AMARS
NO. 1A AUTOMATIC MESSAGE ACCOUNTING AND RECORDING CENTER
DATA SET INTERFACE AND AUXILIARY FUNCTION CIRCUIT DIAGNOSTIC

CONTENTS

1. GENERAL INFORMATION

2. RECORDS AND REQUIREMENTS

3. TEST EQUIPMENT

4. DESCRIPTION OF TEST INFORMATION

5. LOADING THE DSIAF DIAGNOSTIC

6. TEST PROCEDURE

7. AIDES

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1. GENERAL INFORMATION

1.1 This section is intended as a guide for using the Data Set Interface and Auxiliary Function (DSIAF) circuit diagnostic. This section is designed to help an installer with an E.S.S. background perform tests using the DSIAF Diagnostic. The DSIAF Diagnostic was designed to:

(1) Test all active devices in the Data Set Connection Cabinet.

(2) Minimize manual intervention.

(3) Isolate failures to a specific board.

(4) Isolate failures to an integrated circuit.

(5) A test tool for an operational No. 1A AMARC System.

1.2 Initially, the load procedure given in Paragraph 5 and the test procedure in Paragraph 6 are to be performed twice, once for each DSIAF circuit. At a later time the DSIAF Diagnostic can be used to verify the operation of the majority of circuits in the Data Set Connection Cabinet when attempting to isolate a hardware fault between DEC and WECo equipment.

2. RECORDS AND REQUIREMENTS

2.1 The E.S.S. Trouble Record Form (SD-4-1391) should be used to record all troubles which are encountered when running the test in this Handbook Section.

3. TEST EQUIPMENT

3.1 No. 1A AMARC DSIAF diagnostic on magnetic tape.

Code	Description
ITE-5237B	Oscilloscope
SPP-832	Spare Parts Package

4. DESCRIPTION OF TEST INFORMATION

4.1 The DSIAF Diagnostic is divided into four test groups because the test in each group requires the installer to perform manual operations, such as the removal or hooking-up of cables and circuit packs. The TTY will output a message of what manual operation is required at the appropriate time. Switch power off on the DSIAF unit being tested before performing the manual operations of removing and/or inserting circuit packs or cables. Use the power switch located on the appropriate H.P. power supply.

NOTE: The output message will only be printed upon the execution of the first test in each Test Group.

4.2 The following is a description of test included in Test Group 100.

4.21 TEST 101: This test verifies that the DR11C operates properly.

4.3 The following is a description of test included in Test Group 200.

4.31 TEST 201: This test verifies that the CPU No. is properly wired.

4.4 The following is a description of the tests included in Test Group 300. This Test Group diagnoses the different boards of the DSIAF; after the message printout the program will halt waiting for the proper installation of CPC7. Then it will execute in sequence all other DSIAF tests.

4.41 TEST 301: This test is the ODD parity test.

4.42 TEST 302: Power Disconnect test, CPC4 is tested for Power Disconnect on the other processor.

4.43 TEST 303: Power Switch Test. This test checks the ability of the DR11C to control the switching of the Data Sets power and the related function of CPC4.

4.44 TEST 304: Alarm and Display Drive Test. This test verifies that leads B0, B1 and B2 on CPC's are correct.

4.45 TEST 305: Alarm and Display Drive Test. This test is a continuation of Test 304, except it has an isolation test to CPC5.

4.46 TEST 306: Watch Dog Test. This test verifies that the Watch Dog operates by pulsing every 50 and 250 Msec.

4.47 TEST 307: Request to Send (RTS) Memory Test. In this test the memory is tested first, then the drivers are tested. The circuit packs involved are CPC1 (JW440), CPC2 (JW172), CPC3 (JW173) and CPC4 (JW174).

4.48 TEST 310: Date Terminal Ready (DTR) Memory Test, this test verifies that the memories associated with the 202S Data Sets are working.

4.5 The following is a description of tests in Test Group 400. This group requests the installer to <u>perform</u> some <u>Manual Tests</u>.

4.51 TEST 401: Power Alarm and Display Relay Test.

4.6 Test Results Formats

4.61 PASS

When a specific test has completed a particular test, the following printout occurs:

         TST XXX PASS

where   XXX = Test Number

4.62 FAIL

Under a FAIL condition of a test, the following will print:

TST XXX FAIL CPCY, CPCZ, ...

AAAAAA BBBBBB CCCCCC DDDDDD

where   XXX = Test Number

     Y,Z = CPC Number (Circuit Pack No.)

AAAAAA = contents of the Status Register (SR) at address 767770. SR part of the DR11-C.

BBBBBB = contents of the READ/WRITE Buffer Register (RWBR) at address 767772. RWBR is part of the DR11-C.

CCCCCC = contents of the Input Read Only Register (IROR) at address 767774. IROR is part of the DR11-C.

DDDDDD = Program address of the failure.

4.63 ANALYSIS Condition

Under an Analysis Condition of a test, the following will print:

      ANALYSIS: TEST XXX

      FAILURES IN: CPCY ....

           or

      RTS MEMORY ANAL.TST 307

      SINGLE FAILURES IN CPCY ...

           or

      DTR MEMORY ANAL.TST 310

      SINGLE FAILURES IN CPC3, CPC4

5.   LOADING THE DSIAF DIAGNOSTIC

5.1   Loading the Magnetic Tape

5.11 Taking the magnetic tape containing the No. 1A AMARC DSIAF diagnostic, remove the plastic write enable ring (if equipped) from the reel. Removing the write enable ring will protect the magnetic tape from being overwritten.

5.12 Depress the RESET key on the tape drive unit associated with the processor (RESET lamp will light on the drive unit).

5.13 Place the DSIAF reel on the uppermost mount on the drive unit by pulling the handle on the mount out. After mounting the reel, push handle back in place and verify reel is held securely.

5.14 Thread tape through drive, as indicated in printed diagram on the drive unit. Thread tape on the lower reel and wind around reel only twice*, leaving slack in the process of threading.

*NOTE: There is a metalic tape located near the beginning of the tape. This location is termed the load point on the tape. When threading any magnetic tape, it is important in winding tape on the lower reel (tape-up reel) that the load point is before the read/write sensors.

5.15 Depress the LOAD key on the drive unit. The tape should wind forward to the load point and then stop.

5.16 Depress the ONLINE key on the drive unit. Only two lights - ONLINE and LOAD - should be on before continuing.

5.2 Loading Program

5.21 Halt the Central Processor (CU) by placing the ENABLE/HALT key to the HALT position.

5.22 Set the console switches (SWR) on the CU console to 17773030. Then depress the LOAD ADDR key.

5.23 Set the SWR keys to zero - all down.

5.24 Place the ENABLE/HALT key to ENABLE.

5.25 Depress the START key on the CU console. The magnetic tape moves forward and the message CORE MEMORY SIZE IS XXXK WORDS is typed on the processor terminal. The tape then continues to move forward and then rewind back to the supply reel. The DSIAF Diagnostic should now be in memory.

5.26 If CRC check fails the following message will be printed:

CRC CHECK HAS FAILED, RELOAD THE PROGRAM.

It will be necessary to repeat Paragraph 4.2. If errors occur repeatedly, tape could be defective, memory could be defective, or KG11A peripheral could be defective.

5.27 After the magnetic tape rewinds back to the ON LINE/LOAD position, halt the processor using the HALT key.

6. DSIAF DIAGNOSTIC PROCEDURE

6.1 Start

6.11 The DSIAF Diagnostic can be manually restarted at any time following the procedure beginning at this paragraph.

6.12 Set the ENABLE/HALT key on the processor's console to HALT. Load the address 200 into the ADDRESS register by setting the SWR key to 200 and then depressing the LOAD ADDR key.

6.13 Set the SWR keys to state the test number to be performed and the mode of test operation as described below:

SWR Bits	Description
0 thru 8	Test Number to be performed. Test Number must be valid test number (i.e., not 100, 200, 300 or 400) or all zeroes.

NOTE: If bits 0 thru 8 are zero (all down), the default feature will cause Test 101 to be selected.

SWR Bits	Description
9	Not assigned.
10=1 (up)	Loop on test (subtest within a group test) - scope loop.
11=1 (up)	Loop on a test group.
12=1 (up)	Perform test analysis.
13=1 (up)	No TTY printout.
14=1 (up)	Exercixe all tests (continue testing even if error occurs).
15=1 (up)	Halt on an error.

NOTE: SWR bits 9 thru 15 (mode) can be changed during testing without restarting the DSIAF program.

In performing the DSIAF Diagnostic for the first time on a particular DSIAF unit, all tests should be run in consecutive order, starting with TEST 101, with the loop on failure and the test analysis options. Therefore, set the SWR keys to 010101 (octal) - 0/001/000/001/000/001 (binary).

6.14 After the SWR keys have been selected, set the ENABLE/HALT key to ENABLE. Then depress the START key. Press the CONTINUE key. A CRC check of the loaded program will be automatically performed to verify that the program is stored accurately. If a "magging" error has been encountered, the following TTY printout will be typed out:

CRC CHECK HAS FAILED

RELOAD PROGRAM

If the above message occurs, reload the program by repeating procedure from Paragraph 5.2 If error occurs again, repeat the entire procedure starting at Paragraph 5.1.

If no CRC failure has been encountered, the program is accurately stored and the following TTY printout will be typed out:

DSIAF DIAGNOSTIC BEGINS

RMV CA1- THRU CA7-

WHEN THE ABOVE IS DONE TYPE

LF

6.15   Remove CA1 thru CA7 cables from the specific DSIAF circuit packs that are being tested. Type in a line feed (LF) character when this is accomplished.

6.2   Test 101

6.21   The computer will printout the following message on the TTY for this test:

GROUP 1 TST VERIFY THAT DR11C

CABLES ARE INSTALLED FOR DR11C

MAINT. TYPE IN LF WHEN CABLES

ARE INSTALLED.

6.22   At this point in the Test the CA8-X and CA9-X cables should be disconnected from the P11A and P12A connectors and reconnected to TC1 and TC2 respectively. Type in a Line Feed (LF) when this is accomplished.

6.3   Test 201

6.31   The computer will printout the following message on the TTY for this test:

VERIFY THAT DR11C CABLES ARE IN-

STALLED FOR NORMAL USE. TYPE IN

LF WHEN ABOVE IS DONE.

6.32   At this point in the test the CA8-X and CA9-X cables should be reconnected to P11A and P12A respectively. Type in a Line Feed (LF) when this is done.

6.33   The computer will then print out the following message on the TTY:

GROUP 2 TST TYPE IN CPU NO.

FOLLOWED BY LF.

6.34   Type in either "0" or "1", depending on what processor is under test. Then type in a Line Feed (LF) character.

6.4   Test Group 300

6.41   The computer will print out the following message on the TTY for this group test:

GROUP 3 TST VERIFY THAT CPC7 IS

INSTALLED TYPE IN LF WHEN THE

ABOVE IS DONE.

6.42   At this point in the test, remove the circuit pack CPC6 (JW176) from location 03-14 if DSIAF-0 is being tested or from location 03-13 if DSIAF-1 is being tested. Replace CPC6 with maintenance circuit board CPC7 (JW181).

Connect the Diagnostic test circuit* (SD-5P007-01, FS11) located on the back of the Data Set Connection Cabinet to circuits in the DSIAF, as indicated in Figure 6.42. Use the special maintenance cables provided.

*NOTE: Each cable connector is marked with an arrow ">". The cable connector end stamped TS- should match the connector stamped TS- on the Diagnostic test circuit. The other cable connector end should be inserted so that the arrow on the cable connector matches the P1 or P2 connector arrow.

6.43   Type in a Line Feed (LF) character when this is accomplished.

6.44   Tests 301 through 310 will be run sequentially.

6.5   Test 401

6.51   The computer will print out the following messages on the TTY. After each message, the computer will halt and wait for the correct response from the installer.

RESTORE CA1 WHEN THE ABOVE IS DONE

TYPE IN LF.

NOTE: Disconnect the maintenance cable going to DSIAF location 03-16 if DSIAF-0, or 03-11 if DSIAF-1. Connect standard cable CA1 going from 03-11 or 03-16 to the Power, Alarm, and Display circuit, as specified in Section 204.

6.52   Type in a Line Feed (LF) character when this is accomplished.

FS-9 DIAGNOSTIC TEST CKT.	DSIAF-0			DSIAF-1		
	CKT.	LOC.	CONN.	CKT.	LOC.	CONN.
TS 1	CPC2A	03-22	P1	CPC2A	03-05	P1
TS2	CPC2B	03-21	P2	CPC2B	03-06	P2
TS3	CPC1A	03-20	P1	CPC1A	03-07	P1
TS4	CPC5	03-16	P1	CPC5	03-11	P1
TS5	CPC2B	03-21	P1	CPC2B	03-06	P1
TS6	CPC2A	03-22	P2	CPC2A	03-05	P2
TS7	CPC1B	03-19	P1	CPC1B	03-08	P1

FIGURE 6.42

6.53 MJALM,MJ AISLE LAMP, MJ,TO,DS CONT ALW AND ACTIVE DISPLAY SHOULD BE ON. MN ALM, MN AISLE LAMP, AND MN DISPLAY SHOULD BE OFF. IF THE ABOVE WAS DONE, PRESS THE TTY LF KEY.

NOTE: All installer's responses in Test Group 400 are indicated by typing in the line feed character on the TTY. TTY printout may refer to this response as:

1. Press the TTY key.

2. Type LF on the TTY.

3. Press the TTY LF key.

6.54 VERIFY THAT THE MJ ALARM IS CLEARED. IF THE ABOVE IS DONE, TYPE LF ON THE TTY.

6.55 MNALM, MN AISLE LAMP, MN, TO, DS CONT ALW, AND ACTIVE DISPLAY SHOULD BE ON. MJ ALM, MJ AISLE LAMP AND MJ DISPLAYS SHOULD BE OFF. IF THE ABOVE WAS DONE, PRESS THE TTY LF KEY.

6.56 VERIFY THAT THE MN ALARM IS CLEARED. IF THE ABOVE IS DONE, TYPE LF ON THE TTY.

6.57 MN & MJ ALM, MN & MJ AISLE LAMP, TO, DS CONT ALW AND ACTIVE DISPLAYS SHOULD BE ON. IF THE ABOVE WAS DONE, PRESS THE TTY LF KEY.

6.58 VERIFY THAT THE MN AND MJ ALARMS ARE CLEARED. IF THE ABOVE IS DONE, TYPE LF ON THE TTY.

6.59 DS CONT ALW DISPLAY SHOULD BE ON. IF THE ABOVE WAS DONE, PRESS THE LF KEY ON THE TTY.

6.510 "TO" DISPLAY SHOULD BE ON. IF IT IS ON, PRESS THE LF KEY ON THE TTY.

6.511 RMVBTP DISPLAY SHOULD BE ON. IF IT IS ON, PRESS THE LF KEY ON THE TTY.

6.512 VERIFY THAT ALL THE DSIAF LAMPS ARE ON, THEN PRESS THE LF KEY ON THE TTY.

6.513 VERIFY MANUALLY THE WD RELAY AND 202T DATA SET TRANSFORMERS.

NOTE: Verify that the Watch Dog relay associated with the appropriate central processor is operated. (Refer to SD5P007-01, FS-3)

6.514 RESTORE CPC6 AND CA2 THRU CA7 - TEST COMPLETE.

NOTE: Disconnect DSIAF maintenance cables and replace CPC7 with standard circuit pack CPC6, restore standard cables CA2- thru CA7- (refer to Section 204 if required). THE DSIAF must now be in standard cable configuration.

6.6 For the initial installation testing, repeat the loading procedure given in Paragraph 5 and the test procedure given in Paragraph 6.1 through 6.5, using the other processor and DSIAF unit.

7.   AIDES

7.1   Figures 7.1A, 7.1B and 7.1C give the bit definition for registers RWBR (READ/WRITE) Buffer Register IROR (INPUT READ ONLY REGISTER), and SR (STATUS REGISTER) of the DR11-C.

RWBR

At Loc. 767772	RMV BOTH TAPES	MNR ALM	MJR ALM	EIA PD	EIA PC	ON/OFF	RTSE	CLEAR		DTRE	RTS/DTR	DATA SET ADDRESS				
	15	14	13	12	11	10	9	8	7	6	5	4	3	2 1	0	

FIG. 7.1A

IROR

AT LOC. 767774	CPU NUMBER OR MAINT.	CAR 20 to 37 (other CU)	CAR 0 to 17 (other CU)	CTSU 20 to 37	CTSU 0 to 17	CAR 20 to 37	CARO. to 17	CTSM 20 to 37	CTSM 0 to 17	EIAPI IMAGE (other CU)	EIAPI IMAGE	EIAPI (other CU)	EIAPI	RTSI/DTRE (other CU)	RTSI/DTRE	ODD PARITY
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

FIG. 7.1B

SR

AT LOC. 767770	RB								RA	ENBB	ENBA				WATCH DOG OR MAINT.	WATCH DOG OR MAINT.
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

FIG. 7.1C

Manager, Product Engineering
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