



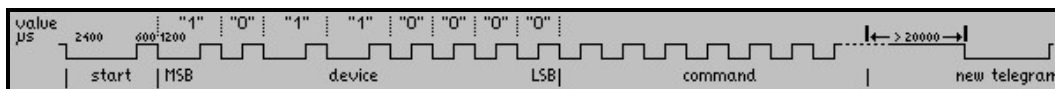
So funktioniert das SONY S-LINK/CTRL-A(II) Protokoll

Dies ist eine kurze Beschreibung des Protokolls basierend auf BigDave's und [William Hollingworth's](#) Ausführungen. S-LINK oder CTRL-A(II) ist ein zweiadriges bidirektionales Bussystem vorwiegend im Hifi-Bereich, an das viele Geräte gleichzeitig angeschlossen sein können.
Vielen Dank an Jesper Nygaard in Kopenhagen (Dänemark) für seine Verstärker-, Tuner- und Surround Codes!



How SONY's S- LINK/CTRL-A(II) protocol works

This is a short description of the protocol based on BigDave's and [William Hollingworth's](#) informations. S-LINK or CTRL-A(II) is a two-wire bidirectional bus system mostly used in audio equipment, where many devices can be connected together.
Many thanks to Jesper Nygaard, Copenhagen (Denmark) for his great help finding amplifier, tuner and surround codes!



S-LINK (CTRL-A) protocol

Send a command to the device (I used here my MD recorder), it will send back a reply message.



Example: "get device name"

you send: B0 6A

you receive: B8 6A 4D 44 53 2D 4A 45 36 34 30 20 20 20 20 00 00 00 00

The device replies with its prefix, repeats the command and tells you "MDS-JE640".

Great and easy bus system, eh? But *you* have to check for collisions!

Known Device Codes

code	device
90	CD Player
B0	MiniDisc Recorder
C0	Amplifier
C1	Tuner
C3	Surround

Device Code composition:

n n n n X y y y

nnnn = device number

X = 0 write to device

X = 1 read from device

yyy = sub-device number

yyy = 111 all devices **nnnn**

MD Send Commands (to MD recorder) prefix 10110000b = B0h

command (hex)	description	remark
00	play	or start recording from record pause
01	stop	

02	pause	
03	pause toggle	
04	eject	
07	record pause	(answer 07)
08	skip +	
09	skip -	
0E	query stored	??? (answer 71)
0F	setup info	prog.-mode, switches (answer 70)
10	fwd fast	end with play or normal
11	rew fast	end with play or normal
12	fwd slow	end with play or normal
13	rew slow	end with play or normal
1F	normal	end from fwd or rew
20	disable remote control	
21	enable remote control	
22	device type	device type code (answer 61)
23	auto pause off	
24	auto pause on	
25	time update on	updates time every second until end of track (answer 51)
26	time update off	
2E	power on	
2F	power off	
32	divide	
33	menu yes	
34	menu no	
35	undo	
3E	device keys disabled	
3F	device keys enabled	
40 TT	erase track	without request!
41 TT TT	move track	from TT to TT, without request!
42 TT	combine with previous track	
43 TT	combine with track TT	without request!
44 DD	query disc	disc info (answer 60)
45 DD TT	query track	track info (answer 62)
46 DD	split adjust	
50 DD TT	play direct track	
51 DD TT	pause (before start) direct track	
54 DD	remain time disc	
58 DD 00	query disc name	no disc name: answer 16
5A TT 00	query track name	no track name: answer 17
6A	device name	answer 6A
72 TT	record date	no date rec.: answer 72 TT 00 00 00 00 00
76 DD TT	combine track a+b	???

78	a-b erase, set point a	???
79	a-b erase, set point b	???
7A	adjust point a	???
7B	adjust point b	???
7C	a-b erase, confirm point a	???
7D	confirm a-b erase	???
97 01 00	disc info	also 97 00 00 (answer 97) ???
98 DD 00 00 [14d x CC]	write disc text	if CC<14d, fill with 00 (ok, answer 1F)
99 BB [16d x CC]	write disc more text	BB>1 (block), if CC<16d, fill with 00 (ok, answer 1F)
9A TT 00 00 [14d x CC]	write track text	if CC<14d, fill with 00 (ok, answer 1F)
9B BB [16d x CC]	write track more text	BB>1 (block), if CC<16d, fill with 00 (ok, answer 1F)
titling characters: ascii 20..5A + 5F..7A and japanese A6..AF + B1..DF		

MD Receive Messages (from MD recorder) prefix 10111000b = B8h

command (hex)	description	remark
00	play	
01	stop	
02	pause	
03	TOC updated	???
04	record play	
05	ignored	
06	seeking	CD Player: unloading or moving carosel
07	record pause	
08	ready	
09	start of track	
0C	30 sec to end of track	
0E	unavailable	
0F	error	
10	no memo	
11	no delete file	
12	no group	
14	invalid disc #	used in disc info query
15	invalid disc or track #	used in track info query
16	no disc name on disc	
17	no track name on disc	
18	door open	only CD-Changer
19	no group	only CD-Changer
1D	no cd text	
1F	title written to memory	
2E	power on	
2F	power off	
31	???	(answer to command 42)
33	complete	

50 DD TT MM SS	track status	disk, track, min, sec (all bcd)
51 TT DD MM SS	time update status	track, disk, min, sec (all bcd) (answer to command 25)
54 DD MM SS	remain time disc	disk, min, sec (all bcd) (if min=100d, byte=a0) (if min>255d, byte=wrong value)
58 DD 00 00 [14d x CC]	disc text	if CC<14d, filled with 00
59 BB [16d x CC]	disc more text	BB>1 (block), if CC<16d, filled with 00
5A TT 00 00 [14d x CC]	track text	if CC<14d, filled with 00
5B BB [16d x CC]	track more text	BB>1 (block), if CC<16d, filled with 00
60 01 01 TT MM SS 00	disc info	# of Discs Tracks (HEX), Total Playing Time Minutes, Seconds (all BCD)
61 DD ID	disc capacity, model identifier	after power on, 07 for MDS-JE530, 0B for CD...
62 DD TT MM SS	track info	Track (HEX), Playing Time Minutes, Seconds (all BCD)
6A	device name	answer: 6A [17d x CC], if CC<17d, filled with 00
70 S1 S2 S3 DD TT	status	S1: 00=stop, 01=play, 02=pause, 04=rec, 05=rec-pause S2: bit0=shuffle, bit1=program, bit2=(only CD: 0=one disc, 1=all discs), bit3=repeat-all, bit4=repeat1, bit5=writable (while playing), bit6= , bit7= S3: bit2..0 input (001 analog, 011 optical, 101 coax), bit7=mono
71	00 01 00 00 (oder 01) 00	after TOC-read, inserting disc

AMP Send Commands (to amplifier) prefix 11000000b = C0h

command (hex)	description	remark
06	mute	answer 70
07	unmute	answer 70
0C	5.1 input on	answer 70
0D	5.1 input off	answer 70
0E	status request 2nd Audio	answer 71
0F	status request Source	answer 70
14	master volume +	no answer!
15	master volume -	no answer!
22	status request ???	answer 61
23	status request ???	answer 62
2C	???	answer 2C
2D	???	no answer!
2E	power on	answer 61, C3, 87, 0F, 1F, 3F, 7F
2F	power off	
30	??? on	answer 70 (Byte3, Bit5=0)
31	??? off	answer 70 (Byte3, Bit5=1)
32	??? on	answer 71 (Byte3, Bit5=0)
33	??? off	answer 71 (Byte3, Bit5=1)
40 VV	Master volume set direct	(no answer, only some amp's)
43	Status request input type	answer 43 (Byte2, L-N), see also command 83

48 NN	Status Source name	answer 48 NN [8 x CC] 00 00 00 00 00, see also command 88
50 SS	Set Source	00=Tuner (answer C8 70, CB 70) 01=Phono (answer C8 70, CB 70) 02=CD (answer C8 70, C8 E1) 03=DAT (answer C8 70, C8 E1) 04=MD (answer C8 70, C8 E1) 05=Tape (answer C8 70, C8 E1) 07=Digital Audio (answer C8 70) 10=Video 1 (answer C8 70, CB 70) 11=Video 2 (answer C8 70, CB 70) 12=Video 3 (answer C8 70, CB 70) 15=LD (answer C8 70, CB 70) 16=SAT (answer C8 70, CB 70) 17=TV (answer C8 70, CB 70) 19=DVD (answer C8 70, CB 70)
52 SS	Set 2nd Audio	00=Tuner, 02=CD, 03=DAT, 04=MD, 05=Tape, 0F=Source (answer 71)
6A	Device name	answer 6A
83 TT	Set input type	01=optical, 02=coax, 04=analog, answer 43
88 SS [8 x CC]	Set Source name	SS=Source (see command 50)

AMP Receive Messages (from amplifier) prefix 11001000b = C8h

command (hex)	description	remark
06	mute	
07	unmute	
0C	5.1 input on	
0D	5.1 input off	
0E	unavailable	
0F	error	
2E	power on	
2F	power off	
43 TT XX	Status input type	01=optical, 02=coax, 04=analog
70 AA AV CC	Status source	AA=Status Audio, AV=Status Video (see command 50) CC: Bit4=5.1 input, Bit3=tapeloop, Bit1=mute
71 AA XX XX (XX)	Status 2nd Audio	AA=Status 2nd Audio (see command 50)
E1 XX TT XX XX...	Status	TT: Bit2=0 after SLINK-command, Bit2=1 after IR-command

TUNER Send Commands (to tuner) prefix 11000001b = C1h

command (hex)	description	remark
03 BB	Band	BB=00: FM, BB=01: AM, answer 70
06	scan +	
07	scan -	
08	preset +	
09	preset -	
0A	mono	

0B	stereo	
50 BB HH LL	Direct Tune	BB=00: FM, (HH*256+LL)/100= frequency [MHz] in 50 kHz steps (value rounded down) BB=01: AM, HH*256+LL= frequency [kHz] in 9 kHz (USA: 10 kHz) steps (value rounded down)
51 BB NN	Preset Station	BB=[01..03] Bank A..C, NN=[00..09] Station number, answer 70, E1
52 PP	PTY Search	00=None, 01=News, 02=Current Affairs, 03=Information, 04=Sports, 05=Education, 06=Drama, 07=Culture...

TUNER Receive Messages (from tuner) prefix 11001001b = C9h

command (hex)	description	remark
48 BB NN [8 x CC] 00 00 00 00 00	Station Status	BB: Bank [01..03], NN: Number [00..09], CC: Name
70 BB NN XX XX	Tuner Status	BB: Bank [01..03], NN: Number [00..09]
E1 XX (XX...)	Tuner Status	

SUR Send Commands (to surround) prefix 11000011b = C3h

command (hex)	description	remark
04	surround	
05	2ch stereo	
06	EQ on	
07	EQ off	
0B	next sound field	
0C	2ch stereo	
0D	AFD	
10	rear volume +	no answer!
11	rear volume -	no answer!
12	center volume +	no answer!
13	center volume -	no answer!
14	sub volume +	no answer!
15	sub volume -	no answer!
51 YY	sound field	00=2ch stereo, 01=AFD, ... 1C=Game (list as on remote)
53 YY ZZ	front speaker	YY: 00=large 01=small, ZZ: 00=front 01=center 02=rear 03=sub
80 YY	rear level	value in dB, MSB=sign
81 YY	center level	value in dB, MSB=sign
83 YY	rear balance	00=center, 01..08=right (08->max), F7..FF=left (F7->max)
86 YY	D.Range Comp	00=off, 01=0.1dB, 02=0.2dB, ...
87 YY	LFE mix	00=0dB, FF=-1dB, ... EC=-20dB, EB..80=off
90	Front bass	??? answer 50
95 YY	Units	01=meter, 02=feet
97 YY	Crossover frequency	00..4B=60Hz, 4C..69=90Hz, 6A..87=120Hz, 88..A5=150Hz, A6..FF=180Hz
96 YY ZZ	Rear placement	YY: 00=side 01=mid 02=behind, ZZ: 00=low 01=high
99 YY	Front balance	00=center, 01..08=right (08=max), F7..FF=left (F7=max)
9F YY	dts LFE mix	value in dB

SUR Receive Messages (from surround) prefix 11001011b = CBh

command (hex)	description	remark
40 RR XX	Status Rear volume	RR=dB in two's complement
50 XX...	Status Front volume	???
70 XX XX XX XX	Status Surround	

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location - global position

communication - electronic mail

communication - line

communication - cell

communication - snail mail



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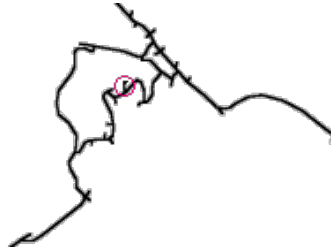
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