

Kairos Autonomi 498 W. 8360 S. Sandy, Utah 84070 801-255-2950 (office) 801-907-7870 (fax) www.kairosautonomi.com

## Configure a Pronto4 to use Analog Steering Feedback

## Introduction

Normally the Pronto4 steering ring uses a quadrature encoder for position feedback. This works well in situations where the steering wheel moves only when the wheels themselves move. But in some vehicles, where the steering is hydraulic, the steering wheel can move without turning the wheels or turning the axis of the vehicle. In this case, attaching a potentiometer to the steering wheels and bringing that signal into the Pronto4 will allow for precise steering control.

## Requirements

Pronto4 with an analog steering feature installed (indicated on the Service Module's configuration sticker).

## Procedure

- 1. Attach a vehicle-specific potentiometer (most often a 10K string potentiometer) to the vehicle where its value will change in proportion to the angle of the wheels or vehicle axis.
- 2. Connect the output of the potentiometer to P206 on the Pronto4. Refer to the following table for the pinout. The cable connector is a TE 206708-1 (available from Digi-Key, Mouser, and similar suppliers).

Pin	Function
2	Analog In
5	Ground
8	+5VDC

- 3. Power on and connect to the Pronto4 (e.g., VNC from an OCU; use a Utility Breakout Board to directly connect a keyboard, mouse, and monitor).
- 4. Close out all the programs and launch "C:\GC07\dj\_svp.exe".
- 5. Move the steering wheel such that the wheels or axis of the vehicle is straight.
- 6. On the first tab (i.e. "COM10" or "SVP Coms"), select "PACKET\_DISABLE" from the dropdown menu and then click the "Send Packet" button.
- 7. Uncheck the boxes "Packet Tx" and "Packet Rx".
- 8. Note the value of the 16th field of the steering stream (see Figure 1). The value will change slightly. Note the median value. This is the "potO" value (i.e., the offset value.

Value: \_\_\_\_\_

Company Confidential © 2013, Kairos Autonomi® Scalable Autonomy™ Configure a Pronto4 to use Analog Steering Feedback v.01.00.01 Page 1 of 3 2014-06-03 / 15:49 Analog Steering Feedback Configuration 01\_00\_00\_01.doc



Kairos Autonomi 498 W. 8360 S. Sandy, Utah 84070 801-255-2950 (office) 801-907-7870 (fax) www.kairosautonomi.com

- 9. Turn the steering wheel to the left so that the wheels or vehicle axis are at their full left position. Verify the value in the 16th field changes as the wheels or vehicle axis move.
- 10. Turn the steering wheel to the right so that the wheels or vehicle axis are at their full right position. Verify the value in the 16th field changes as the wheels or vehicle axis move.
- 11. Click the "Pause READ\_VEHICLE" button. It should change to "READ\_VEHICLE paused". Data should stop streaming in the blue terminal.
- 12. In the blue terminal field, type the following:

1 potN ! 16 potD ! <value noted in step 7> potO ! 1 STEER\_SRC !

- 13. Click on the button labeled "READ\_VEHICLE paused". Data should start streaming and the button should change to "Pause READ\_VEHICLE".
- 14. On the ServoPod tab, move the steering control knob left and right. Verify that the steering moves as commanded.
- 15. If the steering motion does not move in the correct direction, go to the first tab (i.e. "COM10" or "SVP Coms") and type "-1 potN !" (without quotes) into the Packet Command Interface and then click the "Send Packet" button.
- 16. On the Servopod tab, type "90" into the commanded steering position box and press the "Enter" key. If the steering wheel does not move to 90 degrees, from the menu bar select Function->Diagnostics. On the Debug tab, change the "Steps per Degree" field to more or less than the current value and press the "Enter" key. The nominal Steps per Degree value is 16. The full range is 1-100. Initially adjust the field value in single integer values (e.g.,  $16 \rightarrow 17$ ,  $17 \rightarrow 18$ ; 16  $\rightarrow 15$ ,  $15 \rightarrow 14$ ), and modify as appropriate.
- 17. Continue to evaluate different values in the Steps per Degree field until the steering wheel moves to the 90 degree angle. If that fails to yield accurate results, change the gain value (the 1 in 1 potN !) to larger values.
- 18. Once the steering is reacting properly, type "SAVE-RAM" into the field in the Packet Command Interface and then click the "Send Packet" button.

Company Confidential © 2013, Kairos Autonomi® Scalable Autonomy™ Configure a Pronto4 to use Analog Steering Feedback v.01.00.01 Page 2 of 3 2014-06-03 / 15:49 Analog Steering Feedback Configuration 01\_00\_00\_01.doc



Kairos Autonomi 498 W. 8360 S. Sandy, Utah 84070 801-255-2950 (office) 801-907-7870 (fax) www.kairosautonomi.com

BULLETIN BULL-005

🛋 djServoPod , Version 2.10.18	
File Function	
SVP Com ServoPod External RC Control Skid Steer Other	
Filename: D:\svp_pronto4_19_RV-SV-BRAKE-THROTTLE.txt	сом 1
ок Read_vehicle [ 2952 2536 1 0 0 128 2 1 2 4 0 0 0 20592 20808 3200 0 0 0 0 0 0	115200,n.8,1
ок READ_VEHICLE [ 2920 2528 1 0 0 128 2 1 2 4 0 0 0 20048 20952 3320 0 0 0 0 0 (	Open RTS Close DTR
ок READ_VEHICLE [ 2864 2576 1 0 0 128 2 1 2 4 0 0 0 20536 20384 <mark>3296</mark> 0 0 0 0 0 0 (	H: 80
οκ READ_VEHICLE [ 2904 2416 1 0 0 128 2 1 2 4 0 0 0 20656 20784 3280 0 0 0 0 0 0 (	Clear V: 25
Ј ок Read_vehicle [ 2936 2552 1 0 0 128 2 1 2 4 0 0 0 18952 19728 3192 0 0 0 0 0 0 (	Pause Comms
ок READ_VEHICLE [ 2872 2576 1 0 0 128 2 1 2 4 0 0 0 20376 19728 3280 0 0 0 0 0 0 (	Edit Forth File
J OK Read_vehicle [ 2872 2512 1 0 0 128 2 1 2 4 0 0 0 20976 20848 3304 0 0 0 0 0 0 (	Load Forth File
ο <sub>χ</sub> READ_VEHICLE [ 2928 2576 1 0 0 128 2 1	Paste Clipboard
- Redict Connect Holders	READ_VEHICLE
Packet Command Interface     Tx A:   PACKET_DISABLE     Bx:   PACKET_DISABLE	Packet Tx Packet Rx
Messages     00000 17:25:16 09:17-2013: ServoPod Readyl     Clear     Save       00001 17:25:16 09:17-2013: ServoPod Rebooted     Save     Save     Save	FIFO Count

Figure 1: The 16<sup>th</sup> Field of the Serial Stream

Company Confidential © 2013, Kairos Autonomi® Scalable Autonomy™ Configure a Pronto4 to use Analog Steering Feedback v.01.00.01 Page 3 of 3 2014-06-03 / 15:49 Analog Steering Feedback Configuration 01\_00\_00\_01.doc