USB-Adapt™ SH3301

IC Converts PS/2 Data to USB

HID & SYSTEM MANAGEMENT PRODUCTS, SYSTEM MANAGEMENT FAMILY **PRELIMINARY**

DESCRIPTION

The USB-Adapt™ SH3301 is a single IC that converts PS/2 keyboard and mouse data to USB 1.1.

The USB-Adapt™ is ideal for system legacy support, enabling seamless connection of standard PS/2 devices (mice or keyboards) to USB.

The IC offers two hot-pluggable and hot-swappable PS/2 ports; either port can accept a mouse or a keyboard. In addition, the USB-Adapt™ auto-detects and transparently supports the wheel function of wheel mice.

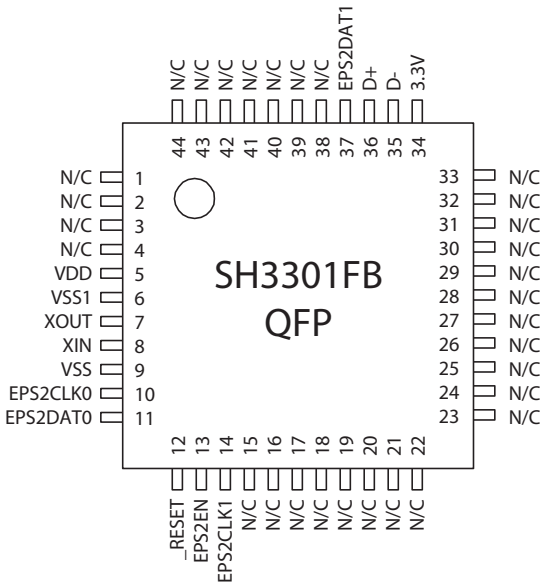
FEATURES

- Interfaces PS/2 devices to USB
- Complies with USB 1.1 specification
- Provides two PS/2 ports
- PS/2 ports support mouse wheel functionality
- Works with standard Windows keyboard and mouse drivers
- Devices are hot-pluggable
- PS/2 ports are auto-selectable and hot-swappable – a mouse or keyboard can be used in either port
- Easy to implement
- Few external components required

APPLICATIONS

- System legacy support

PIN ASSIGNMENTS

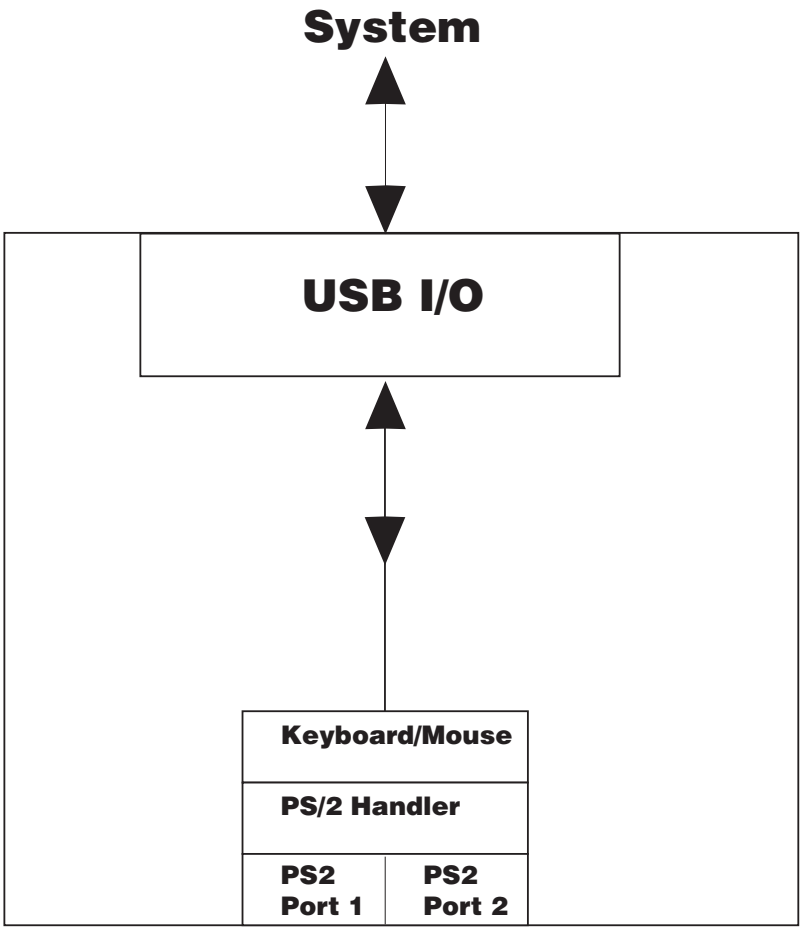


ORDERING CODE

Package options	Pitch	TA = -20°C to +85°C
44-pin QFP	0.8 mm	SH3301FB

Other Materials	Type	Order number
USB-Adapt™ eval. kit	Evaluation kit	EVK-SH3301

BLOCK DIAGRAM



USB FUNCTIONALITY

The USB-Adapt™ is a low-speed composite USB 1.1 device that interfaces PS/2. It supports the USB Human Interface Devices (HID) class specification. It uses two interrupt endpoints for the PS/2 devices.

The USB-Adapt™ handles the merging of all this data, and sends the data to the host system.

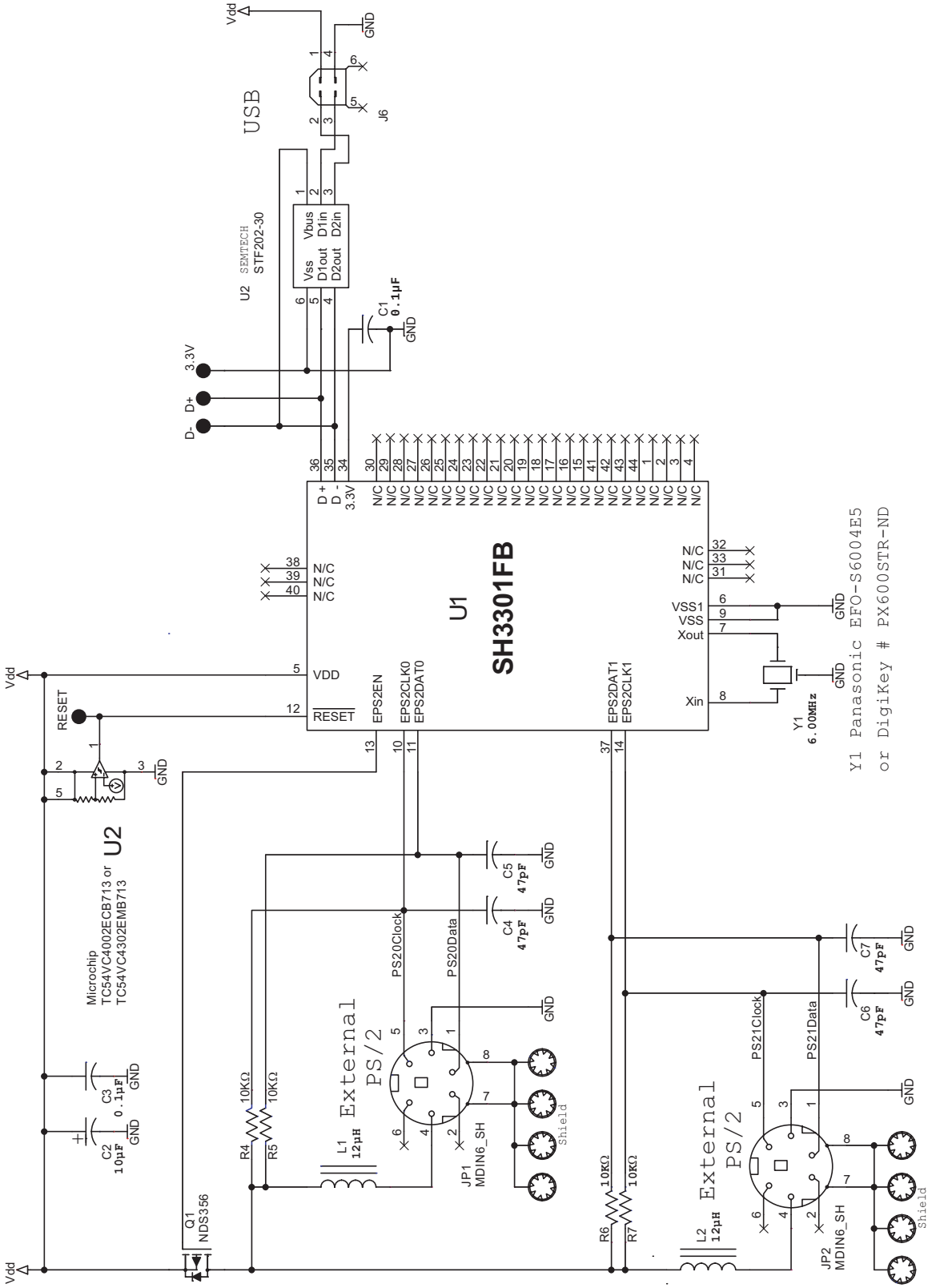
PS/2 PORTS

The two PS/2 ports allow the user to connect legacy PS/2 devices to the USB host system. Standard 104-key keyboards and PS/2 mice, with support for MouseWheel functionality, can be hot-plugged at either of the PS/2 ports and immediately begin communicating with the host.

PIN DEFINITIONS

Mnemonic	QFP	Type	Name and Function
Power Supply			
VDD	5	PWR	**Positive supply voltage**
VSS	9	PWR	**Ground:** negative supply voltage
VSS1	6	PWR	**Ground:** negative supply voltage
Reset			
_RESET	12	I	**Controller hardware reset pin:** Active-low reset line
Oscillator pins			
XIN	8	I	**Oscillator input:** input signal from oscillator
XOUT	7	O	**Oscillator output:** output signal to oscillator
USB			
3.3V	34	O	**USB reference voltage**
D+	36	I/O	**USB D+ line**
D-	35	I/O	**USB D- line**
PS/2			
EPS2CLK0	10	I/O	**Clock line** for external PS/2 port 0
EPS2DAT0	11	I/O	**Data line** for external PS/2 port 0
EPS2CLK1	14	I/O	**Clock line** for external PS/2 port 1
EPS2DAT1	37	I/O	**Data line** for external PS/2 port 1
EPS2EN	13	O	**Enable** external PS/2 ports
Not connected			
	1-4, 15-33, 38-44		**Not used**

SUGGESTED INTERFACING FOR THE USB-ADAPT™



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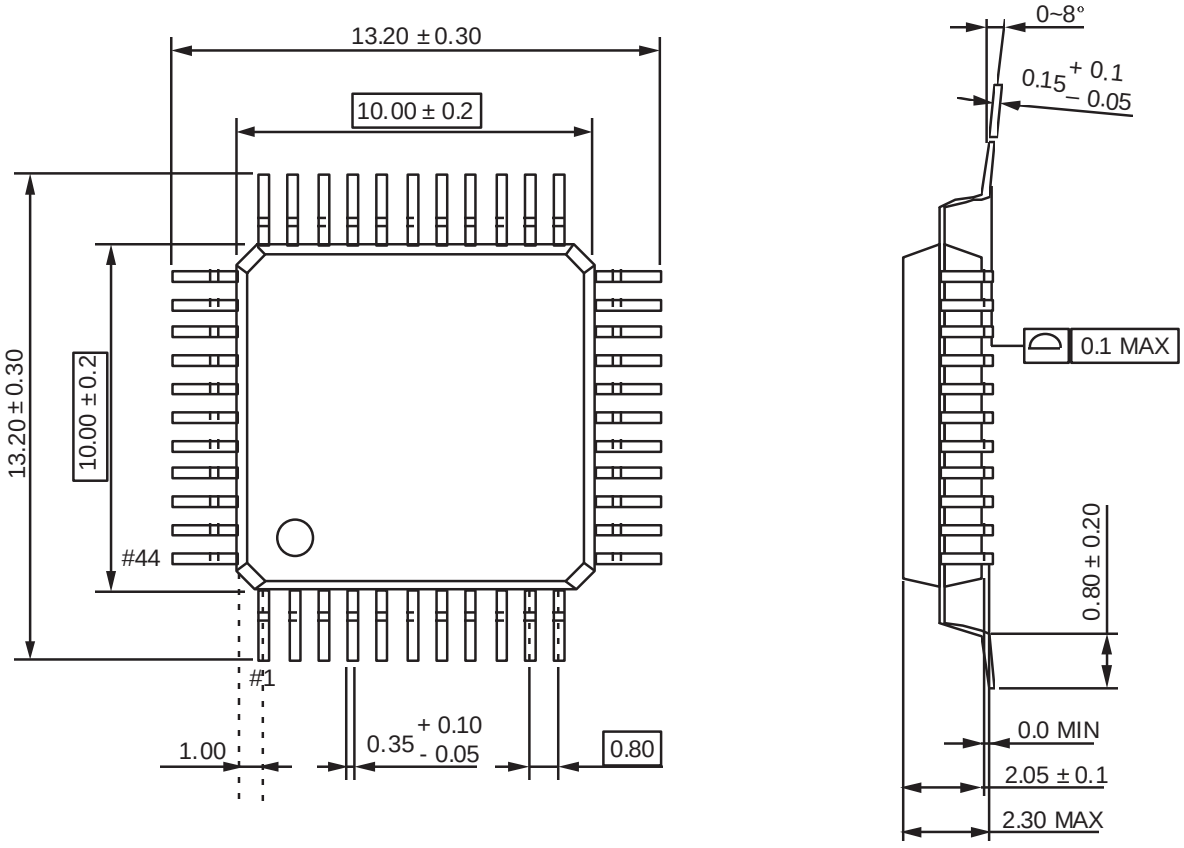
MECHANICAL INFORMATION FOR THE SH3301FB PACKAGE



ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings

Ratings	Symbol	Value	Unit
Supply voltage	V_{DD}	-0.3 to 6.5	V
Input and output voltage	V_{IN}, V_{OUT}	-0.3 to V_{DD} +0.3	V
Current Drain per Pin (not including V_{SS} or V_{DD})	I	20	mA
Operating Temperature SH3301	T_A	T low to T high -40 to +85	°C
Storage Temperature Range	T_{STG}	-65 to +150	°C
ESD rating (human body model)	V_{ESD}	2.0	KV

DC Electrical Characteristics (T_A = -40°C to +85°C, V_{DD} = 4.0 V to 5.25V)

Characteristic	Symbol	Min	Typ	Max	Unit
Supply voltage	V_{DD}	4.0	5.0	5.25	V
Input high voltage					
■ high	V_{IH}	0.8 x V_{DD}		V_{DD}	V
■ low	V_{IL}	V_{SS}		0.2 x V_{DD}	V
Output voltage (except D-, D+)					
■ high (I_{OH}=-200µa)	V_{OH}	V_{DD}–1.0			V
■ low (I_{OL}=1ma)	V_{OL}			0.4	
Output low current (V_{OL}=3V, only pins38, 39, 67)	I_{OL}	8	15	23	mA
Input leakage current					
■ high (all inputs except XIN, XOUT, RESET, D+, D-)	$I_{LIH}1$			3	µA
■ high (XIN, XOUT, RESET)	$I_{LIH}2$			20	µA
■ low (all inputs except XIN, XOUT, RESET, D+, D-)	$I_{LIL}1$			-3	µA
■ low (XIN, XOUT, RESET)	$I_{LIL}2$			-20	µA
Output leakage current (all I/O pins and output pins except D+, D-)					
■ high	$I_{LOH}1$			3	µA
■ low	I_{LOL}			-3	µA
Supply current					
■ Normal operation mode	$I_{DD}1$		5.5	12	mA
■ Idle mode	$I_{DD}2$		2.2	5	mA
■ Stop mode	$I_{DD}3$		180	300	µA

Control Timing (T_A = -40°C to +85°C, V_{DD} = 4.0 V to 5.25V)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency of Operation					
■ Crystal Option	fosc		6.0		MHz
■ External Clock Option	fosc		6.0		MHz

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