

Overo Series Signals and Connectors

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Connector J1 (70-pin): LCD, PWM & Analog Signals

The Signals Document provides a detailed reference for all external electrical signals from the Overo COM. See "[downloads](#)".

Design Notes for Connector J1:

Connector (J1) is one of the 2 x 70-pin connectors located on the bottom of each Overo COM.

1. All logic is at 1.8V.
2. The input range of the supply voltage is approximately 3.3V – 4.2V.
3. The signals of connectors J1 are connected directly to the OMAP35xx without buffers.
4. USBOTG interface supports high speed USB (480MBs).
5. Pin 8 was incorrectly labeled as GPIO127_TS_IRQ. Pin 8 is now correctly labeled as GPIO_10.
6. Pin 14 was incorrectly labeled as GPIO128_GPS_PPS. Pin 14 is now correctly labeled as GPIO_186.
7. The physical location of pin 1 of the J1 connector can be found in the layout information posted at pubs.gumstix.com (see COMs section).
8. Some notes re JTAG and J1-9 (GPIO_31) have been linked below.
9. Last update on Sept 22, 2011 re pin 62 and pin 63.

Comments	Signal	Pin	Pin	Signal	Comments
Use to trigger hard reset (i.e. power-on reset).	N_MANUAL_RESET	1	70	GND	
	GPIO71_L_DD01	2	69	HSORF	
	GPIO70_L_DD00	3	68	HSOLF	
	GPIO73_L_DD03	4	67	VSYSTEM	board supply: 3.3V - 4.2V
	GPIO75_L_DD05	5	66	VSYSTEM	board supply: 3.3V - 4.2V
	GPIO72_L_DD02	6	65	POWERON	Connected to PWRON on PMIC
	GPIO74_L_DD04	7	64	ADCIN7	

	GPIO_10	8	63	TV_OUT1	Connected on Overo COMs R3265 and higher
<ul style="list-style-type: none"> COMs R2173 to R2516: J1 pin 9 is GPIO0_WAKEUP; GPIO31 goes to a test point on the board only. COMs > R2606: J1 pin 9 is GPIO31_WAKEUP. GPIO0 is used as the IRQ from the PMIC. 	GPIO0_WAKEUP	9	62	TV_OUT2	Connected on Overo COMs R3265 and higher
	GPIO185_I2C3_SDA	10	61	GPIO93_L_DD23	
	GPIO80_L_DD10	11	60	GPIO82_L_DD12	
	GPIO81_L_DD11	12	59	SYSEN	Connected to SYSEN on PMIC
	GPIO184_I2C3_SCL	13	58	ADCIN2	
	GPIO_186	14	57	MIC_MAIN_MF	
	GPIO92_L_DD22	15	56	GND	
	GPIO147_GPT8_PWM	16	55	GPIO145_GPT10_PWM	
	GPIO83_L_DD13	17	54	USBOTG_VBUS	power out from the PMIC
	GPIO144_GPT9_PWM	18	53	ADCIN6	
	GPIO84_L_DD14	19	52	VBACKUP	Backup battery input to PMIC
	GPIO85_L_DD15	20	51	ADCIN5	
	GPIO146_GPT11_PWM	21	50	AGND	

	GPIO163_IR_CTS3	22	49	PWM1	
	GPIO91_L_DD21	23	48	ADCIN3	
	GPIO87_L_DD17	24	47	GPIO170_HDQ_1WIRE	
	GPIO88_L_DD18	25	46	USBOTG_ID	
	GPIO166_IR_TXD3	26	45	GPIO90_L_DD20	
	GPIO89_L_DD19	27	44	GPIO86_L_DD16	
	GPIO79_L_DD09	28	43	GPIO69_L_BIAS	
	GPIO77_L_DD07	29	42	PWM0	
	GPIO78_L_DD08	30	41	AUXRF	
	GPIO165_IR_RXD3	31	40	ADCIN4	
	GPIO66_L_PCLK	32	39	MIC_SUB_MF	
	GPIO76_L_DD06	33	38	AUXLF	
	GPIO68_L_FCLK	34	37	USBOTG_DM	
	GPIO67_L_LCLK	35	36	USBOTG_DP	

Connector J4 (70-pin): Extended Memory Bus & MMC Signals

The Signals Document, posted as a download on this page, provides a detailed reference for all external electrical signals from the Overo COM.

Design Notes for Connector J4:

1. All logic is at 1.8V
2. The input range of the supply voltage is approximately 3.3V – 4.2V.
3. The signals of connectors J1, J4 and J5 are connected directly to the OMAP35xx without buffers.
4. The signals named EM_x are connected to the OMAP GPMC interface (named GPMC_x in OMAP documents).
5. USBH interface supports high speed USB (480MBs).

6. J4-46 (4030GP2_N_MMC3_CD) = Card Detect signal for MMC3. It comes from the PMIC. Expansion board schematics may refer to pin 46 as GPIO149_MMC3_CD. The correct signal name, as shown in this table, is 4030GP2_N_MMC3_CD.
7. The physical location of pin 1 of the J1 connector can be found in the layout information posted at pubs.gumstix.com (see COMs section)
8. Last update Sept 22nd, 2011

Comments	Signal	Pin	Pin	Signal	Comments
board supply: 3.3V - 4.2V	VSYSTEM	1	70	EM_CLK	
board supply: 3.3V - 4.2V	VSYSTEM	2	69	EM_NBE1	
	GND	3	68	EM_WAIT0	
	EM_NCS5_ETH0	4	67	EM_NCS6	
	EM_NCS4	5	66	EM_NCS0	
	EM_NWE	6	65	EM_NBE0	
	EM_NADV_AL E	7	64	EM_NCS1	
	EM_NOE	8	63	EM_NWP	
	GPIO65_ETH1 _IRQ1	9	62	EM_A9	
	GPIO64_ETH0 _NRESET	10	61	EM_A4	
	EM_A2	11	60	EM_A10	
	EM_A8	12	59	EM_A3	
	EM_A5	13	58	EM_A1	
	EM_A7	14	57	EM_A6	
	EM_D2	15	56	EM_D0	
	EM_D10	16	55	EM_D9	
	EM_D3	17	54	EM_D8	
	EM_D11	18	53	EM_D1	
	EM_D4	19	52	EM_D13	

	EM_D12	20	51	EM_D6	
	EM_D5	21	50	EM_D14	
	EM_D15	22	49	EM_D7	
	GPIO13_MMC3_CMD	23	48	GPIO151_RXD1	
	GPIO148_TXD1	24	47	GPIO150_MMC3_WP	
	GPIO176_ETH0_IRQ	25	46	4030GP2_N_MMC3_CD	Card Detect signal for MMC3. Comes from PMIC
	GPIO18_MMC3_D0	26	45	GPIO173_SPI1_MISO	
	GPIO174_SPI1_CS0	27	44	GPIO172_SPI1_MOSI	
	GPIO168_USBH_CPEN	28	43	GPIO171_SPI1_CLK	
	GPIO14_MMC3_DAT4	29	42	GPIO175_SPI1_CS1	
	GPIO21_MMC3_DAT7	30	41	GPIO114_SPI1_NIRQ	
	GPIO17_MMC3_D3	31	40	GPIO12_MMC3_CLK	
power in from expansion board	USBH_VBUS	32	39	GPIO20_MMC3_D2	
	GND	33	38	GPIO23_MMC3_DAT5	
	USBH_DP	34	37	GPIO22_MMC3_DAT6	
	USBH_DM	35	36	GPIO19_MMC3_D1	

Connector J5 (27-pin): camera control signals

Design Notes for Connector J5:

The 27-pin connector (J5) is mounted on the top of each Overo COM.

- All logic is at 1.8V
- 1.8V power is supplied by the Overo COM for use on the camera module. This power should not be used as a general supply but only to power a level-shifting transceiver, if needed.
- The input range of the supply voltage is approximately 3.3V – 4.2V.
- VSYSTEM is power from the baseboard routed through Overo for use on camera module.
- The signals of connector J5 are connected directly to the OMAP3503 without buffers.

SIGNAL	PIN	Comment
GPIO94_CAM_HS	1	
GPIO95_CAM_VS	2	
GPIO96_CAM_XCLKA	3	
GPIO97_CAM_PCLK	4	
GPIO98_CAM_FLD	5	
GPIO99_CAM_D0	6	
GPIO100_CAM_D1	7	
GPIO101_CAM_02	8	
GPIO102_CM_D3	9	
GPIO103_CIF_DD04	10	
GPIO104_CIF_DD05	11	
GPIO105_CAM_D6	12	
GPIO106_CIF_DD07	13	
GPIO107_CIF_DD08	14	
CPIO108_CIF_DD09	15	
GPIO109_CAM_D10	16	
GPIO110_CAM_D11	17	
GPIO111_CAM_XCLKB	18	
GPIO167_CAM_WEN	19	
GPIO126_CAM_STROBE	20	
VDDS_1.8	21	

SYSEN	22	
GND	23	
VSYSTEM	24	board supply: 3.3V - 4.2V
GPIO63_CAM_IRQ	25	
GPIO184_I2C3_SCL	26	
GPIO185_I2C3_SDA	27	

Further Information:

- Connector J5 on each Overo COM is the 27-pin Hirose FH26-27S connector.
- Gumstix sells the flex ribbon cable for this J5 connector in the accessories section (cables) of www.gumstix.com, [linked here](#).
- Each end of the flex ribbon connects to a 27-pin Hirose FH26-27S connector. As such, one end would connect to the 27-pin hirose connector on the top of the Overo COM while the other end of the ribbon cable connects to the 27-pin hirose connector mounted on a camera expansion board designed for this purpose.
- The J5 connector is a bottom contact connector not top contact.
- The physical location of pin 1, 2, 26 and 27 of the J5 connector can be found in the layout information posted at pubs.gumstix.com (see [COMs section](#)).

40-Pin Header

Design Notes:

- All logic levels are 1.8V.
- Signals available on 0.100" through-holes.
- A to D converter lines run direct to the TPS65950 with a maximum 2.5V.
- The VCC_1.8 signal is generated on the expansion board.
- More information on Texas Instrument's TPS65950 ·Audio and Power Management module may be found [here](#).
- The 40-pin header is available on the Summit, Tobi, Chestnut43, Palo43, Palo35 and Gallop43 expansion boards.
- This 40-pin header is not available on any Overo COM.

Latest revisions:

April 16, 2012

- Added notes 2 and 3 to the signal table below.

May 27, 2010

- Pin 18 is now correctly labeled as GPIO_10. Pin 18 was incorrectly labeled as GPIO127_TS_IRQ.
- Pin 17 is now correctly labeled as GPIO_186. Pin 17 was incorrectly labeled as GPIO128_GPS_PPS.

February 9, 2010

- Correct VCC_1.8 information.

April 23, 2012

- Added notes 2 and 3.

Comments	Signal	Pin	Pin	Signal	Comment
.	V_BATT	40	39	ADCIN4	.
.	ADCIN3	38	37	AGND	.
.	ADCIN5	36	35	ADCIN6	.
.	ADCIN2	34	33	ADCIN7	.
.	PWM1	32	31	PWM0	.
Note 1	GPIO144_PWM9	30	29	GPIO147_PWM8	.
Note 1	GPIO145_PWM10	28	27	GPIO146_PWM11	.
.	VCC_1.8	26	25	GND	.
.	GPIO185_SDA3	24	23	GPIO184_SCL3	.
.	GPIO166_IR_TXD3	22	21	GPIO165_IR_RXD3	.
.	GPIO163_IR_CTS3	20	19	GPIO170_HDQ_1WIRE	.
.	GPIO_10	18	17	GPIO_186	.
.	VCC_1.8	16	15	GND	.
.	POWERON	14	13	GPIO[0/31]_WAKEUP	Note 2
.	VBACKUP	12	11	SYS_EN	.
Note 3	GPIO148_TXD1	10	9	GPIO151_RXD1	.
.	GPIO175_SPI1_CS1	8	7	GPIO173_SPI1_MISO	.
.	GPIO174_SPI1_CS0	6	5	GPIO172_SPI1_MOSI	.
.	GPIO114_SPI1_NIRQ	4	3	GPIO171_SPI1_CLK	.

.	VCC_3.3	2	1	GND	.
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1. GPIO144_PWM9 and GPIO145_PWM10 signals are used to drive the 4.3" and 3.5" LCD panels. Respectively, these are the "display enable" and "backlight PWM" lines.
2. GPIO0_WAKEUP becomes GPIO31_WAKEUP on all COMs post R2410.
3. On some schematics, this net is erroneously labeled GPIO158_TXD1.

60-Pin Header

Connector Notes:

- All logic levels are 1.8V.
- Signals available on 0.100" through-holes.
- A to D converter lines run direct to the TPS65950 with a maximum 2.5V.
- The VCC_1.8 signal is generated on the expansion board.
- This 60-pin header is available, not populated, on two expansion boards of the Overo series: the Pinto-TH and Thumb0.
- The 60-pin header is not available on any Overo COM.
- More information on Texas Instrument's TPS65950 Audio and Power Management module may be found [here](#).

Last revision:

May 27, 2010

- Pin 26 is now correctly labeled as GPIO_10. Pin 26 was incorrectly labeled as GPIO127_TS_IRQ.
- Pin 25 is now correctly labeled as GPIO_186. Pin 25 was incorrectly labeled as GPIO128_GPS_PPS.

February 9, 2010 to correct the VCC_1.8 information.

Comments	Signal	Pin	Pin	Signal	Comment
	GPIO18_MMC3_D0	60	59	GPIO19_MMC3_D1	
	GPIO20_MMC3_D2	58	57	GPIO17_MMC3_D3	
	GPIO14_MMC3_D4	56	55	GPIO23_MMC3_D5	
	GPIO22_MMC3_D6	54	53	GPIO21_MMC3_D7	
	GPIO13_MMC3_CLK	52	51	GPIO13_MMC3_CMD	
	GPIO150_MMC3_WP	50	49	GPIO149_MMC3_CD	

	V_BATT	48	47	ADCIN4	
	ADCIN3	46	45	AGND	
	ADCIN5	44	43	ADCIN6	
	ADCIN2	42	41	ADCIN7	
	PWM1	40	39	PWM0	
	GPIO144_PWM9	38	37	GPIO147_PWM8	
	GPIO145_PWM10	36	35	GPIO146_PWM11	
	VCC_1.8	34	33	GND	
	GPIO185_SDA3	32	31	GPIO184_SCL3	
	GPIO166_IR_TXD3	30	29	GPIO165_IR_RXD3	
	GPIO163_IR_CTS3	28	27	GPIO170_HDQ_1WIRE	
	GPIO_10	26	25	GPIO_186	
	VCC_1.8	24	23	GND	
	POWERON	22	21	GPIO0_WAKEUP	
	VBACKUP	20	19	SYS_EN	
	GPIO148_TXD1	18	17	GPIO151_RXD1	
	GPIO175_SPI1_CS1	16	15	GPIO173_SPI1_MISO	
	GPIO174_SPI1_CS0	14	13	GPIO172_SPI1_MOSI	
	GPIO114_SPI1_NIRQ	12	11	GPIO171_SPI1_CLK	
	VCC_3.3	10	9	GND	
	GPIO65	8	7	GPIO69	
	GPIO176	6	5	GPIO68	
	GPIO064	4	3	GPIO67	
	GPIO168	2	1	GPIO66	

TurtleCore Expansion Board

Information about the DB-25 connector, also known as the iRobot Create® "cargo bay connector", and other technical documentation for the Turtlecore expansion board, can be found downloaded from pubs.gumstix.com [here](#).

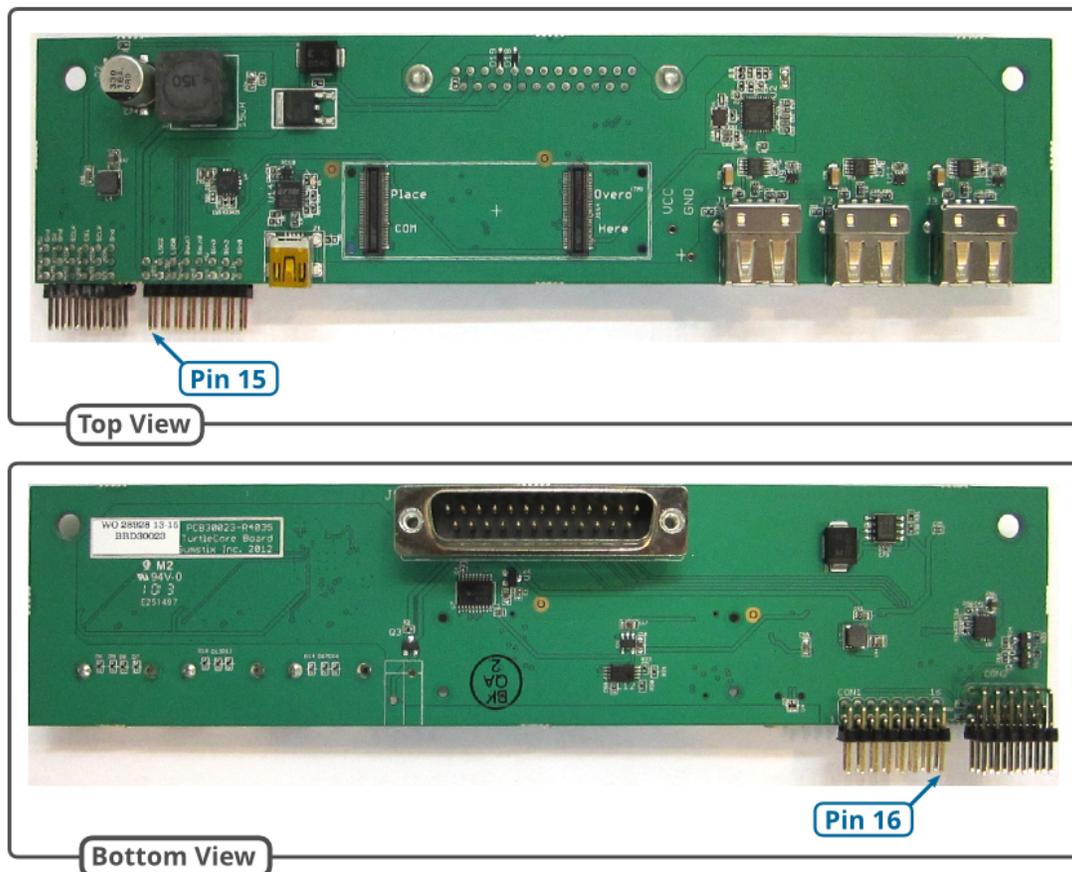
TurtleCore Power Jumper

This section is for users with board revisions R4035 and above only. Users with board revisions R3719 or R3759 should not jumper pins 15 and 16 as it will cause permanent damage to their board.

Identifying Power Pins

For the TurtleCore to power on, pins 15 and 16 of CON1 must be jumpered together. Pins 15 and 16 can be identified using the following illustration:

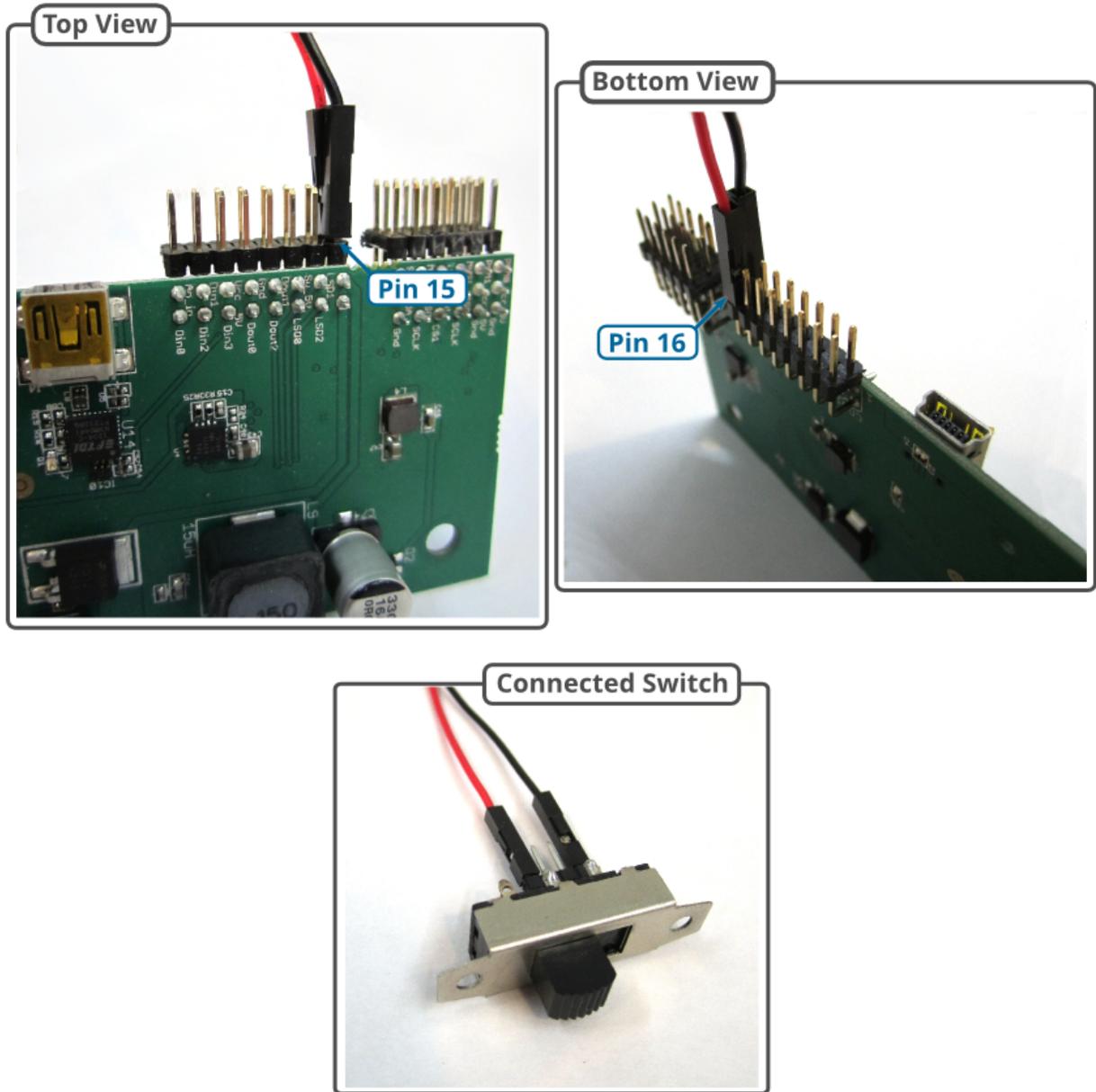
TurtleCore Expansion Board



Connecting via a Jumper or SPST Switch

The two pins must be connected with a jumper or an SPST switch. The following illustration shows the leads for a switch connected to the appropriate pins:

TurtleCore Expansion Board



Jumpered pins will cause a board to be powered any time the iRobot Create is powered on. SPST-connected pins will allow power to the TurtleCore to be controlled independently of the iRobot Create.

LCD Touch Screens

Instructional Videos

- A series of [product videos](#) has been posted at www.gumstix.com that show the connection and power up of an LCD screen to an LCD-ready expansion board of the Overo series.

Expansion boards

Review this [list of expansion boards for the Overo series](#) and look for boards marked with the LCD symbol shown here.



This LCD symbol denotes that the expansion board is "LCD-ready":

Cabling and Compatible USB Devices

The following USB products and devices are known to work. The list is by no means complete

USB Cables

- To connect the USB OTG port of an Overo expansion board to a USB hub (host mode), use the USB Mini-A to USB Mini-B adaptor cable available in the accessories at www.gumstix.com, [linked here](#).

USB Hubs

- The Dynex 4-port USB hub
- Dlink 4 port USB hub - DUBH4
- Belkin USB Bluetooth dongle DBT-122 PN - IBT122 C1G
- 3 port USB Hub with Ethernet from Special Computing (see www.specialcomp.com)
- Belkin Wireless G USB Network Adapter

Network Adaptors

- 10/100baseT Ethernet
 - Hawking HUF11 10/100 Network Adapter
- 802.11b/g
 - Trendnet TEW-424UB --customers report that their use of Trendnet has provided better range due to the external antennas.
 - Ralink Technology, Corp. RT2501USB Wireless Adapter

Other Devices Connected by Customers:

- Dodo USB 3G/HSDPA modem - Huawei Technologies Co., Ltd. E620 USB Modem

JTAG and Bootable microSD cards

Overo COMs & JTAG

Instructions for creating a bootable microSD card are in the Create bootable microSD card at the Getting Started page, [linked here](#).

Note that each Gumstix Overo COM has JTAG pads on the underside of the Overo COM, located between the two 70-pin connectors. Further information can be found in the Overo Signals Document which can be downloaded [here](#).

Information on using JTAG and J1-9 (GPIO_31) - from both Texas Instruments and a Gumstix customer: (added July 20, 2010)

- JTAG is highly usable. There is an issue to do with OMAP's JTAG emulation engine and the state of the EMU/n bits on dead-start. J1-9 (GPIO_31) needs to be pulled high on dead-start. See section 25.6.3 - Initial Scan Chain configuration (SPRUF98D-October 2009, OMAP35x Applications Processor Technical Reference Manual)
- The initial scan chain configuration of the device is determined from the level of the EMU0 and EMU1 pins on the release of the POR. At POR, EMU0 and EMU1 are automatically configured as inputs. The EMU0 and EMU1 pins should be pulled high at POR to configure the initial scan chain of the device to TAP router-only mode.

Verdex Pro COMs & JTAG

Gumstix offers a JTAG-pro expansion board for use with the verdex pro motherboards.

Verdex, Connex and Basix

Information can be found at:

http://docwiki.gumstix.com/JTAG_connector