# verdex pro Series Signals and Connectors Technical Reference


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# 24-Pin Flex Connector

FH12A-24S-0.5SH(55) Digikey part HFK124CT-ND

With a flat flex cable, it is possible to bring those functions from the 24-pin flex connector on to a custom board on the 80-pin side of the verdex pro com in order to reduce the thickness of the multi-board "sandwich".

With a flat flex cable, it is possible to bring those functions from the 24-pin flex connector on to a custom board on the 80-pin side of the verdex pro com in order to reduce the thickness of the multi-board "sandwich".

The 24-pin flex connector addresses several issues:

1. being able to get a console while the computer-on-module is otherwise in use without the physical limitations of the tweener.
2. USB Host.
3. Battery for RTC.
4. Daughtercards that need a flex connector.

Digikey sells a connector and cable that fits the 24 pin connector:

- flex connector - HFK124CT-ND
- flex cable - HFF-24U-03-ND

The part Gumstix uses on the COM is FH12A-24S-0.5SH(55) from Hirose. You can find a footprint of this connector for pcb/gEDA here (CON_FPC-50P-24C-1R-24N__Hirose_FH12-24S-0.5SH). There are many possible lengths and configurations of the interconnecting flex cables; also, you have many choices of connectors to use on your own board.

Ribbon cable: **Flat Flex Jumper**
Pitch: **0.5 mm (0.020")**
Contacts: **24**

| Pin | GPIO | ·Signal |
|---|---|---|
| 1 | GPIO(2) | ·SYS_EN |
| ·2 | ·GPIO(12) | ·BT_NRESET |
| ·3 | ·GPIO(43) | ·BT_TXD |
| ·4 | ·GPIO(42) | ·BT_RXD |
| ·5 | GPIO(44) | ·BT_CTS |

| | | |
|---|---|---|
| ·6 | ·GPIO(45) | ·BT_RTS |
| ·7 | ·GPIO(9) | ·CLK_32 |
| ·8 | · | ·GND |
| ·9 | ·GPIO(38) | ·SSPTXD3 |
| ·10 | ·GPIO(41) | · SSPRXD3_OTG_ID |
| ·11 | ·GPIO(35) | · SSPSFRM3 |
| ·12 | ·GPIO(40) | ·SSPSCLK3 |
| ·13 | ·GPIO(94) | · |
| ·14 | ·GPIO(118) | I2C_SDA |
| ·15 | ·GPIO(117) | ·I2C_SCL |
| ·16 | ·GPIO(0) | · |
| ·17 | · | USBH_P1 |
| ·18 | · | USBH_N1 |
| ·19 | ·GPIO(89) | ·USBH_PEN1 |
| ·20 | ·GPIO(88) | ·USBH_PWR1 |
| ·21 | · | ·V_BACKUP_BATT |
| ·22 | ·GPIO(47) | · IR_TXD |
| ·23 | ·GPIO(46) | ·IR_RXD |
| ·24 | · | ·V_BATT |

# Quick Capture Interface

- 80-pin Hirose connector (verdex pro COMs)
- 120-pin MOLEX connector (verdex COMs)

| | |
|---|---|
| CIF_MCLK | Quick Capture Interface Master Clock |
| CIF_PCLK | Quick Capture Interface Pixel Clock |
| CIF_FV | Quick Capture Interface Frame Synchronization (vertical sync. signal) |

| | |
|---|---|
| CIF_LV | Quick Capture Interface Line Synchronization (horizontal sync. signal) |
| CIF_DD00 | Quick Capture Interface Data |
| CIF_DD01 | |
| CIF_DD02 | |
| CIF_DD03 | |
| CIF_DD04 | |
| CIF_DD05 | |
| CIF_DD06 | |
| CIF_DD07 | |
| CIF_DD08 | |
| CIF_DD09 | |

# 60-Pin Header

Hirose DF12D(3.0)60DP0.5V80.

The 60-pin connector has 0.5mm pitch and an interboard distance of 3mm. So, working with the 60-pin connector requires using surface mount pads and techniques.

For connecting a custom-made board to a gumstix motherboard via the 60-pin hirose connector, hirose part #**DF12D(3.0)-60DP-0.5V(80)** or an acceptable variant is required on the daughtercard side. Check the datasheet to determine what part numbers would be considered acceptable variants.

Hirose #**DF12D(3.0)-60DP-0.5V(80)** (Digikey part #H2752-ND) and its metal/bossed variant, **DF12(3.0)-60DP-0.5V(80)** (Digikey part #H2755-ND), are no longer stocked by Digikey.

RoHS Replacement for #**DF12D(3.0)-60DP-0.5V(80)** (Digikey part #H2752-ND Obsolete) is #**DF12D(3.0)-60DP-0.5V(81)** (Digikey part #H5221TR-ND in stock, min.1ku)

RoHS Replacement for #**DF12(3.0)60DP0.5V(80)** (Digikey part #H2755-ND Obsolete) is #**DF12(3.0)-60DP-0.5V(86)** (Digikey part #H5224TR-ND in stock, min.1ku)

Currently in stock at Digikey is the hirose #DF12D(3.0)-60DP-0.5V(81), Digikey part #H5221CT-ND, which is priced at $3.20 in single quantities. This connector matches the physical dimensions and characteristics of the #DF12D(3.0)-60DP-0.5V(80).

If you plan on using a connector variant other than the #DF12D(3.0)-60DP-0.5V(**), be sure to check the datasheet listed above for dimensions as well, as they may vary from connector to connector.

Both the gumstix basix and the connex motherboards are 80mm x 20mm (i.e. diagonal corners at (0.00,0.00) and (80.00,20.00) and the 60-pin Hirose connector is centered at (7.00,9.25) on the primary side, oriented with its long axis parallel to the y axis.

Location on the gumstix-f motherboard is available here as PDF and here as DXF.

- link to expansion boards https://store.gumstix.com/expansion.html

verdex pro and verdex 60-pin connector:

| Pin | GPIO | Signal | Signal | GPIO | Pin |
|---|---|---|---|---|---|
| 1 | · | GND | GND | · | 60 |
| 2 | GPIO(67) | L_DD09 | USBH_N2 | · | 59 |
| 3 | GPIO(77) | L_BIAS | BITCLK | GPIO(28) | 58 |
| 4 | GPIO(61) | L_DD03 | L_PCLK | GPIO(76) | 57 |
| 5 | GPIO(30) | SDATA_OUT | L_DD15 | GPIO(73) | 56 |
| 6 | GPIO(66) | L_DD08 | L_DD14 | GPIO(72) | 55 |
| 7 | · | GND | FF_RXD | GPIO(34) | 54 |
| 8 | GPIO(71) | L_DD13 | L_DD07 | GPIO(65) | 53 |
| 9 | GPIO(70) | L_DD12 | L_DD05 | GPIO(63) | 52 |
| 10 | GPIO(69) | L_DD11 | L_DD10 | GPIO(68) | 51 |
| 11 | · | USBH_P2 | L_DD01 | GPIO(59) | 50 |
| 12 | GPIO(46) | IR_RXD | NACRESET | GPIO(113) | 49 |
| 13 | GPIO(60) | L_DD02 | IR_TXD | GPIO(47) | 48 |
| 14 | GPIO(100) | FF_CTS | L_DD04 | GPIO(62) | 47 |
| 15 | GPIO(9) | CLK_32 | SYNC | GPIO(31) | 46 |
| 16 | GPIO(75) | L_LCLK | SSPRXD2 | GPIO(11) | 45 |
| 17 | GPIO(17) | PWM1 | SSPSFRM2 | GPIO(14) | 44 |
| 18 | GPIO(58) | L_DD00 | SDATA_IN0 | GPIO(29) | 43 |
| 19 | GPIO(118) | I2C_SDA | GND | · | 42 |
| 20 | GPIO(117) | I2C_SCL | L_FCLK | GPIO(74) | 41 |

| | | | | | |
|---|---|---|---|---|---|
| 21 | GPIO(19) | SSPSCLK2 | L_DD06 | GPIO(64) | 40 |
| 22 | GPIO(87) | L_DD17 | FF_RTS | GPIO(27) | 39 |
| 23 | GPIO(13) | SSPTXD2 | · | GPIO(101) | 38 |
| 24 | GPIO(41) | OTG_ID | N_MANUAL_RESET | · | 37 |
| 25 | GPIO(2) | SYS_EN | PWM0 | GPIO(16) | 36 |
| 26 | GPIO(39) | FF_TXD | BT_TXD | GPIO(43) | 35 |
| 27 | GPIO(86) | L_DD16 | BT_RTS | GPIO(45) | 34 |
| 28 | · | V_BATT | BT_RXD | GPIO(42) | 33 |
| 29 | · | V_BATT | BT_CTS | GPIO(44) | 32 |
| 30 | · | V_BATT | GND | · | 31 |

**Note**: Schematic images and charts below are from the point of view of the gumstix looking at the connector from the daughtercard's point of view, these signals are mirrored

**Note**: This pinout is for the GS270 versions R1205, R1365, and R1511. It may be subject to change in future revisions.

## Connex/Basix

| Signal | GPIO | Pin | Signal | GPIO | Pin |
|---|---|---|---|---|---|
| GND | · | 1 | GND | · | 60 |
| L_DD09 | GPIO(67) | 2 | USB_N | · | 59 |
| L_BIAS | GPIO(77) | 3 | BITCLK | GPIO(28) | 58 |
| L_DD03 | GPIO(61) | 4 | L_PCLK | GPIO(76) | 57 |
| SDATA_OUT | GPIO(30) | 5 | L_DD15 | GPIO(73) | 56 |
| L_DD08 | GPIO(66) | 6 | L_DD14 | GPIO(72) | 55 |
| GND | · | 7 | FF_RXD | GPIO(34) | 54 |
| L_DD13 | GPIO(71) | 8 | L_DD07 | GPIO(65) | 53 |
| L_DD12 | GPIO(70) | 9 | L_DD05 | GPIO(63) | 52 |
| L_DD11 | GPIO(69) | 10 | L_DD10 | GPIO(68) | 51 |
| USB_P | · | 11 | L_DD01 | GPIO(59) | 50 |
| IR_RXD | GPIO(46) | 12 | NACRESET | · | 49 |

| | | | | | |
|---|---|---|---|---|---|
| L_DD02 | GPIO(60) | 13 | IR_TXD | GPIO(47) | 48 |
| FF_CTS | GPIO(35) | 14 | L_DD04 | GPIO(62) | 47 |
| SDATA_IN1 | GPIO(32) | 15 | SYNC | GPIO(31) | 46 |
| L_LCLK | GPIO(75) | 16 | NSSP_RXD | GPIO(84) | 45 |
| PWM(1) | GPIO(17) | 17 | NSSP_FRAME | GPIO(82) | 44 |
| L_DD00 | GPIO(58) | 18 | SDATA_IN0 | GPIO(29) | 43 |
| I2C_SDA | · | 19 | GND | · | 42 |
| I2C_SCL | · | 20 | L_FCLK | GPIO(74) | 41 |
| NSSP_CLK | GPIO(81) | 21 | L_DD06 | GPIO(64) | 40 |
| BT_RXD | GPIO(42) | 22 | FF_RTS | GPIO(41) | 39 |
| NSSP_TXD | GPIO(83) | 23 | DRQ0 | GPIO(20) | 38 |
| BT_CTS | GPIO(44) | 24 | NRESET | · | 37 |
| BT_TXD | GPIO(43) | 25 | PWM(0) | GPIO(16) | 36 |
| FF_TXD | GPIO(39) | 26 | HW_TXD | GPIO(48) | 35 |
| BT_RTS | GPIO(45) | 27 | HW_RTS | GPIO(51) | 34 |
| V_BATT | · | 28 | HW_RXD | GPIO(49) | 33 |
| V_BATT | · | 29 | HW_CTS | GPIO(50) | 32 |
| V_BATT | · | 30 | GND | · | 31 |

**Note**: Schematic images and charts below are from the point of view of the COM looking at the connector. From the daughtercard's point of view, these signals are mirrored.

## Layout of older 60-pin connector

You can check if this connector is on your COM  by using the reference table on the Gumstix motherboard I/O page.

Note: Schematic images and charts below are from the point of view of the gumstix looking at the connector from the daughtercard's point of view, these signals are mirrored.

| Signal | GPIO | Pin | Signal | GPIO | Pin |
|---|---|---|---|---|---|
| GND | · | 1 | GND | · | 60 |
| L_DD(9) | GPIO(67) | 2 | USB_N | · | 59 |
| L_BIAS | GPIO(77) | 3 | BITCLK | GPIO(28) | 58 |

| | | | | | |
|---|---|---|---|---|---|
| L_DD(3) | GPIO(61) | 4 | L_PCLK | GPIO(76) | 57 |
| SDATA_OUT | GPIO(30) | 5 | L_DD(15) | GPIO(73) | 56 |
| L_DD(8) | GPIO(66) | 6 | L_DD(14) | GPIO(72) | 55 |
| GND | · | 7 | FFRXD | GPIO(34) | 54 |
| L_DD(13) | GPIO(71) | 8 | L_DD(7) | GPIO(65) | 53 |
| L_DD(12) | GPIO(70) | 9 | L_DD(5) | GPIO(63) | 52 |
| L_DD(11) | GPIO(69) | 10 | L_DD(10) | GPIO(68) | 51 |
| USB_P | · | 11 | L_DD(1) | GPIO(59) | 50 |
| IRRXD | GPIO(46) | 12 | NACRESET | · | 49 |
| L_DD(2) | GPIO(60) | 13 | IRTXD | GPIO(47) | 48 |
| FFCTS | GPIO(35) | 14 | L_DD(4) | GPIO(62) | 47 |
| SDATA_IN1 | GPIO(32) | 15 | SYNC | GPIO(31) | 46 |
| L_LCLK | GPIO(75) | 16 | NSSP_TXD_RXD | GPIO(84) | 45 |
| PWM(1) | GPIO(17) | 17 | NSSP_FRAME | GPIO(82) | 44 |
| L_DD(0) | GPIO(58) | 18 | SDATA_IN0 | GPIO(29) | 43 |
| I2C_SDA | · | 19 | GND | · | 42 |
| I2C_SCL | · | 20 | L_FCLK | GPIO(74) | 41 |
| NSSP_CLK | GPIO(81) | 21 | L_DD(6) | GPIO(64) | 40 |
| TDO | · | 22 | FFRTS | GPIO(41) | 39 |
| NSSP_TXD_RXD | GPIO(83) | 23 | NTRST | · | 38 |
| TDI | · | 24 | NRESET | · | 37 |
| TMS | · | 25 | PWM(0) | GPIO(16) | 36 |
| FFTXD | GPIO(39) | 26 | HWTXD | GPIO(48) | 35 |
| TCK | · | 27 | HWRTS | GPIO(51) | 34 |
| V_BATT | · | 28 | HWRXD | GPIO(49) | 33 |
| V_BATT | · | 29 | HWCTS | GPIO(50) | 32 |
| V_BATT | · | 30 | GND | · | 31 |

# 80-Pin Connector

7/25/08: As Molex is phasing out the MOLEX 120-pin connector, Gumstix released the verdex pro product line in Q3/2008. the verdex pro motherboards uses a Hirose 80-pin connector, mapped as below, instead of the 120-pin connector found on the verdex motherboard.

- On a verdex pro expansion board, the 80-pin Hirose mating connector would have the product code: DF12D(3.0)-80DP-0.5V.
- Schematic images and charts below are from the point of view of the verdex pro motherboard. Looking at the connector from the daughtercard's point of view, these signals would be mirrored.

| 80-pin | 120-pin | GPIO | Signal | Signal | GPIO | 120-pin | 80-pin |
|---|---|---|---|---|---|---|---|
| · | ·1 | ·GPIO(20) | ·NSDCS2 | ·V_BATT | · | ·120 | ·80 |
| · | ·2 | · | ·SDCLK2 | ·V_BATT | · | ·119 | ·79 |
| · | ·3 | · | ·SDCLK0 | ·I2C_SDA | ·GPIO(118) | ·118 | ·78 |
| · | ·4 | ·GPIO(21) | ·NSDCS3 | ·GND | · | ·117 | ·77 |
| ·1 | ·5 | ·GPIO(2) | ·SYS_EN | ·MMCDAT0 | ·GPIO(92) | ·116 | ·76 |
| ·2 | ·6 | ·GPIO(80) | ·NCS4 | ·I2C_SCL | ·GPIO(117) | ·115 | ·75 |
| ·3 | ·7 | ·GPIO(55) | ·NPREG | ·MMCCMD | ·GPIO(112) | ·114 | ·74 |
| ·4 | ·8 | · | ·X_ADDR_0 | ·MMCDAT2 | ·GPIO(110) | ·113 | ·73 |
| ·5 | ·9 | ·GPIO(22) | ·SSPSCLK2 | ·GND | · | ·112 | ·72 |
| ·6 | ·10 | ·GPIO(15) | ·NCS1 | ·MMCDAT3 | ·GPIO(111) | ·111 | ·71 |
| ·7 | ·11 | ·GPIO(79) | ·NCS3 / NPSKTSEL | ·MMCDAT1 | ·GPIO(109) | ·110 | ·70 |
| ·8 | ·12 | ·GPIO(78) | ·NCS2 | ·MMCCLK | ·GPIO(32) | ·109 | ·69 |
| · | ·13 | · | ·DQM0 | ·DQM1 | · | ·108 | · |
| ·9 | ·14 | · | ·RDNWR | ·CIF_DD00 | ·GPIO(98) | ·107 | ·68 |
| ·10 | ·15 | ·GPIO(18) | ·RDY | ·CIF_FV | ·GPIO(84) | ·106 | ·67 |
| ·11 | ·16 | ·GPIO(99) | ·SDATA_INI | ·MBREQ | ·GPIO(96) | ·105 | ·66 |
| ·12 | ·17 | ·GPIO(102) | ·NPCE1 | ·CIF_DD02 | ·GPIO(116) | ·104 | ·65 |
| ·13 | ·18 | ·GPIO(97) | ·MBGNT | ·CIF_DD01 | ·GPIO(114) | ·103 | ·64 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ·14 | ·19 | ·GPIO(105) | ·NPCE2 | ·NPWE | ·GPIO(49) | ·102 | ·63 |
| ·15 | ·20 | ·GPIO(104) | ·NPSKTSEL | ·CIF_DD03 | ·GPIO(103) | ·101 | ·62 |
| ·16 | ·21 | ·GPIO(107) | ·CIF_DD08 | ·CIF_DD07 | ·GPIO(108) | ·100 | ·61 |
| ·17 | ·22 | ·GPIO(51) | ·NPIOW | ·CIF_MCLK | ·GPIO(53) | ·99 | ·60 |
| ·18 | ·23 | ·GPIO(106) | ·CIF_DD09 | ·NPOE | ·GPIO(48) | ·98 | ·59 |
| · | ·24 | · | ·DQM3 | ·CIF_DD05 | ·GPIO(82) | ·97 | ·58 |
| ·19 | ·25 | ·GPIO(57) | ·NIOISI6 | ·NPIOR | ·GPIO(50) | ·96 | ·57 |
| ·20 | ·26 | ·GPIO(83) | ·CIF_DD04 | ·CIF_PCLK | ·GPIO(54) | ·95 | ·56 |
| ·21 | ·27 | ·GPIO(93) | ·CIF_DD06 | ·SDCKE | · | ·94 | · |
| ·22 | ·28 | · | ·GND | ·X_DATA_29 | · | ·93 | · |
| · | ·29 | · | ·X_DATA_24 | ·X_DATA_25 | · | ·92 | · |
| · | ·30 | · | ·X_DATA_26 | ·X_DATA_27 | · | ·91 | · |
| · | ·31 | · | ·X_DATA_28 | ·X_DATA_31 | · | ·90 | · |
| ·23 | ·32 | · | ·GND | ·NPWAIT | ·GPIO(56) | ·89 | ·55 |
| · | ·33 | · | ·X_DATA_30 | ·NSDRAS | · | ·88 | · |
| ·24 | ·34 | ·GPIO(85) | ·CIF_LV | ·DQM2 | · | ·87 | · |
| · | ·35 | · | ·NSDCAS | ·X_DATA_19 | · | ·86 | · |
| · | ·36 | · | ·X_DATA_23 | ·X_DATA_17 | · | ·85 | · |
| · | ·37 | · | ·X_DATA_21 | ·NOE | · | ·84 | ·54 |
| · | ·38 | · | ·X_DATA_22 | ·X_DATA-16 | · | ·83 | · |
| · | ·39 | · | ·X_DATA_20 | ·X_DATA_02 | · | ·82 | ·53 |
| · | ·40 | · | ·X_DATA_18 | ·X_ADDR_23 | · | ·81 | · |
| · | ·41 | · | ·X_DATA_24 | ·X_DATA_11 | · | ·80 | ·52 |
| ·25 | ·42 | · | ·NWE | ·X_DATA_10 | · | ·79 | ·51 |
| · | ·43 | · | ·X_ADDR_21 | ·X_DATA_00 | · | ·78 | ·50 |
| · | ·44 | · | ·X_ADDR_22 | ·X_DATA_03 | · | ·77 | ·49 |
| · | ·45 | · | ·X_ADDR_18 | ·X_ADDR_15 | · | ·76 | · |
| · | ·46 | · | ·X_ADDR_19 | ·X_ADDR_12 | · | ·75 | ·48 |
| · | ·47 | · | ·X_ADDR_20 | ·X_ADDR_08 | · | ·74 | ·47 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| · | ·48 | · | ·X_ADDR_25 | ·X_ADDR_09 | · | ·73 | ·46 |
| · | ·49 | · | ·X_ADDR_16 | ·X_ADDR_07 | · | ·72 | ·45 |
| · | ·50 | · | ·X_ADDR_17 | ·X_ADDR_10 | · | ·71 | ·44 |
| ·26 | ·51 | · | ·X_DATA_04 | ·X_ADDR_06 | · | ·70 | ·43 |
| ·27 | ·52 | · | ·X_DATA_15 | ·X_ADDR_11 | · | ·69 | ·42 |
| ·28 | ·53 | · | ·X_DATA_12 | ·X_ADDR_05 | · | ·68 | ·41 |
| · | ·54 | · | ·X_ADDR_13 | ·X_ADDR_03 | · | ·67 | ·40 |
| | | | | | | | |
| · | ·55 | · | ·X_ADDR_14 | ·X_ADDR_02 | · | ·66 | ·39 |
| ·29 | ·56 | · | ·X_DATA_05 | ·X_ADDR_01 | · | ·65 | ·38 |
| ·30 | ·57 | · | ·X_DATA_06 | ·X_ADDR_04 | · | ·64 | ·37 |
| ·31 | ·58 | · | ·X_DATA_14 | ·X_DATA_08 | · | ·63 | ·36 |
| ·32 | ·59 | · | ·X_DATA_07 | ·X_DATA_09 | · | ·62 | ·35 |
| ·33 | ·60 | · | ·X_DATA_13 | ·X_DATA_01 | · | ·61 | ·34 |

# Expansion Board Connector Pinouts

## Serial Connector

### Serial Null Modem Cable

| DB9 signal | DB9 | MiniDIN8 Signal | MiniDIN8 |
|---|---|---|---|
| RxD | 2 | 3 | TxD |
| TxD | 3 | 5 | RxD |
| RTS | 7 | 2 | CTS |
| CTS | 8 | 6 | RTS |
| GND | 5 | 4 | GND |

### Serial Modem Cable

| DB9 signal | DB9 | MiniDIN8 | MiniDIN8 signal |
|---|---|---|---|
| RxD | 2 | 5 | RxD |

| | | | |
|---|---|---|---|
| TxD | 3 | 3 | TxD |
| RTS | 7 | 6 | RTS |
| CTS | 8 | 2 | CTS |
| GND | 5 | 4 | GND |

# UART

Note: Current kernels use ttyS3 (HWUART) for bluetooth. This is available on the BTUART pins by setting GPIO42 and 43 to AF3 - and this is the default configuration. This can be very confusing if you want to use the HWUART for something else! To re-enable HWUART on ttyS3, make bluetooth use ttyS1 (see /etc/default/bluetooth) and then set GPIO42 to AF1 in and GPIO43 to AF2 out. You can then set GPIO48 to AF1 out (HWUART TXD) and GPIO49 to AF1 in (HWUART RXD).

## FFUART

FF_CTS

FF_RTS

FF_TXD

FF_RXD

- Logic level (3.3V) signals
- Speeds to 230 kbps
- Normally mapped to ttyS0 in the kernel and Y0 in some schematics
- FFUART pins are located on the 60-pin Hirose connector
- Schematic diagram for the FFUART

## HWUART

HW_CTS

HW_RTS

HW_TXD

HW_RXD

- Logic level (3.3V) signals
- Speeds to 921 kbps
- Normally mapped to ttyS3 in the kernel and Y1 in some schematics
- HWUART pins are located on the 60-pin Hirose connector (connex and basix only)

- Schematic diagram for the HWUARt

### STUART

- Logic level (3.3V) signals
- Speeds to 230 kbps
- Normally mapped to ttyS2
- Schematic diagram for the STUART

### BTUART

BT_CTS

BT_RTS

BT_TXD

BT_RXD

| | |
|---|---|
| BT_NRESET | Bluetooth reset (output, active low) |
| CLK_32 | 32.768 kHz Clock output |

- Logic level (3.3V) signals
- BTUART pins are located on the 0-pin Hirose and 24-pin flex ribbon (verdex only) connectors.
- It is not an exposed interface; mapped to ttyS1 by the kernel and connected physically to the bluetooth module if one is present.
- BT_NRESET and CLK_32 are for an optional Bluetooth module IC (24-pin flex ribbon only)

## NSSP

- Slave speeds to 13 Mbps
- Master speeds to 3.6864 Mbps

## USB

- Version 1.1
- Requires one or two additional GPIO lines for presence or sleep detection

## I2C

- The I2C unit supports a fast mode operation of 400 Kbits/sec and a standard mode of 100 Kbits/sec. Refer to I2C bus specification for details.

Note the I2C on the Gumstix page.

## Batteries and power

Gumstix verdex pro motherboards require 3.4V min and max 5V. Using a power supply above 5v generates extra heat. Gumstix uses LDO voltage regulators, and have on-board generation of all voltages required so just plug in the power supply to any of the expansion board power input ports and go. This range covers Li-Ion, Li-polymer, NiMH (3-cells) or any other combination of reasonable unclean battery supplies that provide nominal output around 3.6 - 5.0 V.