JBL SYNTHESIS SDP-45

SERIAL PROTOCOL

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SDP-45 Firmware Revision: 2013.01q

Protocol Version: 1.0

Document Version: 1.01 (minor updates to documentation)

Document Version: 1.02 (clarification to power on settings)

Document Version: 1.03 (correction to LMOD strings)

Document Version: 1.04 (Clarification for TCP/IP control)

Introduction

This document is intended for users who wish to provide their own user interface or control system for an SDP45 system. The below controls are intended to be used by experienced systems designers. The commands can be sent and received over both control ports.

- Ethernet
- RS232

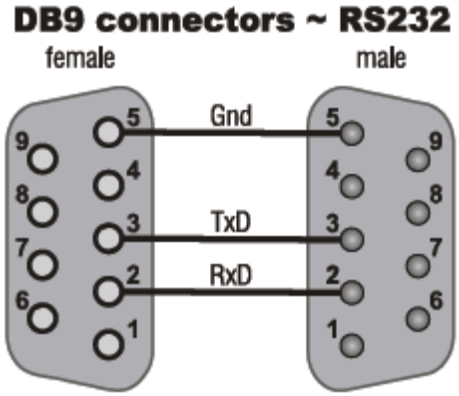
SDP-45receives commands and can send responses to each command. It can also (optionally) broadcast automatic responses to certain system events such as source switching from the front panel etc. (see AUFB). The following commands can be sent over RS232, and TCP/IP (using GET mechanism over port 80).

Hardware Connection

RS232:

SDP-45uses a 9-pin serial straight through connection. The SDP-45 has a 9-pin FEMALE connector on the rear panel.

- 9600 Baud Default (configurable in setup)
- 8 bit data,
- 1 start bit,
- 1 stop bit,
- no parity,
- no handshake



Ethernet:

RJ-45 Standard 10/100 Base-T Ethernet.

- Port 80
- DHCP is on (Default). This can be set to a static IP through the front panel menu.
- Ethernet is OFF IN STANDBY (due to low power requirements for EuP / Energy Star). If Ethernet will be used to power on the unit from standby this behavior must be changed to ON IN STANDBY or Ethernet must not be used for power ON command. Use the trigger or IR commands in this case. ON IN STANDBY can be set through the “hidden” menu options, from System Setup →MISC→scroll to bottom and press ZONE,BD and TV buttons, in this order to open additional screen options.
- **NOTE: The TCP/IP protocol is based on the GET mechanism for web enabled devices. It does not automatically return feedback from user control. For this reason we do not support TCP/IP for serial control of the unit at this time.**

Command format:

ASCII strings ended with carriage return (code 13). All Host Controller commands (input to SDP-45) and SDP-45 Response (feedback) use the same format.

#	D1	D2	C1	C2	C3	C4	P1	P2	...	<CR>

#	**Command start character. In Hex this is 23 or \x23. For TCP/IP: use URL code %23**
D1	Device category, one digit. For SDP-45 D1 must be 1.
D2	RS485 device ID, 1 digit. For SDP-45 D2 should remain 0. D2=0 typically and can only be changed through the front panel menu!
C1..C4	Command name (4 chars) , typically uppercase ASCII letters.
P1,P2	Parameters are two or more arbitrary ASCII characters.
<CR>	Special end character \r: Decimal code 13 or in hex 0D over RS232,or URL dot (.) character over TCP/IP

Response format:

Response format is the same as commands, repeating the D1,D2,C and P bytes (P bytes may carry either an actual status value or ?? in case of errors).

Example of Command and Response for power:

Description	String Example (RS232):	String Example (Ethernet):
command: query power status	**#10MPWRQS\r**	**%2310MPWRQS.**
response: power is off (in standby)	**#10MPWR00\r**	**%2310MPWR00.**
command: power up	**#10MPWR01\r**	**%2310MPWR01.**
response(delayed): power is on	**#10MPWR01\r**	**%2310MPWR01.**

Communication Notes:

- All characters preceding the # of a command, and following the <CR> will be ignored. Do not insert #, spaces, <LF>, <TAB> or other non-ASCII characters inside the command string.
- When using TCP/IP, replace carriage return code with dot '.' and # with %23.
- Do not assume that the number of response bytes P1,P2,... is fixed. Allow up to 320 bytes to be read or until a <CR> is encountered.
- The format of the automatic responses is the same as the response to a serial command sent with the parameter bytes P1 P2 = "QS".

Acknowledgement Commands:

No changes need to be made to receive Acknowledgment from the SDP-45. The SDP-45 will respond back to any command with the current status of the command within 500ms.

Setup for Auto Feedback Communications (RS232 ONLY):

By default the SDP-45 *does* have Auto Feedback turned on. Auto-Feedback can be turned off through the front panel user menu. This means the SDP-45 will only respond to explicit commands sent in through the command system and not respond "asynchronously" to inputs from user interaction through the front panel or IR remote control. Before beginning the session it is recommended that Auto Feedback be forced to ON using the **AUFB** command to ensure that all commands are returned either from RS232 or front panel user input.

Description	**String Example (RS232):**	**String Example (Ethernet):**
command: Turn Auto Feedback ON	**#10AUFB01\r**	**%2310AUFB01.**
Response: Auto Feedback ON	**#10AUFB01\r**	**%2310AUFB01.**

Errors:

A command that is sent with a valid format but a Parameter that cannot be valid (such as input source 10, which does not exist) will return "??" in the parameter bytes.

Description	**String Example (RS232):**	**String Example (Ethernet):**
Response: Main Source Error	#10MSRC??\r	**%23**10MSRC??**.**

Any non recognized command or command which has non standard or incorrect formatting will be ignored. If no response is received within 500ms assume that the command is invalid.

Power On Timing Sequence:

After the power on command is sent the unit will take 5 seconds to power on and acknowledge the power on command. You should wait until the Power ON feedback is received before starting a timer to block sending any additional commands. After receiving the Power On feedback an additional 4.5 seconds should be allowed before sending any commands. During this time the commands may be ignored and will need to be resent.

Power OFF:

All commands except **MPWR** and **INFO** are ignored in standby.

Command List

All commands except **MPWR** and **INFO** are ignored in standby.

COMMAND Bytes C1,C2,C3,C4	PARAMETER Bytes P1,P2,..	DESCRIPTION All feedback is in the same format. In this way the response will echo the command if the command is valid.	NOTES
MPWR		**Main Power**	
	00	Off (Standby)	
	01	On	
	QS	Query Status	
AUFB		**auto-feedback**	
	00	OFF - automatic response on device status change or button press actions will not be broadcast(only the responses to explicit commands)	
	01	Automatic response will always be sent.	Recommended to be sent on power up
	QS	query, return AUFB status	
MSRC		**Main Source**	System power on defaults to last used source
	00	Blu-ray	
	01	SAT / VBL	
	02	Game	
	03	Media Player	
	04	DVR	
	05	TV	
	06	CD	
	07	BAL2	
	08	USB	
	09	7.1 Bypass	
	QS	Query Status	
MVOL		**Main Volume**	MVOL can be used to set the volume, bump it up/down. The unit will respond with a MVOL and the current volume.
	UP	Up 1 step (0.5dB)	
	DN	Down 1 step (0.5dB)	
	xxxx	0200..1120 in 0.1dB units, plus 1000 (-80.0..12.0dB res 0.5dB)	
	QS	Query Status	
MMUT		**Main Mute**	

	00	Mute Off	
	01	Mute On	
	02	Mute toggle	
	QS	Query Status	
ZSRC		**Zone Source**	
	00	Blu-ray	
	01	SAT / VBL	
	02	Game	
	03	Media Player	
	04	DVR	
	05	TV	
	08	Digital Downmix	
	QS	Query Status	
ZVOL		**Zone Volume**	
	UP	Up 1 step (0.5dB)	
	DN	Down 1 step (0.5dB)	
	xxxx	0200..1120 (-80.0..12.0dB)	
	QS	Query Status	
ZMUT		**Zone Mute**	
	00	Mute Off	
	01	Mute On	
	02	Mute toggle	
	QS	Query Status	
MDSL		**Audio Input Source/Mode**	Main Zone can use all input sources. Zone 2 output can use Analog (AN) or Digital (DI) downmix from Main Zone
	00	not applicable,ignore	
	AN	Analog	
	DI	Digital (COAX or OPTICAL)	
	HD	HDMI	
	BP	Bypass 2-Channel (Analog)	
	QS	Query Status	
MENU		**Menu**	Use Display Text Feedback (DISP) to show current information.
	LE	Left	
	RI	Right	
	UP	Up	
	DN	Down	
	SL	Select	
	EX	Exit one menu out, go from Zone to Main	See Auto Save below
	QS	Query status	00 = top (idle) screen 01..99=inside a submenu

DISP		**Display brightness and Text Display Feedback**	
	ON	On	
	OF	Off	
	01	25% Brightness	
	02	50% Brightness	
	03	75% Brightness	
	04	100% Brightness	
	L1	Returns Line 1	Send QS or Auto Feedback ON to receive the text
	L2	Returns Line 2	
	L3	Returns Line 3	
	L4	Returns Line 4	
	QS	Query Status	
ASAV		**Set auto-save or force save now**	
	00	OFF - any parameter changed will not be automatically saved in EEPROM. (will require ASAVSV Command to save!)	
	01	Automatically saves all Changed parameters(within2s). Will also force saving of currently modified parameters.	Recommended to be sent on power up.
	SV	Forces save all modified parameters, without changing the auto save status (ON or OFF)	Send this before exiting the menu setup screens to force save all changes
	QS	Query, return auto-save Status	
OUTP		**Query Output Format (Active Speaker Format)**	
	QS	query, returns listening output format	
	The response will show the speaker output currently active. For example: #OUTP7.1\r would indicate 7.1 speaker output. This does not indicate the decoding or post processing listening mode but does confirm how many speakers are being used. This will also automatically be sent without a QS being issued by the SDP-45 as affected by surround or input mode changes.		
LMOD		**Listening Mode**	These represent output or post processing after the analog or digital signal has been decoded. To see what the input signal bitstream decoding is (DD5.1, TRU-HD, etc…) use INPT to querry the input signal format
		2Ch. to 7.1 effects:	
	00	No Effect	
	01	Pro Logic (emulates the old standard!)	
	02	PLII Music	
	03	PLII Movie	
	04	Neo:6 Music	
	05	Neo:6 Cinema	
	06	Stereo7 (MST 7.1 spk)	
	07	Party (MST mono 7.1)	

	08	Room Reverb: Hall	
	09	Room Reverb: Church	
	10	Room Reverb: Stadium	
	11	Room Reverb: Club	
	12	Room Reverb: Theatre	
	13	Natural	
	14	Stereo7x (MTX 7.1 spk)	
		5.1Ch to 7.1 effects:	
	21	Dolby Dig.5.1(no back)	
	22	Dolby Dig.ex 6.1 Movie	
	23	PLIIx ex 6.1 Music	
	24	PLIIx ex 7.1 Movie	
	25	PLIIx ex 7.1 Music	
	26	PLIIx ex AUTO	
		-- 1 or 2 CH --	
	ST	STEREO (2.1 speakers)	
	MN	MONO (2.1 speakers)	
	QS	Query Status	
INPT		**Query Input Signal BitStream (Source Program)**	Cannot be changed, this is for information use only. The source controls the bitstream
	QS	query, response xx=	
		00: Unknown or illegal	
		01: Analog, BP7 or BP2	
		02: Digital pass-through	
		03: Pink-noise test	
		04: Auto	
		05: Bitstream	
		06: All DTS formats	
		07: PCM Auto	
		08: PCM (CD audio)	
		09: PCM 8 ch	
		0a: AC3 (Dolby Dig)	
		0b: DTS	
		0c: AAC MPEG4,MPEG2,iPhone,	
		iPod,iPad,NintendoDSi,	
		iTunes,DivX,PS3,PSP,	
		SonyWalk,phones,Wii.	
		0d: MPEG(MP1 Layr1 and 2)	
		0e: DTS12 (DVD IEC Type 12)	
		0f: DTS13 (DVD IEC Type 13)	
		10: DTS14 (CD 14-bit)	
		11: DTS16 (CD 16-bit)	
		12: WMP (WMA Pro)	
		13: MP3	

		14: DSD1 (SACD 1bit)	
		15: DSD2	
		16: DSD3	
		17: DDP (Dolby Dig+)	
		18: DTS HD or Master	
		19: Dolby TrueHD	
		1a: DXP (DTS Express)	
DVOL		**Dynamic Range(DRC) and Dolby Volume(DV)**	See User Guide for description of these Dolby Volume parameters
	00	ALL OFF	
	01	DRC OFF; DV LOW - FULL	
	02	DRC OFF; DV MED - FULL	
	03	DRC OFF; DV HI - FULL	
	04	DRC OFF; DV LOW - HALF	
	05	DRC OFF; DV MED - HALF	
	06	DRC OFF; DV HI - HALF	
	07	DRC MED1;DV OFF	
	08	DRC LOW2;DV OFF	
	09	DRC AUTO;DV OFF	
	QS	Query Status	
DDVL		**Dolby Volume Adjust**	See User Guide for description of these Dolby Volume parameters
	xxxx	0200..1120 (-80.0..12.0dB) Set Dolby Volume Calib. Offset (default=0,high=less loud)	
	MS0	Mid/Side OFF (default)	
	MS1	Mid/Side ON(useful in stereo)	
	QS	Query Status (resp.ex.: DDVL0000MS1)	
TRIG		**Trigger Output**	
	xxx	TR1/TR2/TR3	
	000	All triggers Off	
	0	Trigger Off	
	1	Trigger On	
	*	Trigger No Change	
	QS	Query Status	
LFVL		**Left Front Vol Trim**	
	UP	Up 1 step (0.5dB)	
	DN	Down 1 step (0.5dB)	
	xxxx	0880..1120 (-12.0..12.0dB)	
	QS	Query Status	

RFVL		**Right Front Vol Trim**	
	UP	Up 1 step (0.5dB)	
	DN	Down 1 step (0.5dB)	
	xxxx	0880..1120 (-12.0..12.0dB)	
	QS	Query Status	
CNVL		**Centre Vol Trim**	
	UP	Up 1 step (0.5dB)	
	DN	Down 1 step (0.5dB)	
	xxxx	0880..1120 (-12.0..12.0dB)	
	QS	Query Status	
SBVL		**Subwoofer Vol Trim**	
	UP	Up 1 step (0.5dB)	
	DN	Down 1 step (0.5dB)	
	xxxx	0880..1120 (-12.0..12.0dB)	
	QS	Query Status	
LSVL		**Left Surr Vol Trim**	
	UP	Up 1 step (0.5dB)	
	DN	Down 1 step (0.5dB)	
	xxxx	0880..1120 (-12.0..12.0dB)	
	QS	Query Status	
RSVL		**Right Surr Vol Trim**	
	UP	Up 1 step (0.5dB)	
	DN	Down 1 step (0.5dB)	
	xxxx	0880..1120 (-12.0..12.0dB)	
	QS	Query Status	
LBVL		**Left Back Vol Trim**	
	UP	Up 1 step (0.5dB)	
	DN	Down 1 step (0.5dB)	
	xxxx	0880..1120 (-12.0..12.0dB)	
	QS	Query Status	
RBVL		**Right Back Vol Trim**	

	UP	Up 1 step (0.5dB)	
	DN	Down 1 step (0.5dB)	
	xxxx	0880..1120 (-12.0..12.0dB)	
	QS	Query Status	
SPFR		**Front Speakers Setup**	
	00	Off (Not allowed)	
	01	Small	
	02	Large	
	QS	Query Status	
SPCN		**Centre Speaker Setup**	
	00	Off	
	02	Large	
	QS	Query Status	
SPSB		**Subwoofer Setup**	
	00	Off	
	01	On (not in bypass)	
	02	On (also in bypass)	
	QS	Query Status	
SPSR		**Surr Speakers Setup**	
	00	Off	
	01	Small	
	02	Large	
	QS	Query Status	
SPBK		**Back Speakers Setup**	
	00	Off	
	01	1 Small	
	02	2 Small	
	03	1 Large	
	04	2 Large	
	QS	Query Status	
SPCF		**Speaker Config**	
		(Fr/C/Sur/Back/Sub)	
	00	no change or unknown	
	01	S/S/S/S2/Y	
	02	L/S/S/S2/N	
	03	L/L/L/L2/N	
	04	L/N/N/N/N	

	05	L/L/L/L2/Y	
	06	L/L/S/S2/Y	
	QS	Query Status	
XBAS		**Extra Bass Setup**	
		(sub must be on and front=large only)	
	00	Off or not applicable	
	0000	same as above	
	xxxx	0800..1000 (-20.0 .. 0.0dB)	
	QS	Query Status	
TEST		**Pink noise setup**	
	ALL	Automatically sequence all channels every 4s, then exit.	
	MAN	Start manual sequence or increment channel if already started	
	LF	Start Left front(01)	
	CN	Start Centre(02)	
	RF	Start Right front (03)	
	RS	Start Right surround(04)	
	RB	Start Right back(05)	
	LB	Start Left back (06)	
	LS	Start Left surround (07)	
	SB	Start Subwoofer (08)	
	EX	Stop and Exit pink noise setup	
	QS	query status. Resp	
	00	00 = not playing	Response to QS will be the currently active TEST output channel
	01	01 = L (left front)	
	02	02 = C (center)	
	03	03 = R (right front)	
	04	04 = Rs (right surr side)	
	05	05 = Rb (right surr back)	
	06	06 = Lb (left surr back)	
	07	07 = Ls (left surr side)	
	08	08 = SUBWOOFER	
AFMT		**Query Input Format (Program Format)**	
	QS	Query, returns prog format	
		as 8 digit hex bit-flags:	
		BIT0 Left	
		BIT1 Right	
		BIT2 Center	

		BIT8 single surround	
		BIT9 dual surround	
		BIT10 single back	
		BIT11 dual back	
		BIT12 Low Freq Effects	
		BIT13 DualSub(not supp)	
		BIT16 Not Stereo Surr Enc	
		BIT17 Yes Stereo Surr Enc	
		BIT18 Not Back Surr Enc	
		BIT19 Yes Back Surr Enc	
		BIT20 Mono	
		BIT21 Dual Mono	
		BIT24 Karaoke (not supp)	
RATE		**Query Input Sample Rate (Frame Rate)**	
	QS	Query, returns sample rate in Hz (000000=unknown).	
VFMT		**Query Video Input Format**	
	QS	Query, returns video timing and format code xx in hex.	See Video Format Chart Below
VCOL		**Video color depth**	
	QS	query, response xx=	
		00: AUTO	
		08: 3x8 bit	
		0a: 3x10 bit	
		0c: 3x12 bit	
		10: 3x16 bit	
		fe: not applicable	
		ff: unknown	
VCPP		**Copy protection status**	
	QS	query, response xx=	
		00: none	
		01: HDCP	
		02: Macrovision	
		80: AUTO	
		81: ON	
		ff: unknown	
INFO		**Query system info**	

	QS	Query, returns system	
		data in as a long	
		string (typ <300 chars)	
		broken into 22	
		<LF>-delimited lines	
		(code 10 or '\n'),	
		as follows	
		#10INFO<LF>	
		01:%8s<LF> PRODUCT NAME	
		02:%8d<LF> SERNUM	
		03:%8d<LF> MANUFDATE	
		04:%12s<LF>SOFTWARE REV	
		05:%8s<LF> Bootloader Rev	
		06:%8x<LF> DSPA ID	
		07:%8x<LF> DSPA VER	
		08:%8x<LF> DSPB ID	
		09:%8x<LF> DSPB VER	
		10:%8x<LF> CPU PIC32 REV	
		11:%8x<LF> HDMI VER REL	
		12:%8x<LF> KEYPROC PIC16	
		13:%8x<LF> ETHERNET	
		14:%8x<LF> FLASH	
		15:%8x<LF> EEPROM	
		16:%8x<LF> VOLUMECHIP	
		17:%8x<LF> USBAUDIO	
		18:%8x<LF> ZDAC	
		19:%18s<LF>MACADDR[18]	
		20:%16s<LF>NetBiosName[16]	
		21:%4d<LF> Mainboard Rev	
		<CR>	
		Note: %8x means 8 char hex,	
		%8d means 8 char dec,	
		%12s - 12 char str.	
VFMT		**Query Video Input Format**	
	QS	Query, returns video	
		format code xx in hex:	
		00: invalid, unknown, unchanged	
		-- TV --	
		01: 640x480p_60Hz	
		02: 720x480p 60Hz	

		03: 720x480p 60Hz wide	
		04: 1280x720p_60Hz	
		05: 1920x1080i_60Hz	
		06: 720x480i_60Hz	
		07: 720x480i_60Hz wide	
		08: 720x240p_60Hz	
		09: 720x240p_60Hz wide	
		0a: 2880x480i_60Hz	
		0b: 2880x480i_60Hz wide	
		0c: 2880x240p_60Hz	
		0d: 2880x240p_60Hz wide	
		0e: 1440x480p_60Hz	
		0f: 1440x480p_60Hz wide	
		10: 1920x1080p_60Hz	
		11: 720x576p_50Hz	
		12: 720x576p_50Hz wide	
		13: 1280x720p_50Hz	
		14: 1920x1080i_50Hz	
		15: 720x576i_50Hz	
		16: 720x576i_50Hz wide	
		17: 720x288p_50Hz	
		18: 720x288p_50Hz wide	
		19: 2880x576i_50Hz	
		1a: 2880x576i_50Hz wide	
		1b: 2880x288p_50Hz	
		1c: 2880x288p_50Hz wide	
		1d: 1440x576p_50Hz	
		1e: 1440x576p_50Hz wide	
		1f: 1920x1080p_50Hz	
		20: 1920x1080p_24Hz	
		21: 1920x1080p_25Hz	
		22: 1920x1080p_30Hz	
		23: 2880x480p_60Hz	
		24: 2880x480p_60Hz wide	
		25: 2880x576p_50Hz	
		26: 2880x576p_50Hz wide	
		27: 1920x1080i_50Hz	
		28: 1920x1080i_100Hz	
		29: 1280x720p_100Hz	
		2a: 720x576p_100Hz	
		2b: 720x576p_100Hz wide	
		2c: 720x576i_100Hz	
		2d: 720x576i_100Hz wide	
		2e: 1920x1080i_120Hz	

		2f: 1280x720p_120Hz	
		30: 720x480p_120Hz	
		31: 720x480p_120Hz wide	
		32: 720x480i_120Hz	
		33: 720x480i_120Hz wide	
		34: 720x576p_200Hz	
		35: 720x576p_200Hz wide	
		36: 720x576i_200Hz	
		37: 720x576i_200Hz wide	
		38: 720x480p_240Hz	
		39: 720x480p_240Hz wide	
		3a: 720x480i_240Hz	
		3b: 720x480i_240Hz wide	
		3c: 1280x720p_24Hz	
		3d: 1280x720p_25Hz	
		3e: 1280x720p_30Hz	
		3f: 1920x1080p_120Hz	
		40: 1920x1080p_100Hz	
		-- PC formats --	
		80: PC_640x480p_60Hz	
		81: PC_800x600p_60Hz	
		82: PC_1152x960p_60Hz	
		83: PC_1024x768p_60Hz	
		84: PC_1280x768p_60Hz	
		85: PC_1280x1024p_60Hz	
		86: PC_1360x768p_60Hz	
		87: PC_1400x1050p_60Hz	
		88: PC_1600x1200p_60Hz	
		89: PC_1024x768p_70Hz	
		8a: PC_640x480p_72Hz	
		8b: PC_800x600p_72Hz	
		8c: PC_640x480p_75Hz	
		8d: PC_1024x768p_75Hz	
		8e: PC_800x600p_75Hz	
		8f: PC_1024x864p_75Hz	
		90: PC_1280x1024p_75Hz	
		91: PC_640x350p_85Hz	
		92: PC_640x400p_85Hz	
		93: PC_720x400p_85Hz	
		94: PC_640x480p_85Hz	
		95: PC_800x600p_85Hz	
		96: PC_1024x768p_85Hz	
		97: PC_1152x864p_85Hz	
		98: PC_1280x960p_85Hz	

		99: PC_1280x1024p_85Hz	
		9a: PC_1024x768i_87Hz	
		9b: PC_800x600p_56Hz	
		9c: PC_1152x864p_70Hz	
		9d: PC_1152x864p_75Hz	
		9e: PC_1280x960p_60Hz	
		9f: PC_1280x960p_75Hz	
		-- 3D TV --	
		ee: 1920x1080p_24Hz_3D_FP	
		ef: 1280x720p_50Hz_3D_FP	
		f0: 1280x720p_60Hz_3D_FP	
		-- special --	
		fc: FORCE_PASS_THRU	
		fd: PASS_THRU	
		fe: AUTO	
		ff: UNSUPPORTED	