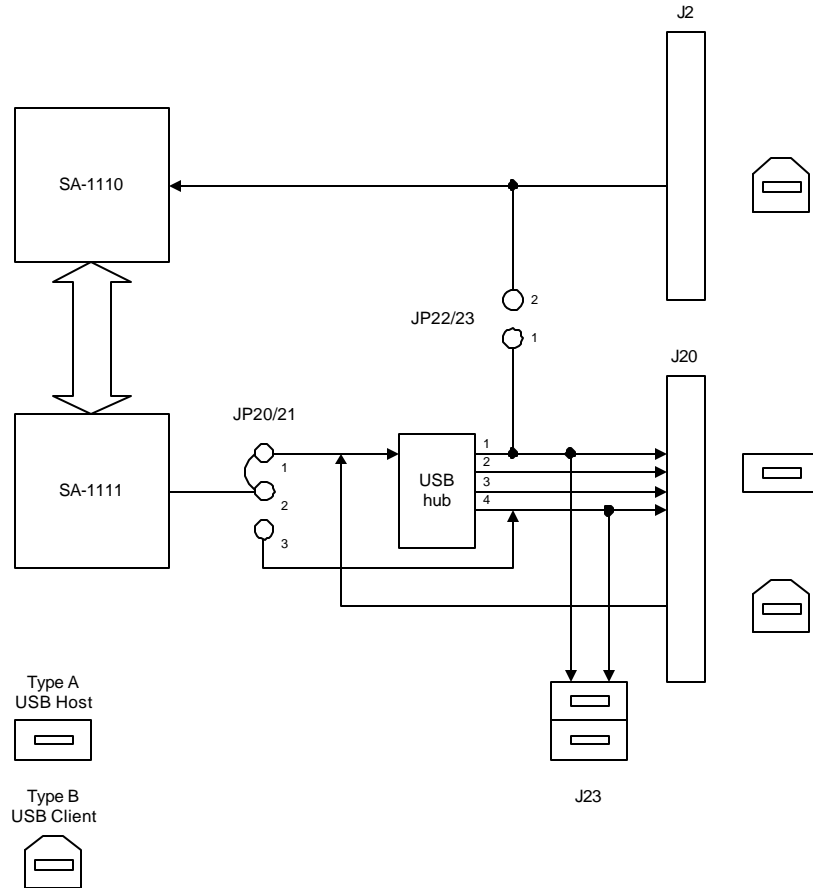


### 4.4 Using USB

The Graphics Master supports several USB configurations to meet the varying needs of our customers. This section details the most common ways these USB circuits can be configured along with the type of socket to use for each configuration.

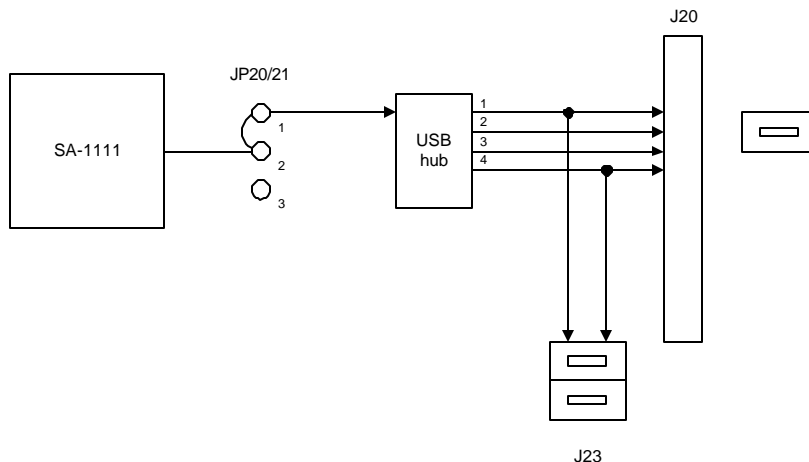
The following diagram illustrates all USB circuitry on the Graphics Master. Arrows indicate the hierarchical flow from host to client (USB data is bi-directional).



### 4.4.1 USB Tier 0 Hub

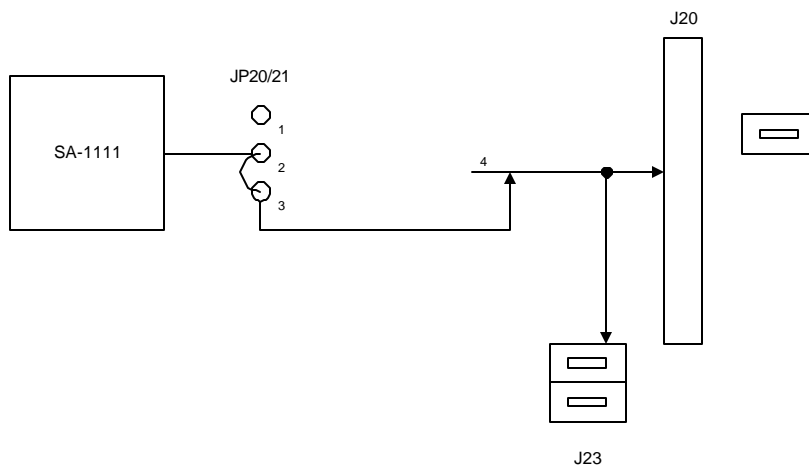
The Graphics Master includes a four-port USB hub, allowing you to connect up to four downstream client devices. You may connect to either of the two host sockets for ports 1 and 4 on J23, or may wire your own host sockets to the pins of J20. In this configuration, the Graphics Master acts as the top-level controller of the USB network.

This is the default configuration of the Graphics Master.



### 4.4.2 USB Tier 0, Single-Port Host

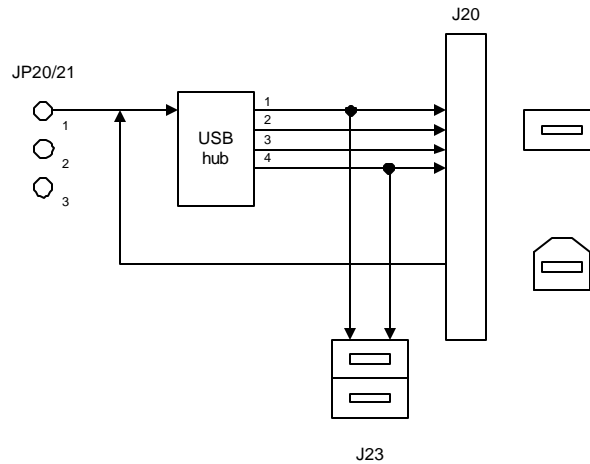
If your application only uses one USB port, you may find some cost savings by eliminating the USB hub on the board. In this configuration, you can bypass the hub and use the Port 4 host connection on either J20 or J23.



### 4.4.3 USB Tier n Hub

You may use the Graphics Master USB circuitry simply as a four-port hub. In this case, connect the upstream (host) device to pins 9 and 10 of J20; don't connect the power supply lines from the host, as they are not needed.

Connect downstream (client) devices to J20 or J23. The Graphics Master supplies power to client devices on pins 11 and 12 of J20.



#### 4.4.4 USB Client

The Graphics Master can act as a client device in a USB network. The most common use for this configuration is where the Graphics Master "docks" or "synchronizes" to a central station.

**Important!** When wiring a USB client socket (Type B) to the Graphics Master, make sure to leave USB\_VCC(J2 pin 26) unconnected. The Graphics Master supplies does not need power from the host device.



#### 4.4.5 USB Host-Client Loopback

Jumpers JP22 and JP23 can create a loopback between the SA-1110 USB client port and Port 1 of the USB hub. This feature can be used to test StrongARM host and client drivers. Make sure to place shunts across both JP22 and JP23 if you use this feature.