Serial Protocol

Nº512
CD/SACD Player

mark
Levinson®

FCC Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and the receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

Caution!

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Canada
This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la Classe B est conforme à la norme NMB-003 du Canada.

A Harman International Company

1 Documents

The following documents should also be used with this document to understand how this protocol can be used with the Nº512 CD/SACD Player.

070-19027   Nº512 CD/SACD Player Owner's Manual

1.1 Change List

No changes have been made.

2 Definitions, Acronyms, and Abbreviations

\r	represents the ASCII new line control character (0x0D)
:	External Protocol String Field Separator
,	External Protocol String Field Parameter Separator for multiple parameters
ACK	Acknowledge
AV	Audio Video System generated response
CMD	Command
CS	Control Source
EOP	End of Packet
HOST	The device initiating or receiving the serial communication packets to/from the player.
ML	Mark Levinson
Nº512	The Mark Levinson product receiving or transmitting the serial communication packets to/from the HOST.
NAK/NACK	No Acknowledge
NTF	Notification
PARAM	Parameter
RQST	Request
RSP	Response
SOP	Start of Packet
SPG	Serial Protocol Guidelines
UI	User Interaction
User Parameter	A user changeable variable that stores a specific value that describes an operating condition for the amplifier.

3 General Description

An external host controller can use the external protocol to control the N⍛512 CD/SACD player. The protocol consists of simple ASCII character set based commands, which are passed to the N⍛512 as command packets via either RS-232 port or the Ethernet port. The N⍛512 will reply to command packets with an acknowledgement to signify that the command has been recognized and acted upon.

```
┌────────────────┐         RS232C cable          ┌──────────────┐
│   EXTERNAL     │                               │    N⍛512     │
│   HOST         │ ═════════════════════════════ │ CD/SACD player│
│  (Controller)  │        or Ethernet cable      │              │
└────────────────┘                               └──────────────┘
```
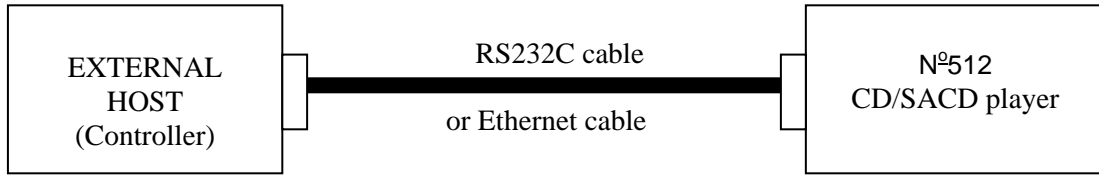
3.1 Serial Port and Cable Configuration

The RS-232 control is through an RJ-11 connector located on the rear panel of the N⍛512 player. The pin-out of the RJ-11 connector is:

Pin 2 - Rx from the control device Data Receive

Pin 3 - Tx to the control device Data Transmit

Pin 5 - system ground

The N⍛512 player receives control messages on pin 2 Data Receive and transmit status responses, notifications, and query data on pin 3 Data Transmit. The connection cable between the N⍛512 and the control device must be configured so that the receive signal on the N⍛512 is connected to the transmit signal of the control device.

3.2 Physical Connection Using a RJ-11 Cable

Host Controller   N⍛512 CD/SACD Player

Host Controller			RJ-11 Cable			N⍛512 CD/SACD Player
Receive Data	2			3		Transmit Data
Transmit Data	3			2		Receive Data
Ground	5			5		Ground

Bit Rate: 57600bps
Data Bits: 8bit
Parity: None
Stop bit: 1bit
Flow Control: None
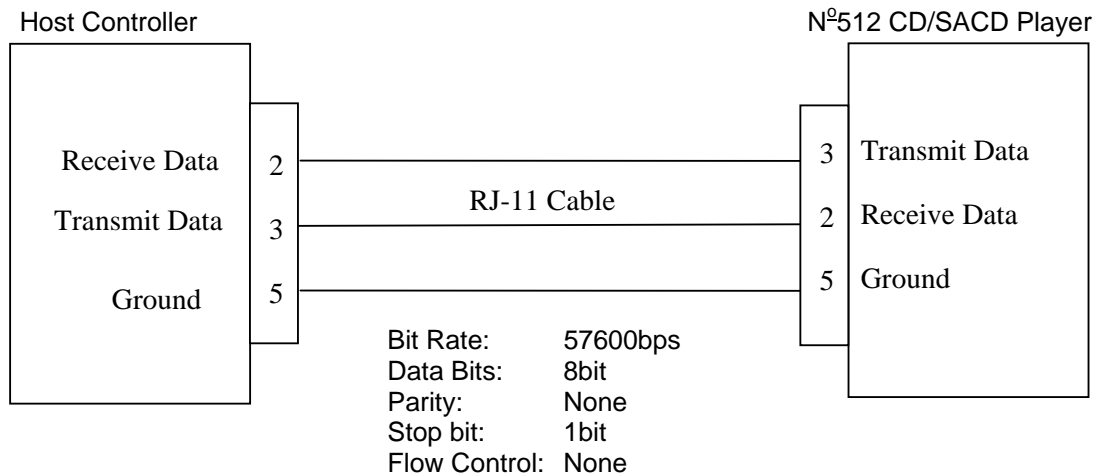
3.3 Physical Connection cable using RJ-11 to DSUB-9

Generally, if connecting the N⍛512 player directly to a computer, a RJ-11 to DSUB-9 cable is required. This is a standard cable that can be found in your local electronics or computer store. The diagram on the next page provides general information for this type of cable. If you have difficulty finding this cable type, contact your authorized Mark Levinson dealer for assistance.

RS-232 Cable Using RJ-11 to DSUB-9 Connectors:
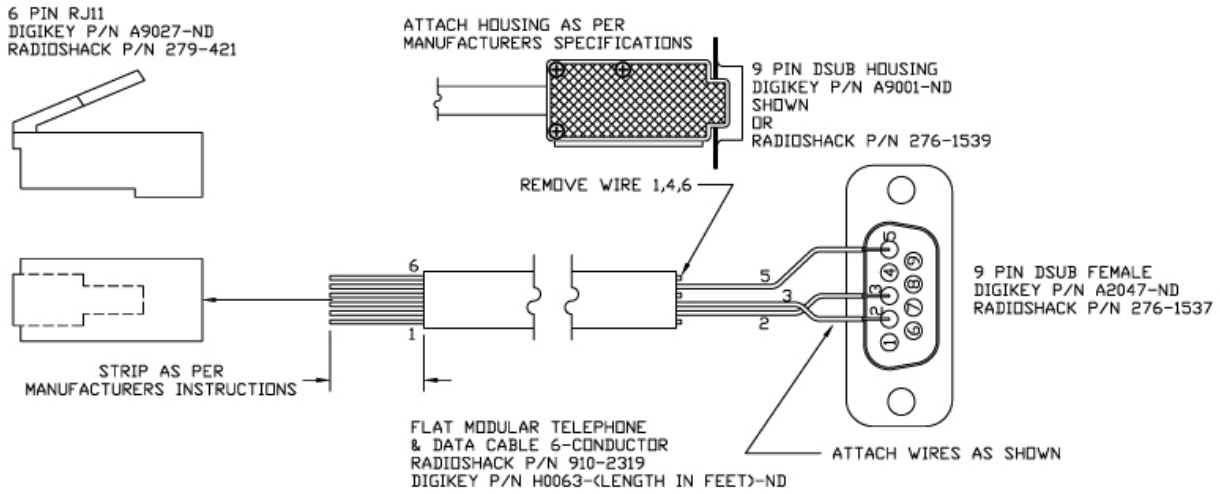
4 Ethernet Port & Cable Configuration

The Nº512 is capable of obtaining a dynamically allocated IP address when connected to a DHCP server. The DHCP setting can be modified via the internal Web page of the Nº512. Refer to the player's user manual for further instructions.

The Nº512 setup for Ethernet Control is defaulted to Auto-Negotiate and recommends the end point to also be configured for Auto-Negotiation. However, the Nº512 is capable of:
• 10/100 BaseT
• Half/Full-duplex
• flow control
• Pause control

NOTE: the above parameters are NOT user adjustable.

4.1 Physical Connection using Ethernet Cables

If using a Direct-to-Ethernet capable Component, use a Crossover Ethernet Cable.
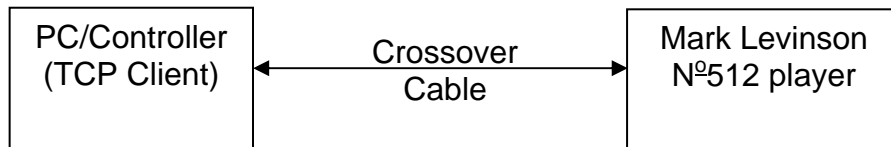
If using a router or switch, use a straight through Ethernet Cable.
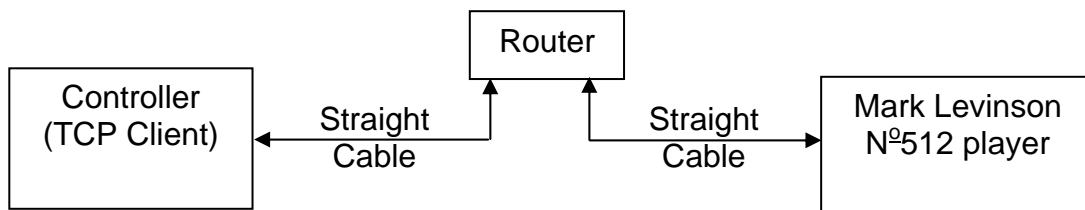
5 Message Formats and Examples

The external protocol consists of a structured format string with specific fields used to indicate:
- Message type
- Source of the command
- Command
- Status/Parameter

Messages can be transmitted to (incoming) and received from (outgoing) the Nº512 to facilitate system control via RS-232 or Ethernet connection.

5.1 Format of the Message Fields

All incoming and outgoing messages must use the following format:

HDR:SRC:CMD:PARAM\r

where:

HDR   The Header field specifies the type of message:
RQST – incoming request
RSP – outgoing response
NTF – outgoing notification

SRC   The Source field specifies the source of the message:
CS – message from a Control Source
UI – message from a User Interaction
AV – used by notifications to indicate and event was caused by the component without user interaction

CMD   The Command field specifies the command selected from the External Protocol Commands table to invoke the desired functionality.

PARAM   The Parameter field specifies the selected parameter from the External Protocol Commands table to achieve the desired effect.

**Fields are separated by a colon ":" and messages are terminated with a '\r' control character (0x0d).**

All fields, commands and associated parameters are *case sensitive* and must be entered as listed in the External Protocol Commands table. Do not insert spaces in message sequences, unless they are indicated in the table.

Maximum message size is 60 characters, including the line ending ASCII control character '\r' (0x0D).

When an incoming or outgoing message uses more than one parameter, the individual parameters must be separated by commas.

HDR:SRC:CMD:PARAM1,PARAM2,PARAM3,…\r

When an incoming command requires multiple parameters per request (RQST), ALL parameters for the given command must be entered AND in the order presented in the External Protocol Commands table, as the descriptors are not utilized in the parameter field of the command/response string. The response message also follows these guidelines.

5.2 Incoming Messages

The Header Field (1st field) of every external protocol string indicates the type of message contained within the transmitted string. All incoming messages to the Nº512 contain the string "RQST" in the header field. Any other string in the header field indicates an outgoing message. The control source that issued the Request (RQST) expects a reply within 500ms after receipt of the string to indicate that the message was received. This response can be an acknowledgement (ACK), the requested action if a data parameter was requested, or a WAIT to indicate the system has received the command but needs additional time to process the request.

NOTE: When an incoming request is received, the system acknowledges receipt of the string within 500ms of receiving the incoming message.

5.3 Outgoing Messages

Outgoing Messages are generated to acknowledge an incoming request, to provide requested information, or to inform of a system action occurring. As with an incoming message, the Header field is used to indicate the type of message contained within the string. Outgoing messages will be a response (RSP) to a request or a system generated notification (NTF) message.

5.3.1 RSP – Response to Command Request

An outgoing RSP will be generated as the result of an incoming RQST. In most cases the response is an acknowledgement (ACK) unless the request is a query "?". In the case of a query, the RSP contains the requested parameter, rather than an ACK.

5.3.2 NTF – Notification of System Action

An NTF is generated as the result of a system action occurring. When commands are issued to the system, they are placed in a queue in the order they are received. When the command is acted upon and the requested action has completed or occurred, a notification is generated within the system. Notifications can occur if a user issues a RQST via External Protocol to instruct the system to perform an action.

When a NTF event occurs, the source field indicates the source of the event:
UI (user interaction)
AV (component generated) fault

It's important to note that Notifications are only sent to the Controller if they are enabled. See the Notification Factory Defaults section of this document for the factory default settings. See the External Protocol Commands section in this document for more information.

5.4 Example Request - RQST

RQST:CS:PWR:ON\r - incoming Request (RQST) from a Control Source (CS) commanding Power (PWR) ON.

RQST:CS:PWR:?\r - incoming Request (RQST) from a Control Source (CS) querying the Power (PWR) state.

RQST:CS:PWR:NTF?\r - incoming Request (RQST) from a Control Source (CS) querying the Power (PWR) Notification state.

RQST:CS:VOL:25.6\r - incoming Request (RQST) from a Control Source (CS) commanding Volume (VOL) to 25.6.

5.5 Example Response - RSP

RSP:CS:PWR:ACK\r – outgoing Response (RSP) generated from a Control Source request, indicating the command (PWR) is valid and the parameter supplied during the request is within the expected range, acknowledging (ACK) the request is being processed.

RSP:CS:PWR:ON\r – outgoing Response (RSP) generated from a Control Source query request, indicating the command (PWR) current state is (ON).

RSP:CS:PWR:EN\r – outgoing Response (RSP) generated from a Control Source notification state query request, indicating the command (PWR) notification is enabled (EN).

5.6 Example Notification - NTF

NTF:UI:PWR:ON\r – outgoing Notification generated from a User Interaction (UI), indicating the command power (PWR) has turned ON.

NTF:UI:VOL:25.6\r – outgoing Notification generated from a User Interaction (UI), indicating the command volume (VOL) is set to 25.6.

NOTE: Notifications for a specific command must be enabled for system generated messages. A User Interaction indicates that a system parameter has changed by a user manipulating the systems front panel controls, IR controls, or by changing a system parameter using the External Protocol.

6 RQST Error Responses and Examples

The External Protocol responds with the following message parameters when an unexpected Incoming Request string is detected. If these responses are received, verify spelling, spacing and capitalization of all characters of the failing field.

The format of the response message string indicates where the error has been detected, as shown in the examples:

- **INVALID_SRC** – The entered Source is not a valid source and is not recognized by the system. *Example:* **RSP:INVALID_SRC\r** – received if sending RQST:Cs:VOL:50.0\r

- **INVALID_CMD** – The entered Command is not a valid command and is not recognized by the system. *Example:* **RSP:CS:INVALID_CMD\r** – received if sending RQST:CS:VoL:50.0\r

- **INVALID_PRM** – The entered Parameter is not a valid parameter for the given command, or is out of the acceptable range for the command. *Example:* **RSP:CS:VOL:INVALID_PRM\r** – received if sending RQST:CS:VOL:47.855\r

- **INVALID_STR** – The entered Request String is not formatted correctly and is not valid. *Example:* **RSP:CS:INVALID_STR\r** – received if sending QST:CS:VOL:50.0\r, or RQST:CSVOL:50.0\r

- **NACK** – The incoming request is Not Acknowledged, indicating the system is in Standby and the request is being ignored. *Example:* **RSP:CS:VOL:NACK\r** – received if sending RQST:CS:VOL:50.0\r while the system is in Standby

7 External Protocol Commands

The command examples under the field "Incoming Request" assumes the keywords RQST:CS: precedes the command parameter indicated in the table, i.e. RQST:CS:PWR:ON\r
The command examples under the field "Outgoing Response" must include the keyword RSP:CS: preceding the response indicated in the table, i.e. RSP:CS:PWR:ACK\r

7.1 AREA

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
AREA*	CD	Select CD Area of Disc	AREA:CD\r	AREA:ACK\r	Selecting an invalid AREA on the installed disc leaves the AREA set to the previous selection. Use the query (?) parameter to verify the AREA selected.
	SACD_2CHAN	Select SACD_2CHAN Area of Disc	AREA:SACD_2CHAN\r	AREA:ACK\r	
	SACD_MULTI	Select SACD_MULTI Area of Disc	AREA:SACD_MULTI\r	AREA:ACK\r	
	NODISC	NODISC is detected in drawer	Not Applicable	AREA:NODISC\r	The NODISC parameter is only valid as a Response when NODISC is found during an AREA query
	?	Request Current AREA State	AREA:?\r	AREA:CD\r	*See note below
			AREA:?\r	AREA:SACD_2CHAN\r	
			AREA:?\r	AREA:SACD_MULTI\r	
			AREA:?\r	AREA:NODISC\r	
				AREA:NACK\r	The player is in Standby mode so commands are ignored.

 *NOTE: **When the direct select AREA command is sent, the transport takes one to six seconds to complete its transition to the new state.** If another AREA command or query is received within this transition period, the transport may not respond to the commands in the correct order, thus resulting in an incorrect response. Subsequent AREA commands or queries, sent after the settle period, will operate correctly.

7.2 CONTROL

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
CONTROL	PLAY	Set unit to Play	CONTROL:PLAY\r	CONTROL:ACK\r	Also removes player from Standby mode.
	STOP	Set unit to Stop	CONTROL:STOP\r	CONTROL:ACK\r	
	PAUSEON	Set Pause On	CONTROL:PAUSEON\r	CONTROL:ACK\r	
	PAUSEOFF	Request Pause Off	CONTROL: PAUSEOFF\r	CONTROL:ACK\r	
	?	Request Current Control State	CONTROL:?\r	CONTROL:PLAY\r	
			CONTROL:?\r	CONTROL:STOP\r	
			CONTROL:?\r	CONTROL:PAUSEON\r	
				CONTROL:NACK\r	The player is in Standby mode so commands - except for PLAY - are ignored.

7.3 DRAWER

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
DRAWER	TOGGLE	Open/Close Drawer	DRAWER:TOGGLE\r	DRAWER:ACK\r	Also removes the player from Standby mode.
	OPEN	Open Drawer	DRAWER:OPEN\r	DRAWER:ACK\r	
	CLOSE	Close Drawer	DRAWER:CLOSE\r	DRAWER:ACK\r	
	?	Request Current Drawer State	DRAWER:?\r	DRAWER:OPEN\r	
			DRAWER:?\r	DRAWER:CLOSE\r	
				DRAWER:NACK\r	The player is in Standby mode so commands - except for TOGGLE, OPEN, and CLOSE - are ignored.

7.4 DSPLY

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
DSPLY	SETFB	Sets Display to Full Brightness	DSPLY:SETFB\r	DSPLY:ACK\r	Display set to Full brightness.
	SET2	Sets Display Brightness to Setting 2	DSPLY:SET2\r	DSPLY:ACK\r	Display set to Medium brightness.
	SET1	Sets Display Brightness to Setting 1	DSPLY:SET1\r	DSPLY:ACK\r	Display set to Low brightness.
	OFF	Turns Display OFF	DSPLY:OFF\r	DSPLY:ACK\r	Display is OFF.
	?	Request Current Display Setting	DSPLY:?\r	DSPLY:SETFB\r	Display set to Full.
			DSPLY:?\r	DSPLY:SET2\r	Display Brightness set to Medium.
			DSPLY:?\r	DSPLY:SET1\r	Display Brightness set to Low.
			DSPLY:?\r	DSPLY:OFF\r	Display is OFF.
	EN	Enables Notification	DSPLY:EN\r	DSPLY:ACK\r	
	DIS	Disables Notification	DSPLY:DIS\r	DSPLY:ACK\r	
	NTF?	Query Notification State	DSPLY:NTF?\r	DSPLY:EN\r	Notification is Enabled
			DSPLY:NTF?\r	DSPLY:DIS\r	Notification is Disabled
				DSPLY:NACK\r	The player is in Standby mode so commands are ignored.

7.5 FPDWNUP

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
FPDWNUP	STOP	Front Panel Button Pressed Down and Released	FPDWNUP:STOP\r	FPDWNUP:ACK\r	
	PLAY		FPDWNUP:PLAY\r	FPDWNUP:ACK\r	Also removes the player from Standby mode.
	PAUSE		FPDWNUP:PAUSE\r	FPDWNUP:ACK\r	
	PTRK		FPDWNUP:PTRK\r	FPDWNUP:ACK\r	Previous Track
	NTRK		FPDWNUP:NTRK\r	FPDWNUP:ACK\r	Next Track
	REW		FPDWNUP:REW\r	FPDWNUP:ACK\r	Fast Backward (PTRK) – emulates holding down the PREV button on Front Panel
	FFWD		FPDWNUP:FFWD\r	FPDWNUP:ACK\r	Fast Forward (NTRK) – emulates holding down the NEXT button on Front Panel
	TIME		FPDWNUP:TIME\r	FPDWNUP:ACK\r	
	REPEAT		FPDWNUP:REPEAT\r	FPDWNUP:ACK\r	
	DISPLAY		FPDWNUP:DISPLAY\r	FPDWNUP:ACK\r	
	CD_SACD		FPDWNUP:CD_SACD\r	FPDWNUP:ACK\r	
	DRAWER		FPDWNUP:DRAWER\r	FPDWNUP:ACK\r	Also removes the player from Standby mode.
	STANDBY		FPDWNUP:STANDBY\r	FPDWNUP:ACK\r	Also removes the player from Standby mode.
				FPDWNUP:NACK\r	The player is in Standby Mode so commands – except for PLAY, DRAWER, and STANDBY – are ignored.

7.6 HWSTATUS

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
HWSTATUS	NAME	Display the assigned host name.	HWSTATUS:NAME\r	Example: HWSTATUS:NO512_00005B\r	Response Only. Outgoing response column lists typical examples.
	MAC	Display the MAC address.	HWSTATUS:MAC\r	Example: HWSTATUS:AABBCCDDEEFF\r	
	IP	Display the Internet Protocol (IP) address.	HWSTATUS:IP\r	Example: HWSTATUS:192.168.10.10\r	
	STATICIP	Display the static IP address.	HWSTATUS:STATICIP\r	Example: HWSTATUS:192.168.50.8\r	
	MASK	Displays the IP address of the subnet mask.	HWSTATUS:MASK\r	Example: HWSTATUS:255.255.255.0\r	
	DHCP	DHCP Status	HWSTATUS:DHCP\r	HWSTATUS:ENABLE\r HWSTATUS:DISABLE\r	Response only.
	MLNETVER	Displays the ML Net version.	HWSTATUS:MLNETVER\r	Example: HWSTATUS:v0.1.0\r	For Customer Service use.

7.7 IRDWNUP

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
IRDWNUP	DRAWER	IR Button Pressed Down and Released	IRDWNUP:DRAWER\r	IRDWNUP:ACK\r	Also removes the player from Standby mode. Use the VOL command to control the Volume level.
	PTRK		IRDWNUP:PTRK\r	IRDWNUP:ACK\r	
	NTRK		IRDWNUP:NTRK\r	IRDWNUP:ACK\r	
	SHUFFLE		IRDWNUP:SHUFFLE\r	IRDWNUP:ACK\r	
	FFWD		IRDWNUP:FFWD\r	IRDWNUP:ACK\r	
	REW		IRDWNUP:REW\r	IRDWNUP:ACK\r	
	PAUSE		IRDWNUP:PAUSE\r	IRDWNUP:ACK\r	
	PLAY		IRDWNUP:PLAY\r	IRDWNUP:ACK\r	Also removes the player from Standby mode.
	REPEAT		IRDWNUP:REPEAT\r	IRDWNUP:ACK\r	
	STOP		IRDWNUP:STOP\r	IRDWNUP:ACK\r	
	TIME		IRDWNUP:TIME\r	IRDWNUP:ACK\r	
	CD_SACD		IRDWNUP:CD_SACD\r	IRDWNUP:ACK\r	
	MUTE		IRDWNUP:MUTE\r	IRDWNUP:ACK\r	
	CLEAR		IRDWNUP:CLEAR\r	IRDWNUP:ACK\r	
	PROGRAM		IRDWNUP:PROGRAM\r	IRDWNUP:ACK\r	
	0		IRDWNUP:0\r	IRDWNUP:ACK\r	
	1		IRDWNUP:1\r	IRDWNUP:ACK\r	
	2		IRDWNUP:2\r	IRDWNUP:ACK\r	
	3		IRDWNUP:3\r	IRDWNUP:ACK\r	
	4		IRDWNUP:4\r	IRDWNUP:ACK\r	
	5		IRDWNUP:5\r	IRDWNUP:ACK\r	
	6		IRDWNUP:6\r	IRDWNUP:ACK\r	
	7		IRDWNUP:7\r	IRDWNUP:ACK\r	
	8		IRDWNUP:8\r	IRDWNUP:ACK\r	
	9		IRDWNUP:9\r	IRDWNUP:ACK\r	
	PLUS10		IRDWNUP:PLUS10\r	IRDWNUP:ACK\r	
	DISPINTENS		IRDWNUP:DISPINTENS\r	IRDWNUP:ACK\r	
	VOL_FIXVAR		IRDWNUP:VOL_FIXVAR\r	IRDWNUP:ACK\r	Lower volume levels BEFORE sending command to avoid extreme changes in the volume level.
	STANDBY		IRDWNUP:STANDBY\r	IRDWNUP:ACK\r	Also removes the player from Standby mode.
				IRDWNUP:NACK\r	The player is in Standby mode so commands - except for PLAY, DRAWER, and STANDBY - are ignored.

7.8 MSG

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
MSG	Up to 12 ASCII Character MSG	Display MSG on Front Panel	MSG:HELLO\r	MSG:ACK\r	No colon, no lower case
	CLEAR	Clear displayed MSG and return to normal display	MSG:CLEAR\r	MSG:ACK\r	
	?	Query Front Panel display	MSG:?\r	MSG:ON\r	Up to 16 characters can be returned.
	EN	Enables Notification of MSG State Changes	MSG:EN\r	MSG:ACK\r	When Notifications are enabled, they are sent approximately once per /second while playing.
	DIS	Disables Notification of MSG State Changes	MSG:DIS\r	MSG:ACK\r	
	NTF?	Query Notification State	MSG:NTF?\r	MSG:EN\r	Notification is Enabled
			MSG:NTF?\r	MSG:DIS\r	Notification is Disabled
				MSG:NACK\r	The player is in Standby Mode so commands are ignored.

7.9 MUTE

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
MUTE	ON	Mute is set ON	MUTE:ON\r	MUTE:ACK\r	
	OFF	Mute is set OFF	MUTE:OFF\r	MUTE:ACK\r	
	?	Request Current MUTE state	MUTE:?\r	MUTE:ON\r	Mute State is ON
			MUTE:?\r	MUTE:OFF\r	Mute State is OFF
				MUTE:NACK\r	The player is in Standby Mode so commands are ignored.

7.10 NOP

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
NOP	NOP	No operation is performed	NOP:NOP\r	NOP:ACK\r	Used for testing communication. The command responds if the player is in Standby mode. However, the command does NOT change the Standby mode state.

7.11 PWR

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
PWR	ON	Player Powered ON from Standby	PWR:ON\r	PWR:ACK\r	Also removes the player from the Standby mode.
	STANDBY	Place Player into Standby Mode	PWR:STANDBY\r	PWR:ACK\r	
	?	Request Current PWR State	PWR:?\r	PWR:ON\r	System Powered ON. The command responds if the player is in Standby mode. However, the command does NOT change the Standby mode state.
			PWR:?\r	PWR:STANDBY\r	System in Standby
	EN	Enables Notification	PWR:EN\r	PWR:ACK\r	
	DIS	Disables Notification	PWR:DIS\r	PWR:ACK\r	
	NTF?	Query Notification State	PWR:NTF?\r	PWR:EN\r	Notification is Enabled
			PWR:NTF?\r	PWR:DIS\r	Notification is Disabled

7.12 REPEAT

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
REPEAT	OFF	Set Repeat option to OFF	REPEAT:OFF\r	REPEAT:ACK\r	
	TRACK	Repeat current Track	REPEAT:TRACK\r	REPEAT:ACK\r	
	DISC	Repeat current disc or program	REPEAT:DISC\r	REPEAT:ACK\r	
	?	Request Current Control State	REPEAT:?\r	REPEAT:OFF\r	
			REPEAT:?\r	REPEAT:TRACK\r	
			REPEAT:?\r	REPEAT:DISC\r	
				REPEAT:NACK\r	The player is in Standby Mode so commands are ignored.

7.13 SHUFFLE

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
SHUFFLE	ON	Set Shuffle option to ON	SHUFFLE:ON\r	SHUFFLE:ACK\r	
	OFF	Set Shuffle option to OFF	SHUFFLE:OFF\r	SHUFFLE:ACK\r	
	?	Request Current Shuffle option State	SHUFFLE:?\r	SHUFFLE:OFF\r	
			SHUFFLE:?\r	SHUFFLE:ON\r	
				SHUFFLE:NACK\r	The player is in Standby Mode so commands are ignored.

7.14 TIME

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
TIME	TOT	Time on Track	TIME:TOT\r	TIME:ACK\r	
	TRT	Track Remaining Time	TIME:TRT\r	TIME:ACK\r	
	TOD	Time on Disc	TIME:TOD\r	TIME:ACK\r	
	TRD	Time Remaining Disc	TIME:TRD\r	TIME:ACK\r	
	?	Request Current Time option	TIME:?\r	TIME:TOT\r	
			TIME:?\r	TIME:TRT\r	
			TIME:?\r	TIME:TOD\r	
			TIME:?\r	TIME:TRD\r	
				TIME:NACK\r	The player is in Standby Mode so commands are ignored.

7.15 TRACK

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
TRACK	PTRK	Move to Previous Track	TRACK:PTRK\r	TRACK:ACK\r	
	NTRK	Move to Next Track	TRACK:NTRK\r	TRACK:ACK\r	
	REW	Cycles through the four Fast Reverse speeds	TRACK:REW\r	TRACK:ACK\r	
	FFWD	Cycles through the four Fast Forward speeds	TRACK:FFWD\r	TRACK:ACK\r	
	?	Request Current Speed	TRACK:?\r	TRACK:FFWD0\r	Normal Speed
			TRACK:?\r	TRACK:FFWD1\r	Response only.
			TRACK:?\r	TRACK:FFWD2\r	
			TRACK:?\r	TRACK:FFWD3\r	
			TRACK:?\r	TRACK:FREW0\r	
			TRACK:?\r	TRACK:FREW1\r	
			TRACK:?\r	TRACK:FREW2\r	
			TRACK:?\r	TRACK:FREW3\r	
				TRACK:NACK\r	The player is in Standby Mode so commands are ignored.

7.16 VOL

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
VOL*	00.0 to 73.2	Sets Volume level between 00.0 and 73.2	VOL:71.1\r	VOL:ACK\r	Sets the Volume level to a selected value. The incoming request is an example of setting the volume level to 71.1 The value 00.0 turns off the volume and 73.2 is the maximum value. Any values above 73.2 are accepted, but the level won't exceed the maximum value.
	?	Request Current Volume	VOL:?\r	VOL:XX.X\r	XX.X indicates the return value of the current volume level.
				VOL:NACK\r	The player is in Standby Mode so commands are ignored.

*NOTE: The volume value MUST be three digits, written in the xx.x format, otherwise the player does not recognize the command and returns an invalid parameter error. If a value is sent that is outside the listed limits, the volume level is clipped to the nearest valid value - either the maximum or the minimum volume level.

7.17 VOLCTL

Command	Parameter	Function	Incoming Request	Outgoing Response	Comment
VOLCTL	FIX	Sets Volume to Fixed State	VOLCTL:FIX\r	VOLCTL:ACK\r	
	VAR	Sets Volume to Variable State	VOLCTL:VAR\r	VOLCTL:ACK\r	
	?	Request Current Volume Control State	VOLCTL:?\r	VOLCTL:FIX\r	
			VOLCTL:?\r	VOLCTL:VAR\r	
				VOLCTL:NACK\r	The player is in Standby Mode so commands are ignored.

8 Notification Factory Defaults

Command	Factory Default Setting	Notes
AREA	N/A	Notification not available for this command
CONTROL	N/A	Notification not available for this command
DRAWER	N/A	Notification not available for this command
DSPLY	**NO**	
FPDWNUP	N/A	Notification not available for this command
IRDWNUP	N/A	Notification not available for this command
MSG	**NO**	
MUTE	N/A	Notification not available for this command
NOP	N/A	Notification not available for this command
PWR	**YES**	
REPEAT	N/A	Notification not available for this command
SHUFFLE	N/A	Notification not available for this command
TIME	N/A	Notification not available for this command
TRACK	N/A	Notification not available for this command
VOL	N/A	Notification not available for this command
VOLCTL	N/A	Notification not available for this command