Grand Concerto and Essentia G Serial Control Protocol

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1.0   Objective

This document describes the NuVo Grand Concerto – Essentia E6G RS232 Serial Control command and response protocol. This protocol allows a component outside a NuVo Grand Concerto or Essentia E6G system to communicate with the unit to solicit its current state or change operational parameters.

2.0   System Description

The NuVo Grand Concerto and Essentia E6G systems are whole-house audio distribution systems. They provide the capability to route audio from external audio sources to one or more output zones. They also provide the capability to control the external audio sources via wall-mounted Control Pads.

The NuVo Grand Concerto system consists of a single Main Processor Unit (MPU), 8 physical zones of control, Zone Display Pads (maximum 20), and external audio sources (maximum 6). Eight additional zones can be added to the Grand Concerto with an expander. This makes the number of physical zones 16. Zones 17-20 are also available as logical zones. These zones must be slaved to another zone.

The NuVo Essentia E6G system consists of a single Main Processor Unit (MPU), 6 physical zones of control, Zone Control Pads (maximum 20), and external audio sources (maximum 6). Six additional zones can be added to the Grand Concerto with an expander. This makes the number of physical zones 12. Two additional physical Control Pads can be added and slaved to any of the 12 physical zones. Also, zones 15-20 are also available as logical zones (slaved to one of the 12 physical zones) under RS232 control only.

All serial communications are initiated by the external serial system controller in a Command - Response format. The NuVo Main Processor Unit will asynchronously transmit status responses to the external device whenever there is a parameter change at a Control Pad (source volume, bass, etc.) or a NuVoNet source updates the one or more Control Pad displays. This allows the serial communications to be kept to a minimum since the external device does not need to poll the NuVo Grand Concerto.

The particular RS232 commands and their use are described later in this document.

3.0   Serial Port Connections

The NuVo Grand Concerto connects to an external device via a DB9 connector on the back of the unit labeled "Programming and Serial Control". On the Essentia E6G, a n identical DB9 connector is provided, labeled "RS232". A pass-through cable with a DB9 male on one end and a DB9 female on the other end is required to connect the NuVo Grand Concerto or Essentia E6G to a PC or most external devices.

4.0   Serial Control Data Format

The NuVo Grand Concerto and Essentia E6G serial port is set to 57600 baud, no parity and 1 stop bit. No hardware/software handshaking is required. The commands are simple enough that they may be issued using a terminal emulator like HyperTerm or Tera Term Pro. The specifics of the protocol are:

1) The data is all ASCII characters with exception of the terminating characters: carriage return <CR> (or 0x0D hex) and line feed <LF> (or 0x0A hex). Upper or lower case characters may be used.

2) All numerical fields are coded as ASCII digit characters.

3) All strings are enclosed in double quotes. When sending a string to the Grand Concerto, double quotes (") and asterisks (*) must be escaped by a backslash.

4) Arguments are delimited by commas.

5) All arguments must be specified.

6) Each Command string is STARTED with an ASCII "*****" character and terminated by a <CR>.

   A special exception to this rule is made for an Essentia E6G system that is in STANDBY mode. STANDBY mode is entered when an ALL OFF command is issued from a Control Pad (key press or IR control), or when the *ALLOFF command is issued to the RS232 port (see paragraph 6.4). The Essentia E6G system is Energy-Star compliant, meaning that the entire system has to consume less than one watt when in this STANDBY mode. For this reason, the Main Processor Unit and all the Control Pads go into a very low-power sleep state. The first character received on the E6G system's RS232 port in STANDBY mode will "wake up" the processor, but a pause of 5 milliseconds is required between this "wake-up" character, and the actual command character sequence (beginning with the ASCII "*" character) to the RS232 port. For the purposes of programming the system RS232 controller, there are two ways this can be accomplished.
   Method 1:
   a. Send one carriage return <CR> (or 0x0D hex) to the RS232 port.
   b. Pause 5 milliseconds with no RS232 transmission to the port.
   c. Send the desired command sequence, such as *Z1ON followed by the <CR> character.

   Method 2 (use this for systems in which it is difficult or impossible to perform a timed pause in the character sequence):
   a. Send a sequence of 33 carriage return <CR> (or 0x0D hex) characters to the RS232 port.
   b. Send the desired command sequence, such as *Z1ON followed by the <CR> character.

7) Each Response string issued by the Main Processor Unit will START with an ASCII "**#**" character and be terminated with a <CR><LF>.

8) If a command has an error in it, or does not adhere to exact command syntax, or is not recognized for any reason the NuVo Main Processor Unit will respond with a "**#?**<CR><LF>" string.

9) Whenever sending multiple commands to the NuVo Main Processor Unit, the host program should pause for 50 milliseconds between commands to prevent buffer overruns.

10) Whenever the status of the system has changed, a serial status message is sent indicating the new state of the controller. It does not matter what caused the state change (front panel buttons, Concerto Display Pads, serial commands, radio information, etc.) These are **unsolicited** messages and the external device needs to handle the reception of the messages to keep itself up-to-date with the Main Processor Unit. The responses to commands with **"?"** will also be sent unsolicited.

4.1   Command Example

This example will request the version information from the NuVo Main Processor Unit:

CMD	*VER<CR>
RSP	#VER"NV-I8G FWv0.91 HWv0"<CR><LF>

This will be the format for all the commands listed in this manual. The <CR> and <LF> will not be shown with the commands in this manual but MUST be assumed.

5.0   Unsolicited System Messages

These are **unsolicited** status messages that are sent from the Main Processor Unit to the external device whenever there is a change in the system. It is **not** always possible to query this information so the external device should be designed to receive the messages asynchronously.

5.1   Source Display Track Status Message

The information contained in the message pertains to the track of the current song playing on an iPod or CD player that is displayed on a Control Pad.

RSP	#SsDISPINFO,DURATIONx,POSITIONy,STATUSz	
Response Packet Breakdown		
S	The source the message is from: 1 to 6	
X	Length of song in 10ths of seconds	
Y	Current time in playing song in 10ths of seconds	
z=0	Normal	
Z=1	Idle	
z=2	Playing	
z=3	Paused	
z=4	Fast Forward	
z=5	Rewind	
z=6	Play Shuffle	
z=7	Play Repeat	
z=8	Play Shuffle Repeat	

5.2   Zone Status Information Message

RSP	#Z1,ON,SRC4,VOL60,DND0,LOCK0 – POWER ON or #Z1,OFF – POWER OFF	
Response Packet Breakdown		
Zx	x=The zone the message is from: 1 to 20	
ON or OFF	ON=Power is ON, OFF=Power is OFF	
SRCx	x=The zones current audio source: 1 to 6	
VOLx	x=The zones current volume level: 0=Max to 79=Min or MUTE	
DNDx	0=Do Not Disturb is OFF, 1=Do Not Disturb is ON	
LOCKx	0=Zone is not locked, 1=Zone is locked	

5.3   *Source Display Line Information Message*

The information contained in the message pertains to the title of the current song playing on an iPod or CD player that is displayed on a Control Pad.

RSP	#SsDISPLINEx,"y"
Response Packet Breakdown	
S	The source the message is from: 1 to 6
X	Line the text is displayed on the Control Pad
Y	Actual line of text from the Control Pad

5.4   *Zone PREV Button Pressed Information Message*

This message is generated whenever a user presses a Control Pad's PREV button.

RSP	#ZzSsPREV
Response Packet Breakdown	
z	The zone number generating button push: 1 to 20
s	The current source number for that source: 1 to 6

5.5   *Zone NEXT Button Pressed Information Message*

This message is generated whenever a user presses a Control Pad's NEXT button.

RSP	#ZzSsNEXT
Response Packet Breakdown	
z	The zone number generating button push: 1 to 20
s	The current source number for that source: 1 to 6

5.6   *Zone PLAY/PAUSE Button Pressed Information Message*

This message is generated whenever a user presses a Control Pad's PLAY/PAUSE button.

RSP	#ZzSsPLAYPAUSE
Response Packet Breakdown	
z	The zone number generating button push: 1 to 20
s	The current source number for that source: 1 to 6

5.7   Zone MACRO Ran Information Message

This message is will occur whenever a named macro associated with an IR source is executed.

RSP	#ZzSsMACROm
Response Packet Breakdown	
z	The zone number generating button push: 1 to 20
s	The current source number for that source: 1 to 6
m	The macro number where 1 is the first macro in the Macros Menu.

6.0 System Commands

The commands listed in this section control the overall functionality of the NuVo Grand Concerto or Essentia E6G System. They are not tied to a specific zone or audio source.

6.1 Request Version

This command will request the version information from the NuVo Main Processor Unit.

Grand Concerto System:

CMD	*VER
RSP	#VER"NV-I8G FWv0.91 HWv0"
Response Packet Breakdown	
NV-IG8	Grand Concerto product number
FWv0.91	Firmware version
HWv0	Hardware version

Essentia E6G System:

CMD	*VER
RSP	#VER"NV-E6G FWv0.91 HWv0"
Response Packet Breakdown	
NV-E68	Essentia E6G product number
FWv0.91	Firmware version
HWv0	Hardware version

6.2 Set Mute

This command will turn the mute ON or OFF for all active zones.

CMD	*MUTEx
Command Parameters	
x=0	Turn the mute OFF
x=1	Turn the mute ON
RSP	#MUTEx
Response Packet Breakdown	
x=0	Mute OFF
x=1	Mute ON

6.3 Send All Zones a Message

This command will display the text string in the bottom line of the Display Pads on all active zones.

CMD	*MSG"x"	
Command Parameters		
x	Any text message up to 50 characters	
RSP	#OK	

6.4 Turn All Zones Off

This command will immediately turn all active zones OFF.

CMD	*ALLOFF	
Command Parameters		
RSP	#ALLOFF	

6.5 Set Page

This command will turn the page ON or OFF for all active zones. When paging is activated, all zones are turned on and switched to source 6 at the configured Page Volume. When paging is turned off, all zones are restored to their pre-page state. Zones with DND turned on or configured as DND-Paging will not be affected by paging.

CMD	*PAGEx	
Command Parameters		
x=0	Turn the page OFF	
x=1	Turn the page ON	
RSP	#PAGEx	
Response Packet Breakdown		
x=0	Page OFF	
x=1	Page ON	

6.6 Configure the Security Code

This command will allow the user to configure the Grand Concerto's security code.

CMD	*CFGSCODE"xxxx"	
Command Parameters		
Xxxx	This argument is exactly 4 numeric digits "1234"	
RSP	#OK	

6.7 Configure the External Mute

The External Mute refers to the function of the "EXT MUTE" input on the back of the system's main unit. In normal operation x=0, when the trigger condition occurs, the system will be muted (same as *MUTE1). The alternate configuration (x=1) is paging (*PAGE1). Low trigger (y=0) indicates that the trigger condition is a low voltage (<0.5V) or a contact closure. High trigger (y=1) configures the trigger as a high (>2V) or open condition. When paging is activated, all zones are turned on and switched to source 6 at the configured Page Volume. When paging is turned off, all zones are restored to their pre-page state. Zones with DND turned on or configured as DND-Paging will not be affected by paging.

CMD	*CFGEXTMUTEx,y
Command Parameters	
x=0	Turn the external mute OFF
x=1	Turn the external mute ON
y=0	Mute is active LO
y=1	Mute is active HI
RSP	#OK

6.8 Configure Time

This command will allow the user to set the real time clock in the Grand Concerto. This command will result in an error response a ("**#?**<CR><LF>" string) with the Essentia NV-E6G as there is no real time clock.

CMD	*CFGTIMEy,m,d,h,n
Command Parameters	
Y	Year in the format: yyyy (2007)
M	Month in the format: mm (01 to 12)
D	Day in the format: dd (01 to 31)
H	Hours in the format: hh (00 to 23)
N	Minutes in the format: nn (00 to 59)
RSP	#OK

6.9 Configure Time Display Mode

This command will allow the user to set the time display mode in the Grand Concerto. This command will result in an error response a ("**#?**<CR><LF>" string) with the Essentia NV-E6G as there is no real time clock.

CMD	*CFGTIMEMODEx
Command Parameters	
x=0	12 hour display mode

x=1	24 hour display mode
RSP	#OK

6.10   Configure Serial Line Delay

This command will allow the user to set the line delay between each message that is output by the Main Processor Unit on the serial port.

CMD	*CFGSDELAYms
Command Parameters	
ms	Line delay between each serial message (in milliseconds). The following values are valid: 0, 1, 2, 3, 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 All other values provided will be rounded down to the nearest valid number of milliseconds.
RSP	#OK

6.11   Configure Power Off Mode

CMD	*CFGPWROFFx
Command Parameters	
x=0	Tap power for zone mute, hold power for a menu to turn other zones off
x=1	Tap power for zone off, hold power for a menu to turn other zones off
x=2	Tap power for zone off, hold power for all off
RSP	#OK

7.0 Source Commands

Source commands are messages that are sent to all zones that are currently listening to the specified source

7.1   Set a Sources Display Line Information

This command will set the display line information for a source. This command can only be used with non-NuVoNet sources.

CMD	*SsDISPLINEx"y"
Command Parameters	
s	The source to send the message to: 1 to 6
x	Line the text is displayed on the Control Pad: 1 to 4
y	Actual line of text to display
RSP	Refer to section 5.3 for the response to this command

7.2   Request a Sources Display Line Information

This command will request all of the display line information for a source.

CMD	*SsDISPLINE?
Command Parameters	
s	The source to send the message to: 1 to 6
RSP	Refer to section 5.3 for the response to this command

7.3   *Set a Sources Display Track Status*

This command will set a sources display track status information for a source. This command can only be used for non-NuVoNet sources.

CMD	*SsDISPINFO,x,y,z	
Command Parameters		
s	The source the message is from: 1 to 6	
x	Length of song in 10ths of seconds	
y	Current stream time in playing song in 10ths of seconds	
z=0	Normal	
Z=1	Idle	
z=2	Playing	
z=3	Paused	
z=4	Fast Forward	
z=5	Rewind	
z=6	Play Shuffle	
z=7	Play Repeat	
z=8	Play Shuffle Repeat	
RSP	**Refer to section 5.3 for the response to this command**	

7.4   *Request a Sources Display Track Status*

This command will request the track information for a source.

CMD	*SsDISPINFO?	
Command Parameters		
S	The source to send the message to: 1 to 6	
RSP	**Refer to section 5.1 for the response to this command**	

7.5   Execute an IR Control Macro for a Source

This command will execute an IR control macro that was configured with the Configurator for a specific source.

CMD	*SsIRCTLy	
Command Parameters		
s	The source to send the message to: 1 to 20	
y	The control macro number	
RSP	#ZoSsIRCTLy	
s	The source that executed the control macro	
y	The control macro number	

7.6   Execute an IR Preset Macro for a Source

This command will execute an IR preset macro that was configured with the Configurator for a specific source.

CMD	*SsIRPREy	
Command Parameters		
s	The source to send the message to: 1 to 20	
y	The preset macro number	
RSP	#ZoSsIRPREy	
s	The source that executed the preset macro	
y	The preset macro number	

7.7   Send a Message to a Source

This command will send a text message to a source with different importance levels and dwell times.

CMD	*SsMSG"x",a,b	
Command Parameters		
s	The source to send the message to: 1 to 6	
x	Text message to send to the source (20 character max)	
a=0	Information message	
a=1	Warning message	
a=2	Error message	
a=3	Flash the message	
b=0	Normal dwell time	
b=1	Short dwell time	
b=2	Long dwell time	
RSP	#OK	

7.8 Is a NuVoNet Source using this Address?

This command will query a NuVoNet source to see if it is using the source address.

CMD	*SsACTIVE?	
Command Parameters		
s	The source to send the message to: 1 to 6	
RSP	#SsACTIVEx	
Response Packet Breakdown		
s	s=The source the message is from: 1 to 6	
x	0=Source **NOT** active, 1=Source is active	

7.9 Get the Current Name of a Source

This command will query a NuVoNet source for its name. This name could be different than the configuration name. The response message of this command will also be sent in an **unsolicited** mode whenever an iPod is docked or undocked.

CMD	*SsNAME?	
Command Parameters		
s	The source to send the message to: 1 to 6	
RSP	#SsNAME"x"	
Response Packet Breakdown		
s	s=The source the message is from: 1 to 6	
x	x=The text name of the source (20 characters max)	

7.10   Set the Name of a Source

This command will set the name of a NuVoNet source. This name is volatile and only temporarily overrides the configuration name.

CMD	*SsNAME"x"	
Command Parameters		
s	The source to send the message to: 1 to 6	
x	x=The text name of the source (20 characters max)	
RSP	#SsNAME"x"	
Response Packet Breakdown		
s	s=The source the message is from: 1 to 6	
x	x=The text name of the source (20 characters max)	

8.0   Source Configuration Commands

The commands listed in this section apply only to the audio sources and their configuration.

8.1   Source Configuration Response

The following response is common for all source configuration commands.

RSP	#SCFGx,ENABLE1,NAME"M3 A",GAIN0,NUVONET1,SHORTNAME"M3A" or #SCFG1,ENABLE0
Response Packet Breakdown	
SCFGx	x=The source the message is from: 1 to 6
ENABLEx	0=Source Not Enabled, 1=Source Enabled
NAME"x"	x=The text name of the source (20 characters max)
GAINx	x=The current gain setting of the source: 0-14
NUVONETx	0=Not A NuVo Net source, 1=A NuVo Net Source
SRCSTATUSx	0=Don't use the sources status, 1=Use the sources status
SHORTNAME"xyz"	Three character description of the source

8.2   Request the Sources Configuration Status

This command will request the current configuration status of a source.

CMD	*SCFGsSTATUS?
Command Parameters	
s	The source to send the message to: 1 to 6
RSP	Refer to section 8.1 for the response to this command

8.3   Set the Source Enable

This command will enable or disable a source.

CMD	*SCFGsENABLEx
Command Parameters	
s	The source to send the message to: 1 to 6
x	0=Disable Source, 1=Enable Source
RSP	Refer to section 8.1 for the response to this command

8.4   Set the Source Name

This command will set the name of a source.

CMD	*SCFGsNAME"x"	
Command Parameters		
s	The source to send the message to: 1 to 6	
x	x=The text name of the source (20 characters max)	
RSP	**Refer to section 8.1 for the response to this command**	

8.5   Set the Source Gain

This command will set the gain of a source.

CMD	*SCFGsGAINx	
Command Parameters		
s	The source to send the message to: 1 to 6	
x	x=Gain: 0 to 14	
RSP	**Refer to section 8.1 for the response to this command**	

8.6   Set the NuVoNet Source

This configures whether or not the source is a "Smart" NuVoNet source or an "IR" source.

CMD	*SCFGsNUVONETx	
Command Parameters		
s	The source to send the message to: 1 to 6	
x	0=Not A NuVo Net source, 1=A NuVo Net Source	
RSP	**Refer to section 8.1 for the response to this command**	

8.7   Set the Sources Short Name

This sets a three-character short name for a source.

CMD	*SCFGsSHORTNAME"xyz"	
Command Parameters		
s	The source to send the message to: 1 to 6	
x	0=Not A NuVo Net source, 1=A NuVo Net Source	
RSP	**Refer to section 8.1 for the response to this command**	

9.0   Zone Commands

The commands listed in this section apply only to the audio zones.

9.1   Request the Zones Status

This command will request the current status of a zone.

CMD	*ZzSTATUS?
Command Parameters	
z	The zone to send the message to: 1 to 20
RSP	Refer to section 5.2 for the response to this command

9.2   Turn the Zones Power ON/OFF

This command will toggle the power to a zone ON or OFF.

CMD	*ZzPOWER
Command Parameters	
z	The zone to send the message to: 1 to 20
RSP	Refer to section 5.2 for the response to this command

9.3   Turn the Zone ON

This command will turn a zone ON.

CMD	*ZzON
Command Parameters	
z	The zone to send the message to: 1 to 20
RSP	Refer to section 5.2 for the response to this command

9.4   Turn the Zone OFF

This command will turn a zone OFF.

CMD	*ZzOFF	
Command Parameters		
z	The zone to send the message to: 1 to 20	
RSP	#Z1,OFF	
Response Packet Breakdown		
Zx	x=The zone the message is from: 1 to 20	
OFF	OFF=Power is OFF	

9.5   Set the Zones Source

This command will set the audio source for a zone.

CMD	*ZzSRCx	
Command Parameters		
Z	The zone to send the message to: 1 to 20	
X	The audio source to use: 1 to 6	
RSP	Refer to section 5.2 for the response to this command	

9.6   Switch the Zone to the Next Available Source

This command will switch the zone to the next available source.

CMD	*ZzSRC+	
Command Parameters		
z	The zone to send the message to: 1 to 20	
RSP	Refer to section 5.2 for the response to this command	

9.7   Set the Zones Volume

This command will set the volume of a zone.

CMD	*ZzVOLx	
Command Parameters		
z	The zone to send the message to: 1 to 20	
x	The volume to use: 0=Max to 79=Min	
RSP	Refer to section 5.2 for the response to this command	

9.8   Increment the Zones Volume

This command will increase the zones volume by one.

CMD	*ZzVOL+
Command Parameters	
z	The zone to send the message to: 1 to 20
RSP	**Refer to section 5.2 for the response to this command**

9.9   Decrement the Zones Volume

This command will decrease the zones volume by one.

CMD	*ZzVOL-
Command Parameters	
z	The zone to send the message to: 1 to 20
RSP	**Refer to section 5.2 for the response to this command**

9.10   Turn the Zones Mute ON/OFF

This command will toggle the mute ON or OFF for a zone.

CMD	*ZzMUTE
Command Parameters	
z	The zone to send the message to: 1 to 20
RSP	**Refer to section 5.2 for the response to this command**

9.11   Turn the Zones Mute ON

This command will turn ON the mute of a zone.

CMD	*ZzMUTEON
Command Parameters	
z	The zone to send the message to: 1 to 20
RSP	**Refer to section 5.2 for the response to this command**

9.12   Turn the Zones Mute OFF

This command will turn OFF the mute of a zone.

CMD	*ZzMUTEOFF	
Command Parameters		
z	The zone to send the message to: 1 to 20	
RSP	Refer to section 5.2 for the response to this command	

9.13   Simulate Zone PLAY/PAUSE Button Press

This command simulates the push/release of the PLAYPAUSE button on a ControlPad.

CMD	*ZzPLAYPAUSE	
Command Parameters		
z	The zone to send the message to: 1 to 20	
RSP	Refer to section 5.6 for the response to this command	

9.14   Simulate Zone PREV Button Press

This command simulates the push/release of the PREV button on a ControlPad.

CMD	*ZzPREV	
Command Parameters		
z	The zone to send the message to: 1 to 20	
RSP	Refer to section 5.4 for the response to this command	

9.15   Simulate Zone NEXT Button Press

This command simulates the push/release of the NEXT button on a ControlPad.

CMD	*ZzNEXT	
Command Parameters		
z	The zone to send the message to: 1 to 20	
RSP	Refer to section 5.5 for the response to this command	

9.16   Turn the Zones Do Not Disturb (DND) ON/OFF

This command will toggle the DND of a zone ON or OFF.

CMD	*ZzDND	
Command Parameters		
z	The zone to send the message to: 1 to 20	
RSP	**Refer to section 5.2 for the response to this command**	

9.17   Turn the Zones DND ON

This command will turn ON the DND of a zone.

CMD	*ZzDNDON	
Command Parameters		
z	The zone to send the message to: 1 to 20	
RSP	**Refer to section 5.2 for the response to this command**	

9.18   Turn the Zones DND OFF

This command will turn OFF the DND of a zone.

CMD	*ZzDNDOFF	
Command Parameters		
z	The zone to send the message to: 1 to 20	
RSP	**Refer to section 5.2 for the response to this command**	

9.19   Turn Party Host ON or OFF

This command allows a zone to become a party host or to exit party host mode.

CMD	*ZzPARTYx	
Command Parameters		
z	The zone to send the message to: 1 to 20	
x	0 to release party host mode for this zone, 1 to make this zone the party host	
RSP	#ZzPARTYx	

9.20   Turn the Zones Lock ON

This command will turn ON the lock of a zone.

CMD	*ZzLOCKON
Command Parameters	
z	The zone to send the message to: 1 to 20
RSP	**Refer to section 5.2 for the response to this command**

9.21   Turn the Zones Lock OFF

This command will turn OFF the lock of a zone if the passed 4 digit security code matches the programmed code.

CMD	*ZzLOCKOFF"xxxx"	
Command Parameters		
z	The zone to send the message to: 1 to 20	
xxxx	The 4 digit security code	
RSP	**Refer to section 5.2 for the response to this command**	

9.22   Execute an IR Control Macro for a Zones Source

This command will execute an IR control macro that was configured with the Configurator for the active source on a zone.

CMD	*ZzIRCTLy	
Command Parameters		
z	The zone to send the message to: 1 to 20	
y	The control macro number	
RSP	#ZzSsIRCTLy	
z	The zone that executed the control macro	
s	The active source on zone 'z'	
y	The control number that was executed on source 's'	

9.23   Execute an IR Preset Macro for a Zones Source

This command will execute an IR preset macro that was configured with the Configurator for the active source on a zone.

CMD	*ZzIRPREy	
Command Parameters		
z	The zone to send the message to: 1 to 20	
y	The preset macro number	
RSP	#ZzSsIRPREy	
z	The zone that executed the preset	
s	The active source on zone 'z'	
y	The preset number that was executed on source 's'	

9.24   Send a Message to a Zone

This command will send a text message to a zone with different importance levels and dwell times.

CMD	*ZzMSG"x",a,b	
Command Parameters		
z	The zone to send the message to: 1 to 20	
x	Text message to send to the source (50 character max)	
a=0	Information message	
a=1	Warning message	
a=2	Error message	
a=3	Flash the message	
b=0	Normal dwell time	
b=1	Short dwell time	
b=2	Long dwell time	
RSP	#OK	

9.25   Is a Control Pad using this Zone Address?

This command will query a Control Pad to see if it is using the zone address.

CMD	*ZzACTIVE?	
Command Parameters		
z	The zone to send the message to: 1 to 20	
RSP	#ZzACTIVEx	
Response Packet Breakdown		
z	s=The zone the message is from: 1 to 20	
x	0=Zone **NOT** active, 1=Zone is active	

9.26   Simulate Control Pad Button Press

This command will simulate the pushing of a button on a Control Pad.

CMD	*ZzBUTTONb,action,menuid,itemid,itemindex	
Command Parameters		
Z	The zone to send the message to: 1 to 20	
b=1	Simulate pushing the **OK** button	
b=2	Simulate pushing the **PLAYPAUSE** button	
b=3	Simulate pushing the **PREV** button	
b=4	Simulate pushing the **NEXT** button	
b=5	Simulate pushing the **POWERMUTE** button	
b=7	Simulate pushing the **UP** button	
b=8	Simulate pushing the **DOWN** button	
action=0	Button action is DOWNUP – button press and immediate release	
action=1	Button action is DOWN – MUST be followed by an UP action	
action=2	Button action is UP – Only valid when menus are not active	
menuid	ID of the active menu	
itemid	ID of the selected menu item	
itemindex	Index of the selected menu item	
RSP	#OK	

9.27   Select a Favorite

This command will act like selecting a Favorite Playlist from a Control Pad.

CMD	*ZzFAVf	
Command Parameters		
z	The zone to send the message to: 1 to 20	
f	Favorite to select: 1 to 12	
RSP	#OK	

9.28   Redirect a Zones Communication to Serial Port

This command will redirect all zone communication to the serial port. This command must be issued in order to implement menu-browsing capability for a zone. This command will fail if a zone is not enabled in the configuration or if a ControlPad is already using this zone address.

CMD	*ZzSERIALx	
Command Parameters		
z	The zone to send the message to: 1 to 20	
x	0=do not redirect communication to serial port, 1=redirect communication to serial port	
RSP	#OK	

9.29   Request a Menu

This command is used for a zone to request a list of up to 20 menu items. If a menu contains more than 20 items, then multiple menu requests must be performed in order to retrieve the entire list.   The controller should wait for the response to each menu request before issuing the next menu request. See Appendix 1 for usage example.

CMD	*ZzMENUREQ,menuid,up,location,itemindex
Command Parameters	
z	The zone to send the message to: 1 to 20
menuid	id of the menu being requested. Use 0xFFFFFFFF to request main menu.
up	0=ignore this argument 1=request the parent menu of the current menu and ignore the remaining arguments to this command
location=0	Retrieve block starting with first item in menu (i.e. 'home' button)
location=1	Retrieve block ending with last item in menu (i.e. 'end' button)
location=2	Retrieve block starting with itemindex (useful for scrolling down a list)
location=3	Retrieve block ending with itemindex (useful for scrolling up a list)
itemindex	Used as a base index for menu requests with location=2 or location=3
RSP	#ZzMENU,menuid,timeout,albumartid,menusize,selecteditemindex,firstblockitemindex,blocksize,"description"
Response Packet Breakdown	
z	The zone the message is from: 1 to 20
menuid	The id of the menu, if 0 the controller must exit the menu
timeout	0=normal menu n=display countdown and automatically take highlighted action after n seconds
albumartid	Not implemented, should be 0
menusize	The total number of items in the menu, 65535 indicates that a menu may take some time to retrieve, controller should tell user to wait while the menu is loading.
selecteditemindex	The index of the selected item, ignore this parameter if it is equal to 65535
firstblockitemindex	The index of the first item in this block

blocksize	The number of items in this block
"description"	The description of the menu (up to 40 characters)
RSP	**#ZzMENUITEM,itemid,itemtype,albumartid,"description"**
Response Packet Breakdown	
z	The zone the message is from: 1 to 20
itemid	The id of the menu item
Itemtype	bitmask indicating how to display menu item bit 0: the item has a sub-menu associated with it bit 1: 'play' will have a different effect than 'select' bit 2: disabled menu item, do not allow 'play' or 'select' bit 3: display checkmark in front of this item bit 4: advanced menu item, should be made difficult or impossible for user to access bit 5: not implemented bit 6: not implemented bit 7: not implemented
"description"	The description of the menu item (up to 40 characters)

9.30   Keep a Menu Active or Exit a Menu

This command is used for a zone to keep a menu from timing out or to force the exit from a menu.

CMD	*ZzMENUACTIVE,menuid,exit
Command Parameters	
z	The zone to send the message to: 1 to 20
menuid	id of the currently active menu.
exit	0=keep the menu active, prevent timeout (this could be used when a user is scrolling up and down through a list of items that has already been retrieved from the Main Processor Unit). 1=exit the menu (this can be used to implement a menu timeout in the controller).
RSP	#OK

10.0 Zone Configuration Commands

The commands listed in this section apply only to the zones and their configuration. All of these commands set the default/power-up state of a zone.

10.1   Zone Configuration Response

The following response is common for all zone configuration commands.

RSP	#ZCFG1,ENABLE1,NAME"M3 A",SLAVETO0,GROUP0,SOURCES0,XSRC0,IR0,DND0,LOCKED0 or #ZCFG1,ENABLE0
Response Packet Breakdown	
ZCFGx	x=The zone the message is from: 1 to 20
ENABLEx	0=Zone Not Enabled, 1=Zone Enabled
NAME"x"	x=The text name of the zone (20 characters max)
SLAVETOx	x=Zone to Slave To: 1 to 16 or 0=None
GROUPx	x=Group to Join: 1 to 4 or 0=None
SOURCESx	x=0 to 63 indicating a bitmask of the sources allowed
XSRCx	0=Not Exclusive, 1=Exclusive
IRx	0=Enabled, 1=Pass Thru Disabled, 2=All Disabled
DNDx	A bitmask (0x01=NoMute, 0x02=NoPage, 0x04=NoParty)
LOCKEDx	0=Lock Off, 1=Lock On

10.2   Request the Zones Configuration Status

This command will request the current configuration status of a zone.

CMD	*ZCFGzSTATUS?
Command Parameters	
z	The zone to send the message to: 1 to 20
RSP	Refer to section 10.1 for the response to this command

10.3   Set the Zones Enable

This command will enable or disable a zone.

CMD	*ZCFGzENABLEx
Command Parameters	
z	The zone to send the message to: 1 to 20
x	0=Disable Source, 1=Enable Source
RSP	**Refer to section 10.1 for the response to this command**

10.4   Set the Zones Name

This command will set the name of a zone.

CMD	*ZCFGzNAME"x"
Command Parameters	
Z	The zone to send the message to: 1 to 20
X	x=The text name of the source (20 characters max)
RSP	**Refer to section 10.1 for the response to this command**

10.5   Slave a Zone to another Zone

This command will slave the zone to another zone. When a zone is slaved to another zone, the Main Processor Unit only outputs zone status commands for the master zone. The slaved zone must treat the zone status commands that are addressed to the master zone as if they were addressed directly to the slaved zone.

CMD	*ZCFGzSLAVETOx
Command Parameters	
Z	The zone to send the message to: 1 to 20
X	x=Zone to Slave To: 1 to 16 or 0=None
RSP	**Refer to section 10.1 for the response to this command**

10.6   Join a Zone to a Group

This command will join a zone to a group of zones so they can all be controlled as one.

CMD	*ZCFGzGROUPx	
Command Parameters		
Z	The zone to send the message to: 1 to 20	
X	x=Group to Join: 1 to 4 or 0=None	
RSP	**Refer to section 10.1 for the response to this command**	

10.7   Enable Sources a Zone can Select

This command will enable the audio sources a zone can select for use.

CMD	*ZCFGzSOURCESx	
Command Parameters		
Z	The zone to send the message to: 1 to 20	
X	x=0 to 63 indicating a bitmask of the sources allowed	
RSP	**Refer to section 10.1 for the response to this command**	

10.8   Set the Exclusive Source for a Zone

This command will enable the audio sources a zone can select for use.

CMD	*ZCFGzXSRCx	
Command Parameters		
Z	The zone to send the message to: 1 to 20	
X	0=Not Exclusive, 1=Exclusive	
RSP	**Refer to section 10.1 for the response to this command**	

10.9   Set the Zones IR state

This command will set the state of the IR for a zone.

CMD	*ZCFGzIRx	
Command Parameters		
Z	The zone to send the message to: 1 to 20	
X	0=Enabled, 1=Pass Thru Disabled, 2=All Disabled	
RSP	**Refer to section 10.1 for the response to this command**	

10.10   Set the Zones Do Not Disturb (DND)

This command will set the state of the DND for a zone.

CMD	*ZCFGzDNDx	
Command Parameters		
Z	The zone to send the message to: 1 to 20	
X	A bitmask (0x01=NoMute, 0x02=NoPage, 0x04=NoParty)	
RSP	**Refer to section 10.1 for the response to this command**	

10.11   Set the Zones Lock

This command will set the locked/unlocked state of a zone.

CMD	*ZCFGzLOCKEDx	
Command Parameters		
Z	The zone to send the message to: 1 to 20	
X	0=Lock Off, 1=Lock On	
RSP	**Refer to section 10.1 for the response to this command**	

10.12   Zone EQ Configuration Response

The following response is common for all zone EQ configuration commands.

RSP	#ZCFG1,BASS0,TREB0,BALC,LOUDCMP0
Response Packet Breakdown	
ZCFGx	x=The zone the message is from: 1 to 20
BASSx	x=The current bass level: –18 to +18 (increments of 2)
TREBx	x=The current treble level: –18 to +18 (increments of 2)
BALx	BALL (left) 2 to 18, BALR (right) 2 to 18,BALC (center) 0
LOUDCMPx	0=Loudness Compensation Off, 1=Loudness Compensation On

10.13   Request the Zones EQ Configuration

This command will request the current EQ configuration from a zone.

CMD	*ZCFGzEQ?	
Command Parameters		
Z	The zone to send the message to: 1 to 20	
RSP	**Refer to section 10.12 for the response to this command**	

10.14   Set the Zones Bass Level

This command will set the zones bass level.

CMD	*ZCFGzBASSx	
Command Parameters		
Z	The zone to send the message to: 1 to 20	
X	–18 to +18 (increments of 2)	
RSP	**Refer to section 10.12 for the response to this command**	

10.15   Set the Zones Treble Level

This command will set the zones treble level.

CMD	*ZCFGzTREBx	
Command Parameters		
Z	The zone to send the message to: 1 to 20	
X	–18 to +18 (increments of 2)	
RSP	**Refer to section 10.12 for the response to this command**	

10.16   Set the Zones Right Balance

This command will set the zones right balance level.

CMD	*ZCFGzBALRx	
Command Parameters		
Z	The zone to send the message to: 1 to 20	
X	0 to 18 (increments of 2)	
RSP	**Refer to section 10.12 for the response to this command**	

10.17   Set the Zones Center Balance

This command will set the zones balance level to zero (or center).

CMD	*ZCFGzBALC	
Command Parameters		
z	The zone to send the message to: 1 to 20	
RSP	**Refer to section 10.12 for the response to this command**	

10.18   Set the Zones Left Balance

This command will set the zones left balance level.

CMD	*ZCFGzBALLx	
Command Parameters		
z	The zone to send the message to: 1 to 20	
x	0 to 18 (increments of 2)	
RSP	Refer to section 10.12 for the response to this command	

10.19   Set the Zones Loudness Compensation

This command will enable/disable the zones loudness compensation.

CMD	*ZCFGzLOUDCMPx	
Command Parameters		
z	The zone to send the message to: 1 to 20	
x	0=Loudness Compensation Off, 1=Loudness Compensation On	
RSP	Refer to section 10.12 for the response to this command	

10.20   Zone Volume Configuration Response

The following response is common for all zone volume configuration commands.

RSP	#ZCFG1,MAXVOL0,INIVOL0,PAGEVOL0,PARTYVOL0,VOLRST0	
Response Packet Breakdown		
ZCFGx	x=The zone the message is from: 1 to 20	
MAXVOLx	x=The zones maximum volume level: 0=Max to 79=Min	
INIVOLx	x=The zones initial power on volume level: 0=Max to 79=Min	
PAGEVOLx	x=The zones paging volume level: 0=Max to 79=Min	
PARTYVOLx	x=The zones party volume level: 0=Max to 79=Min	
VOLRSTx	0=Don't Reset, 1=Reset	

10.21   Request the Zones Volume Configuration

This command will request the current volume configuration from a zone.

CMD	*ZCFGzVOL?	
Command Parameters		
z	The zone to send the message to: 1 to 20	
RSP	**Refer to section 10.20 for the response to this command.**	

10.22   Set the Zones Maximum Volume Level

This command will set the zones maximum volume level.

CMD	*ZCFGzMAXVOLx	
Command Parameters		
z	The zone to send the message to: 1 to 20	
x	x=Maximum level: 0=Max to 79=Min	
RSP	**Refer to section 10.20 for the response to this command.**	

10.23   Set the Zones Initial Volume Level

This command will set the zones initial power on volume level.

CMD	*ZCFGzINIVOLx	
Command Parameters		
z	The zone to send the message to: 1 to 20	
x	x=Maximum level: 0=Max to 79=Min	
RSP	**Refer to section 10.20 for the response to this command.**	

10.24   Set the Zones Paging Volume Level

This command will set the zones paging volume level.

CMD	*ZCFGzPAGEVOLx	
Command Parameters		
z	The zone to send the message to: 1 to 20	
x	x=Maximum level: 0=Max to 79=Min	
RSP	**Refer to section 10.20 for the response to this command.**	

10.25   Set the Zones Party Volume Level

This command will set the zones party volume level.

CMD	*ZCFGzPARTYVOLx	
Command Parameters		
z	The zone to send the message to: 1 to 20	
x	x=Maximum level: 0=Max to 79=Min	
RSP	**Refer to section 10.20 for the response to this command.**	

10.26   Reset the Zones Volume Levels

This command specifies if the volume should always reset to the INIVOL level when a zone is turned on. If VOLRST is 0, the volume will be the same as when the zone was turned off.

CMD	*ZCFGzVOLRSTx	
Command Parameters		
z	The zone to send the message to: 1 to 20	
x	0=Don't Reset, 1=Reset	
RSP	**Refer to section 10.20 for the response to this command.**	

10.27   Zone Display Configuration Response

The following response is common for all zone display configuration commands.

RSP	#ZCFG1,BRIGHT0,AUTODIM0,DIM0,DISPMODE0,TIME1
Response Packet Breakdown	
ZCFGx	x=The zone the message is from: 1 to 20
BRIGHTx	x=The zones Control Pad brightness level: 1 to 7
AUTODIMx	x=The zones Control Pad auto dim delay time: 0 to 8
DIMx	x=The zones Control Pad dim mode: 0 to 3
DISPMODEx	x=0 (not currently used)
TIMEx	0=Don't display time, 1=Display time

10.28   Request the Zones Display Configuration

This command will request the current display configuration from a zone.

CMD	*ZCFGzDISP?
Command Parameters	
z	The zone to send the message to: 1 to 20
RSP	**Refer to section 10.27 for the response to this command.**

10.29   Set the Zones Brightness Level

This command will set the zones Control Pad brightness level.

CMD	***ZCFGzBRIGHTx**
Command Parameters	
z	The zone to send the message to: 1 to 20
x	x=Control Pad brightness level: 1 to 7
RSP	**Refer to section 10.27 for the response to this command.**

10.30   Set the Zones Auto Dim Delay

This command will set the zones Control Pad auto dim delay.

CMD	***ZCFGzAUTODIMx**
Command Parameters	
z	The zone to send the message to: 1 to 20
x=0	Disabled (do not dim)
x=1	Dim after 15 seconds
x=2	Dim after 30 seconds
x=3	Dim after 1 minute
x=4	Dim after 2 minutes
x=5	Dim after 5 minutes
x=6	Dim after 10 minutes
x=7	Dim after 30 minutes
x=8	Dim after 1 hour
RSP	**Refer to section 10.27 for the response to this command.**

10.31 Set the Zones Dim Mode

This command will set the brightness when AUTODIM is engaged or when the time is displayed while the zone is off.

CMD	*ZCFGzDIMx	
Command Parameters		
z	The zone to send the message to: 1 to 20	
x=0	Turn display off	
x=1	Low	
x=2	Medium	
x=3	High	
RSP	**Refer to section 10.27 for the response to this command.**	

10.32 Set the Zones Display Mode (not active)

This command will set the zones Control Pad display mode.

CMD	*ZCFGzDISPMODEx
Command Parameters	
z	The zone to send the message to: 1 to 20
x	x=0
RSP	**Refer to section 10.27 for the response to this command.**

10.33 Set the Zones Display Time

This command will set the zone up to display or not to display the time while zone is off.

CMD	*ZCFGzTIMEx
Command Parameters	
z	The zone to send the message to: 1 to 20
x	0=Don't display time, 1=Display time
RSP	**Refer to section 10.27 for the response to this command.**

11.0   Group Commands

Group commands are messages that are sent to all zones that are currently associated with a group number.

11.1   Turn All Groups Off

This command will off all zones which are members of the specified group.

CMD	*GxOFF	
Command Parameters		
x=0 to 3	Turn group 1, 2, 3 or 4 off	
RSP	#GxOFF	
Response Packet Breakdown		
XOFF	Group turned off	

11.2   Send a Message to a Group

This command will send a text message to all zones which are members of the specified group with different importance levels and dwell times.

CMD	*GgMSG"x",a,b
Command Parameters	
G	The group to send the message to: 1 to 4
X	Text message to send to the source (20 character max)
a=0	Information message
a=1	Warning message
a=2	Error message
a=3	Flash the message
b=0	Normal dwell time
b=1	Short dwell time
b=2	Long dwell time
RSP	#OK

12.0 Menu Navigation

12.1   Menu Navigation Introduction

The Main Processor Unit allows a serial system controller to implement menu navigation that is comparable to the navigation that is performed by the ControlPads. This is achieved by redirecting NuVoNet communication for a specific zone to the serial port. The serial system controller must acquire a zone address that is not already in use by a ControlPad on NuVoNet. After acquiring a zone address, the serial system controller has full control of that particular zone. The serial system controller can also control any other zone in the system by using the *ZCFGSLAVETO command to slave itself to another zone in the system. If a serial system controller intends to be able to control any of the zones in the system, it is recommended that the serial system controller use a zone address between 17-20. Zones 17-20 are always used as slave zones and they do not have speaker outputs associated with them. The following sections provide some menu navigation examples and other general guidelines for implementing menu navigation in a serial system controller.

12.2   Menu Navigation Examples

12.2.1 Acquiring a Zone Address

*zcfg17status?
#ZCFG17,ENABLE0 **← Zone 17 not enabled, we can enable it and redirect to serial port**

*zcfg18status?
#ZCFG18,ENABLE0 **← Zone 18 not enabled, we can enable it and redirect to serial port**

*zcfg19status?
#ZCFG19,ENABLE1,NAME"Zone 19",SLAVETO3,GROUP0,SOURCES255,XSRC0,IR2,DND0,LOCKED0 **← Zone 19 enabled, we may be able to redirect to serial port if a Control Pad is not already using this address**

*zcfg20status?
#ZCFG20,ENABLE1,NAME"Zone 20",SLAVETO4,GROUP0,SOURCES255,XSRC0,IR2,DND0,LOCKED0 **← Zone 20 enabled, we may be able to redirect to serial port if a Control Pad is not already using this address**

*Z20SERIAL,1 **← Let's try to redirect zone 20 to serial port**
#? **← Command failed, this address must be in use by a ControlPad**

*Z19SERIAL,1
#OK **← Command succeeded, zone 19 is redirected to serial port**

*zcfg18enable1 **← Let's enable zone 18 and redirect it to serial port**
#ZCFG18,ENABLE1,NAME"Zone 18",SLAVETO2,GROUP0,SOURCES255,XSRC0,IR2,DND0,LOCKED0
*Z18SERIAL,1
#OK

*zcfg17enable1 **← Let's enable zone 17 and redirect it to serial port**
#ZCFG17,ENABLE1,NAME"Zone 17",SLAVETO1,GROUP0,SOURCES255,XSRC0,IR2,DND0,LOCKED0
*Z17SERIAL,1
#OK

12.2.2 Basic Navigation

*Z19MENUREQ,0xFFFFFFFF,0,0,0 **← Request main menu**
#Z19MENU,0xFFFFFFFF,0,0,11,65535,0,11,"Main Menu" **← Main menu, items 0-10**

```
#Z19MENUITEM,0xFFFF0001,1,0,"Favorites"
#Z19MENUITEM,0xFFFF0002,1,0,"Sources"
#Z19MENUITEM,0x00000002,1,0,"Playlists"
#Z19MENUITEM,0x00000003,1,0,"Artists"
#Z19MENUITEM,0x00000004,1,0,"Albums"
#Z19MENUITEM,0x00000005,1,0,"Genres"
#Z19MENUITEM,0x00000006,1,0,"Tracks"
#Z19MENUITEM,0x00000007,0,0,"Play All"
#Z19MENUITEM,0x00000008,1,0,"M3 Options"
#Z19MENUITEM,0xFFFF0004,1,0,"Adv. Zone Control"
#Z19MENUITEM,0xFFFF0005,1,0,"Setup"
```

*Z19BUTTON1,0,0xFFFFFFFF,0x0000003,3 **← OK button pressed on "Artists"**
#OK
#Z19MENU,0x00000003,0,0,65535,0,0,0,"" **← Please wait while menu is retrieved**
#Z19MENU,0x00000003,0,0,46,0,0,20,"Artists" **← Artists 0-19**
```
#Z19MENUITEM,0x00000002,3,0,".38 Special"
#Z19MENUITEM,0x00000003,3,0,"A.J. Croce"
#Z19MENUITEM,0x00000004,3,0,"ABBA"
#Z19MENUITEM,0x00000005,3,0,"AC/DC"
#Z19MENUITEM,0x00000006,3,0,"Aimee Mann"
#Z19MENUITEM,0x00000007,3,0,"Alison Krauss"
#Z19MENUITEM,0x00000008,3,0,"Annie Lennox"
#Z19MENUITEM,0x00000009,3,0,"Art Garfunkel"
#Z19MENUITEM,0x0000000A,3,0,"Atlanta Rhythm Section & The Marshall Tu"
#Z19MENUITEM,0x0000000B,3,0,"Bachman-Turner Overdrive"
#Z19MENUITEM,0x0000000C,3,0,"Bad Company"
#Z19MENUITEM,0x0000000D,3,0,"Badfinger"
#Z19MENUITEM,0x0000000E,3,0,"Ben Folds"
#Z19MENUITEM,0x0000000F,3,0,"Ben Harper"
#Z19MENUITEM,0x00000010,3,0,"Black Eyed Peas"
#Z19MENUITEM,0x00000011,3,0,"Blue Oyster Cult"
#Z19MENUITEM,0x00000012,3,0,"Bob Dylan"
#Z19MENUITEM,0x00000013,3,0,"Bob Marley"
#Z19MENUITEM,0x00000014,3,0,"Bob Marley & the Wailers"
#Z19MENUITEM,0x00000015,3,0,"Bob Seger & the Silver Bullet Band"
```

*Z19MENUREQ,0x00000003,0,2,20 **← Request next 20 items in this menu**
#Z19MENU,0x00000003,0,0,46,65535,20,20,"Artists" **← Artists 20-39**
```
#Z19MENUITEM,0x00000016,3,0,"Bonnie Raitt"
#Z19MENUITEM,0x00000017,3,0,"Boston"
#Z19MENUITEM,0x00000018,3,0,"Bruce Hornsby & the Range"
#Z19MENUITEM,0x00000019,3,0,"Bruce Springsteen"
#Z19MENUITEM,0x0000001A,3,0,"Buddy Guy"
#Z19MENUITEM,0x0000001B,3,0,"Buffalo Springfield"
#Z19MENUITEM,0x0000001C,3,0,"Carole King"
#Z19MENUITEM,0x0000001D,3,0,"Cat Stevens"
#Z19MENUITEM,0x0000001E,3,0,"Chicago"
#Z19MENUITEM,0x0000001F,3,0,"Chris Isaak"
#Z19MENUITEM,0x00000020,3,0,"Coldplay"
#Z19MENUITEM,0x00000021,3,0,"Collective Soul"
#Z19MENUITEM,0x00000022,3,0,"Cowboy Junkies"
#Z19MENUITEM,0x00000023,3,0,"Creedence Clearwater Revival"
#Z19MENUITEM,0x00000024,3,0,"Crosby, Stills & Nash"
#Z19MENUITEM,0x00000025,3,0,"Cyndi Thomson"
#Z19MENUITEM,0x00000026,3,0,"Dame Janet Baker"
#Z19MENUITEM,0x00000027,3,0,"Dan Fogelberg"
#Z19MENUITEM,0x00000028,3,0,"David Crosby"
#Z19MENUITEM,0x00000029,3,0,"David Gray"
```

*Z19BUTTON1,0,0x00000003,0x0000029,39 **← OK button pressed on "David Gray"**
#OK

#Z19MENU,0x00000004,0,0,65535,0,0,0,"" **← Please wait while menu is retrieved**
#Z19MENU,0x00000004,0,0,1,0,0,1,"Albums" **← Only 1 album by "David Gray"**
#Z19MENUITEM,0x00000034,3,0,"A New Day at Midnight"

*Z19MENUREQ,0x00000004,1,2,20 **← Oops, I meant to select "David Crosby", menu up**
#Z19MENU,0x00000003,0,0,65535,0,0,0,"" **← Please wait while menu is retrieved**
#Z19MENU,0x00000003,0,0,46,39,29,17,"Artists" **← Artists 29-45**
#Z19MENUITEM,0x0000001F,3,0,"Chris Isaak"
#Z19MENUITEM,0x00000020,3,0,"Coldplay"
#Z19MENUITEM,0x00000021,3,0,"Collective Soul"
#Z19MENUITEM,0x00000022,3,0,"Cowboy Junkies"
#Z19MENUITEM,0x00000023,3,0,"Creedence Clearwater Revival"
#Z19MENUITEM,0x00000024,3,0,"Crosby, Stills & Nash"
#Z19MENUITEM,0x00000025,3,0,"Cyndi Thomson"
#Z19MENUITEM,0x00000026,3,0,"Dame Janet Baker"
#Z19MENUITEM,0x00000027,3,0,"Dan Fogelberg"
#Z19MENUITEM,0x00000028,3,0,"David Crosby"
#Z19MENUITEM,0x00000029,3,0,"David Gray" **← This item should be highlighted**
#Z19MENUITEM,0x0000002A,3,0,"Dennis Chambers; Greg Howe; Victor Woote"
#Z19MENUITEM,0x0000002B,3,0,"Diana Krall"
#Z19MENUITEM,0x0000002C,3,0,"London Philharmonic Orchestra"
#Z19MENUITEM,0x0000002D,3,0,"London Symphony Orchestra"
#Z19MENUITEM,0x0000002E,3,0,"New Stories"
#Z19MENUITEM,0x0000002F,3,0,"Seattle Symphony Orchestra"

*Z19BUTTON1,0,0x00000003,0x0000028,38 **← OK button pressed on "David Crosby"**
#OK
#Z19MENU,0x00000004,0,0,65535,0,0,0,"" **← Please wait while menu is retrieved**
#Z19MENU,0x00000004,0,0,1,0,0,1,"Albums" **← Only 1 album by "David Crosby"**
#Z19MENUITEM,0x00000033,3,0,"It's All Coming Back To Me Now"

*Z19BUTTON2,0,0x00000004,0x0000033,0 **← PLAY button pressed on "It's All Coming Back To Me Now"**
#Z3S1PLAYPAUSE
#OK
#Z19MENU,0,0,0,0,0,0,0,"Albums" **← Controller must exit the menu**
#S1DISPLINE1,"1 of 10" **← New display info**
#S1DISPLINE2,"It's All Coming Back To Me Now"
#S1DISPLINE3,"David Crosby"
#S1DISPLINE4,"In My Dreams"
#S1DISPINFO,DUR3914,POS0,STATUS2

12.3 Menu Navigation Considerations

The following is a list of considerations to be made while implementing menu browsing with a serial system controller. These items may not be obvious at first, but they must be taken into consideration if menu navigation is to work properly.

12.3.1 Menu Exit

The serial system controller must exit its menu when the following events occur:
- A menu is received with a menu ID of 0
- The selected source on its zone address or its master zone address changes

The serial serial system controller should also implement its own menu timeout that occurs when no user activity has been detected for an extended period of time. On the ControlPads, this timeout is approximately 30 seconds. When the serial system controller menu timeout is executed, it must send a *ZzMENUACTIVE command with the exitmenu parameter equal to 1.

12.3.2 Zone Status Commands for Slaved Zones

When a zone is slaved to another zone, the Main Processor Unit only outputs zone status commands for the master zone. The slaved zone must treat the zone status commands that are addressed to the master zone as if they were addressed directly to the slaved zone.

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