

ASOS MODIFICATION NOTE 72 (for Electronics Technicians)

Maintenance Branch

W/OPS12: WW

SUBJECT : Acquisition Control Unit (ACU) Memory Firmware Version 2.63

PURPOSE : Firmware upgrade for the Automated Surface Observing System (ASOS) Operational Load.

EQUIPMENT AFFECTED : ASOS ACU (AACU)

PARTS REQUIRED : The parts required will be issued to each site by W/OPS12 from the National Logistics Support Center under the applicable approved site-specific Request for Change.

ACU Electronically Programmable Read Only Memory (EPROM), S100-1A2A3-U8E (set of 4 EPROMs)
Adapter cables, S100-1A9W77. Technicians may need to order S100-1A9W77 for ACUs with serial numbers of 280 and below if the adapter cables have not been installed with previous modifications.

SPECIAL TOOLS REQUIRED : Integrated circuit (IC) insertion tool (ASN: 041-T-13)
IC extraction tool (ASN: 041-T-16)
Electrostatic discharge (ESD) straps

MODIFICATION PROCUREMENT : One set of ACU EPROMs will be initial issued to all ASOS sites listed in attachment **A**.

EFFECTIVITY : Only ASOS Class II sites listed in attachment **A**.

ESTIMATED TIME REQUIRED : 2 Hours

EFFECT ON OTHER INSTRUCTIONS : None.

AUTHORIZATION : This modification is authorized by Engineering Change Proposal S01174.

VERIFICATION STATEMENT : This modification has been tested for operational integrity and verified at the National Weather Service (NWS) Headquarters, Silver Spring, Maryland (SLVM2) and Norfolk, Virginia (ORF).

SPECIAL INSTRUCTIONS : Engineering Handbook No. 11, Section 3.6, Modification Note 47 must be completed before doing this modification.

All SYSLOG, OBSLOG, 5 min, SHEF and archive data must be downloaded prior to starting this modification. All data must be sent to the National Climactic Data Center via the Data Acquisition Program Manager (DAPM).

Direct Command Mode cannot be accessed at the ACU. The data file downloads referenced to in step 3, on page 3 must be downloaded via a remote Operator Interface Device (OID).

GENERAL:

This modification note provides procedures to upgrade the ASOS operational load by removing and replacing the EPROMs on the ACU memory board. The only changes from version 2.63 are:

1. Provides ASOS wind information to Federal Aviation Agency (FAA) Weather System Processor (WSP) sites for use by controllers as airport information.
2. The wind information shall provide a dedicated, single user data port transmitting the two minute average (updated every 10 seconds), magnetic wind direction and wind gust information. Once each 10 seconds, the magnetic wind direction, speed and gust report is displayed at the bottom of the one-minute OID screen.
3. The port shall be a send only RS422 port operating at 1200 baud to 2400, 4800 or 9600 baud.

PROCEDURE:

The following instructions are for EPROMs U7, U8, U17, and U21, on the ACU memory board 1A2A3.

CAUTION

Be careful to protect the electronics on the ACU memory control processing unit (CPU) boards during this procedure. Do not reconfigure any jumpers on the ACU memory or CPU boards unless instructed.

PART 1 – Before Installation of Firmware Upgrade

- a. Call the ASOS Operations and Monitoring Center (AOMC) at 1-800-242-8194 to do the following:
 - a. Identify the site where the ACU firmware V2.63 is to be installed.
 - b. Confirm the site-specific data base is available.
 - c. Upload the current configuration before installing the new firmware.
- b. Get approval from the responsible Meteorologist In Charge (MIC)/Official In Charge(OIC)/ Observer before starting installation. Installation of firmware V2.63, may be performed on any day of the month if restrictions in steps 5 through 7 are satisfied.
- c. Download the following data sets to the laptop using the direct command mode as outlined in section 1.3.14.2, of the Site Technical Manual:

<u>Data Set</u>	<u>File Naming Convention</u>
a. 5MIN	FMMDDdd.STA
b. OBS	HMMDDdd.STA
c. SYSLOG	SMMDDdd.STA
d. DAILY	DMMDDdd.STA
e. SHEF	YMMDDdd.STA
f. ARC5MIN*	ZMMDDdd.STA

Key:

MM = Month of data

DD = Beginning day of data

dd = End day of data

STA = 3 letter station identification (example, Wichita Falls, TX = SPS)

* = 1, 2, or 3 (file will not exist if archive data had not been previously saved)

- d. Forward collected data to the responsible DAPM as soon as possible.
- e. **Commissioned Sites Only:** Do not start installation during inclement weather, precipitation, instrument flight rule conditions, or if any of those conditions are expected within three hours. The responsible MIC/OIC/Observer will define these meteorological conditions.
- f. Do not start firmware installation at a time conflicting with scheduled synoptic observations at 00, 03, 06, 09, 12, 15, 18, and 21Z. Although one and a half hours should be sufficient, allow two hours to complete installation and restart ASOS.

- g. Do not begin the installation process until immediately after an hourly observation has been transmitted. At staffed sites, normal backup observing procedures will be implemented.
- h. Immediately before beginning work at the NWS-staffed sites, the MIC/OIC/Observer informs the tower and any other critical users the ASOS is being turned off for the ACU firmware upgrade. At an unstaffed site, the electronics technician (ET) informs the tower using controller display unit (CDV) and OID to log off and shut down the displays to avoid problems.
- i. Sites without a local OID must attach a terminal to the primary OID port of the ACU 1A9J22 before proceeding.
- j. Use the following steps and upload the current system configuration to the AOMC.

CAUTION

Be sure and complete step h in the following procedure immediately following execution of step f. DO NOT upload the communications change made in step f to the AOMC.

- a. Log on as **TECH**.
- b. Key to the AOMC page (**REVUE-SITE-VERSN-AOMC**).
- c. Command an upload of all data files except VOICE AIRPORT NAME.
- d. Wait for all of the lines to change from "UPLOAD REQ" to "COMPLETE."
- e. When complete, type **EXIT**.

NOTE: DO NOT disable the local OID in step f.

- f. Key to the COMMS page (**REVUE-SITE-CONFIG-COMMS**) and disable all hardware and communication ports. The system voice function automatically broadcasts a "not available" message.
- g. When complete, type **EXIT**.

- h. Key to the AOMC page (**REVUE-SITE-VERSN-AOMC**) and cancel the automatic update of the RS-232 comm started by the configuration changes made in step f.
- i. When complete, type **EXIT**.

PART 2 – ASOS Firmware Version 2.63 Installation

All ASOS application software is contained on the four EPROM ICs on ACU memory board 1A2A3. Verify the following:

- a. ACU CPU EPROMs are version 1.81 or 1.82 [Automated Lightning Detection and Ranging System (ALDARS) sites].
- b. Data collection package (DCP) CPU is version 1.9.
- c. The voice processor board (VPB) must have version 4.0, or higher EPROMs. (Refer to Modification Note 50 for VPB upgrade instructions.)
- d. All of the EPROMs are 32-pin dual in-line package complimentary metal-oxide semiconductor (CMOS) devices, each providing 512K x 8 bits of storage.

Upgrading ASOS software requires replacing affected EPROMs 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 CPU runs the application program directly from the ACU memory board. The DCP application program must first be downloaded from the ACU memory board to random access memory (RAM) storage in the DCP before it can be run by the DCP CPU.

PART 3 – Software Upgrade Procedure

This procedure provides instructions to upgrade ASOS software by removing and replacing four EPROMs on the ACU memory board. After new EPROMs are installed, this procedure requires cold start on the ACU and the application software must be downloaded to the DCP.

This procedure requires removal of the battery jumpers to clear all RAM on the memory board for a complete cold start of the ACU. The Part 4, ACU Memory Board EPROM Installation, requires receiving a download of site-specific data from the AOMC.

PART 4 – ACU Memory Board EPROM Installation:

- a. If the printer is installed and on-line, place off-line by pressing the **ON-LINE** switch located on the printer front panel.
- b. Set the OUTPUT POWER switch on the UPS status panel to the **OFF** position.
- c. Remove the facility power plug (J41) from the back of the ACU cabinet.

CAUTION

Damage to equipment may result if facility power and UPS power is not removed prior to removal or installation of the EPROMs.

CAUTION

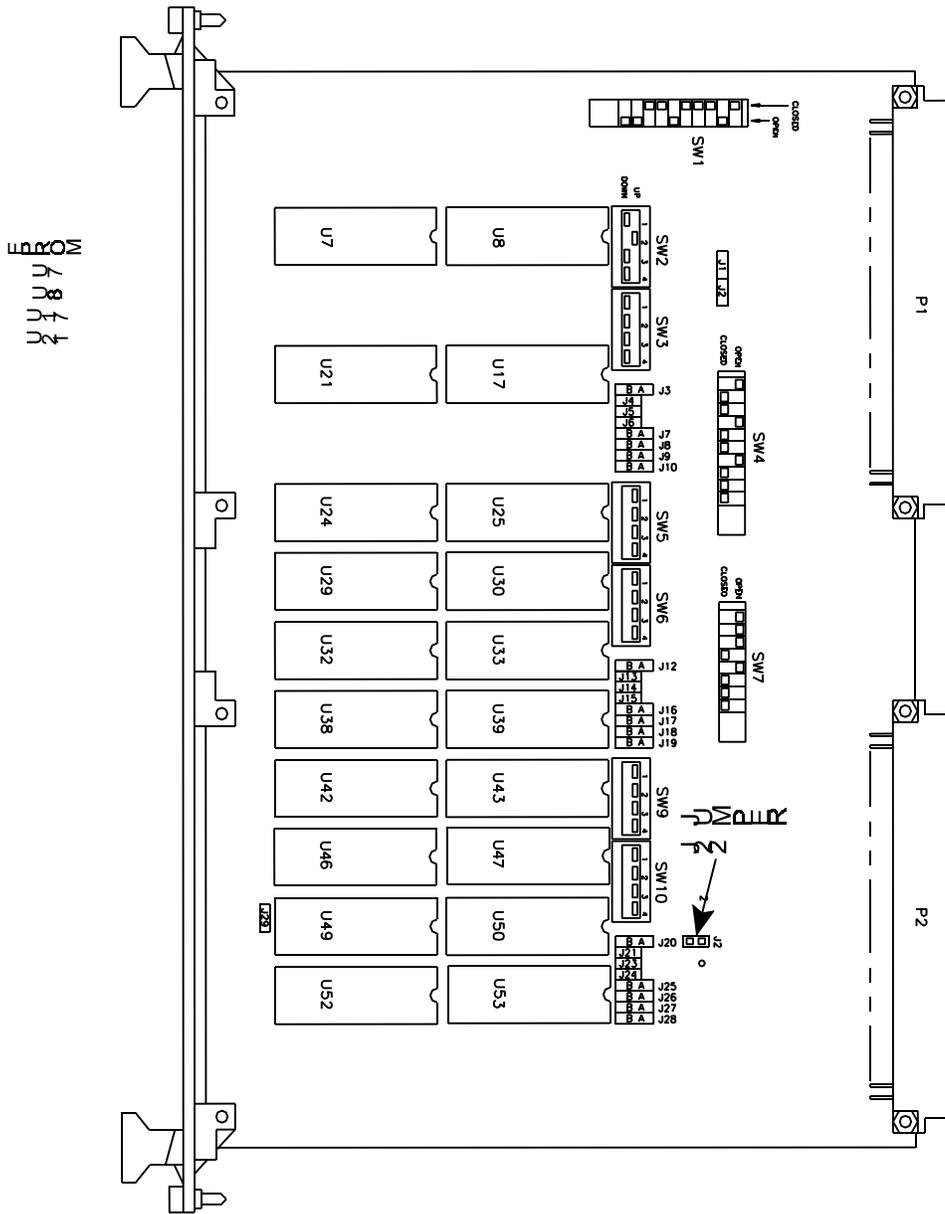
To avoid damaging circuit boards and ICs, use the proper ESD handling procedures listed in EHB-5.

- d. Use a small flat-blade screwdriver to loosen the captive screws at the top and bottom of the ACU blank panel. This panel must be removed before removing the memory board in slot 1A2A3 to avoid damage to the IC on the memory card.
- e. Use a small flat-tipped screwdriver to loosen the captive screws at the top and bottom of the ACU memory board 1A2A3.
- f. Press the extractor handles at the top and bottom of the memory board 1A2A3 in opposite directions to release the board.
- g. Remove the board from the rack.
- h. Disconnect jumper J22. This action removes the battery power from the memory board and is necessary to 'cold boot' the system. (Refer to figure 1 for jumper location.)

CAUTION

Throughout this procedure, discharge any static electricity from the screwdriver before and during use by touching the tool to the grounded chassis surface. Also, lift IC as evenly as possible. Failure to comply may result in damage to IC.

- i. If an IC extraction tool is used to remove the old EPROM chips, skip to step 10. Otherwise, on the underside of the memory board, using a flat-blade screwdriver, remove the three screws, flat washers, and handle bushings securing the front panel of the board. Remove the front panel from the board and then remove the EPROMs by prying between the IC and the IC socket.
- j. Using the IC extraction tool, carefully lift up, as evenly as possible, the U7 EPROM from the socket of the board slide. (Refer to figure 1 for U7 EPROM location.)
- k. Place the U7 EPROM in a conductive foam or on some other static-free surface.



WORKSTATION
U7 U8 U21 U24 U29 U32 U38 U42 U46 U49 U52

CONTROL ROOM LAYOUT

CONTROL ROOM LAYOUT

CONTROL ROOM LAYOUT

- l. Repeat steps 10 and 11 for the removal of the other ICs: U8, U17 and U21.
- m. Remove the new EPROM ICs, for V2.63, from the protective package.
- n. Using the IC insertion tool, install the EPROMs with pin 1 (as identified by the notch in the top of the IC) oriented toward board connectors P1 and P2 (as shown on figure 1) by pressing the EPROMs into the memory board socket according to the following chart.

<u>IC socket</u>	<u>IC part number</u>
U8	62828-45002-1
U17	62828-45003-1
U7	62828-45004-1
U21	62828-45005-1

- o. If panel was removed in step 9, reassemble. Hold the ACU memory board by the handles, position the board with the component side facing to the right and carefully slide the board into VME slot 1A2A3.
- p. Using a small flat-blade screwdriver, tighten the captive screws located at the top and bottom of the boards and blank panels.
- q. Apply facility power to the ACU cabinet and if applicable, ensure the UPS is turned on.
- r. After the power is applied to the ACU, one of the PASS (Green) LEDs on the CPU should illuminate and the PASS LED on the other CPU remains off. After approximately one minute, the LED that was off starts blinking.
- s. If the printer is installed, place the line printer on-line by pressing the **ON-LINE** switch located on the printer front panel. The **ON-LINE** indicator illuminates.
- t. With the power applied to the ACU and OID, and after a brief warmup delay, the OID displays the 1-minute data. If the display is not being updated, press the HELP press **Enter** twice to refresh the screen. The NEED SID AND AOMC PHONE message appears at the top of the screen. Continue with step 24.
- u. If ASOS does not display, return to part 4, step 3 and follow the steps until the ACU memory board is removed.
- v. Ensure the ACU EPROMs are installed correctly.

- w. Follow the INSTALLATION procedures to replace the ACU memory board.
- x. Return to the OID and perform the following:
 - a. Sign on as **TECH**. **Passwords are reset to the default values (REYNOLDS and TESTER)**.
 - b. Proceed to the external communications page (**REVUE-SITE-CONFIG-EXTRN**).
 - c. Enter the AOMC phone number, 1-800-253-4717 into the AOMC PHONE NUMBER field and press the **EXIT** key.
 - d. Proceed to the site physical page (**REVUE-SITE-PHYS**).
 - e. Enter the three or four character SID code in the STATION IDENTIFIER field.
 - f. Press the **EXIT** key. The ASOS calls the AOMC and receives a download of site-specific data.
 - g. Display the AOMC page (**REVUE-SITE-VERSN-AOMC**). This allows you to observe all files being downloaded from the AOMC. All status fields should read "COMPLETE" in approximately 10 minutes. Wait for the AOMC downloads to complete.
 - h. Press the **EXIT** key. Download of the DCP application software should occur automatically. If not, download the DCP application software using **MAINT-PROG-DCP Hard Reset**. At the top of the screen, look for "% DOWNLOADED is displayed." Wait for the DCP download to complete. Press the **EXIT** key.
 - i. Let the system stabilize for 5 to 10 minutes.
 - j. Sign on as a **TECH**, using the site specific password.

- k. Proceed to the software version page (**REVUE-SITE-VERSN-SW**) and verify proper versions for all system software:

Example:

ACU	CPU A	PSOS	1.81 or 1.82
	CPU B	PSOS	1.81 or 1.82
	MEMORY	ACU	2.63
DCP	CPU A	BOOT	1.90
	CPU B	BOOT	1.90
	MEMORY	DCP	2.63

- l. Press the **EXIT** key.

CAUTION

Information inadvertently entered on any of the configuration pages, prior to the AOMC download, will cause the configuration fields to be populated with default values automatically.

- y. Type (**REVUE-SITE CONFIG-COMMS-NEXT CHANG**) to configure WSP on the serial input/output board number 1, port 2.
- z. Enable the following parameters:

<u>STATUS</u>	<u>ENABLED</u>	<u>HANDSHAKE</u>	<u>NONE</u>
BAUD RATE	1200	CONNECTION	HARD-WIRE
PARITY SELECT	NONE		
BITS/CHAR	7		
STOP BITS	2		

- aa. Press the **EXIT** key

NOTE: ACU S/N 288 and below use adapter cables on P16 through P19 to configure the RS-422 ports. The adapter can be ordered from the National Logistics Supply Center using ASN: S100-1A9W77.

- bb. Connect the interface cable that provides ASOS wind information to FAA WSP sites to J27 (labeled FAA TCCC) on the ACU I/O panel assembly 1A9.

FAA will provide, install, and maintain the interconnecting cables and modem equipment needed to connect the ASOS, FAA terminal wind port to the ACU I/O panel assembly 1A9.

- cc. Press **EXIT**.

PART 5 – After Installation of Firmware Upgrade

- a. Clear any maintenance flags occurring as a result of the restart.

NOTE: The operator must turn on report processing for all sensors including RVR with version 2.63 software.

- b. Proceed to the report processing control page (**REVUE-SENSR-STAT-PROC**).
- c. Turn on Report Processing for each sensor including ALDARS.
- d. 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.) If on-site NWS-staff provides backup while the installation is underway, no special observation is needed when ASOS is restarted.

- e. If there is no backup at a site, and a record observation was missed during the installation, a special observation must be taken when ASOS is restarted. The ET should take the following steps at the ASOS keyboard after installation:
- a. Sign on system as **OBSERVER**.
 - b. Type **GENOB**.
 - c. Type **SPEC**.
 - d. Type **XMIT**.
 - e. Type **SIGN**.
 - f. Type your initials again and key **Enter**.
 - g. Press **Enter** twice. This signs the "observer" off the ASOS.
 - h. Leave ASOS running.

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

- f. Inform the office staff that ASOS is again operational. If less than 25 minutes remain until the next hourly observation, augmentation of the ceiling may be required. Augmenting several elements may be necessary (or even the entire observation). The chart below indicates how long it takes after a startup for ASOS to report each observation element automatically.

Times Needed for Elements to be Reported Automatically

	<u>Minimum</u>	<u>Maximum</u>
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.

- g. Verify the ASOS transmitted an hourly observation. Call the AOMC at 1-800-242-8194 and inform the operator of:
- Your location.
 - The installation of firmware version 2.63 has been completed.
 - The ASOS is operational.
- h. Sign on the system as a technician and enter in the SYSLOG that maintenance has been completed.
- Key the **MAINT** screen.
 - Key the **ACT** page.
 - Key **FMK** - Enter the Field Mod Kit (FMK) number as follows: **Mod 72**.
Press **ENTER**. On the second line of the screen, verify that only Mod 72 is displayed. Complete by entering **Y** in the [Y/N] area if only Mod 72 is displayed.
 - Check the SYSLOG and verify the FMK message. Enter a comment in the SYSLOG stating that ACU firmware version 2.63 and DCP firmware version 1.90 has been installed.

NOTE: If other modifications are completed in conjunction with this modification note, make appropriate log entries.

- i. Before logging off from the OID, type **SITE - VERSN - AOMC - UP-LD**. This will command an upload of the site configuration files to the AOMC and ensure that both parties have the same set of data files.

NOTE: If the site configuration files are not uploaded to the AOMC before the technician leaves the site, the data on an old file at AOMC will not match the new site configuration.

- j. At an expansion site with an air traffic control tower (ATCT), the ET will contact the ATCT and supply information on the following:
- a. The ASOS maintenance has been completed.
 - b. The ASOS has been restored to service.

PART 6 – SHIPPING INSTRUCTIONS:

After Modification Note 72 is complete, package the old EPROMs in an anti-static package and ship to the National Reconditioning Center, attention Roger Helphrey, ASOS repair. Items being returned should include the old EPROMs marked as S100-1A2A3-U8D.

REPORTING INSTRUCTIONS:

Report the completed modification on a WS Form A-26, Maintenance Record, using the instructions in Engineering Handbook No. 4 (EHB-4), Engineering Management Reporting System (EMRS), Part 2 and Appendix F. Include the following information on the WS Form A-26:

- a. An equipment code of **AACU** in block 7.
- b. The appropriate serial number in block 8.
- c. A modification number of **72** in block 17a

A sample WS Form A-26 is provided as attachment **B**.

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Attachment **A** - Test Sites for Firmware version 2.63

Attachment **B** - WS Form A-26 Sample

Attachment A**Test Sites for Firmware Version 2.63**

WSP LOCATIONS		ASOS SID	STATE	REGION	CLAS S
Cedar Rapids		CID	Iowa	Central	II
Des Moines		DSM	Iowa	Central	II
Ft. Wayne		FWA	Indiana	Central	II
Grand Rapids		GRR	Michigan	Central	II
Madison		MSN	Wisconsin	Central	II
Toledo		TOL	Ohio	Central	II
Albany		ALB	New York	Eastern	II
Windsor Locks		BDL	Connecticut	Eastern	II
Birmingham		BHM	New York	Eastern	II
Buffalo/Niagra Falls		BUF	New York	Eastern	II
Charleston		CHS	South Carolina	Eastern	II
Greensboro/High Point		GSO	North Carolina	Eastern	II
White Plains	*	HAN	New York	Eastern	II
Islip/Long Island	*	ISP	New York	Eastern	II
Harrisburg-Middleton,	*	MDT	Pennsylvania	Eastern	II
Norfolk		ORF	Virginia	Eastern	II
Richmond		RIC	Virginia	Eastern	II
Rochester		ROC	New York	Eastern	II
Syracuse		SYR	New York	Eastern	II
Honolulu		HNL	Hawaii	Pacific	II
FAA ACADEMY			Oklahoma	Southern	II
Albuquerque		ABQ	New Mexico	Southern	II
Austin- Bergstrom		AUS	Texas	Southern	II
El Paso-Biggs		ELP	Texas	Southern	II
Huntsville/Decatur		HSV	Alabama	Southern	II
Jacksonville		JAX	Florida	Southern	II
Lubbock-Reese		LBB	Texas	Southern	II

WSP LOCATIONS		ASOS SID	STATE	REGION	CLAS S
San Antonio		SAT	Texas	Southern	II
Sarasota/Bradenton		SRQ	Florida	Southern	II
Knoxville		TYS	Tennessee	Southern	II
Los Angeles		LAX	California	Western	II
Ontario	*	ONT	California	Western	II
Portland	*	PDX	Oregon	Western	II
Seattle	*	SEA	Washington	Western	II
Tucson		TUS	Arizona	Western	II

NOTE: Sites marked with an asterisk (*) do not have Low Level Wind Shear Alert System (LLWAS) installed.

Attachment B

WS Form A-26 Sample

ENGINEERING MANAGEMENT REPORTING SYSTEM MAINTENANCE RECORD		Document Number G 49978	
General Information		1. Open Date 06/01/01	Time 0900
2. Initials DKR		3. Response Priority (check one) <input type="radio"/> Immediate <input type="radio"/> Routine <input checked="" type="radio"/> Not Applicable	4. Close Date 06/01/01
Time 1130			
UPGRADE ACU FIRMWARE TO 2.6W I.W.A. MOD NOTE 72			
Equipment Information		6. Station ID ALB	7. Equipment Code AACU
8. Serial Number 000397		9. TM M	10. AT M
11. How Mal. 999			
12. EQUIPMENT OPERATIONAL STATUS TIMES		a. Fully Operational 0:30	b. Logistics Delay []
		c. All Other []	d. Logistics Delay []
		e. Partly Operational []	e. All Other 2:00
13. Parts Failure Information			
14. Work Load Information			
Block #	a. ASN	b. NSN	c. TM AT
1			d. How Mal. []
2			e. Qty. []
3			f. Maint. Hrs. []
4			g. Staff Hrs. []
5			a. Routine []
			b. Non-routine []
			c. Travel 0:30
			d. Misc. 2:00
			e. Overtime []
Miscellaneous Information			16. Initials DKR
15. Maintenance Comments INSTALLED ACU FIRMWARE VERSION 2.6W			
17. SPECIAL PURPOSE REPORTING	a. Mod. No. 72	b. Mod./Act./Deact. Dat 06/01/01	c. []
18. CONFIGURATION MGMT. REPORTING (use as directed)	ASN	Vendor Part Number (New Part)	Serial Number (Old Part)
			Serial Number (New Part)