

APPLICATION NOTE 801

PACIFIC SCIENTIFIC, 110 FORDHAM ROAD, WILMINGTON, MA 01887

PC830 Servo Drive and Motors with a Comcoder (Hall/Encoder)

Note: This application note applies to PC830 firmware version 1.90 and higher.

Introduction

The PC830 Servo drive can commute a motor containing the following feedback devices:

- Resolver
- Incremental Encoder
- Comcoder (Hall/Encoder)

This application note explains how to configure the PC830 to work with a motor containing a Comcoder (Hall/Encoder). It describes how to wire and configure the PC830 to work with Pacific Scientific's R, S and PMA motors as well as Non-Pacific Scientific motors.

Pacific Scientific Motor with a Comcoder (Hall/Encoder)

Pacific Scientific Cables

The following table lists the standard motor feedback cables available from Pacific Scientific.

	Regal (R) Series	Sentry (S) Series	PMA Series
Motor Feedback Cable	PFC-04-03-01-LLL* (MS Connector)	PFC-04-03-01-LLL* (MS Connector)	PFC-02-03-01-LLL* (Interconnectron Connector)

* LLL denotes the cable length in feet. These cable part numbers are based upon the standard (not flexible) cable option.



**Building your
own cable**

The following table lists the pinout for motor power and feedback cables for the R, S, or PMA series motors from Pacific Scientific. Please build your cable accordingly.

PC830	R and S Motors	PMA Motors
TB1-10	GND	GND
TB1-11	Phase R	Phase U
TB1-12	Phase S	Phase V
TB1-13	Phase T	Phase W
J3-1	Sensor 1	Sensor W
J3-2	Sensor 2	Sensor U
J3-3	Sensor 3	Sensor V
J3-8	PTC	PTC
J3-9	PTC RTN	PTC RTN
J3-10	Encoder Power and/or Hall Power	Encoder Power and/or Hall Power
J3-11	Encoder Power RTN and/or Hall Power RTN	Encoder Power RTN and/or Hall Power RTN
J3-12	A-	A-
J3-13	A+	A+
J3-14	B+	B+
J3-15	B-	B-

Note: If connecting a PMA series motor with a Comcoder (Hall/Encoder), **DO NOT** connect Hall sensor leads U, V, and W. Leave them floating and UNCONNECTED.

Procedure

Please follow the steps listed below to configure the PC830:

1. Connect motor and feedback cables to the motor and the PC830.
2. Configure the drive/motor combination using 830Tools.
3. Click on the **Feedback** tab and select **Comcoder (Hall/Encoder)** as the commutation source. Enter the correct incremental encoder line count.

The screenshot shows the 830Tools software window with the title bar "<no name assigned yet>". The window displays the following information:

- Drive: 833
- Motor: PMA22B
- Mode: Position Mode -- Predefined Moves

The "Feedback" tab is selected, showing the following configuration options:

- Commutation Source: Comcoder (Hall/Encoder) (selected from a dropdown menu)
- Feedback Mode: Closes position and velocity loops around the encoder
- Encoder Line Count: 1024 (entered in a text box) lines

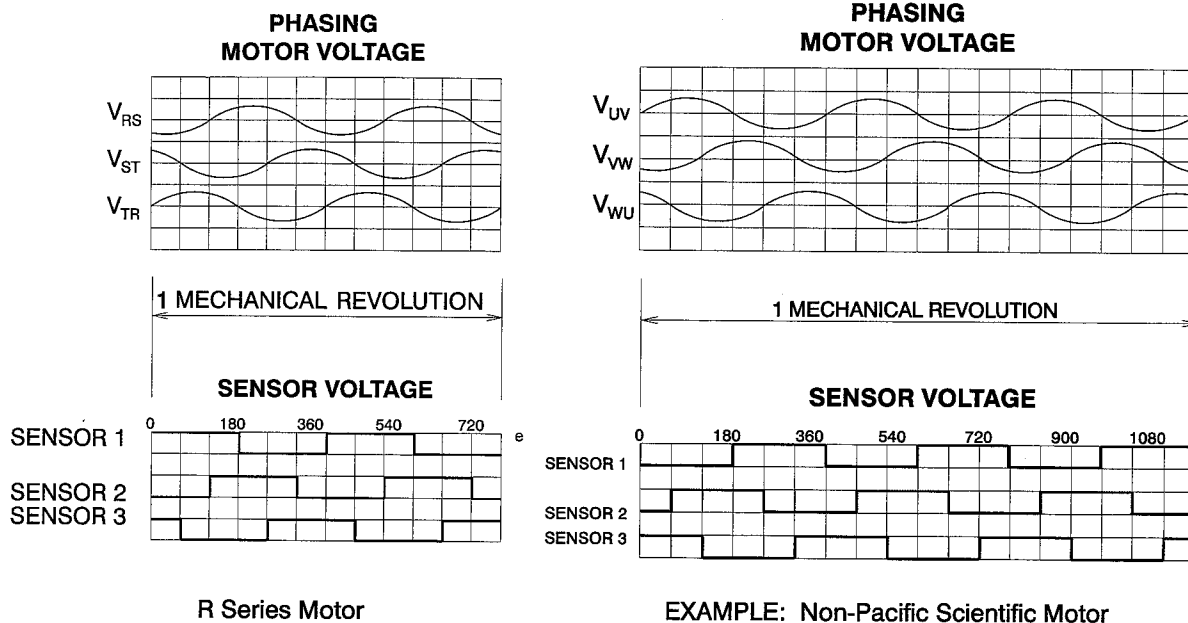
At the bottom of the window, there are three buttons: "<< Back", "Next >>", and "Help".

4. Download the configuration to the drive.
5. Save the configuration to Non-volatile (NV) memory.
6. The motor should now be ready to go.

Non-Pacific Scientific Motor with a Comcoder (Hall/Encoder)

The PC830 was designed to work with Hall sensors using the R, S, and PMA series motors' Hall configuration as the standard. A motor voltage phasing diagram and a Hall sensor phasing diagram for an R series motor and a non-Pacific Scientific motor are shown below. It is necessary to connect the motor power and Hall sensor feedback so that the Non-Pacific Scientific motor phasing diagrams (motor voltage phasing and Hall sensor phasing) exactly matches the R series motor phasing configuration. This section will describe in detail the necessary steps that MUST be performed in order to configure a Non-Pacific Scientific motor with a Comcoder (Hall/Encoder) and a PC830.

Motor Phasing Diagrams



Procedure

1. Obtain the motor voltage phasing diagram and Hall sensor phasing diagram for your specific motor.
2. Compare the motor voltage phasing sequence between the Non-Pacific Scientific motor and the R series motor voltage phasing diagram. It is necessary to have the motor voltage phasing consistent between the two motors so the proper phasing sequence can be achieved.

From the motor voltage phasing diagrams it can be seen that the following relationships will apply:

V_{RS} (R series motor) corresponds to V_{VW} (Non-PacSci motor)
 V_{ST} (R series motor) corresponds to V_{WU} (Non-PacSci motor)
 V_{TR} (R series motor) corresponds to V_{UV} (Non-PacSci motor)

**Procedure
(cont'd)**

3. Wire up the Non-Pacific Scientific motor power leads to the PC830 as follows:

R series motor	Non-Pacific Scientific motor	PC830 Wiring
V _{RS}	V _{VW}	Phase U (TB1-11)
V _{ST}	V _{WU}	Phase V (TB1-12)
V _{TR}	V _{UV}	Phase W (TB1-13)

4. Compare and match the Hall sensor phasing sequence for the Non-Pacific Scientific motor with the standard R series Hall sensor phasing sequence.

The following relationships can be seen by comparing the two Hall sensor phasing sequence diagrams:

Sensor 1 (R series motor) corresponds to Sensor 2 (Non-PacSci motor)

Sensor 2 (R series motor) corresponds to Sensor 1 (Non-PacSci motor)

Sensor 3 (R series motor) corresponds to Sensor 3 (Non-PacSci motor)

The only difference between the diagrams is the Non-Pacific Scientific motor Hall sensor phasing sequence is 60 degrees out of phase with respect to the standard R series Hall sensor phasing.

5. Wire up the Non-Pacific Scientific motor Hall sensor leads to the PC830 as follows:

R series motor	Non-Pacific Scientific motor	PC830 Wiring
Sensor 1	Sensor 2	Hall 1 (J3-1)
Sensor 2	Sensor 1	Hall 2 (J3-2)
Sensor 3	Sensor 3	Hall 3 (J3-3)

Application Note 805

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Wiring Table for a PacSci Servo Motor to the PC830 Servo Drive

Introduction

This application note explains how to interface the PC830 to work with a PacSci servo motor containing a resolver or a comcoder (hall/encoder). This note applies to the standard R, S, F, PMA, and PMB Servo Motor family.

Building Your Own Cable

The following table lists the respective servo motor labels for power and feedback connections to their respective PC830 pin/label location. Please build your cables accordingly. Motor connector "pinout" labeling information can be obtained from the *High Performance Servo Motors* catalog (dated after April 2001) which is located at <http://www.pacsci.com>.

PC830	R, S, F (with hall/encoder)	PMA (with comcoder)	PMB (with comcoder)	All PacSci Motors with Resolvers
TB1-10 (GND)	GND	GND	GND	GND
TB1-11 (U)	Phase R	Phase U	Phase U	Phase U
TB1-12 (V)	Phase S	Phase V	Phase V	Phase V
TB1-13 (W)	Phase T	Phase W	Phase W	Phase W
J3-1 (Hall 1/S1)	Hall Sensor 1	Sensor W	Hall 1	S1
J3-2 (Hall 2/S3)	Hall Sensor 2	Sensor U	Hall 2	S3
J3-3 (Hall 3/S2)	Hall Sensor 3	Sensor V	Hall 3	S2
J3-4 (S4)				S4
J3-6 (R1)				R1
J3-7 (R2)				R2
J3-8 (PTC)	PTC	PTC	PTC	PTC
J3-9 (PTC Rtn)	PTC Rtn	PTC Rtn	PTC Rtn	PTC Rtn
J3-10 (+5v)	Encoder/Hall Power	Encoder/Hall Power	Encoder/Hall Power	
J3-11 (+5v Rtn)	Encoder/Hall Power Rtn	Encoder/Hall Power Rtn	Encoder/Hall Power Rtn	
J3-12 (A+)	A-	A-	A-	
J3-13 (A-)	A+	A+	A+	
J3-14 (B+)	B+	B+	B+	
J3-15 (B-)	B-	B-	B-	

- Note 1: Motor power cable outer braided shield should be terminated at the drive's power connector ground pin.
- Note 2: Motor feedback cable's are individually shielded twisted pair with an overall outer braided shield. Terminate outer braided shield to motor connector case. Terminate individual foil shields at the drive's feedback connector ground pin.
- Note 3: This note implies motors that have serial numbers (datecodes) greater than 0136XXXXX.