What LXI Class B can do
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LAN eXtensions for Instruments
LXI Classes

- **Class C**: Base class
  - Built upon LAN standard
  - Predictable LAN behavior
  - Built-in Web server
  - IVI driver API

- **Class B**: Adds synchronization
  - Class C plus
  - IEEE 1588 Precision Time Protocol (PTP)
  - Peer-to-peer messaging and multicast
  - Timestamp data and state changes

- **Class A**: Adds a wired trigger bus
  - Class B plus
  - A fast hardware trigger bus
Aspects of Class B Instruments…

• Flexible triggering using time, P2P, or multicast
• Time-aware instruments with synchronization
• Time logs give view into timing of system
The essence of LXI Class B Triggering

1. Start Time
   - Count
   - Period
   - Alarm

2. LXI Packet P2P or Multicast
   - Receive
   - Delay
   - Measurement Engine
   - Trigger
   - Time stamp

3. Trigger
   - Receive
   - Delay
   - Transmit
   - LXI Packet P2P or Multicast

Time Record Log
Class C LXI Events and Triggering

Typical LXI Instrument

Pretty much like GPIB instruments...
Class C LXI Events and Triggering Smart Instruments

Software

*TRG

LAN

External timer (oscillator)

External Event

Internal timer (oscillator)

Lists of Freq, Amp, Waveform Type

Class C
Class B Instruments
Time Aware and Messages

**Software**

*TRG

**LAN packet (TCP)**

**LAN packet (UDP)**

External timer (oscillator)

External Event

**Internal timer (oscillator)**

Lists of Freq, Amp, Waveform Type

Time "Step"

Class B

Class C

Time stamps

00:01:05.36 345.123
00:01:05.37 346.234
00:01:05.38 347.345

IEEE 1588 Clock

Time synchronization of actions

00:01:05.36 Step
00:01:05.37 Step
00:01:05.38
00:01:05.39
00:01:05.40

Ts

“Step”

Peer-to-peer

Multi-cast

LAN

Time Triggers

LAN packet (TCP)

LAN packet (UDP)
Antenna Measurement Near-Field

List Sweep Mode

RF Source

Signal Generator

Antenna (transmit)

Antenna (test)

Antenna (reference)

Test IF
(to Rcvr A in)

LO Source
(from PNA source out)

Network Analyzer

Reference IF
(to Rcvr R1 in)

BNC Cables

PSG Trig In

PSG Trig Out

PSG Trig In

PSG Trig Out

LXI™
LAN eXtensions for Instrumentation
Antenna Measurement Far-Field

List Sweep Mode

Wire or Wireless LAN Connection

LXI Packet

LAN eXtensions for Instrumentation
Antenna Measurement Far-Field
Using LXI Class B Trigger Box
Where to go for more information…

• [www.lxistandard.org](http://www.lxistandard.org)
  – Specifications
  – Papers and presentations
    …”Introducing LXI to your IT Department”
    …”Getting to know LXI”, ”Getting started with LXI”
    …“Migrating from GPIB to LXI”, “What LXI Class B can do”
  – Products and vendors

• [www.lxiconnection.com](http://www.lxiconnection.com)
  – Articles on all aspects of LXI
  – Includes multi-vendor cooperation
• Vendor Web sites – find links on the LXI Web site