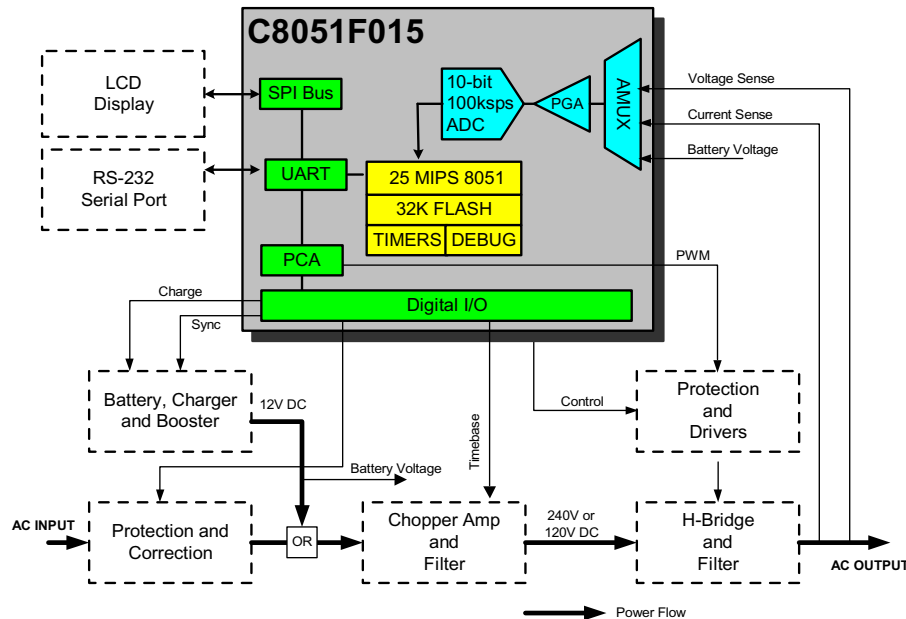




Uninterruptible Power Supply



Background

Uninterruptible Power Supplies (UPS) are used to provide a reliable and stable source of power during power glitches and outages. The UPS works by charging a backup battery during normal operation and converting the DC voltage from the backup battery to an AC output during a power outage.

Cygnal Application

Cygnal's C8051F015 is an in-system programmable, mixed-signal system-on-a-chip that allows most functions of a UPS controller to be integrated into a single chip. As shown in the diagram, the C8051F015 provides complete system control, synchronization, and fault detection for the system.

When the AC input voltage drops below the battery boost DC voltage, the system switches and starts drawing power from the backup battery. The battery charger is also turned off to avoid the load caused by the charging operation. The 12VDC bat-

tery voltage is boosted to the required 120VDC or 240VDC by the chopper amp and filter. The C8051F015 provides PWM control to the H-bridge inverter, and also synchronizes the generated sine wave with the AC input sine wave. The output voltage and current are monitored through the C8051F015's on-chip A/D inputs (10-bit is ideal for 110V and 12-bit for 240V), providing closed loop control.

The C8051F015 also includes UART, SMBus and SPI serial interfaces, four timers, and a five-channel programmable counter array (PCA). Control algorithms and software can be written in 'C' for maintainability and portability. Mixed-signal integration and field programmability make the C8051F015 the ideal choice for power control applications such as UPS systems.