

ASOS MODIFICATION NOTE 36 (for Electronics Technicians)

Engineering Division

W/OSO321:WW

- SUBJECT** : Wind Sensor Assembly Upgrade, Firmware Version 4.0
- PURPOSE** : To add operational enhancements for the ASOS wind sensor
- EQUIPMENT AFFECTED** : Automated Surface Observing System (ASOS)
- PARTS REQUIRED** : EPROM, S100-2A8MT1A1A2-U7A, Rev. 4.0 (27C512)
- MOD PROCUREMENT** : Electronics Technicians (ET) will order, from the National Logistics Supply Center (NLSC), one (1) EPROM for each ASOS site and one (1) EPROM for each spare processor.
- SPECIAL TOOLS REQUIRED** : IC Extraction Tool (ASN:041-T-13)
IC Insertion Tool (ASN:041-T-16)
Electrostatic Discharge (ESD) Straps
- TIME REQUIRED** : 1 hour
- EFFECT ON OTHER INSTRUCTIONS** : ASOS Modification Note 22 is superseded.
- EFFECTIVITY** : All ASOS sites
- CERTIFICATION STATEMENT** : This modification is authorized by Engineering Change Proposal (ECP) E94SM05F118, Rev. C. This modification has been tested for operational integrity at the Field Systems Branch facility, located at Sterling, VA, and the following sites listed for the OT&E:
Eastern Region - BTV, CHS, CLE, and ILM;
Central Region - CYS, DDC, GLD, GRB, and LBF;
Southern Region - ABQ, JAM, and MIA; and
Western Region - AST, GGW, PDT, and PIH.

GENERAL

This modification note provides procedures and instructions for upgrading the ASOS wind system. The wind system upgrading is accomplished by removing the processor board from the wind system electronics enclosure and replacing the EPROM U7 (Revision 3.0 wind firmware) with Revision 4.0 firmware upgrade. Version 4.0 firmware upgrade corrects the data quality error reported in version 3.0.

Firmware Upgrade Changes Are to Include:

1. New diagnostic to detect a failed logic gate on the wind speed pulse input to the wind processor board.
2. The wind direction algorithm changed to accurately resolve the dead-band of the Potentiometer (POT).
3. New code to reject electronic noise in the dead band of a worn POT.
4. The wind speed and wind direction averaging algorithm changed from a “time-constant” type to a “running” type.
5. The capability to set the RS232 baud rate (via terminal) to 300, 1200, 2400, 4800, 9600, and 19200 using the new “WA” command was added. The new command provides the capability to set the “report rate” (for W1, W2, etc. outputs) to values ranging from 1 second to 255 seconds.
6. New diagnostic code records 100 wind direction POT readings following six independent zero crossings. If the POT has gone through zero, the next 100 POT readings will be recorded for six different zero crossings at an 88 Hz sampling rate.

PROCEDURE

Before Installation of Version 4.0 Firmware

1. Call the AOMC at 1-800-242-8194 and provide notification to which ASOS you will be installing the new wind firmware.
2. Get approval of the responsible MIC/OIC/Observer before starting the installation. Installation may be done on any day of the month if the restrictions in steps 3 and 4 are satisfied.
3. **Commissioned Sites Only:** Do not start installation during bad weather, precipitation, instrument flight rule (IFR) conditions, or if any of those conditions are expected within 3 hours. The responsible MIC/OIC/Observer will define those meteorological conditions.
4. Do not start firmware installation at a time that will conflict with scheduled synoptic observations at 00, 03, 06, 09, 12, 15, 18, and 21Z. Although 30 minutes should be sufficient, allow 1 hour to complete installation and restart ASOS.
5. Immediately before starting work at NWS-staffed sites, the MIC/OIC/Observer will inform the Air Traffic Control Tower (ATCT) and any other critical users that the ASOS wind speed and direction will be shut off for a firmware upgrade. At an unstaffed site, the ET will inform the ATCT using Controller Video Displays (CVD) and Operator Interface Devices (OID).

6. Do not begin the installation process until immediately after an hourly observation has been transmitted. At NWS-staffed sites, normal backup observing procedures will be implemented.
7. Turn off the report processing for the wind sensor system.
8. Make the appropriate SYSLOG entries (MAINT-ACT-FMK) Mod 36.
 - a. Log on as **TECH**.
 - b. Key the **MAINT** screen.
 - c. Key the **ACT** screen.
 - d. Key **START** - Stop here and perform "Firmware 4.0 Installation Procedure."

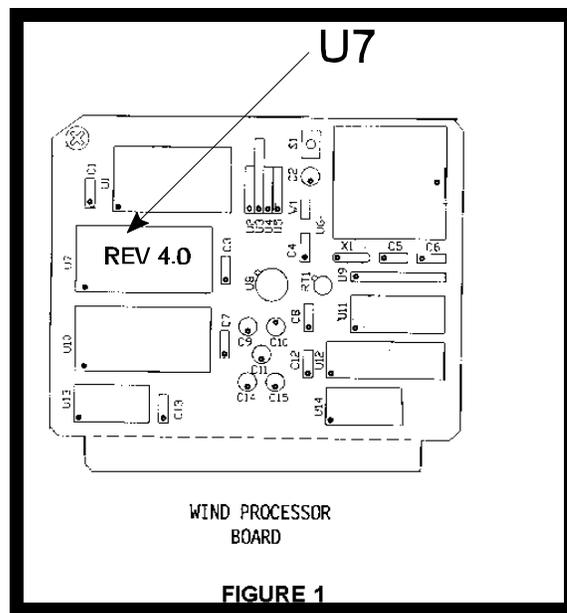
Firmware 4.0 Installation Procedure

9. At the DCP, switch the wind sensor breaker to the **OFF** position.
10. Open the wind sensor's electronics enclosure.
11. Remove the mounting hardware from the Printed Circuit Board (PCB) assembly and remove the PCB from the connector.

CAUTION:

Follow the Electrostatic Discharge (ESD) procedures, found in EHB-5, while removing and installing EPROMs.

12. Locate U7 (Rev. 3.0 or earlier) on the PCB and remove from the socket using the IC Extraction tool. (Refer to figure 1).



CAUTION:

Observe proper Pin 1 orientation and ensure EPROM legs do not become bent during the installation process.

13. Install the new EPROM (Rev. 4.0) into U7 socket using the IC Insertion tool.
14. Reinstall the PCB into the connector and be sure to seat the PCB fully.
15. At the DCP, switch the wind sensor breaker to the **ON** position.
16. Close and secure the wind system's electronics enclosure.
17. Continue with "After Installation of Firmware 4.0."

After Installation of Version 4.0 Firmware

18. When the ASOS has been restarted at unstaffed sites, call to inform ATCT using the CVDs and OIDs to turn the displays back on. (At staffed sites, the MIC/OIC/Observer will call the ATCT.)
19. If the on-site NWS staff provides backup while the installation is underway, no special observation is needed when the wind system is restarted. Proceed with step 20.
20. Inform the office staff that the wind system is operational again. If less than 7 minutes remain until the next hourly observation, augmentation of the wind may be required. The chart below indicates how long it takes after a start up for the ASOS wind system to report the observation.

Times Needed for Elements to be Reported Automatically

Status Output	Minimum (minutes)	Maximum (minutes)
Wind Direction	2	7
Wind Speed	2	7

21. Verify that the wind data appears on the one-minute page. Call the AOMC at 1-800-242-8194 and inform the operator of the following information:
 - a. The ASOS location.
 - b. That installation of firmware version 4.0 has been completed.
 - c. That the wind system is operational.

22. Enter in the SYSLOG that maintenance has been completed.
 - a. Key the **MAINT** screen.
 - b. Key the **ACT** page.
 - c. Key **FMK** - Enter the Field Mod Kit (FMK) number as follows: **Mod 36**.
On the second line of the screen verify that only Mod 36 is displayed. Complete by entering **Y** in the [Y/N] field if only Mod 36 is displayed. When Mod 36 is completed, make appropriate log entries.
 - d. Check the SYSLOG and verify the FMK message. Enter a comment in the SYSLOG stating that version 4.0 firmware has been installed.

23. At an expansion site with ATCT, the ET will contact the ATCT and supply information on the following:
 - a. The ASOS maintenance is completed.
 - b. The ASOS is restored to service.
 - c. The ATCT CVDs, OIDs, and TRACON displays need to be turned back on.

Shipping Instructions

After Modification Note 36 has been completed, package the old EPROMs in an anti-static package and ship to the National Reconditioning Center (NRC), attention Roger Helphrey, ASOS repair. Items being returned should include the S100-2A8MT1A1A2-U7 (Rev. 3.0 EPROM) marked as S100-FMK-60.OLD.

Reporting Modification

For commissioned sites, a completion target date for this modification is 30 days after receipt of the parts. For other sites, the target date for completion is 60 days after receipt of parts. Report completed modification on a Weather Service Form A-26 Maintenance Record, following instructions in Engineering Handbook No. 4 (EHB-4), Engineering Management Reporting System, Part 2, Appendix F (use reporting code **AWIND**). Add in the comment field that version 4.0 firmware was installed.

Also, record the modification number in block 17a as **36** (see Appendix A for a completed sample of WS Form A-26).

John McNulty
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Appendix A

W/OSO321:WWeir:713-1835x129:
Win6.1 file:K:\OSO32\OSO321\Asos Temps\Asosmd36.h11
9/11/96:rev.10/23/97
Update 11/04/97: WW
Spell Check 11/04/97: WW

Copy of the A-26