

Parallax SX-Key Errata

Please feel free to contact our technical support engineers by e-mail to sxtech@parallaxinc.com or by telephone (916) 624-8333. The most recent changes to our development tools will be posted on <http://www.parallaxinc.com> as they become available, and changes to the SX chip are located at <http://www.scenix.com>.

SX-Key Rev. E, Manual v1.0, software v1.05+ (SXKey.exe and SXKey28L.exe)

- There are three editions of the SX-Key software available; the `sxkey.exe` (for 18 and 28-pin sx chips with a 4-digit date code), the `sxkey28l.exe` (for 18 and 28-pin sx chips with a long date code beginning with "A") and the `sxkey52.exe` (for 48 and 52-pin sx chips). All editions may be used with SX-Key Rev. E hardware.
- Please read the `sxkey.txt` (for SXKey.exe), the `sxkey28L.txt` (for SXKey28L.exe) and/or the `sxkey52.txt` (for SXKey52.exe) for late-breaking information not included in the printed manual.
- Many device directives are different in the 28L due to changes in the latest sx chips. For example, the SX28L device directive replaces the PINS28, BANKS8 and PAGES4 directives. The SXKey28L.txt file lists the new directives.
- Some device directives are different in the 48 and 52 due to changes in the silicon. The SXKey52.txt file lists the new directives.

SX-Key Rev. E, manual v0.7, software v0.80+

- If you have a 28-pin SX chip Rev 2.4+, SX-Key Rev. E, software v0.80+ and SX-Key Demo Board Rev's A through D (with the 50 MHz resonator removed), or SX-Key Demo Board Rev. E or F with the X4 jumper removed, replace step 8 on page 10 of the manual with the following three steps:
 - 8a) Pull down the Run menu and select Debug (or press CTRL-D). (The SX-Key software should assemble the code, program the SX chip and open the Debug window. This step will set the SX-Key's oscillator to 50 MHz).
 - 8b) Click the Exit button on the Debug window.
 - 8c) Pull down the Run menu and select Run (or press CTRL-R). (The SX-key software should assemble the code and begin the programming process).
- The following hardware/software combination is required in order to use low-level debugging:
 - SX-Key Rev. E,
 - SX Chip version 2.4 (or greater),
 - SX-Key software version 0.6 (or greater),
 - No crystal, resonator or oscillator pack connected to the SX chip (SX-Key's internal oscillator is used as the clock source while debugging).
- The following must be true in source code to use debug:
 - Must have `FREQ` directive (software v0.7+), (or `OSCHS` in the `DEVICE` line if using software 0.6). `FREQ` syntax is: `FREQ n` ;where n is a number from 400000 to 50000000 (representing 400 KHz to 50 MHz). Note that n may use underscores (_) as digit separators for readability, for example: `4_000_000` means the same as 4000000.
 - Must set `WATCHDOG` off (no `WATCHDOG` directive in `DEVICE` line),
 - Must have a `RESET` directive,
 - Must have 2 free words in first page of code plus (in software v0.83 and below) must have 151 words free near the end of the last page (from 168 to 1FE, 368 to 3FE, 568 to 5FE, or 768 to 7FE). In software v0.84, must have 136 words free near the end of the last page (from 177 to 1FE, 377 to 3FE, 577 to 5FE, or 777 to 7FE).
- The debug feature can be accessed from the Run -> Debug menu, or by pressing Ctrl-D.
- During debug:
 - The SX-Key Demo Board (Rev. A through Rev. D) and the SX-Key QuickProto (Rev. A through Rev. B) require the removal of the ceramic resonator and any associated resistors and capacitors.
 - Single-step, walk, run w/breakpoint and run w/asynchronous break are supported. The current SX chip does not support asynchronous breaks while a breakpoint is set in debug window.
 - The watchpoint is not fully supported in this version.
 - Manual register modifications of \$00 through \$0F on Debug window are not fully supported in this version.
 - When using a breakpoint during run operations, the breakpoint line is executed before control is returned to the Debug window.
 - The breakpoint is ignored during step and walk operations.
- To Run using the SX-Key's on-board oscillator:
 - The SX-Key Demo Board (Rev. A through Rev. D) and the SX-Key QuickProto (Rev. A through Rev. B) require the removal of the ceramic resonator and any associated resistors and capacitors.
 - If using SX-Key software version 0.7, click on Help -> Extra. Modify the number shown, even if the number desired is already displayed. Close the 'Extra' window and click on Run -> Run. The SX-Key will program the device and run the program using the SX-Key's on-board oscillator.
 - If using SX-Key software version 0.8+, use the `FREQ` directive, as described above, to set the desired on-board oscillator frequency, select Run -> Debug (or press CTRL-D). Click the Exit button on the Debug window. From now on, until power is removed, the on-board oscillator will run constantly.
- When using Murata 50 MHz ceramic resonator, use a 1 M Ω resistor across OSC1 and OSC2, and a 5 pF capacitor between OSC2 and ground.
- Occasionally an SX chip will refuse programming in serial mode. The following is a possible, though unconfirmed, remedy:
 - 1) momentarily place +14 vdc on the MCLR pin, 2) power down entire circuit, 3) power up entire circuit and try programming again.
- See errata tables below for further information.

SX PART	ERRATA
Date Code	
AB9921AB	<ul style="list-style-type: none"> • Debug facility is enabled. • Programming time is 2 ms per word. Erase time is 250 ms. • Internal RC is not trimmed to 4 MHz. Use the Calibrate IRC feature of the SX-Key software to trim the IRC to the desired frequency. • Running (not debugging) in SX-Key Demo Board or in customer target system may use the 50 MHz ceramic resonator alone. The 1 MΩ resistor is no longer required. No external capacitors are required if using the Murata 50 MHz resonators supplied by Parallax, Inc. • Debugging in Parallax SX-Key Demo Board or in customer target system requires removal of 50 MHz ceramic resonator and 1 MΩ resistor across OSC1 and OSC2 (or removal of X4 jumper on Demo Board Rev. E). • Brown-out of 4.2 volts, 2.6 volts and 2.2 volts is supported. • Vdd range: 2.5 VDC to 5.5 VDC. Sleep current is 20 uA typical (60 uA maximum) @ 5 V
9849, 9850, 9910A4, 9912B4	<ul style="list-style-type: none"> • Debug facility is enabled. • Programming time is 100 ms per word. Erase time is 250 ms. • Internal RC is not trimmed to 4 MHz. Use the Calibrate IRC feature of the SX-Key software to trim the IRC to the desired frequency.
9815,9818, 9819, 9825,9827,9829 ,9830, 9831,9837,9838 ,9841,9843, 9844,9848, 9908,9911,9913	<ul style="list-style-type: none"> • Running (not debugging) in SX-Key Demo Board or in customer target system may use the 50 MHz ceramic resonator and 1 MΩ resistor. • Debugging in Parallax SX-Key Demo Board or in customer target system requires removal of 50 MHz ceramic resonator and 1 MΩ resistor across OSC1 and OSC2 (or removal of X4 jumper on Demo Board Rev. E). • RTCC must have prescaler assigned to it if sensing external events in Turbo mode. • I/O pins survive ESD up to 2000 VDC. Vdd, Vss, OSC1 and OSC2 survive ESD up to 1000 VDC. • SX chip may draw excessive current during In-System Programming which may damage OSC1. Place a 100 ohm resiter in series with the OSC1 pin. • Brown-out is 4.2 volts or off; 2.5 and 1.3 volts not supported. • Vdd range: 4.5 VDC to 6.25 VDC. Sleep current is 20 uA typical (60 uA maximum) @ 5 V (in rev. 2.4)
9814, 9818, 9819	<ul style="list-style-type: none"> • Debug facility is not enabled. • Programming time is 100 ms per word. Erase time is 250 ms. • Internal RC operates at 3.2 MHz maximum, not 4 MHz as per specification. External RC operates from 100 KHz to 8 MHz. Crystal clock operates from 4 MHz to 30 MHz. • Power-On-Reset (POR) will not work if Vdd rise time is slower than 100 ms. • RTCC must have prescaler assigned to it if sensing external events in Turbo mode. • Brown-out is 4.2 volts or off; 2.5 and 1.3 volts not supported. • Vdd range: 4.5 VDC to 6.25 VDC. Sleep current is 20 uA typical (60 uA maximum) @ 5 V
9747, 9749, 9750, 9810, 9811, 9812	<ul style="list-style-type: none"> •

SX-Key	ERRATA
Rev. E	<ul style="list-style-type: none"> • Supports SX programming and debug/emulation. • Includes on-board programmable oscillator. • For use with SX-Key software version 0.6+. (If using v0.6, click on Help-> Extra and type in the desired frequency. Default is 50 MHz. Use the FREQ directive, described above, to set frequency from source code)
Rev. D	<ul style="list-style-type: none"> • Supports SX programming only. Debug features are not implemented. • For use with SX-Key software version 0.2 and 0.3.
Rev. C	

SX-Key Software	ERRATA
0.84	<ul style="list-style-type: none"> • Works with SX-Key Rev. E. • Debugging requires FREQ directive to specify debugging clock speed (for Run operation), no watchdog, RESET directive, 136 free words at end of last page and supports 40 KHz to 110 MHz operation. • The watchpoint is not fully supported in this version. • Manual register modifications of \$00 through \$0F on Debug window are not fully supported in this version. • Once debug mode has been used, the SX-Key's oscillator can only be disabled by powering down the circuit.
0.8	<ul style="list-style-type: none"> • Program and debug software, third release. • Works with SX-Key Rev. E. • Debugging requires FREQ directive to specify debugging clock speed (for Run operation), no watchdog, RESET directive, 152 free words at end of last page and supports 40 KHz to 110 MHz operation. • The watchpoint is not fully supported in this version. • Manual register modifications of \$00 through \$0F on Debug window are not fully supported in this version. • Assuming no breakpoint is set, after starting Debug, or after pressing Reset on the Debug window, pressing Run will only execute one instruction. Pressing Run again will cause the chip to run normally. • The Stop button will stop a Walk operation but not the Run operation. Only a breakpoint, or pressing Reset, will stop the Run operation. • While stopped, if the Stop button is pressed again, then Run is pressed the chip will run while ignoring any breakpoint. • Must click on Help -> Extra and modify the desired frequency to use the SX-Key's on-board oscillator when running (outside of Debug).
0.7	<ul style="list-style-type: none"> • Program and debug software, second release. • Works with SX-Key Rev. E. • Debugging requires FREQ directive to specify debugging clock speed (for Run operation), no watchdog, RESET directive, 152 free words at end of last page and supports 40 KHz to 110 MHz operation. • Generating a listing with Run -> Listing, or Ctrl-L, overwrites source code in editor window (you must save source code before list generation). • Must click on Help -> Extra and modify the desired frequency to use the SX-Key's on-board oscillator when running (outside of Debug).
0.6	<ul style="list-style-type: none"> • Program and debug software, initial release. • Works with SX-Key Rev. E. • Debugging requires OSCHS in the DEVICE directive line, no watchdog, RESET directive, 160 free words at end of last page and only supports 50 MHz operation. • Generating a listing with Run -> Listing, or Ctrl-L, overwrites source code in editor window (you must save source code before list generation). • Brownout is activated with the directive BROWNOUT, not BORxx.
0.2 and 0.3	<ul style="list-style-type: none"> • Program-only software. Debugging is not supported. • Works with SX-Key Rev. C and D. • Directives IF...ELSE...ENDIF, REPT, MACRO, EXPAND and ERROR are not implemented. • Generating a listing with Run -> Listing, or Ctrl-L, overwrites source code in editor window (you must save source code before list generation). • Use BOR25 to turn on the brown-out feature (4.2) volts. BOR40 and BOR13 are not supported in the SX chip.

SX-Key Demo Board	ERRATA
Rev. E Rev. F	<ul style="list-style-type: none"> • Debugging with SX Rev. 2.4+ requires removal of X4 jumper (to disable board's 50 MHz resonator). Connect X4 jumper to run chip with board's 50 MHz resonator. • In-system debugging requires a 7.5 VDC 1 A power supply to utilize the SX-Key's internal oscillator circuitry.
Rev. D	<ul style="list-style-type: none"> • In-system debugging requires a 12 VDC 1 A power supply to utilize the SX-Key's internal oscillator circuitry.
Rev. C	<ul style="list-style-type: none"> • Debugging with SX Rev. 2.4+ requires removal of 50MHz resonator and the 1MΩ resistor across OSC1 and OSC2. • Resister between OSC1 and OSC2 accommodates running (not debugging) the SX Rev. 2.4+. • Parallax provided 7.5 VDC 300 mA power supplies (enough current for programming) with previous demo board shipments. In-system debugging requires a 12 VDC 1 A power supply to utilize the SX-Key's internal oscillator circuitry.
Rev. B	<ul style="list-style-type: none"> • Debugging with SX Rev. 2.4+ requires removal of 50 MHz. Running with SX Rev. 2.4+ requires 50 MHz resonator and 1MΩ resistor across OSC1 and OSC2. • Parallax provided 7.5 VDC 300 mA power supplies (enough current for programming) with previous demo board shipments. In-system debugging requires a 12 VDC 1 A power supply to utilize the SX-Key's internal oscillator circuitry.
Rev. A	<ul style="list-style-type: none"> • Debugging with SX Rev. 2.4+ requires removal of 50 MHz resonator. Running with SX Rev. 2.4+ requires 50 MHz resonator and 1MΩ resistor across OSC1 and OSC2. • Parallax provided 7.5 VDC 300 mA power supplies (enough current for programming) with previous demo board shipments. In-system debugging requires a 12 VDC 1 A power supply to utilize the SX-Key's internal oscillator circuitry.
sxdemo.src	<ul style="list-style-type: none"> • Virtual Peripheral sample source code runs in SX-Key Demo Board Rev. A through Rev. F. • To run this code you must have the 50 MHz resonator installed on the demo board, or remove the resonator and 1MΩ resistor (Rev's A through D), or remove the X4 jumper (Rev. E or F) and enable the SX-Key Rev. E's on-board oscillator (Click on Help-> Extra and type in 50000000). • Debugging this code requires SX-Key Rev. E, SX Rev. 2.4+, SX-Key software v0.6+, removal of 50 MHz resonator and the 1MΩ resistor across OSC1 and OSC2 (Rev's A through D), or remove the X4 jumper (Rev. E or F).

SX-Key Quick Proto Board	ERRATA
Rev. C	<ul style="list-style-type: none"> • Debugging with SX Rev. 2.4+ requires removal of X4 jumper (to disable board's 50 MHz resonator). Connect X4 jumper to run chip with board's 50 MHz resonator. • In-system debugging requires a 7.5 VDC 1 A power supply to utilize the SX-Key's internal oscillator circuitry.
Rev. A	<ul style="list-style-type: none"> • Debugging with SX Rev. 2.4+ requires removal of 50 MHz resonator. Running with SX Rev. 2.4+ requires 50 MHz resonator and 1MΩ resistor across OSC1 and OSC2. • Parallax provided 7.5 VDC 300 mA power supplies (enough current for programming) with previous quick proto board shipments. In-system debugging requires a 12 VDC 1 A power supply to utilize the SX-Key's internal oscillator circuitry.