OPERATIONS SUPPORT SYSTEMS
COMMON REMOTE TEST SYSTEM 5A
RTS 5A FRAME CIRCUIT

CHANGES

D. Description of Changes

D.1 On sheets B2, B6, B9, B12, and D1 Note 109 is added to indicate that ringing and -72 volts are not required when testing with the 53A test position. The 53A test position is used for testing No. 4 ESS trunks.

D.2 Information concerning the connection to SMAS 3 from the remote test port on sheet B5A is eliminated since this connection will never be implemented.

D.3 Note 6 is added to sheet B5A indicating a reference to SD-1P107-01 for data set connections when using the 53A test position.

D.4 A connection of talk and TSV lines is added to auxiliary network on sheet B5A for 53A test position (TP) use.

D.5 Note 7 is added to sheet B5B showing DDS clock connection when using the 53A TP.

D.6 Note 3 on sheet B5B is modified to include testing of PSDC trunks on No. 4 ESS.

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OPERATIONS SUPPORT SYSTEMS
COMMON REMOTE TEST SYSTEM 5A
RTS 5A FRAME CIRCUIT

CHANGES

D. Description of Changes

D.1 The JMB buffer is added to provide isolation of the RTS5A control circuit logic pulses from the JMB cable going to the remote test ports. This is required to improve the rise time of pulses within the control circuit that go out on the JMB cable, and thereby eliminate erratic operation.

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OPERATIONS SUPPORT SYSTEMS
COMMON REMOTE TEST SYSTEM 5A
RTS 5A FRAME CIRCUIT

CHANGES

D. Description Of Changes

D.1 Z option is rated Mfr Disc and is replaced by W option. W option is added which provides a -72 volt supply for testing -72 volt circuits. A new 135A1 power unit has been designed which is used in the PU4 position in place of the 131H1 power unit. The 135A1 has an additional -24 volt output that is stacked with -48 volts office battery to provide -72 volts. The 135A1 power unit will also supply the +24 volts required if +24 volt office battery is not available.

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OPERATIONS SUPPORT SYSTEM
COMMON REMOTE TEST SYSTEM 5A
RTS 5A FRAME CIRCUIT

CHANGES

D. Description of Changes

D.1 Note 4 has been added to Sheet B2 and Note 3 has been added to Sheet B9. These notes say that interrupt superimposed ringing consists of 20Hz (2 seconds on, 4 seconds off) superimposed on -48 Vdc.

D.2 Note 5 of Sheet B3 and Note 5 of Sheet B10 have been modified to allow the power converter outputs to be run with 20 gauge wire. This has been done to allow the output wires to be run in local cables with the maximum current of 2.75 amperes in the wires.

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OPERATIONS SUPPORT SYSTEMS
COMMON REMOTE TEST SYSTEM 5A
RTS 5A FRAME CIRCUIT

CHANGES

D. Description of Changes

D.1 Note 107 has been added to Sheet D1.

D.2 Sheets B1, B6, B8, and B12 have been changed to show CO ground connected explicitly to frame ground.

D.3 Lead designations have been changed: $\overline{\text{MEMW}}$ to $\overline{\text{MEMW2}}$, $\overline{\text{MEMWR}}$ to $\overline{\text{MEMW2R}}$, $\overline{\text{MEMR}}$ to $\overline{\text{TRPRG}}$, and $\overline{\text{MEMRR}}$ to $\overline{\text{TRPRGR}}$, on Sheets B5A, B14, and G1A.

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OPERATIONS SUPPORT SYSTEMS
COMMON
REMOTE TEST SYSTEM 5A
RTS 5A FRAME CIRCUIT

CHANGES

D. Description of Changes

D.1 Table AA added to show JMA cabling information to enhancement shelf.

D.2 Remove 711 connector module from CAD4.

D.3 Add 711 connector module to CAD12.

D.4 Add sheet H1 showing physical arrangement of JMC BUS connections with 711-type connectors.

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OPERATIONS SUPPORT SYSTEMS
COMMON
REMOTE TEST SYSTEM 5A
RTS 5A FRAME CIRCUIT

TABLE OF CONTENTS

SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 This drawing covers the mounting arrangement, power, and fusing of four Remote Test System 5A (RTS 5A) frame types available.

1.02 The 7-foot controller frame J1P033C (C Bay) comes with one SMAS 5A/5B-RTS 5A control circuit and a capacity of up to two remote test ports (RTPs). Two 7-foot remote test port frames J1P033D (D Bays) can be used with the C Bay to extend the RTP capacity to a maximum of 18.

1.03 The 11-foot 6-inch controller frame, J1P033A (A Bay), comes with one SMAS 5A/5B-RTS 5A control circuit and a capacity of up to eight RTPs. Addition of one RTP frame J1P033B will extend the RTP capacity to a maximum of 20.

2. GENERAL DESCRIPTION OF OPERATION

2.01 The SMAS 5A/5B-RTS 5A control circuit (controller) is a microprocessor system that is used to configure RTPs and connect them to telephone circuits being tested. Circuit testing is initiated by a craftsperson sitting at a 52A test position and entering the circuit number to be tested. This information is sent to the near-end process controller (PC1A), a minicomputer, which calls the controller on a private line or DDD link. The controller will acknowledge, and, for the case of a DDD line, will hang up and call back on a different (originate only) line. Once the link is established, the interchange of control signals between the PC1A and controller begins.

2.02 The controller is used to connect a circuit to be tested to an available RTP and determine how many RTPs are equipped. One RTP per access point is required, and all RTPs may be used simultaneously by a multiplicity of testers. An ac-dc volt-ammeter, a resistance-capacitance meter, a level-frequency meter, and a noise meter are part of the controller hardware. The measurements are automatically made on receipt of appropriate commands from the 52A test position. Transmission test tones are also supplied by the controller.

2.03 Using the controller, the RTP can be configured to test 2-, 4-, and 6-wire circuits that are accessed via the Switched Maintenance Access System (SMAS) 5A or 5B. DC supervisory conditions and terminations may be applied to accessed circuits as well as many of the standard voiceband tests and

signaling tones. Controllable level adjustments are available to translate from standard internal levels to various accessed circuit transmission level points (TLPs).

SECTION II - DETAILED DESCRIPTION

1. FUSING FOR -48, +24, AND -72 VOLTS ON J1P033A CONTROLLER FRAME AND RINGING - FS1

1.01 Sheet B1 supplies -48 volts to the controller and RTPs on two separate feeders, A and B. The controller requires low voltages, which are fused by P1, P2, and P3. P4 is the fuse for an optional +24 volt converter for offices not having +24 volts. This voltage is required to operate local test ports (LTPs).

1.02 An RTP requires two separate -48 volt supplies, which are fused by three fuses, RB( ), RB( ), and RBI( ). Four RTPs are fused from the -48A feeder and four from the -48B feeder. The RTPs also use +24 volts, which is fused by RT(Y).

1.03 This system can be used with a maximum of 18 LTPs, and they are fused in pairs by L(Z). When +24 volt office battery is available, Y option is used. When a +24 volt converter is used, Z option is wired.

1.04 Sheet B2 shows wiring features for -72 volts and ringing. Ringing and -72 volts are not required for RTS operation and should be equipped only if required in circuit testing or when available. The -72 volts is fused individually to each RTP by fuse RP(W). The three ringing sources are each fused only once per RTS 5A system.

2. POWER SUPPLIES FOR J1P033A FRAME - FS2

2.01 This drawing shows wiring arrangements for required power units PU1, PU2, and PU3, and optional converter PU4. Operation is similar on all converters, so only the operation of PU1 will be described.

2.02 PU1 is driven by -48A and central office ground. If low voltage occurs due to faulty converter operation or a shorted output, contact LVA closes and connects -48A to low voltage alarm lead LVA2. Diode BD1 prevents a sneak path from occurring if -48 volts is on LVA2 and the fuse to PU1 opens. Under that condition, without BD1, -48 volts will be applied from LVA2 through contact LVA and into PU1. A large surge through contact LVA can cause it to fail.

2.03 PU1 and PU2 provide power from the logic and linear circuits of the controller and future test enhancement modules (see SD-1P112-01), while PU3 is used exclusively by the controller. Optional unit PU4 provides +24 volts to RTPs and LTPs.

3. J1P033A FRAME ALARMS - FS3

3.01 This circuit provides alarm information to the office using contact closures and a lamp (FRA). Controller fuses are connected to the major alarm circuit using relay 48MJA since loss of any of these voltages causes the entire system to become inoperative. The +24 volt converter power is also wired to the major alarm circuit using relay MJB since loss of this voltage causes all LTPs to become inoperative.

3.02 Since the RTPs are fused on two buses, loss of less than the maximum number of RTPs will still allow the system to be used. The -72 volt and +24 volt office supplies that drive the RTPs and LTPs are fused to the ports individually. Loss of less than the maximum number of ports will still permit system operation and therefore are considered minor alarms. The -48 volt supplies to the RTPs are similarly fused. Relays 48 MNA, 48 MNB, 72 MN, and 24 MN connect these alarms to the minor alarm circuit.

3.03 The red frame alarm lamp (FRA) is located at the top of the bay and will light if there is a major or minor alarm.

3.04 Major alarms due to operation of the 48 MJA or 48 MJB relays can be connected into the major audible and major visual office alarm circuits by means of this drawing.

3.05 Minor audible and minor visual alarm circuitry is also provided for connection into the office network.

3.06 The major and minor alarms have been combined to drive a telemetry circuit if remote monitoring is required.

4. INTERUNIT CONNECTION - FS4

4.01 Sheets B5A and B5B show the interconnections between various circuits in SMAS 5A/B and RTS 5A.

4.02 On Sheet B5A coordinates A0 to G0, there are leads going to SD-1P106-01 and SD-99645-01. These control leads are used in LTP operation and for controlling a maintenance connector network. They terminate on SD-1P107-01 on connectors J1 through J14 of that drawing, and their options are explained in the control circuit.

4.03 The control circuit uses data sets (coordinate 5A/C2) for communication with the PC1A, which can be DDD, private line, or private line with DDD backup. Data set leads leaving the control circuit will be some combination of PLT,R (5A/H0) and subscriber lines (5A/H4). These configurations are shown in detail on SD-1P107-01.

4.04 Logic leads A0 through A11 to $\overline{\text{MEMR}}$ at 5A/B3 originate in the control circuit and chain to all RTPs on the JMB cable. These signals configure the RTPs for proper logic operation. A logic terminator 14D4 is used to supply a resistive termination to these logic buses.

4.05 Shielded pair TTMS, RTMS, (5A/C3) is run as a daisy chain from all RTPs to the controller. This pair is used by the controller for measuring level, frequency, and noise in circuits connected to the RTPs.

4.06 The signal leads at 5A/E3 between RCV1,2 and 404 Hz are part of the JMA cable. These leads originate in the controller and go to all RTPs. This group consists of tones generated by the controller and dc meter leads used by the controller.

4.07 RTP unit J1P033AF consists of two RTPs (5A/D7), and circuit packs can be ordered separately for each RTP. Each RTP requires two sets of originate-only subscriber lines 5A/A9 and 5A/D9 to enable a craftsperson to communicate over an accessed circuit. CD-1P108-01 provides a description of the RTP and its control leads.

4.08 Sheet B5B is used to describe interconnections between the controller, test enhancement modules, and the RTPs.

4.09 Lead group DRO-BSYR, originating in the controller and going to SD-99560-01, is used to drive the connector group network controller. This lead group leaves the controller on connector J15 of SD-1P107-01.

4.10 Leads MODU30 to 1MHz0, originating in the controller and going to the test enhancement modules, are logic leads that the controller uses to drive the enhancements. These signals are run to all enhancement modules and they comprise the JMC cable.

4.11 Signal leads SFDT, 1004 Hz, MFTTO, and their associated grounds are part of the JMA cable and go from the controller to both the enhancements and RTPs. The JMA cable is run from the controller to all enhancement modules and RTPs with all JMA signals, but the enhancement connector going to the JMA bridging adapter is wired to connect only the proper signals.

4.12 The LTM cable consisting of the LTM AA, AB, and AC buses are used to interconnect circuits under test between RTPs and enhancement modules. An accessed circuit can be connected to an RTP and then to an enhancement module via an LTM bus. The enhancement is then used for signal generation and/or measurement.

5. FUSING FOR -48, +24, AND -72 VOLTS ON J1P033B REMOTE TEST PORT FRAME - FS5

5.01 Eleven-foot 6-inch RTP frame J1P033B (B Bay) has a maximum mounting capacity of six RTP units (J1P033AF). Each RTP unit contains two RTPs [(ODD) and (EVEN)] that are fused separately. A full RTS 5A using 11-foot 6-inch frames will contain one B Bay that extends the system to its maximum of 20 RTP.

5.02 The -48 volt distribution to the RTPs is supplied by two feeders, -48A and -48B. Odd numbered RTPs are supplied by -48A and even numbered RTP by -48B. Each RTP requires three fuses to -48 volts, RD( ), RB( ), and RBI( ).

5.03 Fuse FALM is used to provide -48 volt power for an alarm lamp at the top of the B Bay.

5.04 Each RTP uses +24 volt battery, which can be supplied by office battery when available (Option Y), or by a power unit rcunted in the A Bay (Option Z). The +24 volts is fused by RI( ).

5.05 The -72 volts is not required to operate an RTP but it is used in circuit testing. It is supplied when available or required and is fused by RP( ).

5.06 All fuses in the B Bay are connected to the minor alarm circuit.

6. J1P033B FRAME ALARMS - FS6

6.01 The B Bay alarms are all connected to the minor alarm circuitry. Loss of voltage to an RTP will produce contact closures that will cause the following: a red alarm lamp (FRA) at the top of the B Bay will light, both minor audible and minor visual office alarms will operate, and a telemetry circuit may be signaled if the office is equipped with remote monitoring.

7. FUSING FOR -48, +24, AND -72 VOLTS ON J1P033C CONTROLLER FRAME AND RINGING - FS7

7.01 The C Bay consists of the controller and mounting arrangements for up to two RTPs. This drawing is similar to that of FS1, and the similar fusing arrangements are covered by the discussion in Section II, paragraph 1.01.

7.02 If LTPs are equipped in the SMAS 5A or 5B System, they will require +24 volts, which will originate in the office battery when available (Option Y), or in the power unit (Option Z). A maximum of 18 LTPs may be equipped and they are fused using L(z).

7.03 Fusing for the ringing supplies on Sheet B9 is also similar to that of FS1. The three ringing sources are each fused once per RTS 5A System.

8. POWER SUPPLIES FOR J1P033C FRAME - FS8

8.01 FS8 is similar to the A Bay power supplies of FS1 and is covered by the discussion of Section II paragraphs 2.01 through 2.03.

9. J1P033C FRAME ALARMS - FS9

9.01 Frame alarms operation for the C Bay is similar to frame alarm operation in the A Bay. The A Bay frame alarm operation is discussed in Section II, paragraphs 3.01 through 3.06.

10. FUSING FOR -48, +24, AND -72 VOLTS ON J1P033D REMOTE TEST PORT FRAME - FS10

10.01 A fully equipped 7-foot system consists of one C Bay and two D Bays. Each D Bay contains eight RTPs when fully equipped.

10.02 Fusing for each D Bay is similar to the fusing arrangement in the B Bay, which is covered in Section II, paragraphs 5.01 through 5.06.

11. J1P033D FRAME ALARMS - FS11

11.01 The frame alarms circuitry of the D Bay is similar to the frame alarm circuitry in the B Bay. The B Bay frame alarms are covered in Section II, paragraph 6.01.

12. LOGIC TERMINATOR - FS12

12.01 The logic terminator provides resistive terminations to digital bus signals that originate in the controller and are sent to the RTPs. One exception to this is RTPEQ, which is a signal bus read by the controller to determine which RTPs are equipped and operational. The +5 volt power originates in the controller and is sent to the terminator to pull up all of the resistive terminations to +5 volts. Each of the transmitted signal leads is paired with a ground return and +5 volts is bypassed to these returns.

12.02 The terminator is connected to the JMB cable bridging adaptor associated with the equipped RTP with the highest number.

13. ENHANCEMENT LOGIC TERMINATOR - FS13

13.01 This terminator provides resistive terminations for logic signals used by the test enhancement circuit. It is connected to the connector of the JMC cable at the end of the cable run.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 Voltage Range:

+24 volt battery	+22V	to +26V
-48 volt battery	-42.75V	to -52.5V
-72 volt battery	-67.5V	to -78V

1.02 Temperature Range: +40°F to +125°F

2. FUNCTIONAL DESIGNATIONS

Designation	Meaning
P1	Power Unit #1 Fuse
CA	Controller Fuse A
RD	RTP Fuse D
RB	RTP Fuse B
RBI	RTP Indicator Fuse B
L( )	LTP Fuse
RT( )	RTP +24 Volt Fuse
LVA	Low Voltage Alarm
BD	Blocking Diode
NSE GRD	Noise Ground
CO GRD	Central Office Ground
MJ	Major
MN	Minor

3. FUNCTIONS

3.01 To provide power, fusing, and alarms for an RTS 5A control circuit and test enhancement modules; to provide fusing and alarms for remote test ports.

4. CONNECTING CIRCUITS

4.01 Typical connecting circuits are:

(a) SMAS 5A/5B Local Test Ports and Distribution Circuit - SD-1P106-01.

(b) SMAS 5A/5B Jack and Key and Lamp Circuit - SD-99645-01.

(c) SMAS 3A, 3B, 3C Maintenance Concentrator and Control Circuit - SD-99500-01.

(d) Controller and Connector Circuit - SD-99560-01.

5. MANUFACTURING TESTING REQUIREMENTS

5.01 This circuit shall be capable of performing in accordance with the requirements of 3. FUNCTIONS.

6. ALARM INFORMATION

6.01 There is no main fuse for this equipment and circuits are fused individually. A frame alarm lamp FRA is located at the top of each frame and glows red when a fuse is blown.

6.02 The control circuit and test enhancement modules are depowered by turning off power units PU1, PU2, and PU3, or by removing fuses P1, P2, and P3.

6.03 See SD-1P108-01 for removing power from remote test ports.

SECTION IV - REASONS FOR REISSUE

D. DESCRIPTION OF CHANGES

D.1 This CD is reissued to provide a more complete circuit description.

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