EADAS TRAFFIC DATA CONVERTER (ETDC) SD-3B213-01

REMOTE TESTS

ENGINEERING AND ADMINISTRATIVE DATA ACQUISITION SYSTEM (EADAS)

1. GENERAL

1.01 This section describes a method of performing remote tests of the EADAS Traffic Data Converter (ETDC) circuits from the EADAS Central Unit (CU) via the teletypewriter (TTY).

1.02 This section is reissued to add information on the high-resolution 10-second usage card and generally update this section. Revision arrows are used to emphasize the more significant changes. Equipment Test Lists are not affected.

1.03 The tests covered are:

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A. Pass/Fail Test: This test causes an abbreviated operational check of the ETDC(s) under test to be made with an abbreviated output. Busy and Inhibit Test sequences are run and resulting data is analyzed. Upon completion of ETDC analysis, a pass/fail indication will be given at the EADAS CU teletypewriter.

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B. Inhibit-Busy Test: This test checks the ETDC(s) under test for ability to inhibit all input leads from normal traffic and to generate inhibit and busy test sequences. It differs from the Pass/Fail Test in that no analysis is done. Raw data from the Inhibit and Busy Test results are printed out at the EADAS CU line printer.   4

1.04 Test A is intended to be performed on a routine basis. Test B is normally performed on a trouble testing basis or when a detailed printout is desired. These tests are preferably started during light traffic conditions (perhaps at midnight) and then the test results can be analyzed at a later time (perhaps at the beginning of the day shift).

> *Caution: Before any of the tests outlined in this section are performed, it is important that consideration be given to the data which is blocked while the ETDC is being tested. The testing time of each ETDC is approximately 2 minutes, but the data for the entire 30-minute data collection interval is considered lost for the ETDC under test because of the interruption of normal data. If testing a fully loaded EADAS System, the testing time could be as much as 6 hours.*

1.05 The tests in this section will detect *most* ETDC malfunctions and usually identify ETDC failures within one replaceable circuit pack. If it is suspected that the ETDC is not operational or that an input card is not operating properly, the trouble condition should be reported to the maintenance personnel at the distant ETDC location. Include all pertinent information in the trouble report (ETDC unit, input card information, time of day, date, etc).

1.06 Refer to Section ▶190-510-212◀ (local tests of ETDC) if trouble cannot be cleared as a result of performing the tests in this section.

1.07 The ETDC is arranged to accommodate 32 input cards, each of which has 32 input leads, giving a maximum capacity of 1024 inputs. Input card No. 31 is dedicated to handle discrete events; therefore, only 989 inputs can be used for data collection and calculations (addresses 0 and 1 are dedicated for buffer overflow and parity errors, and an additional input is reserved for ETDC cycle

count). There are basically ▶six◀ different types of input cards:

(1) **Peg Count Card**—Causes a unique binary data word (address) to be generated once and only once for each time one of its input leads receives a peg count indication.

(2) **Scaled Peg Count Card**—Causes a unique address to be generated once for each time one of its input leads receives 10 peg count indications.

(3) **Usage Card**—Causes a unique address to be generated for each time one of its input leads is scanned (100 seconds) and found busy.

(4) **Discrete Card**—Causes a unique address to be generated for each time one of its input leads is scanned (10 seconds) and found busy.

(5) **Multiscan Usage Card**—Causes a unique address to be generated for each time one of its input leads is scanned (1.8 seconds) and found busy. (Option YF permits an input lead to be scanned every 1.0 second, and option YG permits an input lead to be scanned every 3.6 seconds.)

(6) ▶**High Resolution 10-Second Usage Card**—Provides highly accurate sampling for short holding time circuits on an individual basis. The card contains circuitry for scanning at a 20 ms rate for 32 inputs. When an individual input reaches a total of 500 in storage (equivalent to 10 seconds), an output is provided to the ETDC encoder.◀

1.08 A record of all input cards associated with each ETDC is maintained in the EADAS CU disk memory. When the maintenance program for the Pass/Fail Test is requested, the record on disk memory is compared with the way the ETDC appears to be equipped. This is an automatic test feature for the Pass/Fail Test program and shall be referred to as the "Map Test". If an ETDC is not properly equipped, the Map Test will cause the TTY to print **FAIL**, a trouble code, and an 11-digit octal input card identification code. An ETDC will fail the Map Test for any of the following reasons:

(a) Record of input card assignment in CU is incorrect.

(b) Input cards are in wrong locations, or missing.

(c) Input cards are inoperative.

(d) One or more common control cards are inoperative.

(e) One or more ETDC switches are not in the normal position.

(f) Transmission facility or associated data set(s) are defective.

1.09 When the Line Printer Dump Test program is requested, the ETDC under test inhibits all of its input leads from collecting data and then scans *all* of its inputs, the same as in the Pass/Fail Test. With the inputs being inhibited, no input should be found busy and, therefore, no address should be generated for any of the inputs of the ETDC. The Inhibit Test printout at the line printer should, therefore, contain all zeros (no counts). If any of the addresses on the printout contain counts, the particular input card(s) causing the failure can be identified. Addresses 0 through 31 are associated with input card No. 0, addresses 32 through 63 are associated with input card No. 1, etc. Inputs 992 through 1023 are reserved for discrete events. Table A is a cross-reference between ETDC input card numbers and the address locations on the line printer dump printout. After the ETDC Inhibit Test is completed, all of the ETDC inputs are internally made busy and then scanned. Depending upon the type of input cards being used in the ETDC, the busy condition will cause one, two, or three counts to be generated for each input lead. Peg count, multiscan usage, or scaled peg count cards cause one address to be generated. Usage and discrete cards cause two or three addresses to be generated. There should always be at least two and no more than three counts on the line printer printout for usage or discrete cards. Use Table A to identify the ETDC input card numbers.

1.10 The ETDC which is dedicated to the data channel terminating at the EADAS CU shall

be referred to as the home ETDC unit. The home ETDC unit will accept traffic data from as many as five remote ETDC units. Input cards No. 26 through 30 in the home ETDC unit may be dedicated to interface remote ETDCs with the home ETDC. If so equipped, input card position No. 26 is to be used for the first remote ETDC, position No. 27 the second remote ETDC, etc. A special input card (concentrator) is used for this purpose. If concentrator cards are not used, regular input cards may be used in the positions.

1.11 The home and remote ETDCs may be tested independently on a system basis, or a maintenance command may cause all ETDCs associated with an EADAS CU to be tested. All channels in the EADAS System may be tested independently, or if the user desires, a maintenance command can be initiated to test all channels sequentially. The operator at the EADAS CU will be required, therefore, to select the proper input TTY message to perform the type of test desired. Maintenance TTY input messages are outlined in Part 4.

1.12 While maintenance testing is in progress, the CU TTY *cannot* be used for other functions. When all channels in the system are being tested sequentially, the automatic testing of all channels can take a considerable length of time. If use of the TTY is desired, testing can be halted. The channel under test is restored to its normal

mode, and the TTY is made available for other requests. This can be done by simply keying in the message **EX:** followed by an exclamation mark (**!**). It should be noted, however, that data on the channel under test is invalid for that collection period. Testing can be resumed by typing **RS:TC:!**.

1.13 *Lettered Steps:* A letter a, b, c, etc, added to a step number in Part 4 of this section indicates an action which may or may not be required depending on local conditions. The condition under which a lettered step, or a series of lettered steps, should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

2. APPARATUS

All Tests

2.01 KSR-35 teletypewriter (used to originate all tests and to print out results of the Pass/Fail Test).

2.02 DEC* LP11 high-speed line printer (used to print out results of the Line Printer Dump Test).

*Registered trademark of Digital Equipment Corporation.

3. PREPARATION

STEP	ACTION	VERIFICATION

All Tests

| 1 | At EADAS CU TTY— Operate power switch to ON. | |

4. METHOD

STEP	ACTION	VERIFICATION

A. Pass/Fail Test

> *Note:* This test cannot be performed during the time interval from 3 minutes prior to and 1 minute after the time in which the data collection interval record is made (every

STEP	ACTION	VERIFICATION
	15 or 30 minutes depending on local option). If a request for a test is made during this interval, the TTY will print **RL** (repeat later).	
2	Using Table B, select the input message associated with the desired Pass/Fail Test to be performed.	
3	At EADAS CU TTY— Key in input message selected in Step 2.	As each character is keyed in, it will be printed out at the TTY. After "!" has been keyed in— TTY prints: **PF** (printout follows). Pass/Fail Test on requested ETDC begins. After completion of ETDC testing— At TTY— Test results are printed out. If other ETDCs are to be tested— Results for other ETDCs are printed out on the TTY after each ETDC has been tested. After last channel has been tested— TTY prints: **TEST COMPLETE** *Note:* See Table C for an example and explanation of a Pass/Fail Test printout.
4a	If channel(s) under test fails— Report trouble to maintenance personnel at distant ETDC location(s).	
5a	After trouble has been cleared at distant ETDC location— Using Table B, select appropriate input TTY message(s) to test channel(s) which failed.	
6a	At EADAS CU TTY— Key in message(s) selected in Step 5a.	Verification same as for Step 3 except that channel tested should print **PASS**.
7a	Repeat Steps 5a and 6a for all channels which failed to meet requirements of Step 3.	

B. Inhibit-Busy Test

STEP	ACTION	VERIFICATION
2	At line printer— Open front door of printer cabinet.	
3	Operate ac power circuit breaker to ON.	
4a	If LP11-FA is used— Operate PRINT INHIBIT switch to OFF.	READY lamp lighted.
5a	Momentarily operate MASTER CLEAR switch.	

STEP	ACTION	VERIFICATION
6	Close front door of printer cabinet.	
7	At control panel on top of printer— Operate ON LINE-OFF LINE switch to ON LINE.	

Note: Do not initiate this test during the time interval from 3 minutes prior to and 1 minute after the time in which the data collection interval record is made (every 15 or 30 minutes depending on local option). If a request for a test is made during this interval, the TTY will print **RL** (repeat later).

STEP	ACTION	VERIFICATION
8	Using Table D, select the input message associated with the desired Line Printer Dump Test to be performed.	
9	At EADAS CU TTY— Key in input message selected in Step 8.	As each character is keyed in, it will be printed out at the TTY. After "!" has been keyed in— TTY prints: **PF** (printout follows). After completion of ETDC Inhibit Test— At line printer— Inhibit Test results printed out. ETDC begins to perform Busy Test. After ETDC has completed Busy Test— At line printer— Busy Test results printed out. If other ETDCs are to be tested— Results for other ETDCs are printed out after each ETDC has been tested.

Note: See Tables E and F for examples and explanations of Line Printer Dump Test printouts.

STEP	ACTION	VERIFICATION
10b	If printout(s) contains errors— Report trouble to maintenance personnel at distant ETDC location(s).	
11b	After trouble has been cleared at distant ETDC location— Using Table D, select appropriate input TTY message(s) to test channel(s) which failed.	
12b	At EADAS CU TTY— Key in message(s) selected in Step 11b.	Verification same as for Step 9 except that results for ETDC tested should not contain any errors.
13b	Repeat Steps 11b and 12b for all channels which failed to meet requirements of Step 9.	

TABLE A

ETDC INPUT CARD NO.	ADDRESSES ON PRINTOUT	ETDC INPUT CARD NO.	ADDRESSES ON PRINTOUT
0	00000 — 00031	16	00512 — 00543
1	00032 — 00063	17	00544 — 00575
2	00064 — 00095	18	00576 — 00607
3	00096 — 00127	19	00608 — 00639
4	00128 — 00159	20	00640 — 00671
5	00160 — 00191	21	00672 — 00703
6	00192 — 00223	22	00704 — 00735
7	00224 — 00255	23	00736 — 00767
8	00256 — 00287	24	00768 — 00799
9	00288 — 00319	25	00800 — 00831
10	00320 — 00351	26	00832 — 00863
11	00352 — 00383	27	00864 — 00895
12	00384 — 00415	28	00896 — 00927
13	00416 — 00447	29	00928 — 00959
14	00448 — 00479	30	00960 — 00991
15	00480 — 00511	31	RESERVED FOR DISCRETE EVENTS

TABLE B

INPUT MESSAGES FOR PASS/FAIL TEST

PASS/FAIL TEST	INPUT MESSAGE	REMARKS
A1	TS:TC:A,P!	Requests maintenance program to perform a Pass/Fail Test on all ETDCs.
A2	TS:TC:A,P,H!	Requests maintenance program to perform a Pass/Fail Test on all home ETDCs.
A3	TS:TC:A,P,R!	Requests maintenance program to perform a Pass/Fail Test on all remote ETDCs.
A4	TS:TC:XX*,P!	Requests maintenance program to perform a Pass/Fail Test on all ETDCs associated with channel No. XX*.
A5	TS:TC:XX*,P,H!	Requests maintenance program to perform a Pass/Fail Test on the home ETDC associated with channel No. XX*.
A6	TS:TC:XX*,P,R!	Requests maintenance program to perform a Pass/Fail Test on all remote ETDCs associated with channel No. XX*.

*XX represents desired channel to be tested.

TABLE C

EXAMPLE OF PASS/FAIL TEST PRINTOUT

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ETDC MAINTENANCE  CHAN 00  FAIL 6    00000001000   00:26:05   05/1/80
ETDC MAINTENANCE  CHAN 01  PASS                    00:28:01   05/1/80
ETDC MAINTENANCE  CHAN 02  PASS                    00:32:56   05/1/80
ETDC MAINTENANCE  CHAN 03  PASS                    00:34:52   05/1/80
ETDC MAINTENANCE  CHAN 04  FAIL 5    00000040000   00:36:48   05/1/80
ETDC MAINTENANCE  CHAN 05  PASS                    00:38:44   05/1/80

ETDC MAINTENANCE  CHAN 96  PASS                    04:20:44   05/1/80
ETDC MAINTENANCE  CHAN 97  PASS                    04:22:40   05/1/80
ETDC MAINTENANCE  CHAN 98  FAIL 2    00400000000   04:24:36   05/1/80
ETDC MAINTENANCE  CHAN 99  PASS                    04:28:32   05/1/80
```

Indicates an ETDC Maintenance Test

Indicates channel No. tested

Indicates whether test passed or failed

See Note 1

See Note 1

Indicates the time of day

Indicates the date

Note 1: Whenever the Pass/Fail Test fails, a failure code will appear on the printout adjacent to the word FAIL. The failure codes and their respective meanings are as follows:

Code	Meaning
1	ETDC failed Inhibit Test--Can be caused by faulty input card as indicated by card position number
2	ETDC failed Busy Test--Can be caused by faulty input card. Indicates that inconsistent data was received from that card. If all cards fail in this manner, suspect control circuit packs.
3	ETDC failed Busy and Inhibit Tests--Can be caused by faulty input card. Indicates that inconsistent data was received from that card. If all cards fail in this manner, suspect common control circuit packs.

TABLE C (contd)

Code	Meaning
4	ETDC failed Map Test--Can be caused by faulty peg count card (looks like discrete or usage card). Can be caused by misassignment of card locations in computer storage. Can be caused by peg count cards interchanged with other cards, or missing or extra input cards.
5	ETDC failed Map and Inhibit Tests--Probably indicates more than one unrelated problem. This is a combination of symptoms leading to codes 1 and 4.
6	ETDC failed Map and Busy Test--Can be a combination of codes 2 and 4, however, the Busy Test (2) can fail in such a manner as to cause the Map Test to also fail.
7	ETDC failed Map, Busy, and Inhibit Tests--This is a combination of codes 1 and 6.

Note 2: The number that is printed out in this column is an 11-digit octal number which represents the particular ETDC input card/s (associated with the channel No. printed on the printout) that caused the failure. To find the particular input card number/s, the octal number must first be converted to a binary number. The position/s where a "1" appears in the binary number is the respective position number of the input card which caused the failure; eg, the octal number shown for channel No. 98 on this printout is 00400000000. When converted to a binary number this number becomes 00000010000000000000000000000000000. Counting from right to left the bit position having a "1" is position number 26 (first position counts zero). Therefore, input card No. 26 associated with channel No. 98 is the card which caused the failure. The simple replacement of the input card at the ETDC location will probably clear the trouble. When the card position number indicates that more than one, or possibly all input cards are faulty, common control cards should be suspected as being faulty.

Note 3: All zeros on a normal EADAS CU TTY printout will be slashed.

TABLE D

INPUT MESSAGES FOR LINE DUMP TEST

LINE PRINTER DUMP	INPUT MESSAGE	REMARKS
B1	TS:TC:A,L!	Requests maintenance program to perform a Line Dump on all EADAS ETDCs.
B2	TS:TC:A,L,H!	Requests maintenance program to perform a Line Dump on all home ETDCs.
B3	TS:TC:A,L,R!	Requests maintenance program to perform a Line Dump on all remote ETDCs.
B4	TS:TC,XX*,L!	Requests maintenance program to perform a Line Dump on all ETDCs associated with channel No. XX*.
B5	TS:TC:XX*,L,H!	Requests maintenance program to perform a Line Dump on the home ETDC associated with channel No. XX*.
B6	TS:TC:XX*,L,R!	Requests maintenance program to perform a Line Dump on all remote ETDCs associated with channel No. XX*.

*XX represents desired channel to be tested.

TABLE E

EXAMPLE OF LINE PRINTER DUMP TEST PRINTOUT – INHIBIT TEST

Indicate ETDC Maintenance Test	Indicates channel No. associated with ETDC	Indicates the type of test ETDC performed	Indicates the time of day	Indicates the date

ETDC MAINTENANCE		CHAN 02		INHIBIT TEST			00:08:34	05/01/80	
00000:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00010:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00020:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00030:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00040: *	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00050:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00060:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00070:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00080:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00090:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00100:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000

00900:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00900
00910:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00920:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00930:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00940:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00950:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00960:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00970:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00980:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00990:	00000	00000								

**

* When the results of the Inhibit Test are printed out, all addresses should contain zero counts. If there are any counts in any of the addresses, the input card associated with the addresses where there are counts should be replaced. Refer the trouble to the maintenance personnel at the ETDC location which caused the failure.

** All zeros on a normal EADAS High-Speed Line Printer printout will be slashed.

TABLE F

EXAMPLE OF LINE PRINTER DUMP TEST PRINTOUT — HOME BUSY TEST

Indicates ETDC Maintenance Test	Indicates channel No. associated with ETDC	Indicates that Busy Test was performed on the home ETDC unit	Indicates the time of day	Indicates the date

ETDC MAINTENANCE	CHAN 02	HOME BUSY TEST	00:09:24	10/01/80					
00000: *	00000	00000	00001	00001	00001	00001	00001	00001	00001	00001
00010:	00001	00001	00001	00001	00001	00001	00001	00001	00001	00001
00020:	00001	00001	00001	00001	00001	00001	00001	00001	00001	00001
00030:	00001	00001	00000	00000	00000	00000	00000	00000	00000	00000
00040:	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00050: **	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
00060:	00000	00000	00000	00000	00001	00001	00001	00001	00001	00001
00070:	00001	00001	00001	00001	00001	00001	00001	00001	00001	00001
00080:	00001	00001	00001	00001	00001	00001	00001	00001	00001	00001
00090:	00001	00001	00001	00001	00001	00001	00001	00001	00001	00001
00100:	00001	00001	00001	00001	00001	00001	00001	00001	00001	00001

00900:	00001	00001	00001	00001	00001	00001	00001	00001	00001	00001
00910:	00001	00001	00001	00001	00001	00001	00001	00001	00001	00001
00920:	00001	00001	00001	00001	00001	00001	00001	00001	00001	00001
00930:	00001	00001	00001	00001	00001	00001	00001	00001	00001	00001
00940:	00001	00001	00001	00001	00001	00001	00001	00001	00001	00001
00950:	00001	00001	00001	00001	00001	00001	00001	00001	00001	00001
00960:	00001	00001	00001	00001	00001	00001	00001	00001	00001	00001
00970:	00001	00001	00001	00001	00001	00001	00001	00001	00001	00001
00980:	00001	00001	00001	00001	00001	00001	00001	00001	00001	00001
00990:	00001	00001	***							

* Addresses 00000 and 00001 are reserved for parity check and for ETDC buffer overflow. These addresses should always contain zero counts when a Busy Test is performed.

** When the results of the Busy Test are printed out, all addresses (with exception of addresses 00000 and 00001) should contain 1, 2, or 3 counts. Peg count,→scaled peg count, high-resolution 10-second usage◄—or multiscan usage cards should produce a count of 1, and usage or discrete cards should produce a minimum count of 2 and a maximum count of 3. For this printout, it can be noted that there are no counts in addresses 32 through 63. This indicates that input card No. 1 is either defective or missing. The simple replacement of the card at the ETDC location will probably clear the trouble for such failures.

*** All zeros on a normal EADAS High-Speed Line Printer printout will be slashed.