5ESS® SWITCHING EQUIPMENT
MESSAGE SWITCH CABINET
CIRCUIT

CHANGES

D. Description of Changes

D.1 Incorporate new feature - Communication Module Processor (CMP). The Communication Module Processor (CMP) consists of a core board and a memory board. The CMP resides in Message Switch Peripheral Unit (MSPU) Community 1 along with the Pump Peripheral Controller (PPC) and Foundation Peripheral Controller (FPC). The Message Switch Control Unit (MSCU) accesses the CMP, via the Input / Output Microprocessor Interface (IOMI), through dual access memory located in the CMP. The function of the CMP is to provide Recent Change response time and Administrative Module (AM) memory relief by migrating the Recent Change and associated data base functions from the AM to the CMP.

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5ESS™ SWITCHING EQUIPMENT MESSAGE SWITCH CABINET CIRCUIT

CHANGES

D. Description of Changes

D.1 Documentation change to bring SD into agreement with manufactured product.

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5ESS™ SWITCHING EQUIPMENT
MESSAGE SWITCH CABINET
CIRCUIT

SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF THE CABINET

1.01 The 5ESS Message Switch (MSG) cabinet transfers control messages between the 3B20D Processor and an Switching Module (SM), or between Switching Modules. In single-module offices, the control messages are passed to the SM over Network Control and Timing (NCT) links. For multimodule offices, the control messages are passed through the Time Multiplexed Switch (TMS) to the SMs over NCT links. The following functions are provided by the MSG cabinet:

(a) Duplicated control message data links for SMs.

(b) Control message time slot routing between the Central Processor and an SM or between two SMs.

(c) Office synchronization to other switching systems.

(d) Duplicated message switching (even in the event of hardware failures).

(e) Control and diagnostic access of the Message Interface/Clock Unit (MICU or MICU2) and the TMS.

(f) Power alarming and control from the Central Processor.

SECTION II - DETAILED DESCRIPTION

1. MESSAGE INTERFACE BUS

1.01 The Message Interface Bus (MIB) provides the Message Switch Cabinet with a synchronous data path for control message time slots. The circuit packs that provide this function together are: the Link Interface (LI), the Message Interface (MI), Module Message Processors (MMPs), and the Pump Peripheral Controller (PPC). For greater message switch reliability, the cabinet provides a duplex MIB function with cross coupling between the Message Switch Peripheral Units (MSPU or MSPU2) and the MICU or MICU2.

1.02 Control message time slots from SMs, via the TMS, are transmitted over fiber optics to the LI. The LI converts the optical transmission to serial TTL levels, reformats the data into 4-bit nibbles, and transmits it to the MI along with the appropriate clock signals. The MI receives the nibbles, reformats them back to serial data, and demultiplexes them for transmission to the various MSPUs. The MI uses the timing signals from the LI for its internal synchronization and provides the MSPUs with timing signals. In the reverse direction, the MMPs transmit serial control message time slots to the MI. The MMPs use the timing signals from the MI to synchronize data transmission. The MI multiplexes all these time slots from the MSPUs and then reformats the serial data into the 4-bit nibbles for transmission to the LI. The LI converts the nibbles to

serial data and provides the optical transmission to the SMs through the TMS.

1.03 The PPC in MSPU community 1 is used to "pump up" the memory in the SMs during office bring-up and program updates. Serial data time slots from the PPC are sent in the identical manner as the MMPs; however, transmission from an SM is used only for diagnostics.

2. INPUT/OUTPUT MICROPROCESSOR INTERFACE

2.01 The Input/Output Microprocessor Interface (IOMI) function provides the message switch cabinet with a means of routing control messages between the Central Processor (CP) and the SM or between SMs. The intelligence for the IOMI is provided by a 16-bit bit-slice processor located in the Message Switch Control Unit (MSCU). For greater message switch reliability the cabinet provides a duplicated IOMI function with cross coupling between the CP and MSCU.

2.02 Control messages originating from SMs are placed in a dual-access memory located on the MMPs. A service request flag is raised for the MSCU to read the dual-access memory. The MSCU retrieves the message from the MMP and determines its destination. If the CP is the destination, the MSCU processor will request a CP memory transfer and serially transmit the message to the CP. If the SM is the destination of the message, the MSCU processor will write the appropriate MMP dual-access memory.

2.03 The PPC and the Foundation Peripheral Controller (FPC) in the MSPU community 1 are also part of the IOMI function. However, no control messages are routed to them. All messages to the PPC are used specifically for pumping up the SM memory. All messages to/from the FPC are used for control and diagnostic access of the MICU and the TMS.

3. CONTROL AND DIAGNOSTIC ACCESS LINK

3.01 The Control and Diagnostic Access Link (CDAL) provides the Message Switch Cabinet with a means of servicing, initializing, and controlling various subdevices. The subdevices controlled by the FPC are the MI, the LI, the network clock (NCLK), and the TMS. For greater message switch reliability, the cabinet provides a duplex CDAL function cross-coupled between the FPC and the duplex MI.

3.02 The link between the MI and the FPC consists of serial transmit data, serial receive data, transmit clock, four device selects, and four device interrupts to the FPC. The MI multiplexes the transmit data, receive data, and clock for all other subdevices. The four select signals are used by the FPC to indicate with which subdevice it is communicating. The four interrupts going to the FPC are from each of the four subdevices. These interrupts are used by the subdevices to signal the FPC for servicing.

4. NETWORK CLOCK

4.01 The NCLK timing provides the TMS with a means of synchronizing the 5ESS Office to other switching systems. The 5ESS Office can be run with stand-alone NCLK synchronization. However, with circuit pack changes in the MICU or MICU2 and a corresponding cabling option, the NCLK can be externally synchronized to incoming T1 transmission lines. For greater message switch reliability, the cabinet provides a duplex NCLK timing function with cross-coupling between each side.

4.02 The stand-alone NCLK uses an on-board oscillator to produce an 8-kHz clock sent to the LI in the single-module office or to the TMS in

the multimodule office. The LI or TMS use the 8-kHz clock to provide synchronization within the office through the NCT links. A 2-kHz cross couple is provided between the NCLKs for better reliability of the NCLK function.

4.03 The externally synchronized NCLK uses incoming T1 transmission lines as its reference source to produce the 8-kHz clock. In this configuration, the message switch cabinet option (y) must be installed for the connection to the Digital Signal cross-connect (DSX).

4.04 There are two versions of the network clock in the MICU2; Network Clock - Model 1 (NCLK1), and Network Clock - Model 2 (NCLK2). NCLK2 provides additional capabilities over NCLK1 and will eventually replace the NCLK1 as the only 5ESS network clock. NCLK1 allows the 5ESS system to be used only in medium-stability applications. The NCLK2 will enable the 5ESS system to be used in both domestic and high-stability export applications.

5. POWER ACCESS AND CONTROL

5.01 The power access and control provides the MSG cabinet with power, alarming, and control.

5.02 -48V feed and return is connected to the cabinet where it is filtered and fused. Individual units connect to the fuse panel to provide voltage to their power converters. The power converters change the -48V to their proper circuit pack voltage and ground.

5.03 Control and alarming of the power converters is provided by individual Control and Display (C&D) circuit packs. The C&D circuit provides both manual and 3B control of the power converters. The 3B monitors the C&D for fuse alarms, power alarms, and requests for out-of-service.

5.04 Cabinet 0 is powered from the A bus, and Cabinet 1 is powered from the B bus. Therefore, the MSG could tolerate a bus failure and still process messages.

SECTION III - REFERENCE DATA

1.01 See the individual unit and circuit pack CDs.

SECTION IV - REASONS FOR REISSUE

D. Description of Changes

D.1 Corrected documentation error in App Fig. 2, CAD 030 and added mnemonics, composite diagrams, and block diagrams.

D.2 Drawing issue 5B, LDI 1D provided for the addition of the optional Message Interface Clock Unit - Model 2 (MICU2) and all of the associated cabling information to the message switch cabinet.

D.3 Drawing issue 4B, LDI 1B provided for the additions of a Message Switch Peripheral Unit, Model 2 (MSPU2), List 4 of the Fuse/Filter Unit, and associated cables to the message switch cabinet. This equipment is added for offices equipped with 33 to 48 Switch Modules or Remote Switching Modules.

D.4 Drawing issue 3D, LDI 1A changed the terminal number in the destination column of CAD 030. This was a documentation change only.

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