

Connecting an Altus Recorder via TCP/IP

With Kinematics' Altus Series Recorders
and the Lantronix Cobox E2

Application Note #45

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Dennis Pumphrey

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Kinometrics, Inc., 222 Vista Avenue, Pasadena, CA 91107. USA

Phone: + 1-626-795-2220 ■ Fax: + 1-626-795-0868

E-mail: services@kmi.com

Website: www.kinometrics.com

ftp:\\ftp.kinometrics.com

Kinometrics SA, Le Tresi 3, 1028 Preverenges, Switzerland

Phone: + 41-21-803-2829 ■ Fax: + 41-21-803-2895

E-mail: kmi_sa@bluewin.ch

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With Kinematics' Altus Series Recorders and the Lantronix Cobox E2

Introduction

Kinematics Altus Series Recorders (referred to throughout this document as simply "Altus Recorder") may be connected via TCP/IP in two different ways:

Via internal modem and standard phone lines.

This method uses optional Altus Recorder firmware (version 2.96 and later) that allows the Altus Recorder to dial an ISP via its internal modem.

The purpose of this firmware is NOT to support continuous connections, but to allow the Altus Recorder to make a local phone call after triggered events are recorded, and transfer the event files to a remote data center using FTP transfers.

To restate, this firmware is intended for automatic FTP transfer of triggered event recordings to the customer's remote data center thereby avoiding long distance charges.

This firmware feature is an extra cost option. For more details, contact Kinematics or see the Altus Monitor Mode manual p/n 302219.

Via full time connection to a LAN or WAN.

This method uses a terminal server to convert the RS-232 data stream of the Altus Recorder front panel into a TCP/IP data stream on Ethernet.

Simply put, the terminal server takes an RS-232 connection in on one side of the box, and puts out an Ethernet connection at a particular IP address and port number, also called a socket.

Terminal servers are available in many forms commercially, and may be stand-alone units with one connection to hundreds of connections, or in some cases the terminal server capability may be provided as part of another unit, such as a router.

This document focuses on the second method of TCP/IP connection using a Lantronix product called a Cobox E2. This inexpensive device provides TCP/IP connection for two RS-232 devices. Several other similar devices are available from Lantronix and other manufacturers including the Lantronix UDS-10, a smaller single port version. You can contact Lantronix at www.lantronix.com.

Many other terminal servers are available commercially and are suitable for use as well.

In addition, an internal network connection (essentially an internal Cobox) is available for New MCU K2s and Makalus. This option brings the network connection out through a water-tight connection in the case and eliminates the need for a separate power supply. See Kinematics Application Note #48 for a description of this option.

Overview of the Cobox

The Cobox E2 is a small metal box approximately 4 ½ x 7 x 1 ½ inches, provided with a wall cube power supply and manual. In addition, the Cobox comes with removable mounting “wings” that assist with secure mounting.

The RS-232 connections are clearly segregated from the network connections. The RS-232 connections are located on one side of the Cobox (one DB-9 and one DB-25), and the network connections are located on the other side of the Cobox (one 10BaseT connection, one AUI port, plus power connection and indicator lights).

Figure 1 – Lantronix Cobox and Accessories

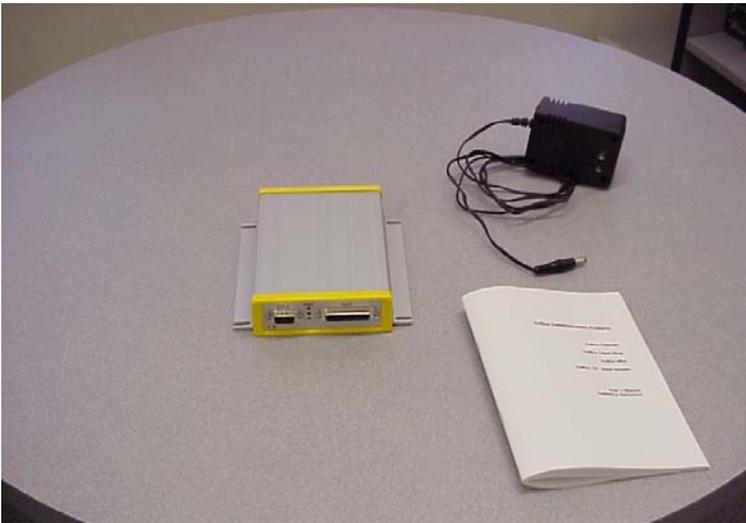


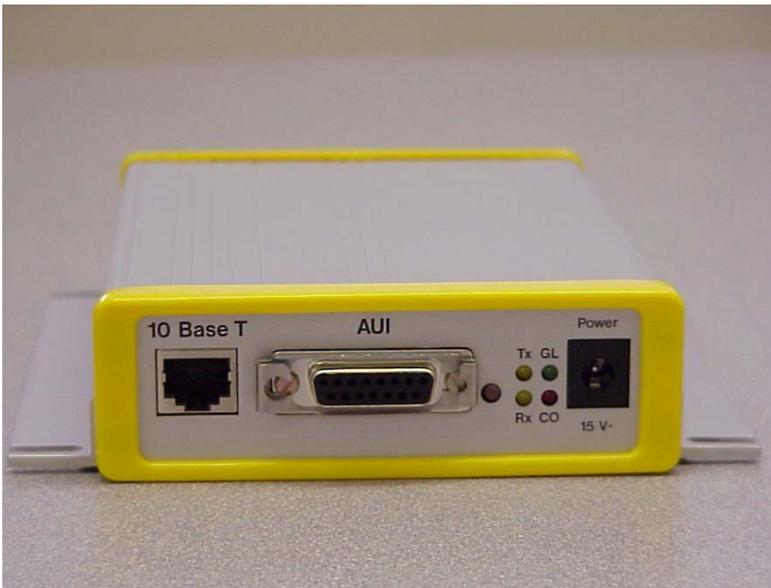
Figure 2 – Cobox Mounting “wings”



Figure 3 – Cobox RS-232 Connections



Figure 4 – Cobox Network and Power Connections



Photos of the Lantronix UDS-10

Figure 5 – Lantronix UDS-10 shown with floppy for scale



Figure 6 – UDS-10 power and 10Base-T connections



Figure 7 – UDS-10 RS-232 connection



Setup of the Cobox E2

Initially, you must connect the Cobox to your network (usually done with a 10BaseT connection), connect to your Altus Recorder via RS-232, and connect power using the wall cube.

After making all connections, you should see the green GL (Good Link) LED lit, indicating a good network connection.

When first out of the box, the Cobox has been defaulted by the Manufacturer to an IP address. You will need to obtain this default address from the Cobox documentation in order to continue.

To configure the Cobox, you communicate with it via Telnet at port 9999. From most computers (that must be on the same LAN as the Cobox), this is done with a command such as:

```
TELNET 11.22.33.44 9999
```

In response, you'll get a message such as:

```
Cobox vX.XX
Press Enter to go into Setup Mode
```

Press ENTER, at which point you'll see something like:

```
*** basic parameters
Hardware: Ethernet TP1
IP addr 011.022.033.044, no gateway set, netmask 255.255.255.000

*** Channel 1 ***
Baudrate 38400, I/F mode 4C, Flow 00
Port 09000
Remote IP Adr: --- none ---, Port 00000
Connect Mode: C0
Disconn Mode: 00
Flush Mode: 80
Pack Cntrl: 00
```

```
*** Channel 2 ***
Baudrate 38400, I/F mode 4C, Flow 00
Port 09001
Remote IP Adr: --- none ---, Port 00000
Connect Mode: C0
Disconn Mode: 00
Flush Mode: 80
Pack Cntrl: 00
```

Change Setup (0 Basics, 1 or 2 for Channel, 8 exit, 9 save and exit)?

This next setup section will describe how to set up the Cobox for use with most networks.

The first thing you need to do is change the IP address of the Cobox. This is done by selecting the “0” option (basics), and then changing the needed parameters. For example, to select the 10BaseT connection at a specific IP address:

```
Change Setup (0 Basics, 1 or 2 for Channel, 8 exit, 9 save and exit)? 0
Ethernet Interface AUI (N) N
IP Address : (011) 012 .(022) 023 .(033) 034 .(044) 045
Set Gateway IP Address (N) N
Netmask: Number of Bits for the Host Part (0=default) (08)
Change telnet config password (N) N
```

Current values are indicated in parentheses. To accept a value without changing it, press ENTER. To change a value, type the new value and press ENTER.

To change the IP address, as each element of the address is displayed (011), enter the new value and press ENTER. This will cause the next element of the address to be displayed .(022).

Please note that the values are inactive until they are saved from the main menu.

If you change the IP address of the Cobox and save the updated values, you will need to use that new address for both future configuration changes through port 9999 as well as for communications with the Altus Recorders connected to the Cobox.

Next, set up each channel appropriately using the menus of the Cobox as follows:

Baudrate – Set this to a high value such as 38400 or 57600 depending on the quality of the RS-232 connection. Remember that the connected Altus Recorder must be set to the same rate as the port.

I/F Mode – In most cases, you’ll want to set this to 4C, which is standard 8-N-1 RS-232.

Flow – Set this to 00, no flow control.

Port No – Select a high port number 9000 or higher. The Cobox will address each port through the port numbers that you specify at the IP address you specified under “basics”.

Connect Mode – Select what makes sense for you, but usually this is set to C0, unconditional connection acceptance.

Remote IP Address – This is set in conjunction with Automatic Connection Mode, and specifies an IP address that the Cobox will automatically connect to on start-up. Usually, this address is left set to zero.

Remote Port – The port specified for automatic connection to a remote IP address.

Disconnect Mode – Usually set to 00, ignore DTR.

Flush Mode – Select 80, the alternate packing algorithm to minimize network traffic.

Pack Control – Select 00, which forces transmit after 12ms of idle time.

Disconnect Time – Set to 00.

Send Char 1 – Set to 00.

Send Char 2 – Set to 00.

On exit, save the updated parameter using the “9” option, save and exit.

Once you have configured the Cobox, you should be able to communicate with the connected Altus Recorders via your LAN or via the Internet (if you specified the gateway).

Note: Kinometrics’ free support software, Altus QuickTalk for Windows, does not support TCP/IP connections. Some device server manufacturers including Lantronix provide software that makes the IP address / socket look like a COM port. Lantronix calls this software the “DeviceComm Manager”. The software allows you to treat the Cobox as if it was on COM4 (for example) and then use QuickTalk to communicate with the Altus Recorder via the IP connection by talking through ‘COM4’. You may need to set the communication port number within a specific range for the DeviceComm Manager to work properly.

Note 2: Lantronix provides a free software utility called the DeviceInstaller that greatly eases the process of configuring Lantronix terminal servers. See the Lantronix documentation or Kinometrics Application Note #48 for a more complete description of the use of the DeviceInstaller.

Example 1:

To communicate in terminal mode with the Altus Recorder connected via a Cobox located at IP address 011.022.033.044 at port 9000, use:

```
TELNET 11.22.33.44 9000
```

You should now be able to communicate in terminal mode with the recorder just as if the recorder were connected via a local serial link.

Example 2:

To communicate with the Altus Recorder connected via a Cobox located at IP address 011.022.033.044 at port 9000 using HyperTerminal (a Windows program), open HyperTerminal and specify the connection via a TCP/IP connection. Give the address 11.22.33.44, port 9000.

HyperTerminal supports file transfers as well as terminal mode communications. Unfortunately, HyperTerminal doesn't work for file transfers over an IP connection. You may find other programs that will work in this mode. Kinometrics' Altus QuickTalk for Windows will allow you to do file transfers over an IP connection if you use the Lantronix DeviceComm Manager or an equivalent from another terminal server manufacturer.

For the record though, using HyperTerminal through a serial interface you can not only communicate with the recorder in terminal mode, but you can also retrieve files. To do this, give the Altus Recorder the TX command with the path and filename of the file to be transferred as an argument, and then select Transfer → Receive File from the HyperTerminal menus. Specify the local name of the file (where it will be put on your PC) and select XMODEM or XMODEM-1K protocol matching the TX mode you told the Altus Recorder to use.

Note: Refer to the Altus Recorder Monitor Mode manual p/n 302219 for details.

Other Applications:

NMS

NMS (Kinemetrics' Network Management System software) can be used to communicate with the Altus Recorder via a TCP/IP connection. NMS is used to monitor a set of Kinemetrics Altus series recorders or selected other devices by monitoring one or more serial or network ports used to communicate with those units.

The Network Management System can support Altus recorders in several modes, including direct connect, remote dial-up, or streaming data modes. The direct connect and remote dial-up modes are used for the reporting of recorder determined events, with those events uploaded and stored locally as EVT format event files. This mode can be used with a Cobox to retrieve recorded events over a LAN or WAN.

Altus Streaming data mode is used to monitor continuously transmitted digital data streams using the Kinemetrics SDS transmission protocol. Data transmitted in this manner is recorded and stored locally at the PC based upon a number of user selectable parameters, that include digital trigger filters, triggers, and storage methods. This mode can be used with a Cobox to retrieve data continuously from remote Altus recorders.

To use the Cobox (or another terminal server) with NMS, select the NMS Configuration dialog, and for the port to be used, specify TCP/IP and then supply the IP address and port number of the Altus Recorder connected through the Cobox.

These options, as well as other features, are described in more detail in the NMS manual p/n 300021.

Antelope

The Cobox can also be used to facilitate the use of Altus series recorders with Antelope Environment Monitoring Software, a distributed open-architecture UNIX-based acquisition, analysis and management software system. Antelope is designed to provide a comprehensive set of environmental monitoring data and processed information in real-time. Finely engineered as an all-in-one system, Antelope integrates state-of-the-art technology and scientific advances, making it ideal for monitoring seismic events from local/regional, national and global networks and arrays. Antelope takes full advantage of the extensive support services provided by the UNIX environment and standard TCP/IP network utilities over multiple physical interfaces.

For more information, contact BRTT at www.brtt.com

Earthworm

Cobox devices of various types have been used with Altus recorders and Earthworm for some time now. Earthworm will work with Altus recorders in SDS streaming mode either through an external terminal server such as a Cobox E2, USD-10, or many others. In addition, the internal Network Option Board may be used.

There are many resources for Earthworm. We suggest you start by contacting the USGS or go to: www.geophys.washington.edu/CNSS/EWAB/sites.html

SMARTS

The Kinemetrics SMARTS software (Seismic Monitoring, Acquisition, Recording, and Telemetry Software) can also be used to communicate in real-time with Q330s via Ethernet or Altus recorders via an RS-232 connection or a TCP/IP connection using internal or external terminal servers.

SMARTS is a multi-platform extensible software architecture written in Java that can collect data in a number of ways and can store data in a number of output formats. SMARTS can run on UNIX, Linux, Windows, and others. SMARTS' modular architecture allows a high degree of customization, including allowing end-users to write their own modules to insert into the data flow.

See the SMARTS User manual p/n 304702 for more information.

Definitions

10BaseT – A 10Mbps Ethernet connection, using an RJ-45 plug-in jack which looks very similar to a standard RJ-11 telephone jack.

AUI – Attachment Unit Interface. A 15 pin connector used for connecting Ethernet “thick wire” connections.

DB-9 – A 9 pin connector, usually for RS-232. On the Cobox, this is the secondary RS-232 port.

DB-25 – A 25 pin connector, usually for parallel ports on a PC, but in the case of the Cobox, this is the primary RS-232 port.

FTP – File Transfer Protocol.

IP Address – Internet Protocol address, e.g. www.kmi.com or 10.0.0.2.

ISP – Internet Service Provider.

LAN – Local Area Network.

LED – Light Emitting Diode.

Router – A device that controls the flow of data within a network or between networks, such as between an internal LAN and the Internet.

TCP/IP – Transmission Control Protocol / Internet Protocol.

WAN – Wide Area Network.