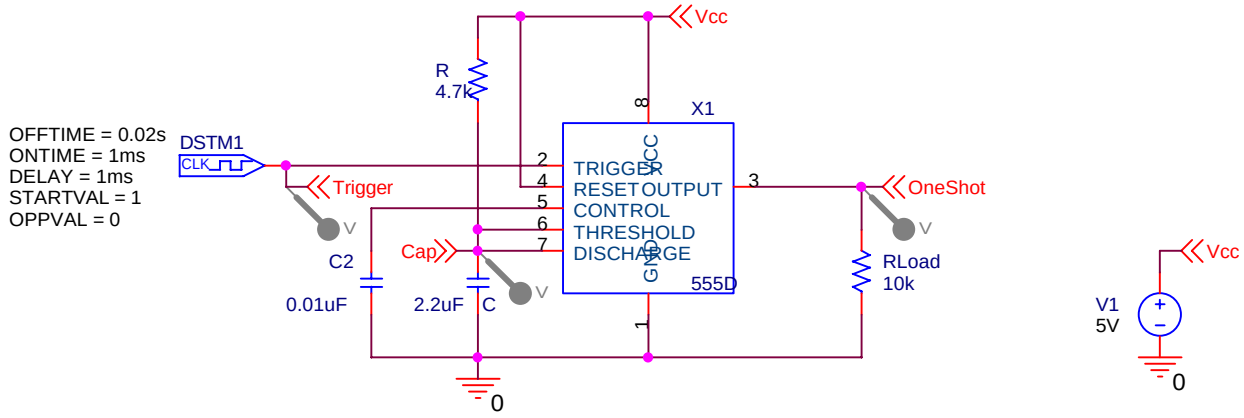
EGR 270
Fundamentals of Computer Engineering
File: OneShot.opj

Using a 555 Timer as a One-Shot (monostable multivibrator)

Purpose: A 555 Timer circuit can be easily configured as a one-shot (monostable multivibrator) by adding an external resistor and capacitor. When the Trigger input (pin 5) goes momentarily LOW, the output (pin 3) of the 555 timer will go HIGH for 1.1RC seconds. The one-shot is "non-retriggerable", so additional LOW pulses on the Trigger input will be ignored until the output is LOW again.

Analysis: For this example, 1.1RC = 1.1(4.7k)(2.2u) = 114 ms, so a transient analysis will be performed until 15ms.



Notes:

1) Best results are obtained using R > 1k.

2) A Digital Clock from SOURCE library was used to trigger the one-shot.

3) OFFPAGE symbols (<<C on the toolbar) were used to give the trigger, capacitor, and output voltages easily recognizable names.

4) Voltage markers (from the PSPICE menu) were added so that Trigger, Cap, and OneShot would be automatically graphed after analysis.

5) The 5V power supply was connected using an OFFPAGE symbol. This is unnecessary, but is often convenient since the supply voltage may be connected to many points in the circuit.

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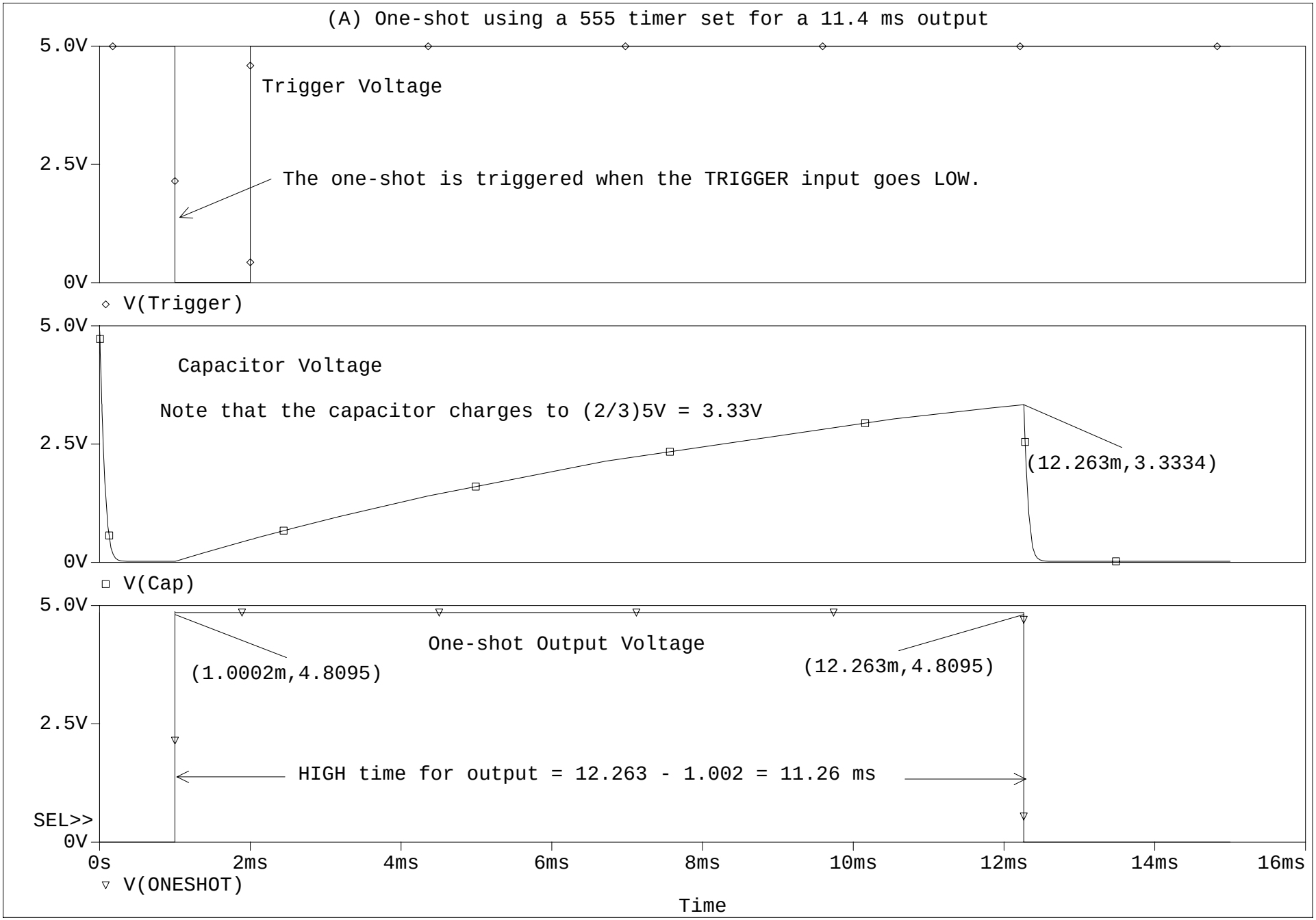
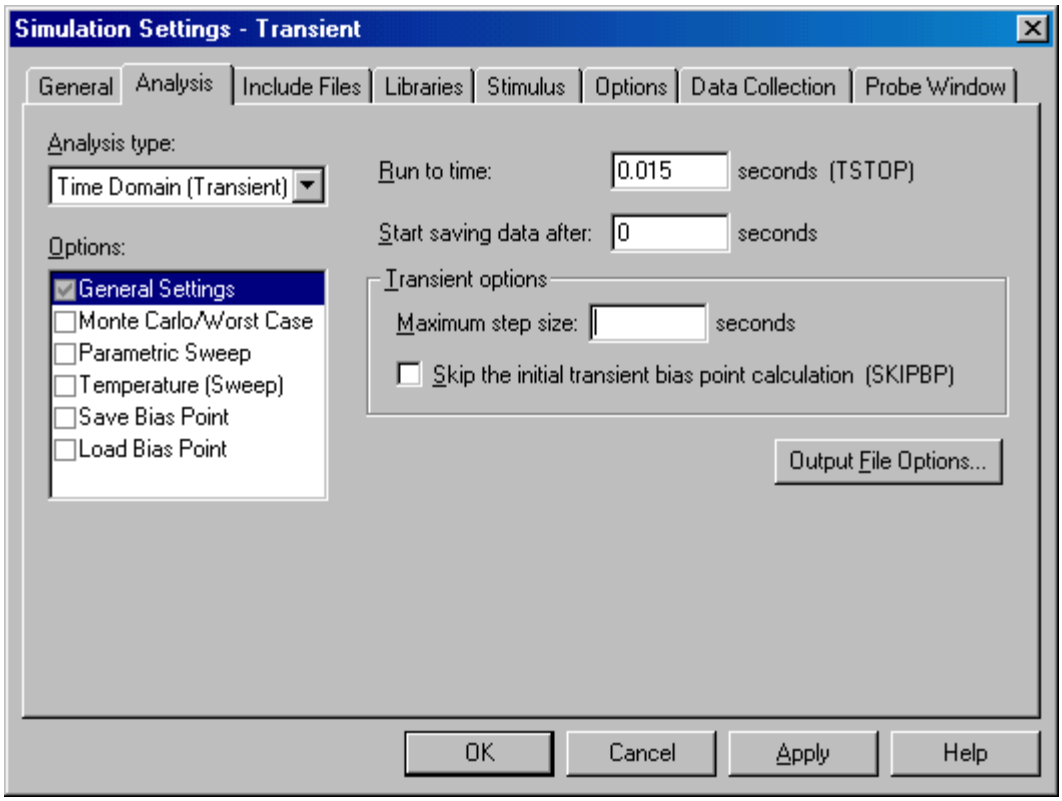

(A) One-shot using a 555 timer set for a 11.4 ms output
5.0V
2.5V
0V
Trigger Voltage
The one-shot is triggered when the TRIGGER input goes LOW.
V(Trigger)
Capacitor Voltage
Note that the capacitor charges to (2/3)5V = 3.33V
(12.263m,3.3334)
V(Cap)
One-shot Output Voltage
(1.0002m,4.8095)
(12.263m,4.8095)
HIGH time for output = 12.263 - 1.002 = 11.26 ms
SEL>>
0s
2ms
4ms
6ms
8ms
10ms
12ms
14ms
16ms
V(ONESHOT)
Time


Simulation Settings - Transient
General
Analysis
Include Files
Libraries
Stimulus
Options
Data Collection
Probe Window
Analysis type:
Time Domain (Transient)
Options:
General Settings
Monte Carlo/Worst Case
Parametric Sweep
Temperature (Sweep)
Save Bias Point
Load Bias Point
Run to time:
0.015
seconds (TSTOP)
Start saving data after:
0
seconds
Transient options
Maximum step size:
seconds
Skip the initial transient bias point calculation (SKIPBP)
Output File Options...
OK
Cancel
Apply
Help