



LIH 1600 16-bit Multi-Channel Data Acquisition System



The LIH 1600 is a high resolution, low-noise scientific data acquisition system. It utilises the newest fiber optic and digital signal processing technologies, in addition to many of the exceptional features of its predecessor the ITC-16. The LIH 1600 provides expandability and versatility that will satisfy both current and future needs.

The LIH 1600 system is comprised of a PCI computer interface card and one or two analog rack units connected by the fiber optic data cables. The fiber optics provide superb optical isolation, virtually eliminating ground loops, while increasing the distance between the computer and the recording set-up to at least five meters. Fiber optic cables are small, flexible, and, unlike conventional electrical cables, do not emit electromagnetic radiation.

The LIH 1600 rack unit has eight analog inputs, four analog outputs, sixteen digital inputs, sixteen digital outputs, and 4 digital trigger in channels all sampling synchronously. In addition two 12-bit asynchronous "telegraphing" A/D converter channels are available for monitoring slow changing parameters.

The eight analog input channels are separated into two banks of four. Each bank is multiplexed into one 16-bit 200 kHz A/D converter. Both A/D converters sample simultaneously and synchronously at the maximum conversion rate resulting in a total throughput of 400 kHz. This unique arrangement allows pairs of channels to be digitized without phase-shift. If the bandwidth of the experiment calls for lower sampling rates, the DSP (digital signal processor) decimates and/or filters the data. An added benefit of filtering is the reduction of noise.

The PCI Bus mastering host interface card supports one or two LIH 1600 rack units. If two rack units are used, then all input and output channels are doubled and fully synchronized. For systems requiring even more channels, multiple PCI and LIH 1600 units are used. Multiple PCI cards installed in the same or in separate computers can be synchronised.

The LIH 1600 can be controlled by the HEKA software packages PULSE, PATCHMASTER and TIDA. A DLL (dynamic link library) is available to control the LIH 1600 from your own applications.

Technical Specifications

Analog Inputs

- Eight 16-bit analog inputs
- Two A/D converters, each multiplexed into 4 inputs
- 400 kHz aggregate, max. 200 kHz per A/D converter
- Input type: differential, optically isolated
- Input Range: -10.24 to + 10.23 V
- Differential non-linearity: $\pm 0.002\%$ of FSR
- Drift: ± 2 ppm/ $^{\circ}$ C
- Input impedance: 1 MOhm
- Signal to noise ratio: 86dB at DC to 160 kHz, <1mV PP

"Telegraphing" Inputs

- Two 12-bit telegraphing inputs
- 5 kHz aggregate, 2.5 kHz per A/D converter
- ± 10 V input range

Digital Inputs

- Sixteen optically isolated inputs
- Rear panel connector
- 3.3V and 5 V logic compatible
- Minimum pulse width: 150 ns

Trigger Inputs

- Four optically isolated inputs
- 3.3. and 5 V logic compatible
- BNC on front panel

Analog Outputs

- Four 16-bit analog outputs
- Four individual D/A converters
- Output type: pseudo differential, optically isolated
- Settling time: < 4 μ s
- Output Range: -10.24 to + 10.23 V
- Gain error: 0.2 % of FSR
- Gain linearity: < 2 dB
- Drift: ± 4 ppm/ $^{\circ}$ C
- Output Impedance: 10 Ohm
- Signal to noise ratio: 116 dB

Digital Outputs

- Sixteen optically isolated outputs
- Rear panel connector
- Sink output current: 6.4 mA (front panel), 3.2 mA (rear panel)

Trigger Out

- Four of the 16 optically isolated digital outputs are provided at the front panel as trigger outputs
- 3.3 V and TTL compatible
- BNC connector on front panel

Additional Connectors

- Digital I/O connector for EPC 8 or TIB 14
- 2 pairs fiber optic transmitters/receivers

Dimensions

- (47.5 x 4.4 x 25.0) cm
- Weight: 3.6 kg
- mounts in 19" rack
- operates on 90 V- 250 V 50/60 Hz

Cable

- 1 pair 5 meter fiber optic cable for each LIH 1600

Host Interface

- PCI-1600 interface to PCI bus computers

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