



SLC[®] Series 5 Carrier System

AUA252() Office Channel Unit Dataport — 5SCTFFE (AUA252) 5SCTFFF (AUA252B)

Features/Functions

- Faceplate status indicators for 19.2, 38.4, switched 56 (SW56) kb/s, and auto-disconnect functions
- 2.4, 4.8, 9.6, 19.2, 38.4, 56, and 64 kb/s data rates
- Enhanced Inventory (AUA252B)
- Switched 56 kb/s service capability and enhanced SW56 option
- AB signaling option
- Loop quality monitor with auto-disconnect option

Description

This data sheet describes the AUA252() office channel unit (OCU) dataport (DP) (AUA252 COMCODE 107534307, AUA252B COMCODE 107727521), and is intended for the end-user of this unit. The AUA252() channel unit (CU) is primarily intended for use in a *SLC Series 5 Carrier System* remote terminal (RT), but is also usable in *SLC Series 5* central office terminal (COT), *SLC-2000* RT, *SLC-2000* COT, and MSDT. This data sheet is reissued primarily to add information on the AUA252B channel unit.

The AUA252() OCU is primarily used in the end-link of a 4-wire (4W), private line, digital data service (DDS) or switched 56 (SW56) kb/s circuit. The end-link is that part of the circuit between the remote terminal and the customer. The AUA252() OCU may also be used to provide local data service.

The AUA252() OCU for DDS and SW56 applications, is always located in the RT. For local data service, the unit may also be installed in the central office terminal (COT). The AUA252() OCU is an enhanced version of the AUA52B OCU. As such, the unit is backward compatible with all the features/functions of the AUA52, AUA152, AUA52B and AUA252 OCUs with the exception that the AUA52B's and AUA252B's have enhanced inventory feature.

Figures 1 through 5 show the typical SW56 applications for both universal and integrated and *SLC* Carrier Systems. Figure 6 shows the faceplate diagram and switch locations for the AUA252() CU. Table 1 lists the features and functions of the office channel unit dataports. Table 2 lists the environment specifications. Table 3 lists the edge connections for the AUA252() office channel units.

Functions

Table 1 lists all the features/functions of the AUA252() OCU as well as the AUA52B, AUA152 and AUA52 OCUs.

Table 1. Features and Functions of the Office Channel Unit Dataports.

Features/ Functions	CUs			
	AUA252()	AUA52B	AUA152	AUA52
Primary Data Rates (kb/s): 2.4, 4.8, 9.6, & 56 19.2 & 64C 38.4	X X X	X X	X	X
Error Correction: MVEC & SVEC 19.2 kb/s SC	X X	X X	X	X
Zero Code Suppression	X	X	X	X
Secondary Channel	X	X	X	X
Sealing Current	X	X	X	X
SW56 Option	X			
AB Signaling Option	X			
Enhanced SW56 option	X			
QMON and Auto-Disconnect	X			
Faceplate Indicators: 19.2 kb/s * 38.4 kb/s SW56 ADIS †	X X X X	X		
Manual Loopback	X	X		
4 Wire, Bridging Access, Faceplate Jack	X	X		
Enhanced Inventory (AUA252B only)	X	X		

* Flashes when an OCU, CSU, or manual loopback is active - AUA52B only

† Flashes when an OCU, CSU, or manual loopback is active - AUA252 and AUA252B only

The AUA252() OCU provides one channel of service and serves as the interface between full-duplex synchronous digital data on a 4W customer loop and the pulse code modulation (PCM) bit stream. The digital data rate may be 2.4, 4.8, 9.6, or 19.2 kb/s (called subrates) or 38.4, 56, or 64 kb/s (called full rates). The unit transmits and receives (T & R) a bipolar return-to-zero signal on a 4W loop. The maximum cable loss that can be tolerated is 45 dB at the frequency equal to one-half the customer's primary data rate. The line drivers and receivers present a balanced 135 ohm impedance across the signal frequency range. The unit provides the proper sealing current to the T & R and T1 & R1 leads when the external load (loop and termination) is less than 5400 ohms.

DDS

The AUA252() OCU for DDS applications provides seven selectable data rates: 2.4, 4.8, 9.6, 19.2, 38.4, 56, and 64 (CLEAR) kb/s. An error correction option is provided to avoid the need to qualify the T-carrier facility for DDS services. There are three error correction methods—the appropriate method depends on the customer data rate. All error correction methods ensure a 10^{-8} error-rate performance for a 10^{-3} error rate facility. The unit provides a zero-code option to guarantee a sufficient ones density on the T-carrier facility. A secondary channel option, when selected, provides a low-speed telemetry channel to the end-user.

Multi-point circuits are vulnerable to errors caused by noise on the 4W loop between the OCU DP and the customer premises equipment (CPE). Noise on the 4W loop or incorrectly optioned CPE can cause bipolar violation errors to be injected into the loop receiver of the OCU DP. The AUA252() OCU provides a quality monitor (QMON) option to prevent these conditions from rendering a multi-point network inoperable. When the QMON option is enabled and excessive errors are detected on the loop, a loop disconnect will occur, the ADIS LED on the AUA252() OCU will light, and "ABNORMAL STATION CODE" (10011110) will be sent toward the network. This will cause a problem branch to be blocked at the upstream multijunction unit (MJU). When the problem condition on the loop is cleared and the loop remains error free for 30 consecutive seconds, the ADIS LED will go out and the AUA252() OCU will return to normal operation.

SW56

The AUA252() OCU for SW56 applications provides SW56 operation, which can be used by local exchange carriers (LEC) to offer dedicated digital access to interexchange carriers (IXC) and SW56 digital data services, such as AT&T ACCUNET[®] Switched 56 service and Sprint 56 of US Sprint.

The AUA252() OCU for SW56 operation allows dialing by the 4W digital data circuit using control mode idle (CMI) signaling in accordance with AT&T PUB 41458. The unit decodes signaling from the network and passes this to the loop as either CMI (idle) or DATA mode (call active). Likewise, the customer premises equipment (CPE) signals the AUA252() OCU by transmitting CMI (on-hook) or DATA mode (off-hook).

The signaling between the AUA252() OCU and the network is wink start, A bit signaling. The default method of decoding signaling from the network is an in-band signaling technique (also referred to as software signaling). If the C bit (bit 8) is 0 in any of the last seven data bytes, signaling is decoded as 0 (idle or on-hook). If bit 8 is 1 in all of the last seven data bytes, signaling is decoded as 1 (call active or off-hook). When employed, this in-band signaling technique allows SW56 service to be provided over circuit configurations that contain tandemed digital signal zero (DS0) data port (DP) units.

The AUA252() OCU also provides an AB signaling option (also referred to as hardware signaling). When this option is enabled, signaling is decoded from the RT backplane. Since this requires that the A & B signaling bits be in frames 6 and 12, respectively, of the incoming DS1 signal, it is not possible to tandem a circuit through standard DS0 DP units when this type of signaling is used. There is one exception to this restriction. When an Adtran digital terminal data module (DTDM) D4 type DS0 DP is used in the D4 bank, shown in Figures 1 and 2, the AB signaling option can be employed.

The AUA252() OCU also provides an enhanced SW56 option. With the enhanced SW56 option enabled and the local CPE off-hook, data in the zero band (X111XXXX) from the switch will cause an alternate CMI code (0101X0V) to be transmitted toward the loop. This is used to pass optional call progress information toward the CPE in accordance with US Sprint Technical Specification TS-0046, Issue 4, April 1989.

Maintenance

The AUA252() OCU for both DDS and SW56 applications supports DDS alternating and latching loopbacks.



NOTE:

When the unit is provisioned for 64 kb/s operation, alternating loopbacks are disabled.

The unit also provides full splitting metallic test access and a faceplate activated PCM loopback toward the customer's loop.

Metallic test access for *SLC* Series 5 Carrier can be obtained via the *SLC* Series 5 Craft Interface Unit (CIU) or the extended test controller (XTC). At an RT location, the XTC can only obtain access in the split out direction toward the customer's loop. The CIU is also used during the manual testing of the transmission performance of the AUA252() OCU. The procedures for setting options and performing tests with the CIU are described in AT&T 363-205-402. The CIU is described in the CIU User's Guide, select code 500-206, and in AT&T 363-205-101 Craft Interface Unit, Description.

Full splitting metallic test access for the *SLC*-2000 system can be obtained via the *SLC*-2000 user interface panel (UIP) if the COT and RT ARM shelves are equipped with the following circuit packs: one BBG220 test head controller (THC), one BBF220 power control unit (PCU), and one BBF225 craft access unit (CAU). For additional information on the *SLC*-2000 Access System, see the *SLC*-2000 Applications, Planning, and Ordering Guide, AT&T 363-208-000, and the *SLC*-2000 User/Service Manual, AT&T 363-208-001.

Synchronization

For all applications of the AUA252() OCU, the *SLC* Series 5 Carrier System or *SLC*-2000 Access System must be synchronized to the DDS network. For universal configurations, the COT must be externally timed from a DDS composite clock source.

Provisioning

The AUA252() OCU has options that must be set before service can be provided. These options are set either manually or electronically.

SLC Series 5 Carrier

For all *SLC* Series 5 Carrier applications including Feature Package F which uses the *SLC*-2000 multi-services distant terminal (MSDT), the following electronic options must be provisioned using the CIU. These options must be provisioned to ensure that the AUA252() OCU is turned up for service.



NOTE:

Use *COMMON LANGUAGE*¹ *CLEI* Code 5SCU48 when using the CIU to provision the AUA252() OCU (Same *CLEI* Code as the AUA52).

1. **Subscriber Data Rate:** Four selections are available: 2.4, 4.8, 9.6, and 56 kb/s. For 19.2 kb/s service, any of the valid subrates may be entered (2.4, 4.8, or 9.6 Kb/s). For 38.4 or 64 kb/s service, the 56 kb/s data rate should be selected. For SW56 service, this option is ignored so any valid data rate may be selected.
2. **Error Correction:** For the subrates, three selections are available: majority vote error correction (MVEC), second channel error correction (SCEC), or NONE. The normal selection for subrates is MVEC. When MVEC is selected for 19.2 kb/s service, the single time slot error correction method described in "Contribution to the ANSI² T1 Standards Project," document #T1ZX1.4/89-023, is provided.

For full rates, two selections are available: SCEC or NONE.

Whenever SCEC error correction is selected, both PCM time slots associated with the CU slot in which the AUA252() OCU is installed are used. The odd-numbered time slot is used for data and the even numbered time slot is used for error correction.

For SW56 service, this option is ignored so any valid error correction option may be selected.

3. **All-Zero-Code:** Two selections are available: *YES* or *NO*. When the All-Zero-Code option is set to *YES*, the AUA252() OCU will allow eight consecutive 0's to be transmitted toward the network. When this option is set to *NO*, two of the 0's, in any string of eight 0's, will be changed to 1's.

This option should be set to *NO* if the Line Encoding option of *SLC* Series

¹ *COMMON LANGUAGE* is a registered trademark and *CLEI*, *CLLI*, *CLCI*, and *CLFI* are trademarks of Bell Communications Research, Inc.

² Registered trademark of American National Standards Institute, Inc.

5 Carrier line interface units (LIUs) is NOT set to B8ZS. If the line encoding option of the LIUs is set to bitwise 8 zero suppression code (B8ZS), the All-Zero- Code option can be set to either *YES* or *NO*.

For 64 kb/s service, the All-Zero-Code option should be set to YES and the Line Encoding option of the LIUs should be set to B8ZS.

For SW56 service, this option is ignored so either YES or NO may be selected.

4. **Secondary Channel:** Two selections are available: YES or NO. The Secondary Channel option should not be confused with SCEC. A secondary channel is a low speed telemetry channel added to the subscriber's data bits. This option should be set to YES only when suitable CPE is available.

For 64 kb/s service, this option must be set to YES.

For SW56 service, this option is ignored so either YES or NO may be selected.

In addition to the electronically provisioned options, the following options may also be selected by manually setting the appropriate option switch on the AUA252() OCU (See Figure 6).

1. **19.2, 38.4, or 64 kb/s:** These services can be selected by setting the appropriate option switch on the AUA252() OCU to the "ON" position (only one data rate may be selected for each application or installation). This action overrides the subscriber data rate input via the CIU. Other CIU options must be set as previously described. When 19.2 kb/s service is selected, the green, 19.2, faceplate LED should be lit. When 38.4 kb/s service is selected, the green, 38.4, faceplate LED should be lit. When 64 kb/s service is selected, the All-Zero-Code and Secondary Channel CIU options must be set to YES.
2. **SW56 Service:** This service can be selected by setting the SW56 option switch on the AUA252() OCU to the "ON" position. This action overrides all the CIU provisioned options.
3. **AB Signaling:** This option determines whether hardware or software signaling methods are used to detect signaling from the network. The hardware signaling option can be selected by setting the AB SIG option switch on the AUA252() OCU to the "ON" position. This option can only be selected if the SW56 option switch is also set to the "ON" position and if the SW56 circuit has not been tandemed through standard DS0 DP units.

Most applications will use the default software signaling mode. The AB (or hardware) signaling mode is only used in conjunction with a digital cross-connect system operating in the signaling mode. For all universal configurations, configurations using the SLC-2000 multi-services distant

terminal (MSDT), and integrated TR303 configurations, the AB signaling option should NOT be selected. For integrated TR08 configurations not using the MSDT, the AB signaling option may be selected.

4. **Enhanced SW56:** This option can be selected by setting the ENH56 option switch on the AUA252() OCU to the "ON" position. This option can only be selected if the SW56 option switch is also set to the "ON" position. When this option is selected, transmission of call progress tones to the CPE is supported in accordance with US Sprint Technical Specification TS-0046, Issue 4, April 1989.
5. **Quality Monitoring:** This option can be selected by setting the QMON option switch on the AUA252() OCU to the "ON" position. When this option is selected, the ADIS faceplate LED will light whenever excessive errors on the customer's loop have been detected and the loop has been disconnected from the DDS network.

SLC-2000 Access System

All electronic provisioning information for all *SLC-2000 Access System* applications is entered using the *SLC-2000 UIP* as opposed to the *SLC Series 5 CIU*.



NOTE:

Use *COMMON LANGUAGE CLEI* code 5SC143 when using the UIP to provision the AUA252() OCU (Same *CLEI* code as the AUA52B).

The provisioning for *SLC-2000 COT* and *RT* applications is the same as that described for *SLC Series 5 Carrier* except that the 19.2 and 64 kb/s data rates must be electronically provisioned via the UIP. The 19.2 and 64 kb/s option switches on the AUA252() OCU are ignored when the unit is installed in a *SLC-2000 COT* or *RT*.

The provisioning for *SLC-2000 MSDT* applications is the same as that described for *SLC Series 5 Carrier*. For these applications, the 19.2 and 64 kb/s data rates must be set manually via the option switches located on the AUA252() OCU. As previously noted for *SW56* applications, the AB signaling option should NOT be selected for *MSDT* applications.

Compatibility

Channel Units

The AUA252() OCU is end-to-end compatible with another AUA252() or SPQ334/AUA52B/AUA152/AUA52 OCU, or AUA34 (5SCU380) or AUA34B (5SC1330) DS0 DP, or D4 dataport CUs in a SLC-96 COT or D4 bank.

SLC Series 5 Carrier

The AUA252() OCU is compatible with the following SLC Series 5 Feature Packages (FPs):

- Universal and integrated Feature Package B with Special Services option (FPB/SS) Mode 1 and Mode 2



NOTE:

SCEC is not supported in FPB/SS Mode 2 universal or integrated configurations.

- Universal Feature Package C (FPC) and Feature Package C with AutoCut (FPC/AC)
- Universal and Integrated Feature Package F (FPF) (SLC-2000 MSDT)
- FP303
- Integrated Network Access (INA) RT.



NOTE:

Mode 3 INA RT imposes the following restrictions on the AUA252() OCU:

- Dataport without SCEC may be assigned to any slot.
- Dataport with SCEC may be assigned to any slot except the last slot in each digroup. For all other slots, the slot to the immediate right of the dataport must remain empty.



NOTE:

The AUA252() OCU is not supported in FPD or FPI.

The AUA252() OCU can be used in any channel unit slot of a SLC Series 5 RT and can be used in combination with any mix of other SLC Series 5 channel units (CUs). If required, all 48 CU slots of a bank can be equipped with AUA252()

OCUs. Certain FPs such as INA RT and certain CUs such as BRITE[®] CUs (AUA90, AUA92, and AUA93) impose placement restrictions on the AUA252() OCU. For details, see AT&T 363-205-010, SLC Series 5 Carrier System Applications and Planning Guide.

SLC-2000 Access System

The AUA252() OCU is compatible with the following *SLC-2000* Access System releases:

- Universal and integrated; metallic and fiber *SLC-2000* R2.0 RT
- Universal, integrated, and INA; metallic and fiber; *SLC-2000* R3.1 COT/RT
- Universal, integrated, and INA; metallic and fiber; *SLC-2000* R3.2 COT/RT
- Universal, and INA; metallic and fiber; *SLC-2000* R3.3 COT
- Universal, integrated and INA; metallic and fiber, *SLC-2000* R4.0, R4.1, and R4.2 RT

The AUA252() OCU can be used in any channel unit slot of a *SLC-2000* COT, RT, or MSDT. It can be used in combination with any mix of other *SLC* Series 5 or *SLC-2000* CUs. If required, all 24 CU slots of a VCOT or VRT as well as the 6 CU slots of an MSDT can be equipped with AUA252() OCUs.

5ESS[®] Switch (Nail-Up/Hair-Pin)

TR08 Integrated Configurations

For TR08 integrated configurations, screen 3 of 18.15 (RT TR08) in recent change/verify (RC/V) must be updated to provide an SSV00 service type for the channels to be nailed-up or hair-pinned.

When the default software signaling mode is used (AB SIG option switch set to the "OFF" position), 7.11 (Nail-Up and Hair-Pin Specification) in RC/V must be inserted with lines 23, 25, and 26 provisioned as follows:

23. SIGMODE "NOSIG"

25. DDS "Y"

26. PATH NUM "1"

When the AB signaling mode is used (AB signaling option switch set to the "ON" position), 7.11 (Nail-Up and Hair-Pin Specification) in RC/V must be inserted with lines 23 and 25 provisioned as follows:

23. SIGMODE "AB"

25. DDS "N"

TR303 Integrated Configurations

TR303 integrated configurations, line 92 in screen 3 of 1.6 in RC/V must be updated to "Y".

Since only the default software signaling mode can be used (AB signaling option switch set to the "OFF" position), 7.11 (Nail-Up and Hair-Pin Specification) in RC/V must be inserted with lines 23, 25, and 26 provisioned as follows:

23. SIGMODE "NOSIG"

25. DDS "Y"

26. PATH NUM "1"

SW56 Applications

Figures 1 through 5 show typical SW56 applications for both universal and integrated SLC Carrier Systems.

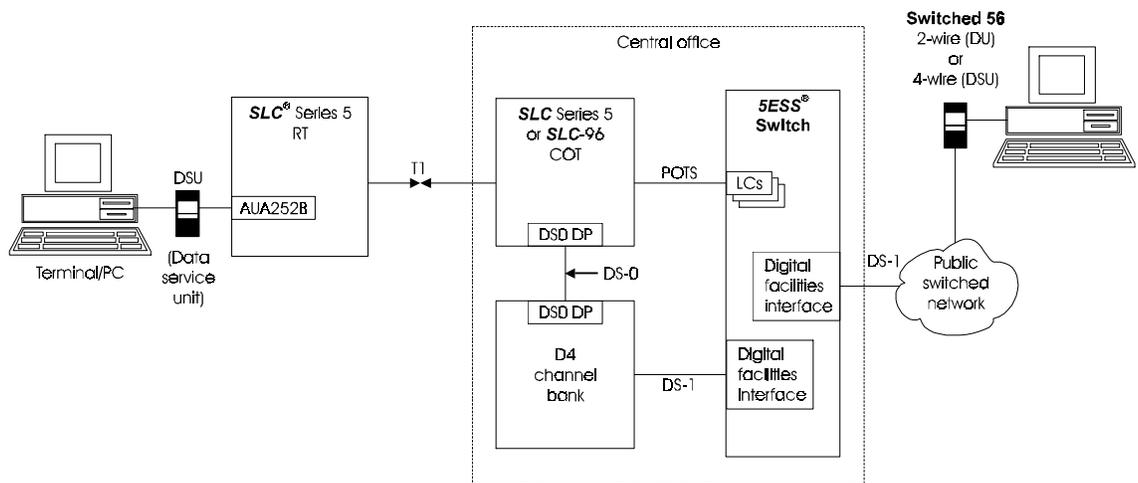


Figure 1. Switched 56 Access, Universal SLC Series 5 Carrier System

⇒ NOTE:
 AB signaling mode may be used for this configuration if the DS0 DP in the D4 bank is an Adtran DTDM.

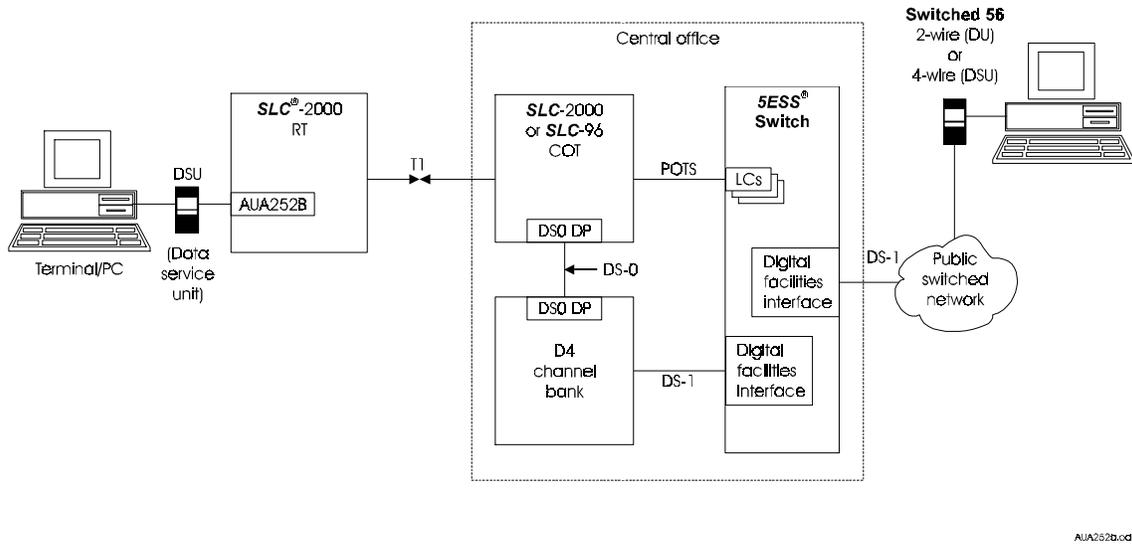
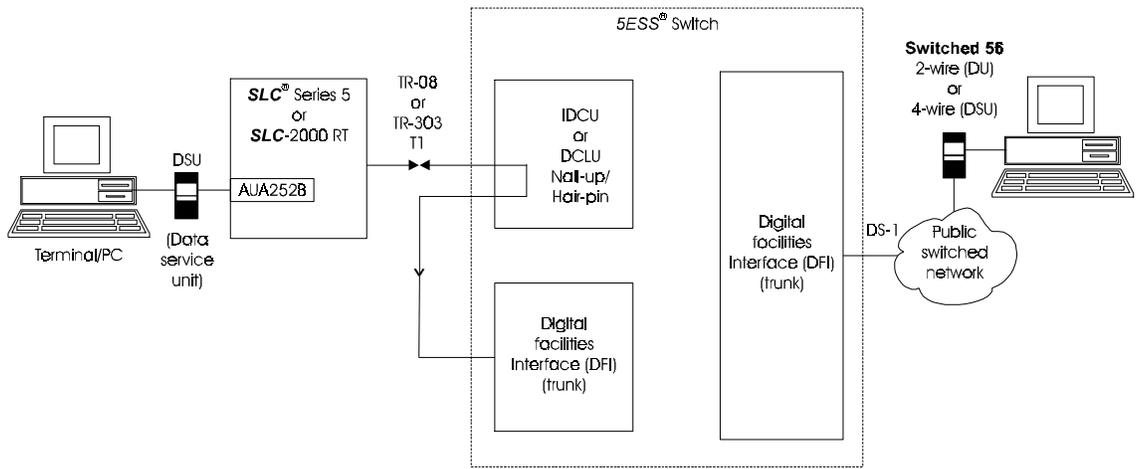


Figure 2. Switched 56 Access, Universal SLC-2000 Access System

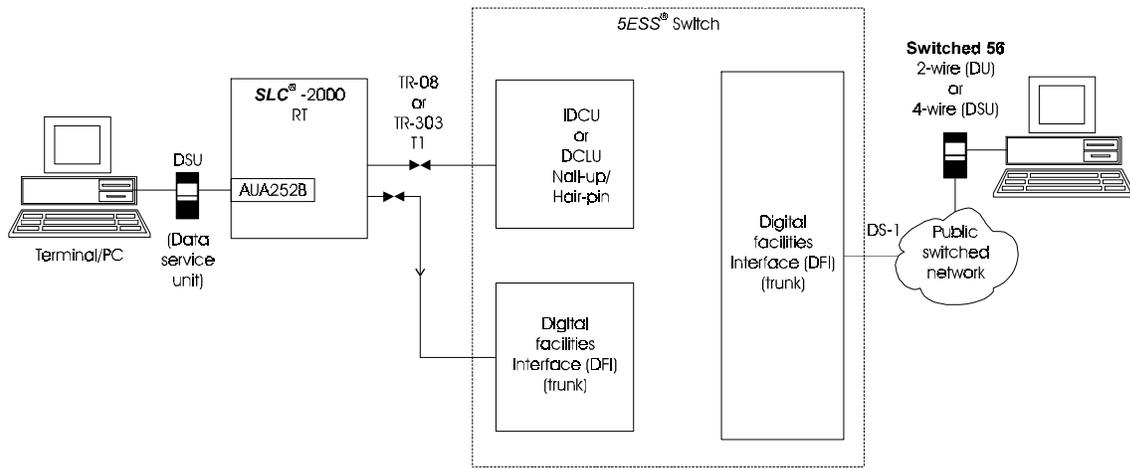
⇒ NOTE:
 AB signaling mode may be used for this configuration if the DS0 DP in the D4 bank is an Adtran DTDM.



AUA252c.pdf

Figure 3. Switched 56 Access, Integrated SLC Carrier System

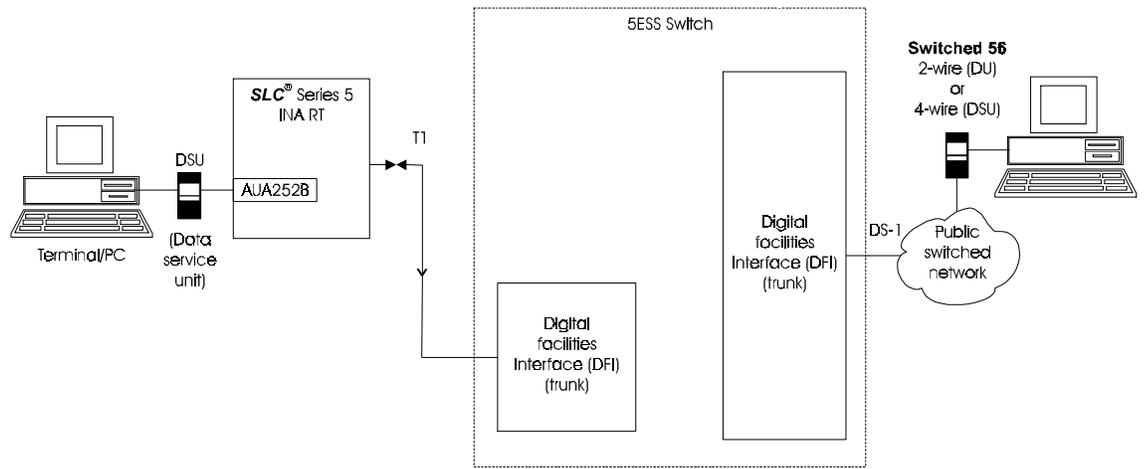
⇒ NOTE:
 AB signaling mode can be used for the TR08 configurations.



AUA252d.cdr

Figure 4. Switched 56 Access, SLC-2000 INA Digroup Application

⇒ NOTE:
AB signaling mode may be used for this configuration.



AUA252a.cdr

Figure 5. Switched 56 Access, SLC Series 5 INA RT

⇒ NOTE:
 AB signaling mode may be used for this configuration.

Specifications

The AUA252() channel unit conforms to the appropriate criteria of ANSI, Bellcore, FCC, GTE, REA, and UL¹ standards.

Table 2 lists the environment specifications.

Table 2. Environmental Specifications

<p>A. Temperature Range (Ambient)</p> <ol style="list-style-type: none">1. Operating, per TR-NWT-000057: in AT&T cabinet mounted RT, outside ambient temperatures of -40° F with no solar load to +115° F with maximum solar load and maximum power dissipation. AT&T cabinets are designed to assure 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.
<p>B. Relative Humidity</p> <ol style="list-style-type: none">1. Operating, per TR-NWT-000057. For outside ambient temperature 84° F or less, relative humidity of 5% to 95%. For ambient temperatures above 84° F, the relative humidity is limited to that corresponding to a specific humidity of 0.024 pounds of water per pound of dry air.2. Storage, per TR-NWT-000057: ambient temperatures 84° F or less, 10% to 95%. For ambient temperatures above 84° F, the relative humidity is limited to that corresponding to a specific humidity of 0.024 pounds of water per pound of dry air.

1 Registered trademark of Underwriters Laboratories, Inc.

Installation and Testing

Procedures for testing the AUA252() CU are given in AT&T 363-205-402, *SLC Series 5 Carrier System Channel Unit Installation and Testing*.

The AUA252(), in all its applications, is not compatible with mechanized loop testing (MLT), nor the pair gain test controller (PGTC), but it is compatible with the extended test controller (XTC) when used with *SLC Series 5 Feature Package C (FPC)* only.

Faceplate Features and Options

Figure 6 shows the AUA252() OCU faceplate and option switch locations. The faceplate has four LEDs, one push-button loopback switch, and one RJ-45 access jack.

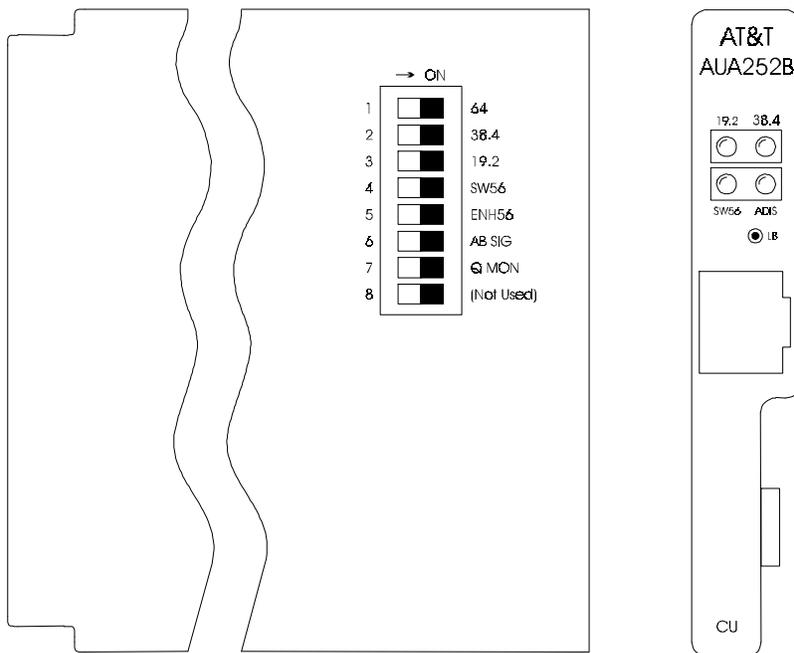
- **19.2 (Green LED):** When lit indicates the unit is optioned for 19.2 kb/s service.
- **38.4 (Green LED):** When lit indicates the unit is optioned for 38.4 kb/s service.
- **SW56 (Green LED):** When lit indicates the unit is optioned for SW56 service.
- **ADIS (Red LED):** When lit, steady, indicates the QMON function has detected excessive bipolar errors from the loop and has disconnected the loop from the DDS network. When flashing, the LED indicates the unit is executing a loopback, invoked locally or via the network.



NOTE:

The ADIS LED is also used to indicate a self-test failure. Upon insertion into the CU slot, a self-test is performed by the unit. During this self-test, the SW56 and ADIS LED will flash and then the 19.2 and 38.4 LED will flash. If a self-test failure is detected, the ADIS LED will remain lit after the self-test is completed.

- **LB (Push Button):** When a pin plug or other pointed instrument is used to depress this recessed push button, a PCM loopback is executed toward the subscriber's drop. The unit will continue to execute this loopback until the push button is depressed again. The ADIS LED will flash for the duration of the loopback.
- **RJ48S Access Jack:** This jack provides bridging access to the T&R (Transmit) and T1&R1 (Receive) pairs of the AUA252() OCU loop. This jack is compatible with the Telepath Industries TPI-95 Digital Loop Analyzer Test Set and other industry standard channel service units (CSU)/data service units (DSU).



AUA252f.cdr

Figure 6. AUA252B Faceplate and Switch Location

Table 3. Edge Connections For AUA252() Office Channel Unit

Finger	Function
1	Frame Ground
13, 17, 19, 20, 21	Circuit Ground
22, 23, 25, 50	+5 Volts DC
26	-48 Volts DC
29	T1
30	R1
31	T
32	R
49	-5 Volts DC

References

The following documents provide additional information about the *SLC Series 5 Carrier System* and *SLC-2000 Access System*:

- AT&T 363-205-010 *SLC Series 5 Carrier System Applications and Planning Guide*
- AT&T 363-205-101 *Craft Interface Unit, Description*
- AT&T 363-205-402 *SLC Series 5 Carrier System Channel Unit Installation and Testing*
- AT&T 363-208-000 *SLC-2000 Access System Applications, Planning, and Ordering Guide*
- AT&T 363-208-001 *SLC-2000 Access System User/Service Manual*
- AT&T 363-208-003 *SLC-2000 Access System Command and Message Manual*
- AT&T 915-710-115 *SLC Series 5 Carrier System Application Engineering*
- AT&T 915-710-116 *SLC Series 5 Carrier System Channel Unit Application and Prescription Setting.*

Technical Assistance

Follow local procedures for obtaining technical assistance. AT&T 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 AT&T Regional Technical Assistance Center at 1-800-225-RTAC.

Ordering Information

Additional copies of this document (AT&T 363-005-212) are available from the Customer Information Center — call 1-800-432-6600.

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