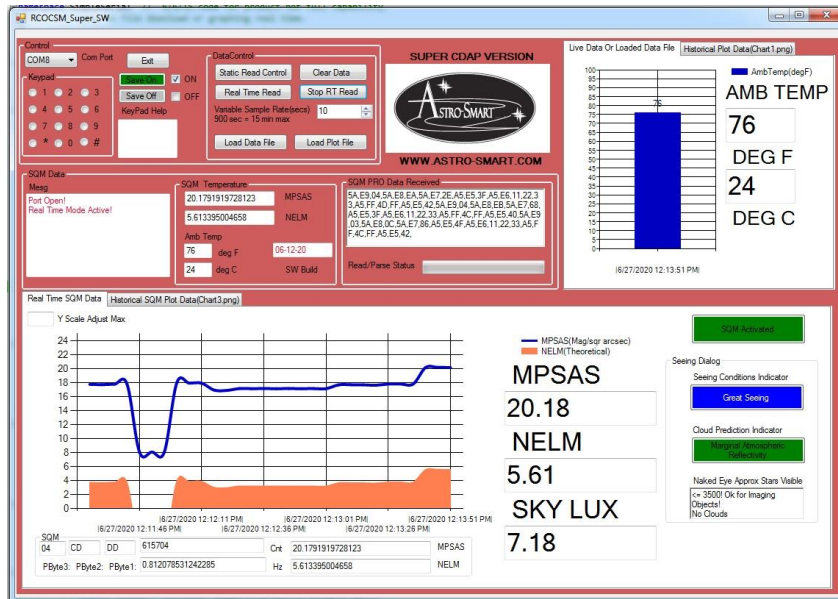




# User's Manual(SQM-PRO)

## SKY QUALITY METER SQM + LUX PRODUCT



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**User's Manual**  
**for the**  
**Astro-Smart**  
**Computerized SQM Pro (Model RC SQM PRO)**

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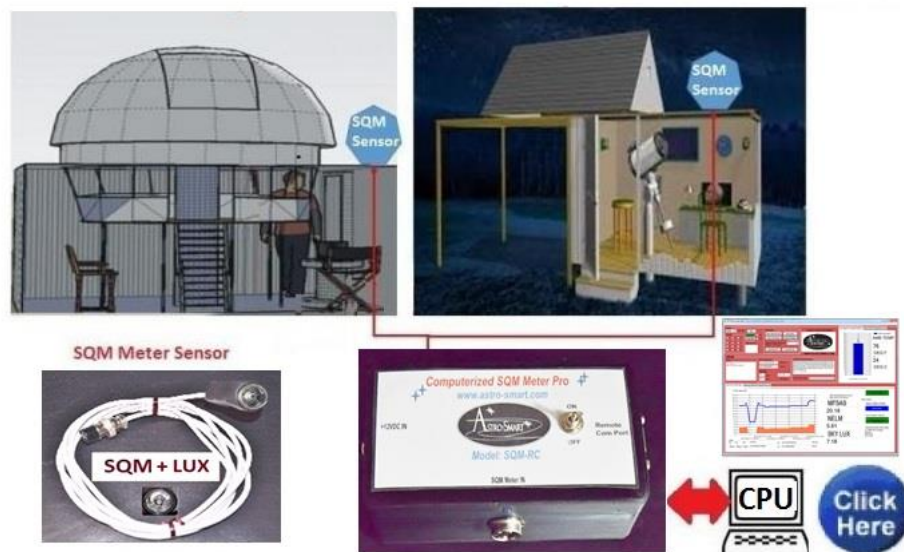
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## Computerized SQM (Model RC SQM PRO)

### A. Overview

The ***SQM-RC-PRO*** can be setup with your home observatory for trouble-free operation controlled by the user supplied computer interface. The SQM meter sensor as seen in the configuration picture should be mounted outside the observatory, so the user can determine if imaging, visual or technical work is appropriate. The SQM meter sensor cable length is typically 6 feet but can be made to any length based on customer requirements. Simply, plug the SQM sensor in and mount the sensor to the location desired on your observatory. Then, connect to your PC with the USB/Serial cable provided and launch the GUI interface provided to read and graph MPSAS and NELM readings continually. The **SQM** features include a graphical reporting system on the software GUI which graphically maps **NELM(Naked Eye Limiting Magnitude)** and **MPSAS (Magnitude Per Square Arc Sec)** over a programmable measurement scale as low as 1 sample every 3 seconds. A Typical Configuration is shown below.

### SKY QUALITY METER SQM + LUX PRODUCT





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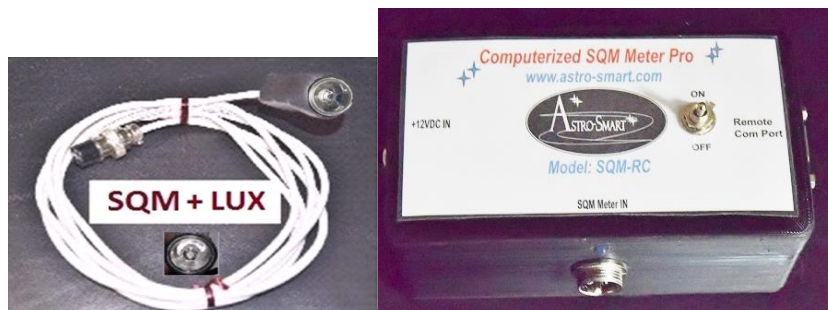
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Astro-Smart is the innovator of this elegant and convenient *solution to your Automated Observatory needs*. The **Computerized Sky Quality Meter System Controller Pro (Model: SQM-RC-PRO)** is a economical yet superior Automation solution made available to the amateur or professional Astronomer. The **Computerized Sky Quality Meter System Controller Pro (Model: SQM-RC-PRO)** is designed to be used with any make or model observatory motor driven roll off or dome observatory.

The intent of the **SQM-RC-PRO** is to be used standalone or in conjunction with **RC-SQM-PRO-PRO** devices. nother option available at Astro-Smart is to upgrade your existing Dew controller product to include the SQM feature. Simply, purchase the add on feature on the purchase link and you can upgrade to include this feature.

Since, the inception of this unique product at Astro-Smart, the **SQM-RC-PRO** was many years in the making, over long periods in astronomy using existing products on the market identifying their weaknesses and limitations making the product you see before you. The **SQM-RC-PRO** is finally here!!! The Astro-Smart **Computerized SQM Sky Quality Meter System Controller Pro (Model SQM-RC-PRO)** designed to be user friendly, serviceable, elegant and reliable and include the following features shown below:

**Figure 1: Computerized SQM Pro  
(RC-SQM-PRO)**





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## B. Features

The Astro-Smart **Computerized SQM Pro ( Model - RC-SQM-PRO )** has these innovative and unique features:

1. *Worry Free Warranty Program For Life Of Product Sale.*
2. *Full Computerized Sky Quality Meter Sensor Solution.*  
*Support for SQM Sky Quality Meter Sensors to measure MSPAS and NELM. 0.2 mag/square arch sec accuracy. Aviation style locking interface. Variable length of sensor cable is available. Standard Length 6 feet.*
3. *Lux sensor with sensitivity range 0.1 to 50k lux.*
4. *USB/Serial interface with PC GUI Measuring Software with Night Sky Advisory Capability.*  
*High quality design employs multi-layer PCB form factor and only the best quality components*
5. *with conformal coatings for outdoor use.*
6. *Price point set below development cost for such a system while providing more features.*
- 7.

The Astro-Smart Computerized SQM Pro ( RC-SQM-PRO ) was designed with the same Astro-Smart USER-Friendly design philosophy as all our other products:

- Usable
- Serviceable
- Elegant
- Reliable
- Build with burn in time testing before ship.
- ... USER-Friendly



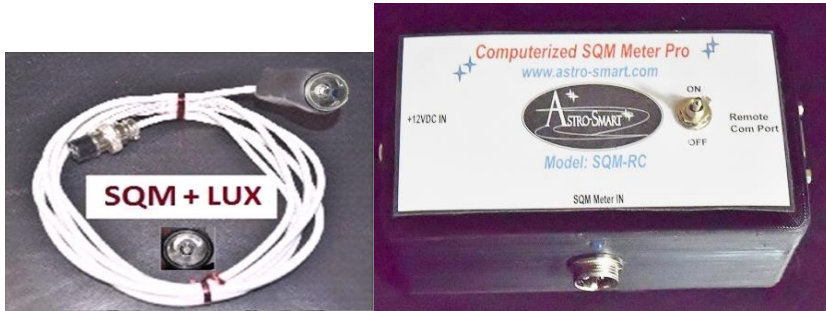
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### C. Contents of Box

1. CD with **RC-SQM-PRO** SW, manual and video tutorials.
2. **RC-SQM-PRO** Controller Module.
3. One USB to serial interface Cable.
4. SQM and Lux Sensor 6ft or optional longer sensor cables.







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## D. Specifications


The **RC-SQM-PRO** requires the following:

- At a minimum of 12 Volts DC at 3.3 amps a 2.5mm DC power connector on your AC/DC supply.

- Center positive voltage, sleeve ground, sees

Figure 2.

Positive (+)  
12VDC



**Figure 2 DC power plug**



- **Note:** Astro-Smart recommends you buy our certified tested power supplies for this product. Users can buy and connect their own power supplies to this product, but they do so at their own risk.



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## E. Design Features

The Astro-Smart integrated Differential Dew Heater Module, **RC-SQM-PRO**, has these innovative and unique features:

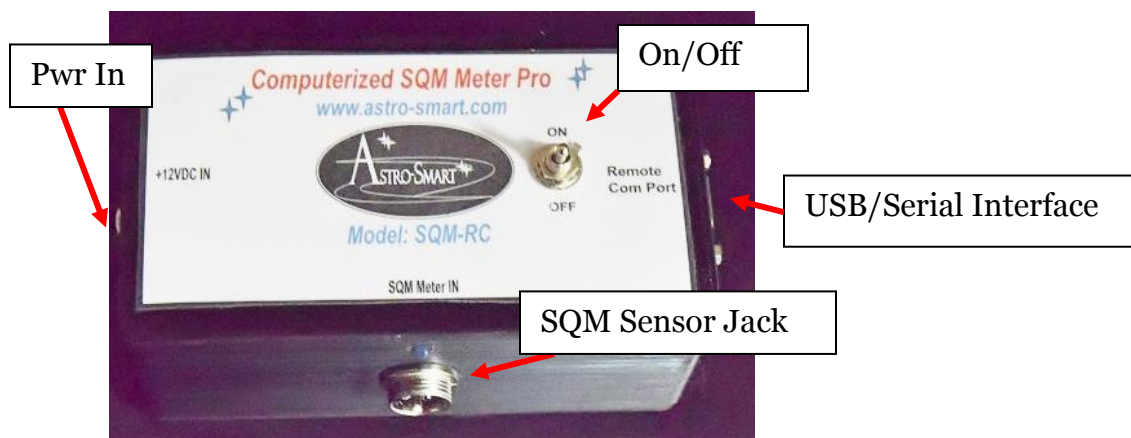
- High quality components and construction utilizing multi-layer board designs with conformal coatings to aid in corrosion prevention in the elements.
- Astro-Smart uses only the best quality components and engineering practices in design, construction and fabrication.
- It can keep optical surfaces free of moisture in many different circumstances. RC-SQM-PRO Front Panel And Connector Diagram:



## F. RC-SQM-PRO Front Panel And Connector Diagram

- **Computerized SQM Pro (Model- RC-SQM-PRO )** Configuration . See Figure 3 below.

**Figure 3 RC-SQM-PRO Overview Model (2020).**



An online video demo of operation can be found on our website at :  
[http://www.astro-smart.com/index.php?p=1\\_24](http://www.astro-smart.com/index.php?p=1_24)





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**G. PC Dew Control Remote User Interface Summary**

Your RC-SQM-PRO can be monitored or controlled from your computer. Just connect the serial to USB cable and in the device manager of your operating system, you must know what port is used when connected. The settings will be automatic and the host PC install program provided will list all available serial ports to connect. You just pick the correct one. A video tutorial is listed in the support page of our website to go thru the basic operations of this feature. Some basic features are listed below.

The screenshot displays the RCOSM\_Super\_SW software interface. At the top, it features a control panel with a keypad, 'Save On/Off' buttons, and 'DataControl' options like 'Static Read Control' and 'Real Time Read'. The central area shows 'SUPER CDAP VERSION' with the Astro-Smart logo and website URL. To the right, a 'Live Data Or Loaded Data File' section contains a bar chart for 'AMB TEMP' showing 76 degrees Fahrenheit and 24 degrees Celsius. Below this, the 'SQM Data' section displays 'Port Open!', 'Real Time Mode Active!', and 'SQM Temperature' readings for MPSAS (20.1791919728123) and NELM (5.613395004658). It also shows 'SQM PRO Data Received' as a hex string and 'Read/Parse Status'. The bottom section features a 'Real Time SQM Data' plot with 'Y Scale Adjust Max' and a legend for 'MPSAS(Mag/sq arcsec)' and 'NELM(Theoretical)'. To the right of the plot, 'MPSAS' is 20.18, 'NELM' is 5.61, and 'SKY LUX' is 7.18. A 'Seeing Dialog' box on the far right indicates 'SQM Activated', 'Great Seeing', and 'Marginal Atmospheric Reflectivity'.

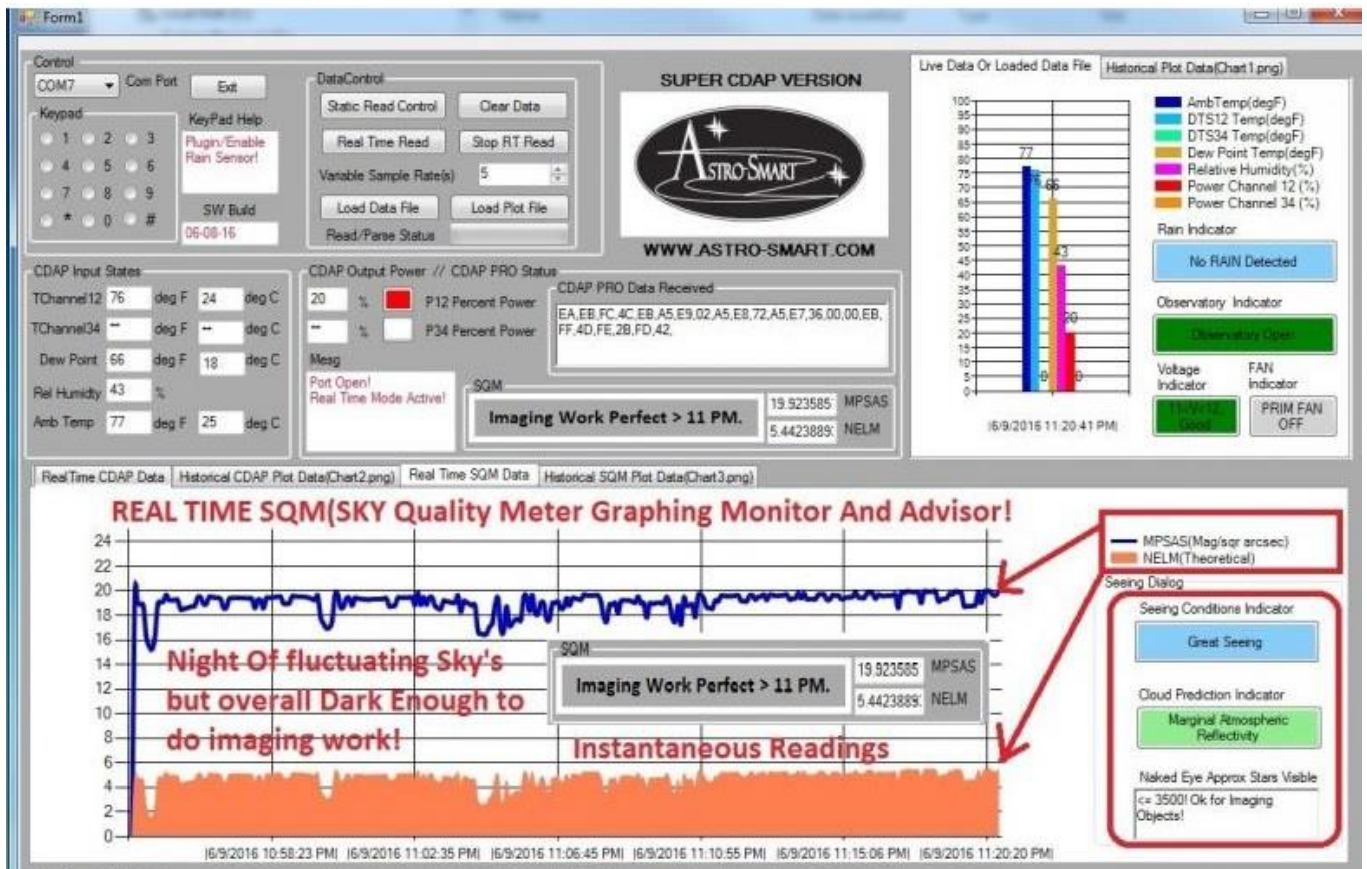


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SW GUI versions are available for the SQM Sensor Integrated In CDAP package and standalone model GUI SW snapshots shown below. Unique to the SQM interface is the graphical representation of MPSAS and NELM with diagnostic guidance to the user to determine the best time to do imaging, visual or technical work.

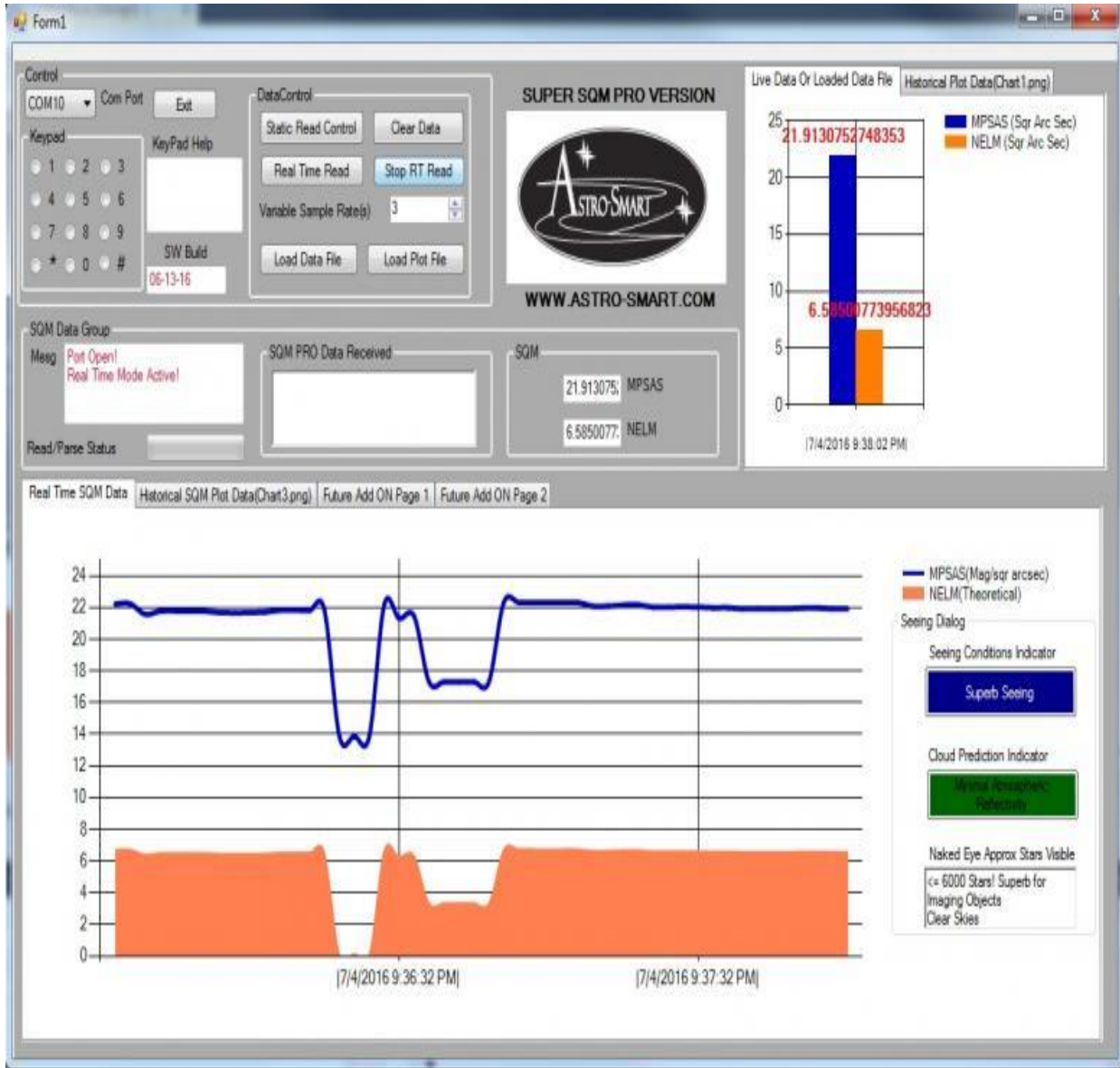




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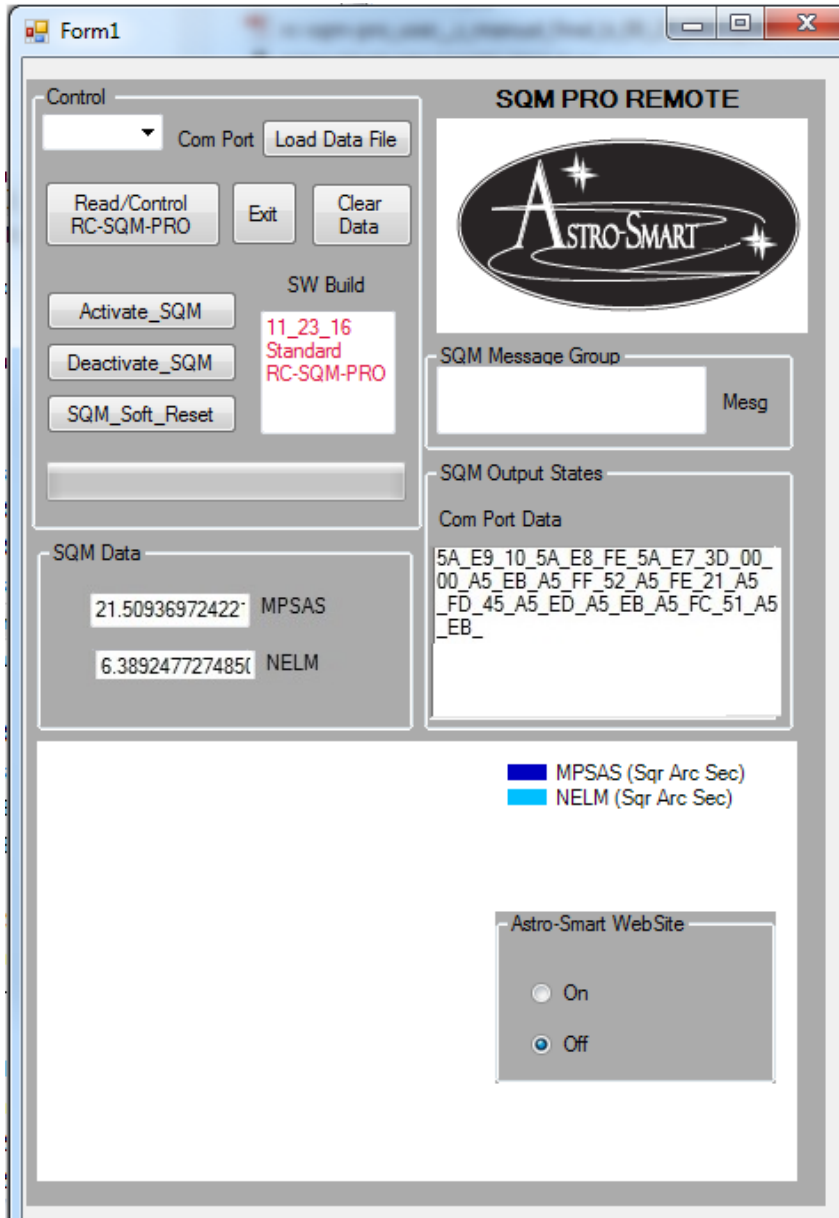


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Shown below is standard SQM interface to display MPSAS and NELM instantons readings.



The PC SW remote interface snap shot main screen is shown to the left. Its a USB-Serial connection to the SQM tested across multiple PC operating system platforms.

The snapshot on the SQM product page shows the left side window with current remote activity with virtual keypad, parametric values, SQM advisor and graphical tracking of MPSAS and NELM.

As part of the SQM pro package, new SQM purchases will get the standard PC SW remote platform for free.



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The simplicity of operation can be seen in the following figure below.

### **The HW/SW requirements for the RC-SQM-PRO to work in PC remote mode are the following:**

1. Connect serial to USB cable provided by Astro-Smart.
2. Plug in your SQM Sensor in the SQM sensor Jack.
3. Install the RC-SQM-PRO SW on your computer(Win XP, Win 7 or Win 8).
4. Turn on the RC-SQM-PRO, then run the device manager on your PC OS to determine which port the RC-SQM-PRO is attached to. Then run the RC-SQM-PRO SW. For compatibility select XP compatibility and Admin control for Win 7 and 8 after installed before running if required.
5. While in RC-SQM-PRO PC interface, select the serial port RC-SQM-PRO is attached to.
6. Select the Read/Control RC-RC-SQM-PRO Button.
  - i. Press the #4 button on the virtual keypad to activate the SQM sensor.
  - ii. Watch the data arrive in the Output status window.
  - iii. In about 5-8 secs, the data will be parsed and reported in I/O status window and the SQM data measurement will appear.
  - iv. Anytime, you wish to update from the device, simply press the Read button again.
7. Other features of the GUI and examples can be seen by demonstration on our website to browse support pages, video tutorials of this product and others.
  - i. [http://www.astro-smart.com/index.php?p=1\\_49\\_Video-Overviews](http://www.astro-smart.com/index.php?p=1_49_Video-Overviews)
8. Enhancements to the software will be made based on user input on a continual basis and can be uploaded from our site for your convenience.





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### A. Summary WebGUI Entry Commands (System Control)

- **'3' Enter:** on WEBGUI is used if user wishes to set a **variance setpoint between optics and ambient temperature  $T_{ambient}$ (ATHS)** or re-calibrate ATHS channel. This has been done at factory. Default activation on power up and reset user modification from sensor value. For example pressing 3 followed by another 1 in subtraction mode will cause ATHS to be lowered by 1 deg F. If it is desired to add value to ATHS, mode 5 must be pressed to go into add mode before performing operation. See below in option 5.
- **'5' Enter:** on WEBGUI is used if user wishes to set a **variance add mode setpoint between sensors by using a value offset in add mode.** This has been done at factory. Default activation on power up and reset subtracts from sensor value. For example pressing 5 followed by a 1 and then another 1 will cause DTS CH1-2 to be increased by 1 deg F. If it is desired to return to subtract mode, either reset the system or use the mode 6 button to return to subtract value mode.
- **'6' Enter:** on WEBGUI is used if user wishes to set a **variance subtract setpoint between sensors by using a value offset in subtract mode.** This has been done at factory. Default activation on power up and reset subtracts from sensor value. For example pressing 6 followed by a 1 and then another 1 will cause DTS CH1-2 to be decreased by 1 deg F.
- **'#' Enter:** For all models on WEBGUI will perform SQM sensor deactivation. LED will turn off.
- **'\*' Enter:** For all models on WEBGUI will perform SQM sensor activated. LED will turn on. This has been done at factory.
- **'o' Enter:** on WEBGUI for all systems will perform a soft reset.





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## B. External SQM Sensor Hints:

Install the SQM Remote Sensor such that the sensor radome is pointing up at the night sky. The SQM sensor is a standard 6 foot in length but can be made to any size based on user requirements. The sensor can be mounted inside or outside your observatory or mount configuration.

## C. Accessories

Another convenient accessory for your *SQM-RC-PRO* that Astro-Smart offers is a 12 VDC car adapter for operating your *SQM-RC-PRO* needs with your telescope from your car rated at 10Amp 12 VDC. ([PC12V10AMP-D](#)).



Another convenient accessory that Astro-Smart offers is a Ethernet interface specifically designed for the *SQM-RC-PRO*. You just plug the supplied RS-232-USB connector that comes with your *SQM-RC-PRO* into the female USB to Ethernet converter. Now, plug in the desired length of ethernet CAT-5 to your remote control computer location to the other CAT-5 termination and simply plug in the USB connector to your computer([ETHER-DM](#)).





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## **Bluetooth Wireless (200 FT)**

Another convenient accessory add-on that Astro-Smart offers is a RF Bluetooth Wireless interface specifically designed for the **SQM-PRO**. For dedicated wireless communication distances less than 200 feet to your computer, the embedded bluetooth upgrade option is right for you. You just connect with your bluetooth capable PC or use supplied bluetooth adapter and enjoy a Wireless connection that's wire free upto 200 feet of unit separation. This add on gives the user ability for simultaneous use of supplied standard serial/USB port interface plus the addition of the Wireless Bluetooth port which can run two remote software applications at once if desired.

## **RF ISM Wireless (650 FT)**

Another convenient accessory add-on that Astro-Smart offers is a RF Wireless interface specifically designed for the **SQM-PRO Pro family**. For dedicated wireless communication distances less than 656 feet to your computer, the [\(RF200M-DM\)](#) option is right for you. You just plug the supplied RS-232-USB connector that comes with your **SQM-PRO family** into the female RF-Wireless Adapter converter which is attached to your remote Computer's USB port. Now, plug in the other RF Wireless interface unit to the RS-232 port of the **SQM-PRO Pro family** and you now have a Wireless connection that supports a RF link wire free upto 656 feet of unit separation. [\(RF200M-DM\)](#).

**Visit Astro-Smart for more astronomical products, services, and training at [www.astro-smart.com](http://www.astro-smart.com) .**



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## D. Warranty, Policies, Copyright Notice:

# Life Time Warranty

All products are guaranteed to the original purchaser to be free from defects in material and workmanship for the life of the product from the date of original purchase. Simply put, once you buy a Astro-Smart product we make sure it works for as long as you keep the product for free upgrades of software and firmware for the product. Warranty coverage excludes normal wear and tear, or damage caused by improper installation, any modification, abuse, misuse, improper maintenance, and unauthorized repairs or modifications to the original product. Shipper is responsible for proper packaging, shipping and insurance on applicable upgrades or repair items. . Upon receipt of returned product, Astro-Smart will assess the item/s to determine if they comply with the conditions of our warranty. Astro-Smart is not responsible for damage caused by the freight carrier, i.e.: USPS, UPS, FED EX, etc., to our product. A claim to repair or replace the product must be initiated by the recipient. In no event shall Astro-Smart be liable for any claim for incidental or consequential damage arising out of or in connection, manufacture, delivery or use of any product offered on this website or by information received by US mail, E-mail, data files or fax.

# Return Policy

Merchandise must be returned in new (mint) condition within 30 days of receipt for exchange/refund which may be subject to 20% restocking charge (Shipper is responsible for proper packaging, shipping, and insurance.). We must receive the returned merchandise within 30 days of the date you received it. All items must be in new (mint) condition. Returned items cannot show evidence of use or wear, dirt, or blemishes of any kind. Merchandise must be returned in its original packaging and should include all supplied materials, instructions, original accessories, hardware, and any CD software disks provided. Software purchases via email or download since released are non-refundable. Astro-Smart is not responsible for lost or damaged packages. Return shipping costs are the responsibility of the customer. Any returned items must be in "as new" condition. We ask that you open and inspect your order upon receipt. No insurance or damage claims will be accepted more than 3 days after delivery. All customers MUST email Astro-Smart before returning products for warranty or repair to get an RMA#(Return Merchandise\_Authorization).



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