



TOUGHSAT T-100

Communications Trailer

Users Manual





Important warning regarding your Ground Control TOUGHSAT T-100 System

All power to the system (controller, modem, external network devices) MUST be disconnected if connecting the satellite mount (dish) to the rack-mounted equipment (controller and modem).

Permanent damage will occur to the unit causing it to cease functionality until the unit is returned to Ground Control's facility for repairs. This damage is NOT covered under the unit's warranty.

If you have any questions regarding connecting or operating your Ground Control Toughsat system, stop and please contact our Technical Support Team immediately for assistance to prevent damaging your equipment. You can contact our 24/7 Support Team at the following:

GROUND CONTROL SUPPORT
USA Toll Free: 1-800-931-5559
International: 00-1-805-783-4633
Email: support@groundcontrol.com

TOUGHSAT T-100 System Information

Please fill out the information on this page with the account information supplied to you from Ground Control and keep the manual in the rack-mount electronics case. It will be helpful both for on-site setup as well as required information if you need to contact Ground Control for support.

Ground Control Account Number: GC_____

iDirect or CPE Serial Number: _____

Modem Static IP Address: _____

System Type (Trailer/ Trailer & Flyaway) _____

Mobile System IP Address: _____

Router IP Address: _____

Contacting Ground Control Technical Support

Ground Control technical support representatives are available 24 hours per day for your convenience. Please note that our standard hours of operation are Monday – Friday, 8AM to 5PM Pacific Standard Time. If you call outside of these hours, support response may be delayed and certain resources may not be available to the support agent.

For Technical Support, please call [1-800-931-5559](tel:1-800-931-5559) from the U.S. or [805-783-4633](tel:805-783-4633) from abroad. You may also email support@groundcontrol.com from a computer connected to working Internet connection.

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The large rear bay of the T-100 is fully enclosed and includes a spare tire and securing straps.

TOUGHSAT T-100 TRAILER FEATURES

- ▶ One Person Setup – Requires little or no training to use.
- ▶ Establishes a half-mile 802.11 wireless "G" network automatically.
- ▶ Download speeds of 5Mbps, Upload of 2Mbps with iDirect from Ground Control.
- ▶ iDirect Evolution X5 1.5RU Satellite Router
- ▶ AC Power Conditioner (1RU) for 8 - 120 VAC outlets - Good for keeping power clean.
- ▶ A portable rack-mount case (6RU) for all electronics that may be easily moved.
- ▶ 50' (14 meters) cable run so electronics case may be moved into a structure or tent.
- ▶ Four easy crank stabilization jacks - Good for high winds and uneven terrain.
- ▶ Security belt for crowd control.
- ▶ Spare tire
- ▶ Optional - Ultra Quiet Honda 1000 Watt generator for 8 hr. run time on one tank. (2000 Watt available).
- ▶ Optional trailer dolly
- ▶ Works in extreme environments (rain, hail, hot, cold)
- ▶ Works with any wired or wireless SIP phone. Or consider our VOIP Phone service.
- ▶ Excellent back-up Internet at any location for emergency organizational use.
- ▶ Rated to withstand wind speeds up to 70 MPH when using leveling jacks.

T-100 Communications Trailer General Specifications

Trailer Dimensions	138"L x 66"W x 58"H (Stowed Dish - Exterior Dimensions)
Rear Storage Space	62"L x 24"H x 46"W (Interior Dimensions)
Weight (loaded)	Under 1400 lbs (includes spare tire, gas & dolly)
Hitch Ball Size	2 Inch
Removable Tongue Length	23" (when removed, trailer is 115 inches long)
Trailer Lights Plug/cable	7-Pole, RV-Style Trailer Connector (male)
Generator	Honda EUi Ultra Quiet 1000 Watt Generator (upgradable to 2000W)
Electronic Components	
	Dish Controller 1 RU (Wireless "G" Access point 100' radius range)
	Satellite Modem 1.5 RU - iDirect Evolution X5 Router
	Power Conditioner 1 RU (with 8 AC plugs)
	2.5 RU available for customer use (front) 6 RU available on back.
	50' (15.3M) Quick-disconnect cable run (between dish and controller)

T-100 Included Equipment



- The Toughsat XP or SP Mobile System.



- A 6RU rackmount case for system electronics
- The Toughsat Controller with integrated 4-port wireless router.
- iDirect Evolution X5 1.5 RU Satellite Router.
- Power Conditioner (1 RU) for 8 AC plugs.
- 50' (14 meters) cable-run so electronics case may be located in a structure or tent.



- Optional Honda EUi 1000 Watt generator (2000 watt available).
System uses about 90 to 150 Watts during normal usage (300 Watts Max for power up spike)



- Two High-Gain range extending antennas for half-mile connectivity
These High-Gain antennas MUST be connected for any wireless connectivity.
(Antennas may be removed and stored for safety).



- Onboard battery powered cabinet lights and trailer flashers for night set-up



- Large enclosed storage area
- Quick-Release straps & railing for securing stored equipment
- Spare Tire



- Trailer Dolly



- Helicopter D-Rings (System weight under 1400 lbs).

T-100 SETUP & OPERATION



No Need to Disconnect Tow Vehicle

The T-100 may be operated while connected to the tow vehicle. If connected, the trailer lights will be supplied power from the tow vehicle. Other electronics are powered by the trailer's onboard generator.

If the tow vehicle is disconnected, power to the trailer lights and flashers will be supplied by the on-board trailer battery.



Choose Level Ground To Park Trailer



BULLSEYE LEVEL

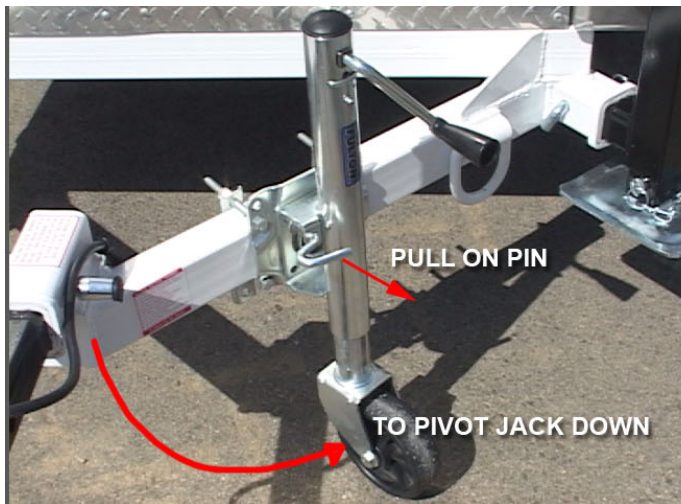


WHEEL CHOCKS

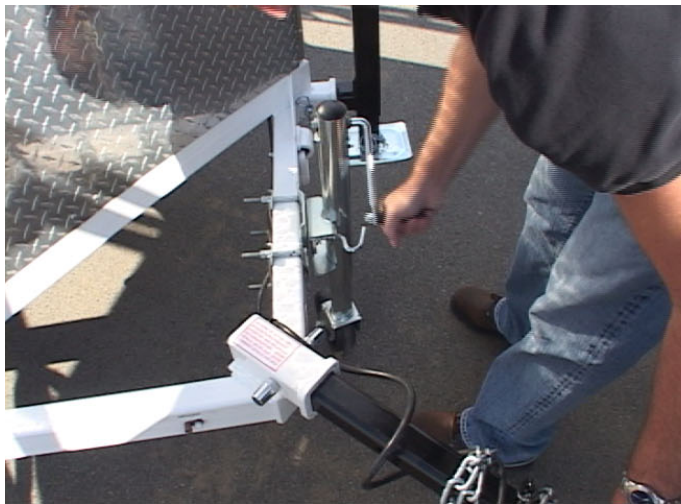
STEP 1 – FIND A LEVEL AREA. If the Toughsat is within three degrees of level, it will normally find satellite within 3.5 minutes. A bullseye level in the tow vehicle or trailer top helps. Chock the trailer wheels for both level or non level terrain for safety.



STEP 2 – DISCONNECT THE TRAILER hitch from the tow vehicle. Don't forget to unplug the 7 Pole connector.



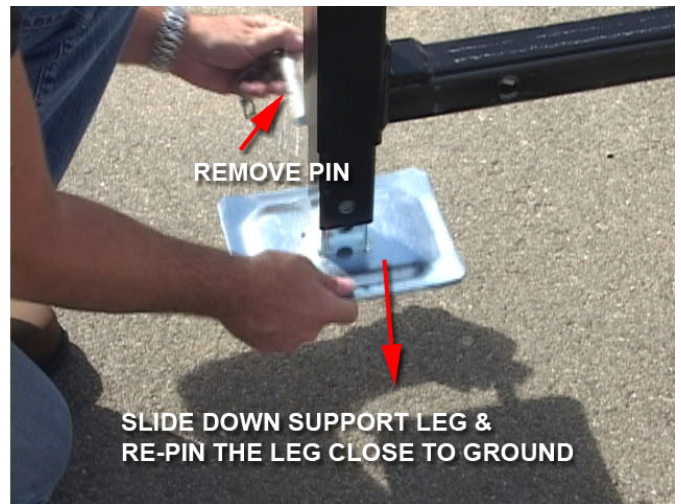
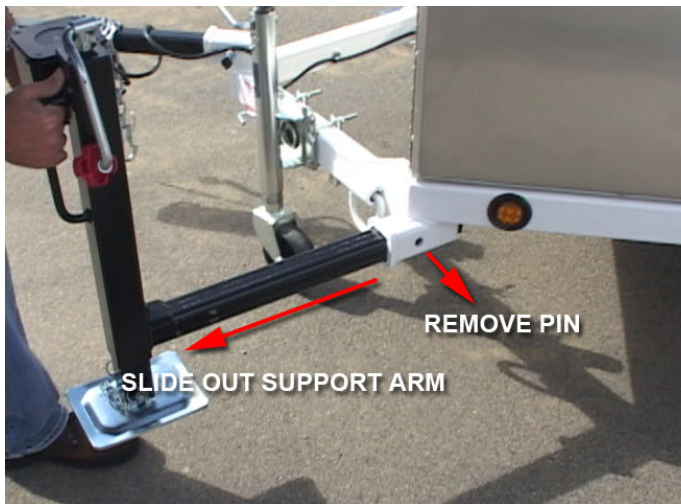
STEP 3 – Pull the pin the holds the front wheel jack against the trailer frame. Rotate it 90 degrees so that the jack locks into place with the wheel side down. Carefully unlock the hitch from the ball.



STEP 4 – Begin to crank up the front of the trailer so that the hitch clears the 2" ball on the tow vehicle.



The trailer dolly is a good way of moving the trailer to a different location. Also note the trailer tongue itself may be removed by unlocking the locking pin that holds it to the trailer frame. Removing the tongue may reduce theft of the system, or allow other tongue configurations to quickly be used on the trailer.



STEP 5 – RETRACT THE SUPPORT LEGS. Although use the supporting leveling legs is not mandatory, it is recommended for high winds or accidental shifting if bumped. Unpin the legs and arms and slide both into place.



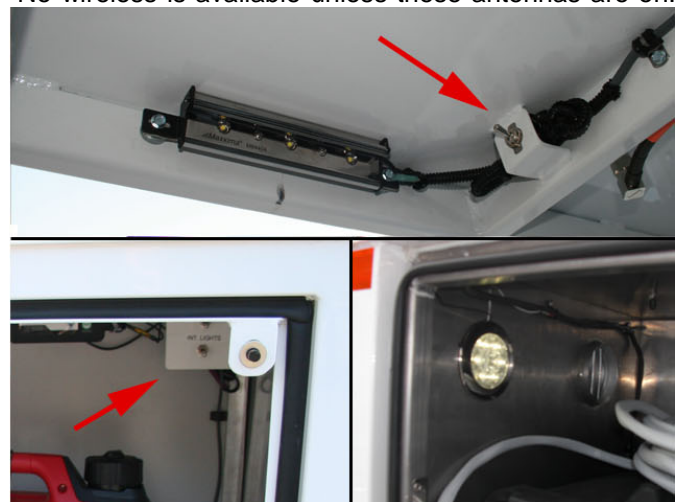
STEP 6 – Crank all jacks to level the trailer.



STEP 7 – Hand tighten the two high-gain antennas into the two bulkhead connectors on top of the trailer. No wireless is available unless these antennas are on.



STEP 8 – OPEN THE GENERATOR CABINET. If dark, you may use the toggle switches for cabinet lights as well as emergency flashers, both of which may run on internal battery. The rear bay has a single switch to turn on the bay lights. The generator may stay in the cabinet (running with door open), or removed from the cabinet.



T-100 POWER OUTLETS



The outlets inside the T-100 are both labeled and color coded. The orange outlets, labeled “Generator” by default are connected to the onboard generator only. The black outlets labeled “Shore Power” by default are connected to the external extension cord socket. These circuits are separate and independent of each other. There are sets of these outlets in both side cabinet areas of the trailer, when moving from one power source to another, check the outlets on both sides to ensure proper connections.

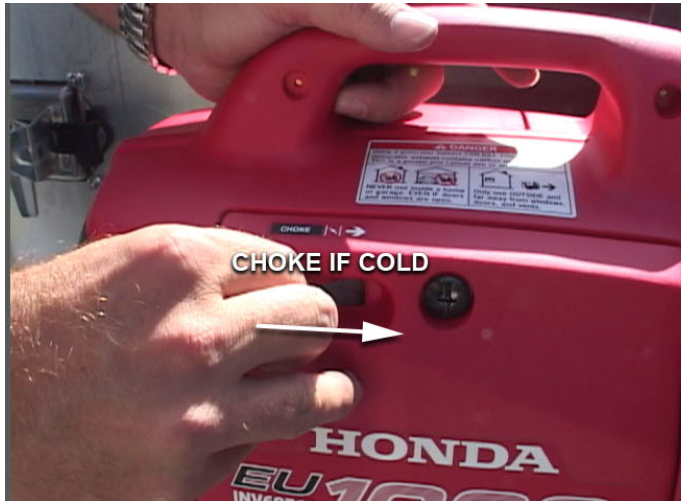
For Generator Use:

1. Ensure that all power distribution devices within the trailer (such as power strips and conditioners) are connected to one of the orange “generator” outlet sockets.
2. Start the generator.

For Shore Power Use:

1. Ensure that all power distribution devices within the trailer (such as power strips and conditioners) are connected to one of the black “shore power” outlet sockets.
2. Ensure there is a source of external power connected to the external shore power extension cord socket.

STARTING THE GENERATOR



STEP 9. START THE GENERATOR. Close the choke if the generator is cold and open the air vent on the gas cap.

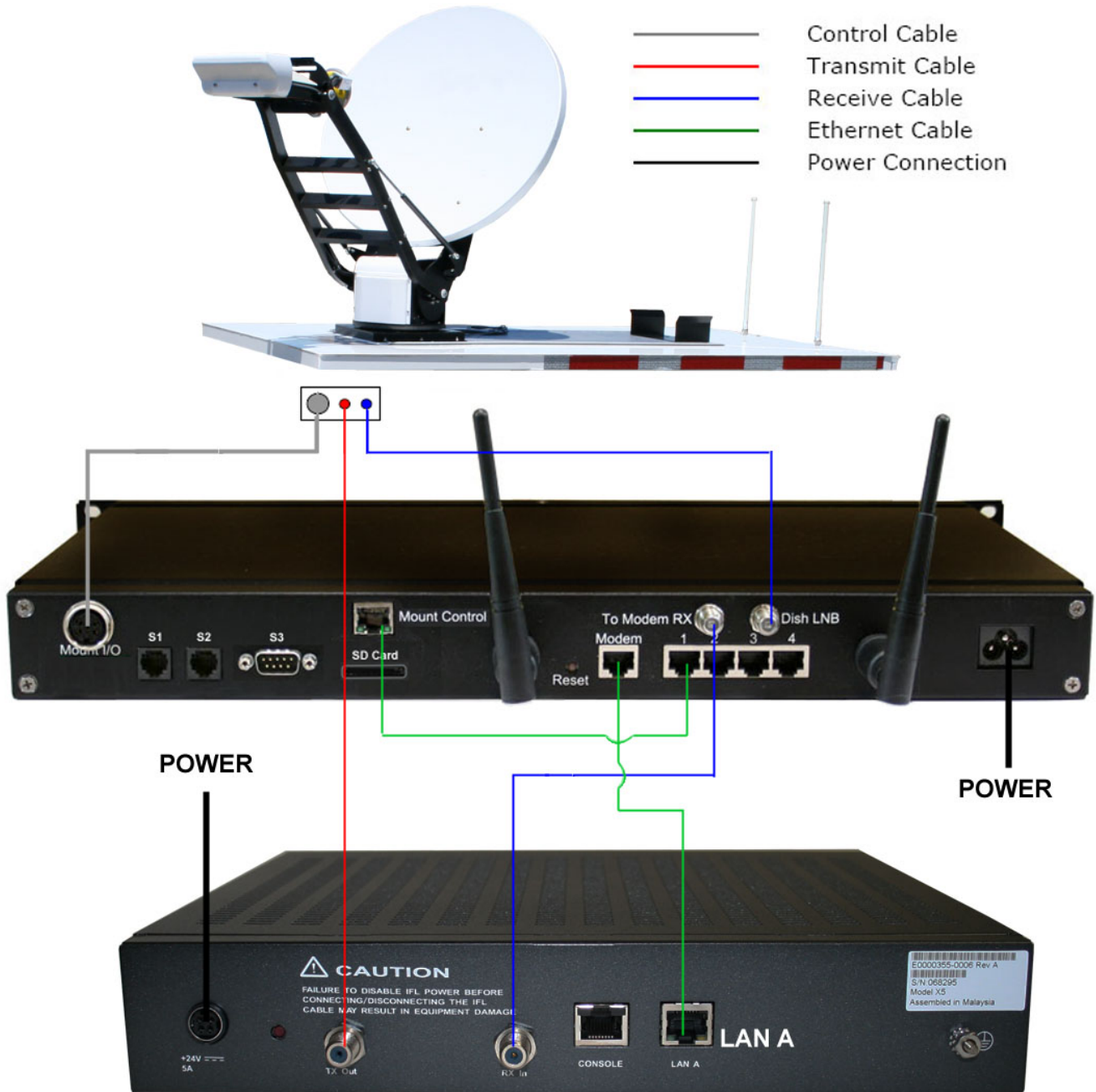


Turn on the POWER Switch to ON, and then firmly and quickly pull the starter cord to start the generator. **IMPORTANT** - Make sure to turn off the choke after the motor has started.



STEP 10 – TURN ON ELECTRONICS. Inside of the electronics case is a portable 6RU rackmount case with an 50 foot cable run that allows you to move the electronics a distance from the trailer. The electronics case includes the iDirect satellite gateway, the 8 AC plug power conditioner, and the Toughsat wireless controller. Both the gateway and controller should power on (lights will appear) with the single toggle switch on the power conditioner.

T-100 WIRING DIAGRAM



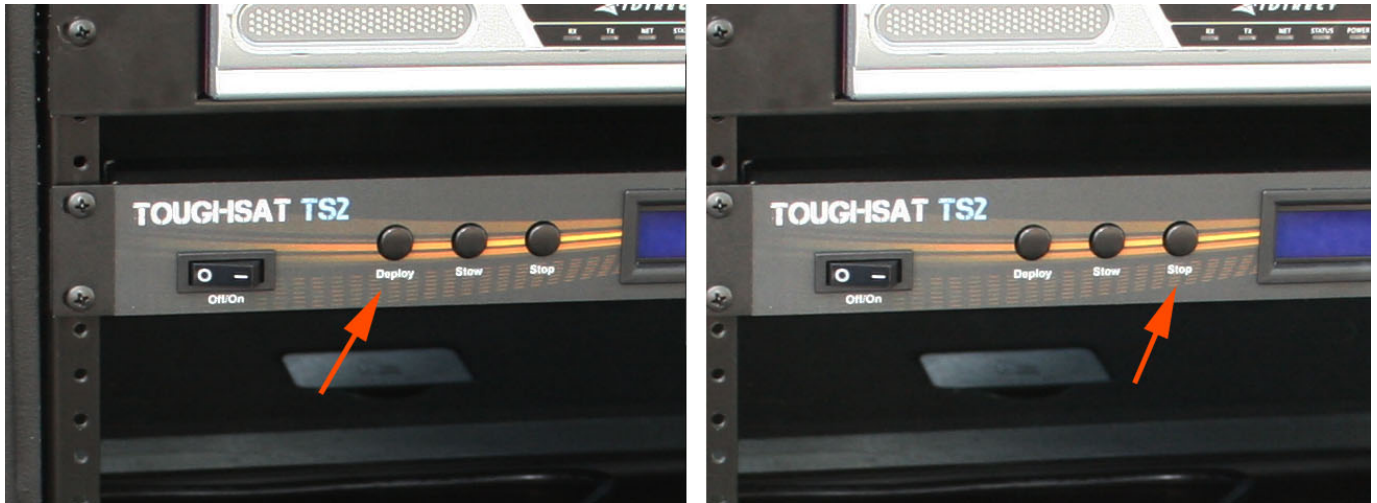
Above is the wiring diagram of the Toughsat to the electronics inside of the 6RU rack-mount case.

Input voltage is 120/240 VAC 6/3 maximum. A UPS or Power Filter is strongly recommended for situations where you generate your own power (solar, DC inverters, fuel powered generators).

WIRELESS ANTENNA NOTE – If you are moving 6RU rack-mount case away from the trailer (up to 50 feet), insert the smaller wireless antennas for a 100’ wireless range. Commercial grade routers will work with our equipment; however support is limited from Ground Control for routing issues with unknown equipment.

WARNING – DO NOT PLUG IN CONTROL CABLE IF CONTROLLER IS POWERED ON. Doing so will damage electronics, which is not covered by the warranty.

DEPLOYING THE DISH



STEP 11 – DEPLOY THE DISH. After GPS has been acquired by the system, (normally within 2 minutes), you may press the “**Deploy**” button on the Toughsat controller, which will raise the system. If for any reason there is any problem, press the “**STOP**” button to stop the unit from deploying. The dish will raise, rotate, and lock on satellite normally in under 3.5 minutes. If there is a problem, make sure that all equipment lights are on.

Once all five lights are green on the front of the iDirect modem, the system is online and ready to use.



USING THE SECURITY BELT



STEP 12 – RETRACT THE SECURITY BELT - The T-100 has two retracting security belts that keep foot traffic from accidentally bumping the trailer, and from standing too close to the transmitter.

USING THE AC/HEATER UNIT



If your T-100 comes with an optional AC/Heater Unit, make sure the front cover is removed before operation. To turn on, simply plug the unit in. Please refer to the included AC-Heater Users Manual for detailed instructions.



The transmission strength is strongest between the radio and the reflector. Do not place any body part in this zone.

CONNECTING TO THE INTERNET

The T-100 is pre-configured, so connecting to the Internet is as easy as connecting to a wireless access point. The default SSID for the wireless access point is “**Toughsat <serial number>**”. You can also connect to the system using an Ethernet cable connected to the back of the controller in one of the 4 LAN ports. The default configuration uses DHCP to manage the IP addresses, so be sure your computer is set for DHCP.

Below are the Toughsat TS2 display and the iDirect Evolution X5 Satellite Router.



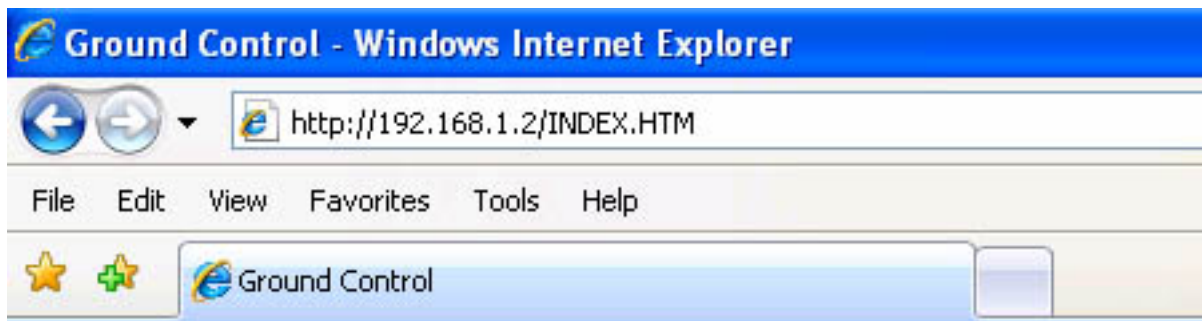
The TS2 will show the current status of the system. When the iDirect X5 Router LED lights turn green (only the Status light should be dark), you are online. If the power light on the X5 is solid green and the TX light is blinking green, the system is still acquiring the satellite.

ACCESSING THE WIRELESS ROUTER

You can reconfigure the wireless settings, add encryption or security, or even disable the wireless completely from the router interface at <http://192.168.1.1>. Leave the username blank and the password is “**admin**”. Do not change the static IP settings inside the router unless instructed by Ground Control.

ACCESSING THE TOUGHSAT WEB INTERFACE

You can view the Toughsat web interface, type in <http://192.168.1.2> on a connected browser.



There are no logins or passwords for this page, and it contains a large amount of information about your system. Some menus will even allow you to change configuration settings for your dish. Leave these alone unless instructed or you know what you are doing. Many of these settings will prevent your dish from working correctly if changed. Contact Ground Control Technical Support if you have questions about the items on these pages.

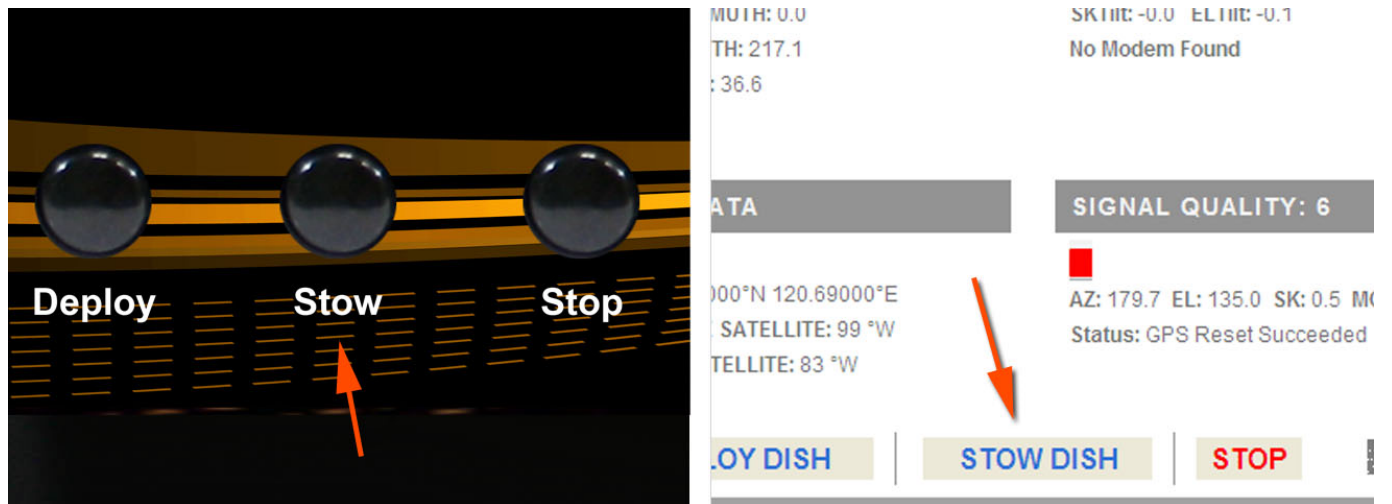
The screenshot shows the 'Main Page' of the Toughsat web interface. The top navigation bar includes 'Main Page', 'iDirect Modem', 'Satellite Settings', 'Setup Screen', and 'Manual Control'. The main content area is divided into several sections: 'CALCULATED SKY POSITION' (MOUNT AZIMUTH: 0.0, MAG AZIMUTH: 217.1, ELEVATION: 36.6, SKEW: 60.6), 'MODEM / MOUNT INFO' (SKTilt: -0.0, ELTilt: -0.1, No Modem Found), 'Main Page' (instructions on finding signal, links for help topics and history, SERIAL#: 11055, FW VER: 12-17-12 09-47am), 'INPUT DATA' (highlighted with a red box, showing GPS OK, coordinates, and satellite info), and 'SIGNAL QUALITY: 6' (highlighted with a red box, showing a red square, AZ: 179.7, EL: 135.0, SK: 0.5, MC: 0.0, and Status: GPS Reset Succeeded). At the bottom, there are buttons for 'DEPLOY DISH', 'STOW DISH', 'STOP', 'DUAL MATRIX', and 'ORDER'.

First, look to the lower left quadrant of the screen, to the “Input Data” Section: Confirm that it displays “GPS Signal OK” and has GPS coordinates. When GPS is “OK”, you may click on “Deploy Dish”. This dish will lock on satellite and create an Internet connection automatically.

This screenshot is similar to the one above, but the 'SIGNAL QUALITY: 6' section is highlighted with a red box. The 'INPUT DATA' section is no longer highlighted. The rest of the interface, including the navigation bar, sky position, modem info, and main page text, remains the same.

Under “Signal Quality” are displayed current signal strength, as well as the status of the dish. In this case it is stowed. When deployed, the Toughsat will search for signal, and when it’s ready, it will display “Passed Test, System Online”. Confirm it by connecting to any web page on the Internet with your browser.

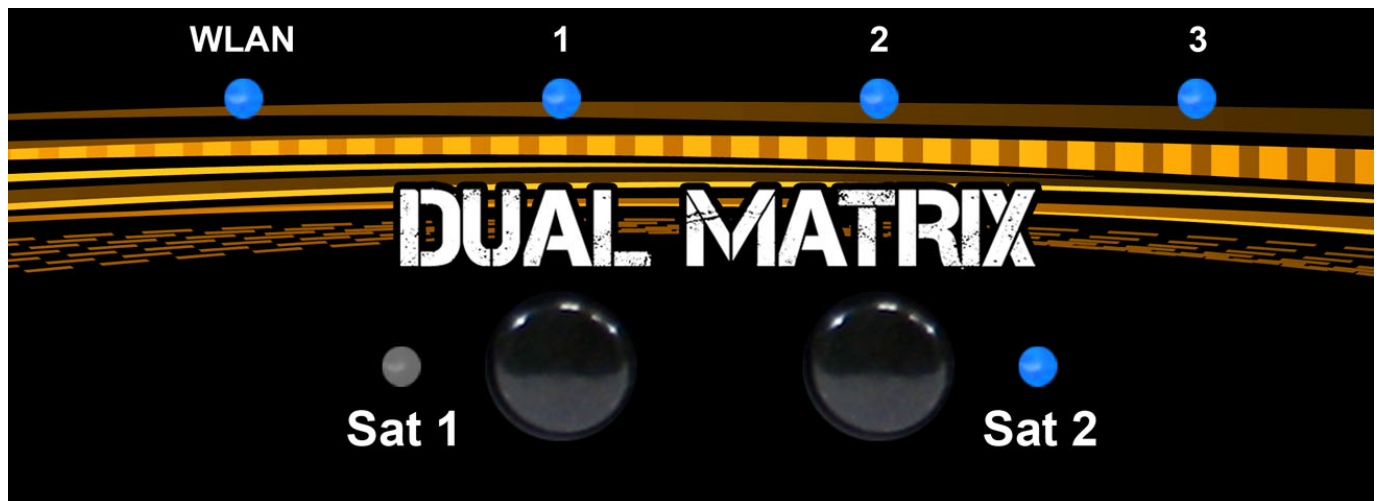
STOWING THE DISH



Stowing the dish on the Flyaway can either be done by pressing “**Stow Dish**” on the Toughsat Control panel, or by accessing the controller’s web page at <http://192.168.1.2> and pressing on the “**Stow Dish**” button.

Press the STOP button anytime there is any problem!

Dual Matrix



Dual Matrix is an optional service from Ground Control available on the TS2 Controller. The two Dual Matrix buttons (Sat 1 and Sat 2) when pressed will automatically access one of two satellites for full connectivity. This service allows for greater flexibility when locating a satellite that may be hidden behind trees. Dual Matrix is also a completely redundant satellite network, where if one satellite / teleport / network fails, the other satellite / teleport & network is available.

For more information on Dual Matrix, please visit www.groundcontrol.com/Dual_Matrix_Satellite.htm

Powering Off The System



POWERING OFF – Make sure to turn off the Electronics power **BEFORE** you turn off the generator. This will help protect the electronics from any electrical fluctuation.

To turn off the generator, rotate the toggle switch.

Finally, close the AIR VENT on top of the generator gas cap. This will prevent gas from leaking from the generator while it is traveling down the road.

FINAL WALK AROUND CHECKLIST

Before you drive off of the trailer, make sure the list below is completed:

- DISH IS FULLY STOWED & ELECTRONIC ARE TURNED OFF**
- CABINET LIGHTS & FLASHERS ARE TURNED OFF**
- GENERATOR AIR VENT IS SHUT (KEEPS GAS FROM SPILLING DURING TRAVELING)**
- HIGH-GAIN ANTENNAS ARE REMOVED AND STORED (OPTIONAL)**
- ITEMS IN STORAGE BAY ARE SECURED**
- WHEEL CHOCKS UNDER TIRES ARE REMOVED**
- CABINET DOORS ARE TIGHTLY SHUT & LOCKED**
- FRONT WHEEL JACK HAS BEEN ROTATED 90 DEGREES TO CLEAR GROUND**
- LEVELING JACKS LEGS ARE RETRACTED AND FULLY CRANKED UP**
- LEVELING JACK PINS FOR BOTH LEGS AND ARMS ARE IN PLACE AND FASTENED**
- TONGUE LOCK IS SECURE**
- 9 POLE CONNECTOR IS SECURELY INSERTED IN TOW VEHICLE**
- TRAILER TONGUE IS LOCKED ON 2" BALL ON TOW VEHICLE – IMPORTANT TO CHECK**
- TRAILER SAFETY CHAINS ARE FASTENED TO TOW VEHICLE**

CONTACTING GROUND CONTROL SUPPORT

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