Soneplex®
Remote Test Access Unit (RTAU)
User Manual

INTRODUCTION

This manual describes and provides installation procedures for the Remote Test Access Unit (RTAU) module used in the Soneplex Broadband System (MPU V5.3 and SCU V3.0 or later).

Revision History

ISSUE	DATE	REASON FOR CHANGE
Issue 1	06/1999	Original
Issue 2	04/2000	Add DS3 MUX compatibility and SCU 3.0 or later support.
Issue 3	09/2004	Technically updated **2. Installation**, **3. LED Check**, and **8. Customer Information and Assistance** sections.

Trademark Information

ADC and ADC Telecommunications are registered trademarks of ADC Telecommunications, Inc.

Soneplex is a registered trademark of ADC Telecommunications, Inc.

Related Publications

Listed below are related manuals and their publication numbers. Copies of these publications can be ordered by contacting the ADC Technical Assistance Center at 1-800-366-3891.

Title	ADCP Number
Soneplex Broadband System Description, Design, and Application Manual (V5)	ADCP-61-472
Soneplex Broadband System Operation and Maintenance Manual (V5)	ADCP-61-471
Soneplex DS3 MUX Module Installation Instructions	ADCP-61-742
Soneplex System Installation Manual	LTPS-UM-8010
Soneplex Shelf Controller Unit (V4.1) User Manual	LTPS-UM-8031

Admonishments

Important safety admonishments are used throughout this manual to warn of possible hazards to persons or equipment. An admonishment identifies a possible hazard and then explains what may happen if the hazard is not avoided. The admonishments — in the form of Dangers, Warnings, and Cautions — must be followed at all times. These warnings are flagged by use of the triangular alert icon (seen below), and are listed in descending order of severity of injury or damage and likelihood of occurrence.

⚠ **Danger**: *Danger is used to indicate the presence of a hazard that **will** cause severe personal injury, death, or substantial property damage if the hazard is not avoided.*

⚠ **Warning**: *Warning is used to indicate the presence of a hazard that **can** cause severe personal injury, death, or substantial property damage if the hazard is not avoided.*

⚠ **Caution**: *Caution is used to indicate the presence of a hazard that **will** or **can** cause minor personal injury or property damage if the hazard is not avoided.*

General Safety Precautions

⚠ **Caution:** *Electronic modules can be damaged by electrostatic discharge (ESD). Before handling modules, wear an anti-static discharge wrist strap to prevent damage to electronic components. Place modules in anti-static packing material when transporting or storing. When working on modules, always place them on an approved anti-static mat that is electrically grounded.*

FCC Compliance Statement

The Remote Test Access Unit has been certified to comply with the requirements for Class A computing devices per part 15 of the FCC regulations.

⚠ **Warning:** *This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with limits for a Class A digital device pursuant to Subpart A of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference to TV and radio reception in which case the user, at their own expense, will be required to take whatever measures may be required to correct the interference.*

This equipment does not exceed Class A limits for radio emission for digital apparatus, set out in the radio interference regulation of the authorization methods of Industry Canada. Operation in a residential area may cause unacceptable interference to TV and radio reception requiring the owner or operator to take whatever steps are necessary to correct the interference.

Certification

The Soneplex Broadband system is compliant with UL 1459.

Standards

ANSI T1.403-1997	Carrier to Customer Installation: DS1 Metallic Interface, 1997
TR-NPL-000054	High-Capacity Digital Service (1.544 Mbps) Interface General Requirements for End Users, Issue 1, April 1989

1   DESCRIPTION

The Remote Test Access Unit (RTAU) (Figure 1) provides maintenance functionality for monitoring and intrusive test access to the DS1 channels in the chassis between the DS3 MUX and the low speed distribution modules (DLX, HLXC, ODS2, and RLX). The RTAU requires no periodic maintenance. It requires the Version D1 or later DS3 MUX module and MPU Version 5.3 or SCU Version 3.0 or later system software to be functional in the Soneplex Broadband System for DS3 applications. If an earlier version of MPU software is used, the RTAU will appear as a blank slot on the Craft Interface's Inventory Status screen. Earlier versions of the SCU software will not display the TAU slot.

The RTAU has the following features:

- Access supervision for intrusive testing (i.e., monitor access, split access for both A and B transmission paths, and loop access for both A and B transmission paths).

- Stress testing of any circuit within the system via the Internal Test Signal Generation feature. Many DS1 networks are tested by passing repeating sequences (patterns) of logical ones and zeros through the network, also known as stress test patterns. As the test patterns are applied to the circuit, they are compared with the original pattern to determine if any errors are introduced. QRS (Quasi Random Signal) is one of the test patterns supported. (QRS conforms to TR-NPL-000054.)

- Capable of inserting bit errors at a specified rate or as single errors or burst errors to the DS1 circuit being tested.

- Ability to monitor (intrusively or non-intrusively) the DS1 circuit being tested.

- User control through the Craft Interface or via the TL1 interface.

- Access to the DS1 through front panel bantam jacks or through the internal test signal generator. This control is configurable through the Craft Interface.

- Supports the Building Integrated Timing Supply (BITS) primary interface through the wire wrap pins on the back of the Soneplex Broadband chassis. If a valid BITS signal is applied to the Broadband chassis, the RTAU will automatically switch over to the BITS primary interface and use the recovered clock for timing.

▶ **Note:** The BITS secondary interface on the Soneplex Broadband chassis is not supported by the RTAU.

11897-A
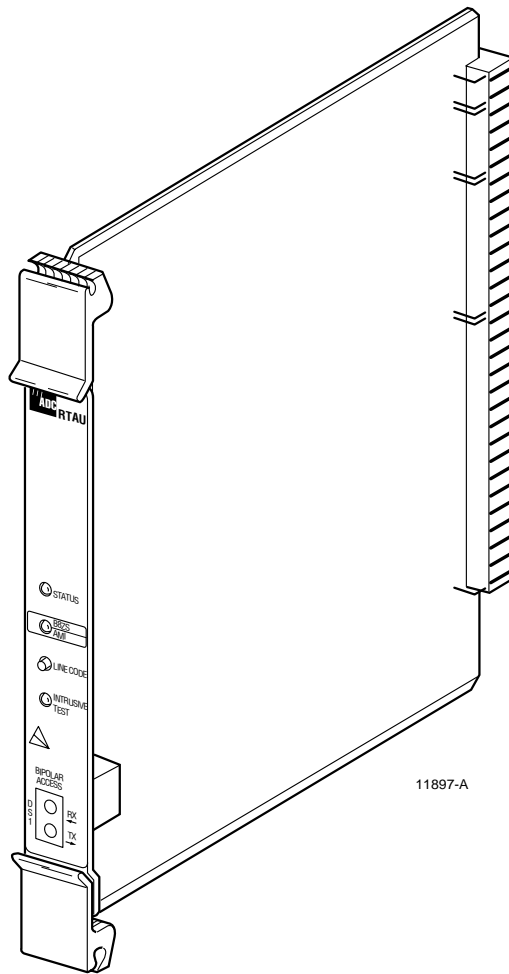
Figure 1. Remote Test Access Unit (RTAU) Module

© 2004, ADC Telecommunications, Inc.

1.1 DS3 MUX Compatibility

Refer to Table 1 for compatibility information for DS3 MUXs, test access units, and MPU/SCU software versions.

Table 1. DS3 MUX, TAU/RTAU, and MPU/SCU Software Compatibility

DS3 MUX TYPE	TEST ACCESS UNIT TYPE	MPU SOFTWARE VERSION	SCU SOFTWARE VERSION	FUNCTIONALITY
C1	TAU	5.1.1 or later	2.5 or later	TAU
C1	RTAU	5.1.1 or later	2.0 or later	NO TEST ACCESS
D1	TAU	5.1.1 or later	2.5 or later	TAU
D1	RTAU	5.2 or earlier	2.5 or earlier	NO TEST ACCESS
D1	RTAU	5.3	3.0 or later	RTAU
G1	TAU	5.1.1 or later	2.5 or later	TAU
G1	RTAU	5.2 or earlier	2.5 or earlier	NO TEST ACCESS
G1	RTAU	5.3	3.0 or later	RTAU

Refer to the Soneplex System Operation and Maintenance Manual listed under Related Publications at the beginning of this manual for more information.

2 INSTALLATION

There are two installation procedures:

- **Initial Installation** - This installation procedure applies to the first time an IBBC shelf will be populated with a RTAU module.

- **Maintenance Installation (Existing System)** - This installation procedure applies to an IBBC shelf that has already been populated with a RTAU module.

Please follow the appropriate procedure per your system configuration.

2.1 Initial Installation

This installation procedure applies to the first time an IBBC shelf will be populated with a RTAU module. If the IBBC shelf has already been populated with a RTAU module, go to 2.2. Maintenance Installation (Existing System).

Installation consists of unpacking and installing the RTAU module, and verifying that it is functioning properly. Use the following procedure to install a RTAU module:

⚠️ **Caution:** *Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an anti-static discharge wrist strap to prevent damage to electronic components. Place modules in anti-static packing material when transporting or storing. When working on modules, always place them on an approved anti-static mat that is electrically grounded.*

⚠️ **Warning:** If the RTAU module is improperly installed, damage can be caused to the system. Be careful when inserting the RTAU module into a new chassis.

Caution must be used to prevent bending pins when inserting modules into a new IBBC shelf. Once a module has been successfully seated in the connector, it "trains" the pins and aligns them to the modules connector greatly reducing the chances of bending pins on subsequent insertions. The following procedure outlines a method to mitigate the risk on a new shelf installation.

1. Open the front cover of the Soneplex Broadband system.

2. Open the shipping carton and carefully unpack the RTAU module from its protective packing material.

3. Once the Soneplex shelf has been installed and powered up:

   a. Remove both-48V A and B side fuses (and "pilot" fuses if used).

   b. Inspect the RTAU slots for bent or misaligned pins.

   c. If pins are not bent, continue to the next step. If pins are bent, refer to **2.1.1 Damaged Pins** section.

4. With shelf unpowered, refer to the chassis marking above the module slot (Figure 2) to install the RTAU module in the full-height slot labeled TAU.
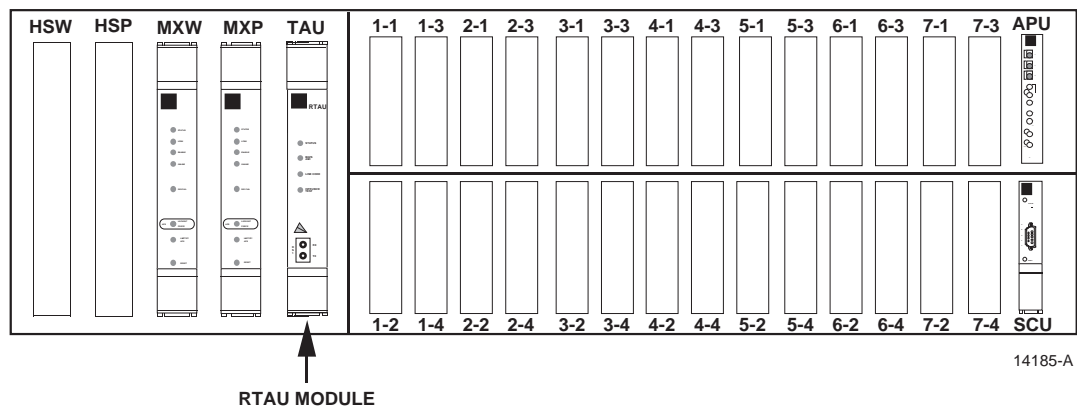
Figure 2. RTAU Mounting Position in the Soneplex Broadband

5. Align the module edges of the RTAU with the mounting slot module guides. Use the injectors to seat the module in the chassis.

6. Remove the RTAU module.

7. Inspect the backplane connector for bent pins.

8. If pins are not bent, continue to the next step. If pins are bent, refer to **2.1.1 Damaged Pins** section.

9. Re-install the RTAU module.

10. With the RTAU module installed, power up the shelf one fuse at a time.

    a. Install the -48V A fuse.

    b. Install the -48V B fuse.

    Refer to **8. Customer Information and Assistance**, if needed.

2.1.1   Damaged Pins

The pins used in the back plane connector should not be straightened after they have been deflected more than 10 degrees from vertical as they will "work harden" and break at the bend. Bent pins must be removed and replaced using special tools and is not recommended as a field repair. Remove shelf with damaged pins and contact ADC for replacement. Refer to **8. Customer Information and Assistance**.

2.2 Maintenance Installation (Existing System)

Replacement of the RTAU module in existing IBBC shelves should follow normal maintenance procedures. Since a module has already been in service in the affected slot, the backplane pins will have been trained into alignment with subsequent replacement modules. If excessive resistance is encountered upon insertion, remove the module and inspect for misalignment or obstructions.

This procedure assumes that the IBBC shelf has already been populated with a RTAU module. If this is the first time that the IBBC shelf has been populated with a RTAU module, go to 2.1 Initial Installation.

Installation consists of unpacking and installing the RTAU module, and verifying that it is functioning properly. Use this procedure to install a RTAU module.

Warning: *To prevent electrical shock, never install equipment in a wet location or during a lightning storm. When installing or modifying telephone lines, disconnect lines at the network interface before working with uninsulated lines or terminals.*

Caution: *Electronic modules can be damaged by electrostatic discharge (ESD). Before handling modules, wear an anti-static discharge wrist strap to prevent damage to electronic components. Place modules in anti-static packing material when transporting or storing. When working on modules, always place them on an approved anti-static mat that is electrically grounded.*

1. Open the front cover of the Soneplex Broadband (V5) chassis.

2. Open the shipping carton and carefully unpack the RTAU module from its protective packing material. Inspect the module for damage

3. Refer to chassis markings above the module slot (Figure 2) to install the RTAU module in the full-height slot marked TAU.

4. Align the module edges of the RTAU with the mounting slot module guides. Use the injectors to seat the module in the chassis. If there is excessive resistance, remove the module and check for obstructions or improper alignment.

3 LED CHECK

1. When the RTAU module (Figure 3) is seated, the STATUS LED will be lit red for approximately 5 seconds. All LEDs will then flash yellow, and then the STATUS LED will be lit green. If the STATUS LED is not lit green after 10 seconds, replace the module. Refer to **2.2 Maintenance Installation (Existing System)**.

12693-B
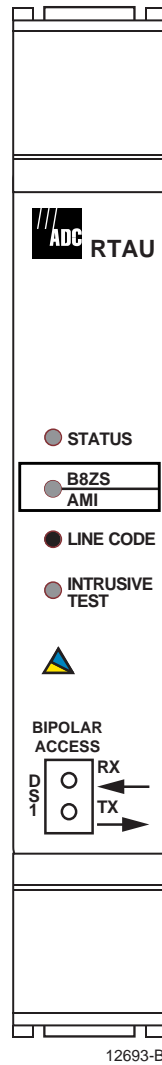
Figure 3. RTAU Front Panel

4   FRONT PANEL OPERATION

All controls and indicators of the RTAU including the jack accesses for a selected DS1 signal are located on the front panel (Figure 3). The controls and indicators are described in Table 2.

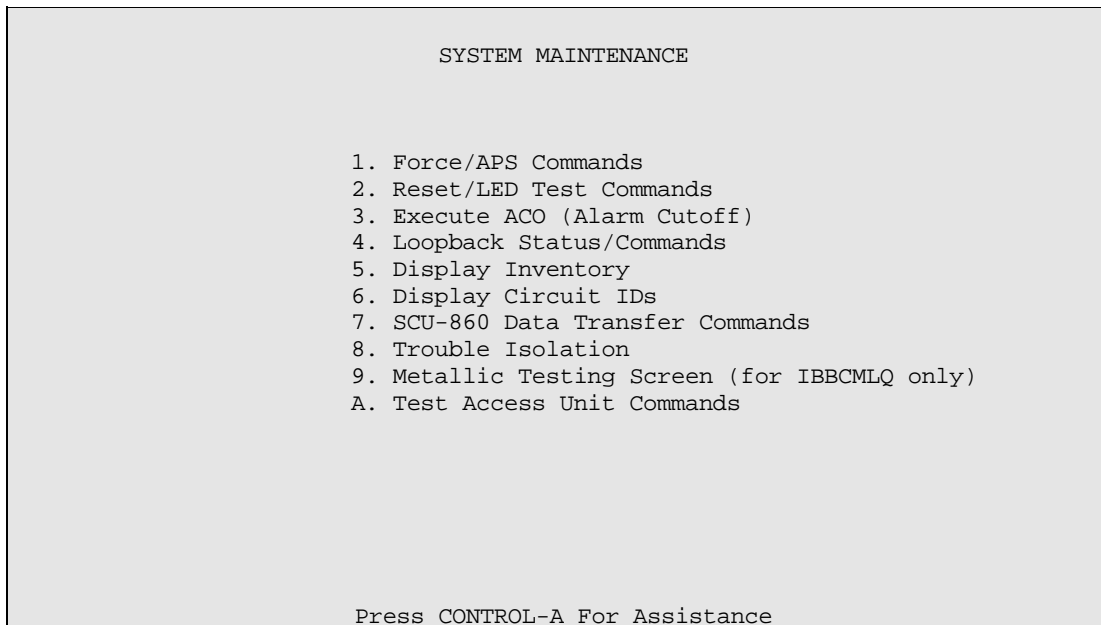**Table 2. RTAU Front Panel Description**

INDICATOR	COLOR	DESCRIPTION
STATUS	Red	Module failure.
	Yellow	LED test.
	Green	Module operating normally.
B8ZS / AMI	Green	Indicates that the user has selected B8ZS line code for the bipolar interface.
	Yellow	Indicates that the user has selected AMI line code for the bipolar interface.
	Off	Indicates that the user has selected the internal signal monitor generator at the RTAU.
Intrusive Test	Yellow	LED test.
	Green	Indicates that the selected test mode of the RTAU is intrusive.
	Off	No intrusive testing in progress.

SWITCH	DESCRIPTION	
LINE CODE	This is a pushbutton switch that toggles the DS1 interface between B8ZS, AMI, or the internal signal monitor generator at the RTAU. When B8ZS has been selected, the B8ZS/AMI LED will turn green; when AMI has been selected, the B8ZS/AMI LED will turn yellow; when the internal signal monitor generator at the RTAU is selected, the B8ZS/AMI LED will turn off. Using this switch overrides the Craft Interface RTAU Line Code field setting.	

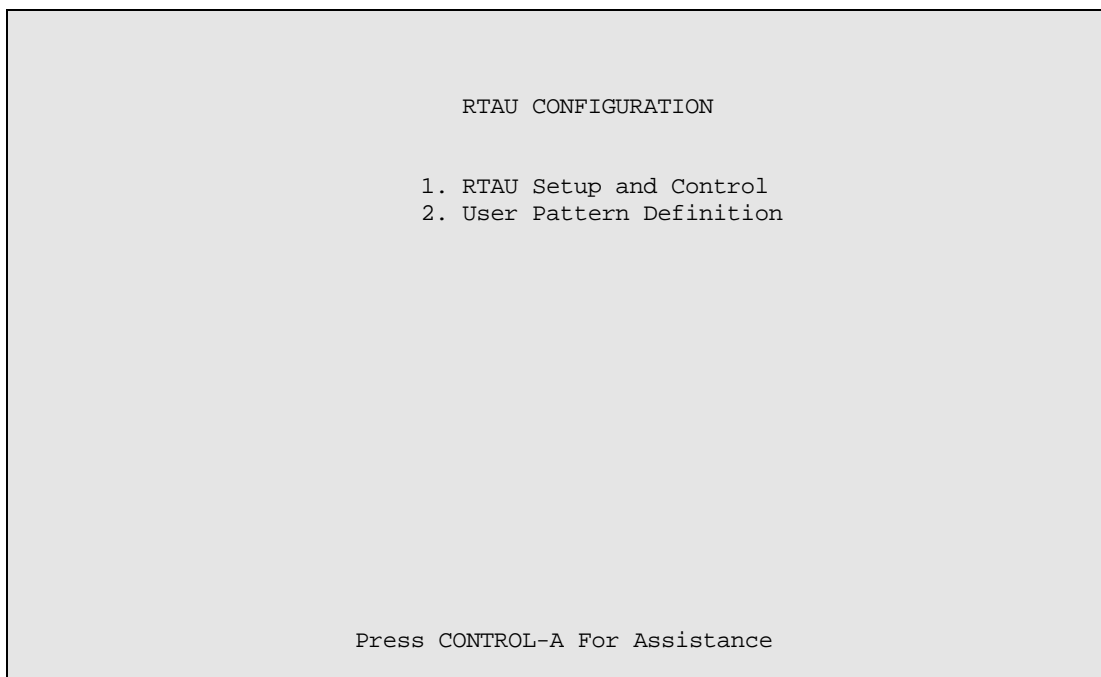| BIPOLAR ACCESS JACKS	DESCRIPTION	
DS1 RX	Bantam jack connection from DS1 receive to test equipment. Bipolar DS1 signals from external test equipment can be applied to the RX jack for testing.	
DS1 TX	Bantam jack connection from DS1 transmit to test equipment. Bipolar DS1 signals from external test equipment can be applied to the TX jack for testing.	
	Note: The DS1 RX and DS1 TX jacks may be used with 22 AWG Plastic Insulated Cable (PIC) up to 655 feet in length. Access for drop or insert of DS1 signals towards the network (DS3 interface) or toward the customer (DS1 distribution modules) for monitoring and intrusive testing is configured through the Craft Interface or the TL1 interface.	

5   CONFIGURATION

Use this menu to view or edit the configuration for the RTAU module after it is installed in the chassis. This menu can also be used to equip, provision, assign thresholds, and assign service state.

▶ **Note:** A "toggle" field type means the user can press the space bar to view and select the next option that is described; or the user can press the "R" key to view and select the previous option. An "input" field type means the user must type an entry in the field according to the parameters described. A "fixed" field is locked and cannot be changed by the user.

▶ **Note:** Edits can be **made** in the configuration database in one of two ways: 1) If the complete field is highlighted, use the space bar to toggle forward or the "R" key to reverse toggle through the options for that field. 2) If only the first space or the field is highlighted, type in the data that applies to that field.

▶ **Note:** Edits can be **saved** into the configuration database after each change is made in one of two ways: 1) Press an arrow key and then Enter or Return **once**; or 2) Press Enter or Return **twice** after all selections and entries are made in the screen but before leaving the screen. If the entries have been accepted, a message "Configuration Successful… Press Any Key To Continue" will appear on the screen.

▶ **Note:** Press CONTROL-A for help information on moving around and editing fields.

▶ **Note:** The RTAU's status can also be displayed using the Shelf Status screen, where the letter "R" in the TAU slot column means an RTAU is present. Refer to the Soneplex System Operation and Maintenance Manual listed under Related Publications at the beginning of this manual for more information on the Shelf Status screen.

▶ **Note:** Be sure to configure the line card to be tested before setting up test access.

1. Refer to Figure 3 (shown previously). Check that the STATUS LED on the front panel of the RTAU module is green, indicating that the module is operating normally.

2. Log on to the Craft Interface. If you are unfamiliar with the log on procedure, refer to the Soneplex System Operation and Maintenance Manual listed under Related Publications at the beginning of this manual for more information.

3. Use the arrow or number keys to select System Maintenance from the Main Menu. Press Enter or Return. The System Maintenance menu will appear as shown in Figure 4.

4. Use the arrow or keyboard keys to select Test Access Unit Commands from the System Maintenance menu. Press Enter or Return. The RTAU Configuration menu will appear as shown in Figure 5.

▶ **Note:** The User Pattern Definition screen is not available for the MPU 5.3 or SCU V3.0 releases.

5. Use the arrow or number keys to select RTAU Setup and Control from the RTAU Configuration menu. Press Enter or Return. The RTAU Setup and Control screen will appear as shown in Figure 6.

▶ **Note:** If the RTAU is not plugged into the chassis and the Test Access Unit Commands selection is made from the System Maintenance menu, the Test Access Unit Status/Commands screen will appear as shown in Figure 7. This screen cannot be configured. However, if the **TAU** is plugged into the chassis and the Test Access Unit Commands selection is made from the System Maintenance menu, the Test Access Unit Status/Commands screen will appear and **can** be configured.

```
                        SYSTEM MAINTENANCE



            1. Force/APS Commands
            2. Reset/LED Test Commands
            3. Execute ACO (Alarm Cutoff)
            4. Loopback Status/Commands
            5. Display Inventory
            6. Display Circuit IDs
            7. SCU-860 Data Transfer Commands
            8. Trouble Isolation
            9. Metallic Testing Screen (for IBBCMLQ only)
            A. Test Access Unit Commands




            Press CONTROL-A For Assistance
```

Figure 4. System Maintenance Menu

```
             RTAU CONFIGURATION


            1. RTAU Setup and Control
            2. User Pattern Definition










            Press CONTROL-A For Assistance
```

Figure 5. RTAU Configuration Menu

6. Starting at the top of Table 3 and working your way to the bottom, configure RTAU fields. Use the arrow keys to move from field to field.

7. Assign the selections by pressing Enter or Return.

```
                    RTAU SETUP AND CONTROL


EQUIPMENT SETUP
===============
Current User : NONE                          Test Circuit: 1-1
Line Code    : INTERNAL                       Mode        : DISABLE


SIGNAL GENERATOR SETUP
======================
Pattern Type : QRS        #:    -------------------------------
Frame Format : UNFRAMED
Loop Code    : NONE                    #:    ----------------


BIT ERROR SETUP        Error Counts        Status        Elapsed Time
===============        ============        ======        ============
Error Count  : 0       Data :             F Sync:        ES :
Error Rate   : OFF     BPV  :             P Sync:        EFS:
Error Locn   : NONE    Frame:             RAI   :
                       CRC  :
                       COFA :


Test Timeout : 60      Measurement  : STOP
In Minutes
                    Press CONTROL-A For Assistance
```

Figure 6. RTAU Setup and Control Screen
(Showing Defaults for Screen With Line Code Field Set to INTERNAL)

```
                 TEST ACCESS UNIT STATUS/COMMANDS


                 Group: 1          DS1#: 1


              Drop Direction    Insert Direction
              ==============    ================
        Status  :

        Command :



                     TAU Present Status: NO









                 Press Control-A For Assistance
```

Figure 7. Test Access Unit Status/Commands Screen
(If there is a TAU in the chassis, the TAU Present Status: displays YES)

Table 3. RTAU Configuration Fields

FIELD	TYPE	OPTIONS	DESCRIPTION	DEFAULT
EQUIPMENT SETUP FIELDS				
Current User	Toggle		OVERVIEW: The Current User field can only be set to NONE or CRAFT from the Craft menu. If the Current User field is set to NONE, the Mode field is automatically set to DISABLE. However, to change this field to CRAFT, the Mode field must first be set to an option other than DISABLE. At that point, the Current User field is automatically set to CRAFT.	NONE
		NONE	The RTAU is not being used.	
		CRAFT	The RTAU is being controlled via the Craft.	
		TL1	The RTAU is being controlled via the TL1 interface. This option cannot be enabled from the Craft menu. When a "Connect Test Access T1" command is issued, the Current User field is automatically set to TL1.	
		EM	The RTAU is being controlled via the Element Manager.	
Line Code	Toggle		OVERVIEW: If external test equipment is being used, set the Line Code field to either AMI or B8ZS. (External test equipment required: T-Berd 211 DS1 test set or equivalent that can generate a T1 signal.) If the internal signal monitor and signal generator of the RTAU is being used, set the line code to INTERNAL. In addition, when an intrusive test mode is selected and the line code is set to INTERNAL, the signal generator "Pattern Type" field defaults to QRS to transmit an unframed QRSS signal.	INTERNAL
		INTERNAL	Disables RTAU front panel bantam jacks for test access. Selects internal TSG and SPD.	
		B8ZS	Enables Bipolar Eight-Zero Substitution line code through the Craft Interface.	
		AMI	Enables Alternate Mark Inversion line code through the Craft Interface.	
Test Circuit	Input	1-1, 1-2, 1-3, 1-4, 2-1, 2-2, 2-3, 2-4, 3-1, 3-2, 3-3, 3-4, 4-1, 4-2, 4-3, 4-4, 5-1, 5-2, 5-3, 5-4, 6-1, 6-2, 6-3, 6-4, 7-1, 7-2, 7-3, 7-4	Group and slot number to be dropped by the DS3 MUX. The Test Circuit option can only be changed if the value set in the Mode field is DISABLE.	1-1

(continued)

Table 3. RTAU Configuration Fields, continued

FIELD	TYPE	OPTIONS	DESCRIPTION	DEFAULT
EQUIPMENT SETUP FIELDS, continued				
Mode	Toggle		OVERVIEW: Valid access modes and the resulting configurations are shown in Figure 8 (RTAU Test Configuration Block Diagram), Figure 9 (MONF and MONE), Figure 10 (SPLTB and SLPTA), Figure 11 (Typical Round-Robin Test Configuration), Figure 12 (Typical End Test Configuration), Figure 13 (SPLTF and SLPTE), Figure 14 (Typical Point-to-Point Test Configuration), Figure 15 (SPLTFL and SPLTEL), and Figure 16 (LOOPF and LOOPE). In addition, when the Mode field change is saved by pressing the Enter or Return key, the MPU or SCU will instruct the DS3 MUX to drop and insert the selected circuit.	DISABLE
		DISABLE	When DISABLE is selected, no monitor or split access can take place. Setting the Mode field to DISABLE also stops any measurement in progress, as if the Measurement field (described below) had been set to STOP. The tested circuit will also be restored to normal operation.	
		MONE	Non-intrusive monitor access to the A pair.	
		MONF	Non-intrusive monitor access to the B pair.	
		SPLTA	SPLTA mode indicates a split in the A transmission path with a Test Signal Generator (TSG) connected in the F direction, and a Signal Presence Detector (SPD) connected to the signal from the E direction.	
		SPLTB	SPLTB mode indicates a split in the B transmission path with a TSG connected in the E direction and an SPD connected to the signal from the F direction.	
		SPLTE	SPLTE mode indicates a split in both the A and B transmission paths. An SPD is connected to the line incoming from the E direction and a TSG is connected to the line outgoing to the E direction. The line outgoing in the F direction is connected to a QRSS source and the line incoming from the E direction is terminated by the nominal characteristic impedance of the line.	
		SPLTF	SPLTF indicates a split in both the A and B transmission paths with a TSG connected to the line outgoing to the F direction and an SPD connected to the line incoming from the F direction. The line outgoing in the E direction is connected to a QRSS source and the line incoming from the E direction is terminated by the nominal characteristic impedance of the line.	

(continued)

Table 3. RTAU Configuration Fields, continued

FIELD	TYPE	OPTIONS	DESCRIPTION	DEFAULT
EQUIPMENT SETUP FIELDS, continued				
Mode, continued	Toggle	SPLTEL	SPLTEL indicates a split in both the A and B paths and connects an SPD to the line incoming from the E direction and a TSG to the line outgoing in the E direction similar to SPLTE mode. The signal in the F direction is looped back.	
		SPLTFL	SPLTFL indicates a split in both the A and B paths and connects an SPD to the line incoming from the F direction and a TSG to the line outgoing in the F direction similar to SPLTF mode. The signal in the E direction is looped back.	
		LOOPE	The LOOPE mode is a full split of both A and B transmissions paths. The incoming line in the E direction is connected to the SPD and this line is connected to the outgoing line in the E direction. The circuit will be looped in one direction. The outgoing line in the F direction (non-test direction) will be connected to a QRSS source and the line incoming from the F direction is terminated by the nominal characteristic impedance of the line.	
		LOOPF	The LOOPF mode is a full split of both A and B transmissions paths. The incoming line in the F direction is connected to the SPD and this line is connected to the outgoing line in the F direction. The circuit will be looped in one direction. The outgoing line in the E direction (non-test direction) will be connected to a QRSS source and the line incoming from the E direction is terminated by the nominal characteristic impedance of the line.	
SIGNAL GENERATOR SETUP FIELDS				
Pattern Type	Toggle		OVERVIEW: If the desired pattern type is not available, select the User Code option to enter a pattern 32 bits or less.	QRS
		QRS	Quasi-Random Signal. QRS (2^{20}-1) is a 1,048,575-bit sequence generated by a 20-stage shift register with feedback taken from the 17th and 20th stages. The non-inverted output is taken from the 20th stage, and an output bit is forced to be a '1' whenever the next 14 bits are all 0's. QRS is typically used to verify continuity and to check circuit performance in the presence of traffic-like signals. Quasi-random Signal (QRS) is a signal repeated every 1 to 24 bits as specified by the Operation System (OS) application. QRS must conform to the description in Bellcore TR-NPL-000054.	

(continued)

Table 3. RTAU Configuration Fields, continued

FIELD	TYPE	OPTIONS	DESCRIPTION	DEFAULT
SIGNAL GENERATOR SETUP FIELDS, CONTINUED				
Pattern Type, continued	Toggle	2^15-1	2^{15}-1 is a 32,767-bit, pseudo-random pattern that generates a maximum of 14 sequential 0's and 15 sequential 1's. The pattern provides a maximum number of 0's allowed for framed, non-B8ZS testing. The pattern does not meet the minimum 1's density requirement.	
		2^23-1	2^{23}-1 is a 8,388,607-bit, pseudo-random pattern that generates a maximum of 22 sequential 0's and 23 sequential 1's. The pattern exceeds excess 0's and does not meet the minimum 1's density requirements for T1 applications.	
		All Ones	Test of T1 span line. The all-1's pattern causes the span line repeater to consume the maximum amount of power. If the current powering the span line is low, transmission errors may occur due to the inter-symbol interference resulting from the inability of a weak repeater power supply to develop the energy necessary to support the transmission of a long sequence of 1's.	
		(Framed) All Zeros	Used as a final confirmation that all network elements in a circuit are properly optioned with B8ZS for clear channel operation. The framed all 0's pattern consisting of a frame bit followed by an all 0's payload will only be applied to circuit optioned with B8ZS for clear channel operation.	
		3 in 24	Used to determine the ability of network equipment to function properly when transporting signal sequences containing both a maximum of 15 consecutive 0's during periods of minimum overall pulse density. • Unframed = 1000 1000 1000 0000 0000 0000 1000 1000 • Framed = 0100 0100 0000 0000 0000 0100 0100 1000	
		2 in 8	Used in conjunction with the 1-in-8 pattern. Useful when performing test to reveal the presence of incorrectly-optioned AMI or B8ZS equipment. Use of the 2-in-8 pattern will confirm the circuits ability to support error-free transmission. • Unframed = 0100 0010 0100 0010 • Framed = 0100 0010 0100 0010	

(continued)

Table 3. RTAU Configuration Fields, continued

FIELD	TYPE	OPTIONS	DESCRIPTION	DEFAULT
SIGNAL GENERATOR SETUP FIELDS, continued				
Pattern Type, continued	Toggle	1 in 8	Containing strings of 7 sequential 0's. It is used to determine the ability of a circuit to handle payload signals having minimum 1's density. Use of this pattern often reveals the existence of timing recovery problem under conditions of low signal density. • Unframed = 1000 0000 1000 0000 • Framed = 0100 0000 0100 0000	
		Daly	Daly Pattern (Modified 55 Octet). This is useful for stressing the timing recovery circuits of line cards and the preamplifier/ equalizer circuits of repeaters. The pattern stresses a circuit by introducing rapid transitions from long sequences of low density octets to high density octets, high density octets to low density octets, and rapid transitions. The pattern may be transmitted framed or unframed. When framed, the frame bit shall be inserted at the octet boundaries and will not overwrite the bits.	
		User Code	For user-defined patterns of 32 bits or less, set the Pattern Type field to User Code. The bits can be entered by typing a string of 0's or 1's in the bit field located to the right of the designated entry.	
Pattern Bits	Display only	None	If the Pattern Type field is configured for User Code, pattern bits will be displayed to the right of the Pattern type field parameter. This field's name is not shown on the screen. If no User Code is entered in the Pattern Type field, this field displays 32 dashes.	None
Frame Format	Toggle	UNFRAMED	Unframed data pattern.	UNFRAMED
		Ft ONLY	Used for SLC framing.	
		SF	Super Frame	
		ESF	Extended Super Frame	

(continued)

Table 3. RTAU Configuration Fields, continued

| FIELD	TYPE	OPTIONS	DESCRIPTION	DEFAULT
SIGNAL GENERATOR SETUP FIELDS, continued				
Loop Code	Toggle		OVERVIEW: The Mode field must be set to a SPLT option before the Loop Code field can be configured. Loop codes will be transmitted until the RTAU detects a change in the signal being received. At that time, the pattern selected before the loop code was set will be transmitted. For example, when sending a Loop Up code, the RTAU will restore the original pattern after it receives the loop code it is transmitting, indicating that the circuit is looped up. Note that the Loop Code bits are displayed in the Loop Code bit field as each code is selected. This is provided as a convenience to the operator who may not know the name chosen for the loop code but does know the pattern.	NONE
		NONE	Disables any active loop code selected for this field. When NONE is selected, the Loop Code field displays 16 dashes.	
		Line Loop Up	10000	
		Line Loop Down	100	
		4-Bit Loop Up	1100	
		4-Bit Loop Down	1110	
		5-Bit Loop Up	11000	
		5-Bit Loop Down	11100	
		ESF CSU Loop Up	0EFF (0000 1110 1111 1111)	
		ESF CSU Loop Down	38FF (0011 1000 1111 1111)	
		ESF NI* Loop Up	12FF (0001 0010 1111 1111)	
		ESF NI* Loop Down	24FF (0010 0100 1111 1111)	
		ESF CSU Payload Loop Up	14FF (0001 0100 1111 1111)	
		ESF CSU Payload Loop Down	32FF (0011 0010 1111 1111)	
		User Loop Up (toggle and input)	Enter a 16-value expression using only 1's, 0's, or "-". The bits can be entered by typing a string of 0's or 1's in the bit field located to the right of the designated entry.	
		User Loop Down	Enter a 16-value expression using only 1's, 0's, or "-". The bits can be entered by typing a string of 0's or 1's in the bit field located to the right of the designated entry.	

*Note: "NI" means Network Interface device.

(continued)

Table 3. RTAU Configuration Fields, continued

FIELD	TYPE	OPTIONS	DESCRIPTION	DEFAULT
BIT ERROR SETUP FIELDS				
OVERVIEW: Bit errors can be injected by the RTAU using the Bit Error Set Up fields. These sections are display-only fields that are only displayed when the line code setting is INTERNAL. The Status field always shows the current status if the line code is INTERNAL, but the Error Counts and Elapsed Time fields only show a value when a measurement is being made.				
Error Count	Input	Range of 0 to 1544	Select either Error Count or Error Rate for bit error setup. Both cannot be set at the same time. If single errors or a burst of errors is desired, set the Error Count field to the number of errors to insert. If the Error Count field is set, the number of errors will be transmitted each time the Enter key is pressed.	0
Error Rate	Toggle	OFF, 1E-3, 1E-4, 1E-5, 1E-6, 1E-7	Select either Error Count or Error Rate for bit error setup. Both cannot be set at the same time. If a steady error rate is desired, set the Error Rate field which indicates the rate bit or frame errors are injected.	OFF
Error Locn	Toggle		OVERVIEW: The Error Location field must be set to either PAYLOAD or FBE if the count or rate field is set. Pressing the Enter or Return key will cause the RTAU to send the errors.	NONE
		NONE	Indicates count is 0 and rate is off.	
		PAYLOAD	Bit errors are injected.	
		FBE	Frame Bit Error. Frame errors are injected.	
Error Counts Data	Display only	None	Eight-digit counter or blank.	Blank
Error Counts BPV	Display only	None	Eight-digit counter or blank.	Blank
Error Counts Frame	Display only	None	Eight-digit counter or blank.	Blank
Error Counts CRC	Display only	None	Eight-digit counter or blank.	Blank
Error Counts COFA	Display only	None	Eight-digit counter or blank.	Blank
Status F Sync	Display only	None	* or blank	Blank
Status P Sync	Display only	None	* or blank	Blank
Status RAI	Display only	None	* or blank	Blank

Table 3. RTAU Configuration Fields, continued

FIELD	TYPE	OPTIONS	DESCRIPTION	DEFAULT
Elapsed Time ES	Display only	None	Six-digit counter or blank.	Blank
Elapsed Time EFS	Display only	None	Six-digit counter or blank.	Blank
Test Timeout in Minutes	Input	0 to 1440	Timeout counter for test access. If the counter is set to a number higher than "0" and then reaches "0" during test, the Mode field will be set to DISABLE automatically. If the counter is set to "0", the test timeout will be turned off, and the test will have unlimited time.	60
Measurement	Toggle and Display		OVERVIEW: Start a measurement by selecting START at the Measurement field. The RTAU will wait for pattern sync and frame sync for framed patterns before starting the measurement. After synchronizing, the measurement display will change to RUNNING. Stop any measurement by selecting STOP. Refer to Figure 17 for a RTAU configuration screen showing a test that is starting. **Note:** If the Mode is set to MONE, MONF, LOOPE, or LOOPF, only frame sync is required before starting the measurement. If the pattern is not in sync, then the Data Error Counts will read "N/A" until pattern sync is established.	STOP
		START	Initiate measurement.	
		STOP	Terminate measurement. **Note:** Setting the Mode field to DISABLE also stops any measurement in progress as if the Measurement field had been set to STOP.	
		RUNNING (display)	Measurement active.	
Waiting on Sync	Display only	None	This parameter is displayed to the right of the Measurement field when the Measurement field is set to START. The WAITING ON SYNC message is display-only; it only shows up when the RTAU is waiting for either frame or pattern sync. Examine the status section to determine what sync is needed.	Blank
Mode	Toggle	DISABLE	To end the test session, restore the tested circuit to normal operation by selecting DISABLE.	DISABLE
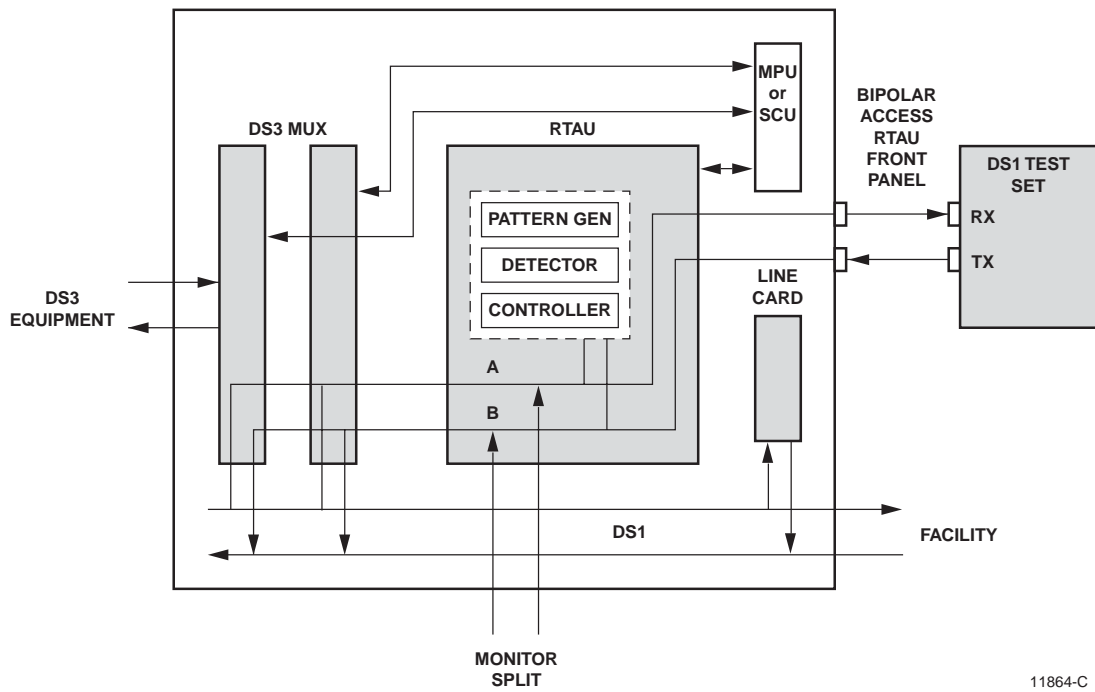
11864-C

Figure 8. RTAU Test Configuration Block Diagram
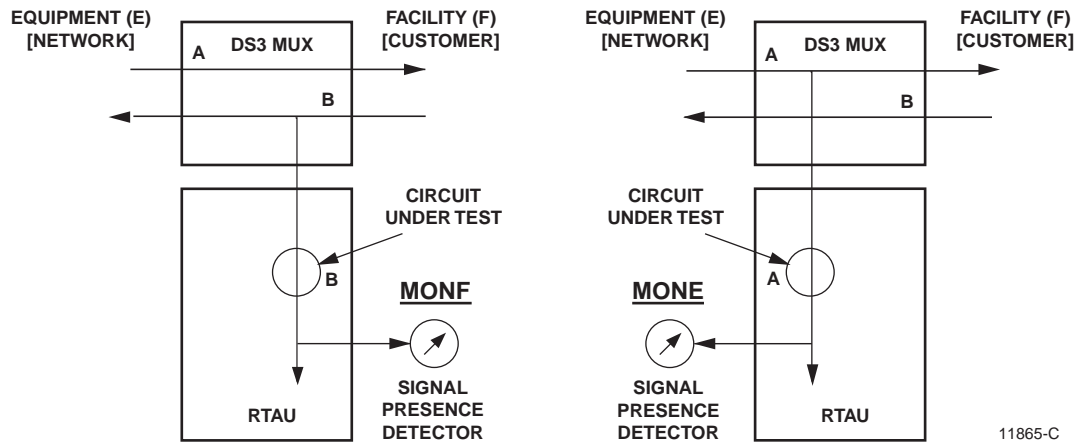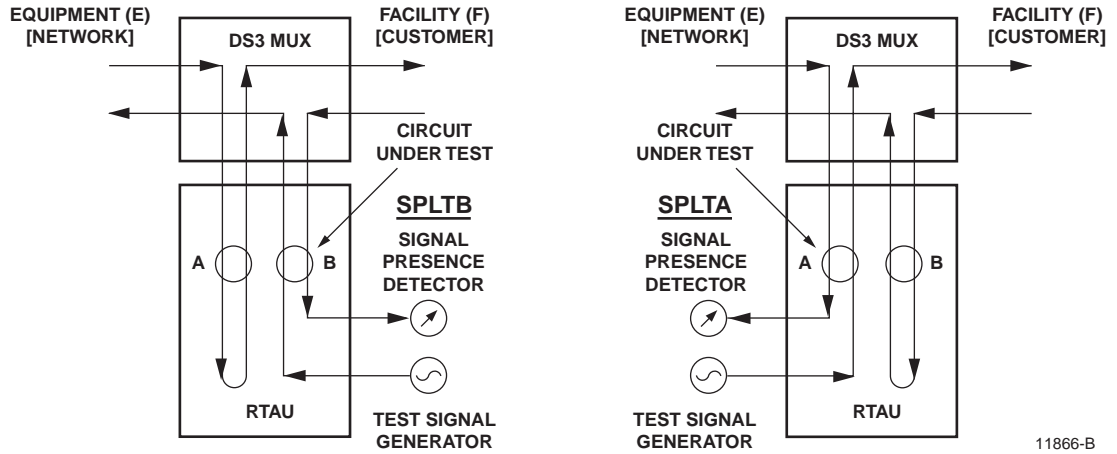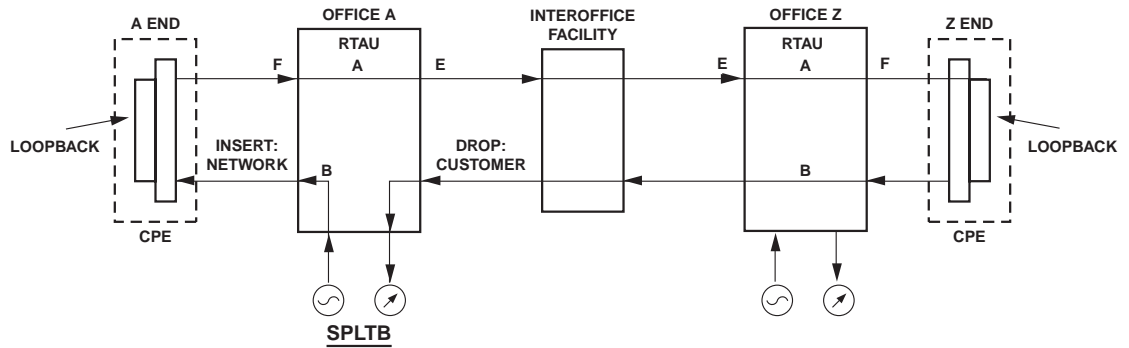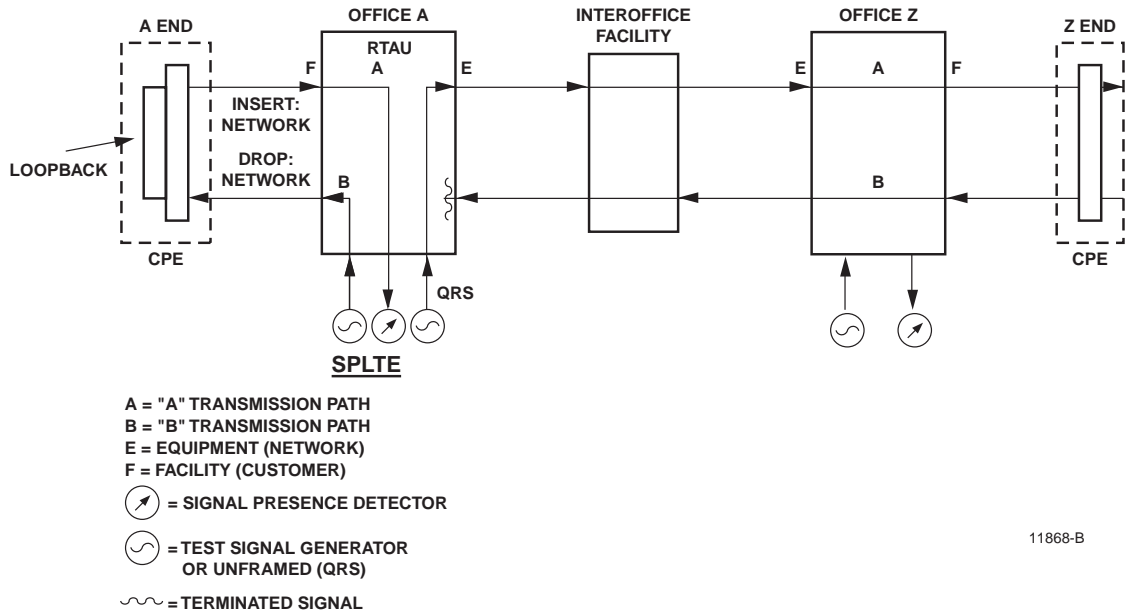

11865-C

Figure 9. MONF and MONE

Figure 10. SPLTB and SLPTA

A = "A" TRANSMISSION PATH
B = "B" TRANSMISSION PATH
E = EQUIPMENT (NETWORK)
F = FACILITY (CUSTOMER)

= SIGNAL PRESENCE DETECTOR

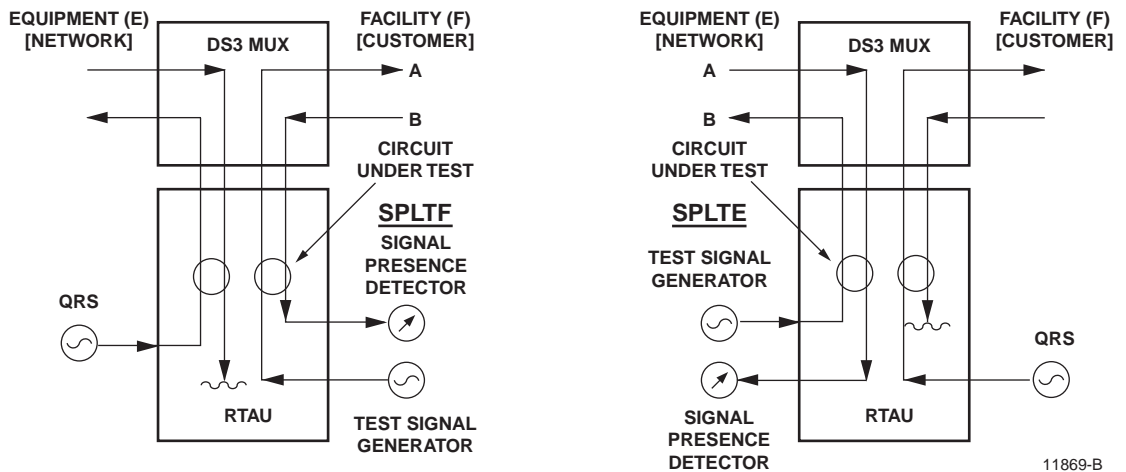= TEST SIGNAL GENERATOR
OR UNFRAMED (QRS)

Figure 11. Typical Round-Robin Test Configuration

A = "A" TRANSMISSION PATH
B = "B" TRANSMISSION PATH
E = EQUIPMENT (NETWORK)
F = FACILITY (CUSTOMER)

= SIGNAL PRESENCE DETECTOR

= TEST SIGNAL GENERATOR
  OR UNFRAMED (QRS)

= TERMINATED SIGNAL

11868-B

Figure 12. Typical End Test Configuration

11869-B

Figure 13. SPLTF and SLPTE

A = "A" TRANSMISSION PATH
B = "B" TRANSMISSION PATH
E = EQUIPMENT (NETWORK)
F = FACILITY (CUSTOMER)

= SIGNAL PRESENCE DETECTOR

= TEST SIGNAL GENERATOR
  OR UNFRAMED (QRS)

= TERMINATED SIGNAL
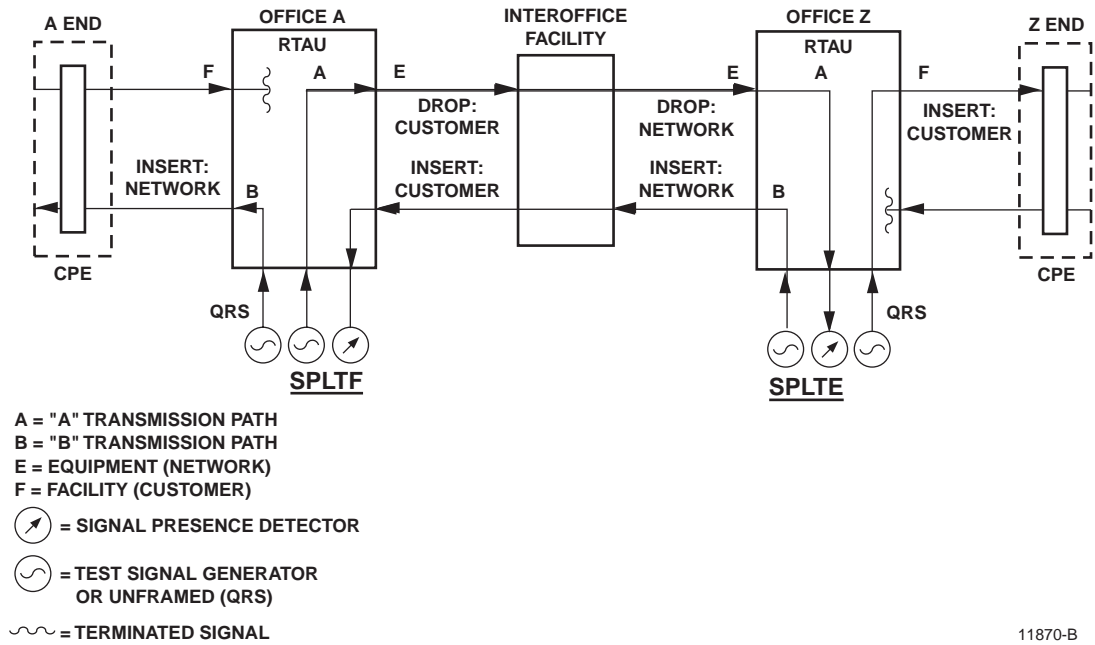
11870-B

Figure 14. Typical Point-to-Point Test Configuration
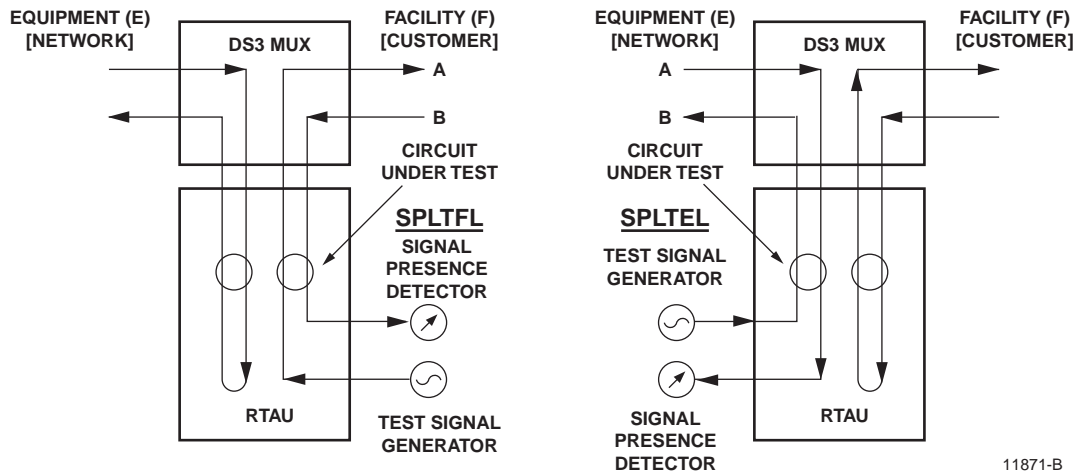
11871-B

Figure 15. SPLTFL and SPLTEL

© 2004, ADC Telecommunications, Inc.
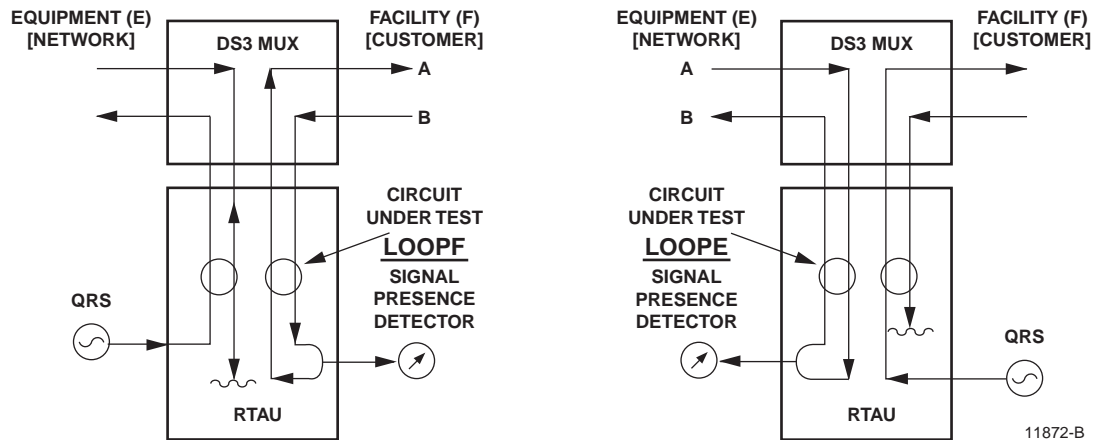
Figure 16. LOOPF and LOOPE

```
                    RTAU SETUP AND CONTROL


        EQUIPMENT SETUP
        ===============
        Current User : CRAFT                   Test Circuit: 1-2
        Line Code    : INTERNAL                Mode        : SPLTE

        SIGNAL GENERATOR SETUP
        ======================
        Pattern Type : QRS     #:     --------------------------------
        Frame Format : ESF
        Loop Code    : NONE                    #:     ----------------

        BIT ERROR SETUP       Error Counts      Status      Elapsed Time
        ===============       ===========       ======      ============
        Error Count  : 0      Data :            F Sync: *   ES :
        Error Rate   : OFF     BPV  :            P Sync: *   EFS:
        Error Locn   : N/A     Frame:            RAI   :
                              CRC:
                              COFA


        Test Timeout : 60     Measurement  : START   WAITING ON SYNC
        In Minutes
                          Press CONTROL-A For Assistance
```

Figure 17. RTAU Setup and Control Screen (Starting a Measurement)

6 TL1 COMMANDS

The TL1 commands shown in Table 4 that are used for the RTAU are defined in Bellcore requirement GR-000834-CORE. For more information about TL1 commands, refer to the Soneplex System Operation and Maintenance Manual listed under Related Publications at the beginning of this manual.

Table 4. TL1 Commands Used for the RTAU

COMMAND	DESCRIPTION
CHG-ACCMD-T1	Change Access Mode T1
CHG-LPBK-T1	Change Loopback T1
CHG-TSTSIG-T1	Change Test Signal T1
CONN-TACC-T1	Connect Test Access T1
DISC-MEAS	Disconnect Measurement
DISC-TACC	Disconnect Test Access Metallic/Digital
DISC-TSTSIG	Disconnect Test Signal
MEAS-SIG-T1	Measure Signal T1
REPT-RSLT	Report Result
TST-INSERRBITS	Test Insert Error Bits

7   SPECIFICATIONS

The technical specifications for the RTAU modules are given in Table 5.

Table 5. RTAU Specifications

PARAMETER	SPECIFICATION	REMARKS
Input Power		
Input Current (Max.)	175 mA at –48 Volts	
Input Current (Nominal)	100 mA at –48 Volts	
Input Voltage (Nominal)	–48 Vdc	
Input Voltage Range	–42 to –60 Vdc	
Power Consumption / Dissipation (Max.)	8.2 watts	
DS1 Jack Access		
Electrical Interface	Bipolar	
Termination	100 ohms nominal ± 5%	
Jack Type	Bantam	
Line Code	AMI or B8ZS	Controlled by front panel switch
Line Rate	1.544 Mbps ± 130 ppm max.	
Dimensions		
Height × Width × Depth	9.5 × 9.9 × 1.0 inches (24.1 × 25.1 × 2.5 cm)	
Weight	12 oz. (.34 kg)	
Environment		
Operating Temperature	–40° to 149° F (–40° to 65° C)	
Storage Temperature	–40° to 158° F (–40° to 70° C)	
Relative Humidity (Operating)	5% to 95%	No condensation
Altitude (Operating or Non-operating)	–1,312 to + 14,764 ft. (–400 to +4,500 m)	

8   CUSTOMER INFORMATION AND ASSISTANCE

ADC Technical support is available 24 hours a day, 7 days a week by contacting the ADC Technical Assistance Center.

Sales Assistance 800.366.3891	• Quotation Proposals • Ordering and Delivery • General Product Information
Systems Integration 800.366.3891	• Complete Solutions (from Concept to Installation) • Network Design and Integration Testing • System Turn-Up and Testing • Network Monitoring (Upstream or Downstream) • Power Monitoring and Remote Surveillance • Service/Maintenance Agreements • Systems Operation
ADC Technical Assistance Center 800.366.3891 Email: wsd.support@adc.com	• Technical Information • System/Network Configuration • Product Specification and Application • Training (Product-Specific) • Installation and Operation Assistance • Troubleshooting and Repair/Field Assistance
Online Technical Support **Online Technical Publications** **Product Return Department** 800.366.3891 E-Mail: repair.return@adc.com	• www.adc.com/Knowledge_Base/index.jsp • www.adc.com/documentationlibrary/technicalpublications/ • ADC Return Authorization number and instructions must be obtained before returning products.

Product information may also be obtained using the ADC web site at **www.adc.com** or by writing ADC Telecommunications, Inc., P.O. Box 1101, Minneapolis, MN 55440-1101, U.S.A.

Contents herein are current as of the date of publication. ADC reserves the right to change the contents without prior notice. **In no event shall ADC be liable for any damages resulting from loss of data, loss of use, or loss of profits and ADC further disclaims any and all liability for indirect, incidental, special, consequential or other similar damages. This disclaimer of liability applies to all products, publications and services during and after the warranty period.**

This publication may be verified at any time by contacting ADC's Technical Assistance Center at 1-800-366-3891 or by writing to ADC Telecommunications, Inc., Attn: Technical Assistance Center, P.O. Box 1101, Minneapolis, MN 55440-1101, U.S.A.

Product Catalog: SPX-RTAU0A11
Part Number: 1169023
CLEI: SNPQCN2D~~
Document: ADCP-61-743, Issue 3

1304058

September 17, 2004

Free Manuals Download Website

http://myh66.com

http://usermanuals.us

http://www.somanuals.com

http://www.4manuals.cc

http://www.manual-lib.com

http://www.404manual.com

http://www.luxmanual.com

http://aubethermostatmanual.com

Golf course search by state

http://golfingnear.com

Email search by domain

http://emailbydomain.com

Auto manuals search

http://auto.somanuals.com

TV manuals search

http://tv.somanuals.com