

PANEL SYSTEMS  
MISCELLANEOUS CIRCUIT  
FOR SUBSCRIBER SENDER FRAME  
FOR THREE AND THREE - TWO DIGIT SENDERS  
FOR USE WITH DECODER

CHANGES

B. CHANGES IN APPARATUS

B.1	Removed	Replaced By
	15 amp fuse	20 amp fuse
	Fig. 1	Fig. 1

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The 15 ampere frame fuse shown in Fig. 1  
is replaced by a 20 ampere frame fuse.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2364-MBC-RJJ-EP

CD-1139-1  
Page 8-B  
Page 11-10  
Page 11-10

EXHIBIT 1004  
EXHIBIT 1004  
EXHIBIT 1004  
EXHIBIT 1004  
EXHIBIT 1004

EXHIBIT 1004

EXHIBIT 1004

EXHIBIT 1004



PANEL SYSTEMS  
MISCELLANEOUS CIRCUITS  
FOR SUBSCRIBER SENDER FRAME  
FOR THREE AND THREE-TWO DIGIT SENDERS  
FOR USE WITH DECODERS

## CHANGES

## B. CHANGES IN APPARATUS

## B.1 Added

Fig. 17, (IC2) - (IC3) E6417 Relays

## D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Fig. 17 is added to provide for activating the intersender timing feature in subscriber senders on a frame when they are in two different groups and are to be treated as such.

D.2 Circuit Note 112 is modified to include use of Fig. 17.

All other headings under Changes, no change.

## 1. PURPOSE OF CIRCUIT

1.1 To provide miscellaneous jacks, test battery terminals, fuse panel alarms, motor stop and frame busy for the sender frame.

## 2. WORKING LIMITS

2.1 None.

## OPERATION

## 3. FUNCTIONS

3.1 To provide visible signals and to cause operation of alarm board and aisle pilot alarms when a fuse panel fuse operates.

3.2 To make busy all senders driven by the motor in case the driving motor stops.

3.3 To make busy all senders driven by the motor in case the lead from the decoder connector or the lead from the miscellaneous circuit for sender make busy frame is grounded.

3.4 To provide miscellaneous jacks as specified on the drawing.

3.5 To provide for operating the intersender timing feature in associated subscriber senders.

## 4. CONNECTING CIRCUITS

When this circuit is listed on a key-sheet the connecting information thereon is to be followed:

- 4.01 Miscellaneous alarm circuit.
- 4.02 Floor alarm board fuse and time alarm circuit - SD-21201-01.
- 4.03 Local frame line circuit - ES-20360-01, SD-96379-01.
- 4.04 Automatic sender test circuit - SD-21186-01.
- 4.05 Test circuit interrupter jack circuit.
- 4.06 Sender circuit - SD-21382-01 (Typical).
- 4.07 Decoder connector circuit - SD-21187-01.
- 4.08 Floor alarm board motor alarm circuit - SD-21202-01.
- 4.09 Floor alarm board circuit.
- 4.10 Miscellaneous circuit for sender make busy frame - SD-21236-01.
- 4.11 Miscellaneous circuit for miscellaneous interrupter frame - SD-21666-01.
- 4.12 Sender load indicating circuit - SD-21942-01.

## DETAILED DESCRIPTION

## 5. FUSE ALARM (FIG. 1)

When the 15 ampere fuse opens, the associated 1-1/3 ampere fuse operates. Operation of any 1-1/3 ampere fuse on the fuse panel lights lamp (FA) and closes the circuit of floor alarm board alarms. When the operated 1-1/3 ampere fuse is removed, the alarm circuits are opened.

## 6. FRAME LINE BETWEEN FRAMES (FIG. 2)

Communication may be established with the "A" switchboard by inserting the plug of an "A" board cord in the "A" board jack



and plugging an operator telephone set into the (TEL) jacks. Where no "A" switchboard is located in the office, communication may be established with the sender make busy frame by operating the (TALK) key at the sender make busy frame and plugging an operator telephone set into the (TEL) jacks. Connection may be made between two or more frames by plugging operator telephone sets into the (TEL) jacks at these frames. Talking battery is supplied thru the connecting circuit. No signaling is provided.

#### 7. SPARE JACK (FIG. 3)

Jack (G) is provided to meet possible future requirements for miscellaneous jacks.

#### 8. FRAME TEST BATTERY SUPPLY (FIG. 4)

One connecting block is furnished on each side of the frame to supply 24 volt battery, 48 volt battery, ground and ground thru 12000 ohms for testing purposes. Ground and 48 volt battery are connected to sleeve and tip, respectively, of jack (A), in which the plug of a test set cord may be inserted.

#### 9. SENDER TEST CIRCUIT REMOTE CONTROL JACK (FIGS. 5, 6 & 7)

Jacks (B), (C) and (D) are connected to the automatic sender test circuits so that repeated tests may be made by means of a test set plugged into one of the jacks.

#### 10. TEST CIRCUIT INTERRUPTER JACKS (FIG. 8)

When jacks (E) and (F) are connected by means of patching cords to jacks (3R) and (4W), respectively, of a 35-C test set, ground over lead M causes the interrupter to function and intermittently close and open the leads connected to tip and ring of each jack. These interrupters are used for testing (RS) relays in the sender when the sender circuit CR table specifies the use of the E and F jacks. The 149 ET (RS) relay used in link type senders in ground cutoff offices is a case where these jacks are required. When the energizing circuit of the relay is closed and opened at the speed of interruption supplied thru jack (E), the relay should operate and remain operated. When the circuit is closed and opened at the speed of interruption supplied thru jack (F), the relay should operate and release.

#### 11. FRAME BUSY RELAYS (FIG. 9)

When ground is connected to lead FB, FC or FD, relays (FB) and (FBI) operate, making busy all senders on the frame.

#### 12. MOTOR STOP (FIG. 10)

When the motor slows down or stops, frame drive contact "S" closes, causing operation of signals at the floor alarm board. When the motor speed is again normal, if the alarm release key at the floor alarm board has been operated, closure of contact "R" operates the alarms as a signal to restore the key.

#### 13. MOTOR TRANSFER (FIG. 11) (MFR. DISC.)

This figure provides wiring for the motor transfer alarm.

#### 14. FUSE ALARM AISLE PILOT LAMP (FIG. 12)

Operation of the fuse alarm, Fig. 1, causes operation of relay (A1) in the floor alarm board fuse and time alarm circuit, lighting lamp (FP).

#### 15. TEST BATTERY SUPPLY (FIG. 13)

The 24 volt battery and resistances required for Fig. 4 are supplied by this figure.

#### 16. RELAY TEST JACKS FOR TESTING 149-AR RELAYS (FIG. 14) (MFR. DISC.)

Jacks (E) and (F) may be connected to the relay test set by means of patching cords. When the energizing circuit of the relay is closed and opened periodically at the speed of interruption supplied thru jack (E), the relay should operate and remain operated. When the circuit is closed and opened at the speed of interruption furnished thru jack (F), the relay should operate and release.

#### 17. RELAY TEST JACKS FOR TESTING 149-AR RELAYS (FIG. 15)

Jacks (E) and (F) may be connected to the relay test set by means of patching cords. When the energizing circuit of the relay is closed and opened periodically at the speed of interruption supplied thru jack (E), the relay should operate and remain operated. When the circuit is closed and opened at the speed of interruption furnished thru jack (F), the relay should operate and release.

#### 18. INTERSENDER TIMING CONTROL FIGS. 16 & 17

Relays (IC) and (IC1), Fig. 16, operate on a signal from the sender load indicating circuit. With relays (IC) and (IC1) operated, ground is connected to the "IT"

lead of each subscriber sender on the frame activating the intersender timing feature in the sender.

When subscriber senders on a frame are in two different groups and are to be

treated as such, the (IC2) or (IC3) relay, Fig. 17, will operate on a signal from its sender load indicating circuit and in turn connect ground to the "IT" lead of each subscriber sender on the frame in the same group.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2314-LLS-FBB-PM





PANEL SYSTEMS  
MISCELLANEOUS CIRCUIT  
FOR SUBSCRIBER SENDER FRAME  
FOR THREE AND THREE - TWO DIGIT SENDERS  
FOR USE WITH DECODER

CHANGES

B. CHANGES IN APPARATUS

B.1	Removed	Replaced By
	15 amp fuse Fig. 1	20 amp fuse Fig. 1

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The 15 ampere frame fuse shown in Fig. 1  
is replaced by a 20 ampere frame fuse.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2364-MBC-RJJ-EP

WIRELESS COMMUNICATIONS  
AND TELEVISION BROADCASTING  
AND CABLE TELEVISION  
AND CABLE TELEVISION

1. WIRELESS COMMUNICATIONS  
2. WIRELESS COMMUNICATIONS  
3. WIRELESS COMMUNICATIONS  
4. WIRELESS COMMUNICATIONS  
5. WIRELESS COMMUNICATIONS  
6. WIRELESS COMMUNICATIONS  
7. WIRELESS COMMUNICATIONS  
8. WIRELESS COMMUNICATIONS  
9. WIRELESS COMMUNICATIONS  
10. WIRELESS COMMUNICATIONS

WIRELESS COMMUNICATIONS

WIRELESS COMMUNICATIONS



PANEL SYSTEMS  
MISCELLANEOUS CIRCUITS  
FOR SUBSCRIBER SENDER FRAME  
FOR THREE AND THREE-TWO DIGIT SENDERS  
FOR USE WITH DECODERS

## CHANGES

## B. CHANGES IN APPARATUS

## B.1 Added

Fig. 17, (IC2) - (IC3) E6417 Relays

## D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Fig. 17 is added to provide for activating the intersender timing feature in subscriber senders on a frame when they are in two different groups and are to be treated as such.

D.2 Circuit Note 112 is modified to include use of Fig. 17.

All other headings under Changes, no change.

## 1. PURPOSE OF CIRCUIT

1.1 To provide miscellaneous jacks, test battery terminals, fuse panel alarms, motor stop and frame busy for the sender frame.

## 2. WORKING LIMITS

2.1 None.

## OPERATION

## 3. FUNCTIONS

3.1 To provide visible signals and to cause operation of alarm board and aisle pilot alarms when a fuse panel fuse operates.

3.2 To make busy all senders driven by the motor in case the driving motor stops.

3.3 To make busy all senders driven by the motor in case the lead from the decoder connector or the lead from the miscellaneous circuit for sender make busy frame is grounded.

3.4 To provide miscellaneous jacks as specified on the drawing.

3.5 To provide for operating the intersender timing feature in associated subscriber senders.

## 4. CONNECTING CIRCUITS

When this circuit is listed on a key-sheet the connecting information thereon is to be followed:

- 4.01 Miscellaneous alarm circuit.
- 4.02 Floor alarm board fuse and time alarm circuit - SD-21201-01.
- 4.03 Local frame line circuit - ES-20360-01, SD-96379-01.
- 4.04 Automatic sender test circuit - SD-21186-01.
- 4.05 Test circuit interrupter jack circuit.
- 4.06 Sender circuit - SD-21382-01 (Typical).
- 4.07 Decoder connector circuit - SD-21187-01.
- 4.08 Floor alarm board motor alarm circuit - SD-21202-01.
- 4.09 Floor alarm board circuit.
- 4.10 Miscellaneous circuit for sender make busy frame - SD-21236-01.
- 4.11 Miscellaneous circuit for miscellaneous interrupter frame - SD-21666-01.
- 4.12 Sender load indicating circuit - SD-21942-01.

## DETAILED DESCRIPTION

## 5. FUSE ALARM (FIG. 1)

When the 15 ampere fuse opens, the associated 1-1/3 ampere fuse operates. Operation of any 1-1/3 ampere fuse on the fuse panel lights lamp (FA) and closes the circuit of floor alarm board alarms. When the operated 1-1/3 ampere fuse is removed, the alarm circuits are opened.

## 6. FRAME LINE BETWEEN FRAMES (FIG. 2)

Communication may be established with the "A" switchboard by inserting the plug of an "A" board cord in the "A" board jack

and plugging an operator telephone set into the (TEL) jacks. Where no "A" switchboard is located in the office, communication may be established with the sender make busy frame by operating the (TALK) key at the sender make busy frame and plugging an operator telephone set into the (TEL) jacks. Connection may be made between two or more frames by plugging operator telephone sets into the (TEL) jacks at these frames. Talking battery is supplied thru the connecting circuit. No signaling is provided.

#### 7. SPARE JACK (FIG. 3)

Jack (G) is provided to meet possible future requirements for miscellaneous jacks.

#### 8. FRAME TEST BATTERY SUPPLY (FIG. 4)

One connecting block is furnished on each side of the frame to supply 24 volt battery, 48 volt battery, ground and ground thru 12000 ohms for testing purposes. Ground and 48 volt battery are connected to sleeve and tip, respectively, of jack (A), in which the plug of a test set cord may be inserted.

#### 9. SENDER TEST CIRCUIT REMOTE CONTROL JACK (FIGS. 5, 6 & 7)

Jacks (B), (C) and (D) are connected to the automatic sender test circuits so that repeated tests may be made by means of a test set plugged into one of the jacks.

#### 10. TEST CIRCUIT INTERRUPTER JACKS (FIG. 8)

When jacks (E) and (F) are connected by means of patching cords to jacks (3R) and (4W), respectively, of a 35-C test set, ground over lead M causes the interrupter to function and intermittently close and open the leads connected to tip and ring of each jack. These interrupters are used for testing (RS) relays in the sender when the sender circuit CR table specifies the use of the E and F jacks. The 149 BT (RS) relay used in link type senders in ground cutoff offices is a case where these jacks are required. When the energizing circuit of the relay is closed and opened at the speed of interruption supplied thru jack (E), the relay should operate and remain operated. When the circuit is closed and opened at the speed of interruption supplied thru jack (F), the relay should operate and release.

#### 11. FRAME BUSY RELAYS (FIG. 9)

When ground is connected to lead FB, FC or FD, relays (FB) and (FBL) operate, making busy all senders on the frame.

#### 12. MOTOR STOP (FIG. 10)

When the motor slows down or stops, frame drive contact "S" closes, causing operation of signals at the floor alarm board. When the motor speed is again normal, if the alarm release key at the floor alarm board has been operated, closure of contact "R" operates the alarms as a signal to restore the key.

#### 13. MOTOR TRANSFER (FIG. 11) (MFR. DISC.)

This figure provides wiring for the motor transfer alarm.

#### 14. FUSE ALARM AISLE PILOT LAMP (FIG. 12)

Operation of the fuse alarm, Fig. 1, causes operation of relay (Al) in the floor alarm board fuse and time alarm circuit, lighting lamp (FP).

#### 15. TEST BATTERY SUPPLY (FIG. 13)

The 24 volt battery and resistances required for Fig. 4 are supplied by this figure.

#### 16. RELAY TEST JACKS FOR TESTING 149-AR RELAYS (FIG. 14) (MFR. DISC.)

Jacks (E) and (F) may be connected to the relay test set by means of patching cords. When the energizing circuit of the relay is closed and opened periodically at the speed of interruption supplied thru jack (E), the relay should operate and remain operated. When the circuit is closed and opened at the speed of interruption furnished thru jack (F), the relay should operate and release.

#### 17. RELAY TEST JACKS FOR TESTING 149-AR RELAYS (FIG. 15)

Jacks (E) and (F) may be connected to the relay test set by means of patching cords. When the energizing circuit of the relay is closed and opened periodically at the speed of interruption supplied thru jack (E), the relay should operate and remain operated. When the circuit is closed and opened at the speed of interruption furnished thru jack (F), the relay should operate and release.

#### 18. INTERSENDER TIMING CONTROL FIGS. 16 & 17

Relays (IC) and (IC1), Fig. 16, operate on a signal from the sender load indicating circuit. With relays (IC) and (IC1) operated, ground is connected to the "IT"



lead of each subscriber sender on the frame activating the intersender timing feature in the sender.

When subscriber senders on a frame are in two different groups and are to be

treated as such, the (IC2) or (IC3) relay, Fig. 17, will operate on a signal from its sender load indicating circuit and in turn connect ground to the "IT" lead of each subscriber sender on the frame in the same group.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2314-LLS-FBB-PM



...the ...  
...the ...  
...the ...  
...the ...  
...the ...

...the ...  
...the ...  
...the ...  
...the ...  
...the ...

...the ...

...the ...