

SACOM Serial Protocol Definition

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This document defines the serial commands available for control and monitoring of SACOM DS8x receivers. The serial commands may be sent using either USB or RS232 connections.

Port Setup

The USB port on the SACOM receiver uses a RS232 to USB driver on the PC, so it appears as a COM port on the computer. The settings for the communications are:

Baud Rate: 115200

Data Bits: 8

Stop Bits: 1

Parity: None

IE 115200, 8, N, 1

Available Commands

1. Read system status (Audio level, RF level, Diversity status, TX Battery level, TX Battery run time hours, TX PAD, TX Low cut, TX Power switch mode, TX Button Lock, TX Button Mode, Conference/Stage mode)
2. RF Channel change
3. Main output volume change
4. Headphone volume change
5. Mute audio
6. Read system information
7. Headphone output volume change
8. Set transmitter parameters (PAD, Low Cut, RF Power Level, Channel, Power switch mode, Button Lock, Button Mode, Conference/Stage mode)
9. Set transmitter name
10. Antenna phantom power on/off
11. Set headphone mode (balanced/unbalanced)
12. Load preset
13. Save preset
14. Read preset names
15. Set GPIO configuration

Serial protocol definition

All communications start with a command sent from the PC to the SACOM receiver. The general format for a packet is:

0xFD : Start byte
0xd : Device address (0 – 7)
0xs : Slot address (0 - 7)
0xC : Command code
0xd : Number of data bytes that follow

0xd0 : Data byte 0
.
.
0xdn : Data byte n
0xFE : End byte

The “0x” prefix indicates a hex value follows. (Don’t actually send the 0x characters). In other words, for 0xFD, the actual value that is sent is 253, which is FD in hex.

For example, the string the PC sends to request the status is:

0xFD	0x0	0x0	0x1	0x0	0xFE
Start	Device	Slot	Cmd	Num	End
byte	addr	addr	code	data	byte
				bytes	

Since there are no data bytes, the end byte appears directly after the data byte count.

1. Read System Status Command

The PC sends the Read Status request to the SACOM Receiver and the receiver returns the string defined below.

The command retrieves 4 channels (slots) of status info at a time.

To get status of channels 0-3, use 0 for the slot value.

To get status of channels 4-7, use 4 for the slot value.

Each channel’s info uses 14 bytes, so all 4 channels use a total of 56 data bytes. Bytes 6 through 19 are the block of data for the first channel, bytes 20 through 33 are for the second channel, etc.

Bytes 10, 11, and 18 are bit-mapped. The bits are defined as follows:

BYTE 10

Bit 7: diversity status (0=ant A, 1=antB)

Bits 6-5: TX status (0=OFF,1=ON,2=MUTE)

Bits 4-3: Battery Type(0=NIMH,1=Alkaline)

Bit 1: Antenna A RF clipping indicator

Bit 0: Antenna B RF clipping indicator

BYTE 11

Bit 7: AES Encryption on/off

Bit 6: Conference mode or stage mode (1=conf mode)

Bits 5-4: Power switch mode (0=ON/OFF,1=ON/MUTE,2=ON/ON)

Bits 3-2: TX RF Power (0=1 mW,1=10 mW,2=25 mW,3=50 mW)

Bit 1: Low Cut

Bit 0: Pad

BYTE 18

Bits 5-4: Button Mode (0=Toggle on/off,1=Push to talk, 2=push to mute)

Bit 3-2: Model (0=Beltpack, 1=Handheld,2=Podium,3=tabletop)

Bit 1: Logic Mute (1=enabled)

Bit 0: TX Button Lock

The PC sends:

0xFD startbyte
0 device
0 slot
1 command
0 data #
0xFE endbyte

The SACOM receiver returns:

byte Receiver Returns:
1 0xFD startbyte
2 0 device
3 0 slot
4 1 command
5 58 data bytes
6 x RSSI1a
7 x RSSI1b
8 x Audio Level 1
9 x RF Channel 1
10 x diversity/TX status/bat type/
11 x AES/conf/swmod/txpwr/lc/pad
12 x tx run hours1
13 x BAT1
14 x main output level 1
15 x HP output level 1
16 x BER MSB
17 x BER LSB
18 x TXLock /logic mut/Model/btnmd
19 x reserved
20 x RSSI1a
21 x RSSI1b
22 x AUDIO2
23 x CHAN2
24 x diversity/TX status/bat type/
25 x AES/conf/swmod/txpwr/lc/pad
26 x tx run hours2
27 x BAT2
28 x main output level 2
29 x HP output level 2
30 x BER MSB
31 x BER LSB
32 x TXLock /logic mut/Model/btnmd
33 x reserved
34 x RSSI1a
35 x RSSI1b
36 x AUDIO3
37 x CHAN3
38 x diversity/TX status/bat type/
39 x AES/conf/swmod/txpwr/lc/pad
40 x tx run hours3

41	x	BAT3
42	x	main output level 3
43	x	HP output level 3
44	x	BER MSB
45	x	BER LSB
46	x	TXLock /logic mut/Model/btnmd
47	x	reserved
48	x	RSSI1a
49	x	RSSI1b
50	x	AUDIO4
51	x	CHAN4
52	x	diversity/TX status/bat type/
53	x	AES/conf/swmod/txpwr/lc/pad
54	x	tx run hours4
55	x	BAT4
56	x	main output level 4
57	x	HP output level 4
58	x	BER MSB
59	x	BER LSB
60	x	TXLock /logic mut/Model/btnmd
61	x	reserved
62	x	mainmutebits/hpmute bits
63	0xFE	endbyte

2. RF Channel Change Command

The PC sends the RF Channel Change command for the selected slot.

The chanval is indexed starting at 0, so to set a slot to RF channel 1, send a chanval of 0.

PC sends

```

0xFD startbyte
0      device
0      slot
2      command
1      data #
chanval data
0xFE  endbyte

```

3. Main Output Volume Change Command

The PC sends the desired value for the analog output volume level.

The range is 0 (off) to 100 (Full Scale). The steps are 0.5 dB.

PC sends

```

0xFD startbyte
0      device

```

0 slot
3 command
1 data #
volume data
0xFE endbyte

4. Headphone Volume Change Command

The PC sends the desired value for the analog output volume level.

The range is 0 (off) to 100 (Full Scale). The steps are 0.5 dB.

PC sends:

0xFD startbyte
0 device
0 slot
11 command
1 data #
volume data
0xFE endbyte

5. Mute Audio Command

The PC sends the desired mute state (0 = NOT muted, 1 = muted) for the selected slot.

PC sends

0xFD startbyte
dev num device
0 slot
4 command
1 data #
0 or 1 on/off
0xFE endbyte

6. Read System Information Command

This command retrieves information about the receiver such as the serial number, date code, model, # channels, # of receivers, Firmware version, PCB version, and total run time hours.

PC sends

0xFD startbyte
dev num device
0 channel
5 command
0 data #
0xFE endbyte

Receiver responds:

byte # drf replies

1	0xFD	startbyte
2	0	device
3	0	channel
4	5	command
5	24	data bytes
6	x	#DRF in network
7	x	DRF serial number MSB
8	x	DRF serial number midB
9	x	DRF serial number LSB
10	x	model
11	x	DRF FW Ver
12	x	DRF #1 mfg year/month
13	x	reserved
14	x	DRF #1 mfg day
15	x	DRF Tot Hours MSB
16	x	DRF Tot Hours midB
17	x	DRF Tot Hours LSB
18	x	MasterSlave slot 0
19	x	MasterSlave slot 1
20	x	MasterSlave slot 2
21	x	MasterSlave slot 3
22	x	MasterSlave slot 4
23	x	MasterSlave slot 5
24	x	MasterSlave slot 6
25	x	MasterSlave slot 7
26	x	DRF1PCB REV
27	x	DRF2PCB REV
28	x	DRF3PCB REV
29	x	DRF4PCB REV
30	0xFE	end byte

7. Set Transmitter Parameters Command

This sets all of the syncable transmitter parameters. Once this is sent, syncing the transmitter to the receiver card via IR will transfer the values to the transmitter.

The values are contained in 2 bit mapped bytes, Telem1 and Telem2, defined below:

Telem1:

Bit 7: AES on/off

Bit 6: Conf mode/stage mode (0=conf mode)

Bits 5-4: Power switch mode: (0 = on/off, 1 = on/mute, 2 = on/on)

Bits 3-2: TX Power level (0=1 mW,1=10 mW,2=25 mW,3=50 mW)

Bit 1: Low cut

Bit 0: Pad

Telem2:

Bit 5: Logic Mute enable (1=logic mute enabled, muting will trigger a GPIO but not mute audio output)

Bits 4-3: Button Mode for podium/tabletop TX(0=Toggle on/off,1=Push to talk, 2=push to mute)

Bit 2: TX Button lock

Bits 1-0: Battery Type (0=NiMh, 1 = alkaline)

byte#	PC sends
1	0xFD startbyte
2	0 device
3	0 channel
4	21 command
5	2 data #
6	Telem1
7	Telem2
8	0xFE endbyte

8. Set Transmitter Name Command

This command sends up to 10 characters (Letters and numbers only) for the name value displayed on the selected transmitter OLED display and on the receiver card OLED display.

The transmitter must be IR synced to update the name value after this command is sent.

byte#	PC sends
1	0xFD startbyte
2	dev num device
3	0 Slot #
4	9 command
5	12 data #
6	name byte 0
7	name byte 1
8	name byte 2
9	name byte 3
10	name byte 4
11	name byte 5
12	name byte 6
13	name byte 7
14	name byte 8
15	name byte 9
16	reserved
17	reserved
18	0xFE endbyte

9. Antenna Phantom Power On/Off Command

This turns on or off the antenna jack 3.3V phantom power for powering active antennas, like the ones SACOM provides.

byte#	PC sends
1	0xFD startbyte
2	dev num device
3	0 slot
4	29 command
5	1 data #
6	on/off 0=off,1=on
7	0xFE endbyte

10. Set Headphone Mode Command

The headphone output jack on the front panel can operate in 2 modes. In normal headphone mode, the tip and ring of the TRS jack are in-phase signals for monitoring with headphones. In balanced mode, the tip and ring are 180 degrees out of phase. This mode is for connecting the jack to the input of a mixer or other balanced input. If the headphone jack is in normal headphone mode, there will be no sound if it is connected to a balance input since the + and – signals will be the same. If the jack is in balanced mode and it is monitored with headphones, the left and right ears will be out of phase and it will sound a bit weird.

byte#	PC sends
1	0xFD startbyte
2	dev num device
3	0 slot
4	30 command
5	1 data #
6	0 or 1 0=HP mode, 1=balanced mode
7	0xFE endbyte

11. Load Preset Command

This preset loads the selected preset from eeprom into the current settings.

byte#	PC sends
1	0xFD startbyte
2	dev num device
3	0 slot
4	21 command
5	1 data #
6	Preset #
7	0xFE endbyte

12. Save Preset Command

This saves the current settings to a selected user preset. It also allows a 10 character preset name to be saved with the preset. This name is displayed in the Sacom GUI in the list of available presets. Presets 1-3 are factory presets and can not be overwritten. Presets 4-8 are user presets and can be written.

The name characters should be sent in ASCII format.

byte#	PC sends
1	0xFD startbyte
2	0 device
3	0 channel
4	22 command
5	11 data #
6	preset number
7	name byte 0
8	name byte 1
9	name byte 2
10	name byte 3
11	name byte 4
12	name byte 5
13	name byte 6
14	name byte 7
15	name byte 8
16	name byte 9
17	0xFE endbyte

13. Read Preset Names

This command retrieves the preset names for the 8 presets. It loads either the first 4 names or the second 4 names, depending on the value of the slot parameter. The names are 10 characters long, and the values are returned in ASCII format.

byte#	PC sends
1	0xFD startbyte
2	0 device
3	0 slot (0 for 0-4, 4 for 5-8)
4	31 command
5	0 data #
6	0xFE endbyte

	Receiver responds
1	FD startbyte
2	0 device
3	0 channel
4	31 command
5	40 data bytes
6	preset 1 name char 1
7	preset 1 name char 2
8	preset 1 name char 3

9		preset 1 name char 4
10		preset 1 name char 5
11		preset 1 name char 6
12		preset 1 name char 7
13		preset 1 name char 8
14		preset 1 name char 9
15		preset 1 name char 10
16		preset 2 name char 1
17		preset 2 name char 2
18		preset 2 name char 3
19		preset 2 name char 4
20		preset 2 name char 5
21		preset 2 name char 6
22		preset 2 name char 7
23		preset 2 name char 8
24		preset 2 name char 9
25		preset 2 name char 10
26		preset 3 name char 1
27		preset 3 name char 2
28		preset 3 name char 3
29		preset 3 name char 4
30		preset 3 name char 5
31		preset 3 name char 6
32		preset 3 name char 7
33		preset 3 name char 8
34		preset 3 name char 9
35		preset 3 name char 10
36		preset 4 name char 1
37		preset 4 name char 2
38		preset 4 name char 3
39		preset 4 name char 4
40		preset 4 name char 5
41		preset 4 name char 6
42		preset 4 name char 7
43		preset 4 name char 8
44		preset 4 name char 9
45		preset 4 name char 10
46	FE	end byte

14. Set GPIO Configuration Command

This command configures the GPIO for the DB25 connector on the back of the receiver. Each GPIO pin can be either an input, an output, or disabled. When configured as an output, it is floating/high impedance when not asserted and driven low when asserted. When configured as an input, driving it low asserts it. In addition, pins 2 and 3 are shared with the RS232 function. When configured as RS232, these pins are only used for TX and RX and unavailable for GPIO.

Byte 31 determines if pins 2 and 3 are GPIO pins or RS232 pins. Setting it to 0 enables RS232, setting it to 1 enables GPIO on these pins.

In the command structure, each pin has a byte associated with it to configure it.

BITS 6-5: pin function (0 = mute, 1 = low battery; 2,3 reserved)

BITS 4-2: slot (0-7). This determines which receiver slot is associated with the pin.

BIT 1: input or output. (0 = input, 1 = output)

BIT 0: enable or disable. (0 = disabled, 1 = enabled)

byte#	PC sends
1	0xFD startbyte
2	0 device
3	0 channel
4	25 command
5	26 data #
6	pin1
7	pin2
8	pin3
9	pin4
10	pin5
11	pin6
12	pin7
13	pin8
14	pin9
15	pin10
16	pin11
17	pin12
18	pin13
19	pin14
20	pin15
21	pin16
22	pin17
23	pin18
24	pin19
25	pin20
26	pin21
27	pin22
28	pin23
29	pin24
30	pin25
31	RS232OFF
32	0xFE endbyte