# Ultra Electronics
# SERVICE BULLETIN

This Service Bulletin complies
with British Civil Airworthiness
Requirements, Sect.A, Chap.A5-3.

Signed . ~~AMS A~~ . . . .

CAA Approval No.    DAI/1501/39

1 November, 1993

## SERVICE BULLETIN No. 003LG-32-001

## LANDING GEAR - EXTENSION AND RETRACTION - CONTROL AND INTERFACE

## INTRODUCTION OF LGCIU Pt. No. 003LG034B

## 1. Planning Information

### A. Effectivity

Airbus Industrie A330 and A340 aircraft, all models.

Landing Gear Control and Interface Unit (LGCIU), part number 003LG034A, all Serial Numbers up to and including 145.

### B. Reason

This Service Bulletin introduces a new on-board replaceable module (OBRM) containing improved software (identified as the 4B Standard) which embodies changes requested by the aircraft manufacturer and changes incorporated by the LGCIU manufacturer to eliminate problems in the 4A Standard. Concurrently with the introduction of the improved software, the manufacturer is initiating a precautionary check on certain circuit components in order to ensure that no diminution of reliability occurs during the life of the LGCIU.

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Changes Requested by the Aircraft Manufacturer

(1)   A new fault message is required which will indicate power
      interrupts exceeding 200msec when the aircraft is in flight
      condition.

(2)   An updated definition of bit 19 in the STX word of a fault message
      is requested.

(3)   An update is required of the text of the interactive mode message
      for the 'no faults' page.

(4)   An update is required of the text of the interactive mode message
      for the 'test in progress' page.

(5)   The aircraft manufacturer requested that the GROUND SCAN menu be
      changed to the GROUND REPORT menu.

(6)   Additional trouble-shooting data was requested and the trouble
      shooting data format was changed.

(7)   Fault messages were required to be updated in accordance with
      ABD0048, Issue C.

(8)   It was required to add cautionary pages to precede the landing
      gear simulation menu.

(9)   It was requested that retraction fault and retraction inhibit
      conditions be modified.


Problems Identified in the 4A Standard Software

(10)  The interactive mode cannot be accessed without valid data from
      the ADIRS.

(11)  Inter-unit data disagree faults should be external for LGCIU 2.

(12)  Instances have occurred of abnormal exit from the interactive mode
      and failure to re-enter the interactive mode.

(13)  Instances have occurred of skipped pages and menus in the
      interactive mode.

(14)  The retraction inhibit condition is incorrectly latched.

(15)  The occurrence of a Class 2 fault indication is not correctly
      latched.

(16) Confirmation times for BITE EPLD faults are too short.

(17) Shortening mechanism downlock faults are indicated when the proximity sensor is faulty.

(18) ADIRS on-ground tolerance and fault confirmation time is too short.

(19) External faults detected in 'DC2' are incorrectly logged on entry to 'DC1'.

(20) Inter-unit disagree faults are sometimes logged when a proximity sensor fault has occurred.

(21) Fault log information is lost after every 64th flight.


C. Description

This Service Bulletin introduces LGCIU Pt. No. 003LG034B, containing a modified OBRM Pt. No. 003LG0300204B. The new OBRM incorporates revised software, described below, which implements the changes and eliminates the problems identified in para. 1.B. No LGCIU hardware changes are required.

The sub-paragraph numbers in the following descriptions correspond with those used in para. 1.B.

(1) If a power interrupt exceeding 200msec occurs while the recording command is 'DC1', the LGCIU records an external fault and transmits the message 'POWER SUPPLY INTERRUPT' to the CMC.

(2) Bit 19 in the STX word of a fault message now indicates that the associated fault has been present 5 seconds after confirmation.

(3) The text of the 'no faults' page has been changed to read 'NO FAULTS DETECTED'.

(4) The text of the 'test in progress' page has been updated to give an indication of the maximum time that the test will take to complete.

(5) The GROUND SCAN menu is now entitled GROUND REPORT menu.

(6) Trouble shooting data indicating the LGCIU status is now recorded when a fault occurs. This information is displayed during interactive mode operation on both the TROUBLE SHOOTING and the GROUND REPORT menus.

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(7) All fault messages have been updated in accordance with ABD0048, Issue C.

(8) Two cautionary pages have been added to give warning of entry to the landing gear simulation menu and to force a confirmation/re-confirmation of the selected option.

(9) Retraction faults associated with the pitch trimmers and shock absorbers now require the gear locked down condition to be true before they are indicated. The retraction inhibit associated with the bogie beams also requires gear up to be selected before it is indicated.

(10) The software has been modified to enable entry into interactive mode if NO DATA is received from the ADIRS.

(11) The inter-unit disagree faults (faults 350 to 386) have been defined as external faults for LGCIU 2. These faults remain defined as internal faults for LGCIU 1.

(12) Abnormal exits from the PREVIOUS LEGS menu of interactive mode were caused by the CMC not accepting the ISO character for FFh. The software has been modified to transmit the ISO charater '-' instead.

Following these abnormal exits, interactive mode could not be entered as a variable was not set. The modified software resets this variable after any interactive mode exit.

(13) The skipping of pages and menus in interactive mode was caused by software interpreting the same command twice. The software has been modified to not process the same command more than once.

(14) The retraction inhibit condition is no longer latched when ground power is connected OR when the on ground condition is true.

(15) ARINC bit 022-21 (Class 2 fault present) has benn changed to indicate that a Class 2 fault has occurred during the current flight. This bit will be latched until the next flight.

(16) Confirmation times for BITE EPLD faults has been increased from zero to 0.7 seconds in order to prevent erroneous faults from being logged.

(17) The condition for shortening mechanism downlock faults has been modified to require valid proximity sensor data.

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(18) The ADIRS on ground tolerance and fault confirmation time has been increased.

(19) External faults that are detected and confirmed when the BITE command is 'DC2' will not be logged. If the fault disappears and recovers it will be incorrectly logged when the BITE command changes to 'DC1'. The software has been revised to prevent this situation from occurring.

(20) A synchronisation effect was observed between the software and the BITE circuitry. This resulted in a single inter-unit disagree fault being announced for every 10 proximity sensor failures detected. The software has been modified to prevent this.

(21) A null record is written to the NV memory every 64 flights in order to ensure that very old faults are not flagged by mistake. This was found to result in the software losing faults from previous flight legs every 64th flight. An additional check has now been built into the software to prevent the loss of any faults.


In addition to the software changes described above, the manufacturer is making a precautionary screening check on some of the hybrid chips used on the control and interface PCBs. Potentially faulty chips can be identified by batch number and confirmed by testing and these will be replaced.


D. Compliance

Compliance with this Service Bulletin is recommended.

The manufacturer will make modified OBRMs available to Operators by exchange, on request. The manufacturer will also incorporate this Service Bulletin, on request, into all units returned for investigation and/or repair. Operators need not return units specifically for this Service Bulletin to be incorporated.

Operators who wish to re-program their own OBRMs will be provided with one master OBRM for use with a recommended firmware data loader (See para. 2 of this Service Bulletin).

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Operators who hold LGCIUs having Serial Nos. listed in para. 2.A of this Service Bulletin must return these LGCIUs to the manufacturer, who will carry out the screening check described in para. C above. Potentially faulty components will be replaced and, at the same time, the manufacturer will incorporate the 4B Standard of software into the returned units.

Modified LGCIUs will be made available, by arrangement, for loan purposes.

E.  Approval

The technical content of this Service Bulletin is approved under the authority of CAA Approval No. DAI/1501/39.

F.  Manpower

Manpower requirement for accomplishment of this Service Bulletin are as follows :-

        Fitting of exchange OBRM              0.25 manhours

        Reprogramming existing OBRM           1.5 manhours

G.  Material Cost and Availability

The new OBRM, Pt. No. 003LG0300204B, will be made available to Operators free of charge by exchange, on request.  Alternatively, a master OBRM will be provided free of charge to Operators who wish to reprogram their own OBRMs.  Sets of new OBRM identification labels will also be supplied for use with the reprogrammed OBRMs — Operators must inform Ultra Electronics of the quantities required.

The manufacturer will carry out the screening check and any necessary rework free of charge on returned units (see para. 2.A of this Service Bulletin).  At the same time, and also free of charge, the manufacturer will incorporate the 4B Standard of software into these returned units.

H.  Tooling — Price and Availability

Operators who wish to reprogram their own OBRMs must have access to an Aerospatiale Firmware Data Loader, Type RMR PRECIS B, Pt. No. 37A0D0-3000-000.  Data on price and availability of this device can be obtained from Aerospatiale Avionics and Systems Division.

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J.  Weight and Balance

Weight and Balance are not affected.

K.  Electrical Load Data

Incorporation of this Service Bulletin has no effect on the aircraft electrical load.

L.  References

Ultra Electronics Component Maintenance Manual Ref. No. 32-31-81.

ABD0048, Issue C.

Ultra Electronics LGCIU Production Test Specification 003-LG-00-0006.

ATE Test Specification, Aerospatiale Ref. No. 003-LG-03-4B.

2.  Accomplishment Instructions

A.  Screening Checks

LGCIUs having the following Serial Nos. should be returned to the manufacturer for screening checks and possible rework.

28, 31, 36, 42, 43, 44, 46 47, 48, 50, 54, 55, 57, 58, 59, 60, 99,

101, 107, 108, 109, 110, 111, 112, 113, 114, 115, 117, 120, 121, 124.

All other LGCIUs merely require the 4B software to be incorporated as described in paras. B and C which follow.

B.  OBRM Change

Accomplishment of this section of the Service Bulletin is achieved by removing OBRM Pt. No. 003LG0300204A and replacing it with OBRM Pt. No. 003LG0300204B.

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Refer to Ultra Electronics Component Maintenance Manual 32-31-81, Page 301, para. 2.A for OBRM removal instructions.

Refer to Ultra Electronics Component Maintenance Manual 32-31-81, Page 702, para. 2.D for OBRM installation instructions.

Correct functioning of the new OBRM will be checked during the start-up BITE tests when the unit is next powered up.

C.  OBRM Reprogramming

Remove and discard the original identification labels from the OBRM.

Refer to the Aerospatiale Instruction Manual for the RMR PRECIS B firmware data loader and carry out the erasing, reprogramming and test procedures as directed, using the 003LG0300204B master OBRM supplied by Ultra Electronics.

Engrave the OBRM part number (003LG0300204B) and serial number details onto the new blank labels, ensuring that the software standard legend is shown as '4B' on the front label.

Using a cloth moistened with iso-propyl alcohol, or an equivalent solvent, thoroughly clean the two areas on the OBRM where the new labels are to be fitted.  Allow the solvent to evaporate and then fit the new labels.

Fit the reprogrammed OBRM as described in para. B above.

D.  Notification

After accomplishment of this Service Bulletin, the Operator must advise the manufacturer of the following details :-

(1)  Service Bulletin Number.

(2)  Serial Number(s) of the LGCIU unit(s) modified.

(3)  Date of accomplishment.

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These details must be sent to :-

        Project Support Manager (Flight Systems),
        Ultra Electronics,
        Controls Division,
        Knaves Beech Business Centre,
        Loudwater,
        High Wycombe, HP10 9UT,
        United Kingdom

The Operator must record the accomplishment of this Service Bulletin within the appropriate equipment documentation system.

3. <u>Material Information</u>

Incorporation of this Service Bulletin changes the manufacturer's part number of the LGCIU from 003LG034A to 003LG034B.

The front face of the new OBRM will carry the legend '4B'.

| New Part No. | Qty. | Unit List Price | Keyword | Old Part No. | Instructions-Disposition |
|---|---|---|---|---|---|
| 003LG034B | - | N/A | LGCIU | 003LG034A | Code 1 |
| 003LG0300204B | 1 | N/A | Module | 003LG0300204A | Codes 1, 2 or 3 |
| 003LG030021 | 1 | N/A | Label | 003LG030021 | Code 4 |
| 003LG030022 | 1 | N/A | Label | 003LG030022 | Code 4 |

Disposition Codes

      1    Return LGCIU to manufacturer

      2    Return OBRM to manufacturer for exchange

      3    Operator to reprogram existing OBRM

      4    Old part not re-usable. New labels are blank and must be engraved (see para. 2.C).

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