CIRCUIT DESCRIPTION

CD-5D123-01
ISSUE 2A
APPENDIX 3B
DWG ISSUE 5B
DISTN CODE BT13

5ESS® SWITCHING EQUIPMENT
REMOTE INTEGRATED SERVICES
LINE UNIT
CABINET
CIRCUIT

Changes

C. Changes in Circuit Requirements Other Than Those Caused by Changes in Apparatus.

C.1 Incorporate Modular Fuse Filter Unit (MFFU) into cabinet.

C.2 Add new wiring list (WB) to provide alarm wiring when cabinet is equipped with MFFU.

Description of Changes

D.1 Pages A1-A3, B1-B9, C1, C2, D1-D10, GB1,GB2,GB2A,GB3,GB3A,GB4,GB4A,GB5,GB36,GB37 and H1 are superseded by issue 5B, and converted to syscad format.

D.2 Update FS 1 to show new MFFU option J and mark FF4 as option K.

D.3 Add page to FS 3.

D.4 Update FS 4 showing options J & K.

D.5 Add option K notation to App Fig 1.

D.6 APP FIGs. 1A, 2A, 4A, 5A, 35A, 36A, 37A, 38A, 43A, 44A, 47, 48 have been added.

D.7 Update Circuit Note 101.

D.8 Update Equipment Notes 201, 203, 204, 205, 206 with option J & K notations.

D.9 Correct Equipment Note 219.

D.10 Update Information Notes 302, 303, 304, 305 and 306 with option J & K notations.

D.11 Correct Information Note 307.

D.12 Add option notation to CADs 001, 006, 007, 008, and 009.

D.13 Add CADs 001A, 002B, 003B, 006A, 052A, 059A, and 060.

D.14 Correct CAD 011A.

AT&T BELL LABORATORIES DEPT NA5340100-HRB-CHS

5ESS® SWITCHING EQUIPMENT
REMOTE INTEGRATED SERVICES LINE UNIT
CABINET
CIRCUIT

SECTION I – GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 The Remote Integrated Services Line Unit (RISLU) cabinet was developed to house the units that provide the operating environment for the Pulse Coded Modulation (PCM) carrier, Control and Data Buses, subscriber line terminations, and

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optional Operator Services Position System (OSPS) connections.

2. GENERAL DESCRIPTION OF OPERATION

2.01 The RISLU houses the Integrated Services Line Unit (ISLU), the Digital Line Trunk Unit-RISLU (DLTU-R), the Fuse/Filter Unit (FFU), the Fan Unit (FU), and the optional Link Adapter Unit (LAU).

2.02 The ISLU provides terminations for the subscriber lines. They may be a combination of any of the following types: 4-wire digital "T", 2-wire digital "U" or analog "Z". The ISLU provides ringing and high level service functions as required by the line circuits. The ISLU houses the Common Control Processor (CCP), Common Control Interface (CCI), and Common Data (CD) packs, which provide access to the signaling and control bits of time slots transmitted to/from the DLTU-R.

2.03 The DLTU-R provides for the terminating of the PCM links from the host 5ESS® Switch office. Also, it regenerates the PICB and PIDB buses to the ISLU, and provides a clock reference.

2.04 The FFU unit provides fusing for all equipment units located in the RISLU cabinet.

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

2.06 The LAU provides a remote alarm section and a terminal adapter section. The alarm section comprises up to six circuit packs. The terminal adapters perform protocol conversion between the 5ESS® Switch (RISLU) and external data links to an OSPS Administrative Processor (OAP) or Directory Assistance System/Computer (DAS/C) system.

SECTION II - DETAILED DESCRIPTION

1. FUNCTIONAL DESIGNATIONS

1.01 The RISLU has five subfunctions: the Integrated Services Line Unit (ISLU), the Digital Line Trunk Unit (DLTU-R), the Link Adapter Unit (LAU), the Fuse/Filter Unit (FFU), and the Fan Unit (FU). The ISLU provides the termination to the subscriber, ringing, battery, etc. The DLTU-R provides the termination of the PCM carrier from/to the host SM, conversion to/from PICB and PIDB signaling, and a timing reference to the ISLU. The LAU provides the connections between the operator services positions and the ISLU, and scan points for the environmental alarms. The FFU provides fusing for all equipment units located in the RISLU cabinet. The FU provides air flow for maintaining correct operating temperatures.

2. FUNCTIONS

INTEGRATED SERVICES LINE UNIT (ISLU)

2.01 The ISLU has several subfunctions: the Common Data (CD), the Common Control Processor (CCP), the Common Control Interface (CCI), the Metallic Access Network (MAN), the High Level Service Circuit (HLSC), the Ring Generator (RG), the Line Group Control (LGC), the Line Group Power (LGP), and the Auxiliary Power (AP).

2.02 The CD provides multiplexing of data onto the attached PIDBs and the dispersal of control information from the Common Control packs to the line groups. The pack can terminate up to four duplex PIDBs and allow the connection of a line to any of the 128 time slots leaving the unit.

2.03 The CCP and CCI pair provide termination of the PICBs from the DLTU-R. A mailbox interface maps an address spectrum into memory, several registers and masks, and scan and distribute points. The Unit Processor (UP) complex includes ROM/EPROM, RAM, timers, mailbox interface, scan interface, and peripheral sequencer. The sequencer drives the control stream to the line groups in the drawers and performs the parallel-to-serial conversion.

2.04 The MAN provides a means of interconnection between High Level Service Circuits, Ringing Generators, Metallic Test buses, and the customer loop. This network is also used to connect a spare line card to a line in the event of a fault.

2.05 The HLSC provides the short per-call testing and non-standard functions, such as multi-party ringing and coin. It can also provide for special ringing.

2.06 The RG provides standard POTS ringing. The appropriate cadence is achieved by bridging the ringing source on and off the line at the proper time. The generator is not capable of ringing all lines in all line groups simultaneously, but it does meet service requirements. Per the current issue of the J-drawing, there are two orderable ringing frequencies: 20 and 25 Hz.

2.07 The LGC provides the duplex-to-simplex conversion between the Common Control and Common Data and up to 32 line cards in the group. Another important function of the LGC is to reclock data transmitted to the Common Data packs. Scan information from the 32 line cards is collected by the LGC and is held for transmission to the CD pack.

2.08 The LGP provides +5 volt power to the line cards.

2.09 The AP provides -5 volt power to the Z (analog) line interface cards.

2.10 The 553A power pack replaces the LGC and the AP described in the previous two sections. The main purpose of the replacement is to reduce the hardware needed in the line card drawers. The effect is to make available the positions that were used by the AP pack. When equipped with the 553A power pack, the ISLU will now support 512 "Z" type (analog) line packs.

DIGITAL LINE TRUNK UNIT-RISLU (DLTU-R)

2.11 The DLTU-R has the following subfunctions: the Digital Facilities Interface - Remote Type 1 (DFI-R1), the Digital Facilities Interface - Remote Type 2 (DFI-R2), the Remote Clock (RCLK), the Power Start Pack, and the Equalizer.

2.12 The DFI-R1 provides one end of the basic link between the host 5ESS® Switch and the RISLU cabinet for control, traffic and clock reference. This interface can be for 24 channel (T1) or 30+2 channel (CCITT30) carrier. Basically, the 24 or 30 channel signaling is converted to PICB and PIDB formats for use by the ISLU, as well as back to 24- or 30-channel carrier for transmission to the host. Also, various RISLU cabinet alarms are monitored.

2.13 The DFI-R2 provides one end of the optional links between the host 5ESS® Switch and the RISLU cabinet for traffic. This interface can also be 24 or 30 channel, but must be the same format as the DFI-R1 used. This circuitry does the 24 (or 30) channel-to-PIDB conversion to the ISLU and the PIDB-to-24 (or 30) channel conversion to the host.

2.14 The RCLK circuitry provides the timing reference to the DFIs and the ISLU. The 24 (or 30) channel

facility is the source for the reference. Control of the remote clock is by a special PICB supplied by the DFI-R1.

2.15 The Power Start Pack prevents the DLTU-R from powering up when the -48V supply is first applied. This is to prevent current surges. There is a faceplate-mounted switch that activates the unit. This switch is only activated when the -48 volt power is completely removed from the unit, not when packs are added/removed.

2.16 The Equalizer interface provides 16 passive equalizers, one for each possible 24-channel link to the RISLU. There are five circuit pack codes that may be used, depending on the length of cable from the Digital Cross-Connect (DSX-1) to the RISLU.

LINK ADAPTER UNIT (LAU)

2.17 The LAU has two subfunctions: remote alarms, and terminal adapters. The alarm section has three circuit pack codes: the Scan Applique Circuit (SAC), the Terminal Adapter (TA), and the Alarm Conversion Circuit (ACC). The terminal adapter section uses the TA pack. The two sections are independent of each other.

FUSE/FILTER UNIT (FFU)

2.18 The fuse panel normal input is -48 volts, with the return (RTN) isolated from frame ground in the equipment cabinet. Each fuse panel has eight 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 eight circuits feeds eight load-fuse positions for a total of 64 available fuses. The first four circuits must be fed from the A (or 0) or the B (or 1) bus. These circuits feed the ISLU. The next two circuits are always from the A (or 0) bus. The remaining two circuits are always from the B (or 1) bus. The last four circuits feed the

rest of the unit in the RISLU cabinet. Note that all units except the ISLU require power from both buses. Alarms that are generated when a fuse operates are sent to the plug-in circuit pack, where they are combined to illuminate a LED for the appropriate half of the fuse panel. Also, an electrical signal is sent form the fuse panel to each cabinet bezel to light an LED, and to the DFI-R1 packs in the DLTU-R to send a message to the host office of the problem.

FAN UNIT (FU)

2.19 The FU provides air flow for maintaining correct operating temperatures. Three separate fans are used in the fan unit. Only two are required to provide sufficient air flow, thereby ensuring that correct operating temperatures are maintained in the event of a fan failure. Circuitry to detect and report a fan failure to the DLTU-R and light the LED in each cabinet bezel is provided. A fan failure alarm may be retired manually.

3. INTERFACES

EXTERNAL INTERFACES

A. 24 or 30+2 Channel Carrier

3.01 This is the link between the Host 5ESS® Switch office and the RISLU cabinet. The 24 channel format is otherwise referred to as T1 carrier. The 30+2 channel format is known as CCITT30. There is a minimum of two links required and there may be up to twelve.

B. Subscriber Lines

3.02 These are the usual telephone cables from a subscriber to the office. Loop lengths are defined by the type of line cards installed. "T", "U", and "Z" line cards may be intermixed in the RISLU. The cabling used is to be the same type as would be

used if the connections were to an ISLU in a central office. There are no special requirements beyond those of the ISLU, i.e. protector blocks, MDF, etc.

C. Power Input

3.03 The power input to the cabinet is -48 volts, with the return (RTN) isolated from frame ground in the equipment cabinet. Each fuse/filter panel has four circuits that are fed from a 20-amp fuse in the power distribution cabinet or from the power plant.

D. LAU Terminal Adapter

3.04 The Terminal Adapters may be synchronous or asynchronous. Synchronous Terminal Adapters are used to convert to ISDN T-interface to the BX.25 synchronous protocol used by the DAS/C. Asynchronous Terminal Adapters are used to convert the ISDN T-interface to the asynchronous RS-232C interface used by the OAP.

E. LAU Alarm Circuits

3.05 The alarm section can monitor up to 48 external alarms. These circuits provide -48V relay closures in normally open or normally closed form. The Terminal Adapters in the alarm section are used to communicate with the host 5ESS® Switch through the RISLU.

INTERNAL INTERFACES

A. Peripheral Interface Control Bus (PICB)

3.06 A PICB consists of five wire-pairs that are used for balanced data transmission and signaling. The clock pair carries a 2.048 MHz gated clock signal. The data OUT pair carries serial information to the peripheral units from the CI. The data IN pair carries serial data from the peripheral units back. The select lead carries signaling information that is used to select the active side. The interrupt pair transmits service requests from the peripheral units. The cable length of the PICB can vary, but has a maximum limit of 20 feet. Data is to be gated in and out of the peripheral unit on the negative edge of the clock.

B. Peripheral Interface Data Bus (PIDB)

3.07 A PIDB consists of four balanced, differentially driven RS422 compatible, twisted wire pairs. The PIDB carries 4.096 megabit/second serial data, a 4.096 MHz clock, and 8 KHz sync. A PIDB provides the physical link for traffic. The PIDB cable can vary in length but has a maximum of 20 feet.

C. Cabinet Alarms

3.08 There are four alarms at the cabinet level that are provided for all applications. They are the power, battery, fuse, and fan alarms. The power and battery alarms are to be connected to the power plant to monitor it for loss of commercial power or -48V problem. These may or may not be used depending on the office preference. The connections for the remaining two alarms are provided as part of the List 1 cabinet wiring. The fuse alarm monitors the fuse alarm boards in the Fuse/Filter units, which check all the fuses in the cabinet. The fan alarm monitors the fan alarm board in the fan unit. The two DFI-R1 packs in the DLTU-R each have the ability to monitor these four alarms. The cabinet alarm cable has blocking diodes in it to prevent the two packs from interfering with each other. This also prevents a short duration alarm condition during the time one of the DFI-R1 packs is being unplugged. Only one of the DFI-R1 packs monitors the alarms at any given time.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

VOLTAGES

1.01 -48 volts +4.5, -6.25 volts.

AMBIENT TEMPERATURE

1.02 0° to 50°C (at circuit pack or office aisle.)

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, Integrated Services Line Unit - SD-5D091-01.

4.02 Circuit Description, Digital Line Trunk Unit-RISLU - SD-5D204-01.

4.03 Circuit Description, Link Adapter Unit - SD-5D064-01.

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

4.05 Circuit Description, Fuse/Filter Panel - SD-5D087-01.

5. GLOSSARY

ACC	Alarm Conversion Circuit
AP	Auxiliary Power
CD	Common Data
CCI	Common Control Interface
CCP	Common Control Processor
DAS/C	Directory Assistance System/Computer
DFI	Digital Facilities Interface
DLTU-R	Digital Line Trunk Unit-RISLU
FFU	Fuse/Filter Unit
FU	Fan Unit
HLSC	High Level Service Circuit
ISDN	Integrated Services Digital Network
ISLU	Integrated Services Line Unit
LAU	Link Adapter Unit
LED	Light-Emitting Diode
LGC	Line Group Controller
LGP	Line Group Power
MAN	Metallic Access Network
OAP	OSPS Administrative Processor
OSPS	Operator Service Position System
PICB	Peripheral Interface Data Bus
PCM	Pulse Coded Modulation
RCLK	RISLU Clock
RG	Ringing Generator
RISLU	Remote Integrated Services Line Unit
RTN	Return
SAC	Scan Applique Circuit
SM	Switching Module
TA	Terminal Adapter
UP	Unit Processor.

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