

3

OPERATIONS SUPPORT SYSTEMS
COMMON
SWITCHED MAINTENANCE ACCESS
SYSTEM 5A
REMOTE MAINTENANCE LOOP
CIRCUITSECTION I - GENERAL DESCRIPTION1. PURPOSE OF CIRCUIT

1.01 The remote maintenance loop (RML) developed for use with the Remote Test System 5A provides a set of looped SMAS 5 () access points to perform diagnostic testing; the RML permits the RTS 5A controller and each remote test port to be exercised functionally under specific test conditions. The RML is designed to implement these loops in a manner that avoids SMAS 5 () network blocking and standardizes on maintenance SMAS numbers without interfering with the SMAS number assignments. The standard maintenance number for the RML are 50099 and 50199. These numbers do not correspond to a physical maintenance connector assignment that can be made on the SMAS 5 () System. The RML cannot be accessed from a SMAS 5 () local test port and is not required for a stand-alone SMAS 5 () installation. The RML is a connectorized unit and is intended for mounting in close proximity to its associated SMAS 5 () distribution network panel.

2. GENERAL DESCRIPTION OF OPERATION

2.01 This circuit is designed to provide a set of looped access points to perform diagnostic testing. This is accomplished by the SMAS/RTS network sending in gated battery zero (GTBO) followed by timed battery zero (TMBO) for access to SMAS number 50099, gated battery one (GTB1) followed by timed battery one (TMB1) for SMAS number 50199. Along with the battery being sent to the RML, the test gated ground (TGTG) lead must have ground applied.

2.02 Upon receipt of the gated battery and the test gated ground, the GT relay is operated. Provided there is battery and ground connected to the circuitry, the GT1 relay will also operate. Operation of these relays provides a gated path for the trunk maintenance (TM) relay, and for control and status leads back to the RTS 5A controller. The operation of the GT1 relay partially enables the ACCA and ACCB relays, and one of these relays will operate when TMBO or TMB1 is received and ENABA or ENABB is removed. This condition

is determined by the external circuitry in the system. The operation of one of these relays will establish a holding path back to the system and connects the looping leads back. The condition on the GTB, TGTG, TMB, and ENAB leads will be removed, and the RML will be in the test state and may be split toward the equipment or facility side.

SECTION II - DETAILED DESCRIPTION1. GENERAL

1.01 This circuit requires -48 volts and ground to be connected in order to function properly. In the absence of this source, an alarm condition is returned to the accessing test port.

2. DETAILED DESCRIPTIONMAINTENANCE LOOP

2.01 In the idle state all relays are in the release condition. Access to this circuit is achieved by -48 volt battery being applied to the GTBOA or GTB1A lead through the 3-2 contact of the GT test jacks, through R3 to the coil of the GT relay, through 4-5 contact to diode CR14, to ground on the TGTG(0) lead, operating the GT relay. Operation of the GT relay will operate the GT1 relay from ground through the 8 make to the coil of GT1 relay to -48 volts. With the GT and GT1 relay operated the following leads are gated through: HO, G, ALM1, SEL, Y, and TPB. During this time a ground will be applied on the G lead, causing the TM relay to operate. The TM relay will lock up through the 1 make contact and through the ACCA or ACCB break contact.

2.02 The operation of the GT1 relay completes a path from ground through the 5 make to the ACCA and ACCB relays. Upon receipt of TMBO or TMB1, along with the removal of ground from ENABA or ENABB leads, the ACCA or ACCB relay will operate. The operation of the ACC or ACCB relay completes a path through the 8 make and 5 make to close and establish a holding path from H and H1 () lead through diode CR4 or CR5, and diode CR7 or CR9 to the 1 make of the TM relay, to the TM relay,

holding it operated. Once these paths have been established, the conditions on the GTB, TGTG, TMB, and ENAB are removed, and the RML circuit is ready for testing as long as a ground is maintained on the H or H1 lead.

LOOP TEST RELAY

2.03 A loop test (LT) relay is provided in the RML so that transmission leads T, T1, R, R1, EL, ED, ML, and MD can be looped at the RML for testing. The LT relay can be operated by the application of +24 volt battery on the C11 or C12 lead, and with the RML accessed, the operate path to the LT is through ACCA or ACCB contacts, through a diode to the coil of the LT relay, causing it to operate. Operation of the LT relay applies a short between leads EL and ED, ML and MD, T and T1, and R and R1. This allows the RTS 5A remote test port to test for continuity on these leads. Removal of the +24 volts on the C11 or C12 lead restores the LT relay to the release conditions.

SP1 RELAY

2.04 Operation of the split 1 (SP1) relay is accomplished by applying -48 volts on the C11(A) or C11(B) lead through the ACCA or ACCB 12 make through diode CR10 to the SP1 relay to ground. Operation of the SP1 relay caused the T and R leads to be split, and both the equipment and facility sides are connected through to the RTS 5A remote test port by way of the ACCA or ACCB relay contacts. The SP1 relay will remain operated and the circuit split as long as -48 volts is applied to the C11 lead.

SP2 RELAY

2.05 Operation of the split 2 (SP2) relay is accomplished by applying -48 volts on the C12(A) or C12(B) lead through the ACCA or ACCB 6 make through diode CR13 to the SP2 relay to ground. Operation of the SP2 relay causes the T1 and R1 leads to be split and both the equipment and facility sides to be connected through to the RTP by way of the ACCA or ACCB relay contacts.

The SP2 relay will remain operated and the circuit split as long as -48 volts is applied to the C12 lead.

LOOP BACK APPLICATION - FS2 AND BD1

2.06 This FS and BD shows the application of the RML and the method that is employed to interconnect the RML into the SMAS network for installation with the stage one distribution network.

REMOTE MAINTENANCE LOOP CIRCUITS - FS3 and BD2

2.07 This FS and BD shows the application of the RML and the method that is employed to interconnect the RML into the SMAS network for small installation (2-port only) application.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 None.

2. FUNCTIONAL DESIGNATIONS

2.01 Relays

<u>DESIGNATION</u>	<u>MEANING</u>
ACCA	Access A
ACCB	Access B
GT and GT1	Gating
LT	Loop Test
SP1	Split 1
SP2	Split 2
TM	Trunk Maintenance

2.02 Jack

<u>DESIGNATION</u>	<u>MEANING</u>
GT Test	Gating Test

2.03 LEDs

<u>DESIGNATION</u>	<u>MEANING</u>
TPB	Test Position Busy

3. FUNCTIONS

- 3.01 Provides a means of looping the transmission leads so the RTS can perform diagnostic testing of the ports.
- 3.02 Provides a means of splitting the loop to either the equipment or facility side.
- 3.03 Provides an alarm condition when access attempt is made and battery and ground are not connected to circuit.
- 3.04 Provides busy indication when circuit has been accessed.

4. CONNECTING CIRCUITS

- a) SMAS 5A/5B Local Test Ports and Distribution Circuit - SD-1P106-01.
- b) RTS 5A/5B and RTS 5A Control Circuit - SD-1P107-01.
- c) RTS 5A Remote Test Port - SD-1P108-01.

5. MANUFACTURING TESTING REQUIREMENTS

- 5.01 All components covered by individual testing specifications shall have met their own testing requirements before over-all testing is performed. In addition, this circuit shall operate as described in SECTION II.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 4131-GCC-EGS