



PowerProtector Technology

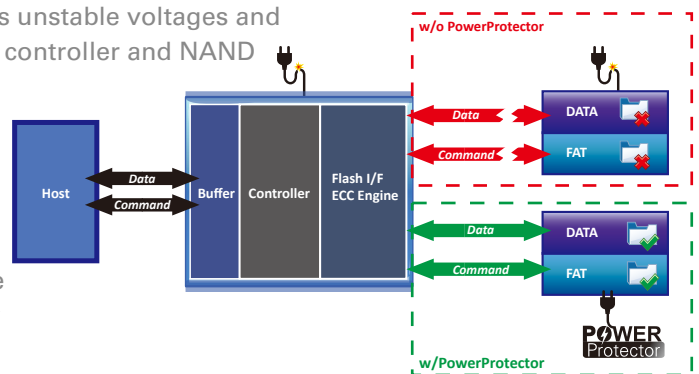
Ensures Data Integrity under Sudden Power Down in All Conditions



The unstable power conditions of outdoor applications such as telecommunications/networking and embedded systems run the risk of data loss and drive corruption during a sudden power failure. Power failures result in downtime as embedded systems are reformatted and operating systems are reinstalled.

ATP PowerProtector's stand alone hardware design ensures a sufficient amount of reserve power during any power abnormalities such as unstable voltages and power outages. A back up power circuit ensures reliable controller and NAND flash operation during a power failure.

During a sudden power failure, the abnormality is discovered by a power loss detection circuit that is integrated into the drive, activating PowerProtector. The drive then draws power from PowerProtector's solid state capacitors for reserve power, which guarantee reliable drive operations. The solid state capacitors allow the flash to finish processing the last command or data.



Comparison between PowerProtector and other solutions

Battery based solutions are not desired for any embedded applications due to their need for replacement over time. This is not an acceptable solution due to the high cost of in-field maintenance. Batteries are also not space efficient and are counterproductive to the design of compact form factors often sought after in embedded modules.

The utilization of a **SuperCap** backup power solution is currently a popular option available for larger form factor SSDs. SuperCaps offer sustained power to vital components allowing for completion of controller and flash functions, but due to certain limitations are not suitable for industrial applications. SuperCaps are well known for their sensitivity to temperature change and their tendency of losing capacitance and functionality at extreme temperatures. Since these are common environments found in mission critical and industrial environments, alternative solutions are needed. SuperCaps, like batteries, also cannot be implemented in small form factor embedded modules due to space requirements.

The solid state capacitor in PowerProtector is a critical component that surpasses the natural limitations of existing SuperCap designs. The solid state capacitor's low series resistance and its minimal sensitivity to temperature and humidity make it the ideal solution for extreme situations. In addition the minimal space requirements of Tantalum Capacitors allow for implementation in smaller form factor embedded modules.

Solution	Design	Effectiveness	Risk	Life Span	Wide Temp.
PowerProtector	Minimal Space Req.	Good	Low	> 5 yrs	Yes
SuperCap	Moderate Space Req.	Good	Degradation	< 2 yrs	No
Battery	Larger Space Req.	Good	Frequent Replacement	< 3 yrs	No

The lifespan of an industrial grade product is a critical feature to consider, given that most products last more than five years. The average life span of SuperCap is less than two years; the capacitance will degrade over time and eventually fail to perform. In contrast, the solid state capacitor of PowerProtector has an average life span of over five years and no capacitance degradation.