

**AWC**

**PicoPAK-VIII Servo  
Coprocessor  
Data Sheet**

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# Table of Contents

Overview .....	1
If You Need Help .....	2
Pin Connections .....	2
Operation .....	3
Software .....	4
Example Circuit .....	5
Other Uses for the PicoPAK-VIII .....	5
Specifications .....	6
Absolute Maximum Ratings .....	6



## Overview

The PicoPAK-VIII is a dedicated servo controller. The host computer sends one positioning pulse to the PicoPAK-VIII, and the PicoPAK repeats the pulse every 20mS to hold the servo in position. It continues to output the pulse until the host sets another pulse output. The PicoPAK-VIII can:

- Generate pulses continuously
- Use only a single line from a common host CPU
- Start with no output or a 1.5mS pulse output
- Works with Basic Stamp's PULSOUT command
- A 10uS sample rate provides 20uS resolution
- Easy to use

Like all PAKs, the PicoPAK-VIII is simple to connect to a Stamp or any microcontroller. In the simplest configuration, you only need a single pin from the host computer (or a servo receiver). In addition, you can connect a reset pin on the PicoPAK to force it to reset.

The PicoPAK-VIII is a standard 8-pin IC. In order to operate, it must have a regulated supply of 5V and connection to a clock element. The PicoPAK-VIII includes a 20MHz ceramic resonator that you can use to clock the chip. If you need more accuracy, a crystal or external oscillator may be used.

## If You Need Help

If you require assistance with your PicoPAK, please feel free to contact us. For best support, e-mail [stamp@al-williams.com](mailto:stamp@al-williams.com). However, you may also call between 9AM - 4PM Central Time at (281) 334-4341. You can also fax to (281) 754-4462. Be sure to check out our Web page for updates at [www.awce.htm](http://www.awce.htm).

**WARNING: The PicoPAK VIII is a static-sensitive, CMOS device. Observe static precautions when handling.**

## Pin Connections

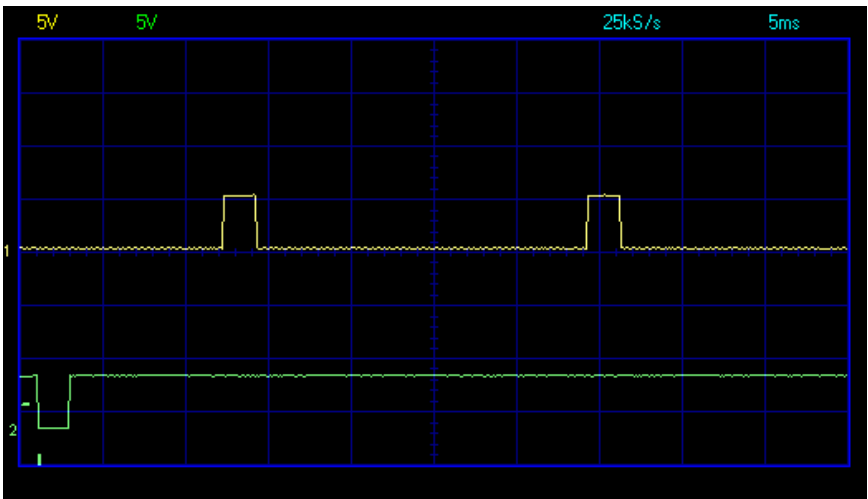
PinName	Type	Description	
1	Vdd	Power	+5V
2	RES1	Clock	Connect to resonator (20MHz max)
3	RES2	Clock	Connect to resonator (20MHz max)
4	RESET	Input	Hardware resets when low. Must be high for normal operation. May tie directly to +5V if you don't wish to reset the chip.
5	CLK/Mode	Input/Output	This pin generates a 100kHz clock (derived from the 20MHz clock). In addition, on reset if the pin is tied down to ground with a 10K resistor, the PAK will start with no output to the servo. If you omit the 10K resistor to ground (or tie the resistor to +5V instead of ground) the PAK will start by emitting a 1.5mS pulse until it receives commands from the host.
6	SERVO	Output	The output to the servo
7	CMD	Input	The input from the host microprocessor or servo reciever
8	Vss	Power	Ground

## Operation

The CMD input is the key to the PicoPAK-VIII's operation. This line is internally pulled high (high is its idle state). So long as the line remains high, the SERVO output continues its output.

When the host computer pulses the CMD line low, the PicoPAK-VIII measures the pulse (with 10uS resolution). It then duplicates this pulse (inverted) with a 20mS pause between pulses.

The figure below shows the output from the host (the bottom trace) and the output from the PicoPAK-VIII (top trace). Note there can be up to 20mS delay before the commanded pulse begins.



On reset, the PicoPAK samples the CLK/Mode pin. If the pin is pulled high (which it is by default) then the PicoPAK begins generating a 1.5mS pulse. If the pin is pulled low with a 10K resistor, the PicoPAK does not generate any pulses until commanded to do so.

## Software

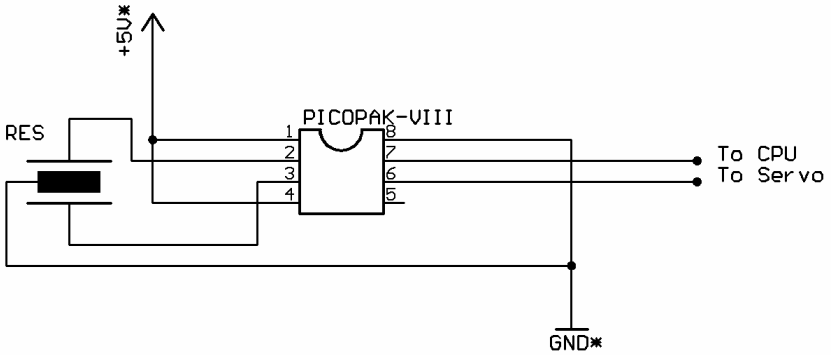
Here is a simple Basic Stamp program to control the PicoPAK-VIII:

```
'{$STAMP BS2}
'{$PBASIC 2.5}
PicoPAK pin 15
HIGH PicoPAK
PULSOUT PicoPAK,1000 ' 2uS/ count so 2mS
GOTO stopp
' Stop here, but don't let Stamp
' reset
STOPP: GOTO stopp
```

The program will produce a 2mS pulse from the PicoPAK indefinitely. Of course, in a real program instead of stopping, you'd continue on with other work while the coprocessor continues producing pulses.



## Example Circuit



### Typical Circuit

## Other Uses for the PicoPAK-VIII

You can use the PicoPAK-VIII to generate pulses for any application. The minimum reliable pulse you can generate is 20uS and the maximum is just over 2.5mS. The sample rate is 10uS which produces a resolution is 20uS, so you can generate a 20uS pulse, or a 40uS pulse, but you can't reliably generate, for example, a 33uS pulse. It is not possible to change the 20mS pause between pulses (of course, changing the resonator frequency will alter all timings proportionately).

# Specifications

## *Absolute Maximum Ratings*

Ambient temperature under bias	-40°C to +125°C
Storage temperature	-65°C to +150°C
Voltage on VDD with respect to VSS	-0.3 to +76.5V
Maximum current out of VSS pin	300 mA
Maximum current into VDD pin	250 mA
Maximum current to/from each output	25mA

## *DC Characteristics*

<b>Parameter</b>	<b>Minimum</b>	<b>Typical</b>	<b>Maximum</b>
Supply voltage	4.5	5V	5.5V
Vdd rise time on power up	.05V/ms	-	-
Supply current @ 5V/20MHz	-	5.2mA	15mA