

CIRCUIT DESCRIPTION

CD-5D300-01
ISSUE 2D
APPENDIX 4AC
DWG ISSUE 9AC
DISTN CODE BT13

ELECTRONIC SWITCHING SYSTEMS
5ESS®
TRUNK UNIT
CIRCUIT

CHANGES

D. Description of Changes

D.01 Change on Issue 9AC of the SD are covered in LDI 8B. These changes specify the introduction of the SN102B Outgoing Trunk Circuit pack as option S. The SN102B circuit pack provides improved protection against lightning damage and is conditionally required in all offices equipped with the TN1058 or TN1058B line grid packs. The SN102B is downward compatible in all other system configurations wherever the SN102 is in use.

AT&T BELL LABORATORIES

DEPT NFNW232230-ZAK-EBH

Copyright © 1990 AT&T
All Rights Reserved.

Printed in U.S.A.

Page 1
1 Page

ELECTRONIC SWITCHING SYSTEMS
NO. 5ESS*
TRUNK UNIT
CIRCUIT

CHANGES

D. Description of Changes

D.1 Changes on Issue 8AC of the SD are covered in LDI Issue 5C dated August 4, 1983. These changes specify the use of the 494GB power unit as an option to the 494A power unit.

D.2 LDI Issue 5C specifies the 494GB power unit as a replacement for the original 494A power unit. This change also states that the 494GB can only be substituted for the 494A after the backplane change specified in LDI Issue 5D has been completed.

D.3 LDI Issue 5C also specifies that the 494GB power unit must be used at the Port St. Lucie installation to overcome 494A failures due to electromagnetic interference from an adjacent radio transmitter installation.

AT&T BELL LABORATORIES

DEPT 54315-GGS-WJG

NOTICE

This document is either
AT&T - Proprietary, or WESTERN
ELECTRIC - Proprietary

Pursuant to Judge Green's Order of August 5, 1983,
beginning on January 1, 1984, AT&T will cease to use
"Bell" and the Bell symbol, with the exceptions as set
forth in that Order. Pursuant thereto, any reference to
"BELL" and/or the BELL symbol in this document is here-
by deleted and "impounded".

*Trademark of AT&T Technologies, Inc.

CIRCUIT DESCRIPTION

CD-5D300-01
ISSUE 2D
APPENDIX 2D
DWG ISSUE 7D
DISTN CODE 7T13

ELECTRONIC SWITCHING SYSTEMS
NO. 5ESS*
TRUNK UNIT
CIRCUIT

CHANGES

D. Description of Changes

- D.1 Changes on Issue 7D of the SD are covered in LDI Issue 5B dated August 4, 1983.
- D.2 The additions listed in LDI Issue 5B include CAD figures that were inadvertently omitted from earlier issues. The CAD figures added are:
- (a) CAD 002 - to MDF
 - (b) CAD 003 - to MCTUO
 - (c) CAD 004 - to MCTU1
 - (d) CAD 005 - to fuse panel
 - (e) CAD 006, Option Y - CDI interconnection.

AT&T BELL LABORATORIES

DEPT 54315-GGS-WJG

*Trademark of AT&T Technologies, Inc.

Printed in U.S.A.

Page 1
1 Page

ELECTRONIC SWITCHING SYSTEMS
NO. 5ESS*
TRUNK UNIT
CIRCUIT

CHANGES

D. Description of Changes

D.1 Two major backplane changes are part of Issue 6A.

(a) The first change was covered in LDI Issue 5A, dated August 4, 1983. This change was required to correct a parity failure condition that occurred when out of service trunk circuit packs were physically removed from or inserted into the trunk unit shelf.

(b) The second change, covered in LDI Issue 5D, dated August 24, 1983, contained instructions for modifying the trunk unit to accept either the 494A or 494GB power unit.

D.2 The changes specified in LDI Issue 5A were required to correct a parity failure condition that occurred when trunk circuit packs were removed from or inserted into a trunk unit shelf. When a trunk circuit is determined to have failed, that trunk circuit pack is taken out of service until it is replaced with a good circuit.

To eliminate parity hits when circuits were physically removed or inserted, some of the original backplane pins were removed and pins of varying lengths were substituted. This change causes ground, power, and clock signals to be sequenced in a suitable manner whenever boards are replaced. This sequencing eliminates the crosstalk between the circuit being replaced and the in-service circuits and thus corrects the parity failure condition.

D.3 The change specified in LDI Issue 5D allows the use of either the 494A or 494GB power unit. The 494A power unit was shipped with the early trunk units. A cost-reduced replacement (the 494GB) was subsequently developed; when it became available in sufficient quantities, the 494A model was to be rated Mfr Disc. Since the 494GB was not totally pin-compatible with the 494A, some backplane cuts and white wires were required in order to substitute the 494GB for the 494A. These are specified in LDI Issue 5D. After the changes are made, the 494A or the 494GB may be used. This allows the offices that contain 494A power units to continue to use these units until a failure or other circumstance mandates their replacement.

AT&T BELL LABORATORIES

DEPT 54315-GGS-WJG

*Trademark of AT&T Technologies, Inc.

NOTICE

This document is either
AT&T - Proprietary, or WESTERN
ELECTRIC - Proprietary

Pursuant to Judge Greene's Order of August 5, 1983,
beginning on January 1, 1984, AT&T will cease to use
"Bell" and the Bell symbol, with the exceptions set out
forth in that Order. Pursuant thereto, any references to
"BELL" and/or the BELL symbol in this document is hereby
deleted and "omitted".

COMMON SYSTEMS
NO. 5 ESS
TRUNK UNIT

TABLE OF CONTENTS	PAGE
SECTION I - <u>GENERAL DESCRIPTION</u>	1
1. <u>PURPOSE OF CIRCUIT.</u>	1
SECTION II - <u>DETAILED DESCRIPTION</u>	1
1. <u>GENERAL</u>	1
2. <u>TRUNK CIRCUITS LOCAL-TOLL</u> ,	1
3. <u>CONTROL AND DATA INTERFACE.</u>	2
4. <u>TEST AND ACCESS</u>	2
5. <u>POWER UNIT.</u>	2
SECTION III - <u>REFERENCE DATA.</u>	2
1. <u>WORKING LIMITS.</u>	2
2. <u>FUNCTIONAL DESIGNATIONS</u>	2
3. <u>FUNCTIONS</u>	2
4. <u>CONNECTING CIRCUITS</u>	2
5. <u>MANUFACTURING TESTING REQUIREMENTS.</u>	2
SECTION IV - <u>REASONS FOR REISSUE.</u>	2

SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 The trunk unit (TU) is a peripheral unit of No. 5 Electronic Switching System (ESS) which is connected to the module control unit (MCU) and the time slot interchange unit (TSIU). It provides for the termination of high traffic voice frequency (VF) trunks. It is divided into two separate and identical service groups (SG). Each converts one to thirty-two 2-wire VF signals to one pulse code modulated (PCM) bitstream using time-division techniques.

SECTION II - DETAILED DESCRIPTION

1. GENERAL

1.01 The function of the TU is to translate analog voiceband signals to and from PCM signals for switching through No. 5 ESS. The TU trunk circuits convert the incoming VF signals to 8-bit PCM samples. The PCM samples from up to thirty-two trunk circuits are multiplexed and processed by the control and data interface

(CDI) to form the 4.096-Mbit signal that is transmitted to the TSIU of No. 5 ESS. The same circuit packs perform the complementary decoding function.

1.02 In addition to VF processing, circuits are provided for transmission of per-channel signaling and supervisory information. This information is transmitted once per framing interval.

1.03 The control channel allows the MCU to interrogate the TU for fault conditions or during diagnostic testing. It also provides the MCU with the capability of controlling the TU for normal transmission, diagnostic testing, or facility access.

2. TRUNK CIRCUITS LOCAL-TOLL

2.01 Several types of trunk circuit designs are available for specific 2- or 4-wire local and local/toll applications. Local applications, 2-wire unit types include loop supervision outgoing (LSO), loop supervision incoming (LSI), test trunk (TST), and 2-wire E and M (2EM). The only 4-wire local trunk available is the 4-wire E and M (4EM). Also available are several types of local/toll trunk circuit designs for specific 2- or 4-wire local/toll applications. The toll application 2-wire unit types include toll loop supervision outgoing (TLO), toll loop supervision incoming (TLOI), and the toll 2-wire E and M (T2EM). The only 4-wire toll trunk available is the toll 4-wire E and M (T4EM). Trunk circuit types may be mixed by groups of either two or four in and combination within a SG as required by the office.

2.02 The trunk circuit provides the interface between the office VF trunk circuits and the common equipment units. Each trunk circuit includes transmitting and receiving VF circuits and signaling supervisory circuits. In the transmitting circuit outgoing VF information is sampled at an 8-kHz rate, providing PCM signals which are fed to the control and data interface (CDI). Also, outgoing per-channel signaling and supervisory information is appended to the voice samples. On the receiving side of the trunk circuit, the PCM samples are accepted from the CDI and converted back to VF. In addition, signaling and supervisory information from the CDI is demultiplexed and converted to signaling and supervisory information for connection to the VF trunk.

3. CONTROL AND DATA INTERFACE

3.01 The control and data interface provides timing signal for up to thirty-two trunk circuits and processes the PCM signal being transmitted both to and from No. 5 ESS.

3.02 Control messages from the MCU are interpreted and distributed within the service group. Replies to control messages are formatted and transmitted to the MCU.

4. TEST AND ACCESS

4.01 The test and access unit provides facility access to the metallic service unit through a relay matrix under the control of the MCU.

4.02 The test and access unit provides the ability to test the signaling capabilities of each trunk circuit in a service group.

5. POWER UNIT

5.01 The Power Unit (PU), which accepts a fused output from the fuse panel, converts the nominal -48 volt dc central office battery to regulated voltages of office battery to regulated voltages of +5.0 volts and -5.0 volts required for the operation of the TU circuitry.

5.02 Light-emitting diodes are provided on the faceplate for out-of-service and converter fail status. A start button and an on-off switch which is equipped with a locking mechanism are provided to insure that power is turned off when the unit is inserted or removed. Test points are provided to monitor output voltages.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 -41.75V to -53.5V

2. FUNCTIONAL DESIGNATIONS

2.01 None

3. FUNCTIONS

3.01 Provides for the translation of VF signals on 2- or 4-wire pairs to PCM signals suitable for No. 5 ESS.

3.02 Provides supervisory and signaling information as required.

3.03 Provides for the conversion of -48 volt office battery to the regulated voltages required for TU operation.

3.04 Provides hardware for diagnostic testing by No. 5 ESS.

4. CONNECTING CIRCUITS

4.01 Module Control Unit Application Schematic - SD-5D040-01

4.02 Time Slot Interchange Unit Application Schematic - SD-5D041-01

4.03 Metallic Service Unit Application Schematic - SD-5033-01

4.04 ESS No. 5 DC Power Distribution Application Schematic - SD-5D005-01

4.05 494A Power Unit - 48 Volt Input, +5 Volt, 5 Amp, -5 Volt, 1 Amp Outputs - APS-843258

4.06 No. 5 ESS Trunk Unit Test and Access Circuit - CPS-SN100

4.07 No. 5ESS Trunk Unit Control and Data Interface - CPS-SN101

4.08 No. 5 ESS Trunk Unit Loop Supervision Outgoing Trunk Circuit - CPS-SN102

4.09 No. 5 ESS Trunk unit Loop Supervision Incoming Trunk Circuit - CPS-SN103

4.10 No. 5 ESS Trunk Unit 4-Wire E and M Trunk Circuit - CPS-SN104

4.11 No. 5 ESS Trunk 2-Wire E and M Trunk Circuit - CPS-SN105

4.12 No. 5 ESS Trunk Unit test Trunk Circuit - CPS-SN107

4.13 No. 5 ESS Trunk Unit Toll Loop Supervision Outgoing Trunk Circuit - CPS-SN112

4.14 No. 5 ESS Trunk Unit Toll Loop Supervision Incoming Trunk Circuit - CPS-SN113

4.15 No. 5 ESS Trunk Unit Toll 4-Wire E and M Trunk Circuit - CPS-SN114

4.16 No. 5 ESS Trunk Unit Toll 2-Wire E and M Trunk Circuit - CPS-SN115

5. MANUFACTURING TESTING REQUIREMENTS

5.01 The Manufacturing Testing Requirements are specified in X-79692.

SECTION IV - REASONS FOR REISSUE

CHANGES

D. Description of Changes

D.1 To include local/toll trunk circuit in the circuit description.

CD-5D300-01 - ISSUE 2D

- D.2 To reflect changes made in issue 2A, 3B, 4A, and 5D of the SD.
- D.3 Circuit Note 101 was updated.
- D.4 Circuit Notes 102 and 103 were updated and changed to Information Notes 302 and 303.

BELL TELEPHONE LABORATORIES, INC.

DEPT 54225-REB-JFO