INVOCON

[INITIATORS]

Solid State Event Initiator (SSI)

Solid-State Pyrotechnic Initiator

[PRODUCT OVERVIEW]

Solid State Event Initiator (SSI)

Invocon's Solid State Event Initiator (SSI) provides highly reliable and safe event-initiation capabilities for energetic devices (squibs), serving as a solid-state replacement for Invocon's legacy Capacitive Discharge Initiator (CDI). The SSI replaces the CDI's mechanical devices with solid-state electronics while maintaining the same levels of fail-safe protection required by rockets and spacecraft for engine activation and pyrotechnic functions. Event initiation is controlled through a combination of programmable timing, external commands, and pressure, with automated error checking and Invocon's Squib Sense™ fire path analysis.

[CAPABILITIES]

Features & Applications

Key Features

- **Fully Redundant Output Channels**
  Supports four fully redundant (or eight non-redundant) output channels with optical isolation between fire paths and control electronics.
- **Squib Sense™ Fire Path Monitoring**
  Invocon's proprietary Squib Sense™ continuously analyzes each fire path for readiness—whether the vehicle is armed or safe—providing pre-fire verification without initiating the squib.
- **Programmable Timing and Pressure Arming**
  Each channel supports independently programmable firing sequences, pressure-based arming windows, and logic-controlled start windows with automated rejection of illegal program inputs.
- **Multiple Sequence Start Modes**
  Firing sequences can be initiated by lanyard pull, an alternate trigger input, or a serial (RS-422) command, providing flexibility for different launch architectures.
- **Compact Footprint**
  Replaces the legacy CDI with a ~75% smaller volume and ~70% lighter package, freeing payload mass and volume for other avionics.
- **Flexible Power Architecture**
  Accepts vehicle power (24–36 VDC) or single/redundant smart rechargeable or primary batteries.

Typical Applications

- **Rocket Stage Separation**
  Fires separation pyrotechnics on a programmable timeline to achieve precise stage separation timing.
- **Payload Deployment**
  Commands pyrotechnic bolt cutters or deployment mechanisms for payload release.
- **Engine Ignition**
  Provides reliable squib ignition for solid rocket motors and liquid engine igniters.
- **Pre-Launch Fire Path Verification**
  Uses Squib Sense™ to verify all squib circuits are intact and ready before arming, reducing range abort risk.

[TECHNICAL DATA]

Key Specifications

SPECIFICATION	VALUE
ELECTRICAL	
Output Channels	4 fully redundant or 8 non-redundant programmable channels
Timing Resolution	1 millisecond per channel
SAFE/ARM Monitoring	Plug identification and state identification
Optical Isolation	Between fire paths and control electronics
Power Options	Vehicle power; single or redundant smart rechargeable batteries; single or redundant smart primary batteries
Input Voltage	24 to 36 VDC
Input Current	Typical 60 mA continuous at 28 V (30 mA per timer), 5 A per squib at initiation
Connectors	MIL-C-38999 for power, HD DB-15 connector for programming, Standard DB-style connectors for all other functions
MECHANICAL	
Size (L × W × H)	6.25 x 6.25 x 1.78 inches (not including connectors)
Weight	3.5 lbs
Case Material	7075 aluminum, Alodine coated (AlMag available if weight critical)
ENVIRONMENTAL	
Operating Temperature	-24 to +61 °C (Acceptance Levels) -34 to +71 °C (Qualification Levels)