

UMI0032_2

ISPI362 OTG Add-On Eval Kit with Intel® PXA250/255 Integrated Development Platform Rev. 4

Semiconductors

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User's Guide Rev. 2.0

Revision History:

Version	Date	Description	Author
2.0	June 2003	<ul style="list-style-type: none">• Updated Table 3-1.• Added PXA255.	Jason Ong
1.0	May 2003	First release.	Jason Ong

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I. Introduction

The ISPI362 is a single-chip Universal Serial Bus (USB) On-The-Go (OTG) Controller, Host Controller (HC) and Device Controller (DC).

- The OTG Controller is fully compliant with *On-The-Go Supplement to the USB 2.0 Specification Rev. 1.0a*.
- The Host Controller is fully compliant with *Universal Serial Bus Specification Rev. 2.0*; supporting data transfer at full-speed (12 Mbit/s) and low-speed (1.5 Mbit/s).
- The Device Controller is also fully compliant with *Universal Serial Bus Specification Rev. 2.0*; supporting data transfer at full-speed (12 Mbit/s).

The target applications of the ISPI362 are embedded systems, portable devices, digital still cameras, and so on. It has a 16-bit data bus for interfacing with a microprocessor and separate I/O addresses.

The ISPI362 evaluation kit with PXA250/255 is a standalone embedded system evaluation kit. Using the popular Intel® PXA250 or PXA255 (previously known as the Cotulla) processor, this kit can fully utilize the bandwidth of the ISPI362.

To shorten the development time for customers, Philips has partnered with Accelent to bring about an OTG add-on evaluation kit with Intel PXA250/255 IDP. During the initial partnership, Accelent had provided IDP revision 2.0. Over time, Accelent upgraded its IDP to revision 4.0. For more detailed information on the changes, refer to the Accelent document *PX2-IDP Spin 2 Revision Status (PX2-IDP - Spin 2 RevSts.pdf)*.

Note: Before you use the Integrated Development Platform (IDP), read *Intel PXA250 Applications Processor Integrated Development Platform (linux_user_guide_EUG-0004-0001B.pdf)* User's Guide from Accelent.

Figure I-1, Figure I-2, Figure I-3 and Figure I-4 show the ISPI362 OTG add-on card for PXA250/255 IDP.



Figure I-1: ISPI362 OTG Add-On Card for PXA250/255 IDP

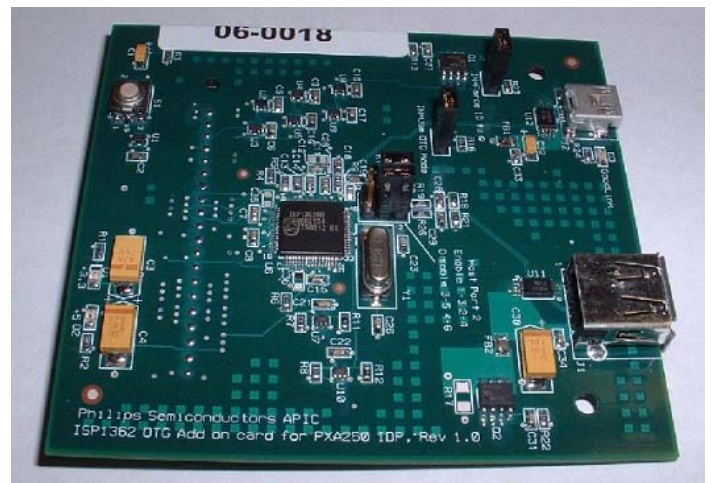


Figure I-2: Top View of the ISPI362 OTG Add-On Card for PXA250/255 IDP

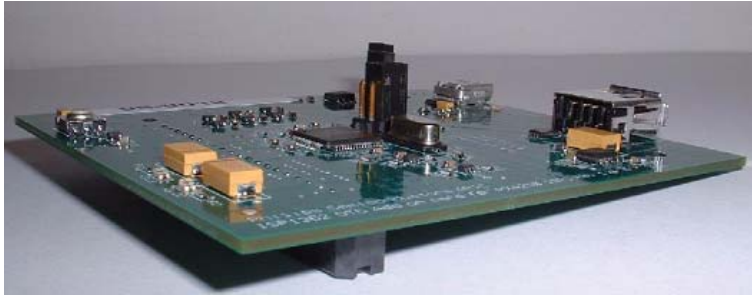


Figure I-3: Side View of the ISPI362 OTG Add-On Card for PXA250/255 IDP

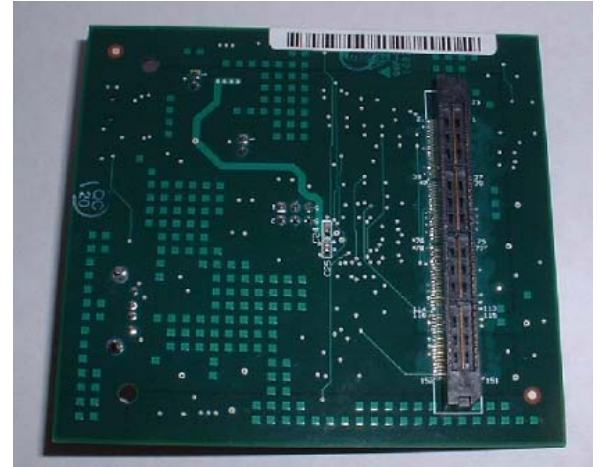


Figure I-4: Bottom View of the ISPI362 OTG Add-On Card for PXA250/255 IDP

2. System Requirements

1. Two Accelent Linux IDP boards (version 2 or later) with the ISPI362 OTG add-on cards attached.
2. One OTG cable.
3. A USB speaker.



Figure 2-1: Accelent IDP Version 2

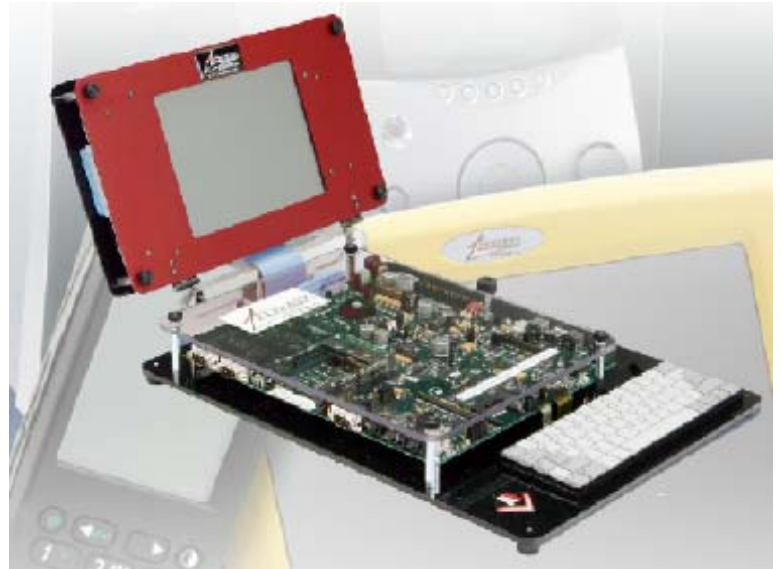


Figure 2-2: Accelent IDP Version 4

3. Installation

1. Copy the nk.bin file to a CompactFlash® (CF) memory unit, and firmly insert the ISPI362 OTG add-on card for the PXA250/255 IDP into connector J13 on the Accelent IDP board.
2. Insert a PC card adapter with CF into either of the PC card slots in the Accelent IDP.
3. Switch ON the Accelent IDP, and wait for the CF memory to be reprogrammed.
4. Eject the PC card to reboot the Accelent IDP.

The ISPI362 evaluation kit with PXA250/255 IDP is now ready for testing.

For information on other ways to program the CF unit in Accelent IDP, refer to the Accelent document *Intel PXA250 Applications Processor Integrated Development Platform*.

3.1. Setting Up the Integrated Development Platform (IDP)

1. Boot the PXA250/255 IDP.
2. Follow the instructions according to the operating system installed on the IDP.

Figure 3-1 shows a setup of the ISPI362 OTG add-on card for PXA250/255 IDP.

Note: To play an MP3 file on an IDP, make sure the file is first uploaded to the IDP through the Ethernet. For more information on how to upload a file, refer to the Accelent document *Intel PXA250 Applications Processor Integrated Development Platform*.



Figure 3-1: Setup of the ISPI362 OTG Add-On Card for PXA250/255 IDP

3.2. Power Supply and LED Indicators

In the ISPI362 OTG add-on evaluation card, the power supply inputs—+3.3 V and +5.0 V—come from the IDP. Therefore, no other external power supply input or on-board power regulation is required.

There are LEDs on the board to indicate the power supply status:

- D1 is the +3.3 V indicator.
- D2 is the +5.0 V indicator.
- D3 is the GoodLink™ indicator for the Device Controller.

3.3. Connectors and Jumpers

The ISPI362 OTG add-on card contains an OTG connector (J2) and a USB downstream port connector (J1) to interface with other USB peripherals. Jumper JP1 sets the OTG port to OTG or non-OTG mode, while JP2 disables the host port.

There is also a reset switch (S1) for the hardware reset of the ISPI362.

Table 3-1 shows the jumper settings that must be configured before using the ISPI362 OTG add-on card.

Table 3-1: Jumper and Switch Settings

Jumper	Description	Setting
JP1	OTG port select	<ul style="list-style-type: none"> ▪ Short for OTG mode [default] ▪ Open for non-OTG mode
JP2	Host port enable	<ul style="list-style-type: none"> ▪ Short <1—3> and <2—4> for enabling port 2 [default] ▪ Short <3—5> and <4—6> for disabling port 2
JP3	ID pin select	<ul style="list-style-type: none"> ▪ Open (use ID from connector) [default] ▪ Short (force ID to zero)

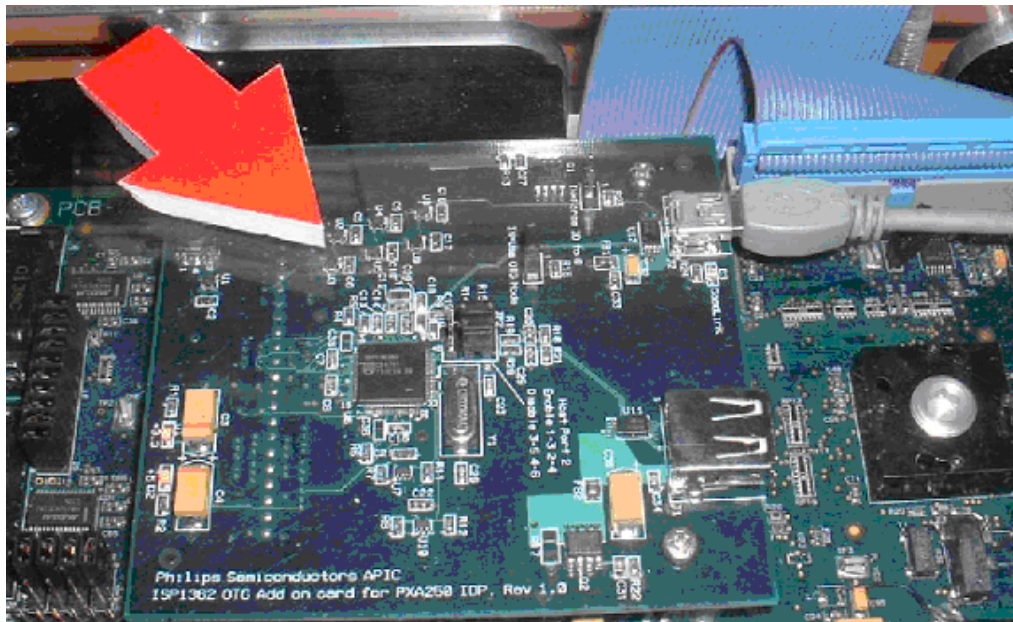


Figure 3-2: ISPI362 OTG Add-On Card on the PXA250/255 IDP

4. ISPI362 Bill of Materials

Quantity	Part Reference	Description	Value	Rating	Manufacturer
9	C2, C5, C6, C9, C10, C16, C17, C21, C22	Capacitor, SMD MLC, 0.01 μ F, \pm 10% 50 V NPO/X7R, 0603	0.01 μ F	50 V	Generic
12	C7, C8, C13, C14, C15, C20, C24, C25, C27, C31, C33, C34	Capacitor, SMD MLC, 0.1 μ F, \pm 10% 16 V X7R, 0603	0.1 μ F	16 V	Generic
2	C23, C26	Capacitor, SMD MLC, 22 pF, \pm 10% 50 V NPO/X7R, 0603	22 pF	50 V	Generic
1	C12	Capacitor, SMD MLC, .022 μ F, \pm 10% 16 V X7R, 0603	0.022 μ F	16 V	Generic

Quantity	Part Reference	Description	Value	Rating	Manufacturer
0	C11	Capacitor, SMD MLC, .022 μ F, \pm 10% 16 V X7R, 0603	0.022 μ F	16 V	Generic
4	C18, C19, C28, C29	Capacitor, SMD, NPO/X7R 47 pF, \pm 10% 50 V 0603	47 pF	50 V	Generic
2	C1, C32	Capacitor SMD, tantalum chip, 4.7 μ F, 16 V, TAJ A-CASE	4.7 μ F	20 V	AVX
1	C30	Capacitor SMD, tantalum chip, 100 μ F, 16 V, TAJ D-CASE	100 μ F	16 V	AVX
2	C3, C4	Capacitor SMD, tantalum chip, 47 μ F, 16 V, TAJ D-CASE	47 μ F	16 V	AVX
1	U6	ISPI362 USB OTG Controller	—	—	Philips
2	JP1, JP3	Header – 1 x 2 .025SQ PIN .100 centers	—	—	Generic
1	JP2	Header – 2 x 3 .025SQ PIN .100 centers	—	—	Generic
1	J3	High-speed terminal, MIT series, 50 Ω , 152 contact, 0.025 in spacing, 8 mm board spacing	—	—	Samtec
1	J1	USB Type A connector, no panel grounding ears	—	—	Tyco/Amp
1	J2	Conn, Mini-AB USB, surface mount	—	—	Acon
2	U11, U12	Diode SMD, Dual USB transient suppressor	—	—	Texas instruments
2	FB1, FB2	Ferrite bead, SMD, with copper pattern heat sink	—	2 A	muRata electronics
4	M1, M2, M3, M4	Shunt, single position, .100 center, black	—	—	Samtec
1	S1	Switch, SMD, momentary, NO, w/ground tab	—	—	Omron
4	U3, U4, U5, U9	IC SMD single OR gate 5 pin	—	—	Fairchild
1	U1	UHS 2-input AND gate, SC70 5 lead	—	—	Fairchild
2	U7, U10	IC SMD, UHS buffer W/3 state out NC7SZ125P5 SC70, 5 lead	—	—	Fairchild
2	U2, U8	NC7SZ04P5 single gate inverter	—	—	Fairchild
2	D1, D2	LED SMT 0805 red	—	—	Lumex
1	D3	LED SMT 0805 green	—	—	Lumex
0	R17	Resistor, SMD, spare, 1206	0	—	No mfg-etched part
4	R9, R10, R19, R20	Resistor, SMD, fixed, film, chip, 22.0 Ω , \pm 5%, 1/16 W, 0603	22	1/16 W	Generic
5	R3, R4, R5, R13, R22	Resistor, SMD, fixed, film, chip, 10 K, \pm 5%, 1/16 W, 0603	10 K	1/16 W	Generic
7	R6, R7, R8, R14, R15, R16, R23	Resistor, SMD, fixed, film, chip, 100 K, \pm 5%, 1/16 W, 0603	100 K	1/16 W	Generic
2	R18, R21	Resistor, SMD, fixed, film, chip, 15.0 K, \pm 5%, 1/16 W, 0603	15 K	1/16 W	Generic
2	R1, R24	Resistor, SMD, fixed, film, chip, 470 Ω , \pm 5%, 1/16 W, 0603	470	1/16 W	Generic
2	R11, R12	Resistor, SMD, fixed, film, chip, 4.70 K, \pm 5%, 1/16 W, 0603	4.7 K	1/16 W	Generic

Quantity	Part Reference	Description	Value	Rating	Manufacturer
1	R2	Resistor, SMD, fixed, film, chip, 680 Ω , $\pm 5\%$, 1/16 W, 0603	680	1/16 W	Generic
2	Q1, Q2	MOSFET, P-channel, 30 V Vds	—	—	Fairchild
1	Y1	12 MHZ, SM, crystal	—	—	Citizen
1		PCB, Philips ISPI362 USB On-The-Go expansion board for Accelent IDPs			

5. ISPI362 OTG Add-On Evaluation Card Schematics

Philips ISP1362 USB On-The-Go Expansion Board For Accelent IDP's

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- Page 3 - IDP Sync Bus Connector
- Page 4 - Philips ISP1362
- Page 5 - USB OTG & Host Connectors

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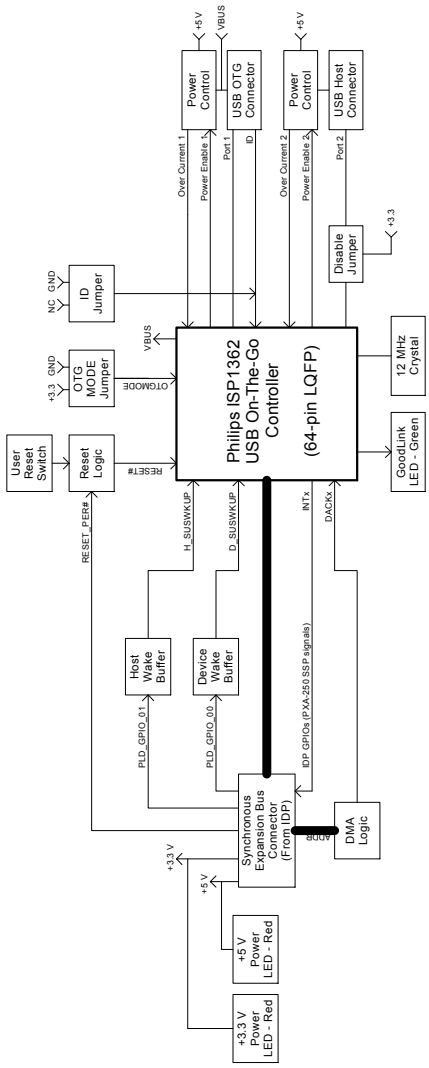
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Philips ISP1362 USB On-The-Go Expansion Board For Accelent IDP's - Block Diagram

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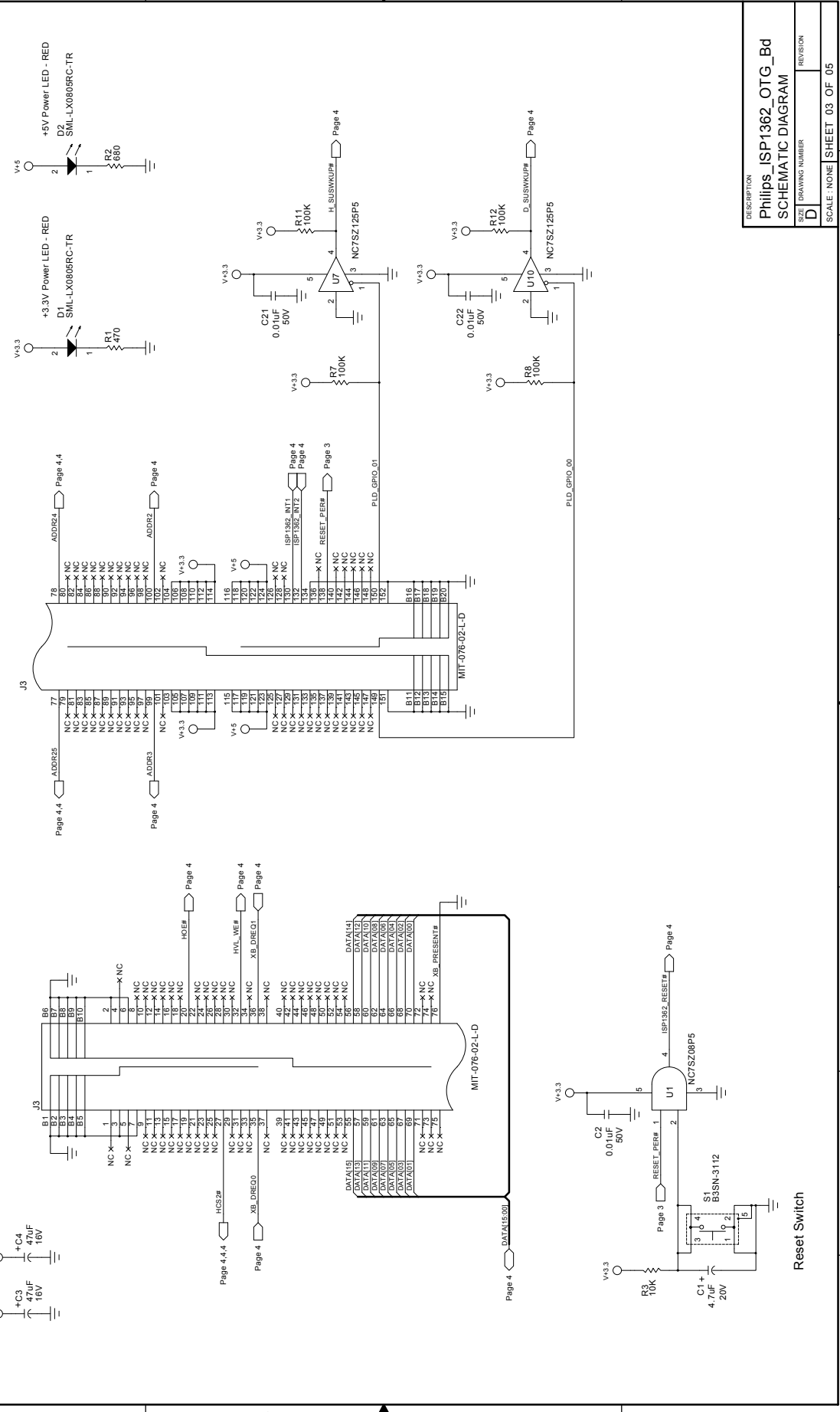
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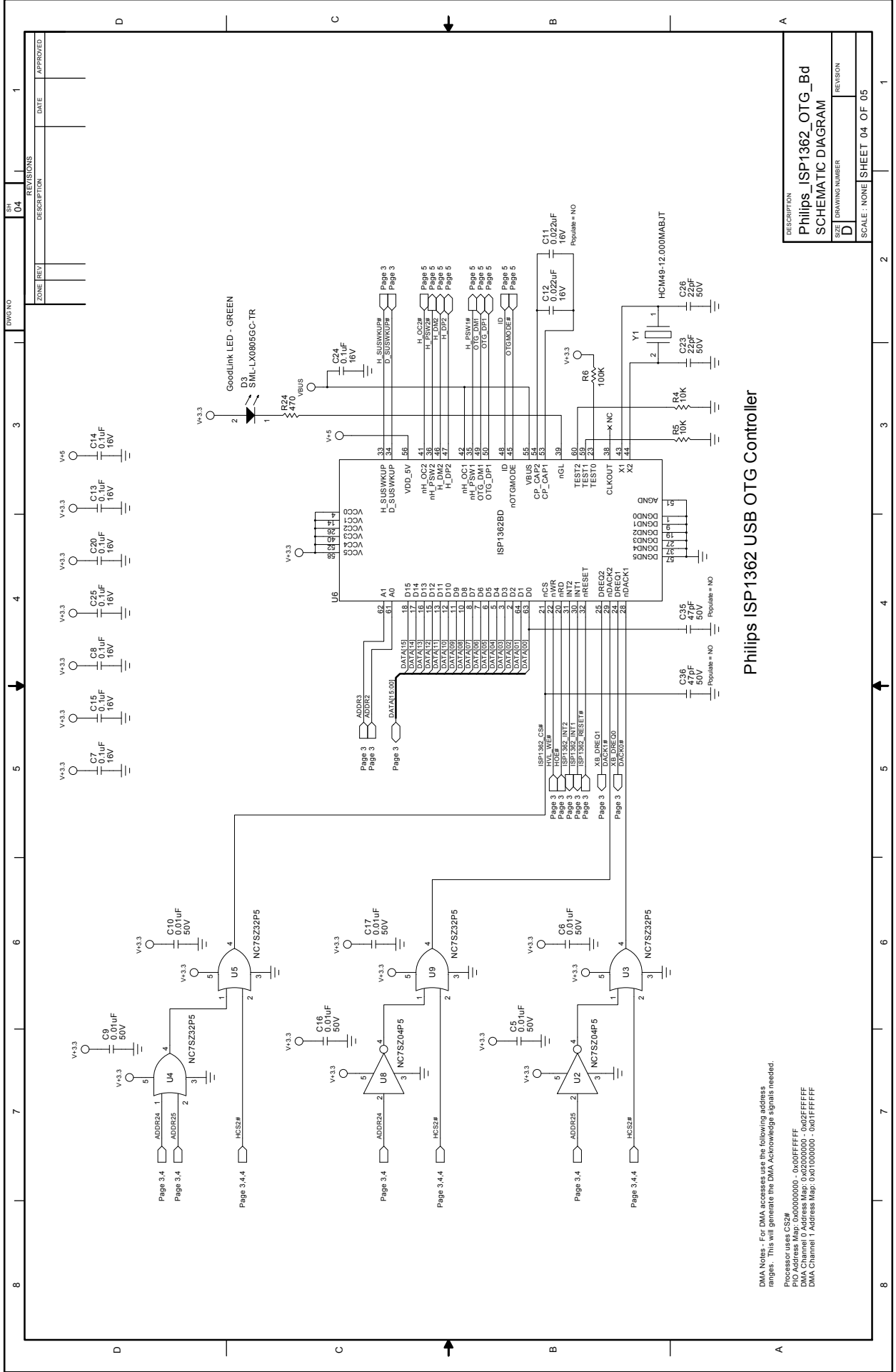


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Accelent IDP High Speed Expansion Connector



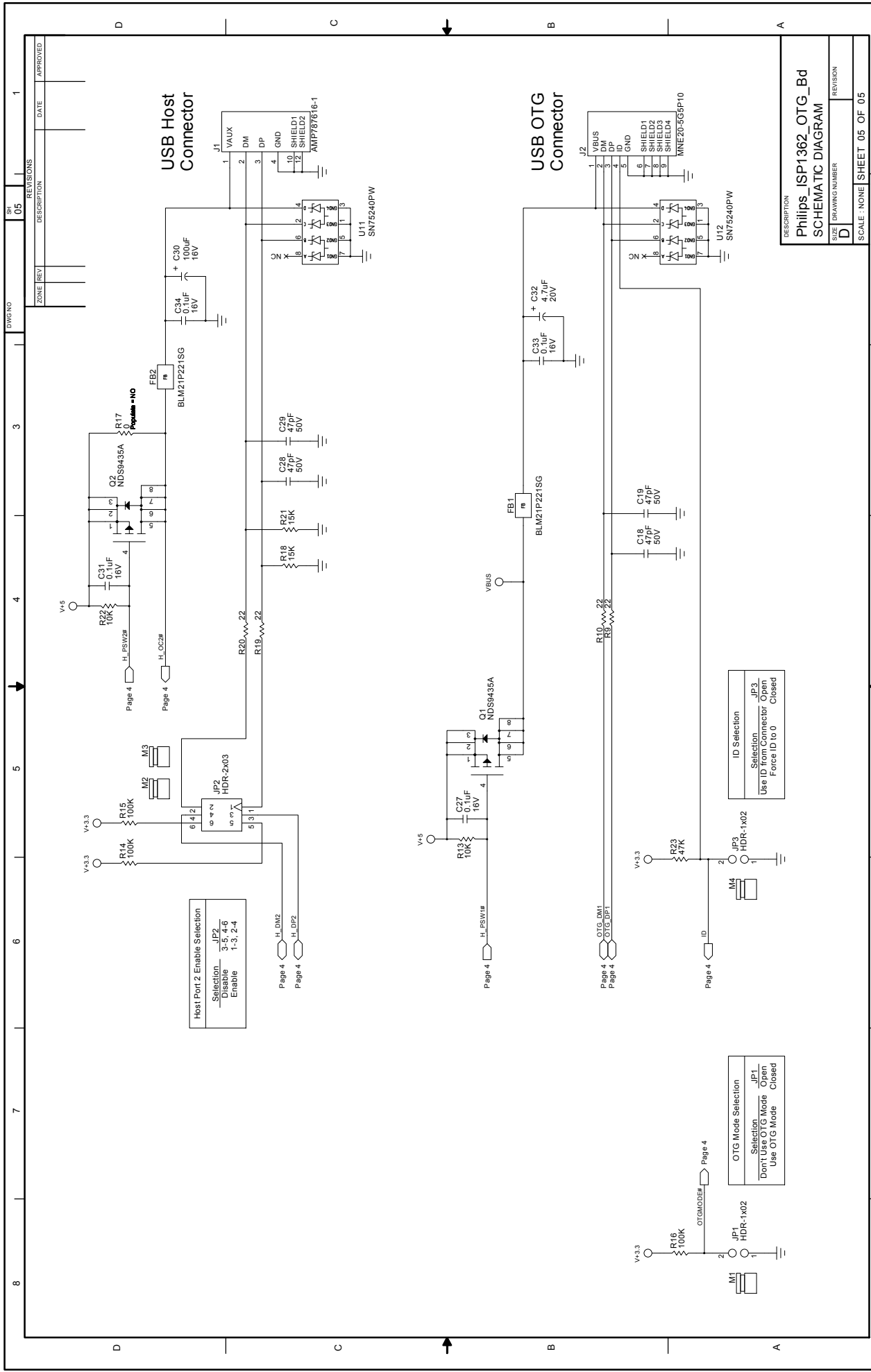


Philips ISP1362 USB OTG Controller

DMA Notes - For DMA accesses use the following address ranges. This will generate the DMA Acknowledge signals needed.

Processor Uses CS#
 PIO Address Map: 0x00000000 - 0x00FFFFFF
 DMA Channel 0 Address Map: 0x02000000 - 0x02FFFFFF
 DMA Channel 1 Address Map: 0x01000000 - 0x01FFFFFF

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6. References

- *ISPI362 Single-chip Universal Serial Bus On-The-Go controller datasheet*
- *ISPI362 Linux Stack User's Guide*
- *Universal Serial Bus Specification Rev. 2.0*
- *On-The-Go Supplement to the USB 2.0 Specification Rev. 1.0a*
- *Intel PXA250 Applications Processor Integrated Development Platform User's Guide from Accelent (linux_user_guide_EUG-0004-0001B.pdf).*

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