DATA SYSTEMS
STATION
REVERSE CHANNEL UNITS
1A-TYPE, 1B-TYPE, 2A-TYPE DATA UNITS
DESCRIPTION AND OPERATION

1. GENERAL

1.01 The reverse channel data units are a low-speed, narrowband AM system designed to work with voice-frequency data sets. Its purpose is to send information from the receiving data set back to the transmitting data set simultaneously, and over the same 2-wire facilities. It may be used as a circuit assurance, line break feature, or reverse information channel with a capability of less than 10 bits per second.

1.02 This section is reissued to show 1A2 and 2A2 Data Units as the current standard models, replacing the 1A1 and 2A1 which are rated manufacture discontinued (MD). The method of adjusting the transmitter output level has been changed.

1.03 Installation and connections of these units are shown in sections covering data sets using reverse channel units.

2. DESCRIPTION

2.01 The reverse channel system consists of Data Units 1A-type, 1B-type, and 2A-type designated as reverse channel transceiver, reverse channel receiver, and reverse channel transmitter, respectively (see Fig. 1, 2, and 3). The 1A-type transceiver is used with half-duplex transmitter-receiving data sets, while the 2A-type transmitter and the 1B1 receiver are used, respectively, with receiving and transmitting data sets. Each unit is designed to be integrated with an associated data set; hence, reverse channel power and line control functions are supplied by the associated set. Signaling lead connections between reverse channel units and the customer are made through the data set interface.

2.02 All components except networks are arranged on printed wiring boards which are mounted on a metal framework.

2.03 Each unit is designed for mounting inside an associated data set. Spade tipped leads from each reverse channel unit provide easy termination of the reverse channel units to various terminal boards inside associated data sets. ▶The 1A1, 2A1 (MD) and 1A2, 2A2 units are both electrically and mechanically interchangeable.◀

2.04 Schematic information such as wiring options and associated circuit components may be found in CD- and SD-1D052-01.

3. OPERATION

3.01 The reverse channel data units are composed of various combinations of three circuits: hybrid, receiver, and transmitter. Figure 4 shows a block diagram of the circuits used in the 1A-type, 1B-type, and 2A-type units.

Hybrid

3.02 The hybrid is a selectively balanced bridge tuned to 387 Hz. It doubles as an input circuit and bias path for the receiver circuit while acting as collector load and coupling circuit for the output stage of the transmitter circuit. The hybrid provides a high degree of isolation between the reverse channel circuits and the data set and also couples both of them to the line with low insertion loss.

Transmitter

3.03 The transmitter circuit consists of an oscillator and control logic to turn the oscillator on

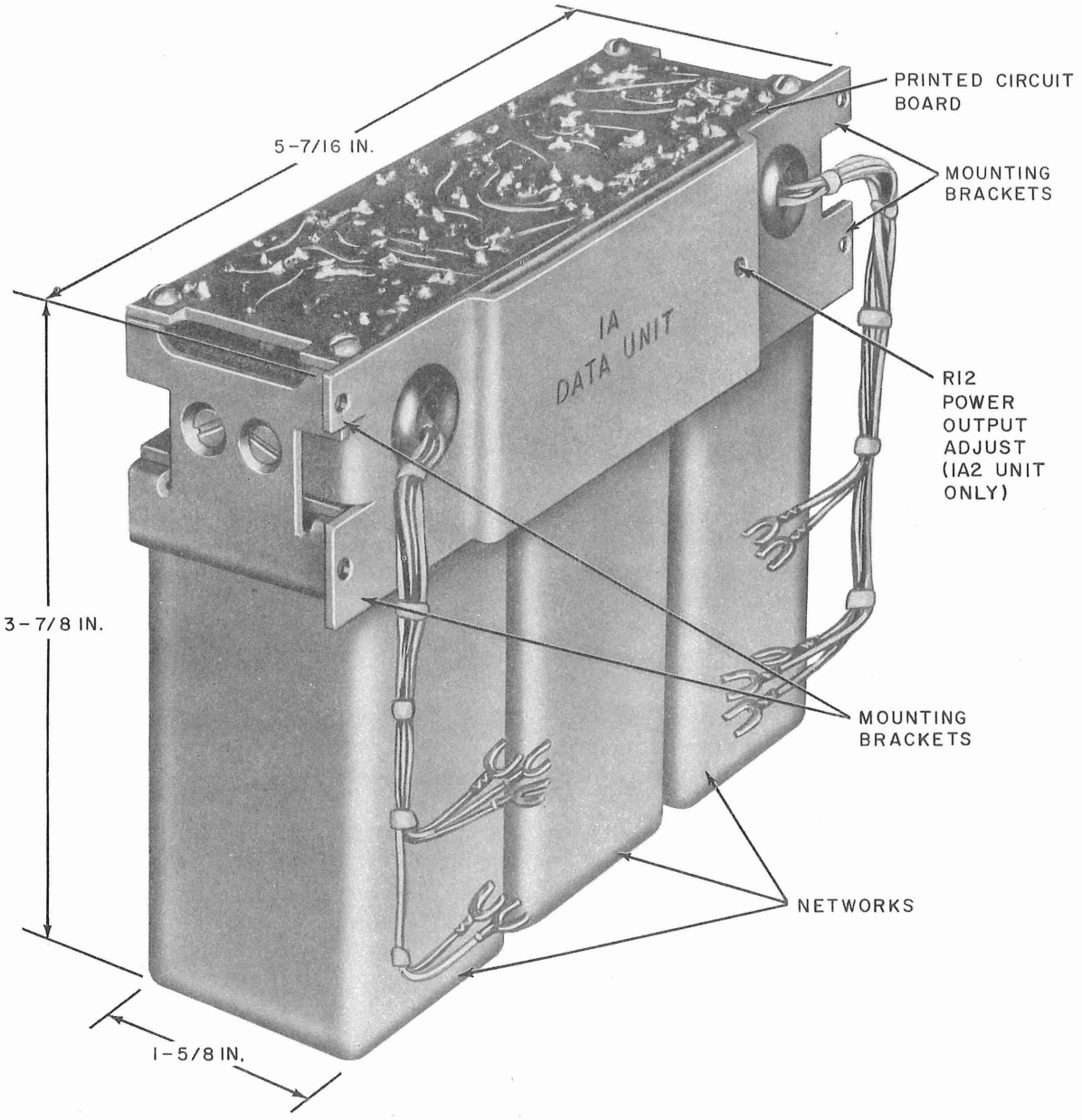


Fig. 1—1A-Type Reverse Channel Tranceiver

and off, and an isolation amplifier to couple the oscillator to the hybrid. The oscillator generates the 387-Hz reverse-channel carrier, while the control logic (provided only in the 1A1) inhibits customer control when the associated data set is in the transmit or test mode. The isolation amplifier for 1A1 and 2A1 units connects to one of three option taps on the oscillator to provide carrier output levels to the line of −9, −6, and −3 dBm. The transmitter output level for 1A2 and 2A2 units may be adjusted between 0 and −12 dBm by potentiometer R12 to meet central office level requirements.

Receiver

3.04 The receiver circuit is composed of a highly selective amplifier tuned to 387 Hz, an automatic gain control circuit, a direct-coupled amplifier, and a detector circuit. Incoming signals are amplified under control of the automatic gain

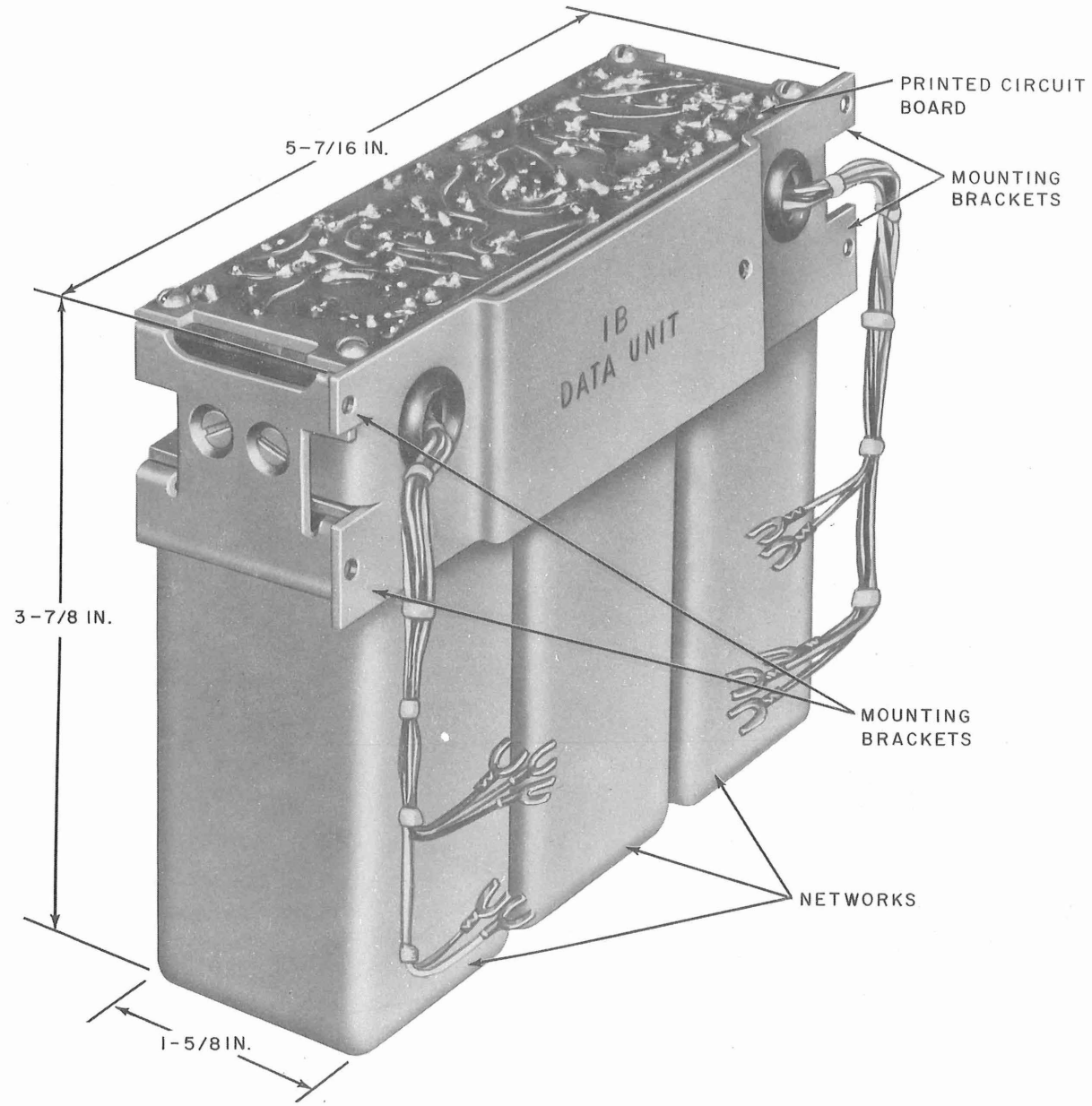


Fig. 2—1B-Type Reverse Channel Receiver

control and are then coupled to the binary detector circuit where a dc output voltage is provided to the customer. A positive voltage (contact closure in the 1B-type) is given when reverse channel carrier is being received, while a negative voltage or an open contact is given when reverse channel carrier is not being received. The bandwidth of the receiver amplifier is approximately 20 cycles at minimum signal level of −48 dBm. At higher input levels the automatic gain control circuit lowers the circuit selectively.

3.05 The 1A-type transceiver is capable of being loop-back tested with data sets similar to Data Set 202C. A signal is put on the line to hold the data set in the test mode. The test relay contacts of the data set loop the RCR (reverse channel receive) and RCS (reverse channel send)

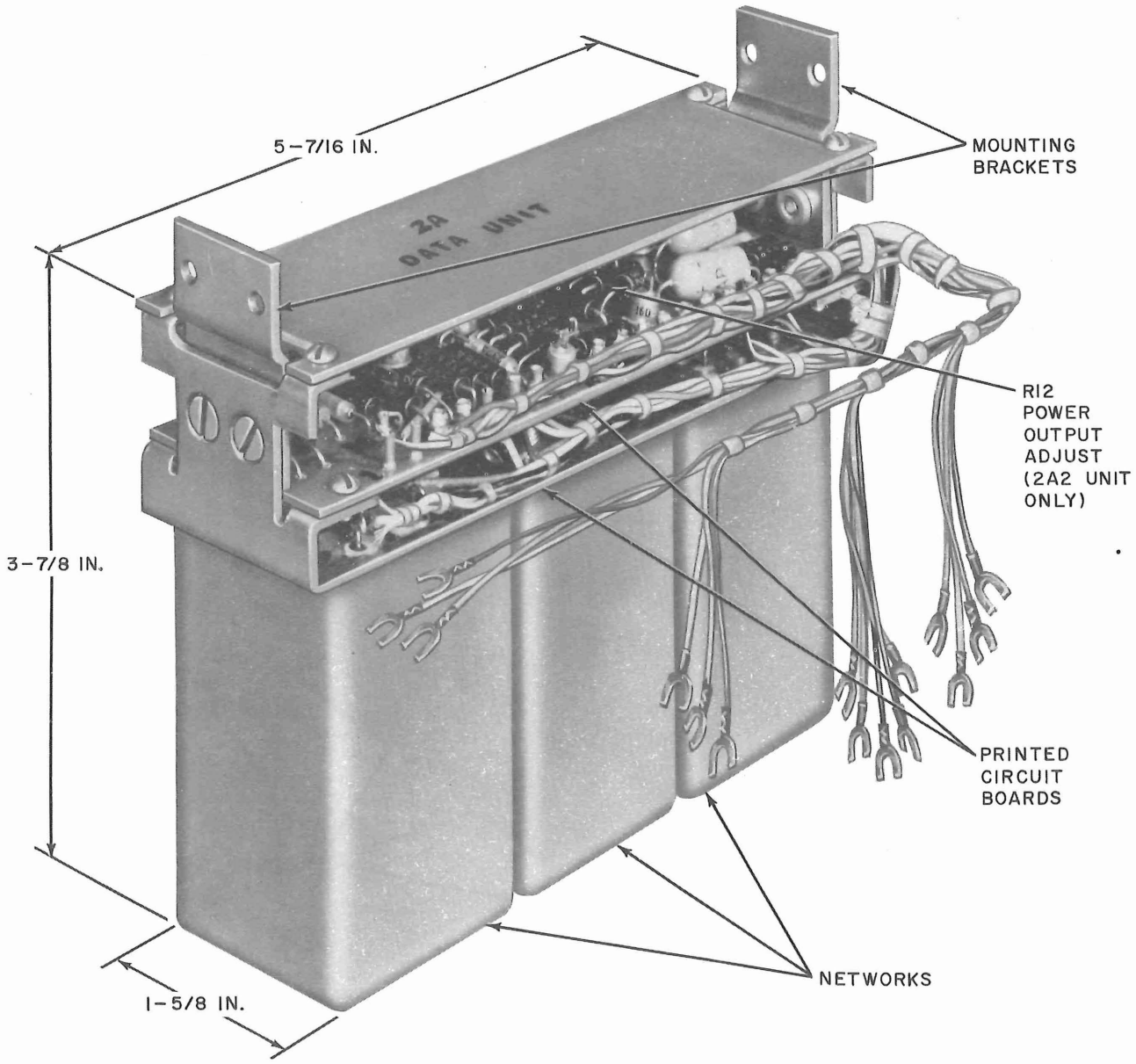
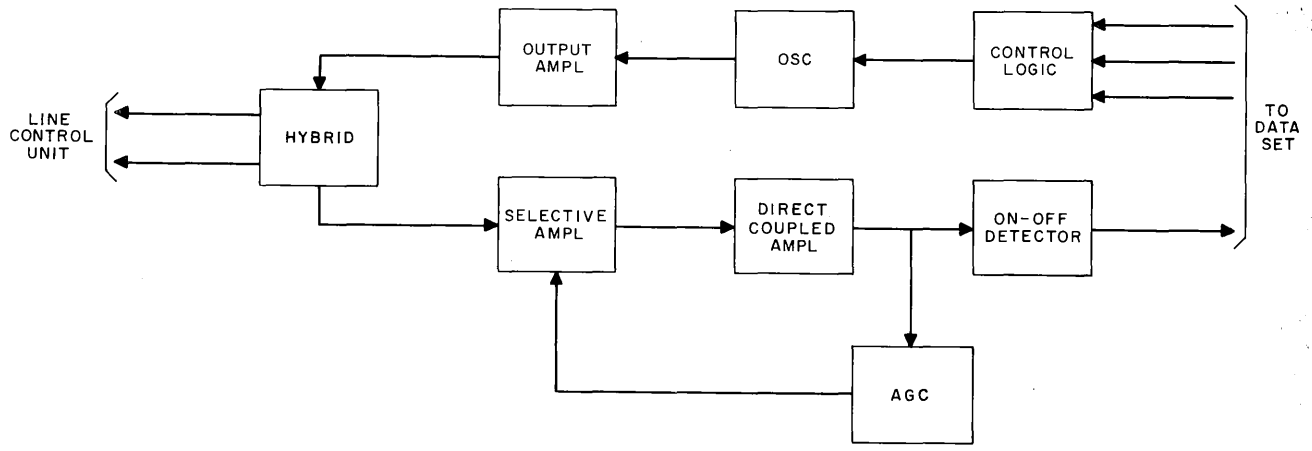


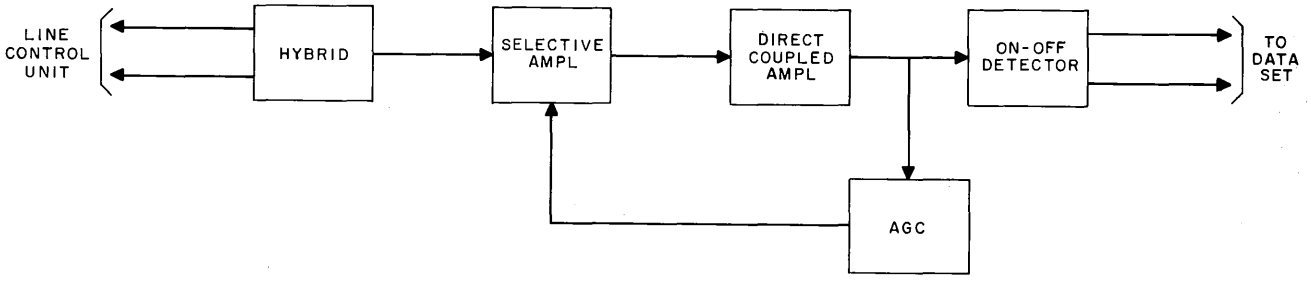
Fig. 3—2A-Type Reverse Channel Transmitter

leads together while disconnecting the customer. After the test is complete, the data set R/S (request-to-send) terminal is made positive which turns the 1A1 off. The loop-back test procedure checks the receiver sensitivity and the transmitter carrier level and frequency.

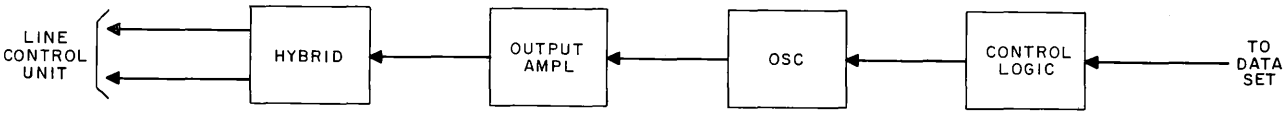
3.06 For more information concerning loop-back testing of 1A-type, 1B-type, 2A-type reverse channel units, refer to practices covering the type of data sets involved.



TRANSCEIVER
1A–TYPE DATA UNIT BLOCK DIAGRAM



RECEIVER
1B–TYPE DATA UNIT BLOCK DIAGRAM



TRANSMITTER
2A–TYPE DATA UNIT BLOCK DIAGRAM

Fig. 4—Block Diagram of Data Units