

# LP3500

MODELS | LP3500 | LP3510 |

*Low-Power Single-Board Computer*

## Key Features

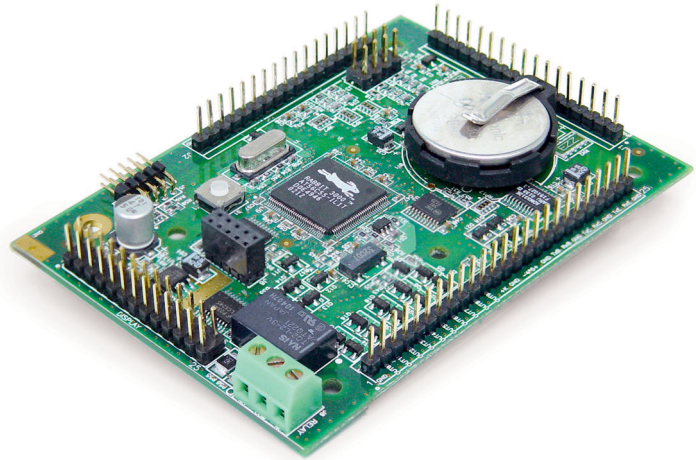
- Low-EMI Rabbit® 3000 microprocessor
- Socketed 3 V lithium battery
- 8 A/D converter inputs with programmable gain
- 6 serial ports (1 RS-485, 3 RS-232, 2 TTL)
- Optional keypad/display, serial Flash, peripherals

## Design Advantages

- Power-save mode draws <100  $\mu$ A
- Low operating consumption: <20 mA at 7.4 MHz

## Applications

- Remote telemetry units (RTUs)
- Pipeline monitoring
- GPS/asset tracking
- Handheld wireless devices
- Remote data acquisition
- Electrical transmission line monitoring
- Other applications that require low-power control



The LP3500 is a low-power single-board computer designed to operate reliably in any place it is deployed, especially where power is limited, such as in portable, hand-held, battery-powered, remote monitoring systems. The LP3500 features built-in analog and digital I/O, while consuming less than 20 mA when fully operational and less than 100  $\mu$ A in power-save mode.

The LP3500 incorporates the low-EMI Rabbit 3000 microprocessor, up to 512K each of Flash and SRAM, 26 industrialized digital I/O, A/D converter inputs and PWM outputs, 6 serial ports, one relay, and two dedicated function ports for easy connection to serial Flash, keypad/display, and other devices. The LP3500 runs at up to 7.4 MHz at a variety of power levels under software control, thereby accommodating a wide range of operating conditions. The board is equipped with 0.1" connectors,

and users can supply their own cables or plug the SBC directly into sockets on their motherboard. The LP3510 is a lower-cost model without A/D or relay features.

A socketed coin-type battery facilitates long-term data storage (SRAM) and real time clock (RTC) operation. When powered by an external battery or power supply (3-30 V DC), the unit can be awakened from the power-save mode by an internal timer, an RS-232 signal, or via polling of an



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external input. The LP3500 can be switched from power-save mode to full operation and back again via software control. In addition, various sections of circuitry (e.g., RS-232 ports) can be switched off via software control to further conserve power when not in use.

The LP3500 can be mounted to a panel or plastic mounting base that allows I/O connections via traditional connectors with 0.1-inch spacing, or it can be inverted and directly mounted to mating connectors on a customer-designed motherboard. The first approach is appropriate where I/O connections go directly to devices and switches, while the second method is suitable where additional circuitry is incorporated on the motherboard.

### Programming the LP3500

Programs are developed and debugged with Rabbit's industry-proven Dynamic C® software. The programming device is connected via a serial cable, or a USB cable. Comprehensive debugging support includes break points, watch expressions and many other extensive features oriented toward real-time embedded systems programming. An extensive library of drivers and sample programs is provided, including a royalty-free TCP/IP stack for network and Internet communications as well as full source code for most library routines.

### Development Kit

The LP3500 Development Kit contains software and hardware tools needed to begin design including a demo board, Dynamic C software and documentation on CD-ROM, User's Manual with schematics, serial cable for programming and debugging, AC adapter (US/Canada only), wiring assembly, and friction-lock crimp pins and housings (standard crimping tool sold separately).

LP3500 Specifications		
Feature	LP3500	LP3510
Microprocessor	Rabbit® 3000 at up to 7.4 MHz	
EMI Reduction	Spectrum spreader for ultra-low EMI (radiated emissions)	
Flash Memory	512K (2 × 256K)	256K
SRAM	512K	128K
Backup Battery	Socketed 3 V lithium coin Panasonic® CR2330, 265 mA-h, supports RTC and SRAM, connection for user-supplied external battery	
Keypad/Display	Supports optional LCD/keypad module with 7 keys and 122 × 32 graphic display	
Digital Inputs	16: fully protected 0–36 V DC, can handle short spikes ±40 V	
Digital Outputs	10: 8 sink up to 200 mA each, 36 V DC max.; 2 source up to 200 mA each, 36 V DC max.	
Relay Output	1 C-form, 1 A, 30 V DC	None
Analog Inputs	General	None
	Single-Ended	
	Differential	
Analog Outputs	3 unfiltered pulse-width modulated, 1 kΩ output impedance	None
Serial Ports	6 shared high-speed, CMOS-compatible ports: <ul style="list-style-type: none"> <li>• 1 RS-485</li> <li>• 3 RS-232 (one 5-wire plus one 3-wire or three 3-wire)</li> <li>• 1 logic-level serial interface for optional add-ons</li> <li>• 1 asynchronous clocked serial port dedicated for programming</li> </ul>	
Serial Rate	Max. asynchronous baud rate = CLK/8	
Real-Time Clock	Yes	
Timers	Ten 8-bit timers (6 cascadable from the first), one 10-bit timer with 2 match registers	
Watchdog/Supervisor	Yes	
Pulse-Width Modulators	10-bit free-running counter and 4 pulse-width registers	
Power	3 V to 30 V DC 20 mA (max.) @ 7.4 MHz, 100 μA max. @ 2 kHz (with linear regulator turned off)	
Operating Temperature	–40° C to +70° C	
Humidity	5% to 95%, non-condensing	
Connectors	<ul style="list-style-type: none"> <li>• 0.1" headers <ul style="list-style-type: none"> <li>• I/O and misc. signals: one 1 × 25, two 1 × 17 headers</li> <li>• Display: one 2 × 13 header</li> </ul> </li> <li>• 2 mm headers <ul style="list-style-type: none"> <li>• Programming port: one 2 × 5 header</li> <li>• Serial interface: one 2 × 4 socket</li> </ul> </li> <li>• Screw-terminal headers <ul style="list-style-type: none"> <li>• Relay: one 3- position screw-terminal header</li> </ul> </li> </ul>	
Board Size	2.60" × 3.65" × 0.45" (66 mm × 93 mm × 11 mm)	
Pricing		
Price (qty 1/25)	\$199/\$175	\$149/\$131
Part Number	20-101-0525	20-101-0526
Development Kit	\$399	\$349
Part Number	U.S. 101-0525/101-0529 Int'l 101-0525 / 01-0530	U.S. 101-0526/101-0529 Int'l 101-0526/101-0530



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