

# CELLULAR TELEPHONE ANTENNA KIT

## INSTALLATION MANUAL

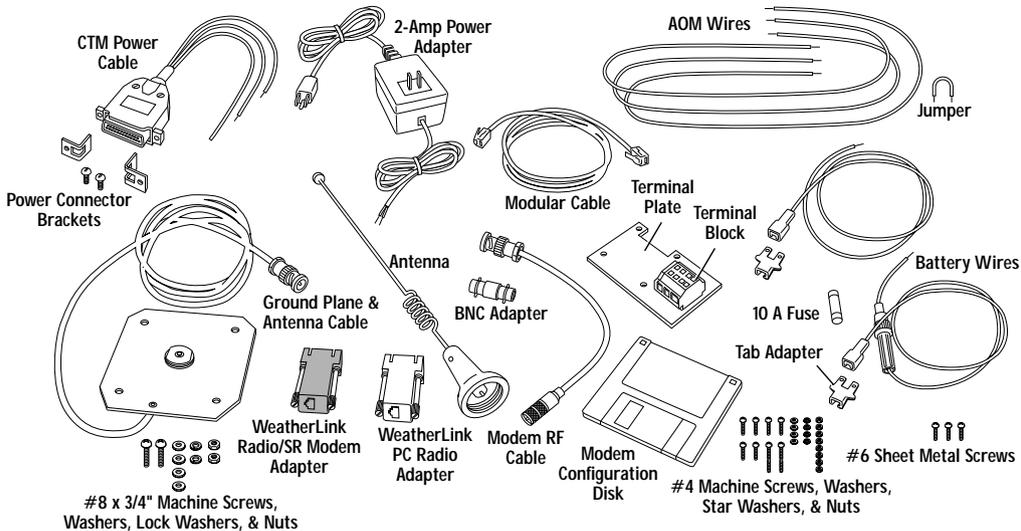


### INTRODUCTION

The Cellular Telephone Antenna Kit contains the materials necessary to connect a WeatherLink® data logger to a Motorola SMCT2 cellular telephone modem (CTM). The SMCT2 CTM must be obtained from Motorola. See the accompanying sheet for Motorola contact information.

### COMPONENTS

The Cellular Telephone Antenna Kit includes the following components. Please make sure you have all listed components before continuing.

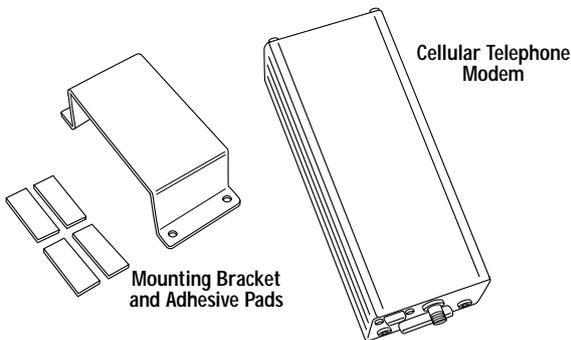


- ◆ Antenna, 806-896 MHz 3dB, Omni-Directional
- ◆ Ground Plane, with antenna base, antenna cable with BNC connector
- ◆ Terminal Plate, with 4-position terminal block and adhesive foam tape
- ◆ WeatherLink Radio/SR Modem Adapter
- ◆ WeatherLink PC Radio Adapter

- ◆ BNC Adapter
- ◆ Power Adapter, 12V, 2A
- ◆ Modem RF Cable, co-axial, BNC and Mini-UHF connectors, 12" (30 cm) long
- ◆ CTM Power Cable, DB25 connector and cable
- ◆ Modular Cable, 6-conductor, 4' (1.2m) long
- ◆ Two Tab Adapters
- ◆ Two Battery Wires (1 red, with in-line fuse holder, 1 black)
- ◆ Three Alarm Output Module Wires (1 green, 1 yellow, 1 white)
- ◆ Jumper Wire, yellow
- ◆ Three #6 Sheet Metal Screws (for mounting modem bracket)
- ◆ Two #8-32 x 3/4" Machine Screws, Washers, Lock Washers, and Nuts (for mounting antenna)
- ◆ Two Power Connector Brackets and #6 Screws
- ◆ Two #4 x 3/8" Machine Screws and Two #4 x 3/4" Machine Screws, Washers, Star Washers, and Nuts (for mounting hang-up cup)
- ◆ Four #4 x 3/8" Machine Screws and Nuts (for mounting Timer on terminal plate)
- ◆ Modem Configuration Disk

## Motorola SMCT2 Cellular Telephone Modem Components

The Motorola SMCT2 CTM should include the following components, which will be necessary for the installation.



- ◆ Cellular telephone Modem (S5692A)
- ◆ Mounting Bracket
- ◆ 4 Adhesive Pads

The CTM should also include a power cable, two wire/fuse loops, one black wire, and a hardware package, none of which is needed.

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## Power Components

You will need to supply power to the CTM site, using one of the following options.

- ◆ If AC power is available at the CTM site, use the power adapter supplied with this kit.
- ◆ To power the CTM with solar power, use the Solar Power Kit (#7708) and 6.5-Amp-Hour Battery (#7711).  
If solar power is used, it will be necessary to switch the power to the phone so that it is on for only limited periods in order to conserve the power drawn. Two alternatives are available:
  - ◆ Alarm Output Module (#7736)
  - ◆ Timer (#7682)  
The Timer is recommended unless the Alarm Output Module is being used for other purposes.

## WeatherLink Components

You will need the following item from your WeatherLink package:

- ◆ PC COM Port Adapter  
On older versions of the WeatherLink, this adapter was labelled AT Adapter.

## Optional Components

The following optional components may be necessary for your installation.

- ◆ Radio Surge Protector (#7681SSC)  
If the CTM is located in an area where lightning strikes are a possibility, use the Radio Surge Protector to provide surge protection between the antenna and the CTM. Davis recommends the use of the Radio Surge Protector in *all installations*.
- ◆ Antenna Mounting Bracket (#7684)  
The hardware provided with the Antenna Kit enables you to mount the antenna on the Sensor Mounting Arm (#7702). If you want to mount it on a pole, post, or wall, use the Antenna Mounting Bracket.

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**Note:** *The CTM's antenna should be located as high as possible and away from buildings and other obstructions, if possible. It is best if the path between the antenna and the nearest phone company cell antenna is completely unobstructed (line-of-sight). Intervening trees and other vegetation can reduce the signal intensity.*

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- ◆ Handset (Motorola #SL2504) and Hang-Up Cup Assembly (Motorola #SL9854)  
If you wish to originate or receive voice calls at the weather station/CTM site, you will need to order the handset and hang-up cup assembly from Motorola. Consult the Motorola Contact and Parts Information Sheet for more details.

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## TOOLS REQUIRED

In addition to the components listed above, you may need the following tools. Please be sure you have everything you need before beginning the installation.

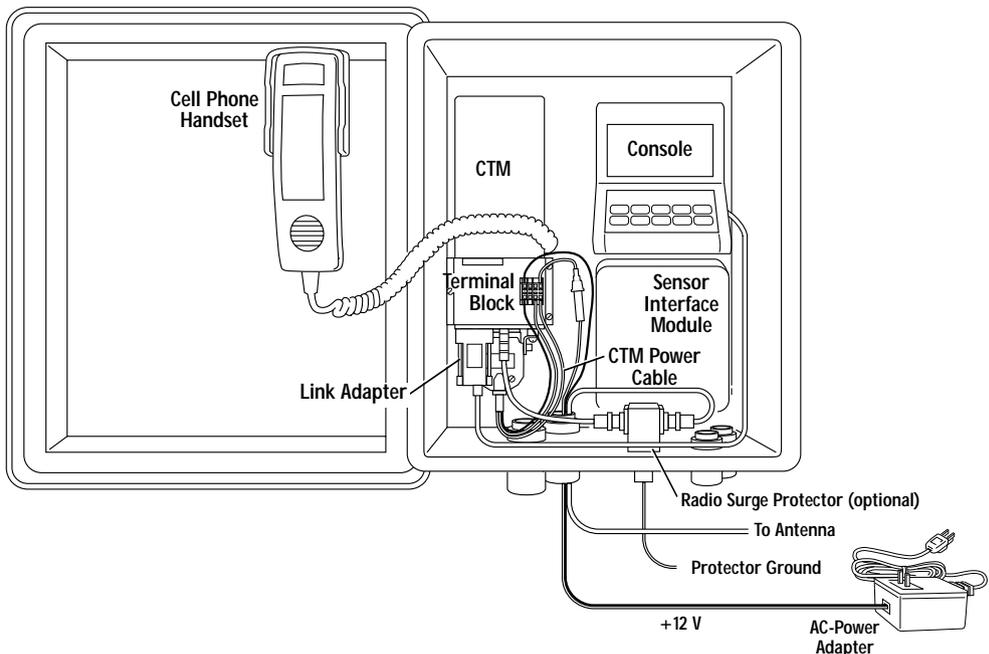
- ◆ Phillips Screw Driver
- ◆ Slotted Screw Driver
- ◆ Electric Drill with 7/32" (5.5 mm) and 1/8" (3 mm) drill bits

## TYPICAL INSTALLATIONS

The illustrations below show three typical installations: AC-powered, solar-powered using the Timer, and solar-powered using the Alarm Output Module. A list of steps for each installation type is provided.

### AC-Powered

The illustration below shows an AC-powered station and cellular telephone modem (CTM).



You must complete the following steps for this installation.

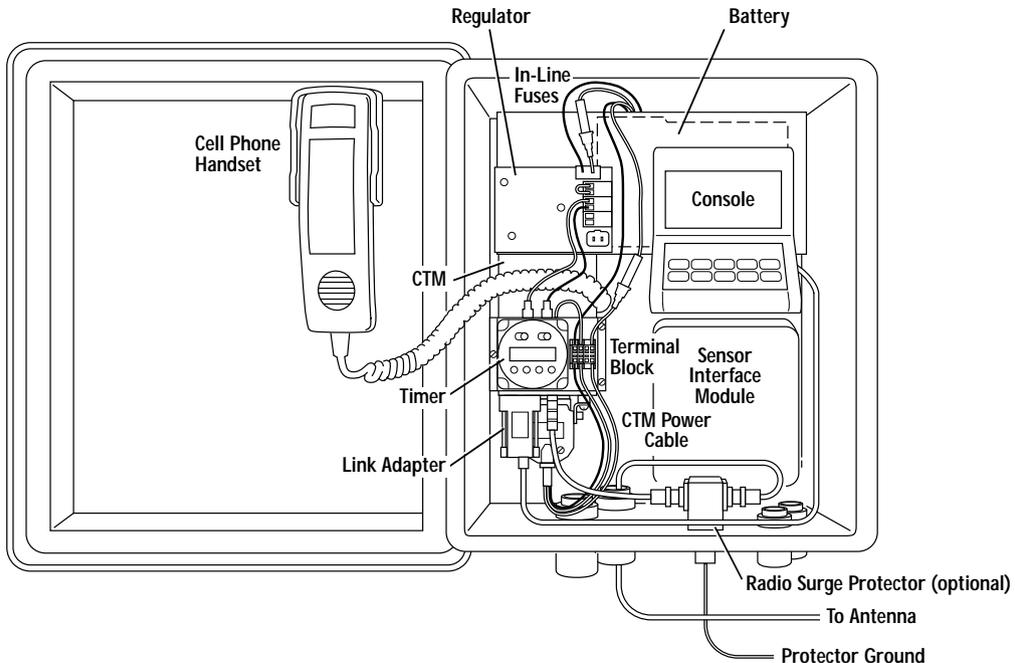
1. Configure the CTM (see "Configuring The Cellular Telephone Modem" on page 8).
2. Install antenna (see "Installing Antenna" on page 11).
3. Install Radio Surge Protector (optional).

Consult the manual supplied with the Radio Protector for installation instructions.

4. Install CTM (see "Installing Cellular Telephone Modem" on page 13).
5. Install terminal plate (see "Installing Terminal Plate/Timer" on page 15).
6. Connect AC-power wires (see "Connecting AC-Power Wires" on page 16).  
Do not connect to AC power yet.
7. Install hand set and hang-up cups (optional; see "Installing Handset and Hang-Up Cups" on page 20).  
If you wish to originate or receive voice calls at the weather station/CTM site, you will need to install the handset and hang-up cup assembly.
8. Check wiring.  
Before you apply power to the system, review your wiring to make sure all connections are correct and all wires firmly secured in the proper terminal.
9. Connect power to system.  
*Do not connect power until the rest of your installation is complete. Plug the power adapter into a power outlet.*
10. Finalize the installation by testing the installation (see "Finalizing the Installation" on page 21).

### Solar-Powered Using Timer

The illustration below shows a solar-powered station and CTM using a Timer for power conservation.



You must complete the following steps for this installation.

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1. Configure the CTM (see “Configuring The Cellular Telephone Modem” on page 8).
  2. Install antenna (see “Installing Antenna” on page 11).
  3. Install Solar Power Kit and 6.5-Amp-Hour Battery (see “Installing Solar Power Kit & Battery” on page 12).
  4. Install Radio Surge Protector (optional).  
Consult the manual supplied with the Radio Protector for installation instructions.
  5. Install CTM (see “Installing Cellular Telephone Modem” on page 13).
  6. Install terminal plate and Timer (see “Installing Terminal Plate/Timer” on page 15).
  7. Connect Timer and battery wires (see “Connecting Timer and Battery Wires” on page 17).
  8. Install hand set and hang-up cups (optional; see “Installing Handset and Hang-Up Cups” on page 20).  
If you wish to originate or receive voice calls at the weather station/CTM site, you will need to install the handset and hang-up cup assembly.
  9. Check wiring.  
Before you apply power to the system, review your wiring to make sure all connections are correct and all wires firmly secured in the proper terminal.
  10. Connect power to system.  
*Do not connect power until the rest of your installation is complete.* Connect the battery cable to B2 on the regulator circuit. Connect the solar panel cable to B1 on the regulator circuit. Finally, insert the fuse into the in-line fuse holder in the red battery wire.
  11. Finalize the installation by programming the Timer and testing the system (see “Finalizing the Installation” on page 21).



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9. Install hand set and hang-up cups (optional; see “Installing Handset and Hang-Up Cups” on page 20).

If you wish to originate or receive voice calls at the weather station/CTM site, you will need to install the handset and hang-up cup assembly.

10. Check wiring.

Before you apply power to the system, review your wiring to make sure all connections are correct and all wires firmly secured in the proper terminal.

11. Connect power to system.

*Do not connect power until the rest of your installation is complete.* Connect the battery cable to B2 on the regulator circuit. Connect the solar panel cable to B1 on the regulator circuit. Finally, insert the fuse into the in-line fuse holder in the red battery wire.

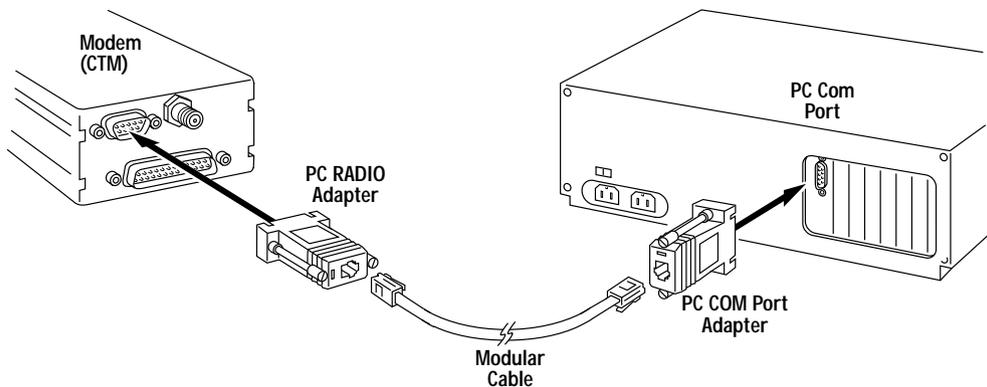
12. Finalize the installation by programming the AOM and testing the installation (see “Finalizing the Installation” on page 21).

## CONFIGURING THE CELLULAR TELEPHONE MODEM

As delivered by Motorola, the cellular telephone modem (CTM) is not compatible with your WeatherLink. Follow the instructions below to configure the CTM.

### Connect the CTM to your Computer

Connect the CTM to your computer, as shown below.

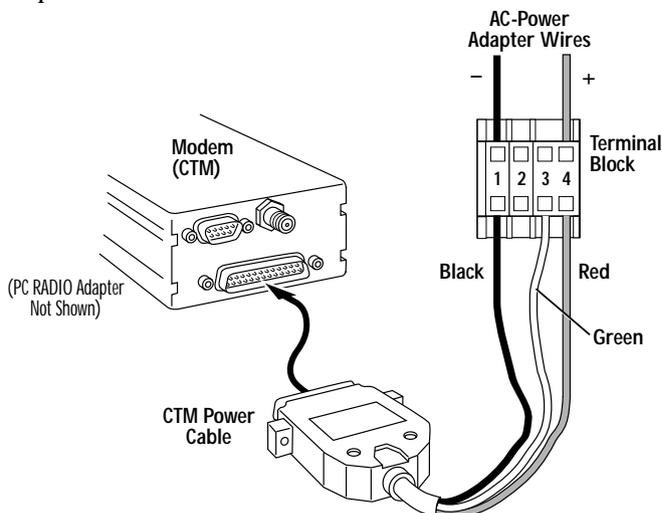


1. Connect the PC COM Port Adapter to a serial port on your PC.
2. Connect one end of the modem cable to the PC COM Port Adapter.
3. Connect the PC RADIO Adapter to the DB9 connector on the CTM.
4. Connect the other end of the modem cable to the PC RADIO Adapter.

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## Power the CTM

Connect power to the CTM, as shown below.



1. On one side of the terminal block, connect the black CTM power wire to terminal 1 (grey), the green CTM power wire to terminal 3 (orange), and the red CTM power wire to terminal 4 (orange).
2. On the other side of the terminal block, connect the black power adapter wire to terminal 1 (grey) and the red power adapter wire to terminal 4 (orange).
3. Plug the power adapter into a power outlet.

## Run The Modem Configuration Program

Finally, use the supplied modem configuration program to configure the CTM.

1. Place the Modem Configuration Disk in your disk drive.
2. Choose Run from the File Menu (Windows 3.1) or the Start Menu (Windows 95).

3. Type A:\CONFIG and press Enter (or choose Ok).  
The Wireless Configuration Program dialog box appears.



4. Select Cell Phone Modem from the Modem Type drop-down list.
5. Select the COM port to which the CTM is connected from the COM Port drop-down list. If you don't know the COM port number, choose COM 1. If you get a program error when attempting to configure the CTM, try again using COM 2, and so on, until you find the correct COM port setting.
6. If you fully understand the CTM's AT command set and wish to configure the CTM differently than the default configuration, choose Advanced. You may then enter the desired AT commands and choose Execute Command to execute the string. Choose View Conf to view the CTM's current configuration.  
The default configuration should work in almost all installations; we do not recommend using the Advanced setting option.



7. When finished, choose Configure.  
The program will attempt to locate and configure your CTM. If you encounter an error, make sure you have selected Cell Phone Modem and then try different serial ports until the configuration completes successfully.

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## INSTALLATION

Follow the instructions below to install the various components of your CTM. In many cases, you will need to use the installation manual supplied with the component for specific instructions.

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**Note:** Before beginning the installation, disconnect the cables attached in order to configure the CTM.

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### Installing Antenna

You may mount the antenna on either the Sensor Mounting Arm or on a pipe, post, or wall using the Antenna Mounting Bracket (#7684).

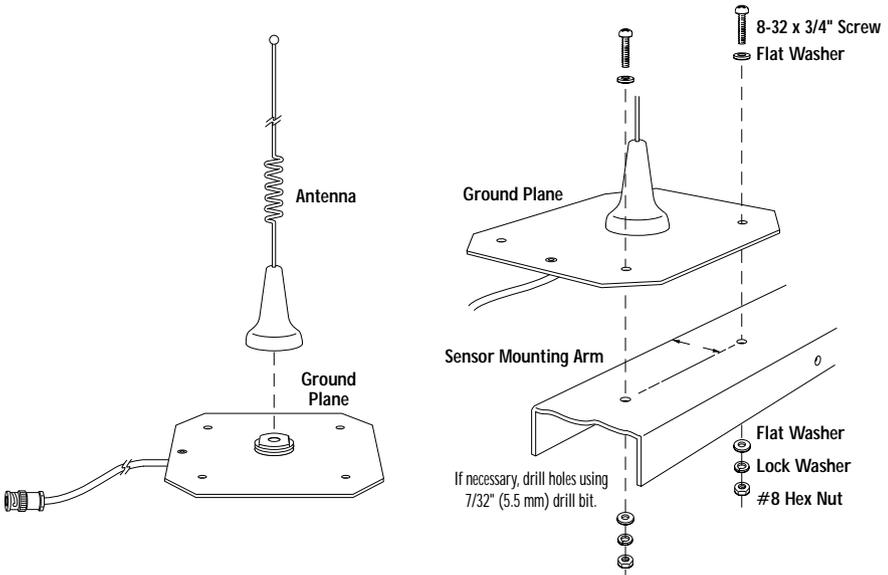
◆ **Installing on Sensor Mounting Arm (SMA)**

Attach the antenna to the ground plane as shown below; screw on until snug. Attach the ground plane to the SMA using the #8-32 x 3/4" screws, flat washers, split lock washers, and hex nuts as shown below.

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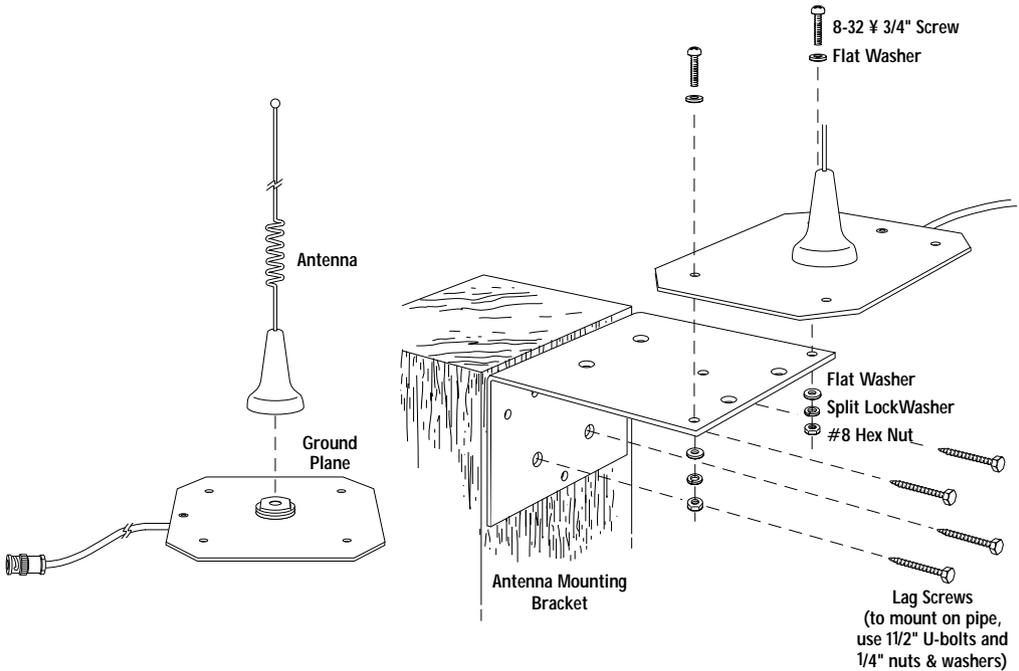
**Note:** It may be necessary to drill one or two holes in the SMA to accommodate the antenna/ground plane assembly. If so, use the holes in the ground plane as a guide and drill holes using a 7/32" (5.5mm) drill bit.

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◆ **Installing on Pipe, Post, or Wall**

Mount the Antenna Mounting Bracket (AMB) on the pipe, post, or wall according to the instructions supplied with the bracket. Attach the antenna to the ground plane as shown below; screw on until snug. Attach the ground plane to the AMB using the #8-32 x 3/4" screws, flat washers, split lock washers, and hex nuts as shown below.



**Installing Solar Power Kit & Battery**

Consult the manuals supplied with the appropriate component for instructions. Note the following, however, as you proceed with the installation.

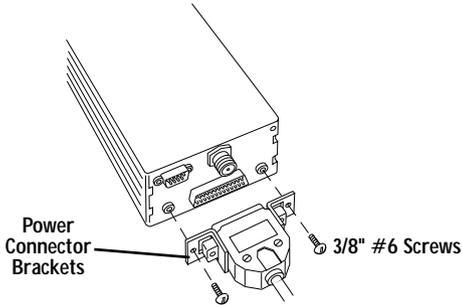
- ◆ **Use tab adapters to attach wires to the battery.**  
Before installing the battery, slide the tab adapters onto the terminals. Attach the black battery wire (supplied with this kit) and the black wire from the battery cable (supplied with the Solar Power Kit) to the tab adapter connected to the ground (black) terminal. Attach the red battery wire (supplied with this kit) and the red wire from the battery cable (supplied with the Solar Power Kit) to the tab adapter connected to the positive (red) terminal. Make sure you have access to the free end of the battery wires and the battery cable once the battery is installed.
- ◆ **Do not connect the solar panel or the battery to the regulator circuit.**  
Make sure you have made no connections at B1 and B2 on the regulator circuit before proceeding.

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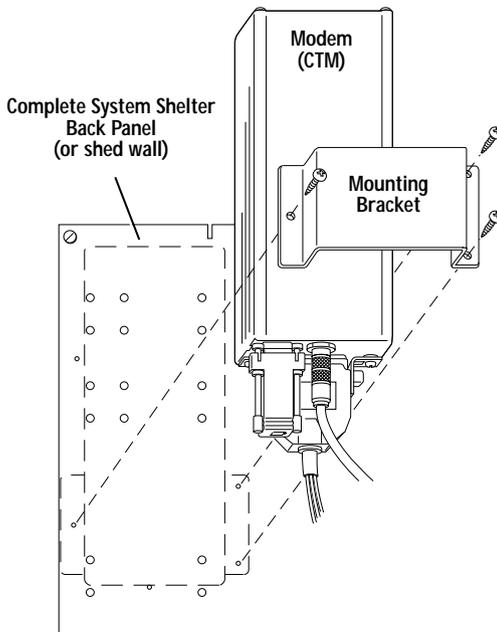
## Installing Cellular Telephone Modem

Follow the instructions below to install the cellular telephone modem (CTM). Install the station console/WeatherLink prior to installing the modem.

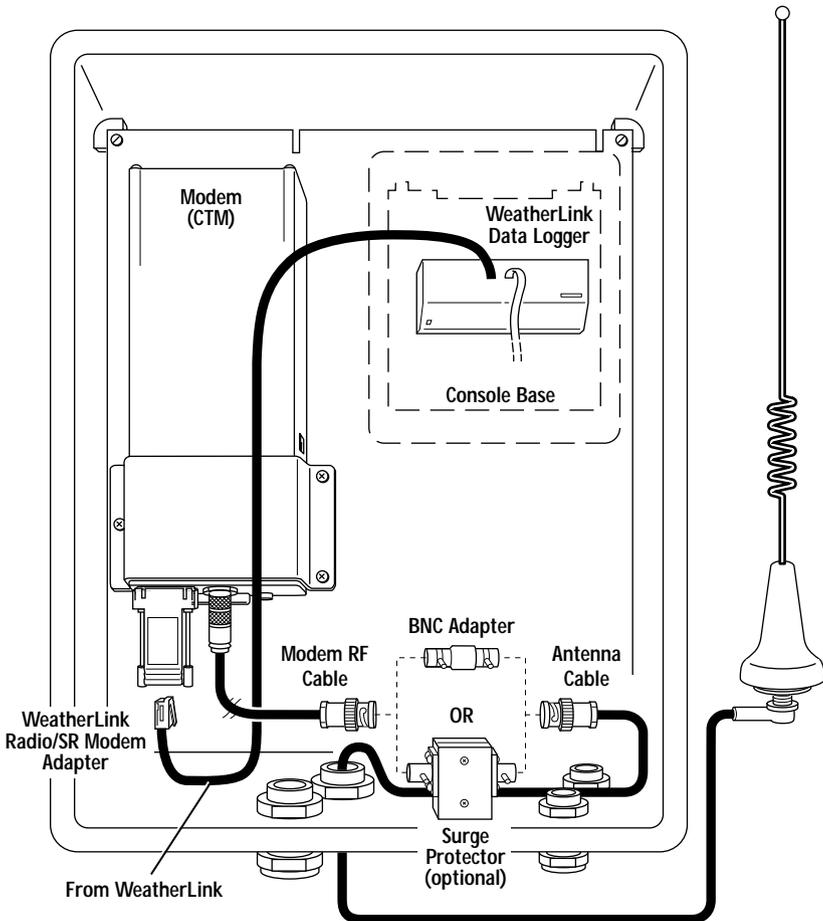
1. Connect the power cable to the DB-25 connector on the CTM, as shown below.



2. Connect the WeatherLink Radio/SRModem Adapter to the DB-9 connector on the CTM.
3. Connect one end of the modem RF cable to the mini-UHF connector on the CTM.
4. Apply adhesive pads to the bracket according to the instructions supplied with the CTM.
5. Attach the CTM and mounting bracket to the back of the Complete System Shelter or the wall of a shed or other housing using the #6 sheet metal screws, as shown below.



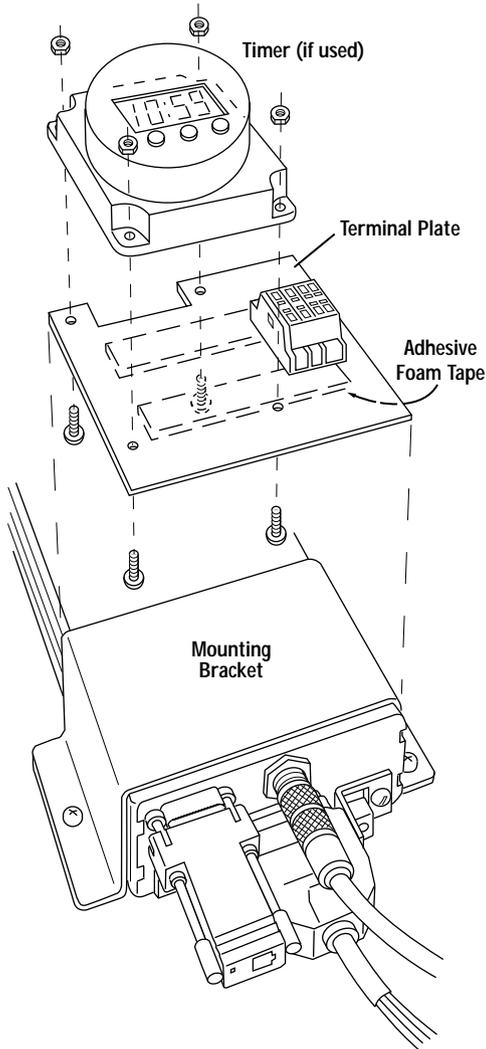
6. Connect the WeatherLink cable to the L1 connector on the WeatherLink Radio/SRModem Adapter.
7. Connect the free end of the modem RF cable to the BNC adapter or the EQUIPMENT side of the Radio Surge Protector.
8. Connect the antenna cable to the BNC adapter or the ANTENNA side of the Radio Surge Protector (routing the antenna cable through one of the strain reliefs at the bottom of the shelter, if using the shelter).



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## Installing Terminal Plate/Timer

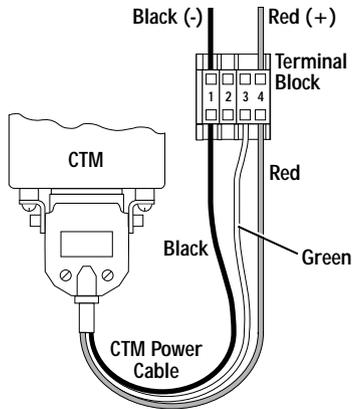
If using the Timer, attach it to the terminal plate as shown below. Secure the terminal plate to the mounting bracket using the adhesive tape on the back of the plate, as shown below.



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## Connecting AC-Power Wires

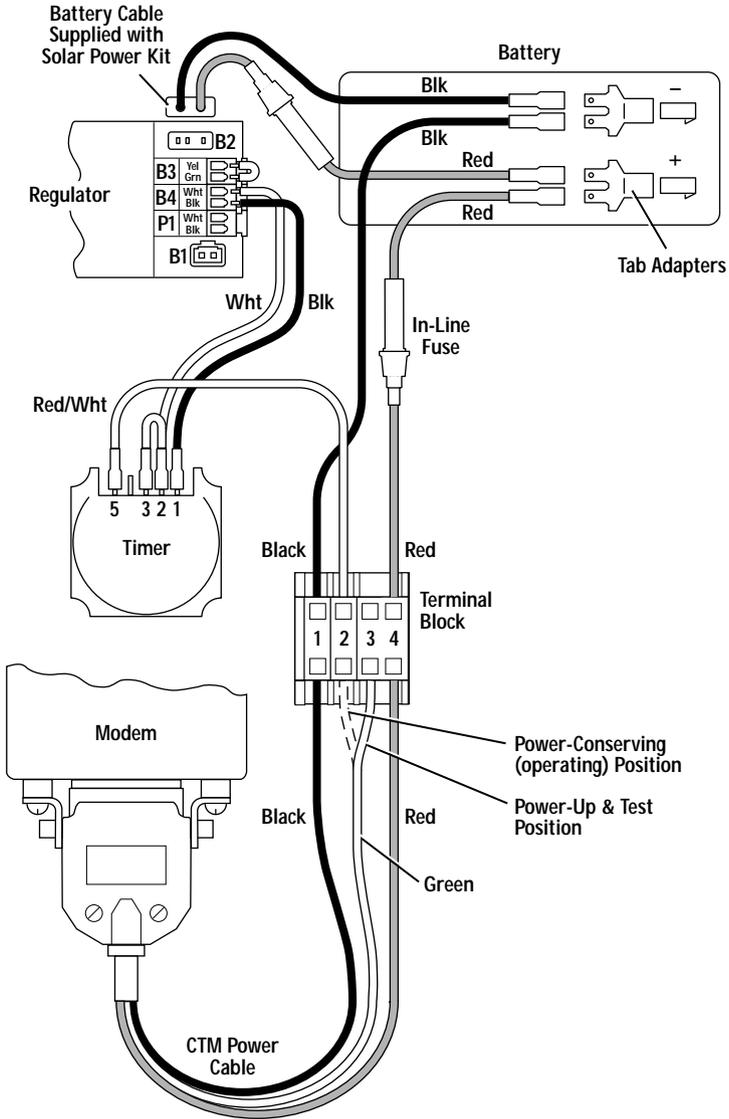
Connect the CTM power cable and AC-power adapter to the terminal block, as shown below.



- ◆ On one side of the terminal block, connect the black CTM power wire to terminal 1 (grey), the green CTM power wire to terminal 3 (orange), and the red CTM power wire to terminal 4 (orange).
- ◆ On the other side of the CTM, connect the black wire from the power adapter or to terminal 1 (grey) and the red wire to terminal 4 (orange).

## Connecting Timer and Battery Wires

If using solar power in conjunction with the Timer, connect the system as shown below.



- ◆ On one side of the terminal block, connect the black battery wire to terminal 1 (grey), the red/white Timer wire to terminal 2 (green), and the red battery wire to terminal 4 (orange).

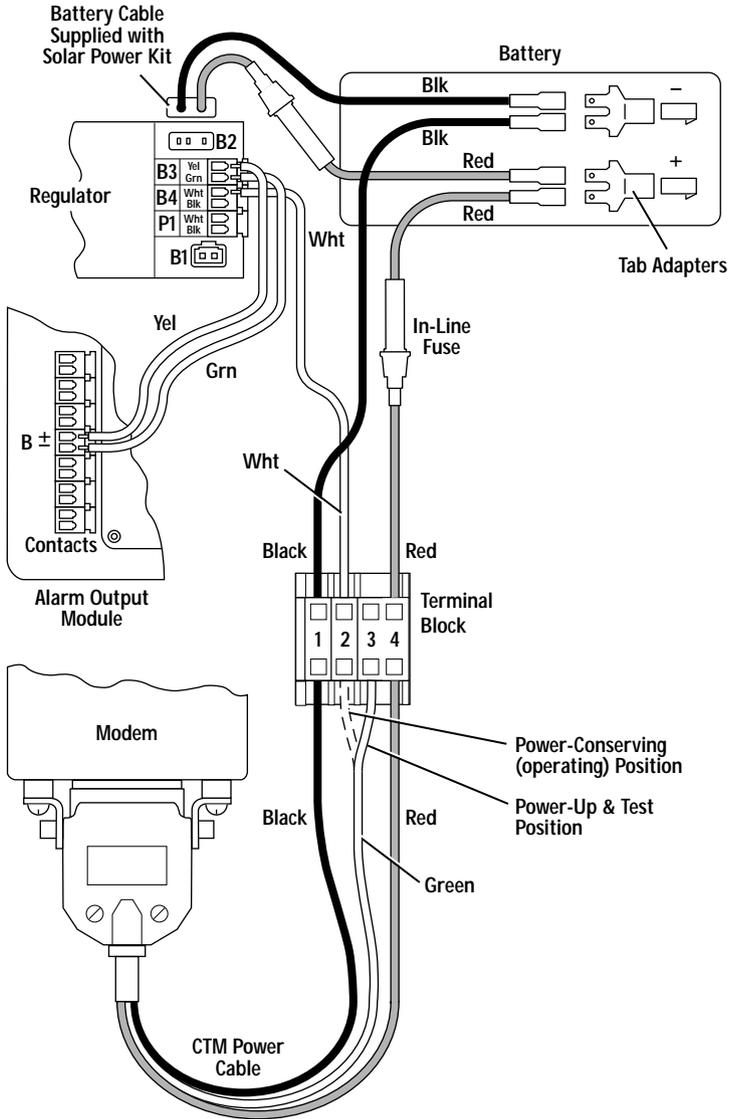
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- ◆ On the other side of the terminal block, connect the black CTM power wire to terminal 1 (grey), the green CTM power wire to terminal 3 (orange), and the red CTM power wire to terminal 4 (orange).

The green wire will need to be moved to terminal 2 (green) after you have tested the installation. Connecting the wire to terminal 3 bypasses the “power-saver” mode and insures power is applied simultaneously to the red and green CTM power wires.

- ◆ Connect the white and black wires from the Timer to the Wht and Blk terminals (respectively) at B4 on the regulator circuit.
- ◆ Jumper together the two terminals (Yel and Grn) at B3 on the regulator circuit using the jumper wire.

## Connecting Alarm Output Module and Battery Wires

If using solar power in conjunction with the Alarm Output Module (AOM), connect the system as shown below.



- ◆ On one side of the terminal block, connect the black battery wire to terminal 1 (grey), the red/white Timer wire to terminal 2 (green), and the red battery wire to terminal 4 (orange).

- ◆ On the other side of the terminal block, connect the black CTM power wire to terminal 1 (grey), the green CTM power wire to terminal 3 (orange), and the red CTM power wire to terminal 4 (orange).  
The green wire will need to be moved to terminal 2 (green) after you have tested the installation. Connecting the wire to terminal 3 bypasses the “power-saver” mode and insures power is applied simultaneously to the red and green CTM power wires.
- ◆ Connect one end of the yellow AOM wire to the Yel terminal at B3 on the regulator circuit. Connect the other end to the positive (+) terminal at B on the AOM.
- ◆ Connect one end of the green AOM wire to the Grn terminal at B3 on the regulator circuit. Connect the other end to the negative (-) terminal at B on the AOM.
- ◆ Connect one end of the white AOM wire to the Wht terminal at B4 on the regulator circuit. Connect the other end to terminal 2 (green) on the terminal block, on the same side as the power wires.

## Installing Handset and Hang-Up Cups

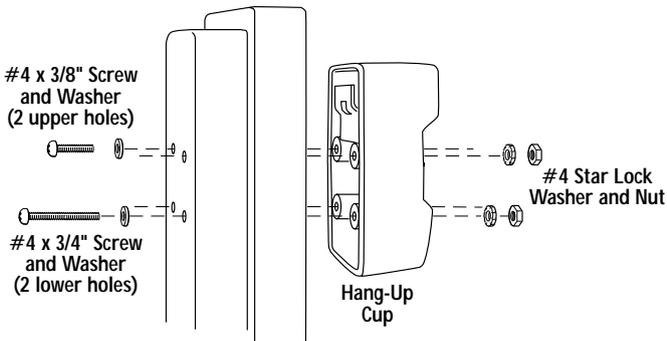
If you wish to originate or receive voice calls at the weather station/CTM site, install the handset and hang-up cup as shown below.

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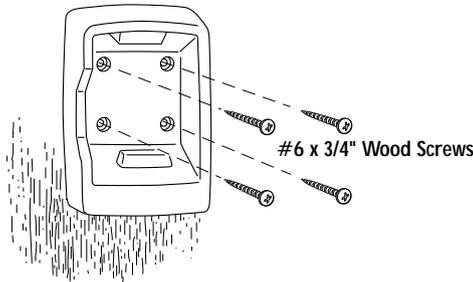
**Note:** If you install a handset you must not turn power off at the handset when leaving the station because this overrides the Timer or Alarm Output Module control. The handset power must be on for the “power saver” switching to “wake up” and receive calls from the WeatherLink software.

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- ◆ **Installing the Handset**  
Insert the phone plug on the end of the handset cable into the jack on the side of the CTM.
- ◆ **Installing the Hang-Up Cups in Complete System Shelter (CSS)**  
Use the cup as a guide and drill holes in the upper right corner of the CSS door with a 1/8" (3 mm) drill bit. Secure the cup using the #4 screws, washers, star washers, and nuts as show below. Use the #4 x 3/4" screws in the two lower holes and the #4 x 3/8" screws in the two upper holes. Make sure the cup is oriented correctly, with the white bumper at the top.



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- ◆ Installing the Hang-Up Cups on Wood Wall (of Shed or Similar Structure)  
Use #6 x 3/4" wood screws to secure the cup assembly in place, as shown below.



## FINALIZING THE INSTALLATION

The sections below detail the final steps that must be taken to complete the installation.

### Test Cell Phone

To insure that the CTM is working properly, test it. If you have a handset place a call. If you do not have a handset, attempt to call the station using the WeatherLink software (try running the Bulletin). Consult the WeatherLink manual for instructions.

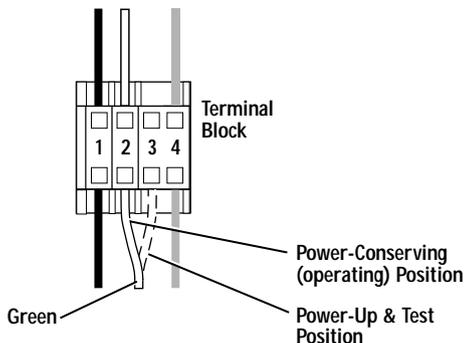
### Move Green CTM Power Wire (Solar Power/Battery Installations Only)

Once you are sure the cellular phone/CTM is working, move the green CTM power wire from terminal 3 (orange) on the terminal block to terminal 2 (green).

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**Note:** If power is completely removed from the CTM, the green CTM wire should be moved back to terminal 3 before power is restored. Once power is restored, move the green wire back to terminal 2. If this procedure is not followed, the CTM will occasionally power up in a non-responding state.

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## Test and Program Timer (Timer Installations Only)

Manually set the Timer on and make sure the CTM is able to receive a call. Manually set the Timer off and make sure the CTM does not answer a call. Finally, program the Timer to enable the CTM. Consult the instructions supplied with the Timer for details.

## Set AOM Jumpers and Test AOM (AOM Installations Only)

Insert jumper B from J5 on the AOM into pin jack 13 at J3 (consult the AOM manual for more details). Close contact B (if the LED to the right of contact B is lit, the contact is closed) by moving the jumper at J7 to Normally-Closed (if necessary) and make sure the CTM is able to receive a call. Open contact B (if the LED to the right of contact B is unlit, the contact is open) by moving the jumper at J7 to Normally-Open (if necessary) and make sure the CTM does not answer when called. *When finished testing, move the jumper at J7 back to the Normally-Open position.*

## Insure Handset Power On

If you install a handset you must not turn power off at the handset when leaving the station because this over-rides the Timer or Alarm Output Module control. The handset power must be on to enable the “power saver” switching to “wake up” the CTM and receive calls from the WeatherLink software.

## POWER CONSERVATION MODE

If the cell phone is operating on solar/battery power, the Timer or AOM will be used to switch the voltage on the green CTM power wire (“Ignition Detect”), causing the CTM to “wake up” and turn on (referred to as enabling the CTM). The CTM will not answer any incoming call unless the Timer or the AOM enables it.

### ◆ AOM Power Saving

The AOM enables the CTM at 5 minutes past each *even-numbered hour* (using the station console’s clock) and keeps it enabled for 4 minutes. When a call is received, the CTM remains enabled during the call and for 2 minutes after the last communication is complete.

### ◆ Timer Power Saving

The user may set the Timer to any desired intervals. Any call in progress when the Timer switches off will continue normally until hang-up.

### ◆ Disabling Power Saving

To disable power saving entirely, leaving the CTM on at all times, move the green CTM power wire from terminal 2 (green) to terminal 3 (orange) on the terminal block.

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## CHARGE BUDGET

When using the CTM in a solar/battery-powered station, one must limit the power drawn by the CTM. This means limiting the time that the CTM is on, enabled to receive calls, and limiting even more severely the duration of calls. The worksheets below enable you to calculate the charge drain per day and the charge gain per day (from the solar panel). Comparison of these two numbers will give you an idea of how long you may use the CTM before draining the power supplied by the solar panel.

### Charge Drain per Day

The worksheet below enables you to calculate the charge drain per day for various power on and transmission times.

COMPONENT	CURRENT (AMPS)	TIME ON (MIN/DAY)	DRAIN (AMP-MIN)	LINE
Console, SIM/junction box & WeatherLink	_____	1440	_____	A
Alarm Output Module/Timer	_____	_____	_____	B
CTM On	0.350	_____	_____	C
CTM Transmitting	1.300	_____	_____	D

**Total System Drain per Day = A+B+C+D:** \_\_\_\_\_ Amp-min

For each system component, write the amount of current drawn (in Amps) in the Current column and the number of minutes per day the component is "on" in the Time On column. Multiply the current drawn by the number of minutes to determine the drain caused by that component each day. Add the individual drain figures together to determine the total drain per day for the entire system. Consult the following for an explanation of worksheet lines A, B, C, and D.

◆ **Line A (Console, SIM/junction box & WeatherLink)**

The Weather Monitor II, with junction box and WeatherLink, draws 16 mA (0.016A) continuously (1440 minutes per day). The GroWeather, Energy EnviroMonitor, and Health EnviroMonitor, with sensor interface module (SIM) and WeatherLink, draw 20 mA (0.020A) continuously (1440 minutes per day).

◆ **Line B (Alarm Output Module/Timer)**

The Alarm Output Module draws 9 mA (0.009A) continuously (1440 minutes per day). The Timer current may be considered negligible (0) when the Timer is off (that is, its relay is not energized). The Timer draws 12 mA (0.012A) when it is on (that is, the relay is closed).

◆ **Line C (CTM On)**

When the CTM is on (enabled), it draws 350 mA (0.35A).

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**Note:** The Alarm Output Module enables the CTM for a minimum of 48 minutes every day (4 minutes each even-numbered hour). The timer enables the CTM for the amount of time for which you have it set.

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◆ Line D (CTM Transmitting)

The CTM draws an *additional* 1300 mA (1.3A) when transmitting.

*Charge Drain per Day Example*

The example worksheet shown below illustrates the power drain for a GroWeather, using the Timer to turn the cell-phone on for six four-minute periods each day. It assumes that one five-minute call is made each day to read out the data.

COMPONENT	CURRENT (AMPS)	<u>TIME ON</u> (MIN/DAY)	DRAIN (AMP-MIN)	LINE
Console, SIM/junction box & WeatherLink	0.020	1440	28.8	A
Alarm Output Module/Timer	0.012	24	0.3	B
CTM On	0.350	24	8.4	C
CTM Transmitting	1.300	5	6.5	D

**Total System Drain per Day = A+B+C+D:**      44.0 Amp-min

## Charge Gain per Day

The worksheet below enables you to calculate the average charge that the solar panel provides to the battery each day for various day lengths and peak solar irradiance values.

FACTOR	VALUE	LINE
Panel Current at 1000 W/m <sup>2</sup>	_____ Amps	E
Peak Solar Irradiance	_____ W/m <sup>2</sup>	F
Day Length	_____ hours	G
"Cloud" Factor	_____	H
<b>Total Gain per Day = (E*F/1000)*0.6*(G*60)*H:</b>		_____ Amp-min

Enter the information into each column and then use the formula to calculate the total gain for the day. The 0.6 factor includes battery efficiency and the integration of the solar cosine effect over the day. The total gain per day formula, therefore, represents the following calculation: (rated panel current) x (peak solar irradiance/1000) x (battery efficiency and solar cosine effect factor) x (day length in minutes) x ("cloud" factor).

◆ **Line E (Panel Current at 1000 W/m<sup>2</sup>)**

The charging current provided by the solar panel when solar irradiance is 1000 Watts per square meter. The panel included with the Davis Solar Power Kit provides 0.6 Amp at 1000 W/m<sup>2</sup>.

◆ **Line F (Peak Solar Irradiance)**

The solar irradiance at solar noon at the station site, in W/m<sup>2</sup>.

◆ **Line G (Day Length)**

The length of the day, in hours.

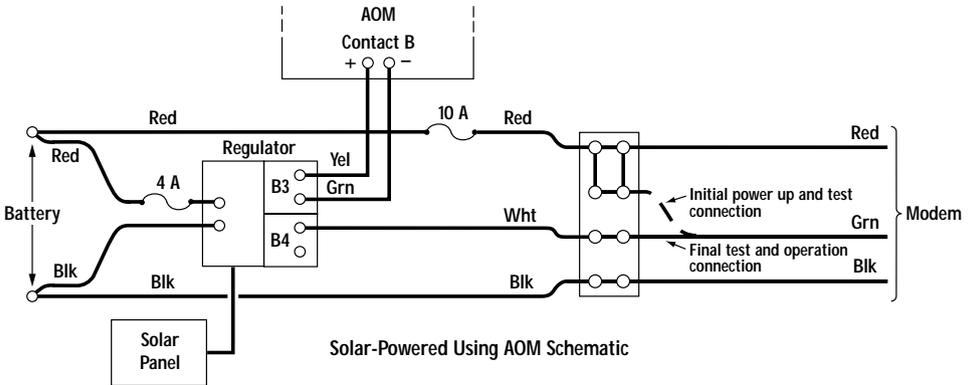
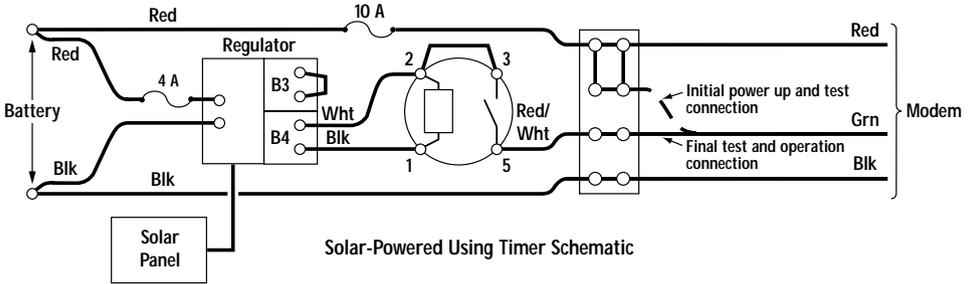
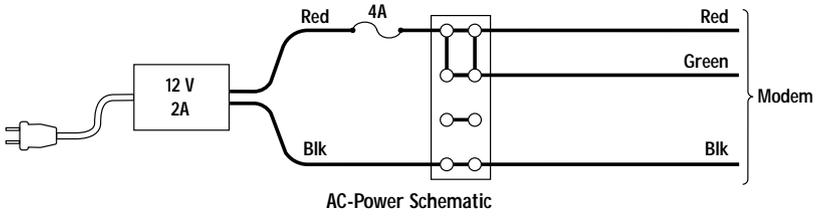
◆ **Line H ("Cloud" Factor)**

A multiplier which you may use to account for cloudiness or other factors which may limit the sunlight reaching the panel throughout the day. For example, a factor of 1.0 would represent an extended period with no clouds. Note that even during cloudy conditions at least 20% of the solar radiation usually gets through.

The example worksheet below illustrates the calculation.

FACTOR	VALUE	LINE
Panel Current at 1000 W/m <sup>2</sup>	0.6 Amps	E
Peak Solar Irradiance	1000 W/m <sup>2</sup>	F
Day Length	10 hours	G
"Cloud" Factor	0.75	H
<b>Total Gain per Day = (E*F/1000)*0.6*(G*60)*H:</b>		148.5 Amp-min

# SCHEMATICS





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Product Numbers: 7652-003

Davis Instruments Part Number: 7395-124  
Cellular Telephone Antenna Kit  
Rev. A Manual (7/8/99)

This product complies with the essential protection requirements of the EC EMC Directive 89/336/EC.

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