EBP US Gang Button Panels • Setup Guide

IMPORTANT NOTE:

Go to **www.extron.com** for the complete user guide, installation instructions, and specifications.

The Extron EBP 50, EBP 100 and EBP 200 eBUS® Button Panels (EBPs) are fully customizable AV system control interfaces for use with Extron IPCP Pro Series Control Processors.

NOTE: These products are only for use with Extron UL Listed IPCP Pro control processors.

Each EBP has two eBUS ports that support both power and communications between the IPCP Pro control processor and eBUS devices. Up to eight eBUS endpoint devices such as EBP button panels can be connected to the control processor and to each other in various cabling topologies. Cabling topology refers to the physical layout of cabling interconnections between devices in a network such as an eBUS system. eBUS systems can include daisy chain, star, or a combination of both topologies (see the *eBUS Technology Reference Guide,* available at **www.extron.com**, for basic diagrams). Every endpoint device must have a unique identification address (bus ID) within the system.

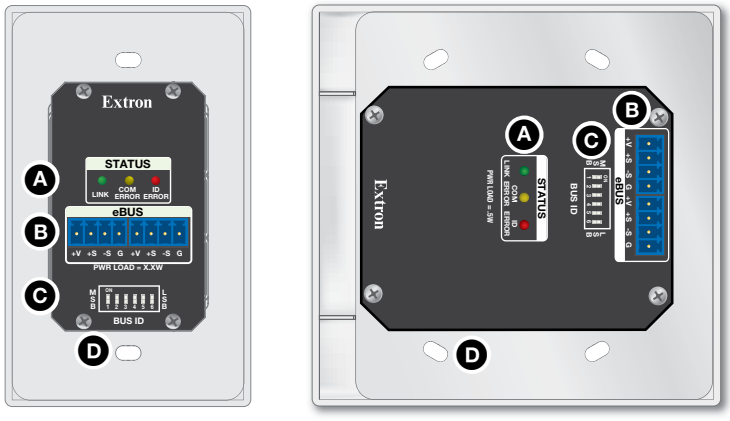
Setup involves setting bus ID DIP switches on the EBPs, then using Extron Global Configurator® Plus and Professional (GCP) software, the Toolbelt utility, or ControlScript® programming, to configure the control processor. Once configured, the panels can be used for AV system control.

This guide provides basic instructions for an experienced installer to install any of these panels. For more details on the EBPs, see the *eBUS Technology Reference Guide*. For details on configuration, see the software help files.

Features

Rear Panel Features

NOTE: The EBP 100 and EBP 200 rear panel features are identical.



EBP 50 Rear Panel **EBP 100 Rear Panel**

- **A** Status LEDs
- **B** **eBUS Connectors**
- **C** **DIP Switches**
- **D** **Mounting Holes**

Figure 1. EBP Rear Panel Features

A **Status LEDs** — The panels have yellow, red, and green LEDs that provide diagnostic information about the connection, communication, and power status of the panels. For more information about how the LEDs are used for troubleshooting, see **Step 7: Test and Troubleshoot** on page 10.

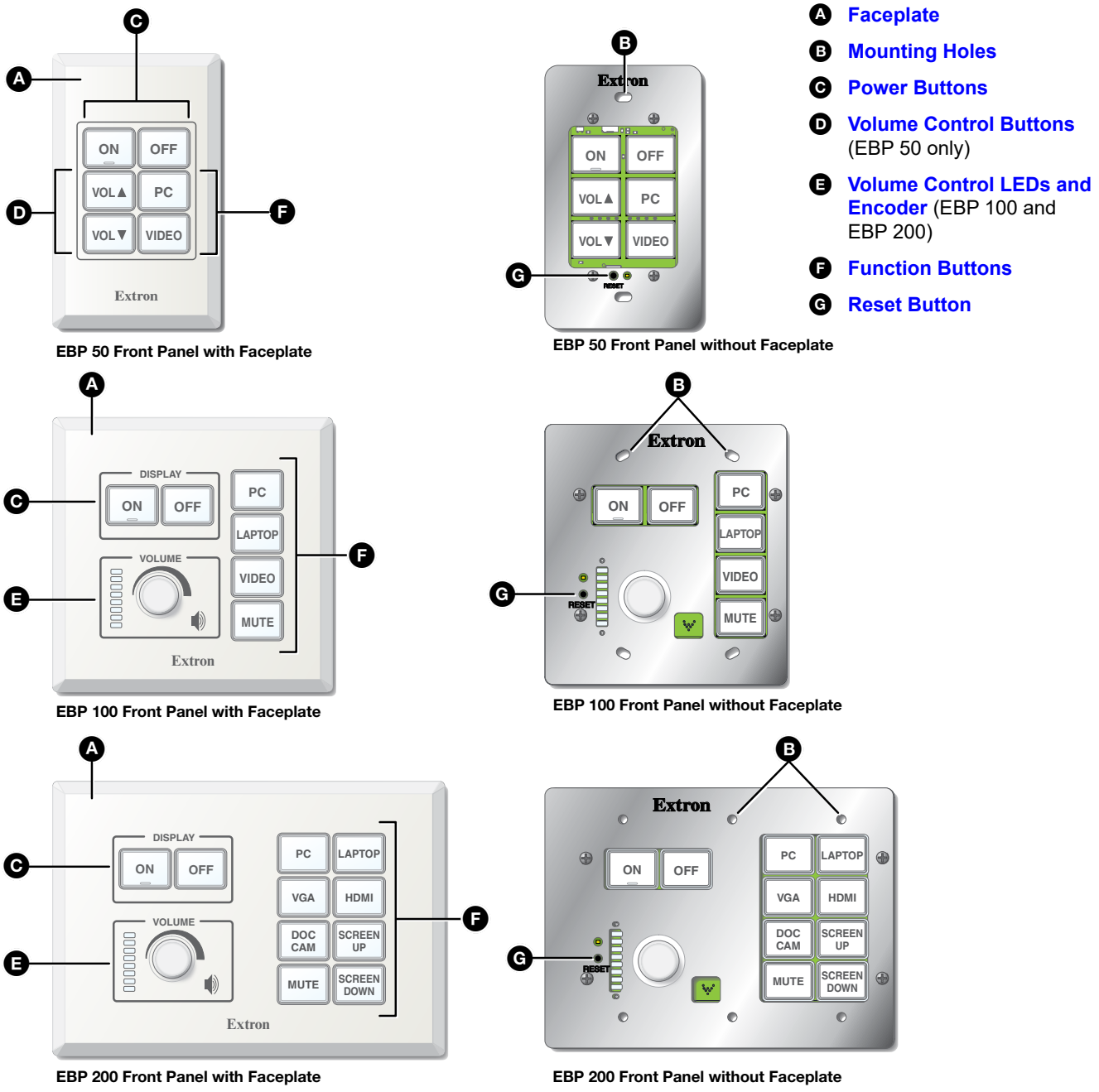
B **eBUS Connectors (2 ports)** (see **figure 1** on page 1) — The four-pole captive screw connectors use the Extron eBUS protocol to connect the panel to a controller and to other panels (see **Step 5: Cable All Devices** on page 8).

C **DIP Switches** — Up to eight devices can be connected to one control processor. Each device connected to the same control processor must have a unique BUS ID, which is set using DIP switches (see **Step 4: Set Bus ID Addresses** on page 5).

D **Mounting Holes** — Used to mount the device to UL-listed junction boxes (see **Step 8: Mount the EBPs** on page 10).

- EBP 50 (1 gang) 2 mounting holes
- EBP 100 (2 gang) 4 mounting holes
- EBP 200 (3 gang) 6 mounting holes

Front Panel Features



EBP 50 Front Panel with Faceplate

EBP 50 Front Panel without Faceplate

EBP 100 Front Panel with Faceplate

EBP 100 Front Panel without Faceplate

EBP 200 Front Panel with Faceplate

EBP 200 Front Panel without Faceplate

Figure 2. Front Panels With and Without Faceplates

NOTE: The buttons and encoders must be configured or programmed to carry out their functions.

- **A** **Faceplate** (see **figure 2** on page 2)
- **B** **Mounting Holes** — EBP 50 has two holes, EBP 100 has four holes, and EBP 200 has 6 holes.
- **C** **Power Buttons** — Control the power to a display.
- **D** **Volume Control Buttons** (EBP 50 only) — Use the Volume Up and Volume Down buttons to adjust the audio volume.
- **E** **Volume Control LEDs and Encoder** (EBP 100 and EBP 200) — Use the encoder to adjust the volume level. The LEDs provide a visual representation of the volume level.
- **F** **Function Buttons** — These buttons can be configured to carry out a variety of functions.
- **G** **Reset Button** — Resets the firmware to the factory installed version.

To reset the firmware

1. Disconnect the eBUS cable that is providing power.
2. While reconnecting power, press and hold down the Reset button.
3. Release the Reset button 1 second after reconnecting power. During the reset process, the front panel buttons are not lit. When the eBUS Connection Status LED lights, the reset process is complete.

Planning the System and Installation

When planning to install an eBUS system you must consider how many EBP button panels to use, maximum cable distance, cabling topology, and mounting. See the *eBUS Technology Reference Guide* for more information about eBUS topologies.

Installation

Step 1: Get Ready

Use the following check list to prepare for the installation.

- Download and install the latest version of the software, firmware, and device drivers needed to configure the IPCP Pro and control the connected AV products. See the IPCP Pro Series User Guide (available at **www.extron.com**) for details on software and drivers.
- Obtain network information (IP addresses, passwords, DHCP settings, and the like) and the MAC address for the control processor.
- Obtain model names, drivers, and setup information for AV devices.
- Determine which eBUS cabling topologies to use and obtain cables, mounting hardware, and any power supplies or hubs required by that configuration (see the *eBUS Technology Reference Guide* for more information about eBUS topologies).

Step 2: Prepare the Installation Site

ATTENTION:

- Installation and service must be performed by authorized personnel only.
- L'installation et l'entretien doivent être effectués par le personnel autorisé uniquement.

- Extron recommends installing the EBP into a grounded, UL Listed electrical junction box.
- Extron recommande d'installer le EBP dans un boîtier d'encastrement électrique mis à la terre, listé UL.

- If the EBP will be installed into fine furniture, it is best to hire a licenced, bonded craftsperson to cut the access hole and perform the physical installation so the surface will not be damaged.
- S'il est prévu d'installer le EBP dans du beau mobilier, il est préférable de faire appel à un artisan autorisé et qualifié pour couper le trou d'accès et réaliser l'installation de telle façon que la surface ne soit pas endommagée.

- Follow all national and local building and electrical codes that apply to the installation site.
- Respectez tous les codes électriques et du bâtiment, nationaux et locaux, qui s'appliquent au site de l'installation.

NOTE: For the installation to meet UL requirements and to comply with National Electrical Code (NEC), the EBP must be installed in a UL Listed junction box (not included with the EBP). The end user or installer must furnish the junction box.

Americans with Disabilities Act (ADA) compliance

When planning where to install these devices, you may need to consider factors affecting accessibility of the button panel such as height from the floor, distance from obstructions, and how far a user must reach to press the buttons. For guidelines, see sections 307 ("Protruding Objects") and 308 ("Reach Ranges") of the 2010 ADA Standards for Accessible Design available at **https://www.ada.gov/regs2010/2010ADAStandards/**.

Site preparation

Model	US Gang Size
EBP 50	1
EBP 100	2
EBP 200	3

Extron offers an assortment of mud rings, optional UL Listed in-wall junction boxes, external wall boxes, and surface or tabletop mounting boxes for use with the eBUS button panels. See **www.extron.com** for a list of compatible accessories.

Step 3: Change a Faceplate, Button Labels, or Knob

You can replace a faceplate or one or more of the labels within the buttons. Some button labels ship with the unit. You can create and print your own customized labels using Extron Button Label Generator software.

To change a bezel or button labels, follow these instructions.

1. The faceplate is held in place by magnets. It is removed by holding the body of the unit with one hand, gripping the sides of the faceplate with the other hand, and pulling the faceplate away from the unit.
2. Gently separate the button lens button cap from its white diffuser: insert the end of the provided Extron removal tool into the corner notch and gently twist the tool (see figure 3, ❶).
3. Remove the label insert from the button cap.

   TIP: If the insert does not come out easily, use a piece of sticky tape to pull it out of the button cap.

4. Select one of the button labels from the printed label sheets included with the unit. Remove the label from its backing and remove the clear, protective film from the other side of the label.
5. Insert the button label into the button cap (❷).
6. Align the cap with the white diffuser and the panel opening, and press the clear cap into place on the button.
7. Attach the faceplate to the EBP by aligning the openings of the faceplate with the buttons and knob and with the LEDs and place the faceplate against the unit.

   The magnetic catches fasten the faceplate onto the unit.

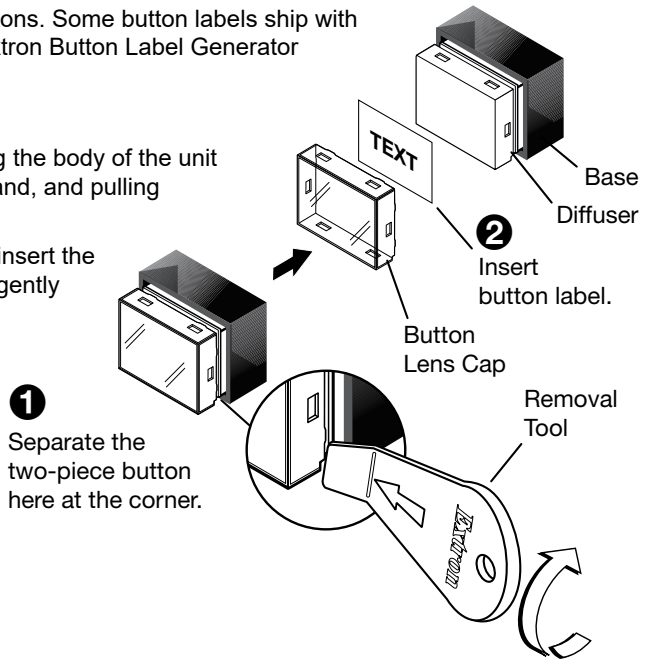


Figure 3. Replacing Buttons

To change a knob (EBP 100 and EBP 200 models only), follow these instructions:

1. Remove the faceplate as described in step 1 above.
2. Firmly grasp the knob and pull it away from the EBP.
3. Align the ridge inside the new knob (figure 4, ❶) with the channel on the knob control (❷) and allow the magnet in the knob to snap into place.
4. Reattach the faceplate to the unit as described in step 7 above.

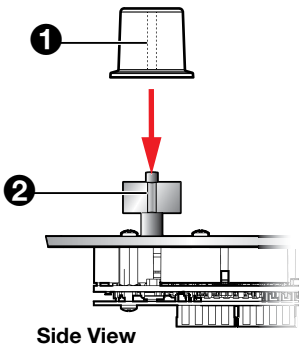


Figure 4. Replacing the knob on EBP 100 or EBP 200

Step 4: Set Bus ID Addresses

Up to eight devices can be connected to one control processor. In order for the control processor to be successfully configured, each device connected to the same control processor must have a unique six-bit, BUS ID, which is set with the DIP switch assembly on the side panel of the EBP (**figure 1**, C, on page 1). If two or more modules have the same bus ID, address conflicts may cause one or more of the panels to not be recognized by the IPCP Pro control processor.

Various combinations of the six DIP switches being set to On or Off, provide 64 addresses: 0 is a reserved eBUS ID and the configurable eBUS ID range is 1 through 63 (see the table on the two following pages). The section below shows an example of binary to decimal conversion.

eBUS ID Setup

BUS ID

	DIP Switch					
	1	2	3	4	5	6
Position	Off	Off	Off	Off	On	Off
Decimal	2^5=32	2^4=16	2^3=8	2^2=4	2^1=2	2^0=1

Figure 5. eBUS ID Setup

Add the decimal numbers for each of the DIP switches that are set to On to obtain the address of the device. In figure 5, only DIP switch #5 is on and the rest are off, which means the address for the device in figure 5 is 0+0+0+0+2+0=2.

NOTES:

- Any address can be used except address 0 (binary: 000000), which is reserved (as the address of the controller) and may not be used.
- Switch 1 (on the left) is the highest value (32, the most significant bit) and is labelled MSB.
- Switch 6 (on the right) is the lowest value (1, the least significant bit) and is labelled LSB.
- **Up** = on = 1, **Down** = off = 0

The following table shows the factory default BUS IDs and the corresponding addresses for the EBP US Gang Button Panel models. These IDs can be changed to any valid value.

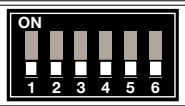
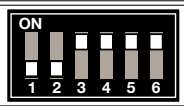
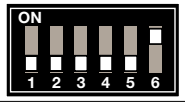
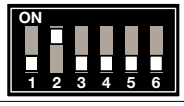
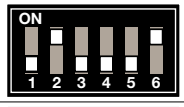
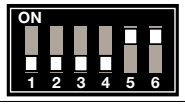
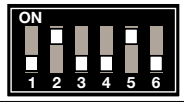
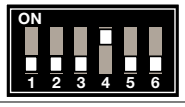
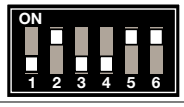
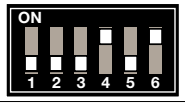
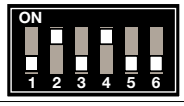
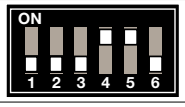
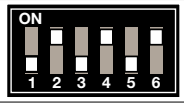
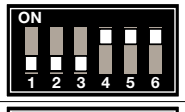
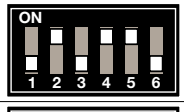
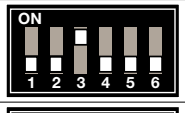
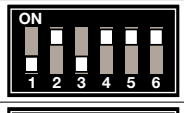
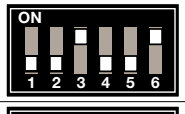
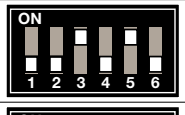
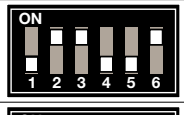
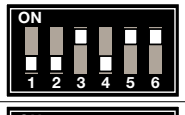
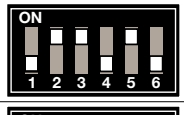
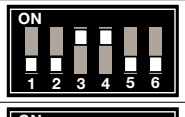
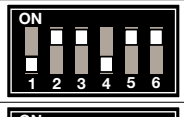
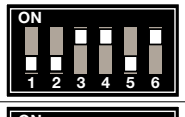
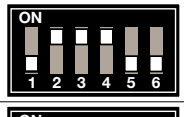
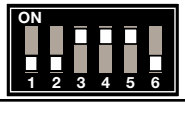
Model	Address	BUS ID
EBP 50	22	010110
EBP 100	3	000011
EBP 200	4	000100

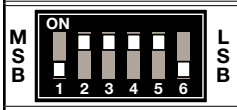
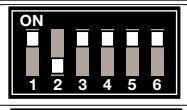
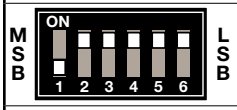
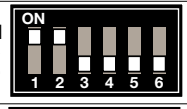
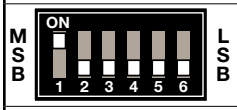
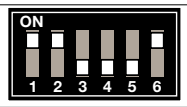
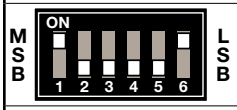
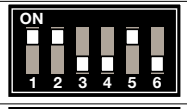
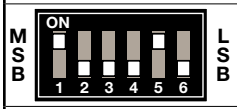
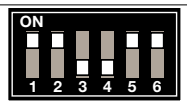
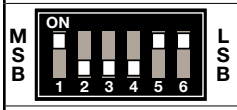
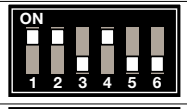
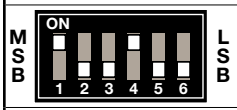
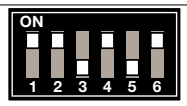
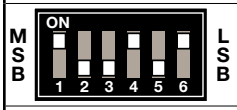
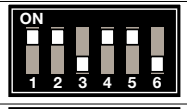
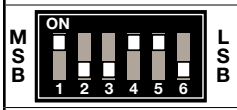
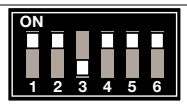
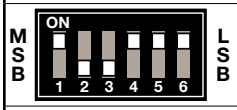
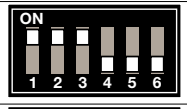
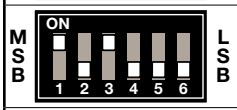
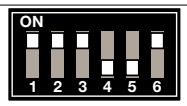
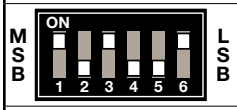
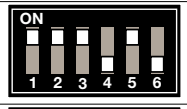
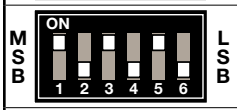
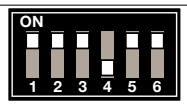
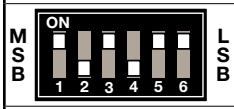
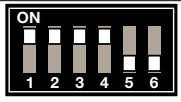
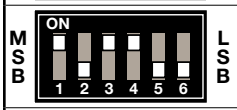
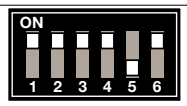
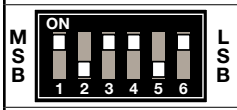
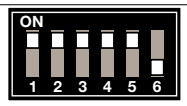
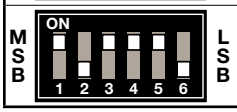
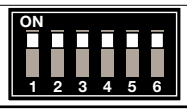
The table on the following two pages shows the DIP switch settings for all 64 possible addresses.

Setting eBUS ID Numbers

In the table below, a DIP switch setting shown as `0` is equivalent to Off. A DIP switch setting shown as `1` is equivalent to On.

NOTE: The ID number `0` (switch setting `000000`) is reserved for the control processor and cannot be used by an eBUS device.

	DIP Switch Setting						Decimal Value		DIP Switch Setting						Decimal Value
	1	2	3	4	5	6			1	2	3	4	5	6	
MSB  LSB	0	0	0	0	0	0	0	MSB  LSB	0	0	1	1	1	1	15
MSB  LSB	0	0	0	0	0	1	1	MSB  LSB	0	1	0	0	0	0	16
MSB  LSB	0	0	0	0	1	0	2	MSB  LSB	0	1	0	0	0	1	17
MSB  LSB	0	0	0	0	1	1	3	MSB  LSB	0	1	0	0	1	0	18
MSB  LSB	0	0	0	1	0	0	4	MSB  LSB	0	1	0	0	1	1	19
MSB  LSB	0	0	0	1	0	1	5	MSB  LSB	0	1	0	1	0	0	20
MSB  LSB	0	0	0	1	1	0	6	MSB  LSB	0	1	0	1	0	1	21
MSB  LSB	0	0	0	1	1	1	7	MSB  LSB	0	1	0	1	1	0	22
MSB  LSB	0	0	1	0	0	0	8	MSB  LSB	0	1	0	1	1	1	23
MSB  LSB	0	0	1	0	0	1	9	MSB  LSB	0	1	1	0	0	0	24
MSB  LSB	0	0	1	0	1	0	10	MSB  LSB	0	1	1	0	0	1	25
MSB  LSB	0	0	1	0	1	1	11	MSB  LSB	0	1	1	0	1	0	26
MSB  LSB	0	0	1	1	0	0	12	MSB  LSB	0	1	1	0	1	1	27
MSB  LSB	0	0	1	1	0	1	13	MSB  LSB	0	1	1	1	0	0	28
MSB  LSB	0	0	1	1	1	0	14	MSB  LSB	0	1	1	1	0	1	29

	DIP Switch Setting						Decimal Value		DIP Switch Setting						Decimal Value
	1	2	3	4	5	6			1	2	3	4	5	6	
	0	1	1	1	1	0	30		1	0	1	1	1	1	47
	0	1	1	1	1	1	31		1	1	0	0	0	0	48
	1	0	0	0	0	0	32		1	1	0	0	0	1	49
	1	0	0	0	0	1	33		1	1	0	0	1	0	50
	1	0	0	0	1	0	34		1	1	0	0	1	1	51
	1	0	0	0	1	1	35		1	1	0	1	0	0	52
	1	0	0	1	0	0	36		1	1	0	1	0	1	53
	1	0	0	1	0	1	37		1	1	0	1	1	0	54
	1	0	0	1	1	0	38		1	1	0	1	1	1	55
	1	0	0	1	1	1	39		1	1	1	0	0	0	56
	1	0	1	0	0	0	40		1	1	1	0	0	1	57
	1	0	1	0	0	1	41		1	1	1	0	1	0	58
	1	0	1	0	1	0	42		1	1	1	0	1	1	59
	1	0	1	0	1	1	43		1	1	1	1	0	0	60
	1	0	1	1	0	0	44		1	1	1	1	0	1	61
	1	0	1	1	0	1	45		1	1	1	1	1	0	62
	1	0	1	1	1	0	46		1	1	1	1	1	1	63

Step 5: Cable All Devices

Attach cables using the diagrams in this section as a guide. Connect a 4-pole captive screw connector to each end of the cable, wiring both ends as shown in figure 6. In most cases the EBPs are powered by the IPCP Pro control processor that provides the eBUS signal. Power is carried on the V+ pin of each eBUS connection.

The four connectors are:

- **+V** — carries 12 VDC power from the controller, active hub, or power supply
- **+S** — carries the positive data signal
- **-S** — carries the negative data signal
- **G** — ground

Extron STP20-2/1000 or STP20-2P/1000 cable is recommended for eBUS connections.

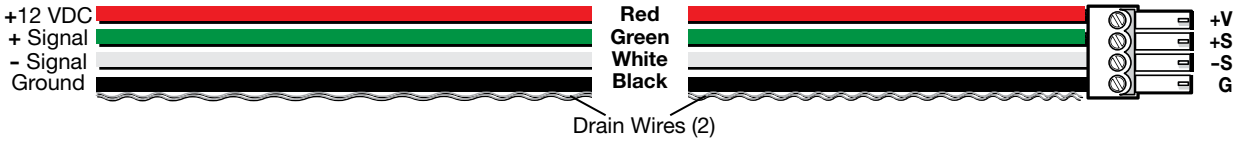


Figure 6. Basic eBUS Connector Wiring and Cable Color Code

NOTES:

- The two eBUS ports are interchangeable: either port can be used to connect the device to a controller or EBDB distribution hub and either can be used to daisy-chain the device to another EBP.
- Connect up to eight eBUS devices for each IPCP Pro control processor.
- Wire the connectors in the same way at both ends.
- Do not exceed a total of 1000 feet (305 meters) of cable for connections between the IPCP Pro and all the EBP panels.
- Do NOT power an EBP from more than one power source. Power is provided by the IPCP Pro. If additional power is required, use a PS 1220EB power supply and distribution hub, or an Extron 12 VDC power supply. If more than one power source is used in a system, make sure that the devices powered by the first source are isolated from the devices powered by the second source by disconnecting the +V pin appropriately (see **figure 7** on page 9).

ATTENTION:

- Always use a power supply supplied or specified by Extron. Use of an unauthorized power supply voids all regulatory compliance certification and may cause damage to the supply and the unit.
- Utilisez toujours une source d'alimentation fournie par Extron. L'utilisation d'une source d'alimentation non autorisée annule toute conformité réglementaire et peut endommager la source d'alimentation ainsi que l'unité.

- If not provided with a power supply, this product is intended to be supplied by a UL Listed power source marked "Class 2" or "LPS" and rated output 12 VDC, minimum 1.0 A.
- Si ce produit ne dispose pas de sa propre source d'alimentation électrique, il doit être alimenté par une source d'alimentation certifiée UL de classe 2 ou LPS et paramétré à 12 VDC et 1,0 A minimum.

- Unless otherwise stated, the AC/DC adapters are not suitable for use in air handling spaces or in wall cavities.
- Sauf mention contraire, les adaptateurs AC/DC ne sont pas appropriés pour une utilisation dans les espaces d'aération ou dans les cavités murales.

- The installation must always be in accordance with the applicable provisions of National Electrical Code ANSI/NFPA 70, article 725 and the Canadian Electrical Code part 1, section 16. The power supply shall not be permanently fixed to building structure or similar structure.
- Cette installation doit toujours être en accord avec les mesures qui s'applique au National Electrical Code ANSI/NFPA 70, article 725, et au Canadian Electrical Code, partie 1, section 16. La source d'alimentation ne devra pas être fixée de façon permanente à une structure de bâtiment ou à une structure similaire.

EBPs that are relatively far from the control processor (see the *eBUS Technology Reference Guide* at **www.extron.com** for details) can be connected to an optional Extron PS 1220EB eBUS power inserter (see figure 7), or an Extron 12 VDC desktop power supply (see figure 8).

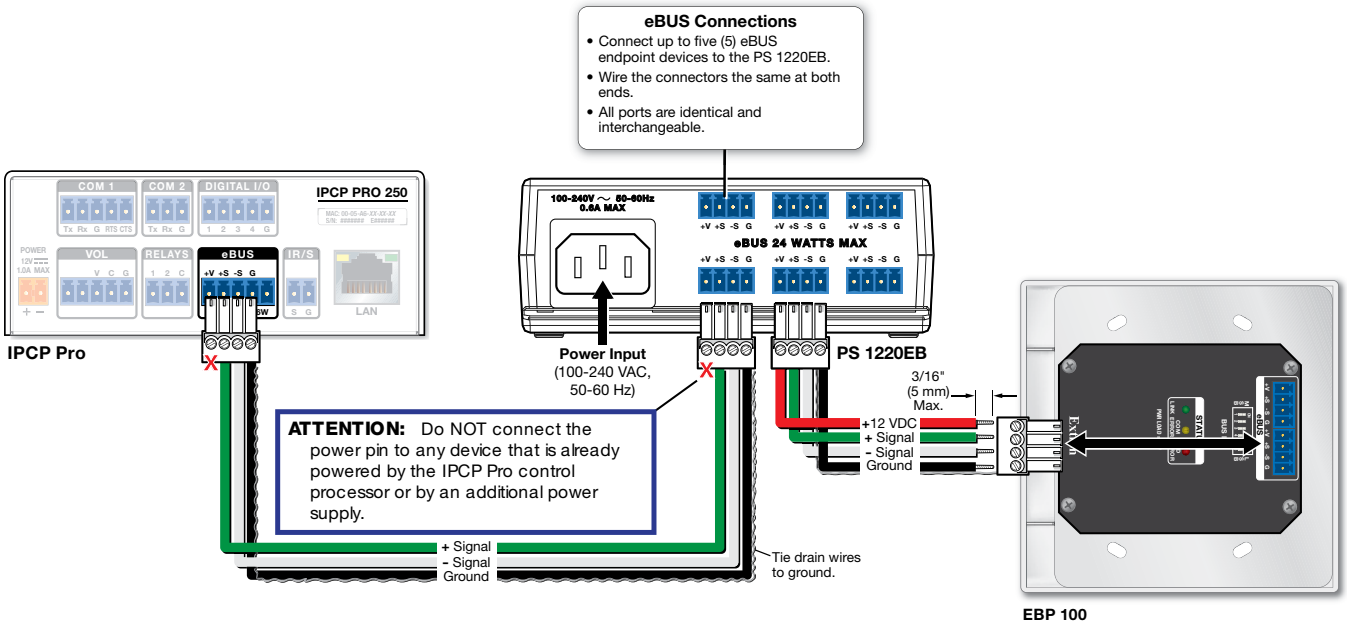


Figure 7. Cabling an eBUS System with an PS 1220EB Power Supply and Distribution Hub

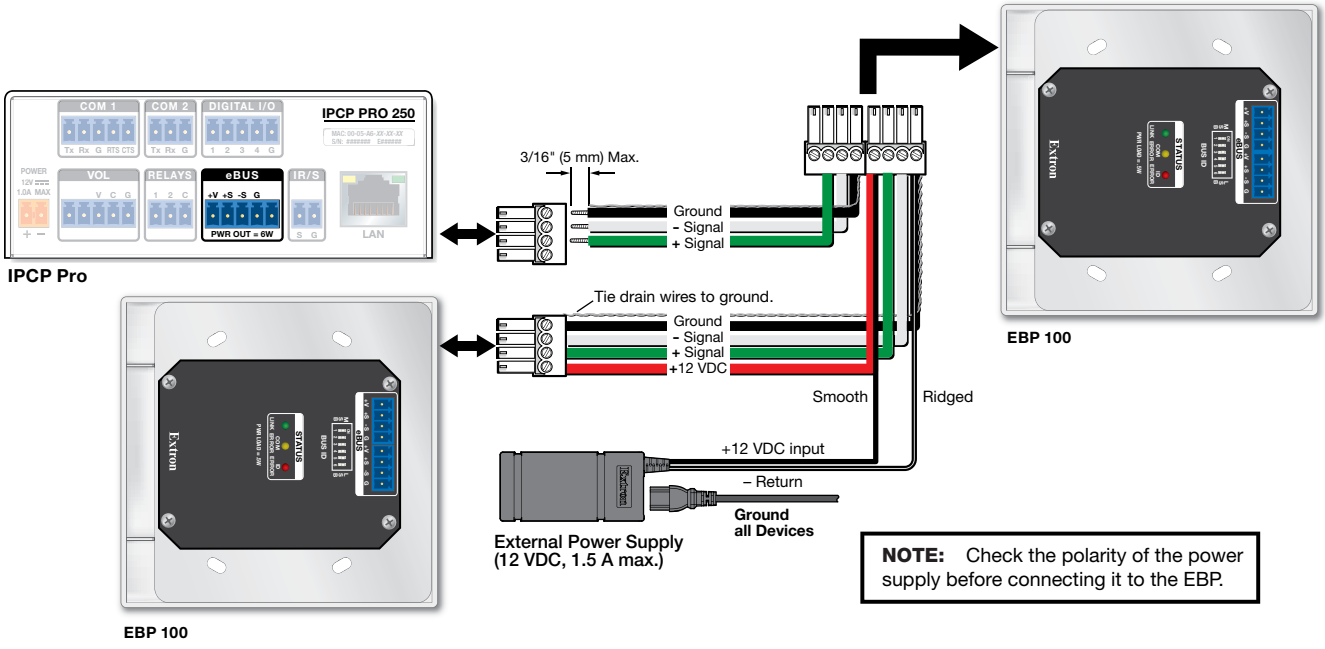


Figure 8. Cabling EBP Panels with an Extron Power Supply

Step 6: Configure or Program the System

EBPs are shipped with pre-labelled buttons in place but these buttons do not have any functions associated with them until they are configured with Global Configurator or programmed with Global Scripter. See the *Global Configurator Help File* or the *Global Scripter Help File* for step-by-step instructions and detailed information.

Step 7: Test and Troubleshoot

1. Verify that the DIP switches on the EBPs are set to the desired address on each device and that there are no BUS ID conflicts in the system (**Step 4: Set Bus ID Addresses** on page 5).
2. The eBUS status LEDs (see **figure 1**, Ⓐ, on page 1) provide information about power and communication status and bus ID address conflicts.
   - **Off** — If all three LEDs are off, the device is not receiving power.
   - **Yellow LED**— Lights solidly when the device is receiving power but communication with the control processor is not confirmed.
   - **Red LED**— Lights solidly when there is a BUS ID address conflict.
   - **Green LED** — Lights solidly when power and communication are both confirmed.
3. Verify that cables to and from the EBPs are wired in the same way at each end (pin 1 to pin 1, pin 2 to pin 2, and so forth).
4. Test the system.
   - Press buttons on the EBPs and ensure the buttons light as desired and that the appropriate control commands or functions are triggered.
   - Ensure that the audio output responds correctly to the volume knob or button. Also ensure that the volume LEDs light correctly as you increase or decrease the audio gain.
5. Make adjustments to wiring, BUS ID address, or system configuration as needed. Remember that the rear panel ports and DIP switches will not be accessible after the EBP is mounted. If needed, upload a revised configuration to the control processor.

If you have questions during installation and setup, contact the **Extron S3 Sales & Technical Support** or the Extron S3 Control Systems Support Hotline (1.800.633.9877).

Step 8: Mount the EBPs

EBP panels can be installed directly into the wall using a 1-gang (EBP 50), 2-gang (EBP 100), or 3-gang (EBP 200) wall mounting bracket (mud ring), wall or surface mounting box or UL-Listed junction box.

ATTENTION:

- 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.
- 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.

NOTES:

- The wall box is not provided and must be purchased separately.
- Install the wall box by following the instructions provided by the manufacturer.
- If the unit is not installed in a mounting bracket, you must install the provided plastic spacer. The spacer positions the unit to allow the magnetic faceplate to attach properly and securely.

Before mounting

1. Decide where to locate the panel. Take into consideration the position of wall studs and windows that could obstruct cable runs.
2. If required, install the electrical wall box by following the instructions provided by the manufacturer.

   Or install the provided wall mounting bracket by following these instructions.

   a. Cut a hole in the wall or furniture:
      - **EBP 50** (1-gang) — 3.7 inches (94 mm) H x 2.2 inches (56 mm) W
      - **EBP 100** (2-gang) — 3.7 inches (94 mm) H x 4.0 inches (102 mm) W
      - **EBP 200** (3-gang) — 3.75 inches (95 mm) H x 5.9 inches (150 mm) W

   b. Turn the screws on the front of the mounting bracket counterclockwise so that the locking arms are flush with the edges of the bracket.

   c. Insert the bracket into the hole. If necessary, enlarge the hole with a file or rasp.

   d. Turn the screws on the front of the mounting bracket clockwise so that the locking arms rotate and secure the bracket against the wall. Do not overtighten the locking arms.
3. Disconnect power from all devices at the source and run the cables through the wall or furniture and, if required, through the plastic spacer.
4. Connect the cables to the EBP rear panel (see **figure 1** on page 1 and see **Step 5: Cable All Devices** on page 8).
5. If you have not already done so, set the DIP switches to give the panel a unique BUS ID (see **Step 4: Set Bus ID Addresses** on page 5).

Mounting

The following diagrams show how to mount the EBP 100. Use the same procedure to mount the EBP 50 or EBP 200.

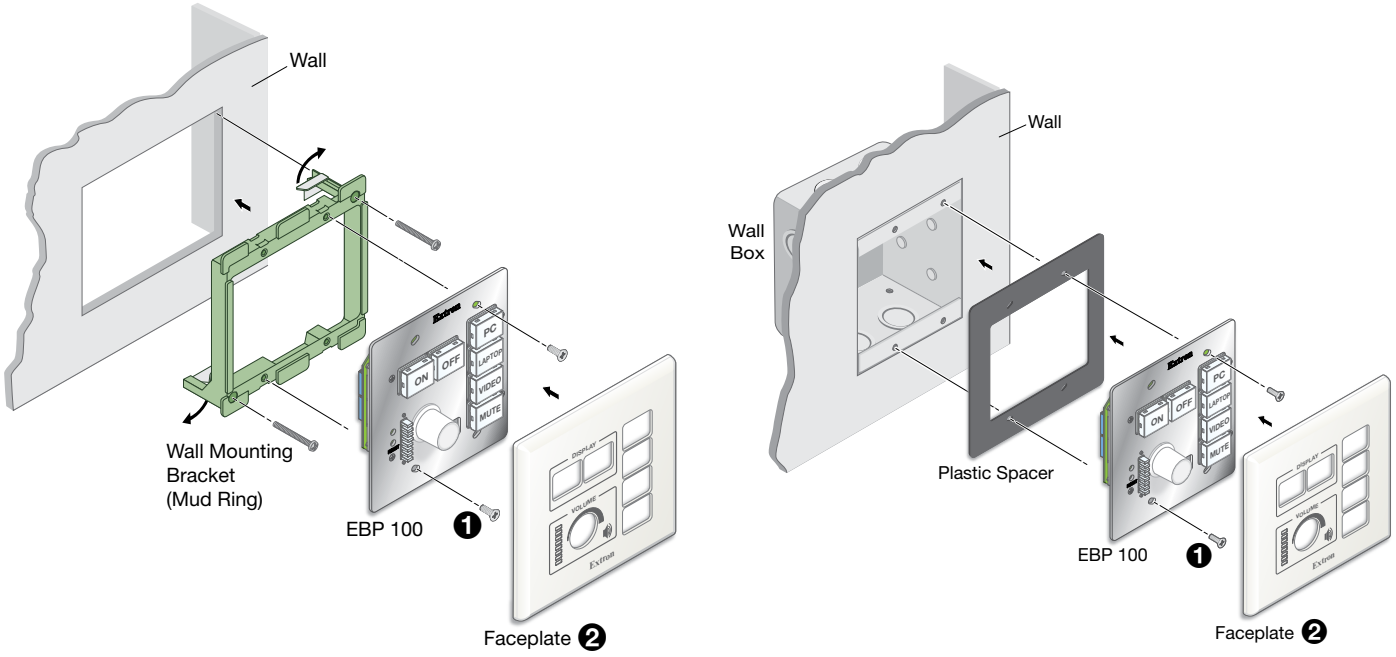


Figure 9. Mounting the EBP 100 with a Wall Mounting Bracket (left) or a Wall Box (right)

1. Insert the cabled EBP into the mud ring or junction box, aligning the mounting holes in the EBP with those in the box or mud ring. The EBP 50 (1 gang) has two mounting holes, the EBP 100 (2 gang) has four mounting holes, and the EBP 200 (3 gang) has six mounting holes.
2. Secure the EBP to the junction box, wall or surface mounting box, or mud ring, using the included screws (see figure 9, ❶).
3. Using a Phillips screwdriver, lightly tighten the screws until snug.
4. Attach the faceplate to the EBP: align the faceplate openings with the buttons, knob (if applicable), and LEDs (if applicable) and place the faceplate against the unit (❷). Magnetic catches hold the faceplate securely to the front of the unit.

For 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.

Worldwide Headquarters: Extron USA West, 1025 E. Ball Road, Anaheim, CA 92805, 800.633.9876

68-2907-50 Rev. D
04 24