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SOURCES AND RESOURCES

Web site: http://www.phrannie.org

The following links are only for this Sources page.
Many of these subjects are covered more thoroughly in separate POOP SHEETS.

Item 1. GENERAL INFO

WARNING: None of this is writ in **STONE**. People change, businesses change, 'phone numbers change, addresses change, products change. Today's sliced bread becomes tomorrow's old hat. **A FURTHER WARNING:** Some of the most innovative and efficient products for RVs were never intended for RV use and are therefore not "rated" as such by their manufacturers. To avoid product liability lawsuits and the like, they must advise that their products are "not recommended for" etc. The choice remains yours. You can do as you wish. Nor do I necessarily recommend that you buy or use any given product. I simply report what has/has not worked for me or others. Following are listings of some favored sources. Keep in mind there are hundreds of sources in the U.S. for information and products of interest to those looking for self sufficiency -- or a better way. Many are good, some are not. Use your consumer skills (see later).

I suggest you make a hobby out of your RV. It's one of the few hobbies that pays for itself. How do you find a competent RV repairman? With great difficulty. RV repair schools are listed in magazines. Some really don't cost too much. Consider going to one, you might make a living as a traveling mechanic. At least, you'll be able to fix your own.

Were I to buy an RV today, I'd get an old one with a good structure and gut it, then start over -- or, if I had big $, get a new one with nothing in it and start from scratch. Perhaps a U-Haul truck? All aluminum and stainless steel -- built like a tank. A 1920's Ford ton-and-a-half woodie? A bus? A trailerable houseboat? (The best boondock parking is on the water.) The possibilities are endless. Be creative.

Author Tom Sturgeon once wrote (paraphrased), "90% of everything is crud." It's not really that bad, but most of us have to start with a routine RV. Even the best leave a lot to be desired. Cabinets, beds and

some of the furniture are nothing but cheap, stapled-together trash. Appliances are inefficient, expensive, hard to repair and unreliable. Most of the money we spent was wasted on "flash'n dash" idiot lights, gauges that don't gauge, converters that don't convert, leaky windows, "attractive decorator fabrics" -- you name it. Unfortunately, we bought the RV all in one piece. Fortunately, we can upgrade the thing one piece at a time. Before you start on that, you'd best know what you're doing. First, you need to know how the existing stuff works and how to take care of it. Then, you can start figuring out how to do things a better way.

There are various categories of "Tips" included. Please read them. If there's a mistake that can be made, I've made it. No point in you reinventing the wheel. Some references are noted as "must have" or similar. I wouldn't say it if I didn't mean it. Note that a few, like some catalogs that are also text books, are free.

For non SKPs (because so many other RV and Alternative Energy folks refer "outsiders" to me for info). The **Escapees RV Club International**, 100 Rainbow Dr., Livingston, TX 77351 (888) SKP-CLUB (www.escapees.com) is the leading (not the biggest) RV club in the world. The club's focus is on being a full support network for RVers, not just a social group. We're not snobbish, either. You'll find every possible type of RV and owner personality. Millionaires and people on Social Security. Oldsters and youngsters. Workers and retired. Full-timers, part-timers and wannabes. Among the club's many features is an effort to be innovative, not just provide you with manufacturer's hype. Check us out.

2A. INFO SOURCES: For Alternative (Better) Energy Solutions

"Home Power-The Hands-on Journal of Home-Made Power." $22.50 per year (6 issues of over 100 pages each) to US Zip Codes 2d Class or $36 for 1st Class in an envelope. **Home Power Magazine**, PO Box 520, Ashland, OR 97520. (800) 707-6585. Also on news stands and in some libraries. Most back issues available. CDs with all issues plus much more available. Web site at www.homepower.com for downloading articles also has whole current magazine issue free. This is the most important info source available for those interested in alternative energy and all that goes with it: solar electricity, batteries, inverters, lighting, refrigeration, innovative products, conforming to electrical codes, building your own electronic goodies, wind and water power and much, much more. Very detailed info covers both basics for beginners and exotics for experts. An absolute must have for those interested in a better way. Both PhDs and old phuds like me use this as a prime reference.

"Solar Electric Catalog and Design Planner," "RVers' Guide to Solar Battery Charging" and **"Systems Installation Guide"**--SKPs Noel and Barb Kirkby of **RV Solar Electric** know more about the in's and out's of using alt energy products in an RV than any other dealers (and an RV is not a fixed house and there are some differences). They publish a free "Solar Electric Catalog and Design Planner" annually (with good info on current topics of general interest) that includes the planning guide that used to cost $2. Their "RVers' Guide" book is listed in no less than the Whole Earth Catalog (we're talking a big recommendation here) as having "what you need to know if you're going to live in an RV." Call them. Request they put you on the mailing list for the free Update and also buy the RVers' Guide for just $12. RV Solar Electric, 14415 N. 73d St., Scottsdale, AZ 85260 (480) 443-8520 or (800) 999-8520. (www.rvsolarelectric.com) If you're thinking about a solar electric system, you need to see this book. If

you intend to install a solar electric system, get a copy of their "Systems Installation Guide." $5 refundable with later purchase. Buy this even if you get your system elsewhere. It has info that no other RV installation guide has. This is a "must have."

(phredlosophy note) I like the way the Kirkbys operate. They provide first-rate info then give you the best price they can from then on, it's up to you and no hard feelings. (If you don't know how to shop, that's your problem, not theirs.) Further, I've seen them discontinue selling some products when the product is controversial or they can't give you the very best price. Then, they'll refer you to the competition. I think that's great! I enjoy dealing with people like this.

Right there with the Kirkbys are Steve and Elizabeth Willey of **"Backwoods Solar Electric Systems."** All the usual alternative energy products + much more. These folks are the ones to talk to about the good/bad/ugly when it comes to generators (as just one example). Friends to RVers for many years, they'll help you.

Home Power, and references from the Willeys and the Kirkbys are absolutely essential for the serious RVer who wants to find a better way. Without these people's information you won't know what you're talking about, won't have the faintest idea what you're doing and will only irritate those you go to for advice because it will be obvious that you haven't bothered to do any homework on your own. Worse, you'll be at the mercy of any charlatan who wants to peddle the latest gimcrack. So, once you've done some reading, and are ready to start serious shopping, you need a comprehensive catalog/shopping guide that you can use to compare products and prices. Here's the best one for this purpose:

Real Goods **"Solar Living Source Book"** is actually the annual main catalog for the **"Real Goods Trading Corporation,"** but it's far more than that. This 690+ pager is a textbook. Each product area (and it covers about any product of interest) includes a comprehensive discussion on all aspects of the technology. Much of the text is written by experts in their field. Products are then compared objectively -- with a minimum of manufacturer's hype. With most of the major brands are represented and with specifications listed in most cases, you can easily compare what's available. From: **Real Goods**, 200 Clara Ave., Ukiah, CA 95482. (800) 919-2400. Most of the "Sourcebook" content is free at (www.realgoods.com). Refrigeration, solar power, heat, water filtration and the like cost big money. "Source Book" will help you save money whether you buy from them or elsewhere.

2B. INFO SOURCES: For buying the RV (your biggest $ cost) and the electrical system (your biggest $ troublemaker)

Buying an RV--Anyone buying an RV, new or used, is making a gigantic mistake if they don't subscribe to **"The RV Consumer Group."** These people tell it like it is: the good, the bad and the ugly. Membership will educate you so you don't get screwed when buying an RV plus much, much more. Their **RV Rating Book(s)** will show you what are the good RVs and what are unsafe or just plain lousy. (Finding out that some of the biggest names in the business are really the worst RVs you can buy is a real eye opener.) As a consumer service, the Rating Book(s) are in many libraries under ISBN 1-884046622. Ask your librarian to borrow it/them for you through the inter-library network if you can't find them. **RV**

Consumer Group, Box 520, Quilcene, WA 98376 (800) 405-3325 or (360) 765-3846. (www.rv.org) Joining is an absolute must if shopping for or buying an RV! Their books will save you thousands of $.

"Managing 12 Volts: How to Upgrade, Operate, and Troubleshoot 12 Volt Electrical Systems" is exactly what the name implies. **This is another absolute must and every RVer should have this book.** Simply put, it's the best info source I've ever seen for keeping your RV's 12 volt electrical system running. Generally, the problem with "books" is that they're outdated before they're ever printed. Not this one! The author did an extraordinary job of writing a book that won't be outdated. By Harold Barre, $19.95, 219 pages, lots of easy-to-read tables and charts, ISBN 0-9647386-1-9. In RV stores or (800) 247-6553 or from "Summer Breeze Pubs." 1017 El Camino Real, Suite 364, Redwood City, CA 94063. Also easily available from Amazon.

"RV ELECTRICAL SYSTEMS" covers both AC and DC electrical systems and is **another must have**. Excellent 12 volt coverage and the best source I've seen on 120 volt AC systems. If it's not covered in this book, you can probably get along without it. The authors go into extraordinary detail without getting into engineering "lingo" and they tell you things nobody else does (and those things many authors assume you already know -- that you don't). With this book you won't be the dumbutt at a rally who miswires something and screws everybody else up. By Bill and Jan Moeller, $19.95, 265 pages, detailed illustrations. In many bookstores and RV stores as well as at Amazon.

I could name a hundred more sources (and will list more in later pages), but if you want the best references or your budget is limited, start with these and go from there. You need to get these and keep them, they're critical. Without them, you'll fail. And go to the public library! Find the good stuff and copy the choice parts. Don't just look up RV or Travel, look in electronics, auto repair, solar, alternative energy, home improvement, nomadics and more -- get creative!

3. ALTERNATIVE (BETTER) ENERGY PRODUCT SOURCES:

RV Solar Electric: Always one of the places experienced RV shoppers check first and last. Solar photovoltaic modules (what laypersons call solar panels), regulators, inverters, catalytic and ceramic heaters and various booklets plus much more. Catalog and Design Planner plus manufacturer specialty sheets free. RV specialists. Long time SKP Club members. Don't miss their seminars at Escapades and rallies. Room for RVs to park at their business and get stuff done.

Backwoods Solar Electric Systems: 1395 Rolling Thunder Ridge, Sandpoint, ID 83864 (208) 263-4290. (www.backwoodssolar.com) Free Catalog/Planning Guide is another "textbook" crammed full of good info. Free quarterly newsletter invaluable with great tips and updates that many magazine writers steal (including me). Several booklets include Do-It-Yourself generator/alternator. Full line of Alternative Energy (AE) products, composting toilets (these people are the experts), lots more. Call/write in advance. On mountain top -- do not attempt to just drive in without calling first.

(Note: I'm often asked why I don't add more dealers. Reason: Those above are all known to me

personally, cover the full range and provide shoppers with a wealth of information.)

Here's another good guy, owner Paul Israel has a good attitude and very excellent reputation. Good info at his web site. Full product line. Good prices. Experienced and knowledgeable technicians/installers that won't screw anything up. Two locations: Main store at 1724 N.E. Lytle, Bend OR 97701. (www.sunlightsolar.com). Seasonal store at 45 So. Central Blvd., Quartzite AZ. (www.rvsolar.com) (888) 787-6527 serves both stores.

The above retailers actively compete with each other (and in a friendly way). They're honest and technically expert. Feel free to comparison shop, but tell them you're doing so and don't try to chisel them for multiple discounts and that kind of foolishness and you can do well.

There are a number of other good dealers across the country. Some advertise in Home Power. Use your consumer skills to protect yourself. Some won't know anything about the peculiar requirements of an RV, and an RV is not the same as a house. Some will know a bit about an RV, being "weekenders." (They can be even more dangerous.) Read the references mentioned elsewhere and learn enough so you can ask intelligent questions (and know the answers to some in advance). Quiz dealers and installers. Do they know, for example, that the 120VAC white (neutral) wires and ground (bare or green) wires in an RV are not to be bonded together as they are in a house? (More on this Q elsewhere.)

SOME SHOPPING TIPS: Use the internet addresses first, if at all possible. Most responsible dealers, such as those I list above, have a LOT of info on their web sites. If you're writing someone for info, send a legal-sized, double-stamped SASE (unless you're paying for a catalog). You'll be surprised how often you get lots of goodies for that courtesy -- and it costs you little -- and you might get a personal note from an executive or techie. Feel free to price shop, but don't be a pinch penny. Some dealers say, "we'll beat/meet any price," but if you keep chiseling them, they'll dump you. What the hell, they can't pay you to take the stuff! Don't make a fool out of yourself by demanding 10% as a senior, another 10% as a Good Sammer, veteran, etc. When you find a good dealer, hang in there for extra bucks on one item if the total order price is OK. Buying piecemeal works, but you often do better if you're a "regular" customer.

WARNING! Everybody like a good deal and you can get a good deal by careful shopping. **But**, many people like to brag about "getting it wholesale" -- or at a better price than Joe Average -- and this can be carried too far. Some dealers take advantage of greedy people. Alternative energy is highly competitive. Be leery of those who claim to sell at "cost" (an impossibility) or way too small a percentage of markup (they'll often say "this is our dealer price"), because they won't be of any help after you've bought the product and will tell you something like (if they'll talk to you at all) "You bought it as a dealer, so get help from the factory." Reliable firms will make a reasonable profit that will cover assisting you after the sale (which costs them $). Realize that in some cases you may have to send a faulty product back to the factory for warranty work or repair. A good dealer will talk you through hookup steps, checkouts and basic troubleshooting. A good manufacturer's techie similar (they don't want you to return things if it's not necessary). Read and follow instructions and cautions. These people can tell if you fried something by hooking it up backwards and then they won't have to honor the warranty unless they want to. In most

cases (other than with the sleaze bags), Don't try to scru them and they won't scruU.

4. SPECIFIC PRODUCTS:

CIRCUIT BOARDS: See 5. MISCELLANEOUS SOURCES later, for a supplier of better circuit boards for many appliances. (I'd check on getting the better **"Dinosaur"** brand boards right from the start and not wait 'till I had a problem.)

TECH SUPPORT SOURCES: ARE IMPORTANT! Get the trouble-shooting poop sheets from the manufacturer and others. Don't wait till the thing craps out, do it early -- like when you buy it. In some cases they'll say no, in others charge a few dollars, in others send really good stuff free.

- Start with the 'phone number/address in the booklet that came with the appliance (Customer Service) for paper-type stuff. Some manufacturers have routine check-out and trouble-shooting material available there (so as not to waste techie's time).
- After that, proceed to the tech support people. In some cases it's a free call. In others, you pay for it. It's usually worth paying for, if you have to, because GIB (the Guy In the Back room) has more stuff, that's updated oftener, than the front office has. Don't waste GIB's time though. Be concise. Have your model and serial numbers handy. Tell him it's likely you'll be in the boonies (Mexico?) or somewhere and might not have any help.
- You might look at **"TL Pubs"** How-To books (MISC SOURCES). These are so simple and general that they're not much use to anybody that knows what they're doing, but they were written for Durbert Dumbutt (who doesn't), and will give you a general idea of what's what and can save you big$ in fixing the small stuff.
- If having a real problem, find the people that fix the things at the factory. When you get in a bind, someone may talk you through the steps. $10 or more long distance can save you hundreds of $ in needless replacement of parts in many cases. Have your model and serial numbers handy. Have your symptoms written out clearly. Be concise when describing problems. Don't get angry and start raving. Some manufacturers aren't very helpful to consumers, saying something like, "We prefer to refer our customers to an official service center." (Great help when you're out in the boonies!)

"...and the Services Dwindle Down to a Precious Few...."

You can still write or call manufacturers and ask for the detailed trouble-shooting/check-out procedures for your appliance. You SHOULD get an answer. Who knows? Computer users can visit the web sites and browse around, usually with some success.

This sad state of affairs isn't unique . It's common across the board (as any automotive or computer buyer well knows). If you complain, you'll likely be told (by any appliance manufacturer) that you shouldn't repair things on your own because a mistake could be dangerous. And it could be, BUT that's up to YOU to decide, not them. Manufacturers explain all this as "down sizing" or a "necessary economy" or some such. Baloney! It's consumer abuse! Bitch about it.

Here are some excellent alternatives:

For refrigeration problems. RV Mobile: 11715 Hwy 99 S., Everett, WA 98204. (425) 355-1170. Web site at (www.rvmobile.com) and e-mail to tj@rvmobile.com. Also check **Gas Refrigeration:** (www.gasrefrigeration.com)

Both web sites have LOTS of tech info, wiring diagrams and GREAT trouble shooting steps for all major reefer brands. These are most valuable (many RoVers insist they're a lot more help than the manufacturers). These are commercial, sales, repair, etc., outfits. They help us with free info as a consumer service. Please don't take advantage of them.

All Seasons RV Appliance Parts and Service: 1150 Mitchell Jellison Dr., Elkhart, IN 46516. (800) 344-0673. Great outfit. Most helpful, especially with older equipment. Another commercial outfit that cares.

RVCLUB: (Not to be confused with the Escapees Club.) This is an extremely active club of RVers that mostly uses the Internet to share info. Go to www.rvclub.com and you'll find a wealth of stuff. It'll take you a while to wade through all the sub-categories, forums, etc., but don't get discouraged. There's a lot there. You can register as a guest and view much of it (including reefer Q&A's). Membership is inexpensive ($10) should you choose to join. Most highly recommended.

ANOTHER SPECIAL NOTE ON PRODUCTS -- SOME GOOD GUYS: "Jameco" (mentioned elsewhere) is a good guy (as are some others I point out as I go along). **"Atwood-Bowen,"** mostly water heaters but other stuff also, is another good outfit. When Anne's Atwood-Bowen water heater crapped out, shortly after warranty expired, they sent a new heater, immediately, at **no cost**. ("Return the old one in the box the new one comes in when you get around to it" were their words). After warranty? a new heater? That cost her about $7 for UPS? Clearly, Atwood-Bowen wants to keep customers happy.

But, then, there are outfits who, if you can ever get in touch with them, will be surly and uncooperative. Finding bad guys is easy. Read the "Action Line" in Good Sam's "Highways" and other RV Pubs to see the losers. I don't list them here because some improve and don't deserve the "kiss of death." (I do respond to personal requests for info on them though.)

4A. REFRIGERATION -- The **Sun Frost** and **NOVAKOOL** brands are two of the most energy efficient in the world today. Compressor operated, like a "household" reefer, but that's where the similarity ends. The extraordinarily efficient "Danfoss" compressors they use consume such a small amount of electricity from your batteries that the energy can be replaced by the output of as few as one, full-size solar module. Naturally, for a reserve in bad weather, you'll use the references quoted elsewhere to calculate how much of a solar (or other charging system) and battery bank you need in your case.

(phredlosophy note) People read the above, then write and ask if these reefers use propane. Obviously not. However, since they run off the batteries, they don't require solar panels either since batteries don't

know (or care) where their charge actually comes from. The solar panels are simply the best source for battery charging and are mentioned to point out the very small amount of electricity (5+ amps -- and that only part of the time) used as opposed to the standard 3-way RV reefer that uses a whopping 30 amps and is totally unsuited to 12VDC operation unless you are actually driving. (Many people, who are accustomed to the "standard" equipment in a "standard" RV, somehow lose the ability to think in innovative terms.)

Nor do my favorable remarks come from propane $ savings (though there are some real savings). I'm encouraging efficiency and convenience. (This type refrigeration, demand water heating and catalytic/ ceramic space heating (see later) allow me to run over 6 months off a 20 gal LP tank and I don't have to level the RV.) These are not always the same size as an RV reefer and some will not, in some cases, fit the existing hole. Those who have one are sure the cabinet work was worth it.

I used a **Sun Frost** for over 12 years. One of the earliest models made, I had problems with it and retired it for a **NOVAKOOL** (below). I know of no problems with the current SunFrost models, but they are designed for stationary use, are heavy and very rigidly constructed with little flexibility or "shock absorbing" features. (I suspect jouncing mine around in an RV contributed to its early demise.) Inserting rubber pads under mounting screws probably would have prevented some problems. You'll also need to add door latches for RV use. Write the manufacturer for info at: Sun Frost Box 1101 Arcata, CA 95518-1101. (707) 822-9095. Purchase from manufacturer or one of the product sources mentioned. A variety of sizes, but you'll be primarily interested in the RF-12 (12 cu ft combination reefer/freezer) for RVs. Sun Frost is available in 12VDC, 24VDC, 120VAC and 220VAC. Some dealers don't carry all versions and claim theirs is the only one available. Run from people like this.

The **NOVAKOOL** brand reefer/freezers use the same extraordinary "Danfoss" compressor as Sun Frost, but in a different configuration. I have two: A 7.5 cu ft model RFS7500 and a 3.5 cu ft model 3800. The best source for Nova Kool (manufactured in B.C.) is **Backwoods Solar Electric Systems.** NOVA KOOL is not as thickly insulated as Sun Frost (it's not supposed to be). It's a simple matter to add a 2" thick "sheath" of cheap urethane insulation to all sides except the door and reduce electrical consumption by half. Ask for info from "Backwoods." The "Adler Barbour Co." has similar compressor refrigeration available in various sizes as well as in component parts so DIYers can custom fit to any configuration (see West Marine" (www.westmarine.com) for a full description of Adler products. I find the workmanship of the NOVAKOOL outstanding. The people who make these do it right. Everything is well fitted and finished. Nothing crude (no heavy particle board -- a criticism of SunFrost). Prices are reasonable. Designed for marine applications, so all components are well "shock absorbered" and hold up under rugged RV use.

OTHER REEFERS--If you're buying a "regular" RV reefer, check on the two-way versions available. Simple and sturdy. LP or 120VAC switchover (no 12V/3-way) means simpler electronics and very few problems. Don't even consider using a standard household reefer in an RV. While energy efficiency of these has increased in recent years, it remains unacceptable.

4B. WATER HEATING--Regular RV water heaters can do a fine job **IF** you maintain them properly.

There's no reason yours should start with a bang, belch black smoke and similar. Get the maintenance/ check-out/trouble-shooting sheets and learn how to take care of it. They will eventually wear out and then you can consider alternatives:

Demand/flash/instant water heaters--are manufactured by several companies. Available in electric or gas. Since the purpose is to create heat, you won't want the electric version in an RV. (If this isn't clear, you need to read the references.) The **Paloma** brand, Model PH-5 (now discontinued), was a favorite for RVers solely because it was reasonably priced and small enough to fit in tight spaces. Paloma clearly states their heaters are not to be used in RVs or boats (product liability). I used one for over 8 years. The choice is yours. Paloma has other faults: It's extremely sensitive to water pressure and will pulsate unless set very precisely. Often, other measures have to be taken as well: increased size of cold water line to heater, check valves, pressure tanks, higher-than-usual pressure pumps, etc. The **Aquastar** and **Bosch** brands are far superior to Paloma in operation, though will still benefit (as will any RV water system) from a better quality pump and a pressurized, bladder-type accumulator tank (see later). They cost more and are larger than Paloma. Paloma and Aquastar are sold by many dealers listed. Always check with local LP dealers! Surprising savings sometimes. Some dealers, though, won't sell you one if they think you don't know what you're doing (product liability again). Find a Bosch dealer through the **"John Condon Co., Inc.,"** 1138 Poplar Pl. So., Seattle, WA 98144 (800) 824-7337. (www.astravan.com) Bosch approves their heater in RVs. Bosch has also introduced a "ventless" model that greatly reduces space needed.

THE LATEST: Another "flash" water heating system has recently been introduced: The **"Precision Temp"** Model RV-500 is cleverly designed to fit the hole where a standard RV water heater usually resides. Nice. Ultra-efficient. Super-good construction. Avoids the clumsy business with all the other flash heaters where you have to find a place to hang 'em on the wall and add water and gas lines. Possibly the best one being sold (though I can't prove it yet). These cost about $700+, which may seem high, but isn't bad when they're of such high quality and should outlast "standard" heaters by many years. Some electric consumption with this one: If you leave it "on" in "standby" mode it draws about 25 milliamps (ma)--no big deal. Fully "on," with hot water running, it only draws about 8/10ths of an amp. Not bad at all! They do have a power cut-off switch also, which helps. In Winter, the switch is "overridden" when temperature goes below 40º, then heater brings water to about 115º (to prevent freezing) and cuts back off. Good, because the heater is fully warranted for two years--except for freeze damage. (90 day full money back and 2-Year Warranty.) Much less hot/cold spikes than some other heaters. At Camping World or call **Precision Temp Inc.,** (800) 934-9690, 1006 Kieley Pl, Cincinnatti, OH 45217. (www.precisiontemp.com)

(phredlosophy note) Some say "flash" heaters are not suitable in deserts (where input water may be too warm to start with, thus heater won't function properly) but this refers to input water from an above-ground tank or exposed water line. On the other hand, if you have 25 or 50 feet of hose (and maybe a water filter) lying out in the sun, you can create the same problem. Think what you're doing. (Most of the alternative energy people are "house" oriented. You have to consider this when working with them.) Aquastar has an optional feature made to handle pre-heated water. Bosch supposedly has no problems in this area.

4C. SPACE HEATING--is often better done with a catalytic heater, ceramic block or other radiant heater than an RV furnace unless you will be in near-zero temperatures. If you're on a hookup, consider using an electric heater. Heating an RV with electricity costs a $ or so a day (even at my Colorado place)--the same cost as running an RV furnace on propane (and I don't have to keep getting refills). Electric heat is safer, saves your batteries and avoids propane furnace crap outs (which happen all to often -- the typical RV furnace is awful and requires constant attention).

- The **CAT** brand catalytic heater was sold by many RV and alternative energy dealers because it was "listed" and had power venting and other safety features. Unfortunately, it also used electricity and had a circuit board (and you know what happens to circuit boards). CAT (actually Thermal Systems, Inc.,) went bankrupt. Those who have a "CAT" brand heater and need fixing or parts should contact: Arnie Lind, **A & L Enterprises,** PO Box 1788, Medical Lake, WA 99022-1788. (509) 299-6090. email: arnie@omnicast.net. His website with good info is at: www.omnicast.net/arnie. Arnie is moving into a larger building in about Nov '02. Another phone # (360) 352-0539 will remain in operation through the move with referral to the new number when it becomes available. Arnie also obtained a large amount of CAT supplies and is again building a limited number of new heaters. Check his web site for more info.
- The **Olympian** brand of catalytic heater is favored by many RVers. Vented adequately, which is no problem in most leaky RVs, I have heard of no problems.
- **Ceramic block heaters**--are becoming popular. They do not require the catalytic (platinum impregnated) pad that has to be occasionally replaced and they bear up well in the dusty area of an RV. (On the other hand, they're larger and use a bit more propane.) The **Empire** brand is popular and comes in a variety of sizes at reasonable prices. Check local LP dealers for literature and prices. Check also with **RV Solar Electric** (PROD SOURCES) and advertisers in **Escapees Magazine**.
- **COZY** brand through the wall vented heaters--are super nice if you have room. The Model A-CDV15 weighs 70 lbs, is 18"W x 28.25"H x 9.75"Deep. No electricity needed. It draws outside air into a sealed combustion chamber, exhausts the same way and draws no air from inside the RV. Output of 15,000BTU is superior to any RV heater. **VALOR** wall heaters are similar to COZY but lighter and smaller (19.5"W x 17"H x 7.5"Deep). Variable heat from 3,000 to 9,000BTU. Best source for COZY or VALOR is **"Backwoods Solar Electric."**
- Some unvented heaters sold have a manufacturer's warning that does not recommend RV or boat use (because of lack of automatic venting). I've used them for 20 years. It's up to you -- as always. (They can put out toxic gas under some circumstances -- so can many things -- like your kitchen stove.) Adequately venting an RV does not require the efforts of a mental giant. See my "Handling Moisture...." poopsheet for more on venting.

4B & 4C Heater Notes: "Regular" RV water heaters and furnaces--will work **IF** you take care of them. Most now include circuit boards, auto ignitors, electronic valves and other devices that increase their efficiency (at the disadvantage of complexity). Heaters **will** fail if they are connected to the "raw" converter output (or if the converter is faulty or batteries are undercharged). They must be connected direct to the battery output (or the charge line that goes to the battery) -- it "buffers" out surges that kill

electronics. Fans must be clean and free running (in many cases, a stuck fan will destroy a circuit board under initial start up). Often, the furnace circuit board is mounted inside the furnace -- ultra-stupid, but that's the way it goes. Heat destroys circuit boards. Some RVers have extended circuit board wiring and mounted it in a protected place away from furnace heat. Water heater anodes must be replaced when sufficiently corroded or the heater tank will do the corroding. Clean wiring contacts at igniter and valves is crucial. Pilot flame and main jet must be properly adjusted. As with reefers, get the poop sheets now, not after it quits.

Propane Confusion (phredlosophy note) When you start comparing appliances that use propane, you get into measuring consumption and output of energy in BTU (British Thermal Units). Many people confuse things, mixing the arithmetic 'twixt BTU available in a measured amount of LP with BTU burned in an open flame with BTU measured as effective heat output of an appliance. Check the library if you want to get into all this. The formulas are EZ. Remember always that there are only so many BTU in any given quantity of a substance. You can't make more. It's against the laws of physics (which is why many of the automotive miracle mileage toys don't work). When comparing hype in ads, you can't just use the "% efficiency" quoted. You need to know what it's based on. If a manufacturer tells you their furnace is 73% efficient, you need to know "Compared to what?" A heater might be labeled (x)BTU, but "of what?" A good water heater, as an example, will show that water at x^o will be heated to y^o with zBTU. TIME is another factor people forget. They point out a standard RV water heater sometimes uses less "BTU" than a demand heater. They forget that the standard heater runs on/off 24 hours a day to keep water hot, but the demand type just uses propane when you need it -- critical when counting BTU or ounces of propane actually used.

4D. WATER FILTERS/TREATMENTS--A complex subject that's understood by very few RVers. Different types of filters do different things. There's no room here for all the details. See my "Water Treatment" poop sheet that tells you what various filters and treatment devices will (or won't) do. In short, a typical canister or RV-store type will cost up to $80+ and will only take out the big chunks. Go to the library and research the subject first. **Real Goods Sourcebook** also has an excellent layman's explanation of what's involved. You really need to see my "Water..." poopsheet for a great deal more info on this most important topic.

- What you'll find out is that a system, that will take out almost everything nasty, will cost about $1,500+. Often, that plant will be a reverse osmosis type that will waste more water than it produces (not too swell when boondocking in the desert). It will be augmented by other filters to remove other nasties.
- Filter-only systems, that will take out almost as much, are going to cost $200-$500+. Figure out what you really need first by reading the refs, then buy what you need. If you're just worried about getting a "bug," you might only need a simple sediment filter in a canister (as found on many RVs) to keep crud from getting in the tank. Then an additional filter (or filters) in the RV to clean the "bugs" and chlorine from water used for drinking, cooking and bathing. Unfortunately, people economize, using one or two cheap filters, and can create more problems than they started with. Note also that once a filter gets "loaded," bacteria not only collect in there, they start multiplying!

- You must use a sediment filter for any water entering your RV -- or you'll have a dirty tank, decaying water heater and a worn out pump. Get a simple take-apart canister type with "sediment" cartridge for this at about any store. Get an additional high-quality filter for drinking and cooking water plus one for the shower if you can afford it.
- Where you buy a filter is important. There are a lot of worthless filters being sold and there are a lot of sales people who have no idea what they're doing and just spout baloney. Some are downright crooks just taking advantage of your fears. Many RVers believe this nonsense and proudly show off the piece of pipe crammed with who-knows-what that "they" told me would do everything and it only cost $20. That's pathetic! TANSTAAFL--There Ain't No Such Thing As A Free Lunch.

"Ozone" water purifiers--are of great interest to RVers because much of our water is suspect and, unlike houses, is normally kept in tanks and jugs where the nasties grow. Ozone purifiers can handle this problem. **Real Goods** is one of those that sell the excellent **ClearWater** brand of ozone filter. Easily moved, takes up little space. Check the Model PR-1300. Again, most highly recommended.

4E. WATER PUMPS--The **"ShurFlo"** brand is readily available in RV stores and is good equipment, but read the specs carefully. Their better pump is going to cost about $150. The less powerful model (that looks like it but isn't nearly as good) about $85. (TANSTAAFL.) The **"Whisper King"** models by ShurFlo are good and they have an upgrade kit for some older models. The **"FLOJET"** brand is also good. Unfortunately, it's as noisy as a wounded buffalo. (I've used both with excellent results.) See **West Marine** catalog (MISC SOURCES) for the full range of pumps available, notice the wide variety of pressures, volumes (and prices). The newer technology, VSD multi-stage pumps made by "Shurflo," "Flojet," and "Aquajet" are far superior to standard RV pumps.

The "Aquajet" pump I use has a much stronger flow, is much quieter in operation, with no rapid cycling and no need for an accumulator tank. Electronics monitor pressure changes and automatically control motor speed as required to maintain pressure across multiple fixtures. Basically, it's a very powerful "smart pump." Comparing it with the similar FloJet and Shur-Flo, I find all three excellent -- but the Aquajet of better construction. All do get warm in extended operation --
you can't just toss them on the floor under the bed. Installation instructions need to be followed, but are simple. A review I wrote on this pump starts out with something like: "This is a real pump. Not some ordinary RV piece of crap." Aquatec Water Systems, 17422 Pullman, Irvine, CA 92614. (800) 297-0803 or (949)225-2200. (www.aquatec.com) for further info.

4F. SEWAGE/MACERATOR PUMPS--that grind up poop into a slurry then pump it anywhere. I wouldn't be without mine and use them all the time, even when on a full hookup. (No fuss, no muss, no leaks, no playing with slinky sewer hoses or propping them up so they'll drain.) The **"ITT/JABSCO/ PAR"** brand is found anywhere. Best source/price is **"Post Marine Supply"** or **"West Marine."** (A garbage disposal is available that uses the same macerator -- forget it.) My "Macerator and Sewage" poop sheet covers what you need to know to install and maintain macerators and a lot of other things people (especially the manufacturers) don't tell you. (You can end up with a lot of poop on your shoes if you screw up when using a macerator.)

4G. PARTS FOR doing-it-yourself WATER/SEWER SYSTEMS--Ordinary plastic water and sewer fittings are best found at very large "home" or "builders" stores (better selection). Use RV stores for odd-ball stuff like offset bushings. When building sewer lines, as when permanently installing a macerator, look for flexible vinyl repair fittings (at builder's stores) with clamps to use at key junctions. They'll cost, but they allow easy repairs and keep glued joints from breaking (like shock absorbers). Check a good, "old timey" hardware store for brass fittings, also good auto stores like NAPA or Big A. Don't use cheap, garden hose stops for macerator lines (or much else). They break, get sticky and are too restrictive. Buy PVC ball valves with teflon balls. Not too expensive and no faults. Look for a hardware store that carries the **WW Grainger** line (Dayton, etc.) and find bladder-type pressure tanks for $30+ that RV stores sell for $80 plus a lot more good stuff. Check Grainger catalog (almost all hardware stores have this). Don't pay catalog retail! Store should discount heavily (usually to what the Grainger catalog calls "Each" price). If not, check elsewhere.

Fresh Water Lines and Fittings--There's a lot of debate among RVers on this. Many old timers insist that the new plastic junk must be removed and replaced with copper. Not necessarily a good idea. The "new" QEST and similar brand butyl, gray plastic, flexible lines and fittings are great for the movement and vibration in an RV. So's copper, **IF** installed properly -- and it usually isn't. The plastic valves also requires proper installation. Too often, there are leaks because the manufacturer hired incompetent people, or subsequent service centers and owners (you?) screwed up.

- Often, I see QEST (and similar) fittings and lines attached with hose clamps! That's stupid. You can get the proper compression rings and the tool for these fittings in any RV store. The rings cost pennies. The tool about $20. (Though many stores will try to sell you the automatic, clamp-on plier style for big $.) Most RVers are too cheap to buy the tools (though thinking nothing of spending big$ on perforated-metal magazine racks to hang in the bathroom and similar useless crap). Then they suffer from their own cheapness with leaky fittings.
- Plastic keeps warm water warm and cold water cold. It expands with cold and leaks less than metal (up to a point -- it can burst when frozen and you must never put too much pressure on it). It's easy to route around tight places. It doesn't corrode. It's cheap. The stuff really is better than copper in some ways BUT you must pay attention to what you're doing and use the right tools. My own RV had plastic fittings that must have been installed by morons. I replaced it with copper (properly done) but might have been better off using plastic installed properly. (Copper allows me to use a high pressure pump and connect to high-pressure city water without chancing a blown line.)
- Plastic valves are a bit pricey and manufacturers often save $ by not installing them. There are a lot of RVs that don't even have cutoff valves at faucets and toilet (and fixing a leak means no water in the RV). If you have the right tool, inserting tees and valves is easy. While you're at it, install a few inexpensive drain valves at water heater, pump and at low points in water lines with tubing to the outside/under the RV. A great help in draining the system.
- You need to be able to drain your system. To avoid a mess when repairing things or changing filters and such as well as to avoid freeze damage. Non-toxic antifreeze can be put in the system for freezing protection in winter storage, but is a pain in the butt. More useful is a "blow out" plug. These are nothing more than a plumbing adapter with a "Schrader" type air valve (just like

on a tire) that allows blowing water out of lines with compressed air. You can buy these ready-made in RV stores or make your own. Put this into a handy place in the line using a tee. Open a valve, turn on air pressure (always have one valve open when under pressure). When water stops flowing and spitting starts, open another valve and close the previous.

4H. BATTERIES--All of the major brands of batteries will work well **IF CARED FOR PROPERLY**. Don't undercharge them, don't overcharge them, don't deep cycle them more than necessary, keep them clean and watered and there's no reason you can't get five + years from a so-called RV/Marine battery (often any battery with a rope tied to it). You must read the references. There's no mystery about batteries if you follow the rules. If you're too lazy to care for them, they'll die. This is also a case where you usually get what you pay for. In 20 years, I've tested many. I've gotten as much as 5+ years from cheap RV batteries. Over 7 years from golf cart batteries. You can get 20 years from industrial batteries (but they just won't fit in an RV). See my "Batteries and Other Electrical Stuff " poop sheet and get "Managing 12 Volts...." and "RV Electrical Systems."

For over 10 years I used six, **Sonnenschein/Dryfit-Prevailer/Deka Solar** (they keep changing the name) **"gel"** batteries. These are sealed gel batteries (not just sealed liquid batteries like "Voyager " or "StowAway"). They can be deep cycled excessively, left partially discharged, left completely discharged for 30 days -- all dreadful things that I won't do, but indicative of a unique quality. What price independence? Real gel cells are expensive. Some companies are now selling gel cell batteries that are a bit cheaper, but also of lighter weight and have less capacity. (TANSTAAFL again.)

AGM (Absorbed Glass Mat) batteries. AGM is a dense filling of glass matting used between battery cells. Fluid electrolyte is absorbed by the matting and allows battery innards to be saturated up to 90%. (**GEL** batteries rely on the thick gel to accomplish the same intense saturation.)
Pros and cons twixt GEL and AGM are quite similar though the batteries really aren't the same:
Pros for both:
No maintenance except external cleaning. Cannot spill. Shock and vibration resistant. No gas release (under normal conditions). Low self discharge. Long cycle life. Can be fully discharged, left as is and brought back to full charge (though this kind of treatment is not recommended). Most sizes can be shipped UPS.

Pros that differ:
AGM (as by "Concorde") can be fully submerged. GELs are highly resistant to water but not intended to be fully submerged. AGM can be installed at any angle (as in aircraft use). GEL can be installed on side or on end, but is estimated to have about a 10% loss in capacity if not upright. Both are tolerant of low temperatures, but the GEL substance is much more tolerant than the thin, wet electrolyte in AGM.

Cons:
High initial cost for both (but my gels were in tenth year when I bought another RV and actually cost less than typical RV/Marine batteries). AGM similarly long lived (if not abused). Both can be damaged by overcharging. GEL are more sensitive to overcharge than AGM and MUST be carefully monitored and MUST have an accurate charge regulator. Actually, both should be charged from an accurate, regulated,

multiple-stage charger and NOT from a standard RV Converter/Charger (nor should any other battery if you expect it to last).

In my current RV I use AGM batteries. "Concorde" is the best known with more time in use to base life expectancy on. "Exide" (some models) and "Optima" also use AGM technology in unique "spiral-wound" cells and are worth looking at.

CAUTION! Some people have the idea that gel or AGM batteries will perform miracles. They won't. There are many advantages, but some disadvantages too. Gel batteries require very careful charging. Mine, for example, must never be charged to more than 14.1 volts. (Other gel brands might differ.) This refers to a sustained charge (as from a battery charger). Momentarily-higher peaks (as from a good solar system regulator) are OK. Obviously, GEL and AGM can't simply be wired up to each other or standard batteries (in some cases, they can't be mixed with other gels or agms either). A good RV converter, that really will regulate at 13.8 volts, will do well with gels (unfortunately, few RV converters can be depended on -- see elsewhere).

Gel and AGM batteries are of keen interest to RVers because they are totally sealed (don't **ever** attempt to remove the caps!), don't need added water and can be put almost anywhere in an RV with no danger of gassing unless you do something catastrophically stupid. Again, though, remember they require very careful charging.

All, not just some, things considered, the best battery (overall) for an RV is a "traction" battery--i. e., a battery designed to power a fork lift or golf cart. I prefer the **"Trojan"** brand. Golf Cart batteries are found in many RVs. A pair of 6-volt in series furnishes 12VDC at from 220 to 240Amp Hours. A pair of Fork Lift batteries, like Trojan's L-16, similarly connected, will furnish about 350 AH. Both types require a large amount of space for servicing and must be outside or, better yet, in a compartment vented to the outside. These are simple lead-acid batteries. They demand watering, cleaning and measuring. IF you are willing to take care of them, they will provide plenty of electricity, at reasonable cost, for many years. These batteries also require care in charging if they are to last (and occasional "equalizing"--see my Battery poop sheets). If you're too lazy, then just buy batteries oftener. See PRODUCT SOURCES or, for the best price, local battery dealers or a Wal-Mart. Call Trojan (800) 423-6569 or 987-6526 and ask for sales/advertising. They have poop sheets on best way to charge and "equalize" batteries. Ask about their newer "Superior Cycling Batteries" also.

Regular 12V RV/Marine batteries will work fine and will last if taken care of. They are more flexible in charging than gels or 6Vs, but still require reasonable caution. If your voltage regulation, in converter or vehicle engine, is not set properly, they'll die early. If you don't keep them clean and watered, ditto. Wal-Mart is often the best source for these and golf cart batteries (so you can easily return them for cheap replacement after you screw up and abuse them).

Wet cell batteries with removable caps should be checked periodically with a hydrometer. This is not something you'd do daily. You need a good volt meter to routinely monitor batteries. **Never** rely on the RVs built-in idiot meter for this (or anything else). No matter what battery you use, you should have a

digital meter. See METERS, later, for more.

Batteries have always been a bugaboo. That may end in the next few? years. Electric cars have been mandated. Incredible advances in technology are in the works now because of this. But, beware the nutty stuff that is coming with it! **Home Power** is an excellent source for info on the latest things that really work.

"HYDROCAPS"--Recombine vapor from liquid-battery cells and return it to cells as well as prevent corrosive discharges. Pricey at over $7 each, per cell, but effective if used properly. They can melt down catastrophically if misused. **"Hydrocap Catalyst Battery Caps,"** 975 N. W 95th St., Miami, FL 33150 (305) 696-2504.

4I. RV CONVERTERS--Will, in almost every case, eventually destroy your batteries. My battery poop sheets cover the faults of the average RV converter. Read also the Ample Power books and "Managing 12Volts..." for descriptions of just how inadequate the battery chargers used in most RVs really are. As always, get the poop sheets from the manufacturer before the thing craps out! This is especially important with converters, because many (most) manufacturers don't want to tell you a thing about what's inside there. They claim it's for your safety, but that's horse hockey. I think they're really worried about someone stealing their technology, though I can't imagine why -- most of them use the "ferro resonant" technology that goes back to the 1930's. The 1950's "SCR" technology some brag about is almost as outdated now. Some of the best RVs (though not all, by any means) don't use converters. They use separate AC and DC systems and an independent battery charger (I highly recommend doing just that).

4J. 120VAC BATTERY CHARGERS (in lieu of converters.)

- Excellent chargers are available from: **Ample Power** (MISC SOURCES). Very expensive, but made for ocean-going boats. (See 4N.)
- **RV Power Products**, 1058 Monterey Vista Way, Encinitas, CA 92024 (800) 493-7877. (www.rvpowerproducts.com) They've developed solar controllers/regulators that are simply the best you can buy. My test report is on their web site. I have their SB-50 and SB-2000 models. They perform faultlessly.
- STATPOWER (see below) makes a very excellent "Truecharge" stand-alone, solid-state, multi-stage, user adjustable battery charger at about $425 (this is the one I recommend for most RoVers). Most excellent -- but see Inverters below.
- "Trace," "Heart Interface" and "STATPOWER" inverters (now owned by "XANTREX") market very superior battery chargers also -- as included or options to their inverters. Batteries and their proper charge are so critical, and screwing things up is so expensive, that were I to buy an "independent" battery charger today, I would buy high quality (probably the **StatPower** models above). However, if you need an inverter anyway, consider something like those mentioned above with battery charger options. You get a battery charger that would cost hundreds of $ more in a stand-alone charger of top quality. With different charging sources and the need to consider temperatures (especially when using gel batteries), you really need a user-adjustable battery charger. Check the "West Marine" catalog for battery chargers, comparison info and tips.

CAUTION! West Marine, as any other purveyor of RV/Marine stuff will also have lots of antique-technology converters, inverters and battery chargers in addition to the good stuff. Do your research.

4K. INVERTERS--The **"Trace," "Heart," "STATPOWER"** and **"PowerStar"** brands are the best available today (in my opinion) for RV use, but there are other very fine ones. Check all PROD SOURCES and **Home Power**. If you run a laser printer, then many inverters, no matter how good, will fry it because most lasers like pure-sine-wave power. There are some exceptions, but they're found on a case-by-case basis and you don't want your laser printer to be a guinea pig. "Pure" sine wave inverters that won't screw up your expensive stuff (and usually won't produce any RF interference on other electronics either) are available in many sizes from **"EXELTECH, Inc."** (800) 886-4683. (www.exeltech.com).

Heart, Trace and **STATPOWER**. Read the ads and articles in **Home Power Magazine** for the latest info on "Things that Work." Keep in mind that HP is intended for homes. Don't be put off by some of the complicated safety precautions necessary with houses. When buying an inverter, always check with **RV Solar Electric** who sells the major brands above and doesn't have to steer you to any one brand. My poop sheets cover considerations when sizing/buying an inverter. There are things in the manufacturer's hype you need to be able to interpret if you're going to spend big$ on an inverter and get what you really need. I use a **STATPOWER** 2,500-watt, pure sine wave model with superb battery charger option to power my whole RV (less air conditioner). Expensive and worth it.

Some Downsides: "PowerStar" inverters can create terrible radio/TV interference. (I had two: One did -- I got rid of it, One didn't and I used it all the time.) Other brands can too. If you can't go to a dealer and try one first, you might go for the **"STATPOWER," "Trace" or "Heart"** noted for very few problems (though I've had minor AM radio interference even with them). Here's how the buying system works: A good dealer will know "about" what will/won't work. He can't know every single TV, etc., though, so he'll have a "try it/ return it for another" policy (you return it in like-new condition and he sends you another to try out.) Pretty good deal. Far better, though, is to go to his place and try them in your RV. (Try doing that in an RV store!)

Inverters to stay away from: Square-wave inverters -- that "square" wave, instead of a pure sine wave or quasi sine wave will also give you a square TV picture and won't run many induction motors, etc. Square wave inverters are cheap (their sole advantage) but don't do much and waste enormous amounts of electricity. Ditto, rotary inverters. They do put out a pure sine wave, but are extremely inefficient electrically, and are big, heavy and noisy. Their technology (like square waves) is ancient (in today's terms).

Here's something to consider--when buying an inverter from a non-RV specialist dealer: They may say "we've had no interference problems." Think about it. They're using them in houses, where the battery/ inverter/etc., room is isolated from the entertainment area. In an RV, the inverter might be just a few feet from that area (if not in it).

And another: Some inverters are factory wired for use in a "house" situation. A couple/few wire connections may have to be changed when used in an RV or boat. (Part of it's that difference in how things are grounded I mentioned earlier.) Make sure your installer (you?) checks on this. The better inverters have detailed instructions covering this. Dealers who are RV specialists know all this and will tell you in advance what need's to be done. It's no big deal.

4L. PHOTOVOLTAIC/SOLAR MODULES/PANELS--All the major brands are good or they wouldn't be in business (it's as competitive as things can get). Almost all of mine are **"Siemens"** (now Shell). I think their overall quality of construction, output, durability, etc., is superior. Other brands, eg., **"BP," "Solarex"** and **"Kyocera"** are also excellent and competitive. "Amorphous" celled panels are being sold also. Manufacturers tout their flexibility and how they will work with bullet holes in them, etc. However, amorphous cells degrade over time and output is gradually reduced. As these cells are further perfected, this shouldn't be a problem (at present, it is). In any case, compare the specs. The catalogs listed earlier help with this, as they compare major brands.

Don't, though, let some clown sell you a rinky-dink little panel he calls an RV model, that will do "anything" for some ultra-low price. He's either a crook, or he just doesn't know anything about RVs. Read the references! (INFO SOURCES) They all have a guide to sizing a solar system (the one from **RV Solar Electric** is quite good). Do the simple arithmetic involved in calculating your amp draw. Select the size battery bank and PV modules you really need. Check all INFO and PROD SOURCES. If solar charging is new to you, see my "Solar..." poop sheets for a layman's EZ-to-read description.

4M. PV (SOLAR) REGULATORS--May or may not be needed. Unless you really live "bare bones," they will be needed. If you were to just put up one module, for one battery, it's doubtful you'd need a regulator (because unless you were very, very conservative in your use of electricity, you'd never fully charge your battery anyway, which is another problem). You could, though, overcharge a battery if you left panel connected and didn't use any electricity (as going away for awhile). A switch is an obvious solution, but will you remember it? How often do you remember to turn your water pump off when leaving the RV? You're almost certain to end up with more than one module. A regulator will provide a safe, convenient connection point, will save your batteries and will allow you to monitor what's going on. I've tested (and use) several. You can buy ultra-hi-tech (and ultra-expensive $1,000) regulators that will do exotic things. You don't need them on a small RV system.

The **Solar Boost 2000** and **SB-50** regulators are the best available for small RV systems to 20 or 50 amps or more (I use both since I run two solar systems). From RV Power Products, 1058 Monterey Vista Way, Encinitas, CA 92024. (800) 493-7877 or (760) 944-8882. (www.rvpowerproducts.com). For small arrays, to 14 amps maximum, look at the **Solar Guard**. You might also look at the **SCI Model III/20 Regulator and Digital Monitor** for economy systems.

Good solar dealers will sell you what you need, not just the one they peddle or manufacture. Those dealers I list in this info sheet will sell you what you need. Regulators are constantly improving as electronic technology is updated. **Home Power** has articles on "Things That Work" and often evaluates regulators.

4N. METERS--are an absolute necessity. You can spend big$ or little$ depending on what you *need* to do. **Ample Power** (INFO and MISC SOURCES) has some of the finest, but they are expensive. (On the other hand, Ample specializes in equipment for ocean-going sail boats. If you're in the middle of the Pacific Ocean, you want the most reliable stuff you can get.) RV Solar Electric's SOLAR GUARD regulator has an excellent analog amp and volt meter built in. Perfect for keeping track of what's going on on a routine basis. You need a digital meter as well (and some regulators have them) because you cannot accurately measure battery voltage without a digital meter. Good digital, built-in Amp/Volt/Amp-Hour meters are advertised in **Home Power** and sold by most PRODUCT SOURCES. Portable digital meters are usually needed for RV use since you need to measure other things in the RV as well, but the best, like **"Fluke"** or **"Beckman"** brands will cost big$.

Currently, the best buy on an excellent, portable digital meter with volts to two decimal places and current measure to 20 amps (perfect for an RV!) are only about $40 from **JAMECO**, 1355 Shoreway Rd., Belmont, CA 94002 (800) 831-4242. (www.jameco.com) **(Metex brand #M3800, JAMECO Part #27115.)** Helluva good buy for a meter perfect for Rvers. Check with them--really good outfit that sells mostly to big buyers but treats little guys like us just as well. **"EQUUS"** brand digital meters are reasonably priced, small and accurate but the el-cheapo model only goes to one decimal place--OK for casual use (like monitoring starting battery) but not good enough for setting regulators and such. (Most PRODUCT SOURCES and check **Home Power**.) **CAUTION! In no case should you ever rely on the idiot lights or the cheesy red/green/yellow meters supplied with RVs!**

4O. SURGE PROTECTORS--another necessity. The simplest form (during storms) is to unplug your RV and use your self containment. If you're on a common line with others (at park or rally) and high-voltage "jolts," rather than true surges, come from the power system or a fellow camper doing something stupid you can also have problems. Low voltage (anything for a long period below 104VAC) can destroy air conditioners, etc., and is common when sharing hookups. A good surge protector, with both high and low volt cutoffs is needed. Simple individual protectors at individual receptacles (a few $ at any hardware store) help but aren't good enough. Beware the $80 protectors at RV stores that have a sealed box in a short length of cable with RV connectors at each end. When some of these -- but not all -- go, they self destruct and you have nothing.

Currently, far better protectors are popular with RVers: Some have models that may be mounted inside the RV (where they won't get stolen), are resettable, repairable or both, and have high/low voltage protection. All have pros and cons as to when and how fast they activate and under what conditions, cost, etc. I suggest you get data sheets from each and decide what you really need. See ads in various RV magazines. Before you do, go to my poopsheet #7.

4P. LIGHTING--Great advances have been made. PL CF (compact fluorescent) lamps and Quartz-Halogen lamps (in reasonable wattages, not the yard lamps some jerks sell to RVers at rallies, that melt fixtures) give more light at less electrical consumption. Virtually all alt energy dealers sell these. The **Real Goods "Sourcebook"** has the best explanation of what they are and how they work and has excellent charts and diagrams that compare the great variety available. Some of these are available at

"regular" lighting stores at lower prices. Once you read up on them, you'll know what to look for. Note particularly how, where DC lighting used to be the standard, the new, more efficient inverters allow the use of some versions (e.g., PLCF) of AC lighting.

Problem: If your AC is coming from an inverter, and the inverter quits, you have no light. Also, some [usually older, but new also if el-cheapos] PL CF lamps and their ballasts can create bad AM radio interference. It can be filtered, but it's a lot of trouble. I use a mixture of 12volt CF lamps and good quartz (**Littlelight** or equal quality) lamps along with regular 120VAC lamps, RV lamps and RV fluorescent lamps. Standard RV lamps (one step above a bulb hanging from a cord) are energy wasters and used only to find things in the dark. Proper quartz lamps, in low wattages on goose-neck fixtures use very little electricity, are attractive and can be adjusted for reading. Look for the new "White LED array" lamps and flashlights that use extremely little electricity and last for over 10 years. I'm using some routinely now and testing some other versions.

Regular RV fluorescents aren't very good. Ballasts fail easily and they can interfere with TV and radio. To avoid much of this look for the better **"Sunray"** brand in RV stores (if you can still find them). If you have the **"ThinLite"** brand of RV fluorescent and experience Radio Frequency Interference (RFI), they will furnish you (free) mylar capacitors that (in some cases) help. Call/write/e-mail them and pull their string a bit.

4Q. COOLING--You ***could*** run an RV air conditioner from a VERY large inverter or bank of inverters, but it's not practical. The battery bank and inverter would have to be enormous. Evaporative (swamp) coolers will work in low humidity areas. A fan is enough in some areas. **"FanTastic"** is the best of the whole-house fans. Fantastic doesn't do much to advise you on fixing their fans -- and with good reason -- all you do is call (800) 521-0298 and they send you replacement parts free -- most unusual and super nice. Check RV discount mail order houses for best prices.

4R. PROPANE ALARMS--can alleviate the worry many people have about fumes from heating devices. Propane "sniffers" are common. You can get alarm only or alarm with auto LP shutoff at the main tank. (Auto shutoffs can use **a lot** of 12VDC as they require a constant flow of electricity to operate solenoid valves.)
CARBON MONOXIDE ALARMS--are less common, but readily available and, some of us think, are more important. Good alarms = $60+. Check before buying for need to replace sensor and ready availability of sensor from regular electronics supplier rather than manufacturer only. The **"Nighthawk" Detection System** is very highly rated. From any ACE Hardware Store or similar. The **"ATWOOD"** company (well-known for top quality RV appliances) also has an excellent one now.

4S. GENERATORS--are like batteries in that the major brands will usually work well **IF** you perform the required maintenance. I've had three -- and sold them all because I never used them. RVers seldom do the very extensive maintenance needed with generators. The cost of a good generator, fuel and maintenance makes generators the most inefficient and costly source of RV electricity. Yet, some people do need them. Most people with adequate solar systems don't need them. If you need one, or want to build your own engine-and-alternator setup for battery charging, get the **Backwoods Solar Electric**

catalog (PROD SOURCES). It gives the best info on what kind to buy (or not buy). Backwoods also sells a how-to booklet and has a DIY kit you can buy that has the parts you need. One thing you must be cautious about with generators: Many are sold to house people and RV people with the manufacturer not making allowances for the "AC neutral and ground wire not to be bonded" restriction mentioned under Inverters and PROD SOURCES. This can be a serious safety hazard. (Onan is known for this fault.) I wouldn't buy a gen without checking this out (and most RV dealers/stores know nothing about this). An independent generator service shop can fix the problem if you can't do it yourself (it's EZ). See my "Batteries and Other Electrical Stuff" poopsheet for more info. That sheet has a 120VAC section that covers much more about generators.

4T. APPLIANCES AND ENTERTAINMENT--There was a time when experienced RVers went to great lengths to find 12VDC equipment or modify 120VAC equipment for 12VDC use. In doing so, there's a risk of frying the thing and you'll violate the warranty. I still do this sometimes and encourage you to make electronics a hobby so you can too. Now, though, with hi-tech inverters that are 90+% efficient, it usually is smarter to get good 120VAC stuff and a quality inverter (or inverters). This is not to say you shouldn't look for quality TV or stereo that use dual voltage AC and DC.

There are a lot of small, 12VDC appliances sold in RV stores. Most simply aren't very good. Some that are, usually from alternative energy stores, are the **"Waring"** brand of 12v blender, the **"Braun"** model 2505 AC/DC rechargeable shaver and the bed warmer sold by many Escapees (**BackWoods** sells all three items). A number of 12V soldering irons are available, but better are the butane pencil irons sold by **"Radio Shack"** and similar stores. There are a variety of rechargeable drills and tools. Most won't last long. The **"Milwaukee"** brand is best and will last.

SAT TV--I get lots of questions on Satellite TV. I had a large "C" Band type. I got rid of it. For people that do watch TV, the new DBS sat systems with 18" dish work extremely well. I have one and like it. They're getting cheaper, too, now that there's more competition and extra features are being introduced. Be a careful shopper! The basic system (antenna, receiver, etc.,) is almost identical from all dealers. A lot of options are available as add-ons (dual-feed antennas, satellite locators, through-the-roof adjustable mounts, electronically operated mounts, etc.). Figure out what you really need.

Example: Permanent roof mounts can be very nice, but if you habitually park under the trees? Automatic/electronic mounts that find the sat with just a click of a button are also nice, but pricey. Do you really have a good reason to spend more on the mount than on the whole magilla? Best way to evaluate SAT systems and mounts is go to an Escapade. There will be at least two dealers with different equipment. Put your hands on them and play. See my "Communications" poop sheets for more info.

5. MISCELLANEOUS SOURCES:

5A. GENERAL SOURCES

"Your Bank is Ripping You Off" by Edward E. Mrkvicka, Jr. ISBN 0-312-15246-9 (Call #332.120973). Not technically an RV source, but one every RVer should read. Former bank vice

president tells how banks take unfair advantage. All libraries have this. It's an eye opener.

Ample Power Co., 2442 NW Market St. $43 (or 1150 NW 52d St.,) Seattle, WA 98107. (800) 541-7789. (www.amplepower.com) Ample Power makes some of the finest instruments, battery chargers, etc., that money can buy. (They specialize in equipment for ocean-going craft and if you're in the middle of the Pacific you don't want cheap stuff.) If you intend to live in an RV, they have two books that don't cost much: **"Living on 12 Volts with Ample Power"** and **"Wiring 12 Volts for Ample Power"** by David Smead and Ruth Ishihara. Living = $25; Wiring = $20.00. (Both for $40.00.) Info on DC electricity not found elsewhere. Most valuable. If short on $, get Wiring first. Also available from Amazon.

Post Marine Supply, 111 Cedar St, New Rochelle, NY 10801 (800) YACHTER. (www.postmarine.com) A swell place. Catalog free if you ask. Best price (around $125+UPS but no sales tax out of state) on ITT/JABSCO/PAR macerators. This is where you find sealers and caulkings that really work plus much, much more.

West Marine, Box 50050, Watsonville, CA 95077-5050 (800) 538-0775. (www.westmarine.com) Similar to Post, but with many stores across country. Giant catalog packed with good info! Many pages are devoted to comparing competing products. Lots of good tips on all sorts of things. Get this for sure. Make sure you get the "Master" catalog, not the abbreviated version.) An excellent place to buy stainless steel hardware in bulk at FAR less cost than your local hardware store. Much, much more.

Tank Meters-- Centroid Products, 2104A Hibiscus Dr., Edgewater, FL 32032 (904) 423-3574. (www.centroidproducts.com) Probes and meters for any tank, any fluid. Accurate! I know exactly what's in my tank. Especially good for fuel tanks. (Installation can be difficult.)

Tank Meters-- AcuGage by Snake River Electronics, 1850 North Arthur Ave. Pocatella, ID 83204. (800) 504-3256. www.snake-river.org Water, Sewage and Fuel tank gauges that work. None of those el-cheapo RV idiot gauges. Sturdy, simple electronics. Very reliable, easy to install. Metal or plastic tanks.

More RV Refs-- The library, where you look up specifics and copy what you need. Leaf through the "Battery Engineer's Handbook" for just one example. Look at electronics hobby books for how to troubleshoot transformers and battery chargers (which no RV book covers adequately). Look also in electronics books for simple, cheap plans for NiCad battery chargers, timing devices, solenoid-operated door locks and all sorts of fun things. Almost all libraries have "Motor Home Life" and "Trailer Life" magazines with about a year's back issues. Some of the technical articles are worth copying.

READ THE COLUMNISTS!--in Escapees Magazine, FMCA Magazine, Trailer and Motorhome Life and various Woodall regional newspaper-type pubs. Look especially for articles by **Bill Farlow** (also in Coast to Coast mag). Farlow is the best there is when it comes to selecting tow vehicles, trouble shooting, or discussing "standard" RV equipment (check with me if you want to talk about innovative equipment). Bill takes complicated subjects and makes them simple. Buy his book(s). Go to his Escapade

seminars. Look also for columns by **Gary Benzler** and the **Gaynors** in the various pubs. Read the "Action Line" type columns in RV Magazines. Look for RVs and RV appliances that constantly reappear with problems and lousy service. It's easy to identify the real losers by doing this and an eye opener to see how some of the biggest names do the worst service.

BUILDING YOUR OWN RV:

Senator Buses by the "Supreme Corp" (PO Box 463, 16500 CR 38, Goshen, IN 46526 (219) 642-4888. Shells used for commuter vehicles, handicapped buses, etc. (Similar to Class B type motorhome but better built.) Extremely-well constructed. They'll outfit with as much, or little, as you want in windows, interior trim, handicapped lifts, etc. You build in the RV stuff. Chevy or Ford chassis. Check with them for dealer nearest you. (See **Custom Built RVs** Below for More.) (See my Buying an RV poopsheet.)

Others: Some RV manufacturers will sell you a "shell" version (like a "Jim Walter" house, you finish the inside). This can be a good way to get what you really want. Make sure the chassis and shell are not from one of those companies you frequently see listed in "RV Action Line" columns as known losers (so much for a list of what RV not to buy). (**Don't do this without joining The RV Consumer Group.**)

Used shells are just that. Get an RV that has a good structure and rebuild it with the same or more caution as above. **(Again, don't do this without joining the RV Consumer Group.)**

Bus Conversions (AND A LOT MORE THAN BUSES)-- Do a simple web search on Google for several sources. Best initial info source I've found for diddling with these is **"Bus Conversions Magazine,"** (www.busconversions.com) The snail mail address for MAK Publishing that handles the magazine is 7246 Garden Grove Blvd. Westminster, CA 92683. (714) 799-0062. $36/yr. Has ads for anybody who is anybody as to where to find buses and unusual parts used. Also has many articles, tips and sources for when rebuilding any kind of RV. **The free "Bulletin Board" tab on their website is spectacularly good for rebuilding tips that no "regular" RV magazine even thinks about covering.**

CUSTOM-BUILT RVs:

Trailers--(A large variety of "stock" designs also, but most people want to "change things a bit." Considered by experts as one of the best (probably ***the*** best) in the country. **"Horizons" RVs** consistently rank highest in RV Consumer Group ratings with four and five stars and always receive outstanding grades for value, durability and highway safety. Workmanship is superb. "Customizing" -- a little bit or a lot -- is normal. These RVs are not cheap, but they are reasonably priced. They often cost less than the junk sold by some other manufacturers. (These people care about their reputation and their customers.)
You won't find a better 5W or Travel Trailer, anywhere, at any price, period. **"Horizons, Inc."** 2618 Mid America Dr. Junction City, KS 66441 (800) 235-3140. (785) 238-7575. FAX (785) 238-4992. Web site (www.horizonsrv.com).

WARNING: There are several outfits advertising "custom built" trailers, etc., in RV magazines. Some build huge, expensive, ill-conceived hulks. Often the planning is lousy, with wasted space and plumbing, electrical and such run aimlessly. Workmanship can be very sloppy. I wouldn't hesitate to deal with "Horizons" but, for all others -- be extremely cautious. Do some research. Don't screw yourself.

FURTHER: "Customizing/Converting" takes time. (It ain't going to be done yesterday so don't expect to walk out with one of those salesman's "What'll you gimme to drive it out today?" specials.) A good shop will meet the date, stated in writing, in advance. Can you do it yourself? Sure.

Kitchen Ovens/Stoves. There are none better than the **"Force 10"** brand At good boating stores. Expensive! -- and worth it. An oven you can put big things in! A broiler you can do the same with that really works! Three burner model with broiler option, all stainless steel, brass and glass = about $1,000 (yikes!) at marine stores mentioned above. Check the new **"Maytag"** RV stoves. Some real innovations, with sealed burners, non-rattling grates you can slide pots around on. Much more. (www.maytag.com) for basic info. These are being sold by Camping World. Call the CW main order desk at (800) 626-5944 for further info. More reasonable for some RVers are apartment-size gas ranges. Many RVers have installed these. Problem is that some use LOTS of 120VAC electricity to run "glowbars" that allow oven to work, etc., and have inefficient pilot lights. You need a simple one with electronic "spark" ignition (piezzo type) that needs no electricity of any kind. The best and reasonably priced is the **"Premier"** brand from **Backwoods Solar Electric Systems**. These folks know what models are energy savers.

Hard-to-find RV parts--some favorite places:

- **All Seasons RV Appliance Parts and Service**, 1150 Mitchell Jellison Dr., Elkhart, IN 46516. (800) 344-0673. Great outfit. Most helpful, especially with older model reefers.
- **Two great ones: RV Mobile:** 11715 Hwy 99 S., Everett, WA 98204. (425) 355-1170. Web site at www.rvmobile.com and e-mail to tj@rvmobile.com. Gas Refrigeration: (www.gasrefrigeration.com). Both web sites have LOTS of tech info, wiring diagrams and GREAT trouble shooting steps for all major reefer brands. These are most valuable (many RoVers insist they're a lot more help than the manufacturer's).
- The above are commercial, sales, repair, etc., outfits. They help us as a free consumer service. Please don't take advantage of them.
- **DTI RV Appliance Parts**, Box 286, Middlebury, IN 46540. (800) 289-0919.
- **Weller Auto**, 2525 Chicago Dr. SW, Grand Rapids, MI 49509. (616) 538-5000.
- **Howell's RV Appliance Repair**, 1162 Greenfield Dr., El Cajon, CA 92021. (619) 441-0066.
- **Singleton's RV Salvage & Sales**, 383 Nelson Rd, Rochester, WA 98579. (360) 273-9566.

For a list of more places send legal-size SASE to: **Terry Banister**, c/o **Highways**, 2575 Vista Del Mar, Ventura, CA 93001. If you find a good place, write Terry and tell him so he can add it to the list.

Doing it yourself. Newstands and libraries abound with amateur/hobby electronics books and magazines. (Radio Shack has some good books too.) Don't just write someone (or me) and ask for a

schematic, it just means you're too lazy to do your home work. Get with the hobby. "Better Use of... Your Electric Lights, Home Appliances, Shop Tools--Everything That Uses Electricity" by Hackleman (from PROD SOURCES) is a classic ref for DIY. It's somewhat dated now, with little mention of improved lighting and integrated circuits, but will get you started. (It also has the best explanation of basic theory.) See Home Power also for frequent DIY articles. Use the library! If you don't know how to really dig in there, ask the reference librarian.

GOING TO MEXICO? (Baja especially?) Don't do it without first joining **"Vagabundos del Mar."** These people know all (yes all, no exaggeration) about it. Combined of boaters and RVers, the club is very SKP-like in style. **An absolute must if you want to have a good time, stay out of trouble and find out where the really good places are.** 190 Main St., Rio Vista, CA 94571. Call (800) 474-2252 (www.vagabundos.com) and they'll send you an info packet. You'll be impressed. Lots of membership services: insurance, road condition reports, fuel and water sources, too many to list here. Most highly recommended! (See my "Getting Along.." poopsheet.)

Toilet Chemicals--PLEASE DON'T USE ANY "MAJOR" BRAND THAT HAS FORMALDEHYDE IN IT! The stuff kills bacteria to get rid of odors. The correct idea is to grow the right kind of bacteria to eat/decompose your poop and then there won't be any odor -- unless something else is wrong (and no big chunks because you will decompose rather than just stop odor). Lots of good brands that do the job: **Plumb John** and **Always Fresh** (good RV stores and rallies) are great. Septic tank stuff like Rid-X (any supermarket) works, but is slow. The best toilet chemical I've ever found is **"ECO-SAVE"** from **JWH**, Box 195, Santa Rosa, CA 95402. (707) 579-0643 (800) 950-9666 (Also in good RV stores and at rallies.) Don't use yeast! Granted, it'll decompose poop, but it'll also create a nasty "brown bread" that will really gum up your valves. My "Macerator and Sewage" poop sheets cover all this -- and a whole lot more on RV sewage.

5B. ELECTRICAL SOURCES

"TYING" ELECTRICAL SYSTEMS TOGETHER. We spend big $ on equipment -- then go to the discount auto store and buy cheesy battery cables and flimsy fuse holders -- and then we lose much of what we paid for. Do yourself a favor! Download free catalog (or get $10 print version) from **"Wrangler Products NW."** 4444 S.E. 27th Ave., Portland, OR 97202. (800) 962-2616. (www.wranglernw.com) My big, ultra-high quality, sealed, color coded, indestructible battery cables, made to my lengths, cost only a little more than junk stuff. My fuse holders were made to my own specifications. Much more! Like high output alternators that include regulators, diodes and such that won't poop out the first time you use the thing. These people can advise you. Most knowledgeable! See my "Batteries..." poopsheets for much more.

CIRCUIT BOARDS--THE RV BUGABOO!

Next to electrical system failures, the biggest bugaboo (problem) with RVs involve expensive failures of the big-3 major appliances: Reefer, Furnace, Water Heater. In many cases, failure is due to poorly designed, flimsy, cheaply constructed and often poorly located circuit boards. There's really no excuse

for this, but that's the way it goes. **"Dinosaur Electronics,"** of Lincoln City, OR makes a variety of replacement boards. All are extremely well designed and sturdy and cost little more than the crap that came with your appliance. Dinosaur doesn't sell directly to the public. Their very excellent web site at (www.dinosaurelectronics.com) lists all their products and retailers. For tech help call (541) 994-4344 8-5 M-F PST. http://DinosaurElectronics.com

JUST A SAMPLE OF DINOSAUR PRODUCTS: Boards for generators (long needed). Reefer, Furnace and Water Heater circuit boards. (They make a "black box" that will replace the infamously-poor circuit board on just about any Dometic refrigerator ever made. Dinosaur's box even allows you to adjust the temperature on the supposedly fixed-temperature "Freedom" series of reefers.) They've also made great improvements in the ignitors that work from circuit boards. (Really smart RVers get Dinosaur boards right away, without waiting for the original one to fail in the middle of nowhere.)

The Best Dinosaur dealer: **"Mark's RV"** 14485 Puzzey Rd., Albion, NY 14411-9528, (800) 713-3235 (www.marksrv.com) will work with you. Very knowledgeable, also sells a great variety of RV parts, has excellent info on web site.

RV ELECTRIC SUPPLY (UMBILICAL) CORDS. That fat, black cord contains lots of insulation and heavy covering because of the abuse it takes. Inside, though, the conductors are just normal #10 Gauge. The actual cable-end connectors are often the first thing to wear out. Look for better ones at marine stores. The adapters used to connect the big cord to various power sources can be another problem. Many are very cheaply built and won't carry the load that the cord itself will. Examine these carefully when shopping and buy the best (not the el-cheapo). Skimpy adapters just create a lot of heat, melt the connector fitting, cause loss of power and can be a serious safety hazard (causing some of the shorts and such that people mistake for surges).

Extension cords also cause problems. Many RVers hook up a cheap, #14 Gauge extension cord to a power source, then a cheap adapter to join the extension cord to the RV umbilical cord, then wonder why connectors deteriorate and why they have low power. Heavy extension cords (with the same #10 guage wire as the umbilical cord) are available. For long runs, get a quality OSHA/UL rated #10 Gauge extension cord of about 50 feet, but make sure it's the type approved for contractors and it will carry just as much "juice" as the big umbilical cord. Don't skimp on cords and adapters! (See "Surge" poop sheet.)

5C. AUTOMOTIVE SOURCES

Towing Towed (TOAD) vehicles. "Towing World" is **THE** place to go for information! PO Box 540907, Omaha, NE 68154 (800) 566-9869. (www.towingworld.com) This is a commercial outfit that can sell you about anything anybody could need. As a MOST VALUABLE consumer service, their web site is literally FULL of free excellent info. Find what can/cannot be towed as well as what special equipment/procedures are needed. Do NOT just do what some well-meaning neighbor suggests, get authoritative info here. Do NOT buy a toad and then figure out (the hard way) if it can even be towed at all. Check here first. Most highly recommended.

Shop Manuals for your vehicle are a necessity. Call **"Helm Inc."** (800) 782-4356 (www.helminc.com) and they will send you a list/chart of what's available (U.S. manufacturers mostly) for yours. You can buy the full set of manuals for $100+, but all you may need is the inexpensive "electrical and vacuum" (or similarly named) book unless you're a serious DIYer. Also, browse at a big bookstore and get a well-illustrated, simple, general automotive trouble shooting manual. (It can save your ass on the road.) See also **"Nutz and Boltz."** (later) for the best source on automotive-type info that will keep you from "panic-on-the-roadway."

Auxiliary and Replacement Fuel Tanks. Best source is **"Transfer Flow, Inc."** 1444 Fortress St., Chico, CA 95973. (800) 442-0056 (916) 893-5209. (www.transferflow.com) Top flite equipment. **Problem:** They don't want you wandering around in the shop. This is usually a good reason to go elsewhere, but it's understandable as a safety precaution in their case with fuel around. **BUT,** get the supervisor to escort you. You need to make sure tanks are vented properly because they won't! They'll assume that your existing filler tubing is OK and very few are because of the sloppy way RVs are manufactured. If you don't check on this (ask their advice and understand you'll have to pay for any modification), you'll likely end up with slow and incomplete fill ups. It's amusing to see people put in a 65 gal tank and then (politically and environmentally correct) fill to the click and stop (without realizing they've only put in 40 gallons).

RV Performance Equipment/Installation/etc. (Names don't indicate all they do. Most handle about anything). **CAUTION:** All those below are good, but occasionally are criticized as having "done something unnecessary" or similar. In almost every case I've found such complaints are due to the customer having told them what was wrong and how to fix it. Describe symptoms accurately, then let ***them*** investigate and recommend. (You don't go to the doctor and demand he remove an appendix.) Check with **RV Consumer Group** (see 2B) for known problems with some RVs (e.g., wandering steering) before going to these places and having something installed that won't help at all:

- **Eric's R V Performance Center** 275 S. 7th Ave., Sequim, WA 98382 (800) 488-3697. (www.ericsrv.com)
- **STC RV Performance Center** 12464 McCann Dr., Santa Fe Springs, CA 90670 (800) 230-3694.
- **Henderson's Line up** 417 SW Marion Ln., Grants Pass, OR 97527 (800) 245-8309. (www.hendersonslineup.com).
- **Al Carrols Performance RV** 1343 Captain Shreve Dr., Shreveport, LA 71105 (318) 865-2886.
- **ALH Repair & Alignment** 1525 Dr Bramblett Rd, Cumming, GA 30130 (404) 887-0220.

Diesel Lo-Sulfur Additive. An arguable. Some mfrs say it's not needed, but it looks like it is. Why take a chance? Two of the biggies, Bosch and Deere suggest using **"Stanadyne Corp's" Performance Formula** (any auto store). Same additive is cheaper in Deere parts dept's under its own label (Part # TY 22030). **LubriDiesel** (see below) diesel additive also excellent. (Additives may be even more necessary under the new California standards. Stay alert on this.)

Gas-Upper-Cylinder Lube. Another arguable. Lead is gone (for all practical purposes) from gas.

Hardened valves/seals in anything built after early 70's should be OK (according to some mfrs). Why take a chance? Many of us use **Lubrigas** or **Lubridiesel** (800) 252-6516 for a dealer or see RV magazine ads. It's cheap insurance. Does it increase mileage? Not necessarily.

Up-to-date Automotive Info--is hard to find. Your (Helm) shop manuals and a trouble-shooting guide are a start. The TL book "RX for... (out of print, but can be found in used book stores) is good for older vehicles. (The newest vehicles won't allow you to do much on your own anyway.)

- **You Need This:** For maintenance tips, debunking of myths, safety, recall info, secret warranty info, true skinny on oils and additives and a whole lot more the best source is: **"Nutz & Boltz"** $20.95/yrl/12 issues, 2d Class from Box 123, Butler, MD 21023 (410) 584-7574 (800) 888-0091. (www.motorminute.com) Check on their "package" deals that include such things as: oil tests, a right to send Nutz a letter with "one unsolvable auto problem that he might be able to solve" plus more.
- **Radio Shows:** There are several Saturday radio shows on auto stuff. Some are silly (like those two dopes on PBS radio), but some are good. Try the dial. Note how few of the "experts" on these shows know anything about the 12 volt system. Local auto programs are often better than the biggies because you can go to the guy's garage and nail him down during the work week -- and he knows it, so he won't say stupid things on the radio.

AUTOMOTIVE IGNITION. My problems stopped when I bought a **Jacobs Electronics** full replacement, computer ignition system. Simply the best there is. I spent a thou$ on the whole bag. Some people have spent a lot less and just upgraded coil and ignition wires with great results. It's your choice -- as it always is. Call (800) 627-8800 (www.jacobselectronics.com) and ask for the full-line catalog and buy Dr. Jacobs book at the same time. Read book first, then select what you think you need, then call back and consult. They won't press you to buy what you don't need. Oddly, Dr Jacob's book is great but the instructions that come with the stuff are sketchy. No matter--call the 800# and they'll talk you through installing anything. Most knowledgeable.

MORE ON DIESELS:

- **"Precision Diesel"** aka "M&S Technical Services", 74 Bell St., West Babylon, NY 11704 (800) 832-8844 or (516) 756-2045. (www.precisiondiesel.com) Specializes in Ford 6.9 and 7.3 diesels and also Chevy and Dodge. Have parts/will ship. Super stuff at discount will save you enough to more than pay for their excellent newsletter and access to their Q&A "hotline" ($29.95 a year). They come highly recommended.
- Info, not parts, on Dodge Cummins is supposed to be fantastic in the magazine **"TDR"** 1275 Elk Ridge Cove, Alpharetta, GA 30005 (e mail to rpatton@ix.netcom.com) $35/year.

5D. MORE PHRED INFO-GATHERING TIPS

OBTAINING DETAILED INFORMATION--First, if it's an item manufactured by a company still in

business, call/write them **now** and gather everything you can. Second, if out of business, put a plea in Escapees RoadRoamer (or similar columns in other mags) and beg someone to copy their stuff and send it to you (you should be willing to pay 20¢ a page plus postage). If it's info on a topic, rather than a specific item, start by writing the appropriate magazine (LEGAL-SIZED SASE enclosed, not some silly little dinky envelope) and ask them if they have reprints available and what's the cost. Your initial inquiry should be BRIEF AND CONCISE. Do not, for example, write and ask for "everything they've got on towing a car behind a motor home" (you should not expect an answer to an idiotic request.) Be specific.

If you're lucky, because of the SASE (double stamp is smart), they might send you a freebie. Usually, they'll send you a note with what's available and how much you need to send to get it. **FMCA** has more info than anyone on TOAD cars. **Home Power** will, usually, send you a free copy of their index (and it's in their magazine once or twice a year). You then locate the back issues that include what topic you might be interested in and buy them -- or get their CDs and visit their web site. **Escapees RV Magazine** stuff: Feel free to write the author of any article and ask questions or request more details, but remember that SKP writers are volunteers. A legal-sized SASE is mandatory. Use the SKP's web site! www.escapees.com for more technical stuff, talk, Q&A, etc. A really great site is www.rvclub.com where you'll find a very active group that posts all sorts of hard-to-find info on their talk/discussion segments.

GET CREATIVE WITH TOLL FREE (800 and similar) NUMBERS--(800) 555-1212 is 800 information (free). If you know the correct name of an outfit and the correct location, then, if they have an 800, 888, 877, etc., number, you may get it. The trick is to know where they are and where the division of the corporation is. A big holding company might be reached by 800 but not know shinola about a small division that makes the appliance you're interested in. Read labels closely. (You need to do that anyway, otherwise you won't have the correct model # and such and they'll think you're an idiot and disconnect you.) If they do know the lower-level outfit, they'll usually give you the commercial number (in another town). Before you call it, again check with 800 info. Lots of 800 numbers are not given to the public routinely. They're intended for dealers and mechanics. Knowing where an outfit is can be difficult. Some large corporations use PO boxes in large cities, but the plant is actually in a nearby suburb, so 800 operator won't be able to find it easily. Keep punching buttons.

Something that's not free in the telephone business--are the privately-owned, rinky-dink telephone systems that, without your knowledge, can use some (not all) credit card numbers to really screw you by charging an exorbitant rate that's superimposed on your regular account. Anytime you're in a new place, you should just press 00 (zero, or operator key, twice). If you hear "AT&T" you're OK. Hang up, start again and make your call. If you don't hear "AT&T," be very careful.

A CAVEAT--The great interest in doing things more independently, as illustrated by the huge success of **Home Power Magazine** and the **Escapees Magazine** as well as other publications, has helped make some of the sources listed here grow a whole bunch. Along with that often comes confusion, incompetence and, in some cases, employees who just don't give a hoot. (It's the American way.) You may no longer be able to BS at length with mom'npop, but have to deal through a bureaucracy. If you think you've been ill treated, take the time to write a note (mark the envelope personal) to the owner.

Don't get emotional -- they'll think you're a nut -- but just be factual.

- **800 numbers are for orders.** In just a few words, you can tell them you need a bunch of stuff but don't have a catalog and and they'll usually send it free even if it's supposed to cost you. *Use* the bureaucracy when dealing with a really huge outfit. GIB (the Guy In Back), for example, will talk you through a checkout (you'll usually be paying for the call) but he might not be equipped to mail out paper work. Write/call Customer Service for things like that.
- **Be clear and concise.** For example: If you're calling to buy something that will be reimbursed by insurance, make sure they don't think you're trying to *sell* insurance. (I saw this happen: A guy had four solar panels destroyed in a storm. He called an alt energy dealer for a replacement price to support his insurance claim. He muddled his call so badly with unessential chummie chatter that they thought he was trying to *sell* insurance and hung up on him.)

Return to list of Poop Sheets

The poop sheet updates are shown in **red**. All of the poop sheets challenge "conventional RV wisdom" (an oxymoron) and, instead, stress doing things properly. See Notes below about printing them out, which you are welcome to do.

The Poop Sheets

1. The Source and Resources List = 130 KB, 18 printed pages (05/2004).
Covers over 90% of the information and product source questions I get. The List has capsule descriptions of key topics that are expanded on if needed in "poopsheets" of their own. Don't settle for RV store crap unless it really is good stuff.

2. Inverters = 65 KB, 11 printed pages (4/2002).
How to interpret manufacturer hype, size an inverter and get what your really need. There's no need to buy more than you need and it's foolish to buy less and have to do it all over again.

3. Macerators and Other Sewer Stuff = 69 KB, 14 printed pages (8/2002).
Things about macerators and sewage problems in general that nobody tells you.

4. Buying an RV = 40 KB, 7 printed pages (4/2002).
With this poop sheet and RV Consumer Group the only person who can screw you, is *you*.

5. Batteries and Other Electrical Stuff = 106 KB, 21 printed pages (10/2002).
You will control your own power company with this info and the books "Managing 12 Volts" and "RV Electrical Systems" along with other references listed. Covers 12VDC and some on 120VAC and generators not found elsewhere.

6. Water Treatment = 37 KB, 7 printed pages (11/2002).
You may need a lot or just a little water treatment. Don't get ripped off in buying equipment and don't do anything stupid.

7. Electric Surge and High & Low Voltage = 28 KB, 8 printed pages (6/2002).
Surges can wipe you out, but more often the real culprit is you or your fellow RVer.

8. Is Solar Electricity For You ? = 22 KB, 4 printed pages (4/2002).
Basics for people who know nothing and those who don't know they know nothing.

9. Composting Toilets = 21 KB, 5 printed pages (4/2002).

These are not generally recommended for RVers but can work if you're willing to do what's necessary -- they require elaborate care and "feeding" (pun intended).

10. Storing an RV = 16 KB, 3 printed pages (4/2002).
There's no point in you doing the same dumb stuff most people do.

11. Handling Moisture in RVs = 62 KB, 12 printed pages (4/2002).
Rubber Roofs, venting and lots more than just fixing leaks.

12. Getting along -- Mexico and Elsewhere = 25 KB, 5 printed pages (4/2002).
Not the usual touristy crappola but things RV magazines don't tell you.

13. Communications = 41 KB, 7 printed pages (4/2002).
Cell phones, the internet, satellite TV -- new things happening all the time.

14. Boondocking = 45 KB, 8 printed pages (4/2002).
Not the usual RV magazine oatmeal, but a buncha' important stuff.

Notes:

Approximate number of pages listed is based on Netscape and a typical printer. Depending on your browser and printer setups, the number of your printed pages can vary widely. **Go to your browser's File/Page Setup** to adjust printing margins, headers and footers. With Netscape/ Communicator, I use only Page number and Page total, and 0.50" for all my margins. If your browser is MS Internet Explorer, use the question mark icon on "Headers and Footers" to help figure out its silly codes (lots of luck). **Color printing** is not necessary if you want to print in black and white.

Use this website! It's free and the poop sheets are full of very useful information and links. You can download what you like and do anything with it you want. You don't have a computer? Then get someone who does to do it for you.

All of the poop sheets are "Reproduction Permitted." Feel free to share them with other people.

Cheers,

phred Tinseth

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