INSTALLATION
and
OPERATION MANUAL

Version 2.0

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ETU-01A E1 Access Unit, Installation and Operation Manual
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This manual supports the following models:
ETU-01A/AC 90~250VAC model
ETU-01A/DC 18~72VDC model

This manual includes the updates for functional firmware version 1.16 and above, including installation and operation of the SNMP optional hardware agent.

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Chapter 1. Introduction

1.1 General

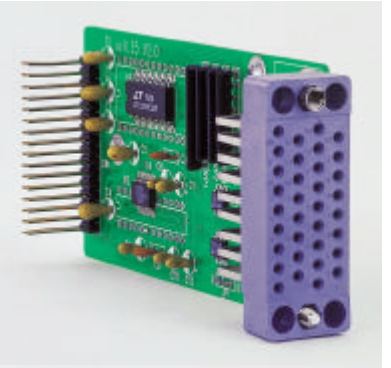
The ***ETU-01A*** provides an economical digital access solution for E1 and Fractional E1 network services. User replaceable Data I/F Modules provide a wide range of industry standard interfaces to DTE devices, which may be linked to an ***ETU-01A*** at data rates of 56Kbps to 2048Kbps.

The ***ETU-01A*** supports local control and diagnostics via the LCD display, keypad and LED status indicators located on the front panel, via the RS-232 control port connection or via optional SNMP. The SNMP option provides Simple Network Management Protocol System functions over a 10BASE-T connection, which allow the user to remotely control, diagnose, and monitor the system. These features enable users to easily configure the unit, execute the loop back/BERT functions and monitor the network status either locally or remotely.

The ***ETU-01A*** operates from 90~250VAC. A model is also available for 18 to 72VDC. The unit is built in a compact case that can be placed on desktops and shelves or installed, by means of an appropriate adapter, in a 19" EIA rack.

Chapter 1. Introduction

At the time of this printing, the ***ETU-01A*** had nine types of user-replaceable data channel modules.



1. ETU/TTU-V35

V.35 Module:

Provides one fully compliant ITU-T V.35 interface on a Female "M" block, 34 pin connector. Operates at any n56/n64 fractional or unframed E1 speed.

2. ETU/TTU-530

RS-530 Module:

Provides one fully compliant EIA RS-530 interface on a female "D" type 25 pin connector. Operates at any n56/n64 fractional or unframed E1 speed.

3. ETU/TTU-449

RS-449 Module:

Provides one fully compliant EIA RS-449 interface by placing an adapter cable on the ETU/TTU-530 module and providing a male "D" type 37 pin connector. Operates at any n56/n64 fractional or unframed E1 speed.

4. ETU/TTU-X21

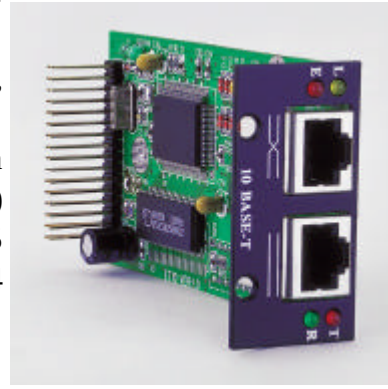
X.21 Module:

Provides one fully compliant ITU-T X.21 interface on a female "D" type 15 pin connector. Operates at any n56/n64 fractional or unframed E1 speed.

5. ETU/TTU-ET10

Ethernet Bridge Module:

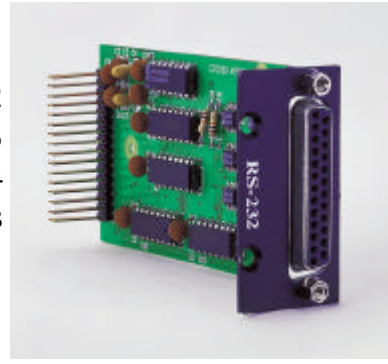
Provides an Ethernet (IEEE802.3) Bridge function over the WAN when matched to another ET10 module, ET10A standalone, or a compatible bridge utilizing standard HDLC protocol. The interface connection is a straight (MDI) or crossover (MDI-X) 10BASE-T Ethernet on a shielded RJ-45 connector. Operates at any n56/n64 fractional or unframed E1 speed.



6. ETU/TTU-232

RS-232 Module:

Provides one fully compliant EIA RS-232 SYNC interface on a female "D" type 25 pin connector. Operates at n56/n64 fractional E1 speed up to 128Kbps (ASYNC 19.2K).



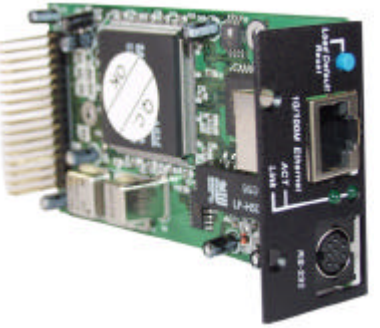
7. ETU/TTU-G64

G.703/64K Module:
Provides one fully ITU-T compliant G.703 Codirectional (line code) 64Kbps interface on a female "D" type 15 pin connector. Operates at 64Kbps only.

8. ETU/TTU-NRZ

NRZ Module:
Provides one NRZ interface on four(4) female BNC type connectors. Operates at any n56/n64 fractional or unframed E1 speed.

9. ETU/TTU-ET10R



Ethernet Router Module:
Provides an Ethernet (IEEE802.3 or IEEE802.3u) Router function over the WAN when matched to another ET10R module, IPR Pro standalone, or a compatible router under PPP or Frame Relay protocol. The interface connection is a straight (MDI) 10/100BASE-TX Ethernet on a shielded RJ-45 connector. Configuration is via RS-232 terminal or via proprietary Windows® based GUI software. Operates at any n56/n64 fractional or unframed E1 speed.

1.2 Functional Description

The ***ETU-01A*** is a single port access unit for E1, Fractional E1 or Fractional cascade (multiplexing) E1 services. The ***ETU-01A*** data channel supports user-selectable transmission rates, which are integral multiples of 56 or 64Kbps, up to a maximum 2.048Mbps. E1 services operate on a line attenuation of up to 43 dB on twisted pair or coax cable, providing an approximate operating range of up to 2Km (using 22AWG wire).

The ***ETU-01A*** packs the data channel into user defined E1 link time slots. The unused time slots may have IDLE code inserted (in frame mode) or have the receive side time slots' data inserted (in cascade mode).

The ***ETU-01A*** has nine types of user data channel modules: V.35, X.21, RS-530, RS-232, RS-449, G.703/64K Codirectional, NRZ/BNC, 10BASE-T Bridge and 10/100BASE-TX Router. The desired interface is achieved by installing the appropriate type of channel module in the ***ETU-01A***. The ***ETU-01A*** supports flexible time slot assignment, allowing the user to specify the selection of time slots.

The ***ETU-01A*** fully meets all of the E1 specifications including ITU-T G.703, G.704, G.706, G.732, and G.823.

The ***ETU-01A*** features V.54 loop back capabilities for performing local analog loop back and remote digital loop back as well as progressive BERT testing. The operator at either end of the line may test both the ***ETU-01A*** and the line in the remote digital loop back mode. The loop back is controlled by local LCD display setting, serial console, optional SNMP or by the DTE interface for V.35, RS-232 and RS-530.

When loop back is selected from the LCD menu system, the unit generates one of fourteen different test patterns, according to ITU, for direct end-to-end integrity testing. The Error indicator flashes for each bit error detected.

Multiple clock source selection provides maximum flexibility in connecting both the E1 and user data interface. The E1 link may be clocked from the recovered receive clock, from the user data port or from the internal oscillator.

1.3 System Timing Considerations

The ***ETU-01A*** has the flexibility to meet the timing requirements of various system configurations. The timing mode for the E1 link and the user channel is selected through the LCD menu system, a serial console or via optional SNMP management.

Master timing

The ***ETU-01A*** E1 link receive path always operates on the receive clock. The ***ETU-01A*** recovers the receive clock from the received E1 link data signal. The source of the ***ETU-01A*** E1 link transmit clock may be selected by the user. The following E1 link transmit timing modes are available:

- **Recovery timing**:

  The ***ETU-01A*** E1 link transmit clock is locked to the recovered receive clock. This is usually the timing mode selected for network operation.

- **Internal timing**:

  The ***ETU-01A*** E1 link transmit clock is derived from the internal clock oscillator. This timing mode is necessary in point-to-point applications over leased line. In this case, one ***ETU-01A*** must use the internal oscillator, and the other may operate from the recovered clock.

- **External (DTE) timing**:
  The ***ETU-01A*** has three data channel clocking modes:

- Clock mode DTE1: The ***ETU-01A*** data channel accepts the user transmit clock from the connected DTE (from the ETC pin) and provides a receive clock (Transparent timing) to the synchronous equipment connected to the data channel.

- Clock mode DTE2: The ***ETU-01A*** data channel accepts the user transmit clock (from ETC pin) and receive clock (from ERC pin) provided by the DTE equipment connected to the data channel. Note: The X.21 data channel cannot be operated in this mode.

- Clock mode DTE3: The ***ETU-01A*** data channel operates as a DCE and accepts both the user transmit and receive clock (All from ETC pin) provided by the DTE equipment connected to the data channel.

1.4 Typical System Applications

General

In a typical application (Figure 1-1), the ***ETU-01A*** is used in a point-to-point connection. The synchronous data channels of each host are connected over an E1 line.

Figure 1-1 Point-to-Point Application

Fractional E1 data service is based on the assumption that the user data rate is a fraction of the available E1 bandwidth, in multiples of 56K or 64K.

Figure 1-2 Fractional E1, Cascade Application

In the above figure, the available E1 Time Slots are divided (Fractional E1) and cascaded (multiplexed). Various data interfaces are employed in each ***ETU-01A*** to provide connections between hosts, LANs and servers across the E1 transmission facility.

1.5 E1 signal structure

The E1 line operates at a nominal rate of 2.048Mbps. The data transferred over the E1 line is organized into frames, with each E1 frame containing 256 bits. The 256 bits are a total of the 32 time slots, each containing eight bits, carrying the data payload.

E1 transmission utilizes two main types of framing: **Frame Alignment Signal** (FAS) and **Multi-Frame Alignment Signal** (MFAS). Framing is necessary in order for equipment receiving the E1 signal to be able to identify and extract the individual channels. **PCM-30** (CAS) transmission system use MFAS framing along with the FAS framing. **PCM-31** (CCS) transmission system use only FAS framing.

Frame Alignment Signal (FAS)

The 2.048 Mbps frame consists of 32 individual time slots (numbered 0-31). As described previously, each time slot consists of an individual 64Kbps channel of data. In the FAS format, time slot 0 of every other frame is reserved for the frame alignment signal pattern. Alternate frames contain the FAS Distant Alarm indication bit and others bits reserved for national and international use.

Multi-Frame Alignment Signal (MFAS)

MFAS framing uses **Channel Associated Signaling** (CAS) to transmit A/B/C/D bit signaling information for each of 30 channels. This method uses the 32 time slot frame format with time slot 0 for the FAS and time slot 16 for the Multi-Frame Alignment Signal and the Channel Associated Signaling.

E1 line signal

The basic E1 line signal is coded using the **Alternate Mark Inversion** (AMI) or **HDB3** rule.

In the AMI format, "ones" are alternately transmitted as positive and negative pulse, whereas "zeros" are transmitted as a zero voltage level. AMI is not used in most 2.048Mbps transmissions because synchronization loss occurs during long strings of data zeros.

In the HDB3 format, a string of four consecutive zeros is replaced with a substitute string of pulses containing an intentional bipolar violation. The HDB3 code substitutions provide high pulse density so that the receiving equipment is able to maintain synchronization with the received signal.

E1 link line coding

The ***ETU-01A*** supports two E1 line codes:

AMI coding.

HDB3 coding.

E1 framing formats

The ***ETU-01A*** supports three frame formats:

Unframed format.

FAS (CCS, PCM-31) format.

MFAS (CAS, PCM-30) format.

1.6 Technical Specifications

E1 link

Framing	**-Unframed/Framed**
	-CCS (PCM31)/CAS (PCM30)
	-CRC4 ON/OFF
Bit Rate	**2.048 Mbps**
Line Code	**-AMI**
	-HDB3
Line Impedance	**-75 ohms**
	-120 ohms
Relative Receive Level	**0 to -43dB**
"Pulse" Amplitude	**-Nominal 2.37V±10% for 75 ohms**
	-Nominal 3.00V±10% for 120 ohms
"Zero" Amplitude	**±0.1V**
Transmit Frequency Tracking	
Internal Timing	**±30 ppm**
Loopback Timing	**±50 ppm**
External Timing	**±100 ppm**
Jitter Performance	**According to ITU-T G.823**
Complies With	**ITU-T G.703, G.704, G.706 and G.732**
Interface Connectors	**-15-pin, D-type Female**
	-BNC

User Data Channels

Interface Types	**-V.35, X.21, RS-530, RS-449, RS-232, -G.703/64K Codirectional, NRZ/BNC, -10Base-T Bridge, and 10/100Base-T Router**
I/F Connectors	
V.35 I/F	**34 pin, M-block Female**
X.21 I/F	**15 pin, D-type Female**
RS-530 I/F	**25 pin, D-type Female**
RS-449 I/F	**37 pin, D-type Male(adpt. cable on RS-530)**
RS-232 I/F	**25 pin, D-type Female**
G.703/64K I/F	**15 pin, D-type Female**
NRZ Interface	**BNC Female (4)**
Bridge I/F	**RJ-45**
Router I/F	**RJ-45**
Line Code	**NRZ (G.703/64K is Codirectional line code)**
Data Rate	**n×56kbps or n×64kbps where n equal 1 to 31 in CCS and n equal 1 to 30 in CAS**
Clock Modes	
RECOVERY	**Receive and transmit clock (recovered) to the synchronous DTE**
INT OSC	**Receive and transmit clock (internal oscillator) to the synchronous DTE**
DTE1 (Transparent)	**Receive clock to the synchronous, and transmit clock from the synchronous device**
DTE2	**Receive and transmit clock from the synchronous DCE (from ETC and ERC pin)**
DTE3	**Receive and transmit clock from the synchronous DCE (all from ETC pin).**
Control Signals	**-CTS ON, or follows RTS -DSR constantly ON, except during test loops -DCD constantly ON, except during signal loss**
Time slot allocation	**User defined**

Setup/Configuration

LCD Display	**2 rows of 16 Characters**
Pushbutton Switches	**-ESC**
	-Left Arrow
	-Right Arrow
	-Enter

LED indicators

POWER	**Green**	**Power**
Sig Loss	**Red**	**E1 link signal loss**
SYNC Loss	**Red**	**E1 link sync loss**
Alarm	**Red**	**E1 link alarm, include: BPV error / CRC4 error / Frame slip / All ones(AIS) / Remote alarm**
TD	**Yellow**	**Transmit data (data port)**
RD	**Yellow**	**Receive data (data port)**
Error	**Red**	**Bit errors**
Test	**Red**	**Loop back and BERT test active**

Physical

Height:	**45 mm**
Width:	**195 mm**
Depth:	**255 mm**
Weight:	**1.5 kg**

Diagnostic tests

Test loops	**-E1 local analog loop back** **-E1 local digital loop back** **-E1 local payload loop back** **-E1 remote analog loop back** **-E1 remote payload loop back** **-Data port local analog loop back** **-Data port local digital loop back** **-Data port V.54 loop back**
BERT test pattern	**-511** **-2047** **-2^15-1** **-2^20-1** **-QRSS** **-2^23-1** **-All ones** **-All zeros** **-ALT** **-Double ALT (11001100….)** **-3 in 24** **-1 in 16** **-1 in 8** **-1 in 4**

RS-232 Craft port

Port interface	**V.24/RS-232 asynchronous (DCE)**
Port connector	**9 pin D-type female**
Data rate	**300, 1200, 2400, 4800, 9600, or 19200 bps** **9600 default**
Data format	**-One start bit** **-8 data bits** **-No parity** **-One stop bits**

Power supply

Voltage	**AC Model: 90 ~ 250 VAC (auto detect)**
	DC Model: 18 to 72 (-18 to -72VDC)
Frequency	**47 to 63 Hz for AC power**
Power consumption	**15 Watts**
Fuse	**0.5A slow blow**

Environment

Temperature	**0-60°C / 32-140°F**
Humidity	**0 to 90% non-condensing**

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Chapter 2. Installation

2.1 General

This chapter provides detailed instructions for mechanical installation of the ***ETU-01A***. Following the completion of installation, please refer to Chapter 3 for operating information.

2.2 Site Preparation

Install the ***ETU-01A*** within reach of an easily accessible grounded AC outlet. The outlet should be capable of furnishing 90 ~ 250 VAC (18VDC to 72VDC for DC model unit). Allow at least 10 cm (4 inch) clearance at the rear of the ***ETU-01A*** for signal lines and interface cables.

2.3 Mechanical Assembly

The ***ETU-01A*** is designed for tabletop or bench installation, and is delivered completely assembled. No provision has been made for bolting the ***ETU-01A*** to a tabletop. An optional 19" rack mount adapter is available.

2.4 Electrical Installation

2.4.1 Power connection

AC power is supplied to the ***ETU-01A*** through a standard 3-prong plug. (Refer to Figure 2-1) The ***ETU-01A*** should always be grounded through the protective earth lead of the power cable.

The line fuse is located in an integral-type fuse holder on the rear panel. Make sure that only fuses of the required rating are used for replacement. Do not use repaired fuses or short-circuit the fuse holder. Always disconnect the power cable before removing or replacing the fuse.

2.4.2 Rear panel connectors

Please refer to the User Data Channels table on page 10 for a description of the digital interface connectors located on the rear panel of the ***ETU-01A*** (Refer to Figure 2-1). The E1 line connectors incorporate DB15 pin or two BNC Coax connectors. (Appendix A provides detailed information on the various interface modules and connectors).

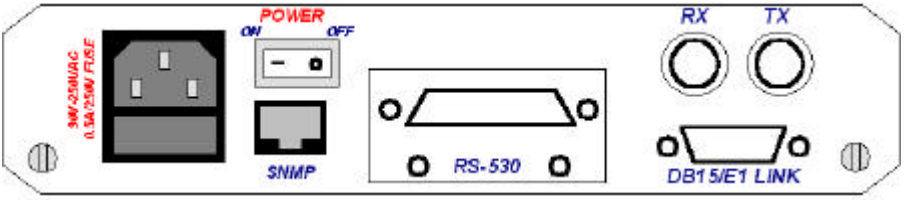

Figure 2-1 ***ETU-01A*** AC rear panel, Option: DCE (RS-530)

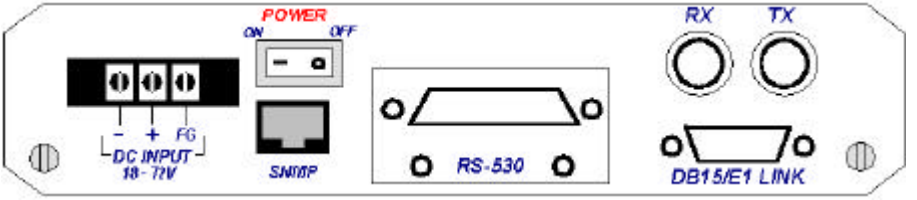

Figure 2-2 ***ETU-01A*** DC rear panel, Option: DCE (RS-530)

E1 Line side

DB-15 Connector

The pin assignment for DB-15 connector is as follows:

Pin:	Function:
E1 Link	
1	TTIP (Transmit data out)
9	TRING (Transmit data out)
3	RTIP (Receive data in)
11	RRING (Receive data in)
ALARM relay contact	
7	common
8	NO (normally open)
15	NC (normally closed)

BNC coax connectors

Two BNC coax connectors marked RX and TX (Same function as the E1 line DB15 connector).

Data port side

V.35 interface connector

Utilizes standard V.35 pin-out. The three test pins have been chosen for loops and test. For applications using a V.35 interface, clock mode is selected DTE2, connect the ERC input clock to pins Z(A) and BB(B).

X.21 interface connector

For applications using an X.21 interface external clock (Clock mode select DTE1 or DTE3), connect the input clock to pins 7(A) and 14(B) of the 15-pin connector.

RS-530 interface connector

Utilizes standard pin-out. The three test pins have been chosen for loops and test. For applications using an RS-530 interface, clock mode is selected DTE2, connect the ERC input clock to pins 20(A) and 23(B).

RS-232 interface connector

Appendix A.5 describes the interface connection for RS-232.

RS-449 interface connector

Appendix A.6 describes the cabling connection between the RS-530 interface and the RS-449.

G.703/64K Interface connector

Appendix A.7 describes the cabling connection for the G.703/64K interface.

NRZ/BNC Interface connector

Appendix A.8 describes the cabling connection for the NRZ/BNC interface.

ET10 10BASE-T Interface connector

Appendix A.9 describes the cabling connection and DIP switch settings for the Ethernet Bridge interface.

ET10R 10/100BASE-TX Interface connector

The Ethernet connection for the ET10R module is a standard MDI, shielded RJ-45. A separate electronic manual (in PDF format) is provided with this module to cover setup and configuration of the router functions.

Cable and Termination

Use a shielded twisted pair cable between the ***ETU-01A*** and the DTE device. The receivers on the ***ETU-01A*** are 100 Ohm terminated (For X.21 and RS-530). If problems are encountered with the connection to the DTE interface, make sure that the DTE interface is terminated correctly.

2.5 DIP Switches and Jumper Settings

2.5.1 Caution

To avoid accidental electric shock, disconnect the ***ETU-01A*** power cord before opening the cover. Access inside the equipment is only permitted to authorized and qualified service personnel.

2.5.2 Procedure

a. Turn power OFF, Disconnect the power cord from the AC mains.
b. Loosen the screws at the left/right of the rear panel.
c. Remove the PCB assembly, noting orientation for installation.
d. Adjust the DIP switches and jumpers as required, according to table 2-1.
e. Replace the PCB and tighten the screws.

Table 2-1

DIPSW1

Item	Function	Setting	Factory
1	E1 line impedance set 120 Ohm	ALL OFF	*
2	E1 line impedance set 75 Ohm	ALL ON	

Chassis GND Jumper

Set this jumper to "CON" to connect logic ground to chassis. Set to "DIS" to separate logic and chassis grounds.

Please refer to the following figure for location of DIP switch and chassis jumper.

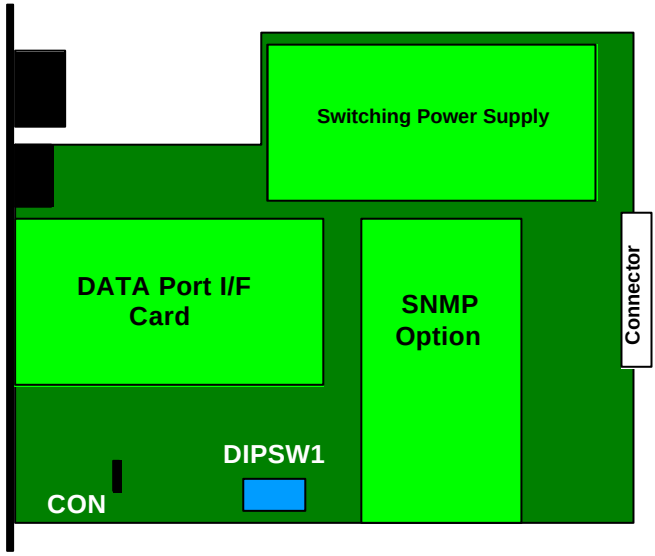

Figure 2-3 : ***ETU-01A*** Main PCB Assembly

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Chapter 3. LCD Operation

3.1 General

This chapter describes the ***ETU-01A*** controls and indicators, and explains operation setup procedures. Installation procedures (in Chapter 2) must be completed and checked before attempting to operate the ***ETU-01A***.

3.2 Controls and Indicators

All controls (push-button switches), LCD display and LED indicators are located on the ***ETU-01A*** front panel. The momentary on pushbutton switches are used to activate menu selections and select parameter settings.

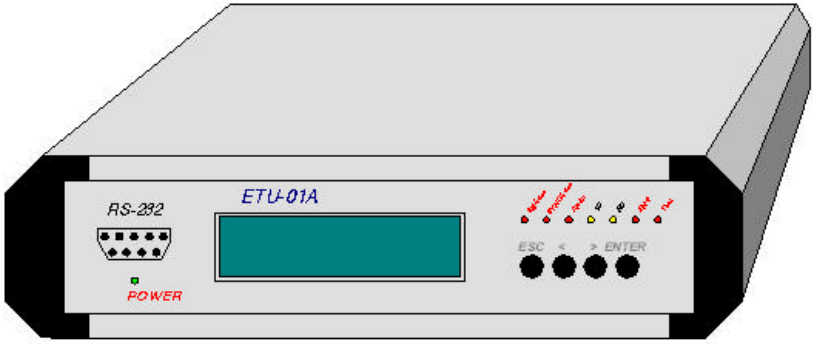


Figure 3-1 : ***ETU-01A*** Front Panel

Use the '<' and '>' arrow keys to browse the menus and select parameters. Use the '**ESC**' function key to return to a previous menu or to abandon setup. Use the '**ENTER**' function key to set a parameter of a selection or to enter a sub-menu.

3.3 Operating Procedure

The ***ETU-01A*** requires no operator attention once installed, except for occasional monitoring of the front panel indicators. Intervention is only required when:

- The ***ETU-01A*** has to be adapted to new operational requirements.
- Diagnostic loops are required.

The ***ETU-01A*** is turned on when its AC power cord is connected to an AC power outlet and the power switch is turned to the ON position. The ***ETU-01A*** will perform its internal POST (power on self test) to verify CPU, RAM, ROM and FPGA integrity. The initial display looks like this:

After about 2 seconds, the tests will be completed and display:

The POWER indicator will be lit, indicating that the ***ETU-01A*** is on. If the LCD display back light is set to either AUTO or ON, it will be lit. Verify the ***ETU-01A*** is in operation by checking that the front panel LEDs match the following indicator conditions:

- POWER: ON
- Sig Loss: OFF
- SYNC Loss: OFF
- Alarm: OFF
- TD: ON, OFF or flashing
- RD: ON, OFF or flashing
- Error: OFF
- Test: OFF

3.4 Menu Operation

3.4.1 Top Level Menus The following are the MAIN MENUs (top level). Press an arrow key to select another Main Menu or press ENTER to reach a sub menu.

Set the Master timing and remote mapping configuration.

Set the Frame type, CRC mode, idle code, Line code and RAI for the E1 link.

Assign the E1 timeslots to be used by the Data Channel.

Data Port Informational screen and settings for Clock Mode, Handshaking, and multiplier (n56K or n64K).

Enable E1 link or data channel Loop Back.

Enable BERT, select E1 or data channel, select pattern, do error insertion and display error results.

Setup for the terminal console port speed. Default is 9600, 8bit, no parity.

Display and set the internal real time clock of the ***ETU-01A***.

Set the mode of the LCD backlight either Off, On, or Auto.

Display the Alarm Buffer and remote alarm buffer.

Displays the CRC-4, BPV (bi-polar violation), E-bit, and FAS error counts.

3.4.2 System Parameter Detail The following screens show the three setup screens under the System Parameter Main Screen; Master Timing, Send Mapping, and Remote Mapping.

SYSTEM PARAMETER.

Press ENTER, MASTER TIMING sub-menu will be displayed. Master Timing sets the source for the timing in the ***ETU-01A***.

Pressing ENTER again will place the cursors on the parameter selection line. The arrow keys are now used to browse the available parameters. Available parameters under Master Timing are:

RECOVERY; Timing is recovered from the main E1 link.

INT OSC; Timing is provided by the internal oscillator of the *ETU-01A*.

DTE 1; Data channel accepts user transmit clock and provides receive clock to DCE on data port. (transparent timing)

DTE 2; Data channel accepts user transmit clock (from ETC pin) and receive clock (from ERC pin) provided by DCE on data port.

DTE 3; Data channel accepts user transmit clock and receive clocks (both from ETC pin) provided by DCE on data port.

Press the ENTER key on the selected parameter. The cursors will return to the top line. Press ESC to return to the top menu level, use the right arrow key to reach the "E1 LINE" menu.

From the MASTER TIMING sub-menu press ESC to return to the SYSTEM PARAMETER screen. Press the Right Arrow key to the SEND MAPPING screen.

If the remote unit has its "Remote Mapping Control" turned on, this unit may send the timeslot mapping information to the remote. This feature enables bandwidth adjustments (active timeslot information) to be passed to the remote unit. To send mapping, press ENTER twice.

From the SEND MAPPING sub-menu press the Right Arrow key to the REMOTE MAPPING screen.

When ON, this unit will allow "Remote Mapping Control" from the remote unit. If OFF, the remote unit may not modify the local unit's timeslot mapping. To modify the parameter, press ENTER once, then use the arrow keys to toggle "ON" or "OFF". Press ENTER to effect the change. Typical settings would place the CO side unit to controlled “OFF”, while the CPE side device would be controlled “ON”.

3.4.3 E1 Line Parameter Detail The following screens show the setup screens under the E1 Line Parameter Screen.

Press ENTER and the E1 LINE sub-menu will be displayed. E1 Line sets the frame type, CRC mode, cascade mode, idle code, RAI state and Line Code for the E1 link of the ***ETU-01A***.

Use the arrow keys to browse the individual link parameters (frame, CRC, etc.). Press ENTER on the parameter to select it with the cursors. Now use the arrow keys to browse the available settings for that parameter. The following is a breakdown of each parameter and available settings:

FRAME; CCS(PCM31), CAS(PCM30), or UNFRAME, CCS default. When UNFRAME is selected, the Data Port rate is automatically set to 2.048 Mbps.

CRC-4; OFF or ON, OFF default. (cannot be set when unframed)

CASCADE, OFF or ON. OFF default.

IDLE CODE; any hex code from 00 to FF, 7E default.

RAI; (Remote Alarm Indicator) DISABLE or ENABLE, ENABLE default.

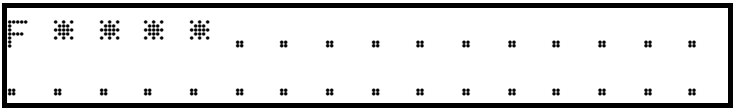
LINE CODE; HDB3 or AMI, HDB3 default.

IMPEDANCE; displays setting dependant upon the DIPSW1 settings.

3.4.4 Timeslot Mapping Detail The following screen is an example of the screen under Timeslot Mapping.

TIME SLOT MAPPING

Press ENTER.



The E1 frame is shown with 32 timeslots, top row left to right are TS0-15, while the bottom row displays the settings for TS16-31. Press ENTER to assign the TS, use the arrow keys to move to the next or previous TS. Designations shown are described as follows:

F = Framing (CCS/CAS) always on TS 00

S = Signaling (CAS) always on TS 16 if in CAS frame mode

. = not assigned

■ = Data Channel uses this TS

TS 00:Cannot be assigned in CCS or CAS mode of E1 LINE to anything but Framing.

If TS 16 is assigned, the frame mode will not be able to be changed to CAS framing until the TS is freed (not assigned).

TS 16:Will automatically be assigned in CAS mode of E1 LINE and can only be used for Signaling.

3.4.5 Data Port Parameter Detail The following shows the setup screens under the Data Port Parameter Screen.

DATA PORT PARAMETER

Press ENTER

The first line shows the data port interface type, clock mode, and the channel's multiplier value (56K or 64K). The second line shows the channel's bandwidth used. In the above display, the data port is using an RS530 interface, clock mode set to E1 Recovery, 64k multiplier and 256Kbps bandwidth (4-64K timeslots). The interface type is automatically displayed from the identity of the installed module. The only exceptions are with NRZ/BNC installed or for RS-449. The display will show that an X21 module is installed instead of NRZ and RS-449 uses an adapter cable on an RS-530 module.

Pressing ENTER from this display will enable editing of the Data Port parameters.

While at the Data Port display, only the multiplier value (N64 or N56) and handshaking (CTS) mode are user settable. As previously stated, the interface type is auto-detected and the data bandwidth is calculated by multiplying the multiplier value times the number of timeslots assigned to the channel under the Timeslot Mapping screen.

Use the arrow keys to browse the available settings under the Data Port channel. They are:

Multiplier value; N64 or N56, default is N64

CTS; ON or (follow) RTS, default is ON

Press the ENTER key to move the cursors to the Multiplier field. Select either N64 or N56 using the arrow keys, then press ENTER.
Use the arrow key to move on to the next parameter setting for CTS.

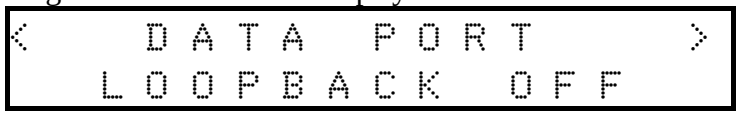
Press ENTER to move the cursors to the CTS field. Select either ON or RTS using the arrow keys, then press ENTER to effect the change.
If the Data Port channel module is not installed, a readout similar to the following will be displayed.

3.4.6 Loop back Parameter Detail The following shows the setup screens under the Loop back Parameter Screen.

LOOPBACK PARAMETER.

Press ENTER

Use the arrow keys to select between the E1 LINE or DATA PORT loop back settings. The DATA PORT display is as follows:



Use the arrow keys to browse the available options for both the E1 Line Loop back and the Data Port Loop back settings. The details for both are as follows:

E1 Line; Loop back Off, Local Analog, Local Digital, Local Payload, Remote Analog or Remote Payload. Default is Loop back Off.

Data Port; Loop back Off, Local Analog, Local Digital, or V.54 Loop. Default is Loop back Off.

Press ESC twice to back out to LOOP BACK PARAMETER and use the right arrow key to move on to the BERT TEST menu.

3.4.7 BERT Test Detail The following displays show the setup screens under the BERT test Parameter Screen.

BERT TEST PARAMETER

Press ENTER

Use the arrow keys to browse the available options for BERT test setting. The details are as follows:

Function; Off or On, default Off. Use to start BERT.

Channel; E1 or Data. Default is E1.

Pattern; 511, 2047, 2e15-1, 2e20-1, QRSS, 2e23-1, All 1, All 0, Alt, 0011, 3in24, 1in16, 1in8, or 1in4. Default is 511.

Err Ins; NONE, Single,10e-1, 10e-2, 10e-3, 10e-4, 10e-5, 10e-6, or 10e-7. Default is NONE.

Result; display the received error bit count and error rate.

BERT TEST ERROR INSERT (SINGLE)

When selecting the Single Error insert the following screen will display.

Press ENTER each time you want to insert an error.

3.4.8 Control Port Parameter Detail The following shows the setup screens under the Control Port Parameter Screen.

CONTROL PORT PARAMETER

Press ENTER

This screen shows the default settings for the Control Port.

Only the speed parameter is settable for the Control Port. Press ENTER.

The arrow keys will browse the available parameters for speed setting. They are as follows:

Speed; 300, 600, 1200, 2400, 4800, 9600, and 19200, default is 9600.

Data Length; fixed at 8 only.

Parity; fixed at NONE only.

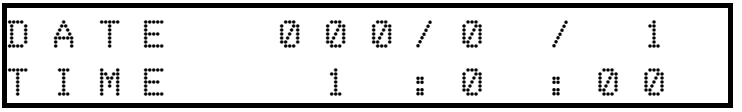
Follow the normal screen procedures to set the speed parameter, then press ESC to return to the upper menu.

3.4.9 Date & Time Display & Set Detail The following shows the setup screens under the Date & Time Parameter Screen.

DATE & TIME DISPLAY & SET

Press ENTER to display current Date and Time.

Press ENTER again to define date and time. The cursor will be in the year field. Use the arrow keys to increment or decrement the year. Press ENTER to save and move on to the month field. Use the arrow keys again to change the month, press ENTER to save and move to the Day field. Continue this procedure for the time settings and then press ESC to start the clock from the set time. The clock used in the ***ETU-01A*** is a ***Dallas DS1743*** and is fully Y2K compliant.



Press ESC again to exit to the upper menu.

3.4.10 Miscellaneous Setup Detail The following shows the setup screens under the Miscellaneous Parameter Screen.

Miscellaneous Parameter Display

Press ENTER.

Use the arrow keys to browse the two menu screens under Miscellaneous. They are LCD LIGHT and RESET TO DEFAULT. While displaying the LCD LIGHT screen, press ENTER.

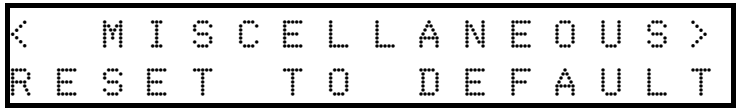
Use the arrow keys to browse the available options for the LCD back lighting. They are:

AUTO; The backlight will automatically turn off in 5 minutes if no key is pressed. The backlight will automatically turn on again if any key is pressed. Default is AUTO.

ON; The backlight will remain permanently on.

OFF; The backlight will remain permanently off.

Select the appropriate value and press ENTER. Use the arrow keys to browse to the RESET menu.



Press ENTER.

```
RESET TO DEFAULT
  PRESS   ENTER
```

Press the ENTER key to completely reset all parameters to their original factory defaults.

3.4.11 Alarm Buffer Display Detail Use this function to display the local or remote Alarm Buffer and/or clear the local Alarm Buffer.

```
<  ALARM BUFFER  >
    DISPLAY
```

Press ENTER and use the arrow keys to select between DISPLAY ALARM BUFFER, DISPLAY REMOTE ALARM BUFFER, and CLEAR ALARM BUFFER. On the display screen, press ENTER.

```
<  DISPLAY ALARM>
    BUFFER
```

Refer to Table 5-2 in Chapter 5 TEST and DIAGNOSTICS, for the meaning of the displayed alarms.

Use the right arrow key to browse to the REMOTE ALARM screen.

```
<DISPLAY REMOTE>
 ALARM BUFFER
```

Pressing ENTER will read the alarm buffer from the remote unit.

If you use the arrow keys to browse to the CLEAR function, the following will be displayed.

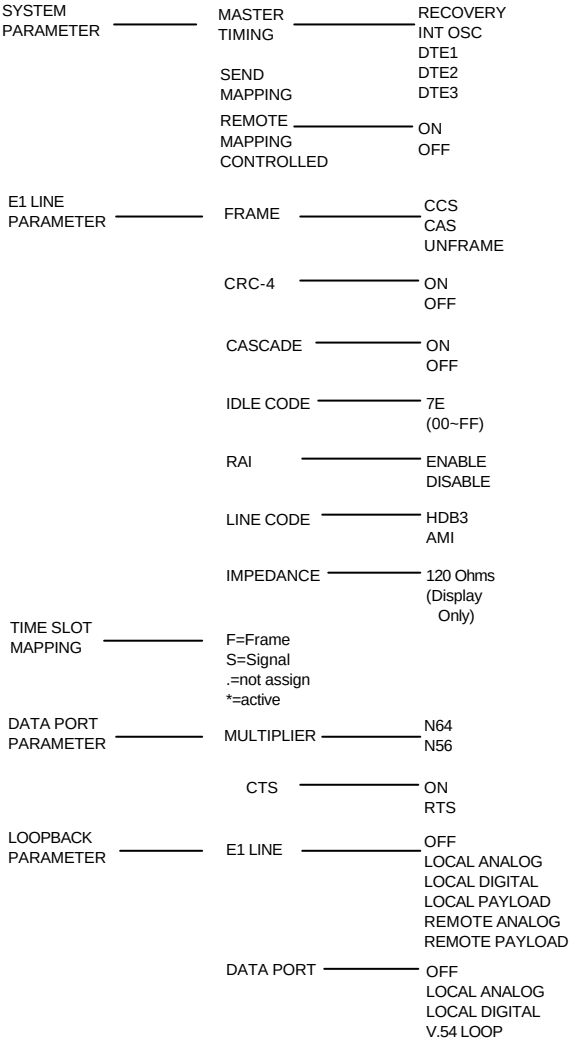
Press ENTER to clear the alarm buffer or press ESC to exit.
Press the right arrow key to display the last top level menu.
PERFORMANCE DISPLAY

The Performance Display is used to show the CRC-4 (checksum) count (CRC4 Cnt) or Bipolar Violations (BPV) count, Current Error Seconds (CURR ES), Current Unavailable Seconds (CURR UAS), Long Term Errored Seconds (LONG ES), Long Term Unavailable Seconds (LONG UAS), Current Seconds (CURR SEC) and Long Seconds (LONG SEC). Refer to Appendix B, for the detailed meaning of the performance displays. Press ENTER.

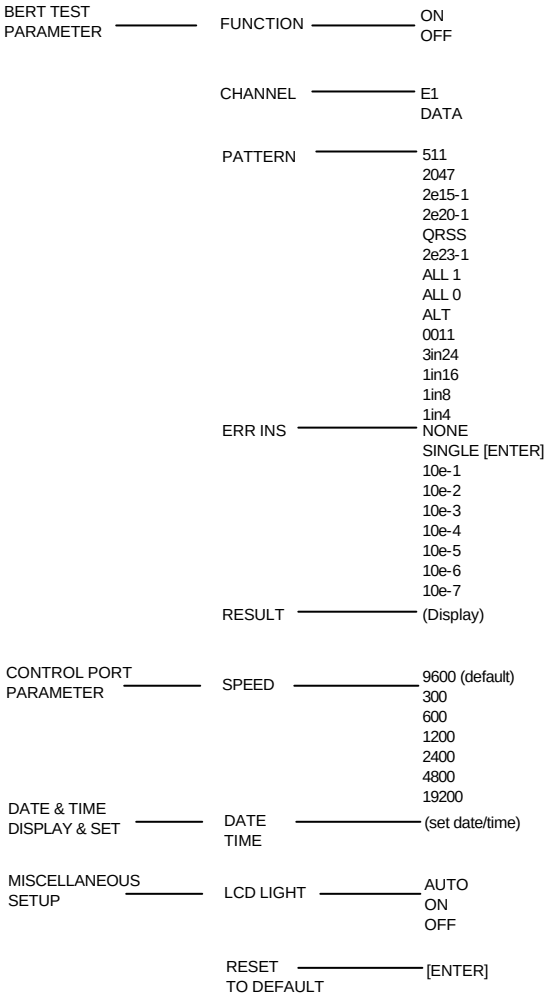
Press the arrow keys to browse the error counts for CRC4 Cnt, CURR ES, CURR UAS, etc. To exit the performance display, press ESC. To clear the data registers, press ENTER on the Reset page.

This completes the detailed discussion of the function setup and operation of the ***ETU-01A*** via the front panel LCD display.

ETU-01A Menu System Overview



ETU-01A Menu System Overview (cont.)



ETU-01A Menu System Overview (cont.)

ALARM BUFFER DISPLAY
- DISPLAY
- ALARM BUFFER
  - DISPLAY
  - REMOTE ALARM BUFFER
  - CLEAR ALARM BUFFER

PERFORMANCE DISPLAY
- BPV CNT
- ERR SECS
- UAS
- LONG ES
- LONG UAS
- CURR SEC
- LONG SEC

Chapter 4. Control Port Operation

4.1 General

The ***ETU-01A*** Control Port, sometimes referred to as a Craft port, (labeled RS-232 on the front panel) is a console terminal port designed to facilitate setup of all parameters through the use of a standard text based (ANSI) terminal or any terminal emulation program running on a Personal Computer.

4.2 Terminal Connection

A notebook computer has become an invaluable tool of the Systems Engineer. Connection of the ***ETU-01A*** to the computer is accomplished by a DB9-pin one-to-one, male to female cable. The ***ETU-01A*** acts as a DCE to the PC's DTE communications port. A convenient application, provided with the Microsoft Windows® NT/9X operating systems, is "HyperTerminal ™". Set the properties to match the ***ETU-01A*** control port defaults as follows: Baud=9600, Data bits=8, Parity=None, Stop bits=1, and handshaking =None and use a direct connection to the PC's COM port. Set the terminal emulation mode to ANSI. Make the appropriate connections, start the terminal application, apply power to the ***ETU-01A***, then press ENTER or SPACE on the PC keyboard. If you are using "HyperTerminal ™" the display should look like that on the following page.

Windows® is a registered trademark of Microsoft Corp., Redmond, WA.
HyperTerminal is a trademark of Hilgraeve, Monroe, MI

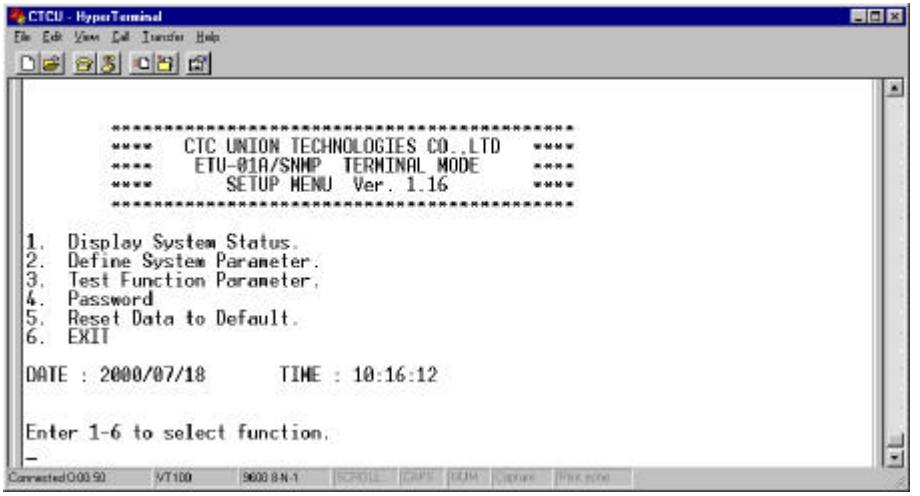


Figure 4-1. Example of terminal display

4.3 Menu System Detail

The menu systems are displayed in the same order and with the same parameters as those in the LCD display. The following section will detail actual displays with descriptions of parameter settings via relevant key commands.

This is the first screen seen after connecting. Note that the first two items, "Display" and "Define" deal with all the system settings. The Display item will browse settings for viewing only, while under Define, all parameters may be both viewed and changed.

```
  ******************************************
  ****   CTC UNION TECHNOLOGIES CO.,LTD   ****
  ****    ETU-01A/SNMP  TERMINAL MODE     ****
  ****       SETUP MENU  Ver. 1.16        ****
  ******************************************

1.  Display System Status.
2.  Define System Parameter.
3.  Test Function Parameter.
4.  Password
5.  Reset Data to Default.
6.  EXIT

DATE : 2000/08/24     TIME : 13:12:14


Enter 1-6 to select function.
```

Enter 1 to enter the Display System Status menu.

```
        <<  Display System Status  >>

    1.  Timing
    2.  E1 Line
    3.  Time Slot
    4.  Data Port
    5.  Control Port
    6.  Alarm Buffer
    7.  BERT Test Result
    8.  Performance
    9.  SNMP Agent Information
    A.  ETU-01A Information


    Enter 1-A or Press "ESC" to previous menu.
```

Enter 1 to display the Timing Parameters.

```
        <<  Display Timing Parameter  >>

    Master Timing : RECOVERY

    Press "ESC" to previous menu.
```

The display shows that the Master Timing is recovered from the E1 link received signal.

Press ESC to return to the Display System Status menu and press 2 to display the E1 Line status.

```
   <<  Display E1 Line Parameter  >>

Frame      : CCS
CRC-4      : OFF
Cascade Mode : OFF
Idle Code  : 7E
RAI        : DISABLE
Line Code  : HDB3
Impedance  : 120 ohm

Press "ESC" to previous menu.
```

The above display shows the settings for Frame type, CRC setting, Cascade Mode, Idle code, RAI setting, Line Code and E1 interface impedance for the E1 line. Press ESC to return to the Display System Status menu and press 3 to display the Time Slot status.

```
   <<  Display Time Slot Mapping  >>

SLOT : 00  01  02  03  04  05  06  07
TYPE : Fr   *   *   *   *   .   .   .

SLOT : 08  09  10  11  12  13  14  15
TYPE :  .   .   .   .   .   .   .   .

SLOT : 16  17  18  19  20  21  22  23
TYPE :  .   .   .   .   .   .   .   .

SLOT : 24  25  26  27  28  29  30  31
TYPE :  .   .   .   .   .   .   .   .

 *: Time slot used          .: Time slot not used
Fr: Framing               Si: Signaling

Press "ESC" to previous menu.
```

The Time Slot mapping display shows the assignments for all of the 32 timeslots of the E1 frame. All timeslots 0~31 are shown with the assigned abbreviations shown directly beneath. Press ESC to return to the Display System Status menu and press 4 to display the Data Port parameter settings for the channel I/F module.

```
        <<  Display Data Port Parameter  >>

    TYPE : RS530
    MULTIPLIER : N64
    CTC : ON
    V.54 Mode : OFF
    SPEED : 256Kbps

    Press "ESC" to previous menu.
```

Press ESC to return to the Display System Status menu and press 5 to display the Control Port settings.

```
        <<  Display Control Port Parameter  >>

    SPEED : 9600bps
    DATA  : 8
    PARITY: NONE

    Press "ESC" to previous menu.
```

The display shows the current settings.

Press ESC to return to the Display System Status menu and press 6 to display the Alarm Buffer Display Menu screen.

```
        <<  Alarm Buffer Display Menu  >>

    1.  Display Alarm Buffer
    2.  Display Remote Alarm Buffer


    Enter 1-2 or Press "ESC" to previous menu.
```

Press 1 to view the buffer. Example follows:

```
         <<  Display Alarm Buffer  >>

    E1 Line SYNC Loss   ON.     00/08/24      16:40:57
    E1 Line MRAI  ON.           00/08/24      16:40:58
    E1 Line SYNC Loss   OFF.    00/08/24      16:41:06
    E1 Line MRAI  OFF.          00/08/24      16:41:06
    ETU-01A Power turn  OFF.    00/08/24      18:33:27

    Press "ESC" to previous menu or "SPACE" to review ,
    "ENTER" to clear
```

Press ESC to return to the Display Alarm Buffer Menu, press SPACE to display the screen again, or press ENTER to clear the alarm buffer. After clearing the buffer, displaying will show:

```
         <<  Display Alarm Buffer  >>

    Alarm Buffer is empty.

    Press "ESC" to previous menu or "SPACE" to review ,
    "ENTER" to clear
```

Press ESC to return to the Display System Status menu and press 7 to display the Bert Test Result screen.

```
        <<  Display Bert Test Result  >>

    Rx Bit : 0

    Rx Error Bit : 00000000000000000

    Rx Error Rate : 0.0e-00

    Press "ESC" to previous menu or "SPACE" to review ,
    "ENTER" to clear.
```

Press ESC to return to the Display System Status menu and press 8 to display the Performance screen.

```
        <<  Display E1 Line Performance  >>

    Bipolar violations count (BPV) : 0
    Current CRC-4 error count : 0
    Current errored seconds (ES) : 0
    Current unavailable seconds (UAS) : 0
    Long-term errored seconds (ES) : 1
    Long-term fail seconds (UAS) : 0
    Current seconds : 27
    Long-term seconds : 25
    Press "ESC" to previous menu.
```

ESC back to Display System Status and enter 9 to display the SNMP Agent Information screen.

```
        <<  SNMP Card Information  >>

    Local IP Address :      <192.168.0.10>
    Subnet Mask Address :   <255.255.255.0>
    Community String :      <Public>

    Agent IP Address :      <0.0.0.0>
    Access Permission :     <Read Only>

    Receiver IP Address :   <0.0.0.0>
    Severity Status :       <Information>

    Hardware Address :      <00-02-AB-01-56-57>

    Press "ESC" to previous menu.
```

ESC back to Display System Status and enter A to display the ETU-01A Information screen.

```
        <<  Display ETU-01A Information  >>

    FPGA Version : 05
    SNMP Card Version : 21

    DATE : 2000/08/24  TIME : 15:35:11

    Press "ESC" to previous menu.
```

The information displayed shows the hardware version numbers of the FPGA chip in the ETU-01A. To exit this display, press ESC. Then press ESC again to go to the very top menu display.

```
    ******************************************
    ****   CTC UNION TECHNOLOGIES CO.,LTD   ****
    ****    ETU-01A/SNMP  TERMINAL MODE     ****
    ****       SETUP MENU  Ver. 1.16        ****
    ******************************************

1.  Display System Status.
2.  Define System Parameter.
3.  Test Function Parameter.
4.  Password
5.  Reset Data to Default.
6.  EXIT

DATE : 2000/08/24  TIME : 15:57:51


Enter 1-6 to select function.
```

Now we will look at defining the system parameters. To do this, enter 2.

```
    <<  Define System Parameter  >>


1.  Timing
2.  E1 Line
3.  Time Slot
4.  Data Port
5.  Date & Time
6.  Remote Config Time Slot Function.
7.  SNMP Agent Setup


Enter 1-7 or Press "ESC" to previous menu.
```

The first selection of system parameters is the Timing parameter, so let's enter 1.

```
        <<  Define Master Timing Parameter  >>

    Master Timing : RECOVERY

    1.  Recovery
    2.  Internal OSC
    3.  DTE 1
    4.  DTE 2
    5.  DTE 3

    Enter 1-5 or Press "ESC" to previous menu.
```

The current master timing is shown as "Recovery". This means that the timing source is derived from the received E1 signal. Press the appropriate number key to change the timing. The change will be immediately reflected. Enter ESC to return to the Define System Parameter menu, press 2 to define the parameters for the E1 Line.

```
        <<  Define E1 Line Parameter  >>

    1.  FRAME
    2.  CRC-4
    3.  CASCADE
    4.  IDLE CODE
    5.  RAI
    6.  LINE CODE

    Enter 1-6 or Press "ESC" to previous menu.
```

To define the Frame type for the main E1 link, press 1.

```
        <<  Define E1 Line Frame Parameter  >>

    Frame      : CCS

    1.  CCS
    2.  CAS
    3.  UNFRAME

    Enter 1-3 or Press "ESC" to previous menu.
```

The current frame type setting is CCS. To change it enter 1~3. Press ESC to exit and leave the setting unchanged. Press ESC. Press 2 to change the CRC-4 setting.

```
        <<  Define E1 Line CRC-4 Parameter  >>

    CRC-4      : OFF

    1.  OFF
    2.  ON

    Enter 1-2 or Press "ESC" to previous menu.
```

The current setting for CRC-4 is Off. To turn on, press 2. To exit without changing, press ESC. Press 3 to define the Cascade Mode.

```
        <<  Define E1 Line Cascade Mode  >>

    Cascade     : OFF

    1.  OFF
    2.  ON

    Enter 1-2 or Press "ESC" to previous menu.
```

In cascade mode, the unused timeslots will pass through their received data. Enter 2 to turn cascade mode ON, 1 to turn cascade mode OFF or ESC to exit to the Define E1 Line Parameters menu. Press ESC and enter 4 to define the Idle code for the E1 line.

```
        <<  Define E1 Line Idle Code  >>

    Idle Code  : 7E

    Enter Code (00~FF) :
```

Enter the new Idle code with the hex value 00~FF, or to exit, press ESC. Press ESC and enter 5 to enable or disable RAI (Remote Alarm Indication) for the E1 line.

```
        <<  Define E1 Line RAI Parameter  >>

    RAI        : DISABLE

    1.  Disable
    2.  Enable

    Enter 1-2 or Press "ESC" to previous menu.
```

Press 1 to disable, 2 to enable RAI, or press ESC to exit without changing. Press ESC and enter 6 to define the E1 Line code.

```
        <<  Define E1 Line Code  >>

    Line Code : HDB3
    1.  HDB3
    2.  AMI

    Enter 1-2 or Press "ESC" to previous menu.
```

Press 1 to define a Line Code of HDB3, press 2 to define a Line Code of AMI or press ESC. Press ESC to return to the Define E1 Line Parameter menu.

Press ESC again to return to the top of the Define System menu.

```
        <<  Define System Parameter  >>

    1.  Timing
    2.  E1 Line
    3.  Time Slot
    4.  Data Port
    5.  Date & Time

    Enter 1-5 or Press "ESC" to previous menu.
```

To enter the Timeslot Mapping menu, press 3.

```
        <<  Define Time Slot Mapping  >>

    1.  Define Time Slot Mapping.
    2.  Send Time Slot to Far End.


    Enter 1-2 or Press "ESC" to previous menu.
```

To define the Timeslot mapping assignments, press 1.

```
        <<  Define Time Slot Mapping  >>

    TIME SLOT 01
    TYPE : Data port

    1.  NC
    2.  Data Port

    Enter 1-2 or Press "ENTER" to next Time Slot or
    "ESC" to previous menu.
```

The slot number and map type are shown. Select 1 to remove the timeslot from the data port, press 2 to assign the timeslot to the data port. Press ENTER to move on to the next timeslot or ESC to exit the mapping function.

If we press the ENTER key now, the second timeslot will be displayed.

```
        <<  Define Time Slot Mapping  >>

    TIME SLOT 02
    TYPE : Data port

    1.  NC
    2.  Data port

    Enter 1-2 or Press "ENTER" to next Time Slot or
    "ESC" to previous menu.
```

Continue to set the timeslot mapping assignments, go on to the next timeslot or ESC. ESC will take us back to the Define Time Slot Mapping menu.

Selecting 2 will take the defined time slot mapping for the local unit and send it to the remote *ETU-01A* unit. In this way, the bandwidth can be controlled from the local unit.

```
<<  Define Time Slot Mapping  >>


1.  Define Time Slot Mapping.
2.  Send Time Slot to Far End.


Enter 1-2 or Press "ESC" to previous menu.
WAIT.........OK
```

The message "WAIT…" will be displayed while the data is being transferred. "OK" will display following successful transfer. Pressing ESC will take us back to the Define System Parameter menu.

```
    <<  Define System Parameter  >>


1.  Timing
2.  E1 Line
3.  Time Slot
4.  Data Port
5.  Date & Time
6.  Remote Config Time Slot Function.
7.  SNMP Agent Setup

Enter 1-7 or Press "ESC" to previous menu.
```

Press 4 to define the Data port parameters.

```
        <<  Define Data Port Parameter  >>

    TYPE : RS530
    MULTIPLIER : N64
    CTC : ON
    V.54 Mode : OFF
    SPEED : 256Kbps


    1.  Multiplier
    2.  CTS


    Enter 1-2 or Press "ESC" to previous menu.
```

Press the appropriate number 1~2 corresponding to the Data Port parameter to be defined.

Press 1 to define the multiplier for the data port.

```
        <<  Define Data Port Multiplier Parameter  >>

    1.  N64
    2.  N56


    Enter 1-2 or Press "ESC" to previous menu.
```

Choose the desired multiplier or ESC to the Define Data Port Parameter menu.

```
        <<  Define Data Port Parameter  >>

    TYPE : RS530
    MULTIPLIER : N64
    CTS : ON
    V.54 Mode : OFF
    SPEED : 256Kbps

    1.  Multiplier
    2.  CTS

    Enter 1-2 or Press "ESC" to previous menu.
```

Now we will select 2 to set the parameter for CTS.

```
        <<  Define Data Port CTS Parameter  >>

    1.  ON
    2.  RTS

    Enter 1-2 or Press "ESC" to previous menu.
```

Enter the appropriate setting for CTS (On always or follow RTS) or press ESC to exit without changing. Press ESC again to exit to the Define System Parameter.

```
        <<  Define System Parameter  >>

    1.  Timing
    2.  E1 Line
    3.  Time Slot
    4.  Data Port
    5.  Date & Time
    6.  Remote Config Time Slot Function.
    7.  SNMP Agent Setup

    Enter 1-7 or Press "ESC" to previous menu.
```

The following is an example of setting the system date and time. Press 5.

```
        <<  Define Date & Time  >>

    1.  DATE
    2.  TIME

    DATE : 2000/08/24  TIME : 16:24:25

    Enter 1-2 or Press "ESC" to previous menu.
```

To define the Date, press 1. Enter the 4 digit year, followed by the 2 digit month (single digit months must have a leading zero) and complete with the 2 digit day (single digit days must have a leading zero).

```
        <<  Define Date  >>

    YEAR (1900 ~ 2099) : 2000
    MONTH ( 01 ~ 12 )  : 08
    DAY   ( 01 ~ 31 )  : 24
```

The screen will revert to the Define Date & Time screen.

```
        <<  Define Date & Time  >>

    1.  DATE
    2.  TIME

    DATE : 2000/08/24  TIME : 16:26:10

    Enter 1-2 or Press "ESC" to previous menu.
```

To define the time, press 2.

```
        <<  Define Time  >>

    HOUR (00 ~ 23) : 16
    MINUTE (00 ~ 59) : 27
    SECOND (00 ~ 59) : 00
```

Enter the Hour, Minutes, and Seconds. (Single digit entries must have a leading zero.)

```
        <<  Define Date & Time  >>

    1.  DATE
    2.  TIME

    DATE : 2000/08/24  TIME : 16:27:05

    Enter 1-2 or Press "ESC" to previous menu.
```

To return to the Define System Parameter menu and start the clock, press ESC.

```
        <<  Define System Parameter  >>

    1.  Timing
    2.  E1 Line
    3.  Time Slot
    4.  Data Port
    5.  Date & Time
    6.  Remote Config Time Slot Function.
    7.  SNMP Agent Setup

    Enter 1-7 or Press "ESC" to previous menu.
```

Press 6 to enter the remote configuration menu.

```
        <<  Remote Config Function  >>

     Controlled : OFF

     1.  OFF
     2.  ON

     Enter 1-2 or Press "ESC" to previous menu.
```

Enter 1 to turn off remote control function (the connected remote unit cannot change the timeslot mapping of this unit). Enter 2 to turn on remote control (the connected remote unit can change the mapping info of this unit). Press "ESC" to reach the Define System Parameter menu and press 7 to setup the SNMP agent.

```
        <<  SNMP Agent Setup Menu  >>

     1.  Set the Agent Information.
     2.  Set Access Control Table.
     3.  Set Trap Receivers Table.
     4.  Set Community String.       < Public >
     5.  Save Parameter to SNMP Card and Exit.

     Enter 1-5 or Press "ESC" to previous menu.
```

NOTE: The SNMP menu is not available if the optional SNMP card is not installed in the *ETU-01A*.

Press 1 to set the agent information (IP address and subnet mask).

```
<<  Set the Agent Information  >>


1.  Local IP Address.           <192.168.0.10>
2.  Subnet Mask.                <255.255.255.0>
3.  Gateway IP Address.         <192.168.0.254>

Enter 1-3 or Press "ESC" to previous menu.
```

Press 1 to set the IP address, 2 to set the subnet mask, 3 to set the default gateway, or ESC to return to the SNMP agent setup menu. If we press 1, the screen will display:

```
<<  Set the Agent Information  >>


1.  Local IP Address.           <192.168.0.10>
2.  Subnet Mask.                <255.255.255.0>
3.  Gateway IP Address.         <192.168.0.254>

Enter 1-2 or Press "ESC" to previous menu.

Input Local IP Address :
```

Key in the IP address in standard decimal format. Then press ENTER. If we press 2, the screen will display:

```
Input Subnet Mask Address :
```

Enter the subnet mask in standard decimal format then press ENTER. If we press 3, the screen will display:

```
Input Gateway IP Address :
```

Enter the address or press ESC to return to the agent setup menu.

```
<<  SNMP Agent Setup Menu  >>

1.  Set the Agent Information.
2.  Set Access Control Table.
3.  Set Trap Receivers Table.
4.  Set Community String.       < Public >
5.  Save Parameter to SNMP Card and Exit.

Enter 1-5 or Press "ESC" to previous menu.
```

Enter 2 to set the access control table.

```
   <<  Set Access Control Table  >>

1.  Input Agent IP Address.     <0.0.0.0>
2.  Input Access Permission.    <Read Only>

Enter 1-2 or Press "ESC" to previous menu.
```

Enter 1 to set the input agent IP address (address of the management workstation), 2 to set access permission for the management workstation, or ESC to exit this menu. From the SNMP agent setup menu, press 3.

```
   <<  Set Trap Receiver Table  >>

1.  Input Receiver IP.          <0.0.0.0>
2.  Input Severity.             <Information>

Enter 1-2 or Press "ESC" to previous menu.
```

Enter 1 to set IP address of the input agent to receive traps sent by the *ETU-01A*. Enter 2 to set the severity of traps sent; informational, warning, or severe.

Press ESC to the SNMP agent setup menu

```
<<  SNMP Agent Setup Menu  >>

1.  Set the Agent Information.
2.  Set Access Control Table.
3.  Set Trap Receivers Table.
4.  Set Community String.       < Public >
5.  Save Parameter to SNMP Card and Exit.

Enter 1-5 or Press "ESC" to previous menu.
```

Press 4 to set the community string.

```
<<  SNMP Agent Setup Menu  >>

1.  Set the Agent Information.
2.  Set Access Control Table.
3.  Set Trap Receivers Table.
4.  Set Community String.       < Public >
5.  Save Parameter to SNMP Card and Exit.

Enter 1-5 or Press "ESC" to previous menu.

==========================================
Input Community String.

Input String. (1 to 8 chars ) :
```

The default community string is “Public”. Enter the text string for the community name up to 8 characters and press ENTER. The agent setup menu will again appear.

```
<<  SNMP Agent Setup Menu  >>

1.  Set the Agent Information.
2.  Set Access Control Table.
3.  Set Trap Receivers Table.
4.  Set Community String.       < Public >
5.  Save Parameter to SNMP Card and Exit.

Enter 1-5 or Press "ESC" to previous menu.
```

Up until now, none of the changes made have been saved to the SNMP card. Press 5 to save the settings. The display will show:

```
Wait..........Config SNMP Card.
```

Following completion, the screen will revert to the Define System Parameters menu.

```
        <<  Define System Parameter  >>

1.  Timing
2.  E1 Line
3.  Time Slot
4.  Data Port
5.  Date & Time
6.  Remote Config Time Slot Function.
7.  SNMP Agent Setup


Enter 1-7 or Press "ESC" to previous menu.
```

Press ESC again to reach the top level menu.

```
    ******************************************
    ****   CTC UNION TECHNOLOGIES CO.,LTD   ****
    ****    ETU-01A/SNMP  TERMINAL MODE     ****
    ****       SETUP MENU  Ver. 1.16        ****
    ******************************************

  1.  Display System Status.
  2.  Define System Parameter.
  3.  Test Function Parameter.
  4.  Password
  5.  Reset Data to Default.
  6.  EXIT

  DATE : 2000/08/24  TIME : 17:14:42

  Enter 1-6 to select function.
```

Now we will move on to setting the Test Function parameters, press 3.

```
      <<  Define Test Mode Function  >>

  1.  LoopBack Test
  2.  Bert Test

  Enter 1-2 or Press "ESC" to previous menu.
```

First we will look at the item Loop Back Test, press 1.

```
      <<  Define LoopBack Test Port  >>

  E1 Line Loopback : LOOPBACK OFF
  Data Port LoopBack : LOOPBACK OFF

  1.  E1 Line
  2.  Data Port

  Enter 1-2 or Press "ESC" to previous menu.
```

The first two lines of the display show the current loop back status of the E1 line and the Data Port. In the next example we will set loop back for the E1 Line. Press 1.

```
    <<  E1 Line LoopBack  >>

E1 Line LoopBack : LOOPBACK OFF

1.  OFF
2.  Local Analog
3.  Local Digital
4.  Local Payload
5.  Remote Analog
6.  Remote Payload

Enter 1-6 or Press "ESC" to previous menu.
```

The choices presented are to turn OFF loop back or turn ON Local Analog, Local Digital, Local Payload, Remote Analog, or Remote Payload loop back. In the following example you will observe that the loop back has changed to Local Analog Loop back. Press 2.

```
    <<  E1 Line LoopBack  >>

E1 Line LoopBack : LOCAL ANALOG

1.  OFF
2.  Local Analog
3.  Local Digital
4.  Local Payload
5.  Remote Analog
6.  Remote Payload

Enter 1-6 or Press "ESC" to previous menu.
```

If we now ESC back, the display of all loop back status can be observed. Note that the E1 Line is now set for Local Analog Loop Back.

```
        <<  Define LoopBack Test Port  >>

    E1 Line Loopback : LOCAL ANALOG
    Data Port LoopBack : LOOPBACK OFF

    1.  E1 Line
    2.  Data Port


    Enter 1-2 or Press "ESC" to previous menu.
```

Now we will select the E1 Line again (Press 1) and turn OFF loop back (by pressing 1).

```
        <<  E1 Line LoopBack  >>

    E1 Line LoopBack : LOOPBACK OFF

    1.  OFF
    2.  Local Analog
    3.  Local Digital
    4.  Local Payload
    5.  Remote Analog
    6.  Remote Payload


    Enter 1-6 or Press "ESC" to previous menu.
```

Press ESC and the status will again be displayed.

```
        <<  Define LoopBack Test Port  >>

     E1 Line Loopback : LOOPBACK OFF
     Data Port LoopBack : LOOPBACK OFF

     1.  E1 Line
     2.  Data Port

     Enter 1-2 or Press "ESC" to previous menu.
```

Press ESC to back out to the Define Test Mode menu. Press 2 to select BERT test.

```
        <<  Bert Test Parameter  >>

     Function : OFF      Channel  : E1
     Pattern : 511       Error Insert : NONE

     1.  Function
     2.  Channel
     3.  Pattern
     4.  Error Insert
     5.  Result

     Enter 1-5 or Press "ESC" to previous menu.
```

To start BERT function with the above parameters, select item 1.

```
        <<  Bert Test Function  >>

     Function : OFF

     1.  OFF
     2.  ON

     Enter 1-2 or Press "ESC" to previous menu.
```

Enter 2 to Start the BERT function.

```
        <<  Bert Test Function  >>

    Function : ON

    1.  OFF
    2.  ON

    Enter 1-2 or Press "ESC" to previous menu.
```

Enter 1 to Stop BERT function. Note that pressing 2 and 1 repeatedly toggles the function on and off. Press ESC.

```
        <<  Bert Test Parameter  >>

    Function : OFF      Channel  : E1
    Pattern : 511       Error Insert : NONE

    1.  Function
    2.  Channel
    3.  Pattern
    4.  Error Insert
    5.  Result

    Enter 1-5 or Press "ESC" to previous menu.
```

To view the BERT results, press 5.

```
        <<  Display Bert Test Result  >>

    Rx Bit : 34078143
    Rx Error Bit : 0
    Rx Error Rate : 0.0e-00

    Press "ESC" to previous menu or "SPACE" to review ,
    "ENTER" to clear.
```

Press ESC.

Now we will select the Data Port for BERT testing. Press 2.

```
        <<  Bert Test Channel  >>

    Channel  : E1

    1.  E1 Line
    2.  Data Port

    Enter 1-2 or Press "ESC" to previous menu.
```

Enter 2, to select Data Port for testing.

```
        <<  Bert Test Channel  >>

    Channel  : DATA

    1.  E1 Line
    2.  Data Port

    Enter 1-2 or Press "ESC" to previous menu.
```

Press ESC. The Bert Test screen will show again.

```
        <<  Bert Test Parameter  >>

    Function : ON       Channel  : DATA
    Pattern : 511       Error Insert : NONE

    1.  Function
    2.  Channel
    3.  Pattern
    4.  Error Insert
    5.  Result

    Enter 1-5 or Press "ESC" to previous menu.
```

Now select a different pattern for testing. Enter 3.

```
      <<  Bert Test Pattern  >>
Pattern : 511

1.  511
2.  2047
3.  2e15-1
4.  2e20-1
5.  QRSS
6.  2e23-1
7.  ALL 1
8.  ALL 0
9.  ALT
A.  0011
B.  3in24
C.  1in16
D.  1in8
E.  1in4

Enter 1-E or Press "ESC" to previous menu.
```

In this example, we will enter 9, to select the ALT 0101 pattern, then press ESC. Note the results screen below. The function is ON, channel is DATA and pattern is ALT.

```
      <<  Bert Test Parameter  >>
Function : ON      Channel  : DATA
Pattern : ALT      Error Insert : NONE

1.  Function
2.  Channel
3.  Pattern
4.  Error Insert
5.  Result

Enter 1-5 or Press "ESC" to previous menu.
```

An important function of BERT is the ability to insert errors at a pre-defined error rate or to insert single bit errors (to verify proper loop back) on command. Press 4.

```
        <<  Bert Test Error Insert  >>

    Error Insert : NONE

    1.  NONE
    2.  SINGLE
    3.  10e-1
    4.  10e-2
    5.  10e-3
    6.  10e-4
    7.  10e-5
    8.  10e-6
    9.  10e-7

    Enter 1-9 or Press "ESC" to previous menu.
```

Press 2, to insert single errors on command.

```
        <<  Bert Test Error Insert  >>

    Press "ENTER" to insert single error or "ESC" to
    previous menu
```

With each press of the ENTER key, an error will be inserted. Press the ENTER key 4 times to insert 4 errors. Then press ESC and then 5 to view the results.

```
        <<  Display BERT Test Results  >>

    Rx Bit: 39204867
    Rx Error Bit: 4
    Rx Error Rate: 1.0e-07

    Press "ESC" to previous menu.
```

Note that almost 40 million bits were received with exactly 4 inserted bit errors. The error rate is about 1 in 10 million bits. After viewing the BERT results, press ESC.

```
        <<  Bert Test Parameter  >>

    Function : ON      Channel  : DATA
    Pattern : ALT      Error Insert : SINGLE

    1.  Function
    2.  Channel
    3.  Pattern
    4.  Error Insert
    5.  Result

    Enter 1-5 or Press "ESC" to previous menu.
```

To turn off the BERT function, call up the function menu. Press 1.

```
        <<  Bert Test Function  >>

    Function : ON

    1.  OFF
    2.  ON


    Enter 1-2 or Press "ESC" to previous menu.
```

Press 1, to turn off BERT.

```
        <<  Bert Test Function  >>

    Function : OFF

    1.  OFF
    2.  ON

    Enter 1-2 or Press "ESC" to previous menu.
```

Press ESC to the Bert Test Parameter page. Then press ESC again to exit to the Define Test Mode screen, followed by ESC again to the top menu page.

```
    ******************************************
    ****   CTC UNION TECHNOLOGIES CO.,LTD   ****
    ****    ETU-01A/SNMP TERMINAL MODE      ****
    ****       SETUP MENU  Ver. 1.16        ****
    ******************************************

    1.  Display System Status.
    2.  Define System Parameter.
    3.  Test Function Parameter.
    4.  Password
    5.  Reset Data to Default.
    6.  EXIT

    DATE : 2000/08/24  TIME : 21:08:01


    Enter 1-6 to select function.
```

The following is an example of Password setting for the *ETU-01A*.

Press 4.

```
        <<  Password  >>

    1.  Set Password
    2.  Clear Password

    Enter 1-2 or Press "ESC" to previous menu.
```

Enter 1 to set the password.

```
        <<  Enter Password  >>


    Enter Password ( 4 Number ) :
```

Enter 1234.

```
    *** Password entry successful. ***

    Press "ESC" to previous menu.
```

Press ESC.

```
        <<  Password  >>

    1.  Set Password
    2.  Clear Password

    Enter 1-2 or Press "ESC" to previous menu.
```

To clear the password, press 2.

```
        <<  Clear Password  >>

    Enter original password :
```

Enter the original password, 1234.

```
    *** Password is DISABLED ***

    Press "ESC" to previous menu.
```

Press ESC twice to return to the main menu.

```
    ******************************************
    ****   CTC UNION TECHNOLOGIES CO.,LTD   ****
    ****    ETU-01A/SNMP TERMINAL MODE      ****
    ****       SETUP MENU  Ver. 1.16        ****
    ******************************************

    1.  Display System Status.
    2.  Define System Parameter.
    3.  Test Function Parameter.
    4.  Password
    5.  Reset Data to Default.
    6.  EXIT

    DATE : 1999/09/28  TIME : 21:14:41

    Enter 1-6 to select function.
```

To reset all parameters to the original factory default settings, press 5. The following will be displayed.

```
<<  Reset Data to Factory Default.  >>


Press "ENTER" to confirm, "ESC" to previous menu.
```

Press ENTER to reset to factory defaults. To exit without resetting press ESC. Press ENTER.

```
   ******************************************
   ****   CTC UNION TECHNOLOGIES CO.,LTD   ****
   ****    ETU-01A/SNMP TERMINAL MODE      ****
   ****       SETUP MENU  Ver. 1.16        ****
   ******************************************

1.  Display System Status.
2.  Define System Parameter.
3.  Test Function Parameter.
4.  Password
5.  Reset Data to Default.
6.  EXIT

DATE : 1999/03/01  TIME : 00:00:51


Enter 1-6 to select function.
```

All parameters have been set back to factory defaults. The clock has also been reset to March 1, 1999. To exit the terminal mode. press 6. The terminal connection will be dropped and the following will be displayed.

```
ETU-01A TERMINAL MODE IS DISCONNECTED
```

This completes the detailed examples of terminal mode operation for the *ETU-01A*.

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Chapter 5. Loop Back and BERT Testing

5.1 General

The ***ETU-01A*** diagnostics functions include:

Status indications and messages.

User activated loop back.

Integrated Bit Error Rate Test (BERT).

The loop back tests and integrated BERT are out-of-service tests which may be activated via the user data port (utilizing the V.54 standard), the front panel LCD interface, from the console terminal menu or via SNMP (when option is installed). The ***ETU-01A*** offers bit error rate testing on both the synchronous data channel and the E1 line, using a locally generated pseudo-random sequence. To provide compatibility with other BERT equipment, you may select the pseudo-random pattern from a list of available patterns.

5.2 Status Indicators and Messages

Indicators:

The status, of the ***ETU-01A***, is indicated by viewing the Signal Loss, Sync Loss, Alarm, Error and Test LED indicators. User data channel activity is indicated by the corresponding RD and TD LED indicators.

Table 5-1 LED indicators

Indicator	Color	Function
Power	Green	ON when power is on.
Sig Loss	Red	ON when received signal is lost.(E1 Line)
Sync Loss	Red	ON when received frame sync is lost.(E1 Line)
Alarm	Red	ON when E1 has an alarm. (Includes: BPV error / CRC4 error / Frame slip / All one / Remote alarm)
RD	Yellow	ON when SPACE is being received. Off when MARK is being received. Flashing when data is received.
TD	Yellow	ON when SPACE is being transmitted, Flashing when data is transmitted.
Error	Red	ON when BERT function is activated and detects bit errors.
Test	Red	ON when the ***ETU-01A*** is in any loop back mode or BERT function is on. Flashing when in loop back initiated by the remote unit.

Display:

The ***ETU-01A*** maintains an alarm buffer. The buffer can store an alarm event of each type along with the time of occurrence. A maximum of 256 alarms may be stored and displayed on the front panel LCD through the ALARM BUFFER DISPLAY menu or the terminal connected to the Control Port. Table 5-2, on the next page, presents the alarm messages generated by the ***ETU-01A***.

Table 5-2 Alarm Message

Message	Description	Corrective Actions	Alarm type
POWER TURN	Power ON/OFF time.		ON/OFF
BRG1 FAILURE	The data port baud rate generator has failed. Only tested at power on.	Check the clock mode of the user data channel. Replace the *ETU-01A*.	ON
FIFO1 SLIP	The data port FIFO buffer suffered an overflow or underflow, usually caused by inconsistencies in clock rates.	Check the clock mode of the user data channel. Replace the *ETU-01A*.	ON
E1 SIG. LOSS	Loss of E1 link receive signal.	Check cable connections to the E1 line connector. Check other equipment providing the link to the *ETU-01A*.	ON/OFF
E1 SYNC LOSS	Loss of E1 link frame sync.	Check cable connections to the E1 line connector. Check other equipment providing the same frame link to the *ETU-01A*. Replace the *ETU-01A*.	ON/OFF
E1 LINK BPV	Bipolar violations in the E1 link receive signal. Updated once per second.	Check that line attenuation does not exceed that specified for E1 line. Check other equipment providing the same line code to the *ETU-01A*.	ON
E1 CRC4 ERR	CRC-4 errors detected in E1 link receive signal. Updated once per second.	Check other equipment providing the same frame link to the *ETU-01A*.	ON
E1 FRAME SLIP	E1 link frame slips are detected. Updated once per second.	Incorrect selection of master clock source. Problem with the equipment connected to the remote end of the link, unstable clock source.	ON
E1 LINE AIS	E1 link receiving an all ones signal.	Problem with the equipment connected to the remote end of the link.	ON/OFF

5.3 USER Activated Loop Back.

The ***ETU-01A*** supports the following types of test loop backs.

E1 line local analog loop back.
E1 line local digital loop back.
E1 line local payload loop back.
E1 line remote analog loop back.
E1 line remote digital loop back.
Data Port local analog loop back.
Data Port local digital loop back.
Data Port V.54 remote loop back.

The user activated loop back functions are accessed from the LOOPBACK PARAMETER menu on the front panel LCD, through the Test Function Parameter => Loop Back Test menu via the console port terminal or with set commands issued by an SNMP management workstation. The available test functions are described in the following pages.

E1 line local analog loop back

The E1 line local analog loop back is performed by connecting the main link transmit signal to the input of the receive path in the Channel Service Unit (CSU), as shown in Figure 5-1. This returns the transmit signal of the Data port to the receive path of the Data port. The Data Port must receive its own transmission. This loop back fully tests the local ***ETU-01A*** operation and the connections to the local DTE. During this loop back, the ***ETU-01A*** E1 line sends an unframed "all ones" signal to the remote equipment. Before initiating this loop back, disconnect the LAN cable from the rear panel Ethernet Bridge interface.

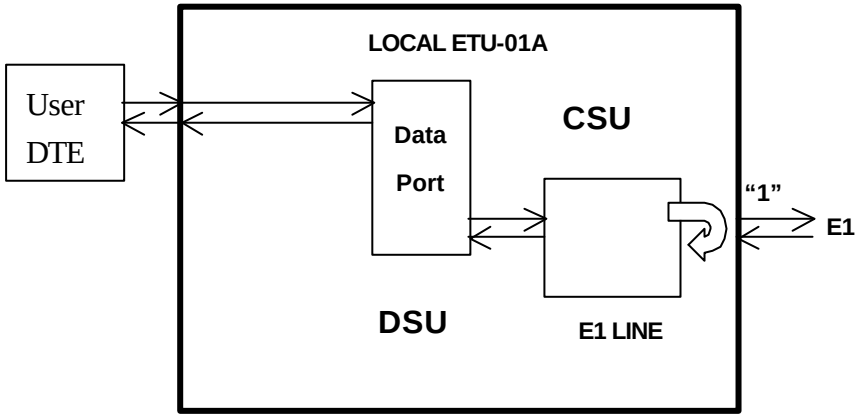


Figure 5-1. E1 link local analog loop back

E1 line local digital loop back

E1 line local digital loop back is performed by connecting the E1 link receive signal to the output of the transmit path, in the DSU. This loop back test checks the performance of the local ***ETU-01A***, the remote ***ETU-01A*** and the connections between them, as shown in Figured 5-2.

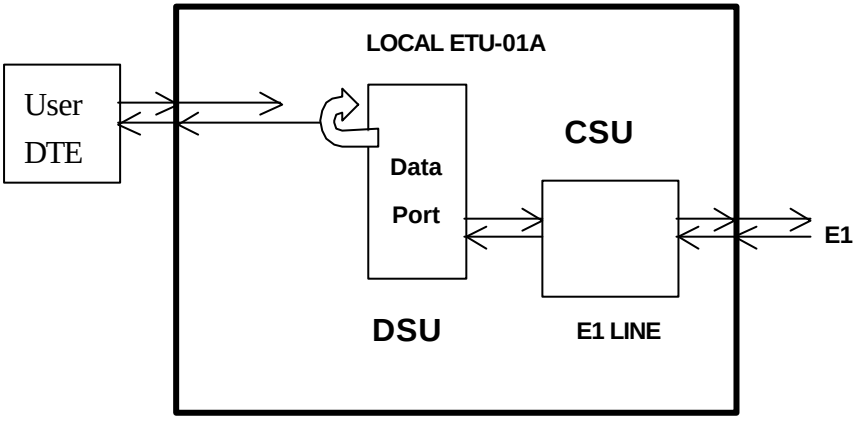


Figure 5-2. E1 link local digital loop back

E1 line local payload loop back

E1 line local payload loop back is performed by connecting the E1 link receive signal to the output of the transmit path, before the Digital Service Unit (DSU). This loop back test checks the performance of the local ***ETU-01A***, the remote ***ETU-01A*** and the connections between them, as shown in Figured 5-3.

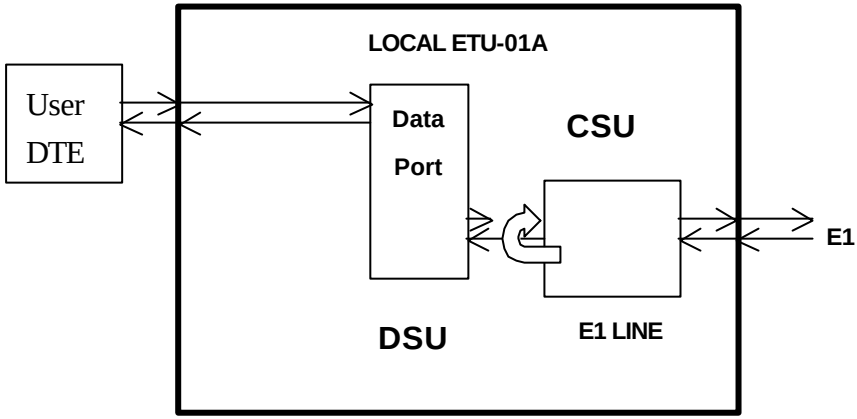


Figure 5-3. E1 link local payload loop back

E1 line remote analog loop back

E1 line remote analog loop back is performed by sending a loop back code to the remote unit. The remote unit then connects its E1 link receive signal to the output of the transmit path, before the Channel Service Unit (CSU). This loop back test checks the performance of the local ***ETU-01A***, the remote ***ETU-01A*** and the connections between them, as shown in Figured 5-4.

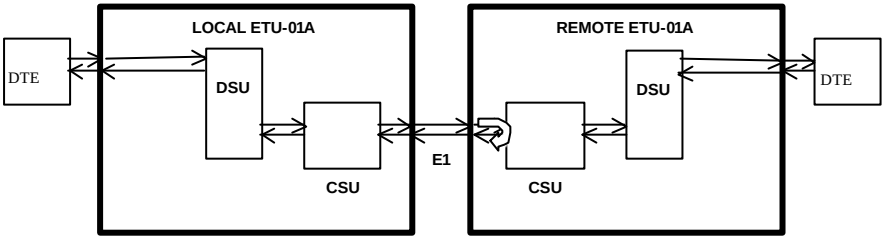


Figure 5-4. E1 link remote analog loop back

note:

The remote loop back codes, also referred to as data link messages, for the ***ETU-01A*** utilize the 4 spare Sa bits within the framing timeslot (TS0). Therefore, any remote loop back functions, including remote analog loop back (LLB) and remote payload loop back (PLB) are only available when running in framed mode (PCM30 or PCM31). Unframed mode does not support any remote loop back functions.

E1 line remote payload loop back

E1 line remote payload loop back is performed by sending a loop back code to the remote unit. The remote unit then connects its E1 link receive signal to the output of the transmit path, before the Digital Service Unit (DSU). This loop back test checks the performance of the local ***ETU-01A***, the remote ***ETU-01A*** and the connections between them, as shown in Figured 5-5.

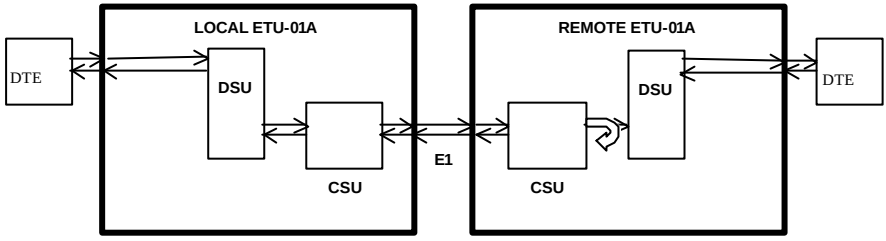


Figure 5-5. E1 link remote payload loop back

Data Port local analog loop back.

Data Port local analog loop back is performed by connecting the data channel transmit data (TD) to the input of the receive path (RD) before the CSU, as shown in Figure 5-6. The test signal is provided by the local DTE.

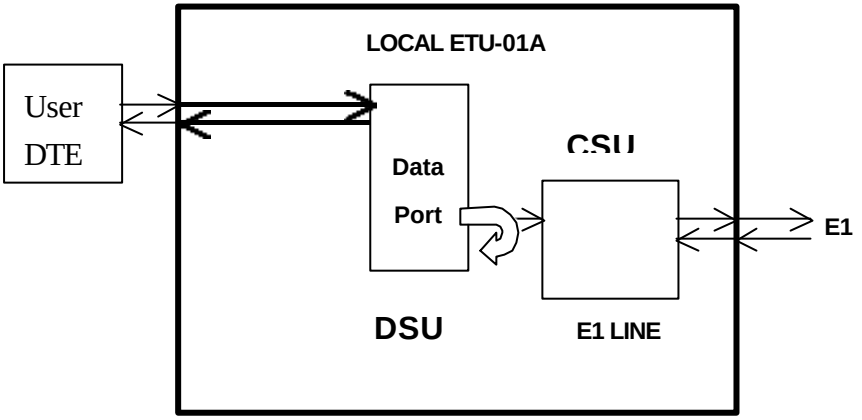


Figure 5-6. Data Port local analog loop back

Data Port local digital loop back.

Data Port local digital loop back is performed by connecting the local data channel receive data (RD) to the data channel transmit input (TD), as shown in Figure 5-7. The test signal is then provided by the remote user DTE.

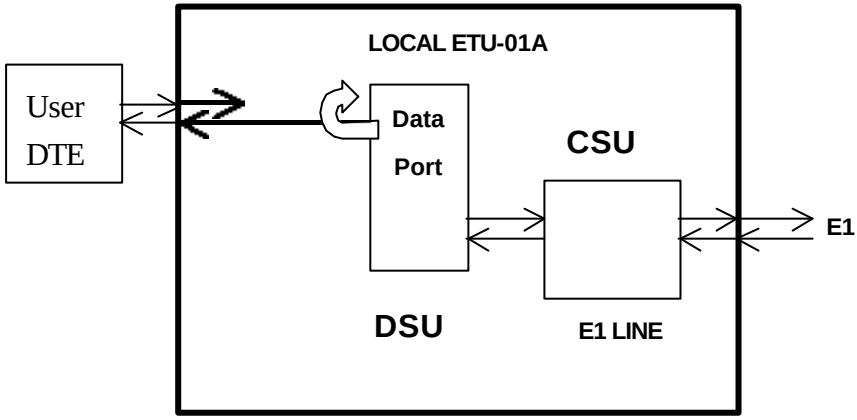


Figure 5-7. Data Port local digital loop back

Data Port V.54 remote loop back

The Data Port V.54 remote loop back is performed by sending standard V.54 loop back codes to the remote unit. The remote unit then connects its local data channel receive data (RD) to the channel transmit input (TD). This loop back test checks the performance of the local ***ETU-01A***, the remote ***ETU-01A*** and the connections between them, as shown in Figured 5-8.

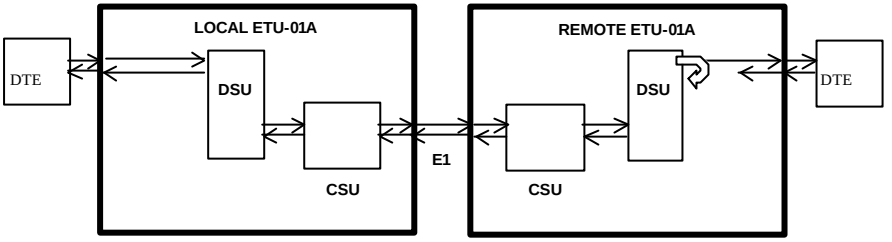


Figure 5-8. Data Port V.54 remote loop back

Integrated Bit Error Rate Test (BERT).

During **Data Port BERT** testing, the local DTE is disconnected and the DSR line is off. An internal pattern generator connects a user selected test pattern sequence to the transmit input of the local data channel interface. To calibrate the system, the user can inject errors at a selectable rate. The receive output is connected to a pattern tester. The tester compares the received and transmitted patterns and detects errors.

During **E1 Line BERT** testing, an internal pattern generator connects a user selected test pattern sequence to the transmit input of the local E1 line interface. To calibrate the system, the user can inject errors at a selectable rate. The receive output is connected to a pattern tester. The tester compares the received and transmitted patterns and detects errors.

BERT local loop back

For a **local test**, use the E1 Line local analog loop back (or hardwire main link RX connector to TX) or the Data Port local analog loop back, to return the data back to the local DTE, as shown in Figure 5-9.

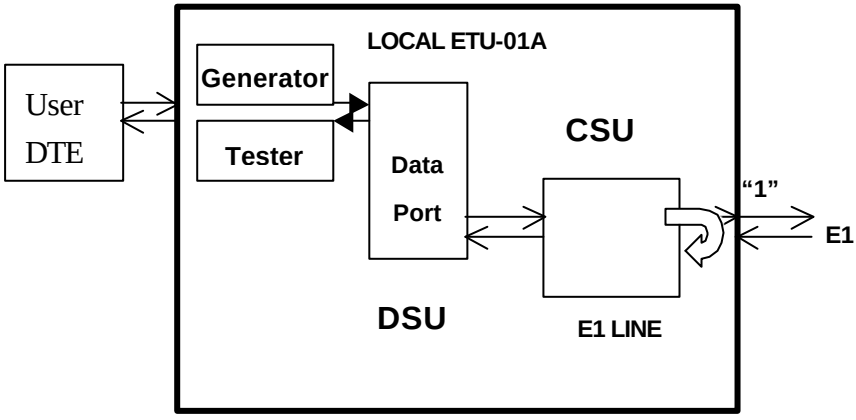
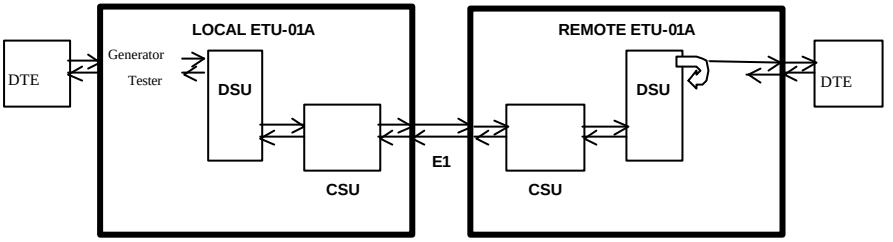


Figure 5-9. BERT for local test

(BERT on Data Port shown, E1 Link analog loop back.)

BERT for system test

For a **system test**, use the remote site's E1 link local digital or payload loop back or data port local digital loop back, to return the data back to the local DTE over the E1 link, as shown in Figure 5-10. Additionally, you may use the local site's E1 link remote analog, remote payload or Data Port V.54 loop back to return the data back to the local DTE.



Local Site:

E1 Link Remote analog or payload loop back; Data Port V.54 loop back (shown).

Remote Site:

E1 Link local digital (shown) or payload loop back; Data Port local digital loop back.

Figure 5-10. BERT used for system test

Chapter 6. SNMP Option

6.1 Installation

Installation of the SNMP optional feature should be performed by qualified service personnel only. As with all electronic devices that are powered from an AC line, dangerous voltages may be present inside the unit. The technician should exercise proper care and judgement. Only open the unit for service after disconnecting the unit from the power source.

This documentation will explain in detail the proper procedure for installation of the SNMP printed circuit board feature for the ***ETU01-A***. This procedure may also require replacement of the operational firmware for older versions of the ***ETU01-A*** as the older firmware does not support the SNMP card functions.

6.1.1 Required tools and supplies

1. No.2 Philips head screwdriver
2. thread lock compound (such as Glyptol™)
3. small, flat blade screwdriver (to aid in replacing firmware IC)

6.1.2 Procedure (Please refer to the attached drawing)

1. Inspect the contents of the SNMP kit. It should contain one(1) SNMP card, three(3) brass standoffs, six(6) 3mm screws, MIB file floppy diskette or CDROM, and possibly a 32pin EEPROM.
2. From the rear of the unit, disconnect all power, data port, and E1 cabling from the unit. Loosen the two captive thumb-screws located on the lower left and right of the unit. Carefully slide the mother PCB out of the case and place on a flat, clean work area. (Refer to Figure 6-1: Firmware Chip Location.)

3. Refer to Figure 6-2, the SNMP Exploded view. Apply thread-lock to three mounting screws and attach the three brass standoffs to the main PCB as shown. The standoffs are to be located on the component side of the main PCB.
4. If the firmware needs to be upgraded, perform this step prior to insertion of the SNMP card. Use a flat-blade screwdriver to carefully remove the EEPROM IC from PCB location U4 (refer to Figure 6-1). Ensure that the pins of the new IC are straight, align the pins with the IC socket and carefully seat the new IC. Excessive force should not be required. Inspect all 32 pins to ensure proper seating and that no pins were inadvertently bent during insertion.
5. Install the SNMP pc board by aligning the pins of the SNMP card with the 20pin connector and seat the card. Ensure that no pins are bent and that all pins have been received into the connector socket on the main PCB.
6. Use the remaining 3mm screws to hold down the SNMP card. Do not over-tighten, just tighten snug. Apply Glyptol™ to the hold down screws at your discretion. Refer to the exploded view Figure 6-2.
7. If the system firmware has been replaced, a system reset will be required to initialize the system properly. Return the motherboard to the case, tighten the captive thumb-screws and re-attach all cables and power. Perform a system reset followed by re-configuration and normal loop back diagnostics. Please refer to Chapter 3 if using the LCD or Chapter 4 for serial terminal.

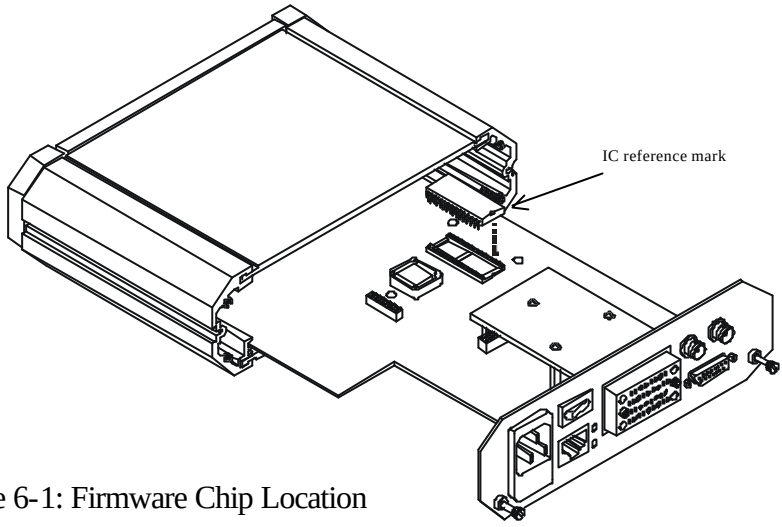


Figure 6-1: Firmware Chip Location

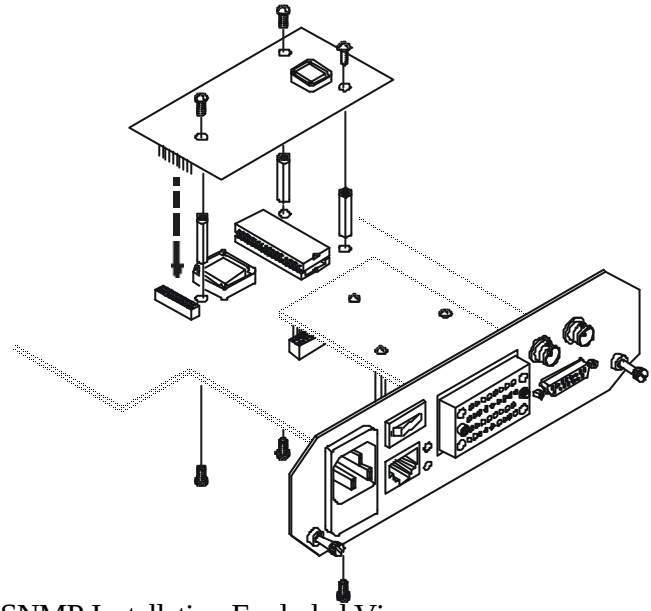


Figure 6-2: SNMP Installation Exploded View

6.2 Simple Network Management Protocol

6.2.1 SNMP Overview

The Simple Network Management Protocol (SNMP) is one of many protocols in the Internet Protocol (IP) suite. SNMP is the protocol recommended specifically for the exchange of management information between hosts residing on IP networks. Network management allows you to monitor and control network devices remotely using conventional computer network technology.

The SNMP management functions of the ***ETU01-A*** are provided by an internal SNMP agent, which utilizes out-of-band communication over standard 10BASE-T Ethernet. The SNMP agent is compliant with the SNMPv1 standard. SNMP communication uses the User Datagram Protocol (UDP). UDP is a connectionless transport protocol, part of the IP suite. The SNMP protocol is an asynchronous command/response polling protocol and operates at the OSI Layer 7 (Layer 7 is the Application Layer. Other IP protocols that operate at this layer are FTP, Telnet, SMTP, etc.). All management traffic is initiated by the SNMP-based network management station. Only the addressed managed entity (agent) answers the polling of the management station (except for trap messages).

All functions and settings accessible via the LCD or serial terminal connection of the ***ETU01-A*** are also readable and settable via the Simple Network Management protocol.

6.2.2 SNMP Operations

The SNMP protocol includes four types of operations:

getRequest	Command for retrieving specific value of an "instance" from the managed node. The managed node responds with a **getResponse** message.
getNextRequest	Command for retrieving sequentially specific management information from the managed node. The managed node responds with a **getResponse** message.
setRequest	Command for manipulating the value of an "instance" within the managed node. The managed node responds with a **getResponse** message.
trap	Management message carrying unsolicited information on extraordinary events (that is, events which occurred not in response to a management operation) reported by the managed node.

6.2.3 The Management Information Base

The management information base (MIB) includes a collection of managed objects. Managed objects are defined as parameters that can be managed, such as specific information on device configuring or on performance statistics values.

The MIB includes the definitions of relevant managed objects (MIB variables) for the specific node. Various MIB's can be defined for various management purposes, types of equipment, etc. The management data itself is a collection of integer, string and MIB address variables that contain all the information necessary to manage the node.

A leaf object's definition includes the range of instances (values) and the "access" rights:

Read-only	Instances of an object can be read, but cannot be set.
Read-write	Instances of an object can be read or set.
Write-only	Instances of an object can be set, but cannot be read.
Not accessible	Instances of an object cannot be read, nor set.

6.2.4 MIB Structure

The MIB has an inverted tree-like structure (root over branches), with each definition of a managed instance forming one leaf, located at the end of a branch of that tree. Each "leaf" in the MIB is reached by a unique path, therefore by numbering the branching points, starting with the top, each leaf can be uniquely defined by a sequence of numbers. The formal description of the managed objects and the MIB structure is provided in a special standardized format, called Abstract Syntax Notation 1, or ASN.1 (pronounced A-S-N dot one).

Since the general collection of MIB's can also be organized in a similar structure, under the supervision of the Internet Activities Board (IAB), any parameter included in a MIB that is recognized by the IAB is uniquely defined.

To provide the flexibility necessary in a global structure, MIB's are classified in various classes (branches), one of them being the experimental branch, another being the management (mgmt) branch, and yet another the group of private (enterprise-specific) branch. Under the private enterprise-specific branch of MIB's, each enterprise (manufacturer) can be assigned a number, which is its enterprise number. The assigned number designates the top of an enterprise-specific sub-tree of non-standard MIB's. Within this context, CTC Union has been assigned the enterprise number 4756. Under this scheme, the path to CTC Union's Enterprise branch would be:

iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).ctcu(4756)

Enterprise-specific MIB's are published and distributed by their creators, who are responsible for their contents. Specific information regarding the CTC Union's sub-tree is available from CTC Union's Research and Development Division.

The MIB supported by the ***ETU01-A*** SNMP Agent follows RFC 1158 (standard MIB-II).

6.2.5 SNMP Communities

To enable the delimitation of management domains, SNMP uses "communities". Each community is identified by a name, which is an alphanumeric string of up to 255 characters defined by the user. Any SNMP entity (this term includes both managed nodes and management stations) is assigned by its user a community name. In parallel, the user defines for each SNMP entity a list of the communities which are authorized to communicate with it, and the access rights associated with each community (this is the SNMP community name table of the entity).

In general, SNMP agents support two types of access rights:

Read-only	the SNMP agent accepts and processes only SNMP **getRequest** and **getNextRequest** commands from management stations which have a read-only community name.
Read-write	the SNMP agent accepts and processes all the SNMP commands received from a management station with a read-write community name. SNMP agents are usually configured to send traps to management stations having read-write communities.

6.3 Breakdown of MIB for ETU-01A

Branch	Leaf object	Set Parameters
0. systemEntry	0. masterTimin	0. Recovery
		1. Internal OSC
		2. DTE1 (transparent)
		3. DTE2 (external)
		4. DTE3
	1. sendMapping	
	2. remoteConfig	
1. e1LineEntry	0. frame	0. CCS
		1. CAS
		2. Unframed
	1. cRC-4	0. OFF
		1. ON
	2. casCADE	0. OFF
		1. ON
	3. idleCode	00 ~ FF
	3. rAI	0. Disable
		1. Enable
	4. lineCode	0. HDB3
		1. AMI
	5. impedance	0. 120 ohm
		1. 75 ohm
2. timeSlotEntry	tS0	0. NC
	tS1 ~ 31	1. CH 1
3. dataPortEntry	0. multiplier	0. N64
		1. N56
	1. cts	0. Always ON
		1. Follow RTS
	2. v54Loop	0. Disable
		1. Enable
	3. portType	See Text 1
	4. dataPortSpeed	See Text 2
4. loopBackEntry	0. e1Line	0. Loopback Off
		1. Local Analog
		2. Local Digital
		3. Local Payload
		4. Remote Analog
		5. Remote Paylaod
	1. dataPort	0. Loopback Off
		1. Local Analog

Branch	Leaf	Set Parameter
5. CONTROL PORT PARAMETER	0. SPEED	0. 300 bps
		1. 600 bps
		2. 1200 bps
		3. 2400 bps
		4. 4800 bps
		5. 9600 bps
		6. 19200 bps
6. ALL CHANNEL		1. Loop back Off
		2. Local Digital
		3. V.54 LOOP
7. bERTTestEntry	0. function	0. OFF
		1. ON
	1. channel	0. CH 1
		1. CH 2
		2. CH 3
		4. CH 4
		5. SL – ML
		6. SL – SL
	2. pattern	0. 511
		1. 2047
		2. 2e15-1
		3. 2e20-1
		4. QRSS
		5. 2e23-1
		6. ALL 1
		7. ALL 0
		8. 0011
		9. 3 in 24
		10. 1 in 16
		11. 1 in 8
		12. 1 in 4
	3. errIns	0. NONE
		1. SINGLE (W)
		2. 10e-1
		3. 10e-2
		4. 10e-3
		5. 10e-4
		6. 10e-5
		7. 10e-6
		8. 10e-7
	4. result	0. Bit Err See Text 3
		1. Bit Err Rate See Text 3
		2. Recount See Text 3
8. DATE & TIME DISPLAY & SET	0. DATE	See Text 4
	1. TIME	See Text 4

Branch	Leaf	Set Parameter
9. MISCELLANEOUS	0. LCD LIGHT	0. AUTO
		1. ON
		2. OFF
	1. RESET TO DEFAULT (W)	Press [ENTER] Send ASCII 13
10. ALARM BUFFER	0. DISPLAY ALARM	See Text 5
	1. CLEAR ALARM (W)	Press [ENTER] 13
11. LED Status		*See Text 6*

Text 1:

Data Port Type code:

0	1	2	3	4	5	6	7
Reserved	RS-232	ET10	X.21	G.703	V.35	RS-530	No Insert

Text 2:

Data Port Speed code: *Unit :Kbps*

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
N56	NC	56	112	168	224	280	336	392	448	504	560	616	672	728	784	840	896
N64	NC	64	128	192	256	320	384	448	512	576	640	704	768	832	896	960	1024

	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
N56	952	1008	1064	1120	1176	1232	1288	1344	1400	1456	1512	1568	1624	1680	1736	2048	
N64	1088	1152	1216	1280	1344	1408	1472	1536	1600	1664	1728	1792	1856	1920	1984	2048	

Text 3:

Bert Result transfer format:

	Text 1 (9)	Text 2 (10)	Text 3 (11)	Text 4 (12)	Text 5 (13)	Text 6 (14)	Text 7 (15)	Text 8 (16)
Bit Err	Byte 5	Byte 4	Byte 3	Byte 2	Byte 1	Byte 0	X	X
Bit Err Rate	0		0	e	-	0	0	X

Bit Err is 48 bits , have to transfer to ASCII for display

Bit Err Rate just an ASCII text string

Text 4:

Date & Time transfer format (BCD code)

	Text 1 (9)	Text 2 (10)	Text 3 (11)	Text 4 (12)
0. DATE	Century (19-20)	Year (00-99)	Month (01-12)	Date (01-31)
1. TIME	Hour (00-23)	Minute (00-59)	Second (00-59)	

Text 5:

Alarm Buffer trap code:

Code	Error message	Error status On/Off
0	Alarm Buffer Empty	0:None
1	Power Turn	1:On 2:Off
2	Main Link Signal Loss	1:On 2:Off
3	Main Link SYNC Loss	1:On 2:Off
4	Main Link AIS	1:On 2:Off
5	Main Link RAI	1:On 2:Off
6	Main Link MRAI	1:On 2:Off
7	Main Link BPV	0:None
8	Main Link Frame Slip	0:None
9	Main Link CRC4 Error	0:None
10	Sub Link Signal Loss	1:On 2:Off
11	Sub Link SYNC Loss	1:On 2:Off
12	Sub Link AIS	1:On 2:Off
13	Sub Link RAI	1:On 2:Off
14	Sub Link MRAI	1:On 2:Off
15	Sub Link BPV	0:None
16	Sub Link Frame Slip	0:None
17	Sub Link CRC4 Error	0:None
18	Channel 1 port FIFO Slip	0:None
19	Channel 2 port FIFO Slip	0:None
20	Channel 3 port FIFO Slip	0:None
21	Channel 4 port FIFO Slip	0:None
22	Channel 1 port Baud Rate Failure	0:None
23	Channel 2 port Baud Rate Failure	0:None
24	Channel 3 port Baud Rate Failure	0:None
25	Channel 4 port Baud Rate Failure	0:None
26	End of Alarm Buffer	0:None

Alarm message Transfer format:

Text 1 (9)	Text 2 (10)	Text 3 (11)	Text 4 (12)	Text 5 (13)	Text 6 (14)	Text 7 (15)	Text 8 (16)
Message Type Code	On/Off Code	Year (BCD)	Month (BCD)	Date (BCD)	Hour (BCD)	Minute (BCD)	Second (BCD)

Text 6:

LED Status:

Parameter							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Test	Error	Sub Alarm	Sub SYNC Loss	Sub Signal Loss	Main Alarm	Main SYNC Loss	Main Signal Loss

ETU01-A SMNP Trap codes

Code	Error message	Error status On/Off
0	Alarm Buffer Empty	0:None
1	Power Turn	1:On 2:Off
2	Main Link Signal Loss	1:On 2:Off
3	Main Link SYNC Loss	1:On 2:Off
4	Main Link AIS	1:On 2:Off
5	Main Link RAI	1:On 2:Off
6	Main Link MRAI	1:On 2:Off
7	Main Link BPV	0:None
8	Main Link Frame Slip	0:None
9	Main Link CRC4 Error	0:None
11	Sub Link SYNC Loss	1:On 2:Off
18	Data port FIFO Slip	0:None
22	Data port Baud Rate Failure	0:None
26	End of Alarm Buffer	0:None

Chapter 6. SNMP Option

A.1 E1 Line Connectors

A.1.1 D-15 connector

The E1 link D-15 connector conforms to AT&T Pub 62411. The physical interface is a 15-pin female D-type connector.

Pin	Designation	Direction	Function
1	TTIP	From *ETU-01A*	Transmit data
2	FG	↔	Frame ground
3	RTIP	To *ETU-01A*	Receive data
4	FG	↔	Frame ground
5	--	--	--
6	--	--	--
7	Alarm relay common	--	Alarm Relay
8	Alarm relay normally open	--	Alarm Relay
9	TRING	From *ETU-01A*	Transmit data
10	--	--	--
11	RRING	To *ETU-01A*	Receive data
12	--	--	--
13	--	--	--
14	--	--	--
15	Alarm Relay normally closed	--	Alarm Relay

Table A-1 E1 D-15 connector pin allocation

A.1.2 BNC connector

Conn.	Pin	Designation	Direction	Function
TX	Center	TTIP	From *ETU-01A*	Transmit data
	Sleeve	TRING	↔	Signal return
RX	Center	RTIP	To *ETU-01A*	Receive data
	Sleeve	RRING	↔	Signal return

Table A-2 E1 BNC connector pin allocation

A.2 X.21 User Data Channel Connector

When the ***ETU-01A*** is ordered with an X.21 interface, the physical interface is a 15-pin female D-type connector wired in accordance with Table A-3.

SIGNAL FUNCTION	PIN	CIRCUIT	DIRECTION	DESCRIPTION
Protective Ground	1	Shield	↔	Chassis ground. May be isolated from Signal Ground.
Signal Ground	8	G	↔	Common signal ground.
Transmitted Data	2 9	T(A) T(B)	To *ETU-01A*	Serial digital data from DTE.
Received Data	4 11	R(A) R(B)	Fm *ETU-01A*	Serial digital data at the output of the *ETU-01A* receiver.
Request to Sent	3 10	C(A) C(B)	To *ETU-01A*	A ON signal to the *ETU-01A* when data transmission is desired.
Data Carrier Detect	5 12	I(A) I(B)	Fm *ETU-01A*	Constantly ON, except when a loss of the received carrier signal is detected.
Signal Timing	6 13	S(A) S(B)	Fm *ETU-01A*	A transmit data rate clock for use by an external data source.
External Transmit clock	7 14	B(A) B(B)	To *ETU-01A*	A serial data rate clock input from the data source.
--	15	--	--	--

Table A-3 X.21 user data channel connector pin allocation

A.3 V.35 User Data Channel Connector

When the ***ETU-01A*** is ordered with a V.35 interface, the physical interface is a 34-pin female M-Block type connector wired in accordance with Table A-4.

SIGNAL FUNCTION	PIN	CIRCUIT	DIRECTION	DESCRIPTION
Protective Ground	A	Frame	↔	Chassis ground. May be isolated from signal ground.
Signal Ground	B	Signal Ground	↔	Common signal ground.
Transmitted Data	P S	TD(A) TD(B)	To ETU-01A	Serial digital data from DTE.
Received Data	R T	RD(A) RD(B)	From ETU-01A	Serial digital data at the output of the ETU-01A receiver.
Request to Sent	C	RTS	To ETU-01A	An ON signal to the ETU-01A when data transmission is desired.
Clear to Sent	D	CTS	From ETU-01A	Constantly ON.
Data Set Ready	E	DSR	From ETU-01A	Constantly ON, except during test loops.
Data Terminal Ready	H	DTR	To ETU-01A	Not used.
Data Carrier Detect	F	DCD	From ETU-01A	Constantly ON, except when a loss of the received carrier signal is detected.
External Transmit clock	U W	ETC(A) ETC(B)	To ETU-01A	A transmitted data rate clock input from the data source.
Transmit Clock	Y AA	TC(A) TC(B)	From ETU-01A	A transmitted data rate clock for use by an external data source.
Receive Clock	V X	RC(A) RC(B)	From ETU-01A	A received data rate clock for use by an external data source.
External Receive clock	Z BB	ERC(A) ERC(B)	To ETU-01A	A received serial data rate clock input from the DTE.
Remote Loop back	HH	RL	To ETU-01A	When on, commands ETU-01A into remote loop back, can disable by DIP sw.
Local Loop back	JJ	LL	To ETU-01A	When on, commands ETU-01A into local loop back, can disable by DIP sw.
Test Indicator	KK	TM	From ETU-01A	ON during any test mode

Table A-4 V.35 user data channel connector pin allocation

A.4 RS-530 User Data Channel Connector

When the ***ETU-01A*** is ordered with an RS-530 interface, the physical interface is a 25-pin female D-type connector wired in accordance with Table A-5.

SIGNAL FUNCTION	PIN	CIRCUIT	DIRECTION	DESCRIPTION
Protective Ground	1	Frame	↔	Chassis ground. May be isolated from signal ground.
Signal Ground	7	AB	↔	Common signal ground.
Transmitted Data	2 14	BA(A) BA(B)	To ETU-01A	Serial digital data from DTE.
Received Data	3 16	BB(A) BB(B)	From ETU-01A	Serial digital data at the output of the ETU-01A receiver.
Request to Sent	4 19	CA(A) CA(B)	To ETU-01A	A ON signal to the ETU-01A when data transmission is desired.
Clear to Sent	5 13	CB(A) CB(B)	From ETU-01A	Constantly ON.
Data Set Ready	6 22	CC(A) CC(B)	From ETU-01A	Constantly ON, Except during test loops.
Data Terminal Ready	20 23	CD(A) CD(B)	To ETU-01A	DTR not used, used for a received serial data rate clock input from the DTE.
Data Carrier Detect	8 10	CF(A) CF(B)	From ETU-01A	Constantly ON, except when a loss of the received carrier signal is detected.
External Transmit clock	24 11	DA(A) DA(B)	To ETU-01A	A transmitted data rate clock input from the data source.
Transmit Clock	15 12	DB(A) DB(B)	From ETU-01A	A transmitted data rate clock for use by an external data source.
Receive Clock	17 9	DD(A) DD(B)	From ETU-01A	A received data rate clock for use by an external data source.
Remote Loopback	21	RL	To ETU-01A	When on, commands ETU-01A into remote loopback, can disable by dipsw.
Local Loopback	18	LL	To ETU-01A	When on, commands ETU-01A into local loopback, can disable by dipsw.
Test Indicator	25	TM	From ETU-01A	ON during any test mode

Table A-5 RS-530 user data channel connector pin allocation

A.5 RS-232 User Data Channel Connector

When the ***ETU-01A*** is ordered with an RS-232 interface, the physical interface is a 25-pin female D-type connector wired in accordance with Table A-6.

SIGNAL FUNCTION	PIN	CIRCUIT	DIRECTION	DESCRIPTION
Protective Ground	1	AA	↔	Chassis ground. May be isolated from signal ground.
Signal Ground	7	AB	↔	Common signal ground.
Transmitted Data	2	BA	To *ETU-01A*	Serial digital data from DTE.
Received Data	3	BB	Fm *ETU-01A*	Serial digital data at the output of the *ETU-01A* receiver.
Request to Sent	4	CA	To *ETU-01A*	A ON signal to the *ETU-01A* when data transmission is desired.
Clear to Sent	5	CB	Fm *ETU-01A*	Constantly ON.
Data Set Ready	6	CC	Fm *ETU-01A*	Constantly ON, Except during test loops.
Data Terminal Ready	20	CD	To *ETU-01A*	DTR not used, used for a received serial data rate clock input from the DTE.
Data Carrier Detect	8	CF	Fm *ETU-01A*	Constantly ON, except when a loss of the received carrier signal is detected.
External Transmit clock	24	DA	To *ETU-01A*	A transmitted data rate clock input from the data source.
Transmit Clock	15	DB	Fm *ETU-01A*	A transmitted data rate clock for use by an external data source.
Receive Clock	17	DD	Fm *ETU-01A*	A received data rate clock for use by an external data source.
Remote Loopback	21	RL	To *ETU-01A*	When on, commands *ETU-01A* into remote loop back, can disable by DIPSW.
Local Loopback	18	LL	To *ETU-01A*	When on, commands *ETU-01A* into local loop back, can disable by DIPSW.
Test Indicator	25	TM	Fm *ETU-01A*	ON during any test mode

Table A-6 RS-232 user data channel connector pin allocation

A.6 RS-530 to RS-449 Adapter Cable

When the ***ETU-01A*** is ordered with a RS-449 interface, an RS-530 module and adapter cable provide the proper interface. The physical interface is a 37-pin male D-type connector wired in accordance with Table A-7.

SIGNAL FUNCTION	RS-530 PIN	RS-449 PIN	RS-449 CIRCUIT	DESCRIPTION
Protective Ground	1	1	Frame	Chassis ground. May be isolated from signal ground.
Signal Ground	7	19,20, 37	SG,RC, SC	Common signal ground.
Transmitted Data	2 14	4 22	SD(A) SD(B)	Serial digital data from DTE.
Received Data	3 16	6 24	RD(A) RD(B)	Serial digital data at the output of the ETU-01A receiver.
Request to Sent	4 19	7 25	RS(A) RS(B)	A ON signal to the ETU-01A when data transmission is desired.
Clear to Sent	5 13	9 27	CS(A) CS(B)	Constantly ON.
Data Set Ready	6 22	11 29	DM(A) DM(B)	Constantly ON, Except during test loops.
Data Terminal Ready	20 23	12 30	TR(A) TR(B)	DTR not used, used for a received serial data rate clock input from the DTE.
Data Carrier Detect	8 10	13 31	RR(A) RR(B)	Constantly ON, except when a loss of the received carrier signal is detected.
External Transmit clock	24 11	17 35	TT(A) TT(B)	A transmitted data rate clock input from the data source.
Transmit Clock	15 12	5 23	ST(A) ST(B)	A transmitted data rate clock for use by an external data source.
Receive Clock	17 9	8 26	RT(A) RT(B)	A received data rate clock for use by an external data source.
Remote Loopback	21	14	RL	When on, commands ETU-01A into remote loop back, can disable by DIP sw.
Local Loopback	18	10	LL	When on, commands ETU-01A into local loop back, can disable by DIP sw.
Test Indicator	25	18	TM	ON during any test mode

Table A-7 RS-530 to RS-449 pin allocation

A.7 G.703/64K Codirectional Connector

When the ***ETU-01A*** is ordered with a G.703/64K interface, the physical interface is a 15-pin female D-type connector wired in accordance with Table A-8.

SIGNAL FUNCTION	PIN	DIRECTION	DESCRIPTION
Protective Ground	**4** 10	↔	**Chassis ground. May be isolated from Signal Ground.**
Signal Ground	**8**	↔	**Common signal ground.**
Transmitted Data	**3** **11**	**To *ETU-01A***	**Serial Codirectional data from DTE.**
Received Data	**1** **9**	**Fm *ETU-01A***	**Serial Codirectional data at the output of the *ETU-01A* receiver.**

Table A-8 G.703/64K Codirectional pin allocation

A.8 G.703/NRZ

When the ***ETU-01A*** is ordered with an NRZ interface, the physical interface is 4 BNC female connectors wired in accordance with Table A-9.

Specifications:

Line Code:	NRZ
Impedance:	50 ohms
Signal Level:	Logic "1": 0V +/- 0.3V
	Logic "0": -1.5V +/- 0.3V
Speed:	2048K Max.

SIGNAL FUNCTION	DIRECTION	DESCRIPTION
Received Data	Fm *ETU-01A*	Serial NRZ data at the output of the *ETU-01A* receiver.
Received Timing	Fm *ETU-01A*	Serial NRZ timing at the output of the *ETU-01A* receiver.
Transmitted Data	To *ETU-01A*	Serial NRZ data from DTE.
Transmit Timing	To *ETU-01A*	Serial NRZ timing from DTE.

Table A-9 NRZ/BNC pin allocation

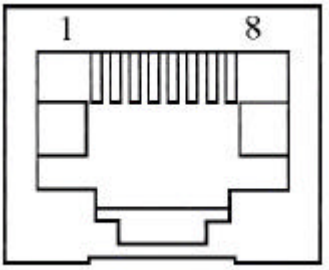
Settings: (by adjustment of jumpers on interface card)

Rx timing; "Normal" or "Inverted"

Tx timing; "Normal" or "Inverted"

A.9 ET10 10BASE-T Ethernet Bridge Interface

When the ***ETU-01A*** is ordered with an **ET10 Interface**, the unit is not only an access unit for E1, but also becomes a high performance WAN bridge for 10Base-T Ethernet extension. The physical interface for **ET10** is a RJ-45 connector, with the pin assignment as follows:



Normal	Crossover
1. Tx +	1. Rx +
2. Tx -	2. Rx -
3. Rx +	3. Tx +
6. Rx -	6. Tx -

DIP Switch Settings

DIP.	STATE	FUNCTION
1	ON	ID, factory default
2	ON	
3	ON	
4	OFF	
5	ON	
6	ON	Enable Filter
	OFF	Disable Filter
7	ON	Disable Compression
	OFF	Enable Compression
8	ON	Half Duplex Ethernet
	OFF	Full Duplex Ethernet

LED Indicators

Designation	Indication
R	Receive data
T	Transmit data
E	Error
L	Link

Appendix B: Performance Monitor

The ***ETU-01A*** includes a performance monitor feature. The contents of the monitor may be viewed via the front panel LCD, through a terminal connected to the control port or via optional SNMP.

General

This section describes the performance evaluation and monitoring functions provided by the ***ETU-01A*** for the E1 link.

The functions actually available depend on the state of the CRC-4 function:

- CRC-4 Enabled: when the CRC-4 function enabled is used, it is possible to monitor the end-to-end data transmission performance. The error detection information is derive from the data payload, by performing a cyclic redundancy check (CRC). The resulting CRC checksum is transmitted in addition to the raw data bits. The receiving end recalculates the checksum and compares the results with the received checksum. Any difference between the two checksums indicates that one or more bit errors are contained in the current data block being evaluated.
- CRC-4 Disabled: in this case, the ***ETU-01A*** does not support the capabilities listed above. However, the ***ETU-01A*** now becomes capable of providing statistics for bipolar violations (BPV).

Appendix B: Performance Monitor

Performance Monitoring

When the CRC-4 function enabled, the ***ETU-01A*** stores El line statistics for the E1 link interface. This permits real-time monitoring of data transmission performance.

The performance parameters statistics are listed below:

Current CRC-4 error events (CRC Cnt)

A CRC-4 error event is any multiframe containing a CRC error event. The number of CRC events in the current second are collected in the current CRC error events register. The register is updated every second.

Note Register contents can be displayed at any time from the LCD, a connected console, or via SNMP. When the CRC error events are displayed on the front-panel LCD, the register can be reset by pressing ENTER when the RESET menu item is displayed.

When the CRC-4 function is disabled, the ***ETU-01A*** will be able to detect bipolar violations and store them in a register for 1 second.

Bipolar violations (BPV Cnt) count (BPV last second)

The total number of bipolar violations counted in the last second. This number is updated every second.

The remaining performance monitor data is available whether CRC-4 is enabled or not.

Current errored seconds (ES)

An errored second is any second containing one or more CRC error events, or one or more controlled slip events. The data is collected for the current 15-minute interval.

Current unavailable seconds (UAS)

An unavailable second is any second in which a failed signal state exists.. The data is collected for the current 15-minute interval.

Long-term errored seconds (LONG ES)

The total number of ES in the current powered-up interval.

Long-term fail seconds (LONG UAS)

The total number of UAS in the current powered-up interval.

Current seconds (CURR SEC)
The number of seconds in the current measurement interval. A measurement interval has 900 seconds (15 minutes).

Long term interval (LONG SEC)

The number of 15-minute intervals in the powered-up period.

Performance Monitor Brief Table

Display	Description	Range
BPV Cnt	The total number of BPV errors during the last second. The display is updated every second. CRC-4 must be disabled.	0-65535
CRC4 Cnt	The number of CRC error events recorded during the last second. The display is updated every second. CRC-4 must be enabled.	0-1024
CURR ES	Number of ES measured during the current 15-minute interval. The display is updated every second.	0-900
CURR UAS	Number of UAS measured during the current 15-minute interval. The display is updated every second.	0-900
LONG ES	Number of ES measured during the current powered-on interval. The display is updated every 15 minutes.	0-65535
LONG UAS	Number of UAS measured during the current powered-on interval. The display is updated every 15 minutes.	0-65535
CURR SEC	The time in seconds that expired from the start of the current 15-minute interval. The display is updated every second.	0-900
LONG SEC	The number of 15-minute intervals that expired from the start of the current powered-on interval. The display is updated every 15 minutes.	0-65535

Appendix C: Rack Mounting Option

All Standalone/Rack Series units have the option of adding standard EIA 19” rack mount capability. Two rack mount options provide for either mounting a single unit (half space) in a rack or for mounting two units in tandem (full space). In either situation, one standard rack unit space is required. Each rack mount kit provides all the necessary hardware for a complete installation.

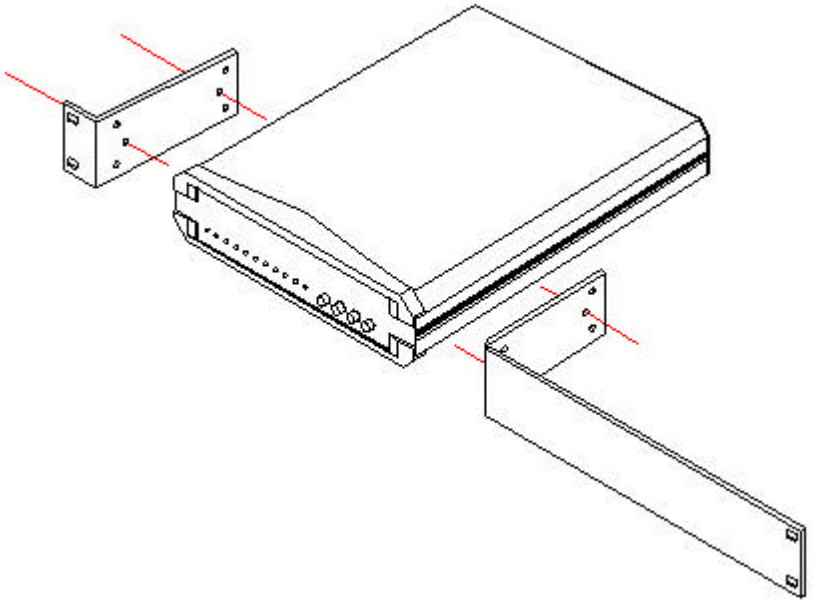


Figure C-1: Rack Mount Installation, ETU01-SS.

In single unit installations, the unit may be placed in the left or right side position simply by reversing the rack mounting “ears”. The kit includes, one (1) short and one (1) long rack adapter, four (4) 3x8mm self-tapping screws, and four (4) #12-24x0.5” screws.

Appendix C: Rack Mounting Option

In order to save rack mount space, units may be mounted in tandem. Please refer to the following drawing examples for this application.

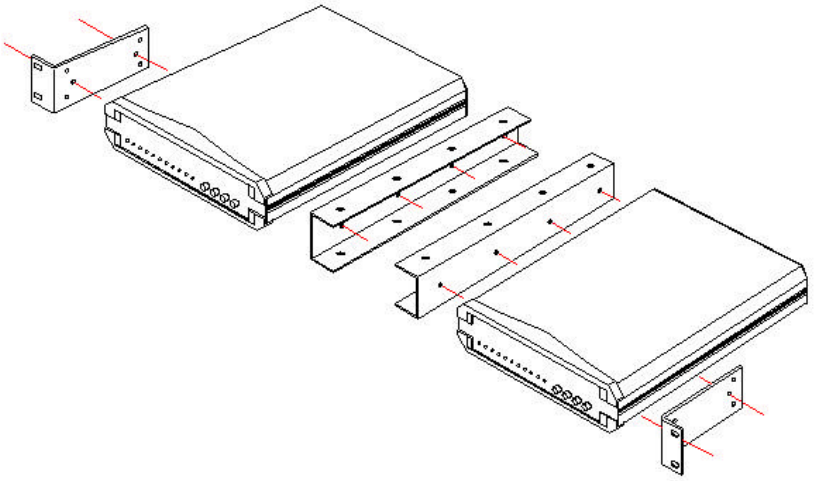


Figure C-2: Tandem Units Mounting (Exploded)

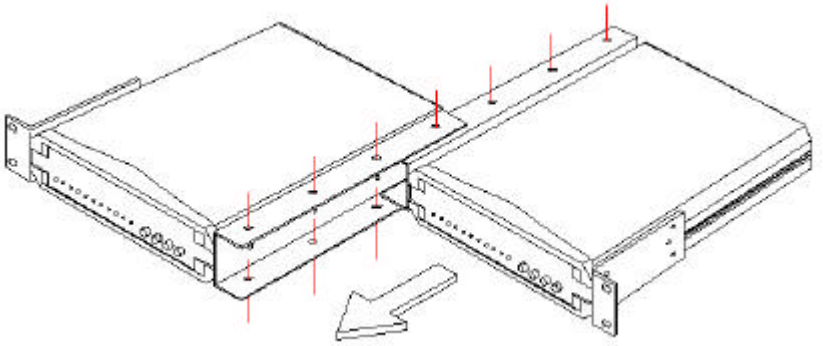


Figure C-3: Tandem Units Mounting Detail

The tandem kit includes two (2) rack mount adapters, one (1) each of inner and outer central mounting adapters, twenty (20) 3x8mm self-tapping screws, and four (4) #12-24x0.5" screws.

NOTES:

NOTES:

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E-mail:info@ctcu.com

Attn : Technical Support Division

From Company: _____

Name:_____

Tel: ( )_____

Fax:( )_____

- **MODEL: ETU-01A/AC ETU-01A/DC**
- **ACTIVITY: As attached in DIP switch setting table**
- **SYS CONFIGURATION:**

- **Question:**

Technical Inquiry Form

MODEL No.: ETU-01A/AC ETU-01A/DC

Please fill in the configuration settings with ' ' marks into the following table.

Send it to us by fax, and we will reply to you immediately.

	FUNCTION	Parameter	Your setting	Suggested
	System Parameter			
	Master Timing	RECOVERY		
		INT OSC		
		DTE1		
		DTE2		
		DTE3		
	E1 Line			
	Frame	UNFRAMED		
		CCS		
		CAS		
	CRC-4	OFF		
		ON		
	CASCADE	OFF		
		ON		
	IDLE CODE	7E		
		00~FF		
	RAI	DISABLE		
		ENABLE		
	LINE CODE	HDB3		
		AMI		
	IMPEDANCE	75		
		120		
	TIMESLOT MAPPING	1~15, 17~31		
	DATAPORT			
	TYPE (RS530,V35,ET10 etc)	Type		
	MULTIPLIER	N64		
		N56		
	CTS	ON		
		RTS		
	V.54 LOOP	OFF		
		ON		
	LOOPBACK			
	E1 LINE	OFF		
		LOCAL		
		REMOTE		
	DATA PORT	OFF		
		LOCAL		
		REMOTE		
	BERT TEST			
	FUNCTION	OFF		
		E1		
		DATAPORT		

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