HSU 100 QUICK START GUIDE

Figures 1 - 3 AND Tables A - D provide additional information.

ADTRAN Technical Support: (800) 726-8663

INSTALLATION & CONFIGURATION

1. Do not connect the HDSL, DTE, or PBX interface cables until the unit is configured.
2. Install any Option Modules before applying power.
3. Plug the power cable into a 120 VAC power outlet and turn the unit On.
4. If a problem is detected during Self Test, contact ADTRAN Technical Support.
5. Menu items and options are selected by pressing a numeric key followed by pressing **Enter**.
6. When the cursor flashes on a menu item, it can be selected by pressing **Enter**.
7. Active configuration options (the current settings for the unit) are displayed.
8. Use the Scroll Keys (**Arrow Up**, **Arrow Down**) to view other items and options.
9. Press **Cancel** at any time to exit to the next higher menu level, except when changing options.
10. Configuration options are automatically saved when changed by pressing **Enter**.
11. During installation, the following options should be checked and changed as necessary:

SELECT TIMING:

[2)CONFIG, 1)HDSL INTERFACE, 1) CLOCK SOURCE], then scroll to:

a. HDSL INTERFACE, BASE DTE, or INTERNAL (without DSX or D&I modules).
b. NORMAL (CSU), NI, or SI, (with DSX or D&I modules).

SET TRAINING:

[2)CONFIG, 2)UNIT, 4)TRAINING MODE], then scroll to: LOCAL or REMOTE

NOTE: ***One unit must be set to LOCAL and the other to REMOTE for training to take place.***

SET BANDWIDTH MAPPING:

1. Select the MAP IN USE: A or B [2)CONFIG, 4)MAP IN USE, then select A or B].
2. Select DS0 MAP A (or B), corresponding to the map in use: [2)CONFIG, 5)DS0 MAP A(B)].
   a. Scroll to CREATE TEMP and press **Enter**. TEMP file contains three fields: DS0 #, PT (Passthru) (Y/N), and PORT.
   b. Select the DS0 to modify (using the scroll keys).
   c. Press **Enter** to advance to the PT field.
   d. No entry is required; PT is set automatically.
   e. Press **Enter** again to advance to the PORT field.
   f. Use the scroll keys to select the desired port.
   g. Press **Enter** to select and advance to the DS0 # field.
   h. Repeat this process, (c through h), until all DS0s have been mapped correctly.

   NOTE: ***If the next DS0 is to be mapped to the same port, use the Copy key to duplicate.***

   i. Press **Cancel** to exit the TEMP file.
   j. Press **Enter** on Apply TEMP > A.
   k. Scroll to CHANGE DISRUPT DATA: YES, and press **Enter** (data must be disrupted for map changes to take effect).
   l. The screen displays MAP APPLIED if the changes were applied.

   NOTE: ***Future modifications to the map can be made by performing the following steps:***

   a. Select DS0 MAP A (or B).
   b. Press **Enter** on Copy A (or B) > TEMP. The screen should change to Copied A (or B) to TEMP.
   c. Scroll down to EDIT TEMP and press **Enter**.
   d. Refer to steps (c through l) above to modify map.

SET PORT CONFIGURATION (see Figure 3, HSU 100 Menu Tree):

[2)CONFIG, 7)PORT CONFIG], scroll to 0.1 Nx56/64; press **Enter.**

a. INTERFACE: 530 or V.35
b. RATE (56/64): select 56K or 64K
c. TX CLK CNTL: select INT-INV, INTERNAL, or EXTERNAL
d. DATA: select NORMAL, INVERTED, or EXTERNAL
e. CTS: select NORMAL or FORCED ON
f. CTS: select NORMAL or FORCED ON
g. DCD: select NORMAL or FORCED ON
h. DSR: select NORMAL or FORCED ON
i. 0 INHIBIT: select OFF or ON

SET DSX-1 PORT CONFIGURATION:

[2)CONFIG, 7)PORT CONFIG], scroll to 1.1 DSX 1 PT; press **Enter.**

a. FORMAT: select ESF or D4
b. CODE: select B8ZS or AMI
c. YELLOW ALARM: select DISABLE or ENABLE
d. LINE LENGTH: select 1-110, 110-220, 220-330, 330-440, 440-550, 550-655, or >655
e. INBAND LOOPBACK: select ACCEPT or REJECT
f. CLOCK SOURCE: select NETWORK (NI) or SECONDARY (SI)

NOTE: ***After completion of the above configuration steps, connect the HDSL, DTE, and PBX cables that are used in the application.***

TROUBLESHOOTING

1. Investigate Alarm/Error conditions:
    a. CSU, DSU, and MODULE Alarms are listed in the STATUS menu under ACTIVE ALARMS: [1)STATUS, 4)ACTIVE ALARMS].
    b. HDSL LOOP ERRORS are reported under LOOP ERRORS: [1)STATUS, 3)LOOP STATUS, 3)LOOP ERRORS].
    c. CSU errors are recorded in the STATUS menu under 2)LINK ERRORS: [1)STATUS, 2)LINK ERRORS].
    d. MODULE ERRORS are reported under PORT STATUS: [1)STATUS, 6)PORT STATUS; select PORT].
2. Verify HDSL configuration, mapping, and port configurations (refer to the *Installation and Configuration* section).
3. Verify HDSL and module connections.
4. Check LOOP QUALITY: [1)STATUS, 3)LOOP STATUS, 1)LOOP QUALITY]. A level of 4 to 9 is good.
5. Check LOOP LOSS: [STATUS, 3)LOOP STATUS, 2)LOOP LOSS]. Loop loss should be less than 35 dB.
6. Call ADTRAN Technical Support for further assistance.

TESTING

LINK TESTS: Control the activation of loopbacks and the initiation of data test patterns. [4)TEST, 1) LINK TEST].

1. LOCAL LOOPBCK: Local Loopback, loops all of the received data back toward the HDSL loop.
    a. LINE ON: Equivalent to an inband CSU loopback initiated by a telco. Provides metallic loop back at HDSL interface.
    b. PAYLOAD ON: Similar to Local Line Loopback, except the framing is extracted from the received data, then regenerated for the transmitted data.
2. REMOTE LOOPBACK:
    a. LINE ON: Provides metallic loopback at the HDSL interface of the HSU 100 on the other end of the HDSL loop.
    b. PAYLOAD ON: Similar to the Remote Line Loopback, except the framing is extracted from the received data, then regenerated for the transmitted data.
3. TEST PATTERN:
    a. NONE: No test patterns.
    b. QRSS ALL DS0s: QRSS pattern assigned to be in all DS0s.
    c. QRSS TST DS0s: QRSS pattern assigned to be in all TST DS0s.
4. PATTERN RESULT: Select to view the results of the Pattern Test.

RUN SELF TESTS: Checks the integrity of the internal operation of the electronic components by performing memory tests and by sending and verifying data test patterns through all internal interfaces.

PORT TESTS: Tests specific data ports. During these tests, normal data flow is disrupted in the DS0s mapped to the port being tested.

1. PORT 0.1 Nx56/64: [4)TEST, 3)PORT TEST, select 0.1 Nx56/64].
    a. REMOTE LOOPBACK: V.54 Inband Loopback of remote unit (Bidirectional Loopback).
    b. PORT/LOCAL: Bidirectional loopback within NX Port for DS0s mapped to the port.
    c. 511 PATTERN: Generates and tests for a 511 pattern.
2. PORT 1.1 DSX1 PT: [4)TEST, 3)PORT TEST, select 1.1 DSX 1 PT].
    a. PORT: Loops toward the HDSL interface.
    b. LINE: Loops toward the PBX. Timing and framing must be obtained from the PBX.

CSA DEPLOYMENT GUIDELINES

The HSU 100 system is designed to provide DS-1 service over loops designed to comply with Carrier Service Area (CSA) guidelines. CSA deployment guidelines are given in Table A.

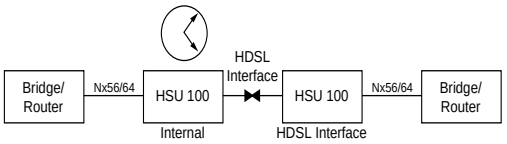
1. All loops are non-loaded only.
2. For loops with 26 AWG cable, the maximum loop length, including bridged tap lengths, is 9 kFt.
3. For loops with 24 AWG cable, the maximum loop length, including bridged tap lengths, is 12 kFt.
4. Any single bridged tap is limited to 2 kFt.
5. Total bridged tap length is limited to 2.5 kFt.
6. The total length of multi-gauge cable containing 26 AWG cable must not exceed:

$$12-[(3*L^{26})/L^{BTAP}]-L^{BTAP} \text{ (in kFt)}$$

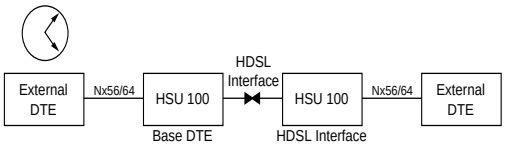
where: L^{26} = total length of 26 AWG cable excluding bridged taps (in kFt)

where: L^{BTAP} = total length of all bridged taps (in kFt)

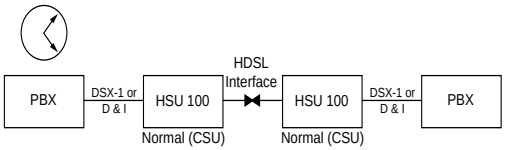
Table A. CSA Guidelines



1. This is an application where the HSU 100 provides timing.



2. This is an application where timing is provided by an external DTE.



3. A dedicated circuit where timing is generated by one of the communication devices. The HSU 100 cannot provide timing with the DSX-1 or D&I boards. Timing must be provided by a PBX. The HSU 100 timing is set to NORMAL(CSU).

Figure 1. HSU 100 Clocking Examples for Timing Configuration

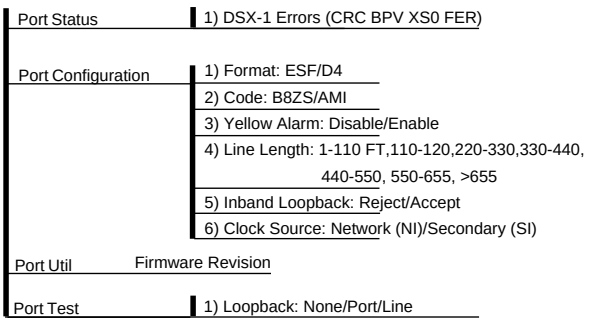


Figure 2. DSX-1 Port Menu

PIN	NAME	DESCRIPTION
1	T RXDATA-TIP	Receive data from the DTE (PBX)
2	FRAME GROUND	-
3	T1 TXDATA-TIP	Send data towards the DTE (PBX)
4	FRAME GROUND	-
5,6,7,8	UNUSED	-
9	R RX DATA-RING	Receive data from the DTE (PBX)
10	UNUSED	-
11	R1 TXDATA-RING	Send data towards the DTE (PBX)
12,13,14,15	UNUSED	-

Table D. Pinout Connectors for DSX-1 15-Pin "D" Shell Interface

PIN	NAME	DESCRIPTION
A	101	Protective Ground (PG)
B	102	Signal Ground (SG)
C	105	Request to Send (RTS) from DTE
D	106	Clear to Send (CTS) to DTE
E	107	Data Set Ready (DSR) to DTE
F	109	Received Line Signal Detector (DCD) to DTE
L, J	-	Local Loopback (LL)*
N, BB	-	Remote Loopback (RL)*
R	104	Received Data (RD-A) to DTE
T	104	Received Data (RD-B) to DTE
V	115	RX Clock (RC-A) to DTE
X	115	RX Clock (RC-B) to DTE
P	103	Transmitted Data (TD-A) from DTE
S	103	Transmitted Data (TD-B) from DTE
Y	114	TX Clock (TC-A)
AA	114	TX Clock (TC-B)
U	113	External TX Clock (ETC-A) from DTE
W	113	External TX Clock (ETC-B) from DTE
NN, K	-	Test Mode (TM) to DTE
*Ignored by HSU		

Table B. Primary V.35 Connector Pinout

PIN	NAME	DESCRIPTION
1	H1-R	LOOP 1 RING
2	H1-T	LOOP 1 TIP
3	NOT USED	-
4	H2-R	LOOP 2 RING
5	H2-T	LOOP 2 TIP
6, 7	NOT USED	-
8	CH GND	CHASSIS GROUND

Table C. HDSL Loops Connector Pinout

PIN	NAME	DESCRIPTION
1	R1 TXDATA-RING	Send data towards the DTE (PBX)
2	T1 TXDATA-TIP	Send data towards the DTE (PBX)
3	UNUSED	-
4	R RXDATA-RING	Send data from the DTE (PBX)
5	T RXDATA-TIP	Send data from the DTE (PBX)
6,7,8	UNUSED	-

Table E. Pinout Connectors for DSX-1 Eight-Position Modular Jack Interface

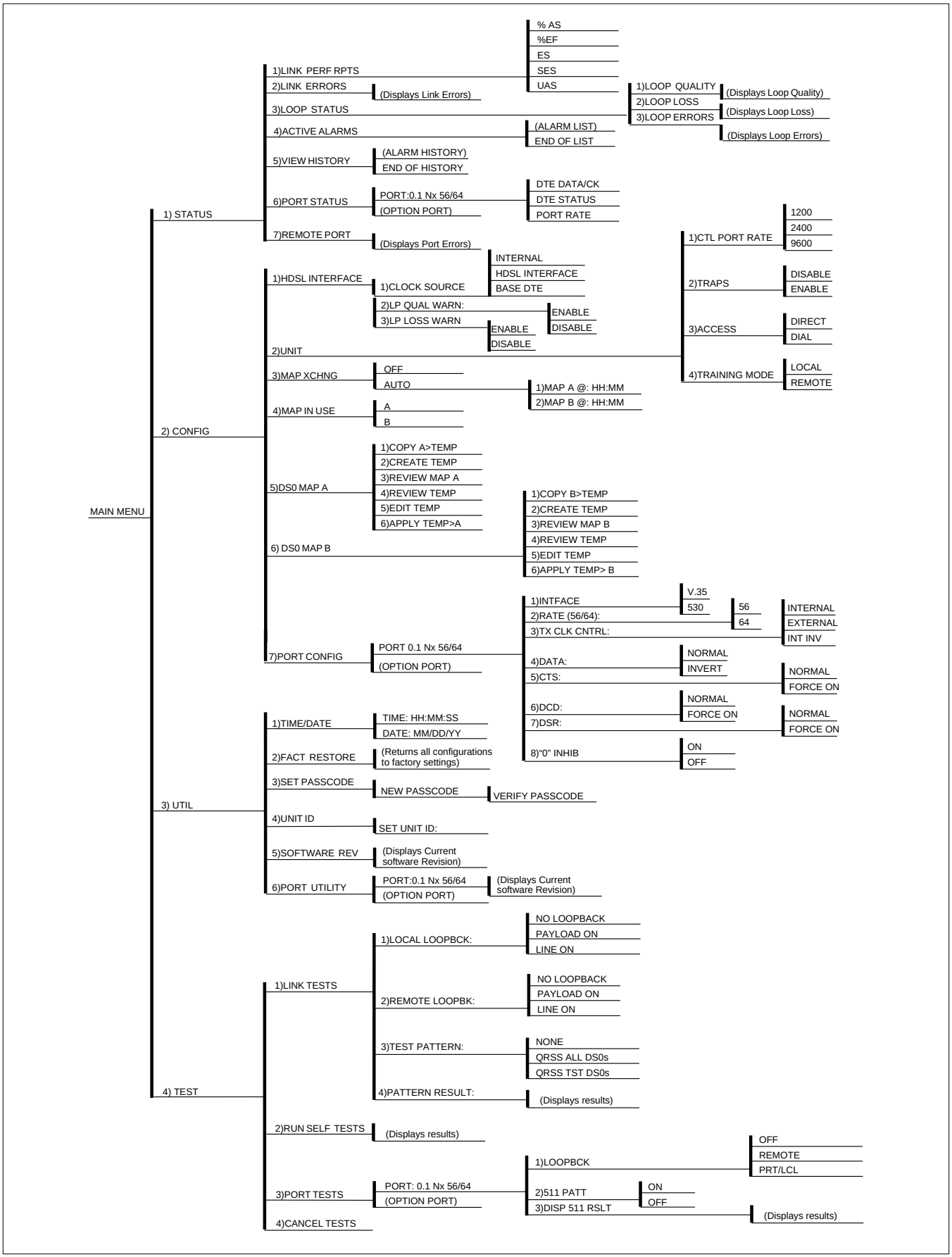


Figure 3. HSU 100 Main Menu