INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

For The

TQ-Group
KTX2 Mode-S(ES) ADS-B Transponder System
Part Number 304110 - XX(XX) – XX(XX)

AS INSTALLED IN

_________________________
(Make & Model Airplane)

Serial Number: ________________ Registration Number ________________

Document Number: TQG-KTX2-ICA
RECORD OF REVISIONS

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<thead>
<tr>
<th>Revision</th>
<th>Date of Revision</th>
<th>Description</th>
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<td>0</td>
<td>05/10/2019</td>
<td>Initial Release</td>
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We welcome your comments concerning this manual. Although every effort has been made to keep it free of errors, some may occur. When reporting a specific problem, please describe it briefly and include the manual part number, the paragraph/figure/table number, and the page number. Send your comments to the STC Holder at:

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Website: [https://www.ads-b.com](https://www.ads-b.com)
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SECTION 1  INTRODUCTION

1.1 Purpose
This document is designed for use by vendors and licensed installers of a 14 CFR 91.227 Compliant TQ-Group KTX2 Mode-S(ES) ADS-B transponder. It contains instructions for continued airworthiness as prescribed by 14 CFR 23.1529 and Part 23 Appendix G.

This ICA also contains information required by the operator to correctly maintain the KTX2 which has been installed under AML STC SA02525AK.

1.2 Scope
This document contains the instructions for Continued Airworthiness for aircraft modified by the installation of an KTX2 under AML STC SA02525AK.

1.3 Document Control
This document is part of the ADS-B TECHNOLOGIES, LLC document control system. There are no superseded documents to the original. Refer to paragraph 2.15 for information on how to obtain FAA approval and how to notify customers of changes.

1.4 Permission to Use Certain Documents
Permission is granted to any entity applying for approval to install a KTX2 transponder system to use AML STC SA02525AK documents to accomplish the Instructions for Continued Airworthiness and show compliance with the AML STC engineering data. It is the responsibility of the applicant to determine the suitability of the documents for the ICA.
1.5 Acronyms and Definitions

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>Aircraft Address – ICAO 24-bit address</td>
</tr>
<tr>
<td>AC</td>
<td>Advisory Circular, or Aircraft Category</td>
</tr>
<tr>
<td>ADS-B</td>
<td>Automatic Dependent Surveillance-Broadcast</td>
</tr>
<tr>
<td>AML</td>
<td>Approved Model List</td>
</tr>
<tr>
<td>APP</td>
<td>Application</td>
</tr>
<tr>
<td>ARINC</td>
<td>Aeronautical Radio, Incorporated</td>
</tr>
<tr>
<td>ATCRBS</td>
<td>Air Traffic Control Radar Beacon System</td>
</tr>
<tr>
<td>DL</td>
<td>Data Loading</td>
</tr>
<tr>
<td>DME</td>
<td>Distance Measuring Equipment</td>
</tr>
<tr>
<td>ETX</td>
<td>End of Transmission</td>
</tr>
<tr>
<td>FCC</td>
<td>Federal Communications Commission</td>
</tr>
<tr>
<td>FID</td>
<td>Flight ID</td>
</tr>
<tr>
<td>FPGA</td>
<td>Field Programmable Gate-Array</td>
</tr>
<tr>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>GNSS</td>
<td>Global Navigation Satellite System</td>
</tr>
<tr>
<td>LRU</td>
<td>Line Replaceable Unit</td>
</tr>
<tr>
<td>NAS</td>
<td>National Airspace System</td>
</tr>
<tr>
<td>NOTAM</td>
<td>Notice to Airman</td>
</tr>
<tr>
<td>RAIM</td>
<td>Receiver Autonomous Integrity Monitoring</td>
</tr>
<tr>
<td>RF</td>
<td>Radio Frequency</td>
</tr>
<tr>
<td>RTCA</td>
<td>Radio Technical Commission for Aeronautics</td>
</tr>
<tr>
<td>RX</td>
<td>Receive</td>
</tr>
<tr>
<td>SBAS</td>
<td>Satellite-Based Augmentation System</td>
</tr>
<tr>
<td>SPE</td>
<td>Single Point Entry</td>
</tr>
<tr>
<td>STB</td>
<td>Standby</td>
</tr>
<tr>
<td>STC</td>
<td>Supplemental Type Certificate</td>
</tr>
<tr>
<td>TQ-G</td>
<td>TQ-Group</td>
</tr>
<tr>
<td>TSO</td>
<td>Technical Standard Order</td>
</tr>
<tr>
<td>TX</td>
<td>Transmit</td>
</tr>
<tr>
<td>WAAS</td>
<td>Wide Area Augmentation System</td>
</tr>
</tbody>
</table>

1.6 Terminology

Except where specifically noted, references made to “the Unit” or “the Installation” will apply to the KTX2. Likewise, the terms “1090 Transponder”, “Mode-S Transponder”, or “Transponder” will also mean the KTX2. References to “metal aircraft” will refer to aircraft with an aluminum skin. “Nonmetallic aircraft” will refer all other aircraft including composite, wood, or tube and fabric construction.
SECTION 2  INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

2.1 Introduction

Content, Scope, Purpose: This document identifies the Instructions for Continued Airworthiness for the modification of an aircraft by the installation of a KTX2

Applicability: Applies to all AML aircraft altered by the installation of STC SA02525AK

Acronyms and Definition & Terminology: See Section 1.5 and 0

Precautions: None

Units of Measurement: None

Referenced Publications: ADS-B Technologies:

TQG-KTX2-IM Installation Manual (Approved Model List Supplemental Type Certificate) KTX2
P/N 304110 - XX(XX) – XX(XX) Rev. 0 or later versions.

Retention: This document, or the information contained herein, will be included with the aircraft’s permanent records.

2.2 Description of Alteration

The KTX2 is a 2 ¼ inch, 0.8 lb panel mount transponder capable of transmitting 1090 MHz ADS-B OUT. The unit provides ADS-B surveillance information to ground stations for air traffic control.

The KTX2 receives its position information from an external GPS source. This GPS source must be rule compliant with the position source requirements of AC20-165A. The external GPS source must support WAAS. The System Block Diagram in Figure 2-1 shows the various interfaces for the KTX2.

Software and hardware configuration data is stored in an EPROM within the unit accessible from various configuration screens.
2.3 Control, Operating and Testing Information

See Reference Publications in paragraph 2.1 for document part numbers.

- See the ADS-B Technologies “Installation Manual (Approved Model List Supplemental Type Certificate) KTX2 P/N 304110 - XX(XX) – XX(XX) for operational checks and system test procedures

2.4 Servicing Information

The KTX2 requires no servicing.

2.5 Periodic Maintenance

All maintenance associated with the KTX2 is on a “Condition Monitored” basis. Condition monitoring is based upon the following:

- Visual observation and actual use by the user.
- All units have unlimited service life, therefore service life is defined as that point in time when repair is no longer economical

The KTX2 is designed to detect internal failures and announce them. A comprehensive self-test is executed automatically upon application of power to the unit, and built-in tests (BIT) are continuously executed. Detected errors are indicated as failure annunciations, system messages, or a combination of the two.

Operation of the KTX2 is not permitted unless the inspections described in this section have been completed within time intervals prescribed in Error! Reference source not found..
### Table 2-1: Periodic Inspections

<table>
<thead>
<tr>
<th>Item</th>
<th>Procedure</th>
<th>Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment Inspection (Metallic Aircraft)</td>
<td>Conduct a complete inspection of the system and associated wiring harness and connectors to ensure continued installation integrity:</td>
<td>At regular aircraft inspection intervals or 12 months – which ever comes earliest</td>
</tr>
<tr>
<td></td>
<td>1. Visually inspect for signs of corrosion.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Visually inspect for condition of wiring, shield terminations for proper grounding, routing, and attachment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. It is recommended that an electrical bond check be performed between the unit and nearby exposed portion of the aircraft metallic structure and verify that the measured value is less than or equal to 2.5 milliohms with the wiring connectors disconnected.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. In the event of bonding check failure, remove the unit and clean it and its mounting holes at both the unit and the aircraft structure and reattach the unit. Re-verify the resistance between the unit and nearby exposed portion of aircraft metallic structure, and ensure it is less than or equal to 2.5 milliohms.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Visually inspect the unit mounting to the aircraft, verify visually that the screw heads are in full contact with the mounting holes etc. Re-torque the screws if required.</td>
<td></td>
</tr>
<tr>
<td>Equipment Inspection (Non-Metallic Aircraft)</td>
<td>Conduct a complete inspection of the system and associated wiring harness and connectors to ensure continued installation integrity:</td>
<td>At regular aircraft inspection intervals or 12 months – which ever comes earliest</td>
</tr>
<tr>
<td></td>
<td>1. Visually inspect for signs of corrosion.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Visually inspect for condition of wiring, shield terminations for proper grounding, routing, and attachment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. It is recommended that an electrical bond check be performed between the unit and nearby exposed portion of the aircraft metallic structure and verify that the measured value is less than or equal to 2.5 milliohms.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. In the event of bonding check failure, remove the unit and clean it and its mounting holes at both the unit and the aircraft structure and reattach the unit. Re-verify the resistance between the unit and nearby exposed portion of aircraft metallic structure, and ensure it is less than or equal to 2.5 milliohms.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Visually inspect the unit mounting to the aircraft, verify visually that the screw heads are in full contact</td>
<td></td>
</tr>
</tbody>
</table>
2.6 Troubleshooting Information
Use the troubleshooting help provided in Error! Reference source not found. for the KTX2 for initial installations and debugging issues that may appear during operation.

Table 2-2: Troubleshooting KTX2

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Cause / Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>No sign of power and/or Screen blank.</td>
<td><strong>KTX2 is not operating:</strong> 8. Verify KTX2 breaker is closed. Check and reset the circuit breaker; 9. Verify power and ground supplied to the KTX2; 10. Replacement of the KTX2 may be required. Contact TQ-G Direct Support before removal of the unit.</td>
</tr>
<tr>
<td>Err FPGA</td>
<td><strong>A severe error has been detected.</strong> There is no access to the FPGA: 11. Attempt to restart the unit; 12. Replacement of the KTX2 may be required. Contact TQ-G Direct Support before removal of the unit.</td>
</tr>
<tr>
<td>Intern. Comm. Fail</td>
<td><strong>Severe failure.</strong> An internal communications error has occurred: 13. Attempt to restart the unit; 14. Replacement of the KTX2 may be required. Contact TQ-G Direct Support before removal of the unit.</td>
</tr>
<tr>
<td>Do System Restart</td>
<td><strong>An error has been detected and the KTX2 should be restarted:</strong> 15. Switch unit off, wait 5 seconds and switch on; 16. If error repeats, contact TQ-G Direct Support for further advice.</td>
</tr>
</tbody>
</table>
### Table 2-2: Troubleshooting KTX2

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Cause / Corrective Actions</th>
</tr>
</thead>
</table>
| **Trans. Output** | **Severe Failure.** The KTX2 is not transmitting.  
1. Check all connections;  
2. If no root cause can be discovered, replacement of the KTX2 may be required. Contact TQ-G Direct Support before removal of the unit. |
| **CRC Failure**   | **Insufficient data from GPS source.**  
17. A minimum of 3 GPS satellites must be in view;  
18. Check GPS antenna connection;  
19. If problem persists, GPS source may have failed. Contact GPS source manufacturer for further details. |
| **BAT LOW**       | **Voltage is < 11 VDC.**  
20. If engine is running, increase RPM;  
21. If engine is off, recharge or replace battery.  
The KTX2 is designed to operate above 9 VDC, but determine cause of low voltage before next flight. |
| **ANT**           | **Possible L-Band antenna failure.**  
22. Check antenna installation (cable & connector);  
23. Resolve problem before next flight. |
| **TRX**           | **Weak Transmitter – Output power limited.**  
24. Check antenna installation (cable & connector);  
25. If no root cause can be discovered, replacement of the KTX2 may be required. Contact TQ-G Direct Support before removal of the unit. |

### 2.7 Removal and Replacement Information

The KTX2 should be removed and reinstalled IAW the procedures outlined in Section 5.4 of the Installation Manual. Use the original packing when shipping the KTX2 to the Factory.

If the KTX2 is removed and reinstalled, verify that the power-up self-tests in Section 4.5 of the Installation Manual are completed with no failure messages noted.

Refer to Appendix A of this document for the KTX2 Configuration and Checkout Log. NOTE: A new Log should be completed and dated upon re-installation.

**NOTE**

Removal and replacement of the interfaced GPS receiver also requires a full functional check of the ADS-B system per the Installation Manual section 4.5.3. Make a log book entry for accomplishment of this test.

### 2.8 Diagrams

The Installer should carefully document the type, serial number and location of all components in the installation. Additionally, a formal schematic should be prepared noting the system
architecture and connections between all components. This schematic, together with the Configuration and Checkout Log, should become a part of the aircraft permanent records.

2.9 Special Inspection Requirements
After a suspected lightning strike, the following actions must be performed (if applicable):

- Verify the proper operation of all KTX2 functions IAW paragraph 4.5 in the Installation Manual
- Follow the Suspected Lightning Strike procedures in Error! Reference source not found. of this document

2.10 Application of Protective Treatments
The KTX2 requires no protective treatments.

2.11 Data Relative to Structural Fasteners
The only structural fasteners required are black #4-40 machine screws for the KTX2.

2.12 Special Tools & Test Equipment
There are no Special Tools required for the maintenance of the KTX2. An IFR-6000 Ramp Test Set, or equivalent, with ADS-B option #5 (1090ES) is recommended for post-installation functional testing found in Section 4 of the Installation Manual. A standard milliohm meter should be used to check electrical bonding.

2.13 Additional Instructions
There are no Additional Instructions.

2.14 Overhaul Period
The KTX2 does not require overhaul at a specific time period. All components are “On Condition” and monitored by self-test and BIT functions.

2.15 ICA Revision and Distribution
To revise this ICA, ADS-B Technologies and TQ-Group will follow authorized company procedures. The latest revision of this ICA is available from TQ-Group at the contact information in paragraph 2.16. A TQ-Group service bulletin will be sent to all KTX2 dealers if a revision is determined to be significant.

2.16 Assistance
For questions regarding this equipment or its use, contact:

TQ-Group GmbH
Attn: Direct Service Support
Mühlstraße 2, 82229 Seefeld, Germany
Telephone: +49 (0)8153-9308-661
Fax: +49 (0)8153-9308-661
Email: support@tq-general-aviation.com
Website: https://www.tq-general-aviation.com/en/Service

(Or)

ADS-B Technologies LLC
Attn: Technical Publications
819 Orca Street
Anchorage, AK 99501
Telephone: (907) 258-2372 (Mon-Fri 10AM-5PM AKT)
Fax: (888) 499-2584

(Or)
Your local FSDO, or certificate holder’s PMI are also capable of responding to most questions regarding this ICA.

2.17 Implementation and Record Keeping
Modification of an aircraft by this AML STC obligates the aircraft operator to include the maintenance information provided by this document in the operator’s aircraft maintenance manual and/or the operator’s aircraft scheduled maintenance program. Backup copies are recommended.

SECTION 3 AIRWORTHINESS LIMITATIONS SECTION
There are no additional Airworthiness Limitations as defined in 14 CFR § 23, Appendix G, G23.4 that result from this modification.

The Airworthiness Limitations section is FAA approved and specifies maintenance required under §43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved
# APPENDIX A  AIRCRAFT CONFIGURATION RECORD

An Aircraft Configuration Record and Aircraft Installation Graphic depicting all equipment locations and wire routing will be filled out by the Installing Agency and must remain a part of the aircraft’s permanent records.

## Aircraft Configuration Record

(This sheet should be retained in aircraft records for future reference)

<table>
<thead>
<tr>
<th>Date: ______________</th>
<th>By: ______________________________</th>
</tr>
</thead>
</table>

### Installation Information

(Use the information found in the general information section to help fill out the following data)

- **Model KXT2 P/N 304110 - XX(XX) – XX(XX)**
- **Unit Serial Number: _______________
- **Aircraft Model: _______________
- **Aircraft Serial Number: _______________

### Configuration

#### Aircraft Options

- **Aircraft Call Sign (FID): _______________**
- **ICAO Mode S ID (AA-Code): _______________**
- **VFR Code: _______________**
- **Aircraft Emitter Category: _______**
- **AIR/GND switch Enabled: Yes □ No □**
- **Maximum Speed: ≤ 75kt □ 75 and ≤150kt □ 150 and ≤300kt □**
- **GNSS Source: NexNav Mini □ Other □ ____________ None □**
- **GNSS Baud Rate: 4800 □ 9600 □ 19200 □ 38400 □**
- **Aircraft Length (Meters): _______**
- **Aircraft Wingspan (Meters): _______**
- **GNSS Antenna Offset (Meters): Longitudinal (From Nose) _______ Lateral _______**

### Notes:

<table>
<thead>
<tr>
<th>Notes:</th>
</tr>
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<tbody>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Aircraft Installation Graphic (Single Engine)
(Installer should annotate locations of significant components & wiring)
Aircraft Installation Graphic (Multi Engine)

(Installer should annotate locations of significant components & wiring)