Total Access™ 850 Bank Controller Unit Installation and Operation

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1. GENERAL

This practice provides installation and operation procedures for the ADTRAN TA 850 Bank Controller Unit (BCU) common module, List 1. The TA 850 BCU module is designed specifically for the ADTRAN Total Access 850 and is not used in any other product. **Figure 1** is an illustration of the TA 850 BCU.

Revision History

This is the initial release of this document. Future revisions to this document will be explained in this subsection.

Features

The TA 850 BCU, part number 1200373L1, includes the following features:

- Controls all common equipment and access modules.
- T1 network termination.
- Built-in Channel Service Unit (CSU).
- Provides VT 100 craft interface via faceplate DB-9 connector.
- Bantam Jacks provide access to Network T1.
- LED network status indication.
- T1 performance monitoring.
- Supports TR-08 signaling.
- NEBS Level 3 and UL 1950 compliant.

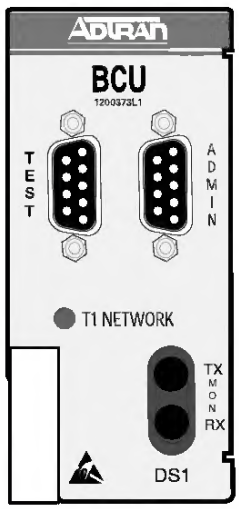

Figure 1. TA 850 BCU

General Description

The TA 850 BCU is a common module plug-in unit designed for the TA 850. The BCU, with a built-in CSU, provides all control functions for the TA 850 common units and all individual access modules. A faceplate ADMIN DB-9 provides access for a VT100 terminal for screen menu provisioning, and bantam test jacks provide transmit and receive monitoring. An additional TEST DB-9 provides timing for DS0 test equipment. A network LED shows status information for the network T1. The unit comprises a main circuit board and daughter card and inserts directly into the BCU slot on the TA 850 shelf. An 8-position DIP switch is mounted on the daughter card and is used for T1 provisioning and clocking.

Functional Description

The TA 850 BCU provisions, operates, monitors, and tests all TA 850 access modules including Quad FXS, Quad FXO, OCU DP, DS0 DP, and Nx56/64 DSU DP. The BCU programs T1 bandwidth use between the various access modules and data ports.

2. INSTALLATION/OPERATION

After unpacking the unit, inspect it for damage. If damage is noted, file a claim with the carrier, then notify ADTRAN Customer Service (see "WARRANTY AND CUSTOMER SERVICE" on page 5).

The TA 850 BCU plugs directly into the controller slot in the common module area of the TA 850 chassis. To insert, hold the unit by the faceplate while supporting the bottom side. Align the card edges to the guide grooves for the designated slot. Insert into the chassis until the edge connector seats firmly into the backplane. Lock the unit in place by pushing in on the locking lever.

CAUTION

This product is intended for installation in Restricted Access Locations only and is intended to be installed in equipment with a Type "B" or "E" installation code.

3. OPTIONS

The TA 850 BCU can be provisioned from either an 8-position Dual In-line Package (DIP) switch (S1) mounted on the PCB, or through screen menus accessed via the faceplate craft interface port. Basic T1 provisioning, clock source, and CSU loopback options are found on the DIP switch. Refer to **Table 3 on page 4** for DIP switch S1 provisioning information. Additional and more in-depth provisioning options for the BCU as well as access modules are available through the craft ADMIN interface.

DIP switch S1 must be provisioned while the BCU is withdrawn from the chassis. Once installed, any software provisioning made will override the DIP switch settings. If the unit is withdrawn and reinserted (power cycled), the software options remain in effect. If a DIP switch setting is changed while withdrawn, the new DIP switch setting takes effect. If none of the DIP switch settings were changed, the unit will be provisioned for the last software settings.

Electronic Provisioning

The ADMIN interface on the TA 850 BCU is used to change factory selected options and obtain access module status through menu screens. To access the menu screens, connect a VT 100 terminal or computer running a terminal emulation program to the craft interface port using a standard male-to-male RS-232 DB-9 cable. Craft port settings are as follows:

- 9600 Baud
- No parity
- 8 Data bits
- 1 Stop bit

CAUTION

The BCU retains provisioning setup when removed from the chassis. If inserted into another chassis, the provisioning setup is invoked on that chassis' access modules.

Windows Hyperterminal. Windows Hyperterminal can be used as a VT 100 terminal emulation program. Open Hyperterminal by selecting PROGRAMS / ACCESSORIES / HYPERTERMINAL. Refer to the Help section of Hyperterminal for additional questions.

NOTE

To ensure proper display background in Windows Hyperterminal, select VT 100 terminal emulation under SETTINGS.

Password. When connected, enter the password. The factory default is PASSWORD in all capital letters. The password can be changed to a user selected password once connected.

Menu Navigation. To traverse through the menus, select the desired entry and press **Enter**. To work backwards in the menu, press the **Esc** (escape) key.

Time Slot Assignment (Plug and Play Environment). The TA 850 can support a plug and play environment for slots 1-6 of the TA 850 bank for the various access modules (i.e., FXS, FXO, OCU DP, DSO DP, UBRITE, E&M, etc.). Each card that is plugged in to slots 1-6 will consecutively take 4 Time Slots automatically when installed in the TA 850 bank, depending on the card that is plugged into the shelf.

Time Slot Assignment - Software Assignment (Non-Plug and Play Environment). Slots 1-6 of the TA 850 Bank are for the various access modules supported by the the TA 850 (i.e., FXS, FXO, OCU DP, DSO DP, UBRITE, E&M, etc.). The T1 interface on the TA 850 BCU supports 24 Time Slot Assignment which can be allocated to the access modules, to the DSX-1, or to the Nx64 module. The TA 850 BCU can override the plug and play assignments through the software menus via the **ADMIN** port on the TA 850 BCU.

Slot	Time Slot Available	Access Module
1	1-4	FXS, FXO, OCU DP, DSO DP, UBRITE, E&M, etc.
2	5-8	FXS, FXO, OCU DP, DSO DP, UBRITE, E&M, etc.
3	9-12	FXS, FXO, OCU DP, DSO DP, UBRITE, E&M, etc.
4	13-16	FXS, FXO, OCU DP, DSO DP, UBRITE, E&M, etc.
5	17-20	FXS, FXO, OCU DP, DSO DP, UBRITE, E&M, etc.
6	21-24	FXS, FXO, OCU DP, DSO DP, UBRITE, E&M, etc.
A/B (special slot)	1-24	Nx56/64
BCU	1-24	BCU or BCU w/DSX-1

Access Module	Maximum Number of DS0s that can be used per module
FXS	4
FXO	4
*OCU-DP	1
*DSO-DP	1
*U-BRITE	1
*E&M	1
Nx56/64 (special slot)	24
*Supported in TA 850 Q300.	

Connections

All TA 850 BCU connections are made through the backplane connector. With the exception of power and the V.35 connector, all of the TA 850 rear panel connectors terminate on the BCU. These include Network T1, Clock source, Alarms, Fractional T1, and Management. Refer to the TA 850 System Installation and Maintenance Practice, part number 64200376L1- 5A, for additional information on rear panel connections. **Table 1** describes the T1 pinout connections.

Faceplate LED

The faceplate Network LED labeled T1 Network provides status information for the network T1 using a color coded message format. Refer to **Table 2**.

4. TESTING

The TA 850 BCU provides a variety of test options for both the Network T1 and DS0 access modules. The faceplate of the BCU provides a bantam jack for local T1 test access. DS0 test access for the digital access modules (OCU DP, DS0 DP, U-BR1TE) is provided via bantam jacks on the faceplate of each unit.

Faceplate Bantam Jack

The faceplate bantam jack provides a means to monitor the network T1 connected to the rear of the TA 850 chassis. The jacks accept standard 310-type bantam plugs.

Figure 2 on page 3 displays where the bantam jacks monitor the T1.

Faceplate TEST connector

The faceplate DB-9 female TEST connector provides the necessary clock output required by standard DSO Logic Test equipment such as a TPI 108/109 test set. Specifically, the TEST connector outputs 8 kHz and 64 kHz clock reference signal. **Figure 3 on page 5** illustrates the DB-9 TEST connector.

Table 1. Pinout Connectors for RJ-48 T1 Interface

Pin	Name	Description
1	R1 - RING1	Receive data from Network DS1
2	T1 - TIP1	Receive data from Network DS1
3	unused	-
4	R - RING	Transmit data to Network DS1
5	T - TIP	Transmit data to Network DS1
6, 7, 8	unused	-

Table 2. LED Indication

LED	Condition	Description
Network T1	OFF	No power.
	RED	Unit in Red Alarm (T1 down or not connected.)
	YELLOW	Receiving Yellow Alarm (far end unit in Red Alarm.)
	GREEN	Normal Operation.
	FLASHING GREEN	Network T1 in Test.

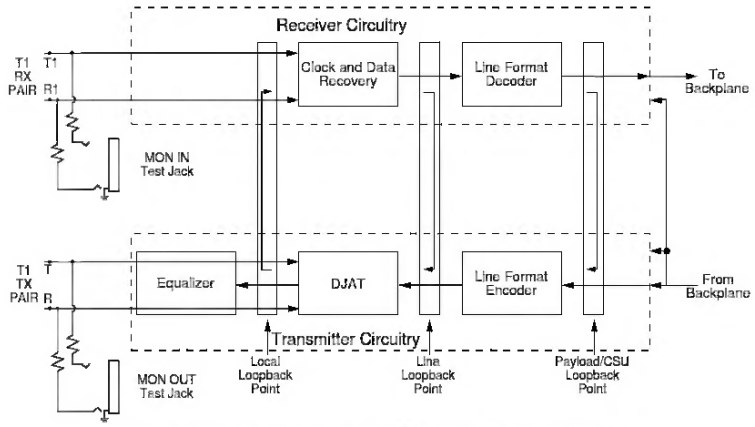

Figure 2. Bantam Jack Monitoring Points

Table 3. DIP Switch S1 Options

Switch	Function	Description
S1-1	Framing Format	Enables either Extended Superframe Format (ESF) or Superframe Format (SF). This option must be configured identically with all other T1 network equipment on this circuit. On* SF Off ESF
S1-2	Line Code Format	Enables Bipolar Eight-Zero Substitution (B8ZS), which allows for Clear Channel operation for the T1 carrier system, or enables Alternate Mark Inversion (AMI). This option must be configured identically with all other T1 network equipment on this circuit. On* AMI Off B8ZS
S1-3	TR-08 Signaling	Enables TR-08 signaling option. When enabled, S1-1 is ignored. On* Enabled Off Disabled
S1-4	CSU Loopback	Enables the CSU Loopback Function. Unit will respond to CSU loopback sent from a remote network device or test equipment. Off* Enabled On Disabled
S1-5 S1-6	Timing Mode Timing A Timing B	Determines clock source for TA 850. S1-5 / S1-6 / Function Off / Off / Loop timing: Derives timing from T1 On / Off / External timing: Derives timing from external BITS clock. Off / On / Local timing: Clock generated from internal timing source. On* / On* / Loop timing: Derives timing from T1.
S1-7 S1-8	DS1 Attenuation LBO A LBO B	Selects attenuation to set receiver sensitivity in decibels (dB). S1-7 / S1-8 / Setting Off / Off / 0 dB/0-133 ft (LBO) On / Off / -7.5 dB Off / On / -15 dB On* / On* / -22.5 dB (Note: Additional LBO settings can be provisioned through the menu interface.)
*Denotes factory default setting.		

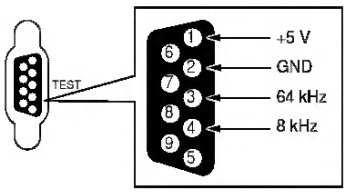

Figure 3. DB-9 Connector Pinout

DS0 test equipment is used to test DS0 access modules such as the OCU DP, DS0 DP, or U-BR1TE. Once the test equipment is connected to the reference clock source, individual tests can be performed on DS0 access modules using the faceplate bantam jacks on each unit.

T1 Loopbacks

The TA 850 supports several T1 loopbacks via the craft interface. These loopbacks include:

- Initiating a remote payload or line loopback command (ESF mode only).
- Responding to a remote payload or line loopback command (ESF mode only).
- Responding to a remote CSU loopback command.

Figure 2 on page 3 displays where the various loopbacks occur in the TA 850 BCU circuitry.

Self Test

The BCU goes into self test when inserted into an active TA 850 chassis. The self test checks internal BCU circuitry. A failed test causes the faceplate Network T1 LED to blink red.

5. SPECIFICATIONS

Refer to **Table 4** for TA 850 BCU specifications.

Table 4. Specifications

Mechanical	
Dimensions	1 11/16" W x 3" H x 10" L
Weight	1 lb
Environmental	
Operating Temperature	-40 to 65 °C
Storage Temperature	-40 to 85 °C
Relative Humidity	Up to 95%, noncondensing
Configuration Codes	
Power Code (PC)	IN: F, OUT: C
Telecommunication Code (TC)	IN: X, OUT: X
Installation Code (IC)	IN: A, OUT: -

6. MAINTENANCE

The TA 850 BCU does not require routine maintenance for design operation.

ADTRAN does not recommend that repairs be attempted in the field. Repair services are obtained by returning the defective unit to ADTRAN Customer Service department.

Flash Upload

The TA 850 BCU can flash upload firmware to the unit using the front panel VT 100 craft interface. Flash upload is useful for product upgrade or enhancements. Flash upload procedures are as follows:

1. Obtain firmware, available by diskette or email, from ADTRAN Customer Service.
2. Connect to the craft interface port using instructions found in "OPTIONS" on page 2.
3. Once connected, enter the Bank Controller submenu and select **Upload Code**.
4. To upload code, select **Load new code** and follow the instructions on the screen. The user is offered the opportunity to increase the baud rate from 9600 to 19.2 K, 38.4 K, or 57.6 K. Be sure that your terminal device can support a higher speed before selecting. Also, some terminal emulation packages (such as Hyperterminal) require that the current session be disconnected and reconnected after changing from one baud rate to another.
5. Continue to follow the instructions on the screen, noting that the TA 850 BCU uses the XMODEM protocol to transfer code.
6. After successfully uploading code, the TA 850 Bank Controller will reset itself and resume operation.

7. WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within 10 years from the date of shipment if it does not meet its published specifications or fails while in service. For detailed warranty, repair, and return information refer to the ADTRAN Equipment Warranty and Repair and Return Policy Procedure.

Return Material Authorization (RMA) is required prior to returning equipment to ADTRAN.

For service, RMA requests, or more information, see the following sections for the correct toll-free contact number.

Product Support Information

Pre-Sales Inquiries and Applications Support. Please contact your local distributor, ADTRAN Applications Engineering, or ADTRAN Sales:

Applications Engineering	(800) 615-1176
Sales	(800) 827-0807

Post-Sale Support. Please contact your local distributor first. If your local distributor cannot help, please contact ADTRAN Technical Support and have the unit serial number available.

Technical Support	(888) 4ADTRAN

Repair and Return. If ADTRAN Technical Support determines that a repair is needed, Technical Support will coordinate with the Customer and Product Service (CAPS) department to issue an RMA number. For information regarding equipment currently in house or possible fees associated with repair, contact CAPS directly at the following number:

CAPS Department	(256) 963-8722

Identify the RMA number clearly on the package (below address), and return to the following address:

ADTRAN, Inc.
6767 Old Madison Pike
Progress Center
Building #6 Suite 690
Huntsville, Alabama 35807

RMA # _____

8. LIMITED PRODUCT WARRANTY

ADTRAN warrants that for ten years from the date of shipment to Customer, all products manufactured by ADTRAN will be free from defects in materials and workmanship. ADTRAN also warrants that products will conform to the applicable specifications and drawings for such products, as contained in the Product Manual or in ADTRAN's internal specifications and drawings for such products (which may or may not be reflected in the Product Manual). This warranty only applies if Customer gives ADTRAN written notice of defects during the warranty period. Upon such notice, ADTRAN will, at its option, either repair or replace the defective item. If ADTRAN is unable, in a reasonable time, to repair or replace any equipment to a condition as warranted, Customer is entitled to a full refund of the purchase price upon return of the equipment to ADTRAN.

This warranty applies only to the original purchaser and is not transferable without ADTRAN's express written permission. This warranty becomes null and void if Customer modifies or alters the equipment in any way, other than as specifically authorized by ADTRAN.

EXCEPT FOR THE LIMITED WARRANTY DESCRIBED ABOVE, THE FOREGOING CONSTITUTES THE SOLE AND EXCLUSIVE REMEDY OF THE CUSTOMER AND THE EXCLUSIVE LIABILITY OF ADTRAN AND IS IN LIEU OF ANY AND ALL OTHER WARRANTIES (EXPRESSED OR IMPLIED). ADTRAN SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, INCLUDING (WITHOUT LIMITATION), ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SOME STATES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO THIS EXCLUSION MAY NOT APPLY TO CUSTOMER.

In no event will ADTRAN or its suppliers be liable to Customer for any incidental, special, punitive, exemplary or consequential damages experienced by either Customer or a third party (including, but not limited to, loss of data or information, loss of profits, or loss of use). ADTRAN is not liable for damages for any cause whatsoever (whether based in contract, tort, or otherwise) in excess of the amount paid for the item. Some states do not allow the limitation or exclusion of liability for incidental or consequential damages, so the above limitation or exclusion may not apply to Customer.

9. REGULATORY REQUIREMENTS

Affidavit Requirements for Connection to Digital Services

- An affidavit is required to be given to the telephone company whenever digital terminal equipment without encoded analog content and billing protection is used to transmit digital signals containing encoded analog content which are intended for eventual conversion into voiceband analog signals and transmitted on the network.
- The affidavit shall affirm that either no encoded analog content or billing information is being transmitted or that the output of the device meets Part 68 encoded analog content or billing protection specifications.
- End user/customer will be responsible for filing an affidavit with the local exchange carrier when connecting unprotected customer premise equipment (CPE) to 1.544 Mbps or subrate digital services.
- Until such time as subrate digital terminal equipment is registered for voice applications, the affidavit requirement for subrate services is waived.

Affidavit for Connection of Customer Premises Equipment to 1.544 Mbps and/or Subrate Digital Services

For the work to be performed in the certified territory of _____(telco name)

State of _____

County of _____

I, _____ (name), _____(business address),

_____ (telephone number) being duly sworn, state:

I have responsibility for the operation and maintenance of the terminal equipment to be connected to 1.544 Mbps and/or _____ subrate digital services. The terminal equipment to be connected complies with Part 68 of the FCC rules except for the encoded analog content and billing protection specifications. With respect to encoded analog content and billing protection:

( ) I attest that all operations associated with the establishment, maintenance, and adjustment of the digital CPE with respect to analog content and encoded billing protection information continuously complies with Part 68 of the FCC Rules and Regulations.

( ) The digital CPE does not transmit digital signals containing encoded analog content or billing information which is intended to be decoded within the telecommunications network.

( ) The encoded analog content and billing protection is factory set and is not under the control of the customer.

I attest that the operator(s)/maintainer(s) of the digital CPE responsible for the establishment, maintenance, and adjustment of the encoded analog content and billing information has (have) been trained to perform these functions by successfully having completed one of the following (check appropriate blocks):

( ) A. A training course provided by the manufacturer/grantee of the equipment used to encode analog signals; or

( ) B. A training course provided by the customer or authorized representative, using training materials and instructions provided by the manufacturer/grantee of the equipment used to encode analog signals; or

( ) C. An independent training course (e.g., trade school or technical institution) recognized by the manufacturer/grantee of the equipment used to encode analog signals; or

( ) D. In lieu of the preceding training requirements, the operator(s)/maintainer(s) is (are) under the control of a supervisor trained in accordance with _____ (circle one) above.

I agree to provide _____ (telco's name) with proper documentation to demonstrate compliance with the information as provided in the preceding paragraph, if so requested.

_____Signature

_____Title

_____ Date

Transcribed and sworn to before me

This _____ day of _____, _____

_____

Notary Public

My commission expires:

_____

FCC regulations require that the following information be provided in this manual to the customer:

1. This equipment complies with Part 68 of the FCC rules. The required label is affixed to the bottom of the chassis.
2. An FCC-compliant telephone cord and modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack which is Part 68-compliant. See Chapter 2, Installation, for details.
3. If your telephone equipment (TA 850) causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice isn't practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.
4. Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your equipment. If they do, you will be given advance notice to give you an opportunity to maintain uninterrupted service.
5. If you experience trouble with this equipment (TA 850), please contact ADTRAN at (256) 963-8000 for repair/warranty information. The telephone company may ask you to disconnect this equipment from the network until the problem has been corrected or until you are sure the equipment is not malfunctioning.
6. This unit contains no user-serviceable parts.
7. The following information may be required when applying to your local telephone company for leased line facilities.

For a T1 Port:

Service Type	REN/ SOC	FIC	USOC
1.544 Mbps - SF	6.0N	04DU9-BN	RJ-48C
1.544 Mbps - SF and B8ZS	6.0N	04DU9-DN	RJ-48C
1.544 Mbps - ESF	6.0N	04DU9-1KN	RJ-48C
1.544 Mbps - ESF and B8ZS	6.0N	04DU9-1SN	RJ-48C
ISDN	6.0N	04DU9-ISN	RJ-48C

For an FT1 Port:

Service Type	REN/ SOC	FIC
1.544 Mbps - SF	6.0N	04DU9-BN
1.544 Mbps - SF and B8ZS	6.0N	04DU9-DN
1.544 Mbps - ESF	6.0N	04DU9-1KN
1.544 Mbps - ESF and B8ZS	6.0N	04DU9-1SN
ISDN	6.0N	04DU9-ISN

NOTE

When connecting FT1 port towards the network, a suitable crossover cable is required.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio frequencies. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Shielded cables must be used with this unit to ensure compliance with Class A FCC limits.

WARNING

Change or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Canadian Equipment Limitations

NOTE

The Industry Canada Certification label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Department of Commerce does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic waterpipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or an electrician, as appropriate.

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the equipment that the total of the LNs of all devices does not exceed 100.

The ringer equivalence number (REN) assigned to each terminal adapter is used to determine the total number of devices that may be connected to each circuit. The sum of the RENs from all devices in the circuit should not exceed a total of 5.0.