

NO. 3 ESS
MAJOR PERIPHERAL (CONTROLLER) TESTS
GENERAL INFORMATION

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1. GENERAL INFORMATION

1.1 Purpose

1.11 The purpose of this section is to provide general information on the major peripheral (controller) testing. This testing is supported by programs which are included as part of the system nonresident, fault diagnosis system for No. 3 ESS.

1.12 The design of these programs allows them to be used in the following applications of testing No. 3 ESS peripheral units:

- a) For initial installation testing
- b) For operational testing
- c) For growth installation testing

1.13 The basic purpose of these programs is to make functional tests of peripheral frames. The programs may detect either equipment faults or wiring errors.

1.2 Peripheral Unit Test Sequence within the 500 Series Tests

1.21 Peripheral Unit Tests (520.XX) should follow the completion of Handbook 269, Section 508 Series Testing.

1.3 Test Prerequisites

1.31 Prior to starting these tests, the proper connection should be made to the frame(s) being tested. The appropriate prerequisite manual checks and tests should have already been made prior to entry into the 500 series test sections.

1.4 Peripheral Units

1.41 The No. 3 ESS major periphery (controllers) includes the switching network, scanners and peripheral pulse distributor controllers, and their associated frame input/output controller (FIOC). The 3A central

control (3ACC) controls periphery over serial I/O channels. The FIOC serves as an interface between the 3ACC and the peripheral controllers. Data is transmitted between the 3ACC and the FIOC in serial bipolar pulses while the data between the FIOC and peripheral controllers is transmitted in parallel form.

1.42 Two FIOC controllers, two scanner controllers, two network controllers, and two peripheral pulse distributor controllers are provided on each control frame. Normally, one control frame is provided for No. 3 ESS offices equipped with up to seven network frames. An additional control frame is provided in offices equipped with eight or more network frames.

1.43 On the control frame, the FIOC and peripheral controllers are duplicated. One FIOC and each of its three associated peripheral controllers function under control of 3ACC 0; the alternate FIOC and each of its three associated peripheral controllers function under control of 3ACC 1.

1.44 The Peripheral Controller Test Programs test the following equipment:

- a) Frame Input/Output Controllers
- b) Scanner Controllers
- c) Distributor Controllers
- d) Network Controllers

1.45 Each FIOC is connected to its controlling 3ACC by five coaxial cables; four utilized in 3ACC-to-Controller communication, and one in Controller-to-3ACC communication. The Controller-to-3ACC cable is shared by the four 3ACC-to-Controller cables to form four complete sub-channels. Each FIOC is connected to three associated peripheral controllers via a data bus.

1.46 Two Peripheral Pulse Distributors (PPDX0 and PPDX1) are provided on each Control Frame. The PPD is made up of a 512 point

matrix and controller. The Peripheral Decoders (PD) are not duplicated. Each PD normally receives data from the active or on-line PPD. Each PD controls 12 state relays.

1.47 The Scanner Controller, located on the Control Frame, is arranged to accommodate 4096 scan points. The scanner ferrod sensor array is organized to accept 512 scan points per Master Scanner (Control Frame) or Universal Scanner (Network Frame).

1.48 There are two designated types of scanners: the Master Scanner (one per office) and the Universal Scanner (one per network frame). The Master Scanner monitors service and trunk circuits requiring more than one scan point; and maintenance and alarm circuits. The Universal Scanners are used for scanning the line attending elements and provide the supervision function in junctors, trunks, and service circuits.

1.49 The switching network is a 5-stage folded (single-sided) design using the sealed contact remanent reed (remreed) switch. A folded design allows any terminal to terminate any line, trunk, or service circuit via a circuit junctor to any other terminal. The majority of the switching network components are located on the Network Frame which includes the first and second stage remreed switches and the associated circuit junctors. The third stage switching network remreed switches and the Network Controller are located on the Control Frame.

2. MAJOR PERIPHERAL (CONTROLLER) TESTS

2.1 General

2.11 The Major Peripheral (Controller) Tests are requested by typing an input request via the Maintenance Teletypewriter. Only one test is allowed at one time. Descriptions of the required input requests are included in the individual test sections (Sections 520.XX).

2.2 Testing Sequence

2.21 The following sequence of performing the Major Peripheral (Controller) tests is recommended for each 3ACC (0 and 1) and its associated units:

- a) Scanner Controller Tests (Master and Universal Scanners) - Section 520.04
- b) Distributor Controller Tests - Section 520.08
- c) Network Controller Tests - Section 520.12

2.3 Modes of Operation

2.31 The Peripheral Test Programs have three modes of operation. They are the normal diagnostic mode, the repeat mode and the step mode.

2.32 The normal mode is designed to detect and isolate single faults. If a test fails, the running of the diagnostic is terminated and a failure or error message is generated. The error message produced by this diagnostic mode is used to look up the trouble in the Trouble Locating Manual (TLM). (The UCL (unconditional) mode option is available to prevent termination of diagnostics when a failure occurs only for "Common System Diagnostics". An error message is printed and the next sequential test is begun until all tests have been run.) Application diagnostics; or, those for the No. 3 ESS peripheral equipment, execute only as normal, step, or repeat.

2.33 The repeat mode is used for troubleshooting and is valid only if a single test or closely related group of test (phase) is requested. (For controller diagnostics, "test" is a "phase" of the diagnostic. A "phase" could include several "tests".) The requested test is run repetitively with a message generated after the first run. Thereafter, a printout is generated only if the result changes. The status is maintained on the pass/fail lamps on the system status panel. The repeat mode will repeat until the EXECUTE key is depressed (turn lamp off). It will then stop. If the key is again depressed (turn lamp on), the diagnostic will again continue running in the repeat mode.

2.34 The step mode is used for a single pass of a single test. After requested, the test is run once and a message is generated. Thereafter, the test is run when the PF EXECUTE button on the system status panel is depressed. No additional messages are generated unless the results change. The status is maintained on the pass/fail lamps on the system status panel.

2.35 The input message format to request the step mode is:

DGN:unit;STEP:aa!

and the request for the repeat mode is:

DGN:unit;RPT:aa!

where the "aa" is the decimal test number.

2.36 Refer to the Input Message Manual (IM-3H000-01) for the complete description of these input requests.

2.4 Supporting Manuals

2.41 The Peripheral Unit Test Programs are part of the generic system fault diagnosis system. Thus, the manuals which are normally used in conjunction with the system program are also applicable during installation testing. These manuals are the Input Message Manual (IM-3H300-01), the Output Message Manual (OM-3H300-01), and the Trouble Locating Manual (TLM-3HXXX).

2.42 The Input and Output Message Manuals contain descriptions of the teletypewriter input requests and output messages, respectively.

2.43 The Trouble Locating Manual (TLM) is used in conjunction with error output messages generated by the test program. The output message contains a trouble number (TN), which is used as a pointer to the TLM.

3. CONTROLLER TROUBLESHOOTING PROCEDURES

3.1 Normally, trouble indications will be in the form of a Trouble Number (TN) associated with a controller circuit or with those circuits used in passing data to or from the controller circuits. If some other trouble response is observed, the tester must proceed on the basis of using all system data available to him to drive at some logical procedures to isolate the fault.

3.2 The TN diagnostic printout gives an entry into the TLM which provides a list of circuit packs or other apparatus which could be associated with the fault. An input request may then be made to either run the failing test (phase) in the STEP or RPT mode to aid in trouble isolation.

3.3 The major peripheral (controllers) equipment is dedicated to either CU0 or CU1. Therefore, no means are available to switch controllers between CUs. However, it may be helpful to compare results with the alternate controller which apparently passes a particular test (phase) or tests.

Arrows indicate new or changed information.

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