

4-26-84

FIELD SETUP INSTRUCTIONS

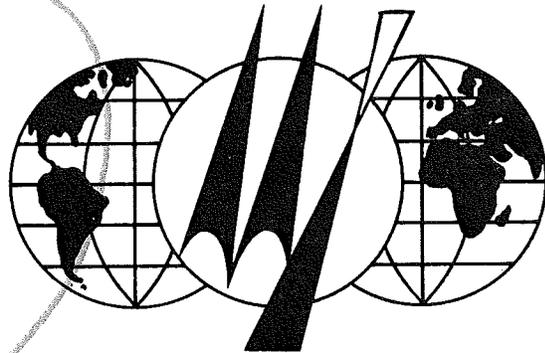
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FEDERAL MANUFACTURED
HOUSING CONSTRUCTION
& SAFETY STANDARDS

MAR 18 1983

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APPROVED



MODULINE INTERNATIONAL, INC.

P.O. BOX 3000 • LACEY, WASHINGTON 98503

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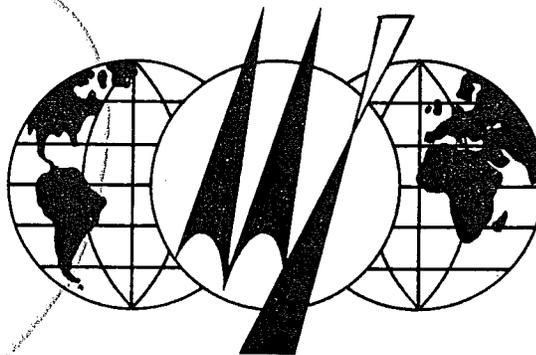
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INTRODUCTION

MODULINE HOMES MEET RIGID FEDERAL STANDARDS

This Moduline Home has been designed and constructed to meet the Federal Code administered by H.U.D. effective June 15, 1976. It also complies with Manufactured Housing Institute recommendations for mobile home construction. The Federal tag on the rear endwall of the home indicates that this home has been inspected by a federally approved inspector during its manufacture.

The following instructions are minimum requirements, consequently before installation of this home, consult with regulatory agencies in the area for codes which may require licenses and permits, or which may affect procedures recommended in this manual.

Proper set-up is essential to full customer satisfaction with this new home. In the event that you encounter unusual conditions not covered in this manual, please contact the dealer or factory service representative.

All drawings and pictures contained in these instructions are intended to be representative only.

PLEASE READ ALL INSTRUCTIONS PRIOR TO INSTALLATION OF THE HOME.

THIS MANUAL MUST STAY WITH THE HOME.

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UNITED STATES ZONE MAPS

ROOF LOAD ZONE MAP

-  NORTH 40 PSF (SNOW)
-  MIDDLE 30 PSF (SNOW)
-  SOUTH 20 PSF (SNOW)

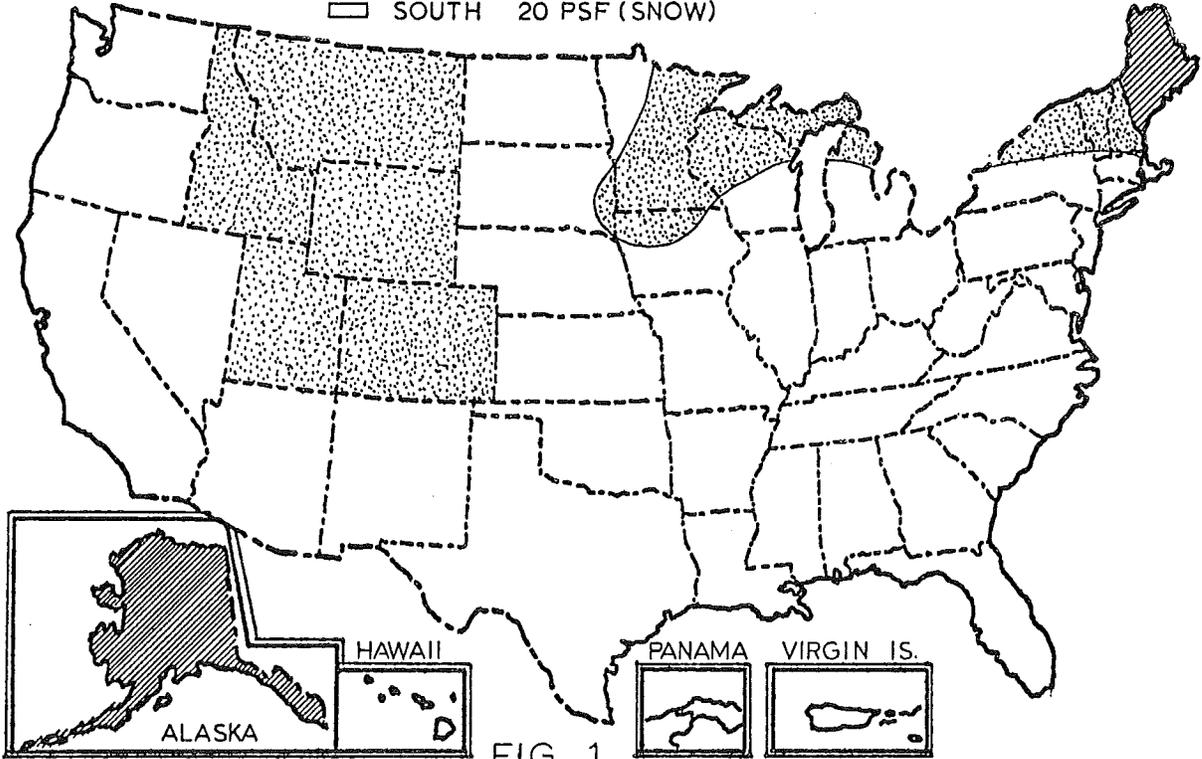


FIG. 1

WIND ZONE MAP

-  STANDARD WIND
-  HURRICANE
- ZONE I 15 PSF HORIZONTAL 9 PSF UPLIFT
- ZONE II 25 PSF HORIZONTAL 15 PSF UPLIFT

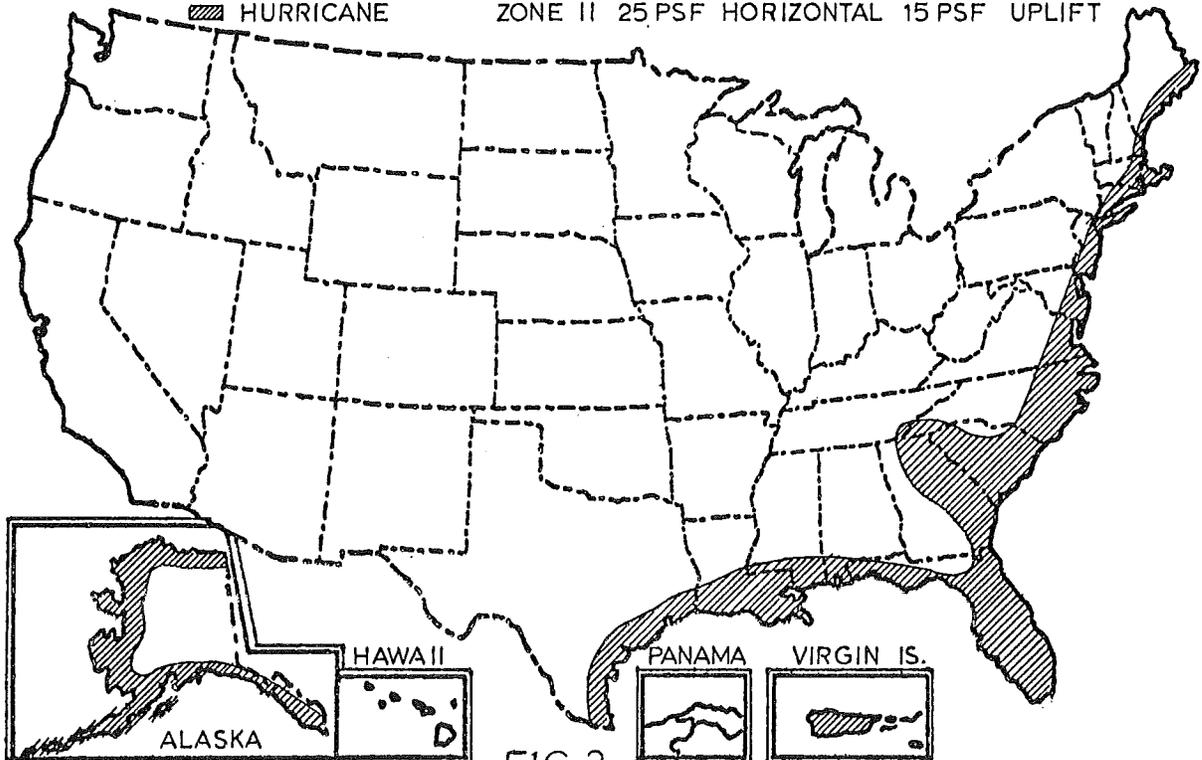


FIG. 2

SITE PREPARATION & PIER CONSTRUCTION

Proper site preparation and pier construction is necessary in order to provide a safe and sound home. An improperly set home can cause continual minor problems such as sticky doors and windows as well as permanent structural damage to the home. The methods and instructions provided in this manual have been designed and tested to insure a safe and sound foundation, therefore, it is important that these instructions be strictly followed.

The home site should be selected or properly excavated to allow proper drainage in order to prevent the accumulation of surface water both under and adjacent to the home. A vapor barrier (such as 6 mil thick polyethylene) must be placed on the ground under the home to minimize the entry of ground moisture into the home. The foundation and pier footings must be placed on firm undisturbed soil (not loose fill) or soil that has been compacted to at least 90 percent of its maximum relative density, with a minimum bearing capacity of 1000 PSF. In areas which are subject to freezing and thawing, the pier footings must be designed and placed in compliance with local building code requirements.

Homes manufactured by MODULINE INTERNATIONAL are designed to be supported by individual piers and secured with diagonal tiedowns. Figures 3 and 4 illustrate some typical acceptable piers. Figure 5 illustrates the need for the diagonal tiedowns which are discussed later in this manual.

Differing weather conditions impose varying loads on the home, Figures 1 and 2 illustrate the various regional design load zones as required by the Federal Manufactured Home Construction and Safety Standard. The footing and tiedown tables include different requirements for each zone, therefore, determine the roof and wind zone for the home site from Figures 1 and 2 before beginning installation.

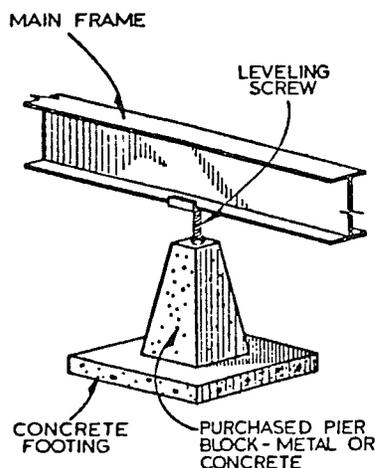


FIG. 3

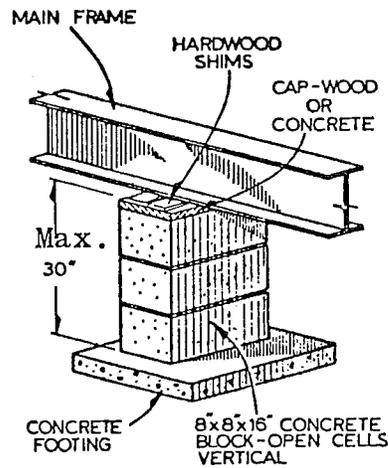
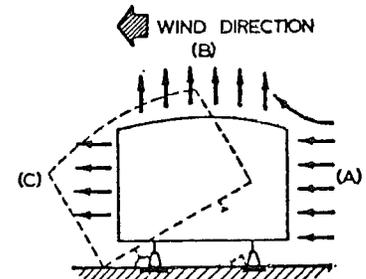


FIG. 4



WHY TIEDOWNS ARE RECOMMENDED

WITHOUT TIEDOWNS WIND:
 (A) PUSHES ON WINDWARD SIDE
 (B) LIFTS ON ROOF
 (C) PULLS ON LEE SIDE
 RESULTING IN THE HOME LIFTING OFF THE FOOTINGS AND TURNING OVER.

FIG. 5

**SINGLEWIDE
SET UP**GUIDELINES

1. Crew size should be a minimum of two experienced home installation men equipped with proper tools.
2. Use jacks with a minimum rating of 5 tons.
3. Use a steel plate $3/8''$ x $2\ 1/2''$ x $5''$ or hardwood blocks $4''$ x $4''$ x $12''$ or equivalent between jacks and steel I-beam to distribute the loads to avoid damage to the beam and voiding of the warranty.
4. Use firm support under the jack base to prevent tipping or settling of jacks.
5. Always follow the sequence of jacking outlined in these instructions to avoid overstressing structural members.
6. Excessive and/or non-uniform jacking during the leveling will cause the home to be racked and twisted which may result in damage to the home.

PROCEDURE

1. Move the home to its desired final position.
2. Using a 6 foot carpenter level, raise or lower the hitch jack until the home is approximately level front to rear. This is a preliminary level and not a final accurate positioning.
3. Jack up one side of the home by placing one jack just forward of the front spring shackle and the other jack just behind the rear spring shackle. These two jacks must be operated simultaneously to raise the home. Next, install the footings and piers just ahead of the forward jack and another pier just behind the rear jack. (Take care not to exceed the 10 foot maximum spacing requirement. To meet this requirement, on a 4 axle unit, place a pier at the center of the axle system).
4. Next, place under the I-Beam a pier, a maximum of 1 foot from the front of the front cross-member and another a maximum of 1 foot from the rear of the home. Adjust the pier heights to keep the home approximately level from front to rear.
5. Repeat steps 3 and 4 for the other side of the home. At the completion of this step, the home should be roughly level from front to rear and from side to side.
6. Place the remaining pier supports under the main I-beam on each side taking care not to exceed the maximum spacing allowable according to the foundation system required for your home and site. If perimeter blocking is required, position the piers at this time.
7. Adjust the final height of the piers as required to obtain a final level floor. Using a carpenter's level, check front to rear and side to side at several points along the floor over the length of the home. Level the home by using the pier block screw jacks or with hardwood shims if concrete blocks are used for piers.
8. Install the tie down system. Tie down straps and anchors shall be installed in accordance with the instructions in this manual.

THIS COMPLETES THE INSTALLATION PROCEDURE, AT THIS TIME THE FLOOR SHOULD BE LEVEL, THE WALLS PLUMB AND ALL DOORS & WINDOWS SHOULD OPERATE FREELY.

**DOUBLEWIDE
SET UP**DOUBLEWIDE SET-UP & BLOCKING

1. The site should be prepared as described for singlewides.
2. Remove polyethylene and wood strip closure materials from both halves of the home. Do not remove temporary structural supports.
3. Position the halves as close together as possible.
4. Draw the two floors together by jacking at an angle. It may be necessary to winch the halves together with a "come along". Be careful not to overstress or bend any structural member during this final positioning phase. A greased piece of plywood or metal sheet under the tires will aid in sliding one half to the other.
5. Install pier blocks and level the heavy half of the doublewide home. Blocking should be accomplished similar to the singlewide method maintaining the 8'-0" o.c. maximum pier block spacing except that the inside axle area blocking should be initiated first. See Pages 7 or 10 for blocking.
6. Seal any potential areas of air infiltration around the floor, walls and ceiling marriage line with insulation, caulking, gasket or a similar sealing material.
7. Correct any alignment problems in endwalls and interior walls during alignment and blocking of the second half.
8. When the two halves are properly aligned and the roofs slightly apart, toenail the two floors together at 32" o.c. if desired, using small spikes or lag screws.
9. Close the ceiling/roof gap by raising the outside of the second half with hydraulic jacks. Longitudinal roof alignment can be accomplished by raising or lowering the outside corners of the second (or light) half.
10. Although not required, the ridge beam halves may be connected together at this time. If desired, fasten the top of the ridge beam together with 1/4" bolts through predrilled holes or 1/4" lag screws (toenailed at 32" o.c.) Step 13 must still be completed as specified.
11. Finalize leveling of the second half.
12. Check the entire marriage connection for proper seal, alignment and tighten all fasteners.
13. Install the galvanized cap over the center beam with putty tape under each side. Secure with No. 8 x 3/4" wood screws. Seal along both sides and joints of cap with roof coating (See Figure 7).

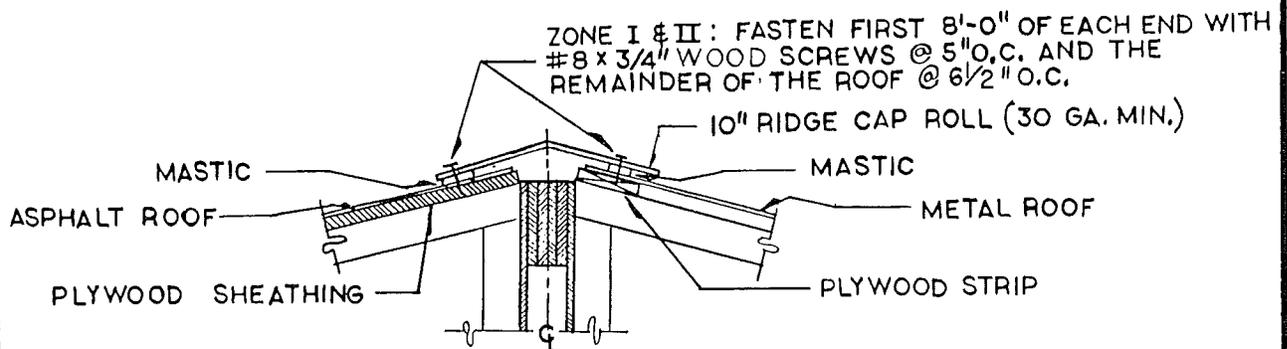


FIG. 7

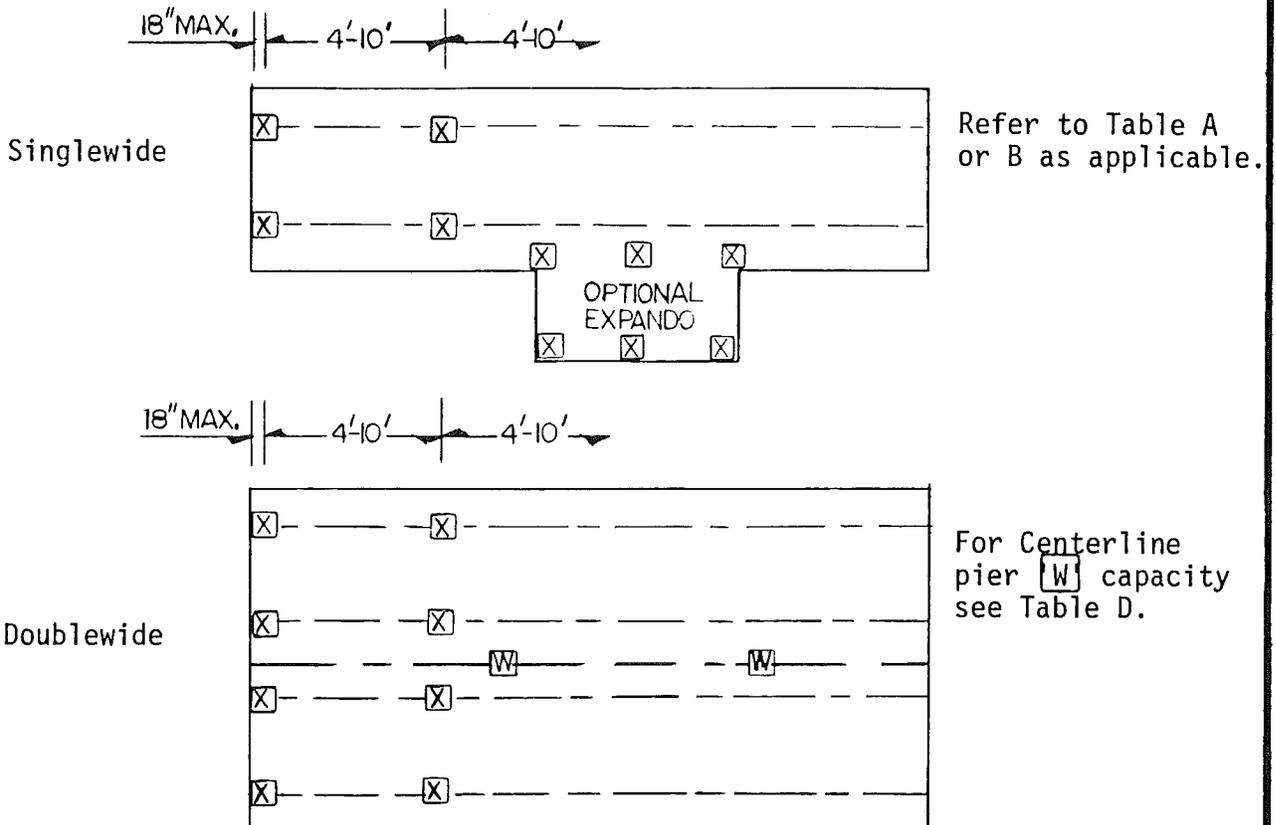
STANDARD PIER TYPE BLOCKING

Standard Pier Type Blocking is the most common arrangement of footings. The footings are spaced as evenly as practical under the main I-Beam. This method is not approved for roof load zones exceeding 40 PSF.

If the home has 6" or wider eaves, you must use Table 'B'. If the home has no eaves or eaves less than 6" wide, you should use Table 'A'. Loads for piers spaced from 4' to 10' are shown on all tables. The maximum recommended spacing of piers is eight (8) feet. See the plans below for further information.

Once you have arrived at the load for each pier load, that load can not exceed the capacity of the pier and footing used. The footing capacity may be determined by multiplying the area (sq. ft.) times the local soil bearing capacity.

See page 14 for General Construction Notes.



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STANDARD PIER TYPE BLOCKING
TABLE 'A'

WITHOUT OVERHANGING EAVES

	LIGHT OR HEAVY	PIER 'X' SPACING	ACTUAL PIER 'X' LOAD		
			So. ZONE (20 PSF)	MID ZONE (30 PSF)	No. ZONE (40 PSF)
12' & 24' WIDES	LIGHT HOME	4	1893	2130	2366
		5	2366	2662	2958
		6	2840	3195	3549
		7	3313	3727	4141
		8	3786	4259	4732
		9	4259	4792	5324
	10	4732	5324	5915	
	HEAVY HOME (Asphalt roof or hardboard siding)	4	2106	2343	2579
		5	2633	2928	3224
		6	3159	3514	3869
		7	3685	4099	4514
		8	4212	4685	5158
9		4738	5271	5803	
10	5265	5856	6448		
14' & 28' WIDES	LIGHT HOME	4	2213	2490	2766
		5	2766	3112	3458
		6	3320	3735	4149
		7	3873	4357	4841
		8	4426	4979	5532
		9	4979	5602	6224
	10	5532	6224	6915	
	HEAVY HOME (Asphalt roof or hardboard siding)	4	2462	2739	3015
		5	3078	3423	3769
		6	3693	4108	4523
		7	4308	4792	5277
		8	4924	5477	6030
9		5539	6162	6784	
10	6155	6846	7538		
16' & 32' WIDES	LIGHT HOME	4	2468	2776	3084
		5	3084	3470	3855
		6	3700	4164	4626
		7	4318	4858	5397
		8	4935	5552	6168
		9	5552	6246	6939
	10	6168	6939	7710	
	HEAVY HOME (Asphalt roof or hardboard siding)	4	2745	3054	3362
		5	3431	3817	4202
		6	4118	4580	5043
		7	4804	5343	5883
		8	5490	6107	6724
9		6176	6870	7564	
10	6862	7633	8404		

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STANDARD PIER TYPE BLOCKING
TABLE 'B'
WITH OVERHANGING EAVES

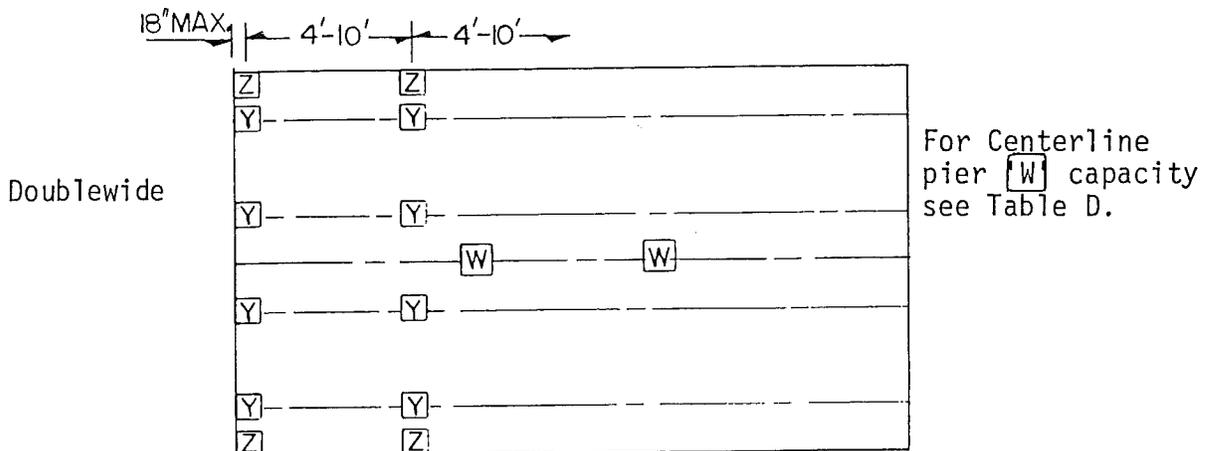
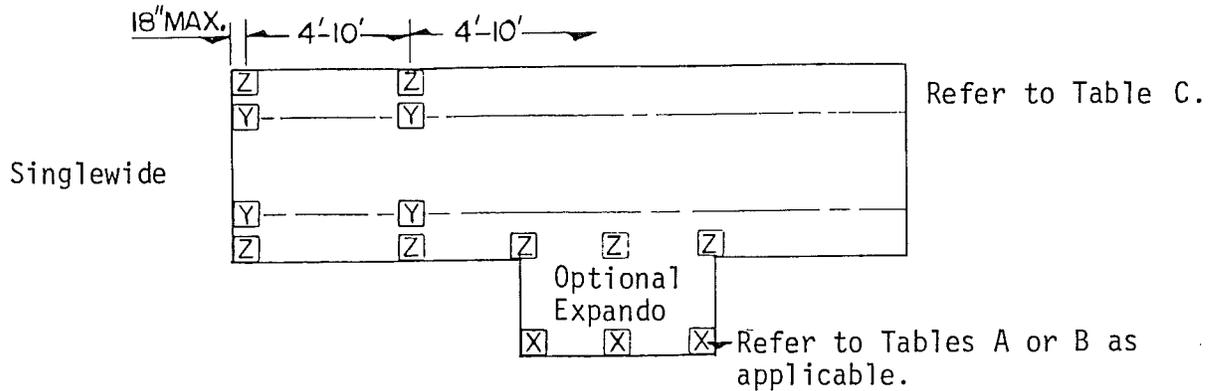
	LIGHT OR HEAVY	PIER 'X' SPACING	ACTUAL PIER 'X' LOAD		
			So. ZONE (20 PSF)	MID ZONE (30 PSF)	No. ZONE (40 PSF)
12' & 24' WIDES	LIGHT HOME	4	2015	2305	2595
		5	2519	2881	3244
		6	3023	3458	3892
		7	3527	4034	4541
		8	4030	4610	5190
		9	4534	5187	5839
		10	5038	5763	6487
	HEAVY HOME (Asphalt roof or hardboard siding)	4	2250	2540	2829
		5	2813	3174	3537
		6	3375	3810	4245
		7	3937	4444	4952
		8	4500	5079	5659
		9	5062	5715	6366
		10	5625	6349	7074
14' & 28' WIDES	LIGHT HOME	4	2335	2666	2995
		5	2919	3332	3744
		6	3504	3998	4492
		7	4087	4664	5241
		8	4671	5330	5990
		9	5254	5997	6739
		10	5554	6663	7487
	HEAVY HOME (Asphalt roof or hardboard siding)	4	2606	2659	3265
		5	3259	3670	4082
		6	3909	4404	4899
		7	4560	5137	5715
		8	5212	5871	6531
		9	5863	6606	7347
		10	6515	7339	8164

PERIMETER TYPE FOUNDATION

Perimeter type blocking is required for roof load zones exceeding 40 PSF and optional for load zones of 40 PSF and less. This method will provide a much more stable set-up. The footings are spaced as evenly as practical, both under the main I-beams and home perimeter.

Refer to Table 'C' for the footing loads when using Perimeter type foundation. Loads for piers spaced from 4' to 10' are shown for footings under the I-beam, 'Y' footings, and for the footings under the home perimeter, 'Z' footings. The maximum pier spacing allowed is 10 feet. See the plans below for further information.

Once the load supported by each pier is determined, the pier and footing size must be determined so that the load bearing capacity of the selected pier type and footing type and size equals or exceeds the actual imposed loads as determined from the previous tables. The footing capacity may be determined by multiplying the footing area in square feet times the allowable soil bearing pressure which can typically be determined from local building inspection office records. To aid in this endeavor, some typical soils and bearing pressures are presented on page 13 along with some typical pier footing capacities.



PERIMETER TYPE BLOCKING

(REQUIRED IN ROOF LOAD ZONES EXCEEDING 40 PSF)

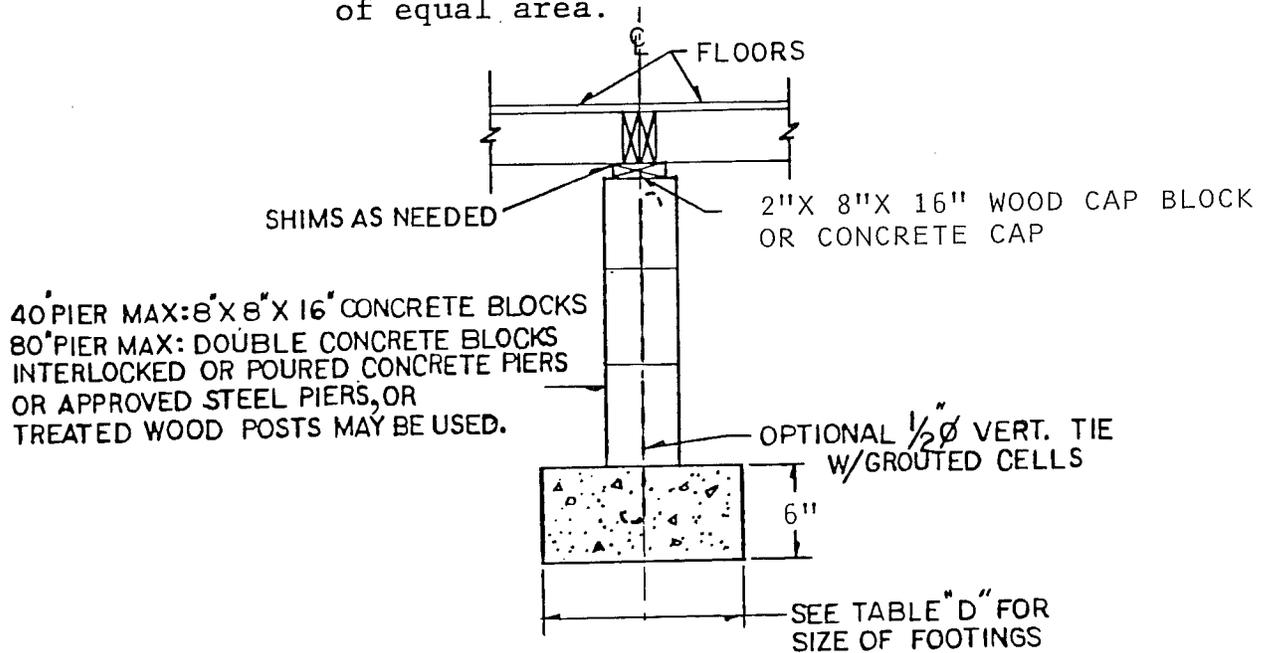
TABLE 'C'

	LIGHT OR HEAVY	Pier Y&Z Spacing	PIER 'Y' LOADS All Load Zones	PERIMETER PIER 'Z' LOADS				
				OPTIONAL			REQUIRED	
				20	30	40	80	
12' & 24' WIDES	Light Home	4	1216	976	1212	1448	2396	
		5	1520	1220	1515	1810	2995	
		6	1824	1464	1818	2172	3594	
		7	2128	1708	2121	2534	4193	
		8	2432	1952	2424	2896	4792	
		9	2736	2196	2727	3258	5391	
		10	3040	2440	3030	3620	5990	
		Heavy Home (Asphalt Roof or hard-board siding)	4	1216	1328	1564	1800	2748
			5	1520	1660	1955	2250	3435
			6	1824	1992	2346	2700	4122
	7		2128	2324	2737	3150	4809	
	14' & 28' WIDES	Light Home	4	1424	1180	1456	1732	2840
			5	1780	1475	1820	2165	3550
			6	2136	1770	2184	2598	4260
7			2492	2065	2548	3031	4970	
8			2848	2360	2912	3464	5680	
9			3204	2655	3276	3897	6390	
10			3560	2950	3640	4330	7100	
Heavy Home (Asphalt roof or hard-board siding)			4	1424	1544	1824	2100	3204
			5	1780	1930	2280	2625	4005
			6	2136	2316	2736	3150	4806
		7	2492	2702	3192	3675	5607	
16' & 32' WIDES		Light Home	4	1600	1228	1536	1844	3076
			5	2000	1535	1920	2305	3845
			6	2400	1842	2304	2766	4614
	7		2800	2149	2688	3227	5383	
	8		3200	2456	3072	3688	6152	
	9		3600	2763	3456	4149	6921	
	10		4000	3070	3840	4610	7690	
	Heavy Home (Asphalt roof or hard-board siding)		4	1600	1608	1916	2224	3456
			5	2000	2010	2395	2780	4320
			6	2400	2412	2874	3336	5184
		7	2800	2814	3353	3892	6048	
			8	3200	3216	3832	4448	6912
			9	3600	3618	4311	5004	7776
			10	4000	4020	4790	5560	8640

DOUBLEWIDE CENTERLINE BLOCKING

Doublewide homes also require support at the centerline of the home. A code number is marked under the home at specific locations, indicating a specific size and capacity of footing that is required at this location. Refer to Table 'D' for an explanation of each symbol. See the figure below for further details.

Example: At one location, the number '2' is marked. By referring to Table 'D' you can see the actual load on the pier and footing is 4600 pounds. If the soil bearing capacity on the site is 1500 Psf, you must use a 21½" x 21½" or larger footing or a round footing of equal area.



TYPE "W" CENTER PIER

A tag and the numbers 1, 2, 3, 4, 5 and/or 6 are marked at several locations on the bottom of each home along its centerline. At the approximate location of each number, center that particular pier, detailed on this page, under the post supporting the roof system.

DOUBLEWIDE CENTERLINE BLOCKING

TABLE 'D'

MINIMUM 'W' FOOTING SIZES BASED ON SOIL BEARING					
SYMBOL	MAX. LOAD	SOIL BEARING CAPACITY			
		1000 PSF	1500 PSF	2000 PSF	2500 PSF
①	2500#	19" x 19"	16" x 16"	14" x 14"	12" x 12"
②	4500#	26" x 26"	21" x 21"	18" x 18"	16" x 16"
③	8000#	34" x 34"	28" x 28"	24" x 24"	22" x 22"
④	10000#	38" x 38"	31" x 31"	27" x 27"	24" x 24"
⑤	14000#	45" x 45"	37" x 37"	32" x 32"	29" x 29"
⑥	18000#	51" x 51"	42" x 42"	36" x 36"	33" x 33"

MAXIMUM LOAD FOR A FOOTING SIZE
BASED ON SOIL BEARING

FOOTING SIZE	SOIL BEARING CAPACITY			
	1000 PSF	1500 PSF	2000 PSF	2500 PSF
12" x 12"	—	—	—	①
16" x 16"	—	①	①	②
20" x 20"	①	①	②	②
24" x 24"	①	②	③	④
30" x 30"	②	③	④	⑤

TYPICAL PIER CAPACITIES

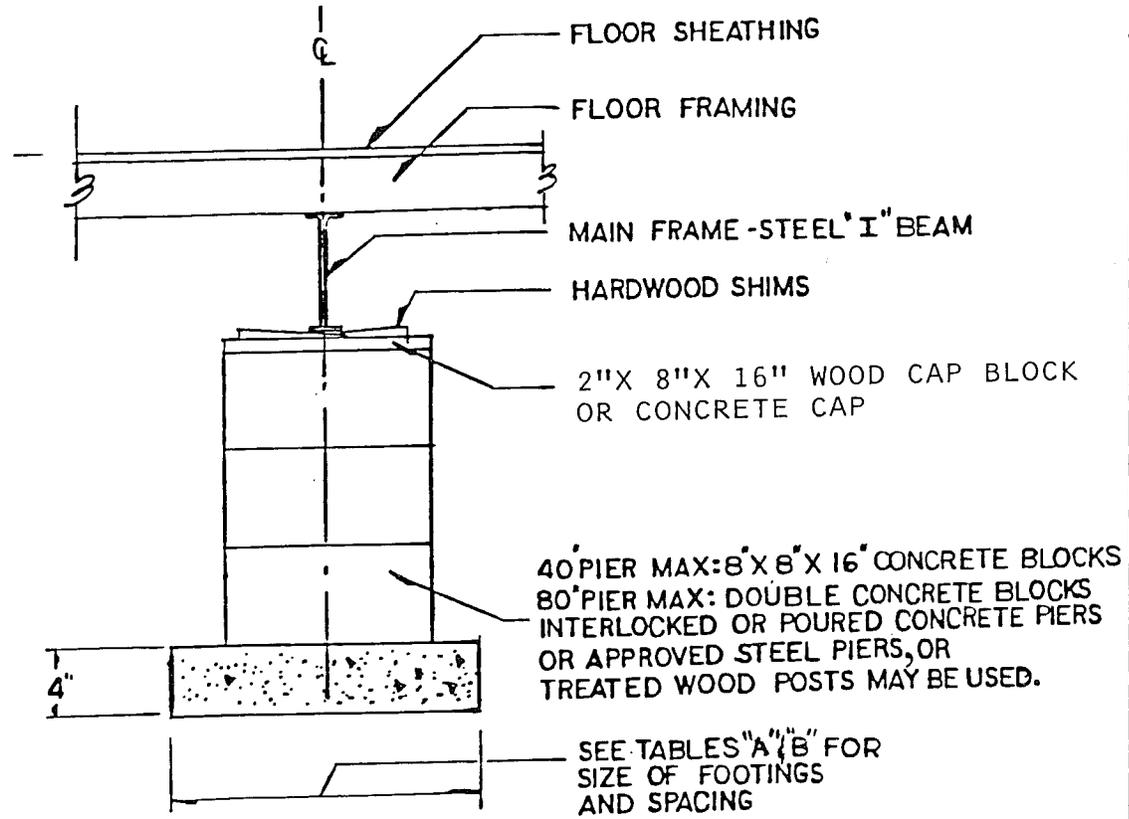
PIER TYPE	TYPICAL CAPACITY
Steel	2000# to 10,000#
Wood(6"x8")	14,000#
Concrete Block	20,000#

TYPICAL SOIL CAPACITIES

SOIL TYPE	BEARING PRESSURE
Compact Sand & Gravel, Hard Clay	2000+ PSF
Loose, Medium and coarse sand, fine compact sand, compact sandy loam, medium clay	1500 PSF
Fine loose sand, loose sandy loam, soft clay	1000 PSF

GENERAL CONSTRUCTION NOTES

1. Main frame pier block location can affect the operation of windows and doors. Therefore, blocking may need periodic adjustment to allow smooth operation of windows and doors.
2. Type 'z' pier blocks are located at the sides of sliding glass doors under the main frame beam to allow smooth operation.
3. The perimeter joist must have 16 square inches of bearing at the top of footing when supported.
4. A maximum setback of 18" from the end of the frame is allowed for endwall piers.
5. Endwall piers may be one-half of the amount shown on the tables.
6. A 'w' footing is required to support all doublewide center-line ridge beam posts and must not be substituted for an 'x' footing.



TYPE "X" - I BEAM PIER SUPPORT

TIP OUT ROOM FIELD INSTALLATION

The mobile home and tip-out room have been designed as a unit to meet the Federal Construction Standard. In order that the warranty be maintained, it is important that the installation be accomplished in accordance with the following instructions:

The home must be in its final level position with all piers and supports installed before tip-out installation.

A minimum of two experienced mobile home men should be available for the tip-out room installation. Never attempt to make the installation without experienced and qualified assistance.

PROCEDURE

1. Install piers and/or footings. See Page 7 or 10.
 2. Carefully lower the tip-out onto the piers and level with hardwood chips or screw jacks.
- NOTE: Do not attempt to level the tip-out by changing the level of the main home.
3. Secure inside panel facia to the exterior wall of the main unit with screws.
 4. Trim the exterior gaps with the insulation strips supplied with the home.
 5. Install roof and aluminum sidewall flashing.
 6. Caulk any open seams.
 7. For electrical crossover your home may be connected by direct wiring (schematic in owner's pack) or secure electrical crossover. See figure 13.
 8. The tip-out must be tied down. See Figure 9 for tip-out tie-down information.

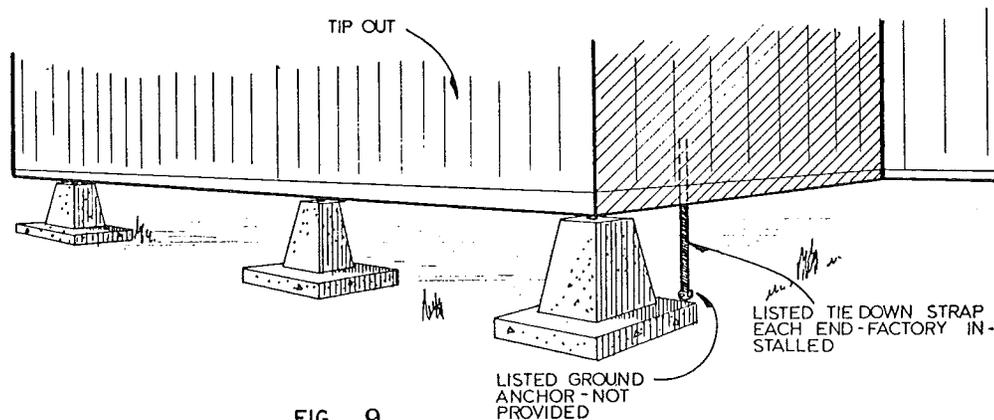


FIG. 9

EXPANDO FIELD INSTALLATION

The mobile home & expando room have been designed as a unit to meet the Federal Manufactured Home Construction and Safety Standard. In order that the warranty be maintained, it is important that the installation be accomplished in accordance with the following instructions:

The home must be in its final level position with all piers and supports installed before expando installation.

PROCEDURE:

1. Install the piers and/or footings. See Page 7 or 10.
2. Carefully lower the expando floor onto the piers and level with hardwood shims. Please be careful, the floor is very heavy (400# for the 12 foot expando and 700# for the 20 foot expando).
 NOTE: Do not attempt to level expando by changing the level of the main home.
3. Carefully push expando into position on the expando floor.
4. Secure the expando to the floor using #8 wood screws at 16"o.c. or the lag screws supplied. Install the lags in the predrilled holes in the floor perimeter.
5. 20 foot expando only: Install the expando opening post under the expando beam (11'-6" max. from either end of the expando) and install a pier block directly under this post.
6. Install blocking at 16"o.c. between the expando beam and the sidewall header.
7. Fill the exterior gaps and uninsulated interior bays with insulation provided. Caulk or paper open gaps or seams to limit air infiltration.
8. Secure the electrical crossover. See figure 13
9. Fasten interior finish paneling securely to the studs and overhead beam with finish nails or staples.
10. Install the exterior metal and trim provided.
11. The expando must be anchored to the ground using the straps provided. (See Figure 10)
12. Test the electrical circuit and inspect for water leakage.

EXPANDO

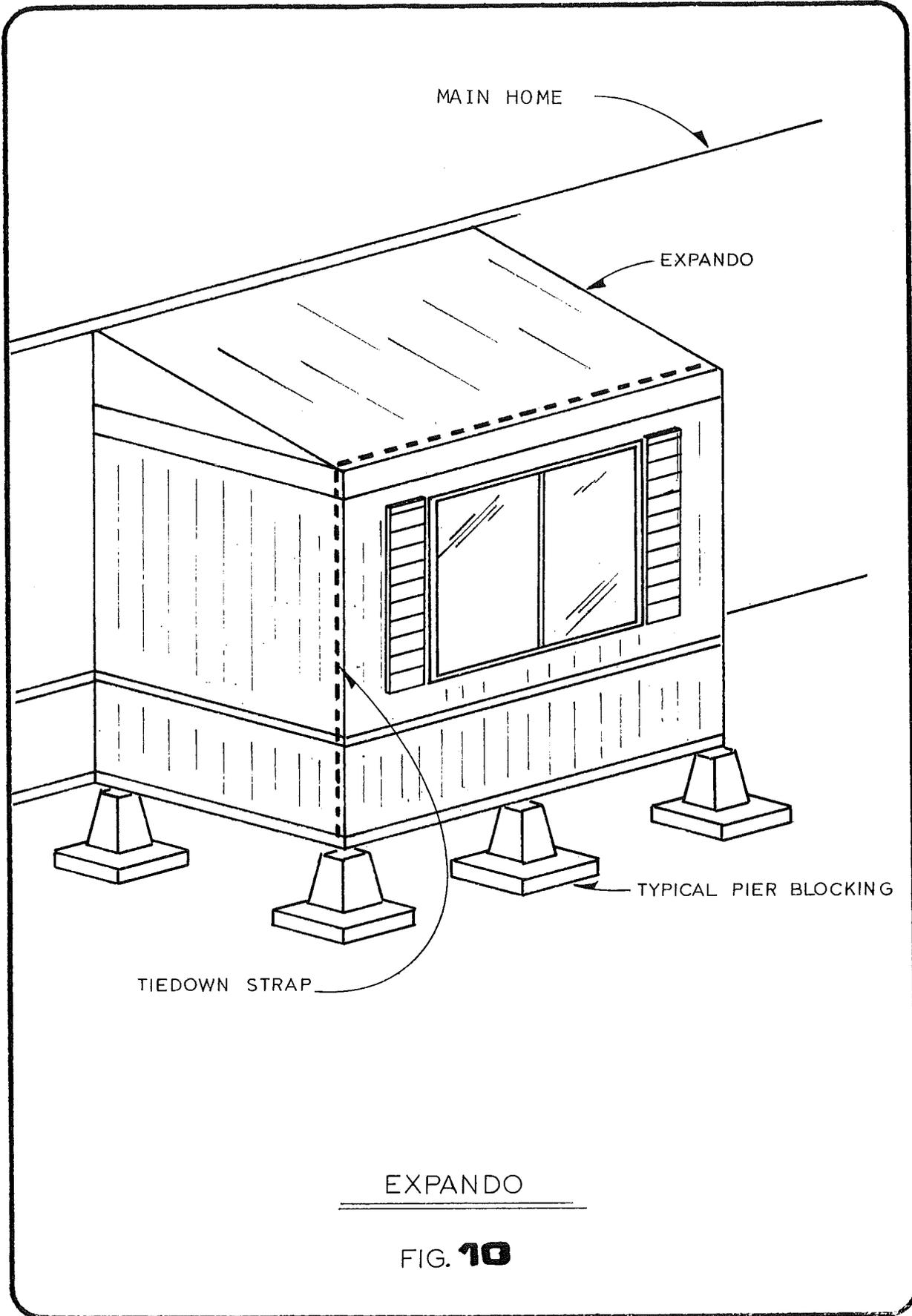


FIG. 10

TIE-DOWN INSTRUCTIONS

Manufactured homes located in the United States must be securely anchored to the site in order to resist wind forces. Figure 2 indicates U.S. wind zones as specified by the Federal Standard. A data plate located near the electrical distribution panel indicates which structural zone the home was designed for.

MODULINE INTERNATIONAL homes do not include the hardware necessary to complete the tie-down system. Approved tie-down equipment is available through the dealer or manufactured home supply stores.

GENERAL REQUIREMENTS FOR TIE-DOWN EQUIPMENT

Tie-down systems must consist of certified materials of adequate strength. Material specifications contained herein should be considered as minimum specifications.

Galvanized cable or steel straps must have at least 4,725 pounds breaking strength. Type 1, Finish B, Grade 1 steel strapping, 1½ inches wide and 0.035 inch thick, conforming with Federal Specification QQ-S-781-H, is typical.

Galvanized connection devices must have at least 4,725 pounds breaking strength.

Ground anchors should be installed per the manufacturer's recommendations and should withstand a minimum 4,725 pounds pull.

TIE-DOWN PROCEDURE

See Page 19 for tie-down details. For your convenience the frame is stenciled "Tie-Down" at each point that a tie-down is required for the zone in which the home is located.

Attach the tie-down equipment only after the home is properly leveled.

1. Place ground anchors in line with each tie-down clip and below the perimeter edge of the home. Do not install the anchors outside the perimeter of the home in order to avoid interference with the skirting installation.
2. Attach tension devices and cables or straps to the anchors and the attachment clips.
3. Tighten all tie-downs until they become taut in an alternating pattern from one side of the home to the other.

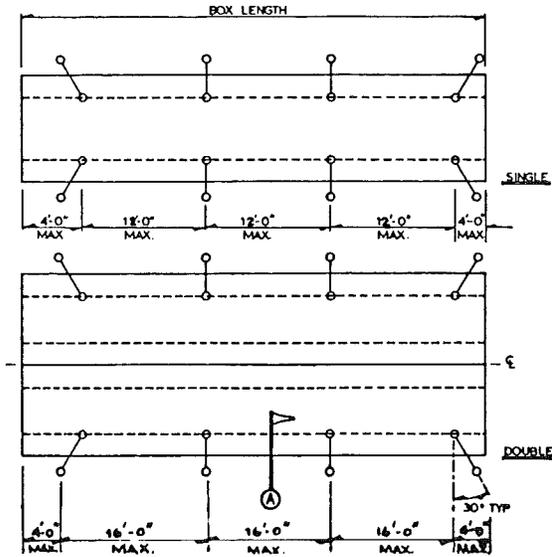
Periodical tightening and adjustment of the tie-downs may be necessary.

A detailed tie-down system by "Minute Man Anchors" is included as one acceptable system of anchorage. There are many systems available which you may choose from, as long as they meet the general requirements listed above and on Page 19.

TIE-DOWN INSTRUCTIONS

TIE DOWN PLACEMENT

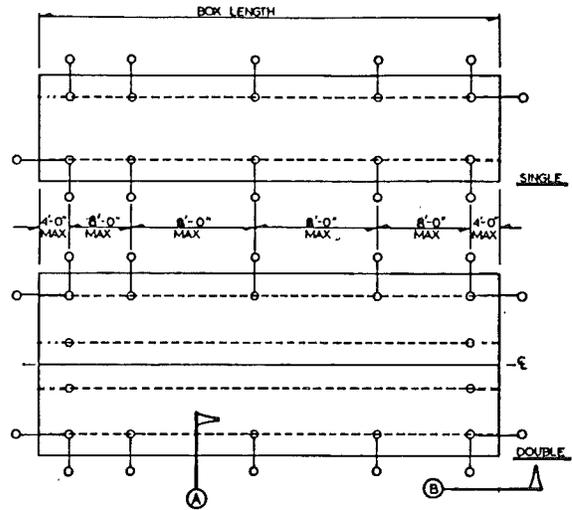
ZONE I - 15 PSF WIND



WIND ZONE I TIEDOWN SUMMARY

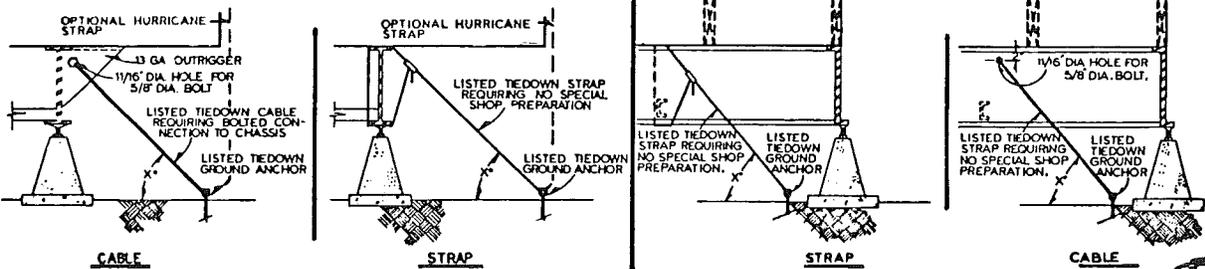
ACTUAL HOME LENGTH	NUMBER OF TIEDOWNS REQUIRED EACH SIDE	
	SINGLEWIDE	DOUBLEWIDE
36' to 44'	4	4
45' to 56'	5	4
57' to 68'	6	5
69' to 80'	7	6

ZONE II - 25 PSF WIND



WIND ZONE II TIEDOWN SUMMARY

ACTUAL HOME LENGTH	NUMBER OF TIEDOWNS REQUIRED EACH SIDE
36' to 40'	5
41' to 48'	6
49' to 56'	7
57' to 64'	8
65' to 72'	9
73' to 80'	10



Pier Height	ANGLE 'X' RANGE			
	Singlewide		Doublewide	
	Zone I	Zone II	Zone I	Zone II
10"	1° - 7°	3° - 6°	0° - 9°	1° - 7°
20"	1° - 6°	3° - 4°	0° - 6°	1° - 5°
30"	1° - 5°	3° - 4°	0° - 5°	1° - 5°

NOTE:

1. A cross member must be adjacent to each tie-down.
2. Tie-down straps are designed to wrap around main frame (see tie-down manufacturer's fastening details).
3. The required diagonal frame tie-downs must not be deleted even when used in conjunction with the supplemental Hurricane Straps. If your home is equipped with supplemental 'over the top' Hurricane Straps, connect them to separate ground anchors using the appropriate listed connector.
4. End tie-down straps shown for Wind Zone II may be reversed to be connected to anchors located under the home. However, both must be angled in from the front and rear or both must be angled out from the front and rear.



TIE-DOWN INSTRUCTIONS

GROUND ANCHORAGE

The following Minute Man anchoring method is for reference only and all anchoring should be completed as per anchor manufacturer's instructions.



Minute Man anchors®

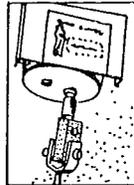


INSTALLATION

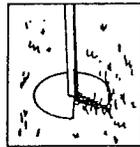
There are two basic methods of installing anchors, each equally effective in properly securing mobile homes to the ground.

Machine Installation

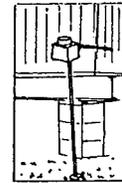
In this method, the anchor is turned the **full depth** of four feet into the ground by an anchor drive machine.



1. Attach anchor to machine.



2. Auger is placed in proper position in line with strap, and machine started.



3. Anchor should be installed at a slight angle as shown to assure head being positioned behind future skirting.

Installation with Manual or Mechanical Post Hole Digger

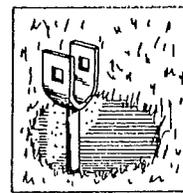
In this method, anchors can be installed with equipment available to the average home owner.



1. A hole is dug to a depth of approximately two feet in the proper position as explained under machine installation.



2. After the hole is dug to 24" depth, the anchor is turned into the ground by hand, using a rod or length of pipe for leverage.



3. After anchor is installed to full depth, earth is repacked, six inches at a time.

CAUTION: These instructions cover installation for frame ties only, and apply to those mobile homes that are specifically engineered to require only frame ties as specified in the mobile home manufacturer's printed installation instructions. Particular attention should be directed to selecting the proper capacity anchoring system, consistent with the home manufacturer's recommendations.

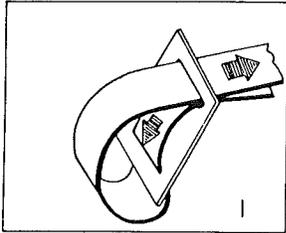
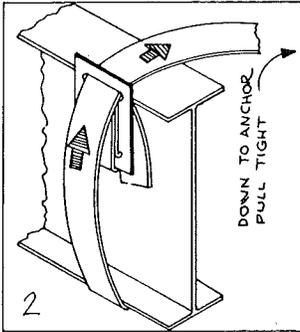
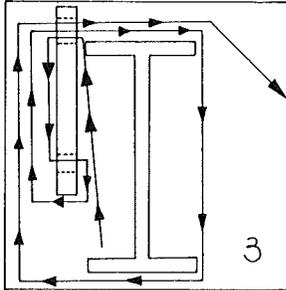
FOR FRAME TIES ONLY

TIE-DOWN INSTRUCTIONS

2.

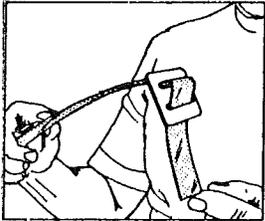
POSITIONING FRAME TIE

FRAME TIE INSTALLATION INSTRUCTIONS

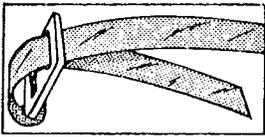




1. Thread 7' length of frame tie strap through buckle as shown.
2. Next, thread long end of strap between frame and floor of home. Bring strap through buckle as shown in diagram and fasten to anchor head.
3. Diagram showing strap in position around frame and through buckle. It is important to remove all slack from system.

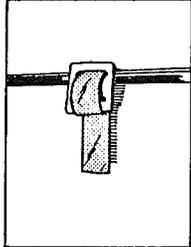
1. See step one in installation instructions.



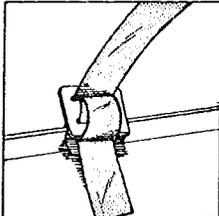
2. Insert strap in position through buckle.



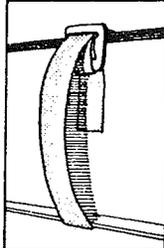
3. Strap should be through buckle in this configuration before installation on frame.



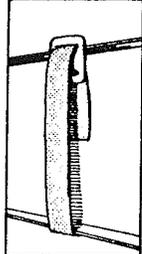
4. Strap should be passed over frame from inside, and buckle pulled into position as shown.



5. Strap should encircle frame and pass through buckle for the second time and over the frame.



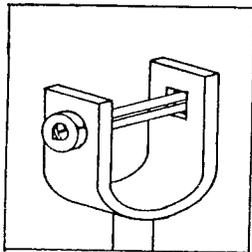
6. Strap is pulled tight from outside, or anchor side, of frame.



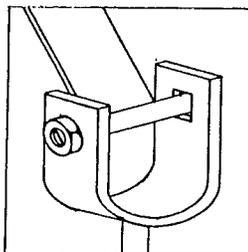
7. Inside of frame tie, properly installed.

**TIE-DOWN
INSTRUCTIONS****PROPER TENSIONING OF STRAP TO ANCHOR HEAD 3.**

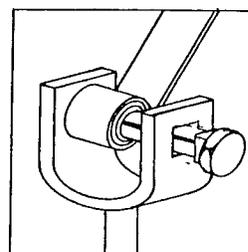
Note: The tensioning bolt can be inserted in the head from either side.



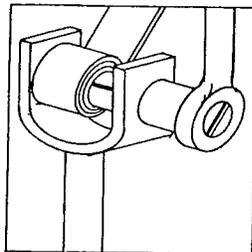
1. Insert bolt into head; attach nut loosely.



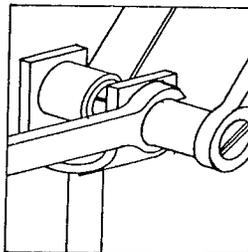
2. Insert strap in slot of bolt 5/8", or until strap is flush with far side of bolt.



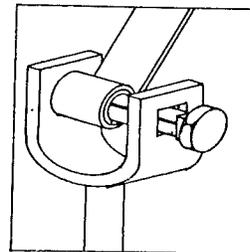
3. Bend strap 90° and take at least four complete turns on bolt until strap is taut.



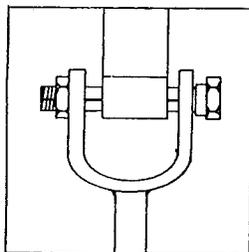
4. Bolt is turned with 15/16" socket wrench, or adjustable wrench, on hex head.



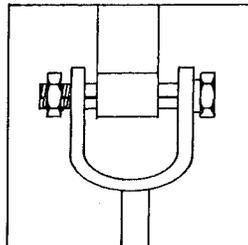
5. To hold bolt under tension while re-positioning wrench, an open-end wrench is placed on 5/8" square shoulders of bolt.



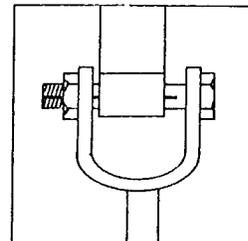
6. Align square shoulders of bolt with square hole in anchor head.



7. Holding hex head of bolt in position, tighten nut to draw square shoulders into square hole.



8. Shoulders are now in locking position; continue to tighten nut.



9. Tensioning device is now in locked, secure position.

For clarity, tools not shown on most photos above.

ELECTRICAL UTILITY CONNECTION

ELECTRICAL CONNECTION

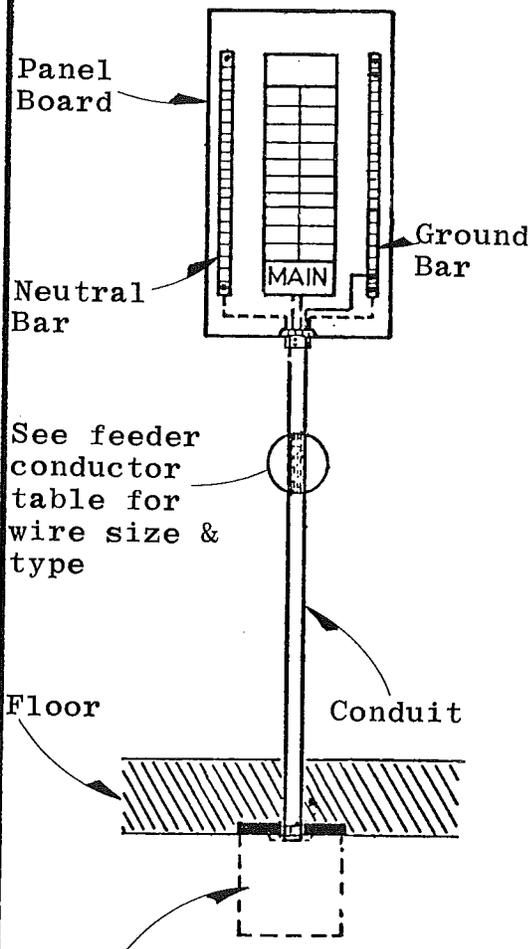
The bottom feeder assembly must have a junction box (sized in accordance with the chart) or suitable fitting attached to the raceway (conduit). The proper size conductors must be installed from the main power supply to the panel-board. (See feeder conductor table for wire size and type)

It is the home owners responsibility to provide the supply connection.

Moduline recommends that all electrical work performed on the finished home be accomplished by a qualified, licensed electrician and in conformance with applicable codes.

NOTE: Your home may be equipped with a 50 amp plug-in type power cord. If so, site preparation must be made for a plug-in power box.

CAUTION: Water heater must be completely filled before activating water heater circuit.



JUNCTION BOX SIZES

- 50 Amp - 4"x 8"x 8"
- 100 Amp - 4"x10"x10"
- 200 Amp - 4"x12"x12"

Fig. 11

FEEDER CONDUCTOR TABLE

WIRE	WIRE SIZE & TYPE			TEMP. RATING
	50 AMP	100 AMP	200 AMP	
HOT	#6 THW-CU.	#3 THW-CU.	3/0 THW-CU.	75° C
HOT	#6 THW-CU.	#3 THW-CU.	3/0 THW-CU.	75° C
NEUTRAL	#10 THW-CU.	#6 THW-CU.	#3 THW-CU.	75° C
GROUND	#10 THW-CU.	#8 THW-CU.	#6 THW-CU.	—

RADCO

FEDERAL MANUFACTURED
HOUSING CONSTRUCTION
& SAFETY STANDARDS

MAR 18 1983

6

APPROVED

WATER UTILITY CONNECTION

The water distribution system may be connected to any safe potable water source. The location of the inlet is under the rear half of the home and consists of a single 3/4" pipe with a cap. A label located near the inlet should help you locate it.

WATER PRESSURE DESIGN

This home has been designed for an inlet water pressure of 80 PSI. When water pressures exceed 80 PSI, a pressure reducing valve must be installed.

SHUT OFF VALVE INSTALLATION

A master shut off valve should be installed between the potable water source and the water inlet. The valve shall be either a full port gate valve or a full port ball valve, and have threaded or solder joints.

TESTING

The home water system was tested for leaks before it was shipped from the factory. Due to vibration and shock encountered in transit, it is important that plumbing and water heater connections be re-checked for any possible leakage.

Testing of the water distribution can be done by subjecting the system to air or water at 80 PSI for 15 minutes without loss of pressure.

DRAINAGE OF WATER LINES

In order to drain the water lines the following procedure should be used:

1. Shut off water supply at the main inlet and open all faucets in the home.
2. Disconnect the water lines at the water heater. Attach a pressurized air system to these lines and blow the water out. Do not pressurize the water heater.
3. Drain the water heater by running a drain hose to the exterior of the home and opening the water heater valve.

PROTECTION FROM FREEZING

All exposed water piping, in climates subject to freezing, should be protected by insulation or electric heat tapes. Any heat tape used is to be listed for manufactured home use. An electrical outlet (receptacle) has been provided beneath the home within two (2) feet of the water inlet line for plugging in a heat tape.

DRAIN UTILITY CONNECTION

The drainage system in your MODULINE home was tested for leaks before your home was shipped from the factory. Due to vibration and shock encountered in transit, it is important that plumbing be re-checked for any possible leakage.

The 3" main drainage outlet is located in the rear half of the home. Insure that the drain pipe from the main drain outlet to the sewage outlet is securely blocked and has at least 1/4" per foot slope. Testing of the drain system can be accomplished by capping the outlet, then filling the entire system with water to the top of the toilet bowl.

NOTE: Plug lower drains (i.e. showers and bathtubs) before running this test.

The test should be sustained for a period of 15 minutes without evidence of leaks.

FIELD INSTALLATION OF INCOMPLETE DRAIN LINE

On homes shipped with incomplete below the floor plumbing, the parts necessary to complete the system are shipped loose in the home. A diagram depicting the assembly of these parts, which apply specifically to your model home is located in the owner's instruction package when necessary.

PROCEDURE FOR COMPLETING DRAINAGE PIPING

1. Following the assembly diagram, roughly lay out the plumbing beneath the home.
2. Starting at one end, work toward the furthest end of the line. Cut pipe to fit and install fittings without adhesive until the entire system is complete.
3. Starting at one end work toward the end of the line, cementing pipe and fittings together as you go with adhesive. Adhesive must be applied to both the fitting and pipe in an even coat. Work on only one joint at a time.
4. The finished drain line must be supported 4'-0" on center and have a 1/4" slope per foot toward the outlet.

R A D C O

FEDERAL MANUFACTURED
HOUSING CONSTRUCTION
& SAFETY STANDARDS

MAR 18 1983

6

APPROVED

GAS UTILITY CONNECTION

MODULINE has pressure tested the gas piping system for leaks before your home left the plant, however, it is essential that the system be retested for leaks before use. (Your utility company may require an on site test and has test equipment)

NOTE: Follow all directions on the tag near the gas supply connection.

TESTING

1. Close all appliance controls and all appliance pilot light valves (see the appliance instructions included in the home or attached to the appliance).
2. Pressure shall be measured with a mercury manometer or slope gauge calibrated so as to be read in increments of not greater than 1/10 pound or an equivalent device.
3. Piping systems shall stand a pressure of at least six inches mercury or 3 PSI on the gauge for a period of not less than 10 minutes without showing any drop in pressure.
4. Check the piping system to appliances by pressuring to at least 7 inches and not more than 14 inches water column. This pressure range is the limit for safe and effective operations of this piping system. Check all connections being tested for leakage with soapy water or a bubble solution.
5. CAUTION Do not pressurize the system above the pressures stated above.
6. The connection to the gas supply should be made by an authorized representative of the utility company.

NOTE:

Before a test is begun, the temperature of the ambient air and of the piping shall be approximately the same. Select a time during the day for testing when air temperatures will remain constant.

**OIL UTILITY
CONNECTION**

OIL FURNACE INSTALLATION

If your home is equipped with an oil gun furnace, be sure to follow the Manufacturers installation instructions and review the following set-up instructions below, before installing oil lines to your furnace.

1. Materials for installation must be new and free from defects or internal obstructions.
2. The copper tubing for the oil line must be annealed type grade K or L, conforming to the specifications for seamless copper water tube or air conditioning or refrigeration field service.
3. The size of copper tubing must be a minimum of 3/8" O.D. or the size shall be specified by the pump Manufacturer.
4. All pipe joints in the piping system unless welded or brazed shall be threaded joints which comply with American National Standards for pipe threads, and the tubing joints shall be made with either a single or double flare of the proper degree as recommended by the tubing Manufacturer.
5. A coupling or union shall be used to join sections of threaded pipe.
6. The grade of piping shall slope in a gradual rise upward from a central location to both the oil tank and the furnace, in order to eliminate "air-locks".
7. All oil piping shall be adequately supported by galvanized or equal metal straps, 4'-0" O.C. except where adequate support and protection is provided by structural members.
8. Before setting the system in operation, the tank installation and piping shall be checked for oil leaks with fuel oil of the same grade that will be burned in the appliance.

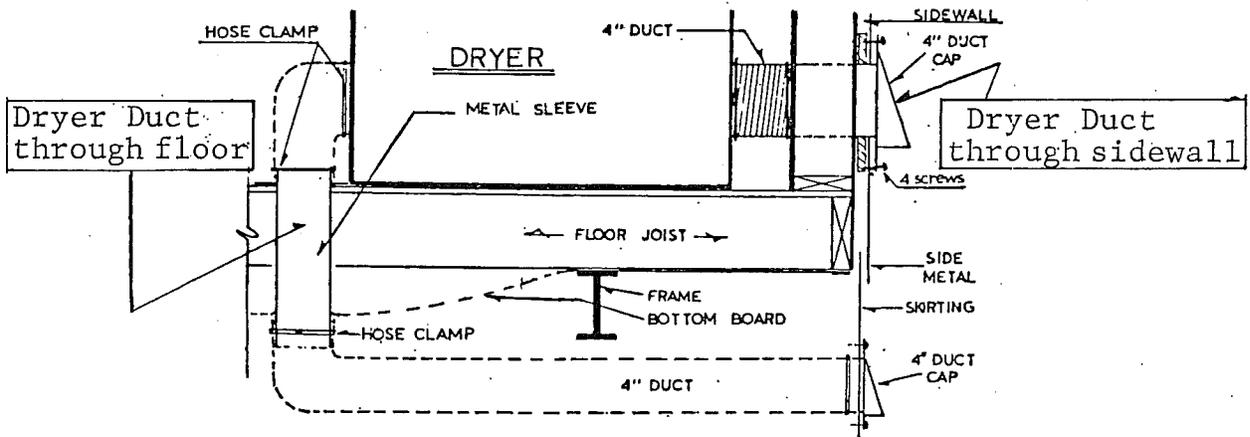
MISCELLANEOUS CONNECTIONS AND SYSTEMS

DRYER EXHAUST SYSTEM INSTALLATION

If your home is equipped with a clothes dryer, it must be exhausted to the outside by a moisture/lint exhaust system. The required components for the exhaust system are installed with the dryer. However, if the system passes through the floor, you may need to connect the 4" duct provided to the metal sleeve under the home located adjacent to the dryer. Extend the duct to the perimeter of the home and attach the lint cap to framing or skirting. (A typical installation is shown below)

CAUTION: The exhaust system must not terminate under the home.

If your home is not equipped with a dryer, but an electrical or gas outlet is provided for one, then a hole in the floor or wall and the necessary components are provided. The exhaust system must be installed in accordance with your dryer manufacturer's installation instructions.



APPLIANCE VENTING SYSTEM INSTALLATION

Due to shipping height restrictions some appliance vents, flues or chimneys extending above the roof cannot be completely installed at the factory. The necessary fittings to complete the installation have been provided. Please refer to the installation instructions of the applicable appliance for the proper procedure for termination of these venting systems.

EXTERNAL AIR CONDITIONER

A totally self contained external air conditioner may not be attached to the home.

PRELIMINARY MAINTENANCE

REPAIRING THE BOTTOM COVERING

A special material is fastened to the bottom side of your new home. It has been installed at the factory to protect against moisture, rodents and unconditioned air from the outside. This covering was inspected at the factory, but could have been damaged during transit or set-up. It is important that any areas that are damaged be resealed.

If the covering is a vinyl coated material, use vinyl patching tape designed to repair tears or holes. If the hole is large, use a patch of the same or similar material as the bottom covering and tape the edges for an airtight seal.

If the bottom covering is an asphalt impregnated board, use a patch of the same or similar material with beads of adhesive around the contact edges to assure an airtight seal. Secure the patch with tape or fasteners until the adhesive is set.

RECAULKING

After the home is leveled and all outside trim is installed, carefully inspect all outside areas which may require recaulking due to normal shocks and movement during transit.

Tighten and reseal any loose components with special attention to seams along the edge of the roof and vent projections through the roof.

A variety of semi-hardening caulks such as vinyl base caulks are available at local hardware stores.

SKIRTING

MODULINE recommends enclosing the space between the ground and the bottom of the home. This "skirting" provides added comfort and conserves energy. In colder climates this also adds extra protection against the possibility of water line freeze-ups.

The skirting must have vent openings to ventilate the underfloor area in order to prevent excessive accumulation of moisture. The minimum amount of vent area shall be 1.5 sq. ft. per 25 lineal feet of skirting, or approximately one 9" x 12" vent every 12' lineal feet of skirting.

Quality skirting materials may be purchased from the dealer or mobile home supply stores. The dealer can provide experienced installation or recommend a qualified person.

ROOF COATING

If roof coatings are applied, choose a product that will not cause streaks or runs on the side of the home. Follow the manufacturer's instructions for application.

NOTE: If it is necessary to walk on the roof, use walk boards to distribute your weight. Avoid walking directly on seams or caulked areas.

GROUND VAPOR BARRIER

A continuous covering of 6 mil (.006") thick polyethylene film or a material of equivalent "perm" rating must be placed on the ground under the home to form a moisture vapor barrier. The ground vapor barrier must totally cover all the earth beneath the home and should be placed under the home skirting. The covering may be made continuous by overlapping of adjacent layers of polyethylene film by 16" or more and taping the joints together. This is necessary to minimize the entry of ground moisture into the home. The ground vapor should be periodically inspected for tears, pulls and joint separations and appropriate repairs made by overlapping patches made of the identical material or overlapping adjacent layers to insure a 16" overlap and taping the joints together.

NOTE: Ground vapor barriers must be installed under "expando" or "tip-out" rooms, also.

CARPORTS AND AWNINGS

If you install an awning or carport:

1. First, block and level the home.
2. Use the proper awning support railing (available through your awning dealer or supplier).
3. Choose an awning that is of a free standing design which has columns to support all its weight.

CAUTION: No part of any adjacent structure may utilize any part of the manufactured home for its structural support.

4. Follow the recommendations of the manufacturer and applicable local building codes during installation of the awning.
5. Caulk or seal all seams or connections from the awning to the home.
6. Make certain that the configuration of attached structures do not limit the effectiveness of egress windows and doors and/or ventilation and light.

**EMERGENCY
EGRESS**EGRESS WINDOWS

Your MODULINE home is designed to assure alternate exits from bedrooms in case of an Emergency. Horizontal slider type windows provide one-half of the window area for exit by simply sliding the window horizontally. Vertical slider windows provide exit openings by sliding the lower window portion up to exit.

STORM WINDOWS

If inside storms are in place, turn attachment clips 90 degrees and remove the storm glass and frame. Then exit through the window as noted above.

If self storing storms are provided, the procedure for opening them is similar to normal window exits.

REMINDER: When you occupy your MODULINE home, familiarize yourself and your family with Emergency procedures and check to see that all shipping clips on screens, storm windows and other appurtenances are removed to insure quick and safe Emergency exits.

NOTE: A sticker is located on bedroom windows which indicates the windows that are specifically designed for egress and the exact opening procedure.

DOUBLEWIDE ELECTRIC CROSSOVER

A doublewide home requires a crossover connection for the electrical system. Crossover wires are individually labeled to facilitate the connections.

Before assembly on the electrical crossover is started, the doublewide home should be completely blocked, leveled and tied together.

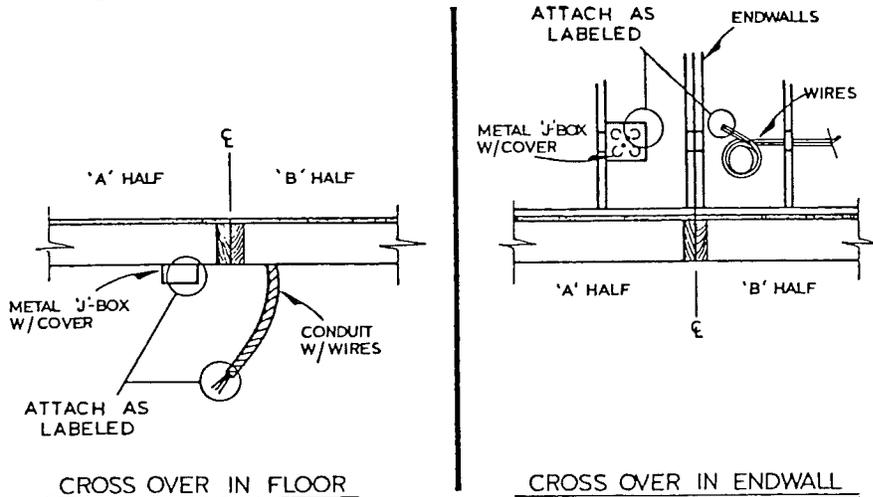
MODULINE recommends that all electrical work performed on the finished home be accomplished by a qualified, licensed electrician and in conformance with applicable codes. See Figure 13 for typical connections.

CONNECTION PROCEDURE

1. Check that wires are ready to connect in "A" half.
2. Power to crossover circuits shall be shut off at main panel board.
3. Remove "J" box cover.
4. Remove knock-out in "J" box side and secure flex conduit to "J" box (connector provided). This applies to in floor crossovers, only.
5. Remove cable sheathing and bare conductors as needed for connectors. Attach as labeled. Ground wires (not shown) must also be connected to each other and a lead run to a grounding lug(s) (provided) which is bonded to the "J" box.
6. Tuck wires into "J" box and replace cover.
7. Turn power on and test to be sure that no problems occur.

BONDING

Near the electrical crossover the steel frames must be bonded together using #8 bare copper wire and the terminal lugs on the frame. If your home has metal siding or a metal roof, this bond wire is not required.



ALTHOUGH YOUR HOME MAY COME WITH CROSS-OVER WIRING IN THE FLOOR OR ENDWALL THE WIRING REMAINS THE SAME.

FIG. 13

WATER LINE CROSSOVER

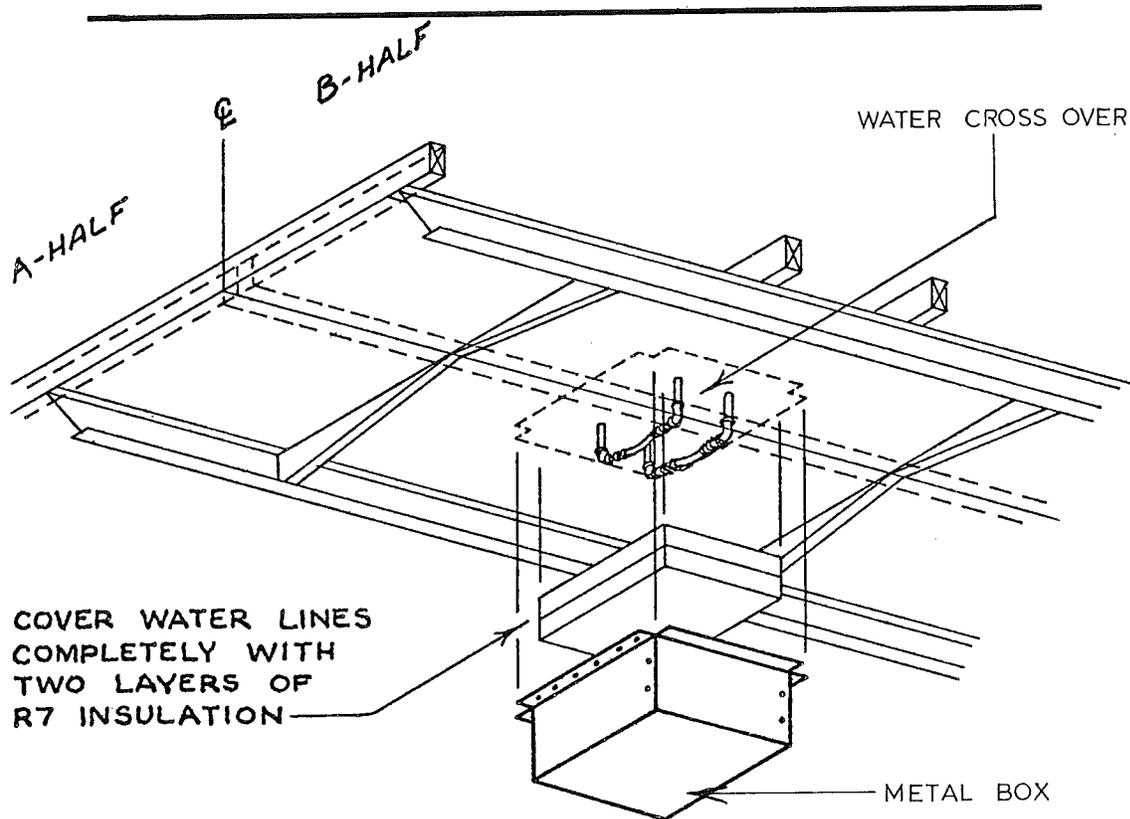
DOUBLEWIDE WATER LINES CROSSOVER

On doublewide homes with plumbing in both halves, two flex connectors for water lines are shipped loose with the home.

GENERAL REQUIREMENTS FOR WATER LINE CROSSOVER

Before assembly on the water lines crossover is started, the doublewide home should be completely blocked, leveled and tied together.

1. Locate the crossover point and remove the protective caps from the pipe ends.
2. Apply pipe dope to the male ends and attach the flex connectors.
3. Completely cover water lines with two layers of R-7 insulation and attach metal box (provided) to joists with sheet metal screws. See Figure 14



ASSEMBLY of METAL BOX AND INSULATION
OVER EXPOSED WATER LINE CROSS-OVER

FIG. 14

DRAIN & GAS LINE CROSSOVER

DOUBLEWIDE DRAINAGE CROSSOVER

On doublewide homes with plumbing in both halves, the parts necessary to connect the drain lines of both halves are shipped loose in the home. A diagram depicting the assembly of these parts, which apply specifically to your model home is located in the owners instruction package.

GENERAL REQUIREMENTS FOR DRAINAGE CROSSOVER

Before assembly on the drain crossover is started, the doublewide home should be completely blocked, leveled and tied together.

1. Following the assembly diagram, roughly lay out the plumbing beneath the home.
2. Starting at the "A" half outlet, work toward the furthest end of the line. Cut pipe to fit and install fittings without glue until the entire system is complete.
3. Starting at the "A" half outlet, work toward the end of the line, gluing pipe and fittings together as you go. Glue must be applied to both the fitting and pipe in an even coat. Work on only one joint at a time.
4. The finished drain line must be supported 4'-0" on center and have a 1/4" slope per foot toward the outlet.

DOUBLEWIDE GAS LINE CROSSOVER

On doublewide homes with gas appliances in both halves, a quick disconnect type assembly is provided. This connection will be located at either the front or rear center line of the home.

GENERAL REQUIREMENTS FOR GAS LINE CROSSOVER

Before assembly on the gas line crossover is started, the doublewide home should be completely blocked, leveled and tied together.

1. Locate the crossover point and quick connect gas lines.
2. Remove the protective caps and join the two lines together. This is a quick disconnect fitting and requires no tools. This connection should be made prior to turning on the gas and testing the lines for leaks. This connection is to remain readily accessible at all times (i.e. direct access is to be provided without having to remove any panel, door, or similar obstruction).

HEAT DUCT CROSSOVER

DOUBLEWIDE HEAT DUCT CROSSOVER

Your new doublewide home requires a crossover connection for the heating system. The crossover duct is shipped loose with your home.

GENERAL REQUIREMENTS FOR HEAT CROSSOVER

1. For your convenience, the crossover starting collars are factory installed. Locate these connection points under your home and remove the temporary cover. They are located approximately in line with each other directly under the furnace location.
2. Attach the insulated flex crossover duct to the starting collars with sheet metal screws. The insulation should be pulled back until the connection is made and then butted against the bottom of the coach and sealed with duct tape.
3. If the crossover duct comes in several sections, the sections must be connected with sheet metal screws, the joint insulated and sealed with duct tape.
4. The crossover duct must not contact the ground. This can be taken care of by loosely strapping the duct to the bottom of the home.

Be sure that the duct is not compressed in any way that would restrict air flow. See Figure 15 below for typical heat duct crossover details.

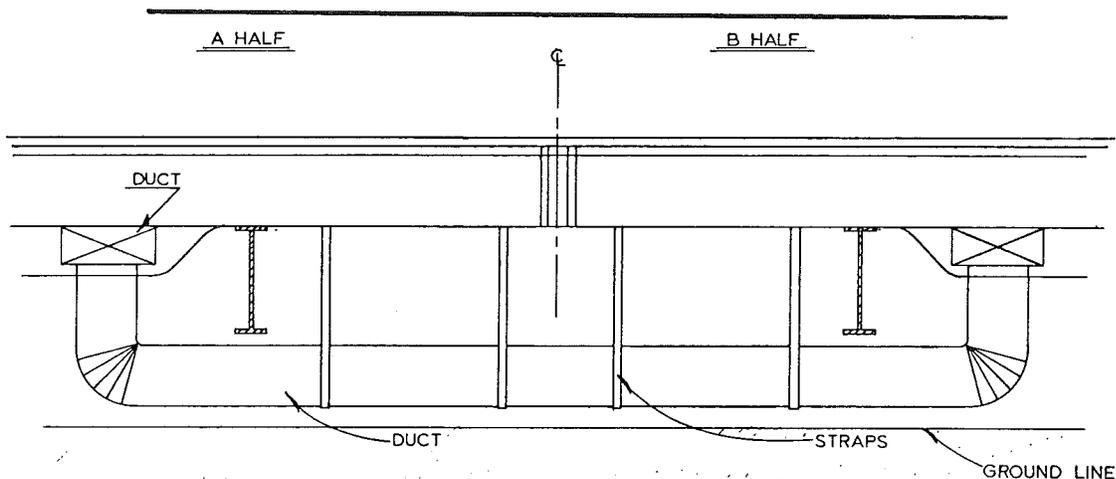


FIG. 15

INTERIOR FINISH

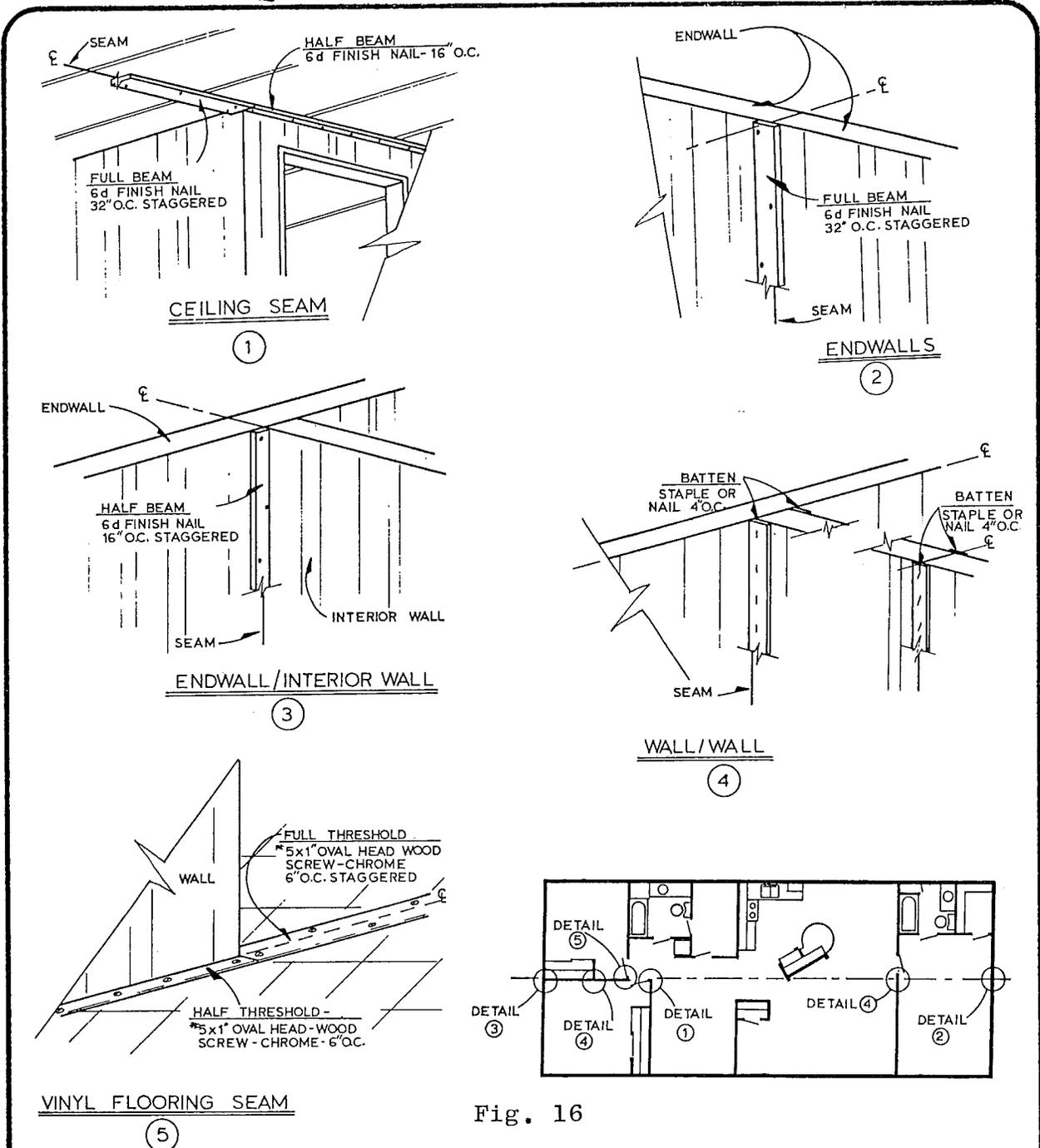
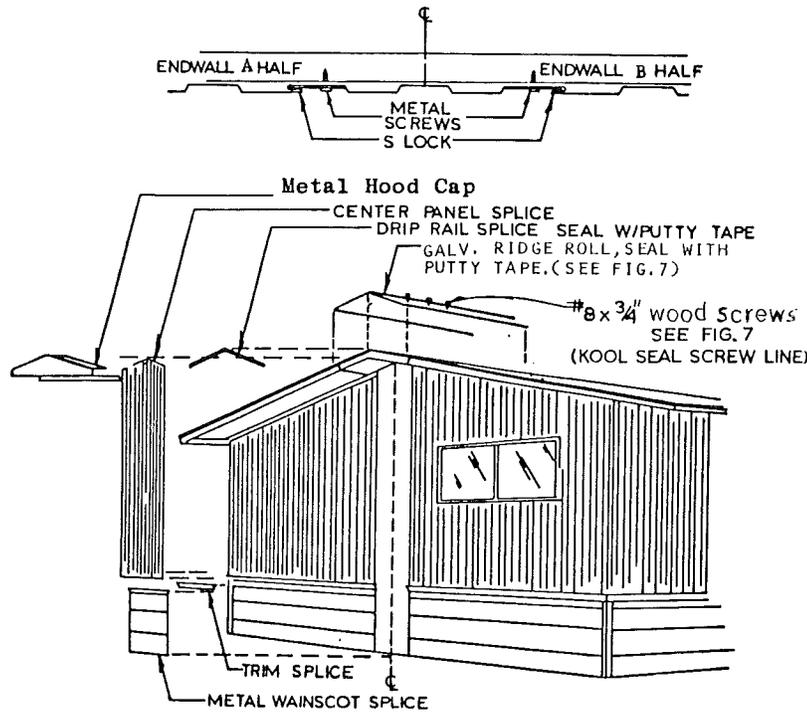


Fig. 16

NOTES:

1. Homes must be fully leveled, blocked and fastened together before interior finish can be installed.
2. Fill all gaps in floor, wall and ceiling joints with insulation.
3. Install carpet bar, pad and tack strip. Finish out carpet work.
4. Install all ceiling beams, half beam first.
5. Install end wall beams and interior wall mouldings.
6. Install metal threshold over vinyl flooring seams.

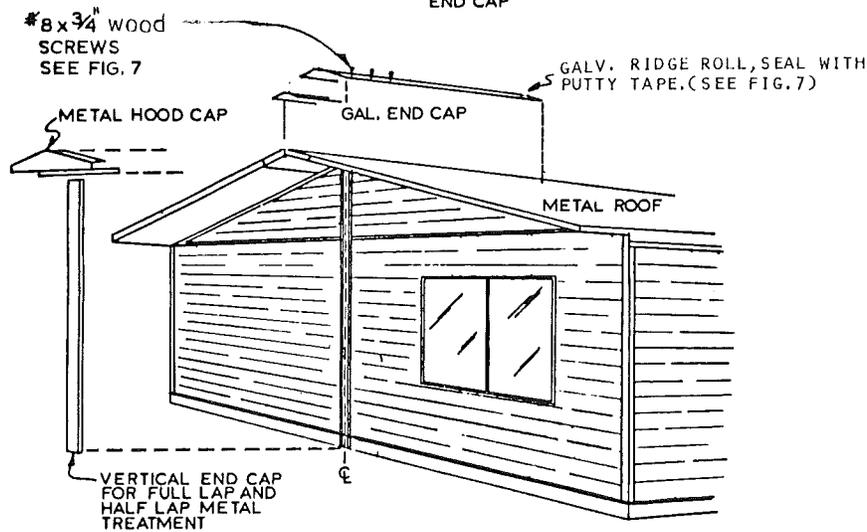
EXTERIOR FINISH



TYPICAL VERTICAL SIDING WITH LAP WAINSCOT, METAL ROOF

Fig. 17

NOTE: REMOVE VISQUEEN & PULL TOGETHER THEN INSTALL CAP & END CAP



TYPICAL LAP SIDING AND METAL ROOF CLOSE-UP

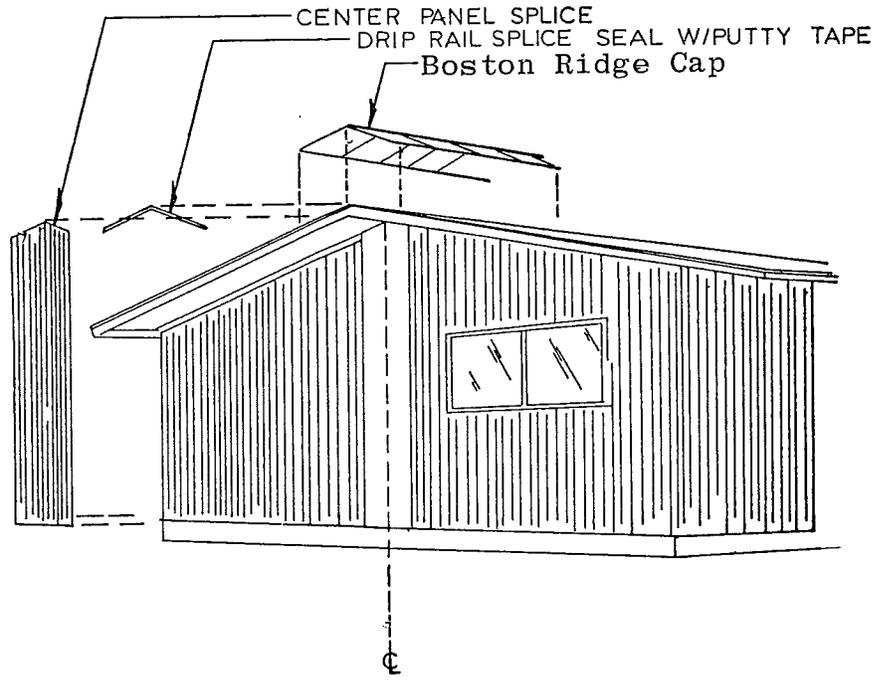
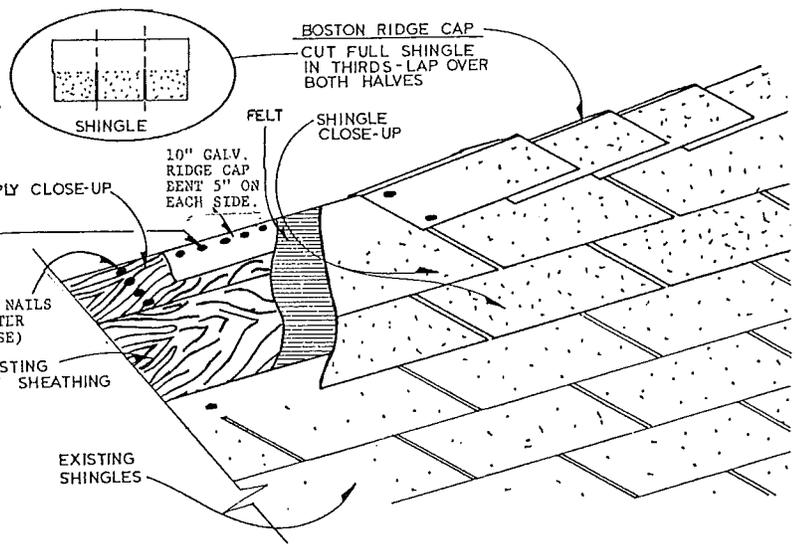
Fig. 18

As an alternate, the home may be weathered-in with 6 mil polyethylene film on the endwalls and all or some of the lap siding left off the endwalls and shipped loose in the home to enable joining the two home sections together on site without an endwall joint seam being visible or to provide for the attachment of a garage on certain models.

EXTERIOR FINISH

NOTE: CERTAIN AREAS OF SHINGLES MAY BE SECURED DURING TRANSIT WITH TACK STRIPS. AFTER REMOVAL, FILL ANY VISIBLE HOLES LEFT BY TACK STRIP FASTENERS WITH AN APPROVED SEALER.

ZONE I & II
 FASTEN FIRST 8'-0" OF EACH END WITH #8 X 3/4" WOOD SCREWS AT 5" O.C. & MIDDLE SECTION WITH #8 X 3/4" WOOD SCREWS AT 6 1/2" O.C.

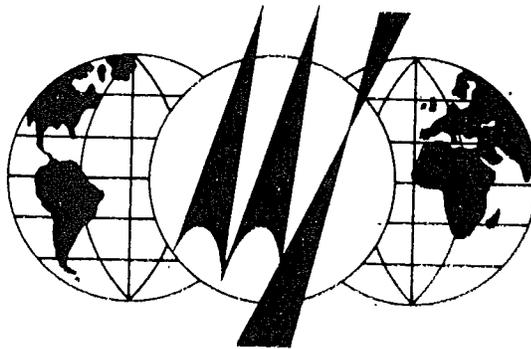


TYPICAL WOOD SIDING, SHINGLE ROOF

Fig. 19

NOTES

A large, empty rectangular box with rounded corners, intended for writing notes. The box is defined by a solid black border and occupies most of the page below the 'NOTES' header.



MODULINE INTERNATIONAL, INC.

EFFECTIVE
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RADCO FEDERAL MANUFACTURED
HOUSING CONSTRUCTION
& SAFETY STANDARDS
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