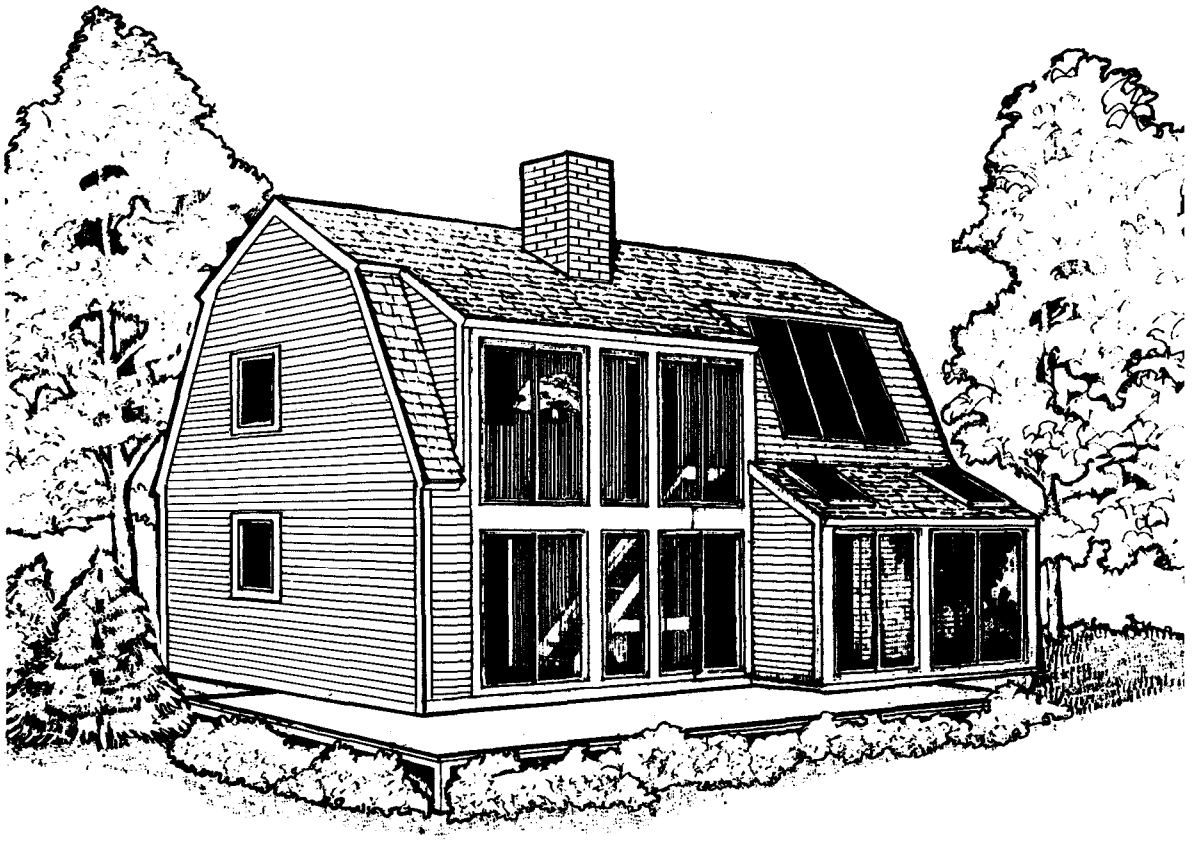
Turner, ME



Builder: Heritage Builders, Turner, ME Designer:

Traditional Living, Inc., Hartland, VT Solar

Designer: Traditional Living, Inc.

Price: $85,000

Net Heated Area: 1320 ft^2

Heat Load: 68.7 x 10' BTU *Iyr*

Degree Days: 7511

Solar Fraction: 45%

Auxiliary Heat: 3.77 BTU/DD/ft^2

Passive Heating System(s): Sun-tempering, direct gain, isolated gain

Recognition Factors: **Collector(s):** Greenhouse glazing, skylights, glass doors and windows, 279 ft^2 **Absorber(s):** Greenhouse floor, brick pavers on concrete slab, greenhouse mass wall Storage: Rock storage bed, mass floor and wall-**capacity:** 7489 BTU/F **Distribution:** Radiation, natural and forced convection **Controls:** Moveable quilt insulating shades, exterior bamboo roll shades, room thermostats, and sensor in rock bed

Back-up: Central airtight wood stove, electric resistance heater

Domestic Hot Water: Flat-plate collector, double walled heat exchanger

This modified 2-story gambrel Cape design specifies pre-cut post and beam construction. The site is part of a 95-acre, 20-lot development; the house is priced for young professionals. A 2-story greenhouse and a small attached single-story greenhouse are prominent design features. The extensive south-facing glass, however, is oriented away from the street, preserving the traditional appearance of the house.

Three passive systems are combined with a back-up wood furnace unit to meet winter heating needs. First, in the single-story greenhouse, solar heat is collected through double-glazed sliding doors and two sky-lights. Heat is absorbed and stored in the concrete floor and in the mass wall divider between the greenhouse and living area. During winter nights, greenhouse heat is distributed from the mass wall divider into interior living spaces. If additional heating of the first story is desired during the day, French doors between the greenhouse and living area may be opened. Operable doors, windows, and quilted insulating shades over south-facing glass control heat gain.

Second, besides using heat produced by the small greenhouse, the living area attached to it collects direct radiation as well through the French doors.

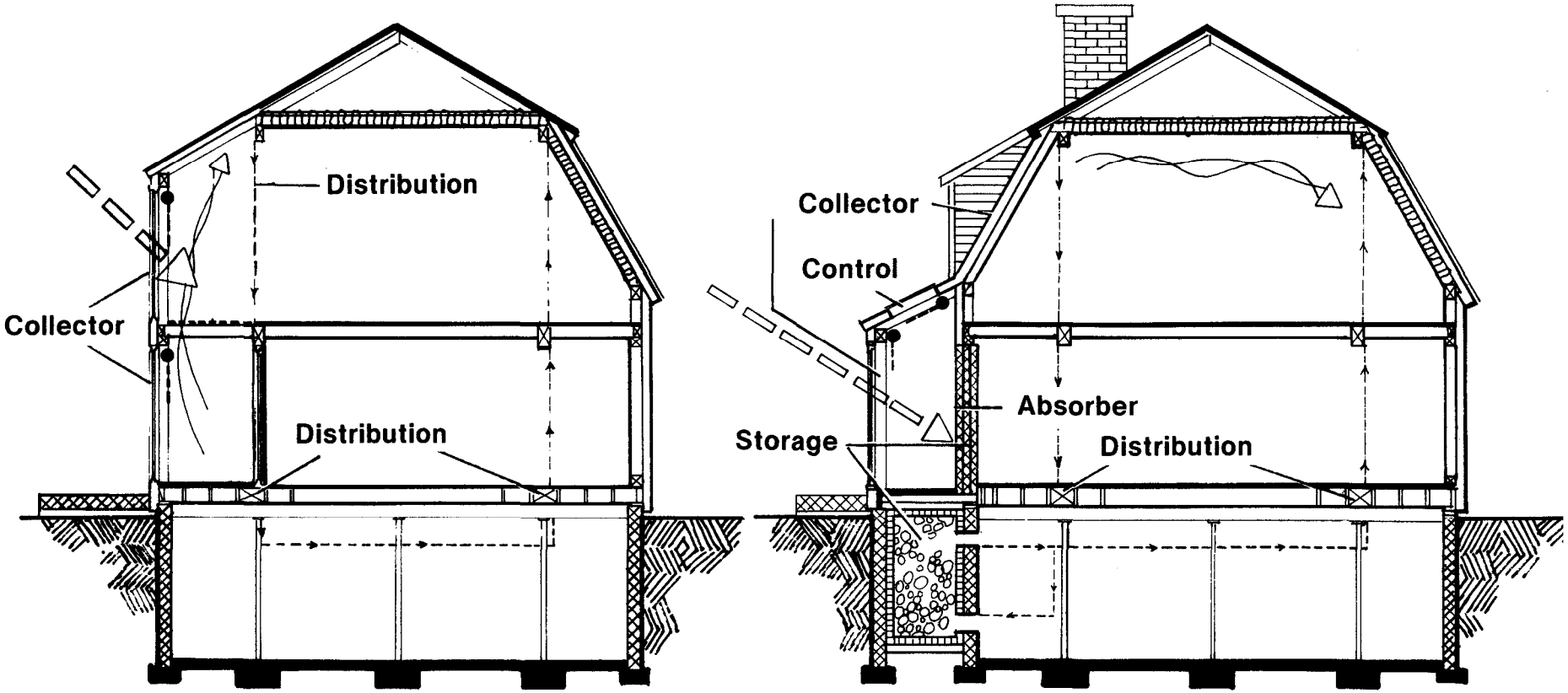
Lastly, the 2-story greenhouse **collects** solar heat through double-glazed fixed panels and sliding doors. Because there is no thermal mass in the greenhouse itself, the heat accumulates and rises through the floor to the peak of the upper level of the greenhouse.

When the air temperature at the peak reaches 90°F, a fan is activated by a thermostat and pulls heated air through a duct into a rock **storage** bin located beneath the smaller greenhouse. Cool air from the rock bed is returned to this greenhouse through ducts.

The **distribution** system for solar heat from this rock bed is integrated with the back-up wood stove. The duct system is equipped with an air-handler that features a reversible fan and motorized damper. This draws heat out of the rock bed for distribution to living and sleeping space.

Nighttime heat losses are **controlled** by interior greenhouse doors, creating a buffer zone across the south glazed wall.

Because summer temperatures in New England are moderate, cooling can be accomplished easily through shading and cross-ventilation. The high angle of incident summer sunlight prevents significant heat absorption by the mass wall or interior floors, and opening the skylight, glass sliding doors, and interior doors permits cross ventilation through the upper and lower levels. The large greenhouse can also be used as a porch with shading provided by a stairway, the second-floor deck and operable exterior bamboo shades.



This plan is from the book
“Passive Solar Homes – 91 new award-winning, energy-conserving single-family homes”,
The U.S. Department of Housing and Urban Development, **1982**

The solar homes designs in this book were the winners of HUD’s fifth (and final) cycle of demonstration solar homes. The 91 winning home plans in the book were selected from 550 applications from builders.

This was a time of great interest and activity in the passive solar home designs – many of the winning homes show a level of innovation not found in most of today’s passive solar designs.

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