Electrical Interface (16-Pin) Signals for Palm™ Handhelds

(Universal Interface System)

March 4, 2002

Universal Interface General Guidelines

Electrical Interface (16-Pin) Signals for Palm™ Handhelds

When viewing the handheld's front, the pins are defined 1 to 16 from left to right.

The handheld's 16-pin connector has USB slave, serial (TIA/EIA-232) and some additional signals to support detecting a peripheral attachment/detachment with a Peripheral ID category.

Note: The USB and the TIA/EIA-232 interfaces cannot be used at the same time.

PIN#	Signal Name	Function
1	GND	Shield Ground, Charging Ground
2	USB_D+	USB D+ signal Slave for synchronization to PC. Not a Master for peripheral attachments.
3	USB_D-	USB D- signal Slave for synchronization to PC. Not a Master for peripheral attachments.
4	VBUS	USB Vbus Slave for synchronization to PC. Not a Master for peripheral attachments.
5	HS_IRQ	Wakes handheld. The HotSync® button momentarily connects this pin to Pin-9. Produces a HotSync Interrupt Notification in the Palm OS 4.0 for applications to use to detect the presence of their peripheral.
6	unused	Not connected. Palm reserves for future use.
7	SG	Signal Ground
8	ID	Peripheral ID: a peripheral must tie this to the appropriate 1% value resistor connected to ground. Complete List of Possible Categories of Peripherals: USB Cradle: short RS-232 Cradle 7.5 K ohm Mfg. Test Cradle 20 K ohm USB Peripheral 47 K ohm Note: For now no handheld has the hardware to support this feature. RS-232 Peripheral 100 K ohm Modem: 220 K ohm Undocked: open (>10,000 K ohm)
9	VOUT	Regulated Voltage out: 3.3 V+-0.2V at 100mA. From VCC. Note that it is the responsibility of the peripheral attachment to manage the following: never draw more than 100mA (exceeding this may damage the Palm handheld), drawing 100mA continuously significantly shortens the handheld's working time, and **do not draw current** while the Palm handheld is in a low battery condition. **SPECIAL NOTE:** Rechargeable Palm handhelds can supply 100mA from here while they are supplying 200mA to the Expansion Slot interface, but Palm handhelds that use Alkaline cells (lower load capability) cannot.
10	RXD (in)	Receive Data: from peripheral to handheld. (When not active the transceiver pin is in tristate.)
11	TXD (out)	Transmit Data: from handheld to peripheral. (When not active the transceiver pin is in tristate.)
12	DETECT	Peripheral Attach/Detach detection: a peripheral must tie this pin to Pin-7 (SG).
13	CTS (in)	Clear To Send: hardware flow control handshake signal. (When not active the transceiver pin is in tristate.)
14	RTS (out)	Request To Send: hardware flow control handshake signal. (When not active the transceiver pin is in tristate.)
15	DTR (out)	Transmit Data: from handheld to peripheral. (When not active the transceiver pin is in tristate.)
16	VCHRG (in)	Used for handhelds with rechargeable cell(s). Positive terminal for the external DC supply that powers the internal charging circuit that charges the Li-Ion Polymer cell (which comes with a protection circuit).

Palm performs ESD tests: +-4KV contact and +-8KV air gap.

Electrical Interface Signals for Palm™ Handhelds

Palm™ m500, Palm™ m505, Palm™ m515

When viewing the handheld front, the pins are defined 1 to 16 from left to right. The handheld's 16-pin connector has USB slave, serial (TIA/EIA-232) and some additional signals to support detecting a peripheral attachment/detachment with a Peripheral ID category. Note: The USB and the TIA/EIA-232 interfaces cannot be used at the same time.

PIN#	Signal Name	Function
1	GND	Shield Ground, Charging Ground (Internally connected to Pin-7)
2	USB_D+	USB D+ signal Slave for synchronization to PC. Not a Master for peripheral attachments. Connects to U7 Pin-2.
3	USB_D-	USB D- signal Slave for synchronization to PC. Not a Master for peripheral attachments. Connects to U7 Pin-6.
4	VBUS	USB VBUS Slave for synchronization to PC. Not a Master for peripheral attachments. Connects to U2 Pin-19
5	HS_IRQ	Wakes handheld. The HotSync® button momentarily connects this pin to Pin-9. Produces a HotSync Interrupt Notification in the Palm OS 4.0 for applications to use to detect the presence of their peripheral. Load resistance range 104,500 – 115,500 ohms
6	unused	Not Connected. Palm reserves for future use.
7	SG	Signal Ground (Internally connected to Pin-1)
8	ID	Peripheral ID: a peripheral must tie this to the appropriate 1% value resistor connected to ground. List of Supported Categories of Peripherals: USB Cradle: short RS-232 Cradle 7.5 K ohm Mfg. Test Cradle 20 K ohm RS-232 Peripheral 100 K ohm Modem: 220 K ohm Undocked: open (>10,000 K ohm)
9	VOUT	Regulated Voltage out: 3.3 V+-0.2V at 100mA. From VCC (U12). Note that it is the responsibility of the peripheral attachment to manage the following: never draw more than 100mA (exceeding this may damage the Palm handheld), drawing 100mA continuously significantly shortens the handheld's working time, and **do not draw current** while the Palm handheld is in a low battery condition.
10	RXD (in)	Receive Data: from peripheral to handheld. Connects to U11 Pin-13. Load resistance range 3K – 7K ohms. (When not active the transceiver pin is in tristate.)
11	TXD (out)	Transmit Data: from handheld to peripheral. Connects to U11 Pin-15. Drives 3K ohms to +-5 Volts (When not active the transceiver pin is in tristate.)
12	DETECT	Peripheral Attach/Detach detection: a peripheral must tie this pin to Pin-7 (SG).
13	CTS (in)	Clear To Send: hardware flow control handshake signal. Connects to U11 Pin-14. Load resistance range 3K – 7K ohms (When not active the transceiver pin is in tristate.)
14	RTS (out)	Request To Send: hardware flow control handshake signal. Connects to U11 Pin-16. Drives 3K ohms to +-5 Volts (When not active the transceiver pin is in tristate.)
15	DTR (out)	Transmit Data: from handheld to peripheral. Connects to U11 Pin-17. Drives 3K ohms to +-5 Volts (When not active the transceiver pin is in tristate.)
16	VCHRG (in)	Positive terminal for the external DC supply that powers the internal charging circuit that charges the Li-Ion Polymer cell (which comes with a protection circuit). Input: 5.0 VDC+-5% @ 1.0 A Receives the output of the approved Palm charger (Motorola model R410510 power supply).

Voltage Regulator:	U12	Linear Technology LTC1878EMS8#TR
Transceiver:	U11	Maxim MAX3386ECUP, Sipex SP3203ECY -- (both are rated +-15KV air ESD)
VBUS:	U2	Philips PDIUSBD12 (slave, so a USB peripheral attachment is not possible)
USB_D:	U7	Analog Devices ADG722BRM, Maxim MAX4642EUA

Palm performed ESD tests: +-4KV contact and +-8KV air gap.

Electrical Interface Signals for Palm™ Handhelds

Palm™ m125

When viewing the handheld's front, the pins are defined 1 to 16 from left to right. The handheld's 16-pin connector has USB slave, serial (TIA/EIA-232) and some additional signals to support detecting a peripheral attachment/detachment with a Peripheral ID category. Note: The USB and the TIA/EIA-232 interfaces cannot be used at the same time.

PIN#	Signal Name	Function
1	GND	Shield Ground, Charging Ground (Internally connected to Pin-7)
2	USB_D+	USB D+ signal Slave for synchronization to PC. Not a Master for peripheral attachments. Connects to U804 Pin-2.
3	USB_D-	USB D- signal Slave for synchronization to PC. Not a Master for peripheral attachments. Connects to U804 Pin-6.
4	VBUS	USB VBUS Slave for synchronization to PC. Not a Master for peripheral attachments. Connects to U801 Pin-19
5	HS_IRQ	Wakes handheld. The HotSync® button momentarily connects this Pin to Pin-9. Produces a HotSync Interrupt Notification in the Palm OS 4.0 for applications to use to detect the presence of their peripheral. Load resistance range 18K – 22K ohms
6	unused	Not Connected. Palm reserves for future use.
7	SG	Signal Ground (Internally connected to Pin-1)
8	ID	Peripheral ID: a peripheral must tie this to the appropriate 1% value resistor connected to ground. List of Supported Categories of Peripherals: USB Cradle: short RS-232 Cradle 7.5 K ohm Mfg. Test Cradle 20 K ohm RS-232 Peripheral 100 K ohm Modem: 220 K ohm Undocked: open (>10,000 K ohm)
9	VOUT	Regulated Voltage out: 3.3 V+-0.2V at 10mA. From VCC (VR601). Note that it is the responsibility of the peripheral attachment to manage the following: never draw more than **10mA** (drawing over 100mA may damage the Palm handheld), and **do not draw current** while the Palm handheld is in a low battery condition. **SPECIAL NOTE:** This Palm handheld uses Alkaline cells (lower load capability than Li-Ion Polymer cells), the limit on maximum total current draw from here plus the Expansion Slot interface is 200mA.
10	RXD (in)	Receive Data: from peripheral to handheld. Connects to U805 Pin-14. Load resistance range 3K – 7K ohms. (When not active the transceiver pin is in tristate.)
11	TXD (out)	Transmit Data: from handheld to peripheral. Connects to U805 Pin-17. Drives 3K ohms to +-5 Volts (When not active the transceiver pin is in tristate.)
12	DETECT	Peripheral Attach/Detach detection: a peripheral must tie this pin to Pin-7 (SG).
13	CTS (in)	Clear To Send: hardware flow control handshake signal. Connects to U805 Pin-13. Load resistance range 3K – 7K ohms (When not active the transceiver pin is in tristate.)
14	RTS (out)	Request To Send: hardware flow control handshake signal. Connects to U805 Pin-16. Drives 3K ohms to +-5 Volts (When not active the transceiver pin is in tristate.)
15	DTR (out)	Transmit Data: from handheld to peripheral. Connects to U805 Pin-15. Drives 3K ohms to +-5 Volts (When not active the transceiver pin is in tristate.)
16	unused	Not Connected. Palm uses for handhelds with rechargeable cells

Voltage Regulator:	VR601	Texas Instruments TPS61006
Transceiver:	U805	Maxim MAX3386ECUP, Sipex SP3203ECY -- (both are rated +-15KV air ESD)
VBUS:	U801	Philips PDIUSBD12 (slave, so a USB peripheral attachment is not possible)
USB_D:	U804	Analog Devices ADG722BRM, Maxim MAX4642EUA

Palm performed ESD tests: +-4KV contact and +-8KV air gap.

When viewing the handheld front, the pins are defined 1 to 16 from left to right. The handheld's 16-pin connector has USB slave, serial (TIA/EIA-232) and some additional signals to support detecting a peripheral attachment/detachment with a Peripheral ID category. Note: The USB and the TIA/EIA-232 interfaces cannot be used at the same time.

PIN#	Signal Name	Function
1	GND	Shield Ground, Charging Ground (Internally connected to Pin-7)
2	USB_D+	USB D+ signal Slave for synchronization to PC. Not a Master for peripheral attachments. Connects to U605 Pin-2.
3	USB_D-	USB D- signal Slave for synchronization to PC. Not a Master for peripheral attachments. Connects to U605 Pin-6.
4	VBUS	USB VBUS Slave for synchronization to PC. Not a Master for peripheral attachments. Connects to U602 Pin-19
5	HS_IRQ	Wakes handheld. The HotSync® button momentarily connects this pin to Pin-9. Produces a HotSync Interrupt Notification in the Palm OS 4.0 for applications to use to detect the presence of their peripheral. Load resistance range 18K – 22K ohms
6	unused	Not Connected. Palm reserves for future use.
7	SG	Signal Ground (Internally connected to Pin-1)
8	ID	Peripheral ID: a peripheral must tie this to the appropriate 1% value resistor connected to ground. List of Supported Categories of Peripherals: USB Cradle: short RS-232 Cradle 7.5 K ohm Mfg. Test Cradle 20 K ohm RS-232 Peripheral 100 K ohm Modem: 220 K ohm Undocked: open (>10,000 K ohm)
9	VOUT	Regulated Voltage out: 3.3 V+-0.2V at 100mA. From VCC (U12). Note that it is the responsibility of the peripheral attachment to manage the following: never draw more than 100mA (exceeding this may damage the Palm handheld), drawing 100mA continuously significantly shortens the handheld's working time, and **do not draw current** while the Palm handheld is in a low battery condition.
10	RXD (in)	Receive Data: from peripheral to handheld. Connects to U601 Pin-13. Load resistance range 3K – 7K ohms. (When not active the transceiver pin is in tristate.)
11	TXD (out)	Transmit Data: from handheld to peripheral. Connects to U601 Pin-15. Drives 3K ohms to +-5 Volts (When not active the transceiver pin is in tristate.)
12	DETECT	Peripheral Attach/Detach detection: a peripheral must tie this pin to Pin-7 (SG).
13	CTS (in)	Clear To Send: hardware flow control handshake signal. Connects to U601 Pin-14. Load resistance range 3K – 7K ohms (When not active the transceiver pin is in tristate.)
14	RTS (out)	Request To Send: hardware flow control handshake signal. Connects to U601 Pin-16. Drives 3K ohms to +-5 Volts (When not active the transceiver pin is in tristate.)
15	DTR (out)	Transmit Data: from handheld to peripheral. Connects to U601 Pin-17. Drives 3K ohms to +-5 Volts (When not active the transceiver pin is in tristate.)
16	VCHRG (in)	Positive terminal for the external DC supply that powers the internal charging circuit that charges the Li-Ion Polymer cell (which comes with a protection circuit). Input: 5.0 VDC+-5% @ 1.0 A Receives the output of the approved Palm charger (Motorola model R410510 power supply).

Voltage Regulator:	U801	Linear Technology LTC1878EMS8#TR
Transceiver:	U601	Maxim MAX3386ECUP, Sipex SP3203ECY -- (both are rated +-15KV air ESD)
VBUS:	U602	Philips PDIUSBD12 (slave, so a USB peripheral attachment is not possible)
USB_D:	U605	Analog Devices ADG722BRM, Maxim MAX4642EUA

Palm performed ESD tests: +-4KV contact and +-8KV air gap.

Electrical Interface Signals for Palm™ Handhelds

Palm™ m130

When viewing the handheld's front, the pins are defined 1 to 16 from left to right. The handheld's 16-pin connector has USB slave, serial (TIA/EIA-232) and some additional signals to support detecting a peripheral attachment/detachment with a Peripheral ID category. Note: The USB and the TIA/EIA-232 interfaces cannot be used at the same time.

PIN#	Signal Name	Function
1	GND	Shield Ground, Charging Ground (Internally connected to Pin-7)
2	USB_D+	USB D+ signal Slave for synchronization to PC. Not a Master for peripheral attachments. Connects to U11 Pin-66.
3	USB_D-	USB D- signal Slave for synchronization to PC. Not a Master for peripheral attachments. Connects to U11 Pin-65.
4	VBUS	USB VBUS Slave for synchronization to PC. Not a Master for peripheral attachments. Connects to U3 Pin-61.
5	HS_IRQ	Wakes handheld. The HotSync® button momentarily connects this Pin to Pin-9. Produces a HotSync Interrupt Notification in the Palm OS 4.0 for applications to use to detect the presence of their peripheral. Load resistance range 18K – 22K ohms
6	unused	Not Connected. Palm reserves for future use.
7	SG	Signal Ground (Internally connected to Pin-1)
8	ID	Peripheral ID: a peripheral must tie this to the appropriate 1% value resistor connected to ground. List of Supported Categories of Peripherals: USB Cradle: short RS-232 Cradle 7.5 K ohm Mfg. Test Cradle 20 K ohm RS-232 Peripheral 100 K ohm Modem: 220 K ohm Undocked: open (>10,000 K ohm)
9	VOUT	Regulated Voltage out: 3.3 V+-0.2V at 100mA. From VCC (U6).). Note that it is the responsibility of the peripheral attachment to manage the following: never draw more than 100mA (exceeding this may damage the Palm handheld), drawing 100mA continuously significantly shortens the handheld's working time, and **do not draw current** while the Palm handheld is in a low battery condition.
10	RXD (in)	Receive Data: from peripheral to handheld. Connects to U16 Pin-16. Load resistance range 3K – 7K ohms. (When not active the transceiver pin is in tristate.)
11	TXD (out)	Transmit Data: from handheld to peripheral. Connects to U16 Pin-21. Drives 3K ohms to +-5 Volts (When not active the transceiver pin is in tristate.)
12	DETECT	Peripheral Attach/Detach detection: a peripheral must tie this pin to Pin-7 (SG).
13	CTS (in)	Clear To Send: hardware flow control handshake signal. Connects to U16 Pin-17. Load resistance range 3K – 7K ohms (When not active the transceiver pin is in tristate.)
14	RTS (out)	Request To Send: hardware flow control handshake signal. Connects to U16 Pin-20. Drives 3K ohms to +-5 Volts (When not active the transceiver pin is in tristate.)
15	DTR (out)	Transmit Data: from handheld to peripheral. Connects to U16 Pin-19. Drives 3K ohms to +-5 Volts (When not active the transceiver pin is in tristate.)
16	VCHRG (in)	Positive terminal for the external DC supply that powers the internal charging circuit that charges the Li-Ion Polymer cell (which comes with a protection circuit). Input: 5.0 VDC+-5% @ 1.0 A Receives the output of the approved Palm charger (Motorola model R410510 power supply).

Voltage Regulator:	U6	Maxim MAX1698
Transceiver:	U16	Maxim MAX3389ECUG
VBUS:	U3	Motorola MC68VZ328PV33V
USB_D:	U11	MediaQ MQ1100

Palm performed ESD tests: +-4KV contact and +-8KV air gap.