REMOTE SWITCHING SYSTEM—CENTRAL OFFICE END
CHANNEL UNIT DESCRIPTION
D4 CHANNEL BANK
DIGITAL TRANSMISSION SYSTEMS

CONTENTS PAGE

1. GENERAL

1.01 This section provides a general description of the remote switching system central office (RSCO) end, D4 channel unit as shown in Fig. 1. The drawings for the RSCO are J98726BW and SD-3C317-( ). The unit face plate is stamped RSCO.

1.02 When this section is reissued, the reason(s) will be listed 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 adustments are covered in Section 365-170-000 (TOP).

2. CHANNEL UNIT DESCRIPTION

A. Application

2.01 The RSCO channel unit provides voice frequency (VF) and signaling trunk facilities between an electronic switching system (ESS) and the remote switching system (RSS) terminal using T1 type digital transmission carrier facilities. The RSS provides a full range of ESS features comparable to those offered to customers having direct access to a No. 1 or a No. 2 ESS office. The RSS serves a minimum of 200 to a maximum of 1024 customers remotely located up to a distance of 150 miles from the ESS office.

2.02 A fully equipped RSS requires 118 VF channels and two data channels between the ESS host office and the RSS remote terminal (Fig. 2). Three D4 channel banks at the host ESS are equipped with 118 RSCO channel units and two data service unit data port (DSU/DP) channel units. The VF and signaling facilities are provided by the RSCO channel units. Digital call processing between the host ESS peripheral unit controller and the microprocessor at the remote RSS terminal is over the data lines provided by the DSU/DP channel units.

B. Transmission Paths

2.03 The VF transmission circuits of the RSCO channel unit are shown in Fig. 3. The ESS trunks are 2-wire, 900-ohm balanced and are converted to 4-wire, 600-ohm unbalanced by the hybrid transformers. Hybrid balance is accomplished

by a fixed resistor capacitor network in the compromise network.

2.04 The VF transmitting level to the pulse amplitude modulator (PAM) is controlled by adjustment of attenuator ATTEN1 to maintain a level of -8.5 dB TLP at the test jack and at the input to the band pass filter (BPF). This adjustment is required due to variances in office levels and cabling losses. Attenuation is provided by ATTEN1 in 0.1 dB steps from 0 dB to a maximum of 6.3 dB.

2.05 The transmitting active BPF attenuates frequencies above and below the VF band of 200 to 3400 KHz, with a rejection peak at 60 Hz. The output of the BPF at the proper level and frequency range is connected to the PAM circuit.

2.06 The PAM samples the VF input under control of timing pulses from the common circuits via the logic circuits and sends VF PAM encoded signals to the D4 common equipment for transmission to the remote terminal over T1 line facilities.

2.07 PAM coded signals are received from the D4 common equipment and connect to the active low pass filter (LPF) circuit. The PAM coded signals are decoded under control of timing pulses from the common circuits via the channel unit logic circuits. The output of the LPF is reconstructed VF at +4.0 dB TLP. The output of the LPF is connected to the 2-wire ESS trunk through attenuator ATTEN2 and the hybrid transformers. The level at the 2-wire output of the hybrid is adjusted by ATTEN2 in 0.1 dB steps over a range from 0.1 dB to 6.3 dB. This adjustment allows for level correction due to variations in office cabling and hybrid transformer losses. The channel unit attenuation and gain and loss parameters are shown in Table A.

C. Signaling and Supervision

2.08 The signaling and supervision between the host ESS and the RSS terminal is accomplished by using the digital signaling channels of the RSCO channel unit, and call request information is transmitted over the data channel.

2.09 When an RSS customer originates a call, the line information is transmitted to the ESS over the data line. The ESS marks the line busy and selects an idle RSCO to provide a voice path to the RSS. The ESS then sends a message over the data channel to connect the calling RSS customer to the voice line. When the voice path is connected, the RSCO logic circuit receives an off-hook status from the host ESS and causes the LC relay in the 2-wire ESS trunk side of the hybrid to place a resistive termination on the trunk, indicating a loop closure to the ESS. A digit receiver is connected to the trunk to receive dial pulses from the RSS customer. When the RSS customer goes on hook, the RSCO logic circuit receives the change in the supervision state from the RSS and releases the LC relay, indicating a disconnect to the ESS. When an ESS customer originates a call to an RSS termination, the host ESS performs the terminating translation of the dialed digits. This translation identifies the remote switch and equipment number for the called line.

2.10 The ESS selects an idle RSCO channel unit and connects the incoming trunk. The ESS sends an order to the RSS to establish the talk path and apply ringing to the called customer line. When the called customer answers, the RSCO logic circuit operates the LC relay, indicating the answer to the ESS. When the called customer goes on hook, the RSCO logic circuit releases the LC relay, indicating a disconnect to the ESS. If the ESS customer terminates, a message is sent to the RSS to disconnect the line. The line being disconnected changes the trunk supervision state, and the logic circuit in the RSCO channel unit releases the LC relay resistive termination on the 2-wire trunk, indicating a disconnect to the ESS.

2.11 A carrier failure results in release of the LC relay providing an open circuit toward the trunk circuit thereby disconnecting an attached customer. The LC relay remains open for a period of 2.5 seconds followed by a loop closure for the duration of the carrier failure.

3. CIRCUIT OPTIONS

3.01 The RSCO channel unit has no circuit options other than attenuators.

3.02 Attenuators ATTEN1 in the transmit and ATTEN2 in the receive circuit are shown in Fig. 3. The attenuator settings are made by moving shorting plugs. Detailed information on the attenuator adjustments is given in Section 365-170-000 (TOP).

4. REFERENCES

4.01 The following is a list of sections associated with the D4 RSCO channel unit.

SECTION	TITLE
255-200-100	Remote Switching System General Description
365-170-000	D4 Channel Bank—TOP
365-170-100	D4 Channel Bank—Description
365-170-101	D4 Channel Unit—General Description
SD-3C317-0	RSCO Channel Unit

TABLE A

CHANNEL UNIT ATTENUATION AND GAIN AND LOSS PARAMETERS

RSCO
CHANNEL UNIT

TRANSMIT PATH (T, R TO TST JACK −8.5 dB TLP POINT)			
G_T INSERTION GAIN (+) OR LOSS (−) dB	ATTENUATOR RANGE (dB)	INPUT LEVEL AT, T, R, (dB)	
		MIN	MAX
−4.0	0 − 6.3	− 4.5	+ 1.8
RECEIVE PATH [TST JACK + 4.0 dB TLP POINT TO T1, R1, OR T, R (2W)]			
G_R INSERTION GAIN (+) OR LOSS (−) dB	ATTENTUATOR RANGE (dB)	OUTPUT LEVEL AT, T1, R1 (dB)	
		MIN	MAX
− 2.3	0 − 6.3	− 12.6	+ 1.7

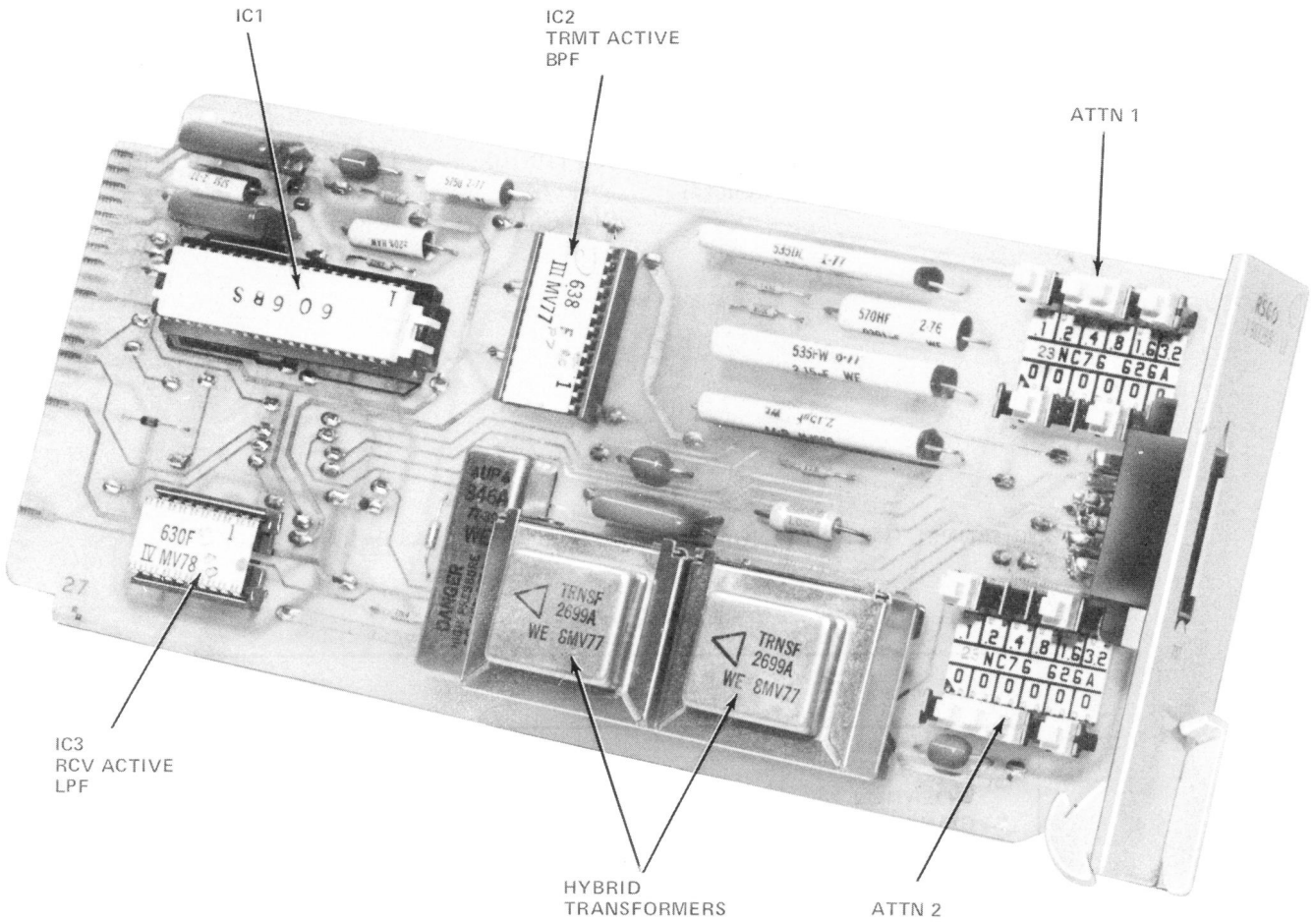
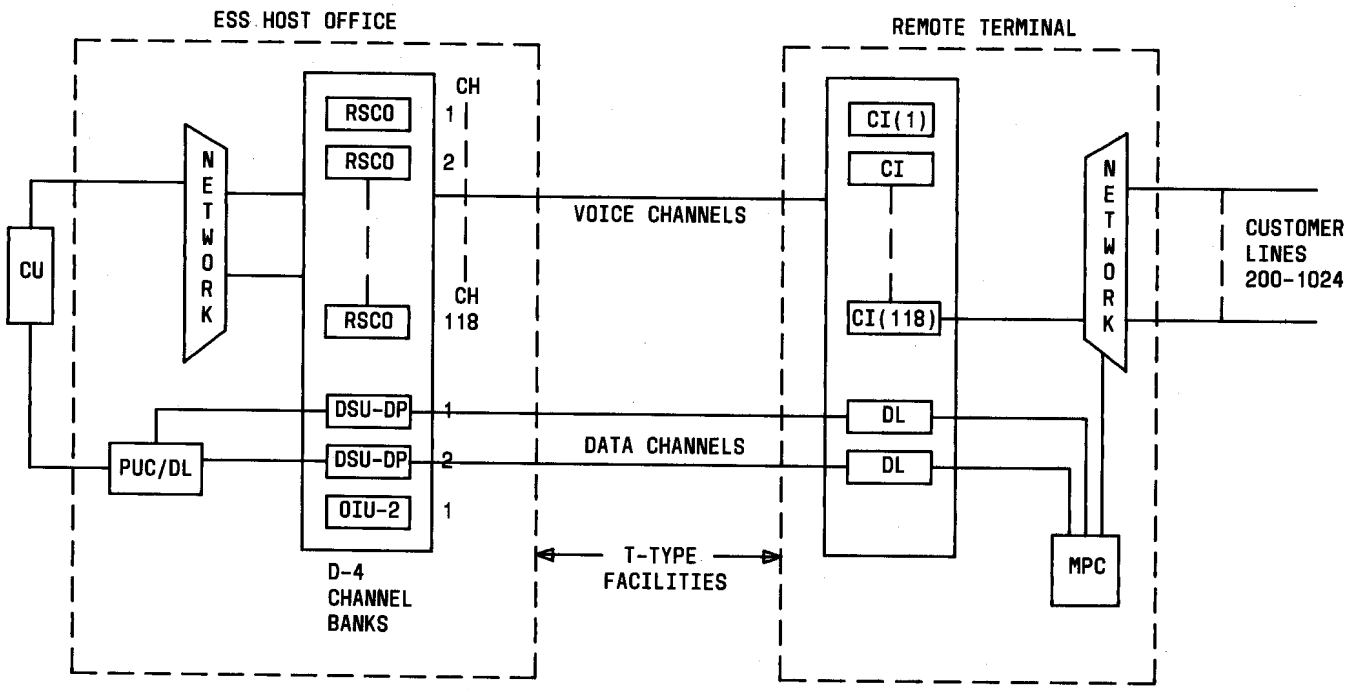


Fig. 1—Central Office End



CU = CONTROL UNIT
PUC/DL = PERIPHERAL UNIT CONTROLLER/DATA LINK
RSCO = REMOTE SWITCHING CHANNEL UNIT
DSU/DP = DATA SERVICE UNIT DATA PORT
OIU-2 = OFFICE INTERFACE UNIT
CI = CHANNEL INTERFACE
MPC = MICROPROSSER CONTROLLER
DL = DATA LINK

Fig. 2—Remote Switching System Arrangements

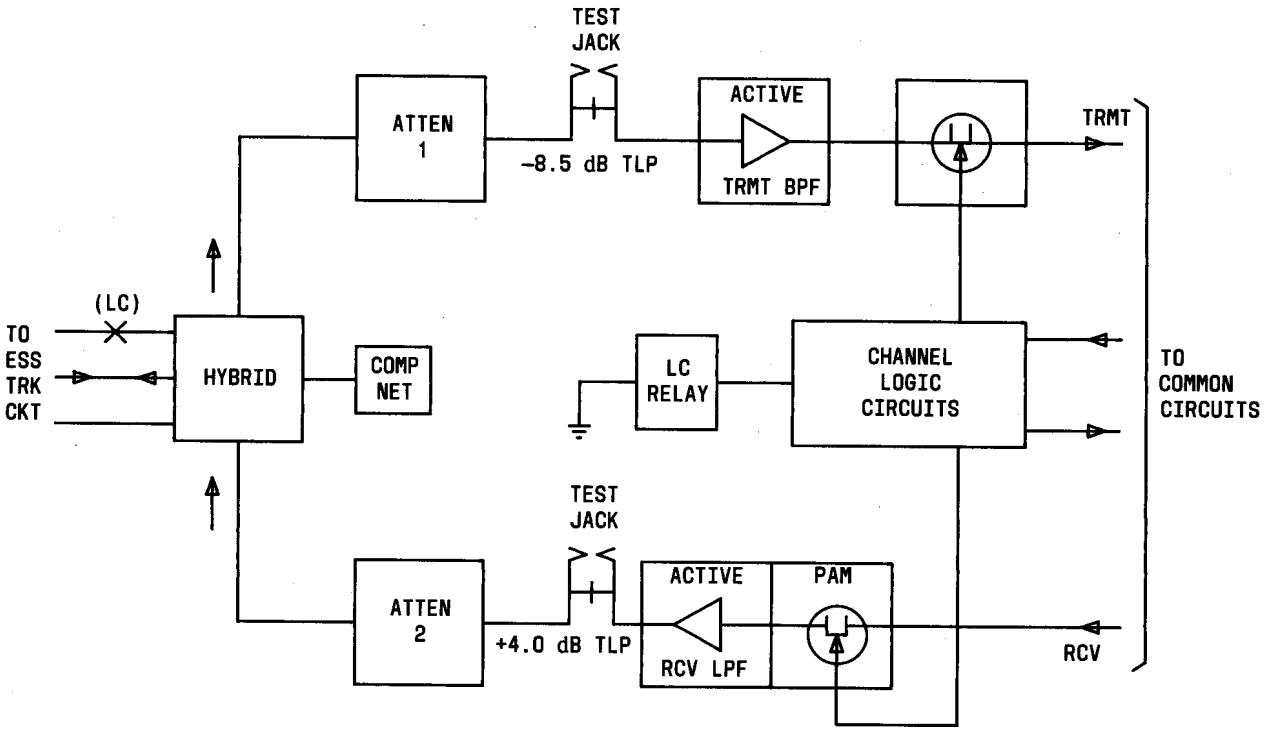


Fig. 3—RSCO Transmission Paths