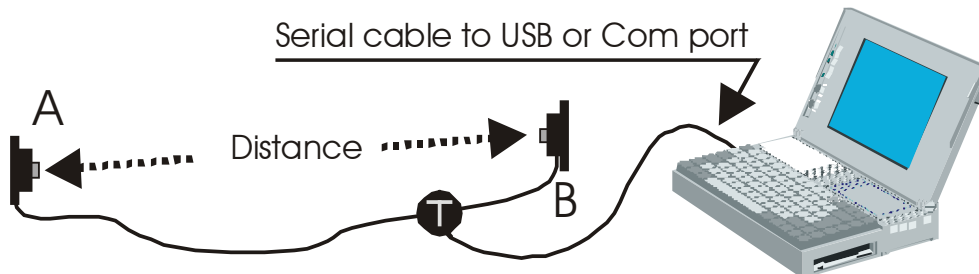*The HX11 system is a multipurpose ultrasonic positioning. The following is a brief description of a few possible configuration scenarios. See the full documentation on the web for detailed description.*

**Wired high-speed ultrasonic distance measurements**.

The images suggest a setup allowing ultrasonic identity signal to be transmitted from device A to device B or vice versa, or echoed of an orderly object. The receiving device reports the time elapsed from start (synchronization) until it receives the signal. Hence time of flight can be extracted from the receiver.
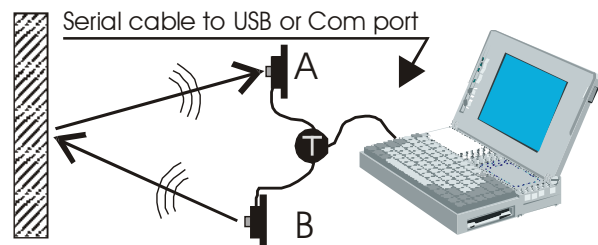
**Wireless ultrasonic distance measurement (identity exchange).**
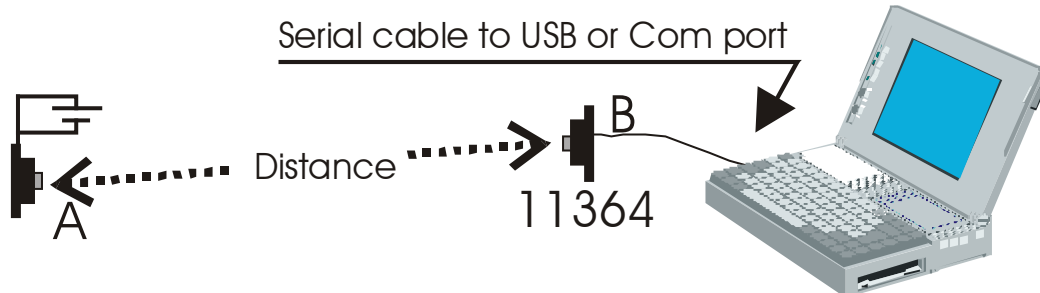
The images show an ultrasonic transponder wireless and a free moving point A. Through ultrasonic identity exchange, caller B measures the distance to transponder A, both directly and using a reflection of an orderly object.

# Hexamite   Hx11
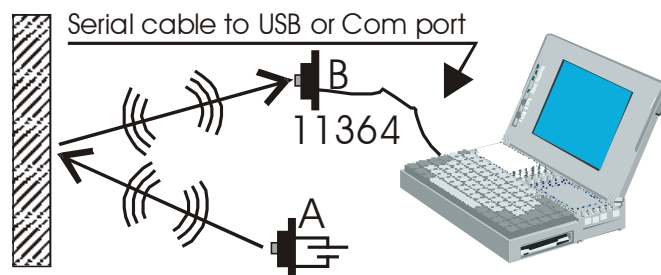
Ultrasonic positioning of multiple objects from more than one perspective.

The image below shows how multiple callers (HX11TR) A and B can measure the distances to multiple transponders (HX11TR) C and D, using ultrasonic identity exchange.
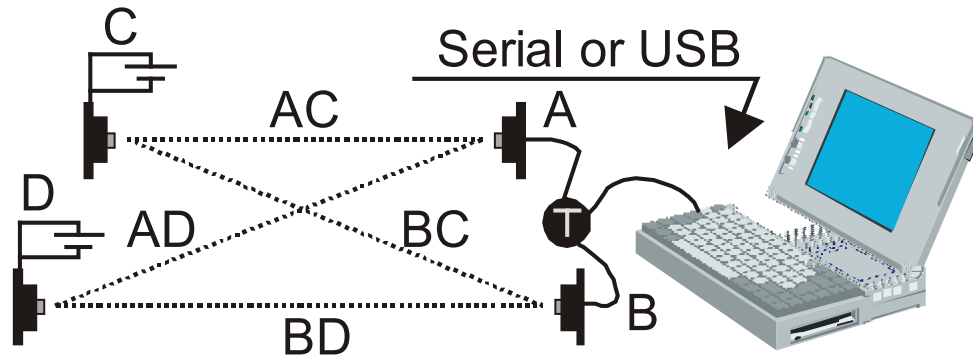

Guidance, tracking, orientation and moving frames

The image below shows device A (HX11TR) with respect to a moving frame containing HX11TR devices B, C and D. Here the user can configure A as a caller and B, C and D as transponders, and thereby get absolute distances AB, AC and AD. Alternatively the user can also configure the networked devices into a synchronous bunch, and use A to deliver high-speed time of flight differentials.
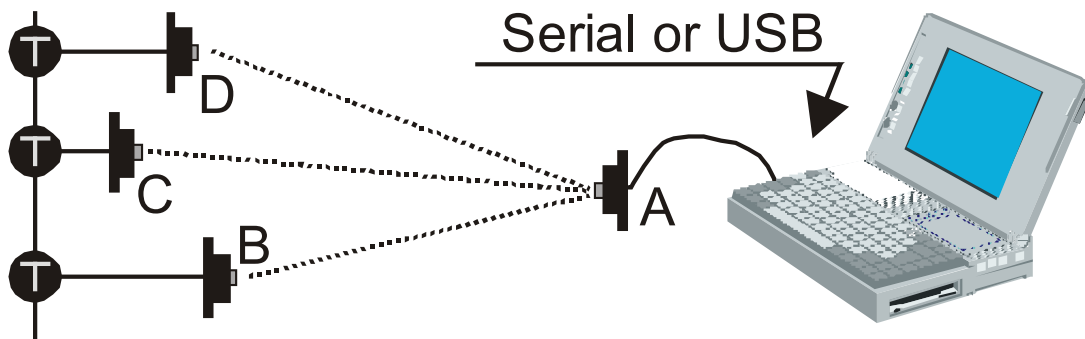
Ultrasonic guidance, tracking, orientation and multiple moving frames

The following illustration shows grouping of a few HX11TR devices. The user has many options, for time of flight measurements using ultrasonic identity exchange. From high-speed differential distance triangulation to direct and absolute ultrasonic positioning for all the vectors shown below.
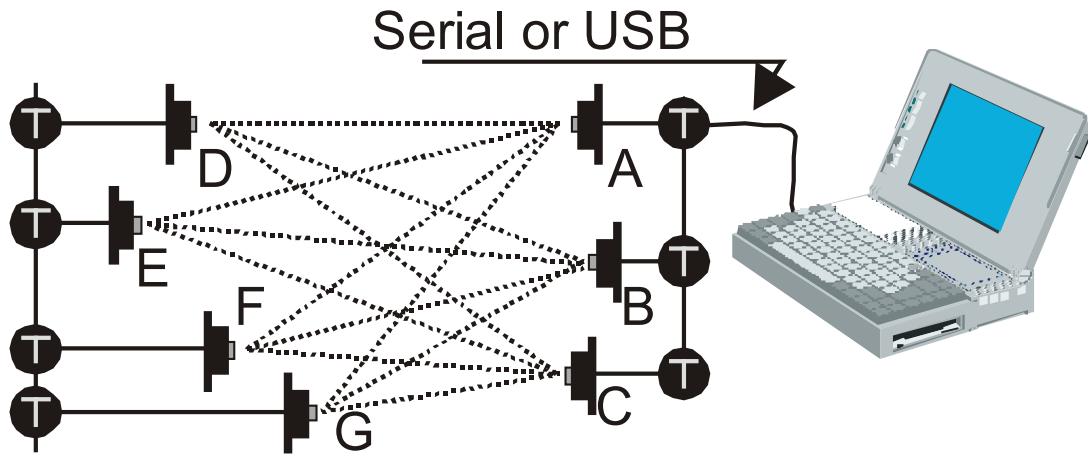
3D wide area ultrasonic tracking

Hexamite provides a few programs to help users get started with ultrasonic tracking like shown below, The programs available for this operation are datalog.exe logs the time identities are received on a file, XYZ triangulates using the time of flight deviations and uTrack to display the 2d motion on a gif image provided by the user. The visual basic code for uTrack is provided.
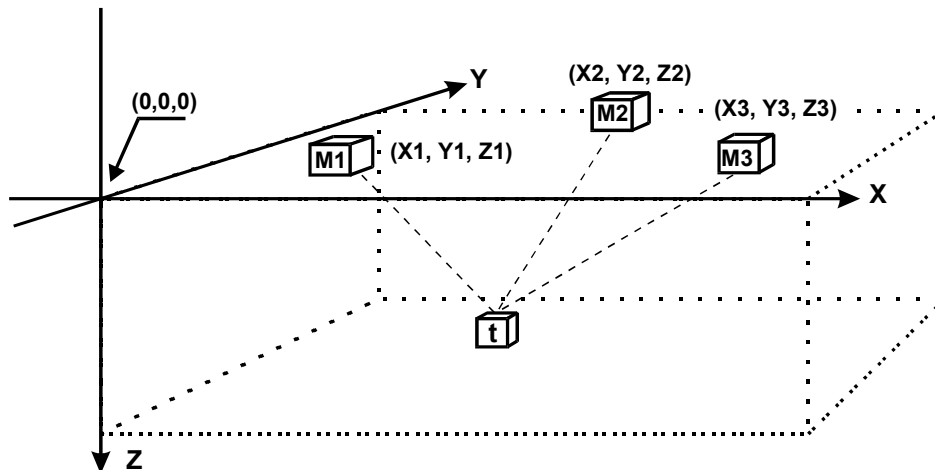
Network formation is entirely up to the user, just type the X,Y coordinates of each HX11TR device (labeled M). into a file called layout.hxm. The following is simple efficient setup with distances between monitors, everywhere the same.
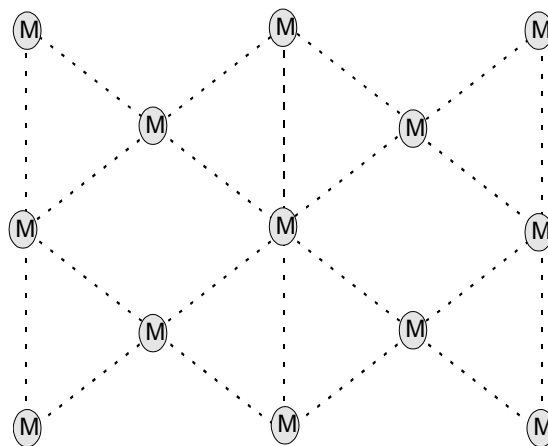
For real time operation the programs datalog and XYZ require a network controller (HX11C) to yield the positioning data via DDE. The user is also free to use own RS485 network driver or connect a small HX11TR network directly to a PC and use own algorithm to compute or triangulate the position of the transmitter t.