



Axon D2i

network audio interface

3rd Party Control API

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1 Overview

The D2i is a Dante enabled product that supports the following interfaces/protocols:

- UDP ASCII protocol
- Multicast transmissions for:
 - Control status messages
 - Metering data
 - Outgoing Axiom messages

2 ASCII Protocol

The D2i supports an ASCII command set that is accessible through direct UDP messaging.

2.1 UDP Configuration

Commands are sent by placing them in a UDP packet which is sent directly to the IP address of the device being controlled. All direct UDP messages should be sent to port 49494 of the recipient device. Responses to commands will be directed back to the specific IP address and port that the request originated from.

2.2 Common ASCII Message Format

The control messages used by the direct UDP command interface have a very simple format. No matter what the device, the format of the message is always the same. The overall format of the message contains only printable ASCII characters so that they can be debugged easily. Each message contains a number of data fields, each separated by a space. The message is then terminated with a carriage return. The general format of a message is shown below:

```
<Command> <Parameter1> <Parameter2><CR>
```

Field Name	Description
<Command>	Command to the device.
<Parameter1>	First optional parameter. See device command tables below for specific details
<Parameter2>	Second optional parameter. See device command tables below for specific details
<CR>	Carriage return character (ASCII character 13)

Table 1 – Common ASCII Command Format

A typical message would look something like the following:

```
PP 2 1<CR>
```

2.3 Command Responses

Each command sent to a device should return a response. Like the original command, the response only contains printable ASCII characters, each field is separated by a space and the message is terminated carriage return. The general format of a response message is shown below.

```
<ACK> <Command> <Parameter1> <Parameter2><CR>
```

Field Name	Description
<ACK>	Success or failure indication: "ACK" if successful; "NACK" if unsuccessful

<Command>	The original command that was given to the device
<Parameter1>	First optional parameter from the original command message
<Parameter2>	Second optional parameter from the original command message
<CR>	Carriage return character (ASCII character 13)

Table 2 – Common ASCII Response Format

If the command is successful, the device will return an ACK response. The ACK message for our example message above would be

```
ACK PP 2 1<CR>
```

If the command is processed but for some reason unsuccessful, the device will return a NACK response instead of an ACK. Just like the ACK, the original command will also be included in the NACK message.

```
NACK PP 2 1<CR>
```

There are cases where the device will not respond to a command at all. This is caused when the device is unable to process the message it was sent for some reason. The most typical situation where this could happen is that the terminating <CR> character missing. Alternatively it could also be that the device is currently supporting the wrong command interface.



2.4 Supported ASCII Command Set

Description	Command	Param 1	Param 2
System			
Get Firmware Version	VERSION	-	-
Get Bootloader Version	BVERSION	-	-
Identify Device	ID	Mode (0 = off, 1 = on)	-
Query current settings	QUERY	-	-
Reset to factory defaults	DEFAULTS	-	-
Get device model name	MODEL	-	-
Perform Firmware Update	FWUPDATE	-	-
Get Product Type	GETPRODTYPE	-	-
Get Product ID	GETPRODID	-	-
Get Vendor ID	GETVENDORID	-	-
Get Device Name	GETDEVICENAME	-	-
Get Device Lock	GETDEVICELOCK	-	-
Get Capabilities	GETCAPABILITIES	-	-
Get MAC Address	GETMAC	-	-
Get RX Status	GETRXSTATUS	-	-
Get Channel Label	GETCHNLLABEL	RX or TX	Channel # (RX[1], TX[1..4])
Set LED Mode	LED	Mode (0 = off, 1 = on)	-
Get LED Mode	LED	-	-
Set Control Message Mode	CMM	Mode (0 = off, 1 = on)	-
Get Control Message Mode	CMM	-	-
Set Control Address	CA	IP Address	Port
Get Control Address	CA	-	-
Set Metering Address	MA	IP Address	Port
Get Metering Address	MA	-	-
Set Low Power Mode Timeout	LPT	Timeout in Minutes (0 = Automatic low power feature disabled, [10..60])	-
Get Low Power Mode Timeout	LPT	-	-
Get Error Status	ERRORS	-	-
Audio			
Set Phantom Power	PP	Channel # ([0..2])	State (0 = off, 1 = on)
Get Phantom Power	PP	Channel # ([0..2])	-



Set Input Gain	IG	Channel # ([0..2])	Gain dB ([-8..34])
Get Input Gain	IG	Channel # ([0..2])	-
Set Input Mute	IM	Channel # ([0..3])	State (0 = unmute, 1 = mute)
Get Input Mute	IM	Channel # ([0..3])	-
Set Output Mute	OM	State (0 = unmute, 1 = mute)	-
Get Output Mute	OM	-	-
Set Automatic Mute Timeout	AMT	Timeout Seconds (0 = Automatic mute feature disabled, [60..600])	-
Get Automatic Mute Timeout	AMT	-	-
Set Matrix Mixer	MM	Details in Section 2.4.27	
Get Matrix Mixer	MM	Details in Section 2.4.27	
Set Matrix Mixer Crosspoint	MMC	Details in Section 2.4.28	
Get Matrix Mixer Crosspoint	MMC	Details in Section 2.4.28	
Set Metering Counter	MC	Count ([1..])	-
Get Input Signal Detection State	SD	-	-
Get Sample Rate	SR	-	-
Axiom			
Send Axiom Passthrough Control	AXIOM	Details in Section 2.4.32	
Set Axiom Messages Mode	AMM	Mode (0 = off, 1 = on)	-
Get Axiom Messages Mode	AMM	-	-
Set Axiom Address	AA	IP Address	Port
Get Axiom Address	AA	-	-
Get Axiom Port Detection State	APD	-	-
Set Axiom Port Baud Rate	APBR	Baud Rate	-
Get Axiom Port Baud Rate	APBR	-	-
Set Axiom Port Mode	APM	Mode	-
Get Axiom Port Mode	APM	-	-

Table 3 – D2i Command Set

2.4.1 Version

The VERSION command will return the application firmware version of the device.

Description of Command	Example Command	Example Response	Description of Response
Recall firmware version	VERSION<CR>	ACK VERSION 1.0<CR>	Firmware version is 1.0

Table 4 – Version Recall Syntax Example

2.4.2 Bootloader Version

The BVERSION command will return the bootloader firmware version of the device.

Description of Command	Example Command	Example Response	Description of Response
Recall bootloader firmware version	BVERSION<CR>	ACK BVERSION 1.0<CR>	Bootloader firmware version is 1.0

Table 5 – Bootloader Version Recall Syntax Example

2.4.3 Identify

The ID command is used to find a device by flashing the device’s status LEDs. When the identify function is activated, the status LEDs will blink white at a rate of 0.5 Hz. The ID command turns on the identify function, which will remain active until the appropriate ID command is sent to turn it off, or the device is reset or power cycled.

Description of Command	Example Command	Example Response	Description of Response
Activate identify mode	ID 1<CR>	ACK ID 1<CR>	Identify mode activated
Deactivate identify mode	ID 0<CR>	ACK ID 0<CR>	Identify mode deactivated

Table 6 – Identify Syntax Example

2.4.4 Query

The QUERY command allows the control system to get a snapshot of the current state of the device. When a QUERY command is sent, the response includes all of the devices parameters. The command takes no parameters. The values in the response are space-delimited.

There are four possible states for the Dante Device Lock state (i.e., “DLS”):

- LOCKED
- UNLOCKED
- NOT_SUPPORTED
- UNKNOWN

Description of Command	Example Command	Example Response	Description of Response
Query for device state	QUERY<CR>	ACK QUERY ID=0 PP1=0	Identify Mode = Off, Mic/line Input Ch1 Phantom Power = Off,

		PP2=1 IG1=0 IG2=12 IM1=0 IM2=0 IM3=0 OM1=0 AMT=0 LPT=30 SD=1 CMM=1 CA=239.70.0.0 CP=49500 MA=239.70.0.0 MP=49501 AMM=1 AA=239.70.0.0 AP=49502 APBR=9600 APM=AXIOM LED=1 DLS=UNLOCKE D SR=48000 <CR>	Mic/line Input Ch2 Phantom Power = On, Mic/line Input Ch1 Input Gain = 0 dB, Mic/line Input Ch2 Gain = 12 dB, Mic/line Input Ch1 Mute = Off, Mic/line Input Ch2 Mute = Off, Axiom In Mute = Off, Axiom Out Mute = Off, Automatic Mute Inactivity Timeout = Disabled, Low Power Inactivity Timeout = 30 minutes, Signal Detected on an Analog Input, Control Message Mode = Enabled, Control Address = 239.70.0.0, Control Port = 49500, Metering Address = 239.70.0.0, Metering Port = 49501, Axiom Multicast Mode Axiom Multicast Address = 239.70.0.0, Axiom Multicast Port = 49502, Axiom Port Baud Rate = 9600, Axiom Port Mode = Axiom, Front panel LEDs are enabled, Dante Device Lock State = Unlocked, Sample Rate = 48 kHz
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Table 7– Query Syntax Example

2.4.5 Defaults

The DEFAULTS command forces the system to return to factory settings. Upon receipt of this command, the factory default settings shall be applied to the device and stored in nonvolatile memory.

Description of Command	Example Command	Example Response	Description of Response
Restore factory defaults	DEFAULTS<CR> >	ACK DEFAULTS<CR>	Ch1 Phantom Power = Off, Ch2 Phantom Power = Off, Ch1 Input Gain = 0 dB, Ch2 Input Gain = 0 dB, Ch1 Input Mute = Off, Ch2 Input Mute = Off, Ch3 Input Mute = Off, Ch1 Output Mute = Off, Identify Mode = Off, Automatic Mute Feature = Disabled, Automatic Low Power Feature = Disabled, Dante TX 1 Mix = Mic/Line 1 at 0 dB gain, Mic/Line 2 at -100 dB gain, Axiom In at -100 dB gain,

			Dante TX 2 Mix = Mic/Line 1 at -100 dB gain, Mic/Line 2 at 0 dB gain, Axiom In at -100 dB gain, Control Message Mode = Disabled, Control Address = 239.70.0.0, Control Port = 49500, Metering Count = 0 (Disabled), Metering Address = 239.70.0.0, Metering Port = 49501, Axiom Message Mode = Disabled, Axiom Address = 239.70.0.0, Axiom Port = 49502, Axiom Port Baud Rate = 9600, Axiom Port Mode = Axiom Front panel LEDs are enabled
--	--	--	--

Table 8 – Default Settings Syntax Example

2.4.6 Get Model

This command requests the Model of the devices MCU firmware. Attero Tech manufactures a variety of Dante enabled devices, this command returns the Model Type of the device. The command has no parameters.

**Note: The value returned is *NOT* retrieved from the Ultimo or anywhere else but hard-coded into firmware itself. This can be used to ensure that the device has the correct MCU firmware loaded in it for what the device is supposed to be.*

Description of Command	Example Command	Example Response	Description of Response
Get Model	MODEL<CR>	ACK MODEL D2i<CR>	Device model is D2i

Table 9 – Get MODEL Syntax Example

2.4.7 Firmware Update

The FWUPDATE command initiates the D2i MCU firmware update process. Upon receipt of this command, the D2i shall reboot and enter the firmware update state.

Description of Command	Example Command	Example Response	Description of Response
Initiate firmware update	FWUPDATE<CR>	-	This command does not have a response.

Table 10 – Bootloader Version Recall Syntax Example

2.4.8 Get Product Type

This command requests the Product Type. The Product Type is the Model_Name data in the Ultimo configuration data. While the Model_Name can be up to 128 characters, the Dante Controller GUI guidelines are followed and the name will be truncated to 32 characters if it is greater than 32 characters.

Description of Command	Example	Example

	Command	Response
Get the Product Type	GETPRODTYPE<CR>	ACK GETPRODTYPE D2i<CR>

Table 11 – Get Product Type Syntax Example

2.4.9 Get Product ID

This command requests the Product ID. The Product ID is the Model_ID data in the Ultimo configuration data. The Model_ID is 64bits and is returned as 16 ASCII characters representing 16 hexadecimal digits. To signify that the data is in hexadecimal the data is preceded with a 0x.

Description of Command	Example Command	Example Response
Get the Product ID	GETPRODID<CR>	ACK GETPRODID 0x0000000000000021<CR>

Table 12 – Get Product ID Syntax Example

2.4.10 Get Vendor ID

This command requests the Vendor ID. The Vendor ID is the Manufacturers_ID data in the Ultimo configuration data. The Vendor_ID is 64bits and is returned as 16 ASCII characters representing 16 hexadecimal digits. To signify that the data is in hexadecimal the data is preceded with a 0x.

Description of Command	Example Command	Example Response
Get the Vendor ID	GETVENDORID<CR>	ACK GETVENDORID 0x41747465726f54<CR>

Table 13 – Get Vendor ID Syntax Example

2.4.11 Get Device Name

This command requests the Device Name. The Device Name is the Friendly Name data in the Ultimo configuration data. The Device Name data is up to 31 characters long consisting of number and letters with no spaces. The name may also contain a dash (“-”) character, but it will not begin or end with a dash (“-”) character.

Description of Command	Example Command	Example Response
Get the Device Name	GETDEVICENAME<CR>	ACK GETDEVICENAME D2i-0a6123<CR>

Table 14 – Get Device Name Syntax Example

2.4.12 Get Device Lock

This command requests the status of the Dante Device Lock. The Device Lock status indicates whether the Ultimo device configuration can be modified (i.e. is unlocked) or cannot be modified (i.e. is locked).

The return values are:

- LOCKED = Locked status
- UNLOCKED = Unlocked status
- NOT SUPPORTED = The Ultimo does not support locking
- UNKNOWN = The Ultimo cannot determine the lock status

Description of Command	Example Command	Example Response
Get the Device Lock	GETDEVICELOCK<CR>	ACK GETDEVICELOCK LOCKED<CR>

Table 15 – Get Device Lock Syntax Example

2.4.13 Get Capabilities

This command requests the Capabilities data in the Ultimo configuration data. The Capabilities data is 32bits and is returned as 8 ASCII characters representing 8 hexadecimal digits. To signify that the data is in hexadecimal the data is preceded with a 0x.

Description of Command	Example Command	Example Response
Get Capabilities	GETCAPABILITIES<CR>	ACK GETCAPABILITIES 0x80000001<CR>

Table 16 – Get Capabilities Syntax Example

2.4.14 Get MAC Address

This command requests the MAC Address used by the Ultimo configuration. The MAC Address data is 48 bits and is returned as 12 ASCII characters representing 12 hexadecimal digits.

Description of Command	Example Command	Example Response
Get MAC Address	GETMAC<CR>	ACK GETMAC 001dc1000495<CR>

Table 17 – Get MAC Address Syntax Example

2.4.15 Get RX Status

This command requests the RX Status for the Dante RX 1 channel.

The three values for the RX channel are the following:

- Status (“ST”): The subscription status of the RX channel.
- Available (“AV”): A non-zero value indicates that the RX channel is available to receive audio.
- Active (“AC”): A non-zero value indicates that the RX channel is active.

When the Dante sample rate is configured for double speed (88.2 kHz or 96 kHz), the Dante channel RX 1 is disabled. In this case, the returned values will be zeros.

Description of Command	Example Command	Example Response
Get RX Status	GETRXSTATUS<CR>	ACK GETRXSTATUS ST1=0 AV1=0 AC1=0<CR>

Table 18 – Get RX Status Syntax Example

The table below lists the possible values for the Status (“ST”) response.

Value	Status	Description
0	DDP_RX_CHAN_STATUS_NONE	Channel is not subscribed or



		otherwise doing anything interesting
1	DDP_RX_CHAN_STATUS_UNRESOLVED	Name not yet found
2	DDP_RX_CHAN_STATUS_RESOLVED	Name has been found, but not yet processed. This is an transient state
3	DDP_RX_CHAN_STATUS_RESOLVE_FAIL	Error: an error occurred while trying to resolve name
4	DDP_RX_CHAN_STATUS_SUBSCRIBE_SELF	Channel is successfully subscribed to own TX channels (local loopback mode)
7	DDP_RX_CHAN_STATUS_IDLE	A flow has been configured but does not have sufficient information to establish an audio connection. For example, configuring a template with no associations.
8	DDP_RX_CHAN_STATUS_IN_PROGRESS	Name has been found and processed; setting up flow. This is an transient state
9	DDP_RX_CHAN_STATUS_DYNAMIC	Active subscription to an automatically configured source flow
10	DDP_RX_CHAN_STATUS_STATIC	Active subscription to a manually configured source flow
14	DDP_RX_CHAN_STATUS_MANUAL	Manual flow configuration bypassing the standard subscription process
15	DDP_RX_CHAN_STATUS_NO_CONNECTION	Error: The name was found but the connection process failed (the receiver could not communicate with the transmitter)
16	DDP_RX_CHAN_STATUS_CHANNEL_FORMAT	Error: Channel formats do not match
17	DDP_RX_CHAN_STATUS_BUNDLE_FORMAT	Error: Flow formats do not match, e.g. Multicast flow with more slots than receiving device can handle

18	DDP_RX_CHAN_STATUS_NO_RX	Error: Receiver is out of resources (e.g. flows)
19	DDP_RX_CHAN_STATUS_RX_FAIL	Error: Receiver couldn't set up the flow
20	DDP_RX_CHAN_STATUS_NO_TX	Error: Transmitter is out of resources (e.g. flows)
21	DDP_RX_CHAN_STATUS_TX_FAIL	Error: Transmitter couldn't set up the flow
22	DDP_RX_CHAN_STATUS_QOS_FAIL_RX	Error: Receiver got a QoS failure (too much data) when setting up the flow
23	DDP_RX_CHAN_STATUS_QOS_FAIL_TX	Error: Transmitter got a QoS failure (too much data) when setting up the flow
24	DDP_RX_CHAN_STATUS_TX_REJECTED_ADDR	Error: TX rejected the address given by rx (usually indicates an arp failure)
25	DDP_RX_CHAN_STATUS_INVALID_MSG	Error: Transmitter rejected the flow request as invalid
26	DDP_RX_CHAN_STATUS_CHANNEL_LATENCY	Error: TX channel latency higher than maximum supported RX latency
27	DDP_RX_CHAN_STATUS_CLOCK_DOMAIN	Error: TX and RX and in different clock subdomains
28	DDP_RX_CHAN_STATUS_UNSUPPORTED	Error: Attempt to use an unsupported feature
29	DDP_RX_CHAN_STATUS_RX_LINK_DOWN	Error: All rx links are down
30	DDP_RX_CHAN_STATUS_TX_LINK_DOWN	Error: All tx links are down
31	DDP_RX_CHAN_STATUS_DYNAMIC_PROTOCOL	Error: can't find suitable protocol for dynamic connection
32	DDP_RX_CHAN_STATUS_INVALID_CHANNEL	Channel does not exist (eg no such local channel)
33	DDP_RX_CHAN_STATUS_TX_SCHEDULER_FAILURE	Tx Scheduler failure
64	DDP_RX_CHAN_STATUS_TEMPLATE_MISMATCH_DEVICE	Template-based subscription failed: template and subscription device names don't match

65	DDP_RX_CHAN_STATUS_TEMPLATE_MISMATCH_FORMAT	Template-based subscription failed: flow and channel formats don't match
66	DDP_RX_CHAN_STATUS_TEMPLATE_MISSING_CHANNEL	Template-based subscription failed: the channel is not part of the given multicast flow
67	DDP_RX_CHAN_STATUS_TEMPLATE_MISMATCH_CONFIG	Template-based subscription failed: something else about the template configuration made it impossible to complete the subscription using the given flow
68	DDP_RX_CHAN_STATUS_TEMPLATE_FULL	Template-based subscription failed: the unicast template is full
96	DDP_RX_CHAN_STATUS_TX_ACCESS_CONTROL_DENIED	TX access control denied the request
97	DDP_RX_CHAN_STATUS_TX_ACCESS_CONTROL_PENDING	TX access control request is in progress
255	DDP_RX_CHAN_STATUS_SYSTEM_FAIL	Unexpected system failure.

Table 19 – RX Channel Status Value Descriptions

2.4.16 Get Channel Label

This command requests the Channel Label for a Dante RX or TX channel.

The command has two parameters, the first parameter is either RX or TX. The second parameter is the channel parameter, either 1 = channel 1, 2 = channel 2, 3 = channel 3, 4 = channel 4. The label data is up to 31 characters long. The channel label can be any characters except =, . or @

When the Dante sample rate is configured for double speed (88.2 kHz or 96 kHz), the Dante channels RX 1, TX 3, and TX 4 are disabled. In this case, the returned labels for RX 1, TX 3, and TX 4 will be empty strings.

Description of Command	Example Command	Example Response
Get channel label for RX 1	GETCHNLLABEL RX 1<CR>	ACK GETCHNLLABEL RX 1 RXCHNL1<CR>
Get channel label for TX 1	GETCHNLLABEL TX 1<CR>	ACK GETCHNLLABEL TX 1 TXCHNL1<CR>
Get channel label for RX 1 when RX 1 is disabled	GETCHNLLABEL RX 1<CR>	ACK GETCHNLLABEL RX 1 <CR>

Table 20 – Get Channel Label Syntax Example

2.4.17 Get/Set LED Mode

The LED command gets or sets the LED mode (0 = disabled, 1 = enabled). The optional first parameter specifies the LED mode to set. When the LEDs are disabled, the LEDs will not display status mode or metering level indications. By default, the LEDs are enabled.

Description of Command	Example Command	Example Response	Description of Response
Enable the LEDs	LED 1<CR>	ACK LED 1<CR>	The LEDs are enabled
Get the LEDs mode	LED<CR>	ACK LED 0<CR>	The LEDs are disabled

Table 21 – Get/Set LEDs State Syntax Example

2.4.18 Get/Set Control Message Mode

The CMM command gets or sets the flag indicating whether the D2i multicast control messages are enabled (0 = disabled, 1 = enabled). The optional first parameter specifies the mode to set. By default, the multicast control messages are disabled.

See section 3.1 for details on control messages.

Description of Command	Example Command	Example Response	Description of Response
Enable multicast control messages	CMM 1<CR>	ACK CMM 1<CR>	Multicast control messages are enabled
Get the multicast control message mode	CMM<CR>	ACK CMM 0<CR>	Multicast control messages are disabled

Table 22 – Get/Set Control Message Mode Syntax Example

2.4.19 Get/Set Control Address

The CA command gets or sets the multicast address and port to which the D2i will transmit control messages. The optional first and second parameters specify the IP address and port to set. The IP address must be a standard IPv4 address, including 4 decimal octets delimited by periods. The port number must be a valid decimal value (0 to 65535).

See section 3.1 for details on control messages.

Description of Command	Example Command	Example Response	Description of Response
Set control address to 224.192.0.100, port 5005	CA 224.192.0.100 5005<CR>	ACK CA 224.192.0.100 5005<CR>	Control address is 224.192.0.100, port 5005
Get control multicast address	CA<CR>	ACK CA 224.192.0.100 5005<CR>	Control address is 224.192.0.100, port 5005

Table 23 – Get/Set Control Address Syntax Example

2.4.20 Get/Set Metering Multicast Address

The MA command gets or sets the multicast address and port to which the D2i will transmit metering messages. The optional first and second parameters specify the IP address and port to set. The IP address must be a standard IPv4 address, including 4 decimal octets delimited by periods. The port number must be a valid decimal value (0 to 65535).

See section 3.2 for details on metering messages.

Description of Command	Example Command	Example Response	Description of Response
Set metering multicast address to 224.192.0.100, port 5005	MA 224.192.0.100 5005<CR>	ACK MA 224.192.0.100 5005<CR>	Metering multicast address is 224.192.0.100, port 5005
Get metering multicast address	MA<CR>	ACK MA 224.192.0.100 5005<CR>	Metering multicast address is 224.192.0.100, port 5005

Table 24 – Get/Set Metering Multicast Address Syntax Example

2.4.21 Get/Set Low Power Mode Timeout

The LPT command gets or sets the automatic low power mode inactivity timeout, which shall be triggered by the input signal sense detection.

When the automatic low power mode feature is enabled:

- The D2i shall enter low power mode after no signal is detected on any input for the given timeout duration.
- The D2i shall exit low power mode after a signal is detected on any input.

When the automatic low power mode feature is disabled, the D2i shall not enter low power mode.

The optional first parameter specifies the timeout to set:

- 0 = Disable the automatic low power mode feature.
- [10..60] = Enable the low power mode feature. The inactivity timeout shall be set to the parameter value in minutes.

Description of Command	Example Command	Example Response	Description of Response
Enable the low power mode feature and set the timeout to 10 minutes	LPT 10<CR>	ACK LPT 10<CR>	The low power mode feature is enabled, and the inactivity timeout is 10 minutes.
Disable the low power mode feature	LPT 0<CR>	ACK LPT 0<CR>	The low power mode feature is disabled.
Get the low power mode setting	LPT<CR>	ACK LPT 10<CR>	The low power mode feature is enabled, and the timeout is 10 minutes.

Get the low power mode setting	LPT<CR>	ACK LPT 0<CR>	The low power mode feature is disabled.
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Table 25 – Get/Set Low Power Mode Timeout Syntax Example

2.4.21 Get Error Status

This command requests the current device error status. In the returned value, each error status flag is represented by a bit. A bit value of 1 indicates that the error has occurred.

Error Bit	Description
Bits 7..31	Reserved
Bit 6	External Flash memory failure.
Bit 5	Failure reading/writing the PCM1863 ADC DSP coefficients.
Bit 4	PCM1863 ADC reports clock errors.
Bit 3	THAT6261 preamp POST test failure.
Bit 2	CS4272 codec POST test failure.
Bit 1	PCM1863 ADC POST test failure.
Bit 0	MCU peripheral failure.

Description of Command	Example Command	Example Response
Get error status (no errors)	ERRORS<CR>	ACK ERRORS 0x00000000<CR>
Get error status (external Flash error)	ERRORS<CR>	ACK ERRORS 0x00000040<CR>

Table 25 – Get Error Status Syntax Example

2.4.22 Get/Set Phantom Power

The PP command gets or sets the phantom power state on a specific mic input channel.

The first parameter indicates the input channel(s):

- 0 = Input channels 1 and 2
- 1 = Input channel 1
- 2 = Input channel 2

The optional second parameter indicates the phantom power setting to apply:

- 0 = Turn phantom power off
- 1 = Turn phantom power on

Note:

Upon receiving this command, the D2i will temporarily mute the Mic/Line inputs for 3 seconds, to prevent transient audio artifacts.

Description of Command	Example Command	Example Response	Description of Response
Set input channel 2 phantom power state to on.	PP 2 1<CR>	ACK PP 2 1<CR>	Input channel 2 phantom power is on.
Set both input channels phantom power state to on.	PP 0 1<CR>	ACK PP 0 1<CR>	Both input channels phantom power are on.
Get input channel 1 phantom power state	PP 2<CR>	ACK PP 2 0<CR>	Input channel 1 phantom power is off.
Get both input channels phantom power state	PP 0<CR>	ACK PP 0 1 1<CR>	Both input channels phantom power are on.

Table 26 – Get/Set Phantom Power Syntax Example

2.4.23 Get/Set Input Gain

The IG command gets or sets the pre-amplifier gain level on a specific mic/line input channel.

The first parameter indicates the input channel(s):

- 0 = Mic/line input channels 1 and 2
- 1 = Mic/line input channel 1
- 2 = Mic/line input channel 2

The optional second parameter indicates the gain in dB to apply. The accepted range is -8 through 34, with a step size of 1 dB.

Description of Command	Example Command	Example Response	Description of Response
Set mic/line input channel 1 gain to 0 dB.	IG 1 0<CR>	ACK IG 1 0<CR>	Applied 0 dB gain to mic/line input channel 1.
Set both mic/line input channels gain to +4 dB.	IG 0 4<CR>	ACK IG 0 4<CR>	Applied +4 dB gain to both mic/line input channels.
Get mic/line input channel 1 gain.	IG 1<CR>	ACK IG 1 4<CR>	Mic/line input channel 1 gain is +4 dB.
Get both mic/line input channels gain.	IG 0<CR>	ACK IG 0 4 12<CR>	Mic/line input channel 1 gain is +4 dB. Mic/line input channel 2 gain is +12 dB.

Table 27 – Get/Set Input Gain Syntax Example

2.4.24 Get/Set Input Mute State

The IM command gets or sets the mute state on a specific input channel.

The first parameter specifies the input channel(s):

- 0 = All input channels (i.e., mic/line input channel 1, mic/line input channel 2, Axiom In)
- 1 = Mic/line input channel 1
- 2 = Mic/line input channel 2
- 3 = Axiom In

The optional second parameter specifies the mute state to set:

- 0 = Unmute

- 1 = Mute

Description of Command	Example Command	Example Response	Description of Response
Mute all input channels.	IM 0 1<CR>	ACK IM 0 1<CR>	All input channels are muted.
Unmute mic/line input channel 2.	IM 2 0<CR>	ACK IM 2 0<CR>	Mic/line input channel 2 is unmuted.
Get mute state for all input channels.	IM 0<CR>	ACK IM 0 1 1 1<CR>	All input channels are muted.
Get mute state for mic/line input channel 2.	IM 2<CR>	ACK IM 2 1<CR>	Mic/line input channel 2 is muted.

Table 28 – Get/Set Input Mute State Syntax Example

2.4.25 Get/Set Output Mute State

The OM command gets or sets the mute state on the Axiom Out channel.

The optional first parameter specifies the mute state to set:

- 0 = Unmute
- 1 = Mute

Description of Command	Example Command	Example Response	Description of Response
Unmute Axiom Out channel.	OM 0<CR>	ACK OM 0<CR>	Axiom Out channel is unmuted.
Get mute state Axiom Out channel.	OM<CR>	ACK OM 1<CR>	Axiom Out channel is muted.

Table 29 – Get/Set Output Mute State Syntax Example

2.4.26 Get/Set Automatic Mute Timeout

The AMT command gets or sets the automatic mute/unmute timeout, which shall be triggered by the input signal presence detection.

The optional first parameter specifies the timeout value:

- 0 = Disable the automatic mute/unmute feature.
- [60..600] = Enable the automatic mute/unmute feature. The inactivity timeout shall be set to the parameter value in seconds.

When the automatic mute feature is enabled:

- The D2i shall apply mute to the input channels when no signal is detected on any input.
- The D2i shall apply unmute to the input channels when a signal is detected on any input and the configured input mute state is unmuted.

When the automatic mute feature is disabled, the D2i shall simply enforce the configured input mute states.

Description of Command	Example Command	Example Response	Description of Response
Enable the automatic mute/unmute feature and set the inactivity timeout to 60 seconds	AMT 60<CR>	ACK AMT 60<CR>	The automatic mute/unmute feature is enabled, and the inactivity timeout is set to 60 seconds.
Disable the automatic mute/unmute feature	AMT 0<CR>	ACK AMT 0<CR>	The automatic mute/unmute feature is disabled.
Get the automatic mute feature setting	AMT<CR>	ACK AMT 60<CR>	The automatic mute/unmute feature is enabled, and the inactivity timeout is set to 60 seconds.
Get the automatic mute feature setting	AMT<CR>	ACK AMT 0<CR>	The automatic mute/unmute feature is disabled.

Table 30 – Get/Set Automatic Mute Syntax Example

2.4.27 Get/Set Matrix Mixer

The MM command gets or sets the entire matrix mixer configuration. To limit payload size, gain values are represented as a 2's-complement 8-bit hex value, which can range from -100 dB (9Ch) to 0 dB (00h). Gain values of -100 mute the mixer crosspoint.

The first parameter specifies the number of inputs in the matrix mixer. This will always be 3:

- Mic/Line 1
- Mic/Line 2
- Axiom In

The second parameter specifies the number of outputs in the matrix mixer. This will always be 2:

- Dante TX 1
- Dante TX 2

After the first 2 parameters follows the value of every crosspoint in the matrix mixer. The order of crosspoints follows that of Input IDs and, for each input, Output IDs. For example, the payload starts with crosspoint Input 1 to Output 1 (Mic/Line 1 -> Dante TX1), then Input 1 to Output 2 (Mic/Line 1 -> Dante TX2), and so on, ending with Input 3 to Output 2 (Axiom In -> Dante TX2).

	Dante TX 1	Dante TX 2	Dante TX 3	Axiom Out
Mic/Line 1	Parameter 3	Parameter 4	N/A	N/A
Mic/Line 2	Parameter 5	Parameter 6	N/A	N/A
Axiom In	Parameter 7	Parameter 8	Fixed Routing	N/A
Dante RX 1	N/A	N/A	N/A	Fixed Routing

Table 31 – Matrix Mixer Configurations (Axiom port enabled)

	Dante TX 1	Dante TX 2	Dante TX 3	Axiom Out
Mic/Line 1	Parameter 3	Parameter 4	N/A	N/A
Mic/Line 2	Parameter 5	Parameter 6	N/A	N/A

Axiom In	Parameter 7 (N/A)	Parameter 8 (N/A)	N/A	N/A
Dante RX 1	N/A	N/A	N/A	N/A

Table 32 – Matrix Mixer Configurations (Axiom port disabled)

Description of Command	Example Command	Example Response	Description of Response
Get matrix mixer configuration	MM<CR>	ACK MM 3 2 00 9C 9C 00 9C 9C <CR>	Retrieved matrix mixer configuration: Mic/Line 1 (+0dB) -> Dante TX 1 Mic/Line 1 (mute) -> Dante TX 2 Mic/Line 2 (mute) -> Dante TX 1 Mic/Line 2 (+0dB) -> Dante TX 2 Axiom In (mute) -> Dante TX 1 Axiom In (mute) -> Dante TX 2
Apply a new matrix mixer configuration	MM 3 2 9C FD 9C FD 00 9C <CR>	ACK MM 3 2 9C FD 9C FD 00 9C <CR>	Applied matrix mixer configuration: Mic/Line 1 (mute) -> Dante TX 1 Mic/Line 1 (-3dB) -> Dante TX 2 Mic/Line 2 (mute) -> Dante TX 1 Mic/Line 2 (-3dB) -> Dante TX 2 Axiom In (+0dB) -> Dante TX 1 Axiom In (mute) -> Dante TX 2

Table 33 – Get/Set Matrix Mixer Syntax Example

2.4.28 Get/Set Matrix Mixer Crosspoint

The MMC command gets or sets the specified matrix mixer crosspoint.

The first parameter specifies the input channel:

- 1 = Mic/Line 1
- 2 = Mic/Line 2
- 3 = Axiom In

The second parameter specifies the output channel:

- 1 = Dante TX 1
- 2 = Dante TX 2

The optional third parameter specifies the gain (-100 to +0) in dB, if setting. Gain values of -100 mute the mixer crosspoint.

Description of Command	Example Command	Example Response	Description of Response
Get Matrix Mixer Crosspoint of	MMC 3 1<CR>	ACK MMC 3 1 0<CR>	The matrix mixer crosspoint of Dante Axiom In -> Dante TX 1 is set to 0 dB

Axiom In -> Dante TX 1			
Set Matrix Mixer Crosspoint of Axiom In -> Dante TX 1	MMC 3 1 - 40<CR>	ACK MMC 3 1 -40<CR>	Applied -40 dB to the matrix mixer crosspoint of Axiom In -> Dante TX 1
Mute Matrix Mixer Crosspoint of Axiom In -> Dante TX 1	MMC 3 1 - 100<CR>	ACK MMC 3 1 -100<CR>	Applied mute to the matrix mixer crosspoint of Axiom In -> Dante TX 1

Table 34 – Get/Set Matrix Mixer Crosspoint Syntax Example

2.4.29 Set Metering Counter

The MC command sets the counter value, specifying the count of metering messages the D2i transmits to the configured metering address and port. The D2i transmits the metering messages at a rate of 1 metering message every 100 msec. The MC command accepts parameter values from 1 through 4,294,967,295.

Description of Command	Example Command	Example Response	Description of Response
Subscribe to metering data for 10 seconds	MC 100<CR>	ACK MC 100<CR>	Subscribed to metering data for 10 seconds

Table 35 – Set Metering Counter Syntax Example

2.4.30 Get Input Signal Detection State

The SD command returns the signal detection state for the combined analog input channels (i.e., Mic/Line 1, Mic/Line 2, and Axiom In). This command returns a single value:

- 0 = No signal detected on any of the analog input channels.
- 1 = Signal detected on at least one of the analog input channels.

Description of Command	Example Command	Example Response	Description of Response
Get the signal detection state	SD<CR>	ACK SD 0<CR>	There is no signal detected on any of the analog inputs.
Get the signal detection state	SD<CR>	ACK SD 1<CR>	There is a signal detected on Mic/Line 1, Mic/Line 2, or Axiom In.

Table 36 – Get Input Signal Detection State Syntax Example

2.4.31 Get Sample Rate

The SR command requests the Dante sample rate in units of Hz.

The return values are:

- 44100
- 48000

- 88200
- 96000

When the Dante sample rate is configured for double speed (88.2 kHz or 96 kHz), the Dante channels RX 1 and TX 3 are disabled.

Description of Command	Example Command	Example Response	Description of Response
Get the sample rate	SR<CR>	ACK SR 48000<CR>	Sample rate is 48 kHz

Table 37 – Get Sample Rate Syntax Example

2.4.32 Axiom Passthrough Control

The AXIOM command allows the control system to send a command payload to the Axiom device connected to the D2i Axiom port.

The command accepts two parameters:

1. The number of bytes in the Axiom command payload.
2. The Axiom command payload.

If the D2i Axiom port mode is “Axiom” and the D2i has detected that there is no Axiom device connected to the D2i Axiom port, then the response will be “ACK AXIOM STATE_DISCONNECT<CR>”. The Axon D2i will poll the Axiom port for Axiom device detection at startup and every 20 seconds during runtime.

Note:

The Axiom device response message will be forwarded to the configured multicast address (see “Get/Set Axiom Multicast Address” section).

Description of Command	Example Command	Example Response	Description of Response
Send the “DEFAULTS<CR>” command to the Axiom device	AXIOM 9 DEFAULTS<CR><CR>	ACK AXIOM 9 DEFAULTS<CR><CR>	The D2i sent the “DEFAULTS<CR>” command to the Axiom device.
Attempt to send the “DEFAULTS<CR>” command to a connected Axiom device	AXIOM 9 DEFAULTS<CR><CR>	ACK AXIOM STATE_DISCONNECT<CR>	The D2i has detected that there is no Axiom device connected to the D2i Axiom port.

Table 38 – Axiom Passthrough Control Syntax Example

2.4.33 Get/Set Axiom Message Mode

The AMM command gets or sets the flag indicating whether the D2i multicast Axiom messages are enabled (0 = disabled, 1 = enabled). By default, the multicast Axiom messages are disabled.

See section 3.3 for details on Axiom messages.

Description of Command	Example Command	Example Response	Description of Response
Enable multicast Axiom messages	AMM 1<CR>	ACK AMM 1<CR>	Multicast Axiom messages are enabled
Get the multicast Axiom message mode	AMM<CR>	ACK AMM 0<CR>	Multicast Axiom messages are disabled

Table 39 – Get/Set Axiom Message Mode Syntax Example

2.4.34 Get/Set Axiom Address

The AA command gets or sets the multicast address and port to which the D2i will transmit all messages the D2i receives from the connected Axiom device.. The optional first and second parameters specify the IP address and port to set. The IP address must be a standard IPv4 address, including 4 decimal octets delimited by periods. The port number must be a valid decimal value (0 to 65535).

See section 3.3 for details on Axiom messages.

Description of Command	Example Command	Example Response	Description of Response
Set Axiom address to 224.192.0.100, port 5005	AA 224.192.0.100 5005<CR>	ACK AA 224.192.0.100 5005<CR>	Axiom address is 224.192.0.100, port 5005
Get Axiom address	AA<CR>	ACK AA 224.192.0.100 5005<CR>	Axiom address is 224.192.0.100, port 5005

Table 40 – Get/Set Axiom Address Syntax Example

2.4.35 Get Axiom Detection State

The APD command returns whether an Axiom device is connected to the D2i Axiom port. This detection state is determined during the D2i booting process, and is only applicable for Axiom devices (i.e., not third party devices). This command returns a single value:

- 0 = There was no Axiom device detected on the D2i Axiom port during boot.
- 1 = There was an Axiom device detected on the D2i Axiom port during boot.

Note:

The Axon D2i will poll the Axiom port for Axiom device detection at startup and every 20 seconds during runtime.

Description of Command	Example Command	Example Response	Description of Response
Get the Axiom detection state	APD<CR>	ACK APD 1<CR>	There was an Axiom device detected on the D2i Axiom port during boot.

Table 41 – Get Axiom Detection State Syntax Example

2.4.36 Get/Set Axiom Port Baud Rate

The APBR command gets or sets the baud rate for the D2i Axiom port. By default, the Axiom port baud rate is 9600.

The optional parameter indicates the Axiom port baud rate to apply. The following baud rates are supported: 9600, 19200, 38400, 57600, 115200, 230400.

Description of Command	Example Command	Example Response	Description of Response
Set Axiom port baud rate to 115200	APBR 115200<CR>	ACK APBR 115200<CR>	Axiom port baud rate is 115200
Get Axiom port baud rate	APBR<CR>	ACK APBR 115200<CR>	Axiom port baud rate is 115200

Table 42 – Get/Set Axiom Port Baud Rate Syntax Example

2.4.37 Get/Set Axiom Port Mode

The APM command gets or sets the D2i Axiom port mode. This mode indicates whether the device connected to the D2i Axiom port is an Axiom device or a third party device. By default, the Axiom port mode is “Axiom”.

The optional parameter indicates the Axiom port mode to apply. The following mode parameters are supported:

- AXIOM
- THIRD_PARTY

When the Axiom port mode is “Axiom”:

- If the D2i has detected that there is no Axiom device connected to the D2i Axiom port, then the response to the Axiom passthrough control command (“AXIOM”) will be “ACK AXIOM STATE_DISCONNECT<CR>”. The Axiom device must be connected to the Axon D2i Axiom port before the Axon D2i is powered on, in order for the Axon D2i to detect the Axiom device.
- Before the D2i enters low power mode, the D2i will transmit the ASCII string “LP<CR>” to the connected Axiom device.

When the Axiom port mode is “Third Party”:

- The response to the Axiom passthrough control command (“AXIOM”) will be a standard ACK response (i.e., the passthrough control response is not dependent on Axiom device detection).

Description of Command	Example Command	Example Response	Description of Response
Set Axiom port mode to third party	APM THIRD_PARTY<CR>	ACK APM THIRD_PARTY<CR>	Axiom port mode is third party
Get Axiom port mode	APM<CR>	ACK APM THIRD_PARTY<CR>	Axiom port mode is third party

Table 43 – Get/Set Axiom Port Mode Syntax Example

3 Multicast Messages

The D2i supports configuration of three multicast addresses and ports for the following purposes:

- Control status messages
- Metering messages
- Axiom passthrough messages

3.1 Control

When the control message mode is enabled (via CMM command), the D2i will transmit all “Set” type command responses to the configured control address/port. These messages will be formatted as the device name, followed by the “Set” command response without the “ACK” string.

Description of Message	Message
The D2i with device name “D2i-0A6123” has enabled phantom power on both mic inputs.	D2i-0A6123 PP 0 1<CR>
The D2i with device name “D2i-0A6123” has muted mic/line input channel 2.	D2i-0A6123 IM 2 1<CR>

Table 44 – Control Message Syntax Example

3.2 Metering

When the metering counter is active (via MC command), the D2i will transmit metering data to the configured metering address/port at a rate of 1 metering message per 100 msec, until the countdown expires.

The return values are:

- 0x00 = CLIP
- 0x01 = HAS SIGNAL
- 0xFD = NO SIGNAL
- 0xFF = INVALID

When the Dante sample rate is configured for double speed (88.2 kHz or 96 kHz), the Dante channels RX 1, TX 3, and TX 4 are disabled. In this case, the returned values for RX 1, TX 3, and TX 4 will be hard-coded to 0xFF (invalid).

Description of Message	Message
The D2i has signal on all RX and TX channels.	RX1=0x01 TX1=0x01 TX2=0x01 TX3=0x01<CR>

Table 45 – Metering Message Syntax Example

3.3 Axiom Passthrough

When the Axiom message mode is enabled (via AMM command), the D2i will transmit all outgoing messages from the connected Axiom device to the configured Axiom address/port.

Description of Message	Message
The D2i with device name “D2i-0A6123” received “ACK VERSION 1.0<CR>” from the connected Axiom device.	D2i-0A6123 ACK VERSION 1.0<CR>

Table 46 – Axiom Passthrough Message Syntax Example

3.4 Low Power Mode

When the D2i low power mode timeout is enabled, the D2i will transmit a message to all configured addresses and ports prior to entering low power mode, to indicate that the D2i is entering low power mode and will be offline soon.

Description of Message	Message
The D2i with device name “D2i-0A6123” is entering low power mode.	D2i-0A6123 LP<CR>

Table 47 – Low Power Mode Message Syntax Example