

Building an Operating Trailer for County Expeditions

Glen W6GJB

Trailer Selection
Modifications
Equipment
Antennas
Resources

Nye – Mineral NV County Line, 2016 7QP



Operations to Date:

CQP

2014 NI6T Tehama MM-HP

2015 K6MI Tehama MM-HP

2016 W6BX Trinity and
KU6W Colusa M2-HP

FD

2015 SAC from Berryessa Peak

2016 SAC from Berryessa Peak
Both 1AB (QRP, solar power)

7QP

2017 Seven NV Counties
M2 HP

Meteor Scatter

2014 Perseids from CM86



System Objectives

- **Reduce setup time and effort in the field.**
- **Don't get anyone injured.**
- **Create a comfortable operating environment in all weather.**
- **Support multi-op county expedition contesting.**
- **Experiment with antennas and portable systems.**
- **Have fun with our friends!**

Having Fun with Friends



Operators and Contributors

Jim K9YC, chief strategist

Tom N3ZZ

Frank W6JT1

Roger N3RC

Rick N6RNO

Tom WB6HYD

Garry NI6T

Rob K6RB

John K6MI

Tom K6EU



N7N 2016 7QP

Antelope Pass, White Pine County, NV



Trailer, Van or RV?

- RV... if you really want an RV for travel, etc., by all means put a radio in it.
- Van...
 - Best choice for off-road access
 - Fully integrated with generators, etc.
- Trailer...
 - Minimum maintenance between operations
 - Easy to modify
 - Open plan can be customized for each operation, including multi-op.

N6MI



A great example of how to do a van. See www.N6MI.com

Choosing a Trailer

- **How Big?**
- **Axles – one or two?**
- **Wheels**
- **Brakes**
- **Doors – ramp or doors?**

Too Big



Just Right



- **6X12 with 6+ ft interior**
- **Single Axle**
- **15 inch wheels**
- **1,000 lb (empty)**
- **Aft doors (not ramp)**
- **Plywood interior**

**If towing with an SUV...
Get electric brakes.**

Trailer Mods and Additions

- **Spare tire and mount (sold separately)**
- **Ladder hooks**
- **Roof rack**
- **Pneumatic Mast**
- **AC wiring, outlets, metering**
- **DC PS, battery, wiring, distribution, metering**
- **DC #2 for Field Day solar power (1AB)**
- **Sound attenuation**
- **Cargo rails**
- **LED lighting**
- **Coax feed-throughs**
- **Operating bench**

Side Ladder Brackets



Trailer Levelling Outrigger Jacks



- Level trailer with respect to mast vertical before extending mast!
- Even on level ground, get the trailer off its springs.
- Greatly increases max wind capability.



Lighting and Sound Insulation



Mounting the Mast

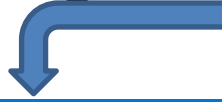


- Base and brace are Will-Burt parts: May be hard to find.
- Requires extensive trailer frame reinforcement for upper clamp.
- Add Army mast adapter to top section.



Will-Burt Pneumatic Masts

Heavy duty non-locking

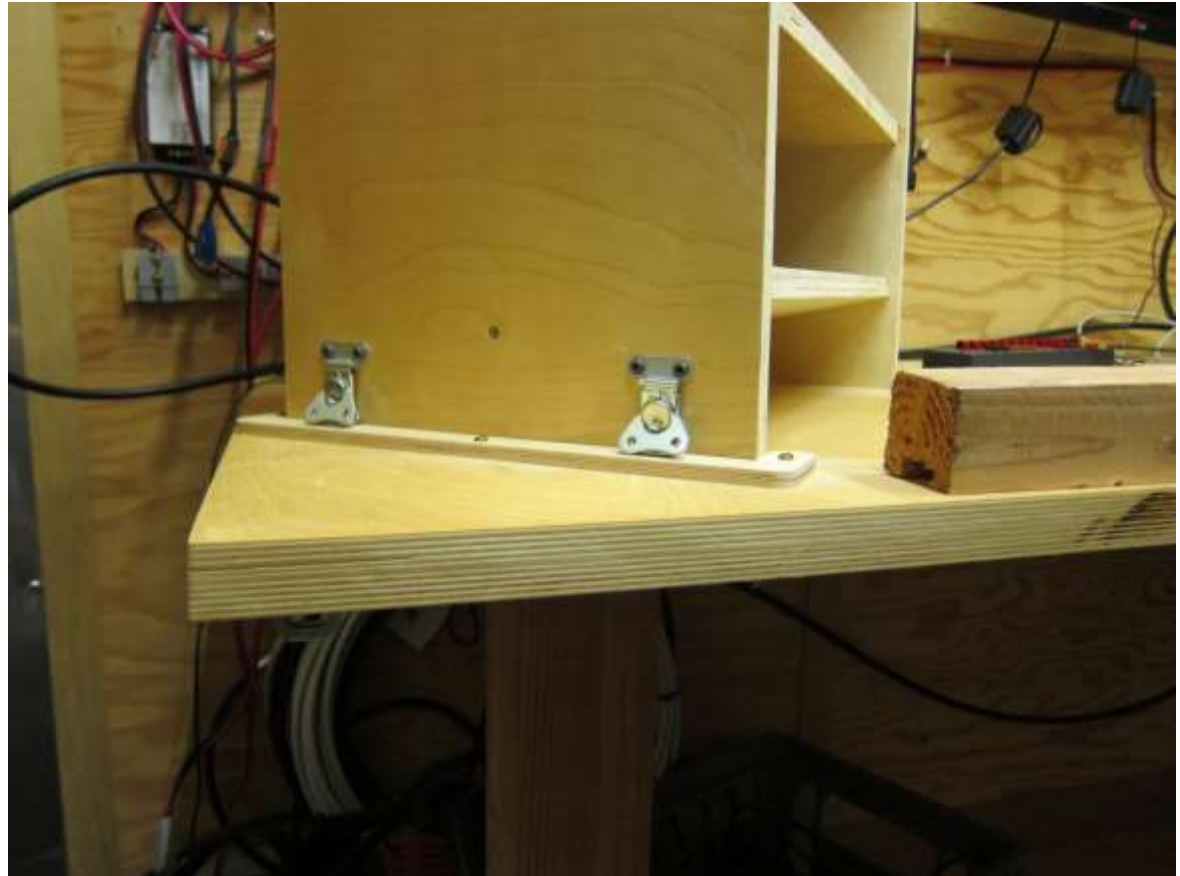


Heavy Duty Models	6-25	7-30	7-42	8.5-48	8.5-52	9.5-56	9-58
Payload Capacity	200 lb / 91 kg	200 lb / 91 kg	200 lb / 91 kg	300 lb / 136 kg	200 lb / 91 kg	300 lb / 136 kg	200 lb / 91 kg
Extended Height	25 ft. / 7.6 m	29 ft. / 8.9 m	41ft.2 in./12.5m	48 ft. / 14.63 m	52 ft. / 15.8 m	56 ft. 2 in./17 m	58 ft. / 17.7 m
Nested Height	5 ft.10 in./1.8 m	6 ft. 8 in. / 2 m	7 ft. 1 in./ 2.1 m	8 ft. 6 in./ 2.6 m	8 ft. 4 in. / 2.5m	9 ft. 6 in./ 2.9 m	9 ft. / 2.7 m
Approximate Weight	110 lb. / 50 kg	125 lb. / 57 kg	235 lb. / 107 kg	275 lb. / 125 kg	266 lb. / 121 kg	296 lb. / 135 kg	290 lb. / 132 kg
Number of Sections	6	6	9	8	9	8	9
Tube Diameter	6.75 in. - 3 in. / 171-76 mm	6.75 in. - 3 in. / 171-76 mm	9 in. - 3 in. / 229-76 mm	9 in. - 3.75 in. / 229-95 mm	9 in. - 3 in. / 229-76mm	9 in. - 3.75 in. / 229-95 mm	9 in. - 3 in. / 229-76 mm
Collar Type	Non-Locking	Non-Locking	Non-Locking	Non-Locking	Non-Locking	Non-Locking	Non-Locking
Maximum Operating Pressure	35 PSIG (2.4 bar)	35 PSIG (2.4 bar)	35 PSIG (2.4 bar)	35 PSIG (2.4 bar)	35 PSIG (2.4 bar)	35 PSIG (2.4 bar)	35 PSIG (2.4 bar)

If you can find a used locking mast, grab it!

Operating Bench

- **Fasten to wall with hinges.**
- **Remove legs as needed to fold bench and create more storage space.**
- **Two sections, both employed for M2, one folded down for MS, creates more room for FD battery bank.**
- **Solid ply wood is best. This is two layers of 16mm Baltic Burch.**
- **Solid core door blank tends to sag.**



DC Power System



- Provides uninterrupted DC power.
- Charges from AC mains or generator.
- Peak power demand is shared between PS and battery.

Cargo Rails

“Logistic Tracks” by KINEDYNE

Many useful hooks, rings, rafter hangers, etc.



Roof Rack

- **2" schedule 40 Aluminum Pipe**
- **Speed-Rail Fittings**
- **Secure to trailer frame**



Generators

- **Honda EU2000i inverter-generator is popular for portable ops.**
- **One gen runs two stations at 300W each or one at 500W.**
- **Take at least two for M2 ops, or buy a EU3000is.**
- **Propane conversion is recommended...**
 - **Runs 20+ hours without refueling.**
 - **Fuel does not go bad if gen sits for long periods.**
 - **Exhaust is less unpleasant .**
 - **<http://www.centralmainediessel.com/>**



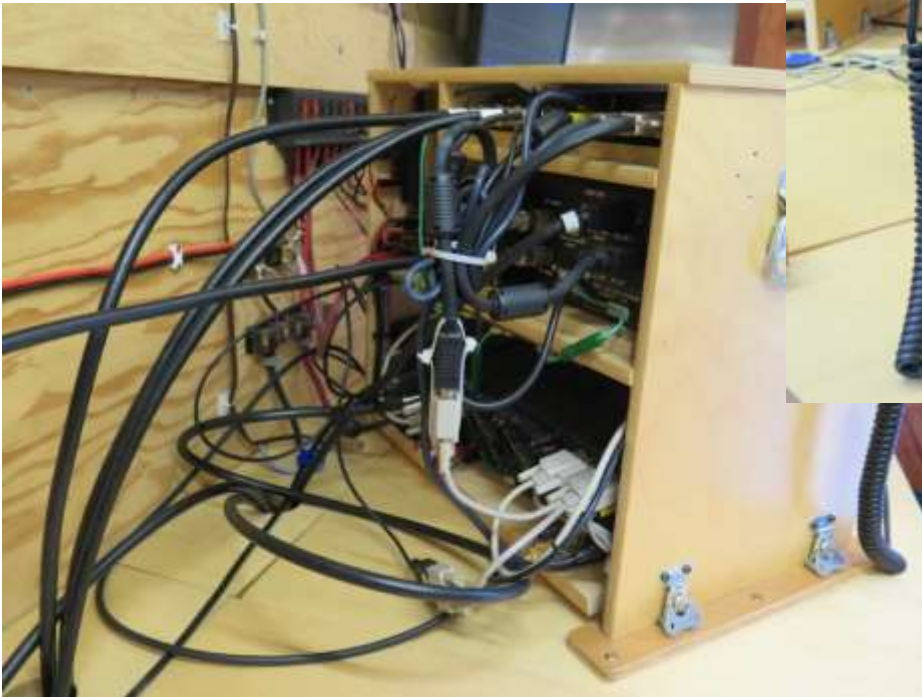
Other System Elements

Single Radio Operations

- Radio Box
 - Pre-wire as much as possible.
 - Secure radios during transit, including off-pavement
- Monitors
 - Consider needs for panadapter display and logging
 - Find monitors that run on 12V and have VESA mounts

Radio Box

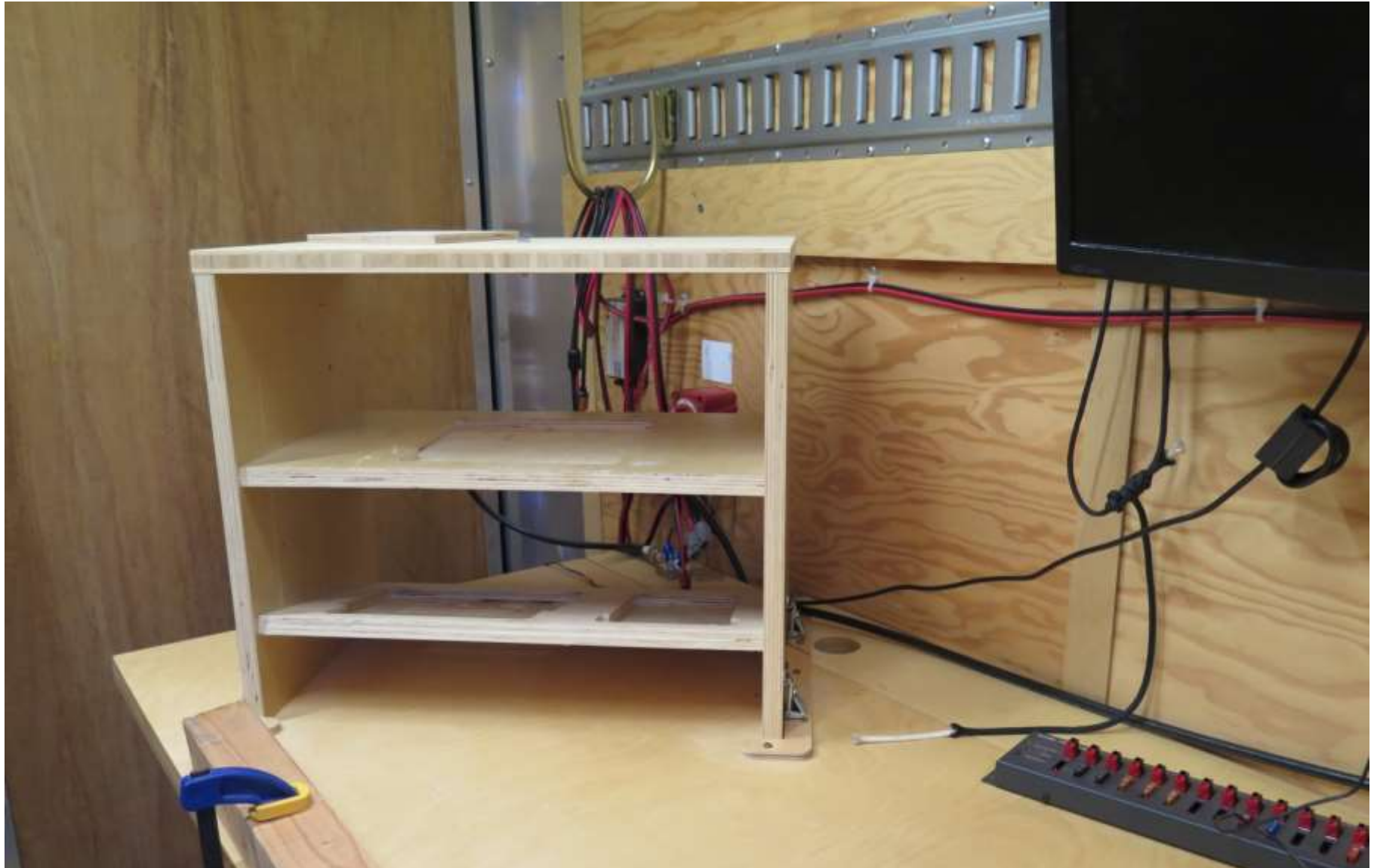
- Minimize footprint
- Reduce clutter
- Protect equipment in transit



Additional Items for Multi-Two Operations

- **Second radio box**
- **Bandpass Filters**
- **Stubs**
- **2 generators**
- **More antennas...**

Box Ready for Radio #2



Antennas

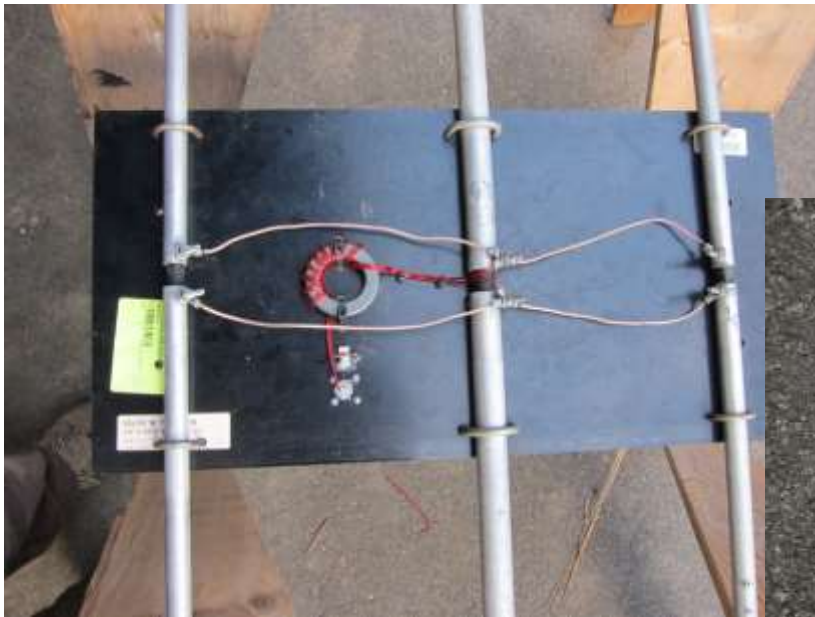
- Light Tribander – modified C3-SS
- Tripod mast system
- 40m rotatable dipole
- 80 inverted V
- Stubs
- Anchors

C3-SS Tri-Bander at 24 ft



Lightweight Tri-Bander

- Force 12 C3-SS modified for fast deployment
- No U-Bolts
- Prewired Driven Elements
- Toggle-Clamped Parasitic Elements



Army Mast System

- Popular system for portable operations.
- Tripod base is available from goverticalusa.com and his ebay shop.
- Aluminum is easily cut with carbide blade in a miter saw.
- Fasten a short section to every antenna boom used for portable ops.



Mast Jack





40m Dipole on Army Mast at 24 ft



40m Dipole

2X 31 ft Jacklite Telescoping Fiberglass Poles

Delrin rod center support

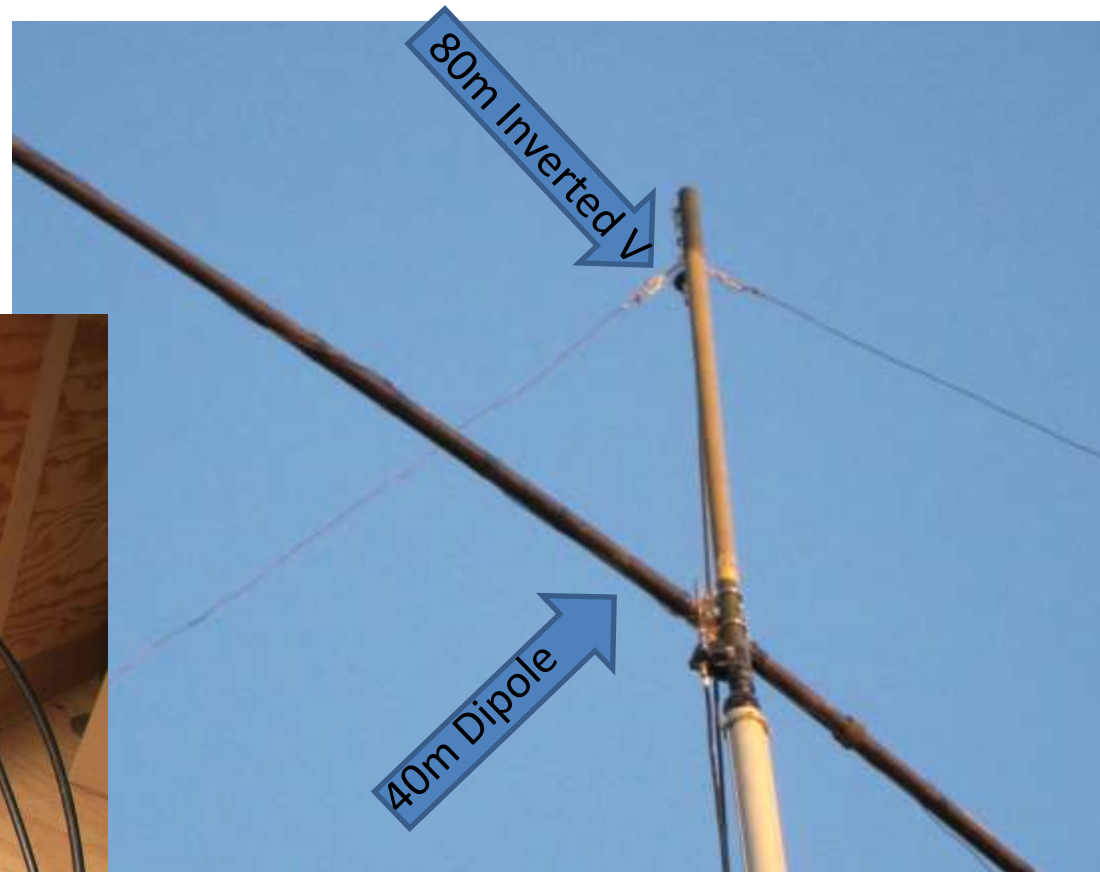
TX choke - 14 bifilar turns #12 THHN on 2.4 inch type 31 core

Radiator – 2X 33 ft of #12 THHN



40-80 Stubs

Stubs allow simultaneous operation on 40 and 80 with less the 4 ft separation between feedpoints.



Mast Extension for 80m Feedpoint



Wire Antenna Feedpoint Assembly



14 bifilar turns of #12 solid THHN on 2.4 inch type 31 ferrite core

Anchoring

This is the best anchoring solution for a wide range of soils and surfaces.

Each kit includes three anchors and removal tool.

Add your own hammer.

www.flyties.com



20m Vertical

Intended to get station on the air quickly.

Effective antenna, but...

Terrible for M2 operations.

RF is everywhere!



Resources

- Pneumatic Masts... Will-Burt www.willburt.com find used on ebay
- Trailer... www.travIntoys.com in Tracy and many others along I-5
- DC Power Management and Battery Charge control – PWRgate PG40S
www.westmountainradio.com
- Speed-Rail Fittings... www.buyrailings.com
- Anchors... www.flyties.com
- Acoustic Insulation... http://stores.ebay.com/Next-Acoustics?_trksid=p2047675.l2563
- Propane generator conversion... <http://www.centralmainediesel.com/>
- Telescoping Poles... <http://www.jackite.com>
- Cargo Tracks... <http://www.kinedyne.com/products/33/logistic-track.html>
- Army Mast Tripod... <https://go-vertical-usa.myshopify.com/>
- Stub Design... <http://audiosystemsgroup.com/Coax-Stubs.pdf>
- Transmit Choke Design... <http://audiosystemsgroup.com/CoaxChokesPPT.pdf>
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