

# Programming Adapter User's Guide

## QF4A512 Programmable Signal Converter

### 1) Introduction

The Programming Adapter was designed to be added to the QF4A512's Development board for the purpose of programming bulk volumes 10,000 parts or less of EEPROM. Additional connectors can also be added to the development board so that parts can also be tested, programs checked etc in the lab and manufacturing floor.

**(Note make sure you have downloaded QF software version 4.0.0 Build 0016 or later from our website)**

The User's Guide for the Programming Adapter board describes the following:

- Board Layout definition.
- Powering the Programming Adapter Board.
- Plugging in the Programming Adapter Board.
- Programming example sequence.
- Auto Configure and Auto Start options addressed.
- Using an external clock source.
- Schematics.
- Silk Screen for component reference.

### 2) Board Layout / Prototyping area definition:

The QF4A512 – PA board was designed to be plugged into the QF4A512 development board. See Figure 1 below for a visual definition of the board.

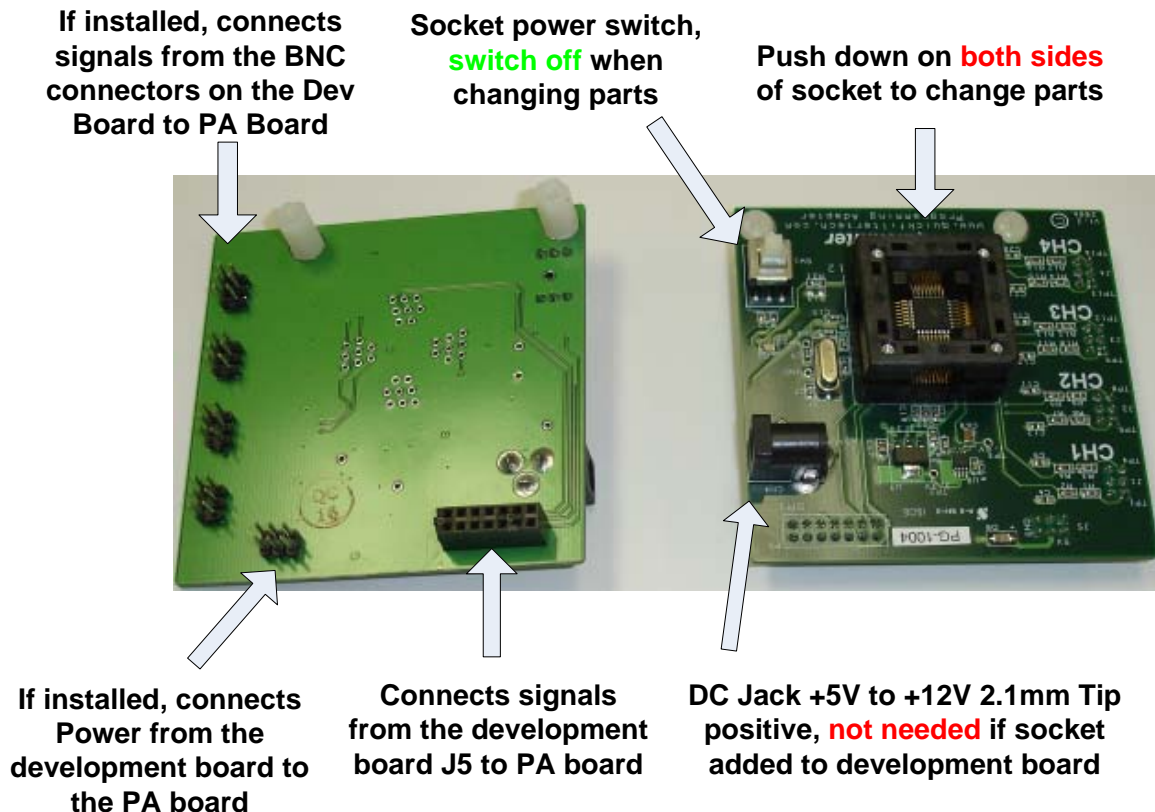


Figure 1

### 3) Powering the Programming Adapter Board:

There are two ways to power the adapter board.

1: Power can be supplied by the development board by soldering a provided 2x8 jack onto the development board same top edge that J5 is located. See the following diagram below:

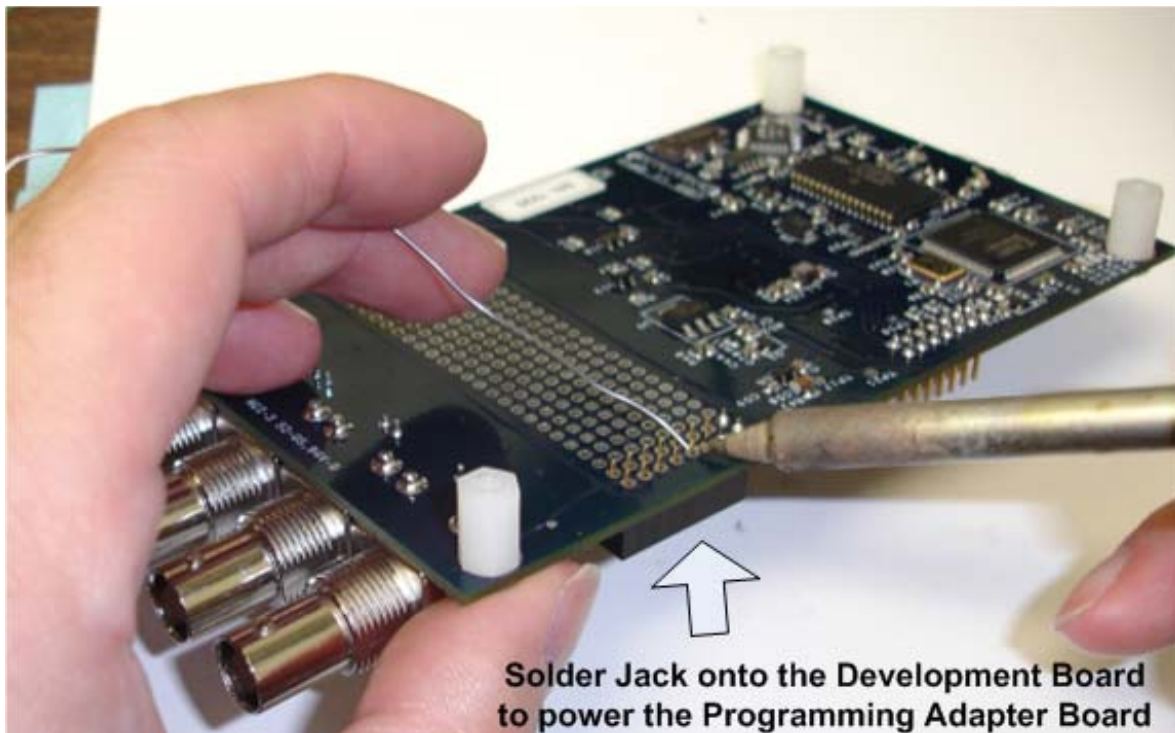


Figure 2

2: Power can also be supplied by plugging in a +5VDC AC Adapter into CN4. This is a 2.1mm barrel connector tip positive. Example Mouser# 412-106054 6VDC/500mA Manufacturer is Xicon, price is approximately \$5. The DC supply can vary from +5VDC to +9VDC. (Note: This voltage will show up in the prototyping area but not injury the development board)

#### 4) Plugging in the adapter board:

See figure 3 for alignment. The QF4A512 programming adapter should be pushed down evenly not at an angle. Note, by adding the 3 additional headers to the development board signals will be brought up to the programming adapter board through J1-J4. See below.

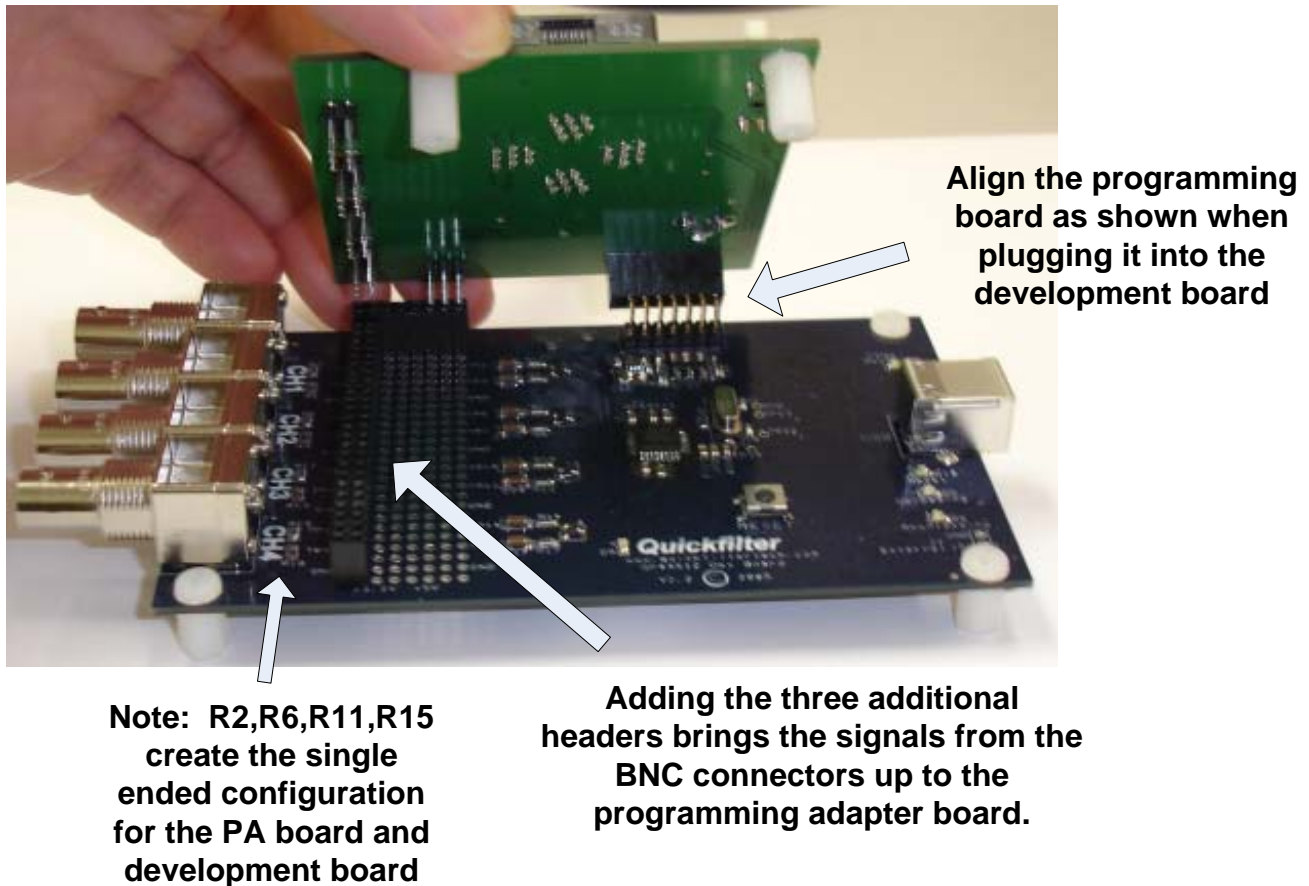


Figure 3

#### 5) Input level and protection scheme:

The QF4A512 programming adapter is DC coupled with input voltage protection only. With no modifications the largest signal is 2Vpp AC coupled. Voltages larger than 3.0V will activate the internal protection diodes which are series limited with 100ohms. These resistors can be changed to simulate the target system including a spot to add AC coupling.

#### 6) Programming example:

Step 1: Plug in the USB cable to the development board. Make sure the programming adapter board is powered either from the development board or through the AC Adapter plugged into CN4.

Step 2: Make sure the power to the socket is "off" this done by pushing SW1 until the red light is OFF.

Step 3: Put a QF4A512 into the socket by pushing down evenly on both sides of the socket while making sure to take note of the proper pin alignment of PIN1. See figure 4.

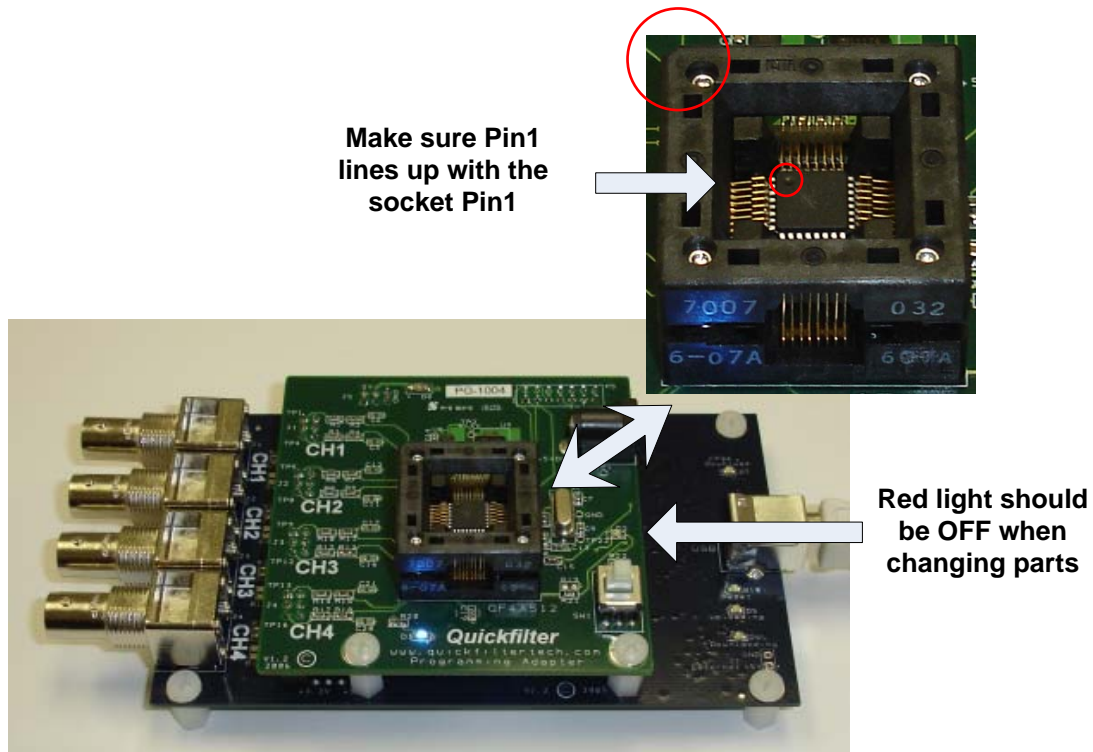


Figure 4

Step 4: Push SW1 so that the red LED is ON. See Figure 5

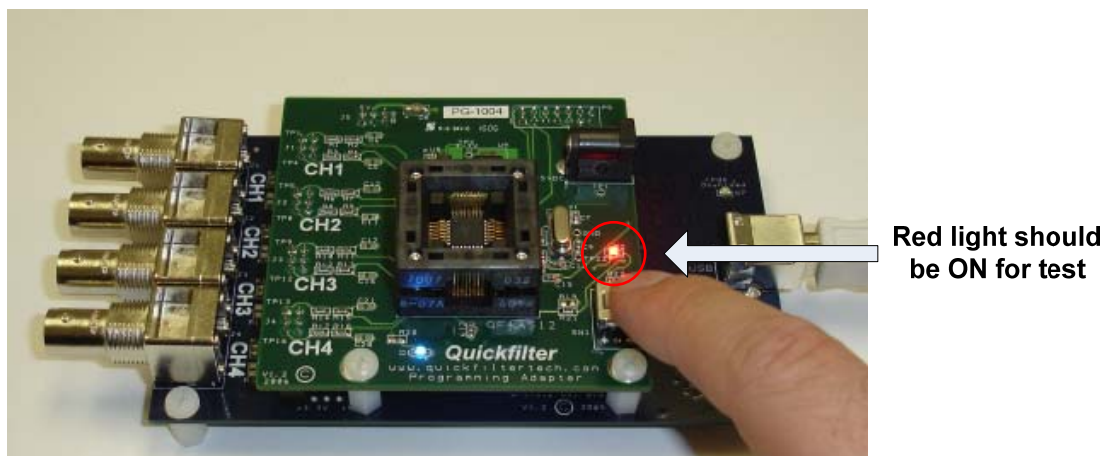
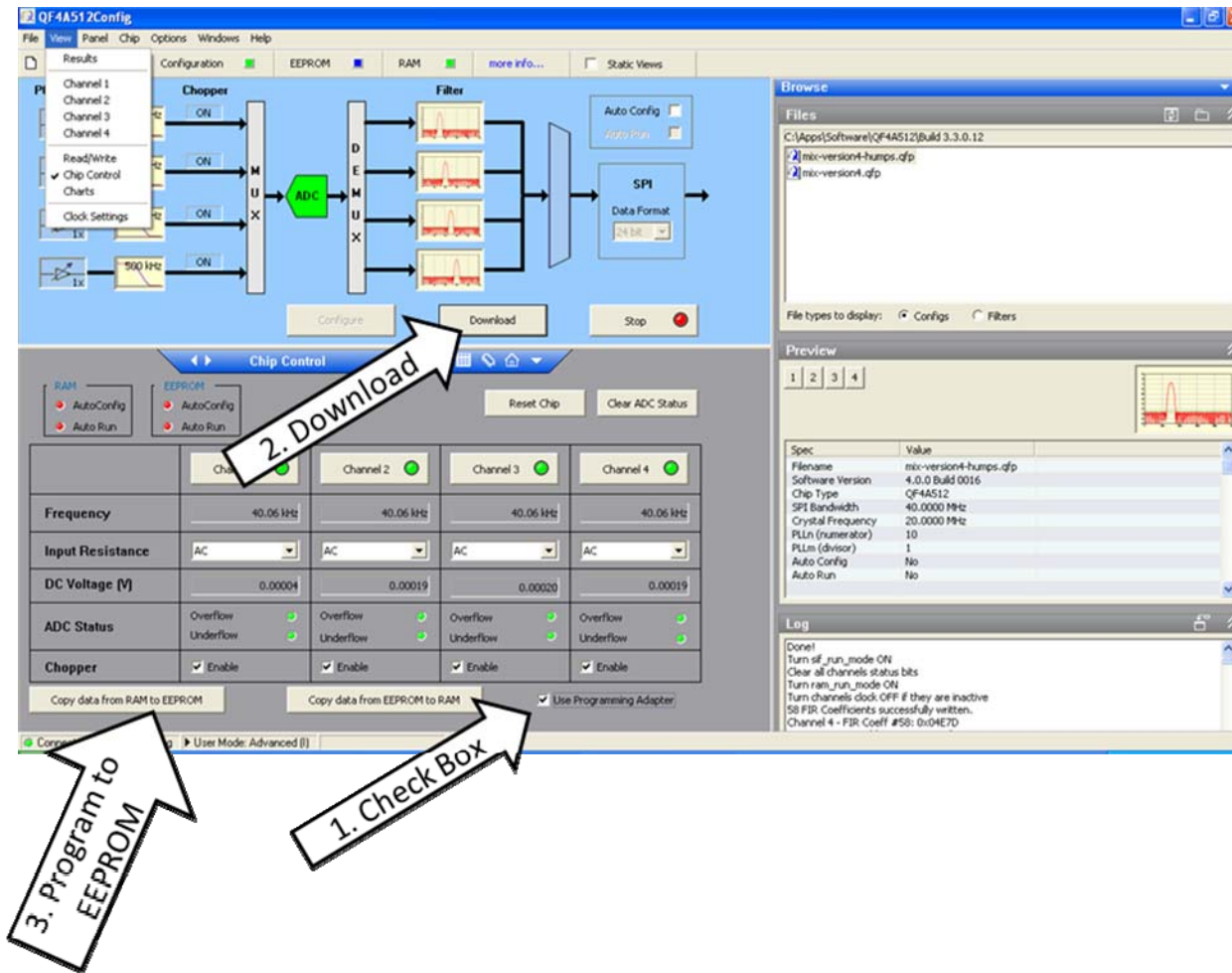


Figure 5



- Step 5: Run Quickfilter software QFPro version 4.0 Build 16 or later version. If installing this newer software, please uninstall the previous version of Quickfilter software first.
- Step 6: Select “View” from the upper left options, select “Preferences”, check the box advanced features.
- Step 7: Choose “View” Chip Control. One: Check the “Use Programming Adapter” box in the lower right hand corner. This is step 1 in figure 6 below.



**Figure 6**

Note: If the “Use Programming Adaptor box does not appear it’s because there isn’t a QF4A512 loaded into the Programming Adaptor, and / or the power button wasn’t pressed on showing a red LED on the programming adaptor before the QFPro software was run. Select Chip Master Reset to refresh.

- Step 8: Open your configuration file that you want to program into the part. “File, Open configuration”. Or “File, Import Image” to select a hex file.
- Step 9: Download the configuration into the RAM on the QF4A in the programming adaptor by selecting the “Download” box labeled 2 in figure 6 above.

Step 10: Click the Copy data from RAM to EEPROM labeled 3 in figure 6 above. Once programming is complete which may take over a minute push SW1 off so the red LED is OFF.

**Programmers note** – Parts and board may be destroyed if the RED LED is ON when swapping parts. Make sure to switch power off to the socket by depressing SW1.

Step 11: Remove the programmed part, put the next QF4A512 to be programmed in the socket taken note of the correct Pin 1 orientation. Push SW1 on so that the red LED is back ON.

Step 12: Repeat by pressing Download (Step 9). Then press copy data from RAM to EEPROM again (Step 10) above for each programmed part.

In order to see the displayed FFT results with auto configure or (auto configure and auto-start) set when using the programming adapter board, the copy data from EEPROM to RAM button needs to be selected to start the software's FFT display running. Make sure to press the STOP button before pressing Copy data from EEPROM to RAM button.

## 7) Auto configure and Auto Start options:

Recall that the QF4A512 can have auto configure and auto start set. If this occurs on either the QF4A512 – PA board with a part in the socket, or on the QF4A512 part on the main development board, a conflict can occur at power up.

**Programmers note** – In some cases the QF4A512 parts may have been programmed with auto configure and auto start enabled. If the power is cycled, or the programmed part is put back in the socket, the QF4A512 will start running automatically. Make sure to press the "Stop" Button before selecting the "Copy data from RAM to EEPROM" button.

This can be solved by simply "resetting" the chip by pressing the "Reset Chip" Button on the configuration screen then press the stop button.

## 8) Using an external clock source:

Since the crystal is lightly loaded, an external driving clock source can directly run the internal PLL. You do not need to remove the 1 Meg resistor, crystal or 18 pF loading capacitors from the development board. Simply apply the external clock source to Test Point TP22. Make sure to tell the Quickfilter software the external clock frequency used when regenerating the QFP file.

**Designer's note** – The allowable input range is 5 MHz to 200 MHz.

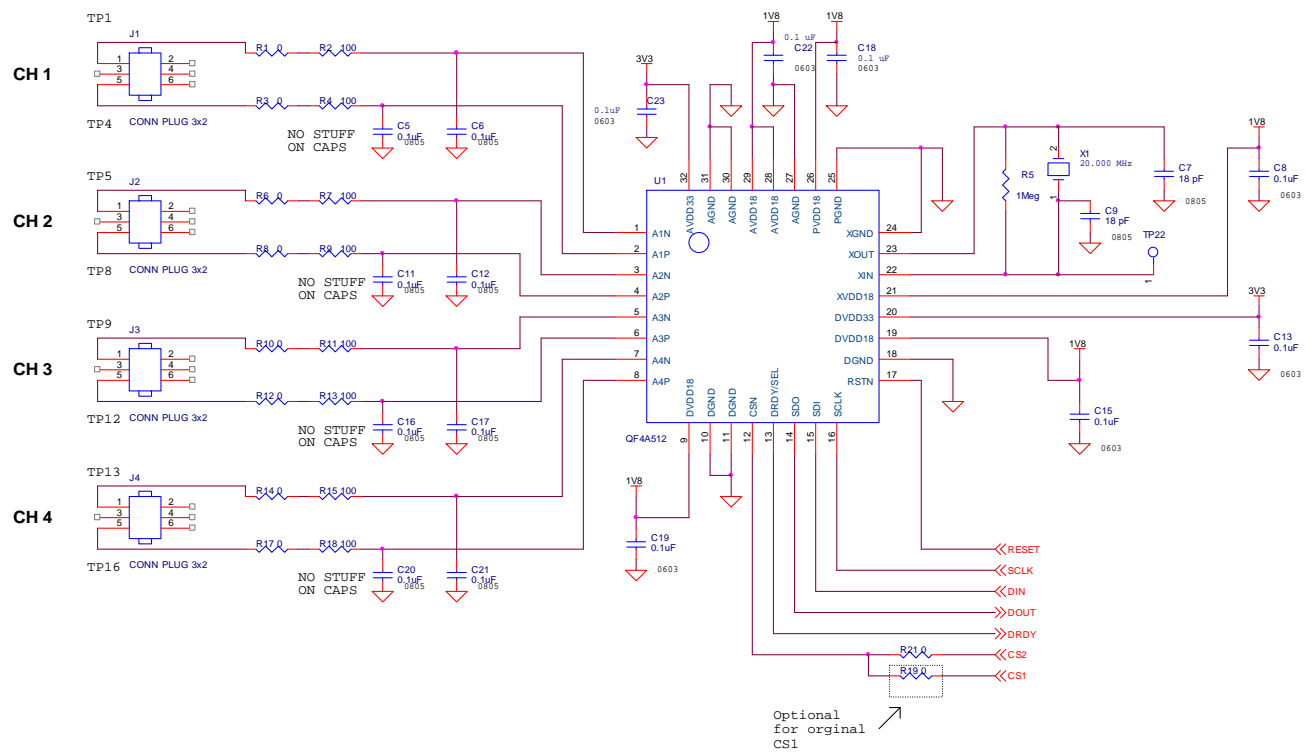
The clock input on Pin 22 to the phase lock loop is a 1.8 Volt level. Therefore the amplitude of the incoming clock source should be 1.62 to 1.98 Volts Peak to peak. Since the input is AC coupled, a DC offset can exist. The clock can be a sine wave, or square wave.

## 9) List of Test Point Definitions:

- TP1 = +5V from DC wall adapter.
- TP2 = +3.3V from on board regulator.
- TP3 = +1.8V from on board regulator.
- TP22 = External clock input.
- GND = Ground point for external clock and voltage measurement.

## 10) Schematics:

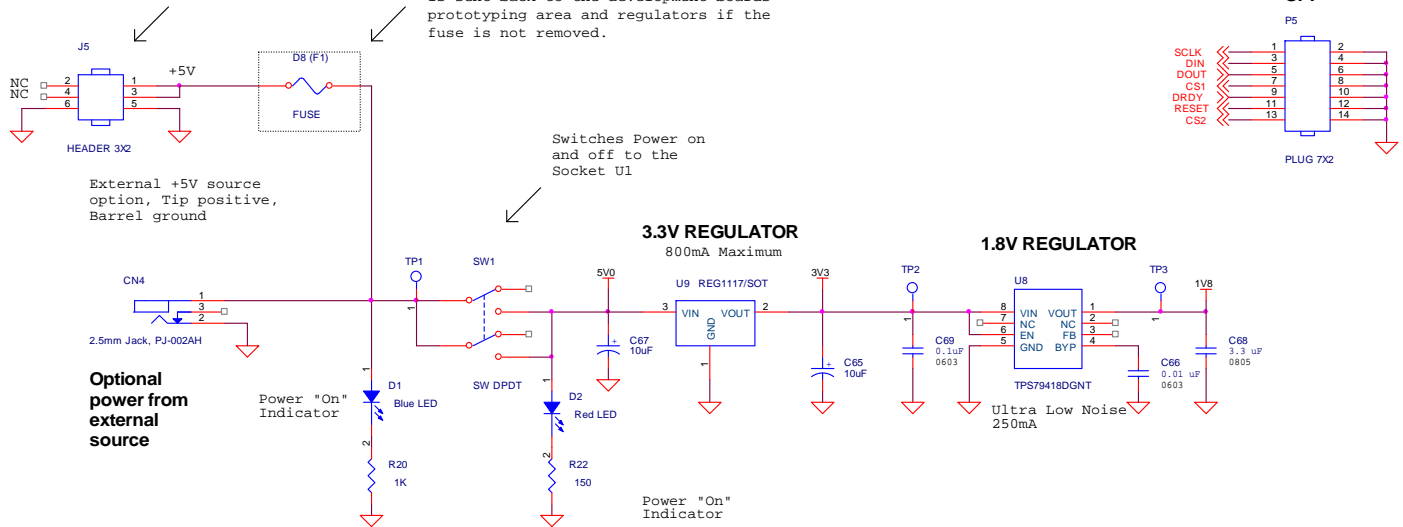
The following are the full schematics for the QF4A512 Programming Adapter Board.



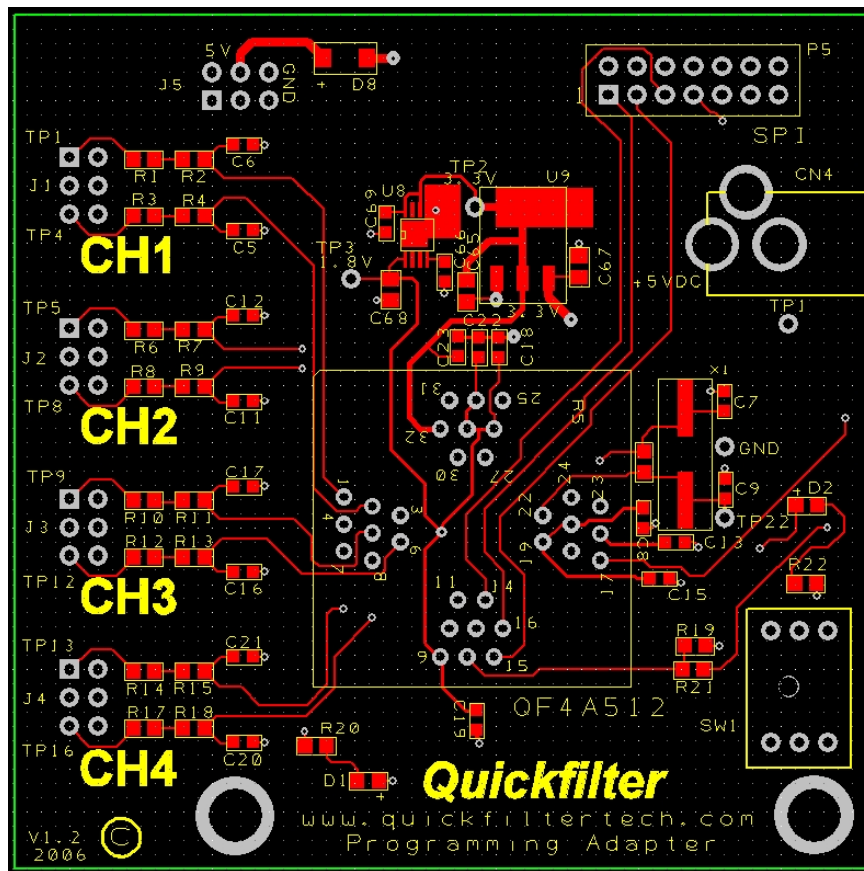
### +5V from USB

0.1" Header Can Be Stuffed on QF4A512DK board to bring +5V power to the adapter board

Can be removed to isolate power when using external supply. Up to 15V DC is acceptable, although +5V DC is recommended. Note the external power is sent back to the development boards prototyping area and regulators if the fuse is not removed.



## 11) Silk Screen:







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