SIGNAL Computer Specs

Component	Acceptable	Recommended	Notes
Required components			
Operating system	Windows XP / Vista / Win7 / Win8 / Win 10	Win7 64-bit	1
Operating system	32-bit or 64-bit	64-bit for computation speed	
CPU speed		3 GHz or greater	2
CPU cores	1	2-4	2
RAM	4 GB	4-8 GB	3
Hard disk	40 GB	160 GB or greater	
Video	Built-in graphics chip or add-in graphics card		4
Video resolution	1600 x 1200	1980 x 1080 or greater	4
Monitor size	17"	24" or larger	5
Computer format	Desktop or notebook	Optional I/O board requires **tower chassis** for full-size PCI slot (see below)	
Optional components			
Audio sound card (general use, indep of SIGNAL I/O board)	Built-in sound chip	Sound card with specs (bandwidth, accuracy, supported sample rates)	7
Audio monitor speakers		Accurate speakers with bandwidth spec	7
SIGNAL I/O board			8
PCI slot (desktop)		**Full-size PCI slot** required for I/O board or PCMCIA adapter.	
PCMCIA slot (notebook)	Type II or Type III	**Type II slot** required for NI-6062E card. **Type II slot + PCMCIA extender** required for Dart I/O card.	
USB flash drive			9
USB Zip and/or floppy drive			10

Notes

1. SIGNAL has been tested extensively with Windows XP, 7 and 10 but runs with most Windows versions.

2. SIGNAL computation does not use multiple CPU cores, so computational speed depends only on CPU clock speed. However, **a multi-core CPU is recommended** so Windows can use the other core while SIGNAL is crunching. SIGNAL 5 I/O is multi-threaded and **does** take advantage of multiple processors. Quad core processors have delivered the best SIGNAL computation times.

3. Minimum required RAM depends on Windows version. 4 GB RAM on WinXP and 8 GB RAM on Win Vista and later are **strongly recommended**. Increasing RAM beyond those limits will **not** increase the number or size of signals that SIGNAL can handle.

4. Current built-in graphics (such as Intel HD4600 and later, included with i5 and i7 CPU chips) provide excellent performance at high resolutions up to 2560x1600 over DVI or DisplayPort (**not** HDMI) video connections. Stand-alone graphics cards may provide crisper images and faster RTS scrolling, but difference may be slight.

5. Consider 24, 27 and 30 inch monitors. Quality depends on screen resolution (e.g., 1920 x 1080) and dot pitch (physical pixel size on the screen, where smaller is better and 0.250 mm is a good benchmark). Optimize these two to make spectrograms crisp and detailed. Resolution, physical size, dot pitch and DPI (dots per inch) are mathematically related (see table in http://en.wikipedia.org/wiki/Dot_pitch). SIGNAL will detect screen resolution and use all of it and can open multiple screen windows side by side, so resolution and physical size both pay off.

6. Playing sounds accurately for audition is important. You want to hear **everything** in your recordings (even outside the band of your target material) because SIGNAL will measure it all. Your ears are your guide. There are many good sound cards. As for speakers, M-Audio offers good quality speakers for a few hundred dollars. Get equipment with published bandwidth specs, which is ideally expressed as +/-3 dB over a specified frequency range.

7. Sounds can be digitized by digital recorders (such as Marantz or Sony) or by SIGNAL using an installed SIGNAL I/O board. Digital recorders may be limited to audio bandwidth. SIGNAL built-in I/O includes the following capabilities: record and digitize beyond the audio band (e.g., including ultrasound); SIGNAL-controlled event recordings (such as scheduled recording or direct-to-disk recording for extended duration in days or weeks); real-time experiments with SIGNAL as the experiment controller (using the SIGNAL **Experiment Maker** module). **Contact Engineering Design for hardware recommendations.**

8. USB flash drive is keychain-size and convenient for moving data between non-networked machines.

9. External Zip drives and floppy drives can be connected via USB to read legacy media.

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