# SPUD : General purpose machine controller

## General Description

SPUD is a versatile controller that has been designed to control a variety of machines. We've packaged SPUD so the user can program it themselves or select from multiple pre-developed firmware packages. Machines where SPUD is well suited as the primary controller include:

- Industrial and commercial machinery
- Electric vehicles (cars, boats, etc)
- Wherever CAN bus, Wi-Fi, and some powerful switching is of use

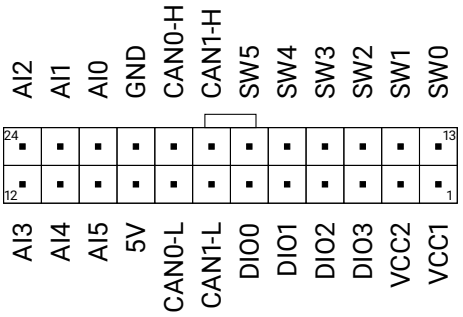


**Figure 1: Pinout diagram of connector (Minitek Pwr 4.2mm)**

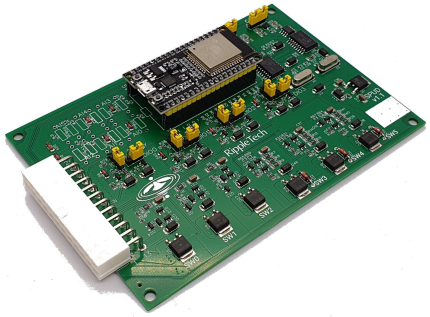

**Figure 2: SPUD circuit board (150x100 mm)**

## Hardware Features

- 6 solid state relays for DC switching and/or PWM output (3A)
- 6 analog to digital (ADC) inputs (12 bit)
- 4 digital input/output channels (5/12V)
- 2 CAN interfaces (1MB/s)
- ESP32 processor (240 MHz, 4MB flash memory, Bluetooth, WiFi)

SPUD can be customised by the user for different applications:

- The solid state relays can switch two different voltages
- The ADC input voltages can be modified by replacing the as-shipped SMD resistors with through hole resistors
- The four digital outputs can be changed to inputs by a simple jumper
- The digital output voltage can then be set by a second jumper on each DIO sub-circuit
- CAN bus termination is available via on-board jumpers
- The ESP32 processor can be programmed using standard methods (C++/MicroPython)

## Software Features

- Programmable via USB cable and standard development tools (Arduino, PlatformIO)
- Configurable via USB cable and/or WiFi
- Example code available via links in User Manual

## User manual

- Hardware configuration
- Connecting SPUD to equipment
- USB communication
- Software examples.