

LPC55S1x/LPC551x

Errata sheet LPC55S1x/LPC551x

Rev. 1.5 — August 10, 2021

Errata sheet

Document information

Info	Content
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Abstract	LPC55S1x/LPC551x errata



Revision history

Rev	Date	Description
1.5	20210810	Added VBAT_DCDC.1: Section 3.8 “VBAT_DCDC.1: The minimum rise time of the power supply must be 2.6 ms or slower for Tamb = -40 C, and 0.5 ms or slower for Tamb = 0 C to +105 C”
1.4	20210423	Added USB.5, Section 3.6 “USB.5: In USB high-speed device mode, when device isochronous IN endpoint sends a packet of MaxPacketSize of 1024 bytes in response to IN token from host, the isochronous IN endpoint interrupt is not set and the endpoint command/status list entry for the isochronous IN endpoint is not updated”. Added USB.6, Section 3.7 “USB.6: In USB high-speed host mode, only one transaction per micro-frame is allowed for isochronous IN endpoints”.
1.3	20210225	Added USB.4, Section 3.5 “USB.4: In USB high-speed device mode, device writes extra byte(s) to the buffer if the NBytes is not multiple of 8 for OUT transfer”. Corrected Typo, Revision identifier as A for USB.3 in Table 1 .
1.2	20201214	Includes Section 3.4 “USB.3: For the USB high-speed device controller, the detection handshaking fails when certain full-speed hubs are connected”.
1.1	20200827	Adds Section 5.1 “CAN-FD peripheral cannot access secure alias address”.
1.0	20191204	Initial version.

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1. Product identification

The LPC55S1x/LPC551x VFBGA98 package has the following top-side marking:

- First line: LPC55S1x/LPC551x
- Second line: JEV98
- Third line: xxxxxxxx
- Fourth line: zzzyywwxR
 - yyww: Date code with yy = year and ww = week.
 - xR: Device revision A

The LPC55S1x/LPC551x HLQFP100 package has the following top-side marking:

- First line: LPC55S1x/LPC551x
- Second line: xxxxxxxx
- Third line: zzzyywwxR
 - yyww: Date code with yy = year and ww = week.
 - xR: Device revision A

The LPC55S1x/LPC551x HTQFP64 package has the following top-side marking:

- First line: LPC55S1x/LPC551x
- Second line: JBD64
- Third line: xxxx
- Fourth line: xxxx
- Fifth line: zzzyywwxR
 - yyww: Date code with yy = year and ww = week.
 - xR: Device revision A

2. Errata overview

Table 1. Functional problems table

Functional problems	Short description	Revision identifier	Detailed description
ROM.1	ROM fails to enter ISP mode when image is corrupted with flash pages in an erased or unprogrammed state.	A	Section 3.1
USB.1	USB HS host fails when connecting to an LS device (mouse).	A	Section 3.2
USB.2	Automatic USB rate adjustment not functional when using multiple hubs.	A	Section 3.3
USB.3	For the USB high-speed device controller, the detection handshaking fails when certain full-speed hubs are connected.	A	Section 3.4
USB.4	In USB high-speed device mode, device writes extra byte(s) to the buffer if the NBytes is not multiple of 8 for OUT transfer.	A	Section 3.5

Table 1. Functional problems table ...continued

Functional problems	Short description	Revision identifier	Detailed description
USB.5	In USB high-speed device mode, when device isochronous IN endpoint sends a packet of MaxPacketSize of 1024 bytes in response to IN token from host, the isochronous IN endpoint interrupt is not set and the endpoint command/status list entry for the isochronous IN endpoint is not updated.	A	Section 3.6
USB.6	In USB high-speed host mode, only one transaction per micro-frame is allowed for isochronous IN endpoints.	A	Section 3.7
VBAT_DCDC.1	The minimum rise time of the power supply must be 2.6 ms or slower for Tamb = -40 C, and 0.5 ms or slower for Tamb = 0 C to +105 C.	A	Section 3.8

Table 2. AC/DC deviations table

AC/DC deviations	Short description	Product version(s)	Detailed description
n/a	n/a	n/a	n/a

Table 3. Errata notes

Errata notes	Short description	Revision identifier	Detailed description
CAN-FD.1	CAN-FD peripheral cannot access memory space with secure alias address.	A	Section 5.1 “CAN-FD peripheral cannot access secure alias address”

3. Functional problems detail

3.1 ROM.1: ROM fails to enter ISP mode when image is corrupted with flash pages in an erased or unprogrammed state

Introduction

On the LPC55S1x/LPC551x, if the image is corrupted with flash pages in an erased or unprogrammed state, the ROM may fail to automatically enter ISP mode.

Problem

When secure boot is enabled in CMPA, and the flash memory contains an erased or unprogrammed memory page inside the memory region specified by the image size field in the image header, the device does not automatically enter into ISP mode using the fallback mechanism, as in the case of a failed boot for an invalid image. This problem occurs when the application image is only partially written or erased but a valid image header is still present in memory.

Work-around

Perform a mass-erase to remove the incomplete and corrupted image using one of the following methods:

- Execute the erase command using Debug Mailbox. The device will enter directly into ISP mode after exiting the mailbox.
- Enter into ISP mode using the Debug Mailbox command and use the flash-erase command.
- Reset the device and enter into ISP mode using the ISP pin. Use the flash-erase command to erase the corrupted (incomplete) image.

3.2 USB.1: HS host fails when connecting with the LS device (mouse)

Introduction

The USB1 high-speed controller is available on select LPC55S1x/LPC551x devices and provides a plug-and-play connection of peripheral devices to a host with three different data speeds:

- high-speed with a data rate of 480Mbps.
- full-speed with a data rate of 12 Mbps.
- low-speed with a data rate of 1.5 Mbps.

Many portable devices can benefit from the ability to communicate with each other over the USB interface without intervention of a host PC.

Problem

USB HS host fails when connecting with an LS device (mouse).

Work-around

To support Full-Speed and Low-Speed applications, it is recommended to use the USB0 Full-Speed port and the USB1 High-speed port for Device or Host. In addition, should an application require support of Low-Speed USB devices with a USB High-Speed Host, this can be accomplished by inserting a USB Hub between the USB1 High-speed port and external USB devices.

3.3 USB. 2: Automatic USB rate adjustment is not functional when using multiple hubs**Introduction:**

Full-speed and low-speed signaling uses bit stuffing throughout the packet without exception. If the receiver sees seven consecutive ones anywhere in the packet, then a bit stuffing error has occurred, and the packet should be ignored.

The time interval just before an End of Packet (EOP) is a special case. The last data bit before the EOP can become stretched by hub switching skews. This is known as dribble and can lead to a situation where dribble introduces a sixth bit that does not require a bit stuff. Therefore, the receiver must accept a packet where there are up to six full bit times at the port with no transitions prior to the EOP.

Problem:

The LPC55S1x/LPC551x devices use the start of an EOP for frequency measurements. This is not functional when going through multiple hubs that introduce a dribble bit because of hub switching skews. For this reason, the start of the EOP cannot be used for frequency measurements for automatic USB rate adjustment (by setting USBCLKADJ in the FRO192M_CTRL register). The problem does not occur when a single hub is used.

Work-around:

Use the FRO calibration library provided in technical note TNxxxxx. This library allows the application to have a crystal-less USB device operation in full-speed mode.

3.4 USB.3: For the USB high-speed device controller, the detection handshaking fails when certain full-speed hubs are connected**Introduction**

See the USB2.0 specification for details regarding the USB High-speed Detection Handshake protocol.

Problem

As a high-speed device, when certain full-speed hubs are connected, the USB device does not detect the HOST KJ sequence correctly and, as a result, does not recognize the speed of the connected host. In this case, the USB device can act erratically due to the wrong speed detection.

Work-around

There are two workarounds:

1. The software work-around below can be implemented in `usb_dev_hid_mouse` where API is called `"USB_DeviceHsPhyChirpIssueWorkaround()"`. In event handler in `USB_DeviceCallback()`,
 - On `"kUSB_DeviceEventBusReset"` event, `USB_DeviceHsPhyChirpIssueWorkaround()` should be called to identify the speed of the host connected to. If full-speed host is connected or `"isConnectedToFshostFlag"` is set, `FORCE_FS` (bit 21) of `DEVCMDSTAT` register should be set to force the device operating in full-speed mode.
 - On `"kUSB_DeviceEventDetach"` event, `FORCE_FS` (bit 21) of `DEVCMDSTAT` register should be cleared.
2. The software workaround below is available in tech note (TN00071) In event handler in `USB_DeviceCallback()`,
 - On `"kUSB_DeviceEventAttach"` event, set `PHY_RX` register trip-level voltage to the highest. `USBPHY->RX &= ~(USBPHY_RX_ENVADJ_MASK);USBPHY->RX |= 2;`
 - On `"kUSB_DeviceEventBusReset"` event, check the `DEVCMDSTAT[SPEED]` to determine the connected bus speed. (`SPEED` are bits 22 and 23). If `DEVCMDSTAT[SPEED]=FS`, `FORCE_FS` (bit 21) of `DEVCMDSTAT` should be set to force the device operating in full-speed mode.
 - On `"kUSB_DeviceEventGetDeviceDescriptor"` event, or first `SETUP` packet has arrived, Set the `USBPHY_RX[ENVADJ]` field back to default 0. Otherwise, `USBPHY_RX[ENVADJ]` field will remains as 2 unless a disconnect event occurs.
 - On `"kUSB_DeviceEventDetach"` event, Clear `FORCE_FS` (bit 21) of `DEVCMDSTAT` register to zero. Reset `USBPHY_RX[ENVADJ]` field back to default 0.

3.5 USB.4: In USB high-speed device mode, device writes extra byte(s) to the buffer if the NBytes is not multiple of 8 for OUT transfer

Introduction

The LPC55S1x/LPC551x device family include a USB high-speed interface (USB1) that can operate in device mode at high-speed. The `NBytes` value represents the number of bytes that can be received in the buffer.

Problem

The LPC55S1x/LPC551x USB device controller writes extra bytes to the receive data buffer if the size of the transfer is not a multiple of 8 bytes since the USB device controller always writes 8 bytes. For example, if the transfer length is 1 bytes, 7 extra bytes will be written to the receive data buffer. If the transfer length is 7 bytes, 1 extra bytes will be written to the receive data buffer.

Work-around

Reserve an additional, intermediary buffer along with the buffer used by the application for USB data. After the USB data transfer into the intermediary buffer has been completed, use `memcpy` to move the data from the intermediary buffer into the application buffer, skipping the extraneous extra byte. This software work-around is implemented on the

SDK software platform.

3.6 USB.5: In USB high-speed device mode, when device isochronous IN endpoint sends a packet of MaxPacketSize of 1024 bytes in response to IN token from host, the isochronous IN endpoint interrupt is not set and the endpoint command/status list entry for the isochronous IN endpoint is not updated

Introduction

The LPC55S1x/LPC551x device family include a USB high-speed interface (USB1) that can operate in device mode at high-speed. The isochronous IN endpoint supports a MaxPacketSize of 1024 bytes.

Problem

When device isochronous IN endpoint sends a packet of MaxPacketSize of 1024 bytes in response to IN token from host, the isochronous IN endpoint interrupt is not set and the endpoint command/status list entry for the isochronous IN endpoint is not updated.

Work-around

Restrict the isochronous IN endpoint MaxPacketSize to 1023 bytes in device descriptor.

3.7 USB.6: In USB high-speed host mode, only one transaction per micro-frame is allowed for isochronous IN endpoints

Introduction

The LPC55S1x/LPC551x device family include a USB high-speed interface which can operate in host mode. Up to three high-speed transactions are allowed in a single micro-frame to support high-bandwidth endpoints. This mode is enabled by setting the Mult (Multiple) field in the Proprietary Transfer Descriptor (PTD) and is used to indicate to the host controller the number of transactions that should be executed per micro-frame. The allowed bit settings are:

00b Reserved. A zero in this field yields undefined results.

01b One transaction to be issued for this endpoint per micro-frame.

10b Two transactions to be issued for this endpoint per micro-frame.

11b Three transactions to be issued for this endpoint per micro-frame.

Problem

For High-bandwidth mode, using multiple packets (MULT = 10b or 11b) in a frame causes unreliable operation. Only one transaction (MULT = 01b) can be issued per micro-frame.

Work-around

There is no software workaround. Only one transaction can be issued per micro-frame.

3.8 VBAT_DCDC.1: The minimum rise time of the power supply must be 2.6 ms or slower for $T_{amb} = -40\text{ C}$, and 0.5 ms or slower for $T_{amb} = 0\text{ C}$ to $+105\text{ C}$

Introduction

The datasheet specifies no power-up requirements for the power supply on the VBAT_DCDC pin.

Problem

The device might not always start-up if the minimum rise time of the power supply ramp is 2.6 ms or faster for $T_{amb} = -40\text{ C}$, and 0.5 ms or faster for $T_{amb} = 0\text{ C}$ to $+105\text{ C}$.

Work-around

None.

4. AC/DC deviations detail

No known errata.

5. Errata notes detail

5.1 CAN-FD peripheral cannot access secure alias address

CAN-FD.1: CAN-FD peripheral cannot access memory space with secure alias address.

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