Shuffle Scoring Board

Download this project in PDF

One Digit	Two Digits	Up/Down Counter	Three Digits	Shuffle Score Board

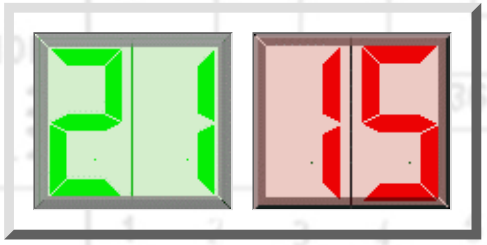
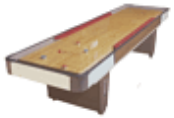


Table Shuffleboard Counter



If you own a Shuffleboard and do not have a scoring board you most likely have looked into purchasing such a board and found out that the asking price for a set of scoring boards would set you back hundreds of dollars . With a bit of experience and skill you or/and a friend can build this automatic scoring board for less than $100.00 and a bit more for two . Two would be required , one for each team of players .

I originally designed this system a few years back for a local shuffle board manufacturer . The original design provided for each player to insert a quarter to set up the scoring logic . A short time after delivery of the prototype to the customer , his business went under . So it was never used until now . While I was writing these web pages on counters it occurred to me that it would make a good project so I dug up the old design , updated and modified the logic circuit with fewer components and elimited a few bells and whistles .

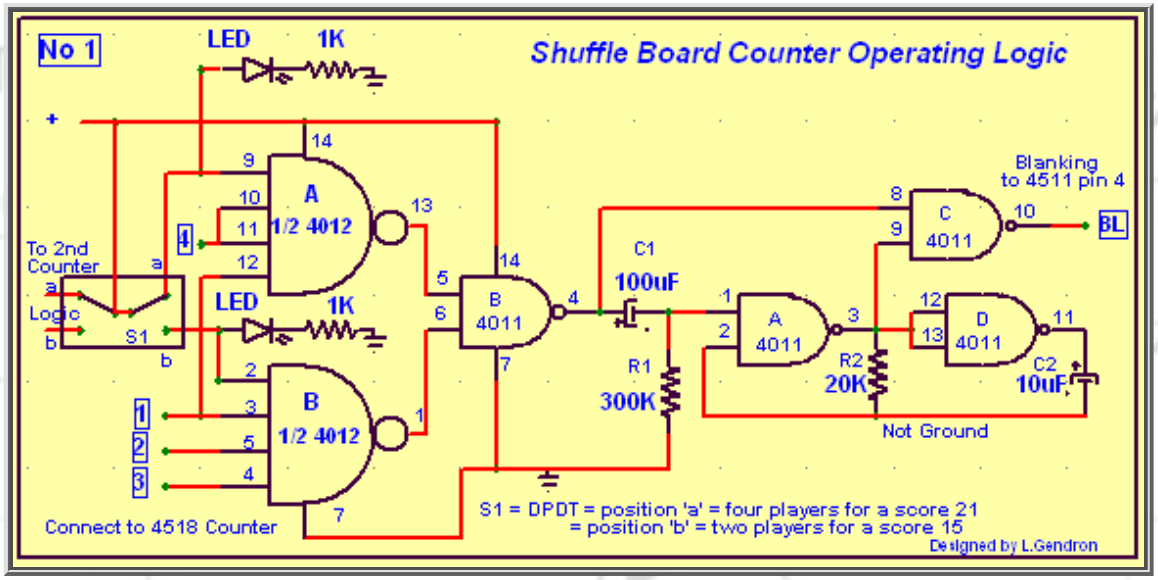
The Logic Control Circuit

Below is the circuit for the Logic Control circuit . You may chose not to include it in your project but it is really simple and cheap to build , beside it would surely impress your friends and guests as it is completly automatic in function .

Here is what it will do for you

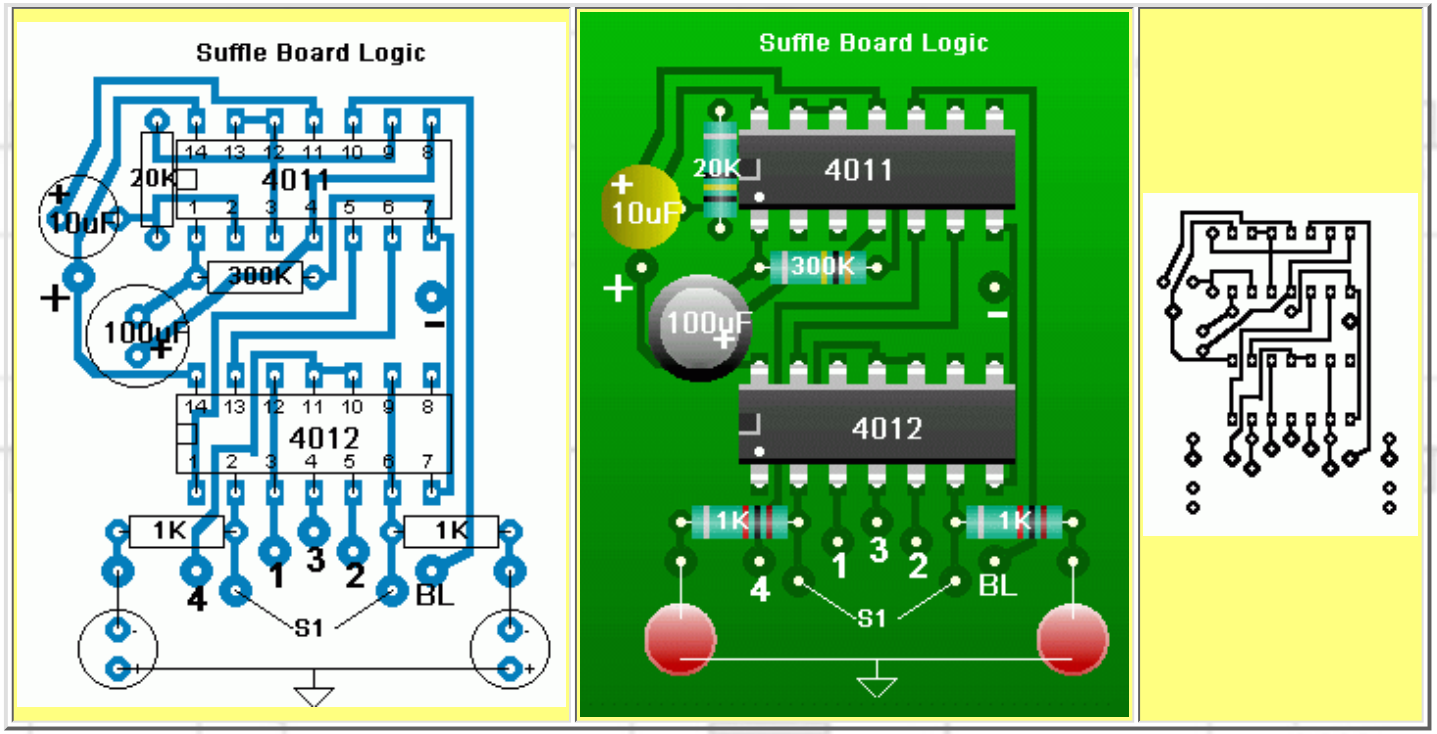
After setting S1 to position 'a' for 2 teams of two players or more the Logic Control will be programmed to count up to a winning score of "21", or position 'b' for just two players for a winning score of 15 .

- S1 is a DPDT switch with one side connected to Scoring Logic board #1 and the other side to Logic board #2 , so that both scoring board are programmed with the same winning scoring set-up .
- Each team enters their score on their respective scoring board and as soon as the winning team reaches the set winning score the display will start flashing for a few seconds then resets both counters to zero ready for the next game .



How does it works

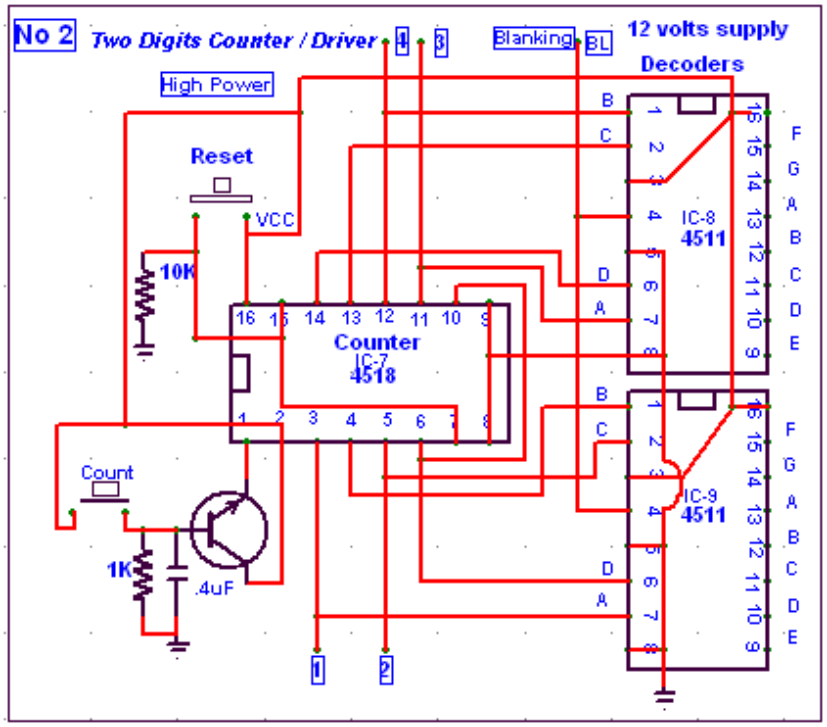
- When S1 being connected from the + supply is set to 'a' or 'b' it enter a high bit (1) into the selected inputs of the CMOS 4012 which is a Dual 4-input "NAND" Gate IC . Some of the inputs of the 4012 are connected as shown on # 2 circuit to monitor the BCD logic of the CMOS 4518 . Those connections points are indicated by boxed numbers 1 to 4 .
- Until all the inputs of gates A and B of the 4012 are not at logic (1) the two gates output will remain at a logic High (1) . As soon as two of the BCD logic are detected as high (1) corresponding to a dispay of 15 or 21 the two gates outputs will change to a low (0) .
- The two low logic from the gates A and B of the 4012 are connected to gate "B"of the CMOS 4011 which is a Quad 2-input "NAND" Gate . The output of gate "B" will change from a logic (0) to a (1) and charge the 100uF (C1) capacitor combined with the 300K (R1) resistor form a timer and at the same time activate a slow cycle oscillator made of gates "A" and "D" and associated resistor (R2) and capacitor (C2) . At he same time gate "C" being connected to monitor the output of Gate "B" which is at a logic (1) and the junction of gates "A" and "D" the logic of which is fluctuating between high and low will also produce a fluctuating logic at the output of gate "C" which is connected to the Blanking inputs (pin 4) of both 4511 decoder which in turn will flash the displays on-off .
- As soon as the capacitor is discharged throught R1 the output logic (1) of gate "B" will change to (0) and the oscillator will stop . Gate "C" inputs will now be low (0) and its output will be high (1) and reset the displays to '00' ready to resume counting .
- The LEDs are used to indicate the setting of S1 'a' or 'b' and therefore the scoring set-up . Other types of indicators may be used .

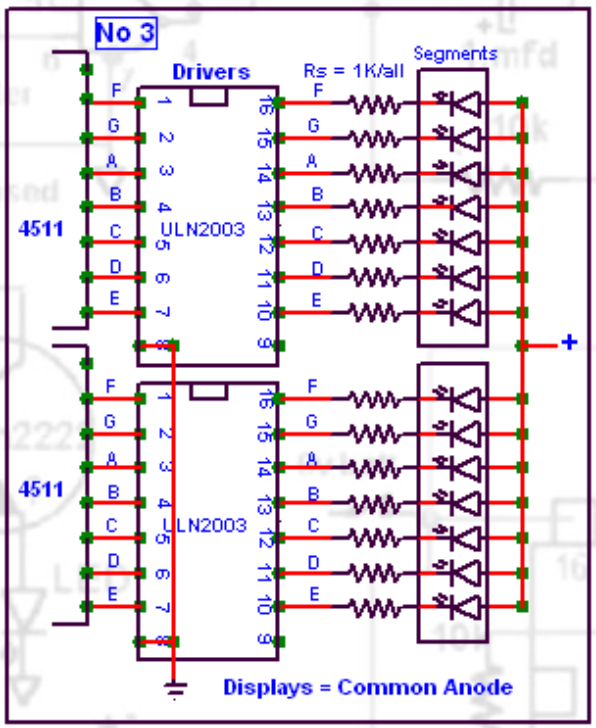


The Counter

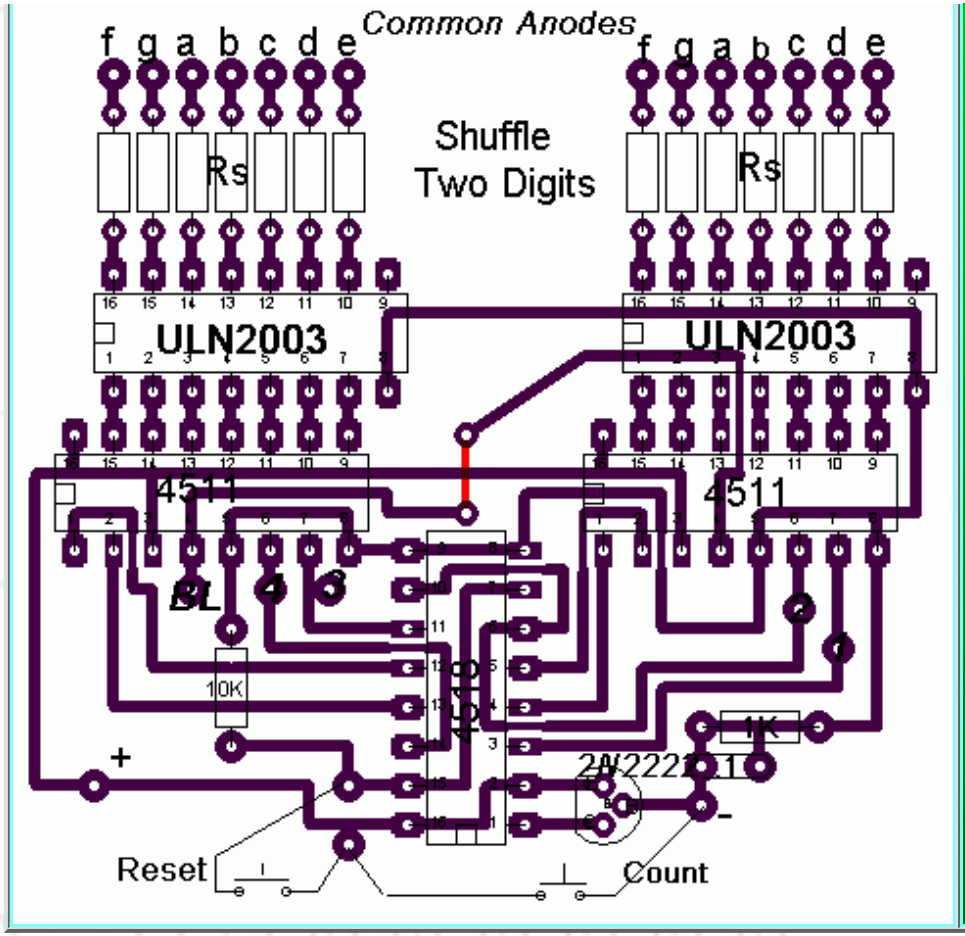
Following the same principles used previously , a two digits counter , circuit # 2 is shown below with the CMOS 4518 . Building the Two Digit Counter requires that we use both counters and one half each of the two available counters is used to drive a CMOS 4511 Decoder / Driver IC to activate each one of the two displays . In this application Common Anodes LEDs Displays are used and Circuit # 3 showing a ULN2003 or MC1413 Darlington Arrays Transistors both ICs are interchangeable and must be added to the 4511 to drive large Common Anode displays .

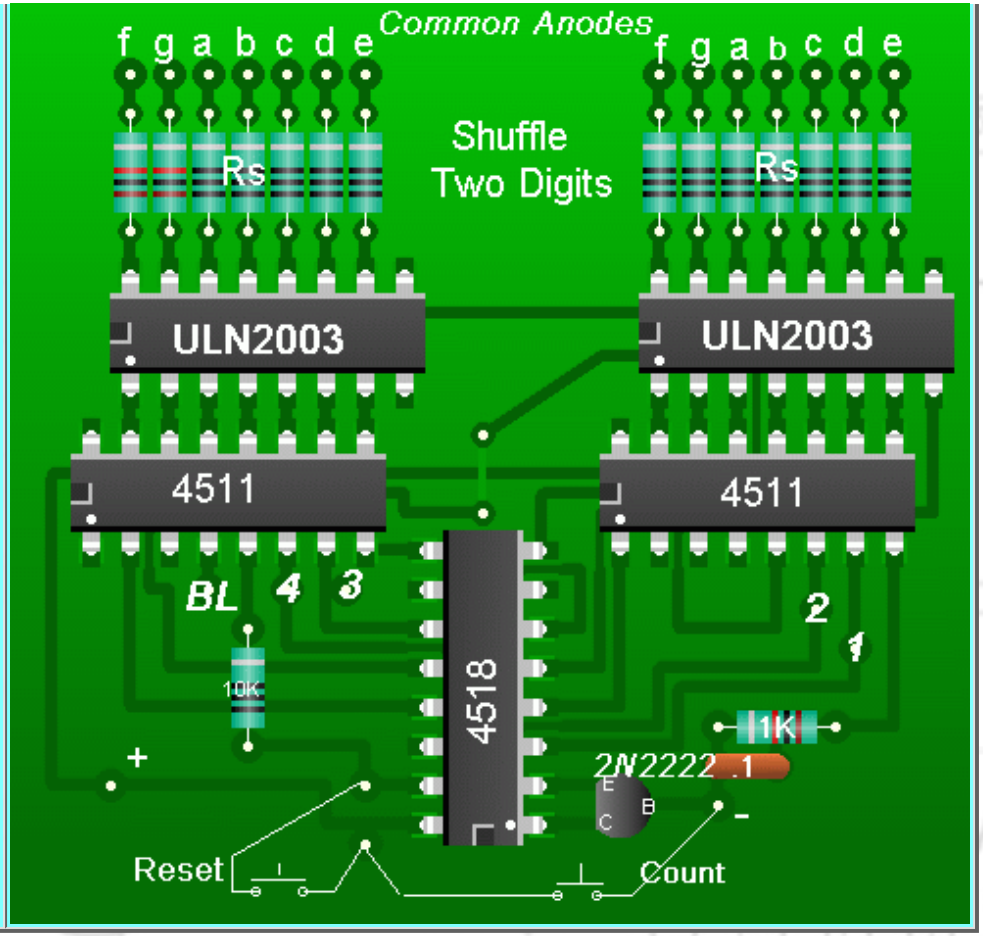
The two digit counter is the same as previously described . Connecting points indicated by the boxed numbers 1 to 4 have been added as well has a connection point from both pins 4 of the 4511 decoders for display blanking as described in the logic set-up .
The Reset is made available so that the counter cand be reset at any time during a count .

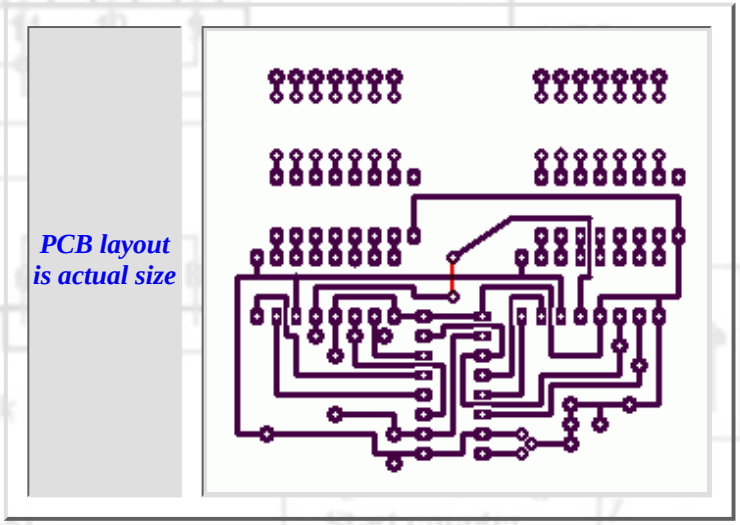




The suggested layout of the counter includes the ULN2003 or MC1413 .


Common Anodes
f g a b c d e
Shuffle
Two Digits
Rs
ULN2003
4511
BL
10K
1K
2N2222
Reset
Count

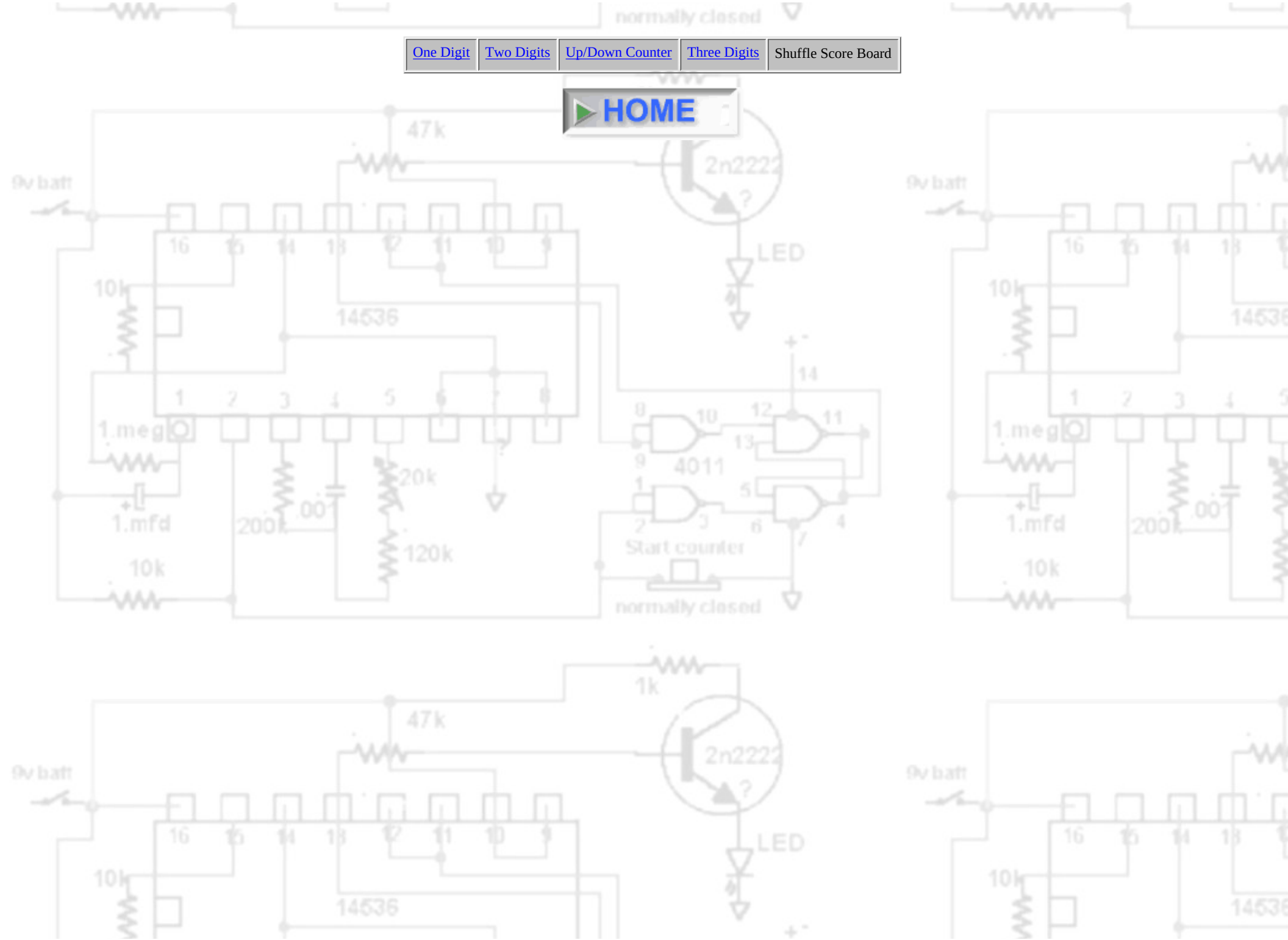

Common Anodes
f g a b c d e
Shuffle
Two Digits
Rs
ULN2003
4511
BL
4
3
2
1
10K
4518
1K
2N2222
Reset
Count


PCB layout
is actual size

[Next page](#)

One Digit | Two Digits | Up/Down Counter | Three Digits | Shuffle Score Board

HOME



Shuffle Scoring Board

One Digit | Two Digits | Up/Down Counter | Three Digits | Shuffle Score Board

Displays, to buy or not to buy ?

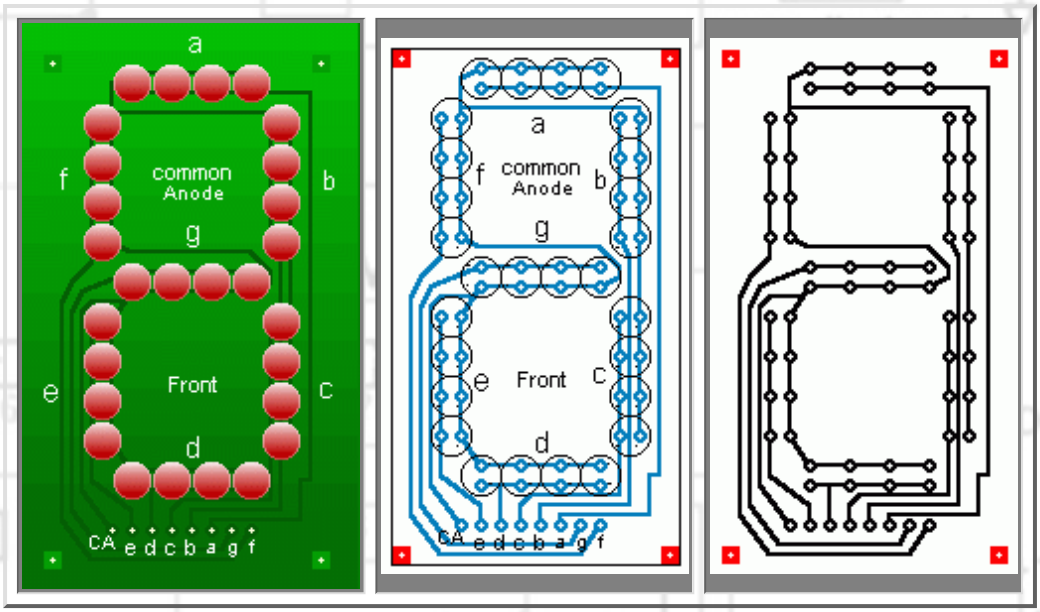
You can buy large displays for about (US) $10.00 each or more which require only 20 mA per segments . Since I recommend that only 10 mA per segment be allowed we are looking at a total current for two displays of about 140 mA plus the current for the circuit boards and if this is the way you chose to go you can then use Common Cathode displays and eliminate the use of the ULN2003/MC1413 and connect the display directly to the Rs resistors.

Very large 20cm (7.8") Common Anode LED Displays in Kit form can be purchased HERE for $39.95 US

On the other hand making your own displays with a bunch of matched LED could be fun and save you quite a few bucks . Because they would require more current the ULN2003/MC1413 will be needed as well as a higher source of current .

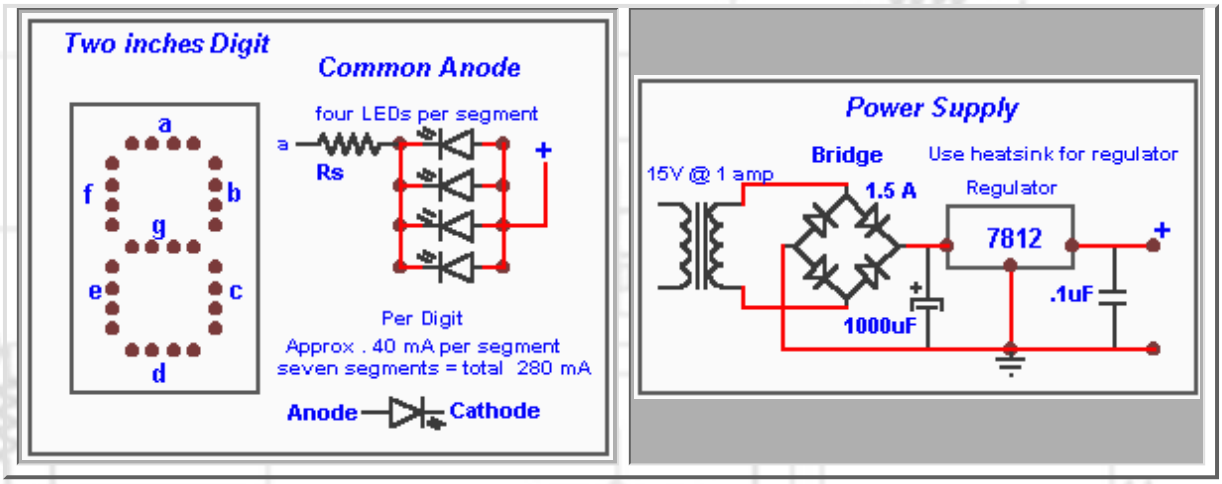
Displays, making your own

Making large displays is not difficult , you can use two PCB layout side by side or wire each LEDs as shown on a perforated board large enought to accomodate two display side by side . The Displays will measure approx. 2" high and each segment will consist of four LEDs charing a current source controlled by Rs . As the drawing shows each segment will require 10mA times 4 or 40mA times 7 segments or 280 mA per display . So for two displays we will require a current source of 560 mA plus the circuits current . So we can safely settle on a 15 volts transformer rated at 1 amp for a regulated voltage output of 12 volts for the power supply for each two digits scoring board.



Use the brightest LED you can find , round or rectangular , you will need a total of 28 LEDs per display . Two different colours for each scoring board , like red and green plus a few spare LEDs for replacement in case some are or go bad .

Once you have completed the displays , a plastic filter of the same colour will be needed to cover the size of the two displays . These filter (1/8' thickness) can readily be purchased and cut to size from scrap by your local plastic supplier at a very little cost .

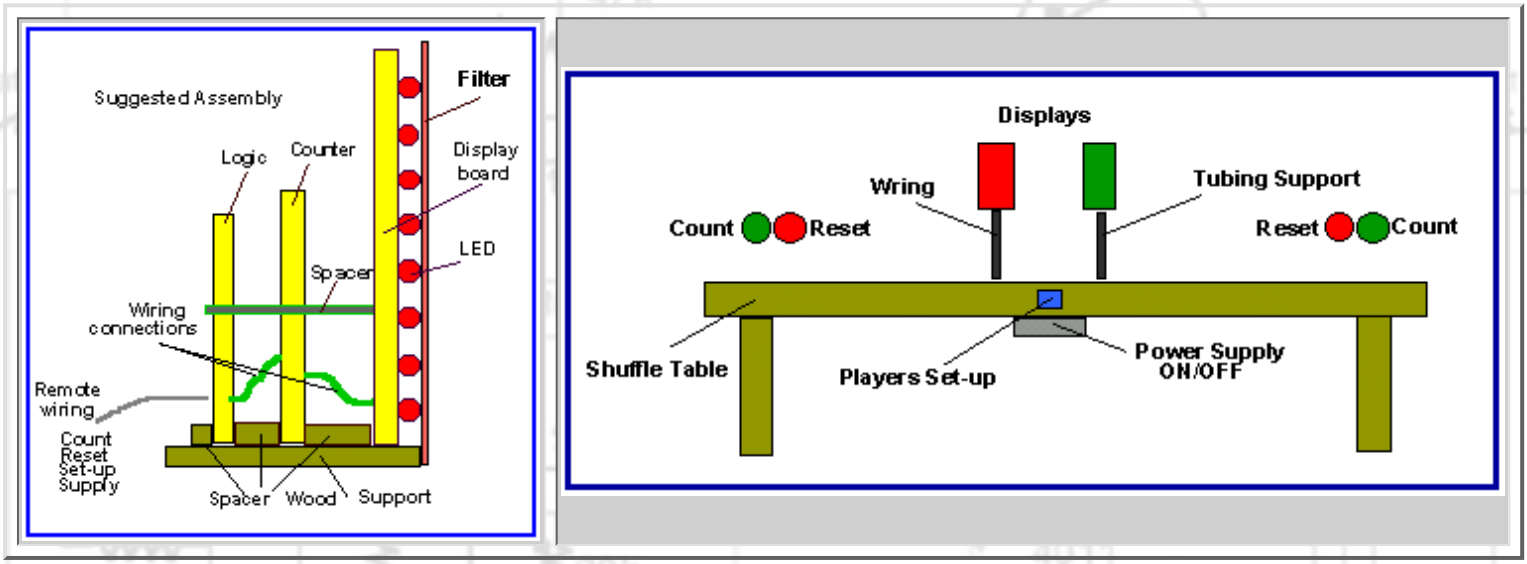


Power Supply

A schematic of a power supply is shown above . The transformer rating is for one two digits scoring board . It may be judged more economical to use only one transformer for both scoring board with an increased current rating of 2 amps , but we run into the regulator problem where it is only rated for 1.5 amps . On the other hand the system will tolerate and unregulated supply , so we can use a single transformer rated at 12 volts/2 amps and a 3 amps rectifier bridge filtered by a large capacitor of 1000uF/25 volts .
Or as previously stated , use two lower rated transformers with regulators for each scoring board , the AC supply source to each or all transformers should be controlled by an on/off switch .

General Assembly

Shown below is a suggested general assembly of the scoring system . The scoring board assembly should be put into an enclosure of your choice and mounted as shown by a supporting pipe or tube into which all the wiring can be routed to the shuffle board table power supply , control buttons and set-up switch . The power supply for safety should also be enclosed into a box with adequate ventilation and mounted on the side or under the table alongs with the ON/OFF switches .
Nice large coloured game push buttons are available for a very reasonable price and could be mounted into a small box and secured to the side of the table flush with the table top .



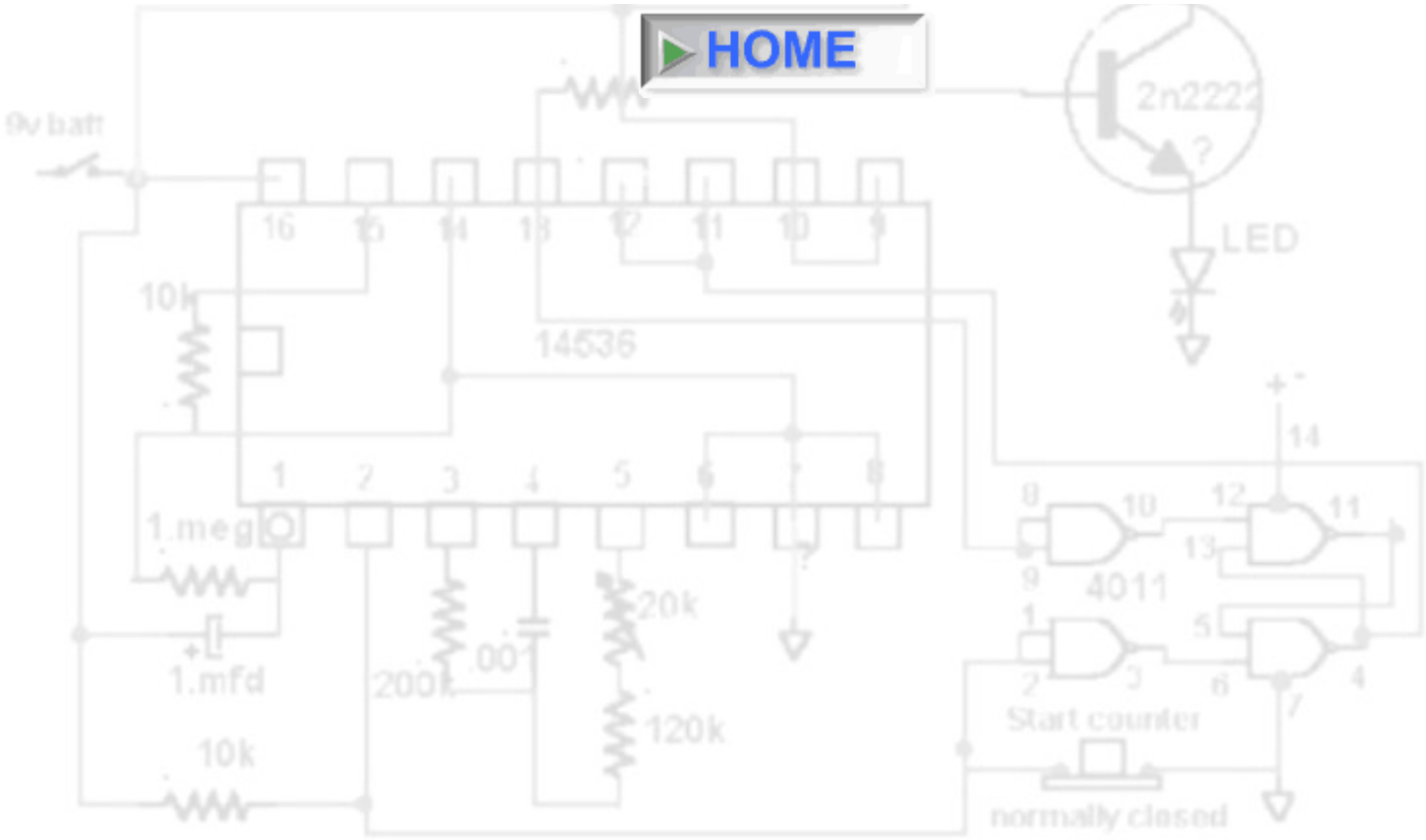
May this project bring you great satisfaction , I tried very hard to include all the necessary information to make this project as easy as possible . A visit to the following sites will surely give you more insight and spark your imagination .

Recroom-products
Home gameroom

Back to page 1

One Digit	Two Digits	Up/Down Counter	Three Digits	Shuffle Score Board

HOME


9v batt
2n2222
LED
10k
14536
1.meg
1.mfd
200k
.001
20k
120k
10k
4011
Start counter
normally closed

1k
47k
9v batt
2n2222
LED
10k
14536
1.meg
1.mfd
200k
.001
20k
120k
10k
4011
Start counter
normally closed

1k
47k