DATA AUXILIARY SET 811C

DESCRIPTION

1. GENERAL

1.01 This section gives a physical description of the central office mounted plug-in Data Auxiliary Set 811C. The section also describes the operation of the data auxiliary set, its function, and the relationship of the equipment to other components in the system. The Data Auxiliary Set 811C is shown by Fig. 1.

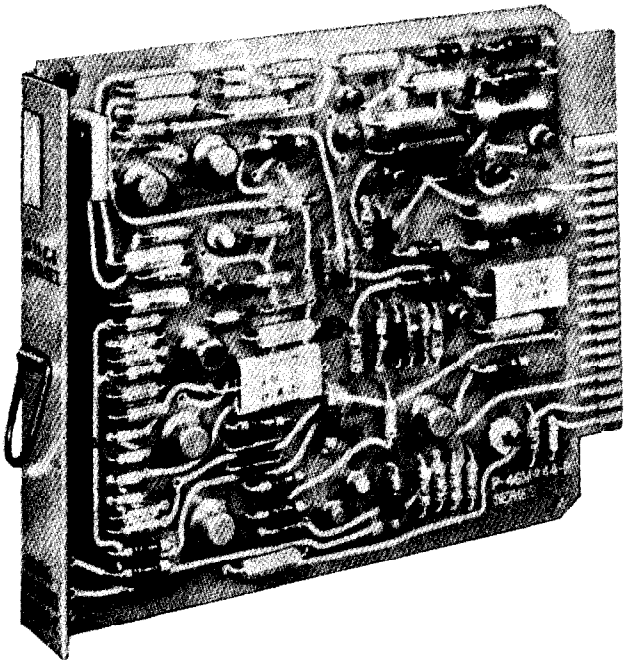

Fig. 1—Data Auxiliary Set 811C

1.02 The Data Auxiliary Set 811C is used in conjunction with Data Sets 108B and 109B. It provides the required interface between these data sets and the hub circuit of a No. 2, No. 9B, or DOTC Serviceboard for data transmission at speeds up to 150 bauds. Refer to Fig. 2 for a block diagram of the system showing the relationship of the units.

1.03 The dc hub voltages, representing data received from other stations, are fed to the Data Auxiliary Set 811C which has the following functions:

(1) The 811C provides a means for converting outgoing No. 2 type high-voltage hub signals into low-voltage dc signals for driving loop Data Set 108B or 109B.

(2) The 811C provides a means for converting the incoming low-level dc signals from the loop Data Set 108B or 109B into high-voltage dc signals suitable for driving the hub.

(3) The 811C provides a directional control circuit which prevents signal loop-around when the half-duplex mode of operation is used by the Data Set 108B.

(4) The 811C provides a means for a carrier fail signal from the 108B or 109B to actuate an alarm signal, to hold the hub marking or spacing (depending on whether the mark or space option is used), and upon receipt of carrier (i.e., cessation of carrier fail signal), to return to the normal operating condition.

1.04 In addition to the ground and power connections, the Data Auxiliary Set 811C sends and receives the following signals as indicated by Table A.

1.05 The Data Auxiliary Set 811C is designed to operate satisfactorily within the environmental condition ranges specified below:

Ambient Temperature Range: 40 to 120°F

Relative Humidity Range: 20 to 95 percent

1.06 The Data Auxiliary Set 811C requires power sources of +24 ±2 volts, -24 ±2 volts, -48 ±4 volts, and -130 ±5 volts. The regular central office batteries are satisfactory for these requirements.

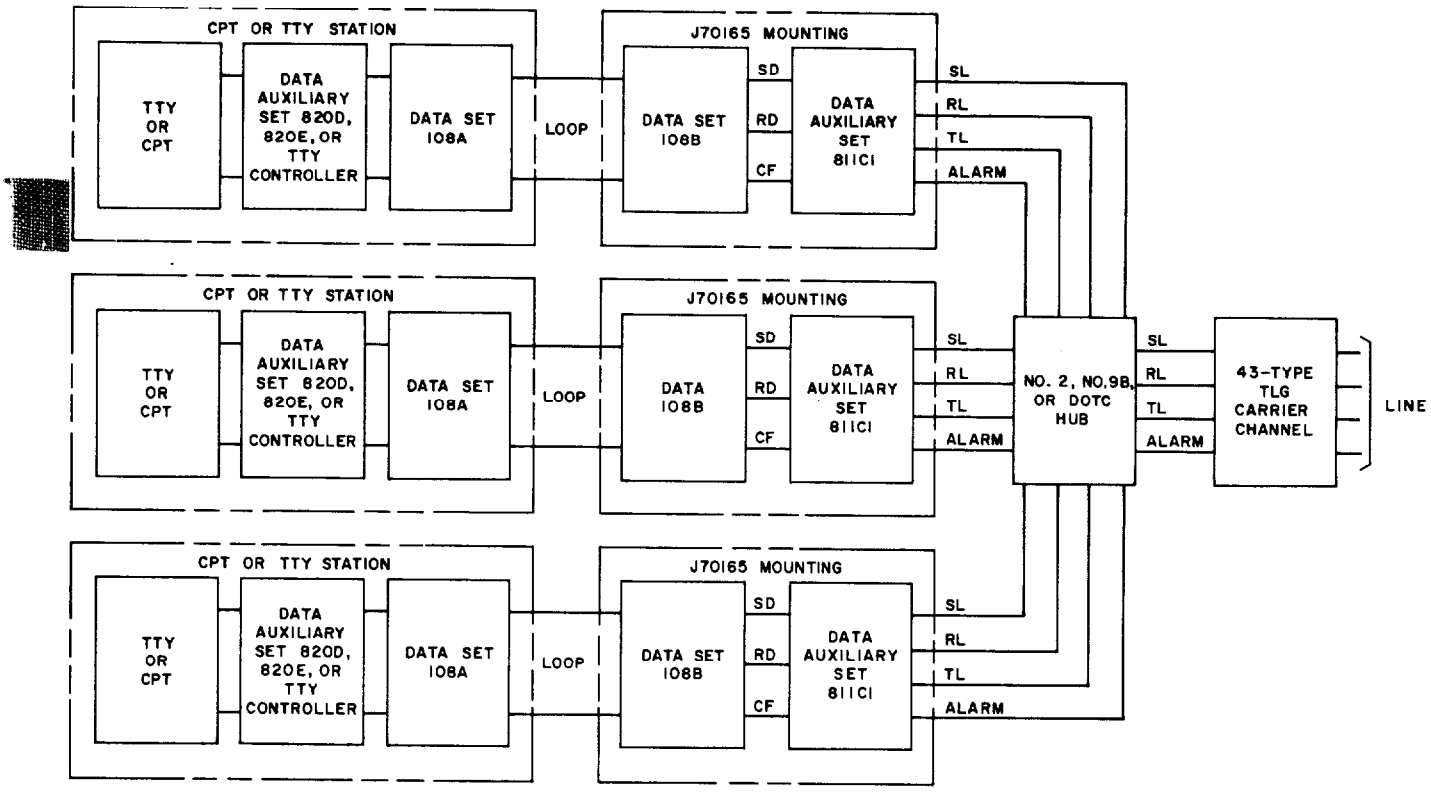

Fig. 2—System Block Diagram

TABLE A

CONNECTION		LEAD DESIGNATION	SIGNAL
FROM	TO		
Hub	811C1	SL	+60 volts represents a mark −30 volts represents a space −60 volts (hub simultaneously receiving a spacing signal from two or more stations)
811C1	Hub	RL	+60 volts represents a mark −30 volts represents a space
		TL	Provides a circuit for operation of the hit indicator lamp circuit
		ALARM	Provides a circuit for operation of the alarms upon loss of carrier
811C1	108B or 109B	SD	+24 volts represents a mark Ground represents a space
108B or 109B	811C1	RD	Ground represents a mark −24 volts represents a space
		CF	+24 volts applied to lead when carrier or line current is received at an acceptable level Small negative voltage applied to lead when carrier or line current is below an acceptable level or has failed

1.07 The Data Auxiliary Set 811C can be operated in either the half-duplex or full-duplex mode. A screw switch is provided to allow selection of the required operating mode when half-duplex hubs are used.

> ***Note:*** When two full-duplex hubs are used, the switch may remain in the half-duplex position since the directional control logic is automatically disabled by the signal voltages used on full-duplex hubs.

2. PHYSICAL DESCRIPTION

2.01 The Data Auxiliary Set 811C is a printed circuit board that is designed to be mounted in a J70165A-1 Mounting Panel along with a Data Set 108B or 109B. Refer to the section entitled Data Set 108B, Description (312-800-100) for additional information on the 108B. Refer to the section entitled Data Set 109B, Description (312-802-100) for additional information on the 109B. Fig. 3 shows the J70165A-1 Mounting Panel.

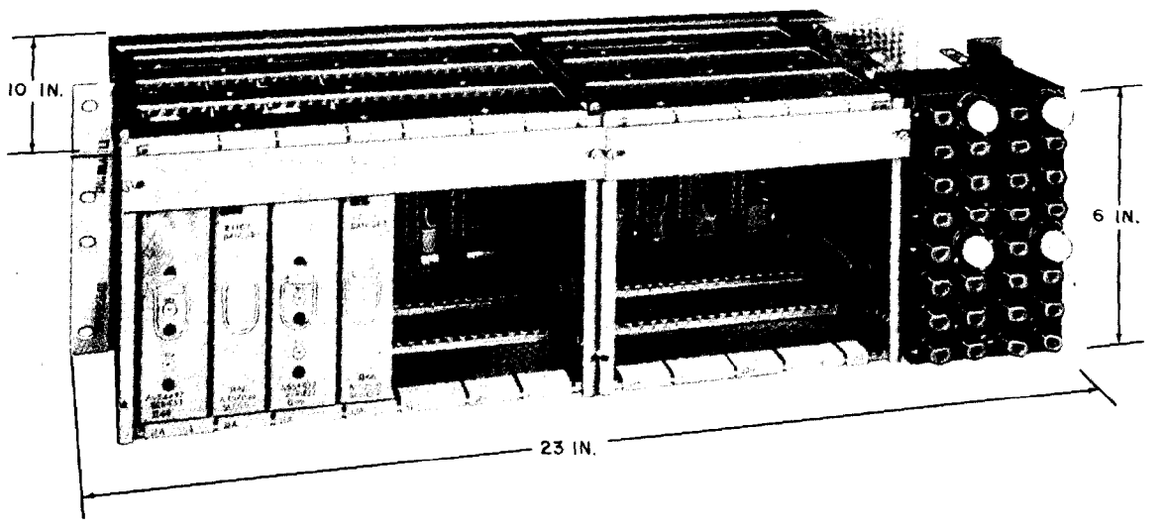

Fig. 3—J70165A-1 Mounting Panel for Six Data Sets 108B or 109B and Six Data Auxiliary Sets 811C

2.02 The J70165A-1 Mounting Panel, in addition to holding the printed circuit boards (108B or 109B and 811C), provides the required connections for the data sets and data auxiliary sets.

3. FUNCTIONAL DESCRIPTION

3.01 The Data Auxiliary Set 811C is essentially a two-channel unit which transmits both to and from the hub and the data set. A functional block diagram of the 811C is given by Fig. 4.

3.02 Data signals are supplied from the hub to the 811C via the SL lead and are transmitted to the 108B or 109B via the SD lead. In order to drive the 108B or 109B without materially loading the hub, three transistor stages are connected between the SL lead from the hub and the SD lead to the connecting data set. These stages make up the driver circuit shown on the block diagram.

3.03 A +60 volt mark signal applied to the SL lead causes a +24 volt (mark signal) output to be applied on the SD lead. The driver circuit is held marking, regardless of the send hub condition, when the directional control circuit applies a positive input signal.

3.04 When no positive input from the directional control circuit is present and the hub furnishes a -30 volt space signal, the SD lead transmits a space which is a zero voltage condition (ground applied) on the SD lead.

3.05 The directional control circuit is provided to prevent the 811C from receiving its own signals back from the hub when in the half-duplex mode of operation. Two input signals are required to perform this function. One input is supplied from a delay circuit which has as its input the signals on the RD lead from the 108B or 109B. The second input is supplied by the linear amplifier and slicer circuit which is connected to the RL lead.

3.06 The directional control is a flip-flop circuit which generates an output based on the condition of the two input signals. The output of the delay circuit is used as one input, and the linear amplifier is used as the second input. Table B shows the operation or output condition of the directional control circuit lead for the various combinations of input lead conditions. For information on the two inputs supplied to the directional control circuit, refer to the following text on the delay circuit and the linear amplifier and slicer circuit.

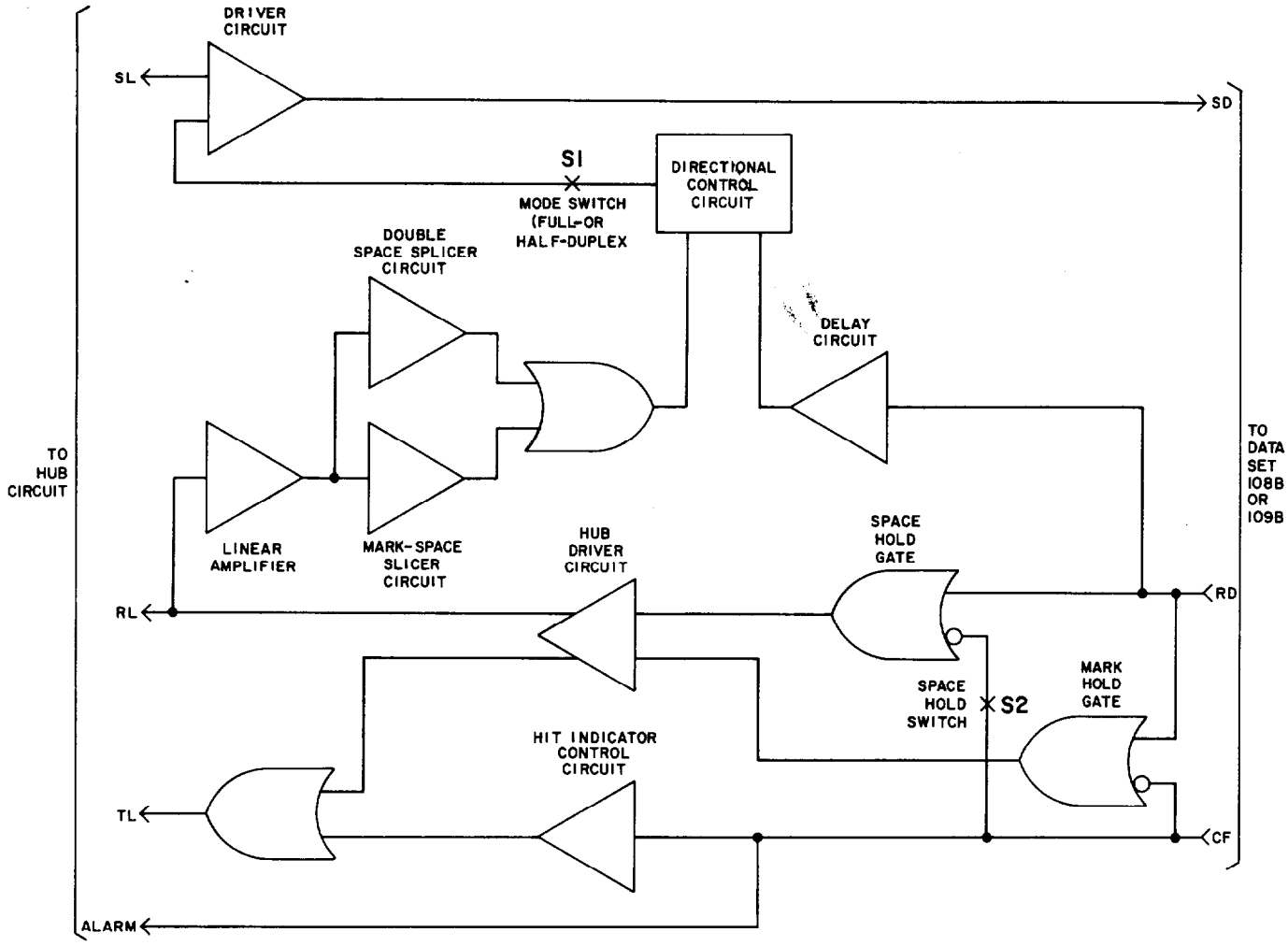

Fig. 4—Data Auxiliary Set 811C, Functional Block Diagram

3.07 The delay circuit is necessary to blank out undesired spacing pulses, which might reach the SL lead, due to the stray capacity between the hub and ground that delays the hub signal transitions.

3.08 The delay circuit is a two-stage switching arrangement which receives a mark (ground) or space (-24 volts) from the RD lead. A space signal causes a negative input signal to be applied to the directional control circuit. When a mark signal is received, a discharging capacitor in the delay circuit delays the space to mark transition. After the capacitor has discharged, the space to mark transition is made and a ground is applied on the directional control input lead.

3.09 In order to operate properly, the directional control circuits require an input from the RL lead. This signal is provided by the linear amplifier and slicer circuit. The input circuit is a very stable high impedance linear amplifier which is necessary to minimize loading of the hub. The linear amplifier feeds a slicer circuit. The output of the slicer is gated through a level shifter diode and is supplied as the input to the directional control circuit.

3.10 When a mark on the RL lead is received by the linear amplifier, the output to the slicer circuit is a ground applied to the directional control circuit input. The directional control circuit interprets the ground as a mark signal. When a

TABLE B

INPUT TO DIRECTIONAL CONTROL CIRCUIT		OUTPUT FROM DIRECTIONAL CONTROL CIRCUIT TO DRIVER CIRCUIT
RD LEAD	RL LEAD	
Space	Space	Positive voltage applied to driver circuit to clamp output on SD lead to marking.
Space	Double Space	Driver circuit unclamped as no voltage is applied by directional control circuit.
Mark	Space	Driver circuit unclamped as no voltage is applied by directional control circuit.
Mark	Mark	A mark on both leads will not change the output state of the directional control circuit. Therefore, either a clamped or unclamped condition may exist.

space signal is applied on the RL lead, a small negative voltage (approximately -8.0 volts) is applied to the directional control circuit. A double space signal results in -24 volts being applied to the directional control circuit.

3.11 In order to convert the signal received from the data set to a signal suitable for driving the hub and operating the hit indicator circuit, a hub driver circuit using inputs from both the RD and CF leads is used.

3.12 When a space signal (-24 volts) is received at the input of the hub driver circuit and a carrier fail signal is not present, the hub driver circuit conducts which causes the hub to go spacing. This current flow also causes the hit indicator lamp on the serviceboard to light. A mark signal holds the hub driver circuit in the off condition. This is a no current flow condition and the hub assumes its +60 volt marking condition unless current is drawn from the hub by another 811C.

3.13 When no carrier fail signal is present, the hub driver circuit follows the signals on the RD lead. The absence of the carrier fail signal also prevents an alarm signal from being generated. When carrier fail is experienced or when the level of the carrier drops below the predetermined value, a negative voltage is presented on the CF lead which causes the following conditions:

(1) The input to the hub driver circuit is held at ground regardless of the signal on the RD lead. This results in a mark condition at the hub when the mark hold option is provided, or a spacing condition when the space hold option is installed.

(2) The alarm circuit can be used to actuate visual and audible alarms when connected to suitable equipment.

(3) The hit indicator circuit lamp lights.

As indicated, the loss of carrier or a carrier level below the permissible value causes the hub driver circuit to send the preselected mark or space (depending on which option is installed) and operates the alarm circuits.

4. REFERENCES

4.01 For additional information on the Data Auxiliary Set 811C and the associated equipment, refer to the documents listed as follows:

(1) SD-70963-01 (Data Auxiliary Set 811C, Schematic Diagram)

(2) CD-70963-01 (Data Auxiliary Set 811C, Circuit Description)

(3) SD-70942-01 (Data Set 108B, Schematic Diagram)

(4) CD-70942-01 (Data Set 108B, Circuit Description)

(5) SD-70944-01 (Data Set 109B, Schematic Diagram)

(6) CD-70944-01 (Data Set 109B, Circuit Description)

(7) Bell System Practice 312-800-100,Data Set 108B, Description

(8) Bell System Practice 312-802-100, Data Set 109B, Description.