CIRCUIT DESCRIPTION

CD-5X221-01
ISSUE 1
APPENDIX 3B
DWG ISSUE 4B
DISTN CODE BT13

5ESS® SWITCHING EQUIPMENT
DIGITAL CONFERENCE
SWITCHING SYSTEM
CABINET
CIRCUIT

CHANGES

D. Description of Changes

By using a combination of one (1) conditioning pack UN526 and one (1) DS1 network interface pack TN1383B for every 24 ports, product design information (PDI) 4B reduces the current total of 72 digital signal 1 (DS1) ports in three shelves to a single shelf providing the same 72 DS1 ports.

AT&T BELL LABORATORIES

DEPT NA5350300-OW-FNG

CIRCUIT DESCRIPTION

CD-5X221-01
ISSUE 1
APPENDIX 2B
DWG ISSUE 3B
DISTN CODE BT13

5ESS® SWITCHING EQUIPMENT
DIGITAL CONFERENCE
SWITCHING SYSTEM
CABINET
CIRCUIT

D. Description of Changes

D.1 PDI 3B adds the new Modular Fuse/Filter Unit (MFFU) J5D003FJ-1, to the
Digital Conference Switching System Cabinet.

AT&T BELL LABORATORIES

DEPT 55535-OW-CEJ

CIRCUIT DESCRIPTION

CD-5X221-01
ISSUE 1
APPENDIX 1M
DWG ISSUE 2M
DISTN CODE BT13

5ESS® SWITCHING EQUIPMENT
DIGITAL CONFERENCE
SWITCHING SYSTEM
CABINET
CIRCUIT

D. Description of Changes

D.1 PDI 2M adds the new Bezel Cover and the 300A Cabinet Fan/Fuse indicator
circuit to the Digital Conference Switching System Cabinet.

AT&T BELL LABORATORIES

DEPT 55535-OW-CEJ

5ESS® SWITCHING EQUIPMENT
DIGITAL CONFERENCE
SWITCHING SYSTEM
CABINET
CIRCUIT

SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 The Digital Conference Switching System (DCSS) cabinet was developed to house the units that provide the operating environment for the Pulse Coded Modulation (PCM)

carrier, control and data buses, and Electronic Industries Association (EIA) RS-232C links for the operator positions and the Administration/Maintenance link.

2. GENERAL DESCRIPTION OF OPERATION

2.01 The DCSS houses the controller unit, up to three condition/DS1 units, the Fuse/Filter Unit (FFU), the Fan Unit (FU), and the alarm panel. It may also house a 30 to 24 channel converter for those countries that use CCITT30 Pulse Coded Modulation (PCM) format.

2.02 The controller unit houses two fully-redundant controllers, each of which is capable of controlling the entire system, and which contains the CPU, memory, alarm maintenance interface, user interface, clock sync, conference summary, and console interface.

2.03 The condition/DS1 unit houses the circuitry that allows the controller to interrogate and scan the ports, send instructions to the ports, modify signals through special processing, and create transmission paths.

2.04 The FFU provides fusing for all equipment units located in the DCSS cabinet. Filtering is done on the -48V DC input voltage.

2.05 The FU provides air flow for maintaining the correct operating temperatures.

2.06 The alarm panel houses indicator lamps and switches used by service personnel to diagnose faults and to monitor and control system status.

SECTION II - DETAILED DESCRIPTION

1. FUNCTIONAL DESIGNATIONS

1.01 The DCSS has five subfunctions:

1. the controller unit,

2. the condition/DS1 unit,

3. the Fuse/Filter Unit (FFU),

4. the Fan Unit (FU) and

5. the 30/24 converter.

The controller performs time slot interchanging and conference summing of the PCM speech. It also contains the firmware for the DCSS, the non-volatile RAM, the user interface, and the console interface. The DS1 unit contains the port conditioners, the DS1 port, and other port cards. The FFU provides fusing for all equipment located in the DCSS cabinet. The FU provides air flow that maintains the correct operating temperatures. The 30/24 converter, an optional unit for countries that use 30 channel PCM, provides the conversion from CCITT30 PCM to 24 channel PCM (T1).

2. FUNCTIONS

CONTROLLER UNIT

2.01 The controller has several subfunctions:

1. primary control,

2. switching,

3. conferencing,

4. maintenance,

5. and input/output channels for DCSS system functions.

One controller unit has the bus structure to handle up to 240 ports (not all available at this time). The unit contains the 495FA power packs, the TN1287 user interface packs, the TN1379 clock sync. packs, the TN1381 CPU packs, the TN1300 conferencer packs, the TN1294 tone announcement packs, and the TN1288 alarm/maint interface pack.

2.02 The 495FA power packs convert the -48V to the voltages needed by the unit, and supply the 5V for the alarm panel circuits. Either of the two converters is able to power the entire unit.

2.03 The TN1287 user interface pack provides eight ports for Intelligent Communications Workstations (ICWs) through individual Universal Synchronous/Asynchronous Receiver/Transmitters (USARTs). Any of the following BAUD rates may be selected for each of the USARTS: 300, 600, 1200, 2400, 4800, 9600, or 19,200. Each USART can be configured to operate over an (EIA) RS-232C link. The DCSS will support two of these packs in each side of the controller. Therefore the maximum number of ICWs for the system is sixteen. (Sixteen connections from each controller side.)

2.04 The TN1379 system clock synchronizer synchronizes the DCSS to incoming digital facilities and provides the DCSS with a +/- 32 ppm high accuracy clock. It also provides slip-free switching between processors, reference links, slip detection between two incoming synchronization links, and an indication that the signals on the links approximate stratum four frequency limits. Two TN1379 packs are required for the system.

2.05 The TN1381 pack provides the CPU functions of overall control and coordination of the system operation. It has a dual architecture which operates in an active-standby mode and conducts continuous maintenance checking on all circuits. Two TN1381 packs are required for the system.

2.06 The TN1300 enhanced conferencer pack performs the time slot interchanging and conference summing of PCM speech. The conferencer circuits form the conferences and perform all switching (time slots). Two TN1300 packs are required for the system.

2.07 The TN1294 provides the tone plant and announcement interface facilities for the DCSS user operations. Up to four packs may be installed.

2.08 The TN1288 alarm/maintenance interface pack provides terminal interfaces, a dual-port RAM, sanity arbitration, and the alarm panel interface. The admin/maint connections are made through this pack. One pack is required for the system.

CONDITION/DS-1 UNIT

2.09 The 495JA power packs convert the -48V to the voltages needed by the unit, and supply the 5V for the alarm panel circuits. Either of the two converters is able to power the entire unit.

2.10 The UN525 condition packs provide signal conditioning to overcome critical performance problems that are possible with analog networks, including loss, noise summing, and echoes. This conditioning process uses automatic gain control, noise suppression, and echo cancellation.

2.11 The TN1382 DS1 PCM pack contain the bi-directional PCM interface circuits, which process PCM data into the proper format for the condition packs and the DCSS network.

2.12 The TN1383 DS1 Network interface pack connects the DS1 circuitry with the DCSS system processor and the digital network, and passes maintenance and alarm information to the DCSS.

2.13 The TN1623 E&M pack provides tie trunk service for the DCSS. It is used in this application as a vehicle to test the trunk links between the DCSS and the host 5ESS® Switch. One pack is required for each system, and is to be installed in the first cond/DS1 unit in the cabinet.

FUSE/FILTER UNIT (FFU)

2.14 The normal input for the fuse panel is -48 volts, with the return (RTN) isolated from frame ground in the equipment cabinet. Each fuse panel has four circuits which are fed from 20-amp fuses in the power distributing cabinet, or from the power plant, by way of the filter panel. Each of the four circuits feeds sixteen load-fuse positions for a total of sixty-four available fuses. The first two circuits must be fed from the A (or 0) bus. The remaining two circuits must be fed from the B (or 1) bus. Note that all units are fused from both buses.

FAN UNIT (FU)

2.15 The fan unit provides air flow for maintaining the correct operating temperatures. Three separate fans are used in the fan unit, but only two are required to provide sufficient air flow, which means that operating temperatures will be maintained in the event of a single fan failure. Fan alarm circuitry is included to report the failure of a fan.

30/24 CHANNEL CONVERTER

2.16 The Power and Alarm Module (PAM) is a dual-function pack, which provides the power for the unit. It

also monitors the alarms in the unit, which are passed on to the alarm panel. Two of these packs are installed in the unit.

2.17 The PCM converter is comprised of two circuit packs: the digital control pack and the system timing pack. These two packs provide the features to convert the two different PCM formats. One pair of packs is required for each Cond/DS1 unit in the cabinet.

3. INTERFACES

EXTERNAL INTERFACES

A. 24 or 30+2 Channel Carrier

3.01 The 24 or 30+2 channel carrier is the link between the 5ESS® Switch and the DCSS cabinet. The 24-channel format is otherwise referred to as T1 carrier. The 30+2 channel format is known as CCITT30. There may be from one to three links for this cabinet. The number of conferee ports desired determines the number of links required. The maximum number of conferees that this cabinet can process is seventy-two.

B. Power Input

3.02 The power input to the cabinet is -48V DC, with the return (RTN) isolated from frame ground in the equipment cabinet. Each FFU panel has two circuits that are fed from a 20-amp fuse in the power distribution cabinet or from the power plant.

C. OSPS Operator Links

3.03 The OSPS operator links are RS-232C format links between the DCSS and the OSPS Intelligent Communications Workstation (ICW). The DCSS is able to connect to sixteen operator positions. There are two links from the DCSS to each ICW.

D. Alarm Signals

3.04 The DCSS alarm panel reports three alarms to the 5ESS® Switch: minor, major, and catastrophic. All three are displayed at the Maintenance (Master) Control Center (MCC) terminal, and the minor and major alarms are also displayed at the DCSS admin/maint terminal.

The Fuse and Fan alarms are reported to the 5ESS® Switch in the same manner as other cabinets. There are also LEDs in the cabinet bezel to indicate these alarms.

E. Test Link

3.05 There is a 56A responder connected to the DCSS on an analog port, used to test the digital links from the 5ESS® Switch to the DCSS. Only one connection to the DCSS is required.

F. Admin/Maint Link

3.06 This connection is used to do the administration functions on the DCSS, and is also used for general maintenance functions on the cabinet, ie. alarm reports. It is an RS-232C format link. The cabinet provides for two admin/maint links. However, only one is required for normal operation.

INTERNAL INTERFACES

A. Data Bus

3.07 The Input and Output (I/O) busses both provide for 8-bit parallel data between the conferencing circuits and the port/conditioning circuits. The address and data busses transmit 32-bit parallel information between major system components. The busses are duplicated, one for each side (active/standby) of the DCSS.

B. Cabinet Alarms

3.08 The 30/24 Ch. converter sends a signal to the alarm panel of the DCSS when there is a problem detected. The alarm panel reports the alarms to the 5ESS® Switch (see external alarms above). There are two alarms: minor and major.

C. 30/24 Ch. PCM

3.09 When equipped with a 30/24 channel converter, the 24 channel PCM is contained within the cabinet. The 30 channel PCM is the format of the information to and from the 5ESS® Switch.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

VOLTAGES

1.01 -48 volts +4.5, -6.25 volts.

AMBIENT TEMPERATURE

1.02 0° TO 44°C (at circuit pack or aisle.) 0° TO 50°C short term.

RELATIVE HUMIDITY

1.03 10-75% normal term; 5-95% short term.

2. FUNCTIONS

2.01 The function of this cabinet is described in Section 1 of this Circuit Description.

3. CONNECTING CIRCUITS

3.01 Power Distribution Panel.

4. REFERENCES

4.01 Circuit Description, Fuse/Filter Unit - SD-5D087-01.

4.02 Circuit Description, Fan Unit - SD-5D019-02.

4.03 Circuit Description, Controller Unit - SD-MP301010-01.

4.04 Circuit Description, Condition/DS1 Unit - SD-MP301022-01.

5. GLOSSARY

5ESS®	No. 5 Electronic Switching System
CCITT	The International Telegraph and Telephone Consultive Committee
DC	Direct Current
DCSS	Digital Conferencing Switching System
DS1	Digital Signal Type 1
EIA	Electronic Industries Association
FFU	Fuse/Filter Unit
FU	Fan Unit
ICW	Intelligent Communications Workstation
LED	Light Emitting Diode
MCC	Maintenance (Master) Control Center
OSPS	Operator Services Position System
PCM	Pulse Coded Modulation
RAM	Random Access Memory
RTN	Return
USART	Universal Synchronous/Asynchronous Receiver Transmitter

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