Product Update

UP006912-0308

Errata for Z8 Encore! XP® F082A Series

Errata for Z8 Encore! XP® F082A Series Silicon with All Date Codes and SL Numbers (includes Revision CA)

The errata listed in Table 1 are found in Zilog's Z8 Encore! XP® F082A Series devices with all date codes. When reviewing the following errata, refer to the most recent version of the product specification. Data contained in this document is Preliminary only. Refer to the product specification for the supported memory configurations.

Table 1. Z8 Encore! XP® F082A Series Errata for Devices with All Date Codes

Sl No.	Summary	Description
1	Table 124 of PS0228 indicates FLAGS are modified by BIT, BSET, and BCLR instructions. This is incorrect.	Table 124: *eZ8 CPU Instruction Summary* indicates that FLAG status is changed when the BIT, BSET, or BCLR instructions are invoked. These commands have no effect on FLAG status.
2	Vectored interrupts do not work upon Stop Mode Recovery.	If Stop Mode Recovery is triggered by an interrupt, the pending interrupt is cleared before completing the recovery and is not serviced. **Workaround** None
3	Stop Mode Recovery does not reset the state of the Watchdog Timer (WDT) enable.	According to the product specification, the WDT should be disabled upon completion of Stop Mode Recovery, unless the WDT_AO option bit is asserted. For this and all previous silicon revisions, the WDT will continue to run after WDT. **Workaround** After entering STOP mode, you must manually disable the WDT oscillator using the oscillator control register. Before re-entering STOP mode, the WDT oscillator should be re-enabled.
4	Stop Mode Recovery requires special RESET pin handling.	The default configuration for the RESET pin (PD0 on the 20-/28-pin devices, PA2 on the 8-pin devices) is the reset function. If this pin is reprogrammed to any other function, the device will not properly recover from STOP mode. **Workaround** Before entering STOP mode, ensure that the RESET pin is programmed to the reset function.

Errata for Z8 Encore! XP® F082A Series (8-pin devices)

Errata for Date Codes 0439 and later

The errata listed in Table 2 are found in the Z8 Encore! XP® F082A Series 8-pin products with date codes 0439 and later, where the code is YYWW (year and week of assembly). When reviewing the following errata, refer to the most recent version of the product specification. Data contained in the document is Preliminary only. Refer to the product specification for the supported memory configurations.

Table 2. Z8 Encore! XP® F082A Series Errata (8-pin Devices) with Date Codes 0439 and Later

Sl No.	Summary	Description
1	Internal Precision Oscillator (IPO) frequency out of specification over voltage and temperature.	The IPO frequency is specified to be 5.5296 MHz +/- 4% over the supply voltage range of 2.7 V to 3.6 V and the temperature range of -40 °C to +105 °C. Actual silicon performance is +/-4% only over a supply voltage range of 3.15 V to 3.45 V and a temperature range of 0 °C to +70 °C. **Workaround** If the application requires better than +/-4% oscillator accuracy, the voltage and temperature must be controlled such that they remain within the ranges given above.
2	Low Power Op Amp (LPO) sink current is less than specified in the product specification.	The sink current may drop below 1 µA over temperature and supply voltage. **Workaround** An external pull-down resistor will improve the sink current performance.
3	Temperature sensor absolute error exceeds specification.	The temperature sensor absolute error is outside the specification over the full temperature/voltage range. **Workaround** Recalibrate the sensor at the user application temperature or use the temperature sensor output for relative measurements.
4	Writes to the Timer Polarity (TPOL) bit must be done twice when the timer is not enabled.	When the timer is not enabled, the TPOL bit does not affect the timer output when changed. **Workaround** When the timer is not enabled, write the Timer Control Register 1 twice with the same value. This will cause the correct timer output behavior to occur.
5	Programmable pull-up resistors source less than the specified current.	The pull-up devices are specified to source at least 30 µA. In actuality, the pull-up devices may source as little as 7 µA. **Workaround** If a faster pull-up is required, use an external pull-up resistor.

Table 2. Z8 Encore! XP® F082A Series Errata (8-pin Devices) with Date Codes 0439 and Later (Continued)

Sl No.	Summary	Description
6	PA2 will not output a strong high.	The PMOS output device of the PA2 port is disabled. The PA2 port will not output a high level unless the internal pull-up resistor is enabled. This pull-up resistor is enabled by default but it should not be turned off unless the port is pulled up externally. Because there is no active drive high, the PA2 port will only produce slow rising edges. **Workaround** If a fast rising edge response time is required, use another GPIO port.
7	VBO/POR Hysteresis is greater than specified in the product specification.	The hysteresis has been measured to be around 100 mV. **Workaround** None.
8	ADC differential mode calibration data.	The ADC calibration data stored in the info block will cause significant error for negative input values on the ADC. This is a production test/calibration issue. **Workaround** All devices with date code 0519 or greater have separate calibration data for the negative input values. See the product specification for details.
9	WDT Default Timeout Period longer than specified.	In the product specification the default timeout period is 100 ms. However, for this version of silicon, the default is equal to the maximum timeout value. **Workaround** Manually set the WDT timeout to the desired value.
10	IPO current consumption higher than typically specified.	When the IPO is enabled, the product specification gives a typical current consumption of 300 µA. The consumption for these date codes is typically 1.5 mA. **Workaround** None.
11	Slow Vdd ramp can hang the device.	When the power supply voltage takes longer than 20 ms to ramp, the device will sometime fail to exit reset. **Workaround** Speed up the V_{dd} ramp.
12	ADC Calibration Data Error.	The calibration data stored in the XP device's information page has a negative slope error. Compensated values may be up to 30 LSBs lower than expected in the ADC modes using an internal reference. External reference calibration data is not affected. **Workaround** Re-calibrate parts in final target board.

Table 2. Z8 Encore! XP® F082A Series Errata (8-pin Devices) with Date Codes 0439 and Later (Continued)

Sl No.	Summary	Description
13	UART Driver Enable pin does not work.	The DE function is not available on Port A2 as specified. **Workaround** None.
14	VBO level higher than specified.	The VBO will generate a reset at higher supply voltage levels than specified. **Workaround** Ensure that the supply voltage does not drop below 2.8 V.
15	Low Voltage Detect (LVD) levels are out of specification.	LVD levels are about 200 mV higher than specified. **Workaround** For lower precision applications, set the detect level 200 mV lower than specified.

Errata for Z8 Encore! XP® F082A Series (20- and 28-pin Devices)

Errata for Date Codes 0440 and Later (Revision BB Silicon only)

The errata listed in Table 3 are found in the production Z8 Encore! XP® F082A Series 20- and 28-pin products with date codes 0440 and later, where the code is YYWW (year and week of assembly).When reviewing the following errata, refer to the most recent version of the product specification. Data contained in the document is Preliminary only. Refer to the product specification for the supported memory configurations.

Table 3. Z8 Encore! XP® F082A Series Errata (20- and 28-pin Devices) with Date Codes 0440 and Later

Sl No.	Summary	Description
1	IPO frequency out of specification over voltage and temperature.	The IPO frequency is specified to be 5.5296 MHz +/- 4% over the supply voltage range of 2.7 V to 3.6 V and the temperature range of -40 °C to +105 °C. Actual silicon performance is +/-4% only over a supply voltage range of 3.15 V to 3.45 V and a temperature range of 0 °C to +70 °C. **Workaround** If the application requires better than +/-4% oscillator accuracy, the voltage and temperature must be controlled such that they remain within the ranges given above.
2	LPO sink current is less than specified in the product specification.	The sink current may drop below 1 µA over temperature and supply voltage. **Workaround** An external pull-down resistor will improve the sink current performance.

Table 3. Z8 Encore! XP® F082A Series Errata (20- and 28-pin Devices) with Date Codes 0440 and Later (Continued)

Sl No.	Summary	Description
3	Temperature sensor absolute error exceeds specification.	The temperature sensor absolute error is outside the specification over the full temperature/voltage range. **Workaround** Recalibrate the sensor at the user application temperature or use the temperature sensor output for relative measurements.
4	Writes to the TPOL bit must be done twice when the timer is not enabled.	When the timer is not enabled, the TPOL bit does not affect the timer output when changed. **Workaround** When the timer is not enabled, write the Timer Control Register 1 twice with the same value. This will cause the correct timer output behavior to occur.
5	Programmable pull-up resistors source less than the specified current.	The pull-up devices are specified to source at least 30 µA. In actuality, the pull-up devices may source as little as 7 µA. **Workaround** If a faster pull-up is required, use an external pull-up resistor.
6	PD0 will not output a strong high.	The PMOS output device of the PD0 port is disabled. The PD0 port will not output a high level unless the internal pull-up resistor is enabled. This pull-up resistor is enabled by default but it should not be turned off unless the port is pulled up externally. Because there is no active drive high, the PD0 port will only produce slow rising edges. **Workaround** If a fast rising edge response time is required, use another GPIO port.
7	VBO/POR Hysteresis is greater than specified in the product specification.	The hysteresis has been measured to be around 100 mV. **Workaround** None.
8	ADC differential mode calibration data.	The ADC calibration data stored in the info block will cause significant error for negative input values on the ADC. This is a production test/calibration issue. **Workaround** All devices with Date Code 0519 or greater have separate calibration data for the negative input values. For details, refer to product specification.
9	WDT Default Timeout Period longer than specified.	In the product specification the default timeout period is 100 ms. However, for this version of silicon, the default is equal to the maximum timeout value. **Workaround** Manually set the WDT timeout to the desired value.

Table 3. Z8 Encore! XP® F082A Series Errata (20- and 28-pin Devices) with Date Codes 0440 and Later (Continued)

Sl No.	Summary	Description
10	IPO current consumption higher than typically specified.	When the IPO is enabled, the product specification gives a typical current consumption of 300 µA. The consumption for these date codes is typically 1.5 mA. **Workaround** None.
11	Open Drain Output Control only on Port A.	Open drain output configuration set by Port A-D Output Control sub registers is possible only for Port A pins. It is not possible to configure Port B, C, D pins for open drain output. **Workaround** None. Use Port A pins for open drain output.
12	External Vref is not available on 20-pin parts.	For 20-pin devices, external Vref is not an option on pin PC2. **Workaround** None.

Errata for Date Codes 0426 and Before 0440

The errata listed in Table 4 are found in the pre-production Z8 Encore! XP® F082A Series 20- and 28-pin products with date codes 0426 and before 0440, where the code is YYWW (year and week of assembly). While reviewing the following errata, refer to the most recent version of the product specification. Data contained in the document is Preliminary only. Refer to the product specification for the supported memory configurations.

Table 4. Z8 Encore! XP® F082A Series Errata (20- and 28-pin Devices) with Date Codes 0426 and Before 0440

Sl No.	Summary	Description
1	IPO frequency out of specification over voltage and temperature.	The IPO frequency is specified to be 5.5296 MHz +/- 4% over the supply voltage range of 2.7 V to 3.6 V and the temperature range of -40 °C to +105 °C. Actual silicon performance is +/-4% only over a supply voltage range of 3.15 V to 3.45 V and a temperature range of 0 °C to +70 °C. **Workaround** If the application requires better than +/-4% oscillator accuracy, the voltage and temperature must be controlled such that they remain within the ranges given above.

Table 4. Z8 Encore! XP® F082A Series Errata (20- and 28-pin Devices) with Date Codes 0426 and Before 0440 (Continued)

Sl No.	Summary	Description
2	LPO sink current is less than specified in the product specification.	The sink current may drop below 1 µA over temperature and supply voltage. **Workaround** An external pull-down resistor will improve the sink current performance.
3	Temperature sensor absolute error exceeds specification.	The temperature sensor absolute error is outside the specification over the full temperature/voltage range. **Workaround** Recalibrate the sensor at the user application temperature or use the temperature sensor output for relative measurements.
4	Writes to the TPOL bit must be done twice when the timer is not enabled.	When the timer is not enabled, the TPOL bit does not affect the timer output when changed. **Workaround** When the timer is not enabled, write the Timer Control Register 1 twice with the same value. This will cause the correct timer output behavior to occur.
5	Programmable pull-up resistors source less than the specified current.	The pull-up devices are specified to source at least 30 µA. In actuality, the pull-up devices may source as little as 7 µA. **Workaround** If a faster pull-up is required, use an external pull-up resistor.
6	PD0 will not output a strong high.	The PMOS output device of the PD0 port is disabled. The PD0 port will not output a high level unless the internal pull-up resistor is enabled. This pull-up resistor is enabled by default but it should not be turned off unless the port is pulled up externally. Because there is no active drive high, the PD0 port will only produce slow rising edges. **Workaround** If a fast rising edge response time is required, use another GPIO port.
7	VBO/POR Hysteresis is greater than specified in the product specification.	The hysteresis has been measured to be around 100 mV. **Workaround** None.
8	ADC differential mode calibration data.	The ADC calibration data stored in the info block will cause significant error for negative input values on the ADC. This is a production test/calibration issue. **Workaround** Manually re-calibrate the device for negative ADC input values.

Table 4. Z8 Encore! XP® F082A Series Errata (20- and 28-pin Devices) with Date Codes 0426 and Before 0440 (Continued)

Sl No.	Summary	Description
9	WDT Default Timeout Period longer than specified.	In the product specification the default timeout period is 100 ms. However, for this version of silicon, the default is equal to the maximum timeout value. **Workaround** Manually set the WDT timeout to the desired value.
10	IPO current consumption higher than typically specified.	When the IPO is enabled, the product specification gives a typical current consumption of 300 µA. The consumption for these date codes is typically 1.5 mA. **Workaround** None.
11	Open Drain Output Control only on Port A.	Open drain output configuration set by Port A-D Output Control sub registers is possible only for Port A pins. It is not possible to configure Port B, C, D pins for open drain output. **Workaround** None. Use Port A pins for open drain output.
12	ADC Internal Reference Voltage Error.	Internal Reference Voltage (Vref) set by REFSEL field in the ADC Control Register was not set optimally, reporting 1.91 V for a specified 2.0 V setting. **Workaround** None. External Vref sourced ADC measurements are not affected by this errata.
13	STOP mode current out of specification.	Measured STOP mode current with LPO ON is 50 µA typical versus the specified 10 µA. STOP mode current with all peripherals OFF is 4 µA typical versus the specified 2 µA. **Workaround** None.
14	Unstable Comparator Output.	Internal reference voltage level set by the REFLVL field in the Comparator Control Register causes an unstable comparator output, worsening as the internal reference voltage increases. **Workaround** None.
15	External Vref is not available on 20-pin parts.	For 20-pin devices, external Vref is not an option on pin PC2. **Workaround** None.

Errata for Date Codes 0352 and Before 0426

The errata listed in Table 5 are found in the pre-production Z8 Encore! XP F082A Series 20- and 28-pin products with date codes 0352 and before 0426, where the date code is YYWW (year and week of assembly). The Z8 Encore! XP F082A Series includes the following devices: Z8F042A, Z8F041A, Z8F022A, Z8F021A, Z8F012A, and Z8F011A. When reviewing the following errata, refer to the most recent version of the product specification. Data contained in this document is Preliminary only. Refer to the product specification for the supported memory configurations.

Table 5. Z8 Encore! XP® F082A Series Errata (20- and 28-pin) Devices with Date Codes 0352 and Before 0426

Sl No.	Summary	Description
1	IPO frequency out of specification over voltage and temperature.	The IPO frequency is specified to be 5.5296 MHz +/- 4% over the supply voltage range of 2.7 V to 3.6 V and the temperature range of -40 °C to +105 °C. Actual silicon performance is +/-4% only over a supply voltage range of 3.15 V to 3.45 V and a temperature range of 0 °C to +70 °C. **Workaround** If the application requires better than +/-4% oscillator accuracy, the voltage and temperature must be controlled such that they remain within the ranges given above.
2	LPO sink current is less than specified in the product specification.	The sink current may drop below 1 µA over temperature and supply voltage. **Workaround** An external pull-down resistor will improve the sink current performance.
3	Temperature sensor absolute error exceeds specification.	The temperature sensor absolute error is outside the specification over the full temperature/voltage range. **Workaround** Recalibrate the sensor at the user application temperature or use the temperature sensor output for relative measurements.
4	Writes to the TPOL bit must be done twice when the timer is not enabled.	When the timer is not enabled, the TPOL bit does not affect the timer output when changed. **Workaround** When the timer is not enabled, write the Timer Control Register 1 twice with the same value. This will cause the correct timer output behavior to occur.
5	Programmable pull-up resistors source less than the specified current.	The pull-up devices are specified to source at least 30 µA. In actuality, the pull-up devices may source as little as 7 µA. **Workaround** If a faster pull-up is required, use an external pull-up resistor.

Table 5. Z8 Encore! XP® F082A Series Errata (20- and 28-pin) Devices with Date Codes 0352 and Before 0426 (Continued)

Sl No.	Summary	Description
6	PD0 will not output a strong high.	The PMOS output device of the PD0 port is disabled. The PD0 port will not output a high level unless the internal pull-up resistor is enabled. This pull-up resistor is enabled by default but it should not be turned off unless the port is pulled up externally. Because there is no active drive high, the PD0 port will only produce slow rising edges. **Workaround** If a fast rising edge response time is required, use another GPIO port.
7	VBO/POR Hysteresis is greater than specified in the product specification.	The hysteresis has been measured to be around 100 mV. **Workaround** None.
8	ADC differential mode calibration data.	The ADC calibration data stored in the info block will cause significant error for negative input values on the ADC. This is a production test/calibration issue. **Workaround** Manually re-calibrate the device for negative ADC input values.
9	WDT Default Timeout Period longer than specified.	In the product specification the default timeout period is 100 ms. However, for this version of silicon, the default is equal to the maximum timeout value. **Workaround** Manually set the WDT timeout to the desired value.
10	IPO current consumption higher than typically specified.	When the IPO is enabled, the product specification gives a typical current consumption of 300 µA. The consumption for these date codes is typically 1.5 mA. **Workaround** None.
11	Open Drain Output Control only on Port A.	Open drain output configuration set by Port A-D Output Control sub registers is possible only for Port A pins. It is not possible to configure Port B, C, D pins for open drain output. **Workaround** None. Use Port A pins for open drain output.
12	ADC Internal Reference Voltage Error.	Internal Reference Voltage (Vref) set by REFSEL field in the ADC Control Register was not set optimally, reporting 1.91 V for a specified 2.0 V setting. **Workaround** None. External Vref sourced ADC measurements are not affected by this errata.

Table 5. Z8 Encore! XP® F082A Series Errata (20- and 28-pin) Devices with Date Codes 0352 and Before 0426 (Continued)

Sl No.	Summary	Description
13	Excessive STOP Mode Current.	ICCS, Supply Current in STOP mode, is out of specification. Consumption in the 1 mA to 3 mA range is typical. **Workaround** None.
14	Unstable Comparator Output.	Internal reference voltage level set by the REFLVL field in the Comparator Control Register causes an unstable comparator output, worsening as the internal reference voltage increases. **Workaround** None.
15	ADC Input Selection mode.	ADC input selection through ADC Control Register 0 (ADCCTL0) bits ANAIN[3:0] does not ground the transimpedance input nodes as specified. Single- Ended Mode: ANAIN[3:0] encoded 1100 does not hold transimpedance input nodes (ANA1 and ANA2) to ground. **Workaround** None
16	IPO 32 kHz frequency error	Two frequencies may be chosen for the oscillator: 5.5296 MHz or 32.768 MHz. The frequency is selected by the OCSEL bits in the 'Oscillator Control Register'. 32 kHz operation is not trimmed to the specified accuracy because of an error in a divider circuit. **Workaround** None. In 32.768 kHz mode best case frequency is 32.00 kHz.
17	Internal Vref has excessive variation with V_{DD}.	Internal Voltage Reference (Vref) set by REFSEL field in the ADC Control register does not stay within specification over the full V_{DD} range. **Workaround** ADC measurements assume 15% Vref error when using the internal voltage reference. The error is 5% more than specified and appears as an ADC gain error, not as an offset error. External Vref sourced ADC measurements are not affected by this errata.
18	LED driver works for red colors only.	Port C GPIO can generate enough current for red LED operation only. Green LEDs are visible down to V_{DD} = 2.7 V and will be driven with a lower current than specified. **Workaround** Use a higher power setting to compensate for current drop. This workaround is not recommended for extended LED operation.

Table 5. Z8 Encore! XP® F082A Series Errata (20- and 28-pin) Devices with Date Codes 0352 and Before 0426 (Continued)

SI No.	Summary	Description
19	LED driver is not 5 V tolerant.	Port C GPIO pins are not 5 V-tolerant pins. **Workaround** None. Port C GPIO must use V_{IH2} (Port B) levels.
20	LED driver has encoding error for drive levels.	LED Drive Level High Register (LEDLVLH) and LED Drive Level Low Register (LEDLVLL) drive level encoding does not match the specification. **Workaround** Correct drive level encoding is: 00 = 3 mA 01 = not available 10 = not available 11 = 20 mA
21	WDT Frequency is incorrect.	WDT oscillator frequency is specified at 10 kHz but actually is 5 kHz. **Workaround** Set WDT reload and timeout delay parameters based on the 5 kHz frequency.
22	Potential electromigration issues through V_{DD} pads.	Current metal width does not support target current density specification for production products. **Workaround** Devices with these date codes (silicon revision AA) are not recommended for use in high current draw continuous operation applications.
23	Switching from PD0 to $\overline{\text{RESET}}$ causes a reset.	$\overline{\text{RESET}}$ and Port D0 are multiplexed on one package pin. Port D0 is a general-purpose output-only pin configuration. When switching the Alternate Function Sub-register PDAF from PD0 output mode (00H) to $\overline{\text{RESET}}$ input mode (01H) generates a device external reset. **Workaround** None.
24	STOP mode does not automatically power down some blocks.	Executing the eZ8™ CPU's STOP instruction does not fully place the device into STOP mode. **Workaround** Manually power down blocks using the power control register before entering STOP mode.
25	WDT unlock state machine requires flush for subsequent writes.	WDT state machine does not return the correct state following a single write operation. **Workaround** After each WDT write insert an additional dummy write to the WDT control register to flush the state machine.

Table 5. Z8 Encore! XP® F082A Series Errata (20- and 28-pin) Devices with Date Codes 0352 and Before 0426 (Continued)

SI No.	Summary	Description
26	Temperature Sensor Sign Bit Error.	When the Temperature Sensor is enabled as the ADC single-ended input source, ADC Control Register 0 (ADCCTLO) bits ANAIN[3:0] = 1110, and the ambient temperature decreases ≥ 10 °C from the initial value false ADC Output Sign Bit errors occur. **Workaround** Perform only Single-Shot ADC samples of Temperature Sensor and ignore the sign bit.
27	External Vref is not available on 20-pin parts.	For 20-pin devices, external Vref is not an option on pin PC2. **Workaround** None.

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