

Theta - Compli

RS-232 Protocol and Control Details

Configuration - The following settings should be used for RS-232 transmission:

Baud Rate – RS-232 baud rate is configured using jumpers on the internal RS-232 interface are located on the upper RS-232 or on the optional 480p board.
Available settings are 2400, 4800, 9600 and *19200. *Factory default is 19200.

Baud Rate	Jumper 1	Jumper 2
2400	Jumped	Jumped
4800	Open	Jumped
9600	Jumped	Open
19200	Open	Open

Data Bits – Eight (8) data bits.

Stop Bits – One (1) stop bit.

Parity – No parity checking.

Flow Control – None.

RS-232 Interface –

Commands are to be sent to the unit via RS-232 using the following format:

Arguments 1 through 3 are in decimal format.

<Command> = <Header><Command ID><Argument 1><Argument 2><Argument 3>
<Header> = <FEh><FAh> = HEX or <254><250> = DECIMAL
<Command ID> = <Byte>
<Argument 1> = <Byte>
<Argument 2> = <Byte>
<Argument 3> = <Byte>
<Byte> = 00h – FFh

EXAMPLE OF DECIMAL COMMAND:

To send the command “Play”, send <254><250><3><1><0><0>

Note: Command 1 and 2 are for IR Equivalents only. Direct Commands are # 3 and higher.
Any invalid command received via RS232 is ignored and will not affect normal operation.

Status Byte –

Upon receiving the command “Poll Status” command [FEh FAh 09h 00h 00h 00h], a single status byte will be transmitted. The format for the status byte is:

<Status Byte> = <R><R><R><R><Device><Power Status>
<R> = 0b : Reserved
<Device> = 000b : Reserved
= 001b : Reserved
= 010b : Reserved
= 011b : Reserved
= 100-111 : Reserved

<Power Status> = 0b : Unit is in standby.
= 1b : Unit is not in standby.

Command Details and Explanation –

This section will outline basic functionality and usage of each command set within the RS232 interface protocol.

Note: Command IDs one(1) and two(2) are implemented to provide provision for future expandability. Command IDs three (3) through nine(9) offer more flexible control solutions and should be used for most applications.

Command ID #1: Send Single-Byte IR Code Equivalent

Command Format:

<FEh><FAh><1><Data Byte><00h><00h>

Functional Description:

This command will write the given data (<Data Byte>) to the unit's IR data bus.

Usage:

This command can be used to effectively implement any other command, which has a one-byte equivalent IR code. Equivalent IR codes for commands can be found on RS-232 command listing. Note that not all commands have equivalent IR codes.

Example:

To send the **single byte** command “**Play**”, send <FEh><FAh><1><79h><00h><00h><254><250><1><121><0><0> DECIMAL Equiv.

Command ID #2: Send Three-Byte IR Code Equivalent

Command Format:

<FEh><FAh><2><Data Byte 1><Data Byte 2><Data Byte 3>

Functional Description:

This command will write the given data (<Data Byte 1><Data Byte 2><Data Byte 3>) to the unit's IR data bus.

Usage:

This command can be used to effectively implement any other command, which has a three-byte equivalent IR code. Equivalent IR codes for commands can be found on RS-232 command listing. Note that not all commands have equivalent IR codes.

Example:

To send the **three byte** command “**Repeat**”, send <FEh><FAh><2><99h><F5h><27h><254><250><2><153><245><39> DECIMAL Equiv.

Command ID #3: Direct Disk Commands

Function:

These commands have a function when the unit is loaded with any Theta CD, CDV or DVD. However, the effect of a given command may vary depending on currently loaded media and state of unit.

Command ID #4: CDV/DVD Commands

Function:

These commands have a function when the unit is loaded with video media. However, the effect of a given command may vary depending on currently loaded media and state of unit.

Command ID #5: DVD Commands

Function:

These commands have an effect only when the unit is loaded with a DVD. Their function may vary depending on the current state of the unit.

Command ID #6: LD Commands Not Used

Function:

These commands have an effect only when the unit is loaded with a LD.

Their function may vary depending of the current state of the unit.

Command ID #7: Miscellaneous Commands

Function:

These commands have the same function regardless of media type.
However, their effect is dependent on current state of the unit.

Command ID #8: Menu Navigation Commands

Usage:

These commands can be used to navigate the unit's menus. Note that available menus are highly dependent on media type and state of the unit.

Command ID #9: Poll Status Command

Function:

This command will request the return of the status byte from the unit. See RS-232 specifications for format and meaning of the status byte.

Usage:

This command can be used to retrieve basic information about the current status of the unit.

RS232-Interface Usage Details –

The RS-232 interface has a first-in-first-out (FIFO) buffer which will allow 15 full-length commands to be received in direct succession. Commands are executed in the order in which they are received with approximately a **½ second delay** between each command. After a command is executed, it is removed from the buffer, making room to receive another command. If the buffer is full, any command received is ignored. For consistent results, no more than 15 commands should be sent in direct succession. If a longer string of commands is necessary, a **minimum of ½ second delay** should be added before sending additional commands.

Example for sending a long string of commands:

[Command 1]
[Command 2]
[Command 3]

.

[Command 15]
[Delay ½ sec]
[Command 16]
[Delay ½ sec]
[Command 17]
[Delay ½ sec]

At most, it will take approximately 10 seconds for the RS-232 interface to execute all of the commands stored in a full command buffer. Overloaded buffers can cause the unit to freeze with respect to RS-232 commands. If this occurs the unit must be rebooted.

Data errors can occur in asynchronous data transmission. Parity checking is not supported in the interface and unexpected operation can occur due to data errors. However, invalid commands are ignored. For this reason, using the IR equivalent command should be avoided if possible because the RS-232 interface will perform no error checking on the data to be sent via the IR data bus.

Command	Command Description	Argument 1 Description	Argument 2 Description	Argument 3 Description	IR Code equivalent
COMMAND AND ALL ARGUMENTS (IE.1, 2 AND 3)		INPUT AS DECIMAL NUMBERS			Byte 1 Byte 2 Byte 3
1	Send single byte IR code equivalent.	0 - 255	Byte to be sent	0	0 -- -- --
Ex: Play	<FEh><FAh><1><79h><00h><00h>				
2	**Send three byte IR code equivalent.	0 - 255	First byte to be sent	0 - 255	-- -- --
	**Note: Arguments 2 and 3 are the second and third bytes to be sent to the unit.				
Ex: Repeat	<FEh><FAh><2><99h><F5h><27h>				
3	Direct disk commands	1	Play	0	79h -- --
Ex: Play	<254><250><3><1><0><0> (Decimal)	2	Previous	0	B9h -- --
		3	Pause	0	F9h -- --
		4	Stop	0	19h -- --
		5	Next	0	39h -- --
		6	Step forward	0	99h F5h EDh
		7	Step reverse	0	99h F5h 1Dh
		9	Numeric keypad 0	0	99h F5h 05h
		10	Numeric keypad 1	0	99h F5h 85h
		11	Numeric keypad 2	0	99h F5h 45h
		12	Numeric keypad 3	0	99h F5h C5h
		13	Numeric keypad 4	0	99h F5h 25h
		14	Numeric keypad 5	0	99h F5h A5h
		15	Numeric keypad 6	0	99h F5h 65h
		16	Numeric keypad 7	0	99h F5h E5h
		17	Numeric keypad 8	0	99h F5h 15h
		18	Numeric keypad 9	0	99h F5h 95h
		19	Program	0	99h F5h 37h
		21	Repeat	0	99h F5h 27h
		22	Repeat A-B	0	99h F5h 17h
		23	Random	0	99h F5h 7Fh
		24	Clear	0	99h F5h A7h
		25	Display	0	99h F5h C7h
		26	Reverse	0	99h F5h 57h
		27	Forward	0	99h F5h 97h

Command	Command Description	Argument 1	Argument 1 Description	Argument 1	INPUT AS DECIMAL NUMBERS	Argument 2	Argument 3	IR Code equivalent
COMMAND AND ALL ARGUMENTS (IE. 1, 2 AND 3)	ARE TO BE							
4	Commands pertaining to CDV/DVD only	0	Jog reverse	0	0	99h	F5h	24h
	From remote control only	1	Jog reverse medium (IR ONLY)	0	0	99h	F5h	A4h
	From remote control only	2	Jog reverse fast (IR ONLY)	0	0	99h	F5h	64h
	From remote control only	3	Jog forward	0	0	99h	F5h	04h
	From remote control only	4	Jog forward medium (IR ONLY)	0	0	99h	F5h	84h
	From remote control only	5	Jog forward fast (IR ONLY)	0	0	99h	F5h	44h
	Shuttle reverse	6	Shuttle reverse	0	0	99h	F5h	3Eh
	Shuttle forward	7	Shuttle forward	0	0	99h	F5h	5Eh
	Play Mode	8	Play Mode	0	0	99h	F5h	FEh
5	Commands pertaining to DVD only	1	Audio	0	0	99h	F5h	7Dh
		2	Subtitle	0	0	99h	F5h	6Ch
		3	Angle	0	0	99h	F5h	ADh
		4	Top menu (title)	0	0	99h	F5h	2Dh
		5	Video adjust	0	0	99h	F5h	0Ch
		6	Surround	0	0	99h	F5h	86h
		7	DVD menu	0	0	99h	F5h	9Dh
7	Miscellaneous commands	0	Dimmer	0	0	99h	F5h	9Fh
		1	Open/Close	0	0	99h	F5h	6Dh
		2	Toggle standby	0	0	99h	F5h	3Dh
		3	Put unit in standby	0	0	--	--	--
		4	Take unit out of standby	0	0	--	--	--
8	Menu navigation commands	0	Up	0	0	99h	99h	4Fh
		1	Down	0	0	99h	F5h	CFh
		2	Right	0	0	99h	F5h	26h
		3	Left	0	0	99h	F5h	C6h
		4	Return	0	0	99h	F5h	2Fh
		5	Enter	0	0	99h	F5h	F7h
		6	Setup menu	0	0	99h	F5h	0Dh
9	Poll status	0	Return status byte	0	0	--	--	--

RS232 Hardware Connections

DB9 CONNECTOR

1 - DCD	0	
2 - Transport sends on this pin	0	
3 - Transport receives on this pin	1	
4 - DTR	1	
5 - GND		
6 - DSR	0	
7 - RTS	1	
8 - CTS	0	
9 - Ring	---	

Internally Connected

Handshaking (TRS and CTS) are not implemented in the RS232 interface

CONTROL PORT

