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COMMON SYSTEMS  
MF KEYSER CIRCUIT  
LOCAL TEST CABINET NO. 3

CHANGES

D. Description of Changes

- D.1 Connecting information on Fig. 1 is expanded so that this circuit may provide MF pulses to a test trunk with key access.
- D.2 In CAD's 51 and 53, changes were made to reflect the information noted in D.1.
- D.3 In CAD's 51, 53, and 54, corrections were made to bring drawing in to agreement with manufacturing drawings.

F. Changes in CD Section

- F.1 Under 4. CONNECTING CIRCUITS add:  
4.7 Test Trunk Circuit - SD-96229-01.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5105-LCB  
WERC DEPT 5105-AAM-WEA

COMMON SYSTEMS  
MF KEYSET CIRCUIT  
LOCAL TEST CABINET NO. 3

CHANGES

B. Changes in Apparatus

B.1 Removed

Cinch Jones barrier strip

D. Description of Changes

D.1 The Cinch Jones barrier strip was removed to make space for an additional key. The leads shown in this drawing were moved to another connector in the local test cabinet No. 3.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5822-RHT-RMA

COMMON SYSTEMS  
MF KEY SET CIRCUIT  
LOCAL TEST CABINET NO. 3

## CHANGES

B. Changes in ApparatusB.1 Added

4 - 185A Networks, S option - Fig. 1  
G,H 18W Resistors, V option - Fig. 1

B.2 SupersededSuperseded By

A Capacitor, 4 mf, W option	A Capacitor, 542F, 2 mf, V option
B Capacitor, 4 mf, W option	B Capacitor, 542AF, 0.62 mf, V option
C Resistor 227A, 583, X option	C Resistor, 18BL, 750, V option

D. Description of Changes

- D.1 In Fig. 1, capacitors A and B have been designated W option, along with wiring to relay KP3 4T and 4B, and V option is added at these points and at resistor C to improve impedance matching.
- D.2 In Fig. 1, 185A networks were added on relays ST1, SA, ST, and KP1 as S option for ESS offices.
- D.3 In Fig. 2, T option was designated and lead 10 was added to Fig. 1 as S option. In addition, pairing of leads to the KP key will always be provided whenever Fig. 2 is required.
- D.4 Fusing Note 101 was changed to show a paired ground lead in ESS offices.
- D.5 Record Note 104 was enlarged to show new options.
- D.6 Note 102 was enlarged to list options required in No. 1 ESS offices.
- D.7 Circuit voltage limits were changed.
- D.8 CAD Fig. 52 and 53 are changed.
- D.9 The above changes were forwarded to the WECO on LDI-4A.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5642-JEK-WAM

CIRCUIT DESCRIPTION

CD-95703-01  
Issue 2D  
Appendix 1D  
Dwg. Issue 4D

COMMON SYSTEMS  
MF KEY SET CIRCUIT  
LOCAL TEST CABINET NO. 3

CHANGES

B. CHANGES IN APPARATUS

B.1	Superseded	Superseded By
	Resistor - 111B - 583 Ohms Y Option	Resistor - 227A - 583 Ohms X Option

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The Mfr Disc, 111B resistor (Y option) is superseded by the 227A resistor (X option).

D.2 Circuit Note 104 and the Options Used table are revised to reflect this change.

D.3 In the Equipment Information column, ED-91465-01 and ED-91725-01 are lined through, and J94709B-( ) is added.

F. CHANGES IN DESCRIPTION OF OPERATION OR CHANGES IN CD SECTION

F.1 In Paragraph 8.2, frequencies 1100 and 1500 are added to keys 3 and 0, respectively.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 6261-RP-AFB-MD

COMMON SYSTEMS  
M. F. KEYSSET CIRCUIT  
LOCAL TEST CABINET NO. 3

## CHANGES

## D. DESCRIPTION OF CIRCUIT CHANGES

D.1 "Z" option is added to provide a means of starting the M. F. signal generator circuit, when provided.

D.2 Reference to Z option is shown in Note 102 and in added Notes 104 and 301.

D.3 Cross-connection Fig. 51 is rated Mfr Disc, Fig. 52 is changed, and Fig. 53 is added.

## 1. PURPOSE OF CIRCUIT

1.1 This circuit is used in the Local Test Cabinet No. 3 to establish test connections to subscriber lines in a #5 crossbar office by means of multi-frequency key pulsing terminating equipment.

## 2. WORKING LIMITS

2.1 Relay (KP2)

Max.Ext.Ckt.	
Res.	8,000 ohms
Min.Ins.Res.	30,000 ohms

## 3. FUNCTIONS

3.1 Provides means for associating the keyset with the Test Jack and Patching Cord Circuit.

3.2 Provides means for connection to a MF register through an incoming test trunk circuit.

3.3 Provides means for sending a MF pulse to the register, when attached, to prepare it to receive numerical pulses.

3.4 Provides a lamp indication when the register is prepared to receive numerical pulses.

3.5 Provides means for sending numerical pulses, corresponding to the called number.

3.6 Provides means for signalling the register that numerical pulsing is completed and for disconnecting the keyset circuit from the test cord.

3.7 Provides means for disconnecting the keyset when a reorder signal is received.

## 4. CONNECTING CIRCUITS

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

4.1 Telephone and Test Circuit - SD-96181-01.

4.2 Test Jack and Patching Cord - SD-96182-01.

4.3 MF Current Supply and Distribution Circuit - SD-95391-01.

4.4 Incoming Trunk Circuit (#5 Crossbar) - SD-25708-01.

4.5 MFP Incoming Register Circuit (#5 Crossbar) - SD-25730-01.

4.6 MF Signal Generator Circuit - SD-95867-01.

## DESCRIPTION OF OPERATION

## 5. GENERAL

Tests of #5 crossbar subscriber lines are made over an outgoing test trunk connected to an incoming test trunk in the crossbar office.

The MF keyset provides multifrequency pulses to the terminating equipment for the selection of the line to be tested.

Relay (KP) connects the keyset to the test jack. The associated patching cord is referred to herein as the test cord.

## 6. TRUNK SEIZURE

The plug of the test cord is inserted in the jack of an idle outgoing test trunk and key (KP) is operated.

Key (KP) operated:

(a) Opens the operating path for (ST) to prevent its operation when (KP) operates.

(b) Closes, in part, a path for operating (KP).

(c) Operates (KP1).

(KP1) operated:

- (a) Opens the operating path for (SA) to prevent its operation when (KP) operates.
- (b) Closes a path in part, for the operation of (KP3).
- (c) Closes, in part, its locking path under control of (KP3).
- (d) Operates (KP).

(KP) operated:

- (a) Provides common holding ground for the circuit.
- (b) Opens the operating path for (KP1). (KP1), being slow-release, holds operated during the contact transfer time of (KP) then locks to common holding ground.
- (c) Closes its locking path, under control of (ST1), to common holding ground.
- (d) Transfers the test cord sleeve from high resistance battery to low resistance battery to operate a marginal relay in the incoming test trunk.
- (e) Transfers the test cord tip and ring from the test circuit to the keyset.
- (f) A bridge is provided through (KP2), in its non-operate direction, to operate the (A) relay in the incoming test trunk which functions to summon and attach a register.
- (g) When "Z" option is furnished, connects the "GS" and "GS1" leads together to start the MF signal generator.

#### 7. REGISTER ATTACHED

The register, attached, operates a relay in the incoming test trunk which transfers the tip and ring of this circuit to the register.

(KP2) then serves as a bridge, in its non-operate direction, to operate the (A) relay of the register.

The register functions to extend the tip and ring to a MF receiver.

When the register and the MF receiver are ready to receive pulses, a relay in the register operates and reverses battery and ground to this circuit and (KP2) operates.

(KP2) operated:

- (a) Opens, in part, the operating path for (ST) to prevent its operation when (SA) operates
- (b) Operates (KP3) under control of (KP1).

#### 8. KEY PULSING

##### 8.1 "KP" Pulse

(KP3) operated:

- (a) Opens the operating path for (SA) to prevent its operation when (KP1) releases.
- (b) Connects the "KP" pulse, consisting of a combination of 1100 and 1700 cycles, to the MF receiver to prepare it to receive numerical pulses.
- (c) Opens the locking path for (KP1) which releases.\*

(KP1) released:

- (a) Closes, in part, a path to operate (SA).
- (b) Disconnects operating ground from (KP) which is now held operated under control of (ST1).
- (c) Opens its own locking path to ground on (KP).
- (d) Releases (KP3).

(KP3) released:

- (a) Disconnects the "KP" pulse signal.
- (b) Recloses, in part, the operating path for (KP1).
- (c) Operates (SA).

(SA) operated:

- (a) Closes a path for the operation of (ST) should (KP2) be released by the register before keying is completed.
- (b) Lights lamp (S) as an indication that the register and the MF receiver are prepared to receive numerical pulses.

\*The release of (KP1) is slowed by shunt resistance (B) to delay the release of (KP3) and allow sufficient time for the "KP" pulse to be recorded in the MF receiver.

8.2 Numerical Pulses

By the operation of numerical keys, corresponding to the number of the called subscriber line (including an office digit when required), numerical pulses are transmitted to the MF receiver which operates relays in the register to control the selection of the called number.

Each operation of a numerical key transmits a combination of two out of five frequencies as follows:

Key	Frequency				
	700	900	1100	1300	1500
1	x	x			
2	x		x		
3		x			
4	x			x	
5		x		x	
6			x	x	
7	x				x
8		x			x
9			x		x
0				x	

x = frequency used

In addition a sixth frequency, 1700 cycles, is used in combination with 1100 cycles for the "KP" pulse (paragraph 8.1) and with 1500 cycles for the "ST" pulse (paragraph 8.3).

8.3 "ST" Pulse

After numerical pulsing has been completed, key (KP) is released.

Key (KP) released:

- (a) Opens the operating path for (KP1) to prevent its operation when (KP) releases.
- (b) Operates (ST).

(ST) operated:

- (a) Locks under control of (KP).
- (b) Connects the "ST" pulse, consisting of a combination of 1700 and 1500 cycles, to the MF receiver which signals the register that selections may be started\*.
- (c) Closes a path for the operation of slow-operate relay (ST1).

\*The register may be arranged:

- (1) to require this signal before starting selections or

- (2) to start selections immediately after receipt of the last numerical pulse in which case arrangements are made in the register to reject the "ST" signal.

In either case a premature "ST" signal, Key (KP) released before completion of numerical pulsing will cause the register and MF receiver to release and a reorder signal will be returned to the test cord as covered in paragraph 11.

9. DISCONNECTION

After an interval, (ST1) operates and releases (KP)\*.

(KP) released:

- (a) Transfers the test cord tip and ring from the keyset to the test circuit.
- (b) Transfers the sleeve of the test cord from low resistance battery to high resistance battery to release a marginal relay in the incoming test trunk.
- (c) Opens the common holding ground to restore the circuit to normal.

\*(ST1) is slow-operate and the release of the (KP) is delayed by shunt resistance (A). During this interval (ST) remains operated to provide sufficient time for the "ST" pulse to be registered in the MF receiver.

10. TEST CONNECTION ESTABLISHED

After key (KP) is released, the register, in conjunction with other circuits, functions to establish the test connection from the test circuit, through the outgoing and incoming test trunks to the called subscriber line.

11. REORDER

Should the register release before keying is completed, the incoming test trunk is set in the reorder condition and leads "T" & "R" are opened releasing (KP2). (KP2) released, operates (ST) causing this circuit to disconnect (paragraph 9) and the reorder signal is transmitted to the test circuit.