

	Rural Training Center-Thailand: Technical Paper ศูนย์ฝึกอบรมชนบท-ประเทศไทย: ทางเทคนิคกระดาน <h2 style="text-align: center;">450 Window Line Slim Jim VHF Antenna Set-up</h2> <p style="text-align: center;">© 2011, All rights reserved.</p>	
www.neighborhoodlink.com/org/rtcth	E-mail: rtc2k5@gmail.com	
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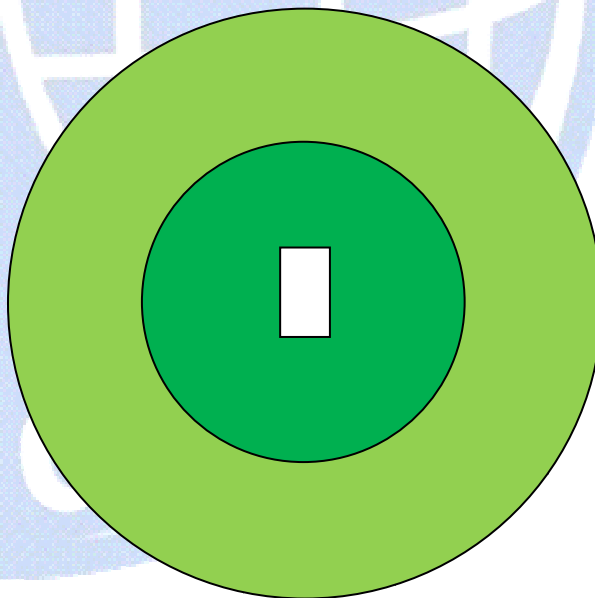
The 450Ω Window Line Slim Jim VHF antenna was built using plans and information from www.hamuniverse.com/ke4nu450slimjim.html but adapted to our circumstances in rural Thailand. These set-up procedures pertain to the portable 450Ω Window Line Slim Jim antenna used with Sparky, the Batt-mobile (the RTC-TH alternative energy demonstration vehicle).

The 450Ω Window Line Slim Jim antenna would be used in a stop 'n park portable operating mode. Sparky might be deployed in recon/scout operations and if necessary, use the 450Ω Window Line Slim Jim vertical antenna to communicate when the normal mobile vertical whip antenna was ineffective.

Parking Site: The set up process begins with selecting a suitably level parking position that is vertically and horizontally clear of overhead obstructions. To quickly estimate the slope of the site, tie a brightly colored streamer to the horizontal cross bar below the PA speaker roof rack on the passenger side of Sparky. From a distance of 18m, place a walking stick perpendicular to the ground. Hold a hand sight level against the stick and sight in on the streamer on Sparky. Use a short measuring tape to get the height of the sighting level elevation in meters. Divide by 18 and express the result as a %. If the slope is 0-12.5% (0-7° angle), the site is considered level. [**Note:** This is the same slope angle for a “level” helicopter landing zone. Slopes from 12.5-25% / 7-15° require helicopters to hover but not land.]

Avoid parking under overhead obstructions, especially utility lines/wires. This is an absolute “No Go” condition when using push-up masts. Sparky carries a variety of optional push up mast/antennas that extend to about 8 m AGL—above ground level. A horizontal stand-off for Sparky is 16 m allowing the use of any combination of push-up mast/antenna onboard without moving Sparky. The minimum horizontal stand-off for the 450Ω Window Line Slim Jim antenna is 12m.

The horizontal stand-off is a safety precaution should the mast/antenna fall.



Dark green is minimum horizontal stand-off from overhead obstructions is 11m for the slingshot antenna. Light green is 16m. If conditions change, calling for optional taller push-up masts, Sparky won't have to be moved. (Note: Diagram is not to scale.)



Set the hand parking brake; post the warning sign



Set the wheel chocks on a rear tire.



Post the warning sign.



Use the PVC base cup bracket on passenger side.



Deploy passenger side PVC at right angles to vehicle.

Without guy-lines, assume the fall zone would be equal to the total height of the mast/antenna. If properly guyed, the fall zone would be about 1/3 the total height of the mast/antenna.

General Prep: Unload the 450Ω Window Line Slim Jim antenna components from Sparky:

- Light weight aluminum push up mast
- PVC stem and 2 extension sections
- PVC base cup bracket (passenger side)
- 450Ω Window Line Slim Jim antenna & tether cord
- Coax cable
- 2-way mast level
- Medium flat blade screw driver

Setting the Mast Mount: The 450Ω Window Line Slim Jim antenna uses the passenger-side (port) mid-ship side mount.

- Slide the base cup bracket onto the under frame mount.
- Loosen the clamps and pivot the outrigger perpendicular to the side of Sparky. Do not tighten the clamps yet.

Install the Mast:

- Remove the white end cap from top of the mast.
- Slide the mast into the outrigger PVC T-fitting.
- Place the bottom end of the past into the PVC based cup.



Unload the light weight blue push up mast.



Remove the white rubber grip handle.

- Use the 2-way mast level to assure a perpendicular mast alignment. Adjust the PVC base cup and/or PVC T-fitting as needed to get the mast as perpendicular as possible. When you are satisfied with the alignment, tighten the clamps of the PVC T-fitting.

Sparky Coax Connections: The 450Ω Window Line Slim Jim uses the VHF #3 ICE lightning arrestor located in the rear compartment. It uses the coax jumper to the #3 position of the VHF antenna switch at the driver-side of the under dash radio console.

- Get the VHF antenna switch jumper coax to VHF #3 ICE and route it up and over the back seat into the rear compartment to connect it to the “radio” SO-239 (top) on VHF #3 ICE.
- Put the 450Ω Window Line Slim Jim ID tab in the VHF Antenna reminder card near the VHF antenna switch and set the VHF antenna switch to position #3.



Insert the push up mast in the PVC mast supports.



Use the 2-way mast level to vertically align the mast.



Get the VHF antenna switch jumper to VHF #3 ICE



Remove the dust caps for connectors to VHF #3 ICE



Connect the VHF #3 jumper to the VHF #3 ICE



Inserting the 450 Window Line Slim Jim ID tab in the VHF Switch card; set the VHF switch to position #3

Antenna Rigging:

- Get the PVC extension out of Sparky.
- Attach the PVC stem into the large diameter blue PVC extension. **Note:** The large diameter PVC extension is also used with larger push-up mast. Doubling up on functions reduces the number of PVC extensions to carry.
- Remove the cap from the top of the large diameter blue PVC extension and attach the smaller diameter upper PVC extension.



Unload the Slingshot PVC extension/stem.



Attach the PVC stem to the large PVC extension



Remove the end cap of the large PVC extension.
[Note: The large PVC extension serves double duty with another push-up mast system.]



Connect the upper PVC extension.



The completed PVC extension.

- Get the 450 Ω Window Line Slim Jim antenna and locate the tether loop at the top end.
- Extract the bamboo locking pin and rubber friction band from inside the end of the small diameter PVC extension.
- Insert the tether loop into the open end of the small diameter PVC extension. Capture and secure the loop with the bamboo locking pin.



Get the 450 Ω Window Line Slim Jim antenna



- Carefully unroll the 450 Ω Window Line Slim Jim antenna.
- Remove and stow the dust caps from the SO-239 and the coax. Then connect the coax to the antenna.
- Use the bottom end of the tether to secure the coax with the air choke loosely to the PVC extension. The weight of the coax will help keep the antenna vertically aligned. Tuck in the tail end of the tether so it will not whipped around in the wind.



- Insert the PVC extension / stem into the upper section of the light weight blue push-up mast. Line up the holes in the mast and the yellow stem.
- Insert the locking pin and secure it with the rubber friction band. This locks the PVC extension to the mast.



- Carefully unroll the coax and prepare to attach the end to the antenna side of the VHF #3 ICE under the rear compartment.
- Under the rear compartment, locate the VHF #3 ICE. Remove and stow the dust cap from the SO-239.
- Connect the antenna coax to the VHF #3 ICE.
- Connect the VHF antenna switch jumper to the radio.
- Double-check all coax connections BEFORE raising the mast.

Note: This mast is **not grounded** for lightning as the fittings and connections for the segments would restrict easy raising and lowering of the mast/antenna assembly. The lightning detector should be turned on anytime push-up masts are deployed. When lightning is detected, radio operations should cease. This means: 1) turn off all power to radios, 2) disconnect all coax jumpers from lightning arrestors to the antenna switch, 3) lower the mast / antenna to the lowest position, 4) then seek appropriate shelter and wait the appropriate time to resume operations. Lightning can strike 56+ km away from a storm even when you under clear skies.



Raising the Mast: Check the wind conditions before raising the mast. For rapid response portability, it is anticipated that guy lines will not be used most of the time. The mast will be raised to the operating height according to prevailing wind conditions.

- Calm to Light Air: Full extension; feed point is 4.35m AGL.
- Light to Gentle Breeze: Extend only second section; feed point is 3.44m AGL.
- Mild to Fresh Breeze: Do not extend mast; feed point is 2.61m AGL.

Note: Using any light weight mast/antenna combination will be guided by the estimated wind stresses using the wind pressure data on the RTC-TH modified Beaufort Wind Scale or MEWS anemometer measurements



450Ω Slim Jim not extended
Winds: Mild to Fresh Breeze
Feed point is 2.61m AGL
Antenna tips are 4.19m AGL



450Ω Slim Jim medium extension
Winds: Light to Gentle Breeze
Feed point is 3.44m AGL
Antenna tips are 5.03m AGL



450Ω Slim Jim fully extended
Winds: Calm to Light Air
Feed point is 4.35m AGL
Antenna tips are 5.85m AGL

Warning: Do not extend any mast section past the “30 cm” reference line marked on the mast. This assures that each mast section has an overlap of 30 cm to help stiffen the mast for normal operations.

In dead calm wind conditions, if added antenna height is needed, you may extend the mast to the “15 cm” reference line. However, this practice should be discouraged except in situations of dire emergency.



Antenna Orientation: There is no particular directional orientation for 450Ω Window Line Slim Jim. It is an omni-directional vertical antenna.

Before using the 450Ω Window Line Slim Jim Antenna:

- confirm all necessary warning signs are posted at the driver's position (e.g. parking brake set, wheel cocks set, mast deployed).

- Confirm the radio is turned “off” (there is no power to the radio).
- If any other antenna or coax is connected to the radio, remove it.
- Connect the VHF antenna switch jumper to the radio.
- Confirm the VHF antenna switch is set to the #3 position for 450Ω Window Line Slim Jim antenna.
- Turn on the radio and listen for traffic before attempting to transmit.

Note: If equipment and time are available, consider using an SWR meter to check and tune the system for the optimum SWR.

The antenna, supporting mast, and accessories all easily fit inside Sparky. It takes about 15 minutes after parking to set up and get on the air (take down time is about 11 min.).

The rapid set up time is facilitated by the simplicity of the mast/antenna components and the integration of the mast



450Ω Window Line Slim Jim Details		mast support brackets, ICE lightning arrestors, coax jumpers, and VHF antenna switch in Sparky. [Note 1: The 4 position VHF antenna switch gives flexibility to set up a beam and a vertical antenna at the same time. Note 2: The light weight mast can be left in the support brackets for short distance moves to another operating location.] 🌐
Dimensions (cm)	Height: 148 cm (vertical elements)	
	Width: 2 cm	
Wind Profile	Min: 0.00267m ²	
	Max: 0.0296 m ²	
Weight	0.2 kg	
SWR	1.1:1	
Set-up Time	~ 15min set up; ~11 min take-down	
Construction	450Ω Window Line, PVC fittings, pill bottle cap, SO239 connector	
Accessories	<ul style="list-style-type: none">• Light weight blue aluminum push-up mast (Lowe's Aqua EZ telescopic Pole, Item #102924, model PO15)• PVC stem• PVC large diam ext (34mm OD)• PVC small diam ext (22mm OD)• Locking pin (mast to PVC stem)• Coax connector dust caps• PVC base cup bracket• PVC T-fitting outrigger• RG8X coax feed line (~7m with air choke; 6 turns of coax)	
Tools	<ul style="list-style-type: none">• Flat blade screw driver• 2-way mast level	Antenna Info Source www.hamuniverse.com/ke4nu450slimjim.html