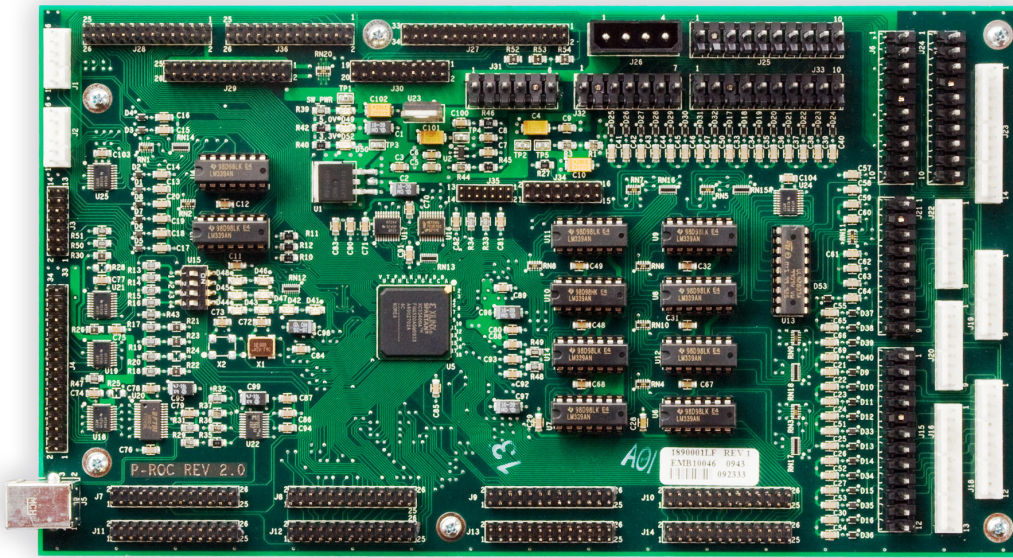# P-ROC

Pinball - Remote Operations Controller

P-ROC at a glance:

- Controls custom machines
- Controls existing machines
- 208 Drivers
- 256 Switches
- DMDs & Alphanumerics
- Auxiliary port devices
- Field upgradeable

Overview

The P-ROC is a circuit board that manages all of the hardware interfaces on a pinball machine. It interfaces directly to switch circuitry and indirectly (through traditional and/or custom driver boards) to driver circuits for control of coils, lamps, flashers, LEDs, motors, magnets, and other pinball playfield mechanisms.

The P-ROC and a processing element together provide a programmable platform for creating and running custom applications on a pinball machine. The high-level game rules run on the processing element, which could be any USB host ranging from small microcontrollers and single board computers to high-powered, state-of-the-art computers, and the P-ROC handles the real-time control of the pinball machine hardware.

Control Existing Machines

The P-ROC was designed to replace the CPU board in the following generations of pinball machines:

- WPC (WPC-alphanumeric through WPC-95)
- Stern/Sega Whitestar
- Stern SAM

Control Custom Machines

The P-ROC is ideally suited for controlling fully custom pinball machines. Along with a processing element and PinballControllers.com Driver Boards, the P-ROC provides a complete control system for custom pinball machines ranging from very simple to extremely complex.

Software

Open source software provides access to the P-ROC at levels appropriate for any application. Applications can be written in practically any language and will run on most mainstream operating systems including Windows, OS X, and Linux. The pyprocgame pinball development framework was developed to work with the P-ROC. It takes care of the game environment and common machine functions, freeing developers to concentrate on their game rules. More information available at pyprocgame.pindev.org.

Features

An on-board FPGA (field programmable gate area) provides management of the following features:

Drivers

For controlling game features such as coils, lamps, flashers, LEDs, motors, magnets, etc:

- 32 dedicated
- 176 through companion power driver boards

The P-ROC performs driver functions when requested by software.
Functions: activate/deactivate, timed pulse, schedule, and pitter-patter.

Switches

- 32 dedicated
- 16x8 matrix (16 inputs, 8 outputs)
- 64 frequency-controlled for long-range IR

All switches are scanned automatically. Switch state changes optionally result in notifying software and/or automatically initiating one or more driver functions.

DMD Controller

A dot matrix display (DMD) controller sends dot data from internal frame buffers to a DMD over a standard 14-bit ribbon cable. It supports 16 levels of dot brightness and tunable timing parameters.

Auxiliary Port

A fully programmable auxiliary port engine enables control of existing devices (alphanumeric displays, multi-segment LED displays, etc) as well as custom devices.

Upgradability

The FPGA firmware is field upgradeable allowing for future feature additions.

it's your game, make your own rules!

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