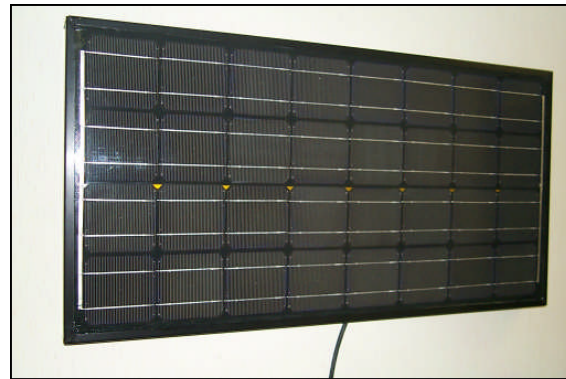


STU-47 TRACK CIRCUIT SOLAR MODULE



Innovative Solutions for Your High Integrity Power Needs



RedHawk Energy Systems, LLC was formed in 2004 as a manufacturing subsidiary of the Arthur N. Ulrich Company.

We Specialize In:

- Renewable & "Green" Energy Systems
- Remote Site Power Systems
- Battery Systems, Testers, Monitors & Accessories

Our Products Include:

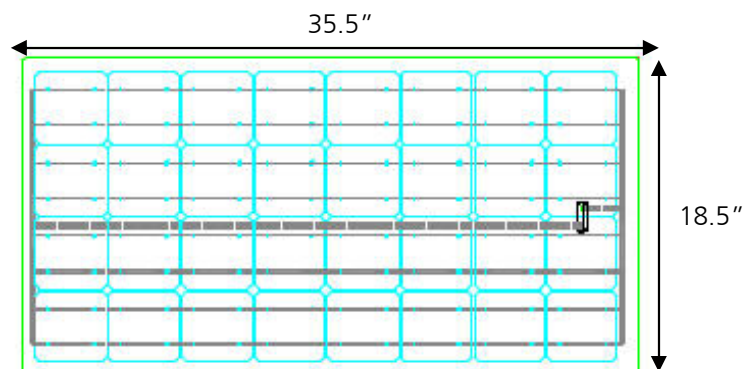
- Photovoltaic (Solar) Power Systems
- Wind Generators
- Fuel Cells
- Extended Run Engine Generators
- Thermoelectric Generators
- Hybrid Power Systems
- RP Series Retractable Masts
- Retractable Wind Generator Pole Adaptors
- Nickel Cadmium Batteries
- Lead Acid Batteries
- RH Series Portable Battery Testers
- Battery Enclosures
- Battery Watering Tools
- Battery Lifting Slings

The RedHawk Energy Systems, LLC STU-47 Track Circuit Solar Module is a specially designed solar module for charging 2 series connected Nickel Cadmium cells. With a peak wattage rating of 47 watts, the STU-47 is particularly well suited for long track circuit applications requiring higher voltages and currents. The STU-47 module consists of 32 single crystalline silicon solar cells, electrically configured with four series strings of 8 cells each providing a nominal output of 3.8 volts at its peak power rating. The solar cells are laminated between a multi-layered polymer backsheet and layers of ethylene vinyl acetate (EVA). The front panel surface is a non-breakable fluoropolymer Tefzel, a DuPont film similar to Teflon. The STU-47 is available in single module configurations or as an integrated assembly of multiple modules.

Typical Electrical Specifications

Maximum Power (P_{max}) = 47 Watts	Open Circuit Voltage (V_{oc}) = 4.6 Volts
Voltage at Pmax (V_{mp}) = 3.8 Volts	Short Circuit Current (I_{sc}) = 13 Amps
Current at Pmax (I_{mp}) = 12.4 Amps	Cells per Module = 32

These specifications represent the performance of typical module as measured at its output terminal with illumination of $1kW/m^2$ (1 Sun) and cell temperature of $25^{\circ}C$.





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About Us

RedHawk Energy Systems, LLC was formed in 2004, as a manufacturing subsidiary of the Arthur N. Ulrich Company to specifically focus on alternative, renewable and advanced energy systems for critical power applications. Since 1982, we have provided hundreds of standard and custom systems for wayside and communications applications. Our systems are designed to install easily and quickly to provide years of trouble-free service.

We Specialize In:

- Alternative/Renewable "Green" Energy Systems
- Remote Site Power Systems
- Battery Systems, Testers & Accessories

Our Products:

- Photovoltaic (Solar) Power Systems
- RP Series Retractable Mast
- Wind Generators
- Wind Generator Pole Adaptors
- Hydrogen & Methanol-Based Fuel Cells
- Thermoelectric Generators (TEGs)
- Extended Run Engine Generators
- Hybrid Power Systems
- Nickel Cadmium Batteries
- Lead-Acid Batteries
- RH Series Portable Battery Testers
- Battery Enclosures
- Battery Watering Tools
- Battery Lifting Slings

Our Services:

- Comprehensive Site Survey
- Installation Supervision & Training
- CAD Drawings & Interconnects Diagrams
- Complete IOM Manuals & Packages
- Project Management

Our Railroad Division has Extensive Experience in Power Systems for:

- Pole Line Replacement
- Track Circuit Power
- AEI, Hot Box & Defect Equipment Detectors
- Radio & Microwave Communication Systems
- Intermediate Signals
- Highway Crossings
- Control Systems



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