



**Builder:** Hartman Briddell Watkins, Rockville, MD

**Designer:** Landon M. Proffitt, Frederick, MD

**Solar Designer:** Solar Energy Scientific and Technical Services, Frederick, MD

**Price:** \$75,000

**Net Heated Area:** 1675 ft<sup>2</sup>

**Heat Load:** 81.4 x 10<sup>6</sup> BTU/yr

**Degree Days:** 5060

**Solar Fraction:** 47%

**Auxiliary Heat:** 5.13 BTU/DD/ft<sup>2</sup>

**Passive Heating System(s):** Direct gain, indirect gain (Trombe wall), isolated gain

**Recognition Factors:** **Collector(s):** South-facing glazing, mass wall glazing, greenhouse glazing, 301 ft<sup>2</sup> **Absorber(s):** Concrete slab, block mass wall **Storage:** Concrete slab, block mass wall—**capacity:** 4950 BTU/°F **Distribution:** Radiation, convection **Controls:** Operable vents and winds, moveable insulation, sunshades

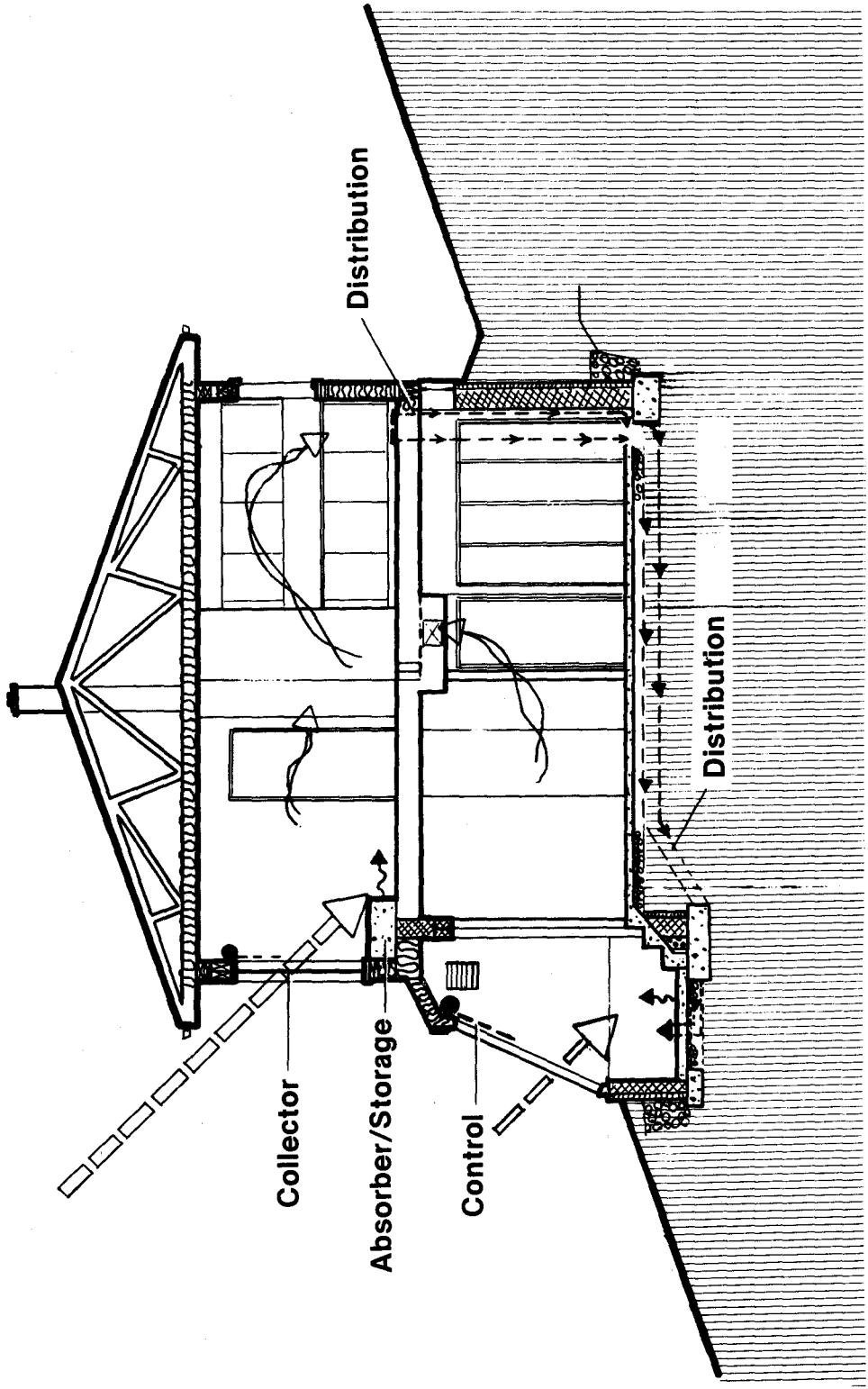
**Back-up:** 19,500 BTU/H electric air-to-air heat pump, wood stove

This compact, 2-story house combines three methods of solar **collection** for heating: direct radiation, Trombe wall, glazing, and a greenhouse. At the upper level, direct solar radiation is **absorbed** and **stored** in a 12-inch deep by 30-inch wide concrete ledge located at windowsill height and running the length of the living/dining room. The block wall on the lower floor serves as the **absorber** and **storage** element for both the Trombe wall system and the adjacent greenhouse. Heat rises through the floor vents from the Trombe wall and greenhouse for **distribution** to the living/dining area on the upper level. Cooler air flows down through floor vents along the north side of the house to the basement, where it re-enters the greenhouse or Trombe wall through intake vents

near the floor. Through-vents are located in the second bedroom on the house's south side to the first bedroom on the north. At night heat radiates from the mass slab, Trombe wall, and greenhouse wall to the interior spaces.

Overnight, the greenhouse is shut off, and, to control heat loss through all windows and vents, they are closed with curtains. Summer overheating is controlled by overhangs and additional fold-down panels above the Trombe wall. Both the greenhouse and Trombe wall have separate exterior vents for exhaust cooling in the summer.

As a conservation measure, earth is bermed to a 7-foot depth at the north side of the house; insulation values are R-18 and R-33 in the walls and ceilings.



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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