# 5ESS® ELECTRONIC SWITCHING EQUIPMENT MISCELLANEOUS CABINET (6FT) CIRCUIT

## CHANGES

*REASONS FOR REISSUE*

Added information for the New 16A Annoucement System Circuit. (FS3K/FS3J) and updated 15A Annoucement System.

*DESCRIPTION OF CHANGES*

1 Added FS3K, FS3J and App. Fig 40 to 45 and updated FS3E App. Fig 34, 35, 36 and 37 for the 15A Announcement System.

AT&T

DEPT NA5350000-OW

CD-5D130-01
ISSUE 5A
APPENDIX 6B
DWG ISSUE 31B
DISTN CODE BT13

# 5ESS® SWITCHING EQUIPMENT MISCELLANEOUS CABINET (6FT) CIRCUIT

*Description of Changes*

Added information for the optional new look 5E2000 cabinet as a replacement for the current standard cabinet.

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DEPT NA5350000-OW-FNG

# 5ESS® SWITCHING EQUIPMENT MISCELLANEOUS CABINET (6FT) CIRCUIT

*Description of Changes*

Added the 15A announcement system J1C267A-1/SD97815-01, equipped with either:

- One or two BLD1s, eight unique 20-second announcements per pack.
- One or two BLD2s, eight unique 40-second announcements per pack.

Added the 400A remote record pack J1C267A-1/SD97815-01.

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# 5ESS® SWITCHING EQUIPMENT MISCELLANEOUS CABINET (6FT) CIRCUIT

*Description of Changes*

This product design information (PDI) adds an optical (OPTO) isolator to the pin field at the rear of the fuse filter unit to convert the -48V fuse failure signal to an OPTO output closure, and to send this alarm back to the host office by way of the modular metallic service unit (MMSU).

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# 5ESS® SWITCHING EQUIPMENT
# MISCELLANEOUS CABINET (6FT)
# CIRCUIT

## CHANGES

*D. Description of Changes*

Added information for selecting 5ESS® approved fuses, to be used when common systems equipment or non-AT&T equipment is placed in the miscellaneous cabinet.

AT&T BELL LABORATORIES

DEPT NA5350300-OW-FNG

# 5ESS® SWITCHING EQUIPMENT MISCELLANEOUS CABINET (6FT) CIRCUIT

## CHANGES

*B. Changes in Apparatus*

Replaced the 13A Announcement System J1C121A-1 with a new 13A+ Announcement System J1C121A-2/SD978813-01.

Added Remote Record Concentrator J1C262A-1/SD97812-01.

Added new UD8, CEPT Circuit Pack, to the 13A.

*D. Description of Changes*

Removed the 13A Announcement System (Rated "DA"), which is option ZN.

Added the new 13A+ Announcement System, which is option ZO.

The 13A+ power requirements are less than the 13A, therefore, no fan unit is required for the 13A+ and the 14A Recorded Announcement Units.

AT&T BELL LABORATORIES

DEPT NA5350300-OW-FNG

# 5ESS® SWITCHING EQUIPMENT
# MISCELLANEOUS CABINET (6FT)
# CIRCUIT

## B. Changes in Apparatus

B.01 Replaced 2 J5D003AU-1,L1 with one new modular fuse filter unit J5D003FJ-1,L115.

B.02 Added Alarm Opto-Isolator (AOI) card J5D003FJ-1,L14 for RSM application only.

## D. Description of Changes

D.01 Removed the old FFU J5D003AU-1, which is option ZK. Added the new MFFU J5D003FJ-1 which is option ZL. Added the AOI card to unit as an option for RSMs only (option ZM).

AT&T BELL LABORATORIES

DEPT 55535-WAW-CEJ

# 5ESS® SWITCHING EQUIPMENT MISCELLANEOUS CABINET (6 FT) CIRCUIT

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* This CD covers Drawing Issues through 25A. For Reasons for Reissue, see Appendixes 1M and 7M.

## SECTION I - GENERAL DESCRIPTION

### 1. PURPOSE OF CIRCUIT

1.01 The miscellaneous cabinet (6 FT) provides mounting space for peripheral units that do not require module time slots or control ports.

### 2. METHOD OF OPERATION

2.01 One miscellaneous cabinet is required for minimum equipage. Each cabinet (except +48 volt cabinet) is equipped with fuse/filter panels (A and B bus) that supply -48 volt filtered power through alarm-type fuses as required.

2.02 The following equipment is mounted in a miscellaneous cabinet on a job engineered basis:

(a) resistor panel(s) (maximum two per cabinet)

(b) office alarm unit

(c) converter and local frame unit

(d) dial tone delay alarm unit

(e) distribute point applique unit

(f) inverter

(g) inductor panel

(h) 13A announcement system

(i) remote alarm unit [Prior 5E2(2)]

(j) remote alarm relay unit

(k) power distribution panel

(l) transmission rate converter unit

(m) light guide stranded cable interconnection module

(n) 14A announcement system

(o) link adaptor unit

(p) 3-fan unit

(q) music-on-queue

## SECTION II - DETAILED DESCRIPTION

### 1. POWER AND FUSING (-48V) FS 1A-1C

1.01 Four -48 volt dc power feeders [-48(A,B)(0,1)] and returns, representing both A and B power buses of the dc power distribution circuit, are connected to the fuse/filter panels (A and B buses) circuits 0 and 1.

1.02 In cabinets where a 13A announcement system is equipped, a J5D005CA-1,L1 inductor unit is required to provide additional filtering of the -48 volt dc power feeders from the dc power distribution circuit.

1.03 Fused -48 volts is supplied to the miscellaneous cabinet units as required, via 70-type alarm indicator fuses. The miscellaneous cabinet fuse/filter panels are equipped with fuse positions as follows:

| BUS | FEEDER | FUSE POSITIONS |
|---|---|---|
| A | 0 | 1T→6T, 1B→6B |
| A | 1 | 7T→12T, 7B→12B |
| B | 2 | 13T→18T, 13B→18B |
| B | 3 | 19T→24T, 19B→24B |

Any fuse supplying -48 volts to a 13A announcement system must be isolated from other fuses. Therefore, the remaining fuse positions for that feeder can not be used.

1.04 In a 5ESS® Switch office, the fuse/filter panels fuse alarm outputs (FALM0, FALM1) are multed, A bus to A bus and B bus to B bus, across the miscellaneous cabinet lineup, and are connected to inputs on the Office

Alarm Unit (OAU). An additional output from each bus (FA0, FA1) is connected through the fuse alarm LEDs (top front and rear of cabinet) to ground, so that a visual indication is present if any fuse in the cabinet operates.

1.05 Refer to CD-5D053-01 for detailed description of the fuse/filter panel circuit.

## 2. INVERTER CIRCUIT - FS 2A, 2B

2.01 An additional -48 volt feeder (-48AINV0) and return from the dc power distribution circuit are fed directly to the dc to ac inverter. The inverter provides an emergency 120 volt ac protected supply to the data set cabinet and the TeleTYpewriter (TTY) equipment at the master control center, or to the tape/disk cabinet.

2.02 Two scan points (SC29 and SC31 for the first inverter) provide alarm signals by sensing operation of the output fail alarm relay (K1) and the transfer alarm relay (K3) respectively. K1 operates when both commercial and inverter ac is lost and K3 operates when transfer is made from commercial to inverter ac. ABS power (-48VABS) is supplied to provide a visual indication when relay K1 operates.

2.03 The original inverter, KS-20817,L1A magnetic type, has been replaced with WP-91652,L20 electronic type.

## 3. 13A ANNOUNCEMENT SYSTEM - FS3

3.01 Refer to CD-97753-01 for detailed description of the 13A announcement system.

## 4. RESISTOR PANEL - FS 4

4.01 Refer to CD-5D044-01 for detailed description of the resistor panel.

4.02 Each resistor panel in a miscellaneous cabinet must be powered from both A and B power buses.

## 5. DIAL TONE DELAY ALARM CIRCUIT/EXTERNAL SANITY MONITOR - FS 5

5.01 Dial Tone Delay Alarm Circuit (Option V)

The Dial Tone Delay Alarm (DTDA) circuit periodically tests a 5ESS Switching Module Originate Process. The DTDA circuit originates a test call that causes the originate process to connect dial tones to the line. If the tones are detected, the line origination is removed. If there are no tones present after the origination is removed, the DTDA circuit waits twenty to sixty seconds and repeats the process. If, after origination the dial tones are not present in a nine-second look interval, the Time Out relay (TO) operates, sending a contact closure to indicate an alarm to the switching module. If, after the origination is removed, the tones are still present during a nine-second time interval, the TO operates. Finally, when turned off, the power switch causes contacts to close, sending a power off alarm to the switching module.

5.02 External Sanity Monitor (Option U)

The External Sanity Monitor (ESM) periodically tests a 5ESS Switch call process between two switching modules. The ESM originates the test call on a direct connect line. The call process causes a line terminated on the ESM to be power rung and connects audible ringing tones to the originating line. If the tones are detected by the ESM,

the line origination is removed. If there are no tones present after the origination is removed, the monitor waits twenty to sixty seconds and then repeats the process. If after origination, the audible ringing tones are not present in a fourteen-second look interval, the TO operates, sending a contact closure, indicating an alarm, to the 3B Input/Output Processor (3BIOP). If, after the origination has been removed, the tones are still present during a fourteen-second time interval, the TO operates, signaling the 3BIOP of an alarm. The reorder or busy tones, if connected to the originating line, cause the ESM to send an alarm message. Finally, when turned off, the power switch, causes a distribute point applique relay to turn off, sending a power alarm to the 3BIOP.

5.03 Refer to CD-1A277-01 for a detailed description of the dial tone delay alarm unit (equipped with option T).

5.04 Refer to CD-3H911-01 for a detailed description of the distribute point applique unit (equipped with options W and Y).

## 6. CONVERTER AND LOCAL FRAME (TEL JACK) UNIT - FS 6

6.01 The converter and local frame (tel jack) unit is equipped with a 131-type dc-to-dc power converter that supplies +24 volts to the dial tone delay alarm unit as required. Also mounted on this unit is the circuitry required for intercabinet communications (option X) and a terminal strip used to distribute -48 volt dc power (-48VABS, -48ALMB) to the alarm circuits.

## 7. OFFICE ALARMS - FS 7

7.01 The office alarm unit provides the interface between the 3B processor and 5ESS Switch alarm signaling equipment. It also provides forty-eight duplicated scan points (IOP0 and IOP1). An additional forty-eight duplicated scan points are provided (option W) as required.

7.02 Refer to CD-5D008-01 for a detailed description of the office alarm unit.

## 8. REMOTE ALARMS - FS 8

8.01 The remote alarm unit provides the interface between the Modular Metallic Service Unit (MMSU) and 5ESS Switch alarm signaling equipment.

8.02 Refer to CD-5D008-01 for a detailed description of the remote alarm unit.

## 9. POWER AND FUSING + 48 VOLTS - FS 9 - 12

9.01 One to five +48-volt fuse panels can be equipped on a miscellaneous cabinet as required to supply fused +48-volt dc power to analog trunk circuits. Each fuse panel is powered with two +48-volt feeders (A and B buses), and is equipped with positions for forty-eight 70B-type alarm fuses. Each analog trunk circuit is assigned one A bus fuse and one B bus fuse.

9.02 As required, one to three J86705A-1 converter panels are equipped on the same miscellaneous cabinet as the fuse panels are (above). Each converter panel is equipped with one or two 132 AD converters that convert a -48 volt source (-48VA, -48VB) to the +48 volt input to the fuse panels.

9.03 +48-volt fuse panels, fuses, converter panels, and converters are equipped as shown in Table A.

9.04 The first converter panel in a +48 volt miscellaneous cabinet is equipped with the circuitry required to provide major and minor alarms. The major alarm (PMJ) and minor alarm (PMN) are then melted across the other converter panels as required. An additional output from the first converter panel is connected through the fuse alarm LEDs (top front and rear of cabinet) to provide a visual indication if +48 volts is lost.

9.05 Refer to CD-5D083-01 for a detailed description of the +48-volt fuse panel.

9.06 Refer to CD-32404-01 for a detailed description of the +48-volt converter panel.

9.07 Refer to CD-5D070-01 for a detailed description of the +48-volt dc power distribution.

## 10. REMOTE ALARM RELAYS - FS 13

10.01 The remote alarm relay unit provides a means to connect the 5ESS Switch alarm system to audible alarm panels or exit pilot lights in quantities greater than can normally be connected to the alarm units, or to non-5ESS Switch alarm equipment.

10.02 The remote alarm relays can be connected to the alarm units to provide indications for either audible or visual alarms and can provide voltage or contact closure only.

10.03 When the remote alarm relays are connected to a set of contacts in the alarm circuit packs (TN137, TN934), nothing else can be connected to those same contacts.

10.04 See CD-5D071-01 for a detailed description of the remote alarm relay unit.

## 11. POWER DISTRIBUTION PANEL - FS 14

11.01 The power distribution panel (J86334D,LA,B) can be mounted in the miscellaneous cabinet in small remote offices, where it is not desirable to have a separate power distribution cabinet.

11.02 Refer to CD-5D005-01 for a more detailed description of the power distribution function.

## 12. TRANSMISSION RATE CONVERTER UNIT FS-15A, 15B

12.01 The Transmission Rate Converter Unit (TRCU) (J5D003ED-1) provides Time Multiplex Switch (TMS) and the Switching Module (SM) with interface to standard transmission equipment via the D3 cross-connect. The TRCU is mounted in the miscellaneous cabinet at host offices.

12.02 Refer to CD-5D086-01 for a detailed description of the TRCU.

12.03 The TRCU2 (J5D003ED-2) provides electrical and/or optical interface between the TMS and SM to transmission facilities for Optically-integrated Remote switching Module (ORM) application. The TRCU2 is mounted in the host office.

12.04 Refer to CD-5D086-02 for a detailed description of the TRCU2.

## 13. LIGHTGUIDE STRANDED CABLE INTERCONNECTION MODULE FS 16

13.01 The Lightguide Stranded Cable Interconnection Module (LSCIU) (CC#105389548) provides the interface between stranded-type outside plant or riser cables and central office, repeater station, or remote terminal equipment interconnection cables.

TABLE A
Fuse Panels, Fuses, and Converter Configurations

| NUMBER OF TRUNK CIRCUITS REQUIRING +48V | NUMBER OF ANALOG TRUNK UNITS (IF ALL CIRCUITS REQ +48V) | AVERAGE AMPERES OF +48V REQ'D | FUSES REQ'D | FUSE PANELS REQ'D | CONVERTERS REQ'D | COMBINED TOTAL OUTPUT CURRENT RATING OF EQUIPPED POWER UNITS |
|---|---|---|---|---|---|---|
| 181 | 5 | 2.3 | 10 | 1 | 2 | 2.3A |
| 757 | 23 | 4.6 | 46 | 1 | 3 | 4.6A |
| 1500 | 46 | 6.9 | 92 | 2 | 4 | 6.9A |
| 2304 | 72 | 8.7 | 144 | 3 | 5 | 9.2A |
| 2500 | 78 | 9.2 | 156 | 4 | 5 | 9.2A |
| 3700 | 115 | 11.5 | 230 | 5 | 6 | 11.5A |

## 14. 14A ANNOUNCEMENT UNIT FS 3 A/B

14.01 The 14A (J1C194A-1) announcement is designed to emulate the 7A and 13A announcements. It provides offices with one or two independent channels of recorded announcements.

14.02 The 14A can be mounted in miscellaneous cabinets at either a host or remote office. For remote offices, the 14A requires a line interface unit in addition to the channel or channels used.

14.03 A remote record unit is available for remotely recording announcements.

## 15. LINK ADAPTER UNIT FS 17

15.01 The Link Adapter Unit (LAU) is a dual-purpose unit which provides status and alarm information to the remote operator site, and can also be used as an interface between a 5ESS Switch and Operator Services Position System Administrative Processor (OAP).

15.02 For detailed information about the LAU, see CD-5D064-01.

## 16. 3-FAN UNIT FS 18

16.01 A 5ESS Switch 3-fan unit (J5D003BE-2) is added as an option to cool the TRCU or TRCU2.

16.02 Refer to CD-5D019-02 for a detailed description of the 3-fan unit.

## 17. MUSIC-ON-QUEUE FS 19

17.01 The music-on-queue unit (J1A033GR-1) provides music to up to twenty-two trunk circuits. Up to two additional distribution unit. (J1A033GU-1) may be connected to each music-on-queue circuit, as required, to provide music to a maximum of sixty-six trunk circuits.

17.02 Refer to CD-1A432-01 and SD-1A432-01 for a detailed description of the music-on-queue unit

17.03 The Music-on-Queue Unit may be powered from 120 volts 60 hertz AC or 220 volts 50 hertz AC. See J5D005C for correct ordering information.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 None.

2. FUNCTIONAL DESIGNATIONS

2.01 None.

3. FUNCTIONS

3.01 The miscellaneous cabinet provides mounting space for peripheral units that do not require module time slots or control ports.

3.02 It provides filtered -48-volt dc power from two separate buses (A and B) through alarm-type fuses.

3.03 It provides -48-volt dc power (ABS) to the dc-to-ac inverter circuit and office alarm unit.

3.04 It provides +48-volt dc power from two separate buses (A and B) through alarm-type fuses to the analog trunk circuits.

4. CONNECTING CIRCUITS

4.01 When this circuit is listed on an application schematic, the connecting information listed thereon must be followed:

+48-Volt Converter Panel - SD-82404-01
+48-Volt dc Power Distribution Circuit - SD-5D070-01
+48-Volt Fuse Panel - SD-5D083-01
13A Announcement System Circuit - SD-97753-01
3BIOP Circuit - SD-4C100-01
Ac Power Distribution Circuit - SD-5D004-01
Analog Trunk Unit - SD-5X203-01
Audible and Visual Alarm Circuit - SD-5D017-01
Data Set Cabinet Circuit - SD-5D071-01
Dc Power Distribution Circuit - SD-5D005-01
Dc-to-Ac Inverter Circuit - SD-82178-01
Dial Tone Delay Alarm Circuit - SD-1A277-01
Distribute Point Applique Unit Circuit - SD-3H911-01
Intercabinet Communications Circuit - SD-5D139-01
Fuse/filter Panel Circuit - SD-5D053-01
Master Control Center Circuit - SD-5D114-01
Modular Metallic Services Unit Circuit - SD-5D033-01
Office Alarm Unit Circuit - SD-5D008-01
Resistor Panel Circuit - SD-5D044-01
Transmission Rate Converter Unit 1 or 2 circuit SD-5D086-01 or 02
3-Fan Unit circuit SD-5D019-02
Music-On-Queue Unit SD-1A432-01

5. MANUFACTURING TESTING REQUIREMENTS

Intermediate Requirements

5.01 None

End Requirements

5.02 Cabinets are to be tested and equipped at an elevated temperature of 50°C. Tests are required for the following equipment groups:

(a) External Sanity Monitor

(b) ac-to-dc Inverter

(c) Office Alarm Circuit - TN137

(d) Scan Applique Circuit - TN867

5.03 test steps for the ESM:

(a) Connect -48 volts and ground to the ESM circuit.

(b) Turn the dc-to-dc converter on and measure the output voltage. It must measure +24 volts from ground.

(c) Operate power off key. The lamp is on when power is off.

(d) (1) Turn the circuit power on. Turn the time potentiometer full counter clockwise. Push and release the reset key.

(2) Fifteen to twenty-five seconds after release of the reset key, the OR relay must operate.

(3) Thirteen to seventeen seconds after the OR relay operates, the TO relay must operate at a 1 KHz tone sound.

(4) Push the reset and repeat (2) and (3).

(e) (1) Connect an oscillator to the T and R terminals as show in Figure 1.

(2) 0.7 to 1.7 seconds after the OR relay operates, the DT relay must operate.

(3) The tone must be heard when the OR relay operates. The potentiometer volume may need to be adjusted.

(4) When the DT relay operates, the OR relay must release.

(5) Relay DT must release a short time after the OR relay.

(6) 15 to 25 seconds after the DT relay releases, the OR relay must operate, starting the cycle over.

(7) Check several cycles repeating steps (2), (3), (4), (5) and (6).

(8) During the previous check, operate the test key. The test lamp must turn on, and 13 to 17 seconds after the OR relay operates, the 1 KHz tone must be heard. Push and release the test key. The lamp must turn off and the tone must be silent.

(9) Turn the time potentiometer fully clockwise. The time in step (6) is now between 50 and 70 seconds.

(f) Remove the oscillator and repeat steps (d)(2), (d)(3), and (d)(4). In step (d)(2), the time interval must be between 50 and 70 seconds.

(g) Before doing step (d)(4), check to insure TO relay contacts 9 and 12 are closed; then do step (d)(4) and check that they are open.

(h) Check to insure that the A1 relay contacts 10 and 12 in the distribute point applique circuit are closed. Operate the power off key and check to see that they open and that the power off lamp is on.

5.04 Test steps for the ac-to-dc inverter:

(a) Commercial ac (117 V, 60 Hz, 10) must be run into the inverter

per Figure 15 of SD-5D004-01. This ac goes to TB2, terminals 3, 4, and 5.

(b) The output of the inverter must go to its normal load, or any load up to 1000 VA can be simulated. This ac comes from TB2, terminals 1, 2, and 3.

(c) A -48 V office battery must be connected, per SD-5D005-01, FS 20, to the input of the inverter on TB1 terminals 1 and 2.

(d) Alarm wiring must be connected to the inverter, per FS 20 of SD-5D005-01, as follows:

(1) Inverter Transfer Alarm (ITA), scan point SC30, is connected to TB4, terminals 1 and 2. This is a normally-open contact that closes when the inverter transfers from commercial ac to operation of the inverter; this signifies normal transfer action of the inverter.

(2) Inverter Fail Alarm (IFA), scan point SC29, is connected to TB5, terminals 2 and 3. This is a normally-closed contact that, under normal inverter operation, goes to open when the K1 relay operates. If the inverter fails to operate, the K1 relay is de-energized and the contact between terminals 2 and 3 closes, generating the alarm.

(3) Commercial Power Fail alarm (CPF), scan point SC47, is connected to TB4, terminals 4 and 5. This is a normally-open contact that closes when commercial power fails and the inverter starts up.

(e) To test the ITA scan point SC30 and the CPF scan point SC47, have commercial ac power on to the inverter and -48-V dc power in to the inverter. Operate the TEST switch on the inverter; hold it down until the SC30 and SC47 indications appear. Release the TEST switch; after a timed interval of up to 30 seconds, the inverter must transfer back to its normal stand by mode, and the SC30 and SC47 alarm indications must go away.

(f) To test the IFA scan point SC29, place a temporary shorting jumper on TB5, between terminals 2 and 3. The SC29 alarm indication must appear. Remove the temporary shorting jumper, and the SC29 alarm indication must go away.

5.05 Test steps for the Office Alarm Circuit - TN137

(a) Energize the board with -48 V on pin 000 or 001 and 48 V return on pin 002 or 003. Confirm that the contact of K5 opens at this time. Confirm that opto U6 output is saturated.

(b) Inject 5-mA into MN (pin 350 with pin 254 as the return path). Confirm that K3 picked up and that K6 picked up.

(c) Remove the 5-mA drive into MN. Confirm that K3 remains picked up and that K6 has dropped out.

(d) Before proceeding further, insure that a minimum of 5 seconds have elapsed since step (a) began.

(e) Inject 5-mA into MJ (pin 255 with pin 355 as the return path). Confirm that K2 picks up and that K7 is cycling.

(f) Remove the 5-mA drive into MJ. Confirm that K2 remains picked up and that the cycling of K7 stops with K7 dropped out.

(g) Inject 5-mA drive into CR (pin 356 with pin 256 as the return path). Confirm that K1 picks up and that K7 is cycling.

(h) Remove the 5-mA drive into CR. Confirm that K1 remains picked up and that the cycling of K7 stops with K7 dropped out.

(i) Confirm that current in the -48-V power feed does not exceed 150-mA.

(j) Inject 5-mA into RET (pin 253 with pin 353 as the return path). Confirm that K1, K2 and K3 now drop out.

(k) De-energize the board. Confirm that K5 contact has closed and that opto U6 output is open.

(l) With -48 ABRTN connected, connect -48 V in series with 2K - 8K ohms to FA0 (pin 300). Confirm that opto U7 output 0 and 1 are saturated.

(m) Remove the voltage from FA0 (pin 300) and confirm that opto U7 outputs 0 and 1 are open.

(n) Connect -48 V in series with 2K - 8K ohms to FA1 (pin 301) and confirm that opto U8 output 0 and 1 are saturated.

(o) Remove the voltage from FA1 (pin 301) and confirm that opto U8 outputs 0 and 1 are open.

5.06 Test steps for the scan applique circuit - TN867

(a) Energize the board with -48 V on pin 000 and 48 V return on pin 002.

(b) To test opto-isolator XX, connect SCXXNO to SCXXCM. Verify that the SCXX opto outputs for side 0 and 1 are saturated.

(c) Without removing the previous connection (step 2), connect SCXXNC to SCXXCM. Verify that the SCXX opto outputs for side 0 and 1 are open.

(d) Remove the connections from SCXXNO and SCXXNC. Verify that the SCXX opto outputs for sides 0 and 1 are open.

(e) De-energize the board by disconnecting pins 000 and 002. Confirm that relays K1 and K2 release.

5.07 It has been assumed that all functions of the remote alarm unit circuit pack, TN934, have been tested and that the pack has been properly installed in the unit. Therefore, only the cabinet wiring is tested, not all circuit pack functions.

(a) Connect a 5100-ohm load resistor from lead PWRALM1 to lead PWRALM. Then connect the minus lead of a 48-volt power supply through the fuse/filter panel to lead -48ALMB, and connect the plus lead to the -48RTNB lead (ground). A current greater than 5 milliampers must flow in the load resister. Measure the voltage from pins 032, 132, 033, or 133 to pins 232, 332, 233, or 333. This voltage must be zero.

(b) Connect the minus lead of a 48-volt power supply to lead -48VABS and the plus lead to lead RTNABS (ground). The current through the load resistor in (a) must be less than 0.5 milliamperes. The voltage measured from pins 032, 132, 033, or 133 to pins 232, 332, 233, or 333 must be 48 volts. The voltage from pins 232, 332, 233, or 333 to ground must be -48 volts.

(c) Connect 5100 ohm load resistors between the following leads: MNAUD and MNAUDR, TB and TBR, LMPCR and LMPCRR, LMPMJ and LMPMJR, LMPMN and LMPMNR, and LMPST and LMPSTR. A current of less the 0.5 milliamperes current must flow in these resistors.

(d) Connect the following leads together: OSC08P to OSC08N, OSC09P to OSC09N, OSC10P to OSC10N, and OSC11P to OSC11N. A current greater than 5 milliamperes must flow in the load resistors connected in step three. Current in the resistor connected from lead MNAUD to lead MNAUDR flows for about 5 seconds. Current in the resistor connected from lead TB to lead TBR cycles on and off for 5 seconds. Current in all other load resistors flows until the connections made in this step (d) are removed. Remove the connections made in this step (d). No current must flow in the load resistors.

(e) Connect the following leads together: to 1SC10N, and 1SC11P to 1SC11N. A current greater than 5 milliamperes must flow in the load resistors connected in step three. The current flow is the same as that observed in step four.

Figure 2. Circuit Diagram for the Remote Alarm Unit Test.

Remove the connections made in this step (e). No current must flow in the load resistors.

(f) Remove all connections, load resistors, and power supplies. This test sequence is complete.

## 6. TAKING EQUIPMENT OUT OF SERVICE

6.01 Removing the miscellaneous cabinet from service requires interruption of all voltages to the circuits mounted in the cabinet.

## SECTION IV - REASONS FOR REISSUE

### B. Changes In Apparatus

B.1 Added

- Transmission Rate Converter Unit (TRCU), K or L option, FS 15, APP. FIG 19
- Lightguide Stranded Cable Interconnection Module (LSCIM) 1 FS 16, APP. FIG. 20
- 14A announcement unit (host and remote offices) - FS 3B, 3C, APP. FIG. 20, 21

B.2 Add two 982SC OPTO isolator alarm cards to the Fuse Filter Unit.

### D. Description of Changes

D.1 This reissue also covers information authorized by the following appendixes to Issue 3 of this CD.

Appendix 3B - DWG ISSUE 5B
Appendix 4A - DWG ISSUE 6A

D.2 The 14A announcement was added to provide a two-channel announcement system for host and remote offices (FS 3B, 3C).

D.3 The link adapter unit was provided to create an interface between the 5ESS Switch and Operator Services Position System (OSPS) (FS 17 CAD 17).

D.4 FS 3B and 3C were revised to better facilitate ordering a 14A announcement (D.2).

D.5 FS 7 and FS 13 were revised to provide connectorized cables for the office alarm unit. FS 14 was changed to add LEDs to a power distribution panel.

D.6 In a RSM add two OPTO isolators to the pin field at the rear of the Fuse Filter Unit to convert the -48 volt fuse failure signal to a OPTO output closure and send this alarm back to the Host office via the MMSU.

D.7 Add the wiring on the Office Alarm Unit for the seventh and eighth Power Distribution Cabinets scan points (alarms) as an option when required.

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