Workabout Pro4 HDK

Upgrade Guide

WORKABOUT PRO4 HARDWARE DEVELOPMENT KIT UPGRADE GUIDE

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Warranty

Revision History

Changes to the original guide are listed below:

Change	Date	Description
Rev A	4/2015	Zebra rebrand.

TABLE OF CONTENTS

ABOUT THIS GUIDE

About This Guide

This guide describes the main differences between the Workabout Pro4 and its predecessors, for users of the HDK.

Chapter Descriptions

Chapter 1: Hardware

shows the differences between the block diagrams for the Workabout Pro4 and its predecessors.

Chapter 2: Device Drivers

describes the differences in the I2C EEPROM between the Workabout Pro4 and its predecessors.

Chapter 3: Software

describes the differences between the COM ports, APIs, and some registry settings for the Workabout Pro4 and its predecessors.

Chapter 4: Tether Connector

shows the differences between the pinouts for the tether connector for the Workabout Pro4 and its predecessors.

Chapter 5: 100-Pin Connector

shows the differences between the pinouts on the 100-pin connector for the Workabout Pro4 and its predecessors.

Chapter 6: Scanner Connector

describes the differences between the scanner connector for the Workabout Pro4 and its predecessors.

Chapter 7: USB Connector

describes the differences between the internal USB connector for the Workabout Pro4 and its predecessors.

Chapter 8: Audio Connector

describes the differences between the audio connector for the Workabout Pro4 and its predecessors.

Text Conventions

NOTE Notes highlight additional helpful information.

IMPORTANT These statements provide important instructions or additional information that is critical to the operation of the computer or other equipment.

WARNING These statements provide important information that may prevent injury, damage to the equipment, or loss of data.

CHAPTER 1 HARDWARE

Comparison of Socket Positions

The following diagrams show the positions of the electrical connectors on the main logic board for the Workabout Pro4, and the Workabout Pro G2 and the Workabout Pro3 computers.

Figure 1-1 *Connector Locations on the Workabout Pro4*

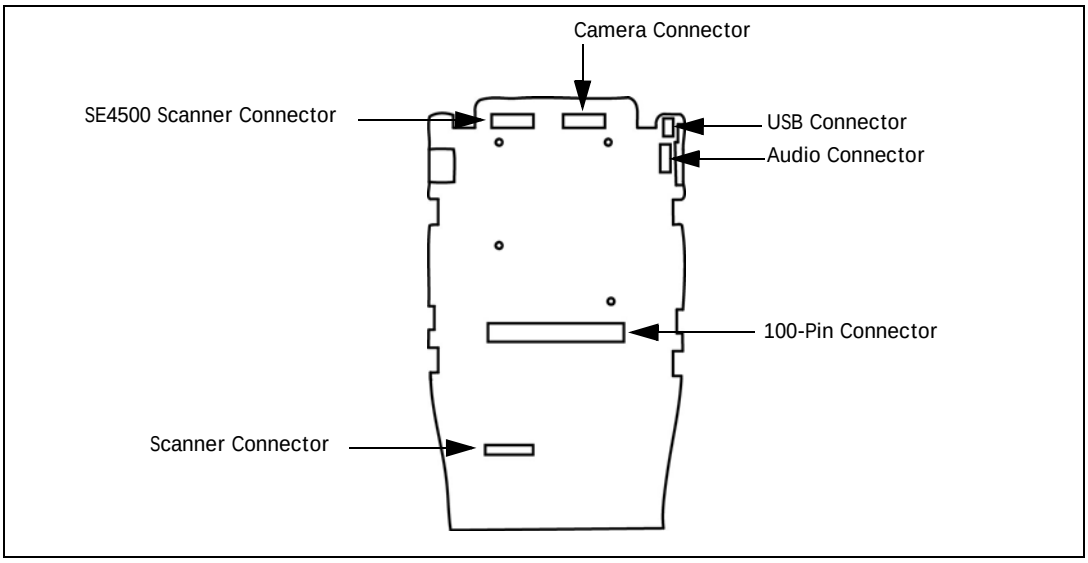
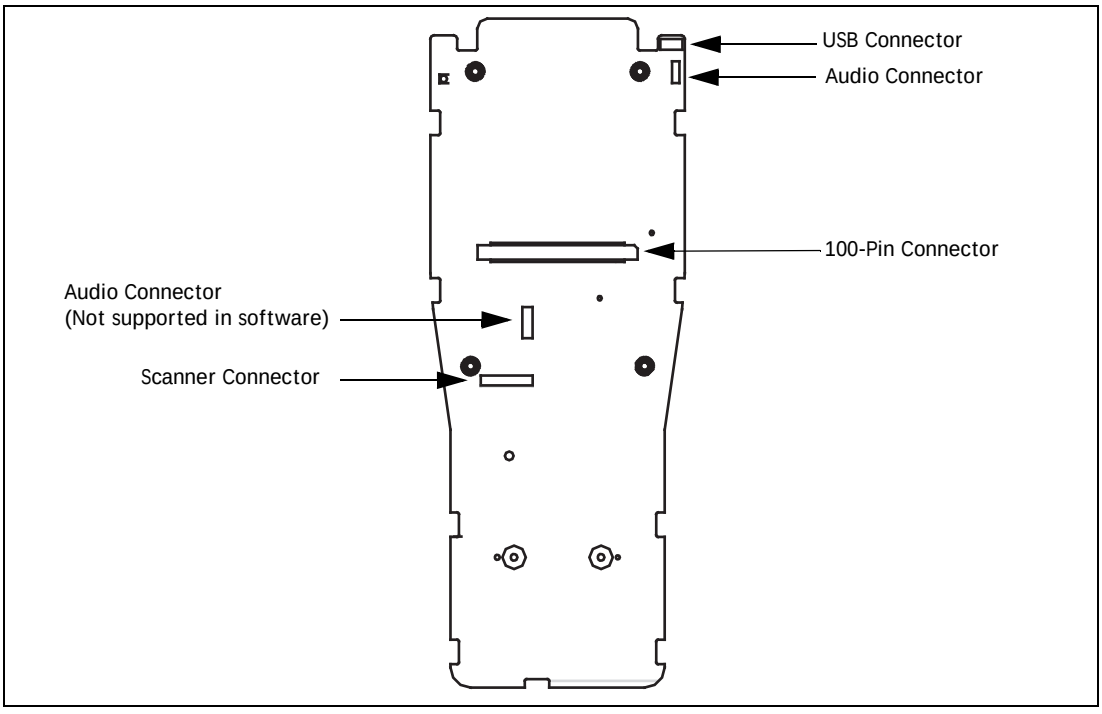


Figure 1-2 *Connector Locations on the Workabout Pro G2 and the Workabout Pro3*



Main Processor

These two diagrams compare the main logic boards of the Workabout Pro4 with its predecessors.

Figure 1-3 *Workabout Pro4 Block Diagram*

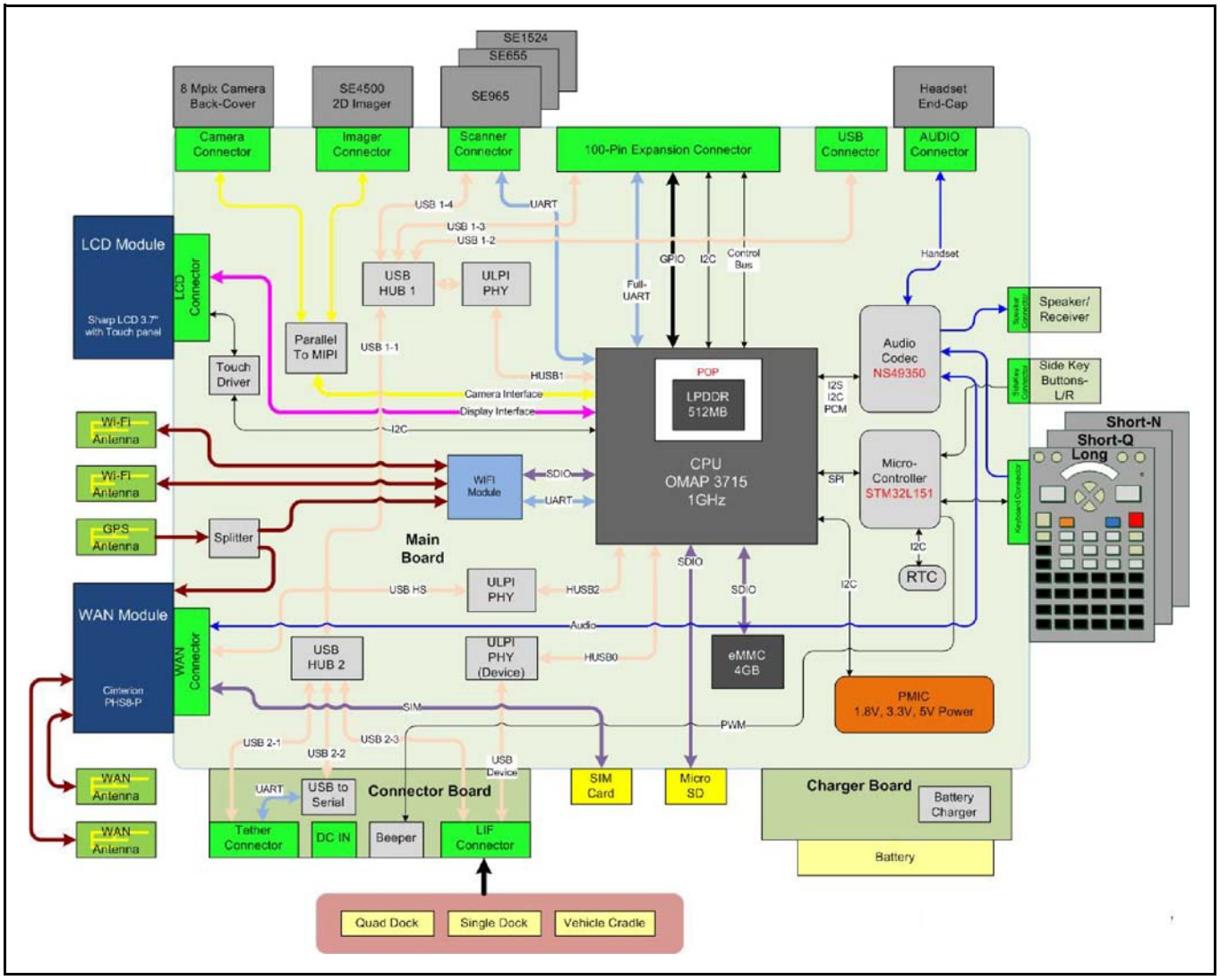
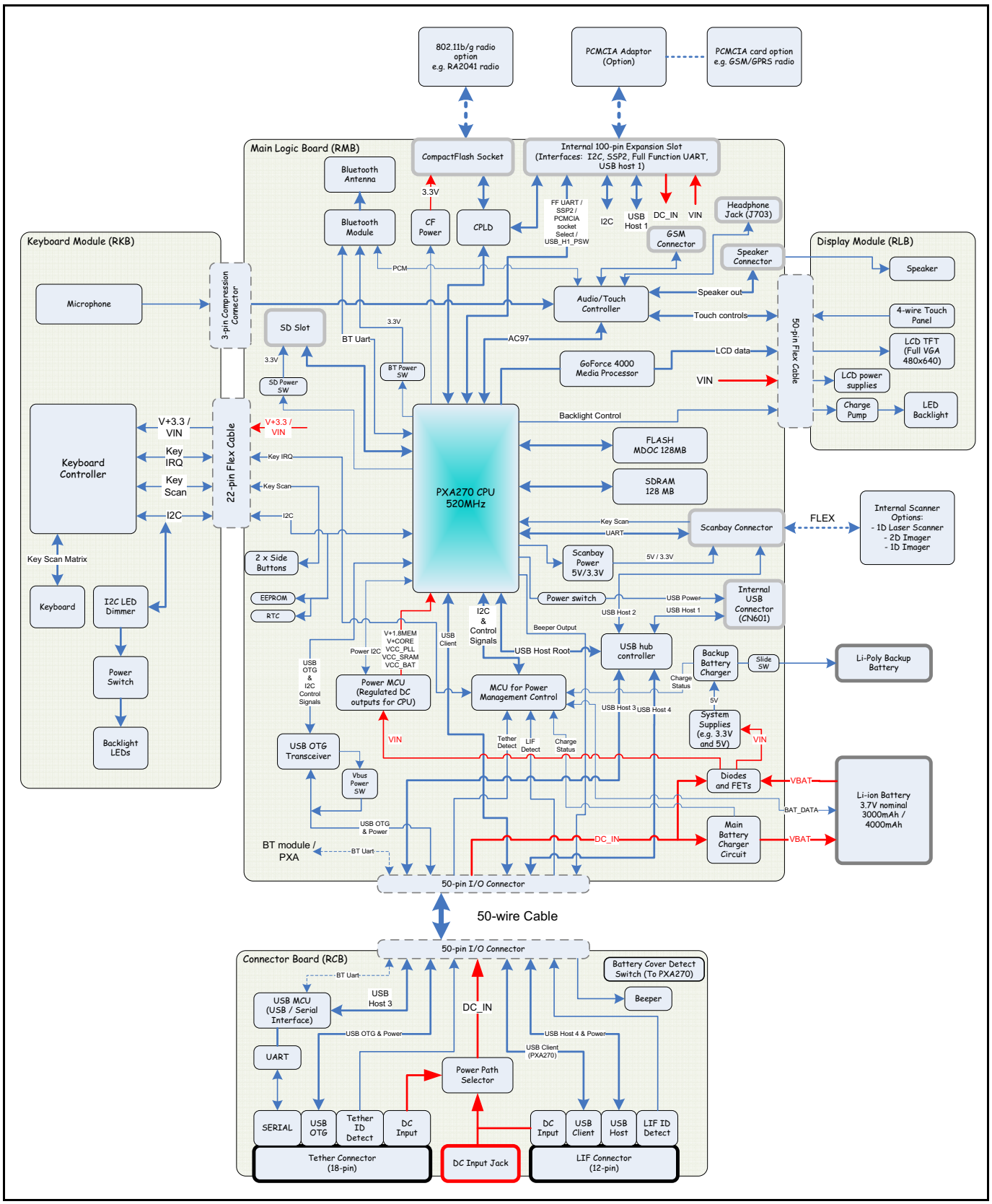


Figure 1-4 *Workabout Pro G2 and Workabout Pro3 Block Diagram*



Comparison of Mounting Frames

The screw holes in the frames are in the same positions on both the Workabout Pro4 and the Workabout Pro3.

Figure 1-5 *Workabout Pro4 Mounting Frame*

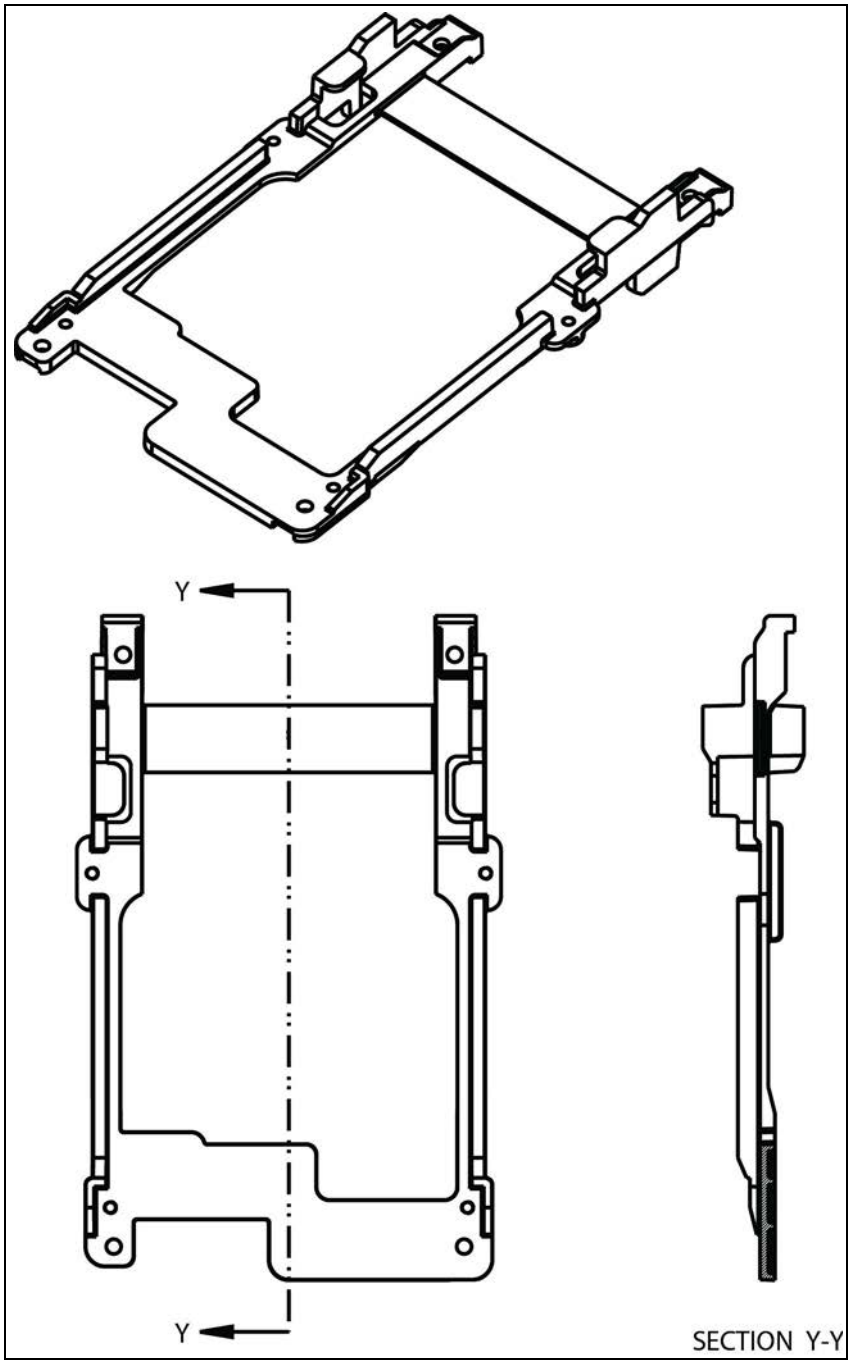
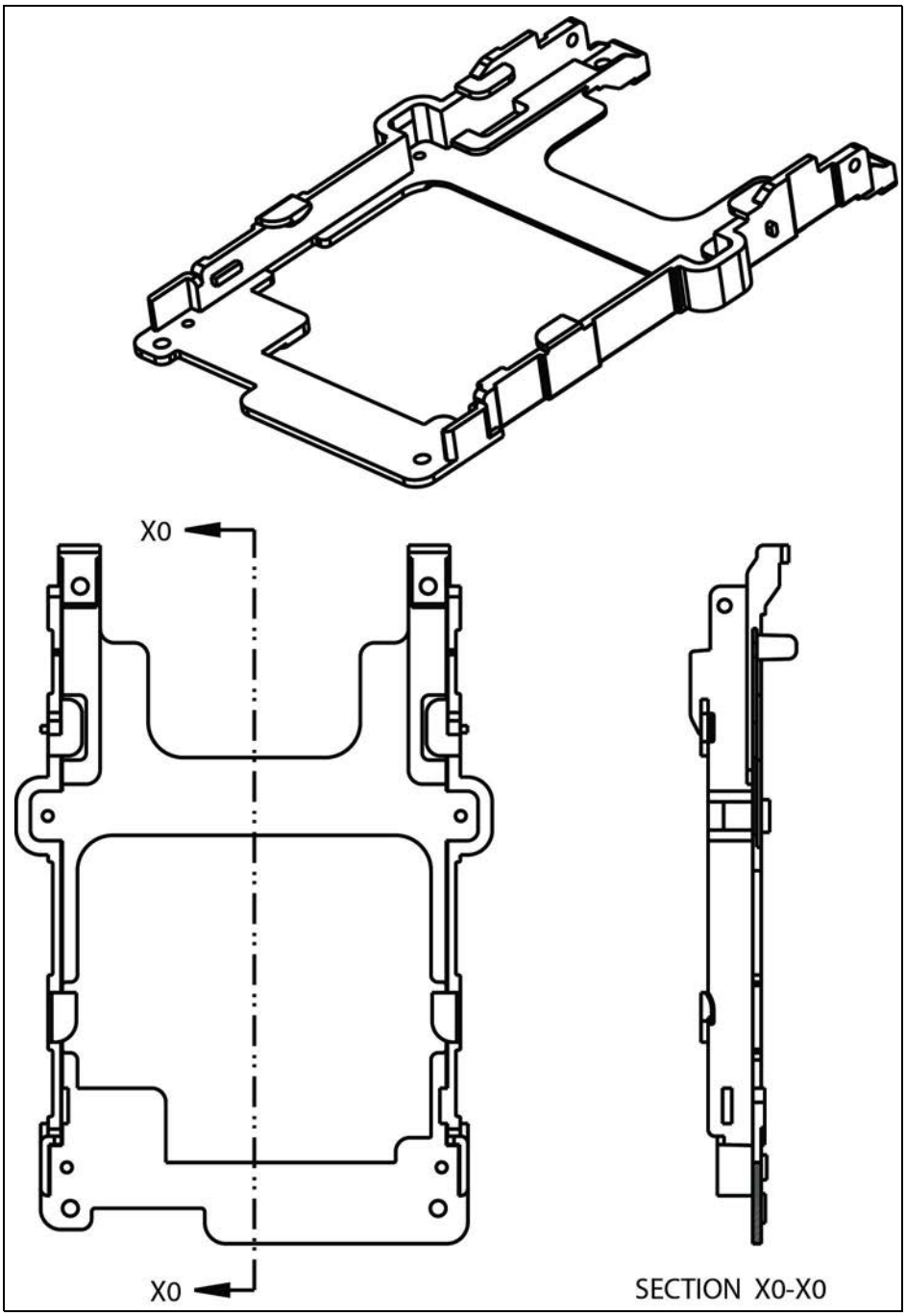


Figure 1-6 *Workabout Pro3 Mounting Frame*



On/Off Switch

The Workabout Pro4 does not have a physical on/off switch. Earlier Workabout Pro models did have an on/off switch. On the Workabout Pro4 there is a capacitor in place of this switch.

Effect of Workabout Pro4 battery removal on the 100-pin connector

When the battery is removed the following occurs:

- V-IN drops to 0 V.
- The GPIO pins are disconnected.

External Connectors

There are no changes to the following:

- Tether connector
- LIF connector
- Single unit docking station
- Four unit multi-docking station
- Vehicle cradle
- Port replicator

CHAPTER 2 DEVICE DRIVERS

I2C Addresses

I2C and smBus device addresses are 7 bits long.

The addresses defined here are shifted left by one bit to suit the device address format required by the Windows CE I2C driver. The following addresses are reserved:

Address	Notes	Workabout Pro G2 and Workabout Pro3	Workabout Pro4
0x20	Power Micro	Yes	
0x22	Power Micro	Yes	
0x34	Audio Codec		Yes
0x64	Real-time clock	Yes	
0x66	Keyboard Micro	Yes	
0x68	Keyboard Micro	Yes	
0xa0	WWAN EEPROM address: E0, E1, E2 low	Yes	Yes
0xa2	Expansion EEPROM address: E0 high, E1, E2 low	Yes	Yes
0xb0	Speaker Amp		Yes
0xe0	PXA255/270 configurable I2C address	Yes	

Expansion Module EEPROM Fields

Hardware type

This field contains a single ASCII character. It defines the hardware type of the expansion module. Drivers for the hardware are loaded based on this value.

Table 2-1 *Hardware Type Characters in the Expansion Module EEPROM*

ASCII		Workabout Pro G2 and Workabout Pro3	Workabout Pro4
Character	Code		
a	0x61	PCMCIA	No effect
b	0x62	Serial	Serial
c	0x63	USB	USB
d	0x64	PCMCIA, Serial	Serial
e	0x65	PCMCIA, USB	USB
f	0x66	Serial, USB	Serial, USB
g	0x67	PCMCIA, Serial, USB	Serial, USB
s	0x73	An **s** or any undefined value means the hardware is standard, and the operating system loads drivers based on registry settings.	
Any other value			

CHAPTER 3 SOFTWARE

COM Port Assignments

Table 3-1 *Default COM-Port Assignment*

COM Port	Workabout Pro G2 and Workabout Pro3	Workabout Pro4
COM0:		ActiveSync.
COM1:	On 100-pin expansion connector.	On 100-pin expansion connector. Can also be used by WAN in some circumstances.
COM2:	Virtual serial port of the tether port. No adapter is required to use these lines.	Virtual serial port of the tether port.
COM3:	**Cannot be reassigned.** Internal scanner or imager.	**Cannot be reassigned.** Internal scanner, or imager, that uses a serial connection.
COM4:	**Cannot be reassigned.** USB client port—used by ActiveSync.	GPS.
COM5:	RS-232 port A on port replicator, and serial port available on USB-to-serial adapter. This port is removed in suspend and restored on resume.	RS-232 port A on port replicator, and serial port available on USB-to-serial adapter. This port is removed in suspend and restored on resume.
COM6:	RS-232 port B on port replicator. This port is removed in suspend and restored on resume.	RS-232 port B on port replicator. This port is removed in suspend and restored on resume.
COM7:	RS-232 port C on port replicator. This port is removed in suspend and restored on resume.	RS-232 port C on port replicator. This port is removed in suspend and restored on resume.
COM8:	Virtual port—for WWAN GSM	Virtual port—for WWAN radio
COM9:	**Cannot be reassigned.** IRCOMM port.	WAN GPS if enabled.
COM20	**Cannot be reassigned.** Internal *Bluetooth* radio.	Not used.
COM21	Built-in USB-Serial adapter port. This port is removed in suspend and restored on resume.	Built-in USB-Serial adapter port. This port is removed in suspend and restored on resume.

Serial Endcaps

No serial endcaps are available for the Workabout Pro4.

C++ Application Programming Interface

The Workabout Pro4 HDK APIs are backwards compatible to the Workabout Pro3. The PCMCIA namespace exists in the Workabout Pro4 HDK; however, there is no supporting hardware on the Workabout Pro4. This namespace applies only to Workabout Pro3 applications.

Code developed for the Workabout Pro3 must be recompiled using the Workabout Pro4 HDK APIs before being installed on a Workabout Pro4. Assuming that the supporting hardware is available on the Workabout Pro4 the application should run.

The PCMCIA namespace is deprecated.

A new namespace ExpansionPower enables, disables, and queries the state of the power to the 100-pin expansion connector.

Configure Standard Device Drivers for the Expansion Slots

HKEY_LOCAL_MACHINE\Drivers\PsionTeklogix\Expansion Slot

Value Name	Workabout Pro G2 and Workabout Pro3	Workabout Pro4
PCMCIA	Enable/disable PCMCIA on the 100-pin connector—socket 1. The PCMCIA pin is not available for other uses. The pins defined for this slot have predefined meanings and must be adhered to in the hardware.	Not available.
FFUART	Enable/disable serial lines and UART on the 100-pin expansion connector using COM1: .	Enable/disable serial lines and UART on the 100-pin expansion connector using COM1: .
USB	Enable/disable USB hub and ports for USB on the 100-pin expansion connector and internal USB connector. Both connectors are enabled, or disabled, simultaneously.	Enable/disable USB hub and ports for USB on the 100-pin expansion connector and internal USB connector. Both connectors are enabled, or disabled, simultaneously.
ExpansionUSB	Not available.	Enable/disable USB hub and port for USB on the 100-pin expansion connector.
InternalUSB	Not available.	Enable/disable USB hub and port for USB on the internal USB connector.

CHAPTER 4 TETHER CONNECTOR

Connector Type

The same connector is used on the Workabout Pro G2, the Workabout Pro3 and the Workabout Pro4.

Connector Position And Orientation

For a comparison of the socket positions see Comparison of Socket Positions on page 1-3.

Pinouts

Pin	Name	Function on Workabout Pro G2 and Workabout Pro3	Function on Workabout Pro4
1	GND	Ground	Ground
2	USB_HOST_D+	USB D+ (host or device)	USB host full speed D+
3	USB_HOST_D-	USB D- (host or device)	USB host full speed D-
4	USB_HOST_PWR	USB Device Power Detect	USB host power, +5 V, 0.5 A max
5	TXD	COM2:	RS232C UART TxD
6	RXD	COM2:	RS232C UART RxD
7	TETHER_DETECT	Device detect input	Device detect input
8	DC_IN	Power supply to Workabout Pro4	Power, +5 V, 3 A max
9	DC_IN	Power supply to Workabout Pro4	Power, +5V
10	DC_IN	Power supply to Workabout Pro4	Power, +5V
11	CTS	COM2:	RS232C UART CTS
12	RTS	COM2:	RS232C UART RTS
13	DSR	COM2:	RS232C UART DSR
14	DTR	COM2:	RS232C UART DTR
15	DCD	COM2:	RS232C UART DCD
16	RI	COM2:	RS232C UART RI
17	GND	Ground	Ground
18	GND	Ground	Ground

Sensing Device Presence

For device identification, in the connected cable, one of the following pull-down resistors must be connected between TETHER_DETECT (pin 7) and ground:

Pull-down Resistor	Device Workabout Pro G2 and Workabout Pro3	Device on Workabout Pro4
200 kΩ	USB client.	Reserved (Do not use).
100 kΩ	USB host.	USB host.
49.9 kΩ	USB serial.	USB serial.

CHAPTER 5 100-PIN CONNECTOR

Connector Type

The 100-pin connector is an FX6-100S-0.8SV2 receptacle.

The same connector is used on the Workabout Pro G2, the Workabout Pro3 and the Workabout Pro4.

Connector Position And Orientation

For a comparison of the socket positions see Comparison of Socket Positions on page 1-3.

100-Pin Connector Pinout

The Workabout Pro4 uses a subset of the pins that are used on the Workabout Pro G2 and the Workabout Pro3.

Pin	Name	Function on Workabout Pro G2 and Workabout Pro3	Function on Workabout Pro4	Sleep State Workabout Pro G2 and Workabout Pro3	Sleep State on Workabout Pro4
1	V_IN	System power	System power		
2	V_IN	System power	System power		
3	V_IN	System power	System power		
4	V_IN	System power	System power		
5		System data bus	Not connected, floating		
6		System address bus	Not connected, floating		
7		System data bus	Not connected, floating		
8		System address bus	Not connected, floating		
9		System data bus	Not connected, floating		
10		System address bus	Not connected, floating		
11		System data bus	Not connected, floating		
12		System address bus	Not connected, floating		
13		System data bus	Not connected, floating		
14		System address bus	Not connected, floating		
15		System data bus	Not connected, floating		
16		System address bus	Not connected, floating		
17		System data bus	Not connected, floating		
18		System address bus	Not connected, floating		
19		System data bus	Not connected, floating		
20		System address bus	Not connected, floating		
21	GND	Ground	Ground		
22	GND	Ground	Ground		

Pin	Name	Function on Workabout Pro G2 and Workabout Pro3	Function on Workabout Pro4	Sleep State Workabout Pro G2 and Workabout Pro3	Sleep State on Workabout Pro4
23		System data bus	Not connected, floating		
24		System address bus	Not connected, floating		
25		System data bus	Not connected, floating		
26		System address bus	Not connected, floating		
27		System data bus	Not connected, floating		
28		System address bus	Not connected, floating		
29		System data bus	Not connected, floating		
30		System address bus	Not connected, floating		
31		System data bus	Not connected, floating		
32		System address bus	Not connected, floating		
33		System data bus	Not connected, floating		
34		System address bus	Not connected, floating		
35		System data bus	Not connected, floating		
36		System address bus	Not connected, floating		
37		System data bus	Not connected, floating		
38		System address bus	Not connected, floating		
39	GND	Ground	Ground		
40	GND	Ground	Ground		
41		PCMCIA wait	Not connected, floating		
42		System address bus	Not connected, floating		
43		PCMCIA IOIS16	Not connected, floating		
44		System address bus	Not connected, floating		
45		PCMCIA REG	Not connected, floating		
46		System address bus	Not connected, floating		
47		PCMCIA OE	Not connected, floating		
48		System address bus	Not connected, floating		
49		PCMCIA WE	Not connected, floating		
50		System address bus	Not connected, floating		
51		PCMCIA IOR	Not connected, floating		
52		System address bus	Not connected, floating		
53		PCMCIA	Not connected, floating		
54		System address bus	Not connected, floating		
55		Socket select	Not connected, floating		

Pin	Name	Function on Workabout Pro G2 and Workabout Pro3	Function on Workabout Pro4	Sleep State Workabout Pro G2 and Workabout Pro3	Sleep State on Workabout Pro4
56		System address bus	Not connected, floating		
57	GND	Ground	Ground		
58	GND	Ground	Ground		
59		PCMCIA CE1	Not connected, floating		
60		System address bus	Not connected, floating		
61		PCMCIA CE2	Not connected, floating		
62		System address bus	Not connected, floating		
63	InputPin63	GPIO *or* PCMCIA slot ready	GPIO Interrupt capable		
64	InputPin64	GPIO	GPIO		
65	InputPin65	GPIO *or* PCMCIA slot card detect	GPIO Interrupt capable		
66	InputPin66	GPIO	GPIO		
67	OutputPin67	GPIO *or* PCMCIA slot reset	GPIO		State maintained
68		Peripheral ready	Not connected, floating		
69	OutputPin69	GPIO *or* PCMCIA slot power select	GPIO		State maintained
70	OutputPin70	GPIO *or* PCMCIA slot power enable	GPIO		State maintained
71	OutputPin71	GPIO	GPIO		State maintained
72	OutputPin72	GPIO *or* PCMCIA slot buffer enable	GPIO		State maintained
73	InputPin73	GPIO	GPIO		
74	OutputPin74	GPIO	GPIO		State maintained
75	InputPin75	GPIO	GPIO		
76	OutputPin76	GPIO	GPIO		State maintained
77	GND	Ground	Ground		
78	GND	Ground	Ground		
79	WAKEUP	u-P GPI	Wake Up signal		
80	USB_H_D+	USB host port 1 D+	FS USB host D+		

Pin	Name	Function on Workabout Pro G2 and Workabout Pro3	Function on Workabout Pro4	Sleep State Workabout Pro G2 and Workabout Pro3	Sleep State on Workabout Pro4
81	FF_RXD	UART RXD	UART RxD		
82	USB_H_D-	USB host port 1 D-	FS USB host D-		
83	FF_TXD	UART TXD	UART TxD		High
84	GND	Ground	Ground		
85	FF_CTS	UART CTS	UART CTS		
86	NC1		Not connected, floating		
87	FF_DCD	UART DCD	UART DCD		
88	USB_H_PE	USB host power enable	USB host power enable		
89	FF_DSR	UART DSR	UART DSR		
90	OutputPin90	GPIO	GPIO		State maintained
91	FF_RI	UART RI	UART RI		
92	OutputPin92	GPIO	GPIO		State maintained
93	FF_DTR	UART DTR	UART DTR		High
94	OutputPin94	GPIO	GPIO		State maintained
95	FF_RTS	UART RTS	UART RTS		High
96	InputPin96	GPIO	GPIO		
97		DC power	Not connected, floating		
98	I2C_SDA	I2C data	I2C data		
99		DC power	Not connected, floating		
100	I2C_SCL	I2C clock	I2C clock		

I2C Bus (Pins 98 and 100)

Speed on Workabout Pro G2 and Workabout Pro3: 100 kHz.

Speed on Workabout Pro4: 400 kHz.

Power to the 100-Pin Connector

Workabout Pro G2 and Workabout Pro3

Expansion power is on at all times, even when the battery is removed. There is no API for controlling expansion power.

Workabout Pro4

Expansion power is turned off at these times:

- When the battery door is opened while the Workabout Pro4 is powered up.
- When the battery is removed.
- When the battery power is very low while the Workabout Pro4 is in suspend mode.
- During a reset.

  Power is applied to the 100-pin connector as the Workabout Pro4 reboots; however, if no EEPROM is detected, and no expansion-related registry keys are set, power is turned off again.

Expansion power can be controlled and queried using the ExpansionPower namespace.

GPIO

Effect of expansion power on GPIO pins on the Workabout Pro4

If expansion power is not present, all outputs are Hi-Z and the output pins are left in their last known state. All input pins are pulled high.

When expansion power is restored, output pins are returned to their last configured state. Input pins are pulled high unless the expansion device is pulling them low.

Comparison of GPIO settings for Workabout Pro4 and earlier versions

		Default State		Suspend Mode or Sleep Mode	
Pin Number	Input / Output	Workabout Pro G2 and Workabout Pro3	Workabout Pro4	Workabout Pro G2 and Workabout Pro3	Workabout Pro4
63	Input	Low	Low		
64	Input	Low	Low		
65	Input	Low	Low		
66	Input	Low	Low		
67	Output	Low	Low	Low	State maintained. Default if not configured
69	Output	Low	Low	Hi-Z	State maintained. Default if not configured
70	Output	Low	Low		State maintained. Default if not configured
71	Output	Low	Low		State maintained. Default if not configured
72	Output	Low	High	High	State maintained. Default if not configured

		Default State		Suspend Mode or Sleep Mode	
Pin Number	Input / Output	Workabout Pro G2 and Workabout Pro3	Workabout Pro4	Workabout Pro G2 and Workabout Pro3	Workabout Pro4
73	Input	Low	Low		
74	Output	Low	High		State maintained. Default if not configured
75	Input	Low	Low		
76	Output	Low	Low	Hi-Z	State maintained. Default if not configured
90	Output	Low	Low		State maintained. Default if not configured
92	Output	Low	Low		State maintained. Default if not configured
94	Output	Low	Low		State maintained. Default if not configured
96	Input	Low	Low		

CHAPTER 6 SCANNER CONNECTOR

Scanner Connector Location

For the location of the scanner connector on the main logic board see Comparison of Socket Positions on page 1-3.

Scanner Connector Pinout

The pinout for the scanner connector is identical to the pinout for the scanner connector on the Workabout Pro G2 and the Workabout Pro3.

Pin	Name	Function on Workabout Pro G2 and Workabout Pro3	Function on Workabout Pro4
1	BAR_5V	+5 V bar code supply. Switchable.[1]	+5 V bar code supply Switchable[1]
2	BAR_5V	+5 V bar code supply. Switchable.[1]	+5 V bar code supply Switchable[1]
3	BAR_TXD	Data from Workabout Pro4 to scanner device.	Data from Workabout Pro4 to scanner device
4	USB_H_D-	USB host port 2 D-.	USB host port 2 D-
5	BAR_RXD	Data from scanner device to Workabout Pro3.	Data from scanner device to Workabout Pro4
6	USB_H_D+	USB host port 2 D+.	USB host port 2 D+
7	BAR_CTS	CTS from scanner device to Workabout Pro3.	CTS from scanner device to Workabout Pro4
8	GND	Ground.	Ground
9	BAR_RTS	RTS from Workabout Pro4 to scanner device.	RTS from Workabout Pro4 to scanner device
10	BAR_3V3	Switchable.[1] Short circuit to ground detection for backward compatibility.[1]	Switchable[1] Short circuit to ground detection for backward compatibility
11	GND	Ground.	Ground
12	GND	Ground.	Ground
13	KSCAN_R2	Keyboard row.	Keyboard row
14	BAR_3V3	3.3 V power supply. Switchable.[1]	3.3 V power supply. Switchable[1]
15	KSCAN_C7	Keyboard column.	Keyboard column
16	BAR_PWRDWN	Power-down from scanner device to Workabout Pro3.	Power-down from scanner device to Workabout Pro4
17	BAR_TYPE	Not used.	Not used
18	nBAR_WKUP	Wakeup signal to scanner device.	Wakeup signal to scanner device

Pin	Name	Function on Workabout Pro G2 and Workabout Pro3	Function on Workabout Pro4
19	BAR_3V3	Switchable.[1] Short circuit to ground detection for backward compatibility.	Switchable[1] Short circuit to ground detection for backward compatibility
20	nBAR_TRIG	Trigger signal to scanner device.	Trigger signal to scanner device
21	GND	Ground.	Ground
22	GND	Ground.	Ground

Notes:

1: When controlled through software, pins 1, 2, 10, 14, and 19 are switched on and off together.

CHAPTER 7 USB CONNECTOR

USB Connector Location

For the location of the USB connector on the main logic board see Comparison of Socket Positions on page 1-3

Block Diagrams

Figure 7-1 *Workabout Pro4 Internal USB Connector Block Diagram*

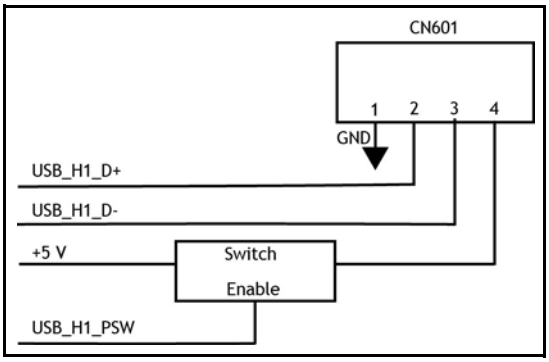
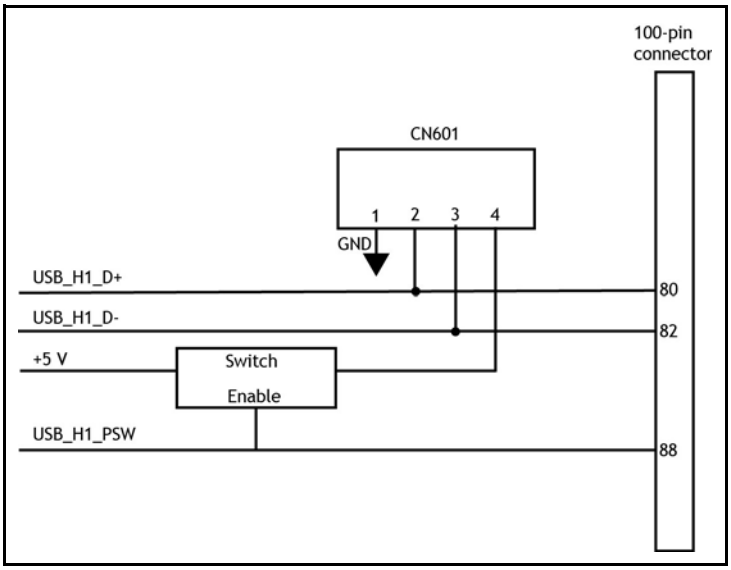


Figure 7-2 *Workabout Pro G2 and Workabout Pro3 Internal USB Connector Block Diagram*



Internal USB Connector Pinout

The pinout for the USB connector on the Workabout Pro4 is identical to the pinout for the USB connector on the Workabout Pro G2 and the Workabout Pro3; however, on the Workabout Pro4 it does not share a USB port with the 100-pin connector.

Table 7-1 *Pinout Of The Internal USB Connector*

Pin	Name	Description
1	Ground	
2	USB_H1_D+	USB host port 1 D+
3	USB_H1_D-	USB host port 1 D-
4	USB_H1_PSW	USB host power enable

CHAPTER 8 AUDIO CONNECTOR

Audio Connector Location

For the location of the audio connector on the main logic board see Comparison of Socket Positions on page 1-3.

Audio Connector Pinout

The pinout for the audio connector on the Workabout Pro4 is identical to the pinout for the audio connector on the Workabout Pro G2 and the Workabout Pro3.

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