



Programming BiPOM Microcontrollers

(By the Hobbyist and the Professional)



BiPOM Electronics, Inc. is one of the world's leading providers of microcontroller systems and applications, including hardware, firmware, software, manufacturing, and field/technical support.

BiPOM's extensive family of low cost, small size, professional quality micro-controllers and peripheral boards are easy to use and program in a wide variety of applications.

As one of the world's leading manufacturer of microcontroller boards, BiPOM also has the most extensive programming support of any manufacturer, including custom programming.

Microcontroller and Programming Selection Guides at: www.bipom.com

BiPOM microcontroller boards can be used in three (3) major ways:

1. As a Server (slave) data acquisition and control device with a Windows PC as the Client (master) via USB, RS232 Serial, Ethernet, or wireless
2. Standalone as an autonomous, self sufficient, low power control unit
3. Standalone control unit running a high-level operating system such as Linux or Windows CE



1 As a Server for a Windows PC

Connect the PC to any of eight (8) BiPOM microcontroller boards and fifteen (15) peripheral boards and use LabVIEW or MATLAB to develop the application programs. The BiPOM software library, "ClientAPI", is a free download from the BiPOM website, with board purchase.

Traditional Windows programming languages, such as Visual C++ and Visual BASIC are also supported for this type of use of BiPOM microcontrollers.

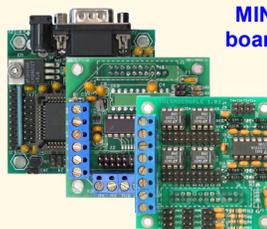
Windows PC with LabVIEW



Free 50-page LabVIEW Application Guide is available from www.bipom.com



Serial or USB Cable



MINI-MAX with Data Acquisition boards (e.g. DAQ-128, DAQ-2543, THERMOCOUPLE-4)

Also works with other software systems that use **ActiveX**



ClientAPI
Software Library System





2 Standalone - Autonomous, Low Power Control Units

BiPOM boards have a wide range of programming support, from pre-packaged applications to easy to use graphical languages:

EZ-APP - BiPOM's advanced configurator eliminates programming

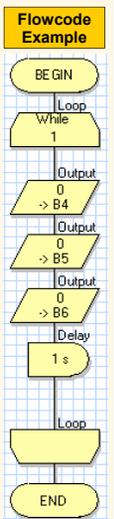
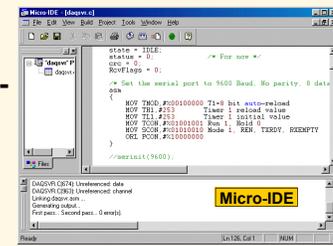
Ladder Logic - Easy, high-level programming (using wiring diagrams)

Flowcode - Easy, high-level programming (using flowcharts)

Wiring/Arduino - Popular language applicable to BiPOM boards

BASIC, Assembly, & C/C++ - Traditional programming languages.

This standalone mode is especially popular for robotics applications by hobbyists as well as advanced users.



```
Micro C Example for Humidity Measurement
for(;;)
{
  // Read raw humidity value from Sensirion
  ec = SHT_Measure(&humidity, &cs, MEASURE_HUMIDITY);
  if( ec ) printf("\n ERROR Reading Humidity"); continue;

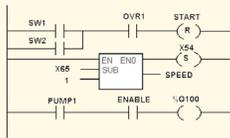
  // Convert raw values to human readable form
  SHT_Calculate(&temperature, &humidity);

  // Display humidity as RH%
  printf("\n Humidity : %d.%d%%", humidity/10, humidity%10);

  // Wait a little bit before next measurement
  delay(2000);
}
```



EZ-APP



Ladder Logic



Assembly

GCC Keil IAR

CCS Micro C SDCC

BASCOM-51 BASCOM-AVR



3 Standalone - High-Level Operating Systems

All of BiPOM's family of ARM9 boards, including the new GadgetPC, can run high-level operating systems, such as ARM9 Linux, Debian Linux (with over 25,000 free prepackaged applications), and Windows CE. Thus, all the languages that can generate executable code for Linux or Windows CE, can be used to program this family of BiPOM microcontroller boards.

The ARM9 series microcontroller boards have many performance advantages over low end PC's, while supporting a full range of USB devices and peripherals, in a small package with low power (< 1 watt).

This high-level mode is popular for high-end/complex robotics and mobile applications.



Linux



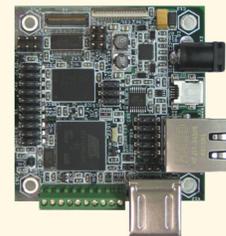
GadgetPC

ARM9 (AT91SAM9260) based microcontroller system



RGI-RTR4X4 Robot

Photo: Courtesy of www.roboticsgroup.com



MINI-MAX/ARM9260-E

The Ultimate Embedded Linux machine



debian

Linux scripts and tools simplify application development



```
##### ARM9 LINUX PORT I/O TEST #####
echo "Testing Port B8"
for a in $(seq 1 1) ; do
#
  echo "**** ARM9 PORT I/O TEST ****"
  /mnt/usb/bin/gpio B 8 0
  ledDelay
  /mnt/usb/bin/gpio B 8 1
  ledDelay
done
fi
```

Built-in drivers for many devices, including USB



Custom programming and support available, ask: info@bipom.com

Visit our web site at: www.bipom.com