

Crestron Control of AudioReQuest through an RS232 Serial Port



Version: 1.7.11

Modified: 10/09/2002 – Updated for 1.7.11 commands

Modified: 07/29/2002 – Corrected DoubleClick command; now says NEXT command instead of ENTER

Modified: 07/25/2002 – Added Intro Mode to Serial Commands

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Modified: 1/05/2002 – updated and revised completely to include Crestron debugging and new protocols.

Modified: 6/21/2001 – added delimited version of GUI data. Requires ARQ firmware version 1.3.0

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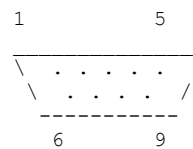
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Rear Serial Port Settings:

**9600 Baud, 8 bits, No Parity, 1 Stop Bit.
No Flow Control**

ARQ 1 MiniJack Connector

Tip -> Pin #2 RxD
Ring -> Pin #3 TxD
GND -> Pin #5 GND



ARQ 2 + ZONE Rear Control Serial Port

Pin #2 RxD
Pin #3 TxD
Pin #5 GND

Crestron Control of AudioReQuest through an RS232 Serial Port

Introduction:

This document outlines the serial port protocol and how to interface to it from the Crestron control processor and touch panels. This document is designed to be used in conjunction with the Single Zone Crestron macro version 2.1.0. For Multi-Zone control, please download the AudioReQuest Multi-Zone macro and accompanying documentation.

One-Way Serial Control:

AudioReQuest can be controlled by only sending serial commands to it. This is useful for interfacing to control systems that don't use any feedback, such as keypads and one-way remote controls like the wireless Crestron STS touch panel.

Single Button Interface Examples:

a. QuickPlay Commands (require 1.7.0 or higher)

When the button is pressed, the AudioReQuest will cycle through the available custom Playlists like tuner presets. It will automatically return to the first Playlist after the last Playlist is reached.

[NEXT-PLAYLIST (0x30,0x9E)]

b. Random Music

When the user walks up to a Keypad and presses "ARQ" button AudioReQuest will start playing a random song from the entire collection. If music is already playing then AudioReQuest will go to the next random song.

Send the following hexadecimal numbers to the ARQ through the Serial Port:

[RANDOM-IN (0x30,0x80)]

Multiple-Button One-Way Interface Examples:

Crestron's STS wireless remote is a good example of a one-way remote control that, when used with the AudioReQuest video output, can be an easy to use interface. Using the JUMP-TO-PLAYLIST QuickPlay commands, you can easily create a page that simply allows a user to immediately access their favorite playlists, without two-way feedback.

Two-Way Serial Control:

On www.request.com are examples for the Crestron control systems that can in real-time display the same information as on the Video output of the AudioReQuest, allowing you to browse and access the entire collection of the AudioReQuest.

Tip:

If you connect the ARQ Serial Port to a PC Serial Port, run a terminal program and type '3','c','3','g' you will be requesting data and will see the same feedback as a control system would.

a. Requesting Data from AudioReQuest

The first step for Two-Way serial control is to request data from AudioReQuest. What is used in the Crestron demo programs is the "Delimited GUI" format. When the demo program is started and the user goes into the AudioReQuest portion, the command is sent from the control system to the AudioReQuest.

The Crestron demonstration programs send an ARQ-CONNECT signal to request data. If this command is not sent then AudioReQuest will **not** transmit feedback!! When you are integrating the Macro into your program this means pulsing the START-COMMUNICATIONS input.

b. Processing the Serial data from AudioReQuest

Crestron processes the data coming from AudioReQuest in SIMPL+. It processes the incoming stream of text, finds and cuts out the appropriate data, and then sends the information to the touch

panels. If you are having trouble getting text feedback double check to make sure the SIMPL+ module is being compiled correctly.

c. Displaying the Serial data from AudioReQuest

If you are using more than 3 or 4 touchpanels, be sure to use an “Indirect Text Broadcast” to send serial data to each touch panel. This will increase the speed that text appears on the touch panel. This ‘Indirect Text Broadcast’ will send out the serial text to all the touch panels at once, instead of to each one individually.

Note 1: If you use the Indirect Text Broadcast you must delete the serial signals from the touch panel serial joins under Network Modules.

d. AudioReQuest flips pages on the Crestron touch panels. Why and how?

(NOTE: Automatic page-flipping is not used in AudioReQuest Crestron Interface 2.0)

Why: AudioReQuest flips the pages on the Crestron touch panel because AudioReQuest was designed to work from 2 screens: Navigator and Player. The Navigator page is used to search for music, and the Player page is used to display what is currently playing.

How: There are 2 signals in the ARQ-Crestron Macro that should be linked to the join numbers of the actual Navigator and Player pages in VT-PRO. These are NAVIGATOR-PAGE and PLAYER-PAGE and will pulse when the pages should flip to them.

The drawback is that this method will flip the pages of all touchpanels in the system, not just the ones accessing the ARQ. Therefore we need to have a Set/Reset Latch and Buffer logic combination that will buffer the NAVIGATOR-PAGE and PLAYER-PAGE signals for each touch panel.

e. No more page flipping with Firmware 1.6.0 and AudioReQuest Crestron interface 2.0

If your ARQ is running 1.6.0 or higher be sure to download the new Crestron protocols from www.request.com. They eliminate any need for page flipping and will be easier to integrate into your program.

Notes:

1. AudioReQuest sends both Player and Navigator information, so multiple touch panels can get different information at the same time.
2. When using a CNMSX series processor, it is recommended to keep the time counter off. This will prevent time updates from being constantly sent to touch panels, and will keep the touch panel response time quick.
3. The Manage page uses a feature called ‘doubleclick’. The first click highlights the line, the second click will “drill in” without actually playing a song. This eliminates the worry of accidentally emptying the Jukebox. The highlight makes it possible to select artists, albums, playlists or songs for addition to the jukebox.



Sample NAVIGATOR CT-1000 Screen



Sample PLAYER CT-1000 screen

AudioReQuest MACRO Inputs:

Inputs	Version	Description
ARQ-RECEIVE\$	1.2.4	Receive line – to be tied to RX on the COM port
BUTTON-CANCEL	1.2.4	Linked to the HOME button – brings you to same place in navigator view every time.
BUTTON-COPY	1.2.4	USE WITH CAUTION - Copies Selected Songs (or where the cursor is if no songs are selected) into playlist. Best if used in LCD MODE for feedback.
BUTTON-DELETE	1.2.4	USE WITH CAUTION - Deletes Selected Songs (or where the cursor is if no songs are selected) Best if used in LCD MODE for feedback.
BUTTON-DOWN	1.2.4	NAV: Move cursor down PLAYER: Next song
BUTTON-EDIT	1.2.4	USE WITH CAUTION - Edits Selected Songs (or where the cursor is if no songs are selected) Best if used in LCD MODE for feedback.
BUTTON-ENTER	1.2.4	NAV: Enter (go into artist, play song etc) PLAYER: Toggle for pause
BUTTON-INFO	1.2.4	Brings up Information. (Best if used in LCD view)
BUTTON-INTRO	1.2.4	Toggle Intro on/off.
BUTTON-JUKEBOX	1.2.4	Adds wherever cursor is to Now Playing to be played later.
BUTTON-LEFT	1.2.4	NAV: Move cursor left PLAYER: Rewind
BUTTON-MODE	1.2.4	NAV: Switch to Player view PLAYER: Switch to NAV view
BUTTON-NOWPLAYING	1.2.4	Go to NOW PLAYING view in NAV mode.
BUTTON-PAUSE	1.2.4	Toggle Pause on/off.
BUTTON-REPEAT	1.2.4	Toggle repeat on/off.
BUTTON-RIGHT	1.2.4	NAV: Move cursor right PLAYER: Fast Forward
BUTTON-SELECT	1.2.4	Selects / Deselect toggle wherever cursor is.
BUTTON-SHUFFLE	1.2.4	Toggle shuffle on/off.
BUTTON-STOP	1.2.4	Stop music currently playing.
BUTTON-THEMES	1.2.4	Switch to the next theme.
BUTTON-UP	1.2.4	NAV: Move cursor up PLAYER: Previous song
BUTTON-VISUALS	1.2.4	Go into visuals mode.
JUMP-DOWN	1.2.4	NAV: Page down PLAYER: Jump into 'random' mode
JUMP-UP	1.2.4	NAV: Page up PLAYER: Jump out of 'random' mode
KEYBOARD 0-9	1.2.4	Numbers 0-9
KEYBOARD A-Z	1.2.4	Alphabet (Lower Case)
KEYBOARD-BACKSPACE	1.2.4	Backspace (Best for LCD mode)
KEYBOARD-SHIFT	1.2.4	SHIFTS any letters pressed for 3 seconds
KEYBOARD-SPACE	1.2.4	Space bar (Best for LCD mode)
NAV-ALBUM	1.2.4	Go to ALBUM view in NAV mode.
NAV-ALL	1.2.4	Go to ALL view in NAV mode.
NAV-ARTIST	1.2.4	Go to ARTIST view in NAV mode.

NAV-CD	1.2.4	Go to CD view in NAV mode.
POWER-OFF	1.2.4	Soft power off.
POWER-ON	1.2.4	Soft power on.
PRESS-LINE-X-FLIP (X=0-7)	1.2.4	Move cursor to a line and perform action on it (send enter command) and flip to PLAYER page.
START-COMMUNICATIONS-TOGGLE	1.2.4	- REQUIRED for feedback - Important to PULSE when entering ARQ pages
STOP-COMMUNICATIONS	1.2.4	Not required for serial communications.
VOLUME-DOWN	1.2.4	Decrease ARQ volume.
VOLUME-UP	1.2.4	Increase ARQ volume.
DESELECT-ALL	1.3.1	Deselects songs. Good to do if using the Selected Songs playlist in any way.
DISCRETE-EJECT	1.3.1	Ejects the CD ROM. Works from both NAV and PLAYER.
DISCRETE-FORWARD	1.3.1	Sends Fast Forward command. Works from both NAV and PLAYER.
DISCRETE-NEXT	1.3.1	Sends Next song command. Works from both NAV and PLAYER.
DISCRETE-PAUSE	1.3.1	If playing, then pauses. Does nothing if already paused. Works from both NAV and PLAYER.
DISCRETE-PLAY	1.3.1	Sends play command. Works from both NAV and PLAYER.
DISCRETE-PREVIOUS	1.3.1	Sends Previous song command. Works from both NAV and PLAYER.
DISCRETE-RANDOM-IN	1.3.1	Goes into Random mode from both NAV and PLAYER.
DISCRETE-RANDOM-OUT	1.3.1	Goes out of Random mode from both NAV and PLAYER.
DISCRETE-REPEAT-OFF	1.3.1	Turns Repeat mode off. Works from both NAV and PLAYER.
DISCRETE-REPEAT-ON	1.3.1	Turns Repeat mode on. Works from both NAV and PLAYER.
DISCRETE-REWIND	1.3.1	Sends Rewind command. Works from both NAV and PLAYER.
DISCRETE-SHUFFLE-OFF	1.3.1	Turns Shuffle mode off. Works from both NAV and PLAYER.
DISCRETE-SHUFFLE-ON	1.3.1	Turns Shuffle mode on. Works from both NAV and PLAYER.
DISCRETE-UNPAUSE	1.3.1	If paused, then plays. Does nothing if not paused. Works from both NAV and PLAYER.
RESET-FREEDB	1.3.1	Resets the pending internal freedb lookups.
GOTO-LINE-X (X=0-7)	1.5.91	Moves the cursor to line X. Does not perform any action, just moves the cursor.
REFRESH	1.5.91	Refreshes text. Best if done when going into a page, especially for the first time.
TIME-OFF	1.5.91	Turns the time elapsed off. Useful for decreasing bandwidth.
TIME-ON	1.5.91	Turns the time elapsed on.
BUTTON-MENU	1.6.0	Go to Menu. (Best if used in LCD mode)
DISCRETE-NAVIGATOR	1.6.0	Switch page on ARQ to NAVIGATOR.
DISCRETE-PLAYER	1.6.0	Switch page on ARQ to PLAYER.
DOUBLECLICK-LINE-X (X=0-7)	1.6.0	Moves the cursor to line X. If cursor is already on

		line X then performs action on that line (sends NEXT command) Good for moving cursor around and navigating for features like 'add to jukebox'
LCD-TEXT-OFF	1.6.0	Turn LCD text off.
LCD-TEXT-ON	1.6.0	Turn LCD text on.
NAV-HOME	1.6.0	Go to Home in navigator mode. If ARQ is not in NAVIGATOR mode this command will switch it.
NAV-JUMP-DOWN	1.6.0	Page down in navigator mode. If ARQ is not in NAVIGATOR mode this command will switch it.
NAV-JUMP-UP	1.6.0	Page up in navigator mode. If ARQ is not in NAVIGATOR mode this command will switch it.
NAV-MOVE-LEFT	1.6.0	Move left in navigator mode. If ARQ is not in NAVIGATOR mode this command will switch it.
PLAYER-DATA-ALWAYS-OFF	1.6.0	Turns above feature off. Will still get player data in PLAYER mode.
PLAYER-DATA-ALWAYS-ON	1.6.0	Player data will be sent in both NAVIGATOR and PLAYER modes. NOTE: On a CMNSX-PRO be sure to pulse the TIME-OFF line as it can overload the serial buffer.
PLAY-NOFLIP	1.6.0	Play song where cursor is without flipping to Player page.
PRESS-LINE-X-NOFLIP (X=0-7)	1.6.0	Move cursor to a line and perform action on it (send enter command) BUT do not flip to PLAYER page.
REQUEST-PLAYER-INFO	1.6.0	Get player information from any mode.
DISCRETE-AUTORIP-OFF	1.7.0	Disable AutoRip. If AutoRip is already disabled, this command is ignored.
DISCRETE-AUTORIP-ON	1.7.0	Enable AutoRip. If AutoRip is already enabled, this command is ignored.
NEXT-PLAYLIST	1.7.0	Begin playing the first song in the next available Playlist.
PLAY-PLAYLIST-N (N=1-10)	1.7.0	Jump directly to Playlist-N without flipping. If no Playlist with that number exists, the command is ignored. For more detail on the QuickPlay commands, please see ReQuest Interface Guide #1A – General IR and RS-232 Serial Port Interfacing
PREVIOUS-PLAYLIST	1.7.0	Begin playing first song in the previous Playlist.
CLEAR-NOW-PLAYING	1.7.11	Stops any currently playing songs and empties the Now Playing list.
CREATE-JUKEBOX-PLAYLIST	1.7.11	Creates a playlist from songs added to the Jukebox. Requires keyboard interface to name the playlist.
CAPITAL 0-9	1.7.11	! @ # \$ = + & * ()
CAPITAL A-Z	1.7.11	Letters A-Z (Upper Case)
CAPITAL-APOSTROPHE	1.7.11	Quotation Mark (")
CAPITAL-COLON	1.7.11	Tilda (~)
CAPITAL-COMMA	1.7.11	Question Mark (?)
CAPITAL-PERIOD	1.7.11	Forward Slash (/)
LOWER 0-9	1.7.11	Numbers 0-9
LOWER A-Z	1.7.11	Letters A-Z (Lower Case)
LOWER-APOSTROPHE	1.7.11	Apostrophe (')
LOWER-COLON	1.7.11	Colon (:)
LOWER-COMMA	1.7.11	Comma (,)
LOWER-PERIOD	1.7.11	Period (.)

JUMP-TO-GENRES	1.7.5	ARQ switches to Navigator mode and jumps directly to the list of Genres
PREVIOUS-GENRE	1.7.5	Plays the songs in the previous Genre. If not currently playing a Genre, jumps to last Genre.
NEXT-GENRE	1.7.5	Plays the songs in the next Genre. If not currently playing a Genre, jumps to first Genre.

Outputs	Version	Description
GOTO-NAVIGATOR-PAGE	1.2.4	Goes high when in NAVIGATOR page
GOTO-PLAYER-PAGE	1.2.4	Goes high when in PLAYER page
REPEAT-FB	1.2.4	High when in REPEAT mode
SHUFFLE-FB	1.2.4	High when in SHUFFLE mode
INTRO-FB	1.2.4	High when in INTRO mode
SONG-X-FB (X=0-7)	1.2.4	Line X is high when cursor is on that line. Only one line can be high of the 0-7 lines.
NAVIGATOR-TITLE\$	1.2.4	Serial feedback for Title at the top of the NAVIGATOR page
NAVIGATOR-LINE-X\$ (X=0-7)	1.2.4	8 lines of Serial feedback that make up the NAVIGATOR page.
PLAYER-SONG-TITLE\$	1.2.4	Serial feedback for current song title
PLAYER-ARTIST\$	1.2.4	Serial feedback for current ARTIST.
PLAYER-ALBUM\$	1.2.4	Serial feedback for current ALBUM.
PLAYER-PLAYLIST\$	1.2.4	Serial feedback for current PLAYLIST.
PLAYER-NEXT-TITLE\$	1.2.4	Serial feedback for next title.
PLAYER-TOTAL-TIME\$	1.2.4	Serial feedback for total time.
PLAYER-ELAPSED-TIME\$	1.2.4	Serial feedback for elapsed time.
PLAYER-SONG-PROGRESS	1.2.4	Analog song progress value.
PLAYER-ELAPSED-TIME	1.2.4	Analog elapsed time value.
PLAYER-TOTAL-TIME	1.2.4	Analog total time value.
PLAYER-STATE	1.2.4	Analog Player State: 0=Stop, 1=Play, 2=Pause
ARQ-TRANSMIT\$	1.2.4	Transmit line – to be tied to TX on the COM port.
S-SONG-X-FB (X=0-7)	1.6.0	Line X is high when that line is selected. Multiple lines can be selected at any point.
LCD-LINE-ONE\$	1.6.0	LCD feedback line one.
LCD-LINE-TWO\$	1.6.0	LCD feedback line two.
LCD-LINE-THREE\$	1.6.0	LCD feedback line three.
LCD-LINE-FOUR\$	1.6.0	LCD feedback line four.

Appendix A: Troubleshooting

a. Can't establish one-way Serial communication:

- Make sure Serial settings are: 9600 Baud, 8 bits, No Parity, 1 Stop Bit. **No Flow Control**
- Double check to make sure flow control is turned off.
- If you connect the ARQ's Rear Serial Port to a PC Serial Port, run a terminal program at the above baud rate and type '3','c','3','g' you will see feedback on the terminal program. This is a good sanity check to verify a good cable.
- If you have an ARQ1 make sure it has a serial port. There were early models that did not have a serial port. Call ReQuest Multimedia with the hardware version if you are not sure. *(You can find the hardware version in MENU->SYSTEM INFORMATION)*
- Check to make sure the AudioReQuest is not encoding or doing any File Transfers.
- If you are trying to establish communication with a ZONE through serial using the included cables and you received your zone before December 15th then try putting a NULL Modem adapter (the wrong cable was included during that time frame on ZONE'S)

b. Have one-way control, now can't get any text out of AudioReQuest onto my Crestron touch panel:

- Make sure you are sending the "Data Request" command. AudioReQuest will not send any data until it is requested. The most commonly used data request (used in all demo Crestron Programs) is Delimited GUI. Send the following hex numbers and you should see feedback: **[0x33,0x63] [0x33,0x67]**. In the ARQ Crestron Macro this is the START-COMMUNICATIONS line. Make *sure* that this is being sent in Test Manager.
- If you connect the ARQ's Rear Serial Port to a PC Serial Port, run a terminal program and type '3','c','3','g' you will see feedback on the terminal program. Now, if you connect it back to the control system and it works (shows text on touch panel) it is because you did a 'Data Request' in the terminal program. Power off/on the ARQ and Crestron control processor and if there is no feedback the 'Data Request' command is not being sent.
- Check the firmware version in AudioReQuest. *(You can find the software version in MENU->SYSTEM INFORMATION)* Much of the feedback sent requires firmware version 1.6.0 or higher. *(Software updates can be done either by CDROM or online)*
- Check www.request.com under SUPPORT->DOWNLOADS to make sure you have the latest version of the ARQ Crestron Demo Program and corresponding touch panel files.
- Download and run the ARQ Crestron demo program available on our web site on both the touch screen and the Control Processor. This will eliminate any errors made when integrating the AudioReQuest Macro into your Crestron program and will make debugging easier.

c. Getting garbled text, or lines not refreshing properly on Crestron Touch panels:

- If you have a CNMSX type system with large amounts of indirect text being sent to many touch panels, it is recommended to use an external CNXCOM-2 com port to communicate with the Audio Request system, instead of an internal CNMSX com port. The CNXCOM-2 card is better suited to processing large amounts of data.

- d. When I integrate the AudioReQuest Crestron Demo Program into my Crestron program all the touch panels flip to the AudioReQuest pages:**
- This is because AudioReQuest actually flips the pages of its macro. This is to make sure that the two systems are in synch. See the page flip section of the Two-way Serial Control portion of this document for details on buffering the page flips to be touch panel specific.
 - This problem has been fixed in version 1.6.0 of the AudioReQuest firmware. Check www.request.com for a new Macro and demonstration program.
- e. Sometimes the time stops elapsing and buttons stop responding on a Crestron Touch panel:**
- This is because older versions of the AudioReQuest Crestron macro actually drive the page flips. If the AudioReQuest is in 'Navigator' mode and the Crestron Touch panel is on the 'Player' page then nothing will work. Double check that the Crestron panels and the AudioReQuest are "in synch", i.e. both on Player.
- f. The whole macro seems really sluggish. The text is being drawn slowly on the touch screens:**
- If there are a lot of touch panels attached to one control processor then make sure you are using an "Indirect Text Broadcast" to send the serial data out to the touch panels. This does a broadcast of serial text to all of the touch panels instead of sending each line to each touch panel individually.
- g. When I go into the ARQ-Crestron Macro on my touchpanel nothing happens:**
- When you go into the Macro be sure to pulse the START-COMMUNICATIONS signal. This should update all the information on the touch panel, as well as flip it to the correct screen
- h. What do I do if I go through all of these and I still can't get it to work?**
- Call us at 1-800-236-2812 and we would be glad to help you!

Appendix B: Serial Commands

REQUIRES 1.7.0	REQUIRES 1.7.11	REQUIRES 1.7.5
AUTO-RIP-ON	CREATE-JUKEBOX-PLAYLIST	JUMP-TO-GENRES
AUTO-RIP-OFF	CLEAR-NOW-PLAYING	
PLAY-PLAYLIST-X		
NEXT-PLAYLIST		
PREVIOUS-PLAYLIST		
Direct Playlist Access No Page Flip		
Direct Playlist Access With Page Flip		

Discrete Commands	
Action	Command
Power-ON	0x30, 0x73
Power-OFF	0x30, 0x74
Deselect	0x30, 0x76
Random-IN	0x30, 0x80
Random-OUT	0x30, 0x7F
Pause-ON	0x30, 0x84
Pause-OFF	0x30, 0x81
Shuffle-ON	0x30, 0x85
Shuffle-OFF	0x30, 0x82
Repeat-ON	0x30, 0x86
Repeat-OFF	0x30, 0x83
Previous Song	0x30, 0x87
Next Song	0x30, 0x89
Fast Forward	0x30, 0x88
Rewind	0x30, 0x8A
Eject	0x30, 0x8B
Play	0x30, 0x8C
Goto-Navigate	0x30, 0x8E
Goto-Player	0x30, 0x8F
Enter-No Flip	0x30, 0x8D
Auto Rip On	0x30, 0x92
Auto Rip Off	0x30, 0x93
Play Playlist 1	0x30, 0x94
Play Playlist 2	0x30, 0x95
...	...
Play Playlist 10	0x30, 0x9D
Next Playlist	0x30, 0x9E
Previous Playlist	0x30, 0x9F
*Direct Playlist Access -No Flip	(0x43, 0xN)
*Direct Playlist Access -W/ Flip	(0x42, 0xN)
Create Playlist from Jukebox	0x30, 0xA8
Clear Now Playing	0x30, 0xA0

* - Jump to Playlist N, where N=1 to 255, so to Jump to Playlist 15, send 0x43, 0x0F

Action	Command	Action	Command	Action	Command
Mode	0x30, 0x01	CD	0x30, 0x1E	Symbol "@"	0x30, 0x69
Menu	0x30, 0x02	ALL	0x30, 0x1F	Symbol "#"	0x30, 0x6A
Power (TOG)	0x30, 0x03	ARTIST	0x30, 0x20	Symbol "\$"	0x30, 0x6B
Stop	0x30, 0x0E	ALBUM	0x30, 0x21	Symbol "*"	0x30, 0x6C
Pause (TOG)	0x30, 0x0F	NOW PLAYING	0x30, 0x22	Symbol "/"	0x30, 0x6D
Record	0x30, 0x10	Visuals	0x30, 0x5B	Symbol "\"	0x30, 0x6E
Shuffle (TOG)	0x30, 0x11	Themes	0x30, 0x5C	Symbol "`"	0x30, 0x6F
Repeat (TOG)	0x30, 0x12	Info	0x30, 0x5E	Symbol "_"	0x30, 0x70
Cancel	0x30, 0x13	Delete	0x30, 0x35	Symbol "-"	0x30, 0x71
Select (TOG)	0x30, 0x14	Copy	0x30, 0x66	Symbol "+"	0x30, 0x72
Previous / Up	0x30, 0x15	Jukebox	0x30, 0x68	Symbol "~"	0x30, 0x73
Forward/Right	0x30, 0x16	Edit	0x30, 0x7D	Symbol ":"	0x30, 0x74
Next / Down	0x30, 0x17	Letter "a"	0x30, 0x23	Letter "A"	0x30, 0x41
Rewind / Left	0x30, 0x18	Letter "b"	0x30, 0x24	Letter "B"	0x30, 0x42
Enter / Pause	0x30, 0x19	Letter "c"	0x30, 0x25	Letter "C"	0x30, 0x43
Volume Up	0x30, 0x1A	Letter "d"	0x30, 0x26	Letter "D"	0x30, 0x44
Volume Down	0x30, 0x1B	Letter "e"	0x30, 0x27	Letter "E"	0x30, 0x45
Jump Up	0x30, 0x1C	Letter "f"	0x30, 0x28	Letter "F"	0x30, 0x46
Jump Down	0x30, 0x1D	Letter "g"	0x30, 0x29	Letter "G"	0x30, 0x47
Intro (TOG)	0x30, 0x5F	Letter "h"	0x30, 0x2A	Letter "H"	0x30, 0x48
Number '1'	0x30, 0x04	Letter "i"	0x30, 0x2B	Letter "I"	0x30, 0x49
Number '2'	0x30, 0x05	Letter "j"	0x30, 0x2C	Letter "J"	0x30, 0x4A
Number '3'	0x30, 0x06	Letter "k"	0x30, 0x2D	Letter "K"	0x30, 0x4B
Number '4'	0x30, 0x07	Letter "l"	0x30, 0x2E	Letter "L"	0x30, 0x4C
Number '5'	0x30, 0x08	Letter "m"	0x30, 0x2F	Letter "M"	0x30, 0x4D
Number '6'	0x30, 0x09	Letter "n"	0x30, 0x30	Letter "N"	0x30, 0x4E
Number '7'	0x30, 0x0A	Letter "o"	0x30, 0x31	Letter "O"	0x30, 0x4F
Number '8'	0x30, 0x0B	Letter "p"	0x30, 0x32	Letter "P"	0x30, 0x50
Number '9'	0x30, 0x0C	Letter "q"	0x30, 0x33	Letter "Q"	0x30, 0x51
Number '0'	0x30, 0x0D	Letter "r"	0x30, 0x34	Letter "R"	0x30, 0x52
Shift	0x30, 0x3C	Letter "s"	0x30, 0x35	Letter "S"	0x30, 0x53
Space	0x30, 0x3D	Letter "t"	0x30, 0x36	Letter "T"	0x30, 0x54
Back Space	0x30, 0x3F	Letter "u"	0x30, 0x37	Letter "U"	0x30, 0x55
Symbol " " "	0x30, 0x75	Letter "v"	0x30, 0x38	Letter "V"	0x30, 0x56
Symbol "` "	0x30, 0x76	Letter "w"	0x30, 0x39	Letter "W"	0x30, 0x57
Symbol "= "	0x30, 0x77	Letter "x"	0x30, 0x3A	Letter "X"	0x30, 0x58
Symbol "& "	0x30, 0x78	Letter "y"	0x30, 0x3B	Letter "Y"	0x30, 0x59
Symbol "! "	0x30, 0x79	Letter "z"	0x30, 0x3E	Letter "Z"	0x30, 0x5A
Symbol "? "	0x30, 0x7A				
Symbol "; "	0x30, 0x7B				
Symbol ". "	0x30, 0x7C				