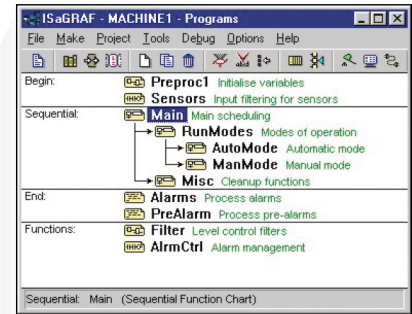# Embedded PLC

## Key Features

- An ISaGRAF 32 I/O V3.50 Workbench
- A fully featured BL2500
- Embedded PLC Kernel for BL2500
- Prototyping wires, connectors and terminals
- Programming cable and documentation

## ISaGRAF V3.50 supports the following industrial programming languages

- Sequential Function Chart (SFC)
- Function Block Diagram (FBD)
- Ladder Diagram (LD)
- Structured Text (ST)
- Instruction List (IL)
- Flow Chart (FC)

## Applications

- Factory automation
- Motion control
- Process control
- Distributed control systems
- Complex networking



ISaGRAF 32 Workbench

The Embedded PLC Application Kit enables a Rabbit 3000 based single-board computer to be programmed via the Programmable Logic Controller (PLC) international programming standard IEC61131-3.

A programmable logic controller (PLC) is a small embedded computer used for automation of real-world processes, such as control of machinery on factory assembly lines. The program controls the complex sequences required in modern manufaturing automation.

The Embedded PLC executes all of the IEC61131-3 programming languages plus Flow Charts. The developer writes these programs via the ISaGRAF V3.50 Workbench (32 I/O package included). The Embedded PLC Application Kit gives you everything you need to get started programming a Rabbit Semiconductor SBC with the ISaGRAF PLC programming system.

The Embedded PLC Application Kit is powered by the BL2500, an advanced single-board computer that incorporates flash memory, SRAM, digital I/O ports, A/D converter inputs, RS-232/RS-485 ports and Ethernet interface (10/100 Mbps). The BL2500 single-board computer gives PLC designers extremely low-cost embedded control for high-volume applications such as product control, factory equipment control, access control, HVAC, and vending machines. The BL2500's compact board size of 100 x 100 mm is easily mountable in standard 100 mm DIN rail trays. External connections via polarized locking industry standard Molex® type connectors enable rapid assembly with wire harnesses.

**RABBIT** Semiconductor
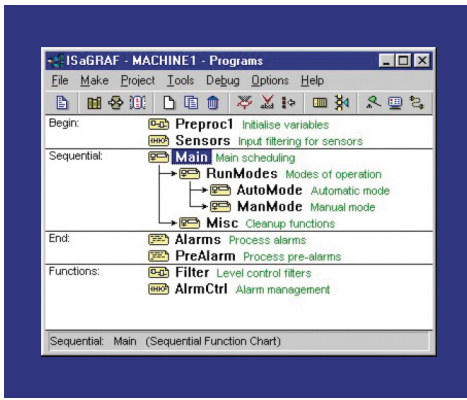
ISaGRAF 32 Workbench
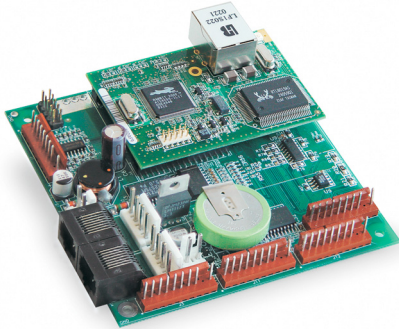
BL2500 Single-Board Computer

Embedded PLC Application Kit

| Embedded PLC Application Kit Specifications | |
|---|---|
| Application Kit Contents | • BL2500 with 10/100BaseT, 512K Flash, 256K + 512K SRAM, 44.2 MHz clock (Rabbit Semiconductor P/N: 101-0602)<br>• ISaGRAF V3.50 32 I/O Workbench<br>• Embedded PLC Kernel for the BL2500<br>• BL2500 Prototyping Board and interfacing cables<br>• ISaGRAF Programming Cable<br>• User Documentation |
| I/Os supported | • 16 Digital Inputs<br>• 8 Digital Sinking Outputs<br>• 1 Analogue Input (connected through AD0): 10 bits resolution, 0 - 3.3V<br>• 1 Analogue Output (connected through DA1): 10 bits resolution, 0 - 3.3V<br>  For further details, refer to the BL2500 technical specification. |
| Communications | • Communication parameters are configurable using the Embedded PLC Utility for the Rabbit Processor<br>• Modbus TCP (using static IP address)<br>• Modbus RTU over RS-232 (using BL2500 serial port E)<br>• Modbus RTU over RS-485 (two-wire mode, using BL2500 serial port D)<br>• Modbus RTU serial communication configuration (fixed):<br>  • Baud rate: 19200 or 9600<br>  • Parity: None<br>  • Data bits: 8<br>  • Stop bits: 1<br>  • Flow control: None |
| Performance: | • Digital Inputs scan time = 200 µsec<br>• Analogue Input scan time = 83 msec<br>• Digital Output update time = 30 µsec per output<br>• Analogue Output update time = 120 µsec<br>• Boolean instruction = 30 µse<br>• Program execution overhead = 100 µsec per program |
| Memory space | • Maximum size of the ISaGRAF application database is 50000 bytes.<br>• Size of ISaGRAF real-time database (holds variables, SFC engine data) is 10000 bytes<br>• Free root memory is approximately 9000 bytes<br>• Embedded PLC kernel code size is approximately 260000 bytes |
| Development Kit<br>Part Number | $599<br>U.S.  101-1108            Int'l 101-1109 |

| BL2500 Specifications & Features | |
|---|---|
| FEATURE | BL2500 |
| Microprocessor | Rabbit 3000 at 29.4 MHz |
| Ethernet Port | 10Base-T, RJ-45 (standard) |
| Flash Memory | 256K (standard) |
| SRAM | 128K (standard) |
| LEDs | 4, user-programmable |
| Digital Inputs | 16: 15 protected to ±36 V DC, 1 protected to +5 –36V; threshold is 1.5 V nom. |
| Digital Outputs | 8, sink up to 200 mA each, 36 V DC max. standoff voltage |
| Analog Inputs | One 10-bit resolution, 8-bit accuracy, input range 0.1–3.1 V, 10 samples/s |
| Analog Outputs | Two 9-bit PWM, 0.1–3.1 V DC, 17ms settling time |
| Serial Ports | 6 serial ports:<br>• 1 RS-485<br>• 2 RS-232 or 1 RS-232 (with CTS/RTS)<br>• 1 CMOS level asynchronous or clocked serial port<br>• 1 expansion serial port multiplexed to two RS-422 clocked SPI ports<br>• 1 CMOS compatible serial port for programming/debug |