

SDS-2500 RS232 Control Protocol

Document Conventions & Definitions

All commands are shown in Hexadecimal and are not case sensitive. Hexadecimal data is often denoted by the presence of 0x before the data bytes.

Angle brackets (and anything within them) <> represent 1 byte of data.

Port Configuration

These are the settings that are required for successful communication with the SDS-2500.

Serial port control:

Baud Rate: 115200
Data Bits: 8
Parity: None
Stop Bits: 1

Command Structure

Each command for the SDS-2500 is made up of 13 bytes, the first two are a fix value header byte, the next 10 bytes are the command and the final byte is a checksum:

<A5> <5B> <data (0)> <data (1)> <data (2)> <data (3)> <data (4)>
<data (5)> <data (6)> <data (7)> <data (8)> <data (9)> <Checksum>

Checksum Calculation

The Checksum is calculated by subtracting the value of the data bytes from the value 0x100.

Example:

<A5> <5B> <00> <01> <02> <03> <04> <05> <06> <07> <08> <09>

Firstly, add up the value of the data (everything excluding the first two header bytes):

$$0x00+0x01+0x02+0x03+0x04+0x05+0x06+0x07+0x08+0x09 = 0x2D$$

$$\text{Checksum} = 0x100 - 0x2D = 0xD3$$

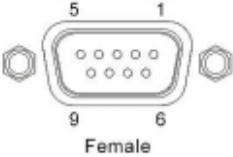
Therefore, the final command becomes:

<A5> <5B> <00> <01> <02> <03> <04> <05> <06> <07> <08> <09> <D3>

Establishing communication

Once a D9 serial cable has been attached from the SDS-2500 unit to a control device (i.e. PC, laptop or 3rd party control system) and mains power applied the link is active. Simply enable the port from the control device and the SDS-2500 will accept incoming commands.

D9 Port – Pin Functions



The diagram shows a female D9 connector with 10 pins. The pins are arranged in two rows of five. The top row is labeled 5, 1, 6, 2, 7 from left to right. The bottom row is labeled 9, 4, 3, 8, 10 from left to right. The word "Female" is written below the connector.

PIN	Function	PIN	FUNCTION
1	Not Used	6	Not Used
2	RS232 send data	7	Not Used
3	RS232 receive data	8	Not Used
4	Not Used	9	Not Used
5	Ground Earth	10	Not Used

Commands

Control of the SDS-2500 can be broken down in to the following 8 categories:

1. General System Command
2. Input Format Selection
3. Output Mode Selection
4. Crosspoint Control
5. EDID Management
6. Multi-viewer Layout
7. Video Wall Control
8. Switching Time and Mode

The tables below step through each of these command types in turn providing command examples

1. General System Commands – Control of system bell, image border control, scaler and auto adjust functions

System Bell ON/OFF

SEND:

<A5><5B><06><01><Bell ON/OFF><00><00><00><00><00><00><00><Checksum>

Bell OFF: 0xF0

Bell ON : 0x0F

Example for Bell OFF:

<A5><5B><06><01><F0><00><00><00><00><00><00><00><09>

Example for Bell ON:

<A5><5B><06><01><0F><00><00><00><00><00><00><00><EA>

System Bell Status Query

SEND:

<A5><5B><01><0B><00><00><00><00><00><00><00><00><F4>

RECEIVE:

<A5><5B><01><0B><00><00><Bell ON/OFF><00><00><00><00><00><Checksum>

Bell OFF: 0xFF

Bell ON : 0x00

Example when Bell ON:

<A5><5B><01><0B><00><00><00><00><00><00><00><00><F4>

Example when Bell OFF:

<A5><5B><01><0B><00><00><FF><00><00><00><00><00><F5>

Image Borders ON/OFF

SEND:

<A5><5B><0C><01><BorderON/OFF><00><00><00><00><00><00><00><Checksum>

Border ON : 0x0F

Border OFF: 0xF0

Example for Border ON:

<A5><5B><0C><01><0F><00><00><00><00><00><00><00><E4>

Example for Border OFF:

<A5><5B><0C><01><F0><00><00><00><00><00><00><00><03>

Image Borders Query

SEND:

<A5><5B><0C><03><00><00><00><00><00><00><00><00><F1>

RECEIVE:

<A5><5B><0C><03><BorderON/OFF><00><00><00><00><00><00><Checksum>

Border ON : 0x0F

Border OFF: 0xF0

Example when Border OFF:

<A5><5B><0C><03><F0><00><00><00><00><00><00><00><01>

Example when Border ON:

<A5><5B><0C><03><0F><00><00><00><00><00><00><00><E2>

Scaler Commands

SEND:

<A5><5B><0A><0F><00><00><output port><00><00><00><00><00><Checksum>

Output A: 0x01

Output B: 0x02

Output C: 0x03

Output D: 0x04

Example for Output C:

<A5><5B><0A><0F><00><00><03><00><00><00><00><00><E4>

Auto Adjust Command

SEND:

<A5><5B><0A><0E><00><00><output port><00><00><00><00><Checksum>

Output A: 0x01

Output B: 0x02

Output C: 0x03

Output D: 0x04

Example for Output B:

<A5><5B><0A><0E><00><00><02><00><00><00><00><E6>

2. *Input Format Selection* – Select between HDMI, VGA or Composite for any of the SDS-2500 inputs

Input Format Set

SEND:

<A5><5B><0A><01><video format><00><input port><00><00><00><00><00>
<Checksum>

HDMI: 0x01, VGA: 0x02, Composite: 0x03

Input 1: 0x01, Input 2: 0x02, Input 3: 0x03, Input 4: 0x04

Example to set input 2 to HDMI:

<A5><5B><0A><01><01><00><02><00><00><00><00><00><F2>

Example to set input 1 to VGA:

<A5><5B><0A><01><02><00><01><00><00><00><00><00><F2>

Example to set input 4 to composite:

<A5><5B><0A><01><03><00><04><00><00><00><00><00><F2>

Input Format Query

SEND:

<A5><5B><90><01><00><00><input port><00><00><00><00><00><Checksum>

Input 1: 0x01, Input 2: 0x02, Input 3: 0x03, Input 4: 0x04

Example to check video format of input 2:

<A5><5B><90><01><00><00><02><00><00><00><00><00><6D>

RECEIVE:

<A5><5B><90><01><video format><00><input port><00><00><00><00><00>
<Checksum>

HDMI: 0x01, VGA: 0x02, Composite: 0x03

Input 1: 0x01, Input 2: 0x02, Input 3: 0x03, Input 4: 0x04

Example response from input 2 being set to VGA format:

<A5><5B><90><01><02><00><02><00><00><00><00><00><6B>

3. **Output Mode Selection** – Select between Matrix, PIP/POP and Video Wall Modes

Set Display Mode

SEND:

<A5><5B><13><01><Display Mode><00><00><00><00><00><00><00><Checksum>

Matrix: 0x01, PIP/POP: 0x02, Video Wall: 0x03

Example to set SDS-2500 to Video Wall mode:

<A5><5B><13><01><03><00><00><00><00><00><00><00><E9>

Display Mode Query

SEND:

<A5><5B><13><02><00><00><00><00><00><00><00><EB>

RECEIVE:

<A5><5B><13><02><Display Mode><00><00><00><00><00><00><00><Checksum>

Matrix: 0x01, PIP/POP: 0x02, Video Wall: 0x03

Example of received command showing SDS-2500 set to PIP/POP mode:

<A5><5B><13><02><02><00><00><00><00><00><00><00><E9>

4. Crosspoint Control – Applicable when SDS-2500 set to Matrix Mode

Switch Command

SEND:

<A5><5B><02><03><Input><00><Output><00><00><00><00><00><Checksum>

Input 1: 0x01, Input 2: 0x02, Input 3: 0x03, Input 4: 0x04

Output A: 0x01, Output B: 0x02, Output C: 0x03, Output D: 0x04

Example to set Output D to Input 2:

<A5><5B><02><03><02><00><04><00><00><00><00><00><F5>

Example to set Output B to Input 4:

<A5><5B><02><03><04><00><02><00><00><00><00><00><F5>

Crosspoint Query Command

SEND:

<A5><5B><02><01><Output><00><00><00><00><00><00><00><Checksum>

Output A: 0x01, Output B: 0x02, Output C: 0x03, Output D: 0x04

Example to query input set to output C:

<A5><5B><02><01><03><00><00><00><00><00><00><00><00><FA>

RECEIVE:

<A5><5B><02><01><Output><00><Input><00><00><00><00><00><Checksum>

Output A: 0x01, Output B: 0x02, Output C: 0x03, Output D: 0x04

Input 1: 0x01, Input 2: 0x02, Input 3: 0x03, Input 4: 0x04

Example to receive that output C is set to input 2:

<A5><5B><02><01><03><00><02><00><00><00><00><00><00><F8>

5. EDID Management – Set EDID values to the inputs of SDS-2500

Set Single Input Port EDID

SEND:

<A5><5B><03><02><EDID><00><input><00><00><00><00><00><Checksum>

EDID - 1080I stereo audio 2.0: 0x01, 1080P stereo audio 2.0: 0x02, DVI 1920x1080: 0x03

Input 1: 0x01, Input 2: 0x02, Input 3: 0x03, Input 4: 0x04

Example to set 1080P EDID to input 1:

<A5><5B><03><02><02><00><01><00><00><00><00><00><F8>

Set All Input Port EDID

SEND:

<A5><5B><03><01><EDID><00><00><00><00><00><00><Checksum>

EDID - 1080I stereo audio 2.0: 0x01, 1080P stereo audio 2.0: 0x02, DVI 1920x1080: 0x03

Example to set 1080I EDID to all inputs:

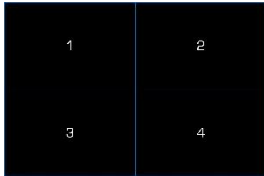
<A5><5B><03><01><01><00><00><00><00><00><00><FB>

6. Multi-viewer Layout and Audio – Choose between the four layout options for PIP/POP output and select audio input channel. Applicable only when SDS-2500 in Multi-viewer mode

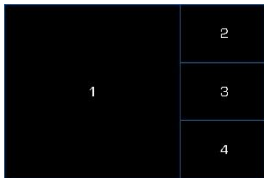
Select Multi-viewer Layout

SEND:

<A5><5B><14><01><PIP/POP Mode><00><00><00><00><00><00><00><Checksum>



Mode 1: 0x01



Mode 2: 0x02



Mode 3: 0x03



Mode 4: 0x04

Example to set SDS-2500 to mode 3:

<A5><5B><14><01><03><00><00><00><00><00><00><00><E8>

Query Multi-viewer Layout

SEND:

<A5><5B><14><02><00><00><00><00><00><00><00><EA>

RECEIVE:

<A5><5B><14><02><PIP/POP Mode><00><00><00><00><00><00><00><Checksum>

Mode 1: 0x01, Mode 2: 0x02, Mode 3: 0x03, Mode 4: 0x04

Example to show received command when SDS-2500 is in mode 4:

<A5><5B><14><02><04><00><00><00><00><00><00><00><E6>

Set PIP/POP Main Input (this input will be displayed in position 1 as per the diagrams on the previous page)

SEND:

<A5><5B><14><03><Main Input><00><PIP/POP Mode><00><00><00><00><00><Checksum>

Main Input – Input 1: 0x01, Input 2: 0x02, Input 3: 0x03, Input 4: 0x04

PIP/POP Mode – Mode 1: 0x01, Mode 2: 0x02, Mode 3: 0x03, Mode 4: 0x04

Example to set input 2 as the main input on PIP/POP Mode 2:

<A5><5B><14><03><02><00><02><00><00><00><00><00><E5>

Example to set input 3 as the main input on PIP/POP Mode 4:

<A5><5B><14><03><03><00><04><00><00><00><00><00><E2>

NOTE: The command above does not change the PIP/POP Mode, it can be sent as a pre-configuration option so that when the desired Mode is selected the correct screens are in the correct location.

Query PIP/POP Modes Main Input

SEND:

<A5><5B><14><04><00><00><PIP/POP Mode><00><00><00><00><00><Checksum>

PIP/POP Mode – Mode 1: 0x01, Mode 2: 0x02, Mode 3: 0x03, Mode 4: 0x04

Example to query main input of mode 4:

<A5><5B><14><04><00><00><04><00><00><00><00><00><E4>

RECEIVE:

<A5><5B><14><04><Main Input><00><PIP/POP Mode><00><00><00><00><00><Checksum>

Main Input – Input 1: 0x01, Input 2: 0x02, Input 3: 0x03, Input 4: 0x04

PIP/POP Mode – Mode 1: 0x01, Mode 2: 0x02, Mode 3: 0x03, Mode 4: 0x04

Example to show main input of mode 4 is input 1:

<A5><5B><14><04><01><00><04><00><00><00><00><00><E3>

Select audio input for Multi-viewer Mode

SEND:

<A5><5B><16><01><Audio Input><00><00><00><00><00><00><00><Checksum>

Audio input – Input 1: 0x01, Input 2: 0x02, Input 3: 0x03, Input 4: 0x04

Example to set audio input 3 for PIP/POP mode:

<A5><5B><16><01><03><00><00><00><00><00><00><00><E6>

Query audio input for Multi-viewer Mode

SEND:

<A5><5B><16><02><00><00><00><00><00><00><00><E8>

RECEIVE:

<A5><5B><16><02><Audio Input><00><00><00><00><00><00><00><Checksum>

Audio Input – Input 1: 0x01, Input 2: 0x02, Input 3: 0x03, Input 4: 0x04

Example to show receipt for input 2 set as audio input for PIP/POP mode:

<A5><5B><16><02><02><00><00><00><00><00><00><00><E6>

7. Video Wall Control – Change input seen on video wall output and adjust x-y position of image

Set Video Wall Input

SEND:

<A5><5B><16><01><video input><00><00><00><00><00><00><00><Checksum>

Video Input – Input 1: 0x01, Input 2: 0x02, Input 3: 0x03, Input 4: 0x04

Example to set Video Wall output to Input 3:

<A5><5B><16><01><03><00><00><00><00><00><00><00><E6>

Query Video Wall Input

SEND:

<A5><5B><16><02><00><00><00><00><00><00><00><00><E8>

RECEIVE:

<A5><5B><16><02><video input><00><00><00><00><00><00><00><E8>

Video Input – Input 1: 0x01, Input 2: 0x02, Input 3: 0x03, Input 4: 0x04

Example to show receipt of input 3 as video wall input:

<A5><5B><16><02><03><00><00><00><00><00><00><00><E5>

Adjust Video Wall x-position

SEND:

<A5><5B><15><01><X-position><00><00><00><00><00><00><Checksum>

X-position – Hex range of 0x01 – 0x32 (1-50 in decimal)

Example to move x-position by 35 = 0x23

<A5><5B><15><01><23><00><00><00><00><00><00><00><C7>

Adjust Video Wall y-position

SEND:

<A5><5B><15><02><Y-position><00><00><00><00><00><00><Checksum>

Y-position – Hex range of 0x01 – 0x32 (1-50 in decimal)

Example to move y-position by 28 = 0x1C

<A5><5B><15><02><1C><00><00><00><00><00><00><00><CD>

Query Video Wall x & y-position

SEND:

<A5><5B><15><03><00><00><00><00><00><00><00><E8>

RECEIVE:

<A5><5B><15><03><X-pos><00><Y-pos><00><00><00><00><00><Checksum>

X-position – Hex range of 0x01 – 0x32 (1-50 in decimal)

Y-position – Hex range of 0x01 – 0x32 (1-50 in decimal)

Example to show receipt of x-pos 15 (0x0F) and y-pos 27 (0x1B)

<A5><5B><15><03><0F><00><1B><00><00><00><00><00><BE>

8. Switching Times and Modes – Adjust the length of time it takes a switch command to execute and the fashion in which switch is visually seen on video outputs

Adjust Switching Time

SEND:

<A5><5B><0B><02><Time><00><Output><00><00><00><00><00><Checksum>

Time – Half Second increments: 0x01 = 0.5s, 0x02 = 1.0s, 0x03 = 1.5s, 0x04 = 2.0s, 0x05 = 2.5s, 0x06 = 3.0s, 0x07 = 3.5s, 0x08 = 4.0s

Output – Output 1: 0x01, Output 2: 0x02, Output 3: 0x03, Output 4: 0x04

Example to set switch time of output 3 to 2.5s:

<A5><5B><0B><02><05><00><03><00><00><00><00><Checksum>

Query Switching Time

SEND:

<A5><5B><98><02><00><00><Output><00><00><00><00><00><Checksum>

Output – Output 1: 0x01, Output 2: 0x02, Output 3: 0x03, Output 4: 0x04

Example to send switch time query for output 1:

<A5><5B><98><02><00><00><01><00><00><00><00><65>

RECEIVE:

<A5><5B><98><02><Time><00><Output><00><00><00><00><00><Checksum>

Time – Half Second increments: 0x01 = 0.5s, 0x02 = 1.0s, 0x03 = 1.5s, 0x04 = 2.0s, 0x05 = 2.5s, 0x06 = 3.0s, 0x07 = 3.5s, 0x08 = 4.0s

Output – Output 1: 0x01, Output 2: 0x02, Output 3: 0x03, Output 4: 0x04

Example receipt to show output 1 switch time of 3.0s:

<A5><5B><98><02><06><00><01><00><00><00><00><5F>

Adjust Switch Mode

SEND:

<A5><5B><0B><01><SwMode><00><Output><00><00><00><00><00><Checksum>

SwMode – Fast Switching: 0x01, Fade in/Fade out: 0x02, Split Vertical Out: 0x03, Split Horizontal Out: 0x04, Wipe Right: 0x05, Wipe Down: 0x06, Wheel Clockwise 1: 0x07, Wheel Clockwise 4: 0x08, Box Out: 0x09, Box In: 0x0A, Circle In: 0x0B, Circle Out: 0x0C, Blinds Horizontal: 0x0D, Blinds Vertical: 0x0E, Checkerboard Horizontal: 0x0F, Checkerboard Vertical: 0x10

Output – Output 1: 0x01, Output 2: 0x02, Output 3: 0x03, Output 4: 0x04

Example to set output 2 to switch mode circle out:

<A5><5B><0B><01><0C><00><02><00><00><00><00><00><E6>

Query Switch Mode

SEND:

<A5><5B><98><01><00><00><Output><00><00><00><00><00><Checksum>

Output – Output 1: 0x01, Output 2: 0x02, Output 3: 0x03, Output 4: 0x04

Example to query switch mode of output 4:

<A5><5B><98><01><00><00><04><00><00><00><00><00><63>

RECEIVE:

<A5><5B><98><01><SwMode><00><Output><00><00><00><00><00><Checksum>

SwMode – Fast Switching: 0x01, Fade in/Fade out: 0x02, Split Vertical Out: 0x03, Split Horizontal Out: 0x04, Wipe Right: 0x05, Wipe Down: 0x06, Wheel Clockwise 1: 0x07, Wheel Clockwise 4: 0x08, Box Out: 0x09, Box In: 0x0A, Circle In: 0x0B, Circle Out: 0x0C, Blinds Horizontal: 0x0D, Blinds Vertical: 0x0E, Checkerboard Horizontal: 0x0F, Checkerboard Vertical: 0x10

Output – Output 1: 0x01, Output 2: 0x02, Output 3: 0x03, Output 4: 0x04

Example receipt to show output 4 set to switch mode wipe down:

<A5><5B><98><01><06><00><04><00><00><00><00><00><5D>