**General Purpose Instrumentation Bus**

GPIB is a short range digital communications bus that has been in use for nearly 50 years. Originally created for use with automated test equipment, the standard is still in wide use today.

This is due to the fact that it remains one of the very few methods of controlling, interfacing, and integrating various different instrumentation devices produced by different manufacturers in a uniform and generic fashion.

In the late 1960s Hewlett-Packard developed the HP Interface Bus (HPIB) to enable easier interconnection between instruments and controllers such as computers. In 1975 the bus was standardized by the Institute of Electrical and Electronics Engineers as the IEEE Standard Digital Interface for Programmable Instrumentation, IEEE-488-1975 (now IEEE-488.1).

IEEE-488.1 formalized the mechanical, electrical, and basic protocol parameters of GPIB, but said nothing about the format of commands or data. In 1987 the IEEE-488.2 standard, Codes, Formats, Protocols, and Common Commands for IEEE-488.1, provided for basic syntax and format conventions, as well as device independent commands, data structures, error protocols, and the like. Another standard SCPI was introduced in the 1990s for device commands. In 2003 the standard was upgraded to support high speed data rates of 8MB/S known as HS-488.

The GPIB interface uses a 24-pin Amphenol micro ribbon connector cable, most commonly in a stackable male/female combination that allows for easy daisy chaining by stacking cables (as shown here). They are locked in place by thumb screws typically metric M3.5×0.6 threads.

Total cable length is limited to 20 meters, although bus extender devices are available. The cables are readily available from many sources on the Internet and electrical suppliers with various lengths.

**LX700 - GPIB Firmware / Software**

The LX700 System Controller provides the internal firmware for handling the GPIB commands and processing. Each module within an LX700 mainframe appears as a sub-instrument. GPIB commands are typically issued by user scripts as controlled from a PC using custom software. A LabVIEW driver will also be available in the future for system interface virtualization.

The GPIB interface for each module is unique, due to the specialization of each module and its characteristics and features. As new future modules are released, the firmware for the LX700 mainframes will be revised and updated to provide GPIB support for each new module. The firmware updates can be easily downloaded and installed by the user as binary hex code for flash memory.

The GPIB functionality is most effective when multiple instruments of various kinds must be integrated into an overall larger system, and controlled by a central software program/script. Since the LX700 Win32 application software is not involved; the management, control, and processing requirements must be met by the user's own custom software. While GPIB is very effective for general mode, option, and feature control, data processing requirements can be much more demanding and highly numerical.
Specifications

- Electrical Connector: 24 Pin Female Micro Ribbon
- Mechanical Locking: M3.5x0.6 Threaded Jacks
- Electrical Conformance: IEEE-488.1 Parameters
- Protocol Conformance: IEEE-488.2 Syntax
- Command Conformance: SCPI basics, plus Proprietary
- Maximum Data Rate: HS-488, 8MB/Sec
- LED Indicators: REMOTE, LISTEN, TALK, TRIGGER
- Interface Controller: NI-TNT4882
- Voltage Levels: TTL 5V
- Height Dimension: 3.5 Inches
- Width Dimensions: 1.8 Inches
- Depth Dimensions: 4.3 Inches
- Weight: 0.2 lbs, 0.1kg

LX700 - GPIB Installation

The LX700-GPIB Interface is provided as an optional user installable plugin which mounts in the left end of the chassis (shown below). The unit internally connects to the LX700 System Controller via an edge card connector, and requires only 8 screws to be removed/replaced by the user. The procedure typically requires 10 minutes and only requires a philips screwdriver.