

IP•Tube E^2 Duo
User's Guide

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Engage Communication Service Center:

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1 Introduction

IP•Tube E^2 Duo User's Guide provides the information users require to install, configure and operate the IP•Tube E^2 Duo product developed and manufactured by Engage Communication Inc. This product will enable the user to install the function, across an IP network, to move data in a securely packaged form, to a unit in a remote location. Protocols supported include legacy protocols such as NetBEUI, IPX, AppleTalk and Decnet. Legacy applications that utilize non-routable protocols are able to access services across an IP point to point connection.

1.1 Security

IP•Tube E^2 Duo provides a high level secure communication by only exchanging packets with the remote network. The Ethernet frames within the IP envelope must be addressed to specific Ethernet MAC addresses.

Network security is established with Full On Source, Destination Address, UDP Port and IP Packet filtering. Interconnectivity is selectively controlled at the interface, network device and application layers.

1.2 Management

Management of IP•Tube E^2 Duo is accomplished with a Command Line Interface, (CLI), that is accessed through the console port or an SSH connection. Templates of the most common configurations provide for an Edit and Paste approach.

1.3 Unit Ports and Indicators

1.3.1 Console Port

A console port for "Out of Band" management access to the unit.

1.3.2 LAN Interface

IP•Tube E^2 Duo provides two 10/100/1000BaseT Ethernet LAN interfaces. Management via the LAN ports is enabled when access to the unit is more convenient remotely. LAN1 typically receives data from a local network and the LAN2 port moves the encapsulated data to a remote network. LAN protocols IP, TCP and ICMP are supported.

1.4 About this Guide

1.4.1 Organization

Introduction provides an overview of the *IP•Tube E^2 Duo User's Guide* as well as feature descriptions.

Installation QuickStart provides a concise description of the installation and configuration process, plus examples to get the experienced user up and running in a minimum of time.

Installation of IP•Tube E^2 Duo gives a detailed step by step of the installation and initial configuration of the units. It covers the physical environment and connections required to install the units then steps the administrator through the configuration process of the console port and LAN connections.

Command Line Interface provides a command-by-command description of the upper level interface as well as the interfaces to the various ports.

IP•Tube E^2 Duo Configuration & Operation details the configuration and ongoing operation of IP•Tube E^2 Duo. Several common configurations are provided as examples.

Troubleshooting reviews some of the common issues that may occur during installation and normal operation of the units and provides descriptions of causes and solutions to these issues.

Appendix - IP•Tube E^2 Duo specifications, connector pinouts and crossover wiring details and includes diagrams of the units.

Glossary - Telecommunication and TCP/IP terminology.

1.4.2 Intended Audience

This manual is intended for administrators of telecommunication and network systems. The technical content is written for readers who have basic computer, telecommunication and networking experience.

It is important that any administrator responsible for the installation and operation of Engage IP•Tube products be familiar with IP networking and data communication concepts, such as network addressing and synchronous serial interfaces. These terms are central to an understanding of IP•Tube functionality, and are covered in the Glossary section.

2 Installation QuickStart

This QuickStart Chapter is intended for users who understand how they want their IP•Tube E^2 Duo installed and configured and only require the mechanics of performing that installation.

2.1 Communication with IP•Tube E^2 Duo

2.1.1 Console Port

Initial communication with IP•Tube E^2 Duo unit is made through the Console port, utilizing the Command Line interface, (CLI) detailed in Chapter 4: *Command Line Interface.*

Please use the provided USB to DB9 serial converter to connect to the IP•Tube E^2 Duo's USB port. The DB9 side of the cable will connect to a computer that is running a Terminal Server program (TeraTerm, HyperTerm, etc.). It is typical to connect the DB9 to another USB to DB9 serial converter as DB9 serial ports are not common on todays computers. In this case, use the NULL MODEM ADAPTER provided to allow communication between IP•Tube E^2 Duo and computer. The use of the null modem adapter is necessary when using two USB to DB9 serial converter cables.

Once a serial connection between a workstation and the IP•Tube E^2 Duo console port is established and a carriage return **<CR>** is entered, a **Login** prompt will appear.

The default login is: **root**.

The default password for first time login is also **root**. It is highly recommended that the password be changed upon initial login.

2.1.2 SSH

Once an IP address has been assigned, the user can log into the unit via the network and continue configuration using SSH. Most SSH clients are compatible with the IP•Tube E^2 Duo.

2.2 Editing & Pasting Configurations

Users of either CLI have the option of editing a standard IP•Tube E^2 Duo configuration in a text editor and pasting that configuration to IP•Tube E^2 Duo. The examples in this section are included in a configuration file found on the shipping disk.

Edit the desired configuration listing using a simple text editor. Connect to the IP•Tube E^2 Duo unit through SSH or the Console port, then enter the configuration mode with the command: **config**.

Paste the edited text, comments and all, to the IP•Tube E^2 Duo, then issue the command: **save**. The unit will reset and come up with the new configuration.

To save an IP•Tube E^2 Duo configuration to a file, issue the command: **show configuration all**, and copy the output of the command to a file with your text editor.

2.3 IP•Tube E^2 Duo Cabling

IP•Tube E^2 Duo uses standard 10/100/1000BaseT Ethernet cabling to connect to an Ethernet switch, router or hub. A crossover 10/100/1000BaseT cable can be used for direct connection to a single router, wireless radio or other Ethernet device.

The cabling used to connect IP•Tube E^2 Duo LAN Ports to a switch, router or hub is straight through Ethernet cabling.

2.4 IP•Tube E^2 Duo Configuration Parameters

The setup of IP•Tube E^2 Duo involves configuration of the:

- IP•Tube E^2 Duo Security Parameters
- Interface Specific Parameters
- IP•Tube E^2 Duo System Parameters

2.4.1 IP•Tube E^2 Duo Security Parameters

To establish a Full On Source, Destination Address envelopes must be addressed to specific Ethernet MAC addresses. Interconnectivity is selectively controlled at the interface, network device and application layers.

No device on the public network can access, or pass data to LAN2 for delivery to the private network other than another IP•Tube E^2 Duo. Thus connectivity via UDP from the public network is limited to the IP•Tube itself.

2.4.2 Interface Specific Parameters

Console Configuration Parameters

Serial communication settings to the USB serial port should be set as:

115200 baud, 1 stop bit, no parity, 8 bit data, flow control none

LAN Configuration Parameters

IP•Tube E^2 Duo Ethernet number 2 (LAN2) is configured for network connectivity. The following parameters must match the configuration of the LAN interface to which it is connected.

2.4.3 IP•Tube E^2 Duo System Parameters

System parameters include IP•Tube E^2 Duo Host name, the Ethernet IP address and the default router.

host name

Provide a unique name for IP•Tube E^2 Duo.

Example:

```
host name AptosTubeE2
```

ip address

IP•Tube E^2 Duo requires configuration of the LAN2 (WAN) interface which will communicate to another IP•Tube E^2 Duo. IP•Tube E^2 Duo IP packets communicate over LAN2 only. Configuration of the LAN1 (Local Network) interface is optional. Management access to the unit via SSH is possible via LAN1 or LAN2.

Example:

```
ip address aaa.bbb.ccc.ddd
```

default gateway

If the remote IP•Tube E^2 Duo, whose IP address is configured with **ip address**, resides on a different IP network from the Local IP•Tube E^2 Duo, a default gateway must be specified. The default gateway is typically the local IP WAN Router.

Example:

```
default gateway aaa.bbb.ccc.ddd
```

Configuration Examples

With the **show config** command you can list the configuration parameters of the system and both LAN ports.

Example 1:

This is an example of a configuration of the IP•Tube E^2 Duo with ip address for each unit on same network. Note that there is no lan1 ip address required and no default gateway required for this configuration.

unit 1	unit 2

`default gateway`
`peer ip address 192.168.3.51`
`tunnel udp port 3175`
 	
`interface lan1`
`  ip address`
 	
`interface lan2`
`  ip address 192.168.3.50`
	`default gateway`
	`peer ip address 192.168.3.50`
	`tunnel udp port 3175`
	
	`interface lan1`
	`  ip address`
	
	`interface lan2`
	`  ip address 192.168.3.51`

Example 2:

This is an example of a configuration of the IP•Tube E^2 Duo with ip address for each unit on different networks. Note a default gateway is required for this configuration.

unit 1	unit 2

`default gateway 192.168.3.254`
`peer ip address 192.168.4.50`
`tunnel udp port 3175`
 	
`interface lan1`
`  ip address`
 	
`interface lan2`
`  ip address 192.168.3.50`
	`default gateway 192.168.4.254`
	`peer ip address 192.168.3.50`
	`tunnel udp port 3175`
	
	`interface lan1`
	`  ip address`
	
	`interface lan2`
	`  ip address 192.168.4.50`

3 Installation of IP•Tube E^2 Duo

This section provides details on the physical location and connections required for the installation of Engage IP•Tube E^2 Duo equipment. Also covered is the initial communication with IP•Tube E^2 Duo.

References are made to IP•Tube E^2 Duo Command Line Interface as well as Configuration and Operation. These topics are covered in detail in later chapters.

The use of Engage IP•Tube E^2 Duo systems to create a bridge between two Ethernet LANs over an IP network requires one IP•Tube E^2 Duo unit at each end.

A standard IP•Tube E^2 Duo package includes:

- IP•Tube E^2 Duo unit - with installed LAN interface
- Console port adapter and cable
- Power Converter (110 or 220 VAC input/12 VDC output)
- Documentation Compact Disk with IP•Tube E^2 Duo User's Guide and configuration examples

3.1 Installing the Hardware

3.1.1 Locating IP•Tube E^2 Duo

Site consideration is important for proper operation of IP•Tube E^2 Duo. The user should install the unit in an environment providing:

A well-ventilated indoor location

Access within six feet of a power outlet

Two feet additional clearance around the unit to permit easy cable connection

As an option, IP•Tube E^2 Duo can be mounted in a standard 19 inch equipment rack, (rack mounts are available from Engage).

3.1.2 Powering IP•Tube E^2 Duo

Engage IP•Tube E^2 Duo units utilize an external power adapter, available in 110 VAC and 220 VAC versions, providing DC output.

The appropriate power adapter is provided with each unit. Ensure the power adapter is not connected to power then plug the DC adapter into the rear panel POWER connector.

3.1.3 Console Port

IP•Tube E^2 Duo includes a Console port for initial configuration. It may be used for serial communication from a local workstation or for remote connection via a modem. The Console port utilizes a USB port.

Please use the provided USB to DB9 serial converter to connect to the IP•Tube E^2 Duo's USB port. The DB9 side of the cable will connect to a computer that is running a Terminal Server program (TeraTerm, HyperTerm, etc.). It is typical to connect the DB9 to another USB to DB9 serial

converter as DB9 serial ports are not common on todays computers. In this case, use the NULL MODEM ADAPTER provided to allow communication between IP•Tube E^2 Duo and computer. The use of the null modem adapter is necessary when using two USB to DB9 serial converter cables.

Communication to the console port should be set for:

115200 baud, 1 stop bit, no parity, 8 bit fixed, flow control none

Once a serial connection between a workstation and IP•Tube E^2 Duo console port is established and a carriage return <CR> is entered, a Login prompt will appear.

The default login is: root.

The default password for first time login is also **root**. It is highly recommended that the password be changed upon initial login.

3.1.4 Configuring the Engage IP•Tube E^2 Duo for the LAN

IP•Tube E^2 Duo needs to be configured with a number of parameters for proper operation on the network, including:

- Ethernet IP address
- IP data target unit IP address (peer ip address)
- Default gateway if the IP data target is on another IP network

The configuration procedure depends on the network environment in which IP•Tube E^2 Duo is to be installed.

Note: It is strongly suggested that you configure IP•Tube E^2 Duo with its unique network identity before making any Ethernet or Wide Area connections.

3.1.5 Ethernet Interfaces

Engage IP•Tube E^2 Duo systems utilize 10/100/1000BaseT Ethernet cable to connect to the Local Area Network. Each system provides a 10/100/1000BaseT interface on the front panel for connection to an Ethernet switch or hub using a straight-thru Ethernet cable. For direct connection to a PC or other LAN device, the user should obtain a 10/100/1000BaseT crossover cable.

10/100/1000BaseT Ethernet cabling and crossover pinouts are provided in the Appendices.

3.1.6 Ethernet Status LEDs

The green LED on the right side of the Ethernet interface indicates link established and it will blink for activity.

The amber LED on the left side of the Ethernet interface indicates a 1000BaseT link established.

4 Command Line Interface

Command Line access to IP•Tube E^2 Duo may be via a serial connection to the Console port or an SSH connection to the Ethernet interface.

SSH provides a secure communications facility defining a standard method of interfacing terminal devices to each other. Any standard SSH client can be used to communicate to an Engage IP•Tube E^2 Duo provided there is IP connectivity between the User Host and the IP•Tube E^2 Duo.

For communication through the Console port, standard terminal communication software is used.

4.1 Console Communication

Serial communication to the console port should be configured for:

115200 baud, 1 stop bit, no parity, 8 bit fixed, flow control none

Please use the provided USB to DB9 serial converter to connect to the IP•Tube E^2 Duo's USB port. The DB9 side of the cable will connect to a computer that is running a Terminal Server program (TeraTerm, HyperTerm, etc.). It is typical to connect the DB9 to another USB to DB9 serial converter as DB9 serial ports are not common on todays computers. In this case, use the NULL MODEM ADAPTER provided to allow communication between IP•Tube E^2 Duo and computer. The use of the null modem adapter is necessary when using two USB to DB9 serial converter cables.

4.2 Logging in to IP•Tube E^2 Duo

- An SSH session is opened by providing the IP address of the IP•Tube E^2 Duo. On opening a Command Line Interface, (CLI) session, via the Console port or SSH, the **login** prompt requires entry of a login ID.
- The default login ID: **root.**
- IP•Tube E^2 Duo is shipped with default passwords. Passwords are set or modified with the **passwd** command, detailed below.

4.3 Overview of Commands

The Engage CLI supports shorthand character entry. At most 3 characters are required for the parsing of commands. For example: **show configuration** can be entered as: **sh con**. The CLI is not case sensitive. Description of the commands uses both upper and lower case for syntax definitions and examples. A full description of the command line interface follows.

4.3.1 Categories

The command set can be divided into four categories:

- General
- Show
- Config
- Config Interface

4.3.2 Online Help

Included in the General commands is the **help** command, providing information on the entire command set.

4.3.3 Configuration Modes

For the **config** and config **interface** commands, Engage employs a modal approach. The user enters the Config mode, makes changes, then Saves those changes. On Saving the changes the user leaves the Config mode.

The Config interface mode, within the Config mode, is used to set parameters for a specified interface. Once in the Configuration mode, the user enters the **interface** command. All subsequent commands apply to the specified interface.

The command prompt indicates the mode of operation:

- `name#` the single "#" indicates standard mode
- `name##` indicates IP•Tube E^2 Duo is in the Config mode
- `name(LAN1)##` IP•Tube E^2 Duo is in Config Interface mode for LAN Port 1

To move up one level, from Interface Config mode to Config mode, enter the **interface** command with no argument. To change between interfaces when in Interface Config mode, specify the new interface. For example:

```
name(s1)## interface lan1
```

Note: The LAN1 port is the private (local) interface, commonly receives data and LAN2 is the public (WAN) port and generally sends data.

4.3.4 Syntax for Command Parameters

{} == one of the parameters in set is required

[ ] == one of the parameters in set is allowed (optional)

4.4 System Level or General Commands

passwd

Allows setting or modifying the login password. The IP•Tube E^2 Duo ships with default passwords. On entering the **passwd** command, the user is prompted to enter, and confirm, the new password.

bye | quit | logout

Any of these commands will terminate the user session. If you have unsaved configuration changes, you will be prompted to save or discard the new configuration.

reset

Resets IP•Tube E^2 Duo.

help [help | all | config | show]

Provides Help information on a selected list of topics. Typing **help** with no argument provides the Help summary screen which is the top-level list of commands.

ping {dest.address} [**src.address**] [[**{number}**]]

Sends an ICMP ECHO message to the specified address. Any source address from an interface on IP•Tube E^2 Duo can be used. This can be useful to test routes across a LAN or WAN interface.

By default, only 1 message (packet) is sent. A numeric value can be entered to send more than one message.

upgrade [**user@**]**{SFTP host}:{Filename}**

SFTP (secure file transfer protocol) provides a means for upgrading IP•Tube E^2 Duo firmware in a TCP/IP environment. An SFTP upgrade may be accomplished from a CD provided by Engage Communication if the user can configure their own local SFTP server and place the appropriate upgrade file, from the CD or from Engage Tech Support, on the server.

Once a connection to a SFTP server site has been established, issue the **upgrade** command.

```
upgrade chris@157.22.234.129:/users/chris/e2duo.upg
```

Note that an IP•Tube E^2 Duo which is running an upgrade must go through a reset when performing an upgrade. This may cause the SSH connection to drop. If this does occur, simply re-establish the SSH connection.

4.5 show Commands

show interface [**lan1** | **lan2**] **{info** | **statistics}**

Provides details on either LAN interface. If no interface is specified, either the current interface per "**interface**" command will be used, or all interfaces will be shown.

info details the port type, port state, etc.

statistics lists the packets transmitted, received, etc.

show router provides general configuration and status information, including the Ethernet hardware address and the firmware version.

show config all provides a list of all configuration parameters. No argument is the same as **all**. This list provides the basis for storing an IP•Tube E^2 Duo configuration into a local text file. The full configuration can be edited offline.

show config interface [**lan1** | **lan2**]

If no interface is specified, either the current interface per the **interface** command will be used, or all interfaces will be shown.

show config router lists IP•Tube E^2 Duo Hostname, etc.

4.6 Configuration Commands

4.6.1 Config Commands

Enter the configuration mode, at which point the following commands may be used.

save

Save the changes and exit Configuration mode.

end

Exit Configuration mode.

restore

Restores the current IP•Tube E^2 Duo configuration, ignoring any changes which have been made during the current **config** session.

host name {namestring}

Provide a unique name for IP•Tube E^2 Duo. The new host name does not take effect until a save and reset is performed. For example:

```
host name Dallas IPTube
```

default gateway address

Enter the IP address of the default router or gateway. This must be an IP address on the same network as IP•Tube E^2 Duo.

tunnel udp port value

tunnel udp port specifies the UDP port source and destination address. IP•Tube E^2 Duo only accepts packets that match its UDP Port configuration. This port number is typically 3175 but can be any available port on the router.

peer ip address address

peer ip address specifies the destination ip address of the receiving IP•Tube E^2 Duounit.

4.6.2 Config Interface Commands

Configuration of IP•Tube E^2 Duo involves setting parameters for the LAN interfaces. The user must specify which interface is being configured with the command:

interface [**lan1** | **lan2**]

To move up one level, from **Interface Config** mode to **Config** mode, enter the **interface** command with no argument. To change between interfaces when in **Interface Config** mode, specify the new interface. For example:

name(LAN1)## **interface lan1**

ip address address

The interface IP address is required for configuration with SSH or connectivity tests with ping. This configuration parameter is required for LAN2 only. LAN1 is optionally configured for an IP address

Example assigning IP address:

ip address 192.168.1.1

Example removing IP address:

ip address

5 IP•Tube E^2 Duo Configuration & Operation

This section provides operational theory and configuration details specific to IP•Tube E^2 Duo. The IP•Tube E^2 Duo has unique requirements regarding its interface to other equipment.

5.1 IP•Tube E^2 Duo Installation Steps

The process of installing an IP•Tube E^2 Duo involves the following steps:

- Planning for IP•Tube E^2 Duo interconnect
- Installing IP•Tube E^2 Duo hardware
- Configuring System and Ethernet parameters
- Configuring IP•Tube E^2 Duo interface parameters
- Making Ethernet cabling connections
- Verifying IP•Tube E^2 Duo connection

5.2 System and Ethernet Parameters

Initial configuration items include the hostname for the specific IP•Tube E^2 Duo, as well as a login and password. See *Command Line Interface* for specific syntax requirements.

Examples:

```
host name AptosTubeE2
```

```
passwd <cr>
```

A default gateway should be defined if the IP•Tube E^2 Duo being configured is on a different IP network than the remote IP•Tube E^2 Duo:

Example:

```
default gateway 172.16.1.254
```

IP•Tube E^2 Duo IP address is configured by first entering the interface:

```
interface {lan1 | lan2}
```

Then entering the address.

Example:

```
ip addr 172.16.1.222/24
```

IP•Tube E^2 Duo destination address, called "**peer ip address**" is set to the IP address of the receiving unit.

Example:

```
peer ip address 172.16.0.222
```

5.3 QoS and UDP Port Number

Intermediary routers and switches can be configured for Quality of Service (QoS) prioritization to ensure that IP•Tube E^2 Duo packets receive highest priority as they are routed through the IP interconnect. This QoS could be configured based on the IP•Tube E^2 Duo Ethernet IP addresses, but a more straightforward method makes use of the unique UDP port number used by IP•Tube E^2 Duo.

Communication between IP•Tube E^2 Duo systems uses packets destined for UDP port number 3175. This registered port assignment, (reference www.iana.org/assignments/port-numbers), allows QoS configuration to prioritize UDP packets destined for port 3175.

This prioritization is essential for voice and other traffic which is sensitive to latency and delay on the LAN/WAN interconnection.

5.4 IP Packet Encapsulation Overhead

The encapsulation of data into IP/UDP packets for transmission over Ethernet adds overhead due to the Ethernet, IP, and UDP headers - a total of 44 bytes. This 44 byte overhead should be taken into account when considering Ethernet bandwidth utilization.

The encapsulation overhead can be expressed as a ratio of (Data + Overhead)/(Data) and can be used to calculate the Ethernet bandwidth utilization.

6 Troubleshooting

Communication and Network systems are subject to problems from a variety of sources. Fortunately, an organized troubleshooting approach usually leads to the area of the problem in short order. It is essential to distinguish between problems caused by the LAN (network system), the WAN equipment (communication equipment) and IP•Tube E^2 Duoconfiguration.

This troubleshooting section is structured with symptoms in the order the user might encounter them.

6.1 Unable to Communicate with IP•Tube E^2 Duo

Installations first require communication with the IP•Tube E^2 Duo through console access or from the network, usually the same network as IP•Tube E^2 Duo itself. Proceed through the following symptoms if you are unable to communicate with the local IP•Tube E^2 Duo using SSH, Ping, etc. IP Addressing should be double checked if accessing the unit via the network.

6.2 Ethernet/General

Cause: Network Cabling is faulty

Solution: Verify cabling is good by swapping IP•Tube E^2 Duo cabling with a known good cable and connection. Check the status LEDs on the 10/100/1000BaseT switch to confirm a good connection. If necessary, create a stand-alone LAN with just the workstation and IP•Tube E^2 Duo.

6.3 High Ethernet Error Count

Cause: Bad cabling or building wiring

Solution: Check all cabling. Swap to known good port on 10/100/1000BaseT switch or hub to troubleshoot, (testing with large Ping Packets to ascertain quality of Ethernet Connection). To eliminate issues with building wiring connect IP•Tube E^2 Duo with a known good Ethernet cable in the same room as the Ethernet hub.

6.4 Can't Communicate using SSH with the IP•Tube E^2 Duo

Cause: IP address is not set properly on the IP•Tube E^2 Duo

Solution: The Console Port (using cable included with the product) provides direct access to the command line interface of IP•Tube E^2 Duo. The Console port utilizes the CLI, detailed in *Command Line Interface*. Here the IP address can be double checked for accuracy.

Cause: Workstation not on the same subnet as the IP•Tube E^2 Duo

Solution: During an initial configuration of an IP•Tube E^2 Duo, communication should come from within the same net/subnet. With no default router, IP•Tube E^2 Duowill not be able to reply to communication off its own subnet.

Cause: IP stack on the workstation not configured

Solution: Ensure that other devices on the same LAN can be pinged, or otherwise 'seen'.

6.5 Can't communicate to IP•Tube E^2 Duo - Console Port

Cause: Baud Rate, Stop Bits, etc. set wrong on communication application

Solution: Ensure the communication software is configured for a fixed, asynchronous data rate of 115200 bps, 1 stop bit, no parity, 8 bit fixed and that the Flow control is set to none.

6.6 IP•Tube E^2 Duo Off Net IP Interconnect Verification

In most applications IP•Tube E^2 Duo will be located on different IP networks and the interconnection is through a routed connection. At each end of the routed connection the Tube's default router IP address needs to be pointed to the first router in the path to that remote IP subnet. Through an SSH connection to an IP•Tube E^2 Duo it is possible to verify the ability of the unit to ping its local default router and to ping the remote IP•Tube E^2 Duo. Note: the console port does not support the Ping Command as it does not have an IP Address.

6.7 TCP/IP Connection

An IP Ping program is the best tool for troubleshooting TCP/IP connectivity. As a sanity check, first ensure you can ping the local router. If unsuccessful, go back to "Can't Communicate using SSH with IP•Tube E^2 Duo"

6.8 Can't IP Ping Remote IP•Tube E^2 Duo

Cause: Ping workstation does not have Default Gateway (or Router) set. In the workstation's IP configuration, alongside workstation's own IP address and subnet mask, you must provide the IP address of the device (a router) to which all packets destined off the local net should be sent.

Cause: default router on the net, serving as Default Gateway for all net workstations, does not know about the remote IP net where the remote IP•Tube E^2 Duo is located.

Solution: Under these circumstances, the two IP•Tube E^2 Duo units are on different networks or subnets, the **default gateway** address must be configured.

7 Appendix

7.1 IP•Tube E^2 Duo Specifications

7.1.1 Ethernet Port

10/100/1000BaseT Ethernet

7.1.2 LAN Protocol

IP, TCP, UDP, ICMP

7.1.3 Quality of Service Support

IANA Registered UDP Port 3175

7.1.4 Upgrade Capable

IP•Tube E^2 Duo firmware upgrade via Secure File Transfer Protocol, SFTP.

7.1.5 Management

SSH support with Edit and Paste Template Files
Console Port for Out of Band Management
Remote configuration & monitoring

7.1.6 Power Supply

External 12 Volts DC, 1Amp, with standard AC plug. International power supplies available.

7.1.7 Physical

Standard 19 inch rack mount kit available
Dimensions: 6.125" (L) x 4.25" (W) x 1.125" (H)
Weight: approximately 2 lbs., excluding external power adapter.

8 Glossary

Terms and Concepts

Before using the Engage IP•Tube E^2 Duo, you should be familiar with the terms and concepts that describe TCP/IP. If you are experienced with internet routers, these terms may already be familiar to you.

8.1 General Networking Terms

Network

A network is a collection of computers, server devices, and communication devices connected together and capable of communication with one another through a transmission medium.

Internet

An internet is any grouping of two or more networks connected by one or more internet routers.

Network Services

Network services are the capabilities that the network system delivers to users, such as print servers, file servers, and electronic mail.

Addresses

Transmitting information in a network system is made possible by an addressing scheme that identifies the sender and destination of the transmission, using network and node addresses. Data is transmitted to and from these addresses in the form of packets.

Routing Table

A routing table is maintained in each router. This table lists all networks and routers in the internet and enables routers to determine the most efficient route for each packet. The routing table serves as a logical map of the internet, specifying the address of the next router in the path to a given destination network and the distance in hops. The router uses the routing table to determine where and whether to forward a packet.

Each router periodically broadcasts its routing table to other routers on each of its directly connected networks, enabling them to compare and update their own tables with the most recent record of connected networks and routes. In this way, routing tables are kept current as changes are made on the internet.

Hop

A hop is a unit count between networks on the internet. A hop signifies "one router away."

Node

Device on the network.

8.2 TCP/IP Networking Terms

SFTP

Secure File Transfer Protocol gives users the ability to transfer files between IP hosts. It uses TCP to provide connection initiation and reliable data transfer.

Host

A computer with one or more uses that can act as an endpoint of communication if it has TCP/IP.

ICMP

Internet Control Message Protocol provides a means for intermediate gateways and hosts to communicate. There are several types of ICMP messages and they are used for several purposes including IP flow control, routing table correction and host availability.

IP

Internet Protocol which routes the data.

IP Datagram

The basic unit of information passed across an IP Internet. It contains address information and data.

ping

Packet InterNet Groper is a program which uses an ICMP echo request message to check if the specified IP address is accessible from the current host.

Port

A destination point used by transport level protocols to distinguish among multiple destinations within a given host computer.

SubNet Address

An extension of the IP addressing scheme which enables an IP site to use a single IP address for multiple physical networks. Subnetting is applicable when a network grows beyond the number of hosts allowed for the IP address class of the site.

TCP

Transmission Control Protocol ensures reliable, sequential, delivery of data. TCP at each end of the connection ensures that the data is delivered to the application accurately, sequential, completely and free of duplicates. The application passes a stream of bytes to TCP which breaks it into pieces, adds a header, forming a segment, and then passes each segment to IP for transmission.

SSH

Secure Shell (SSH) is a cryptographic network protocol for operating network services securely over an unsecured network. A user can SSH from the local host to a host at a remote site.

UDP

User Datagram Protocol provides a simple, efficient protocol which is connectionless and thus unreliable. The IP address contained in the UDP header is used to direct the datagram to a specific destination host.

Well-Known Port

Any set of port numbers reserved for specific uses, with transport level protocols (TCP & UDP). Well-known ports exist for echo servers, time servers, SSH and FTP servers.