Spring
2004

AWC
Powering Microprocessor Designs

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Microcontroller Design Catalog

What's New?

- Atmel ATmega Kits—Program in C!
- New Kits: PIC + CPLD, Relay controller,
- PAK-XII our simplest math coprocessor ever!
- Assembled Kits

Table of Contents

Price: $17.95
Order #: RS1KIT

Assembled: $25.50
Order #: RS1ASM

RS-I RS-232 Prototyping Adapter

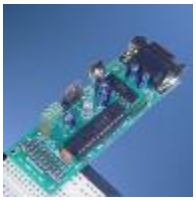
This handy kit is a must have around the lab. Simply connect a male DB9 serial cable to the RS-I and connect the board to your TTL/CMOS circuit on a breadboard. Based on the industry standard MAX232, the 6 pins allow you to connect the transmit, receive, RTS, and CTS lines. You can also use this board as a building block for a variety of projects. Requires assembly and a single 5V regulated supply (check out our PS-I kit, below). Also available as a bare board (RS1BARE $9.95). NEW: Now has traces on board to simplify rewiring for DCE use!

Bestseller!

Price: $14.95
Order #: PSIKIT
Breadboard for illustration purposes only.

PS-I Power Supply Kit

Looking for a useful and fun to build kit? The PS-I allows you to connect a 2mm wall transformer (center positive) to a breadboard or other project. A 5V regulator is provided although you could substitute another three terminal regulator with proper component choices. An LED shows you the power supply is on, and a shunt jumper allows you to turn off the supply and makes a handy current measurement test point. Requires assembly. Also available as a bare board (PSIBARE $7.95).



Price: $29.95
Order #: MPU28KITF
Includes PIC16F873A

Also available:
Bare board (MPU28BARE—$12.95)

GPMPU28 PIC Prototyping Board

Need a PC board for a PIC project? Look no further. This handy board accepts most 28-pin PICs and includes a MAX232 level converter, a 5V power supply, a spot for a three terminal resonator, and an edge connector you can wire to other circuitry or plug into a breadboard.

A unique pattern allows you to easily change what signals appear on the edge connector. Includes ICSP header. On board LED is perfect for status indicators. Shown with optional reset switch mounted. Assembly required.

APP-II PIC Programming Kit

If you've ever wanted to start programming 16F-family PICs, this kit is the easiest and fastest way to get started. You can build PIC circuits on your own breadboard. The APP-II is a PIC16F873A specially programmed to download hex files directly from any computer (using the computer's serial port).

Great features include:

- 19 digital I/O and 5 analog inputs (10 bit)
- 192 bytes of RAM; 256 bytes of EEPROM
- 3.8K words of program storage
- 20MHz operation (includes resonator)
- Easy-to-build PC board

Requires a solderless breadboard and a 5V supply. Includes parts not shown. Assembly required.

Price: $34.95
Order #: APP2GPPS

Also available:
APP-II chip only and resonator (APP2BARE—$12.50)

APP-III PIC Programming Kit

If you've ever wanted to start programming PICs, this kit is the easiest and fastest way to get started. You can build PIC circuits on your own breadboard. The APP-II is a PIC18F252 specially programmed to download hex files directly from any computer (using the computer's serial port).

Great features include:

- 19 digital I/O and 5 analog inputs (10 bit)
- 1.5K of RAM (384 bytes with no banking); 256 bytes of EEPROM
- 15.8K words of program storage
- 20MHz operation (includes resonator)
- Powerful 18F chip supports stacks, reduces bank switching, and is easier to program

Requires a solderless breadboard and a 5V supply. Includes parts not shown. Assembly required.

Price: $44.95
Order #: APP3GPPS

Also available:
APP-III chip only and resonator (APP3BARE—$15.50)

Serial Cable (6' DB9 M/F)

Need a serial cable to connect an RS-I, APP-II, or GPMPU28 to your PC. This is it! High-quality cable has all 9 pins wired straight through.

Price: $8.99
Order #: CAB9MF

GPMPU40 Universal CPU Board
Here's a powerful board that will let you use the microcontroller that's best for your project — not the one that you happen to have support for.

This board provides a unique pattern that can handle any DIP processor from 8 pins to 40 pins on .3" or .6" centers. An onboard regulator, clock, reset, and RS232 converter can connect to the pins appropriate for the micro you are using. There's a 40 pin header for connection to a breadboard or other circuit and a 6 pin header for an external programmer or debugger.

Use the GPMPU40 with a PIC, AVR, H8, Zilog, or virtually any microcontroller! Perfect for consultants or development labs that use many different processors.

Order with the size socket you want (although the boards are the same, only the socket supplied is different).

Price: $24.95
Order #: GP40BAS (40 pin)
Order #: GP28BAS (28 pin .3")
Order #: GP18BAS (18 pin)
Order #: GP8BAS (2x8 pin)

Price: $14.95
Order #: GP40BARE (bare PCB)

PICPLD PIC/CPLD Kit
What do you get when you join a PIC with a Xilinx 9572 CPLD? The PICPLD kit. This powerful kit allows you to solve problems with PIC programming and sophisticated high-speed digital logic. Need a dozen PWM outputs? No problem. A specialized UART? Download it to the CPLD. Be sure to check out our Web tutorials for this product! Available with a 16F873A or 18F252 processor.

Assembly required.

Price: $99.95
Order #: PICPLDJT (16F)

Price: $114.95
Order #: PICPLD18 (18F)

APP-IV C Programming Kit

Based on our popular GPMPU40 board, this powerful kit allows you to program an Atmel ATmega 8 using assembly language or C! The kit includes everything you need to get started. Use the built-in serial port to program the device or for communications from your program to the outside world.

Price: $39.95
Order #: APP4KIT

Assembled: $65.95
Order #: APP4ASM

The ATmega 8 has nearly 8K of program space, 1K of RAM, and a wide range of peripheral devices (including a multi-channel A/D converter).

The APP-IV includes support for the powerful open source Gnu C compiler. You can write serious C programs under Windows or Linux, debug using a software simulator, and then download your program to the APP-IV via your serial port. You won't believe how productive you'll be!

Assembly required.

KP-1 Relay Board

Sometimes there is no substitute for relay switching. The KP-1 makes it easy to add two SPST relays to any microcontroller project. Each relay has 2 inputs. Bring them both high to energize the relay. It is that simple! Connect both inputs together if you want a single control line. Need to switch up to 240V at 16A? Get a KP-I today.

Price: $24.95
Order #: KP1

Assembly required

Price: $23.49
Order #: PAK-I

Price: $29.99
Order #: PAK-II

PAK-I and II Math Coprocessors

These ICs add floating point math to practically any microcontroller. Only two outputs and an input or one input and one I/O pin required. Works with processors that can't perform bidirectional I/O, too. Fast 20MHz operation, IEEE754 compatibility, and 8 available digital I/O pins make this a must-have for anyone who wants to beef up the math capabilities of their microprocessor. The PAK-II adds 8 more I/O pins, space for 24 temporary results, roots, logs, exponentiation, sine, cosine, tangent, and more.

Includes resonator, manual, and example disk.

Price: $24.95
Order #: PAKIII
Price: $29.95
Order #: PAKIV

PAK-III and IV I/O Coprocessors

This easy to use 18 pin (PAK-III) or 28 pin (PAK-IV) IC requires only two pins from the host computer but provides 8 (or 16) I/O pins with powerful capabilities. Use the built-in functions to measure pulses, generate PWM, or output audio tones. You issue a command using a synchronous protocol, and the PAK will wait until you are ready to send the result. This lets you program the PAK-III to do one task while the main processor does other things. The PAK-III Also provides 64 bytes of EEPROM storage (the PAK-IV has onboard RAM). Includes resonator, manual, and example disk.

Price: 24.95
Order #: PAKVb

PAK-Vb PWM Coprocessor

Every microcontroller designer knows how handy PWM is. You can use it to dim lights, control motor speed, or with an external RC network, develop an analog voltage. The problem with most processors is that when they generate PWM, they stop doing anything else. With the PAK-V a simple RS232 (TTL/CMOS level) command can set an 8-bit duty cycle on any of 8 PWM channels. The PAK-V will continue PWM on all 8 channels until you command it to stop! Minimum pulse width is 2uS. Includes resonator, and manual.

PAK-VIa PS/2 Coprocessor

If you've ever wanted to connect a PS/2 keyboard or mouse to your microprocessor, this chip is just what you need. In cooked mode, the chip delivers ordinary ASCII characters (including extended characters) and manages the keyboard LEDs for you. In raw mode, you take control of the keyboard — or read a mouse for a low-cost, high-precision position sensor. A simple RS-232 (TTL/CMOS level) interface and a built-in buffer makes the PAK-VI an unbeatable value. The PAK-VIa has 32 byte buffer and low current consumption (<10mA). Includes resonator, manual, and examples on disk.

Price: $29.95
Order #: PAKVIa

Also, see the PAK-XI on page 9 and the GP-2 on page 14

PAK-VIIa Pulse Input Coprocessor

If you need to count or measure pulses, the PAK-VII pulse input coprocessor can measure 8 channels with a 5uS resolution at once. The host computer — using a simple synchronous protocol — can measure the time high, the time low, and the number of edges detected. In addition, handy built-in counters allow you to measure time intervals down to 200uS. Great for reading sensors, encoder wheels, or anywhere you want to measure pulses. Includes resonator, manual, and example disk.

Price: $24.95
Order #: PAKVIIa

Perfect for Servo Robots!

PAK-VIIIa Pulse Output Coprocessor

This versatile IC can generate 8 pulse outputs with a 10uS resolution (or 4 channels at 5uS). You can independently set the on time, the off time, and a count of pulses using 16-bit integers. Perfect for controlling servo motors, generating high-precision PWM, or any place you need to generate 8 channels of pulse output with minimum load on the host computer. Also optionally generates fixed clock pulses. Uses the proven PAK synchronous protocol — only two pins required in most applications. Includes resonator, manual, and examples on disk.

Price: $24.95
Order #: PAKVIIIa

Price: $32.95
Order #: PAK-IX

PAK-IX Floating Point A/D

What's better than a math coprocessor? A math coprocessor with 5 channels of 10 bit analog to digital conversion. The PAK-IX is identical to our PAK-II (see page 5) but instead of 16 digital I/O pins, you get 8 digital I/O and 5 analog inputs with 10 bit resolution. In addition to all the commands you can use with the PAK-II, you can also read analog values and even automatically average multiple samples into a floating point number. Great for any application where you need to convert raw counts to engineering units. Includes resonator, manual, and disk.

PAK-X Data Acquisition Coprocessor

The PAK-X is a 5 channel, 10-bit A/D data acquisition coprocessor. You can set a high and low limit for each channel. The PAK-X will assert an output bit to indicate if a channel is out of limits. Each channel has a separate high and low limit output. In addition, the PAK-X remembers that the out of limit indication occurred and tracks the minimum and maximum value for each channel.

How could you use the PAK-X? Suppose you are monitoring four production lines with a Basic Stamp. If the temperature rises above a certain value, you want to turn on a fan. The catch is, once an hour, the Stamp dials out to a PC via a modem. While this is happening, the Stamp isn't monitoring the temperature or controlling the fan. With the PAK-X, you can set the PAK-X so that it will turn on the appropriate fan when the temperature exceeds the high limit. If the Stamp is busy, the PAK-X will remember that the high limit condition occurred and will also record the maximum reading. That way the Stamp can get up to date when it is ready.

Includes resonator, manual, and disk.

Price: $24.95
Order #: PAK-X

PAK-XI Position Sensor Coprocessor

The PAK-XI makes it simple to convert any PS/2 mouse to an accurate two-dimensional position sensor. Perfect for robots, numerically controlled machines, or anywhere you need accurate position data.

Simple RS-232 commands allow you to poll the current X and Y positions (16-bits) as well as read the button status or reset the position data.

Includes resonator, manual, and disk.

Price: $24.95
Order #: PAK-XI

Also see the GP-5 on page 13

PAK-XII Floating Point Coprocessor

Our newest math coprocessor is also our easiest to use. Simple RS232 communications, ASCII commands, and an RPN stack make this nothing short of a scientific calculator for your microprocessor!

How easy is it to use the PAK-XII? Try this simple Basic Stamp program:

```
x=114  ' simulated sensor data
SEROUT TX,BAUD,[dec x," 3.325*="]
SERIN RX,BAUD,[dec result,
    WAIT("."),dec4 frac]
```

That's it! You just computed 3.325 * 114 and read the answer in two parts (a whole number part and a fractional part).

Features include:

- Speedy 10 MIPS internal operation
- Comparison operations
- Trig and logarithmic operators
- Analog comparator available
- Adjustable A/D reference voltage (2.56V, 5V, or external reference)
- A/D channels are high impedance

Price: $29.99
Order #: PAK-XII

Which PAK do I need?

Each PAK has a different function. Some also have similar or equivalent board-level kits. How do you know which one you need. This handy summary can help you decide:

- Floating Point Math
  - PAK-I: Basic 32-bit floating point math
  - PAK-II: Floating point math (32-bit) with logarithms and trig functions
  - PAK-XII: Simplified floating point math with analog inputs
- Analog Input
  - PAK-IX: Same as the PAK-II but with 5 A/D inputs
  - PAK-X: Reads analog data and compares to limits
  - PAK-XII: Floating point math with analog inputs
- I/O Expansion
  - PAK-III: Extra concurrent I/O (8-bit)
  - PAK-IV: Extra concurrent I/O (16-bit)
  - GP-3: Add digital/analog I/O to PC
- PWM
  - PAK-V: Provides 8 channels of pulse width modulation
  - GP-6: Board level kit similar to the PAK-V
- PULSE I/O
  - PAK-VII: Reads 8 channels of pulse input
  - PAK-VIII: Produces 8 channels of pulse output
  - GP-4: Board level kit similar to PAK-VIII
- PS/2
  - PAK-VI: Converts a keyboard or mouse to RS-232
  - GP-2: Board level equivalent of a PAK-VI
  - PAK-XI: Reads X and Y position from PS/2 mouse
  - GP-5: Board level kit similar to PAK-XI

Components

Just the components you need to finish your next project:

- DIP PICs with 3 pin 20MHz resonator
  PIC18F252: (PIC18F252—$12.50)
  PIC16F873A: (PIC16F873—$12.00)
  PIC16F628A: (PIC16F628—$3.50)

- Other processors
  PIC12F629 with 8 pin socket (PIC12F629—$2.00)
  Ubicom SX28 with 3-pin 50MHz resonator (SX28-$6.50)
  Atmel ATmega 8/16MHz with 3-pin 10MHz resonator (AT8-$8.99)

- Three terminal resonators and oscillators
  10MHz: (RES10—$1.45; 5 pack: RES10PACK—$2.90)
  20MHz: (RES20—$1.50; 5 pack: RES20PACK—$3.00)
  50MHz: (RES50—$2.00; 5 pack: RES50PACK—$5.50)
  50MHz DIP can oscillator (OSC50—$3.00)

- DIP ICs
  MAX232 RS232 to TTL converter (MAX232—$3.00)
  7805 5V regulator IC TO-220 (X7805—$1.50)
  7833 3.3V regulator IC TO-220 (X7833—$1.50)
  74LS244 Octal Buffer (X74244—$1.00)

- 5V LEDs (pack of 4) (LED-5—$5.00)

- Blue LEDs (PACK of 2) (BLUELED-$1.00)

- Female DB9 (right angle, short reach, PCB mount)
  (DB9FRA—$1.50)

- IRL520 Logic-level 9A MOSFET TO--220 (IRL520—$1.50)

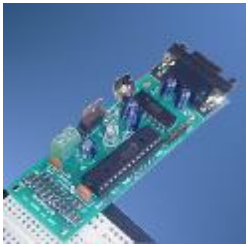
- SPST pushbutton switches for solderless breadboard (SW4—
  $6.00)

More Components

- PS/2 cable (female, 6 pins, 4 wires for keyboard/mouse) (PS2CON–$3.00)
- Three terminal IR sensor (IRSENSE–$4.00)
- IR LEDs, right angle (IRLED–$1.00)
- 40 pin male header (HEAD40-$1.00)
- 20 pin header socket (SKT20–$5.00)
- 40 pin DIP socket (pack of 2) (SKT40–$2.00)
- 28 pin (.3") DIP socket (pack of 2) (SKT28–$1.25)
- 18 pin (.3") DIP socket (pack of 2) (SKT18–$1.25)
- 8 pin (.3") DIP socket (pack of 4) (SKT8–$2.00)
- 2.1mm coaxial power connector PCB mount (X21MM–$1.50)
- Xilinx XC9572 CPLD PLCC84 - (XC9572–$12.00)
- Bare PCBs (all include appropriate manual)
  - GPMPU28: (GPMPUBARE–$12.95)
  - GPMPU40: (GP40BARE–$14.95)
  - ASP-III: (APP3BARE–$14.95)
  - RS-I: (RS1BARE–$9.95)
  - PS-I: (PS1BARE–$7.95)
  - PBX-84 (PBX84BARE–$24.95)

LCD Terminal!

Price: $49.95
Order #: GP1KIT



GP-1 RS-232 Terminal Kit

Have you ever needed a more powerful user interface for your projects? How about a full-blown terminal? With the GP-1 kit, you simply add a PS/2 keyboard and a standard 14-pin LCD display and you have a complete terminal with a VT100-style command set. You can set multiple baud rates (19200, 9600, 2400, or 1200 baud) and configure the device to use many different LCD sizes. Configuration is stored in EEPROM, so once you set the kit up, you never have to do it again.

Requires assembly. LCD not included.

PS/2 Converter!

Price: $49.95
Order #: GP2KIT

GP-2 PS/2 to RS232 Converter

This handy board allows you to connect a PS/2 keyboard or mouse to any RS232 device. This is essentially the same as our PAK-VIa chip, but it is a completely integrated solution that includes a MAX232 level converter, a 5V regulator, and a PS/2 connector.

Now it is simple to connect a keyboard or mouse to any project!

Assembly required.

Price: $49.95
Order #: GP3KIT

Bestseller!

Connect your PC to the Real World
This kit (based on our GPMPU28 board, see page 4) allows you to connect the analog and digital world to your PC programs. Finally you can sense and control the real world from Basic, C++, or any PC programming language.

Features:
- 8 digital input/output pins (with extended functions)
- 5 10-bit analog inputs
- 1 hardware PWM output
- 1 hardware counter/timer
- 1 onboard LED for status displays
- Onboard 5V regulator (7805)
- True RS-232 with hardware handshaking

Libraries and examples for use with Visual Basic, Visual C++, Excel, Active Server Pages, Java, and many other languages. Monitor temperatures, pressures, or switch closures. Control outputs like LEDs, lamps, valves, and relays (may require level drivers).

What can you do with this kit? The possibilities are endless:
- Use a PC as an analog voltage monitor
- Control lights, relays, or motors
- Sense real-world inputs like switches or alarm sensors
- Store real world data in programs like Excel
- Publish real world data to the Internet
- Perfect for animated displays, lighting effects, and more

This kit marries the real world power of a microcontroller with the programming power of your favorite PC programming language. You can control it directly with any RS232-capable computer, or use the Java drivers with any platform that support javax.comm.

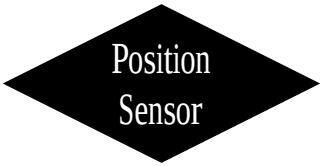
Assembly required.

Price: $39.95
Order #: GP4KIT

Control 8 Servos from your PC

This kit (based on our GPMPU28 board, see page 4) allows you to connect up to 8 servos to a PC. Simple ActiveX DLLs allow you to control the servos from practically any PC language. Or send RS-232 commands directly to the board to control each servo's position.

Assembly required.



Price: $49.95
Order #: GP5KIT

Measurements Made Easy

This kit (based on our GPMPU28 board, see page 4) allows you to use an ordinary PS/2 mouse to accurately read position in two dimensions. Perfect for robotics, numerically controlled machines, or anywhere you need an inexpensive precise measurement.

This kit can display measurements in inches, millimeters, raw mouse counts, or any combination. Settings allow you to configure the board for different mouse resolutions and serial outputs. Send the data to a PC, a serial printer, or a serial LCD. When used with a serial LCD, this kit can replace expensive digital readout units.

EEPROM stores configuration data — typical applications never send data to the board after you use a PC to set the initial configuration.

The kit includes a PS/2 connector making it simple to connect a mechanical or optical mouse.

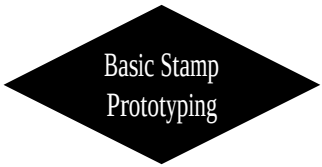
Assembly required.

Price: $44.95
Order #: GP6KIT

Your PC can generate PWM

Want to control motors or lighting from your PC? If you need PWM, you can use the GP-6 to connect our powerful PAK-Vc to your PC. Simple serial command from virtually any PC language. Includes power supply and RS232 connector to get your running fast!

Assembly required.



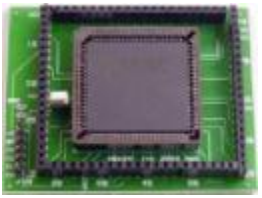
Price: $25.95
Order #: ASP3PS

Basic Stamps Made Easy

Do you use Basic Stamps? Would you like a development board that can handle any Basic Stamp II or variant (including 40 pin and 32-pin Stamp clones)? Then you need our ASP-III kit. Based on our bestselling GPMPU40 kit, this board provides:

- Regulated 5V supply
- A programming port
- A separate RS232 port with MAX232
- An optional Stamp-controlled LED
- A 40 pin header to connect every Stamp pin to a breadboard or other circuit
- If using 24 pin Stamps, you can use the remaining holes for 2 8-pin DIPs or a 16-pin DIP (for example, EEPROMs or A/D chips)

Assembly required.



Price: $54.95
Order #: PBX84

Price $24.95
Order #: XCP1

Price: $49.95
Order #: ABX84

Price $24.95
Order #: ACP1

Order #: NETPDAQ
Price: $44.95

PBX84 Xilinx XC9500 Prototype Board

This kit allows you to easily prototype and build with the Xilinx XC9500 family CPLD (Complex Programmable Logic Devices). The companion XCP1 JTAG programming kit mates directly with the board and allows you to program the CPLD with a PC printer port and free software from Xilinx. Don't know how to use CPLDs? Check out our free tutorials on the Web. By default, the board has three prototype sockets, and one header that mates with your breadboard. However, you can customize the board in many different ways. Assembly required.

Also available:
Xilinx XC9572 CPLD (XC9572—$12.50)
PBX84 and XCP1 together (PBXKIT—$74.50)
Complete kit with CPLD (PBXALL—$82.50)
Bare Xilinx board (PBX84BARE—$24.95)

ABX84 Altera MAX7000 Prototype Board

Same great features as the above board, but for the Altera MAX7000 family parts. The Altera devices require a different JTAG adapter (ACP1; compatible with other Altera JTAG cables). Pictured with CPLD (not included).

Also available:
Altera kit with JTAG kit (ABX84J—$69.50)
Altera-compatible JTAG kit (ACP1—$24.95)
Bare Altera board (ABX84BARE—$24.95)

NetPorter

If you've ever wanted to make a microcontroller available on the Internet, you need NetPorter. NetPorter is a powerful PC-based application and hardware data acquisition board that can read data over an ordinary RS232 port from any type of instrument or processor.

A very flexible scripting language lets you adapt NetPorter to existing devices easily. NetPorter can build Web pages and publish them via FTP or e-mail them. It can also act as a Web server itself. Also available as software-only.

About AWC

Policies

We want you to be happy, and we know that you will be once you've tried one of our PAKs or kits for yourself. If you aren't happy with a PAK, return it within 21 days in good condition for a full refund. Kits are not returnable once you've started building them. Software is not returnable, but we will replace defective media.

All prices are in US dollars. Prices and specifications are subject to change without notice.

We typically ship USPS priority mail which is generally 2 to 3 days to most places (but it can occasionally take longer) for a flat rate of $5. For $20, we can ship USPS express. This is normally 1 day service, but takes 2 days to some locations. For Canadian orders, the shipping is a flat $7 (global priority). Other countries are $12 flat rate shipping. Where available, we ship global priority mail.

If you would prefer to ship UPS or FedEx, you may send us your account number and we will ship using your account.

Prices and specifications are subject to change without notice.

Don't Miss Us on the Web

Be sure to check out our Web site for lots of free projects and tips. Here's just a sampling of what's available:

- **Project of the Month—** A new project every month.
- **The Basic Stamp FAQ**—Everything you ever wanted to know about the Basic Stamp.
- **PIC and AVR Tutorials**—Learn to program popular microcontrollers.
- **PAK Examples**—Converting temperatures, a Morse code keyboard, controlling a robot, lots more.
- **Interfacing**—Learn how to interface PAKs to Basic Stamps, BX24s, 68HC11s, 8051s, AVRs, PICs, Ubicom SX, and more.

Tech Tip

GCC and Microcontrollers

Our new APP-IV kit allows you to program an Atmel ATmega 8 chip with no external programmer. All by itself, that's a great deal — the ATmega is a powerful CPU that doesn't require banking and has many features (including a hardware multiplier).

But the best feature is that the board is ready to use with the powerful GNU C compiler. Not only does the compiler support the APP-IV, but there is tremendous library support for all of the ATmega devices.

There are two open source libraries that are of interest. The AVR LIBC is the standard library for the AVR (see http://www.nongnu.org/avr-libc). This contains things like basic string handling, math, and even standard I/O.

There is also a very advanced AVRLIB library available at http://hubbard.engr.scu.edu/embedded/avr/avrlib. This open source library provides functions for A/D, PWM, GPS, file system access, timers, UARTs, SPI, and much more.

The APP-IV can use many standard AVR programming drivers including AVRProg, UISP, and AVRDude, so you can easily use it from Windows or Linux.

The productivity of writing code with a powerful and standard C compiler is amazing. You can even debug (with source code) using the software simulators included with the compiler or with Atmel's own AVR Studio simulator. Once you try it, you'll have a hard time going back to assembly language. Of course, you can add assembly to your C code, or program the APP-IV with the standard Atmel assembler, if you must.

PAK Interfacing

Simple Synchronous Protocol

Most of the PAKs use a synchronous protocol to communicate (with the exception of the PAK-V and VI, X, XI, and XII). This allows host computers to work with the PAK at their convenience without taking up valuable resources like interrupts. If you use the Basic Stamp or a similar processor you can use SHIFTIN and SHIFTOUT to talk to the PAKs very easily (and the PAKs have example libraries to help you get started).

Any Processor

Our Web site has example code for many processors including the PIC, SX, 68HC11, AVR, BX24, 8051, and other popular processors. In general, interfacing a PAK that uses Shiftin/Shiftout to a new host will require 4 routines:

1. A routine to reset the PAK

2. A routine to send a byte to the PAK

3. A routine to receive a byte from the PAK

4. A routine to wait for a ready condition (may be an optional part of the receive code)

For PAKs with a 10MHz resonator, the clock frequency should not exceed 50kHz. For 20MHz and 50MHz PAKs you should keep the clock below 100kHz. Slower speeds are fine but don't maintain the clock high for more than 2 seconds or some PAKs will reset (this can be a problem if you are trying to single step code that uses the PAK -- make sure the clock line pulses).

For reference, the Basic Stamp II uses a 16kHz frequency and the Stamp IISX uses 42kHz.

You can find more information — including ready to use code — on our Web site at http://www.al-williams.com/awce/doclib.htm.

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