

CIRCUIT EXPLANATION

M

CONNECTOR CIRCUIT
TERMINAL PER STATION
CODE OR HARMONIC RINGING
GRD OR BAT (1) GENERATOR
H-580056

(Written specifically for circuit issue 19,
but may also apply to later issues. Refer
to H print for appropriate E issue number.)

FEATURES

- (a) Provides interrupter lead connected to switch through wiper EC for generator code or frequency. Each interrupter lead corresponds to a different code or frequency. Each interrupter lead corresponds to a different code or frequency.
- (b) Provides coded ground pulses for coded single-frequency ringing. Coded ground pulses which operate a coding relay in the Connector in accordance with the required ringing code, are connected to the EC lead and single-frequency generator to the generator lead.
- (c) Provides reverse-battery supervision.
- (d) Provides last-party release.
- (e) Provides optional timed disconnection for calling party release.

CIRCUIT OPERATION

1. Seizure (Operated: VON springs)

Resistance (#2E) battery via lead C marks this circuit idle to a battery searching Selector. When this circuit is seized by a Selector, the loop to A is closed via leads +L and -L. Relay A operates and closes B. Relay B operates, connects ground to lead C to mark this switch busy to other Selectors and to hold preceding equipment operated

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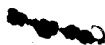
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ISSUE

5

DRAWING NO.

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and closes #2E. Relay E operates, connects resistance (H) battery to lead EC.

2. Vertical Stepping (Operated: Relays A, B, and E; VON springs)

Relay A follows the first series of dial pulses and, when at normal, opens B and closes the VERT magnet in series with #1E, thus stepping this switch to the desired level. As the switch steps to the first level, the VON springs restore, opening #2E. Relays E and B do not restore during vertical stepping due to their slow-to-release characteristics. At the end of a last pulse of this first digit, A re-operates, closes B and opens #1E. After its slow-to-release interval, E restores, and disconnects resistance (H) battery from lead EC.

3. Rotary Stepping (Operated: Relays A and B)

Relay A follows the second series of pulses and, when at normal, opens B and closes the ROT magnet in multiple with C. The ROT magnet follows the pulses and steps the wipers to the dialed terminals. Relay C operates on the first pulse and connects resistance (H) battery to wiper C. At the end of pulsing A re-operates, closes B and opens C. Relays C and B are slow-to-release and remain operated during rotary stepping.

4. Testing the Dialed Line (Operated: Relays A, B, and C)

4.1 Dialed Line Busy

If the dialed line is busy, ground via wiper C, closes H. Relay H operates. After its slow-to-release interval, C restores, connects lead BUSY TONE via resistor F and capacitor N to lead -L to return busy tone to the calling party, and remains operated until the calling party disconnects.

4.2 Dialed Line Idle

If the dialed line is idle resistance battery is encountered by wiper C. After its slow-to-release interval, C restores and closes #1G. After its slow-to-operate interval, G operates to its "X" contacts, locks with both windings in series,

operates completely, grounds wiper C to hold the cut-off relay in the line circuit operated, short circuits #1G, connects ground to lead RM ST to start the ringing machine, connects lead PU to #2E, and connects lead GEN GRD and resistance (VERT magnet) battery via #1F to wipers "+" and "-" respectively (FIG BG) or connects ground and battery via #1F to wipers "-" and "+" respectively (FIG GG).

5. Ringing (Operated: Relays A, B, and G)

A ground pulse on lead PU at the start of a cycle of the ringing interrupter closes #2E. Relay E operates, locks via resistor B, and connects lead EC to H.

If FIG BG is used, H operates, connects lead RB TONE via capacitor M to the calling line via lead -L, and following the ground pulses via wiper EC transfers wiper "-" from resistance battery via VERT magnet to lead GEN.

If FIG GG is used, H operates, connects lead RB TONE via capacitor M to the calling line via lead -L, and following the ground pulses via wiper EC transfers wiper "-" from ground to lead GEN via resistor A.

The ringing process is repeated during each cycle of the interrupter until the called party answers.

6. Called Party Answers (Operated: Relays A, B, E, G, and possibly H)

When the called party answers, the loop via wipers "-" and "+" is closed to #1F. After its slow-to-operate interval, F operates to its "X" contacts, locks via its #2 winding, operates completely, disconnects ground from lead RM ST ("A" wiring) or opens B ("M" wiring), connects ground to lead SUPY 1 ("A" wiring) or lead TIMED DIS-CONNECTION ("M" wiring), connects wipers "+" and "-" to lead +L and -L respectively, opens E, and closes D thru the called telephone. After its slow-to-release interval, E restores and opens H. Relay H restores, disconnects ringing current from the called line via #1F to prevent further ringing, disconnects lead RB TONE to the calling line from lead -L. Relay D operates, reverses battery polarity to the calling line for purposes of supervision or metering, disconnects

lead SUPY 1 ("A" wiring) or lead TIMED DISCONNECTION from relay B ("M" wiring), and closes B.

7. Release

7.1 From Switch Through (Operated: Relays A, B, D, F, and G)

7.11 Calling Party Release ("A" wiring)

7.111 Called Party Disconnects First

If the called party disconnects first, the line loop is opened to D. Relay D restores, connects ground to lead SUPY 1, and returns battery polarity via leads -L and +L to normal. When the calling party releases, the loop is opened to A. Relay A restores, closes C, and opens B. After its slow-to-release interval, B restores, opens C, F and G, and removes ground from lead C to release the preceding equipment. Relay G restores, disconnects ground from lead SUPY 1, disconnects wipers "-" and "+" from leads -L and +L, closes the RLS magnet, and removes ground from wiper C. After its slow-to-release interval, F restores. The RLS magnet operates and returns the switch shaft to normal, operating the VON springs. The VON springs operate and open the RLS magnet. The RLS magnet restores. The circuit is now at normal.

7.112 Calling Party Disconnects First

If the calling party disconnects first, the loop is opened to A. Relay A restores, closes C, and opens B. After its slow-to-release interval, B restores, opens C, F and G, removes ground from lead C to release the preceding equipment, and connects ground to lead SUPY 2. Relay G restores, disconnects wipers "-" and "+" from leads -L and +L respectively, removes ground from wiper C, and opens the line loop to D. After its slow-to-release interval, F restores. Relay D restores, removes ground from lead SUPY 2, and closes the RLS magnet. The RLS magnet operates and returns the switch shaft to normal, operating the VON springs. The VON springs operate and open the RLS magnet. The RLS magnet restores. The circuit is now at normal.

7.12 Last Party Release ("A" and "Z" wiring)

7.121 Called Party Disconnects First

If the called party disconnects first, the line loop is opened to D. Relay D restores, connects ground to lead SUPY 1, and returns battery polarity on the calling line to normal. When the calling party releases, the loop is opened to A. Relay A restores, closes C, and opens B. After its slow-to-release interval, B restores, opens C, F and G, and removes ground from lead C to release the preceding equipment. Relay G restores, disconnects wipers "-" and "+" from leads -L and +L, disconnects ground from lead SUPY 1, closes the RLS magnet, and removes ground from wiper C. After its slow-to-release interval, F restores. The RLS magnet operates and returns the switch shaft to normal, operating the VON springs. The VON springs operate and open the RLS magnet. The RLS magnet restores. The circuit is now at normal.

7.122 Calling Party Disconnects First

If the calling party disconnects first, the loop is opened to A. Relay A restores, closes C, and opens B. After its slow-to-release interval, B restores, opens C, removes ground from lead C to release the preceding equipment, and connects ground to lead SUPY 2. When the called party disconnects, the line loop is opened to D. Relay D restores, removes ground from lead SUPY 2, connects ground to lead SUPY 1, and opens F and G. Relay G restores, disconnects wipers "-" and "+" from leads -L and +L respectively, and closes the RLS magnet. After its slow-to-release interval, F restores. The RLS magnet operates and returns the switch shaft to normal, operating the VON springs. The VON springs operate and open the RLS magnet. The RLS magnet restores. The circuit is now at normal.

7.13 Timed Disconnection ("M" wiring)

If the called party disconnects first, the line loop is opened to D. Relay D restores, removes ground from B, connects lead TIMED DISCONNECTION to B, and returns battery polarity on the calling line to normal. After a specified delay, the timer transfers lead TIMED DISCONNECTION from low resistance ground to high resistance ground, opening B.

After its slow-to-release interval, B restores, opens F and G, and removes ground from lead C to release the preceding equipment. Relay G restores, disconnects wipers "-" and "+" from leads -L and +L, and closes the RLS magnet. When the preceding equipment restores, the loop to A is opened. Relay A restores. After its slow-to-release interval, F restores. The RLS magnet operates and returns the switch shaft to normal, operating the VON springs. The VON springs operate and open the RLS magnet. The RLS magnet restores. The circuit is now at normal.

If the calling party releases before timed disconnection the circuit restores to normal as previously described in Section 7.112.

7.2 From Incompleted Call

7.21 Line Busy (Operated: Relays A, B, and H)

When the calling party releases, the circuit is opened to A. Relay A restores, and opens B. After its slow-to-release interval, B restores, opens H, removes ground from lead C to release preceding switches, and closes the RLS magnet. Relay H restores and removes busy tone from lead -L. The RLS magnet operates as explained previously in Section 7.111 to return the switch to normal.

7.22 Unanswered Calls (Operated: Relays A, B, E, G, and possibly H)

When the calling party restores, the circuit is opened to A. Relay A restores and opens B. After its slow-to-release interval, B restores, removes ground from lead C to release the preceding equipment, and opens E and G. Relay G restores, removes ringing current from the called line, removes ground from lead RM ST ("A" wiring), and closes the RLS magnet. After its slow-to-release interval, E restores and opens H. The RLS magnet operates as explained previously in Section 7.111 to restore the switch to normal.

