

# B. & H. CEDAR LOG HOMES' CONSTRUCTION MANUAL

*"Life-Styles in Solid Cedar"*

February 1, 2006



Our model log home near Fredericksburg, VA  
"Sandy's Joy"

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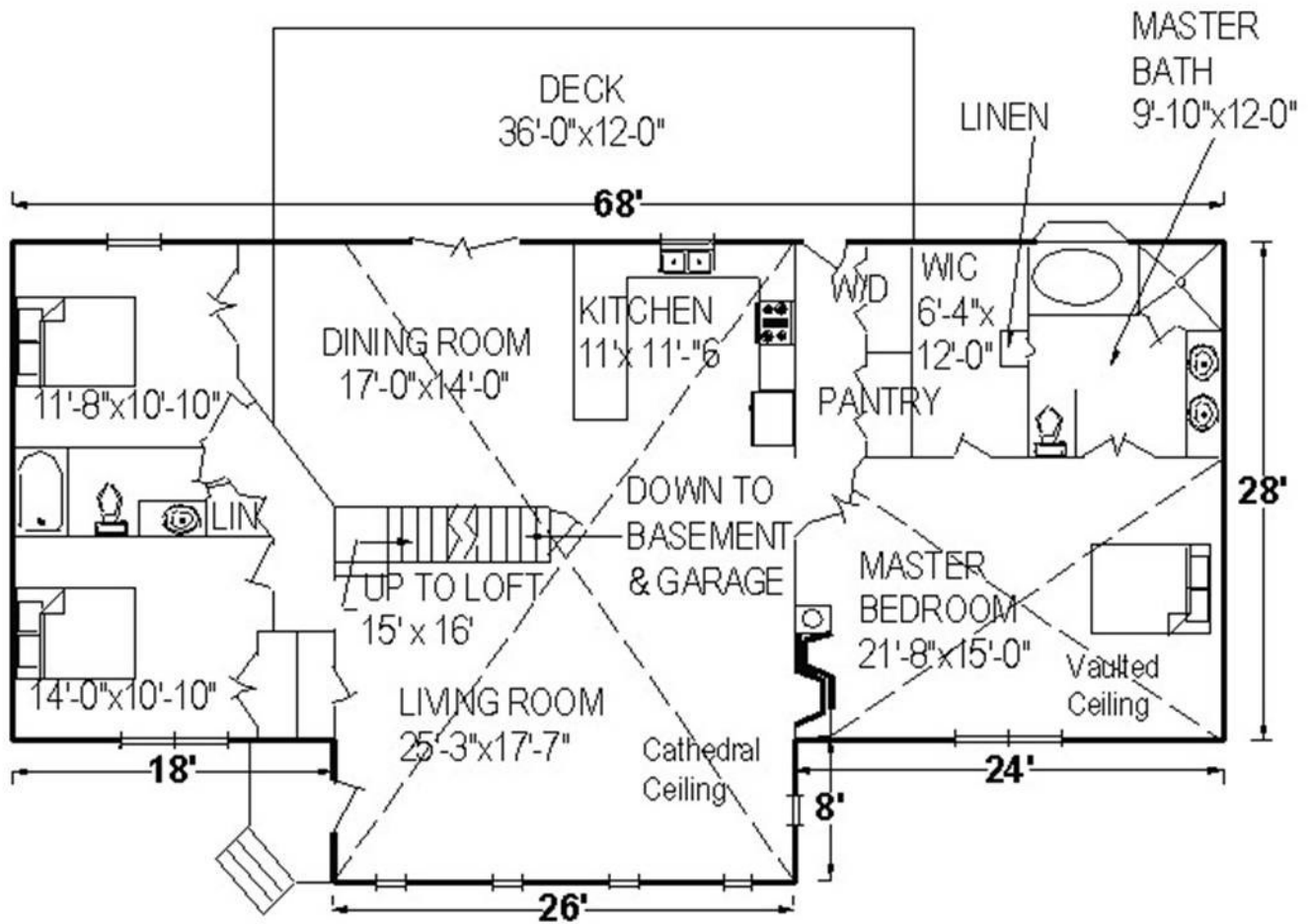
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Just in case you were wondering, here is the floor plan for our model log home. Now, on to the B&H Cedar Log Homes construction manual >>>>>

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"Sandy's Joy" - 2300 square feet of living space, plus the basement  
Our model in Fredericksburg, VA



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**CAUTION:** While every effort has been made in the preparation of this manual, B&H Cedar Log Homes, L.L.C. cannot guarantee against human error or omission. The contractor or homeowner using this manual must study both this manual and the approved construction drawings. If there are any questions regarding these drawings or this manual, contact B&H Cedar Log Homes.

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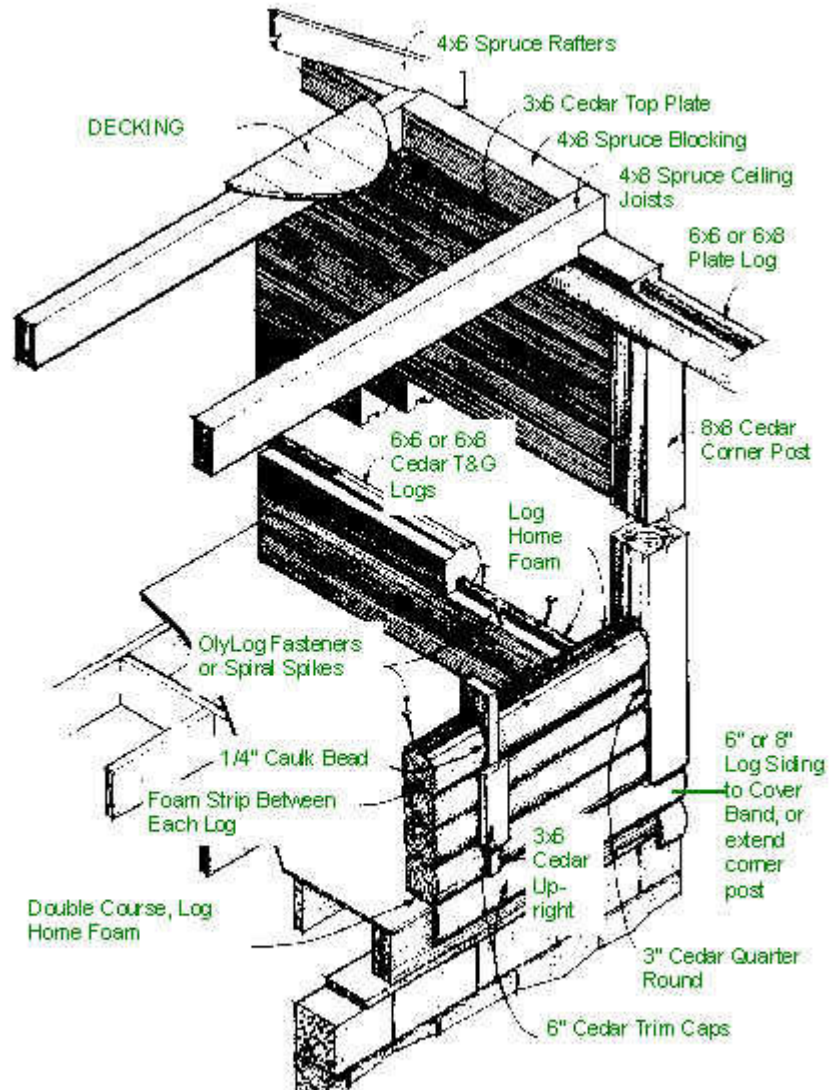
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# CONSTRUCTION DETAIL FOR THE B&H POST & BEAM CEDAR LOG HOME



## TYPICAL LOG HOME DETAIL

Not to Scale

Figure 1



Figure 2



Figure 3



Figure 4

## 1. Important Differences Between Standard Construction & Construction of Log Homes:

**Selection of the builder** - It is important that builders, even experienced builders, accept the fact that differences do exist between the construction of log homes (or as some would say, log cabins) and standard construction. Any builder, starting his first log home with the idea that he or she is so experienced at construction that he has "seen it all," is doomed to make mistakes that will be costly and virtually irreversible. However, with proper training and a willingness to learn, any builder can produce a beautiful log home.

**Checking and other natural characteristics of solid wood** - Checking, knots, color variations and other natural characteristics are inherent traits of solid wood. The well informed log home buyer has inspected one or more completed homes and has seen and accepted these characteristics as assets - - as an important part of the character of a log home. Each log and beam is carefully inspected prior to shipment, will carry the necessary loads and will be aesthetically pleasing when it is a part of the log home. (Figure 3)

**Sub-floor** - The sub-floor is similar to sub-floors in standard construction with one important exception: There must a double band around the entire perimeter of the foundation. (Refer to the construction drawings.) This double band is required to support and provide a nail base for the log walls. It is recommended that the boards in the double band be pressure treated. (Figure 2)

**Caulking** - Two key words here: quality and quantity. Any attempt to save money by purchasing cheap caulking is foolhardy. B&H provides the best caulking available as part of the kit. Caulking instructions are included in this manual. Be generous when applying the caulking because caulking is your first line of defense against air and rain infiltration. Caulking should be applied against the outside of the outside tongue for the full length of the log. When caulking panel logs, apply caulk across each end of each log, against the uprights. Be generous here and look for oozing caulk when the next log is drawn tight. Remember, caulk against the uprights will eventually be covered with trim caps. However, when applying the caulk, try to avoid getting the caulk on the exposed surfaces of the log. Surfaces that have had caulk removed do not accept finish coatings as readily as the natural, clean surface. Having said that, occasional "oozing" caulk is an indication of a good caulking job. (Figure 4)

**Electrical and plumbing** - While it may be obvious, it is still worth noting that plumbing cannot be run through the solid wood exterior walls of log homes or log cabins. Electrical wiring is usually run through the exterior walls only

when necessary to reach switches and receptacles in the exterior walls of log homes. When planning for the electrical, additional wiring and time may be necessary since the exterior walls are not available for short cuts. It will be necessary to "think ahead" since wiring is frequently run in routed grooves on top of beams (for example, to reach a ceiling light fixture). Don't forget to route the groove and lay the wiring before nailing the floor on top of the beam joist in log homes. Although this may sound complicated, with a little forethought it is quite simple.

**Special tools required:**

*Oversized circular saw.* - This tool will be helpful, but not essential, for squaring the ends of beams.  
*32 - 48 ounce hammer.* - A heavier than normal hammer will be needed to drive the log spikes.  
*1/2" electrical drill.* - Not that this is a special tool for an experienced builder. We are just making the point that the heavy hammer will not be necessary for the log-to-log OlyLog fasteners. Another advantage of the OlyLog fastener is that pre-drilling is not necessary.

**Protection of the logs and beams** - Remember, the logs and beams will be visible in the finished log home. Considerable care is taken in the manufacturing and shipment of these components to assure that they are delivered to the job site clean and undamaged. Once delivered, their protection becomes the responsibility of the log home builder. For example, do not get them muddy and do not walk on them. Beams and logs not off loaded to the house sub-floor should be placed on lumber or blocks, with plastic between the materials and the ground (to prevent mud from splashing on the materials), and covered against the weather. Dirty material must be thoroughly cleaned and/or sanded before applying stain or clear finish. Refer to Appendix C for instructions on proper long-term storage of the logs, beams, and rafters.

**Nomenclature** - Terms used in this manual, especially when referring to parts or components of the log home, may not be familiar to the reader. Please refer to Figure 1 for identification of these components in log homes by B&H. .

**2. Preparations for and Receipt of the Kit:**

The foundation and sub-floor should be complete. Also, locations of the log panels (refer to construction drawings) should be marked around the perimeter of the sub-floor. (Figure 5)

The site should be accessible for delivery by tractor-trailer. Accessibility means room for the tractor-trailer to maneuver as necessary to reach the unloading site and return to the highway. Also, the ground must be firm enough to support the loaded rig without being stuck. If it is necessary to call a tow truck to pull the rig out of the mud, this will be at the expense of the customer or builder. If the driver considers it too risky to leave the public highway, the builder must provide a fork lift to unload the log home kit and carry the bundles to the construction site.



Figure 5

Space must be available at the site for storage of materials. As noted earlier, take care to protect the materials against physical damage and dirt.

Finally, a representative of B&H Cedar Log Homes will be on site to inventory materials. A representative of the builder and/or the homeowner is welcome to observe the process. Shipping damage is the responsibility of the trucking company.

**3. Positioning of the Uprights, Corner Posts, and First Logs in Log Homes by B&H:**

Before nailing any piece to the sub-floor it will be necessary to properly position corner posts, the first logs in each panel, and every upright, around the perimeter of the sub-floor. (Figure 5).

To set the corner posts, first mark off a 5 3/4" square on each outside corner of the sub-floor; in other words, about 1 1/2" will over hang two edges of the sub-floor. For inside corners, mark the sub-floor to allow for 1 1/2" of the corner post to over hang each edge of the sub-floor. Brace the corner posts in a

near plumb position.

To position the first logs, some builders will snap chalk lines such that the bottom of each log hangs over the edge of the sub-floor approximately 1/2" if the band is to be covered with shiplap. Other builders prefer to position each log and upright individually on the theory that the edge of the sub-floor may not be perfectly straight. If the foundation is to be covered with stone, the logs must extend over the sub-floor about 1 1/2". This can best be accomplished by nailing 2x4's to the top of the band and positioning the logs flush with the edge of the 2x4's. Next, position the first log in each panel around the sub-floor

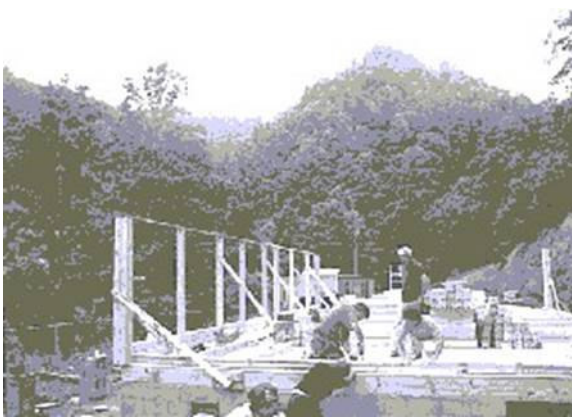


Figure 6

with 3"x 6" uprights between the logs. The uprights, rather than in the vertical position, at this step are laying on edge on the floor between the logs.

Now, carefully position corner posts, logs, and uprights until all are properly placed. The corner posts are the keys to properly positioning this first course of logs. Small adjustments in the position of the corner posts on the sub-floor will make up for any wall that is slightly longer or shorter than desired.

#### 4. Nailing the Corner Posts, Uprights, and First Logs to the Log Home Sub-floor:

Important: Refer to the caulking schedule and spike schedule before proceeding with this step. Follow these instructions carefully.

Start by bracing a corner post in the plumb position and "toe nailing" to the sub-floor with common nails. Working out from that corner post, position the uprights to the plumb position and align with string, nail the bottom logs, uprights and remainder of the corner posts to the sub-floor and double band beneath.. For doors, rather than using the single header log as a spacer, cut a 2x4 the same length as the log and nail the 2x4 to the sub-floor. Brace uprights into plumb position. (Figure 6)

#### 5. Installation of the Logs in Each Panel of Log Homes by B&H:

Important: Refer to the caulking schedule and spike schedule before proceeding with this step. Follow these instructions carefully.

When this step is completed, all but the last panel log will be installed in every panel. The last panel log is discussed in detail later.

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**Electrical receptacles in the log walls:** Before installing the second log, mark (on the sub-floor) the locations of 8" fasteners that are close to the location of electrical boxes. After installation of the second logs, drill holes through both logs and the sub-floor, being careful to avoid spikes located as described above. Chisel and/or saw holes in the third logs for installation of the electrical boxes.

**Electrical switches in the log wall:** When it is necessary to install a light switch in the log wall, the wiring may be run from above or below. Simply make the decision ahead of time and drill accordingly. When possible, the switches should be located in the interior stud walls of the log home.

---

It is recommended that each log be first nailed to the uprights (to hold the log in position between uprights) and then nailed or bolted to the log beneath.

When spiking or bolting logs, it is extremely important to seat each log as tight as possible. The ends of

each log should be close to level after it is positioned. However, a tight fit is more important than a level log. During this process, be careful not to damage the log tongues of the log home walls.

Nails and bolts must be counter sunk slightly. The OlyLog fasteners will counter sink themselves.

Keep the faces of the logs flush with the inside edges of the up-rights.

When the next to last log is in position, it may be slightly out of level and/or out of alignment with the logs in the adjacent panels. This is normal.



Figure - 7



Figure - 8

## 6. Installation of the Last Panel Log:

When seated without fasteners to either the uprights or the log below, the shoulders of this log will extend above the desired height of the uprights. Do not, under any condition, fasten this log into position "as is".

There are several techniques for leveling the height of the log walls. Regardless of the technique, the shortest panel will set the finished height of the log walls.

So, here is the way one experienced log home builder levels the walls of his log homes: With the last panel log temporarily in place, he marks the height of the shortest end of the shortest panel at the upright. The mark is placed where the log shoulder meets the upright. He then sets every last panel log in place and strikes a line (with a chalk line or laser level) all the way around the log walls such that the line is the same distance above the subfloor as the mark placed on the upright. A 2x4 guide is nailed to the log walls & an electric chain saw cuts every upright and last panel log to the desired height. At this stage, the top of the log walls are flat. Tongues are fabricated with appropriately sized and positioned wood strips. These strips can be sized on the job or, frequently, the strips delivered in the lumber bundles can be used. Caulking should be placed between the strips and the log wall.

## 7. Framing for Windows and Doors:

If the windows have brick molding, frame window opening with 2x4's. The 2x4's shall be flush with the inside of the 3x6 uprights and the brick molding nailed directly to the 2x4's. If the windows are to be flanged mounted, frame the window opening with 2x6's. The windows can then be trimmed as shown in figures 7 & 8. In both cases the tongue should be removed from the log under the window before nailing the 2x's beneath the window.

2x4's are used as jacks in the door openings, supporting the logs above the door in log homes..

Always lay two beads of caulking between the jacks and logs or uprights before nailing the jacks into position.

## 8. Installation of the Plate Log:

Important: Refer to the caulking schedule and fastener schedule before proceeding with this step. Fol-

low these instructions carefully.

Before installing the plate logs, check the tops of the walls to assure that they are straight. Using a string, align walls and brace with 2x4's until the top plates are installed.

Plate logs are usually installed full length to provide rigidity to the wall; however, joints above windows and doors should be avoided. Where the plate log grooves passes over the uprights, lay two short pieces of sealant foam to eliminate air infiltration at these points. Plate logs are delivered with the ends square. To minimize air infiltration at these butt joints, either drive a spiral spike vertically through the joint or drill a 3/4" hole vertically through the joint, apply some caulking to the hole and drive in a 3/4" dowel.

Be sure to extend plate logs beyond the corner posts as necessary to catch the fly rafters (refer to the construction drawings).

### 9. Installation of the Top Plate:

Again, top plates are usually installed full length to provide rigidity to the wall. Top plate joints should be offset as much as possible from the plate log joints and top plate butt joints should be spiked or doweled as described in the plate log instructions.

### 10. Installation of Manufactured Trusses:

If the construction drawings call for manufactured trusses instead of exposed beams and rafters then, except for installation of the trim caps on the wall and around the band board, the balance of the job is standard construction which is beyond the scope of this manual.

### 11. Installation of 4"x 8" Overlays, 6"x 6" Tie Poles & 4"x 8" Blocking (refer to construction drawing details):

The overlays are typically located in the ceilings of the first floor. One end of the overlays usually rests on the log wall, with the other end supported by an interior partition or engineered beam (not part of the log home kit)..

At the log wall, the overlay rests on the top plate such that the top of the overlay will be flush with the top of the 4"x 8" blocking once the blocking is installed. Once the blocking is in place, flush with the exterior wall, the 2" difference between the 4"x 8" blocking and 6" top plate is filled with dimension lumber and plywood.

Before placing either overlays, tie poles, or blocking on the log wall, lay two heavy beads of caulking on the top plate. Assure that each overlay and tie pole is placed "crown up." Nail the blocking, tie poles and overlays to the top plate with 8" spikes. Each vertical butt joint should be caulked first and then, after spiking, seal with a spike or dowel driven through the joint.

Opposite ends of the overlays are usually supported by interior partitions. Here the overlays rest, without notching, on a double 2"x 4" plate with the space between overlays filled with either trim boards or sheet rock (neither supplied as part of the log home kit).

\* Electrical - If the construction plans call for ceiling lights in a room, it will be necessary to route or groove the top of the appropriate overlays to allow for placement of the wiring. This must be completed and the wiring installed, but not necessarily terminated, before nailing the sub-floor to the overlays.

### 12. Installation of the 6"x 6" or 6"x 8" Ridge Beam and Ridge Beam Supports in Log Homes:

After the sub-floor is laid on the second floor, the ridge beam and supports are installed in accordance with the log homes construction drawings. As with the overlays, ridge beam sections should be placed crown up. Butt joints in the ridge beam should be placed directly over supports and nailed with 8" spikes. An interior stud wall partition, support post or collar tie is an ideal place to break the ridge beam. Gusset plates, if specified by drawings, are to be purchased locally.

Check the log homes construction drawings for ceiling lights or fans to be hung from the ridge beam and install unterminated wiring as necessary.

Rafters are to be cut to length and notched as required by the drawings. Again, install crown up; check for electrical ceiling fixtures and install wiring as necessary.

#### 13. Installation of the 4"x 6" Rafters:

Rafters are to be cut to length and notched as required by the drawings. Again, install crown up; check for electrical ceiling fixtures and install wiring as necessary.

#### 14. Construction of the Stud Walls for Gable Ends and Shed Dormers in Log Homes:

Perhaps the most important warning here is to assure that the wall sheathing overlaps the top plate on the log wall. Without this overlap, rain will collect on the top plate and serious problems will develop in the future. As noted in the following paragraph, these stud walls must be covered with 1/2" exterior grade plywood and black paper.

#### 15. Installation of the Log Homes Shiplap Log Siding:

Shiplap siding must always be installed over black paper and 1/2" plywood. Not only does the plywood make the wall weather tight, it reduces waste in the shiplap siding because it will not be necessary to "break" the siding on studs. Twenty percent waste is allowed for when shiplap siding is needed. It will be wise to save any excess siding for use as trim inside the house. Always use galvanized nails when nailing siding.

The siding may be installed vertical, horizontal, or diagonally.

#### 16. Fabrication and Installation of Beam Trusses & Collar Ties:

Beam truss & collar tie materials are shipped unassembled. Refer to the drawings and assemble accordingly. If gusset plates are needed, purchase locally.

#### 17. Construction of the Log Home Porch:

At this stage, construction of the porch should not be a difficult task. Of course, refer to the construction drawings.

A couple of suggestions and/or precautions: Be sure to provide for ventilation of the house roof when trimming or covering the knee wall under the porch roof. Also, break only one 4"x 6" plate (construction drawings normally call for a double 4" x 6" porch plate over the porch posts) on top of any one porch post.

#### 18. Installation of the Trim Caps to Cover the Uprights:

First, caulk the joints between the uprights and logs (refer to the caulking schedule). Cut the trim caps to length and nail over the uprights, both inside and outside the house, with galvanized nails (not supplied as part of the kit).

#### 19. Installation of the Quarter Rounds:

First, caulk the joints between the corner posts and logs. Cut the quarter rounds to length and nail in the corner of the 8"x 8" post and the logs, both inside and outside the house.

#### 20. Covering the Band Boards:

If the log home band boards are to be covered with shiplap or trim boards, always use galvanized nails, and, it is recommended that joints be mitered rather than butt.

The band boards may also be covered with stone or mortar mix. Please refer to the construction details.

## 21. Options for Log Homes Interior Trim:

Trim caps are used extensively for trim throughout the log home. In particular, they are used to trim windows, doors, under the roof above the log wall, and to cover uprights. 1"x 6" tongue and groove paneling is sometimes used as trim between the roof and log wall.

Standard trim boards from your local lumberyard are occasionally used a trim when low cost is of primary importance.

In unique situations, even rope is a choice.

To view a large number of photographs of interior features of log homes, please visit <http://www.model-log-homes.com> and select from the menu options "Photos of [kitchens](#), [great rooms](#), [bedrooms](#), [bathrooms](#), [interior details](#) & [exteriors](#)."

## APPENDIX A

# LOG & TIMBER FASTENER SCHEDULE

Note: B&H Cedar Log Homes provides approximately 5% more fasteners (spiral spikes and/or threaded fasteners) than are required to complete the house under ideal conditions.

Note: Be extremely careful not to damage the log tongue during construction.

The panel logs - "Toe nail" each end of each panel log into the up-rights and corner posts. Use two 5" spikes (one on either side of the log tongue) for each end. Drive 8" fasteners down to the sub-floor (first panel log) or the next log. 8" fasteners are alternated on either side of the tongue. The distance between fasteners should be up to but not more than 16". Before fastening any logs, refer to the caulking schedule.

The plate log - At butt joints, toe nail with two 5" spikes. Drive 8" fasteners down to the next log, alternating on either side of the tongue. The distance between fasteners should be up to but not more than 16". Before fastening the plate log, refer to the caulking schedule.

The top plate - At butt joints, use two 5" spikes in each end of each top plate. Drive 8" fasteners into the plate log, alternating on either side of the log tongue. The distance between spikes should be up to but not more than 16". Before fastening the top plate, refer to the caulking schedule.

Ceiling joists - Over the log wall: First, drive two 8" fasteners through each joist into the top plate. Angle each fastener to force the joist against the adjacent block. Next, drive one 6" spike through the joist into the adjacent block. Use additional fastener(s) if necessary to hold a twisted joist in position.

Over interior partitions in log homes by B&H: Drive two 8" fasteners through each joist into the stud wall plate. Use additional fastener(s) if necessary to hold a twisted joist in position.

Blocking - Between ceiling joists: Drive at least three 8" fasteners through each block into the top plate below. When using 4"x 8" blocking, toe nail with 5" spikes.

Blocking parallel to ceiling joists: Use two 8" fasteners in each end of the blocking. Drive additional fasteners no more than 16" apart along the length of each piece. When using 4"x 8" blocking, toe nail with 5" spikes. Use additional fastener(s) if necessary to hold a twisted piece in position.

House rafters - Drive two fasteners through each end of each rafter into the blocking, ridgepole, or stud wall below. Use either 5" or 6" spikes as appropriate. Use additional fastener(s) if necessary to hold a twisted rafter in position.

Porch plates - First course of 4"x6": Drive two 6" spikes into the top of each porch post. Where plates join on top of a post, use two fasteners in each end of each plate.

Second course of 4"x6" in log homes by B&H: Use two 6" spikes in each end of each 4"x6". Drive additional 6" spikes no more than 16" apart along the length of each piece. Use additional spike(s) if necessary to hold a twisted timber in position.

Porch rafters - Drive two fasteners through each end of each rafter. Use additional fastener(s) if necessary to hold a twisted rafter in position.

Ridge poles, purlins, knee braces, etc. - As a "rule of thumb," use at least two fasteners at each connection and allow for at least 2" of bite into the wood below. Use additional fastener(s) and bite if necessary to hold a twisted timber in position.

## APPENDIX B

### CAULKING SCHEDULE FOR LOG HOMES BY B&H

CAUTION: Read and follow manufacturer's instructions and precautions.

Note: When using the caulking supplied by B. & H. Cedar Log Homes, one 10 1/2 ounce cartridge of caulking will seal a 1/4" x 1/4" joint 24' long. Increasing joint size to 3/8" x 3/8" reduces coverage to less than 12'. Cut the tip of the cartridge to dispense caulking 1/4" in diameter. More caulking is provided than is needed to caulk the house under ideal conditions.

The first panel log - Before placing the first log on the sub-floor, lay two beads of caulking on the sub-floor on each side of the log groove. (As shown in the construction details, two strips of sealant foam must be placed in the groove of this first log. These two strips are to be placed one on top of the other, not side-by-side.)

Between panel logs - Lay a bead of caulking in the corner between the outside tongue and outside



of the log. This bead must lie against the outside edge (in the corner) of the tongue. Also, caulk each end of each log at the up-rights and corner posts, on both sides of and across the tongues. (A single strip of sealant foam must be placed between the tongues of all logs.)

Outside and inside the panel logs - Caulk each end of each log at the up-rights and corner posts. This may be done as each log is placed or after the wall is erected.

The last panel log - Caulk this log the same as other panel logs, carrying the bead across the up-rights.

Figure



The plate logs in log homes - Lay a bead of caulking between the tongue and outside of the log. This bead must lie against the outside edge (in the corner) of the tongue. Also, lay two beads of caulk between the butt joints of each log.

The top plate - Lay two beads of caulking between the butt joints of each top plate. Also, before placing each joist and blocking, lay two parallel beads of caulk (approximately 4" - 5" apart) on the top plate.

The joists and blocking - Lay two parallel beads of caulk between the joists and blocking in the log homes. Lay two parallel beads of caulk on top of the joists and blocking immediately before beginning construction above this level.

Figure

## APPENDIX C

### LONG TERM STORAGE OF BEAMS & RAFTERS

Introduction: Generally speaking, when the B&H log home kit is delivered to the job site, the subfloor is in place and the builder immediately begins erection of the log walls. Therefore, long term storage of the logs is seldom a consideration. On the other hand, it is not unusual for the beams and rafters to remain on the job for several weeks before they are installed in the house. Therefore, the precautions that follow are primarily focused on the proper storage of the beams and rafters. Should the log materials also sit on the job for a period of time before log homes construction starts, the following precautions would apply to these materials.

The objective of the precautions stated below is three-fold; first, to limit prolonged exposure to direct sunlight, second to allow for proper air circulation around each timber, and third to protect against precipitation.

Due to various weather conditions at the each construction site around the country, it is not possible to state how long beams and rafters can be safely stored without taking the precautions stated below. This is a judgment call that can only be made by the homeowner or contractor. B&H recommends that these precautions be implemented within 72 hours after delivery.

Protection against direct sun light: Failure to protect the log homes materials against direct sun light will result in excessive warping and twisting during storage.

Protection of the top of the bundles is the priority. This can easily be accomplished by placing scrap lumber on top of the bundle. Strips must be placed between the bundle and the scrap lumber, as described below, to provide for proper air circulation within the bundle. Protection against precipitation, as described below, also protects against exposure to direct sun light.

Protection of the sides of the bundles is generally not recommended because this restricts airflow within the bundles.

Providing for proper ventilation: Failure to allow air to flow around each timber can result in mould growth. Should this occur, in most cases the mould can be removed by wiping with a mixture of Clorox and water.

Select a storage area that is "high and dry." Place 4x4's on the ground (better yet, use 6x6's) no more than 3' apart. Take extra care to assure these foundation timbers are level. Failure to level the timbers will cause the log home timbers to warp.

To allow for proper air circulation, the bundles must be repacked on the above foundation with wood strips such as 1"x 2" furring strips between each layer of timbers. Be sure that the strips are "in line" vertically within the pack. When using scrap strips, be sure that all strips in the same layer are the same thickness. Place strips about three feet apart within a layer. Be sure to leave a space (about 1") between each timber within each layer. Taking these precautions will limit warping during storage.

Protection against precipitation: Excessive rain and snow on and within the bundles compromises the first two steps described above.

Placing sheet metal, plywood or plastic on top of the bundles can best provide this protection. This cover material should be placed on strips, to allow for air circulation, not directly on the timbers. If plastic is used it should not hang down the sides to restrict airflow within the bundles. Covering the sides of the bundles is not recommended because this would restrict airflow within the bundles.

NEVER, repeat NEVER, encase the bundles of log homes lumber in plastic. This traps condensate within the bundles causing rapid deterioration of the timbers.

Remember: the customer cannot hold B&H responsible for damage after receipt.