

DATA SET 110C

DESCRIPTION

1. GENERAL

1.01 This section covers the physical and functional description of Data Set 110C. The section also includes information on the operation of the data set and its relationship to the other components of the 110-system. The Data Set 110C is part of the 110-system shown in Fig. 1.

1.02 The Data Set 110C is designed as part of the transmission system connecting a No. 1 ESS-ADF office to the associated Control Serving Test Center (CSTC). The transmission system includes a Data Set 110C at a No. 1 ESS-ADF office and a Data Set 110B at the CSTC as shown in Fig. 1. The Data Set 110C provides the termination at the ESS office for the transmission system.

1.03 Data Set 110C is designed to provide a low-speed (up to 150 bauds), full-duplex (FDX), serial dc data transmission over 4-wire metallic facilities to Data Set 110B at the CSTC. Data is transmitted over one pair of lines (the transmit loop) and received over the other pair of lines (the receive loop).

Note: The length of the transmission lines must not exceed 1/2 mile (150-ohm loop of intra-office cabling).

1.04 The basic functions of the data set are as follows:

- (a) Convert the signals from the CSTC into signals which are acceptable to the ESS equipment in the No. 1 ESS-ADF office.
- (b) Convert the signals from the ESS office equipment into signals which are acceptable to Data Set 110B at the CSTC.

1.05 The other functions of the data set are as follows:

- (a) Operate a ferrod in master scanner equipment of the No. 1 ESS-ADF office.

(b) Detect signal failure on the receive loop from the CSTC and do the following:

- (1) Interrupt the operation of the ferrod when signal failure on the receive loop is detected.
- (2) Apply a mark hold to the ESS office equipment after signal failure on the receive loop is detected.

1.06 Data Set 110C can only be arranged for 4-wire operation with the Data Set 110B. The two pairs connecting the 110C to the 110B are designated as follows:

- T—Transmit Loop Tip Lead
- R—Transmit Loop Ring Lead
- T1—Receive Loop Tip Lead
- R1—Receive Loop Ring Lead.

1.07 The Data Set 110C transmits data to and accepts data from the Delay Character Assembler-Disassembler (DCAD) in the No. 1 ESS-ADF office. The signals used by the ESS office equipment are as follows:

- (a) A mark is a +12 volt signal
- (b) A space is a ground level signal.

1.08 The interface leads to the ESS office equipment from the Data Set 110C are as follows:

- BA—Transmitted Data Lead
- BB—Received Data Lead
- DM—Received Data Monitor Lead
- CF3 and CF0—Signal Detector Leads.

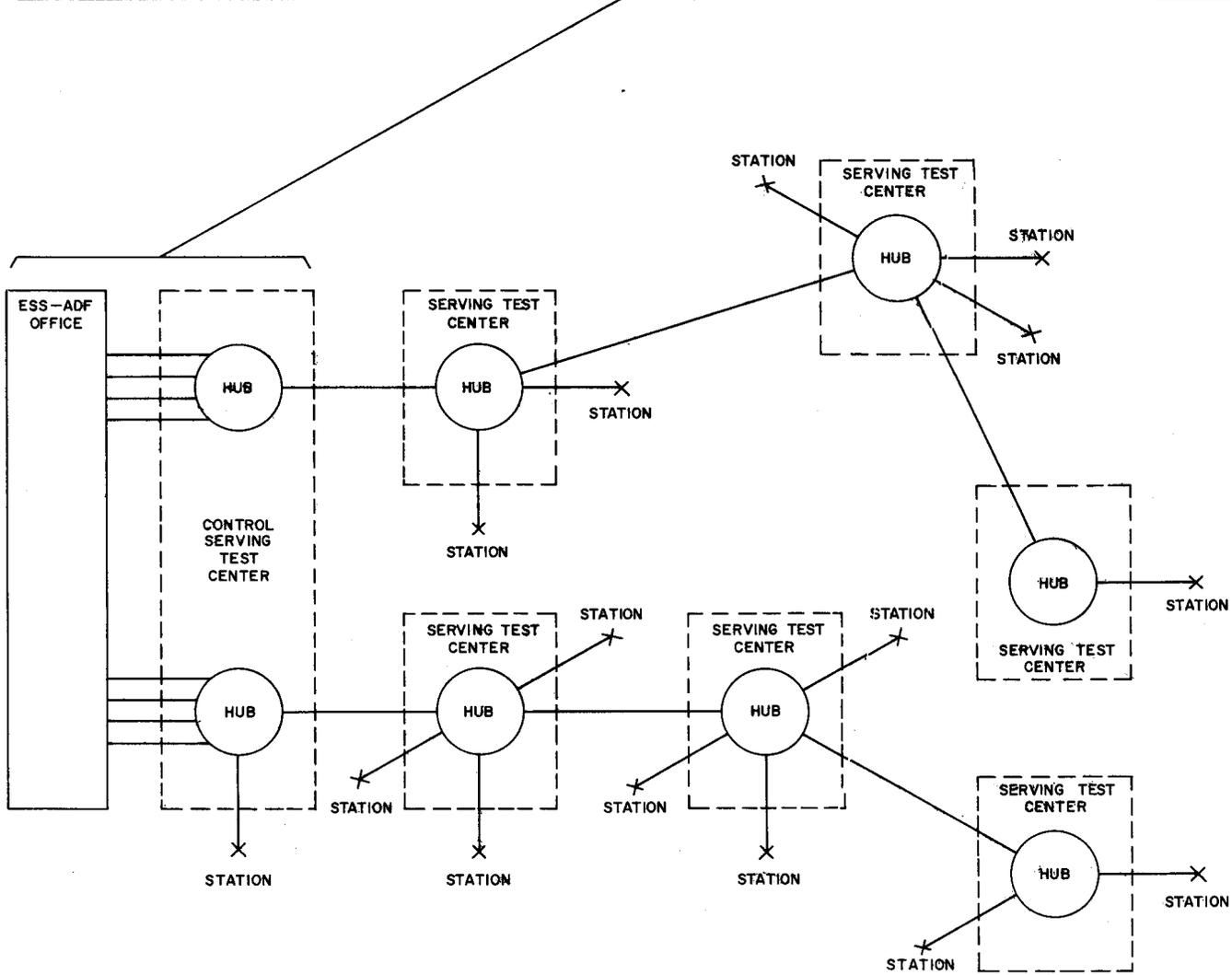
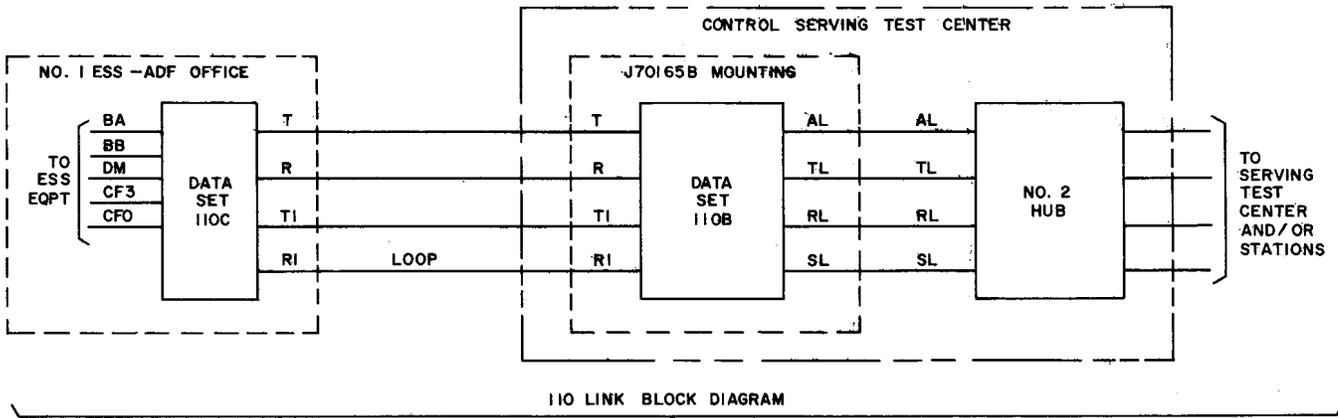


Fig. 1—System Block Diagram

1.09 The power required by the Data Set 110C is supplied from the regular central office battery supplies of -48 volts and +24 volts. The permissible range of the -48 volt supply is from -42.75 to -52.5 volts. The permissible range of the +24 volt supply is from +20.75 volts to +26.25 volts.

1.10 The data set will operate in ambient temperatures from +40 to +120°F and in relative humidity from 20 to 95 percent.

2. PHYSICAL DESCRIPTION

2.01 The Data Set 110C is a printed circuit board which is similar to the printed circuit boards used in ESS office equipment. The data set is shown in Fig. 2.

2.02 The data set will be located in a Short Link DC Data Set Frame (J3A011A-1) of a No. 1 ESS-ADF office as shown in Fig. 3. The frame will hold a maximum of 256 data sets in four assemblies which are per J3A011AB-1 and are designed A, B, C, and D. Each assembly is composed of four mounting shelves which are

numbered 0, 1, 2, and 3. The frame also consists of the following units:

- (a) A master fuse panel per J3A011AA-1 (see Fig. 3) is provided to furnish the necessary +24 volts and -48 volts to each mounting shelf of the frame. The master fuse panel also provides the power that is required for other functions of the frame. The power for each shelf is provided through two fuses for each required voltage which means that each shelf will still have power even though the fuse for one of the voltages has blown.
- (b) A filter panel per J1A053E-1 is provided to furnish the power to the master fuse panel.
- (c) A filter panel per J3A011AE-1 is provided to filter the power to each mounting shelf and control which power lead is to be used to feed the power to each mounting shelf.
- (d) A control panel per J3A011AC-1 is provided to intra-office telephone jacks, test jacks for the +24 and -48 volt power, a Power Off (PWR OFF) lamp, an Audible Alarm Off (AUD

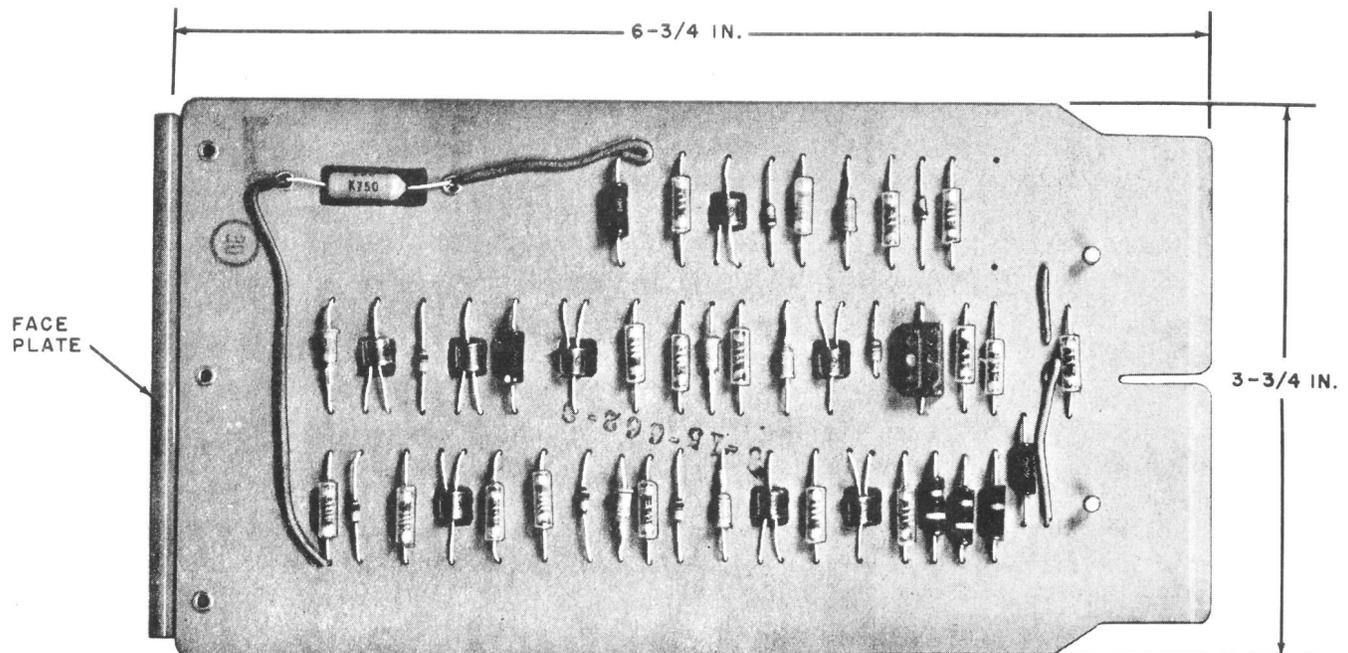


Fig. 2—Data Set 110C

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ALM OFF) key, and a Off Normal (OFF NOR) lamp.

- The PWR OFF lamp, when lit, will indicate a blown fuse somewhere in the frame.
 - The AUD ALM OFF key is used to switch off the office audible alarms when an alarm condition has taken place in the frame.
 - The OFF NOR lamp, when lit, will indicate that the office audible alarms have been cut off by depressing the AUD ALM OFF key.
- (e) A terminal strip panel per J3A011AC-1 is provided to furnish terminal strips for the connection of the miscellaneous circuits of the frame. Also mounted on this panel is the FA relay which provides the connection between the alarm circuits of the frame and the office alarm circuits.
- 2.03** Each mounting shelf (see Fig. 4) will mount 16 data sets. The mounting positions of the data sets on the shelf will be numbered 0 to 15 or as prescribed by the local telephone company.
- 2.04** Each shelf is equipped with a +24 volt fuse and a -48 volt fuse for each data set that can be mounted on the shelf. (Refer to Fig. 4 for the fuse arrangement.)
- 2.05** A mounting shelf is also equipped with two distributing terminal strips. The terminal strips provide the connections to each data set mounting position for the leads of the respective data set as outlined in 1.06 and 1.08.
- 2.06** Each shelf is also equipped with an M relay (see Fig. 4). The M relay provides the connections between the DM leads (refer to 1.08 for description) of the data set mounting positions on the shelf and a 16-pair bus circuit in the Automatic Data and Channel Test Frame (ADACT) of the No. 1 ESS-ADF office. The ADACT is where distortion measurements are made on circuits in the ESS-ADF office.
- 2.07** The data set has no optional methods of operation.

3. FUNCTIONAL DESCRIPTION

3.01 The Data Set 110C is essentially a 2-channel unit which transmits both to and from the Delay Line Character Assembler-Disassembler (DCAD) in the No. 1 ESS-ADF office and over the connecting pairs to the Data Set 110B. A functional block diagram of Data Set 110C is shown in Fig. 5.

3.02 The data signals are supplied from the DCAD to the Data Set 110C via the BA lead and are transmitted to the Data Set 110B via the send loop leads T and R. To drive the send loop without materially loading the DCAD, the 110C provides a transistorized circuit which is the transmitter as shown in Fig. 4.

3.03 The signals from the DCAD to the 110C are handled in the following manner:

- (a) When a mark (+12 volt) signal is applied to the BA lead, the transmitter circuit applies a mark (approximately 1 ma of current) signal to the send loop to the Data Set 110B.
- (b) When a space (ground) signal is applied to the BA lead, the transmitter circuit is cut off, producing a space (approximately 8 ma of current) signal over the send loop to the Data Set 110B.

Note: The current amplitude is dependent on the line length and variations in power supply voltages at each data set.

3.04 When data signals are received from the Data Set 110B to the Data Set 110C via the receive loop (leads T1 and R1), the signals are passed to the DCAD via the BB lead. To pass the signals to the DCAD, the 110C (Fig. 5) consists of the following circuits:

- (a) **Receiver Circuit:** The receiver circuit consists of a 3-state differential detector that can distinguish between the metallic line current conditions representing a mark, a space, and a current failure on the receive loop.
- (b) **Ramp Driver Circuit:** This circuit is designed to provide a 20-microsecond rise and fall time for the data transitions. It passes the data information to the DCAD via the BB lead. The transition shaping is required to

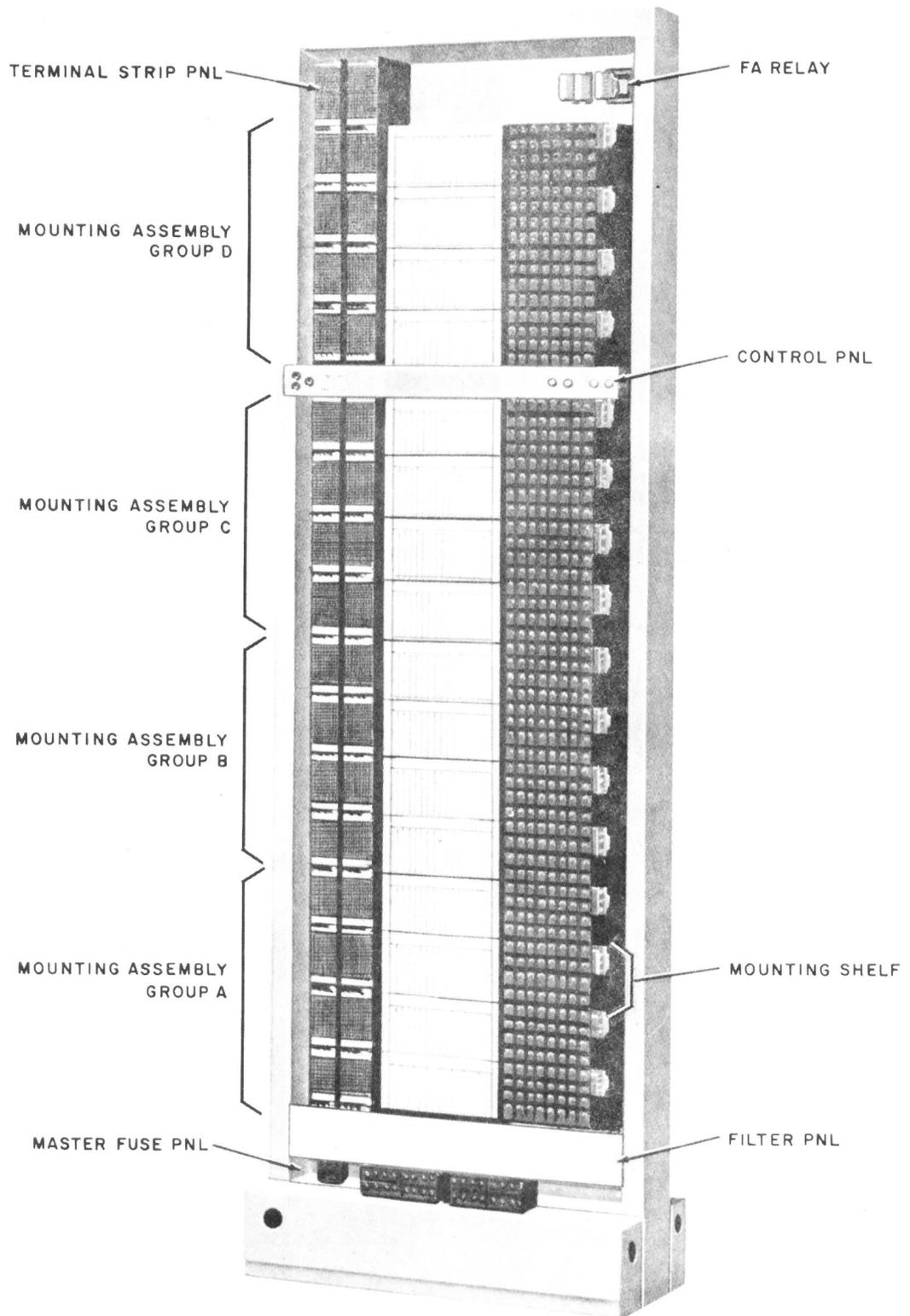


Fig. 3—Short Link DC Data Set Frame J34011A-1, Front View

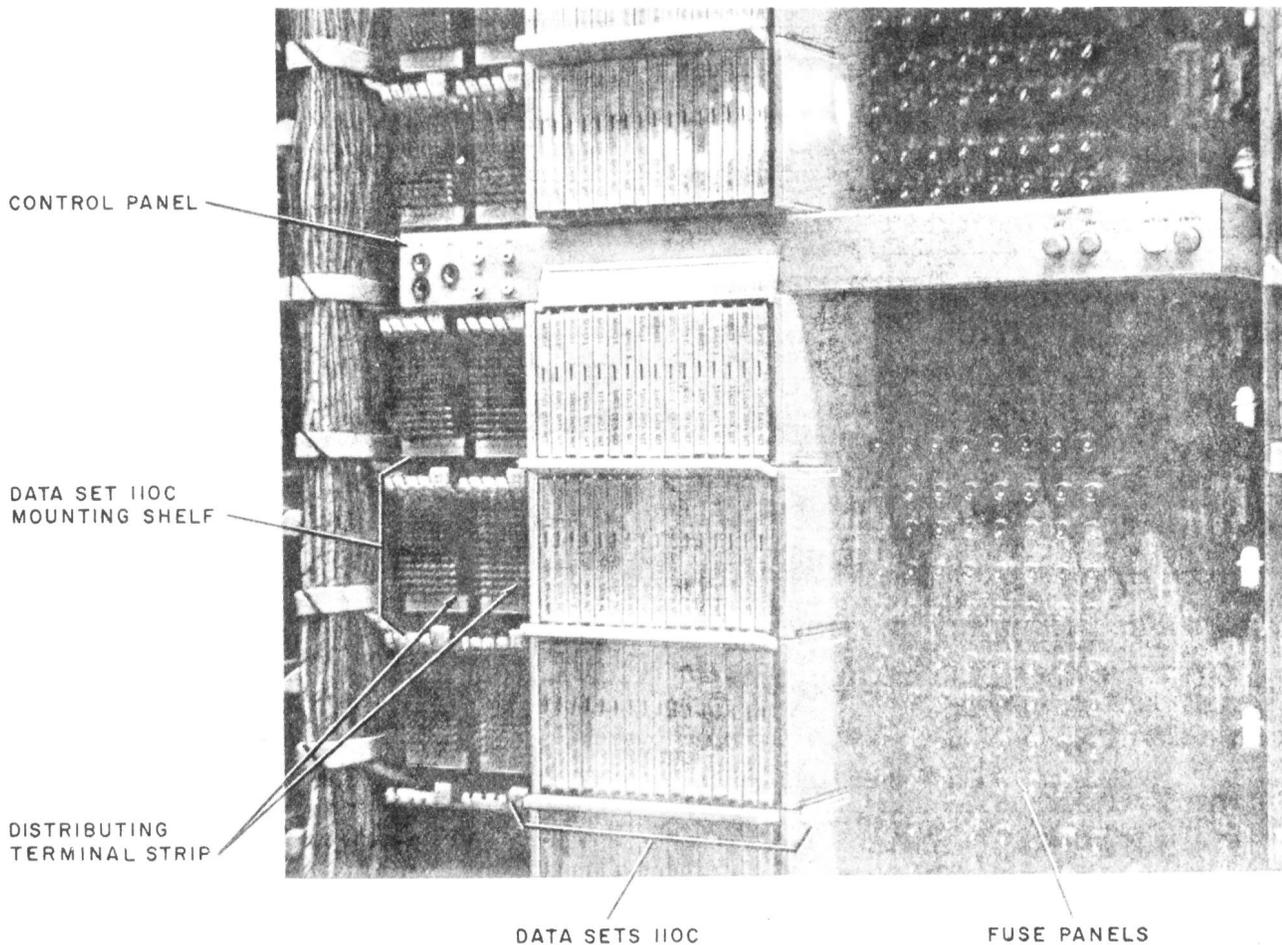


Fig. 4—Mounting Shelf For Data Set 110C

prevent the excessively high frequencies that are present in square waves from reaching the No. 1 ESS-ADF office equipment.

3.05 The signals (a mark and a space) or a current failure on the receive loop are handled in the Data Set 110C as follows:

(a) When a mark (approximately 1 ma of current) signal is applied to the 110C via the receive loop, the receiver circuit recognizes the signal as a mark condition and passes a ground level signal to the ramp driver circuit. The ramp driver cuts off causing a mark (+12 volt) signal to be applied to the DCAD via the BB lead.

(b) When a space (approximately 8 ma of current) signal is applied to the 110C via the receive loop, the receiver circuit recognizes the signal

as a space condition and passes a +6 volt signal to the ramp driver circuit. The +6 volt signal causes the ramp driver to operate which causes a space (ground) signal to be applied to the DCAD via the BB lead.

(c) When a current failure occurs on the receive loop, the receiver circuit recognizes the current failure condition and passes a ground level signal to the ramp driver circuit. The ground level signal cuts off the ramp driver and holds a mark (+12 volt) signal to the DCAD via the BB lead until current failure condition is corrected.

Note: The current amplitude is dependent on the line length and variations in power supply voltages at each data set.

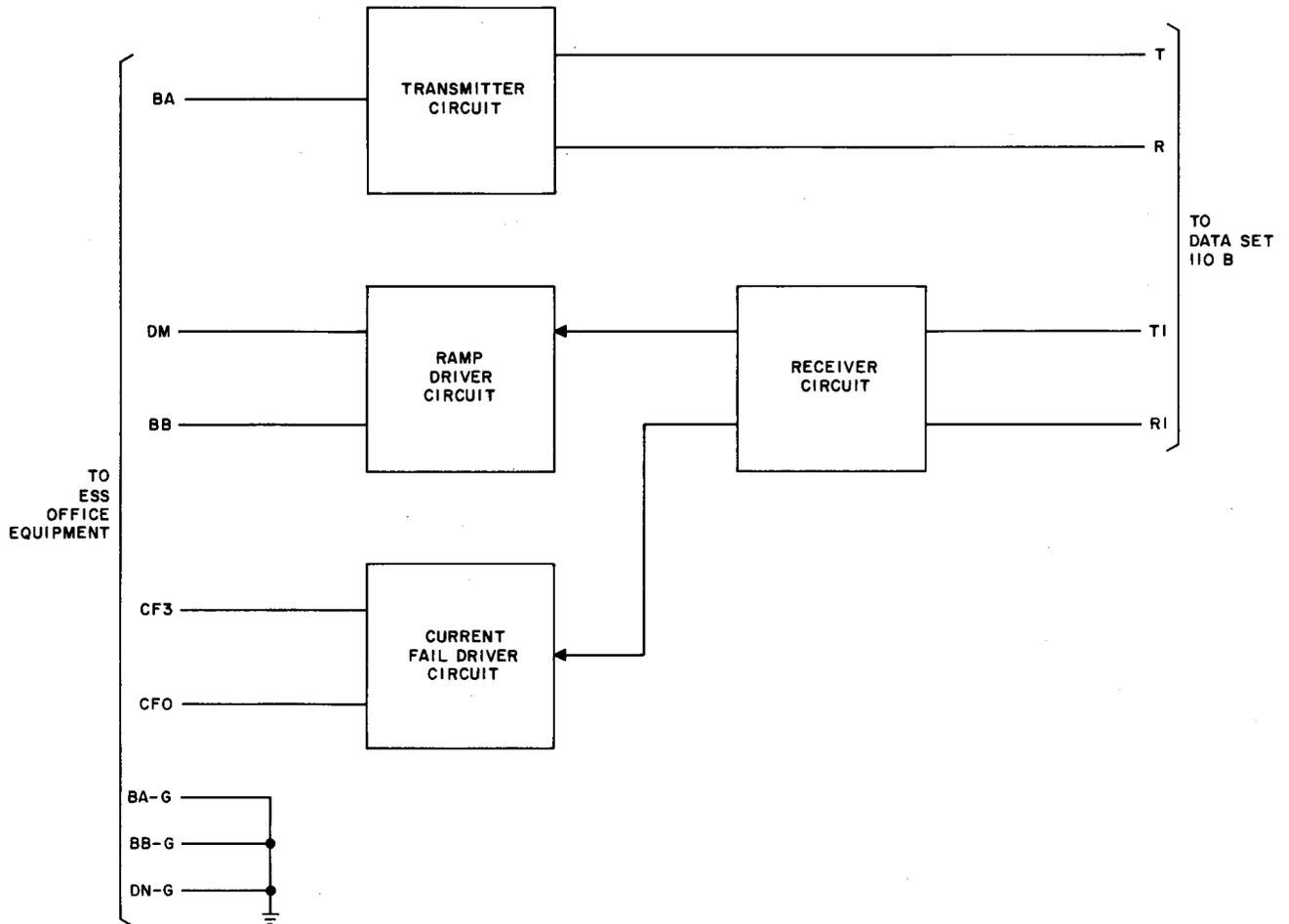


Fig. 5—Data Set 110C, Block Diagram

3.06 The Data Set 110C is equipped with a current fail driver circuit which operates a ferrod in the master scanner of No. 1 ESS-ADF office. When the receiver circuit recognizes a current failure on the receive loop, a ground level signal is applied to the ramp driver circuit and to the current fail driver. This causes the current fail driver to cut off and open the path of the ferrod. With the current path of the ferrod via leads CF3 and CF0 opened, the master scanner in the ESS office recognizes this as an alarm condition. Each data set (mounted in the Short Link DC Data Set Frame shown in Fig. 3) will be connected to an individual ferrod circuit in the master scanner equipment.

3.07 The output of the Data Set 110C which is applied to the DCAD via the BB lead can also be applied to the Automatic Data and Channel

Test Frame (ADACT) in the No. 1 ESS-ADF office via the DM lead. The ADACT is located where the personnel of the No. 1 ESS-ADF office can measure the distortion of the received data from the CSTC. Refer to 2.06 for the connection between the data set and the ADACT.

3.08 To make a distortion measurement on the received data information of any Data Set 110C, the ADACT operates only the M relay of the shelf where the data set is located. The distortion measurement reading on the received data information can now be made at the ADACT.

4. REFERENCES

4.01 For additional information on the Data Set 110C and associated equipment, refer to the documents listed in (1) through (9).

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- (1) SD-70947-01 (Data Set 110C, Schematic Diagram)
- (2) CD-70947-01 (Data Set 110C, Circuit Description)
- (3) Bell System Practice 312-803-100, (Data Set 110B, Description)
- (4) SD-3A011-01 (No. 1 ESS-ADF, Short Link DC Data Set Frame Circuit, Schematic Diagram)
- (5) CD3A011-01 (No. 1 ESS-ADF Short Link DC Data Set Frame, Circuit Description)
- (6) J8A011A-1 (Short Link DC Data Set Frame Specifications for No. 1 ESS-ADF)
- (7) CD3A018-01 (No. 1 ESS-ADF Automatic Data and Channel Test Frame, Circuit Description)
- (8) CD 1A209-01 (No. 1 ESS, Master Scanner Frame, Circuit Description)
- (9) CD3A004-01 (No. 1 ESS-ADF Delay Character Assembler and Disassembler, Circuit Description)