

StudioComm with Dante® Support

Model 792 Central Controller and Model 793 Control Console

User Guide

Issue 1, February 2021

This User Guide is applicable for systems consisting of:
Model 792: serial number M792-00151 and later with application firmware 1.05 and later;
Model 793: serial number M793-00151 and later with application firmware 1.03 and later

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Revision History

Issue 1, February 2021:

- Initial release.

Introduction

Dante® digital audio has found wide acceptance in all aspects of audio, from live entertainment and broadcast events, to corporate, recording, and post-production facilities. While certainly a legacy technology, analog audio signals have maintained an important place in the world of professional audio. And the days of needing to support only 2-channel stereo and 5.1 or 7.1 surround formats have ended. The variety of surround formats, and their associated channel counts and arrangements, has expanded the need for specialized equipment. The ability to monitor these Dante digital and analog audio sources in a convenient and sonically excellent way has become a requirement for many applications. Studio Technologies has addressed these needs with the StudioComm with Dante Support system consisting of the Model 792 Central Controller and the Model 793 Control Console.

Rather than supporting a specific surround format, the StudioComm with Dante Support system incorporates an internal 16-channel

architecture. This allows a range of surround audio applications to be easily supported. With Dante digital and analog audio inputs, Dante digital and analog monitor outputs, and an extensive set of operating resources it's a simple task to integrate a monitoring system into virtually any contemporary facility. The carefully selected group of features, including both 16-channel surround and 2-channel stereo inputs, configurable input-signal time delays, multiple pre- and post-fader outputs, and mute/solo functions make the system powerful yet simple to operate. And by using the best of contemporary technology, as well as following rigorous design practices, the system's audio quality is excellent.

A StudioComm with Dante Support system starts with the Model 793 Control Console. It's the system's "command center" and is designed to reside at a user's location, allowing fingertip selection of all monitoring functions. Numerous LED indicators provide complete status information. A backlit OLED display indicates key operating and configuration parameters. The second part of the StudioComm system is the Model 792

Figure 1. Model 792 Central Controller front view

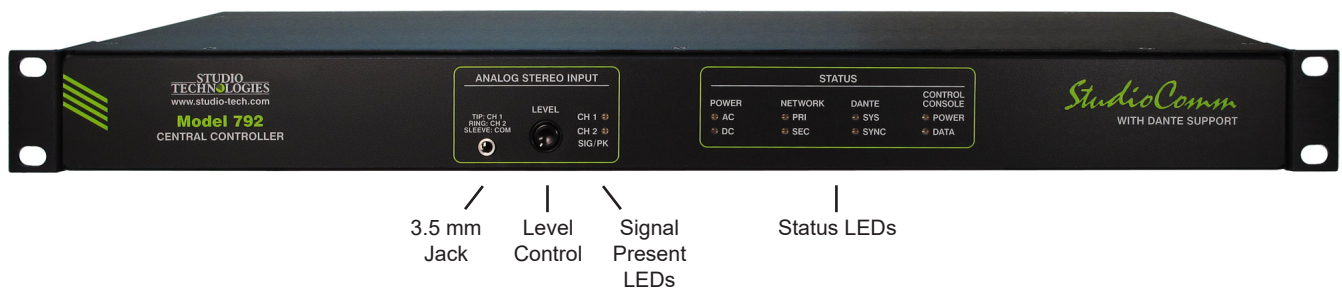


Figure 2. Model 792 Central Controller back view



Central Controller. This one-rack-space unit contains all the circuitry required to support the Dante digital and analog audio input and output signals. It links with the Model 793 using a 9-conductor D-subminiature cable. An integral web server allows fast and flexible configuration of the unit's networking, audio, and Dante performance. This allows the system's performance to be optimized to meet the needs of many specific applications.

Dante audio resources include both surround and stereo inputs and outputs. The Dante surround input and output functions consist of 16 independent channels while the stereo input and output functions support two channels. The Dante channels are compatible with AES67 and support Dante's ST 2110 implementation. Analog audio resources include a 16-channel surround input, a 2-channel stereo input, and a 16-channel surround output.

Great care was taken in designing the system's circuitry, ensuring that the character of the Dante digital and analog audio input signals is preserved. All audio processing is performed in 32-bit logic using a high-speed field-programmable-gate-array (FPGA) integrated circuit. The performance of the analog-to-digital and digital-to-analog functions will meet or exceed virtually any professional audio product. The sonic performance of the StudioComm system is completely "pro" with no compromises.

The Model 792 Central Controller occupies one space (1U) in a standard 19-inch rack. Dante digital audio sources are interfaced using one or two gigabit (GigE) Ethernet network connections that use RJ45 connectors. This arrangement allows switched or redundant Dante operation. A third gigabit network connection provides an independent means of accessing the Model 792's configuration webpages. This ensures that facilities can support separate audio and maintenance



Figure 3. Model 793 Control Console front view

networks. Standard connectors on the Model 792 allow simple interfacing with Dante digital audio, analog audio, control console, and power connections. AC mains power is connected directly to the Model 792, with an acceptable range of 100 to 240 V, 50/60 Hz. A source of nominal 12 volts DC can also be connected. If both power sources are connected the AC mains source will provide operating power while the DC source serves as a "hot standby."

Two Surround and Two Stereo Inputs

The Model 792 allows connection of one Dante digital surround and one analog surround signal source. Each surround input allows up to 16 independent channels to be supported with no defined format. This provides flexibility for installations that utilize formats such as 7.1, 7.1.2, 7.1.4, 10.2, 11.1, 11.1.4, etc. Each of the 16 channels associated with a surround input is full-fidelity and, as such, is appropriate to use as a main, surround, back, side, ceiling, or low-frequency enhancement channel. This flexibility allows the Model 792 to be utilized in a variety of applications, including experimental or test formats.

Support for two 2-channel stereo inputs is also provided. A Dante stereo input allows two channels of Dante audio to be selected for monitoring. An unbalanced analog input, located on the Model 792's front panel, allows the output of a "semi-pro" personal audio device to be directly connected.

The audio performance of the Model 792's analog inputs is very good. Low-noise, wide dynamic-range circuitry ensures that the audio quality is preserved. The analog audio signals are routed to high-performance analog-to-digital conversion (ADC) circuitry that supports a bit depth of 24 and sample rates of 44.1, 48, and 96 kHz. A precision voltage-reference circuit helps the ADC circuitry perform highly accurate signal conversion. The audio signals, now in the digital domain, are routed to a high-speed programmable logic (FPGA) device where they are mixed and level-controlled as necessary.

Each of the four inputs, two surround and two stereo, can have a unique name assigned to it. This can be helpful when a Model 793 Control Console user is selecting which input to monitor. In addition, a time delay can be applied to each input, useful for compensating for video processing or display "latency." Delays of up to 999 milliseconds, as related to a sample rate of 48 kHz, can be applied. Each input channel, 36 in total, can be level "trimmed" over a ± 20 dB range in steps of 0.1 dB.

Analog Surround Input

The Model 792 provides 16 independent analog input channels which are compatible with balanced or unbalanced line-level sources. These inputs have a nominal level of +4 dBu and are electronically balanced (differential), capacitor-coupled, and ESD (static) protected for reliable operation in demanding applications. Extensive filtering

minimizes the chance that radio frequency (RF) energy will cause interference. The analog inputs are protected from damage should a moderate DC voltage be accidentally connected. These characteristics make the analog inputs suitable for use in studio and mobile facility environments. The analog input signals are converted to 24-bit digital and then utilized by the internal logic circuitry. Compatible signal sources include audio consoles, broadcast playback equipment, and analog output ports on routers and networked audio equipment.

Dante Surround Input

The Model 792 provides a 16-channel "wide" Dante input for direct interfacing with applications that utilize Dante technology. As with the Analog Surround Input, the format of the 16 input channels is not defined. Signals with a bit depth of up to 24 and sample rate of 44.1, 48, or 96 kHz are compatible. The Dante surround input channels have a nominal signal level of -20 dBFS.

Analog Stereo Input

A 3-conductor 3.5 mm jack is located on the Model 792's front panel and allows direct interconnection with the output of a personal audio device. The input circuitry is optimized for use with "semi-pro" equipment that has a nominal level of -10 dBu. A rotary level control and two signal-present LEDs enable a user to easily optimize the sensitivity of the input circuitry, matching its performance to the nominal level of the connected source. A high-performance ADC circuit converts the analog signal to 24-bit digital.

Dante Stereo Input

The Model 792 provides two Dante digital audio input channels for interfacing with a stereo source. As with the Dante Surround Input, the Dante Stereo Input has a nominal

level of -20 dBFS, a bit depth of up to 24, and sample rate support of 44.1, 48, and 96 kHz.

Three Monitor Outputs

The StudioComm with Dante Support system provides three monitor outputs: one 16-channel Dante digital, one 16-channel analog, and one 2-channel stereo Dante digital. Configuration choices allow the characteristics of the three outputs to be optimized to meet the requirements of specific applications. For flexibility, a configuration menu choice allows the level of each analog output channel to be individually adjusted (“trimmed”) over a range of ± 20 dB in 0.1 dB steps.

Analog Output

The Analog Surround Output is 16 channels “wide” and can be selected for pre- or post-fader (before or after the level control) operation. These analog output channels are intended for connection to inputs on audio amplifiers or powered loudspeakers associated with a monitor loudspeaker system. Power-up/power-down muting relays help to protect the loudspeaker system from unwanted transient signals.

The analog surround output channels have a nominal level of +4 dBu and are electronically balanced, capacitor-coupled, and ESD (static) protected. High-quality components, including the critical digital-to-analog converters, are used to provide low-distortion, low-noise, and sonically excellent performance. Robust circuitry provides protection from damage should a moderate DC voltage be accidentally connected, something especially useful in broadcast applications. The analog outputs are compatible with virtually all balanced and unbalanced loads with an impedance of 2 k ohms or greater.

The Model 792’s analog output channels have a maximum level of +24 dBu. This allows both compatibility and significant headroom in applications where digital audio input signals with a nominal level of -20 dBFS need to be converted into analog signals that have a nominal level of +4 dBu.

Dante Surround and Stereo Outputs

The Model 792 provides two Dante monitor outputs. One is 16 channels and the other is 2-channel stereo. Each is selectable to be either pre- or post-fader and can be routed (Dante subscribed) to inputs on compatible monitor loudspeakers. They can also be utilized for level metering or other general-purpose uses, typically configured for pre-fader operation. The nominal level of the Dante monitor outputs is -20 dBFS. Each Dante output channel can have its level individually adjusted (“trimmed”) over a range of ± 20 dB with a step size of 0.1 dB.

Dante Performance

Two of the Model 792’s three gigabit Ethernet ports are utilized by the Dante audio interfaces. These ports can be selected, using the Dante Controller software application, for switched or redundant Dante operation. Support is provided for both AES67 and Dante Domain Manager™ (DDM) operation. The Model 792 will also support Dante’s ST 2110 implementation.

The StudioComm with Dante Support system allows the Dante audio sample rate to be selected for 44.1, 48, or 96 kHz with a bit depth of 24. The Dante Controller software application is used to route (subscribe) the Model 792’s receiver (input) and transmitter (output) channels with the associated Dante compliant-equipment.

Operation

The Model 793 Control Console provides the operator with an easy-to-use interface and includes a set of pushbutton switches, a rotary control, and a backlit OLED graphics display. Together these resources are used to select the desired monitoring environment. User functions include selecting the input source, adjusting the listening level, selecting the monitor output, and activating other special features. The four audio inputs, two 16-channel surround and two 2-channel stereo, can be individually selected for monitoring. Although only one is typically selected to be monitored at any one time, for flexibility two, three, or all four can be combined (summed) and monitored. The rotary control (actually an encoder with 30 steps per rotation) allows adjustment of the monitor output level in 0.5-dB steps.

For content confirmation, each of the unit's sixteen channels can be individually muted or soloed as desired. Multiple channels can also be simultaneously muted or soloed and needed. A reference level value can be saved and then enabled by the operator, allowing the monitor output level to be directly returned to a known value. A mute all function simultaneously mutes all sixteen output channels. The dim feature allows the operator to attenuate the monitor output level from among four configurable values. The graphics display will show a variety of system-related information. This includes the text names that have been assigned to the input sources and output destinations. The display will also show the current monitor output level directly in dB. Pressing the rotary control's knob will cause the management port's IP address to display, helpful when configuring the StudioComm with Dante Support system.

LED indicators are provided on both the front and back panels of the Model 792. These relate to selected performance characteristics of the Ethernet interfaces, Dante interface, general system activity, and levels of the unbalanced stereo audio input. They can be useful during installation, troubleshooting, and operation of the StudioComm system.

Special applications can take advantage of the Model 792 Central Controller's ability to be controlled using an API running under an operating system on external computer hardware. Using HTTP, in the form of sending GET or POST HTTP requests, all Model 793 Control Console user control functions can be duplicated using a software-based application. These HTTP requests will interface with the Model 792 by way of the management Ethernet interface.

Simple Installation

The Model 792 Central Controller uses standard connectors to allow fast and convenient interconnections. Gigabit Ethernet connections are made to local area network (LAN) ports using three RJ45 connectors, two for Dante and one for management. Multiple LEDs on the unit's back panel display the status of the network connections. Four 25-pin female D-subminiature connectors are used to interface with the unit's 16 channels of analog surround input and 16 channels of analog monitor output. A 3-conductor 3.5 mm jack, located on the Model 792's front panel, allows connection of a source of unbalanced stereo audio.

A detachable power cord is used to connect the Model 792 to a source of AC mains power. A DC power source can be connected using a 4-pin XLR connector. The lightweight aluminum enclosure mounts in one space

(1U) of a standard 19-inch rack enclosure. An interconnecting cable with 9-pin male D-subminiature plugs on each end are used to interconnect the Model 792 Central Controller with the Model 793 Control Console. An interface cord with an approximate length of 20 feet (7.3 meters) is included with each StudioComm system. The standalone Model 793 Control Console is typically placed on a surface that allows easy operator access.

AC and DC Power

The Model 792 allows an AC mains source of 100-240 V, 50/60 Hz to be connected by way of a detachable power cord. The unit can also be powered using a 12 volts DC source that is connected via a broadcast-standard 4-pin XLR connector. If both the AC and DC power sources are connected the Model 792 will be powered by the AC mains supply. Only if the AC mains source fails will a load be placed on the DC source. The Model 792 Central Controller provides a current-limited source of 12 volts DC power for use by the Model 793 Control Console.

Future Capabilities and Firmware Updating

Both the Model 792 and Model 793 were designed so that their capabilities can be easily enhanced in the future. A USB connector, located on the Model 792's back panel, allows its main and FPGA firmware (embedded software) to be updated using a USB flash drive. The Model 792 uses Audinate's Brooklyn II module to implement its Dante connectivity. The firmware in this module can be updated via the unit's Ethernet connections, helping to ensure that the Dante capabilities remain up to date. The Model 793 also utilizes a USB connector, located inside the unit, to allow its main

firmware to be updated. All firmware files and configuration parameters are securely stored in non-volatile memory.

Installation

In this section the Model 792 Central Controller will be mounted in one space (1U) of an equipment rack. Ethernet data connections will be made. Some applications will require analog audio input and/or output signals be interconnected. A location will be selected for the Model 793 Control Console and it will be interconnected with the Model 792. AC mains and/or DC power will be connected to the Model 792.

Up to three Gigabit Ethernet data connections will be made to the Model 792 using standard RJ45 patch cables. Connections can be made to the Analog Surround Output using two 25-pin D-subminiature connectors. If needed for the application, line-level Analog Surround Input connections will be made using two additional 25-pin D-subminiature connectors. A 3-conductor 3.5 mm jack, located on the front panel, is provided for interconnection with a source of stereo analog audio. It will typically remain available for temporary use by a personal audio device, however a permanent connection can be made.

AC mains power can be connected to the Model 792 by means of a detachable cord set that is compatible with the unit's 3-pin IEC 320 C14 inlet connector. Some applications may warrant connection to a source of nominal 12 volts DC which can be made by way of a 4-pin XLR connector. The DC source can be used to power the Model 792 or it can serve as a backup power source should AC mains be connected.

What's Included

The shipping carton contains one each of the following: Model 792 Central Controller, Model 793 Control Console, 9-pin D-subminiature interconnecting cable (approximately 20 feet (6 meters) in length), and instructions on how to obtain an electronic copy of this guide. Also included in the shipping carton is a North-American-standard AC mains cord. For destinations outside of North America the local reseller or distributor should provide an appropriate AC mains cord.

Mounting the Model 792

The Model 792 Central Controller requires one space (1U) in a standard 19-inch (48.3 cm) equipment rack. Secure the Model 792 into the equipment rack using two mounting screws per side. As the Model 792 does not contain a fan or other noise-producing source it can be located within a room or other structure where audio monitoring is going to take place. Select a location that is convenient for making connections to the Ethernet interfaces, analog audio outputs and inputs, and interfacing with the Model 793 Control Console. Twisted-pair (UTC) Ethernet has a 100-meter (325-foot) interconnection cable limitation. But that can be overcome by using a fiber-optic interconnection between the Model 792 and the Ethernet switch or switches in the one or more associated local-area-networks (LANs). A 3-conductor (stereo) 3.5 mm jack is located on the Model 792's front panel. This allows direct connection of an analog source provided by a personal audio device. Selecting a location for the Model 792 that allows ready access to this jack can be helpful in some applications. A cable is supplied for interconnecting the Model 792 with the Model 793. If the needs of a specific installation dictate, an alternate-length interconnecting cable can be fabricated and used.

Ethernet Connections

The Model 792 provides three Gigabit (GigE) Ethernet ports for flexibility and compatibility with many networking implementations. Two ports are provided for interconnections with one or two local area networks (LAN) associated with Dante audio-over-Ethernet networking schemes. They are labeled as PRI (primary) and SEC (secondary). Using the Dante Controller application these ports can be configured for Switched or Redundant Dante operation. The third Ethernet port, labeled MGMT, is dedicated to accessing the Model 792's management resources. An internal web server function supports the Model 792's management port's webpages. These webpages are used for configuration, monitoring, and maintenance of Model 792 and Model 793 operation.

By providing three Ethernet ports the Model 792 allows support for facilities that utilize independent networks for Dante audio transport and equipment management. In this way, "production" networks that support transport of audio signals by way of a single LAN (for Switched Dante) or two LANs (for Redundant Dante) can be separate from an engineering network that is used by technical personnel for configuring and maintaining a facility or "plant."

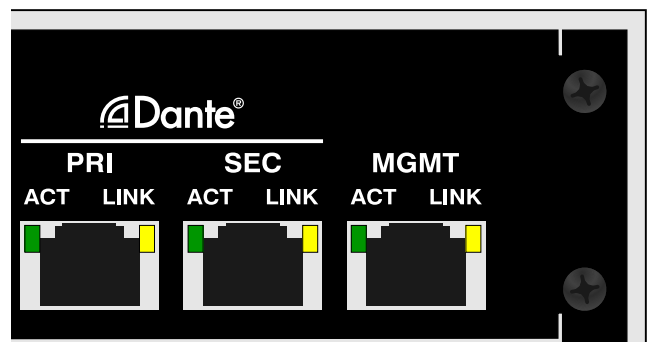


Figure 4. Detail of Model 792 back panel showing the Ethernet port's RJ45 jacks

Connections to the three Ethernet interfaces are made by way of standard RJ45 connectors (jacks) that are located on the back of the Model 792's enclosure. The Ethernet interfaces support auto MDI/MDI-X so that crossover cables are not required.

Refer to Appendix B, located at the back of this guide, for examples of how the Model 792's three Ethernet interfaces might be utilized.

Dante Port Connections

At least one 1000BASE-T (GigE) Ethernet connection is required for Model 792 Dante operation. It should be connected to the primary RJ45 jack. A second 1000BASE-T connection can be made to the secondary RJ45 jack if Redundant Dante is desired. (For this functionality to be active the Model 792's network configuration must be set for Redundant within the Dante Controller software application.) While technically 100BASE-TX Ethernet can also be used for these Dante connections, it is not optimal. Additionally, it's important to note that 10BASE-T Ethernet connections are not sufficient.

When configured in Dante Controller for the Switched network mode the Model 792's secondary Dante Ethernet connection can also be used as a "loop through" port such as would be provided by an Ethernet switch. Switched mode is the default setting but using the secondary Dante port in this manner for applications other than troubleshooting or "looping" to access the Model 792's management port is not recommended. It will function reliably but "daisy chaining" Ethernet signals can limit flexibility and present a failure point; it's optimal if each Dante Ethernet interface connects directly to a separate port on an Ethernet switch.

Management Port Connection

An Ethernet signal is required to be interconnected with the management port so that Model 792 configuration and management can be performed. It's recommended that a 1000BASE-T (GigE) connection be made but a 100BASE-TX or even a 10BASE-T connection is sufficient. (GigE will provide the best performance and it's assumed that all contemporary applications will support it.) The Model 792's management port can share a network that is being used by the unit's one or two Dante network connections. Refer to Appendix B for examples of how this can be easily implemented.

Dante and Analog Audio

The Model 792 provides both Dante digital and analog audio output signals. In most cases, the Analog Surround Output channels will be configured for post-fader operation and connected to inputs on amplifiers or amplified speakers. The Analog Surround Output can also be configured for pre-fader operation. Dante Surround and Dante Stereo Outputs are also provided. They too can be configured for pre- or post-fader operation. Surround and stereo audio inputs are available in both Dante digital and line-level analog formats. These output and input resources allow a combination of Dante digital and analog connections to be made so as to best support a wide range of specific applications.

Analog Audio Connections

Connecting analog signals to and from the Model 792 are made by way of four 25-pin female D-subminiature (DB-25F) connectors and one 3-conductor 3.5 mm jack. Two of the D-sub connectors are associated with the Analog Surround Output channels; the other two D-sub connectors are used by the Analog

Surround Input channels. The 3.5 mm jack is provided for interconnecting with a stereo analog audio source typically provided by a personal audio device. Refer to Figures 1 and 2 for a view of the 3.5 mm connector on the front and the D-sub connector on the back.

Analog Surround Output

Two 25-pin female D-subminiature connectors (DB-25F), labeled Analog Surround Output Channels 1-8 and Analog Surround Output Channels 9-16, are located on the Model 792's back panel. They provide access to the sixteen Analog Surround Output channels. These outputs are electronically balanced and will perform optimally when driving loads of 2 k (2000) ohms or greater. In most situations, these outputs will be connected to inputs on audio amplifiers associated with monitor loudspeakers or to the inputs of loudspeakers that contain integrated amplifiers ("amplified speakers").

The wiring scheme used by the D-subminiature connectors comply with AES59-2012, as made popular by TASCAM. Wiring assemblies prepared for use with the Model 792's Analog Surround Output channels should be identical to that of TASCAM-type output assemblies. Refer to Figures 6 and 7 or Appendix A for the exact connection details.

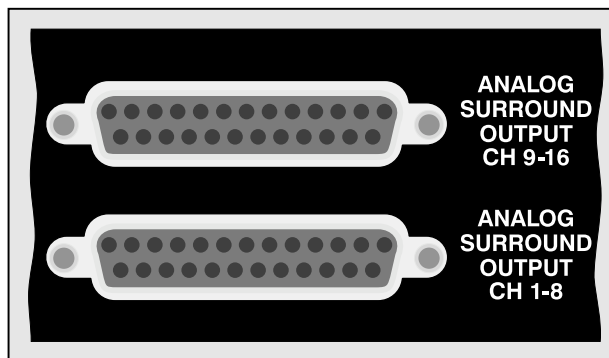


Figure 5. Detail of Model 792 back panel showing the Analog Surround Output Channels

Channel	High (+)	Low (-)	Shield
1	24	12	25
2	10	23	11
3	21	9	22
4	7	20	8
5	18	6	19
6	4	17	5
7	15	3	16
8	1	14	2

Notes:

- 1) Connector type is 25-pin female D-subminiature (DB-25F). Installer must provide male (DB-25M). Connector uses 4-40 threaded inserts for locking with mating plug.
- 2) Wiring scheme follows AES59-2012 convention. Standard TASCAM-type wiring harnesses are typically compatible (locking hardware requires 4-40 screw threads).

Figure 6. Connections for Analog Surround Output Channels 1-8

Channel	High (+)	Low (-)	Shield
9	24	12	25
10	10	23	11
11	21	9	22
12	7	20	8
13	18	6	19
14	4	17	5
15	15	3	16
16	1	14	2

Notes:

- 1) Connector type is 25-pin female D-subminiature (DB-25F). Installer must provide male (DB-25M). Connector uses 4-40 threaded inserts for locking with mating plug.
- 2) Wiring scheme follows AES59-2012 convention. Standard TASCAM-type wiring harnesses are typically compatible (locking hardware requires 4-40 screw threads).

Figure 7. Connections for Analog Surround Output Channels 9-16

But note that unlike TASCAM-type assemblies, the Model 792's D-sub connectors use "locking" screws with 4-40 threads.

In most applications, 3-pin male XLR connectors will be used to interface with the inputs on the associated amplifiers or amplified speakers. In this case, a Model 792 monitor output channel's + terminal would go to pin 2 of the XLR, the – terminal to XLR

pin 3, and the shield terminal to XLR pin 1. Balanced connection of the Analog Surround Output channels is the preferred connection method but unbalanced operation does not pose a problem. To connect to an unbalanced input, connect the + terminal as signal high, and only the Model 792's shield terminal as the signal low/shield. Leave the – terminal unconnected. For correct unbalanced operation it is important not to connect the – terminal and shield together.

How the Analog Surround Output functions will depend on its configuration. When its source is selected for pre-fader the sixteen output channels will have a fixed nominal level of +4 dBu. When selected for a post-fader choice the output level of the Analog Surround Output channels will depend on the setting of the level control located on the Model 793 Control Console. When the level trim configuration parameters are set for 0 dB and the level control is at its maximum value (0 on the display) the input-to-output signal path will be at unity gain; no gain or attenuation will impact the signal.

A level trim configuration selection in one of the Model 792's management webpages allows adjustment of the signal level of each individual channel over a –20.0 to +20.0 dB range. This will ensure that the Analog Surround Output channels can be compatible with audio signals and equipment that have a wide range of nominal levels. In some cases, the output level might benefit from being reduced, such as by 10 dB, rather than having gain added.

Analog Surround Input

Two female 25-pin D-subminiature (DB-25F) connectors, located on the Model 792's back panel, are used to connect with up to sixteen channels of line-level analog audio associated with a surround source. The connectors

are labeled Analog Surround Input Channels 1-8 and Analog Surround Input Channels 9-16. Refer to Figures 9 and 10 or Appendix A for details on the exact pinout of these D-sub connectors. The wiring scheme used by the D-subminiature connectors comply with AES59-2012, as made popular by TASCAM. A wiring assembly prepared for use with the Analog Surround Input channels would be identical to a standard TASCAM-type input assembly with the exception of using "locking" screws with 4-40 threads.

Each Analog Surround Input circuit is electronically balanced and optimized for connection to a balanced or unbalanced source with a nominal signal level of +4 dBu. A configuration selection in one of the Model 792's management webpages allows adjustment of the input gain of each individual channel over a –20.0 to +20.0 dB range. This will allow the inputs to be made compatible with audio signals that have a wide range of nominal levels. When connecting a consumer-level ("–10 dBV") audio source adding 12 dB of gain to each input might be effective. In some legacy applications, adding 10 dB of gain to an input channel associated with a low-frequency-enhancement (LFE) channel may be appropriate.

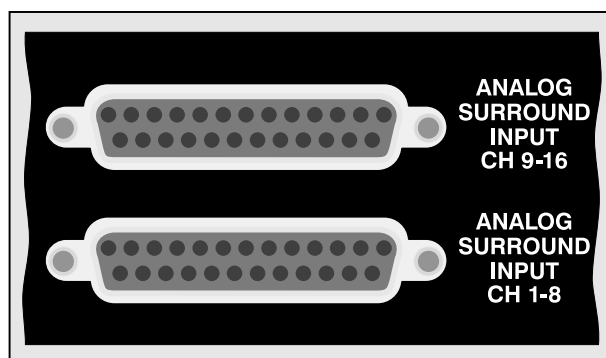


Figure 8. Detail of Model 792 back panel showing the Analog Surround Input Channels

Channel	High (+)	Low (-)	Shield
1	24	12	25
2	10	23	11
3	21	9	22
4	7	20	8
5	18	6	19
6	4	17	5
7	15	3	16
8	1	14	2

Notes:

- 1) Connector type is 25-pin female D-subminiature (DB-25F). Installer must provide male (DB-25M). Connector uses 4-40 threaded inserts for locking with mating plug.
- 2) Wiring scheme follows AES59-2012 convention. Standard TASCAM-type wiring harnesses are typically compatible (locking hardware requires 4-40 screw threads).

Figure 9. Connections for Analog Surround Input Channels 1-8

Channel	High (+)	Low (-)	Shield
9	24	12	25
10	10	23	11
11	21	9	22
12	7	20	8
13	18	6	19
14	4	17	5
15	15	3	16
16	1	14	2

Notes:

- 1) Connector type is 25-pin female D-subminiature (DB-25F). Installer must provide male (DB-25M). Connector uses 4-40 threaded inserts for locking with mating plug.
- 2) Wiring scheme follows AES59-2012 convention. Standard TASCAM-type wiring harnesses are typically compatible (locking hardware requires 4-40 screw threads).

Figure 10. Connections for Analog Surround Input Channels 9-16

Balanced analog sources should be wired so that signal high is connected to +, signal low to -, and shield to the shield connection. With an unbalanced source, connect signal high to the + connection, and shield to both the - and the shield connections. If connecting to an unbalanced analog source in this manner results in hum or noise try

connecting signal high to + and shield to -; leave the shield connection unterminated.

Analog Stereo Input

A 3-conductor (stereo) 3.5 mm jack and associated rotary potentiometer are located on the Model 792's front panel. Together they allow direct interfacing with a source of analog stereo audio, typically provided by a personal audio device. The input circuit's nominal level is -10 dBu, but the potentiometer will allow sources with a nominal level moderately lesser or greater than -10 dBu to be effectively utilized.

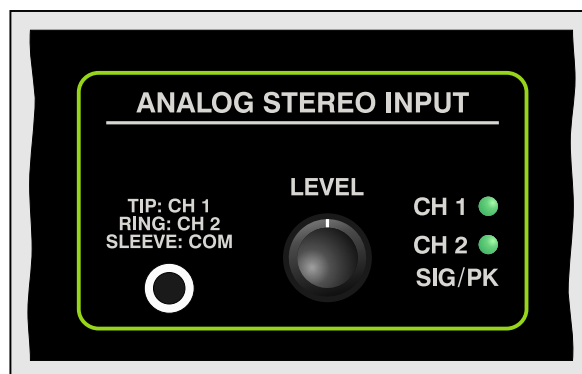


Figure 11. Detail of Model 792 front panel showing analog stereo input

In most cases, the 3.5 mm jack will be left unterminated allowing a temporary connection to be made. However, there's no reason why a permanent connection can't be made. The interconnecting cable's 3-conductor 3.5 mm plug should be wired such that left channel audio is on the tip lead, right channel audio is on the ring lead, and audio shield/common is on the sleeve lead. Refer to Figure 12 for connection details.

A configuration selection in one of the Model 792's management webpages allows adjustment of the input gain of each channel over a -20.0 to +20.0 dB range. In most cases, changing the trim value to something other than 0 will not be necessary.

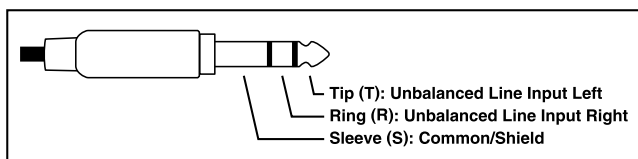


Figure 12. Connections for mating plug compatible with the Analog Stereo Input 3.5 mm receptacle

Connecting the Model 792 to the Model 793

A 9-pin female D-subminiature connector (DE-9F), labeled To/From Control Consoles, is provided on the back panel of the Model 792 Central Controller. This is used to interface the rack unit with the Model 793 Control Console. Refer to Figure 14 or Appendix A for details. A cable with 9-pin male D-sub (DE-9M) connectors on each end is used to interconnect the Model 792 with the Model 793. A cable, approximately 20 feet (6 meters) in length, is included in the shipping carton. This cable implements all nine connector pins in a one-to-one manner.

Should an interconnecting cable of a different length be required there's no problem for one to be fabricated and used. While it can be wired in a one-to-one fashion supporting all nine pins, only four connections are actually required: pin 1 (data+), pin 6 (data-), pin 4 (DC+), and pin 9 (DC-).

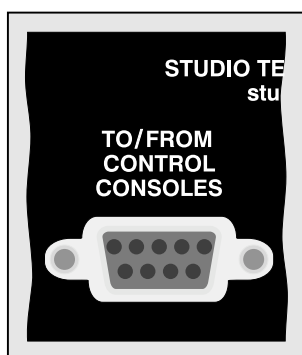


Figure 13. Detail of Model 792 back panel showing the DE-9F connector

Signal	Pin	Direction
Data + (RS-485)	1	To/From Model 793
Data - (RS-485)	6	To/From Model 793
Data Shield	2	To/From Model 793
DC + (12 V)	4	To Model 793
DC - (12 V Return)	9	To Model 793
DC Power Shield	5	To/From Model 793

Note: Connector type on Model 793 is 9-pin female D-subminiature (DE-9F). Connector uses 4-40 threaded inserts for locking with mating plug.

Figure 14. Connections between Model 792 and Model 793

The Model 792's connector pinout scheme was designed to allow creation of an interconnecting cable which uses commonly available 2-pair audio cable. This cable, consisting of two twisted pairs each with an individual shield, is typically small in diameter, flexible, and available in many colors. One pair and shield can be used for the data connections: data+ on pin 1, data- on pin 6, and shield on pin 2. The second pair and shield can be used for the DC connections: DC+ on pin 4, DC- on pin 9, and shield on pin 5. This implementation has the advantages of providing a shield for the data path and a more robust common (return path) connection (two conductors including the shield) for the DC power source.

A few simple calculations are required to determine the maximum cable length when fabricating a "custom" cable to connect the Model 792 to the Model 793. The differential transmission scheme used by the system's RS-485 interface makes an interconnection in excess of 1000 feet (>300 meters) easily possible. The limiting factor is typically the ability of the wiring to pass the DC power supplied by the Model 792 to the Model 793. The Model 792 supplies 12 volts DC, 500 milliamperes (mA) maximum which will provide a significant power margin to support lengthy cable runs.

The Model 793 requires a minimum of 9 volts DC, 75 mA maximum, for operation. (The voltage must be measured directly at the Model 793's 9-pin D-subminiature connector.) As such, the maximum interconnecting cable length is directly related to the resistive voltage loss associated with the two DC-carrying conductors (supporting pins 4 and 9). As the Model 792 supplies 12 volts and the Model 793 requires 9 volts minimum, this leads to a 3 volts maximum drop due to the interconnecting cable. Using Ohm's law, it's quite easy to determine if a desired cable length can be supported. Calculate the voltage drop by multiplying the total resistance (in ohms) of the proposed cable by 0.075 (the Model 793's maximum required current in amperes). Remember to include the resistance in both conductors (DC+ and DC-) when calculating the voltage drop. If the voltage drop in the cable is 3 volts or less it should function correctly. If it's greater than 3 volts the cable is too long or the wire gauge is too small.

Connecting Power to the Model 792

The Model 792 requires a source of AC mains or nominal 12 volts DC for operation. Either source can be connected with the same result. Both can also be simultaneously connected if a redundant (backup) power scheme is desired.

Connecting AC Mains Power

The Model 792 can operate directly from AC mains power of 100 to 240 volts, 50/60 Hz, 20 watts maximum. As a "universal mains input" device there are no switches to set or jumpers to install. A 3-pin IEC 320 C14 inlet connector on the back panel mates with a detachable mains cord set. Refer to Figure 15 for a detailed view.

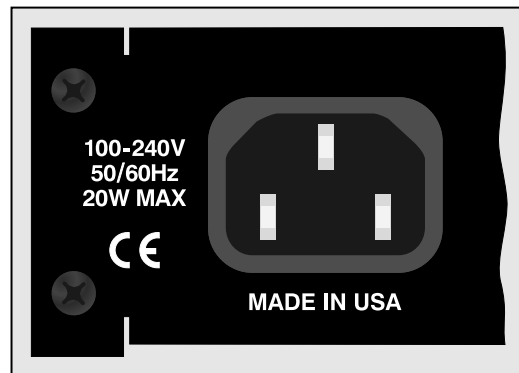


Figure 15. Detail of Model 792 back panel showing the AC mains power connector

All units are supplied from the factory with an AC mains cord that has a North-American (NEMA 5-15L) standard plug on one end and an IEC 320 C13 connector on the other end. Units intended for use in other destinations require that an appropriate mains cord be obtained. The wire colors in the mains cord should conform to the internationally recognized color code and be terminated accordingly:

<u>Connection</u>	<u>Wire Color</u>
Neutral (N)	Light Blue
Line (L)	Brown
Earth/Ground (E)	Green/Yellow

Because the Model 792 does not contain a power on/off switch it will begin operation as soon as AC mains power is connected.

Safety Warning: The Model 792 does not contain an AC mains disconnect switch. As such, the AC mains cord plug serves as the disconnection device. Safety considerations require that the plug and associated inlet be easily accessible to allow rapid disconnection of AC mains power should it prove necessary.

Connecting DC Power

The Model 792 can also operate from a source of 10 to 18 volts DC. The current required from a 12 volts DC source is 1.6 ampere maximum. A 4-pin male XLR connector, located on the unit's back panel, is used to connect the source of DC. Refer to Figure 16 for a detailed view. Prepare a mating connector (female) so that pin 1 is DC- and pin 4 is DC+. Pins 2 and 3 are not used and should remain unconnected. This connector type and pinout have become a broadcast DC power standard and should be familiar to many technical personnel. Because the Model 792 contains no power on/off switch it will begin operation as soon as a DC power source is connected.

As previously mentioned, both an AC mains source and a DC source can be connected at the same time. If this is the implementation then the AC mains source will always power the Model 792 with the DC source serving as a "hot standby." Only if the AC source fails will the unit draw power from the DC source. This will occur automatically with no interruption of Model 792 operation. In this "standby" mode (when an AC mains source is connected) the Model 792 draws less than 100 microamperes (uA) from the DC input.

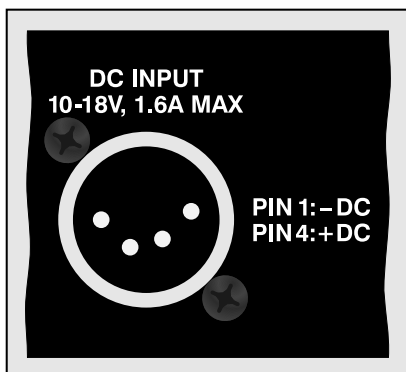


Figure 16. Detail of Model 792 back panel showing the DC input power connector

Dante Configuration

For audio to correctly pass to and from the StudioComm system requires, at a minimum, that several Dante-related parameters be configured. These configuration settings are stored in non-volatile memory within the Model 792's Dante network interface circuitry. Configuration will typically be done with the Dante Controller software application, available for download free of charge at audinate.com. Versions of Dante Controller are available to support several operating systems.

The Model 792's Dante interface is compatible with the Dante Domain Manager (DDM) software application. Refer to DDM documentation, also available from Audinate, for details on which Model 792 and related parameters may have to be configured.

Audio Routing

The Model 792's eighteen Dante transmitter (output) channels can be assigned to the desired Dante receiver (input) channels on associated equipment. This will route the sixteen channels associated with the Dante Surround Output and the two channels associated with the Dante Stereo Output to the devices that will be "listening" to them. Within Dante Controller a "subscription" is the term used for routing a transmitter flow (a group of up to four output channels) to a receiver flow (a group of input channels).

The Model 792 uses the Brooklyn II module to implement its Dante functionality. The number of transmitter flows associated with this module is 32 and, as such, typically no flow limitation will occur. Flows, which can support up to four audio channels, can either be unicast, multicast, or a combination of the two. (Note that in the AES67 mode the Dante transmitter (output) channels will only function in multicast; unicast is not supported.)

Using Dante Controller the desired Dante transmitter (output) sources can be routed to the eighteen Dante receiver (input) channels associated with the Model 792. The exact number utilized will depend on the specific application. Sixteen of the Dante receiver (input) channels are assigned to the Model 792's Dante Surround Input and two channels are associated with the Model 792's Dante Stereo Input.

Unit and Channel Names

The Model 792 has a default Dante device name of **ST-M792-** along with a unique suffix. The suffix identifies the specific Model 792 that is being configured. The suffix's actual alpha and/or numeric characters relate to the MAC address of the unit's Brooklyn II module. The eighteen Dante transmitter (output) channels have default names of **Sur Ch1** through **Sur Ch16**, **St Ch1**, and **St Ch2**. The eighteen Dante receiver (input) channels have default names of **Sur Ch1** through **Sur Ch16**, **St Ch1**, and **St Ch2**. Using Dante Controller, the default device and channel names can be revised as appropriate for a specific application. Refer to Appendix C at the end of this guide for a summary of the channel numbers, names, and descriptions.

Device Configuration

The Model 792 supports audio sample rates of 44.1, 48, and 96 kHz with no pull-up/down options available. The digital audio data is in the form of pulse-code modulation (PCM) samples. Encoding choices within Dante Controller are PCM 16, PCM 24, and PCM 32, but in most cases the selection of PCM 24 would be appropriate. Clocking and device latency parameters can be adjusted if required but the default values in Dante Controller are typically correct.

Network Configuration – Dante

The Model 792 allows connection of three Ethernet signals using standard RJ45 jacks which are located on the back panel. Two jacks are for use by Dante and the third for connecting to a network designated for management or maintenance purposes. The Dante ports are labeled PRI and SEC indicating that they are the primary and secondary connections. How these two ports function can be selected in the Dante Redundancy section of Dante Controller's Network Configuration tab. The choices are Switched or Redundant.

If Switched is selected then the Model 792 can establish one connection with an Ethernet network. It doesn't matter which RJ45 jack is utilized, although for clarity this would typically be the primary jack. The secondary RJ45 jack can be used to interconnect with another piece of networked equipment.

If the Model 792's Dante network is configured for Switched ensure that only one of the two Dante RJ45 jacks on the back panel is connected to the LAN associated with the Dante network. If both of the Model 792's Dante RJ45 connections are routed to ports on the same LAN this will typically "crash" the network! (Although some of the latest/most-advanced Ethernet switches will automatically detect and prevent such a "network bridging" issue from occurring.)

If Redundant is selected then Dante's Redundant networking capability will be enabled. In this case, separate network connections should be made to the primary and secondary RJ45 jacks.

Network Configuration – IP Addresses

When the Model 792 has been configured for the Switched network mode a single Dante IP address will be associated with the network connection that is made to either the primary or the secondary RJ45 jack. If the network configuration has been selected for Redundant then separate IP addresses and related network parameters will be assigned to the primary and secondary Dante Ethernet ports.

Typically, the Model 792's Dante IP address or addresses and related network parameters will be determined automatically using DHCP or, if that's not available, the link-local network protocol. If desired, Dante Controller allows IP addresses and related network parameters to be manually set to a fixed (static) configuration. While this is a more-involved process than simply letting DHCP or link-local "do their thing," if fixed addressing is necessary then this capability is available.

Note that if the Model 792's network configuration has been set for Redundant then the primary and secondary Dante IP addresses and related parameters can be independently configured. This allows both interfaces to be configured automatically, both interfaces to be configured manually, or one interface configured automatically and the other configured manually.

AES67 Configuration – AES67 Mode

Dante Controller allows a Model 792 to be configured for AES67 operation. This requires the AES67 mode to be set for Enabled. As previously noted in this guide,

if AES67 mode is Enabled then the Dante transmitter (output) channels will use multi-cast. The sample rate will be fixed at 48 kHz.

Model 792 Clocking Source

While technically the Model 792 can serve as a Leader clock for a Dante network (as can all Dante-enabled devices), in most cases the unit will be configured to receive its timing reference ("sync") from another Dante device. As such, the Dante Controller check box for the Preferred Leader that is associated with the Model 792 would typically not be enabled.

Model 792 and Model 793 Configuration

Many Model 792 Central Controller and Model 793 Control Console operating parameters can be configured using the web-pages that are provided by way of the Model 792's management Ethernet port. A standard web browser is all that is required to utilize the menu webpages. Of course, the device hosting the web browser must be part of the same network that includes the Model 792's management Ethernet port. The management port's network configuration can also be revised using the Model 793 Control Console's configuration resources.

Management IP Address

It's easy to identify the active management IP address. With the StudioComm system powered and operational, and a network connection made to the management port, press the Model 793 Control Console's level control. The management IP address will show on the Model 793's display. The level

control can be pressed again to return the display to normal operation. Or, after a 2-minute inactivity timer, the display will automatically return to normal operation.

How the management Ethernet port obtains its IP address will depend on the Management Addresses configuration setting. It can be made in the Network Configuration management webpage or using the Model 793 Control Console.

The default method is automatic so the Model 792's management port will first try to obtain an IP address using DHCP. If that is not successful an IP address will be assigned using the link-local protocol. The Model 792 might also have been configured to use a manual (fixed or static) IP address.

The Model 792's management webpages can be used to review or makes changes to the IP address and related parameters. Alternately, the Model 793 Control Console's menu resources can be used.

Accessing the Management Webpages

To access the Model 792's home page, type the Model 792's management IP address into the browser's search bar. (It's possible that some browsers may require the text **http://** followed by the IP address.)

Login Menu: Once the Overview page displays then access to the Configuration Menu is possible. Clicking on the link labeled Configuration Menu will first lead to the Login Menu. The entry of a valid user name and password is now required. This is not a sophisticated security implementation! It is intended to keep "honest" people from making unauthorized changes to the configuration of the Model 792 and Model 793.

User Name: Enter the Model 792's user name into this field. It is case sensitive. The default user name is **guest**. If the default user name and password are active the default user name will display in this field.

Password: Enter the Model 792's password into this field. It is case sensitive. The default password is **guest**. If the default user name and password are active the default password will display in this field.

Login Button: Click on the login button to submit the entered user name and password. If the correct entries have been made the Configuration Menu webpage will display. If an incorrect user name and/or password is entered then a login failed message will be displayed.

Configuration Menu

Once the correct user name and password text have been submitted the Configuration Menu webpage will display. This menu offers access to specific function menus. These menus allow Model 792 and Model 793 configuration choices to be displayed and, if desired, changed.

Dante Surround Input Menu

Label: This field allows a text name to be entered and stored. A maximum of 15 characters can be entered, including upper and lower alphabetic characters, numbers, and standard punctuation marks. The label text should be selected to represent the source that is subscribed to the Dante Surround Input. The label text will be presented on the Model 793's display when this input is selected. This can assist the user in knowing exactly what source has been selected.

Delay: This field allows a time delay value to be entered and stored. A time delay would typically be used to synchronize ("match")

the timing between audio and video signals, compensating for delay caused by a video processor or display. The allowable delay range is 0 to 999 in 1-millisecond increments. The Model 792 will apply this time delay value to all channels associated with the Dante Surround Input. The selected time delay will apply equally to all sixteen input channels.

The configured delay time is referenced to the Model 792 being configured for a sample rate of 48 kHz in the Dante Controller application. In this case, the delay range would be 0 to 999 milliseconds. For other sample rates the time must be linearly scaled. For example, if the Model 792 is configured for a sample rate of 96 kHz the actual delay range would be 0 to 499 milliseconds. In this case, selecting a delay of 128 will result in an actual time delay of 64 milliseconds.

Submit: The Submit button is located below the field for delay. To save changes made to the label and/or delay fields requires that the Submit button be pressed.

Trim: Each of the sixteen channels associated with the Dante Surround Input can have its level individually adjusted (“trimmed”). The range is –20.0 to +20.0 in 0.1-dB steps. This function can be used to allow the relative level of the various channels to be matched. It can also be used to compensate for an input signal that doesn’t support the Model 792’s nominal Dante level of –20 dBFS.

Submit Trim Values: The Submit Trim Values button is located below the field for channel 16. To save changes made to any or all of the sixteen trim fields requires that the Submit Trim Values button be pressed.

Clear Trim Values: The Clear Trim Values button is located directly below the Submit Trim Values button. Pressing this button will

cause all sixteen trim fields to go to a value of 0.0. This function can be useful, returning the nominal level of all sixteen input channels to –20 dBFS. But care must be taken so as not to disturb any revised values that may have previously been entered.

Analog Surround Input Menu

Label: This field allows a text name to be entered and stored. A maximum of 15 characters can be entered, including upper and lower alphabetic characters, numbers, and standard punctuation marks. The label text should be selected to represent the source that is connected to the Analog Surround Input. The label text will be presented on the Model 793’s display when this input is selected. This can assist the user in knowing exactly what source has been selected.

Delay: This field allows a time delay value to be entered and stored. A time delay would typically be used to synchronize (“match”) the timing between audio and video signals, compensating for delay caused by a video processor or display. The allowable delay range is 0 to 999 in 1-millisecond increments. The Model 792 will apply this time delay value to all channels associated with the Analog Surround Input. The selected time delay will apply equally to all sixteen input channels.

The configured delay time is referenced to the Model 792 being configured for a sample rate of 48 kHz in the Dante Controller application. In this case, the delay range would be 0 to 999 milliseconds. For other sample rates the time must be linearly scaled. For example, if the Model 792 is configured for a sample rate of 96 kHz the actual delay range would be 0 to 499 milliseconds. In this case, selecting a delay of 128 will result in an actual time delay of 64 milliseconds.

Submit: The Submit button is located below the field for delay. To save changes made to the label and/or delay fields requires that the Submit button be pressed.

Trim: Each of the sixteen channels associated with the Analog Surround Input can have its level individually adjusted (“trimmed”). The range is -20.0 to $+20.0$ in 0.1-dB steps. This function can be used to allow the relative level of the various channels to be matched. It can also be used to compensate for an input signal that doesn’t support the Analog Surround Input’s nominal level of +4 dBu.

Submit Trim Values: The Submit Trim Values button is located below the field for channel 16. To save changes made to any or all of the sixteen trim fields requires that the Submit Trim Values button be pressed.

Clear Trim Values: The Clear Trim Values button is located directly below the Submit Trim Values button. Pressing this button will cause all sixteen trim fields to go to a value of 0.0. This function can be useful, returning the nominal level of all sixteen input channels to +4 dBu. But care must be taken so as not to disturb any revised values that may have previously been entered.

Dante Stereo Input Menu

Label: This field allows a text name to be entered and stored. A maximum of 15 characters can be entered, including upper and lower alphabetic characters, numbers, and standard punctuation marks. The label text should be selected to represent the source that is subscribed to the Dante Stereo Input. The label text will be presented on the Model 793’s display when this input is selected. This can assist the user in knowing exactly what source has been selected.

Delay: This field allows a time delay value to be entered and stored. A time delay would typically be used to synchronize (“match”) the timing between audio and video signals, compensating for delay caused by a video processor or display. The allowable delay range is 0 to 999 in 1-millisecond increments. The Model 792 will apply this time delay value to both channels associated with the Dante Stereo Input. The selected time delay will apply equally to both input channels.

The configured delay time is referenced to the Model 792 being configured for a sample rate of 48 kHz in the Dante Controller application. In this case, the delay range would be 0 to 999 milliseconds. For other sample rates the time must be linearly scaled. For example, if the Model 792 is configured for a sample rate of 96 kHz the actual delay range would be 0 to 499 milliseconds. In this case, selecting a delay of 128 will result in an actual time delay of 64 milliseconds.

Submit: The Submit button is located below the field for delay. To save changes made to the label and/or delay fields requires that the Submit button be pressed.

Trim: Each channel associated with the Dante Stereo Input can have its level individually adjusted. The range is -20.0 to $+20.0$ in 0.1-dB steps. This function can be used to allow the relative level of the channels to be matched. It can also be used to compensate for an input signal that doesn’t support the Model 792’s nominal Dante level of -20 dBFS.

Submit Trim Values: The Submit Trim Values button is located below the field for channel 2. To save changes made to either or both of the trim fields requires that the Submit Trim Values button be pressed.

Clear Trim Values: The Clear Trim Values button is located directly below the Submit Trim Values button. Pressing this button will cause both trim fields to go to a value of 0.0. This function can be useful, returning the nominal level of both input channels to -20 dBFS. But care must be taken so as not to disturb revised values that may have previously been entered.

Analog Stereo Input Menu

Label: This field allows a text name to be entered and stored. A maximum of 15 characters can be entered, including upper and lower alphabetic characters, numbers, and standard punctuation marks. The label text should be selected to represent the source that is connected to the Analog Stereo Input. The label text will be presented on the Model 793's display when this input is selected. This can assist the user in knowing exactly what source has been selected.

Delay: This field allows a time delay value to be entered and stored. A time delay would typically be used to synchronize ("match") the timing between audio and video signals, compensating for delay caused by a video processor or display. The allowable delay range is 0 to 999 in 1-millisecond increments. The Model 792 will apply this time delay value to both channels associated with the Analog Stereo Input. The selected time delay will apply equally to both input channels.

The configured delay time is referenced to the Model 792 being configured for a sample rate of 48 kHz in the Dante Controller application. In this case, the delay range would be 0 to 999 milliseconds. For other sample rates the time must be linearly scaled. For example, if the Model 792 is configured for a sample rate of 96 kHz the actual delay range

would be 0 to 499 milliseconds. In this case, selecting a delay of 128 will result in an actual time delay of 64 milliseconds.

Submit: The Submit button is located below the field for delay. To save changes made to the label and/or delay fields requires that the Submit button be pressed.

Trim: Each channel associated with the Analog Stereo Input can have its level individually adjusted. The range is -20.0 to $+20.0$ in 0.1-dB steps. This function can be used to allow the relative level of the channels to be matched. It can also be used to compensate for an input signal that doesn't support the Analog Stereo Input's nominal level of -10 dBu.

Submit Trim Values: The Submit Trim Values button is located below the field for channel 2. To save changes made to either or both of the trim fields requires that the Submit Trim Values button be pressed.

Clear Trim Values: The Clear Trim Values button is located directly below the Submit Trim Values button. Pressing this button will cause both trim fields to go to a value of 0.0. This function can be useful, returning the nominal level of both input channels to -10 dBu. But care must be taken so as not to disturb any revised values that may have previously been entered.

Input Controls Menu

The Model 793 Control Console provides four pushbutton switches that are used to select the source or sources to be monitored.

Button Sources

For operator convenience, the source associated with each button can be individually assigned. Each button can also be configured for Disabled.

Input A: This is a configurable field with five choices: Dante Surround, Analog Surround, Dante Stereo, Analog Stereo, and Disabled. This field is used to assign which audio input source will be monitored when the button labeled Input A is selected. Selecting Disabled will prevent the button labeled Input A from having any action when it is pressed.

Input B: This configuration assigns which of the four audio input sources will be monitored when the button labeled Input B is selected. The choices, including Disabled, are the same as those offered for the button labeled Input A.

Input C: This configuration assigns which of the four audio input sources will be monitored when the button labeled Input C is selected. The choices, including Disabled, are the same as those offered for the button labeled Input A.

Input D: This configuration assigns which of the four audio input sources will be monitored when the button labeled Input D is selected. The choices, including Disabled, are the same as those offered for the button labeled Input A.

Analog Surround Output Menu

Source: This is a configurable field with four choices: Off, Pre-Fader, Post-Fader Output A, and Post-Fader Output B. This field is used to select the audio source for the Analog Surround Output. Off configures the sixteen channels associated with the Analog Surround Output to remain silent. When selected for Pre-Fader the nominal output level is fixed at +4 dBu (unity gain from input-to-output). When selected for Post-Fader A the output will be active when the Output A function is active on the Model 793. When selected for Post-Fader B the output will be active when the Output B function is active

on the Model 793. The output level when selected for either of the post-fader choices will be an attenuation relative to the Model 792's nominal level (attenuation relative to unity gain).

Submit: The Submit button is located below the Source field. To save a change made to the Source field requires that the Submit button be pressed.

Trim: Each of the sixteen channels associated with the Analog Surround Output can have its level individually adjusted ("trimmed"). The range is -20.0 to +20.0 in 0.1-dB steps. This function allows the relative level of each analog output channel to be adjusted as required. It can also be used to compensate for input levels on associated devices that don't support the Model 792's +4 dBu nominal analog level.

Submit Trim Values: The Submit Trim Values button is located below the field for channel 16. To save changes made to any or all of the sixteen trim fields requires that the Submit Trim Values button be pressed.

Clear Trim Values: The Clear Trim Values button is located directly below the Submit Trim Values button. Pressing this button will cause all sixteen trim fields to go to a value of 0.0. This function can be useful, returning the nominal level of all sixteen outputs to +4 dBu. But care must be taken so as not to disturb any revised values that may have previously been entered.

Dante Surround Output Menu

Source: This is a configurable field with four choices: Off, Pre-Fader, Post-Fader Output A, and Post-Fader Output B. This field is used to select the audio source for the Dante Surround Output channels. Off configures the sixteen channels associated with the Dante Surround Output to remain silent.

When selected for Pre-Fader the nominal output level is -20 dBFS (unity gain from input-to-output). When selected for Post-Fader A the output will be active when the Output A function is active on the Model 793. When selected for Post-Fader B the output will be active when the Output B function is active on the Model 793. The output level when selected for either of the post-fader choices will be an attenuation relative to the nominal output level (attenuation relative to unity gain).

Submit: The Submit button is located below the Source field. To save a change made to the Source field requires that the Submit button be pressed.

Trim: Each of the sixteen transmitter (output) channels associated with the Dante Surround Output can have its level individually adjusted (“trimmed”). The range is -20.0 to $+20.0$ in 0.1-dB steps. This function allows the relative level of each transmitter (output) channel to be adjusted as required. It can also be used to compensate for input levels on associated devices that don’t support the Model 792’s -20 dBFS nominal Dante level.

Submit Trim Values: The Submit Trim Values button is located below the field for channel 16. To save changes made to any or all of the sixteen trim fields requires that the Submit Trim Values button be pressed.

Clear Trim Values: The Clear Trim Values button is located directly below the Submit Trim Values button. Pressing this button will cause all sixteen trim fields to go to a value of 0.0. This function can be useful, returning the nominal level of all sixteen Dante transmitter (output) channels to -20 dBFS. But care must be taken so as not to disturb any revised values that may have previously been entered.

Dante Stereo Output Menu

Source: This is a configurable field with four choices: Off, Pre-Fader, Post-Fader Output A, and Post-Fader Output B. This field is used to select the audio source for the Dante Stereo Output channels. Selecting Off will cause both output channels associated with the Dante Stereo Output to remain silent. When selected for Pre-Fader the nominal output level is -20 dBFS (unity gain from input-to-output). When selected for Post-Fader A the output will be active when the Output A function is active on the Model 793. When selected for Post-Fader B the output will be active when the Output B function is active on the Model 793. The output level when selected for either of the post-fader choices will be an attenuation relative to the Model 792’s nominal level (attenuation relative to unity gain).

Submit: The Submit button is located below the Source field. To save a change made to the Source field requires that the Submit button be pressed.

Trim: Both of the transmitter (output) channels associated with the Dante Stereo Output can have their level individually adjusted (“trimmed”). The range is -20.0 to $+20.0$ in 0.1-dB steps. This function can be used to allow the level of each transmitter (output) channel to be adjusted as required. It can also be used to compensate for input levels on associated devices that don’t support the Model 792’s -20 dBFS nominal Dante level.

Submit Trim Values: The Submit Trim Values button is located below the field for channel 2. To save changes made to either or both of the trim fields requires that the Submit Trim Values button be pressed.

Clear Trim Values: The Clear Trim Values button is located directly below the Submit Trim Values button. Pressing this button will

cause both trim fields to go to a value of 0.0. This function can be useful, returning the nominal level of both Dante transmitter (output) channels to -20 dBFS. But care must be taken so as not to disturb any revised values that may have previously been entered.

Output Controls Menu

Output A Label: This field allows a text name to be entered and stored. A maximum of 15 characters can be entered, including upper and lower alphabetic characters, numbers, and standard punctuation marks. The label text should be selected to represent the implementation that is associated with the Output A function. The label text will be momentarily presented on the Model 793's display when the Output A function is selected. This can assist the user in knowing exactly which output device, typically a loudspeaker system, has been selected to be active.

Output B Label: This field allows a text name to be entered and stored. A maximum of 15 characters can be entered, including upper and lower alphabetic characters, numbers, and standard punctuation marks. The label text should be selected to represent the implementation that is associated with the Output B function. The label text will be momentarily presented on the Model 793's display when the Output B function is selected. This can assist the user in knowing exactly which output device, typically an alternate loudspeaker system, has been selected to be active.

Dim Level: This is a configurable field with four choices: 10 dB, 15 dB, 20 dB, and 25 dB. This field is used to select the amount of attenuation that will be applied to all post-fader outputs when the Dim function is active. It will be applied equally to all channels associated with an output, whether sixteen channels for surround or two channels for stereo.

Auto Reference Level Off: This is a configurable field with two choices: Disabled and Enabled. This field is used to select whether or not a user turning the level control will cause the Reference Level function to automatically turn off. If configured for Disabled and the Reference Level function on the Model 793 is enabled, when a user rotates the level control the Reference Level function will remain enabled. If configured for Enabled and the Reference Level function is enabled, when the level control is rotated the Reference Level function will automatically disable. This function is provided to meet the personal taste of Model 793's users. There is no "right" or "wrong" configuration setting.

Reference Level: This is a configurable field that allows a value to be stored for use when the Model 793's Reference Level function is active. The reference level will be indicated on the Model 793's display when the Reference Level function is active. The allowable range is -70.0 to 0 in 0.5 -dB steps. The desired value can be directly entered. The selected choice should reflect a "standard" level that will assist users in being able to immediately select a known monitor level. Often the selected level will equate to weighted sound pressure level (SPL) in the range 80 to 85 dB.

Submit: The Submit button is located at the bottom of the page. To save changes made to any of the fields in the Output Controls Menu requires that the Submit button be pressed. Once the Submit button is pressed the revised values will become active.

Network Configuration Menu

Dante IP Addresses

Primary: This is a display-only field that shows the IP address associated with the Model 792's primary Dante connection. It

will show either No Ethernet Link or an IP address. Note that the IP address displayed in this field is not the IP address associated with the Model 792's management Ethernet port! The 32-bit IP v4 address is displayed in what's known as dot-decimal notation.

How the IP address is determined depends on the Model 792's network configuration setting as performed using the Dante Controller application. The IP address can be established automatically using a DHCP server or the IPv4 link-local protocol. An IP address assigned to the primary Dante port by link-local will have a format of 169.254.x.x. The primary IP address can also be configured for a manual (static or fixed) number using the Dante Controller application.

If the network configuration is selected in Dante Controller for Switched then the primary Dante IP address will be associated with a network connection made to either the primary or the secondary RJ45 jacks on the Model 792's back panel. If the network configuration is selected for Redundant then the primary Dante IP address will be associated with the RJ45 jack labeled PRI on the Model 792's back panel. **No Ethernet Link** will display if an Ethernet connection has not been made with the primary RJ45 jack.

If the Model 792's network configuration in Dante Controller is selected for Switched ensure that only one of the RJ45 jacks on the back panel is connected to the LAN associated with the Dante devices. The other RJ45 jack can be used to interconnect with another piece of networked equipment. But be careful — having both of the Model 792's RJ45 jacks connected to ports on the same LAN will typically “crash” the network!

Secondary: This is a display-only field that shows the IP address associated with the Model 792's secondary Dante connection. It

will show Disabled, No Ethernet Link, or an IP address. Note that the IP address displayed in this field is not the IP address associated with the Model 792's management Ethernet port!

What is displayed and how a displayed IP address is determined depends on the setting of the Model 792's network configuration using the Dante Controller application. If the network configuration is selected for Switched then a secondary Dante IP address will never be active and Disabled will be displayed.

If the network configuration is selected for Redundant then the secondary Dante IP address will be displayed. This is the Ethernet connection that is associated with RJ45 jack labeled SEC on the Model 792's back panel. The IP address can be established automatically using a DHCP server or the IPv4 link-local protocol. An IP address assigned to the secondary Dante port by link-local will have a format of 172.31.x.x. The secondary IP address can also be configured for a manual (static or fixed) number using the Dante Controller application. **No Ethernet Link** will display if an Ethernet connection has not been made with the secondary RJ45 jack.

Management Addresses

MAC Address: This is a display-only field that shows the MAC (media access control) address associated with the Model 792's management Ethernet port. This is a unique hardware identification number that is assigned to each specific Model 792. No two Ethernet-connected devices should ever share a MAC address.

Current IP Address: This is a display-only field that shows the IP address associated with the Model 792's internal management web server. The web server is accessed with an Ethernet network connection made to the

RJ45 jack labeled MGMT on the Model 792's back panel. This address can be assigned automatically via DHCP or IPv4 link-local. It can also be manually assigned with a fixed or static IP address. The Current IP Address is not associated with the Model 792's primary or secondary Dante Ethernet jacks.

IP Address Configuration: This is a configurable field with two choices: Automatic and Manual. To minimize the chance of losing access to the internal management web server restoring the Model 792's factory defaults will not change the currently selected choice. Note that the Model 793 Control Console can also be used to revise the Model 792's management IP address configuration.

This configuration impacts how the Model 792 obtains the IP address that is used for accessing the Model 792's management web server and associated menu webpages. This setting has no impact on how the Model 792 obtains the primary and secondary IP addresses associated with the Dante Ethernet connections.

Selecting the Automatic setting will cause the Model 792 to use DHCP or IPv4 link-local to establish the IP address of the Model 792's management port. With this setting, upon establishing a link to the Model 792's management RJ45 jack the DHCP protocol will request an IP address and related parameters. If obtaining an IP address by way of the DHCP protocol is not successful then the IPv4 link-local protocol will be used. If an IP address has the format of 169.254.x.x then it was assigned using IPv4 link-local.

Even if the IP address was established using link-local the DHCP protocol will stay active. Every 30 seconds the Model 792's firmware will check for the presence of a DHCP server. If one becomes available then an IP address will be requested and, when obtained, will

automatically be used, replacing the IP address that was previously established by link-local.

The Manual setting allows the desired IP address and related parameters to be manually entered. This can be useful when a fixed addressing scheme has been established. In this way, a static IP address can be entered along with the other important network parameters.

When selected for Automatic the fields for manual IP address, subnet mask, gateway IP address, and DNS IP address will be "grayed out" (will have a gray background) to indicate that their values cannot be manually changed. In this condition they are display-only. Changing between Automatic and Manual and vice-versa will not impact the values stored in the manual IP address, subnet mask, gateway IP address, and DNS IP address fields.

Manual IP Address: This field is grayed out and will not display any text when the IP address configuration mode is selected for Automatic. When the IP address configuration is selected for Manual this field will display the IP address that is stored in the Model 792. This is the IP address that is currently being used, or will be used at the time of the next Ethernet management connection reboot. It is the IP address that allows access to the Model 792's management web server and associated menu webpages. It has nothing to do with the IP addresses associated with the Dante Ethernet jacks.

The manual IP address can be modified as desired to meet the requirements of the application. After entering an IP address using the standard dot-decimal notation format (four octets separated by dots) the Submit button must be pressed for the changes to be stored. Restoring the Model 792 default

values will not change the stored IP address. A system reboot is required for the revised manual IP address to be utilized. Note that the Model 793 Control Console can also be used to revise the Model 792's manual IP address.

Subnet Mask: This field is grayed out when the IP address configuration mode is selected for Automatic. This field will be display-only in this instance and will display an IPv4 subnet mask in dot-decimal notation (four octets separated by dots) if the current IP address and related network parameters were obtained by way of DHCP. This is the subnet mask that is being used by the internal management web server. If the IP address configuration mode is selected for Automatic and the current IP address was obtained by way of link-local then the associated subnet mask of 255.255.0.0 will be shown in this field.

When the IP address configuration is selected for Manual the field will not be grayed out. In this situation, the stored subnet mask will be displayed and can be modified as desired to meet the requirements of the application. The displayed value is the subnet mask that is currently in use, or will be used at the time of the next Ethernet management connection reboot. After entering an IP address using the standard dot-decimal notation format (four octets separated by dots) the Submit button must be pressed for a change to be stored. A system reboot is required for the revised subnet mask value to be utilized. Restoring the Model 792 default values will not change the stored subnet mask value. Note that the Model 793 Control Console can also be used to revise the Model 792's management subnet mask.

Gateway IP Address: This field is grayed out when the IP address configuration mode is selected for Automatic. This field will be

display-only in this instance and will display an IPv4 gateway IP address in dot-decimal notation (four octets separated by dots) if the current IP address and related network parameters were obtained by way of DHCP. This is the gateway IP address that is being used by the Model 792's management web server.

If the IP address configuration mode is selected for Automatic and the current IP address was obtained by way of link-local no gateway IP address will be shown in this field. This is because no gateway IP address is associated with link-local.

When the IP address configuration is selected for Manual the field will not be grayed out. In this situation, the stored gateway IP address will be displayed and can be modified as desired to meet the requirements of the application.

The displayed value is the gateway IP address that is currently in use, or will be used at the time of the next Ethernet management connection reboot. After entering a gateway IP address using the standard dot-decimal notation format (four octets separated by dots) the Submit button must be pressed for a change to be stored. A system reboot is required for the revised gateway IP address to be utilized. Restoring the Model 792's default values will not change the stored gateway IP address value.

DNS IP Address: This field is grayed out when the IP address configuration mode is selected for Automatic. This field is display-only in this instance and will display an IPv4 DNS IP address in dot-decimal notation (four octets separated by dots) if the current IP address and related network parameters were obtained by way of DHCP. This is the DNS IP address that is being used by the Model 792's management web server.

If the IP address configuration mode is selected for Automatic and the current IP address was obtained by way of link-local no subnet mask will be shown in this field. This is because no DNS IP address is associated with link-local.

When the IP address configuration is selected for Manual the field will not be grayed out. In this situation, the stored DNS IP address will be displayed and can be modified as desired to meet the requirements of the application. The displayed value is the DNS IP address that is currently being used, or will be used at the time of the next Ethernet management connection reboot.

In most cases, the Model 792's default DNS IP address will be appropriate. But there's no issue entering a revised DNS IP address. Once it's entered, using the standard dot-decimal notation format (four octets separated by dots), the Submit button must be pressed for a change to be stored. A system reboot is required for the revised gateway IP address to be utilized. Restoring the Model 792 default values will not change the stored gateway IP address.

Submit: The Submit button is located near the bottom of the Network Configuration Menu webpage. For any changes made to fields on the Network Configuration page to be saved the Submit button must be pressed.

System Reboot: The System Reboot button is located at the bottom of the Network Configuration Menu webpage. For any changes made to the Network Configuration page to be acted upon requires that the System Reboot button be pressed. Initiating a reboot cycle for the Model 792 Central Controller and associated Model 793 Control Console will cause the system to go into a mute all condition. This is a feature that will potentially protect monitor loudspeakers and the ears of

users. To resume monitoring audio signals will require one or more button presses to be performed on the Model 793 Control Console.

Menu Access Menu

As a security method a user name and password must be entered before the configuration webpages can be accessed. (This is what you did to get this far!) These values can be changed as desired.

The Model 792's access security method is in no way rigorous. The user name and password are sent to and received from the Model 792 as plain text. They are also stored within the Model 792 as plain text. There is no security method or encryption associated with these fields. Anyone "snooping" on the LAN that is transporting Model 792 data will see all values in plain text! The user name and password values are intended simply to provide a means of keeping "friendly" or "honest" users from easily changing the configuration of a Model 792 and Model 793. If unauthorized access is of concern it's recommended that an Ethernet connection to the Model 792's management RJ45 jack not be present except when access by authorized personnel is desired.

The default user name is **guest** and the default password is **guest**. These are case sensitive. If neither of the defaults are changed then they will display in the User Name and Password entry fields on the Login Menu webpage. If the default user name and/or default password is changed then neither the user name nor the password will display upon accessing the Login Menu webpage.

User Name: In this field a revised user name can be entered. The user name has a minimum of five characters, a maximum

of 15 characters, and is case sensitive. All 95 of the printable ASCII characters can be used. These include upper and lower alphabetic characters, numbers, and standard punctuation marks.

New Password: In this field a revised password can be entered. The password is a minimum of five characters, a maximum of 15 characters, and is case sensitive. All 95 of the printable ASCII characters can be used. These include upper and lower alphabetic characters, numbers, and standard punctuation marks.

Confirm New Password: For a new password to be considered valid it must also be entered in this field.

Submit: The Submit button is located below the field for Confirm New Password. To save changes made to the User Name and/or New Password fields requires that the Submit button be pressed.

System Information Menu

Default Settings

A button labeled Restore is provided to allow many of the Model 792 and Model 793 defaults to be restored. This will not impact the network configuration or user name and password settings. Be careful, as clicking the Restore button will immediately cause the defaults to be restored. Any changes made will immediately become effective. Refer to Appendix D for a list of factory default values.

Model 792

Serial Number: This is a display-only field that shows the Model 792's hardware serial number. This number has been assigned at the factory and cannot be changed.

Firmware Version: This is a display-only field that shows the version number of the Model 792's main firmware. This firmware can be updated using a USB flash drive. Details are provided in the Technical Notes section of this user guide.

FPGA Version: This is a display-only field that shows the version number of the Model 792's programmable logic (FPGA) firmware. This firmware can be updated using a USB flash drive. Details are provided in the Technical Notes section of this user guide.

Dante Product Version: This is a display-only field that shows the product version number that's contained in the Dante interface (Brooklyn II module). This number is assigned by Studio Technologies, Inc. as an identifier when releasing Dante firmware. The firmware for the Model 792's Dante interface can be updated by way of an Ethernet connection using the Dante Updater software application that's provided as part of the Dante Controller software application.

Dante Software Version: This is a display-only field that shows the version number of the firmware associated with the Dante interface (Brooklyn II module) that the Model 792 utilizes for Dante interconnectivity. This version number is assigned by Audinate and can't be changed by Studio Technologies, Inc. As noted previously, the firmware for the Model 792's Dante interface can be updated by way of an Ethernet connection using the Dante Updater software application.

Model 793

Firmware Version: This is a display-only field that shows the version number of the Model 793's firmware. This firmware can be updated using a USB flash drive. Details are provided in the Technical Notes section of this user guide.

Menu Text and Links

The following paragraphs provide details on some of the links, buttons, and text that are presented on the Model 792's webpages.

Company Name Link: On the bottom of each webpage is a link with the title Studio Technologies, Inc. Clicking on this link will cause the browser to open a webpage that is the home page of the Studio Technologies, Inc. website.

Device Name: In the upper-left corner of each Model 792 webpage is the Model 792's Dante device name. This name is unique to each device in a Dante deployment and is used as part of Dante subscriptions (channel routing). The name can be changed from within the Dante Controller application.

Identify Device Button: In the upper-left corner of most Model 792 webpages is a button called Identify Device. Clicking on it will cause the Dante identify action to commence on the specific StudioComm system. A unique LED lighting sequence will take place on both the Model 792 and associated Model 793. This command will help ensure that the web server on the desired Model 792 is being accessed.

Configuration Menu Link: In the upper-right corner of the Overview webpage is a link named Configuration Menu. Clicking on this link will result in the Login Menu webpage being provided by the Model 792's web server. Once the correct user name and password have been entered, access to the Configuration Menu will be provided. Once on each specific configuration menu webpage there is a link that returns a user to the Configuration Menu.

Help Link: In the upper-right corner of most menu webpages is a link labeled Help. This will cause the web browser to open a web-

page that comes from the Studio Technologies website. This webpage will provide access to information relevant to the Models 792 and 793, including an electronic copy of this guide.

Log Out Button: In the upper-right corner of the Configuration Menu webpage is a button called Log Out. It will cause the Model 792's web server to end the session and log out the user. To again access the menu webpages will require that a user provide a valid user name and password.

Model 793 Configuration Mode

A special mode provided by the Model 793 Control Console allows the management IP address mode and related parameters to be configured.

A small button, labeled CONFIG, is located on the back of the Model 793 Control Console, adjacent to its 9-pin female D-subminiature connector. When the StudioComm system is powered and functioning, press the button for approximately two seconds to place both the Model 793 and the associated Model 792 Central Controller into their configuration modes. During that 2-second interval the Model 793's display will show a message that reads "Hold to Edit Configuration Settings." When the configuration mode becomes active the Model 793's array of pushbutton switches and LEDs will no longer perform their normal functions. The buttons will be disabled and only the mute mode and solo mode LEDs will be active. These two LEDs will light in an alternating pattern to indicate that the configuration mode is active. When the Model 792 enters its configuration mode it will immediately mute the post-fader monitor output channels, providing a protection measure for connected loudspeakers and related equipment.

Once in the configuration mode, rotating the Model 793's level control knob will allow selection of the various parameters and configuration choices. Pressing the level control knob will serve as an enter function. The Model 793's configuration menu choices include the ability to select the management interface's IP address configuration method, the management interface's manual IP address, and the management interface's manual subnet mask. With a little practice, changing the configuration settings will become intuitive. For revised management network settings to become active requires that the StudioComm system be rebooted (restarted) which can be done from one of the menu choices.

To leave the configuration mode and return the StudioComm system to normal operation requires performing one final action. On the Model 793 Control Console press and hold the configure button for two seconds. After this interval has elapsed the configuration mode will be exited and normal operation will again take place.

Our apologies to those of you who find the configure button a pain to use, but it's supposed to be that way! Seriously, the top of the button is slightly recessed from the Model 793's back panel, making accidental activation unlikely. We didn't want normal operation to cease because someone pushed a Model 793 into a "rats' nest" of schedules, memos from management, and empty coffee cups! But a firm press with the fleshy part of an index finger should do the trick.

There is no problem frequently "tweaking" the StudioComm with Dante Support's management IP address mode and related parameters. The network configuration data is stored in non-volatile memory within the

Model 792 and is rated for many thousands of read and write cycles and a retention time in tens of years.

Operation

Now that the StudioComm system is installed and configured it's ready for use. Operators should find the system easy to use and flexibility enough to meet their needs. However, there are a number of nuances in the unit's operation. This may make it valuable for personnel to spend some time reviewing this section of the user guide.

Upon application of AC mains or DC power, the Model 792 Central Controller and the Model 793 Control Console will go through power-up sequences. The LED associated with the USB receptacle on the Model 792's back panel will flash green once to indicate that it is functioning. The LEDs associated with the Model 792's three Ethernet jacks may, or may not, light as part of their power-up activity. The LEDs on the Model 792's front panel will first light green, then light red in a confirmation sequence. The Model 793 will go through an extensive process of "testing" its graphics display and then will sequentially light all of its LEDs.

While the LEDs are going through their power-up sequence the display will show the Model 792's and Model 793's main firmware version numbers followed by the Dante interface's sample rate.

After the Models 792 and 793 have completed their power-up sequences the system will return to some of its last operating conditions. Restored values include the selected input source(s), the monitor output selection, and the mute/solo status. The reference level, mute all, and dim functions will be in their off states. As a precaution, however, all output channels configured to be post-fader will

always return to a level of -70 dB. This helps to ensure that upon power up any associated monitor loudspeakers won't return to a concerning high level. Once the power-up sequence has completed an operator can then use the level control or reference level button to return the system to the desired post-fader output level. If the Mute All function was enabled it can then be turned off. The same holds true for the Dim function.

Model 792 Central Controller

The Model 792's front panel contains ten bi-color LEDs which reflect the status of major StudioComm functions. The two power LEDs indicate the presence of incoming mains and/or nominal 12 volts DC power. They are labeled AC and DC. When a source of mains power is connected the AC LED will light green. The DC LED will light green whenever a connected DC source exceeds approximately 10 volts DC. The DC LED will light red when the input is between approximately 9 and 10 volts, indicating a low-voltage condition. Once the DC input is less than approximately 9 volts the LED will not light and the Model 792 will no longer operate from the DC source.

Two LEDs are associated with the Model 792's primary and secondary Dante Ethernet connections. They are labeled PRI and SEC.

How they respond will depend on the Model 792's network setting as made in the Dante Controller application.

When the Dante interface has been configured for Switched operation the primary LED will light red when no Ethernet connection is present. It will light green when a GigE Ethernet connection is present. It will light orange when a 100 MB/s Ethernet connection is present. The secondary LED will not light when an Ethernet connection is not present. It will light green when a GigE or 100 MB/s Ethernet connection is present.

When the Model 792's Dante interface has been configured for Redundant operation the primary and secondary LEDs will light red when an Ethernet connection is not present on their respective RJ45 ports. Each will light green when a GigE Ethernet connection has been made and orange when a 100 MB/s Ethernet connection has been made.

Two LEDs are associated with the Model 792's Dante interface. The system LED, labeled SYS, and the synchronization LED, labeled SYNC, will both light red as the Model 792's Dante interface starts to function and awaits connection to the associated LAN or LANs. The sys LED will light red to indicate that the interface is not ready

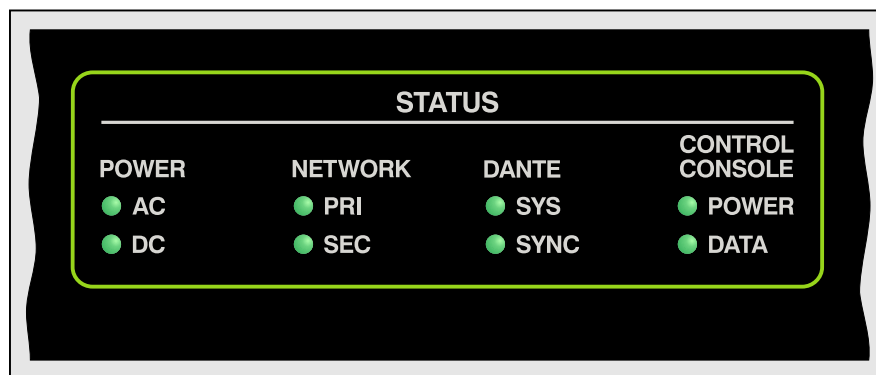


Figure 17. Detail of Model 792 front panel showing status section LEDs

to pass data to other devices. It will blink red if there is an issue communicating with the internal Dante Brooklyn II module. It will light green when it is operating normally and ready to pass data.

The sync LED will light red to indicate that the Model 792's Dante interface has not established timing synchronization. It will light solid green when it has synchronized with a Dante network and an external clock source (timing reference) is being received. The sync LED will slowly flash green if this specific Model 792 is part of a Dante network and is serving as the Leader Clock. (In this case other Dante devices are following this Model 792 which is acting as their timing reference.) It's possible that up to 30 or 40 seconds may be required for the sync LED to reach its final state.

Two LEDs are associated with the connections between the Model 792 and the Model 793 Control Console. They are labeled Power and Data. The Power LED will light green when the Model 792 is supplying nominal 12 volts DC power to the Model 793. This LED will light red to indicate that the 12 volts DC output is in the short-circuit or over-current condition. This would rarely occur, but could display a short-circuit in the interconnecting cable or a major fault in the Model 793. Once the over-current condition is remedied the Power LED will again light green. The Data LED will flash green when messages are correctly passing back and forth between the Model 792 and the Model 793. Note that the Data LED will not light when a Model 793 is either going through its power-up sequence or is actively in its configuration mode.

The two LEDs on the left side of the Model 792's front panel are associated with the Analog Stereo Input. They are labeled Channel 1 and Channel 2 and will light in

response to the level of a stereo (2-channel) signal connected to the unit by way of the 3.5 mm jack on the front panel. A 2-section rotary control (potentiometer) is associated with the stereo input allowing adjustment of the circuitry's sensitivity. The LEDs will light green when the connected signals are within their normal range, yellow when signals are approaching their allowable maximum, and red when the signals are at risk of or are actively being degraded due to excessive level.

Model 793 Control Console

The Model 793 Control Console sends commands to the Model 792 Central Controller and the latter performs all the audio processing and control tasks. The Model 793 is a desktop unit that serves as the interface or control surface that the operator uses to observe and select the monitoring functions that the StudioComm system is performing. To make operating topics easy to describe the Model 793's functions are divided into four main groups: input source selection, monitor output general functions, input mute/solo, and display.

Note that in the lower-left corner of the Model 793's front panel are three buttons which are labeled Aux A, Aux B, and Aux C. As of the writing of this guide these buttons and associated LEDs perform no functions. They are ready to support features which future firmware releases may implement. Pressing the buttons will result in no operational action occurring. The three LEDs will light as part of the Model 793's power-up sequence but otherwise will not light.

Input Source Selection

The Model 793 provides four buttons to select which input or inputs are to be monitored. Configuration Menu selections assign which of the four input sources are

assigned to each button. It's also possible to disable specific input buttons. Two sources are associated with Dante receiver (input) channels, one for surround (up to sixteen channels), and one stereo (two channels). Another two sources are compatible with analog signals. The Analog Surround Input supports up to sixteen channels. The other input, Analog Stereo, is accessible on the front panel by way of a 3.5 mm TRS jack. It's intended for temporary (or "on the fly") connection to the output of a personal audio device. However, it can be connected to the same source all the time if desired.

One, two, three, or all four sources can be selected for monitoring at any one time. To select an input source simply press one of the four input source buttons. The corresponding LED will light to indicate that this input has been selected. To select additional sources press and hold the first source's button, then press and hold the button(s) associated with the desired additional source(s). Applicable LEDs will light and the channels of the selected sources will be combined (mixed or summed) without the addition or subtraction of level. (They will be combined at "unity" gain.)

When an input source is selected its text name will appear on the Model 793's display for approximately three seconds. (This text can be personalized for the specific application using the configuration webpages.) If more than one source is selected then the display will show **Multiple**.

Any time that a single source has been selected its associated input button can be pressed and the display will show the name of the source. If a button has been configured for disabled, pressing that button will cause no operational action to take place. Its associated LED will not light and the display will show **Button Disabled**.

Monitor Output General Functions

Four buttons and one rotary level control are associated with the outputs selected for Post-Fader operation. The buttons are used to select the monitor output destination and enable or disable the Reference Level, Mute All, and Dim functions. The level control is used to manually adjust the post-fader channel output levels. (This level control is the "fader" that relates to the term "post-fader" monitor outputs that are mentioned in this guide.)

Output Select: One button on the Model 793 is used to select which monitor output(s) will receive the post-fader audio signals. Configuration choices allow which of the physical monitor output(s) will be assigned to the button selections. The choices include Dante Surround, Analog Surround, and Dante Stereo.

To change which output is active simply press the button. The LED associated with the active choice will light: green for A and orange for B. Upon an output being selected the text name will show on the display for approximately four seconds. (This text can be revised using the Configuration Menu.) If a physical monitor output has not been assigned to an output selection (Output A or Output B) then that output can't be selected. This would cause the button to have no action and the LED associated with the active output would remain lit.

In the odd event that no physical output has been assigned to either output selection then neither LED will light and the button will cause no action to take place. And there would be no post-fader audio active on any analog or Dante output. This would reflect an incorrect configuration and could only be remedied by a revising the system's configuration.

Reference Level: Enabling the reference level button will cause the monitor output level to go to a preset value. Technical personnel, using a sound-pressure-level (SPL) meter and precision signal source, should have set this level to meet the requirements of the specific monitoring environment. A green LED is associated with the reference level button and will light whenever the function is active. The display will indicate the reference output level.

How the level control acts when the Reference Level function is active depends on a configuration setting. If the Auto Reference Level Off function is disabled turning the level control will have no impact on the output level and the Reference Level function; it will remain inactive. If the Auto Reference Level Off function has been enabled turning the level control will cause the Reference Level function to automatically turn off. In addition, the level control will impact the post-fader output level.

The LED associated with the reference level button can also serve as a calibration aid. If the Reference Level function is not active, whenever the post-fader output level is selected, using the level control, to be the same as that stored for the reference level value the reference level LED will flash green. This exact level can be reached through the use of the level control, either by itself or through the setting of the level control in conjunction with the Dim function. Whatever path the post-fader output takes to reach the reference level value, it will cause the reference level LED to flash green!

Mute All: Pressing the mute all button causes the post-fader output channels associated with the configured Dante and analog outputs to fully mute. The display indicates the mute condition by showing three dashes (— — —). If the display's screen saver mode

is active the word **Muted** will instead show. The mute all button is always set to “latch” the function on and off. A red LED is associated with the mute all button and will light whenever the Mute All function is active.

Dim: The Dim function is provided for user convenience, allowing the level of the post-fader outputs to be reduced by a fixed amount. A configuration selection allows the dim level to be selected from among four choices: 10 dB, 15 dB, 20 dB, or 25 dB. Pressing the dim button will enable the function and cause the associated LED to light orange. The dim button is always set to “latch” the function on and off. The display will indicate the revised post-fader monitor output level. When dim is active the post-fader monitor output level reduction will apply no matter whether the level is being set by the level control or by the reference level button. The LED associated with the dim button will light orange whenever the Dim function is active.

It's worth discussing the Auto Dim Off function. Whenever dim is enabled due to the dim button being pressed, and the level control is active (reference level mode is not active), changing the position of the level control will automatically turn off dim. The Auto Dim Off function is a unique attempt at protecting the aural health of users. No longer will there be a heart-stopping blast of audio when the dim button is pressed, supposedly to enable dim, but actually turning dim off because it was already enabled. It's hard to explain unless you've experienced this in person—trust us, this situation can and does happen!

Level Control: The level control is used to manually adjust the post-fader output level. It provides the ability to adjust the post-fader monitor output level over a 70-dB range. It can also set the monitor output channels to fully mute. Technically, the level control is a

30-step-per-revolution mechanical encoder. The amount of level change in dB per step (per “click”) will depend on how quickly the level control is turned. When rotated slowly, each step represents a 0.5-dB change in level. In this case, to traverse the entire level range would require rotating the level control more than four full turns. But the Model 793’s software detects when the level control is rotated more quickly and increases the amount of level change in dB per step. A little experimentation will allow the user to acquire a good “feel” for how best to use the level control.

The reference level LED will flash green when the level control selects the post-fader output level to be the same as the stored reference level. Whenever the level control is rotated counterclockwise and passes -70.0 dB the post-fader monitor output channels will automatically mute. As previously discussed, the display will indicate the full mute condition by showing three dashes (---).

If the Mute All function is active the level control won’t have an impact on the post-fader output level. It’s also not active whenever the Reference Level function is active, except if the Auto Reference Level Off function has been enabled. In this case, if the Dim function is active, turning the level control will automatically disable the Dim function.

A “hidden” Model 793 feature allows the post-fader monitor output level and IP address of the Model 792’s management port to be displayed as desired. A switch is associated with the level control; press and release it to activate the display mode. Upon activation four lines of information will show on the Model 793’s graphics display:

Line 1: The text **Monitor Level:** will show.
Line 2: The monitor level, in dB, will show.
Line 3: The text **Mgmt IP Address:** will show.
Line 4: The management port’s IP address will show in dot-decimal notation, e.g., 192.168.1.141.

The information, including updated monitor level, will continue to show on the display until the knob is again pressed. If the knob is not pressed within approximately two minutes the normal screen saver mode will become active.

Input Mute/Solo: The Input Mute/Solo functions allow specific input channels to be selected for individual or group mute or “solo” monitoring. The functions take place electrically “after” the Input Source Selection and Input Delay functions but “before” the post-fader functions.

The Input Mute/Solo Mode button and sixteen input mute/solo channel buttons, along with associated LEDs, work together to provide excellent operating flexibility. The Input Mute/Solo Mode button allows the user to select between the Mute and Solo functions. Going from the Mute function to the Solo function, or vice-versa, clears all active mutes or solos. Pressing the mode button twice is a legitimate means of quickly clearing muted or soloed channels. To mute or solo a channel simply requires pressing one of the sixteen input mute/solo buttons. The buttons function in a press-to-enable/press-to-disable “latching” mode. Multiple channels can be muted or soloed at the same time. Red LEDs associated with a muted or soloed channel will light to indicate that the function is active.

Output Level Display: Most of the time the Model 793’s display will show the post-fader output level as the amount of attenuation, in

dB, relative to unity gain. To explain in greater detail, the display will show the output level as an attenuation value in reference to the maximum output. The maximum output is 0 dB, indicating that an input signal would be passing to an output channel at unity level (no gain or loss). The monitor output attenuation is in the form of 0.5-dB steps, with each “click” of the level control causing 0.5 dB of level change. As an example, the display showing -40.5 would indicate that the post-fader analog and, if configured, Dante Surround Output is set to be 40.5 dB below (less than) the maximum level.

As the level control is moved counterclockwise the output level will go down and the indicated value will get more negative. Continuing to turn the level control counterclockwise will cause the monitor output to reach its normal maximum attenuation which is -70.0 dB. The monitor output level can only go to a value less than -70.0 dB if the Dim function is enabled. As an example, begin with the level control having adjusted the monitor output level to be -55.0 dB. Then activate the Dim function which would add an additional amount of attenuation to the -55.0 dB. In our example the dim value is -20 dB so the resulting monitor output level will go to -75.0 dB.

Screen Saver: The Model 793’s screen saver mode will automatically enable whenever approximately two minutes has passed without a pushbutton switch being pressed or the level control being rotated. Whenever the screen saver is active the post-fader output level, in dB, will show on the graphics display, “moving around” the display in what appears to be a random pattern. This is provided to minimize the chance of “screen burn” occurring. Screen saver mode will terminate whenever a pushbutton is pressed or the level control is rotated.

Technical Notes

Sample Rate Change

At any time, the Dante Controller software application can be used to change the sample rate of the Model 792 Central Controller’s Dante interface. The allowable choices are 44.1, 48, and 96 kHz. If this occurs when the system is operating normally a special protection sequence will be invoked. The Model 792’s outputs that are configured for post-fader will go into full mute, the display on the Model 793 Control Console will show the new rate for approximately four seconds, and then the Model 793’s screen saver mode will become active. A user would then need to turn off the full mute function to again monitor the selected input signal.

Dante IP Addresses

If the Model 792’s Dante interface has been configured for Switched operation, by default the primary or secondary Dante Ethernet interface will attempt to automatically obtain an IP address and associated settings using DHCP (Dynamic Host Configuration Protocol). If a DHCP server is not detected an IP address will automatically be assigned using the link-local protocol. This protocol is known in the Microsoft® world as Automatic Private IP Addressing (APIPA). It is also sometimes referred to as auto-IP (PIPPA). Link-local will randomly assign a unique IP address in the IPv4 range of 169.254.0.1 to 169.254.255.254. In this way, multiple Dante-enabled devices will connect together and automatically function, whether or not a DHCP server is active on the LAN. Even two Dante-enabled devices that are directly interconnected using an RJ45 patch cord should correctly acquire IP addresses and be able to communicate with each other. As previously discussed in this guide, using Dante

Controller the Model 792's Dante Ethernet IP address and related network parameters can also be set for manual (fixed or static) operation.

If the Model 792's Dante interface has been configured for Redundant operation then both Ethernet interfaces will attempt to automatically obtain IP addresses and associated network settings using DHCP. If DHCP is not available to an Ethernet port then a link-local IP address will be assigned. If automatic assignment is not desired each interface can be individually configured using Dante Controller to use a manual (fixed or static) IP address and related network parameters.

The specific IP address assigned to each Dante interface can be identified using several methods. The Dante Controller application will directly display the network parameters of the primary and, if utilized, secondary Ethernet interfaces. Another means is to utilize the Model 792's Network Configuration webpage to directly display the IP addresses assigned to the primary and, if utilized, secondary Ethernet ports.

Optimizing Dante Network Performance

For best Dante audio-over-Ethernet performance a network that supports VoIP QoS (voice-over-internet-protocol quality of service) capability is recommended. This can typically be implemented on virtually all contemporary managed Ethernet switches. There are even specialized switches that are optimized for entertainment-associated applications. Refer to the Audinate website (audinate.com) for details on how to optimize a network for Dante applications.

Management IP Address

By default, the Model 792's management Ethernet interface address configuration is set for automatic. In this way, it will attempt to automatically obtain an IP address and associated settings using DHCP. If a DHCP server is not detected an IP address will automatically be assigned using the link-local protocol in the IPv4 range of 169.254.0.1 to 169.254.255.254. Using the network configuration webpage provided as part of the Model 792's management system the management Ethernet IP address and related network parameters can be set for a manual (fixed or static) configuration.

It's easy to determine the active IP address being used by the Model 792's management Ethernet port. Simply press the level control on the Model 793 Control Console. This will cause the display content to change and directly show the management IP address. To return the display to normal operation again press the level control. Or wait approximately two minutes for an inactivity time-out period to occur.

Model 792 Remote Control

The Model 792 Central Controller can be remotely controlled using **HTTP POST** commands sent to **http://<M792's IP Address>/Ctrl.htm**. All of the functions provided in the Model 793 Control Console (including input sources, channel mute/solo, output controls, and output level) are capable of being remotely controlled. The current state of a Model 792 unit can be "polled" by sending an **HTTP GET** command to the same URL. For details please refer to Appendix E located at the end of this user guide.

Model 792 Firmware Update Procedure

It's possible that updated versions of the two firmware (embedded software) files that are utilized by the Model 792's microcontroller and FPGA (field-programmable-gate-array) integrated circuit will be released to add features or correct issues. Refer to the Studio Technologies' website for the latest firmware files. The Model 792 has the ability to load revised files into non-volatile memory by way of a standard USB flash drive.



Figure 18. Detail of Model 792 back panel showing the USB receptacle

The Model 792 implements a USB host function and provides access by way of a type A receptacle located on the back panel. The Model 792 updates its firmware using files named **M792.bin** for the main firmware and **DSMC.bit** for the FPGA firmware.

The update process begins by preparing a USB flash drive. The flash drive doesn't have to be empty (blank) but must be in the personal-computer-standard FAT32 format. Either or both of the firmware files can be automatically loaded at the same time. On the flash drive's root folder, save the desired new firmware file(s), ensuring that the required name or names are specified. For the main firmware the file name must be **M792.bin**. For the FPGA firmware the file name must be **DSMC.bit**. Studio

Technologies will supply each firmware file inside a .zip archive file. While the firmware file inside of the zip file will adhere to the naming convention required by the Model 792, the name of the zip file itself will include the file's version number. For example, a file named **M792v1r05MCU.zip** would indicate that version 1.05 of the main MCU firmware (**M792.bin**) is contained within this zip file.

Once the USB flash drive is inserted into the USB receptacle, located on the back panel, the Model 792 must be powered off and again powered on. At this point the file(s) will automatically load. The precise steps required will be highlighted in the next paragraphs of this guide.

To install either or both of the firmware files follow these steps:

1. Remove power from the Model 792. This will entail either removing the AC mains power connector or removing the external source of 12 volts DC. (Both must be disconnected if dual powering has been implemented.)
2. Locate the USB receptacle on the Model 792's back panel. It is labeled Firmware Update. Directly adjacent to the USB receptacle is a small hole that provides visual access to a green LED indicator.
3. Insert the prepared USB flash drive into the USB receptacle.
4. Apply power to the Model 792. Power can be provided by connecting AC mains or a source of 12 volts DC.
5. After a few seconds the Model 792 will run a "boot loader" program that will automatically load and save the new firmware file(s) that are present on the USB flash drive. The update process can range from approximately 15 seconds to approximately 45 seconds,

depending on which of the two files are going to be updated. While files are being loaded the green LED, located adjacent to the USB receptacle, will flash slowly. Once the entire loading process has completed the Model 792 will restart using the newly saved main and/or FPGA firmware.

6. At this time the Model 792 is functioning with the newly loaded firmware and the USB flash drive can be removed. But to be conservative, remove the power source first and then remove the USB flash drive.
7. It's a good idea to confirm that the desired firmware has been loaded and that the Model 792's main and FPGA firmware versions are operating as expected. To observe the Model 792's main firmware version number, simply view the Model 793 Control Console's display as the system powers up. The version number of the main firmware for both the Model 792 and the Model 793 will display as part of the Model 793's start-up sequence. To observe the version numbers of the Model 792's main, FPGA, and Dante firmware requires accessing the Model 792's System Information webpage.

Note that upon power being applied to the Model 792 if a connected USB flash drive doesn't have a correct file in its root folder no harm will occur. Upon power up the green LED, located adjacent to the USB receptacle, will flash on and off rapidly for a few seconds to indicate that a valid file has not been found. After this warning, normal operation using the unit's existing firmware will begin.

Model 793 Firmware Update Procedure

It's possible that an updated version of the firmware (embedded software) that is utilized by the Model 793's microcontroller integrated circuit will be released. Refer to the Studio Technologies' website for the latest Model 793 firmware. The Model 793 has the ability to load a revised file into non-volatile memory by way of a standard USB flash drive. The Model 793 implements a USB host function and provides access by way of a type A receptacle located on a printed circuit board assembly inside the unit's enclosure. The Model 793 updates its firmware using a file named **M793.bin**.

The update process begins by preparing a USB flash drive. The flash drive doesn't have to be empty (blank) but must be in the personal-computer-standard FAT32 format. In the root directory, save the desired new firmware file, ensuring that it is named **793.bin**. Studio Technologies will supply the firmware file inside a .zip archive file. While the firmware file inside of the zip file will adhere to the naming convention required by the Model 793, the name of the zip file itself will include the file's version number. For example, a file named **M793v1r03MCU.zip** would indicate that version 1.03 of the firmware (**M793.bin**) is contained within this zip file.

The Model 793's enclosure must be carefully disassembled to gain access to the USB type A receptacle. Disassembly will only be performed after the interconnecting cable that links the Model 793 with the associated Model 792 has been disconnected. Once the USB flash drive is inserted into the USB receptacle, located on the Model 793's circuit board, the Model 793 must be powered on again by reconnecting the unit with the Model 792. At this point the **M793.bin** file

will automatically load. The precise steps required will be highlighted in the next paragraphs of this guide.

To install the Model 793's main firmware file, follow these steps:

1. Disconnect AC mains or DC power from the associated Model 792 Central Controller. Then remove the 9-pin cable that interconnects the Model 793 Control Console with the Model 792 Central Controller. This will entail disconnecting the 9-pin D-subminiature plug (DE-9M) that attaches to the 9-pin D-subminiature connector (DE-9F) on the back panel of the Model 793.
2. Separate the Model 793's cover from its chassis by removing four 4-40 thread pitch hex head screws and associated lock washers. Use a 5/64-inch hex wrench to remove the two screws located on the top edge of the back panel and the two screws located on the bottom front of the unit. Be certain to save the screws and lock washers so that re-assembly will be fast and painless. Once the screws are removed set the Model 793 upright on a flat surface and carefully rotate the cover forward 180 degrees. Be careful not to kink or damage the ribbon interconnecting cable.
3. Locate the right-angle USB receptacle on the main printed circuit board assembly. A green LED is located directly adjacent to the USB receptacle and is provided for USB status.
4. Insert the prepared USB flash drive into the USB receptacle. (It must have the new **M793.bin** file in its root folder.)
5. Reconnect the 9-pin cable that links the Model 793 to the Model 792. Then reconnect AC mains or DC power to the Model 792. "Boot up" of both units will begin.
6. After a few seconds the Model 793 will run its "boot loader" program that will automatically load and save the new firmware file that is present on the USB flash drive. The update process should take approximately 15 seconds. While the file is being loaded the green LED, located adjacent to the Model 793's USB receptacle, will flash slowly. Once the loading process has completed the Model 793 will restart using its newly saved main firmware.
7. Note that if the USB flash drive doesn't have the correct file in its root folder no harm will occur. Upon power up the green LED, located adjacent to the USB receptacle, will flash on and off rapidly for a few seconds to indicate that a valid file has not been found and then normal operation using the unit's existing firmware will begin.
8. At this time the Model 793 will be functioning with the newly loaded firmware. Power down the Model 792 by removing the AC mains or DC power source. Remove the 9-pin interconnecting cable that links the Model 793 to the Model 792. Then remove the USB flash drive.
9. Using the four screws and lock washers that were previously saved, reassemble the Model 793's cover to its chassis. Ensure that the ribbon cable is not pinched and that the cover fits snugly to the chassis.
10. Reconnect the 9-pin cable that links the Model 793 to the Model 792. Normal operation can now commence.
11. It's a good idea to confirm that the desired firmware has been loaded and that the Model 793's is operating as expected. To observe the Model 793's firmware version number requires one to simply view

the display. As the Model 793 performs its power-up sequence the version number of the main firmware of both the Model 792 and the Model 793 will momentarily display. The System Information webpage from the Model 792's web server can also be used to display the firmware version numbers for both the Model 793 and the Model 792.

Dante Firmware Update

As previously discussed in this guide, the Model 792 implements Dante connectivity using the Brooklyn II module from Audinate. The firmware (embedded software) residing in the Brooklyn II module can be updated using one of the Model 792's Dante Ethernet ports. The Dante Controller software application can be used to determine the version of the firmware (embedded software) that resides in the Brooklyn II module. The System Information webpage provided by the Model 792's web server can also be used to identify the firmware version. The Dante Controller software application includes an automated method of updating the Brooklyn II module's firmware. It's called Dante Updater and is very easy to use. The Dante Controller application is available, free of charge, on the Audinate website (audinate.com).

The latest Model 792 Dante firmware file, with an extension of .dnt, is available on the Studio Technologies' website as well in Audinate's product library database. The latter allows the Dante Updater software application that is included with Dante Controller to automatically update the Model 792's Dante interface.

Restoring Factory Default Settings

A command in the System Information webpage provided by the Model 792's web server allows most of the configuration settings to be restored to their factory default values. This can be useful but must be used with caution. Any customization made to the Model 792's configuration will be lost. This can be offset in a positive way by returning the Model 792 to a known configuration, a point that might aid in troubleshooting an issue. Refer to Appendix D for a list of the default values.

Specifications

Model 792 Central Controller

Network Audio Technology:

Type: Dante audio-over-Ethernet

AES67-2018 Support: yes

Dante Domain Manager (DDM) Support: yes

Ethernet Interface Configuration: Dante Switched or Dante Redundant

Bit Depth: 16, 24, or 32

Sample Rate: 44.1, 48, or 96 kHz

Pull-Up/Down Support: no

Dante Receiver (Input) Channels: 18, organized as one 16-channel surround input and one 2-channel stereo input

Dante Transmitter (Output) Channels: 18, organized as one 16-channel surround output and one 2-channel stereo output

Dante Audio Flows: 32 receiver, 32 transmitter

Internal Digital Audio Processing: 32-bits, fixed

Dante Input-to-Dante Output Audio Processing Latency: <200 uSec

Nominal Dante Receiver (Input) and Transmitter (Output) Level: –20 dBFS

Network Interfaces: 3

Functions: Dante primary, Dante secondary, and management

Type: 1000BASE-T (Gigabit Ethernet (GigE)) per IEEE 802.3ab

Audio Inputs: 4

Dante Surround: 16 channels

Analog Surround: 16 channels

Dante Stereo: 2 channels

Analog Stereo: 2 channels

Level Trim: –20.0 to +20.0 dB in 0.1-dB steps, configurable per channel

Delay: 0 to 999 milliseconds @ 48 kHz sample rate, configurable per input group (time range scales up or down depending on actual sample rate)

Analog Surround Input:

Number of Channels: 16

Type: electronically balanced, capacitor coupled, intended for connection to balanced (differential) or unbalanced signal sources

Impedance: 20 k ohms

Nominal Level: +4 dBu, reference –20 dBFS, adjustable ± 20 dB in 0.1-dB steps

Maximum Level: +24 dBu, results in digital output level of 0 dBFS

Dynamic Range: 120 dB, A-weighted

Distortion (THD+N): <0.0004% (–108 dB), ref 1 kHz, +23 dBu input/–1 dBFS output

Frequency Response: ± 0.2 dB, 14 Hz to 20 kHz

Analog Stereo Input:

Number of Channels: 2

Type: unbalanced, capacitor coupled

Impedance: 10 k ohms

Nominal Level: –10 dBu, adjustable with rotary level control, each channel adjustable ± 20 dB in 0.1-dB steps

Maximum Level: +10 dBu, with level control at unity, results in digital output level of 0 dBFS

Dynamic Range: 104 dB, A-weighted

Distortion (THD+N): <0.0017% (–95 dB), ref 1 kHz, +9 dBu input/–1 dBFS output

Frequency Response: ± 0.7 dB, 10 Hz to 20 kHz

Audio Outputs: 3

Dante Surround: 16 channels

Analog Surround: 16 channels

Dante Stereo: 2 channels

Signal Sources: none, pre-fader or post-fader, configurable per output

Level Trim: –20.0 to +20.0 dB in 0.1-dB steps, configurable per channel

Analog Surround Output:

Number of Channels: 16

Type: electronically balanced, source impedance 200 ohms

Nominal Level: +4 dBu @ –20 dBFS input source and level control fully clockwise

Maximum Level: +24 dBu into 2000 (2 k) ohms or greater

Frequency Response: 20-20 kHz, ± 0.1 dB @ 48 kHz sample rate; 10-40 kHz, ± 0.4 dB @ 96 kHz sample rate

Dynamic Range: 119 dB, A-weighted

Distortion (THD+N): <0.001%, 20-22 kHz, level control fully clockwise, 22 kHz bandwidth

Latency (Analog Input-to-Digital-to-Analog Output):

48 kHz Sample Rate: 590 us

96 kHz Sample Rate: 310 us

General Purpose Input (GPI):

Function: not implemented as of the writing of this guide

Type: active low, 1 mA maximum, input pulled up to 3.3 volts DC via 3.4 k (3400) ohm resistor

Interface: pin 7 of the Control Console interface connector (DE-9F); use pin 3 as common

General Purpose Output (GPO):

Function: not implemented as of the writing of this guide

Type: active high, 3.3 volts DC in series with a 3.4 K (3400) ohm resistor (1 mA maximum); can also sink up to 100 mA at 3.3 volts DC maximum

Interface: pin 8 of the Control Console interface connector (DE-9F); use pin 3 as common

Control Console Interface:

Application: for use only with Model 793 Control Console

Type: RS-485, 115.2 kbit/s, 8-1-N

Polling Interval: 50 milliseconds

Power Source: 12 Vdc, 500 mA maximum

Connectors:

Analog Surround Input: 2, 25-pin female D-subminiature (DB-25F), AES59-2012 compliant

Analog Surround Output: 2, 25-pin female D-subminiature (DB-25F), AES59-2012 compliant

Analog Stereo Input: 3-conductor (TRS) 3.5 mm jack

Ethernet: 3, RJ45 jack (2 Dante, 1 management)

To/From Control Console: 9-pin female D-subminiature (DE-9F)

USB: type A receptacle (used only for firmware updating)

DC Input: 4-pin male XLR (pin 1 negative, pin 4 positive)

AC Mains: 3-blade, IEC 320 C14-compatible (mates with IEC 320 C13)

Power Sources:

AC Mains: 100 to 240 V, 50/60 Hz, 20 W maximum

DC Input: 10-18 volts DC, 1.6 A maximum at 10 volts; current draw when AC mains present is less than 100 uA

Environmental:

Operating Temperature: 0 to 50 degrees C (32 to 122 degrees F)

Storage Temperature: –25 to 70 degrees C (–13 to 158 degrees F)

Humidity: 25 to 85%, non-condensing

Altitude: not characterized

Dimensions:

19.0 inches wide (48.3 cm)

1.72 inches high (4.4 cm)

8.1 inches deep (20.6 cm)

Mounting: one space (1U) in a standard 19-inch rack

Weight: 3.5 pounds (1.6 kg)

Model 793 Control Console

Application: for use only with Model 792 Central Controller

Control Data: RS-485, 115.2 kbit/s, 8-N-1

Connectors:

To/From Central Controller: 9-pin female D-subminiature (DE-9F)

USB: type A receptacle (located inside Model 793's enclosure and used only for firmware updating)

Input Power: 12 volts DC nominal (9 volts DC minimum), maximum current 75 mA, provided by Model 792 Central Controller

Environmental:

Operating Temperature: 0 to 50 degrees C (32 to 122 degrees F)

Storage Temperature: –20 to 70 degrees C (–4 to 158 degrees F)

Humidity: 25 to 85%, non-condensing

Altitude: not characterized

Dimensions (Overall):

7.20 inches wide (18.3 cm)

2.20 inches high (5.6 cm)

5.40 inches deep (13.7 cm)

Deployment: intended for tabletop applications

Weight: 1.7 pounds (0.8 kg)

Specifications and information contained in this User Guide subject to change without notice.

Appendix A—Connection Pin-Out Charts

Channel	High (+)	Low (-)	Shield
1	24	12	25
2	10	23	11
3	21	9	22
4	7	20	8
5	18	6	19
6	4	17	5
7	15	3	16
8	1	14	2

Notes:

- 1) Connector type is 25-pin female D-subminiature (DB-25F). Installer must provide male (DB-25M). Connector uses 4-40 threaded inserts for locking with mating plug.
- 2) Wiring scheme follows AES59-2012 convention. Standard TASCAM-type wiring harnesses are typically compatible (locking hardware requires 4-40 screw threads).

Connections for Analog Surround Input Channels 1-8

Channel	High (+)	Low (-)	Shield
1	24	12	25
2	10	23	11
3	21	9	22
4	7	20	8
5	18	6	19
6	4	17	5
7	15	3	16
8	1	14	2

Notes:

- 1) Connector type is 25-pin female D-subminiature (DB-25F). Installer must provide male (DB-25M). Connector uses 4-40 threaded inserts for locking with mating plug.
- 2) Wiring scheme follows AES59-2012 convention. Standard TASCAM-type wiring harnesses are typically compatible (locking hardware requires 4-40 screw threads).

Connections for Analog Surround Output Channels 1-8

Channel	High (+)	Low (-)	Shield
9	24	12	25
10	10	23	11
11	21	9	22
12	7	20	8
13	18	6	19
14	4	17	5
15	15	3	16
16	1	14	2

Notes:

- 1) Connector type is 25-pin female D-subminiature (DB-25F). Installer must provide male (DB-25M). Connector uses 4-40 threaded inserts for locking with mating plug.
- 2) Wiring scheme follows AES59-2012 convention. Standard TASCAM-type wiring harnesses are typically compatible (locking hardware requires 4-40 screw threads).

Connections for Analog Surround Input Channels 9-16

Channel	High (+)	Low (-)	Shield
9	24	12	25
10	10	23	11
11	21	9	22
12	7	20	8
13	18	6	19
14	4	17	5
15	15	3	16
16	1	14	2

Notes:

- 1) Connector type is 25-pin female D-subminiature (DB-25F). Installer must provide male (DB-25M). Connector uses 4-40 threaded inserts for locking with mating plug.
- 2) Wiring scheme follows AES59-2012 convention. Standard TASCAM-type wiring harnesses are typically compatible (locking hardware requires 4-40 screw threads).

Connections for Analog Surround Output Channels 9-16

Signal	Pin	Direction
Data + (RS-485)	1	To/From Model 793
Data - (RS-485)	6	To/From Model 793
Data Shield	2	To/From Model 793
DC + (12 V)	4	To Model 793
DC - (12 V Return)	9	To Model 793
DC Power Shield	5	To/From Model 793

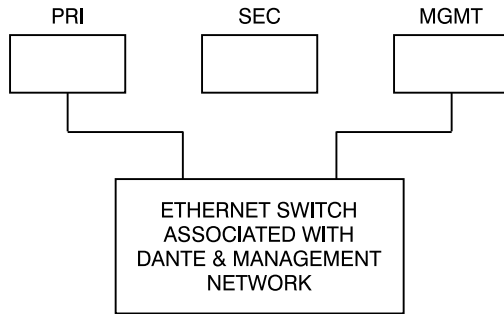
Note: Connector type on Model 793 is 9-pin female D-subminiature (DE-9F). Connector uses 4-40 threaded inserts for locking with mating plug.

Connections between Model 792 and Model 793

Appendix B—Network Configuration Examples

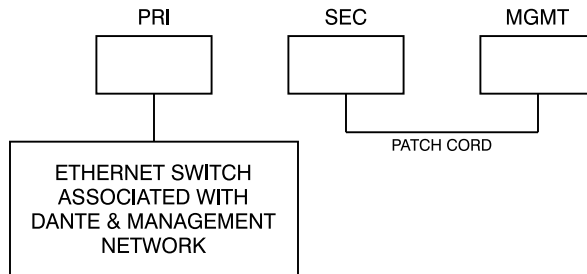
ONE LAN – SWITCHED DANTE

MODEL 792 NETWORK INTERFACE
CONFIGURED FOR SWITCHED OPERATION



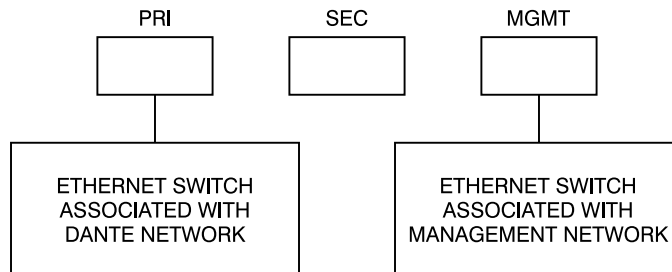
ONE LAN – SWITCHED DANTE

MODEL 792 NETWORK INTERFACE
CONFIGURED FOR SWITCHED OPERATION

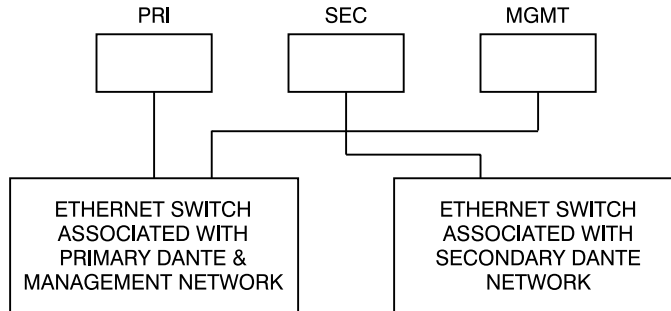


TWO LANs – SWITCHED DANTE

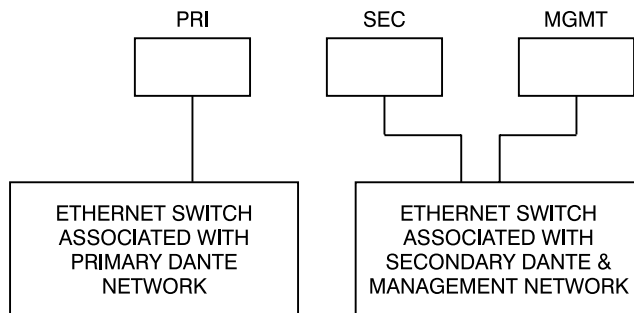
MODEL 792 NETWORK INTERFACE
CONFIGURED FOR SWITCHED OPERATION



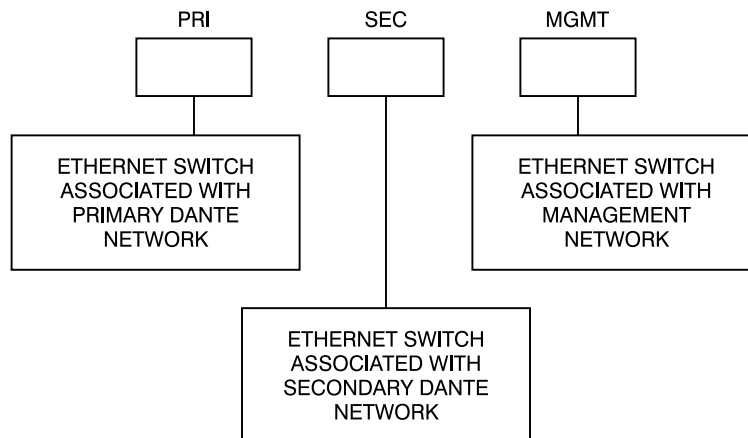
TWO LANs – REDUNDANT DANTE
MODEL 792 NETWORK INTERFACE
CONFIGURED FOR REDUNDANT OPERATION



TWO LANs – REDUNDANT DANTE
MODEL 792 NETWORK INTERFACE
CONFIGURED FOR REDUNDANT OPERATION



THREE LANs – REDUNDANT DANTE
MODEL 792 NETWORK INTERFACE
CONFIGURED FOR REDUNDANT OPERATION



Appendix C—Default Dante Channel Names

Dante Receivers (Inputs)

Number	Name	Description
1	Sur Ch1	Surround Input Channel 1
2	Sur Ch2	Surround Input Channel 2
3	Sur Ch3	Surround Input Channel 3
4	Sur Ch4	Surround Input Channel 4
5	Sur Ch5	Surround Input Channel 5
6	Sur Ch6	Surround Input Channel 6
7	Sur Ch7	Surround Input Channel 7
8	Sur Ch8	Surround Input Channel 8
9	Sur Ch9	Surround Input Channel 9
10	Sur Ch10	Surround Input Channel 10
11	Sur Ch11	Surround Input Channel 11
12	Sur Ch12	Surround Input Channel 12
13	Sur Ch13	Surround Input Channel 13
14	Sur Ch14	Surround Input Channel 14
15	Sur Ch15	Surround Input Channel 15
16	Sur Ch16	Surround Input Channel 16
17	St Ch1	Stereo Input Channel 1
18	St Ch2	Stereo Input Channel 2

Dante Transmitters (Outputs)

Number	Name	Description
1	Sur Ch1	Surround Output Channel 1
2	Sur Ch2	Surround Output Channel 2
3	Sur Ch3	Surround Output Channel 3
4	Sur Ch4	Surround Output Channel 4
5	Sur Ch5	Surround Output Channel 5
6	Sur Ch6	Surround Output Channel 6
7	Sur Ch7	Surround Output Channel 7
8	Sur Ch8	Surround Output Channel 8
9	Sur Ch9	Surround Output Channel 9
10	Sur Ch10	Surround Output Channel 10
11	Sur Ch11	Surround Output Channel 11
12	Sur Ch12	Surround Output Channel 12
13	Sur Ch13	Surround Output Channel 13
14	Sur Ch14	Surround Output Channel 14
15	Sur Ch15	Surround Output Channel 15
16	Sur Ch16	Surround Output Channel 16
17	St Ch1	Stereo Output Channel 1
18	St Ch2	Stereo Output Channel 2

Appendix D—Model 792 and Model 793 Factory Default Values

Dante Surround Input:

Label: Dante Surround
Delay: 0 ms (all 16 channels)
Trim: 0.0 dB (all 16 channels)

Analog Surround Input:

Label: Analog Surround
Delay: 0 ms (all 16 channels)
Trim: 0.0 dB (all 16 channels)

Dante Stereo Input:

Label: Dante Stereo
Delay: 0 ms (both channels)
Trim: 0.0 dB (both channels)

Analog Stereo Input:

Label: Analog Stereo
Delay: 0 ms (both channels)
Trim: 0.0 dB (both channels)

Button Assignment:

Input A: Dante Surround Input
Input B: Analog Surround Input
Input C: Dante Stereo Input
Input D: Analog Stereo Input

Dante Surround Output:

Source: Post-Fader Output B
Trim: 0.0 dB (all 16 channels)

Analog Surround Output:

Source: Post-Fader Output A
Trim: 0.0 dB (all 16 channels)

Dante Stereo Output:

Source: Off
Trim: 0.0 dB (both channels)

Output Controls:

Output A Label: Output A
Output B Label: Output B
Dim Level: 20 dB
Auto Reference Level Off: Disabled
Reference Level: -20 dB

Menu Access:

User Name: guest
Password: guest
(Note: Using the Restore Default Values function in the System Information Menu webpage does not restore these items to their factory default values.)

Network Configuration – Management Addresses:

IP Address Configuration: Automatic
Manual IP Address: 192.168.1.92
Subnet Mask: 255.255.255.0
Gateway IP Address: 192.168.1.1
DNS IP Address: 8.8.8.8

(Note: Using the Restore Default Values function in the System Information Menu webpage does not restore these items to their factory default values.)

Appendix E—Model 792 Control using HTTP

The Model 792 Central Controller allows the user to control the majority of the settings found on the Model 793 Control Console via an API using HTTP requests. This document will outline those settings and the usage of the API.

Access the Model 792's web GUI at http://<M792_IP_ADDR>/ctrl.htm where <M792_IP_ADDR> is the Model 792's management IP address. Press the level control on the Model 793 to display the management IP address.

I. Usage

Settings can be changed by sending a GET or POST HTTP request to:

http://<M792_IP_ADDR>/ctrl.htm

For example, to select the input associated with button A the following HTTP request can be sent (IP Address =192.168.1.120):

<http://192.168.1.120/ctrl.html?ina=on>

Multiple settings can be changed in the same request. This is done by using the '&' character to concatenate the selections in the URL. The following request will select the input associated with button B, set Mute/Solo to Mute, and mute channel 8:

<http://192.168.1.120/ctrl.html?inb=on&ms=mute&msc=0080>

II. Settings

1. Input Button Selection (can select multiple)

Input Button	Value	HTML Name	Usage
A	On/Off	ina	ina=[on/off]
B	On/Off	inb	inb=[on/off]
C	On/Off	inc	inc=[on/off]
D	On/Off	ind	ind=[on/off]

2. Output Channel Selection (can only select one)

Output	Value	HTML Name	Usage
A	On/Off	op	op=a
B	On/Off	op	op=b

3. Channel Mute/Solo Selection (can only select one)

Selection	Value	HTML Name	Usage
Mute	mute	ms	ms=mute
Solo	solo	ms	ms=solo

4. Mute/Solo Channel Setting (can OR multiple)

Mute/Solo Channel	Value	HTML Name	Usage
1	1 (0x0001)	msc	msc=0001
2	2 (0x0002)	msc	msc=0002
3	4 (0x0004)	msc	msc=0004
4	8 (0x0008)	msc	msc=0008
5	16 (0x0010)	msc	msc=0010
6	32 (0x0020)	msc	msc=0020
7	64 (0x0040)	msc	msc=0040
8	128 (0x0080)	msc	msc=0080
9	256 (0x0100)	msc	msc=0100
10	512 (0x0200)	msc	msc=0200
11	1024 (0x0400)	msc	msc=0400
12	2048 (0x0800)	msc	msc=0800
13	4096 (0x1000)	msc	msc=1000
14	8192 (0x2000)	msc	msc=2000
15	16384 (0x4000)	msc	msc=4000
16	32786 (0x8000)	msc	msc=8000

5. Reference Level Selection

Selection	Value	HTML Name	Usage
Reference Level	On/Off	ref	ref=[on/off]

6. Mute All Selection

Selection	Value	HTML Name	Usage
Mute All	On/Off	mut	mut=[on/off]

7. Dim Selection

Selection	Value	HTML Name	Usage
Dim	On/Off	dim	dim=[on/off]

8. Level Control Setting

Setting	Value	HTML Name	Usage
Level	[-70.0, 0.0]	lvl	lvl=[-70.0, 0.0]

