# ELECTRONIC SWITCHING SYSTEM
# NO. 3
# UNIVERSAL TRUNK
# CIRCUIT

CHANGES

F. Changes in CD Table of Contents

F.1 Change Table of Contents SECTION II - DETAILED DESCRIPTION to read:

1. OUTGOING TRUNK CIRCUIT REVERSE BATTERY WITH HIGH LOW SUPERVISION (FB399).....1

2. 2-WAY TRUNK CIRCUIT WITH E&M LEADS SUPERVISION (FB361, FB382, & FB391).....2

INCOMING CALLS.....2
OUTGOING CALLS.....2

3. INCOMING TRUNK CIRCUIT WITH REVERSE BATTERY SUPERVISION WINK OR IMMEDIATE START (FB371).....2

4. INCOMING TRUNK CIRCUIT WITH REVERSE BATTERY SUPERVISION DELAY DIAL (FB370).....2

F. Changes in CD Section II

F.1 Change 1. OUTGOING TRUNK CIRCUIT WITH REVERSE BATTERY SUPERVISION (FB360) to read 1. OUTGOING TRUNK CIRCUIT REVERSE BATTERY HIGH LOW SUPERVISION (FB399)

F.2 Add the following after Section II, 2.15:

3. INCOMING TRUNK CIRCUIT WITH REVERSE BATTERY SUPERVISION WINK OR IMMEDIATE START (FB371)

3.01 The purpose of this circuit is to provide the necessary incoming trunk circuit functions for connecting to transmission facilities that use reverse battery supervision wink or immediate start and MF or DP signaling.
This trunk circuit can be used for local or tandem completion.

3.02 When the central office is seized at the distant end and the call is an MF call, an MF receiver is connected to the circuit via the switching network. A dc continuity check is made, and a start-pulsing signal is sent to the distant office via a battery reversal of tip and ring.

3.03 If the call is a DP call, a receiver is not associated with this circuit as in a MF call. The dial pulses are collected by the digit processing programs directly from the trunk scan point. The distant office may require a start-pulsing signal, similar to the one used for an MF call.

3.04 If the call is to terminate locally and the called line is idle, audible ringing tone is returned to the calling party. At the same time, a ringing circuit is connected via the network to the called line, and the appropriate type of ring is applied. When the called party answers, the line is connected to the trunk via a previously reserved path. If there is a charge call, an answer signal is returned to the distant office by putting a battery reversal of the tip and ring. In the case of a talk-free call, no battery reversal is transmitted.

3.05 If the called line is busy, this circuit is connected via the network to a tone and recorded announcement circuit, and busy tone is returned to the calling party.

3.06 Two relays, designated A and B, are operated by the distributor circuit under program control. These relays are used to provide the necessary circuit states for the various functions of the circuit. Each state is defined by a particular relay or relays operating or releasing. For example, with the A relay operated and B relay released, the trunk circuit is placed in the bypass state (for the other trunk states see SD-3H220-01). These relays can be operated or released in any combination at the same time.

## 4. INCOMING TRUNK CIRCUIT WITH REVERSE BATTERY SUPERVISION DELAY DIAL (FB370)

4.01 The purpose of this circuit is to provide the necessary incoming trunk circuit functions for connecting to transmission facilities that use reverse battery supervision delay dial and MF signaling from a 4A or 4M crossbar office.

4.02 The operation of this circuit is similar to that described in Section 3 with the exception that this circuit provides an off-hook condition in the idle state.

F. Changes in CD Section III

F.1 Change 1. WORKING LIMITS to read:

1. WORKING LIMITS

1.01 Trunk supervision ranges:

Earth potential difference - ±3 volts.

Maximum external conductor loop resistance (E leads, FB361, FB382, and FB391) - 4000 ohms.

Maximum external loop resistance (outgoing trunk, FB360) - 4000 ohms.

Maximum external loop resistance (incoming trunk, FB370 and FB371) - 4000 ohms.

Minimum insulation resistance - 30,000 ohms.

F.2 Change 3. FUCNTIONS to read:

3. FUNCTIONS

Outgoing Trunk Circuit Reverse Battery with high low Supervision (FB399)

F.3 Change 2-WAY TRUNK CIRCUIT WITH E&M LEAD SUPERVISION (FB361) to read: 2-WAY TRUNK CIRCUIT WITH E&M LEAD SUPERVISION (FB361, FB382, and FB391)

F.4 Change 3.08 to read:

3.08 Permits MF and DP digit transmission.

F.5 Change 3.14 to read:

3.14 Permits MF and DP digit reception.

F.6 Add the following after Section III, 3.16:

Incoming Trunk Circuit with Reverse Battery Supervision Wink or Immediate State (FB371)

3.17 Monitors for a connect signal from the distant office.

3.18 Sends a wink start-pulsing signal to the distant office.

3.19 Permits MF and DP digit reception.

3.20 Provides talking states for local and tandem calls.

3.21 Returns answer or change and disconnect signals to the originating end.

Incoming Trunk Circuit with Reverse Battery Supervision Delay Dial (FB370)

3.22 Monitors for a connect signal from the distant office.

3.23 Sends a wink start pulsing signal to the distant office.

3.24 permits MF digit reception.

3.25 Provides talking states for local and tandem calls.

3.26 Returns answer or changes disconnect signals to the originating end.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5329-WLH-GH

# ELECTRONIC SWITCHING SYSTEMS
# NO. 3
# UNIVERSAL TRUNK
# CIRCUIT

## CHANGES

### F. Changes in CD Table of Contents

F.1 Change table of contents, SECTION II - DETAILED DESCRIPTION to read:

1. OUTGOING TRUNK CIRCUIT REVERSE BATTERY WITH HIGH LOW SUPERVISION (FB399).....1

2. 2-WAY TRUNK CIRCUIT WITH E&M LEADS SUPERVISION (FB361).....2

INCOMING CALLS.....2

OUTGOING CALLS.....2

3. INCOMING REVERSE BATTERY SUPERVISION WINK OR IMMEDIATE START (FB371).....2

### F. Changes in CD Section II

F.1 Change 1. OUTGOING TRUNK CIRCUIT WITH REVERSE BATTERY SUPERVISION (FB360) to read 1. OUTGOING TRUNK CIRCUIT REVERSE BATTERY WITH LOW SUPERVISION (FB399)

F.2 Add the following after Section II, 2.15:

3. INCOMING TRUNK CIRCUIT WITH REVERSE BATTERY SUPERVISION WINK OR IMMEDIATE START (FB371)

3.01 The purpose of this circuit is to provide the necessary incoming trunk circuit functions for connecting to transmission facilities that use reverse battery supervision wink or immediate start and MF or DP signaling. This trunk circuit can be used for local or tandem completion.

3.02 When the central office is seized at the distant end and the call is an MF call, an MF receiver is connected to the circuit via the switching network. A dc continuity check is made and a start-pulsing signal is sent to the distant office via a battery reversal of tip and ring.

3.03 If the call is a DP call, a receiver is not associated with this circuit as in a MF call. The dial pulses are collected by the digit processing programs directly from the trunk scan point. The distant office may require a start-pulsing signal, similar to the one used for an MF call.

3.04 If the call is to terminate locally and the called line is idle, then audible ringing tone is returned to the calling party. At the same time, a ringing circuit is connected via the network to the called line, and the appropriate type of ring is applied. When the called party answers, the line is connected to the trunk via a previously reserved path. If there is a charge call, an answer signal is returned to the distant office by putting a battery reversal of the tip and ring. In the case of a talk-free call, no battery is transmitted.

3.05 If the called line is busy, this circuit is connected via the network to a tone and recorded announcement circuit, and busy tone is returned to the calling party.

3.06 Two relays, designated A and B, are operated by the distributor circuit under program control. These relays are used to provide the necessary circuit states for the various functions of the circuit. Each state is defined by a particular relay or relays operating or releasing. For example, with the A relay operated and B relay released, the trunk circuit is placed in the bypass state (for the other trunk states see SP 3H-220-01). These relays can be operated or released in any combination at the same time.

F. Changes in CD Section III

F.1 Change 1. WORKING LIMITS to read:

1. WORKING LIMITS

1.01 Trunk supervision ranges:

Earth potential difference - ±3 volts.

Maximum external conductor loop resistance (E leads, FB361) - 400 ohms.

Maximum external loop resistance (outgoing trunk, FB360) - 4000 ohms.

Maximum external loop resistance (incoming trunk, FB371) - 4000 ohms.

Minimum insulation resistance - 30,000 ohms.

F.2 Change 3. FUNCTIONS to read:

3. FUNCTIONS

Outgoing Trunk Circuit Reverse Battery with High Low Battery Supervision (FB399)

F.3 Change 3.08 to read:

3.08 Permits MF and DP digit transmission.

F.4 Change 3.14 to read:

3.14 Permits MF and DP digit reception.

F.5 Add the following after Section III, 3.16:

INCOMING TRUNK CIRCUIT WITH REVERSE BATTERY SUPERVISION WINK OR IMMEDIATE STATE (FB371)

3.17 Monitors for a connect signal from the distant office.

3.18 Sends a wink start - pulsing signal to the distant office.

3.19 Permits MF and DP digit reception.

3.20 Provides talking states for local and tandem calls. Signals to the originating end.

3.21 Returns answer or change and disconnect signals to the originating end.

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ELECTRONIC SWITCHING SYSTEMS

NO. 3
UNIVERSAL TRUNK
CIRCUIT

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## SECTION I - GENERAL DESCRIPTION

1.01 The purpose of this circuit is to specify the wiring information for the J3H001BE unit, which provides the means of universally wiring and physically mounting 24 of the most commonly used trunk circuits, which are on circuit packs in No. 3 ESS. One of these units is mounted on each network frame, and additional growth units are placed on the control and miscellaneous frames.

## SECTION II - DETAILED DESCRIPTION

### 1. OUTGOING TRUNK CIRCUIT WITH REVERSE BATTERY SUPERVISION (FB360)

1.01 The purpose of this circuit is to carry out the functions required at the origination end of a trunk to complete a call to a customer served by another central office. This call is originated by a customer who is served by the office using this circuit.

1.02 When a connection to another central office is to be set up, the system control causes the required type of digit transmitter to be connected to this outgoing trunk circuit via the switching network. The trunk circuit is put into the bypass state, which connects the digit transmitter directly to the outgoing transmission facility with no bridging or series impedances. Continuity is performed by the digit transmitter through the network to the distant office trunk.

1.03 After the digits are outpulsed, supervision of the distant office is transferred to the trunk scan point associated with the trunk supervisory bridge in this trunk circuit. This trunk is then placed in the continuity and hold state, and the digit transmitter is then released.

1.04 When this circuit is in the continuity and hold state, a dc continuity check of the switching network circuit path connecting the junctor circuit associated with the calling customer to this circuit is made. At the same time, a dc holding path is provided to the distant office trunk.

1.05 The calling-customer line supervision and talking battery are provided via the line supervisory element in the associated junctor circuit when this circuit is switched to the local state.



F1 4

1.06 When the called party answers a nonfree call, the polarity to this trunk supervisory element is reversed at the distant office. This reversal, the answer or charge signal, is detected by the trunk scan point in this circuit. Call party disconnect, nonfree call, is signaled by a battery reversal at the distant office and is again detected at the trunk scan point.

1.07 When the circuit is returned to the idle state at the end of the call, tip and ring to the distant office are opened to direct current and an ac idle circuit termination is placed across tip and ring.

1.08 Two relays, designated A and B, are operated by the distributor circuit under program control. These relays are used to provide the necessary circuit states for the various functions of the circuit. Each state is defined by a particular relay or relays operating or releasing. For example, with the A relay operated and the B relay released, the trunk circuit is placed in the bypass state (for other trunk states see SD-3H220-01). These state relays can be operated or released in any combination at the same time.

## 2. 2-WAY TRUNK CIRCUIT WITH E&M LEAD SUPERVISION (FB361)

2.01 The purpose of this circuit is to provide the necessary incoming or outgoing trunk circuit functions for connecting to transmission facilities that use E&M lead supervision and multifrequency (MF) or dial pulsing (DP). This trunk circuit can be used for local or tandem completion.

### INCOMING CALLS

2.02 When the transmission facility from another central office is seized at the distant end and the call is an MF call, an MF receiver is connected to this circuit. A dc continuity check of the network path is made and a start-pulsing signal is sent to the distant office. Supervision of the transmission facilities is maintained at the trunk scan point. After the digits have been received, the receiver is released.

2.03 If the call is a DP call, a receiver is not associated with the circuit as in an MF call. The dial pulses are collected by the digit processing programs directly from the trunk scan point. The distant office may require a start-pulsing signal similar to the one used for an MF call.

2.04 If the call is to terminate locally and the called line is idle, audible ring tone is returned to the calling party. At the same time, a ringing circuit is connected via the network to the called line, and the appropriate type of ringing is applied. When the called party answers, the line is connected to the trunk via a previously reserved path. If it is a charge call, an answer signal is returned to the distant office by putting a contact closure on the M leads. In the case of a talk free call the M leads are left open.

2.05 If the called line is busy, this circuit is connected via the network to a tone and recorded announcement circuit, and busy tone is returned to the calling party.

2.06 If the call is to terminate in another central office, this circuit is connected via the network to an outgoing trunk circuit over which the necessary digits have been outpulsed. A dc continuity check of the network path is made, and the two connecting trunk circuits are switched to the proper states.

2.07 When the called party answers, a contact closer is placed on the M leads, thus indicating a change in state to the originating office. When the called party disconnects, the contact closer is removed, passing the disconnect information to the originating office.

2.08 When the circuit is made idle at the end of the call, the tip and ring toward the transmission facility are opened to direct current by the insertion of an ac idle circuit impedance termination.

### OUTGOING CALLS

2.09 With an MF call an MF transmitter is connected to this circuit via the network, and a check for network continuity is made. Then a seizure is sent to the distant office from the trunk circuit. After receiving a start-pulsing signal from the distant office, the digits are outpulsed.

2.10 In a DP call a seizure signal is sent to the distant office, which may or may not be arranged to return a start-pulsing signal. Such a signal, if expected, will be received on the E lead of this circuit. The dial pulses are transmitted under control of the 3A CC.

2.11 During outpulsing, supervision is maintained by the scan point associated with the trunk circuit that is under the control of the E leads. After the digits are outpulsed, the transmitter is released, and the calling line is connected to this circuit.

2.12 When the calling party is a local customer, line supervision and talking battery are provided via the junctor. When the called party answers, answer supervision is detected at the trunk scan point. When the called party disconnects, the circuit is returned to the idle state.

2.13 If the calling party is served by another office or an operator, a dc continuity check is made of the network path connecting the incoming trunk to this circuit. The two trunk circuits are switched to the proper talking states. Answer and disconnect signals from the called party are detected at the trunk scan point. Calling party disconnect is detected at the trunk supervisory scan point in the incoming trunk circuit.

2.14 When either one or both parties disconnect, the tip and ring toward the switching network are opened, and the tip and ring toward the transmission facility are terminated in an ac impedance.

2.15 Three relays, designated A, B, and C, are operated by the distributor circuit under program control. These relays are used to provide the necessary circuit states for the various functions of the circuit. Each state is defined by a particular relay or relays operating or releasing. For example, with the A relay operated and the B and C relays released, the trunk circuit is placed in the talk free state (for other examples, see SD-3H220-01). These three relays can be operated or released in any combination at the same time.

## SECTION III - REFERENCE DATA

### 1. WORKING LIMITS

1.01 Trunk supervision ranges:

Earth potential difference - ±3 volts.

Maximum external conductor loop resistance (E leads, FP361) - 400 ohms.

Maximum external loop resistance (outgoing trunk, FP360) - 6000 ohms.

Minimum insulation resistance - 30,000 ohms.

### 2. FUNCTIONAL DESIGNATIONS

2.01 Relays

| Designation | Meaning |
|---|---|
| A,B,C | These relays are alphabetically designated for program reference. |

### 3. FUNCTIONS

Outgoing Trunk Circuit With Reverse Battery Supervision (FP360)

3.01 Provides a idle circuit termination to the transmission facility.

3.02 Provides bypass elements to permit direct association of the transmission facility to an appropriate digit transmitter connected through the network.

3.03 Provides for reception of answer of charge and disconnect signals from the distant end.

3.04 Provides talking state for local calls.

2-Way Trunk Circuit with E&M Lead Supervision (FP361)

Outgoing Calls

3.05 Present a idle circuit termination.

3.06 Originates a connect signal to the distant office.

3.07 Monitors for a start-pulsing signal.

3.08 Permits MF digit transmission.

3.09 Receives answer or charge and disconnect signals from the distant end.

3.10 Provides talking states for local and tandem calls.

Incoming Calls

3.11 Monitors for a connect signal from the distant office.

3.12 Presents a idle circuit termination to the transmission facility.

3.13 Sends a wink start-pulsing signal to the distant office.

3.14 Permits MF digit reception.

3.15 Provides talking states for local and tandem calls.

3.16 Returns answer or charge and disconnect signals to the origirating end.

### 4. CONNECTING CIRCUITS

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

(a) Master Scanner Circuit - SD-3H140-01.

(b) Distribute Point Circuit - SD-3H150-01.

(c) Junctor Unit Circuit - SD-3H200-01.

(d) Network Frame Circuit (Network Appearance) - SD-3H901-01.

(e) E&M Lead Applique Circuit - SD-99774-01.

## 5. MANUFACTURING TESTING REQUIREMENTS

### Intermediate Requirements

5.01 None.

### End Requirements

5.02 This circuit should be tested to verify that it is wired in accordance with the schematic and wiring drawings, that the requirements of the circuit requirements table are met, and that the circuit is capable of performing all functions stated in this circuit description.

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DEPT 5341-WLH-LEG

## 6. TAKING EQUIPMENT OUT OF SERVICE

6.01 Information for taking this circuit out of service is found in IM-3H000 and OM-3H000. Also the associated fuse must be removed before removing the trunk circuit from the unit.

## SECTION IV - REASONS FOR REISSUE

### D. Description of Changes

D.1 Provided complete CD information.