

TIS-126 Clock Distribution Buffer

User's Guide and Specifications

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Introducing the TIS-126 Clock Distribution Buffer

What it Does

The Clock Distribution Buffer accepts an input clock signal and regenerates as a 0-3.3V (unloaded) or 0-1.5V (50 Ohm load) signal on the six output ports. The frequency range is 100 KHz to 100 MHz.

Why

The Buffer is typically used to send a reference clock, usually from GPS Disciplined Oscillator or other stable reference, to multiple pieces of test equipment, transmitters or receivers. The 50 Ohm output impedance ensures that an undistorted reference can be delivered to the connected equipment.

Dimensions

The TIS-126 is housed in a small aluminum enclosure:

8.5 cm wide x 3.5 cm high x 12 cm deep (this includes the connectors)

Weight: 180 gm.

Connections

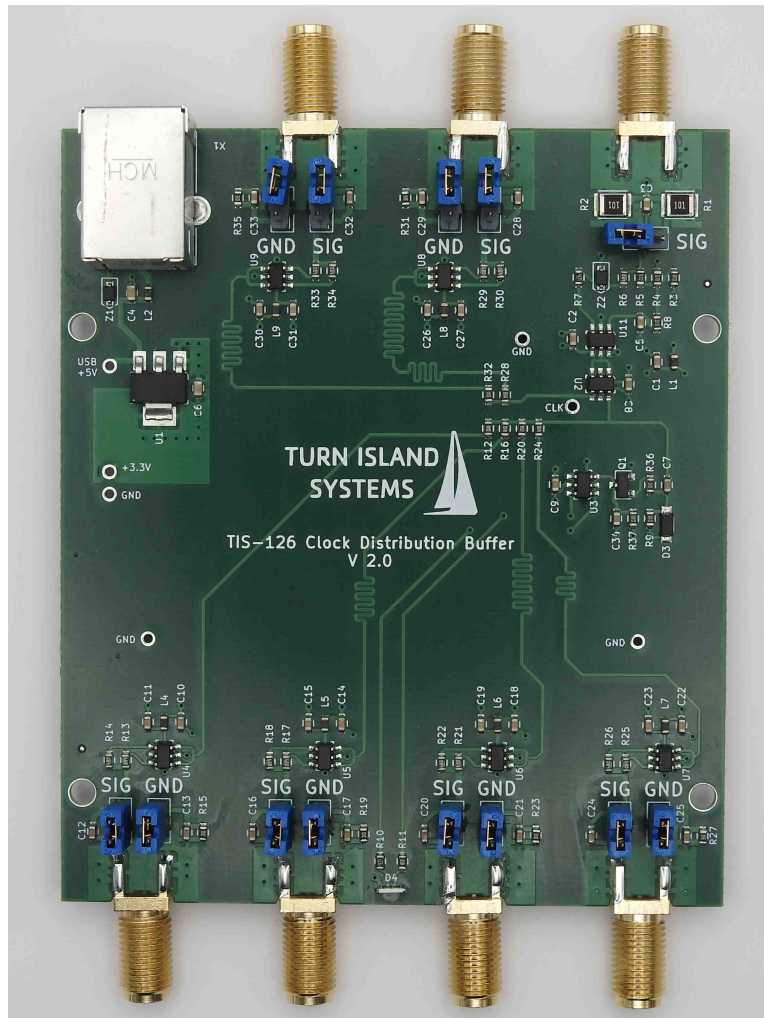
- Output Ports 1-6: SMA jack
- Clock Input: SMA Jack
- Power: USB, type B
- Front panel LED indicator

Specifications

- Input frequency range: 100 KHz to 100 MHz
- Input level: -20 dBm to +20 dBm sine or square-wave
- Input level: 0.06 V P-P to 5V P-P
- Input impedance: 50 Ohms
- Output level: 0-3.3V (unloaded) or 0-1.5V (50 Ohm load)
- Output impedance 50 Ohms
- Jumper-plug selection of AC or DC input and output coupling
- USB power: 200 mA maximum (100 MHz, all outputs with 50 Ohm load)

AC/DC-Coupling Options

Output Stages

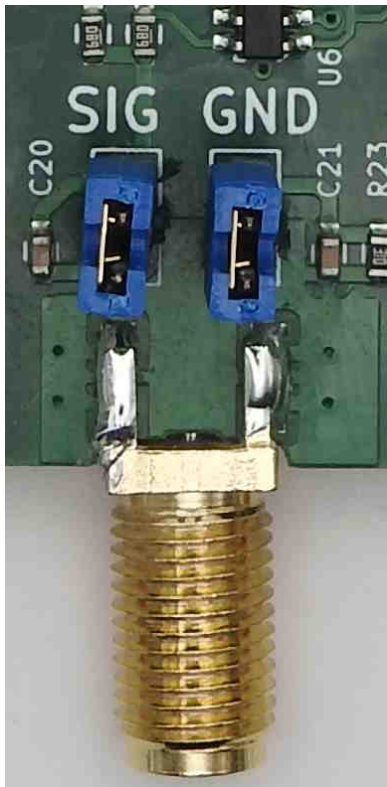


Each of the six outputs can be configured for DC or AC-coupling of the signal, and similar AC/DC coupling of the SMA ground connection. These connectors are isolated on the front panel. In the AC-coupled configuration the jumpers can be stored by plugging them onto a single pin.

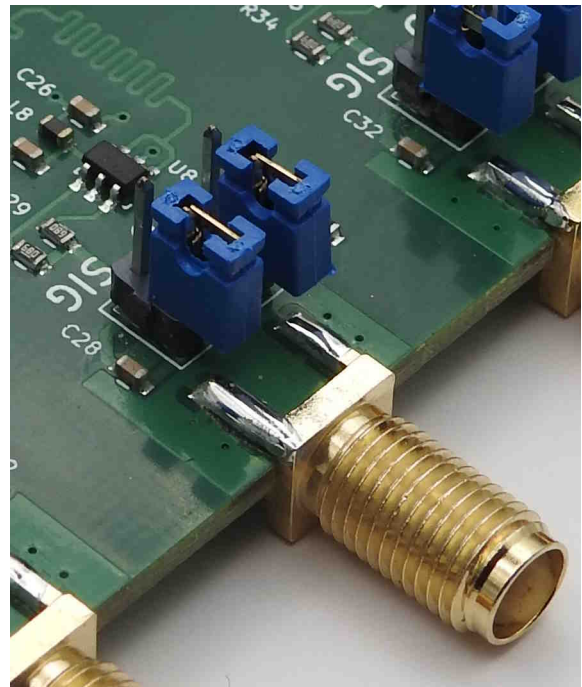
When mitigating system DC ground loops both signal and ground are typically jumpered for AC-coupling, and this is the configuration in which the TIS-126 is shipped. The AC-coupled ground connection has a 1 megohm resistor to the unit common ground, providing for static bleedoff.

For some uses you will want to provide a DC-coupled ground and AC-coupled signal, or signal and ground both DC-coupled.

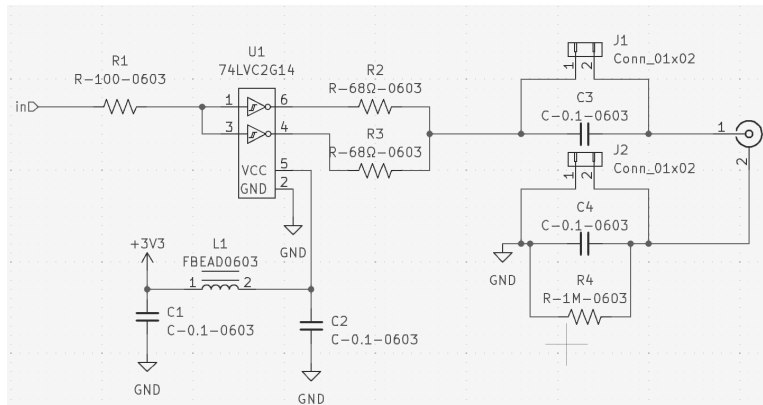
Note that this AC-coupling does not provide isolation from RF ground loops or other RF common-mode situations. For this class of problem you will need an external isolation transformer, or possibly a simple ferrite clamp choke on the interconnect cables.



Output signal and ground DC-coupled



Output signal and ground AC-coupled



Input Stage

The input stage has the AC/DC coupling option on the signal input, but the ground connection is not broken. The TIS-126 is shipped in the AC-coupled input configuration. In most cases you will want to use AC-coupling, but in the case of low-frequencies (such as the 1 pps output of some GPSDOs) or other special cases you may need to switch to DC-coupling.

Changing the Jumpers

The easiest way to access the AC/DC jumpers is to remove the SMA nuts and washers from the rear panel, and remove the four screws that secure the front panel. The board and front panel can then slide out of the chassis.

The v1.0 units may have hex socket-head screws (metric M2.5 with 1.5mm socket) securing the front and rear faceplates. In future builds these will be replaced by Phillips-head screws to make jumper-selection more convenient.

For easy removal and re-install of the SMA jack nuts, an 8mm or 5/16" socket is very handy.



Front Panel LED Indicator

This LED shines through a small hole at the center of the front panel, indicating the status of the TIS-123:

- No power: dark!
- No clock input: red (or blue on the first five units)
- Clock presence: green (or red / green flashing below about 100 Hz)

Version 1.0 Errata

- Output impedance is approximately 40 Ohms. This should pose no problem, but future units will be closer to 50 Ohms.
- The indicator LED is mis-wired, so rather than red/green the colors are blue/green.