

15A1, 15A2, AND 15A3 DATA UNITS IDENTIFICATION

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Because many of the Data Sets 403D3 through 8 (MD) are still used 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 Power for the 15A1, 15A2, and 15A3 Data Units is supplied by the associated DS 403D-type basic receiver.

1.04 The three data units are interface couplers which operate with a DS 403D-type basic receiver (Fig. 1) and couple the receiver to a business machine. The current standard and superseded DS 403D-type basic receivers and the associated 15A-type Data Units and their application are listed in Table A. The data units make it possible to use the same basic receiver with business machines requiring either a relay contact interface (15A1) (on a 2-out-of-8 code basis), a binary coded matrix (15A2) (BCM—a special 4-level binary code) Electronic Industries Association (EIA) voltage interface, or a serial, ASCII (American National Standard Code for Information Interchange), EIA voltage interface (15A3).

1. GENERAL

1.01 This section provides a physical and functional description of the 15A1, 15A2, and 15A3 Data Units, which are used with the Data Set (DS) 403D-type basic receiver. The 15A-type Data Units are interface couplers which couple the DS 403D-type basic receiver to a business machine. This section also discusses the application of the data units and provides a list of references for additional information on the data units and associated equipment.

1.02 This section is reissued for the following reasons:

- To show Data Sets 403D3, 4, 5, 6, 7, and 8 rated Manufacture Discontinued (MD).
- To show Data Sets 403D9, 10, 11, 12, 13, and 14 as the respective replacing data sets.
- To delete references to 17A-type Data Mountings.
- To show 3A2 Data Mounting rated MD and to show the 3A3 Data Mounting as the replacement.
- To replace Table B, which gave only the 15A2 Data Unit interface designations, with a new Table B showing 15A1, 15A2, and 15A3 Data Unit interface designations.

1.05 The data units provide the following features:

15A1 Data Unit

- Permits data set to interface with business machine on a relay contact closure basis with data information presented to business machine in a 2-out-of-8 code format
- Answer-back channel for signaling from receiver to transmitting station
- Voice answer-back channel permitting voice communication with transmitting station
- Provision for testing receiver remotely from data test center.

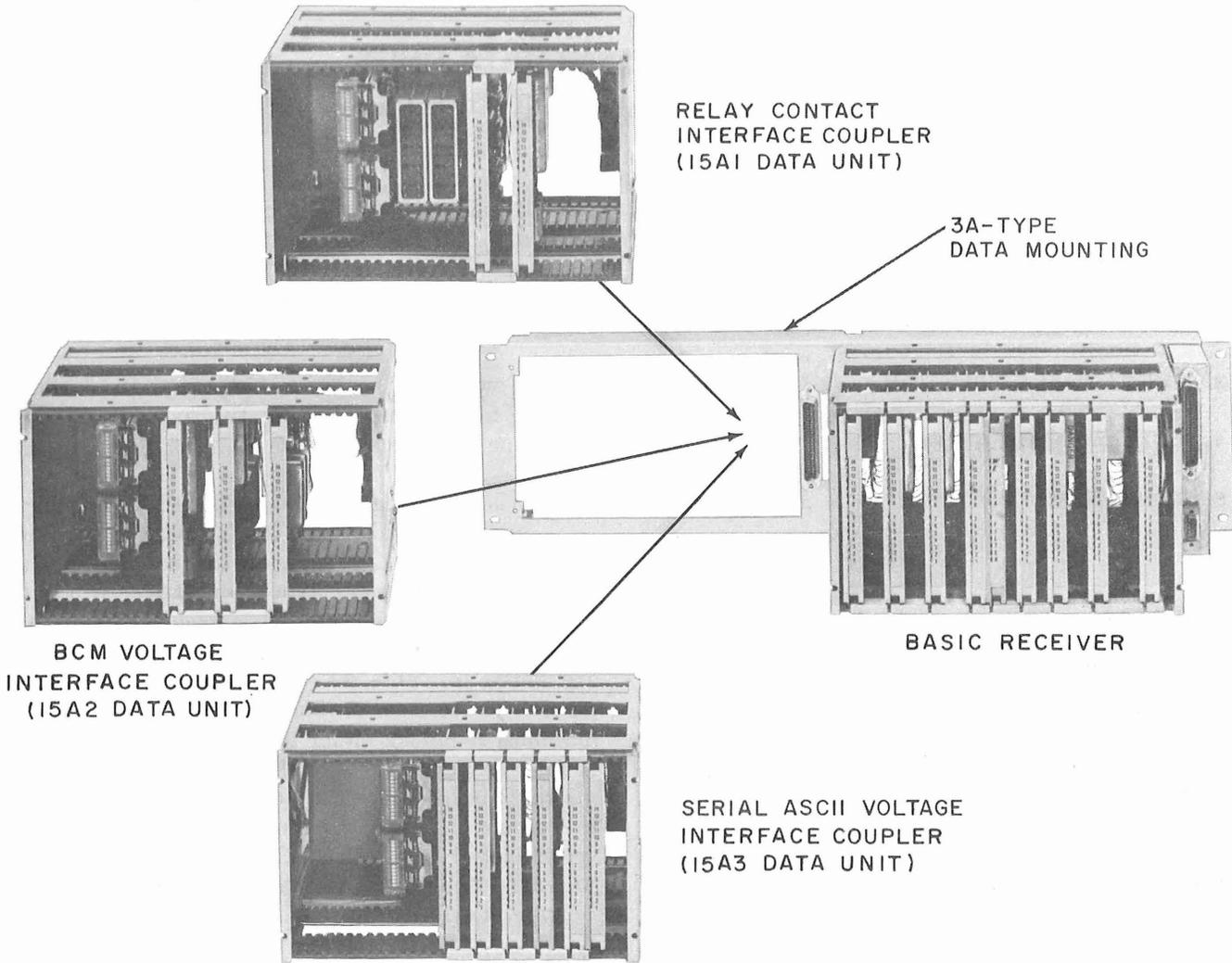


Fig. 1—Data Set 403D-Type Showing Three Related Interface Units

15A2 Data Unit

- Permits data set to interface with business machines on a BCM, EIA voltage basis
- Answer-back channel for signaling from receiver to transmitting station
- Voice answer-back channel for voice communication with transmitting station
- Provision for testing the receiver remotely from data test center.

15A3 Data Unit

- Permits data set to interface with business machines on a start-stop, serial, ASCII, EIA voltage basis
- Timed answer-back signals indicating that specific characters have been received
- Automatically terminates call when a specific character is received or when a specified period of inactivity has occurred (time out)

TABLE A
15A-TYPE DATA UNIT APPLICATION IN
DATA SETS 403D-TYPE

DATA SET CODE	DATA UNIT SUPPLIED	APPLICATION	TYPE OF PROVIDED INTERFACE
403D3 (MD) 403D9	15A1	Multiple Station Multiple Station	2-out-of-8 Contact
403D4 (MD) 403D10		Single Station Single Station	
403D5 (MD) 403D11	15A2	Multiple Station Multiple Station	4-Level Binary Coded Matrix (EIA Voltage)
403D6 (MD) 403D12		Single Station Single Station	
403D7 (MD) 403D13	15A3	Multiple Station Multiple Station	Serial ASCII (EIA Voltage)
403D8 (MD) 403D14		Single Station Single Station	

- Automatically presents a specific character to business machine at the beginning of each call to ensure message separation
- Provision for testing the receiver remotely from data test center.

1.05 The data units are designed for proper operation in an environment with an ambient temperature range of +40 to +120°F and a relative humidity range of 20 to 90 percent.

2. PHYSICAL DESCRIPTION

15A1 Data Unit

2.01 The 15A1 Data Unit (Fig. 2) consists of two circuit packs (CP AR254 and CP AR255) plugged into a frame. The frame also contains two AJ81 relays, two 293E relays, interconnecting wiring, a connector at the rear to mate with a connector on a 3A-type Data Mounting, and a 3-1/2 foot M25F cord with attached interface connector for connecting the unit to a business machine. Test points are provided on the circuit packs.

2.02 The 15A1 Data Unit measures 6 inches high by 10 inches wide by 7-1/2 inches deep and weighs about 5 pounds.

15A2 Data Unit

2.03 The 15A2 Data Unit (Fig. 3) consists of three circuit packs (CP AR255, CP AR285, CP AR284) plugged into a frame. The frame also contains two AJ81 relays, interconnecting wiring, a connector at the rear to mate with a connector of a 3A-type Data Mounting, and a 3-1/2 foot M25F cord with attached interface connector for connecting the unit to a business machine.

2.04 The 15A2 Data Unit measures 6 inches high by 10 inches wide by 7-1/2 inches deep and weighs about 6 pounds.

15A3 Data Unit

2.05 The 15A3 Data Unit (Fig. 4) consists of six circuit packs (CP AR286, CP AR287, CP AR288, CP AR289, CP AR290, CP AR291) plugged into a frame. The frame also contains two AJ81 relays, interconnecting wiring, and a 166A-type regulator which provides well regulated +5V dc for the integrated circuits in the data unit. The

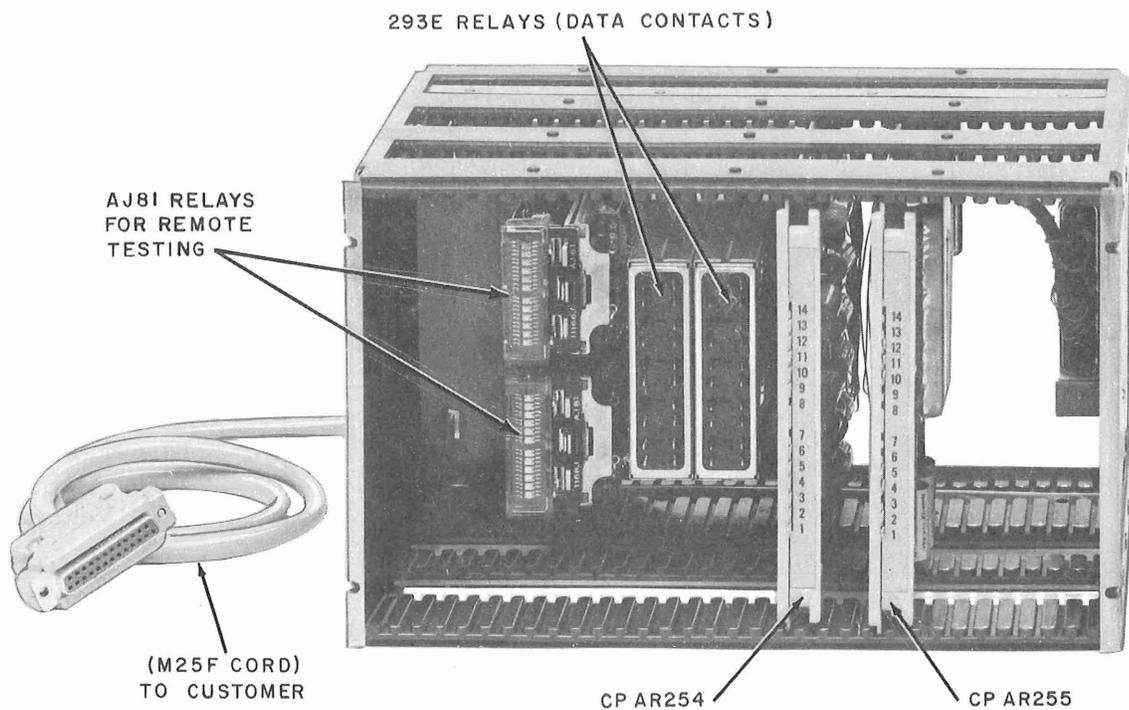


Fig. 2—15A1 Data Unit—Front View Components

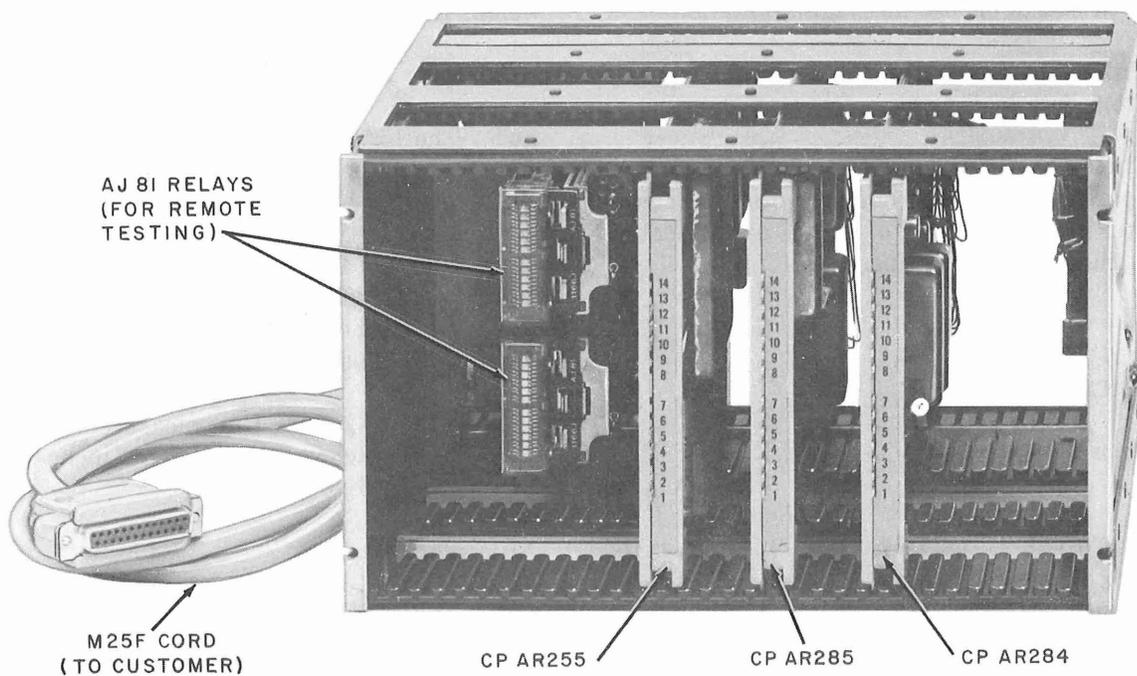


Fig. 3—15A2 Data Unit—Front View Components

regulator is protected by a 1/2-amp Littelfuse microfuse in its input lead. A connector is provided at the rear to mate with a connector of a 3A-type Data Mounting and a 3-1/2 foot M25F cord with attached interface connector for connecting the unit to a business machine.

2.06 The 15A3 Data Unit measures 6 inches high by 10 inches wide by 7-1/2 inches deep and weighs about 10 pounds.

3. FUNCTIONAL DESCRIPTION

15A1 Data Unit (Contact Interface Coupler)

3.01 Functionally, the 15A1 Data Unit consists of data relay circuitry, a voice answer-back limiter, an answer-back transmitter, remote test circuitry, and control function circuitry (Fig. 5).

3.02 Received data signals from the telephone line are detected and processed by the receiver, and dc signals are applied directly to dry-reed relays (one relay for each A-group and one relay for each B-group frequency). The relay

contacts are protected by 185A series RC networks. The output to the connecting business machine is a modified 2-out-of-8 code (one relay contact closure in each group) for data indications and a data carrier detector closure to signal ground for sampling and timing indications.

3.03 A voice-frequency input to the voice answer-back limiter couples a prerecorded or machine-generated voice signal to the data line. This input is amplitude-limited before it is sent through the basic receiver and then applied to the data line.

3.04 The answer-back transmitter generates three different frequencies (1017 Hz, 1785 Hz, and 2025 Hz), which when operated in a frequency shift keying mode at a rate up to 40 baud, provide signaling from the receiving station to the remote transmitting station. The answer-back transmitter can be used:

- To permit the receiving station to identify itself

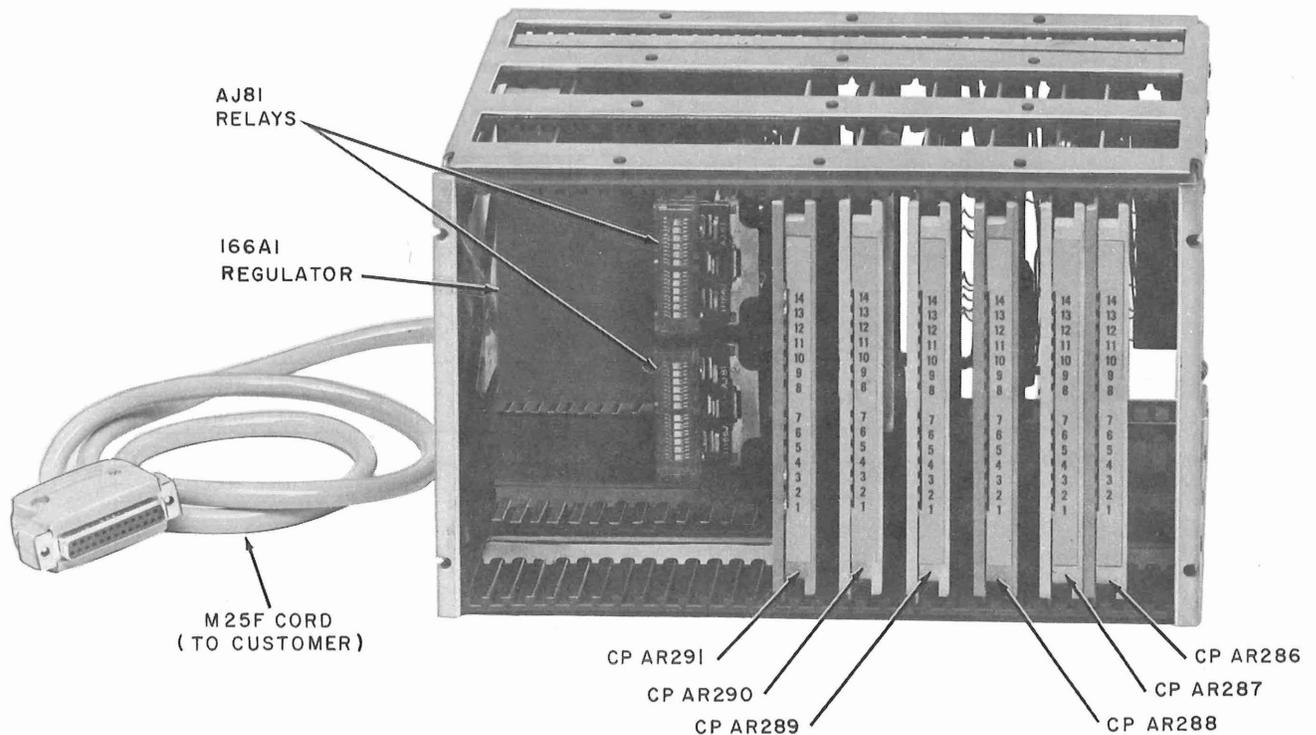


Fig. 4—15A3 Data Unit—Front View Components

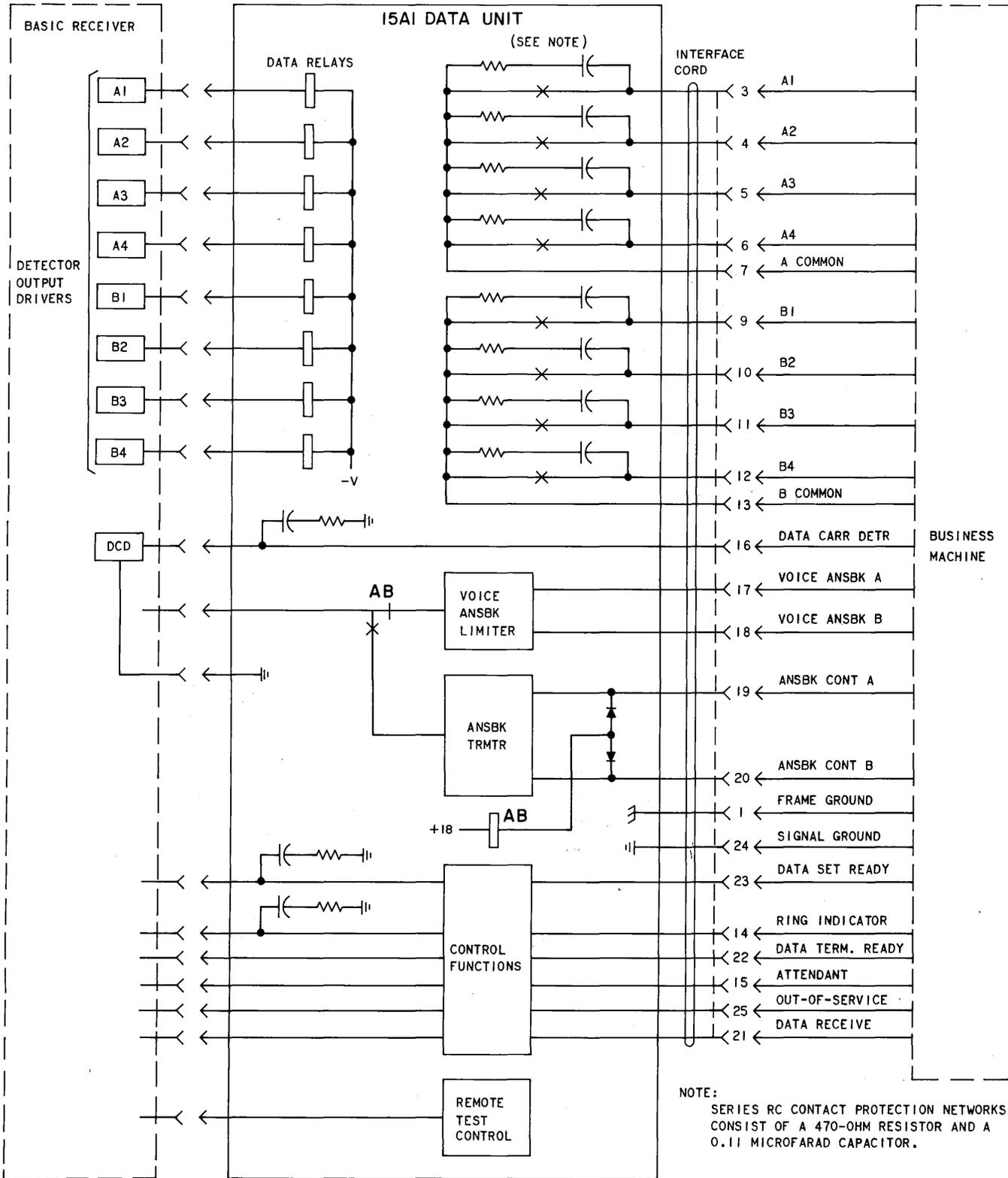


Fig. 5—15A1 Data Unit—Functional Block Diagram

- To indicate errors in received information
- To acknowledge error-free transmission.

3.05 The remote test control circuitry provides a means for testing the receiver from a data test center.

3.06 The input/output control functions, which operate in conjunction with the basic receiver, permit the data set to function as follows:

- (1) **Ring Indicator:** A signal ground indication is sent to the connecting business machine whenever 20-Hz ringing voltage appears at the input of the data set.
- (2) **Data Set Ready:** A signal ground indication is sent to the connecting business machine whenever the data set has answered a call and is ready to receive or transmit data.
- (3) **Data Terminal Ready:** A signal ground indication is received by the data set indicating that the business machine is ready to receive data calls.
- (4) **Attendant:** A signal ground indication is received by the data set from the business machine when a data call should be intercepted by an attendant at the business location.
- (5) **Out-of-Service:** The presence or absence (installer option) of a signal ground indication on this lead will make the data set appear busy to incoming calls.
- (6) **Data Receive:** The connecting business machine sends a signal ground indication on this lead to transfer the data set to the receive mode, or removes the ground indication to transfer the data set to the answer-back mode. Interface lead designations for all three 15A-type Data Units are given in Table B.

15A2 Data Unit—BCM Interface Coupler)

3.07 This data unit provides the same basic functions as the 15A1 Data Unit but provides these functions through a form of voltage interface. Data is presented using a BCM code (Fig. 6). The data carrier detector indication is transmitted after the data indications and may be used to sample

the data leads, permitting the detection of 0000 as a valid character.

3.08 The 15A2 Data Unit (Fig. 7) contains output drivers for control and data functions, a voice answer-back limiter, an answer-back transmitter, and remote test circuitry. The interface is voltage-controlled (except for the voice answer-back channel, which is a 600-ohm balanced input) and conforms where applicable to EIA Standard RS-232-B. The interface designations and terminal numbers are given in Table B. With the exception of receive data 1, 2, 3, and 4, and that ground indications are replaced by appropriate voltage indications, the functions are the same as explained for the 15A1 Data Unit.

15A3 Data Unit (ASCII Interface Coupler)

3.09 The 15A3 Data Unit (Fig. 8) contains code format translation circuits, a parallel-to-serial converter, function control circuits, an answer-back tone generator, and remote test circuitry. The interface connections are on a voltage basis and conform to EIA Standard RS-232-B.

3.10 The 15A3 Data Unit is capable of sending an answer-back tone when the TOUCH-TONE® star (*) or number sign signal (#) is received. The answer-back generator is not under customer control. It also can send a tone and terminate the telephone connection when a double number sign (##) is received.

3.11 The ASCII characters transmitted to the business machine for TOUCH-TONE star, number sign, and double number sign inputs are set by the installer according to the service order. The character chosen for the double number sign can be sent automatically to the business machine at the beginning of each call. The data set will put out the selected ASCII character for # on the first character of the ## sequence. For details on available options, refer to Sections 594-025-100 and 594-026-100.

3.12 After either 15 or 45 seconds of inactivity, the 15A3 is capable of sending the double number sign, sending an answer-back tone, and terminating the telephone connection.

3.13 The signal received from the data line and passed through the receiver is translated from 2-out-of-8 code format to ASCII format. It

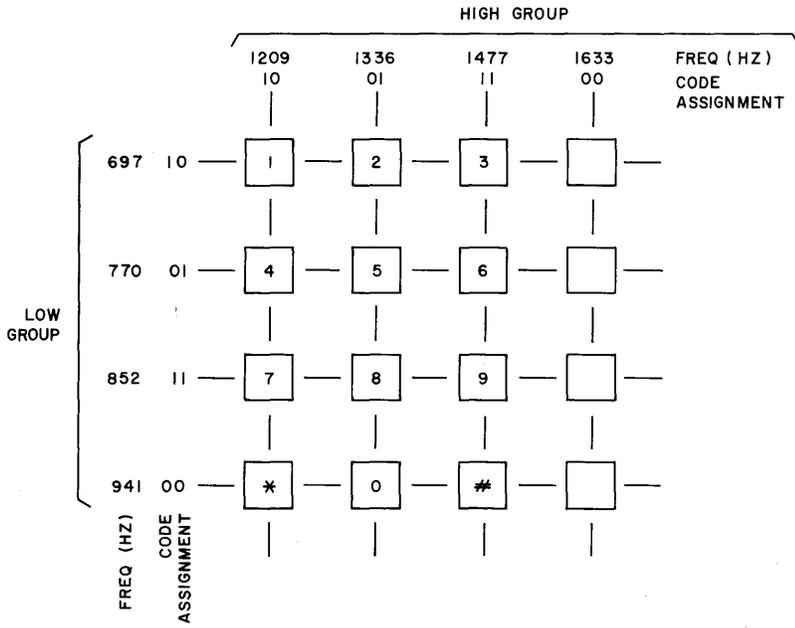
TABLE B
INTERFACE CIRCUIT SUMMARY — 15A-TYPE DATA UNITS

TERMINAL NUMBER	15A1 DATA UNIT	15A2 DATA UNIT	15A3 DATA UNIT
1	Frame Ground	Frame Ground	Protective Ground
2	Spare	Spare	Spare
3	A1	Receive Data 1	Received Data
4	A2	Receive Data 2	Spare
5	A3	Receive Data 3	Clear to Send
6	A4	Receive Data 4	Data Set Ready
7	A Common	Spare	Single Ground
8	Spare	Spare	Spare
9	B1	Spare	Data Set Test A
10	B2	Spare	Spare
11	B3	Spare	Spare
12	B4	Spare	Spare
13	B Common	Spare	Spare
14	Ring Indicator	Ring Indicator	Spare
15	Attendant	Attendant	Spare
16	Data Carrier Detector	Data Carrier Detector	Spare
17	Voice Answer-Back A	Voice Answer-Back A	Spare
18	Voice Answer-Back B	Voice Answer-Back B	Spare
19	Answer-Back Control A	Answer-Back Control A	Spare
20	Answer-Back Control B	Answer-Back Control B	Data Terminal Ready
21	Data Receive	Data Receive	Spare
22	Data Terminal Ready	Data Terminal Ready	Spare
23	Data Set Ready	Data Set Ready	Spare
24	Signal Ground	Signal Ground	Spare
25	Out-of-Service	Out-of-Service	Spare

is then translated from parallel to serial form, and presented to the business machine on an EIA voltage basis.

3.14 The remote test control circuitry provides a means for testing the receiver from a data test center.

3.15 The interface control circuits are defined and explained in EIA Standard RS-232-B. The Data Set Ready circuit turns on about 3 seconds before the receiver is ready to accept incoming data to allow time for business machine start-up.



ARRANGEMENT OF TOUCH-TONE DIAL SHOWING CODE ASSIGNMENT OF THE BCM VOLTAGE INTERFACE COUPLER.

SYMBOL	RECEIVE DATA LEADS			
	RD1	RD2	RD3	RD4
1	1	0	1	0
2	1	0	0	1
3	1	0	1	1
4	0	1	1	0
5	0	1	0	1
6	0	1	1	1
7	1	1	1	0
8	1	1	0	1
9	1	1	1	1
0	0	0	0	1
*	0	0	1	0
#	0	0	1	1
UNASSIGNED	1	0	0	0
	0	1	0	0
	1	1	0	0
	0	0	0	0

BCM CODE TABLE

Fig. 6—Code Assignment and Code Table for 15A2 Data Unit

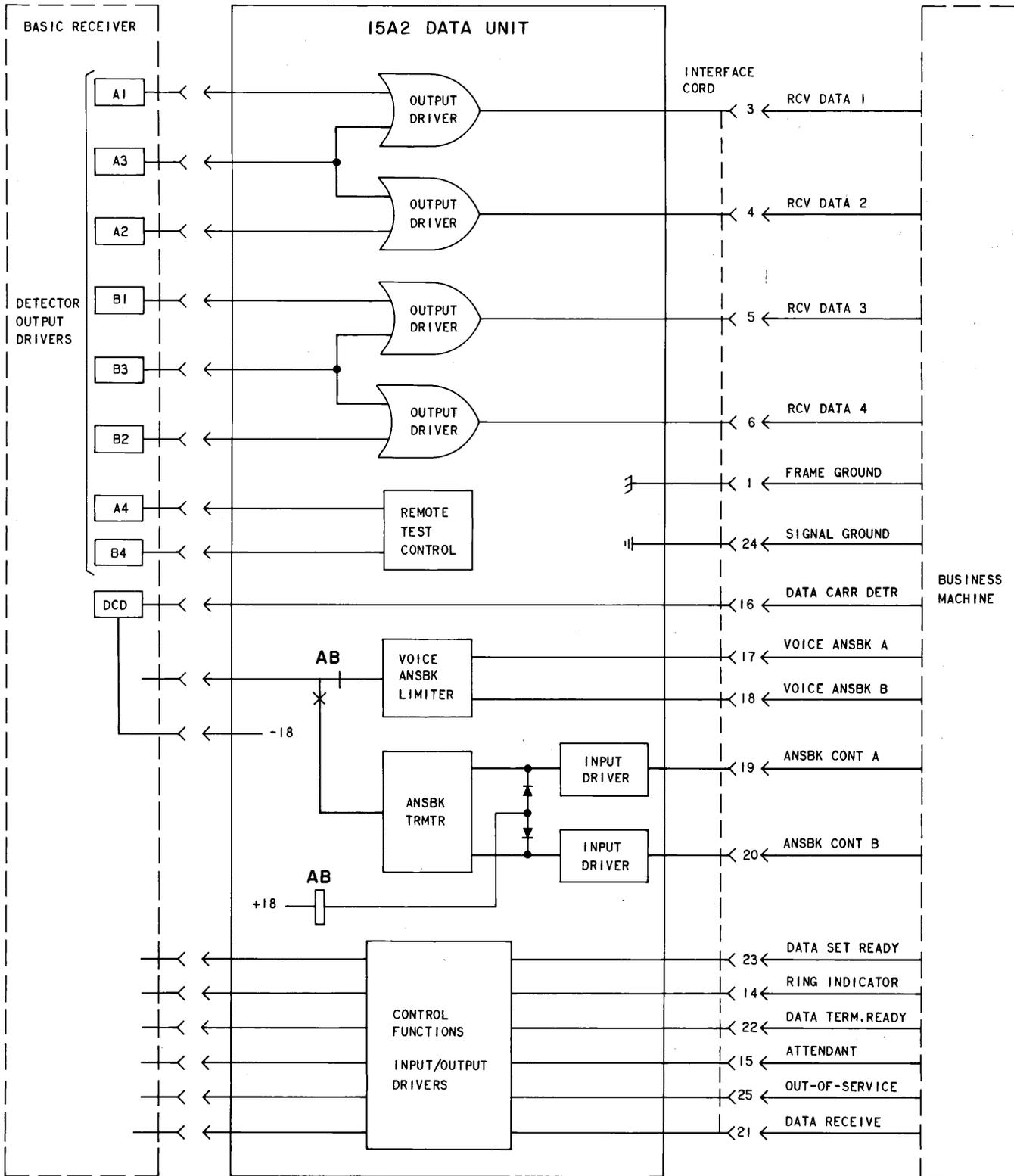


Fig. 7—15A2 Data Unit—Functional Block Diagram

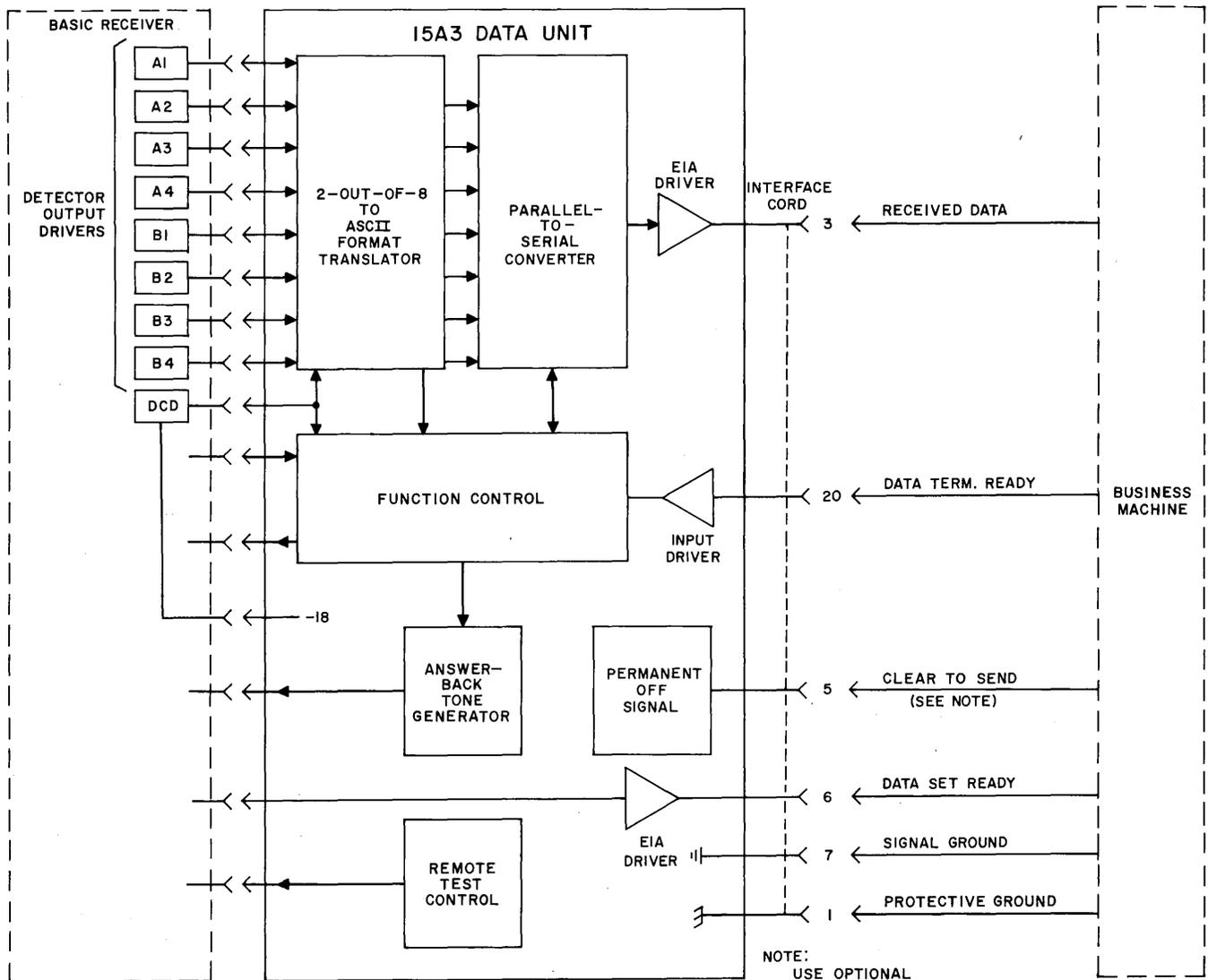


Fig. 8—15A3 Data Unit—Functional Block Diagram

4. GENERAL APPLICATION

4.01 The 15A1, 15A2, and 15A3 Data Units are designed to couple physically with a basic receiver and make a 403D-type Data Set (Fig. 1). Table A identifies the various Data Sets 403D-type which may be formed by different arrangements of the 403D-type basic receiver and the three data units.

5. REFERENCES

5.01 For additional information on the 15A1, 15A2, and 15A3 Data Units and associated equipment, refer to the following:

- Data Set 403D-Type Multiple Data Set Station—Description and Operation (594-025-101)
- Data Set 403D-Type—Description (594-025-100)
- Data Set 403E-Type Single Receiver Station—Description and Operation (594-026-100)
- Data Systems Station—Data Set 403D-Type Receiver Circuit (SD- and CD-1D130-01).