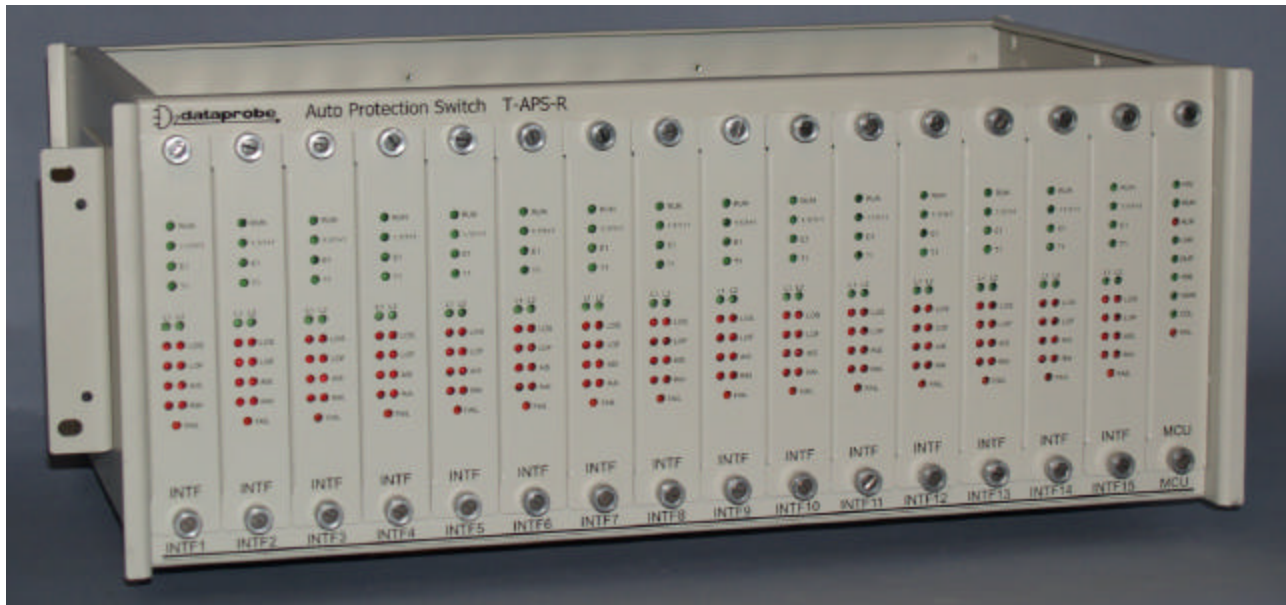




## T-APS-R T1/E1 Protection Switch 1150069

### General Description

Dataprobe's Model T-APS-R Automatic Protection Switch allows for protection of T1 or E1 circuits. The Model T-APS-R can be used for protecting switch full or fractional services, as well as single ended applications. The unit can be configured for use in Framed or unframed network protocol applications. It is designed for use with redundant circuits and automatically switches paths in order to maintain service. The T-APS provides both serial and Ethernet connectivity for remote access and is SNMP compatible. Local and remote alarm notifications are provided for circuit failures.



T-APS-R15 Nest Front View, shown with 15 line cards and MCU

### Features

- T1 or E1 interface selectable
- 1+1 or 1:1 automatic switching.
- End to end or end to C.O. auto-switching capability.
- Redundant CPE switching to single T1/E1 line.
- Selectable alarm threshold and switching activation thresholds.
- Configurable via RS-232 serial port or Ethernet Network.
- SNMP Management.
- Both active and standby line status monitoring.
- Power fail – card service bypass circuit.
- Alarm status and history via serial interface.
- T1/E1 circuit failure master alarm relay output.
- Nest expansion capability using single IP address.
- Dual Power Inputs -48 VDC, optional 90 ~ 250 VAC.

REF: K3/T-APS-R\_1150069 V3.7 V060602D.DOC



Technical Support: 201-934-5111  
Main: 201-934-9944

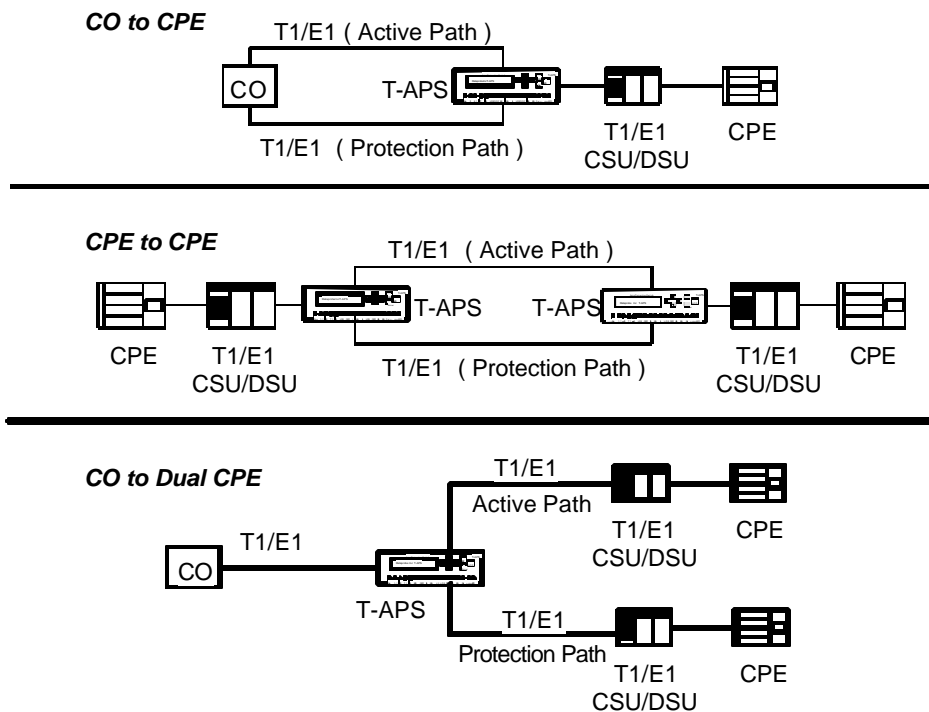
tech@dataprobe.com  
Website: dataprobe.com

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## Typical Applications

The T-APS can be used in end-to-end or customer premise to C.O. configurations.



## LED Indicators

### MASTER CONTROL UNIT - MCU Card

- +5V:** Power On.
- Run:** Blinking - MCU operating properly.
- ALM:** On - Line Card failure.
- LNK:** On -Network Link connected.
- DUP:** On - Full Duplex, Off - Half Duplex.
- 10M:** 10Mb network speed.
- 100M:** 100Mb network speed.
- COL:** Network Collision.
- Fail:** MCU card failure.

### T1/E1 Interface Line Card - (INF)

**RUN LED:** While running properly, the RUN display light should be blinking.

**1+1/1:1 LED :** The LED will be on when the units are set in the 1:1mode. The 1:1 LED is off when the units are set in the 1+1 mode. While the LOOK IN function setting is ON, the 1:1 LED will be blinking when the CPE side had a fault.

**E1 LED:** It will be on in the E1 setting.

**T1 LED:** It will be on in the T1 setting.

**L1 LED:** It will be on if L1 is on active path.

**L2 LED:** It will be on if L2 is on active path.

### Blinking events:

First setting the L1 as the active and L2 as protection path, the L1 light will be on and L2 light will be off. In the event of automatic switch to L2, the L2 light will flash quickly before L1 light turns off. The L2 light will then be on and L1 light off if switching succeeds.

In the event of fault from CPE side in L1 active and L2 protection path setting, the LOOK IN Function will apply (see Setup, Selection B LOOK IN ). Setting the LOOK IN Function On will indicate the CPE side fault by showing L1 light on and 1:1 LED light blinking.

In the event of L2 protection path fault, the fault is also indicated as L1 light on and L2 light blinking. The fault from CPE failure or L2 fault can be easily distinguished by MEASURE ERROR RATIO function.

**LOS LED:** Loss Of Signal light will be on if the connection is lost of signals.

**OOF LED:** Out of Frame light will be on if the connection is out of frame.

**AIS LED:** Alarm Indication Signal light will be on when alarm signal received.

**RAI LED:** Remote Alarm Indication light will be on when remote unit fault received

**Fail LED:** Failure Light will be on if a system fault or a circuit failure occurs.

# Installation

## Nest Shelf

Turn off power source until all connection are completed.

### Power

Connect -48VDC from A source and B source (if available) to terminal block positions marked -48A and -48B located on the upper left rear of the chassis. Connect the +48VDC return for each source to the terminals marked GND (A) and GND (B) respectively. Connect the frame ground to position marked FGND.

An external 110-220VAC AC power supply option is available for powering the T-APS-R-15 on AC power source. Dataprobe Item# 1930073

### Network

Connect your network to the 8 wire modular jack marked **LAN** located on the lower left rear panel using a pin to pin, non reversing cable. Wiring detail is shown below.

### Serial

Connect an RS232 DTE terminal device to the RJ11 jack marked **COM** located on the left side of the rear panel. See wiring detail below

### Expansion

An RS-485 BUS is provided for expanded the communication bus to multiple nests. Be sure to connect point A to point A, point B to point B, from HOST / MASTER to each SLAVE SHELF and SW1 is correctly set.

### Alarm Contacts

Alarm contacts are provided on the rear panel for indicating a hardware failure alarm (NC-COM). Additional alarm information is available thru the network or serial ports

## T-APS-R-15 Rear Panel Connections

### T1 / E1 RJ45 PIN Assignments::

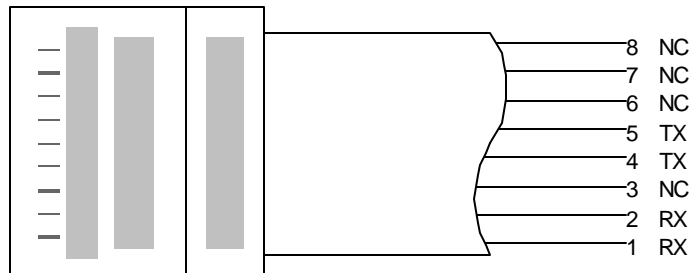
#### CPE, L1, and L2

CPE: Customer Premise Equipment

L1: Line 1, Active Path

L2: Line 2, Protection Path

Pin	Assignment
1	<b>Receive Data</b>
2	<b>Receive Data</b>
3	No Connection
4	<b>Transmit Data</b>
5	<b>Transmit Data</b>
6	No Connection
7	No Connection
8	No Connection



### RS232 Serial Port

Pin	Assignment
1	No Connection
2	No Connection
3	No Connection
4	<b>Signal Ground</b>
5	<b>Receive Data</b>
6	<b>Transmit Data</b>
7	No Connection
8	No Connection

### Ethernet Network

Pin	Assignment
1	<b>Transmit +</b>
2	<b>Transmit -</b>
3	<b>Receive +</b>
4	No Connection
5	No Connection
6	<b>Receive -</b>
7	No Connection
8	No Connection

### RS-232 Setup Port

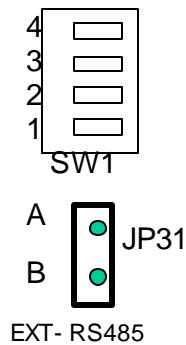
The Setup Port can be used to set the parameters of the T-APS-R. You can access the Setup Port using a VT100 terminal, or PC running terminal emulation software (like Hyperterminal).

The RS-232 port settings are: 9600bps, 8 Data Bits, 1 Stop Bit, No Parity ( 9600 N 8 1) Once you connect to the T-APS-R, press the Escape Key (Esc) to display the password prompt. Enter the Password and press Enter. The main system configuration menu is displayed.

**Factory preset password: PASS**

### RS485 Expansion Connection and Setting

An RS-485 BUS is provided for expanded the communication bus to multiple nests. Be sure to connect point A to point A, point B to point B, from HOST / MASTER to each SLAVE SHELF



DIP SW1 sets the address (master/slave) when connecting multiple T-APS-R nests using one IP. When cascading multiple nests, master T-APS-R Nest must have the DIP Switch set as 0 0 0 0. Up to eight T-APS-R nests can be connected thru the host. DIP SW1 chart: 1 = ON

SW1	Host	1	2	3	4	5	6	7
4	0	0	0	0	0	0	0	0
3	0	0	0	0	1	1	1	1
2	0	0	1	1	0	0	1	1
1	0	1	0	1	0	1	0	1

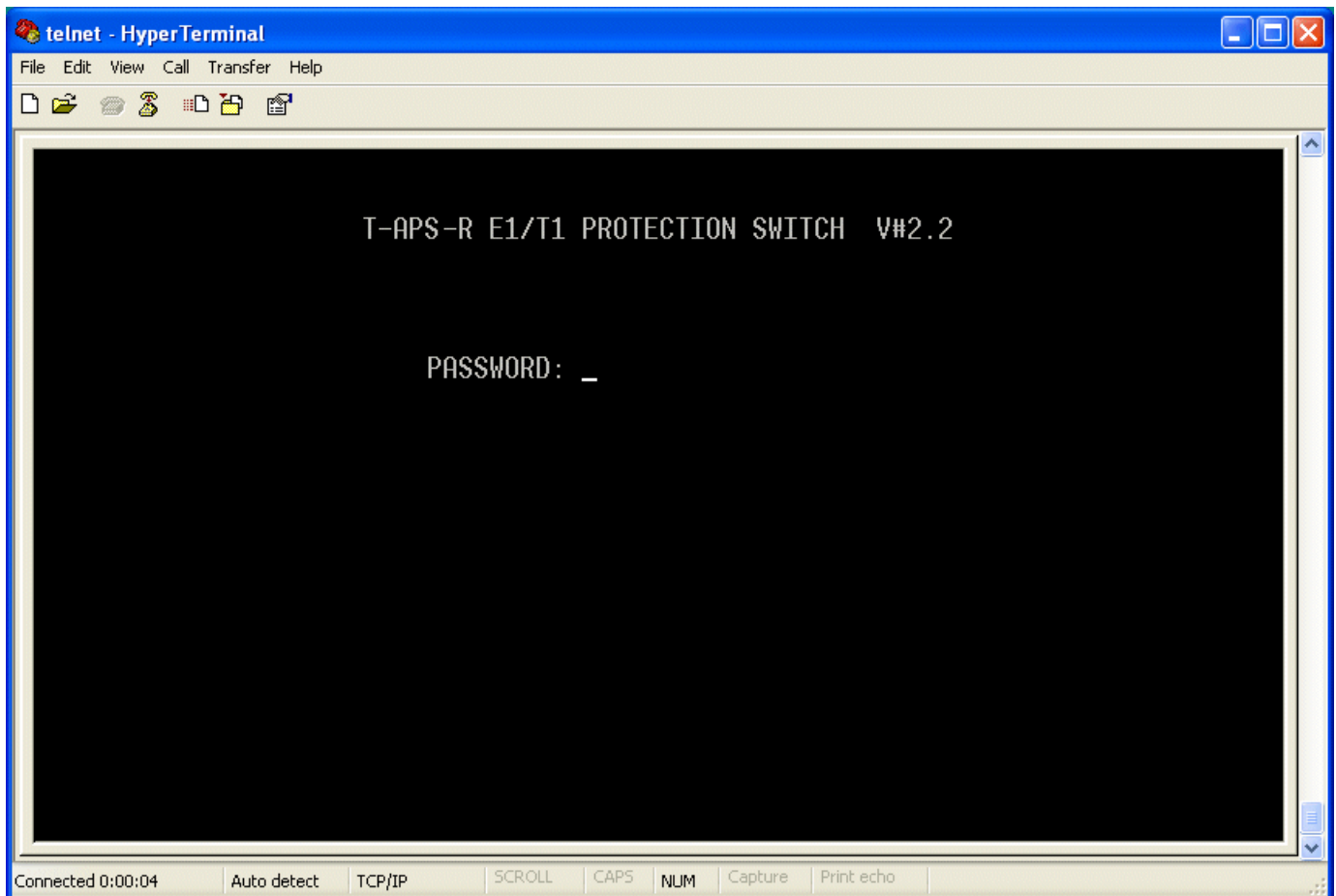
## Setup & Operation

### Terminal or Telnet

T-APS-R provides RS-232 (CIT) and LAN (OS) interfaces to support VT100, Telnet, and SNMP for remote access. This provides access to both master host nest shelf and any additional slave nest shelves connected. Programmable setting includes: Set TX and RX monitoring threshold values, manual or automatic switch, date, time, IP Address, and change Password.

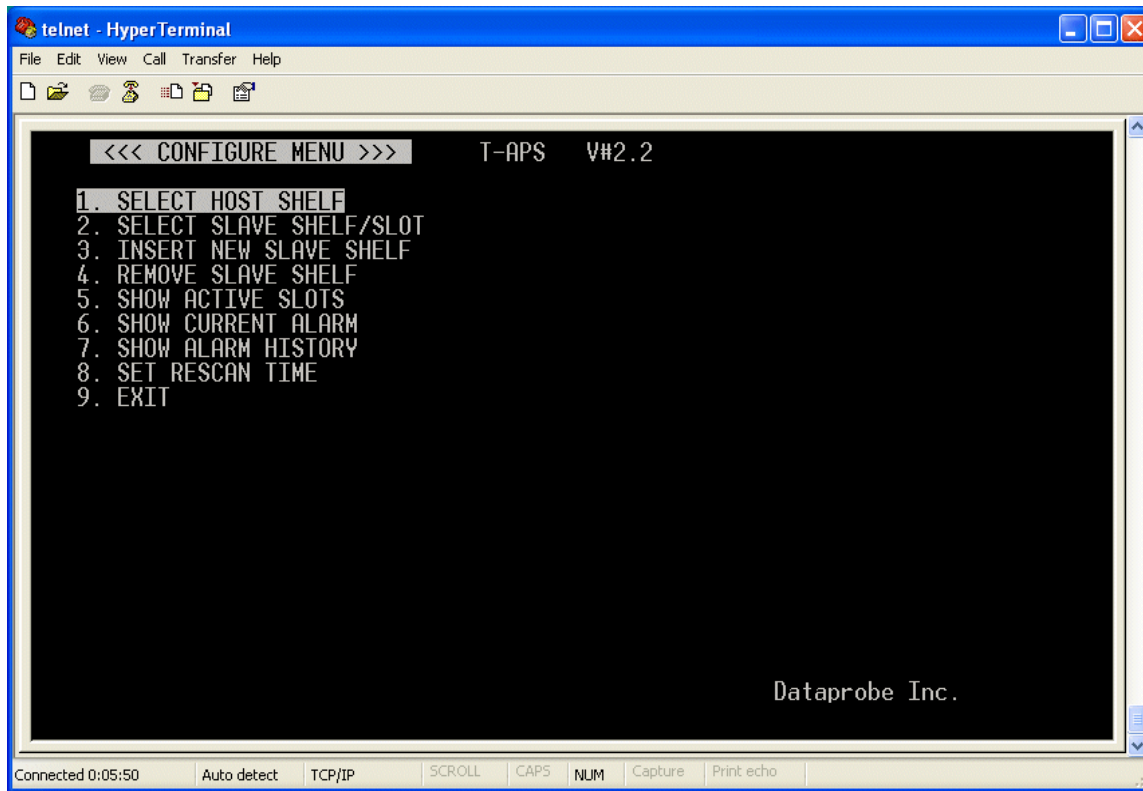
### Setup

**Enter Password – Factory Default = PASS**



# Setup Structure

## Configuration Menu



### Select Host Shelf Menu

Selects the Master Host Shelf Nest for Configuration and Setup

### Select Slave Shelf/Slot

For stacking multiple T-APS-R T1/E1 protection switch units, Select Number range 2~8, and Slot Number 1~15. Example: "2, 15" means Shelf 2 Slot 15.

### Insert New Slave Shelf

To stack multiple T-APS-R T1/E1 protection switch units, Insert new slave shelf address range from 2~8 as slave shelf.

### Remove Slave Shelf

For stacking multiple T-APS-R T1/E1 protection switch units, Remove slave address range from 2~8.

### Show Active Slave Shelf

Display and Show Active Slave Shelf.

### Show Current Alarm

Show Current Alarm status.

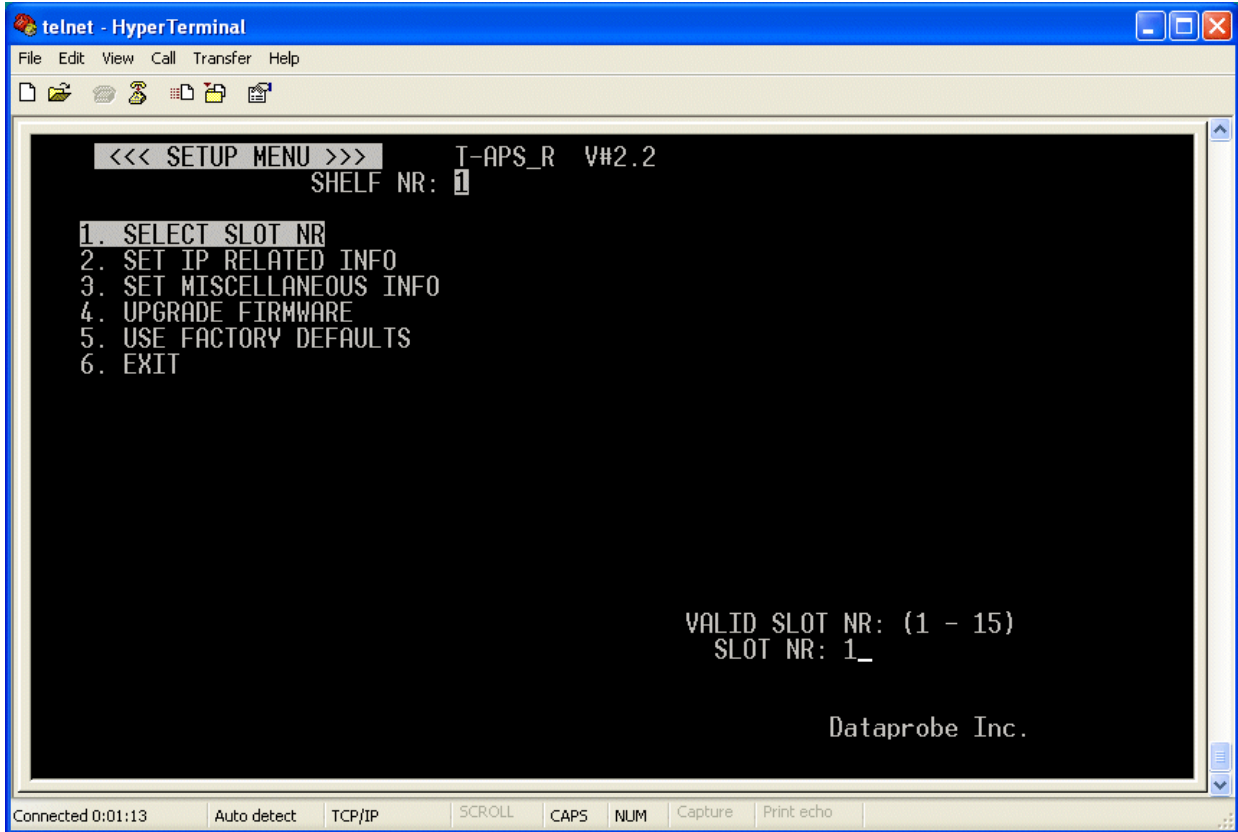
### Show Alarm History

1. Show Alarm History.
2. Clear All Alarm History

### Set Rescan Time

Master T-APS-R will use the set rescan time to scan its slave units if the slave units had been removed or replaced, the scan result will be displayed in Show Active Slave Shelf. Default setting is 5 Minutes.

## Exit Setup Menu – Host Shelf



### Select Slot NR

Select Card 1 – 15 to access individual card settings.

## Set IP Related Information



Note: All IP Related Information must be set in order for SNMP to run properly.

1. Set Gateway Address
2. Set Subnet Mask
3. Set Source IP
4. Set TFTP Server IP (Future Firmware Upgrades)
5. Set NTP Information
6. Set NTP Sever IP Address
7. Set Time Zone
8. Set Daylight Saving – Enable or Disable
9. Synchronize host time

### SET TRAP IP

Insert up to two Trap IP address for alarm trap reporting.

Default IP address, “0.0.0.0” for disable.

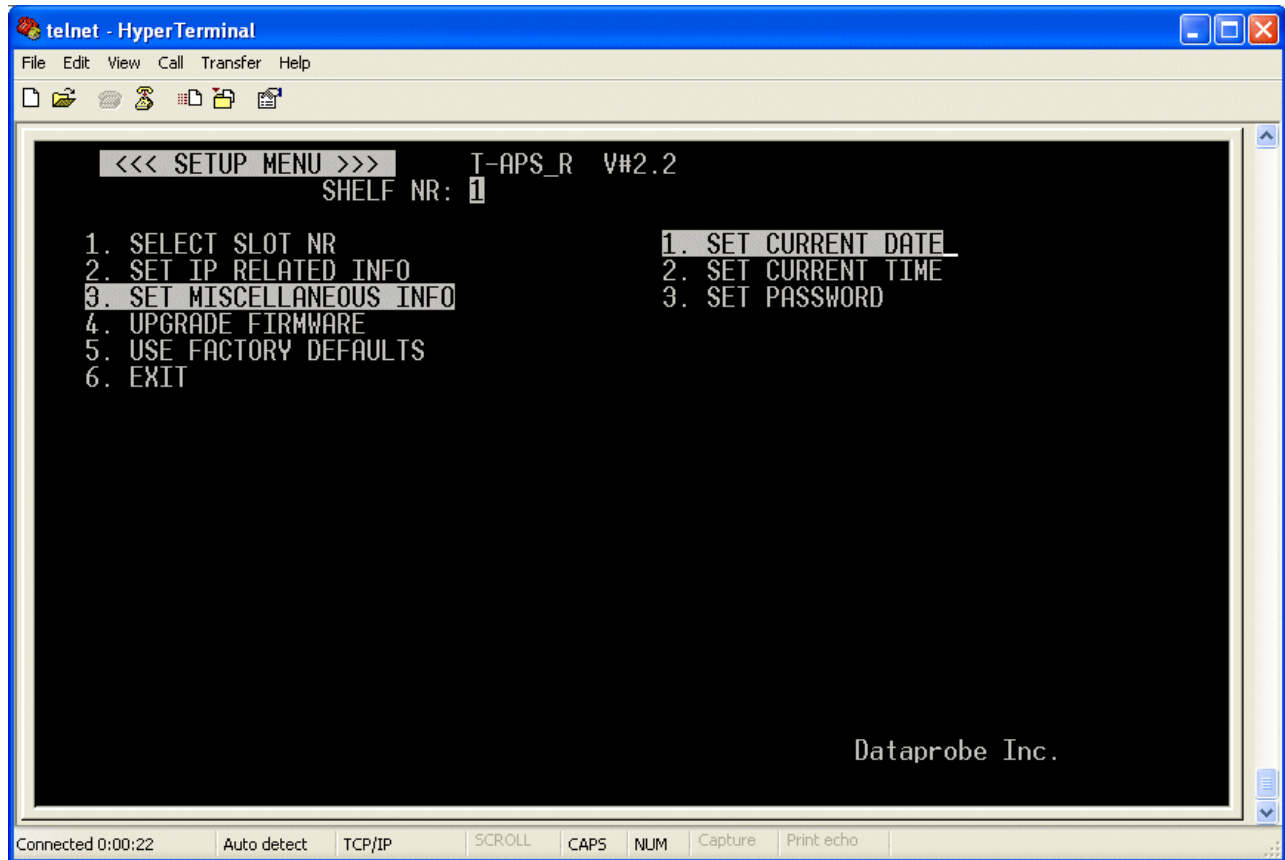
### SET COMMUNITY STRING

Set Community String for SNMP SET, SNMP GET, and SNMP TRAP password.

### SET DHCP INFORMATION

1. Enable/Disable DHCP
2. Set Client Name
3. Show DHCP Given Information.

## SET MISCELLANEOUS INFORMATION



### SET PASSWORD

Set configuration password. Default password: PASS

### Upgrade Firmware

This feature provides the ability to download the latest firmware for T-APS-R.

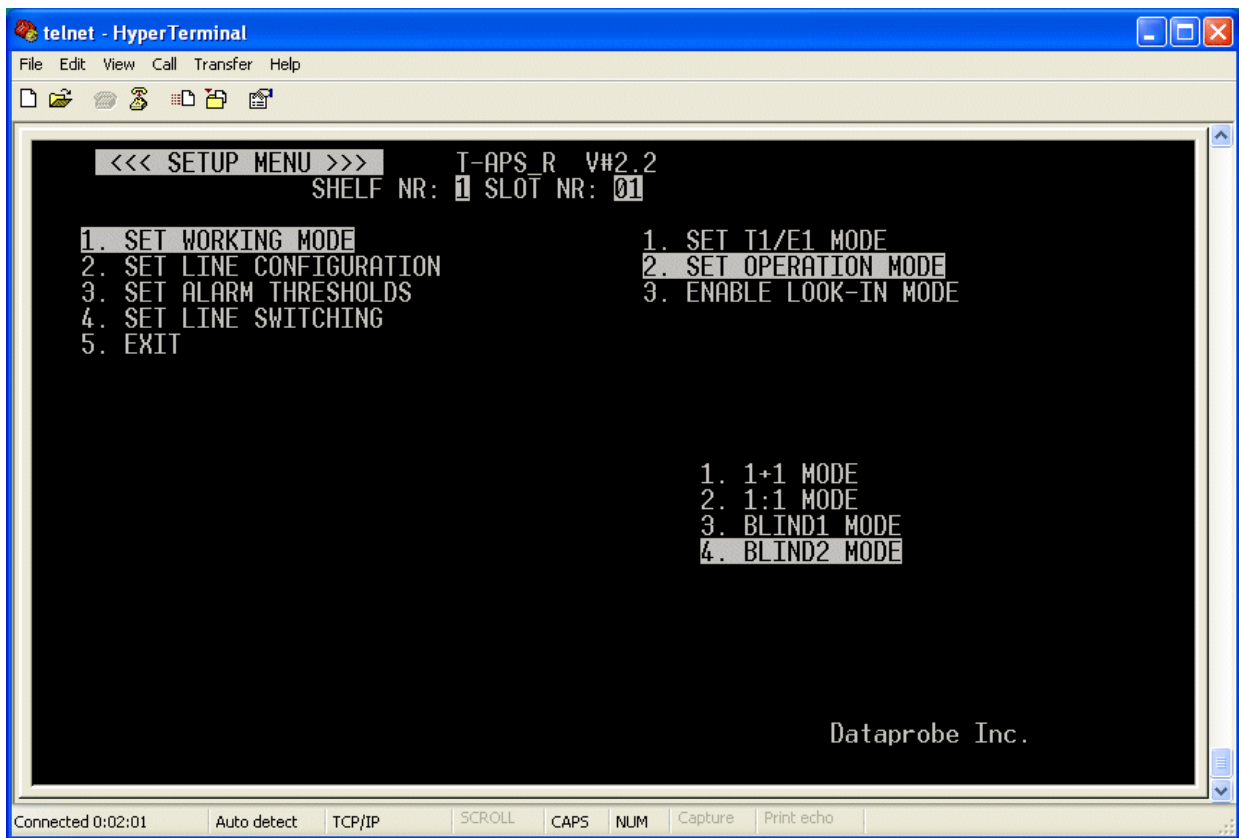
### Use Factory Defaults

### Exit & Save Host Shelf Setting

This will display the current setting for the card nest just accessed and then confirm your intent to exit the system.



# Line Card - Setup Menu



## Set Working Mode

**Set T1/E1 Mode** - Select T1 or E1.

### Set Operation Mode

**1+1** End to End or Single Ended Full T Service application. Data sent on both Active and Protection Path. T-APS duplicates CPE Tx data on both lines and the better quality line is selected at each end.

**1:1** End to End Fractional T Service application. Data sent on Active Path. Protection Path used for circuit performance and communication between T-APS units. Units use the same line at each end.

**Blind 1** Independent operation. T-APS communicates to remote site on unused path to monitor circuit performance. Can be used with other APS type devices. Monitors for loss or degradation of CO signals on Active line and transfers to Protection Path. Monitors status or Protection Path from LOS only when the path not in use.

**Blind 2** Independent operation. No communication between T-APS unit or equipment at remote site. Can be used with other APS type devices. Monitors for loss or degradation of CO signals on Active line and transfers to Protection Path. Does not monitor condition of Protective Path when not in use.

## T1/E1 Auto Protection Switch 1+1, 1:1 or Blind Comparison Chart

Item	Function	1+1	1:1	Blind 1	Blind 2
1	Switching Time (within)	12ms	25ms	12ms	12ms
2	Ability to retrieve protection path status (Good or Bad) from CO or CPE.	No	Yes	No	No
3	Ability to provide protection path status (Good or Bad) from LOS only	Yes	Yes	Yes	No
4	Manual switching to working path on both ends (CO or CPE)	No	Yes	No	No
5	Single Ended Application	Yes	No	Yes	Yes
6	Duplicate CPE Signal in both Active and Protective Path	Yes	No	Yes	No

Note: Referring T-APS installed in both CO to CPE sides

CO: Central Office

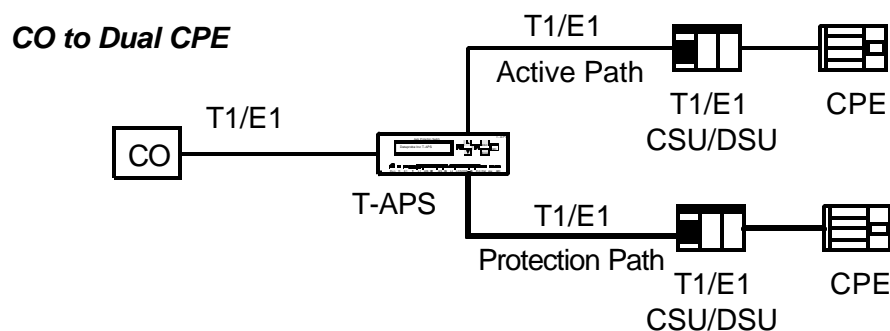
CPE: Customer Premises Equipment

### Redundant CPE Applications

The T-APS can be used for switching a T1/E1 circuit between two sets of CPE for redundant equipment operation. The Working Mode selection can be either 1+1, Blind 1 or Blind 2.

In the 1+1 and Blind 1 modes, TX signals from the CO will be present at each of the two CPE devices.

In Blind 2 mode only the current selected working path will see the TX signals. The alternate path will not provide TX to it's associated CPE while the Protective Path is working.



## Enable Look-In Mode

T-APS-R units will do a checking function to the CPE signal before switching from active path to the protection path.

**Enable:** T-APS-R will be enabled to check CPE signals. In the event of excessive bit errors from the CPE side to T-APS-R, T-APS-R will not perform switching. Enable Look-In may increase a few milli-second to the switching time.

**Disable:** T-APS-R will be disabled to check CPE signals. In the event of excessive bit errors from the CPE to T-APS-R, T-APS-R will perform switching in all events including excessive bit errors from CPE side

## Set Line Configuration

### Set Line Format

#### T1 Setting Selections

UNFRAMD: Unframe

SF: SuperFrame

ESF: Extended SuperFrame

#### E1 Setting Selections

CAS: Channel Associated Signaling (for voice)

CCS: Common Channel Signaling (for data)

CAS&C: Channel Associated Signaling & CRC-4 (Cyclic Redundancy Check 4)

CCS&C: Common Channel Signaling & CRC-4

### Set Line Code

#### T1 Setting Selections

B8ZS: Bipolar 8-zero substitution or Binary 8-zero substitution.

AMI: Alternate Mark Inversion

#### E1 Setting Selections

HDB3: High-Density Bipolar order 3 encoding.

AMI: Alternate Mark Inversion

### Set Receive Sensitivity (Network)

LONG : T1 Setting Sensitivity is –36 dB  
E1 Setting Sensitivity is –43 dB

SHORT: T1 Setting Sensitivity is –15 dB  
E1 Setting Sensitivity is –10 dB

## Set Buildout (Network)

### T1 Setting Selection

- (A) DSX1-1: 0 to 133 feet
- (B) DSX1-2: 133 to 266 feet
- (C) DSX1-3: 266 to 399 feet
- (D) DSX1-4: 399 to 533 feet
- (E) DSX1-5: 533 to 655 feet
- (F) -7.5dB CSU
- (G) -15dB CSU
- (H) -22dB CSU

### E1 Setting Selection

(A) 120 Nor: 120 ohm Normal Return Loss.

Recommended setting for (1) stable T1/E1 circuits or (2) short distance between T-APS-R and the connected next equipment. For example, T-APS-R to HDSL.  
(In general, set 120Nor)

(B) 120 Hi: 120 ohm High Return Loss.

Recommended setting for (1) unstable T1/E1 circuits or (2) long distance between T-APS-R and the next connected equipment. (200 meters or more)

## Set Receive Sensitivity (User)

LONG: T1 Setting Sensitivity is -36 dB  
E1 Setting Sensitivity is -43 dB

SHORT: T1 Setting Sensitivity is -15 dB  
E1 Setting Sensitivity is -12 dB

## Set Buildout (User)

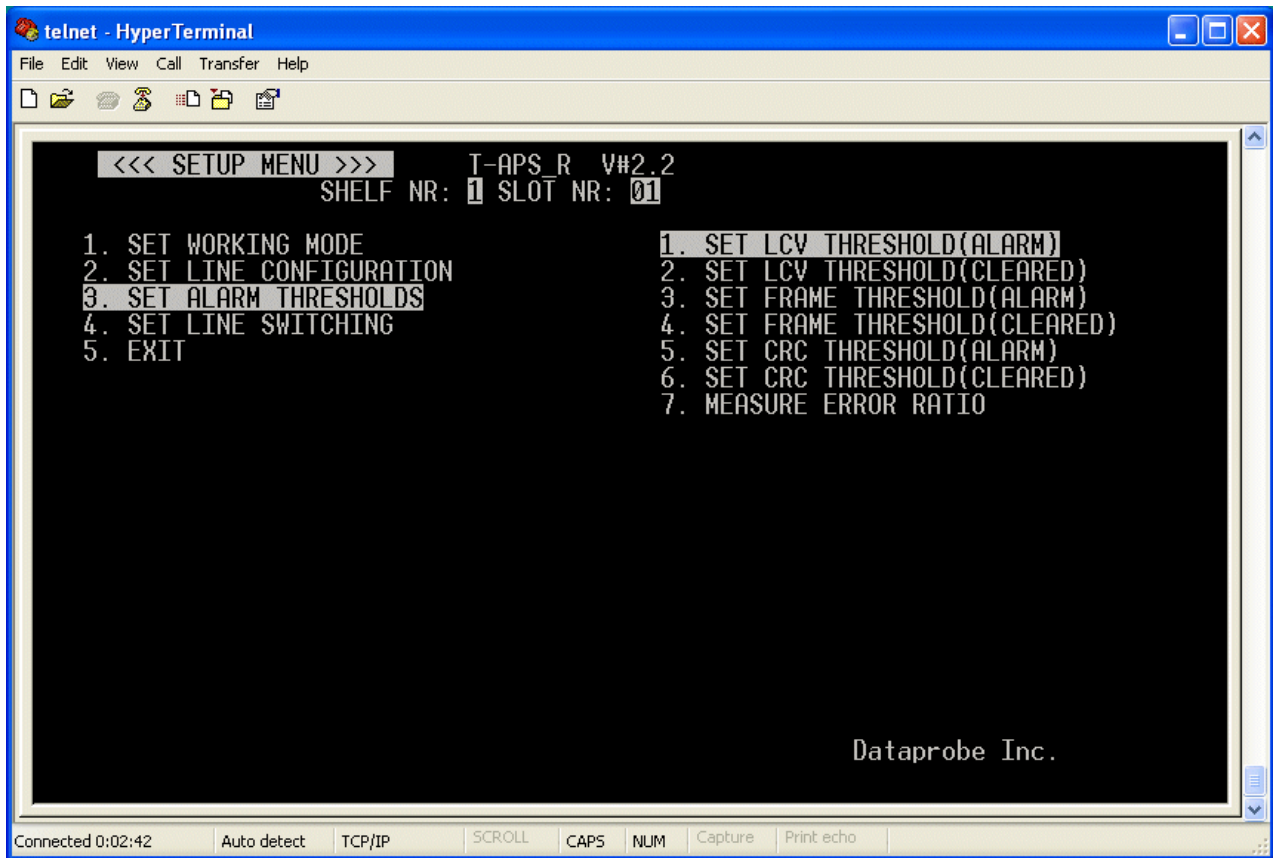
### T1 Setting

- (A) DSX1-1: 0 to 133 feet
- (B) DSX1-2: 133 to 266 feet
- (C) DSX1-3: 266 to 399 feet
- (D) DSX1-4: 399 to 533 feet
- (E) DSX1-5: 533 to 655 feet
- (F) -7.5dB CSU
- (G) -15dB CSU
- (H) -22dB CSU

### E1 Setting

- (A) 120 Nor: 120 ohm Normal Return Loss
- (B) 120 Hi: 120 ohm High Return Loss

# Set Alarm Thresholds



## Set LCV Threshold (Alarm)

### Set Line Code Violation Error Ratio

$$1E-7 = 1 \times 10^{-7}$$

$$5E-6 = 5 \times 10^{-6}$$

$$1E-5 = 1 \times 10^{-5}$$

$$1E-4 = 1 \times 10^{-4}$$

$$1E-3 = 1 \times 10^{-3}$$

Once the Line Code Violation Error Ratio exceeds the preset threshold value, it will then switch the ACTIVE PATH to the PROTECTION PATH.

## Set LCV Threshold (Cleared)

### Set Line Code Violation Alarm Clear Ratio

$$1E-9 = 1 \times 10^{-9}$$

$$1E-8 = 1 \times 10^{-8}$$

$$1E-7 = 1 \times 10^{-7}$$

$$1E-6 = 1 \times 10^{-6}$$

$$1E-5 = 1 \times 10^{-5}$$

Once the Line Code Violation Clear Ratio achieves the preset threshold value, it will then switch back from PROTECTION PATH to the ACTIVE PATH.

## Set Frame Threshold Alarm

$$1E-5 = 1 \times 10^{-5}$$

$$1E-4 = 1 \times 10^{-4}$$

$$1E-3 = 1 \times 10^{-3}$$

$$1E-2 = 1 \times 10^{-2}$$

$$1E-1 = 1 \times 10^{-1}$$

Once the Frame Error Ratio exceeds the preset threshold value, it will then switch the ACTIVE PATH to the PROTECTION PATH.

## Set Frame Threshold (Cleared)

$$1E-7 = 1 \times 10^{-7}$$

$$5E-6 = 5 \times 10^{-6}$$

$$1E-5 = 1 \times 10^{-5}$$

$$1E-4 = 1 \times 10^{-4}$$

$$1E-3 = 1 \times 10^{-3}$$

Once the Frame Clear Ratio achieves the preset threshold value, it will then switch back from PROTECTION PATH to the ACTIVE PATH.

## Set CRC Threshold Alarm

### Set Cyclic Redundancy Check error ratio

$$1E-5 = 1 \times 10^{-5}$$

$$1E-4 = 1 \times 10^{-4}$$

$$1E-3 = 1 \times 10^{-3}$$

$$1E-2 = 1 \times 10^{-2}$$

$$1E-1 = 1 \times 10^{-1}$$

Once the Cyclic Redundancy Check Error Ratio exceeds the preset threshold value, it will then switch the ACTIVE PATH to the PROTECTION PATH.

## Set CRC Threshold (Cleared)

### Set Cyclic Redundancy Check alarm clear ratio

$$1E-7 = 1 \times 10^{-7}$$

$$5E-6 = 5 \times 10^{-6}$$

$$1E-5 = 1 \times 10^{-5}$$

$$1E-4 = 1 \times 10^{-4}$$

$$1E-3 = 1 \times 10^{-3}$$

Once the Cyclic Redundancy Check Clear Ratio achieves the preset threshold value, it will then switch back from PROTECTION PATH to the ACTIVE PATH.

## Measure Error Ratio

MEASURE ERROR RATIO will measure and display Line Code Violation (LCV), Cyclic Redundancy Check (CRC), and Frame Error (FRME).

# Set Line Switching

## Set Switching Mode

### Automatic Switching

Once the bit error exceeds the preset threshold value or other connection failures, the system will automatically switch from Active path to Protection path.

### Manual Switching

Once the bit error exceeds the preset value or other connection failures, the system can be switched from Active path to Protection path manually.

## Select Active Line

Line 1 as Primary Active path.

Line 2 as Primary Active path.

## Set Recovery Time

### Selections: 00 to 99 MINUTES

Setting the time interval to recover from protection path to the active path. Default: 2 Minutes.

Setting Recovery at **00 Minute**: When Active Path experiences bit errors or lost signals, it will switch to the Protection Path. The Protection Path will **immediately switch back** to Active Path when Active Path is in a good condition.

Setting Recovery at **1 to 98 Minutes**: When Active Path experiences bit errors or lost signals, it will switch to the Protection Path. The Protection Path will switch back to Active Path after Active Path stays in good condition for **set number of minutes**.

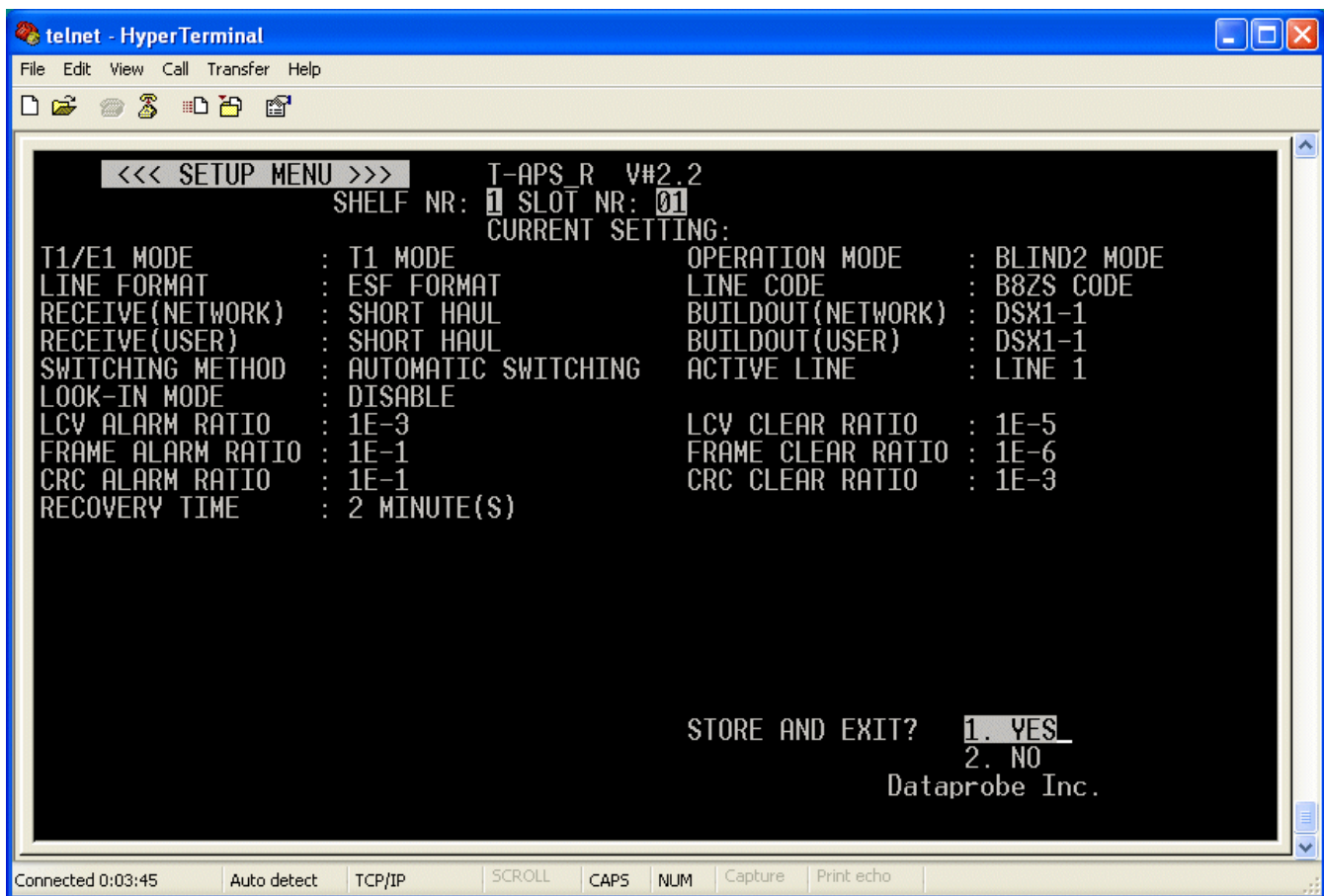
Setting Recovery at **99 Minutes**: When Active Path experiences bit errors or lost signals, it will switch to the Protection Path. While setting Recovery at 99 Minutes, the Protection Path **will not switch back** to Active Path. The Protection Path will only switch back to Active Path when experiencing excessive bit errors or lost of signals.

## Show Current Line

Display the current path in use, L1 or L2.

## Exit & Save Card Settings

This will display the current setting of the selected card just accessed and then confirm your intent to save and exit the system.



The screenshot shows a HyperTerminal window titled "telnet - HyperTerminal". The window contains a telnet session with the following text:

```
<<< SETUP MENU >>>          T-APS_R  V#2.2
                                SHELF NR: 1  SLOT NR: 01
                                CURRENT SETTING:
T1/E1 MODE       : T1 MODE      OPERATION MODE    : BLIND2 MODE
LINE FORMAT      : ESF FORMAT   LINE CODE        : B8ZS CODE
RECEIVE(NETWORK) : SHORT HAUL  BUILDOUT(NETWORK) : DSX1-1
RECEIVE(USER)    : SHORT HAUL  BUILDOUT(USER)    : DSX1-1
SWITCHING METHOD  : AUTOMATIC SWITCHING ACTIVE LINE      : LINE 1
LOOK-IN MODE     : DISABLE
LCV ALARM RATIO  : 1E-3        LCV CLEAR RATIO  : 1E-5
FRAME ALARM RATIO : 1E-1        FRAME CLEAR RATIO : 1E-6
CRC ALARM RATIO  : 1E-1        CRC CLEAR RATIO  : 1E-3
RECOVERY TIME    : 2 MINUTE(S)

                                STORE AND EXIT?  1. YES_
                                                    2. NO
                                                    Dataprobe Inc.
```

The window also shows a status bar at the bottom with the following information: Connected 0:03:45, Auto detect, TCP/IP, SCROLL, CAPS, NUM, Capture, Print echo.

## Current Settings

The Set up Menu screen will be display the current line card configuration. Selecting YES will store the settings for this line card to memory and exit to the main Set Up Menu screen of the nest.

## ***SNMP Ethernet Port***

The system can be managed by SNMP through standard management software. Dataprobe provides a private MIB which is available on our web site at: <http://www.dataprobe.com/files/switch/taps/taps-r.mib>  
Traps can be programmed to respond to various application requirements as well as operational functions set and system status retrieved.

## ***Setting I/P Address***

The T-APS comes with factory installed IP address **192.168.1.254**. In most cases this will need to be changed.

Consult your Network Administrator to determine the appropriate IP address. The IP address is changed thru the Set Up menu screen .

To set the IP address, the hardware (MAC) address must be known. This address is located on a label on the back of the unit or can be accessed thru serial port. The syntax for the MAC address is: nn-nn-nn-nn-nn-nn

IP Address, Subnet Mask and Gateway: Enter the appropriate information in dotted decimal format (xxx.xxx.xxx.xxx). If you are unsure of the entries, consult your network administrator.



## **Specifications**

### **T1 Interface**

Bit Rate	1.544 M b/s
Line Code	AMI B8ZS
Frame Format	SF ESF Unframed
Bit Rate	1.544M b/s
Impedance	100 Ohms Resistive Balanced
Input Level	0-36 dB
Output Level	6V p-p
Line Build Out	0-655 feet

### **E1 Interface**

Bit Rate	2.048 M b/s
Line Code	AMI HDB3
Frame Format	CCS CAS CCS+CRC CAS+CRC Unframed
Impedance	120 Ohms Resistive Balanced
Input Level	0-43 dB
Output Level	6V p-p
Line Build Out	0-655 feet

### **LED Status Display**

RUN 1+1/1:1, T1 or E1, Line 1 and Line2, LOS, OOF, AIS, RAI, Fail.

### **ALARM Contacts**

Form C relay 0.5A 30VDC MAX

### **Automatic Switching Parameter Programmable**

Code Violation	10-3 10-6
CRC Error	10-1 10-3
Frame Error	10-1 10-3
AIS	Unframed
Loss of Signal	
Fault Duration	
Recovery Interval	0 Minute 1~98 Minutes 99 Minutes (Toggle)
Console Port	RS-232 (VT-100)
Network	10BaseT Ethernet
Power	-48V±5V DC standard, optional 110 -230VAC, 50-60Hz
Weight	1.1 KG
Dimension	482mm W x 177mm H x 267mm D, 19.0in W x 7.0in H x 10.50in D
Operating Temperature	0°C~50°C
Relative Humidity	5% 90%,Non-condensing
Regulatory Compliance	FCC Part 15 Class A
Reliability	MTBF 44,000 hrs

## TECHNICAL SUPPORT, RETURNS & WARRANTY

Dataprobe Technical Support is available 8:30AM to 5:30PM ET to assist you in the installation and operation of this product. To obtain Technical Support call our Tech Support Hotline at 201-967-8788, or Email us at tech@dataprobe.com. Please have the following information available when you call:

- Model of Product
- Serial Number
- Data of Purchase
- Name of Seller (if other than Dataprobe)

If you purchased this product through an **Authorized Dataprobe Reseller**, you should contact them first, as they may have information about the application that can more quickly answer your questions.

### WARRANTY

Seller warrants this product, if used in accordance with all applicable instructions, to be free from original defects in material and workmanship for a period of One Year from the date of initial purchase. If the product should prove defective within that period, Seller will repair or replace the product, at its sole discretion.

Service under this Warranty is obtained by shipping the product (with all charges prepaid) to the address below. Seller will pay return shipping charges. Call Dataprobe Technical Service at (201) 967-8788 to receive a Return Materials Authorization (RMA) Number prior to sending any equipment back for repair. Include all cables, power supplies and proof of purchase with shipment.

**THIS WARRANTY DOES NOT APPLY TO NORMAL WEAR OR TO DAMAGE RESULTING FROM ACCIDENT, MISUSE, ABUSE OR NEGLIGENCE. SELLER MAKES NO EXPRESS WARRANTIES OTHER THAN THE WARRANTY EXPRESSLY SET FORTH HEREIN. EXCEPT TO THE EXTENT PROHIBITED BY LAW, ALL IMPLIED WARRANTIES, INCLUDING ALL WARRANTIES OF MERCHANT ABILITY OR FITNESS FOR ANY PURPOSE ARE LIMITED TO THE WARRANTY PERIOD SET FORTH ABOVE; AND THIS WARRANTY EXPRESSLY EXCLUDES ALL INCIDENTAL AND CONSEQUENTIAL DAMAGES.**

Some states do not allow limitations on how long an implied warranty lasts, and some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may have other rights which vary from jurisdictions to jurisdiction.

**WARNING:** The individual user should take care to determine prior to use whether this device is suitable, adequate or safe for the use intended. Since individual applications are subject to great variation, the manufacturer makes no representation or warranty as to the suitability of fitness for any specific application.