

CIRCUIT DESCRIPTION

CD-1C906-01
ISSUE 2A
APPENDIX 3B
DWG ISSUE 5B
DISTN CODE 1N98

6

COMMON SYSTEMS
SYSTEM STATUS PANEL
CIRCUIT

CHANGES

D. Description of Changes

- D.1 Changed the designation for CR1.55 on the system status panel from SPARE to NPR ACT (Non-Resident Program Active).

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5515-TKS-LEG

CIRCUIT DESCRIPTION

CD-1C906-01
ISSUE 2A
APPENDIX 2D
DWG ISSUE 4D
DISTN CODE 1N98

COMMON SYSTEMS
SYSTEM STATUS PANEL
CIRCUIT

CHANGES

D. Description of Changes

D.1 Changed stocklist code of switches from commercial part to
KS code.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5515-TKS-LEG

CIRCUIT DESCRIPTION

CD-1C906-01
ISSUE 2A
APPENDIX 1A
DWG ISSUE 3A
DISTN CODE 7N98

COMMON SYSTEMS
SYSTEM STATUS PANEL
CIRCUIT

CHANGES

B. Changes in Apparatus

<u>B.1 Superseded</u>	<u>Superseded By</u>
CRL.35 Alarm Indicator 534D - App Fig. 1	CRL.35 Alarm Indicator 534F - App Fig. 1
CRL.36 Alarm Indicator 534D - App. Fig. 1	CRL.36 Alarm Indicator 534F - App Fig. 1
R13.00 Resistor KS-13491,L1, 2.2K - App Fig. 1	R16.05 Resistor KS-13491,L1, 1.2K - App Fig. 1
R13.01 Resistor KS-13491,L1, 2.2K - App Fig. 1	R16.06 Resistor KS-13491,L1, 1.2K - App Fig. 1

D. Description of Changes

- D.1 Changed MINOR and MINOR POWER alarm indicators from type 534D (red) to type 534F (yellow).
- D.2 Replaced LED dropping resistors associated with D.1 to obtain proper luminance.
- D.3 Changed LED codes from 530 type to 534 type to correct drawing error.

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DEPT 5515-TKS-LEG

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COMMON SYSTEMS
SYSTEM STATUS PANEL
CIRCUITSECTION I - GENERAL DESCRIPTION1. PURPOSE OF CIRCUIT

1.01 The system status panel (SSP) provides a display of system health for 3A CC applications, acts as an interface circuit to the E2A telemetry required for switching control center (SCC) applications, and provides emergency manual control (ie, system initialization capability). It operates in conjunction with the system status panel controller (SSPC) and system status panel relay (SSPR) unit. In almost all cases, the logic elements in the SSP are required for an SSP function to operate properly.

SECTION II - DETAILED DESCRIPTION

1.01 The SSP is basically comprised of switches, lamps and lamp drivers, and LEDs. The typical lamp or LED indicator circuit is replicated with minor variation between individual units of the same indicator type. To avoid repetition, one indicator circuit of each type will be described and exceptions pointed out as required. The switches, too, generally perform similar functions, but where exceptions exist, they will be pointed out.

GENERAL SWITCH OPERATION

1.02 Switches, S3 through S15, S17 through S20, and S26, are nonlocking, while switches S1, S2, and S16 are locking. Each switch has an associated lamp, but some lamps do not have an associated switch. The switch contact is constructed so that the break-contact will open the ground path to its corresponding output before the make-contact applies ground to its corresponding output. When the switch is released, the contact operation is reversed; the make-contact removes ground to its corresponding output before the break-contact applies ground to its corresponding output. When used with the SSPC (SD-12907-01) the signal generated by the contact operation is inputted to a special electronic debouncer circuit which, after the first closure, ignores subsequent contact bounce until the switch is released (ie, the break-contact grounds its associated lead).

FORCE ACTIVE

1.03 Additions to the general switch operation include combining certain contacts of S17, S18, and S19 to obtain specific functions. Operating S17, S18, or S19; the select 0, select 1, or force switches, respectively; will retire an active force (lock) function. But, to retire an active select function, the specific switch (S17 or S18), must be momentarily operated. To achieve this type of operation it is required that, whenever S17 or S18 is operated, output lead I1FOR1 must be one active; but, I1FOR1 must not be one active when S19 is operated. Operation of any of these switches grounds lead KR101I10 and opens ground to KR11I00. When the I1FOR1 lead is one active, it inhibits setting the SSPC force flip-flop but allows the flip-flop to be cleared when lead KR01I10 is grounded.

LOCK (LOCK FUNCTION)

1.04 Lead INHKR011, when one active, inhibits hardware setting of the SSPC lock flip-flop. If lead INHKR011 is grounded, the lock flip-flop may be set or cleared depending on the previous state of the lock flip-flop. An additional S20 make-contact, in series with make-contact 5-6, allows both leads KR01I10 and INHKR011 to be grounded when the switch is operated, and provides isolation between the leads when the switch is not operated. This permits S20 to control the SSPC lock flip-flop, and also allows other switches to externally access lead KR01I10 for the purpose of clearing the lock flip-flop. Retiring the SSPC lock bit is permitted by operation of S17, S18, or S19 via lead KR101I10 to lead KR01I10 through the SSPC isolation gates.

TEST CONTROL EXECUTE

1.05 When S5 is operated, test-control relay PF, located in the SSPR, is activated, setting or clearing the SSPC test control execute flip-flop. This configuration allows the relay driven by the execute flip-flop to be JRed with specific switches on other frames.

CIRCUIT POWER

1.06 When the circuit power switch S1 (shown unoperated) is operated, contact 5-6 provides an operate path for relay A in the

SSPR. When contact 2-1 opens, the ground path around R9 is removed. This section enables a relay driver, located in the SSPC, to operate SSPR relay B when +3V is applied to the SSPC.

1.07 In addition to the normal operation time and the delay caused by the application of power to the SSPC, resistor R9 and capacitor C1 provide a time delay of approximately 500ms to the operation of the SSPC relay B driver circuit. Resistors R7 and R8 provide short-circuit protection while capacitor C1 is discharging. Break-contact 5-4 of S1 enables the power alarm circuit for SSPC power, and make-contact 2-3 indicates the status of the circuit power switch to system monitor circuits.

ALTERNATE BUS

1.08 The alternate bus switch, S3, provides the ground operate path for the +24 Vdc alternate power bus switching relay PAB24 in the maintenance frame power circuit and the -48 Vdc alternate power bus switching relay AB48 in the SSPR. The switch is nonlocking, and will release the relays it controls only when it is held operated. Break-contact 5-4 controls relay PAB24, and break-contact 2-1 controls relay AB48, which, in turn, controls the +24 Vdc alternate bus switching relay AB24 in the SSPR. The ALT BUS lamp is controlled by the SSPC ALT BUS flip-flop. Software messages from the 3A CC continually attempt to set this flip-flop, but may do so only if at least one of the three alternate bus switching relays is off normal.

LAMP AND POWER TEST

1.09 The lamp and power test switch, S4, initiates a lamp test for the SSP and a power alarm test (PAT) for all converters and reference circuits appearing in the common system maintenance frame in No. 2B ESS and No. 3 ESS offices. The normal +24 Vdc LED supply voltage is passed through S4 contact 2-1. Contact 2-3 of S4 controls the +24 Vdc to the lamp (DS1.24) associated with the lamp and power test switch, and to transistors Q2 and Q3.

1.10 When S4 is operated, transistor Q2 is enabled and, via lead LTI0, inhibits all lamp driver control circuits in the SSPC. Consequently, the lamps and LEDs on the SSP will light in the absence of a control signal; eg, a logic gate open collector or other open circuit path into the SSP will cause the associated lamp and/or LED to light. Also, transistor Q3 is enabled and operates the PAT relay in the maintenance frame power circuit. The PAT relay controls the sequencing required for this test. Also, the normal +24 Vdc supply to the LED devices is interrupted by break-contact 2-1 in S4, and the power is supplied via current-limiting resistor R12. This feature reduces the total current switching and noise coupling related to the lamp test function. When the lamp and

power test switch is released, the lamps and LEDs return to their former status, the power alarm test is retired, and the +24 LED supply voltage is bypassed around R12.

LAMP POWER

1.11 The lamp power switch, S2, controls the +24 Vdc voltage applied to the lamps and LEDs. Contact 3-2 of S2 supplies +24 Vdc to lead LP24 (lamps and lamp drivers), and contact 6-5 supplies +24 Vdc to lead LED24 (LED circuits). A series-current-limiting resistor, R10, is located between the power supply to the LEDs and S2. In the lamp supply, a current-limiting resistor, R11, is located between contact 2 of S2 and the selected lamp circuits.

1.12 When S2 is not operated, the +24 Vdc supply to the LEDs is reduced by resistor R17 and varistor RV1 to a voltage range of 0.9 to 1.5 Vdc. Resistor R18 holds the lamp supply voltage level through lead LP24 at approximately 4 Vdc. The reduced voltage levels provide a pullup voltage to the SSPC Lamp/LED control gates so that they may still control other logic (eg, E2A telemetry interface circuits) in the SSPC. This reduced voltage is not sufficient to illuminate the lamps or LEDs. To completely remove lamp or LED power, remove fuses AA3 and AA2 respectively in the maintenance frame power circuit (SD-1C909-01).

LAMP AND LAMP DRIVERS

1.13 The lamp driver circuits D00 through D21 and D25 are identical; therefore, only D00 will be described. Driver circuit D00 is made up of three resistors and one transistor. When input KMR10J1 is open, transistor Q1.0 conducts and sinks a 50 mA current with an output of approximately 0.5 volts. The junction voltage of R1.0 and R2.0 is approximately +2.2 Vdc, thus providing a transistor base drive current of 1.2 mA.

1.14 A keep-warm resistor, R4.0, maintains an 8-mA current flow through lamp DS1.00 when transistor Q1.0 is not conducting, thus preventing the large current surge which is usually encountered when cold tungsten filament lamps are turned on. When used in this circuit, DS1.00, which is representative of lamps DS1.00 through DS1.25, has a nominal operate-current of 35 mA at 24 Vdc. A voltage level less than +0.5 volts dc will inhibit transistor Q1.00 from conducting, and DS1.00 will extinguish.

1.15 Current-limiting resistor R11 associated with all lamp circuits (except DS1.00, DS1.09, DS1.22, and DS1.24) will cause a dimming of its associated lamps when several lamps are lit at the same time; eg, during a lamp test. Lamps not associated with R11 are exceptions due to variations in color. Since the green filter absorbs more light than the red and

white, DS1.00, DS1.09, DS1.22, and DS1.24 cannot tolerate a reduced current during a lamp test.

LED INDICATOR CIRCUITS

1.16 The LED indicators shown on this circuit are red, green, and amber, and have the same configuration except that amber LEDs use a lower resistor value (R3,R16) than that used for the red or green LED circuits.

1.17 Since all LED indicator circuits are identical, only CR1.00 will be described. The nominal voltage across CR1.00, from a +24 Vdc source through resistor R3.00, is 1.8 Vdc, and the current passing through the LED circuit is approximately 10mA (18mA for amber LEDs). To extinguish the LED indicator, the voltage at lead KMR2201 (junction of R3.00 and CR1.00) must be lowered to approximately +1.4 Vdc.

1.18 When used with the circuit (SD-1C907-01) KMR2201 is driven to approximately +0.15 Vdc by a 1A logic open-collector gate. When the driving source is removed the LED will light. Essentially, an open circuit input turns on the LED and a grounded input extinguishes the LED.

1.19 Capacitors C2 through C12 are used as decoupling networks. They are strategically placed throughout the circuit to reduce noise coupling due to large current surges during lamp test.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 None.

2. FUNCTIONAL DESIGNATIONS

2.01 Functional designations pertaining to this circuit are listed on SD-1C906-01 as part of Information Note 3.02. Since the circuit is used in more than one system (eg, No. 2B ESS and No. 3 ESS) each lamp and/or LED is listed by designation and correlated to an associated signal lead and systems related function. Where applicable, the lamps are also referenced by switch number.

3. FUNCTIONS

3.01 Provides a display of system health via visual indicators driven by

input/output (I/O) messages from 3A CC to the SSPC.

3.02 Provides a means of allowing manual request of a system initialization simultaneously to both 3A CCs.

3.03 Provides a means of locking (forcing) a 3A CC on- or off-line.

3.04 Provides for control of other switching functions by supplying switches that are interrogated via program initiated I/O messages to the SSPC.

3.05 Forms an integral part of the interface circuitry to the E2A telemetry for SCC applications.

3.06 Provides some control for the central office alarms interface in the SSPR.

4. CONNECTING CIRCUITS

4.01 When this circuit is listed on a keysheet, the connecting information thereon should be followed.

- (a) System Status Panel Controller (SSPC) - SD-1C907-01.
- (b) System Status Panel Relay Unit (SSPR) - SD-1C908-01.
- (c) Maintenance Frame Power Unit - SD-1C909-01.
- (d) Maintenance Frame Circuit - SD-1C912-01.

5. MANUFACTURING TESTING REQUIREMENTS

5.01 The manufacturing testing requirements are specified in X-78887.

SECTION IV - REASONS FOR REISSUE

D. Description of Changes

D.1 Changed routing of lead LT10 from the SSP to the SSPC to coax cable. The routing was changed from flat ribbon cable because of noise coupling in the cable.