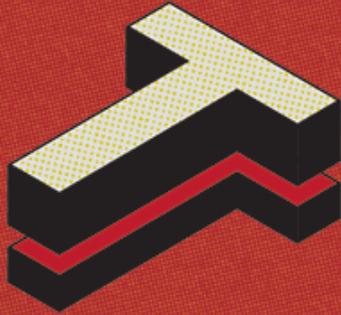


CraftyMech





## Test Pattern Generator

Updated 6/7/2021 - Firmware 05  
(C) 2014-2021 CraftyMech LLC

<http://craftymech.com>

# Usage

The Test Pattern Generator produces display patterns for use with Standard Resolution (15.7khz) and Medium Resolution (24khz) RGB monitors. These patterns may be used to calibrate a display, or diagnose display issues.

## FEATURES

- Selectable resolution (Standard/Medium)
- Single button operation
- On-screen Menu for easy configuration
- +/- H,V Sync, +/- Composite Sync
- R,G,B Cut-off
- Inverted video mode for Sanyo/Sharp monitors
- Battery level indicator
- Low-power Sleep mode (15,30,45,60 minute timer)
- Uses 9V battery (not included)
- Power LED

# Quick Guide

## ***How do I access the Menu?***

The Menu is displayed by holding down the *MODE* button.

## ***What is the green bar on the title screen?***

The horizontal green bar is the battery level indicator. When the title screen is first displayed, the bar will be empty. The initial battery level reading will take about two seconds. Refer to *Section 3* for more information.

## ***I only want to display the patterns that I find useful.***

You can enable/disable patterns (and animations) via the on-screen Menu. If all patterns & animations are disabled, then only the title screen will be displayed.

## ***I changed the DIP switch for resolution but nothing happened.***

Resolution change will take effect when the TPG is power-cycled. This protects you from accidentally changing the resolution, and possibly damaging the monitor circuitry.



CraftyMech

# TPG<sup>2</sup>

## CONTENTS

1. Output Header	5
2. Resolution	6
3. Battery Level	7
4. Patterns	8
5. Animations	9
6. DIP Switches	10
7. Menu	11
8. Troubleshooting	13
9. Test Cables	15

# 1 : Output Header

The output header is a 10 pin interface for connecting the TPG to a monitor chassis.

The layout from left to right is: R, G, B, GND, V, H, n/c, GND, -V, -H

It is recommended to use a test cable with a 4 position connector for R,G,B,GND and a 2 position connector for the desired sync polarity.

The H output pins may be used for composite sync. If composite sync output from the H pins is not desired, this option can be disabled from the Menu (hold down the *MODE* button).

The connector pins on the output header are .156" pitch. Although separated into two blocks of 6 and 3 pins, the output header will accept a 10 pin connector. However, it will be easier to remove connectors from the output header if they are split into smaller blocks (4 and 2 pins as recommended above).

## 2: Resolution

The TPG supports Standard Resolution (15.7khz) and Medium Resolution (24khz) modes.

The resolution is selected with position 4 of the DIP Switch, while the unit is powered off. If the resolution is changed while the power is on, the setting will take effect on the next power cycle.

Always double check the resolution switch setting before connecting the TPG to a monitor chassis. Mismatching the resolution & chassis type may result in damage to the chassis when the TPG is powered on.

### Notes on Medium resolution

- These patterns are not available: 8 Color Bars (Alternate version), RGB Crosshatch.
- These animations are not available: Trippy, Solar, Maze, and Hypno.

### 3: Battery Level

The TPG includes a built-in battery level indicator that is displayed on the (1) title screen, and (2) Menu screen. When the title screen is first displayed, it will take about two seconds for the initial battery measurement to complement.

The battery level is visualized as a horizontal bar filled with green to indicate battery health. When battery level is critical, the bar will be near empty and colored red.

The battery level will be checked periodically while the TPG is powered on. Access the Menu (by holding down the *MODE* button), to view the most recent battery reading.

The battery level is measured by checking the output of the TPG's +5v voltage regulator. As the 9volt battery capacity diminishes from use, the output of this voltage regulator will drop below the nominal +5v. Critical battery level is reached when the output of the TPG's voltage regulator drops below +4.5v. At this point operation will become unstable, and the 9volt battery must be replaced.



# 4: Patterns

The *MODE* button is used to select the test pattern to display. Pressing *MODE* will cycle through the available patterns for the chosen resolution. Holding down *MODE* will display the Menu, where patterns may be toggled ON/OFF.

When cycling through patterns using the *MODE* button, only enabled patterns will be displayed.

## PATTERN LIST

Checkerboard (Black & White)

8 Color Bars

Color Gradients (R,G,B)

Vertical Bars (R,G,B)

Horizontal Bars (R,G,B)

Solid Red

Solid Green

Solid Blue

Solid White

Horizontal Bars (Black & White)

8 Color Bars (Alternate version)

Checkerboard (4 Color)

Crosshatch w/ center dots

RGB Crosshatch



# 5: Animations

The TPG includes looping sequences for verifying operation over an extended time. They are designed to refresh the display continuously, preventing image *burn-in* that might occur with a static pattern. There are five animations included, which can be enabled/disabled via the Menu.

## ANIMATION LIST

**Trippy** - This sequence plots  $\text{Cos}(x)$  while cycling the color palette, with shrinking/expanding borders.

**Solar** - A vertical scrolling loop of a randomly generated solar flare, plotted with  $\text{Sin}(x)/x$ .

**Maze** - First made famous as a one-line code demo for the Commodore 64, this sequence is a vertically scrolling randomly generated maze.

**Hypno** - Don't stare at this animation for too long! Real-time scrolling parametric plot of  $\text{Sin}(x^2 + y^2)$ .

**Blocks** - These randomly positioned falling blocks stack up until they fill the screen.



# 6: Dip Switches

The Dip Switch bank has 4 switches. Dip switches are always in one of two states: ON or OFF. The switch numbers run from left (1) to right (4). A switch is ON, when the top of the rocker switch is depressed. A switch is OFF, when the bottom of the rocker switch is depressed.

## **Dip 1:** Red Channel

OFF: Cut Off (no signal)

ON: Red signal active

## **Dip 2:** Green Channel

OFF: Cut Off (no signal)

ON: Green signal active

## **Dip 3:** Blue Channel

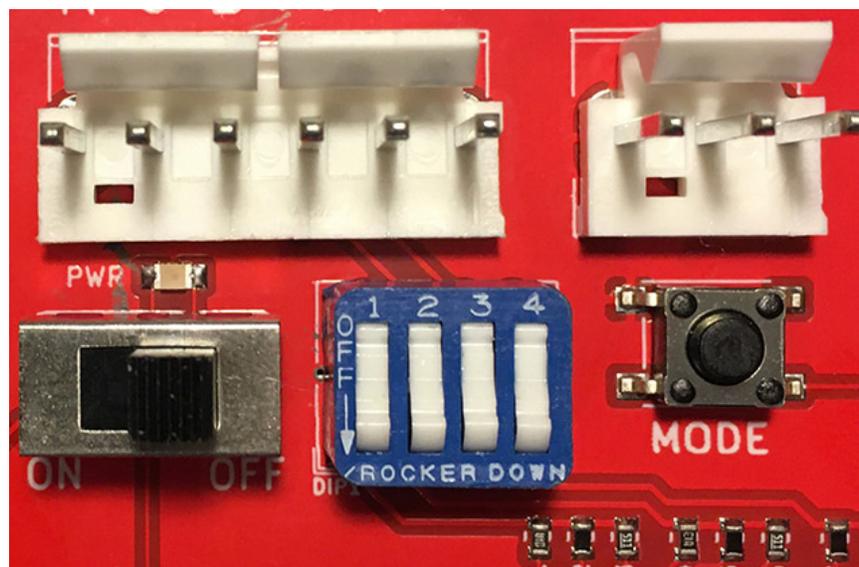
OFF: Cut Off (no signal)

ON: Blue signal active

## **Dip 4:** Resolution

OFF: Medium Res

ON: Standard Res



## 7: Menu

The on-screen Menu is activated by holding down the *MODE* button. The Menu is only supported in Standard resolution, although the settings will carry over to Medium resolution.

The *MODE* button is used to navigate the Menu options. A short press of the *MODE* button will move the cursor to the next option, while a longer press of the *MODE* button will toggle the option between Y/N.

Moving the cursor to EXIT, and holding down the *MODE* button, will exit the Menu and re-display the last selected pattern.

### BATTERY LEVEL

There is a battery level indicator at the top of the Menu screen. This horizontal bar will fill with green to indicate battery health. When battery level is critical, the bar will be near empty and colored red.

### SPECIAL FUNCTIONS

#### **Invert**

This feature will output an inverted signal compatible with Sanyo and Sharp monitors used with Nintendo arcade boards. The overscan area of the video signal is not inverted, so white borders will appear around the test patterns (outside the display area). When inverted, the title screen will have a blue & white checkerboard.

## **Sleep**

The sleep/resume feature of the TPG is designed to save battery life if the unit is accidentally left on. When enabled, the TPG will enter a low-power state after the configured time interval of no activity (pressing the *MODE* button resets the sleep timer). When the TPG is in Sleep mode, pressing the *MODE* button will resume operation by displaying the last selected pattern.

There are 4 time intervals that may be selected in the Menu: 15, 30, 45, and 60 minutes. These options are represented by values of 1 (15 minutes), 2, 3, and 4 (60 minutes). The Sleep feature may be disabled by toggling the value to N.

This function is enabled by default with a time interval of 30 minutes.

## **CSYNC**

When enabled, this function will output a signal on the H pins suitable for use as Composite Sync. If disabled (N), then both the H & V output pins must be connected to the signal header on the monitor chassis to drive the display. Disabling this function can be used to test a chassis with a fully separated H/V sync signal. This function setting does not take effect until exiting the Menu.

The Menu is always displayed with CSYNC enabled, to prevent a condition where no display results from disabling CSYNC.

This function is enabled (Y) by default.

# 8: Troubleshooting

Use the following guide to help solve issues you may encounter while using the TPG with an arcade monitor.

## **The monitor will not sync.**

- Try both sync polarity combinations. It is recommended to first use -H/-V, and if the monitor will not sync, then try +H/+V.
- Check your sync connection between the TPG and chassis to ensure that the polarity matches (-sync connected to -sync input on the chassis, +sync connected to +sync input on the chassis). Most chassis follow the standard Wells Gardner input pinout (from left to right) of: R, G, B, GND, +V, +H, n/c, -V, -H
- Some chassis will not sync properly if V is connected when being fed composite sync. If your test cable has a separate connector for sync (recommended), try turning the sync connector so just the H pin is connected.
- If you are sure the sync is connected properly between the TPG & monitor chassis, then the hold/sync pot on the chassis may need to be adjusted slightly to lock in the picture. If there are two adjustment pots on the chassis, start with vertical, then horizontal hold.

## **No picture.**

- Check that at least one of the three R,G,B Dip Switches=ON.
- Check battery voltage with a multi meter, a reading of at least +6.5v is needed for stable operation of the TPG.
- Check that the resolution DIP switch matches the monitor type you are testing (Standard or Medium resolution).

### **The TPG frequently resets back to the title screen.**

- Battery voltage is approaching the critical point ( $< +6.5\text{v}$ ), where the TPG may not work properly. Replace the 9V battery.

### **The display is too dim/bright, or the contrast is too low/high.**

Adjustment of the monitor chassis brightness/contrast pots may be needed, to better match the RGB signal levels of the TPG.

### **The TPG does not enter sleep mode if left running.**

- The sleep function must be enabled from the Menu (hold down the *MODE* button to display the Menu).

Have a question, or issue that was not covered by the troubleshooting guide? Please send an email to [support@craftymech.com](mailto:support@craftymech.com)

## 8: Test Cables

The part numbers below can be used to build your own test cable for use with the TPG. The recommended length is 6', with a pair of connectors on each end (4pin + 2pin).

The connector pinout is as follows, from left to right:

4pin: R,G,B, Ground

2pin: H,V

Using a separate 2pin connector for sync allows you to easily change sync between -H/-V, and +H/+V.

### **Molex part numbers:**

09-50-8021 Housing, 2 pin .156" x 2

09-50-8041 Housing, 4 pin .156" x 2

08-50-0134 Crimp terminal .156"

### **Online Resellers:**

[greatplainselectronics.com/products.asp?cat=86](http://greatplainselectronics.com/products.asp?cat=86)

[digikey.com](http://digikey.com)

[mouser.com](http://mouser.com)

