

While reorganizing and purging my GMC documentation, I ran across a document which I had not looked at in several years: "GMC Motorhome Maintenance and Information Notes" by John N. Engebretsen PE, Engebretsen Engineering, Copyright 1992 & 1993, Danville, CA.

This is an excellent 52 page compendium of GMC information from a variety of sources, including, apparently, GMCMI Newsletters, GMC Manuals, rally presentations, personal contributions from the author and others. It covers almost every facet of the GMC in succinct detail, with a lot of hard-to-find reference information and part numbers (many of which are now obsolete, I fear). It would be useful to almost any GMC owner, and invaluable to all newbies.

While the cover of the document bears a copyright notice and a sales price, the copyright was apparently never registered. Since Mr. Engebretsen passed away in 2006, the unregistered copyright should now have no validity, even to benefit his heirs.

It seems to me that distribution of his efforts to the GMC community is a way to honor him, therefore I'm going to offer it up for wide distribution.

In view of the 1993 date, a LOT of the information is obsolete. Most of the individuals mentioned are either deceased, no longer involved with GMC's, or no longer performing the services mentioned. Similarly, a lot of the businesses are either no longer involved with GMC's, or closed down. Likewise, many of the products promoted, and the part numbers offered are no longer available.

Despite all that, the narrative can be invaluable to those just becoming acquainted with the GMC, and will help ensure that all major points of interest are at least addressed.

Ken H.

11 Nov 2013

GMC Motorhome Maintenance & Information Notes

Revised 15 February 1993

\$14.00 (\$9.00 for update of previously purchased copy-Return front cover page.)

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510-820.3543

Foreword

In 1973 It was the middle of a big gas shortage, and I was looking at, and testing GMC's. I still have a file of the sales brochures from then. So for years every time I saw a GMC pass I twisted my head and felt a pang in my stomach. When I aquired my vintage 75 Palm Beach (1989) I wanted to get up to speed with it as soon as possible. However I found that every time I picked up a wrench I had to stop and spend a half hour looking for some information that I had read but could not remember where I saw it, and the next time research the same info all over again. So I started punching notes into the computer. This was done on a 486 computer using Windows Word and a Laserjet IIID printer. My business logo is from Autocad.

These notes are organized with the same groupings as the x7525 maintenance manual. References are to GMC chapter newsletters(GMC #) or GMC Western chapter(GMCW #) newsletters, dealer service (DSB.DATE) bulletins, or the X7525 maintenance manual (Man Page). Addresses for Suppliers of multiple items are listed at the end. This information was compiled to bring many bits of information together, and to quickly identify where to research further for details. I would expect that it will need reprinting once a year to add new information, delete old information, incorporate suggestions, and corrections.

Your core library of detailed information should include the x7525 maintenance manual, operators manual, 78z parts book, a complete set of newsletters from the GMC International chapter of FMCA, Also a maintenance log with past maintenance that was passed on to you, and current history. The best source of part numbers is the 78z parts book which you should be carrying with you. A GMC parts department computer if operated properly should supply info as to whether the part is available, discontinued or superceeded with a new part number,(which you should save for future reference) but this will vary between dealers parts people depending on their capabilities and cooperation, usually they just need the part # to check the computer.This will change now that Cinnabar is taking over the warehousing and distribution of parts. The suppliers listed at the end, and referenced in the text are the ones I have found so far to be helpful or referenced in newsletters. I am sure there are others to be added. These suppliers also seem to specialize in, or go out of their way to help GMCers, and are aware of the special needs of our vehicle. If you have an aftermarket part number, the parts stores through their cross references can often find a common part in stock that GM would have to ship from a regional depot. The GMC Intl parts cross reference is very useful.

Any projects that you plan to do yourself should be evaluated with respect to your capabilities. experience, time available, and any safety related factors. Make sure that good shop safety practices are followed, and use the best tools that you can get. If you get the work done, having this information available will help to plan and expedite the job, and save money.

In a strange city you may find that a phone call, and UPS can get that critical part to you much faster than trying to locate it locally if at all.

Be sure to document all repairs and upgrades in a maintenance log book so that you can track your work, and to plan for the work that will need to be performed. Start it with information from the previous owner. While you are at it start a gas log at the back cover of this maintence log and work forward. Each year tot up the gallons and miles and record the average MPG for the year. It will also stir a few memories when you brouse all the places that you gassed up.

Any comments, suggestions, complaints, or a discussion of information included or not included will be entertained/welcomed with an open mind with my fellow GMCer's.

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.. Maintenance schedules

A) 3k miles

Chassis lubrication, Lithium chassis lube

(weight off of rear axles when lubing)(also two fittings, steering shaft & u-joint)

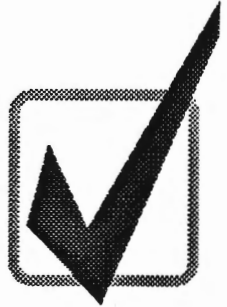
Engine oil & filter change -- Probably adding qt/800 miles worst case, when traveling.

Check all lights and buzzers

B) 6k miles (Six Months if earlier)

Ck engine drive belts (3ea)

Ck power steering fluid level



C) 12k miles (1 Year if earlier)

Ck drum/disk, and parking brakes, grease parking brake cables (use WD40 flex cables)

Replace air cleaner

Replace fuel filter

Engine tune up, Ck spark plug cables

Replace spark plugs --HEI with Platinum plugs should last longer, 30000 miles.

Ck air conditioning sight glass

Replace windshield wiper blades

D) 24k miles (2 Years if earlier)

Repack front and rear wheel bearings, (and CV joints if necessary)

Change ATF, Dextron II

Change final drive GL-5 gear lubricant

Check Fuel cap, tanks and lines.

Replance radiator hoses and engine belts (3)

Drain & flush cooling system

Ck final drive boots & shaft seals

E) Onan Generator

100 hours Onan oil change and maintenance

0) Info and Maintenance

Our 1970's GMC Motorhomes represent a quality of design and construction that is ahead of the current state of the art. You will be well rewarded for the effort and time required to restore and update these great machines, but the effort must be expended before you can extract the rewards. Preventive maintenance, upgrading and restoring must be done before hitting the road, otherwise the pain of fixing and patching problems as they happen on the road will come back to haunt you. This manual will hopefully give you a headstart.

The GMC Motorhome was designed by Bill Mitchell at GMC corporate styling. The Airstream apparently influenced the design. (Seminar John Mitchell)

GMC test track movies shows it cornering like a sports car which emphasizes its 37" high location of the center of gravity (without a roof storage box full). They were not able to roll it without the use of a ramp on one side. When spun against a curb it would jump the curb instead of rolling. (Seminar Roy Reitter)

Trivia: My neighbor a retired SF policeman tells me that Clint Eastwood has a GMC that he uses when he is on location for his movies. Now if he would use the GMC in one of his famous chase scenes he would really have some eye catching action!!!

--Walt Krebs Grants Pass Or, F102210 Has the Newman-Hass (Paul Newman) racing team GMC in their original racing colors.

--In the San Francisco bay area, Radio Station Magic 61 (610 AM) has a 26 foot GMC with a hydraulic antenna tower which is used as a mobil studio. It is seen at shopping centers and events on a rotating schedule. It had 130,000 miles last time I checked.

A) Manuals

73-78 Parts Book	78Z	Available from GMC
75-76 Maintenance Manual	X7525	Available from Cinnabar
76 Maint. Supplement	X7625 TZE166V100878 +	
77-78 Maint. Supplement	x7725	
Service bulletins	from GMC International chapter	(GMC6)

B) GMC Parts

At the Aug 92 Mount Hood Roundup Len Milburn of GMC Service Parts Operation, Officially passed the parts baton to Cinnabar Engineering. After inventory all GMC Motorhome parts in GMC warehouses, will be transferred to Cinnabar Warehouses in Detroit and The SF Bay area. Cinnabar will also be obtaining new replacement parts for discontinued items sold under the GMC Motorhome label. The original tooling that is found will be used for these parts. Higher ratio differential gears are on the wish list. Let Wes know what you want.

C) Quantity Built

1973 to 1978, 12900+ units, 1976 3260 total. (GMC1, Red Holman GMC). There are probably about 9,000 still on the road. 65% are west of the Mississippi river.

D) Gross Vehicle Weight

73-74	4000	7000	11000	Front, Rear, Total
75-76	4200	7500	11700	
77-78	4500	8000	12500	

E) Dimensions

Track	Front = 75.28"	Rear = 82.12"
Length	260 - 26' 9" including spare.	230 - 23' 9"
Width	8' Height 8' 1", w/AC = 9' 2", w/storage = 9' 6"	
Interior ceiling	76" Overhang 260 = F 53.2" R 104.66" 230 = F 53.2" R 88.66"	
Wheelbase	260 = 160", 230 = 140" to center of tandems	

F) Miscellaneous Info & Maintenance

- a) Towing: Manual calls for use of 4x4 timbers. A towing assist of 3" tube is available. \$150 Kelly's Welding, 2315 Lakota Lane, St Cloud FL 32769. 305-892-1166. (GMC36)
- The best way to tow is picking up the front with a stinger under the front wheels, and about 9" off of the road, or by loading it on a flat bed trailer.

1) Body, Heating & Engine Air Conditioning

Floor Plans: For GMC, Coachman Birchaven/Royal, Midas units are listed.

(GMC1)

A) Maintenance

a) Water leaks:

(DSIB 75-TM-10, 75-TM-10a)

A systematic approach is required to eliminate all roof leaks. Also a lot of silicon rubber. The two vent fans, the 3 plumbing vents, the refrig vent, and 11 clearance lights all set in silicone rubber with new stainless screws. Also new gaskets #2444123(13 ea) for for 10 clearance lights, 1 porch light, 2 lights in generator and propane compartment. Also the screws for the ladder, and rails were rusted and loose so these were replaced and set in silicon rubber. also the joint above the windshield is a persistant source of water drips. The roof corner strip where the roof joins the body side should be resealed.

The roof top corner channel will carry water front or rear. ie a leak at the refrig vent will carry to the rear side window or forward to center of the right side window over dinette where the electric cable slots out. On left side forward to the end of channel behind the drivers seat, or back to rear window, about 8 inches in front of the center divider.

b) Windshield leak: The joint above the windshield was sealed with 1/2" trim tape. (GMC34)

c) Dust leaks: I found dust coming in the right rear corner, The area between the floor, and body needed sealing with some caulking.

B) Paint

Note that GMC used the best paint available even today. Dupont IMRON urethane paints are a standard aircraft finish currently used on LearJets and other aircraft. IMRON was used starting with #TZE165V100089. Don't use lacquer on IMRON for repairs or touch up.

a) Exterior & Panel paint codes

(DSIB 78-IM-2)(GMC4)

b) Stripe removal: use 3M #08907 Woodgrain & Stripe remover, and #08908 Woodgrain & Stripe Adhesive remover will remove adhesive. \$10 each. A hair drier may also remove the stripe.

(GMC19)

c) Striping: Custom striping materials, catalog, and color chart. Universal Products, 521 Industrial Street Goddard KS 67052. 800-835-2054

C) Glass

a) Layout letter coding

(DSB 78-IM-1)(GMC-3)

b) Windshield, was Libby-Owens-Ford , currently being made in Finland.

\$450 + freight: Peninsula Glass Co.

Glassparts \$450 + freight

c) Run channel for sliding side windows: flocked rubber channel: GMC#2003071

\$50/25' Need 50' each side for 73/74 models, 12' for the driver & passenger windows on 75 & later models which have Hehr side windows.

(DSB Jun75)

To install in the drivers/pax window Pull out the rubber worm which acts as a window stop. Pull the old channel out and cut off by sliding window. open sliding window remove the rest of the old channel including the vertical portion. Clean groove thoroughly. Take a 6' piece of channel(at least 70") start with end at bottom rear and 1" behind where worm/channel joint was. Lay channel along window and mark the three drain slots. get a leather or paper punch and punch a row of holes in the outer corner of the channel over each of the 3 drain slots. Take the end and slide under the window from the front and work back until the end and drain holes are located properly. mark the channel for the front bottom window corner and and cut out a 90 degree chunk out of each side of

channel when this is worked into groove it results in a 45 degree bevel. Seat channel on up the front groove, at the top make another 90 degree corner. seat this in groove and start back along top groove. Take the end of channel and slide in channel above window work backward until you can slide window forward and grasp the end and work back till in place to back top corner. Next the worm in the bottom rear corner must be positioned so that window handle has at least 1/2" of clearance from the window frame. Also note the bottom rear of window slides over the worm about a 1/2" before contacting it. The end of the bottom window channel should be cut off to meet the end of the worm, and a bit of trim cement can be put under the end of the channel and the worm. Next make a 90 degree corner in the top rear of the channel and cut where it joins the worm from the top. This vertical piece should be long enough to leave the worm slightly compressed, probably an inch to 1 1/2" down from top. The compression is all that is required to hold the channel in place.

The Mar91 Tucson seminar handout By Al Singleton Milpitas CA and Lee Mackay of San Jose would be helpful if you want to replace the channel in 1973/74/early 75 GMC's which don't have Hehr side windows. Mark & punch zig zag hole pattern for drain channel. Slide window back & forth to install continue up end and top, and back to worm. Then glue ends only.

- e) Hehr side windows: Installed April 1975 and later. The channel can be cleaned with cleaner and q-tips, and lubed with silicone grease to make them slide easier.

(DSIB 75-IM-23)

Side window latch: latch w/rubber bumper from original manf. Hehr International Inc, Inside sales dept, 1103 West Pearl St, Chesaning MI 48616, 517-845-3061 (GMC15)
To Install: remove side sash strip w/2 screws on outside, then file rectangular hole larger for new lock.

Improved replacement #7000-41 (NAG D5153) works on both left or right side. \$2.50 (GMC20)

- e) Windshield repairs: Novus INC, 10425 Hampshire S., Minneapolis MN 55438. 800-328-1117 612-944-8000 (GMC14)

--You might try a Locktite bullseye repair kit, or carry one just in case. \$9.95

- f) Side windows: can use 3/16" acrylic/Lexan which can have the curve set in some airport shops. (GMC28)

--Replacement side & back window glass & screens is now available. Clasco (GMC37)

- g) Window source: left or right \$825 + \$50 crating. New source side windows: Assy is glass frame, screen, latch, no int trim. Door/Galley is stationary top, sliding bottom \$409.50 + 30 crating. Front/Rear side is fixed top sliding bottom. Rear: left or right \$505 + 30 crating. Rear Exit: glass only \$320 + 50 crating. All assy w/30 crating can ship UPS, others by truck. Red Holman GMC. (GMC29)

--These assemblies are Hehr T sliders with low ventilation area, and have a "Winnebago" look. There are some reports that to accomodate the GMC curve they are bent in the middle and in some cases will distort the door curve when installed. Cinnabar is working on an original replacement.

-- Try Glassparts, and Peninsula Glass for windshields.

- h) Windwings: I installed a pair from JANA. My main concern about these is that the window post doesn't have a lot of area for structural strength, and the location of these 3/16" holes needs to be very carefully chosen. The outside angle goes into the windshield grommet. Inside of that is the side window frame which the sliding side window goes forward into. By drilling a pilot hole 3/16" from the front of the outside angle I found about 1/16" between the window frame and the side window frame. This shouldn't loose too much strength when the 3/16" hole is drilled for the ww brackets. It required two holes 3 3/8" & 10 5/8" from the bottom of the outside window angle. I put some pipe joint compound around the screw and the head inside to seal it. JANA Associates, 3790 West Chimayo Road, Littleton CO 80123. 303-795-9281 \$45 + s Mo Lewis, Five Leathers Lane, Muskogee, OK 74401. 918-682-7165 \$43 + s Ragusa Pattern Shop. w/cast aluminum mounts. #CRV-24 \$45 + s

D) Windshield Wipers, Washers

- a) Sluggish wipers: ck filter (3/8 x 2") on wiper motor. (GMC11)
- b) Wiper refills: 5/8" x 20" Anco 53-20, Truck size, usually takes a day to order.

E) Doors

- a) Not fitting: If door loses its curve, blocks are clamped to top and bottom and an engine come-along(chain lift) is attached to pull curve back into door. (DSTB 75-TM-19)
- b) Door Latch: GMC#716189 is Peterbilt truck #20-08229R \$14. ck rust (GMC18)
on inside cup of door latch.
- c) Screen door w/zipper, and velcro mount. Jim Steele, 1098 (GMC21)
Forth Ave, Chula Vista CA 92011. 619-420-7340.
- d) Screen doors Alex Burch, MI 313-435-5219 -- He is the main supplier of screen doors.

F) Fiberglass

- a) Fiberglass repairs: Most RV supply houses have fiberglass repair kits that can be used to repair holes or cracks. This should be done early while they are still small repair jobs.
- b) Custom fiberglass body parts: (GMC30)
 - Fender skirts for front and rear set \$395
 - Front air dam and air scoop \$275
 - Front & rear splash pans between bumper and body \$125 each
 - Exhaust covers for left and right duals \$145Del Daily, Mona-Bilt Boats Inc., 5830 SW 53rd Terrace,
Miami FL 33155. 305-661-9632

G) Sheetmetal ?

H) Seats

Made by Flexsteel.

Lumbar support was added using 1x4x12" wood centered behind center spring (GMC35)

I) Mirrors, Sunvisors

- a) New variable curvature glass glues on to existing glass after (GMC20)
turning mirrors horizontally. drivers = #3L, pax#3R. 24.95ea + ship or
44.95 pair inc ship. MultiVex Corp, PO BOX 42375, Detroit MI 48242 313-595-8957.

J) Radiator Grille

Cinnabar has a replacement.

K) Heat/Air (engine)

- a) If High fan doesnt work ck that alternator is charging.
- b) Rubber A/C condenser mounts GMC#397224 Can use (GMC27)
Harley Davidson motorcycle mount #62563-65 as direct rep.
- c) Heater hose: Watch for heater hose chaffing.
- d) Water shutoff valve GM#3028767 discontinued. Use Everco Co #H-1991
- e) Heater blower: Everkool M892 blower motor is a direct replacement and is better
then the current GMC part.

L) Miscellaneous Body Heating & Air

- a) Reduce engine compartment noise by mounting 22 gage galv sheet (GMC26)
on bottom of engine cover.
- b) Body mounts: Check that they are all in place and tight. I found one with the hold
down strap missing, and I had to fabricate a new one. There are 4 of these, two on each
side behind front wheels and in front of rear tandems, each about 2 feet from the tire.
- c) Under body insulation: I found the insulation hanging down over the mufflers. So I
fabricated some 18" stringers and put 6 of them under the insulation in the front 2 bays.

2) Frame

A) Jack note

People use jacks or jack stands on frame at points other than the designed jack points. This deforms the frame rails, and may require straightening, or reinforcements to prevent a future failure. (JNE)

B) Frame Replacement

See Buskirk Enterprises.

3A) Steering

Steering 17.5:1 ratio 2.95 turns lock to lock

A) Miscellaneous Steering

- a) Center steering wheel: adjust, tie rods equally on opposite directions.
- b) Steering centering device: SAFE-T-PLUS \$325 (GMC10)
United Safety Apparatus Inc, 2150 Moreland Avenue S.E.,
Atlanta GA 30315. 800-872-7233 404-662-1341
- c) Telescoping steering wheel: Use column from 68 to 76 (GMC 9)(GMC28)
Buick/Olds/Cad. reprint of procedure \$3 from editor
Use from 74 to 78 full size GM cars (GMC31)
- d) U shaped steering wheel: From 85/86 Olds Cutlass Supreme will fit and allow a better view of dash.
- e) Front steering lever: #697068 discontinued. Refurbished by Fritz Slama. \$150 (GMC29)

3B) Front Suspension, Final Drive & CV joints

A) Alignment

caster	+1 ½° to 2 ½°	+2° max ½° dif R/L
camber LH	+ ½° to 1°	+3/4°
camber RH	+ ¼° to 3/4°	+ ½°
toe	0 to -¼"	-1/8" ±1/16"

note: LH camber must be more positive than RH camber

* Members indicate +1/8" toe gives better directional stability

(Man 3A-20)
(GMC24)

B) Bearings

Pack Bearings with disk-brake wheel bearing grease.

- a) Check gap: between 2 bearings and spacer, should be 0.004-0.006" any larger can cause early bearing failure. (GMC22)
- b) Front wheel bearing: cross reference

	GMC	Bower/BCA
Bearing set	12351677	<-S1287, Timke
outside bearing	7450344	LM 104949
outside cup	7450343	LM 104911
inside bearing	7451228	LM 104949
inside cup	457234	LM 104911
outer seal	401024	National 5109

- c) When servicing front bearings make sure that the new seal housing fits into the knuckle before assembling to avoid disassembly to fix. Was caused by a burr. (GMC26)
- d) Wheel Bearing Assy: new design w/3 bearings, grease w/o removing wheel 5 yr warrenty. pair \$1500 (+75inst) incl hubs,steering knuckles,

brake rotors, seals, housings, & bearings.

Wallace Bearing & Hub Co, 9004 Nogales Highway, Tucson AZ 85706

602-294-3076 See Ad in FMCA Magazine. They have a 32' stretched GMC

C) bearing seals

	outer	inner
GMC	401024	401026
C-R	24888	25515
National	5109	5123
NAPA	47470	47471
Delco	290-17	290-19

D) Shocks

Front: Bilstein B-46-0940-1 (see rear suspension-RD Enterprises) Note that the shocks also act as limit stops for the front suspension. Also note that correct front torision bar height adjustment is important to prevent broken front shocks or a bent front axle (which should have no more than 0.030" runout or it will vibrate).

E) Torsion bar Height adjustment

Don't adjust height adjustment bolts without taking load off of them. (Man 3A-14 figure 16) See rear suspension, ride height adjustment for the required height.

a) If adjuster nuts: #395043 are bent, replace \$2.10. Bolts #395042 \$1.60. (GMC32)

b) Longer bolts: Original bolt is grade 8 2 1/4" with 1/2-20 full thread. A 3" bolt of same type is available \$10. Harry Shea, Foremost Fastner Company, 1010 West National Avenue, Addison IL 60101. 708-543-9685

c) Worn A frame torsion bar hole: This hex hole became worn and let torsion bar slip 1/6 th turn. This socket should be checked for wear if you need longer adjuster bolts. In this case the a-frame was replaced with one from a Toronado, old support straps were welded to the replacement, and the ball Joint was replaced with one for the MH. (GMC33)

F) CV joint service

a) Constant velocity joints: Inner CV joints don't usually fail. Al Topp-F095193 assures me that the left front drive shaft can be removed without pulling the ball joints as specified per the shop manual.

G) Final Drive

The cover should be removed for periodic maintenance, the oil drained cleaned out, cover replaced with a new gasket and refilled with GL-5 lubricant.

H) Miscellaneous Front Suspension

a) Worn front hub repairs: Roland Wilbur, 90070 Greenwood Drive, (GMC7)
Leaburg, OR 97489. 503-896-0073

b) New part numbers: Front wheel hub 701998 (GMC11)
Rotor 701603

c) Parts;JC Whitney

(GMC16)

CV joint boot outer	85-8580A	\$ 9.98
" " " inner incl clamp & grease	85-8581R	9.98
split style CV boot	55-3646A	13.45 ???
CV joints	97-1169WF	169.95
CV joint repair kit	38-1476X	89.87
CV joint kit	71-0254X	113.38
front wheel bearings	38-0649P	35.63
front wheel seals	38-0650Y	3.20
rebuilt Transmission w/torque converter	76-0038RFE	340.00

d) Stabilizer bar: heavier/stiffer replacement is available
w/bolts & brackets. \$250 + \$9 ship. Chuck Stoddard, Caspro Co.

(GMC20)

e) Stabilizer bar bushing kit: incl 10 poly bushings,2 brackets,and all nuts & washers.
\$33.80 Gateway

f) Front suspension Parts: Cross reference

(GMC23)

Description	GM part#	MOOG#
ball joints, upper	9757984	K5238
" " " , lower	9755841 702775 kit	K6215
tie rod ends, outer	7817092	ES412RL
" " " , inner	7817093	ES361R
tie rod seals	6259391	incl w/kit
Control arm bushing-upper	NA	K-7104
Control arm bushing-lower	NA	K-5222
steering damper assy	4975363	SSD-61
Boot seal kit	old 7800666 7845000	CV2456

Lower ball joints usually replaced 60-80k miles.

4A) Rear Suspension

A) Shocks

Rear shocks on the GMC are unique because a road bump extends the shock which is opposite to normal shock action, so don't use just any off the shelf shock adsorber. The GMC air rear suspension has very little friction dampening so the shock adsorber must supply the total damping action.

a) **Rear shocks:** Bilstein #B-46-0950 (for front see front suspension)
Bilstein has over the years supplied shocks specifically setup and tuned for the GMC, and was issued a patent in 1989 on their design. Bilstein also has a very good warranty.

To install, slide bottom on bolt, turn top toward front, as end approaches hole, rotate bolt out into hole. RD Enterprises, 11880 Fuerte Dr, EL Cajon CA 92020. 619-282-8550 Mark

b) **Note that driving in full raise will break rear shocks.**

When jacking rear end up or lowering do so slowly to avoid breaking or damaging the shock. This is because the shocks on the GMC also function as up/down stops for the suspension.

c) **Rear shocks:** CASPRonow supplies rear shocks specifically for MH.

B) Rear ride height Adjustment

When leveling set park brake off, foot off brakes. (Man4-34)

Ride height: Top of front/rear oblong hole to gnd Front 13 1/8"

Rear 11 11/16" $\pm 1/4$ " This Oblong hole is 24 3/8" behind center of front wheel, and 56 3/8" (23' 40 3/8") behind center of tandem wheels. (F 3 3/8", R 3 1/4" to bottom of frame) (DSIB 77-IM-2)

Under frame measurement for level: Front = 9 3/4" $\pm 1/4$ "

Rear = 8 7/16" $\pm 1/4$ ".

Say front 9 3/4" rear 8 1/2" $\pm 1/4$ " under Frame to ground.

The height control valve arm is set to adjust rear height.

Correct ride height is necessary to avoid breaking shocks, and also the tandem wheel camber(wheel in/out tilt) is correct only at the specified ride height preventing excess tire wear.

See front suspension, torsion bar adjustment for the other half of the job.

B) Miscellaneous Rear Suspension

a) **Rear Wheel Seal:** GM#3857731, NAPA#46453, National#8974S or 472015, Bower/BCA#501349. 4ea \$26.

b) **Rear Wheel Bearings:** Set for 4 wheels \$145.

(GMC31)

	GMC	Bower
Inner bearing	7451228	LM501349
Inner race	457234	LM501310
Outer bearing	7450344	LM15103-S
Outer race	7450343	LM15243

Note: Rear wheel bearings should be repacked at 25k miles.

c) **Rear stabilizer kit:** Minimize wander from passing trucks and grooved roads.

Twin stabalizers. drill 2 holes. \$695.00 + 39.00 ship. Chuck Stoddard, Caspro Co.

d) **Rear Wheel alignment:** See tires and wheels

e) **Rear Suspension Arm, Bushing:**

when re-bushing use a long line bore reamer because both bushings must be reamed at the same time. one member has and will rent. Mike Kinnear, Kinnear motors Inc, 160 N Wheeler St, Jasper TX 75951. 409-384-2505

(GMC24)



4B) Wheels & Tires

A) Wheels

- a) Wheel stud tightening pattern: Alternating criss cross. (Man 10-2)
- b) Radial wheels: Starting with TZE165V101674 wheels are Radial, stamped "Radial" or "R" circled on the inside near the circumferential weld. Radial tires can split non radial wheels. Accuride #27725 or 27995 are radial rated , #27604 is not. (DSBNov76)
 --Firestone Radial Rims: GMC#2034918, New #14035525. are (GMC20)
 Accuride #27995 list \$125, Avail \$75 Richard Voss, 3305 West Blvd, Kokomo IN 46902. 317-453-2759.
 --Wheels: GMC#14005762(per 78z) also used on Chev 1 ton truck. (GMC22)
 Lug nuts: Chev truck #3978901 ---Ck that runout is in spec on these Chev wheels.
- c) Weld aluminum wheel: 16.5" DOT labeled, 3200 lbs, \$219.50 1st, incl cap stem. (GMC17)
 + \$20 for lug pack of 8 nuts w/ss washers. Weld Racing Inc, 933 Mulberry, Kansas City MO 64101. 816-421-8040.
 #448-7702 16.5 x 6.75 \$215.00 incl cap stem & lug nut pack. Buskirk Ent. (GMC29)
 Note: the Weld rim has a poor reputation and its hub fit is not the same as the GMC steel wheels.
- d) Alcoa aluminum: This 16" wheel seems to be the best choice of wheels. Its reputation is good, and it fits the hub the same as the original steel wheel. Alcoa hubcaps and lug nuts should be used. The 16" size seems to be the emerging standard. Ed Whitson (FMCA#085951) had a set of these installed at Kingsburg (Apr90), and they looked impressive. He used Michelin XPS 215/85R16 tires. PADCO \$1600, Alcoa franchise. These are forged from a 18"dia x 8" solid billet.
- e) Appliance/Keystone aluminum: 16" wheel has a large hub opening similar to the Weld wheel. H & H Tire Service Kingsburg:CA 209-897-7424 Don Strand (son in law of Harmon Prine FMCA #F107486) They also can install Alcoa wheels. (Ed above)

B) Tires

a) Tire table:

Tire Size	Rev /Mile **	Width TRA/Mich	Diameter TRA/Mich	Single load TRA/Michelin	Pressure TRA/Mich
LT225/75R1	???	8.8/ ---	29.3/ ---	2680/ ---	80/ --
LT215/85R1	682 + 4.0	8.5/8.9	30.4/30.5	2680/2680	80/80 <--
LT235/85R1	657 + 7.9	9.1/9.4	31.7/31.9	3042/3042	80/80
8.75R16.5*	709 + 0%	8.5/8.6	29.5/29.2	2350/2350	65/65 oe
8.75R16.5	709 + 0%	8.5/8.6	29.5/29.2	2680/2680	80/75
9.50R16.5*	686 + 3.3	9.5/9.4	30.6/30.4	2780/2780	65/70
9.50R16.5	686 + 3.3	9.5/9.4	30.6/30.4	3170/3170	? /80 <-

* Load range D, all others load range E. Michelin LT sizes for XPS Rib all steel tire.
 TRA = Tire and Rim Association. The rims are all 6.00" except 9.50R16.5 are 6.75".

-- Note the LT225/75R16 is not a steel body tire.

- b) Michelin XPS LT tires in rib/highway: The XPS Rib is the current Michelin all steel tire, the XCA all steel tire is discontinued. (GMC27)
 --The XPS Rib LT215/85R16(\$149.38) is the best choice if going to an Alcoa or Appliance wheel. Its outside diameter is about the same as the 9.50R16.5 tire. The LT225/75R16 is closest to the original 8.75's size but is not available in all steel construction.
 --SearsMichelin: LT Radial 8.75R16.5 D load, #95F65330 \$139.99 --steel belted.
 -- LT Radial 9.50R16.5 E load, #95F65316 \$169.99 steel body(all steel)
 -- LT Radial 235/85R16 E load, #95F65341 \$154.99 steel body (Too big)
 --Warrenty 40000 miles, no time limit, (Michelin warrenty is for 4 years).

- c) **Michelin Tires:** In general Michelins are more nearly round, hold balance with wear, have long tread life, and run cooler. I have used tires manufactured by Michelin since 1966. I recently had a bad experience with Bridgestone/Firestone tires which were extremely noisy.

Michelin Consumer Relations: 800-433-6838 or 803-458-6005 Tech info, warrenty info, and aid locating hard to find tires.

- d) **Speedometer Gears:** Stock gear is 31 tooth/ivory color#403417.

For 9.50R16.5 or LT215/85R16 tires use 30 tooth/Blue GMC#561035. Next is 29 tooth/green GMC#403999. O-ring #8622076 should also be replaced.

while you are at it lube the speedometer cable.

The change from 31 to 30 tooth is 3.2%, 31 to 29 tooth is 6.5% change.

--To test on highway speedometer check. Get total time and indicated speed on road.

Say 5 mile test took 4min 45seconds and we indicated 58 mph. (Using cruise control)

$$\text{Seconds / mile} = 4\text{min } 45 \text{ sec} \div 5 = 285 \text{ seconds} \div 5 = 57 \text{ seconds/mile}$$

$$\text{Actual speed} = 3600 \div 57 = 63 \text{ miles per hour}$$

Percent error = difference \div actual = $5 \div 63 = 7.9\%$ high. Which is the difference I measured with a 9.50 tire, so use a 29 tooth speedometer gear to correct. A following speed check showed a speed about 1% high.

- e) **Tire noise factors:** rim centering & runout. tire roundness, Runout, balance. * on outside rim is low runout spot, Remount & rebalance to ck balancer. (DSB Nov76)

-- The noisiest tires I ever had were a set of Bridgestone tires.

C) Miscellaneous Tire/Wheel

- a) **Lug wrench:** I had an X lug wrench that twisted when a nut was stubborn, so I bought a 3/4" drive T bar from Sears, a 7/8" SK impact socket, and a 30" piece of pipe for an extension handle. The hardened impact socket will straighten rough lug nuts when you use it. With the T bar centered you can spin loose nuts on and off. With the extension handle 80 lbs will give you the required torque. If some tire shop overtightened them you wont have any problem getting the nuts loose, but check the studs are not stretched.

- b) **Tire cover:** Orig. Fiberglass Spare Cover:w/raised GMC logo. (GMC 9)

Ocean Atlantic Services Inc. -- Also Terry Olds/GMC 139.95 (1990)

Orig spare tire covers: \$20 Ralph Luby (Probably a soft slip on) (GMC17)

- c) **Valve stems** are schroeder #TR571. (GMC26)

- d) **Mud flaps:** After cleaning a lot of tar off of the body and looking at chipped paint from rocks I installed a set of mud flaps. I used GMC #998227 white 11" x 18" (15\$ per pair), with a red GMC logo 1 1/2 x 4 1/2". I installed using clips and bolts, and existing holes so that no holes were drilled in the body. For the front tandem I used a 5"x11" aluminum bracket to mount. For the rear The bracket was 8 1/2" wide 5 1/2" tall & 1/8"thick. These were cut on a bandsaw and shaped in a vise.

- e) **Old tires:** Be very suspicious of old tires. You can have a tire with tread that looks almost new, but I have had several old tires manufactured by Michelin throw their treads when they hit a stretch of warm road. It can shake your confidence in an eyeball inspection. Since some GMC's have been stored a lot, you also need to know the age of the tires.

D) Directional Stability

I have read many sources discussing a lack of directional stability, possible sources of the problem, and remedies. There doesn't seem to be any consistancy to this body of information, and it appears to stem from a combination of many factors. The major contributors are Tandem wheel alignment, and tire type and size.

My own experience is not consistant with what I have read. Initally the machine had a set of bias tires on it. It required constant hands on attention, and was skittish when passing trucks. This was on smooth freeway, on a road that had ruts embedded such as the final section of I15 into Las Vegas it was hair raising, and required moving the vehicle to straddle the ruts.

Front wheel alignment was right on, and front tire wear was as square as I have seen on any vehicle. Rear alignment was as straight as possible with the front tandems toed in close to spec. with the rear tandems toed out an equal amount. Front tandem tire wear was cupped and erratic. I installed a steering stabilizer which did not have any effect on the problem. The next trip I started off with the front tires changed to 9.50 Michelins, steel belted, at 65Lbs, This was slightly better, and after 2000 miles I installed a pair of Sears 8.75 Michelins, steel belted, on the front tandems and drove another 3000 miles. This configuration was also slightly better. Before the next trip I installed a pair of 8.75 Michelin XCA all steel tires on the rear tandems and set the pressure, Rear tires to 65 lbs, Front 70. I drove 1100 miles to Las Vegas, and it was as stable as my 300zx (well almost). In April 91 I drove 1800 miles to the Tucson Easter egg roundup with the same driving results, including a lot of 2 lane roads.

I have to reserve judgement as to the controlling factor or factors, and observe as the tires wear and, other factors change. The angle of the spindles on the control arms is such that I have toe-in on the front tandems and toe-out on the back tandems. Given this toe in/out combination of each tandem pair, my theory was that at any given instant the direction the vehicle would go next was a function of which rear tandem pair had the most weight at that instant. With the right tandem pair pushing the vehicle to the left, and the left tandem pair pushing the vehicle to the right. The result was a constant hunting as the vehicle shifted and the driver corrected. The odd combination of all Michelins, larger tires on front, and the higher air pressures seems to work well, but the two front tandems were wearing abnormally. The Michelin truck tire handbook calls for tandems to be aligned as straight as possible with no toe in or out, and my observations seem to bear that out.

The combination of machined alcoa wheels and Michelin 215/85R16 steel tires is probably the ultimate solution. But 9.50R16.5 Load range E all steel tires all around should do as well, and have the most weight capacity/margin. The oversize/capacity tires are especially helpful on twisting up and down roads where you can bottom out and turn at the same time, where the stock tires tend to squash and don't have full control.

E) Rear Wheel Alignment

a) This alignment refers to the alignment of the tandem pair as a whole.

Use straight edge across face of wheel pair. front and rear distance to frame should be equal $\pm 0.0625"$ (1/16"). Note one toe shim changes 0.125". (DSB Dec76)

Note Michelin truck tire manual calls for tandem wheels to be aligned straight with no toe in or out.

A quick eyeball check is to sight along inside and outside of rear tire pair and see where they line up on front tires. Note that because front track is 6.84" less than rear track that rear wheels will line up 3.42" outside front wheels.

A more accurate variation of the first procedure is to use a block by front wheel marked for the 3.42" distance, and to sight along the straight edge against tandems to align to the block. Then measure from straight edge to get toe in/out. If you are using larger tires on front, than the distance marked on block must be adjusted. Because of the long wheelbase his method is probably more accurate than measuring from the frame as suggested in the dealer service bulletin. Fritz Slama (Seminar) used a string instead of a straight edge, a laser pointing device would be even better.

b) Alignment of control arms when there are discrepancies between front and rear tandems, and they are not in alignment with each other. This is the first step to getting a perfect rear alignment.

-- T&C Custom Campers in Pittsburg CA, can machine & shim the rear control arms to get both tandems into alignment as long as they haven't previously been subjected to the torch in an alignment attempt, or have had an encounter with a curb. They align the tandems per the Dealer Service Bulletin method (Measuring from scribe line on tire, front

and back) which I don't consider valid when you shim spindles for arms that are not in spec, and not measuring the change with a line to the front of the vehicle. The end result is that you can have each pair aligned with each other but each pair tracking to one side or the other, which is not good with tandem wheels, but in most cases this should not be a problem.

- Darrel Winterfeldt Has a rear suspension spindle shim Kit. \$89 + ship. If you don't have access to a tool to pull the spindles, you will have to find a shop to do it.
- Apparently some people/shops in the past have taken a torch to bend arms to make a correction. I would strongly recommend against this.
- Make sure that there are no small automotive shims installed in previous alignments.

4C) Air System

The air system evolved in a zigzag path. Starting with the power level system in 1973. In 1975 they changed to plastic air line fittings which leaked when cold. Jan 1976 brought the Electro Level I which essentially replaced the dashboard rotary air distribution valves with solenoids. Great -- except they made the air tank much smaller so that it had no margin for leakage, or extra capacity to raise the vehicle to level. This led to GMC recommending the operation of the vehicle in HOLD, resulting in vehicles not operating at the optimum height. They also had not solved their previous leakage problems. The final iteration was the electronic based Electro Level II in the late 78's with additional problems. (fixes-see Air Tank)

Gateway has a kit to replace the 73-75 rotary air valves with solenoid valves. Good however I would prefer to mount the solenoids in each wheel well next to the height control valve to get rid of air lines and make it easy to check for leaks. I would also put a 2 way solenoid in the air supply line because the height control valves are one of the main sources of leakage when not on the road. When I cut air to them, my system will hold its pressure for weeks.

A) Dana air compressor

Early single cylinder Brown compressors were replaced with the Dana unit.

Dana manufacturer: RDH Enterprises, Inc., 610 South Industrial Drive,

Litchfield IL 62056. 217-324-3978 (May 1992)

GMC part Group 14.010

illus.#	RDH #	Description
1	55A-00699	Connector - 90 Male
2	55A-00715	plug 1/8 pipe
3	63A-00009	Head
4	63A-00010	Valve, Exhaust
5	55A-00684	Seal, O ring
6	63A-00185	Piston & rod assembly
7	63A-00183	Housing Assembly
8	63A-00019	Washer, thrust
9	63A-00208	Crankshaft assembly
10	63A-00006	Crank pin
11	63A-00068	Seal, O ring
12	63A-00186	Intake assembly
13	63A-00020	Filter, intake
14	63A-00022	Retainer, filter
15	---	Not needed on GMC
16	---	"
17	---	"
18	63C-00171	Motor
19	63A-00172	Spacer, motor
20	63A-00181	Hose

21	63C-00135	Bracket, mounting	
22	63A-00132	Pulley, 19 tooth	
23	55A-00347	Screw, #8-32 x 1/4"	
24	55A-00682	Ring, retaining	
25	63A-00133	Pulley, 36 tooth	
26	63A-00133	"	
27	55A-00741	Belt, timing	\$ 3.28
28	63C-00173	Guard, belt	\$ 1.52
NS	55A-00765	Screw, #10-24 x 1/2"	
NS	55A-00730	Clamp, tube	
NS	55A-00743	Nut 1/4-20 Hex-lock	
NPN	55A-00685	Screw #10-24 x 1"	
NPN	55A-00292	Screw #10-32 x 3/8"	

Clean or replace Dana air filter every 6mos/6000mi

(Man 4-34/35)

Drain reservoir condensate once a month

(Man 4-35)

Note: air intake hose to compressor comes from inside under dash.

B) Air tank

The air tank system can be greatly improved by installing the Power level upgrade kit \$80.50 or Electro level I upgrade kit \$88.50 from Cinnabar. This is a Must Have item. It goes a long way toward solving the air system leakage problems that had been so persistent. While you are at it replace any plastic air fittings you might have. If the previous owner had installed this kit, Wes's records will show, so ask. The reduced size of the Electro Level air tank makes the upgrade kit an absolute must to hold pressure in the system.

C) Rotary air distribution valve repair (Power level 73-75)

PKG 20 o-rings \$3.00 Kamen/King bearing part #568-008, 3/16x5/16x1/16

(GMC 9)

1) remove level panel - 4screws

(Man 4-13)

2) Disconnect 6 tubes - mark them

3) remove control knob-hex screws, and each control from panel - screws

4) separate valves - 3 allen screws(Carefully catch springs)

5) pull off springs, push pistons from front, pull off O-ring, remove the opposite direction, clean, relubricate pistons(silicone grease) reassemble w/new O-rings.

Use Locktite 515 to replace the gasket, cure 12 hours or more before pressurizing. I put some scotch tape around the outside of the joint to seal out air to help the anerobic (no air) curing action. If the air inlet valve wont hold at least 55 + lbs of air without popping off(leave hose to air bag[OUT] off while pumping up system to test this) then a stronger spring will be required, or find another spring to fit outside of the existing spring. You can test internal leakage by pressurizing the air bag connection(OUT), and immersing in water. This repair is a procedure that will test your patience.

Note that older rotary valves have some structural and sealing/porosity problems that new replacements fix. Cinnabar supplies #715105.

D) Solenoid valve system (Electro Level 1976)

Starting in 1976 solenoid valves replaced the rotary air distribution valves. This part of the Electro level system is a big improvement, and should be trouble free. With Magic Bubbles it should be easy to identify any air leaks, and seal or replace individual parts. The two way solenoids seal off the air bags when the system is not being operated. Note the downside of this system was a much smaller air tank. (see air tank for upgrade kit)

E) Air bags

a) Air bags with cones: Don't buy air bags without cones It is not worth \$20 to install the cones yourself. If you don't install the air bag when recieved, then test for air leaks before warrenty runs out. The #2030001 Air Spring Assembly(Cones & studs are included) from Cinnabar comes ready to set into place between the arms, (You might

need to replace two 1 1/8" nuts and lock washers with Cinnabar Stainless Steel Air Bag Fastener Kit \$9 + s). Firestone #4502, with cones #4503. From Cinnabar, Gateway, Red Holman, Terry Olds/GMC.

- b) Hot dogging: If you store your unit with the rear end below normal operating height, the air bag, hot dog shaped stretching, will be offset.

F) Removal of air bag

- a) Remove: soak nuts in WD-40, (See air bags with cones above) block up system. remove 1 1/8" nut on end opposite air inflation end. Deflate, remove air line and 1 1/8" nut from inflation end. If nut not free, rotate inflation stud/nut until out of airbag. Compress bag and remove. Install new or resealed air spring assembly per below.
- b) Reseal leaking stud in good air bag: If stud is out, and nut is frozen on it, use #6 easy out in unthreaded end of inflation stud and remove nut. Otherwise lock 2 nuts against each other on the inflation stud. Remove cones from air bag, and pull out the inflation end. Clean threads of both studs with 3/4"-16 die. Install new o-ring (7/8ID, 1 1/16OD 3/32section) in the female opening. Reinstall stud using Loctite 277 on threads. Hold collar on air bag and tighten stud using wrench on locked nuts (two nuts locked against each other). Cure locktite 12 hours. Reinstall cones.
- c) Install Air Bag: Compress Air Spring Assembly and install with studs in control arms. If necessary replace two 1 1/8" nuts and lock washers with Cinnabar Stainless Steel Air Bag Fastener Kit \$9 + s. Put the 1 1/8" nuts and lock washers on both ends, tighten the air supply/inflation end, hook up the air line with valve kit if you have, and add just a little air to place the bag, then tighten the nut at the other end. Inflate to normal height, take out jack or blocks. Finish with bubble and leakdown test.
- d) Nut wrench: Use Snap-on flare nut wrench #RXFS-2836. use 1 1/8 end. \$28.75. Remove nut while bag is pressurized. (GMC22)

G) Emergency air bag substitutes

If you have a questionable air bag carry one of these. Also a blowout on all steel tires can whip the bag and puncture it. So carry one of these substitutes so you can limp home.

- a) 1 1/2x13.5" pipe with 5/8x16" threaded rod + nuts & lock washers.
- b) 3/4" x 16" threaded rod with 6 nuts, allowing setting of ride height.
- c) 4x4x13.5" drilled for 2ea 5/8x5" lag bolts. These can double as wheel chocks. (GMC18)
- d) I watched a 26' go sailing across the rough area next to the beach, and had to see it. Uno Lignell from Redding CA had taken a front coil spring from a Ford car. He made two end plates the diameter of the coil, and drilled a hole for a bolt in the center of each. He tack welded the bolt head and welded a 3" piece of pipe to fit inside the spring on each end plate. The spring assembly with the two end units set into place replaced the air bag assembly. He adjusted the height by adding a couple of washers on each bolt. The air bag assemblies are in storage.

H) Height Control Valves

These were originally made by Delco, which are preferred. Some replacements being supplied are from NEWAY. (note the check valves and fittings from the Delco unit don't fit well into the NEWAY unit) These are truck or bus units which require drilling holes and cutting off of the arm to install GMC control arm (which also has a hole drilled) on unit. Be sure to leak test before installing. There is a check valve on the air supply line to prevent air from bleeding back to a low air system. Ck valve O-rings 0568-010 5/16"x7/16"x1/16". The NEWAY valve I have will drain air from the system when parked. I haven't been able to identify the location of the leak, but when I close the needle valve in the incoming air red air line it stops. This while the distribution valve is in hold.

- a) Mounting: The plastic body may fatigue and break where the height control valve is mounted. Aluminum plates on both the inside and outside of body fiberglass will make a secure mount for the valve. Use at least a 4" square, and with a ballpeen hammer round edges away from the fiberglass both inside and out.
- b) Location: Height control valves on some later units are not located to allow the full

up/down adjustment range, and may need relocating. If this is necessary install aluminum plates per above at same time.

- c) **Testing:** Off vehicle, hook to air hose and dunk in bucket to ck for leaks then test in a level position for a 4 to 18 second opening delay when moving arm up quickly 2", and a 4 second maximum closing delay when the arm is released. Also move arm down quickly 2" and ck for a 10 to 50 second exhaust delay (MAN 4-26)

I) Miscellaneous Air system

- a) A valve kit including an elbow with a Schroeder valve tapped in, and a valve isolates the air bag for testing, storage, or road problems. Fritz Slama (kit \$50) --This is a Must Have for power level systems - He says he has supplied about 500 of these kits. This stops your GMC from going up and down like a yoyo when testing the air system.
- b) **Needle valves for leak testing:** In addition to the valves above I have added a needle valve to the air supply at the height control valves, and coming out of the main tank. Although this adds more potential leak sources they make testing and isolating problems in the system much easier. I was told from another source that needle valves may leak, however I haven't seen any sign of internal leaks (ie as if the valve was not completely closed), and it would only skew your leak test data. External leaks will show with magic bubble, and the nut on the valve stem will need periodic tightening. For the Electro Level system the needle valves at the height control valves also be useful.
- c) **Penn pressure switch on air tank** is still available from GMC #8884243 \$36.(1990) Cinnabar/Wes says he can get it cheaper?
- d) **Low air pressure switch/light:** If the wires that were connected to the low air pressure switch are lengthened and connected to the unused switch pole on the Penn switch that operates the Air compressor, the teltale light will indicate when the compressor is running.

J) Testing Air system

The approach to testing of the air system is basically one of divide and conquer. you will need some air fittings and short air tube to do this. put a fitting on one end of the air tube and wrap the other end around a dowel and clamp it to seal it off. For the bubble test get a bottle of *Miracle Bubbles* at a toy store, or five & dime. Keep some of this in your GMC for testing on the road. You also need a brush that will reach to the bottom of the bottle to swab fittings.

- a) **Test Air bags:** If you have (Fritz slama) valves at your air bags close them with the GMC at normal height and record how long it takes to go down/deflate for both left and right sides. If you dont have these valves put in schroeder valves to isolate them and test. I found my left air bag lost its pressure much faster then the right. A bubble test showed three pinholes in the air bag that deflated it in about a week. The 2 way solenoids will serve to seal of the air bags on the Electro Level system, but also bubble test at the solenoid valve end of the lines to the air bags.
- b) **Test air supply system:** Disconnect red tube to air tank and use the above tube to seal the air out of the tank. fill the tank, and do a timed leakdown test if it leaks bubble test all connections and redo any that leak. Once this part of the system can retain its pressure for 24 hours than continue on.
- c) **Test the rotary air distribution valves:** Now follow the red tube that you disconnected at the air tank a short distance where you will find a tee going forward and back. Disconnect the forward tube from the tee and connect to the air tank. This removes the Height control valve at each wheel from the system. The line going forward supplies the rotary air distribution valves on the dash. Pressurize the system, and with the valves in the hold position again do a leakdown check. Every few hours write down the time and pressure. then calculate how many pounds per hour are being lost. Ideally you should be close to zero, and if its much more than that you have a problem. If these valves have a pressure loss, test them per the previous section and replace, or if your adventurous and

have a lot of patience, repair them so that there is no air loss to this point in the system. Once system pressure holds, continue. In my case both rotary valves had major leaks.

- d) **Solenoid Valves(Electro Level):** Bubble test this system thoroughly with the power wires to the 2 way valves disconnected to isolate the air bags, and the air supply line to the height control valves plugged or a needle valve turned off.
- e) **Test lines to air bags:** If you have (Fritz Slama) valves at your air bags I am sure you already have them closed so that your GMC hasn't been going up and down like a yoyo with all this testing. If you dont, the lines at the air bags will need to be sealed with an appropriate combination of fittings. The next step is to set first the right rotary distribution valve to raise and do a pressure leakdown check. Repeat for the left side. When this is satisfactory(maybe 2 psi drop in 24 hours or less) than reconnect the tee and line going to the height control valves at each rear wheel. The Electro level solenoids perform essentially the save function as these valves at the air bags, however it would be nice to have a Schroeder valve tee'd in to the line at the air bag to add air for maintenance, test, or emergencies.
- e) **Test the height control system:** In front of the left height control valve is a tee in the red line. Disconnect the line to the right side and cap it off. Again leakdown test the system and repair any leaks. next reconnect the red line to the right side and test and repair that part of the system. Repeat for the left side. Hopefully you will have found the problems before you get all the way to the end. End result no readable pressure drop in 24 hours, But as the day warmed it rose 1 deg, and the next morning it was down 2 degrees. But it came back to the starting pressure as the day warmed. So there was a 3 degree change from hot to cold ambient temperature. You need to also bubble test your test connections to avoid erroneous data. Finally its leak free, check that it works, disconnect level arm, put system in travel, turn on power or connect shop air to the tank, and push the arm up and see it the system raises, then pull arm down and lower it. Now it would be great if the leakage when sitting in hold is only 2 PSI per day.

5) Brakes

Front Disk 11" x 1.205" 210 sq in swept area, Rear 11" x 2" shoes 276 sq in swept area. 486 sq in total swept area. (2 1/2" rear shoes add 25% to rear swept area, 346 rear, 556 total) (All disks 630 total). Periodically brake to a stop firmly several times when backing to auto adjust rear brakes. (assuming that your auto adjusters are in good working condition) A complete brake system overhaul and adjustment with silicone fluid will get the parking brake so it holds also.

A) Brake modification

Note when you modify the brake system you assume full responsibility for the changes.

- a) **Metalic:** Pads and shoes work well. (GMC18)
- b) **2 1/2" wide Shoes:** Instead of stock 2" shoes (turn drums) works well. (GMC18)
- c) **1 1/16" cyl:** (stock were 15/16) on front-rear shoes works well. (GMC18)
- d) **Disk brake pads:** Bendix D153 or Wagner MX7084R. These are 1/2" longer and slightly thicker. also used on some GM trucks. (GMC29)
---These are metallic and I have found to work well.
- e) **Rear Disk Brakes:** Some people have used back plates, rotors, and calipers from 76\78 Eldorado's and some Toronado's, with some machining to adapt to GMC. (GMC36)
- f) **Rear disk brake kit:** Bolt on kit. Leigh Harrison Stealth Systems Inc, 1520 Woodside Drive Woodbridge VA 22191. 703-494-9914

B) Miscellaneous Brakes

- a) **Check front brake line:** 2ft down where throttle cable crosses can wear. tie back throttle cable, or protect with tubing. (GMC11)
- b) **Park brake kit:** 3 ss wheels & pins to replace clevis for free operation Dan Homerich, 1596 Kingsmere Circle, Rochester Hill MI 48063. 313-375-1228. \$198 incl inst. (GMC19)
- c) **Brake system maintence:** Brake fluid adsorbs water/moisture from the air. (faster in wet humid climates) Under hard braking the fluid gets hot and boils. steel brake lines rust inside. They should be flushed every 2 years, and if the rust can't be flushed out replace the steel lines and hoses. Also the cylinders should be inspected and replaced or honed and kitted if necessary. (GMC25)
--Silicone brake fluid will avoid this water problem.
- d) **Original front brake hoses:** These should be replaced, they will block inside, and lock front wheel brake. I saw one in Las Vegas (Nov 90) that the disk got red hot from running this way.
- e) **Hot brakes:** Dont set emergency when brakes are hot or hold pedal on when hot ie at the foot of a long downgrade to prevent distorting drums & rotors. (GMC37)
- f) **Silicone Brake fluid (DOT 5):** Expensive, buy in larger quantities, Need 1 qt for system and 1qt(or denatured alcohol) for bleeding and draining. Partial cans can be stored because it doesn't adsorb water which DOT 3/4 specification brake fluids we normally use do. It is recommended for show cars that are seldom used, so It should be especially good for our GMC because of periods of storage between trips. This adsorbed water rusts the brake system and lines. Also it has a higher dry and wet boiling point, and viscosity at -40°F than DOT 3 or DOT 4 specification fluids.
To Install: 1) The change is not easy because the two fluids are not compatable, and the old fluid must be completely flushed out of the system. You should change it when completely overhauling the system. Flush the system with approximately 1 qt silicon brake fluid or denatured alcohol(cheaper). If using alcohol blow out with air. This flushing should also get any rust out of the system.
2) When putting in the Silicone fluid in the system use low pressures and gravity to bleed the fluid into the system slowly because silicone fluid aerates easily.
- g) **Brake Guard** This product has hit the market recently and is probably is as deceptively marketed as possible, and yet stay legal. It lists at \$795, and sells for less than \$400. It probably has less than \$25 in parts, and appears to function simular to the accumulator

that you install in your water system. If you have out of round drums that this would compensate for than, it would be better to spend the \$400 to fix them than mask the problem with this. Remember that ABS anti lock brakes have sensors to stop braking to a wheel when its rotational speed slows below the other wheels. This doesn't provide that function, and as a responsible consumer it is best to avoid it, and its misrepresentations.

C) Brake parts

Qty	Description	GMC #	Aftermarket	
1	Master cylinder 73-77	18008633	Napa 39075, Replaces 5472542, 2623214	\$151.10 (GMC22)
1	Master cylinder 78	18014707	Napa 39075	\$141.25
1	Master cylinder kit 73-77		Raybestos MK646	(GMC22)
1	Combination valve	25509422		52.25
2 ea	Front brake hoses	9758214	Wagner F86578, EIS#SP5363, Napa36675	\$14.20
2 ea	Front brake hose washers	231343		\$0.40
1	Left caliper	2521711	Napa42-2010,WagCR80941-R	\$45
1	Right caliper	2621712	Napa 42-2011,WagCR80940-L	\$45
2 ea	Front caliper repair kit	5468767	Delco#173-144	\$10
1	4ea Front disk brake pads 1/2" Longer, metallic	1154578 12321452	WagMX728AR BendixD153, WagMX7084R	\$33.20 (GMC22) (GMC29)
2 pr	Rear hose assy	9757643	None	\$29ea
4ea	Rear brake cylinders	18004890	Delco172-1219,EisEW51081, Napa37048, Wag 15/16"F51081 \$39.34 Wag 1 1/16" F79767 \$41.02 Bendix 13709,	25.40 (GMC22)
2 Wh 2 Wh	See Brake Mods.	oversize		(GMC18)
	Rear cyl overhaul kit	5463361	Delco173-112, RaybWK423 Napa423	(GMC20)
2set	Rear hold down springs	5472515		
2	Rear brake spring kits	18002398	Napa22-34	\$7.70
2set	2Pr Rear brake shoes	1154577	WagWEB462, NapaRS462	\$35
2set	2Pr oversize 2 1/2" wide rear brake shoes (see Brake modification)	--	???	

- a) These are the same as the 65-70 Pontiac Bonneville.(73-76only) 77-78 used same shoes as Chev,Buick,Cad. GMC#1154577- New (GMC22)

6A) Engine

455CI/7.5L V-8 4-Barrel Roch. Carb	403CI in 1977 TZE167 V101285 +
Net Horsepower 212 at 3400 RPM	200 at 3600
Net Torque FtLb 344 at 2400 RPM	330 at 2400
Compression 8.5 to 1	7.9 to 1
Bore 4.126"	4.351" -> over square
Stroke 4.250"	3.385"

Note: dont use Olds carburetor, distributor, fuel pump, or cam, they are different. If you exchange parts you probably will get non motorhome parts which will cause problems. On rebuilt engines the intake manifold may also be different. The motor home cam was designed for 2400 peak rpm vs Toronado 3400 peak torque rpm. The cam was tuned for low rpm torque. The 3.07 rear end was selected for economy, not performance. Cinnabar may get a ~3.50 rear end. Sodium cooled valves and rotators may be helpful when doing a valve job. 500 CI Cad engine is completely different. Olds engine was more durable. Olds & Cad engine had same bolt pattern to transmission. The distributor had a different spark advance curve from the Toronado. (Seminar John Mitchell)

Filters:	Oil-455/77-403	78-403	air	fuel	PCV
Penzoil	PZ2				
A/C	PF30	PF24	A212CW	GF441	CV679C
FRAM	PH25	PH3429	CA136	CG12	FV112
Motorcraft	FL9	FL331	FA39	FG34	EV10
Purulator	PER33	PER123	AFP74	P120	PV20

Oil: Quaker State 10-40, SF/CC, SG is a higher grade with better oxidation & sludge perf.

	455-GM/Gates-length	403
Belts: Front-AC, Water pump	9433674/7619-62.2"/1580mm	9433670/7603
Center-Fan, Water pump, PS	416102/7450--45.7"/1160mm	9433640/7450
Rear-Alternator Water pump	405600/7570--57.1"/1450mm	405600*/7570
Belt and Hose kit	2006648	2031044

Note adjust tension on center belt before tightening the front & rear belts.

Belt & Hose kit available from Cinnabar. *78 RPO-LO4 #2025920 Probably 145 amp alt.

Spark Plug:	Bosch	A/C	Champion	(GMC25)
				Gap
73-74(455)	WR10FP	R45S	RJ12YC	0.040
75-77(455HEI)	WR10FPZ	R46SX	RJ18YC6(.060)	0.080
77-78(403HEI)	WR10FPY	R46SX	RJ18YC6	0.060

Code: W = 14mm thread diameter

C = copper core center electrode

R = Resistor type plug

P = Platinum core center electrode

10 = heat range

Y = 0.060 gap

F = Thread on plug is 3/8"

Z = 0.080 gap

Note if 0.080 gap causes arcing in your HEI system use 0.060 gap

A) Oil filter & cooler

a) Broken oil cooler lines: Check condition,

(Man 6A-2)

Custom lines may be better

(GMC6)

--If you have a broken oil line, temporarily remove oil cooler extension.

b) use gasket from old oil filter to replace gasket between

(GMC20)

block and oil cool diverter. use 1 1/4" wrench.

B) Engine failure

The primary cause of engine failures/replacements (on the road) are a timing chain failure or loss of engine oil pressure. So replace the timing chain after 90000 miles, and install a low oil pressure alarm/check oil cooler lines and hoses.

C) Engine Removal

The shop manual calls for the engine and transmission to go down either with MH lifted or over a pit. Darrel Winterfelt (seminar) lifts the engine only through the engine hatch and with an extended trolley on the lift carries it to entrance door. (dinette is removed) Bob Blekinsop had his engine without transmission removed out the front when it quit on the road.

- a) A-frame engine hoist: member has /will rent. Mike Kinnear, (GMC24)
Kinnear Motors Inc, 160 N Wheeler St, Jasper TX 75951. 409-384-2505
Also John Clement, Corona CA 714-737-0969 -in classifieds- (GMW6)

D) Fan Shroud

To get to the water pump or the timing chain the manual calls for removal of the radiator, but if the fan is unbolted and the fan shroud is disconnected and they are dropped down the job can proceed without removing the radiator. The shroud can be modified to make this easier. The 403 engine doesn't have braces on the shroud, instead it is 3" longer. The braces can be removed and a 3" extension can be fabricated. Make it in two pieces with the top half riveted and the bottom half bolted. (Seminar AJ Marshall)

E) Timing Chain

This rates extra attention because somewhere past 90k miles you are pushing your luck. There is no limp home mode, and the motorhome is a little big to tow home. Also big engines usually incur more damage when the timing chain breaks. By checking the number of degrees of backlash (ck distributor rotor as engine is rotated forward than back) you can evaluate the condition of it to a maximum of 12 degrees backlash- this is iffy.

This is one item where preventive maintenance is called for. Procedure: remove fan, fanshroud, then drop both. Loosten the air conditioner and alternator, remove PS pump belts and tie back PS pump. Then remove water pump. The bolt on the front of the drive shaft required a 3/4" 700ftlb impact wrench to remove. Remove TC cover. Replace timing chain and install cover. Replace fuel pump, fan clutch, get 8 vane water pump, Be sure to replace belts and hoses, flush and replace antifreeze. You will need a gasket kit.

- a) Timing chain: 73-75 to 5V100472#405866. 75-78all #382881 change chain and both sprockets. (GMC27)
- b) The Edlebrock timing chain: This True/Precision double roller timing chain is probably the best available. It includes steel cam and crank gears. (#7813 \$69, 1975-455)(GMC34)
It allows you to advance cam timing for more low speed torque, but I didn't try that.

F) Miscellaneous Engine

- a) Ignition switch: GM#1990099 now GM#1990116. AC Delco#D1405B (Man 6Y-45)
Also NAPA#KS6622.
- b) Engine cover gasket: Check the gasket whenever the the engine cover is opened to ensure that it is sealing. Repair or replace to keep fumes out of MH.
- c) Timing: Harmonic balancer may slip on its rubber core throwing timing mark off. Cross check by noting distance of mark from keyway. (Man 6A-49)

G) Engine swap or hotrod

- a) Cadillac 500 ci: If your need to replace the engine this initially appears to be a viable alternative giving 10% more displacement, and fuel injection. Fritz Slama was one of the pioneers to do this in 1982, Good Sam fuel economy 12.92. You should note that this will take a lot of effort/resources, and is not a simple swap. Some references are: Hot Rod Magazine, 8/89 "Anchors away", Popular Hot Rodding, 4/88 "The Anchorman" (GMC32)
- b) Detroit Allison Diesel: I saw an adv in FMCA June 91 for 1973 23 foot GMC with this 8.2 liter engine, with 25k miles on it, giving 14 mpg. 313-235-4151
- c) Hotrod: Vern Holt of Bonita CA (F053349) has a 493 ci MH engine with Holly Pro-Jection giving 450 hp and 525 lb ft torque. It will lay 60 ft rubber on dry concrete. By Mondello Performance Van Nuys CA. 818-994-6910 Olds engine handbook \$4. Sept 92 Popular Hot Rodding mag.

6K) Engine cooling

A) Temp sender

	<u>STD/NAPA TS6469</u>
C	140
1/8	192
1/4	230
9 Lb Cap vents at 245° --»	1/2 255
15 Lb Cap vents at 267 -->	3/4 275
H	285

Standard temp sender, and 9 Lb Cap would vent at 234°F or 245° with 50/50 antifreeze, which is under 1/2 of gage. 15 Lb Cap would vent at 267°F with 50/50 antifreeze. reading. I found that because of manufacturing variations the NAPA parts I tried did not vary much from standard. Test for yourself to verify the calibration of the temperature sender you get. JC Whitney has a digital gage that can be adjusted for calibration.

B) Olds waterpump

Olds Toronado also has a lower volume water pump which was for non air conditioned vehicles, which you don't want to use. Check for correct part #231462, 231887, 556283, 12337519. Don't use parts #231461, 231886. Darrel Winterfeldt has an 8 vane(vs 6) TRW pump for increased capacity \$115 (GMC13-40)

C) Fan clutch

If it spins freely or grates/is rough or roars/doesnt release,replace. Some have let go after 60K. Fan clutch 73-77 455 GMC(was #550528)22050648 Murray#271303. Make sure it is thermostatic type(has coiled spring on outside), not torque limiting type. I used Hayden 2747. (GMC17)

D) Cooling Miscelaneous

- a) Antifreeze: Many antifreezes now contain silicone or silicates which are added to protect aluminum engines however it attacks 95l/5t solder in old radiators, new radiators use high tin solder(EPA phasing out lead use). Prestone and Zerex both contain silicone. STP Heavy duty antifreeze, Zerex XPA, and Peak meet GMC spec 6038M/1899M for low silicone/silicates. (GMC36/37)
--Full force antifreeze by Old World Automotive products of Des Plaines IL 60016. States on back "Meets GM-1899M, non-aluminum spec, for older model cars". It is also sold for diesel engines. [I use this]
- b) Thermostat: GMC uses a 195° thermostat. Don't substute a lower temperature thermostat with the mistaken idea of running the engine cooler. In the 1970's the auto industry switched to the 195° temp because it was found to be hot enough to vaporize contaminants/acids in the oil system, which significantly extended the life of the engine.

6L) Radiator

- a) Radiator stone guard:14" x 36" x 1/4" galv mesh wire (GMC5)
These were being sold at the March91 Tucson roundup.
- b) ReCored radiator: Exchange \$300, Red Holman GMC (GMC9)
- c) Transmission coolers: If mounted with plastic pins into the core (GMC26)
can cause wear requiring recoring.
- d) AC Delco dealers: Can re-core the radiator using part #1006 used in GMC trucks.(GMC32)
- e) Radiator cap: The orig radiator cap opens at 9 PSI which raises the boiling point 22° giving a 245° boiling point with 50/50 antiffreeze. [see temp sender above]Some owners are using a 15 PSI cap which gives a boiling point about 267°. (1975 MAN 6K-1)

6M) Engine fuel System

Note the Toronado fuel pump has a third outlet for fuel return, Don't use, check if you get a spare.

If you are are rehousing your fuel tanks Pressure check each tank for leaks, and when system is back together test it at the liquid/vapor separator in left front tandem wheel well. The 5/16 hose goes to the top of the tanks. pressure here will test the whole system including the gas cap. Don't wast your mony on a shop that wont do these tests, and avoid pulling a tank again to solder one of the vent outlets.

A) Fuel/Gasoline & Additives

- a) **Fuel,Unleaded:** The Olds engine and all other auto engines from 1971 on, have hard valve seats and were built for unleaded fuel which GMC recommended be used. Also there will be no lead buildup with the maintenance problems that lead causes. I remember endless hours scraping the lead off cylinder heads and pistons as a kid and know first hand what it does to engines.

Switching to unleaded fuel will allow the detergents to gradually get rid of this hard crust and restore your engine. The Onan generator may require decarbonizing, which it would need anyway. Also leaded gas will be discontinued in 2 or 3 years(California Jan 92).

- b) **Fuel w/Alcohol (Ethanol):** This will dissolve deposits, and can clog fuel filters in main, & auxiliary tanks, and the carburetor filter. (GMC30)

Maybe, but you will spend a lot of time trying to find gas that doesn't have alcohol, and in many areas it cant be avoided. When I dropped my fuel tanks to solder a leak this spring the inside was so clean and shinny that it was just like a bathroom mirror. Maybe from the MBTE from Tucson Roundup, and Nevada. The detergent required for fuel injection cars will also keep your fuel system clean. I find I'm using gas with Ethanol a large part of the time.

- c) **Fuel w/MTBE(Methyl Tertiary Butyl Ether):** Gasoline futures were put on hold, till the new Clean Air Act Standards were published in Aug 91requiring that the 10 worst poluted urban areas will use oxygenated fuel additives(MTBE), or ethenol starting 1Nov92. Every oil company either has MTBE plants or are constructing them. For example Exxon is spending \$100 million on 3 plants. So we will see a lot more of this. A carburetor rebuild kit using viton parts must be found to deal with it. (See Carburetor--Rebuild kits)

Encountered in Arizona and Nevada, I didn't get rid of the symptoms until I got gas in Bakersfield. Identified by label on gas pump. MTBE causes backfiring, poor acceleration, surging, and stumbling. It also reduces your MPG/increases gas consumption.

MTBE swells rubber parts in the GMC carburetor, raising float level, and causing the accelerator pump to malfunction (Seminar Alex Wong). MTBE causes the engine to run 2 1/2 to 3 % leaner (if it did not have the associated carb problems).

B) Carburetor

Note the Rochester QuadJet Carburetor is different from Olds/Toronado, dont exchange. The air bleed, fuel jets, and float levels are different. The 455 uses carb # 7045254, GMC #7047554, Delco24-405 \$359.53 from GMC. The 403 uses carb #17058254 GMC #17055854, Delco24-409. Note: CA carb is different and not available, save old carb for smog ck.

- a) **Carburetor part # vs GM part #:** The Carburetor # marked on left rear side of carb is different from 78z GMC part #, and this carburetor part # is used for cross reference by Rochester, rebuilders, and parts houses.

The 7045254 (403-17058254) carb. number, which is marked on the front of the vertical rib to the left of the secondary/rear valve pair butterfly valves. This is looking at the carb with the hatch open. You will need an inspection mirror to read the number, and some cleaner to polish area.

- b) **Rebuild kits:**The solution to the alcohol/ether problem will be an aftermarket carb

rebuild kit that incorporates only viton/teflon or other materials not affected by these problem fuel additives. (Seminar Alex Wong/Dick Pyle)

Dealers Rochester listing for cross reference show the 7045254(403-17058254) carb. number. Note GMC carb overhaul kit #17051886 is discontinued.

Apparently all carb kits are made by only one of two companys. Standard whose parts come out of the box in a bag, or Baldwin Washington whose parts come out of the box in a tray shaped box with a plastic cover. These are sold under many different labels. Standard only has a float for the GMC, no rebuild kit. I haven't found a Baldwin Washington labeled package, but I have found some kits in their packaging:

- NAPA/Echlin 2-5561A with viton needle & seat assy.,
- Filko KP #26-1398. -- no indication of materials.
- Delco 17076057 (1#760570 Group #3.725, Float 1#07046301 Group #3.745 This last kit was used by the GMC western seminars.

--Note Toronado air bleed and fuel jets are different size, different float level --1/4")

The projected multifuel autos down the pike will use stainless steel fuel tanks and feedback computer systems. So you think we have problems now.

The Delco rebuild kit (above) used at the Colorado Springs seminars by Alex Wong (Sep91) should be the answer.

- c) Choke: The choke heater tubes and heater assy (see parts book on engine, page 8) develop holes and rot away with long use causing low milage/hard starting. replacement aluminum tubes #2, 3 can be fabricated, and GMC still has heaters #8. (GMC36)

C) Fuel Leaks

If there is one, the short fuel hose between the fuel pump and the carburetor Must be in a like new condition and checked periodically because it is pressurized. I have seen this spring a leak and spray gasoline over the engine. Needless to say this would feed a big fire if it lit off.!!!! (Also see --- 8A)Fuel Tanks---

If an electric fuel pump is added this same hazard will exist between it and the engine, and the hose should be changed to a better grade of hose.

D) Miscellaneous Fuel System

- a) Carb fuel filter: Change at 12000miles. Not required if a filter is added in front of the switchover valve. See Miscellaneous fuel tanks
- b) Fuel Injection: Per Alex Wong seminar there is no current aftermarket unit with the correct capacity, and a limp home mode of operation. Also they don't have a smart computer that will compensate for engine vacuum demand. The 454 mark-4 throttle body unit is the most probable substitute but its 46mm 2bbl air flow may be too low and restrict top end performance. Also see Engine G)engine swaps or hotrod,Pro-Jection.
- c) Electric fuel pump: Note: Per seminars/Alex Wong you dont need this if you get rid of the vacuum leaks in the gas line.
Also note that leaking pressure hoses spray gas so use better gas hose.
- 1) Carter P4594 (orig for ww2 tanks) 2.5 amp, 70 GPH, (GMC15)
self priming. \$50 Carter Carburator Co.
- 2) Aux fuel pump with bipass, self priming, 7psi, Unknown GPH, available from CASPRO.
- d) Throttle Cable: #723592 discontinued. Now available \$69 + s. Clasco (GMC37)

6N) Fuel Tanks

After replacing hoses, or working on system, pressure test the whole system at the liquid vapor separator (1/4" hose) in the left rear wheel well to verify that the system is leak free. (see leak testing)

A) Fuel Tank leaks

If you have gas coming out of the system anywhere, including the gas cap after it has been filled than you have work to do. Also if you have to top off repeatedly for the last 6-10 gallons you have some more work to do.

When you have a leak in the fuel tank system a puddle of gas under your GMC will get your attention very quickly. Because of the size of the fuel system and the age of the hoses, and 1970's design you will need to spend time testing, replacing hoses and fixing the system. It should include the following items:

- » Test for leaks. Especially of the vapor vent lines on top of the tanks. The whole system can be tested by disconnecting the 1/4" hose for the smog cannister in the left rear wheel well at the Vapor Separator, and pressure/leak testing.
- » Replace all hoses if they are original, or leak. (This will require dropping the tanks) Note that each tank must be tested for leaks while it is out, or you will most likely pay to have it dropped again.
- » Clean and test the Vapor Separator
- » Install a check valve in front of the vapor separator (where you leak tested).
- » Install a separate filler vent for the rear fuel tank to the left front wheel well.

In the past I have had gas running out of the carbon cannister and also from the vent pipe on the top of the front tank both at the same time. If every thing is working properly you should be able to pump till you can't get any more in, and the expansion space should be intact without gas running out anyplace. I don't want to overfill but I want to know absolutely that the tank is full, and with my calculator be able to plan the next refill stop without finding out later that I was 10 gallons short, and maybe not convenient to a gas stop.

Now when the gas pump filler clicks off, I can only add 0.3 gallons by topping off. and my tank vents just like a new car when I remove the gas cap, even when it has been stored for a period of time.

B) Leak Testing

Test system by disconnection 1/4" hose from the vapor separator (in the left rear wheel well), and pressurize the system. The gas cap should open at 1 to 1 1/2 PSI. Then pinch fuel hose going forward to the carburetor and check for pressure retention. (Man 8-8)
I also blew air through the 1/4" hose to the carbon cannister, and found no significant back pressure.

C) Dropping tanks & Fuel Hose replacement

One of my first tasks was dropping the tanks and replacing all the hoses. I repeated again in 91 because the vent on the aux tank was leaking so I soldered it. Remember gas vapor is explosive so work with tanks accordingly, I filled tank with water, and flushed it with shop air to solder it.

- a) Dropping tanks: The procedure is as follows. Put one of those dainty little jacks under the front of the tank. at the back of the tank loosen the nuts on the two hanger bolts to the end. take out the 3 bolts that hold the front of the tank. lower front with jack 1 1/2". Disconnect vent hose from T, and disconnect gas hose from switch valve. loosen outside clamp on fill hose, push tank sideways to slide this hose off of the T, then put a short piece of 1 1/8" broom handle in the end of the hose and reclamp, prevented the remaining gas from sloshing out when removing the tank. drop the front of tank down. disconnect 5/16" vent hose on right side of tank. Disc. gage wire and ground. Take off the two hanger nuts in the back, drop tank and slide out. Use the same procedure for the rear tank, but also disconnect the 1/4" hose to the generator.

- Be sure to leak test tank especially the top vapor vent connection. (Use Magic Bubbles)
- b) To install tanks: Raise rear and start nuts on the 2 hanger bolts. Hook the vent hose(clamp down), and connect the gage wire and ground. I used tytys to secure wire between the 2 hoses. (For the rear/Main tank connect the generator hose). Raise front of tank part way then secure the two hoses and wire in the depressed channel on top of tank and tape with some duct tape. put extra tape over hose where the above panel has a joint. Take out 1 1/8" plug out of fill hose and finish raising tank. push tank to right and slide fill hose on to the fill pipe. Put in 3 front bolts and tighten the 2 rear hanger bolts. Tighten fill hose clamp, connect 3/8" vent hose, and connect gas hose to switch valve. Repeat for second tank.
- c) Gas Hose selection: Recommended Gates #27088 gas hose. At 3.50/ft it may be fuel injection pressure hose, and costs 3 times regular fuel hose at \$1.20, but it may be worth it. (GMC25)
When comparing hoses count the webb threads on cut end, to see how much reinforcing the hose has. Note that Butyl rubber will swell even in vent lines, silicon hose is ok but expensive, Nylon hose is ok, Teflon is good and very inert.
It is a lot of work to drop tanks and replace hoses so it may be best to pay more. (JNE)
Other factors to consider would be if you have or plan an electric fuel pump, or if you get a significant amount of alcohol or MTBE in your gasoline(Soon probably everybody).
- d) Gas hose required: 1/2" -2' for filler vent,
3/8" -30' for gas line and filler vent,
5/16" -13' for top tank vent to vapor separator,
1/4" -8' for generator from back tank. -17' vapor separator to cannister. (25'ttl)
1 1/8"x1 1/2" 90 deg. filler(Neoprene) get from GMC, for back/Main tank.
GMC#717979, prior to serial #3V101757 use #695638
1 1/8"x4" straight filler, try Cinnabar. for front/Aux tank.
You should also replace gage unit O-rings, & ck filter socks for fuel intake.
Note that the clamp on 5/16" vent hose on top of tank must be down to prevent touching above, which can cause a cracked vent, requiring soldering or epoxy to fix.

D) Fuel tank filler Vent.

By separating the filler vent for the rear/main tank from the front/aux tank you can get rid of the need to top off the tanks repeatedly to get the last 6-10 gallons into the tanks. Mine typically can only take 0.3 gallon after the filler nozzle clicks off.

a) materials

- | | |
|---|----------------------------------|
| 2 hose clamps for 1/2" id hose. | 3 hose clamps for 3/8" id hose. |
| 4" x 1/2" id gase hose. | 8' x 3/8" id gas hose. |
| 3" x 5/16 id tube | 1/4" pipe tee. |
| 1/4" x 3" pipe nipple. | 1/4" pipe to 3/8 id hose nipple. |
| rubber end cap for tubing. in carburetor section of auto parts. | |

b) installation

Between the front/aux tank and left frame is a tee with 3/8" id hoses from the rear/main and the front/aux tank filler vent hoses. Disconnect the 3/8" id filler vent hose from the rear tank. Cap tee with a rubber carb. end cap and clamp. Slip 3"x 5/16 od tube in vent hose from rear tank, also slip 8' x 3/8" id fuel hose onto tube and clamp to join these hoses. run hose along the vent tube to the left front wheel well and use plastic tyty.s to secure every 2'. remove front wheel well liner. In the rear of wheel well there are the gas filler pipe and 1/2" vent tube coming down from the gas filler cap. Disconnect the 1/2" id hose from the vent tube, Cut the 3" nipple in half, and with some teflon tape screw into the two sides of the pipe tee. Screw the hose nipple into the bottom of the tee with some teflon tape sealing. insert the tee into the vent hose and add a short piece of 1/2" gas vent hose on to the other side of the tee, and clamp these with the short hose going to the gas cap filler vent. connect the 3/8" id hose coming from the rear tank to the bottom of the tee/nipple, and clamp. Secure with some more tyty's. When your filling the aux tank will vent straight through the tee, and the spitting from the rear tank will drain off

before it gets to the filler cap, so it will not cut off until both tanks are filled. Note the check valve in the vapor vent will prevent the filling of the expansion area at the top of the gas tanks. The filler nozzle will click off about 0.3 gallons short of running over, and no topping off will be needed to assure a gas fill.

E) Vapor Separator & Emission vent System

- a) Vapor separator: While I was at it I removed vapor separator, and cleaned it with some drano in the sink till the float moved freely. I then tested it with a hose to see if it would cut off water flowing in the bottom or 5/16" connector. The top connector to the carbon cannister up front is smaller-1/4".
- b) Emission vent system: *This system is important in the filling of the gas tank.* This system is not supposed to vent freely from its vapor outlets on the top of the fuel tanks (expansion area is above the filler vent). *If this system is freely venting when you fill the tanks, the expansion area above the gas filler vent will be filled.* Once the expansion area is filled with the cool gas from the storage tank, it will expand. If the vapor separator is working you will have gas expanding out of your gas cap. If the vapor separator is not working then you will have gas running from the vapor cannister at the right front of your vehicle. If a vapor hose or connector is leaking, and the vapor separator is not working, you can have gas running from both places. This happened to me.
- c) Fuel check valve: This was added to prevent the free flow of air from the expansion area on top of the tank. The GMC carbon cannister was probably supposed to provide some back pressure to prevent this free venting above the expansion area, but with malfunctioning vapor separators allowing raw gas to wash through the carbon cannister, and age it doesn't provide this function now.
The shop manuals of current cars show that they have a fuel check valve which provides about 0.6 PSI back pressure to the tank in the emission vent line, and free flow of air into the tank as gas is pumped out. These are \$20.48 (Nissan part #17330-01P00 or 17330-P7900). I mounted it in front of the vapor separator. Using a couple of clamps on the 1/4" hose, with the arrow pointer towards the cannister.
This improves the operation of the system. You will get vapor venting from your fuel tanks when you remove the gas cap, especially when its hot. You wont have gas running out no matter how much you top off(except some splashes from the filler vent bubbling when the cap is off). Note that the gas cap also has pressure relief at 1 to 1 1/2 psi.
Note that like modifying the brake system, you take full responsibility for the changes.

F) Miscellaneous Fuel Tank

- a) Fuel tank/water tank epoxy patch: Travaco Laboratories Inc, (GMC5)
345 Eastern Avenue, Chelsea MA 02150. 617-884-7740
- b) Filler vent: May be too long. pipe comes down under engine (GMC13)
platform, down behind rear of left tire & connects to 2 ft of 1/2" hose. Shorten to prevent a low spot or gooseneck effect. Ensure that it angles down. To remove wheel well shroud: 6 bolts along edge fender, 1 bolt over tire.
- c) Gas cap: Gates 31742, Stant BG-807, Kragen lists GMC MH.
Gas cap should open on pressure test at 1 to 1 1/2 psi. (Man 8-8)
- d) Run on Aux tank part of time to clean out, and exercise valve. --AJ Marshall Tucson 91
- e) Gas filter: Install if front of switchover valve AC#GF-62 \$30, Element GF-157 --AJ
--This is a must have. You can also remove the small carburetor inlet filter.

6T) Emission controls & CA Smog cks

A) Canister vapor filter

GMC#7028131 AC#A478C California units have 2 cannisters, and filter is in bottom unit

B) Calif Smog checks:

- a) Speedometer Electric Service, Hayward CA 510-276-1522
- b) McBride's Service & Supply, Chino CA 800-627-1297
- c) I find Montgomery Wards Best. They will take RV's if you call ahead. They can also issue a sticker for the license. They charge \$10 more than the car price for RV's, as long as you remove the engine cover. They also mail \$5-off certificates quite often.

6Y) -Engine Electrical & Batteries -- See Chapter 11

7) Transmission

HMT425 3-speed Turbo Hydramatic

A) Transmission overheating/Engine Fire

Transmission fluid sprayed on the engine exhaust manifolds can cause a fire. (GMC37)

- a) Check oil cooler lines: on left side close to manifolds for leaks from pin holes.
- b) Transmission runs cool: In 2nd uphill at 45mph(low at 25). Don't lug up in high and burn the tranny, it will run much cooler in second. In second the torque converter is operating at a lower ratio, and the oil pump at the higher engine speed circulates more oil. Note that the transmission can overheat even when the engine temperature is ok. You need a transmission temperature gage to track this.
- c) Vent close to Manifold: Overheated fluid from this transmission vent can boil on to exhaust manifolds. Dont overfill transmission, and *if transmission is too hot pull over to side and fast idle to cool (dont shut off)*. You may need to add a larger auxillary transmission oil cooler.

B) Modifications

a) Change ratio's kit:

	<u>stock</u>	<u>Art Car Kilgore</u>	
1	2:48	2:75	3.00
2	1:48	1:57	1.57
3	1:1	1:1	1:1
R	2:08	2:46	?
torque converter	2.20:1		
final drive	3.07:1		

1) #13438(TH-100) inc planet/ring/sun gears

\$303.00(instalation \$350).Change torque converter: Faster lockup, 10-35% better milage. \$196.38 Used in 1985 motorhomes. Art Car Performance Transmission, 10575 Bechler River Avenue, Fountain Valley CA 92708. 714-962-6655 (GMC12)

2) For Turbo 400-425-475 transmissions Planetary gear kit. HD \$650, EHD \$850.

John Kilgore, 412 S. San Fernando Blvd, Burbank CA 91502. 818-843-7180

Mini Allison power fix can be installed at 9 other locations in West.

(Jul90 Adv)

- b) Two speed torque Converters: These were in 66/67 Toronados ir 67 Eldorados. You should use the whole unit including the differential (3.27 ratio) and the right stub axle.

(GMC32)

C) Transmission Oil Cooler

- a) Oil cooler sizing: My current auxillary transmission oil cooler is in series with the original

8B) Exhaust System

A) Exhaust manifold

Another task I had to do immediately, and the engine sounded like new after I was done.

- a) Remove 5 bolts using 9/16 6pt impact socket. Use liquid wrench, carefully use impact wrench and avoid breaking. Discard bolts. Four bolts can be accessed for liquid wrench from spark plug wells. If a bolt is broken it will require drilling and tapping. Be careful not to drill hole too deep ie into water jacket.
- b) Replace bolts(10 ea) with GMC#9420462 marked green. The bolt is 3/8" x 1 1/4" (300M). 300M is a special high silicon anti-corrosive steel by Republic Steel. To install tap holes out to clean them. Clean and use old thick washers. Coat bolts with Permatex #133K anti-seize lubricant. Torque bolts to 25 ftlb. Retorque after 2000 miles if a gasket was used. (JNE)
Manifold bolt #9420462 is discontinued. New #9440954 grade 9 cap screw. cheaper. (Jan90 #94204264 could be obtained) (GMC28)

c) Manifold preparation:alternatives

- 1) machine manifold flat \$20, also requires head to be flat and use Permatex #26B Hi temp silicon red-650F or better yet #101BR Ultra copper 700degF. This with no gasket.
- 2) Use a gasket, Felpro #1439 and gasket shellac such as Permatex indian head. Previous leaks may have pitted the head surface, and they may not be flat than a gasket is a must. The gasket will reduce heat transfer with possible cracking and warping of manifolds. The new bolts can be reused if installed per above. (GMC28)

B) Miscellaneous Exhaust

- a) Dirty dipstick: This could be from burned tube by exhaust (GMC10)
- b) Muffler replacements: 25 1/2"long w/2 1/4"pipes.
GMC#411456, AP #2679, NAPA #21793, Walker #21793.
also Walker #21685. (GMC23)
- c) Mufflers: 25 1/2" long 2 1/4" inlet/outlet. GM#411456 AP2679 NAPA 21793
Walker 21793
- d) Inspect: Periodically: inspect for exhaust system integrity due to the wood floor panels, and potential fire danger.
- e) Stainless steel exhaust system: Includes right/left header pipes , Y pipe , long main pipe, and tail pipe. \$1250 + s Zeb Frady, Southland Enterprises, 822 Gainesville Highway, Buford GA 30518. 404-271-7502 (Original system is 2 1/2") (GMC34)
- f) Exhaust System: 3" Ypipe, Main pipe, Tailpiece, 220 CFM mufflers \$498 + s. With Thorley Headers \$750 + s. Jardine, PO BOX 8488, Jackson WY 83001. 307-733-7473
The stock pipe is 2 1/2", so the 3" pipe gives 44% increased area. (GMC37)

9) -Steering System -- See Chapter 3A

10) -Wheels & Tires -- See Chapter 4B

.. Fuses & Light Bulbs

A)Fuses

	<u>QTY</u>		<u>QTY</u>	
SFE 4	1	AGC 5	1	AGC are all same length.
SFE 5	1	AGC 10	5	
SFE 10	1	AGC 15	7	
SFE 20	5	AGC 25	1	

B)Light bulbs

	<u>Qty</u>			(MAN 12-45)
tell-tale CruiseControl	1	74		
Door Open	1	74		
Low Air	1	74		
Park Brake	1	74		
Low Fuel	1	74		
unused				
Air Level	2	74		
Speedometer cluster	2	194		
Brake warning	1	161		
Alternator warning	1	161		
High beam indicator	1	161		
Turn singal indicator	2	168		
Instrument cluster	2	194		
Dome Lights	2	211	9422525	
Radio		?		
Heater control	1	1895		
Fiber optic Bulb	1		9433143	
Headlights	2	6014	5962548	
Park & Turn signal(Ft)	2	1157	9428902	
Side markers-on strip	4	194	9421330	
Clearance & ID(top F/R)	10	67	142450	
Stop & tail	2	1157	9428902	
Back up lights	2	1156	see below	
License	1	67		
RT under hood light	1	1141		
RV-Porch light	1	1141	1.44amp	(MAN 24B-10)
RV-LP/propane Compt.	1	1141		
RV-Gen/Battery compt.	1	1141		
Living-RH front light	2	1141		
Living-LH front light	2	1141		
Kitchen light	2	1141		
Range hood lights	2	1156		
Range light	1	12v	15watt screw	(Camper world)
Aisle floor lights	2	67	0.59 amp	
Refrigerator light(DOM)	1	211 ?		
Hall lights	2	1141		
Rear Reading lights	2	1383	1.5 amp. Xantech #W1383, Fredson #06-2146-00 \$4.29	
Bathroom lights	6	1141		

11) Engine Electrical & Batteries(Engine & RV)

A) Alternator

a) 80Amp Delcotron

most problem parts;

1116387

voltage regulator

1984462

Brush holder

1875645

Bridge rectifier

1977064

Diode trio

(GMC15)

1869573

Capacitor

Bearing, rear GMC#1961323

New Departure #MNJ 471

\$1.50

Bearing, front GMC#907988 " "

#Z 99503 \$6.50

b) 1978 145Amp Delcotron. most delivered with 80 amp. Has anybody seen one of these?

c) RV battery isolator diode assy: Isolates batterys,while

(MAN 24B-18)

charging both batteries. From orig. GM manufacturer.

(Gen = 80 amp) 70 amp GMC #706751 SurePower 702

(GMC14)

95 amp

SurePower 952

120 amp

SurePower 1202

Sure Power Industries Inc, 10189 S.W. Avery, Tualatin OR 97062

800-845-6269 Attn. Douglas Brice

d) 120 amp alternator: from Camping World.(APR91) #3625 \$269.98

including voltage regulator

Isolator, 130 amp

6688 44.98

isolator wiring kit

6691 39.98

80 amp circuit breaker

7187 27.98

e) Exchange or Rebuilt Alternators and starters:

-- rebuilt 100 amp alternator: #27SI-200 \$60.00 (old price)

Automotive Rebuilders Supply of Indiana, 514 E. 31st St, Anderson IN 46014. (GMC17)

-- Heavy duty Alternators \$175/125 exchange, Starters \$150. Kelley Industries, 412B

South Palestine, Athens TX 75751. 800-256-2142 (Apr 90 Adv)

f) RV/Engine Battery connect: Use #8 wire clipped across solenoid to charge front battery at home or if alternator is out. or belt breaks. (GMC27)

g) If the alternator is not charging: The heater hi-blower wont work.

B) Batterys

Note: The transmodes, and coaches outfitted by other manufactures, did not have the 4d size RV battery behind the generator. Instead they had two smaller batteries, one in front behind the vehicle battery, and the second behind the generator.

a) RV battery Sears #9654(catalog only) Dihard Deep cycle 1300 Amp cranking.

20 3/4" x 8 1/4" x 10 3/8" heigh. \$150 from catalog. This 4D size battery will provide 25 amps for 6.5 Hours, or 5 amps for 38 hours.

b) Slide out battery tray:\$125 incl ship. holds 4d or 2 reg batterys

includes 2 cables. Buskirk Enterprises Inc,

(GMC21)

c) RV battery cable: ck for wear from drivers firewall to solenoid, along where cable rubs fiberglass grille. tape and add convoluted/flexible plastic conduit.(GMC#8885537 25')

(SB #77-TM-4)

C) Engine advance

a) Controller/ knock-detonation sensor by Carter\$139.00 + \$4ship Caspro Co.

(GMC25)

D) HEI Ignition/Distributor

Note that this unit is different from Olds/toronado, dont exchange. The cam and counterweights are unique to the motorhome.

- a) Ignition module: -carry a spare!- GMC #1875990, Delco #875990
when mounting use heat transfer grease (GMC21)
- b) Pickup Coil: Broken leads cause erratic firing or no start. (GMC14)
Remove distributor to fix or replace(not easy). GMC#1876210 NAPA#MP100
- c) Advance weights: Ck operating if slow acceleration or backfiring, also check vacuum advance. Backfiring can also come from MTBE in gasoline. Buy vac advance only from GM
- d) Rotor: This is an often overlooked item, and if it sparks through the center below where the coil electrode comes down to the rotor than you have a dead short to the distributor shaft, with a dead engine. The new white plastic is a better material for this part. This sent me to the side of the road at Tehachapi at 11pm with no power steering or brakes. It is easy to see the spark damage to the rotor. Standard #DR-318 \$5 -Carry a spare!-

E) Starter

- a) A bad starter solenoid: This can cause hot start problems (GMC26)
- b) Solenoid contacts: These can often be rejuvenated by cleaning and smoothing with a file.

12) Chassis Electrical, Cruise Control, & Instruments

A) Dashboard Instruments:

- a) headlight alarm: #75-2250R \$5.49 JC Whitney (GMC16)
Also from GMC #999373 \$4.95 (GMC32)
- b) Outside thermometer: chrome #12-7256X black #12-7257N JC Whitney (GMC22)
- c) Auxillary instrument panel: It is nice to add additional instruments and switches convenient to the driver on this added panel, for example I have:
 - Air system pressure gage
 - Manifold pressure gage
 - Transmission temperature gage
 - Cooling water overtemp light
 - Engine oil pressure low, light (see next item)
 - Miscellaneous switches
- d) Low oil pressure warning system: Send stamped envelope to editor (GMC24)
- e) Dash labels: Seven labels on sheet \$6 Ocean Atlantic Services (GMC31)

B) Cruise Control

This old mechanical system has time constants designed to very effectively hold speed for this heavy vehicle. (Man 12-36)

- a) Rebuilt Transducer: Ohio Valley Speedometer Supp (GMC4)
2101 Frankfort Avenue, Louisville, KY 40206. 800-626-1588, 502-893-3155
Also AC Delco #25030250 Remanufactured part. \$53 + Exc (GMC33)
- b) If cruise control is dumped: By turn signal, ck ts bulb out. (GMC6)
- c) Reprint: 16 page service manual reprint \$3.00 to Ralph Luby (GMC11)
- d) if cruise control not operating: First ck the stop light/cruise control switch. Old #9794682
new #25524845 78z 7-28 #24 \$3.72 (GMC32)

C) Turn signal

- a) Add lights: To front mirror brackets: (GMC11)
 - Sears# Peterson Mfg Co#
 - Amber 55093 V107WA
 - Red 55092 V107WR \$3.00, need 2-A, 2-Red
- b) Add chime: use relay, Radioshack dingdong chime 273-067 (GMC11)

c) **Beeper:** Beeper with volume control and on/off switch. \$24.95w/Ship. MNM Products Inc.
3700 Osuna NE Suite 601, Albuquerque NM 87109. 505-344-4922

D) Clearance lights

These lights are made by Signal Stat, and are available from multiple sources

Assembly Amber CE-1150A, Red CE-1150 (GMC37)

Lens only CE-8861 (red, amber, clear)

GM#2444123 Gasket only 115-59463 --These must be replaced periodically to
Bulb 67 prevent leaks

E) Tail lights

Tail lights are the same as the Chev/GMC Beauville/Sport vans. (My 1971)

85+ van lights fit if hole is enlarged.

Left taillight #5974391 \$95

Right taillight #5974392

2ea backup light socket kits #12017133

2ea signal light socket kits #12003759

F) Lights, swiveled under rear cabinet

From Xantech \$15.95

(GMC 2)

finish	Fredson	Xantech
brushed gold	10-3010-33	727.40
brushed silver	10-3010-29	727.50
black		727.60
brushed bronze		727.70
chromes		727.80
bulbs	06-2146-00	W1383

These lights can also be used to replace driver/pax light & will fit if switch is removed.

G) Rear outside light failure

If you experience a partial or complete failure of rear lights or fuel gages & tank switching drop panel under steering wheel and reseal plug against left wall under dash.

(It happened to me on Interstate at night.) (MAN 12-18/19)

H) Miscellaneous Lights

a) Fluorescent Lights:

(GMC 2)

b) Backup lights: 50 watt quartz-halogen bulbs from Germany. Don's off road

Specialties, 7444 Reseda blvd unitAB, Reseda CA 91335. 818-881-9866 (GMC 30)

13) -Radiator -- See 6L

24A) -Maintenance Schedule & Trip Prep-Chap 0/30F

24B) RV Electrical Including Converter & Inverter

A) 120 volt system

a) Loads:	*Power convertor	6.8 Amp(45Amp DC out)	(MAN 24B-9)
	Water heater 1000 Watt	8.7	
	Water heater 1500 Watt	12.5	
	Roof Air front 13.5BTU	15.0	
	Roof Air rear 11.0BTU	10.0	
	Vacuum cleaner	7.0	
	Refrig, Dometic RM 763	2.5	
	Microwave 1200 Watt	8.0-10	
	Toaster 1000 Watt	8.0	

*Triad-Ultrad power converter provides 12vdc power for 12volt system, and also charges battery, but only slowly. No load 14v,loaded drops to 12v which wont charge battery.

The maximum battery charging rate is probably 10 to15 amp. (DSIB 75-IM-1)

- b) Park power cord: Through long usage the 50 amp plug had worked off of the end of the cable, and the wires were showing. I split a piece of 1 1/2" radiator hose and put over the plug and cord then secured it with a couple of clamps. Note Coachman units have 30 amp
- c) The large single circuit breakers: Can be replaced with a pair of 15 or 20 amp breakers. ie Bryant BRD breakers. This allows selectively turning off of loads for power management.
- d) AC power from 455 engine: This unit would allow running air conditioner or microwave from a 120 volt alternator on engine. Would be nice for very hot days on the road. The Kit includes the alternator, which can replace the existing alternator, with blower, an electronic AC power unit which sets frequency, and remote control. 5000 watts, \$3295 + charger \$795. Note that a large alternator, and 2000 watt inverter(with proper installation) will run a 13.5kBtu air conditioner for a lot less money(See Trace inverter). Power Technology Inc. Sales Dept, 1200 South Sherman Suite 100, Richardson TX 75081-6500. 214-437-0680
- e) AC Power from RV Battery (See Inverters): One new motorhome has no aux generator. It has a 190 amp alternator on engine, 6 ea L16 RV batteries, and 2 ea 2000 watt inverters in Parallel (4000 watt total). They claim it will run 13500 Btu air conditioner for 4 hours.

B) 12 volt DC system

a) Loads	Refrig, Dometic RM 763	21* (Engine only)	
	" On Propane	1 to 3 , 0 Amp Propane only, no lights	
	Lights	1 to 3 amps ea	
	Bathroom lights	8.5	
	Range fan & lights	6.7	
	Furnace blower	6.8	
	Water pump	3.6	
	Recirculating toilet	7.0	
	Vent fans	3.5	(MAN 24B-10)

* See 24D Refrigerator for electrical wiring safety for a circuit with this high load.

b) RV Battery: see engine electrical.

C) Converter

Triad-Ultrad power converter (DSIB 75-IM-1)

- a) Note: a Converter is a low power battery charger whose output is optimized to provide power for working appliances at 12 v, and its output is low at the battery charging voltage of 14 volt. It is not an effective way to quick charge the battery from the generator because it charges so slowly and it puts no load on the generator. Its rated 12 volt output of 45 amps is available at 12 volts, not at 14 volts required to charge battery, because it is designed to power appliances, and to trickle charge the battery. You may also find some 12 volt appliances run better close to 12 volts rather than 14 volts.

- b) 12v circuit breakers: Cole-Hersee #30410-xx (ie xx = 15amp) (GMC6)
- c) If converter not charging: Ck GND on body side strut behind Range. (DSIB 75-IM-1)
- d) Triad-Utrad converter: repair found 2 caps 4ufd 660v, 6 diodes PR 6962 were needed.
They will repair converter \$50 prepaid incl ship. BW Manufacturers, Division of Magnatek,
721 North Webster, Kokomo, IN 46901. 317-452-5444 (GMC28)
- e) Converters: 45 & 75 amp. Output 14 volts to 85%load. 2 speed fan switches 5/90%load.
45 amp is 11 1/4 x 7 1/4 x 4" \$139 + s. Todd Engineering, 28706 Holiday Place, Elkhart
IN 46517. 219-293-8633 (GMC31)

D) Inverter

Uses 12vdc input which is inverted to 120 volt AC to supply power for appliances, microwave, TV, videotape unit, or computers.

This is used when not hooked to park 120v power, or not running aux generator.

Primarily when dry camping, and for the microwave at lunch stops. Your wife could also watch the soaps, or VCR while you headed down the Interstate.

Assuming that you have a 200 amp/hour 4D battery or 2 gulf cart batteries. The 5 minutes required to bake a potato in a 1200 watt AC(600 Watt RF Cooking) microwave will take about 9 or 10 amp/hours. Most things require only a minute or two.

With an optional 110 amp built in battery charger it will provide a generator load and charge a large RV battery in a reasonable time when dry camping. It also should have automatic switch over of 120 volt loads and battery charging, when the generator or shore power 120 volt comes on. Note that normal RV battery charging from the auxillary 6000 watt Onan generator is only 10 amps.

- a) Trace Engineering Model #2012SB: 2000 Watt 120v . \$1375 list with 110 Amp battery charger and low battery cut off option. Remote control/4 function voltmeter option \$250 can be added later. It has crowbar protection for shorts, power factor control for starting of motors, and frequency regulation for VCR's. It senses when external hookup or generator supplies 120vac and switches to the battery charger mode to supply 110 amps to the RV battery for quick charging with out running the generator too long. This switching also switches the input 120v AC power to its output to power the appliances that were running on it. The battery charger will charge the battery quickly, and will load the generator. This unit with the battery charger will also replace the converter, and the dimensions indicate that it will fit in the same space in the GMC. The power panel circuit breakers would have to be setup so that all of the inverter loads are on one bank and the non inverter loads such as the air conditioners, refrig, and water heater would be on the other bank. Then the input power lead from the park/generator cable for the bank with the inverter loads would be rerouted from the 40 amp main CB to the inverter, and the inverter output would connect to the 40 amp circuit breaker to feed the inverter bank loads. This allows the automatic switching of the inverter to operate. It has a delay so that the generator can get up to speed before the load is switched to it, and doesn't start with a load which must be avoided. Note that starting the generator under load must be avoided because it will burn out components in the generator system. The battery charger option has multiple controls to allow tailoring of the bulk charging voltages and amperages and the sustained floating voltage(converter mode), with settable timeouts and temperature compensation. Fortunately the default setting is with all of the switches set to 12 oclock. The overload capability of this unit is very high, ie allowing the toaster, microwave, and a hair drier for 3 or 4 minutes(3400 watts)(Motor starting to 6000watts). If used very heavily the fan (Option \$120) can be added later if required. You can add an optional solar panel controller \$90, when adding solar panels.
Dimensions: 6.9" H, 11.4" W, 12.4" D. Trace Engineering, 5917 195th N.E. , Arlington WA 98223. 206-435-8826

- b) Trace Model 812SB provides 800Watt AC power, and 25 Amps of battery charging. \$650. Note that the 812 won't run a microwave oven which uses an input power of about 1000 to 1200 watts of AC, and provides an output/cooking power of 500 to 700 watts.
- c) Heart Interface Ems 1800
This unit is now sold by Camper World. \$1349. It is 1800 watts. It includes an automatic transfer switch and 65 amp battery charger. It uses 0.07 amps when in standby mode. It includes a remote monitor panel. 7 1/4"hx15"Wx10 1/2"D. For microwaves, TV's ect.
- d) Other suppliers: Note that there are other suppliers of inverters with different sizes and features available depending on what you want to run on it. I suppose that you could also use a separate hi amp battery charger but it is nice to have it all in a single unit with automatic switching.

24C) Onan Motor Generator

Model 6.0NH-1R/9000G, 120v, 60 cycle, 50amp, 6.0 KVA, 6.0 KW.

A) Onan parts cross reference

Description	ONAN	GMC	*carry as spares. (need 2)-included in decarb kit	
head gasket 6K	110-1731			
" " 4K	110-1920 "			
oil filter	122-0445	710319	-discontinued	(GMC22)
" " -Short	122-0323?			
filter seal	122-0347	707296		
air cleaner/filter	140-1229	710391	\$12.60	
fuel pump	149-0650			
fuel filter	149-1445			
exhaust Muffler	155-1222	707148		
breaker points	160-1154	707218		
capacitor, points-tunKt	160-1161	707217	\$6.70	
Spark plug	167-0245	5612073	Bosch WR8FP	
de-carbon kit	168-0127		\$19.50	(GMC23)
starter brush (+)	191-1005		\$3.20	
starter brush (-)	191-1008		\$3.50	
brushes, alternator	214-0096		4Ea @1.65	\$6.60
springs for brushes	212-1232		4Ea @0.60	\$2.40
control board assy	300-0944	2000341	200.00	
NEW board	300-1073			
Meter, Hobbs totalizing	302-0885		Hobbs #15059	\$69.60
*bridge rectifier	305-0517	707164	\$17.85	
*low oil pressure switch	309-0237	707294	\$4.00	
capacitor, ignition coil	312-0017	707210	\$4.60	
circuit breaker	320-0549			
operators Manual	940-0315	\$ 2.50	nn model/serial #	

plus #F118 Distributor and sales/service directory.
ONAN Company, Parts Dept, 1400 73rd Avenue N.E., Minneapolis MN 55432.
612-574-5000

B) Oil filter

Company	Model	Length	Diameter	Gasket-OD	ID	Thickness
Onan ***	122-0323	4 1/4"	3"	2 3/4"	2 3/8"	3/16"
Penzoil	PZ-12	4 3/4"	3"	2 3/4"	2 3/8"	3/16"
Baldwin	B-243					
Purolator	FCO-252					
A/C	X-9					

Fram *	PH28A	4 7/8" 3"	2 25/32"	2 29/64" 3/16"
Fram *	PH2870	4 15/16 3"	2 25/32"	2 29/64" 3/16"
Lee	LF-213			
Motorcraft	FI-271			
Mopar	L-323			
Hastings	134			
NAPA	1342			

Note: If length is less than 4 1/4" it wont come out of housing and air will escape. Also can't reach to remove/install.

Note: * Compare gasket OD/ID with Onan filter for proper fit.(May not fit)

Note:*** Measured from Onan original removed from generator.

C) Troubleshooting/Repair

a) Printed circuit board:

1)Under cover with start/stop sw

(Man 24c-48)

Jumper 9 to 11 to energize ignition & fuel pump Jump 1 to 7 to run starter.

remove jump 9 to 11 to stop. Note no fuse protection or low oil pressure stop.

2)If not operating: ck replace/solder connectors to board.

(GMC13)

3)Many problems traced to one of the relays on right side.

(GMC14)

repair at: \$75 Flight Systems Inc, Hempt Rd, Mechanicsberg,

(GMC23)

PA 17055. 717-697-0333 If send ck with board \$69.00inc ship.

(GMC29)

b) If no AC power: ck Circuit breaker on top gen closed

(Man 24C 7)

problem could be Bridge rectifier. located inside air intake

screens of stator. **carry a spare**

c) Bridge rectifier: \$15.00 ea postage incl. George Dye

(GMC22)

d) If blowing oil: Ck rubber hose vent on top of crankcase has not collapsed inside. (GMC21)

e) Oil leak: if found in air discharge chute may be bolts holding oil filter bracket. Use a two piece distributor clamp wrench KD#104.

This bracket has an engine mount strap behind it, and has another gasket behind it which may need replacing.

(GMC30)

f) Ck fiber pass through grommet: The cable from the rear RV battery is carried in to the bottom of the generator by a fiber grommet and stud. With ageing this insulating grommet may allow allow an unfused short of the battery causing a fire. This should be replaced or be redesigned.

(Seminar Tucson AJ Marshall)

D) Miscellaneous Onan Motor Generator

a) Fuel: Gas for generator is drawn from a separate dip tube on the left

rear corner of the rear/main fuel tank, and can use the main tank down to five gallons remaining.

b) Air discharge duct: Turn outward.\$25 + ship.

(GMC7)

Ron Tase, 605 Kings Way, Merritt Island FL 32953. 407-452-6688

(GMC25)

Aluminum unit with end louver \$35 + ship. Rance Baxter, RD 1 BOX 298, Genesee, PA

16923. 814-228-3338

(GMC33)

c) Starter solenoid: #307-0845 on schematic as K-1. Starter solenoid

(GMC23)

from 76 Mazda \$27 direct replacement.

Generator fuel pump #149-0650. NAPA #610-1017 \$67 direct replacement.

d) Starter bracket: breaks: Cast iron rep. #CRV-4 \$24.95 Ragusa

e) Circuit breaker: \$65. Square D makes makes 120/240v 60ampbreaker

(GMC27)

#QOU-160 \$10. mount with alum angle in orig holes.

Onan #320-0549 \$22.45 Central Florida Motor home repair, 1241

(GMC28)

West Columbia St, Orlando FL 32805. 407-425-0393

f) Air filter: 6"long, 3" OD, 1 3/4" ID.

g) Spark plugs: Bosch Platinum WR8FP, one step hotter is WR9FP AC #R46S. with 0.020" gap.

h) Oil/filter change: Use 3/4" wrench to drain. Add 4 1/2 Qt oil. At 100Hrs

- i) Electronic ignition: Kit replaces point unit, coil, and sparkplug cables. Reduces fuel consumption 25-40%. Jacobs Electronics Attn: Smokey, 500 North Baird Street, Midland TX 79701, 800-375-5226

24D) Refrigerator

- A) Vent roof opening: Is smaller then roof vent. larger hole improves circulation/cooling. (GMC20)
- B) Norcold: Sidney OH. Locations of parts and service. 800-543-1219. Western parts warehouses at Pacoima CA, and Portland OR. Contact: Jerry Alexander (Kingsburg roundup) 818-897-7577 260 page service manual \$33, Parts manual for original refrig \$7.95 + s. (GMC35)
- C) Dometic DuoTherm: Parts manual. 800-544-4881
I have a model 763 3-way unit. 6.0 CF

Safety Note: 3 way ie 12 volts operation when engine is running can draw up to 23 amps of 12 volts dc, which requires a minimum #10 wire or #8 wire. If the wire is too small, or has a poor connection, it can turn into a heating element starting a fire. Also this is too much amperage for the fuse block which will heat and burn out. So a heavy duty fuse must be run directly to the fuse block input line (#10 wire), which comes from the RV battery/engine generator, rear battery junction.

24E) Roof Air

- A) Single Air: Mark IV (Man 24E-1)
- B) Dual Air: Dometic Duo-Therm Front 13500 BTU #54615-036
Rear 11000 BTU #54612-036
Owned by Dometic see above for manuals
- C) Clean filters perodically: Available from Camping World.
- D) 15000 Btu Air: Will operate ducted system. 110 Lbs, 115 volt, 20 Amp.
Electronic wall thermostat will select best of 3 speeds. From Dometic.

24F) LP Gas System

- | | | | |
|----------------|-----|----------|----------------------------------|
| @4.25 Lbs/Gal) | 30" | 44.5 lbs | 10.6 x 0.8 = 8.4 gallons usable |
| | 40" | 62 lbs | 14.5 x 0.8 = 11.7 gallons usable |
- A) Over volume cutoff valve: install before pressure reg. (GMC23)
Camping world \$24.98 #68-60
- B) 80% valve: Required on new RVs. positive shut off at 820%. (GMC24)
from Manchester Tank. Manf of tanks for GMC. \$55.50
- C) Propane filter: Threads into the regulator #G-405 \$17.68 + s, G-405-1 element & o-ring \$4.42 + s. Marshall Brass Co, 450 Leggett Rd, Marshall MI 49068. 800-0447-9513 (GMC32)

24G) Furnace

- A) Sol-Aire furnace: Is no longer manufactured. Duo Therm Replacement is discontinued.
Try 32K BTU Hydro Flame Sundowner available at Coast Connection stores.
AJ Marshall FMCA #090442 Displayed one installed. Tucson Roundup Mar91.
- B) Delayed ignition: Can be caused by burner corrosion, and poor elect. connection.
- C) Reventing: see FMCA mag Feb 79, or Motorhome Life July 78.

24H) Range

- A) Magic Chef Co: Parts Dept, 28812 Phillips Street, Elkhart IN 46515. 219-264-2128
- B) Range top clips: For grates: #50-20252-1 8ea/1.85 (GMC15)
Minuteman Recreational Vehicles, 1021 Memorial Dr, Chicopee MA 10120.
413-593-5591

- C) 110v burner: One member substituted a 110v eye for one of the gas eye's. (GMC25)
D) Magic Cheff oven: gas is off only in the pilot-off position. (Man 24H-2)

24J) Water system

A) Replacement Water Heater

2 way hot water:Atwood EHM6-SM 6Gal 1500watt, engine coils. This heater is identical to GMC unit except engine reheat loop is inside instead of on surface which is more efficient and heats faster(reheat hoses connect on rear end), but it is rated for 170 degree (Marine)engine water. GMC is 195° & much hotter (to 260° w/15# cap) when pulling hills. Atwood has a thermostat kit(\$38) which solves the problem. This setup heats water fast on the road and holds it at 150 degrees. Without the kit the water was so hot it spit and steamed, and could be dangerous. The kit comes as standard equipment on their 10 gal heater which is unfortunately too big.

Atwood Thermostat Kit includes: Parts #91781,#91782,#91779,#91780,#91459,#91309. Remove rear seat and bed storage cabinet, Remove back wall of bathroom.(Bedroom side) The replacement was mounted using the original straps and holes.

Water heater from Gateway

Kit--Atwood Mobil Products, 4750 Hiawatha Dr, Rockford IL 61103. 815-877-7461(1990)
Inner tank assembly #92940 \$88 + s Atwood (GMC35)

B) Miscellaneous Water system

a) Bathroom water pump switch (GMC5)

3 way switch matches orig. from Ocean Atlantic Service Inc. (GMC20)

A diode from the bathroom light to water pump switch will turn on the pump. (GMC28)

b) Water accumulator: available from Sears. #42F2909 \$25.67 2 Gal, 8 3/8D, 12 9/16"Long. ---Mount these under the bathroom sink.

From Camping world #7281 \$99.98. A smaller(1 qt) less expensive unit is available also. From Fredson RV parts, #05-2080-00 \$23.99 12"long. (GMC10)
made by Jabsco #12573-2000

SHURflo 1 Qt tank, Uses diaphragm. 8.9"x4.1"x3.6" \$40 #2290. Camper World

c) Replacement parts for water heater:

Camco Manufacturing Inc, 121 Landmark Dr, Greensboro NC 27409. 919-668-7661

#03700/03703 1000 watt/8.7amp \$8.00

#03740/03743 1500 watt/13amp 8.00

#07723 Adjustable thermostat 10.00 (GMC12)

Rheem, available at rv and plumbing supply

81-33-264 AP-7483 1500 Watt heating element

81-33-047 AP-6830 Adapt-o-flange

81-35-120 AP-8293 Upper Thermostat (GMC31)

d) 3 way hot water heater: Atwood model GCCHGA-3 Install cut 2" into rt top counter. also cutout in outside wall. (GMC22)

e) Check valve: For units prior to tze166V100529 Check valve (DSV Jun76)

#796778 can be installed in cold water inlet to prevent hot water backing into cold water system. The valve is plastic and is marked SMP 903. -- Brass replacements are avbl.

f) QEST polybutylene plumbing: Catalog (Original equipment in GMC) (GMC13)

US BRASS,QEST Customer service, po box 869245,Plano TX 75074. 214-423-2900

g) Water pump: SHURflo Model 200

(GMC15)

1)	valve assy. kit	94-110	\$ 5.50
	diaphragm kit	94-123-00	5.50
	switch assy.	94-255-01	8.95
	housing,pipe to pipe	94-025	4.25
	lower housing	94-94-017-01	19.50
	complete pumphead	94-058-11	44.00

SHURflo, 1400 Cerritos Avenue East, Anaheim CA 92805. 714-533-7700
12650 Westminster, Santa Ana CA 92706. 714-554-7709

2) Surflo Tri-A-Fram pump w/ckvalve 6amp, 2.8GPM \$60 Camper World.

h) Galley sink faucet: Made by Moen. Valve cartridge #1225 replace. (GMC23)

i) Water sender: Cleaning and resealing arm joint w/silicon seal & shrink tube to rejuvenate.
Electronic water sender: \$60 Ocean Atlantic Services also Terry Olds (GMC30)

j) Drain vents: Vent Line #V20493 1 1/2" White, Camper World.

k) Inlet water regulator: This plastic regulator gave up the ghost in Reno when I hooked to park water and found it was 110 lbs. At the local hardware store (home) I bought an all brass, 150lb regulator(Raindrip 450C) with gage. I modified, and mounted it in the existing plastic housing so it fits under the door. I also put in a TV and a Telephone jack while I had access to it.

--Try Marshall Brass 327-00CW + 1/2" male fitting. Camper World (GMC37)

l) Shower Hose: A nice SSteel Shower hose 72" \$9 will make the shower head available for head shampoos ect., and will reach wherever you need it. Shower head was made by Alsons

J) Water tank: If it gives up the ghost replace it with a stainless steel tank. Fritz Slama

k) Bathroom faucet: Was made by Indiana Brass. Parts master stem cold/left #2030, Rt #2029. Another found cold #ST1-7C, Ht #ST1-7H. Grease stems periodically.(GMC33)

l) Coiled shore water hose: 25' rebounder \$35. Marigold Marketing, 1221 Tabor Ave, Fairfield CA 94533.

-- 25', Yellow, 500lbs pressure. Camper world (catalog only) \$35.98

24K) Toilet

A) Standard:Thetford Aqua-Magic

(Man 24K-1)

B) Recirculating: Thetford Electra-Magic.

(Man 24K-4)

C) Note Coachman units are different.

24L) Holding Tank and Drainage

A) Gate valve:Thetford #01447. Gateway

B) Holding tank repairs: Glue sticks for glue guns to repair poly tanks 4"long pkg of 3
\$2.95 + \$1ship. E-Z Red Co, 28 Oak St, Deposit NY 13754. 607-467-2866 (GMC23)

--new product Seal-N-Place NAPA part #765-1544 \$10 (GMC36)

C) Tank drain: I rerouted the tank drain from its awkward location at right rear to left rear. I installed an elbow about 18" behind holding tank then to inside left frame rail and an elbow back through an existing hole in frame crossmember then a rubber flexible joint, and more pipe then a 45 elbow outward in front of bumper, and cap.

D) Holding tank replacement: #791846 is available as No. M791846 \$242 +s. Mobil Resource systems Inc., 1300 Logan Ave, Costa Mesa CA 92626. 714-545-7220(GMC31)

E) Hose storage: I found the original dump hose storage was too small so I replaced it with a 46" one from Camper World #6371 which easily holds 20' with large end connectors.

f) Coachman holding tank: The Coachman Transmode outfitted units have an additional blackwater holding tank added behind the existing tank which is used for grey water.

24N) Cabinets Interior Finish & Drapes

A) Cabinets

- a) Bathroom top shelf: pop rivet 1 1/2 x 32" alum angle to hold stuff (GMC4)
- b) Lower Dinette table: Substitute a 5" wide support, reattach mounting strip with 1/8" shim, and cut off top of table leg. (GMC10)
- c) Overhead cabinet hinges: from Holiday Rambler dealers who are Parkway parts distributors. #08759 \$8.45 per pair. (GMC13)
- d) To refinish cabinet doors: Remove old finish with laquer thinner. Seal with clear sealer. Woodmode Harvest Oak aerosol #LA-275 will go with formica. (GMC26)
- e) The padded end caps: For the overhead storage cabinets loose their shape and pull away from the cabinet with age. These can be restored by removing a layer of the back with a sharp knife cutting a piece of 1/4" plywood to fit, mount buried nuts in plywood, glue to back of rubber padding and then staple the plastic on outside around the plywood. Then the original screws can be used to remount the padded caps back in place on the cabinet.
- f) Overhead Storage Cabinets: Upon close examination both front overhead cabinets had shaken back and end joints loose. I took these down (Disconnect Lamp 12v power plug and take out hanger bolts). Liberal quantities of white glue, some nails and screws, and clamping while the glue set restored their structural condition, while they were restorable.

B) Drapes/Windows

- a) Cleaning Drapes: I took the drapes down clipped off the old elastic hangers, and sewed on plastic sliders(Kirsch 3909B-25). Apparently dry cleaning wont take out water stains. So I Washed them, first spraying the water stains with bleach(do this outside in the open air) till they faded away then immediately put drapes in filled wash machine using warm wash and cold rinse. Next 30 minutes in dryer on wash and wear cycle. Then while still quite damp they were pressed with a dry iron, and hung with pleats pushed together(open), then as they dried they were spread to a closed position. They look great and shrunk only 3%. Some of the rods were relocated vertically so the drapes would cover the rod.
- b) Drapery Material: 30yards + front should be certified to MVSS #302 flammability. (GMC5)
- c) Drapery source: \$550 Fabric samples, Insulated material Geneva Dye (GMC11)
(GMC14)
- d) Continuous Z Folding Material: Replaces venetian blinds up/dn from Kirsch, need side rails. (GMC15)
- e) Black acrylic side tracks: For miniblinds or zfold. can be covered. \$25 for pair. incl ship & hand. George Dye
- f) Sun screen fabric: That you can see through blocks 70% of sun rays (GMC21)
54"width stock colors(gray,camel, dk brown,blue,pale green) \$3.50 LF.
Fishell Screen Co, 15445 Grand Ave PO BOX 1756, Surprise AZ 85374. 602-583-9117
--Thermal covers inside window using NASA developed fabric. 800-873-4648 (GMC37)

C) Miscellaneous Interior Finishing

Formica with walnut finish can be used to replace trim around the windows, and a wood trim strip can dress up joint below.

- a) Sagging ceiling panels: use 3/4" #10 ss screws & finishing washers into longitudinal roof stiffeners. (GMC5)
- b) Floor carpeting: 26' = 25sqyd ?25x8/9=22.2 ---Seems too much-- (GMC5)
- c) 4x8' replacement interior panel: \$80, cant ship. they redo interior \$1080. Ocean Atlantic services Inc. (GMC19)
- d) If converting rear seats: To permanent bed you can remove false floor for more space. (GMC20)

- e) Dash cover: 13 colors, good fit, no altering to install. \$66 + s. Dasco Sales, Attn D
Davis, 1730 North Acacia Ave, Fullerton CA 92631. 714-871-3618 (GMC32)

24P) Exhaust Vents & Fans

- A) Bath Vent: camping world #5155 \$50, same holes. (GMC5)
 B) Vent fan:(75-78,78 bath) Was Hammond Manufacturing Corp (GMC10)
 Now The Highland Group, 9300 Midwest Ave, Garfield Heights OH 44125. (GMC20)
 800-321-6992.
 C) Fan-Tastic Vent: This automatic thermostatically controlled fan with rain sensor is the ultimate roof vent fan replacement. Model 6000. Fan-Tastic Vent 4349 South Dort Highway, Burton MI 48529. 313-742-0330 Available from Camper World.
 To Install: Remove old unit and clean up. Use supplied white plastic template to mark hole on roof. the hole is the same size but the corners are larger. cut only half of each corner, and bend it down. I riveted a 2 1/2" Long 1"aluminum angle to each tab to screw the inside trim piece to, and also the ground wire. The inside trim piece was shortened 3/4" using a pair of tin snips. The unit was sealed and screwed in place with 28ea #8x3/4" stainless screws. Hook up the wires. then stuff some fiberglass insulation above the ceiling edges to stabilize it, Then drill 4 corner holes into the aluminum angles previously installed and screw the trim piece in place.

24Q) Vacuum

- a) Bags: GMC#706109 from Red Holman GMC \$14.20 pkg/4 (GMC10)
 b) Vacuum: Was made by Jet line products, now a sub of Thomas Industries. (GMC21)
 #T648 pkg 4 \$6.55 + ship Thomas Industries Inc Service Dept, Gilbert St, Hopkinsville KY 42240. 800-874-3100.
 c) Hoover Bags: Type J bags fit vacuum. \$2 for 4ea. (GMC27)
 d) Door gasket: Use foam WX stripping to replace door gasket

25) Fire Extinguishers & Emergency Equip/Alarms

For engine fire prevention see Engine fuel system/fuel leaks, and Transmission.

- a) Fire Extinguishers: ck periodically. powder packs & loose charge. Shake upside down to loosen it up. A 5Lb Halon or dry chemical extinguisher can be recessed into the refig compartment by the entrance door. A Halon unit is good to initially knock down a fire and if it wont stay out dry chemical will seal it.
 b) Smoke detectors: This is required in new US motorhomes. --put one in.
 c)Propane detector: This is required in new Canadian motorhomes. Propane is combustible in the 2% to 4% range and the detector measures the lower 10 to 20% range. The sensing unit is mounted 8" off of the floor. Propane hair spray will cause a false alarm. A good unit would cost \$70 to \$80.
 d) Carbon Monoxide detector: They will be required in 1993 on all new motorhomes. Quantum CO*Star #3A-i \$80. Quantum Group 800-432-5599
 e) Medical Kits: Medical kits ranging from \$10 to \$140. Catalogs available.
 --Adventure Medical Kits, 6812 Phinney Ave. N, Seattle WA 98103. 206-783-7107
 --Atwater Carey Ltd., 218 Gold Run Road, Boulder CO 80302. 303-444-9326
 --Mountain Medicine USA, Ridge Road, Eaton NH 03832. 603-447-6100

30A) Microwave

See section 24B Inverter, for operation on the RV battery.

- A) Little litton: 9 1/2h 13d 18 3/8w under the counter mount (GMC12)
 B) Replace inside Magic Chef oven: With White-Westinghouse model KM170H Which measures 12 13/16"H, 19 11/16"W, 12"deep 0.6CF, 500Watt (GMC21)
 C) Sharp Carousel II: Model R-3A11, Sears#99728. 600 Watt output,

0.7CF. 18"W 11.5"H 12"D + Door. Will fit in cabinet above 3 drawers if back & door is removed. A block above will lock in place. I wired an electric plug for it. No cutting of cabinet is required. Its a wee bit high to reach, but doesn't take up space in kitchen that is not available.(1975 Palm Beach)

30B) Awning

A) Carefree

2145 West 6th Ave, Broomfield CO 80020. 303-469-3324

a) To clean mildew, 3Gal hot water, 1PT clorox, 1/4 cup Joy.

B) Zip Dee

Instruction manual and do it yourself instructions.

Executive Coach Enterprises, 504 Haven Road, Albion MI 49224. 517-629-2211.

30C) CB

A) Channels

Emerg	9	
Truck SE LAX	15	Lax to San Diego and toward Yuma.
Truck East	17	
Truck West	19	West of Cascade/Sierra Ranges.
GMC	12	Gettysburg (GMC37)
RV	13	Sept 89, Good Sam Club.

B) Miscellaneous CB

a) Antenna connector: Unscrewing and cleaning corrosion in this connector at the base of the antenna will usually improve reception (GMC37)

30D) TV

I made an aluminum mount for a Sony 8" TV on the post behind the pax seat, below the cabinet, and above the head of one seated in the dinette. The TV has digital tuning and scans channels using a remote control, which helps away from home where you dont know which channels are available. I have 12v wired to it from the 12v buss. Model KV8AD10.

A) Accessory supplier: Winegard Co, 3000 Kirkwood Street, Burlington IA 52601. 319-753-0121 Note RoadStar 21"dia. x 4" Antenna is not directional, but has a preamp.

B) TDP Mini-State: This is a 7" x 21" Disk shaped antenna that can be mounted on the rear air conditioner, using a 16x18" aluminum plate. It is a UHF/VHF broadband directional antenna with a 20Db preamp and an optional infrared remote control for the rotator. Since it is directional with a rotator it gives better distance reception with less ghosts.

TDP Electronics, 111 Old Bee Tree Road, Swannanoa NC 28778. 704-298-6990

J C Whitney # 12-6038P \$129.95, optional wireless remote 03-7493x \$69.95(1991)

I put cable/Antenna switch and controller in the top of the kitchen cabinet.

This gives me excellent TV reception.

C) TDP Omni-state: Same as above but non directional, with 19Db preamp. 4 screws mount to base. Model 5MS770. \$99. Schad Electronics, 980 S First ST, San Jose CA 95110. 408-275-6484, 800-262-1130

--JC Whitney #37-5867U \$89.95

D) When running cables: Mount a jack above water inlet to hook up cable TV which is becoming more available at RV parks. While you are at it also put in a phone jack.

30E) Miscellaneous Seminars & Towing

A) Travel info

- a) **Alaska:** Bob Blenkinsop, 8315 North Del Mar Ave, Fresno CA 93711, 209-432-6399 1988 Jul-Aug steamer, 20 GMC's.
Harmon Prine FMCA#F107486 Summer 91 with 5 units.
- b) **Ferry & Port reservation service:** Juneau/Incoming Tour Center. Alaska ferry space booking and ports of call activities reservations. 907-463-3891 7days 8am-9pm CST

B) Seminar technical topics (at GMC Western Roundups)

--Sample listing.

Air suspension. Wes Caughlan Mesa March 89, Orland Sept 89, Kingsburg Mar 90 Tucson Mar 91

Engine & MH development history Tucson AZ Mar 91 John Mitchell. Retired 1974, 35 years w/GM. John was in charge of all corporate auto engine development. He used Olds engine for compression ratio and fuels optimization tests, up to 25/1 compression ratio.

Engine removal, Up and Out: Mesa AZ March 89. Darrell Winterfeldt, Longmont CO. 303-530-4995. (With a trolley out of the side door.)

LP gas system. Tucson Mar 91. Wes Caughlan

Maintenance of GMC. Tucson Mar 91. AJ Marshall

Onan Generator. Tucson Mar 91. Eric Simonsen.

Refrigeration With heat, Theory and installation Colorado Springs CO, Sept 91

Jerry Alexander, Norcold Corporation.

Rochester Quadjet carburator, fuels, & fuel injection: Mesa AZ March 89, Orland Sept 89, Tucson Az Mar 91. Alex Wong, GMC Corp.

Rochester Quadjet carburator, Carburetor overhaul clinic. Colorado Springs CO Sept 91 Alex Wong, Dick Pyle GMC Corp.

Tandem axle alignment: Mesa AZ March 89. Fritz Slama check alignment using a ball of string. Also installed 500 cid Cad engine. Good Sam fuel economy 12.92 1982.

Turbocharging: Mesa AZ March 89. Grant Greene Lafayette CO. Darrel Winterfeldt Longmont CO.

Window channel replacement. 73/74 side windows & all Driver Pax sliding windows.

Tucson Mar 91, Al Singleton & Lee McKay

Evolution of the GMC Motorhome: Slide and video presentation, GMC advertisements, video's of sales movies, and test track movies. Tucson AZ 29Mar91 Roy Reitter who is also FMCA National Director. 314-394-9848

C) Towed Cars

- a) **Digital speedometers:** Don't add milage when ignition is off (GMC17)
- b) **Pre 1989 automatic transmission Honda's:** Can be towed on all four without any special consideration. They recommend running it and shifting through gears every 200 miles.
- c) **1991 Ford/Mercury:** Escort/Tracer manual transmission cars now approved for towing.
- d) **1991 Nissan:** Nissan has now approved several manual transmission models for towing.
- e) **Center bumper hitch:** Class III. Must cut a hole in center of bumper. \$230 + s. Gemco Motorhome Prod. 2212 E. South Weber Dr, South Webber UT 84405. 801-479-1580
- f) **Towing tips:** When towing on all 4 wheels, the steering wheel must be unlocked.
- g) **Towlite Tow Bar:** Telescopes, self aligns, and can fold and store on MH bumper. Duncan Manufacturing Co, 4091-F West 11th, Eugene OR 97402. 503-485-4692
- h) **Take apart towing dolly:** The Tow-N-Stow will dismantle into 8 pieces and go in trunk. \$1195. TOW Pro, 301 Industrial Blvd, McKinney TX 75069. 214-548-9562
- i) **Hookup for towing:** Will require safety chains, electric for stop lights/turn signals, and maybe brakes. Check when leaving campgrounds, vandals will sometimes disconnect.
- j) **1992 Saturn:** Now have Factory approval to tow Automatics, and stick shifts.

30F) Trip Preparation, Startup & Packing lists

A) Check Lists

The habitual use of a startup check list just like a pilot can become a ritual that can save you some grief. It should include at least the following items and maybe more:

Air system to travel (before you are seated)

-- Visually check Height-- outside.

Shore connections disconnected and stowed,

-- including electric adaptor plugs.

All exterior doors closed or secured

-- Generator, LP gas, Storage, ect

Trailer hookup

-- If towing (vandals disconnect)

Awing secured

Entrance door closed and locked

Refrigerator door travel latched

Stove gas off

--Range top valve & Oven pilot

TV antenna down (if you have)

Side windows closed (rear and front)

Roof vent closed

Seat belts on

Drive Defensively, Enjoy!!!

Notice it follows a walking sequence. If I have used the leveling system in the campground I start the engine, set the level system to travel/release parking brake, go outside and watch it level, and complete the check list as you return to the drivers seat and go. If you want to emphasize it, have your copilot read it to you, and you check and respond to each item. This ritual can avoid an unpleasant problem on a great trip.

The only other related problem I had was forgetting the gas cap so I now take it off, put it behind the filler pipe while refilling. This works. It also vents the California smog sleeve on the filler hose.



B) Motor Home Packing list

(Sample)

Kitchen

Dont forget silverware, Salad shooter
Paper plates, paper cups, napkins
Tupperware for storage.
roll paper towels
Ck permanent dishes, kettles
Ck: flashlight charged
Battery in clock if required.
Dish rags & towels.
Matches in jar

Refrig

Ketchup, salad dressing, butter, cheeze,
mayonaise,
Spagetti sauce
eggs, milk , Baloney
Pace picante sauce, pickles, jam, mustard
bread, Sweet rolls
salad material
soft drinks, beer
Jug tea, jug wine, jug orange juice

Freezer

Ice, icecream, hot dogs, orange juce, beef
patties

Under Sink

Dish soap, Spic&Span, Comet, Windex,
insect spray
misc canned goods, sugar, salt, Cerial
car cleaner & Armor All
Water jug--Put in fresh water

Bathroom

Tooth paste, bath soap, prell, hair spray,
toothbrushes, Jergens lotion
Sea & Ski sun tan/blocker
toilet paper, kleenix, paper towels

Bedroom

Storage/right & Headboard: bath towels,
hand towels, washrags, extra blankets,
sheets & pillowcases, Wine in
headboard.
Storage/left Your clothes
Bed made up
Electric blanket
Electric Razor on headboard
alarm clock on headboard

Under bed

Dirty clothes bag, w/laundry soap/bleach
Bicycles, folding

Shelf under Electric box

Toilet Chemicals,Extra roll toiletpaper
Air hose, connector, gauge

Closet

Hanging clothes
Toilet kits
First aid kit
Shoes, slippers

Drawers

Top: Me Swimsuit, misc clothes
Center: Kitchen
Bottom: You Swimsuit, misc clothes

Front

TV (view & edit your travel video's)
Cameras, film
Camcorder, tapes
Computer
travel info
cardix print of latest, family, gmc addresses
FMCA Member index
Campground index/guide
Maps

Misc.

Electric heater if needed.

Tool/Spare parts area

Extra engine oil, and ATF
Tool boxes
Spare parts
Electric extension, #10
Water hose
Cable TV coax.
Telephone hookup cable

Dinette seat(under)

Canned goods and soft drinks

Glove Compartment

Ck spare fuses

Top Storage Box

?extra tire & wheel(blocked so it wont slide)
---Between trips The stock is kept up for
emergencies ie earthquakes.

Clubs, & Suppliers

A) Clubs & Publications

- a) FMCA, 8291 Clough Pike, Cincinnati OH 45244-2796. 800-543-3622
FMCA has 20 GMC chapters. FMCA Motor Coaching Magazine, Member roster for contacts. ID tag for coach.
- b) GMC International Chapter(FMCA), Province Road, Barrington NH 03825.
603-664-5044 Ralph Luby. Newsletters from 1982 on.
- c) GMC Western States Chapter(FMCA), 6328 Mountford Drive, San Jose CA 95123
Tony Weir Secretary. Annual roundups have strong technical seminars. Newsletters from 1988.
- d) Good Sam Club, PO BOX 500, Agoura CA 91301. 800-234-3450
Their road service for GMC motorhomes has an outstanding reputation.
- e) GMC Motorhome Marketplace Monthly Publication \$20. 7091 Broadway -Suite D,
Merrillville IN 46410

B) Supplier List

Note this is not a complete list of all known suppliers.

A & B RV Service Inc., 22322 South Normandie, Torrance CA 90502. 213-320-444

--Lengthened Merlin Miller's (FMCA #F068889) GMC 2' at rear cap. saw at Tucson 91.

Buskirk Enterprises Inc, 116 Orval St, Sandusky MI 48471. 313-648-2444. --Servicing Dealer,
--Replacement frame, 29' stretched GMC with turbo charging and port fuel injection. Weld
aluminum wheels. Slide out battery mount, obsolete GMC parts. Restoration and full maint.
Upholstery, carpet, drapes, and cabinets.

Camping World, 800-626-5944, 19 stores across US plus catalog for mail order.

Caspro Company, PO BOX 390, Novelty OH 44072. Chuck Stoddard, 216-423-0809

--Stabilizer bars, Steering improvements, Electric fuel pump, Mirrors, ect.

Cinnabar Engineering, Wes Caughlan PE, 1036 West Loyola Drive, Los Altos

Hills CA 94022. 415-948-2618. FAX 415-948-6263 Warehouses Detroit & SF Bay area.

-GM license for GMC Motorhome parts & publications which GMC no longer stocks -Aug 92.

Note: Wes has a column in MotorHome Magazine, & organizes GMCW seminars. He also
writes Coach Talk which was distributed by the GMC Western Chapter with its newsletter.

Clasco Manufacturing Corporation, 5611 Commerce Drive, Orlando FL 32839. 407-859-1393

--Replacement side & rear window glass, Throttle cable, Transmission cable, body parts.

George/Geneva Dye, 941 Vicksburg St, Deltona FL 32725. 904-789-2057 --Drapes & Blinds.

Fredson RV Supply Co, 815 North Harbor Blvd, Santa Ana CA 92703, CAT \$3. 714-554-8000

Ken L Frey GMC Repairs, 1669 N. Old Bethlehem Pike, Quakertown PA 18951. 215-536-1246

--Servicing Dealer. Ken Lectures on repairs at numerous Roundups.

Gateway Motorhome Co, #8 Old Westbury Lane, St Louis MO 63119. 800-654-0374

314-968-8981 Bob Hendershot. --Windshields, Water Heaters, Body parts, ect.

Golby Motor Corp, Orlando FL. 407-859-9000 --Full service, machine shop, parts new & used.

Glasparts, 145 West Hereford Street, Gladstone OR 97027, 503-650-9655 --Windshields

GMC Motorhome Service, 21582 Ferguson Road. Beaver Creek OR. 503-632-6953 Bob Fry
--Servicing Dealer. Obsolete GMC parts.

Red Holman GMC, 35300 Ford Road, Westland MI 48185. 800-521-3548 FMCA Mag Ad.
--GMC Motorhome parts.

Ocean Atlantic Services Inc, 194 Cambridge Court, Ormond Beach FL 32074. 904-673-3128
--Interior refurbishing. Rect Headlight kit, Fog lamps, sun visor, bumper covers.

Osburn's RV Service Inc. Ed & Blake 6001 Hollywood NE, Albuquerque NM 87113.
505-821-0543, 821-0541 --Full service.

PADCO Bill Paden FMCA #115844 1405 San Antonio ST, Alameda CA. 510-522-1931
--Has Alcoa wheel franchise.

Peninsula Glass Co, 6005 NE 121 Ave, Vancouver WA 98682. 800-468-4323 206-892-2029
--Windshields.

Ragusa Pattern Shop INC, 1920-D East Warner Ave, Santa Ana CA 92705. 714-261-5898.
--Custom GMC castings.

Silver Motor Coach 1300 Logan Ave, Costa Mesa CA 92626. 714-545-7220.
--New coaches, restoration and full service.

Alex Sirum Auto Alex & Jeff 2013 S. Parrott Ave, Okeechobee FL. 813-763-1121
--Servicing Dealer.

Fritz Slama 839 Field Ave., Hillsboro WI 54634, 608-489-2514. FMCA#031621
--Air bag valves, Steering arm, SS water tank.
These now available from: Steve Rasmussen, 5637 133rd Street W, Savage MN 55378.
612-894-4877

Terry Olds/GMC, 10300 Springfield Pike, Cincinnati OH 45215, 513-771-3858 800-426-6745
--GMC Parts supplier, Plus they have a stock of discontinued parts. FMCA Mag ad.

T & C Custom Camper, 1592 Willow Pass Road, West Pittsburg CA 94565. 510-458-5800
--Servicing Dealer. GMC work. ie alignment, dropping tanks engine changes, ect.

J.C. Whitney, 1917-19 Archer Avenue, Chicago IL 60680. 312-431-6102

Darrel Winterfeldt, 5468 Gun Barrel Road, Longmont, CO 80503. 303-530-4995
--Rear suspension pin and spindle kit, wheel shim kit. Engine changes, 8 vane water pump.

Xantech Corp, 13038 Saticoy St, North Hollywood CA 91605. 213-982-6600
--Swivel lights if back of coach.

Note: Single item suppliers are listed in text where noted.