# SX Virtual Peripheral Library

A Virtual Peripheral is a module of software which provides a specific function when running on the SX microcontroller. Due to major advancements made in both performance and predictability, the SX is capable of providing solutions using Virtual Peripherals that other microcontrollers can only provide in hardware or through external components. Using Virtual Peripherals on an SX provides software configurability, resulting in major benefits to your system cost, flexibility, and time to market.

| Available for download @ http://www.scenix.com | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Type** | **Peripheral Name** | **Description** | **Memory Program Flash (Words)** | **Usage RAM (Bytes)** | **Number of I/O Used** | **Required CPU Performance MIPS@50MHz** | **Library File Name** |
| **Telephony** | DTMF Detection | Detects DTMF (touch-tone) digits within 14ms without error detection or within 48ms with error detection. Uses 2 pins. | 295 | 52 | 2 | 40 | contact sales@scenix |
| | DTMF Generation | DTMF Generation using 1 PWM output. Includes 1 UART for software interface with a PC. | 89 | 15 | 1 | 5 | dtmg_gen_1_3.src |
| | FSK Detection | Demodulation of an FSK signal using one pin. | 42 | 2 | 1 | 4 | simple_fsk_rcv.src |
| | FSK Generation | Converting an RS-232 input into an FSK modulated signal using one PWM output. | 47 | 8 | 1 | 4 | simple_fsk_gen.src |
| | Caller ID | Detects and demodulates the Caller-ID signal which appears between the first and second ring. | tbd | tbd | tbd | tbd | contact sales@scenix |
| | Ring Detect | Detects the ring signal from a telephone line. | tbd | tbd | tbd | tbd | contact sales@scenix |
| | Call Progress Detect | Provides Call Progress Detect function. | 295 | 52 | 2 | 40 | contact sales@scenix |
| | Call Progress Generation | Dial-tone generation using one PWM output. | 89 | 15 | 1 | 5 | contact sales@scenix |
| | FSK 202 R2R | Bell 202 1200 bps FSK modulation via R2R Ladder DAC. | tbd | tbd | tbd | tbd | contact sales@scenix |
| | DTMF Generation R2R | DTMF generation via R2R ladder DAC. | tbd | tbd | tbd | tbd | contact sales@scenix |
| | Pulse Dial Receive | Provides Pulse Dial Receive function. | WORK IN PROGRESS | | | | |
| | Pulse Dial Generation | Provides Dial Generation function. | WORK IN PROGRESS | | | | |
| **Interface** | I2C Slave | Works with the SX Demo Board to read from, write to, or erase the serial EEPROM memory device. | N/A | N/A | 3 | varies w/ usage | i2cs_vp.src |
| | I2C Master | Works with the SX Demo Board provided by Parallax to write to, read from, or erase the serial EEPROM memory device. | 117 | 7 | 2 | varies w/ usage | i2cm_vp.src |
| | I2C Multi-Master | Works with 2 SX demo boards on an M-Master I2C bus interfacing 2 SX's to serial EEPROM device. | tbd | tbd | tbd | tbd | contact sales@scenix |
| | SPI/uWire Master Interface | Add Low-speed SPI communication capability to the SX (up to 500 Kbps SPI Master). | 102 | 11 | 5 | varies w/ usage | spi_m1.src |
| | SPI/uWire Master Interface | Adds High-speed SPI communication capability to the SX (500K to 1.72MHz SPI Master). | 74 | 13 | 4 | varies w/ usage | spim.src |
| | SPI/uWire Slave Interface | Adds SPI communication capability to the SX (up to 1.1MHz SPI Slave). | 108 | 13 | 4 | varies w/ usage | spis.src |
| | 2400-230.4K UART | A simplified software module that communicates over an RS-232 port to a PC and echoes back what is received. Compatible with the SX Demo Board. | 51 | 10 | 2 | .1 - 4.5 | uart_vp.src |
| | Eight UART (19.2K Baud) | Configures the Port B pins as inputs and Port C pins as outputs for the respective UARTs. Offers an impressive example of the power of virtual peripherals. | 308 | 55 | 16 | 13 | uarts.src |
| | MMC | Allows mass data storage retrieval on sandisk MMC EEFlash cards (2-16 Mg TD). | WORK IN PROGRESS | | | | |
| | Full Duplex Buffered UART | UART with buffering and speed translation. | WORK IN PROGRESS | | | | |
| | Interfacing w/ Invox Chip | Interfacing the SX with an Invox analog storage chip. | WORK IN PROGRESS | | | | |
| | uWire Master | Allows Implementation of uWire (master mode) serial interface on the SX device (using the SX-Key demo board). | WORK IN PROGRESS | | | | |
| | uWire Slave | Allows Implementation of uWire (slave mode) serial interface on the SX device (using the SX-Key demo board). | WORK IN PROGRESS | | | | |
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| Display | 8-Bit LCD Interface | Interfacing an SX uC to a Hitachi HD44780-driven LCD display, using an 8-bit parallel data bus without interrupts. | 120 | 2 | 11 | 2 when writing continuously | lcd8xmpl.src |
| | 4-Bit LCD Interface | Interfacing an SX uC to a Hitachi HD44780-driven LCD display, using an 4-bit parallel data bus without interrupts. | 109 | 4 | 8 | 2 when writing continuously | lcd4xmpl.src |
| | Driving 7 Segment LED | Binary to 7 segment LED converters. | 29 | 0 | 11 | Example Code | seven_seg.src |
| | PWM Bar Graph | Creates a bar graph display similar to a signal strength meter on a stereo. | tbd | tbd | tbd | tbd | tbd |
| | LCD Driver | Uses two software A/D converters to read in a known resistance value, and compare it to an unknown, and then outputs the results on an 8-segment LCD. | 280 | 21 | 15 | Example Code | lcd.src |
| Signal | Artificial Sine Wave Generator | Sine Wave Generation utilizing one PWM output and an algorithmic approach to sine generation. | 30 | 8 | 1 | 4 | artificial_sine.src |
| | Dual 8-Bit PWM's | Software module that creates an 8-bit PWM signal on one output port pin. Compatible with the SX Demo Board. | 10 | 5 | 2 | 4 | pwm_vp.src |
| | Eight 8-Bit PWM's | Provides 8 PWM outputs on the PORT B pins. Each PWM is individually adjustable for different duty cycles (frequencies of up to 1MHz are available). | 25 | 17 | 8 | 8 | pwms.src |
| | Two 8-Bit ADC | Implements a simple 8-bit A/D converter on any CMOS input to the SX device. Compatible with the SX Demo Board. | 25 | 7 | 4 | 8 | adc_vp.src |
| | Sigma Delta ADC | Reading an external voltage by employing bitstream continuous calibration to create a simple, low cost 8-bit analog to digital converter with an input range of 0-5V. | 25 | 7 | 4 | 8 | adc_vp.src |
| | Variable Resolution ADC | Sigma Delta ADC with 8-16 bit resolution. | WORK IN PROGRESS | | | | |
| General | Stepper Motor Control | This routine excites the stepper motor using half-step sequence (the excitation method can be changed to any sequence you choose). | 27 | 6 | 4 | 6 | stepper.src |
| | 16-Bit Timer | Creates two 16-bit independent timers. Each timer consumes only 11 instruction cycles. Compatible with the SX Demo Board. | 20 | 8 | 2 | 8 | timer_vp.src |
| | 4x4 Keyboard Scan | Presents programming techniques for scanning a 4x4 keyboard, usually found in both consumer and industrial applications, for simple numeric data entry. | 102 | 7 | 4 | 1 | keyscan.src |
| | Real-Time Clock | Implements a real time clock that keeps a 16-bit millisecond count, and has the option for full time clock capabilities, including seconds, minutes, hours, and days. | 39 | 9 | 0 | 5 | clock_vp.src |
| | Push Button Debounce | Presents programming techniques for implementing and debouncing from 1-4 push buttons. | 48 | 5 | 0 | 2 | buttons_vp.src |
| | Path Switcher | Demonstrates the use of a path switcher (combined with a simple real-time clock) to reduce the execution time of each interrupt. | 7 | 0 | 0 | 2 | buttons_vp.src |
| DSP | Fast-Fourier Transform | Implementation of a 16-piont (16-bit signed real/complex data) FFT. | 580 | 85 | 5 | tbd | contact sales@scenix |
| | Digital Filter Routines | Implementation of FIR and IIR filters of different orders. | WORK IN PROGRESS | | | | |
| | Discrete Fourier Transform | — | WORK IN PROGRESS | | | | |
| Misc | Math Pack | Programming techniques for performing commonly found arithmetic operations. | NA | NA | NA | NA | sx_arith.src |
| | PLD Replacement | Implementation of AND-OR PLA using the SX. | WORK IN PROGRESS | | | | |
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