

COMMON SYSTEMS
DIAL PULSE AMPLIFIER CIRCUIT
FOR USE WITH SERVICE OBSERVING CIRCUITS
IN CROSSBAR OR PANEL OFFICE

CHANGES

B. CHANGED AND ADDED APPARATUS

B.1 Superseded Superseded By
AC 83 Capacitor AR 101 Capacitor
"S" option "N" option

added. This change is made to remove the AC 83 capacitor which is unsuitable for use in this circuit.

D.2 The working limits formerly read, 239HE or 280W sender pulse.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 "S" option is rated "Mfr. Disc." and superseded by "N" option which is

D.3 Note 103 and the "Options Used" table are changed in reference to the above.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2321-FPP-AAB-EO

COMMON SYSTEMS
DIAL PULSE AMPLIFIER CIRCUIT
FOR USE WITH SERVICE OBSERVING CIRCUITS
IN CROSSBAR OR PANEL OFFICE

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded	Superseded by
(V) .0804 - .0812 Condenser "T" Option	.08004 - 08038 Condenser "S" Option
(PL) 239FG Relay, "R" Option	280DW Relay, "Q" Option

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER
THAN THOSE APPLYING TO ADDED OR
REMOVED APPARATUS

C.1 Test note 101 formerly read: "The plate current of the (V3) vacuum tube shall be adjusted as follows: With meter plugged into jack (S) and the (NO) key operated adjust the (EC2) and (EC3) batteries until the plate current does not exceed 0.5, with the (OP) key operated and "X" wiring adjust the (EC2) and (EC3) batteries until the plate current in the (V3) vacuum tube is Min. 8 Max. 12.9 and with the (OP) key operated and "Y" wiring, adjust the (EC2) and (EC3) batteries until the current is Min. 4 Max. 6.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The use of the (V) .0804 - .0812 condenser in this circuit was rated "Mfr. Disc." and designated "T" option. It was superseded by the .08004 - .08038 condenser designated "S" option. Prior to issue 6-D "T" option was not designated and "S" option was not shown.

D.2 The use of the (PL) 239FG relay in this circuit was rated "Mfr. Disc." and designated "R" option. It was superseded by the 280DW relay designated "Q" option. Prior to issue 6-D "R" option was not designated and "Q" option was not shown.

D.3 Reference to Q, R, S and T options were added in circuit note 103.

D.4 The "options used" table was added.

D.5 Reference to the 280W sender pulse relay was added to the working limits.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3310-SRM-RLI-X

TO BE USED AS AN ORIGINAL
BY THE MANUFACTURING SHOP

CIRCUIT DESCRIPTION
SYSTEMS DEVELOPMENT DEPARTMENT
PRINTED IN U.S.A.

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COMMON SYSTEMS
DIAL PULSE AMPLIFIER CIRCUIT
FOR USE WITH SERVICE OBSERVING CIRCUITS
IN CROSSBAR OR PANEL OFFICE

CHANGES

B. CHANGES IN APPARATUS

- B.1 (SA) resistance 69F rated Mfr. Disc. and superseded by
(SA) resistance per KS-8058.

All other headings, No change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3340

LBS)
FJS) QY

COMMON SYSTEMS
DIAL PULSE AMPLIFIER CIRCUIT
FOR USE WITH SERVICE OBSERVING CIRCUITS
IN CROSSBAR OR PANEL OFFICE

CHANGES

B. CHANGES IN APPARATUS

Added

188M Resistance (PR) (optional)

D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 "Z" wiring and apparatus are added to provide for operation with Long Range senders equipped with the line balancing dial tone coil having one winding in the tip and one winding in the ring.
- D.2 Formerly note 102 (A) read as follows: "Furnish "X" wiring and apparatus to observe service in a panel or crossbar office where the max. loop is 1500 ohms".
- D.3 Note 102 (D) and table of changes are added.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 332

HDC) WV
FJS)

COMMON SYSTEMS
DIAL PULSE AMPLIFIER CIRCUIT
FOR USE WITH SERVICE OBSERVING CIRCUITS
IN CROSSBAR AND PANEL OFFICES

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Note 102A and B read as follows: "102A Furnish "X" wiring and apparatus to observe service in a crossbar office where the max. loop is 1500 ".

102B Furnish "Y" wiring and apparatus to observe service in a panel or crossbar office where the max. loop is 1000 and the panel sender pulse relay (L) is a L1 or L24 relay.

D.2 Working limits added to the drawing.

D.3 In CD change working limits to read as follows:

Working Limits:

2.1 When this circuit is used to observe service in a crossbar or panel office where the maximum loop is 1500 2 MF and the sender pulse relay (L) is a 239HE relay, the maximum permissible voltage difference between the (L) relay of the sender and the filament of the vacuum tubes measured at the (P) protector of the service observing circuit shall be ± 0.5 volts.

2.2 Where this circuit is used to observe service in a panel or crossbar office where the maximum loop is 1000 4MF and the sender pulse relay (L) is a "L1", "L24" or 239HE relay the maximum permissible voltage difference between the (L) relay of the sender and the filament of the vacuum tubes measured at the (P) protector of the service observing circuit shall be ± 0.75 volts.

2.3 The working limits for the (PL) rley when it works with a 239HE sender pulse relay (L) and a 1500 loop is as follows:

	FLAT-IMR- COIN-2PT.	PBX
Max. Ext. Ckt. Loop	1500 ω 10000 ω	1500 ω 1000 ω PBX Extension 15000 ω PBX Operator
Min. Ins. Res.		
Ringling Bridge Cap. (Normal)	2MF	3MF
Dial Speed	7 to 15PPS	7 to 15PPS PBX Extension 7 to 21PPS PBX Operator

NOTE: : PBX operator's telephone and dial circuits equipped with 54AA retard coil, or with the 54B retard coil if shunted by a 1000 ω resistance.

2.4 The working limits for the (PL) relay when it works with a 239HE sender pulse relay (L) and a 1000 ω loop is as follows:

	FLAT-IMR- COIN-2PT.	PBX
Max. Ext. Ckt. Loop	1000 ω	1000 ω 10000 ω PBX Extension 15000 ω PBX Operator
Min. Ins. Res.	10000 ω	
Ringling Bridge Cap. (Normal)	4MF	3MF
Dial Speed	7 to 15PPS	7 to 15PPS PBX Extension 7 to 21PPS PBX Operator

2.5 The working limits for the (PL) relay when it works with a L1 or L24 sender pulse relay (L) and a 1000 ω loop is, as follows:

	FLAT-IMR- COIN-2PT.	PBX
Max. Ext. Ckt. Loop	1000 ω	1000 ω 10000 ω PBX Extension 15000 ω PBX Operators
Min. Ins. Res.	10000 ω	
Ringling Bridge Cap. (Normal)	4MF	3MF
Dial Speed	7 to 13PPS	7 to 13PPS PBX Extension 7 to 21PPS PBX Operators

NOTE: PBX operator's telephone and dial circuits equipped with 54AA retard coil, or with the 54B retard coil if shunted with a 1000 ω resistance.

- D.4 In title "Dial Pulse Amplifier Circuit" was "Dial Re-
cording Circuit." "Vacuum Tube Type"
- D.5 Rating of drawing was Provisional.

All other headings, No change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 332

FSI) GT
FJS)

CIRCUIT DESCRIPTION
SYSTEMS DEVELOPMENT DEPARTMENT
PRINTED IN U.S.A.

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COMMON SYSTEM
DIAL RECORDING CIRCUIT
VACUUM TUBE TYPE
FOR USE WITH SERVICE OBSERVING CIRCUITS
IN CROSSBAR OR PANEL OFFICE

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Lead from punching 8 to (RP) resistance was shown as a ground at the resistance.

D.2 Cross connections changed.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 332

FSI) EJ
WLF)

COMMON SYSTEMS
DIAL RECORDING CIRCUIT
VACUUM TUBE TYPE
FOR USE WITH SERVICE OBSERVING CIRCUITS
IN CROSSBAR OR PANEL OFFICE

DEVELOPMENT

1. PURPOSE OF CIRCUIT

- 1.1 This circuit was designed to provide a vacuum tube pulsing circuit for use with a panel or crossbar subscriber's line.

2. WORKING LIMITS

- 2.1 When this circuit is used to observe service in a crossbar office where the maximum line loop is 1500 2 MF the maximum permissible voltage difference between the (L) relay of the sender and the filament of the vacuum tubes measured at the (P) protector of the service observing circuit shall be ± 0.5 volts.
- 2.2 Where this circuit is used to observe service in a panel or crossbar office where the maximum loop is 1000 4MF and the panel sender pulse relay (L) is a "L1" or "L24" relay the maximum permissible voltage difference between the (L) relay of the sender and the filament of the vacuum tubes measured at the (P) protector of the service observing circuit shall be ± 0.75 volts.

OPERATION

3. FUNCTIONS

- 3.1 To provide a vacuum tube pulsing circuit for repeating the pulses from a subscriber's line to a pen register circuit.
- 3.2 To provide a means for adjusting the grid bias of the balancing vacuum tubes (V2) and (V3) to compensate for deterioration and variation in the vacuum tubes and variation of the voltage in the power supply circuits.

4. CONNECTING CIRCUITS

- 4.1 Multiline Service Observing circuit.

4.2 Complaint Service observing circuit.

DETAILED DESCRIPTION

5. INITIAL ADJUSTMENT

The pulsing circuit is designed so that there should be approximately equal and opposite ampere turns acting through the primary and secondary windings of the (PL) relay when the subscribers loop is open and the voltage on the ring of the line is minimum. This results in just enough bias to cause the (PL) relay to return to normal and close its back contact. This adjustment is made by operating the (AMP) key in the service observing circuit for about 15 minutes to insure the filaments have been lit long enough to permit the tubes to reach their operating condition when the (NO) key is operated and the biasing batteries (EC2) and (EC3) are adjusted until the plate current in the plate of the V3 vacuum tube does not exceed .0005 amperes. The operate test of the (PL) relay is made by releasing the (NO) key and operating the (OP) key. If "X" wiring is used the current in the plate of the (V3) vacuum tube shall not exceed a minimum of .008 amperes and a maximum of .0129 amperes. If "Y" wiring is used minimum current shall not be less than .004 amperes and the maximum .006 amperes. With these values the (PL) relay should operate and open its back contact. After this adjustment has once been made, it should not require frequent checking unless the vacuum tubes are changed, since the only possible variation is due to the deterioration of the vacuum tubes.

6. PULSING CIRCUIT

The pulsing circuit consists essentially of the (V1), and (V2) and (V3) vacuum tubes and the polarized differential wound relay (PL). The (V1) is the operating tube and its grid is connected through the 100,000 ohm resistance (SB) and the normal contacts of the (OP) and (NO) keys to the ring of the line over the lead designated 1. The (V2) and (V3) vacuum tubes are the balancing tubes and are operated with a fixed grid biasing battery (EC2) and (EC3). The primary and secondary windings of relay (PL) are poled oppositely and have an equal number of turns. Since the (PL) relay does not have a biasing spring, the primary winding has enough current flowing through it to hold the (PL) relay on its back contact.

7. OPERATION

When a subscriber's receiver is removed from the switchhook, and before dialing is started, the negative potential on the grid of the (V1) tube is reduced, which increases the plate current through the (V3) tube and thus through the secondary winding of the (PL) relay which then operates.

When the dial contacts are opened the negative potential on the grid of the (V1) tube is increased, resulting in a decrease in the plate current of the (V3) tube which releases relay (PL). Each time relay (PL) is released the associated circuit or circuits function to operate the pen register. When the subscriber disconnects at the end of the call, the (PL) relay is again released which is recorded by the pen register.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 332

FSI) CG
WLF)