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COMMON SYSTEMS
SIGNALING
FU() PLUS AUXILIARY SIGNALING
CIRCUIT
FOR USE WITH
TYPE F SIGNALING

CHANGES

D. Description of Changes

- D.1 On sheets G1, G2, G3, G4 and G6, canceled sheet notes that specify AMP (CHAMP) connector to correct documentation.
- D.2 In CAD-14 added "OR CAD-32" to destination showing "TO CAD-15".
- D.3 The following changes were made to provide F Signaling frame interface identification when F Signaling Analog Terminals are used with digital carriers.
- (a) Added CAD-32, CAD-33 and CAD-34
 - (b) Added references to CAD-32, CAD-33 and CAD-34 at CAD-3, CAD-4, CAD-5, CAD-6, CAD-11, CAD-12, CAD-19, CAD-20 and CAD-30.
 - (c) In CAD-26, changed EG to SG

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 4162-LIC-LCJR

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SECTION I - GENERAL DESCRIPTION1. PURPOSE OF CIRCUIT

1.01 This circuit provides information pertaining to the use and compatibility of the dual unit type F signaling system.

1.02 Bay wiring information is also provided for the following:

(a) Type FU() 2600-Hz converter circuit and type F auxiliary signaling circuits such as FA(), FB(), FC(), FD(), FG(), FH(), FL(), FM(), FP(), FR(), and FS().

(b) Tone Supply and Transfer-Fuse and Alarm-Power Converter Circuits.

2. GENERAL DESCRIPTION OF OPERATIONSIGNALING BAY

2.01 The connectorized Signaling Bays J99335T, U, V and W are similar to the J99335G, H, J and K respectively. The bay wiring is terminated in a series of multipin connectors which are located at each shelf level throughout the bay. This arrangement eliminates the wiring field at the top of the bay and requires central office wiring with multipin connectors.

2.02 Type F signaling is a 2600-Hz signaling system used to transform dc supervisory and dial pulse signals into ac tone signals for transmittal over 4-wire line or carrier facilities. It then converts the ac tone signals into dc signals for use by electromechanical or electronic switching circuits.

2.03 The type F signaling system is similar in purpose to the type E signaling system which, in most applications, it replaces and with which it is electrically compatible.

TONE SUPPLY AND TRANSFER FUSE AND ALARM CIRCUIT

2.04 The fuse and alarm circuit provides circuitry for actuating the minor and major audible and visual office alarms when the signaling unit, tone supply, ringing, or regulated converter fuses fail. It also provides a talk battery filter as well as a high and low voltage detection circuit for signal voltage.

2.05 The tone supply and transfer circuit provides the 2600-Hz oscillator for use by the signaling circuits. The transfer portion of the circuit will switch the full load to either of two oscillators normally provided, and actuate the office minor alarm if preset limits are exceeded.

2.06 The -48 to -24 volt dc to dc regulated converter provides controlled power for operating the signaling units and tone supplies. The converter reduces the effect of -48 volt battery office noise and limits the variations in voltage, thus providing more stable operation of the signal detector and speech amplifier. In addition, the voltage converter helps to isolate the 2600-Hz tone from the -48 volt supply. A circuit breaker is provided to disable the entire bay.

2.07 The carrier group alarm control provides a means of activating the trunk release and make-busy features in the signaling unit when carrier failure occurs.

COMPATIBILITY

2.08 Compatibility of the FU() plus auxiliary unit with other signaling units is shown in SD-1C240-02.

SECTION II - DETAILED DESCRIPTION

1. FS1 SIGNALING CIRCUIT

1.01 FS1 provides connecting information between the combination of FU() and F auxiliary signaling units and the line facility, the switching equipment, the power source, and the 2600-Hz tone source, and the carrier group alarm control circuit. Option Z provides a local ground connection to the signaling unit for the E lead when working with trunk circuits not requiring type II (looped) or type III (partial looped) signaling leads. The SB lead provides battery through a 500-ohm protective resistor for the M lead when working with trunk circuits requiring type II or type III signaling leads. Option Y provides wiring for an external echo suppressor or equalizer.

1.02 If a signaling unit should fail, it can be removed and replaced by another unit. If doubt exists as to whether the unit or the connecting circuit is at fault, the Test Extender Circuit, SD-1C241-02, can be used to examine the input and output ports and the control leads.

2. FS2 TONE SUPPLY AND TRANSFER-FUSE AND ALARM-POWER CONVERTER AND CARRIER GROUP ALARM CIRCUITS

2.01 The connections external to the bay are as follows:

- (a) Office -48 volt signal supply voltage.
- (b) SB lead -48 volt through a 500 ohm resistor.
- (c) Major and Minor audible office alarm.
- (d) Major and Minor visible office alarm.
- (e) Major and Minor alarms to Centralized Status Alarm and Control Systems (CSACS) and Surveillance Control of Transmission Systems (SCOTS).
- (f) Carrier Alarm circuit.
- (g) Carrier Group Alarm remote cutoff.
- (h) ESS remote master scanner.
- (i) Office continuous ringing.

2.02 The connections internal to the bay auxiliary units are as follows:

- (a) 2600 Hz tone.
- (b) 20 Hz ringing.
- (c) -48 volt filtered talk battery.
- (d) CGA leads; W(), ALB, ALM and ALO.

2.03 The connections to the FU() Plus Auxiliary are as follows:

- (a) -24 volt signal voltage.
- (b) -24 volt grd B and -48 volt grd A.

2.04 The Tone ground (TG) lead goes to the FU() unit.

2.05 Fuses and Alarm: The -48 volt office signal supply goes to a circuit breaker that may be used as a switch to turn power off the entire bay. The -48 volt for the talk battery and the SB lead is filtered and fused. The audible and visible alarm connections are made contacts in the MJ and MN relays.

2.06 Carrier Group Alarm: A ground on the SA () lead or a loop closure between the SA () and GRD (SA) leads indicates a carrier failure. The remote cutoff for the CGA requires a ground; this opens the ALC lead to the AUX units and overrides the CGA alarm. The CGA unit FYH supplies the ESS remote master scanner with an open during a carrier failure.

2.07 20 Hz Ringing: The 20 Hz ringing is fused and connected to the office alarm during a failure.

2.08 A detailed discussion of FS2 may be found in CD-7C011-01.

3. CAD FIGURES

3.01 CAD's 3, 4, 5, 6, 11, 12, 13 and 30 provide connecting information from the signaling unit to transmission and signaling leads.

3.02 CAD's 7, 8, 9 and 10 provide connecting information from the signaling unit to external echo suppressors or equalizers.

3.03 CAD's 19 and 20 provide connecting information for the load resistors associated with type II and III looped signaling.

3.04 CAD's 14, 15, 16, 17 and 18 provide connecting information for the local cable from the fuse and alarm unit and carrier group alarm units to the signaling units.

3.05 CAD's 1 and 2 provides connecting information for the signaling unit connector.

3.06 CAD's 21, 22 and 23 provide connecting information for the office alarm leads and the -48V office power.

3.07 CAD's 24, 25, 26, 27, 28, 29, and 31 provide connecting information for various office configurations of distribution frames for the transmission, signaling, and echo suppression leads.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 Working limits are provided in the circuit description of each circuit.

2. FUNCTIONAL DESIGNATIONS

2.01 Leads

<u>Designation</u>	<u>Meaning</u>
RCO	Remote alarm cutoff
GA	Carrier group alarm to ESS
GAP	Carrier group alarm return
GFD (SA)	CGA loop closer to ground
TS	Oscillator (2600-Hz supply)
RS	Ringing source
S	Signaling unit
SA	Carrier group alarm
SB	Signal battery or M lead return
SG	Signal ground or E lead return
TB	Talk battery
TG	Tone ground
TN	2600-Hz tone

2.02 Leads or straps used for local interconnections on the signaling units or tone supply are generally described in their respective circuit descriptions.

3. FUNCTIONS

3.01 The major and minor alarm leads shown on this drawing are controlled by the Tone Supply and Transfer-Fuse and Alarm Power Converter Circuits, and are described in CD-7C008-01, and CD-1C224-02.

4. CONNECTING CIRCUITS

4.01 The following circuits are covered by this drawing:

(a) 2600-Hz Tone Supply and Transfer Circuit - SD-1C224-01, and SD-1C224-02.

(b) Type F Signaling Circuits are compatibility information added on SD-1C240-02, issue 7B.

(c) Fuse and Alarm Circuit - SD-7C011-01.

(d) Carrier Group Alarm Common Control Circuit - SD-1C284-01.

(e) Regulated Converter - SD-81868-01.

4.02 The following are typical connecting circuits:

(a) For switching equipment trunk circuits, see Signaling Compatibility with Switching Circuits - SD-99421-08.

(b) For type E signaling units, see Application Schematic - SD-98151-01.

(c) TT Board Patching Jack Circuits - SD-55337-01, SD-62741-01, and SD-64724-01.

(d) Carrier Application Schematics - SD-59106-01, SD-64360-01, SD-97031-01, SD-97118-01, and SD-97118-02.

(e) Carrier Systems VF Patching Jack Circuit - SD-64303-01, SD-59329-01, and SD-59330-01.

(f) Carrier Group Alarm Control Circuit - SD-97166-01.

(g) Consolidated Bay with Maintenance Connector Circuit - SD-1C375-01.

(h) ESS No. 1 Remote Master Scanner Applique Circuit - SD-1A210-01.

(i) V3 or V4 Telephone Repeater Application Schematic - SD-95144-01 and SD-97047-01.

(j) 24V4 Repeater - SD-99739-01.

(k) Test Extender Circuit - SD-1C241-02.

(l) DX Signaling Circuit - SD-95487-01, SD-1C363-01, and SD-1C364-01.

(m) L-Type Multiplex 12 channel Bank - Type A6-SD-53121-01.

5. MANUFACTURING TESTING REQUIREMENTS

5.01 None are required for this drawing since they are provided for in the Y specifications of each individual circuit.

6. ALARM ROUTINES

6.01 Major and Minor alarm routines and restoral procedures are discussed in detail in CD-7C011-01.

7. TAKING EQUIPMENT OUT OF SERVICE

7.01 When troubles arise in the signaling unit or associated connections which cannot be repaired easily by replacing the signaling unit, it may be possible to localize the trouble by using the Test Extender Circuit (SD-1C2#1-02). This circuit makes the input and output ports and the control leads available for easy testing.

SECTION IV - REASONS FOR REISSUED. Description of Changes

D.1 The following changes were added to provide circuit information and final drawing release for SD-7C012-01.

- (a) Added equipment drawings ED-7C048-(), J99335U, J99335V, and J99335W to Supporting Information table.
- (b) Added quantities in Provide column of Feature and Option table Circuit Note 102.
- (c) Added reference to Note 310 in T SUP & TP-FUSE & ALARM FWP CONV - CAPR GF ALARM in Circuit Note 102.
- (d) Added to Circuit Note 310, "The FU() and AUX comprise a single signaling circuit and are considered as one position in Table A".
- (e) Added power converter requirements for 10 1/2 foot, 9-foot and 7-foot bays to Circuit Note 203.
- (f) Added carrier group alarm requirements for 10 1/2 foot, 9-foot and 7-foot bays to Circuit Note 204.
- (g) In CAD-15 added reference to 11 1/2 foot, 10 1/2 foot and 9-foot bays.
- (h) In CAD-15 added "if used" reference to 6th shelf assembly.
- (i) Added CAD-32 for 7-foot bay.
- (j) In FS1, changed lead designation for FU() terminals 30, and 21 and AUX terminals 3, and 23 from "TPMT IN" to "LBCC". Changed lead designation for FU() terminals 15, and 26 and AUX terminals 5, and 25 from "PCV OUT" to "NET".

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