1. Unless Otherwise Specified:
   All resistors are in ohms
   All capacitors are in uF
   All voltages are DC
   All polarized capacitors are aluminum electrolytic

2. Interrupted lines coded with the same letter or letter combinations are electrically connected.

3. Device type number is for reference only. The number varies with the manufacturer.

4. Special signal usage:
   _B Denotes - Active-Low Signal
   <> or [] Denotes - Vectored Signals

5. Interpret diagram in accordance with American National Standards Institute specifications, current revision, with the exception of logic block symbology.

6. Net function indications:
   Some nets have functions indicated in addition to the net names. The net names are shown in red and the MCU functions associated with the net are shown in blue. If a net has no blue function shown the net name indicates the associated function.

TWR-K65F180M
### POWER NETS

- **JUMPER Header**
  - **microUSB_PWR**
  - **microUSB_VBUS**
  - **ONBOARD_USB_VBUS**

- **SWITCH IC PWR**
  - **K20 REG**
    - **3.3V**
    - **5V**

- **JUMPER Header**
  - **PSV_USB**
  - **PSV_ELEV**
  - **ELEV_USB_VBUS**
  - **VREG_USB**
  - **SDA_VOUT33**
  - **VCC_3V3_SDA**
  - **PSV_TRG_USB**
  - **VREG_IN**
  - **P3V3**
  - **P1V8**

- **ELEVATOR CONNECTORS**
  - **5V**
  - **ELE_PS_SENSE**

- **USB0_VBUS**
  - **3.3V**

- **BATTERY**
  - **3V**

### Description of Nets:
- **miniUSB_VBUS**: 5V, Primary input power.
- **PSV_USB**: 5V, Filtered from miniUSB_VBUS.
- **microUSB_VBUS**: 5V, Secondary input power.
- **ONBOARD_USB_VBUS**: 5V, Filtered from miniUSB_VBUS.
- **PSV_ELEV**: 5V, Third input power from primary elevator connector.
- **ELEV_USB_VBUS**: 5V, USB power from primary elevator connector.
- **PSV_TRG_USB**: 5V, Output from USB power switch, controlled by K20's VTRG_EN and elevator's ELE_PS_SENSE.
- **VREG_IN**: 5V, Output from jumper header, select PSV_TRG_USB. Also could be supplied externally via header pin.
- **P3V3**: 3.3V, Output from LDO or from/to the elevator connector.
- **P1V8**: 1.8V, Output from LDO.
- **SDA_VOUT33**: 3.3V, Output from the K20 internal regulator.
- **VCC_3V3_SDA**: 3.3V, Output from SDA_VOUT33 via 0ohm resistor.
- **MCU_VREGIN0**: 5V, Output from jumper header to select ONBOARD_USB_VBUS or ELEV_USB_VBUS.
- **MCU_VREGIN1**: 5V, Output from jumper header to select ONBOARD_USB_VBUS or ELEV_USB_VBUS.
- **MCU_VREGOUT**: 3.3V, Output from the K65 internal regulator.
- **V_SUPPLY**: 3.3V or 1.8V, Output from jumper header, select 1.8V, 3.3V, SDA_VOUT33, MCU_VREGOUT. Also could be supplied externally via header pins.
- **V_BRD**: 3.3V or 1.8V, Output from V_SUPPLY via MOSFET, controlled by RTC_MOSFET.
- **MCU_PWR**: 3.3V or 1.8V, Output from jumper header to select V_BRD. Also could be supplied externally via header pin.
- **VCOIN**: 3V, Output from the coin battery.
- **K65_VBAT**: 3.3V or 1.8V, Output from jumper header, select MCU_PWR or VCOIN. Also could be supplied externally via header pin.
- **VDDA**: 3.3V or 1.8V, Output from jumper header to select MCU_PWR. Also could be supplied externally via header pin.
- **VREFH**: 3.3V, Upper reference voltage for ADC on the MCU. Filtered from VDDA.
- **VREFL**: 0V, Lower reference voltage for ADC on the MCU. Filtered from VDDA.
- **VSSA**: 0V, VSSA power for MCU and analog circuits. Filtered from VSSA.
- **GND**: 0V, Digital Ground.
**Serial Interface**

**OpenSDA Power Outputs**

- VCC_3V3_SDA
- VCCA
- VCCB
- OE
- GND

- **PVD Logic:**
  - Digital Interface is always reset when USB port is disconnected

- **GND Testpoint:**

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**Board Power Selector Table**

1-2  1.8V from Reg internal regulator
3-4  1.8V from Regulator (default)
5-6  3.3V from Regulator (default)
7-8  3.3V from Reg internal regulator

V_SUPPLY can also be sourced by removing all shunts and applying an external supply voltage to J9 pin 2 with the associated GND connected to TP11 or TP12. (Note that the RESET LED - D2 [sheet 5], the four user LEDs - D6, D7, D8, D9 [sheet 7], and the accelerometer - U15 [sheet 7] are powered by P3V3 and will not work if using only an external source.)

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**K65 VREG in Selector Table**

Note that not all functions of the board will operate at 1.8V. Also, please check that lower boards used with this board have the correct I/O voltages when this board is set to 1.8V.

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**Drawing Title:** Board Power Selector (See Table)

**Date:**

**Sheet:**

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**Component Breakdown:**

- **ICAP Classification:**
  - FCP: FIUO: PUBI:

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**Drawing Number:**

**Revision:**

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**Notes:**

- **X-TWR-K85F180M**

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**GENERAL PURPOSE TWRPI**

Note: The TWRPI connectors are powered by V_BRD which may be 1.8V or 3.3V. Not all TWRPI boards will work at 1.8V.

Check that TWRPI boards will work at 1.8V before using them with this board when V_BRD is jumpered for 1.8V.

Place the 0402 0ohm resistor close to the key trace in order to shorten the stubs.

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**K65 USB Interface (Host or Device)**

Note that there is never a combination that allows sending the USB1 (HS) to the elevator.

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**microSD Card**

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**ENET0_1588_TMR_HEADER**

Place the 0402 0ohm resistor close to the key trace in order to shorten the stubs.

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**K65-COREX JTAG SECTION**

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Note: this SDHC socket is powered by V_BRD which may be 1.8V or 3.3V. No provision is made for dynamic switching between the two voltages. Therefore, this interface may not work properly when the MCU is running from 1.8V.
Interrupts

Place the decouple capacitors above close to the SDRAM power pins.

ACCELEROMETER

Default: 1-2, 3-4 (Enable Accel Interrupts)

LEDS

Place the 0Ω 10G resistor close to the key trace in order to shorten the stubs.

TOUCH PADS + LEDS

Default: 1-2 (Enable Potentiometer)

POTENTIOMETER

ACCELEROMETER

TOUCH PADS + LEDS

LEDS

POTENTIOMETER
Place the 0402 0ohm resistor close to the key trace in order to shorten the stubs.

Note that signals coming from the elevator are usually 3.3V. They should not be used when the board is configured for 1.8V operation.