User's Manual Computerized Dew Annihilator

(Model RCDA)

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User's Manual

for the

Astro-Smart

Computerized Dew Annihilator

(Model RCDA)

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A. Overview

The RCDA can be setup with your telescope for troublefree operation controlled manually by the user supplied key pad interface.

Astro-Smart is the innovator of this elegant *solution to your dew problem*. The **Computerized Dew Annihilator (Model: RCDA)** is one to the most advanced yet modest dew controllers made available to the amateur or professional Astronomer. **The Computerized Dew Annihilator (Model: RCDA)** is designed to be used with any make or model of telescope. Whether you have a refractor, newtonian, schmidt-cassegrain, or a ritchey-chretien, the **RCDA** will solve your dew problems while informing you every step of the way. Its like having a hired dew specialist posted at your telescope 24/7.

The **RCDA** systems incorporates a common four port heater capability controlling multiple channels. For instance, one channel CH12 heater may be used for the main imaging telescopes secondary corrector plate for dew control while CH34 heater can be used for the primary mirror, another mounted imaging scope, guider or finder scope or your eyepieces.

In the following picture you can see **RCDA** system with common 4 heat channels, PWM LED indicators on CH1/2/3/4, Low voltage cutoff circuit protection with LED indicator for power supplies using battery sources and 2 12 VDC outputs for powering camera and focuser.

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Figure 1: Computerized Dew Annihilator (RCDA)

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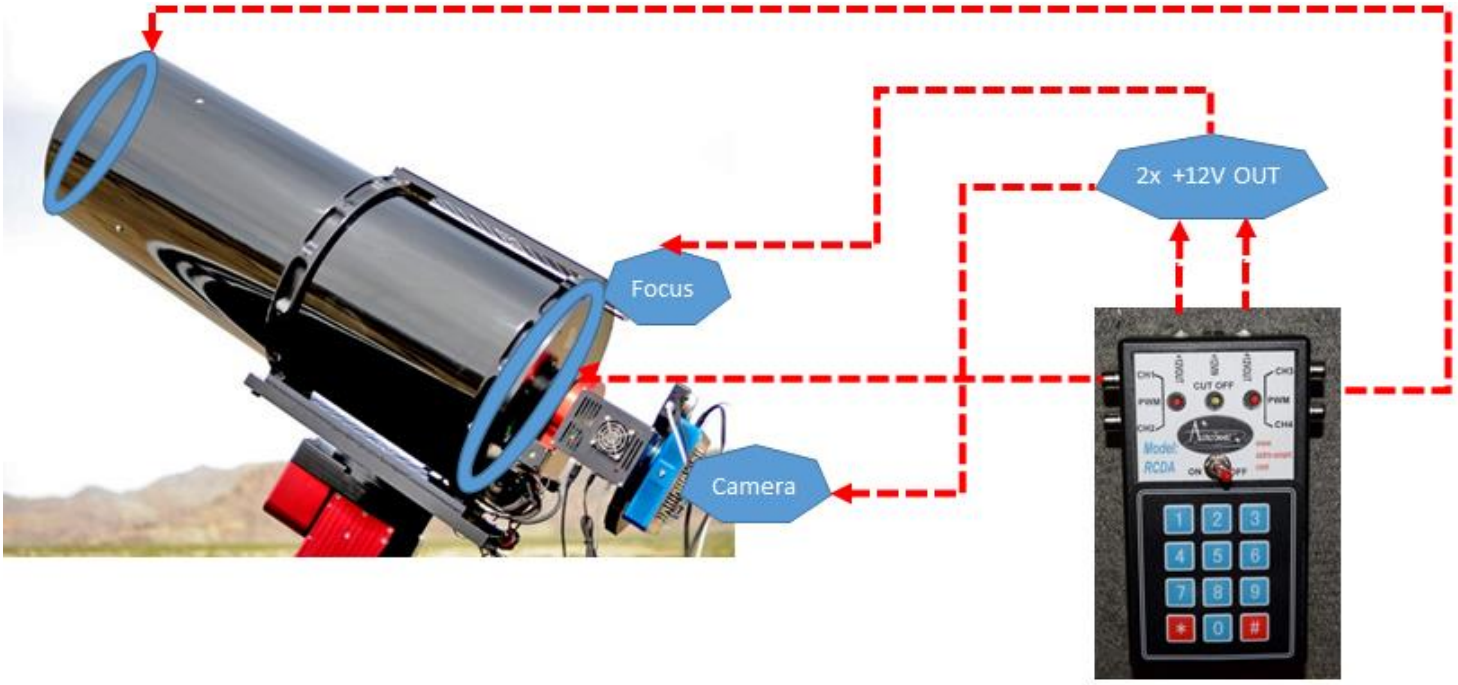
Typical Configuration for the RCDA is shown below on a ritchey-chretien but can be used with any reflector, refractor, newtonian or schmidt-cassegrain telescope.



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B. Features

Since, the inception of this unique product at Astro-Smart, the **RCDA** was many years in the making, over long periods in astronomy using existing products on the market to control dew, identifying their weaknesses and limitations making the product you see before you. The **RCDA** is finally here!!! The Astro-Smart **Computerized Dew Annihilator** (Model **RCDA is** designed to be user friendly, serviceable, elegant and reliable and include the following features shown below:

1. ***Worry Free Warranty Program For Life Of Product Sale.***
2. ***Full Computerized Dew Control Solution.***
3. ***4 Automated or Manual Output Port Heat Channels User Control Capable of 120 Watts(12V, 10Amps). Works with any RCA type heat strap....Astro-Zap, Kendrick, etc.***
4. ***Over Current, Reverse Current and Over Voltage Protection Design with Switchable ON/OFF Power.***
5. ***Low Voltage Cut-OFF Circuit Control And LED Indicator.. Cutoff at 10.5-11VDC.***
6. ***Variable Power Control Duty Cycle 0-100%, 300 Hz. Patented Asto-Smart Wave Cancellation Method And Pulse Width Modulation(PWM) for Efficient Heat Output Tailored for Extreme Dew Removal, Reduced Wave Interference with CCD Imaging and Conservation of Power Drawl.***
7. ***PWM LED Flash Indicators For Heat PWM Output Ports.***
8. ***Two 12VDC output ports 3.5mm Jack. 10 Amp max.***
9. ***Updatable Firmware and Standalone Software OS GUI Interface.***
10. ***High quality design employs multi-layer PCB form factor and only the best quality components with conformal coatings for outdoor use.***
11. ***Void of RFI(Radio Frequency Interference) protected to enhance Astro-Imaging .***
12. ***Price point set below development cost for such a system while providing more features.***

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The Astro-Smart Computerized Dew Annihilator (**RCDA**) 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

C. Contents of Box

The package contents are shown below with choice of: RC-CDA-R or CDA-R.

1. ***RCDA Dew Controller System***
2. ***12 Volt 5 amp DC fused cigarette adapter harness.***

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D. Input / Output Power Specifications

The **RCDA** 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. Based on the 4 channel configuration, the **RCDA** is rated at 5 Amps per duplexed channel or 10 Amps total. Ie. Ch1-2 5 Amp max + Ch3-4 5 Amp max for a total of 10 Amps at 12 VDC which gives a variety of heat strap configurations possible. A power supply rated at 12 VDC and 10 Amps rms is the ideal configuration which astro-smart recommends and provides as a purchase option.

  Note: This current drawn through the **RCDA** is dependent on the resistance of each dew strap being used with the **RCDA**. The total current for all the dew straps must not exceed the power supply current rating.

The total resistance of all the dew straps used with the iDDHM must follow this equation for SAFE operation:

$$\frac{\text{Current Rating of Power Supply}}{\text{Voltage output of Power Supply}} = \frac{1}{R_{strap\ 1}} + \frac{1}{R_{strap\ 2}} + \frac{1}{R_{strap\ 3}} + \frac{1}{R_{strap\ 4}}$$

Astro-Smart assumes no responsibility if this warning is not heeded.

- Center positive voltage, sleeve ground, see Figure 2.

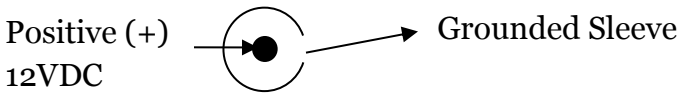

Figure 2 DC power plug

- Uses dew straps manufactured by other astronomical vendors.
- **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. CDA-R Front Panel And Connector Diagram

- **Computerized Dew Annihilator (Model- RCDA)** Configuration . See Figure 3 below.

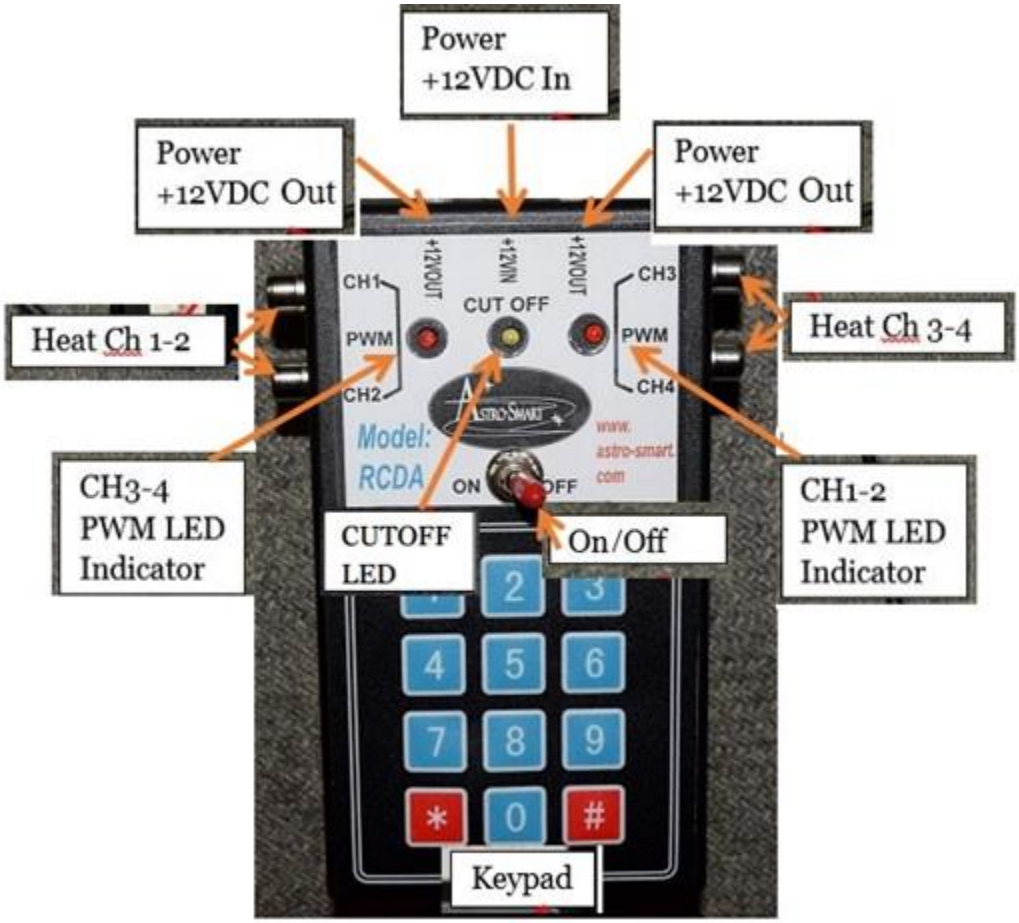

Figure 3 CDA-R Overview Model (2016).

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F. Basic Functionality

The user can watch as the **RCDA** adjusts heat and controls dew on your telescope based on humidity, dew point, local ambient and temperature differential from optical interfaces with the surrounding environmental conditions. The automatic bootup default control summary features are explained below with user override options for manual control during standard operation described below in next section.

G. BootUp: Default

1. Fix all connections to your **RCDA** as depicted in Figure 3. This includes heater straps CH1/CH2/CH3/CH4 and power supply interface as specified in Figure 1, Figure 2.(Expected Def Operation.)
2. Turn On power switch from center(OFF) to Up position(ON).. Boot up sequence. All functions are a go when the "Beep" is heard.

   Note:" The RCDA requires a complete circuit meaning the heat straps being plugged in to provide current drawl and heat applied to the optics."

Online video demo's of operation can be found on our website at :
http://www.astro-smart.com/index.php?p=1_24

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H.Summary Keypad Entry Commands (System Control)

Note: Use keypad entry instructions below when using buttons on keypad on standalone RCDA keypad.

Note: Picture examples of modes are shown below of what to expect when pressing the keypad before the system responds to the user action invoked.

- **'#' Enter:** *on keypad will perform a soft RCDA reset of the system.* ***SW RESET***
- **'*' Enter:** *on keypad will perform a soft RCDA reset of the system.* ***SW RESET***
- **' 1' Enter**: *on keypad = 20% PWM CH12.*
- **' 2' Enter**: *on keypad = 40% PWM CH12.*
- **' 3' Enter**: *on keypad =60% PWM CH12.*
- **' 4' Enter**: *on keypad =80% PWM CH12*
- **' 5' Enter**: *on keypad =100% PWM CH12*
- **' 6' Enter**: *on keypad =20% PWM CH34*
- **' 7' Enter:** *on keypad =40% PWM CH34*
- **'8' Enter:** *on keypad =60% PWM CH34*
- **'9' Enter:** *on keypad =80% PWM CH34*
- **'0' Enter:** on keypad= 100% PWM CH34

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I. Accessories

Optional Accessories:

Another convenient accessory that Astro-Smart offers for your **RCDA** is a right angle heater connector (RAHC-DM).This allows your heater to be connected to the **RCDA** at a right angle. This may be convenient for you to alleviate any bending that you have of your heater connector and wire.

Another convenient accessory for your **RCDA** that Astro-Smart offers is Two versions of power supplies based on your dew heating needs for 6 Amp or 10Amp 12 VDC supplies(PS12VXAMP-D).

Another product Astro-Smart offers is our Premium Dew Heater Straps. Astro-Smart is proud to announce the offering of our Premium Dew Controller straps that can be used with the Astro-Smart Dew Controller products and compatible with other vendor dew controllers with RCA jack input to control temperature of your telescope optics, cameras, camera lens, telescope eyepieces and sensitive electronics.

The materials used for these Premium Dew Straps include Industrial Velcro, High Quality Insulating Material to project heat toward the optics and away from the atmosphere, 5 foot power cord with male RCA connector and Power Conductor Current capable of 10 Amps.

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J. 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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