

Protocol Example Stream for Avcom of Virginia Single Board Remote Spectrum Analyzers

All SBS, CLM and RSA rev B models (1100, 2150, 2500)

AVCOM of Virginia, Inc. 7730 Whitepine Rd. Richmond, VA 23237 www.avcomofva.com

Revision History

Release	Reason	By	Date
Rev F	Initial release (starting at F to keep in sync with protocol document)	MC	April 3, 2009
Rev G	Corrected "LNB Power & Fixed LO Offset" Table	MC	April 9, 2009
	Added detailed descriptions of bytes in packets		

Introduction

The avcom revised protocol for SBS, CLM and RSA rev B models is based on a simple request-reply communications.

The following document is meant to be a supplement to the "Protocol for Avcom of Virginia Single Board Based Remote Spectrum Analyzers" document to assist in visualizing the communications between the analyzer and the GUI software.

Communication Steps Described

A simple example of the communication between the analyzer is given below. Communication is always initiated by the GUI software on a PC or SBC and a reply is sent by the analyzer.

Communication

- 1. GUI tries to communicate with older avcom analyzers first (for backward compatibility with old RSA rev A, PSA-45d, MSA-4570E, PSA-37XP, MSA-45E, etc.)
- 2. If no reply from older analyzer, GUI tries to communicate with newer protocol analyzers (SBS, CLM, RSA rev B) by requesting a "Hardware Description" packet from the analyzer.
- 3. If a "Hardware Description" is sent by the analyzer, the GUI assumes it is talking to a new protocol analyzer and can set up it's interface accordingly. The "Hardware Description" sent by the analyzer contains current settings and features, such as current center frequency, span, RBW, reference level, number of inputs, LNB power settings, etc.
- 4. GUI gets firmware version from Hardware Description packet received in (3).
 - a. If firmware version less than 2.6, skip step 5.
 - b. If firmware version greater than or equal to 2.6, do step 5.
- 5. GUI Request a "Get LNB Power & Fixed LO" packet (for firmware version 2.6 and later). The GUI can set up its interface with the information returned by the analyzer gathered from the "LNB Power & Fixed LO" packet.
- 6. GUI can change the analyzer settings if desired, with the "Change Settings" request. The analyzer will change its settings and reply with a waveform packet containing the current settings.
- 7. To continue viewing waveforms, the GUI repeatedly requests a single waveform packet using the "Waveform Transmission Settings" request. Request 1 (single) waveform repeatedly as desired.

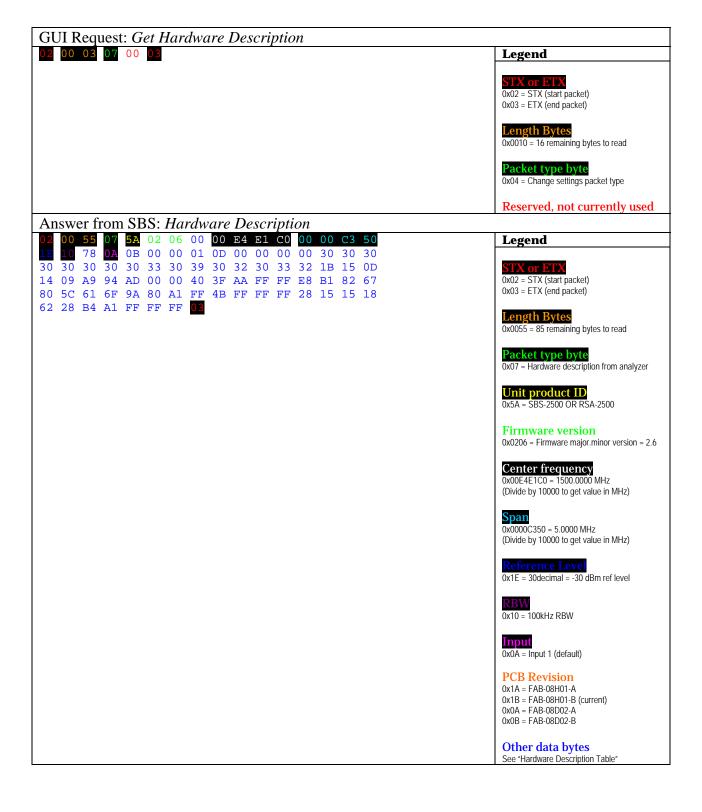
Communication Example

Notes: Com Port or TCP Port opened prior to communication by process "AVCOM Eng GUI v2841.exe" **Notes:** Refer to protocol document for all mediums of communication (USB, Serial, Ethernet) for baud rate, hardware flow control, parity and data bits settings.

Notes: On serial port see notes in protocol document about DTR and RTS.

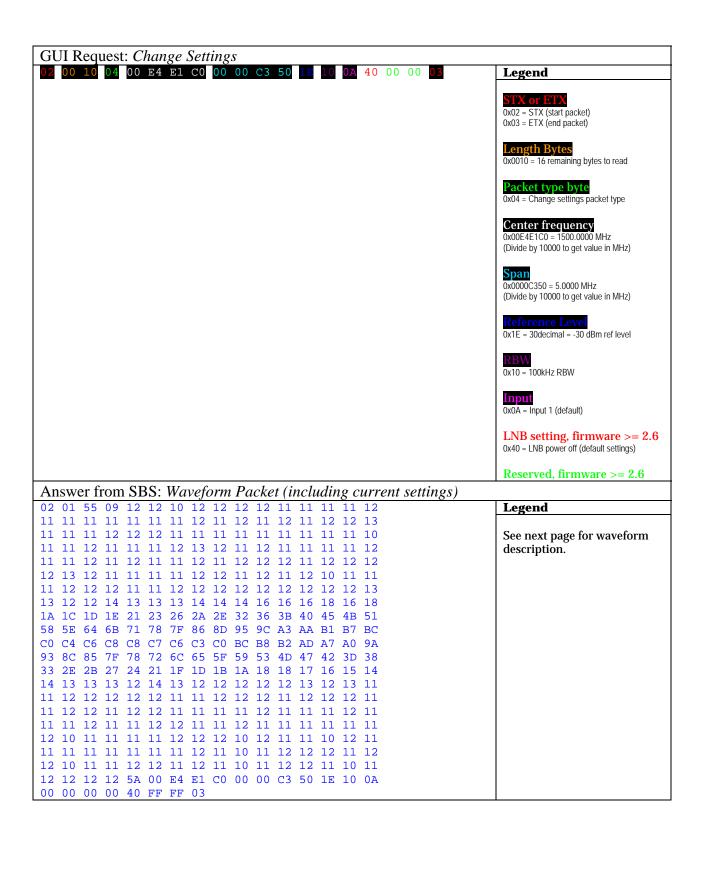
GUI Request: Request to startup old protocol analyzer (for backwards compatibility)		
FE FE FF 00		
Answer from SBS, CLM and RSA rev B: none		

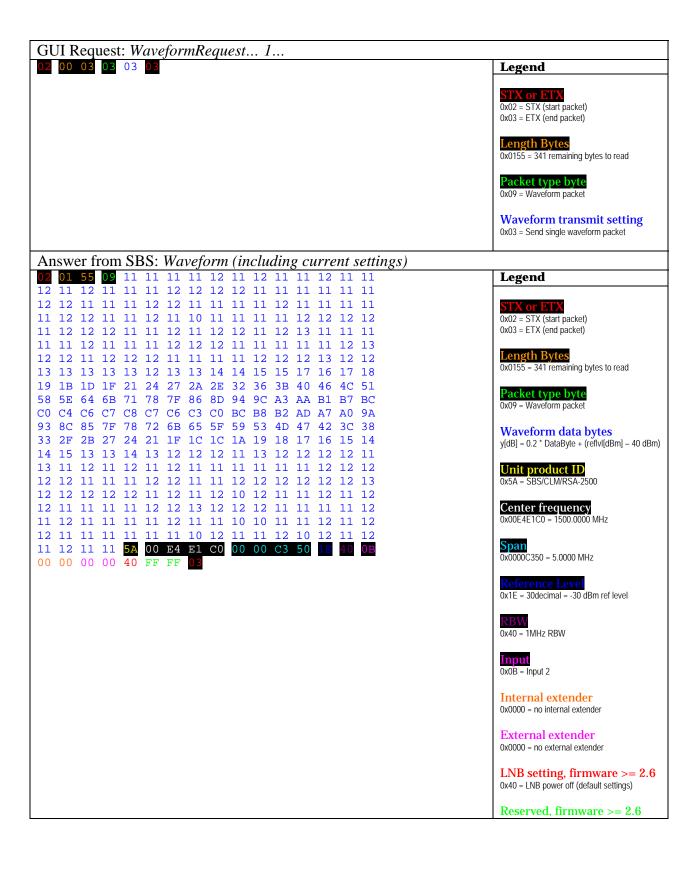
GUI Request: Request to startup old protocol analyzer (for backwards compatibility)		
FE FE FF 00		
Answer from SBS, CLM and RSA rev B: none		



NEW!: If analyzer firmware reported in "Hardware Description" packet is >= 2.6 then include:

GUI Request: Get LNB Power & Fixed LO Settings	
02 00 02 0D 03	Legend
	Ox02 = STX (start packet) 0x03 = ETX (end packet)
	Length Bytes 0x0002 = 2 remaining bytes to read
	Packet type byte 0x0D = Request LNB power & fixed LO packet
Answer from SBS: LNB Power & Fixed LO Settings	
02 00 2D 0D 80 80 11 00 00 00 00 00 00 00 00 00	Legend
00 00 00 00 00 00 00 00 00 00 00 00 00	0x02 = STX (start packet) 0x03 = ETX (end packet)
	Length Bytes 0x002D = 45 remaining bytes to read
	Packet type byte 0x07 = LNB Power and Fixed LO Offset packet
	RF LO Offset Mask 0x80 = Bit set, all low band offset (bit7 always set) (bit 5 - bit 0 for RF Inputs 6-1) 0 = Use LNB Power mask to determine offset 1 = Always use low band offset
	LNB Power Mask 0x08 = Bit set, all use 22kHz (bit7 always set) (bit 5 – bit 0 for RF Inputs 6-1) 1 = uses voltage to select band 0 = uses 22kHz to select band
	RF Input Block Power 0x11 = option is off (subtract 10 decimal to get input value if option is turned ON. Valid input values 0x00-0x05)
	Internal extender offsets For inputs 1-6, two bands each, each band is a signed word (2 bytes) in MHz. Example: 0x05FB 0x05 = +5MHz 0xFB = -5MHz
	LNP Power state per input See LNB Power settings table (bit sets)
	Reserved





GUI Request: WaveformRequest 23N (as long as desired)				
02 00 03 03 03 03	Legend			
	STX or ETX 0x02 = STX (start packet) 0x03 = ETX (end packet)			
	Length Bytes 0x0155 = 341 remaining bytes to read			
	Packet type byte 0x09 = Waveform packet			
	Waveform transmit setting 0x03 = Send single waveform packet			
Answer from SBS: Waveform (including current settings)				
02 01 55 09 12 11 12 11 11 12 12 11 11 11 12	Legend			
12 11 12 11 11 11 11 11 11 12 11 11 12 11 12 11 12 12	STV on ETV			
11 11 11 11 12 11 11 11 11 11 11 11 10 12 11 11 11	0x02 = STX (start packet)			
11 11 11 11 13 11 12 11 11 12 11 12 12 11 12	0x03 = ETX (end packet)			
12 11 12 12 12 12 12 11 11 11 12 11 11 1	Length Bytes			
11 11 11 12 12 11 12 12 12 12 12 12 12 1	0x0155 = 341 remaining bytes to read			
12 13 13 12 13 13 14 15 15 15 17 17 16 17 19 19 1B 1D 20 22 23 26 2A 2E 31 36 3B 40 46 4B 51				
58 5E 64 6B 71 78 7F 86 8D 95 9C A3 AA B1 B6 BC	Packet type byte 0x09 = Waveform packet			
C0 C4 C6 C7 C8 C7 C6 C3 C0 BC B8 B3 AD A7 A0 9A	0x09 = waveform packet			
93 8C 86 7F 78 72 6B 65 5F 59 53 4D 47 42 3D 38	Waveform data bytes			
32 2E 2A 27 23 21 20 1D 1C 19 19 18 17 16 16 15	y[dB] = 0.2 * DataByte + (reflvl[dBm] – 40 dBm)			
14 15 14 14 13 12 12 13 13 13 12 11 12 12 11 13 12 12 12 12 11 12 12 12 12 12 12 13 14 15 16 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18	Unit product ID			
12 13 12 12 11 11 10 11 11 12 11 11 11 11 12 12	0x5A = SBS/CLM/RSA – 2500			
12 12 12 12 12 11 11 12 11 11 12 11 11 1				
12 12 12 12 11 11 11 12 12 12 12 11 12 12	Center frequency 0x00E4E1C0 = 1500.0000 MHz			
11 11 11 12 12 11 11 11 11 11 11 12 11 11	(Divide by 10000 to get value in MHz)			
12 12 11 12 5A 00 E4 E1 CO 00 00 C3 50 IE 10 0A 00 00 00 00 40 FF FF 03	Span 0x0000C350 = 5.0000 MHz (Divide by 10000 to get value in MHz)			
	Reference Level 0x1E = 30decimal = -30 dBm ref level			
	RBW 0x10 = 100kHz RBW			
	Input 0x0A = Input 1 (default)			
	Internal extender 0x0000 = no internal extender			
	External extender 0x0000 = no external extender			
	LNB setting, firmware >= 2.6 0x40 = LNB power off (default settings)			
	Reserved, firmware >= 2.6			