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Proper Termination of Element™ CANBus with Axia Accessory Panels & Element Button Modules

Updated June 11, 2015

Axia Element consoles use CANBus technology (short for Controller Area Network Bus) to connect fader modules and accessory panels with the Element CPU. CAN is a broadcast, differential serial bus standard (ISO 11898-1, 2003), originally developed by Robert Bosch GmbH, designed specifically to be robust in electromagnetically noisy environments (as broadcast facilities can sometimes be).

One of the benefits of CANBus is that it allows connected devices to be daisy-chained — the bus connection looping through one module to the next, and so on.

Like similar serial bus connection methods, CANBus must be terminated at the furthest point in the chain (users with SCSI device experience will understand this immediately). Early Element consoles have terminators built-in to the Power Distribution Board located in the console overbridge; new consoles incorporate running changes and use outboard RJ-45 Termination Blocks. The procedures that follow assume that your console is equipped with these blocks; if you have earlier consoles without these blocks and with hard-terminated Power Distribution Boards, please contact Axia Customer Support for special instructions.

This document details proper termination procedures for consoles when CANBus studio accessory panels and switch modules are installed, and applies whenever the following modules or accessory user panels are field-installed by the owner:

Console Modules

- #2001-xx189 5-Button SmartSwitch Module
- #2001-xx190 10-Button SmartSwitch Module
- #2001-xx187 5-Button Film Cap Switch Module
- #2001-xx188 10-Button Film Cap Switch Module

Studio Accessory Control Panels

- #2001-20198 4-Button SmartSwitch Accessory Panel
- #2001-20199 Mic Control/Headphone Selector Panel
- #2001-20200 Headphone Selector Panel

Note: This document is not a complete reference to module or accessory panel installation; it covers only proper CANBus termination procedures. For full details on module installation, please refer to the Element User's Guide, "Appendix C: Installing a New Module" or "Appendix E: Accessory User Panels".



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About the Terminator Blocks



The RJ-45 Terminator Block used on Element consoles is shown at left. They are installed on the Element Power Distribution Board.

Important!

- Element consoles installed for use with Axia StudioEngine+Element Power Supply/CPU combinations require UtwoU terminator blocks. Follow the instructions in the StudioEngine section below.
- Element consoles installed for use with Axia PowerStation console engines require only UoneU terminator block, installed at the farthest end of the CANBus chain. Follow the instructions in the PowerStation section below.

For consoles using Studio Engine+Element Power Supply/CPU

Consoles mated to Axia StudioEngines require two external Terminator Blocks.

As of 2009, single-frame consoles shipped from the factory have *one* Terminator Block installed, typically on the Element Power Distribution board (see photo at right; block is circled for clarity). Dual-frame consoles are shipped with one Block installed in each frame (or in the longest module daisy-chain in each frame) as appropriate.

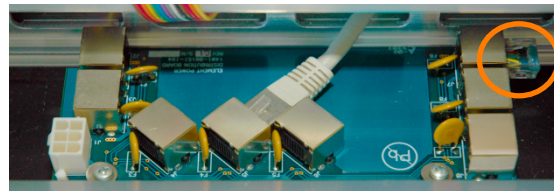


Figure 1: Power Distribution Board

Another Block is shipped with each Element Power Supply/CPU unit, and must be user-installed at the end of the longest fader module daisy-chain, or the end of the longest Accessory Panel daisy-chain.

There should never be more than two blocks installed on any console paired with the StudioEngine+Element Power Supply combo.

Termination Instructions for Single-Frame Consoles

Without Studio Accessory Control Panels

Element modules are installed “daisy chained” from the factory – one module is connected to the Element Power Distribution Board, and subsequent modules are connected to it in a chain configuration. Determine which module is at the end of the chain (typically the Monitor module) and insert the Termination Block found in the Element Power Supply box into the open port on the back of the module.

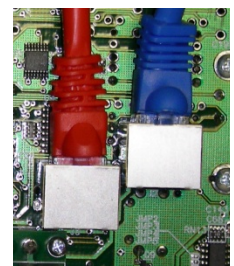


Figure 2: Module RJ-45 Jacks



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Adding Studio Accessory Control Panels

1. Remove one of the RJ-45 Termination Blocks from its existing location and set it aside.
2. Connect another CAT-5 cable to the empty RJ-45 jack on the Power Distribution Board and route it out of the console frame to the location of your new Studio Control Panel. Connect it to one of the RJ-45 jacks on the Panel.
3. If you are done adding Control Panels, skip to Step 5.
4. If you need to add another Studio Control Panel, connect its CAT-5 cable to the empty jack on the previously installed Panel. Repeat this until you are finished.
5. When you have installed all of your Studio Control Panels, insert the RJ-45 Termination Block that you removed in Step 1 into the empty RJ-45 Jack on the final Panel.
6. Refer to the Element User's Guide, Appendix C for instructions on properly setting the rotary ID switch on the back of each panel.

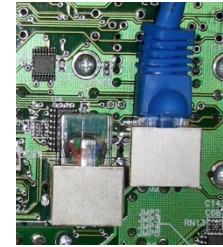


Figure 3: Final Accessory Panel with RJ-45 Termination Block installed.

If you have a large console with lots of modules, it's possible that all positions on the Power Distribution Board are already filled. In this case, examine the module connections and determine on which module the RJ-45 Termination Block is installed. Remove it, and add your Accessory Panel connections to this daisy-chain, remembering to re-install the Termination Block on the last Panel when you are through.

Adding 5- and 10-Button SmartSwitch Modules

Note that these SmartSwitch modules do not feature a second RJ-45 connector; they cannot be used at the end of a module daisy-chain and must be connected directly to the Power Distribution Board.

1. Locate an unused RJ-45 jack on your console's Power Distribution board.
2. Take the CAT-5 cable that shipped with your SmartSwitch Module and connect one end to the empty RJ jack; connect the other end of the CAT-5 cable to your new SmartSwitch Module.
3. No changes to the locations of the RJ-45 Termination Blocks are necessary.
4. Refer to the Element User's Guide, Appendix C for instructions on properly setting the rotary ID switch on the back of each panel.

If you have a large console with lots of modules, it's possible that all positions on the Power Distribution Board are already filled. In this case, examine the module connections and determine on which module the RJ-45 Termination Block is installed. Remove it, and transfer another module's connection cable from the Power Distribution Board to this daisy-chain, remembering to re-install the Termination Block on the last Module when you are through.

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Termination Instructions for Dual-Frame Consoles

When Element is ordered in a dual-frame configuration (two frames linked to a single Element CPU and functioning as a single console), they utilize a special CANBus “Y” cable to connect to the Element Power Supply. One RJ-45 Terminator Block should be installed in the Power Distribution Board of each frame. Any accessory Studio Control Panels should be added to just one of the frames (it doesn’t matter which) in the daisy-chain configuration described above, and that frame’s RJ-45 Terminator Block transferred to the Panel at the end of the chain.

If you find there are more than two RJ-45 Terminator Blocks installed on your split-frame system, remove the unneeded Blocks so that there are a total of two Blocks are installed — one in each frame.

As shown in Figure 4, each frame is connected to the Element CPU via a 6-conductor CANBus cable.

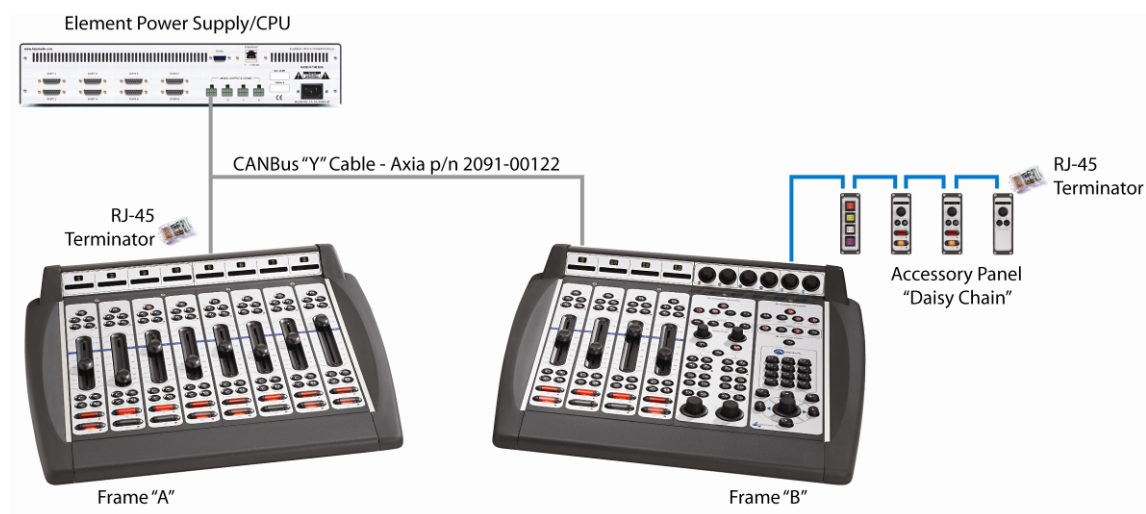


Figure 4: Installing Termination Block in a split-frame Element console

Adding new Studio Accessory Panels

1. Remove the RJ-45 Termination Block from the Power Distribution Board of one of the Element frames, and set it aside.
2. Undo the setscrews that hold in one of the modules installed in your Element.
3. Turn the module over and find the two RJ-45 jacks on the back; one is occupied by the CAT-5 cable that connects it to the Power Distribution Board.
4. Connect another CAT-5 cable to the empty RJ-45 jack and route it out of the console frame to the location of your new Studio Control Panel. Connect it to one of the RJ-45 jacks on the Panel.

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5. To add another Studio Control Panel, connect its CAT-5 cable to the empty jack on the previously installed Panel.
6. When you are finished installing Studio Control Panels, insert the RJ-45 Termination Block that you removed in Step 1 into the empty RJ-45 Jack on the final Panel.

For consoles using PowerStation

Consoles mated to Axia PowerStation integrated console engines require only one external Terminator Block (one is built into PowerStation itself).

As of August 2009, single-frame consoles shipped from the factory have *one* Terminator Block installed, typically on the Element Power Distribution board (see photo at right; block is circled for clarity). Dual-frame consoles are shipped with one Block installed in each frame (or in the longest module daisy-chain in each frame) as appropriate. **There should never be more than one external Terminator Block installed on a console paired with PowerStation.**



Figure 5: Power Distribution Board

Termination Instructions for Single-Frame Consoles

Without Studio Accessory Control Panels

Element modules are installed “daisy chained” from the factory – one module is connected to the Element Power Distribution Board, and subsequent modules are connected to it in a chain configuration. A Termination Block will be factory installed either on the Power board or at the end of the module daisy chain; no modifications are needed.

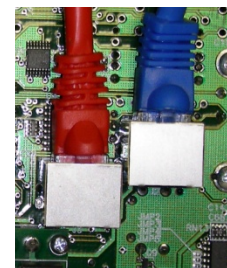


Figure 6: Module RJ-45 Jacks

Adding Studio Accessory Control Panels

1. Remove the RJ-45 Termination Block from its existing location and set it aside.
2. Connect another CAT-5 cable to an empty RJ-45 jack on the Power Distribution Board and route it out of the console frame to the location of your new Studio Control Panel. Connect it to one of the RJ-45 jacks on the Panel.
3. If you are done adding Control Panels, skip to Step 5.
4. If you need to add another Studio Control Panel, connect its CAT-5 cable to the empty jack on the previously installed Panel. Repeat this until you are finished.
5. When you have installed all of your Studio Control Panels, insert the RJ-45 Termination Block that you removed in Step 1 into the empty RJ-45 Jack on the final Panel.

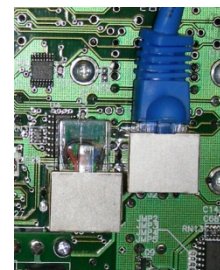


Figure 7: Final Accessory Panel with RJ-45 Termination Block installed.

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6. Refer to the Element User's Guide, Appendix C for instructions on properly setting the rotary ID switch on the back of each panel.

If you have a large console with lots of modules, it's possible that all positions on the Power Distribution Board are already filled. In this case, examine the module connections and determine on which module the RJ-45 Termination Block is installed. Remove it, and add your Accessory Panel connections to this daisy-chain, remembering to re-install the Termination Block on the last Panel when you are through.

Adding 5- and 10-Button SmartSwitch Modules

Note that these SmartSwitch modules do not feature a second RJ-45 connector; they cannot be used at the end of a module daisy-chain and must be connected directly to the Power Distribution Board.

1. Locate an unused RJ-45 jack on your console's Power Distribution board.
2. Take the CAT-5 cable that shipped with your SmartSwitch Module and connect one end to the empty RJ jack; connect the other end of the CAT-5 cable to your new SmartSwitch Module.
3. No changes to the locations of the RJ-45 Termination Blocks are necessary.
4. Refer to the Element User's Guide, Appendix C for instructions on properly setting the rotary ID switch on the back of each panel.

If you have a large console with lots of modules, it's possible that all positions on the Power Distribution Board are already filled. In this case, examine the module connections and determine on which module the RJ-45 Termination Block is installed. Remove it, and transfer another module's connection cable from the Power Distribution Board to this daisy-chain, remembering to re-install the Termination Block on the last Module when you are through.

Termination Instructions for Dual-Frame Consoles

When Element is ordered in a dual-frame configuration (two frames linked to a single PowerStation and functioning as a single console), they utilize a special CANBus "Y" cable to connect to the Element Power Supply. One RJ-45 Terminator Block should be installed in the Power Distribution Board of each frame:

Remove the Block from Frame 1.

Any accessory Studio Control Panels should be added to the second frame in the daisy-chain configuration described above, and that frame's RJ-45 Terminator Block transferred to the Panel at the end of the chain.

As shown in Figure 8, each frame is connected to the Element CPU via a 6-conductor CANBus cable.



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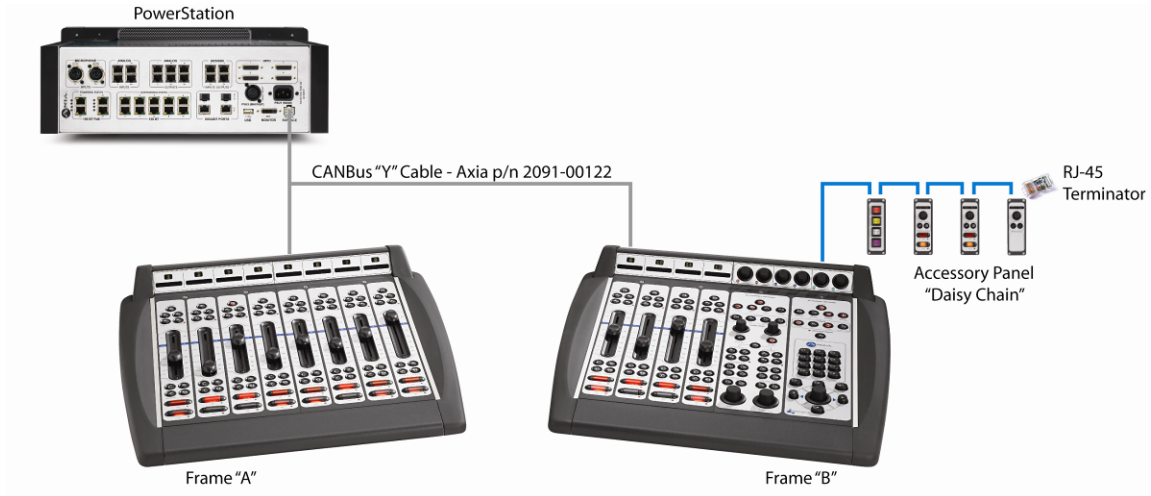


Figure 8: Installing Termination Block in a split-frame Element console with PowerStation

To add new Studio Accessory Panels:

1. Remove the RJ-45 Termination Block from your Element, and set it aside.
2. Undo the setscrews that hold in one of the modules installed in your Element.
3. Turn the module over and find the two RJ-45 jacks on the back; one is occupied by the CAT-5 cable that connects it to the Power Distribution Board.
4. Connect another CAT-5 cable to the empty RJ-45 jack and route it out of the console frame to the location of your new Studio Control Panel. Connect it to one of the RJ-45 jacks on the Panel.
5. To add another Studio Control Panel, connect its CAT-5 cable to the empty jack on the previously installed Panel.
6. When you are finished installing Studio Control Panels, insert the RJ-45 Termination Block that you removed in Step 1 into the empty RJ-45 Jack on the final Panel.

If you require more assistance or have questions about this procedure, please contact Telos Alliance Support at support@telosalliance.com.