Date: Jan. 25/99

Subject: Transmittal of Revision 1 To Service Bulletin Number
           V25000-ENG-73-0141

Service Bulletin Revision History:

Event	Date
Basic Issue	Nov. 11/98
Revision 1	Jan. 25/99

Reason For Issuance Of Revision:

(1) This Service Bulletin is being revised to Keep Out Zone values on page 2.

(2) This Service Bulletin is being revised to add the Service Bulletin number and the correct software level to the description data in the progression chart on page 27.
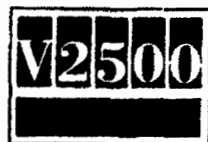
Effect on Prior Compliance:

None.

List of Effective Pages:

Bulletin Page No.	Rev. No.	Effective Date
1 to 4	1	Jan. 25/99
5 to 26	Basic	Nov. 11/98
27	1	Jan. 25/99
28	Basic	Nov. 11/98

ENGINE - FUEL AND CONTROL - TO PROVIDE A NEW A1SCN14/R ELECTRONIC ENGINE CONTROL (EEC) SOFTWARE

MODEL APPLICATION

V2500-A1

BULLETIN INDEX LOCATOR

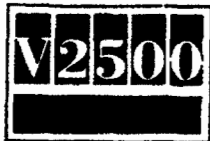73-22-00

Compliance Category Code

4

Internal Reference No.

98VZ004

1. Planning Information

   A. Effectivity

      (1) Aircraft: Airbus A320

      (2) Engine: V2500-A1 Engines through Serial No. V0361

      For engines specified which incorporate this Service Bulletin the Bump configurations which follow are applicable.

      BUMP 00 (No Thrust Bump)

      BUMP 04 (No Thrust Bump)

      BUMP 07 (Improved Consolidated Thrust Bump)*

      *The Flight Operations Manual will have specific instructions for Aircraft which have Engines with these Thrust Bump Configurations.

      CAUTION: THE INTERMIX OF ELECTRONIC ENGINE CONTROLS MUST BE DONE BY THE INSTRUCTIONS GIVEN IN REFERENCE (3), AIRBUS SERVICE BULLETIN A320-73-1065.

      If Service Bulletin V2500-ENG-75-0025, specified in Reference (1) is incorporated on the engine(s) it must be removed when this Service Bulletin is incorporated.

      You must contact your IAE Representative when you incorporate this Service Bulletin. You must obey the contractual obligations when you change from a no thrust bump configuration (other than 00 or 04).

   B. Reason

      (1) Condition:

          For stabilized engine ground running within a certain N1 speed Range, V2500-A1 Engines may have reduced fan flutter margin.

      (2) Background:

          Erosion (blunting) of the blade leading edges reduces the fan flutter margin.

      (3) Objective:

          Restrict steady state engine fan operation in the region (zone) where the flutter can occur. This keep out zone will only be applied to on-ground, static operation (less than 0.07 MN). The keep out zone will not be applied during unrated N1 mode operation, and during thrust reverser operation.

          The keep out zone is defined as follows:

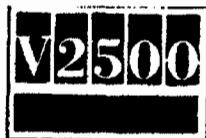 | | |
          |---|---|
          | 1.127 to 1.195 EPR | EPR mode operation |
          | 66.1% to 75% N1C2 | Rated N1 mode operation (zone is expressed in corrected speed) |

          The keep out zone will be implemented as a throttle flat. The following explanation is written in terms of EPR mode operation. The same operational impact applies to the rated N1 mode.

Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

For increasing (acceleration) throttle movement, engine power will be limited to no more than the low end of the keep out zone (1.127 EPR) until EPR command exceeds the high end of the zone (1.195 EPR).

For decreasing (deceleration) throttle movement, engine power will be limited to no less than the high end of the keep out zone (1.195 EPR) until EPR command goes below the low end of the zone (1.127 EPR).

    (4)   Substantiation

This change has been fully tested on the closed loop bench and run on A320 Aircraft.

    (5)   Effects of Bulletin on Workshop Procedures:

Removal/Installation	Not affected
Disassembly/Assembly	Not affected
Cleaning	Not affected
Inspection/Check	Not affected
Repair	Not affected
Testing	Not affected

    (6)   Supplemental Information

None.

C. Description

    (1)   To provide a new Electronic Engine Control (EEC) with A1SCN14/R software logic.

Part I: Model Number 150-1 (H/S part number beginning with 798300) or Model Number 150-20 (HS part number beginning with 808050) — If the Electronic Engine Control is sent to one of the addresses listed in Paragraph 2. B.

    (a)   A new EEC can be obtained from the supplier referenced in Part I of this Service Bulletin. The removed part is returned, programmed, identified with the new part number, and installed again.

Part II : Model Number 150-20 (HS part number beginning with 808050) **ONLY** — If the Electronic Engine Control is reprogrammed on site

   (b)   The EEC can be programmed on the engine, by the procedure given in part II of this Service Bulletin, and identified with the new part number.

D. Approval

The Part Number Changes and/or part modifications described in Section 2 and 3 of this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and are FAA-APPROVED for the Engine Model listed.
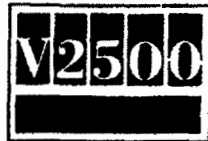
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E. Compliance

Category 4

Accomplish at the first visit of an engine or module to a maintenance base capable of compliance with the accomplishment instructions regardless of the planned maintenance action or the reason for engine removal.

F. Manpower

Estimated Manhours to incorporate the full intent of Part I of this Service Bulletin (in service):

Venue   Estimated Manhours

(1) In service.. .. .. TOTAL: 1 hour 16 minutes

    (a) To gain access

       (i) Install warning notices .. 5 minutes

       (ii) Open the fan cowls .. .. . 7 minutes

       (iii) Remove the EEC .. .. <u>23 minutes</u>

                       TOTAL: 35 minutes

    (b) To return to flyable status

       (i) Install the EEC .. .. 28 minutes

       (ii) Close the fan cowls .. .. . 8 minutes

       (iii) Remove the warning notices <u>5 minutes</u>

                       TOTAL: 41 minutes

Estimated Manhours to incorporate the full intent of Part II of this Service Bulletin (in service):

Venue   Estimated Manhours

(2) In service.. .. .. TOTAL: 1 hour 25 minutes

    (a) To gain access

       (i) Install warning notices .. 5 minutes

       (ii) Open the fan cowls .. .. . 7 minutes

       (iii) Program the EEC .. . <u>1 hour</u>

                    TOTAL: 1 hour 12 minutes

    (b) To return to flyable status

       (i) Close the fan cowls .. .. . 8 minutes

       (ii) Remove the warning notices <u>5 minutes</u>

                    TOTAL: 13 minutes

Estimated Manhours Part I or Part II (overhaul):

(3) At overhaul .. .. Not applicable
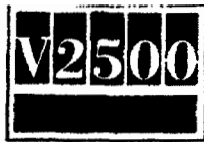
G. Material – Price and Availability

   (1) Modification kit is not required.

   (2) This Service Bulletin will be done at no cost to the operator.

   (3) See "Material Information" section for prices and availability of future spares.

H. Tooling – Price and Availability

   The tools and equipment that follow are necessary to do the procedure given in Part II of this Service Bulletin.

   (1) A dedicated (recommendation) IBM compatible computer, with the following minimum requirements:

      (a) 80286 processor

      (b) 512 Kbytes RAM

      (c) 1.44 Mbyte, 3.5" floppy disk drive

      (d) Dual channel RS–422 asynchronous communication board (HS recommends Model DS202 by Qua Tech Incorporated) with the following setup:

         Channel A EEC – COM3 (Base address 2E8, IRQ level 5)

         Channel B EEC – COM4 (Base address 3E8, IRQ level 5)

      (e) MSDOS operating system (version 3.0 or higher)

      (f) Virus scan program such as "VI–SPY" or "McAfee" is recommended.

         NOTE: The IBM computer date/time must be current prior to performing this procedure.

   (2) Hamilton Standard diskette called out in Reference (2). This diskette contains the EEC150-20: application code, trims, memory clear utilities, and software loader. The diskette can be obtained from:

   IAE Customer Support
   400 Main Street
   M/S 121-10
   East Hartford,
   CT 06108 USA
   Tel: 860-565-5515   Fax: 860-565-0600

   Associated Engine Serial Numbers and IAE Tracking No. S371UI must be stated on all correspondence.

   (3) EEC150-20 communication cables as defined in Table 1.

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EEC SIGNAL NAME	EEC CONNECTOR	QUA–TECH CONNECTOR	QUA–TECH SIGNAL NAME
UART IN LINE B CHA	P1–b	PA–2	TXD+
UART IN LINE A CHA	P1–H	PA–7	TXD–
UART OUT LINE A CHA	P1–c	PA–4	RXD+
UART OUT LINE B CHA	P1–J	PA–8	RXD–
BOOT DISC CHA	P1–D	N/A	N/A
BITE DISC CHA	P1–Z	N/A	N/A
BOOT/BITE RTN CHA	P1–m	N/A	N/A
UART IN LINE B CHB	P7–b	PB–2	TXD+
UART IN LINE A CHB	P7–H	PB–7	TXD–
UART OUT LINE A CHB	P7–c	PB–4	RXD+
UART OUT LINE B CHB	P7–J	PB–8	RXD–
BOOT DISC CHB	P7–D	N/A	N/A
BITE DISC CHB	P7–Z	N/A	N/A
BOOT/BITE RTN CHB	P7–m	N/A	N/A
Table 1 Communication Connections			

(4) EEC150-20 NAMEPLATE PN 751333-1 or modified nameplate 822815-1.

(5) 28 VDC +/- 0.5A power supply and associated power cables as defined in Table 2.

EEC SIGNAL NAME	EEC CONNECTOR	POWER SUPPLY
GTP CHA	P3–m	+28VDC
GTP RTN CHA	P3–r	RTN
GTP CHB	P9–m	+28VDC
GTP RTN CHB	P9–r	RTN
Table 2 Power Supply Connections		

I. Weight and Balance

    (1) Weight change   None

    (2) Moment arm   No effect

    (3) Datum   Engine Front mount Centerline (Power Plant station (PPS) 100)
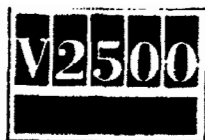
J. Electrical Load Data

This Service Bulletin has no effect on the aircraft electrical load.

K. References

(1) IAE V2500 Service Bulletins:

V2500-ENG-70-0336 (Information - Provide A New Electronic Engine Control With SCN12B/N Software And Featuring Hardware Common to The A5)

V2500-ENG-70-0056 (Information - Fuel And Control - To Announce A Hinged Heat Shield Configuration for the (EEC) electronic Engine Control)

V2500-ENG-73-0007 (Engine - Fuel And Control- Incorporate A New Electronic Engine Control (EEC) Configuration)

V2500-ENG-73-0015 (Engine - Fuel And Control - Incorporate A New Electronic Engine Control (EEC) Configuration And Rework The Data Entry Plug Assembly To The SCN11E Software Configuration)

V2500-ENG-73-0024 (Engine - Fuel And Control - Provide An Electronic Engine Control (EEC) With improved Printed Circuit Boards)

V2500-ENG-73-0027 (Engine - Fuel And Control - Provide An Electronic Engine Control (EEC) With The SCN 11G/J Software Configuration)

V2500-ENG-73-0037 (Engine - Fuel And Control - Provide A New Electronic Engine Control (EEC) With The SCN 12A Software Configuration)

V2500-ENG-73-0044 (Engine - Fuel And Control - Provide A New Electronic Engine Control (EEC) With The SCN 12B Software Configuration)

V2500-ENG-73-0069 (Engine - Fuel And Control - Provide A New Electronic Engine Control (EEC) With The SCN 12C Software Configuration)

V2500-ENG-73-0082 (Engine - Fuel And Control - Provide A New Electronic Engine Control (EEC) With The SCN 12D Software Configuration)

V2500-ENG-73-0112 (Engine - Fuel And Control - To Provide A New A1SCN13/Q Electronic Engine Control Version 084/084 Software)

V2500-ENG-75-0025 (Engine - HP/LP Active Clearance Control Ducts - To Provide A Front Duct Cover Assembly for Controlled Service Use)

(2) Hamilton Standard Service Bulletin EEC-150-20-73-21/ EEC-150-1-73-32.

(3) Airbus Service Bulletin A320-73-1065 (Aircraft Mod. 27957).

(4) V2500 Aircraft Maintenance Manual.

(5) The V2500 Engine Illustrated Parts Catalog (S-V2500-1IA), Chapter/Section 73-22-34.
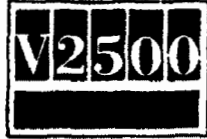
Printed in Great Britain

(6) The V2500 Engine Manual (E-V2500-1IA), Chapter/Section 71-00-00,
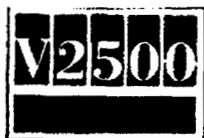   Testing-11.

L. Other Publications Affected

(1) The V2500 Engine Illustrated Parts Catalog (S-V2500-1IA),
     Chapter/Section 73-22-34, Figure 1, to add the new parts.

Printed in Great Britain

2. Accomplishment Instructions

   Part I: Model Number 150-1 (H/S part number beginning with 798300) or Model Number 150-20 (HS part number beginning with 808050) - If the Electronic Engine Control is sent to one of the addresses listed in Paragraph 2.B.

   A. The Source Demonstration requirements of this rework means that any facility not authorized to accomplish this rework either utilize the Authorized Vendors listed below or contact IAE Manager Maintenance Operations to determine if a qualification program can be initiated at their facility.

      IAE-INTERNATIONAL AERO ENGINES AG
      400 Main Street M/S 121-10
      East Hartford, CT 06108 USA

   B. Authorized Rework Vendors for this bulletin are listed below.

      Customer Service Center
      Hamilton Support Systems
      97 Newberry Road
      East Windsor, CT 06088 USA

              OR

      Hamilton Standard Customer Support Center - Maastricht B.V.
      Maastricht Aachen Airport
      P.O. Box 269
      6190 AG BEEK
      The Netherlands

   C. The designation by IAE of an authorized rework vendor indicates that the vendor has demonstrated the necessary capability to enable it to carry out the rework. However, IAE makes no warranties or representations concerning the qualifications or quality standards of the vendors to carry out the rework, and accepts no responsibility whatsoever for any work that may be carried out by a rework vendor, other than when IAE is listed as the vendor. Authorized rework vendors do not act as agents or representatives of IAE.

   D. Removal Instructions

      (1) Remove the old part number (Table 4) Electronic Engine Control by the procedure given in Reference (4), Chapter/Section 73-22-34, Removal/Installation. Refer to Figure 1.

      (2) Remove the Active Clearance Control (ACC) Front Duct Cover Assembly. Refer to V2500-ENG-75-0025 specified in Reference (1), and Figure 2.

         (a) Locate the Front ACC Duct.

         (b) Remove the two 4W0102 Bolts from the Front Duct Cover Assembly.

         (c) Remove the 2A3637 Front Duct Cover Assembly.

            NOTE: When you incorporate this Service Bulletin with the new SCN14/R software logic, the Front Duct Cover Assembly given in V2500-ENG-75-0025 must be removed. See Reference (1).

E. Rework Instructions

   (1) Do a modification of the Old P/N (Table 4) Electronic Engine
        Control (See Reference (5), Chapter?Section 73-22-34, Fig/Item No.
        01-028) and reidentify by the procedures given in Reference (2).

Procedure	Supplementary Information
(a) Send the Electronic Engine Control to the approved vendor to be modified. See Paragraph 2B.	See Figure 1.

F. Installation Instructions

   (1) Install the new part number (Table 4) Electronic Engine Control
        (1 off) by the approved procedure given in Reference (4),
        Chapter/Section 73-22-34, Removal/Installation.

        CAUTION: MAKE SURE THAT THE DATA RECORD ON THE DEP BACKSHELL
                 AGREES WITH THE DATA RECORD ON THE ENGINE
                 IDENTIFICATION PLATE.

   (2) Install the Data Entry Plug (with the applicable wire combination).
        See Reference (4), Chapter/Section 73-22-35, Removal/Installation.

        NOTE: Before you incorporate this Service Bulletin do a check of
               the Data Entry Plug configurations in use. Make sure you
               have one of the permitted Bump configurations given in this
               Service Bulletin.

        NOTE: If you have a Bump configuration in use that is not one of
               the permitted Bump configurations given, you must change the
               wire configuration to one of the approved Bump
               configurations specified. Use the procedure specified in
               Reference (6), Chapter/Section 71-00-00 Testing-11. You
               must change the engine records to include this modification.

               When you change the wire configuration of the Data Entry
               Plug assembly you must do a check to make sure the new
               configuration is correct. Use the electrical connector
               specified. See Reference (6), Chapter/Section 71-00-00,
               Testing-11.

        (a) Install a Data Entry Plug with the 00/04 Bump configuration
             for engines that will not use the Thrust Bump.

        (b) Install a Data Entry Plug with the 07 Bump configuration for
             engines that will use the Improved Consolidated Thrust Bump.

             NOTE: When you either change or replace the Data Entry Plug
                    Assembly to incorporate a Bump configuration you must
                    install a new Engine Identification Plate. Contact
                    your IAE representative to get a new Engine
                    Identification Plate.

G. Recording Instructions

   (1) A record of accomplishment is necessary.

Part II : Model Number 150-20 (HS part number beginning with 808050) **ONLY** — If the Electronic Engine Control is Reprogrammed on site.

NOTE: This procedure can only be accomplished by maintenance personnel that have been trained by an IAE representative.

NOTE: In the following procedure, statements provided to show text copied from the computer screen:

> **are indented, bold, and as illustrated on this line.**

E7975

However the number 'E7975' is a SB graphic reference and does NOT appear on the computer screen.

A. Isolate aircraft electrical system and gain access to the EEC by doing the pre-requisite procedures given in Job Set-up in Reference (4), Chapter/Section 73-22-34, Removal/Installation (the removal procedure.

NOTE: Do not turn on aircraft 28VDC power until instructed to do so in the following procedure.

NOTE: Reprogramming the EEC will clear the fault memory. It is recommended that a record of existing EEC faults be obtained before initiating reprogramming.

B. General

(1) Hamilton Standard electronic Engine Control Model EEC150-20, software is programmed into the EEC using an IBM compatible computer and Hamilton Standard supplied software.

(a) Disassembly of the EEC is not required.

(b) Data integrity of the Hamilton Standard supplied software is performed as part of the reprogramming procedure.

(c) A bit-for-bit memory verification test is included as part of the reprogramming procedure.

(d) No functional, thermal cycle, or vibration testing is required for units reprogrammed in accordance with this Service Instruction.

(e) The EEC can be programmed at room ambient conditions or while it is installed on the engine.

(2) The tools specified in Paragraph 1. H. are necessary to accomplish this procedure.

C. Do the steps that follow to reprogram the Electronic Engine Control (EEC) without removing it from the engine.

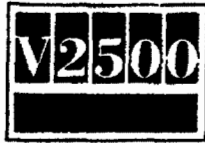(1) Verify that the model number on the identification plate of the unit is "EEC150-20".

(2) Record the current unit part number and the unit serial number from the nameplate. This information will input into your computer.

(3) Connect commercial power to all necessary reprogramming equipment.

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(4) Remove the harness connector from the EEC connector marked J1 and connect the programming harness connector marked P1 to the EEC connector marked J1. Ensure that the red engagement stripe on the EEC connector J1 is fully covered.

(5) Remove the harness connector from the EEC connector marked J7 and connect the programming harness connector marked P7 to the EEC connector marked J7. Ensure that the red engagement stripe on the EEC connector J7 is fully covered.

(6) If the computer and power supply connections to the cables are permanent, skip to step C. (9).

(7) Connect the programming harness connector marked "ch. a uart" to the IBM compatible computer UART board connectors for the channel A RS-422 Port (COM-3). Make sure that the connectors are properly mated.

(8) Connect the programming harness connector marked "ch. b uart" to the IBM compatible computer UART board connectors for the channel B RS-422 Port (COM4). Make sure that the connectors are properly mated.

   NOTE: UART connections can differ for different IBM Compatible Computers.

   NOTE: It is important to verify that the connectors are correctly installed for correct loader operation. Hamilton Standard recommends labeling the RS-422 COM3 port as "ch. a uart" and COM4 port as "ch. b uart" on the computer to reduce errors.

(9) If the EEC is powered by aircraft 28VDC power supply, skip to step C. (13)

(10) If the computer and power supply connections to the cables are not permanent, connect the opposite end of P3 and P9 cables to the 28VDC power supply.

(11) Remove the harness connector from the EEC connector marked J3 and connect the power supply harness connector marked P3 to the EEC connector marked J3. Ensure that the red engagement stripes on EEC connector J3 are fully covered.

(12) Remove the harness connector from the EEC connector marked J9 and connect the power supply harness connector marked P9 to the EEC connector marked J9. Ensure that the red engagement stripes on EEC connector J9 are fully covered.

(13) Turn on the aircraft 28VDC power supply to the EEC

(14) Locate the BOOT/BITE switches for channel A and channel B. Set the Boot/BITE switches to the ON (closed) position.

(15) Turn on the power to the IBM compatible computer.

   NOTE: Please make sure that the Disk Drive "A" has no disks present, prior to power on of the computer.

(16) Wait for the MSDOS prompt "C:\>" to appear on the IBM compatible computer.

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V2500-ENG-73-0141
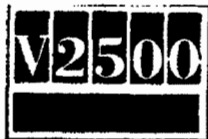
NOTE: The procedure uses disk drive "A" to identify the location
of the floppy drive in the computer system. If your
computer is configured with the 3.5 inch floppy drive at a
different designation, substitute that designation into the
procedure.

(17) Obtain the Hamilton Standard reprogramming diskette which is given
in Table 4 and Reference (2).

(a) Make sure that the write protection tab of the diskette is
covering the "hole".

NOTE: If necessary, you can remove the stickers from the corner of
the disk and move the protecting device to close the hole.

(b) Insert the diskette into the floppy drive designated as "A" on
the IBM computer.

(18) The display will show the "C:\>". Type **a:** then press the **RETURN**
key.

NOTE: Some computers have the **RETURN** key designated **ENTER.**

(19) The display will show the "A:\>" prompt.

(a) Type **LDR150** then press the **RETURN** key. this starts the UART
programming utility.

1   Several messages will appear including the program
identification, version number, time and the UTC/P&W
document property rights notice.

2   If there is a configuration error on the diskette, the
program will display the appropriate error message and
abort the programming process. Refer to Table 3 for a
summary of error code description and troubleshooting
suggestions.

(20) The UART programming utility LDR150, will display the following
message:

> **Enter operators name performing download : [ ] >**   E7963

(a) The field between the brackets will always be empty the first
time the program is executed on the diskette.

(b) Subsequent execution of the program will display the last name
entered.

1   If the operator is the same, press the **RETURN** key to
continue.

2   If a different name is present than the operator or no
name is present, the operator should enter his/her name
and press the **RETURN** key.

(21) The LDR150 program will display the following message:
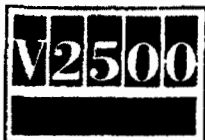
WARNING—EEC Fault Memory Will Be Cleared By This Program.
If an EEC Fault Dump Is Requested prior to Programming,
enter Q to Quit or C to Continue [Q/C] :>

E7964

(a) If a fault dump has already been accomplished or is not required, type **C**, then press the **RETURN** key.

(b) If a fault dump is required or the operator wishes to terminate the programming procedure, type **Q**, then press the **RETURN** key.

(c) If the operator selects the quit option, turn off the 28VDC power to the EEC and go to step C.(37).

(22) The LDR150 program will now prompt with the following message:

Enter the 9 character EEC Serial Number   : [XXXX—XXXX]>

E7965

From the Hamilton Standard nameplate, enter the nine character EEC serial number and press the **RETURN** key.

NOTE: For steps (23) and (24), if the EEC150-20 part number on the nameplate between the dashes is a single digit, enter a zero immediately preceding this digit.

Example: P/N 808050-4-030 would be entered as 808050-04-030.

(23) The LDR150 program will now prompt with the following message:

Enter the 13 character Current EEC HW Part No.: [XXXXX—XX—XXX]>

E7966

From the Hamilton Standard nameplate, enter the 13 character EEC Hardware Part Number and press the **RETURN** key.
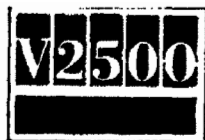
(24) The LDR150 program will now prompt with the following message:

Enter the 13 character SB EEC HW Part No. : [XXXXX—XX—XXX]>

E7967

From Table 4 and Reference (2), the Service Bulletin, enter the 13 character EEC Hardware Part Number and press the **RETURN** key.

(25) The LDR 150 program will now prompt with the following message:

> **Enter Trim Checksum Value for "XXXXXX.TRM"   :**

E7968

The xxxxxx.xxx designation is the name of the Trim File being loaded to the EEC. From Table 4 and Reference (2), the Service Bulletin, enter the trim checksum value and press the **RETURN** key.

(26) The LDR150 program will now prompt with the following message:

> **Do you wish to reenter the above entries [Y/N/Q]** :

E7969

    (a)   To proceed with programming process, type **N**, then press the **RETURN** key. Continue with step C. (27).

    (b)   To correct any errors in the data entered, type **Y** then press **RETURN**. ··continue with step C. (20).

    (c)   To quit the programming process, type **Q**, then press **RETURN** . Turn off the 28VDC power to the EEC and continue with step C. (37).

(27) At this point the screen will be initialized to display the activity of the programming process.

    (a)   Status messages will scroll across the screen.

    (b)   If an error occurs, see Table 3 for a summary of error code description and troubleshooting suggestions.

(28) The LDR150 program will prompt with the following message:

> **Turn OFF the BITE and BOOT switches to the EEC**
> **then**
> **Turn OFF POWER to the EEC and wait at least 5 seconds**
> **then**
> **Turn ON POWER to the EEC**
>
> **...Press the RETURN Key When Ready to Continue**

E7970

Locate the BOOT/BITE switches on your test equipment, and set the BOOT/BITE switches to the OFF (open) position.

(29) Switch off the 28VDC Aircraft supply to the EEC, wait 5 seconds, then switch on the 28VDC power supply to the EEC.

(30) On the IBM compatible computer, press the **RETURN** key.

(31) Wait until the LDR150 program prompts with the following message:
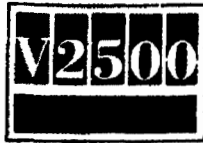
Nov.11/98

V2500-ENG-73-0141

Page 15

> **Turn ON the BITE and BOOT switches to the EEC**
> **then**
>
> **Turn OFF POWER to the EEC and wait at least 5 seconds**
> **then**
>
> **Turn ON POWER to the EEC**
>
> **...Press the RETURN Key When Ready to Continue**
>
> E7971

Locate the BOOT/BITE switches on your test equipment, and set the BOOT/BITE switches to the ON (closed) position.

(32) Switch off the 28VDC power supply to the EEC, wait 5 seconds, then switch on the 28VDC supply to the EEC.

(33) On the IBM compatible computer, press the **RETURN** key.

(34) Wait until the LDR150 program prompts with the following message:

> **Turn Off POWER to the EEC**
>
> **...Press the RETURN Key When Ready to Continue**
>
> E7972

Switch off the 28VDC supply to the EEC

(35) On the IBM compatible computer, press the **RETURN** key.

(36) The LDR150 program will now display the status of the programming process. Record the name of the log file for hard copy report of the process.

    (a) If a successful programming occurred, the following message will be displayed:

> ******EEC PROGRAMMING SUCCESSFULLY COMPLETED******
>
> **Record the log file name "VLXXXX.LOG" for later printout.**
>
> E7973

    If desired, record the log file name "VLXXXX.LOG" for later printout."

    (b) If programming was unsuccessful, the following message will be displayed:

****DOWNLOAD PROCESS ABORTED – ERROR CODE "X"**

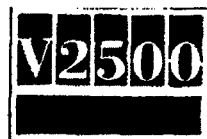**Record the log file name "VLXXXX.LOG" for later printout.**

E7974

> If desired, record the log file name "VLXXXX.LOG" for later printout."
>
> The "X" refers to the type of error that caused the process to abort. Table 3 describes the error codes and action to be taken.

(37) Press the **RETURN** key to terminate the program and return to the MSDOS prompt "**A:\>**".

(38) A paper copy of the log file can be made by the IBM compatible computer if a printer is available. You can do this as follows:

> NOTE: You can remove the diskette, write protect the diskette, and move to a system with a printer if no printer is connected to the original system. Complete the commands listed below to make a paper copy.

(a) At the MSDOS prompt, type **PRINT VLXXX.LOG.**

(b) Press the **RETURN** key.

(c) Wait until the printer is finished before proceeding to the next step.

(d) Remove the diskette, write protect the diskette.

(39) Disconnect the EEC reprogramming electrical connectors from J1 and J7 and J3/J9, if applicable.

(40) Reconnect the aircraft electrical harness connectors to J1 and J7 and J3/J9, if applicable.

(41) Identify the Electronic Engine Control by the procedure specified in Reference (2).

(42) Close-up the engine and remove the remaining notices by doing the post-requisite procedures given in Job Close-up in Reference (4), Chapter/Section 73-22-34, Installation.

(43) Do the post-installation test specified in Reference (4), Chapter/Section 71-00-00, as required for Removal/Installation of an Electronic Engine Control.

(44) For this reprogramming diskette, make (add to) a record of accomplishment, listing diskette part number, operator, EEC serial number, and date.

(45) When fleet reprogramming is complete, return the reprogramming diskette and a record of accomplishment to your IAE representative, for return to IAE.

ERROR CODE	ERROR TYPE	ACTION
E1	EEC VERIFY ERROR – Data verify error in EEC – Compare failed or location could not be programmed	Try procedure 3 times, if still bad return.EEC unit.
E2	COMMUNICATION ERROR – Communication problem between EEC and IBM compatible computer	Check BITE, cables, power supply. UART board, and EEC. Retry 3 times.
E3	CONFIGURATION ERROR – Configuration data comparison failed. (Possible Hardware P/N mismatch, EEC compatibility mismatch, Trim Checksum mis- match)	Operator data entered incorrect or incorrect data on existing nameplate. Check data – retry with the correct information.
E4	SYSTEM PROBLEM – Poor operating environment, bad disk, or program aborted by op- erator.	If the process was not termi- nated by the operator, check that the disk is not write protected, or re- place disk and retry.
	Table 3 Error Code Definitions	

A1 SCN14/R				
	Old P/N	A1 SCN14/R New P/N	SB Line Reference Paragraph	Line
Reprogramming Diskette	n/a	819191-16	2. Part II	C. (17)
EEC: (HS) HW Part No.	808050-4-050 798300-15-050 798300-16-050 798300-17-050 798300-18-050	808050-4-052 798300-15-052 798300-16-052 798300-17-052 798300-18-052	2. Part I	D.(1), E.(1), F.(1)
	(same)	(same)	2. Part II	C. (24)
EEC: IAE P/N	2A3289 2A3290 2A3291 2A3292 2A3293	2A3417 2A3418 2A3419 2A3420 2A3422	2. Part I	D.(1), E.(1), F.(1)
Trim Checksum	n/a	28671	2. Part II	C. (25)
	Table 4 Reprogramming Input Reference Table			
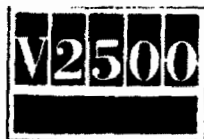
Printed in Great Britain
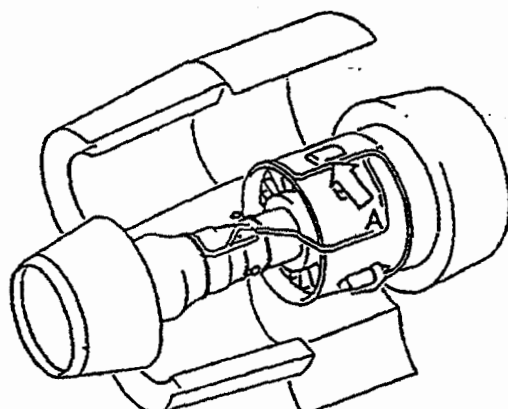
REMOVE THE ELECTRONIC ENGINE
CONTROL AND INSTALL THE NEW
ELECTRONIC ENGINE CONTROL
(EEC) OR OBTAIN THE NEW EEC BY
THE INSTRUCTIONS GIVEN IN THE
TEXT

FWD
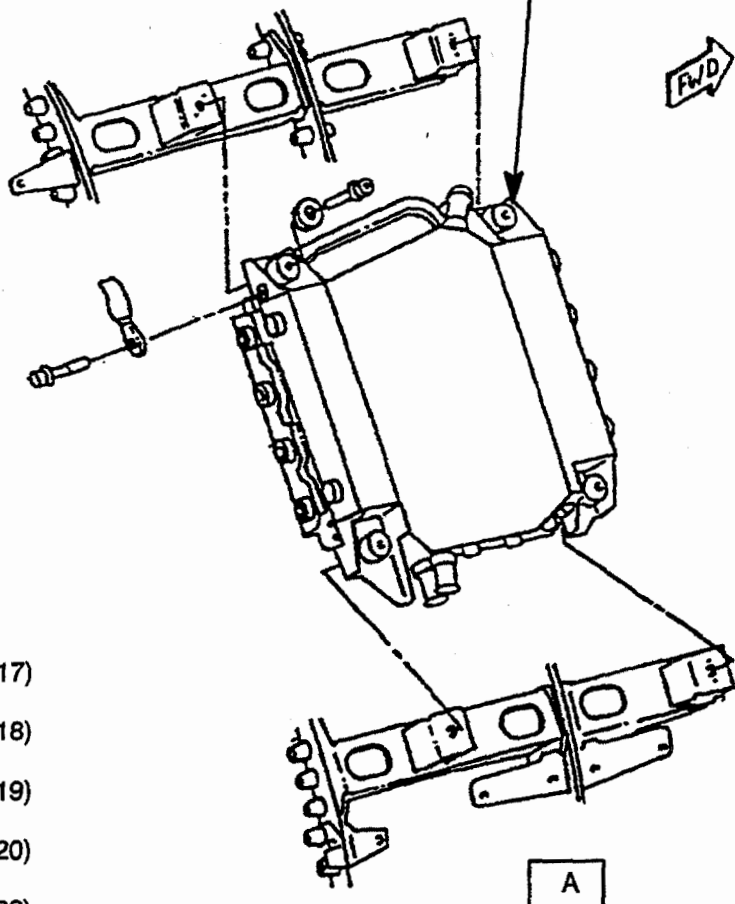
*NEW PART NUMBER

808050-04-052 (2A3417)
        OR
798300-15-052 (2A3418)
        OR
798300-16-052 (2A3419)
        OR
798300-17-052 (2A3420)
        OR
798300-18-052 (2A3422)

A

E8003

Location of the Electronic Engine Control (EEC)
Figure 1

REMOVE THE PN 4W0102
BOLTS

REMOVE THE PN 2A3637
FRONT DUCT COVER ASSEMBLY

FRONT ACTIVE
CLEARANCE CONTROL
DUCT

A
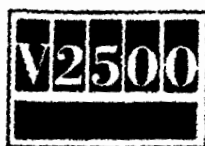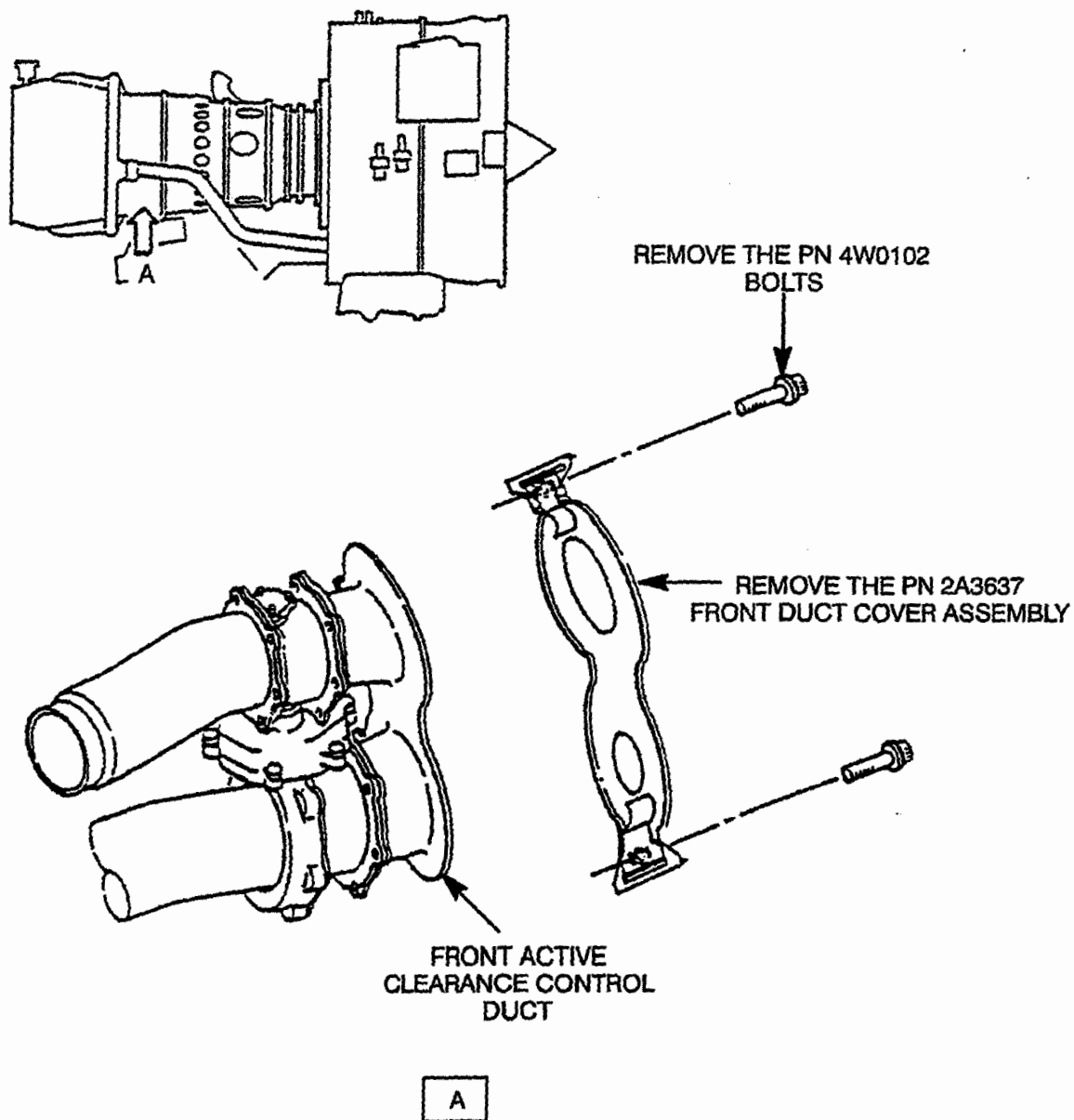
E7723

Location of the ACC Front Duct Cover Assembly
Figure 2
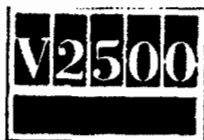
3. __Material Information__

    A. Kit associated with this bulletin.

       None

    B. Parts affected by this bulletin.

New Part No. (ATA No.)	Qty	Est'd Unit Price($)	Keyword	Old Part No. (IPC No.)	Instructions Disposition

Applicability: For each V2500 Engine to incorporate this Service Bulletin that incorporates V2500-ENG-70-0056, V2500-ENG-70-0336, V2500-ENG-73-0007, V2500-ENG-73-0015, V2500-ENG-73-0024, V2500-ENG-73-0027, V2500-ENG-73-0032, V2500-ENG-73-0037, V2500-ENG-73-0044, V2500-ENG-73-0069, V2500-ENG-73-0112 and V2500-ENG-73-0XXX.

808050-04-052 (2A3417) (73-22-34)	1		Control, Electronic Engine	808050-04-050(S1)(1D)(A)(B) (2A3289) (01-280)	

Applicability: For each V2500 Engine to incorporate this Service Bulletin that incorporates V2500-ENG-73-0007, V2500-ENG-73-0015, V2500-ENG-73-0027, V2500-ENG-73-0032, V2500-ENG-73-0037, V2500-ENG-73-0044, V2500-ENG-73-0069, V2500-ENG-73-0112 and V2500-ENG-73-0XXX, but does not incorporate V2500-ENG-70-0056, V2500-ENG-70-0336 and V2500-ENG-73-0024.

798300-15-052 (2A3418) (73-22-34)	1		Control, Electronic Engine	798300-15-050(S1)(1D)(A)(B) (2A3290) (01-280)	

Applicability: For each V2500 Engine to incorporate this Service Bulletin that incorporates V2500-ENG-73-0007, V2500-ENG-73-0015, V2500-ENG-73-0024, V2500-ENG-73-0027, V2500-ENG-73-0032, V2500-ENG-73-0037, V2500-ENG-73-0044, V2500-ENG-73-0069, V2500-ENG-73-0112 and V2500-ENG-73-0XXX, but does not incorporate V2500-ENG-70-0056 and V2500-ENG-70-0336.

798300-16-052 (2A3419) (73-22-34)	1		Control, Electronic Engine	798300-16-050(S1)(1D)(A)(B) (2A3291) (01-280)	

Applicability: For each V2500 Engine to incorporate this Service Bulletin that incorporates V2500-ENG-70-0056, V2500-ENG-73-0007, V2500-ENG-73-0015, V2500-ENG-73-0027, V2500-ENG-73-0032, V2500-ENG-73-0037, V2500-ENG-73-0044, V2500-ENG-73-0069, V2500-ENG-73-0112 and V2500-ENG-73-0XXX but does not incorporate V2500-ENG-70-0336 and V2500-ENG-73-0024.

798300-17-052 (2A3420) (73-22-34)	1		Control, Electronic Engine	798300-17-050(S1)(1D)(A)(B) (2A3292) (01-280)	

Applicability: For each V2500 Engine to incorporate this Service Bulletin that incorporates V2500-ENG-70-0056, V2500-ENG-73-0007, V2500-ENG-73-0015, V2500-ENG-73-0024, V2500-ENG-73-0027, V2500-ENG-73-0032, V2500-ENG-73-0037, V2500-ENG-73-0044, V2500-ENG-73-0069, V2500-ENG-73-0112 and V2500-ENG-73-0XXX but does not incorporate V2500-ENG-70-0336.

798300-18-052 (2A3422) (73-22-34)	1		Control, Electronic Engine	798300-18-050(S1)(1D)(A)(B) (2A3293) (01-280)	

Nov.11/98
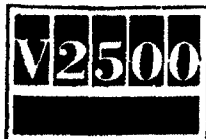
C. Instructions/Disposition Code Statements:

(S1)This Service Bulletin may be intermixed with SCN12A, SCN12B, SCN12C, SCN12D, SCN13/Q on either of the engines on the aircraft.

(1D)You can obtain the new part by modification. Use the approved procedure given in Reference (2). Purchase new parts from or return the old parts for modification to the approved vendor given in the Accomplishment Instructions.

(A) The new part is currently available.

(B) The old part will no longer be supplied.

NOTE: The estimated 1998 unit prices shown are provided for planning purposes only and do not constitute a firm quotation. Consult the IAE Price Catalog or contact IAE's Spare Parts Sales Department for information concerning firm prices.

MODIFICATIONS   PART NUMBER CHANGE

BASE LINE

```
                              ┌──────────────────────────┐
                              │   798300-8-026, L7       │
                              │       (2A1988)           │
                              │          OR              │
                              │   798300-8-026, L7       │
                              │       (2A1989)           │
                              └──────────────────────────┘
                                           │
V2500-ENG-73-0007             ┌──────────────────────────┐        CONTINUED ON
PROVIDES SCN10D               │   798300-027, L7         │────────  SHEET 2         (A)
SOFTWARE                      │       (2A2039)           │
                              └──────────────────────────┘
                                           │
V2500-ENG-73-0015             ┌──────────────────────────┐        CONTINUED ON
PROVIDES SCN11E               │   798300-8-032, L12      │────────  SHEET 2         (B)
SOFTWARE AND A                │       (2A2189)           │
MULTIPLE BUMP                 └──────────────────────────┘
                                           │
V2500-ENG-73-0024             ┌──────────────────────────┐
PROVIDES SCN11E               │   798300-10-032, L12     │
SOFTWARE AND PRINTED          │       (2A2166)           │
CIRCUIT BOARDS                └──────────────────────────┘
                                           │
V2500-ENG-70-0056             ┌──────────────────────────┐
PROVIDES HINGED               │   798300-14-032          │
FIRE SHIELDS                  │       (2A2285)           │
                              └──────────────────────────┘
                                           │
V2500-ENG-73-0027             ┌──────────────────────┐    ┌──────────────────────┐
PROVIDES SCN11G               │   798300-14-037      │    │   798300-10-037      │
SOFTWARE                      │       (2A2392)       │    │       (2A2390)       │
                              └──────────────────────┘    └──────────────────────┘
                                           │                         │
V2500-ENG-73-0032             ┌──────────────────────┐    ┌──────────────────────┐
PROVIDES SCN11H               │   798300-14-038      │    │   798300-10-038      │
SOFTWARE                      │       (2A2480)       │    │       (2A2478)       │
                              └──────────────────────┘    └──────────────────────┘
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CONTINUED ON   (C)   CONTINUED ON   (D)   E7724
SHEET 3   SHEET 3

Family Tree - Electronic Engine Control (EEC)
Ref. Catalog Sequence No. 73-22-34. Fig. 01 Item 280
Figure 3 (Sheet 1)

PART NUMBER CHANGE

*THERE IS NO PROCEDURE TO
ADVANCE THIS CONFIGURATION

Ⓐ CONTINUED FROM
SHEET 1

Ⓑ CONTINUED FROM
SHEET 1


```
798300-12-032          798300-12-027
  (2A2284)               (2A2283)*

798300-12-037          798300-18-037
  (2A2391)               (2A2356)

798300-12-038          798300-8-038
  (2A2479)               (2A2475)
```

Ⓔ
CONTINUED ON
SHEET 4

Ⓕ
CONTINUED ON
SHEET 4

E7725

Family Tree - Electronic Engine Control (EEC)
Ref. Catalog Sequence No. 73-22-34. Fig. 01 Item 280
Figure 3 (Sheet 2)

MODIFICATIONS   PART NUMBER CHANGE

Ⓒ   Ⓓ

CONTINUED FROM   CONTINUED FROM
SHEET 1   SHEET 1

V2500-ENG-73-0037
PROVIDES SCN12A   798300-14-041   798300-10-041
SOFTWARE   (2A2692)   (2A2690)

V2500-ENG-73-0044
PROVIDES SCN12B   798300-14-045   798300-10-045
SOFTWARE   (2A2993)   (2A2991)

V2500-ENG-70-0336
PROVIDES COMMON
HARDWARE FOR THE   2A2995*   2A2995*
V2500-A1 AND V2500-A5

V2500-ENG-70-0336
PROVIDES COMMON   808050-3-045   808050-3-045
HARDWARE FOR THE   (2A3105)   (2A3105)
V2500-A1 AND V2500-A5

V2500-ENG-73-0069
PROVIDES SCN12C/O   808050-4-046   Ⓖ   808050-4-046   Ⓗ
SOFTWARE FOR THE   (2A3148)   (2A3148)
V2500-A1

V2500-ENG-73-0082
PROVIDES SCN12D   808050-04-048   808050-04-048
SOFTWARE FOR THE   (2A3224)   (2A3224)
V2500-A1

*THIS PART IS SHOWN FOR THE RECORD ONLY   Ⓖ AND Ⓗ CONTINUED ON SHEET 5

E7726

Family Tree - Electronic Engine Control (EEC)
Ref. Catalog Sequence No. 73-22-34. Fig. 01 Item 280
Figure 3 (Sheet 3)

Printed in (
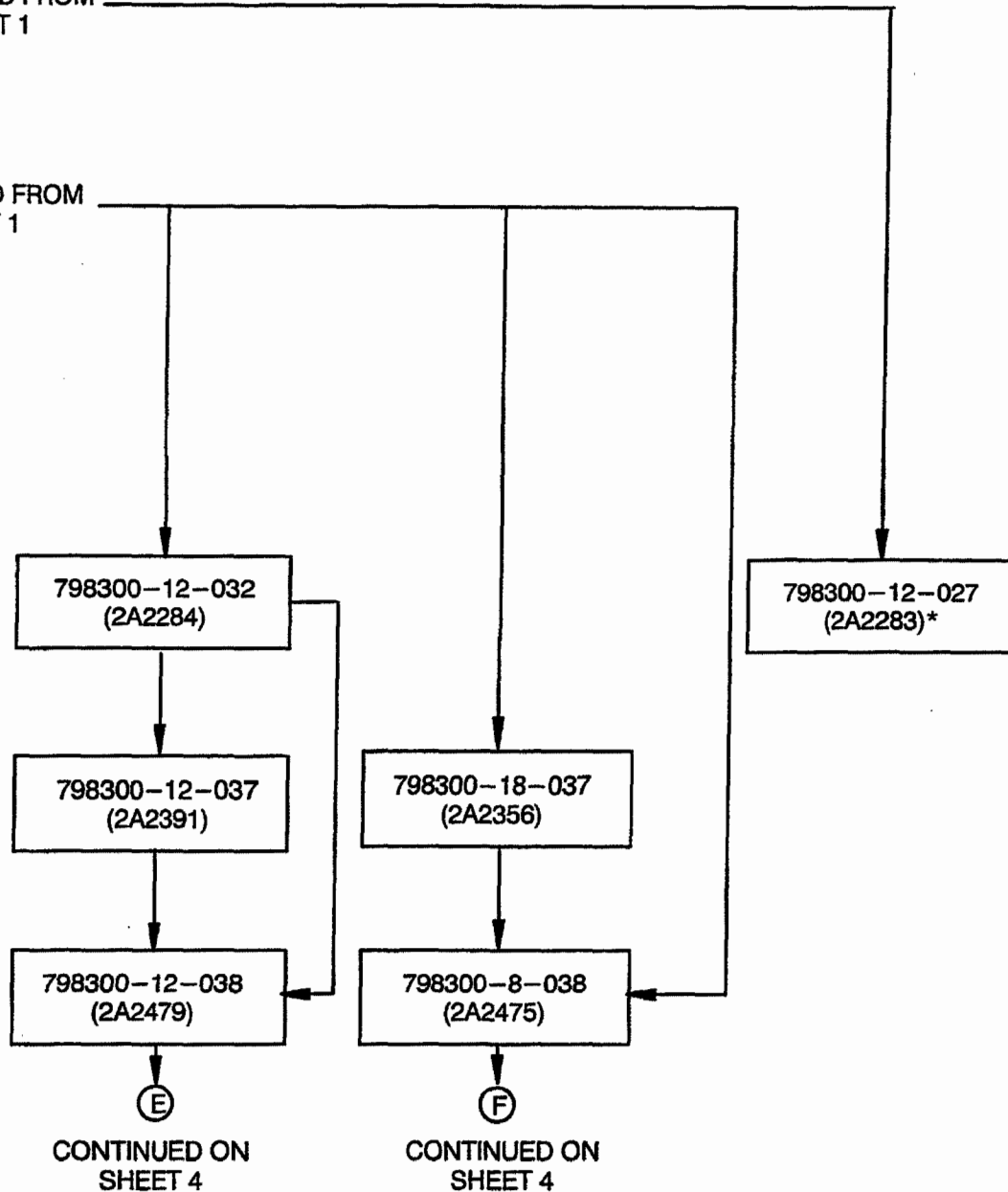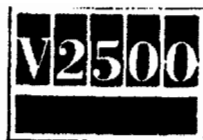
PART NUMBER CHANGE

Ⓔ CONTINUED FROM SHEET 2

Ⓕ CONTINUED FROM SHEET 2

```
        ┌─────────────────┐              ┌─────────────────┐
        │ 798300-12-041   │              │ 798300-8-041    │
        │   (2A2691)      │              │   (2A2757)      │
        └────────┬────────┘              └────────┬────────┘
                 │                                │
        ┌────────▼────────┐              ┌────────▼────────┐
        │ 798300-12-045   │───┐          │ 798300-8-045    │───┐
        │   (2A2992)      │   │          │   (2A2990)      │   │
        └────────┬────────┘   │          └────────┬────────┘   │
                 │            │                   │            │
        ┌────────▼────────┐   │          ┌────────▼────────┐   │
        │    2A2995*      │   │          │    2A2995*      │   │
        └────────┬────────┘   │          └────────┬────────┘   │
                 │            │                   │            │
        ┌────────▼────────┐   │          ┌────────▼────────┐   │
        │  808050-3-045   │   │          │  808050-3-045   │   │
        │   (2A3105)      │   │          │   (2A3105)      │   │
        └────────┬────────┘   │          └────────┬────────┘   │
                 │            │                   │            │
        ┌────────▼────────┐  Ⓘ          ┌────────▼────────┐  Ⓙ
        │  808050-4-046   │              │  808050-4-046   │
        │   (2A3148)      │              │   (2A3148)      │
        └────────┬────────┘              └────────┬────────┘
                 │                                │
                 Ⓚ                                Ⓛ
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Ⓘ Ⓙ Ⓚ AND Ⓛ CONTINUED ON SHEET 6

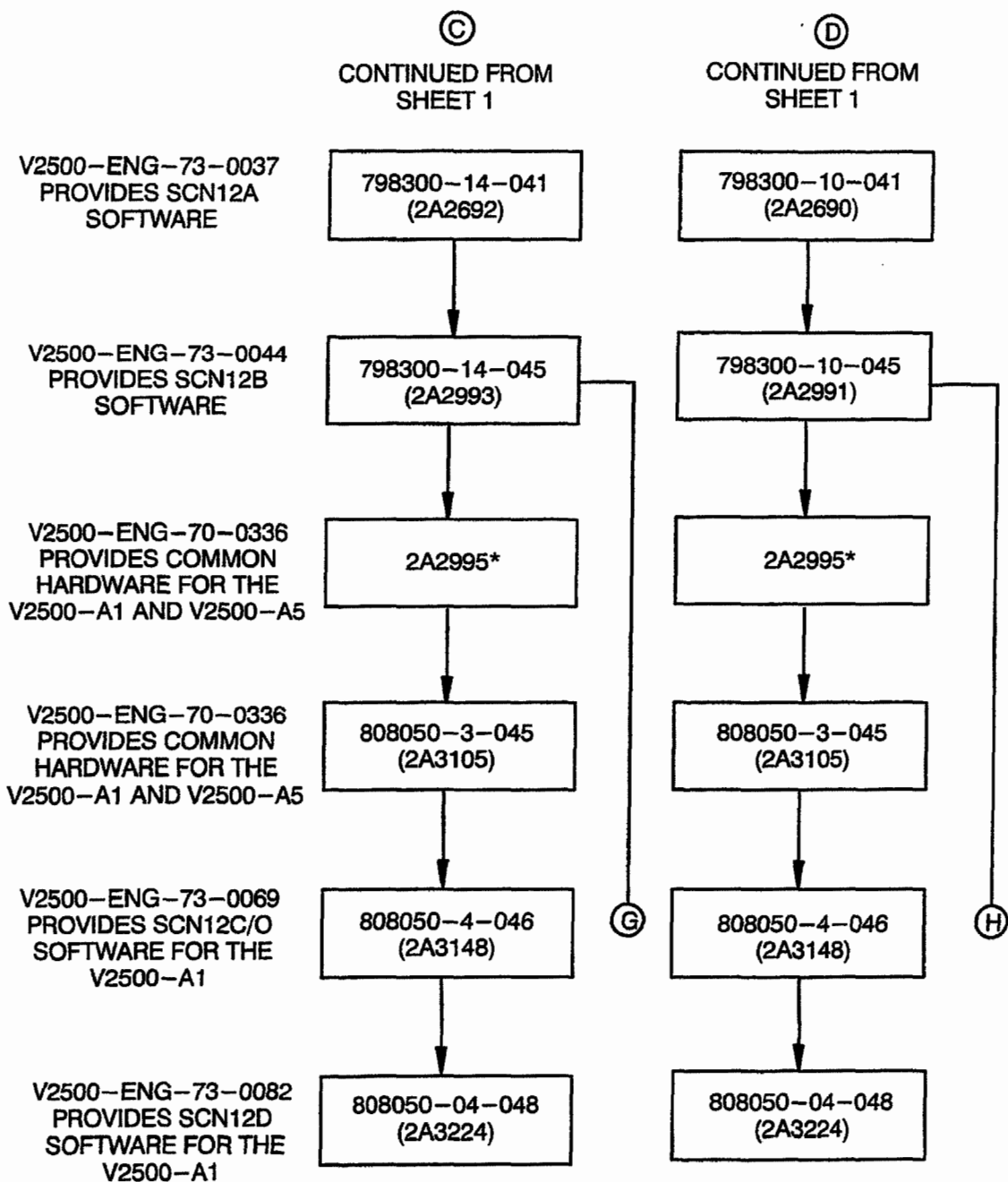*THIS PART IS SHOWN FOR THE RECORD ONLY

E7727

Family Tree - Electronic Engine Control (EEC)
Ref. Catalog Sequence No. 73-22-34. Fig. 01 Item 280
Figure 3 (Sheet 4)

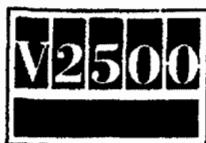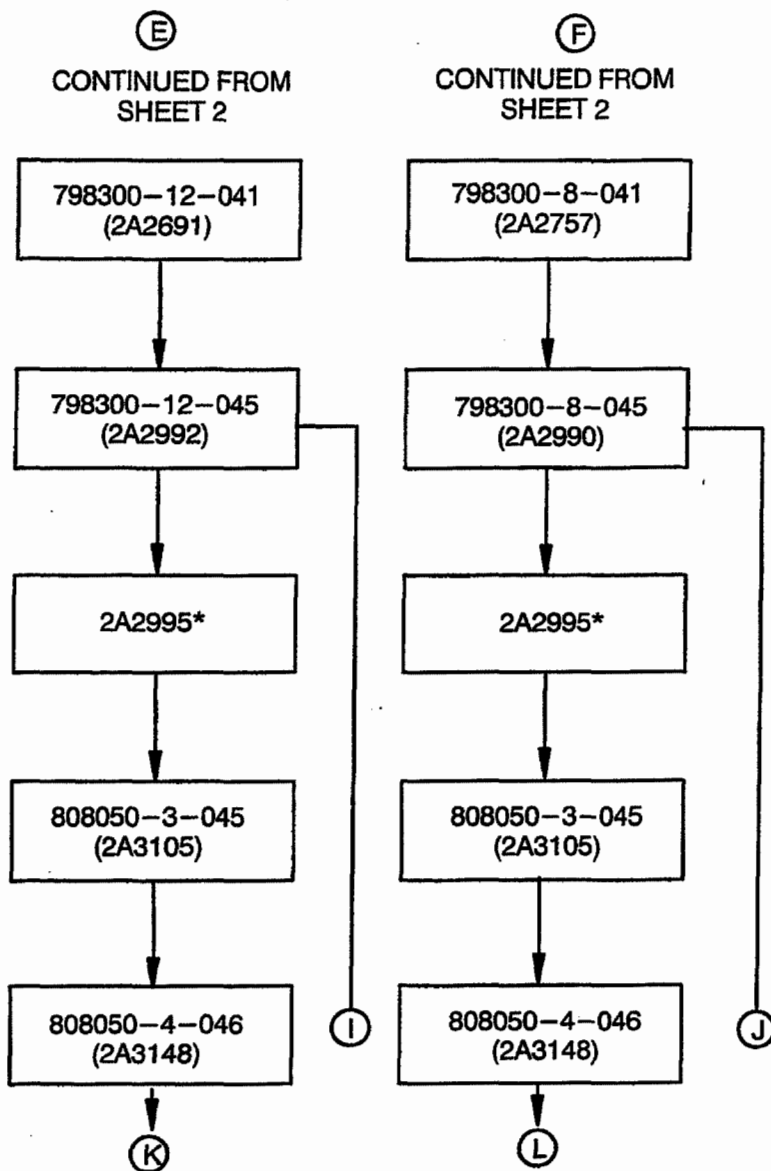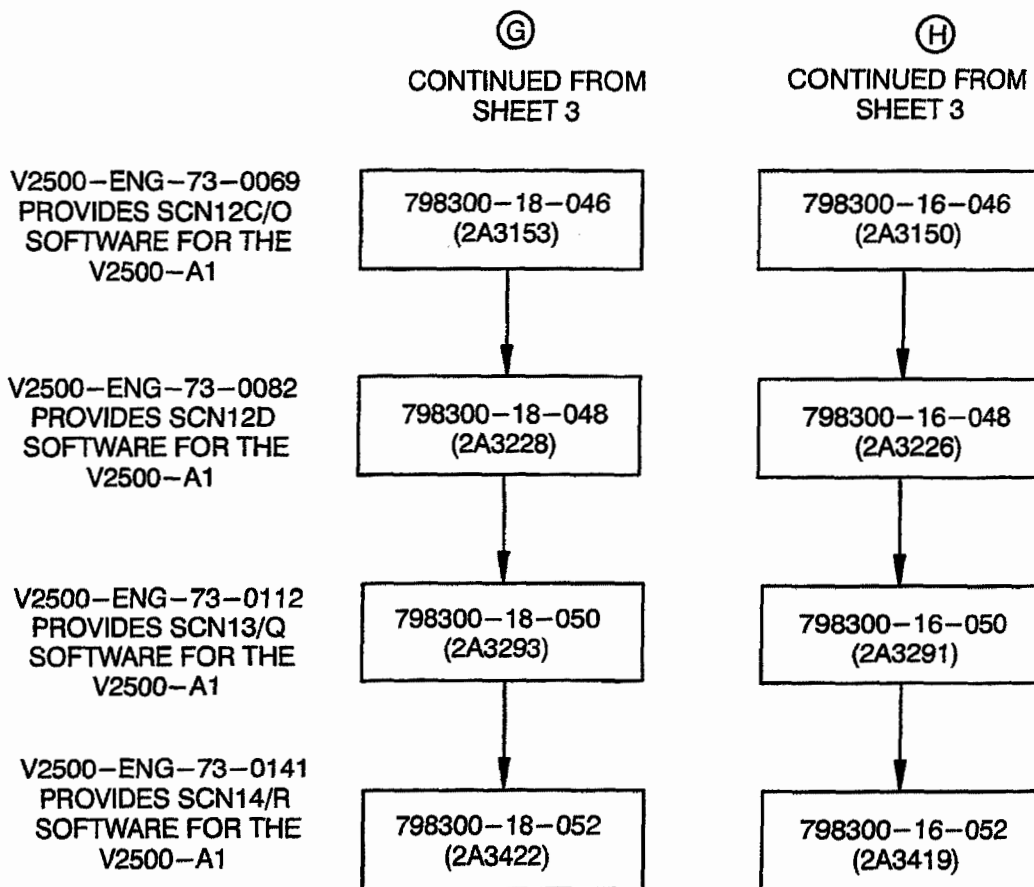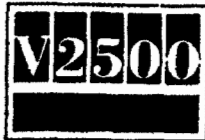# V2500 International Aero Engines
SERVICE BULLETIN

MODIFICATIONS | PART NUMBER CHANGE

Ⓖ   Ⓗ

CONTINUED FROM SHEET 3   CONTINUED FROM SHEET 3

V2500-ENG-73-0069
PROVIDES SCN12C/O
SOFTWARE FOR THE
V2500-A1

| 798300-18-046 (2A3153) | 798300-16-046 (2A3150) |

V2500-ENG-73-0082
PROVIDES SCN12D
SOFTWARE FOR THE
V2500-A1

| 798300-18-048 (2A3228) | 798300-16-048 (2A3226) |

V2500-ENG-73-0112
PROVIDES SCN13/Q
SOFTWARE FOR THE
V2500-A1

| 798300-18-050 (2A3293) | 798300-16-050 (2A3291) |

V2500-ENG-73-0141
PROVIDES SCN14/R
SOFTWARE FOR THE
V2500-A1

| 798300-18-052 (2A3422) | 798300-16-052 (2A3419) |

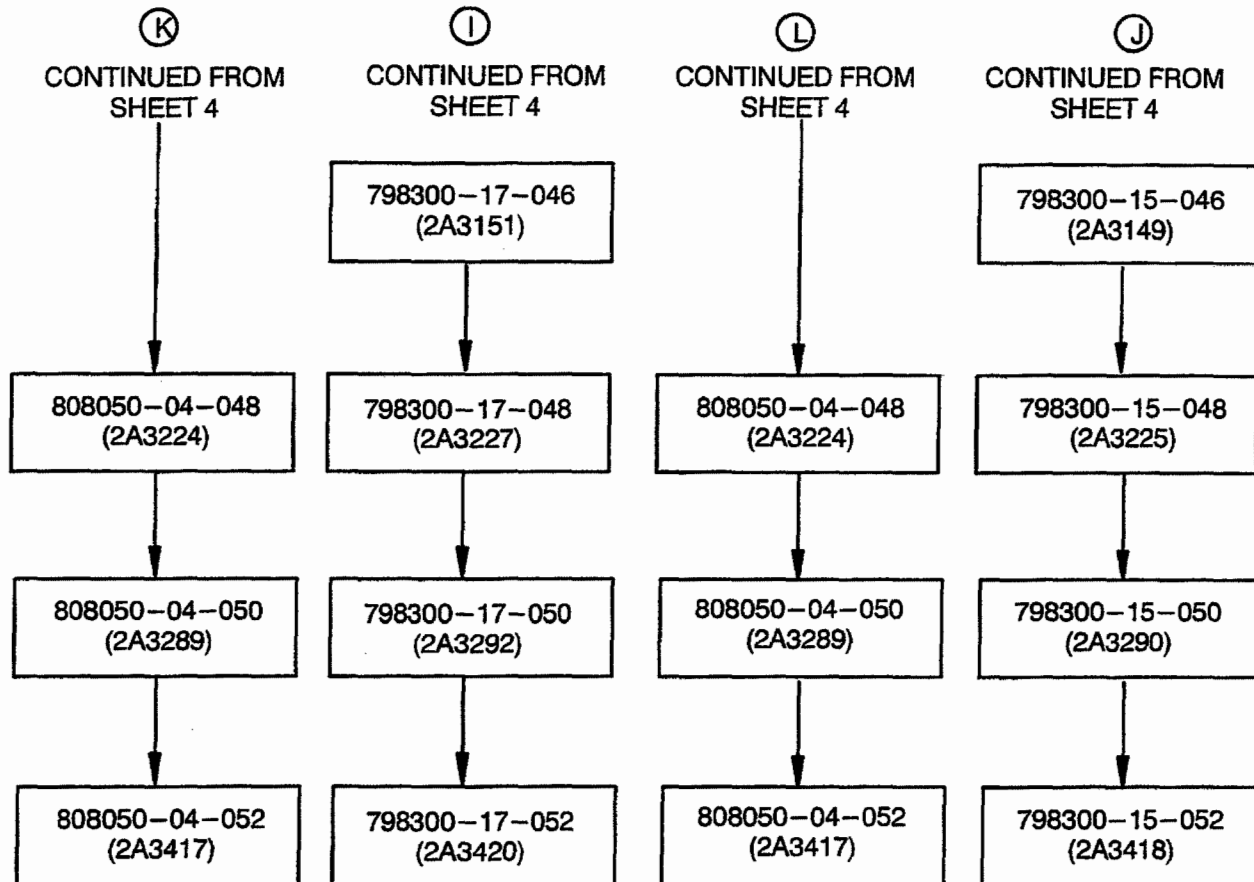E8004A

Family Tree - Electronic Engine Control (EEC)
Ref. Catalog Sequence No. 73-22-34. Fig. 01 Item 280
Figure 3 (Sheet 5)

PART NUMBER CHANGE

Ⓚ
CONTINUED FROM
SHEET 4

Ⓘ
CONTINUED FROM
SHEET 4

Ⓛ
CONTINUED FROM
SHEET 4

Ⓙ
CONTINUED FROM
SHEET 4

	798300−17−046 (2A3151)		798300−15−046 (2A3149)
808050−04−048 (2A3224)	798300−17−048 (2A3227)	808050−04−048 (2A3224)	798300−15−048 (2A3225)
808050−04−050 (2A3289)	798300−17−050 (2A3292)	808050−04−050 (2A3289)	798300−15−050 (2A3290)
808050−04−052 (2A3417)	798300−17−052 (2A3420)	808050−04−052 (2A3417)	798300−15−052 (2A3418)

E8005

Family Tree − Electronic Engine Control (EEC)
Ref. Catalog Sequence No. 73−22−34. Fig. 01 Item 280
Figure 3 (Sheet 6)

Hamilton Standard
A United Technologies Company

SERVICE BULLETIN
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ENGINE FUEL AND CONTROL - EEC150-20 - INCORPORATION OF NEW SOFTWARE CONFIGURATION: A1 SCN14/R

FAA Repair Station License Number - SI3R842L
FAA Repair Station License Number - CW5Y794M

1. Planning Information

A. Effectivity

(1) Refer to Table 1.

Table 1. Effectivity

All Hamilton Standard EEC150-20 Electronic Engine Controls:
808050-4-XXX

NOTE: Following incorporation of this Service Bulletin, the EEC150-20 can be installed on Airbus A320 aircraft that use the IAE V2500-A1 engine. XXX indentifies all available software configurations.

B. Concurrent Requirements

(1) None

C. Reason

The purpose of this Service Bulletin is to allow the V2500-A1 operators to install new software in the EEC150-20.

(1) Problem

(a) For stabilized engine ground running within a certain N1 speed range, V2500-A engines may have a reduced fan flutter margin.

(2) Cause

    (a) Erosion (blunting) of the blade leading edges reduces the fan flutter margin.

(3) Solution

    (a) Restrict steady state engine fan operation in the region (zone) where fan flutter can occur. This keep out zone will only be applied to on-ground, static operation (less than 0.07 MN). The keep out zone will not be applied during unrated N1 mode operation nor during reverse operation.

        The keep out zone is defined as follows:
        1.127 to 1.195 EPR (for EPR mode operation)
        66.1% to 75% N1C2 (Rated N1 mode operation with zone expressed in corrected speed).

        The keep out zone will be implemented as a throttle flat. The following explanation is written in terms of EPR mode operation. The same operational impact applies to the rated N1 mode.

        For increasing (acceleration) throttle movement, engine power will be limited to no more than the low end of the keep out zone (1.127 EPR) until EPR command exceeds the high end of the zone (1.195 EPR).

        For decreasing (deceleration) throttle movement, engine power will be limited to no less than the high end of the keep out zone (1.195 EPR) until EPR command goes below the low end of the zone (1.127 EPR).

(4) Substantiation

    (a) None

D. Description

    (1) The EEC150-20 is reprogrammed and reidentified with the new part number.

E. Compliance

    (1) Category 4 - Accomplish on a planned basis when an installed EEC150-20 is at a maintenance base capable of compliance with the Accomplishment Instructions, regardless of other planned maintenance.

F. Approval

    (1) The part number changes and/or modifications described in paragraphs 2. and 3. of this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and are FAA-approved for the EEC150-20 Electronic Engine Control listed.

G. Manpower

    (1) Approximately 1 man-hour is necessary to perform these Service Bulletin procedures.

H. Material - Cost and Availability

(1) This Service Bulletin will be done at no charge to the operator for units that are reprogrammed in the field (See Paragraph 3. Accomplishment Instruction, Alternate Reprogramming Method) or that are returned to one of the following addresses for incorporation of this Service Bulletin:

    (a) Hamilton Standard
        A United Technologies Corporation
        Attention: Hamilton Support Systems
                    Electronics Service Center
        97 Newberry Road
        East Windsor, CT 06088
        USA
        FAA Repair Station Licence Number SI3R842L

    (b) Hamilton Standard
        Customer Support Center - Maastricht
        Maastricht-Aachen Airport
        Horsterweg 7
        6191 RX Beek
        The Netherlands
        FAA Repair Station Licence Number CW5Y794M

(2) The hard copy purchase order to perform this Service Bulletin must refer to the HS Service Bulletin number EEC150-20-73-21 and the IAE Service Bulletin Number V2500-ENG-73-0141.

(3) The parts required to accomplish this Service Bulletin are listed in Section 2, Material Information. These parts are available to the operator at no charge. The reprogramming diskette can be obtained from your local IAE service representative. Lead times for the other parts can be obtained from Hamilton Standard by issuing a hard copy, purchase order for the quantity requested. Purchase orders for parts must refer to HS Service Bulletin number EEC150-20-73-21, to IAE Service Bulletin number V2500-ENG-73-0141, and must be addressed to:

    Mail: Hamilton Standard
                A United Technologies Company
                Attn: Manager Commercial Spares
                Mail Stop: 2MGGHH10
                One Hamilton Road
                Windsor Locks, CT 06096-1010
                USA
                Facsimile:(860)654-6905

I. Weight and Balance

(1) None

J. Electrical Load Data

(1) Not affected.

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K. Software Accomplishment Summary

    (1) None

L. References

    E9137 Standard Practices Manual
    Component Maintenance Manual CMM 73-28-01
    IAE Service Bulletin Number V2500-ENG-73-0141
    HS Service Bulletin Number EEC150-20-73-21
    HS Service Bulletin Number EEC150-20-73-16

M. Other Publications Affected

    (1) Illustrated Parts Catalog 73-28-01

N. Interchangeability or Intermixability of Parts

    (1) Reference IAE Service Bulletin Number V2500-ENG-73-0141

2. Material Information

A. This Service Bulletin change uses the parts in the list for each EEC150-20 that incorporates this Service Bulletin.

B. Any parts that usually are discarded when you disassemble the EEC150-20 are not in the list.

C. In the list of parts for this change, MSQ is the Minimum Sales Quantity. The parts that have an entry in this area of the list are supplied only in this quantity, or a multiple of this quantity.

D. In the list of parts for this change, the Key Word is a one-word name for the part.

E. In the list of parts for this change, the Instruction Codes tell you what to do with the parts. A short list under the list of parts tells you about the instruction codes that are used in the list.

F. New Parts Required

Table 2. New Parts

New PN	Qty	MSQ	Estimated Price	Key Word	PN Before this SB	Instruction Code
808050-4-052	1		--	Control	808050-4-XXX	A
819191-16	1	1	0.00	Diskette, Reprogramming	819191-13	B,C
819106-4	1	1	0.00	S Record Format	819106-3	C

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SERVICE BULLETIN

Instruction Code A: The "P/N Before this SB" is used to make the "New P/N".

Instruction Code B: One reprogramming diskette can modify approximately 40 EEC150-20 units. You should order the proper quantity of diskettes to modify your fleet of EEC150-20 units.

Instruction Code C: The reprogramming diskette is provided to you at no charge by IA See your local IAE service representative for ordering information.

3. Accomplishment Instructions

CAUTION: REFER TO THE E9137 STANDARD ELECTRONIC PRACTICES MANUAL FOR SPECIAL PRECAUTIONS. ELECTROSTATIC DISCHARGE (ESD) CA CAUSE DAMAGE TO THE ELECTRONIC COMPONENTS IN THE EEC150-20.

NOTE: The Alternate Reprogramming Method procedures may be used whenever th EEC electrical connectors are disconnected from the aircraft. If the EEC is reprogrammed using 28 VDC power from the aircraft, refer to the engine Service Bulletin.

NOTE: Refer to the E9137 Standard Electronic Practices Manual to do the procedur unless otherwise noted.

A. If you use the Alternate Reprogramming Method, skip to step 3.B. Otherwise refer to CMM 73-28-01, section 200 (ATLAS) to reprogram the EEC150-20. Use the program and version number shown below:

Replace Y805881-084 with Y805881-086
Replace Y805882-084 with Y805882-086
Replace Y806086-084 with Y806086-186

If you do not use the Alternate Reprogramming Method of programming, skip to step 3.AO.

B. If you use the Alternate Reprogramming Method, verify that the model number on the identification plate of the unit is EEC150-20.

C. Record the current unit part number and the unit serial number from the nameplate. Yc will enter this information into the computer.

D. Plug in all necessary equipment, but do not turn the equipment on.

E. Connect the programming harness connector marked P1 to the EEC connector marke J1. Ensure that the red engagement stripe on the EEC connector J1 is fully covered. Connections are given in Table 3.

F. Connect the programming harness connector marked P7 (Table 2) to the EEC connecto marked J7. Ensure the red engagement stripe on the EEC connector J7 is fully covere If the computer and power supply connections to the cables are permanent, skip to step 3.J.

G. Connect the programming harness connector marked CH A UART to the IBM compatible computer UART board connectors for the channel A RS-422 port (COM3). Ensure that these connectors are properly mated.

H. Connect the programming harness connector marked CH B UART to the IBM compatible computer UART board connectors for the channel A RS-422 port (COM4). Ensure that these connectors are properly mated.

   NOTE: UART connections can differ for different IBM compatible computers.

   NOTE: It is important to verify that the connectors are correctly installed for correct loader operation. HS recommends labeling the RS-422 COM3 port as CH A UART and COM4 port as CH B UART on the computer to reduce errors.

I. Connect the opposite end of P3 and P9 (Table 3) cables to the 28 VDC supply.

J. Connect the power supply harness connector marked P3 to the EEC connector marked J3. Ensure that the red engagement stripes on EEC connector J3 are fully covered.

K. Connect the power supply harness connector marked P9 to the EEC connector marked J9. Ensure that the red engagement stripes on EEC connector J9 are fully covered.

L. Locate the BOOT/BITE switches for Channel A and Channel B. Set the BOOT/BITE switches ON (closed).

M. Turn on the 28 VDC power supply to the EEC.

N. Turn on power to the IBM compatible computer.

O. Wait for the MSDOS prompt C:\> to appear on the IBM compatible computer.

   NOTE: The procedure assumes the floppy disk is in drive A. If the floppy drive in your computer has another designation, substitute that designation in the procedure.

P. Obtain the Hamilton Standard reprogramming diskette PN 819191-16. Ensure that the write protection tab of the diskette is covering the "hole."

Q. Insert the diskette into the floppy drive designated A on the IBM compatible computer. The display shows C:\>.

R. Type **a:**, then press the RETURN key (ENTER key on some computers). The display shows A:\>.

S. Type **LDR150**, then press RETURN. This starts the UART programming utility. Several messages appear, including the program identification, version number, time, and the UTC/P&W document property rights notice.

   NOTE: If there is a configuration error on the diskette, the program displays the appropriate error message and aborts the programming process. See Table 4 for a summary of error code descriptions and troubleshooting suggestions.

T. The UART programming utility LDR150 displays the following message: Enter operator's name performing download:[]>. The field between the brackets is always empty the first time the program is executed. Subsequent execution displays the last name entered.

   (1) If this is not the first execution of the program, and the displayed name is unchanged, press RETURN and go to step V.

(2) If this is the first program execution (no name is displayed), or if the operator's name changes, enter the new name and press RETURN.

U. The LDR150 program displays this message:

WARNING - EEC Fault Memory Will Be Cleared By This Program. If an EEC Fault Dump is Required Prior to Programming, Enter Q to Quit or C to Continue [Q/C]:

(1) If a fault dump is already completed, or is not required, type C, then press RETURN, and go to step V.

(2) If a fault dump is required, or if you want to stop the programming procedure, type Q, then press RETURN. If the programming procedure is stopped, turn off 28 VDC power to the EEC and go to step 3.AK.

V. The LDR150 program displays this message: ENTER THE 9 CHARACTER EEC SERIAL NUMBER: [xxxx-xxxx].

W. Enter the nine character EEC serial number, from the nameplate, and press RETURN.

NOTE: For steps 3.X and 3.Y, precede the middle part number digit with a zero. For example, enter 808050-4-032 as 808050-04-032.

X. The LDR150 program display shows: ENTER THE 13 CHARACTER CURRENT EEC HW PART NO.: [XXXXXX-XX-XXX]. Enter the part number and press RETURN.

Y. The LDR150 program display shows: ENTER THE 13 CHARACTER SB EEC HW PART NO.: [XXXXXX-XX-XXX]. Enter the new part number given in this Service Bulletin and press RETURN.

Z. The LDR150 program display shows: ENTER TRIM CHECKSUM VALUE FOR XXXXXX.XXX:>. The XXXXXX.XXX designation is the name of the Trim File being loaded into the EEC. Enter the trim checksum value 28671 and press RETURN.

AA. The LDR150 program display shows: DO YOU WISH TO ENTER THE ABOVE ENTRIES [Y/N/Q]:

(1) To proceed with the programming process, type Y, then press RETURN. Go to step 3. AB.

(2) To correct any errors in the data entered, type N, then press RETURN. Go to step 3.T.

(3) To quit the programming process, type Q, then press RETURN. Turn off the 28 VDC power to the EEC and continue with step 3. AL.

AB. At this point, the screen is initialized to display the activity of the programming process. Status messages scroll across the screen. If an error occurs, see Table 4 for a summary of error code descriptions and troubleshooting suggestions.

AC. The LDR150 program display shows:

Turn off the BITE and BOOT switches to the EEC
then
Turn Off POWER to the EEC and wait at least 5 seconds

then
Turn On Power to the EEC.

Press the RETURN Key When Ready to Continue.

(1) Locate the BOOT/BITE switches on your test equipment, and set them to the OFF position (open).

AD. Switch off the 28 VDC power to the EEC wait 5 seconds, then switch power on.

AE. On the IBM compatible computer, press RETURN.

AF. Wait until the LDR150 program display shows:

Turn ON the BITE and BOOT switches to the EEC
then
Turn Off POWER to the EEC and wait at least 5 seconds
then
...Press the RETURN Key When Ready to Continue.

(1) Locate the BOOT/BITE switches on your test equipment, and set the BOOT/BITE switches to the ON position (closed).

AG. Switch off the 28 VDC power supply to the EEC, wait 5 seconds, then switch power on.

AH. On the IBM compatible computer, press RETURN.

AI. Wait until the LDR150 display shows:

Turn Off POWER to the EEC
... Press the RETURN Key When Ready to Continue.

(1) Switch off the 28 VDC power supply to the EEC.

AJ. On the IBM compatible computer, press the RETURN key.

AK. The LDR150 program displays the status of the programming process. Record the name of the log file for hard copy report of the process.

(1) If programming is successful, the following message is displayed:

EEC REPROGRAMMING SUCCESSFULLY COMPLETED
Record the log file name VLXXXX.LOG for later printout

If desired, record the log file name VLXXXX.LOG for later printout.

(2) If the programming is unsuccessful, the following message is displayed:

DOWNLOAD PROCESS ABORTED - ERROR CODE X
Record the log file name VLXXXX.LOG for later printout.

If desired, record the log file name VLXXXX.LOG for later printout.

The X refers to the type of error that caused the process to abort. Table 4 describes the error codes and action to be taken.

AL. Press RETURN to stop the program and return to the MSDOS prompt: A:\>.

AM. If a printer is available, a paper copy of the log file can be generated by the IBM computer:

    NOTE: If no printer is available, you can move the diskette to a system with a printer and do the next three steps.

    At the MSDOS prompt, type PRINT   VLXXXX.LC

    (1) Press RETURN.

    (2) Do not proceed to the next step until the file is printed.

AN. Disconnect the EEC electrical connectors from the J1, J3, J7, and J9 connectors.

AO. Put the information shown below on a new identification plate.

    NOTE: EEC150-20 assemblies reprogrammed at one of the addresses given in 1.H. are returned with their assemblies reidentified.

    NOTE: If Service Bulletin EEC150-20-73-16 (reference 1.L.) is incorporated, bypass (1) and (2) below and go to (3).

    (1) Put the new end assembly part number in the PART NO. area of the of the new identification plate.

PART NUMBER BEFORE THIS Service Bulletin	PART NUMBER AFTER THIS Service Bulletin
808050-4-XXX	808050-4-052

    (2) Put the new IAE part number in the CI NO. area of the new identification plate.

EEC150-20 END ASSEMBLY	NEW IAE PART NUMBER
808050-4-052	2A3417

    (3) Use a ballpoint pen or its equivalent to put the date and the last three digits of the new part number (3. AC. (1)) on the identification plate per HS Service Bulletin EEC150-20-73-21. Erase (scratch out) the existing HS and IAE part numbers (i.e. 050 and 2A3289).

Table 3. Communication Connections

EEC SIGNAL NAME	EEC CONNECTOR	QUA-TECH CONNECTOR	QUA-TECH SIGNAL NAME
UART IN LINE B CHA	P1-b	PA-2	TXD+
UART IN LINE A CHA	P1-H	PA-7	TXD-
UART OUT LINE A CHA	P1-c	PA-4	RXD+
UART OUT LINE B CHA	P1-J	PA-8	RXD-
BOOT DISC CHA	P1-D	N/A	N/A
BITE DISC CHA	P1-Z	N/A	N/A
BOOT/BITE RTN CHA	P1-m	N/A	N/A
UART IN LINE B CHB	P7-b	PB-2	TXD+
UART IN LINE A CHB	P7-H	PB-7	TXD-
UART OUT LINE A CHB	P7-c	PB-4	RXD+
UART OUT LINE B CHB	P7-J	PB-8	RXD-
BOOT DISC CHB	P7-D	N/A	N/A
BITE DISC CHB	P7-Z	N/A	N/A
BOOT/BITE RTN CHB	P7-m	N/A	N/A

Table 4. Power Supply Connections

EEC SIGNAL NAME	EEC CONNECTOR	POWER SUPPLY
GTP CHA	P3-m	+28 VDC
GTP RTN CHA	P3-r	+28 VDC RTN
GTP CHB	P9-m	+28 VDC
GTP RTN CHB	P9-r	+28 VDC RTN

Table 5. Error Code Definitions

ERROR CODE	ERROR TYPE	ACTION
E1	EEC VERIFY ERROR - Data verify error in EEC - Compare failed or location could not be programmed.	Try procedure three times; if still bad return EEC unit.
E2	COMMUNICATION ERROR - Communication p ble computer.	Check BITE, cables, power supply, UART board, and EEC. Retry three times.
E3	CONFIGURATION ERROR - Configuration data comparison failed. (Possible hardware PN mismatch, EEC compatibility mismatch, trim checksum mismatch)	Operator data entered incorrectly or incorrect data on existing nameplate. Check data - retry with the correct information.
E4	SYSTEM PROBLEM - Poor operating environment, bad disk, or program aborted by the operator	If the process was not terminated by the operator, check that the disk is not write protected, or replace disk and retry.

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IAE Engineering Change Number 98VZ004
IAE Service Bulletin Number V2500-ENG-73-0141