



Rotel RT-1084 RS232 HEX Protocol

Date	Version	Update Description
February 6, 2012	1.00	Original Specification

The RS232 protocol structure for the RT-1084 is detailed below. This is a HEX based communication protocol.

Connection Settings

Baud Rate	Parity	Valid Data Bits	Stop Bit Value	Handshaking	Data Type
38400	N	8	1	None	String

All commands sent to the attached Rotel device must follow the command structure detailed below, unless specified otherwise. Send only the bytes only, no spaces, delimiter, etc.

Standard Command String Format

Start	Count	Device ID	Type	Key	Checksum
0xFE	0x03	0x22	0x10	0xFF	0xFF

Note: The count byte only includes the ID, Type, and Key bytes; it does not include the Start or Checksum bytes.

Note 2: Do not include any carriage returns or line feeds after the commands

Communication Protocol

Command and response messages are included on the following pages. The standard response string of the unit mirrors the data that would be available on the front panel of the unit.

Any change to the status of the front display on the unit will prompt a feedback string mirroring that change.

Note that the spaces shown between hex bytes below are for clarity only; do not include spaces in the actual command sent to the unit.

Meta Encoding

The start byte for all command and response strings is FE. To keep the device from encountering the start byte FE in any position other than as the start byte, any occurrence of the bytes FD or FE in a command string must be converted to either FD 00 (for FD), or FD 01 (for FE). This will allow the string to pass while masking any occurrence of the byte FE except as the start byte. Commands that have Meta Encoding applied will be highlighted in red.

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Table 1 - Type 10 Primary Commands

RT-1084 HEX	Command Description
POWER COMMANDS	
FE 03 22 10 00 35	Power Toggle
FE 03 22 10 01 36	Power On
FE 03 22 10 02 37	Power Off
SOURCE SELECTION COMMANDS	
FE 03 22 10 1D 52	Source Sirius 1
FE 03 22 10 1E 53	Source Sirius 2
FE 03 22 10 1F 54	Source Sirius 3
FE 03 22 10 20 55	Source HD Radio
FE 03 22 10 21 56	Sirius / HD Radio Toggle
TUNER COMMANDS	
FE 03 22 10 08 3D	Tune Up
FE 03 22 10 09 3E	Tune Down
FE 03 22 10 19 4E	Preset Up
FE 03 22 10 1A 4F	Preset Down
FE 03 22 10 32 67	Frequency Up
FE 03 22 10 33 68	Frequency Down
FE 03 22 10 23 58	Category Up
FE 03 22 10 24 59	Category Down
FE 03 22 10 18 4D	Memory
FE 03 22 10 0A 3F	Band Toggle
FE 03 22 10 0C 41	AM
FE 03 22 10 0B 40	FM
FE 03 22 10 05 3A	Auto Tuning
FE 03 22 10 07 3C	Tune / Preset
FE 03 22 10 30 65	Tuning Mode Select
FE 03 22 10 31 66	Preset Mode Select
FE 03 22 10 06 3B	Frequency Direct
FE 03 22 10 04 39	Preset Scan
FE 03 22 10 29 5E	Tuner Display
FE 03 22 10 28 5D	RDS PTY
FE 03 22 10 26 5B	RDS TP
FE 03 22 10 27 5C	RDS TA
FE 03 22 10 25 5A	RDS AF

RT-1084 HEX	Command Description
FE 03 22 10 03 38	FM Mono
FE 03 22 10 39 6E	Preset List
FE 03 22 10 3A 6F	Channel List
FE 03 22 10 3B 70	Category List
NUMERIC KEY COMMANDS	
FE 03 22 10 17 4C	Number 0
FE 03 22 10 0E 43	Number 1
FE 03 22 10 0F 44	Number 2
FE 03 22 10 10 45	Number 3
FE 03 22 10 11 46	Number 4
FE 03 22 10 12 47	Number 5
FE 03 22 10 13 48	Number 6
FE 03 22 10 14 49	Number 7
FE 03 22 10 15 4A	Number 8
FE 03 22 10 16 4B	Number 9
SETUP MENU COMMANDS	
FE 03 22 10 2A 5F	Setup
FE 03 22 10 36 6B	Cursor Left
FE 03 22 10 37 6C	Cursor Right
FE 03 22 10 38 6D	Enter
OTHER COMMANDS	
FE 03 22 10 1B 50	Sirius ID
FE 03 22 10 22 57	Digital / Analog Mode Toggle
FE 03 22 10 2D 62	Front Display On/Off
FE 03 22 10 2E 63	Display Dimmer
FE 03 22 10 FF 34	Display Refresh

Table 2 - Type 14 HD Radio Discrete Commands

RT-1084 HEX	Command Description
POWER COMMANDS	
FE 03 22 14 00 39	Power Toggle
FE 03 22 14 01 3A	Power On
FE 03 22 14 02 3B	Power Off
TUNER COMMANDS	
FE 03 22 14 08 41	Tune Up
FE 03 22 14 09 42	Tune Down
FE 03 22 14 19 52	Preset Up
FE 03 22 14 1A 53	Preset Down
FE 03 22 14 32 6B	Frequency Up
FE 03 22 14 33 6C	Frequency Down
FE 03 22 14 18 51	Memory
FE 03 22 14 0A 43	Band Toggle

RT-1084 HEX	Command Description
FE 03 22 14 0C 45	AM
FE 03 22 14 0B 44	FM
FE 03 22 14 05 3E	Auto Tuning
FE 03 22 14 07 40	Tune / Preset
FE 03 22 14 30 69	Tuning Mode Select
FE 03 22 14 31 6A	Preset Mode Select
FE 03 22 14 06 3F	Frequency Direct
FE 03 22 14 04 3D	Preset Scan
FE 03 22 14 29 62	Tuner Display
FE 03 22 14 28 61	RDS PTY
FE 03 22 14 26 5F	RDS TP
FE 03 22 14 27 60	RDS TA
FE 03 22 14 25 5E	RDS AF
FE 03 22 14 03 3C	FM Mono
NUMERIC KEY COMMANDS	
FE 03 22 14 17 50	Number 0
FE 03 22 14 0E 47	Number 1
FE 03 22 14 0F 48	Number 2
FE 03 22 14 10 49	Number 3
FE 03 22 14 11 4A	Number 4
FE 03 22 14 12 4B	Number 5
FE 03 22 14 13 4C	Number 6
FE 03 22 14 14 4D	Number 7
FE 03 22 14 15 4E	Number 8
FE 03 22 14 16 4F	Number 9
SETUP MENU COMMANDS	
FE 03 22 14 2A 63	Setup
FE 03 22 14 36 6F	Cursor Left
FE 03 22 14 37 70	Cursor Right
FE 03 22 14 38 71	Enter
OTHER COMMANDS	
FE 03 22 14 22 5B	Digital / Analog Mode Toggle
FE 03 22 14 2D 66	Front Display On/Off
FE 03 22 14 2E 67	Display Dimmer

Table 3 – Type 15 Sirius Module 1 Discrete Commands

RT-1084 HEX	Command Description
POWER COMMANDS	
FE 03 22 15 00 3A	Power Toggle
FE 03 22 15 01 3B	Power On
FE 03 22 15 02 3C	Power Off
TUNER COMMANDS	
FE 03 22 15 08 42	Tune Up
FE 03 22 15 09 43	Tune Down
FE 03 22 15 19 53	Preset Up
FE 03 22 15 1A 54	Preset Down
FE 03 22 15 32 6C	Frequency Up
FE 03 22 15 33 6D	Frequency Down
FE 03 22 15 23 5D	Category Up
FE 03 22 15 24 5E	Category Down
FE 03 22 15 18 52	Memory
FE 03 22 15 06 40	Frequency Direct
FE 03 22 15 29 63	Tuner Display
FE 03 22 15 39 73	Preset List
FE 03 22 15 3A 74	Channel List
FE 03 22 15 3B 75	Category List
NUMERIC KEY COMMANDS	
FE 03 22 15 17 51	Number 0
FE 03 22 15 0E 48	Number 1
FE 03 22 15 0F 49	Number 2
FE 03 22 15 10 4A	Number 3
FE 03 22 15 11 4B	Number 4
FE 03 22 15 12 4C	Number 5
FE 03 22 15 13 4D	Number 6
FE 03 22 15 14 4E	Number 7
FE 03 22 15 15 4F	Number 8
FE 03 22 15 16 50	Number 9
SETUP MENU COMMANDS	
FE 03 22 15 2A 64	Setup
FE 03 22 15 37 71	Cursor Left
FE 03 22 15 38 72	Cursor Right
FE 03 22 15 38 72	Enter
OTHER COMMANDS	
FE 03 22 15 1B 55	Sirius ID
FE 03 22 15 2D 67	Front Display On/Off
FE 03 22 15 2E 68	Display Dimmer

Table 4 – Type 16 Sirius Module 2 Discrete Commands

RT-1084 HEX	Command Description
POWER COMMANDS	
FE 03 22 16 00 3B	Power Toggle
FE 03 22 16 01 3C	Power On
FE 03 22 16 02 3D	Power Off
TUNER COMMANDS	
FE 03 22 16 08 43	Tune Up
FE 03 22 16 09 44	Tune Down
FE 03 22 16 19 54	Preset Up
FE 03 22 16 1A 55	Preset Down
FE 03 22 16 32 6D	Frequency Up
FE 03 22 16 33 6E	Frequency Down
FE 03 22 16 23 5E	Category Up
FE 03 22 16 24 5F	Category Down
FE 03 22 16 18 53	Memory
FE 03 22 16 06 41	Frequency Direct
FE 03 22 16 29 64	Tuner Display
FE 03 22 16 39 74	Preset List
FE 03 22 16 3A 75	Channel List
FE 03 22 16 3B 76	Category List
NUMERIC KEY COMMANDS	
FE 03 22 16 17 52	Number 0
FE 03 22 16 0E 49	Number 1
FE 03 22 16 0F 4A	Number 2
FE 03 22 16 10 4B	Number 3
FE 03 22 16 11 4C	Number 4
FE 03 22 16 12 4D	Number 5
FE 03 22 16 13 4E	Number 6
FE 03 22 16 14 4F	Number 7
FE 03 22 16 15 50	Number 8
FE 03 22 16 16 51	Number 9
SETUP MENU COMMANDS	
FE 03 22 16 2A 65	Setup
FE 03 22 16 36 71	Cursor Left
FE 03 22 16 37 72	Cursor Right
FE 03 22 16 38 73	Enter
OTHER COMMANDS	
FE 03 22 16 1B 56	Sirius ID
FE 03 22 16 2D 68	Front Display On/Off
FE 03 22 16 2E 69	Display Dimmer

Table 5 – Type 17 Sirius Module 3 Discrete Commands

RT-1084 HEX	Command Description
POWER COMMANDS	
FE 03 22 17 00 3C	Power Toggle
FE 03 22 17 01 3D	Power On
FE 03 22 17 02 3E	Power Off
TUNER COMMANDS	
FE 03 22 17 08 44	Tune Up
FE 03 22 17 09 45	Tune Down
FE 03 22 17 19 55	Preset Up
FE 03 22 17 1A 56	Preset Down
FE 03 22 17 32 6E	Frequency Up
FE 03 22 17 33 6F	Frequency Down
FE 03 22 17 23 5F	Category Up
FE 03 22 17 24 60	Category Down
FE 03 22 17 18 54	Memory
FE 03 22 17 06 42	Frequency Direct
FE 03 22 17 29 65	Tuner Display
FE 03 22 17 39 75	Preset List
FE 03 22 17 3A 76	Channel List
FE 03 22 17 3B 77	Category List
NUMERIC KEY COMMANDS	
FE 03 22 17 17 53	Number 0
FE 03 22 17 0E 4A	Number 1
FE 03 22 17 0F 4B	Number 2
FE 03 22 17 10 4C	Number 3
FE 03 22 17 11 4D	Number 4
FE 03 22 17 12 4E	Number 5
FE 03 22 17 13 4F	Number 6
FE 03 22 17 14 50	Number 7
FE 03 22 17 15 51	Number 8
FE 03 22 17 16 52	Number 9
SETUP MENU COMMANDS	
FE 03 22 17 2A 66	Setup
FE 03 22 17 36 72	Cursor Left
FE 03 22 17 37 73	Cursor Right
FE 03 22 17 38 74	Enter
OTHER COMMANDS	
FE 03 22 17 1B 57	Sirius ID
FE 03 22 17 2D 69	Front Display On/Off
FE 03 22 17 2E 6A	Display Dimmer

Section 2: Feedback String Format

Standard Response String Format

Start	Count	ID	Type	Data (xx Bytes)					
0xFE	0x37	0x22	0x20	Flag1	...	Flag4	tChar0	...	tChar4

Data						Checksum
Line1(0)	...	Line1(21)	Line2(0)	...	Line2(21)	0xXX

The feedback string is a representation of the display of the unit. The Flag1 – Flag4 data bytes contain data on which of the various icons on the front display are currently illuminated. The tChar0 – tChar4 data bytes contain ASCII data representing the numeric text that appears in the front right corner of the display. It can contain current frequency information when the unit is tuned to an HD Radio station.

The Line1 – Line2 data bytes contain ASCII data representing the text that appears across the front display. It can contain current frequency information, as well as RDS radio text data and should be parsed to obtain this information. The RT-1084 uses a 2 line display, however depending upon the mode (FM, HD Radio, Sirius), the display can sometimes be 1 line of text or 2. The Text Mode flag bits in Flag 4 will indicate what mode the display is currently in.

The display status uses 1 bit in Flag4 to confirm if the front display is On or Off.

The Type 1/2 bits were added with Software V1.79. These bits are used to determine if the current feedback data is for the HD Radio, Sirius 1, Sirius 2 or Sirius 3 modules.

Flag1 – Flag4 Data

	Flag1	Flag2	Flag3	Flag4
Bit0	DAB	Tuned	MHz	Text Mode 1
Bit1	RDS	Stereo	DP	Text Mode 2
Bit2	Signal Bar 3	AF	COL	Type 2
Bit3	Signal Bar 2	PTY	AM	Type 1
Bit4	Signal Bar 1	Memory	FM	Display Mode
Bit5	Signal Bar 0	Auto	HD Radio	Standby LED
Bit6	Ant	Preset	Sirius	kHz
Bit7				

Display Status

	Display On	Display Off
Display Mode	0	1

Display Text Status

	1 Line (13 Char)	1 Line (13 Char)	2 Lines (22 Char)
Text Mode 1	0	1	0
Text Mode 2	0	0	1

Feedback Type Status

	HD Radio	Sirius 1	Sirius 2	Sirius 3
Zone 1	0	0	1	1
Zone 2	0	1	0	1

