ISDN PORTABLE TEST SET
MODEL 570
OPERATING MANUAL

Issue # 11 - Firmware 1.10

TELE-PATH INSTRUMENTS
21 S. YORKSHIRE ST., SALEM, VA 24153
(540) 375-0500

Manufactured under an NSAI Registered
ISO 9001 Quality System

TELE-PATH INSTRUMENTS
A Division of TTC
A Dynatech Company

TABLE OF CONTENTS

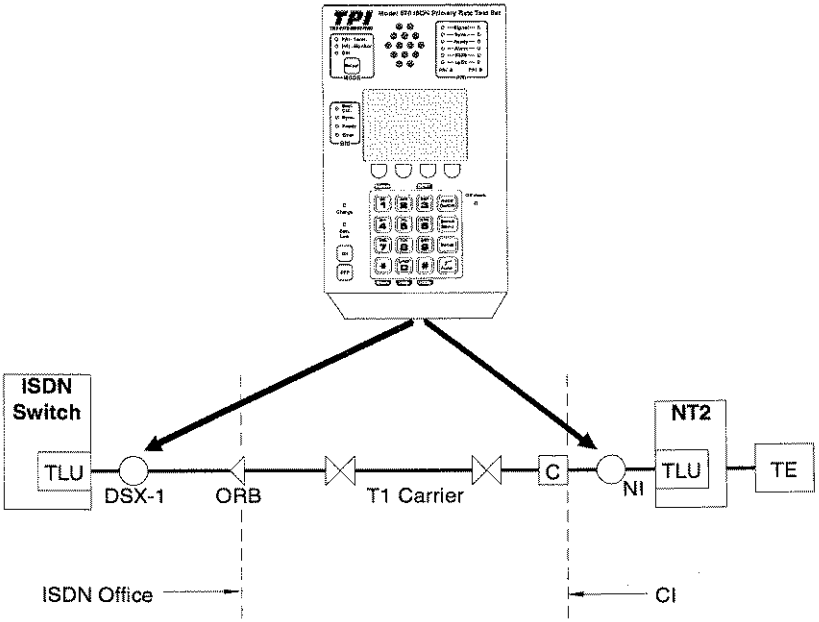
Table of Contents

Table of Contents

SECTION I

INTRODUCTION

TPI Model 570
ISDN
Portable Test Set



NI	Network Interface
ORB	Office Repeater Bay
CI	Customer Installation
TLU	Terminating Line Unit
ASYNC MUX	Asynchronous Multiplexer
C	DS1 Interface Connector (Smart Jack)

Figure 1.1 ISDN Primary Rate Interface (T-1 Carrier System)

1.1 GENERAL INFORMATION

The Tele-Path Model 570 ISDN Portable Test Set is a compact, battery operated device used to conduct testing of Primary Rate ISDN circuits at the customer premise or main distribution frame. The Model 570 is designed both for rugged durability and ease of use, with menu driven screens.

The Model 570's operating modes allow it to function in a Terminating mode, acting as the NT2 and Terminal Equipment (NT2/TE), or in a Bridge mode allowing monitoring of an operational PRI circuit.

Depending on the BRI Basic Rate Interface (BRI) option installed, the unit's BRI mode selection enables the unit to function at the "U" Interface as a Network Termination (NT1), Terminal Equipment (TE), or NT1/TE combination, Line Termination (LT), or in a Monitor mode; or at the "S/T" Interface as TE or in a Monitor mode.

The Model 570 allows testing of a 23B+D circuit configuration or a dual span 23B+D and 24B configuration. Multiple 24B circuits may be tested by keeping the controlling D channel span up and successfully connecting and testing additional 24B circuits. The D channel time slot is selectable so that individual trunk groups, with their own D channels, may be tested.

Call controls include NORTEL (DMS), AT&T (5ESS), and National ISDN-2 (includes NORTEL, AT&T, and Siemens).

The Model 570 capabilities also include:

- Selectable Voice and Data capability, using multiple B channels in the Data mode
- Simultaneous B channel calls
  - Origination on one B channel and recieve on another
- Multi-call capability (up to 23 of any combination)
- Auto answer incoming calls
- BERT
  - T-1 with QRSS
  - B channel with 2047 (any combination of B channels within a PRI span)
- DSL ESF EOC channel status including loopback response
- Block error testing
- Speed dial memory
- Layers 1, 2, and 3 message analysis
- RS-232 Data port with real-time monitoring of D channel, D channel decode and display of messages
- Battery operated

1.1.1 PRIMARY RATE ISDN

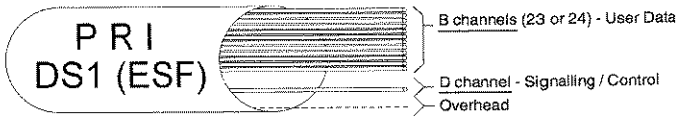
INTRODUCTION

ISDN today is a Digital Network which promises a wide range of enhanced services, including Voice, Data, and Multimedia. While ISDN customers may subscribe to either the Primary Rate Interface (PRI) service, or the Basic Rate Interface (BRI) service, PRI is growing toward a bandwidth on demand service, up to full DS1 speed, as Central Office generic software allows Bearer service selections that route B channels (N x 64) as one switched "pipe."

Figure 1.1 shows a typical PRI ISDN configuration with a T-1 carrier system providing the 4-wire PRI service to the customer premise. The DS1 interface connector, or "Smart Jack," provides the actual physical termination of the span allowing access by premise wiring to the service. Technical standards describe a NT1 and NT2 equipment where both physically terminate the ISDN subscriber loop. NT2 equipment provides switching functions for Terminal Equipment while NT1 equipment does not. In this manual, we will refer to PRI terminating equipment (like a PBX), as NT2/TE equipment for simplicity.

The PRI service is a 4-wire, full duplex DS1 service at 1.544 Mb/s using Superframe (SF) or Extended Superframe (ESF) format at the DS1 facility level (ESF is most often used). The ESF framing structure provides for embedded operations channel communications and single-ended performance monitoring capabilities. The PRI service consists of 1.536 Mb/s of information payload with 8 Kb/s additional overhead in the DS1 ESF format. Each DS1 payload is channelized into 24 separate byte-interleaved 64 Kb/s time slots. The 64 Kb/s Bearer (B) channels are used to transport data and the 64 Kb/s Delta (D) channel is used for signaling. The most common service configuration is 23B+D. However, since one D channel may provide control and signalling for more than 23 B channels, additional DS1 access may be channelized in a 24B form.

Figure 1.2 ISDN PRI Channelization



23B (23 x 64 = 1472 K) + D (64 K) = 1536 K + 8 K Overhead = 1.544 Mb/s
or
24B (24 x 64 = 1536 K) + No D channel = 1536 K + 8 K Overhead = 1.544 Mb/s

Line coding can be either AMI (Alternate Mark Inversion) or B8ZS (Binary 8 Zero Substitution). B8ZS is the most often used line coding type.

Central Office vendor implementations of PRI can vary, depending upon the software generic capability:

- Multiple D channels in a single DS1 facility for control of different trunk groups.
- Hot standby backup D channel capability where a channel in a 24B arrangement is held idle to move a D channel from another 23B+D DS1 to the backup span in case of failure.

The DS1 interface connector, referred to as a "Smart Jack," provides:

- loopback testing controlled by the Network
- loopback of the T-1 span simplex power
- 4-wire physical access, bantam or 8-pin modular for premise equipment

Loopback testing is normally implemented using the EOC overhead. The Model 570 accesses the DS1 facility at the smart jack on the customer premise side. The Model 570 is not designed to handle high voltages on the DS1 facility itself. Line buildout (LBO) loss pads allow access at carrier access points.

1.1.2 BASIC RATE INTERFACE (Optional)

ISDN BRI uses a standard 2-wire non-loaded telephone line to provide digital channels capable of simultaneous voice, data, and low speed video transmission. The Channels consist of two Bearer (B) Channels, which carry Voice, Circuit-Switched, or Packet-Switched Data up to 64 Kbps, and a 16 kb/s; Data or Delta (D) Channel for packet-switched data and signaling information. When combined, the two B channels and one D Channel make up the Basic Rate (2B+D) Access. A Maintenance Channel and framing information are added, and the result is a transmission rate of 160 Kbps at the "U" Interface. See Figure 1.3 below:

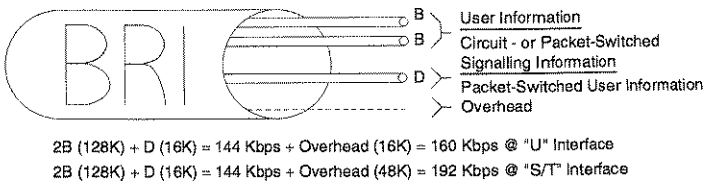


Figure 1.3 ISDN Basic Rate Interface

A typical configuration for ISDN Basic Rate Access is shown in Figure 1.4 below.

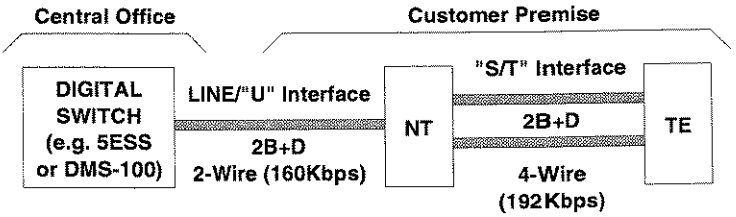


Figure 1.4 ISDN Basic Rate Access

LINE/"U" Interface

The "U" Interface refers to the physical interface on the Network side of an NT1. It is a 2-wire interface that uses an echo cancelling technique to transmit and receive information over the same pair of wires.

Network Termination (NT1)

Network Termination (NT1) is the Customer Premise. termination equipment that converts the 2-wire "U" Interface signal to a 4-wire "S/T" Interface signal. The NT1 also provides some simplified looping capabilities for testing of the facilities.

Terminal Equipment (TE)

Terminal Equipment is a Customer ISDN terminal that operates when connected to an ISDN BRI, either a "U" or a "S/T". Examples are digital telephones, data terminals, and integrated work stations.

Other kinds of Customer terminals which operate from a non-ISDN Interface (RS-232) would need a Terminal Adapter (TA) to convert from the non-ISDN Interface to the appropriate ISDN Interface.

2B1Q Line Code

The ANSI "U" Interface incorporates a 2B1Q line code (non-loaded twisted pair for distances of up to 18,000 feet using 26 ga. cable). The 2B1Q (two binary, one quaternary) line coding is a four level, or quaternary code. Each level is determined from a single combination of two bits. Thus, 160 Kbps data rate equates to a 40 KHz signal. The lower frequency is desirable for extending the transmissions.

1.2 PHYSICAL DESCRIPTION

The TPI Model 570 ISDN Portable Test Set illustrated in Figure 1.5 below consists of circuit boards and a battery pack, which are housed in an aluminum case. The test set weighs less than 6 pounds (depending on interfaces optioned) and has external dimensions of 8½" high, 5½" wide, and 4¼" deep for the basic unit.

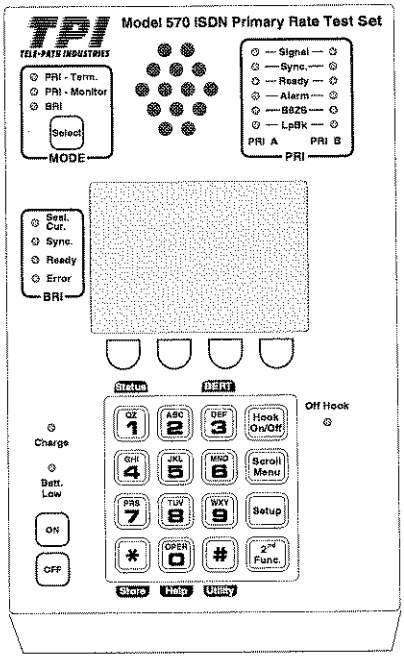


Figure 1.5 Model 570 with lid open

The internal battery pack is a custom lead acid rechargeable flat pack that can be externally charged via the TPI 570-4 Battery Charger/AC Adapter. A fully charged battery will typically last for 8 hours of operation. When the "**Batt. Low**" LED illuminates, there are approximately 10 minutes of operating time left before complete shutdown. At that time, the internal battery needs to be recharged.

An aluminum, hinged cover is attached to the unit to protect the control panel when the unit is being transported. The cover is secured by a latch that snaps loose and unhooks. The hinged cover houses a lid Quick Reference Label that details unit operation.

A D-ring is attached to both sides of the unit for convenience to allow attachment of a carry strap (the Soft Pack Carry Case shoulder strap may be used).

Connector interfaces are located on the top of the unit, under a weather resistant cover (¼ turn fastener). See figure 1.6 below.

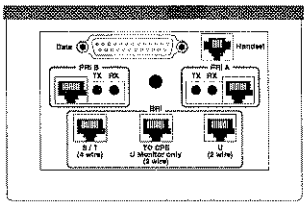


Figure 1.6 Top Interface panel

1.2.1 EXTERNAL CONNECTIONS

The top of the unit houses connections, under the weather resistant cover, to the line interfaces (**PRI A/B**), an external **Handset**, and the **Data** monitor. The right side of the case houses a connector for the TPI 570-4 battery charger/AC adaptor. The left side houses the EPROM access panel, and the bottom side houses the battery pack door.

Connection to the DS1 line under test is made on the top of the unit on either the **PRI A** span or **PRI B** span using the respective mini bantam or 8-pin jack. When one of the BRI options are purchased, an 8-pin jack will be added between the PRI jacks for access to the BRI Interface.

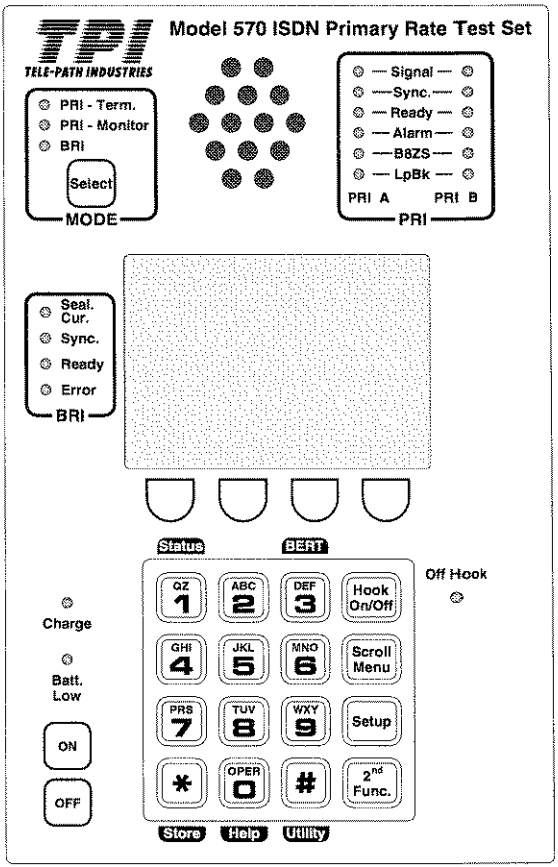
The optional handset may be used to access a "second" B channel call. Connection for the TPI 570-8 handset may be made via the 4-pin modular jack provided at the top of the unit.

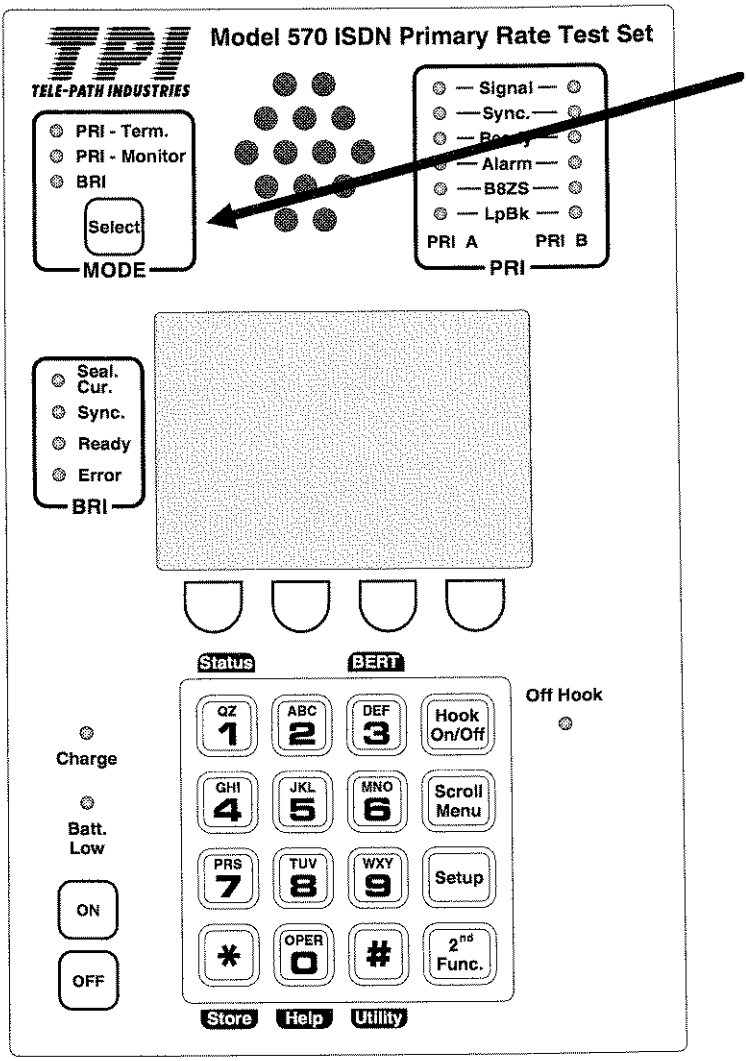
The **Data** DB25/RS-232 connector is used for monitoring of D channel signalling with external equipment. Information output will be in HEX and English format for easy analysis.

The Model 570 allows the user to place a circuit- switched voice or data call, choose data call speed, network/facility options, and B channel(s), perform Bit error rate testing, and select the single or multiple B channels for loopback testing.

1.2.2 CONTROLS AND INDICATORS

The front panel contains an LCD with soft keys, a keypad, and function keys to configure the unit or conduct a test. Light-emitting diodes (LEDs) are used as status indicators, and a speaker and microphone are included for hands-free operation.




TPI
TELE-PATH INDUSTRIES
Model 570 ISDN Primary Rate Test Set
PRI - Term.
PRI - Monitor
BRI
Select
MODE
Signal
Sync.
Alarm
B8ZS
LpBk
PRI A
PRI B
PRI
Seal. Cur.
Sync.
Ready
Error
BRI
Status
BERT
Off Hook
Charge
Batt. Low
ON
OFF
QZ 1
ABC 2
DEF 3
Hook On/Off
GHI 4
JKL 5
MNO 6
Scroll Menu
PRS 7
TUV 8
WXY 9
Setup
*
OPER 0
#
2nd Func.
Store
Help
Utility

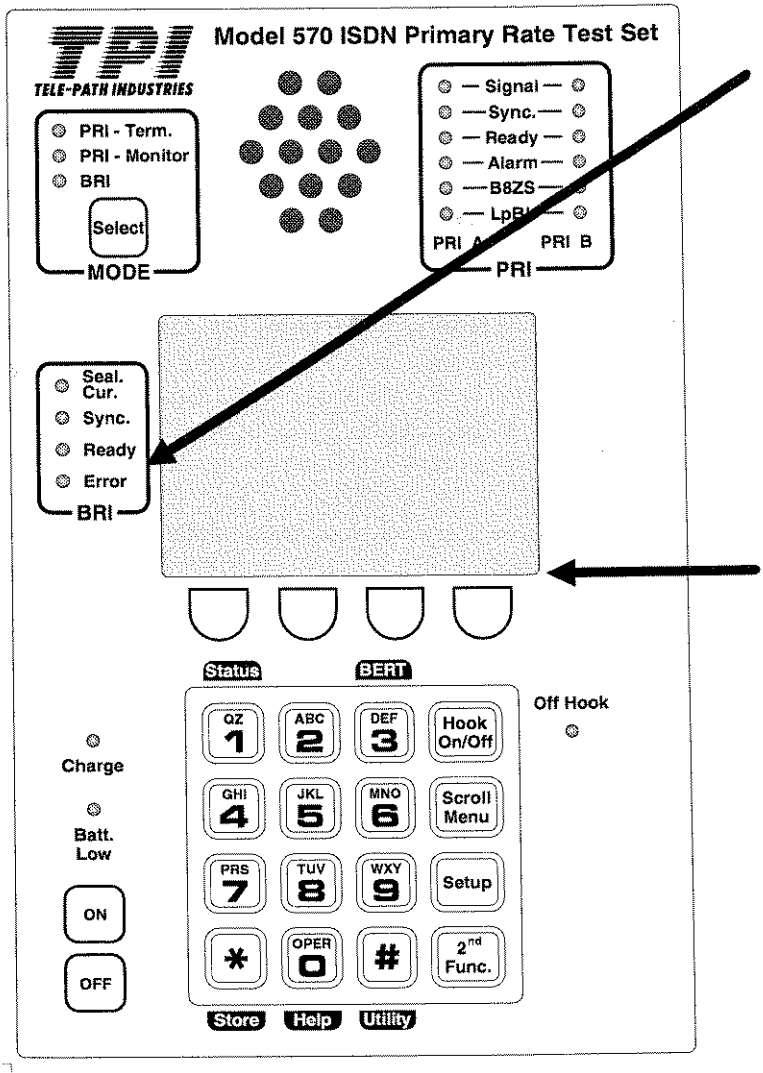
MODE Select

The mode area is used to select the operating mode. **PRI - Term.** is used to terminate the PRI facility. **PRI - Monitor** is used to monitor the PRI facility through monitor jacks. **BRI** is used to operate in the Basic Rate U Interface NT1/TE mode, if the BRI option is installed.

The **PRI - Term.** (Terminate) mode places the Model 570 on the line(s) under test as a terminating piece of equipment, typically a PBX or Bridge/Router (a NT2 class of equipment as defined by international standards). In this mode, the D channel signaling is constantly occurring between the Model 570 and the network switch. When testing a multiple span arrangement using both PRI-A and PRI-B, the span carrying the D channel must always be connected to the Model 570. Calls may be placed and received by the Model 570 emulating a PBX in this mode.

The **PRI - Monitor** mode places the Model 570 on the line under test monitoring and decoding the D channel messaging on that interface. The Rx jacks on both PRI-A and PRI-B are used to monitor traffic in both directions. The Model 570 decodes and formats the message for easy analysis. The English language-formatted information is made available for external analysis via the Data Interface connector and to an internal 4K buffer for viewing on the LCD.

The **BRI** mode is an optional capability of the Model 570. Using the modular BRI connector, the Model 570 can test Basic Rate ISDN service at the "U" Interface in a mode emulating a NT1/TE. That is, it acts as the NT1 terminating the 2-wire subscriber loop and a TE, in this case, an ISDN telephone. Thus, the BRI option allows testing of circuit switched voice and data service, as well as D channel packet data service.


TPI
TELE-PATH INDUSTRIES
Model 570 ISDN Primary Rate Test Set
PRI - Term.
PRI - Monitor
BRI
Select
MODE
Signal
Sync.
Ready
Alarm
B8ZS
LpBk
PRI A
PRI B
PRI
Seal. Cur.
Sync.
Ready
Error
BRI
Status
BERT
Off Hook
Charge
Batt. Low
ON
OFF
QZ 1
ABC 2
DEF 3
Hook On/Off
GHI 4
JKL 5
MNO 6
Scroll Menu
PRS 7
TUV 8
WXY 9
Setup
*
OPER 0
#
2nd Func.
Store
Help
Utility

BRI Area

This area is used when operating in BRI mode, if optioned. If the BRI option is not installed, these LEDs are inactive.

The **Seal. Cur.** LED, when illuminated green, indicates that at least 5mA of sealing current has been detected.

The **Sync.** LED, when illuminated green, indicates that the test set has been able to gain synchronization with the received BRI carrier signal.

The **Ready** LED, when illuminated green, indicates that the Layer 2 initialization process has been completed and a call may be initialized from the test set.

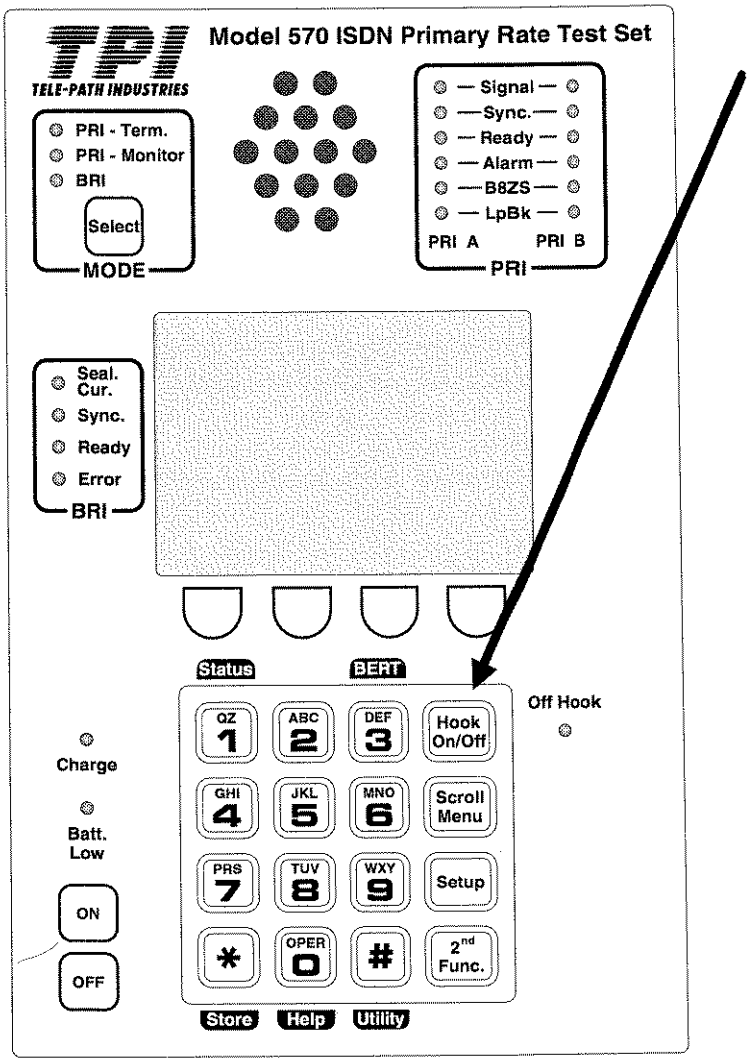
The **Error** LED, when illuminated red, indicates an error condition.

LCD SCREEN AND SOFT KEYS

The LCD and front panel control keys (soft keys) are used to:

- Configure the test set for access to PRI services
- Select the call configuration desired - bearer services and channels
- Select BERT test parameters
- Establish loopbacks
- Conduct Layer 1, 2, and 3 message analysis
- Activate D channel monitor outputs
- Conduct turn-up and troubleshooting activities

The LCD, with large font characters, is controlled using the four soft keys below the LCD display and the function keys on the keypad.


TPI
TELE-PATH INDUSTRIES
Model 570 ISDN Primary Rate Test Set
PRI - Term.
PRI - Monitor
BRI
Select
MODE
Signal
Sync.
Ready
Alarm
B8ZS
LpBk
PRI A
PRI B
PRI
Seal. Cur.
Sync.
Ready
Error
BRI
Status
BERT
Off Hook
Charge
Batt. Low
ON
OFF
QZ 1
ABC 2
DEF 3
Hook On/Off
GHI 4
JKL 5
MNO 6
Scroll Menu
PRS 7
TUV 8
WXY 9
Setup
*
OPER 0
#
2nd Func.
Store
Help
Utility

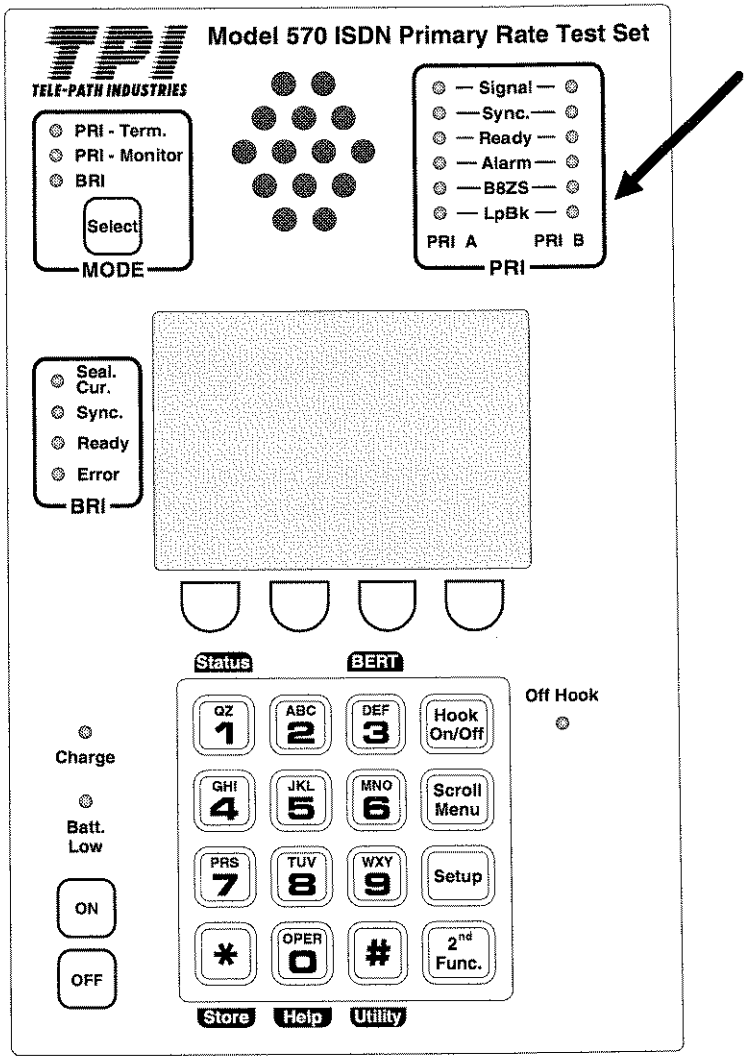
KEYPAD

The **Hook On/Off** key is used to send (initiate) a call after the dial sequence has been entered. PRI services use "enblock dialing" in which the dial string is sent out over the D channel as a block of data in the Setup message. The **Off Hook** LED shows the off hook or "active call" status.

The **Scroll Menu** key is used to move through the menu selections on the display and moves a cursor from top to bottom on specific menus.

The **Setup** key moves the display to the initial setup menu screen from any point in the menu trees.

The **2nd Func.** key is used to activate the "second functions" associated with the five labeled keys: 1/Status, 3/BERT, */Store, 0/Help, and #/Utility.


TPI
TELE-PATH INDUSTRIES
Model 570 ISDN Primary Rate Test Set
PRI - Term.
PRI - Monitor
BRI
Select
MODE
Signal
Sync.
Ready
Alarm
B8ZS
LpBk
PRI A
PRI B
PRI
Seal. Cur.
Sync.
Ready
Error
BRI
Status
BERT
Off Hook
Charge
Batt. Low
ON
OFF
QZ 1
ABC 2
DEF 3
Hook On/Off
GHI 4
JKL 5
MNO 6
Scroll Menu
PRS 7
TUV 8
WXY 9
Setup
*
OPER 0
#
2nd Func.
Store
Help
Utility

PRI Area

The Primary Rate status LEDs are arranged in two columns: one for the "A" PRI DS1 Interface and one for the "B" PRI DS1 Interface corresponding to the interface connectors on the top of the Model 570. The A interface is the 23B+D formatted DS1 facility and the B interface is the 24B formatted facility.

The **Signal** LED, when illuminated green, indicates that a DS1 carrier signal has been detected.

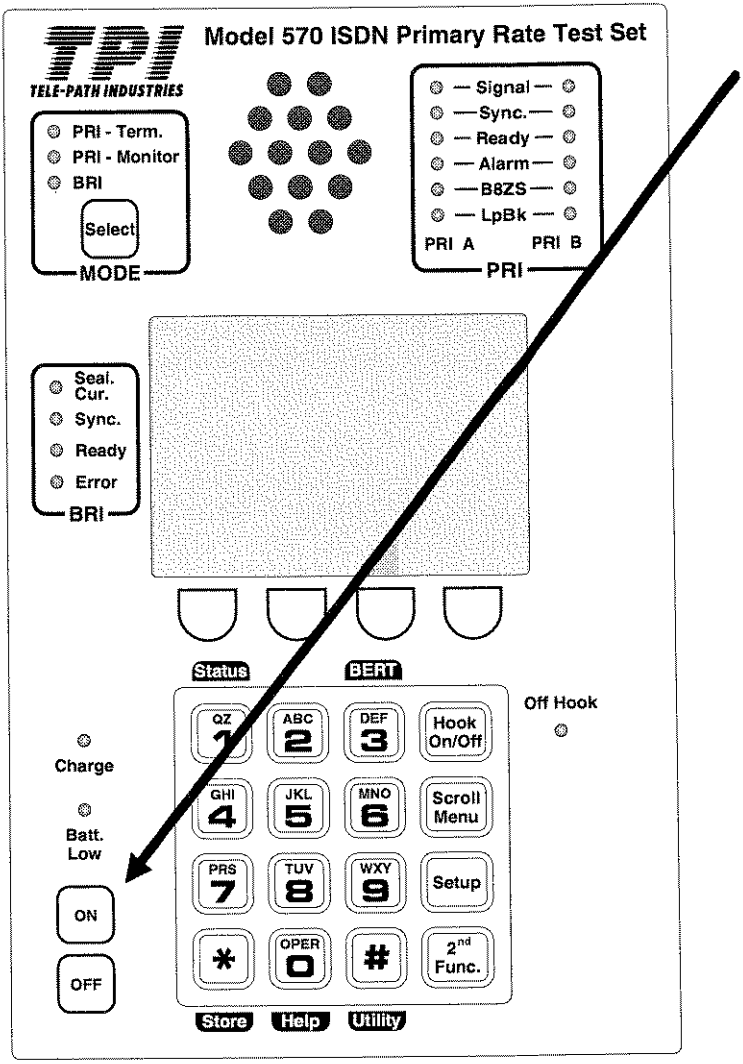
The **Sync.** LED, when illuminated green, indicates that the test set has been able to gain synchronization with the received PRI signal.

The **Ready** LED, when illuminated green, indicates that the Layer 2 initialization process has been completed and a call may be initialized from the test set. The **Ready** LED is not active in the PRI-Monitor mode.

The **Alarm** LED, when illuminated red, indicates an alarm condition has been received from the network.

The **B8ZS** LED will illuminate green for one second when a B8ZS sequence is received.

The **LpBk** LED will illuminate amber when the unit has responded to a T1 Loop Up command or the user has initiated a loopback test.


TPI
TELE-PATH INDUSTRIES
Model 570 ISDN Primary Rate Test Set
PRI - Term.
PRI - Monitor
BRI
Select
MODE
Signal
Sync.
Ready
Alarm
B8ZS
LpBk
PRI A
PRI B
PRI
Seal. Cur.
Sync.
Ready
Error
BRI
Status
BERT
Off Hook
Charge
Batt. Low
ON
OFF
QZ 1
ABC 2
DEF 3
Hook On/Off
GHI 4
JKL 5
MNO 6
Scroll Menu
PRS 7
TUV 8
WXY 9
Setup
*
OPER 0
#
2nd Func.
Store
Help
Utility

POWER

The power switch is used to turn the ISDN Portable Test Set **ON** and **OFF**. If there is no activity (DSL sync, or keystroke) for five (5) minutes, the ISDN Portable Test Set will turn itself off to conserve battery life.

The **Charge** LED indicates that the AC Adaptor/Battery Charger is plugged into the unit. The adaptor will recharge the battery with the power on, but it is recommended that the power be off for faster recharging.

NOTE: *Up to 8 hours of continuous use is possible from a fully charged battery pack.*

When the **Batt. Low** LED lights, there is approximately 10 minutes of operating time left before complete shutdown.

CAUTION: *The 10 minute low battery warning is only approximate and will depend on several factors. To insure proper operation throughout the testing procedures, TPI recommends that the user recharge the battery as soon as the Batt. Low LED lights.*

1.2.3 INTERFACE PANEL

The top panel of the Model 570, illustrated below (Figure 1.7), houses an interface panel for connection of a handset, access to the D channel, and access to the line(s) under test (BRI or PRI).

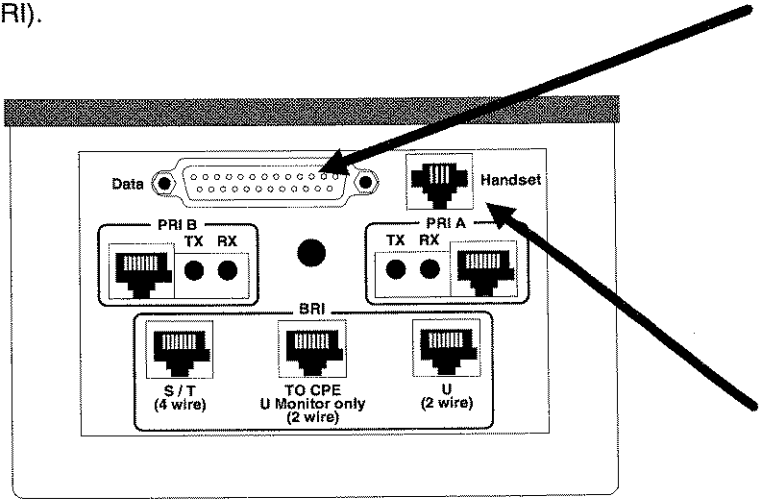


Figure 1.7 Connector Panel

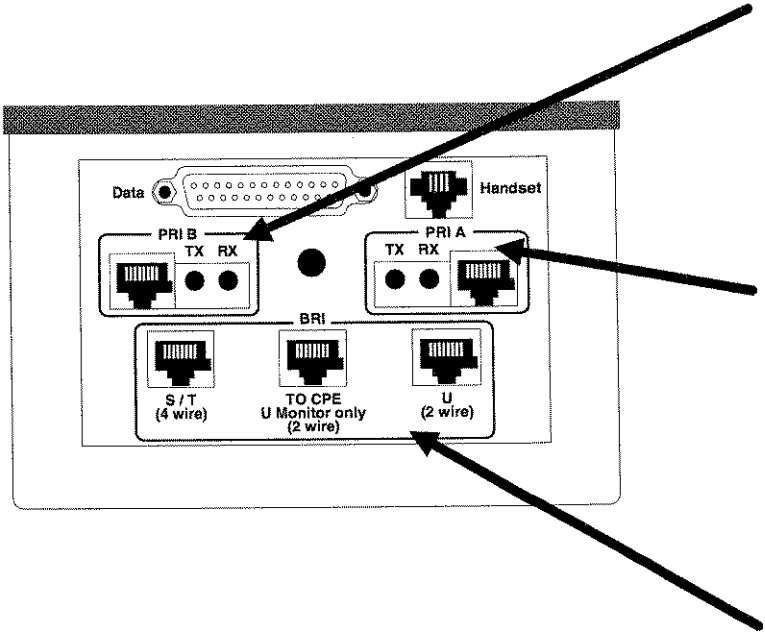
DATA

The **Data** interface is a DB25/RS-232 connector for monitor access to the D channel signalling. The D channel signalling in both directions is available.

Output speed is selectable 9.6K, 19.2, or 38.4 Kbps, 8 data bits, no parity, and 1 stop bit. Information is displayed in HEX and formatted English language translation. If the signalling channel is extremely busy, some messages may be lost when the output speed selected is low.

HANDSET

The Handset jack is a 4-pin modular jack for use with the TPI 570-8 (TPI 835090) handset. When connected, this allows access to a "second" call on the Model 570. In this manner, a call can be placed from the "Speaker Phone" on the front panel and, after selecting the appropriate soft key, answered on the handset, (i.e., the user can call out on one B channel and in on another B channel). The "Utility" menus allow a selection for "Handset" or "Speaker Phone" for the "first" call.


Data
Handset
PRI B
TX RX
PRI A
TX RX
BRI
S / T
(4 wire)
TO CPE
U Monitor only
(2 wire)
U
(2 wire)

PRI B INTERFACE

The **PRI B** interface includes an 8-pin modular jack and a dual mini bantam jack. The two connectors are wired in parallel. These jacks allow access to a second DS1 facility.

PRI A INTERFACE

The **PRI A** interface includes an 8-pin modular jack and a dual mini bantam jack. The two connectors are wired in parallel.

NOTE: *The DS1 containing the D channel should be connected to the* **PRI A** *interface and additional DS1 facilities controlled by that D channel can then be selectively connected to the* **PRI B** *interface, as testing dictates.*

BRI INTERFACE

The **BRI** interface includes three 8-pin modular jacks that allow access to a 2B1Q BRI facility for testing.

The **S/T (4 wire)** jack is used when operating as TE or in ST Monitor mode; the **TO CPE (2 wire)** jack is used when monitoring the U interface; and the **U (2 wire)** is used when operating as NT1, NT1TE, or LT.

1.3 MENUS AND KEYPAD

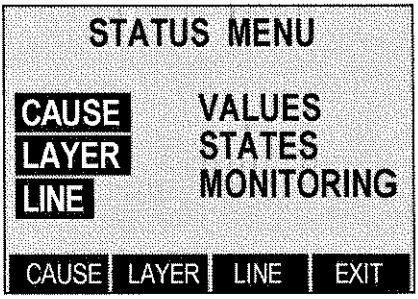
The LCD display and keypad are used to perform many functions from setting up voice and data calls to setting up and viewing test results.

Screen actions are initiated via the following keys:

1/Status	-	This key is used to review the test results and display diagnostic cause messages.
3/BERT	-	This key allows the Model 570 to conduct 2047 Bit Error Testing on any of the B channels or QRSS on the full T1.
*/Store	-	This key is used to program speed dial numbers
0/Help	-	This key is used to view "Help" menus. (not yet active)
#/Utility	-	This key is used to access sub-menus to perform various utility functions, e.g., select a specific call control, control the LCD Backlight, to enable the RS-232 packet data monitor, etc.
Hook On/Off	-	This key is used to send dialed digits or answer an incoming call.
Scroll Menu	-	This key is used to scroll through menu selections.
Setup	-	This key allows the user to review the current setup configuration and accept it, or respond to menu prompts to change the setup.
2nd Func.	-	This key is used to activate the 2nd Function keys.

1.3.1 **Status** Key

This key provides direct access to the STATUS MENU screen:



These menus allow the user to view the status of various functions. The STATUS menu is divided into three sections of sub-menus: Cause Values, Layer States, and Line Monitoring.

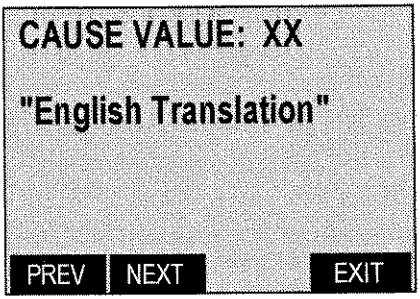
Cause Values:
- Cause Value
- B channel in use
- Calling Line ID
- Inbound Destination Number

Layer States:
- PRI-A Input Layer 1
- PRI-B - Input Layer 1
- Layer 2 - LAPD State
- Layer 3 State
- D channel Status

Line Monitoring:
- PRI-A
  - CRC Errors - Seconds
  - BPV Errors - Seconds
  - Frame Errors - Seconds
  - Elapsed Time
- PRI-B
  - CRC Errors - Seconds
  - BPV Errors - Seconds
  - Frame Errors - Seconds
  - Elapsed Time

1.3.1.1 **CAUSE** Sub-menu

Selecting the **CAUSE** soft key displays the cause message status screen:

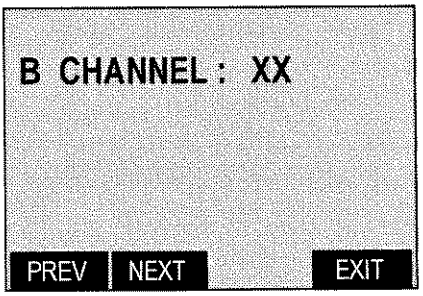


This is an information menu which provides diagnostic cause messages. The first line displays the cause value. The second line will display the actual cause message which may be one of the following:

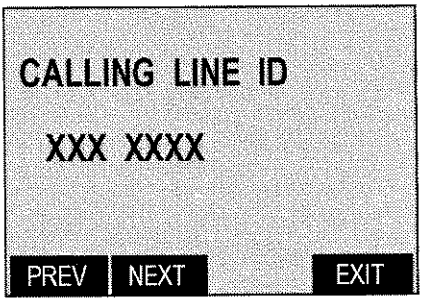
1	UNASSIGNED NUMBER	2	NO ROUTE TO TRANSIT NETWORK	3	NO ROUTE TO DESTINATION
6	CHANNEL IS UNACCEPTABLE	7	CALL AWARDED	16	NORMAL CALL CLEARING
17	USER BUSY	18	NO USER RESPONSE	19	ALERTING BUT NO ANSWER
21	CALL REJECTED	22	NUMBER CHANGED	26	NON-SELECTED USER CLEARING
27	DESTINATION OUT OF ORDER	28	INVALID NUMBER FORMAT	29	REQUEST FACILITY REJECTED
30	RESPONSE TO STATUS INQUIRY	31	NORMAL, UNSPECIFIED	34	NO CIRCUIT/ CHAN AVAILABLE
35	QUEUED	38	NETWORK OUT OF ORDER	41	TEMPORARY FAILURE
42	NETWORK CONGESTION	43	ACCESS INFO DISCARDED	44	REQ. CHANNEL NOT ABAILABLE

47	RESOURCE UNAVAILABLE	49	QUALITY OF SERVICE UNAVAIL	50	REQ FACILITY NOT SUBSCRIBED
52	OUTGOING CALLS BARRED	54	INCOMING CALLS BARRED	57	BEARCAP NOT AUTHORIZED
58	BEARCAP NOT AVAILABLE	63	SERVICE NOT AVAILABLE	65	BEARER SERVICE NOT IMPLEMENTED
66	CHANNEL TYPE NOT IMPLEMENTED	69	REQ FACILITY NOT IMPLEMENTED	70	RESTRICTED, DIGITAL ONLY
79	SERVICE NOT IMPLEMENTED	81	INVALID CALL REFERENCE VALUE	82	CHANNEL DOES NOT EXIST
83	NO CALL ID	84	CALL ID IN USE	85	NO CALL SUSPEND
86	CALL CLEARED	88	INCOMPATIBLE DESTINATION	91	TRANSIT NETWORK NOT EXIST
95	INVALID MESSAGE	96	INFO ELEMENT MISSING	97	MESSAGE TYPE NON-EXISTENT
98	MESSAGE NOT COMPATIBLE	99	INFO ELEMENT NON-EXISITENT	100	INVALID INFO ELEMENT CONTENT
101	MESSAGE NOT COMPATIBLE	102	RECOVERY ON TIMER EXPIRY	111	PROTOCOL ERROR
127	INTERWORKING				

Pressing the **NEXT** soft key will display the B channel status screen, which reports the B channel in use:



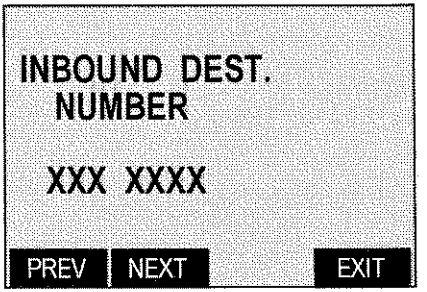
Pressing the **NEXT** soft key moves to the calling line ID screen:



When an incoming call is received, this menu will display the calling party number on the second line, if the data received contains the calling party number. If not, nothing will be displayed.

NOTE: *If the calling party ID was blocked, the Hook screen will show "Restricted".*

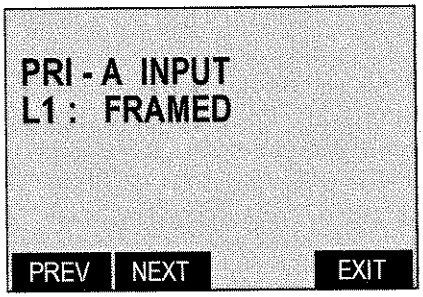
Pressing the **NEXT** soft key will move to the following screen.



This screen displays the number that was "called" by an in-bound call to the Model 570. For example, if the PRI under test has "DID" service, the DID number dialed by the caller will appear.

1.3.1.2 **LAYER** Sub-menu

Pressing the **STATUS** function key will return to the STATUS MENU. Selecting the **LAYER** soft key will move to the Layer 1 status screen for the PRI A interface:

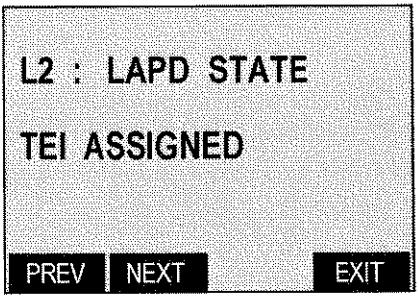


If operating on a single DS1, the "PRI-A INPUT" line will not be displayed. This is a menu which provides Layer 1 diagnostic messages relative to the state of the PRI Interface. Messages that may appear include:

- NO SIGNAL DETECTED
- SIGNAL NOT FRAMED
- FRAMED[1]

[1] **NOTE:** *If a yellow alarm is detected on the interface, "YELLOW ALARM" will appear below "FRAMED".*

If multiple DS1's have been selected, then pressing **NEXT** will display the PRI-B Layer 1 status. Otherwise, pressing the **NEXT** soft key will move to the Layer 2 status screen.



This is a menu which provides Layer 2 information for link access protocol for the "D" channel. The complete messages and their meanings are indicated below:

"TEI ASSIGNED" = TEI has been assigned

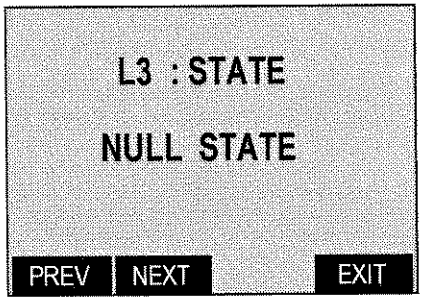
"AWAITING EST" = Not yet in multiple frame state

"AWAITING RELEASE" = Release request from multiple frame state

"MULT FRAME EST" = Completed SABME / UA (This is the state the 570 should be in when ready to place a call.)

"TIMER RECOVERY" = Error State

Pressing the **NEXT** soft key will move to the Layer 3 status screen.



This is a menu which provides Layer 3 information for the state of actual calls.

The Layer 3 messages and their meanings are indicated below:

"NULL STATE" = No call exists.

"CALL INIT" = (Call Initiated) The state exists for an outgoing call.

"OUT CALL PROC" = (Outgoing Call Proceeding)

"CALL DELIVERED" = Remote user alerting has been initiated.

"CALL PRESENT" = States an incoming call.

"CALL RECEIVED" = Incoming call not yet answered.

"CONNECT REQUEST" = Incoming call answered, waiting to be awarded.

"IN CALL PROC" = (Incoming Call Proceeding)

"CALL ACTIVE" = Incoming call or outgoing call state.

"DISCONNECT REQ" = (Disconnect request) Request for network to clear the end-to-end connection.

"DISCONNECT IND" = (Disconnect Indication) Receipt of invitation to disconnect.

"SUSPEND REQUEST" = Request for network to suspend the call.

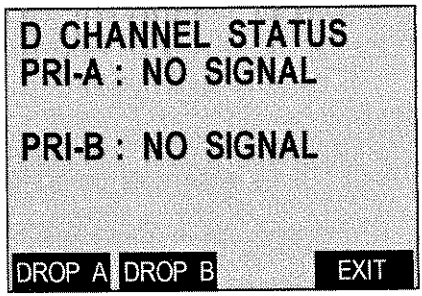
"RESUME REQUEST" = Request for network to resume a previously suspended call.

"RELEASE REQUEST" = Request for network to release a call.

"OVERLAP RECEIVE" = (Overlap Receiving) Network is prepared to receive additional call information (if any) in overlap mode.

"IDLE STATE" = (Idle Call State) No calls in progress; On hook.

If the "Backup D channel" option has not been enabled under the "Utility" menu, pressing the **NEXT** soft key will return to the Layer 1 status screen. Otherwise, pressing the **NEXT** soft key or "Scroll Menu" key moves to the D channel status screen.



NOTE: *This display will appear only if the "Backup D channel" feature has been enabled under the "Utility" menu.*

The status of the D channel on the two PRI interfaces connected to the Model 570 will appear:

"NO SIGNAL" = No signal detected on the physical interface.

"NO FRAME" = Framing pattern not recovered from incoming signal.

"OUT OF SERVICE" = Layer 1 only established. Layer 2 not established.

"STANDBY" = D channel Layer 2 communication established.

"IN SERVICE" = D channel "In Service" message received from the Central Office.

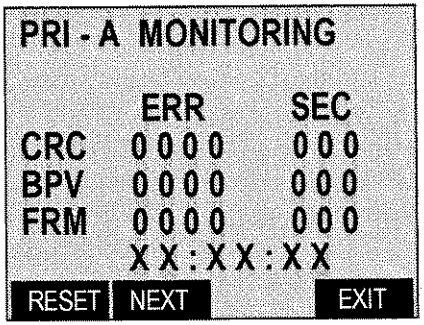
"MANUAL OUT OF SERVICE" = Specifies that the "DROP" soft key has been activated and the Model 570 D channel on the indicate interface is idle.

Backup D channel testing is accomplished by pressing the **DROP A** or **DROP B** soft key as appropriate. The **DROP** soft key will cause the Model 570 to idle the In Service D channel. The "Backup D channel" status will change from "Standby" to "In Service", based upon the Central Office sending an In Service message for the backup D channel. The original D channel will show "Manual Out of Service" when the **DROP** key is activated.

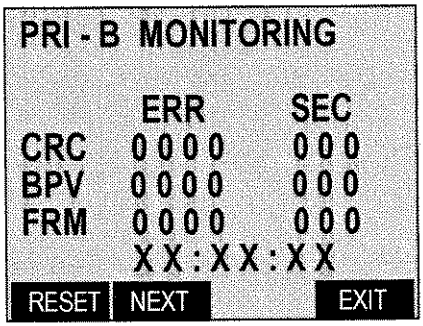
The soft key that was **DROP A** then changes to **EST A** (Establish A). Another swap of the In Service D channel can be made by pressing **EST A** which brings up Layer 2 communication on PRI-A moving the status to "Standby". Pressing **DROP B** will cause another swap of the In Service D channel.

1.3.1.3 **LINE** Sub-menu

Pressing the **LINE** soft key on the STATUS MENU displays the line monitoring screens which display the block error test data:



Elapsed time counter shows HR:MIN:SEC. If multiple DS1's have been selected, then pressing **NEXT** moves to the PRI-B line monitoring screen:



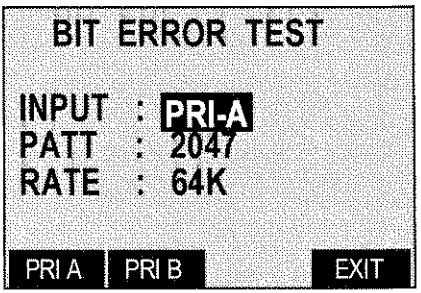
Pressing **RESET** will reset the counters to zero. Pressing the **EXIT** soft key will display the Call screen.

1.3.2 **BERT** Key

This key allows Bit Error Testing from the following sub-menus:

- Bit Error Test Configuration
- BERT channel selection
- Channel Loopbacks

Pressing **2nd Func.** and then **BERT** (3) on the keypad will display the following menu:



The first line shows the input selection as the PRI-A (DS1) interface with PRI-A highlighted, showing the cursor position which can be moved through each line by pressing the **Scroll Menu** key. As the cursor moves from line to line, the possible selections appropriate to that line appear as soft keys. Thus, in the example, the Input selection is a choice between DS1 interfaces labeled PRI-A and PRI-B. The selection displayed on the screen is the "selected" choice.

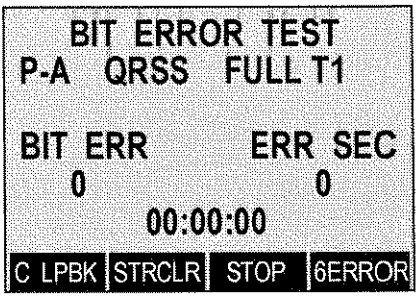
Scrolling down one line moves to the test pattern selection: 2047 or QRSS. A 2047 pattern is available for B channel testing, and if selected, the data rate and specific channels must also be selected. If the QRSS pattern is selected for testing the full T-1 (DS1) bandwidth, the data rate and channel selections do not apply and the display changes to the BIT ERROR TEST screen (see next page).

Data rate selection is 56K or 64K. Upon selection of the data rate, the display changes to the following:

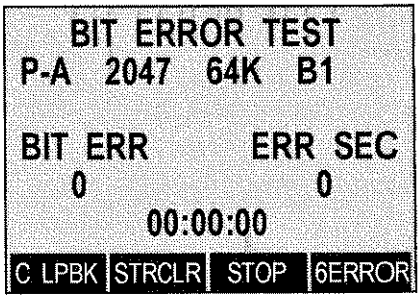
The cursor, shown as the shaded square on the display, indicates that a B channel selection can be made. Select the desired channel by pressing the digits on the keypad. Any number of channels can be selected from either PRI-A or PRI-B.

By pressing the **NEXT B** soft key, the number entered will be selected as a channel, a comma will appear to the right of the selection, and the cursor will move to the right indicating that the unit is ready for the next selection. Pressing the **BKSPCE** soft key will move the cursor one position to the left, erasing any digit shown. A new selection can then be made from the keypad.

Press the **ENTER** soft key when the selection process is completed. The display will move to the BIT ERROR TEST screen:



or:



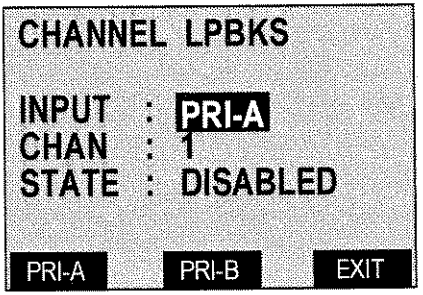
The first line shows the setup for the testing to be conducted: interface A or B, pattern (2047 for individual B channels, QRSS for full T1), and B channels ("MUL" is displayed if more than one B channel is being tested. The Bit Errors and Errored Seconds results appear along with an elapsed timer (HR:MIN:SEC)

Pressing the **STRCLR** soft key starts the Bit Error Testing and clears the counters.

Pressing the **STOP** soft key stops the test and freezes the counters and the elapsed time. The elapsed time counters count up from zero until the test is terminated.

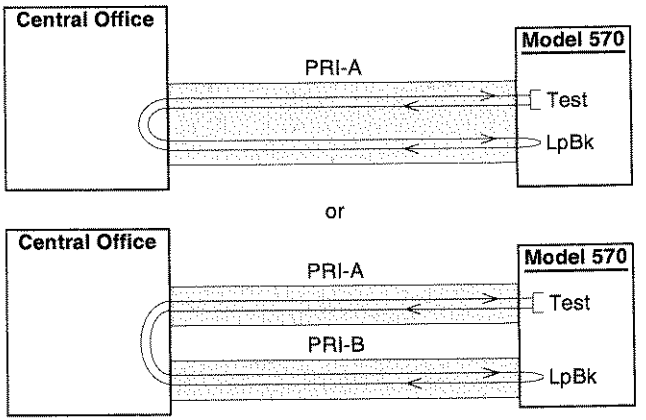
Pressing the **6ERROR** soft key inserts 6 bit errors (1 errored second) into the pattern stream with each press.

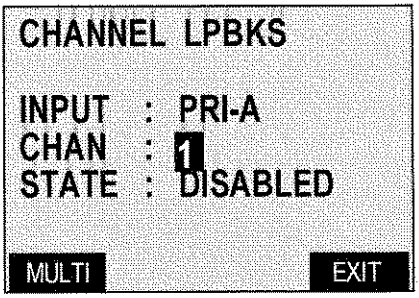
Pressing the **C LPBK** soft key moves the display to the CHANNEL LOOPBACK screen:



The Channel Loopback screen allows the Model 570 to be configured for loopbacks. Any channel, or channels, on either PRI-A or PRI-B may be selected. The Model 570 can provide a loopback for testing from the network, or another test set at another location.

The Model 570 can originate a test by calling out and then back into itself, looping that call back to the originating channel(s).





Pressing **Scroll Menu** moves the cursor down to the Channel Select line. Any single channel may be selected using the keypad. If more than one channel is to be selected, pressing the **MULTI** soft key will move to the loopback channels selection screen. Specific channels may be selected using the keypad and soft keys.

Pressing the **ENTER** soft key to move to the **STATE** line allows the channel loopback configured to be activated. When the **ENABLE** soft key is pressed, the **LpBk** LED for the selected interface will light amber on the front panel indicating that the loopback is enabled.

Pressing the **EXIT** soft key from the Loopback configuration screen will move the display to the Call screen in an idle state.

NOTE: *In the first diagram, a call is placed over a B channel , say B1, to a B channel on the same PRI span, say B-6. After the in-bound call is answered (B-6), the technician places that B channel in a loopback mode. Then, a BER test is initiated on the channel for the first call (B-1). In this manner, two channels on the same span are tested.*

NOTE: *This same sequence could be initiated using an H_0 outbound call or an Nx64 call. Thus, in the case of an H_0 call, 12 B channels would be tested (6 out and 6 in).*

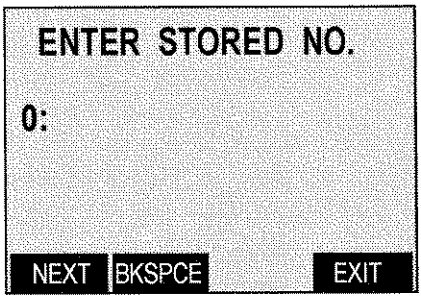
In the example with two PRI spans connected to the Model 570, the number dialed on the first call reaches a B channel(s) on the second span connected to the Model 570. Once again, the channels are placed in loopback and BER Testing is initiated over the channel(s) associated with the first call.

Using the Model 570 you can test H_0 and Nx64 multi-rate ISDN calls if there is no destination reachable at time of testing. Any combination of channels may be tested as long as the "called" channels are all placed in loopback.

1.3.3 **Store** Key

This key allows frequently used numbers to be stored for future speed dial applications.

If you select item ***/Store** on the keypad, the following screen will result:



This screen is used to program and store speed dial numbers. The last number stored in Position "0" will be displayed. If no number has been stored in position "0", the display will read "0: ". Up to ten numbers, with up to 30 digits each, may be stored in locations 0-9 for future speed dial applications. Press **Scroll Menu** to view stored numbers.

To store additional numbers, press the **Scroll Menu** key to increment the stored number location counter.

To change a stored number, press the **BKSPCE** soft key to move one space to the left, erasing the previous number. Enter new numbers from the keypad.

Pressing the **NEXT** soft key stores the number entered and moves to the next location.

An example of a frequently used number you may want to store would be the local TPI Model 560 Automated Test Line access number.

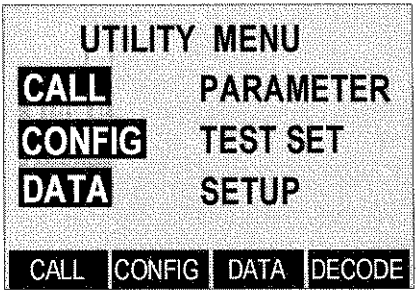
To exit the STORE menu, press the **EXIT** soft key. The call screen will be displayed.

1.3.4 **Utility** Key

These menus allow various utility selections to be made. The UTILITY menu is divided into three sections of sub-menus: Call Parameter, Test Set Configuration, and Data Setup.

Call Parameter	- B-Channel selections - Switch call control selections - D-Channel location selection - Directory number entry - Called party type and plan - Call options - Backup D-Channel testing
Test Set Configuration	- Firmware rev. number - Multi Call - Auto Answer - Battery Charge Level - First Call Assignment - Volume level - LCD contrast level - Backlight-On/Off - Auto power down-On/Off - PRI Loss Insertion - PRI-A Loopback-On/Off - PRI-B Loopback-On/Off - EOC Loop Commands
Data Setup	- Bearer Capability-Voice/Data 56K / 64 / N x 64 / H0 / 3.1KHz Channels selected - D-Channel monitor-On/Off - D-Channel Capture Filters - D-Channel Capture - D-Channel Storage
Decode	- A shortcut to the D-Channel Capture and Storage menus

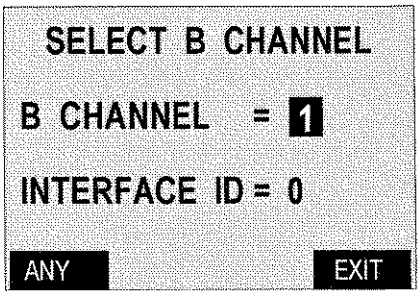
The main Utility menu is:



The **DECODE** soft key allows direct access to the "D-Channel Capture" and D-Channel Storage menus (also found under the DATA sub-menu).

1.3.4.1 **CALL** Sub-menu

Selecting **CALL** moves to the B-channel selection screen:



NOTE: *The Interface ID only appears if multiple DS1's are selected (Setup menu).*

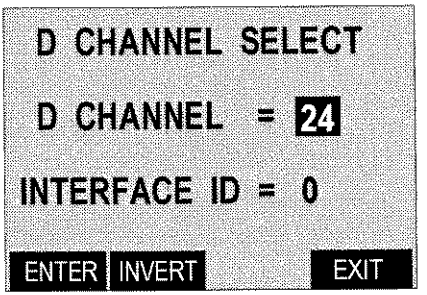
This screen selects the outgoing B-Channel. The cursor is highlighting the B-Channel selection. The default is 1. Enter a channel number from 1 to 24, using the keypad. To place outgoing calls on the first available B-Channel, select the **ANY** soft key. Pressing **EXIT** will return to the HOOK screen.

Press **Scroll Menu** to move to the Interface ID line. In MULTI DS1 mode, up to 20 spans can be used. Enter the span that the desired B-Channel is located on.

Scroll Menu moves to the Call Control screen. The current call control selection will be shown:

Select the appropriate soft key to change the selection. Selecting the EXIT soft key returns to the Hook screen.

Pressing Scroll Menu moves to the D-Channel selection menu:



NOTE: *The Interface ID only appears if multiple DS1's are selected (Setup menu).*

This screen is used to enter the location of the D-Channel. The cursor is positioned on the D-Channel number with the current setting (default is 24). Enter the channel, from 1 to 24, using the keypad, then select **ENTER**.

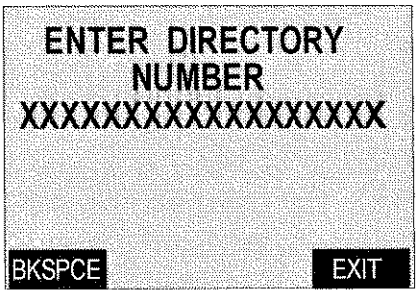
The **INVERT** soft key can be selected to reverse the D-Channel signaling (change "0" to 1" and "1" to "0"). This is also known as "Inverted HDLC".

The **EXIT** soft key is used to return to the Hook screen.

Pressing **Scroll Menu** moves the cursor to the Interface ID line. In Multi DS1 mode, up to 20 spans can be used. Enter the span (0-19) that the selected D-Channel is located on.

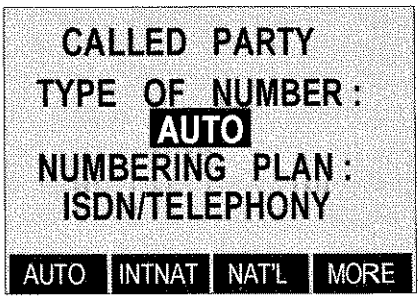
Multiple trunk groups or backup D-channel service can be tested in this manner.

Pressing **Scroll Menu** again moves the display to the Directory Number screen:



The Directory Number, consisting of up to 30 digits, may be entered using the keypad. If a Directory Number is entered, it will be sent out as part of the "Setup" message when a call is placed as a calling party number element.

Pressing **Scroll Menu** displays the following menu:



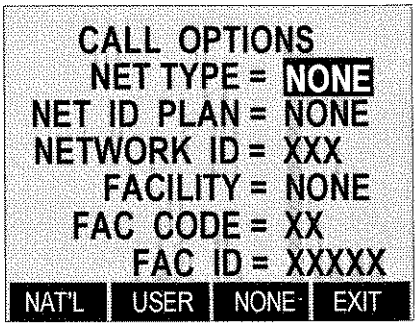
This menu selects the type of number and the numbering plan for the called party number information element. Pressing the **MORE** soft key will display more options.

The type of number and numbering plan options are shown in the following table:

Table 1
Called Party Number Type and Plan

AT&T and NTI Custom	National Call Control
Type of Number:	Type of Number:
Auto	Auto (w/ISDN/Telephony Numbering Plan)
National	National (w/ISDN/Telephony Numbering Plan)
International	International (w/ISDN/Telephony Numbering Plan)
Subscriber	Subscriber (w/Private Numbering Plan)
Unknown	Unknown(w/Unknown Numbering Plan)
NOTE: Auto = Subscriber for 7 digits or less National for 8 digits or more	
Numbering Plan:	Numbering Plan:
ISDN/Telephony Private Unknown	Automatically determined by "type of number"

Scroll Menu moves to the Call Options screen. This menu enables the programming of two specific call setup message elements which affect the routing of a call and the access to specific optional features within the network. The codes that are entered are specific to the switch providing the Primary Rate service and the networks which may be used. Consult your company practices and service order information for details.



The Call Options screen allows the programming of the "Network-Specific Facilities" options in the setup information elements. There are actually two parts to this option:

Network options
- Network Type: User, National or None
- Network Plan: CIC, Data or Unknown
- Network ID: 3 digits

Facility options
- Facility: Service, Feature or None
- Facility Code: 2 digits
- Facility Identifier: 5 digits

NOTE: *Network options and Facility options may be programmed and selected independently, i.e., both are not required.*

The Facility Identifier is generally used to specify trunk groups. Up to 5 digits may be entered.

Pressing "**Scroll Menu**" moves the cursor to each line. The applicable selections are shown on the soft keys. The Network ID, Facility code, and Facility Identifier are entered using the keypad.

The **EXIT** sof key can be pressed to return to the Hook screen.

The following tables outline the available options. Table 2 identifies the **Network** options. Tables 3-5 identify the **Facility** options.

Table 2
Network Options

Network Type (three choices)	National	(soft key)
	User	(soft key)
	None	(soft key)
Network ID Plan (three choices)	CIC	(soft key)
	Data	(soft key)
	Unknown	(soft key)
Network Number (three digits)	CIC (Carrier Identification Code)	
	AT&T	288
	MCI	222
	SPRINT	333

Data codes - CCITT recommendation X.121 outlines codes - consult your company practices.

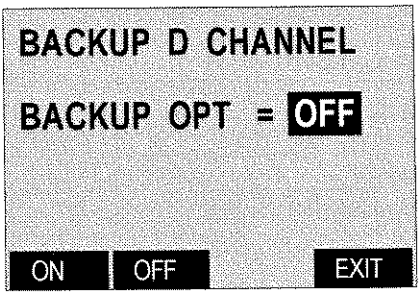
Table 3 AT&T Facility Options	
AT&T Custom (PRI)	
Feature	Code
Operator Telephone Co.	5
Operator Common Carrier	6
Service	
Access for Virtual Private Network	1
MEGACOM 800 service	2
MEGACOM service	3
IN WATS	4
WATS Maximal subscriber band	5
ACCUNET	6
International Long Distance Service	7
International 800	8
Electronic Tandem Network	11
Private Virtual Network	13
DIAL-IT NOVA	16
AT&T National ISDN-2	
Service	
WATS Band	1
National ISDN Banded OUTWATS	18
Foreign Exchange	19
Tie Trunk Selection	20
National ISDN INWATS	17
National ISDN Unbanded OUTWATS	18

Table 4 NORTEL Telecom FACILITY Options	
Service	Code
Private	1
In WATS	2
Out WATS	3
Foreign Exchange	4
Tie Trunk	5

Table 5 ISDN-2 Options	
Service	Code
In WATS	17
Out WATS	18
Foreign Exchange	19
Tie Trunk	20

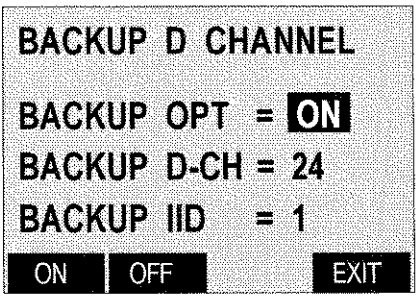
(Except AT&T - see Table 2)

Pressing **Scroll Menu** from the Call Options display moves to the Backup D channel test selection display:



Central Office switches can be programmed, on a "subscription" basis, to provide a D channel backup capability for configurations that have one PRI with D channel (23B+D) supporting multiple (24B) PRI's without D channels. A second PRI is configured to be a 23B+D interface with the D channel in a standby mode. Should a failure occur on the primary (active) interface, the D channel signaling is automatically switched over to the backup D channel or another interface. The Model 570 can test this scenario.

Pressing the **ON** soft key enables the following menu to be displayed:



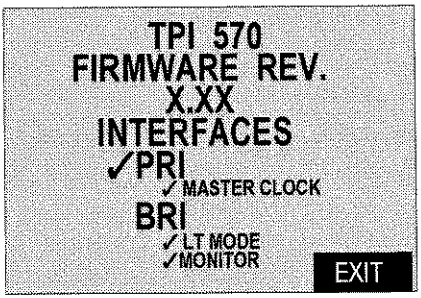
Pressing **Scroll Menu** moves the highlighted cursor to the channel number select and IID number select lines. Select the channel (from 1 to 24) that the Backup D-Channel is located on. Press **Scroll Menu** to move to the Backup IID selection. Enter the Interface ID (0-19) that the Backup D-Channel is located on. Actual testing is controlled from the "D channel Status" menu under "Status/Layer."

1.3.4.2 **CONFIG** Sub-menu

Pressing the **CONFIG** soft key on the Utility menu moves the display to the test set configuration sub-menus:

- Firmware Rev. #/Interfaces installed
- Multi Call
- Auto Answer
- Battery Charge Level
- First call Assignment
- Volume Level
- LCD Contrast Level
- Backlight On/Off
- Auto Power Down On/Off
- PRI Loss Pad
- PRI-A loopback
- PRI-B loopback
- EOC Loopback Command

The first of these is:



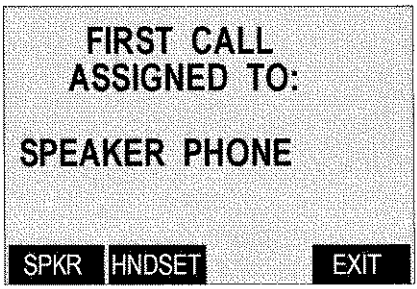
This screen lists the software revision, interfaces, and features installed in the Model 570. "PRI" is a standard interface, while "BRI" is optional. The "BRI" Interface will only be checked if the BRI option has been installed. If the features (smaller text items) do not have the "check mark" (✓) in front of them, then either the unit is not equipped with that feature or the hardware in the unit cannot support the features. This would most likely occur in older units that have received a firmware update.

Pressing **Scroll Menu** displays the MULTI CALL screen. When "ON", this screen allows up to 23 calls (of any combination). The status of these calls will be displayed on the HOOK screen.

Pressing **Scroll Menu** displays the AUTO ANSWER screen. When "ON", the TPI 570 will recognize an incoming call and automatically answer it.

Pressing **Scroll Menu** displays the status of the battery charge level in Volts.

Pressing **Scroll Menu** again moves to the following display:



This screen allows a selection for the first call to be made from the Model 570: Speaker Phone or Handset. The default selection is Speaker Phone. Pressing the **HNDSET** soft key changes the selection to the Handset (in this case the second call would be on the Speaker Phone).

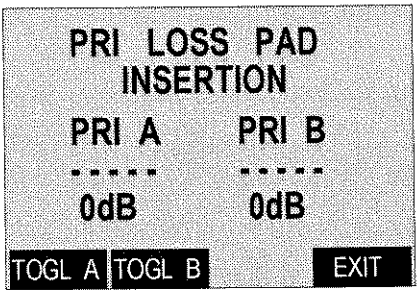
Pressing the **Scroll Menu** key moves to the VOLUME LEVEL screen. Press the **RAISE** or **LOWER** soft keys to select a volume level from 1 to 9.

Pressing the **Scroll Menu** key moves to the LCD CONTRAST screen. Press the **RAISE** or **LOWER** soft keys to select a contrast level from 1 to 9.

Pressing **Scroll Menu** moves to the LCD BACKLIGHT control screen. Select **ON** or **OFF** with the corresponding soft key.

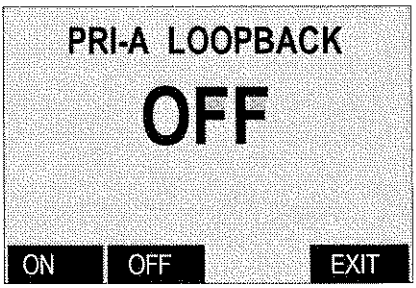
Pressing the **Scroll Menu** key moves to the AUTO POWER DOWN control screen. Select **ON** or **OFF** with the corresponding soft key. Auto power down **ON** will enable the battery power to be conserved by automatically turning the Model 570 off after 5 minutes if there has been no keypad activity, nor active signal detected at a DS1 interface, and the AC Adapter is not plugged into an AC line.

Pressing the **Scroll Menu** key displays the following screen:



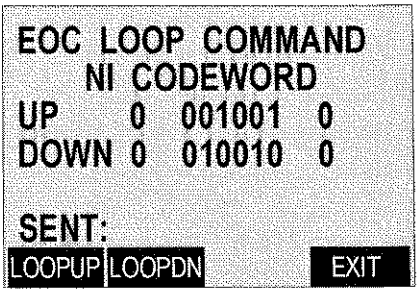
This screen is used to insert loss into the transmitted data. Selecting **TOGL A** will insert 7.5 dB loss onto the PRI-A interface; **TOGL B** will insert loss onto PRI-B. Pressing **TOGL A** again will remove the loss.

Pressing **Scroll Menu** moves to the LOOPBACK screen:

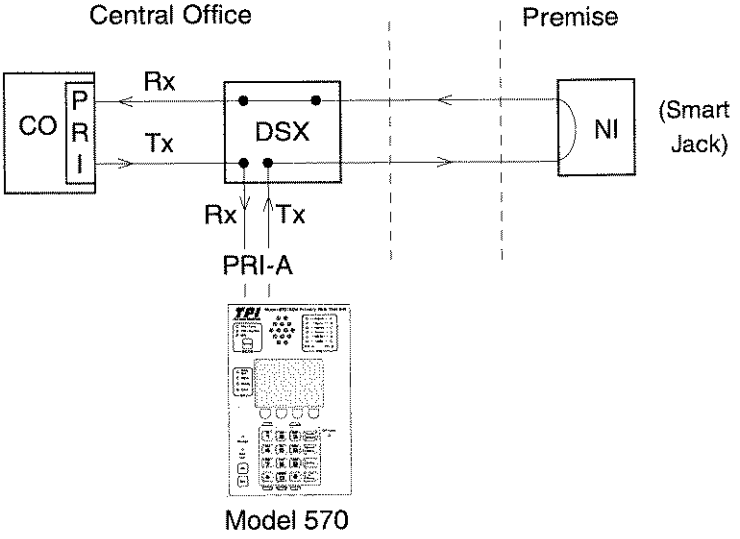


The first screen is the loopback status for the PRI-A interface. **Scroll Menu** will move to the PRI-B interface. The **ON** or **OFF** selection is made by pressing the applicable soft key. After an interface has been placed in a loopback ON position, the **LpBk** LED for **PRI** A or B will light amber.

Pressing **Scroll Menu** displays the following screen:



This screen is used to send a EOC Loop Up or Loop Down command to a Network Interface Unit or Smart Jack at the customer premise when test access is at the DSX cross connect panel(s).



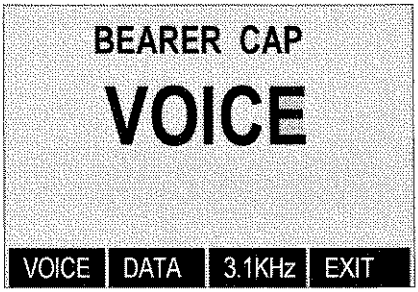
Model 570

NOTE: *Both TX and RX are connected to interface PRI-A.*

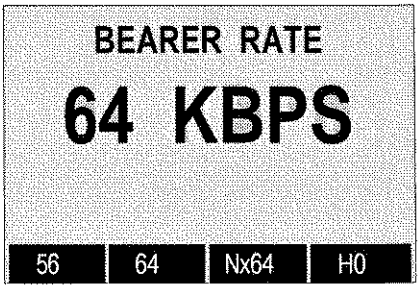
This arrangement allows testing of the PRI service, as if the technician was at the premise, yet access is within the Central Office. The EOC Loopup and Loopdown commands control the Smart Jack at the premise to establish this test configuration. The actual command codes shown are sent when the **LOOPUP** and **LOOPDN** soft keys are pressed. The applicable LOOPUP or LOOPDOWN will be shown on the last line of the screen (SENT: **LOOPUP**).

1.3.4.3 **DATA** Sub-menu

Pressing the **DATA** soft key from the Utility menu will display the following menu:



If **VOICE** is selected, the "D Channel Monitor" menu is displayed. If **DATA** is selected, **Scroll Menu** moves to the BEARER RATE select screen for data services:



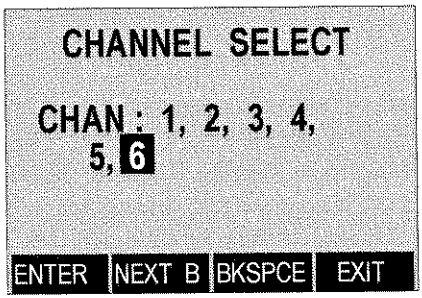
Data rates selectable using the soft keys are 56 Kbps, 64 Kbps, Nx64, and H_0.

The H_0 selection is for 384 Kbps using six (6) B channels. Pressing the H_0 soft key moves to the H_0 CHANNEL GROUP selection screen. Channel groups to select include 1–6, 7–12, 13–18, and 19–24.

NOTE: *The H_0 selection should not contain the D channel.*

The Nx64 selection is for any fractional bandwidth or number of channels from 1 to 24. Pressing the Nx64 soft key moves to the selection for Contiguous and Non-Contiguous channel selections.

Selecting contiguous prompts for the channel to start with and the channel to end with. If Non-Contiguous is selected, pressing **Scroll Menu** moves to the CHANNEL SELECT screen:

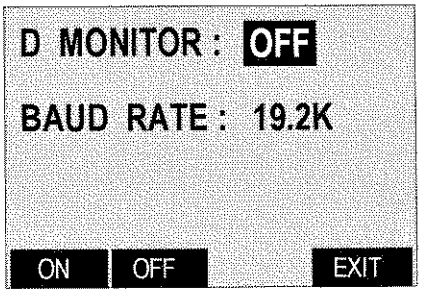


The display shows the current selection(s). The cursor is shown as the shaded square. Enter the desired channel numbers using the keypad. Any channel number from 1 to 24 may be entered. Pressing the **NEXT B** soft key will select the entered channel and move the cursor to the next position to the right.

NOTE: *A channel number that is designated as the D channel should not be selected.*

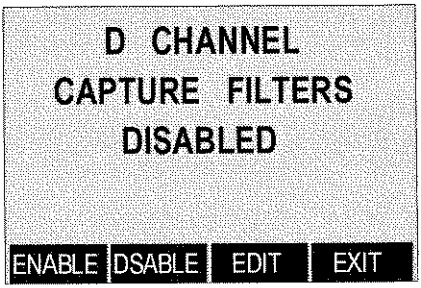
Pressing the **BKSPCE** soft key will move the cursor one position to the left erasing a previous entry.

Pressing **ENTER** or **Scroll Menu** after channel selections have been made, moves the display to the D channel MONITOR ON/OFF selection.



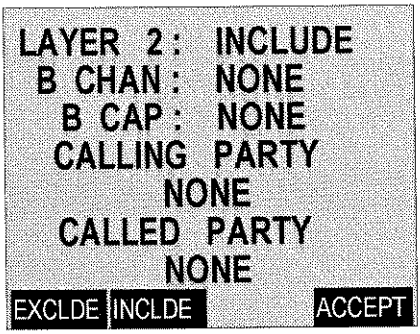
Select **ON** to enable decoded D channel messages to be dumped out the RS-232 Data port. Pressing **Scroll Menu** moves the cursor to the Baud Rate selection line and three speeds (9.6Kbps, 19.2 Kbps and 38.4 Kbps) appear as soft key selections.

Pressing **Scroll Menu** will display the D Channel Capture Filters menu:



This menu displays the status of the D Channel Filters. These filters apply to the messages being captured by the Model 570 for LCD display. If the filters are DISABLED, all D Channel messaging will be captured. If the filters are ENABLED, the messages will be screened to ensure compliance prior to placing them in the capture buffer.

Pressing the **EDIT** soft key or pressing the **ENABLE** soft key will display the filter status menu:



This menu displays the elements which can be used to filter the D channel messages. The items listed can be specified individually, or, if more than one item is selected, an "and" function can be performed to further restrict the messaging being captured.

If the **LAYER 2** menu item is set to INCLUDE, then the Layer 2 messages will be captured into the buffer with all other messages. Selecting EXCLUDE will not capture Layer 2 messages. The default is INCLUDE.

Pressing **Scroll Menu** highlights the **B CHAN**NEL filter. When a number is entered, the Model 570 will capture all messaging pertaining to a certain B Channel. If NONE is selected, then the B Channel is not used in the determination of capturing a message.

Pressing **Scroll Menu** highlights the **B**EARER **CAP**ABILITY filter. This filter allows calls to be captured based on their capability. Selections include NONE, VOICE, DATA, and 3.1KHZ AUDIO. Once a call of the specified bearer capability is detected, all messaging associated with that call (Call Reference Value) are captured. If NONE is selected, then the bearer capability is not used in the determination of capturing a message.

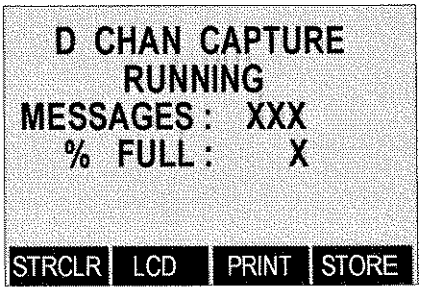
The next menu item is the **CALLING PARTY** Number. Up to 32 digits can be entered. Once a number is entered into this field, the call messaging is not captured until a call has been verified to originate from this number. Once a call is detected with this calling party number, all associated messaging is captured. If NONE is selected, then the calling party number is not used in the determination of capturing a message.

The last item is the **CALLED PARTY** Number. Up to 32 digits can be entered. Once a number is entered into this field, the call messaging is not captured until a call has been verified to specify this number as the Called Party Number. Once a call is detected with this called party number, all associated messaging is captured. If NONE is selected, then the called party number is not used in the determination of capturing a message.

Pressing the **ACCEPT** soft key will return to the D Channel Capture Filters menu.

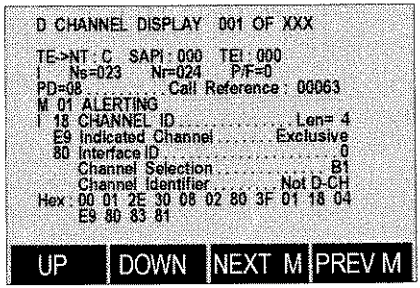
Pressing **Scroll Menu** moves to display the status of the D channel "Message Capture" feature. The Model 570 can capture D channel message traffic and display them on the LCD or save them for later reference or dump them out the Data port for external analysis.

The "D Channel Capture" display will appear as:



The **STRCLR** soft key clears the messages and starts the capture from that moment. The number of messages captured will increase until the storage space is full. The maximum number of messages will vary due to varying message lengths.

Pressing the **LCD** soft key freezes the message capture at that moment and displays the first message "001 of XXX" on the screen in decoded form: English language and HEX. (See example of decoded format below.) The display will look like:



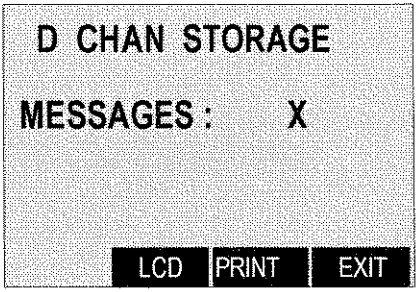
The display will show up to 12 lines of a single message. Pressing the **UP** or **DOWN** soft keys will scroll through a long message such as a setup message.

Pressing the **NEXT M** or **PREV M** soft keys will scroll between full messages. The message number on the title line will show the sequential number of the captured messages. Pressing **Scroll Menu** returns to the capture status display.

Pressing the **PRINT** soft key will dump the captured messages out the Data port. "PRINTING" will show in the status line during this event.

Pressing the **STORE** soft key will store what messages are in the "D Channel Capture" mode (up to 4K bytes of data). "STORING" will show in the Status line during this event.

Pressing **Scroll Menu** moves the display to the status of the "**Stored**" messages:



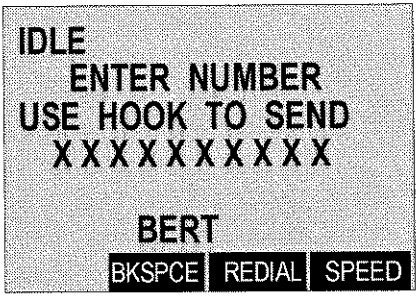
The messages in this capture buffer are stored and can be viewed on the **LCD** or dumped out the serial data port. Up to 4K bytes of messages can be stored and held in memory on power down.

There are two buffers for D-Channel messages: the "capture" buffer is a 4K buffer used to continuously capture up to 4K bytes of data (newest in/oldest out). When the **STORE** soft key is pressed, the data moves from the "capture" buffer to the "storage" buffer. The "storage" buffer is a 4K buffer that stores messages in memory on power down.

NOTE: *If the D channel Backup feature is enabled (ON), each message viewed on the LCD and the serial **DATA** port will show the interface for the D channel PRI-A or PRI-B as the first line. If the stored data was captured with the D channel Backup feature enabled and the D channel Backup feature is no longer enabled, the messages will show PRI-B as applicable only.*

1.3.5 **Hook On/Off** Key

If you select item "**Hook On/Off**" on the keypad, the following screen will be shown:



This screen is the CALL SCREEN, showing an idle state. Numbers up to 32 digits may be entered using the keypad (**BKSPCE** to move one place to the left and erase digit with each key press).

NOTE: *If a call attempt is rejected by the Central Office, the "Cause" message will appear on the screen. See the Cause message listing in section 1.3.1.1.*

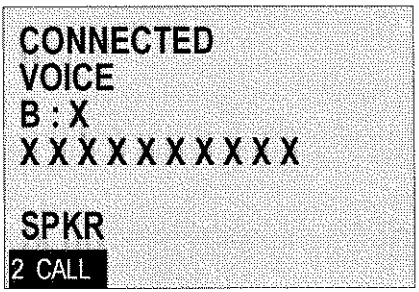
If a BER test is in progress, "BERT" will appear on the display reminding the user that BERT is active and no calls can be placed. Other conditions may also be displayed, such as Loopback (LPBK), 40KHz Tone, or 40KHZ Measure (40KHZ MEAS).

If a previous call has been placed, the **REDIAL** soft key can be pressed to dial the last number.

The **SPEED** soft key allows access to one of ten (10) stored numbers. Pressing SPEED will move to the speed dial selection screen. Entering a digit, 0 to 9, on the keypad will automatically place the outgoing call to the stored number in the speed dial location selected.

If entering a number manually from the keypad, the number must be entered and the Hook On/Off key must be pressed to send the number. Primary rate ISDN uses enblock dialing - the entire number is sent out as a block of information in the outgoing setup message.

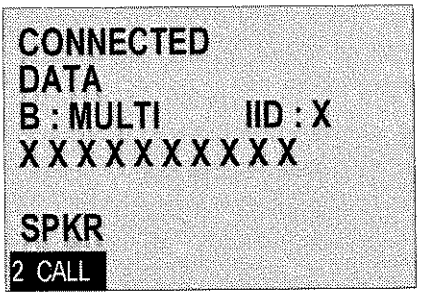
The following menu will result, after passing quickly through the "DIALING" and "RINGBACK" states:



When a call is made and connected, the B channel that is in use will be displayed.

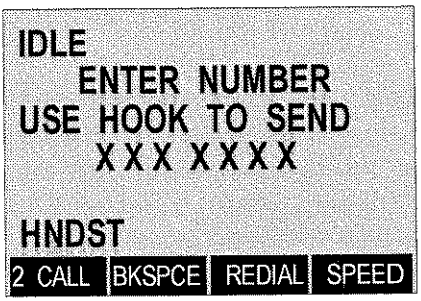
NOTE: *An in-bound call will show "Ringing" as the status. If the calling party ID is blocked by the caller, the display will show "Restricted" below the number. If the calling party ID is not available, that will be shown.*

If the call was a multi-channel DATA call then the display will show:



In this case, the IID number of the DS1 used to set up the call is indicated. SPKR means the call is on the hands-free speaker phone in the Model 570.

The **2 CALL** soft key is used to make a **second call**. Pressing this soft key will change the display to the following:



The **HNDST** (Handset) indicates this menu applies to the call associated with the handset. To move back and forth between the two call status screens, press the **2 CALL** soft key.

NOTE: *The Model 570 can place two outgoing calls or it can call **out** and back **in**to itself.*

The number that is displayed on the status screen is the "dialed number" for outgoing calls and the "calling party number" for inbound calls.

When the Model 570 is receiving a call, a Sonalert is sounded. To answer the call, press the **Hook On/Off** key. The status screen outlined above will be displayed.

When one call is active on the Model 570, and a call is received (rings at the Model 570), it may be answered by pressing the **2 CALL** soft key to display the incoming call status, then pressing the **Hook On/Off** key will answer the call. In either case, the call status screen will appear as outlined above.

NOTE: *In a multiple DS1 environment, care should be taken to ensure calls are made using only the DS1's connected to the Model 570. D channel signaling is active for all DS1's, however, the Model 570 can access only those connected to Interface PRI-A or PRI-B.*

The normal sequence followed by the Model 570 when making a voice call will be as indicated below:

1 - HOOK SCREEN (IDLE)
2 - ALERT
3 - CONNECT
4 - DISC (Disconnect)
5 - HOOK SCREEN (IDLE)

An incoming call will sound an alert tone. To answer, press the **Hook On/Off** key. Conversation may now take place. To hang up, press the **Hook On/Off** key again.

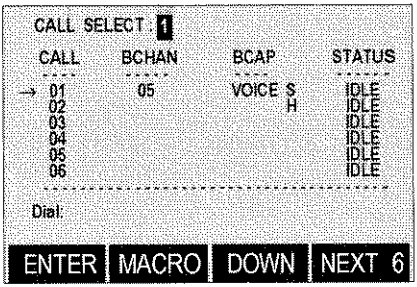
NOTE: *During a call, if the other end terminates a call, the Model 570 will automatically go to "On Hook" status.*

The Model 570 will display call sequence messages to indicate call status, along with other status messages such as "Rejected", "Connect", "Proceeding", and "Ringing". The meaning of these messages is reviewed below:

DIALING	-	In the process of dialing digits as entered.
RELEASING	-	Sent the disconnect message to the switch.
REJECTED	-	Have been denied service by the switch, e.g. channel requested is not available.
CONNECT	-	Received message from switch that call has been put through.
PROCEEDING	-	Placed a call and the switch is ringing the other end, which has not yet answered.
RINGING	-	Receiving an incoming call (go OFF HOOK to answer).

"MULTI CALL" HOOK SCREEN

If the "Multi Call" feature is enabled (in the "Utility/CONFIG" menu), the Hook screen will appear as:



This screen displays the status of all calls (up to 23). The "01" item is the call number; "BCHAN" is the B channel the call is placed (or received) on; "BCAP" is the bearer capability for this call; an "S" or "H" after the bearer capability indicates where the call is located: Speaker or Handset; and "STATUS" reports the call progress (e.g., Idle, Outgoing, Incoming, etc.)

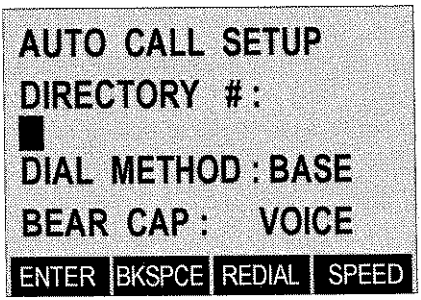
To move the cursor (→) to the next call, select the **DOWN** soft key. To view the next six calls (i.e., 7 through 12), select the **NEXT 6** soft key.

To place a call, enter the number to be dialed, followed by the **ENTER** soft key.

Selecting the **MACRO** soft key will display the following menu:

This menu is used to select calling functions to perform. Selecting **PREV** will move the cursor to the previous item; **NEXT** will move to the next item, and **SELECT** can be pressed to perform the function highlighted.

Selecting either of the "Call" macros will display the following menu:

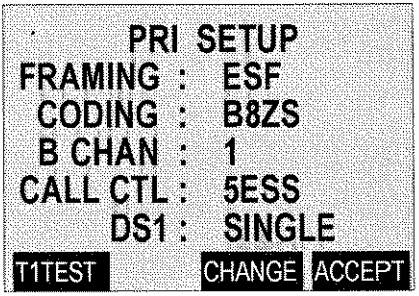


This screen is used set up the multiple calls. The first selection enters the directory number. The dialing method selection designates how to dial the multiple calls: using the same number over and over (**BASE**), or use the number entered for the first call and increment the directory number for each call (**INC**). The last item, BEAR CAP, selects the bearer capability.

Once the call setup is complete, select the **RUN** soft key to initiate the calls. Call status will be displayed on the Hook screen. To hang up the calls, select the "HANG UP" macro.

1.3.6 **Setup** Key

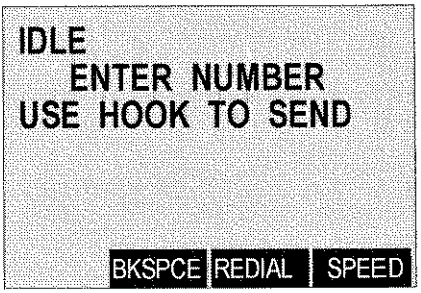
If you press the **Setup** key, a menu will be displayed that reflects the current setup configuration. For example:



Pressing the T1TEST soft key will place the Model 570 in a T1, Layer 1 test mode. This mode provides additional T1 test patterns and loop codes. In the T1 test mode, the Model 570 will test the T1 physical layer (Layer 1). Therefore, the ISDN portions of the test set are not used in this mode. Section 2.5 provides a discussion of the additional capabilities of the Model 570 in the T1 test mode.

See Section 2.2 for a step-by-step description of the setup menus when **CHANGE** is selected.

To accept the present setup, press the **ACCEPT** soft key. This will move the display to the dial, or On Hook Idle screen.



See Section 1.3.5 for more details on the Hook screen.

1.4 ACCESSORIES AND OPTIONS

The TPI 570 ISDN Portable Test Set comes equipped with the following cables and accessories:

PART #	DESCRIPTION
TPI 570-2 (TPI 834003)	8-Pin Mod to Mod Cable [2]
TPI 570-4 (TPI 825400)	Battery Charger/AC Adapter [12VDC, 500mA]

The TPI ISDN Portable Test Set has several ***options*** which may be ordered as well:

PART #	DESCRIPTION
TPI 570-BRI (TPI 836781)	BRI Basic Testing Capability
TPI 570-UPG (TPI 836781)	BRI Option Upgrade -- *Existing PRI-only Units*
TPI 570-BRI2 (TPI 836782)	Enhanced BRI Testing Capability (U, S/T and Monitor Interface Option)
TPI 570-UPG2 (TPI 836782)	BRI2 Upgrade for PRI-only units
TPI 570-UPG3	BRI2 Upgrade for Basic BRI units
TPI 570-F/W	3 yr Firmware Enhancement Agreement

The Model 570 ISDN Portable Test Set has several ***optional*** accessories as well:

PART #	DESCRIPTION
TPI 570-2 (TPI 834003)	Replacement 8-pin Mod to 8-pin Mod Cable
TPI 570-3 (TPI 836326)	8-Pin Mod to 4 Clip Leads Cable (HD)

Hazardous voltages can be present on th eline side of the network interface. Do not use the TPI 836326 cable in locations where hazardous voltages can be present.

TPI 570-4 (TPI 825400)	Replacement Battery Charger / A/C Adapter
TPI 570-7 (TPI 837190)	Soft Pack Carry Case
TPI 570-8 (TPI 835090)	Hand Set
TPI 570-9R (TPI 836408)	Bantam to Bantam Receive Cable
TPI 570-9T (TPI 836409)	Bantam to Bantam Transmit Cable
TPI 570-10 (TPI 835048)	Replaceable Battery Assembly
TPI 570-UPD	Firmware Update

1.5 MAINTENANCE

The only replaceable parts on the ISDN Portable Test Set are the firmware module and external cords. The LED indicators and displays are soldered into the unit and are not field replaceable.

If the Model 570 operation should become suspect, the unit may be checked for proper operation by performing a SELF TEST. This is done by turning the power off then on again, which will initiate a Power-Up Self Test. If this procedure does not operate successfully, contact the factory Customer Service department at 540-375-0500.

1.5.1 CALIBRATION

Calibration is not required for the Model 570, due to the Digital nature of its design and due to the synchronous nature of the derived timing from ISDN networks. If proper operation of the ISDN Portable Test Set is in question, the Power-Up Self Test mentioned above may be performed.

1.5.2 EPROM MODULE

The EPROM module, located on the left side of the unit, may be removed and upgraded. Removal is accomplished through the following steps:

- Turn power OFF and unplug AC Adapter, if used.
- With a static discharge wrist strap on, remove the (2) screws from the EPROM door on the left side of the unit.
- Remove the door.
- Push the corner tabs toward the outside.
- Gently pull out the EPROM circuit board.
- Insert the new board assembly and firmly press the board into place to secure it.
- Replace the (2) screws in the EPROM door.
- Power up the Model 570 and verify that the SELF TEST passes.

Return the replaced EPROM module(s) to TPI Customer Service, with the unit serial number noted.

1.6 SPECIFICATIONS

PHYSICAL

LINE INTERFACES

DS1 per ANSI T1.403 (1989)

8-Pin Mod Pinouts

1 & 2 = RX Input

4 & 5 = TX Output

POWER

Internal 12V Lead Acid Rechargeable Battery

Battery Charger/AC Adapter

Battery Life = 10 Hours of continuous use from fully charged battery state.

WEIGHT

≤6 pounds

DIMENSIONS

4¼" deep, 5½" wide, 8½" long

ENVIRONMENTAL

(Reference Bellcore TR-NWT-000063)

Storage

Temperature = -20° – +140° F

Humidity = 10% – 95%

Operating

Temperature = +40° – 100° F

Short term = +35° – +120°

Humidity = 20% – 50%

Short term = 10% – 80%

OPERATIONAL

MODES
- NT1/TE (Phone and NT1 Replacement)

CALL CONTROLS (PRI)
- 5ESS per 235-900-342
- NTI-F per NT NIS-A211-1
- NAT'L (National) per vendor documents and Bellcore SR-NWT-002120

BRI Option
- 2B1Q per ANS1 T1.601
- Call Controls include 5ESS, NTI-F, and National ISDN

RS-232 DATA Connector
- Selectable speeds - 9.6, 19.2, 38.4K
- 8 Data Bits, 1 Stop Bit
- No Parity

MEASUREMENTS

LCD
- 192 x 128 Dot Matrix Display

TEST RESULTS
- Block Errors
- B8ZS
  - CRC Errors & Errored Seconds
  - BPV Errors & Errored Seconds
  - Frame Errors & Errored Seconds

BIT ERROR TESTING
- 2047 Pattern - B channels
- QRSS Pattern - DS1
- Bit Errors & Errored Seconds

CALL STATUS
- Displayed on LCD
- Layer 1, 2, 3

LED INDICATORS

MODE

PRI - Term. - Indicates the unit is operating on the PRI span in a Terminate mode.

PRI - Monitor Indicates the unit is operating on the PRI span in a Monitor mode.

BRI - Indicates the unit is operating on the Basic Rate span.

PRI

Signal A - Indicates that a DS1 carrier signal has been detected on the 23B+D facility.

Signal B - Indicates that a DS1 carrier signal has been detected on the 24B facility.

Sync. A/B - Indicates DSL is Framed. (Framing Pattern)

Ready A/B - Indicates that the Model 570 is ready to place/receive a call.

Alarm A/B - Indicates a yellow alarm condition (Receive only).

B8ZS A/B - Indicates that a B8ZS sequence has been received (in AMI only).

LpBk A - Indicates that the 23B+D DS1 facility is in a loopback condition or user configured loopback.

LpBk B - Indicates that the 24B DS1 facility is in a loopback condition or user configured loopback.

BRI

Seal. Cur. - Indicates that Sealing Current is present.

Sync. - Indicates synchronization with the received PRI carrier signal.

Ready - Indicates that the layer 2 initialization process has been completed and a call may be initialized from the test set.

Error - Indicates an error condition.

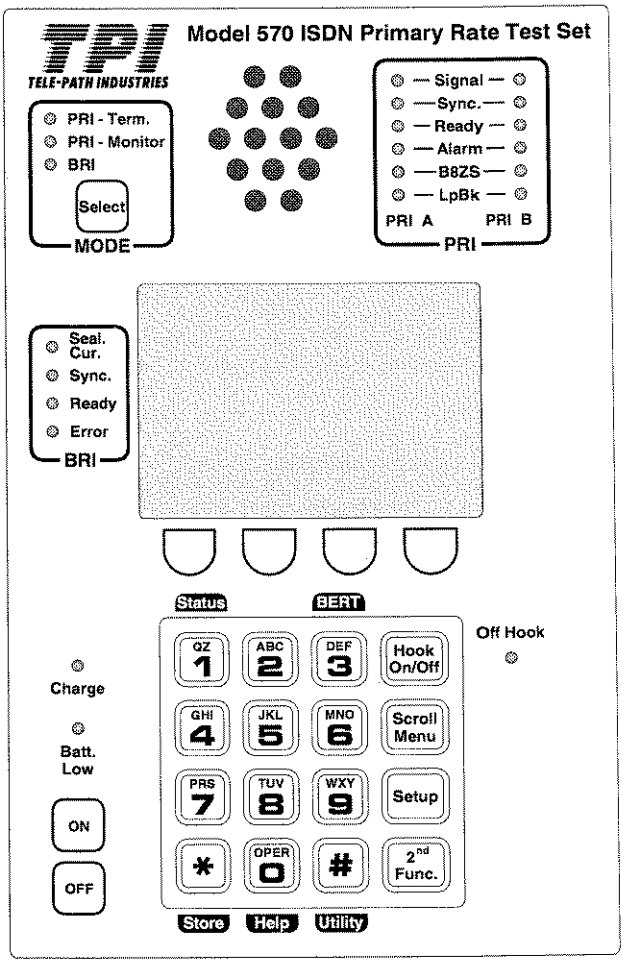
Off Hook - Indicates that the Model 570 is in a call state.

Charge - Indicates that the AC Adapter/Battery Charger is plugged into the unit to recharge the internal battery.

Batt. Low - Indicates a Battery Low condition, with a maximum of ten minutes of operating time remaining before complete shutdown.

SECTION II

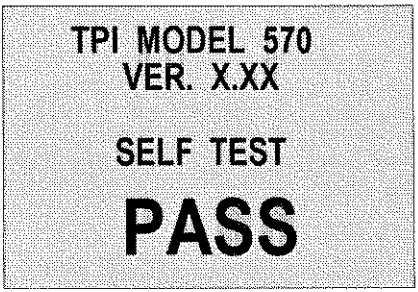
PRIMARY RATE TESTING


TPI
TELE-PATH INDUSTRIES
Model 570 ISDN Primary Rate Test Set
PRI - Term.
PRI - Monitor
BRI
Select
MODE
Signal
Sync.
Ready
Alarm
B8ZS
LpBk
PRI A
PRI B
PRI
Seal. Cur.
Sync.
Ready
Error
BRI
Status
BERT
Off Hook
Charge
Batt. Low
ON
OFF
QZ 1
ABC 2
DEF 3
Hook On/Off
GHI 4
JKL 5
MNO 6
Scroll Menu
PRS 7
TUV 8
WXY 9
Setup
*
OPER 0
#
2nd Func.
Store
Help
Utility

2.1 POWER UP

Press the power **ON** switch. This will turn the Model 570 on and will start the Self Test routine. The LCD screen will flash, then clear, and all LEDs will light, then extinguish.

When the self test has concluded, a message will appear on the LCD screen (briefly) with the current software version and a message reporting the results of the Self Test:



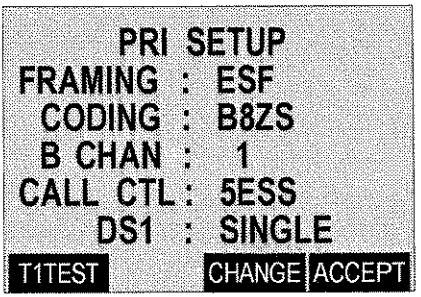
NOTE: *If the self test should fail, please contact TELE-PATH INSTRUMENTS at 221 S. Yorkshire St., Salem, VA 24153, phone (540) 375-0500, fax (540) 375-0505.*

2.2 SETUP

Setup

- Framing
- Coding
- Call Control
- DS1
- Interface ID (if **MULTI** DS1 selected)

At the conclusion of the Self Test routine, the LCD displays the setup screen. For example, the following menu would result at the conclusion of the Self Test routine if the last setup was Extended Super Frame (ESF) framing, B8ZS line coding, and 5ESS call control.

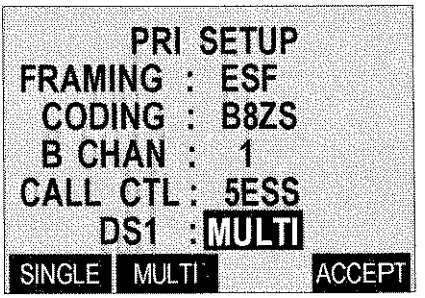


This power up menu prompts the user to consider the setup for the current application prior to taking any other action. The **T1TEST** soft key changes to T1 mode (see Section 2.5). If the setup displayed is correct, it may be accepted by pressing the **ACCEPT** soft key. Pressing the **ACCEPT** soft key will move the display to the on HOOK idle screen.

If the setup needs to be changed, press the **CHANGE** soft key. The cursor will move to highlight the FRAMING selection. The framing selections SF or ESF will show as soft keys. Pressing a soft key or **Scroll Menu** will move the cursor down one line to the line coding selections, B8ZS or AMI.

Next, the cursor moves to the B channel select line, **B CHAN.** Any single channel number from 1 to 24 may be selected using the keypad. The "any channel available" entry may be selected by pressing the **ANY** soft key.

Next, the cursor moves to the **CALL CTL** selection. The soft keys provide a selection for NAT'L (National ISDN-2), 5ESS (AT&T custom PRI), and DMS (NORTEL).



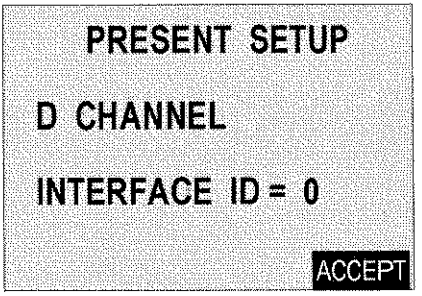
After selecting a soft key or presing the **Scroll Menu**, the cursor will move to the **DS1** select line. A **SINGLE** selection means that only one interface (PRI-A) is active for this setup. The PRI-A interface should always be used for the DS1 containing the D-channel.

NOTE: *The normal configuration would be 23B+D with the D channel in the 24th time slot, i.e., channel 24; but, the D channel can be located in any time slot.*

Multiple trunk groups may be present. In that case, there would be more than one D channel. The channel location must be selected for the trunk group to be tested. D channel messages will involve only the B channels associated with that group.

D channel locations other than 24 are made in the ***Utility*** *menu.*

Select the multiple configuration by pressing the **MULTI** soft key. This configuration means both DS1 interfaces are to be active. The display will change to the following:



This screen allows a selection for the Interface ID (IID) number (0-19) for the DS1 that contains the D channel connected to the PRI-A interface. Normally, the D channel span is ID number 0.

A single D channel may control up to 19 other 24B format DS1s.

Pressing the **ACCEPT** soft key moves to the Hook screen allowing the placement of calls.

NOTE *The DS1 containing the D channel should always be connected to the PRI-A Interface.*

2.3 TESTING AT THE PRI INTERFACE

Model 570 Terminate Mode

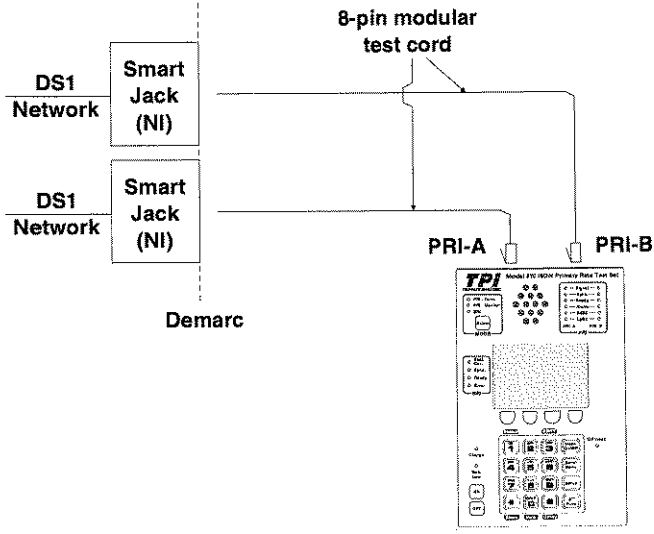


Figure 2.1 Replacing a PBX with the Model 570

NOTE: *PRI-A contains the D channel. Access can be gained at the DX-1 cross connect panel(s) and the same tests can be performed in the Terminate mode as outlined.*

2.3.1 Select **PRI-Term. MODE** (Terminate)

2.3.2 Setup = Use "**Setup**" key for
EASY-USER-MODE
[Framing = SF or ESF]
[Line Code=B8ZS or AMI]
[B channel=Select]
[Call Control = 5ESS, DMS, or NAT'L]
[DS1 = Single or Multiple]

2.3.3 Connection = Use **PRI A** or **PRI B** Jacks

2.3.4 Bearer Cap. = Voice or Data

2.3.5 Place A Call = Use "**Hook On/Off**" key to send digits

2.3.6 Block Error Testing = Use "**1/STATUS**" key and LINE sub-menu

2.3.7 Originate Loopback Testing - call OUT and IN to looped-back channel(s)

2.3.8 BERT TESTING = Use "**3/BERT**" KEY

2.4 MONITOR D CHANNEL

2.4.1 GENERAL

The PRI-Monitor mode enables the Model 570 to access a live Primary Rate ISDN line through "Monitor" jacks on the T-1 facility and provides an output of the D channel messaging. The output is formatted for easy analysis in English. The HEX format data is also included for each message. The output is available for external analysis at the Data interface DB25-pin/RS-232 connector. It is also available to the Model 570 screen directly from an internal buffer.

The messages in the buffer are sequencially numbered for easy review and scroll access on the LCD. See the output example in the following pages.

The connection uses both the RX jack on PRI-A and the RX jack on PRI-B to provide full duplex (both directions) data analysis. Access must be through "Monitor" jacks on the T-1 facility to prevent a double termination impedance being placed on the line (the termination from the Model 570 and the termination of the equipment being monitored). In the Monitor mode, the Model 570 is not signaling to the switch. Therefore, the READY LED and CALL STATUS screens are inactive.

2.4.2 PROCEDURE

1) Select **PRI-Monitor MODE** (Bridge)

2) Configure the "PRESENT SETUP" menu as desired. Press the **ACCEPT** soft key to store the setup. The "D MONITOR" menu will be displayed.

3) If using an external device connected to the **Data** DB25-pin serial port, select the **ON** soft key and select the "BAUD RATE". If an external device is not being used, **Scroll Menu** to the "D CHANNEL CAPTURE" menu.

4) Communication parameters for remote equipment will need to be set to match those of the Model 570. These are: No Parity, 8 Data Bits, 1 Stop Bit. The data rate is selectable between 9.6 Kbps, 19.2 Kbps, and 38.4 Kbps.

   When connecting the remote equipment directly to the Model 570, a straight cable should be used.

5) Connect the Model 570 PRI-A (RX) jack to the network TX through the Monitor jacks. Again, using the Monitor jacks, connect the Network RX (same as TE TX) to the PRI-B (RX) jack of the Model 570.

6) The D channel messages may be captured, stored, and viewed on the LCD or dumped to the serial **Data** port. If the **PRINT** soft key is pressed, the current D channel monitor message stream will be interrupted while the captured data is printed.

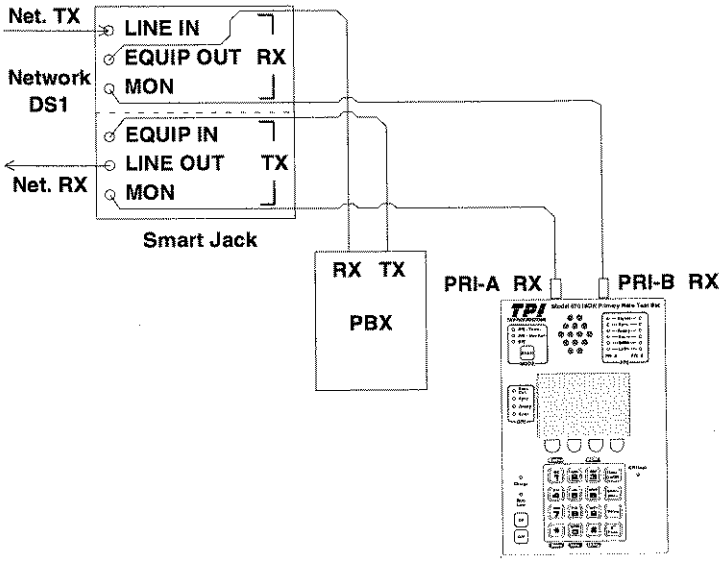


Figure 2.2 Connection for Monitor mode

NOTE: *Access at Monitor jacks on "smart jack". Connection to the Model 570 uses the RX in each interface (PRI-A and PRI-B). The "Signal" and "Sync" LEDs wil light, but the "Ready" LED will not light in the Monitor mode.*

D channel Output example:

```
TE->NT:C SAPI:000 TEI:000
I Ns=004 Nr=004 P/F=0
PD=08......Call Reference:00006
M 05 SETUP
I 04 BEARER_CAPABILITY.......Len=3
 80 Coding Standard..........CCITT
  Transfer Capa.............Speech
 90 Transfer Mode...........Circuit
  Transfer Rate...........64 kbit/s
 A2 Layer 1 Protocol.........u-law
I 18 CHANNEL ID..............Len=3
 A9 Indicated Channel....Exclusive
  Channel Selection.............B1
  Channel Identifier......Not D-CH
I 6C CALLING PARTY NUMBER....Len=8
 C1 Type of Address.....Subscriber
  Numbering Plan ID...........ISDN
  8573052
Hex:00 01 08 08 08 02 00 06 05 04 03
    80 90 A2 18 03 A9 83 81 6C 08 C2
    38 35 37 33 30 34 30 70 08 C1 38
    35 37 33 30 35 32

NT->TE:R SAPI:000 TEI:000
RR Nr=005 P/F=0
Hex:00 01 01 0A

NT->TE:C SAPI:000 TEI:000
I Ns=004 Nr=005 P/F=0
PD=08.........Call Reference:00006
M 02 CALL PROCEEDING
I 18 CHANNEL ID..............Len=3
 A9 Indicated Channel....Exclusive
  Channel Selection............B19
  Channel Identifier......Not D-CH
Hex:02 01 08 0A 08 02 80 06 02 18 03
    A9 83 93
```

TE Initiates Call

Network Responds

2.4.3 D CHANNEL MESSAGE ANALYSIS

Communication direction between the customer (Terminal Equipment) and C.O. (Network Termination) is indicated as follows:

`NT->TE`	= C.O. to Customer
`TE->NT`	= Customer to C.O.

Call setup messages are shown and include detailed call status information, some of which includes the following information:

A unique call reference number is assigned to each call and included in each message.

```
PD=08.........Call Reference:  02944
```

Multiple calls on the single D channel will generate hundreds of messages intermingled, requiring a careful search or sort of those related to a single call.

Layer 2 messages and definitions:

`PD`	= Protocol Discriminator Used to distinguish the user-to-network call control messages from other messages.
`TEI`	= Terminal Endpoint Identifier.
`I`	= Information Frame. They contain layer 3 messaging
`C`	= Command

R	= Response. Identifies frame as a Command frame or a Response frame. Layer 3 messages always are Command messages.
Ns	= Number Sent
Nr	= Number Received
P/F	= Poll/Final Bit. Data link poll and response indicator. In a command frame, P/F=1 indicates a response to the poll is required. This is a layer 2 activity.
RR	= Receiver Ready. All layer 3 messages are acknowledged by the receiving entity. They are also used in a "keep alive" function.
SAPI	= Service Access Point Identifier.

The SAPI identifies a point at which layer 2 services are provided by a layer 2 entity to a layer 3 entity or a management entity.

The SAPI specifies a layer 2 entity to process a layer 2 frame or a layer 3 or management entity to receive information carried by the layer 2 frame. The SAPI field allows 64 Service Access Points (SAPs) to be specified.

The SAPI values are allocated as follows:

SAPI Value	Related Layer 3 or Management Entity
0	Call Control procedures
1	Reserved for packet mode communication using Q.931 call control procedures
16	Packet communication conforming to X.25 level 3 procedures
63	Layer 2 management procedures
All others	Not used

`SABME` = Set Asynchronous Balanced Mode Extended.

`UA` = Un-numbered Acknowledgment.

NOTE: *Before point-to-point acknowledgment information transfer can start, an exchange of a SABME frame and a UA frame must take place. This layer 2 activity results in establishment of a multiple frame operation state.*

```
M 05 SETUP
I 04 BEARER_CAPABILITY.......Len= 3
```

"M" indicates presence of a message type; "05" is the hex value of the message, followed by the message name. "I" indicates an information element, followed by the hex value and the information element name. "Len=3" (length) is the number of bytes the information element contains. For example, "3" indicates three variable length information elements are listed under the "I", each with their own hex value.

2.5 BACKUP D CHANNEL TESTING

Central Office switches can be programmed, on a "subscription" basis, to provide a D channel backup capability for configurations that have one PRI with D channel (23B+D) supporting multiple (24B) PRI's without D channels. A second PRI is configured to be a 23B+D interface with the D channel in a standby mode. Should a failure occur on the primary (active) interface, the D channel signaling is automatically switched over to the backup D channel or another interface. The Model 570 can test this scenario.

Backup D channel testing is accomplished by performing the following:

1) Press the **Setup** key. **Scroll Menu** to the **DS1** line. Select the **MULTI** soft key, verify the Primary D-Channal IID, then press **ACCEPT**.

2) Connect the line with the primary D channel to the PRI-A jack. In approximately a minute, the **Signal, Sync,** and **Ready** LEDs will light.

3) Conenct the line with the backup D channel to the PRI-B jack. In approximately a minute, the **Signal** and **Sync** LEDs will light.

4) Enter the **Utility** menu then select the **CALL** soft key. **Scroll Menu** until the "Backup D Channel" screen is displayed. Enable the backup D channel by selecting the **ON** soft key. The screen will prompt for the backup D channel number (the channel that the D channel is located on) and the backup interface ID (the span where the backup D channel is located on).

5) Press **Scroll Menu** to move to the backup D channel number. Enter the backup D channel number, press **Scroll Menu**, then enter the backup IID. Select **EXIT** to accept the selectons and return to the hook screen. In approximately a minute the PRI-B **Ready** LED will light.

6) Enter the **Status** menu then select the **LAYER** soft key. **Scroll Menu** until the "D Channel Status" screen is displayed. The primary D channel status (PRI-A) should be "In Service" and the backup D channel status (PRI-B) should be "Standby".

7) Press the **DROP A** soft key. This causes the Model 570 to idle the in-service D channel. The "Backup D channel" status will change from "Standby" to "In Service", based upon the Central Office sending an "In Service" message for the backup D channel. The original D channel will show "Manual Out of Service" when the **DROP** key is activated. When the **DROP A** soft key is pressed, the selection changes to **EST A** (Establish A).

8) Press **EST A** to bring up Layer 2 communication on PRI-A moving the status to "Standby" and PRI-B status to "In Service".

9) Pressing **DROP B** will cause another swap of the in-service D channel. The status of PRI-A will changefrom "Standby" to "In Service", and the status of PRI-B will change to "Manual Out of Service"

10) Press **EST B** to bring up Layer 2 communication on PRI-B moving the status to "Standby" and PRI-A status to "In Service".

11) Both D channels have now been tested. Select the **EXIT** soft key to return to the Hook screen.

2.6 T1 TESTING

2.6.1 KEYPAD AND SOFT KEY SELECTIONS

LINE Monitoring
(Soft key)
- CRC / BPV / Frame Errors / Errored Sec.

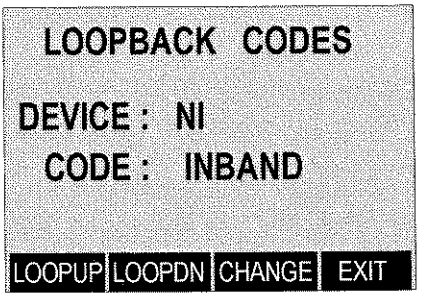
Testing:
- Pattern / Rate
- Bit Err. / Err. Sec., Insert Errors, Timed Tests

CONFIG Test Set
(Soft key)
- Firmware Rev.
- Battery Status
- LCD Contrast
- Master Clock
- Backlight
- Auto Power Down
- Loss Insertion
- Loopbacks

The menus available under the T1 test mode are virtualy the same as those for the ISDN mode. The only significant change is a few additional screens under the **Utility/CONFIG** menu:

Following the "LCD Contrast" menu is a "Master Clock" menu. Selecting the **ON** soft key allows the Model 570 to use its internal clock to generate the T1 signal.

Following the "PRI-A LOOPBACK" screen is the "Loopback Codes" menu, used for CSU/NI and Inband/EOC loopback commands:



The current loopback configuration is displayed. The **LOOPUP** soft key will transmit the loop up code for the Device and Code selected. The **LOOPDN** soft key will transmit the appropriate loop down code for the Device and Code selected.

Pressing **CHANGE** will allow the device (CSU or NI) and code (INBAND or EOC) to be changed. If SF framing is being used, only INBAND codes can be transmitted.

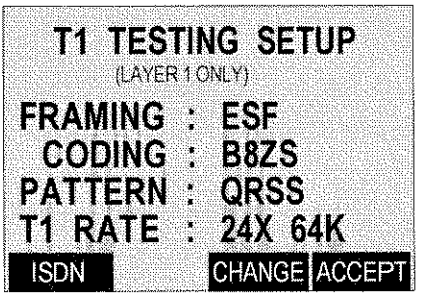
The Model 570 will respond to CS6 In-Band or EOC payload loopback.

Pressing the **EXIT** soft key will return to the BERT screen.

2.6.2 SETUP

The T1 test mode is accessed by pressing the **T1TEST** soft key from the PRI Setup menu. In the T1 test mode, additional patterns for BER Testing are available, as well as additional loop commands.

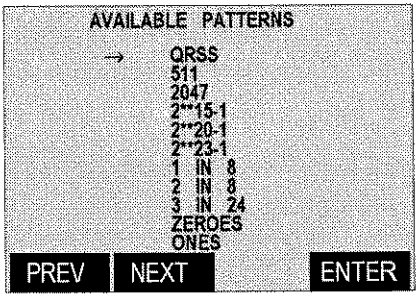
Once the **T1TEST** soft key is pressed, the following Setup screen will be displayed:



The configuration of the T1 line to be tested is set via this menu. Pressing the **CHANGE** soft key will move to the T1 FRAMING line. The Model 570 supports both the SF and ESF framing modes. By pressing the appropriate soft key, the framing mode can be selected.

Once a selection is made, or **Scroll Menu** is pressed, the Line CODING line is highlighted. Select AMI or B8ZS.

Next, the T1 Test PATTERN can be selected. The **NEXT** and **PREV** soft keys will cycle through the selections. Pressing **LIST** will display the following menu:



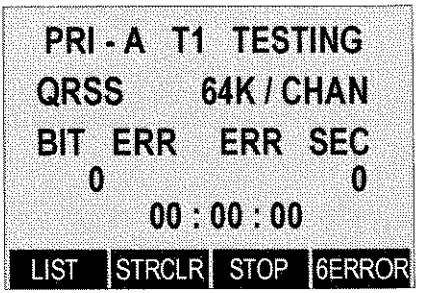
The **NEXT** and **PREV** soft keys will move the pattern selector (→) up or down the list. The **ENTER** soft key will accept the highlighted selection and return to the T1 Testing Setup menu.

Selection of the T1 RATE can now be made. This is the rate to test the T1 line. The T1 can be tested with a 64K per channel rate (**24X 64K**), or can be tested at a 56K per channel rate (**24X 56K**).

Pressing the **ACCEPT** soft key will save the settings and move to the T1 BERT menu.

2.6.3 T1 BER TESTING

Upon completion of the Setup, the following menu will be displayed:



The display indicates the current test pattern, the line rate, bit error and errored second count, and an ascending timer.

The **LIST** soft key displays the "Available Patterns" menu.

Pressing **STRCLR** will start the BER Test, clear the counters, and start the timer. The selected pattern will be transmitted down the T1 line. The display will report any errors found in the incoming pattern. There will be an initial burst of errors as the Model 570 establishes pattern sync. Pressing **STRCLR** again will clear the errors and restart the timer.

The **6ERROR** soft key can be used to insert 6 errors into the transmit pattern.

Run the test for a desired amount of time and determine if the total errors is acceptable (see your company policy).

Press the **STOP** soft key to end the BER Test. The timers and error counters will freeze.

SECTION III

BASIC RATE TESTING

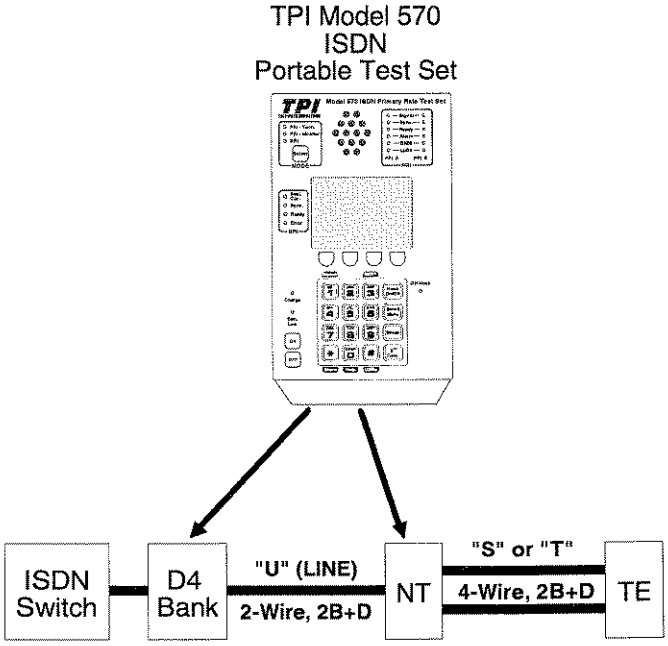


Figure 3.1 ISDN Basic Rate Access

3.1 GENERAL INFORMATION

With the optional BRI (Basic Rate Interface) Interface installed, the unit's BRI mode selection allows the unit to function at the "U" Interface as a NT1 (Network Termination), as TE (Terminal Equipment), both (NT1/TE), or LT (Line Termination). It may be connected to either the "U" interface, or the "S/T" interface. The Model 570 allows placement of additional loss on the circuit, either at the "U" or the "S/T" interface, for margin analysis testing.

The Model 570 allows selection of a loopback of either B-Channel, or for the full 2B+D bandwidth. The Model 570 also responds to network controlled loopbacks at the NT1.

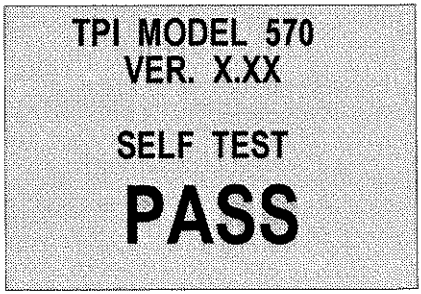
The Model 570's ISDN testing and measurements include:

- FEBE (Far End Block Errors) and FEBE Errored Seconds,
- CRC Errors and CRC Errored Seconds,
- Bearer Service selections:
  - Voice,
  - Data, and
  - D-Channel Packet Data,
- Dual Call Testing,
- Bit Error Testing,
- D-Channel message analysis,
- Cause Messages,
- Layer 1, 2, 3 States,
- U interface Monitor,
- S/T Monitor,
- 2B1Q 40 KHz Tone:
  - Generate,
  - Measure, and
- Line Voltage Measurement

3.2 SETUP

Press the power **ON** switch. This will turn the Model 570 on and start the Self Test routine. The LCD screen will flash then clear, and all LEDs will light then extinguish.

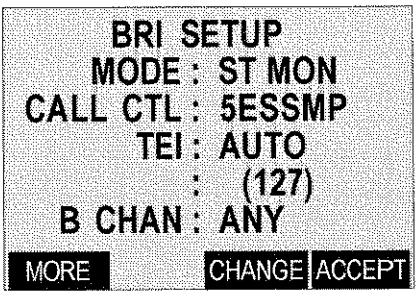
When the self test has concluded, a message will appear on the LCD screen (briefly) with the current software version and a message reporting the results of the Self Test:



The BRI **Error** Led(s) will illuminate for the selected interface until access is gained to a circuit.

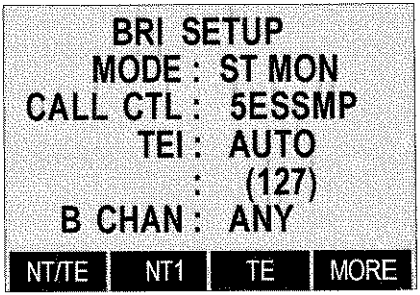
NOTE: *If the self test should fail, please contact TELE-
Yorkshi
375-05*

At the conclusion of the Self Test routine, the LCD will report the last setup used. For example:



This menu prompts the user to consider the setup for the current application, prior to taking any other action. If the last setup reported is correct, the setup may be accepted by pressing the **ACCEPT** soft key. Pressing **MORE** will display the SPID/DN menu.

If the setup needs to be changed, press the **CHANGE** soft key. The cursor will move to highlight the MODE selection:

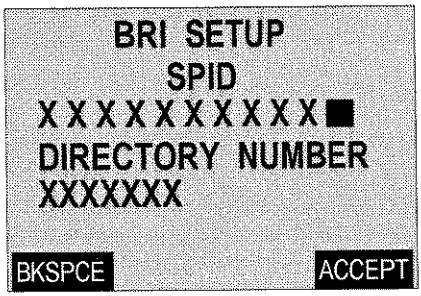


The selections NT1TE, NT1, TE, and MORE will appear as soft keys. Selecting **MORE** will display more selections: U MON, ST MON, LT, and MORE.

Pressing one of these soft keys or pressing **Scroll Menu** will move the cursor down one line to the TEI selections, AUTO or FIXED. If FIXED is selected, the TEI number (0 - 63) must be entered via the keypad.

Next, the cursor moves to the B-Channel select line, B CHAN. Soft key selections appear for B1, B2 or ANY. The ANY selection will request "any channel available".

Pressing **Scroll Menu** or **ACCEPT**, from the B CHAN select line will display the SPID/DN Menu:



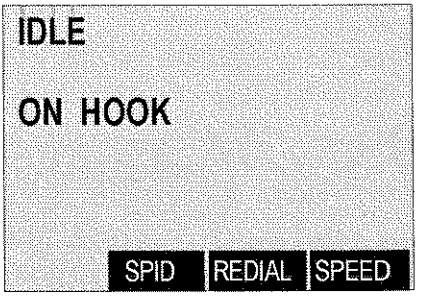
This menu is also available under the **MORE** soft key on the original SETUP menu.

Enter the SPID, up to 14 digits, using the dial pad number keys. Press the **ACCEPT** soft key to enter the SPID and move to the Hook screen or press the **Scroll Menu** will move to the Directory Number line.

NOTE: *The Directory Number is not applicable for the 5ESS point-to-point selection.*

Pressing **Scroll Menu** again will return to the Setup screen.

Pressing the **ACCEPT** soft key will move the display to the HOOK menu:



The **SPID** soft key allows reviewing/editing of the current SPID. The **REDIAL** soft key redials the last number entered. The **SPEED** soft key dials pre-stored numbers.

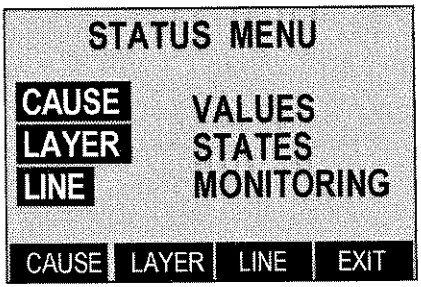
After setup is complete, gain access to the network using the 2B1Q BRI jack on the top of the unit.

Loopbacks and BER Testing can now be initiated.

3.3 MENUS

3.3.1 STATUS

Pressing **2nd Func.** then the **1** key provides direct access to the STATUS MENU screen:



These menus allow the user to view the status of various functions. The STATUS menu is divided into three sections of sub-menus: Cause Values, Layer States, and Line Monitoring.

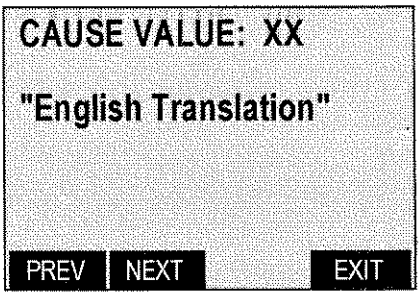
Cause Values:
- Cause Value
- TEI / USID/TID
- B Channel in use
- Calling Line ID
- Inbound Destination Number

Layer States:
- M Channel data
- Layer 1
- ST Info States
- Layer 2
- Layer 3
- RX Loopback
- ST Info
- L2: LAPD State
- L3 State:

Line Monitoring:
- CRC Errors / Errored Seconds (U)
- FEBE Errors / Errored Seconds (U)
- BPV Errors / Errored Seconds (ST)
- Frame Erors, Errored Seconds
- U Line Voltage

3.3.1.1 **CAUSE** Sub-menu

Selecting the **CAUSE** soft key displays the cause message status screen:

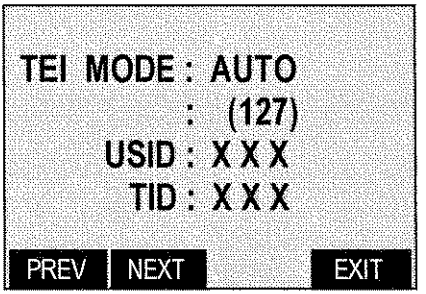


This is an information menu which provides diagnostic cause messages. The first line displays the cause value. The second line will display the actual cause message, which may be one of the following:

1	UNASSIGNED NUMBER	2	NO ROUTE TO TRANSIT NETWORK	3	NO ROUTE TO DESTINATION
6	CHANNEL IS UNACCEPTABLE	7	CALL AWARDED	16	NORMAL CALL CLEARING
17	USER BUSY	18	NO USER RESPONSE	19	ALERTING BUT NO ANSWER
21	CALL REJECTED	22	NUMBER CHANGED	26	NON-SELECTED USER CLEARING
27	DESTINATION OUT OF ORDER	28	INVALID NUMBER FORMAT	29	REQUEST FACILITY REJECTED
30	RESPONSE TO STATUS INQUIRY	31	NORMAL, UNSPECIFIED	34	NO CIRCUIT/ CHAN AVAILABLE
35	QUEUED	38	NETWORK OUT OF ORDER	41	TEMPORARY FAILURE

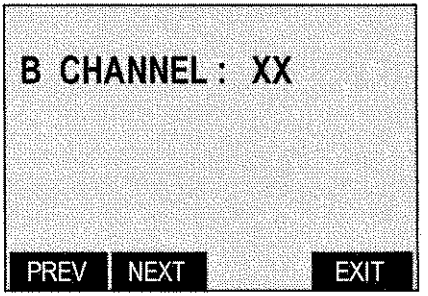
42	NETWORK CONGESTION	43	ACCESS INFO DISCARDED	44	REQ. CHANNEL NOT AVAILABLE
47	RESOURCE UNAVAILABLE	49	QUALITY OF SERVICE UNAVAIL	50	REQ FACILITY NOT SUBSCRIBED
52	OUTGOING CALLS BARRED	54	INCOMING CALLS BARRED	57	BEARCAP NOT AUTHORIZED
58	BEARCAP NOT AVAILABLE	63	SERVICE NOT AVAILABLE	65	BEARER SERVICE NOT IMPLEMENTED
66	CHANNEL TYPE NOT IMPLEMENTED	69	REQ FACILITY NOT IMPLEMENTED	70	RESTRICTED, DIGITAL ONLY
79	SERVICE NOT IMPLEMENTED	81	INVALID CALL REFERENCE VALUE	82	CHANNEL DOES NOT EXIST
83	NO CALL ID	84	CALL ID IN USE	85	NO CALL SUSPEND
86	CALL CLEARED	88	INCOMPATIBLE DESTINATION	91	TRANSIT NETWORK NOT EXIST
95	INVALID MESSAGE	96	INFO ELEMENT MISSING	97	MESSAGE TYPE NON-EXISTENT
98	MESSAGE NOT COMPATIBLE	99	INFO ELEMENT NON-EXISITENT	100	INVALID INFO ELEMENT CONTENT
101	MESSAGE NOT COMPATIBLE	102	RECOVERY ON TIMER EXPIRY	111	PROTOCOL ERROR
127	INTERWORKING				

Pressing the **NEXT** soft key moves to the TEI screen:



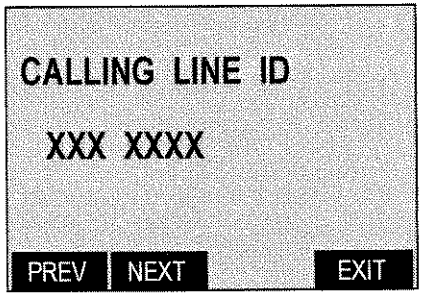
This menu displays the current Terminal Endpoint Identifier (TEI) mode and number as well as the User Service Identifier (USID) and Terminal Identifier (TID) codes, if any (TID required for National), after access has been gained.

Pressing the **NEXT** soft key moves to the B-Channel screen:



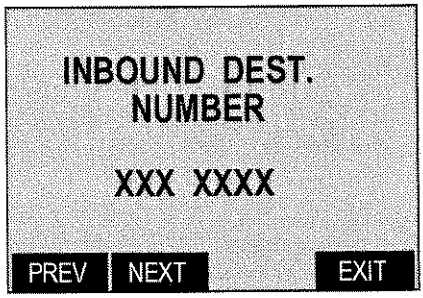
This menu reports which "B" channel is in use, if any.

Pressing the **NEXT** soft key moves to the calling line ID screen:



When an incoming call is received, this menu will display the calling party number on the second line, if the data received contains the calling party number. If not, nothing will be displayed.

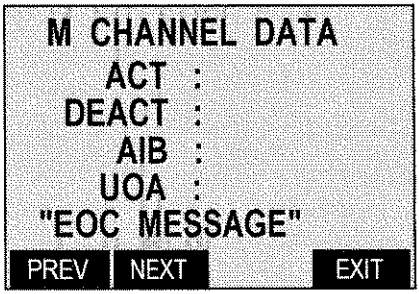
Pressing the **NEXT** soft key will move to the Inbound Destination Number screen:



This screen displays the number that was "called" by an in-bound call to the Model 570.

3.3.1.2 **LAYER** Sub-menu

Pressing the **STATUS** function key will return to the STATUS MENU. Selecting the **LAYER** soft key will move to the M Channel screen:



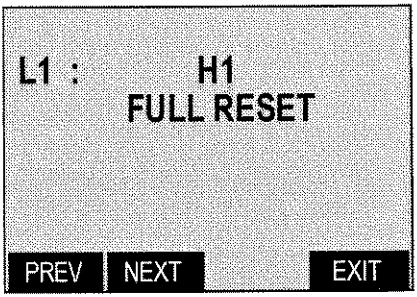
This menu provides Maintenance Channel information relative to the Activate Bit (ACT), the Deactivate Bit (DEA), the Alarm Indicator Bit (AIB), U Only Activation (UOA) Bit, and the actual EOC messages received. If in "U" Monitor mode, data will be displayed for both CPE and CO directions.

ACT=1 is normal	-	(0 indicates not transparent to network)
DEA=1 is normal	-	(0 indicates the network is going to deactivate)
AIB=1 is normal	-	(0 indicates a problem)
UOA=1 is normal	-	(0 indicates S/T bus not activated)

The last line displays the EOC message information. The EOC message will be addressed to "NT1" or "BROADCAST". The Actual EOC message received may be one of the following:

"2B+D LOOPBACK"	"B1 LOOPBACK"
"B2 LOOPBACK"	"REQUEST CRPT CRC"
"NOTIFY CRPT CRC"	"RETURN TO NORMAL"
"HOLD STATE"	"UNABLE TO COMPLY"

Pressing **Scroll Menu** or the **NEXT** soft key will move to the Layer 1 screen:

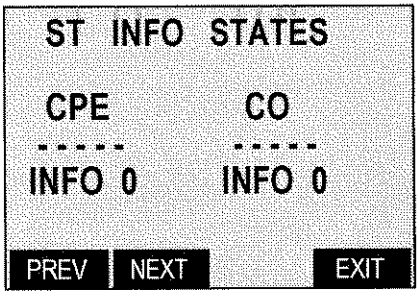


This is a menu which provides Layer 1 diagnostic messages relative to the state of the U Interface. Messages that may appear include:

"H1 FULL RESET"	(Interface is being reset)
"H2 ALERTING"	(Interface is trying to alert network)
"H6 ISW SYNC"	(Sync has been found on inverted sync word)
"H8 ACTIVE"	(Interface is active)
"H10 TEAR DOWN"	(Interface in process of being torn down)

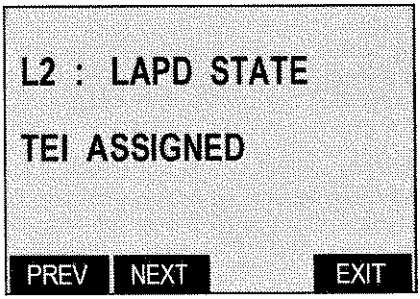
If in "U" Monitor mode, "Sync" and "Active" status will be displayed for both directions.

If inS/T, the following menu will be displayed:



This menu provides Layer 1 diagnostic messages relative to the state of the S/T Interface. This will be the first menu when in the TE mode.

Pressing **Scroll Menu** or the **NEXT** soft key will move to the Layer 2 screen:

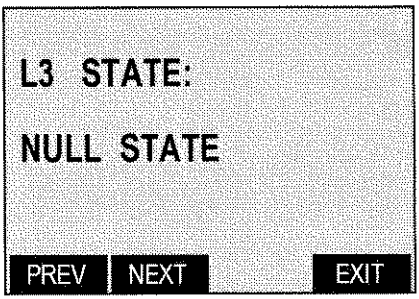


This is a menu which provides Layer 2 information for link access protocol for the "D" channel. The second line will display the message.

The complete messages and their meanings are indicated below:

TEI UNASSIGNED	-	Power up state.
ASSIGN AWAITING TEI	-	Requesting TEI state.
ESTABLISH AWAITING TEI	-	Requesting TEI state.
TEI ASSIGNED	-	TEI has been assigned.
AWAITING ESTABLISHMENT	-	Not yet in multiple frame state.
AWAITING RELEASE	-	Release request from multiple frame state.
MULTIPLE FRAME ESTABLISHED	-	Completed SABME / UA (This is the state the 570 should be in when ready to place a call.).
TIMER RECOVERY	-	Error State.

Pressing **Scroll Menu** or the **NEXT** soft key will move to the Layer 3 screen:

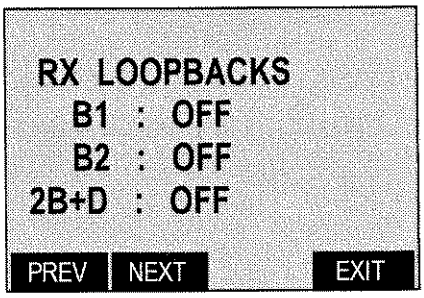


This is a menu which provides Layer 3 information for the state of actual calls. The second line will display the information. The following is a list of these messages and their meanings:

NULL STATE	-	No call exists.
CALL INIT (Call Initiated)	-	The state exists for an outgoing call.
OVERLAP SENDING	-	Call establishment request acknowledgement has been received permitting additional call information to be sent in the overlap mode.
OUT CALL PROC	-	Outgoing Call Proceeding.
CALL DELIVERED	-	Remote user alerting has been initiated.
CALL PRESENT	-	State exists for an incoming call.
CALL RECEIVED	-	Incoming call not yet answered.
CONNECT REQUEST	-	Incoming call answered, waiting to Be awarded.
IN CALL PROC	-	Incoming Call Proceeding.
CALL ACTIVE	-	Incoming call or outgoing call state.

DISCONNECT REQ	-	(Disconnect request) Request for network to clear the end-to-end connection.
DISCONNECT IND	-	(Disconnect Indication) Receipt of invitation to disconnect.
SUSPEND REQUEST	-	Request for network to suspend the call.
RESUME REQUEST	-	Request for network to resume a previously suspended call.
RELEASE REQUEST	-	Request for network to release a call.
OVERLAP RECEIVE	-	(Overlap Receiving) Network is prepared to receive additional call information (if any) in overlap mode.
IDLE STATE	-	(IDLE CALL STATE) On Hook. No calls in progress.

Pressing **Scroll Menu** or the **NEXT** soft key will move to the Loopbacks screen:

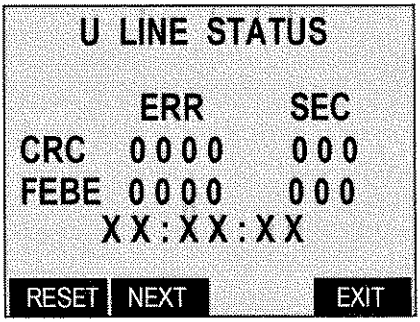


This illustration shows that all three loopbacks are not currently activated.

To exit the "**1/Status**" menu, press the "**EXIT**" soft key.

3.3.1.3 **LINE** Sub-menu

Pressing the **LINE** soft key on the STATUS MENU displays the line monitoring screen:



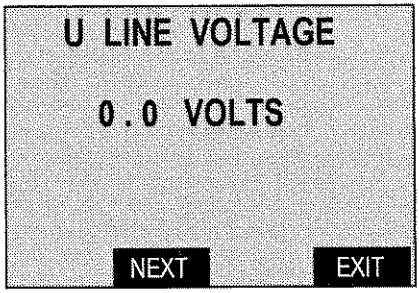
Results are displayed for CRC and FEBE Errors and Errored Seconds. Elapsed time counter shows HR:MIN:SEC. If in "U" monitor, errors will be counted for both directions. The CO direction will be displayed. Press **Scroll Menu** to view errors that occured in the CPE direction

If in TE mode, the top line will change to "ST LINE STATUS" and BPV and FRM errors will be displayed.

NOTE: *This timer is for the RESULTS screen only and is not valid for BER Testing.*

Pressing **RESET** will reset the counters to zero. Pressing the **EXIT** soft key will display the Hook screen.

Pressing **NEXT** will display the following menu:

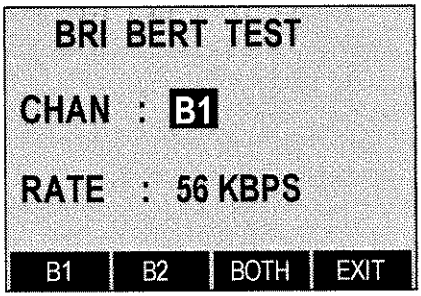


This menu reports the line voltage on the U interface. The volt range displayed will be approximately 10 to 15 volts. Although a volt meter could measure an open line (a line with nothing attached to it) at 48 volts, the Model 570 terminates the voltage down to 10 to 15 volts. If in TE mode, the "ST SIGNAL LEVEL" (the signal voltage level on the ST interface) will be displayed

3.3.2 BERT

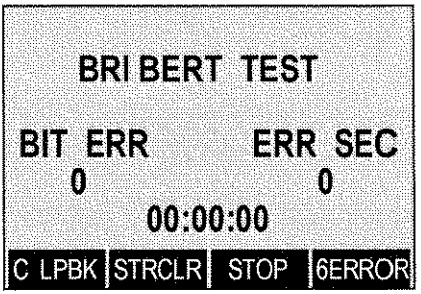
This key allows Bit Error Testing on either of the B Channels.

If you select item **3/BERT** on the keypad, the following menu will result:



The channel and data rate currently selected will be displayed. You may select a specific B-Channel to **BERT** by selecting the appropriate soft key or select both channels by selecting the **BOTH** soft key. Selection of a channel or pressing the **Scroll Menu** key will move to the Rate selection line.

You may select the desired data rate (56 or 64) by pressing the appropriate soft key. Selection of a rate or pressing the **Scroll Menu** key will move to the Error screen:



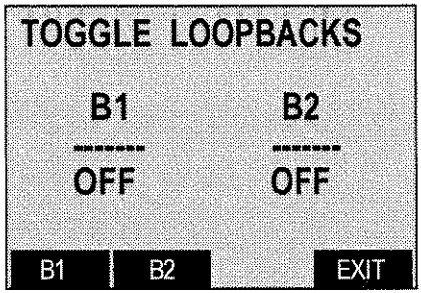
Testing will begin when you depress the **STRCLR** (start and clear) soft key. Bit Errors and Errored Seconds will be displayed.

The **6ERROR** soft key may be used to insert 6 bit errors into the transmitted data.

NOTE: *Please note that when 6 bit errors are inserted into the transmitted data, they may or may not fall within the same errored second. The use of the "**6ERROR**" soft key might result in two errored seconds.*

Selecting the **STOP** soft key will terminate testing (counters will lock up).

Pressing the **C LPBK** soft key moves the display to the TOGGLE LOOPBACKS screen:



The Toggle Loopbacks screen allows the Model 570 to be configured for loopbacks. Either channel may be selected. The Model 570 can provide a loopback for testing from the network, or another test set at another location.

The Model 570 can originate a test by calling out on one B-Channel then back into itself on the other B-Channel, looping that call back to the originating channel(s).

Pressing **Scroll Menu** moves back to the BERT STATUS screen.

Pressing the **EXIT** soft key from the toggle loopback configuration screen will move the display to the Hook screen in an idle state.

BER Testing

To conduct BER Testing, perform the following:

1) Press the "**#/Utility**" key.

2) Press the "**DATA**" soft key. The "BEARER CAP" menu is displayed.

3) Select the "**DATA**" soft key, then the "**EXIT**" soft key.

4) Place a call:

   A - Go off hook by pressing the "**Hook On/Off**" key ("Off Hook" LED will light).

   B - Enter the number using the keypad (LCD screen will display number entered and channel connected).

5) Press "**2nd Func.**" followed by "**BERT**".

6) Check the B-Channel and Speed.

   - B-Channel should be the B-Channel shown when the call was connected.
   - Speed should be 64K for Clear Channel Testing and 56K for Non-Clear.

7) Start the BER Test by pressing the "**STRCLR**" soft key. There will be a burst of bit errors (BE).

8) Press the "**STRCLR**" soft key again to clear the initial errors. Press the "**6ERROR**" soft key to insert 6 bit errors into the transmit pattern.

9) Run the test for a desired amount of time and determine if total errors is acceptable (see your company policy).

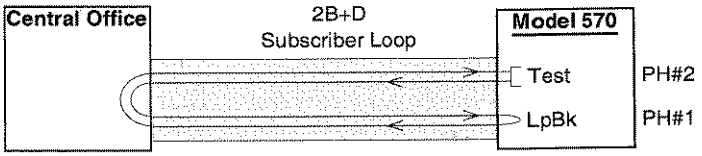
10) Press the "**STOP**" soft key to end the test.

The dual call feature of the Model 570 enables BER tests to be conducted on both B-channels simultaneously, thus testing the full 128K bandwidth. This testing can be accomplished in two scenarios.

LOOPBACK:

With each B-channel having a dialable number, turn the "Dual Call" feature ON in the "**Utility**" menus, "**EXIT**" to the ON HOOK screen, select "**SPID**" soft key, and enter SPID #1 and SPID #2. Return to the Hook screen for PH#1 (Phone 1) and press the "**PHONE2**"soft key to reach the PH #2 Hook screen. Go Off Hook and dial the number for phone #1.

When the sonalert is heard, press "**PHONE1**" to move to Phone #1, press the "**Hook On/Off**" key to answer the call. Place the "called" B-channel into loopback mode, enter the BERT menu, and start a test over the "calling" B-channel (the PH#2 call B-channel).



NOTE: *If the "Second Call" feature is ON, a call can be placed out to the switch and back to the second B-channel. Then one of the channels may be placed in loopback ("**Utility**" menu, "**Config**" sub-menu, "Loopbacks Select" display or BERT C LPBKS menu), and BERT testing initiated over the other B-channel. Thus, both B-channels can be tested at the same time.*

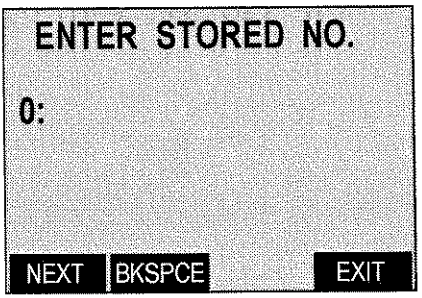
STRAIGHTAWAY:

In the same manner as loopback, two technicians with Model 570's can call each other. In this scenario, the first would call the second technician. The second technician would then call the first, using the PH#2 Hook screen. The called technician would place the incoming B-channel in loopback. Each technician would then initiate BER testing over the out-bound B-channel.

3.3.3 **Store** Key

This key allows frequently used numbers to be stored for future speed dial applications.

If you select item ***/Store** on the keypad, the following screen will result:



This screen is used to program and store speed dial numbers. The last number stored in Position "0" will be displayed. If no number has been stored yet in position "0", the display will read "0: ". Up to ten numbers, with up to 30 digits each, may be stored in locations 0-9 for future speed dial applications. Press **Scroll Menu** to view stored numbers.

To store additional numbers, press the "NEXT" soft key or the **Scroll Menu** key to increment the stored number location counter.

To change a stored number, press the **BKSPCE** soft key to move one space to the left, erasing the previous number. Enter new numbers from the keypad.

Pressing the **NEXT** soft key stores the number entered and moves to the next location.

An example of a frequently used number you may want to store would be the local TPI Model 560 Automated Test Line access number.

To exit the STORE NUMBER menu, press the **EXIT** soft key.

3.3.4 **Utility** Key

These menus allow various utility selections to be made. The UTILITY menu is divided into four sections of sub-menus: Call Parameter, Test Set Configuration, Data Setup, and Decode.

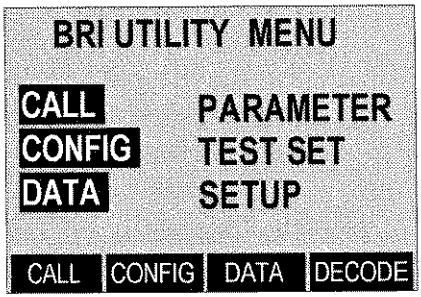
Call Parameter
- B-Channel selections
- Switch call control selections
- Call Appearance selection
- Dual Call selection
- TEI selection
- BRITL Test Feature (5ESS only)

Test Set Configuration
- Firmware rev. number / interfaces
- Battery Charge Level
- First Call Assignment
- Volume level
- LCD contrast level
- Backlight-On/Off
- EOC Commands (LT mode only)
- Auto power down-On/Off
- Toggle Loopbacks
- Loss Pad Insertion
- Power Source Voltage
- 2B1Q 40KHz Tone generation
- 2B1Q 40KHz Tone measurement

Data Setup
- Bearer Capability-Voice/Data
  56K / 64K (if Data selected)
- D-Channel Packet Data
  Call User Data (if packet selected)
  Logical Channel Number
  Closed User Group
  Reverse Charge
  RPOA
- D-Channel monitor-On/Off

Data (Cont'd)	-	D-Channel Capture
	-	D-Channel Storage
Decode	-	Shortcut to D-Channel Capture and Storage menus

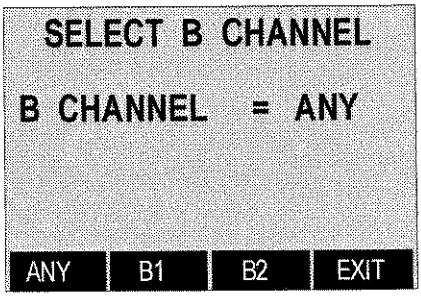
The main Utility menu is:



The **DECODE** soft key allows direct access to the "D-Channel Capture" menu (also found under the DATA submenu).

3.3.4.1 **CALL** Sub-menu

Pressing the **CALL** soft key moves to the B-channel selection screen:



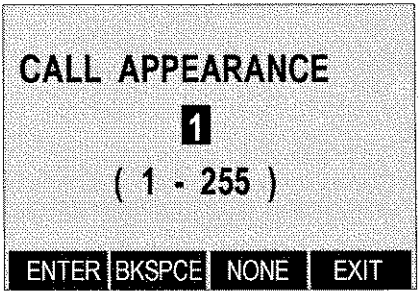
This menu indicates that the default is either B Channel. To choose a channel for outgoing calls, press the corresponding soft key.

NOTE: *You will be denied if you choose a B channel that the translation of that line doesn't support.*

Pressing the **Scroll Menu** key moves to the Call Control screen. The current call control selection will be shown:

Press the appropriate soft key to change the selection.

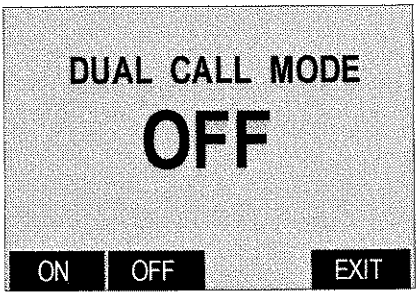
Pressing the **Scroll Menu** key at this time will result in the following menu being displayed:



For 5ESS Custom and DMS-F Call Controls, this menu allows the user to place outgoing calls on button numbers selected, other than 1 which is the default setting. Enter the call apperacne, using the keypad, followed by the ENTER soft key. Select BKSPCE to erase one digit to the left.

Pressing the EXIT soft key will move to the Hook screen. **AUTO** may be pressed, for 5ESS Call Control, to automatically search for the first call appearance on the line under test. For DMS and NAT'L Call Controls, **NONE** may be pressed to not specify a call appearance.

Pressing the **Scroll Menu** key at this time will result in the following menu being displayed:

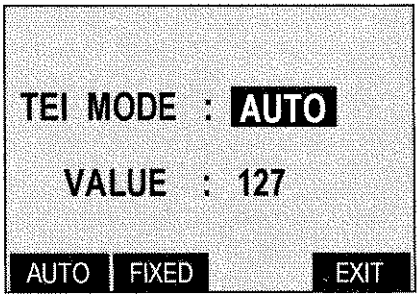


Selecting **ON** enables dual call feature. This allows the Model 570 to handle two calls at the same time using both B-channels (B1 and B2).

If Dual Call Mode is ON, pressing Scroll Menu moves to the Dual TEI Mode screen.

If the Dual TEI Mode is ON, the Model 570 will accept 2 SPID's (entered from the Hook screen, SPID sub-menu) and operate with 2 TEI's. If Dual TEI mode is OFF, the Model 570 will support 2 calls with only 1 SPID and TEI.

Pressing the **Scroll Menu** key moves to the TEI select screen:



If Dual TEI is ON, "PHONE 1" or "PHONE 2" will be displayed on the top line of this menu. You may change the TEI status by selecting the proper soft key (**FIXED** or **AUTO**). If you select fixed TEI, you will need to enter the new TEI using the keypad.

0-63: Fixed values chosen by user
64-126: Assigned by the switch
127: Broadcast value

In 5ESS Call Control, pressing the **Scroll Menu** key moves to the BRITL TEST FEATURE screen. Selecting **ENABLE** allows switch feature verification for 5ESS switches.

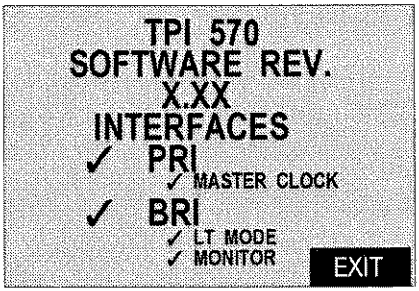
Pressing **Scroll Menu** will wrap around to the first menu (Select B Channel); **EXIT** will exit to the HOOK screen.

3.3.4.2 **CONFIG** Sub-menu

Pressing the **CONFIG** soft key on the Utility menu moves the display to the test set configuration sub-menus:

- Software Rev. / Intefaces
- Battery Charge Level
- Phone Assignment
- Volume Level
- LCD Contrast Level
- Backlight On/Off
- Auto Power On/Off
- Toggle Loopbacks
- Loss Insertion
- PS Voltage (ST)
- 40 KHz Tone Generation
- 40 KHz Tone Measure

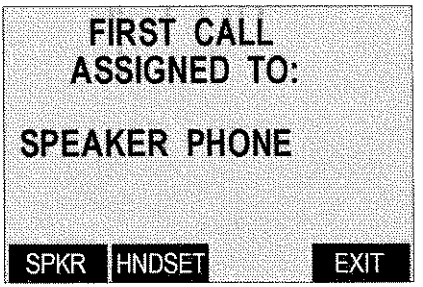
The first of these is:



This menu reports the firmware revision number, installed interfaces, and features. The check mark indicates which items are installed. If the check mark does not appear next to "BRI", then the BRI option is not installed. If the ckeck mark does not appear next to the features (small text items), the hardware in the unit cannot support the feature. This would most likely happen when an older unit gets a firmware update.

Pressing **Scroll Menu** displays the status of the battery. The three numbers at the top serve as a guideline in determining the battery charge status. The actual battery voltage appears inside the picture of the battery.

Pressing **Scroll Menu** again moves to the following display:



This screen allows a selection for the first call to be made from the Model 570: Speaker Phone or Handset. The default selection is Speaker Phone. Pressing the **HNDSET** soft key changes the selection to the Handset (in this case, the second call would be on the Speaker Phone). If in Dual Call mode, "PHONE 1" will replace "First Call."

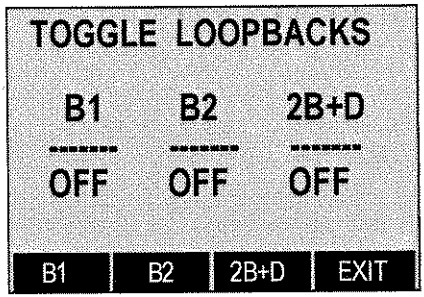
Pressing the **Scroll Menu** key moves to the VOLUME LEVEL screen. Press the **RAISE** or **LOWER** soft keys to select a volume level from 1 to 9.

Pressing the **Scroll Menu** key moves to the LCD CONTRAST screen. Press the **RAISE** or **LOWER** soft keys to select a contrast level from 1 to 9.

Pressing the **Scroll Menu** key moves to the LCD BACKLIGHT control screen. Select **ON** or **OFF** with the corresponding soft key.

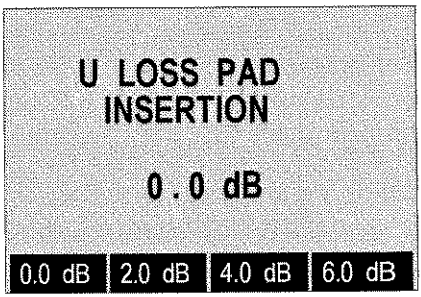
Pressing the **Scroll Menu** key moves to the AUTO POWER DOWN control screen. Select **ON** or **OFF** with the corresponding soft key. Auto power down **ON** will enable the battery power to be conserved by automatically turning the Model 570 off after 5 minutes if there has been no keypad activity, nor active signal detected at the selected interface, and the AC Adapter is not plugged into an AC line.

Pressing **Scroll Menu** moves to the LOOPBACK screen:



This Loopback screen allows the Model 570 to be configured for loopbacks. Either channel may be selected. The Model 570 can provide a loopback for testing from the network, or another test set at another location. In TE mode, the 2B+D loopback is not available.

Pressing the **Scroll Menu** key moves to the 2B1Q 40 kHz Tone screen:



Up to 6 dB of loss may be inserted on the "U" Interface by pressing the appropriate soft key.

If in TE mode, the loss is inserted on the "S/T" interface. If in NT1 mode, loss can be inserted on both interfaces. In TE mode, pressing the **Scroll Menu** key will display the POWER SOURCE VOLTAGE screen. This menu reports the voltage for PS1, PS2, and PS3.

Pressing the **Scroll Menu** key moves to the 2B1Q 40 kHZ TONE SCREEN. Press the **ENABLE** soft key to generate a 40 kHz tone at approx. +14dBm.

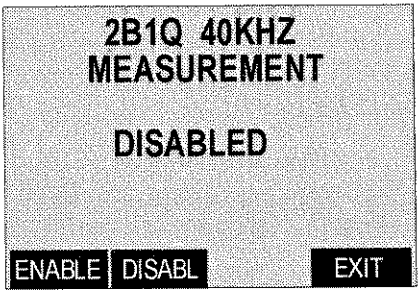
The 2B1Q (two Binary, one Quarternary) Line Coding is a four level, or quarternary code. Each level is determined from a single combination of two bits. Thus, a 160 Kbps (binary) 2B1Q line would be tested with a 40 KHz test tone.

The Model 570 can generate a 40 KHz test tone for the 2B1Q signal. The signal amplitude should be generated by the Model 570 at approximately 0 dBm. A TIMS set at the far end measuring the tone level can thus measure loop loss.

When performed during initial installation, this test will verify that the line loss is correct. The Actual Measured Loss (AML) is compared with the Estimated Measured Loss (EML).

Insertion loss measured during initial installation and during a maintenance test should comply with company practices.

Pressing the **Scroll Menu** key will display the following menu:



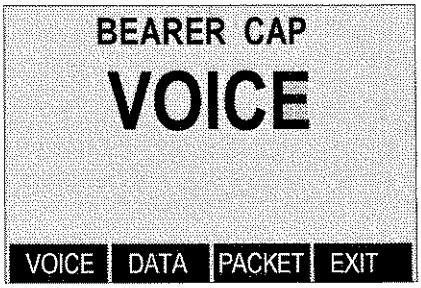
Select the **ENABLE** soft key to measure a 40KHz test tone sent from the far end. The results, displayed in dBm, indicate the loop loss on the line.

3.3.4.3 **DATA** Sub-menu

Pressing the **DATA** soft key on the Utility menu moves the display to the data setup sub-menus:

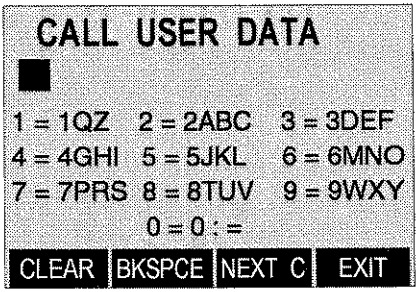
- Bearer Capability select
  - Voice
  - Data, 56/64K
  - Packet
    - Call User Data
    - LCN
    - CUG
    - Reverse Charge
    - RPOA
  - D Channel Monitor-On/Off, Rate
  - D Channel Capture-LCD/Print
  - D Channel Storage-LCD/Print

Pressing the **DATA** soft key from the Utility menu will display the following menu:



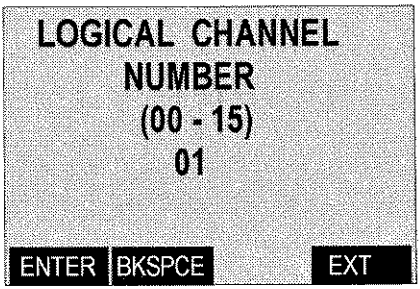
If **DATA** is selected, pressing **Scroll Menu** will display the BEARER RATE menu. Select 56K, or 64K.

If **PACKET** is selected, then additional setup selections may be made by pressing **Scroll Menu**.



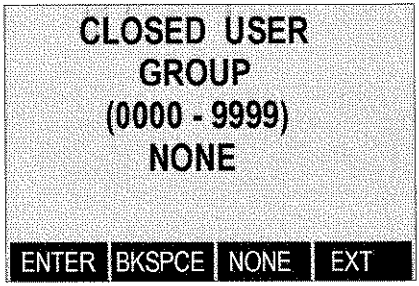
User data sent as part of the packet call may be selected from this screen. The legend at the bottom of the screen describes the keys. For example, press the "1" key three times to select the letter "Z". The **CLEAR** soft key will erase the entire entry, and **BKSPCE** will back up one character. Once the desired number/letter is reached, press the **NEXT C** soft key to move to the next character, one space to the right.

Press **Scroll Menu** to select Logical Channel Number.



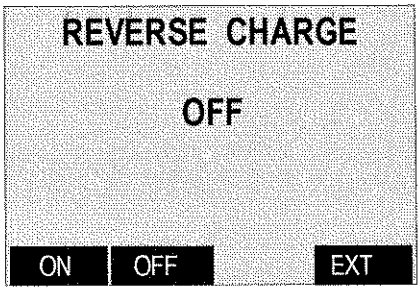
The default setting is 01. Up to 16 channels may be selected. Use the keypad to make another selection and press **ENTER** to accept the selection and move to the next screen.

Press **Scroll Menu** to move to the Closed User Group screen.



Enter a number from 0-9999 if testing within a closed user group.

Pressing **Scroll Menu** will display the Reverse Charge screen:

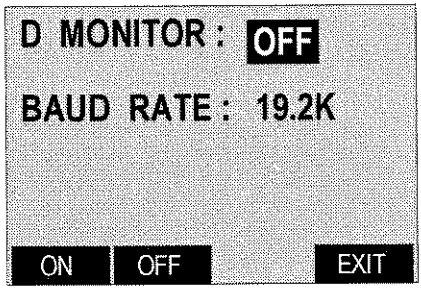


The default is "OFF".

Pressing **Scroll Menu** will display the RPOA select screen:

A four digit code may be entered for routing to a specific RPOA, if desired.

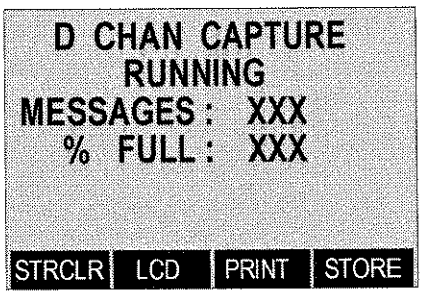
If **VOICE** is selected from the "Bearer Cap" menu, pressing **Scroll Menu** moves to the D-channel monitor select screen:



Select **ON** to enable decoded D-Channel messages to be dumped out the RS-232 Data port. Pressing **Scroll Menu** moves the cursor to the Baud Rate selection line and three speeds (9.6Kbps, 19.2 Kbps and 38.4 Kbps) appear as soft key selections.

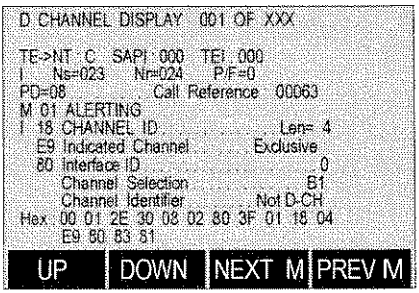
Pressing Scroll Menu now moves to display the status of the D-Channel "Message Capture" feature. The Model 570 can capture D- Channel message traffic and display them on the LCD, as well as save them for later reference or dump them out the Data port for external analysis.

The "D Channel Capture" display will appear as:



The **STRCLR** soft key clears the messages and starts the capture from that moment. "RUNNING" will show in the status line during this event. The number of messages captured will increase until the storage space is full. The maximum number of messages will vary due to varying message lengths.

Pressing the **LCD** soft key freezes the message capture at that moment and displays the first message "001 of XXX" on the screen in decoded form: English language and HEX. See example of decoded format below:



The display will show up to 12 lines of a single message. Pressing the **UP** or **DOWN** soft keys will scroll through a long message, for example, a setup message.

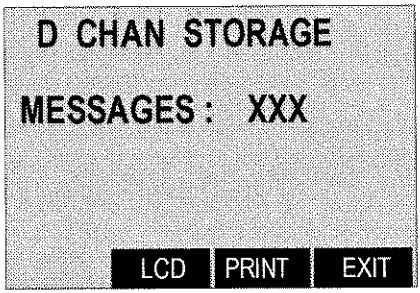
Pressing the **NEXT M** or **PREV M** soft keys will scroll between full messages. The message number on the title line will show the sequential number of the captured messages. Pressing **Scroll Menu** returns to the capture status display.

Pressing the **PRINT** soft key will dump the captured messages out the Data port. "PRINTING" will show in the status line during this event.

Pressing the **STORE** soft key will store what messages are in the "D Channel Capture" buffer (up to 4K bytes of data).

"STORING" will show in the status line during this event.

Pressing **Scroll Menu** moves the display to the status of the "**Stored**" message buffer:



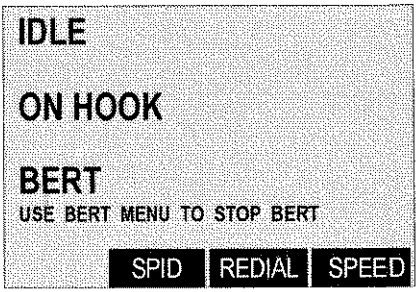
The messages in this storage buffer are stored and can be viewed on the **LCD** or dumped out the serial port. Up to 4K bytes of messages can then be stored in a separate buffer and are held in memory on power down.

There are two buffers for D-Channel messages: the "capture" buffer is a 4K buffer used to continuously capture up to 4K bytes of data (newest in/oldest out). When the **STORE** soft key is pressed, the data moves from the "capture" buffer to the "storage" buffer. The "storage" buffer is a 4K buffer that stores messages in memory on power down.

Pressing **Scroll Menu** again returns to the first menu - "Bearer Cap".

3.3.5 **Hook On/Off** Key

If you select item "**Hook On/Off**" on the keypad, the following screen will be shown:



This is the CALL SCREEN, which reports the line state on the first line and the Model 570 state on the second line. This screen will also display the calling number of an incoming call.

If a previous call has been placed, the **REDIAL** soft key can be pressed to dial the last number.

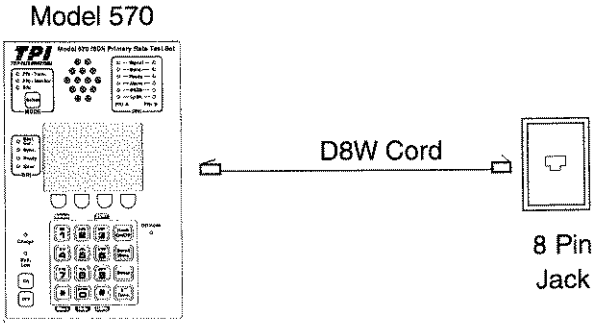
The **SPID** soft key can be selected to review or change the SPID.

If a BER test is in progress, "BERT" will appear on the display reminding the user that BERT is active and no calls can be placed. Other conditions may also be displayed, such as Loopback (LPBK), 40KHz Tone, or 40KHZ Measure (40KHZ MEAS).

If the "Dual Call" feature is ON, this screen will show "PH#1" or "PH2". Press **Scroll Menu** to move between the two calls.

3.4 TESTING AT THE "U" INTERFACE

3.4.1	Setup	= Use "**Setup**" key (Mode = NT1TE)
3.4.2	Connection	= Use **U (2 wire)** jack
3.4.3	Place A Call	= Use "**Hook On/Off**" key
3.4.4	Errored Second Testing	= Use "**1/Status**" key
3.4.5	Network Originated Loopback Testing	= **STATUS** LED's will indicate loopback status
3.4.6	BERT TESTING	= Use "**3/BERT**" KEY



Replacing an "NT1" and "TE" with the Model 570.

3.5 TESTING AT THE "S/T" INTERFACE

This mode is only available if the BRI2 option is installed.

3.5.1 Setup = Use **Setup** key (Mode = TE)

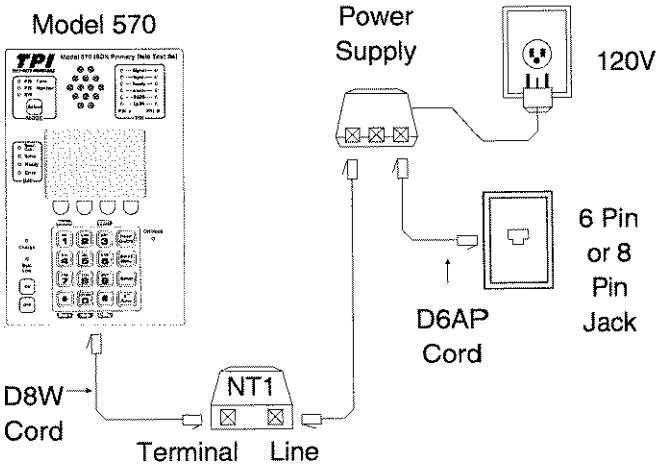
3.5.2 Connection = Use **S/T (4 wire)** jack

3.5.3 Place A Call = Use **Hook On/Off** key

3.5.4 Errored Second Testing = Use **1/Status** key

3.5.5 Network Originated Loopback Testing = **STATUS** LED's will indicate loopback status

3.5.6 BERT TESTING = Use **3/BERT** KEY



Replacing a "TE" with the TPI 570

3.6 NT1 REPLACEMENT

This mode is only available if the BRI2 option is installed.

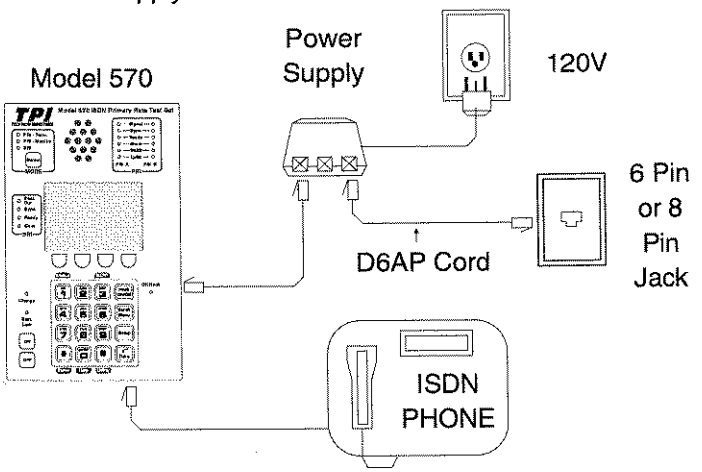
3.6.1 Setup = Use **Setup** key (Mode = NT1)

3.6.2 Connection = Use **U (2 wire)** jack

3.6.3 Errored Second Testing = Use **1/Status** key

3.6.4 Network Originated Loopback Testing = **STATUS** LED's will indicate loopback status

NOTE: *The TPI 570 will pass power from the **U (2 wire)** jack to the **S/T (4 wire)** jack. If a phone were connected to the **S/T** Interface jack, the phone must be powered by a separate power supply.*



Replacing a "NT1" with the TPI 570

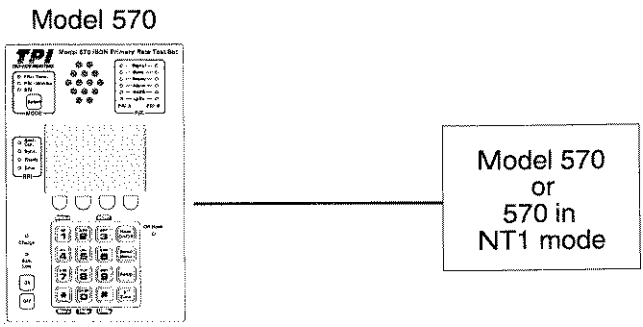
3.7 LT MODE TESTING

In the "NT" mode, the Model 570 2B1Q "U" Interface operates as it always has, looking like an NT1 to the switch. However, in the "LT" mode, the Model 570 2B1 "U" Interface will act like a Switch Line Card.

The "LT" mode can be used to do Layer 1 qualification of coper facilities. When a Model 570 is in "LT" mode on one end of a pair of wires, and another Model 570 is in "NT" mode on the other end, the Model 570s will sync on each other and Layer 1 testing can take place by performing a BERT test on B1 and B2 from each Model 570 to the other, or by checking for CRC and FEBE errors on each set under the "**Results**" menu.

3.7.1 Setup = Use **Setup** key (Mode = LT)

3.7.2 Connection = Use **U (2 wire)** jack



Replacing a "NT1" with the TPI 570

3.7.3 Loopback Testing = Send EOC "B1 Loopback Command" (Use **MESSAG** soft key to select messages)

NOTE: *The NT1 is always address 0. A mid-span repeater, address 1, may also be controlled for loopbacks.*

Press **SEND** to send the message.

3.7.4 BERT Testing = BERT on B1

3.7.5 Repeat procedure for B2

3.8 "U" MONITOR

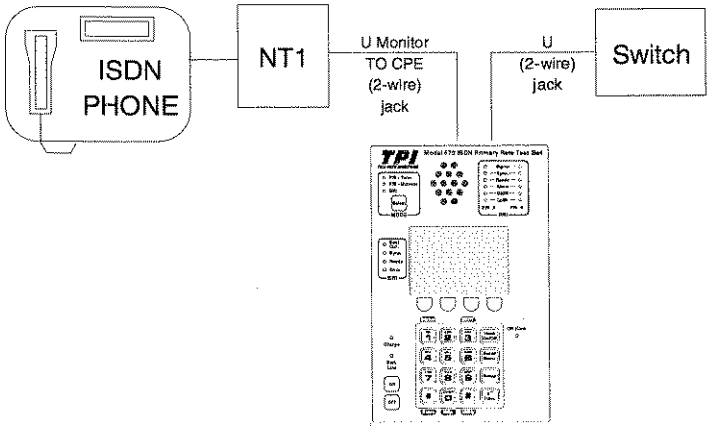
This mode is only available if the BRI2 option is installed.

3.8.1 Setup = Use **Setup** key (Mode = U MON)

3.8.2 Connection = Use **U (2 wire)** jack

3.8.3 Errored Second Testing = Use **1/Status** key

3.8.4 Network Originated Loopback Testing = **STATUS** LED's will indicate loopback status

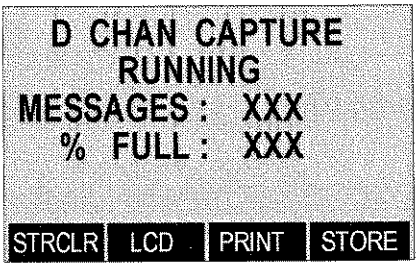


Model 570

Monitoring the "U" Interface with the TPI 570

After completing "Setup," gain access to the line.

Enter the **"Utility"** menu and select the **DATA** soft key. Press **Scroll Menu** until the "D CHAN CAPTURE" menu is displayed.



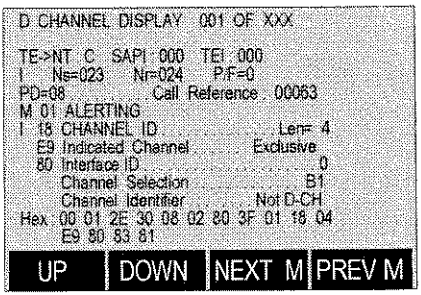
This menu reports the status of the "D Channel Capture" feature: running or stopped, how many messages captured, how full the 4k buffer is.

Press the STRCLR soft key to clear th emessages and start the capture from that moment.

If desired, pressing the LCD soft key to view captured messges.

NOTE: *Selecting LCD freezes the message capture at that moment.*

The first message, "OO1 of XXX," will appear on the screen in decoded form. For example:



The display shows up to 6 lines of a single message. Pressing the **DOWN** soft key will scroll through a long message.

Pressing the **NEXT M** or **PREV M** soft keys will scroll between messages. The message number on the title line will show the sequential number of the captured messages. Pressing **Scroll Menu** returns to the capture status display.

3.9 "ST" MONITOR

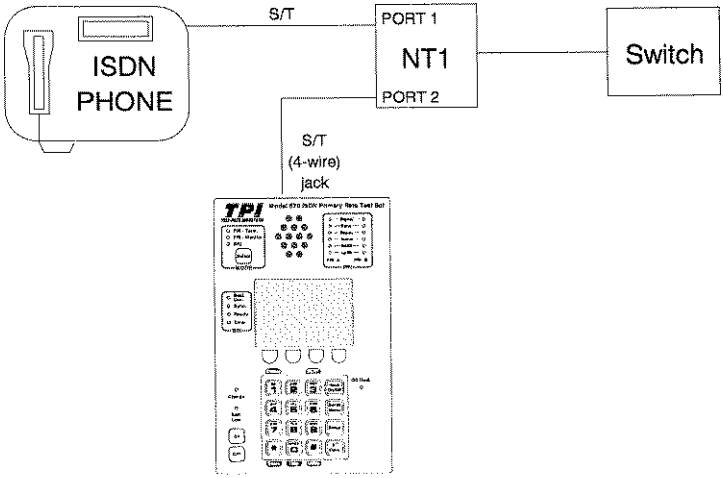
This mode is only available if the BRI2 option is installed.

3.9.1 Setup = Use **Setup** key (Mode = ST MON)

3.9.2 Connection = Use **U (2 wire)** jack

3.9.3 Errored Second Testing = Use **1/Status** key

3.9.4 Network Originated Loopback Testing = **STATUS** LED's will indicate loopback status

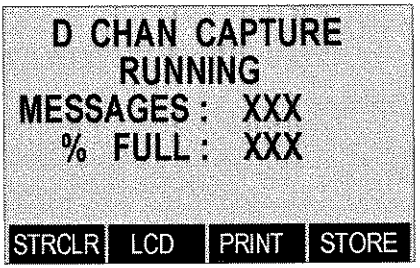


Model 570

Monitoring the "S/T" Interface with the TPI 570

After completing "Setup," gain access to the line.

Enter the **"Utility"** menu and select the **DATA** soft key. Press **Scroll Menu** until the "D CHAN CAPTURE" menu is displayed.



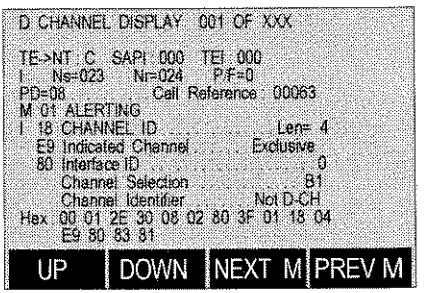
This menu reports the status of the "D Channel Capture" feature: running or stopped, how many messages captured, how full the 4k buffer is.

Press the STRCLR soft key to clear th emessages and start the capture from that moment.

If desired, pressing the LCD soft key to view captured messges.

NOTE: *Selecting LCD freezes the message capture at that moment.*

The first message, "OO1 of XXX," will appear on the screen in decoded form. For example:



The display shows up to 6 lines of a single message. Pressing the **DOWN** soft key will scroll through a long message.

Pressing the **NEXT M** or **PREV M** soft keys will scroll between messages. The message number on the title line will show the sequential number of the captured messages. Pressing **Scroll Menu** returns to the capture status display.

3.10 DUAL CALL CAPABILITY

3.10.1 OVERVIEW

The Dual Call feature enhancement for the Model 570 allows two outgoing, two incoming, or one of each, Circuit Switched Data calls to be in progress at the same time, which verifies that both "B" channels can be used simultaneously.

Although it will work for Voice, the Dual Call feature is intended for Simultaneous Data Calls, in order to simulate what happens when a Video Terminal Adapter sets up a call on each B-Channel and combines the bandwidth, in order to transfer Video information at 112 Kbps or 128 Kbps.

3.10.2 DETAILS

1) Setup

- Set up the Model 570 as normally done prior to connecting to the line under test (e.g., SPID, Call Control, etc.).
- Choose the "**Utility**" key, then the "**CALL**" soft key.
- Press the "**Scroll Menu**" key for the DUAL CALL menu.
- Press the "**ON**" soft key to enable the dual call mode.
- Press the "**Scroll Menu**" key to view the Dual TE1 menu.
- Select the "**ON**" soft key to turn on Dual TE1
- Press the "**Scroll Menu**" key.
- Enter the TE1 for Phone 1.
- Press the "**Scroll Menu**" key.
- Enter the TE1 for Phone 2.
- Select the EXIT soft key.

- Press the "**Utility**" soft key, then the "**DATA**" soft key to access the BEARER CAP menu.
- Select the "**DATA**" soft key, then press the "**Scroll Menu**" key to set the Speed to 64Kbps, if desired.
- Press the "**EXIT**" soft key to return to the HOOK screen.

2) CONNECTION

- Connect the Line-under-test, and wait for "**Sync**", "**Active**", and "**Ready**" indications as you would for a normal setup.

3) OPERATION

- When the Dual Call Mode has been enabled, "PH #1" will appear on the HOOK screen.
- Press the "**PHONE2**" key and "PH #2" will appear. (In this manner, the screen and keypad are coordinated to operate as two phones.)
- Calls may now be placed or reviewed on either or both B-Channels using the Dual Call mode. All Call Control menus are still valid. (e.g., Call Appearance, B-Channel selection, and Bearer capability for each "Phone")

4) TYPICAL TEST SCENARIO

Initiate a Call on "PH #1"

- Go OFF HOOK on "PH #1"
  make sure that the message "Dial tone" appears on the Hook Screen (on 5ESS Switches, no Dial tone will be heard).

Initiate a Call on "PH #1"

- Select the "**PHONE2**" soft key to move to "PH #2".
- Go OFF HOOK on "PH #2"

- If the "Dial Tone" message appears on the Hook Screen, the translations are correct (max B-Channel) for Simultaneous Data calls

  Clear the calls
- Go back ON HOOK for "PH #2"
- Select the **PHONE 1** soft key to move back to "PH #1"
- Go ON HOOK.
- The above Scenario is all that is necessary to test for Simultaneous B-Channel operation.

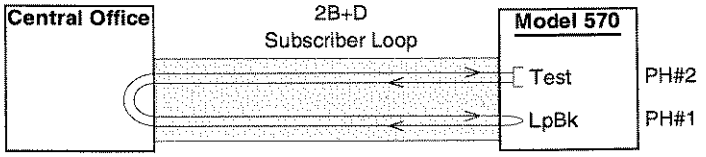
5) ADDITIONAL TEST SCENARIO

- Call from one B-channel to another, place one in loopback and initiate BERT from the other call (B-channel).

The Dual Call feature of the Model 570 enables BER tests to be conducted on both B-channels simultaneously, thus testing the full 128K bandwidth. This testing can be accomplished in two scenarios.

LOOPBACK:

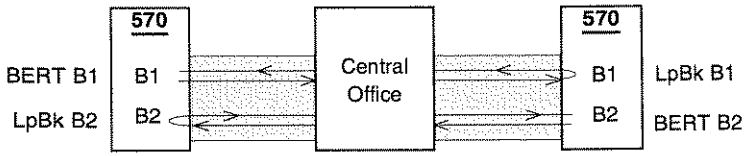
- With each B-channel having a dialable number, turn the "Dual Call" feature ON in the "**Utility**" menus, "**EXIT**" to the ON HOOK screen, select "**SPID**" soft key, and enter SPID #1 and SPID #2. Return to the Hook screen for PH#1 (Phone 1) and press "**PHONE 2**" to reach the PH #2 Hook screen. Go Off Hook and dial the number for phone #1.
- When the sonalert is heard, press "**PHONE 1**" to move to Phone #1, press the "**Hook On/Off**" key to answer the call. Place the "called" B-channel into loopback mode, enter the BERT menu, and start a test over the "calling" B-channel (the PH#2 call B-channel).



NOTE: *If the "Second Call" feature is ON, a call can be placed out to the switch and back to the second B-channel. Then one of the channels may be placed in loopback ("**Utility**" menu, "**Config**" sub-menu, "Loopbacks Select" display or BERT C LPBKS menu), and BERT testing that may be initiated over the other B-channel. Thus, both B-channels can be tested at the same time.*

STRAIGHTAWAY:

In the same manner as loopback, two technicians with Model 570's can call each other. In this scenario, the first technician would call the second. The second technician would then call the first, using the PH#2 Hook screen. The called technician would place the incoming B-channel in loopback. Each technician would then initiate BER testing over the out-bound B-channel.



3.11 BRITL

A Basic Rate Interface Dial-Up Test Line (BRITL) feature of AT&T switches provides a means by which the craftsperson can test operation of a BRI (Basic Rate Interface) from the customer side (CPE) of a BRI. The Model 570 must be setup with 5ESS Call Control to use this feature. By placing a test call to a pre-assigned Directory Number, the craftsperson may gain access to a set of test commands via the CPE keypad, e.g., the Model 570 keypad. These commands will allow the Basic Rate Interface to be tested without additional craft support at the Central Office.

The Model 570 can be utilized to go off hook and dial the BRI Test Line access code:

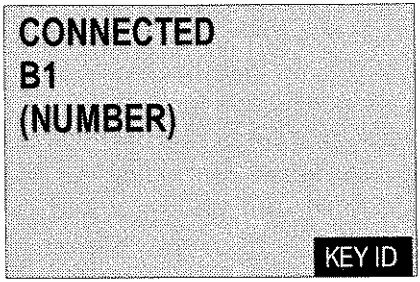
1 - Connect to the line under test.

2 - Press the "**Utility**" key, "**CALL**" soft key, then "**Scroll Menu**" to the "BRITL TEST FEATURE" menu. Select ENABLE.

3 - Press the "**Hook On/Off**" key to go off hook.

4 - Upon hearing dial tone, dial the BRI Test Line access code using the keypad.

5 - A secondary dial tone will be heard and a display message will indicate successful origination of the Test Line. Once connected, the "**KEY ID**" soft key will be displayed on the hook screen:



6 - When the "**KEY ID**" soft key is pressed, switch feature verification will be enabled. BRI Dial-Up Test Line keypad codes may now be used to exercise the set of commands available. At this point, any button number may be entered via the keypad, followed by "#". The LCD will then display what that button number has been translated for by the switch. This procedure may be repeated for other button numbers.

Valid BRI Dial-Up Test Line (BRITL) keypad codes are as follows (when the switch is provisioned with 5E6 software generic or above):

KEYPAD	ACTION
*11X#	Run BER Test on Channel X with Current Parameter
*120#	Display Current Test Termination
*12X#	Set Test Termination
*130#	Display Current Test Duration
*13X#	Set Test Duration
*140#	Display Current Test Data Rate
*14X#	Set Test Data Rate
*2#	Send Alerting Signal to the CPE
*3#	Print LCEN on CPE display
*4#	Print Primary DN/MLHG on CPE display
*0#	Repeat Previous Message (Display/Tone)

As an example, enter "*3#" on the keypad. The Line Card Equipment Number of the BRI will be displayed on the Model 570 LCD screen.

Valid BRI Dial-Up Test Line (BRITL) parameters are listed below:

COMMAND SUFFIX X	KEYPAD CODE *11X	KEYPAD CODE *12X	KEYPAD CODE *13X	KEYPAD CODE *14X
1	B1	CPE	20 Sec.	64K Clear
2	B2	NT1	2 Min.	64K Restrict.
3		Line Card	20 Min.	56K Clear
41		BRITE CU1		
42		BRITE CU2		
43		BRITE CU3		
44		BRITE CU4		
45		BRITE CU5		
46		BRITE CU6		

7 - Pressing the "**KEY ID**" soft key again will disable the Feature Verification.

NOTE: *The BRITL is only available with 5ESS Call Control and will not function if the unit is not connected to a line.*

The BRITL Access Number may be conveniently stored in one of the speed dial locations for quick recall (access).

APPENDIX A

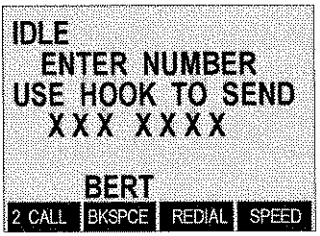
QUICK REFERENCE

QUICK REFERENCE

HOW TO MAKE A PRI VOICE CALL

Primary Rate ISDN does not require a SPID or TEI to be set by the user. "Voice" service and the B-Channel should be selected from the "Utility" menu prior to placing a call.

❶ Press the "**EXIT**" soft key or "**Hook On/Off**" key to display the Call menu:



❷ From this menu, **Enter The Number** using the keypad, or Speed Dial or Redial with the soft keys.

❸ Press "**Hook On/Off**" to send the number to the switch.

❹ Conversation may now take place using the "**Hands Free**" feature. An external handset may also be connected to answer or place a second call. Press the "**2 CALL**" soft key to display the second call status screen. "**BERT**" appears on the bottom line indicating that BERT testing is in progress.

*To end a Voice Call, go **On Hook***
*by pressing the "**Hook On/Off**" keypad button.*

QUICK REFERENCE

TROUBLESHOOTING TIPS

❶ If a connection is not made, or the LCD returns to the HOOK menu, press the "**1/Status**" key to check the CAUSE INFO, which will give a diagnostic cause message

❷ If set-up needs to be checked, press the "**Setup**" function key, to return to the setup menu where the present setup can be viewed/changed.

❸ The "**1/Status**" menu and **LAYER STATES** sub-menu can be used to review Layer 1, 2, or 3 messages.

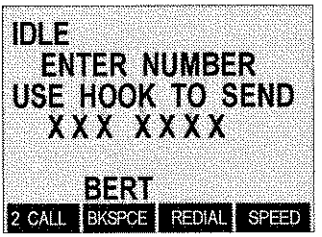
❹ The unit will provide the decoded D-Channel messages to the RS-232 port. To enable this feature, press the "**#/Utility**" key, select "**DATA**", and "**Scroll Menu**" to the **D-Channel Monitor** menu and press "**ON**".

QUICK REFERENCE

HOW TO MAKE A PRI DATA CALL

Primary Rate ISDN does not require a SPID or TEI to be set by the user. From the "Utility" menu, select DATA, Data service, Data Rate, and B-channel(s) prior to placing a call.

❶ Press the "**EXIT**" soft key or the "**Hook On/Off**" key to display the Call menu:



❷ From this menu, **Enter The Number** using the keypad, or Speed Dial or Redial with the soft keys.

❸ Press "**Hook On/Off**" to send the number to the switch.

❹ Conversation may now take place using the "**Hands Free**" feature. An external handset may also be connected to answer or place a second call. Press the "**2 CALL**" soft key to display the second call status screen. "**BERT**" appears on the bottom line indicating that BERT testing is in progress.

*To end a Data Call, go **On Hook***
*by pressing the "**Hook On/Off**" keypad button.*

QUICK REFERENCE

TROUBLESHOOTING TIPS

❶ If a connection is not made, or the LCD returns to the Call menu, press the "**1/Status**" key to check the CAUSE INFO, which will give a diagnostic cause message

❷ If set-up needs to be checked, press the "**Setup**" keypad button, to return to the setup menu where the present setup can be viewed/changed.

❸ The "**1/Status**" menu and **LAYER STATES** sub-menu can be used to review Layer 1, 2, or 3 messages.

❹ The unit will provide the decoded D-Channel messages to the RS-232 port. To enable this feature, press the "**#/Utility**" key, select "**DATA**", and "**Scroll Menu**" to the **D-Channel Monitor** menu and press "**ON**".

APPENDIX B

GLOSSARY

AMI *Alternate Mark Inversion* - A switch vendor's line code (i.e., AT&T AMI, NTI AMI).

ANI *Automatic Number Identification* - Ability of the network to notify the called party of the calling party's number.

B-Channel *Bearer Service Channel* - Operates at 64 Kbps and carries user voice and data.

BERT *Bit Error Testing* - A test in which a series of bits arranges in a pseudo-random pattern are transmitted and then compared bit-by-bit for errors called "bit errors" or "logic errors."

B8ZS *Binary 8 Zero Substitution* - Code that replaces a string of 8 zeros by inserting a one bit in place of a zero in the T-Carrier transmission to allow for clear channel 64 Kbps channels.

BPV *Bipolar Violation*

BRI *Basic Rate Interface* - One of the access methods to an ISDN circuit. Comprising of either 1B+D or 2B+D channels.

BRITL *Basic Rate Interface Dial Up Test Line* - A feature of AT&T switches.

Cause Message - Diagnostic messages describing the "cause" of call rejection.

CCIS *Common Channel Interoffice Signaling* - North American version of Signaling System 6.

CCS *Common Channel Signaling* - Out of band network signaling whereby several voice trunks share a common signaling channel (i.e., SS6 and SS7).

CLASS *Custom Local Area Signaling Services* - A set of services that is offered by telcos that have implemented SS7.

CODEC *Coder/Decoder* - Device used to convert analog signals to digital bit streams and vice versa.

CPE *Customer Premise Equipment* - Devices or equipment that the customer provides to interface with the telephone company.

CRC *Cyclic Redundancy Check* - A mathematical algorithm used to detect bit errors in data transmission.

D-Channel - The out of band signaling channel that carries ISDN network signals. It can also be used to carry packet-mode user data. The D-Channel operates at 16 Kbps in the BRI and 64 Kbps in the PRI.

DCE *Data Circuit-terminating Equipment* - Term defined by both frame relay and X.25 committees that applies to switching equipment and is distinguished from the devices that attach to the network (DTE). See also DTE.

DSL *Digital Subscriber Line* - A technology that provides full-duplex service on a single twisted metallic pair at a rate sufficient to support ISDN Basic Access and additional framing, timing recovery, and operations functions. The physical termination of the DSL at the network end is the LT; the physical termination at the user end is the NT.

DTE *Data Terminal Equipment* - In the RS-232-C standard specifications, the RS-232-C is connected between the SCE and a DTE. The main difference between a DCE and a DTE is that pins two and three are reversed.

ESF *Extended Super Frame* - Framing structure providing for an EOC structure

EOC *Embedded Operations Channel* - Optional data links within the signal for operations and maintenance use by carriers that do not terminate or channelize the 64-kb/s facility data link.

HDLC *High-level Data Link Control* - A generic link-level communications protocol developed by the International organization for Standardization (ISO). HDLC manages synchronous, code-transparent, serial information transfer over a link connection.

IEC *Inter-Exchange Carrier* - In the U.S. is a long distance telephone company (also abbreviated IC and IXC).

ISDN *Integrated Services Digital Network* - An ISDN provides a wide range of voice and nonvoice services within the same network using a limited set of connection types and multipurpose user-network interface arrangements. A variety of implementation configurations is supported, including circuit-switched, packet-switched, and nonswitched connections and their concatenations. New services are arranged to be compatible with 64 kbit/s switched digital connections. Service features, maintenance capabilities, and network management functions are provided through intelligence built into the network and compatible intelligence in the user terminals.

ISPBX *Integrated Services Private Branch Exchange* - A term describing an ISDN-compatible PBX.

IVDT *Integrated Voice/Data Terminal* - An ISDN terminal that allows both voice and data communications.

LAPD *Link Access Protocol on the D-Channel* - The ISDN data link layer protocol specified for the D-Channel.

LT *Line Termination* - The equipment that terminates the access line at the network end.

M-Channel - A 4 Kbps maintenance channel for NT1-TE communication over the 2-wire BRI circuit

Multi Point - Configuration that supports multiple terminal equipment devices.

NI-1 *National ISDN-1* - A standard call control and feature set for BRI.

NI-2 *National ISDN-2* - A standard call control and feature set for PRI.

NSF *Network Specific Facilities* - An element in the setup message that can specify optional routing and services.

NT *Network Termination* - In this standard, the equipment that terminates the DSL on the customer side of the interface. The NT function may be in an NT1, and NT2, or a TE.

NT1 *Network Termination type 1* - The ISDN device responsible for the termination of the ISDN transmission facility at the customer premises.

NT2 *Network Termination type 2* - An ISDN device responsible for on premises communications distribution, such as a PBX, LAN, or Host Computer.

Octet - An eight (8) bit quantity; used in lieu of the term "Byte".

PS1 *Power Source 1* - The Sealing Current power, derives its power locally (commercial power and/or batteries). The source may be an integral part of the NT.

PS2 *Power Source 2* - The Stand Alone Power Pair, also derives its power locally (commercial power and/or batteries). The source may be located or associated with the NT or it may be located separately; eg, in a remote wiring closet.

PS3 *Power Source 3* - An optional power source that may be used in some cases.

PLP *Packet Layer Protocol* - The X.25 Level 3 protocol.

Point to Point - Point to point connection.

PRI *Primary Rate Interface* - One of the access methods to an ISDN circuit. Comprising of 23 B-Channels and one D-Channel (23B+D) or 24 B-channels (24B).

SAPI *Service Access Point Identifier* - A subfield in the LAPD address field which indicates the type of Level 3 service being obtained.

SF *Super Frame* - Eight frames (12 ms) shall constitute a superframe. The first frame in the superframe shall be identified by inverting the polarity of the synchronization work (SW) in this frame.

Smart Jack - Network termination device for DS1 circuits.

SPID *Service Profile Identifier* - A number used by Terminal Equipment to request identification from the switch on a multipoint circuit for BRI service.

SPM *Service Profile Management* - A service of NOTREL switches that provides the user's terminal with the service parameters contained in its network profile.

SS6 *Signaling System No. 6* - CCITT version of CCIS, one of the first common channel signaling networks.

SS7 *Signaling System No. 7* - The high speed, digital common channel signaling network required for ISDN applications.

S/T Interface - The standard 4-wire (2 RX, 2 TX) ISDN Interface used by ISDN terminals and is the physical interface on the terminal side of a NT1.

STP *Signal Transfer Point* - A SS7 switching point.

TE *Terminal Equipment* - Any ISDN compatible device that may be placed on the network, such as a telephone, IVDT, PBX, TV, PC, etc.

TE1 *Terminal Equipment type 1* - ISDN compatible terminal equipment.

TE2 *Terminal Equipment type 2* - Non-ISDN compatible terminal equipment.

TEI *Terminal Endpoint Identifier* - A subfield in the LAPD address field that identifies a given TE device on the ISDN interface.

TID *Terminal Identifier* - A TID value is unique within a given USID. If two terminals on an interface subscriber to the same service profile, then the two terminals will be assigned the same service USID> However, two different TIDs are required to uniquely identify each of the two terminals.

Transport Layer *Layer 4 of OSI Reference Model* - Primarily responsible for error free communication between two hosts across the sub network.

2B1Q *Two Binary One Quaternary* - A signaling method used across the 2-wire BRI (U reference point). 2B1Q is a four level line code associating 2 bits to each line signal.

U Interface - The physical 2-wire echo canceling interface on the network side of a NT1 for BRI.

USID *User Service Identifier* - A USID uniquely identifies a service profile on an access interface.

INDEX

A

B

C

D

E

H

I

K

L

M

N

O

P

R

S

T

V

MODEL 570
OPERATING MANUAL
ADDENDUM

Issue 11B - Firmware 2.10

Firmware version ***2.10*** includes the following enhancements:

PRI Enhancements:

- Setup menu has been modified.
  - Directory Number and Bearer Capability have been added.
  - Framing (ESF/SF) and Coding (B8ZS/AMI) selections have been moved to the **Utility/Config** menu.
- Hook screen has been improved.
  - Calling Party Name (if received) is now displayed above the phone number.
  - Data rate for incoming Data calls is now displayed.
  - Two B Channel Transfer in single PRI mode has been added. Once two calls are connected in PRI Terminate mode, a **TRNSFR** soft key appears on the Hook screen. When the **TRNSFR** soft key is pressed, the two calls are tied together in the switch and the B channels become available again.

NOTE: *Two B Channel Transfer is only available with National call control.*

- PRI Monitor mode has been enhanced.
  - Decoding of Nortel SL1 call control layer 3 messages has been improved.
  - B Channel audio monitor has been added. The B Channel to be monitored can be set in the **Utility/Config** "Audio" menu.
- Operator System Access (OSA) and Network Specific Facilities (NSF) Special Class of Call Service Information Elements in Setup messages are now decoded in D Channel Capture and Monitor modes.
- Additional Call Options have been added to the **Utility/Call** menu.

- Transit Network Select (TNS) Information Element can be sent with the Network Specific Facilities (NSF) Information Element in the same Setup message.

- Operator System Access (OSA) Information Element can be sent with the Network Specific Facilities (NSF) Information Element in the same Setup message.

- Lookup tables have been added to assist with NSF Call Options.

  - When Network ID Plan is set to CIC, a **LIST** soft key appears once the Network ID field is highlighted. Once a Network ID Option (e.g., AT&T, MCI, or Sprint) is selected and accepted, its ID code is entered as the Network ID.

  - When Facility is set to Service, a **LIST** soft key appears once the Facility Code (FAC CODE) field is highlighted. Once a Service Option (e.g., MEGACOM service, IN WATS) is selected and accepted, its code is entered as the Facility Code.

  - When Facility is set to Feature, a **LIST** soft key appears once the Facility Code (FAC CODE) field is highlighted. Once a Feature Option (e.g., Operator Telephone Co.) is selected and accepted, its code is entered as the Facility Code.

BRI Enhancements:

- S/T Signal Level (**Status/Line** menu) is displayed in Peak Volts *and* dB.
- TE mode S/T Line Termination is now stored when the test set is powered off.

NOTE: *TE mode is only available with the BRI2 option.*

- Auto/Guess SPID has been taken off the **Setup** Menu. The **Setup** menu configures the physical interface. The SPID needs to be set after the physical interface is ready. Example: The TPI 570 can not query the switch for a SPID when it does not have sync.
- D Channel Monitor capability Enhancements:
  - Time stamp used in decoded D channel messages sent out the RS-232 Data port can now be set in the **Utility/Config** menu. The time stamp uses a 24-hour clock. It is not saved on power down.
  - Hex Only selection has been added to the **Utility/Data** "D Monitor" menu. When Hex Only is **On**, the TPI 570 sends abbreviated D channel messages out the RS-232 Data port.
- ViTL (Virtual Test Link) Related Enhancement:
  - Keyboard Lock/Unlock commands have been added to the TPI 570. ViTL operator can remotely lock the keypad on the TPI 570 to prevent local operation.

Firmware version ***2.00*** includes the following enhancements:

PRI Enhancements:

- Network Emulation capability added

  Allows placing and receiving calls to or from the CPE or the TPI 570 without an active connection to an ISDN switch. To enable the TPI 570 Network Emulate mode, select **NETWK** on the EMULATE line in setup.

  From the Hook screen, enter the number to dial, then press **Hook On/Off**. The CPE should signal an incoming call. PRI Network Emulation supports one T-1.

- Auto call and BERT macro added

  Ability to place multiple calls (full span or half span), loop, and BERT. With "Multi Call" ON, select the **MACRO** soft key from the Hook screen. Select "AUTO + BERT CALL". A setup menu will prompt for the directory number, dialing method, bearer cap, call span, and the test time.

  The directory number is the number to call.

  The dialing method selections are **BASE** and **INC**. **BASE** is used to dial the same number again and again. **INC** (increment) is used to begin with the directory number entered and increment one digit with each call

  The call span selections are **FULL** or **HALF**. Select **FULL** span to place 23 calls, **HALF** span to place 11 calls.

  The "TEST TIME" selection enters the length of time to run the test for each channel.

  Select **RUN** to begin. Results will be displayed on the screen.

  This feature can also be found under the **Utility/CALL** menu "DO YOU WANT TO MAKE AUTO CALL WITH BERT" screen. If "Multi Call" is OFF, the 570 will automatically turn "Multi Call" On and the setup screen described above will be displayed.

- Presentation Indicator selection added to **Utility/CALL** menu.

A menu has been added to the **Utility/CALL** menu, after the "Directory Number" screen, to turn the Presentation Indicator **ON** or **OFF**. The presentation indicator indicates if a calling identity item may be presented to the called party. This menu selection is only displayed if a directory number has been entered.

- Calling Name decode added

If the customer has subscribed to the service, the calling name will be decoded in the D Channel message capture.

BRI Enhancements:

- Network Emulation capability

Allows placing and receiving calls from the CPE or the TPI 570 without an active connection to an ISDN switch. To enable the TPI 570 Network Emulate mode, select **LT NTW** mode in setup.

From the Hook screen, enter the number to dial, then press **Hook On/Off**. The CPE should signal an incoming call. BRI Network Emulation supports the U interface.

- SPID Guess added

NOTE: *SPID Guess is only available in CPE Emulate mode.*

An **AUTO** soft key has been added to the SPID screen (SPID screen found in **Setup** or from the Hook screen **SPID** soft key). Select the **AUTO** soft key to display the AUTO menu. Select item "1" either by entering **1** on the keypad or pressing the **SELECT** soft key with GUESS SPID highlighted. Enter the 10 digit phone number (directory number) then press **ENTER**.

The 570 will then attempt to guess the SPID. If a SPID is determined, "SPID FOUND" will be displayed, along with the SPID number, and the SPID will be sent to the switch.

SPID Guess can also be found under **2nd Func.**, **2** (Auto).

- Auto SPID added

NOTE: *Auto SPID is only available in CPE Emulate mode.*

An **AUTO** soft key has been added to the SPID screen (SPID screen found in **Setup** or from the Hook screen **SPID** soft key). NOTE: Auto SPID is only available in CPE mode.

Select the **AUTO** soft key to display the AUTO menu. Select item "2" either by entering **2** on the keypad or pressing the **SELECT** soft key with AUTO SPID highlighted. Press **START** to perform the auto SPID function. If auto SPID is supported by the switch, the number of SPIDs found will be displayed. The SPID numbers will also be displayed, along with the bearer capabilities for that SPID. To select a SPID, press the **UP** or **DOWN** soft key until the desired SPID is highlighted and select **SEND**. Auto SPID can also be found under **2nd Func.**, **2** (Auto).

- IT™ Macro added

Press **2nd Func.**, **2** to enter the "Auto" menu. The IT macro is a user defined macro that places calls to a test number and runs a test for a user specified time. Select item "3" either by entering **3** on the keypad or pressing the **SELECT** soft key with IT MACRO highlighted. Press Selecting **IT MACRO** will prompt for the 10 digit phone number to guess the SPID, prompt for the number to dial (e.g., 560B loopback device), ask if the number returns the call, and prompt for the test time for each bearer cap.

Select the **START** soft key to initiate the macro. For the Voice mode, the 570 places a call and checks for Layer 1 errors for the amount of time specified. For the Data 56K or Data 64K mode, the 570 places a call and runs a 2047 BERT for the test time selected.

Select **RESULT** to view the macro results. To store these results, press **STORE** from the "RESULTS" screen and select a record number under which to store them.

- Enblock dialing added

  A new screen has been added to the **Utility/CALL** menu after the TEI menu for selection of the dialing method. The dialing method selection will be used for all dialing applications (manual dial, speed dial, redial, IT macro).

  In **ENBLOCK** dialing, all the digits are entered via the keypad before the call is attempted. These digits are then included in the "Setup" messages as the called party number and sent to the switch to request the call.

  In **OVERLAP** dialing, the setup message is sent to the switch without the called party number, then the switch returns "Dial Tone" and the caller enters the number to be called, one digit at a time, until the switch has collected enough digits to route the call.

- Presentation Indicator selection added to **Utility/CALL** menu.

  A menu has been added to the **Utility/CALL** menu, after the "Dialing Method" screen, to turn the Presentation Indicator **ON** or **OFF**. The presentation indicator indicates if a calling identity item may be presented to the called party.

- 3.1K Audio Bearer Capability added

  3.1K Audio selection added to "BEARER CAP" screen under **Utility/DATA** menu. To select 3.1K Audio bearer capability, press the **3.1K** soft key.

Menu structure

Status / QZ 1

STATES (Soft key)
- M Chan. Info.
- Layer 1 Info.
- Layer 2 Info.
- Layer 3 Info.
- RX Loopback Status
- PS Voltage
- Line Voltage

CAUSE (Soft key)
- Cause Info.
- USID / TID
- Parameter Download (SPM)
- TEI
- B Chan. in use
- Call Status (Dual Call)
- CLID
- Parameter Download (NTI Protocol Rev.)

RESULT (Soft key)
- CRC / FEBE Errors, Errored Seconds
- Timed Tests
- B-Channel Delay

Auto / ABC 2

Auto Modes
- SPID ITEMS - Guess SPID/Auto SPID
- Bearer Tests - Test for Bearer cap., Local or Distant
- IT Macro - User defined macro to place calls to a test number and run a test for a user specified time
- Parameter Download - Query the switch for features
- Video Mode - Auto Answer and Loop Video Calls

BERT / DEF 3

BERT:
- G.821 Results
- Timer, Insert Errors
- Blocks Received, Block Errors
- B1, B2, Both
- 56K, 64K, Video
- Pattern Select

/ **Utility**

MODES (Soft key)
- EBS Station Address
- POTS Mode
- Dual Call
- SPID #2
- DN #2
- Call Self, Loop
- Centrex Prefix
- BRITL Feature Verification
- Select B-Channel
- Dialing Method
- Call Appearance
- Call Control
- TEI

CONFIG (Soft key)
- Interfaces
- LT Mode
- EOC Message & Address
- Battery Status
- Volume Level
- LCD Contrast
- Insert Loss
- 40kHz Tone
- Auto Power Down
- Toggle LpBk's
- Macro BERT pattern
- Macro BERT time

DATA (Soft key)
- Bearer Cap.
- Speed
- Packet Type
- B-Packet Channel
- TEI
- Call User Data
- LCN
- CUG
- Reverse Charge
- RPOA
- D Packet Size
- Echo Mode
- Calling Address
- D-Chan. Capture
- D-Chan. Monitor
- Line Audio Monitor
- EBS Msg. Decode