

DIMENSION[®]400, 2000, AND CUSTOM PBX

DCTS CONTROLLER TESTS

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1. GENERAL

1.1 This section provides information for testing and troubleshooting the DCTS controllers. This section also provides information for testing the controllers via the DIMENSION 400 or the DIMENSION 2000.

1.2 The testing portion of this section should only be performed when it is not possible to perform the X-Ray tests or whenever trouble is encountered.

1.3 During testing, if all of the electronic telephone sets are not plugged in a FACILITY alarm will result. If this is undesirable and the controller is not required during test it may be taken out of service via PROC 40 (DIMENSION 400) or PROC 60 (DIMENSION 2000). This will allow the observation of facility alarms due to other causes in the event that they occur.

2. RECORDS

2.1 Form SD-97-1313 is required for recording the results of these tests.

3. EQUIPMENT

<u>QTY.</u>	<u>ITEM</u>
1	MAAP

PRIVATE

THE INFORMATION CONTAINED HEREIN SHOULD NOT BE DISCLOSED TO UNAUTHORIZED PERSONS. IT IS MEANT SOLELY FOR USE BY AUTHORIZED BELL SYSTEM EMPLOYEES.

4. PROCEDURE 80 (DIMENSION 400)4.1 General

4.11 The PROC 80 program performs four main functions in aiding the crafts-person in maintaining the DCTS controller:

- a. Displays diagnostic information from on-line maintenance data.
- b. Tests DCTS system and displays diagnostic information from the results.
- c. Provides crafts-person with the ability to reinitiate the test from the controller and provides a Pass/Fail indication at the ETC.

NOTE: Reinitiating the test at the controller under test is achieved by powering down and then powering the controller back up. The Pass lamp is located at LC56, test point 2 and the fail lamp is located at LC56, test point 8.

- a. It takes the place of the on-line 1-second periodic, which is disabled for the ETC being worked on by PROC 80.
- b. When Word 2 is displayed it updates the station power and TEST station bits.
- c. It requests a test to be performed on the ETC once every second to provide background testing.

A pass/fail indication is provided at the ETC after successful completion of testing or when any test fails. The background testing does not alter the MAAP display or affect procedure operation, it is only performed when no other operations are taking place.

NOTE: PASS lamp is the lamp at test point 2 on the LC56 circuit pack and the FAIL lamp is the lamp at test point 8 on the LC56 circuit pack.

4.2 PROC 80 - Legal Button Pushes

4.21 STEP - Displays diagnostic information from on-line maintenance data for the next equipped controller.

4.22 WORD, 1/2 - Displays diagnostic information contained in the word number requested.

4.23 EXECUTE - Tests the DCTS controller and displays diagnostic information from the results.

4.24 RESET,EXECUTE - Resets the major or minor alarms, facility indicator and clears on-line maintenance data.

4.25 DISPLAY - Displays the next faulty station in display fields 3 and 4 of Word 1.

4.3 PROC 80 - Fail Codes

4.31 PROC 80 program provides the craftsperson with one of seventeen possible fail codes. See table below:

Fail Code	Fail Code Definition	Fail Code Origination		Display Field Affected	
		On-Line Data	Proc 80 Test	Word 1	Word 2
0	No Failure Found	Yes	Yes	--	--
1	LC 34 Internal Loop Around	No	Yes	7,8	--
2	LC34 - LC 60 Loop Around	Yes	Yes	7,8	--
3	Fault Reg. Bit Stuck at 0	Yes	Yes	--	All
4	Fault Reg. Bit Stuck at 1	Yes	yes	--	All
5	Minor Memory Read/Write	Yes	Yes	--	All
6	Station Fault	Yes	Yes	3,4	--
7	Steering Ckt. Fault	Yes	Yes	3	--
8	Hyperactive Station	Yes	No	3,4	--
9	Message Abort Fault	Yes	Yes	--	--
10	Minor Change Fault	Yes	Yes	--	--
11	Button Count Fault	No	Yes	--	--
12	Major Change Fault	No	Yes	--	--
13	Station Power Fault	No	Yes	--	--
14	Common ETC Fault	No	Yes	--	All
15	Major Memory Read/Write	No	No	--	--
99	Proceed to Procedure 81	Yes	No	--	--

5. PROC 81 (DIMENSION 400)

5.1 General

5.11 PROC 81 program performs three main functions in aiding the craftsperson in maintaining the DCTS controller.

- a. Displays diagnostic information from on-line maintenance data.
- b. Tests DCTS controller and displays diagnostic information from the results.
- c. Provides craftsperson with the ability to reinitiate the test from the controller and provides a Pass/Fail indication at the ETC.

NOTE: Reinitiating the test at the controller under test is achieved by powering down and then powering the controller back up. The Pass lamp is located at LC56, test point 2 and the fail lamp is located at LC56, test point 8.

5.2 PROC 81 - Legal Button Pushes

5.21 STEP - Displays diagnostic information from on-line maintenance data for the next equipped controller.

5.22 WORD, 1/2 - Displays diagnostic information contained in word number requested.

5.23 EXECUTE - Tests the DCTS controller and displays diagnostic information from the result. CAUTION: Operating the EXECUTE button causes stations associated with the controller to be put out of service until the test is finished and the PROC NO key is reoperated.

5.3 PROC 81 - Fail Codes

5.31 PROC 81 will display one of 99 possible fail codes. When the PROC is first displayed one of 15 fail codes will be displayed (fail codes 1 - 15) if a fault exists, otherwise a "O" will be displayed in the fail code field. When the MAAP - EXECUTE button is pushed and if a fault exists then one of the last 84 fail codes will be displayed. If no fault is found, then a "O" will be displayed in the fail code field.

See Table on Page 5.

Fail Code	Fail Code Definition	Fail Code	Fail Code Definition
0	No Failure Found	50	Memory Parity Bit Stuck at 1
* 1	LC34 Internal Loop Around	51	Str. Ckt. Enable Bit Stuck at 1
* 2	LC34-LC60 Loop Around	52	XMIT Bit Stuck at 1
* 3	Fault Register Bit Stuck at 0	53	Sta. Addr. Bus Bit Stuck at 1
* 4	Fault Register Bit Stuck at 1	54	X-R Bus Bit Stuck at 1
* 5	Minor Memory Read/Write	55	Station Power Bit Stuck at 1
* 6	Station Fault	56	Message Abort Bit Stuck at 0
* 7	Steering Circuit Fault	57	SCT Timeout Bit Stuck at 0
* 8	Hyperactive Station	58	SAHT Timeout Bit Stuck at 0
* 9	Message Abort Fault	59	Memory Addr. Bit Stuck at 0
* 10	Minor Change Fault	60	Memory Cont. Bit Stuck at 0
* 11	Button Count Failure	61	Memory Parity Bit Stuck at 0
* 12	Major Change Failure	62	RCVR. Stuck Bit Stuck at 0
* 13	Station Power Fault	63	NRB Bit Stuck at 0
* 14	Common ETC Fault	64	Test Station Bit Stuck at 0
* 15	Major Memory Read/Write	65	Spare
16	Spare	66	Message Parity
17	Spare	67	Message Abort
18	Spare	68	SCT Timeout
19	Spare	69	SAHT Timeout
20	Spare	70	Memory Addressing
21	Internal LC34 - SIO/CF	71	Memory Contents
22	Internal LC34 - TIO/CF	72	Memory Parity
23	Internal LC34 - No Message	73	Str. Ckt. Enable
24	Internal LC34 - Echo	74	XMIT Stuck
25	Spare	75	RCVR. Stuck
26	Spare	76	Sta. Addr. Bus
27	Spare	77	X-R Bus
28	Spare	78	NRB (No Station Response)
29	Spare	79	SCT & SAHT
30	LC34-LC60 Loop Around	80	MSG. Parity, MSG. Abort & SCT
31	Spare	81	SC Enable, X-R Bus and Sta. Addr.
32	Spare	82	SC Enable & Sta. Addr. Bus
33	Spare	83	X-R Bus & Sta. Addr. Bus
34	Spare	84	XMIT Stuck & Sta. Addr. Bus
35	Memory Test - All 0's Pattern	85	SAHT & Memory Contents
36	Memory Test - All 1's Pattern	86	Memory Cnts., Parity & Addr.
37	Memory Test - Bit Pattern	87	SAHT & XMIT Stuck
38	Memory Test - Single Bit	88	Memory Addr. & Sta. Addr. Bus
39	Memory Test - Memory Parity	89	Test Station
40	Spare	90	Spare
41	Spare	91	Spare
42	Spare	92	Spare
43	Spare	93	Spare
44	Cannot Power Up Stations	94	Spare
45	Cannot Power Down Stations	95	Minor Change Failure
46	Spare	96	Button Count Failure
47	SCT Timeout Bit Stuck at 1	97	Major Change Failure
48	Memory Address Bit Stuck at 1	98	Spare
49	Memory Cont. Bit Stuck at 1	99	Analyze Word 2

*These Failcodes are determined on line and will only be displayed when PROC 81 is read in or when separate controllers are stepped to. They will not be displayed as a result of tests being executed by PROC 81.

6. CIRCUIT PACK, LED INDICATORS

6.1 The following chart shows the locations of LED's by circuit pack.

- 6.2 LC55 - LED lamps
- 6.21 (-48V) - Red LED which indicates a blown -48V fuse on the associated LC55 circuit pack.
- 6.22 (5V) - Red LED which indicates a blown 5V fuse on the associated LC55 circuit pack.
- 6.3 LC56 - LED Lamps
- 6.31 HEARTBEAT - Green LED which indicates successful memory read/writes in the DCTS unit.
- 6.32 PASS - Green LED which indicates a successful execution of test per PROC 80, 81 and 523.
- 6.33 Test point lamps 3 through 7 - Green LED's which indicate that tests are being performed.
- 6.34 FAIL - Green LED lamp which indicates that either PROC 80, 81 or 523 failed during execution.
- 6.35 XR-BUS - Red LED which indicates a stuck at 0 or 1 Transmit or Receive bus.
- 6.36 STA. BUS - Red LED which indicates a stuck at 0 or 1 Station Address Bus.
- 6.4 LC59 - LED Lamps
- 6.41 FAULT - Red LED lamp which indicates an existing fault in the DCTS controller.
- 6.5 NORMAL LED INDICATIONS
- 6.51 Normal LED indications is one where only the LC56 circuit pack "HEARTBEAT" lamp is flashing and no other LED's are lit.
- 6.52 Note: When the Test Station is plugged in the LC56 circuit pack "HEARTBEAT" LED will remain either in the lit or extinguished state and the LC59 FAULT LED will be lit.
- 7. PROC 523 (DIMENSION 2000 PBX)
- 7.1 PROC 523 used in the DIMENSION 2000 incorporates basically the same features as PROC 80 and 81.
- 7.2 PROC 523 Tests.

- 7.21 TEST #1 - Displays the failure history plus any on-line maintenance fault codes.
- 7.22 TEST #2 - Tests the DCTS controller the same way as PROC 80.
- 7.23 TEST #3 - Tests the DCTS controller the same way as PROC 81.

8. TEST PROCEDURES

- 8.1 Using either PROC 81 (DIMENSION 400) or PROC 523, Test #3 (DIMENSION 2000) test each controller by operating the EXECUTE key after the procedure has been called.
- 8.2 After Step 8.1 has been completed, go to PROC 80 (DIMENSION 400) or PROC 523, Test #2 and execute the test for each controller.

9. TROUBLESHOOTING AIDS

- 9.1 When an alarm condition exists, the "alarm cause indicators" will point to the most likely cause or point to another procedure or test that should be performed.
- 9.2 CAUTION - Executing PROC 81 or PROC 523, Test #3 will cause the controller being tested to put out of service. It will remain out of service until the WAIT lamp has been extinguished and the PROC. No. button has been depressed again. This mode of operation allows the craftsperson to go to a remote controller, (1) make the necessary repairs, (2) perform a power down/power up sequence at the controller (3) observe the PASS/FAIL LED's to determine if the trouble was fixed.
- 9.3 Station failures and Steering circuit failures are best determined via PROC 80 or PROC 523, Test #2. It should be noted that if there are a large number of station failures the stations as indicated should be fixed and then the PROC NO button should be operated and on-line maintenance routines should be allowed to run for a couple of minutes so that other station failures can be found, (on-line maintenance is the only way that Hyperactive stations can be found, see paragraph 4.3). The procedure can then be displayed again to determine if further station faults exists.
- 9.4 The following table indicates which circuit packs should be replaced for the various fail codes. It should be noted that PROC 523 does not have the equivalency of Word 2 of either PROC 80 or 81 and that the table may be used to determine the circuit pack replacement sequence.

Fail Code	Fail Code Definition	Circuit Pack Replacement Sequence
0	No Failure Found	
1	LC34 Internal Loop Around	LC34, LC44
2	LC34-LC60 Loop Around	LC60, LC34 See Note 1
3	Fault Register Stuck at 0	LC59
4	Fault Register Stuck at 1	LC59
5	Minor Memory Read/Write	LC57,LC58,LC60
6	Station Fault	LC55, Station
7	Steering Circuit Fault	LC55
8	Hyperactive Station	Station
9	Message Abort Fault	LC60
10	Minor Change Fault	LC56,LC58,LC57
11	Button Count Failure	LC56,LC58
12	Major Change Failure	LC56,LC58,LC57
13	Station Power Fault	LC59
14	Common ETC Fault	
15	Major Memory Read/Write	
16	Spare	
17	Spare	
18	Spare	
19	Spare	
20	Spare	
21	Internal LC34 - SI0/CF	LC34,LC44
22	Internal LC34 - TI0/CF	LC34,LC44
23	Internal LC34 - NoMessage	LC34,LC44
24	Internal LC34 - ECHO	LC34, LC44
25	Spare	
26	Spare	
27	Spare	
28	Spare	
29	Spare	
30	LC34-LC60 Loop Around	LC34,LC60 See Note 1
31	Spare	
32	Spare	
33	Spare	
34	Spare	
35	Memory Test - All 0's Pattern	LC57,LC58
36	Memory Test - All 1's Pattern	LC57,LC58
37	Memory Test - Bit Pattern	LC59,LC60,LC57
38	Memory Test - Single Bit	LC57,LC58
39	Memory Test - Memory Parity	LC57,LC58,LC59
40	Spare	
41	Spare	
42	Spare	
43	Spare	
44	Connot Power Up Stations	LC59,LC58,LC56
45	Cannot Power Down Stations	LC59,LC58,LC56
46	Spare	
47	SCT Timeout Bit Stuck at 1	LC59,LC58
48	Memory Address Bit Stuck at 1	LC59,LC57,LC58
49	Memory Contents Bit Stuck at 1	LC59,LC57,LC58
50	Memory Parity Bit Stuck at 1	LC59,LC57,LC58

Fail Code	Fail Code Definition	Circuit Pack Replacement Sequence
51	Str. Ckt. Enable Bit Stuck at 1	LC59,LC56
52	XMIT Bit Stuck at 1	LC59,LC56,LC60
53	Sta. Addr. Bus Bit Stuck at 1	LC59,LC56,LC58
54	X-R Bus Bit Stuck at 1	LC59,LC56
55	Station Power Bit Stuck at 1	LC59,LC56,LC58
56	Message Abort Bit Stuck at 0	LC59,LC60
57	SCT Timeout Bit Stuck at 0	LC59,LC58
58	SAHT Timeout Bit Stuck at 0	LC59
59	Memory Addr. Bit Stuck at 0	LC59,LC57,LC58
60	Memory Contents Bit Stuck at 0	LC59,LC57,LC58
61	Memory Parity Bit Stuck at 0	LC59,LC57,LC58
62	RCVR. Stuck Bit Stuck at 0	LC59,LC56,LC57
63	NRB Bit Stuck at 0	LC59,LC56,LC58
64	Test Station Bit Stuck at 0	LC59
65	Spare	
66	Message Parity	LC60
67	Message Abort	LC60
68	SCT Timeout	LC59
69	SAHT Timeout	LC59
70	Memory Addressing	LC57,LC58
71	Memory Contents	LC57,LC58
72	Memory Parity	LC57,LC59
73	Str. Ckt. Enable	LC59
74	XMIT Stuck	LC59
75	RCVR. Stuck	LC56
76	Sta. Addr. Bus	LC56
77	X-R Bus	LC56
78	NRB (No Station Response)	LC56
79	SCT and SAHT	LC58,LC59
80	Msg. Parity, Msg. Abort & SCT	LC59,LC60
81	SC Enable, X-R Bus & Sta. Addr.	LC56,LC59
82	SC Enable & Sta. Addr. Bus	LC56,LC59
83	X-R Bus & Sta. Addr. Bus	LC56,LC58
84	XMIT Stuck & Sta. Addr. Bus	LC56,LC58
85	SAHT & Memory Contents	LC57,LC58,LC59
86	Memory Cnts., Parity & Addr.	LC57,LC58,LC59
87	SAHT & XMIT Stuck	LC59,LC60
88	Memory Addr. & Sta. Addr. Bus	LC59,LC60
89	Test Station	LC56,LC59
90	Spare	
91	Spare	
92	Spare	
93	Spare	
94	Spare	
95	Minor Change Failure	LC56,LC58,LC57
96	Button Count Failure	LC56,LC58,LC57
97	Major Change Failure	LC56,LC58,LC57
98	Spare	
99	Analyze Word 2	
100		