

BMXdigital Automation Protocol
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BMXdigital Automation Protocol Reference

Overview

This document describes the protocol exposed by the BMXdigital Server. This server provides remote control and monitoring features for external applications. These applications are considered clients of the BMXDigital Server.

Note:

TCP/IP via Ethernet is by design a non-deterministic delivery mechanism. The BMXdigital itself has a small (40-150ms) latency with regard to network commands. Consequently, commands issued from a client to the BMXdigital server cannot be guaranteed to act in an instantaneous manner. The client application must not assume zero system latency. An example of such a violation would be to issue an “ON” command and start audio delivery concurrently. Time critical client commands should precede audio in a manner that considers network and device latencies.

The “network layer” is IP and the “transport layer” is TCP. The “physical layer” is 10-BaseT. All communications with the server are made using port number 6000.

In order that *multiple clients* interact with the server in an orderly and non-conflicting manner it is recommended that a system integrator assume responsibility for the operation of the whole system. The system integrator is responsible for ensuring that contention for control of such things as remote fader control is avoided.

Having a system-wide design is also important when considering the use of control lockout features. BMXdigital will unlock all controls on a channel controlled by a remote client should one of the remote client either close the connection or fail to keep the connection “alive”. Therefore control of a single channel by multiple clients is not recommended.

Each client must “attach” to those channels it wishes to control. Any messages received for a channel not attached to the sending client will be ignored and the server will return a NAK response.

Implementation

A client application *must* implement the following commands and responses.

- Dummy Query (command)
- Nak (response)
- Ack (response)

A client that only wishes to load session files must also implement the Load Session command.

Any client requiring control and/or status replies from the BMX Digital will need to implement the Attach command plus any commands or status requests and replies that the application requires.

Note that the BMX Digital server only emits data that the client has requested. This means that the client application does not need to handle any status replies that it did not specifically request.

Physical Layer

The transmission layer for the BMXDigital server is Ethernet 10 Base-T.

Application Layer

Data are sent to the transmission layers using message packets. These packets contain complete commands and status replies. The format of a message packet is shown below.

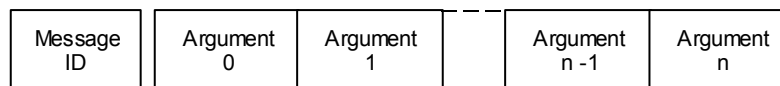


Figure 1 - Message Packet

Common Structure

The Common Structure to many Argument lists has the Channel # as argument 0. The Channel # field indicates the channel that is being affected by the message. These channels are not to be confused with physical locations. They represent the logical address and also indicate the specific module type being addressed. The assigned value ranges and types are:

Value range		Module Type Addresses
00h	0	All available modules (Use only with great caution)
01 – 3Fh	1 – 63	Universal I/O module
41 – 4Fh	65 – 79	Telco Direct module
51 – 5Fh	81 – 95	Telco Router module
61 – 6Fh	97 – 111	Telco RLS module
71 – 7Fh	113 – 127	Direct module
81 – 8Fh	129 – 143	Router module
91 – 9Fh	145 – 159	RLS module
A0 - AFh	160 – 175	Meters
B1h	177	Session Module
B2h	178	Control Room Monitor
B3h	179	Studio Monitor

There may be additional arguments as required by the type of command. These additional arguments are described for each command in the **Command Reference** section of this document.

Confirmation of Connection and Dead-Man

Each client application is responsible for periodically checking that its connection to the server is active. If the client fails to keep the connection alive then all controls on all attached channels will be unlocked and all fixed verniers are released.

The maximum period of this connection check should be less than ten seconds for each client. The client sending a DUMMY QUERY command to the server makes the connection check.

Features that are affected by this “Dead-man” operation are so noted in this document.

To assist in the development and debugging of clients for the BMXDigital server an entry may be placed into the NQX.INI file of the BMXDigital system to disable the server’s Dead-man feature. The entry shown below may be added to the file in the BMXDigital section:

```
[BMXDigital]  
DeadMan = 0
```

To re-enable the dead-man feature either set the value in the INI file to “1” or delete the entry.

Do not leave this entry in the file for production use.

Message Identifier Overview

General Purpose Commands:

Message id		Command
00h	0	Ack
01h	1	Nak
02h	2	Status Request
03h	3	Dummy Query
04h	4	Attach
05h	5	End of media time
06h	6	Load Session

Message id		Command	Dead-man Affects
10h	16	Fixed Vernier Enable	•
11h	17	Control Lockout	•
12h-18h	18 - 24	Reserved	

Set commands:

19h	25	Fixed Vernier Level	•
1Bh	26	Set Message For Display	•
1Ch	27	Set “A” Label	
1Dh	28	Set “B” Label	
1Eh to 2Fh	31 - 47	Reserved	

Commands that duplicate manual or external operation:

General Command Messages

30h	48	Ready	
31h	49	ON/(Off)	
32h	50	Source	
33h	51	Mode	
34h	52	Cue	
35h	53	Bus On	
36h	54	Bus Pre-Switch	
37h	55	Bus Pre-Fader	
38h	56	Pan / Balance Insert	
39h	57	Solo	
3Ah	58	Cue Reset – Reserved	
3Bh	59	Solo Reset – Reserved	
3Ch	60	Control Room Monitor Selection - Reserved	
3Dh	61	Headphone Monitor Selection - Reserved	
3Eh	62	Studio 1 Monitor Selection - Reserved	
3Fh	63	Studio 2 Monitor Selection - Reserved	
40H – 4Fh	64	Reserved	

Telco Module Specific

60	96	AUTO FOLDBACK	
61h	97	TO RECORD	
62h	98	TO MONITOR	
63h-67h	99 - 103	Reserved	

STATUS REPLIES

80h	128	Ready / (Not Ready)
81h	129	ON/(Off)
82h	130	Source
83h	131	Mode
84h	132	Cue
85h	133	Bus On
86h	134	Bus Pre-Switch
87h	135	Bus Pre-Fader
88h	136	Pan / Balance Insert
89h	137	MODULE EXISTENCE
8Ah	138	Solo
8Bh	139	Meter Tally
8Ch	140	REMOTE LINE SELECT
8Dh	141	PENDING STATUS REPLY
8Eh	142	Control Room Monitor Selection
8Fh	143	Headphone Monitor Selection
90h	144	Studio 1 Monitor Selection
91h	145	Studio 2 Monitor Selection
92h	146	Telco Auto Foldback
93h	147	Telco To Record
94h	148	Telco To Monitor
95h	149	ON key state
96h	150	OFF key state
97h	151	Session File Loaded
98-9Fh	152 - 159	Reserved

Command Reference

ACK [00h] [00]

This command is used to acknowledge a Dummy Query from the client.

Arguments

None

NAK [01h] [01]

This command informs the client of some type of error when processing a received command.

Arguments

- [0] The offending Message ID.
- [1] Reason for NAK.

- 01 Unknown MSG ID
 - 02 Invalid argument count for a given MSG ID
 - 03 Inconsistent Message or Channel # error
 - 04 Invalid Argument
 - 05 Device not configured for this operation
 - 06 Channel not attached by client
 - 07 Session File not found on server
 - 08 Command not implemented
 - 09 Error loading session file
 - 10 Channel not present
 - 11 Module not a Telco
-

Status Request [02h] [02]

A client sends this command to the server requesting some data or state of the controlled functions.

Arguments

- [0] The Message ID of the required function's status
- [1] The channel number whose status is being requested
- [2] Reply On Change or On Request
 - 00h Reply ON CHANGE
 - 01h Reply ON REQ

Note that both types of request will result in the current state of the request being returned to the client.

Dummy Query [03h] [03]

The client uses this command to ensure that the data link layer exists. The server will respond with an ACK to acknowledge receipt of the command.

Arguments

None

Attach [04h] [04]

The client uses this command to inform the server which channels it will be controlling. Any commands and/or requests received by the server from a client for channels to which the client is not attached will be rejected with a NAK response.

Arguments

- [0] The channel number to be attached to the client
- [1] 1 == Attach, 0 == Detach

End In [05h] [05]

This command is used to display a “count down” message on the lower display of the given channel. The count down is the approximate time until the media being served to the channel will end.

Arguments

- [0] The channel number to display the count down
- [1] The time (in seconds) for the start of the count down

Note that the minimum time is 5 seconds and the maximum time is limited to 16 seconds. Times outside these limits will be adjusted into range.

Load Session [06h] [06]

The named session file will be loaded.

Arguments

- [0 - 9] The (ASCII) filename (10 characters) without the “SES” extension

The filename may be shorter than 10 characters, in which case the remaining bytes in the message must be 00h.

If the session file does not exist on the server a NAK response will be sent.

Fixed Vernier Enable [10h] [16]

This command enables the fix vernier feature of the specified device.

Arguments

[0] Channel Number

[1] Vernier Type

Multiple devices may be operated upon in a single command. Set the state bits in the lower nibble to the required logic states and assert the appropriate bits in the upper nibble to indicate which state bits are valid.

01h	Fader
02h	Pan/Balance
04h	Send1
08h	Send2
10h	Fader state valid
20h	Pan/Balance state valid
40h	Send1 state valid
80h	Send2 state valid

Control Lockout [11h] [17]

This command controls the lockout of a feature of a single channel. It may be used to lockout or enable a single function on a channel or all functions on a channel.

Arguments

- [0] Channel Number
[1] Function Control
- | | | |
|-----|-----|-----------|
| 00h | OFF | (disable) |
| 01h | ON | (enable) |
- [2] Function Value

The following table contains the function values for “Universal I/O” modules.

00h	Reserved	10h	UTL 4 Assign
01h	Send 1 On	11h	UTL 4 Pre-fader
02h	Send 1 Pre-Fader	12h	UTL 4 Pre-Switch
03h	Send 1 Pre-Switch	13h	Program 1
04h	Send 2 On	14h	Program 2
05h	Send 2 Pre-Fader	15h	Program 3
06h	Send 2 Pre-Switch	16h	Program 4
07h	UTL 1 Assign	17h	Off Line 1
08h	UTL 1 Pre-Fader	18h	Off Line 2
09h	UTL 1 Pre-Switch	19h	Solo
0Ah	UTL 2 Assign	1Ah	Cue
0Bh	UTL 2 Pre-Fader	1Bh	Mode Left
0Ch	UTL 2 Pre-Switch	1Ch	Mode Right
0Dh	UTL 3 Assign	1Dh	On
0Eh	UTL 3 Pre-Fader	1Eh	Insert
0Fh	UTL 3 Pre-Switch	1Fh	Source

The following table contains the function values for “Telco/Codec” modules.

00h	Reserved	10h	UTL 4 Assign
01h	Send 1 On	11h	UTL 4 Pre-fader
02h	Send 1 Pre-Fader	12h	UTL 4 Pre-Switch
03h	Send 1 Pre-Switch	13h	Program 1
04h	Send 2 On	14h	Program 2
05h	Send 2 Pre-Fader	15h	Program 3
06h	Send 2 Pre-Switch	16h	Program 4
07h	UTL 1 Assign	17h	Off Line 1
08h	UTL 1 Pre-Fader	18h	Off Line 2
09h	UTL 1 Pre-Switch	19h	Solo
0Ah	UTL 2 Assign	1Ah	Cue
0Bh	UTL 2 Pre-Fader	1Bh	Mode Left
0Ch	UTL 2 Pre-Switch	1Ch	Mode Right
0Dh	UTL 3 Assign	1Dh	On
0Eh	UTL 3 Pre-Fader	1Eh	Insert
0Fh	UTL 3 Pre-Switch	1Fh	Reserved
		20h	Take
		21h	To Monitor
		22h	To Record
		23h	Auto

The following table contains the function values for “RLS/Router” modules.

00h	Reserved	10h	UTL 4 Assign
01h	Send 1 On	11h	UTL 4 Pre-fader
02h	Send 1 Pre-Fader	12h	UTL 4 Pre-Switch
03h	Send 1 Pre-Switch	13h	Program 1
04h	Send 2 On	14h	Program 2
05h	Send 2 Pre-Fader	15h	Program 3
06h	Send 2 Pre-Switch	16h	Program 4
07h	UTL 1 Assign	17h	Off Line 1
08h	UTL 1 Pre-Fader	18h	Off Line 2
09h	UTL 1 Pre-Switch	19h	Solo
0Ah	UTL 2 Assign	1Ah	Cue
0Bh	UTL 2 Pre-Fader	1Bh	Mode Left
0Ch	UTL 2 Pre-Switch	1Ch	Mode Right
0Dh	UTL 3 Assign	1Dh	On
0Eh	UTL 3 Pre-Fader	1Eh	Insert
0Fh	UTL 3 Pre-Switch	1Fh	Reserved
		20h	Take

The following reserved table contains the function values for the “Control Room Monitor” module

00h	Reserved		
01h	Monitor Ext 1	11h	Headphone Ext 1
02h	Monitor Ext 2	12h	Headphone Ext2
03h	Monitor Ext 3	13h	Headphone Ext3
04h	Monitor Ext 4	14h	Headphone Ext 4
05h	Monitor Send 1	15h	Headphone Send 1
06h	Monitor Send 2	16h	Headphone Send 2
07h	Monitor UTL 1	17h	Headphone UTL 1
08h	Monitor UTL 2	18h	Headphone UTL 2
09h	Monitor UTL 3	19h	Headphone UTL 3
0Ah	Monitor UTL 4	1Ah	Headphone UTL 4
0Bh	Monitor Tel	1Bh	Headphone Tel
0Ch	Monitor Record	1Ch	Headphone Record
0Dh	Monitor Program 1	1Dh	Headphone Program 1
0Eh	Monitor Program 2	1Eh	Headphone Program 2
0Fh	Monitor Program 3	1Fh	Headphone Program 3
10h	Monitor Program 4	20h	Headphone Program 4
		21h	HP Follow Monitor
		22h	Auto Cue
		23h	Mode Left
		24h	Mode Right

The following reserved table contains the function values for the “Studio Monitor” module

00h	Reserved		
01h	Studio 1 Ext 1	11h	Studio 2 Ext 1
02h	Studio 1 Ext 2	12h	Studio 2 Ext2
03h	Studio 1 Ext 3	13h	Studio 2 Ext3
04h	Studio 1 Ext 4	14h	Studio 2 Ext 4
05h	Studio 1 Send 1	15h	Studio 2 Send 1
06h	Studio 1 Send 2	16h	Studio 2 Send 2
07h	Studio 1 UTL 1	17h	Studio 2 UTL 1
08h	Studio 1 UTL 2	18h	Studio 2 UTL 2
09h	Studio 1 UTL 3	19h	Studio 2 UTL 3
0Ah	Studio 1 UTL 4	1Ah	Studio 2 UTL 4
0Bh	Studio 1 Tel	1Bh	Studio 2 Tel
0Ch	Studio 1 Record	1Ch	Studio 2 Record
0Dh	Studio 1 Program 1	1Dh	Studio 2 Program 1
0Eh	Studio 1 Program 2	1Eh	Studio 2 Program 2
0Fh	Studio 1 Program 3	1Fh	Studio 2 Program 3
10h	Studio 1 Program 4	20h	Studio 2 Program 4
		21h	Talk over Mute 1
			Talk over Mute 2

Fix Vernier Level [19h] [25]

This command overrides the selected vernier if Fixed Vernier feature is enabled for the indicated function.

Arguments

- [0] Channel Number
- [1] Vernier Type
 - 01h Fader
 - 02h Pan/Balance
 - 03h Send1
 - 04h Send2
- [2] Control value - 00h to FFh

Typically vernier levels are set before sending the first fixed vernier enable command for a function.

Set Message For Display [1Bh] [27]

This command sends a message (up to 160 characters) to the lower display on the given channel. For messages shorter than 160 characters the remaining bytes must be 00h.

Arguments

- [0] Channel Number
- [1] ASCII Character
- ...
- [160] ASCII Character

The message is displayed until either cancelled by the operator, receipt of a NULL message, or operation of the DEAD MAN.

Set “A” Label [1Ch] [28]

This command sends 10 characters of text for display by the “A” display on the given channel. For text that is shorter than 10 characters the remaining bytes must be 00h.

Arguments

- [0] Channel Number
- [1] Label – ASCII character
- ...
- [10] Label – ASCII character

Set “B” Label [1Dh] [29]

This command sends 10 characters of text for display by the “B” display on the given channel. For text that is shorter than 10 characters the remaining bytes must be 00h.

Arguments

- [0] Channel Number
 - [1] Label – ASCII character
 - ...
 - [10] Label – ASCII character
-

Remote Line Select [1Dh] [29]- Reserved

This command selects one of sixteen inputs per channel. This setting is applicable to a channel with a type of RLS.

Arguments

[0] Channel Number

[1] Select input
00h -> 0Fh

Code	Input	Code	Input
00h	A	08h	I
01h	B	09h	J
02h	C	0Ah	K
03h	D	0Bh	L
04h	E	0Ch	M
05h	F	0Dh	N
06h	G	0Eh	O
07h	H	0Fh	P

RLS Labels Send [1Eh] [30] - Reserved

This command sends up to 32 10-character labels for display on an RLS module. Each label must be 10 bytes in length. For shorter labels the remaining bytes must be 00h. The labels are in ascending selection order and any selections not used must be filled with 00h bytes. Labels 1 – 16 are for analog and 17 – 32 are for digital inputs.

Arguments

- [0] Channel Number
- [1] Label – ASCII Character
- ...
- [320] Label – ASCII Character

Ready [30h] [48]

If activated while the channel is ON, the channel will turn OFF. If activated while the channel is OFF, the OFF lamp will light to indicate that the source is ready to play.

Arguments

- [0] Channel Number
- [1] Ready On/Off
 - 00h OFF (Source not ready)
 - 01h ON (Source ready)

On [31h] [49]

This command turns the module ON or OFF.

Arguments

- [0] Channel Number
 - [1] Module On/Off
 - 00h OFF (module is turned off)
 - 01h ON (module is turned on)
-

Source Select [32h] [50]

This command selects the signal source

Arguments

[0] Channel Number

[1] Source
00h A
01h B

Mode [33h] [51]

This command sets the module Mode to Mono sum, Left source, Right source, or Stereo mode.

Arguments

[0] Channel Number

[1] Select Mode
00h Stereo
01h Only left source
02h Only right source
03h Mono sum mode

Cue [34h] [52]

This command routes the pre-fader signal to the console cue bus.

Arguments

- [0] Channel Number
- [1] Select cue bus
 - 00h Do not route to cue bus
 - 01h Route to cue bus

Bus On [35h] [53]

This command turns on or off the selected bus.

Arguments

- [0] Channel Number
 - [1] Bus State
 - 00h Off
 - 01h On
 - [2] Bus
 - 01h Send1
 - 02h Send2
 - 03h UTL 1
 - 04h UTL 2
 - 05h UTL 3
 - 06h UTL 4
 - 07h Program1
 - 08h Program2
 - 09h Program3
 - 0Ah Program4
 - 0Bh Offline 1
 - 0Ch Offline 2
-

Bus Pre-Switch [36h] [54]

This command turns on or off the pre-switch of the specified function. The off state will cause post-switch to be selected.

Arguments

- [0] Channel Number
 - [1] Button State
 - 00h Off (post-switch)
 - 01h On (pre-switch)
 - [2] Bus
 - 01h Send1
 - 02h Send2
 - 03h UTL 1
 - 04h UTL 2
 - 05h UTL 3
 - 06h UTL 4
-

Bus Pre-Fader [37h] [55]

This command turns on or off the pre-fader switch of the specified bus. The off state will cause post-fader to be selected.

Arguments

- [0] Channel Number
- [1] Button State
 - 00h Off (post-fader)
 - 01h On (pre-fader)
- [2] Bus
 - 01h Send1
 - 02h Send2
 - 03h UTL 1
 - 04h UTL 2
 - 05h UTL 3
 - 06h UTL 4

Pan / Balance Insert [38h] [56]

This command enables the pan / balance control.

Arguments

- [0] Channel Number
 - [1] Pan / Balance dial enable
 - 00h Dial not active
 - 01h Dial active
-

Solo [39h] [57]

This command routes the after-fader signal to the console solo bus.

Arguments

[0] Channel Number

[1] Route to solo bus control

00h Do not route to solo bus

01h Route to solo bus

Cue Reset [3Ah] [58] - Reserved

This command turns all of the cue buttons on the console to the “off” state and takes all channels out of cue.

Solo Reset [3Bh] [59] - Reserved

This command turns all of the solo buttons on the console to the “off” state and takes all channels out of solo.

Control Room Monitor Selection [3Ch] [60] - Reserved

This command controls the buses that are routed to the Control Room Monitor. A combination of buses may be selected with a single command.

Arguments

- [0] Channel Number
- [1] Bus selections – MS Byte
- [2] Bus selections – LS Byte

MS Byte		LS Byte	
Bit	Bus	Bit	Bus
7	External 4	7	UTL 2
6	External 3	6	UTL 1
5	External 2	5	Tel
4	External 1	4	Record
3	Send 2	3	PGM 4
2	Send 1	2	PGM 3
1	UTL 4	1	PGM 2
0	UTL 3	0	PGM 1

Headphone Monitor Selection [3Dh] [61] - Reserved

This command controls the buses that are routed to the Headphone Monitor. A combination of buses may be selected with a single command.

Arguments

[0] Channel Number

[1] Bus selections – MS Byte

[2] Bus selections – LS Byte

MS Byte		LS Byte	
Bit	Bus	Bit	Bus
7	External 4	7	UTL 2
6	External 3	6	UTL 1
5	External 2	5	Tel
4	External 1	4	Record
3	Send 2	3	PGM 4
2	Send 1	2	PGM 3
1	UTL 4	1	PGM 2
0	UTL 3	0	PGM 1

Studio 1 Monitor Selection [3Eh] [62] - Reserved

This command controls the buses that are routed to the Studio 1 Monitor. A combination of buses may be selected with a single command

Arguments

- [0] Channel Number
- [1] Bus selections – MS Byte
- [2] Bus selections – LS Byte

MS Byte		LS Byte	
Bit	Bus	Bit	Bus
7	External 4	7	UTL 2
6	External 3	6	UTL 1
5	External 2	5	Tel
4	External 1	4	Record
3	Send 2	3	PGM 4
2	Send 1	2	PGM 3
1	UTL 4	1	PGM 2
0	UTL 3	0	PGM 1

Studio 2 Monitor Selection [3Fh] [63] - Reserved

This command controls the buses that are routed to the Studio 2 Monitor. A combination of buses may be selected with a single command

Arguments

[0] Channel Number

[1] Bus selections – MS Byte

[2] Bus selections – LS Byte

MS Byte		LS Byte	
Bit	Bus	Bit	Bus
7	External 4	7	UTL 2
6	External 3	6	UTL 1
5	External 2	5	Tel
4	External 1	4	Record
3	Send 2	3	PGM 4
2	Send 1	2	PGM 3
1	UTL 4	1	PGM 2
0	UTL 3	0	PGM 1

Telco Auto Foldback [60h] [96]

This command controls the operation of the auto-foldback feature of the console. When in the active state the signal routed to the foldback bus will be controlled by the caller being on the air. When this feature is not active foldback is manually selected.

Arguments

- [0] Channel Number
- [1] Auto Foldback control
 - 00h Disable auto-foldback
 - 01h Enable auto-foldback

Telco To Record [61h] [97]

This command controls the routing of the Telco to the Record Bus.

Arguments

- [0] Channel Number
- [1] Telco to Record control
 - 00h Disable
 - 01h Enable

Telco To Monitor [62h] [98]

This command controls the routing of the Telco to the Monitor Bus.

Arguments

- [0] Channel Number
 - [1] Telco to Monitor control
 - 00h Disable
 - 01h Enable
-

Status Requests (Replies)

Ready [80h] [128]

Returns the state of Ready signal.

Arguments

[0]	Channel Number
[1]	State of Ready signal
00h	Ready is FALSE
01h	Ready is TRUE

On [81h] [129]

Returns the on/off state of the module.

Arguments

[0]	Channel Number
[1]	Module state
00h	Module is Off
01h	Module is On

Source [82h] [130]

Returns the selected source of the specified channel.

Arguments

[0]	Channel Number
[1]	Module Source
00h	Source is A
01h	Source is B

Mode [83h] [131]

Returns the Mode of the specified channel.

Arguments

[0]	Channel Number
[1]	Module Source
00h	reserved
01h	Left source only
02h	Right source only
03h	Mono sum mode
04h	Stereo mode

Cue [84h] [132]

Returns the cue button state for the specified channel.

Arguments

[0]	Channel Number
[1]	State of cue
00h	Cue is OFF
01h	Cue is ON

Bus On [85h] [133]

Returns the map of assigned buses

Arguments

[0] Channel Number

[1] Bus selections – MS Byte

[2] Bus selections – LS Byte

MS Byte		LS Byte	
Bit	Bus	Bit	Bus
7		7	PGM 2
6		6	PGM 1
5		5	UTL 4
4		4	UTL 3
3	Offline 2	3	UTL 2
2	Offline 1	2	UTL 1
1	PGM 4	1	Send 2
0	PGM 3	0	Send 1

Bus Pre-Switch [86h] [134]

Returns the map of the pre-switch assignments.

Arguments

- [0] Channel Number
- [1] Bus assignments

Bitmap	
Bit	Bus
7	
6	
5	UTL 4
4	UTL 3
3	UTL 2
2	UTL 1
1	Send 2
0	Send 1

Bus Pre-Fader [87h] [135]

Returns the map of the pre-fader assignments.

Arguments

- [0] Channel Number
- [1] Bus assignments

Bitmap	
Bit	Bus
7	
6	
5	UTL 4
4	UTL 3
3	UTL 2
2	UTL 1
1	Send 2
0	Send 1

Pan / Balance Insert [88h] [136]

Returns the state of the Insert Pan/Balance button.

Arguments

[0]	Channel Number
[1]	Insert Pan/Balance State

00h	off
-----	-----

01h	on
-----	----

Module Existence [89h] [137] - Reserved

Returns a map of the console according to module type and position. The module type arguments are ordered by their physical position in the console starting at the extreme left.

Note: The first actual module on the left of a console may *not* be physical location 1. Please refer to the console documentation for the actual first physical location at the left of the console.

Arguments

[0] – [63]	Module Type
00h	Unknown
01 – 3Fh	Universal Input
41 – 4F	Telco direct
51 – 5F	Telco router
61 – 6F	Telco RLS
71 – 7F	Direct
81 – 8F	Router
91 – 9F	RLS
A1 – AF	Meter
B1h	Session Module
B2h	Control Room Monitor
B3h	Studio Monitor
FFh	Module Not Present

Solo [8Ah] [138]

Returns the state of the Solo (After Fader Logic) button.

Arguments

[0]	Channel Number
[1]	State of solo
00h	Solo is OFF
01h	Solo is ON

Meter Tally [8Bh] [139] - Reserved

Returns the average & peak level information of the specified bus. The values are accumulated over 3,840 samples (87 or 80 msec).

The protocol limits the number of buses that may be monitored to six. These six buses to comprise of PGM1 – 4 plus any two other buses.

To find the peak value, the magnitude of the every sample is compared to the previous peak value in the same period. If the sample magnitude exceeds the peak value, then the sample magnitude is the new peak value, else it is discarded.

If no previous peak value is present, the sample magnitude is the new peak value.

This reply does not use a channel number, instead a bus ID is returned which is defined as follows:

Value	Bus ID	Value	Bus ID
00h	Solo	08h	PGM 2
01h	Send 1	09h	PGM 3
02h	Send 2	0Ah	PGM 4
03h	Utl 1	0Bh	External 1
04h	Utl 2	0Ch	External 2
05h	Utl 3	0Dh	External 3
06h	Utl 4	0Eh	Tel/Rec
07h	PGM 1	0Fh	Cue

Arguments

- [0] Bus ID
- [1] Bus(x) Left – Peak
- [2] Bus(x) Right – Peak
- [3] Bus(x) Left – Average
- [4] Bus(x) Right - Average

Each argument for audio level represents a “bin” on a 40-segment meter. The actual level values for each bin are shown in the following table.

Value	>=	<	Value	>=	<
00h	INF	-57	14h	-20	-19
01h	-57	-54	15h	-19	-18
02h	-54	-51	16h	-18	-17
03h	-51	-48	17h	-17	-16
04h	-48	-45	18h	-16	-15
05h	-45	-42	19h	-15	-14
06h	-42	-39	1Ah	-14	-13
08h	-36	-33	1Ch	-12	-11
09h	-33	-30	1Dh	-11	-10
0Ah	-30	-29	1Eh	-10	-9
0Bh	-29	-28	1Fh	-9	-8
0Ch	-28	-27	20h	-8	-7
0Dh	-27	-26	21h	-7	-6
0Eh	-26	-25	22h	-6	-5
0Fh	-25	-24	23h	-5	-4
10h	-24	-23	24h	-4	-3
11h	-23	-22	25h	-3	-2
12h	-22	-21	26h	-2	-1
13h	-21	-20	27h	-1	0

Remote Line Selection [8Ch] [140] - Reserved

Returns the current RLS selection for the given channel.

Arguments

- [0] Channel Number
- [1] Selected input

Code	Input	Code	Input
00h	A	08h	I
01h	B	09h	J
02h	C	0Ah	K
03h	D	0Bh	L
04h	E	0Ch	M
05h	F	0Dh	N
06h	G	0Eh	O
07h	H	0Fh	P

Pending Status [8Dh] [141]

Returns the Pending Status for the channel.

Arguments

- [0] Channel Number
- [1] Condition
 - 00h Channel has no pending commands
 - 01h Channel has pending commands

Control Room Monitor Selection [8Eh] [142] - Reserved

Returns the status of the current Control Room Monitor Bus selections.

Arguments

- [0] Channel Number
- [1] Bus selections – MS Byte
- [2] Bus selections – LS Byte

MS Byte		LS Byte	
Bit	Bus	Bit	Bus
7	External 4	7	UTL 2
6	External 3	6	UTL 1
5	External 2	5	Tel
4	External 1	4	Record
3	Send 2	3	PGM 4
2	Send 1	2	PGM 3
1	UTL 4	1	PGM 2
0	UTL 3	0	PGM 1

Headphone Monitor Selection [8Fh] [143] - Reserved

Returns the status of the current Headphone Monitor Bus selections.

Arguments

- [0] Channel Number
- [1] Bus selections – MS Byte
- [2] Bus selections – LS Byte

MS Byte		LS Byte	
Bit	Bus	Bit	Bus
7	External 4	7	UTL 2
6	External 3	6	UTL 1
5	External 2	5	Tel
4	External 1	4	Record
3	Send 2	3	PGM 4
2	Send 1	2	PGM 3
1	UTL 4	1	PGM 2
0	UTL 3	0	PGM 1

Studio 1 Monitor Selection [90h] [144] - Reserved

Returns the status of the current Studio 1 Monitor Bus selections.

Arguments

- [0] Channel Number
- [1] Bus selections – MS Byte
- [2] Bus selections – LS Byte

MS Byte		LS Byte	
Bit	Bus	Bit	Bus
7	External 4	7	UTL 2
6	External 3	6	UTL 1
5	External 2	5	Tel
4	External 1	4	Record
3	Send 2	3	PGM 4
2	Send 1	2	PGM 3
1	UTL 4	1	PGM 2
0	UTL 3	0	PGM 1

Studio 2 Monitor Selection [91h] [145] - Reserved

Returns the status of the current Studio 2 Monitor Bus selections.

Arguments

- [0] Channel Number
- [1] Bus selections – MS Byte
- [2] Bus selections – LS Byte

MS Byte		LS Byte	
Bit	Bus	Bit	Bus
7	External 3	7	UTL 2
6	External 2	6	UTL 1
5	External 1	5	Tel
4	External 4	4	Record
3	Send 2	3	PGM 4
2	Send 1	2	PGM 3
1	UTL 4	1	PGM 2
0	UTL 3	0	PGM 1

Telco Auto-Foldback [92h] [146]

Returns the status of the Telco Auto-Foldback function.

Arguments

- [0] Channel Number
- [1] Telco Auto-Foldback state

00h Disabled
01h Enabled

Telco To Record [93h] [147]

Returns the status of the routing of the Telco to the Record Bus.

Arguments

[0]	Channel Number
[1]	Telco to Record state

00h	Disabled
01h	Enabled

Telco To Monitor [94h] [148]

Returns the status of the routing of the Telco to the Monitor Bus.

Arguments

[0]	Channel Number
[1]	Telco to Monitor state

00h	Disabled
01h	Enabled

ON key state [95h] [149]

Returns the state of the ON key.

Arguments

[0]	Channel Number
[1]	Key State
00h	Not pressed
01h	Pressed

OFF key state [96h] [150]

Returns the state of the OFF key.

Arguments

[0]	Channel Number
[1]	Key State
00h	Not pressed
01h	Pressed

Revision History

1.0

First release of document.

1.1

- The display message command was changed to include the persistence of the message. Persistence was not discussed in the previous release. The message is now displayed until the operator cancels it, a client sends a NULL (all zeros) message, or the DEAD MAN operates.

1.2

- An entry was added to the NQX.INI file to control the Dead-man feature.
- The “Reason for NAK” values were changed to be a simple value rather than a bit position.
- A NAK reason was added to indicate a “Session file not found” error when the Session Load command is used.
- The Attach command was updated to include a second argument to indicate “Attach” and “Detach” to enable a client to detach from a channel.
- A new Status reply was added to signal the successful loading of a session file as a result of the Session Load command.

1.3

- Added decimal values for message IDs.
- Changed the arguments for the following status replies
 - Bus On [85h]
 - Bus pre-switch [86h]
 - Bus pre-fader [87h]
- Removed “Pending” status from reserved list

1.4

- Added new NAK message “reasons”
 - 08 Command not implemented
 - 09 Error loading session file
 - 10 Channel not present
 - 11 Module not a Telco
- Reserved the “Select All” entry for Control Lockout
- Changed “Stereo” code for Mode command
- Changed argument bit definitions for Bus On
- Removed Session File Loaded status reply
- Added “Implementation” section

1.5

- The command codes for the following messages were incorrect due to a documentation error:
 - Set Message For Display

- Set “A” Label
 - Set “B” Label
 - The overview section containing the above messages was also incorrect.
- 1.6
- Added port number to Overview section
 - Added latency warning box to Overview section
 - Added “Ready” command