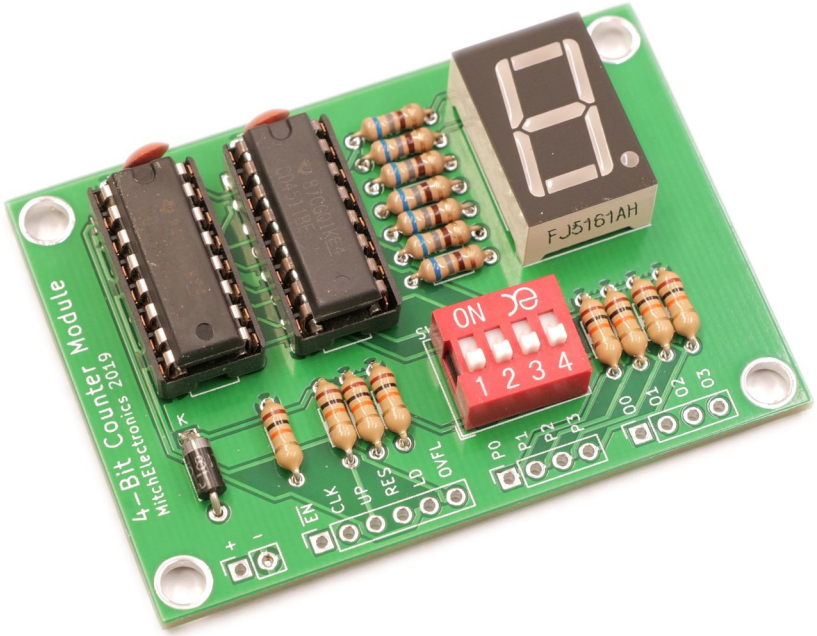
4-Bit Counter Module

MitchElectronics® 2020



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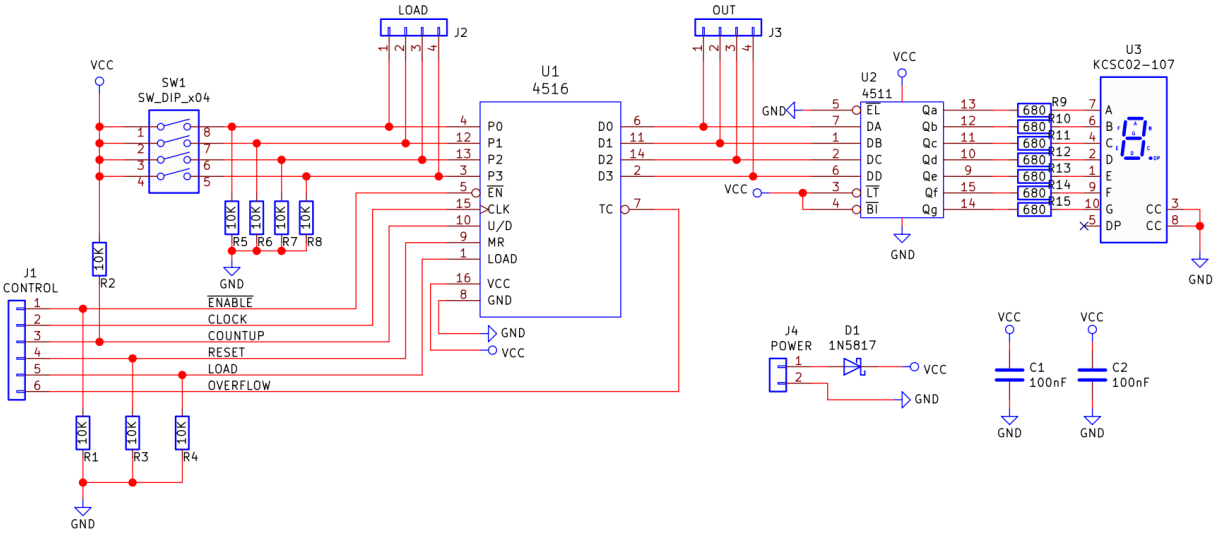
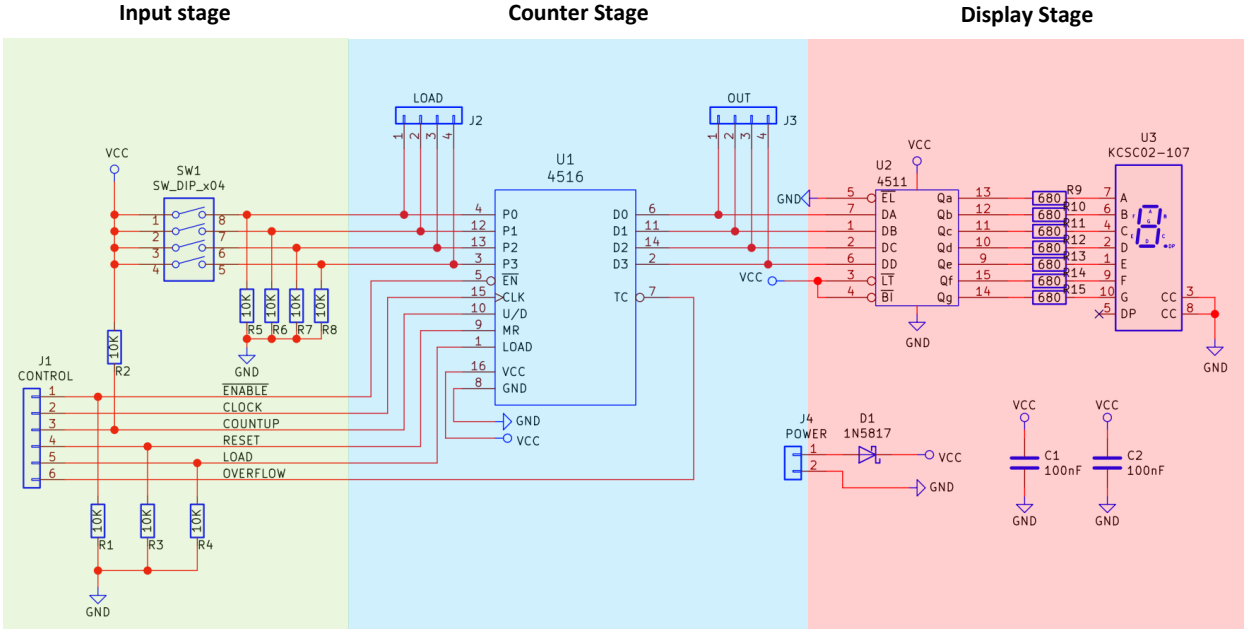
CONTENTS

SCHEMATIC



Schematic (Blocktised)

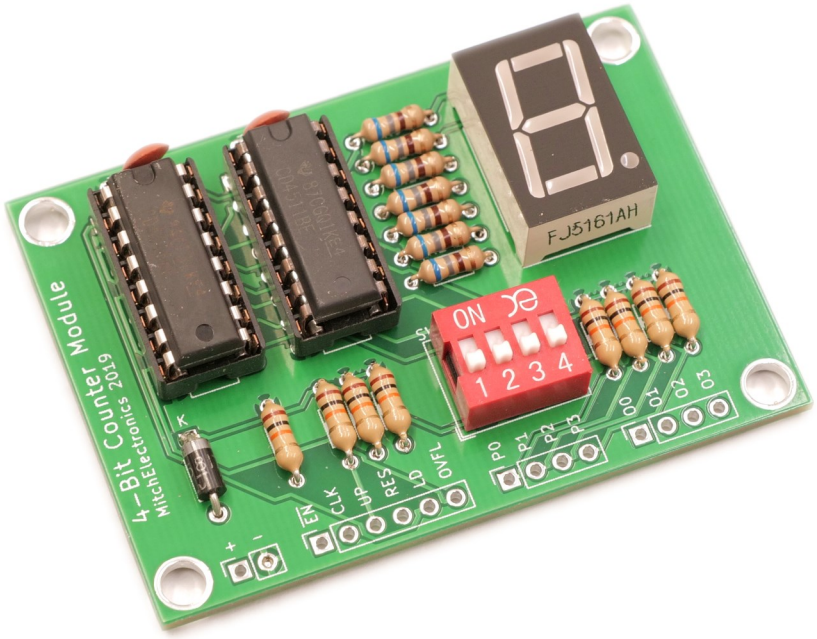


SCHEMATIC EXPLANATION

The 4-Bit Counter Module does exactly what it says on the tin and is a small 4-bit counter circuit based on the 4516. The counter module has three main stages with each stage responsible for a different function; input stage, counter stage, and display stage.

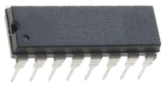
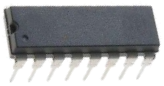
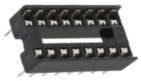
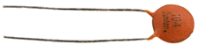
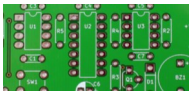
The input stage is responsible for taking signals from external sources which are accesible via the various pads. Signals which are responsible for inputs to the 4516 all have pull down resistors (R1, R3, R4, R5, R6, R7, R8) and this is to ensure that if there is no signal present then the default logic setting for these inputs is 0. The 4516 also has four inputs which can set the counter to a specific value and this is connected to an exteranl 4 way connector as well as a 4 way DIP switch. The DIP switch allows for a hardwired preset value to be chosen while the external pads allow for external signals to set the preset value.

The counter stage is simply a 4516 in no special configuration. The output of the 4516 is connected to the display stage as well as an external connector which allows for the binary output to be connected to external circuits. The display stage consists of the 4511 and a 7 seg display which converts the digital output of the 4516 to a decimal number which is displayed on the 7 seg display. Note that the 4516 counts in binary and has four outputs which means the largest number it can count to is 15 (1111). The 4511 can only output numbers between 0 and 9 so if the binary value of the 4516 goes beyond 9 then the segment will display nothing.



MATERIALS

Check that you have the following components

Component	Component Name	Quantity	Looks like
4516	U1	1	
4511	U2	1	
16 DIP Socket	U1, U2	2	
680Ω Resistor	R9—R15	7	
10KΩ Resistor	R1—R8	8	
100nF Capacitor	C1, C2	2	
1N5817	D1	1	
4 Way DIP Switch	SW1	1	
PCB	-	1	

CONSTRUCTION

Download the electronics construction manual

To learn how to construct circuits on PCBs download the Electronics Construction Manual from MitchElectronics using the link below. This document shows you how to install all electronic components used in MitchElectronics kits. The list below shows the sections relevant to this kit so do not worry if you see component sections in the document that don't come with this kit!

www.mitchelectronics.co.uk/electronicsConstructionManual.pdf

Relevant sections in the electronics construction manual

Resistors

Capacitors

Diodes

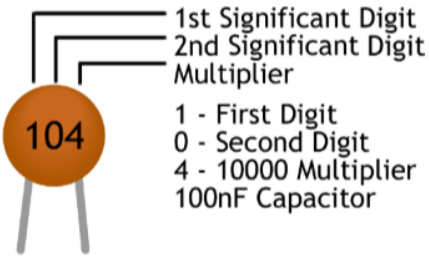
Switches

ICs

Wires

RESISTOR AND CAPACITOR IDENTIFICATION

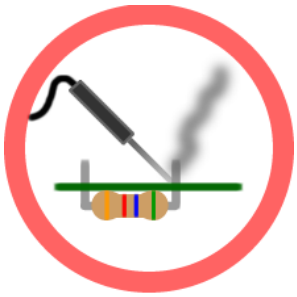
Colour	1ST Band	2ND Band	3RD Band	Multiplier	Tolerance
BLACK	0	0	0	1Ω	
BROWN	1	1	1	10Ω	±1%
RED	2	2	2	100Ω	±2%
ORANGE	3	3	3	1kΩ	
YELLOW	4	4	4	10kΩ	
GREEN	5	5	5	100kΩ	±0.50%
BLUE	6	6	6	1MΩ	±0.25%
VIOLET	7	7	7	10MΩ	±0.10%
GREY	8	8	8		±0.05%
WHITE	7	7	7		
GOLD					±5%
SILVER					±10%



IMPORTANT INFORMATION

RoHS Compliant Kit (Lead free)

Low Voltage Kit



Caution! Soldering Required

TERMS AND CONDITIONS

MitchElectronics Mission

The main goal of MitchElectronics products is to provide safe electronics to makers and professionals alike while keeping the cost affordable. MitchElectronics kits are ideal for classrooms whereby students can learn about electronics using a hands-on approach which is not only highly effective at teaching students but also improves hand-eye co-ordination as well as grow interest in electronics. Since MitchElectronics kits are aimed at novices and those who are new to electronics they are designed to use low voltage power supplies such as 9V batteries which are inherently safe due to their limited voltage and current capabilities.

MitchElectronics Liability

MitchElectronics kits must be inspected and tested by a competent individual before use and must be constructed by those who are competent to do so. MitchElectronics is not liable for kits and products that are constructed incorrectly or to a poor standard whereby poor standard includes (but not limited to) poor solder connections, overheated components, and damaged components. MitchElectronics is not liable for harm, injury, or damage caused by the misuse of kits and/or products if

- Incorrectly constructed
- Powered by sources other than “portable batteries” or the specified power supply
- Kits used outside their operational range (such as voltage supply, temperature etc.)
- Used as a sub-system (i.e. connected to additional circuits and modules)
- Used in a non-educational environment
- Used in a commercial environment
- Used in any dangerous or potentially hazardous environment
- Purchased from an unauthorised third party

Portable batteries refers to low powered alkali batteries. Lithium-based batteries and those with large current capabilities (such as lead-acid batteries) are not considered portable or safe

The use of the kits or products in the above scenarios automatically voids any warrantee or guarantee of that kit or product.

Kits must be

- Inspected for damage before and after construction
- Inspected for missing parts
- Constructed correctly by a qualified individual
- Used in an appropriate manner (i.e. within operational ranges)
- Purchased from an authorised seller

Those who are not competent to construct, inspect, and test kits and products must be accompanied by a competent individual and that competent individual assumes all responsibility for harm or damages and MitchElectronics is not liable for any harm or damage.

Missing Parts

MitchElectronics is only liable for missing parts for kits that have been purchased within 28 days and that have been purchased directly from www.mitchelectronics.co.uk. MitchElectronics is not liable for any product sold by an unauthorised third party.