ASOS MODIFICATION NOTE 10 (for Electronics Technicians)
Engineering Division
W/OSO321:BGM

SUBJECT	:	ACU Software Version 2.1
PURPOSE	:	To add maintenance capability and operational enhancements for the ASOS
EQUIPMENT AFFECTED:		ASOS
PARTS REQUIRED	:	Microcircuit P/N 62828-45002-1 Microcircuit P/N 62828-45003-1 Microcircuit P/N 62828-45004-1 Microcircuit P/N 62828-45005-1
MOD PROCUREMENT	:	The above parts will be provided through NLSC as an ASOS Field Modification Kit S100-FMK015D. ECP E93SM05F097
SPECIAL TOOLS REQUIRED	:	IC insertion tool Small flat-tipped screwdriver Conductive foam Electrostatic discharge (ESD) straps
TIME REQUIRED	:	1 hour
EFFECT ON OTHER INSTRUCTIONS	:	EHB-11, section 3.6, modification notes 14 and 15 are to be installed in conjunction with this modification.
CERTIFICATION STATEMENT	:	This modification is being tested for operational integrity in the Engineering Design Branch laboratory and sites listed in Appendix B.

GENERAL

This modification note provides procedures to upgrade the ASOS software by removing and replacing erasable programmable read only memory (EPROM). This note provides procedures for "Before Installing Firmware" and "After Installing Firmware." Appendixes C,D,E and F attached to this note is information on changes and fixes implemented in firmware version 2.1. Reference ASOS Modification Notes 14 and 15 in EHB-11, Section 3.6.

PROCEDURE

Follow instructions provided in FMK 015D for installation of EPROMs U8, U7, U17, and U21 on the ACU memory board 1A2A3.

CAUTION

Be careful to protect the electronics on the ACU memory and CPU boards during this procedure. Do not reconfigure any jumpers on the ACU memory or the ACU CPU boards unless instructed by the procedure.

BEFORE INSTALLING FIRMWARE

1. Call the AOMC at 1-800-242-8194. Inform the person who answers the phone at which office you will be installing new firmware. Confirm that AOMC will provide access to the site-specific data base. Coordinate with the AOMC, then upload current configuration status before installing the new firmware.

2. For commissioned sites, get approval of the responsible MIC/OIC before starting installation. For non-commissioned sites, the el tech must coordinate with the site MIC/OIC before starting installation. You may install on any day of the month if permission is granted and the restrictions in steps 3 and 4 are complied with.

3. **Commissioned Sites Only**: Do **not** start installation during bad weather, precipitation, instrument flight rule (IFR) conditions, or if any of those conditions is expected within 3 hours. These meteorological conditions will be defined by the responsible MIC/OIC.

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 about 45 minutes should be sufficient, allow 1 hour to complete installation and restart ASOS.

5. Immediately before beginning work at NWS staffed sites, the MIC/OIC/ Observer will inform the tower and any other critical users that ASOS will be shut off for firmware upgrade (unstaffed sites, the el tech will inform tower). He/She will alert towers using Controller Video Displays (CVD) and Operator Interface Devices (OID) to log off and shut down display power to avoid confusion. At commissioned sites only, download the following data to laptop using the direct command mode: 5-minute data (12 hrs.), and SYSLOG information (24 hrs.), SHEF messages (24 hrs.), and any 2-hour archive files.

6. Do not begin the installation process, i.e., halt ASOS, until immediately after an hourly observation has been transmitted. At NWS-staffed sites, normal backup observing procedures will be implemented.

7. Disable all hardwire and dial communication ports to AFOS (REVUE-SITE-CONFIG-COMMS). The system voice function will automatically broadcast "not available" message when the ACU power is turned off.

8. Make the appropriate SYSLOG entries (MAINT-ACT-FMK) #015D

AFTER INSTALLING FIRMWARE

See page 4 for a description of the time required to reboot ASOS and sensor response time after a new firmware load.

9. When ASOS is restarted at unstaffed sites, call to inform towers using CVDs and OIDs to turn on their displays. (At staffed sites, the MIC/OIC observer will call the tower.)

10. If on-site NWS staff provides backup while the installation is underway, no special observation is needed when ASOS is restarted. Proceed to step 11.

If there is no backup on site and a record observation was missed during the installation, a special observation must be taken when ASOS is restarted. The el tech should take the following steps at the ASOS keyboard after installation:

a. Press [SIGN].
b. Type his/her initials and press [RETURN].
c. Type the observer level password and press [RETURN].
d. Press [GENOB].
e. Press [SPECL].
f. Press [EXIT].
g. Press [SIGN].
h. Type his/her initials again and press [RETURN].
i. Press [RETURN] twice. This signs the "observer" off ASOS.
j. Leave ASOS running.

Note: The "observer" must sign off before the 5-minute edit time is up.

11. Inform office staff that ASOS is again operational and that because at most 15 minutes remain until the next hourly observation, augmentation of the ceiling might be required. It might also be necessary to augment several elements or even enter manually an entire observation. The chart below indicates how long it takes after start up for ASOS to report each observation element automatically.

Times Needed for Elements to be Reported Automatically

	Minimum	Maximum
Pressure	60 seconds	10 minutes
Precipitation Amount	60 seconds	*
Wind direction	2 minutes	7 minutes
Wind speed	2 minutes	7 minutes
Precipitation Type	2 minutes	*
Temperature	5 minutes	10 minutes
Dew Point	5 minutes	10 minutes
Visibility	10 minutes	15 minutes
Obstruction to Visibility *	10 minutes	
Ceiling	30 minutes	35 minutes

* Maximum time not applicable since phenomena may not be present. Minimum time applies if phenomena are present.

12. Verify that ASOS transmitted an hourly observation. Call the AOMC at 1-800-242-8194 and tell the operator:

    a. Your location,
    b. That installation of the new firmware has been completed, and
    c. That ASOS is operational.

13. Enter in the SYSLOG that maintenance has been completed.

14. At an expansion site with ATCT, the el tech will contact ATCT and supply information on the following:

    a. ASOS maintenance completed,
    b. ASOS restored to service, and
    c. Tower CVDs and OIDs need to be turned on, and TRACON asked to turn on their displays.

REPORTING MODIFICATION

Target date for completion of this modification is 30 days after receipt of parts. Report completed modification on WS Form H-28, Engineering Progress Report for each system, according to instructions in EHB-4, part 2, using reporting code ASOS.

Make appropriate entries in the SYSLOG using the Maintenance Action keys, Field Modification keys, and comment fields. Follow these steps:

1. Log on as TECH.
2. Key the MAINT screen.
3. Key the ACTION page.
4. Key START - Stop here and preform the modification FMK-15D. After FMK-15D is complete log on system.
5. Key the MAINT screen.

6. Key the ACTION page.
7. Key FMK - Enter the Field Mod Kit (FMK) number as follows: FMK15D
   On the second line of the screen verify that only FMK15D is displayed.
   Complete by entering **Y** in the Y/N if only FMK15D is displayed.
8. Check the SYSLOG and verify the FM message. Notify the AOMC via the telephone that FMK 15D is complete.

NOTE: Parts removed (EPROMs) should be returned to NRC as S100-FMK015DOLD. NRC will reprogram the EPROMs for other ASOS applications.

J. Michael St. Clair
Chief, Engineering Division

Attachments
Appendix A
Appendix B
Appendix C
Appendix D
Appendix E
Appendix F

W/OSO321:BMcCormick:713-1834:3/23/94
WP51 Files: AMOD10.H11, EHB-11a disk
Spellcheck sol 3/23/94

INSTRUCTIONS

FIELD MODIFICATION KIT - ASOS SOFTWARE VERSION UPGRADE

1. UPGRADING ASOS SOFTWARE

1.1 GENERAL

All ASOS application software is contained on four erasable programmable read only memory (EPROM) integrated circuits (IC) on ACU memory board 1A2A3. Figure 1 illustrates the ACU memory board and identifies the four EPROMs (U8, U17, U7, and U21). The EPROMs are 32-pin dual in-line package (DIP) CMOS devices, each providing 512K x 8 bits of storage. Upgrading ASOS software requires only replacing the four EPROMs on the ACU memory board with higher revision level ICs.

The four EPROMs on the ACU memory board contain both the ACU application program and the DCP application program. The ACU CPU runs the ACU application program directly from the ACU memory board. The DCP application program must first be downloaded from the ACU memory board to RAM storage in the DCP before it can be run by the DCP CPU.

Sites without a local OID (i.e., no RS232 connected for the primary OID) should attach a terminal to the LOCAL OID port of the ACU (J22) before proceeding.

1.2 SOFTWARE UPGRADE PROCEDURE

Table 1 provides the procedure to upgrade ASOS software by removing and replacing the four EPROMs on the ACU memory board. After new EPROMs are installed, this procedure cold starts both the ACU and associated DCPs.

If the ACU PROMs in the system are 1.70 or higher, the ACU is no longer cold started by removing battery jumper J22 (Figure 1) to clear all RAM on the board. The next step requires receiving a download of site-specific data from the AOMC. The DCPs are cold started by performing a hard reset of each DCP from the processor status page on the OID. After completion of the upgrade procedure, the EPROMs removed from the ACU memory board should be packaged in appropriate electrostatic discharge (ESD) protective material for return.

NOTE: There may be an approximate 20-minute wait required to access the AOMC.

Table 1. Replacing ACU Firmware

Step | Procedure

REMOVAL

Tools and Materials Required: IC insertion tool
Small flat-tipped screwdriver
Conductive foam

1. If printer is on-line, take it off-line by pressing **ON-LINE** switch on printer front panel. **ON-LINE** indicator extinguishes.

CAUTION

Damage to equipment may result if power is not removed prior to removal or installation. Ensure that OUTPUT POWER switch is set to 0 (off) and facility power is removed.

To avoid damage to circuit boards and integrated circuits, use proper ESD handling procedures, including the use of a grounding strap when performing the following steps.

2. Set OUTPUT POWER switch on UPS status panel to 0 (off) position. OUTPUT indicator on status panel extinguishes.

3. Remove facility power from ACU cabinet.

4. Using small flat-tipped screwdriver, loosen captive screws located at top and bottom of ACU memory board 1A2A3.

5. Press extractor handles at top and bottom of ACU memory board 1A2A3 in opposite directions to release board and remove board from rack.

6. On underside of board using small flat-tipped screwdriver, remove three screws and flat washers securing front panel to board. Remove board from front panel.

7. IF THE ACU PROMS IN THE SYSTEM ARE **1.70** OR HIGHER PROCEED TO STEP **8,** OTHERWISE CONTINUE WITH STEP **7.**

Remove battery jumper J22 from ACU memory card. Jumper will be reinstalled during installation procedure.

CAUTION

Throughout this procedure, discharge screwdriver before and during use by touching tool to grounded chassis surface. Failure to comply may result In damage to integrated circuits.

Table 1 (continued)

CAUTION

Lift integrated circuit as evenly as possible. Failure to comply may result in damage to integrated circuits.

8. From front of board, slide small flat-tipped screwdriver between integrated circuit **U7** and its IC socket. Carefully pry up on U7 to lift it from socket as evenly as possible. Remove U7 from socket and place in conductive foam or on some other static-free surface.

9. Repeat Step 8 for the following integrated circuits: U21, U8, and U17.

INSTALLATION

Tools Required: IC insertion tool
Small flat-tipped screwdriver

Step Procedure

1. Verify that printer is off-line.

CAUTION

Damage to equipment may result if power is not removed prior to removal or installation. Ensure that OUTPUT POWER switch is set to 0 (off) and facility power is removed.

To avoid damage to circuit boards and Integrated circuits, use proper ESD handling procedures, including the use of a grounding strap when performing the following steps.

2. Verify that OUTPUT POWER switch on UPS status panel is set to 0 (off) position and **OUTPUT** indicator on status panel is extinguished.

3. Verify that facility power is removed from ACU cabinet.

CAUTION

Throughout this procedure, discharge IC insertion tool before and during use by touching tool to grounded chassis surface. Failure to comply may result in damage to integrated circuits.

4. Using IC insertion tool, remove new EPROM integrated circuits from protective packaging and insert into ACU memory board sockets in accordance with the following chart. Ensure that EPROMs are installed with pin 1 (as identified by notch in top of IC) oriented toward board connector P1 as shown on Figure 1.

IC socket IC part number

Table 1 (continued)

U8	62828-45002-1
U17	62828-45003-1
U7	62828-45004-1
U21	62828-45005-1

5. Using a small flat-tipped screwdriver, install three flat washers and screws securing front panel to board.

6. Holding ACU memory board by handles, position board with component side to the right and carefully slide board into card rack on its guides. Align board with rear connector and press into place.

7. Using small flat-tipped screwdriver, tighten captive screws located at top and bottom of board. This completes modification note 10. Complete modification notes 14 and 15 before going to step 8.

8. Apply facility power to ACU cabinet.

9. Set OUTPUT POWER switch to 1 (on) position.

10. Place printer on-line by pressing ON-LINE switch on printer front panel. **ON-LINE** indicator illuminates.

11. With power applied to ACU and 0ID and after a brief warmup delay, OID displays 1-minute display. If display is not being updated, press HELP key twice to refresh screen. The NEED SID AND AOMC PHONE message appears at top of screen.

    If this does not occur, return to REMOVAL procedure, step 1. Follow the steps until the ACU memory board is removed. Ensure the ACU PROMs are installed correctly. Follow INSTALLATION procedures to replace the ACU memory board. If the system is still not functioning correctly, contact Al Wissman at (301) 713-0260.

12. At OID, sign onto system as a technician.

13. Display external communications page on OID (sequentially press REVUE-SITE-CONFG-EXTRN keys from 1-minute display). Enter phone number of AOMC (1-800-253-4717) into AOMC PHONE NUMBER field and press EXIT function key.

14. Display site physical page on OID (sequentially press REVUE-SITE-PHYS function keys from 1-minute display). Enter three or four character SID code in STATION IDENTIFIER field and press EXIT function key. The system then calls the AOMC and receives a download of site-specific data.

15. Display AOMC version page on OID (sequentially press REVUE-SITE-VERSN-AOMC function keys from 1-minute display). This will allow you to observe that all the files are being downloaded from the AOMC. All status fields should read "COMPLETE" in approximately 5 minutes. Press EXIT.

Table 1 (continued)

NOTE: The following steps cold start the DCPs.

16. Display maintenance page on OID (press MAINT function key from 1-minute display).

17. Using PREV/NEXT keys, position cursor over PROC field and press SEL key. The OID displays the processor status page.

18. Using PREV/NEXT keys, position cursor over DCP #1 - HARD field and press RESET key. Respond "YES" and "ENTER" to the "ARE YOU SURE?" message. The corresponding status field displays INITIALIZING while the unit is initializing. The progress of the download can be monitored by the PERCENT COMPLETE message that appears at the top of the screen.

    When the percent complete reaches 100, the DCP status field changes to RUNNING.

19. If the system contains more than one DCP, repeat step 19 for DCPs #2 and #3 as required.

FINAL ACTIONS

1. After the FMK has been completed, clear any maintenance flags that occur as a result of the restart.

2. After the FMK has been completed, display the maintenance action page on OID (sequentially press MAINT-ACT function keys from 1-minute display). Press FMK, enter the requested information. This will place a message In the SYSLOG indicating the type of maintenance performed. Additional information on the maintenance action function may be found in the Software User's Manual.

3. Display the SW version page on the OID (sequentially press REVUE-SITE-VERSN-SW function keys from 1-minute display). The following fields should display version 2.1: MEMORY ACU APPLICATION EPROM, MEMORY DCP APPLICATION EPROM, and MEMORY DCP APPLICATION RAM. (These fields may take 5-10 minutes before they all read 2.1.)

At this point, the FMK is complete.

Table 1 (continued)

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Table 1 (continued)

ASSEMBLY DRAWING

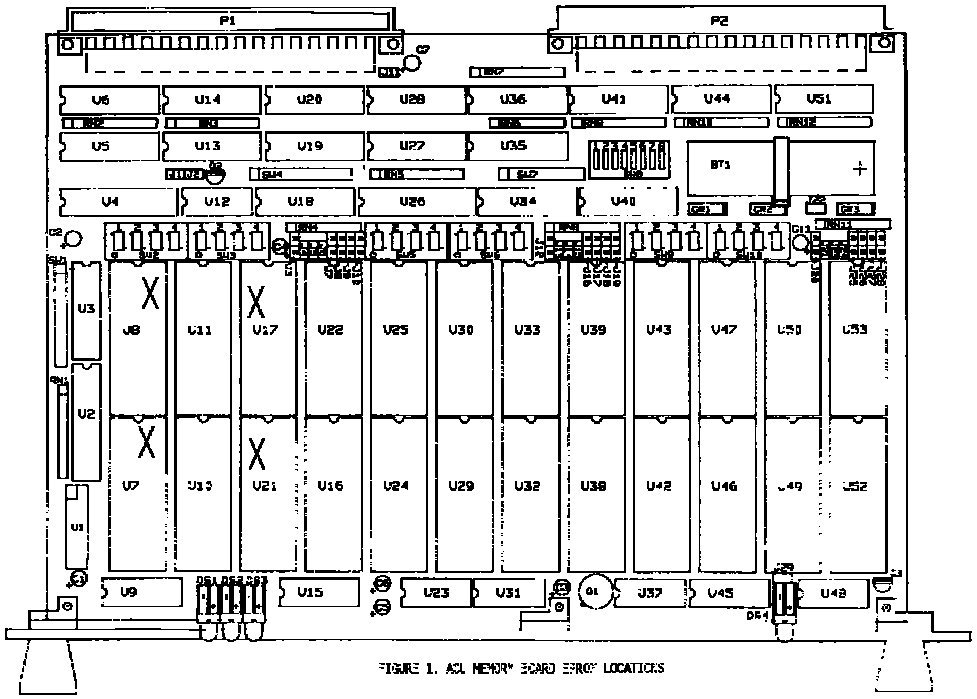

FIGURE 1. ACL MEMORY BOARD EPROM LOCATIONS

EPROM DESIGNATION	PART NUMBER	FUNCTION
U8	62935-46002-1	BYTE 1
U7	62928-46003-1	BYTE 2
U21	62928-46004-1	BYTE 3
U17	62928-46006-1	BYTE 4

Table 1 (continued)

Table 1 (continued)

APPENDIX B

V 2.1 Software Sites

AAI/SMI shall provide software version 2.1 EPROMs and Field Modification Kits to the following locations.

Albany, NY (ALB)
Atlantic City, NJ (ACY)
Binghamton, NY (BGM)
Erie, PA (ERI)
Portland, ME (PWM)
Williamsport, PA (IPT)
Worcester, MA (ORH)
Detroit, MI (DTW)
Flint, MI (FNT)
Peoria, IL (PIA)
Rockford, IL (RFD)
Sioux City, IA (SUX)
Springfield, IL (SPI)
Spokane, WA (GEG)
Hanover, VA (W83)
St. Cloud, MN (STC)
Kansas City, MO (KCI)
Milwaukee, WI (MKE)
Sterling, VA (ST0 & ST1)
Silver Spring, MD (NWSH)

Appendix C

Operational Trouble Reports (OTR) Fixed in V2.1

OTR#	TITLE/Summary
064, 101, 237	**Spontaneous Warm Boots** - SMI has written software to flag all VME BUS errors in the code, so they can pinpoint where warm boots are occurring. The VME BUS error will tell the SMI programmers the last line of code executed before the warm boot occurred. SMI hopes this will help isolate the problem. **This is not intended to solve the warm start problem; it is intended as a start to help them solve the problem.** Field personnel will be requested to document the last steps that were performed before the warm boot occurred. This would include saving the SYSLOG, SAO's, OID 1-minute screen, and the 12-hr archive data for the period just before the warm boot.
169	**Missing Wind Data Flags on Daily Summary** - Wind data continued to be updated on the daily summary page after report processing was turned off. The daily summary now reports "E" for estimated wind data.
195	**Incorrect Present Weather Remark** - The system generated improper remarks during intermittent LEDWI operation (e.g., SEMMB17SEMMB22SEMMB36SEMMB36SEMM PWINO). ASOS now simplifies the remark to SEMM PWINO.
225	**Rain Gauge Processing Deficiency** - ASOS continued to update precipitation parameters (24-hour precipitation and daily summary) after report processing was turned off. ASOS now ignores these tips.
227	**Incorrect Daily Weather Code on Daily Summary** - The daily summary code "X" for tornado was entered on the daily summary even though the USP for tornado was aborted. The USP must now be transmitted before the code is updated on the daily summary.
228	**Required CRs and LFs Not in SAO Text** - WMO requires that SAO text line not exceed 69 characters with a double carriage return/line feed. ASOS formerly split SAO text after the 78th character with a single carriage return/line feed. ASOS now conforms with the WMO spec.
235	**Pressure Sensor Status Deficiency** - The ACU Status screen reported Pressure "*" (indeterminant) while REVUE SENSOR STATUS reported "P" (pass). Both screens now report "*".

Table 1 (continued)

236	**Missing "E" Prefix for Edited Wind 5-MIN OBS** - The "E" prefix from 5MIN OBS wind report was missing after OBS EDIT. "E" now correctly shows up in 5MIN OBS.
246	**Invalid Pressure Remark in SAO when Pressure Missing** - After pressure sensors showed "M", a PRESFR remark was still generated. The logic has been corrected.
252	**20% Comms Fails Not Reported on 2nd Day** - PHX experienced ACU/DCP Comms Fails >20% of the time for 2 days. The SYSLOG only reported failures on the first day. SYSLOG now reports COMMS failures at 0600 LST each day.
253	**AOMC Display Page - Inaccurate Data/time in the Download Column** - The time was inaccurate on the REVUE/SITE/VERSN/AOMC page after a download from AOMC. ASOS now downloads the SITE/PHYSICAL page first from AOMC. This corrects inaccurate data.
254	**Improper Removal of TNO Remark** - The TNO remark was being removed whenever communication was established with GS200 or ADAS. The TNO continues to appear when ADAS or GS-200 COMMS are established.
255	**Invalid Temp Data Format on Monthly Summary** - Observers were only able to enter integer values for the temperature departure from normal on the monthly summary page. Observers can now enter floating point data in this field.

Appendix D

Modifications Implemented in Version 2.1

A. **Multiple Sensor Algorithms** - Meteorological Discontinuity and Backup Algorithms replaced the Early Warning and Areal Algorithms. See Appendices C and D for detailed algorithm information.

B. **No Automatic Transmission of Urgent Special via GENOB** - The prompt "DO YOU WANT TO TRANSMIT (Y OR N)" must be answered "Y" before transmission can begin (there is no default character).

C. **Rounding Temperatures** - ASOS previously rounded all temperatures (positive and negative) up (i.e., -2.5 became -2.0) ASOS now rounds negative temperatures down.

D. **Rework Voicing of TNO, ZRNO, PWINO** - New voicing is:

TNO - "Thunderstorm information not available"
ZRNO - "Freezing rain information not available"
PWINO - "Present weather information not available"

E. **SHEF Formatting** - The onset/termination criteria have been added to the 15-min SHEF message.

F. **Freezing Rain Algorithm Changes** - The Freezing Rain algorithm logic now interacts with the LEDWI to a much greater extent. See Appendix B for detailed algorithm information.

G. **Synoptic Maximum/Minimum Temperatures and 4 Group** - The calculation of the daily maximum and minimum temperatures has been simplified. A 4 group for 24-hour calendar day maximum and minimum temperatures has also been added to the SAO remarks. See Appendix B for detailed algorithm information.

H. **Tower Visibility Remark** - No tower visibility remark is included in the SAO when both tower and surface visibility are the same.

I. **AOMC Secondary Phone Number** - This adds a secondary phone number for AOMC on the REVUE SITE COMMS EXTRL page, so ASOS sites have more than one phone line to dial AOMC for software uploads/downloads.

J. **Expand Present Weather Field for Volcanic Ash** - The first line of the present weather field has been increased to 15 characters to allow entry of "VOLCANIC ASH".

K. **External Communications Page** - AFOS site IDs are now displayed with the AFOS dial back-up phone numbers.

L. **Remote Pressure Sensor Capability** - Pressure sensors can now be configured at the DCP for Navy sites in Antarctica.

Table 1 (continued)

M. **Dial Backup for Alaska and Hawaii** - Provides backup via AFOS phone (port 1) for dial backup to the PRIME computer when link between ASOS and ADAS/GS-200 has been lost (if there have been no ADAS/GS-200 communications for 6 minutes).

N. **SHEF Formatting** - Missing Data will be formatted with "M" instead of "MMM" as in previous versions.

O. **SHEF Back-up Dial Around** -

Separate AFOS addresses have been added for 15-min and 1-hr SHEF messages.

If AFOS Hardwire is primary - If a valid response to the reply request is not received, a single additional attempt is made via AFOS phone.

If AFOS Phone is primary - Retry attempts are identical to those for SAOs.

ASOS systems with a hardwire connection to AFOS will now be able to transmit SHEF messages on the dial backup port with no ACK/NAK.

P. **Addition of Digits for ASOS-to-AOMC Phone Numbers** - Additional digits have been added to accommodate auxiliary telephone systems at remote ASOS sites.

Q. **1200-baud Flag for Alaska-AOMC Comms** - Provide editable flag within AOMC phone number to set AOMC phone link to 1200 baud when Alaska sites dial AOMC.

R. **Major Rework of FAA Voice** - There is now greater use of phrases rather than single words. Vocabulary has been added and more time is provided between observations.

S. **AFOS Port Sharing Device (PSD)** - Allows use of a PSD at ASOS sites to communicate with AFOS using a Remote Terminal to AFOS (RTA) and Auxiliary Backup Terminal (ABT).

T. **GTA Radios** - The maintenance screen now displays: transmit frequency, power level, power supply status, forward and reflected voltages, and ACU communications. The frequency and power level can be set from the OID (by the technician or system manager).

U. **UPS Replacement** - The SOLA UPS is no longer in production and is being replaced by a Deltec UPS. Version 2.1 includes the ability to interface with either UPS.

Appendix E

Multiple Sensor Algorithms Meteorological Discontinuities

Sky Condition Report

1. Primary and met discontinuity sky condition reports are generated independently.

2. Primary sky condition report is **always** used in the official observation. Met discontinuity sky condition report is **never** used in the body of the observation.

3. Primary sky condition report and met discontinuity sky condition report are only compared when generating the remark (not the report). Amount stabilization and height stabilization processes are performed when constructing independent reports.

4. Primary sky condition report is not modified due to layers reported in the met discontinuity sky condition report.

Sky Condition Remark

1. The remark "LOC CHI NO" is generated if the met discontinuity sky condition report is missing.

2. Remarks "CIG VALUE LOC" and "CLDS LWR LOC" are generated based on comparison between the primary sky condition report and the met discontinuity sky condition report.

3. Variable ceiling remark ("CIG minVmax") or variable layer amount remark ("BKN V SCT", "BKN V OVC", or "OVC V BKN") generated based on layer heights and amounts in the official sky condition report.

Sky Condition Special Alert and Local Alert

Special Alerts and Local Alerts issued based on contents of primary sky condition report.

Visibility Report

1. Primary and met discontinuity visibility reports are generated independently.

2. Primary visibility report is **always** used in the official observation. Met discontinuity visibility report is **never** used in the body of the observation.

Visibility Remark

1. The remark "LOC VIS NO" is generated if the met discontinuity visibility report is missing.

Table 1 (continued)

2. The remark "VSBY VALUE LOC" is generated based on comparison between the primary visibility report and the met discontinuity visibility report.

3. Variable visibility remark may be generated using the 1-minute visibility values from the primary sensor only. Values from the met discontinuity sensor shall not be used to generate variable visibility remarks.

Visibility Special Alert and Local Alert

Special Alerts and Local Alerts issued based on contents of primary visibility report.

Multiple Sensor Algorithms Backup

Sky Condition Report

1. Primary and backup sky condition reports are generated independently.

2. Backup sky condition report used in the official observation **only** if the primary sky condition report is missing.

3. Primary sky condition report and backup sky condition report are only compared when generating the remark (not the report). Amount stabilization and height stabilization processes are performed when constructing independent reports.

4. There is no interaction between the primary sky condition report and the backup sky condition report.

Sky Condition Remark

1. No remark is generated if backup sky condition report is missing.

2. No remark generated based on comparison between the primary sky condition report and the backup sky condition report.

3. Variable ceiling remark ("CIA minVmax") or variable layer amount remark ("BKN V SCT", "BKN V OVC", or "OVC V BKN") generated based on layer heights and amounts in the official sky condition report.

Sky Condition Special Alert and Local Alert

Special Alerts and Local Alerts issued based on contents of the **official** observation.

Visibility Report

1. Primary and backup visibility reports generated independently.

2. Backup visibility report used in official observation if primary visibility sensor is inoperative.

Visibility Remark

Variable visibility remark ("VSBY minVmax") is generated based on 1-minute values from the primary sensor. If the primary sensor if inoperative, values from the backup sensor are used.

Visibility Special Alert and Local Alert

Special Alerts and Local Alerts issued based on contents of the **official** observation.