



SLC[®] Series 5 Carrier System

AUA293 Integrated Services Digital Network (ISDN) Basic Rate Interface Transmission Extension 3rd Generation (BRITE III) Channel Unit — 5SC4PT0

Features/Functions

- FAIL and LPBK LEDs on faceplate
- One channel of ANSI¹ standard U-DSL ISDN basic rate interface
- Path or segmented PM provisionable from LDS
- Faceplate digital test jack
- Faceplate rotary switch for B1 and B2 loopbacks
- Optional NULL CU operation
- Optional universal digital channel operation
- Optional sealing current
- 2B+D, B1+D, B2+D, or D-only service
- Selectable LULT / LUNT modes
- Backward compatible with AUA92/AUA93 BRITE II CUs
- Optional Zero Byte Substitution
- UL² recognized
- PGTC type metallic test access
- Conforms to Telcordia Technical Reference TR-NWT-000397 and other industry standards

1 Registered trademark of American National Standards Institute, inc.

2 Registered trademark of Underwriters Laboratories Inc.

Description

This data sheet describes the AUA293 integrated services digital network (ISDN) basic rate interface transmission extension third generation (BRITE III) channel unit (CU) (COMCODE 107940538) and is intended for the end-user of the unit.

The AUA293 ISDN BRITE III CU provides one ANSI standard digital subscriber line (U-DSL) over a non-loaded two wire loop. The AUA293 ISDN BRITE III CU operates in the following access systems:

- *SLC*[®] Series 5 central office terminal (COT) and remote terminal (RT).
- *SLC*[®]-2000 COT and RT metallic distribution shelf (MDS).
- Multi-services distant terminal (MSDT), hosted on a *SLC*-2000 RT/host digital terminal (HDT).
- Switched digital broadband access system (SDBAS) optical network unit (ONU).
- DDM-2000 FiberReach Narrowband Shelf (NBS) hosted on a *SLC*-2000 HDT.

The AUA293 CU is a single channel unit that provides either an LT-mode or an NT- mode (switch selected) U - interface for full duplex transmission to one customer over a loop that meets ANSI T1.601-1992 standards. The AUA293 CU uses the U-interface 2B1Q signal to provide a 4-level line code at a data rate of 160 kb/s (80k baud), comprised of two of B channels and one D channel, plus overhead. The D channel is used for signaling and low-speed packet data. The B channels may be used for circuit-switched voice, circuit-switched data, or packet data. The AUA293 channel unit may be used on non-loaded loops up to 18 kft. in length (42 dB at 40 kHz loop loss, 1300 ohms DC resistance design).

Each AUA293 CU occupies one physical slot in a channel bank. When optioned for B1+D, B2+D, or D-only service, the AUA293 may be mixed with any other channel unit (except 2B+D) without restriction. The following are the placement restriction rules for AUA293 channel units when used in a *SLC* Series 5 Carrier System:

- Channel units provisioned for 2B+D service are not allowed in slots 3, 6, 9, or 12 of a digroup.
- Only another 2B+D channel unit may occupy the slot to the immediate right of a 2B+D AUA293 CU.

There are no placement restrictions for the AUA293 CU in the *SLC*-2000 MDS. In the *SLC*-2000 MSDT, NBS, or the SDBAS ONU, standard placement rules apply (see sections on MSDT, NBS, and ONU placement rules).

This data sheet is being updated to add ordering information on the NULL channel units.

Description of Figures and Tables

- Figure 1 shows the AUA293 CUs in a typical BRITE circuit.
- Figure 2 shows the node address assignment during loopback.
- Figure 3 shows the faceplate diagram and the option switches.
- Table 1 lists the environmental specifications.
- Table 2 lists the power drain of the AUA293 CU.
- Table 3 lists the option switch settings.
- Table 4 shows the POTS ID versus ISDN ID selection in *SLC Series 5 Carrier Systems*.
- Table 5 shows the channel and timeslot usage per service selected.
- Table 6 lists the placement rules in ISDN *SLC Series 5 Carrier Systems*.
- Table 7 lists the placement rules in Non-ISDN *SLC Series 5 Carrier Systems*.
- Table 8 lists the *SLC-2000 Access System* provisioning parameter values.
- Table 9 shows the faceplate rotary switch operation to control downstream loopbacks.
- Table 10 shows B1 and B2 loopback operation.
- Table 11 lists the LED indications.
- Table 12 lists the edge connections.

Compatibility

The AUA293 CU is compatible with the following systems:

- *SLC Series 5 RT* (FPB, FPC/AC, INA)
- *SLC-2000 RT* Release 3.2 or later
- *SLC Series 5 COT* (FPC)
- *SLC-2000 Access System COT* Release 3.2 or later
- *DDM-2000 FiberReach NBS* hosted by a *SLC-2000 HDT* Release 4.4 or later
- Optical network unit (ONU) of switched digital broadband access system (SDBAS) Release 1.3 or later
- Multi-services distant terminal (MSDT) hosted by a *SLC-2000 Access System RT/HDT* Release 3.2 or later

The AUA293 CU can be used in TR-008 Mode 1 COTs, TR-008 Mode 1 RTs, TR-008 Mode 1 virtual remote terminals (VRTs), and INA VRTs. The AUA293 CU can not be used in TR-303 systems, TR-303 VRTs, TR-008 Mode 2 systems, or TR-008 Mode 2 VRTs.

Specifications

The AUA293 CU conforms to the following industry standards:

- American National Standards Institute, "*Integrated Services Digital Network (ISDN) - Basic Access Interface for Use on Metallic Loops for Application on the Network Side on the NT (Layer 1 Specification)*," ANSI T1.601-1992, February 21, 1992.
- AT&T Technical Reference, "*Digital Channel Bank Requirements and Objectives*," PUB 43801, November 1, 1982.
- Telcordia Technical Reference TR-NWT-00057, Issue 2, January 1993, "*Functional Criteria For Digital Loop Carrier Systems*," Bell Communications Research, Inc.
- Telcordia Technical Reference TR-NWT-000393, Issue 2, January 1991, "*Generic Requirements for ISDN Basic Access Digital Subscriber Lines*," Bell Communications Research.
- Telcordia Technical Reference TR-NWT-000397, Issue 3, December 1993, "*ISDN Basic Access Transport System Requirements (A Module of TSGR, FR-NWT-000440)*," Bell Communications Research.
- Telcordia Technical Reference TR-TSY-000398, Issue 1, March 1990, "*Universal Digital Channel (UDC) Generic Requirements and Objectives*," Bell Communications Research.
- Telcordia Technical Reference TR-TSY-000821, Issue 1, June 1990, and all Revisions, "*Operations Technology Generic Requirements (OTGR): Network Maintenance: Transport Surveillance - Additional Transport and Transport — Based Surveillance (A Module of OTGR, TR-TSY-000439)*," Bell Communications Research.
- Telcordia Technical Reference TR-TSY-000829, Issue 1, November 1989, "*Operations Technology Generic Requirements (OTGR): Generic Operations Interfaces — Embedded Operations Channels (A Module of OTGR, TR-TSY-000439)*," Bell Communications Research.
- Telcordia Technical Reference FR-NWT-000476, Issue 1, 1995 Edition, "*Operations Technology Generic Requirements (OTGR): Network Maintenance: Access Testing, Section 6 (A Module of OTGR, FR-NWT-000439)*," Bell Communications Research.
- Telcordia Generic Reference GR-1089-CORE, Issue 1, November 1994, "*Electromagnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunications Equipment*," Bell Communications Research.

- FCC Rules and Regulations, Part 15, “*Radio Frequency Devices*,” Sections 15.105 and 15.109.
- Underwriters Laboratories UL1459, Second Edition, October 1990, “*Standard for Telephone Equipment (Includes Section 50A)*,” Underwriters Laboratories, Inc.

For further specification information, consult 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*.

This unit is intended for use in *SLC Series 5 Carrier Systems* located in controlled environments that conform to the specifications of Telcordia Technologies GR-63¹. It may also be used in applicable Lucent Technologies cabinets designed for *SLC Series 5* and intended for applications in non-controlled (outside plant) environments that conform to Telcordia Technologies GR-487². These cabinets, when properly equipped, are designed to maintain internal environmental conditions within appropriate operational limits for *SLC Series 5 Carrier* equipment such that system performance meets TR-NWT-000057³.

The applicable outside plant environment criteria for cabinet enclosures (per GR-487) are summarized in Table 1 Environmental Specifications.

Table 1. Environmental Specifications

<p>A. Temperature Range (Ambient)</p> <ol style="list-style-type: none"> 1. Operating, per TR-NWT-000057: in Lucent Technologies cabinets exposed to ambient temperatures of -40° F (-40° C) with no solar load to +115° F (46° C) with maximum solar load and maximum power dissipation. Lucent Technologies cabinets are designed to ensure that the components within do not exceed their rated temperatures for the above conditions. 2. Storage, per TR-NWT-000057: ambient temperatures of -40° to 140° F (-40° to 60° C).
<p>B. Relative Humidity</p> <ol style="list-style-type: none"> 1. Operating, per TR-NWT-000057. For outside ambient temperature 84° F (29° C) or less, relative humidity of 5% to 95%. For ambient temperatures above 84° F (29° C), the relative humidity is limited to that corresponding to a specific humidity of 0.024 pound of water per pound of dry air. 2. Storage, per TR-NWT-000057: ambient temperatures 84° F (29° C) or less, 10% to 95%. For ambient temperatures above 84° F (29° C), the relative humidity is limited to that corresponding to a specific humidity of 0.024 pound of water per pound of dry air.

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- 1 Telcordia Technologies Generic Reference GR-63, Issue 1, October 1994, and all Revisions and Supplements, "Network Equipment-Building System Requirements: Physical Protection (a module of LSSGR, GR-64; TSGR, FR-440, and NEBS FR, FR-2063)," Telcordia Technologies, Inc.
 - 2 Telcordia Technologies General Requirements GR-487, Issue 1, June 1996, and all Revisions and Supplements. "General Requirements for Electronic Equipment Cabinets," Telcordia Technologies, Inc.
 - 3 Telcordia Technologies Technical Reference TR-NWT-000057, Issue 2, January 1993, and all Revisions and Supplements, "Functional Criteria For Digital Loop Carrier Systems," Telcordia Technologies, Inc.

Table 2. Power drain of the AUA293 CU

Condition	Value (± 0.2 W)
NT1 ¹ connected, sealing current off:	1.0 W
NT1 connected, sealing current on:	1.3 W

1 Network termination, layer 1

Interfaces

The AUA293 channel unit provides two primary interfaces: the carrier-side interface and the loop-side interface.

Figure 1 shows the carrier-side and loop-side interfaces of the AUA293 CU in a typical BRITE circuit.

The carrier side interfaces through the SLC Series 5 Carrier System or SLC-2000 Access System to the 1.544 mb/s DS1 or T1 facility. The carrier side interface conforms to either the Bellcore TR-NWT-000397 Standard or the Lucent (AT&T) AUA92 /AUA93 BRITE II CU specification. The carrier side of an AUA293 CU will interface to another AUA293 CU when the Lucent / Bellcore (**LB**) option switch set to the **ON** position (Bellcore). If the AUA293 carrier side is facing an AUA92 CU or AUA93 CU, the **LB** option switch is set to the **OFF** position (Lucent).

The loop-side interface is the ANSI Standard ISDN 2-wire U-interface which is used to deliver Basic Rate Service. This interface always runs at 160 kb/s, and may provide D-only, B1+D, B2+D, or 2B+D service.

The loop-side interface of the AUA293 CU in the LULT mode typically faces the loop to the subscriber, and terminates in an NT1 and an ISDN station set. The loop-side interface of the AUA293 CU in the LUNT mode is typically connected to the LT port of an ISDN-equipped local digital switch (LDS), such as the integrated services line unit (ISLU) of the 5ESS[®] Switch. The loop-side interface of the AUA293 CU in the LUNT mode may also be connected to the loop-side interface of another AUA293 CU (or other BRITE CU meeting ANSI standards) in LULT mode to create a tandem BRITE circuit.

A third interface is provided on the AUA293 CU: the RJ-45 faceplate jack used for digital test access. This faceplate jack provides access to the transmit and receive digital signals plus the 8 kb/s and 64 kb/s clocks for use with a Tele-Path Industries (TPI) 108/109 test set (or equivalent). With a test set connected to this jack, a DS0 signal may be inserted into either the B1 or B2 channel of the downstream BRITE circuit.

The rotary faceplate switch selects the downstream node where the DS0 signal is looped back, and returned to the test set through the RJ-45 faceplate jack.

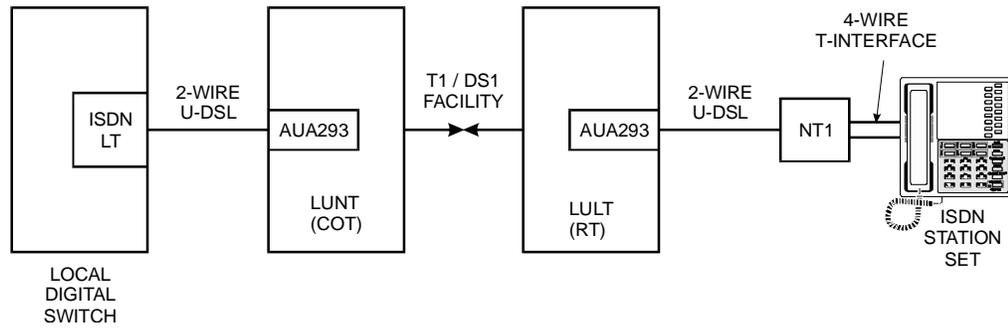


Figure 1. AUA293 Channel Units in a Typical BRITE Circuit

Installation

The option switch settings on the AUA293 channel unit are shown in Table 3. The proper optioning of these switches is discussed in this section.

Table 3. AUA293 Channel Unit Option Switch (S1) Settings

Switch (S1) Position Number	Switch Label	CU Operation When Switch Position Off	CU Operation When Switch Position On (Default Position)
1	UD	Universal Digital Channel selected (eoc processing disabled)	Normal eoc processing selected
2	PI	POTS ID selected (NULL CU operation)	ISDN ID selected
3	SC	Sealing current off	Sealing current on
4	LB	Compatible with the Lucent AUA92, AUA93, AHG18, AHG28 BRITE II CUs	Compatible with BELLCORE TR-397
5	ZB	ZBS off	ZBS on
6	B2	B2 channel disabled	B2 channel enabled
7	B1	B1 channel disabled	B1 channel enabled
8	NL	LUNT mode selected	LULT mode selected

**NOTE:**

When the CU is installed in a SLC-2000 Access System RT or COT, the system provisioning will override the B1 and B2 switches on the AUA293 CU.

For delivery of ISDN basic rate services, the **UD** switch is to be in the **ON** position. All eoc functions are enabled in this position: loopbacks, metallic test access, CRC testing, and performance monitoring. The **UD** switch is only placed in the **OFF** position when all the eoc functions are to be disabled: then the AUA293 CU provides universal digital channel (UDC) operation. The UDC uses the ISDN basic rate interface as a digital “pipe” with up to 144 kb/s of bandwidth available for clear transport of any services. The UDC is specified in Bellcore Technical References TR-397 and TR-398.

The choice of POTS ID (**PI** switch **OFF**) versus ISDN ID (**PI** switch **ON**) depends on the system in which the AUA293 CU is installed. For SLC-2000 RT, MSDT, NBS, and SDBAS ONU, ISDN ID is to be selected (**PI** switch **ON**). If the system is SLC Series 5, then Table 4 is to be used to determine whether the POTS ID or the ISDN ID is chosen.

Table 4. POTS ID versus ISDN ID selection in SLC Series 5 Carrier Systems

ID	COT BCU	RT BCU
ISDN	MC97755A1B - COT (FPC)	MC97776A1B - RT (FPC/AC) MC97776A1B - RT (FPB) MC97776A1 - RT (FPB)
POTS	MC97755A1 - COT (FPC) MC97725A1 - COT (FPC)	MC97776A1 - RT (FPC) MC97771A1 - RT (FPC) MC97769A1 - RT (INA) MC97756A1 - RT (FPC) MC97724A1 - RT (FPB)

The selection of POTS ID versus ISDN ID plus the enabling of the **B1** and **B2** channels affects the placement rules in SLC Series 5 Carrier Systems, which are discussed in the next sections.

When the AUA293 CU is installed in an RT, MSDT, NBS, or ONU, the LUNT / LULT (**NL**) switch is normally set to LULT (**ON**). The AUA293 CU provides one channel of service, in the line unit line termination (LULT) mode. When the AUA293 CU is installed in a COT, the AUA293 CU provides the line unit network termination (LUNT) function and the **NL** switch is normally set to LUNT (**OFF**).

When the AUA293 CU is in the LUNT mode, the sealing current (**SC**) switch is disabled. When the AUA293 CU is in the LULT mode, the **SC** switch is active: Sealing current may be turned on or off. It is recommended to turn sealing current on only if the AUA293 CU faces an NT1.

The enabling or disabling of the B1 and B2 channels determines the number of DS0 timeslots used by the AUA293 CU. It is recommended that these switches be set to the desired bandwidth, even though these switches can be overridden by system provisioning in the SLC-2000 Access System and the MSDT. Depending on the position of the **LB** (Lucent / Bellcore) switch, and the enabling of the **B1** and **B2** channels, the DS0 timeslot usage is as shown in Table 5.

Table 5. Channel and Timeslot Usage per Service Selected

LB Switch Setting	DS0 Time Slot	Service Selected			
		2B+D	B1+D	B2+D	D-only
Telcordia	1	B1	B1	B2	D
	2	B2	D	D	
	3	D			
Lucent	1	B1	B1	B2	D
	2	D	D	D	
	3	B2			

The Zero Byte substitution feature of the AUA293 BRITE III CU allows this channel unit to pass 64 kb/s clear channel data on both B-channels without requiring 64 kb/s clear channel capability (e.g., B8ZS) on the T1 transmission facility.

Normally, the **ZB** switch would be placed in the **ON** position. If clear channel capability (B8ZS) is enabled on the transmission facility between RT and COT, then the **ZB** switch may optionally be set to the **OFF** position.

SLC Series 5 Placement Rules

The AUA293 CU occupies one physical slot in a *SLC Series 5* central office terminal or remote terminal channel bank. The placement of BRITE channel units is restricted because 2B+D service requires three time slots per channel unit. Placement rules for BRITE III (2B+D selected) and BRITE II (AUA92 and AUA93) channel units are based on a 3-slot (tri-slot) group. Each digroup of 12 physical slots is divided into 4 tri-slot groups. The tri-slot groups are physical slots 1, 2 and 3; 4, 5 and 6; 7, 8 and 9; and 10, 11 and 12. The placement rules for BRITE 2B+D channel units are as follows:

- A 2B+D BRITE channel unit must not occupy the last slot in a tri-slot group. Therefore, a 2B+D AUA293 channel unit must not be installed in physical slots 3, 6, 9, or 12 in any digroup.
- Only another 2B+D BRITE channel unit may occupy the slot to the immediate right of a 2B+D channel unit.
- A B1+D, B2+D, or D-only BRITE channel unit (or any other single or dual channel unit) must **not** be placed in the slot to the immediate right of a 2B+D channel unit.

The placement rules for BRITE channel units in ISDN *SLC* Series 5 Carrier System are shown in Table 6 below:

Table 6. BRITE Placement Rules in ISDN *SLC* Series 5 Carrier Systems

2B+D BRITE III or 2B+D BRITE II	2B+D BRITE III or 2B+D BRITE II or Empty	Empty
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Y	Y	Y
or	or	or
Empty	Empty	Empty

Y or Empty	2B+D BRITE III or 2B+D BRITE II	Empty
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2B+D BRITE III or 2B+D BRITE II	Empty	Y
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NOTE:

Y = Any valid dual- or single- channel unit or a B1+D, B2+D, or D-only AUA293 BRITE III or BRITE II.

NULL Channel Unit Operation

When ISDN ID is selected, the AUA293 CU is always installed without a NULL¹ CU. When POTS ID and 2B+D service are selected, the AUA293 CU must be installed with a NULL CU. If POTS ID and D-only, B1+D, or B2+D service is selected, then the NULL CU is not necessary. When POTS ID and 2B+D service are selected, the NULL CU must be installed in either:

- The third slot of a tri-slot group, when two AUA293 CUs are installed in the first two slots of a tri-slot group, or
- The third slot of a tri-slot group, when one AUA293 CU is installed in the second slot of a tri-slot group, or
- The second slot of a tri-slot group, when the AUA293 CU is installed in the first slot of a tri-slot group.

Table 7 shows the placement rules for the AUA293 CU and NULL CU in non-ISDN SLC Series 5 Carrier Systems.

Table 7. BRITE Placement Rules in Non-ISDN SLC Series 5 Carrier Systems

2B+D BRITE III	2B+D BRITE III	NULL	Y or Empty	Y or Empty	Y or Empty
Y or Empty	2B+D BRITE III	NULL	2B+D BRITE III	NULL	Y



NOTE:

Y = Any valid dual- or single- channel unit or a B1+D, B2+D, or D-only AUA293 BRITE III CU.

¹ NULL channel units are not manufactured by Lucent Technologies and can be obtained from Pulse Communications, Inc., Herndon, Virginia at 800-381-1997.

SLC-2000 Access System Placement Rules and Provisioning

The AUA293 CU may be placed in any physical CU slot of the *SLC-2000* COT metallic distribution shelf (MDS).

In a *SLC-2000* RT MDS configured for metallic distribution, the AUA293 CU may be placed in any physical CU slot.

In a *SLC-2000* RT configured for Fiber distribution (FiberReach or Fiber In The Loop (FITL)) the standard placement restrictions for all channel units apply. Placement rules are given in 363-208-000, *SLC-2000 Access System Application, Planning, and Ordering Guide*.

When the AUA293 CU is installed in a *SLC-2000* Access System, in addition to the setting of the option switches, the slot must be provisioned electronically from the *SLC-2000* Craft Interface Terminal (CIT). Three parameters need to be provisioned from the CIT: CLEI, Function Code, and Service. Table 8 shows the parameter values for provisioning the AUA293 CU in the *SLC-2000* Access System.

Table 8. *SLC-2000* Provisioning for the AUA293 CU

Parameter	System	
	<i>SLC-2000</i> COT	<i>SLC-2000</i> RT
CLEI	5SC1JE	5SC1HE
Function Code	BRI	BRI
Service	2B+D, B1+D, B2+D, D	2B+D, B1+D, B2+D, D

SDBAS ONU Placement Rules

See 363-208-200, *Switched Digital Broadband Access System Applications, Planning, and Ordering Guide* and 363-208-201, *Switched Digital Broadband Access System Release 1.01 Optical Network Unit User/Service Manual* for placement rules.

MSDT and FiberReach NBS Placement Rules and Provisioning

The standard MSDT and FiberReach NBS CU placement rules apply to the AUA293 CU. When the MSDT or NBS is hosted from a TR-008 VRT, the AUA293 CU may be placed in any physical slot in the MSDT or NBS. When the MSDT or NBS is hosted from a TR-303 VRT, standard placement rules apply. In the TR-303 case, when one or more TR-303 ISDN CUs are installed, no CU may be placed in the last slot of the MSDT or Quad mode NBS. In the TR-303 case, the AUA293 CU may be placed without restriction in the octet mode NBS.

**NOTE:**

A 2B+D BRITE CU may not be installed in slots 2 and 5 of the MSDT or NBS.

When the AUA293 CU is installed in the MSDT or NBS; the provisioning of the CLEI, Function Code, and Service parameters is performed from a CIT connected to the HDT, and this provisioning is identical to that when the CU is installed in the *SLC-2000* RT.

Testing

The AUA293 BRITE CU supports the following testing features:

- Metallic test access
- Performance monitoring
- CRC testing
- Digital loopbacks

In response to a pair gain test controller (PGTC) type test initiate signal, the CU will connect the subscriber drop to the dc bypass pair after the PGTC test setup sequence has completed successfully. The AUA293 CU itself is not PGTC testable, so the automatic PGTC channel tests will fail. The subscriber drop will remain connected to the dc bypass pair to allow metallic loop testing from MLT or other equivalent test systems until PGTC test access has been terminated.

The AUA293 CU supports both path and segmented performance monitoring (PM), as described in the referenced Bellcore TRs. The AUA293 CU will select between path or segmented PM based on an eoc command from the LDS. The AUA293 CU defaults to path PM. The CU stores current and previous hour PM counts for block errors (BE - also called coding violations), errored seconds (ES), and severely errored seconds (SES). The CU also stores current and previous day ES and SES counts. These counts are all retrievable via eoc messages. The CU supports thresholding.

To test the PM counters, the CU supports the ability to generate corrupted CRC via eoc messages.

The AUA293 CU supports digital loopback operation via eoc messages. Loopbacks may be requested by the LDS or the faceplate rotary switch. Loopbacks may also be established in the AUA293 CU upon command from the 950A test set, if an AUA92 or AUA93 CU is in the circuit. When the loopbacks are initiated from the LDS or the faceplate rotary switch, the digital test signal is sent from an upstream location to a downstream loopback and returned upstream. In the case of loopbacks initiated from the 950A test set, loopbacks may be either upstream or downstream, depending on the location of and the setting on the 950A test set. For further information on the 950A test set, see 363-005-238, *950A Test Set*.

Figure 2 shows the node addresses assigned to BRITE CUs for loopbacks. The NT1 is assigned address **0**. Each CU in the BRITE circuit is assigned an address, starting with the BRITE CU closest to the LDS which is assigned address **1**. The address assignments shown in Figure 2 assume loopback operation from the LDS or from the first BRITE CU.

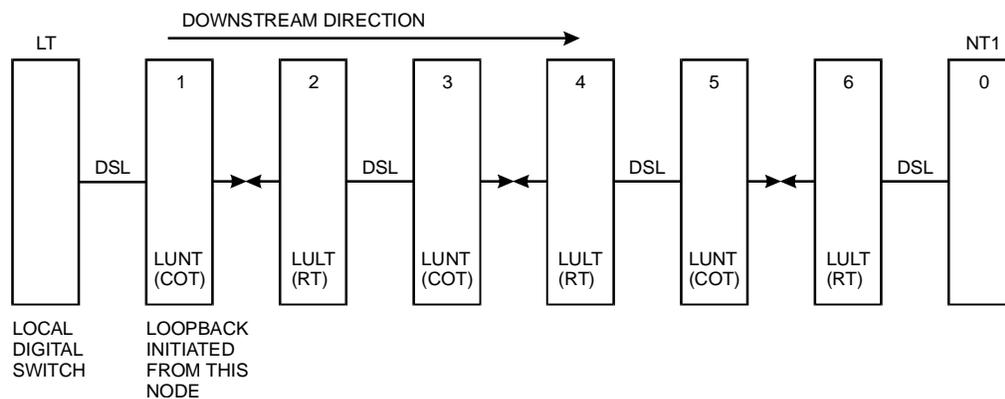


Figure 2. Node Address Assignment During Loopback

If loopbacks are initiated from other locations in the circuit, the numbers on the faceplate rotary switch are interpreted as shown in Table 9.

Table 9. Faceplate Rotary Switch Operation

Rotary Switch Position	Loopback Location
0	NT1
1	Current unit
2	Second unit downstream
3	Third unit downstream
4	Fourth unit downstream
5	Fifth unit downstream
6	Sixth unit downstream
7	None
8	None
9	None
Clockwise rotation selects B1 loopback Counterclockwise rotation selects B2 loopback	

Table 10 shows loopback operation initiated from the faceplate rotary switch for a BRITE circuit with six CUs in tandem. To activate B1 loopbacks, follow the procedure shown in the upper half of Table 10:

- Start with the rotary switch at position **9** and connect the DDS test set to the faceplate RJ45 jack. No loopbacks will be active, but the **LPBK** LED will flash 9 times per cycle¹.
- Move the rotary switch clockwise (**CW**) from position **9** to position **0**. This will initiate a **B1** loopback at the **NT1**. The **FAIL** LED will begin flashing once per cycle, and repeat this pattern as long as a **B1** loopback is active.
- Move the rotary switch **CW** from position **0** to position **1**. This will tear down the loopback at the **NT1**, and initiate a **B1** loopback at the current CU (**address 1**). The **FAIL** LED will continue to flash once per cycle, and the **LBPK** LED will be constantly lit as long as the loopback is active.
- Repeat this procedure, moving the rotary switch in the **CW** direction, until all addresses with CUs have been tested.
- Remove the test set. No loopbacks will be active, and all LEDs will be off.

¹ LEDs flash “n” times per cycle to indicate various status conditions. The overall cycle time depends on the number of flashes. A “cycle” indicates a sequence of rapid On flashes, followed by an Off period.

To activate B2 loopbacks, follow the procedure shown in the lower half of Table 10:

- Start with the rotary switch at position **7** and connect the DDS test set to the faceplate RJ45 jack. No loopbacks will be active, but the **LPBK** LED will flash 7 times per cycle.
- Move the rotary switch counterclockwise (**CCW**) from position **7** to position **6**. This will initiate a **B2** loopback at **address 6** (assuming 6 CUs in the BRITE circuit.). If the CU at address **6** exists, a **B2** loopback will be established in this CU. On the AUA293 CU at **address 6** the **FAIL** LED will flash twice per cycle, and the **LBPK** LED will be on constantly. The **FAIL** LED at the current CU (where loopbacks are initiated) will also flash twice per cycle to indicate B2 loopback. If a CU does not exist at address **6**, move the rotary switch to the address of the last CU in the circuit.
- Repeat this procedure, moving the rotary switch in the **CCW** direction, until all CUs have been tested with a **B2** loopback.
- To initiate a **B2** loopback at the NT1, move the rotary switch in the **CCW** direction to position **0**. The **FAIL** LED will flash twice per cycle.
- When concluding loopback testing, move the rotary switch to position **9**. Then all loopbacks will de-activate, and the **LPBK** LED will flash 9 times per cycle.
- Disconnect the test set from the RJ45 jack. No loopbacks will be active, and all LEDs will be off.

Table 10. AUA293 CU - B1 & B2 Loopback Operation.

Type	Location		AUA293 Faceplate Rotary Switch	LEDs											
				CU 1 ADDR 1		CU 2 ADDR 2		CU 3 ADDR 3		CU 4 ADDR 4		CU 5 ADDR 5		CU 6 ADDR 6	
	Phys.	Lpbk		Fail	LB										
B1	CU 1	None	9		F9										
		NT1	9-to-0 CW	F1											
		ADDR 1	0-to-1 CW	F1	On										
		ADDR 2	1-to-2 CW	F1		F1	On								
		ADDR 3	2-to-3 CW	F1				F1	On						
		ADDR 4	3-to-4 CW	F1						F1	On				
		ADDR 5	4-to-5 CW	F1								F1	On		
		ADDR 6	5-to-6 CW	F1										F1	On
B2	CU1	None	7		F7										
		ADDR 6	7-to-6 CCW	F2										F2	On
		ADDR5	6-to-5 CCW	F2							F2	On			
		ADDR 4	5-to-4 CCW	F2					F2	On					
		ADDR 3	4-to-3 CCW	F2				F2	On						
		ADDR 2	3-to-2 CCW	F2		F2	On								
		ADDR 1	2-to-1 CCW	F2	On										
		NT1	1-to-0 CCW	F2											
		None	0-to-9 CCW	F2	F9										

In Table 10, all LEDs are assumed to be off unless otherwise indicated. Only steady state LED status information is displayed in Table 10, when the proper loopback has been established. Although Table 10 shows the LED status for loopbacks initiated from CU position number 1, loopbacks may be initiated from all CU positions under normal operating conditions as well as during the following fault conditions:

- Connection between the CO and CU 1 broken
- Connection between the CU 2 and CU 3 broken
- Connection between the CU 4 and CU 5 broken
- Connection between the CU 6 and NT1 broken
- Any combination of the above conditions

When initiating loopbacks from CU positions 2 thru 6, loopbacks will not occur for CU positions that do not exist.

Faceplate Features and Options

The AUA293 channel unit faceplate is shown in Figure 3.

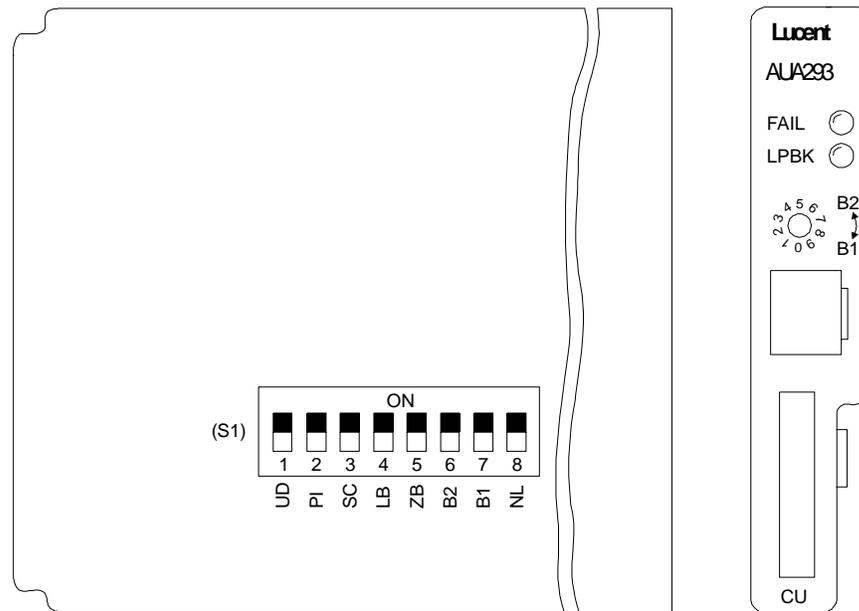


Figure 3. AUA293 Faceplate Diagram and Option Switches

The following LED indicators are located on the faceplate: **FAIL** and **LPBK**.

Both the **FAIL** and **LPBK** LED indicators turn on when the AUA293 CU is inserted in a system. The CU runs self tests, and both LEDs will turn off if the self tests pass.

Both the LED indicators turn on during LED test, if there are no placement violations.

When loopbacks are being initiated using faceplate rotary switch, the **FAIL** LED will indicate which B channel is looped back, and the **LPBK** LED will indicate the relative address of the loopback. If the rotary switch is turned clockwise (**CW**), to initiate B1 loopbacks, the **FAIL** LED will flash once per cycle. If the rotary switch is turned counter clockwise (**CCW**), to initiate B2 loopbacks, the **FAIL** LED will flash twice per cycle. The **LPBK** LED will flash "n" times per cycle to indicate the relative address of the loopback. If the **LPBK** LED flashes once per cycle, indicating relative address 1, the loopback will take place in the CU under test. If

the **LPBK** LED flashes twice per cycle, the loopback will occur in the next BRITE CU downstream. B1 or B2 loopbacks may be established at up to 6 relative address, if BRITE CUs are installed for the addresses requested.

When a DDS test set is connected to the faceplate RJ45 jack, the **LPBK** LED will flash **0** to **9** times, to indicate the position of the rotary switch. Loopbacks will only be initiated when the test set is connected and the rotary switch is turned **CW** or **CCW** to a valid CU address. It is recommended that the rotary switch be set to one of the following positions before installation of the CU or test set: **7**, **8**, or **9**.

The **FAIL** and **LPBK** LEDs light as indicated in Table 11 for many other conditions.

RJ-45 faceplate Jack: The RJ-45 faceplate jack allows for manual testing of the BRITE Circuit with a DDS test set. (See Testing section of this data sheet)



CAUTION:

The standard connector of a DDS test set is the RJ-45 (8-pin) connector. Forcing another type of connector into the AUA293 CU faceplate jack can result in damage to the jack pins.

Table 11. AUA293 Channel Unit LED Indications

FAIL¹	LPBK¹	LED TEST²	STATUS INDICATION
On	On	NDP	Self test error - remove and reinstall CU
On	On	DP	LED Test
On	Off	DP	2B + D service
Off	Off	NDP	2B + D service
Off	On	DP/NDP	PGTC test
Off	Off	DP	2B + D service Placement violation
On	Off	NDP	2B + D service placement violation - check rules
F3	F3	DP	B1+ D, B2 + D, or D-only service
Off	Off	NDP	B1+ D, B2 + D, or D-only service
F3	F3	DP	Placement violation of B1+ D, B2 + D, or D-only service
On	Off	NDP	Placement violation of B1+ D, B2 + D, or D-only service
F1	On	NDP	B1 Loopback end
F2	On	NDP	B2 Loopback end
F3	On	NDP	2B + D Loopback end
F2	F2	NDP	U interface not synchronized
F1	F1	NDP	PCM interface not synchronized
F3	Off	NDP	PCM G Bit set - DS1 facility failure
F4	Off	NDP	PCM E Bit set - DS1 facility failure
F4	On	NDP	U-interface activity

Table 11. AUA293 Channel Unit LED Indications—Continued

FAIL¹	LPBK¹	LED TEST²	STATUS INDICATION
F1	F1	NDP	Loopback setup: wait a few seconds and then the B1 channel will loopback at relative address 1
F1	F2	NDP	Loopback setup: wait a few seconds and then the B1 channel will loopback at relative address 2
F1	F3	NDP	Loopback setup: wait a few seconds and then the B1 channel will loopback at relative address 3
F1	F4	NDP	Loopback setup: wait a few seconds and then the B1 channel will loopback at relative address 4
F1	F5	NDP	Loopback setup: wait a few seconds and then the B1 channel will loopback at relative address 5
F1	F6	NDP	Loopback setup: wait a few seconds and then the B1 channel will loopback at relative address 6
F2	F1	NDP	Loopback setup: wait a few seconds and then the B2 channel will loopback at relative address 1
F2	F2	NDP	Loopback setup: wait a few seconds and then the B2 channel will loopback at relative address 2
F2	F3	NDP	Loopback setup: wait a few seconds and then the B2 channel will loopback at relative address 3

Table 11. AUA293 Channel Unit LED Indications—Continued

FAIL¹	LPBK¹	LED TEST²	STATUS INDICATION
F2	F4	NDP	Loopback setup: wait a few seconds and then the B2 channel will loopback at relative address 4
F2	F5	NDP	Loopback setup: wait a few seconds and then the B2 channel will loopback at relative address 5
F2	F6	NDP	Loopback setup: wait a few seconds and then the B2 channel will loopback at relative address 6

1 The LPBK and FAIL LED's can be continuously On, continuously Off, or flash n times per cycle (Fn).

2 This test can only be performed using the AUA293 CU in conjunction with an AUB27() Alarm Display Unit (ADU). The push-button switch on the ADU can be in the depressed (DP) state, or the non-depressed (NDP) state.

Table 12. Edge Connections For AUA293 Channel Unit

Finger	Function
1	Frame Ground
13, 17, 19, 20, 21	Circuit Ground
22, 23	+5R Volts dc
25, 50	+5S Volts dc
26	-48 Volts dc
31	TA (Tip Odd)
32	RA (Ring Odd)

References

The following documents provide additional information about the use of this channel unit in the *SLC Series 5 Carrier System* and the *SLC-2000 Access System*:

363-205-004	<i>SLC-2000 Access System, Multi-Services Distant Terminal Feature, User/Service and Ordering Manual</i>
363-205-010	<i>SLC Series 5 Carrier System Applications and Planning Guide</i>
363-205-402	<i>SLC Series 5 Carrier System Channel Unit Installation and Testing</i>
363-206-300	<i>DDM-2000 FiberReach Multiplexer — Applications, Planning, and Ordering Guide</i>
363-208-000	<i>SLC-2000 Access System Applications, Planning, and Ordering Guide</i>
363-208-001	<i>SLC-2000 Access System User/Service Manual</i>
363-208-003	<i>SLC-2000 Access System Command and Message Manual</i>
363-208-200	<i>Switched Digital Broadband Access System Applications, Planning, and Ordering Guide</i>
363-208-201	<i>Switched Digital Broadband Access System Release 1.01 Optical Network Unit User/Service Manual</i>

Technical Assistance

Follow local procedures for obtaining technical assistance. Lucent Technologies also provides in-hours or emergency out-of-hours help for the *SLC Series 5 Carrier System* and the *SLC-2000 Access System*. Call the Lucent Technologies Regional Technical Assistance Center at 1-800-225-RTAC.

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