IP-E2A
E2A Telemetry Interface Application
User's Manual

Build #4

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APPLICATIONS, INC

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Introduction

The E-Telemetry systems, with its associated central and remote equipment, was introduced originally for the purpose of centralizing alarm collection, effecting remote controls, elimination of staff from rural buildings, and utilizing the remaining maintenance staff in a more effective manner.

As technology advanced, E-Telemetry was used, with several central units, and a multitude of remote units. The E-telemetry units were for surveillance and control applications in the areas of switching, distribution, and interoffice facility management.

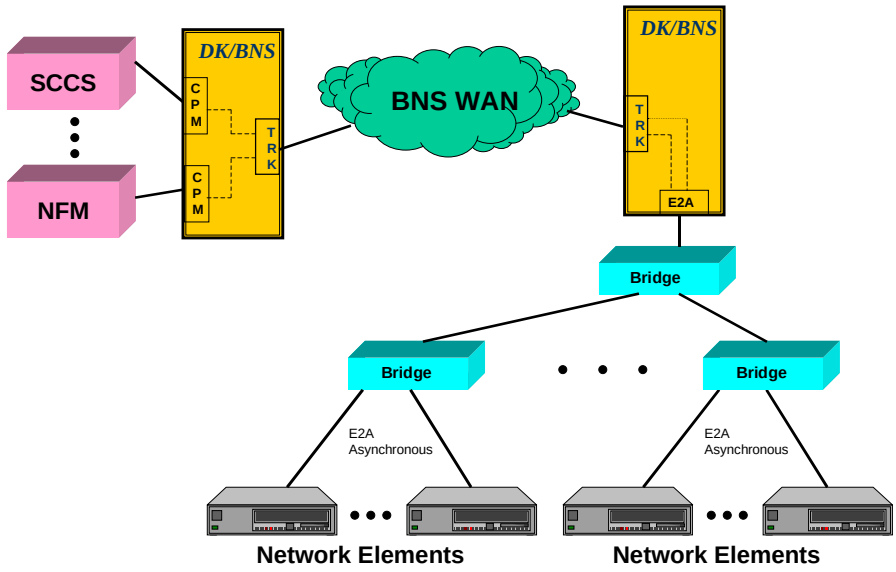
The central units were originally manual and not capable of managing numerous remote units. The later central units became rather large minicomputer based operations systems.

The remote units also evolved from a collection of discrete components to microprocessor based units. There are two basic functions of the remote units. The first is to monitor the binary states of alarm points supplied as relay contacts, and transmit these monitored states back to the operations systems on demand. The second is to provide relay closures to the monitored equipment under the control of the operations system.

The E-Telemetry protocol is used to join the central operations systems and remote units.

The following is a typical diagram of the E-Telemetry system as it is deployed:

NE Telemetry Data Link via E2A
Typical Deployment

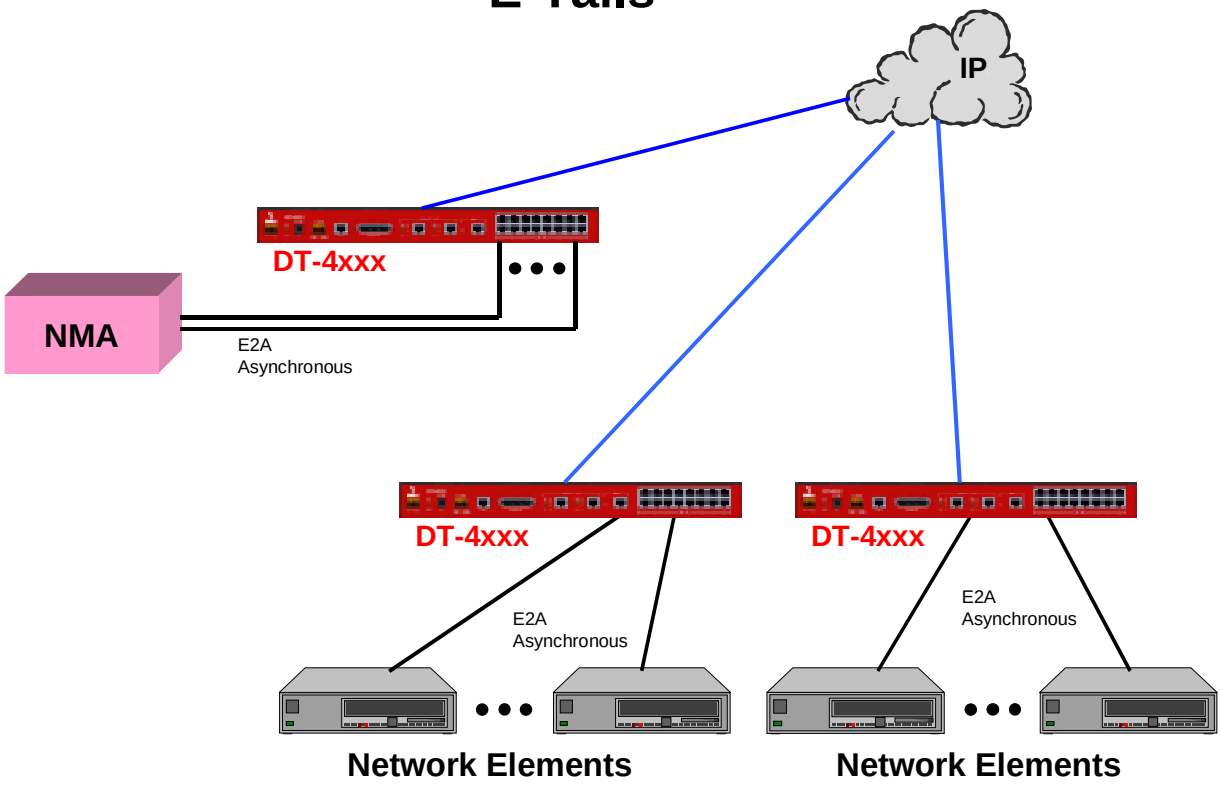


The operations system communicates with a central access point for a set of network element on a bridge network. This is a serial port an a BNS/Datakit E2A card, or it may be a direct interface on the host if there is no BNS/Datakit network present. The central access point is attached to one or more tiers of bridges to broadcast the message to multiple network elements. In some installations, these bridges are actually 202T data sets configured as a half duplex multi-drop distribution net.

The distribution scheme works well for the E-telemetry interface, but diagnosing problems can be exceptionally time consuming with a multi-leg multi-drop bridge network. This paper attempts to address those problems by the eventual elimination of the bridge network.

One approach to the elimination of the bridge network is to centralize the bridge functions, and distribute individual tail circuits to each remote device. Of course, if this were done physically; the cost would be prohibitive. However, it makes sense to do it logically. Consider the following solution:

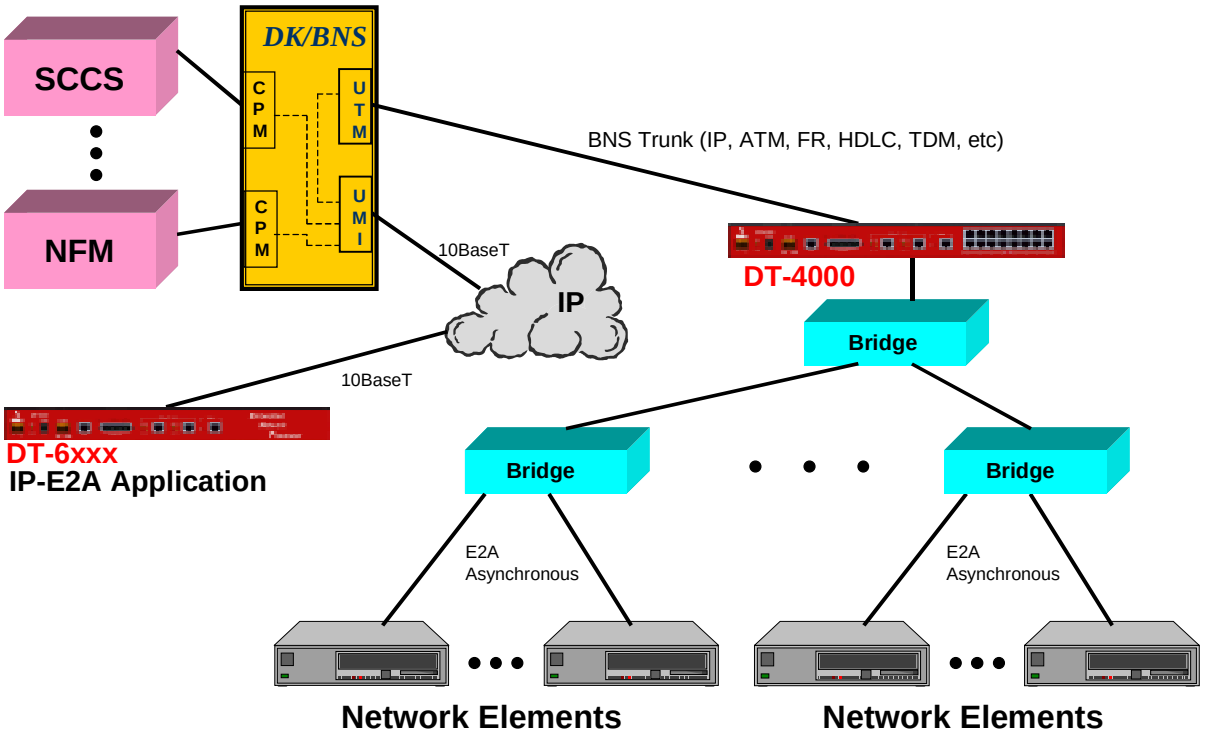
Using a DT-4xxx for Transparent E2A Telemetry Transport "E-Tails"



In the diagram above, the bridge exists at the OS head. Individual tail circuits are used to each network element. However, instead of a physical connection; the **DT-4xxx** is used for a logical connection using an embedded network. Each of these tail circuits (called E-Tails) can be individually diagnosed without affecting the others.

Another approach would be to replace the E2A ports on the Datakit feeder network and provide a drop-in solution to the bridges themselves. This requires the following configuration.

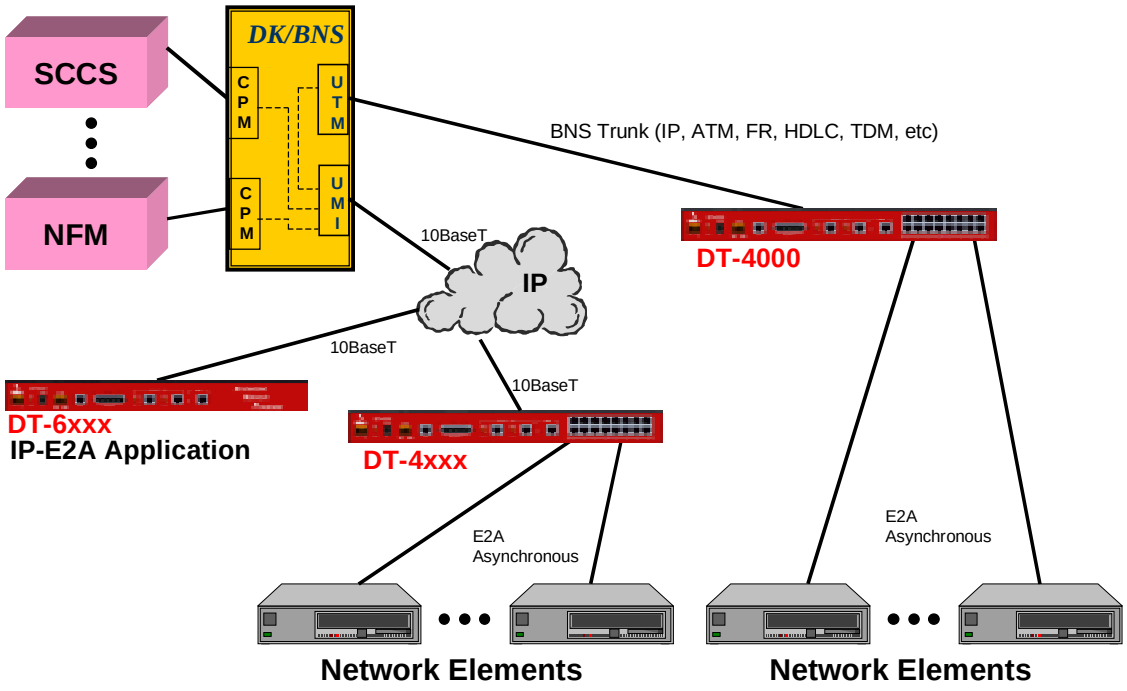
NE Telemetry Data Link via E2A
Drop-In Replacement for Legacy BNS E2A Card



In the diagram above, the **DT-6xxx** is executing the **IP-E2A** application that interfaces to the SCCS and NFM operations system without changes. As far as these operations systems are concerned, they are communicating via a Datakit E2A port. This allows a smooth and effective migration of these components.

Since the IP-E2A application is also able to handle the functions of the entire bridge network, the DT-4xxx E-tails solution can be used to provide an effective telemetry network with diagnostics. This is shown below:

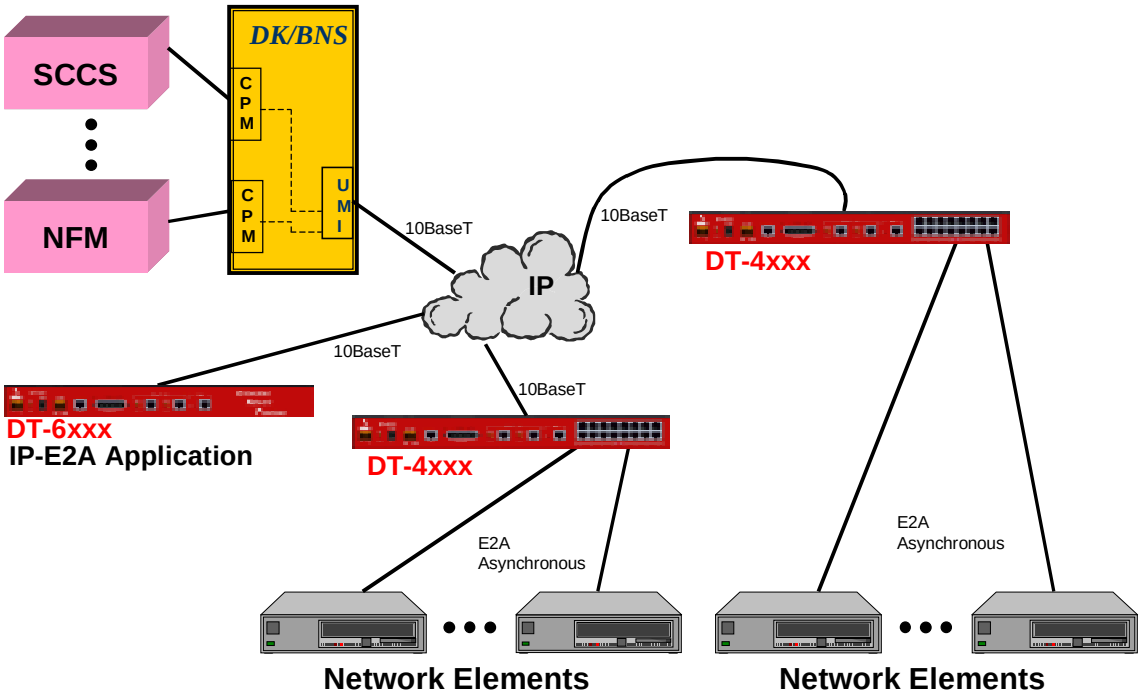
NE Telemetry Data Link via E2A
Drop-In Replacement for Legacy BNS E2A Card
IP-E2A Performs Bridge Function



It should be noted that the functionality may traverse several network types. In the example shown above, both BNS and IP networks are being used. One DT-4000 is acting as a native BNS device, and another is acting as an IP native device. The interaction is completely seamless.

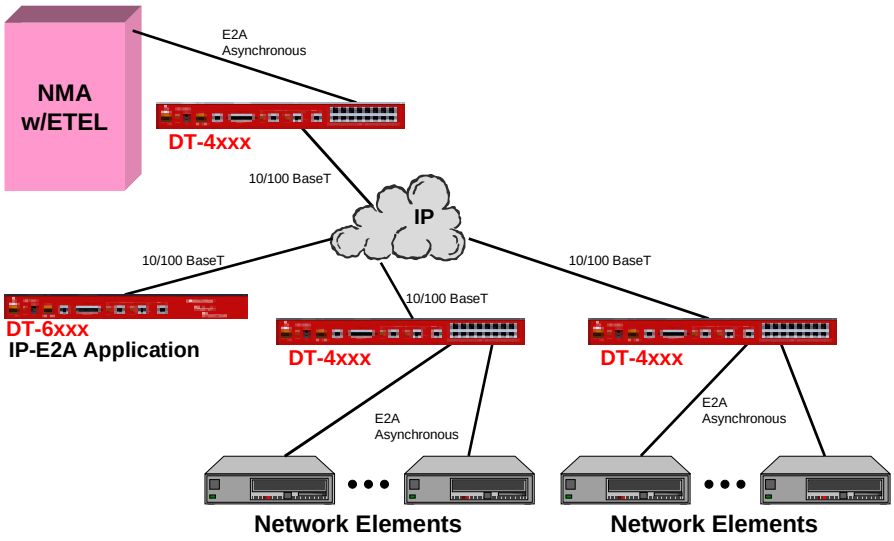
Of course all devices can be IP native. The exception is the host interface which is has the requirement of not being changed. This requires only one BNS connection at the host site. All other components use the IP network. This is shown below:

NE Telemetry Data Link via E2A
Drop-In Replacement for Legacy BNS E2A Card
IP-E2A Performs Bridge Function



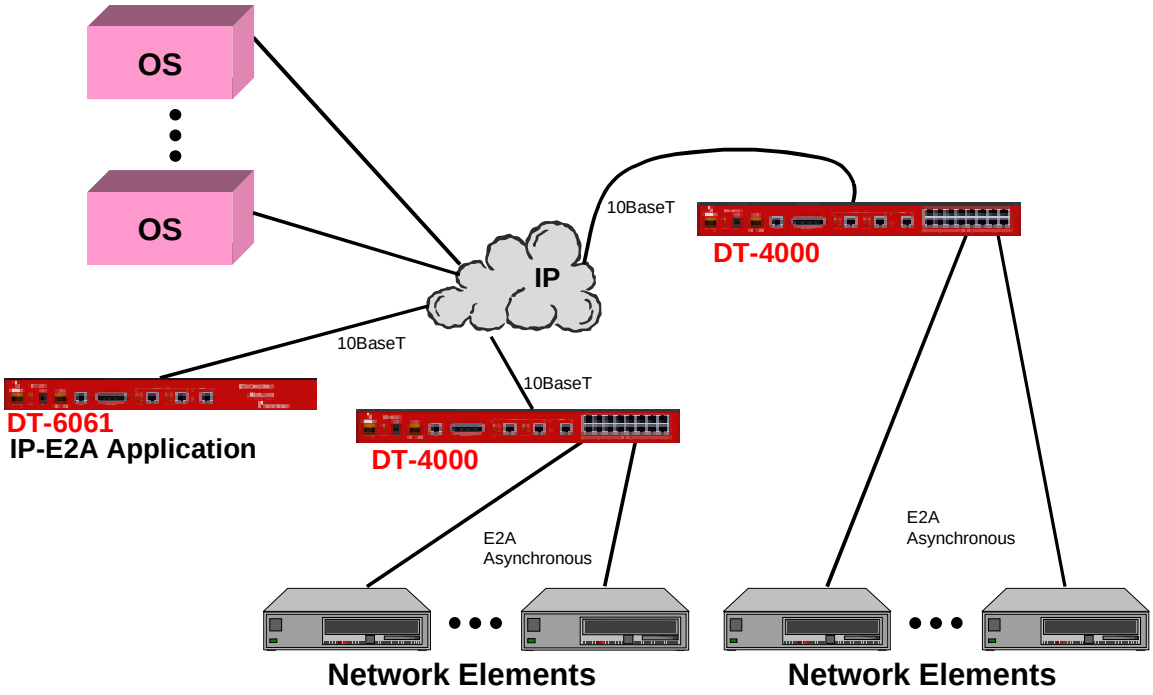
There may be a situation where an OS, such as NMA, provides support for E2A endpoints with dedicated hardware. The NMA OS also supports the virtual interface. However, should the dedicated hardware interface be desired, the deployment would be as follows:

NMA Serial E2A to NE Serial E2A via IP-E2A
IP-E2A Performs Digital Bridge Function



Finally, some hosts will use a native interface to the IP-E2A application. No BNS network is required at all.

NE Telemetry Data Link via E2A
IP-E2A Performs Bridge Function



The intent of the **IP-E2A** application, and the E-Telemetry features of the **DT-4xxx** are to provide a simple and effective migration scheme for this very important interface.

IP-E2A Features

This section defines the features of the **IP-E2A** application. This is done as a list, but some features require further elaboration.

- Support for one Host E2A interface per instance. The E2A interface is typically originating on a Datakit CPM module, and a virtual port on a UMI is used to connect the host to the **DT-6xxx IP-E2A** instance.
- Up to 64 bridge E-tails per instance of the **IP-E2A** application.
- Support for the BNS E2A port protocol. This eliminates any host software changes.
- Automatic configuration of the **DT-4xxx** ports set up for E-Tails.
- Up to 30 instances of the **IP-E2A** application may be present on the same **DT-6160,** or **DT-6061**.
- Up to 48 instances of the **IP-E2A** application may be present on the same **DT-6260**.
- 1 Configuration Console is available to be used by the **IP-E2A** administrator for configuration, diagnostic and measurement purposes.
- The **IP-E2A** application requires **no** configuration for proper operation.

Suggested Reference

The following documents are resident at http://www.datatekcorp.com under the documentation button.

Document	Scope
DT-6xxx Platform User's Manual.	Describes the **DT-6xxx** Embedded Network Processor infrastructure and command set. This includes configuration information, hardware specifications, and SNMP MIB support. The **DT-6xxx** is the infrastructure on which the **IP-E2A** application shall reside.
DT-4000 User's Manual. **DT-42xx** User's Manual.	Describes the **DT-4xxx** multi-protocol access device. The **DT-4xxx** is used as the interface for physical serial connections to the E-Telemetry devices.
DT-6xxx Redundant Operation White Paper.	Describes the method of operating the **DT-6xxx** in a 1+1 sparing configuration. **Note**: *This paper is not posted on the above site. Contact the author for a copy via email.*

IP-E2A Interfaces

The TCP port numbers associated with a **DT-6xxx** application are normally referenced by which **instance** the application is installed. The **IP-E2A** may be installed on any of the 30 **instances** of the **DT-6061** or **DT-6160**, or on any of the 48 instances of the **DT-6260**.

Consult the **DT-6xxx** infrastructure manual for information on how to install an application.

The TCP Numbers associated with the **IP-E2A** application instance are as follows:

Set	**#Channels**	**TCP Port#**	**Usage**
OA&M	1	10000 + **Instance#**	Administration of the **IP-E2A** application. This is the standard configuration TCP port number for a **DT-6xxx** application. For example, instance #1 is 10001, instance #2 is 10002, and so on. Connections to this TCP port are made via a Telnet client.
Host	1	30000 + (200 * **Instance#-1**)	There is a single connection to the Operations System host. For instance #1, this is 30000, for #2 it is 30200, through instance #30 at 35800.
E-Tails	64	30000 + (200 * **Instance#-1**) + 1.	There are up to 64 E-tail connections. Each E-tail may be connected to a **DT-4xxx** port. The **DT-4xxx** port is automatically initialized at connection. All 64 E-tails are considered a single bridge network.

Serial Host	1	30000 + (200 * **Instance#**-1) + 2.	There is a single serial host connection per instance. The serial host connection is mutually exclusive with the OS host connection on the same instance. The Serial Host is expected to be connected to a **DT-4xxx** device that is serially attached to the host E2A port.

IP-E2A Command Set

Input Conventions

All parameters may be given on the command line. Parameters of the form **name=<value>** may be given in any order.

Commands may be entered in upper or lower case.

Parameters of the form **name=value** may use upper or lower case for **name**.
Default values, if any, are shown in parenthesis as part of the prompt.
Case is preserved for values. Backspace erases one character.

Login

Syntax: login PASSWD=<password>

The login command is used to allow access to the other configuration commands.

The login command is only visible when the application is in the *logged out* (i.e. secure) mode. The unit enters this mode whenever a *logout* command is issued or when the Telnet to the application instance OA&M TCP port is interrupted for any reason.

The password is not echo-suppressed. The password consists of up to seven alphanumeric characters. Special characters are not allowed.

The default password is “initial”.

Logout

Syntax: logout

The logout command is only allowed if the console user is logged *in*. It uses no arguments. It will set the console to the logged *out* mode.

Change Password

Syntax: chgpass PASSWD=<old> NEWPASS=<new> CONFIRM=<new>

The **chgpass** command is used to change a user password on the system console. The command is only allowed if the user is logged *in*.

All three parameters must be given on the same line as the command. None of those entries are echo-suppressed.

If the current password is valid, and the two entries for the new password match, the password is changed to the new value.

Help

Syntax: help |? [Command]

The **help** command is always visible. The help command displays the currently allowed commands for the mode that the unit is currently entered. The alternate command for help is a question mark.

Version

Syntax: ver

The **version** command is only visible when the application is *logged in*. The command has no arguments. It displays the current software and database revisions of the application.

Verify of Configuration

Syntax: vfy

The **vfy** command is only visible when the application is *logged in*. In the **IP-E2A** application, the **vfy** command does not require arguments. The **vfy** command displays the relevant configuration of the **IP-E2A** application instance.

Display of Measurements

Syntax: dmeas < ALL | RMT <RANGE> >

The **dmeas** command is only visible when the application is logged in. The command is used to display the current measurements on any of the interfaces.

The **dmeas** command always display the measurements for the common elements of the **IP-E2A** application.

The **dmeas** command may display the measurements specific to one or more remote E-tails by using the **RMT** argument. The **<RANGE>** is the remote endpoint list for which measurements are required. The value of **ALL** shall yield measurements for all of the remote endpoints.

Displaying Current Connections

Syntax: dc

The **dconn** command is used to display all of the current connections into the **IP-E2A** application.

Please note that the command does not require any arguments. The command will issue a report that shows the connection peer for each active connection.

Snooping on Traffic

Syntax: snoop [OFF | HOST | RMT <Range>]

The **IP-E2A** application has a diagnostic ability to snoop on any of interfaces which carry data. This is done with the **snoop** command. All output is directed to the OA&M connection.

If the command is invoked with no arguments, it produces a report of all active snooper configurations.

If the command is invoked with the **OFF** option, all of the active snooper configurations are disabled.

If the command is invoked with the **HOST** option, the OS Host interface snooping is enabled. This option also enables snooping the serial host interface, if such is used.

If the command is invoked with the **RMT** option, the specified remote E-tail connections are snooped. A range of remote E-tails may be specified.

E2A Address Maps

Syntax: map [ADDR | TIMEOUT | CLEAR]

The **IP-E2A** application creates and manages a dynamic E2A address map. This allows the remote E-Tails to be positioned anywhere in the bridge chain, and not necessarily at the end device. Further, it does not require any configuration due to its dynamic nature. The address map is used to send the E2A traffic to just a single remote and thereby minimize the network overhead.

The **map** command will display the dynamic E2A address map. All 256 E2A addresses on the virtual tree are displayed in a 16 x 16 grid. The value of "." indicates that this E2A address is not known at the present time. A numeric value indicates the remote number that contains that E2A address. Note that a remote number may contain just one address, the entire E2A address range, or any other permutation. E2A addresses are unique and will never be contained by more than one remote.

When the **map** command is invoked without arguments, it will display the E2A address map. This is exactly the same function as if the **addr** argument has been provided.

When the **map** command is invoked with the **timeout** argument, a similar 16 x 16 grid is displayed that contains the number of message timeouts from the remote since last cleared. In the timeout grid, the value of '.' represents the value zero, and '*' represents a value greater than 99. Numeric values were not used for zero to enhance readability as this grid tends to be sparse.

When the command is invoked with the argument of **clear**, both the address map and timeout grid are manually cleared. All of the E2A address are then acquired dynamically and the map is rebuilt.

The address map has a diagnostic ability to snoop on any of interfaces which carry data. This is done with the **snoop** command. All output is directed to the OA&M connection.

Clear Measurements

Syntax: clr < ALL | HOST | RMT <RANGE> >

The measurements displayed with the **dmeas** command are aggregated until cleared. The **clear** command will set measurements to zero. When the target is **ALL**, the OS Host interface and all of the remote E-tail connection measurements are cleared. When the target is **HOST**, only the OS Host and common aggregate measurements are cleared. When the target is **RMT**, a range of E-tail ids indicates which connections are to have the measurements cleared.

Prompt Labels

Syntax: label [word (no spaces) | NONE]

The prompt on the application console may be customized with a label up to eight characters in length. The value of **none** deletes any existing label on the prompt. The current configuration is displayed during a *verify configuration*, by invoking the **label** command without arguments, or merely by the prompt display.

Application Comments

Syntax: comment [L1="Any Comment"]
[L2="Any Comment"]
[L3="Any Comment"]

The **IP-E2A** application may have comments which are displayed with the *verify configuration* command. Up to three lines of comments are available. Each line may have a comment up to 64 characters in length. Each comment is double quoted to allow for spaces to be embedded. A comment with no characters (i.e. "") is used to delete a comment which is not desired. It is not necessary to delete prior to adding a new comment. The new comment shall replace the existing comment at the line specified.

IP-E2A Measurements

This section itemizes the measurements available using the *display measurements* (**dmeas**) command.

The base measurements are always displayed, and the error and exception counters are only displayed if nonzero.

The measurements available are as follows:

Measurement Description	**Type**
Number of Bytes Received	Base
Number of Bytes Transmitted	Base
Number of IP Packets Received	Base
Number of IP Packets Transmitted	Base

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