International Aero Engines

SERVICE BULLETIN

ENGINE - FUEL AND CONTROL - TO PROVIDE A NEW ELECTRONIC ENGINE CONTROL (EEC) WITH THE SCN10B SOFTWARE CONFIGURATION TRIMS - CATEGORY CODE 4 - MOD.ENG-73-0083

1. Planning Information

A. Effectivity

(1) Aircraft: Airbus A320/A321

(2) Engine: V2527-A5 Engines before Serial No.V10193*
V2530-A5 Engines before Serial No.V10193*

*The Serial Number data shown is of a preliminary nature and is provided for advanced planning only. A future revision to this Service Bulletin will confirm final serial number effectivity

This Service Bulletin can be intermixed with SCN-10A or SCN-9A, Reference (1) or (2), for the V2527-A5 and the V2530-A5.

This Service Bulletin must not be incorporated until Reference (3) Hamilton Standard Service Bulletin EEC-150-20-73-8 has been completed.

B. Reason

(1) Condition

During ground taxi operation with A5 SCN 10A, the V2500-A5 can experience uncommanded engine "rundown" as a result of apparent HPC surge.

(2) Background

Pilot selection of APU bleed air for the aircraft Environmental Control System (ECS) during taxi produces a sequencing of aircraft bleed isolation valves which results in backpressure of the engine HPC from the APU. In A5 SCN 10A, closure of the 7A bleed for ground taxi operation below 5500 feet was implemented to help alleviate off-idle EGT spiking concerns. Implementation of the 7A Bleed on-ground override in the reduced HPC stability margin relative to previous versions of EEC software, thus increasing the susceptibility of the engine to surge due to backpressure from the APU.

(3) Objective

Modify the EEC software to return the 7A Bleed functioning to that obtained with A5 SCN 9A. This is accomplished by disabling the 7A bleed on-ground override function for all altitudes such that the 7A Bleed will operate per the normal steady state schedule and remain open during ground taxi operation.

(4) Substantiation

The flight simulation and flight testing of the SCN10B software logic was accomplished at Airbus in Toulouse, France.

(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 SCN10B software logic with version 027/027 trims. This software version provides changes to starting.

Part I - If the Electronic Engine Control is sent to one of the addresses listed in Paragraph 2. B., Accomplishment Instructions

(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 - If IAE is requested to assist or coordinate the reprogramming of the Electronic Engine Control

(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

Incorporation of this Service Bulletin on A320/A321 aircraft is authorized by Reference (5), Airbus Service Bulletin A320-73-1048.

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.

E. Compliance

Category Code 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 bulletin:

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	23 minutes
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	5 minutes
TOTAL	41 minutes
(2) At overhaul	Not Applicable

Estimated Manhours to incorporate the full intent of Part II of this Bulletin:

Venue	Estimated Manhours
(1) 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	1 hour

TOTAL 1 hour 12 minutes

(2) At overhaul .. .. TOTAL: 1 hour

(a) Program the EEC .. .. .. 1 hour

G. Material - Price and Availability

(1) Modification Kit not required.

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

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)

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

(f) Virus scan program such as "VI-SPY" is recommended.

(2) Hamilton Standard diskette called out in Reference (3). This diskette contains the EEC150-20: application code, trims, memory clear utilities, and software loader.

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

(4) EEC150-20 Nameplate PN 751333-1.

(5) 28VDC, 5.0 +/- 0.5A power supply and associated power cables as defined in Table 2.

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

(4) EEC150-20 Nameplate PN 751333-1.

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

E7528

(5) 28 VDC, 5.0 +/- 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

ded0001058

Tables 1 and 2 Communication and Power Supply Connections

I. Weight and Balance

(1) Weight change .. .. .. None

(2) Moment arm .. .. .. No effect

(3) Datum .. .. Engine front mount Centerline (Powerplant station P.P.S.100)

J. Electrical Load Data

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

K. References

(1) Internal Reference No.

96VZ002

(2) Other References

V2500-ENG-73-0080 (Engine - Fuel and Control - To Provide a New Electronic Engine Control (EEC) With the SCN10A Version 026/026 Trims

V2500-ENG-73-0052 (Engine - Fuel and Control - To Provide a New Electronic Engine Control (EEC) With the SCN9A Version 021/121 Software Configuration and Hardware Changes to Address Nacelle Drainage Requirements)

Hamilton Standard Service Bulletin EEC150-20-73-12, Revision 1

Hamilton Standard Service Bulletin EEC150-20-73-8

This Service Bulletin is subject to A/C Modification 25596 and is covered by AIB SB A320-73-1048.

V2500 Aircraft Maintenance Manual

V2500 Engine Illustrated Parts Catalog

L. Other Publications Affected

(1) The V2500-A5 Engine Illustrated Parts Catalog, Chapter/Section 73-22-34, Figure 1, to add the new parts.

2. Accomplishment Instructions

Part I - If the Electronic Engine Control is sent to one of the addresses listed in Paragraph 2. B., Accomplishment Instructions

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 Technical Services to determine if a qualification program can be initiated at their facility.

IAE-INTERNATIONAL AERO ENGINES AG
Corporate Center II
628 Hebron Ave.
Glastonbury, CT 06033-2595 USA
ATTN: Director Technical Services

B. The Authorized Rework Vendor for this bulletin is listed below:

Hamilton Standard
97 Newberry Road
East Windsor, CT 06088 USA

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 808050-4-024 (2A3210) Electronic Engine Control by the approved procedure given in Reference (6), Chapter/Section 73-22-34, Removal/Installation. Refer to Figure 1.

E. Rework Instructions

(1) Do a modification of the 808050-4-024 (2A3210) Electronic Engine Control (See Reference (7), Chapter/Section 73-22-34, Fig/Item No.01-280) and reidentify by the procedures given in Reference (3).

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

F. Installation Instructions

(1) Install the 808050-4-026 (2A3223) Electronic Engine Control (1 off) by the approved procedure given in Reference (6), Chapter/Section 73-22-34, Removal/Installation. See Figure 1.

G. Recording Instructions

(1) A record of accomplishment is necessary.

Part II - If IAE is requested to assist or coordinate the reprogramming of the Electronic Engine Control

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

A. Isolate aircraft electrical system and gain access to the EEC by doing the pre-requisite procedures given in steps 2A., B., C. and D. in Reference (6), Chapter/Section 73-22-34, Removal/Installation, (the removal procedure).

NOTE: Only select aircraft 28VDC back-on to on when instructed to in the following procedure.

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 reprogrammed 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.

(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.

(a) Make sure 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. (13).

(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 (COM3). Make sure that these connectors are properly mated.

(8) Connect the programming harness 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 (13).

(10) Connect the opposite end of P3 and P9 cables to the 28VDC 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 are fully covered.

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

(14) Turn on the 28VDC power supply to the EEC.

(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.

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 different designation, substitute that designation into the procedure.

(17) Obtain the Hamilton Standard reprogramming diskette which is given in Reference (3).

(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 compatible 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 identifcation, 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 operator's name performing download:[ ]>"

(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 Required Prior to Programming, enter Q to Quit or C to Continue [Q/C]:

(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]>". 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 preceeding this digit.

Example: P/N 808050-4-026 would be entered as 808050-04-026.

(23) The LDR150 program will now prompt with the following message: "Enter the 13 character Current EEC HW Part No.: [XXXXXX-XX-XXX]>". 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 EEC HW Part No.: [XXXXXX-XX-XXX]>". From Reference (2). the Service Bulletin, enter the 13 character EEC Hardware Part Number and press the RETURN key.

(25) The LDR150 program will now prompt with the following message: "Enter Trim Checksum Value for "xxxxxx.xxx:>". The xxxxxx.xxx designation is the name of the Trim File being loaded to the EEC. From Reference (3), the Service Bulletin, enter the trim checksum value and press the RETURN key.

(26) The LDR program will now prompt with the following message: "Do you wish to reenter the above entries [Y/N/Q]:".

(a) To proceed with programming process, type N, then press the RETURN key. Continue with step C. (26).

(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 28 VDC 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 LRD150 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 EEC

Press the RETURN Key when Ready to Continue

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

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

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

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 supply power 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

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 successful programming occurred, the following message will be displayed:

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

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

(b) If the 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.

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 1 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 (3).

(42) Close-up the engine and remove the remaining notices by doing the post-requisite procedures given in the steps 6, 7 and 8 in Reference (6), Chapter/Section 73-22-34 Removal/Installation, (the installation procedure) and the Recording Instructions given in Part I, Paragraph G.

(43) Do the post-installation test specified in Reference (6), Chapter/Section 71-00-00, as required for removal/installation of an Electronic Engine Control.

(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 (3).

(42) Close-up the engine and remove the remaining notices by doing the post-requisite procedures given in the steps 6, 7 and 8 in Reference (6), Chapter/Section 73-22-34 Removal/Installation,(the installation procedure) and the Recording Instructions given in Part I, Paragraph G.

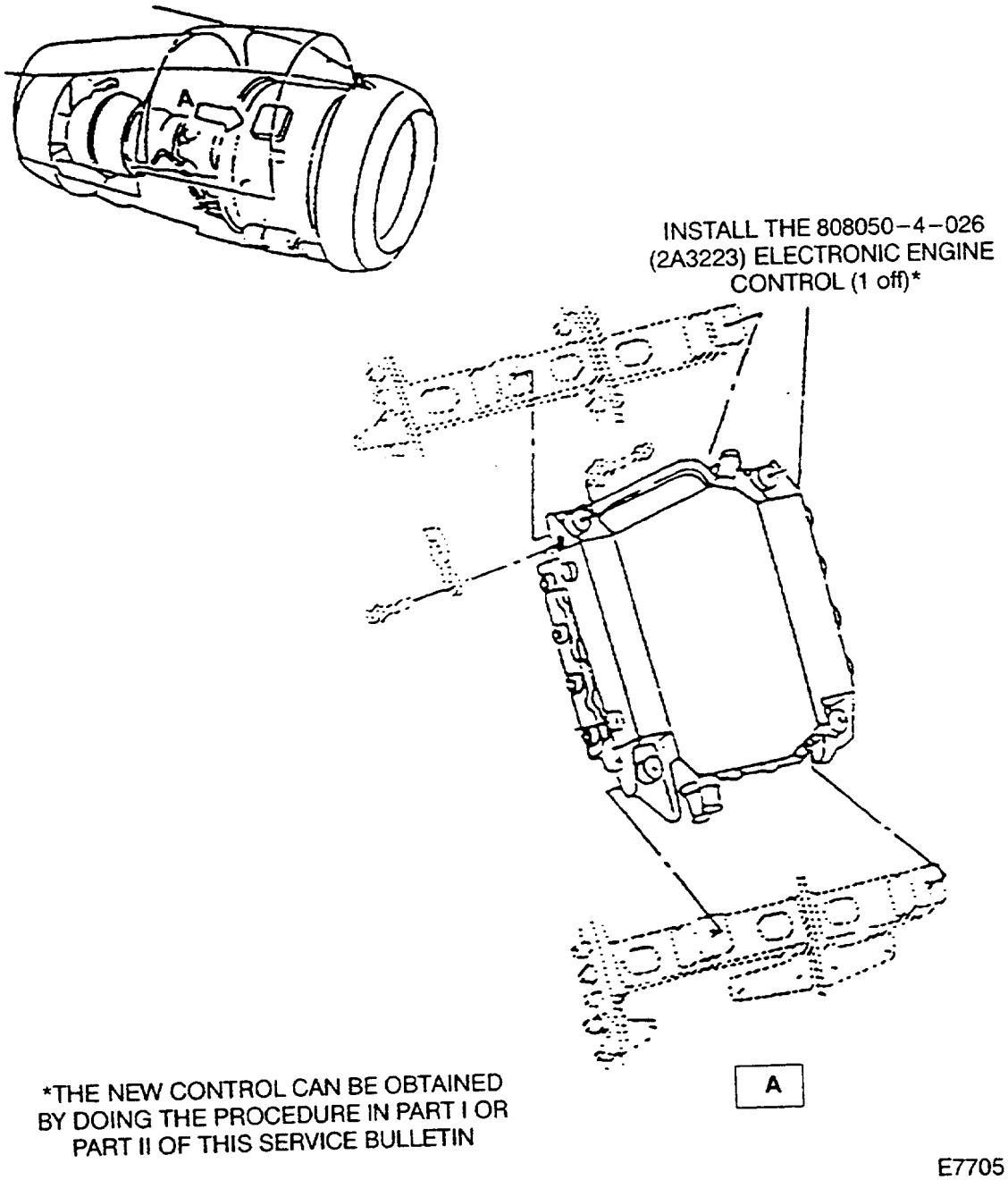
(43) Do the post-installation test specified in Reference (6), Chapter/Section 71-00-00, as required for removal/installation of an Electronic Engine Control.

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 mismatch)	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 operator.	If the process was not terminated by the operator, check that the disk id not write protected, or replace disk and retry.

Table 3
Error Code Definitions

ded0001061

Error Code Definitions
Table 3



Location of Electronic Engine Control (EEC)
Fig.1

3. Material Information

Applicability: For each V2500 Engine to incorporate this Bulletin.

A. Kits 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
808050-4-026 2A3223 (73-22-34)	1		Control, Electronic Engine	808050-4-024 2A3210 (01-280)	(1D) (A)

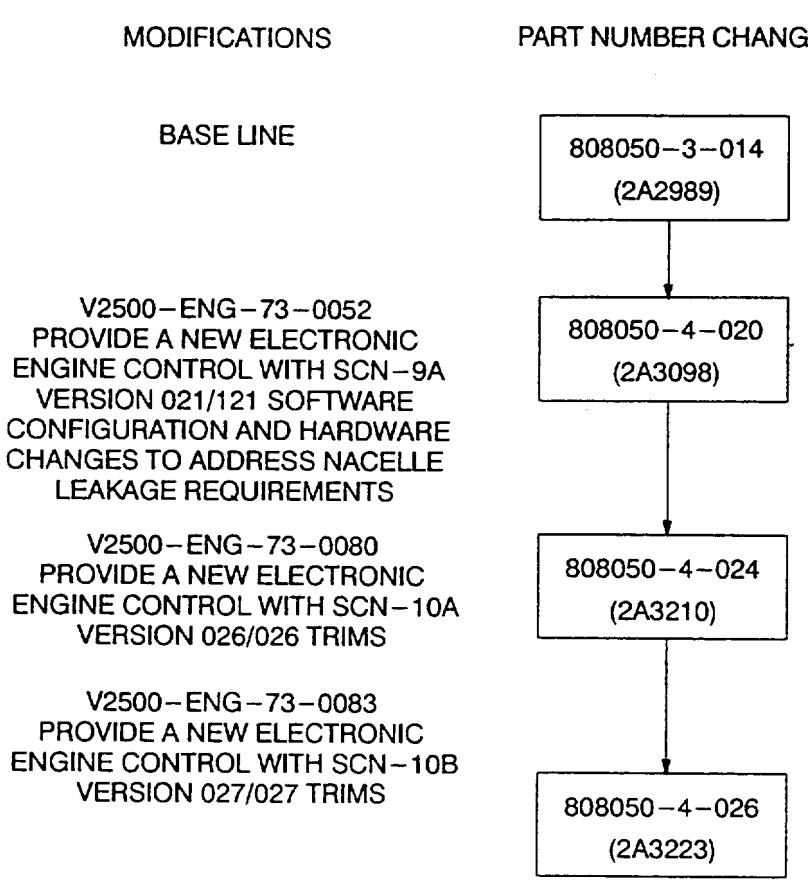
C. Instruction/Disposition Code Statements:

(S1) This Service Bulletin can be intermixed with SCN-10A or SCN-9A, Reference (1) or (2), for the V2527-A5 and the V2530-A5.

(1D) The New part can be obtained through modification by the approved procedure in Reference (3). Purchase the New parts from or return the Old parts for modification to the approved vendor given in the Accomplishment Instructions.

(A) New part is currently available.

NOTE: The estimated 1995 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.



d0002004

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

Printed in Great Britain

UNITED TECHNOLOGIES HAMILTON STANDARD

SERVICE BULLETIN

Engine Fuel and Control – EEC150–20 Electronic Engine Control – Incorporation of Airbus (A5) SCN10B Software Configuration

HSS FAA Repair Station License Number – SI3R842L
PWORCE FAA Repair Station License Number – CW5Y794M

Revision	Date	Pages Affected
1	Jul 27/96	1,6,13

1. Planning Information

A. Effectivity

Hamilton Standard EEC150–20 Electronic Engine Controls Part Number

808050–4–XXX

XXX – Identifies all available software configurations.

NOTE: Following incorporation of this service bulletin, the EEC150–20 can be installed on Airbus A320 and A321 that use the IAE V2500–A5 Series engines.

NOTE: Hamilton Standard Service Bulletin EEC150–20–73–8 must be incorporated prior to incorporation of this service bulletin.

B. Reason

The purpose of this Service Bulletin is to allow the Airbus A320 and A321 operators to install Airbus (A5) SCN10B software in the EEC150–20.

(1) Problem.

(a) During ground taxi operation with A5 SCN 10A (HS Service Bulletin EEC150–20–73–10), the V2500–A5 can experience uncommanded engine "rundown" as a result of apparent HPC surge.

(2) Cause.

(a) Pilot selection of APU bleed air for the aircraft Environmental Control System (ECS) during taxi produces a sequencing of aircraft bleed isolation valves which results in backpressure of the engine HPC from the APU. In A5 SCN10A, closure of the 7A Bleed for ground taxi operation below 5500 feet was implemented to help alleviate off–idle EGT spiking concerns. Implementation of the 7A Bleed on–ground override resulted in reduced HPC stability margin relative to previous versions of EEC software, thus increasing the susceptibility of the engine to surge due to backpressure from the APU.

(3) Solution.

(a) Modify the EEC software to return the 7A Bleed functioning to that obtained with A5 SCN9A. This is accomplished by disabling the 7A bleed on–ground override function for all altitudes such that the 7A Bleed will operate per the normal steady state schedule and remain open during ground taxi operation.

C. Description

You do not open the EEC150–20 to install the revised software. The EEC150–20 is reprogrammed with Airbus (A5) SCN10B software and re–identified with the new part number. A functional test of the EEC150–20 is not required.

D. Compliance

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.

E. Approval

The part number changes and/or part modifications given 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.

F. Manpower

Approximately 1 man–hour is necessary to do these Service Bulletin procedures.

G. Material – Cost and Availability

(1) IAE funds this program. The hard copy, no–charge purchase order to perform this service bulletin must refer to the HS service Bulletin Number EEC150–20–73–12 and the IAE Service Bulletin Number V2500–ENG–73–0083.

This service bulletin will be done at no charge to the operator if the EEC150–20 is sent to one of these addresses:

(a) United Technologies Corporation
Hamilton Standard Division
Attention: Hamilton Support Systems
Electronics Service Center
97 Newberrry Road
East Windsor, CT 06088
U.S.A. (FAA Repair License No: SI3R842L)

(b) Pratt & Whitney
Overhaul and Repair Center – Europe (PWORCE)
Maastricht Airport
P.O. Box 269
6190 AG BEEK
Maastricht Airport
The Netherlands (FAA Repair License No: CW5Y749M)

(2) You can do these Service Bulletin procedures at your own location at your own cost and expense using the "Alternate Reprogramming Method" described in the accomplishment instructions. If you do these Service Bulletin procedures with the "Alternate Reprogramming Method", you need to obtain the software diskette used to reprogram the EEC. Refer to Material Information to order the Reprogramming Diskette.

(3) One Reprogramming Diskette can be used to modify approximately 40 EEC150–20 units. The Software Loader Utility used to reprogram the EEC creates a log file on the Reprogramming Diskette. When the log file is filled or when your fleet of EEC's is modified, return the Reprogramming Diskette to Hamilton Standard. Contact your local Hamilton Standard Field Support Representative if you need assistance to return the Reprogramming Diskette.

(4) The new parts required to accomplish this Service Bulletin are listed in Section 3, Material Information.

H. Tooling

NOTE: The following tools and equipment are necessary to perform the "Alternate Reprogramming Method" procedures:

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

(a) 80286 processor

(b) 512 Kbytes RAM

(c) 1.44Mbyte, 3.5" floppy disk drive

(d) Dual channel RS–422 aysnchronous 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)

NOTE: THE IBM COMPUTER DATE/TIME MUST BE CURRENT PRIOR TO PERFORMING THIS PROCEDURE.

(2) Hamilton Standard diskette called out in the Service Bulletin which is being incorporated. This diskette contains the EEC150–20: application code, trims, memory clear utilities, and software loader.

(3) EEC150–20 commuication cables as defined in Table 1.

(4) 28VDC, 5.0 +/– 0.5A power supply and associated power cables as defined in Table 2.

I. Weight and Balance

None

J. Electrical Load Data

Not Affected

K. References

E9137 Standard Electronic Practices Manual
Components Maintenance Manual CMM 73–28–01
IAE Service Bulletin Number V2500–ENG–73–0083
Hamilton Standard Service Bulletin EEC150–20–73–12
Hamilton Standard Service Bulletin EEC150–20–73–8

L. Other Publications Affected

Illustrated Parts Catalog 73–28–01

2. Accomplishment Instructions

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

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

A. If you use the "Alternate Reprogramming Method" skip to step 2.B. Otherwise refer to CMM 73–28–01, section 200 (ATLAS) to reprogram the EEC150–20. Use the program, version number, and engine trims shown below.

	Channel A	Channel B
Application Program:	Y811183	Y811184
Application Version Number:	027	027
Engine Trim Program:	Y811185	Y811185
Engine Trim Version Number:	027	027

If you do not use the "Alternate Reprogramming Method" of programming, skip to step 2.AM

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. This information will be input 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 marked J1. Ensure that the red engagement stripe on the EEC connector J1 is fully covered.

F. 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. If the computer and power supply connections to the cables are permanent, skip to step 2.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 B 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 cables to the 28VDC 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 to the ON (closed) position.

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

N. Turn on the power to the IBM compatible computer.

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

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.

P. Obtain the Hamilton Standard reprogramming diskette P/N 819191–8. Ensure that the write protection tab of the diskette is covering the "hole". Insert the diskette into the floppy drive designated as "A" on the IBM compatible computer.

Q. The display will show the **"C:\>"**. Type **a:** then press the **RETURN** key (note: some computers have the **RETURN** key designated as **ENTER**).

R. The display will show the "**A:\>**" prompt. Type **LDR150** then press the **RETURN** key. This starts the UART programming utility. Several messages will appear including the program identification, version number, time and the UTC/P&W document property rights notice. If there is a configuration error on the diskette, the program will display the appropriate error message and abort the programming process. See Table 3 for a summary of error code description and troubleshooting suggestions.

S. The UART programming utility **LDR150**, will display the following message: "**Enter operator's name performing download : [ ] >**". The field between the brackets will always be empty the first time the program is executed on the diskette. Subsequent execution of the program will display the last name entered. If the operator is the same, press the **RETURN** key to continue. If a different name is present than the operator's or no name is present, the operator should enter his/her name and press the **RETURN** key.

T. The LDR150 program will display the following 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] :

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

If a fault dump is required, or the operator wishes to terminate the programming procedure, type **Q**, then press the **RETURN** key. If the operator selects the quit option, turn off the 28VDC power to the EEC and go to step 2.AI.

U. The LDR150 program will now prompt with the following message: "**Enter the 9 character EEC Serial Number : [XXXX–XXXX] >** ". From the Hamilton Standard nameplate, enter the nine character EEC serial number and press the **RETURN** key.

NOTE: For steps 2.V and 2.W, if the EEC150–20 part number on the nameplate between the dashes is a single digit, enter a zero immediately preceeding this digit.
Example: P/N 808050–4–025 would be entered as 808050–04–025.

V. The LDR150 program will now prompt with the following message: "**Enter the 13 character Current EEC HW Part No. : [XXXXXX–XX–XXX] >** ". From the Hamilton Standard nameplate, enter the 13 character EEC Hardware Part Number and press the **RETURN** key.

W. The LDR150 program will now prompt with the following message: "**Enter the 13 character SB EEC HW Part No. : [XXXXXX–XX–XXX] >** ". From the Service Bulletin, enter the new 13 character EEC Hardware Part Number and press the **RETURN** key.

X. The LDR150 program will now prompt with the following message: "**Enter Trim Checksum Value for "xxxxxx.xxx" : >** ". The xxxxxx.xxx designation is the name of the Trim File being loaded to the EEC. Enter the trim checksum value **5859** and press the **RETURN** key.

Y. The LDR150 program will now prompt with the following message: "**Do you wish to reenter the above entries [Y/N/Q] :** ".

(1) To proceed with programming process, type **N**, then press the **RETURN** key. Continue with step 2.Z.

(2) To correct any errors in the data entered, type **Y,** then press **RETURN**. Continue with step 2.S.

(3) To quit the programming process, type **Q**, then press **RETURN**. Turn off the 28VDC power to the EEC and continue with step 2.AJ.

Z. At this point the screen will be initialized to display the activity of the programming process. Status messages will scroll across the screen. If an error occurs, see Table 3 for a summary of error code description and troubleshooting suggestions.

AA. 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

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

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

AC. On the IBM compatible computer, press the **RETURN** key.

AD. Wait until the LDR150 program prompts with the following message:_

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

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

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

AF. On the IBM compatible computer, press the **RETURN** key.

AG. Wait until the LDR150 program prompts with the following message:

Turn Off POWER to the EEC

...Press the RETURN Key When Ready to Continue

Switch off the 28 VDC power supply to the EEC .

AH. On the IBM compatible computer, press the **RETURN** key.

AI. 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.

(1) If successful programming occurred, the following message will be 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 was unsuccessful, the following message will be 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 1 describes the error codes and action to be taken.

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

AK. If a printer is available, a paper copy of the log file can be generated by the IBM compatible computer. To do this, at the MSDOS prompt, type **PRINT VLXXXX.LOG**, then press the **RETURN** key. Wait until the printer is finished before proceeding with the next step. If the printer is not available remove the diskette and move it to a system that has a printer and type the preceeding command for a paper copy.

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

AM. Change the Hamilton Standard Part Number to show that this Service Bulletin is included into the end–assembly configuration. Put the information shown below on a new unit identification plate. EEC150–20 units reprogrammed at one of the addresses shown in paragraph 1.G.1 will be sent back with their assemblies re–identified as shown.

(a) Put the new end–assembly part number in the "PART NO." area of the new identification plate:

PART NUMBER BEFORE THIS SERVICE BULLETIN	PART NUMBER AFTER THIS SERVICE BULLETIN
808050–4–XXX	808050–4–026

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

EEC150–20 END–ASSEMBLY	NEW IAE PART NUMBER
808050–4–026	2A3223

Table 1. COMMUNICATION CONNECTIONS

EEC SIGNAL NAME	EEC CONNECTOR	QUA–TECH CONNECOR	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 2. POWER SUPPLY CONNECTIONS

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

Table 3. 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 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 compatability mismatch, Trim Checksum mismatch)	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 operator.	If the process was not terminated by the operator, check that the disk is not write protected, or replace disk and retry.

3. Material Information

A. This Service Bulletin change will use 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 multiplication 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. The prices that are shown are estimates for one part. When you buy the parts, the prices may be different. Send requests for parts to:

Mail: Hamilton Standard
A United Technologies Corporation
Attention: Manager Commercial Spares
Mail Stop: 2MGGHH10
One Hamilton Road
Windsor Locks, CT 06096–1010
USA

Facsimile: (860)–654–6905

Purchase orders for parts must refer to the HS Service Bulletin Number EEC150–20–73–12, the IAE Service Bulletin Number V2500–ENG–73–0083.

G. New Parts Required

New PN	Qty	MSQ	Estimated Price	Key Word	PN Before this SB	Instruc–tion Code
751333–1	1	20	1.80	Plate	–	A
819191–8	1	1	0.00	Diskette	–	B,C

Instruction Code A. The "New PN" is the same as the "PN before this SB".

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 IAE. See your local IAE Service Representative for Diskette ordering information.

Hamilton Standard Service Bulletin EEC150–20–73–8
Hamilton Standard Service Bulletin EEC150–20–73–12
Hamilton Standard Internal Reference Number 239584, 241004
IAE Service Bulletin Number V2500–ENG–73–0083
IAE Internal Reference Number 96VZ002