
ASOS MODIFICATION NOTE 56 (for Electronics Technicians)

Engineering Division

W/OSO321: WW/WDW

SUBJECT : Installation of the Solid State Time Delay Relay (SSTDR), Digital Output Module (DOM), and Uninterruptible Power Supply Bypass Circuit (UPSBC) into the Single Cabinet Automated Surface Observing System (ASOS) (SCA)

PURPOSE : In the event of a UPS failure, the addition of an SSTDR, DOM, and UPSBC will ensure a proper reset of the Data Collection Package (DCP) while bypassing the UPS.

EQUIPMENT AFFECTED : All Class II SCAs

PARTS REQUIRED : Field modification kit (FMK) S100-FMK95SCA: (Class II SCA)

MOD PROCUREMENT : This FMK will be initial issue by the National Weather Service (NWS) Headquarters and is required for all Class II SCA ASOS sites.

EFFECTIVITY : All Class II SCA sites (systems with an UPS installed)

SPECIAL TOOLS REQUIRED : Drill, Motor (3/8")
No. 23 (0.154-inch) drill bit

TIME REQUIRED : 4 hours per SSTDR/UPSBC

EFFECT ON OTHER INSTRUCTIONS : Modifications Notes 47 and 50 must be installed prior to or in conjunction with this modification.

AUTHORIZATION : This modification is authorized by Engineering Change Proposal **E97SM05F093D**.

VERIFICATION STATEMENT : This modification is written for future installations. Verification sites will be identified in appendix A.

GENERAL

This modification note provides procedures for installing an SSTDR, DOM, and UPSBC in the Class II SCA. Class II systems are those that have a UPS installed. When the UPS fails, the UPSBC allows the UPS to be bypassed allowing the facility power to be applied to the SCA. The SSTDR delays activation of the Class II system for 3 seconds. This ensures a proper reset of the SCA's pressure sensors and power supplies.

PROCEDURE

The following instructions are for installation of the SSTDR, DOM, and UPSBC in the Class II SCA.

BEFORE INSTALLATION OF THE SCA SSTDR, DOM, and UPSBC

1. Ensure the FMK has all parts listed in appendix B.
2. Contact the ASOS Operations Monitoring Center (AOMC) at 1-800-242-8194 and provide notification on which SCA will have the SSTDR, DOM, and UPSBC installed.
3. Get approval of the responsible MIC/OIC/Observer before starting installation. The SSTDR, DOM, and UPSBC may be installed on any day of the month if restrictions in steps 3 and 4 are satisfied.
4. **Commissioned sites only:** Do not start installation during inclement weather, precipitation, instrument flight rule conditions, or if any of those conditions are expected within 3 hours. The responsible MIC/OIC/Observer will define those meteorological conditions.
5. Do not start the SSTDR installation at a time that will conflict with scheduled synoptic observations at 00, 03, 06, 09, 12, 15, 18, and 21Z. Although 3 hours *per* SSTDR, DOM, and UPSBC should be sufficient, allow 4 hours *per* SCA to complete installation and restart the SCA.
6. Immediately before beginning work at NWS-staffed sites, the MIC/OIC/Observer will inform the air-traffic control tower (ATCT) and any other critical users that ASOS will be shut off for SSTDR, DOM, and UPSBC installation. (For unstaffed sites, the electronics technician will inform the ATCT.)
7. Do not begin the installation process until immediately after an hourly observation has been transmitted. At NWS-staffed sites, normal back-up observing procedures will be implemented.

8. Make the appropriate SYSLOG entries, (MAINT-ACT-FMK) Mod 56.
 - a. Log on as **TECH**.
 - b. Key the **MAINT** screen.
 - c. Key the **ACT** page.
 - d. Key **START** - Stop here and perform "INSTALLATION OF THE SCA SSTDR/UPSBC."

INSTALLATION OF THE SCA SSTDR (K1), DOM (K2), AND UPSBC (XK3)

A. Class II SCA SSTDR (K1), DOM (K2), and UPSBC (XK3):

WARNING

Ensure the AC power is completely removed from the SCA. Death or severe injury may result if power is not completely removed from the SCA prior to installing the SSTDR.

1. Open the SCA enclosure door and remove power from circuit breaker, CB21, by placing the switch into the **OFF** position.
2. At the AC junction box, open and remove power to the SCA by placing the main circuit breaker into the **OFF** position.

Note:

To accommodate the 7A1A1A13-K1 assembly, the 5-plug power outlet strip must be removed and rotated 90° to a horizontal position and reinstalled, just as if this were a Class II SCA with an UPS installed, above the battery compartment.

3. Remove the battery box from the SCA using instructions from the Site Technical Manual (STM) S-100, pages 3-108, table 3.5.17. (Note: The procedure in table 3.5.17 is for the DCP; however, the same procedure applies to the SCA.)

Note:

Be advised the procedure in table 3.5.17 is for the DCP; however, the same procedure applies to the SCA.

4. Remove plugs from the 5-plug power outlet strip.
5. Remove the 5-plug power outlet strip saving all hardware.

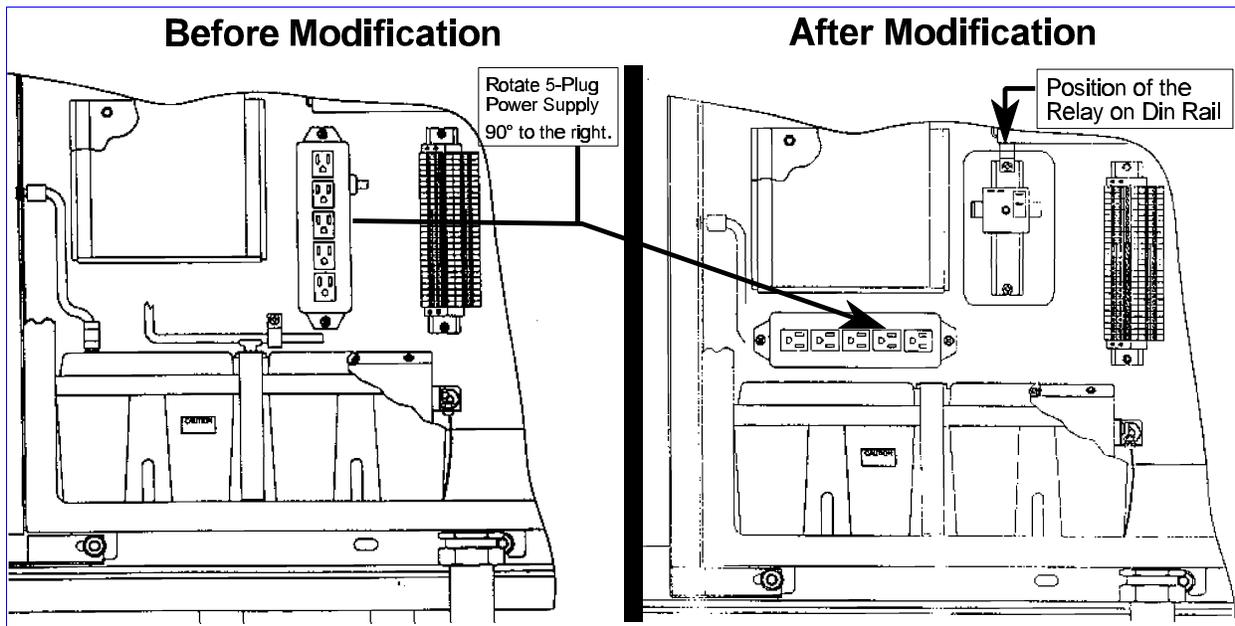


Figure 1 SCA Modification Diagrams for SCA SSTDR, DOM, and UPSBC Installation

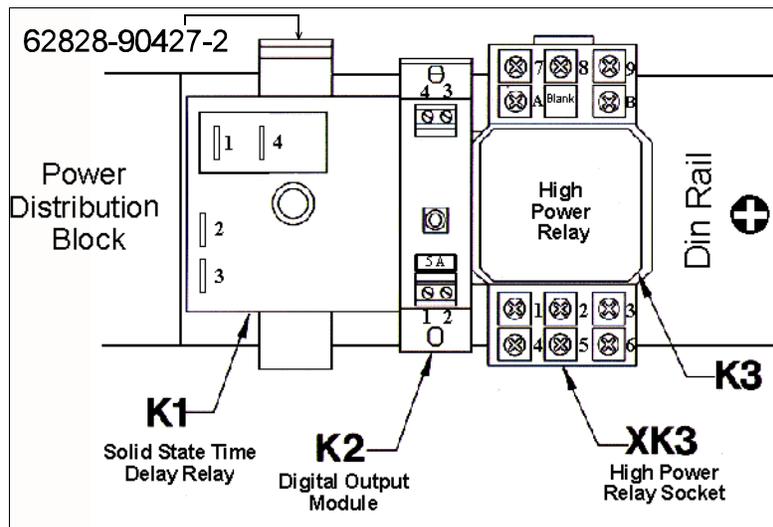


Figure 2 SSTDR, DOM, and UPSBC Assembly

6. Using the power outlet strip as a template, place the power outlet strip above the battery compartment (as in figure 1) and mark where the two holes will need to be drilled for remounting.

7. Using the 7A1A1A13 assembly as a template, line the top hole of the 7A1A1A13 din rail

with the top hole of where the 5-plug power outlet strip was originally. Mark where the bottom hole will be drilled.

8. Using a No. 23 (0.154-inch) drill bit, drill the three premarked holes in the A1 backplate.
9. Clip the SSTDR bracket (P/N 62828-90427-2) on the din rail. (See figure 2.)
10. Install the SSTDR (P/N 62828-90427-1) on the bracket using the machine screw (P/N MS51957-50). Be sure to install the end clamps (P/N 62828-90123-1) on each side of the SSTDR.
11. Install the SCA SSTDR assembly (7A1A1A13-K1) and the 5-plug power outlet strip, as shown in figure 1, using machine screws (P/N MS51957-45), flat washers (P/MS15795-807), and lock washers (P/N MS35338-137), hardware saved from the removal of the power outlet strip **and** self-tapping screws (P/N MS51861-45C), flat washers (P/NMS15795-808), and lock washers (P/N AA55610-138) where holes were drilled.

Note:

The SCA power distribution block (PDB) may need to be loosened from the A1 backplate to connect wires along the right side of the PDB.

12. Locate W106P36 (yellow receptacle end); this is the AC power connector that mates with the UPS line cord. Disconnect and cap only the gray wire at P36 and 7A1A1A4-1B. (This wire will no longer be used.)
13. Locate W106P37 (yellow plug on the bottom of the UPS); the AC power out of the UPS that powers the PDB. Disconnect and cap only the following wires:

Gray wire P37-1 to A1A4-12A (No longer used)
White wire P37-2 to A1A4-17C

14. Perform the following steps in the order prescribed. (This will eliminate any back tracking later.)
 - a. Open the wiring harness and tie the four long thin wires to an area near the VME rack and lay the remainder of the harness near the SSTDR, DOM, and UPSBC assembly.

Note:

Wires in steps b through d are located in wire bundle WI34. Wires in steps e through s are located in wire bundle WI33.

- b. Connect the wire labeled A1A13K1-1/A1A4-1C to K1-1.

- c. Connect the wire labeled A1A13K1-2/A1A4-1B to K1-2.
- d. Connect the wire labeled A1A13K1-3/A1A4-9C to K1-3.
- e. Connect the wire labeled A1A13K2-1/A1A13XK3-5 to K2-1.
- f. Connect the wire labeled A1A13K2-2/A1A13XK3-A to K2-2.
- g. Connect the two wires labeled A1A13XK3-5/P37-1 and A1A13XK3-5/A1A13K2-1 to XK3-5.
- h. Connect the two wires labeled A1A13XK3-6/P37-2 and A1A13XK3-6/A1A13XK3-B to XK3-6.
- i. Connect the wire labeled A1A13XK3-1/A2XA15P2-B2 to XK3-1.
- j. Locate the wire labeled A1A13K1-4/P36-1 and remove its labels. **Relabel** this wire A1A13XK3-2/P36-1. Remove existing connector and crimp on a spade connector. Connect this wire to XK3-2. At the same time, connect the wire labeled A1A13XK3-2/A1A13K1-4 to XK3-2.
- k. Connect the wire labeled A1A13XK3-3/A1A4-9C to XK3-3.
- l. Connect the wire labeled A1A13XK1-4/A1A13XK3-2 to K1-4.
- m. Connect the wire labeled A1A13K2-4/A2XA15P2-A13 to K2-4.
- n. Connect the wire labeled A1A13K2-3/A2XA15P2-B1 to K2-3.
- o. Connect the wire labeled A1A13XK3-7/A2XA15P2-A7 to XK3-7.
- p. Connect the wire labeled A1A13XK3-8/A1A4-12A to XK3-8.
- q. Connect the wire labeled A1A13XK3-9/A1A4-17C to XK3-9.
- r. Connect the wire labeled A1A13XK3-A/A1A13K2-2 to XK3-A.
- s. Connect the wire labeled A1A13XK3-B/A1A13XK3-6 to XK3-B.

Note:

The following steps will be performed on the PDB, 7A1A1A4 (PDB).

Note:

When making connections to the PDB, ensure the wires are not inserted too far into their terminals. If this occurs and the terminal screw is tightened down, the wire insulation may prevent the contact from taking place.

Note:

Check each connection made to the PDB by giving a slight tug on each wire.

- t. Connect the wire labeled A1A4-1B/A1A13K1-2 to PDB-1B.
- u. Connect the wire labeled A1A4-1C/A1A13K1-1 to PDB-1C.
- v. Connect the two wires labeled A1A4-9C/A1A13K1-3 and A1A4-9C/A1A13XK3-3 to PDB-9C.
- w. Connect the wire labeled A1A4-12A/A1A13XK3-8 to PDB-12A.
- x. Connect the wire labeled A1A4-17C/A1A13XK3-9 to PDB-17C.

Note:

The following steps will be performed on the UPS connectors. Use a butt splice (P/N M7928/5-4) and an extension of a 14-gauge wire to complete these extensions if necessary.

- y. Connect the wire labeled P36-1/A1A13K1-4 to the yellow receptacle (W106P36) disconnected in step 12, page 5. Reassemble this plug and connect it back to the UPS AC input plug.
 - z. Connect the wire labeled P37-1/A1A13XK3-5 to the yellow plug (W106P37) disconnected in step 13, page 5.
 - aa. Connect the wire labeled P37-2/A1A13XK3-6 to the yellow plug (W106P37) disconnected in step 13, page 5. Reassemble this plug, and connect it back to the UPS output socket.
15. The following should be performed at the VMEbus cabinet:
- a. Remove the digital input/output (I/O) board (7A1A2XA15) from the VMEbus cabinet. (This will reduce the likelihood of any damage to the pins as they are pushed in from the back side of the terminal connector.)
 - b. Also, remove any spare slot covers left and right of the digital I/O. (Space for the following connections is limited. Removing spare slot covers will allow your hands to fit into the VMEbus cabinet to disconnect the P2 terminal connector.) Alternatively, the four nuts that secure the VME rack to the

mounting plate can be removed and the VME rack tilted forward to allow rear access to the 7A1A2XA15P2 connector. If this second technique is used, skip to step g.

- c. At the back of the SCA VMEbus cabinet, locate the lower portion (P2) of the digital I/O board's terminal connector (7A2XA15P2).
- d. Remove the two screws securing the P2 in place, and pull the P2 terminal connector forward. **Be careful not to drop the P2 mounting screws.**
- e. Unsecure the four thin wires as mentioned in step 14a.

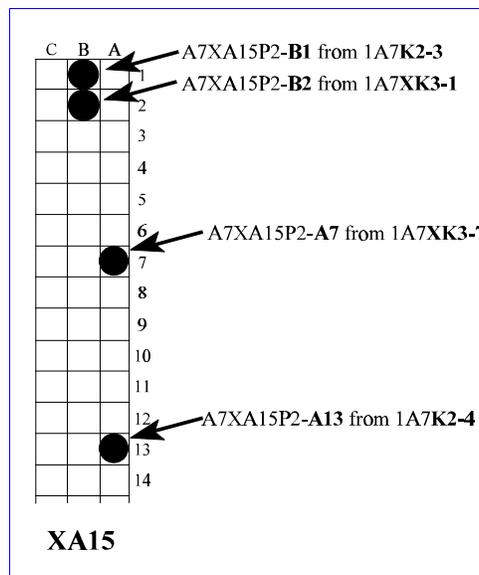


Figure 3 7A2XA15P2

- f. Route and secure the wiring harness of four wires under the VMEbus cabinet and up through the 7A2XA15P2 slot.
- g. Insert the pins into their respective slots in the P2 connector terminal. Insert each pin with the retaining clip in a down position and be sure to listen for a “click” sound. This will indicate the pin is properly seated. (Refer to figure 3.)

- h. Reinstall the 7A2XA15P2 terminal connector into the back of the VMEbus cabinet.
 - i. Reinstall the digital I/O board and all of the spare slot covers.
16. Spot tie any loose wires using the cable ties provided in the FMK. Apply labels to K1, K2, and K3. Reinstall the battery box using the instructions from STM S100, pages 3-108, table 3.5.17.
 17. Reconnect the power plugs removed from the 5-plug power outlet strip in step 4.

Note:

When power is reapplied to the SCA, there will be approximately a 3-second delay until the SCA begins to run.

18. Return the AC facility power to the SCA from the junction box.
19. Reapply the AC power to the UPS.
20. Reinststate power from the circuit breaker CB21 to the SCA.
21. Proceed to "VERIFICATION PROCEDURE OF THE SCA CLASS II SSTDR, DOM, and UPSBC."

VERIFICATION PROCEDURE OF THE SCA CLASS II SSTDR, DOM, and UPSBC

1. Return to the operator interface device (OID), and log on as **TECH**.
2. From the 1-minute screen, press: **MAINT - SEL ACU - ACU UPS**.
3. Verify the UPS by-pass switch CMDUPS INLINE is **ON** and the UPS INLINE is "P."
4. On the XK3, verify there is 115 VAC across pins A and B.
5. Set the CMDUPS INLINE to "OFF."
6. Wait approximately 2 minutes and the ACU UPS INLINE should indicate a failure "F." (In the SYSLOG, an error message will appear: ACU UPS BY-PASSED.)
7. On the XK3, verify there are <10 VAC present across pins A and B.
8. Set the CMDUPS INLINE to "ON."
9. Wait approximately 2 minutes and the ACU UPS INLINE should indicate a failure "P."

10. Disable the UPS by removing power from the UPS unit. (The ACU should go to the BY-PASS mode, and the system clock should continue to update without a glitch.)
11. Wait approximately 2 minutes, and the ACU UPS INLINE should indicate a failure "F." (In the SYSLOG, an error message will appear: "ACU OUTPUT DISABLED" AND "ACU UPS BY-PASSED").
12. Restore power to the UPS and wait approximately 2 minutes, and the ACU UPS INLINE should indicate a failure "P" and the UPS BYPASS SWITCH has returned to the INLINE state.
13. Check the 12-HR pages to ensure all data are being collected from the sensors. Clear all failures on the MAINT pages for the ACU and DCP that were caused by powering down the system.
14. When complete, key **EXIT**.
15. Proceed with the "AFTER INSTALLATION OF THE SCA CLASS II SCA SSTDR, DOM, and UPSBC."

AFTER INSTALLATION OF THE SCA CLASS II SSTDR, DOM, and UPSBC

1. Call the AOMC at 1-800-242-8194 and inform the operator of:
 - a. Your location.
 - b. The installation of the SSTDR, DOM, and UPSBC has been completed.
2. Enter in the SYSLOG that maintenance has been completed.
 - a. Key the **MAINT** screen.
 - b. Key the **ACT** page.
 - c. Key **FMK** - Enter the FMK number as follows: **Mod 56**. On the second line of the screen, verify that only Mod 56 is displayed. Complete by entering **Y** in the [Y/N] area if only Mod 56 is displayed. If other modifications are completed, make the appropriate log entry.
 - d. Check the SYSLOG and verify that FMK message. Enter a comment in the SYSLOG stating the SSTDR has been installed.

REPORTING MODIFICATION

Target date for completion of this modification is 30 days for commissioned sites and 45 days for non-commissioned sites, after receipt of parts. Report the completed modification on an NWS Form A-26, Maintenance Record, using the instructions in Engineering Handbook No. 4 (EHB-4), Engineering Management Reporting System (EMRS), part 2, appendix F. Report the completed modification to the SCA using equipment code **ASCA** in block 7. Record a modification number of **56** in block_17a of the A-26. A sample A-26, Maintenance Record is provided in appendix C.

John McNulty
Chief, Engineering Division

Appendix A - Test Sites
Appendix B - Parts List
Appendix C - A-26

W/OSO321:W.Whisel:713-1833x156
File:K:\OSO32\OSO321\Asos Temps\Mod56.wpd
spellcheck:11/17/99:src

The operational test and evaluation sites for the SSTDR are:

To be included at a later date.

S100-FMK95SCA SCA UPS Bypass and Time Delay Relay	
Quantity	Nomenclature
1	W134 wire harness
1	Metal rail
12	3 1/2" long wire tie wraps
1	8-32 x 1 1/4" #1 phillips pan head machine screw
1	Airtronics cube/relay timer
3	#1 sheet metal screw #1 phillips pan head 1/2" long
2	3 screw terminal block
1	Rail mount
1	Nylon cable clamp
3	7/32"ID x 7/16"OD flatwasher
3	3/16"ID x 3/8"OD lockwasher
1	A13 label
1	K1 label
1	K2 label
1	K3 XK3 label
1	A1A13XK3-3 label
1	W133 wire harness
1	Potter & Brumfield relay
1	Potter & Brumfield relay socket
1	Relay bail
1	Crouzet indicator fuse
2	Insulated spade crimp-on terminal #14-16 AWG for #5 screw

A-26 (EMRS)