Axiom Data Logger Firmware Release Notice
Firmware Version 1.3.47

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Introduction

Axiom F7 data logger is the successor to F6.

The same F7 firmware is used for all Axiom hardware variants, such as F7-GN-AX and F7-G6-IR-AX-AT-QD.

Firmware support may lag hardware availability.

This firmware notice will help AEM sales representatives and customers determine the suitability of each release for specific applications.

Firmware may be updated in the field by users with a USB flash drive. Brief update instructions and special actions are included in this document.

Overview of Release

Firmware release v1.3.47 represents substantial progress from the prior pre-release versions. It resolves several issues of earlier builds. Due to structural changes to the database, a factory restore operation must be done *before and after* updating. This will erase the measurement datastore and device configuration. The update process will depend on the firmware version installed on the unit.

To prevent reintroducing the legacy database structure, once a station is updated to v1.3.47, the firmware cannot be reverted to versions earlier than v1.3.43.

User-facing improvements relative to v1.2.33:

- Support for Gill WindSonic sensors
- Improved firmware update workflow, with clearer status messages, immediate user feedback, and safeguards against installing incompatible versions
- Startup progress indication during database initialization, including a reminder to remove the USB drive
- Protection against accidental input while the database is performing background maintenance
- Improved SDI-12 sensor discovery, mapping workflow, and user interface
- Improved low battery messaging
- GPS configuration and survey management screens for GNSS-equipped models
- Support for non-G6 variants with GNSS
- G6 transmission measurements, viewable on the Current Conditions screen
- Improved telemetry logging and GOES transmission support, including SHEF message formatting and more reliable transmission buffering

- Resolved several conditions that could cause an unexpected station reboot, including during Current Conditions editing, trace log download, and database startup
- Trace Log relocated under Service > Tech Tools

System-level improvements include:

- Database journaling performance improved by roughly 32x, with stronger protection against corruption from unexpected power loss
- Improved SDI-12 communication reliability, reducing the potential for sensor data loss
- Corrected Rain Total not resetting during Factory Reset
- Improved file system error recovery and storage robustness
- Enhanced configuration validation and error handling
- Improved low-voltage charging and telemetry behavior
- Simplified Trace Log output for easier troubleshooting
- Numerous additional stability, performance, and reliability improvements; see Appendix B for the complete release history

Update from V1.1.15 or Lower

If the firmware version installed on the data logger is v1.1.**15 or lower**, use the following instructions.

The firmware version may be found at Menu – Station > About tab.

It would be best to perform the following update process at the office or bench before field deployment.

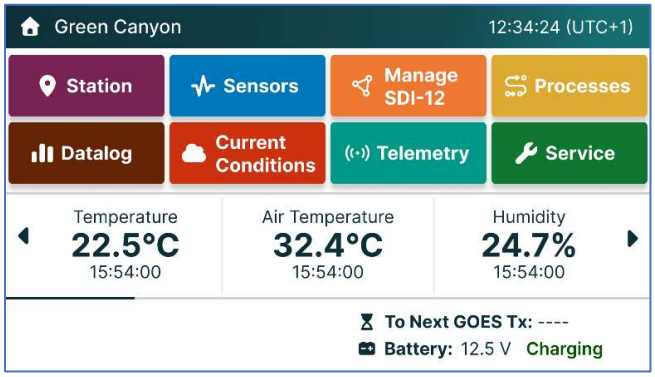
Update Preparation

1. Download firmware file (contact AEM Support) to a Windows PC.
2. Download the configuration file provided by AEM application or support engineering5
3. Save the firmware file to the root directory of a USB flash drive.
4. Save the configuration file to the root directory of the same USB flash drive.

Instructions

> **Warning:** Do **not** power cycle the unit before the update**!** Power reset can trigger background tasks that can delay or interrupt the update process.

Before proceeding, ensure the data logger has been powered and operating for at least 20 minutes.



1. Insert the flash drive into the Axiom F7 USB port.
2. Clear All Configurations
    a. Navigate to Menu – Service > Configuration Reset > Clear All Configurations
    b. Select "Next" and then "Yes" (For errors, see notes 1 & 2.)
3. Factory Reset (First time, blocks journaling)
    a. Navigate to Menu – Service > Configuration Reset.
    b. Select Factory Reset button on the bottom-right of the screen.
4. Firmware Update to v1.3.47
    a. Navigate to Menu - Service > Update screen
    b. Select the firmware file and then press "Use Selected File."
    c. Acknowledge the prompts to complete the process, which takes approximately 6 minutes.
5. Remove USB flash drive while "Setting Things Up" progress bar is present.
6. Confirm Firmware Version
    a. Navigate to Station->About
    b. Confirm FW version 1.3.**47**
7. Factory Reset (Second time, reformats partition.)
    a. Navigate to Menu – Service > Configuration Reset.
    b. Select Factory Reset button on the bottom-right of the screen.
8. Load Configuration

a. Navigate to Menu – Station > Setup tab
b. Load Configuration from USB flash drive
c. Configuration will automatically be updated to the new format

9. Final Step – Visit Report
    a. Navigate to Menu – Service > Visit Report > Start Report
    b. Start Visit Report? Yes.
    c. Enter the report fields.
    d. Confirm Creating a Report
    e. Navigate to Menu – Service > Visit Report > End Report
    f. End Visit Report? Yes.
    g. Enter report notes.
    h. Confirm Creating a Report

Notes

1. While the steps outlined in this procedure are intended to avoid errors, tasks that access the database may be interrupted and fail to complete. Avoid restarting the data logger. Doing so will re-initiate background maintenance tasks (database journaling) that may block update actions. This vulnerability is corrected in the new firmware. In the meantime, bypass errors and repeat the actions until successful.
2. If the unit becomes sluggish or unresponsive do not power cycle. Keep the data logger powered and wait 1 hour before trying again.

Update from V1.2.31 or Higher

If the firmware version installed on the data logger is v1.2.**31 or higher**, use the following instructions.

The firmware version installed on the data logger may be found at Menu – Station > About tab.

It would be best to perform the following update process at the office or bench before field deployment.

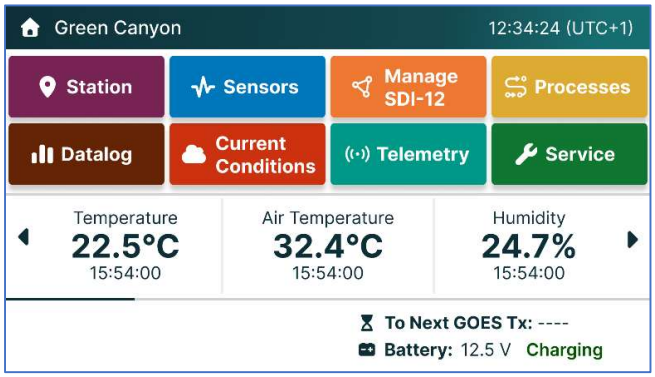
Update Preparation

1. Download firmware file (contact AEM Support) to a Windows PC.
2. Download the configuration file provided by AEM application or support engineering
3. Save the firmware file to the root directory of a USB flash drive.
4. Save the configuration file to the root directory of the same USB flash drive

Instructions

> **Warning:** Do **not** power cycle the unit before the update**!** Power reset can trigger background tasks that can delay or interrupt the update process.

Before proceeding, ensure the data logger has been powered and operating for at least 20 minutes.



1. Insert the flash drive into the Axiom F7 USB port.
2. Clear Measurement Datastore
    a. Navigate to Menu – Service > Configuration Reset
    b. Select "Clear Measurement Datastore"
    c. Select "Next" and then "Yes" (For errors, see notes 1 & 2.)
3. Clear All Configurations
    a. Navigate to Menu – Service > Configuration Reset > Clear All Configurations
    b. Select "Next" and then "Yes" (For errors, see notes 1 & 2.)
4. Firmware Update to v1.3.47
    a. Navigate to Menu - Service > Update screen
    b. Select the firmware file and then press "Use Selected File."
    c. Acknowledge the prompts to complete the process, which takes approximately 6 minutes.
    d. Select OK button on completion.
    e. **Important After the update is complete, wait 20 minutes before proceeding.**
5. Factory Reset to implement memory partition resizing
    a. Navigate to Menu – Service > Configuration Reset.
    b. Select Factory Reset button on the bottom-right of the screen.

6. Remove USB flash drive while "Setting Things Up" progress bar is present.
7. Confirm Firmware Version
    a. Navigate to Station->About
    b. Confirm FW v1.3.**47**
8. Load Configuration
    a. Navigate to Menu – Station > Setup tab
    b. Load Configuration from USB flash drive
    c. Configuration will automatically be updated to the new format
9. Final Step – Visit Report
    a. Navigate to Menu – Service > Visit Report > Start Report
    b. Start Visit Report? Yes.
    c. Enter the report fields.
    d. Confirm Creating a Report
    e. Navigate to Menu – Service > Visit Report > End Report
    f. End Visit Report? Yes.
    g. Enter report notes.
    h. Confirm Creating a Report

Notes

1. While the steps outlined in this procedure are intended to avoid errors, tasks that access the database may be interrupted and fail to complete. Avoid restarting the data logger. Doing so will re-initiate background maintenance tasks (database journaling) that may block update actions. This vulnerability is corrected in the new firmware. In the meantime, bypass errors and repeat the actions until successful.
2. If the unit becomes sluggish or unresponsive do not power cycle. Keep the data logger powered and wait 1 hour before trying again.

3. Action Descriptions

The following are full descriptions of update actions that may be called out in the update instructions.

Update Action	Description
Standard update	Simple USB update. Typically, adds features, user interface improvements, and sensor extensions.
Mandatory update	Firmware addresses operational bugs that may jeopardize data integrity, telemetry, or operational reliability.
Power reset required *before* update	Following firmware update, users should disconnect and reconnect both the solar input and battery.
Save configuration *before* update	While this may be a routine task, when checked the update may affect the configuration file structure or format. This explicit task ensures that a fallback version is retained.
Save datalog *before* update	Firmware update process may erase or corrupt the data, such as when a factory reset is required. If the historic data must be preserved, the datalog must be downloaded to a USB flash drive.
Factory reset required *before* update	This step should be rare. Factory reset may be required to clear temporary files in advance of the firmware update. Factory Reset will erase all measurement data and device configuration.
Power reset required after update	Following firmware update, users should disconnect and reconnect both the solar input and battery.
Restore configuration after update	This step will be required after a factory reset. It may also be required for other configuration file changes.
Factory reset required after update	This step should be rare. Factory reset may be required to apply new memory allocation or other structural changes. Factory Reset will erase all measurement data and device configuration.
Do not downgrade after update	Update includes foundational changes that may affect memory, database, or configuration syntax. Downgrading may require special actions to restore prior memory structure or configuration syntax.

Appendix A – Firmware Release Details

The following sections identifies specific features or functions available in the firmware release. Further information may be included in the technical release notes or available from AEM support staff.

Y – Yes, the capability is supported

(P) – Partial implementation

Operations and Interface

Description	Support	Notes
Station Name and Site Information	Y	User editable through touch screen.
Load and Save Configuration w/ USB	Y	Fixed name for locally-saved files.
Sensor Configuration		Must be pre-configured by AEM.
Data Log Configuration	Y	Editable through touch screen.
Current Conditions, Home Carousel	(P)	Auto refresh. Only editable through AEM configuration file and firmware.
Current Conditions, Page	(P)	Auto refresh. Configurable through touch interface. Available data points restricted by AEM configuration.
Sensor Mapping	Y	
Dynamic Datapoint Naming		
Enable-disable Discrete Sensors		
Add-remove Sensors in GUI		
Edit Home Sensor Carousel		
Warning and Error Diagnostics		

Sensor Support

Axiom includes sensor templates for sensors that are specifically identified. Other SDI sensors may be used with the Generic SDI interface but may not have been individually tested for compatibility.

Sensor	Function	Support	Notes
AEM THS (Analog)	Temperature, Humidity	Y	
AEM FS-3 (Analog)	Fuel temperature, Fuel moisture	Y	
AEM RG-T	Rain, Tipping-bucket	Y	
AEM SDI-PYR-SR	Solar Radiation	Y	
AEM SDI-WS-RMY (Wind)	Wind speed, Wind direction	Y	
AEM SDI-BP	Barometric pressure		

Sensor	Function	Support	Notes
AEM SDI-THP	Temperature, Humidity, Barometric pressure		New Lambrecht sensor.
AEM SDI-AM	Analog interface expansion module		
S-HPII-CON Hydraprobe	Soil Moisture and Temperature	Y	Permittivity not yet implemented.
Keller PT	Depth, Temperature, Stage	Y	
LX80	Water level, Radar		
LX80-S	Snow level, Radar		
LX80-O	Oceanographic Water Level, Radar		
Gill Windsonic	Wind direction, Wind Speed	Y	
Generic Stage	Water level		
Generic PT	Water level, PT		Submersible pressure transducers only.
Generic SDI	Programmable SDI sensor		
AWP-225, -425	Precipitation		
OTT Pluvio	Precipitation		
WS6, WS7	Integrated weather instrument		

Data Log

Description	Support	Notes
Capacity Status	Y	>10 for most applications
User-configurable Logs	Y	
Log Download	Y	
TX-aligned Data Log w/ G6 Telem data	Y	Updates to match G6 TX time changes.

Calculations and Processes

Description	Support	Notes
User Variable		
Function		
Statistical (Min, Max, Delta, Median, Avg, Std Deviation)	(P)	Min, Max, Avg are implemented through config file.
Wind Avg, Peak, Variation	(P)	Avg and Peak are implemented through config file.

Script (Python)		

Telemetry

Description	Support	Notes
G6 GOES Transmitter, Built-in	Y	User-configurable text and SHEF code messages.
Iridium SBD, Built-in		
AirTalk, Built-in RVT2		
AEM CTX-G1 Cell Modem		
GNSS-only, No GOES Transmitter	Y	Applies to F7-GN and F7-IR-GN only.

Service Tools

Description	Support	Notes
Site Visit Report	Y	Reports automatically saved to USB.
Rain Gauge Calibration	Y	Tipping bucket calibration check
Wind Sensor Calibration	Y	RM Young (SDI) functional check
Audit Log	Y	
Configuration Reset	Y	
Factory Reset	Y	
Trace Log	Y	
Update	Y	Firmware update to data logger and G6 transmitter via USB flash drive.
Set Date/Time		
Safe Reboot		
Password Setup		
Download Saved Visit Reports	Y	

Appendix B – Detailed Release Notes

The following notes include both prior internal and external release that may be useful for some users.

v1.3.47 — QA Release Candidate — June 25, 2026

- Corrected an interrupt stack overrun condition that could result in intermittent screen display errors
- Added a protective pop-up during database journaling activity to block user input while a progress indicator is shown

v1.3.46 — QA Release Candidate — June 25, 2026

- System Improvement — Firmware update process now blocks installation of versions prior to v1.3.43, preventing reversion to the legacy ITTIA database structure
- System Improvement — Journaling progress screen now includes a reminder to remove the USB drive during startup

v1.3.45 — QA Release Candidate — June 24, 2026

- System Improvement — Configuration restore now provides immediate on-screen confirmation once the user confirms the restore action
- System Improvement — SDI-12 save/unmap workflow now provides prompt feedback, eliminating repeated delayed status messages
- Bug Fix — Resolved an issue where GOES Tx log parsing could stall when encountering a malformed or truncated log line

v1.3.44 — Customer Release Candidate — June 12, 2026

- System Improvement — Added a journaling progress bar during datastore startup
- System Improvement — Resolved an unbounded eMMC busy-loop condition that could contribute to unexpected station restarts
- Bug Fix — Resolved an issue where editing the Current Conditions list could trigger a station restart
- Bug Fix — Resolved an issue affecting accuracy of SDI-12 sensor search results
- Bug Fix — Resolved an issue where downloading the trace log could trigger a station restart
- Bug Fix — UART bridge now automatically recovers following a detected I2C error
- Bug Fix — Resolved a display issue affecting the G6 Log tab when accessed via swipe navigation

v1.3.43 — NIFC Soak Test Release Candidate — June 1, 2026

- System Improvement — ITTIA database internal journaling performance improved by a factor of 32x
- Bug Fix — Resolved an issue where Rain Total was not cleared during a Factory Reset
- Bug Fix — Increased GOES Tx buffer load retry allowance to reduce database write-lock contention
- Foundation Code — Added AirTalk configuration change event
- Foundation Code — Added AirTalk configuration object type

v1.3.42 — Internal QA Build — May 19, 2026

- System Improvement — Hardened database against corruption following power loss
- System Improvement — Reduced repeated event output in Trace Log
- System Improvement — General GUI stability improvements

- System Improvement — GOES telemetry configuration now supports custom naming via configuration file
- System Improvement — Relocated Trace Log access to Service > Tech Tools
- Bug Fix — Resolved eMMC diagnostics issue

v1.2.41 — Internal QA Build — May 13, 2026

- Feature Release — SDI-12 mapping: mapped row behavior, vendor/ID string, map list order, mapped sensor initialization, added address column "X"
- System Improvement — Added datastore global handle protection and hardened dp/query handle lifetime
- Foundation Code — Implemented Keller PT initialization via SDI-12 commands
- Foundation Code — Implemented parsing of polynomial transform parameters from configuration
- Foundation Code — Implemented polynomial transform application for SC and DPS sensor measurements
- Foundation Code — Implemented fixed-count polynomial coefficient handling for static allocation
- Foundation Code — Added manual UTC date/time set capability (disabled pending time zone/DST completion)
- Bug Fix — Resolved an issue causing Test Tx to hang at 100%
- Bug Fix — Corrected units reported by 'dpi' for YB

v1.2.40 — Internal QA Build — April 17, 2026

- Feature Release — Added low battery message to G6 status on Home screen
- Feature Improvement — Reworked firmware update Start button, messaging, and font size
- Feature Improvement — Updated firmware update initiation message to "Reading Firmware File" with increased font size
- Bug Fix — Resolved an issue where the OK button was unresponsive after a successful firmware update
- Bug Fix — Resolved an issue affecting G6TELM TxAligned Datalog when switching between Tx times
- Bug Fix — Resolved an issue with incomplete reading of configuration object lists
- Bug Fix — Resolved Visit Report Error Code 3
- Bug Fix — Resolved an issue where a firmware update could reset the station name

v1.2.39 — Internal QA Release Candidate — March 9, 2026

- Bug Fix — Resolved an issue that could cause a station restart during firmware update
- Bug Fix — Resolved an issue introduced in v1.2.38 causing GOES Tx to report as all slashes ('/////')

v1.2.38 — Internal QA Build — March 8, 2026

- Added system-level code for upcoming polynomial transformation parsing and processing (SC/DPS)
- Bug Fix — Resolved an issue causing extra NULL characters in Datalog download headers
- Bug Fix — Resolved an issue introduced in v1.2.37 where the Watchdog prevented USB firmware updates from completing

v1.2.37 — Internal QA Release Candidate — March 27, 2026

- Feature Release — Support for multiple messages on telemetry configuration screens (BLM, SHEF)

- System Improvement — Added TMON diagnostics for RAM overrun detection
- Bug Fix — Resolved a partial failure in GNSS site visit report export for G6 logs
- Bug Fix — Resolved truncation of "To Next GOES Tx" text box on Home screen
- Bug Fix — GNSS units no longer receive an inapplicable 'G6' command
- Bug Fix — Disabled eMMC sleep command on heartbeat (500 ms) when eMMC is busy, eliminating sleep/wake cycling under load
- Bug Fix — Resolved an issue where the logger could become unresponsive while continuing to transmit GOES "NO DATA AVAILABLE FOR TRANSMISSION"; recovery is now fully automatic
- Performance Improvement — Removed unnecessary database lcdlstat calls, improving stability and performance

v1.2.36 — Internal QA Release Candidate — March 17, 2026

- System Improvement — Added low battery status display to Home screen
- System Improvement — Added voltage cutoff/resume behavior for GOES Tx (configurable)
- System Improvement — Added diagnostics for TMON task starvation from other tasks (eMMC access contention)
- Bug Fix — Resolved a minor memory leak in Site Visit report, introduced in v1.2.35

v1.2.35 — Limited Customer Release (Technical Draft) — March 12, 2026

- Bug Fix — Adjusted solar panel-to-battery charging delta to 0.8V (hardware-limited threshold)
- Bug Fix — Resolved a station name saving issue when the name included a space
- Bug Fix — Resolved parsing of Sensor Config object to allow ADC channel 0
- System Improvement — Added trace log diagnostic output for eMMC lockup conditions

v1.2.34 — Internal QA Release Candidate — March 9, 2026

- Feature Release — SDI-12 Gill wind sensor support
- System Improvement — Validated sensor configuration and simplified format on save
- System Improvement — Added object name validation prior to save
- System Improvement — Added configuration scan and validation on boot
- Foundation Code — Implemented datapoint list search by source object, in preparation for Datapoint Name Service
- Bug Fix — Resolved Init and measurement process issues on RMY Calibration screen

v1.2.33 — Internal NIFC Soak Test Candidate — February 26, 2026

- Feature Release — RMY Wind Sensor Calibration screen
- Feature Release — Datalog now updates G6TELEM Datalog when Tx time changes (new NESID set — NIFC edge case)
- System Improvement — Added measurement configuration validation prior to save
- System Improvement — Removed unused configuration properties
- System Improvement — Added Keller sensor configuration object type
- System Improvement — Added first-powerup database creation via CLI
- Bug Fix — Resolved an issue transmitting all slash ('/////') values at low battery voltage
- Bug Fix — Added GOES Outputs (YB, YR, YF, SWR) to datapoint service; now selectable for display, datalog, and Tx
- Bug Fix — Resolved a repeating database hard fault on reboot

v1.2.32 — Internal QA Release — February 12, 2026

- Feature Release — GNSS daughter card support
- Feature Release — GNSS EEPROM driver
- Feature Release — Telemetry screens now shown/hidden based on model number
- System Improvement — Updated carousel configuration with nine standard fields
- System Improvement — Reduced number of internal files generated
- System Improvement — Added file system corruption detection and recovery routines
- System Improvement — Added measurement lookup by sensor
- System Improvement — Added case-insensitive field name matching for telemetry datapoints
- System Improvement — Added AT Test Fixture message count CLI commands
- System Improvement — Reduced trace log repetition
- System Improvement — Added heap memory diagnostics
- System Improvement — Implemented single-series datastore close
- Bug Fix — Resolved an issue affecting the 24-hour message in Trace Log download
- Bug Fix — Resolved a database initialization issue following nBATT_UV emergency shutdown
- Bug Fix — Resolved an SDI-12 I2C bus lockup condition
- Bug Fix — Resolved rain sensor setup text running off-screen on the GUI
- Bug Fix — Resolved an issue where Factory Reset loaded a configuration containing a G6 Network block, preventing GOES entry from the GUI
- Bug Fix — Telemetry logs now display in chronological order, newest first
- Bug Fix — GUI now displays an error for invalid GOES field entries