

## 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 issue affects the Equipment Test List.

1.03 The tests covered are:



*1.05 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 TDC is being tested. The testing time of each TDC is approximately 2 minutes, but, the data for the entire 15- or 30-minute data collection interval is considered lost for the TDC 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.*

PAGE

**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 TDC analysis, a Pass/Fail indication will be given at the EADAS CU teletypewriter.

3

1.06 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).

**B. Inhibit-Busy Test:** This test checks the ETDC/s under test for its ability to inhibit all of its 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

1.07 Refer to Section 252-115-512 (local tests of ETDC) if trouble cannot be cleared as a result of performing the tests in this section.

1.04 Test A is intended to be performed on a routine basis, and for making an abbreviated check of the ETDCs. 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 the beginning of the day shift).

1.08 The ETDC is arranged to accommodate 32 input cards each of which have 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 four 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 receive 10 peg count indications (3) **Usage**

## SECTION 252-115-511

**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.

**1.09** 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 printout the word 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 not correct
- (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) defective.

**1.10** 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. 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 any 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 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.

**1.11** 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 TDC unit will accept traffic data from as many as five REMOTE ETDC units. Input card numbers 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.

**1.12** The HOME and REMOTE ETDCs on a system basis may be tested independently, or a maintenance command may cause all ETDCs associated with a 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, therefore, be required to select the proper input TTY message to perform the type of test desired. Maintenance TTY input messages are outlined in Part 4.

**1.13** 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 in RS:TC:!

**1.14 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 -FA, L8 high speed line printer (used to printout results of the Line Printer Dump Test).

**3. PREPARATION**

STEP	ACTION	VERIFICATION
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**All Tests**

- |   |   |  |
|---|---|--|
| 1 | At EADAS CU TTY—<br>Operate power switch to ON. |  |
|---|---|--|

**4. METHOD**

STEP	ACTION	VERIFICATION
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**A. Pass/Fail Test**

*Note:* This test cannot be performed 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 printout 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—<br>Key in input message selected in Step 2. |  |
|---|--|--|

As each character is keyed in it will be printed out at TTY.

After "!" has been keyed in—  
TTY prints out 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 out TEST COMPLETE.

**SECTION 252-115-511**

<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
		<i>Note:</i> Table C is 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 5 except that channel tested should print the word "PASS".
7a	Repeat Steps 5a and 6a for all channels which failed to meet requirements of Step 3.	
<b>B. Inhibit-Busy Test</b>		
2	At line printer— Open front door of printer cabinet.	
3	Operate ac power circuit breaker to ON.	
4	Operate PRINT INHIBIT switch to OFF.	READY lamp lighted.
5	Momentarily operate MASTER CLEAR switch.	
6	Close front door of printer cabinet.	
7	At control panel on top of printer— Operate ON LINE-OFF LINE switch to ON LINE.	
	<i>Note:</i> Do not initiate this test 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 printout RL (Repeat Later).	
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 TTY. After "!" has been keyed in— TTY prints out PF (printout follows). After completion of ETDC inhibit testing—

STEP	ACTION	VERIFICATION
10a	If printout/s contain errors— Report trouble to maintenance personnel at distant ETDC location/s.	At line printer— Inhibit test results printed out. ETDC begins to perform busy test. After ETDC has completed busy testing— 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.
11a	After trouble has been cleared at distant TDC location— Using Table D, select appropriate input TTY message/s to test channel/s which failed.	<i>Note:</i> Table E is an example and explanation of a Line Printer Dump test printout.
12a	At EADAS CU TTY— Key in message(s) selected in Step 11a.	Verification same as for Step 9 except that results for ETDC tested should not contain any errors.
13a	Repeat Steps 11a and 12a for all channels which failed to meet requirements of Step 9.	

TABLE A

TDC INPUT CARD NO.	ADDRESSES ON PRINTOUT	TDC 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

ETDC MAINTENANCE-CHAN	00	FAIL 6	00000001000	00:26:05	10/1/73
ETDC MAINTENANCE-CHAN	01	PASS		00:28:01	10/1/73
ETDC MAINTENANCE-CHAN	02	PASS		00:32:56	10/1/73
ETDC MAINTENANCE-CHAN	03	PASS		00:34:52	10/1/73
ETDC MAINTENANCE-CHAN	04	FAIL 5	00000040000	00:36:48	10/1/73
ETDC MAINTENANCE-CHAN	05	PASS		00:38:44	10/1/73

ETDC MAINTENANCE-CHAN	96	PASS		04:20:44	10/1/73
ETDC MAINTENANCE-CHAN	97	PASS		04:22:40	10/1/73
ETDC MAINTENANCE-CHAN	98	FAIL 2	00400000000	04:24:36	10/1/73
ETDC MAINTENANCE-CHAN	99	PASS		04:28:32	10/1/73

Indicates a ETDC Maintenance Test

Indicates Channel No. Tested

Indicates whether test passed or failed

See Note 1

See Note 2

Indicates Time of Day

Indicates 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 common control circuit packs.

TABLE C (cont)

<u>Code</u>	<u>Meaning</u>
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.
4	ETDC failed Map Test--Can be caused by faulty pegcount card (looks like discrete or usage card). Can be caused by miss-assignment of card locations in computer storage. Can be caused by pegcount cards interchanged with other cards, or missing or extra input cards.
5	ETDC failed Map and Inhibit Tests--Probably indicates more than one unrelated problems. 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; e. g., the octal number shown for Channel No. 98 on this printout is 0040000000. When converted to a binary number this number becomes 00000010000000000000000000000000. 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 ETDC's.
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

	Indicates 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		10/01/73		
0000:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00010:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00020:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00030:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00040:	*	0000	0000	0000	0000	0000	0000	0000	0000	0000
00050:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00060:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00070:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00080:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00090:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00100:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
**										
00900:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00910:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00920:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00930:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00940:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00950:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00960:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00970:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00980:	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
00990:	0000	0000								

\* 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 E (cont)

	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	10/01/73		
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 to addresses 00000 and 00001) should contain 1, 2, or 3 counts for all equipped input cards. Pegcount 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.