

Q165 Prototype Module

July 23, 2020

The Q165 Prototype module gives the electronics experimenter a convenient way to implement custom circuitry for their 5U Moog-panel-format synthesizer.

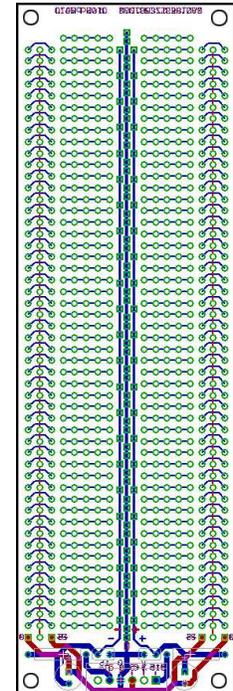
The panel provides placement for knobs, jacks, switches and LEDs. White blocks provide space to write labels using a fine-point ink marker.

The prototype board provides center and side power rails, and enough space for 4-6 integrated circuits - typically op-amps. The pad-per-hole array accepts most common thru-hole components and is arranged like a typical proto board and solderless breadboard, but with additional holes on the sides to accept MTA connectors. The power entry section is laid out for +15V and -15V entry filters along with +5V for digital circuits.

A variety of parts are provided in the kit including PCB mounting spacers, MTA connectors for power, jacks and pots, along with a variety of common resistors, capacitors, transistors and diodes. Op-amp and an OTA ICs are also provided.

The user must supply the circuit design, tools, additional electronic components, and of course the skills.

The Q165 module accepts a standardized Synthesizers.com 6-pin MTA power connection.



Q165 Prototype Module Specifications

Panel Size: Single Width 2.125"w x 8.75" 5U (Moog Unit Format).

Panel Components: 5 jacks, 2 pots, 1 toggle switch, 2 LEDs.

Proto Board Size: 1.9" x 6".

Power: +15V, -15V, +5V Synthesizers.com standard 6-pin MTA.

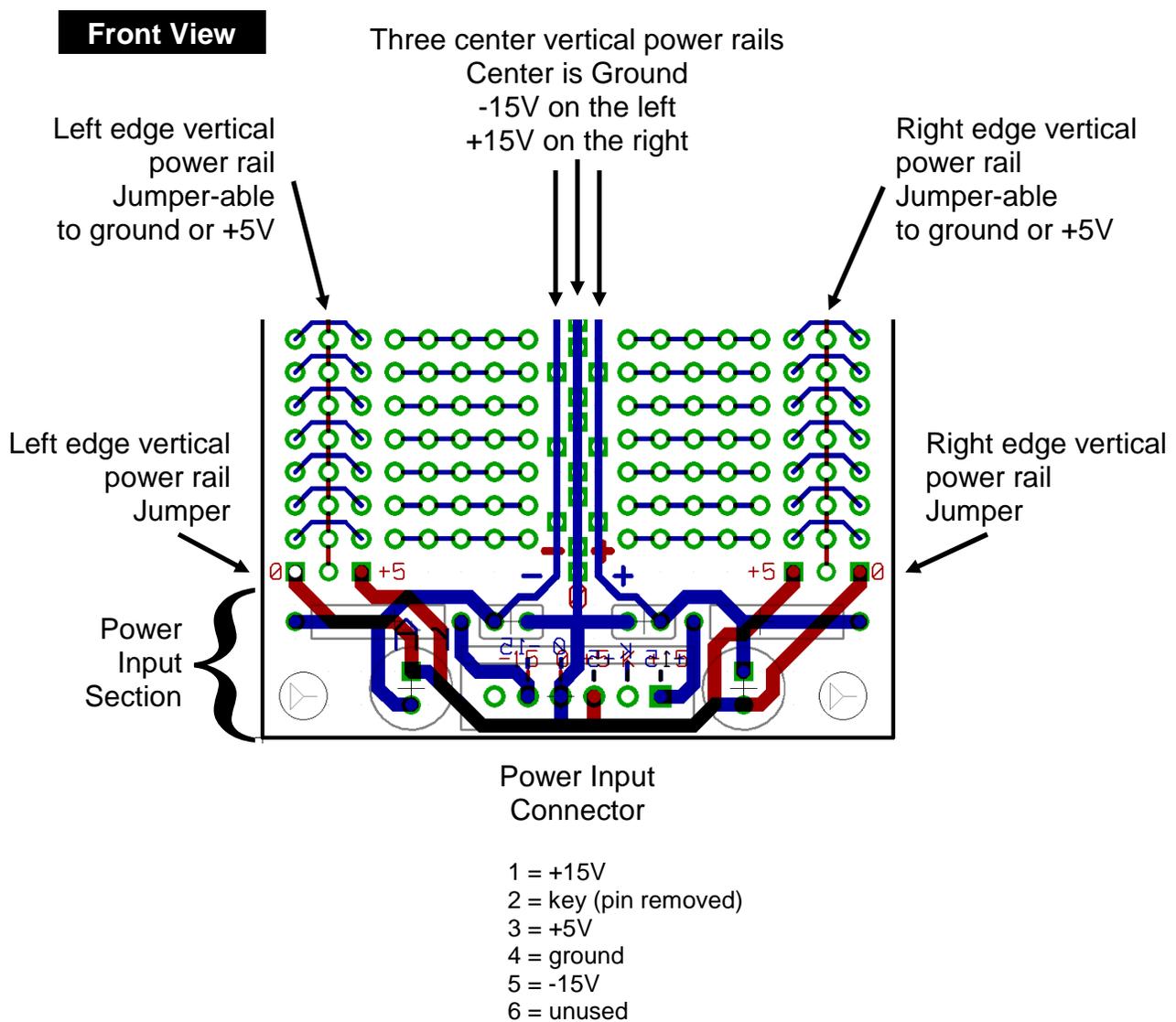
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Prototype Board Layout

The prototype board provides a grid of holes with solder pads. These pads are connected to help wire circuits. The diagram below shows the connections between pads.

ICs can be placed in the center, straddling the center vertical power rails. Analog ICs such as TL074 Op-Amps can then be wired to +15V and -15V rails. Digital ICs such as 74HC14 Inverters can be wired to the center ground rail and to +5V from the right edge vertical power rail jumpered to +5V.

MTA connectors (.1) can be placed on the left or right edge - the connector body will cover up the side vertical power rail. An additional pad is provided to make connection to the circuit.



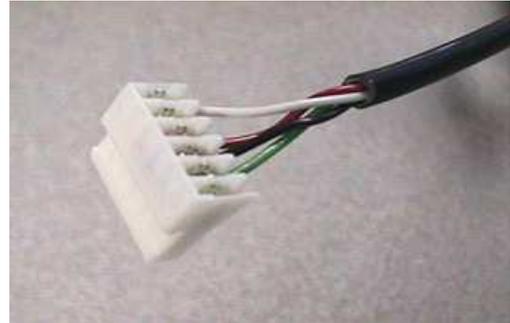
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Power Input

The Q165 board accepts power using a standardized Synthesizers.com power connector. In Synthesizers.com systems, power is distributed by a power harness having multiple cables that plug into modules.

Power Connector

The power connector on the circuit board is a male 6-pin .1 MTA connector. The power harness has a 6-pin female connector. The harness supplies 4 signals - ground (black), +5V (red), -15V (green), +15V (white). Some modules do not use all available voltages.



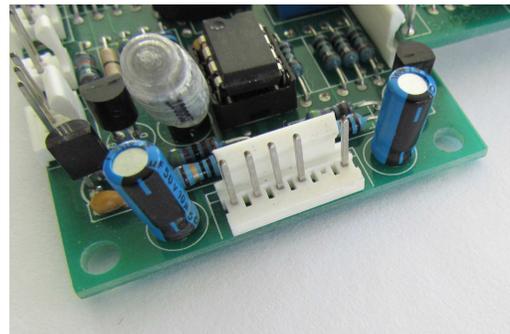
Power Connector Part Numbers

Female cable mount: #6404416

Male PCB mount: #6404566

Manufacturer: AMP

Vendor: Mouser, Digi-Key



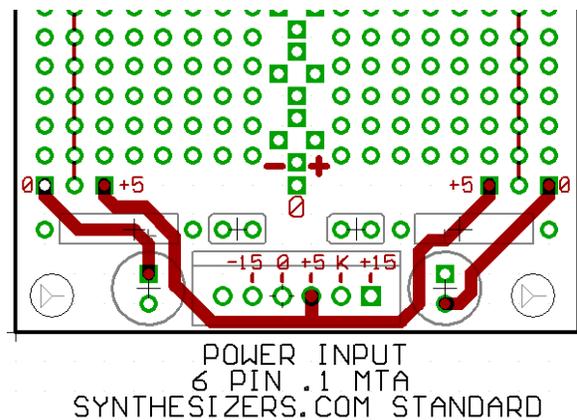
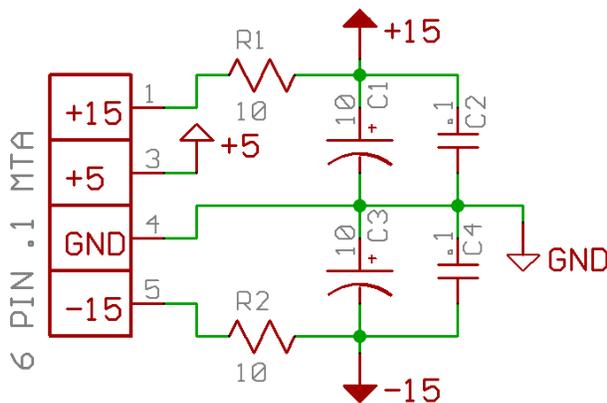
Power Connector Pinout

- 1 = +15V
- 2 = key (pin removed)
- 3 = +5V
- 4 = ground
- 5 = -15V

Power Input Circuit

The Q165 board has a power input circuit built-in - a power connector, series resistors and filter capacitors. The series resistors can be jumpered, replaced with inductors, or used with the supplied 10 ohm resistors which tend to act like fuses to save traces when shorts occur. The power rails +15V, Ground, and -15V are routed vertically through the center of the board under where ICs go. Rails on the left and right side can be jumpered for ground or +5V. These edge grounds can be used for MTA connectors mounted on the edge of the board.

Schematic



Q165 Prototype Module

Parts

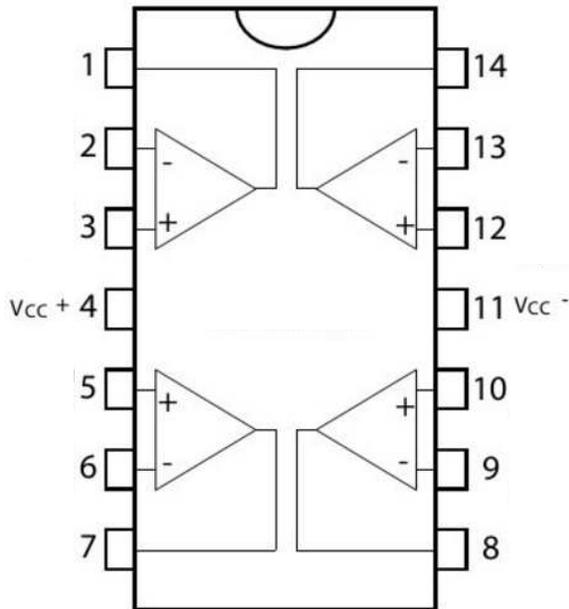
Various parts are provided for building circuits. It is likely that you will need additional parts.

Q165 Circuit board	2) 1000pf capacitor
Q165 Customizable panel	10) .1uf capacitor
4) Spacers	1) 1uf capacitor
8) 4-40 Screws	4) 10uf capacitor
2) 1" Knobs	
2) 100K Pot assembly	4) 14 pin IC socket
5) Jack assembly	1) 16 pin IC socket
2) Toggle switch assembly	
1) LED red with cable	4) TL074 IC quad op-amp
1) LED green with cable	1) LM13700 IC dual OTA
2) LED holder	
	4) 2N3904 NPN transistor
2) 10 ohm resistor	4) 2N3906 PNP transistor
10) 470 ohm resistor	
10) 1K resistor	4) 1N4148/1N914 Diode
10) 10K resistor	
10) 20K resistor	2) 1K Trimmer pot
10) 49.9K resistor	
20) 100K resistor	1) MTA .1 connector 6 pin male (pin removed)
2) 300K resistor	10) MTA .1 connector 2 pin male
	5) MTA .1 connector 3 pin male

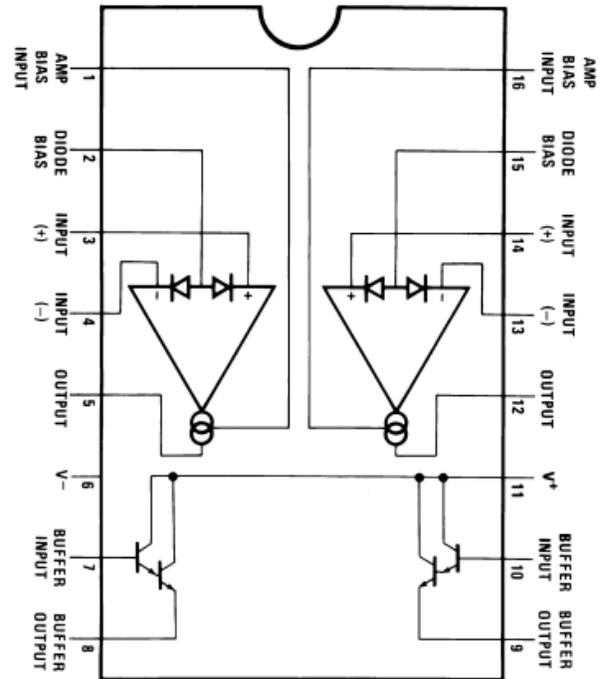
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Pinouts

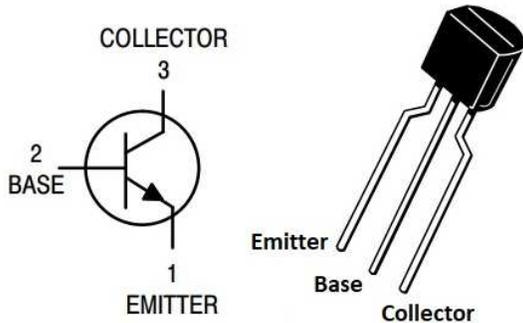
TL074/TL084 Quad Op-Amp (14 pins)



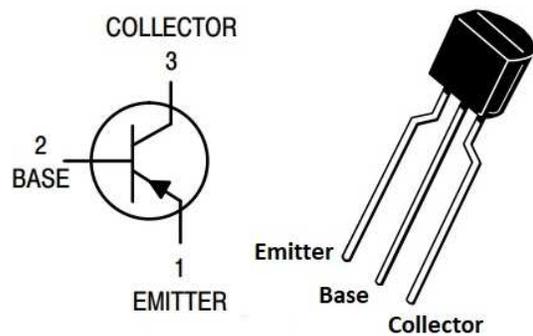
LM13700 Dual OTA (16 pins)



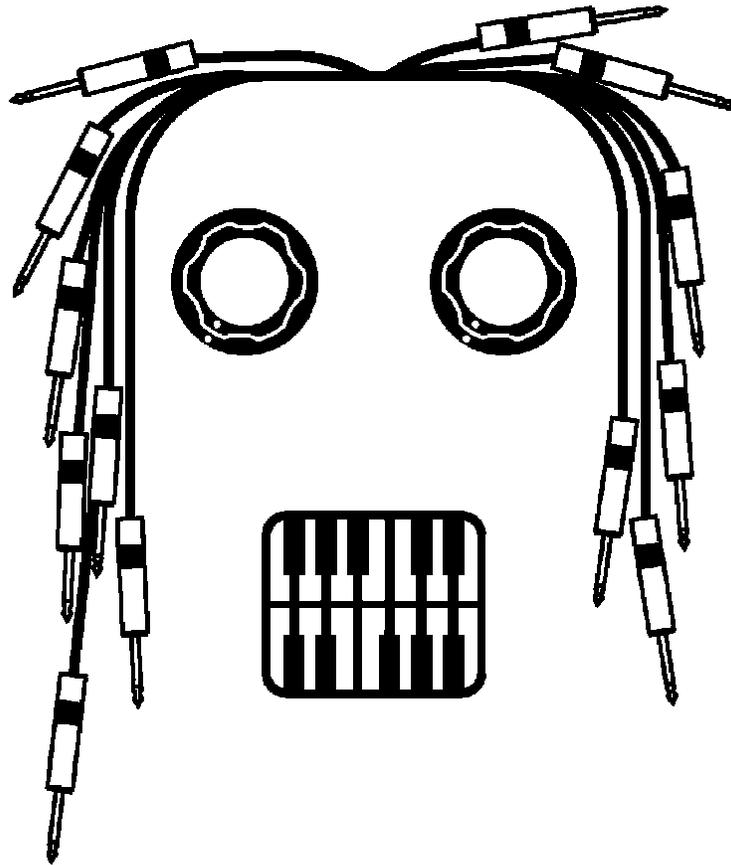
2N3904 NPN Transistor



2N3906 PNP Transistor



Patcher Jack



Synthesizers.com