

**WIDEBAND DATA STATION USING DATA SET 303-TYPE  
TWO-WIRE SWITCHED SERVICE  
(460.8 KBPS DATA OVER PICTUREPHONE® FACILITIES)  
DESCRIPTION AND OPERATION**

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Monitoring and Terminating Jacks . . . . .	17	1.01 This section describes the Data Set (DS) 303-type wideband data station when used to transmit data over PICTUREPHONE facilities. The information will include a description of the single-line station and also the station when used in the key telephone system arrangement.	
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**1.04** The wideband data station using DS 303J26 (Fig. 1) is designed to provide high-speed data service with a voice coordination channel.

**1.05** The data station serves as part of a wideband data system that utilizes the PICTUREPHONE transmission facilities. The DS 303J26 is designed to provide a synchronous bit rate of 460.8 kilobits per second (kbps) data. The PICTUREPHONE line interface unit (114A Interconnecting Unit) is located at the wideband station and provides the proper termination for the PICTUREPHONE line.

**1.06** The wideband data station apparatus may be connected in either of two PICTUREPHONE station arrangements:

- (1) Single-line station arrangement
- (2) Key telephone station arrangement.

Figures 2 and 3 are complete block diagrams of the two system arrangements. Information in this practice applies equally to data stations used with either arrangement unless otherwise noted. Although this section is written to describe only the wideband data station, the complete system is shown for continuity.

**1.07** This station arrangement is used in 2-wire switched service (data over PICTUREPHONE facilities) application.

**1.08** A Data Auxiliary Set (DAS) 801C4, series 3 or higher, may be provided at the station. When provided, the station has the capability to automatically process a data call over the PICTUREPHONE network.

**1.09** The wideband data station accepts serial high-speed 460.8 kbps data from a business machine and transmits this data to a receiving station over the PICTUREPHONE transmission facilities.

- (a) The high-speed signals are fed from the business machine to DS 303J26 over coaxial cables via the unbalanced customer interface. Data Set 303J26 shapes the signals so that they can be sent over PICTUREPHONE facilities.
- (b) The data is passed through DAS 806D1 to the 114A Interconnecting Unit.

(c) The 114A Interconnecting Unit provides the proper termination for the PICTUREPHONE transmission facility.

(d) The DAS 804A7 provides a means of obtaining access to the wideband data PICTUREPHONE network, as well as providing for voice transmission and certain control functions of the station.

**Note:** The DAS 804A3 may be used in place of DAS 804A7; however, the DAS 804A3 may not function properly when connected to lines served from electronic central offices and/or on long lines installed under the UNIGAUGE plant program. In this case, the DAS 804A7 is required. The description in this practice applies equally to both sets.

## 2. PHYSICAL DESCRIPTION

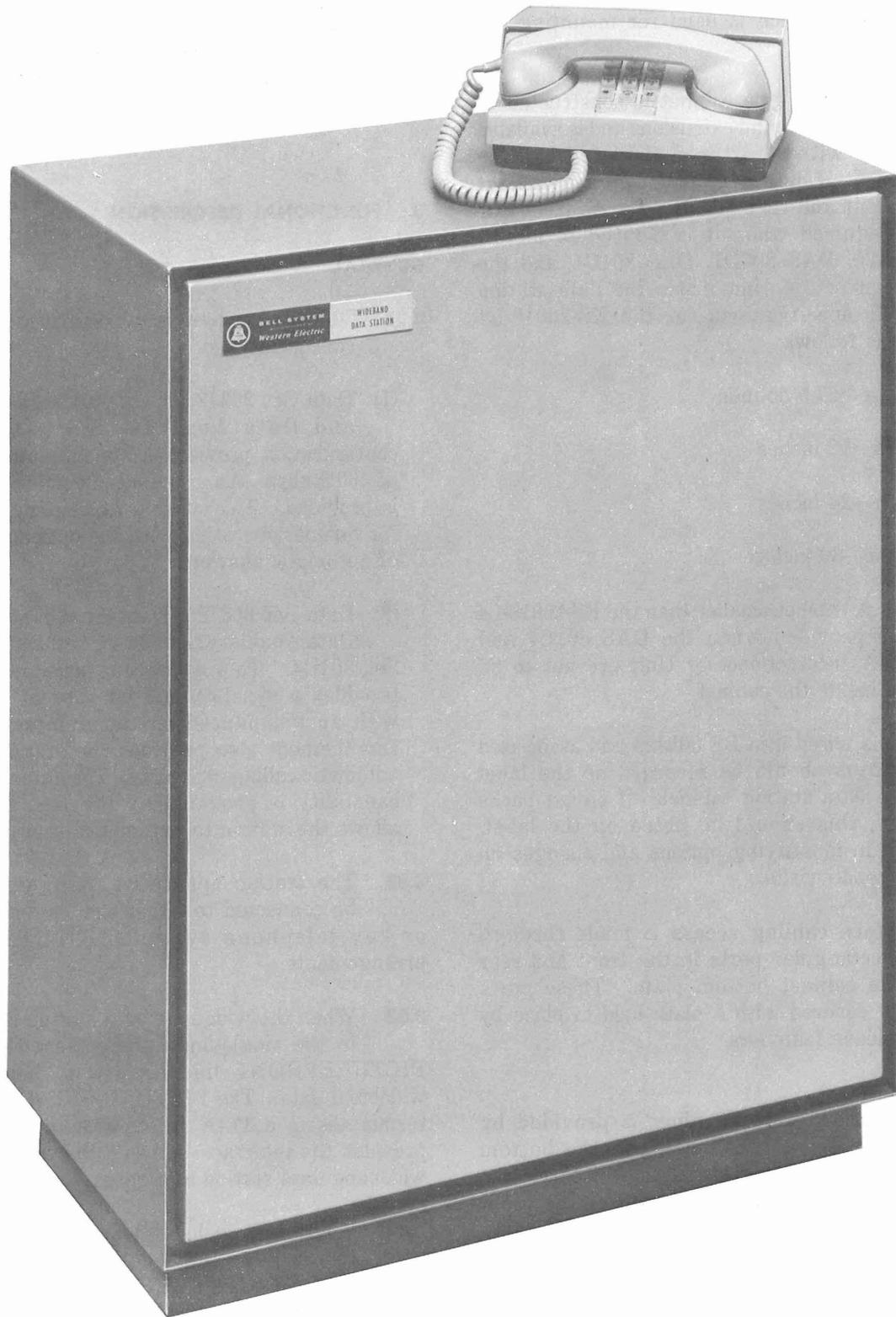
**2.01** The components which are combined to make up a DS 303J26 wideband data station are DS 303J26, DAS 806D1, DAS 804A7, and DAS 801C4 (optional). With the exception of DAS 804A7, the components may be mounted in a KS-20018 Bell System cabinet of the appropriate size (Fig. 4). The 114A Interconnecting Unit which is part of the PICTUREPHONE facility may be mounted in the cabinet or remotely located from the data station by a distance not to exceed 100 cable feet.

**2.02** The following paragraphs will provide physical characteristics of the wideband data station and its components. Information concerning the mounting arrangements will also be supplied.

**2.03** Shelves coded KS-20018-L9B are provided in the data station cabinet for mounting the 114A Interconnecting Unit and the DAS 801C4. The shelves occupy the two lower-tier locations. The shelf used for the 114A Interconnecting Unit is not required when it is desired to locate the 114A Interconnecting Unit remotely.

**2.04** When the 114A Interconnecting Unit is remotely located from the cabinet, a B25A extender cable will be necessary. Extender cable B25A is available in 5-, 15-, 30-, 60-, and 100-foot lengths.

**2.05** The apparatus within the cabinet receives its power from a KS-20598 outlet box located to the left (as viewed from the rear) of DS 303J26 (Fig. 5). The outlet box is mounted onto the



**Fig. 1—Wideband Data Station Using Data Set 303J26**

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87T-type bracket which is used for mounting DS 303J26.

**2.06** The KS-20018-type cabinet is constructed of aluminum sheet and extrusions and is available in 2-tone gray with a textured vinyl finish. The cabinet consists of dark gray framework with light olive gray front and rear panels. The KS-20018-L4 cabinet is required when it is desired to mount the DS 303J26, DAS 806D1, DAS 801C4, and the 114A Interconnecting Unit inside the data station cabinet. The specifications for the KS-20018-L4 cabinet are as follows:

Weight—27.5 pounds

Depth—12 inches

Width—24 inches

Height—30 inches.

**Note:** A cabinet smaller than the KS-20018-L4 may be provided when the DAS 801C4 and the 114A Interconnecting Unit are not to be located inside the cabinet.

**2.07** Options wired into DS 303J26 and associated apparatus should be recorded on the label placed in the data station cabinet. If circuit packs are changed, this should be noted on the label. This will aid in identifying options and changes on subsequent repair visits.

**2.08** Interface cabling access is made through two rectangular ports in the front and rear center of the cabinet bottom plate. These ports are normally covered with a plate held in place by two quick-release fasteners.

**2.09** Ventilation of the cabinet is provided by three large screened holes in the bottom plate and two half-inch wide slots which run the full width of the cabinet at the top of the front and rear panels.

**2.10** The cabinet has a skirt forming the base with a 6-inch port at the rear for cable ingress. Four levelers are provided with the cabinet but may be removed when the cabinet is to be secured to the floor. Bolts or screws may be used for fastening the cabinet to the floor.

**2.11** Vertical mounting strips (part of the two side walls of the cabinet) provide means for mounting the DS 303J26, DAS 806D1, and the KS-20018-L9B shelves.

### 3. FUNCTIONAL DESCRIPTION

#### GENERAL

**3.01** There are two basic station apparatus configurations:

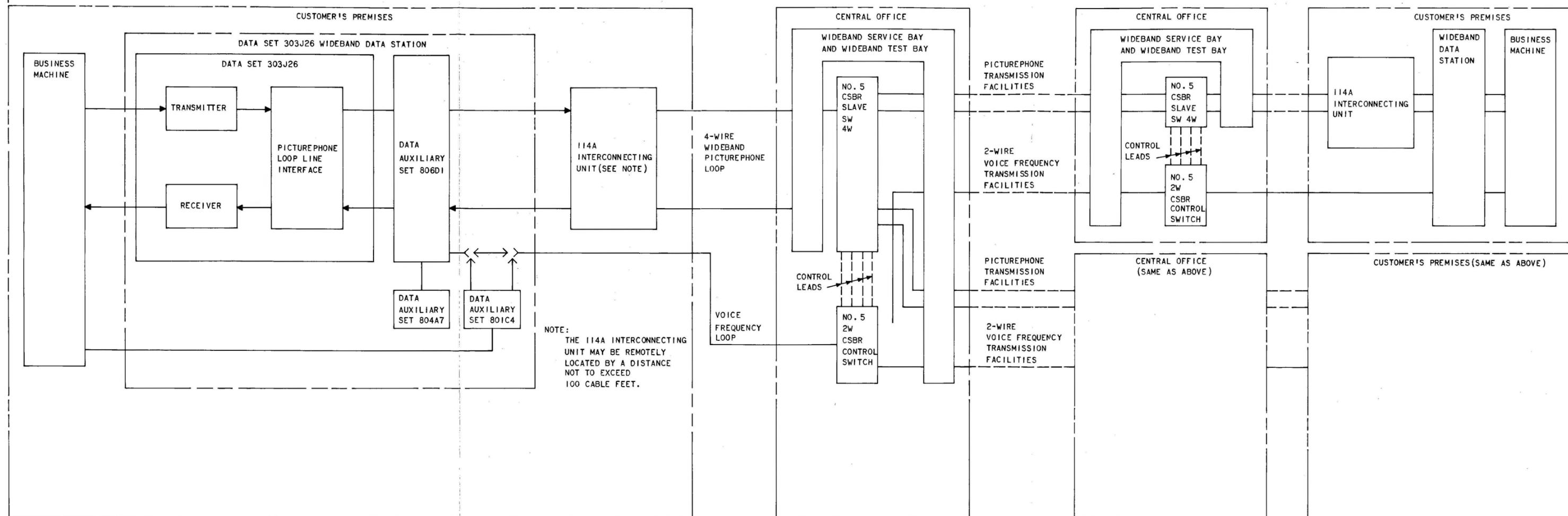
(1) Data Set 303J26, Data Auxiliary Set 806D1, and Data Auxiliary Set 804A7. This configuration provides a synchronous data rate of 460.8 kbps. An unbalanced customer interface is provided. This station arrangement provides for manual operation with the optional capability of automatic answer.

(2) Data Set 303J26, Data Auxiliary Set 806D1, Data Auxiliary Set 804A7, and Data Auxiliary Set 801C4. This apparatus arrangement also provides a synchronous bit rate of 460.8 kbps with an unbalanced customer interface. This arrangement also provides the station with the automatic calling capability. The automatic calling capability is provided by the DAS 801C4 and allows the station to automatically process a call.

**3.02** The station apparatus configurations may be connected to either the single-line station or key telephone system PICTUREPHONE arrangements.

**3.03** When the wideband data station is connected to the single-line arrangement (Fig. 2), the PICTUREPHONE line facility is used *only* for wideband data. The PICTUREPHONE line facility terminates in a 114A Interconnecting Unit which provides the interface between the facility and the wideband data station apparatus.

**3.04** When the wideband data station is connected to the key telephone system arrangement (Fig. 3), the PICTUREPHONE facility is made available to any one of several ports under control of the key telephone system. The wideband data station is one of these ports. The 114A Interconnecting Unit provides the interface between the facility and the wideband data apparatus of the data station.



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**Fig. 2—Wideband Data System Using PICTUREPHONE Facilities, DS 303J26 Provided in the Single Line Station Arrangement—Block Diagram**

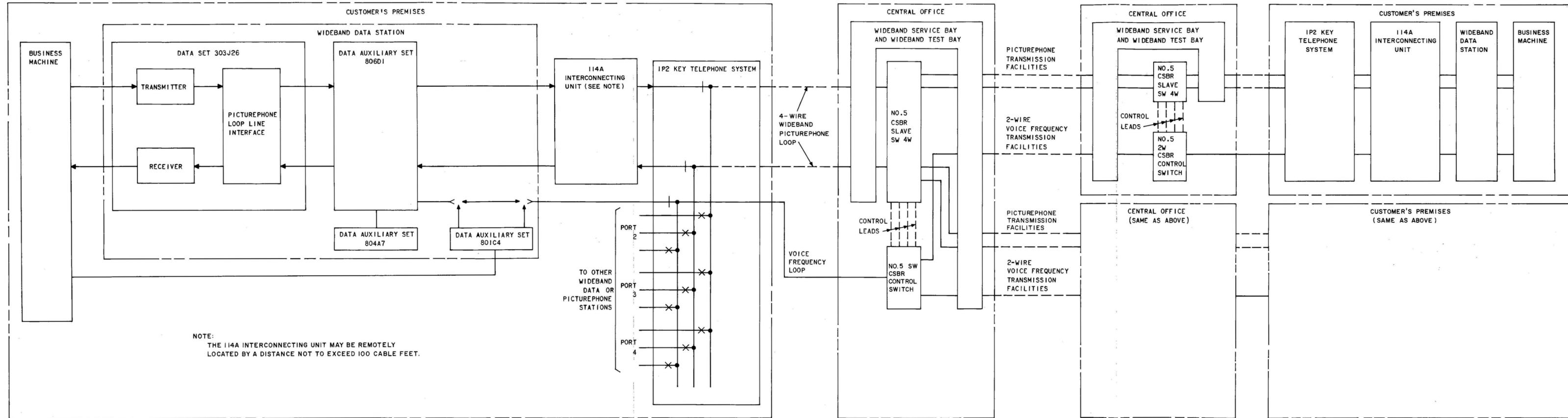
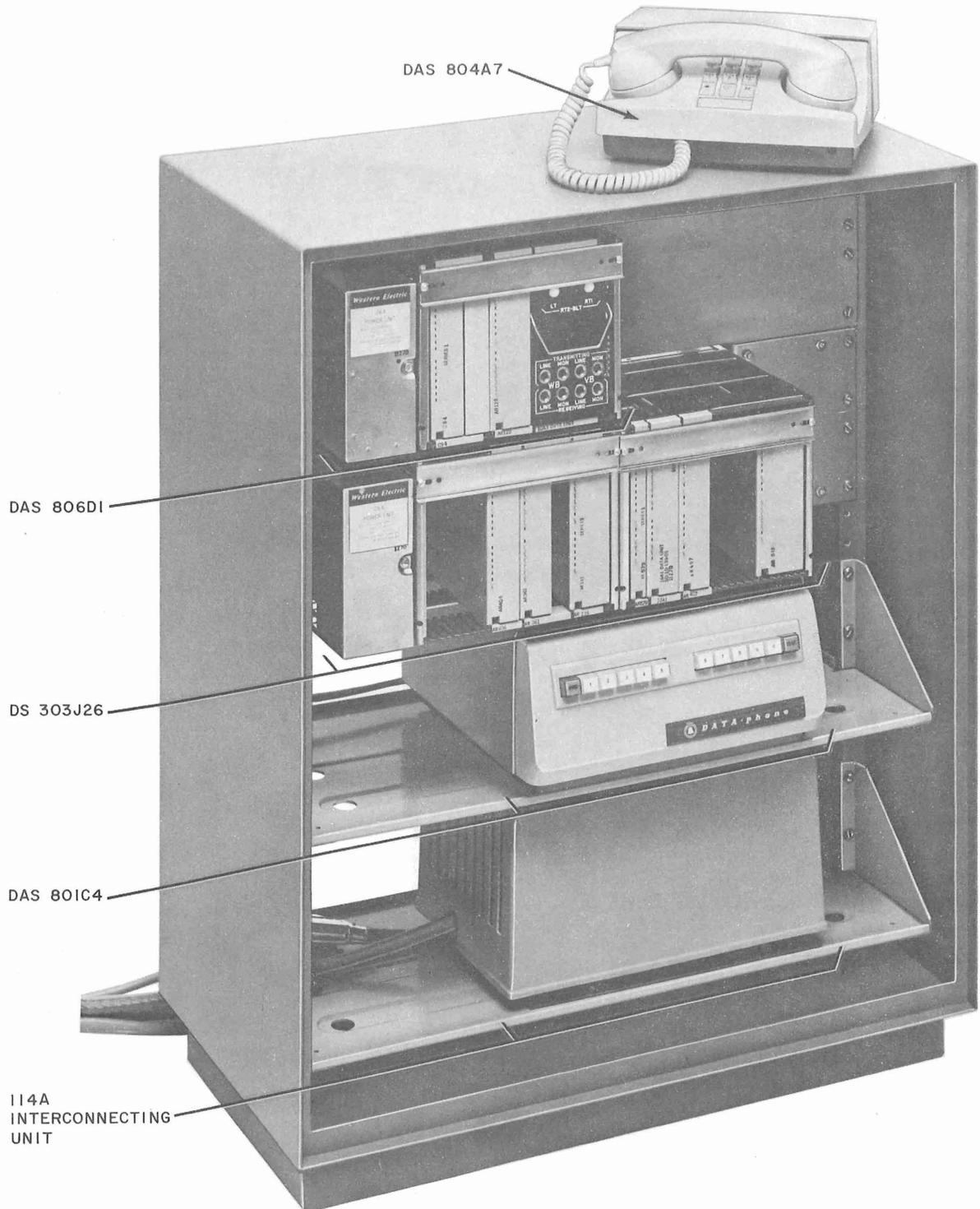


Fig. 3—Wideband Data System Using PICTUREPHONE Facilities, DS 303J26 Provided in the IP2 Key Telephone Arrangement—Block Diagram



**Fig. 4—Data Set 303J26 Wideband Data Station With 114A Interconnecting Unit Mounted in the Data Station Cabinet**

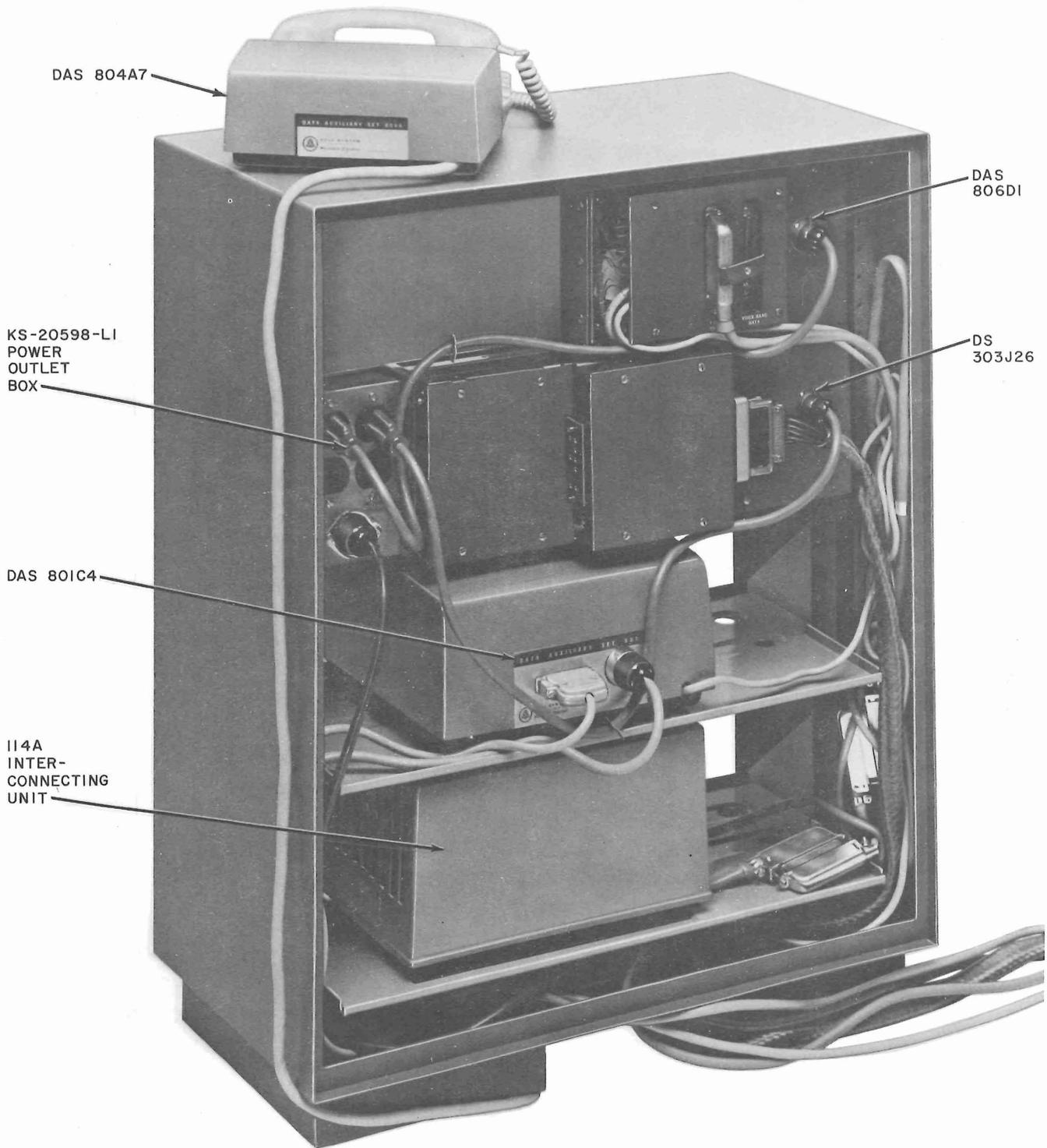


Fig. 5—Data Set 303J26 Wideband Data Station With 114A Interconnecting Unit Mounted in the Data Station Cabinet—Rear View

**DATA SET 303J26, DATA AUXILIARY SET 806D1,  
AND DATA AUXILIARY SET 804A7****A. General**

**3.05** The DS 303J26 wideband data station is located at the customer's premises and provides the interface between business machine equipment and the PICTUREPHONE line facilities. A voice-frequency coordination channel equipped with DAS 804A7 is provided to furnish talking capability and the necessary control functions. Both the wideband and the voiceband parts of the station may be operated in the full-duplex mode.

**3.06** The DS 303J26 accepts high-speed ON-OFF baseband signals from the customer's business machine and produces a line signal suitable for transmission over PICTUREPHONE facilities. The PICTUREPHONE loop line interface circuit pack interfaces the DS 303J26 with the 114A Interconnecting Unit.

**3.07** The 114A Interconnecting Unit provides an interface for the PICTUREPHONE line facilities. The unit also provides a Video Call Connect (VCC) signal for control of DS 303J26 during an idle line loop-back condition. Refer to Fig. 6 and 7, respectively, for block diagrams of the data station operating with PICTUREPHONE single-line and 1P2 key telephone system arrangements.

**3.08** Data Auxiliary Set 806D1 provides line interfacing and interconnection arrangements for the components that make up the data station. In addition to line interfacing and interconnections, DAS 806D1 provides the following test and maintenance features:

- (a) **Local Test:** This provides a means for looping the data station transmit line circuit to the receive circuit at the DAS 806D1 line side. This permits a check of performance through the data station from the business machine on a local loop-back basis.
- (b) **Remote Test:** The remote test feature enables a test center to loop the facilities at the DAS 806D1 line interface so that transmission tests can be made over the facilities and to loop the send data circuit to the receive data circuit inside the data set on the data set side of the customer's interface so that overall transmission tests can be made.

(c) **Monitoring and Terminating Jacks:** These jacks provide access to the associated wideband line facilities. Monitoring and terminating jacks are located on the line side of the local test and remote test relays.

**3.09** The DAS 804A7 includes a telephone which provides voice communication over the voice-frequency coordination channel. In addition, it provides control of the switching functions required by the data set.

**3.10** The DAS 804A7 is mounted outside the data station cabinet. It is connected to the data station and telephone lines through a mounting cord which plugs into DAS 806D1. When required, DAS 804A7 may be remotely located to the data cabinet by a distance not to exceed 75 cable feet. For this application, the appropriate length connector cable B25A will be used.

**3.11** Data Auxiliary Set 804A7 is equipped with six buttons which read left-to-right: (blank), TST, AUTO, WB CHAN, TALK, and DATA. The functions of these buttons are described briefly as follows:

- **TST**—A locking button which, when depressed, places the station in the local test mode. When any other button on DAS 804A7 is depressed, this button releases. The associated lamp lights when the TST button is depressed, when the local test mode is established by either DAS 806D1 or the customer, or when the station is in the remote test mode.
- **AUTO**—A locking button which, when depressed, enables the automatic answer feature. The associated lamp lights when the automatic answer feature is enabled.
- **WB CHAN**—This button is blocked. The associated lamp lights when the station is conditioned for wideband data transmission.
- **TALK**—A locking button which, when depressed, places the data station in the talk mode. This button is released when any other button is depressed. When the station is placed in the talk mode, transmission of wideband data is prevented unless the station had previously been in the data

mode in which case the WB CHAN lamp remains lighted.

- **DATA**—A nonlocking button which, when depressed, places the wideband data station in the data mode. The lamp associated with the DATA button is removed. The DATA button need not be depressed after the initial operation except when it is desired to cradle the handset during a data transmission.

**B. Test and Maintenance Features**

**3.12** The test and maintenance features provide a means of isolating trouble in the system with a minimum of lost time. The following is a brief description of these features, ie, idle loop-back test, local test, remote test, and monitoring and terminating jacks.

**Idle Loop-Back Test**

**3.13** The idle loop-back in the 114A Interconnecting Unit provides a loop-back of the 4-wire facility both toward the central office and toward the station. These loop-backs are removed when the station is active. Therefore, in the idle line condition it is possible for the business machine to send data to itself. Control logic in the DS 303J26 maintains the receive data path in a mark-hold condition, thereby preventing a false receive-data indication on the AGC lead to the business machine during the idle line period. In order to remove this mark-hold condition and utilize the loop-back in the 114A Interconnecting Unit for sectionalizing test, a ground should be placed on TP7 of AR513 in DS 303J26. This ground simulates Video Call Connect (VCC) logic that originates in the 114A Interconnecting Unit and is used to remove the mark-hold condition when the station is active. Refer to Fig. 9 for a functional diagram of the 114A Interconnecting Unit idle loop-back.

**Local Test**

**3.14** Functionally, the local test permits the business machine to send data to itself through the data station. Refer to Fig. 8 for a functional diagram of the local test feature. The mark-hold condition of the receive data path is removed when local test is instituted. The local test condition can be initiated in either of three ways: (1) by operating the LT key on the 10A-type Data Unit thus placing the station in the local test

condition, (2) by placing an ON signal on the local test (LT) lead from the business machine, or (3) by depressing the TST button on DAS 804A7.

**3.15** Regardless of how the local test condition is established, it is functionally the same. Relays operate in DAS 806D1 to connect the transmit line circuits to the receive line circuits and to terminate the transmit and receive lines.

**3.16** When the station is placed in the local test mode, the LT lamp on the 10A-type Data Unit and the lamp associated with the TST button on DAS 804A7 light.

**Remote Test**

**3.17** There are two remote tests: remote test 1 (RT1) and remote test 2 (RT2). RT1 provides a turn-around connection at the DAS 806D1 line interface. RT2 provides a turn-around connection at the business machine interface. The combination of the tests provides the serving central office or data test center with a means of testing the transmission facilities, as well as the data station. Refer to Fig. 10 for a functional diagram of the remote test feature.

**3.18** A 2800-Hz tone transmitted for at least 7 seconds from a test center is used to initiate each of the two test conditions in sequence. The 2800-Hz tone is applied and detected on the voice pair. The tone is detected in Data Auxiliary Set 806D1 and is used to initiate a sequential relay chain. The relay chain, in turn, controls the relays which loop the lines and data sets. Wideband lines are looped by relay RT1A. When the voice circuit is 2-wire, only the wideband lines are looped. In order for these tests to be performed, a call must be placed to the station to be tested and the station must answer. When the station answers, the idle line loop-back in the 114A Interconnecting Unit is removed, thereby allowing the proper remote test loop-back to be initiated. When a test call is made to the data station, the line may be held by having the attendant cradle the handset at the end of the first 2800-Hz tone period (when handset receiver goes dead). The call may also be answered and DAS 804A7 placed in the data mode with handset cradled prior to the remote test sequence. However, this method requires an ON signal on the DTR lead from the business machine.

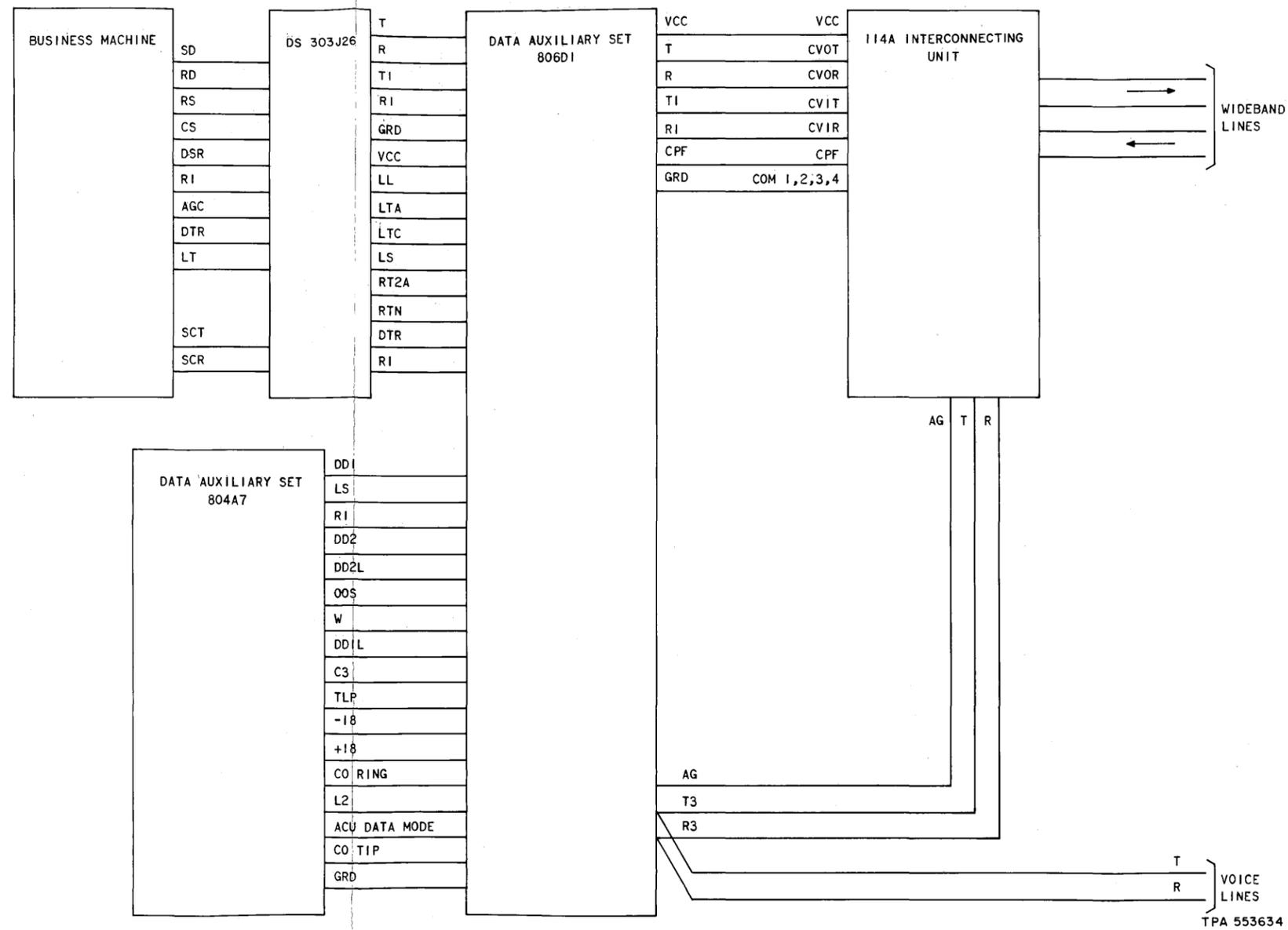


Fig. 6—Data Set 303J26, Data Auxiliary Set 806D1, Data Auxiliary Set 804A7, and the 114A Interconnecting Unit Connected in a Single Line Station Arrangement—Block Diagram

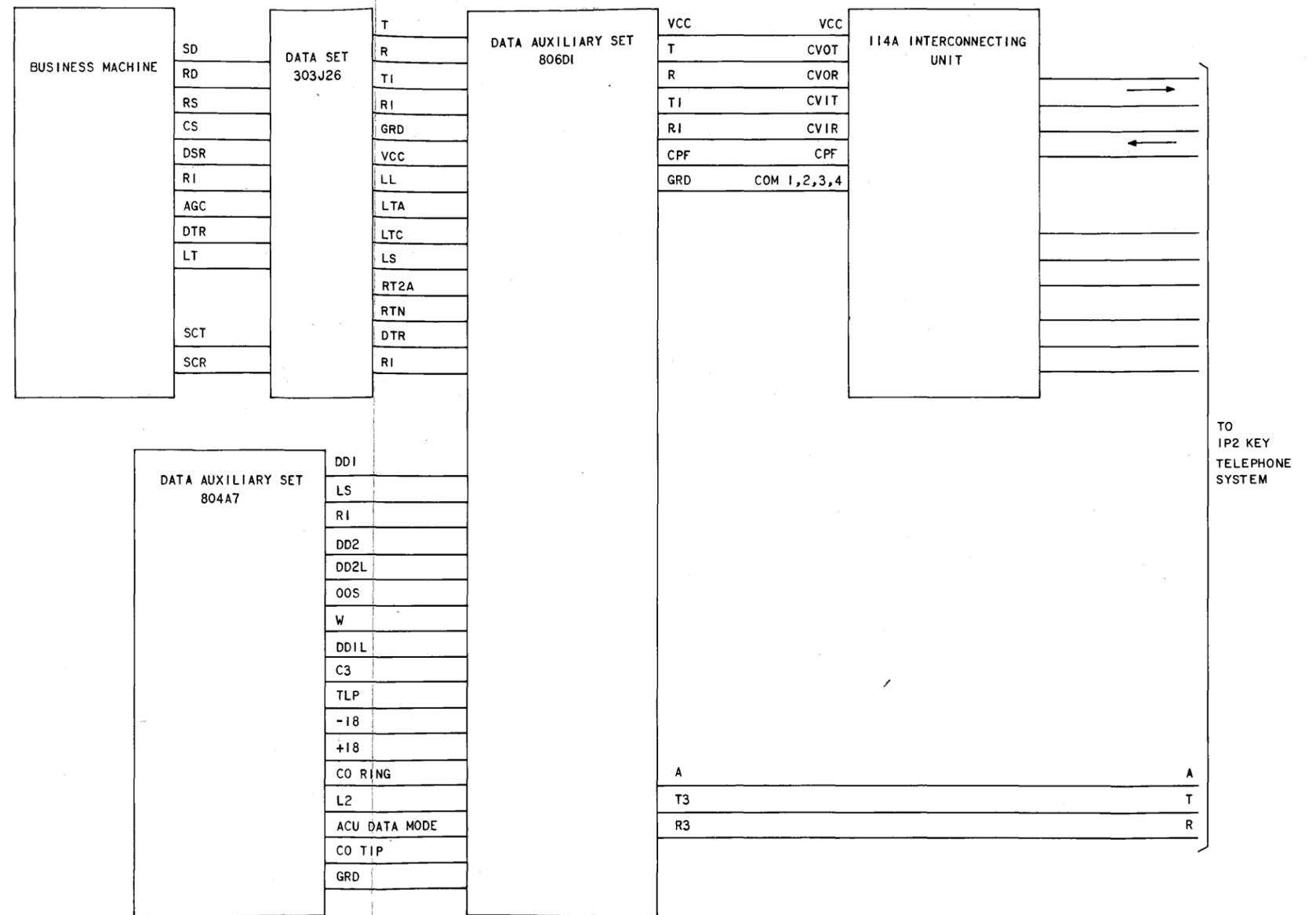
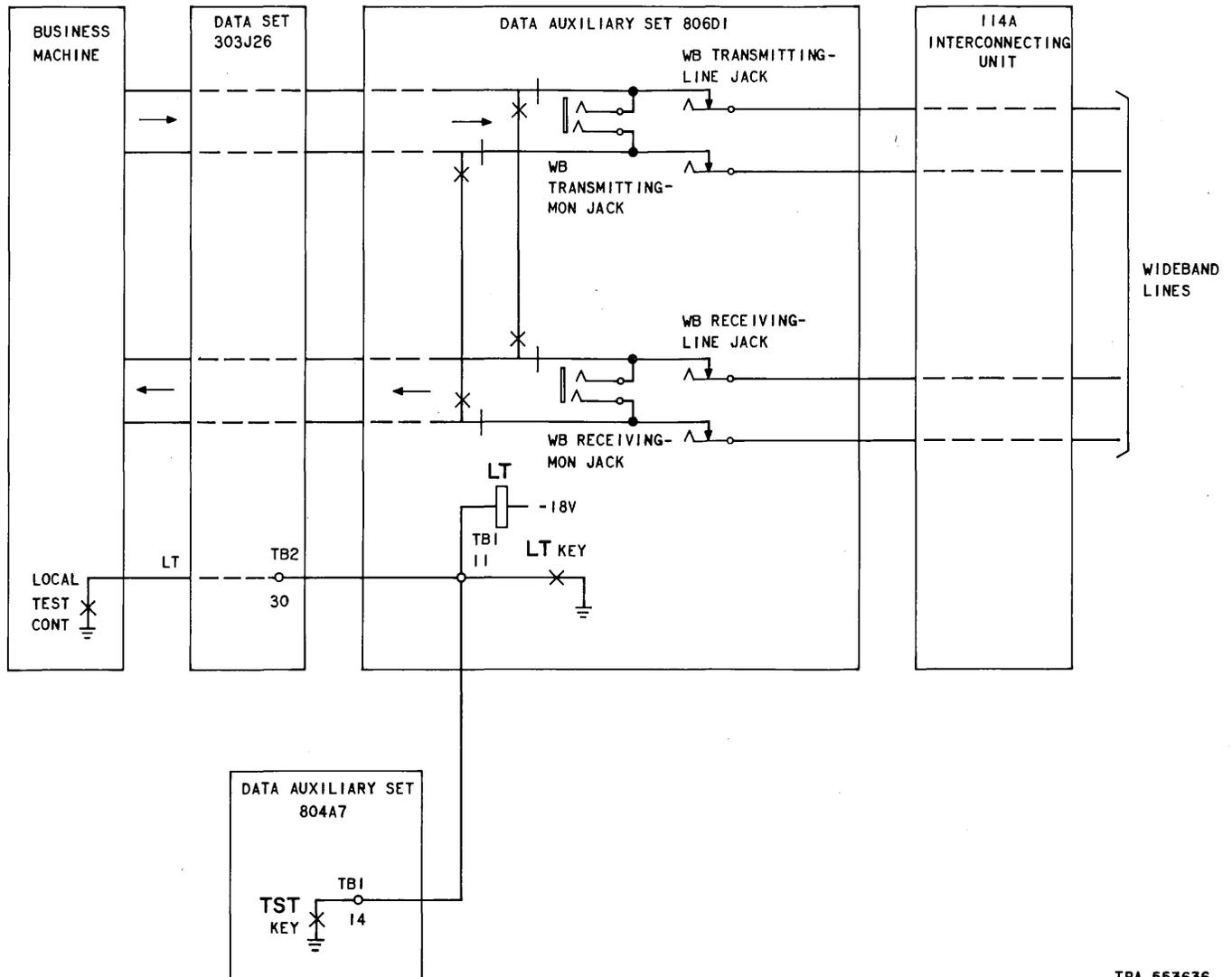


Fig. 7—Data Set 303J26, Data Auxiliary Set 806D1, Data Auxiliary Set 804A7, and the 114A Interconnecting Unit Connected in a Key Telephone Station Arrangement—Block Diagram



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**Fig. 8—Local Test Feature—Functional Diagram**

**3.19** When the wideband lines are looped, the data set is disconnected from the lines. The looping path includes the jack normals and normal contacts on the LTA and LTB relays in the transmission path.

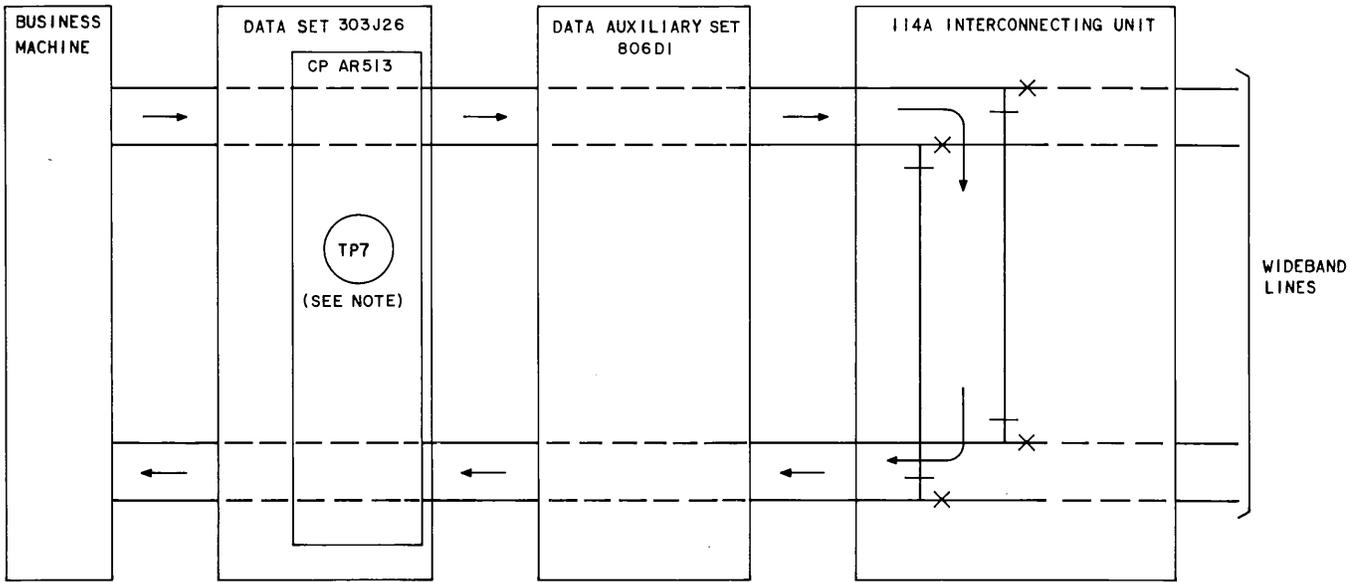
**3.20** The wideband data set is looped by a relay that is included as part of the data set. Control of this relay is over the RT2A lead to the wideband data set.

**3.21** The lines will be looped (RT1) when the 2800-Hz tone is applied for at least 7 seconds for the first time and then removed. The second application and removal of the tone loops the data set (RT2). The third application and removal

restores the data auxiliary set to its normal transmission mode. The associated data set is then restored to service. The sequence must be completed. If the state of the remote test sequence is not known, the data auxiliary set can be restored to normal by breaking and reapplying the ac power. The test conditions controlled by the 2800-Hz tone can also be set up by operating the LRT key on DAS 806D1 in the same sequence and time duration as the 2800-Hz tone.

#### **Monitoring and Terminating Jacks**

**3.22** Monitoring or bridging jacks are provided on both the transmit and the receive pairs of the wideband transmission paths. These jacks



NOTE:  
 A GROUND PLACED ON TP7 REMOVES THE MARK-HOLD CONDITION FROM THE RECEIVE DATA PAIR, THEREBY ALLOWING THE IDLE LOOP-BACK IN THE 114A INTERCONNECTING UNIT TO BE USED FOR LOCAL TEST PURPOSES.

Fig. 9—114A Interconnecting Unit Idle Loop-Back—Functional Diagram

are located on the line side of the local test relay. These jacks may also be used as equipment-terminating jacks by inserting a dummy plug in the corresponding line-terminating jack.

3.23 Both the transmit and receive pairs of the wideband lines are connected to the data auxiliary set through line jacks which permit the lines to be terminated for test purposes (Fig. 8). When a line is terminated, it is disconnected from all circuitry internal to the data auxiliary set.

C. Control Functions

3.24 There are gates inside DS 303J26 which block transmitted and received data unless the proper conditions exist. The following control functions are used in transmitting and receiving data. These functions exist at the customer's interface and are applicable to both the single-line and key telephone system arrangements.

- **LT**—The local test (LT) function is an ON current signal sent by the business machine to place the station in the local test mode.

- **SD, CS**—Data is sent from the business machine to the transmitter circuits in DS 303-type on the send data (SD) lead. The customer's SD signal is terminated by a cable terminator. This cable terminator blocks data unless the clear-to-send (CS) signal is ON.

- **CS, RS, DSR**—To initiate the transmission of data, the request-to-send (RS) signal is originated by the business machine. (RS can be permanently strapped in the data set in the ON condition.) The RS signal is a current interface signal which provides one of the inputs required for CS. The other input to CS is either the data set ready (DSR) or the local test (LT) signal. The DSR signal indicates that all the required data set conditions are fulfilled. The DSR signal is provided when the station is not in local or remote test and the line status signal is ON. When the DSR signal is ON and an ON RS signal is received, the data set will deliver a CS ON signal to the business machine and enable its SD cable terminator. When the RS signal is sent

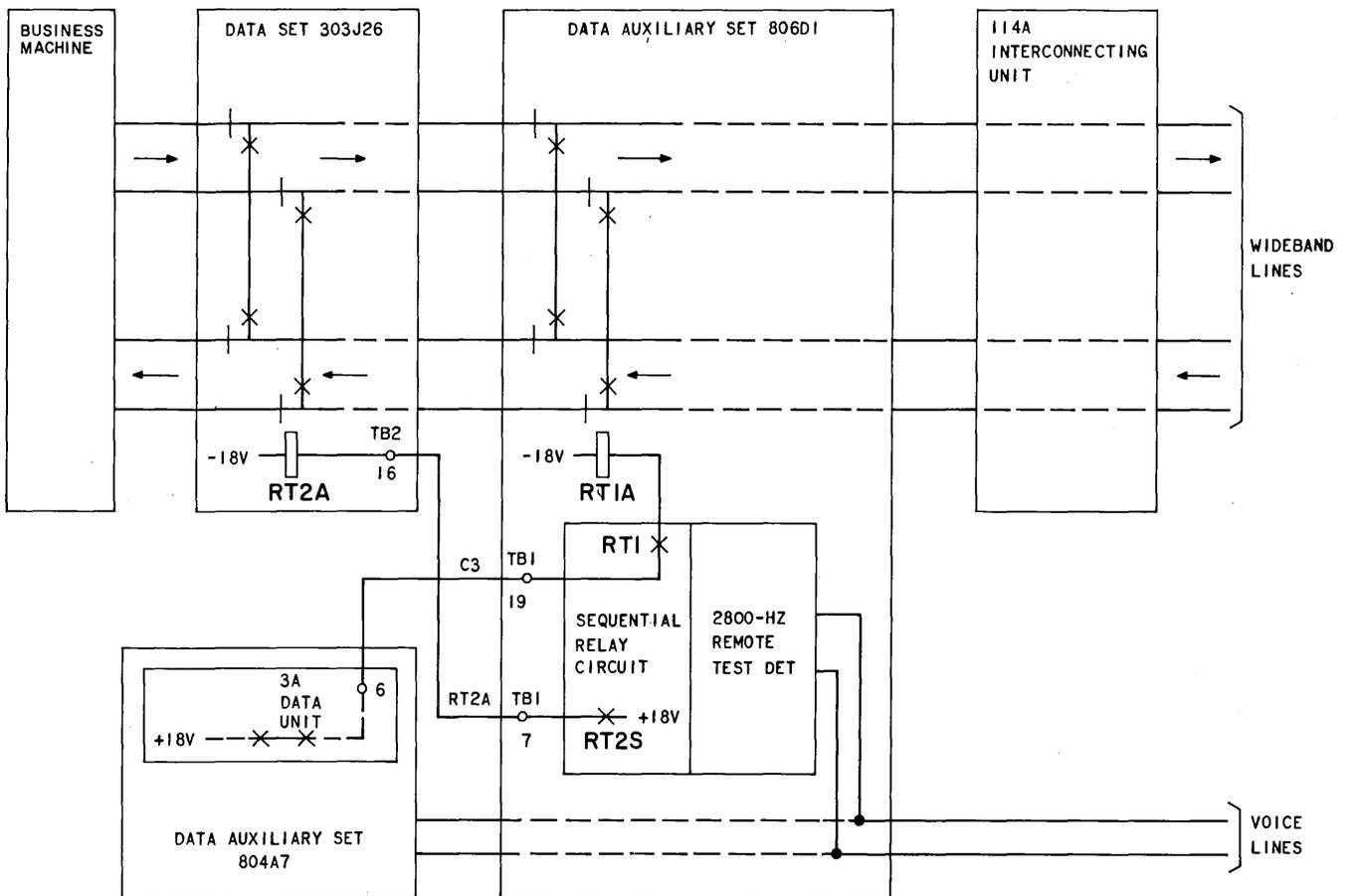


Fig. 10—Remote Test Feature—Functional Diagram

from the business machine to the data set and the CS signal is returned to the business machine, the system is conditioned to transmit data. The signals on the SD lead are sent to the transmitter circuit and then to the facilities.

- **DSR, RD**—To receive data, the DSR control signal must be ON. When DSR is ON, the RD gate is opened. When the gate is open, the data set is conditioned to pass the receiver output through the RD cable driver to the business machine.
- **AGC**—The automatic gain control (AGC) is an ON current signal which is sent to the business machine when the received data is present.

**3.25** Operation of Data Set 303J26 requires two clock signals, ie, clocks for the transmitter and receiver.

- **SCT**—The clock signal is originated within the data set. The clock is delivered to the customer on lead serial clock transmit (SCT).
- **SCR**—The receiver output is applied to the sync recovery and signal regenerator circuit pack. This circuit pack contains circuitry for deriving a clock signal from the received data. The clock signal is delivered to the customer via the serial clock receive (SCR) lead.

**3.26** The high-speed customer interface is provided on a current-switching basis with the exception

of DTR and RI. These are standard EIA voltage interface leads:

- **DTR**—Data Terminal Ready—An ON voltage signal supplied from the customer's terminal equipment to indicate that it is ready to transmit and receive data. This signal must be present to place the station in the data mode and to automatically answer an incoming call. The signal must be OFF to terminate a call while in the data mode.
- **RI**—Ring Indicator—An ON signal on this lead indicates to the business machine equipment that a ringing signal is being received from a remote station.

**3.27** The signal and control leads between DS 303J26 and DAS 806D1 are as follows. These leads are applicable to both the single-line and the key telephone system arrangements.

- **T and R**—Form the wideband tip and ring of the transmit pair.
- **T1 and R1**—Form the wideband tip and ring of the receive pair.
- **LTA**—Local Test—The local test mode can be established from the customer's data terminal equipment by application of an ON signal to the LT lead in the high-speed cable to DS 303J26. The signal is converted to a ground closure in DS 303J26 and passes to DAS 806D1 over the LTA lead. This ground initiates the local test mode by operating the LTA relay in DAS 806D1.
- **LTC**—The connecting DS 303J26 requires an indication of the local test status from DAS 806D1. This indication is provided over the LTC lead which delivers a ground when the data auxiliary set is not in the local test mode. The ground is removed when the local test mode is established.
- **RTN**—Remote Test Normal—A ground is passed over the RTN lead to the connecting DS 303J26 when the DAS 806D1 is not in the remote test mode. The ground is removed when the remote test mode is established.
- **RT2A**—Remote Test—During the RT2 mode, DAS 806D1 applies positive battery to the

RT2A lead. Positive battery on the RT2A lead operates the RT2A relay in DS 303J26 which connects the output of the RD gate to the input of the SD gate to loop back the data set toward the line. When the station is operating synchronously, relay RT2A also applies the recovered clock (SCR) to the DS 303J26 transmitting circuits.

- **RI**—Ring Indicator—An ON voltage signal to DS 303J26 which indicates that ringing current is present on the voice-frequency coordination circuit. An OFF signal is present when ringing current is not present. This signal is for use by customer's equipment.
- **DTR**—Data Terminal Ready—An ON voltage signal sent on this lead to DAS 806D1 indicates that the customer's data terminal equipment is ready to transmit and receive data. This signal is used in DAS 804A7.
- **LS**—Line Status—A +18 volt signal to DS 303J26 indicates that DAS 804A7 is in the data mode.
- **VCC**—Video Call Connect—The VCC signal is originated in the 114A Interconnecting Unit and provides control to the DS 303J26 PICTUREPHONE loop line interface circuit pack. When an idle loop-back exists in the 114A Interconnecting Unit, the VCC lead is at ground and maintains the receive line signal in the mark-hold condition.
- **LL**—Line Looping—The LL signal originates in the DAS 806D1 and provides control to the DS 303J26 PICTUREPHONE loop line interface circuit pack. When the wideband data station is in the remote test 1 (RT1) mode, the LL lead is at ground, thereby holding the data set receive line signal in the mark-hold condition. This prevents the business machine from possibly receiving a false receive data signal indication on the AGC lead.

**3.28** The signal and control leads between DAS 806D1 and the 114A Interconnecting Unit are as follows. These leads are applicable to both the single-line and the key telephone system arrangements.

- **T and R**—Form the wideband tip and ring of the transmit pair. These leads mate with

the CVOT and CVOR leads of the 114A Interconnecting Unit.

- **T1 and R1**—Form the wideband tip and ring of the receive pair. These leads mate with the CVIT and CVIR leads of the 114A Interconnecting Unit.
- **VCC**—Video Call Connect—The VCC signal is originated in the 114A Interconnecting Unit and provides control to the line interface circuitry in DS 303J26. The connection of this lead to DAS 806D1 is made so as to confine wiring on the data side of the 114A Interconnecting Unit with DAS 806D1.
- **CPF**—Customer Power Failure—A ground is supplied from DAS 806D1 over lead CPF to the 114A Interconnecting Unit. This ground verifies continuity between the DAS 806D1 and the 114A Interconnecting Unit. Absence of this ground prevents completion of a call to the data station over the PICTUREPHONE facility.

**3.29** Additional leads between the DAS 806D1 and the 114A Interconnecting Unit are required when the wideband data station is connected in the single-line station arrangement. These leads are as follows:

- **AG**—This signal originates in the DAS 804A7. A ground on this lead indicates to the 114A Interconnecting Unit that the DAS 804A7 is off-hook in the talk mode or holding in the data mode.
- **T3 and R3**—These leads form the tip and ring pair from the voice facility to the 114A Interconnecting Unit.

**3.30** The leads between DAS 804A7 and DAS 806D1 can be divided into three categories: ringing indication, voice communication, and control functions. These leads are required for both the single-line and the key telephone system arrangements.

**Note:** DAS 804-type was designed to provide control for the normal switching functions required by data sets that do not have integrated control features. The lead designations are common to all DASs 804. These lead designations may not be the same as the functional designations in this application.

- **LS, COM, TLP**—The line status signal voltage applied to the DSR gate in DS 303J26 is a positive voltage signal which indicates that DAS 804A7 is in the data mode. The LS signal originates in DAS 804A7 when DAS 804A7 is in the data mode. The ground on the COM lead is applied to a set of contacts on the LS relay. When operated, the LS relay applies ground to the DAS 806D1 LSS relay via the LS lead. When the LSS relay operates, a voltage of +18 is applied to the LSS lead. The signal path is then divided into two parts. One branch goes to DS 303J26 and the other branch goes back to DAS 804A7 via the TLP lead. The +18 volts indicates to DS 303J26 that the station is in the data mode. The +18 volts over the TLP lead lights the WB CHAN lamp. The +18 volts is removed from the TLP lead when the station is in either the remote test mode (relay RTNS in DAS 806D1 released) or in the local test mode (relay LTC in DAS 806D1 operated).
- **C3**—The C3 lead provides battery from DAS 804A7 for line-looping relay RT1A in DAS 806D1. Released contacts of the T relay enable this circuit. Application of the battery is delayed by contacts of the LS relay. This delay is necessary to permit transmission of the answer-back tone before the lines are looped ahead of the data station.
- **DD1, DD1L**—The local test mode can be controlled from a connecting DAS 804A7 by depressing the TST key. Depression of the TST key places ground on the DD1 lead. This operates the LTA relay in the same manner as when ground is applied from the LT key of the DAS 806D1. The local test mode is indicated by a lighted TST lamp on DAS 804A7. The TST lamp is lighted when -18 volts is applied to the DD1L lead through a make contact on relay LTC.
- **DD2, DD2L**—When the AUTO button on DAS 804A7 is depressed, the AA relay in DAS 806D1 is held operated by ground applied over the DD2 lead. The operated AA relay applies +18 volts to the DD2L lead to light the lamp associated with the AUTO button.

● **RI**—The COM lead supplies a ground from DAS 806D1 via the ZA option in the DAS 804A7 to a set of contacts on the R relay in DAS 804A7. The ground signal is provided from DAS 804A7 on the RI lead to DAS 806D1 when ringing is present and is open at all other times.

● **W, OOS**—The W and OOS leads are used for control of the C relay. The DTR signal is passed from the customer through DS 303J26 to DAS 806D1, through the S option in DAS 806D1 via the W lead to DAS 804A7. The W lead provides the input to the C relay driver. When the data station is in either the local or remote test mode, relays in DAS 806D1 apply ground on the OOS lead. The C relay must be operated in the data mode and released in the talk mode. The C relay is operated in any of the following three ways:

(a) By placing a ground on the OOS lead. This ground is provided by relay action in DAS 806D1 when the station is in either the remote or local test mode.

(b) By depressing the DATA key on DAS 804A7, provided the customer has an ON signal on the DTR lead and battery is on the line. As the DATA button is depressed, the H relay operates and completes the operating path for the C relay.

(c) When ringing is detected, provided that the station is conditioned for automatic answering and the customer has an ON signal on the DTR lead.

● **CO TIP, CO RING**—The CO TIP and CO RING leads provide the tip and ring leads necessary for standard telephone service.

● **D1, D2, L2, ACU DATA MODE**—These leads provide the answer-back tone path. Answer-back tone is applied to the impedance-matching transformer in DAS 804A7 through the LS break contact. Leads D1 and D2 from the impedance-matching transformer are bridged onto the CO TIP and CO RING leads via the DAS 806D1 option J and leads L2 and ACU DATA MODE.

**D. Options**

**3.31** Certain options are required in the various apparatus units of the DS 303J26 wideband data station. Table A is provided as a quick reference for these options. The following paragraphs will functionally describe these options.

**TABLE A**  
**OPTIONS REQUIRED FOR DS 303J26,**  
**DAS 806D1, AND DAS 804A7**

DATA SET 303J26	DATA AUXILIARY SET 806D1	DATA AUXILIARY SET 804A7
Z	J	B
J	S	F
Q	B	G
	W	H
	X	J
	ZA	Q
	ZB	W
	ZC	X
	ZE	ZA
		ZD
		ZM

**3.32** The following is a description of the options required in DS 303J26:

● **Z Option**—This option provides the proper connection between the DS 303J26, clock generator, and the signal control circuit packs when internal transmitting clock is provided. This option is factory-furnished in synchronous sets.

● **J Option**—Sync Logic Normal—This option is factory-provided and used whenever the Y option is not provided.

● **Q Option**—When this option is installed, the scrambler idle code is transmitted whenever it is receiving a transmit clock. This option is not factory-furnished but must be supplied by the craft employee.



*The M option is factory-furnished and should be removed for this station arrangement.*

In addition to the previously described options, certain strapping is required on DS 303J26 circuit pack AR361. This strapping provides signal continuity and is to be installed by the craft employee as follows: E1 to F1, E2 to F2, B1 to C1, and B2 to C2.

**3.33** The following is a description of the options required in the DAS 806D1:

- **J Option**—Factory-furnished option which completes the answer-back tone and voice-frequency data paths in DAS 804A7.
- **S Option**—Factory-furnished option which is used when the DTR signal is to be provided from the customer's data terminal. It must be used if the station has an automatic answer feature.

**Note:** When S option is provided, the customer's business machine must have the capability to control the DTR lead.

- **W Option**—This option, not factory-furnished, is provided for use with 2-wire voice circuits. It connects the 2800-Hz test detector to the voice pair in DAS 806D1.
- **X Option**—This option is factory-furnished and provides a 0-dB pad in the wideband transmitting line.
- **B Option**—This option provides the wideband lines through the local and remote test relay contacts. This option is factory-furnished.
- **ZA Option**—This option completes the +18 volt path to the WB CHAN lamp. This option must be provided by the craft employee.
- **ZB Option**—This option provides the ACU TALK IND from the DAS 804A7 to the DAS 801C4. This option must be provided by the craft employee.

- **ZC Option**—This option provides for the simultaneous WB DATA/TALK feature and must be provided by the craft employee.

- **ZE Option**—This option provides a termination for the voice lines when a voiceband data set is not provided. This option must be provided by the craft employee.

**3.34** The following is a description of the options required in the DAS 804A7:

- **B Option**—Connects R relay make contact to AUTO key to provide part of the operate path for the C relay in the automatic answer mode. This option is factory-provided.

- **F Option**—Used to connect the TALK lamp to the T relay. When the station is in the talk mode, the lamp associated with the TALK key lights. This option must be provided by the craft employee.

- **G Option**—Converts the AUTO key to locking-type operation and provides remainder of operate path for C relay in automatic answer mode. Used with the B option, it provides the automatic answer function for the data station. This option must be provided by the craft employee.

- **H Option**—Provides a balanced pair on DT and DR instead of a single signal lead with a common ground. This option must be provided by the craft employee.

- **J Option**—Factory-furnished option which provides the proper network configuration for fixed 2-wire service.

- **Q Option**—Factory-furnished option which provides ringing on the transmit pair.

- **W Option**—Factory-furnished option which provides 900-ohm line impedance.

- **X Option**—Provides answer-back tone power level of -12 dBm to serving central office. This option is factory-provided.

- **ZA Option**—An installer option to allow use of the +18 volt power supply in the data set.

- **ZD Option**—Factory-furnished option which provides the 11G apparatus unit.
- **ZM Option**—In this station arrangement, the ZM option is required to complete the answer-back tone path.

#### E. Operation

**3.35** Data Set 303J26 provides 460.8 kbps data service on PICTUREPHONE facilities. A DAS 804A7 is provided at the station and is used to originate calls on the PICTUREPHONE network. Access to the PICTUREPHONE network is obtained by prefixing the number sign to the normal dialing code.

**3.36** There are two different types of PICTUREPHONE arrangements, ie, single-line station and key telephone station arrangements. The basic operation of the two stations differs as follows:

- **Single-Line Station Arrangement**—When the wideband data station is used with the single-line arrangement, the PICTUREPHONE line facility is used exclusively for wideband data. The PICTUREPHONE line facility is terminated at the 114A Interconnecting Unit.
- **Key Telephone System Arrangement**—When the wideband data station is used with the key telephone system arrangement, the PICTUREPHONE line facility is made available to any one of several ports under control of the key telephone system. The wideband data station is one of these ports. The operation of this station arrangement differs from that of the single-line station in that the wideband station must be accessed via the key system. Once the wideband data station is accessed to the PICTUREPHONE facilities, operation of the two systems is identical.

**3.37** There are two basic types of attendant operations, ie, the normal operation of initiating and receiving telephone or data calls and test operation. The operating procedures necessary to place telephone and data calls, as well as the various operating procedures associated with testing, are described below.

#### Manual Origination—Manual Answer

##### 3.38 To Initiate a Telephone Call:

- (a) Lift handset.
- (b) Depress TALK button (TALK lamp lights).
- (c) Dial the desired telephone number and complete the call in the usual manner.

##### 3.39 To Initiate a Data Call—Dial Direct:

- (a) Lift handset.
- (b) Depress the TALK button (TALK lamp lights).
- (c) Depress the # button before dialing the 7-digit number (10-digit number when area code is included).

**Note 1:** Depressing the number symbol (#) as the first digit when placing a local wideband data call provides a signal which engages the associated wideband circuits. This signal identifies the call as one requiring a wideband channel. Failure to depress the # button will result in establishment of an ordinary voice circuit.

**Note 2:** If the *called* station is experiencing a power failure indication, this results in reorder or busy-back tone at the *calling* station.

- (d) Reach agreement with the called attendant on the method or time to return to the talk mode. Confirm whether the receiving station is prepared to receive data.
- (e) After establishing the connection, the attendants at both the calling and called stations agree to enter the data mode and then each depresses the DATA button. This action releases the TALK button, extinguishes the TALK lamps, and, after approximately 5 seconds, lights the WB CHAN lamp. The data stations are now in the data mode and wideband transmission can begin. Now the attendants can place their handsets on the switchhooks. Having established the data mode, it is now possible for the attendants to have simultaneous voice communication and wideband data transmission

by depressing their TALK buttons. (During data transmission, the handset must never be cradled when the TALK button is depressed. This action will release the call.)

**3.40 To Answer a Telephone Call:**

- (a) Lift handset.
- (b) Depress TALK button (TALK lamp lights).
- (c) Complete the remainder of the call in the usual manner.

**3.41 To Answer Incoming Manually Originated**

**Data Call:** To answer an incoming call, depress the TALK button, lift handset (TALK lamp lights), and answer in the usual way. The parties should initially establish the need for voice communication during or at the end of transmission. The parties should agree on the method or time to return to the talk mode. Confirm that your station is prepared to receive data. When transmission can be started, report "Ready—start" to sending attendant. Depress the DATA button. The TALK lamp extinguishes and, in approximately 5 seconds, the WB CHAN lamp lights.

**3.42 To Terminate a Call:** If no conversation is necessary at the end of data transmission, an end-of-transmission (EOT) code may be sent by the terminal (business machine) equipment at the sending station. The code causes the terminal equipment to release the call by removing the DTR ON signal. When the call is released, the DAS 804A7 is removed from the holding condition, thereby extinguishing the WB CHAN lamp. The call may also be terminated manually by lifting the handset, depressing the TALK button, and replacing the handset on the switchhook.

**Manual Origination—Automatic Answer**

**3.43 To Initiate a Call:** Originate calls to an unattended receiving station in the same manner as for an attended receiving station. If the unattended station is ready to receive data, it will answer automatically. A brief ringing will be heard followed by the high-pitched answer-back tone. At the end of the tone, depress the DATA button. The DATA button will not light. After the DATA button is depressed, the WB CHAN lamp will light. Both stations are now in the data

mode, and transmission can begin. Replace handset on the switchhook.

**3.44 Automatic Answering:** When the station is arranged for automatic answering, all calls are received on an automatic (unattended) basis. This requires the business machine to supply a DTR ON signal. When ringing occurs, the station will answer and go into the data mode automatically. If an AUTO button is provided, it must be depressed to allow automatic answering. When the button is not depressed, the bell continues to ring until the call is answered manually, until the AUTO button is depressed, or until the calling party abandons the call.

**3.45 Terminating Call From Originating Station:**

At the end of data transmission, and EOT code may be sent to terminate the call automatically, or the call may be terminated manually. To terminate the call manually, lift the handset, depress the TALK button, and replace the handset on the switchhook.

**3.46 Terminating Call From Receiving Station:**

No attendant operation is required at the receiving station to terminate a call. At the end of data transmission, an EOT code is sent from the originating station. This causes the receiving station to release the call, by turning DTR off, and extinguish the lamps.

**Simultaneous Data/Talk Feature**

**3.47** When this feature is provided, enter the data mode in the usual manner. When voice communication is desired, then depress the TALK button. The system is now capable of data transmission and voice communication simultaneously.

**3.48** If you wish to place the handset "on-hook" without dropping the call, depress DATA button before going "on-hook."

**3.49** The call may be terminated by either of two methods: going "on-hook" when the TALK button is depressed or removing the ON signal from the DTR lead.

**3.50** The simultaneous talk/data mode can be entered only after the data mode has previously been established. Going "on-hook" while the TALK button is depressed will terminate the call. When the handset is "on-hook" and DAS

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804A7 is in the data mode, the call is terminated by removing the DTR signal.

### Manual Station Testing

**3.51** To go into the local test mode under control of DAS 804A7:

- (1) Depress the TST key. The associated lamp lights.
- (2) The station is now in the local test mode as previously described.

**3.52** To go into local test mode under control of DAS 806D1:

- (1) Turn LT key to vertical position. The LT lamp lights. Also, TST lamp on DAS 804A7 lights.
- (2) This places the station in the local test mode as previously described.

**3.53** The BLT key performs no function in this application.

**3.54** The LRT key is a nonlocking key that, when depressed and held for approximately 7 seconds, performs the same function as the 2800-Hz tone described in remote test. When this key is depressed and released the first time, RT1 lamp lights. The second time the LRT key is depressed and released, both the LT and RT1 lamps light. The third time the LRT key is depressed and released, both lamps extinguish and the station returns to normal. The TST lamp on DAS 804A7 is lighted when either the LT or RT1 lamp is lighted.

### Attendant Cooperation for Remote Test

**3.55** Remote test requires that a call be placed to the wideband data station and that the station answer the call. Upon being notified that a remote test is to be made, the attendant can either (1) go into the data mode and then go "on-hook" or (2) remain in the talk mode and listen for 2800-Hz tone. When the tone stops (receiver goes dead), then go "on-hook." No further attendant action is required. The procedure in (2) above eliminates the need for an ON DTR signal from the business machine.

## DATA SET 303J26, DATA AUXILIARY SET 806D1, DATA AUXILIARY SET 804A7, AND DATA AUXILIARY SET 801C4

### A. General

**3.56** Operation of the apparatus in this station arrangement is essentially the same as that described in the previous paragraphs. The addition of Data Auxiliary Set 801C4 does, however, provide the station with the automatic calling capability. The DAS 801C4 is referred to as an automatic calling unit or ACU. The automatic calling capability allows the business machine to automatically originate calls on facilities equipped for TOUCH-TONE® dialing.

**3.57** The ACU may be provided in the data station in either the single-line or the key telephone station arrangement. Operation of the ACU is essentially the same in either arrangement. Refer to Fig. 11 and 12, respectively, for the single-line and key telephone system block diagram arrangements.

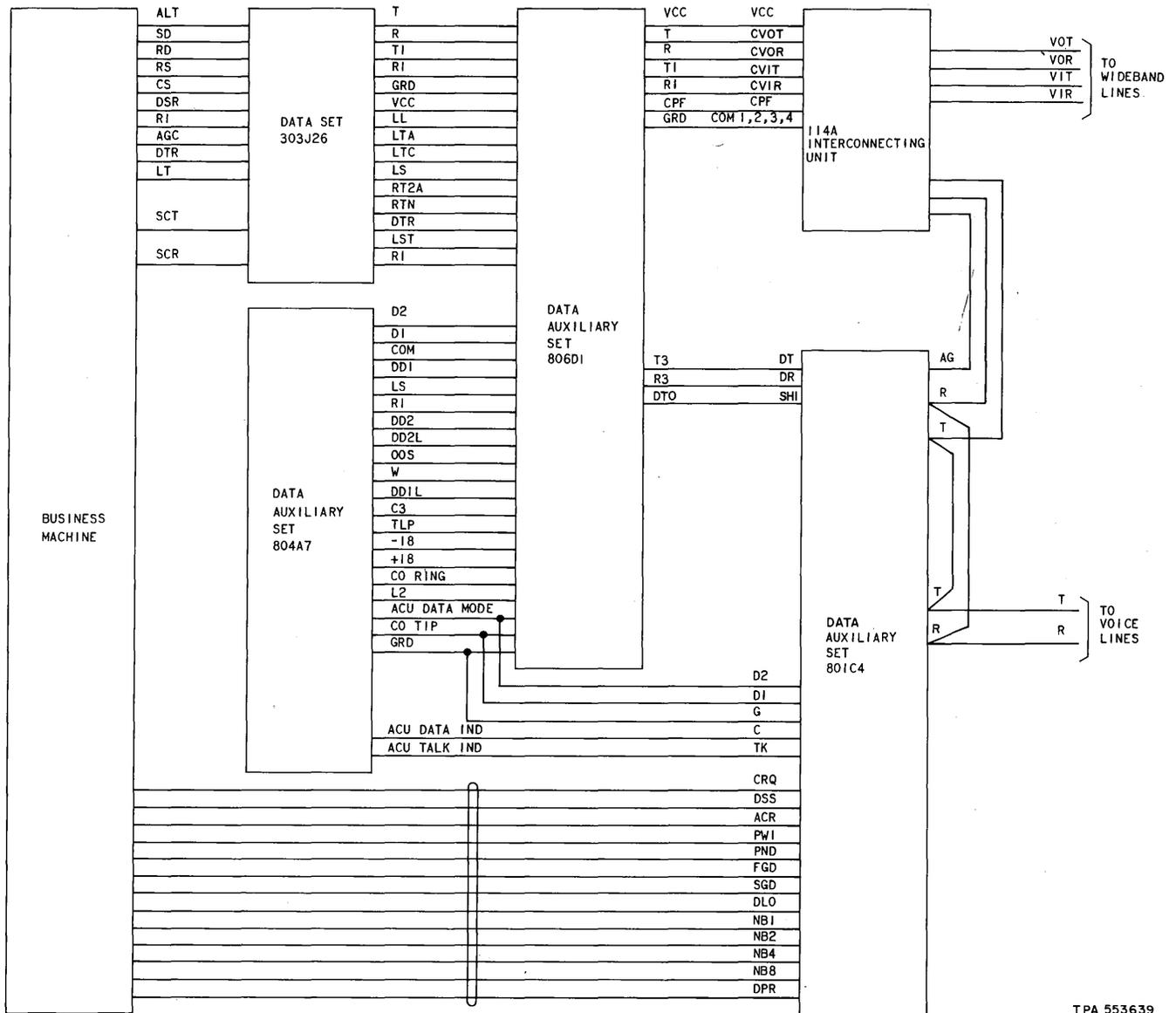
### B. Test and Maintenance Features

**3.58** The local test, remote test, and monitoring and terminating jacks perform the same function in this station arrangement as in the DS 303J26, DAS 806D1, and DAS 804A7 station arrangement previously described. For test applicable to DAS 801C4, refer to Section 598-012-501.

### C. Control Functions

**3.59** The addition of DAS 801C4 does not affect the control leads between the DS 303J26 and the business machine. The addition of DAS 801C4 does, however, require additional leads to the customer business machine. These leads are the standard ACU interface leads. The interface leads applicable to this station arrangement are listed in Table B.

**3.60** The addition of the ACU either adds or changes the function of the following station leads. See Fig. 11 or 12 for leads applicable to either the single-line or key telephone system arrangement. It should be noted that some of these leads have one functional designation at one end and a different functional designation at the other end, ie, T3 at DAS 806D1 and DT at the ACU. This is done intentionally to provide a cross reference.



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Fig. 11—Data Set 303J26, Data Auxiliary Set 806D1, Data Auxiliary Set 804A7, 114A Interconnecting Unit, and Data Auxiliary Set 801C4—Single Line Station Arrangement—Block Diagram

- **T and R**—Tip and ring of the telephone line from DAS 801C4 to the 2-wire TOUCH-TONE facilities for the single-line station arrangement or from DAS 801C4 to the 1P2 key telephone for the key telephone system arrangement.
- **DT and DR**—Tip and ring of the telephone line from the DAS 801C4 to the DAS 806D1.
- **ACU TALK INDICATOR**—When DAS 804A7 is in the talk mode, an off-hook indication is given to the ACU by placing ground on the TK lead to the ACU. This prevents the business machine from originating a call automatically when a call is being originated manually.
- **ACU DATA INDICATOR**—Ground is applied by DAS 804A7 to the C lead of ACU when the DAS 804A7 goes to the data mode.
- **GRD**—Provides DAS 804A7 ground to the G lead of ACU.

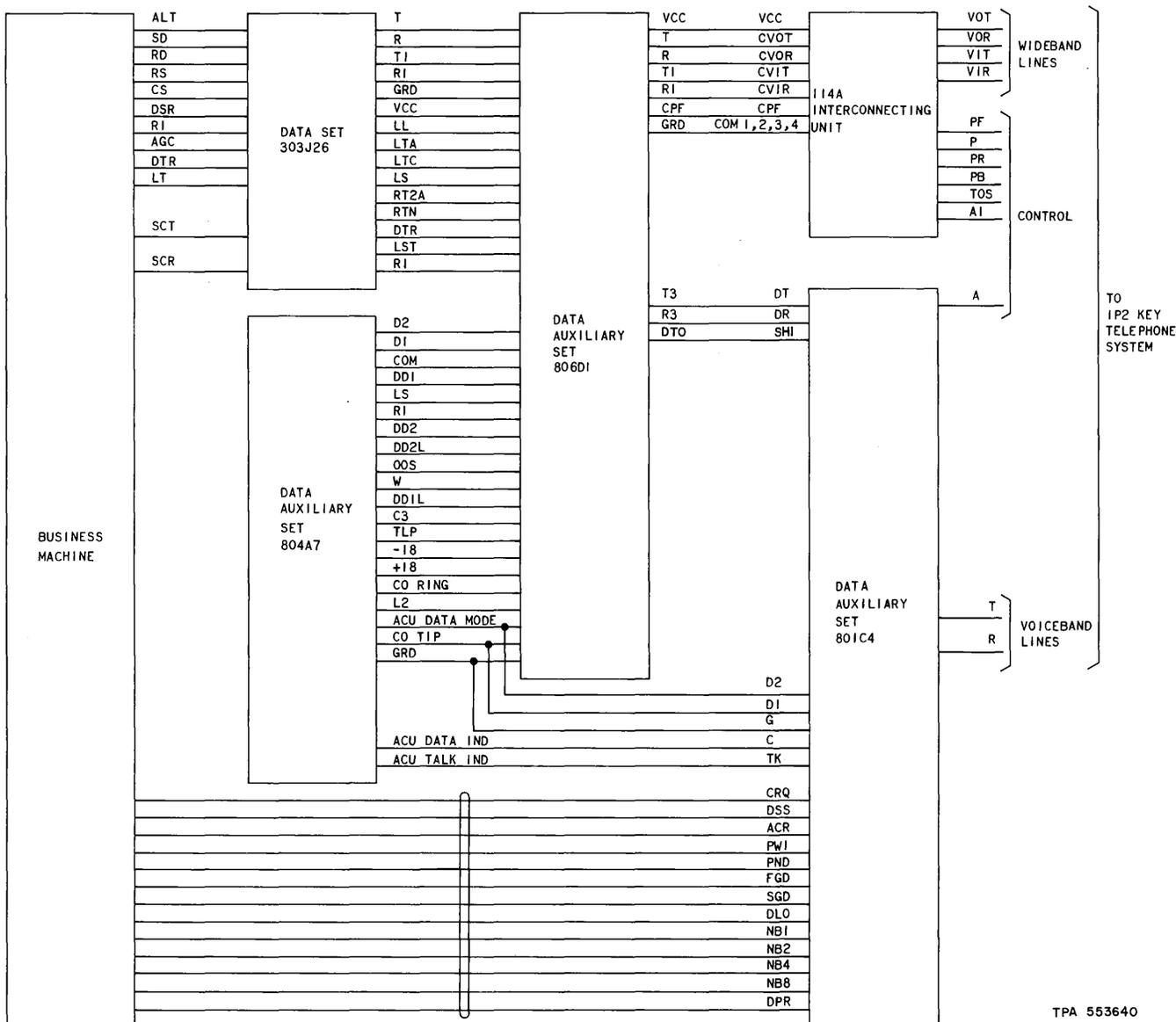


Fig. 12—Data Set 303J26, Data Auxiliary Set 806D1, Data Auxiliary Set 804A7, 114A Interconnecting Unit, and Data Auxiliary Set 801C4 Key Telephone Station Arrangement—Block Diagram

● **ACU DATA MODE, CO TIP**—These leads are connected together by the D1, D2 leads of the ACU when answer-back tone is detected. This action is the electrical equivalent of pushing the DATA button on DAS 804A7 when answer-back tone is heard.

● **DTO**—Ground is supplied to the DTO lead by DAS 801C4 when DAS 804A7 is either off-hook in the talk mode or in the data mode. This ground is used in DAS 806D1

to provide a relay-latching path required for the simultaneous DATA/TALK option (ZC).

**D. Options**

**3.61** Options required for this station arrangement are identical to those previously described for the data station equipped with DS 303J26, DAS 804A7, and DAS 806D1. However, certain

**TABLE B**  
**ACU SIGNAL INTERFACE CONNECTOR LEADS**

LEAD	DEFINITION
FGD	Frame Ground
DPR	Digit Present
ACR	Abandon Call and Retry
CRQ	Call Request
PND	Present Next Digit
PWI	Power Indicator
SGD	Signal Ground
DSS	Data Set Status
NB1	Binary Digit With Weight 1
NB2	Binary Digit With Weight 2
NB4	Binary Digit With Weight 4
NB8	Binary Digit With Weight 8
DLO	Data Line Occupied

options are required in the DAS 801C4. The options, as specified in Table C, must be provided.

#### **E. Operation**

**3.62** Operation of this station arrangement, when the automatic calling feature is not used, is identical to that described for the data station equipped with DS 303J26, DAS 804A7, and DAS 806D1. When the automatic calling unit is provided, operation of the station may be considered as hands-free operation. No attendant operation is necessary.

#### **Automatic Operation**

**3.63** Automatic operation, that is, automatically originating and terminating data calls, is possible in this station arrangement under the following conditions:

- An automatic calling unit is provided at the sending location.
- The AUTO button is depressed at the receiving location.

- The customer's business machine at the sending location is arranged to transmit an EOT code. The EOT code causes the terminal (receiving) equipment to release the call and extinguish the WB CHAN lamp.

#### **4. REFERENCES**

**4.01** The circuit descriptions (CDs) and schematic drawings (SDs) for the apparatus included in the DS 303J26 type wideband station are as follows:

- SD-1D100-01 and CD-1D100-01 Data Set 303-Type
- SD-1D041-01 and CD-1D041-01 Data Auxiliary Set 804A7
- SD-1D218-01 and CD-1D218-01 Data Unit 32A-Type
- SD-1D103-01 and CD-1D103-01 Data Auxiliary Set 801C4
- SD-1D217-01 and CD-1D217-01 Data Auxiliary Set 806D-Type
- SD-1D219-01 and CD-1D219-01 10A3 Data Unit
- SD-69904-01 and CD-69904-01 114A Interconnecting Unit
- SD-1D099-01 and CD-1D099-01 Data Station for Wideband Service Using Data Set 303-Type.

**4.02** Bell System Practices covering the various equipment in the station are as follows:

SECTION	TITLE
593-012-100	Data Set 303-Type, Description
598-030-100	Data Auxiliary Set 804A-Type, Description and Operation
598-012-101	Data Auxiliary Sets 801C3 and 801C4, Description and Operation
590-100-106	10A-Type Data Unit, Identification and Operation

TABLE C

**OPTIONS REQUIRED IN DAS 801C4 AS USED IN 2-WIRE  
SWITCHED SERVICE DATA OVER PICTUREPHONE FACILITIES**

OPTION	DESCRIPTION	FACTORY-PROVIDED
B	ACU answer detection or end of number	Yes
F	Data set to data mode by isolated contact	No
R	Stop ACR timer when DSS goes ON	Yes
S	Detect 2025-Hz answer tone	Yes
W	Detect end of answer tone	No
Y	Loop start	Yes
ZD	Terminate call via data set after DSS ON	No
ZH	2-wire	Yes
ZM	DLO controlled by ACU	Yes
M	D10P cord	Yes
ZB	Grounded TK and CL contacts	No

**Note 1:** Remove the following factory-provided options: Z, ZA, Q, X.

**Note 2:** DAS 801C4 must be Series 3 (with option ZQ — CP AS64). This version includes a 12-combination TOUCH-TONE transmitter and control circuit.

**Note 3:** Do not use T option in DAS 804A7 in spite of the ACU application. (T is for "ground start" line applications.)

590-100-113	16A1 Data Unit, Identification	598-077-100	Data Auxiliary Set 806D-Type, Identification
463-390-100	PICTUREPHONE Connecting Arrangement PVF—114A Interconnecting Unit	590-100-122	32A-Type Data Unit, Description and Operation.