MAXIMUM

Summit

Installation & Operation Instructions

for remote operating mode

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Introduction

Thank you for buying a Summit remote. These instructions are designed to take you step by step through the process of installing and using a Summit remote. Carefully following these instructions will help ensure many years of trouble free service from your installation. If you are uneasy about running wires you should consult a qualified professional. TV antenna, satellite dish, ham radio, home entertainment and alarm system installers are good choices. You should be able to locate some of these professionals in your area by consulting the yellow pages. It is always best to show prospective installers these instructions and obtain quotations from a few different installers in your area.

Preparing for Installation

What you need for the installation

To install Summit you will need the following items.

Components Included with Summit Remote

You may want to check off each item as you unpack the instrument.

- ☐ Indicator (readout, brass case)
- ☐ Pluggable terminal strips (one 3 position and, one 2 position)
- ☐ 120 VAC to 24 VDC adapter with 6' of cable

Components Not Included with Summit Remote

Summit Master

Data link cable

Optional Components for Summit installations

Additional Summit Remote(s)

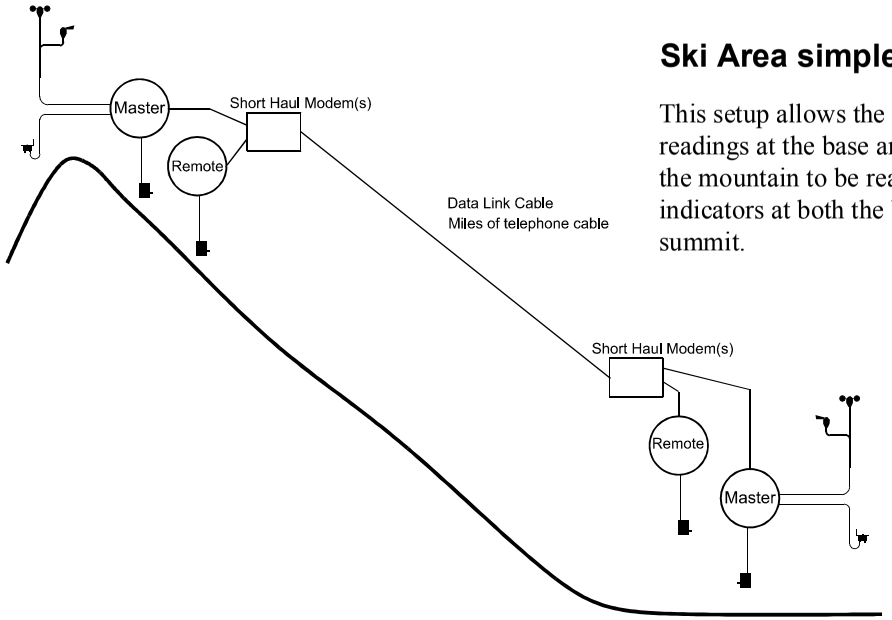
Planning the installation

Develop an overall plan

Summit master/remote systems can be used in many ways. Master Summit's read the wind and temperature sensors and show the current readings. Summit remotes connect to a master or, another remote, via a 2400 baud data link and, can show current readings or calculated values. A simple example is a master in one room and a remote displaying the current readings in a different room.

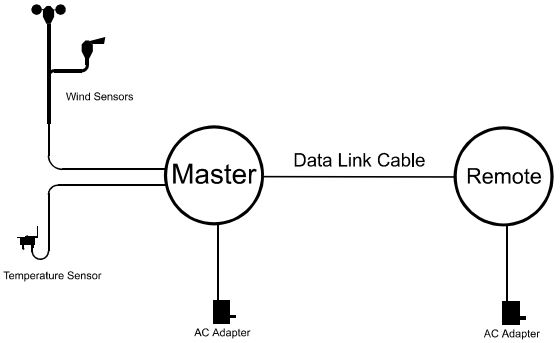
You can have an unlimited number of remotes connected to a system and, the remotes can be right next to the master or miles away. The following diagrams illustrate a simple setup and some of the more complex possibilities. If you are setting up a configuration more complicated than the simple example, we strongly recommend that you sketch out your plan on paper now.

Ski Area simple example

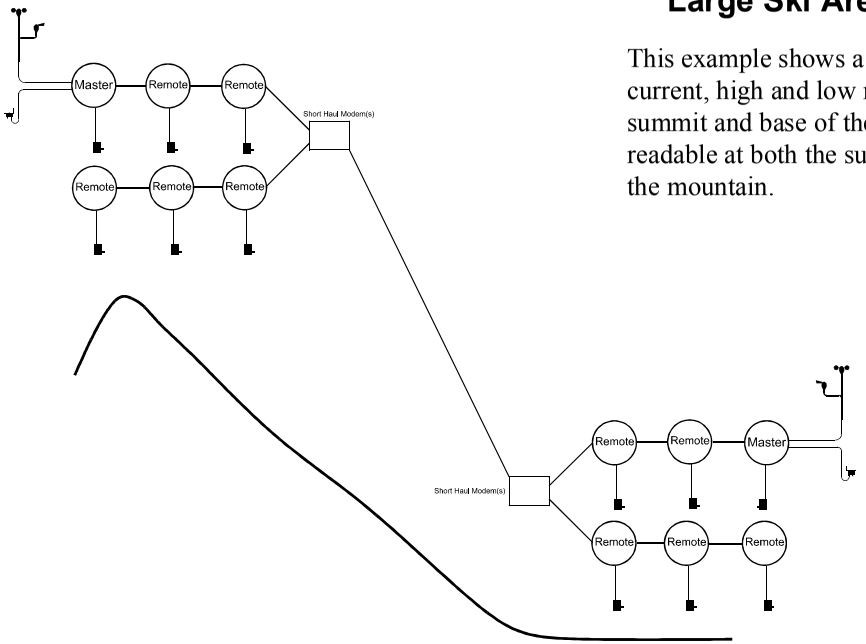


This setup allows the current readings at the base and summit of the mountain to be read on indicators at both the base and summit.

Simple two readout example

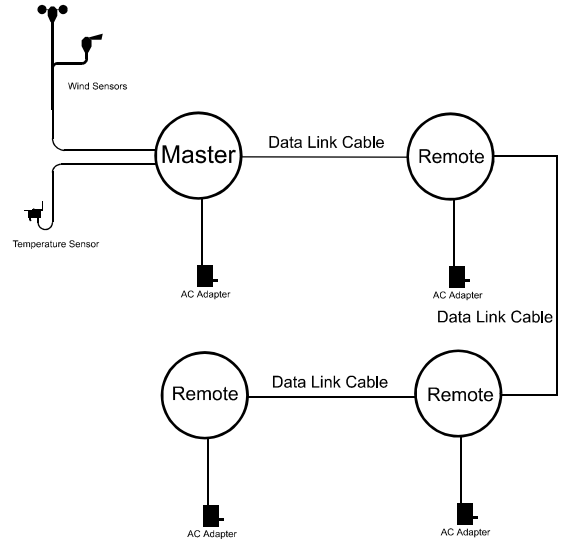


Large Ski Area example



This example shows a setup where the current, high and low readings for the summit and base of the mountain are readable at both the summit and base of the mountain.

Four readout example



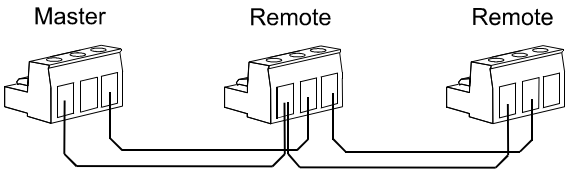
Remote Indicator(s)

Summit's large size allows it to be easily read from over 100 feet away when properly installed. For best performance you should avoid locations where direct sunlight will shine on the instrument. You must also have an AC outlet near the selected location. The AC adapter supplied with Summit has a 6 foot cord. You can extended this distance by splicing on wire to the adapter. The table below gives the maximum distances allowed for various gauges of wire.

Extending the AC Adapter wire		
Wire Gague AWG	Extension wire length in feet	Total wire length (including AC adapters 6 foot cord)
22	5	11
20	10	16
18	15	21
16	20	26
14	35	41

Link Cables

Now that you have selected the location for the remote(s) you should measure how much wire you will need for the link cable(s). When using multiple remotes you daisy chain the data link cable between units. The chain starts at the master, the transmit terminal of the master connects to the receive terminal of the first remote. If there are more remotes then the transmit terminal of the first remote connects to the receive terminal of the second remote (see diagram). To use more remotes you simply keep repeating the pattern.



The data link used by Summit is 2400 baud, 8-N-1, RS-232 format so, you should use cable designed for RS-232 data transmission. If you are unfamiliar with RS-232 cable installation you may want to consult a professional network cabling specialist.

Summit uses circuits that conform to the current transmission standard (EIA-232). The old standard, RS-232 specified a 50 foot maximum distance for cables. Because the standard did not specify the type of cable, some users had problems with distances of less than 50 feet and others were able to use hundreds of feet with great success. Instead of specifying a maximum cable length, EIA-232 specifies a maximum capacitance of 2500 pF (pico Farads). This is helpful, especially for manufacturers of RS-232 circuits and cable, however it does not take into account real world conditions. The real world factors that affect the data link are numerous so, we recommend that you only use cable specifically designed for RS-232 data transmission and follow all of the suppliers recommendations.

In general, standard RS-232 cable is usable for up to 50 feet and special cables are good for lengths of a few hundred feet. The type of cable you use is also dependent on the electrical noise of the environment. Cables designed for low noise environments like offices, hotels, homes, are less expen-

sive than cables designed for noisy locations like factories. If you are using multiple remotes the cable length limits are for each segment of the daisy chain cabling. As an example, if you are using cable rated for 100 feet, then you can use 100 feet for each segment of the cabling for a total distance of 200 feet between the master and the second remote.

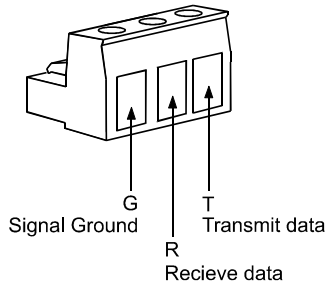
If you need to have a data link of longer than a few hundred feet, you should use line extenders and/or short haul modems. Line extenders and short haul modems allow you to have Summits connected by miles of wire. Many of these devices allow you to use existing runs of standard telephone cable. If you use these devices you will probably need to buy standard DB-25 male connectors or, some other connector, for the Summit side connection to the driver/modem.

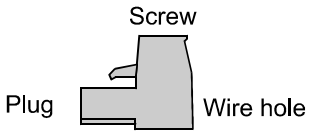
Installation

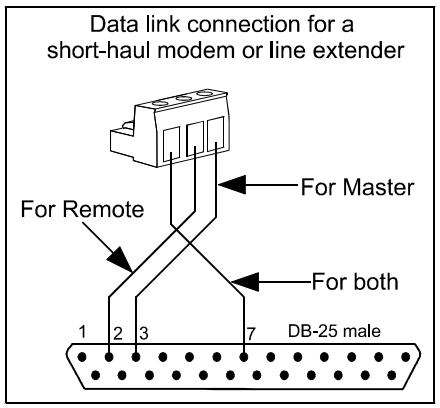
Trial wiring

You should do a trial wiring before running the wires through the walls. Perform the trial wiring in the comfort of your home, garage, etc. This will ensure your confidence in the instruments' operation. If you are using line extenders or, short haul modems, you should obtain them and any connectors and wire before proceeding.

First we will wire a 2 conductor shielded cable for the link to a master. Two conductor shielded cable has two insulated wires and one bare wire for the shield. Connect the insulated wires to the signal ground and transmit data terminals (see diagram). Next connect the other end of the signal ground wire to the signal ground terminal for the remote. Finally connect the other wire to the receive data terminal of the remote. In most cases you do not need to use the shield wires. However if you are installing in a very noisy environment you may need to connect the shield wire to an earth ground. If you use an earth ground you must only connect one end of the shield to earth ground. Connecting both ends of the shield to earth ground will create a ground loop, increasing the noise in the cable or in extreme cases, possibly damaging the equipment. When using multiple remotes, you can connect the shield wires together at all the remotes in the middle of the chain, then connect either the master or, the last remote end of the shield to earth ground.

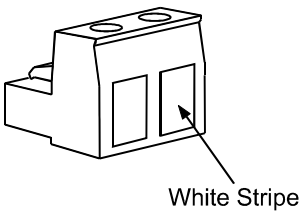






When using line extenders or short haul modems, you will probably need to make adapter cables that connect the terminal strips to a DB-25 connector (see diagram). You will also need to follow the manufacturers instructions for wiring the extenders/ modems together.

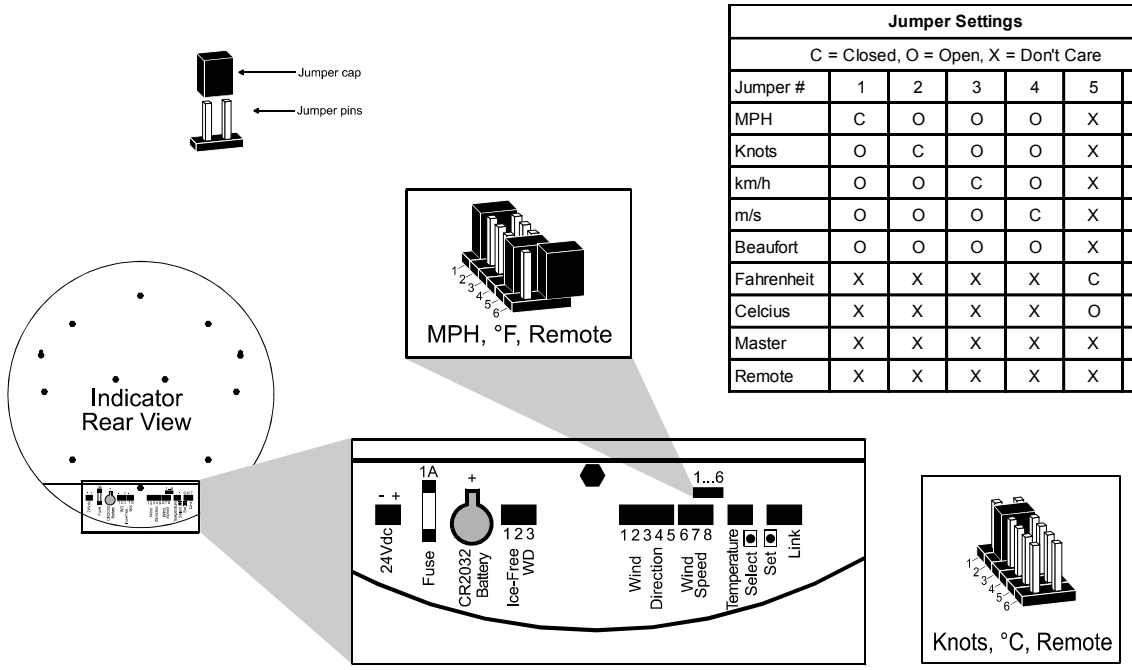
Lastly, connect a 2 terminal connector to the AC adapters 2-conductor cable. The adapter is polarity sensitive so be sure to connect the wires as shown in the diagram. If the master and remote are close to one another you may be tempted to obtain and use one AC adapter for both units. Do



not do this as it will create a ground loop through the data link cable.

Configuration and Testing

We're now ready to configure and test the system. First, the units of measurement jumpers need to be set. There are six standard PC type jumpers like you find on the circuit boards in a PC. When the jumper cap is mounted on the jumper pins, the jumper is closed, if the cap is not mounted on the pins, the jumper is open (see diagram). The first four jumpers control the units of measurement for wind speed, the fifth jumper sets the units of measurement for temperature and, the sixth jumper sets master or remote operating mode. Summit remote is shipped with the jumpers set for: Speed = MPH, Temperature = °F and Mode = Remote (see diagram). The following table shows all of the valid jumper settings. If you want to use other units of measurement then you must change the jumper settings using the table and diagrams.



Jumper Settings						
C = Closed, O = Open, X = Don't Care						
Jumper #	1	2	3	4	5	6
MPH	C	O	O	O	X	X
Knots	O	C	O	O	X	X
km/h	O	O	C	O	X	X
m/s	O	O	O	C	X	X
Beaufort	O	O	O	O	X	X
Fahrenheit	X	X	X	X	C	X
Celcius	X	X	X	X	O	X
Master	X	X	X	X	X	C
Remote	X	X	X	X	X	O

Summit remote uses the wind direction terminals to set what type of remote it will be. It is shipped with no jumper installed making it a normal remote. If you want to make the remote a different type you should remove the 5 position terminal connector from the unit and add a jumper to terminals as given in the following table.

Remote Jumper Settings and values displayed		
Remote Type	Terminals to jumper	Values displayed
Normal	none	Current wind and temperature
High	1 to 3	Daily high wind and temperature
Low	2 to 3	Daily low temperature and average wind
Chill	4 to 3	Current wind and wind chill temperature

Now it's time to plug the terminal strips into the indicator. Note that there is a plug already installed in the space for the optional ice-free wind direction sensor, don't remove this plug. To plug in a terminal, position it with the screw heads oriented toward the middle of the indicator and press into place firmly. The connectors will snap into place when inserted correctly. Go ahead and plug the terminals into the appropriate positions on the indicator (see diagram) The AC adapter connects to the position labeled 24Vdc, **do not plug the AC adapter into a 110VAC outlet yet**.

Before we power up the instrument you need to understand the boot sequence.

When Summit is powered up it first lights up all the LED's for 3 seconds.

Next Summit turns off all the LED's for 2 seconds.

During this time Summit is reading the jumper settings and doing it's POST (Power On Self Test).

The POST codes are now shown on the speed and temperature digits for 6 seconds.

The wind speed 10's digit shows whether the instrument is in master or remote mode, 0 = Remote and 1 = Master.

The wind speed 1's digit shows the type of remote, if the instrument is a remote, 0 = Normal remote, 1 = High remote, 2 = Low remote, 4 = Chill remote.

The temperature 100's digit shows the wind sensor type, 0 = Ice Free, 1 = Standard.

The temperature 10's digit indicates the wind speed units of measurement, 7 = m/s, E = km/h, L = Knots, P = MPH and, Blank = Beaufort.

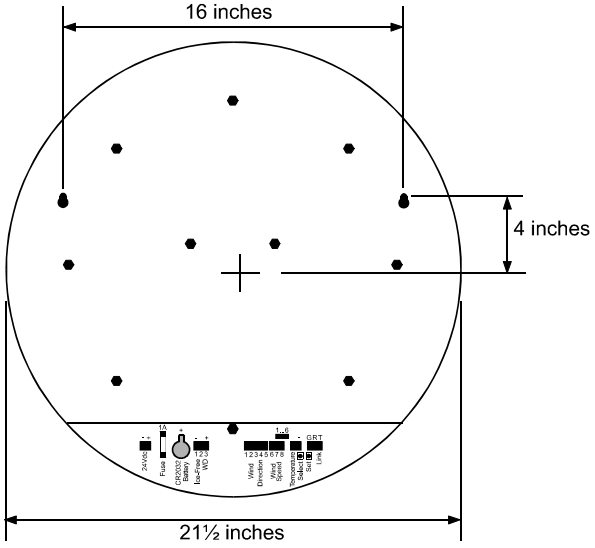
The temperature 1's digit shows the temperature units of measurement, 0 = °F, 1 = °C.

If the Summit is a high or, low remote, the clock setting mode is started now. The clock allows Summit to reset the memories at midnight so, you need to set the clock to the current time. In clock setting mode the wind speed digits show the hours and the temperature digits show the minutes. When clock setting mode starts none of the digits are flashing. If the select button **is not** pressed within 10 seconds then clock setting mode is ended and the boot process continues. If the select button **is** pressed within 10 seconds then the hours digits will start flashing to indicate that you can now set the hours. Pressing and releasing the set button on the back of the instrument will advance the hours by one (note Summit always uses a 24 hour clock, midnight = 00:00). When you have the hours set, press the select button, the hours will stop flashing and the minutes will start flashing to indicate that you can now set the minutes. When you finish setting the minutes with the set button, press the select button again. Now there are no digits flashing, if you do nothing then in 10 seconds the clock setting mode will be ended and the boot process continues. If you press the select button again the hours digits will start flashing and you can set the hours again. Note: you only need to set the clock on the first high/low remote. All other high/low remotes will automatically synchronize to the time set on the first high/low remote.

Finally Summit starts a ten second countdown for start of normal operation. The wind speed digits count from 0 to 9 and, the temperature digits will show 32, during this period.

Now plug the AC adapter into a 110VAC outlet. Check the POST codes to make sure you have installed all jumpers correctly. Once the instrument has completed the boot sequence, the North, south, East and, West LED's will turn on and the number displays will shows dashes. Whenever a Summit remote has not received at least ten seconds worth of valid data from a Summit master the display will show this pattern. If there is a functioning master connected to the data link cable then the remote will start showing the readings in about ten seconds. This completes the testing, unplug the AC adapter from the 110VAC outlet and, disconnect the wires from the sensors and terminal connectors.

Final installation



The indicator hangs on the wall from the two hanger holes on the back. The holes will accept #10 or #8 screws and are located on 16 inch centers for easy mounting (see diagram). Depending on the wall material you may need to use wall anchors, molly bolts, etc. Install the indicator mounting screws now.

Make a hole in the wall behind the Indicator through which all wires will be fed. **CAUTION: DO NOT MOUNT THE INDICATOR WITH ANY WIRES UNDER ITS LIP BECAUSE OF SHORT CIRCUIT HAZARD.**

Feed the AC Adapters' cord from the AC outlet, through the wall to the Indicator.

Run the data link cable(s) between the master and remote location(s). If you are using line extenders or short haul modems you should install them now.

At the indicator, connect the cables to the terminal connectors. Plug the terminal connectors into the indicator. Hang the indicator on the mounting screws.

Plug the AC Adaptor into the 110 VAC outlet. Verify that the POST codes are correct. This completes the installation of Summit remote.

Appendix A - Remote Specifications

Display Range and Resolution

Wind speed	0 to 255 MPH	1 MPH
Wind direction	16 compass points	22.5°
Temperature	-40 to 122 °F	1°F

Power Requirement

24 to 28 VDC @ < 1Amp

Data Link Format

RS-232 levels

2400 baud

8 data bits

1 start bit

1 stop bit

No parity

Appendix B - Troubleshooting

If you have a problem with Summit, please try the following troubleshooting instructions to narrow down the source of the problem, before contacting us. If you need further assistance you may contact us at:

Maximum Inc.
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New Bedford, MA 02745
(508) 995-2200
Fax (800) 989-2580
e-mail - service.maximum@imtra.com
Also check our web site for late breaking information - www.maximum-inc.com

Symptom	Things to check
LED's do not light.	AC Adapter wiring. AC adapter power, 24 to 28 VDC. AC outlet power, 110 to 120VAC. Indicator fuse.
Fuses keep blowing.	AC Adapter wiring.

The m/s units for wind speed won't work even though the jumpers are set correctly.

Make sure that there is a terminal connector installed in the ice-free direction terminals and, that the connector has a jumper wire connecting terminals #1 and 2.

The highs/lows shown are yesterdays or otherwise wrong.

Check the setting of the clock by re-booting the Summit and resetting the clock if it's wrong. If you keep losing the setting check the battery.

The clock in a high/low master keeps losing its setting.

Check the battery of the clock. You can do this with a battery tester or you can simply set the time. Wait a few minutes then unplug the AC power. After a couple more minutes reconnect the AC power. If the clock comes up with midnight instead of the time you just set, the battery is dead.

Appendix C - Common Questions and Answers

Q What are the two push button switches for?

A The two push button switches are only used with remotes that calculate Highs, Lows or Averages. They are used on the remotes for setting the time of the built-in clock. See the configuration and testing section for details.

Q How do I test the clock battery?

A You can do this with a battery tester or you can simply set the time. Wait a few minutes then unplug the AC power. After a couple more minutes reconnect the AC power. If the clock comes up with midnight instead of the time you just set, the battery is dead.

Q What if I want the high/low/average readings to reset at a time other than midnight?

A This can be done by intentionally setting the time wrong when you set the clock. You need to set the time so that Summit thinks it is midnight at the time you want the reset to happen. To calculate the time to set on Summit you first calculate the time offset. The time offset is equal to 24:00 minus the desired reset time. Some examples are, for a reset time of 6:00 the time offset = 24:00 - 6:00 = 18:00. For a reset time of 15:00 (3:00PM) the time offset = 24:00 - 15:00 = 9:00. Once you have calculated the time offset, you should note it on the back of the instrument and in these instructions. Now you set the clock ahead by the amount of the time offset. For the examples, if the current time is 10:24 and, you want a reset time of 6:00. The time offset is 18:00 so, you want set the clock ahead by 18 hours which is 28:24. Obviously you can't set a clock to 28:24 so you subtract 24 hours giving you a time of 4:24 to set on the Summit clock. If you wanted the reset time to be 15:00, the time offset is 9:00 so, you set the clock ahead 9 hours which is 19:24. This method will work with very odd reset times like 18:47 but, the addition and subtraction are more difficult, 24:00 - 18:47 = 5:13. If the current time is 21:54 then you'd set it to 21:54 + 5:13 = 27:07, 27:07 - 24:00 = 3:07.

Appendix D - FCC Notice

Information to the Summit User

Warning: Changes or modification to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designated to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.

- Connect the equipment into an outlet on a circuit different than from that which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

Shielded cables must be used with this unit to ensure compliance with the Class B FCC limits.

If necessary the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: HOW TO IDENTIFY AND RESOLVE RADIO TV INTERFERENCE PROBLEMS. This booklet is available from the U.S. Government Printing Office, Washington DC 20402 Stock No. 004000003454.

Appendix E - Warranty

Five year limited warranty

Maximum instruments are supported by many years of experience in building weather instrumentation to the most exacting standards of construction. Instrument sensors and details are consistently the highest quality so that their accuracy can meet the needs of commercial users. This allows us to offer the following warranty:

Maximum Inc. of 30 Samuel Barnet Blvd., New Bedford, MA. warrants its Weather instruments to be free from defects in the material and workmanship for five years from date of original purchase. This warranty does not cover damages due to improper installation or use, lightning, or damage attributed to unauthorized service. Nor does this warranty apply if any seal on any instrument is broken. Any defective weather instrument which is returned for service will be repaired, or replaced, at the option of Maximum, free of charge. The forgoing is in lieu of all express warranties.

Procedure

The instrument must be returned, postage prepaid, to Maximum and should be accompanied by a return address and a brief statement of the malfunction. Services under this warranty will be available at any time of the year and will be completed within three weeks after the instrument is returned. The return of the warranty card is not a condition of warranty coverage, but may serve as evidence of your date of purchase.

Limits of Liability

The foregoing shall constitute the sole and exclusive remedy of any owner of a Maximum weather instrument for the breach of warranty including the implied warranties of merchantability and fitness. Implied warranties with the respect to Maximum weather instruments, which shall exist only if imposed by law, shall be limited in duration to the duration of this warranty. IN NO EVENT SHALL MAXIMUM INC. BE LIABLE FOR SPECIAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE INSTALLATION OR USE OF ANY INSTRUMENT. Some states do not allow the exclusion of incidental or consequential damages, so the above limitations or exclusions may not apply to you. Maximum does not make or assume or authorize any other person to make or assume for it any

other warranty or liability in connection with its weather instruments. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Owners Notes