DATA SET 403D-TYPE
MULTIPLE DATA SET STATION
DESCRIPTION AND OPERATION

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1. GENERAL

1.01 Data Set 403D-type is a low-speed parallel data set receiver designed to receive two-out-of-eight signals generated by a TOUCH-TONE® telephone and transmitted over the DDD network or private switched network facilities. Data Set 403D-type is used in multiple set installations, and is also the basic element in the Data Set 403E-type single set installation. These data sets supersede Data Set 403A-type, which is rated Manufacture Discontinued (MD). This section provides a physical and functional description of a typical multiple data set arrangement utilizing Data Set 403D-type, and describes the basic operation procedures for the multiple data set station. Information is also provided on the CALL DIRECTOR® telephone sets which may be used with the multiple data set station. A list of references which provide additional information on the components making up the data station is given in Part 5 of this practice.

1.02 This section is reissued for the following reasons:

- To show Data Sets 403D3, 5, and 7 rated Manufactured Discontinued (MD).
- To show Data Sets 403D9, 11, and 13 as the respective replacing data sets.
- To include new circuit packs (CPs) used in the current standard data sets, which provide for operation with ESS and on Unigauge loops, and meet the signal level constraints of FCC Tariff No. 263.
- To include a call origination and return-to-data feature. This requires a 1B3 Data Mounting instead of a 1B2 Data Mounting and a CP AR462 instead of the CP AR252. The 1B2 Data Mounting and CP AR252 are rated MD. This feature also requires a modified CALL DIRECTOR.
- To show CP AR250 rated A&M only.
- To show a 3A3 Data Mounting instead of the 3A2 Data Mounting, which is rated MD.
- To correct reference to Section 598-055-100.

Because many of the Data Sets 403D3, 5, and 7 (MD) are still in use in the field, information on these units is retained. Since this reissue constitutes a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 There is no standard multiple data set station using Data Set 403D-type, because a multiple station may consist of 4 to 16 receivers in a single cabinet with associated equipment. Two or more cabinets containing sixteen or less data sets each may be grouped to provide a multiple data station with a corresponding number of data sets (Fig. 1).

Note: The primary consideration when coupling Data Sets 403D-type together is the 31A Power Unit. This power unit operates 4 to 16 data sets. When there are eight or more data sets in a station, two power units may be used to minimize the chance of complete station failure. The station should be arranged to have each power unit operate with a minimum of four data sets.

Fig. 1—Typical Multiple Data Set 403D-Type Data Station

1.04 Table A provides a list of items which must be ordered for making either 8, 16, or 20 data set installations. Table A is to be used as a guide only; the job requirements will determine the number of data sets and related components for a given installation. A CALL DIRECTOR telephone set may be used in parallel with the Data Auxiliary Set 804K-type to provide a station for remote control functions of the multiple data set station. For instance, a CALL DIRECTOR will make control functions available to a clerk in a front office, while the multiple data station is located in another area. Refer to the section entitled Data Set 403D-Type Multiple Data Set Station—Installation and Connections (594-025-201) for installation instructions.

1.05 The multiple data station is designed to contain data set receivers with the same or different interfaces for the detection of coded information transmitted by a TOUCH-TONE telephone, Data Set 401-type, or any transmitter using the TOUCH-TONE 2-out-of-8 frequencies transmission code over the DDD telephone network, private switched facilities, or point-to-point private line. The various DS403D-type receivers and interface units used in a multiple receiver station are listed in Table B; the circuit pack complement for these receivers are listed in Table C. For more detailed information on the function of the data set, refer to the section entitled Data Set 403D-Type—Description (594-025-100).

1.06 Line control and normal telephone control functions for the multiple data set station are provided by Data Auxiliary Set 804K-type, which mounts on the front of the cabinet, or by a remote console.

1.07 The data station is designed for proper operation in an environment with an ambient temperature range of +40 to +120°F with a relative humidity range of 20 to 90 percent.

TABLE A

EQUIPMENT NEEDED FOR 403D-TYPE MULTIPLE DATA SET STATION

NUMBER OF COMPONENTS NEEDED FOR			COMPONENTS	FUNCTION
8 DATA SETS	16 DATA SETS	20 DATA SETS		
1	1	2	KS-20093-L1 Cabinet	Houses up to 16 data sets and associated components making up the multiple data set station.
1	1	2	KS-20093-L6 Half door	This panel encloses the bottom portion of the middle door when a Data Auxiliary Set 804K-type is used.
1	1 or 2	2 or 3	31A Power Unit	Supplies power for 4 to 16 data sets.
1	2	3	1B3 Data Mounting	Provides connectors for interconnecting the components of multiple data station.
8	16	20	Data Sets 403D9, 403D11, 403D13	These are the basic data sets (receiver) which make up the data station.
1	1	2	KS-20129-L1 Power Strip	This strip is mounted within the cabinet to distribute utility power within the cabinet (use is optional).
1	1	1	KS-15900-L1 Interrupter	Provide flash and wink indications for all lamps associated with data station.
1 to 3	1 to 3	1 to 6	400D Key Telephone Unit	Provides hold functions and flashing and winking lamp indications for service and auxiliary lines.
1	1	2	Data Auxiliary Set 804K1 (Rotary Dial) or 804K2 (TOUCH-TONE Dial)	Provides line control and telephone communications for the data station.
2	4	5	KS-20093-L10A Mounting Plate	Provides mounting of the customer interface connector.
11	9	21	KS-20093-L10B Mounting Plate	Blank panels for unused interface connector spaces.
8	16	20	M50H Cord 6 ft long	Provides control and data connections between 1B3 Data Mounting and the data set.
1	1 or 2	2 or 3	M8H Cord 10 in. long	Provides connections from the 1B3 Data Unit to the 31A Power Unit.
1	1	2	M50G Cord 6 ft long	Provides connections between the 1B3 Data Unit located at front of the data cabinet and Data Auxiliary Set 804K-type.

TABLE A (Cont)

NUMBER OF COMPONENTS NEEDED FOR			COMPONENTS	FUNCTION
8 DATA SETS	16 DATA SETS	20 DATA SETS		
1	3	4	M50G Cord 18 ft long	Provides connections between the 1B3 Data Unit located at the rear of data cabinet and Data Auxiliary Set 804K-type. It also connects the telephone lines to the 1B3 Data Mounting.
—	1	1	M15F Cord 5 ft long	Provides interconnections of two 1B3 Mounting within one cabinet.
—	—	1	M15F Cord 15 ft long	Provides connection for interconnecting two 1B3 Data Mountings between two separate cabinets.
—	1	1	M8H Cord 3 ft 6 in. long	Provides power connections between two 1B3 Data Mountings in the same cabinet when a single 31A Power Unit is used.
8	16	20	M7P Cord 6 ft 6 in. long	Supplies power to each data set.
1	1	2	M50F Cord 6 ft long	Provides connection between Data Auxiliary Set 804K-type and the 1B3 Data Mounting located at front of cabinet.
—	1	1	M50F Cord 18 ft long	Provides connection between Data Auxiliary Set 804K-type and the 1B3 Data Mounting located at rear of cabinet.
1	1 or 2	2 or 3	P-40J328 Power Cord	Provides utility power to the 31A Power Unit, one per 31A Power Unit.
Note: The following equipment is required to provide line control through the use of a 630D2, 1630-D2, or 2630D2 CALL DIRECTOR remote from the multiple data station. The specified equipment is for a 16-data-set station only. Stations with more or less than 16 data sets may be locally engineered using the information provided in the section entitled Data Set 403D-Type Multiple Data Set Station—Installation and Connections (594-025-201).				
—	1	—	630D2, 1630D2, or 2630D2 CALL DIRECTOR	Provides circuitry for line control functions.
—	1	—	A75A Connector Cable (varying lengths as required)	Must be locally engineered for connection between CALL DIRECTOR and the 6683-50 Connecting Blocks.
—	2	—	66B3-50 (or equivalent) Connecting Block	For connection between data set and CALL DIRECTOR.
—	1	—	M50G Cord—6, 9, or 18 ft long	Interconnects 1B3 Data Mounting and the A25B Connector Cable.
—	1	—	A25B Connector Cable (single-ended)	Interconnects M50G Cord and the 66B3-50 Connecting Blocks.

TABLE B

DATA SETS 403D-TYPE USED IN MULTIPLE RECEIVER STATION

DATA SET CODE	DATA UNIT SUPPLIED	CP SUPPLYING MULTIPLE RECEIVER CONTROL	TYPE OF INTERFACE PROVIDED
403D3 (MD) 403D9	15A1	AR252 (MD) AR462	2-out-of-8 Contact
403D5 (MD) 403D11	15A2	AR252 (MD) AR462	4-Level Binary Coded Matrix (EIA Voltage)
403D7 (MD) 403D13	15A3	AR252 (MD) AR462	Serial ASCII (EIA Voltage)

Note: These data sets are supplied with a P47M644 Adapter to fit 25-inch mounting space.

TABLE C

CIRCUIT PACK COMPLEMENT OF DATA SET 403D-TYPE BASIC RECEIVERS

USED IN DATA SET 403D-TYPE MULTIPLE RECEIVER STATION

DATA SET	CIRCUIT PACK USED							
	CONTROL UNIT	LINE CONTROL	OPTION BOARD	AGC	FILTER	GROUP LIMITERS	CHANNEL DETECTORS	TIMERS, DETECTOR
CURRENT STANDARD 403D9 403D11 403D13	AR462	AR422	AR461	AR249	755A	AR248	AR246 & AR247	AR245
RATED MD 403D3 403D5 403D7	AR252[1]	AR251[1]	AR250[2]					

Notes: 1. Rated MD

2. Rated A & M only

2. PHYSICAL DESCRIPTION

DATA RECEIVER 403D-TYPE

2.01 The basic building block of the Data Set 403D-type multiple data set station is the Data Set 403D-type receiver (Fig. 2). This set consists of a 3A3 Data Mounting, nine plug-in circuit packs installed in a basic receiver, and one of three interface couplers (Data Unit 15A1, 15A2, or 15A3).

2.02 The receiver is 23 inches long and weighs approximately 12 pounds. A 2-inch adapter is supplied with the data set for mounting it in a 25-inch rack.

2.03 For more information on the 15A1, 15A2, and 15A3 Data Units, refer to the section entitled 15A1, 15A2, and 15A3 Data Units—Identification (590-100-111).

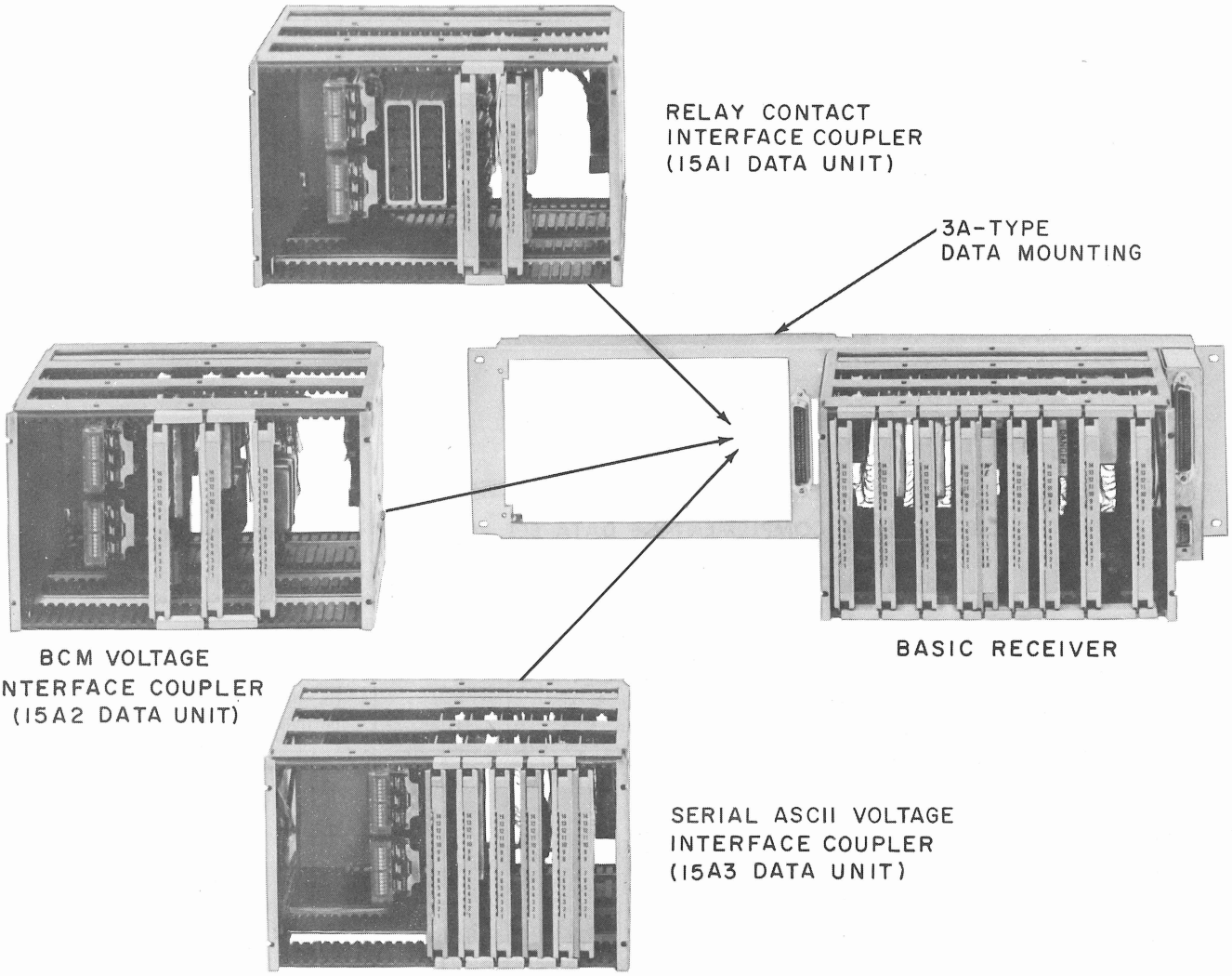


Fig. 2—Basic Receiver and Optional Coupler Units Which Make Up a Data Set 403D-Type

1B3 DATA MOUNTING

2.04 The 1B3 Data Mounting (Fig. 3) is a 25-inch panel which contains connectors, fuses, KTU equipment, a 31A Power Unit, and KTU mountings. It also contains jacks for distribution of power and for interconnecting the associated data sets, Data Auxiliary Set 804K-type, and other components making up the station.

2.05 One 31A Power Unit will supply power for 4 to 16 Data Sets 403D9 and 403D11 or 4 to 8 Data Sets 403D13.

2.06 For more information on the 1B3 Data Mounting, refer to the section entitled 1B-Type Data Mounting—Identification (590-102-101).

DATA AUXILIARY SET 804K-TYPE

2.07 Data Auxiliary Set 804K-type (Fig. 4) is a 48-button panel-type control unit which provides control for as many as 16 Data Sets 403D-type. This set also provides normal telephone service and line control for testing and maintaining the receivers of the multiple data set station.

2.08 The data auxiliary set is mounted on the front center door of the cabinet and contains connectors for interconnecting with the 1B3 Data Mounting(s).

2.09 For more information on Data Auxiliary Set 804K-type, refer to the section entitled Data Auxiliary Set 804K-Type—Identification (598-055-100).

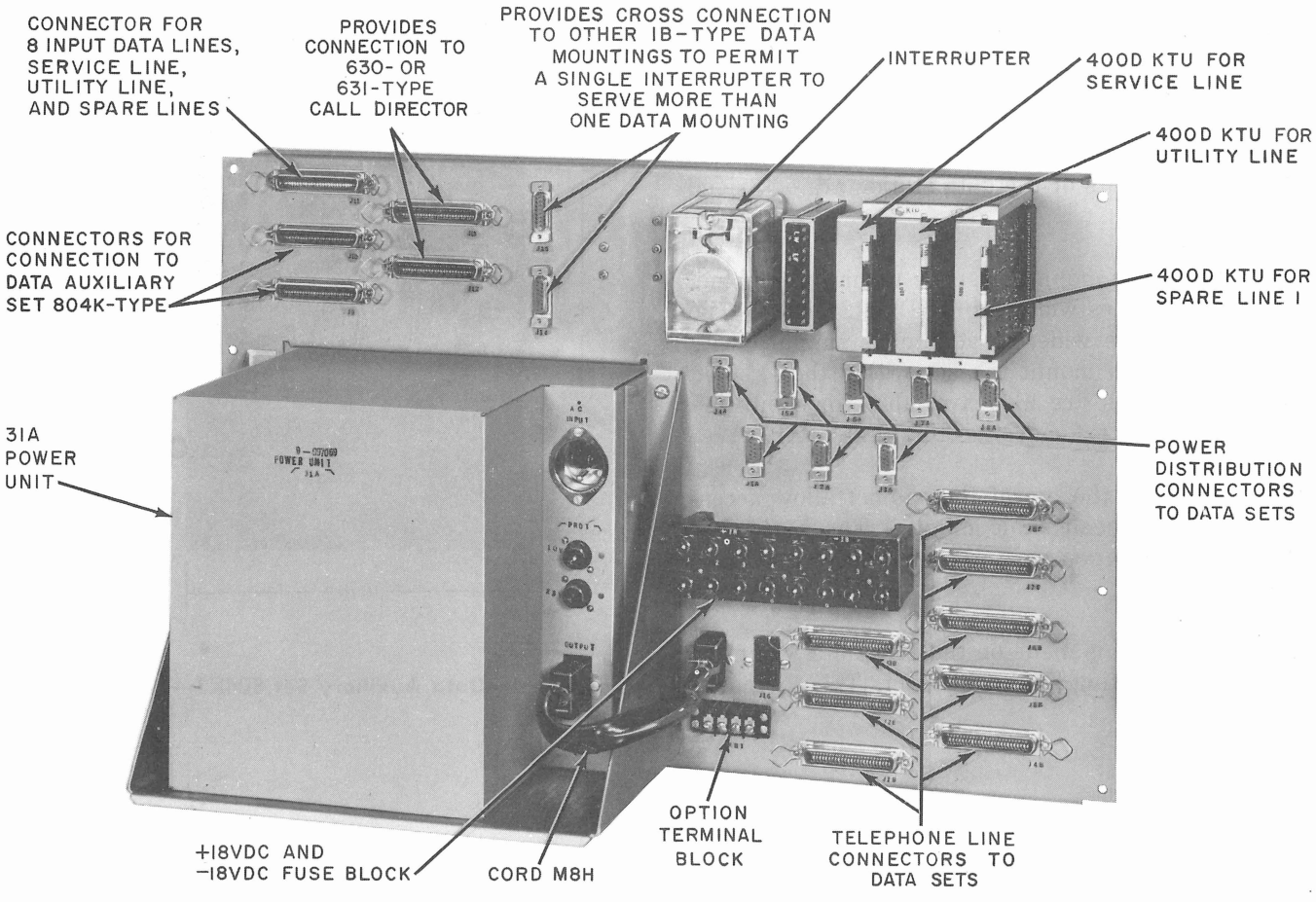


Fig. 3—1B-Type Data Mounting With Options and Features Incorporated

KS-20093-L1 CABINET

2.10 The multiple data set station is housed in a KS-20093-L1 cabinet with KS-20093-L6 half-door panel (Fig. 5). This cabinet is 30 inches wide, 30-1/2 inches deep, 74-1/4 inches high, and is designed to house as many as 16 data sets with associated equipment. The cabinet contains two compartments—a 25-inch section for mounting the receivers, and a 5-inch section for mounting the jacks for the customer interface.

2.11 The cabinet has mounting brackets arranged to accept eight receivers facing the front and eight receivers facing the rear. There are also cable brackets and cable channeling for dressing interconnecting cables. For more information on the cabinet, refer to the section entitled Data Sets—Multiple Installation Information (590-010-201).

MISCELLANEOUS

2.12 Cables required for interconnecting the various components of the data station are described in Table A.

2.13 Since the mounting space within the cabinet is 25 inches wide and the Data Set 403D-type is only 23 inches wide, an adapter is supplied with each data set to mount the set within the cabinet. Mounting plates are also available for mounting the customer interface connectors (Table A).

2.14 Holes at the top of the cabinet allow access for overhead cable inputs. The bottom of the cabinet is open to permit cable access from underneath.

2.15 Provision is made on the 1B3 Data Mounting for mounting KTU equipment. This equipment

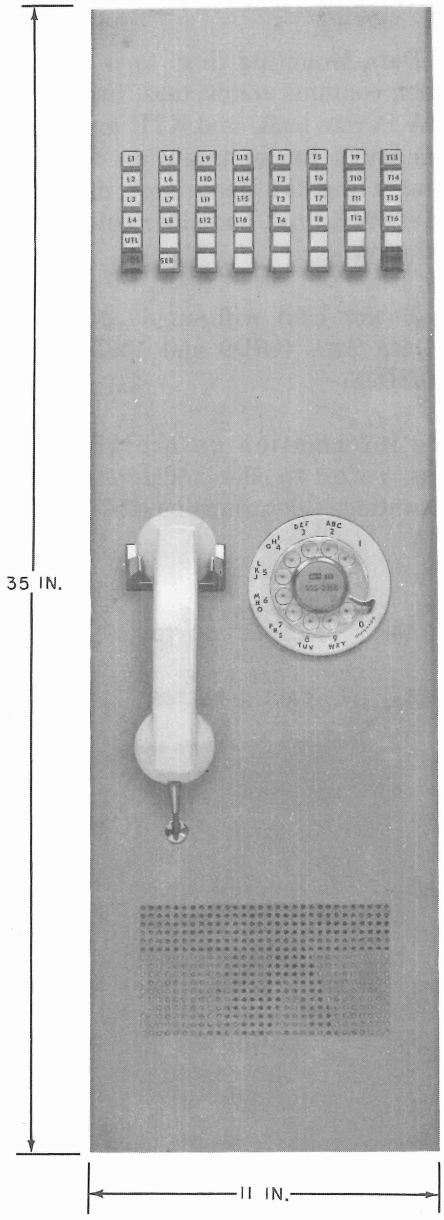


Fig. 4—Data Auxiliary Set 804K1—Front View

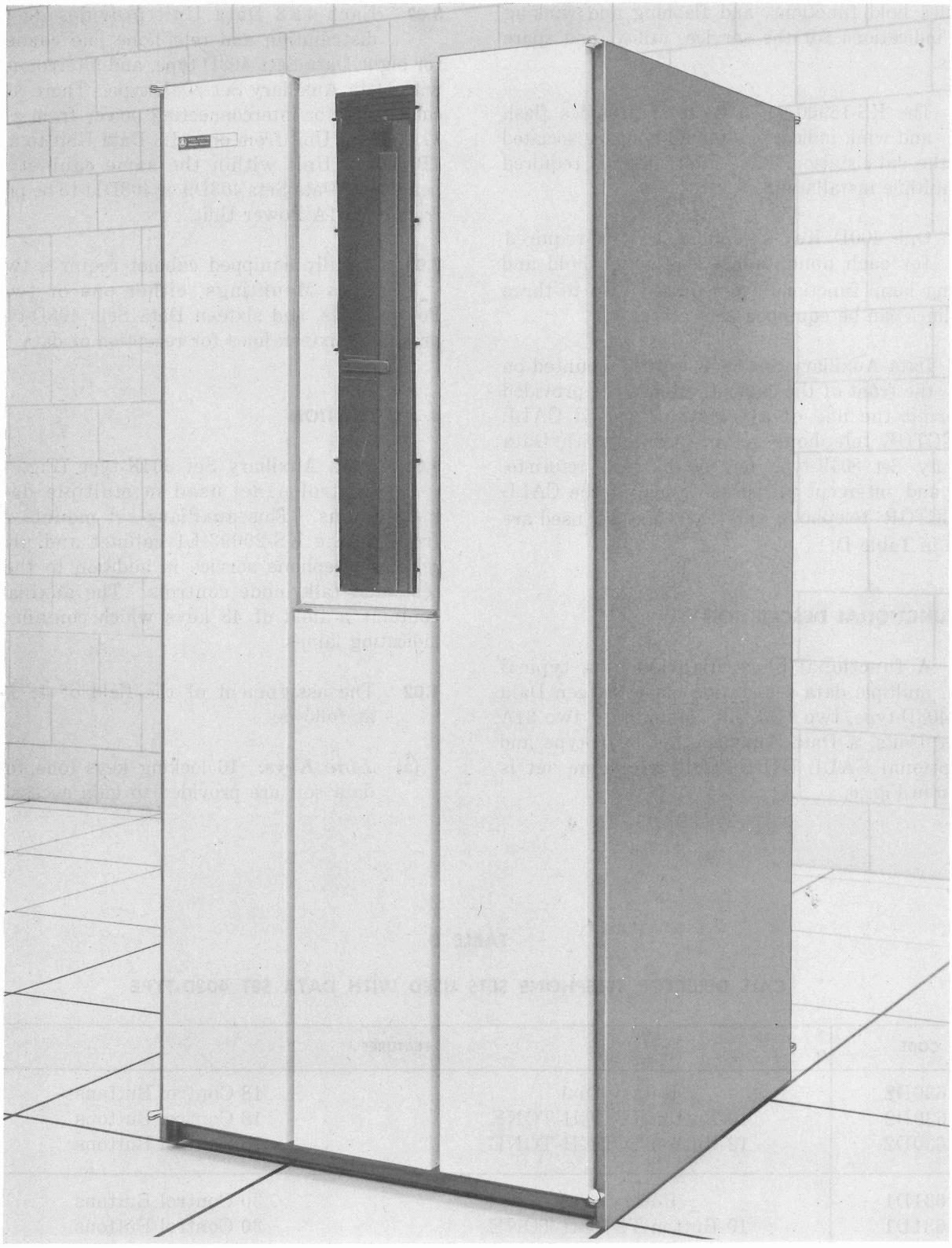


Fig. 5—KS-20093-L1 Cabinet—Front View With KS-20093-L6 Half-Door Panel Installed

provides hold functions, and flashing and winking lamp indications for the service, utility, and spare 1 lines.

2.16 The KS-15900-L1 interrupter provides flash and wink indications for all lamps associated with the data station. One interrupter is required per multiple installation.

2.17 One 400D Key Telephone Unit is required for each nondata line for which hold and flashing lamp functions are required. Up to three such lines can be equipped per cabinet.

2.18 Data Auxiliary Set 804K-type is mounted on the front of the cabinet. Means are provided to permit the use of a remotely located CALL DIRECTOR telephone set in parallel with Data Auxiliary Set 804K-type for control, test, return-to-data, and intercept purposes. Some of the CALL DIRECTOR telephone sets that may be used are given in Table D.

3. FUNCTIONAL DESCRIPTION

3.01 A functional block diagram of a typical multiple data set station using sixteen Data Sets 403D-type, two 1B3 Data Mountings, two 31A Power Units, a Data Auxiliary Set 804K-type and an optional CALL DIRECTOR telephone set is shown in Fig. 6.

3.02 Each 1B3 Data Unit provides dc power distribution and telephone line connections for eight Data Sets 403D-type, and interconnections with Data Auxiliary Set 804K-type. There are also connectors for interconnecting power from a single 31A Power Unit from one 1B3 Data Unit to another 1B3 Data Unit within the same cabinet. This permits 16 Data Sets 403D9 or 403D11 to be powered from one 31A Power Unit.

3.03 A fully equipped cabinet requires two 1B3 Data Mountings, either one or two 31A Power Units, and sixteen Data Sets 403D-type for providing sixteen lines for reception of data.

4. OPERATION

4.01 Data Auxiliary Set 804K-type (Fig. 4) is a control panel used in multiple data set installations. This auxiliary set mounts on the front of the KS-20093-L1 cabinet and provides regular telephone service in addition to the data, test, and talk mode controls. The auxiliary set contains a field of 48 keys which contain status indicating lamps.

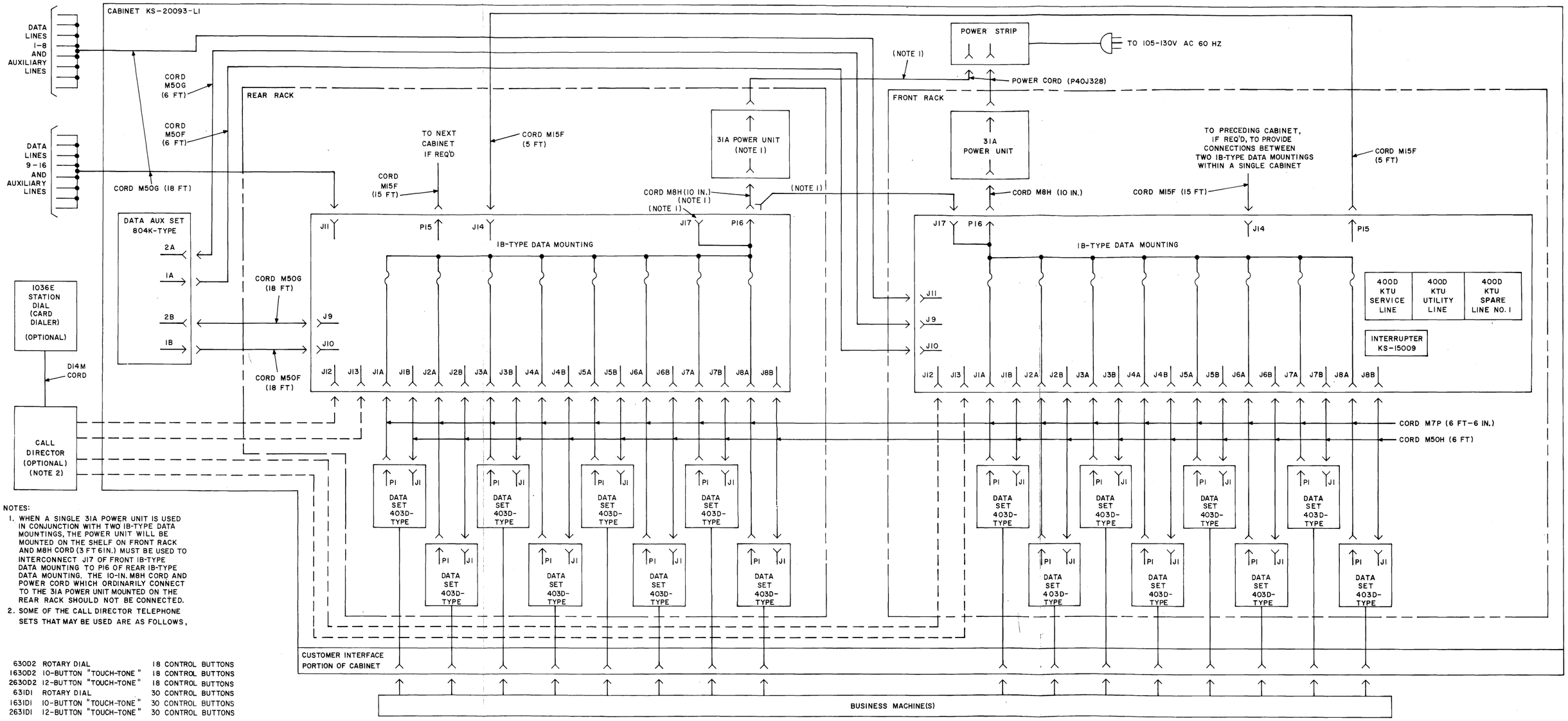
4.02 The assignment of the field of 48 keys is as follows:

(a) ***Line Keys:*** 16 locking keys (one for each data set) are provided to gain access to the

TABLE D

CALL DIRECTOR TELEPHONE SETS USED WITH DATA SET 403D-TYPE

CODE	FEATURES	
630D2	Rotary Dial	18 Control Buttons
1630D2	10-Button TOUCH-TONE	18 Control Buttons
2630D2	12-Button TOUCH-TONE	18 Control Buttons
631D1	Rotary Dial	30 Control Buttons
1631D1	10-Button TOUCH-TONE	30 Control Buttons
2631D1	12-Button TOUCH-TONE	30 Control Buttons



NOTES:

1. WHEN A SINGLE 31A POWER UNIT IS USED IN CONJUNCTION WITH TWO 1B-TYPE DATA MOUNTINGS, THE POWER UNIT WILL BE MOUNTED ON THE SHELF ON FRONT RACK AND M8H CORD (3 FT 6 IN.) MUST BE USED TO INTERCONNECT J17 OF FRONT 1B-TYPE DATA MOUNTING TO P16 OF REAR 1B-TYPE DATA MOUNTING. THE 10-IN. M8H CORD AND POWER CORD WHICH ORDINARILY CONNECT TO THE 31A POWER UNIT MOUNTED ON THE REAR RACK SHOULD NOT BE CONNECTED.
2. SOME OF THE CALL DIRECTOR TELEPHONE SETS THAT MAY BE USED ARE AS FOLLOWS,

630D2	ROTARY DIAL	18 CONTROL BUTTONS
1630D2	10-BUTTON "TOUCH-TONE"	18 CONTROL BUTTONS
2630D2	12-BUTTON "TOUCH-TONE"	18 CONTROL BUTTONS
631D1	ROTARY DIAL	30 CONTROL BUTTONS
1631D1	10-BUTTON "TOUCH-TONE"	30 CONTROL BUTTONS
2631D1	12-BUTTON "TOUCH-TONE"	30 CONTROL BUTTONS

Fig. 6—Data Set 403D-Type Multiple Data Set Station—Block Diagram

data lines and to indicate the status of the data set associated with each line.

(b) ***Test Keys:*** 16 nonlocking keys (one for each data set) are provided to transfer a data set from its data line to the service line and to place the data set in the test mode. When the data set is transferred from its data line to the service line, the data line is made to appear busy to all incoming calls.

(c) ***Test Release:*** One key is provided to release any of the 16 data sets from the test mode.

(d) ***Service Line:*** One key is provided to supply ordinary telephone service for the station. Access to this line is gained by pressing the service line key and lifting the handset. There is one ringer in the data auxiliary set which normally is connected across the service line.

(e) ***Hold Key:*** One nonlocking releasing key is provided to supply the hold function for all lines (data, service, spare, and utility) which are so equipped. Release of the HOLD key releases the depressed line key. When a data line is placed in "hold," the lamp under the data key and also the hold key "winks." When the service, spare, or utility lines are placed in "hold," only the lamp associated with that line "winks."

(f) The utility and spare 1 keys are reserved for two extra lines to be connected to Data Auxiliary Set 804K-type as needed. External ringers and 400D KTUs must be supplied on these lines. There are 11 unused keys on the data auxiliary set.

4.03 When a CALL DIRECTOR telephone set is connected in parallel with Data Auxiliary Set 804K-type, the control keys on the telephone set should be designated the same as on Data Auxiliary Set 804K-type.

4.04 The customer business machine may or may not be arranged to control attendant intercept of the data lines. When the business machine requires control of line intercept, the proper option must be installed. An attendant can then interrupt a data line only after the business machine has operated the attendant lead.

4.05 If the data set contains the option for controlling line interface independent of the business machine, the attendant may accidentally interfere with data transmission. [Attendant control (Option E) is the only line intercept option available on ASCII output data sets.].

4.06 Ordinarily, the only time the attendant interrupts the line is during testing, or if the remote transmitting station needs information in addition to that which the business machine provides. In this case, the business machine, acting upon a special code or on its own initiative, turns on the attendant lead. The monitoring attendant recognizes this condition by observing a flashing line button on either the Data Auxiliary Set 804K-type, or the CALL DIRECTOR telephone set. The monitoring attendant answers by removing the handset and depressing the appropriate line button. The monitoring attendant may also select any idle data set and place it on the service line for testing.

4.07 Data set operation for a typical multiple data set installation is described in Table E and shown in Fig. 7.

TABLE E

TYPICAL OPERATION OF MULTIPLE DATA SET STATION USING DATA SET 403D-TYPE

STEP	OPERATION
1	Connection is established from A to B.
2	Ringing appears on line B.
3	Ringing is automatically tripped. A holding patch is connected across line B. LINE lamp on Data Auxiliary Set 804K-type, and/or 630D2, 1630D2, or 2630D2 CALL DIRECTOR lights steadily.
4	After 1.1 seconds, a 2025-Hz tone is transmitted for 0.57 or 1.25 seconds (B to A).
5	Business machine at station B is signaled that the data set at station B is ready to receive data.
6	Data is transmitted (A to B).
7	The connection may be released in one of the following ways: (a) At any time during a data call, the call can be terminated by opening Data Terminal Ready lead from the business machine. (b) If there is a conversation between customer A and B, all that is needed to terminate the call is for both parties to hang up. It is not possible to return to data without placing a new call. (c) If Data Set 403D13 is used, call may be terminated by sending a special code from A to B. *Note:* If operator A were to have need to converse with operator B, the business machine, acting on a special code transmitted from station A, signals station B by causing the LINE lamp on Data Auxiliary Set 804K-type and/or its remotely located associate, 630D2, 1630D2, or 2630D2 CALL DIRECTOR at station B, to flash. The attendant at station B observes this, lifts handset, depresses flashing LINE lamp which then becomes a steady light, and speaks to operator A. This is true for Data Sets 403D9 and 403D11 and is not true for Data Set 403D13.

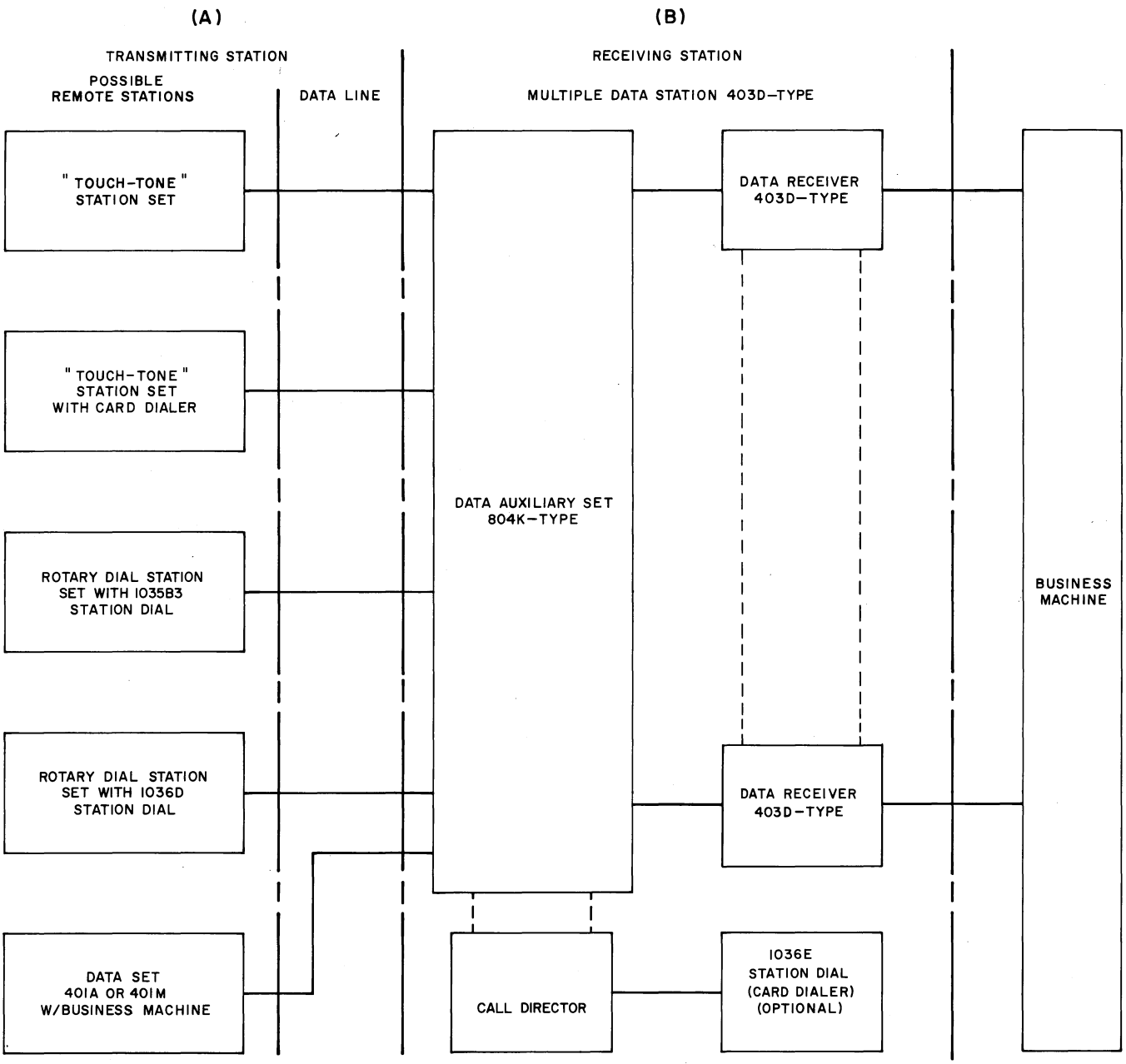


Fig. 7—Block Diagram of Data Set 403D-Type Multiple Data Set Station Operation

5. REFERENCES

5.01 Additional information on Data Set 403D-type and associated equipment may be found in the following documents:

590-004-106	Data Sets 403A-, D-, and E-Types—Reference Guide
590-010-200	Data Sets—General Installation and Connection Information
590-010-201	Data Sets—Multiple Installation Information
010-250-001	Crediting Charges on Test Calls
314-205-501	Data Systems—DATA-PHONE® Service on DDD Network—Test Requirements for Subscriber, Foreign Exchange, and Remote Exchange Lines
594-025-100	Data Set 403D-Type—Description
594-025-201	Data Set 403D-Type Multiple Data Set Station—Installation and Connections
502-630-100	Telephone Sets 630-, 1630-, and 2630- Series—General Purpose—Selection and Use (CALL DIRECTORS)
598-055-100	Data Auxiliary Set 804K-Type Identification
590-102-101	1B-Type Data Mounting—Identification
590-100-111	15A1, 15A2, and 15A3 Data Units—Identification
502-630-XXX	CALL DIRECTOR series
SD- & CD-1D130-01	Data Systems Station—Data Set 403D-Type Receiver Circuit
SD- & CD-1D135-01	Data Systems Station—1B-Type Data Mounting