WE'RE ENGINEERING A BETTER TOMORROW

DISCRETE LOGIC SOLVING SYSTEM

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LOCKHEED MARTIN
We never forget who we're working for®

LOCKHEED MARTIN ENERGY - NUCLEAR SYSTEMS & SOLUTIONS

SAFETY CONTROL SOLUTIONS

Discrete Logic Solving System provides safety-critical instrumentation and control (I&C) applications – offering numerous nuclear power plant solutions without software-like elements.

DLSS™ is implemented in custom hardware-based logic. No FPGA, microcontroller or microprocessor running software. Familiar PLC-like form, fit, and function, but non-digital.

Unique non-digital design approach. DLSS offers a hardware-based architecture, solid-state electronics, analog and discrete logic circuits; and a simple configuration of common input/output modules and application-specific logic solving modules. Platform configuration (input/output distribution) is strategically defined to maximize availability (minimize downtime) of the critical functions.

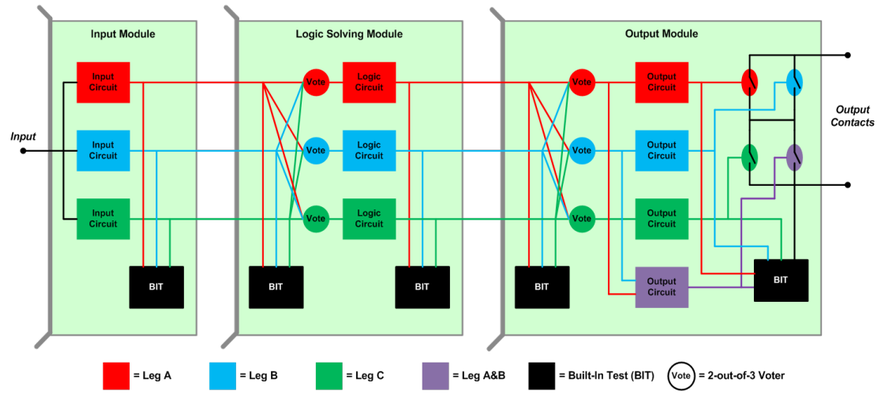
Simplicity at its best. A platform of circuitry and infrastructure are configured into a card rack and backplane subsystem where several subsystems occupy a single cabinet. Depending on the application, a channel, division, or train of equipment may reside in a single cabinet–ideal for retrofitting existing facilities. Channels, divisions and trains may also be distributed across numerous cabinets, either in the same room, or isolated rooms complying with redundancy and diversity requirements. Most importantly, the **DLSS** architecture offers detection and indication when and where a failure may occur in the system.

Protection and safety when it counts. DLSS protects nuclear power plants by monitoring, calculating and actuating protective elements to ensure safety measures are operational when it counts.

Ensuring logic and safety. When integrated to form a protective system, one or more **DLSS** system components monitor the status of the nuclear facility through signals received from peripheral input devices or sensors. **DLSS** samples inputs, solves custom logic, and drives outputs to actuate peripheral protective elements protecting the nuclear facility.

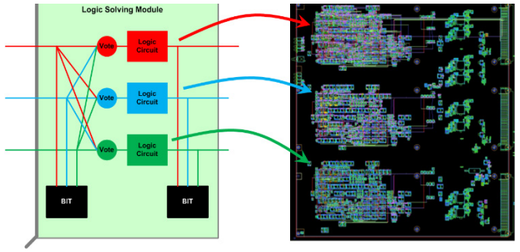
DLSS components can be assembled in separate divisions with **application specific discrete voting logic** for specific plant safety requirements to implement plant systems such as:

- Emergency diesel generator startup and shutdown
- Load shedding and emergency load sequencing
- Engineered safety features actuation systems
- Auxiliary feedwater actuation systems
- Relay trip systems
- Interlock systems important to safety
- Control systems for safety chillers
- Redundant reactivity control systems
- Diverse instrumentation and control systems



DLSS Features:

- Non-digital, hardware-based architecture
- Triple Modular Redundancy (TMR) for fault tolerance
- Built-In Test (BIT) to detect faults
- Hot Standby and Hot Swap Capabilities
- Decentralized BIT isolates faults to Lowest Replaceable Unit (LRU)
- Superior reliability through stringent derating criteria
- Visual indicators at the LRU-level to report faults
- Common platform approach reusable/deployable to multiple applications
- Long service life with decades of product support



TMR Modules for Fault Tolerance

DLSS Benefits:

- No software-like features avoids complexity and licensing risks associated with digital I&C
- Modern analog electronics enhance safety, reliability and efficiency
- Designed, qualified and produced under a 10 CFR 50 Appendix B Quality Assurance Program
- Modular design for new and retrofit applications
- Significantly less complex than general purpose platforms (e.g. PLCs)
- Eliminates risk of software common-cause failure
- Supports system diversity

DLSS Platform:

- Chassis Assemblies
- Field Wiring/Cabling Termination
- 18-slot 9U Chassis
- 4 Logic Solving Module Slots
- 14 Input/Output Module Slots
- Triple Redundant Point-to-Point Communication