



DESERTROTOR
Commercial Ground Control Stations for Unmanned Vehicles

MIRA 12X

Ground Control Station Operating Manual



December 2022

7/1/22	Initial version
12/1/22	Added Smartview radio configuration

Our Philosophy - Offer products that are high quality, highly compatible and cost effective. Integrating proven technology coupled with our innovative interfacing and design skills keeps costs down all while offering countless unmatched features.

Our Skills - The Desert Rotor team has designed breakthrough ground control systems in the defense sector. We bring that extensive knowledge and skill to our products, proudly designed and assembled in Scottsdale, Arizona USA.

Flight Controls - Operate unmanned aerial vehicles the natural way using HOTAS (Hands on Throttle and Stick). The gaming and defense industry utilizes this layout and truly is the simpler more professional way to fly.

Compatible - We design our systems to be able to accommodate rapidly evolving technology. Use our ground control systems with virtually any unmanned vehicle and autopilot system.

Your Business - Elevate your business by using and offering a ground control system that is cost effective, easy to use and raises your professional brand. OEM available. Offer your own brand of ground control system.

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Welcome to the next generation of ground control station (GCS) technology. Designed and manufactured in Scottsdale, Arizona. We are honored you decided to make the MIRA 12X a key system in your overall operations of unmanned vehicles. At Desert Rotor we strive for our products to be high quality, highly compatible and cost effective. Our MIRA 12X platform was designed to last. All components are highly accessible and easily upgradable to future technological developments.

We designed the MIRA 12X to be able operate most aircraft types and autopilot systems. We achieved this by designing the Desert Rotor GCS Smart View™ interface. Within this interface you can assign functions and channels to the various joysticks, buttons, switches and dials. The interface also allows you to save aircraft/autopilot settings and easily switch to other aircraft profiles. There are infinite possibilities and configurations within the MIRA 12X.

A key message we would like to deliver is the fact that flying unmanned aerial vehicles can be extremely dangerous and can lead to criminal prosecution, destruction of property, injury, death of yourself and many others. It is your responsibility that you check your country and regions regulations when operating the MIRA 12X and all devices you are using. The use and operations of the MIRA 12X can be prohibited or even illegal in many countries and regions. It is entirely you and your companies responsibility to check those laws and regulations.

The Desert Rotor team wish you a safe and prosperous future with the next generation of UAV flight control and operations.

Terms & Conditions

PRODUCT USAGE. The MIRA 12X is a GCS for unmanned aerial vehicles. The product serves as transmitter controls, field computer and wireless video/data communications system. The MIRA 12X has a wide variety of applications and uses. DESERT ROTOR is not liable for uses within research & development and outside of its primary functions and applications. DESERT ROTOR is not able to conduct tests based on all possible combinations of software and hardware environments. Therefore, DESERT ROTOR is unable to promise nor warrant that there will be absolutely no risk of loss or damage of information, or any other kind of loss, during operating, piloting and/or execution of any of the functions or components.



LIMITATION OF LIABILITY. The software and hardware was designed following careful development and testing by DESERT ROTOR, but DESERT ROTOR is not able to conduct tests based on all possible combinations of software and hardware environment. Therefore, DESERT ROTOR is unable to promise nor warrant that there will be absolutely no risk of loss or damage of hardware, property, information or any other kind of loss, during operating, piloting and/or execution of any of the functions or components. Customer must be fully aware of risks using the MIRA 12X as the system can be used with countless hardware components that were not tested alongside the MIRA 12X.

DESERT ROTOR LLC does not warrant that the software and hardware included in MIRA 12X units contain no defects or errors. DESERT ROTOR LLC IS NOT LIABLE FOR ANY INDIRECT, INCIDENTAL LOSS OR CONSEQUENTIAL DAMAGES ARISING FROM THE MIRA 12X, INCLUDING BUT NOT LIMITED TO LOSS OF PROFITS, DAMAGE TO BUSINESS, CESSATION OF WORK, HARDWARE MALFUNCTION OR DAMAGE, OR ANY OTHER COMMERCIAL DAMAGE, PERSONAL INJURY, LOSS OR DEATH ARISING FROM USE OF THE MIRA. REGARDLESS OF WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY OR ANY OTHER THEORY OF LIABILITY, EVEN IF DESERT ROTOR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.



Further, in no event shall the liability of DESERT ROTOR exceed the individual price of the MIRA 12X on which liability is asserted. As DESERT ROTOR has no control over use, setup, assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage, injury or death. By the act of use, setup or assembly, the user accepts all resulting liability. If Customer and/or End User are not prepared to accept the liability associated with the use of the MIRA 12X, Customer is advised to seek an alternative GCS solution.

Support & Service

We strive for not only world class ground control systems but world class support as well. As a company we are dedicated to developing our distribution channels to fully understand and support the MIRA 12X platform along with the highly knowledgeable Desert Rotor team.

We designed the MIRA 12X platform for anyone to be able to work on and troubleshoot. Desert Rotor has strategically positioned support to be available from our distributors as well. We do ask you contact the seller of your system in the event you need technical support. Though we do have resources available for the end users.

E-mail : info@desertrotor.com

Phone : 1.888.938.8470

Website: www.desertrotor.com

Symbol & Word Definitions

HOTAS - Hands On Throttle And Stick

GCS - Ground Control Station

Li-ion - Lithium Ion

NUC - Embedded PC

FPV - First Person View



STOP & THINK



CAUTION



BATTERY
WARNING



WATCH OUT



ELECTRICITY WARNING



BODILY HARM



SHOCK WARNING



FIRE
HAZARD

Specifications

Model	Base MIRA 12X
Displays	Single LG Display™ 19" HD Wide
Resolution	1440x900
Brightness	Sunlight Viewable - 1200NITS
Display I/O	Single/HDMI/DVI
Analog Video	No
GCS Radio Interface	GCS SmartView™ Touchscreen HUD
Stereo Sound	Yes
Auxiliary Bays	1
GCS Protocols	PPM,SBUS,SERIAL
Embedded PCs	OnLogic™ Intel Comet Lake, i3, i5, i7, i9 Quad
Peripherals	Integrated Keyboard & Multi-Gesture Trackpad
Wireless	Intel 8260 M.2 Wifi AC, Bluetooth 4.0, vPro
GCS Layout	HOTAS (Hands On Throttle and Stick)
Flight Joystick	APEM™ Hall Effect - 3-AXIS / 2-Top Button
Aux Joystick	2-Axis Payload/Gimbal Joystick
Switch Array	6-POS/3-POS/2-POS Guarded/2 Dials
Throttle	Delrin Machined Precision Slider w/ Detent
Size (L x W x D)	Pelican™ 1510 (22"x 13.81"x 9")
Weight	30lbs
Color	Midnight Black, Desert Gold, Hunter Green
MSRP	\$8,200

Regional Compliance Disclaimer

The MIRA 12X can be configured in infinite ways with countless types of components. It is ENTIRELY up to you to determine the compliance of these components in your region. Some of the components require HAM radio licenses and could be completely prohibited. The MIRA 12X itself could be restricted and not allowed in certain countries and regions. Desert Rotor, LLC is not liable for misuse or user not being compliant to their area, region or country.



BEFORE USING

MIRA 12X Base Contents

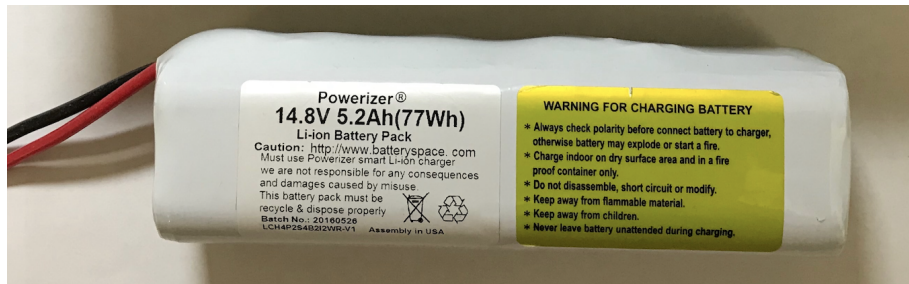
- MIRA 12X Ground Control System
- MIRA 12X Protection Insert
- MIRA 12X Signal Cable (Can be pre-installed depending on your configuration)
- MIRA 12X 12V Out Auxiliary Cable (If applicable)
- MIRA 12X Dust Protection Grommet Set
- MIRA 12X Operating Manual
- 14.8V/1.8A - UL & CE Certified Li-ion Charger
- 18V/6A - UL & CE Certified Power Supply
- 4S 5200mAh Li-ion Battery (Qualified Orders)
- Desert Rotor Decal Set
- Desert Rotor Microfiber Cleaning Cloth
- 3M™ Mounting Velcro

Depending on the configuration purchased the contents received could vary

Lithium-Ion Batteries & Charging

The Lithium-Ion pack we offer is a 4S 5200Mah pack with Anderson Connectors. The pack has internal circuits that protect it from various extreme scenarios. The MIRA 12X does allow for other types of lithium 4 cell batteries to be plugged in.

Li-ion Battery Pack - 4S 5200Mah - 14.8V



Lithium-Ion Battery Pack	
Battery	Li-ion Battery: 14.8V 5.2Ah (77Wh, 8A rate)
Voltage	14.8V (working) 16.8V (peak) 11.0V (cut-off)
Capacity	5200 mAh min. (77 wh)
Protection Circuits	8 Amp - 2 x 420 Polyswitch
Max. Discharging Rate	8 Amp limited by Polyswitch
Connector	Anderson Powerpole 30A
Dimension(HxWxL)	1.6"(43mm) H x 1.6"(43mm) W x 5.5 "L(139mm)
Weight	404 grams (14.3 oz)
Certification	UN 38.3 Passed
Warning	<p>Li-Ion battery may be exploded if misusing. We are not responsible for any damages or losses caused by misusing (included but not limited to: improperly charging/discharging, any changes of this battery pack, mis-assembling battery packs)</p> <p>Always charge battery with attention. Battery pack shall be placed on a fire-proof place to avoid any accident</p> <p>Please go to website listed below for additional warnings http://www.batteryspace.com/warningsforusingbatteries.aspx</p>



Lithium-Ion Charger



If elected for Li-ion battery packs from Desert Rotor, they come partially charged. **CHARGE PACKS BEFORE USE!**

Li-ion Charger	
Feature	<ul style="list-style-type: none"> • Smart battery charger designed to charge 14.8V Li-Ion/Polymer battery • It use delta-V technology to monitor and control the charging process. • CCCV charging mode, and power off when battery voltage reaches 16.5V • Charge time = (Ah rate of the pack x 1.5) / 1.8A charge current
Input Voltage	110- 240VAC, 50/60 Hz
Input Power	48W Max
Output Voltage	16.8VDC
Charging current	1.8A
Battery Capacity to use	>= 2200 mAh
Protection	Short Circuit / Over-load Protection
LED Indicator	<ul style="list-style-type: none"> • Red LED = charging • Green LED = fully charged • Dim Green/no LED - trying to charge a fully charged battery.
Dimension(LxWxH)	120mm(4.7") x 60mm(2.4") x 38mm(1.5")
Weight	8.6Oz (244grams)
Certification	CE , Recognized or tested by one of NRTL (National Recognized Testing Laboratory) , for more information, contact Battery Space @ 510-525-2328

NOTE: LITHIUM-ION PACKS AND CHARGER HAVE ANDERSON 30AMP CONNECTORS

Charger - Smart Charger (1.8A) for 14.8V Li-ion/Polymer Rechargeable Battery Pack

Simple plug and play charger is included. You have the option to plug it into the MIRA 12X in the Charging Port on the switch panel. Then push main power switch on the to the “CHARGE” position.

You also have the option to take the Lithium-Ion battery packs out of the MIRA 12X and plug them directly into the charger. There are no buttons on the charger.

Charger Light **GREEN** - Pack is finished charging

Charger Light **RED** - Pack is charging or no pack connected

NOTE: NEVER LEAVE PACKS UNATTENDED WHILE CHARGING - LITHIUM BATTERIES CAN START FIRES THAT WILL DESTROY EVERYTHING YOU HOLD DEARLY. THEY BURN HOT, QUICK AND HAVE CAUSED SERIOUS INJURY INCLUDING DEATH. BE SMART. HANG OUT WHILE IT'S CHARGING.



Power Supply



Power Supply	
Model Number	PST-EA11203 Switching Power Supply
Input Voltage Range	90-264 VAC 50/60 (47 to 63) Hz
Peak Output Power	EA11203B 120W, 140 watts surge
Output Voltage	Factory set 18 VDC
Protections	Over Voltage Protection, Over Current Protection, Auto Recovery
Input Connector	IEC320 C6 or IEC C13, Class I input socket allows cords for any country to be used, the North American cord is included.
Dimensions	170 x 60 x 35 mm (6.7 inch x 2.4 inch x 1.4 inch)
Temperature	0 to 40°C operating, -20 to 85°C storage
MTBF	30,000 hours
Weight	510 grams, 1.1 pounds
Cooling	Fan cooled, the fan comes on only when necessary, so it will cycle on and off as needed
Approvals	UL/CUL, TUV, CE, CB, CCC, EK, PSE, ROHS, WEEE, CEC compliant

Each MIRA 12X comes with a power supply that is 18V/6AMP. It is rated for 120volts to 220volts incoming AC voltage. Depending on the region, you may need a travel adapter to plug into the wall to use the power supply. The power supply uses a 4 PIN DIN configuration that connects to the GCS switch panel.

The power supply works independent from the included charger. The power supply can not, and does not charge the provided Lithium-Ion packs.

NOTE: NEVER LEAVE THE MIRA 12X WHILE RUNNING OFF THE POWER SUPPLY AND/OR LITHIUM PACKS. THE SYSTEM IS COMPATIBLE WITH COUNTLESS OFF-THE-SHELF HARDWARE THAT MAKES IT IMPOSSIBLE TO TEST EVERY CONFIGURATION. THE SYSTEM HAS BUILT IN FUSE AND POWER PROTECTION THOUGH WE ADVISE TO TURN EVERYTHING OFF BEFORE LEAVING IT UNATTENDED



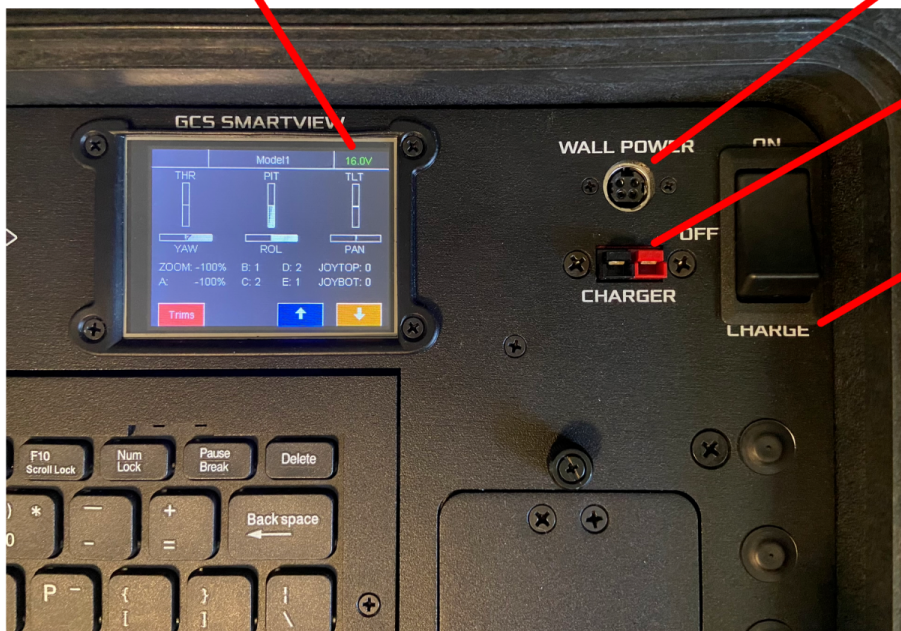
Approvals
UL/CUL, TUV, CE, CB, CCC, EK, PSE, ROHS, WEEE, CEC compliant

Battery Voltage Calibrated to 4 Cell Lithium-Ion
(can be programmed to show 5 or 6 cell)

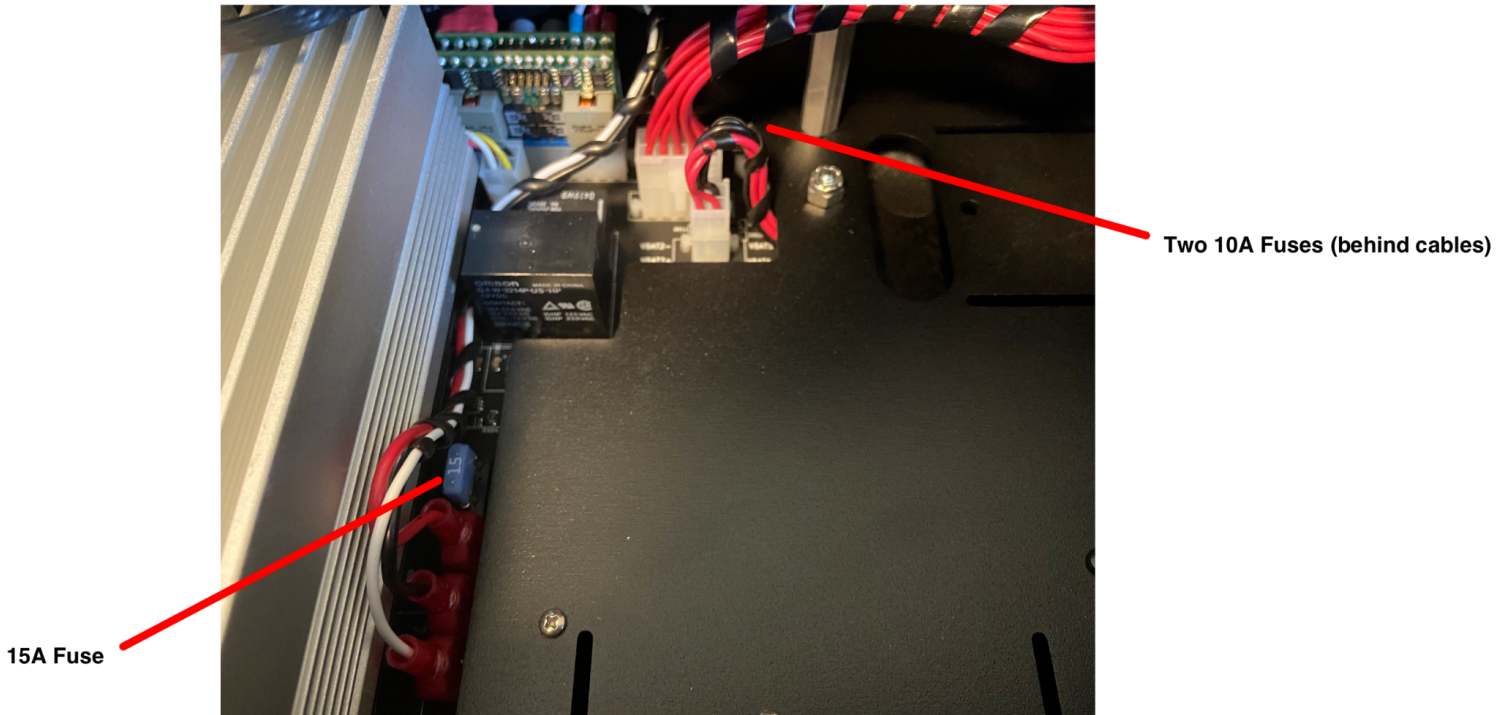
18.2V Power Supply Input

Charger Connection

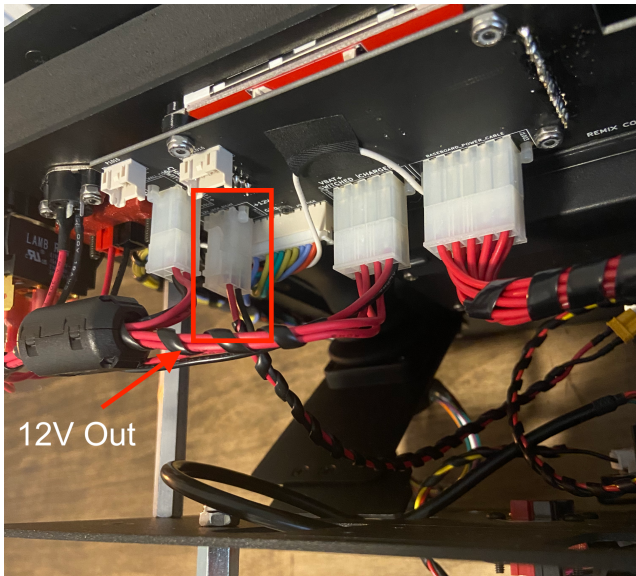
When power switch is set to charge and the charger is connected, GCS will automatically shut off and charge internal batteries



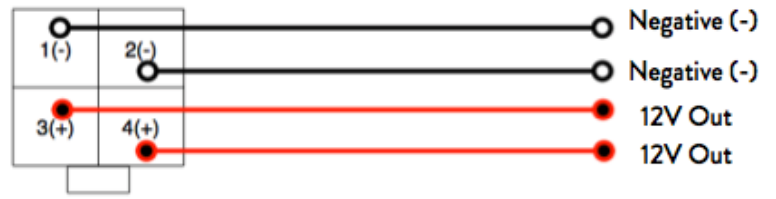
Power Connectors and Fuses



12V Out AUX Connector - Base Panel



12V AUX OUT



Cleaning

Use a damp rag or included Desert Rotor microfiber cloth to wipe down the unit. Please ensure unit is turned off to avoid the risk of shock and/or electrocution. Do not use cleaning chemicals as it could damage components and finish of the MIRA 12X. A mild soft dishwashing detergent is sufficient so as long as it's lightly damp on a rag.



FEATURES & HARDWARE

Pelican 1510 Case



- FAA Carry-on size approved
- Polyurethane wheels with stainless steel bearings
- Automatic Pressure Equalization Valve - balances interior pressure, keeps water out
- Rubber over-molded top and side handles
- Double throw latches
- O-ring seal
- Retractable extension handle

Note: The MIRA 12X is NOT waterproof. It is only weather resistant when case is closed. Do not operate the MIRA 12X when it is raining, snowing or in questionable weather. If you can not operate a standard laptop computer in the weather situation you are in you can not operate the MIRA 12X in the same weather.



OnLogic™ HX500 Embedded PC

Embedded PC Specifications	
SKU	HX500
Hardware Line	Industrial Line
Processor	Intel Comet Lake - i5, i7, i9 (HX500)
Processor Cores	Up to 10 Core
Graphics/GPU	Intel UHD Graphics 630
Memory Type	DDR4 SO-DIMM (non-ECC)
Memory Capacity	up to 32 GB
Memory Speed	1600 MHz
Wireless	Intel Embedded Wireless-AC 9260 802.11ac Wi-Fi & BT 5.1 Card & 4G LTE Options available
Embedded PC I/O	4 USB 3.2 ports 2 LAN Port 3 Mini-DisplayPorts or 2 HDMI 1 mic/headphone connector
Operating System	Windows 10 IoT or Ubuntu Desktop
Storage Options	up to 1 TB
LAN Controller	Intel I218LM GbE
Regulatory Information	FCC (Class B)/CE certified UL Listed RoHS



The MIRA 12X has an integrated OnLogic™ HX500 Embedded PC with Intel™ microprocessor. The MIRA 12X has an integrated power switch on the switch panel. When turning the MIRA 12X on, the PC system does not turn ON until you press the PC POWER for the Dual Screen HD version. For the Single Screen HDW version the PC will automatically turn on when MASTER Power is pressed to ON position.

NOTE #1: PC POWER - When turning off the MIRA 12X, **ALWAYS turn the PC off first**. If you press the MASTER MIRA 12X power switch to “Off” it will “hard shutdown” the PC (as if you just pulled the plug on a running desktop computer).



MIRA 12X HDW - 19"inch Samsung HD Wide Display



NOTE # 1 - DISPLAY STARTUP: The MIRA 12X HDW version's embedded PC auto-turns on when MASTER power is switched to 'ON'. It may take 3 to 5 seconds for the 19" display turns on and shows Window Startup prompts. ALWAYS press PC POWER when turning off GCS so embedded PC turns off appropriately.

NOTE # 2 - HDMI SWITCHING: The Single Screen version has a built in HDMI Switcher, where 'HDMI 1' defaults to the PC display. 'HDMI 2' is for an Auxiliary display. The HDMI input cable for 'HDMI 2' is located in the battery bay. Earlier MIRA 12X HDW models did not have the integrated HDMI switcher.

MIRA 12X Control Panel Layout

Transmitter Controls



The control/transmitter interface is highlighted above. The GCS SmartView™ interface allows the end-user to assign channels and functions to the various highlighted hardware. If necessary there are trim buttons to the left of the flight control stick. Note the throttle trim above the throttle slide.

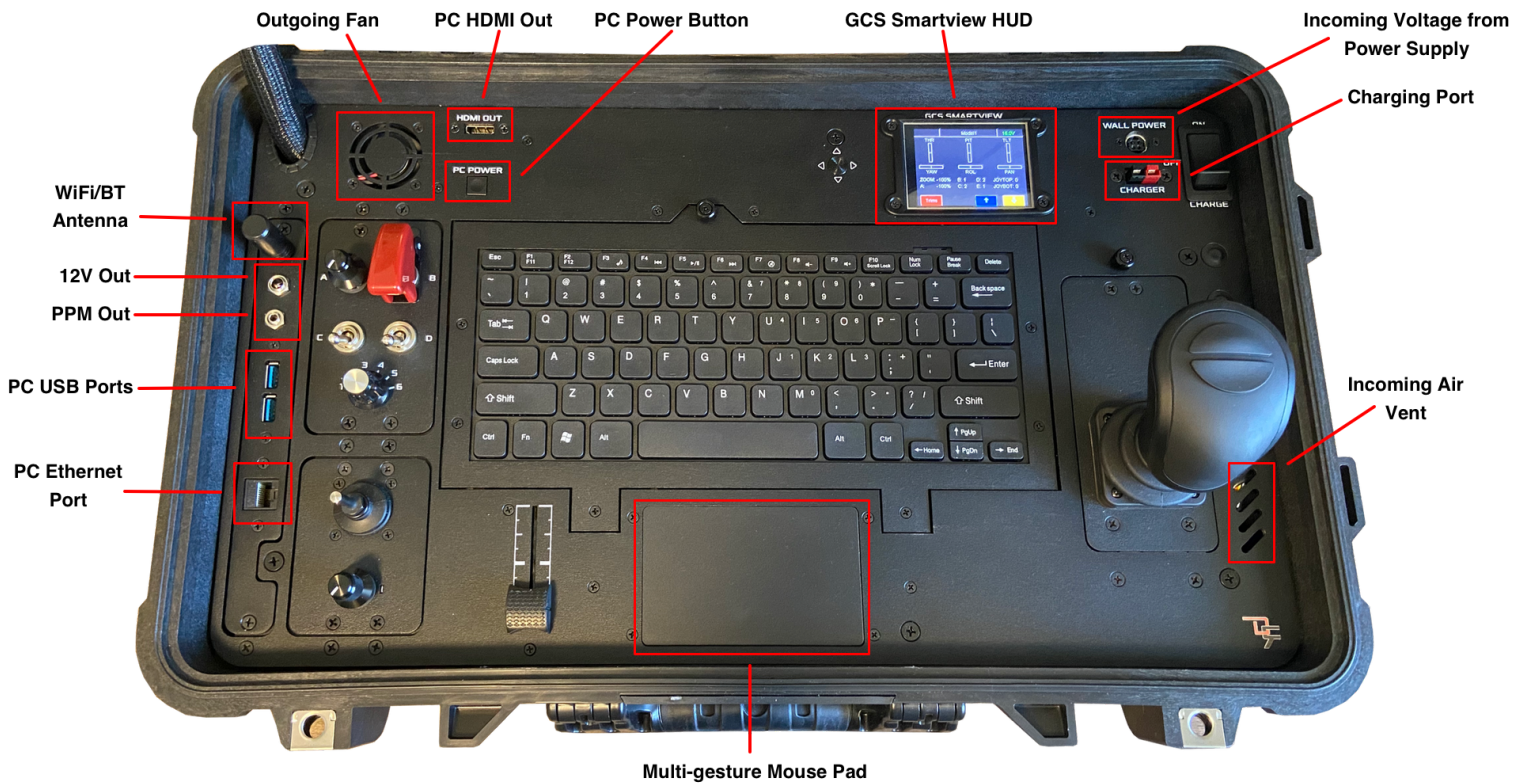
Note: ALWAYS ENSURE AND CHECK ALL CONTROLS AND FUNCTIONS ARE GOING THE CORRECT DIRECTIONS IN THE AUTOPILOT SOFTWARE.

ALWAYS ENSURE BEFORE EVERY FLIGHT THAT YOUR FAILSAFE FUNCTIONS OF YOUR AUTOPILOT ARE ENABLED AND PROPERLY ENABLED ON ONE OF THE SWITCHES ON THE MIRA.



MIRA 12X Control Panel Layout

Remaining Components/Features

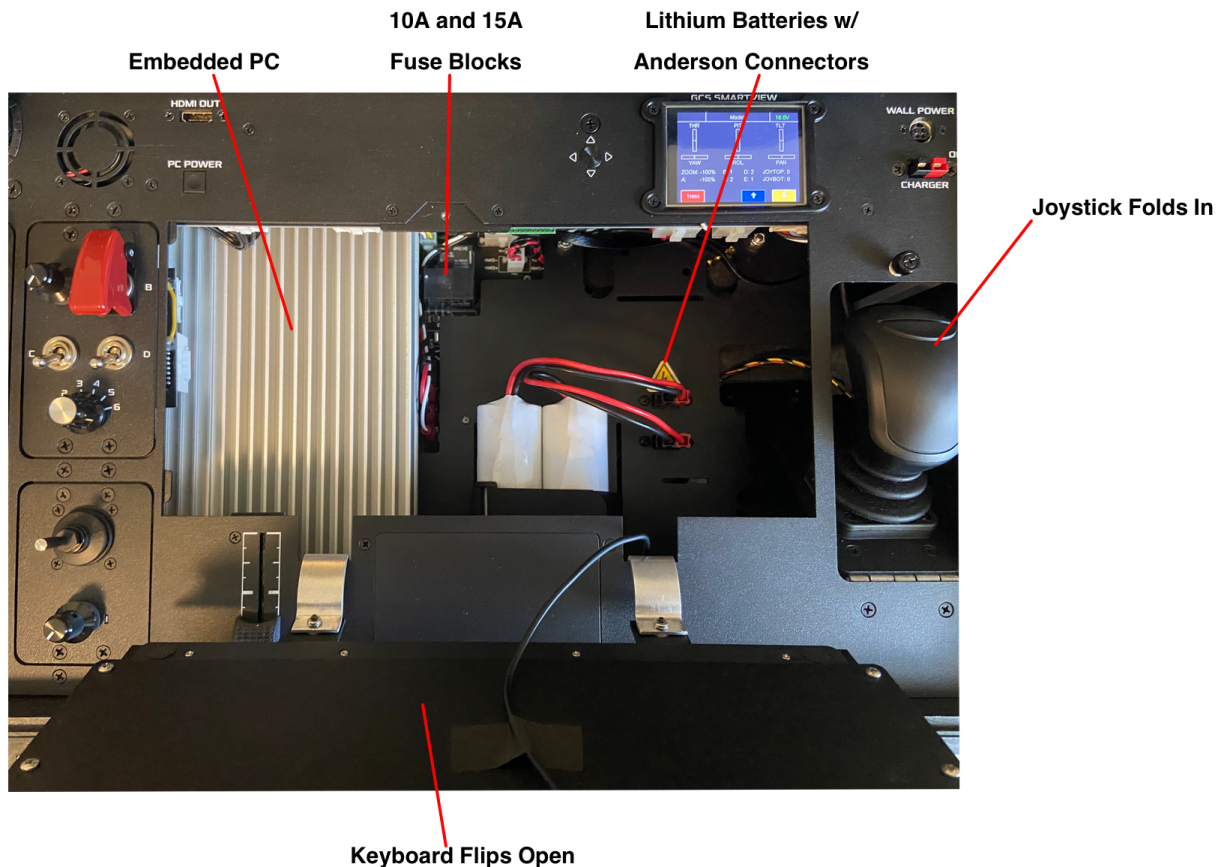


The MIRA 12X was designed to work with your existing ground components and future UAV technology. Everything is strategically laid out for easy/quick access. As with any new component it is best to rigorously test before performing critical flights/missions.

We love feedback. If you feel the layout could be better optimized to your needs please shoot us a note info@desertrotor.com.

Note: The MIRA 12X is NOT waterproof. While highly durable and fairly weather resistant it should not be used while raining and snowing without proper overhang protection.

Keyboard and Joystick Hatch



When you release the thumbscrew it will release the joystick into the joystick bay. This needs to happen for the case to be able to close.

The Keyboard hatch allows you to access:

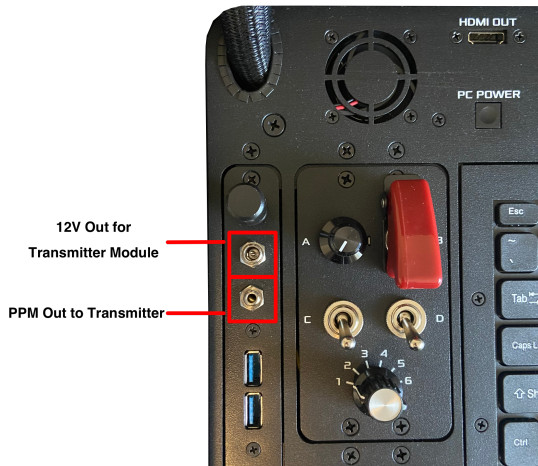
- Battery Packs and Parallel Anderson Plugs
- Fuse Blocks. There are two 10A fuses and one 15A fuse.
- Auxiliary Bay # 2 (Default Cables) - 12V Power / 2 SMA Antenna / LAN Cable

Note: The system was designed to be able to “Hot Swap” battery packs while in use. This allows you to continue on long-endurance flights and missions. This is when you take one of the two packs out and replace it with a fresh pack. You will see the battery meter automatically increase.

While it is possible to “Hot Swap” we highly advise alternative solutions such as plugging the power supply in from a AC Main wall outlet/generator. Or turning off the MIRA 12X when swapping out batteries.



PPM Output & 12V Out



The GCS SmartView interface creates a PPM Out signal that can interface with most off-the-shelf transmitter modules. The connector is a Mono plug. We recommend using a transmitter module like the TBS Crossfire Long-Range RF module or RFD Radio. The MIRA 12X can interface with other modules along with MIMO Digital Radios. You may have to build a PPM Out cable for the transmitter module (one is included, specify when ordering). For 12V power use a DC barrel plug to whatever connector is needed on the transmitter module.

NOTE #1 - ADDITIONAL PPM OUT - Depending on your purchase your GCS may have had additional PPM OUT and connectivity. Usually another PPM out w/+5Volts is pigtailed in the Auxiliary hatch on the display panel.

NOTE #2 - SERIAL RS232 SIGNAL OUT - Depending on your purchase your GCS may have a RS232 digital out connector in Auxiliary bay #2 (also known as battery bay). This RS232 Out is for the GCS to output the GCS Controls via a digital signal than can be transmitted using MICROHARD point to point radios

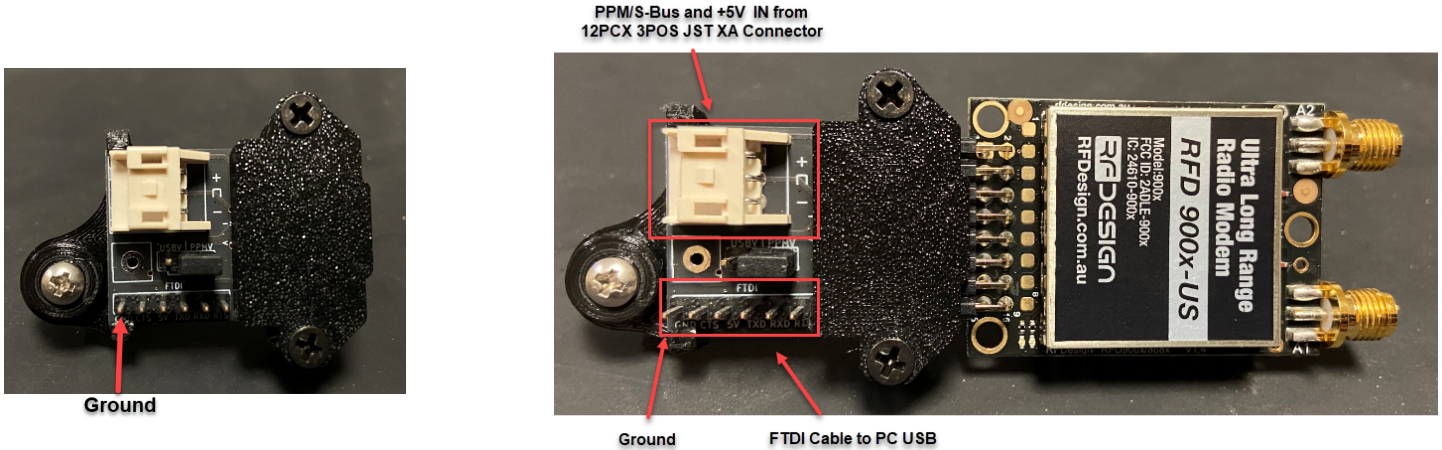
Note: *Check You Local Laws & Regulations as some regions may not allow the use or require a HAM radio license to operate the various offered transmitters and/or along with the MIRA 12X!



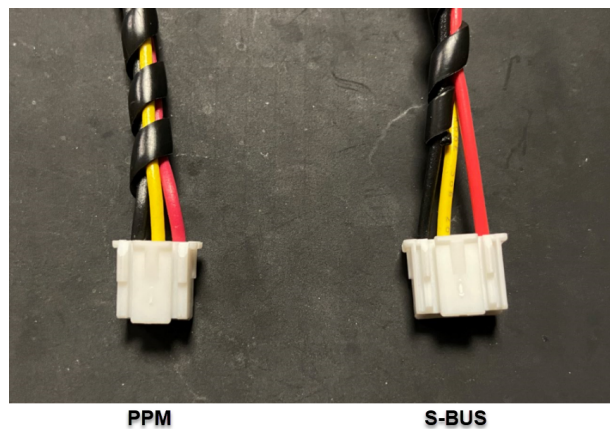
RFD Radio Setup

RFD Radio Adapter must be used for Ground Radio Modem

- 1) Plug adapter into bottom pins of RFD



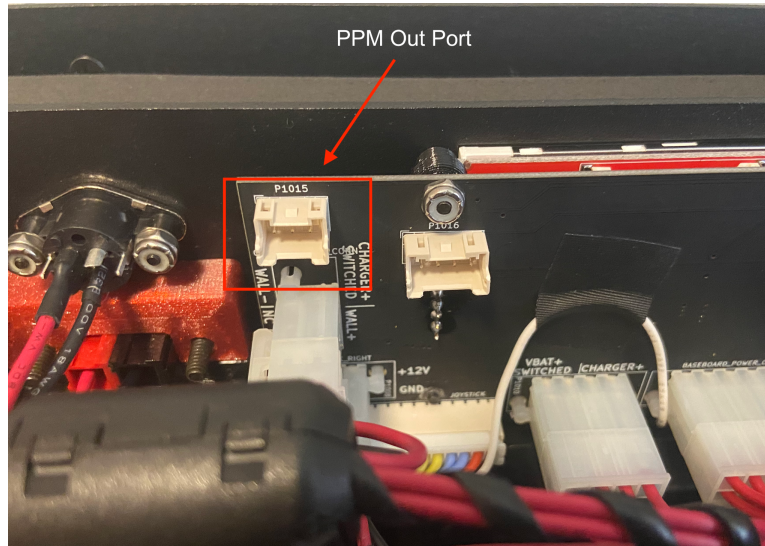
- 2) FTDI Cable can be plugged into RFD Adapter taking note of polarity and other end to an open USB port on PC
- 3) There are two different cables for running PPM and S-Bus. Both cables connect to the RFD Adapter using a 3POS JST XA Connector (shown above). The PPM cable also has a 3POS connector on the opposite end, while S-Bus cable uses a 4POS connector



RFD Radio Setup

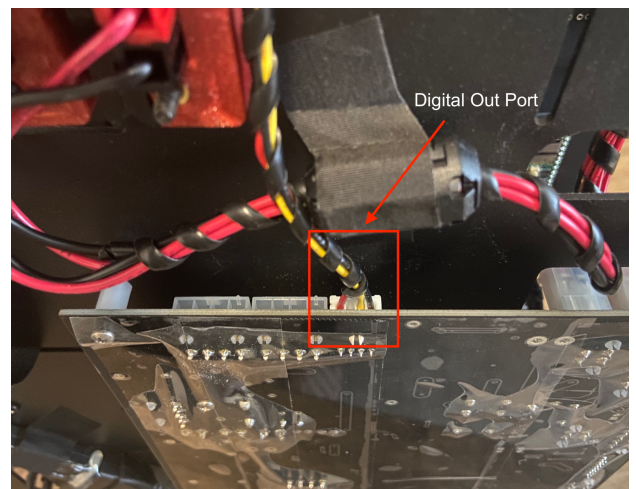
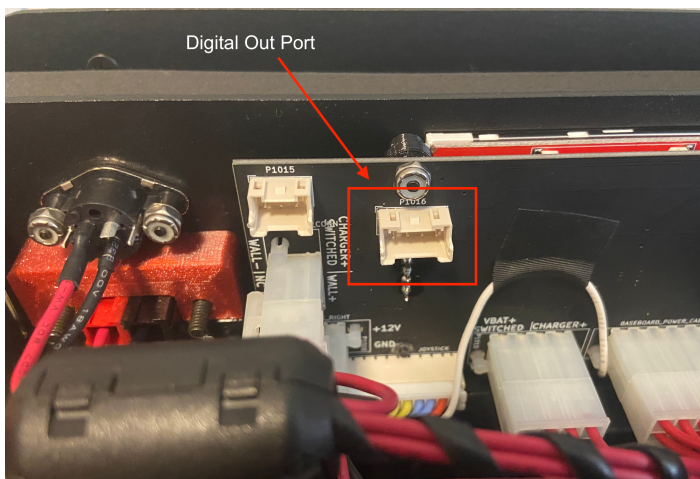
PPM Setup

- 4) Plug in 3POS JST XA Connector end into PPM Out found below the charger port under the switch panel.



S-Bus Setup

- 5) For S-Bus, plug in 4POS JST XA Connector end into Digital Out Port. There are two Digital Out Ports: under switch panel and under base panel as shown below. [Note: Unmounting may be required to access Digital Out Ports]

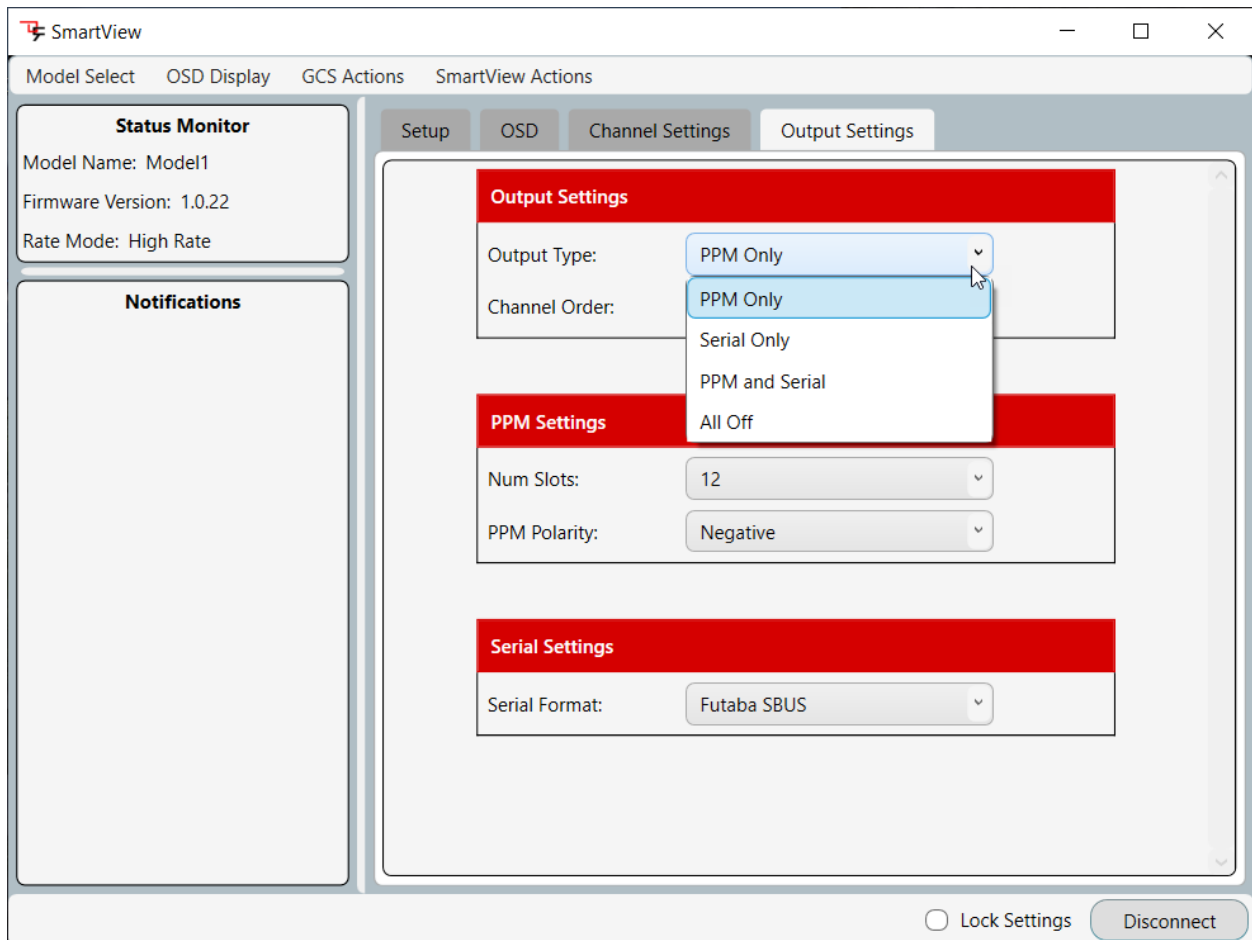


RFD Radio Setup

When connecting new radios to Desert Rotor ground control stations, Smartview may need to be adjusted.

Under **Output Settings**, use **Output Type** to adjust for PPM, Serial, or both. Use 'PPM and Serial' for simultaneous radio use.

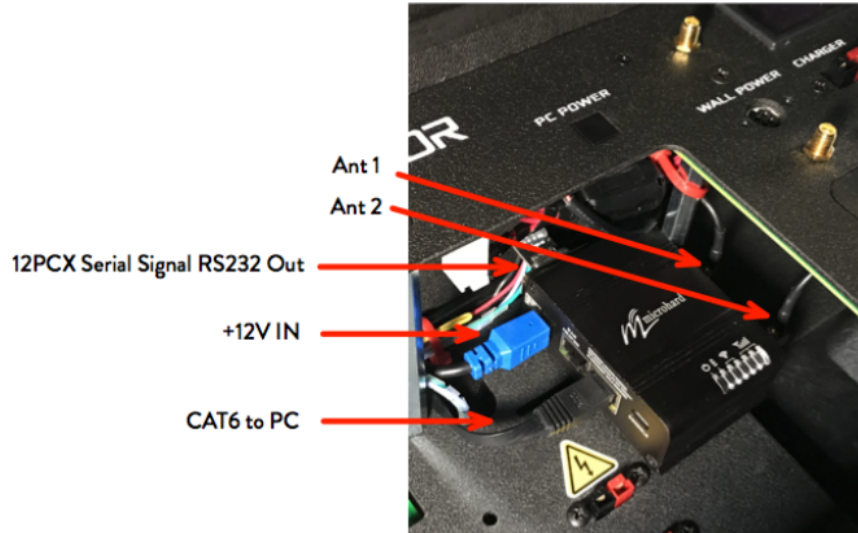
Use **Serial Format** to switch between Serial and SBUS



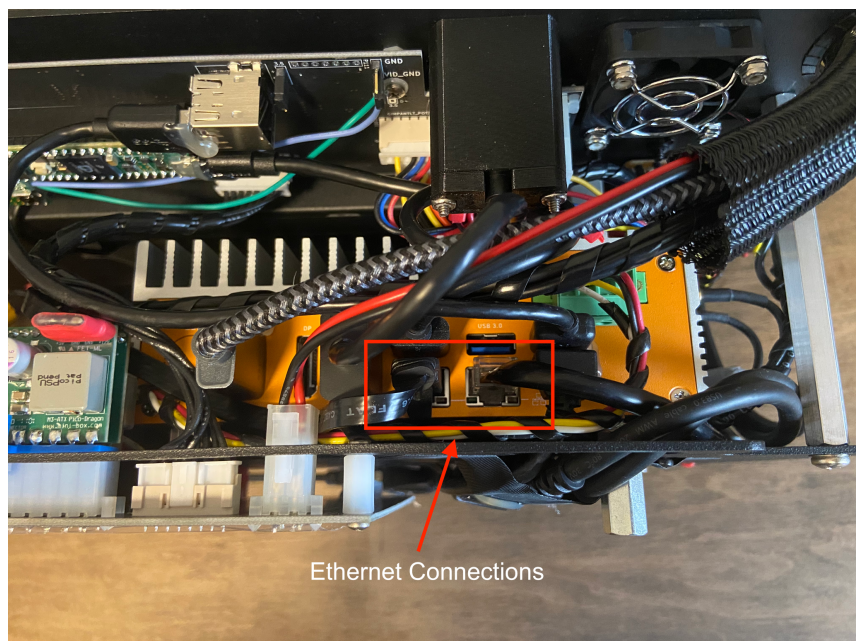
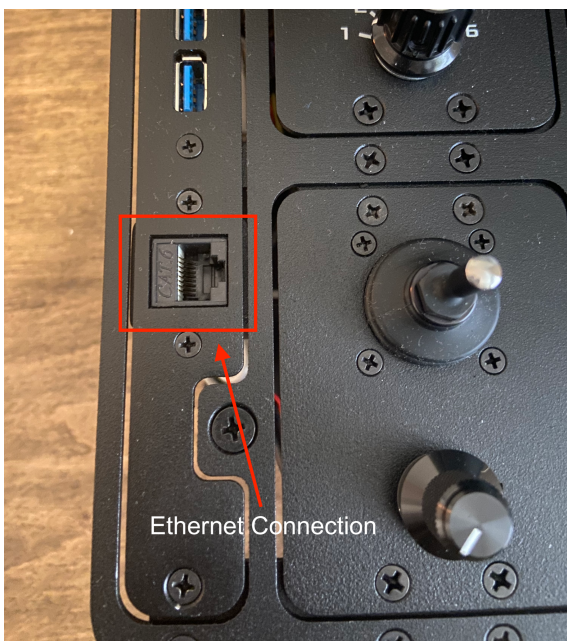
Microhard Radio Setup

[Note: Installation may require unmounting GCS, reference Unmount Guide if necessary]

- 1) Install Microhard into GCS plugging in 12V Supply, Serial out RS232, and Lan connector

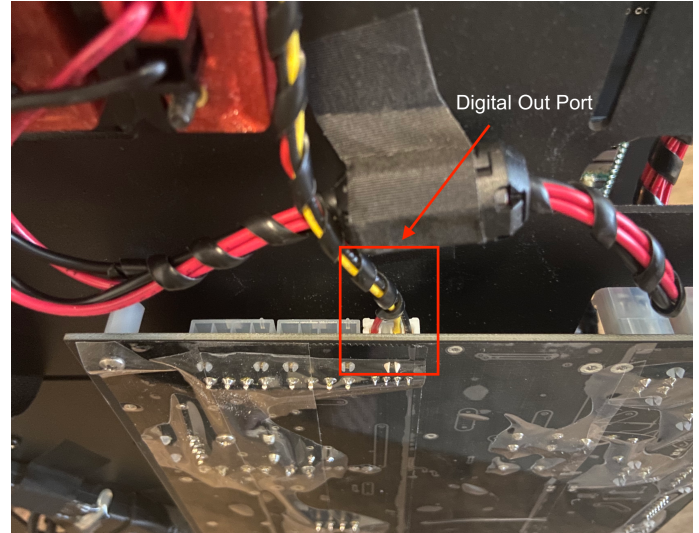
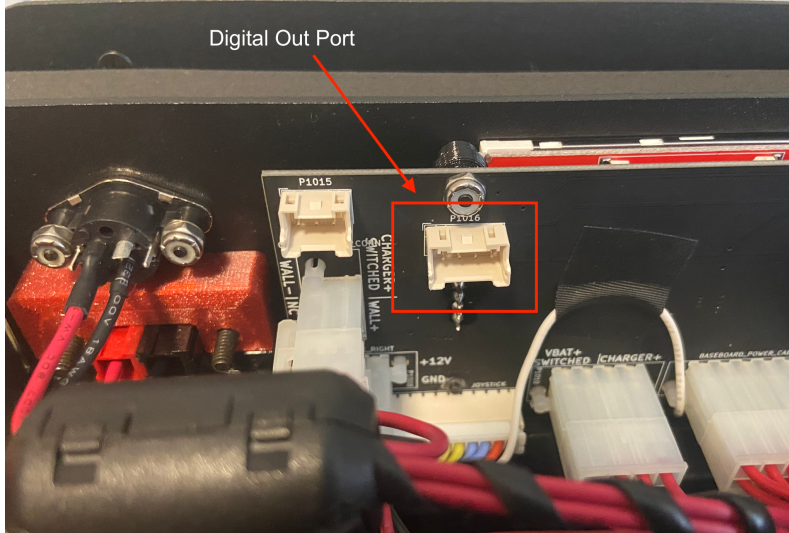


- 2) If Ethernet cable not already available in radio bay, connect Ethernet to embedded PC (either through back of PC or through the switch panel as shown below)

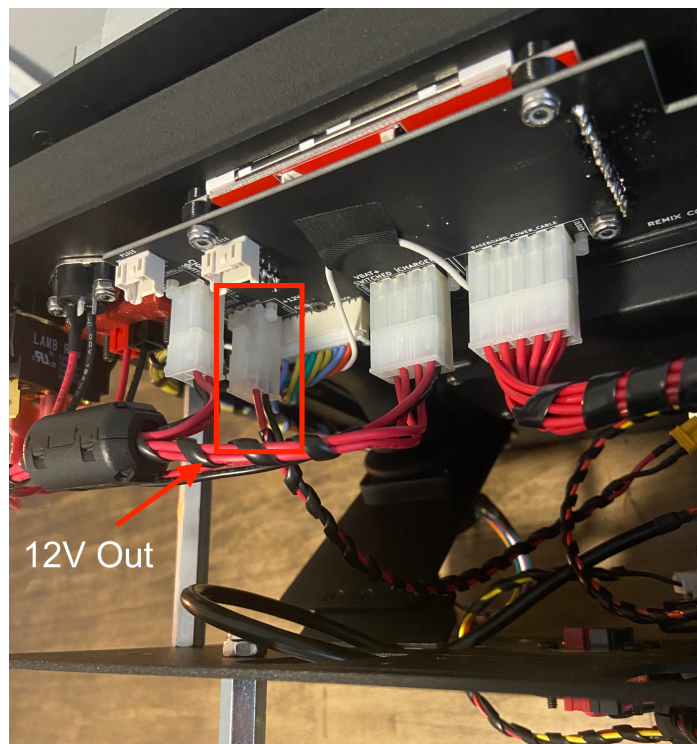


Microhard Radio Setup

- 3) Connect VGA Cable to Digital out on GCS. There are two Digital Out ports: under switch panel and under base panel, as shown below.



- 4) Connect 12V supply found on underside of GCS to 12V IN on Microhard

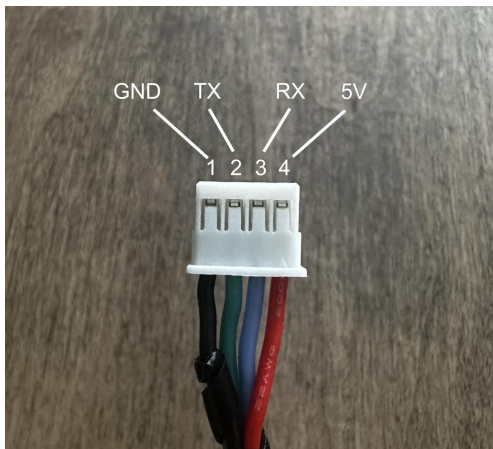


Custom Radio Setup

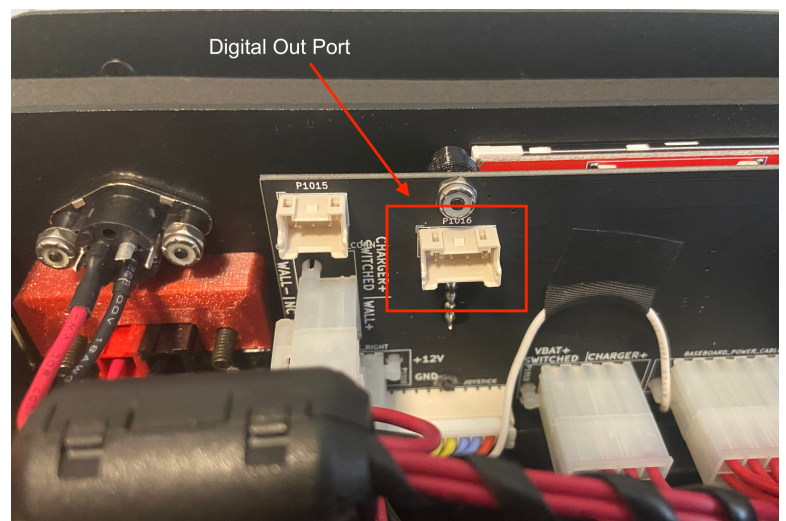
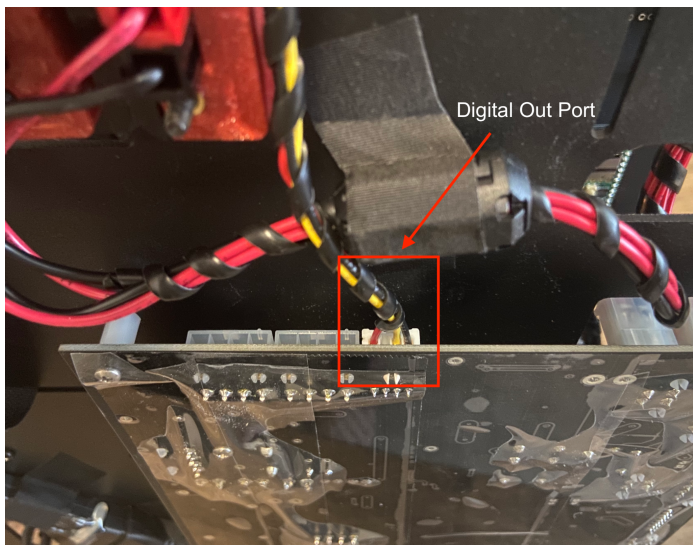
Serial Out Connection

Desert Rotor ground control stations output Serial 3.3V TTL. Serial harnesses with DB9 RS232 converters can be supplied with GCS per request.

Serial ports use JST-XA 4POS connectors.



There are two Serial Out Ports: under switch panel and under base panel as shown below. [Note: GCS unmounting may be required to access Serial Out Ports]

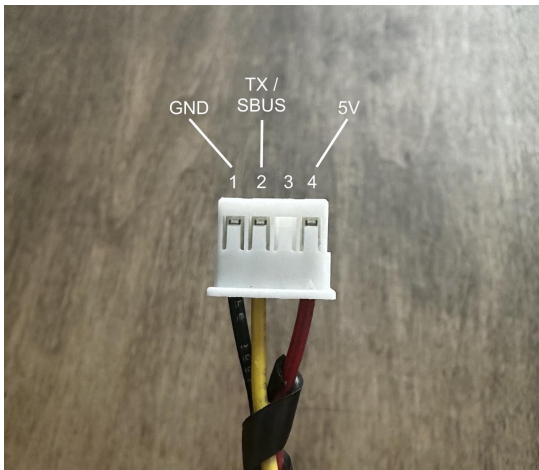


Custom Radio Setup

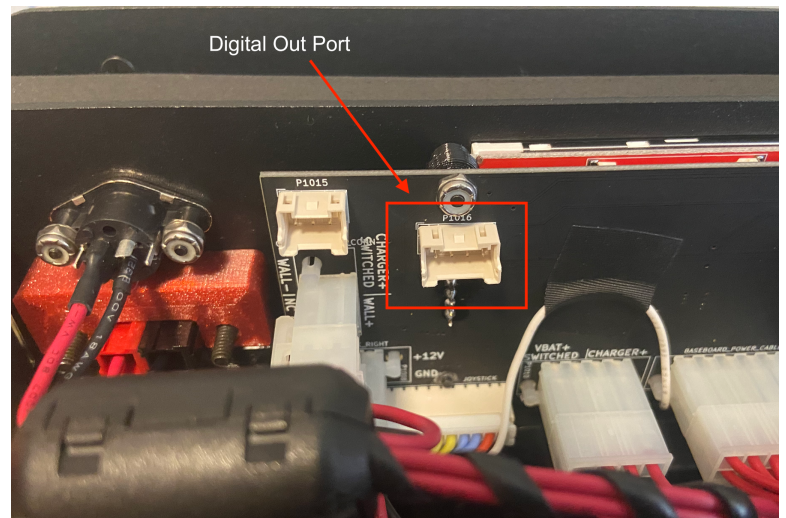
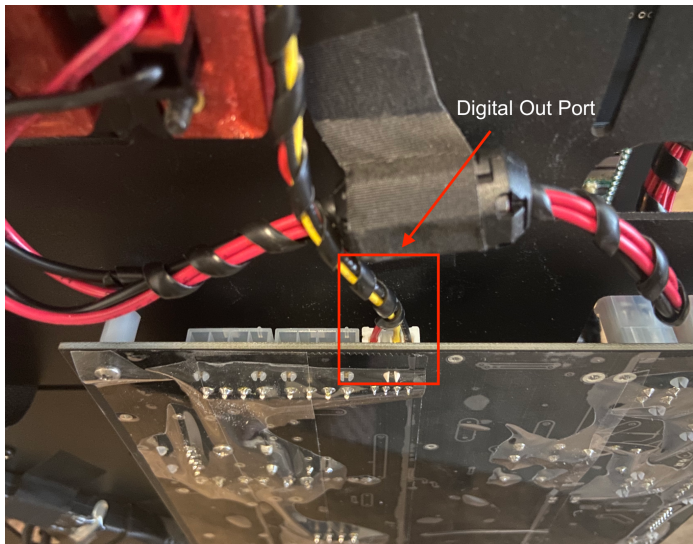
SBUS Out Connection

Desert Rotor ground control stations can output SBUS through the Serial ports as well. For SBUS, use GND, 5V, and TX (RX is not needed).

Use a Serial Port JST-XA 4POS without pin 3



There are two Serial Out Ports: under switch panel and under base panel as shown below. [Note: GCS unmounting may be required to access Serial Out Ports]

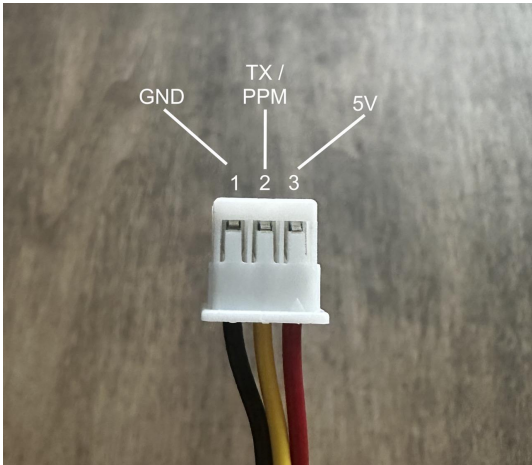


Custom Radio Setup

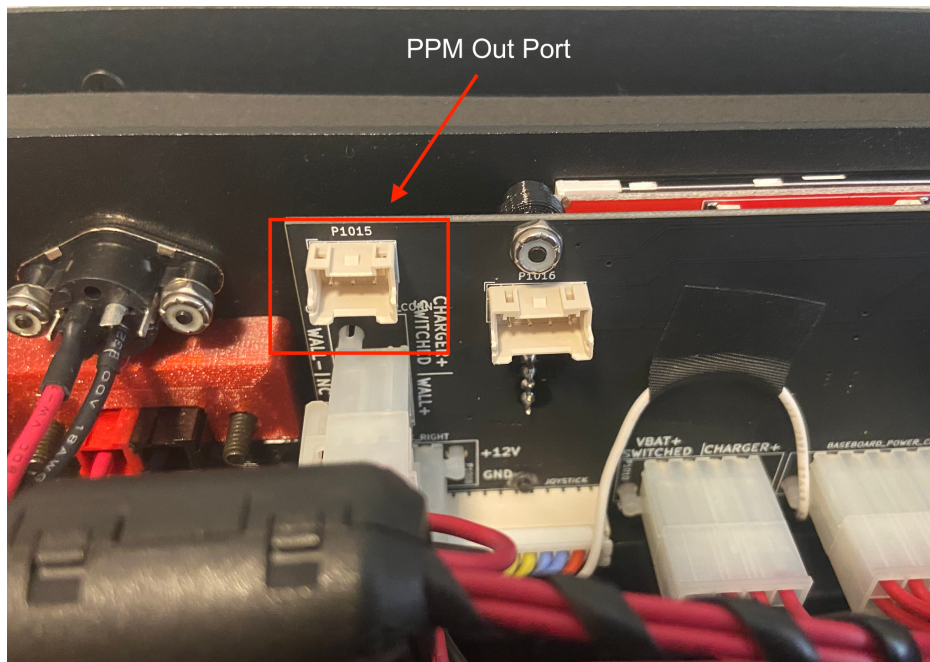
PPM Out Connection

Desert Rotor ground control stations can output PPM via designated ports.

PPM Out port uses JST-XA 3POS connectors.



PPM Out found below the charger port under the switch panel. [Note: GCS unmounting may be required to access PPM Out Ports]

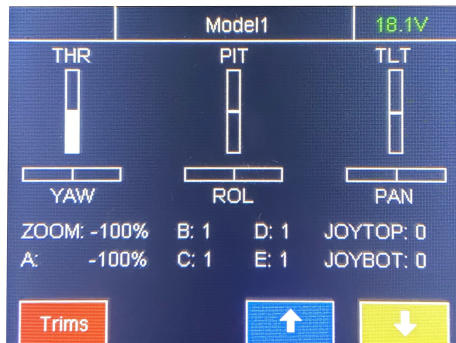


OPERATING THE MIRA 12X

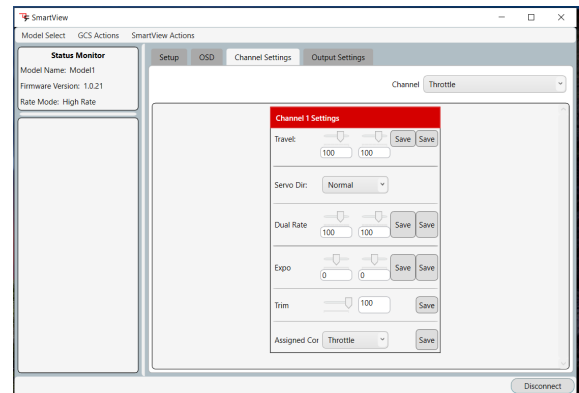
Menu & Settings - Master Map (MIRA 12X SMARTVIEW VIEW)

GCS Smart View™ Interface (Note: There are two ways to access GCS Smart View™ via the Touchscreen HUD and the Windows GUI program.)

Touchscreen HUD



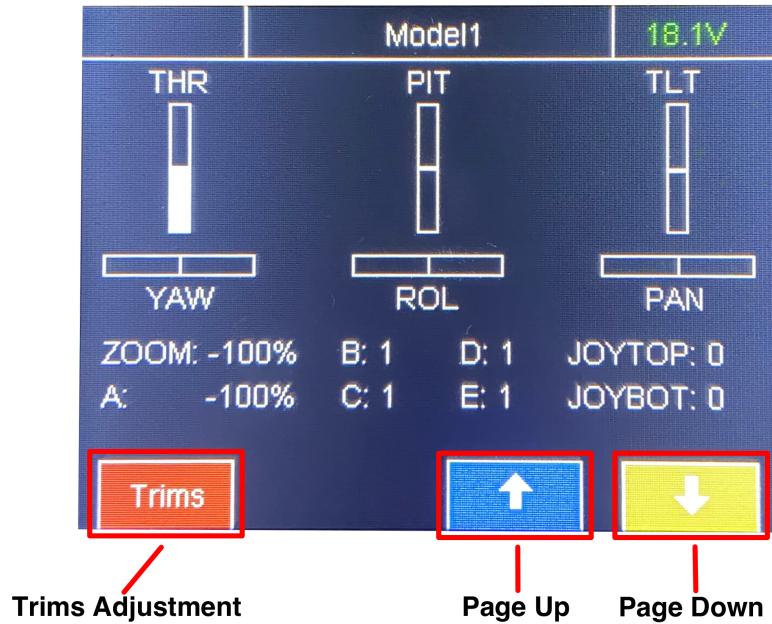
Windows GUI



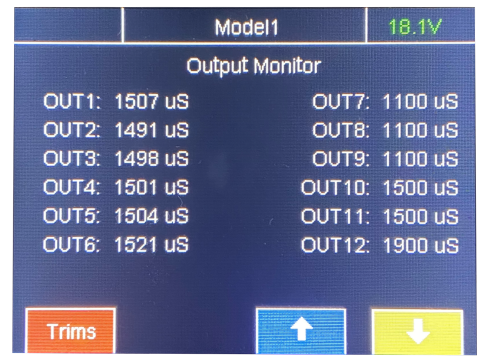
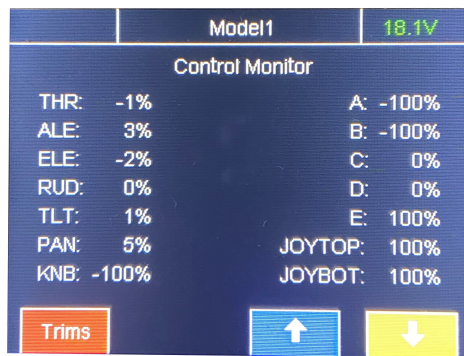
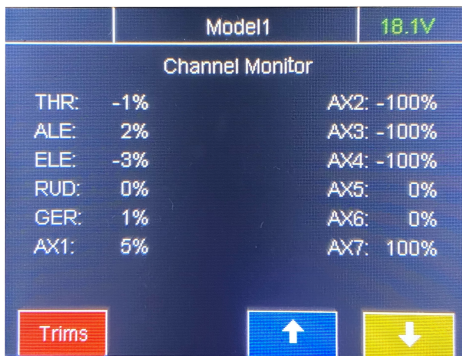
GCS SmartView is the interface you will be using to “dial-in” your unmanned aircraft. It is a very simple interface which can be accessed via the Touchscreen HUD or Windows GUI program. When developing the interface of the GCS we wanted to offer something very simple yet has all the transmitter functions you need for all aircraft types and most autopilot systems.

Note: It is prudent to restart/cycle the MIRA 12X power if system has been on for extended periods of time. Similar to a computer or mobile device. When switching out components such as video receivers, modems, radios, any axillary devices please turn off the MIRA 12X before installing and then turn on.

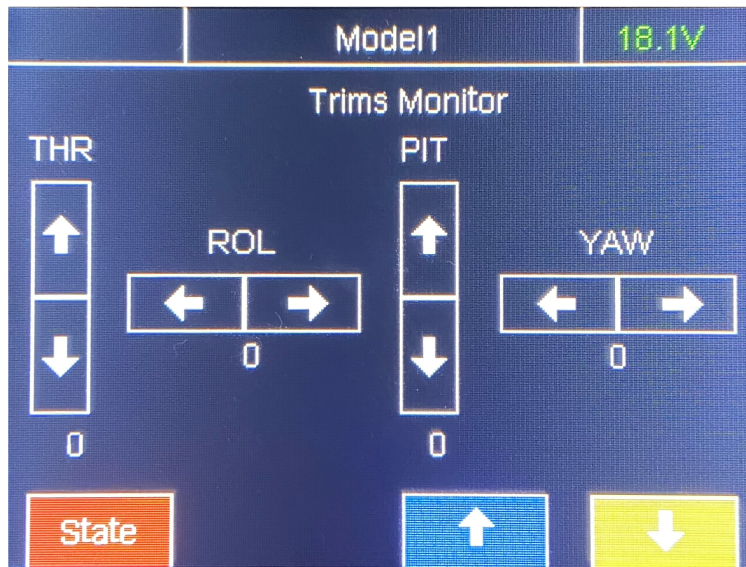
SmartView Monitor Screens



The SmartView HUD has four monitor screens to swap between. They monitor the different control values and output values of the GCS. Use the arrows to swap between the monitor screens. Click on the ‘Trims’ button to access the Trim Adjustment screen.

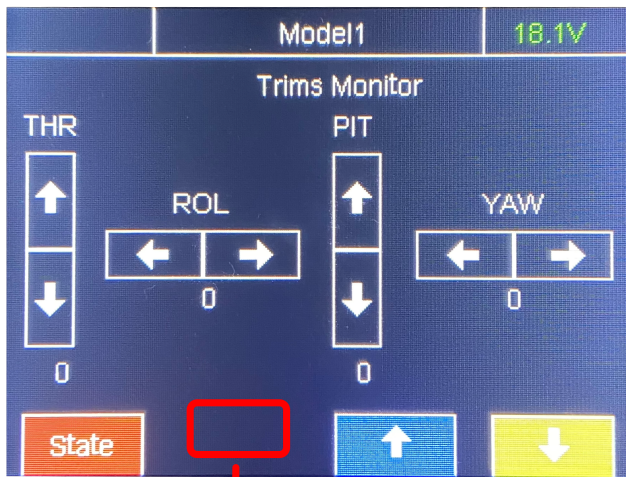


SmartView Trims

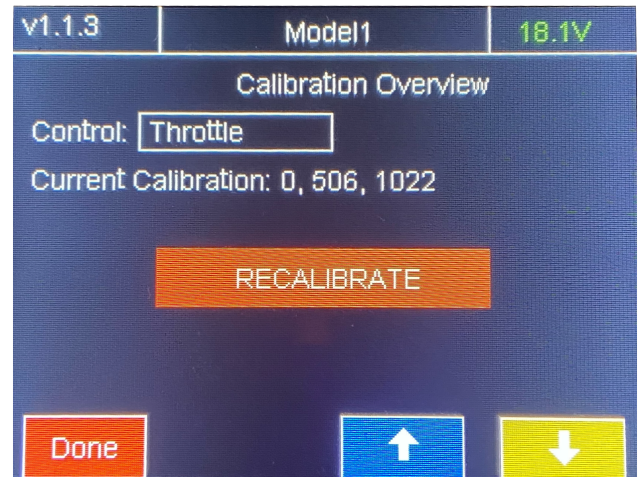


Use the arrows to adjust each channel's trim. Click on the red 'State' button to go back to the Monitor pages. The adjustments will be automatically saved.

SmartView Control Calibration



Press down with one finger
for 5-7 seconds



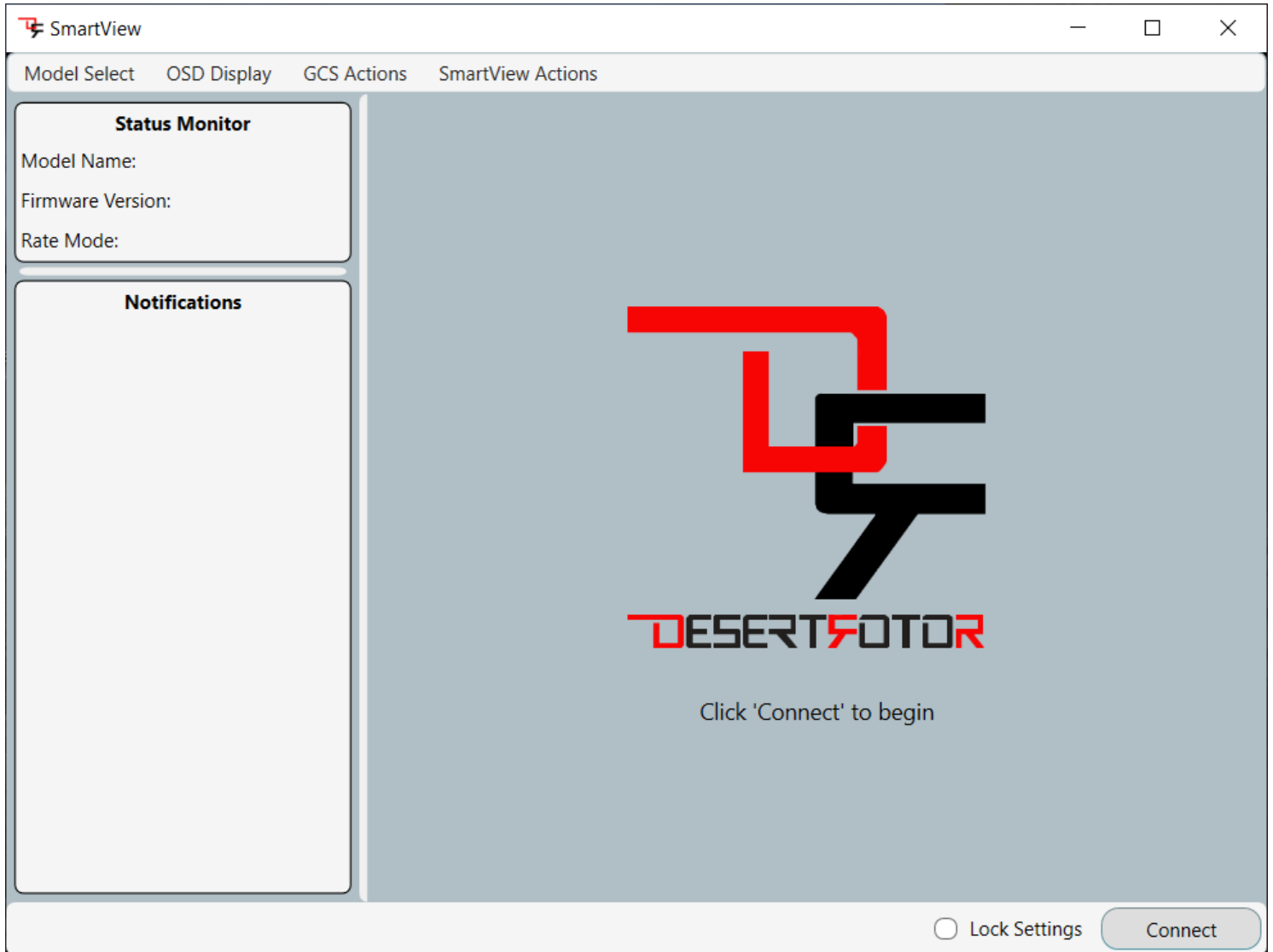
To access the calibration screen, go to the trims page. Press with one finger in the blank space between the Up Arrow and the 'State' button for 5-7 seconds. Use the arrows to scroll between desired channels. Click the 'Recalibrate' and follow the instructions on the screen.

The MIRA 12X controls come calibrated. These are the controls calibrated:

- Throttle
- Yaw
- Pitch
- Roll
- Gimbal Pan
- Gimbal Tilt
- Gimbal Knob
- Dial Knob A



Menu & Settings - GCS SMARTVIEW WINDOWS - SmartView Intro Screen

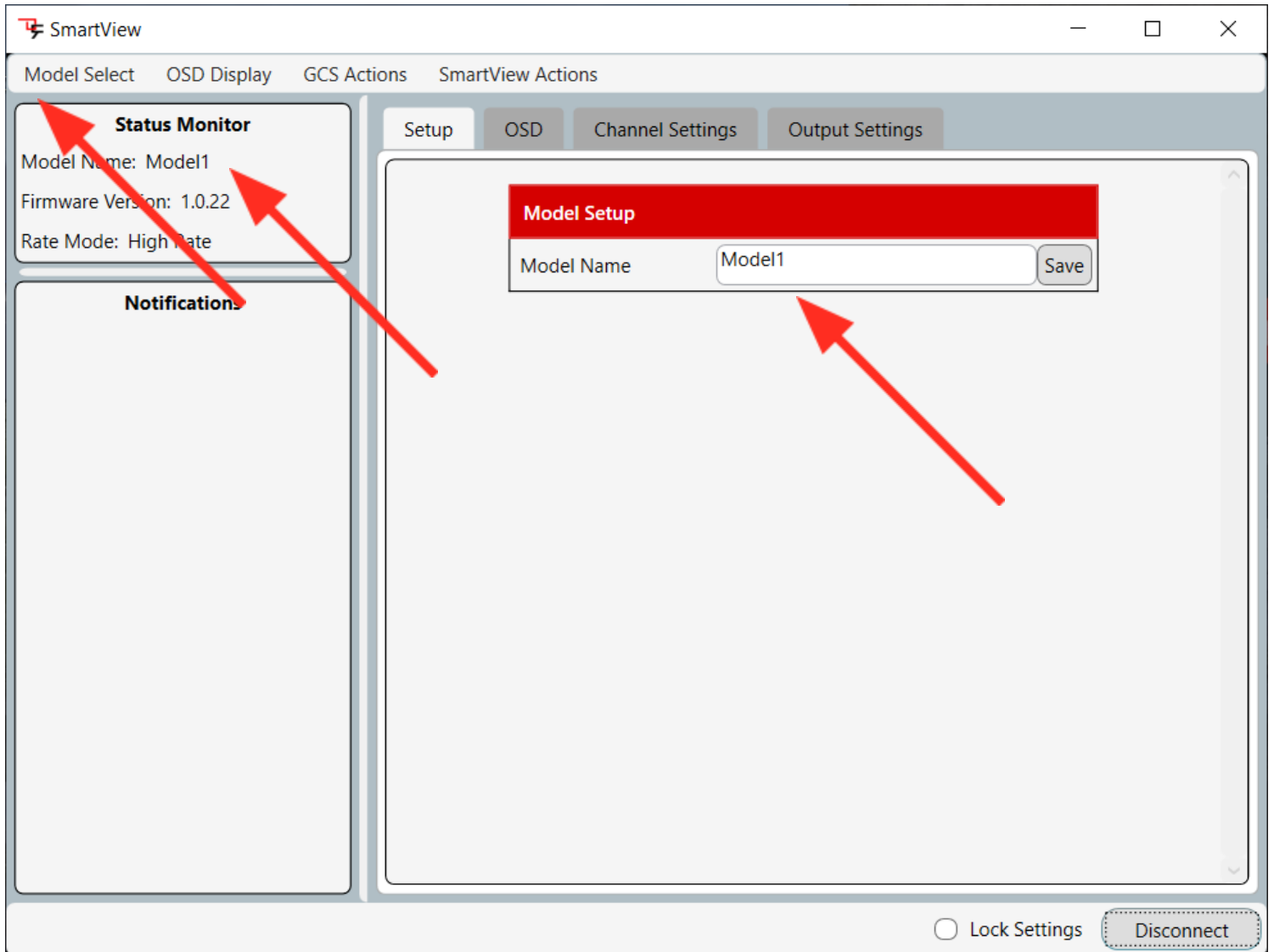


GCS SmartView Windows App is pre-installed on the Windows Desktop if you purchased a GCS from Desert Rotor on July 2020 or later. The application had a soft release from July 2019 to July 2020 and many GCS purchase during this time may have the application pre-installed.

After double clicking on the application you will see the basic layout of the GCS SmartView Application. Once you press the 'Connect' button the application will access the internal GCS processor to show the menu/settings of the 12 Channel GCS.

NOTE: The GCS controls (switches, joysticks, buttons, dials) are always in play and active the moment the GCS is turned on, EVEN if the PC is TURNED OFF.

Menu & Settings - GCS SMARTVIEW WINDOWS - SmartView Setup Screen



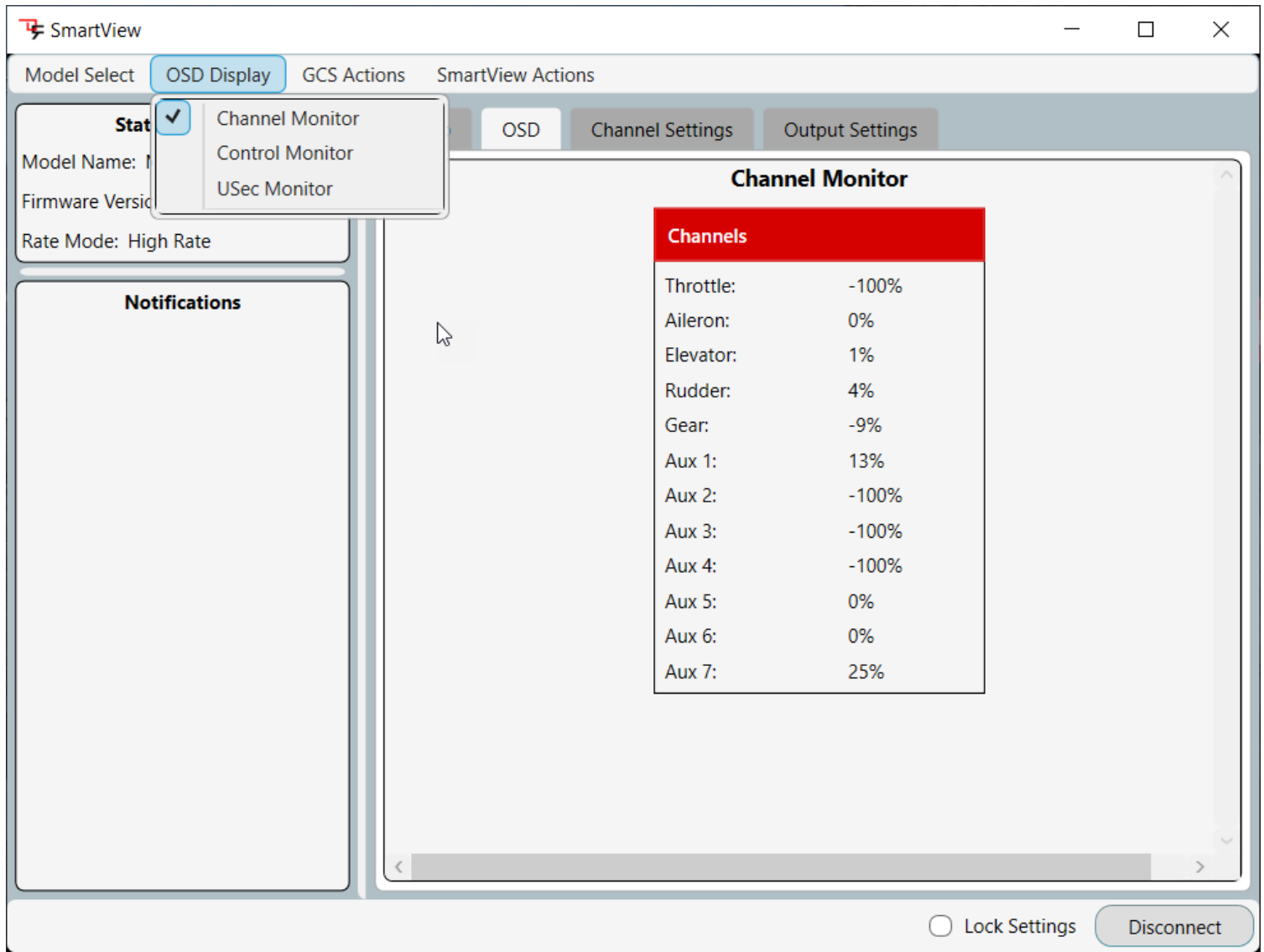
Once SmartView connects the Model Setup box loads along with the Model name and Firmware Version

Under the 'Model Select' menu you have the ability to select up to 5 different saved models

The 'Notifications' area alerts you to any changes you are making to the Channel settings with your model profile

LOCK SETTINGS - Will allow you to ensure all settings can not be changed when that is shown selected

Menu & Settings - GCS SMARTVIEW WINDOWS - SmartView OSD Channel Monitor

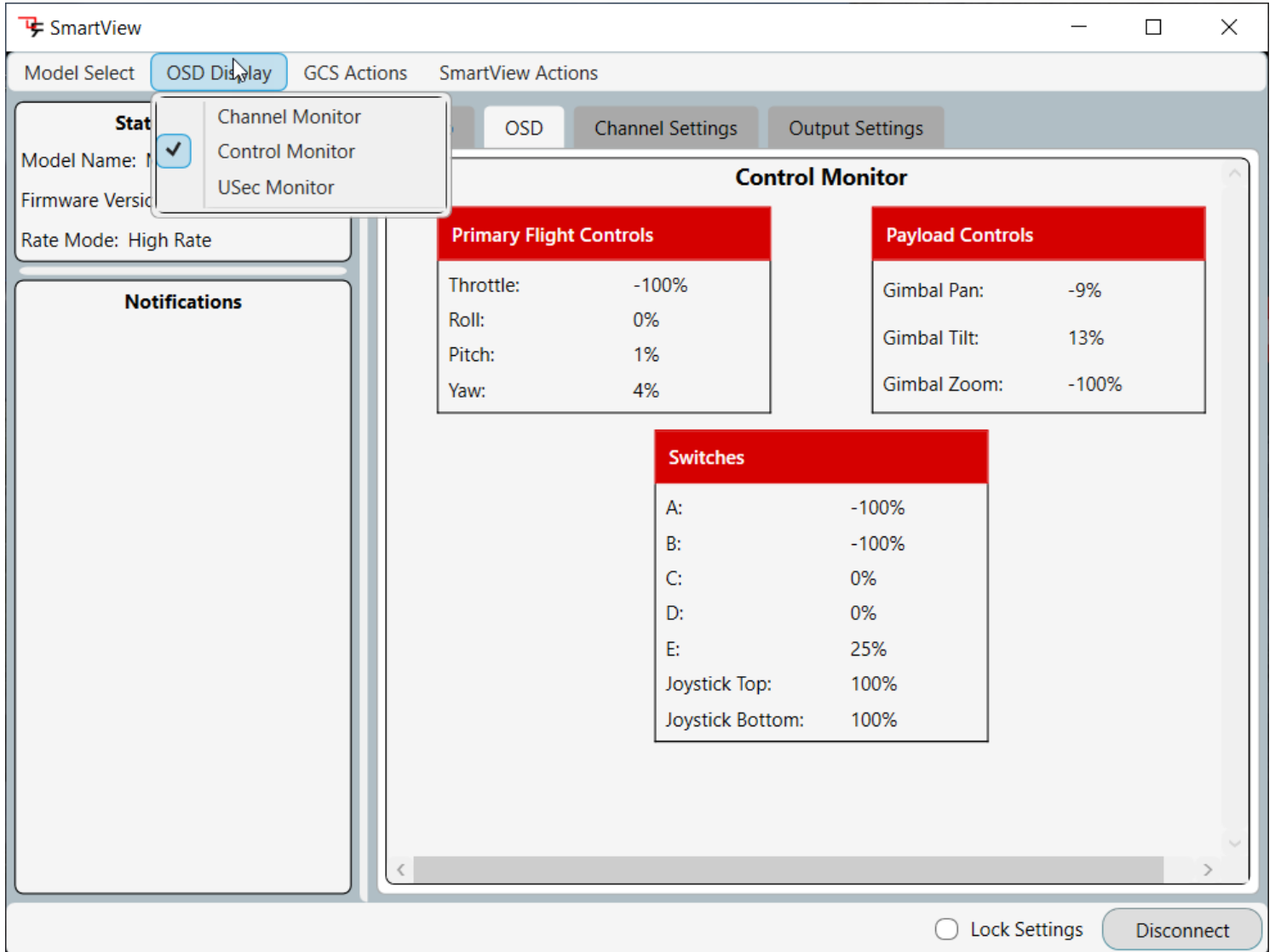


There are 3 different OSD views you can select with the GCS SmartView software.

- CHANNEL MONITOR
- CONTROL MONITOR
- USEC MONITOR

The CHANNEL MONITOR will show all 12 Channels and their positions in percentage format which includes the trim calculations.

Menu & Settings - GCS SMARTVIEW WINDOWS - SmartView OSD Control Monitor



There are 3 different OSD views you can select with the GCS SmartView software.

- CHANNEL MONITOR
- CONTROL MONITOR
- USEC MONITOR

The CONTROL MONITOR will show all 12 Channels separated by their general functions and their positions in percentage format.

Menu & Settings - GCS SMARTVIEW WINDOWS - SmartView OSD USEC Monitor

Model Select OSD Display GCS Actions SmartView Actions

Stat
Model Name: M
Firmware Versio
Rate Mode: High Rate

Channel Monitor
Control Monitor
Usec Monitor

Usec Output Monitor

Usec Output	
Slot 1::	1100 usec
Slot 2:	1500 usec
Slot 3:	1504 usec
Slot 4:	1518 usec
Slot 5:	1464 usec
Slot 6:	1552 usec
Slot 7:	1100 usec
Slot 8:	1100 usec
Slot 9:	1100 usec
Slot 10:	1500 usec
Slot 11:	1500 usec
Slot 12:	1600 usec

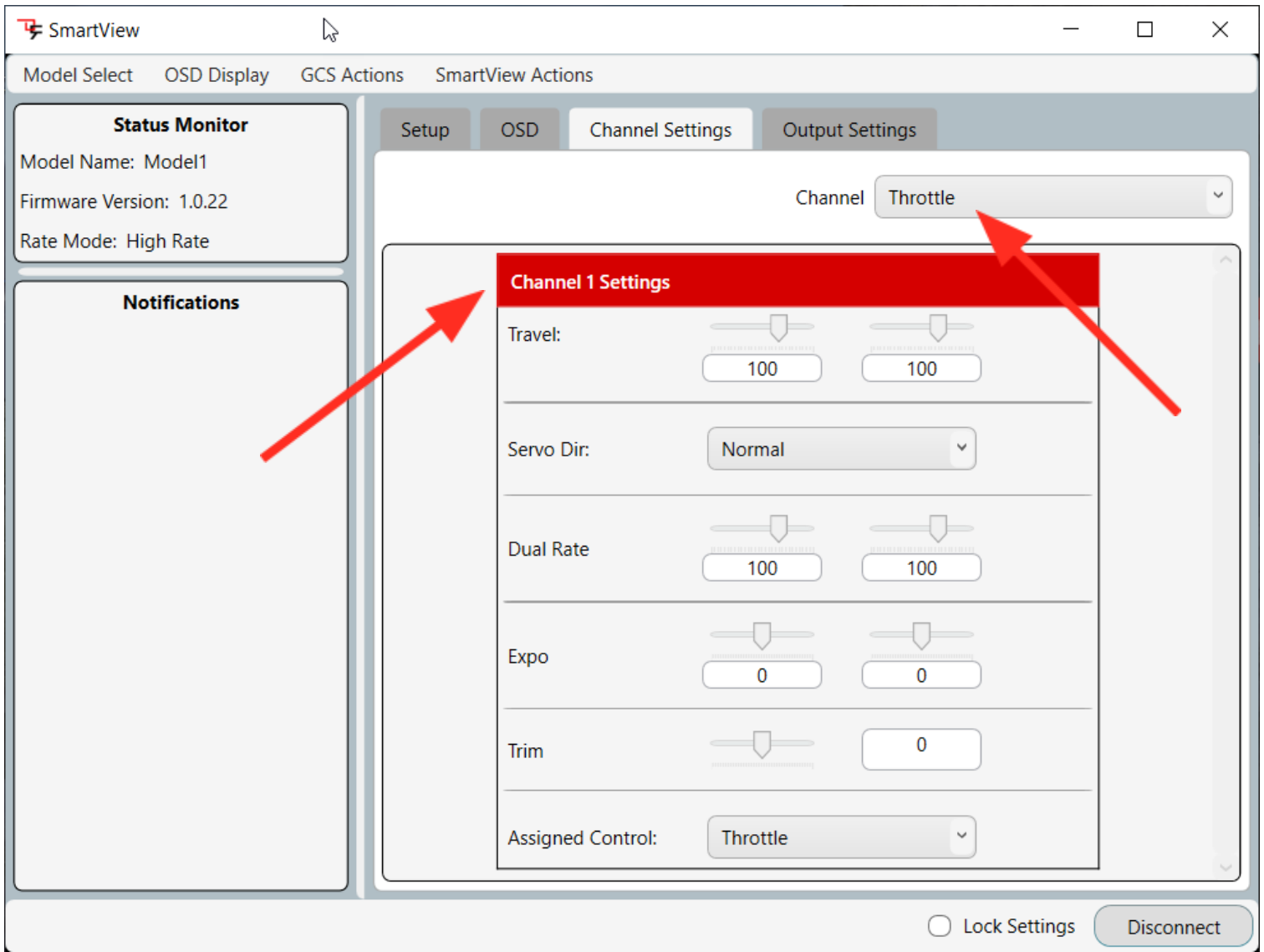
Lock Settings Disconnect

There are 3 different OSD views you can select with the GCS SmartView software.

- CHANNEL MONITOR
- CONTROL MONITOR
- USEC MONITOR

The USEC MONITOR will show all 12 slots and each channels USEC figures

Menu & Settings - GCS SMARTVIEW WINDOWS - SmartView Channel Settings

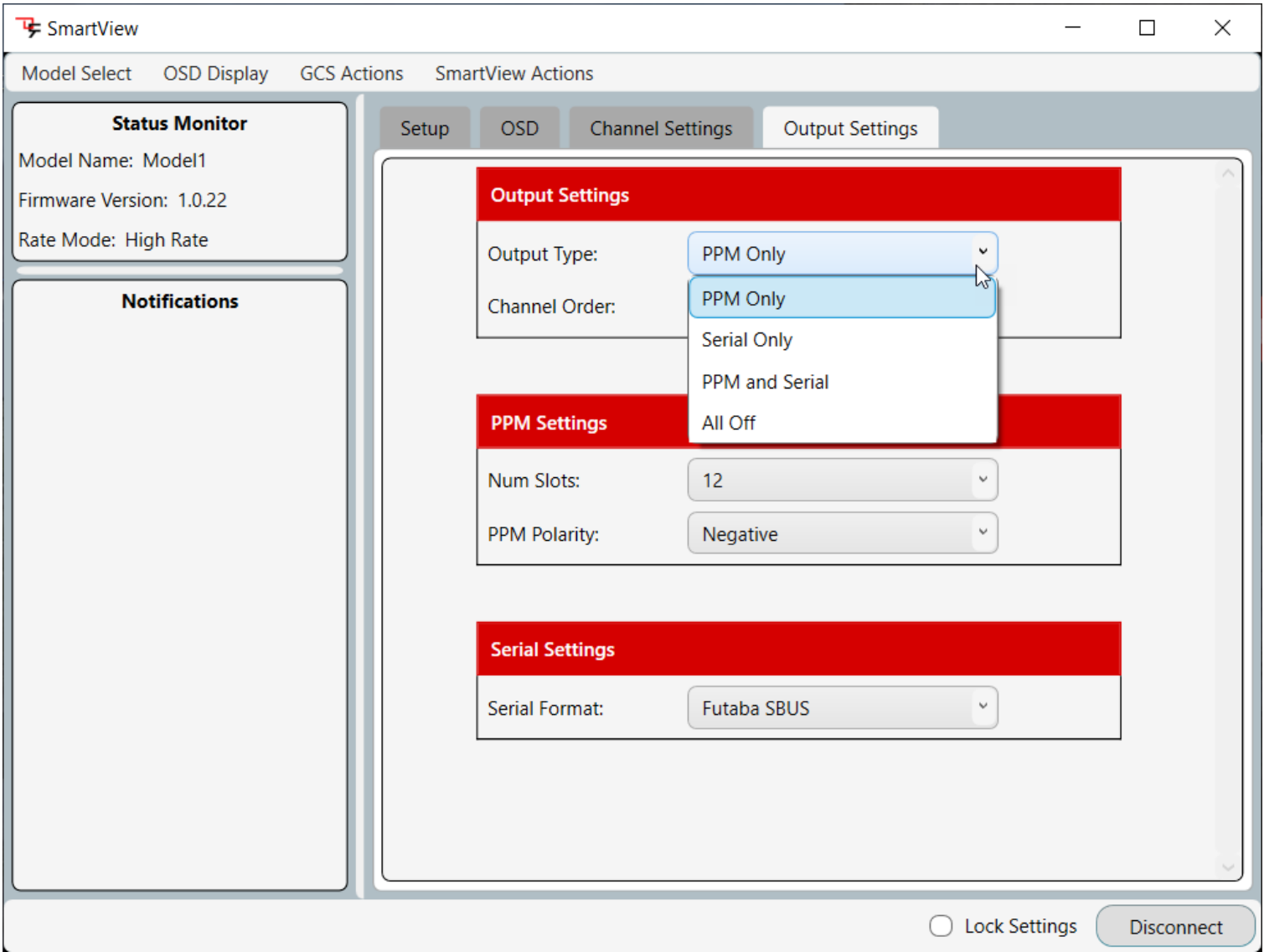


Under the CHANNEL SETTINGS tab you can go Channel by Channel and adjust each channel settings.

Under These Settings You Can Adjust:

- TRAVEL
- SERVO DIRECTION
- DUAL RATE
- EXPO
- TRIM
- ASSIGNED CONTROL

Menu & Settings - GCS SMARTVIEW WINDOWS - SmartView Output Settings



Under the OUTPUT SETTINGS tab you can select the type of signal the GCS will output through the various signal output connectors/ports.

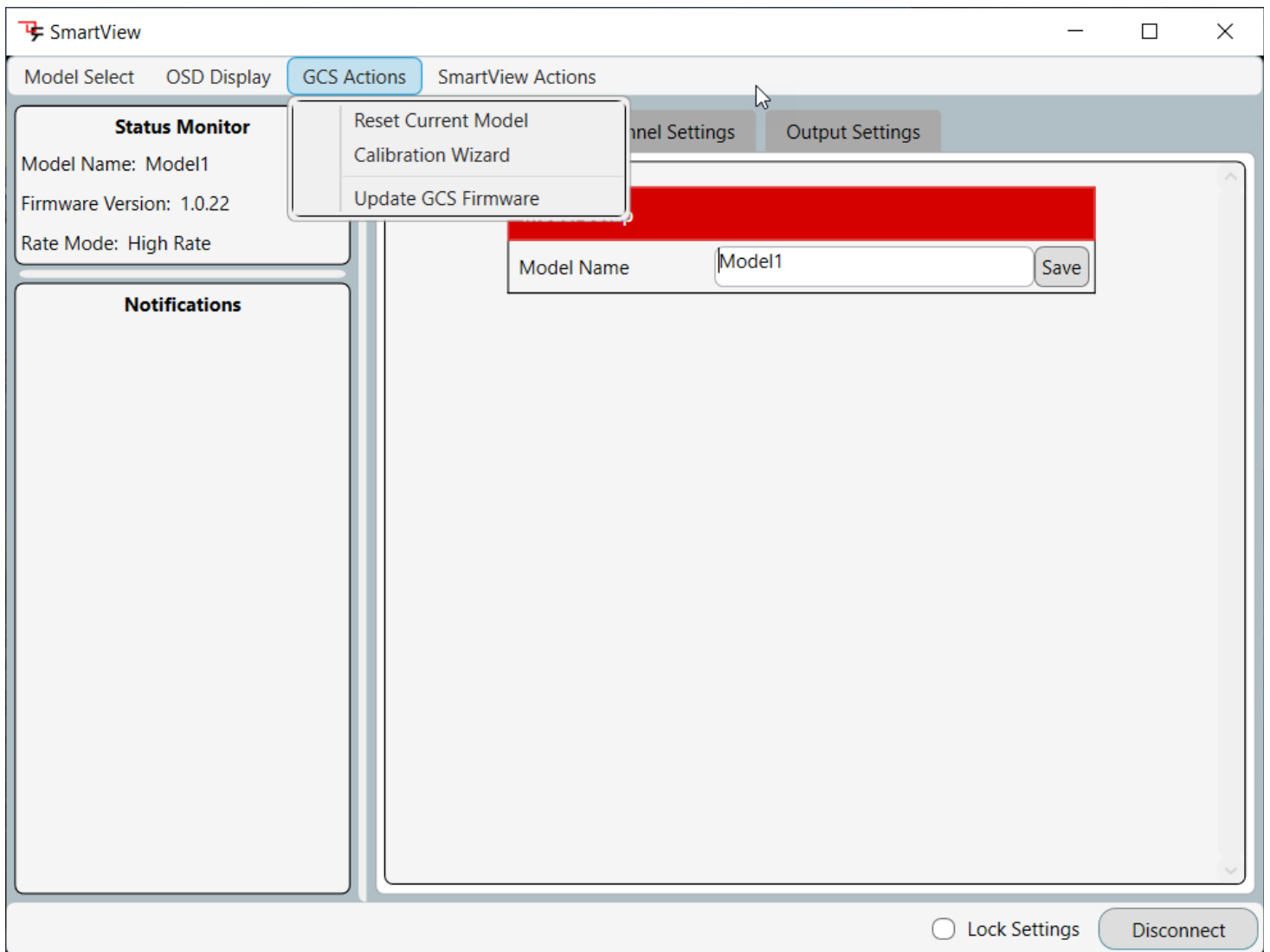
You have the option to stream PPM Only, SERIAL Only and both signals to stream simultaneously.

Under the 'Serial Settings' you can also choose the type of SERIAL output you would like to stream. The options are:

- Futaba SBUS - This selection will stream Native SBUS in the Futaba format.
- AIRBORNE INNOVATIONS - This selection will stream Serial in the Airborne Innovations format for Microhard and Picoradios

Most radios and autopilots can transmit through one or more of the available protocols through the Desert Rotor GCS

Menu & Settings - GCS SMARTVIEW WINDOWS - SmartView GCS Actions



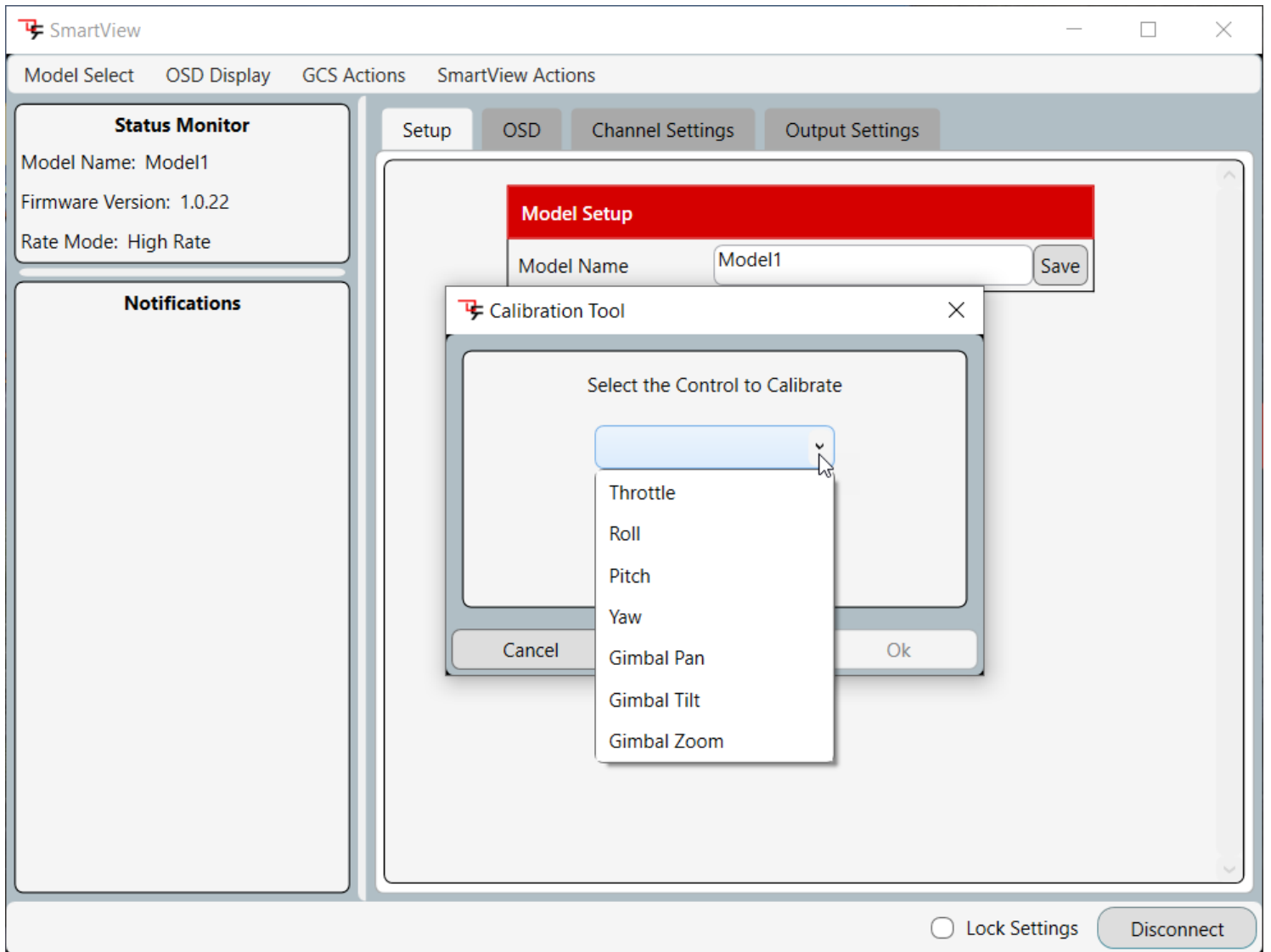
Under the GCS ACTIONS you have few key actions that might be needed:

-RESET CURRENT MODEL - Reset all Channel and Model settings for the current model listed.

-CALIBRATION WIZARD - **NOTE: ALL GCS CONTROLS, DIALS and JOYSTICKS are calibrated at the factory. We recommend prudent operations which is to calibrate regularly all controls alongside the autopilot recognition of those controls. (SEE NEXT PAGE FOR IMAGE)**

-UPDATE GCS FIRMWARE - GCS Units with the Windows GUI - SmartView interface comes with the most current software from the factory. Periodically DesertRotor will release updates for the GCS Firmware and the SmartView desktop software program.

Menu & Settings - GCS SMARTVIEW WINDOWS - SmartView Calibration Screen

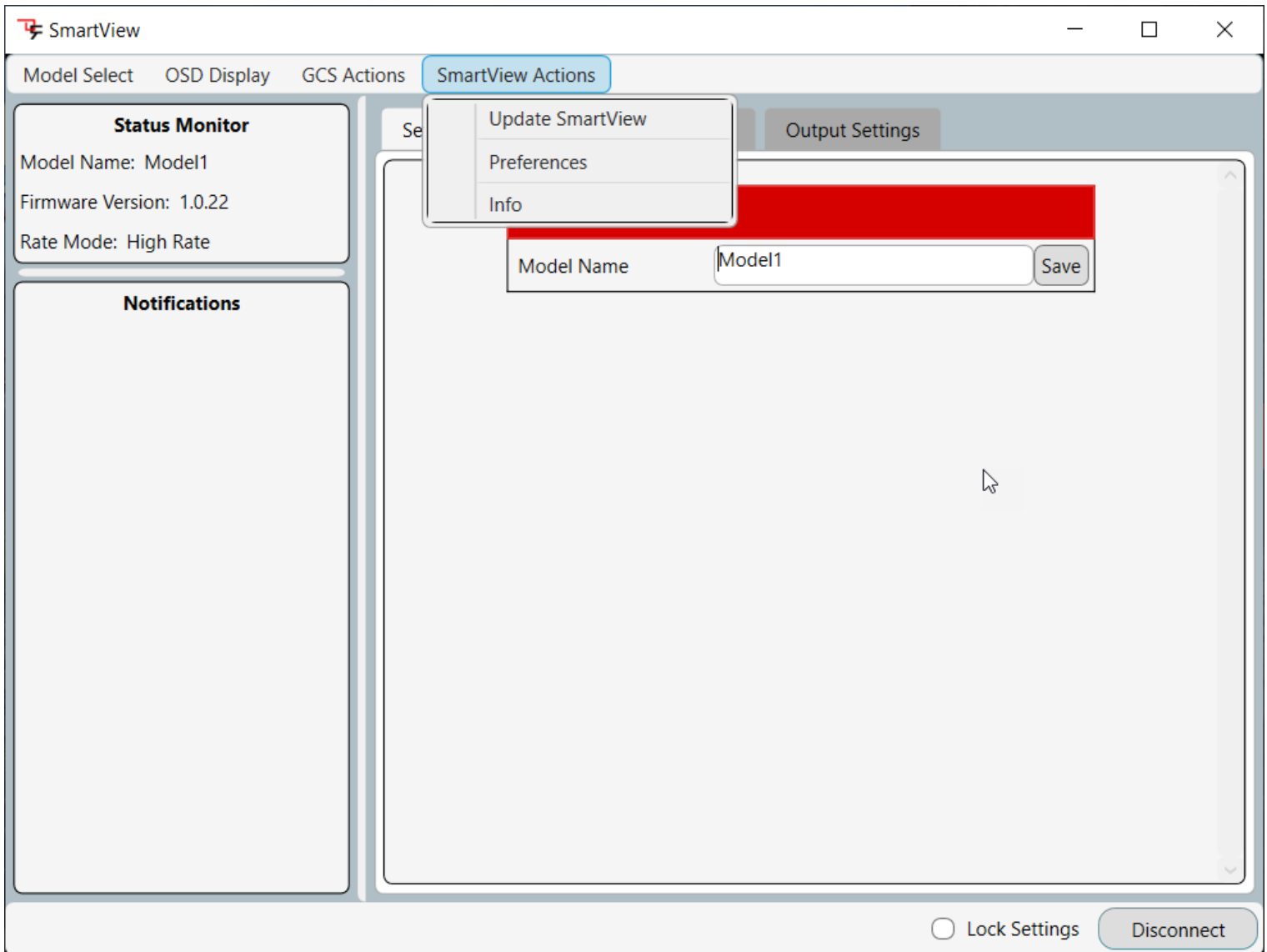


-CALIBRATION WIZARD -

NOTE: ALL GCS CONTROLS, DIALS and JOYSTICKS are calibrated at the factory.

We recommend prudent operations which is to calibrate regularly all controls alongside the autopilot recognition of those controls.

Menu & Settings - GCS SMARTVIEW WINDOWS - SmartView Actions

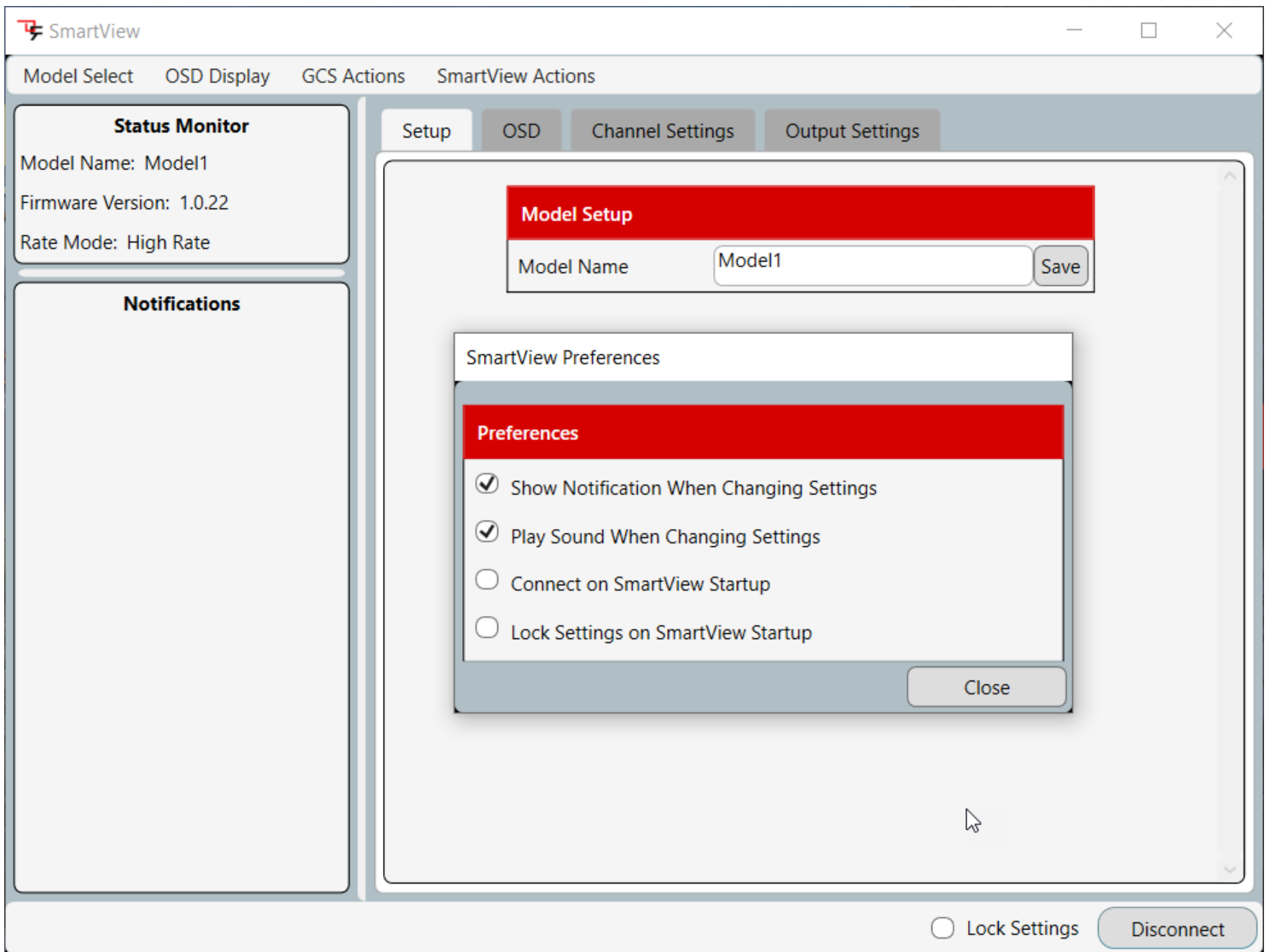


Under the SMARTVIEW ACTIONS you can update the desktop SMARTVIEW application when clicking on 'Update SmartView'

NOTE: There are two paths to update the GCS and GCS Desktop App.

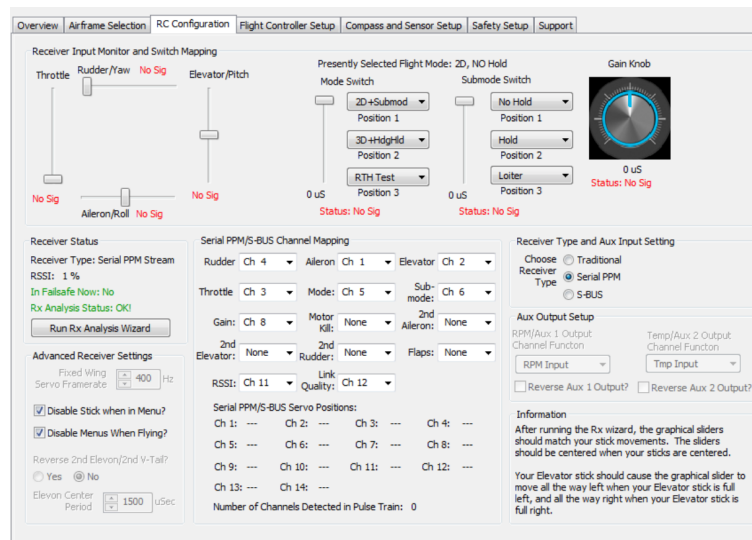
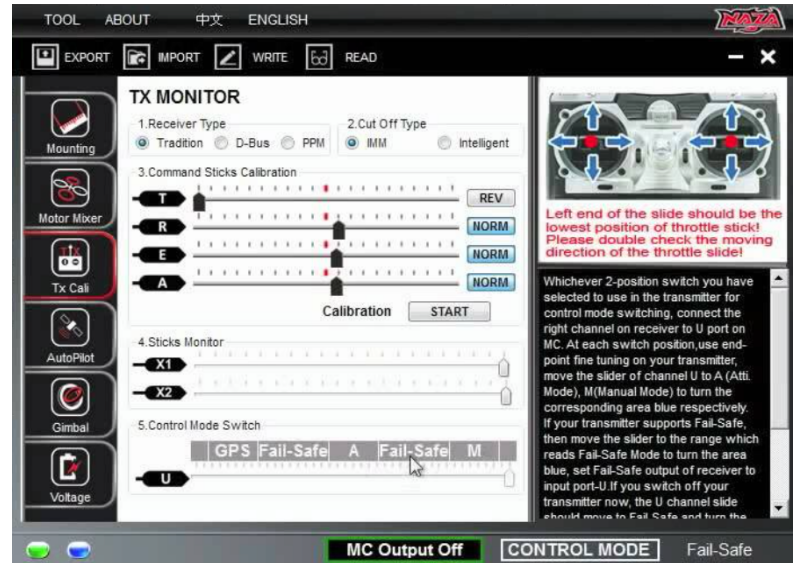
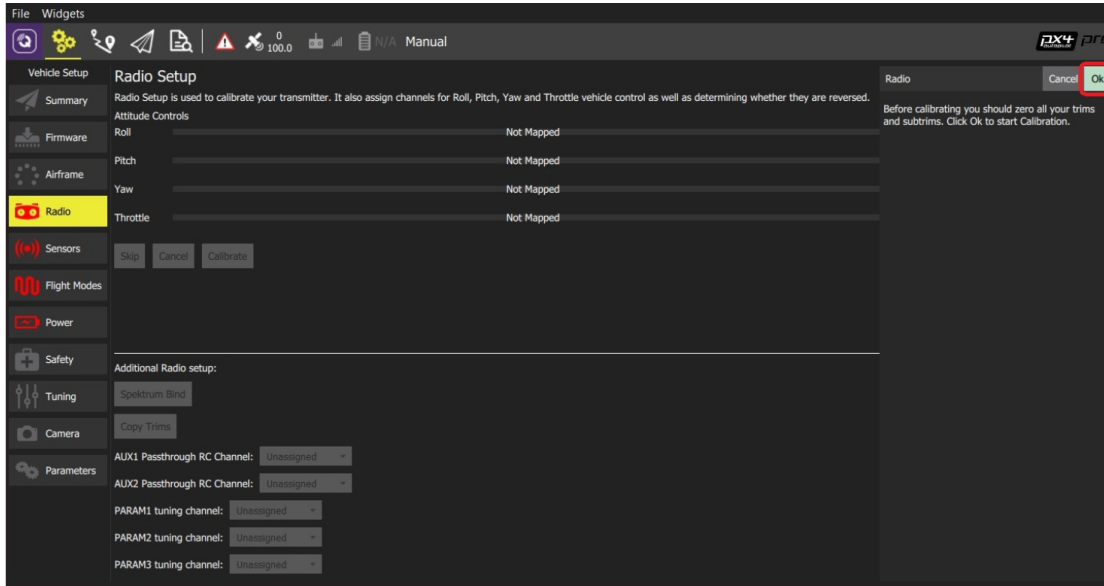
- 1) Under 'SmartView Actions' you are updating the desktop application
- 2) Under 'GCS Actions' you are updating the GCS internal firmware

Menu & Settings - GCS SMARTVIEW WINDOWS - SmartView Actions



Under the SMARTVIEW ACTIONS you can update the additional SmartView Preferences

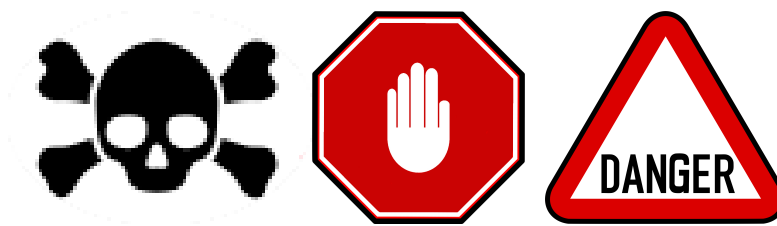
Examples of Autopilot Software and the Transmitter Calibration Screens



AIRCRAFT & AUTOPILOT CONSIDERATIONS

Note: ALWAYS CROSS CHECK FLIGHT CONTROL MOVEMENTS AND DIRECTIONALS IN THE AUTOPILOT SOFTWARE YOU ARE USING. USUALLY IN THE AUTOPILOT SETUP MENU YOU CAN SEE ALL TRANSMITTER CONTROLS, WHAT THEY ARE CONTROLLING AND WHETHER THEY ARE MOVING IN THE CORRECT DIRECTIONS.

SETUP & CALIBRATE THE AUTOPILOT SOFTWARE WITH THE MIRA 12X CONTROLS OR YOUR AIRCRAFT MAY CRASH/FLYAWAY OR EVEN WORSE CAUSE INJURY OR DEATH



- 1) CALIBRATE YOUR AUTOPILOT WITH THE MIRA 12X AND TRANSMITTER MODULE
- 2) SETUP YOUR FLIGHT MODES - ENSURE THE FLIGHT MODE SWITCHES WORK
- 3) SETUP YOUR FAILSAFE TO ENABLE IN THE EVENT THE MIRA 12X AND TRANSMITTER LINK BREAKS AND COMPLETE POWER LOSS HAPPENS ON THE GROUND END
- 4) BEFORE EVERY FLIGHT ALWAYS CHECK YOUR AUTOPILOT, CONTROL SURFACES AND MIRA DIRECTIONALS

COMPLIANCE

Your Responsibilities and Liabilities

You are responsible for checking your local laws and regulations

Rules and regulations vary in every region operating unmanned aircraft. It is entirely your responsibility to be in adherence and ensure all your equipment and personnel is compliant to the region.

Desert Rotor is not responsible for misuse or unlawful use of our products. Operating unmanned technology can lead to criminal prosecution, jail, serious injury and death of yourself and many others. Be Smart!

Check You Local Laws & Regulations as some regions may not allow the use or require a HAM radio license to operate the various offered transmitters and/or along with the MIRA 12X.

The software and hardware was designed following careful development and testing by DESERT ROTOR, but DESERT ROTOR is not able to conduct tests based on all possible combinations of software and hardware environment. Therefore, DESERT ROTOR is unable to promise nor warrant that there will be absolutely no risk of loss or damage of hardware, property, information or any other kind of loss, during operating, piloting and/or execution of any of the functions or components. Customer must be fully aware of risks using the MIRA 12X as the system can be used with countless hardware components that were not tested alongside the MIRA 12X.

Be Smart! Be Safe! Mitigate As Much Risk As Possible!

The Desert Rotor Team Wishes You a Prosperous and Safe Future!

APPENDIX

Warranty/Repairs/Customer Service

WARRANTY. DESERT ROTOR shall provide its services and meet its obligations under this Agreement in a timely and professional manner that will meet generally acceptable standards in the industry and region. DESERT ROTOR will provide a standard of care equal to, or exceeding, the care used by service providers within the computer manufacturing industry.

1. DESERT ROTOR warrants that the MIRA 12X units delivered to Customer are free of defects and the units comply with the baseline specifications shown in Schedule A.
2. Warranty period shall be 100 calendar days, from the date of delivery to the Customer.
3. Warranty is conditional upon proper use of the MIRA 12X in the application for which they are intended and shall not apply to any MIRA 12X units that had been subjected to abuse, misuse, neglect, negligence, improper testing, improper usage, storage and/or handling.
4. Warranty will not apply to MIRA 12X units that have been tampered for Customers research & development efforts and have been serviced or repaired by Customer and/or End User.
5. Warranty will not apply to MIRA 12X units that have not been operated, repaired and maintained in accordance with the operating manuals.
6. Warranty will not apply to MIRA 12X units that failed due to fire, water, lightning and/or other acts of God or nature. This includes acts of violence, vandalism or any situation that compromises the core integrity of the MIRA 12X unit. This includes operations in conditions such as temperature, altitudes and environments outside the recommended ranges.