll to the PVS 407D and click **Configure**. The window opens in emulation mode.

> **NOTE:** An offline emulation of the PVS 407D can aid in becoming familiar with the device before configuring an active unit.

e. Once the program is running, click on the drop-down arrow on the product name tab and select the **PVS 407D Help** file. Follow the help file instructions to configure the device.
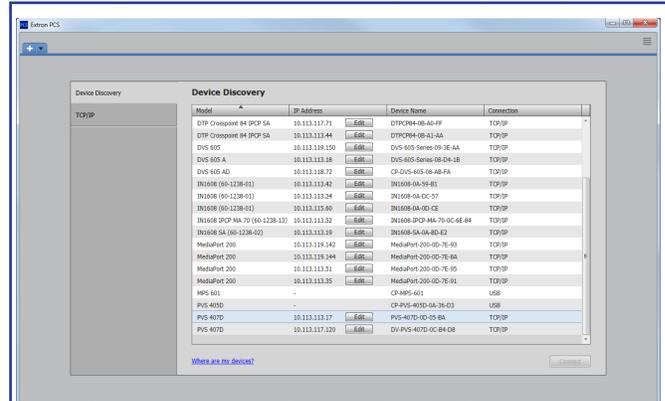
1d Select online device(above).... ...... or emulation mode (below).
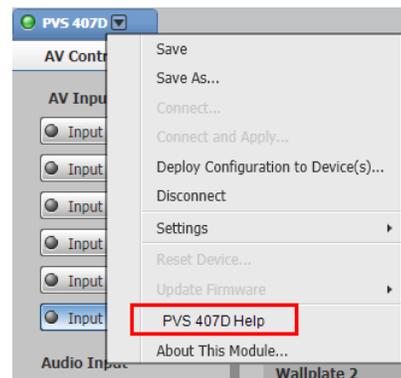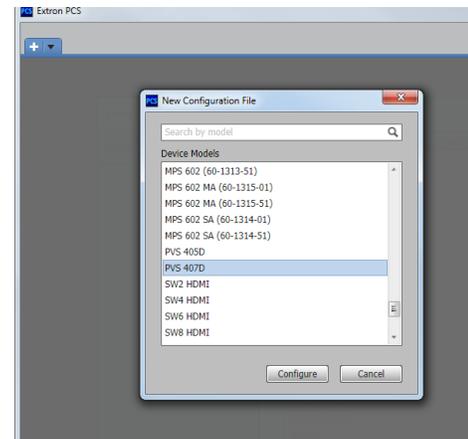
1e Accessing the Product Help File in PCS.

2. Configure the System — Global Configurator.

a. Download and install the Extron Global Configurator (GC) configuration program (available at **www.extron.com**) on the PC.

b. Ensure the PC and the MLC 104 IP Plus are connected to the LAN and powered on.

> **NOTE:** Alternatively, connect a 2.5 mm TRS configuration cable (part number 70-335-01) to the PC and to the front panel configuration port of the MLC 104 IP Plus.

c. Launch the Global Configurator program and click on **Help, Contents**, or press <F1>.

d. Select the **MLC 104 IP Plus/PoleVault** system from the drop-down box in the Help file. Follow the instructions on the Help page to configure the MLC.

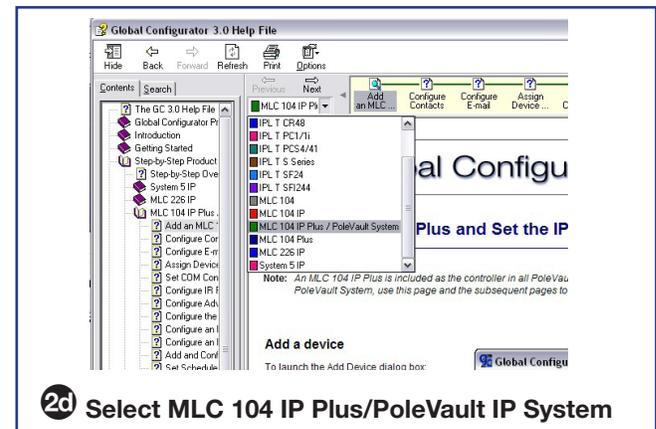**e.** To move to the next page in the Help file (as shown in the yellow box, figure 2e), click the **NEXT** button above the drop-down box. Repeat as needed, following the instructions on the pages to configure the MLC 104 IP Plus.
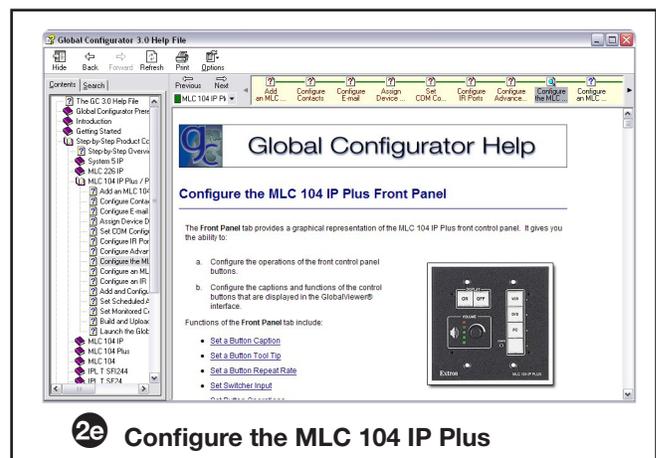

2a Install Global Configurator software

2c Launch Global Configurator

2d Select MLC 104 IP Plus/PoleVault IP System

2e Configure the MLC 104 IP Plus

3. Test the System.

a. Connect all the input devices (PC, BluRay player, document camera, and, where desired, LAN cables, and so forth) to the wallplate transmitters and power up the input devices. Check that power and signal are present at the transmitters. The transmitter LEDs light amber or green as described below:

Amber LED:
Wallplate is powered, however there is no signal from the input source, or the signal from the input source is present but the input is not selected.
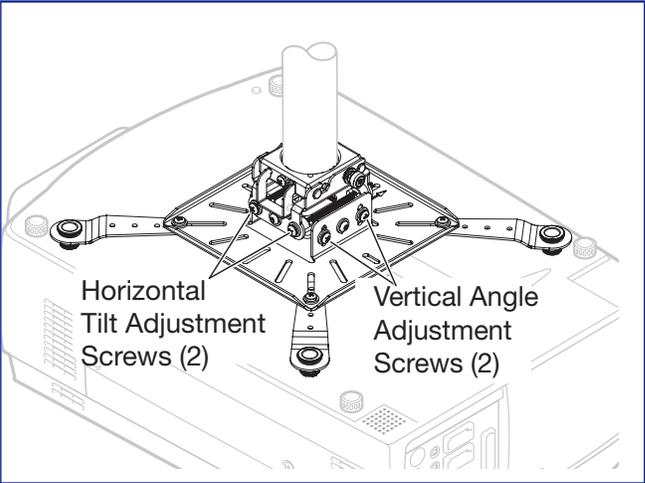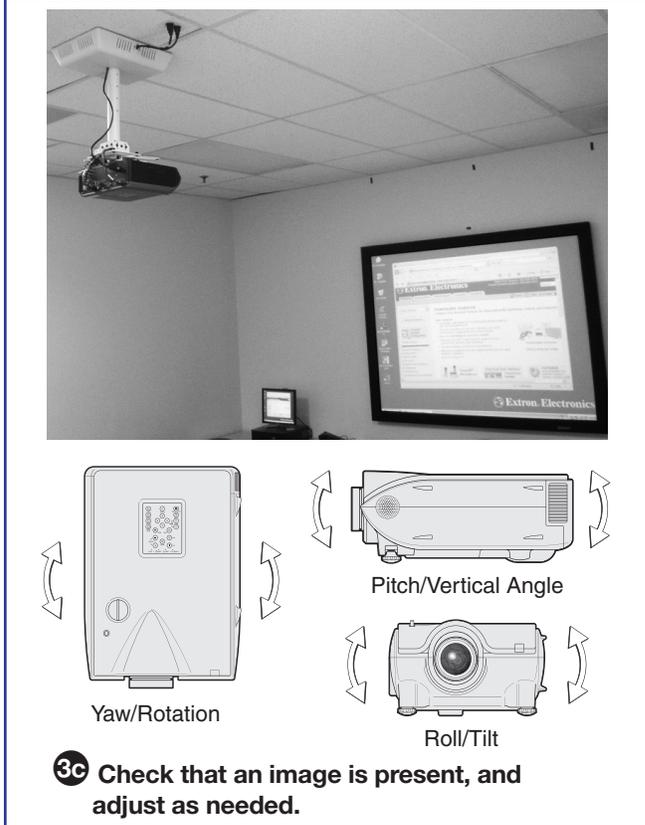
Green LED:
Wallplate is powered, the input is selected *AND* a signal is present from the input source.

b. At the MLC 104 IP Plus, turn on the display. Once the the projector is powered up, check with an active video source (PC or BluRay) that a good image is shown on screen.

> **NOTE:** If the display does not turn on, check the MLC controller configuration and wiring.

c. Properly align and adjust projector mounting settings as follows:
- Adjust the rotation (yaw) by turning the unit on the projector pole. Secure the location by tightening the two set screws on the UPB mount plate to the pole (see below right).
- Loosen all pivot screws and adjust the vertical angle (pitch) of the projector. Lock down the four adjustment screws.
- Adjust the horizontal tilt (roll) of the projector. Lock down all the remaining adjustment and pivot screws.
- Adjust the image settings on the projector (zoom, focus, keystone, brightness, contrast, and so on). See the projector user manual.

3b Connect and turn on the input devices, and turn on the display via the MLC.

Pitch/Vertical Angle

Yaw/Rotation

Roll/Tilt

3c Check that an image is present, and adjust as needed.

Horizontal Tilt Adjustment Screws (2)

Vertical Angle Adjustment Screws (2)

d. Test the controller configuration as follows:
- Check that the MLC is controlling the projector and PVS 407D, and outputs the correct image when switching inputs.
- Check the projector power control (turn it off and on at the MLC).
- Adjust the configuration as necessary.

e. Adjust the audio input sensitivity as follows:
- Ensure there is an audio source at each transmitter.
- On the PVS switcher, select an input and, using the **up and down Input audio adjustment buttons**, set the gain level for each input to a comfortable maximum level, where the input "normal" LED is lit, indicating the level is set properly. This ensures no clipping if the MLC volume is turned to maximum during operation.
- Repeat step **e** for all inputs.

f. Where installed, to adjust the microphone sensitivity switch on the microphone, press and hold the **volume down button** until no beeps are heard from the speakers. Then press and hold the **volume up button** until six beeps are heard. To adjust the VoiceLift audio output level press the **VoiceLift audio adjustment buttons** on the switcher to the "normal" setting and the LED lights. Test and adjust the microphone so that the amplified voice is heard just above the normal voice level at each speaker location. See the *VoiceLift User Guide,* and page 66 of this guide for details.
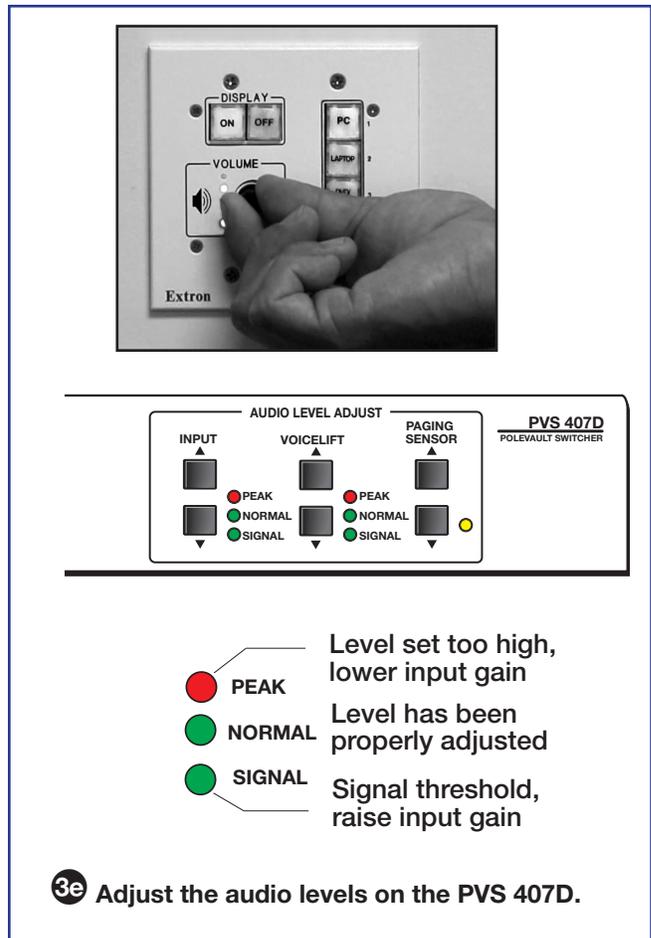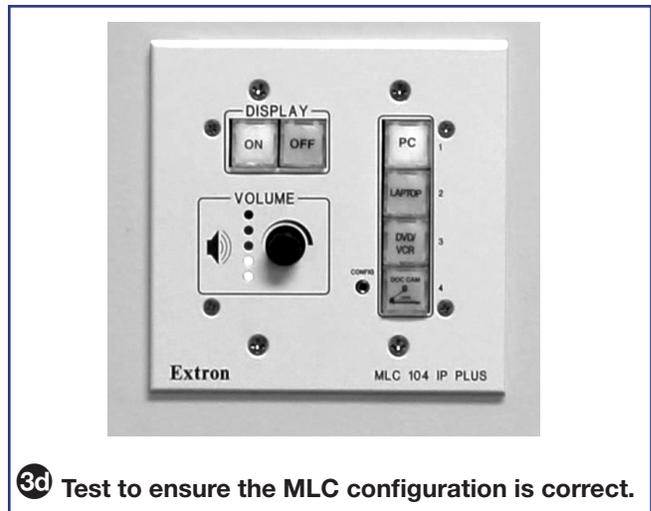
> **NOTES:**
> - The MLC volume control does not control the VoiceLift volume.
> - By default the switcher has been configured so that input level and VoiceLift input adjustments may not be required.

g. Where installed, it may be necessary to adjust the sensitivity of the Priority Paging system. During a test transmission of the paging system press the **Paging Sensor audio adjustment buttons** until program audio is no longer heard from the PoleVault speakers. See the *Priority Page Sensor Installation Instructions*, or page 67 of this guide, for details.

> **NOTE:** The Paging Sensor has been enabled by default. Default is set to 3 seconds. Adjustment can be made using Product Configuration Software (PCS) or by SIS commands.

3d Test to ensure the MLC configuration is correct.

3e Adjust the audio levels on the PVS 407D.

4. Final Installation.

a. Slide the covers of the PMK onto the base plate, ensuring the power cable can exit the unit through the power cable access slot.

b. Using a 5/32 inch hex wrench, tighten down the four screws on the PMK to secure the sides in place.

c. Check and tighten the adjuster plate locking screws on the projector bracket.

d. Hole plugs can be used to cover any exposed holes in the slotted pipe if necessary.
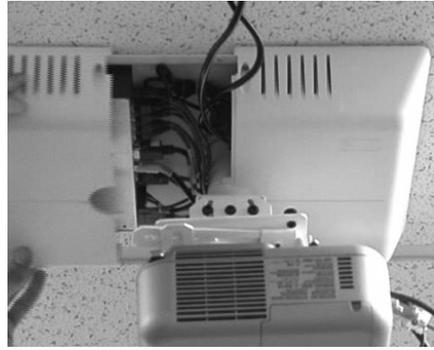
4a **Slide the covers onto the PMK 560.**

Optional Accessory Installation — VoiceLift System

The Extron VoiceLift system is an easy-to-use, low-power, voice amplification system that ensures the speaker's voice can be clearly heard at a comfortable level throughout the classroom. Speech is picked up by the pendant microphone worn by the teacher and is transmitted via wireless from a base station receiver and the PVS 407D to the installed ceiling speakers.

For detailed installation information, see the *VoiceLift Installation Instructions*, supplied with the device.

VoiceLift System Included Parts:

- VLP 202 Pendant Microphone
- VLR 102 Receiver
- Wall charger

Installation Procedure (VoiceLift)

1. Determine the optimal receiver location and remove the ceiling tile where it is to be installed. Mark and drill a 2.5 inch diameter hole in the ceiling tile

2. Insert the ceiling bracket screw through the back plate (attached to the housing) and the hole in the ceiling tile and loosely attach the Z bracket.

3. Align the back plate knockout over the hole in the ceiling tile and tighten the bracket screw to secure.

4. Replace the ceiling tile.

5. Pull the communication and power Ethernet cable (and other secondary use cables) through the receiver base and connect the Ethernet cable to the Receiver Out port (the RJ-45 connector on the left on the receiver base).

6. If desired, set the Tone switch on the receiver base. Set the Mix DIP switch on the receiver to Off as the Aux In port (on the VLR) is not used.

7. Place the dome onto the housing, align the arrows on the dome locking tab and on the housing rim. Turn the dome until it locks in place (approximately 1/8 turn).

8. Pull the cables from the receiver to the PVS 407D switcher location, through the pipe and down into the PMK 560.

9. Disconnect the power from the switcher, and plug the VoiceLift cable into the PVS 407D VoiceLift receiver port.

10. Replace power to the switcher. This also powers the VoiceLift receiver.

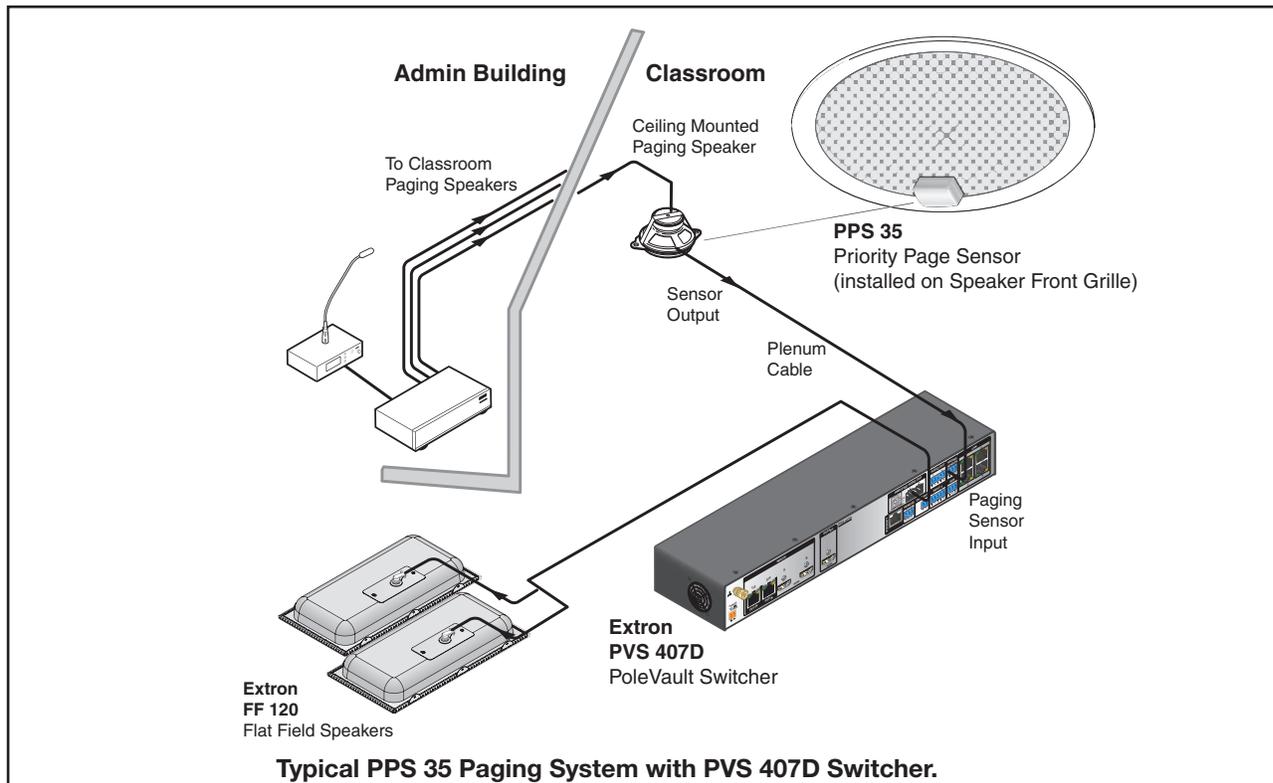❷ **Attach the Z bracket to the ceiling tile and the back plate.**
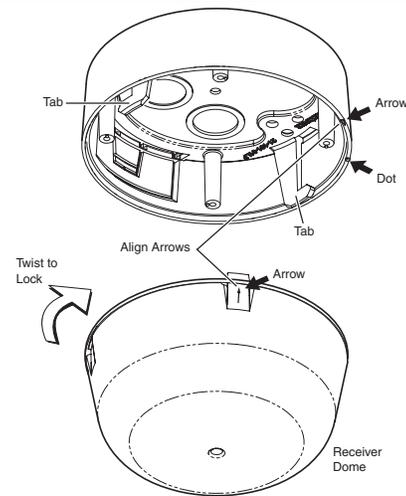
❼ **Align the arrows on the housing rim and the dome tab.**

PVS 407D VoiceLift Port

VoiceLift Input
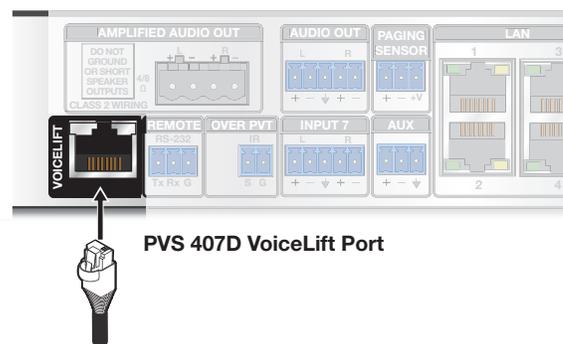
❾ **Plug VoiceLift cable into PVS 407D.**

Optional Accessory Installation — Priority Page Sensor (PPS 35)

Typical PPS 35 Paging System with PVS 407D Switcher.

The Extron PPS 35 Priority Page Sensor works with the PVS 407D PoleVault Digital Switcher only and is an optional part of a PoleVault, a PlenumVault, or a WallVault system.

For detailed information, see the *Priority Page Sensor Kit Installation Instructions*, supplied with the device.

The PPS 35 mounts to the front face of any public address (PA) loudspeakers with the pre-installed hook-and-loop fastener. The cable is connected to the rear panel 3-pole captive screw Paging Sensor port of the PVS 407D switcher, located up to 50 feet away. Fifteen feet of cabling is supplied already attached to the sensor.

When the Priority Page Sensor senses a PA system broadcast, it sends a signal to mute the audio output of the switcher for the duration of the PA broadcast.

PPS 35 Prority Page Sensor (part number 70-1074-01)

NOTES:

- The PPS 35 unit is NOT plenum rated and should not be installed above a drop ceiling.
- The cable attached to the PPS 35 unit IS plenum rated and may be installed above a drop ceiling.
- The PPS 35 is NOT compatible with the PPC 25 Priority Page Controller.
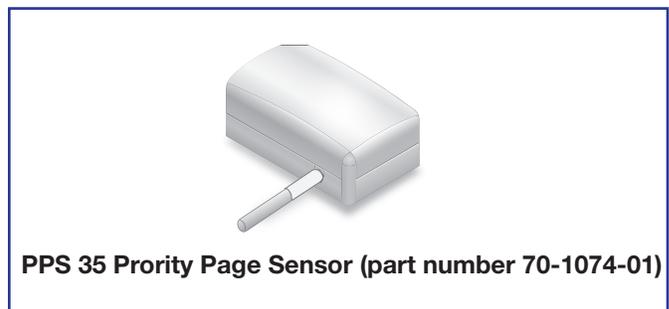
Installation Procedure (PPS 35)

1. Using the hook-and-loop fastener, attach the PPS 35 to the front grille of a paging system speaker that is located within fifty feet of the PVS 407D.

2. Run the attached cable to the switcher location.

3. Connect the end of the three-wire cable to the Paging Sensor port on the rear panel of the PVS 407D. Wire the connector as shown at right.

4. Test and configure the PPS 35 using the PVS 407D front panel, or using SIS commands, or via the PCS configuration software.
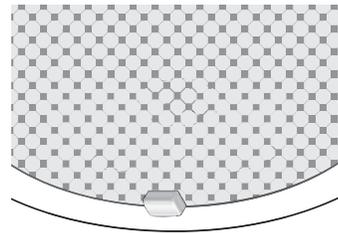
❶ **Attach the Sensor to the front grille of a speaker.**

PVS 407D Paging Sensor Port

Red (**+V**)
Drain Wire (**-**)
Black (**+**)
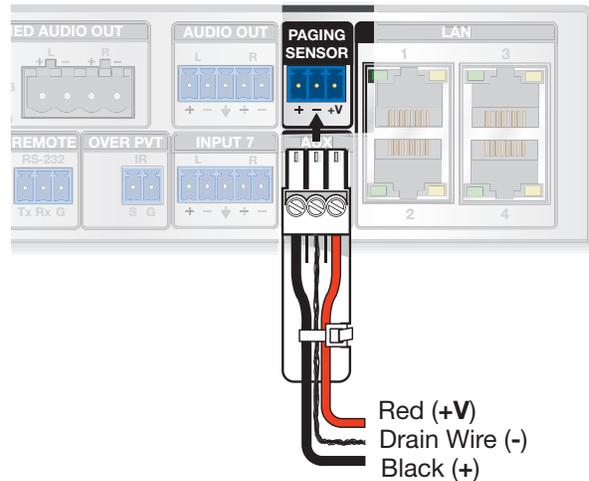
❸ **Wire the sensor into the PVS 407D.**
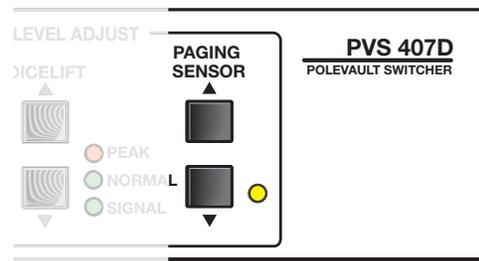
❹ **Configure the PPS 35 via the front panel.**

Optional Accessory Installation — Priority Page Sensor Kit (PPS 25)

Admin Building   **Classroom**

Ceiling Mounted Paging Speaker

To Classroom Paging Speakers

Priority Page Sensor

Sensor Output

Plenum Cable

Paging Sensor Input

Extron PVS 407D PoleVault Switcher

Extron FF 120 Flat Field Speakers

Typical PPS 25 paging system with PVS 407D switcher.
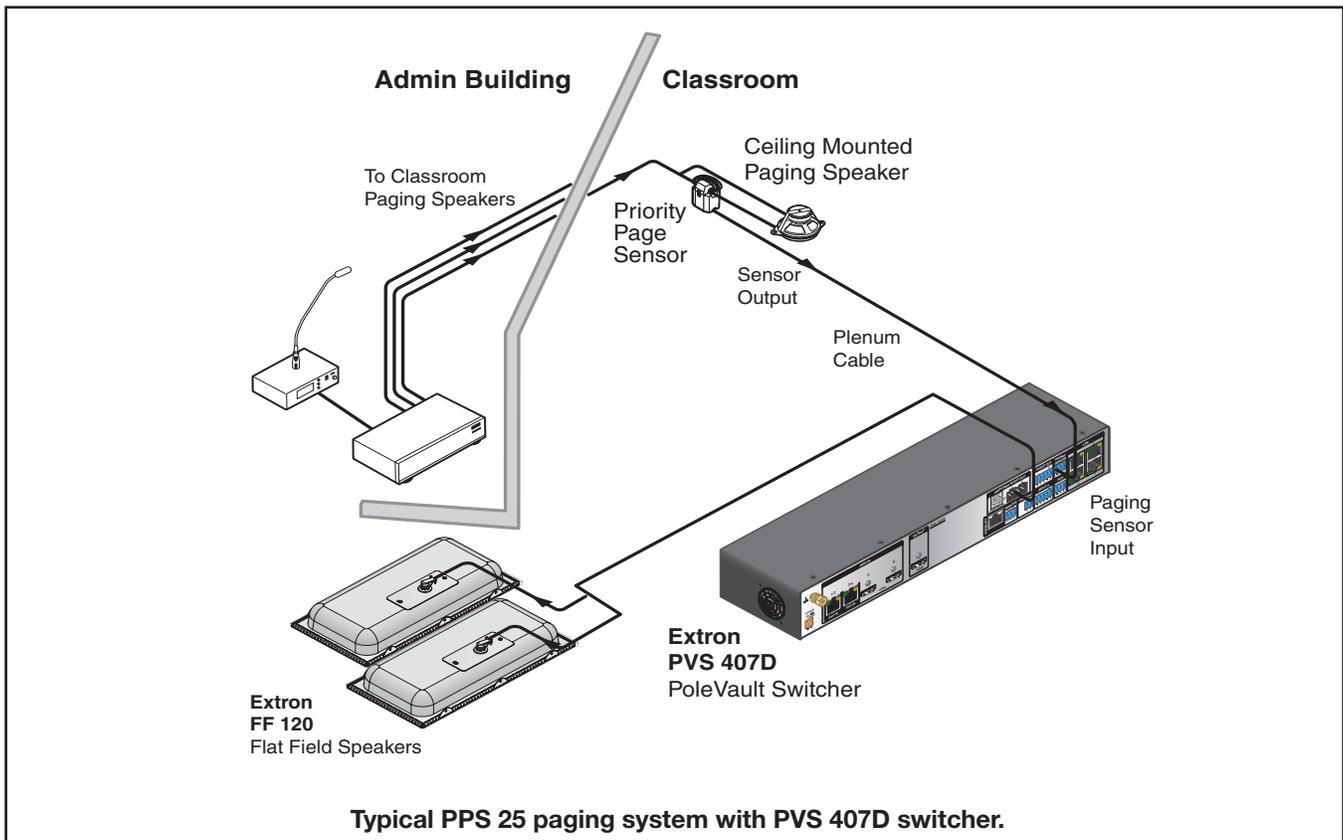
The Priority Page Sensor Kit momentarily silences classroom audio whenever a page is made from a public address (PA) system.

For detailed information, see the *Priority Page Sensor Kit Installation Instructions*, supplied with the device.

> **NOTE:** The Priority Page Sensor works with traditional 25 V or 70 V and 4/8 ohm PA systems. It is not designed for, and may not work properly with, two-way intercoms or systems that are IP-based or that use digital clocks.

Priority Page Sensor Kit Included Parts:

- Priority Page Sensor (part number 70-619-01)
- UL Listed junction box with a cable clamp and a lid
- 35 feet (10.7 m) of sensor cable

Installation Procedure (PPS 25)

> **WARNING:** **Risk of serious personal injury if installation is not done correctly.** All structural steps, anchoring, and electrical installation should be performed by qualified personnel in accordance with local and national building codes, fire and safety codes, and/or local and national electrical codes.
>
> **To meet the plenum rating requirement, the Priority Page Sensor assembly must be installed in a UL Listed junction box with a cover. All cables to and from the sensor must be plenum rated.**
>
> **AVERTISSEMENT :** **Risque potentiel de blessure grave ou de mort.** Toute mesure structurelle, ancrage, et installation électrique, devrait être effectué par un personnel qualifié, conformément aux codes du bâtiment, aux codes incendie et sécurité, et aux codes électriques locaux et nationaux.
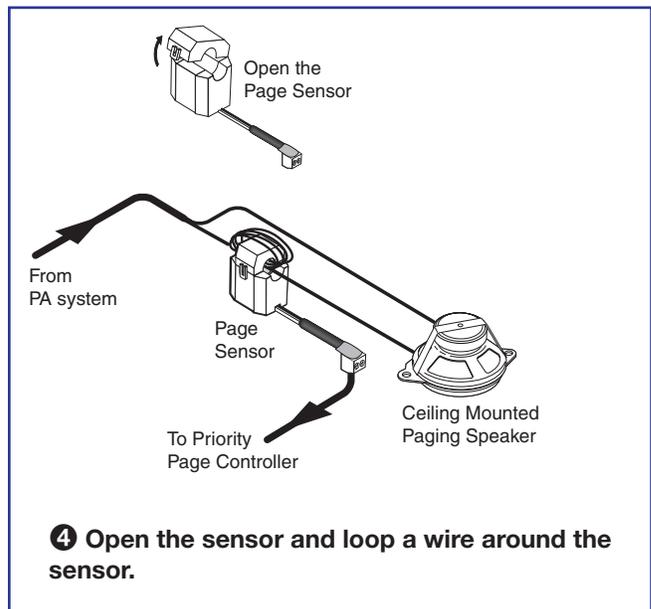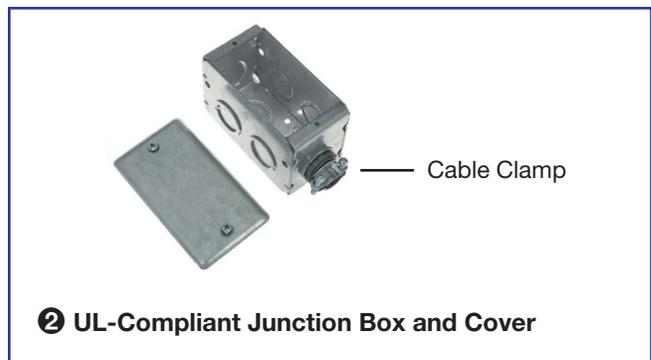>
> **Afin de répondre aux exigences en matière d'installation ignifuge, le kit de capteur de priorité doit être installé dans un boîtier d'encastrement compatible-UL avec couvercle. Tous les câbles depuis et vers le capteur doivent être conformes à la norme d'installation ignifuge.**

1. Choose a suitable location for the sensor near, and in series with, the speakers.

2. **If the sensor is to be located in a plenum space, the junction box (provided) can be used.** Knock out an opening at one end of the box and attach the cable clamp (see figure at right). Secure the box at the sensor location.

3. Disconnect the PA system speaker cable. Remove the outer protective jacket from the speaker cable to expose the two speaker wires from the sensor to the speaker (as shown at lower right). Do not remove the inner protective jackets that cover the individual wires.
   If the sensor is to be located in a plenum space, feed a loop of one of the exposed speaker wires through the cable clamp into the junction box. The other wire must bypass the sensor to be connected later directly to the speaker.

4. Open the top of the Priority Page Sensor and loop the speaker wire that is inside the junction box tightly around the top part of the sensor.

   > **NOTE:** Loop only one of the speaker wires around the sensor cover. Do not loop both wires. Polarity need not be observed.

   The other speaker wire must bypass the sensor and connect directly to the speaker.
   - For a 25 V or 70 V system, wrap 5 to 8 loops.
   - For a 4/8 ohm system, wrap 2 to 4 loops.

5. Close and latch the top of the Priority Page Sensor. Reconnect the speaker cable to the speaker.

Cable Clamp

❷ **UL-Compliant Junction Box and Cover**

Open the Page Sensor
From PA system
Page Sensor
To Priority Page Controller
Ceiling Mounted Paging Speaker

❹ **Open the sensor and loop a wire around the sensor.**

6. Strip 3/16 inches of insulation from each conductor on the bare wire end of the remaining blue sensor cable. Do not tin the leads. Feed the wire into the junction box (clamping it down if necessary) and connect the wires to the Page Sensor port captive screw connector (use the + and - poles) on the rear panel of the PVS 407D. Polarity need not be observed.

7. If a junction box is being used in a plenum space, ensure the sensor and all wires fit inside the box (as shown at right). All cables leaving the box must be plenum rated. Tighten the cable clamp and secure the lid to the junction box.

> **NOTE:** To enable the switcher's paging sensor port, use the PCS Configuration program, available at **www.extron.com**.

PVS 407D Paging Sensor Port

Page Sensor

❻ Wire the Priority Page Sensor to the Paging Sensor port on the switcher.

❼ Ensure the sensor and wires fit completely inside the junction box before attaching the cover.

Testing and Adjustment Procedure

To test that the classroom audio is muted when a PA system announcement (a page) occurs:

1. Turn the classroom audio on.

2. Speak into the PA system microphone. The classroom audio should be muted while the PA page occurs and be restored when the page ends. The Paging Sensor yellow LED lights when a PA page is made.

3. If the program fails to mute the classroom audio during a page, press the Sensitivity audio adjustment up button on the front panel of the PVS 407D (increasing sensitivity).

4. If the classroom audio is muted without a page occurring, press the Sensitivity audio adjustment down button (decreasing sensitivity).

Testing and Adjustment:
❸ and ❹ The Sensitivity Adjustment Buttons

Outline of Installation Steps for WallVault Digital Systems (WMK 160)

Stage 1 — Install the Screen and Projector.

☐   **Mark the screen location (page 18)**.

☐   **Install projector to verify location (page 18**).

☐   **Verify the image location (page 21)**.

☐   **Cut the ceiling tile (page 22)**.

☐   **Preliminary safety hardware installation (page 22)**.

☐   **Finish projector drop ceiling mount installation (page 23).**

☐   **Secure the projector drop ceiling mount to the ceiling (page 24)**.

☐   **Install the electrical box (if required) (page 25)**.

☐   **Install the screen (page 25)**.

Stage 2 — Mount the PVT Wall Plates and the MLC 104 IP Plus.

☐   **Install the mud rings (page 29)**.

☐   **Pull cables (at the input locations) (page 30)**.

☐   **Install the wall plates (page 31)**.

☐   **Install the MediaLink Controller (page 32)**.

Stage 3 — Install the FF 120 Speakers.

☐   **Cut the ceiling tile (page 36)**.

☐   **Install the speaker on the drop ceiling (page 36).**

☐   **Terminate the speaker cable for the PVS switcher (page 38).**

Stage 4B — Install the WMK 160 and PVS 407D.

☐   **Install the WMK 160 base plate (page 44)**.

☐   **Install the switcher onto the base plate (page 45).**

☐   **Run the cables to the WMK 160 location (page 46).**

☐   **Cable the switcher (page 46)**

☐   **Final Installation (page 46)**

Stage 5 — Configure the PoleVault Switcher and the System.

☐   **Configure the switcher — PCS Configuration program (page 61)**.

☐   **Configure the system — Global Configurator (page 62)**.

☐   **Test the system (page 63).**

☐   **System final installation (page 65)**.

Optional Accessory Installation

☐   **VoiceLift System (page 66).**

☐   **Priority Page Sensor PPS 35 (page 67)**.

☐   **Priority Page Sensor Kit PPS 25 (page 69).**

The pages listed above contain instructions for installing the WallVault Digital System. Where possible, line drawings and photos from an actual installation are used to clarify some of the steps discussed in the text. Most images have a number corresponding to the step that is being described (for example, **③ₐ)**.

Outline of Installation Steps for WallVault Digital Systems (USFM 100)

Stage 1 — Install the Screen and Projector.

☐   **Mark the screen location (page 18)**.

☐   **Install projector to verify location (page 18**).

☐   **Verify the image location (page 21)**.

☐   **Cut the ceiling tile (page 22)**.

☐   **Preliminary safety hardware installation (page 22)**.

☐   **Finish projector drop ceiling mount installation (page 23).**

☐   **Secure the projector drop ceiling mount to the ceiling (page 24)**.

☐   **Install the electrical box (if required) (page 25)**.

☐   **Install the screen (page 25)**.

Stage 2 — Mount the PVT Wall Plates and the MLC 104 IP Plus.

☐   **Install the mud rings (page 29)**.

☐   **Pull cables (at the input locations) (page 30)**.

☐   **Install the wall plates (page 31)**.

☐   **Install the MediaLink Controller (page 32)**.

Stage 3 — Install the FF 120 Speakers.

☐   **Cut the ceiling tile (page 36)**.

☐   **Install the speaker on the drop ceiling (page 36).**

☐   **Terminate the speaker cable for the PVS switcher (page 38).**

Stage 4C — Install the USFM 100 and PVS 407D.

☐   **Install the USFM 100 base plate (page 48)**.

☐   **Install the switcher onto the base plate (page 48).**

☐   **Run the cables to the USFM 100 location (page 49).**

☐   **Cable the switcher (page 50)**

☐   **Attach the boom arm, power supply, and projector (page 50)**

Stage 5 — Configure the PoleVault Switcher and the System.

☐   **Configure the switcher — PCS Configuration program (page 61)**.

☐   **Configure the system — Global Configurator (page 62)**.

☐   **Test the system (page 63).**

☐   **System final installation (page 65)**.

Optional Accessory Installation

☐   **VoiceLift System (page 66).**

☐   **Priority Page Sensor PPS 35 (page 67)**.

☐   **Priority Page Sensor Kit PPS 25 (page 69).**

The pages listed above contain instructions for installing the WallVault Digital System. Where possible, line drawings and photos from an actual installation are used to clarify some of the steps discussed in the text. Most images have a number corresponding to the step that is being described (for example, **❸ₐ)**.

Outline of Installation Steps for PlenumVault Digital Systems (PVM 220)

Stage 1 — Install the Screen and Projector.

☐   **Mark the screen location (page 18)**.

☐   **Install projector to verify location (page 18**).

☐   **Verify the image location (page 21)**.

☐   **Cut the ceiling tile (page 22)**.

☐   **Preliminary safety hardware installation (page 22)**.

☐   **Finish projector drop ceiling mount installation (page 23)**.

☐   **Secure the projector drop ceiling mount to the ceiling (page 24)**.

☐   **Install the electrical box (if required) (page 25)**.

☐   **Install the screen (page 25)**.

Stage 2 — Mount the PVT Wall Plates and the MLC 104 IP Plus.

☐   **Install the mud rings (page 29)**.

☐   **Pull cables (at the input locations) (page 30)**.

☐   **Install the wall plates (page 31)**.

☐   **Install the MediaLink Controller (page 32)**.

Stage 3 — Install the FF 120 Speakers.

☐   **Cut the ceiling tile (page 36)**.

☐   **Install the speaker on the drop ceiling (page 36)**.

☐   **Terminate the speaker cable for the PVS switcher (page 38)**.

Stage 4D — Install the PVM 220 and PVS 407D.

☐   **Remove the device mounting plate from the access door (page 53)**.

☐   **Remove ceiling tile and install suspension cables (page 53)**.

☐   **Suspend the main PVM 220 enclosure from the ceiling (page 54)**.

☐   **Run AC power wiring to the AC module in the PVM 220 (page 55)**.

☐   **Run signal and control cables to the PVM 220 (page 56)**.

☐   **Install devices onto the device mounting plate (page 57)**.

☐   **Cut and install ceiling tile into the access door (page 57)**.

☐   **Install the mounting plate onto the access door (page 58)**.

☐   **Cable the switcher (page 58)**.

☐   **Verify and configure the setup (page 59)**.

☐   **Attach the door tether to the door (page 59)**.

☐   **Secure the door latches (page 59)**.

Stage 5 — Configure the PoleVault Switcher and the System.

☐   **Configure the switcher — PCS Configuration program (page 61)**.

☐   **Configure the system — Global Configurator (page 62)**.

☐   **Test the system (page 63)**.

☐   **Final installation (page 65)**.

Optional Accessory Installation

☐   **VoiceLift System (page 66).**

☐   **Priority Page Sensor PPS 35 (page 67)**.

☐   **Priority Page Sensor PPS 25 (page 69).**

The pages listed above contain instructions for installing the PlenumVault Digital System. Where possible, line drawings and photos from an actual installation are used to clarify some of the steps discussed in the text. Most images have a number corresponding to the step that is being described (for example, **③ⓐ**).

Extron Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:
Extron Electronics
1230 South Lewis Street
Anaheim, CA 92805
U.S.A.

Europe and Africa:
Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

Asia:
Extron Asia Pte Ltd
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Japan:
Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

China:
Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Middle East:
Extron Middle East
Dubai Airport Free Zone
F13, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions, or if modifications were made to the product that were not authorized by Extron.

> **NOTE:** If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.
>
> **USA**: 714.491.1500 or 800.633.9876   **Europe**: 31.33.453.4040
> **Asia**: 65.6383.4400   **Japan**: 81.3.3511.7655

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

Outline of Installation Steps for PoleVault Digital Systems

Stage 1 — Install the Screen and Projector.

☐ **Mark the screen location (page 18).**

☐ **Install projector to verify location (page 18**).

☐ **Verify the image location (page 21).**

☐ **Cut the ceiling tile (page 22).**

☐ **Preliminary safety hardware installation (page 22).**

☐ **Finish projector drop ceiling mount installation (page 23).**

☐ **Secure the projector drop ceiling mount to the ceiling (page 24).**

☐ **Install the electrical box (if required) (page 25).**

☐ **Install the screen (page 25).**

Stage 2 — Mount the PVT Wall Plates and the MLC 104 IP Plus.

☐ **Install the mud rings (page 29).**

☐ **Pull cables (at the input locations) (page 30).**

☐ **Install the wallplates (page 31).**

☐ **Install the MediaLink Controller (page 32).**

Stage 3 — Install the FF 120 Speakers.

☐ **Cut the ceiling tile for the speakers (page 36).**

☐ **Install the speaker on the drop ceiling (page 36).**

☐ **Terminate the speaker cable for the PVS switcher (page 38).**

Stage 4A — Install the PMK 560 and PVS 407D.

☐ **Install the PMK 560 base plate (page 40).**

☐ **Pull the cables (at the switcher location) (page 41).**

☐ **Finish installing the mounting kit (page 43)**

Stage 5 — Configure the PoleVault Switcher and the System.

☐ **Configure the switcher — PCS Configuration program (page 61).**

☐ **Configure the system — Global Configurator (page 62).**

☐ **Test the system (page 63).**

☐ **Final installation (page 65).**

Optional Accessory Installation

☐ **VoiceLift System (page 66).**

☐ **Priority Page Sensor PPS 35 (page 67).**

☐ **Priority Page Sensor PPS 25 (page 69).**

The pages listed above contain instructions for installing the PoleVault Digital System. Where possible, line drawings and photos from an actual installation are used to clarify some of the steps discussed in the text. Most images have a number corresponding to the step that is being described (for example, **③a**).

> **NOTE:** Similar outline lists of steps for installing WallVault (WMK 160 or USFM 100) and PlenumVault (PVM 220) Digital Systems can be found on pages 73 through 76.