E-610051
SIZE A SHEET 1 TOTAL 9
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# EXPLANATION OF INCOMING REPEATER CKT. CX DIALING H-610051

## FEATURES

1. Repeats pulses to succeeding equipment as loop pulses.
2. Arranged for supervision on loop basis or via 4th wire.
3. Provides Peg Count and ATB indication.
4. Provides idle line termination.

## OPERATION

### I. Figures 1, 2, 3 or 4 Used

#### 1. Seizure

The preceding equipment seizes this circuit by forwarding ground via lead E, closing A. Relay A operates, removes ground from lead ATB for a possible All Trunks Busy condition, closes #1D across leads +SW and -SW to seize the succeeding switch, and closes B. Relay B operates, removes the line termination from across leads +SW and -SW, closes #2D and grounds lead CSW. Relay D does not operate as both windings are energized in magnetic opposition.

2. Pulse Repeating (Operated: Relays A and B)

2.1 Non-Restricted (Omit FIG DR and "N" wiring)

Relay A follows the pulses via lead E and, when at normal, opens B and the loop via #1D to the INC SWITCH, and closes C. Relay C operates, shunts one side of the repeat coil and #1D (via resistor C), disconnects lead A from lead B ("M" wiring), and connects the line termination across leads +SW and -SW. Relays B and C remain operated during pulsing due to their slow-to-release characteristics.

At the completion of pulsing, A re-operates, closes the loop via leads +SW and -SW, closes B, and opens C. After its slow-to-release interval, C restores, removes the line termination from across leads +SW and -SW, and removes the shunt from #1D and the repeat coil. Further pulsing is the same as previously described in this Section.

2.2 Digit Restriction (Use FIG DR, "N", "C" and "R" wiring, omit FIG EC, OH, "D" and "M" wiring)

The first digit is absorbed so as to provide a proper interval for seizure of the succeeding equipment. Relay A follows the pulses of the first digit and, when at normal, opens B and closes C. The loop is not effected at this time because the pulsing contacts of A are short-circuited by the contacts of F. Relay C operates, shunts one side of the repeat coil and #1D (via resistor C), connects the line termination across leads +SW and -SW, and closes #2F (FIG DR). Relay F operates to its "X"

contacts only and short-circuits #1F. Relays B and C remain operated during pulsing due to their slow-to-release characteristics.

At the completion of pulsing of the first digit, A re-operates, closes B, and opens C. After its slow-to-release interval, C restores, removes the short circuit from #1F, closes #1 and #2F in series, removes the line termination from across leads +SW and -SW, and removes the shunt from #1D and the repeat coil. Relay F operates fully, opens its initial operating path, and removes the short circuit from the pulsing contacts of A. Further pulsing is the same as that described in Section 2.1.

3. Called Party Answers (Operated: Relays A and B and possibly F)

When the called party answers, reverse battery polarity is returned via leads +SW and -SW causing #1 and #2D to be magnetically aiding. Relay D operates and closes E (FIG OH - "D" wiring) or transfers lead M from ground to resistance (lamp L) battery ("C" and "R" wiring) to provide answer supervision. Relay E (FIG OH) operates, locks, and transfers lead M from ground to resistance (lamp L) battery ("D" wiring). If 4th wire supervision is used, ground is returned via lead EC SW closing E (FIG EC - "M" wiring). Relay E operates and transfers lead M from ground to resistance (lamp L) battery ("C" wiring).

4. Flash Busy (Operated: Relays A and B)

When the incoming switches provide 4th wire supervision (FIG EC), flash busy is provided by intermittent ground pulses via lead EC SW. Relay E follows the pulses and,

when at normal, transfers lead M from resistance (lamp L) battery to ground to return a flash busy indication to the preceding equipment.

If reverse battery supervision is provided, D follows the changes of battery polarity via leads +SW and -SW and, when at normal, transfers lead M from resistance (lamp L) battery to ground ("C" and "R" wiring) to return a flash busy indication to the preceding equipment.

5. Release

5.1 Release from Completed Call [Operated: Relays A, B, D or E (FIG EC), and possibly E (FIG OH) or F]

Release of this circuit is under the control of the calling party. When the called party disconnects, normal battery polarity is returned via leads +SW and -SW causing #1 and #2D to be magnetically opposed. Relay D restores and transfers lead M from resistance (lamp L) battery to ground ("C" and "R" wiring) to provide disconnect supervision.

If 4th wire supervision is used, ground is removed from lead EC SW opening E (FIG EC) when the calling party disconnects. Relay E restores and transfers lead M from resistance (lamp L) battery to ground ("C" wiring).

When the calling party disconnects, ground is removed from lead E opening A. Relay A restores, opens the loop via #1D and leads +SW and -SW thereby opening #1D, opens B, and closes C. Relay C operates, shunts one side of the repeat coil and #1D (via resistor C), disconnects lead

A from lead B ("M" wiring), and connects the line termination across leads T and R. After its slow-to-release interval, B restores, grounds lead PC to operate a Peg Count meter, opens C and #2D, opens E (FIG OH, "D" wiring) or #1 and #2F (FIG DR, "N" wiring), and removes ground from lead C SW. Relay F restores and removes ground from lead PC ("N" wiring). Relay E restores and transfers lead M from resistance (lamp L) battery to ground ("D" wiring). After its slow-to-release interval, C restores, transfers ground from lead PC ("M" wiring) to lead ATB, connects lead A to lead B ("M" wiring), and removes the shunt from one side of the repeat coil and #1D. The circuit is now at normal.

5.2 From a Busy Condition (Operated: Relays A, B, D or E (FIG EC) intermittently, and possibly F (FIG DR)]

When the calling party disconnects, ground is removed from lead E opening A. Relay A restores, opens the loop via #1D and leads +SW and -SW thereby opening #1D, opens B, and closes C. Relay C operates, shunts one side of the repeat coil and #1D (via resistor C), opens E (FIG EC - if operated), and connects the line termination across leads T and R. Relay D or E (if operated) restores and transfers lead M from resistance (lamp L) battery to ground. After its slow-to-release interval, B restores, opens #2D, C, and #1 and #2F (FIG DR - "N" wiring), removes ground from lead C SW, and grounds lead PC to operate a Peg Count meter. Relay F restores and removes ground from lead PC ("N" wiring). After its slow-to-release interval, C restores, and the following operation is the same as that described in Section I-5.1.

6. Pulse Measurement

To measure the percent make of the pulsing springs of A, the PULSE TEST KEY is operated and the dial plug is inserted in the PULSE INPUT springs 3 and 4 to seize the equipment. As A follows the pulses of the dial, the percent make is measured across the PULSE MEAS springs 7 and 8.

II. Figures 5 or 6 Used

1. Seizure

The preceding equipment seizes this circuit by forwarding ground via lead E, closing A. Relay A operates, closes #1D across leads +SW and -SW to seize the succeeding equipment, removes ground from lead ATB for a possible All Trunks Busy condition, and closes B. Relay B operates, removes the line termination from across leads R and T, connects lead T to lead +SW, closes #2D, and grounds lead C SW. Relay D does not operate as #1 and #2D are energized in magnetic opposition.

2. Pulse Repeating (Operated: Relays A and B)

Relay A follows the pulses via lead E and, when at normal, opens the loop via #1D and leads +SW and -SW, opens B, and closes C. Relay C operates, disconnects lead A from lead B, and shunts the repeat coil. Relays B and C remain operated during pulsing due to their slow-to-release characteristics.

At the completion of digit, A re-operates, closes the loop via #1D and leads +SW and -SW, opens C, and closes B.

After its slow-to-release interval, C restores, connects lead A to lead B, and removes the shunt from the repeat coil. Further pulsing is the same as that previously described in this Section.

3. Called Party Answers (Operated: Relays A and B)

When the called party answers, reverse battery polarity is returned via leads +SW and -SW causing #1 and #2D to be magnetically aiding. Relay D operates and transfers lead M from ground to resistance (lamp L) battery.

If 4th wire supervision is used, ground is returned via lead EC SW closing E (FIG EC). Relay E operates and transfers lead M from ground to resistance (lamp L) battery.

4. Flash Busy (Operated: Relays A and B)

When the incoming switches provide 4th wire supervision (FIG EC), flash busy is provided by intermittent ground pulses via lead EC SW. Relay E follows the pulses and, when at normal, transfers lead M from resistance (lamp L) battery to ground to return a flash busy indication to the preceding equipment.

When reverse battery supervision is provided, D follows the changes of battery polarity via leads +SW and -SW and, when at normal, transfers lead M from resistance (lamp L) battery to ground to return a flash busy indication to the preceding equipment.

5. Release

5.1 From a Completed Call [Operated: Relays A, B, and D or E (FIG EC)]

Release of this circuit is under the control of the calling party. When the called party disconnects, normal battery polarity is returned via leads +SW and -SW causing #1 and #2D to be magnetically opposed. Relay D restores and transfers lead M from resistance (lamp L) battery to ground to provide disconnect supervision.

If 4th wire supervision is used, ground is removed from lead EC SW opening E (FIG EC) when the calling party disconnects. Relay E restores and transfers lead M from resistance (lamp L) battery to ground.

When the calling party disconnects, ground is removed from lead E opening A. Relay A restores, opens the loop via #1D and leads +SW and -SW thereby opening #1D, opens B, and closes C. Relay C operates, shunts the repeat coil, and disconnects lead A from lead B. After its slow-to-release interval, B restores, connects the line termination across leads T and R, opens #2D and C, removes ground from lead C SW, and grounds lead PC to operate a Peg Count meter. After its slow-to-release interval, C restores, transfers ground from lead PC to lead ATB, and connects lead A to lead B. The circuit is now at normal.

5.2 From a Busy Condition [Operated: Relays A, B, and D or E (FIG EC) intermittently]

When the calling party disconnects, ground is removed from lead E opening A. Relay A restores, opens the loop via

#1D and leads +SW and -SW thereby opening #1D, opens B, and closes C. Relay C operates, shunts the repeat coil and opens E (FIG EC - if operated). Relay D or E (if operated) restores and transfers lead M from resistance (lamp L) battery to ground. After its slow-to-release interval, B restores, and the following operation is the same as that described in Section II-5.1.

6. Pulse Measurement

Operation is the same as that described in Section I-6.

(4) IFF
(9) JFZ:sw