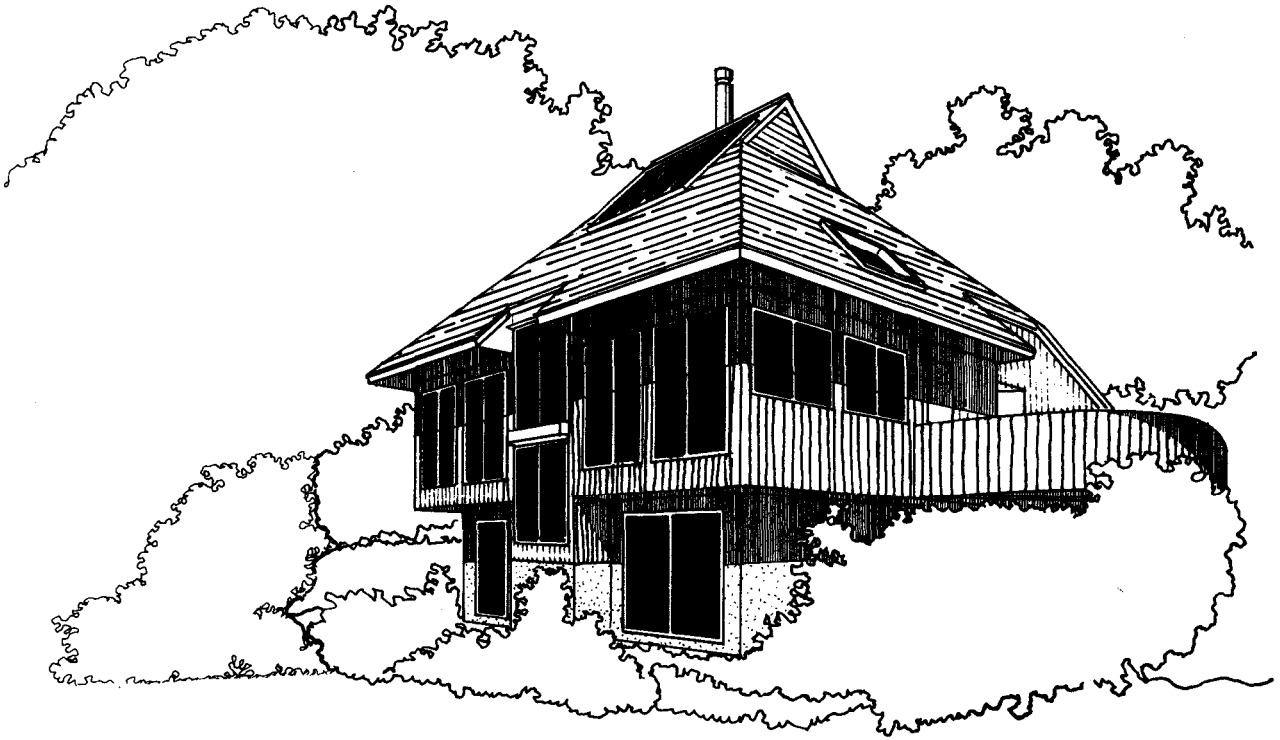
Canton, CT



Builder: Hartford-West, Inc., West Simsbury, CT

Designer: Richard Reinhart, Farmington, CT Solar

Designer: Energy Research Group, Farmington, CT

Price: $150,000

Net Heated Area: 2200 ff^2

Heat Load:99.9x10^6 BTU/yr

Degree Days: 6350

Solar Fraction: 35%

Auxiliary Heat: 4.69 BTU/DD/ff^2

Passive Heating System(s): Direct gain, sun-tempering

Recognition Factors: **Collector(s):** South-facing glass, 396 ft^2 **Absorber(s):** Concrete wall and floor, tile floor **Storage:** Concrete wall and floor **capacity:** 17,349 BTU / F **Distribution:** Radiation, natural and forced convection **Controls:** Vents, shutters, damper, operable shades, insulated panels

Back-up: Air-to-air heat pump (35,000 BTU /H), electric resistance heaters

Domestic Hot Water: Flat-plate collectors (74 ft^2), 120-gallon storage

This contemporary Connecticut design reflects styling that has had wide market acceptance in the suburban Hartford area. The house is set into a south-facing slope which provides earth-berming for the lower level on the east, west, and north; this siting enhances exposure to summer breezes while reducing exposure to winter winds. Winter heat loss is further limited by the garage on the north side and the air-lock vestibule on the east; by fiberglass insulation with R-values of 21 in the walls, and 34 in the ceiling and roof; by a buffer zone of low-use spaces on the north; and by insulating shades or shutters on all glazing.

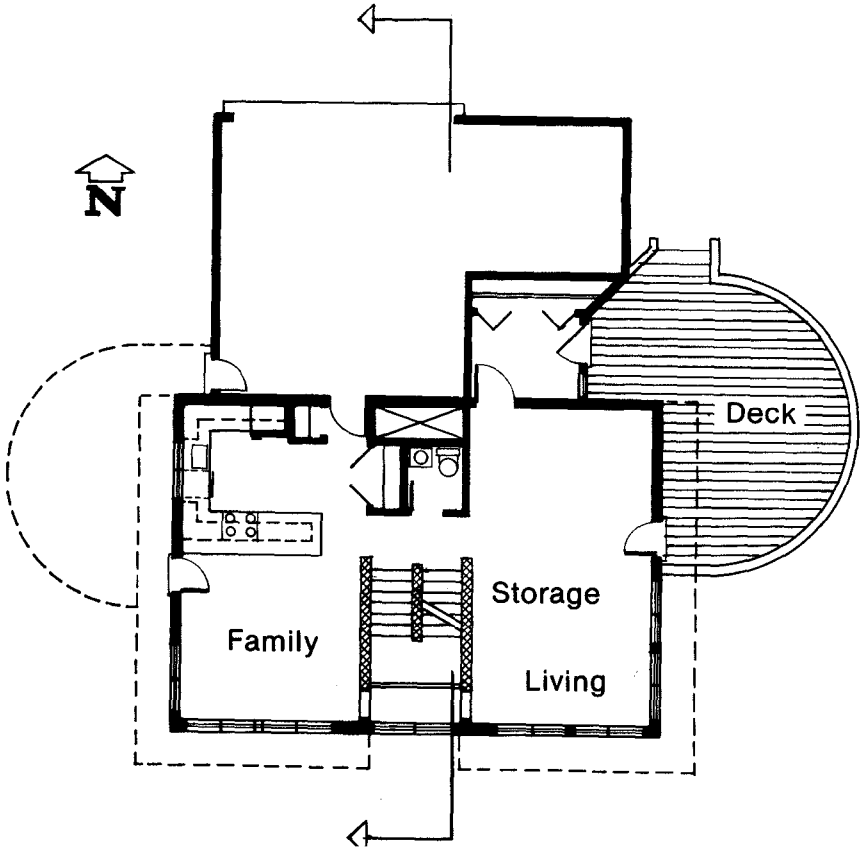
During winter days, solar heat is collected through double-glazed east-, west-, and south-facing windows. On the lower level, heat is absorbed and stored in the concrete walls, and in concrete and tile floors of the bedrooms. Additional storage is provided by the masonry walls of the 3-story stairwell. Stored heat is later distributed as it radiates back into the stairwell, living room, and sleeping spaces when interior temperatures drop. When interior windows between the stairwell and upper-level bedrooms are open, solar-heated air will be distributed to these bedrooms by convection. Excess solar heat from the lower-level bedrooms is distributed to upper levels when bedroom doors are open.

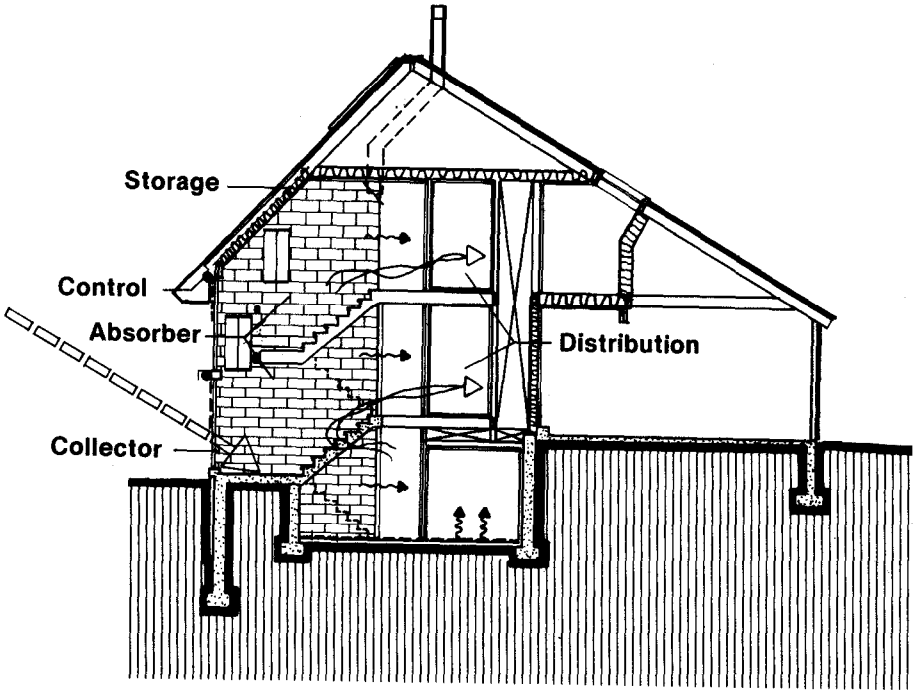
Solar heat can also be distributed throughout the house by the air handling unit in the heat pump back-up system. Every year in the fall, a damper in the cetl-

ing-Ievel return air vent is manually opened. The fan in the air handler pulls solar-heated air from the top of the stairwell through the return duct and **distributes** it to living and sleeping spaces via the duct system. During winter nights, heat loss is **controlled** by manually closing exterior insulating shades on stairwell glazing and. interior insulating shades on all other windows.

To reduce solar heat gain during the summer, the shades can be closed during the day and then opened at night to re-radiate house heat outside. At the beginning of the cooling season, a panel of rigid insulation is removed from the attic vent in the stairwell ceiling, and the damper is opened. If the exterior windows in the stairwell are opened and the upper windows are closed, then cool air is pulled up through the stairwell, and hot air is exhausted through continuous ridge vents in the attic. Whole house cross-ventilation is induced by opening other windows and skylights. If the floor level return vent in the upper hall is opened, the air handler can distribute cool air pulled into the stairwell from outside.

A Sunworks™ active solar system heats domestic water with four collectors mounted on the roof.





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.

www.BuildItSolar.com