SAMSUNG
Consumer RS232 Control Worksheet

SAMSUNG 5-STAR SOLUTIONS

Overview

Most Samsung Consumer TVs can be controlled via RS232. Control can be through the USB port using a Samsung proprietary dongle or via the native 3.5mm ExLink port. Some models are not supported, however. Some of the Samsung Entry-Level TVs may have chipset limitations that prevent complete control from Serial Commands.

TV Setup w/ USB Dongle

If the Samsung TV has a native 3.5mm ExLink port (currently Q70 and above) there are no additional settings that need to be adjusted in the TV, just plug and play. Using a model that requires the USB dongle (8000 or Q60) means a few settings in the TV need to be turned on for control to work.

Setting up the USB to ExLink Dongle

1. With a Samsung IR remote.
2. While the TV is in the Off state hit Mute – 1 – 8 – 2 – Power
3. In the Service Menu navigate to Control – Sub Option
4. Ensure **EXT Link Support** and **USB Serial** options are **ON**

RS-232 Jack	UART
EXT Link Support	ON
Serial Log On/Off	
Watchdog	ON
Fast Boot in Production	OFF
USB Serial	ON

5. Once the options are turned on in the service menu, power off the TV for them to be set.
6. **Try switching the USB Port if you have any issues with control!

Command Lines and Check Sum

Samsung Consumer models will use a string of hex numbers to form a command line. These commands are different than those used in the Commercial models. A full list of the commands can be found at the end of this document.

08x22x00x00x00x01xD5 (OFF)

08x22 are fixed and will be the same for every consumer display command.

The middle 4 are the command. See command list at the end of this document.

The last number will be the Checksum. This is a calculated number based on the command. See below.
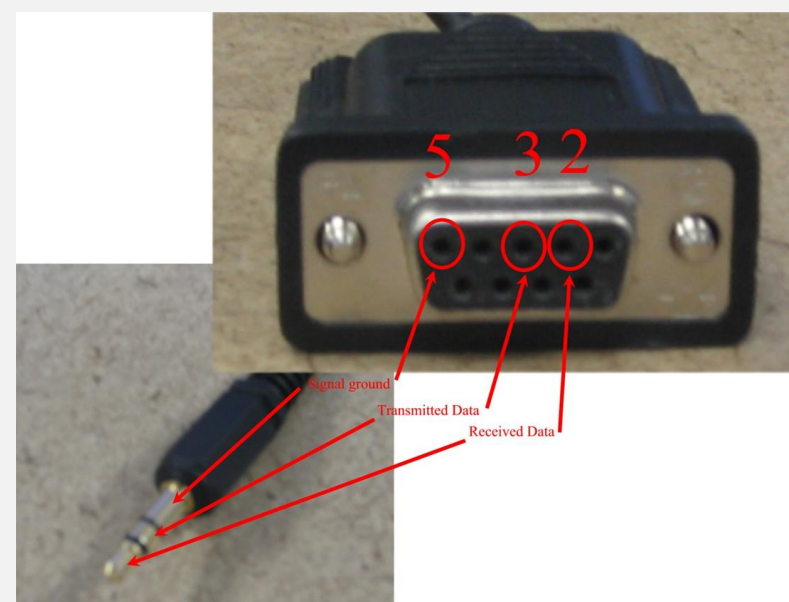
Calculating a Checksum

The Checksum is calculated by adding all numbers in the command line and subtracting the total from 256 (FF+1). Using the Off Command:

	Hex	08	+	22	+	00	+	00	+	00	+	01	=	2B
	Decimal	8		34		0		0		0		1		43

If we add everything up we get 43 (2B in Hex). We take 256 and subtract 43 to get 213. Converting that back to Hex gives us D5. There it is, your Checksum is **D5**.

ExLink Pin-out

The 3.5mm pin-out is as follows:

- Tip: Received Data (2)
- Ring: Transmitted Data (3)
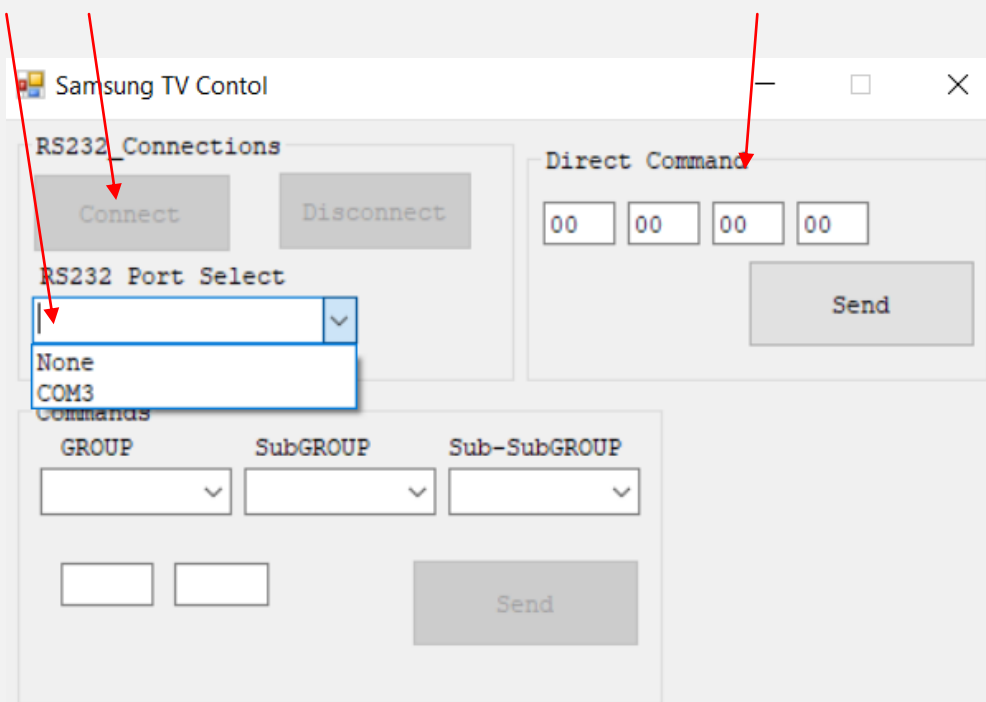- Sleeve: Ground (5)

Samsung Serial Control Test App

Check RS232 Via Your Computer.

Samsung Test App is a great tool for quick and easy testing. You can test commands, port activity, USB dongle, checksums, etc.

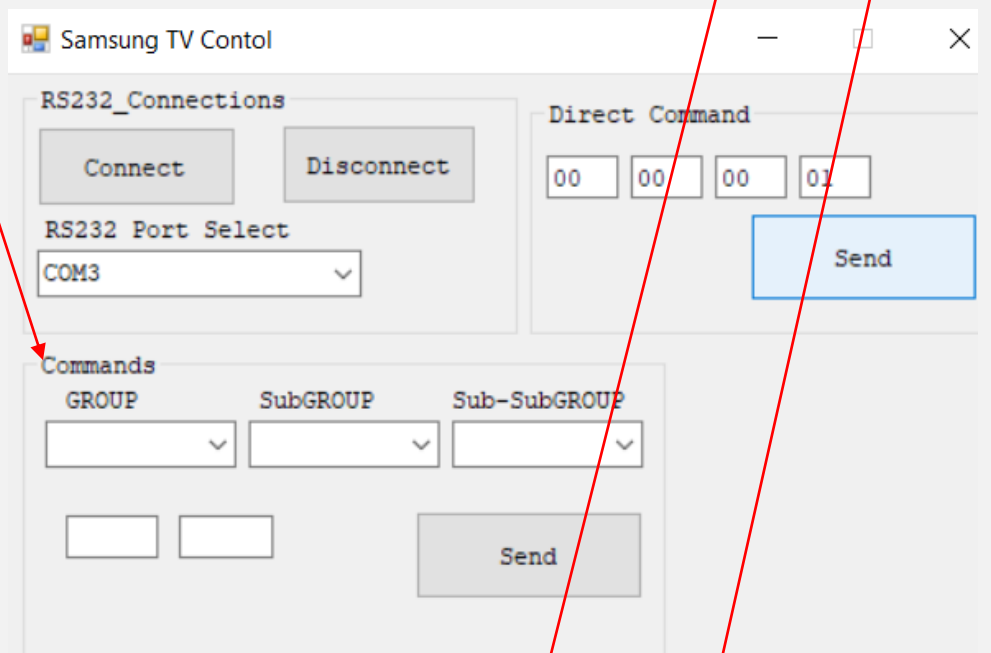1. Download the app - SamTvControlLite.zip
2. Connect your computer's COM Port to the TV's 3.5mm ExLink port
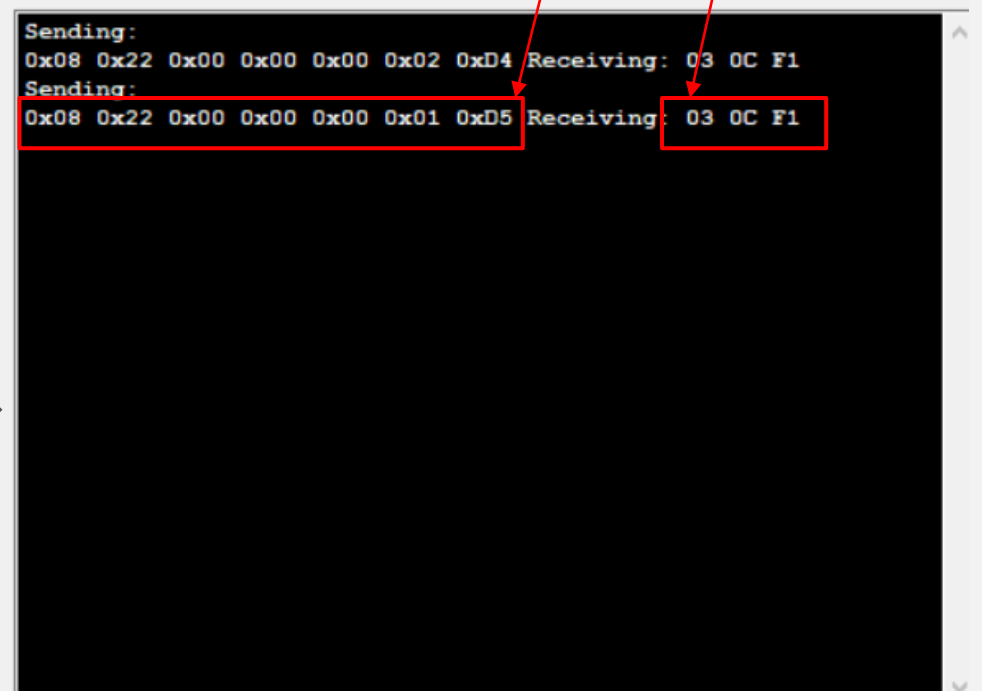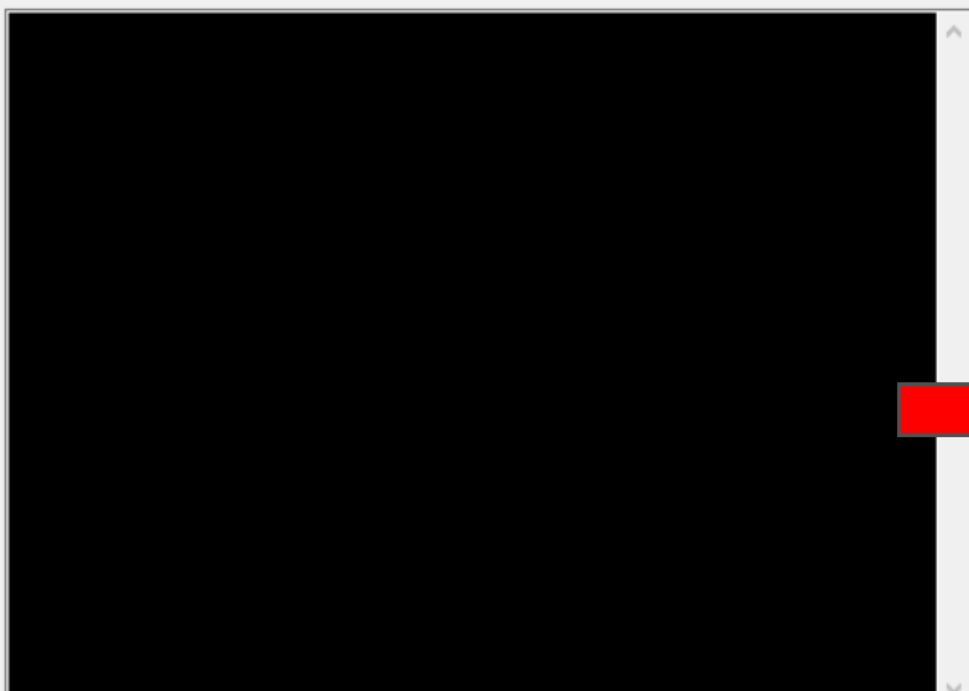3. Launch the app to start testing!

1. Choose the RS232 Port Select (the PC must be connected) and click "Connect"

1. Use either the Direct Command or Group Commands to control the display

1. After sending, the app should display the command line and receive a "success" feedback – 03 0C F1

Control Item				Cmd	Cmd	Cmd	Value	Comment
General	Power	Power		0x00	0x00	0x00	0x00	
		Off					0x01	
		On					0x02	
	Volume	Direct		0x01	0x00	0x00	(0~100)	
		Up				0x01	0x00	
		Down				0x02	0x00	
	Mute			0x02	0x00	0x00	0x00	
	Ch.	Direct		0x04		0x00	–	
		Continuous	Up	0x03	0x00	0x01	0x00	
			Down			0x02	0x00	
Input	Source List	TV	TV	0x0a	0x00	0x00	0x00	
		AV	AV1			0x01	0x00	
			AV2				0x01	
			AV3				0x02	
		S-Video	S-Video1			0x02	0x00	
			S-Video2				0x01	
			S-Video3				0x02	
		Component	Component1			0x03	0x00	
			Component2				0x01	
			Component3				0x02	
		PC	PC1			0x04	0x00	
			PC2				0x01	
			PC3				0x02	
		HDMI	HDMI1			0x05	0x00	
			HDMI2				0x01	
			HDMI3				0x02	
			HDMI4				0x03	
		DVI	DVI1			0x06	0x00	
			DVI2				0x01	
			DVI3				0x02	
		RVU	RVU			0x07	0x00	
Picture	Mode	Dynamic(Entertain)		0x0b	0x00	0x00	0x00	
		Standard					0x01	
		Movie					0x02	
		Natural					0x03	
		CAL-NIGHT					0x04	
		CAL-DAY					0x05	
		BD Wise					0x06	
		Relax					0x07	
	Brightness		0~50		0x01	0x00	(0~50)	Backlight renamed to Brightness
	Contrast		0~100		0x02	0x00	(0~100)	
	Shadow Detail		(-5~+5)		0x03	0x00	(-5~+5)	Brightness renamed to Shadow Detail
	Sharpness		0~100		0x04	0x00	(0~100)	
	Color		0~10		0x05	0x00	(0~100)	
	Tint	G/R			0x06	0x00	(0~30)	Range changed to 0_30 0-G15, 14-G1, 30-R15
	Advanced Settings	Dynamic Contrast	Off		0x07	0x01	0x00	
			Low				0x01	
			High				0x03	
		Gamma	-3 ~ 3			0x03	(-3~3)	
		Gamma type	HLG			0x04	0x00	
			ST2084				0x01	
			BT1886				0x02	
			2.2				0x04	Newly added
		RGB Only Mode	Off			0x05	0x00	
			Red				0x01	
			Green				0x02	
			Blue				0x03	
		Color Space	Auto			0x06	0x00	
			Native				0x01	
			Custom				0x02	
		White Balance	R-Offset			0x07	(-50~50)	
			G-Offset			0x08	(-50~50)	
			B-Offset			0x09	(-50~50)	
			R-Gain			0x0a	(-50~50)	
			G-Gain			0x0b	(-50~50)	
			B-Gain			0x0c	(-50~50)	
			Reset			0x0d	0x00	
		Motion Lighting	Off			0x11	0x00	
			On				0x01	
		Color Space Custom Color	Red			0x12	0x00	
			Green				0x01	
			Blue				0x02	
			Yellow				0x03	
			Cyan				0x04	
			Magenta				0x05	
		Color Space Custom Red	0~100			0x13	0~100	
		Color Space Custom Green	0~100			0x14	0~100	
		Color Space Custom Blue	0~100			0x15	0~100	
		Color Space Adjustment Point	50%			0x1b	0x00	
			75%				0x01	
			100%				0x02	
		Color Space Custom Reset				0x1c	0x00	
		Local Dimming	Low		0x0b	0xA	0x01	
			Standard				0x02	
			High				0x03	
		HDR+	Off		0x0b	0x0B	0x00	
			On				0x01	
		Minimum Brightness	0~50			0x0C	(0~50)	Minimum
		Ambient Light Detection (Eco sensor)	Off			0x0D	0x00	
			On				0x01	
		10p White Balance	Off		0x07	0x16	0x00	
			On		0x07	0x16	0x01	
			Interval		0x07	0x17	(1~10)	
			Red		0x07	0x18	(-50~50)	
			Green		0x07	0x19	(-50~50)	
			Blue		0x07	0x1a	(-50~50)	
			Reset		0x00	0x1b	0x00	
		20p White Balance	Off		0x0e	0x16	0x00	
			On		0x0e	0x16	0x01	
			Interval		0x0e	0x17	(1~20)	
			Red		0x0e	0x18	(-50~50)	
			Green		0x0e	0x19	(-50~50)	
			Blue		0x0e	0x1a	(-50~50)	
			Reset		0x0e	0x1b	0x00	

Key Map

KEY	Value
KEY_SOURCE	0x01
KEY_POWER	0x02
KEY_SLEEP	0x03
KEY_1	0x04
KEY_2	0x05
KEY_3	0x06
KEY_VOLUP	0x07
KEY_4	0x08
KEY_5	0x09
KEY_6	0x0A
KEY_VOLDOWN	0x0B
KEY_7	0x0C
KEY_8	0x0D
KEY_9	0x0E
KEY_MUTE	0x0F
KEY_CHDOWN	0x10
KEY_0	0x11
KEY_CHUP	0x12
KEY_PRECH	0x13
KEY_GREEN	0x14
KEY_YELLOW	0x15
KEY_BLUE	0x16
KEY_MENU	0x1A
KEY_TV	0x1B
KEY_INFO	0x1F
KEY_MINUS	0x23
KEY_CAPTION	0x25
KEY_TTX_MIX	0x2C
KEY_EXIT	0x2D
KEY_OK (Enter)	0x2E
KEY_FACTORY	0x3B
KEY_3SPEED	0x3C
KEY_EMANUAL	0x3F
KEY_STOP	0x46
KEY_PLAY	0x47
KEY_REC	0x49
KEY_PAUSE	0x4A
KEY_TOOLS	0x4B
KEY_GUIDE	0x4F
KEY_RETURN	0x58
KEY_SUBTITLE	0x59
KEY_UP	0x60
KEY_DOWN	0x61
KEY_RIGHT	0x62
KEY_LEFT	0x65
KEY_CH_LIST	0x6B
KEY_RED	0x6C
KEY_HOME(Home)	0x76
KEY_HOME(Smart hub)	0x79
KEY_TV	0x7D
KEY_HDMI	0x8B
KEY_POWER	0x98
KEY_PAGE_LEFT	0xA8
KEY_PAGE_RIGHT	0xA9

Control Item				Cmd	Cmd	Cmd	Value	Comment	Key Map
	Picture Option	Color Tone	Cool		0x0a	0x00	0x00		
			Standard				0x01		
			Warm1				0x02		
			Warm2				0x03		
		Digital Noise Filter	Off			0x02	0x00		
			Auto				0x04		
		HDMI Black Level	Normal			0x04	0x00		
			Low				0x01		
		Film Mode	Off			0x05	0x00		
			Auto				0x02		
		Auto Motion Plus	Off			0x06	0x00		
			Auto				0x02		
			Custom				0x04		
		Blur Reduction			0x0b	0x01	value		
		Judder Reduction				0x02	value		
		LED Clear Motion	Off			0x03	0x00		
			On				0x01		
		HDMI1 UHD Color Mode	Off			0x04	0x00		
			On				0x01		
		HDMI2 UHD Color Mode	Off			0x05	0x00		
			On				0x01		
		HDMI3 UHD Color Mode	Off			0x06	0x00		
			On				0x01		
		HDMI4 UHD Color Mode	Off			0x07	0x00		
			On				0x01		
	Screen Adjustment	Picture Size	16:9	0x0b	0x0a	0x01	0x00		
			4:3				0x04		
			custom				0x0B		
		Fit to Screen	Off		0x0d	0x02	0x00		
			On				0x01		
	Reset Picture	Reset Picture		0x0b	0x0b	0x00	0x00		
	Factory-SVB	Expert-N/D Adj	On	0x0b	0x0d	0x00	0x00		
			Off				0x01		
			Fix				0x02		
	Apply Picture Mode	All Sources			0xb	0x0e	0x00	0x00		
		Current Source					0x01		
	Pip	PIP	Off	0x0b	0x08	0x00	0x00		
			On				0x01		
			Antenna			0x01	0xff		
			Size			0x02	0xff		
			Position			0x03	0xff		
			Sound_Select_Main			0x04	0x00		
			Sound_Select_Sub				0x01		
			Channel_Up			0x05	0x00		
			Channel_Down				0x01		
Sound	Sound Mode	Standard		0x0c	0x00	0x00	0x01		
		Music					0x02		
		Movie					0x03	Updated	
		Clear Voice					0x04		
		Amplify					0x05		
		Optimized					0x06		
	Equalizer	Balance				0x01	0x00	(0~20)	
		100hz					0x01	(0~20)	
		300hz					0x02	(0~20)	
		1khz					0x03	(0~20)	
		3khz					0x04	(0~20)	
		10khz					0x05	(0~20)	
		Reset					0x06	0x00	
	Equalizer(7Band)	100hz					0x07	(0~20)	
		200hz					0x08	(0~20)	
		500hz					0x09	(0~20)	
		1KHz					0x0A	(0~20)	
		2KHz					0x0B	(0~20)	
		5KHz					0x0C	(0~20)	
		10KHz					0x0D	(0~20)	
	SRS TruSurround HD	Off				0x02	0x00	0x00	
	Virtual Surrond	On						0x01	
	SRS TruDialog	Off				0x03	0x00	0x00	
	Dialog Clarify	On						0x01	
	Preferred Language	English				0x04	0x00	0x00	
		Spanish						0x01	
		French						0x02	
		Korean						0x03	
		Japanese						0x04	
	Multi-Track Sound	Mono				0x05	0x00	0x00	
		Stereo						0x01	
		SAP						0x02	
	Auto Volume	Off				0x06	0x00	0x00	
		On						0x01	
	Speaker Select	TV Speaker				0x07	0x00	0x00	
		External Speaker						0x01	Not supported
		Audio Out						0x01	
	Sound Select	Main				0x08	0x00	0x00	
		Sub						0x01	
	Sound Reset	Sound Reset				0x09	0x00	0x00	
	Auto Stereo	Manual				0x0b	0x00	0x00	
		Auto					0x00	0x01	
	Audio Delay	Dealy Value (0~250)				0x0d	0x00	(0~250)	Not supported in SERO TV
KEY	Key Generation			0x0d	0x00	0x00	Refer key map		
OSD	Enable/Disable Cmd Result OSD	Disable		0x0e	0x01	0x00	0x00		
		Enable					0x01		
Others	Art Mode	OFF		0x0b	0x0b	0x0e	0x00		
		ON					0x01		
	Ambient Mode	OFF		0x0b	0x0b	0x10	0x00		
		ON					0x01		
	HDMI CEC	OFF		0x0b	0x0b	0x0f	0x00		
		ON					0x01		
	Video Player	Pause		0x0e	0x02	0x00	0x02	Steps:	
		Resume		0x0e	0x02	0x00	0x03	1. Copy multiple mp4 files in pen drive.	
		Stop		0x0e	0x02	0x00	0x04	2. Rename them to 1.mp4, 2.mp4 and so on.	
		Seek		0x0e	0x02	0x01	(0~255)	3. Insert pen drive in board.	
		UI Off		0x0e	0x02	0x02	0x00	4. Send command	
		UI On		0x0e	0x02	0x02	0x01	0x0E 0x02 0x03 0x01(for 1.mp4).	
		Player On UI Off (0 – 255)		0x0e	0x02	0x03	(0~255)	1.mp4 file will be played. To play 2.mp4 file, give command 0x0E 0x02 0x03 0x02	