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how to operate the...

DATAPHONE™ 300/1200

DATA SET 212A

 **Bell System**

NOTES

Data Set 212A

Data set 212A is capable of transmitting and receiving data at two distinct bit rates over the switched telephone network. In the low-speed mode, the maximum bit rate is 300 bits per second; in the high-speed mode, the bit rate is 1200 bits per second. In the low-speed mode, data set 212A is compatible with data sets 103-type and 113D. In the high-speed mode, it is compatible only with another data set 212A. Data set 212A may be provided with a standard 6-button telephone set which can serve up to five data sets and permits manual calling or answering. Automatic answering may be provided as an option. Automatic calling may be provided with a data auxiliary set 801-type.

- Observe MC lamp for 2 minutes.

Low-Speed Mode: If MC lamp remains lighted, this indicates excessive data distortion. If similar performance is observed on another call, the condition should be reported to the Telephone Company.

High-Speed Mode: If MC lamp flashes 3 or more times or remains lighted, repeat the test. If similar performance is observed on another call, the condition should be reported to the Telephone Company.

Data sets are returned to normal operating condition.

- To terminate the test, depress to release ST buttons at both data sets and terminate the call.

REPORTING TROUBLE

The only troubles that should be reported to the Telephone Company are those encountered with equipment and/or service provided by the Telephone Company. Before reporting trouble to the Telephone Company it is important to verify that the trouble exists in the Telephone Company provided equipment and/or service and not in the customer provided equipment.

Trouble encountered with the Telephone Company provided equipment and/or service should be reported immediately by calling _____.

Indicate in the report that the trouble is "Dataphone service trouble" and report the results of the tests performed.

If the Telephone Company test center needs to perform tests, the customer's permission will be obtained prior to testing.

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Status Lamps on the Data Set

The data set is provided with eight status lamps. Each lamp lights a portion of the front cover which shows its 2-letter identification. The lamps and their functions are as follows:

MB (Make Busy) — This lamp is lighted when the AL button is depressed or when the terminal equipment activates the make busy circuitry in the data set.

TR (Terminal Ready) — This lamp is lighted when the terminal equipment is ready.

MR (Modem Ready) — This lamp is lighted when the data set is in the data mode.

SD (Send Data) — This lamp is lighted when a space signal is transmitted; it flickers during transmission of data.

RD (Received Data) — This lamp is lighted when a space signal is received; it flickers during reception of data.

HS (High-Speed) — This lamp is lighted when the data set is operating in the high-speed mode.

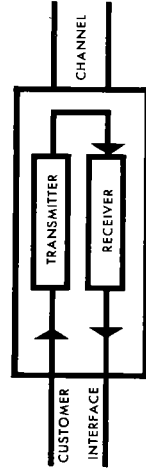
MC (Modem Check) — This lamp is lighted when the data set is in the idle condition. If the data set is in the data mode, the lamp is off if a valid line signal is received.

TM (Test Mode) — This lamp is lighted when the data set is in a test mode.

Buttons on the Data Set

The data set has five push-to-operate, push-to-release buttons. These buttons condition the data set as follows:

AL (Analog Loopback) — This switch connects the data set output to the data set input to permit local testing through the customer interface.



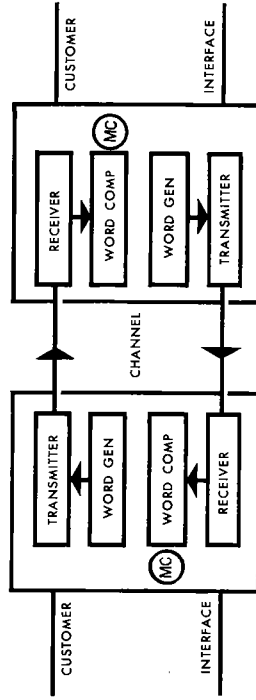
Analog Loopback Mode

Digital Loopback Test: This test is identical to the Digital Loopback Self Test except that it uses the terminal equipment instead of the self-test features of the data set. Procedures are the same except that the ST button is not depressed.

By transmitting data from the terminal equipment and comparing it with the received copy, the terminal equipment, data sets, and channel can be checked. Procedures for proper application of this test are established by the data terminal manufacturer.

END-TO-END TESTING

This self test is used to analyze the local and distant data sets and the channel without external equipment. This is the recommended test for low-speed performance. Attendants are required at both ends to conduct the test. The speed mode employed should be the one used by the terminal equipment.



End-to-End Self Test

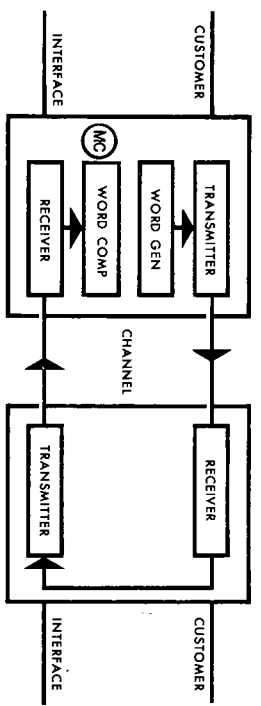
- Establish a call between the two data sets to be tested.
 - Depress ST button on both data sets.
 - Transfer to data mode at both data sets.
- MR, SD, RD, TM lamps light.
HS lamp lights if HS button is depressed.
MC lamp goes off.
MB lamp stays off.
Disregard TR lamp.*

If the distant station is attended, set up the test as follows:

- Depress ST and HS buttons on local data set.
- Dial a call to distant station and instruct answering attendant to depress DL button.
- Instruct distant attendant to go to data mode. When high-pitched tone is heard, go to data mode at local data set.

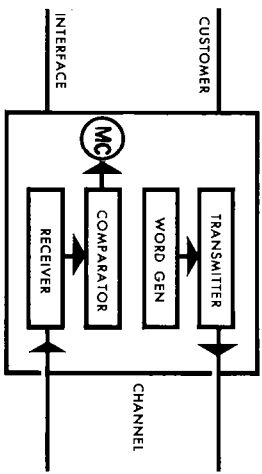
Complete the test by performing the following procedure at the local data set:

- Observe data set lamps.
 - SD, RD, HS, MR, TR lamps light.*
 - MC lamp goes off.*
 - Disregard MB and TRL lamps.*
 - If MC lamp flashes more than 4 times or remains lighted, performance is not satisfactory. If another call experiences similar performance, the trouble should be reported to the Telephone Company.*
- To terminate test, depress to release RDL (unattended) and ST buttons and terminate the call.
 - Data set is returned to normal operating condition.*



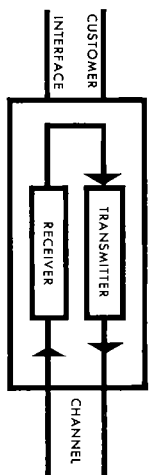
Digital Loopback Self Test

ST (Self Test) — This button disconnects the terminal equipment and activates the data set self test circuits.



Self Test Mode

DL (Digital Loopback) — This button disconnects the terminal equipment from the data set and loops the data set receiver to the transmitter. This allows testing of the local data set from a distant location such as a data test center.



Digital Loopback Mode

RDL (Remote Digital Loopback) — This button can be used to place an unattended distant data set in the digital loopback mode. This button can only be used when the data set is in the high-speed mode.

HS (High-Speed) — This button is used to control the speed mode of an originating (calling) station. When the switch is depressed, the data set is in the high-speed mode; when the switch is out, the data set is in the low-speed mode. The speed mode must be selected **before** going to the data mode, and cannot be changed once the data set is in the data mode. On an answering data set, this button has no effect. The speed mode in this case is determined by the calling data set.

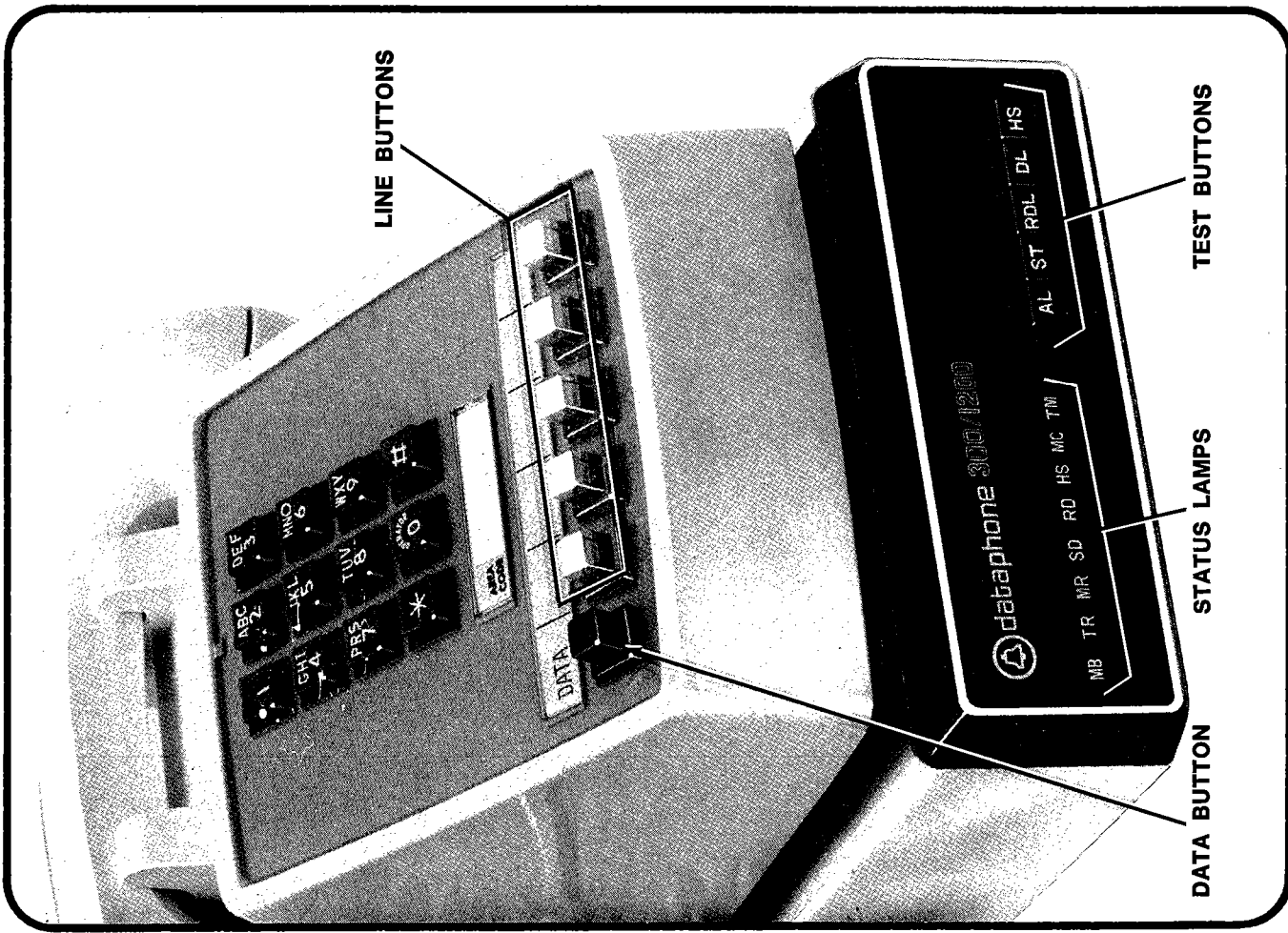


Fig. 1 — Data Set 212A With Telephone Set

Analog Loopback Test: This test is used to check the operation of the local data set in conjunction with the terminal equipment. The data set should be idle (MC lamp lighted, MR lamp off). Conduct the test in the speed mode used by the terminal equipment.

- Verify that TR lamp is lighted. *Terminal equipment is supplying a data-terminal-ready signal.*
- Depress AL button (and HS button if a high-speed test). *MB, TM lamps light. HS lamp lights if HS button is depressed. After 3 seconds, MC lamp goes off. Disregard MR lamp.*

By transmitting test data and comparing it with the received copy, the terminal equipment is checked for proper operation. Procedures for proper application of this test are established by the data terminal manufacturer.

- To terminate the test, depress to release AL button. *Data set is restored to normal operation.*

DIGITAL LOOPBACK TESTING

Two Digital Loopback Tests are described; both tests use one data set in the digital loopback mode, acting as a repeater to test the local and distant sets and the associated channel. Digital Loopback Tests are not a satisfactory method for the isolation of suspected troubles for the low-speed mode of data set operation; the End-to-End Self Test is recommended for low-speed mode testing. When testing in the high-speed mode, an attendant is normally not required at the distant station because of the remote digital loop feature at the local data set.

Digital Loopback Self Test (High-Speed Mode): If the distant station is unattended, it must be optioned to respond to the test and to answer the call automatically. At the local data set, set up the test as follows:

- Depress RDL, ST, and HS buttons. *Distant data set answers automatically and goes to data mode.*
- Dial a call to the distant station and when the high-pitched tone is heard, go to the data mode.

Testing Procedure

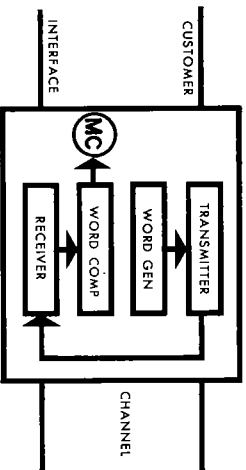
In cases of suspected trouble, the attendant should perform the Analog Loopback Self Test at the local data set. If the test is passed, the suspected trouble can be further isolated by performing either the End-to-End Self Test or the Digital Loopback Test. If these tests are successful, there is strong indication that the Telephone Company provided equipment is operating satisfactorily.

The data set is equipped with four test buttons (AL, ST, DL, RDL), which are used when performing the following tests.

ANALOG LOOPBACK TESTING

Analog Loopback Self Test: This test is used to analyze the local data set without external equipment. The data set should be idle (MC lamp lighted, MR lamp off). Conduct this test in the speed mode used by the terminal equipment.

- Depress AL and ST buttons (and HS button if a high-speed test).
MB, SD, TM lamps light. HS lamp lights if HS button is depressed.
- Observe MC lamp for 1 minute.
After 3 seconds, RD lamp lights and MC lamp goes off. Disregard MR and TR lamps.
- To terminate the test, depress to release AL and ST buttons.
If MC lamp flashes or lights steadily, data set has failed the test.
Data set is restored to normal operation.



Analog Loopback Self Test

DATAPHONE Service

CONTROLS ON THE TELEPHONE SET

Data set 212A may be provided with the 6-button key telephone set shown in Fig. 1. Five of the six buttons are used to select the desired data set and the associated telephone line. The red DATA button is nonlocking; it releases the locking-type LINE buttons when it is depressed and released, to transfer the data set to the data mode. The procedure for originating, answering, and terminating a call is described as follows. If no telephone set is provided, only the automatic procedure applies.

MANUALLY ORIGINATING A CALL TO A MANUALLY ANSWERED STATION

- Verify that AL, ST, RDL, and DL buttons are released.
- Verify that MC and TR lamps are lighted.
- Verify that data set is in proper speed mode as determined by HS button.
- Depress the appropriate LINE button.
- Lift the handset.
- When dial tone is heard, dial the call.
- Make sure that the answering data set goes to the data mode first.
High-pitched answer tone is heard in handset.
- When answer tone is heard, momentarily depress the red DATA button on the telephone set.
LINE button lamp lights. LINE button releases.
- Place the handset on-hook.
MR lamp lights. MC lamp goes off. HS lamp lights if data set is in high-speed mode.

MANUALLY ORIGINATING A CALL TO AN AUTOMATIC ANSWERING STATION

- Verify that AL, ST, RDL, and DL buttons are released.
 - Verify that MC and TR lamps are lighted.
 - Verify that data set is in proper speed mode as determined by HS button.
 - Depress the appropriate LINE button.
 - Lift the handset.
 - When dial tone is heard, dial the call.
- When distant data set has answered, a high-pitched answer tone is heard in the handset.*
- LINE button lamp lights.
LINE button releases.*
- MR lamp lights.
MC lamp goes off.
HS lamp lights if data set is in high-speed mode.*

AUTOMATICALLY ORIGINATING A CALL

Stations arranged for automatic calling require no intervention by the attendant. When the data set is in the data mode, the telephone set LINE button lamp and the data set TR and MR lamps are lighted, and the MC lamp is off.

MANUALLY ANSWERING AN INCOMING CALL

- Depress the LINE button that flashes during ringing.
 - Answer by lifting the handset.
 - Verify that TR lamp is lighted.
- LINE button lamp lights.*

- Momentarily depress the nonlocking DATA button on the telephone set.
- Data set is in data mode when MR lamp lights. Place handset on-hook.

LINE button lamp remains lighted and LINE button releases.

AUTOMATICALLY ANSWERING AN INCOMING CALL

Stations arranged for automatic answer require no intervention by the attendant. When the data set is in the data mode, the telephone set LINE button lamp and the data set TR and MR lamps are lighted, and the MC lamp is off.

RETURNING TO THE TALK MODE

When data transmission is completed, return to the talk mode may be possible by picking up the handset and depressing the appropriate lighted LINE button. Care must be exercised to select the correct LINE button if more than one data set is controlled by the same telephone set. When the data set is transferred to the talk mode, the lamp under the LINE button goes off.

MANUALLY TERMINATING A CALL

- Pick up the handset.
 - Depress the appropriate lighted LINE button.
 - Place handset on-hook.
- LINE button lamp goes off.
MR lamp on data set goes off.*