

**2-WIRE REVERTIVE PULSE — ORIGINATING AND TERMINATING  
CHANNEL UNIT DESCRIPTION  
D4 CHANNEL BANKS  
DIGITAL TRANSMISSION SYSTEMS**

CONTENTS	PAGE
1. GENERAL . . . . .	1
2. CHANNEL UNIT DESCRIPTION . . . . .	1
A. Application . . . . .	1
B. Transmission Paths . . . . .	1
C. Signaling and Supervision . . . . .	1
D. Trunk Processing . . . . .	2
3. CIRCUIT OPTIONS . . . . .	2
4. REFERENCES . . . . .	3

**1. GENERAL**

**1.01** This section provides a detailed description of the 2-wire revertive pulse originating (RPO) and the 2-wire revertive pulse terminating (RPT) channel units used with D4 channel banks and T-type line facilities. The drawing numbers and faceplate codes are shown in Table A. A typical channel unit is shown in Fig. 1.

**1.02** Whenever this section is reissued, the reason for reissue will be given in this paragraph.

**1.03** This section provides a functional description of the channel unit(s) at a block diagram level. The transmission paths and signaling circuits that characterize the unit(s) are described herein. Circuit elements that are common to all units (active filters, pulse amplitude modulators and demodulators, gates, and channel unit logic functions) are mentioned in this section and described in detail in the General

Channel unit descriptive Section 365-170-101. Voice frequency levels, circuit and signaling options, and attenuator settings are given on the circuit layout record card. The procedures for making the settings and adjustments are covered in Section 365-170-000 (TOP).

**2. CHANNEL UNIT DESCRIPTION**

**A. Application**

**2.01** These channel units provide the interface between the revertive pulsing trunks and the D4 common equipment at the originating and terminating ends.

**2.02** The transmission circuits of the RPO and RPT channel units are the same and will be covered together as shown in Fig. 2.

**B. Transmission Paths**

**2.03** The 2-wire balanced 900-ohm connection from the trunk circuit is converted to an unbalanced 600-ohm 4-wire trunk circuit by means of the hybrid (Fig. 2). The nominal loss of the transmit or receive path through the hybrid is 4.0 dB.

**2.04** The transmit voice frequencies are attenuated by ATTEN1 to adjust the input level to the active transmit (TRMT) band pass filter (BPF) to -8.5 dB TLP. The BPF which is used as a low pass filter, has a 60-Hz rejection peak, and passes a band of frequencies from approximately 200 to 3400 Hz to the pulse amplitude modulator (PAM). The junction field effect transistor (JFET) gate is opened at a rate determined by timing pulses from the D4 logic circuit. The JFET gate produces PAM samples which are transmitted to the D4 common circuits.

**NOTICE**

Not for use or disclosure outside the  
Bell System except under written agreement

**2.05** The receive PAM samples from the D4 common circuits enter the receive PAM. The JFET gate conducts at a rate set by the D4 logic circuit which is under control of the timing pulses from the common circuits. The PAM samples are reconstructed to voice frequency waveforms in the RCV active low pass filter (LPF) at an output level of +4.0 dB TLP measured at the test jacks. Attenuator ATTEN2 adjusts the 2-wire output level to the trunk circuit to the required value.

### C. Signaling and Supervision

**2.06** Revertive pulse signaling is used on interoffice trunks between panel offices, between panel and No. 1 crossbar, and sometimes between other type offices. In panel application the originating **office** sends a start signal to the terminating **office**. Upon receipt of the start signal, the terminating **office** selector switch begins stepping and sends a corresponding revertive pulse for each step to the originating **office**. When the received number of pulses equals the digit requested, the originating **office** sends a stop signal. The procedure continues until all digits have been transmitted. At this time the terminating **office** sends an incoming advance pulse to the originating **office**. The circuit is then ready to be connected through to the talking paths.

**2.07** The terminating channel unit (RPT) loop closure acts as a signal to start the revertive pulsing. The revertive pulses are sensed by resistor bridge R8, R9, R12, R13, R16, R17, and capacitor C3 in the originating channel unit (RPO).

**2.08** When the revertive pulses received at the terminating office match the digits to be forwarded, a stop signal (open loop) is sent to the terminating office.

**2.09** The RPT logic circuit momentarily releases its LC relay indicating to the terminating **office** to stop pulsing. The originating **office** then sends a start pulse to the terminating **office** for the second digit pulses to be transmitted.

**2.10** When the final digit has been transmitted, the terminating **office** sends an incoming advance pulse to the originating end. The signal is generated by reversing the battery on the 2-wire trunk to the RPT from the terminating **office**. The battery reversal is sensed by resistor bridge R6, R7, R10, R11, R14 and R15 in the RPT. The

logic circuit places a logic 1 in the signaling frame on the T1 line. The originating end D4 common circuit logic detects this signal, converts it, and operates the RB relay, reversing the battery polarity of the 2-wire trunks in the RPO channel unit. The battery reversal indicates the digits have been sent and the originating central office completes the talking circuit.

### D. Trunk Processing

**2.11** Trunk processing is under control of the D4 common circuits. In the originating channel unit circuit, a carrier failure results in operation of the RB relay, reversing the trunk battery polarity. This simulates a busy trunk thereby preventing it from being seized by the central office. In the terminating channel unit circuit, a carrier failure results in the release of the LC relay, opening the circuit to the central office and disconnecting the customer.

## 3. CIRCUIT OPTIONS

### Attenuation

**3.01** The RPO and RPT channel units have the same transmit and receive attenuators. The attenuators may be adjusted from 0 to 6.3 dB in 0.1 dB steps.

**3.02** Transmit attenuator ATTEN1 adjusts a 2-wire input level from a range of +1.8 to -4.5 dB TLP to the required -8.5 dB TLP at the input test jack to the transmit active BPF.

**3.03** Receive attenuator ATTEN2 adjusts the +4.0 dB TLP output of the receiver active low pass filter to the required 2-wire trunk level within the range of 0 to -6.3 dB TLP.

### Network Buildout Capacitor

**3.04** The compromise hybrid balance network consists of an 898-ohm resistor in series with a 2.15 uf capacitor. The network buildout capacitor is connected in parallel with the compromise network, and is adjustable in 0.002 uf steps up to a maximum of 0.064 uf.

**3.05** The compromise network balances the office impedance with the NBOC added to balance the office wiring capacitance.

<b>Trunk Processing</b>	<b>SECTION</b>	<b>TITLE</b>
<b>3.06</b> Table B covers the following RPO and RPT channel unit options:	179-100-311	D4 Channel Bank - Signaling Compatibility
(a) Trunk busy during carrier failure.	365-170-000	D4 Channel Bank - TOP
(b) Circuit requirements when RPT connects to incoming crossbar registers that are equipped with U type relays.	365-170-100	D4 Channel Bank Description
<b>4. REFERENCES</b>	365-170-101	D4 Channel Units - General Description
<b>4.01</b> The following is a list of sections associated with D4 equipment.		

TABLE A

D4 CHANNEL UNITS

J98726( )	SD/CD	CHANNEL UNIT TYPE	FACEPLATE MARKING
BF	3C340-0_	2-Wire Revertive Pulse, Originating End	2RPO
BG	3C341-0_	2-Wire Revertive Pulse, Terminating End	2RPT

TABLE B

D4 CHANNEL UNIT OPTIONS

CHANNEL UNIT MARKING	OPTION	FUNCTION
2RPO (Gray) J98726BF SD3C340-0_	SD   1G	When selected, trunk processing (during a carrier failure alarm) will provide an on-hook, releasing the attached customer, followed 2.5 seconds later by an off-hook, making the channel appear busy.  Provides an internal ground on the 1 ( ) lead during a carrier failure. When disconnected (black portion of socket exposed and plug inserted to cover white portion), provides a dry contact closure to the 2 ( ) lead during a carrier failure.
2RPT (Gray) J98726BG SD3C341-0_	XB	Conditions the channel unit for use when connected with crossbar incoming registers having U-type relays. When used in panel offices, this option must not be selected.

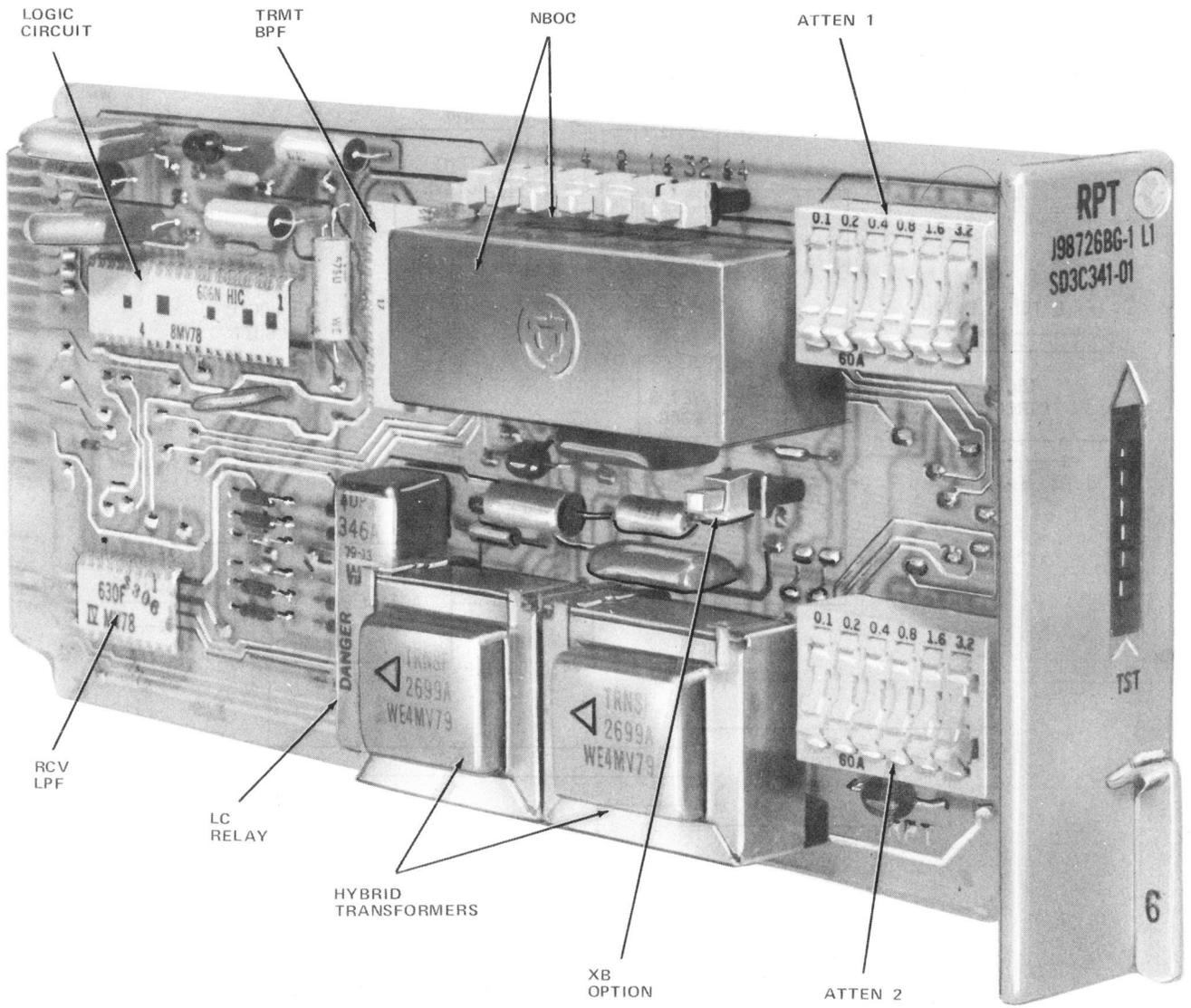


Fig. 1—2-Wire Revertive Pulse

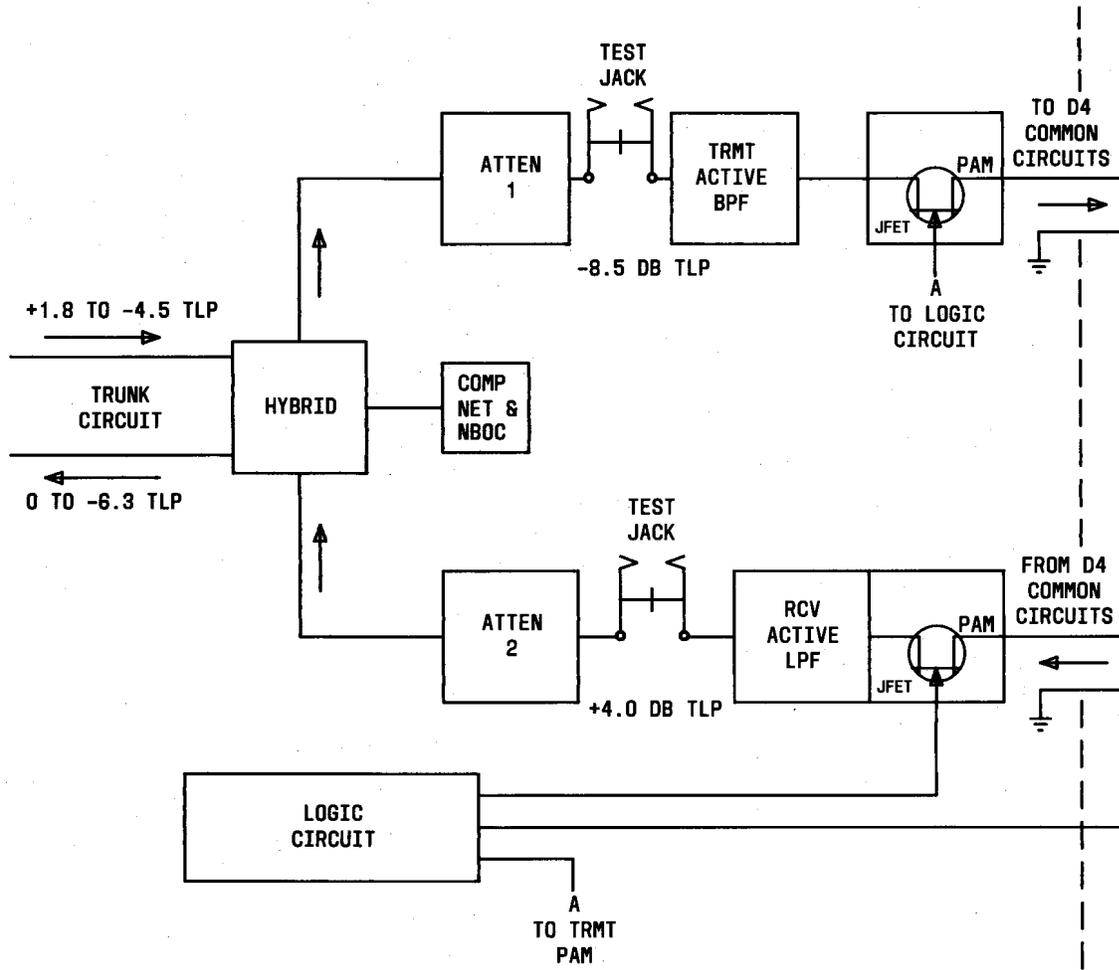


Fig. 2—2-Wire Revertive Pulse Transmission Paths

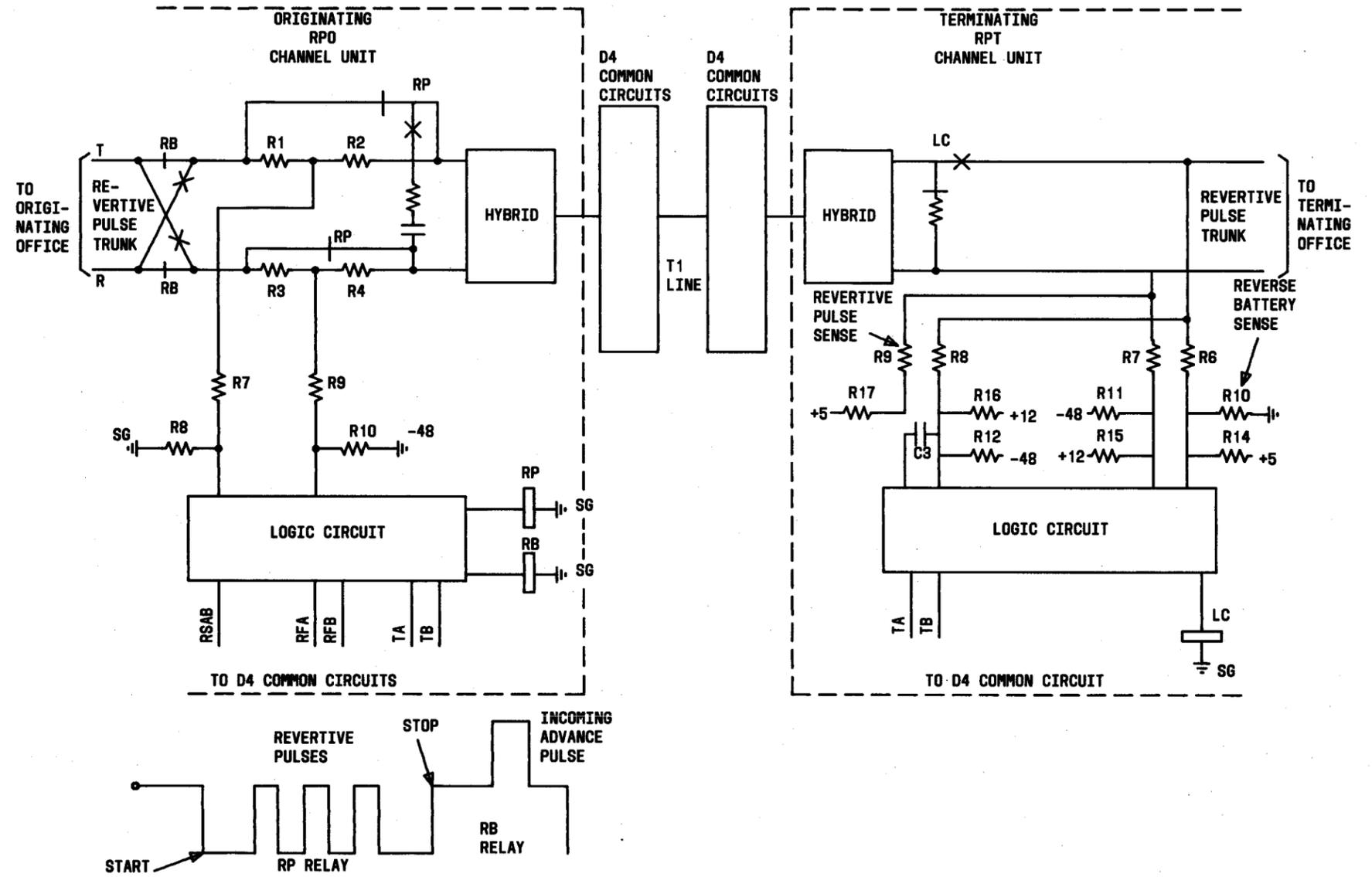


Fig. 3—2-Wire Revertive Pulse Signaling Circuits