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To: SRT group

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Subject: SRT receiver communication protocol

The digital and analog SRT receivers use RS232 serial communication at 2400 baud (8 databits, 1 stop bit and no parity). A command is sent to the receiver in the form of serial bytes

b0, b1, ..., bn

For both analog and digital receivers the first 4 bytes are the keyword freq

b0 = 'f'

b1 = 'r'

b2 = 'e'

b3 = 'q'

and the next 3 bytes are the 1st L.O. frequency so that

$$\text{freq} = ((b4 * 256 + b5) * 64 + b6) * 0.04 \text{ MHz}$$

The next byte is the attenuator byte for the analog receiver and the mode byte for the digital receiver.

Analog receiver

b7 = 0 attenuator off

b7 = 1 attenuator on

Digital receiver

b7 = mode

Mode definitions

Mode	Graychip freq MHz	Sample rate MHz	Bandwidth MHz	FFT size	#FFTs in accum	comments
0	1.0	40	0.5	64	4096	H-line
1	1.0	40	0.1	64	1024	OH-line
2-254						Not yet defined
255						Echo command

Analog receiver response

After receiving the command the receiver sets the L.O. and starts the integration. In the case of the analog receiver the response is 3 bytes where such that the integrated power count is

$$(b1 * 256 + b2) / b0$$

Digital receiver response

After receiving the command the receiver sets the L.O. and Graychip and starts accumulating spectra. When the prescribed integration is reached (as defined by the mode) the response is an array of 64 bin accumulated spectra returned as 128 bytes where the even bytes are the most significant byte of each 16 bit frequency bin.

The 16 bit integers words are in the following order:

$W_0 = \text{D.C. (i.e. center of I.F.)}$

$w_1 = +1 \text{ freq. Bin}$

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$w_{31} = +31 \text{ freq. Bins}$

$w_{32} = -32 \text{ freq. Bins}$

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$w_{63} = -1 \text{ frequency bin}$