DATA SYSTEMS—"DATAPHONE®" SERVICE AND OTHER DATA SERVICES ON THE DIRECT DISTANCE DIALING NETWORK OVERALL MAINTENANCE PROCEDURES

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1. GENERAL

1.01 This section describes the overall trouble clearing procedures and analysis of data services, on switched telecommunications or direct distance dialing (DDD) network, hereafter called switched data services. Initially, only telephone company provided data sets were connected to the network and the service was called DATAPHONE service. However, with the advent of interconnection, "other" data equipment or customer provided equipment (CPE) was permitted to directly interconnect using some means of network protection. With the registration program, network protection is intended by having equipment registered and connections made using voice jacks or data jacks. These changes, along with the various methods that customers can use to access the switched network, have complicated the investigation of trouble reports on switched data services. Therefore, changes are required in the overall plan for trouble investigation and maintenance of switched data services in a complex, multivendor environment.

1.02 This section is reissued for the following reasons:

(a) To include information on voice and data jacks

(b) To update testing methods and analysis procedures

(c) To clarify supported switched data services

(d) Provide information for handling data trouble reports envolving satellite trunk connections

(e) To provide information for handling data trouble reports involving international calls.

Since this reissue is a general reissue, no revision arrows have been used to denote significant changes.

1.03 All trouble reports on switched data services will be received by the special service center (SSC). An integral part of the SSC is the data test center (DTC) capability. This practice covers the handling, controlling, and clearing of all trouble reports. The SSC/DTC may often find it necessary and advantageous to request the assistance of other work groups in locating, sectionalizing, and clearing data troubles.

1.04 To provide a systematic approach to the location and clearing of trouble, the plan is divided into the following phases:

(a) Trouble Investigation—Phase I—Remote Tests

(b) Trouble Investigation—Phase II—On-Site Tests

(c) Trouble Investigation—Phase III—Escalate to Data Technical Support (DATEC)

A. Description of Overall Maintenance Plan

1.05 Switched data services involves the use of local loops, foreign exchange (FX), wide area telecommunications service (WATS), remote exchange (RX), and PBX station lines to access the DDD network. Various publications describe the DDD network to customers and defines those data services that the telephone company supports or does not support.

1.06 The customer is normally the first party to recognize the existence of a trouble condition. It is essential that telephone personnel obtain a clear understanding of the problem at the outset of the investigation through a ***trouble report analysis***. The procedure for performing this analysis is given in Section 668-010-300. From preliminary analysis, it should be possible to determine the type of trouble and the locations experiencing it. If the trouble is properly analyzed, erroneous and/or misdirected reports should be eliminated.

B. Additional Maintenance Considerations Voice Jacks and Data Jacks

1.07 The voice jack and/or data jack provide the means for registered data sets (both TELCO and CPE) to be connected to the DDD network. When a CPE data set is used with these jacks, the error rate performance is not specified nor is the data set to be tested, by the DTC or other TELCO personnel. Descriptive information on the voice and data jacks is given in Section 590-101-103.

Test Requirements

1.08 The customer may have his local access line terminated in either a voice jack or a data jack. Transmission tests are required at installation for FX, RX, and remote WATS lines as indicated in Section 314-205-501. However, for loops and local WATS, installation tests are the same as normal business service, whether terminated in a voice jack or data jack. That is, only a normal line test is required. With a data jack, however, insertion loss is measured as part of the data jack installation.

1.09 In case of problems at installation or during a trouble report, the following parameters should be measured on the access line:

Voice Jack

- Insertion Loss
- C-Notched Noise
- Impulse Noise

Data Jack

- Insertion Loss
- C-Notched Noise
- Impulse Noise
- Slope (404-2804 Hz)

The limits for these various parameters are given in Section 314-205-501. If the limits cannot be met, the circuit should be referred to the circuit provision bureau (CPB) for design on an expedited basis.

Levels of Support

1.10 Since it is not possible to control the transmission parameters that affect data transmission in all possible arrangements, there is a need to define the two levels of support. These terms are defined below.

1.11 Fully supported switched data services are services for which the telephone company has published end-to-end performance standards. End-to-end performance (over a long period of time) is supported on 85 percent of the connections for fully supported services. These performance standards are called minimum acceptable performance (MAP) criteria and are described in Section 314-205-503. When TELCO data sets are used, end-to-end digital error performance is also

supported. Digital error performance criteria are no more than one bit error in 100,000 bits transmitted for asynchronous data transmission, or no more than one-1000 bit block in error out of 100-1000 bit blocks transmitted for synchronous data transmission.

Support to Satisfactory Voice Quality Only

The second level of support is satisfactory voice quality only. A trouble report on this category of service should be handled as a normal voice type trouble report. Each element of the end-to-end connection should meet its standard objectives. Representative examples of this category are:

- Service on an FX line to a station more than 200 miles from the dial tone office
- Service from any station to any other station through OCC, CPE facilities or equipment
- Service from an off-premises PBX station to any station other than on-premises station behind the same PBX
- Service from any private switched network off net to a station on the DDD network
- Acoustically or inductively coupled stations
- Service to any country other than the 50 states and Canada.

Trouble Reports Involving Satellite Trunks

1.13 The planned growth of satellite facilities in the switched network will increase the exposure of switched data services to satellite facilities. While most data systems will operate satisfactorily over satellite trunks, there are some data arrangements which may experience difficulties resulting in trouble reports. The following guidelines for handling these reports are as follows:

(a) If a satellite trouble is suspected, call the local DATEC team and verify that satellite routing between the cities the customer is calling is available. (DATEC advisories are issued as required to update satellite trunk status.) If satellite routing is not possible, normal trouble testing procedures should be followed to clear the trouble.

(b) If the trouble cannot be cleared using normal testing procedures, or if a satellite trouble is confirmed, then escalate the trouble to DATEC.

Trouble Reports Involving International Calls

1.13 If a customer trouble report is received which involves an international data service the following steps should be taken:

(a) Assure that locally provided TELCO facilities are performing satisfactorily

(b) If no trouble is found, immediately refer the report to the appropriate international service coordination center.

These centers and their areas of responsibilities are given in Section 314-205-500.

2. SWITCHED DATA SERVICE—OVERALL MAINTENANCE PLAN

2.01 The overall maintenance plan consists of three different phases. The first two phases presents a suggested procedure for investigating and isolating trouble. The third phase is entered only when the trouble cannot be cleared through normal testing or when a third consecutive trouble report on the same trouble is received within a 30-day period. The phases are arranged to allow performing the easiest tests on the most probable causes first, followed by the more difficult and time consuming on-site tests last (if needed).

2.02 The existence of a complex, multivendor environment requires that trouble investigation be made promptly in order to isolate the trouble cause to either TELCO or CPE. Trouble isolation is quickly made by performing remote test procedures and by using self-test features of the data set(s) if available. Additionally, the multivendor environment requires that CPE be checked to insure proper operation. If the telephone company dispatches repair personnel and the trouble cause is not TELCO equipment, a maintenance of service charge (MSC) may be assessed the customer. Therefore, it is important that unnecessary dispatch of repair personnel be avoided if possible. A dispatch of repair personnel should only be made when it is determined, by the results of remote tests, that TELCO equipment is the trouble cause and a dispatch is necessary. The administration of the MSC is described in Section 660-101-312.

2.03 The procedures given in Phase I consists of those remote tests performed by DTC personnel on the customers local access line and the TELCO data sets. These tests normally are made in response to the first trouble report from the customer. However, they may also be made in response to additional reports on the same service.

Note: When three similar trouble reports on the same service are received within 30 days and have been closed out as "test OK," "came clear," "found OK," "no trouble found," etc, escalate immediately to Phase III when the third report is received.

CHART 1

TROUBLE INVESTIGATING—PHASE I— REMOTE TESTS

APPARATUS:

None required

STEP	PROCEDURE
1	The SSC/DTC receives a trouble report from the customer.
2	The SSC/DTC analyzes the customer trouble report using the questions given for this analysis in Section 668-010-300. This analysis should indicate the probable location of trouble such as near-/far-end, CPE/TELCO, loop/data set, network, etc.
3	If customer report indicates local loop trouble, perform the normal dc tests on the near-end local loop to confirm or eliminate trouble such as opens, shorts, crosses, etc. ***Note:*** If trouble appears to be caused by excessive noise or loss, proceed to Phase II and perform transmission tests on the access line as given in Section 314-205-501.
4	If results of the dc tests are not satisfactory, the SSC/DTC will arrange for repairing or changing the loop.
5	If the customer report indicates TELCO data set trouble, or if the trouble persists and the loop meets test requirements, the SSC will notify the DTC serving the area and instruct them to perform a test of the near-end data set.
6	If the near-end TELCO data set tests defective, dispatch repair personnel to replace the defective data set.
7	If the near-end data sets tests satisfactorily, and the trouble persists, the DTC should test the far-end data set if TELCO supplied.
8	If the far-end data set tests defective, the DTC will inform the SSC of the test results. The SSC will inform the proper repair group for appropriate acton.
9	If the near- and far-end data sets both test OK, the customer will be advised so that they may contact their business machine people and possibly avoid a maintenance of service charge.
10	If the service is restored satisfactorily, the trouble report will be closed. If the customer is not satisfied with the service and there is no evidence of additional trouble on CPE, proceed to Phase II.

2.04 If the source of trouble is not apparent from tests and information obtained in Phase I, further investigation is necessary to identify the section of data system that is malfunctioning. The activities in Phase II are intended to further isolate the source of trouble by dispatching repair personnel to perform dynamic tests on the data sets and, if necessary, perform transmission tests on the access lines. These activities are initiated by the failure of Phase I to isolate the problem.

CHART 2

TROUBLE INVESTIGATION—PHASE II—
ON-SITE TESTS

APPARATUS:

None required

STEP	PROCEDURE
1	If the customer provided equipment tests satisfactorily, and the service is not restored, the SSC will dispatch a data repair person to the customer site. The customer will be advised by the SSC/DTC that a maintenance of service charge may be assessed if no trouble is found in TELCO equipment.
2	The data repair person will perform a dynamic test to the proper DTC, if data set is TELCO supplied. If data set is not TELCO, perform transmission tests on the access line only and go to Step 5.
3	If the results of the dynamic tests are not satisfactory, replace the data set and repeat the dynamic test.
4	If the results of the dynamic tests are satisfactory, and the trouble persists, the data repair person will perform transmission tests on the access line as given in Section 314-205-501.
5	If the results of the transmission tests do not meet the limits given in Section 314-205-501, corrective action should be made by notifying the circuit provision bureau (CPB) for action on an expedited basis.
6	If the results of the transmission tests are satisfactory and the trouble persists, and if the data sets are TELCO provided, the data repair person will perform an end-to-end self test of the data sets if these test capabilities are available.
7	If the end-to-end self tests are unsatisfactory, replace the defective data set.
8	If the end-to-end self tests are satisfactory and the customer is not satisfied with the service and there is no evidence of additional trouble, proceed to Phase III.

A. Trouble Investigation—Phase III—Escalate to Data Technical Support (DATEC)

2.05 There are three levels of data technical support available for assisting field forces on data service problems. The first level of technical support is the DATEC support personnel in an area or division organization. Local DATEC may then contact the second level of technical assistance from DATEC support personnel at the company headquarters or the third level of support from AT&T headquarters.

2.06 Technical escalation of data service problems is appropriate under the following conditions:

(1) The service meets Bell System specifications but does not meet the customer's performance expectations.

(2) The service does not meet Bell System specifications and the problem source cannot be identified.

(3) The service has generated a high incidence of trouble reports.

2.07 When trouble conditions have been escalated to DATEC personnel, they may direct that certain tests be repeated or additional tests be performed. These tests may include the following:

(a) End-to-end transmission (MAP)

(b) End-to-end error performance (if TELCO supplied data set)

(c) Hold and trace.