TITLE:	Hardware and Software Update
DOCUMENT NUMBER:	SB AD32/AC32/01
EQUIPMENT:	AD32 RVSM Air Data Display and AC32 Digital Air Data Computer
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RECORD OF REVISIONS

Rev.	Date	Reason for Revision	Prepared	Checked	Approved
1.0	30/08/04	Initial Release	-	-	-
1.1	26/04/21	Service Bulletin reformatted. No changes to the technical content.	*J. Garrett*	*O. Diatlova*	*A. Savin*

SERVICE BULLETIN

1. Planning Information

   A. Effectivity

   The modification procedure described in this service bulletin applies to AD32 RVSM Air Data Display flight instrument and AC32 Digital Air Data Computer.

   B. Concurrent Requirements

   None required.

   C. Reason

   This document is issued to provide information about the hardware and software changes on AD32 RVSM Air Data Display and AC32 Digital Air Data Computer.

   Hardware Changes:

   - To have better visual altitude alerter warning at night, an internal resistor needs to be changed to have less brightness, applicable only for AD32

   - Internal module fixation with clamps will be done in order to simplify the module assembly

   - AD32 and AC32 will have additional information incorporated in the identification plate:

     - RTCA/DO-178B Level A

     - RTCA/DO-160D

     - Weight of the unit

     - Power supply

   Software Changes:

   The software upgrade will be carried out in order to accomplish the modification as explained in detail under section D (Description). Software modification depends on the configuration of the unit's individual execution.

   D. Description

   This Service Bulletin includes the following software modification to be accomplished on AD32 and AC32:

   IAS Low Indication

   Parametrical IAS limit is implemented under consideration of IAS low indication due to hysteresis to 1 knot. If the IAS drops below this limit, a discrete output shall be activated including the IAS monitoring function to BIT execution.

   Qci Selftest Tolerance Level

   Fault Code FC 059 (Qci-Drift) occurs during production and burn-in-test, so Qci Selftest tolerance value (level) for Qci-BIT will be increased from 0.15 mbar to 0.6 mbar.

   Impact Pressure Dependency

   The impact pressure dependency calculation depends on the validity of impact pressure. This is not necessary for altitude calculation without SSEC correction and leads to invalid altitude in case of non-configured pitot sensor. The software change removes the dependency of impact pressure from altitude calculation.

   Watchdog Timeout Period

   The timeout period of the watchdog self-test is determined to 1.6 seconds. Due to watchdog device tolerances this time span is too short, and a watchdog failure may be recognized. Therefore, the watchdog time period for self-testing is extended to 2.5 seconds.

Alerter Setting Logic

The altitude alerter setting logic will be modified in order to eliminate the alert warning which is caused when the alerter knob has been rotated on AD32 Air Data Display. This modification on alerter logic will also delay the alert activation by one second to prevent the alerts if the knob is turned slowly.

NOTE:
If alerter is always ON, the alerter cannot be switched OFF by pushing the alerter setting knob.

Alert Light Logic

If the AD32 Air Data Display has the internal alerter ACTIVE, the alert light should be controlled only by internal alerter (priority). If the internal alerter is INACTIVE, the alert light can be controlled by external alerter.

CODE Flag Logic

The CODE flag logic will be parameterised, as shown below.

Parameter/Condition	Encoder Circuit Fails	CODE off or Encoder not connected
ShowCodeOFF = YES	CODE flag in view	CODE flag in view
ShowCodeOFF = NO	CODE flag in view	CODE flag out of view

Test Duration

The initiated test BIT sequence with its modification will indicate the configuration ID for five seconds, the LCD (liquid crystal display) for five seconds and the test delay for 0 (zero) seconds.

ON ALT Discrete Output Function

When the indicated altitude is the same as pre-selected altitude, hysteresis is ± 5 ft and discrete output is parametrically low by 300 ms (0 … 1000 ms).

The modification will accomplish a new parameter for OnALT (0 … 1000 ms), and hysteresis of (± 0 … 100 ft).

NOTE:
The pre-select function monitors the actual indicated altitude against the pre-selected altitude selected on the alerter/pre-selector device.
When "ON ALT" condition exists, the pre-selector outputs a "hold engage" signal to the autopilot computer (when certain conditions exist). This output must be in addition to standard altitude alerting functions as required by RVSM.

Test Delay 0 (Zero) Seconds

Test activation delay range was for 1 to 5 s, and will be changed to 0 to 5 s.

TAT FC (Fault Code) FC39 Non-critical Definition

The fault code FC39 for TAT (Total Air Temperature) is defined now as a non-critical failure.

This will be done to prevent the situation of, if TAT probe is defect then the altitude indication must not be lost on the AD32/AC32.

Configuration Dependency of Pitot Sensor Selftest

At present, the pitot sensor selftest does not depend on sensor configuration. Configuration dependency for pitot sensor selftest will now be implemented.

NOTE:
For hardware modification details, refer to section 1C – Hardware Changes.

E. Compliance Recommendation

Incorporation of this Service Bulletin is optional based on the individual operator or industry.

F. Approval

The AD32 RVSM Air Data Display and AC32 Digital Air Data Computer conform to TSO-C106, TSO-C88a, and TSO-C10b.

This Service Bulletin contains no modification information that revises the approved configuration and therefore does not require any implementation of governmental or other regulatory agency approval.

G. Manpower

This modification can be done by THOMMEN AIRCRAFT EQUIPMENT AG or its approved service centres.

H. Weight and Balance

Not affected.

I. Electrical Load Data

Not changed.

J. Software Accomplishment Summary

Refer to section 1C – Software Changes.

K. References

None.

L. Other Publications Affected

None.

M. Interchangeability of Parts

Not applicable.

2. Material Information

A. Material - Price and Availability

The hardware parts/materials required for this modification are procured by THOMMEN AIRCRAFT EQUIPMENT AG or its approved service centres.

Installation of this Service Bulletin is subject to no special pricing.

For more information please contact:

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NOTE:
All units subject for modification must be scheduled prior to shipping. Contact THOMMEN AIRCRAFT EQUIPMENT AG for further lead time and delivery schedule.

B. Tooling - Price and Availability

No special tools are required.

3. Accomplishment Instructions

   A. Procedure

   The modification procedure can be accomplished by THOMMEN AIRCRAFT EQUIPMENT AG or its approved service centres.

   B. Testing

   The testing can be accomplished by THOMMEN AIRCRAFT EQUIPMENT AG or its approved service centres.

   Additional verification of software version (optional)

   Since the AD32 /AC32 software verifies internal operating process, this verification is optional. Software version verification cannot be accomplished by a separate test. It can be verified by automatic startup BIT sequence.

   C. Modification Status Marking

   The identification plate for the AD32 RVSM Air Data Display and AC32 Digital Air Data Computer is attached externally to the instrument housing. The MOD columns identify the modification status.

   Examples of identification plates for the AD32 RVSM Air Data Display and AC32 Digital Air Data Computer are shown below (with former company name and address):
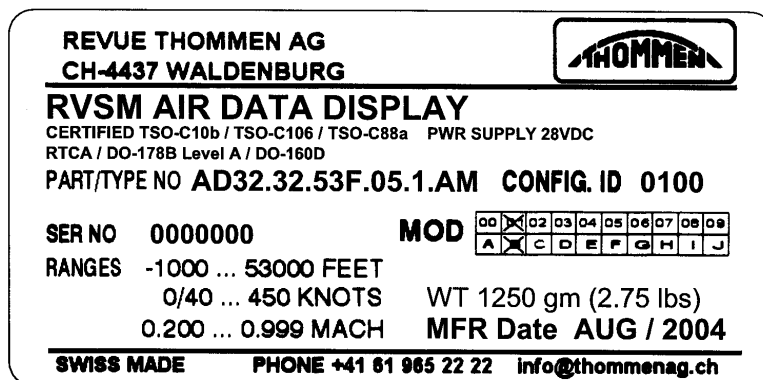

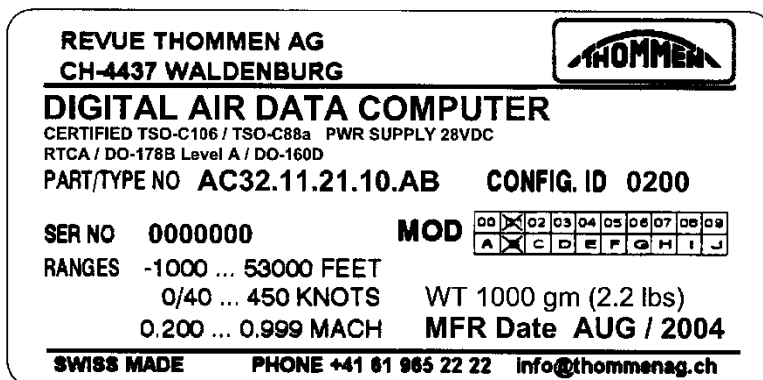Figure 1 - AD32 RVSM Air Data Display Identification Plate

Figure 2 - AC32 Digital Air Data Computer Identification Plate

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