

Special RS232 commands for Fonix 7000

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1 Overview

The 7000 can do a few things via RS232 which cannot be performed from the keyboard. Extended control over various parameters can be performed, as well as examination of low-level signal data.

2 Command Listing

| Command | Number |
|----------------------------------|--------|
| Set Source Amplitude Value | 0 |
| Set Frequency Value | 2 |
| Set Noise Reduction Value | 4 |

2.1 Set Source Amplitude Value (0)

The source level can be set in 0.01dB increments from 0.01dB to the maximum possible level that the hardware can produce. The maximum level is dependent upon the configuration and leveling. The absolute maximum possible source Spl setting allowed is 120.00dB. Setting the source to 0dB turns it off.

2.2 Set Frequency Value (2)

The frequency can be set in 50Hz increments from 50Hz to 8KHz. It should be noted that the microphones are only calibrated from 100Hz to 8KHz, and that the 7000 is designed for optimal operation between 200Hz and 8KHz. The frequencies below 200Hz are rolled off by the hardware. Leveling and compensation is centered around the 200Hz to 8KHz range. Signals outside that range are provided with whatever level they have after the correction has been applied to the signal data. In addition, signals below 200Hz may not be as accurate. They are provided as is. The lowest possible frequency is 50Hz.

2.3 Set Noise Reduction Value (4)

Noise reduction can be set from 0 to 127. Care should be used when setting large noise reduction values in pure tone because it will cause the keyboard to become sluggish.

When in synchronous measurement (source on), Each doubling of the noise reduction value adds an additional one bit of effective signal dynamic range (6dB for each bit added).

| NR | increased dynamic range |
|-----|-------------------------|
| 2 | 6dB |
| 4 | 12dB |
| 8 | 18dB |
| 16 | 24dB |
| 32 | 30dB |
| 64 | 36dB |
| 127 | 42dB |

Adding noise reduction improves the ability of the 7000 to measure low level signals by reducing non-synchronous noise and providing additional effective bits to the ADC conversion through time averaging. Thus setting the noise reduction to 16 makes the 7000 measurements seem like it has a 16bit ADC in software even though the hardware is only 12bits. This can help to make signals with a large dynamic range appear smoother in areas closest to the noise floor.

3 New Command Listing

| Command | Number |
|-----------------------------------|--------|
| Set Impulse Rejection Value | 108 |
| Get Impulse Rejection Value | 107 |
| Get Raw Sample Data | 110 |
| Get Signal Information | 109 |
| Get Bitmap | 120 |

3.1 Set/Get Impulse Rejection Value (108/107)

In normal operation, (leveling being the exception,) impulse rejection is disabled. You can apply impulse rejection by setting the level of rejection you wish to apply to the measurement. The maximum rejection allowed is 24dB. Care should be used when applying small signal rejection values since it can make the measurements take much longer in a noisy environment. Normal signal rejection should be in the range between 3dB and 12dB.

Noise rejection is a bit complex in its operation. It is tied to the prescalers and the noise reduction setting. Noise rejection can only occur when noise reduction is on (set to 2 or higher).

After a prescale change occurs, the rejection counter is set to zero. The next measurement made then becomes the reference level for the signal rejection. If the RMS level next measurement made is equal to or greater than the previous RMS level plus the noise rejection level set, the measurement will be discarded. The number of sequentially rejected measurements allowed is determined by the Noise Rejection setting divided by two. Thus if noise rejection is set to 4, the Impulse rejection limit is set to 2. Meaning that after two successive measurement rejections, the last measured signal RMS will become the new impulse rejection reference level. Immediately after an input prescale change, the next measurement will become the new impulse rejection reference level and the impulse rejection count is set back to zero. Each valid (non-rejected) signal becomes the new reference level and clears the impulse rejection count.

Impulse Rejection uses the overall RMS of the last valid measured signal. Impulse rejection works on the assumption that an impulse will be a RMS signal level that is above the previously measured signal. A negative RMS value below the reference level is treated as a valid signal and will become the new impulse reference level. If the input prescale (input gain) is changed, the next measurement made will become the new impulse rejection reference level.

3.2 Get Raw Sample Data (110)

Normally the measured data from the 7000 is processed and presented as dB values. Via RS232 it is possible to get the last raw (linear time-domain) measurement made. This is the output from the ADC converter. You can either get the last measurement made, or request a new measurement to be made. If a specific measurement is made, you can set the number of samples to be collected in the measurement (256 max, 16 min).

You can ask for either the raw measured data directly from the ADC converter, or you can ask for the time averaged data (determined by the noise reduction and impulse rejection settings).

3.3 Get Signal Information (109)

You can also ask for the specifics of the measurement conditions of the last measurement made.

| | |
|------------------|--|
| SampleRate | samplerate of signal |
| CaptureSize | number of capture samples |
| SourceSamples | number of samples in source |
| RampSamples | source ramp up/down samples |
| CouplerSkew | source to coupler mic sample delay |
| ProbeSkew | source to probe mic sample delay |
| InA.PrescaleGain | InputA (coupler mic) prescale gain |
| InB.PrescaleGain | InputB (probe mic) prescale gain |
| OutL.RmsOffset | Lchan single tone to RMS offset |
| OutR.RmsOffset | N/A |
| OutL.MaxLevel | Lchan max possible output level |
| OutR.MaxLevel | N/A |
| InA.GainIndex | InputA (coupler mic) prescale gain index |
| InB.GainIndex | InputB (probe mic) prescale gain index |

3.4 Get Bitmap (120)

The 7000 allows retrieval the current screen image. This is useful for publication of information presented on an 7000 screen. A program (FCAPTURE.EXE) is provided with the RS232 Technical Support Information which allows you to capture a 7000 screen image to a Windows BMP file.