SOURCE OF PARTS/MATERIALS:	ASOS ACU Firmware asos0800.hex, script.wax (Procomm Plus Executable file) script.was (Procomm Plus Aspect file) and Flash CPU.key (Procomm Plus file) available on the ASOS CPU Firmware & Sensor Software page: http://www.ops1.nws.noaa.gov/asos/cpu_firmware.htm. DCP EPROM and Integrated Circuit (IC) insertion/extraction tools are available through the National Logistics Support Center (NLSC) and are required for all ASOS sites. ASOS electronics technicians need to order the pair of DCP EPROMs (S100-2A1A2A1U29B) for each DCP and each spare DCP CPU card.
DISPOSITION OF REMOVED PARTS/MATERIALS:	Retain version 1.9 DCP EPROMs for possible fall-back use.
TOOLS AND TEST EQUIPMENT REQUIRED:	Ethernet cable, RJ-45 to RJ-45 CAT 5 patch crossover (ASN: S100-TE310) Serial RS-232 cable, DB-9 to RJ-45 (ASN: S100-TE311) Laptop computer with: CD-ROM Ethernet Network Interface Card IC insertion tool (ASN: 041-T-13) IC extraction tool (ASN: 041-T-16) Conductive foam for old U29 and U30 Electrostatic Discharge (ESD) Kit (ASN: 041-T-7) SolarWinds TFTP Server Version 9.1.0.111 available on the ASOS CPU Firmware & Sensor Software page: http://www.ops1.nws.noaa.gov/asos/cpu_firmware.htm Software, ProComm Version 4.7 (ASN: S100-TE318-2) Refer to ASOS Modification Note 73, Revision E, Page A-3 [5], Part 1, Step 3 for proper fuse installation; and Page A-11 [13], Part 6 for shipping instructions, if required. ASOS Maintenance Note 38, Restarting GTA Radio ASOS Maintenance Note 39, Freezing Rain Sensor Activation ASOS Maintenance Note 52, Loading Procomm Plus 4.7
DOCUMENTS AFFECTED:	ASOS Modification Note 80, Revision G supersedes previously released Modification Note 80, Revision F.
PROCEDURE:	Attachment A provides procedures for implementing this modification.

ATTACHMENT A - ASOS ACU or SCA CPU and DCP Firmware Upgrade

This modification note provides procedures to load the ASOS firmware into the Synergy Acquisition Control Unit (ACU) or Single Cabinet ASOS (SCA) processor from a laptop and to upgrade the ASOS software by removing and replacing erasable programmable read-only memory (EPROM) on each Data Collection Package (DCP) Central Processor Unit (CPU). It assumes that the Synergy ACU CPU (P/N S100-1A2A1-2 or S100-1A2A1-3) has previously been installed. If the CPU has not been installed, see ASOS Modification Note 73, Revision E.

It is strongly recommended to successfully execute this procedure at a local site prior to attempting installation at a site requiring long distance travel.

Procomm Plus is used to interface with the ACU CPU. A Procomm Plus script file will set up the CPU and load the new firmware. The SolarWinds TFTP Server program version 9.1.0.111 will be loaded onto the laptop and used to transfer the new ASOS firmware from the laptop to the ASOS CPU via an Ethernet connection.

Complete Section A.1 before traveling to the site.

A.1 Preparing the Laptop

Consult with the local Electronics System Analyst (ESA) to ensure proper laptop configuration, and for Administrator privileges on the laptop.

NOTE: During configuration and use of the TFTP software on ASOS, the laptop firewall setting SHOULD BE OFF.

Preparing the laptop correctly is critical to successfully completing this modification. Various *Microsoft* operating systems interface differently with the programs required. Many options within the various operating systems could inhibit successful completion of this modification note. Pay particular attention to the IP address setup.

Microsoft .NET 2.0 Framework and *Internet Explorer* version 6 or later will be needed to install SolarWinds TFTP version 9.1.0.111. Both of these files are available on the Microsoft Website.

A.1.1 Software Installation

1. Procomm Plus 4.7 must be installed on the laptop. To install Procomm Plus 4.7, see ASOS Maintenance Note 52.
2. Follow the procedures in Attachment C to remove SolarWinds TFTP Server version 3.0.9 dated June 2000, and replace it with SolarWinds TFTP Server version 9.1.0.111.
3. Copy files **script.was** and **script.wax** to **C:\Program Files\ProComm Plus\Aspect**. Copy file **Flash CPU.key** to the ProComm folder on the laptop (usually C:\Program Files\ProComm Plus).
4. Copy the ASOS firmware file, **asos0800.hex**, to **C:** (root directory on the C: drive) on the laptop. This file is the same name for all firmware versions, only the *Modified Date* will change. **Pay close attention to the *Modified Date* of the file to be loaded.**
5. It is recommended to create a separate folder for each version of *asos0800.hex*.

A.1.2 Procomm Plus Setup

From the desktop:

1. Select **START**, **Programs**, **ProComm Plus**, **Data Terminal**.
2. Select **OPTIONS**, **META Key Editor**.


DRAFT

3. Set the IP address range and security settings:

   a. Select **File**, **Configure** and then select the **Security** tab. The *SolarWinds TFTP Server* window will display. Refer to Figure A-2.

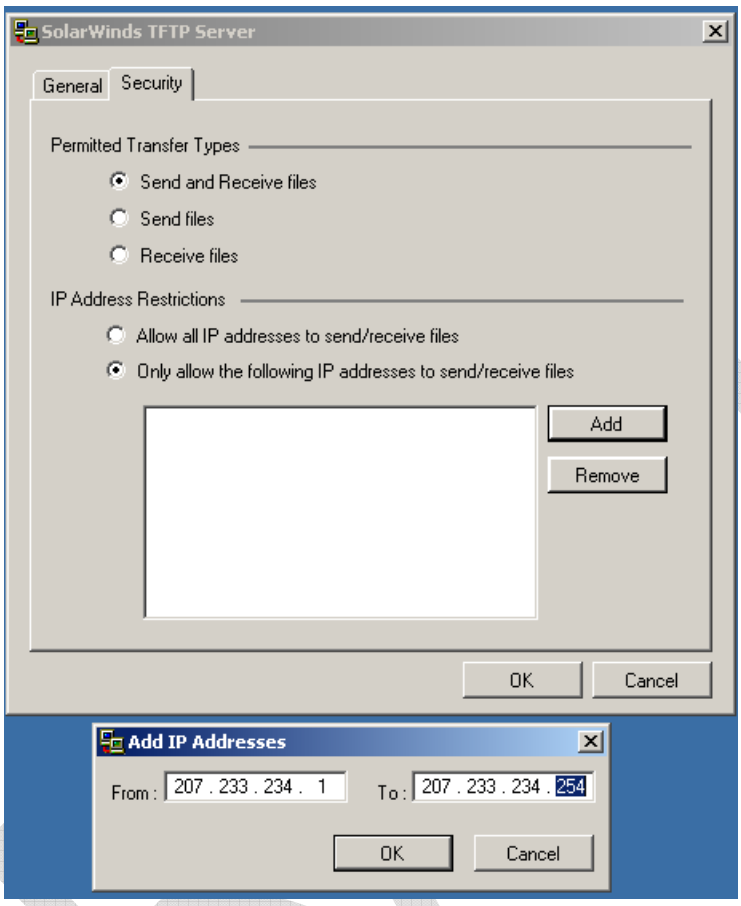

Figure A-2: Solar Winds TFTP Server Window Security Tab

   b. Under *Permitted Transfer Types*, select the **Send and Receive files**.

   c. Under *IP Address Restrictions*, select **Only allow the following IP addresses to send/receive files**.

   d. Select **Add** and enter the IP address range *From* **207.233.234.1** *To* **207.233.234.254** in the *Add IP Addresses* window.

   e. Select **OK** in the *Add IP Addresses* window and then select **OK** in the *SolarWinds TFTP Server* window (Figure A-2).

NOTE: Perform the installation on any day of the month immediately after an hourly observation has been transmitted. Do not start the installation at a time that conflicts with scheduled synoptic observations (00Z, 06Z, 12Z, 18Z). At staffed sites, normal backup observing procedures will be activated.

8. Once on site, call the AOMC (1-800-242-8194 or 8895) to provide the location and identifier of the ASOS and which upgrade is going to be installed. Confirm that access to the site-specific database is available.

NOTE: Sites without a local OID must attach a laptop to the primary OID port (1A9J22).

9. Upload the current configuration if not completed in Step 4.
10. Complete the following steps to document this modification:
    a. Select **MAINT**, **ACT**, **FMK** and type **MOD 80F**.
    b. Press **Enter**.
    c. Confirm by pressing **Y** and **Enter**.
    d. Press **EXIT**.
11. Ensure the NWS office, any ATC on watch or Contract Weather Observer (CWO) signed on the system is provided an expected return-to-service time. This also includes ALL local users with access to ASOS data using either a video display unit (VDU) or OID.

A.2 Installing the ACU Processor Firmware Procedure

NOTE: This procedure requires that the laptop have an Ethernet port.

1. Prepare the electronics technician's laptop with SolarWinds and Procomm Plus per Section A.1.
2. Verify there are no active maintenance flags on the system.
3. The archive of all required system data to a laptop using the DCM must have been performed as listed in Section A.1.5, Step 5 and Table A-1.
4. Obtain approval from the MIC/OIC before starting the installation.

NOTE: Perform the installation on any day of the month immediately after an hourly observation has been transmitted. Do not start the installation at a time that conflicts with scheduled synoptic observations at 0Z, 6Z, 12Z and 18Z. At staffed sites, normal backup observing procedures will be activated.

5. Once on site, call the AOMC, 1-800-242-8194 or 8895, to provide the location and identifier of the ASOS and which upgrade is going to be installed. Confirm that access to the site-specific database is available.
6. Ensure any ATC on watch or CWO signed on the system is provided an expected return-to-service time. This also includes all local users who have access to ASOS data using a VDU, OID or local display.
7. At sites where there is no observer or ATC signing on the ASOS, proceed to the COMMS page. Select **REVUE**, **SITE**, **CONFG**, **COMMS** and disable the site long-line communications port (i.e., **ADAS**, **AFOS PHONE**).

21. Flip the RESET switch on the processor board to the **RIGHT**. The laptop display indicates that the processor is being programmed. The programming download takes a few minutes.

NOTE: To resolve a board problem, try the following:

1. Verify Section A.2 Steps 7 and 8 have been completed.
2. Confirm that a fuse is inserted into the **FC31** position on the daughter board.
3. Perform a battery check of the board between the Ground Point and Fuse Check - Point A, and then between the Ground Point and Fuse Check - Point B on the solder side of the daughter board. The voltage should be 3.4 ±0.4 VDC on both sides of the fuse. If the measurement on Point A passes but the measurement on Point B fails, change the fuse. If the measurement on Point A fails and the message does not display, replace the processor board.

If problems continue, contact Technical Assistance.

22. When programming completes, wait for the screen to display **`O.K. to reboot now`** (Figure A-5). If this message does not display, the board may have another problem and should be suspect.

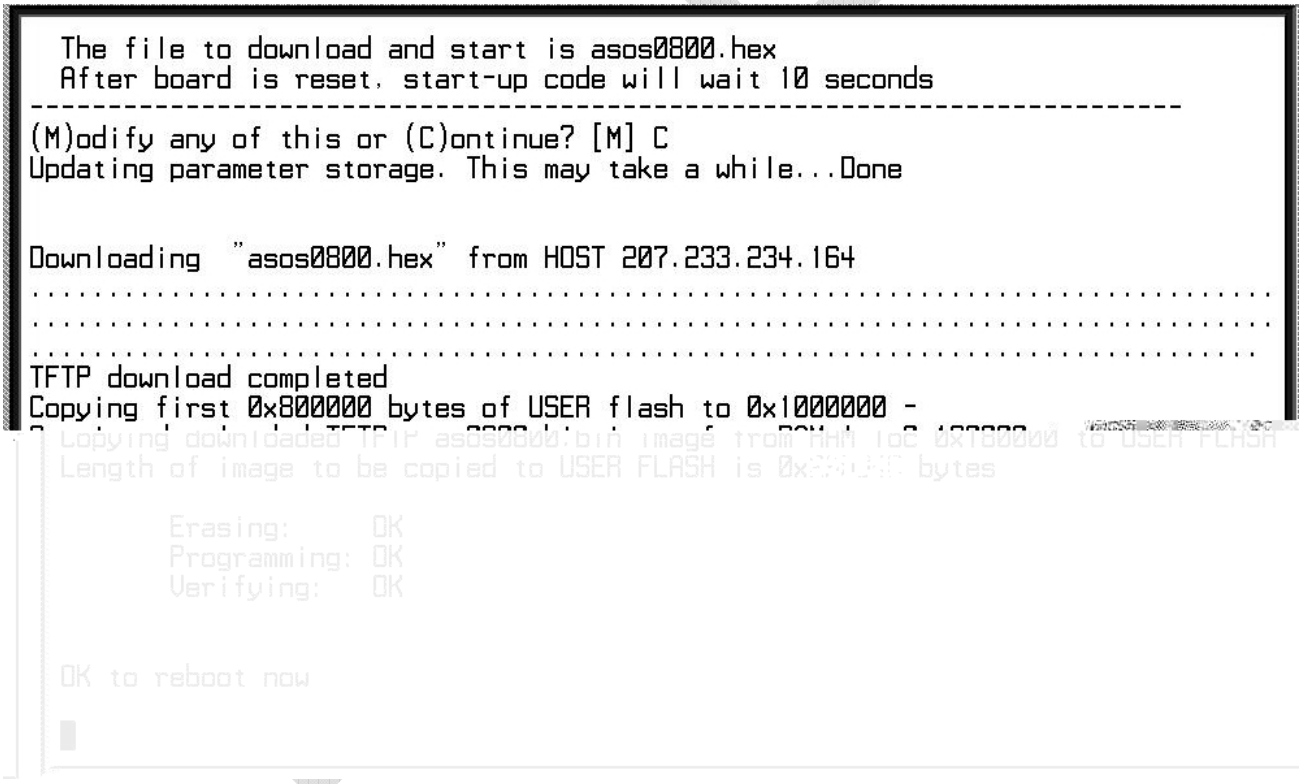

Figure A-5: CPU Download Complete - Byte Count

23. Verify the correct firmware loaded:

`Length of image to be copied to USER FLASH is 0x2CF054 bytes`. See Figure A-5.

`0x2CF054` is the correct image length for version 3.05X.

Notify ASOS Maintenance Branch (W/OPS12 at (301) 713-1833 x156, x161 or x147) if the User Flash does not agree with the version documentation.

24. Flip the switch on the processor to the **LEFT**. The processor will issue a **pROBE+>** prompt.

    Select **META Key** in ProComm Memory 0. Refer to Figure A-6.

    (Or t*ype* ***f*m<space>f0800000..f0b00000<space>0<enter>**.)

    This command fills the processor memory with zeros (0) between hexadecimal addresses f0800000 and f0b00000. This step clears the memory locations were the site specific data is stored on the processor. Refer to Figure A-6.

    The processor will issue a **pROBE+>** prompt.

    Select META Key in ProComm **VERIFY 0**.

    (Or type **dm<space>f0800000<enter>**.)

    This command is issued to verify that the command clearing the memory was successful and instructs the CPU to display the first memory block. It is a good indicator that the entire memory has been cleared. The CPU will return all zeros for the given memory locations.

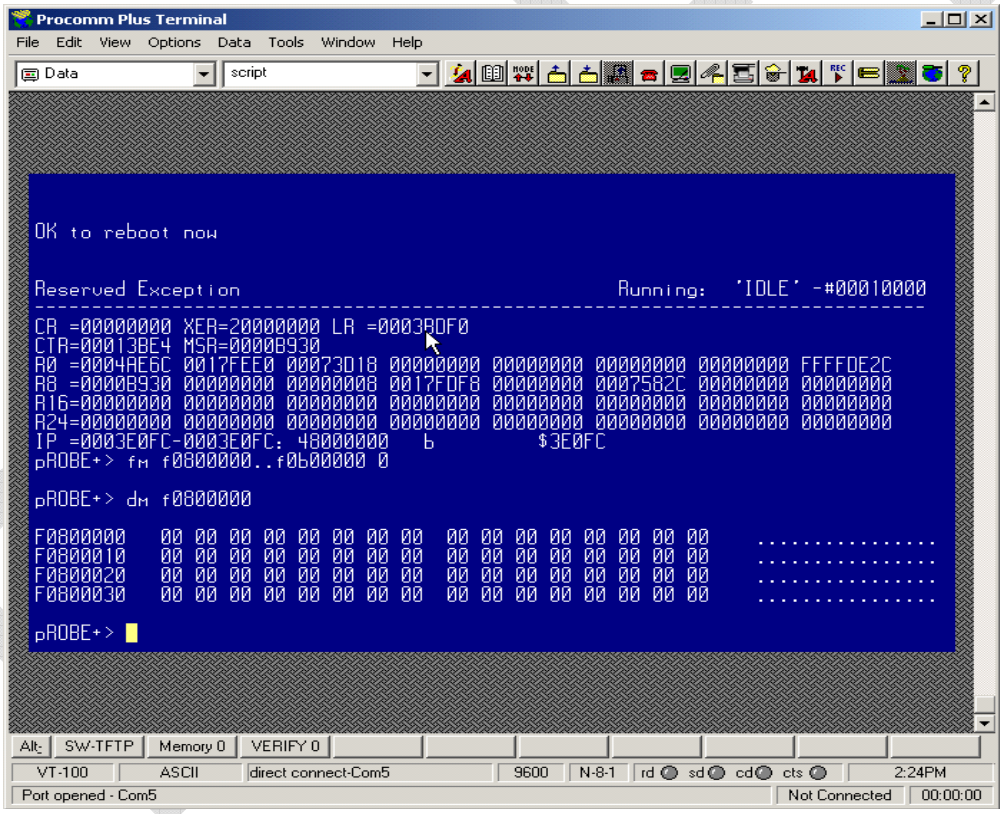

Figure A-6: Fill Memory with Zeros and Verify

25. After the processor issues the **pROBE+>** prompt, flip the switch on the processor to the **RIGHT** to **RESET**. This will complete the firmware upgrade.

26. Monitor the successful restart of the ACU or SCA on the laptop. After approximately two minutes, the last lines on the screen display:

    `Transferring control to USER FLASH application…`

9. Using an integrated circuit extractor, remove U29 and U30 from the DCP CPU printed circuit boards 2A1A2A1 (and 2A1A2A2 if installed). Place the removed ICs in conductive foam or another static-free surface.

10. Remove the new EPROM ICs from the protective package and carefully insert them into the DCP CPU board sockets U29 and U30.

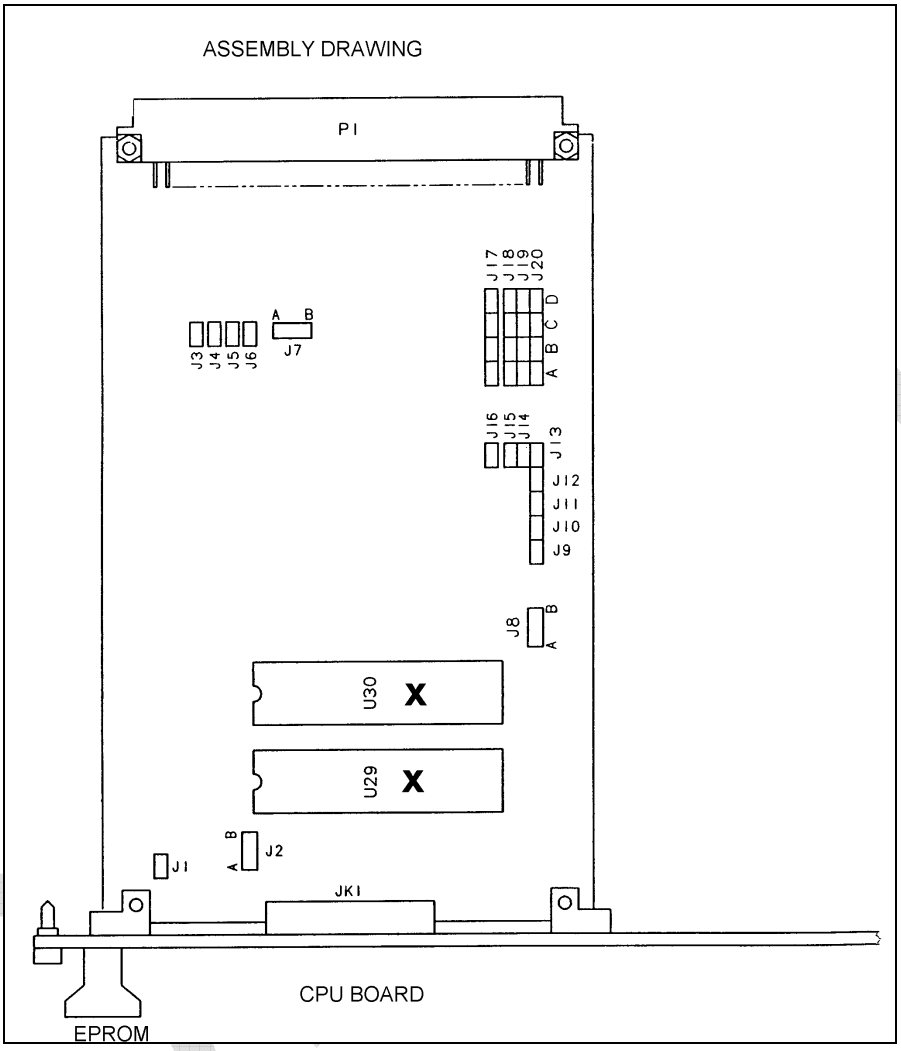

Figure A-7: DCP CPU Board Sockets

EPROM IC SOCKET	EPROM DESCRIPTION
U29	DCP Version 2.00 @ U29
U30	DCP Version 2.00 @ U30

11. Ensure that the EPROMs are installed with pin 1 (as identified by the notch in the top of IC) oriented toward board connectors J1 and J2 as shown in Figure A-7.

12. Hold the DCP CPU-1 board by the handles to position the board with the component side facing the right, and carefully slide the board into the appropriate card slot on its upper guide. Verify CPU-1 has jumpers J3, J4, J5, and J6 installed.

13. Align the board with the rear connector and press into place.
14. Verify CPU-2 (if installed) has jumpers J3 and J5 removed. Install CPU-2 as described previously.
15. Use a small, flat-blade screwdriver to tighten the captive screws located at the top and bottom of the DCP CPU board.
16. Connect the JK1 cable(s) removed in Step 5. CPU-1 is W27P1 – A1A2A1JK1 (CPU-2 is W28P1 – A1A2A2JK1 if installed).
17. Using a small, flat-blade screwdriver, loosen the captive screws located at the top and bottom of the DCP memory board (2A1A2A3).
18. Locate J34 on the DCP memory board and note its exact location (**B position** is toward the bottom, pin A is empty). Remove J34 and leave disconnected for 5 minutes. See Figure A-8.

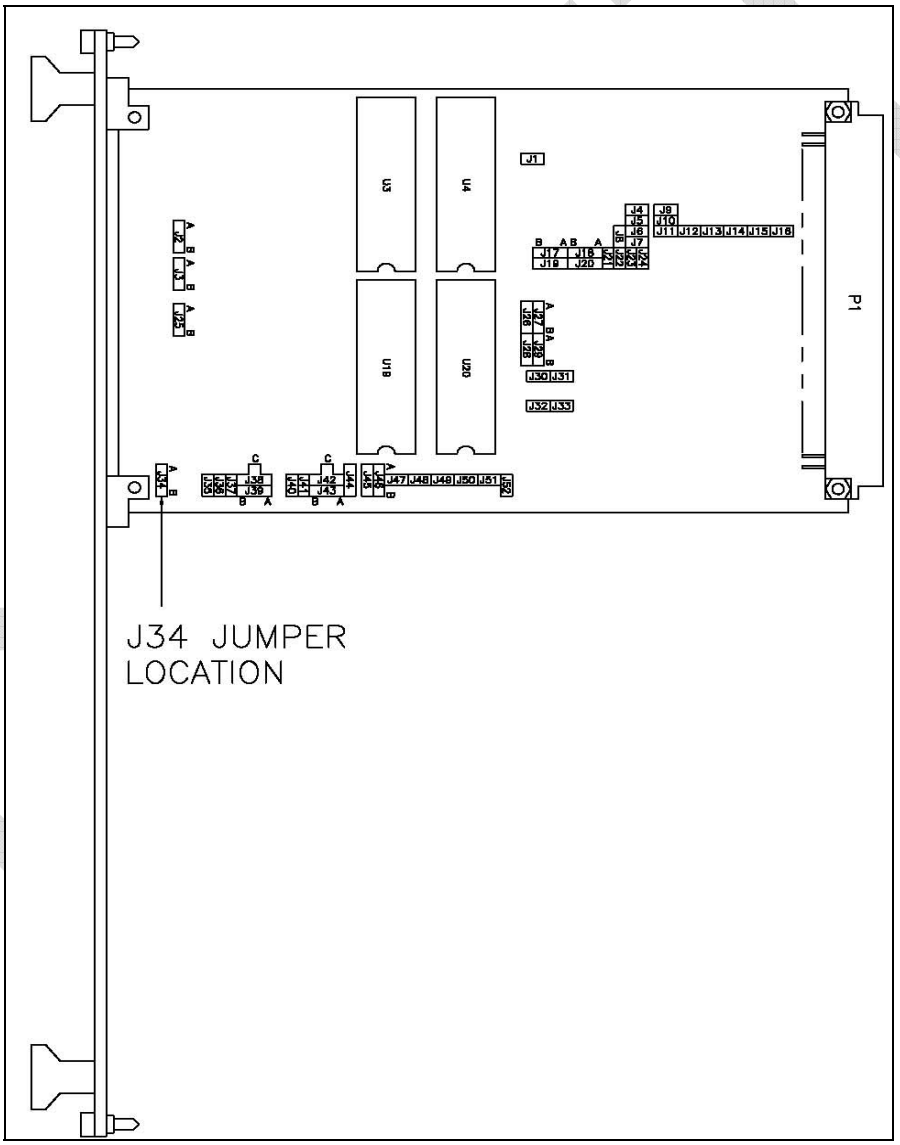

Figure A-8: DCP Memory Board J34 Location

19. Reinstall J34 onto the DCP memory board in the **B position** and note the empty Pin A.

a. Proceed to the SOFTWARE VERSIONS page. Select **REVUE**, **SITE**, **VERSN** and **SW** (Figure A-9) and verify the proper versions for all system software.

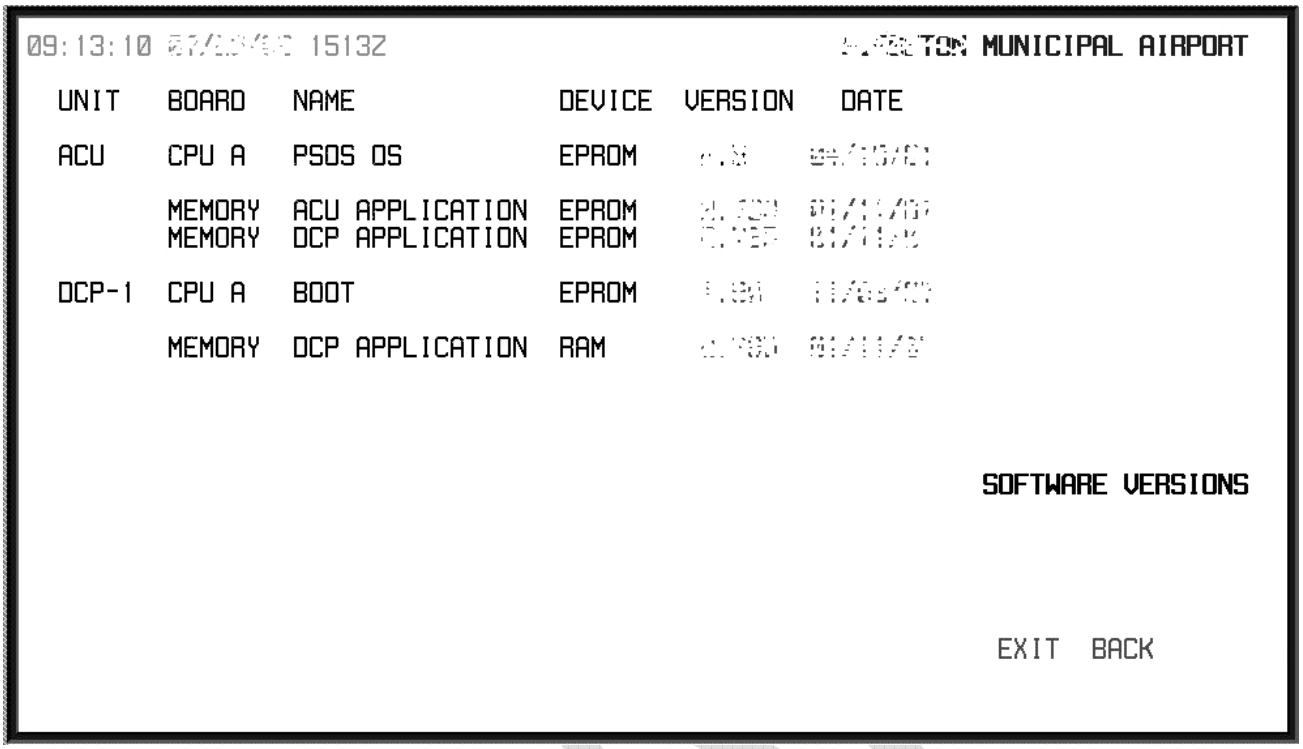

Figure A-9: Software Versions Page

b. Write down the **Memory ACU** and **DCP APPLICATION VERSION** and **DATE**. See Figure A-9. Also write down the **DCP CPU A** and **B BOOT EPROM VERSION** and **DATE**. Sites will have either one or two DCP CPU cards. Some sites will have two or more DCPs. ACU only or SCA sites will not have a DCP.

c. For this modification, the information shown in Figure A-9 should be:

ACU	CPU A	PSOS OS	EPROM	2.5	04/19/01
	MEMORY	ACU APPL.	EPROM	2.79X	03/23/09
	MEMORY	DCP APPL.	EPROM	2.79X	03/23/09
DCP1	CPU A	BOOT	EPROM	2.0	05/02/06
	CPU B	BOOT	EPROM	2.0	05/02/06
	MEMORY	DCP APPL.	RAM	2.79X	03/23/09

This information will be used on the EMRS report. See Attachments D and E.

d. The DCP download of application software (Step 1) should be complete and have occurred automatically (after discharging the DCP memory for five minutes). If not, download the DCP application software using (**MAINT**, **PROC**, **DCP**) hard reset.

e. Select **EXIT**.

5. Clear any maintenance counts that occurred due to the restart before turning on the sensor REPORT PROCESSING.

6. Monitor the ASOS sensor data. Select **REVUE**, **SENSR**, **12HR** and **PAGE**. Ensure the sensors are stable and the readings compare well with observed conditions. See Table A-2 at Step 21.
7. Select **EXIT**.

NOTE: Report processing MUST BE turned ON for each sensor with this version of software.

8. Proceed to the REPORT PROCESSING CONTROL page. Select **REVUE**, **SENSR** and **STAT**.
9. Turn on REPORT PROCESSING for each sensor by selecting the **PROC** command. Enter the electronics technician's initials for each sensor that is turned on.
10. If applicable to the site, turn on **REPORT PROCESSING** for ALDARS.
11. If a single-site thunderstorm/lightning detection sensor is installed, turn on **REPORT PROCESSING** for the thunderstorm sensor.
12. Select **EXIT**.
13. Proceed to the FREEZING RAIN STATUS page. Select **MAINT**, **DCP**, **FREEZING RAIN** and confirm the correct seasonal activation, **SENSOR DISABLE/ENABLE**, will display according to ASOS Maintenance Note 39, Freezing Rain Sensor Deactivation/Activation:

Example for Sites Listed in APPENDIX A :	Example for Sites Listed in APPENDIX B:
SENSOR DISABLE: APR 01	SENSOR DISABLE: MAY 01
SENSOR ENABLE: OCT 15	SENSOR ENABLE: SEP 15

14. Alaska and Pacific regions will not identify a SENSOR DISABLE/ENABLE date in these fields.
15. Select **EXIT** and **SIGN** off the system.
16. At **NWS-staffed** sites, the MIC/OIC/observer informs the air traffic control tower (ATCT), and other critical users that the firmware upgrade has been completed and the ASOS has been restored to service. (During hours of operation, verify that the GTA voice broadcast has been set to the last hourly observation according to FAA procedures, and Maintenance Note 38.)
17. To check the status of the GTA radio:
    a. **SIGN** on as **Technician**. Select: **CMD** and **VOICE**. A screen displays **CURRENT AIRPORT OUTPUT = LAST OBSERVATION** (or per FAA).
    b. Select the **TYPE** command to scroll through radio output options.
    c. Select **EXIT**.

    At **FAA-staffed** sites, the electronics technician informs the ATCT, and other users that the firmware upgrade maintenance has been completed and the ASOS has been restored to service. (During hours of operation, verify that the GTA voice broadcast has been set to the last hourly observation according to FAA procedures and Maintenance Note 38.)
18. If on-site weather personnel provided normal backup observing procedures while the installation was underway, no special observation is needed when the ASOS is restarted.
19. If there is no backup at a site and a recorded observation was missed during the installation, a special observation must be taken when the ASOS is restarted. The electronics technician should **SIGN** on the system as an observer and transmit a special observation from the *GENERATE SPECIAL* page. Select **GENOB | SPEC** and **XMIT**.

31. At FAA-staffed sites, contact the ATCT and supply the following information:
    a. The ASOS maintenance has been completed and it has been restored to service.
    b. The ATCT VDUs, OIDs, and TRACON display need to be turned on.
32. Notify the MIC/OIC that this ASOS maintenance action has been completed.

A.5 Modification Note 81F

If for any reason installation of the firmware fails or causes a conflict with the site-specific configuration, perform the following:

1. Install the previous version of ACU firmware following the instructions in Section A.2.
2. Replace the DCP EPROMS with the original U29/U30 V1.90 following the instructions in Section A.3. When reverting back to the original configuration, the reporting instructions are documented as Modification Note 81F.

ATTACHMENT B - MS Windows 2000 Professional IP Address Configuration

Consult the local ESA to ensure proper laptop configuration, and for Administrator privileges on the laptop.

NOTE:	During configuration and use of the TFTP software on ASOS, the laptop firewall setting SHOULD BE OFF.

This procedure requires the laptop to have an Ethernet network interface card installed. Follow the individual manufacturer's instructions for Ethernet adapter installation and initial setup.

The Ethernet network interface card must be configured with the proper addressing. The correct IP address is required for the SolarWinds TFTP Server program to locate and load the firmware onto the CPU. With the proper addressing the ProComm script file can instruct the processor to upload the firmware from the correct IP address by interfacing with the SolarWinds TFTP Server program.

The exact steps will vary across different *Windows* operating system platforms.The following instructions reflect how to configure the IP address on the electronics technician's laptop.

1. From the desktop, select **Start | Settings | Network and Dial-up-Connections** (Figure B-1).

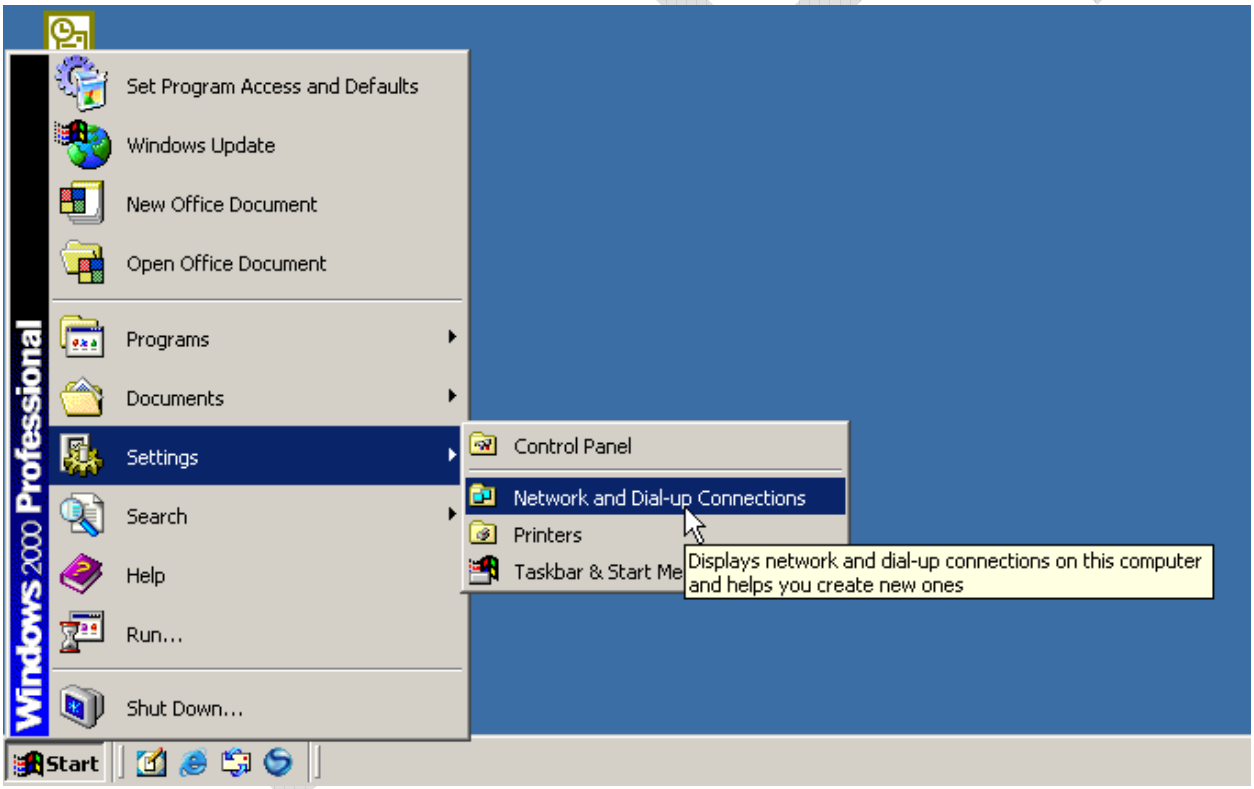

Figure B-1: Network and Dial-up Connections

4. Inside the *Internet Protocol (TCP/IP)* window (Figure B-3), fill out the following fields:
   a. Select the **Use the following IP address:** button.
   b. In the *IP address:* field, type in **207.233.234.164**.
   c. In the *Subnet Mask*: field, type in **255.255.255.128**.
   d. In the *Default gateway*: field, type in **207.233.234.164**.
   e. Select **Use the following DNS server addresses** and leave the *Preferred DNS server* and *Alternate DNS server* fields blank.

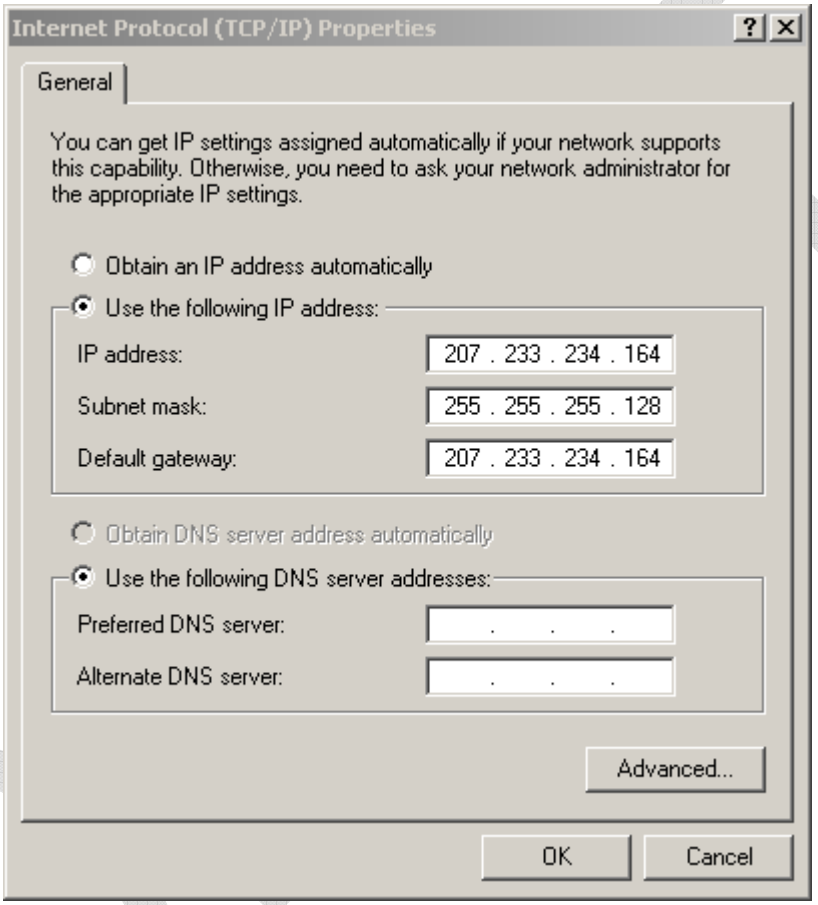

Figure B-3: Internet Protocol (TCP/IP)

5. Select **OK**. The *Local Area Connection Properties* window will display.
6. Select **OK** and then close the *Network and Dial-up Connections* window.

7. Select **Start**, **Run**, and type **ipconfig** and then select **OK** (Figure B-4). The new IP address for the network interface card will then be configured.

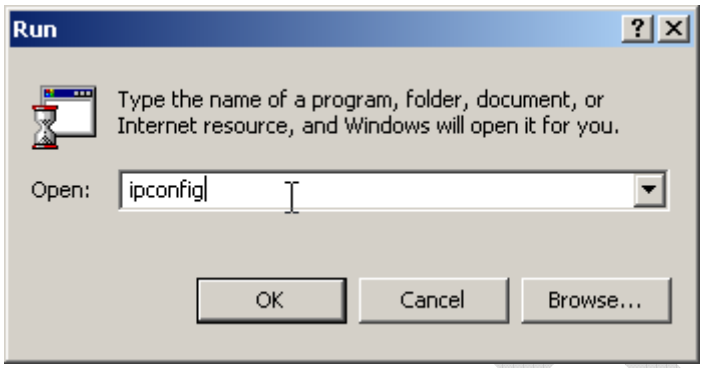

Figure B-4: Run Window

2. Select **Automatic** and then select **Next**. Refer to Figure C-2.

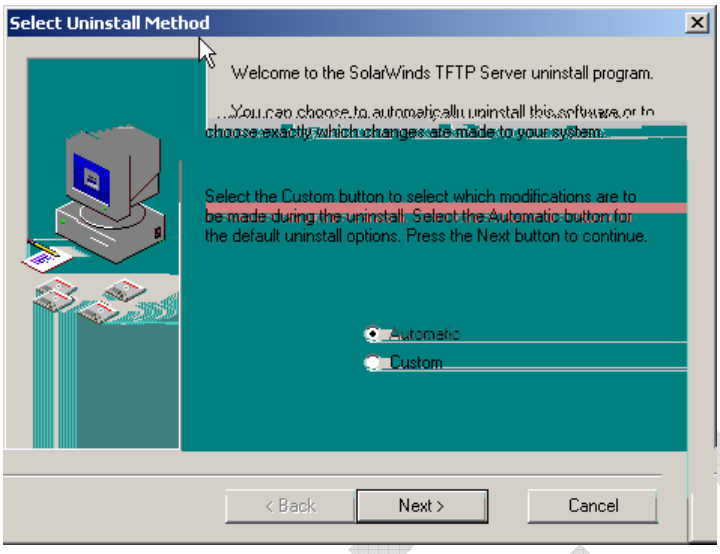

Figure C-2: Select Uninstall Method Window

3. Select **Finish** (Figure C-3). Close out of the *Add or Remove Programs* window and the *Control Panel* Window.

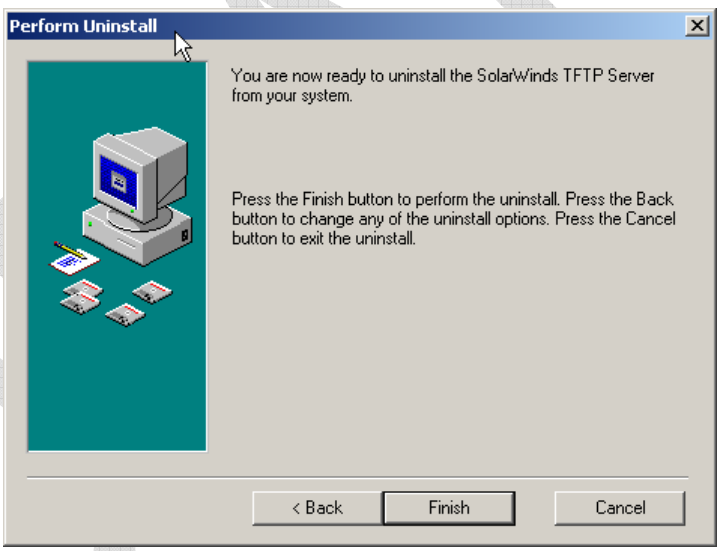

Figure C-3: Perform Uninstall Window

4. Create a folder, **SolarWind_V9**, on the electronics technician's laptop C:\ drive.

   Download the later version of SolarWinds TFTP Server version 9.1.0.111 program from the following web address, SolarWinds TFTP Server Version 9.1.0.111 available at http://www.ops1.nws.noaa.gov/asos/cpu_firmware.htm

   Microsoft .NET 2.0 Framework and Internet Explorer version 6 or later will need to be installed with SolarWinds TFTP version 9.1.0.111. Both of these files are available on the Microsoft Website. Contact the ESA for assistance.

9. Choose the default Destination Folder (Figure C-8), **C:\Program File\SolarWinds**. Select **Next** to install the package.

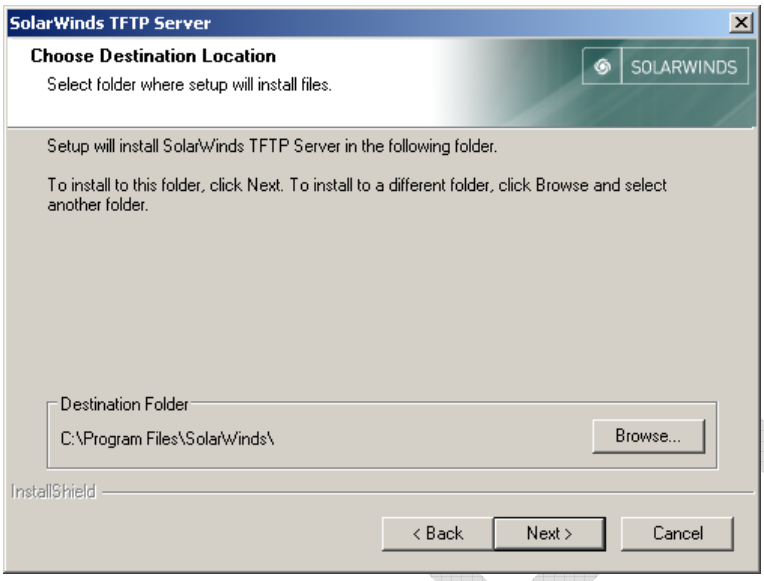

Figure C-8: Choose Destination Location

10. Select **Install** inside the *Ready to Install the Program* window to start the installation. Refer to Figure C-9.

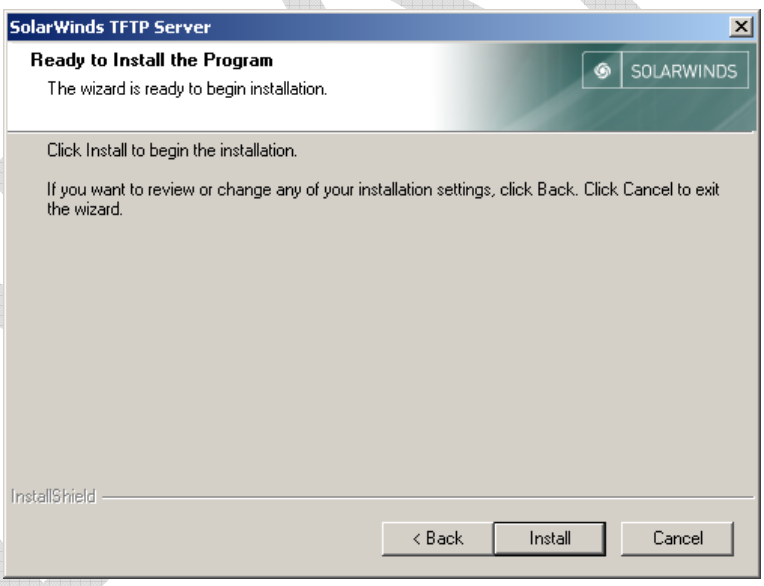

Figure C-9: Ready to Install the Program