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## ***SLC*<sup>®</sup>-2000 Access System**

### ***SPQ*<sup>®</sup>334 Dual DS0 Dataport Channel Unit — 5SC3240**

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#### **Features/Functions**

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- Two fully functional DS0 dataports per channel card
- 2.4, 4.8, 9.6, 19.2, 38.4, 56, and 64 kb/s data rates
- Operates in release R3.3 *SLC*-2000 COT
- Enhanced Inventory
- AB signaling option
- 4-wire switched 56 kb/s service capability
- 4-wire bridging access faceplate jack

#### **Description**

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This data sheet describes the *SPQ334* dual digital signal zero (DS0) dataport (DP) channel unit (COMCODE 107590127) and is intended for the end-user of this unit. The *SPQ334* dual DS0 dataport channel unit (CU) is primarily used in the end-link of a digital data system (DDS) private line data service, but is also used in switched 56 kb/s (SW56) applications. A DDS end-link is the part of the service between a customer and the local central office. The *SPQ334* dual DS0 DP CU is always located in the *SLC*-2000 Access System central office terminal (COT).

The *SPQ334* dual DS0 DP channel unit provides two channels of service and serves as the interface between full-duplex synchronous digital data (bipolar return-to-zero format) on a 4-wire (4W) tip/ring side of the unit and the pulse code modulation (PCM) bitstream. The digital rate may be 2.4, 4.8, 9.6, or 19.2

kb/s (called substrates), or 38.4, 56 or 64 kb/s (called fullrates). All customer data, even when less than 64 kb/s, are embedded in the 64 kb/s bitstream. The line drivers and receivers present a balanced 135 ohm impedance across the signal frequency range.

For most applications the 4-wire tip/ring side of the CU will face another DS0 dataport CU in an interoffice carrier system, which connects the DDS end-link to a DDS hub office. The DS0 signal at the tip/ring interface has a range limitation of 1500 feet.

The *SPQ334* dual DS0 DP channel unit provides latching loopback capability for fault isolation and DDS-type testing. Splitting test access to the metallic leads is available through the *SLC-2000* user interface panel (UIP).

The *SPQ334* dual DS0 DP operates only in the *SLC-2000* Access System COT with release R3.3 (or higher).

Figure 1 shows a typical SW56 application for a universal *SLC-2000* Access System. Figure 2 shows the faceplate diagram for the *SPQ334* dual DS0 DP CU. Table 1 lists the features and functions of the DS0 dataports. Table 2 lists the option settings and Table 3 lists the edge connections for the *SPQ334* dual DS0 DP channel unit.

## Functions

Table 1 lists the features/functions of the SPQ334 dual DS0 DP channel unit and the AUA34B and AUA34 DS0 dataports.

**Table 1. Features and Functions of the DS0 Dataports.**

Features/ Functions	CUs		
	SPQ334	AUA34B	AUA34
Number of Circuits	2	1	1
Primary Data Rates (kb/s): 2.4, 4.8, 9.6, & 56 19.2 & 64 38.4	X X X	X X	X
Error Correction: MVEC & SCEC 19.2 kb/s EC	X X	X X	X
Zero Code Suppression	X	X	X
SW56 Option	X		
AB Signaling Option	X		
Faceplate Indicators: 19.2 kb/s * FAIL†	X	X	
4-Wire Bridging Access Faceplate Jack‡	X	X	
Enhanced Inventory	X	X	

\* Flashes when loopback is active - AUA34B only

† Flashes when loopback is active - SPQ334 only

‡ 4-wire bridging access faceplate jack also supplies the clock sources necessary to drive DDS-type test sets

## DDS

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For DDS applications the *SPQ334* dual DS0 DP 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.

## SW56

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The *SPQ334* dual DS0 DP CU also 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*<sup>®</sup> Switched 56 service and Sprint 56 of US Sprint<sup>®</sup>. The functions needed in the DS0 DP located in the COT are dependent on the Switched 56 operating mode provisioned in the OCU DP located in the RT.

When the OCU DP located in the RT is configured for switched 56 operation and in-band signaling, no special features are required in the tandem DS0 DP's. In this case, the *SPQ334* should be set for Switched 56 but not AB signaling (enable SW56 but not ABSIG). Provisioned this way, the *SPQ334* DS0 DP will function as if set for standard 56kb/s operation with SCEC disabled. When employed, this in-band signaling technique allows SW56 service to be provided over circuit configurations that contain tandemed digital signal zero (DS0) dataport units.

When the OCU DP located in the RT is configured for switched 56 operation with AB signaling, the tandem *SPQ334* DS0 DP must be provisioned with switched 56 as well as AB signaling (enable SW56 and also ABSIG) to ensure that the signaling information is transferred between the tandem DS0 DPs.

When the AB signaling option (also referred to as hardware signaling) is enabled, signaling is decoded from the COT 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 Figure 1, the AB signaling option can be employed.

## Maintenance

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Maintenance of the *SPQ334* dual DS0 dataport, and the circuit in which it is embedded, can be accomplished by use of loopbacks within the dataport, metallic access through the backplane test bus, and manual access through faceplate test jacks.

The DDS maintenance system relies primarily on loopbacks to isolate the trouble. These loopbacks can be latching and non-latching (alternating), and the *SPQ334* CU supports both types.

**NOTE:**

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

Full splitting metallic test access to the tip/ring pairs can be obtained via the *SLC-2000* UIP. The procedures for performing tests with the UIP are described in AT&T 363-208-001, *SLC-2000 Access System User/Service Manual*. Use of the UIP for testing requires that the ARM shelf be 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).

## Synchronization

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For all applications of the *SPQ334* dual DS0 DP channel unit, the *SLC-2000* Access System must be synchronized to a DDS type composite clock. The COT interface to the composite clock is the *SLC-2000* BDK260 system timing unit.

## Provisioning

The *SPQ334* dual DS0 DP channel unit has options that must be set before service can be provided. These options may only be set electronically.

Electronic provisioning information is entered using the *SLC-2000* CIT. Options for the channel unit are set by entering commands into the CIT which then transmits the option information to the system controller where the option information is stored in nonvolatile system memory. The system controller then writes the options into memory registers on the channel unit when the channel unit is installed. If the channel unit is already installed, the system controller writes the option information into the channel unit registers immediately after it receives the information from the CIT. Unplugging the channel unit does not erase the option information stored in system. Reinserting the channel unit causes the options to be rewritten immediately into the channel unit registers by the system controller.

**⇒ NOTE:**  
Use *COMMON LANGUAGE*<sup>1</sup> *CLEI* Code 5SC3240 when using the CIT to provision the *SPQ334* dual DS0 DP.

Table 2 lists the options set by the *SLC-2000* CIT for the *SPQ334* dual DS0 DP CU and the range of the options.

**Table 2. Options set by the CIT for the *SPQ334* dual DS0 DP CU**

Option	Range
Function code	DS0* or SW56
Subscriber Data Rate	2.4, 4.8, 9.6, 19.2, 38.4, 56* or 64 kb/s
Error Correction	NONE*, MVEC, or SCEC
All-Zero-Code Allowed	YES or NO*
AB Signaling	YES or NO*

\* These Default values will be selected if the options are not provisioned.

1. **Function code:** Select either dedicated DDS digital signal zero (DS0) or Switched 56 kb/s (SW56) operation.
2. **Subscriber Data Rate:** Enter the appropriate customer primary data rate. Any of the valid subrates or fullrates can be entered — 2.4, 4.8, 9.6, 19.2, 38.4, 56, or 64 kb/s. For SW56 service, this option is not available.

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

3. **Error Correction:** For 38.4, 56 and 64 kb/s services, the available error correction is either second channel error correction (SCEC) or NONE. For a data service at one of the subrates, majority vote error correction (MVEC) is the only selection. At 19.2 kb/s the *SPQ334* can support either SCEC or MVEC. When the *SPQ334* CU is optioned for 19.2kb/s service, the MVEC option invokes the single time slot error correction method described in "Contribution to the ANSI <sup>1</sup> T1 Standards Project," document #T1ZX1.4/89-023. When using SCEC error correction at 19.2 kb/s, an additional time slot is required.

Whenever SCEC error correction is selected, two PCM time slots are used for each DS0 DP circuit. The odd-numbered time slot is used for data and the even numbered time slot is used for error correction.

For SW56 service, error correction is not available.

4. **All-Zero-Code:** Two selections are available: YES or NO. When the All-Zero-Code option is set to YES, the *SPQ334* dual DS0 DP will allow eight consecutive 0s to be transmitted toward the OCU dataport at the RT. When this option is set to NO, two of the 0s, in any string of eight 0s, will be changed to 1s.

This option should be set to NO if the line interface unit (LIU) is NOT set to ZERO CODE SUPPRESSION or ZERO CODE SUBSTITUTION. If the line encoding option of the LIUs is set to binary 8 zero substitution (B8ZS) line coding, the OCU 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, All-Zero-Code is not available.

5. **AB Signaling:** Two selections are available: YES or NO. This option determines whether a hardware or software signaling method is used to detect signaling from the network if the SW56 option is selected. The hardware signaling option is enabled by setting the AB SIG option to YES.

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 using the *SLC-2000* multi-services distant terminal (MSDT), the AB signaling option should NOT be selected.

## Compatibility

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### Channel Units

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The *SPQ334* dual DS0 DP is end-to-end compatible with other dataports as follows:

- *AUA252*( ) OCU DP
- *AUA52*( )/*AUA152* OCU DP
- *SPQ452* dual OCU DP



**NOTE:**

Except for the *SPQ452*, not all features are available with above listed channel units.

### *SLC-2000* Access System

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The *SPQ334* dual DS0 DP is supported by *SLC-2000* Access System COT software Release 3.3 and later.

The *SPQ334* dual DS0 DP can be used in any COT channel unit slot and can be used in combination with any mix of the other *SLC-2000* Access System CUs.

The *SPQ334* dual DS0 DP is compatible with *SLC-2000* COTs in a universal configuration operating in the TR-08 or INA mode, and connecting to the RT over a fiber or metallic feeder.

The MSDT does not support the *SPQ334* dual DS0 DP.

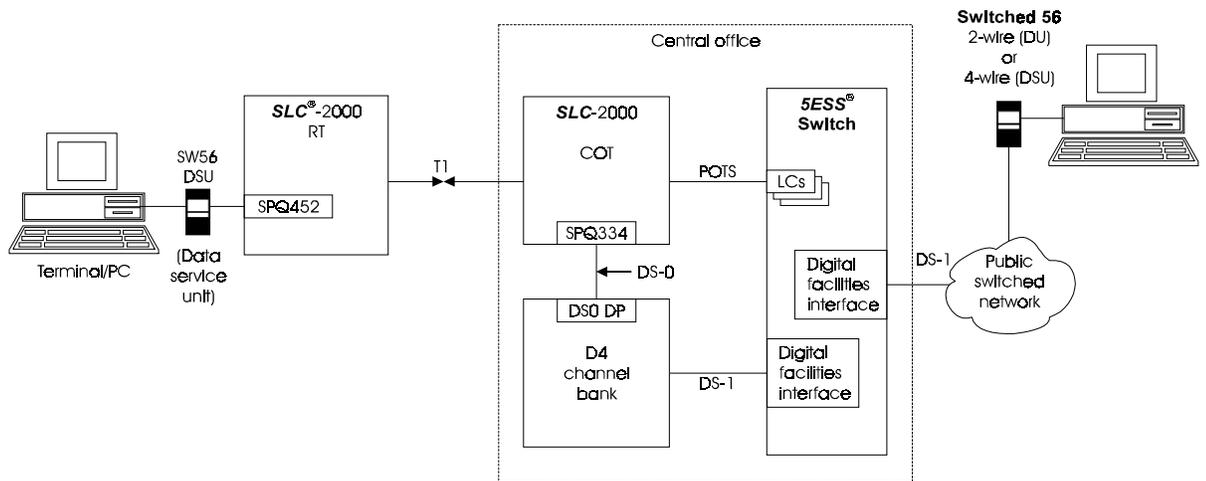
### *SLC* Series 5 Carrier System

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The *SPQ334* dual DS0 DP is NOT compatible with the *SLC* Series 5 Carrier system.

## SW56 Applications

Figure 1 shows a typical SW56 application using a universal SLC-2000 Access System.



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**Figure 1. 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.

## **Specifications**

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The *SPQ334* dual DS0 DP channel unit conforms to the appropriate criteria of ANSI, Bellcore, FCC, GTE, REA, and UL<sup>1</sup> standards.

## **Installation and Testing**

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Procedures for testing the *SPQ334* dual DS0 DP CU are given in AT&T 363-208-001, *SLC-2000 Access System User/Service Manual*.

The *SPQ334* dual DS0 DP, in all its applications, is not compatible with mechanized loop testing (MLT), nor the pair gain test controller (PGTC).

Jack access is provided to tip/ring pairs via two RJ-45 jacks on the *SPQ334* faceplate.

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1 Registered trademark of Underwriters Laboratories, Inc.

## Faceplate Features and Options

Figure 2 shows the *SPQ334* dual DS0 DP faceplate. The faceplate has one LED, two RJ45 jacks.

- **FAIL (Red LED):** When lit indicates either power up of the CU or a FAIL condition of either DS0 DP on the channel unit. The LED also flashes when a loopback is established.
- **RJ45 Access Jacks:** These jacks provide bridging access to the Transmit and Receive pairs of the *SPQ334* dual DS0 DP circuit. These jacks are compatible with the Telepath Industries TPI-95 Digital Loop Analyzer Test Set and industry standard channel service units (CSU)/data service units (DSU).

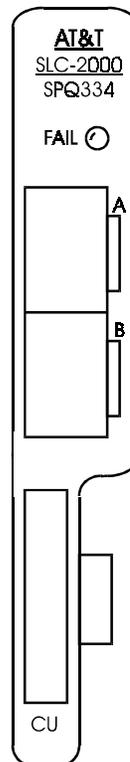


Figure 2. *SPQ334* Faceplate

**Table 3. Edge Connections For SPQ334 Dual DS0 Dataport Channel Unit**

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<b>Finger</b>	<b>Function</b>
1	Frame Ground
3	T2 (transmit, 2nd channel)
4	R2 (transmit, 2nd channel)
5	T3 (receive, 2nd channel)
6	R3 (receive, 2nd channel)
13, 17, 19, 20, 21	Circuit Ground
22, 23, 25, 50	+5 Volts DC
26	-48 Volts DC
29	T1 (receive, 1st channel)
30	R1 (receive, 1st channel)
31	T (transmit, 1st channel)
32	R (transmit, 1st channel)
49	-5 Volts DC

## **References**

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The following documents provide additional information about the SLC-2000 Access System:

- AT&T 363-205-004 *SLC-2000 Access System, MSDT, User/Service and Ordering Manual*
- 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 915-710-116 *SLC Series 5 Carrier System Channel Unit Application and Prescription Setting.*

## **Technical Assistance**

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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**

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Additional copies of this document (AT&T 363-005-332) are available from the Customer Information Center — call 1-800-432-6600.

## **Comments**

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Comments about this document can be directed to:

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