CSS
Custom Silicon Solutions, Inc.

CSS555 EZ Programmer

Operating Manual

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Contents

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Operating Instructions & Features

The EZ Programmer provides a quick and simple method of reading and programming CSS555 & CSS555C devices. Some of its features include:
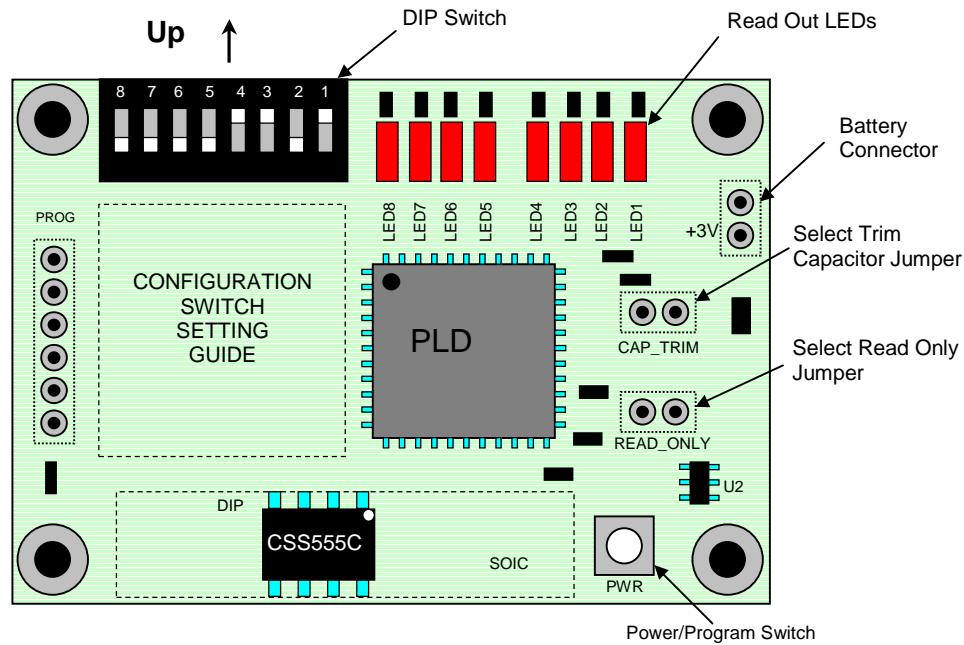
Features
   Stand alone programmer (no PC required)
   Runs on two AAA batteries
   Provides both PROGRAM & READ functions
   Provides access to both Configuration & Capacitor Trim data
   Comes with a DIP socket, but can be easily be adapted for SOIC packages

Operating Instructions
A small PLD (Programmable Logic Device) controls the serial interface signals used to program and read the CSS555 device. New configuration data is entered via a DIP switch. Data is read back after programming and displayed by LEDs. The Program and Read cycles are automatically run each time the power button is pressed and held ON. (See the PCB drawing on page 3) The LEDs blink while the program cycle is underway. When the program cycle has finished, the new data is displayed on the LEDs until the POWER switch is released.

Programmer Board

Up ↑   DIP Switch   Read Out LEDs

Battery Connector

Select Trim Capacitor Jumper

Select Read Only Jumper

Power/Program Switch

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Operating Instructions (cont)

The programmer can be powered with two AAA batteries or a regulated +3.3V±5%, 100mA DC supply. After connecting power to the PCB, insert the CSS555(C) observing proper ESD handling practices. To program new configuration data, set the DIP switches to the appropriate positions. The function of each switch is shown in the "Configuration Settings" table on page 5. (A setting guide is also provided on the PCB.) To read the configuration settings only (no programming), install the "Read Only" jumper. If the device is a CSS555C with an internal timing capacitor, a second jumper allows Read/Write access to the capacitor trim data.

After applying power and configuring the DIP switches and jumpers, the Program and Read cycles are executed by pressing and holding the push-button Power switch. Programming takes about two seconds. When completed, the LEDs will stop blinking and the steady display shows the value of the new configuration (or capacitor trim) data. The display remains on until the power button is released. Releasing the power switch powers down the IC and programmer, making it safe to remove the CSS555 device.

Examples of various programming cycles are shown on pages 7 - 10.

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555 Timer Configuration Settings Table

Switch Setting 8 7 6 5 4 3 2 1	Counter Setting	Switch Setting 8 7 6 5 4 3 2 1	Configuration Settings
x x x x x ↓ ↓ ↓	1	x x x x ↓ x x x	Astable (if Count ≠ 1)
x x x x x ↓ ↓ ↑	10	x x x x ↑ x x x	Monostable (if Count ≠ 1)
x x x x x ↓ ↑ ↓	100	x x x ↓ x x x x	Micro-power
x x x x x ↓ ↑ ↑	1K	x x x ↑ x x x x	Low-power
x x x x x ↑ ↓ ↓	10K	x x ↓ x x x x x	Standard trip levels (⅓, ⅔)
x x x x x ↑ ↓ ↑	100K	x x ↑ x x x x x	LV trip levels (10%, 90%)
x x x x x ↑ ↑ ↓	1M	x ↕ x x x x x x	Bit 7 Not used
x x x x x ↑ ↑ ↑	1	↕ x x x x x x x	CSS 555/555C (Read only)

Notes:
Set Counter to 1 for standard 555 operation
Switch 4's setting is only used if Counter setting is > 1.
Bit 8 is Read Only. Switch 8's setting has no affect during programming.
LED 8 OFF = CSS555 (No internal timing capacitor)
LED 8 ON = CSS555C (100pF Internal timing capacitor)
See CSS555 spec for more details.

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Internal Timing Capacitor Trim Table (CSS555C only)

Switch Setting 8 7 6 5 4 3 2 1	Switch Value	Trim Capacitor Value
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	0	~ 85pF (minimum)
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↑	1	Minimum + 1/8 pF
↓ ↓ ↓ ↓ ↓ ↓ ↑ ↓	2	Minimum + 1/4 pF
	3 - 126	85 to 100 pF
↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑	127	Mid – 1/8 pF
↑ ↓ ↓ ↓ ↓ ↓ ↓ ↓	128	~100 pF (mid)
↑ ↓ ↓ ↓ ↓ ↓ ↓ ↑	129	Mid + 1/8 pF
	130 - 252	100 to 115 pF
↑ ↑ ↑ ↑ ↑ ↑ ↓ ↑	253	Maximum – 1/4 pF
↑ ↑ ↑ ↑ ↑ ↑ ↑ ↓	254	Maximum – 1/8 pF
↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑	255	~ 115pF (maximum)

Notes:
Switch 1 & LED 1 = LSB, Switch 8 & LED 8 = MSB
The timing capacitor is trimmed to 100pF at the factory. To preserve its value,
read the original setting before programming in a new one.

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Example #1 – Program & Read the Configuration Settings

Settings: Counter = 1K, Monostable, Standard Trip Levels, Micro-Power

1) Connect the battery to the programmer board.
2) Install a CSS555(C) part into the test socket.
3) Set the DIP Switches.
  Refer to the "Switch Setting Guide" (on the PCB) or Table on page 5.
  Set switches to: 1=Up, 2=Up, 3=Down, 4=Up, 5=Down, 6=Down
     (Switches 6 & 7 are "Don't Care")
     (Up = towards the edge of the board, as shown on page 3)
4) Check jumpers. (CAP_TRIM & READ_ONLY should NOT be installed)
5) Press and HOLD the POWER bush-button switch.
  The **RED** LEDs will blink for about 2 seconds.
6) Check the new configuration setting (Continue holding the Power switch ON)
  The LEDs will display the new configuration setting.
  LEDs 1-7 should match the DIP switch settings.
  LED 8 indicates the device type, CSS555 or CSS555C (ON = CSS555C)
  (Bit 8 is "Read Only", Switch 8 will not change the part type.)
7) Release the Power switch and remove the part.

Example #2 – Read the Configuration Settings (No Program)

Switch Settings: None for Read Only (DIP Switch is not used)

1) Connect the battery to the programmer board.
2) Install a CSS555(C) part into the test socket.
3) Set all the DIP Switches to "Down".
  This step is optional – the switch data is not used for READ.
  (Up = towards the edge of the board, as shown on page 3)
4) Check jumpers.
  READ_ONLY jumper MUST be installed. (Read Only = Enabled)
  CAP_TRIM jumper should NOT be installed. (Trim Cap NOT selected)
5) Press and HOLD the POWER push-button switch.
  The **RED** LEDs will blink for about 2 seconds.
6) Check the configuration setting (Continue holding the Power switch ON)
  LEDs 1-7 display the configuration setting.
  LED 8 indicates the device type, CSS555 or CSS555C (ON = CSS555C)
7) Release the Power switch and remove the part.

Example #3 – Read the Capacitor's Trim Setting (CSS555C only)

Switch Settings: None for Read Only (DIP Switch is not used)

1) Connect the battery to the programmer board.
2) Install a CSS555C part into the test socket.
3) Set all the DIP Switches to "Down".
    This step is optional – the switch data is not used for READ.
    (Up = towards the edge of the board, as shown on page 3)
4) Check jumpers.
    READ_ONLY jumper MUST be installed. (Read Only = Enabled)
    CAP_TRIM jumper MUST be installed. (Trim Cap selected)
5) Press and HOLD the POWER bush-button switch.
    The **RED** LEDs will blink for about 2 seconds.
6) Read the trim setting (Continue holding the Power switch ON)
    The LEDs will display the trim setting in binary.
    LED 1 = LSB, LED 8 = MSB.
    See "Capacitor Trim Table" on page 6 to convert binary to pF.
7) Release the Power switch and remove the part.

Example #4 – Adjust the Capacitor's Trim Setting (CSS555C only)

Settings: Increase timing capacitor value by ~ 1pF

1) Connect the battery to the programmer board.
2) Install a CSS555C part into the test socket.
3) Read the binary trim setting per Example #3
4) Set the DIP Switches.
    To increase the capacitor value by 1pF, add 8 to the trim value.
    Set switches 1 - 8 to the new binary value
    Switch 1 = LSB, 8 = MSB; DOWN = 0, UP = 1
    (Up = towards the edge of the board, as shown on page 3)
5) Check jumpers.
    READ_ONLY jumper should NOT be installed. (Enable programming)
    CAP_TRIM jumper should be installed. (Trim Cap selected)
6) Press and HOLD the POWER bush-button switch.
    The **RED** LEDs will blink for about 2 seconds.
7) Read the new trim setting (Continue holding the Power switch ON)
    The LEDs will display the trim setting in binary. (LED 1 = LSB)
    LEDs 1-8 should match the DIP switch settings.
    See "Capacitor Trim Table" on page 6 to convert binary to pF.
8) Release the Power switch and remove the part.

Mini CD Contents

1) CSS555 & CSS555C Specifications (PDF)
2) CSS555 Application Notes (PDF)
    CSS555_App_Note1_Serial_Interface
    CSS555_App_Note2_SPICE_Model
    CSS555 Application Circuits
3) CSS555 & CSS555C SPICE Models (Text)
4) Delay Calculators (Excel)
    CSS555_Calc.xls
    CSS555_Adj_Duty_Calc.xls
5) EZ Programmer Operating Manual (PDF)

Programming SOIC Packages

Your CSS555 programmer comes with an 8-pin DIP socket pre-installed. There are two simple options to convert it for use with SOIC packages.

Option #1 – SOIC Packages Only
Remove the DIP test socket and replace it with an SOIC socket. The PCB routing and thru-holes are designed to accept either socket. The SOIC socket is:
8 Pin SOIC Socket: 3M PN = Textool 208-7391-55-1902

Option #2 – DIP and SOIC Packages
Purchase the SOIC socket listed above and a DIP Ribbon Cable, part number:
CW Industries, PN C2PXS-1406M. (14 conductors is the smallest size available)
The connector side of the cable plugs into the DIP socket. Solder the wires that connect to DIP pins 1-8 to the corresponding SOIC socket pin. With this adapter, the programmer can be used with either DIP or SOIC packages.

The programmer can also be used to program parts after they have been installed into a system. For more information on how to do this, see page 5 of "CSS555_App_Note1_Serial_Interface.pdf".

Troubleshooting Tips

Symptom	Possible Problem
LEDs never come on	Dead battery
	Battery installed backwards
	Battery not connected
Data always = All 0's	CSS555 installed backwards
Data always = All 1's	CSS555 not installed (open socket)
	CSS555 not fully seated or a bent pin
Data won't change	"Read Only" jumper is installed
	Bad IC (try another)
Wrong data	Power switch "glitched"
	Bad IC (try another)

The CSS555 has ESD protection rated at 5,000V. However, like all CMOS ICs, always avoid electrostatic buildup to prevent damage to the device.

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Contact Information

Thank you for purchasing the CSS555 EZ Programmer. For more information or assistance, please contact Custom Silicon Solutions at:

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